



**MOTOROLA**



## Motorola Canopy™ 30/60 Mb Backhaul Quick Start Guide

### Personal Safety

*Before installing the Canopy OFDM Backhaul, please read the User Guide on the CD, taking special note of safety information.*

### Lightning Protection

Direct and nearby lightning strikes can destroy or damage your equipment. Such damage is not covered under warranty. To best protect against the harmful effects of lightning, follow the location and installation recommendations on the enclosed card.

### Checklist

Check the contents of all packages against the packing list. Ensure that you have the correct tools for the job:

### List of special tools required

- Two (2) 13mm wrenches
- RJ45 Crimp Tool
- Two (2) short Ethernet patch cables

- Personal Computer (PC) running Windows 98 or later with 10/100 or 1000BaseT Ethernet interface and Internet Explorer 6 or higher (recommended) or FireFox 1.x
- 6mm general purpose crimp tool for the grounding lug (for lightning protection)

### Phase 1: Configure Units

If the link has been purchased as a pair, then the front of this Quick Start Guide shows pre-loaded configuration information for both units to work as a link. The software, license number, unit's IP address, Subnet Mask, Gateway IP address, target MAC address, master/slave mode, and arming state are pre-configured. **Do not lose the license key information.** You will probably want to change the management IP addresses of the units to be compatible with your network design. You may wish to upgrade the software - check on the support section of the Canopy website for the latest release.

- Step 1:** Design the network – plan and decide each unit’s IP address, Subnet Mask, Gateway IP address, and target MAC address. The MAC address can be found on the label on the paired unit, marked as “ESN”. (The ESN (Electronic Serial Number) is the MAC address.)
- Step 2:** Remove the cover from the Power Indoor Unit (PIDU), connect an Ethernet patch cable from the Outdoor Unit (ODU) power port to the ODU port on the PIDU and replace the cover.
- Step 3:** Connect another patch cable from the PIDU Ethernet LAN port to the installation PC. (Ensure the system is not yet connected to a network.)
- Step 4:** Connect the power cord to the PIDU and to an AC (mains) receptacle.
- Step 5:** Ensure that the PC is set to the correct subnet and use the Web browser to connect to IP address 169.254.1.1 for Slave or 169.254.1.2 for the Master unit.
- Step 6:** Select ‘System Administration’ and then click on the ‘Login’ button. (The password will be empty for new units.)
- Step 7:** Select ‘Change Password’ to set a password.
- Step 8:** Check on the status page that the software version is as expected. Latest software is available from the Web (<http://www.motorola.com/canopy>).
- Step 9:** Select ‘Installation Wizard’ and set the desired IP Address, Subnet Mask, Gateway IP Address, and Target MAC Address.
- Step 10:** Confirm the Target MAC Address, Master/Slave choice, Symmetry, Max Transmit Power and Range. Confirm installation configuration.
- Step 11:** Repeat steps 2-9 for the paired unit.

## Phase 2: Install and Align

The Backhaul uses audible tones during installation to assist the installer with alignment. Optimum alignment is achieved by aligning for maximum frequency (highest pitch) of the tone. Peaking of the tone frequency may take a few minutes, depending on overall link quality. The meanings of the audio tones are shown in Table 1. In each state, the unit should be aligned to give the highest pitch tone. If the tone varies wildly while in the Synchronized or Registered state, you may be suffering from interference or a fast fading link. Installing in this situation may not give a reliable link. The cause of the problem should be investigated before completing the installation.

Tone	State	Description
Regular beep	Free Channel Search	Executing Band Scan
Slow broken tone	Scanning	Not demodulating received signal
Fast broken tone	Synchronized	Demodulating received signal
Solid tone	Registered	Both Master and Slave units exchanging radio layer MAC management messages

**Table 1: Audio indications from the ODU**

- Step 1:** Install Master unit first. Use *shielded* Cat-5 Ethernet cable for all Ethernet cable connections. Aim unit using GPS and compass, or visual sighting. Leave powered up.
- Step 2:** Install Slave unit second, and apply power.
- Step 3:** Adjust Slave unit direction to gain highest pitch tone.
- Step 4:** Back at the Master, without moving the Slave, fine-adjust the Master unit direction to gain highest pitched tone. Note: Order matters – align Slave to Master first (Step 3), then fine-adjust Master to Slave (Step 4).
- Step 5:** If necessary, repeat fine-adjustment at the Slave, then the Master, until optimum alignment has been obtained.

## Special Notes:

**Band Scan:** When first applying power and from time to time the Master unit will carry out a band scan to determine which channels are not in use. During this 10 to 15 second scan, neither unit will transmit. During this time the installation tone on both Master and Slave units will drop back to **Scanning** state. The pitch of the tone will be proportional to the background noise level. Do not try to align the unit at this time.

**Ranging:** The Master unit can take up to 60 seconds (6 minutes in the worst case) to determine the range of the link being installed. The Master unit will remain in the Scanning state until the length of the link has been established. The Master unit will only move to the Synchronized state when the length of the link has been established. If the link does not move to the Synchronized state, then:

- Confirm the target MAC address, Range, Master/Slave choice, Symmetry Throughput Optimization or Spectrum Management are set correctly
- Check for interference
- Check that the signal level received is sufficient.

**False Moves:** During the period in which the Master unit is determining the range between units, the Master unit may falsely move to the Synchronized state and then back to the Scanning state. These state transitions are part of the ranging process and should be ignored.

**Slave doesn’t range:** The Slave unit does not have a ranging process. The Slave unit will change to the Synchronized state as soon as the wanted signal is demodulated.

**Retries:** If at the end of the ranging period the Registered state is not achieved due to interference or other reasons, the Master unit will retry twice more on the same channel before moving to another available channel. Should this occur it may take a number of minutes to establish a link in the Registered state.

## Phase 3: Disarm Both Units *Important, Don’t forget!*

When the alignment process is complete **remember to disarm both units** in the link as described in section 7.3.6 of the User Guide. *Until both units are disarmed, the link will not be active.*

Disarming does the following:

- Turns off audible alignment aid.
- Enables Adaptive Modulation
- Fully enables Dynamic Frequency Selection
- Clears unwanted installation information from the various systems statistics
- Stores the link range for fast link acquisition on link drop

## Final Note

Record the following items for future reference:

- Take a screen shot or print of the status page
- Record the position and orientation of the ODU
- Record surrounding objects which may interfere with the link. (A photograph is recommended.)
- After 1 hour of operation the mean value of Link Loss on the status page should be within 15dB for NLoS and 5dB for LoS Links of the value computed in the Link Estimator. The Link Estimator may need re-running to account for new known obstacles.