The JT 5112 MIOS module is a multi-function JTAG controlled I/O system instrument. It features 64 mixed signal I/O channels plus custom programmable functions. This compact unit was designed for easy integration into fixtures or bench use, making it ideal for production testing or as an everyday board debug tool.

The I/O channels allow measurement of both digital and analog signals. With the MIOS connectors and/or test points of a Unit Under Test (UUT) can be measured and driven as part of a JTAG/Boundary-scan test. By utilising the mixed signal I/O channels of a JT 5112 users enjoy increased test coverage for both the digital and the analog parts of a UUT.

From the total of 64 I/O channels, up to eight can be selected as analog channels that can measure or source voltages up to 30 Volts (unipolar) or ± 15 Volts (bipolar). The remaining 56 channels are digital only. Of these digital channels 16 also have a frequency counter, 1 can be used as a programmable clock generator and 1 more can be used for pulse width measurements. For higher channel counts multiple MIOS modules can be 'daisy-chained' via the TAP-IN, TAP-OUT connectors.

In addition to their use as boundary-scan I/O signals, the I/O channels can also be controlled via application specific digital functions that can be programmed in the reconfigurable FPGA (Altera Cyclone type) of the JT 5112. Examples of such functions include CAN bus (excl Phy), E-net (excl Phy), SPI, DDR memory interfaces etc.

The unit is fully supported by JTAG Technologies application development tools [ProVision and JTAG Live] and run-time software options such as PIP/LV [drivers for NI LabView], PIP/TS [drivers for TestStand], etc.

### Key features

**IO system for existing controllers**
- 64 I/O channels in total
- 56 digital
  - 16 with frequency counter;
  - 1 with programmable clock generator;
  - 1 with pulse width measurement
- 8 digital or analog, programmable per channel
- Custom programmable FPGA

### Voltage levels

<table>
<thead>
<tr>
<th>Type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAPs:</td>
<td>Standard 3.3V (programmable 1.05 to 3.6V; 5V tolerant)</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>1.05 to 3.6V; 5V tolerant</td>
</tr>
<tr>
<td>Analog I/O</td>
<td>0 to 30V or -15 to +15V</td>
</tr>
</tbody>
</table>

We are boundary-scan.
## JT 5112 - MIOS (MIXED-SIGNAL IO SCAN) MODULE

IO System with digital, analog and frequency measurement

### ELECTRICAL

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>From USB: 5 V, 500 mA</td>
</tr>
<tr>
<td></td>
<td>External: 9-15 V, 0.8 A</td>
</tr>
<tr>
<td>Speed</td>
<td>480 Mbps (non-isolated), 12 Mbps (isolated)</td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td>400 VAC</td>
</tr>
<tr>
<td>TCK</td>
<td>1 kHz to 15 MHz</td>
</tr>
<tr>
<td>Voltage range</td>
<td>1.05 V to 3.6 V (5 V tolerant)</td>
</tr>
<tr>
<td>Threshold</td>
<td>$\Omega$ 50% of selected voltage</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>Rated range of use: 0 °C to 60 °C (boxed), 0 °C to 70 °C (unboxed)</td>
</tr>
<tr>
<td>Voltage range</td>
<td>1.05 V to 3.6 V</td>
</tr>
<tr>
<td>Output current</td>
<td>max ±8 mA @ 3.3 V</td>
</tr>
<tr>
<td>Analog I/O</td>
<td>Operating: 15% to 90% non-condensing</td>
</tr>
<tr>
<td>Voltage range</td>
<td>0 V to 30 V or -15 V to +15 V @ 0.5 mA max</td>
</tr>
<tr>
<td>Resolution</td>
<td>16 bit (0.5 mV)</td>
</tr>
<tr>
<td>Relative fault</td>
<td>± 0.7% full scale</td>
</tr>
<tr>
<td>Input impedance</td>
<td>1 Mohm parallel with 100 pF</td>
</tr>
</tbody>
</table>

### Over Voltage Protection

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Isolation threshold: VCC + 0.6 V</td>
</tr>
<tr>
<td>From USB</td>
<td>Isolation voltage protection: -0.5 V to +15 V</td>
</tr>
<tr>
<td>External</td>
<td>Overshoot rejection: Overshoots less than 400 ns will not result in OVP isolation</td>
</tr>
<tr>
<td>USB</td>
<td>Pull-up resistor: 20 – 50 Kohm</td>
</tr>
<tr>
<td>Speed</td>
<td>Other</td>
</tr>
</tbody>
</table>

### Environmental

**ENVIRONMENTAL MIL-T-28800E Class5 Style E**

**Threshold**

@ 50% of selected voltage

**Temperature**

Digital I/O: 0 °C to 60 °C (boxed), 0 °C to 70 °C (unboxed)

Analog I/O: 5% to 95% non-condensing

### Digital Interface

- **TAP**: Clock generator 0 to 62.5 MHz, step 0.0582 Hz
- **TCK**: 1 KHz to 15 MHz
- **Sample rate**: 15 kS/s
- **Weight**: 161 grams
- **Slew rate**: 0.5 V/µs
- **Dimensions**: 107 x 175 x 18 mm
- **Voltage range**: 1.05 V to 3.6 V (5 V tolerant)
- **Input impedance**: 1 Mohm parallel with 100 pF

### Analog Connectors

- **Analog Interface Circuitry**: Output current max ±8 mA @ 3.3 V
- **Relative fault**: ± 0.7% full scale
- **Relative Humidity**: 15% to 90% non-condensing
- **Vibration**: Swept sine resonance search 5 – 55 Hz, 2 g (0.33 mm p-p), 15 min per axis 10 min resonance dwell

### Increasing test coverage

- **Voltage range**: 0 to 200 MHz
- **Overshoot rejection**: Overshoots less than 400 ns will not result in OVP isolation
- **Overshoots**: 4-8192 ns; accuracy 4 ns, resolution 1 ms
- **Pull-up resistor**: 20 – 50 Kohm

### Specifications

- **ELECTRICAL**: Power, From USB, External, USB, Speed, Galvanic isolation, TCK, Voltage range, Threshold, Digital I/O, Voltage range, Output current, Analog I/O, Voltage range, Resolution, Relative fault, Input impedance

### Technical Data

- **Isolation voltage**: 0.5 V to +15 V
- **Overshoots**: Less than 400 ns will not result in OVP isolation
- **Pull-up resistor**: 20 – 50 Kohm

### Contact Information

- **North America**: Toll free - 877 FOR JTAG Western US - 949 454 9040
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**Increasing test coverage**

- **Over Voltage Protection**: Isolation threshold VCC + 0.6 V
- **Power**: Isolation voltage protection -0.5 V to +15 V
- **Overshoot rejection**: Overshoots less than 400 ns will not result in OVP isolation
- **Pull-up resistor**: 20 – 50 Kohm

**www.jtag.com**

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