



Remote Universal Communication System

RDM21

Distribution

Module

Installation Guide and User Manual

Version 1.0



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INSTALLATION GUIDE AND USER MANUAL

RUCS DISTRIBUTION MODULE (RDM21)

The RUCS Distribution Module (DM) model 21 is a high-power, ruggedized, outdoor meshing access point designed for the connection and extension of existing networks and internet services. DM's are connected to the internet through an existing router or a RUCS Portable Communications Link (PCL) and then mounted outside in a high location for maximum range.

All RDM21s incorporate three radio modules, one 3x3 MU-MIMO 2.4-GHz radio that functions as the access point for local Wi-Fi connections, and two with 2x2 MIMO 5-GHz radios for meshing backhaul connections. Default bandwidth is 80Mhz for the 5GHz links and 20Mhz for 2.4Ghz. Power is typically provided through a Cat6 cable via the included Power-over-Ethernet (POE) injector.

Distribution Module Installation Guide

Before installation, please confirm all listed parts are included in kit.

Included kit parts:

- 1 – RUCS Distribution Module with building/pole mount and hardware
- 3 – Omni directional 2.4-GHz antennae (mount directly to bottom of DM case)
- 4 – RPSMA (male) to N-Type (male) cable connectors for flat panel antennae
- 2 – Directional 2x2 5-GHz flat panel antennae with mounting hardware
- 1 – 48-volt gigabit rated POE Injector. Power input is 120VAC.
- 1 – Installation Hardware Kit with:
 - 1 – 14-foot Cat5e ethernet cable
 - 1 – Ethernet cord cap
 - 1 – Hex tool for DM Mounting Bracket bolts
 - 2 – Pole to Mounting Bracket “U” bolts w/ nuts
 - 4 – Wall Anchor Screws

Other items that may be required for installation include, but are not limited to:

1. Longer length of outdoor rated Cat5e or Cat 6 ethernet cable (100m max wire length)
2. Additional hardware for building or pole mount meeting specific location needs and requirements.
3. Ladder or lift, drill, drill bits, screwdrivers, and other hand tools.

Distribution Module (DM) Placement and Installation

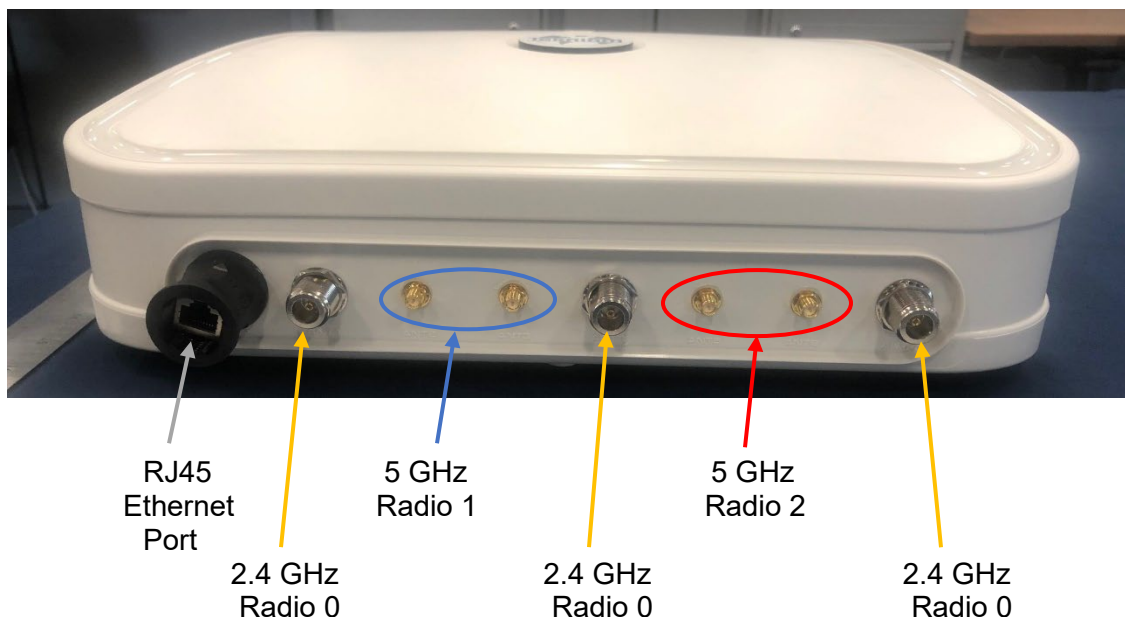
Installation should be completed only by a qualified professional.

The DM should be installed on a pole or building a minimum of 5 meters above the ground in a location with clear lines-of-sight between DM's and above potential obstructions such as adjacent structures and other objects that may cause interference. Site review and device placement should be evaluated by the installation specialist to determine the best location for the DM that meets network operational parameters. Identifying locations for the DMs that meet client connection needs that also provide clear lines-of-sight between DM's that are planned to mesh or connected is critical for the implementation of a successful Wi-Fi system.

Assemble the Distribution Module

Complete the initial assembly steps on a work bench or table:

1. Install the Mounting Bracket to the back of the DM using the 4 included hex-head screws. Tighten with the included hex tool – DO NOT OVER TIGHTEN!
2. Screw the 4 - RPSMA (male) to N-Type (male) cable connectors to the 4 – RPSMA (female) connectors on the base of the DM. Hand tighten to snug fit only. Wrap connection with waterproofing tape.
3. Install 3 - Omni antenna for Radio 0 to the 3 “N-Type” connectors on the base of the DM. Hand tighten to snug fit only. Wrap connection with waterproofing tape.



Ethernet and Antenna Connections on Bottom of DM

Install the Distribution Module and Antennae

The DM and flat panel antennae can be mounted to a flat vertical surface or on a pole (2" maximum diameter) using the provided mounting brackets and hardware. The DM must be mounted outside, as high as possible, with all attached antennae and cables pointing straight down.

The Base DM is connected and energized using the appropriate length of Ethernet cable between the DM and the internet router or a RUCS Portable Communications Link (PCL). Remote DMs are connected only to the POE power supply or alternate power sources such as solar, wind, or battery units installed as part of the overall solution when 120VAC line power is unavailable.

The 2.4 GHz access point radio in each DM is configured to scan for the best radio channel using auto-channel technology, sensing neighboring RUCS Distribution Modules and adjusting the configuration of each set of connected 2.4 GHz radios to channels with minimal interference to maximize system speed and overall throughput.

Mount the two 5-GHz flat panel directional antennas to the building or pole using the provided brackets and hardware near the associated DM. Install one panel antenna below the DM (for Radio 1) and the second antenna above the DM (for Radio 2).

Connect the flat panel antennas using the provided 3' cables previously connected to the DM on the work bench during the assembly Step. Radio 1 connects to the pair of connectors on the left half of the DM nearest the Cat5 cable connection and Radio 2 connects to the pair of connectors on the right half of the DM – see exhibit above.

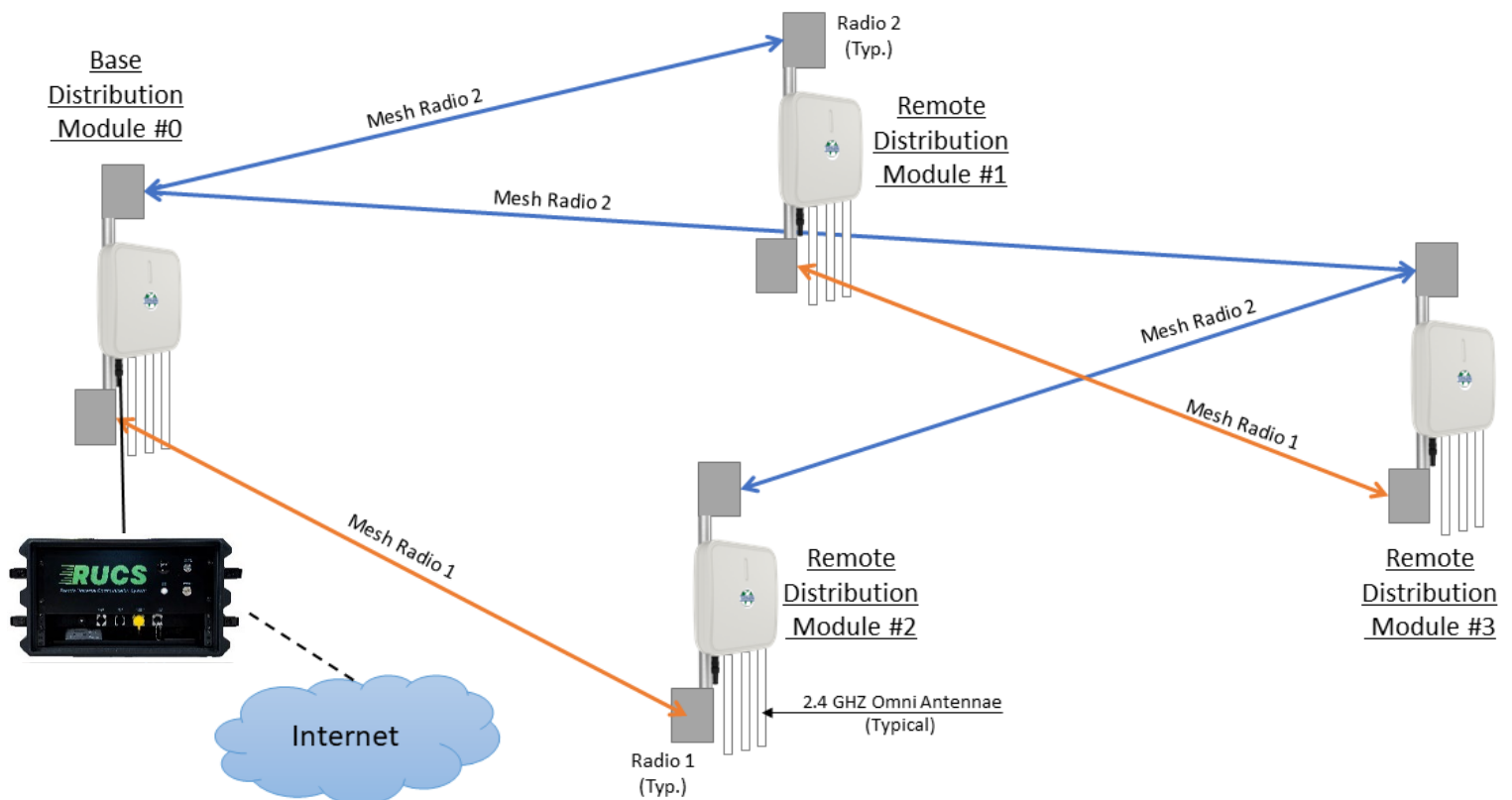
Wrap cable connections to flat panel antennae with waterproofing tape.

Install the provided ethernet cord cap on the ethernet cable to be connected to the RUCS for the existing internet connection. Plug in the ethernet cable and screw in the cord cap. DO NOT OVER TIGHTEN.

NOTE: To reduce potential for water damage, make sure the DM is mounted with antenna and cables are at the bottom and pointed down, that all antenna connections are wrapped with waterproofing tape, and that the ethernet cable has a drip loop if entering a building or equipment enclosure.

For best meshing performance, the integrated modular 5 GHz radios are intended to be connected in matching sets (i.e., DM0-Radio 1 pairs with DM2-Radio 1, DM0-Radio 2 pairs with DM1-Radio 2 and DM3-Radio 2, etc.)

The 5GHz Mesh Radio 1 defaults to channel 36. The 5GHz Mesh Radio 2 defaults to channel 149. These channel settings are remotely adjustable if required due to site conditions.



Meshing Network Schematic

Aim the flat panel antenna towards the DM to be paired with, aligning first DM Radio 1 panel antenna towards target DM Radio 1 panel antenna, and aligning first DM Radio 2 antenna towards next DM's Radio 2 antenna.

Note: Radio 1s will mesh to multiple other Radio 1s when available and within line-of-sight. Radio 2s will do the same with other Radio 2s.

Operation of RUCS DMs within TekMESH™

TekMESH™ is the private Wi-Fi management platform created for the access and overall management of the installed RUCS Distribution Modules. **TekMESH™** provides both the management interface and the user portal for connection to the system, and provision for network access permissions and payment, if required.

Each RUCS DM requires up to 3 minutes to boot up and start. Typically, no user or installer configuration is required.

After the DM has booted, user can scan for available Wi-Fi networks via the user's Wi-Fi enabled device. Device interface will show the general SSID **TekMESH™** and a unique SSID something like "RDM21-xxxxxx" for individual RUCS DMs. Once a user device is connected to **TekMESH™**, the access portal will appear on the user's device to allow Wi-Fi connection and internet usage/access. Follow on-screen instructions to connect and access the internet.

Note: Its best to use the general SSID **TekMESH™** to connect as it will access the DM network with best connection speeds and capacity. The general **TekMESH™** SSID supports user access across available DM locations.