Technical Data

TICRO 100

IEEE 1588/PTP Time Converter

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Visit www.omicron-lab.com for more information.
Contact support@omicron-lab.com for technical support.

Technical data subject to change without notice.
# 1 Timing Performance

<table>
<thead>
<tr>
<th><strong>PTP Timestamping Resolution</strong></th>
<th>8 ns</th>
</tr>
</thead>
</table>
| **PTP locking speed**           | Locked after approximately 30 seconds  
                                 | (overall accuracy better than 200 ns) |
| **Supported timing protocol**   | PTP according to IEEE 1588–2008 (IEEE 1588 Version 2) |

**PTP (IEEE 1588) Features**
- Default profile IEEE 1588-2008, Annex J
  - End-to-end (multicast) and peer-to-peer delay mechanisms
  - PTP over UDP/IPv4, UDP/IPv6 and Ethernet/IEEE 802.3  
    (IEEE 1588-2008 Annex D, E, and F)
- Power profile IEEE C37.238-2011  
  (IEEE profile for use of IEEE 1588-2008 Precision Time Protocol in power systems applications)
- Power profile IEEE C37.238-2017  
  (IEEE profile for use of IEEE 1588-2008 Precision Time Protocol in power systems applications)

**Holdover performance**
- Holdover drift in 24 hours at constant temperature, after 48 hours of operation:
  - With high precision oscillator (OCXO-25): < 25 μs  
    (measured values < 4 μs)
2 Time Code and Frequency Outputs

WARNING:
All inputs and outputs of the TICRO 100 are electrically connected to the SELV (safety extra low voltage) insulation group of the device. It is strongly forbidden to connect none-SELV compliant voltages to all inputs and outputs.

2.1 Electrical Specifications

| 10 MHz | • BNC connector  
|        | • Sinusoidal  
|        | • 50 Ω output impedance  
|        | • 4 dBm (1 Vpp) ±2 dBm at 50 Ω load  
|        | • Short circuit protected  
|        | • Ground connected to housing  

Out 1, Out 2

| • BNC connector  
| • 50 Ω output impedance  
| • Unmodulated (digital) time codes: 2.5 V at 50 Ω load, 5 V at open circuit, TTL compatible  
| • Modulated IRIG-B: 3 V amplitude (peak) at 50 Ω load, 6 V amplitude at open circuit  
| • Short circuit protected  
| • Ground connected to housing  

Out 3

| • Screw terminal  
| • Optocoupler Darlington output  
| • Maximum collector-emitter voltage: 30 V  
| • Maximum current: 100 mA  
| • Pulse delays  
| ton < 3 µs (at all load impedances)  
| toff < 20µs (at 30 VDC, load impedance < 1 kΩ)  
| • Supports digital (unmodulated) time codes  

Out 4, Out 5

| • Fiber optical output  
| • ST connector  
| • Wavelength 820 nm  
| • Compatible with 50/125 µm, 62.5/125 µm, 100/140 µm fibers and 200µm plastic-clad silica (PCS) fibers  
| • Support digital (unmodulated) time codes  

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2.2 Supported Time Codes

**IRIG-B**
- TAI, UTC or local time base
- Unmodulated (IRIG-B00x) or 1kHz Modulation (IRIG-B12x)
- Coded expressions: Control functions, Straight binary seconds, BCD YEAR

**DCF77**
- Unmodulated DCF77 time code
- CET / CEST time base

**PPX**
- TAI, UTC or local time base
- 1, 10, 100, 1000 PPS, 1 PPM, 1 PPH or custom period
- Custom period between:
  - 10 mHz to 2.048 MHz (at output 1 and output 2)
  - 10 mHz to 10 kHz (at output 3)
- Custom pulse width (>10ns)
- Falling or rising edge
- Can be combined with Trigger

**Trigger**
- TAI, UTC or local time base
- Absolute trigger date and time programmable with 1s resolution
- Can be combined with PPX

3 Networking and Management

**Management**
- Web Interface (HTTP/HTTPS)
- TFTP, FTP, and SSH access
- Automated configuration via SSH, SOAP and XML files
- Fail-safe software upgrade in the field
- Email notifications
- Syslog (local and remote)

**Networking**
- Twisted pair (10BaseT/100BaseTX, RJ45) and optical Ethernet (100BaseFX, LC, multimode) connectors. One interface useable at a time.
- Supports IPv4 and IPv6
- Power over Ethernet according to IEEE 802.3af
- DHCP
- Zeroconf (MDNS/DNS-SD)

**USB**
- USB 2.0 (Type B)
- USB network gadget (RNDIS)
- Allows network connection to the TICRO 100 and devices attached to TICRO 100’s Ethernet interface (with USB only IPv4 is supported @ the moment)
4 Other

Power Supply

Power over Ethernet
- Max. power consumption 13W
- Powered Device (PD) class 3 according to IEEE 802.3af
- Operates as PSE (power sourcing equipment) according to IEEE 802.3af when powered via front or back panel DC input. Capable of supplying a class 1 PD (up to 4W).

Front panel DC input
- 18-57 V DC
- power consumption <15W
- Terminal block, maximum conductor cross section 1.5 mm²
WARNING: Product safety according to IEC 61010-1 and IEC 60255-27 only achieved by using an external power supply unit that complies with the SELV standard.

Back panel DC input
- 18-57 V DC, power consumption <15W
- power consumption <15W
- barrel connector
WARNING: Back panel DC input does not fulfil the surge requirements of IEC 60255-27. Use the front panel DC input if compliance with IEC 60255 is required.
WARNING: Product safety according to IEC 61010-1 only achieved by using an external power supply unit that complies with the SELV standard.

EMC
This Product adheres to the electromagnetic compatibility (EMC) directive 2004/108/EC (CE conform).

General
- Radiated emissions according to EN 61326-1, CISPR 11, IEC 60255-25, EN 55022, class A, 30 MHz - 6 GHz
- Radiated emissions according to FCC part 15 class A, 30 MHz - 6 GHz
- Radiated immunity according to EN 61326-1, EN 61000-4-3, IEC 60255-22-3: 80 MHz – 3 GHz, AM 1 kHz, m=0.8, 10 V/m
- ESD according to EN 61326-1, EN 61000-4-2, IEC 60255-22-2: contact discharge ±6 kV, air discharge ±8 kV

Front panel DC input
- Conducted immunity continuous wave according to EN 61326-1, EN 61000-4-6, IEC 60255-22-6, 150 kHz - 80 MHz, AM 1 kHz, m=0.8, 10V, spot measurements at 27 MHz, 68 MHz
- EFT (Burst) according to EN 61326-1, EN 61000-4-4, IEC 60255-22-4: 5/50 ns, 5 kHz, 1 minute, ±2 kV
- Surge according to EN 61326-1, EN 61000-4-5, IEC 60255-22-5: Line-Line ±1 kV, Line-PE ±2 kV
- ESD according to EN 61326-1, EN 61000-4-2, IEC 60255-22-2: contact discharge ±6 kV
<table>
<thead>
<tr>
<th>Section</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| Back panel DC input          | • Conducted immunity continuous wave according to EN 61326-1, EN 61000-4-6, IEC 60255-22-6, 150 kHz - 80 MHz, AM 1 kHz, m=0.8, 10V, spot measurements at 27 MHz, 68 MHz  
|                              | • EFT (Burst) according to EN 61326-1, EN 61000-4-4, IEC 60255-22-4: 5/50 ns, 5 kHz, 1 minute, ±2 kV  
|                              | • Surge according to EN 55024, EN 61000-4-5: Line-PE ±0.5 kV  
|                              | • ESD according to EN 61326-1, EN 61000-4-2, IEC 60255-22-2: contact discharge ±6 kV  |
| Ethernet port (RJ45)         | • Conducted emission according to EN 55022, IEC 60255-25, 150 kHz – 30 MHz, class A  
|                              | • Conducted immunity continuous wave according to EN 61326-1, EN 61000-4-6, IEC 60255-22-6, 150 kHz - 80 MHz, AM 1 kHz, m=0.8, 10V, spot measurements at 27 MHz, 68 MHz  
|                              | • EFT (Burst) according to EN 61326-1, EN 61000-4-4, IEC 60255-22-4: 5/50 ns, 5 kHz, 1 minute, ±4 kV  
|                              | • Surge according to EN 61326-1, EN 61000-4-5, IEC 60255-22-5: Line-PE ±1 kV  
|                              | • ESD according to EN 61326-1, EN 61000-4-2, IEC 60255-22-2: contact discharge ±6 kV  |
| Ethernet port (Fiber)        | • ESD according to EN 61326-1, EN 61000-4-2, IEC 60255-22-2: contact discharge ±6 kV  |
| 10 MHz, Out 1, Out 2, Out 3  | • Conducted immunity continuous wave according to EN 61326-1, EN 61000-4-6, IEC 60255-22-6, 150 kHz - 80 MHz, AM 1 kHz, m=0.8, 10V, spot measurements at 27 MHz, 68 MHz  
|                              | • EFT (Burst) according to EN 61326-1, EN 61000-4-4, IEC 60255-22-4: 5/50 ns, 5 kHz, 1 minute, ±4 kV  
|                              | • ESD according to EN 61326-1, EN 61000-4-2, IEC 60255-22-2: contact discharge ±6 kV  |
| Out 4, Out 5                 | • ESD according to EN 61326-1, EN 61000-4-2, IEC 60255-22-2: contact discharge ±6 kV  |
| USB port                     | • Conducted immunity continuous wave according to EN 61326-1, EN 61000-4-6, IEC 60255-22-6, 150 kHz - 80 MHz, AM 1 kHz, m=0.8, 10V, spot measurements at 27 MHz, 68 MHz  
|                              | • EFT (Burst) according to EN 61326-1, EN 61000-4-4, EN 55024: 5/50 ns, 5 kHz, 1 minute, ±1 kV  
|                              | • ESD according to EN 61326-1, EN 61000-4-2, IEC 60255-22-2: contact discharge ±6 kV  |

**WARNING:**  
The back panel DC input does not fulfil the surge requirements of IEC 60255-22-5.  
Use the front panel DC input, when compliance with IEC 60255-22-5 is required.  

**WARNING:**  
The USB port does not fulfil the burst requirements of IEC 60255-22-5.
### Safety
- IEC 60950
- IEC 61010
- IEC 60255

### Environmental

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temp</td>
<td>-20°C … +50°C (-4°F … + 122°F)</td>
</tr>
<tr>
<td>Storage temp</td>
<td>-40°C … +85°C (-40°F … +185°F)</td>
</tr>
<tr>
<td>Climate</td>
<td>Tested according to IEC 60068-2-30, Test Db, damp heat, cyclic (6 cycles, 55°C)</td>
</tr>
<tr>
<td>Vibration</td>
<td>Tested according to IEC 60068-2-6 and IEC 60255-21-1 (class 1).</td>
</tr>
<tr>
<td></td>
<td>• Response: frequency range 10…150 Hz, 0.5 g, 1 sweep cycle per axis</td>
</tr>
<tr>
<td></td>
<td>• Endurance: frequency range 10…150 Hz, 1 g, 20 sweep cycles per axis</td>
</tr>
<tr>
<td>Shock</td>
<td>Tested according to IEC 60068-2-27 and IEC 60255-21-2 (class 1)</td>
</tr>
<tr>
<td></td>
<td>• Response: 5 g/11 ms, half-sinusoid, 3 pulses in each direction, 6 directions</td>
</tr>
<tr>
<td></td>
<td>• Withstand: 15 g/11 ms, half-sinusoid, 3 pulses in each direction, 6 directions</td>
</tr>
<tr>
<td></td>
<td>• Bump test: 10 g/16 ms, half-sinusoid, 1000 pulses in each direction, 6 directions</td>
</tr>
</tbody>
</table>

### Mechanical

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>Housing type</td>
<td>IP40 according to IEC 60529</td>
</tr>
<tr>
<td>Dimensions</td>
<td>H x W x D: 54.6 x 171.6 x 121 mm / 2.15” x 6.75” x 4.76” (without accessories)</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt;750 g / &lt;1.65 lbs</td>
</tr>
</tbody>
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