

# TCR180USB/PP-1/TCAM-1

## Product Highlights

- | An ultra-compact time signal generator that can be synchronized to a variety of timecode formats
- | Connected via microUSB connector for power, management, and PC synchronization
- | Engineered to order with specific outputs



## Generate Pulse and Timecode Clock Signals Based on a Timecode Input

The TCR180USB/PP-1/TCAM-1 is an ultra-compact clock signal generator designed by Meinberg that is synchronized to an external timecode signal such as IRIG-B or AFNOR NF S87-500 and can be used to synchronize the connected PC and also generate accurate pulse signals as well as AM timecode signals for use by other devices.

A variety of amplitude-modulated and DC level shift (pulse-width modulated) timecode formats are supported as input signals, providing absolute flexibility for your synchronization needs.

The TCR180USB/PP-1/TCAM-1 is managed using Meinberg's MbgMon tool, which allows the inputs and outputs to be flexibly configured and provides detailed information on how the input timecode is being decoded.

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## Operating Specifications

<b>Acoustic Noise Emissions</b>	0 dB(A)
<b>Operating Temperature</b>	0 °C to 50 °C (32 °F to 122 °F)
<b>Storage Temperature</b>	-20 °C to 70 °C (-4 °F to 158 °F)
<b>Relative Humidity</b>	Max. 85 % at 40 °C (104 °F), non-condensing

## Integrated Oscillator

<b>Short-Term Frequency Stability at 10 MHz*</b>	$\pm 2 \times 10^{-9}$ Hz after t = 1 second
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\* The full specified holdover performance requires the system to have been synchronized for 1 hour previously and is dependent on the quality of the reference signal.

## Support Information

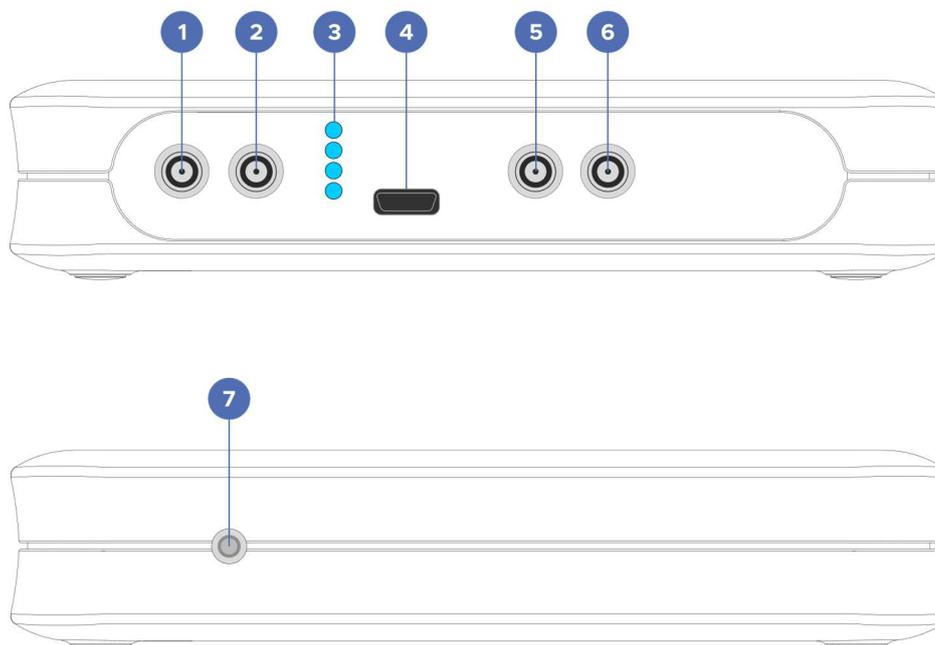
<b>Technical Support</b>	Free lifetime support via telephone and email, including firmware updates
<b>Warranty</b>	Three-year warranty, extendable upon request
<b>Firmware Updates</b>	Firmware is field-upgradeable; updates can be installed directly from the unit or via a remote network connection. Software updates are provided free of charge for the lifetime of your Meinberg product.
<b>RoHS Compliance</b>	The product is fully RoHS-compliant.
<b>WEEE Status</b>	The purchase of this product is considered to be a “B2B” transaction (non-household product) for the purposes of the European Union Waste of Electrical and Electronic Equipment Directive; the product falls under Category 6, “Small IT and Telecommunications Equipment”. For disposal, it must be returned to the manufacturer to ensure WEEE compliance. Any transportation expenses for returning this product (at end-of-life) must be covered by the end user, while Meinberg will cover the costs for the waste disposal itself.

## Accessories

- | 1 m (3.3 ft) RG 174 coaxial cable for connection of the TCR180USB/PP-1/TCAM-1 to the timecode reference signal.\*
- | 1.8 m (5.9 ft) USB 2.0 cable for power supply and data communication.

\* Meinberg also offers customized coaxial cables to accommodate your specific installation requirements. Please reach out to your Meinberg Sales Representative or Authorized Meinberg Distributor for more information.

# TCR180USB/PP-1/TCAM-1 Connectors



## 1 AM Timecode Input

For a list of supported timecode formats, please refer to “Timecode Support”.

<b>Connector Type</b>	SMB, male
<b>Cable Type</b>	Coaxial cable, shielded
<b>Input Signal</b>	AM timecode (amplitude-modulated)
<b>Required Input Accuracy</b>	± 100 ppm
<b>Signal Level</b>	800 mV <sub>pp</sub> – 8 V <sub>pp</sub>
<b>Termination</b>	Default 600 Ω, optionally 50 Ω or 5 kΩ
<b>Insulation Voltage</b>	3000 V DC

## 2 DCLS Timecode Input

For a list of supported timecode formats, please refer to “Timecode Support”.

<b>Connector Type</b>	SMB, male
<b>Cable Type</b>	Coaxial cable, shielded
<b>Input Signal</b>	DCLS timecode (pulse width-modulated)
<b>Required Input Accuracy</b>	± 100 ppm
<b>Signal Level</b>	5 V
<b>Internal Series Resistor</b>	330 Ω
<b>Insulation Voltage</b>	3750 V <sub>rms</sub>

### 3 Status LEDs

<b>Fail</b>	Indicates time synchronization errors
<b>Tele</b>	Indicates the detected state of the input timecode signal
<b>Data</b>	Indicates the detected state of the decoded timecode data
<b>Init</b>	Indicates the system state (initialized, oscillator phase-locked)

### 4 USB Connector

The USB connector is used both to power the TCR180USB/PP-1/TCAM-1 and to communicate with the PC it is connected with for management, monitoring, and also synchronization of the host PC's clock.

<b>Connector Type</b>	Micro-USB Type B
<b>Connection Standard</b>	USB 2.0
<b>Power Supply Requirement</b>	5 V DC, 400 mA
<b>Cable Requirements</b>	<ul style="list-style-type: none"> <li>- USB 2.0, power &amp; data capable</li> <li>- Max. 2 m (6.6 ft) length</li> <li>- Data line minimum conductor thickness AWG28</li> <li>- Power line minimum conductor thickness AWG24</li> </ul>

### 5 Programmable Signal Output

For a list of supported programmable signals, refer to “**Programmable Signal Support**”.

<b>Connector Type</b>	SMB, male
<b>Cable Type</b>	Coaxial cable, shielded
<b>Signal Level</b>	TTL (5 V without load, 2.5 V with 50 $\Omega$ load)
<b>Pulse Rise Time</b>	Typically 4 ns
<b>Pulse Fall Time</b>	Typically 4 ns

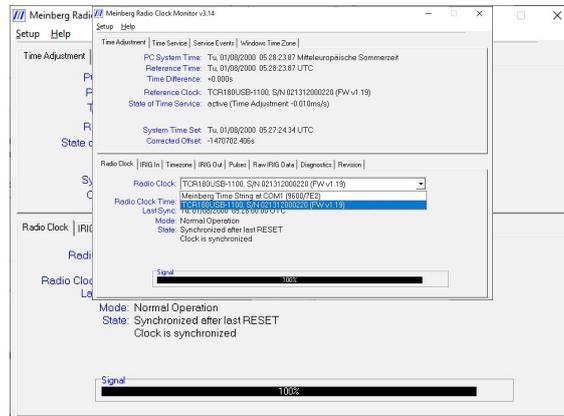
### 6 AM Timecode Output

<b>Connector Type</b>	SMB, male
<b>Cable Type</b>	Coaxial cable, shielded
<b>Output Signal</b>	AM timecode (amplitude-modulated)
<b>Signal Level</b>	3 V <sub>pp</sub> / 1 V <sub>pp</sub> (MARK / SPACE), assuming 50 $\Omega$ load
<b>Cable Type</b>	Coaxial cable, shielded

### 7 BSL Button

The BSL button on the front side of the device is intended to be used for firmware updates and diagnostic purposes under the guidance of Meinberg's Technical Support.

# Configuration and Monitoring



The TCR180USB/PP-1/TCAM-1 is configured and monitored using the free-of-charge tool **MbgMon**. This tool:

- | manages the synchronization of the PC’s internal clock to the incoming timecode signal,
- | allows the input and output timecode to be configured in terms of timecode format and timezone adjustments (in particular if incoming timecode is not UTC),
- | allows the programmable output signals to be configured,
- | allows the state of the Meinberg time service and decoding of the IRIG signal to be monitored.

## Timecode Support

### Input Timecode

IRIG AM	IRIG A132, A133, A136, A137, B122, B123, B126, B127
IRIG DCLS	IRIG A002, A003, A006, A007, B002, B003, B006, B007
AFNOR	AFNOR NF S 87-500
IEEE	IEEE 1344, IEEE C37.118

### Output Timecode

IRIG AM	IRIG A132, A133, A137, B122, B123, B126, B127
IRIG DCLS*	IRIG A002, A003, A007, B002, B003, B006, B007
AFNOR	AFNOR NF S 87-500
IEEE	IEEE 1344, IEEE C37.118

\* DCLS timecode output is available via the programmable signal output.

# Programmable Signal Support

<b>Idle</b>	The programmable pulse output is essentially disabled when set to “Idle”.
<b>Timer</b>	The output generates a voltage signal with a fixed daily schedule. It is possible to define up three times in a day when the output is switched on, and three times in a day when the output is switched off.
<b>Single Shot</b>	A single pulse of defined length is generated once a day at a set time of day.
<b>Cyclic Pulse</b>	A regular pulse is generated at defined intervals starting at midnight local time of each day.
<b>Pulse-per-Second</b>	A regular pulse of defined length is generated once a second.
<b>Pulse-per-Minute</b>	A regular pulse of defined length is generated once a minute.
<b>Pulse-per-Hour</b>	A regular pulse of defined length is generated once an hour.
<b>DCF77 Marks</b>	A simulated time string is output that follows the structure of the signal transmitted by the German DCF77 time code transmitter.
<b>DCLS Time Code</b>	Generates DCLS Time Code in accordance with the configured IRIG or other time code standard.
<b>10 MHz Frequency</b>	Generates a fixed TTL frequency signal of 10 MHz.
<b>Synthesizer Frequency</b>	Generates a custom frequency.
<b>Time Sync</b>	Generates a continuous signal if TCR180USB/PP-1/TCAM-1 is synchronized to its reference.