



# MANUAL

## AMX21/HS

### Antenna Switch Unit

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Meinberg Radio Clocks GmbH & Co. KG



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# 1 Imprint

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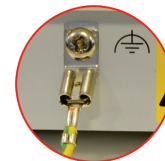
Date: 2015-11-03

## 2 Safety instructions for building-in equipment

This building-in equipment has been designed and tested in accordance with the requirements of Standard IEC60950-1 "Safety of Information Technology Equipment, including Electrical Business Equipment".

During installation of the building-in equipment in an end application (i.e. rack) additional requirements in accordance with Standard IEC60950-1 have to be taken into account.

NOTE: First attach the case to protective earth - before you connect the AMX21/HS with the power line (see chapter Grounding connection AMX21/HS).



GND

### General Safety instructions

- The building-in equipment has been evaluated for use in office environment (pollution degree 2) and may be only used in this environment. For use in rooms with a higher pollution degree more stringent requirements are applicable.
- The equipment/building-in equipment was evaluated for use in a maximum ambient temperature of 40°C.
- The building-in equipment may not be opened.
- Protection against fire must be assured in the end application.
- The ventilation opening may not be covered.

### For AC Supply 100-240VAC

- The building-in equipment is a class 1 - equipment and must be connected to an earthed outlet (TN Power System).
- For safe operation the building-in equipment must be protected by max 16 A fuse in the power installation system.
- Disconnection of the equipment from mains is done by pulling the mains plug at the outlet. Don't use the connector at the module for disconnection from mains.

### For DC Supply 100-240VDC

- The device can be disconnected outside the unit in accordance with the regulations as in EN 60950 (e.g. through primary side line protection).
- Assembling and disassembling of the power connector is only allowed if the device is disconnected from power supply (e.g. through primary side line protection).
- All feed lines are sufficiently protected and dimensioned.

Fuse: T3A  
Connector Diameter: 1mm<sup>2</sup> - 2,5mm<sup>2</sup> / 17AWG - 13AWG

## 2.1 Additional Safety Hints



This manual contains important information for the installation and operation of this device as well as for your safety. Make sure to read carefully before installing and commissioning the device.

Certain operating conditions may require the observance of additional safety regulations not covered by this manual. Nonobservance of this manual will lead to a significant abatement of the security provided by this device. Security of the facility where this product is integrated lies in the responsibility of the installer.

The device must be used only for purpose named in this manual, any other use especially operation above the limits specified in this document is considered as improper use.

Keep all documents provided with the device for later reference.

This manual is exclusively for qualified electricians or by a qualified electrician trained personnel who are familiar with the applicable national standards and specifications, in particular for the construction of high voltage devices.

## 2.2 Supply Voltage



### **WARNING!**

This device is powered by a dangerous voltage. Nonobservance of the safety instructions of this manual may lead to serious damage to persons and property and to danger to life! Installation, commissioning, maintenance and operation of this device are to be carried out by qualified personnel only.

The general safety instructions and standards ( e.g. IEC, DIN, VDE, EN ) for installation and work with high voltage equipment as well as the respective national standards and laws must be observed.

**NONOBSERVANCE MAY LEAD TO SERIOUS DAMAGE TO PERSONS AND PROPERTY AND TO DANGER TO LIFE!**

The device may not be opened. Repair services may only be carried out by the manufacturer.

Supply lines for this device must be equipped via an appropriate switch that must be mounted close to the device and must be marked as a mains switch for the device.

To ensure safe operation supply mains connected to this device must be equipped with a fuse and a fault-current circuit breaker according to the applicable national standards for safe operation.

The device must be connected to a protective earth with low grounding resistance according to the applicable national rules.

## 2.3 Cabling



### **WARNING!**

**DANGER TO LIFE BY ELECTRICAL SHOCK! NO LIVE WORKING!**

Wiring or any other work done the connectors particularly when connectors are opened may never be carried out when the installation is energized. All connectors must be covered to prevent from accidental contact to live parts.

ALWAYS ENSURE A PROPER INSTALLATION!

## 2.4 Safety Hints Antenna



### **WARNING!**

**DANGER TO LIFE BY ELECTRICAL SHOCK!**

Make sure to comply with the occupational health and safety standards when installing the antenna. Never work without a proper fall protection device!

Do not carry out any installation or maintenance work on the antenna system or cabling when there is a potential risk of lightning.

### **Surge Voltage Protector**

Due to extremely high currents associated with lightning no surge protection device can provide absolute safety from the impacts caused by lightning!

## 2.5 Replacing the Fuse

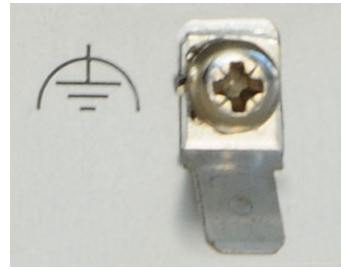


- Keep a spare fuse ready for replacement. Make sure rated current and characteristics are correct.
- Disconnect all signal lines, such as error relais, serial cables and GPS antenna.
- Disconnect the device from mains! Afterwards loose the locking screws of the power connector (if present) and remove the plug from the device.
- Replace the fuse.
- Connect all cables and signal lines in reverse order and switch on the device after checking there is no potential danger caused by the installation.

## 2.6 Grounding connection AMX21/HS

**Note:**

To ensure a safe operation and to fulfil the requirements in accordance with DIN EN 60950, the system must be correctly connected to an equipotential grounding bus. On the rear panel of the system a grounding connector is provided.

**Note:**

Use a grounding cable with  $\geq 1,5\text{mm}^2$   
Please ensure a correct crimp connection!



## 3 AMX21/HS Features

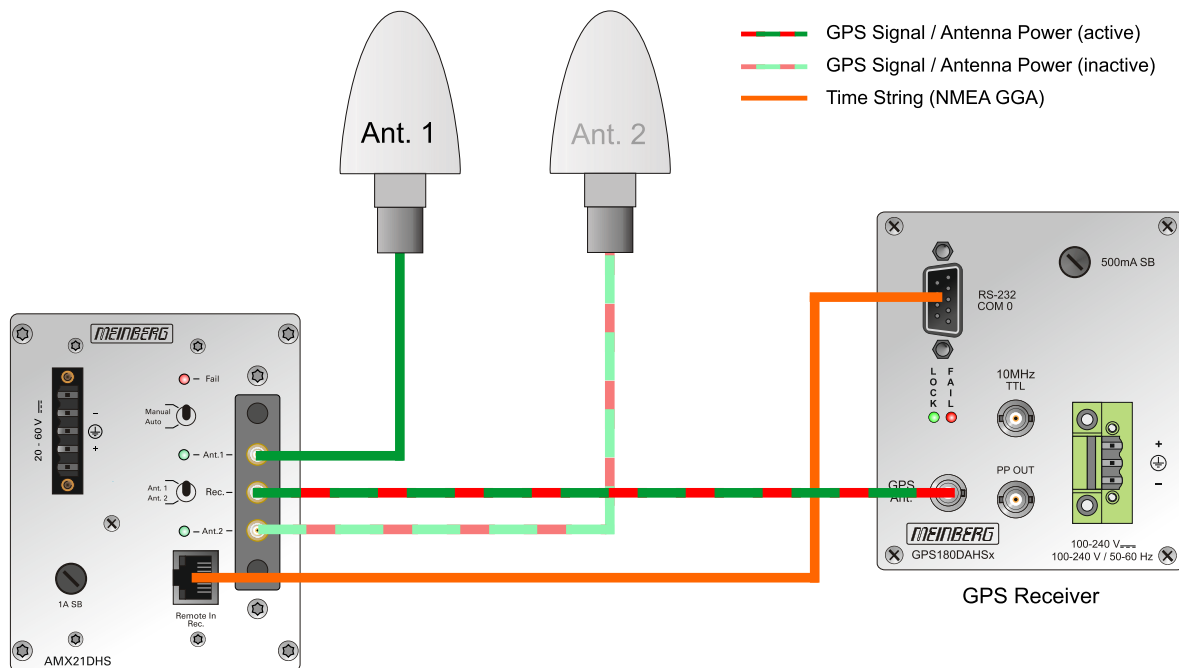
### Functionality:

The AMX21/HS switching unit expands the redundancy concept on to the antenna. A receiver can now be connected with two antenna/converter units. If an antenna fails or provides poor reception, the switchover to the other antennae will be done either automatically or manually, depending on the pre-selected mode.

The switchover between the two antenna/converter units can occur manually as well as automatically. A switch is available for choosing between the two operating modes. In the "Manual" mode a second switch can be used for direct switching between the two antennas.

In "Auto" mode the switching between the antennas depends on the number of visible satellites. This information is transmitted via time string (NMEA GGA format). The NMEA Time String is generated by the connected GPS receiver.

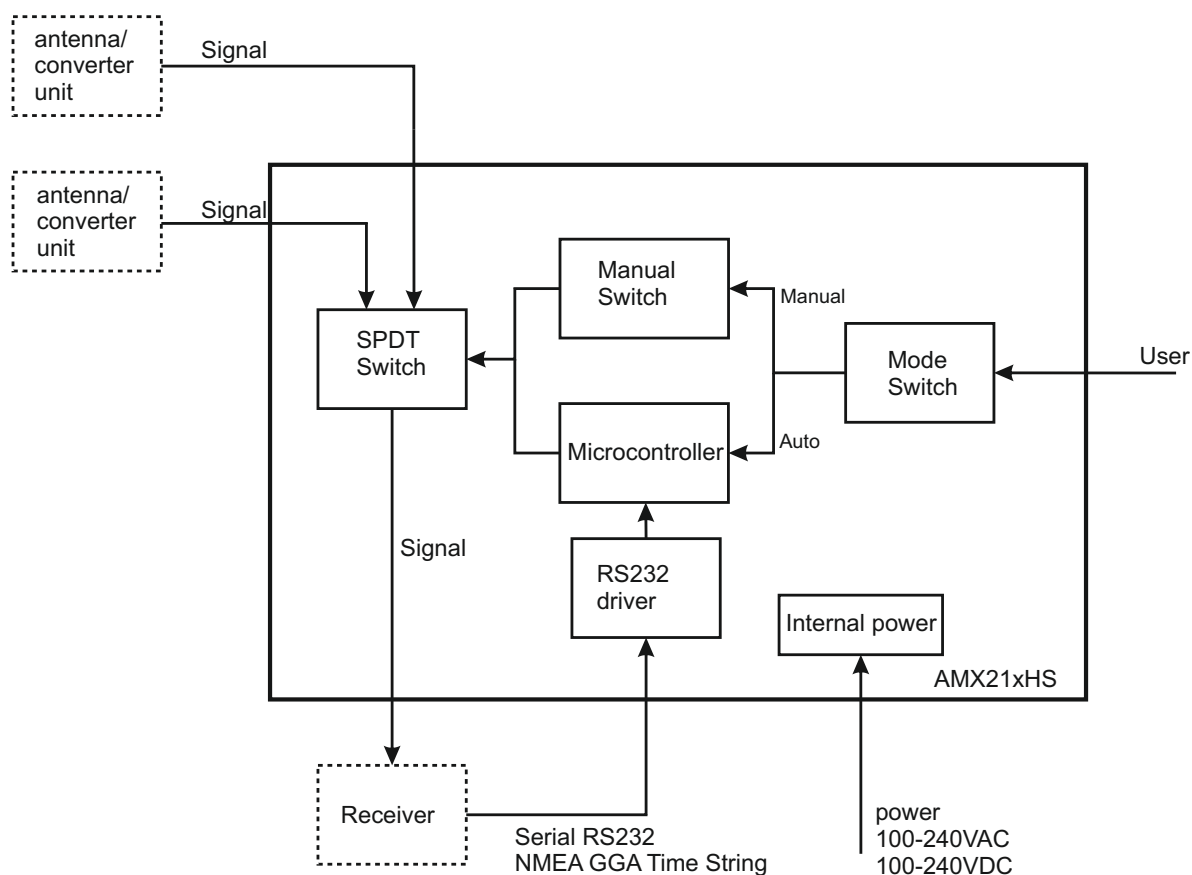
In Auto mode the antenna selector switch is without function.



The switching unit AMX21/HS is designed for mounting on a DIN rail. The front panel integrates two switches, three LED indicators and three SMA connectors. The integrated power supply is available as an AC (AMX21DAHS) and a DC variant (AMX21DHS).

The antenna/converter units are connected to the switching unit by a 50Ω coaxial cable. The output of the switching unit – the chosen antenna signal – is connected to the receiver in the same way. It is possible to connect up to four receivers to one antenna by using an optional antenna diplexer.

### 3.1 Block Diagram AMX21



#### Electrical Specifications SPDT Switch

$T_A = +25\text{ }^{\circ}\text{C}$ ,  $V_{ctl} = 0/V_{dd}$ ,  $V_{dd} = +3\text{V to } +5\text{V}$ , 50 Ohm System

| Parameter                  | Frequency     | Min. | Typ. | Max. | Units |
|----------------------------|---------------|------|------|------|-------|
| Insertion Loss             | DC - 2.0 GHz  |      | 0.9  | 1.3  | dB    |
|                            | 2.0 - 4.0 GHz |      | 1.0  | 1.5  | dB    |
|                            | 4.0 - 6.0 GHz |      | 1.8  | 2.5  | dB    |
| Isolation (RFC to RF1/RF2) | DC - 2.0 GHz  | 53   | 60   |      | dB    |
|                            | 2.0 - 4.0 GHz | 48   | 56   |      | dB    |
|                            | 4.0 - 6.0 GHz | 35   | 50   |      | dB    |

## 4 Installation

### 1. Power Supply

The module is designed for following power supply options:

|           |                            |
|-----------|----------------------------|
| AMX21DHS  | 20...60 V DC               |
| AMX21DAHS | 100...240 V DC             |
|           | 100...240 V AC, 50...60 Hz |

The voltage feed is done via 5 pole screw terminal in the front panel of the device and should have low resistance to minimize spurious emission (EMI). A fuse is integrated and available at the front panel. To avoid potential differences between the signal ground of AMX21xHS and a post-connected unit installed on different DIN rails, the signal ground of the clock is insulated from the case.

**The case must be grounded by using the rear contact.**

### 2. Powering up the system

If both, the two antennas and the power supply have been connected, the system is ready to operate.

### 3. The front panel layout

#### - **Ant. X LEDs**

The LEDs Ant. 1 and Ant. 2 show the switching status of the output Rec. LED Ant. 1 lights up when the signal from antenna 1 is available on the output Rec. Therefore is Ant. 2 lighted up when the signal from antenna 2 is present on the output.

#### - **Fail LED**

LED Fail is lighted up if no timestring is available from the receiver – only in Auto mode.

#### - **SMA connector Ant. 1/ Ant. 2**

These two SMA connectors will be each connected with an antenna/converter unit.

#### - **SMA connector Rec**

The signal of the chosen antenna is available on this SMA connector. It has to be connected to the receiver.

#### - **Remote In Rec**

This serial RS232 interface will be also connected to the receiver via RJ45 connector. The time-telegram, which is generated from the receiver, have to be analyzed. For this it will be sent to the internal microcontroller of the AMX21/HS system via this serial interface. A connection to the receiver is necessary in both modes - automatic and manual mode.

## 5 Technical Data AMX21/HS

|                                  |   |
|----------------------------------|---|
| <b>Power supply:</b>             | 20...60 V DC<br>100...240 V DC<br>100...240 V AC, 50...60 Hz  |
| <b>Operation Voltage Antenna</b> | 5...18 V DC   |
| <b>Bandwidth:</b>                | DC to 6 GHz   |
| <b>Electrical connectors:</b>    | coaxial SMA female connectors<br>5pin screw terminal for connecting the power supply<br>serial RS232 interface via RJ45 jack for connecting with the receiver (Auto-Mode) |
| <b>Control elements:</b>         | two switches for choosing the operating mode and the antenna  |
| <b>Status info:</b>              | two LEDs show which antenna is chosen<br>FAIL-LED shows that no serial string is available (in Auto-Mode only)  |
| <b>Physical dimensions:</b>      | 105 mm x 85 mm x 104 mm (H x W x D) for 35 mm DIN mounting rail   |
| <b>Ambient temperature:</b>      | 0...45 °C   |
| <b>Humidity:</b>                 | max. 85 %   |

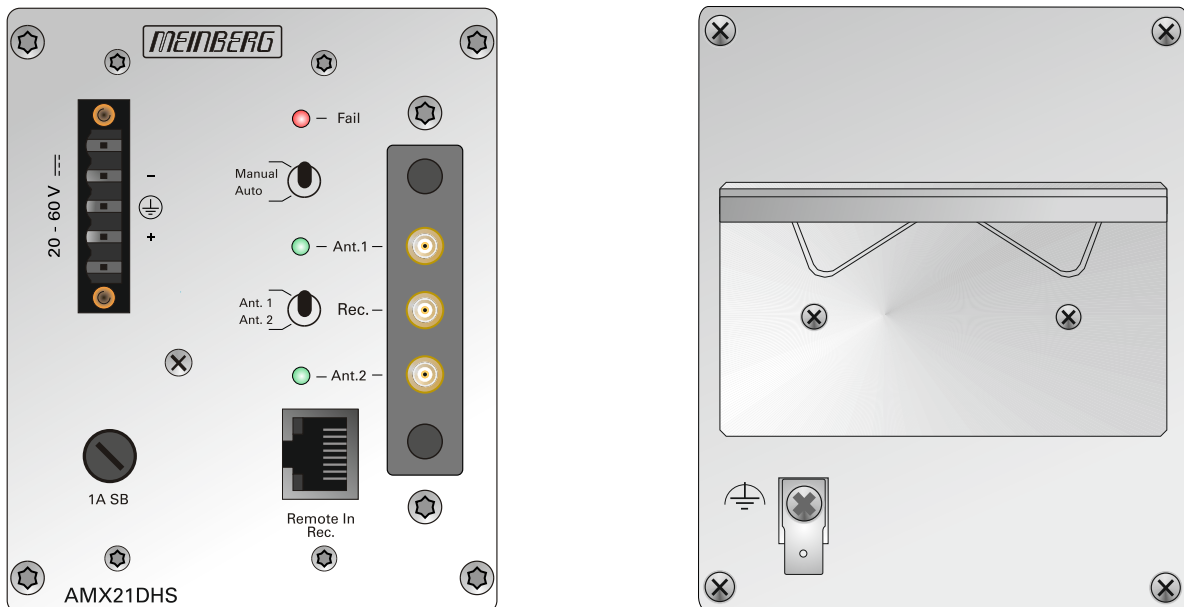


Figure: Front- and Rear View AMX21DHS - Connectors and DIN Rail