



The Synchronization Experts.



## SETUP GUIDE

### IMS-RSC180

#### Hot-Plug Module

December 17, 2021

Meinberg Funkuhren GmbH & Co. KG



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# 1 Imprint

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## 2 Introduction

This Setup Guide is a systematically structured guideline to assist you with the set-up of your Meinberg product.

### Functionality of IMS-RSC180

The RSC Redundant Switch Control module controls the switchover mechanism between two reference clocks in redundant systems with two Meinberg clock modules. The RSC is used to switch between the connected clocks and to select the corresponding pulse, frequency outputs, and serial interfaces. The RSC module can be configured with various operating modes that dictate how the module switches between clocks. The status LEDs indicate which clock is currently selected as the Master Clock, as well as the current operating state of the switch control module.

Please refer to the LANTIME Firmware Manual for a more detailed description of all of the status monitoring configuration options and features available for your Meinberg product.

LTOS Firmware Manual Download:  
<http://www.mbg.link/doce-fw-ltos>

### Compatibility

The IMS-RSC180 is compatible with the following systems in the IMS product family:

IMS System	M500	M1000	M1000S	M2000S	M3000	M3000S	M4000	IMS-MDU
	✗	✗	✗	✗	✓	✓	✓	✓

The IMS-RSC180 can be used in the following slots:

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

## 3 Important Safety Information



Please ensure that IMS modules designed for "hot-plugging" (modules that are removable and insertable while a system is in operation) are always handled with the utmost care.

**Before performing any maintenance work on the system:**

- We recommend making a backup of any stored configurations (e.g. using a USB flash drive or from the Web UI)
- Take note of the chapter "Prevention of ESD Damage".
- Take note of the chapter "Power Supply".

### 3.1 Additional Safety Information



This manual contains important safety information regarding the installation and use of the device. Please read it through fully before setting up the device for use.

This device may only be used for the purpose described in this manual. In particular, the specified operating limits of the device must be heeded. The person setting up the device is responsible for safety matters in relation to any larger system in which the device is installed!

Failure to observe these instructions may have an adverse impact on device safety!

Please keep this manual in a safe and accessible place.

#### **Target Readership**

This manual is only intended to be used by qualified electricians, or by persons who have been appropriately instructed by qualified electricians and who are familiar with applicable national standards and safety rules & regulations, especially in relation to the installation of low-voltage (< 1000 V) installations.

## 3.2 Prevention of ESD Damage



### ATTENTION!

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



### Symbol Indicating Devices with ESDS Components

The following measures will help to protect ESDS components from damage and malfunction.

#### When preparing to dismantle or install devices:

Ground your body (for example, by touching a grounded object) before touching sensitive devices.

Ensure that you wear a grounding strap on your wrist when handling such devices. These straps must in turn be attached to an uncoated, non-conductive metal part of the system.

Use only tools and devices that are free of static electricity.

#### When transporting devices:

Devices must only be touched or held by the edges. Never touch any pins or conductors on the device.

#### When dismantling or installing devices:

Avoid coming into contact with persons who are not grounded. Such contact may compromise your connection with the earth conductor and thus also compromise the device's protection from any static charges you may be carrying.

#### When storing devices:

Always store devices 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 device has a lithium battery fitted on it.

### 3.3 Power Supply



#### WARNING!

The IMS system in which the module is used is operated at a dangerous voltage. Please refer to your IMS Manual for more information about safety.

When removing a hot-pluggable power supply unit, always disconnect its power cable before removing it from the IMS system.

Never open a power supply unit—there may still be hazardous residual voltages present even after disconnection from the mains supply. In the event that a power supply unit is no longer working (e.g. defective), please return it to Meinberg for repair.

Failure to observe these safety instructions may result in serious injury and/or property damage. The IMS system must only be installed, set up, and operated by qualified personnel.

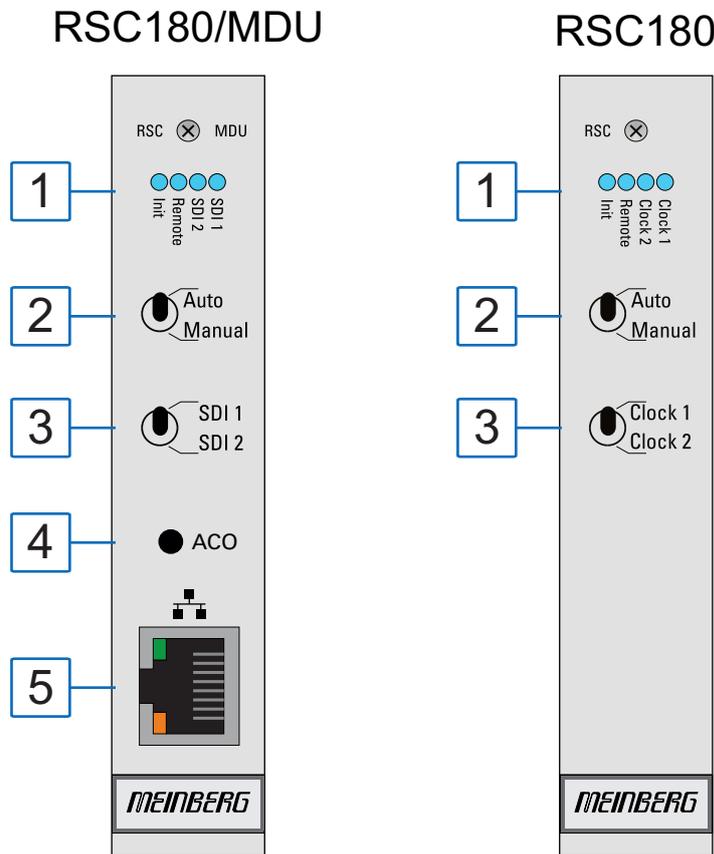
### 3.4 Cabling



#### WARNING!

Danger of death from electric shock! Never work on the system while the power is live! Always disconnect the cables from the devices at **both** ends before working on the plugs and terminals of connected cables!

## 4 LEDs, Switches, and Interfaces on the IMS-RSC180



### 1. LED Indicator

#### Clock 1 / Clock 2 (SDI 1 / SDI 2)

These LEDs show which of the two reference clocks is currently the "Master Clock".

#### Remote

This indicates whether the module is currently being managed remotely over an Ethernet connection. In remote mode, the Master Clock can be selected using an SNMP command. The most recent state set while in remote mode will be retained after control is handed back to the local automatic controller, unless this state is inconsistent with the control logic (e.g., if the clock has been configured to run solely from the oscillator).

#### Init

This LED lights up blue while the RSC switch control module is being initialized.

## 2. Auto/Manual Switch

This switch selects between Automatic and Manual mode. Manual mode overrides the module's internal selection logic and the reference clock used for signal generation can only be selected manually using the Clock 1 / Clock 2 switch. In Manual mode, outputs are always enabled, regardless of the synchronization state of the clocks.

### "Auto" Switch Position

The reference clock is selected by the RSC's internal control logic. The Master Clock is selected based on the TIME\_SYNC signals generated by the receivers, which indicate the synchronization status of the clocks.

To prevent switchovers from being unnecessarily performed (for example, if one clock regularly falls back to a free-running oscillator while the other is synchronized), the Master and Backup Clock will be swapped upon each switchover. This Master/Backup relationship will only be swapped back if the new Master Clock (formerly the Backup Clock) loses synchronization while the Backup Clock (formerly the Master Clock) is synchronized. If both clocks are running off their respective oscillators, no switchover will be performed; the current state will be retained and the outputs are disabled if so configured (using the menu & controls on the device's display).

**Important:** To ensure that the automatic switchover mechanism is effective, the remote management functionality must be disabled via the display panel menu: *Ref. Time* → *Switch Unit* → *SCU Cntl* → *MANUAL: disable*. If remote management is left active, the system will use the clock selected by the manual control mechanism and the unit will not switch over to the current Master Clock.

### Manual Mode (Display Panel Menu)

In Manual mode, the reference clock is selected from the display panel menu. In this case, errors will not cause the reference clock to be switched over, and pulse & frequency outputs as well as the serial interfaces will remain enabled.

Menu: *Switch Unit* → *SCU Cntl* → *MANUAL : enable*

### Note:

A LANTIME Display Unit (LDU) can optionally be used for systems without a display panel (M1000S and M3000S).

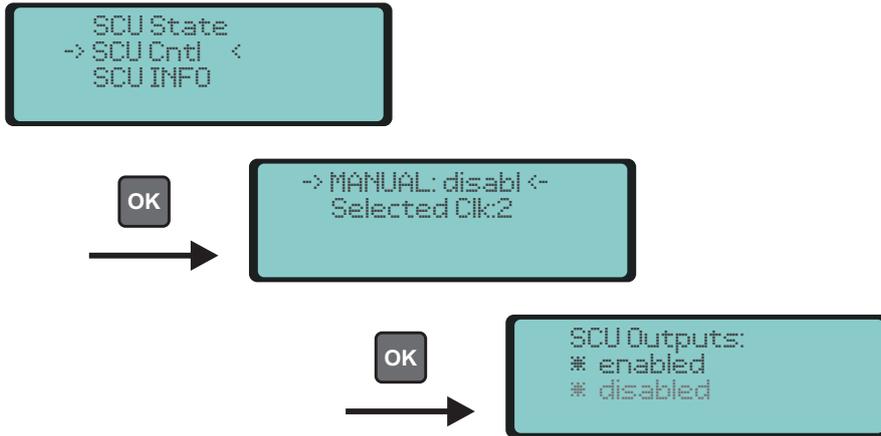
### Menu "Switch Unit → SCU State"



This menu displays the status information of the RSC:

Mode:	Manual   Automatic
CLK1 / CLK2:	Status of reference clocks
MUX:	Enabled   Disabled - Status of output signals while clock is running from oscillator
Selected Clk:	Selected reference clock (1 or 2)

Menu "Switch Unit → SCU Cntl"



MANUAL: Enabled | Disabled Switches between automatic and manual mode  
 Selected Clk: 1/2 Selects the master reference clock

### 3. Clock 1 / Clock 2 Switch (SDI 1 / SDI 2)

This switch is used to manually select the receiver or input reference in "Manual" mode. No automatic switchover is performed in the event of the selected input reference losing its signal.

### 4. ACO Button (Access Control Override)

The button labeled ACO can be used if the access password has been forgotten. However, it will only work if there is no connection with the "Meinberg Device Manager" software. If it is held down for a short time (for around four seconds), the set password will be reset for 30 seconds to a blank field (i.e., you can simply press RETURN when prompted for the password). After these 30 seconds, the system will then restore the password to its previous value. This applies to connections made via both Telnet and mbgdevman. If a connection to mbgdevman is established during the 30 seconds, the "empty" password will remain valid for the duration of this connection (even if this connection is upheld for longer than 30 seconds). In this case, the old password will only be restored when the connection is terminated.

### 5. Network Interface (MDU only)

RSC switching modules used in an MDU system feature a network interface which can be used to configure the system and components of the system; for this purpose you will require the "Meinberg Device Manager" software.

Download and documentation: <https://www.meinbergglobal.com/english/sw/mbg-devman.htm>

## 4.1 RSC180: DIP Switches

The various modes of the board can also be configured using onboard DIP switches.

### Configuration Using DIP Switches

SW	NAME	Description
1	DIS_ENA	Enables / disables signals if both clocks are out of sync
2	DIS_MAN	Enables / disables manual override via front panel controls
3	DIS_REM	Enables / disables remote mode
4	FUNCTION	RSC board functionality: either in an IMS system or as LAN interface
5	Reserve	
6	Reserve	
7	Reserve	
8	DIS_MST	Enables / disables "Priority Master" clock selection
9	Clk1_Clk2	Selects Master Clock 1 or Clock 2 based on priority
10	EN_CLK	Activates the clock with a sync event after reset (only if DIP 1 is ON).



Figure: DIP Switches on RSC180

### Description of DIP\_SW positions:

#### Switch 1 Positions:

- (0) OFF: If both clocks are out of sync, all output signals are disabled.
- (1) ON: Even if both clocks are out of sync, outputs remain enabled on one of the clocks.

#### Switch 2 Positions:

- (0) OFF: Front panel control functions enabled.
- (1) ON: Front panel control functions disabled.

#### Switch 3 Positions:

- (0) OFF: Remote control enabled.
- (1) ON: Remote control disabled.

#### Switch 4 Positions:

- (0) OFF: The RSC board is used in an IMS system.
- (1) ON: LAN interface is enabled for configuration and monitoring.

Switch 5-7 Reserves.

#### Switch 8 Positions:

- (0) OFF: "Priority Master" mode is disabled.
- (1) ON: "Priority Master" mode is enabled.

If Switch 8 is ON:

Switch 9 Positions:

- (0) OFF: The "Priority Master" is Clock 1.
- (1) ON: The "Priority Master" is Clock 2.

If Switch 1 is ON:

Switch 10 Positions:

- (0) OFF: One clock is always enabled, even if out of sync.
- (1) ON: A clock is only enabled after the first sync event following a reset.

## 5 Before You Start

### 5.1 Contents of Delivery

Unpack the IMS-RSC180 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: [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.

### 5.2 Disposal of Packaging Materials



The packaging materials we use are fully recyclable:

Material	Use for	Disposal
Cardboard	Shipping, packaging of accessories	Paper recycling
Plastic Wrapping	Shipping, packaging of accessories	Household waste or recycling depot

## 6 System Installation

### 6.1 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:

**PWR Slot:** "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 on.

**I/O, ESI and MRI Slots:** "Hot-Pluggable".

**CLK1/CLK2 Slots:** "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.

**RSC/SPT Slots:** "Hot-Pluggable" It will not be possible for your IMS system to switch between signal generators while the RSC/SPT is not installed.

**CPU Slot:** "Not 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!



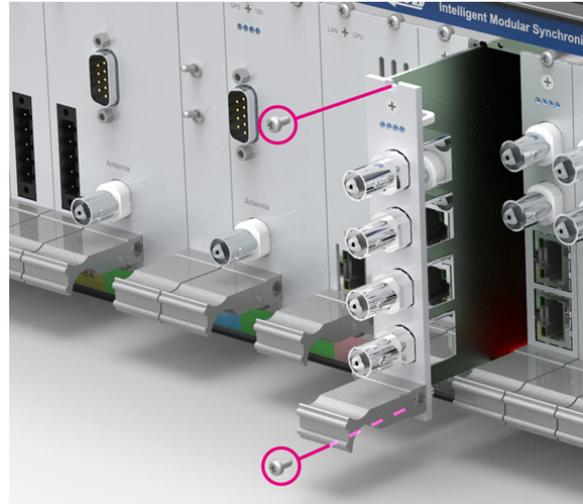
The NTP service and access to the web interface will be unavailable while the CPU is not installed. Management and monitoring functions will also be disabled.

## 6.2 Installation of Hot-Pluggable IMS Modules.

If the system is supplied with an antenna and antenna cable, it is advisable to first mount the antenna in a suitable location (refer to the chapter "Mounting the Antenna" in your IMS system manual) and to lay the antenna cable.

Please use a Torx screwdriver (T8 x 60) to remove and install IMS modules.

1. Follow the safety instructions at the beginning of this manual!
2. Remove the two marked Torx screws from the module holder plate or the cover plate of the empty slot.
3. **Please note when removing modules:**  
The module must be pulled **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 in the system backplane, the module can be easily pulled out.
4. **Please note when installing modules:**  
Ensure that the module is correctly inserted into the two guide rails of the system chassis. Failure to do so may result in damage to the module and chassis. Ensure that the module is securely seated in the connector block inside the chassis before you fasten the two screws.
5. The installed module is now ready for use.



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

## 6.3 RSC Switch Card: Monitoring and Mangement

### 6.3.1 Configuration Using IMS-RSC180 via Web Interface

State & Configuration

**GNS Clock [CLK1 - Sync to GNS]:**

MRS State MRS-Settings IRIG Settings Serial Ports Miscellaneous

Initialize Receiver

**GPS Clock [CLK2 - Sync to GPS]:**

MRS State MRS-Settings IRIG Settings Serial Ports Miscellaneous

Initialize Receiver

**Switch Card:**

IRIG Settings Programmable Pulses Synthesizer Time Zone

Enable Outputs Miscellaneous Initialize Receiver

Output Timecode  
B002+B122

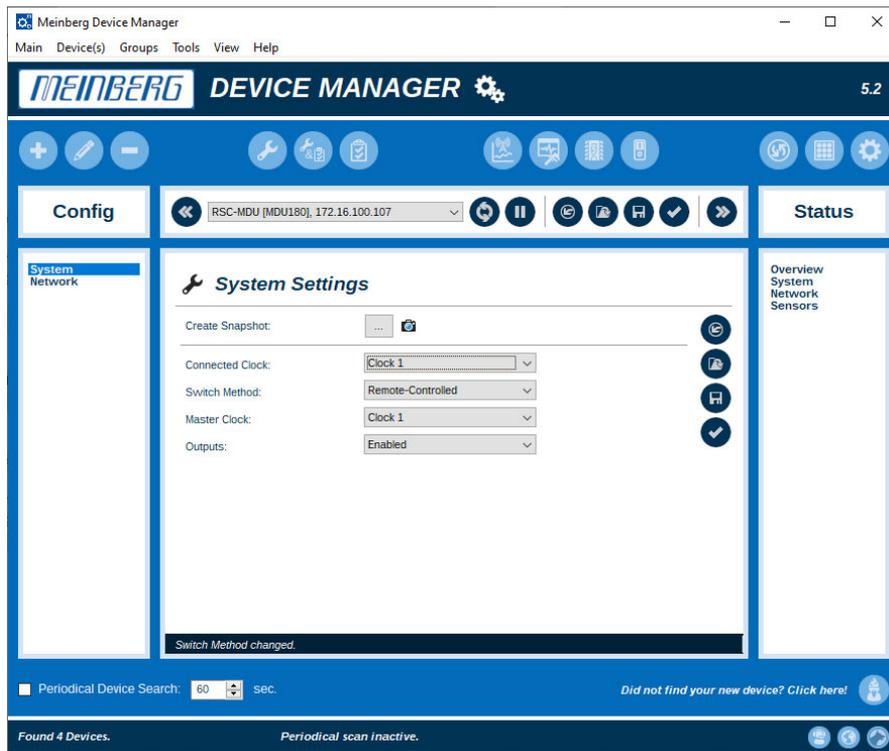
Time Scale  
UTC

The following parameters are configured via the RSC module when using two receiver modules (redundant mode).

- IRIG Settings:** Selection of the desired time code (output).
- Programmable Pulses:** Configuration of the Programmable Pulse Outputs (PPO\_1 - PPO\_4).
- Synthesizer:** Selection of output frequency (1/3 Hz to 10 MHz) and phase (-180° bis + 180°).
- Time Zone:** Selection of local time zone offset from UTC.
- Enable Outputs:** Outputs always active or only when receiver is synchronized.
- Miscellaneous:** GPS time scale (UTC, TAI or GPS), SSM Quality Level .
- Initialize Receiver:** Initialization of date/time for both clocks.

Comprehensive documentation about the LANTIME Web Interface is available for download from our website: <http://www.mbg.link/doce-fw-ltos>

### 6.3.2 Configuration Using RSC/MDU and Meinberg Device Manager



#### "System Settings" Menu in Meinberg Device Manager.

The switchover mode can be selected in this menu. If the selector switch on the RSC module is set to "Auto", it will be possible to select "Remote-Controlled" here. This enables the Master Clock to be selected via the Meinberg Device Manager software.

Please refer to the Meinberg Device Manager manual for a detailed overview and description of all configuration and monitoring options:

<https://www.meinbergglobal.com/download/docs/manuals/english/meinberg-device-manager.pdf>

Meinberg Device Manager can be downloaded free of charge from the following link:

<https://www.meinbergglobal.com/english/sw/mbg-devman.htm>

## 7 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)

## 8 RoHS and WEEE

### Compliance 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". We ensure that 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.



### WEEE status of the 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 must 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.

