REMOS SPACE SYSTEMS AB

GROUND STATION AUTOMATION UNIT

SEQUENCER

INSTRUCTION MANUAL

Rack-Mounted Control and Switching Platform

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Revision	Firmware Version	Date	Nature of Revision
1	v1.0.0	2025-07-01	First release of the Sequencer manual, including physical characteristics, `Modbus TCP/IP` integration, and network configuration guidance.
2	v1.0.0	2026-03-27	Updated the manual presentation to a released product format. Added branded opening and closing pages, formal front matter, and the **Safety, Cautions, and Operational Constraints** section. Improved overall clarity, document-control metadata, headers and footers, and corrected labels, references, formatting, and LaTeX cleanup items.

Scope

This manual defines the released operational description of the Remos Sequencer hardware unit, its external interfaces, and the baseline procedures used for installation, network commissioning, and host-system integration. It is intended to support deployment of the Sequencer in automated ground-station workflows where deterministic switching and ordered control actions are required.

The manual covers the physical unit overview, environmental and interface characteristics, operator-visible hardware features, and the `Modbus TCP/IP` path used by host software such as Expedite. Customer-specific hardware mappings, relay assignments, or firmware extensions may be documented separately where applicable.

Intended Audience

This manual is intended for integration engineers, test engineers, operators, and technical personnel who install, configure, or interface external systems with the Remos Sequencer.

The reader is expected to be familiar with Ethernet networking, rack-mounted hardware integration, basic RF-site precautions, and the relevant host software used to control the Sequencer.

Conventions Used In This Manual

The following conventions apply throughout this manual:

- Interface names, IP addresses, ports, commands, and example values are written in monospace.
- User-interface labels and on-screen fields are written in bold when they refer to visible controls or displays.
- `Modbus TCP/IP` references in this manual describe the released host interface baseline for the documented firmware revision.
- Customer-specific wiring, switching assignments, and relay logic may differ between delivered units and shall be confirmed against the delivered configuration.

Controlled Baseline

This document defines the released baseline for Sequencer firmware version **v1.0.0**, unless otherwise stated. Where a delivered unit includes customer-specific hardware mappings, additional interfaces, or later firmware changes, the delivered configuration shall take precedence over generic examples in this manual.

Safety, Cautions, and Operational Constraints

- External RF paths, relays, and switching chains shall be verified before live operation.

- Power, grounding, and network connections shall be checked before remote commanding is enabled.
- Customer-specific relay actions and output mappings shall be confirmed before issuing automated or remotely triggered sequences.
- Host access to `Modbus TCP` port `502` shall be validated as part of commissioning.

System At A Glance

The Remos Sequencer is a rack-mounted automation unit intended to execute deterministic control actions within a ground-station chain. It provides Ethernet connectivity for host integration, local status visibility on the integrated display, and configurable switching behavior for mission-specific workflows.

Contents

1 System Overview

The Remos Sequencer is engineered to integrate with external host systems over Ethernet networks, providing deterministic control and monitoring through a `Modbus TCP/IP` interface. Core capabilities include ordered switching, status indication via the front-panel LCD and indicators, and remote configurability for deployment in ground-segment environments.

Figures 1 and 2 illustrate the front and back panels of the unit. The front panel includes an LCD display that provides real-time system status, including relay states and internal temperature, as well as two USB ports for connecting a keyboard and mouse. These peripherals allow direct interaction with the sequencer's onboard interface, functioning similarly to a standard embedded PC. The rear panel houses RF connectors, a power input, and an Ethernet port, supporting both data interfacing and power delivery.

This manual outlines the mechanical specifications, connectivity options, interface behavior, and integration guidance needed for effective deployment of the Remos Sequencer within satellite ground-station infrastructures.

Figure 1: The front panel of the sequencer

Figure 2: The back panel of the sequencer

2 Environmental Characteristics

- **RF Connection:**
  - ☐ Radio Tx and Rx : SMA Female
  - ☐ Antenna Tx and Rx : N-Type Female
- **Mechanical and Environmental Specifications:**
  - ☐ Chassis Size: 4U
  - ☐ Chassis Weight: 12 kg
  - ☐ Chassis Dimensions: 482.6 x 177 x 425 mm
  - ☐ Operating Temperature Range: 10 to 40 °C
  - ☐ Storage Temperature Range: -20 to 70 °C
  - ☐ Humidity: 10% to 90%, non-condensing
  - ☐ Cooling: Forced-air, side-to-back airflow
  - ☐ Mounting: Standard 19-inch rack-mount
- **Power Requirements:**
  - ☐ Frequency: 50/60 Hz
  - ☐ Voltage: 110-240 V AC
  - ☐ Power Consumption: 200 W max (regular operations)
  - ☐ Power Connector: IEC 60320 C14
  - ☐ Max Power Rating: Combined up to 300 W
- **Interface and Connectivity:**
  - ☐ Ethernet Ports: 1 x Realtek 2.5 GbE
  - ☐ USB Ports (Front): 2 x USB 3.2
  - ☐ Display Interface: Integrated touchscreen LCD
  - ☐ Control Interface: `SSH`, `REST API`, `Modbus`
- **Software Features:**
  - ☐ Sequencer: Packet sequencing generated by Expedite modem
  - ☐ IP Address: Displayed on the integrated touchscreen

3 Connecting the Sequencer to a Host System

■ **Establish `TCP/IP` Connectivity**

☐ Connect the sequencer to your local Ethernet network using a standard RJ-45 cable.

☐ Ensure the device is powered and properly grounded.

■ **Identify the Sequencer's IP Address**

☐ Read the sequencer IP address directly on the LCD screen, as shown in Figure 3.

Figure 3: IP address on the Sequencer LCD interface

■ **Enter the Address in the Host System** Once identified, enter the IP address into the host control software's Sequencer configuration field. Ensure that `Modbus TCP` port `502` is reachable and not blocked by local firewall policy.

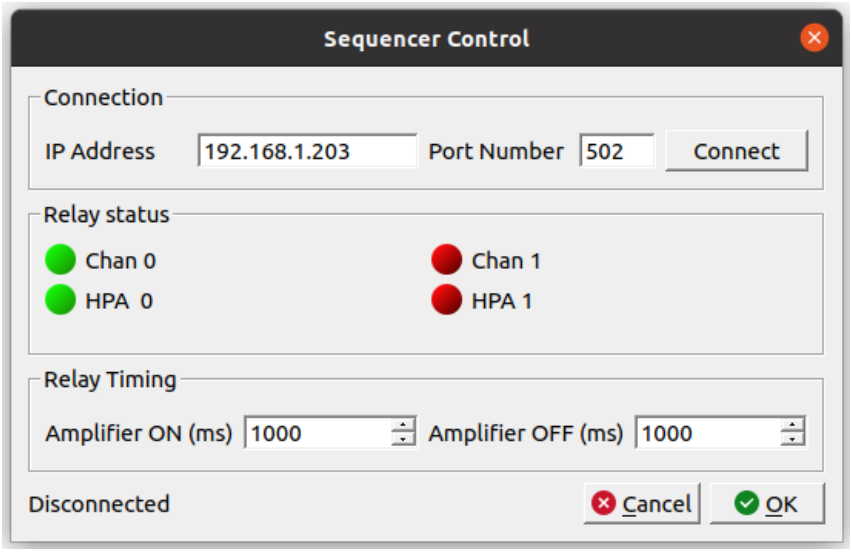

Figure 4: Setting sequencer connection in Expedite

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