**Mx-PLT™ CAN/LIN Physical Layer Tester**

MX-PLT is a CAN/LIN physical layer test solution that integrates seamlessly with Danlaw's Mx-Suite embedded software test environment. The cost-effective desktop solution automatically performs tests based on OEM conformance specifications, which reduces test time and operational costs as compared with traditional manual testing. By using a trusted tool that conforms to standard test methods and reporting formats, components are quickly qualified for production release.

Mx-PLT is a modular system for measuring CAN/LIN devices with three main hardware components: the Danlaw Mx-PLT module, the PicoScope 5243A, and the Danlaw Ground Offset Battery Simulator module. The Mx-Suite software coordinates the operations of the Mx-PLT, providing a library of standardized conformance test cases.

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**Benefits**

- Automatic testing saves time (weeks reduced to a few hours)
- Pre-configured and calibrated system
- Generates reports in OEM-standard formats
- Quick turn-around time to detect and fix issues prior to manufacturing

**Features**

- Comprehensive physical layer test system for CAN (high speed, medium speed, fault tolerant, single-wire) and LIN (master, slave, master/slave)
- Tests include normal usage, abnormal power perturbations, and network stress conditions, including invalid bit insertion
- Built-in Self-test (BIST) for power supply, network bus loads, and oscilloscope
- Includes measurement equipment, electronic impedance switching, power supply with crank simulation and ground offset, and harnesses (with pigtails for your ECU connection)
- Mx-PLT transform connectors for Mx-Suite software included

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**Communication Bus Specifications**

**CAN Physical Layer Complaince Testing**

- General Motors: GMW14241 sections 1-3
- Fiat Chrysler Automobiles: 7-Z0140, 7-Z0146, 7-Z0166
- Toyota: TSC7222G
- Nissan: 25953NDS36

**LIN Physical Layer Complaince Testing**

- SAE J2602/2 (Layer 1)
- Ford: 000601.101.AA
**Mx-PLT™ CAN/LIN Physical Layer Tester**

**Mx-PLT Conformance Library of Test Cases**

**CAN - DWHS / DWMS**

(Dual Wire High/Medium Speed)

- (+) Ground Offset/Line Capacitance Sensitivity
- (-) Ground Offset/Line Capacitance Sensitivity
- Behavior during Crank
- CAN Circuit Shorts
- CAN Wires Shorted to -Ground, Supply
- CAN-HI BATTERY SHORT with Power-On RESET
- CAN-HI GROUND SHORT with Power-On RESET
- CAN-HI TO CAN-LO SHORT with Power-On RESET
- CAN-LO BATTERY SHORT with Power-On RESET
- CAN-LO GROUND SHORT with Power-On RESET
- Power-Up or Reset for ECU not implement CAN
- Wake-up Device Capacitance, Input Capacitance
- Dominant Input Threshold
- Dominant Output, Output Voltage Levels
- Ground Loss - on another ECU, on the ECU Under Test
- High Voltage Sensitivity
- Internal Differential Resistor, Resistance
- Internal Resistance of CANH and CANL
- Interruption of CAN Wires
- Local Wake-up
- Loss of - Ground, Supply
- Low Voltage Sensitivity
- Operation at Min Power Supply Voltage
- Open Circuit on CANL Open Circuit on CANH
- Operation at Max Power Supply Voltage
- Min and Max Supply Voltage Level for Bus
- Communication Output Voltage Levels after Failure
- Modes Tests - Dom, Rec Current Consumption Test
- Recessive Input Threshold
- Recessive Output Voltage Levels
- Recessive Output Short Between CANH and CANL
- Short Circuit Between CANH and CANL
- Short Circuit Between CANH and CANL
- Short Circuit Between CANH and Ground
- Short Circuit Between CANL and Ground
- Short Circuit Between CANL and -Vbat
- Signal Characteristics (Asymmetric Load), (Symmetric Load)
- Signal Rise/Fall Times
- Supply +Vbat Loss on the ECU Under Test
- Test Immunity to Potential Ground Offsets
- Tolerance of Bit Timing
- Tolerance to Baud Rate Variation
- Transceiver Slope Control
- Transmitted Waveform Measurement
- Wake Up by CAN

**CAN - DWLSFT**

(Dual Wire Low Speed Fault Tolerant)

- Bit Rising Edge and Falling Edge Times
- Engine Cranking Power Voltage Curve
- CANH and CANL Internal Resistance
- Dominant Signal Voltage Levels
- Bit Time Precision During Message Transmission
- Ground Potential Deviation Immunity Test - Anomalies
- Ground Potential Deviation Immunity Test - No Anomalies Min and Max Power Level for Communication via bus Node Anomaly Tolerance Test - CAN Wire Open Circuit Node Anomaly Tolerance Test - CAN Wire Short Circuit Node Anomaly Tolerance Test - Short Circuit to Power Recessive Signal Voltage Levels
- Signals Features (Symmetry)

**CAN - Communication Enable**

- Comm En Line In Input Threshold / Threshold Hysteresis
- Comm En Line In Successful Wakeup Detection
- Comm En Line In Wakeup Filter Function
- Continuous Wake Out Continuous High Level Output
- Continuous Wake Out High Level Output Voltage
- Continuous Wake Out Low Level Output Voltage
- Continuous Wake Out Short Circuit Output Current
- Comm En In Comm En Shorted - to Gnd, to Battery
- Comm En In Loss of - Gnd Connection, Power Supply
- Comm En Out Comm En Shorted - to Battery, to GND
- Comm En Out Loss of - Gnd Connection, Power Supply
- Comm En Pulsed Wake In Successful Wakeup Detection
- Comm En Pulsed Wake In Wakeup Filter Function
- Comm En Pulsed Wake Out High Level Output Voltage
- Comm En Pulsed Wake Out Low Level Output Voltage
- Comm En Pulsed Wake Out Short Circuit Output Current
- Comm En Pulsed Wake Out Wake Up Pulse Length

**CAN - SWLS**

(Single Wire Low Speed)

- Behavior during Crank
- Bus Dominant Output Voltage Level
- Bus Recessive or Passive State Low Voltage
- Bus Shorted to Battery/Ground
- Device Capacitance/Resistance
- Input Threshold HVWU/Normal Mode
- Loss of Ground Connection
- Loss of Power Supply
- Min and Max Supply Voltage Level for Bus Comm
- Signal Characteristics
- Signal Rise/Fall Time
- Temporary Loss of Power Supply
- Test Immunity to Battery Offsets
- Test Immunity to Ground Potential Offsets

**LIN**

- Battery Offset Voltage
- Bus Wiring Short to Ground Master / Slave
- Master Node Termination Resistance
- ECU Power Loss - Master / Slave
- Ground Offset Voltage
- Loss of ECU Ground at Master or Slave Node
- Master and Slave Node ECU Time Constant and Cap Meas Master Node Bit Time Meas
- Bus Writing Short to Battery Device with TxD/RxD Not Acc
- Master Node Tr-d max and Td-r max Measurement
- Mstr/SI Node VII Level Meas and Input Thresh Hysteresis
- Vih-Vil Master Node Vin Level Meas
- Master Node Voh and Vol Levels Meas
- Op Range Norm Batt Volt-Mstr/SI Device with TxD/RxD Not Acc
- Op Range Over Volt-Mstr/SI Device with TxD/RxD Not Acc
- Op Range Under Volt-Mstr/SI Device with TxD/RxD Not Acc
- Sample Timing Slave Node Sample Pt Fixed Clock Max/Min Bit Sample Timing Slave Node Slave Node Bit Time Meas - Autoauding
- Slave Node Bit Time Meas - Fixed Clock Slave Node Slave Node Numeur Resiitance
- Slave Node Tr-d max and Td-r max Meas
- Slave Node VII Level Meas and Input Thresh Hysteresis
- Vih-Vil Slave Node Vin Level Meas, Slave Node Voh Vol Levels Meas
Mx-PLT™ CAN/LIN Physical Layer Tester

Product Features

Mx-PLT Module
For control, communications, and bus loading.

<table>
<thead>
<tr>
<th>Features</th>
<th>CAN (ISO 11898 - dual wire and fault tolerant, J2411 - single wire); LIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus Types</td>
<td></td>
</tr>
<tr>
<td>PC Interface</td>
<td>USB 2.0 (USB 1.1 compatible)</td>
</tr>
<tr>
<td>Operating Temp. Range</td>
<td>0º C to 45º C</td>
</tr>
<tr>
<td>Humidity</td>
<td>5 to 80% RH, non-condensing</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>100-230V @1A</td>
</tr>
</tbody>
</table>

Ground Offset Battery Simulator Module
For ECU power, to create stressing voltages, offset voltages, and cranking waveforms required by tests.

<table>
<thead>
<tr>
<th>Features</th>
<th>0 - 29V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volt</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>6A continuous; 20A peak (&lt;1 sec)</td>
</tr>
<tr>
<td>Offset Voltage Range</td>
<td>0 - +/- 4.5V</td>
</tr>
<tr>
<td>Resolution</td>
<td>9mV</td>
</tr>
<tr>
<td>Accuracy</td>
<td>1%</td>
</tr>
<tr>
<td>Slew Rate</td>
<td>&lt;1 ms for the range</td>
</tr>
<tr>
<td>PC Interface</td>
<td>USB 2.0 (USB 1.1 compatible)</td>
</tr>
</tbody>
</table>

PicoScope 5243A
For measurements and capture of waveforms.

<table>
<thead>
<tr>
<th>Features</th>
<th>100 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth</td>
<td></td>
</tr>
<tr>
<td>Vertical Resolution</td>
<td>12 bits</td>
</tr>
<tr>
<td>DC Accuracy</td>
<td>+/- 1%</td>
</tr>
<tr>
<td>Maximum Sampling Rate</td>
<td>13 MS/s streaming; 125 MS/s one shot</td>
</tr>
<tr>
<td>PC Interface</td>
<td>USB 2.0 (USB 1.1 compatible)</td>
</tr>
</tbody>
</table>

About Danlaw

We are a global leader in connected car and automotive electronics. Our people live, breathe, and create innovative tech for some of the world’s largest car makers. Thirty years ago, we designed software for the first 8-bit Electronic Engine Control module, and today, we continue to develop forward-looking technologies. We focus our efforts on R&D to stay ahead of rapidly changing industry needs in an increasingly connected world. Danlaw is known for ground-breaking tech, efficient development, and adaptive solutions for dynamic environments. Our world-class connected vehicle solutions make Danlaw one of the largest suppliers of connected products, tools, and services in the world.