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# IMS-TCR: IRIG Time Code Receiver and Generator Module

This product is only compatible with Meinberg's line of modular **IMS LANTIME** systems.
Visit the [1]IMS Information Page to learn more.

The frequency locking of the master oscillator to the time code system enables this module to generate fixed and programmable standard frequencies with high accuracy and stability. Various oscillator options allow the cost efficient implementation of different requirements concerning the accurracy of the outputs.

The generator of the IMS-TCR module generates pulses per second and per minute and per hour. Four programmable outputs are also available. The pulses are synchronized to UTC-second.

The Meinberg MRS concept supports setting up a prioritized list of input sources that are used to synchronize the internal hardware clock of the IMS-TCR and then generate a large number of different output signals used by IMS I/O compatible cards to provide a user-defined selection of synchronization output signals by adding BPE, CPE or other IMS modules.

[2]

The figure shows a LANTIME M1000 with IMS-TCR reference module. The generated time codes are provided as output signals via BNC connectors using a BPE expansion card.

## Key Features

- Generation of IRIG-A/B/G, IEEE 1344, IEEE C37.118 or AFNOR NF S87-500 time codes
- Plug and play
- Programmable Pulse Outputs
- RS-232 interface
- Status LEDs
- Reception of time code formats IRIG-A/B/G, IEEE 1344, IEEE C37.118 or AFNOR NF S87-500
- Configurable time zone

# Description

The module TCR180 has been designed to receive and to generate IRIG-A/B/G, IEEE 1344, IEEE C37.118 or AFNOR NF S87-500 time codes.

It is used in applications like data acquisition, standalone computer time synchronization (for systems without a network connection or higher accuracy requirements) or as an IRIG converter device.

Receiver:The module provides two input channels for decoding of modulated and unmodulated time codes in IRIG-A/B/G, IEEE 1344, IEEE C37.118 or AFNOR NF S87-500 format. The receiver's automatic gain control (AGC) allows the reception of modulated IRIG signals within an amplitude range from 600 mVpp to 8 Vpp. In addition, the TCR180 provides an optocoupler input for decoding unmodulated codes with TTL- or RS-422 level for example.

Generator:The board TCR180 can generate time codes in IRIG-A/B/G, IEEE 1344, IEEE C37.118 or AFNOR NF S87-500 format. These signals are provided as modulated (3 Vpp/1 Vpp into 50 ohm) and unmodulated (TTL into 50 ohm) time codes.

The independent configuration of the time code and its offset to UTC of the receiver and the generator allows the use of TCR180 for time code conversion applications.

# Characteristics

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| **Status Indicators** | **Status info by 4 LED light indicators (2mm light pipes)** |
| | * Init - blue: while the receiver passes through the initialization phase |
| | * Data - green: correct time code detected |
| | * Tele - green: telegramm consistent |
| | * Fail - red: the internal timing is in holdover mode |
| **Input signal** | **TC AM In** (BNC female connector)<br>Modulated IRIG-A/B/G, IEEE 1344, IEEE C37.118 or AFNOR NF S87-500 signal, input insulated by transformer, input impedance 50 ohm, 600 ohm or 5 kohm selectable by jumper.<br><br>**TC DCLS In** (BNC female connector)<br>Unmodulated (DC level shift) IRIG-A/B/G, IEEE 1344, IEEE C37.118 or AFNOR NF S87-500 signal, input insulated by photocoupler. |
| **Accuracy free run** | ±1·E-8 if the decoder was synchronous for at least 1 h |
| **IRIG Time Code Input** | IRIG - A002/A132, A003/A133, A006/A136, A007/A137, B002/B122, B003/B123, B006/B126, B007/B127,  G002/G142, G006/G146, IEEE 1344, AFNOR NFS 87-500 and IEEE C37.118 (other codes on request) |

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| **Frequency Outputs** | Frequency synthesizer 1/8 Hz up to 10 MHz (TTL, sine 1,5Vrms) |
| **Pulse Outputs** | Four programmable pulse outputs, TTL level |
| **Precision of timebase** | Required accuracy of time code source: +/- 100ppm |
| **Interface** | Single serial RS-232 interface |
| **Serial Time String Output** | Baud rate: 300 Bd...115200 Bd<br>Data format: 7E2, 8N1, 8N2, 8E1, 7N2, 7E1, 8O1<br>Time telegram: [3]Meinberg Standard Time String , SAT, Uni Erlangen (NTP), SPA, RACAL, COMPUTIME, ION or [4]Capture String |
| **Supported Timecode Formats** | **IRIG A002:** 1000pps, DCLS signal, no carrier, BCD time of year<br>**IRIG A132:** 1000pps, AM sine wave signal, 10 kHz carrier, BCD time of year<br>**IRIG A003:** 1000pps, DCLS signal, no carrier, BCD time of year, SBS time of day<br>**IRIG A133:** 1000pps, AM sine wave signal, 10kHz carrier, BCD time of year, SBS time of day<br>**IRIG A006:** 1000pps, DCLS signal, no carrier, BCD time of year, BCD year<br>**IRIG A136:** 1000pps, AM sine wave signal, 10kHz carrier, BCD time of year, BCD year<br>**IRIG A007:** 1000pps, DCLS signal, no carrier, BCD time of year, BCD year, SBS time-of-day<br>**IRIG A137:** 1000pps, AM sine wave signal, 10kHz carrier, BCD time of year, BCD year, SBS time-of-day<br>**IRIG B002:** 100pps, DCLS signal, no carrier, BCD time of year<br>**IRIG B122:** 100pps, AM sine wave signal, 1 kHz carrier, BCD time of year<br>**IRIG B003:** 100pps, DCLS signal, no carrier, BCD time of year, SBS time of day<br>**IRIG B123:** 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, SBS time of day<br>**IRIG B006:** 100 pps, DCLS Signal, no carrier, BCD time of year, BCD year<br>**IRIG B126:** 100 pps, AM sine wave signal, 1 kHz carrier frequency, BCD time of year, BCD year<br>**IRIG B007:** 100 pps, DCLS Signal, no carrier, BCD time of year, BCD year, SBS time-of-day<br>**IRIG B127:** 100 pps, AM sine wave signal, 1 kHz carrier frequency, BCD time of year, BCD year, SBS time-of-day<br>**IRIG G002:** 10000pps, DCLS Signal, no carrier, BCD time of year<br>**IRIG G142:** 10000pps, AM sine wave signal, 100 kHz carrier frequency, BCD time of year<br>**IRIG G006:** 10000pps, DCLS Signal, no carrier, BCD time of year, BCD year<br>**IRIG G146:** 10000pps, AM sine wave signal, 100 kHz carrier frequency, BCD time of year, BCD year<br>**IEEE1344:** Code according to IEEE1344-1995, 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, SBS time of day, IEEE1344 expansion for date, time zone, daylight saving and leap second in Control Funktions Segment<br>**C37.118:** Like IEEE1344 - with turned sign bit for UTC-Offset<br>**AFNOR:** Code according to NFS-87500, 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, complete date, SBS time of day |

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| **Output signal** | Modulated IRIG-A/B/G, IEEE 1344, IEEE C37.118 or AFNOR NF S87-500 signal, 3 Vpp (high) and 1 Vpp (low) into 50 ohm.<br><br>Unmodulated (DC Level Shift) IRIG-A/B/G, IEEE 1344, IEEE C37.118 or AFNOR NF S87-500 signal, TTL into 50 ohm, active high or active low selectable by jumper.<br><br>*(The generated signals are available as outputs via additional IMS modules)* |
| **Backup Battery Type** | **CR2032 (lithium button cell)**<br>In the event of loss of power to the main system, this battery powers the real-time clock and also ensures that GNSS almanac data is properly buffered in RAM.<br>Lifetime of lithium battery: Min. 10 years |
| **Current Draw** | +5 V  1,1 A to 1,4 A (depends on oscillator option) |
| **Supported Temperature** | Operational: 0 - 50 °C (32 - 122 °F)<br>Storage: -20 - 70 °C (-4 - 158 °F) |
| **Supported Humidity** | Max. 85 % (non-condensing) at 40 °C |
| **Warranty** | Three-year warranty |
| **Options** | OCXO MQ/HQ/DHQ (specifications look at [5]oscillator options) for higher accuracy in holdover mode |
| **RoHS Status of Product** | This product is fully RoHS-compliant. |
| **WEEE Status of Product** | This product is handled as a B2B (Business to Business) category product. To ensure that the product is disposed of in a WEEE-compliant fashion, it can be returned to the manufacturer. Any transportation expenses for returning this product (at end-of-life) must be covered by the end user, while Meinberg will bear the costs for the waste disposal itself. |

**Manual**

The English manual is available as a PDF file: [6]Download (PDF)

**Links:**

[1] https://www.meinbergglobal.com/english/products/modular-sync-system.htm
[2] https://www.meinbergglobal.com/images/grafik/ims_lt-m1000_tcr_rear.jpg
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