



The Synchronization Experts.



## **SETUP GUIDE**

### **IMS-MRI**

#### **Hot-Plug Module**

September 27, 2023

Meinberg Funkuhren GmbH & Co. KG



# Table of Contents

<b>1</b>	<b>Imprint</b>	<b>1</b>
<b>2</b>	<b>Copyright and Liability Exclusion</b>	<b>2</b>
<b>3</b>	<b>Change Log</b>	<b>3</b>
<b>4</b>	<b>Introduction</b>	<b>4</b>
<b>5</b>	<b>Important Safety Information</b>	<b>5</b>
5.1	Appropriate Usage . . . . .	5
5.2	Product Documentation . . . . .	6
5.3	Electrical Safety . . . . .	6
<b>6</b>	<b>Important Product Information</b>	<b>7</b>
6.1	CE Marking . . . . .	7
6.2	UKCA Marking . . . . .	7
6.3	Ensuring the Optimum Operation of Your Device . . . . .	7
6.4	Maintenance and Modifications . . . . .	7
6.5	Prevention of ESD Damage . . . . .	8
6.6	Disposal . . . . .	9
<b>7</b>	<b>MRI Variants</b>	<b>10</b>
<b>8</b>	<b>Front Connectors IMS-MRI</b>	<b>11</b>
8.1	IMS-MRI - Status LEDs . . . . .	12
8.2	Time Code AM Input . . . . .	13
8.3	Time Code DCLS Input . . . . .	13
8.4	10 MHz Frequency Input . . . . .	14
8.5	Pulse per Second Input . . . . .	14
<b>9</b>	<b>Front Connectors IMS MRI-FO</b>	<b>15</b>
9.1	IMS-MRI - Status LEDs . . . . .	16
9.2	AM Time Code (Modulated) Input . . . . .	17
9.3	Time Code DCLS (unmodulated) Input . . . . .	17
9.4	10 MHz Fiber Optic Input . . . . .	18
9.5	PPS Fiber Optic Input . . . . .	18
<b>10</b>	<b>Before You Start</b>	<b>19</b>
10.1	Contents of Delivery . . . . .	19
<b>11</b>	<b>System Installation</b>	<b>20</b>
11.1	Important Information Regarding Hot-Pluggable IMS Modules . . . . .	20
11.2	Installation and Removal of Hot-Pluggable IMS Modules . . . . .	21
<b>12</b>	<b>Configuration and Status Monitoring</b>	<b>23</b>
12.1	Configuration of Input Signals . . . . .	23
12.2	Status Monitoring of the Input Signals . . . . .	24
<b>13</b>	<b>Troubleshooting</b>	<b>25</b>
<b>14</b>	<b>Your Opinion Matters to Us</b>	<b>26</b>

<b>15 RoHS Conformity</b>	<b>27</b>
<b>16 List of Abbreviations</b>	<b>28</b>

# 1 Imprint

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## 3 Change Log

Version	Date	Revision Notes
1.00	06/20/2016	Initial Version
1.01	02/14/2020	Description of reference signals
2.00	04/30/2021	Revision based on new standardized setup guide structure
2.01	03/17/2022	Chap. 2, 5, 10, 11, 13 added
2.2	09/27/2023	Chap. 6.2 signal level with 50 $\Omega$ adjustable via jumper Copyright and product information added Safety instructions updated

## 4 Introduction

This Setup Guide is a systematically structured guideline which supports you during the set-up of your Meinberg product.

The IMS-MRI (MRI=Multi Reference Input) provides four signal inputs: 1x Time Code AM, 1x Time Code DCLS, 1x 10 MHz as well as 1x PPS. These input signals are made available to the IMS system as additional reference signals. The signals can be monitored and selected in the "Clock" menu of the assigned clock module after successful initialization.

### Features .

As already mentioned above, an MRI module is assigned to a clock module and provides it with additional reference signals. If additional reference signals should also be available for the second clock module in redundant operation, it is necessary to add another MRI module for this purpose.

#### Example:

1x GPS Clock on CLK1 requires 1x MRI on MRI1

1x GPS Clock on CLK1 and 1x GNS Clock on CLK2 requires 1x MRI on MRI1 and 1x MRI on MRI2

The LTOS manual provides a complete description of all configurations and status monitoring options of your Meinberg product.

Download LTOS7 Firmware manual:

<http://www.mbg.link/doce-fw-ltos>

### Compatibility

The IMS-MRI is an IMS module that is compatible with the following systems of the IMS family and can be used in the slots shown in the table down below.

#### System Compatibility - IMS MRI

IMS System	M500	M1000	M1000 S	M2000 S	M3000	M3000 S	M4000
Compatible	✓	✓	✓	✓	✓	✓	✓

#### Slot Compatibility - IMS MRI

IMS Slot	PWR	CLK	CPU	MRI	ESI	I/O
Compatible	✗	✗	✗	✓	✗	✗



## 5 Important Safety Information



The safety information provided in this chapter as well as specific safety warnings provided at relevant points in this manual must be observed during every installation and operation procedure of the device, as well as its removal from service.

Any safety warnings affixed to the product itself must also be observed.

Any failure to observe this safety information, these safety warnings, and other safety-critical operating instructions in the product documentation, or any other improper usage of the product may result in unpredictable behavior from the product, and may result in injury or death.

Depending on your specific device configuration and installed options, some safety information may not be applicable to your device.

Meinberg accepts no responsibility for injury or death arising from a failure to observe the safety information, warnings, and safety-critical instructions provided in the product documentation.

It is the responsibility of the operator to ensure that the product is safely and properly used.

Should you require additional assistance or advice on safety-related matters for your product, Meinberg's Technical Support team will be happy to assist you at any time. Simply send a mail to [techsupport@meinberg.de](mailto:techsupport@meinberg.de).

### 5.1 Appropriate Usage



**The device must only be used appropriately in accordance with the specifications of the product documentation!** Appropriate usage is defined exclusively by this manual as well as any other relevant documentation provided directly by Meinberg.

**Appropriate usage includes in particular compliance with specified limits!** The device's operating parameters must never exceed or fall below these limits!

## 5.2 Product Documentation

The information in this manual is intended for readers with an appropriate degree of safety awareness.

The following are deemed to possess such an appropriate degree of safety awareness:

- **skilled** persons with a familiarity with relevant national safety standards and regulations,
- **instructed** persons having received suitable instruction from a skilled person on relevant national safety standards and regulations



Read the product manual carefully and completely before you set the product up for use.

If any of the safety information in the product documentation is unclear for you, do **not** continue with the set-up or operation of the device!

Safety standards and regulations change on a regular basis and Meinberg updates the corresponding safety information and warnings to reflect these changes. It is therefore recommended to regularly visit the Meinberg website at <https://www.meinbergglobal.com> or the Meinberg Customer Portal at <https://meinberg.support> to download up-to-date manuals.

Please keep all product documentation, including this manual, in a safe place in a digital or printed format to ensure that it is always easily accessible.

Meinberg's Technical Support team is also always available at [techsupport@meinberg.de](mailto:techsupport@meinberg.de) if you require additional assistance or advice on safety aspects of your system.

## 5.3 Electrical Safety

The IMS LANTIME system in which the module is installed is operated at a hazardous voltage. Please refer to the specific safety information contained within the manual of your IMS system for more information.

When removing a hot-pluggable power supply module, the power supply cable must first be disconnected from the module before the module itself is removed.

Never open a power supply module—hazardous voltages may still reside within the module even after it is disconnected from the power source. If a power supply module is defective, it can be sent to Meinberg for repair.

The installation, set-up, and operation of an IMS system must be performed by suitably qualified personnel.

Failure to observe these safety instructions can result in severe injury.



## 6 Important Product Information

### 6.1 CE Marking

This product bears the CE mark as is required to introduce the product into the EU Single Market.



The use of this mark is a declaration that the product is compliant with all requirements of the EU directives effective and applicable as at the time of manufacture of the product.

### 6.2 UKCA Marking

This product bears the British UKCA mark as is required to introduce the product into the United Kingdom (excluding Northern Ireland, where the CE marking remains valid).



The use of this mark is a declaration that the product is in conformity with all requirements of the UK statutory instruments applicable and effective as at the time of manufacture of the product.

### 6.3 Ensuring the Optimum Operation of Your Device

- Ensure that ventilation slots are not obscured or blocked by dust, or else heat may build up inside the device. While the system is designed to shut down safely and automatically in the event of temperature limits being exceeded, the risk of malfunctions and product damage following overheating cannot be entirely eliminated.
- The device is only deemed to be appropriately used and EMC limits (electromagnetic compatibility) are only deemed to be complied with while the device housing is fully assembled in order to ensure that requirements pertaining to cooling, fire safety, electrical shielding and (electro)magnetic shielding are upheld.

### 6.4 Maintenance and Modifications



#### Important!

Before performing any maintenance work on or authorized modification to your Meinberg system, we recommend making a backup of any stored configuration data (e.g., to a USB flash drive from the Web Interface).

## 6.5 Prevention of ESD Damage



An **ESDS** device (electrostatic discharge-sensitive device) is any device at risk of damage or malfunction due to electrostatic discharge (ESD) and thus requires special measures to prevent such damage or malfunction. Systems and modules with ESDS devices usually bear this symbol.

Precautionary measures should be taken to protect ESDS components from damage and malfunction.

- Before removing or installing a module, ground your body first (for example, by touching a grounded object) before touching ESDS modules.
- Ensure that you wear a grounding strap on your wrist when handling such ESDS components. This strap must in turn be attached to an uncoated, non-conductive metal part of the system.
- Use only tools and equipment that are free of static electricity.
- Ensure that your clothing is suitable for the handling of ESDS components. In particular, do not wear garments that are susceptible to electrostatic discharges (wool, polyester). Ensure that your shoes enable a low-resistance path for electrostatic charges to dissipate to the ground.
- Only touch or hold ESDS components by the edges. Never touch any pins or conductors on the ESDS components.
- When removing or installing ESDS components, avoid coming into contact with persons who are not grounded. Such contact may compromise your connection with the grounding conductor and thus also compromise the ESDS component's protection from any static charges you may be carrying.
- Always store ESDS components in ESD-proof ("antistatic") bags. These bags must not be damaged in any way. ESD-proof bags that are crumpled or have holes cannot provide effective protection against electrostatic discharges. ESD-proof bags must have a sufficient electrical resistance and must not be made of conductive metals if the ESDS component has a lithium battery fitted on it.

## 6.6 Disposal

### Disposal of Packaging Materials



The packaging materials that we use are fully recyclable:

Material	Used for	Disposal
Polystyrene	Packaging frame/filling material	Recycling Depot
PE-LD (Low-density polyethylene)	Accessories packaging, bubble wrap	Recycling Depot
Cardboard	Shipping packaging, accessories packaging	Paper Recycling

For information on the proper disposal of packaging materials in your specific country, please inquire with your local waste disposal company or authority.

### Disposal of the Device



This product falls under the labeling obligations of the Waste Electrical and Electronic Equipment Directive 2012/19/EU ("*WEEE Directive*") and thus bears this WEEE symbol. The presence of this symbol indicates that this electronic product may only be disposed of in accordance with the following provisions.



#### Important!

Do not dispose of the product via the household waste. Inquire with your local waste disposal company or authority on how to best dispose of the product if necessary.

This product is considered to be a "B2B" product for the purposes of the WEEE Directive and is also classified as "IT and Telecommunications Equipment" in accordance with Annex I of the Directive.

It can be returned to Meinberg for disposal. In this case, the shipping costs are to be borne by the customer, while Meinberg will cover the costs for disposal. If you wish for Meinberg to handle disposal for you, please get in touch with us. Otherwise, please use the return and collection systems provided within your country to ensure that your device is disposed of in a compliant fashion to protect the environment and conserve valuable resources.

## 7 MRI Variants

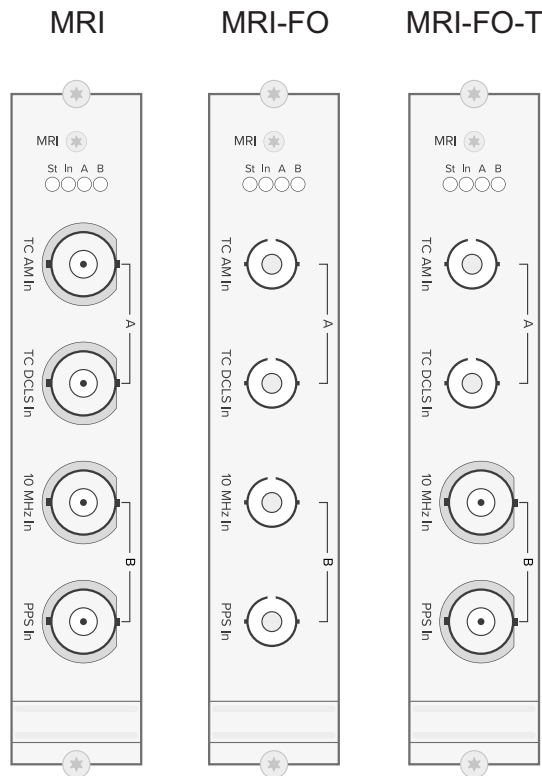
The MRI module (MRI = Multi-Reference Input) is available in a number of different models. The standard MRI modules provide the following signal input connectors, depending on the model in question:

MRI	4x BNC	TC AM, TC DCLS, 10 MHz, PPS
MRI-FO	4x ST	TC AM, TC DCLS, 10 MHz, PPS
MRI-FO-T	2x ST, 2x BNC	TC AM, TC DCLS (ST) / 10 MHz, PPS (BNC)

The MRI-FO model is especially well-suited to transmission of MRS signals over long distances, with the transmission of MRS signals over fiber-optic cable also making it much less susceptible to interference.



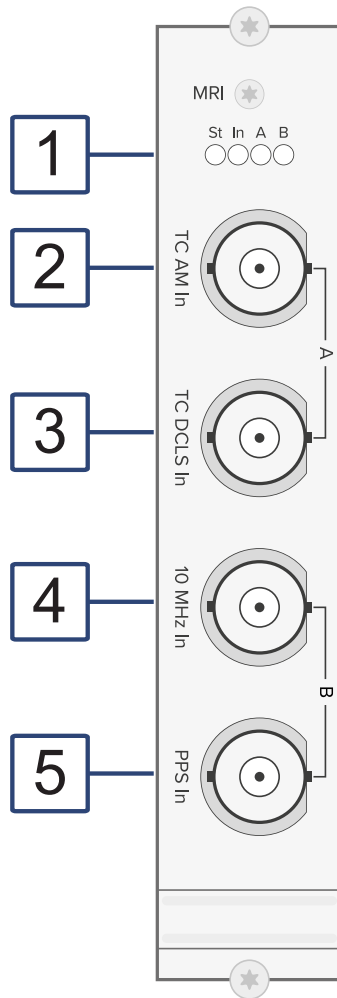
Before the amplitude-modulated IRIG AM signal can be fed into the FO input, it must first be generated using a Meinberg "CON/TCM/FO" converter.



### Technical Specifications of the MRI Module

Electrical Connector:	DIN 41612 96-Pin Connector
Operating Voltage:	+5 V DC
Current Draw:	100 mA
Temperature Range:	0–50 °C / 32–122 °F
Relative Humidity:	Max. 85%

## 8 Front Connectors IMS-MRI

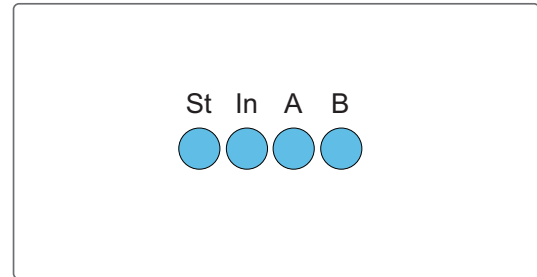


The numbering in the drawing above relates to the relevant subsection in this chapter.

## 8.1 IMS-MRI - Status LEDs

### Status display

LED St:	Status of MRI in IMS-System
LED In:	Synchronization status
LED A:	Status of the input signals (TC-AM/DCLS)
LED B:	Status of the input signals (10 MHz/PPS)



The status messages of the LED's are as follows:

#### LED St:

Blue	During initialization
Green	During operation

#### LED In.

Shows the state after initialisation

Green	MRI successfully initialized
-------	------------------------------

#### LED A - Status *TC-AM and TC-DCLS*

This LED will usually display the following color pattern when the IMS system is booted:  
1 sec red -> 1 sec yellow -> 1 sec green -> 1 sec off

Green light	TC-AM and/or TC-DCLS signal is available
Yellow light	TC-AM and/or TC-DCLS signal is not available

#### LED B - Status *10 MHz and PPS*

This LED will usually display the following color pattern when the IMS system is booted:  
1 sec Red -> 1 sec Yellow -> 1 sec Green -> 1 sec Off

Green light	10 MHz and/or PPS signal is available
Yellow light	10 MHz and/or PPS signal is not available



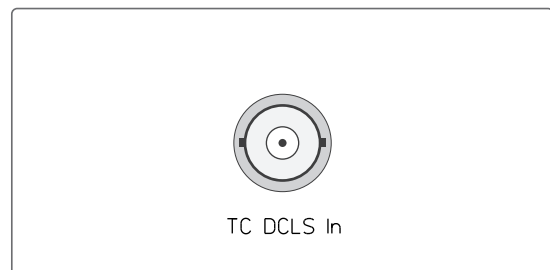
## 8.2 Time Code AM Input

<b>Input Signal:</b>	AM Time Code (Amplitude-Modulated Sine Wave Signal)
<b>Signal Level:</b>	800 mV <sub>pp</sub> up to 8 V <sub>pp</sub>
<b>Input Impedance:</b>	600 Ω or 50 Ω Internally selectable by jumper (default 600 Ω)
<b>Time Code Signale:</b>	B122/123, B126/127 A132/A133, A136/137 G142/G146 IEEE1344 C37.118 AFNOR NFS 87-500
<b>Insulation Voltage:</b>	3000 V DC
<b>Connector Type:</b>	BNC Female, Insulated
<b>Cable:</b>	Coaxial Cable, Shielded



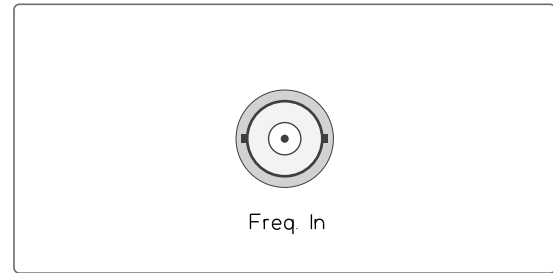
## 8.3 Time Code DCLS Input

<b>Input Signal:</b>	DCLS Time Code, Pulse-Width Modulated (e.g., IRIG-B00x)
<b>Time Code Signals:</b>	B002/003, B006/007 A006/A007 G002/G006 IEEE1344 C37.118 AFNOR NFS 87-500
<b>Insulation Voltage:</b>	3750 V <sub>rms</sub>
<b>Typ. Input Voltage:</b>	5 V DC
<b>Max. Input Current:</b>	60 mA
<b>Internal Series Resistor:</b>	Diode current limited to 330 Ω
<b>Connector Type:</b>	BNC Female, Insulated
<b>Cable:</b>	Coaxial Cable, Shielded



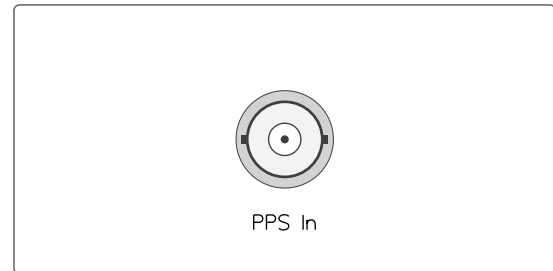
## 8.4 10 MHz Frequency Input

<b>Input Signal:</b>	10MHz Frequency
<b>Signal Level:</b>	Sine Wave ( $1.5 V_{pp} - 5 V_{pp}$ ) or TTL
<b>Connector Type:</b>	BNC Female
<b>Cable:</b>	Coaxial Cable, Shielded

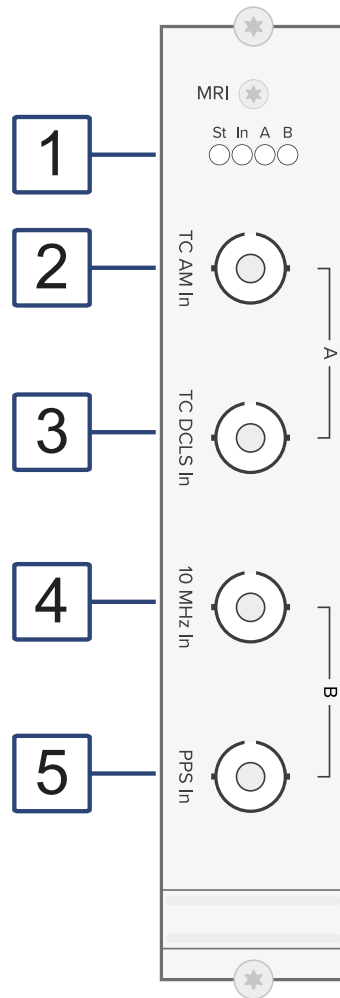


## 8.5 Pulse per Second Input

<b>Input Signal:</b>	PPS (Pulse per Second)
<b>Signal Level:</b>	TTL
<b>Pulse Length:</b>	$\geq 5\mu s$ , Active High
<b>Connector Type:</b>	BNC Female
<b>Cable:</b>	Coaxial Cable, Shielded



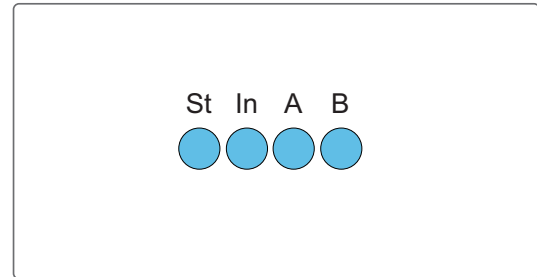
## 9 Front Connectors IMS MRI-FO



## 9.1 IMS-MRI - Status LEDs

### Status display

LED St:	Status of MRI in IMS-System
LED In:	Synchronization status
LED A:	Status of the input signals (TC-AM/DCLS)
LED B:	Status of the input signals (10 MHz/PPS)



The status messages of the LED's are as follows:

#### LED St:

Blue	During initialization
Green	During operation

#### LED In.

Shows the state after initialisation

Green	MRI successfully initialized
-------	------------------------------

#### LED A - Status *TC-AM and TC-DCLS*

This LED will usually display the following color pattern when the IMS system is booted:  
1 sec red -> 1 sec yellow -> 1 sec green -> 1 sec off

Green light	TC-AM and/or TC-DCLS signal is available
Yellow light	TC-AM and/or TC-DCLS signal is not available

#### LED B - Status *10 MHz and PPS*

This LED will usually display the following color pattern when the IMS system is booted:  
1 sec Red -> 1 sec Yellow -> 1 sec Green -> 1 sec Off

Green light	10 MHz and/or PPS signal is available
Yellow light	10 MHz and/or PPS signal is not available

## 9.2 AM Time Code (Modulated) Input

**Input Signal:** Unbalanced Sine Wave Signal

**Input Type:** Fiber optic (FO), Multi mode

**Time Code Signals:** B122/123, B126/127  
IEEE1344  
C37.118  
AFNOR NFS 87-500

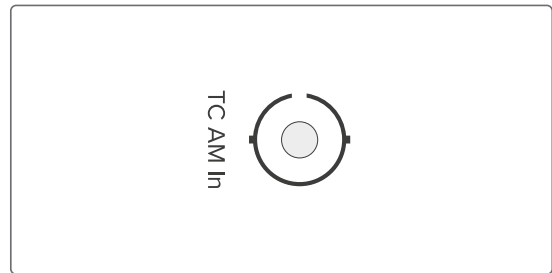
**Wave length:** 850 nm

**Min. Input Power:** 3  $\mu$ W

*To ensure reliable signal detection, the input signal should not fall below the specified value.*

**Connector Type:** ST Connector

**Type of fiber:** GI 50/125  $\mu$ m or  
62,5  $\mu$ m gradient fibre



## 9.3 Time Code DCLS (unmodulated) Input

**Input Signal:** Time code DCLS, pulse width modulated.  
(e.g. IRIG-B00x)

**Input Type:** Fiber Optic (FO), Multimode

**Time code signals:** B002/003, B006/007  
IEEE1344  
C37.118  
AFNOR NFS 87-500

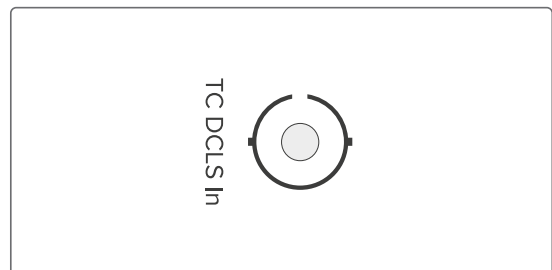
**Wave length:** 850 nm

**Min. input power:** 3  $\mu$ W

*To ensure reliable signal detection, the input signal should not fall below the specified value.*

**Connection type:** ST connector.

**Fiber type:** GI 50/125  $\mu$ m or  
62.5/125  $\mu$ m gradient fiber

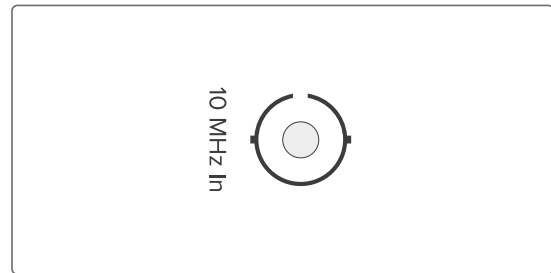


## 9.4 10 MHz Fiber Optic Input

<b>Input Signal:</b>	10 MHz Frequency
<b>Input Type:</b>	Fiber Optic (FO), Multimode
<b>Wave Length:</b>	850 nm
<b>Min. Input Power:</b>	3 $\mu$ W

*To ensure reliable signal detection, the input signal should not fall below the specified value.*

<b>Connection Type:</b>	ST Connector
<b>Fiber Type:</b>	GI 50/125 $\mu$ m oder 62,5/125 $\mu$ m gradient fiber

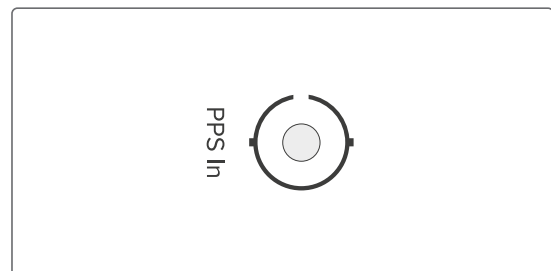


## 9.5 PPS Fiber Optic Input

<b>Input Signal:</b>	PPS (Pulse per Second)
<b>pulse length:</b>	$\geq 5 \mu$ s, active high
<b>Input Type:</b>	Fiber Optic (FO), Multimode
<b>Wave Length:</b>	850 nm
<b>Min. Input Power:</b>	3 $\mu$ W

*To ensure reliable signal detection, the input signal should not fall below the specified value.*

<b>Connection Type:</b>	ST Connector
<b>Fiber Type:</b>	GI 50/125 $\mu$ m oder 62,5/125 $\mu$ m gradient fiber



# 10 Before You Start

## 10.1 Contents of Delivery

Unpack the IMS-MRI and all accessories carefully and check the contents of the delivery against the enclosed packing list to ensure that no parts are missing. If any of the listed items are missing, please contact our Sales Department at [sales@meinberg.de](mailto:sales@meinberg.de).

Check that the product has not been damaged in transit. If the product is damaged or fails to operate upon installation, please contact Meinberg immediately. Only the recipient (the person or company receiving the system) may file claims or complaints against the forwarder for damage caused in transit.

Meinberg recommends that you keep the original packaging materials in case the product needs to be shipped or transported again at a later date.

# 11 System Installation

## 11.1 Important Information Regarding Hot-Pluggable IMS Modules

The following information should be strictly observed when replacing IMS modules during operation. Not all IMS modules are fully hot-pluggable. For example, it is naturally not possible to replace a power supply unit in a system without PSU redundancy without first having installed a second power supply unit while the system is in operation.

The following rules apply for the individual IMS slots:

<b>PWR Slot:</b>	"Hot-Swappable"	If you operate your system with only one power supply unit, a second power supply unit must be installed before removing or replacing it in order to keep your system operational.
<b>I/O, ESI, and MRI Slots:</b>	"Hot-Pluggable"	
<b>CLK1, CLK2 Slots:</b>	"Hot-Pluggable"	When a clock module is replaced or installed, it is important to rescan the reference clocks ("Rescan Refclocks") in the "System" menu of the Web Interface.
<b>RSC/SPT Slots:</b>	"Hot-Pluggable"	It will not be possible for your IMS system to switch between signal generators while the RSC/SPT is not installed.
<b>CPU Slot:</b>	" <u>Not</u> Hot-Pluggable"	Before the CPU is removed, the IMS system must be powered down.  Please note that after powering on and rebooting the LANTIME Operating System, the configuration of some IMS modules may be reset to factory defaults!



### Information:

The NTP service and access to the web interface will be unavailable while the CPU is not installed. Management and monitoring functions will also be disabled.



## 11.2 Installation and Removal of Hot-Pluggable IMS Modules

A Torx screwdriver is required (T8 x 60) to remove and install IMS modules.

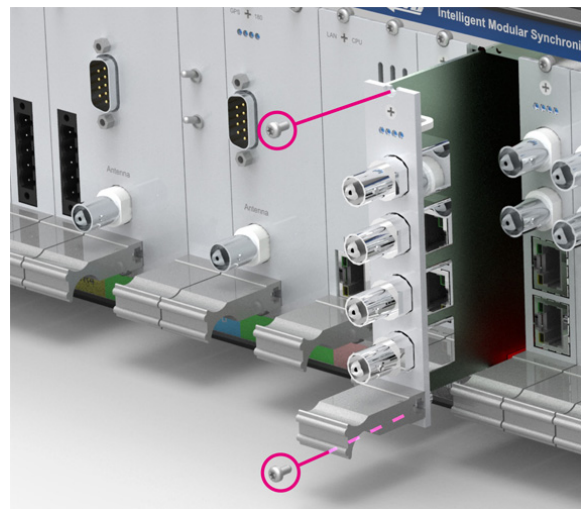


### Important!

Heed the safety information in Chapter 5 of this manual!

### Removing a Module

1. Remove the two marked Torx screws from the module faceplate.
2. Pull the module **carefully** out of the guide rail. Note that the module will be securely seated in the connector block inside the chassis—a certain amount of force must be applied to release the module. Once the module has been detached from the connector block on the system backplane, the module can be easily pulled out.
3. If the removed module is not to be replaced with another module, a suitable one-slot or two-slot 'placeholder' faceplate should be fitted using the two Torx screws in order to cover this space.



*Locations of fixture screws in a 1U IMS system*

## Installing a Module

1. To replace a module, remove the installed module in accordance with the guide "**Removing a Module**" on the previous page. Otherwise, remove the two Torx screws from the cover plate of the unused slot. We recommend keeping the cover plate in a safe place for later use.
2. Insert the module correctly into the two guide rails of the system chassis. If the module cannot be inserted with minimal force, it is possible that the module is not properly seated in the guide rails. In this case, you should pull the module out and try again. **Do not use excessive force when pushing the module in!** Failure to heed this instruction may result in damage to the module and/or chassis.
3. Once the module has reached the connector block of the system backplane, a little more force will be required to insert the module into the connector block. Ensure that the module is locked securely into place and that the faceplate of the module is flush with that of the adjacent modules or cover plates.
4. Insert and tighten the two Torx screws with a **max. torque of 0.6 Nm**.

The installed module is now ready to be set up for use.

# 12 Configuration and Status Monitoring

This chapter explains how to put an IMS-MRI into operation via the web interface.

## 12.1 Configuration of Input Signals

Four fixed input signals (time code AM, time code DCLS, 10 MHz and PPS) can be supplied via the MRI module to synchronize the system.

### MRS prioritization

The provided input signals are available for selection after initialization of the module and can then be configured and monitored.

The screenshot displays the 'Status & Configuration' page for the 'GPS Clock [CLK1 - Sync to GPS]'. At the top, there are tabs for 'MRS Status', 'MRS-Settings' (which is highlighted with a blue box), 'IRIG Settings', 'Serial Ports', and 'Miscellaneous'. Below the tabs, there are buttons for 'Initialize Receiver' and 'XHE-Rubidium'. The main section is titled 'Source Priority' and contains a list of 8 sources, each with a dropdown menu:

- 1. Source: GPS
- 2. Source: PPS in
- 3. Source: IRIG
- 4. Source: Fixed Freq. in
- 5. Source: PTP (IEEE1588)
- 6. Source: PPS plus string
- 7. Source: --- Unconfigured ---
- 8. Source: --- Unconfigured ---

*MRS setting: selection and prioritization of the available input sources.*

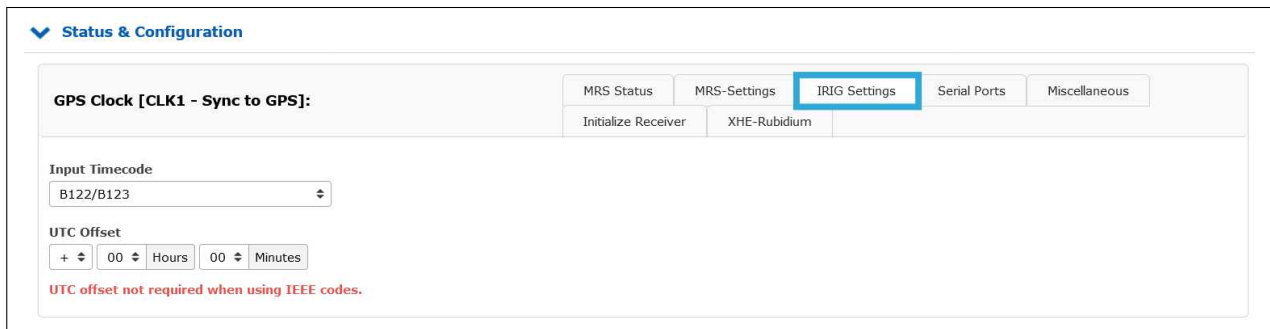
1. Open the "Clock" menu → "Status & Configuration"
2. Select the respective clock module of the corresponding MRI module
3. Click on the tab "MRS settings".
4. Configure the reference signals shown in the priority list.

## IRIG settings

Several time codes are available for selection for the IRIG reference signals of the MRI.

1. Open the "Clock" menu → "Status & Configuration"
2. Select the respective clock module of the corresponding MRI module
3. Click on the tab "IRIG settings".
4. Configure a required input code and if necessary an offset to UTC.

These are to be configured in the "Status & Configuration" submenu in the "IRIG Settings" tab.



Menü: Configuration of IRIG-Timecodes

## 12.2 Status Monitoring of the Input Signals

This chapter describes the status monitoring of the IMS-MRI via the web interface.

Important parameters of the previously configured reference signals are displayed in the **MRI Status** tab of the "Status & Configuration" submenu in the priority list. Among other things, the status and the offset of the respective reference signal to the specified time source can be seen here.

A detailed explanation of all parameters can be found in the LTOS manual.

Priority	Source	Status	Offset	Statistics
01	GPS	Signal available, Is master, Warmed up, Is locked, Is accurate	+7.0ns	
02	PPS in	Signal available	-50.0ns	Auto-Bias: 0.000000000s Step-Comp.: 0.000000000s Span: 0.000000000s
03	IRIG	Signal available	+998.5us	
04	Fixed Freq. in	Signal available	+0.0ns	Not available
05	PTP (IEEE1588)	No connection, No signal		Not available
06	PPS plus string	No connection, No signal	N/A	
-	NTP	Not prioritized	N/A	
-	ext. Osc.	Not prioritized	N/A	

## 13 Troubleshooting

Our Technical Support team will be pleased to help you with any problems that you may be having with your Meinberg IMS-MRI. However, before you contact our Technical Support team, it is advisable to read this chapter through first to see if your problem might be more quickly resolved with one of the solutions below.

Problem	Possible Causes	Possible Solutions
The module is not detected by the base IMS unit.	The module may not have been properly inserted into the slot.	Ensure that the module is properly aligned with the guide rails inside the IMS unit; the module must lock securely into the socket at the back. The metal plate of the module should be perfectly flush with the metal plates of the other slots and the screws should be straight.
The IMS module is not listed and not configurable in the web interface of the IMS system.	The firmware of your IMS system may not be up to date.	Check in the menu <b>System</b> → <b>Configuration &amp; Firmware Mangement</b> if the latest firmware version is installed on your system. If necessary, install the latest version.
The reference signals TC AM and TC DCLS of the MRI are connected, but the reference clock does not synchronize.	Connected time code signal and configured input code do not match.	Make sure that the AM and/or DCLS time code signals are connected to the correspondingly labeled socket. Also check whether, for example, a TC-DCLS is also configured in the menu text of the web interface when the DCLS signal is connected.

Table: Troubleshooting IMS MRI

## 14 Your Opinion Matters to Us

This user manual is intended to assist you in the preparation, use, and care of your Meinberg product, and provides important information for configuration and status monitoring.

Be a part of the ongoing improvement of the information contained in this manual. Please contact our Technical Support team if you have any suggestions for improvements or technical questions that are relevant to the manual.

### Meinberg – Technical Support

**Phone:** +49 (0) 5281 – 9309- 888

**Email:** [techsupport@meinberg.de](mailto:techsupport@meinberg.de)

# 15 RoHS Conformity

## Conformity with EU Directive 2011/65/EU (RoHS)

We hereby declare that this product is compliant with the European Union Directive 2011/65/EU and its delegated directive 2015/863/EU "Restrictions of Hazardous Substances in Electrical and Electronic Equipment" and that no impermissible substances are present in our products pursuant to these Directives.

We warrant that our electrical and electronic products sold in the EU do not contain lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBBs), polybrominated diphenyl ethers (PBDEs), bis(2-ethylhexyl)phthalat (DEHP), benzyl butyl phthalate (BBP), dibutyl phthalate (DBP), or diisobutyl phthalate (DIBP) above the legal limits.



## 16 List of Abbreviations

MRI	Multi Reference Input
BNC	Bayonet Neill–Concelman connector
ST	Straight tip
BFOC	Bayonet fiber optic connector
FO	Fiber Optic
IRIG	Inter Range Instrumentation Group
ESD	Electrostatic Discharge
ESDS	Electrostatic Discharge Sensitivity/Sensitive
GND	Ground
LTOS	LANTIME Operating System
PPS	Pulse per Second
TTL	Transistor–Transistor Logic
Web-UI	Web User Interface