



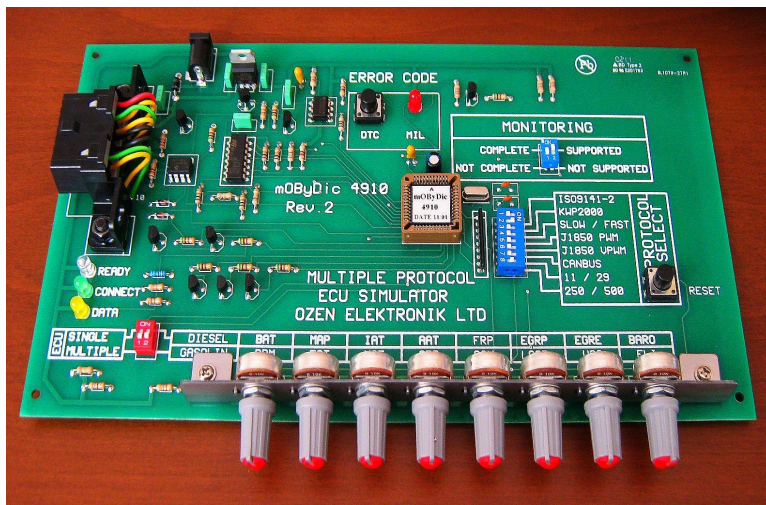
Features

- Simulates a single or 4 different ECU's (PCM,TCM,HEC,ABS)
- Selectable protocol via dip switch
- Selectable Gasoline / Diesel PID's
- Advanced monitoring / Readiness functions
- Generates DTC for each ECU separately
- Variable PID with 8 potentiometers
- VIN value
- Simulates ISO9141-2 , KWP2000 , J1850 PWM , J1850 VPWM , CAN
- SAE-J1979 / ISO15031-5 compatible
- Multiframe / Multimessages operation
- 12 VDC Power Adapter

ÖZEN
ELEKTRONIK

Multiple Protocol OBD
ECU Simulator according
to SAE J1979 and to ISO
15031-5

mOByDic 4910



PCM : Powertrain Control Modul
TCM : Transmission Control Modul
ABS : Antilock Braking System
HEC : Cluster Panel Modul



1. General

After power on a LED test sequence is running then the LED ready lites on and the simulator is ready. The LED connect lites on when a connection with selected protocol is done succesfully. The MIL LED blinks when no protocol is selected. The yellow data LED indicates the communication between the ECU Simulator and the OBD tester. By pressing the DTC button the MIL LED is on and the DTC's are generated.



2. Dipswitchs and Buttons

2.1 Protocol Select

Selects the desired protocol . After selecting protocol , the user must press on the reset button to reinitialize the simulator . When more than 1 protocol is selected the priority is from top to bottom (ISO9141-2 has highest priority).

2.2 Gasoline / Diesel Select

Selects the desired engine and the corresponding PID set . This function can be changed without doing a restart . If the user doesnt take care to Service 1 PID 0 bits. (implemented PID) all 16 PID values can respond to service 1 query.

2.3 Single / Multiple ECU Select

Selects the number of ECU's . This function can be changed without doing a restart . If single is selected only PCM is responding while on multiple all 4 ECU's are responding to OBD queries.

2.4 Monitoring / Readiness Select

Selects the Monitoring supported and Monitoring complet / not complet for PCM affect all monitoring bits simultanously. Active only in PCM ECU

2.5 Reset Button

When pressed a hardware reset is done . It is mostly used after selecting / reselecting protocol .

2.6 DTC Button

It is used to generate DTC's. Visualised by MIL LED.



3. Services

In the 4910 services 1 , 2 , 3 , 4 and 9 are implemented.

3.1 Service 1

The purpose of this service is to allow access to current emission-related data values, including analogue inputs and outputs, digital inputs and outputs, and system status information. The request for information includes a parameter identification (PID) value that indicates to the on-board system the specific information requested

PID \$00 is a bit-encoded PID that indicates, for each ECU, which PIDs that ECU supports. PID \$00 is supported by all ECUs that respond to a service \$01 request, because the external test equipment that conforms to ISO 15031-4 use the presence of a response message by the vehicle to this request message to determine which protocol is supported for diagnostic communications.

3.1.1 PCM (Powertrain ECU)

Implemented PID's are :

If gasoline is selected

RPM , LOAD , VSS , FLI , ECT , MAF , APP , O2V

If diesel is selected

BAT , MAP , IAT , AAT , FRP , EGRP , EGRE , BARO

Common PIDs for both selection

RUNTM = Software Version of Simulator

OBDSUP = EOBD

3.1.2 TCM (Automatic Transmission ECU)

Only VSS is implemented

3.1.3 ABS (ABS ECU)

Not intended to be OBD compliant

3.1.4 HEC (Cluster Panel ECU)

VSS , RPM , ECT , FLI , BAT



3.2 Service 2

The purpose of this service is to allow access to emission-related data values in a freeze frame. This allows expansion to meet manufacturer specific requirements not necessarily related to the required freeze frame, and not necessarily containing the same data values as the required freeze frame. The request message includes a parameter identification (PID) value that indicates to the on-board system the specific information requested. PID specifications, scaling information, and display formats for the freeze frame are same as in Service 1. The ECU(s) will respond to this message by transmitting the requested data value stored by the system. All data values returned for sensor readings will be actual stored readings, not default or substitute values used by the system because of a fault with that sensor.

Not all PIDs are applicable or supported by all systems. PID \$00 is a bit-encoded PID that indicates, for each ECU, which PIDs that ECU supports. Therefore, PID \$00 is supported by all ECUs that respond to a service \$02 request as specified even if the ECU does not have a freeze frame stored at the time of the request. PID \$02 indicates the DTC that caused the freeze frame data to be stored. The frame number byte will indicate \$00 for the mandated freeze frame data..

3.2.1 PCM (Powertrain ECU)

If the DTC button is pressed P0100 cause a freeze frame storage as follow :

PID	Description	Stored Value
05	Engine Coolant Temp.	40
0C	Engine RPM	2345 1/min
0D	Vehicle Speed Sensor	67

3.2.2 TCM (Automatic Transmission ECU)

Not implemented for this ECU

3.2.3 ABS (ABS ECU)

Not implemented for this ECU

3.2.4 HEC (Cluster Panel ECU)

Not implemented for this ECU



3.3 Service 3

The purpose of this service is to enable the external test equipment to obtain emission-related DTC's. This is a two step process for the external test equipment.

Step 1 - Send a service \$01, PID \$01 request to get the number of emission-related DTC's from all ECU's that have this available. Each ECU that has a DTC(s) stored will respond with a message that includes the number of stored codes to be reported. If an ECU is capable of storing emission-related DTC's does not have stored DTC's, then that ECU responds with a message indicating zero DTC's are stored.

Step 2 - Send a service \$03 request for all emission-related DTC's. Each ECU that has DTC's will respond with one or more messages, each containing up to three (3) DTC's. If no emission-related DTC's are stored in the ECU, then the ECU may not respond to this request.

DTC's are transmitted in two (2) bytes of information for each DTC. The first two (2) bits (high order) of the first (1) byte for each DTC indicate whether the DTC is a Powertrain, Chassis, Body, or Network DTC. The second two (2) bits will indicate the first (1) digit of the DTC (0 through 3). The second (2) nibble of the first (1) byte and the entire second (2) byte are the next three (3) hexadecimal characters of the actual DTC reported hexadecimal

If less than three (3) DTC's are reported, the response message used to report DTC's shall have their unused bytes set to zero to maintain the required fixed message length for all messages. If there are no DTC's to report, a response message is allowed, but not required for SAE J1850 and ISO 9141-2 interfaces. For ISO 14230-4 interfaces, the ECU will respond with a report containing no DTC's (DTC#1, DTC#2, and DTC#3 shall be all set to \$00).

3.3.1 PCM (Powertrain ECU)

Generates P0100 , P0101 , P0102

3.3.2 TCM (Automatic Transmission ECU)

Generates B0200 , B0201

3.3.3 ABS (ABS ECU)

Generates C0300

3.3.4 HEC (Cluster Panel ECU)

Generates U0400



3.4 Service 4

The purpose of this service is to provide a means for the external test equipment to command ECU's to clear all emission-related diagnostic information. This includes:

- Number of diagnostic trouble codes (can be read with Service \$01, PID \$01)
- Diagnostic trouble codes (can be read with Service \$03)
- Trouble code for freeze frame data (can be read with Service \$02, PID \$02)
- Freeze frame data (can be read with Service \$02)
- Oxygen sensor test data (can be read with Service \$05)
- Status of system monitoring tests (can be read with Service \$01, PID \$01)
- On-board monitoring test results (can be read with Services \$06 and \$07)
- Distance travelled while MIL is activated (can be read with Service \$01, PID \$21)

3.4.1 PCM (Powertrain ECU)

Deletes P0100 , P0101 , P0102

3.4.2 TCM (Automatic Transmission ECU)

Deletes B0200 , B0201

3.4.3 ABS (ABS ECU)

Deletes C0300

3.4.4 HEC (Cluster Panel ECU)

Deletes U0400



3.5 Service 9

The purpose of this service is to enable the external test equipment to request vehicle specific vehicle information such as Vehicle Identification Number (VIN) and Calibration ID's. Some of this information may be required by regulations and some may be desirable to be reported in a standard format if supported by the vehicle manufacturer.

An optional feature of this service is for the ECU to indicate which INFOTYPE's are supported INFOTYPE \$00 is a bit-encoded value that indicates support for INFOTYPEs from \$01 to \$20. INFOTYPE \$20 indicates support for INFOTYPE's \$21 through \$40, etc. This is the same concept as used for PID support in services \$01 and \$02

3.5.1 PCM (Powertrain ECU)

VIN = OZEN MUL- PRO v1.0

3.5.2 TCM (Automatic Transmission ECU)

No VIN is implemented

3.5.3 ABS (ABS ECU)

No VIN is implemented

3.5.4 HEC (Cluster Panel ECU)

No VIN is implemented