MOTOROLA

CANOPY INSTALLATION AND WIRING METHODS

68P81011Y33-O
SEPTEMBER 26, 2005

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CANOPY INSTALLATION AND WIRING METHODS/ RECOMMENDATIONS

THE INTENT OF THIS GUIDE

Document statement of purpose:

The purpose of this document is to provide the dealer/customer with suggestions/ recommendations with regards to possible installation methods for the Canopy products. This document is not meant to replace any dealer/customer provided system design or on-site work effort (such as site and path drive surveys – which would be a necessary component of any successful installation). Please refer to the Canopy product manuals and user guides (which can be found on the http://motorola.canopywireless.com Web site) for more detailed explanations with regards to the Canopy product settings/configurations noted in this document.

WHAT THE READER SHOULD KNOW

- The person reviewing and/or implementing the applications noted in this document has a basic understanding of Ethernet (i.e. has at a minimum reviewed the IP-101 Networking Basics document).
- The person reviewing and/or implementing the applications noted in this document has a basic understanding of Canopy products and has attended Canopy product training.
- The person reviewing and/or implementing the applications noted in this document has a basic understanding of tower hardware and electrical requirements (i.e. the specifications noted in the R56 manual - http://R56.mot.com).
- The person reviewing and/or implementing the applications noted in this document has a basic understanding of the actual bandwidth throughput available through the various Canopy AP, SM, and BH products, i.e.: that any/all single frequency radios operate in a half duplex mode – minus any overhead required between the pair of radios (subtract 30% from the aggregate Ethernet throughput for overhead – and then divide by the remaining bandwidth by 2 to derive the actual bi-directional full duplex Ethernet throughput).
- That all of the Canopy units/products noted in this document have been upgraded to the latest firmware revisions (as noted on the http://motorola.canopywireless.com/ support_software.php Web site).

NOTE

Sources for the material used in this presentation include but are not limited to the following public Internet locations:

- http://motorola.canopywireless.com
- http://motorola.canopywireless.com/support_software.php

CHAPTER

1

CANOPY INSTALLATION RECOMMENDATIONS

PRE-SALES AND SYSTEM DESIGN RECOMMENDATIONS

Step # 1: Perform a site survey to determine the existence and location of any existing radio communications equipment at any/all sites where the Canopy products are to be located. Existing radio equipment (if any) will need to be identified, and the locations and frequencies used by this existing radio equipment should be noted – to be used during the design phase of your work effort. The Spectrum analyzer tool included with the latest Canopy firmware release (ver: 7.1) should allow for a reasonable analysis of the frequencies in use at the proposed Canopy sites (see the Spectrum analysis screen example noted on Figure 1-1 on page 1-5). Determinations will also need to be made with regards to the existence of, or lack of, line of sight transmission paths – which will in turn affect the frequency of the Canopy radio equipment specified for your customers application.

NOTE

A line of sight transmission path would include adequate (i.e. 80%+) Fresnel zone clearance (the height of the Fresnel zone can vary between 10 and 100 ft. – depending on the length of the transmission path).

Step # 2: Prepare a drawing or sketch of the proposed network – noting the locations of the proposed Canopy radios. Ancillary equipment, such as cameras and voice multiplexers, should also be noted on the drawing – with notations at each site indicating the quantity of interfaces, interface types, and bandwidth requirements for the individual interfaces.

Step # 3: Based on the results of the site and path surveys as noted in Step1, the following design criteria and/or work effort will need to be evaluated and/or performed:

- Plot a frequency plan on the drawing prepared in Step 2 -allowing for any overlap of frequencies/transmission paths between sites.
- Determine the frequency, radio “type” (AP, SM or BH), and ”size” of the radio link to be used between each site – which would be based on the bandwidth required for each site (as noted on the drawing prepared in Step 2). In most cases the bandwidth will be additive, i.e.beginning at the outermost remote sites, add the bandwidth required for each successive link between the furthest most site and main site/application termination point. Each intermediate site will need to have sufficient bandwidth for any locally connected ancillary devices –plus the bandwidth required by the sites being “fed” by the intermediate site.

NOTE

The bandwidth available for any remote Ethernet network is only as much as the slowest link between it and the main site/application termination network.

- Determine the transmission clocking order/sequence for each transmission path.

NOTE

There can only be one master transmission clock source for any given segment/ ”chain” of transmission links.

Step # 4: After having performed the required site surveys (for each site where the Canopy radio equipment will be located) you will need to determine the best location on the supporting structure for the radios and associated interconnecting equipment (such as CMM's, surge suppressors, etc.). Determinations will need to be made with regards to the mounting of the Canopy Radio equipment (and associated peripherals) relative to the condition of the tower and the location of any existing radio equipment.

NOTE

The maximum distance between any two pieces of powered Ethernet equipment is 328 ft.

The following site factors will need to be considered:

- High power RF transmission equipment, if located in close proximity to the Canopy radios, wiring, or associated ancillary equipment can cause RF interference in the Canopy system. Adequate spacing will need to be provided between existing high power transmission equipment and the Canopy system to allow for proper operation of the Canopy network. A minimum of 20 ft. of separation MAY allow for adequate separation, however 100 ft. would be optimal. It should also be noted that a minimum of 100ft. of separation is required between Canopy AP and BH radios utilizing the same frequency range.
- The general condition of the tower/mounting structure – i.e. rust, corrosion, instability, bonded electrical grounds between sections, etc.
- Reflective surfaces, if located in close proximity to the Canopy radios, can cause RF diffraction/multi-path in the Canopy radios transmission path – resulting in signal loss or instability. Care should be taken when reviewing possible Canopy radio sites to determine if such site factors exist.
- Existing tower mounting hardware and/or associated support mechanisms (support wires, brackets, etc.) can cause transmission beam diffraction and should considered when evaluating Canopy radio mounting locations.
- The general condition of the tower/mounting structure, i.e. rust, corrosion, instability, bonded electrical grounds between sections, etc., should be evaluated when determining the equipment installation methods used for your customers application.
- A path or coverage analysis should be performed if terrain based obstructions may be in the transmission paths – or if the transmission path can not be “driven” and/or if a visual clear line of sight (with adequate Fresnel zone clearance) transmission path can not be ascertained (due to the length of transmission path). If a path/coverage analysis tool is not available for your use, Motorola Pre-sales Engineering can assist you with this work effort.

NOTE

If you require assistance with the design of your customers application, please contact the Site Equipment Team at sitequip@motorola.com.

- The condition of the tower/mounting structure will be a factor when determining the proper mounting and grounding methods to be used when installing the CMM units, surge suppression equipment, and Canopy radios. Grounding of the tower and associated equipment should be performed in accordance to the R56 manual – which notes the fact that there can only be a single point of ground between the tower and any associated/ interconnected structures/power sources. If the tower does not have a grounding system (to provide for a proper ground between all segments of the tower) and/or is rusted or corroded, special attention will need to be given to the methods used when mounting the equipment, i.e.: grinding away any rust or corrosion from grounding points, using the recommended mounting hardware, using the proper size ground wiring, etc.

NOTE

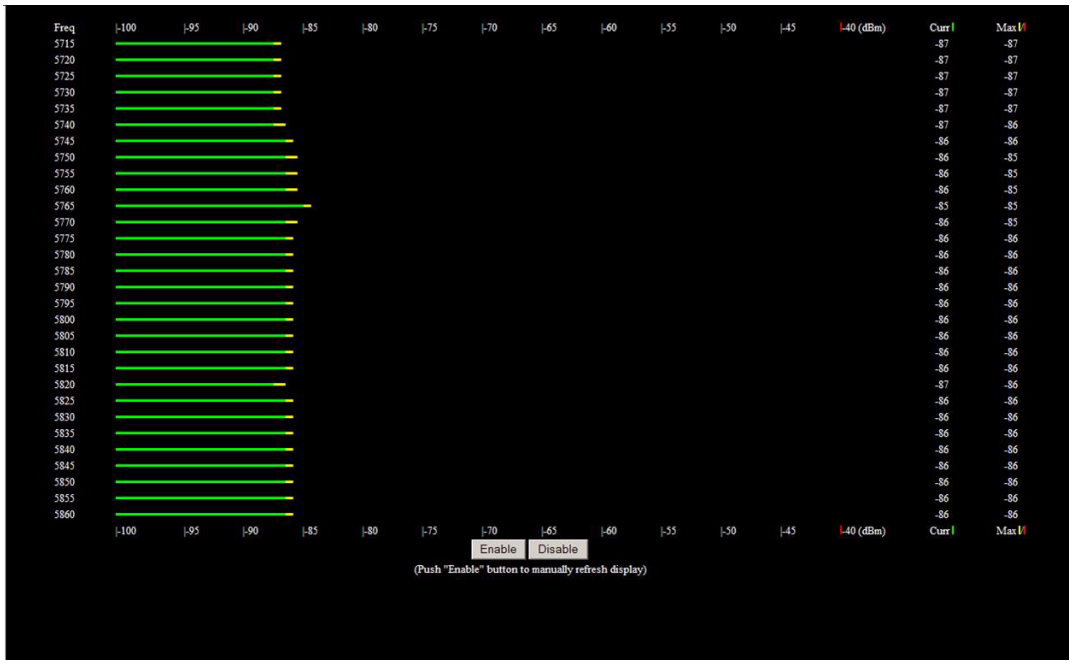
Please follow the installation and grounding instructions noted in the R56 Manual when installing tower and tower associated equipment.

SPECTRUM ANALYZER SCREEN EXAMPLE

NOTE

Note the -87db “noise floor”. Frequency spikes/interference would be noted (above the “noise floor” on bar graph portion of the screen and in the far right “Max” column.

FIGURE 1-1 SPECTRUM ANALYZER SCREEN EXAMPLE



POST SALES/INSTALLATION RECOMMENDATIONS

Step # 1: Unpack and stage the equipment. Perform software upgrades to any/all application equipment as needed (the latest software/firmware for the Canopy products can be found on the http://motorola.canopywireless.com Web site). The staging of the equipment should include the connection, powering up, configuration, and operational testing of all of the components in the application. It is also recommended that you label any/all associated cabling and equipment at this time – which should help to expedite the installation of the equipment at the customers site (IP addresses and frequencies should also be noted on the equipment using removable labels – if security is an issue).

NOTE

The Canopy equipment which you may have just received may not have the latest firmware. Please refer to the http://motorola.canopywireless.com/support_software.php Web site for further information with regards to firmware versions and availability.

Step # 2: After the staging and testing of the application has been completed, the installation of the equipment at the customers sites may begin – using the configuration and cables tested in Step1.

NOTE

Again, Please follow the installation and grounding instructions noted in the R56 Manual and local codes when installing tower and tower associated equipment.

Step # 3: During the staging and installation process it is strongly recommended that you keep an accurate record of the MAC address, IP address, and serial number of all of the equipment being installed for future maintenance purposes (serial numbers are required for equipment warranty and repair services – so having this information documented should help to lessen the number of tower “climbs” when servicing defective hardware).

Step # 4: An accurate drawing or sketch of the customers application/network should be kept for future upgrade and/or troubleshooting purposes. As much information as possible should be included on the diagram – i.e. frequencies, sectors, color codes, locations (including latitude and longitude coordinates), IP addresses, passwords, etc. should also be noted on the system diagram.

CHAPTER

2

CONNECTORS, CABLING, AND CABLE WIRING DIAGRAMS

POWER OVER ETHERNET CABLE (POE)

Power Over Ethernet Cable (POE) contains 4 twisted pairs shielded, 24 AWG solid bare copper conductors, riser rated, polyolefin insulation, foil shield bonded to industrial grade oil res sun res PVC jacket, drain wire, rip cord. Sequential marking at two foot intervals.

SUITABLE APPLICATIONS

Industrial Ethernet Cable, Harsh Environments, 100MHz Category 5e, Gigabit Ethernet, 100BaseTX, 100Base VG ANYLAN, 155 ATM, 622ATM Component or Composite video, AES/EBU Digital Video, RS422, CMX-Outdoor, RJ-45 Compatible, Noisy Environments

PHYSICAL CHARACTERISTICS

TABLE 2-1 PHYSICAL CHARACTERISTICS OF POWER OVER ETHERNET CABLE

Characteristics	Description
Conductor	
Number of pairs	4
Total Number of Conductors	8
AWG	24
Stranding	Solid
Conductor Material	BC BareCopper
Insulation	
Insulation material	PO_Polyolefin
Nom.Insulation Wall Thickness	.010in.

FIGURE 2-1 POWER OVER ETHERNET CABLE

POWER OVER ETHERNET CONNECTORS AND CRIMP TOOLS

MODULAR PLUG

- 8 positions, 8 contacts (RJ45) shielded (for solid wire)
- Weight: 0.01 lbs
- Prepackaged: please order in increments of 10, 100, or 1000

TABLE 2-2 MODULAR PLUG

Jameco P/N	116601CL
Mfg	JAMECO VALUEPRO
Mfg #	GU4514

Connector, RJ45, 8P8C Solid (STP - Shielded Twisted Pair)

FIGURE 2-2 MODULAR PLUG

TELEMASTER MODULAR CRIMP/CUT/STRIP TOOL

For RJ11 (6P) and RJ45 (8P) Modular Plugs

- Repeatable crimp action for consistent high-quality connectors
- Size: 6.0"L x 2.0"W
- Weight: 0.8 lbs

Includes: Cut and strip blade

TABLE 2-3 TELEMASTER MODULAR CRIMP/CUT/STRIP TOOL

Jameco P/N	161091
Mfg #	30-496

Tool, RJ11 6P & RJ45 8P Crimp/Cut/Strip

FIGURE 2-3 TELEMASTER MODULAR CRIMP/CUT/STRIP TOOL

POWER OVER ETHERNET CABLE WIRING

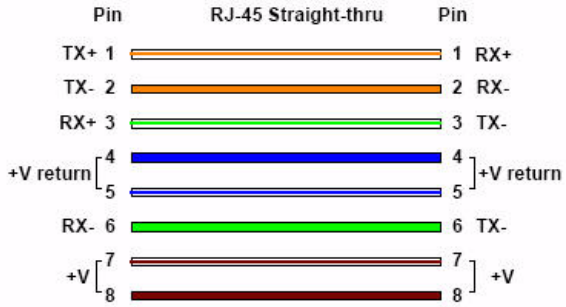
RJ-45 PINOUT FOR STRAIGHT-THROUGH ETHERNET CABLE

FIGURE 2-4 RJ-45 PINOUT FOR STRAIGHT-THROUGH ETHERNET CABLE

RJ-45 Pinout for Straight-through Ethernet Cable

Pin 1 →	white / orange	← Pin 1
Pin 2 →	orange	← Pin 2
Pin 3 →	white / green	← Pin 3
Pin 4 →	blue	← Pin 4
Pin 5 →	white / blue	← Pin 5
Pin 6 →	green	← Pin 6
Pin 7 →	white / brown	← Pin 7
Pin 8 →	brown	← Pin 8

Pins 7 and 8 carry power to the modules.



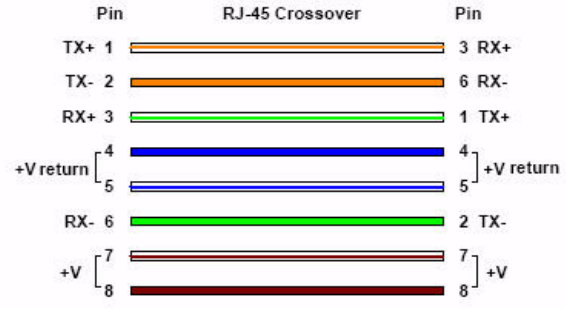
RJ-45 PINOUT FOR CROSSOVER ETHERNET CABLE

FIGURE 2-5 RJ-45 PINOUT FOR CROSSOVER ETHERNET CABLE

RJ-45 Pinout for Crossover Ethernet Cable

Pin 1 →	white / orange	← Pin 3
Pin 2 →	orange	← Pin 6
Pin 3 →	white / green	← Pin 1
Pin 4 →	blue	← Pin 4
Pin 5 →	white / blue	← Pin 5
Pin 6 →	green	← Pin 2
Pin 7 →	white / brown	← Pin 7
Pin 8 →	brown	← Pin 8

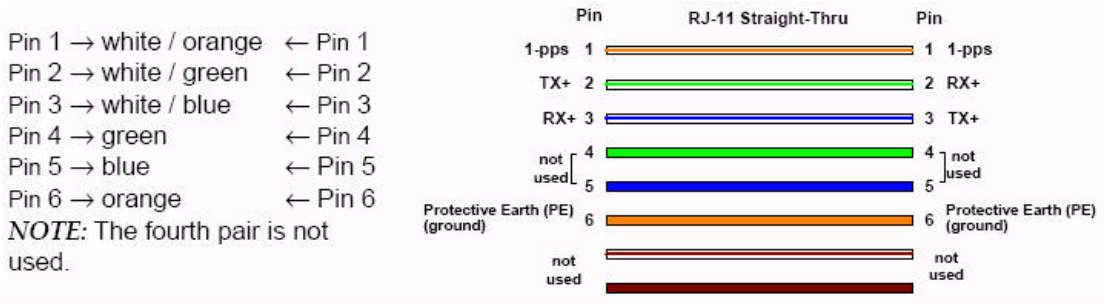
Pins 7 and 8 carry power to the modules.



RJ-11PINOUT FOR STRAIGHT-THROUGH SYNC CABLE

An RJ-11 connectors are commonly used to connect devices for phone lines. The Canopy system uses a utility cable with RJ-11 connectors between the AP or BH and synchronization pulse. Presuming CAT 5 cable and 6-pin RJ-11 connectors, the following diagram shows the wiring of the cable for sync.

FIGURE 2-6 RJ-11PINOUT FOR STRAIGHT-THROUGH SYNC CABLE



CHAPTER

3

EQUIPMENT LOCATION RECOMMENDATIONS/ SUGGESTIONS

TOWER SITE EQUIPMENT INSTALLATION LOCATION RECOMMENDATIONS

Figure 3-1 represents the suggested equipment location, interconnect wiring, and grounding recommendations for sites where a single Canopy radio will be located - with little or no existing/on-site radio equipment (i.e. a minimal amount of RF interference).

NOTE

The maximum distance between customers network and the Canopy radios would be 328 ft. (for each segment).

FIGURE 3-1 TOWER SITE - MINIMAL AMOUNT OF RF INTERFERENCE

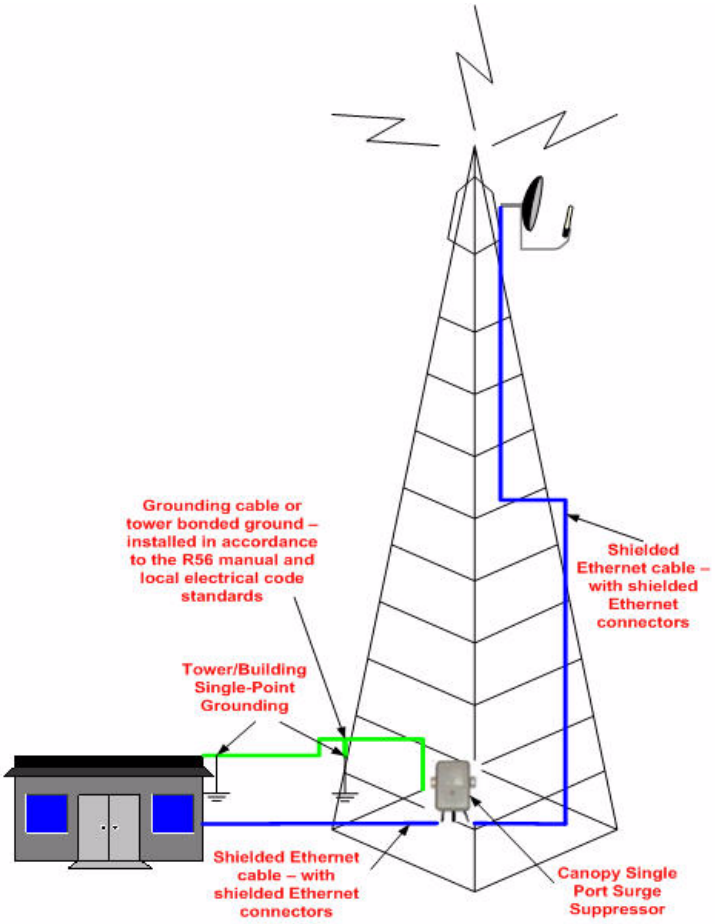


Figure 3-2 represents the suggested Canopy equipment location, interconnect wiring, and grounding recommendations for sites where a single Canopy radio will be located – at locations where there may be a substantial amount of existing radio equipment (i.e. extensive RF interference).

NOTE

The maximum distance between customers network and the Canopy radios would be 328 ft.

FIGURE 3-2 TOWER SITE - EXTENSIVE RF INTERFERENCE

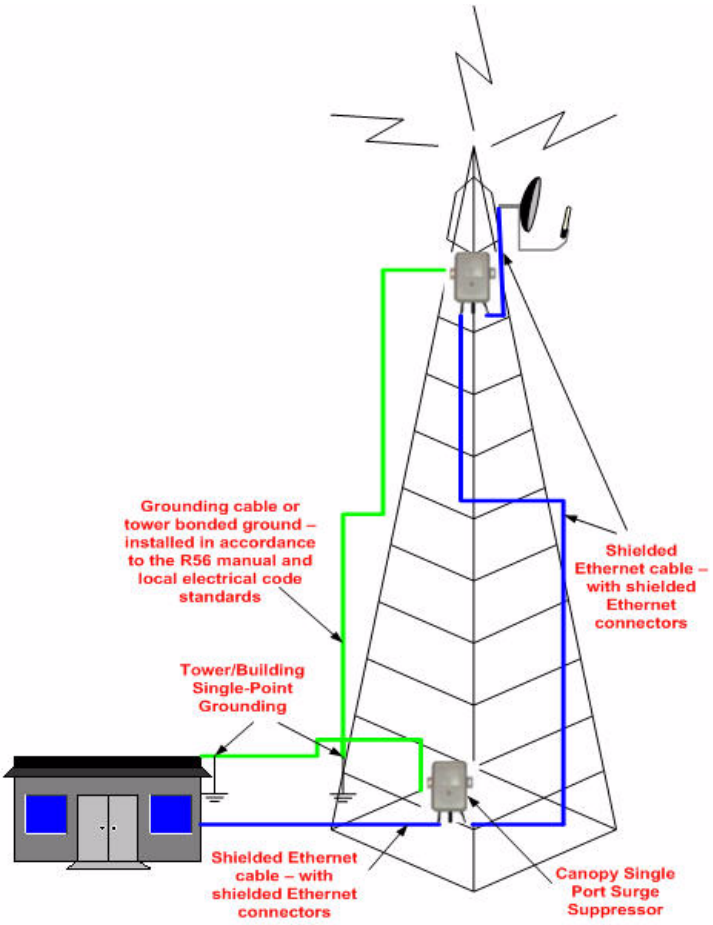


Figure 3-3 represents the suggested equipment location, interconnect wiring, and grounding recommendations for sites where multiple Canopy radios will be located (with the CMM unit located at the top of the tower) - with or without existing radio equipment (i.e. with minimal or a substantial amount of RF interference).

NOTE

The maximum distance between the customers network and the CMM, and the CMM and the Canopy radios would be 328 ft. (for each segment).

FIGURE 3-3 TOWER SITE - MINIMAL OR A SUBSTANTIAL AMOUNT OF RF INTERFERENCE

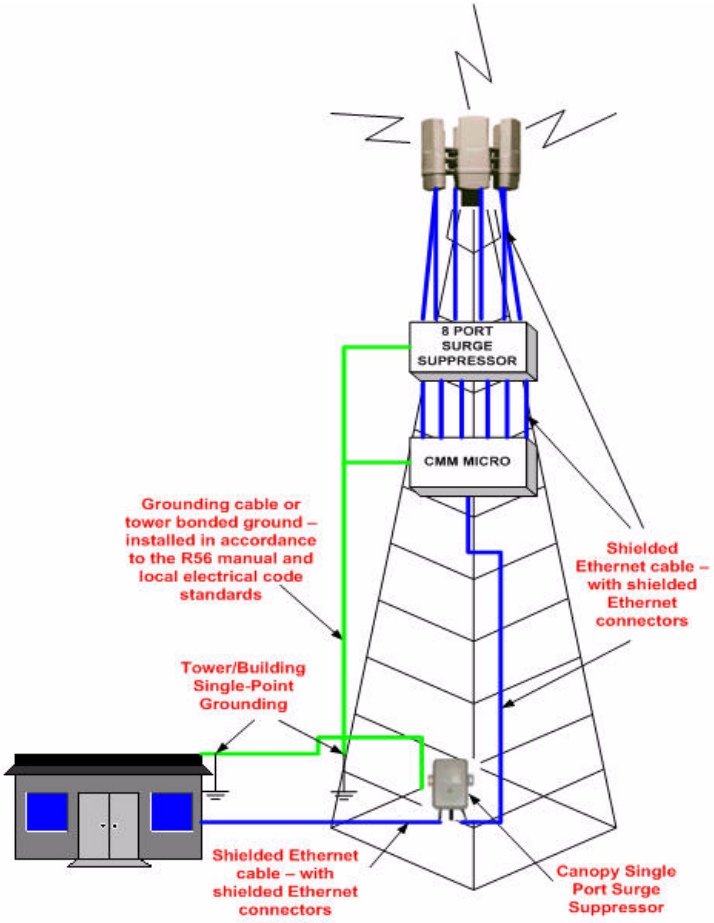


Figure 3-4 represents the suggested equipment location, interconnect wiring, and grounding recommendations for sites where multiple Canopy radios will be located (with the CMM unit located at the bottom of the tower) - with or without existing radio equipment (i.e. with minimal or a substantial amount of RF interference).

NOTE

The maximum distance between the customers network and the CMM, and the CMM and the Canopy radios would be 328 ft. (for each segment).

FIGURE 3-4 TOWER SITE - MINIMAL OR A SUBSTANTIAL AMOUNT OF RF INTERFERENCE

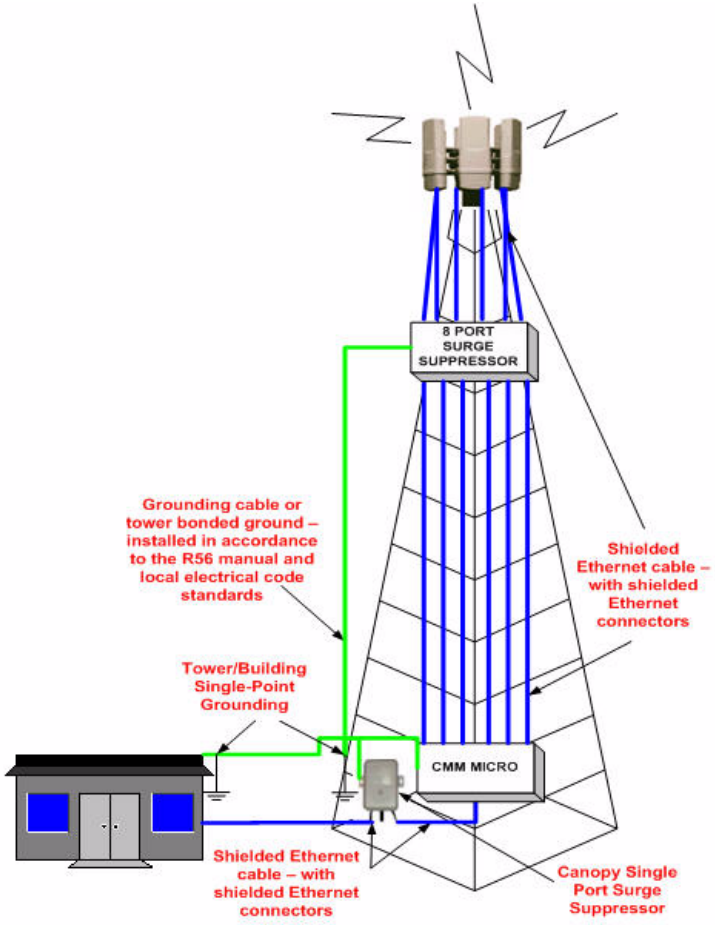


Figure 3-5 represents the suggested equipment location, interconnect wiring, and grounding recommendations for sites where multiple Canopy radios will be located (with the CMM unit located inside of a controlled environment structure) - without existing radio equipment (i.e. with a minimal amount of RF interference).

NOTE

The maximum distance between the customers network and the CMM, and the CMM and the Canopy radios would be 328 ft. (for each segment).

FIGURE 3-5 TOWER SITE - MINIMAL AMOUNT OF RF INTERFERENCE

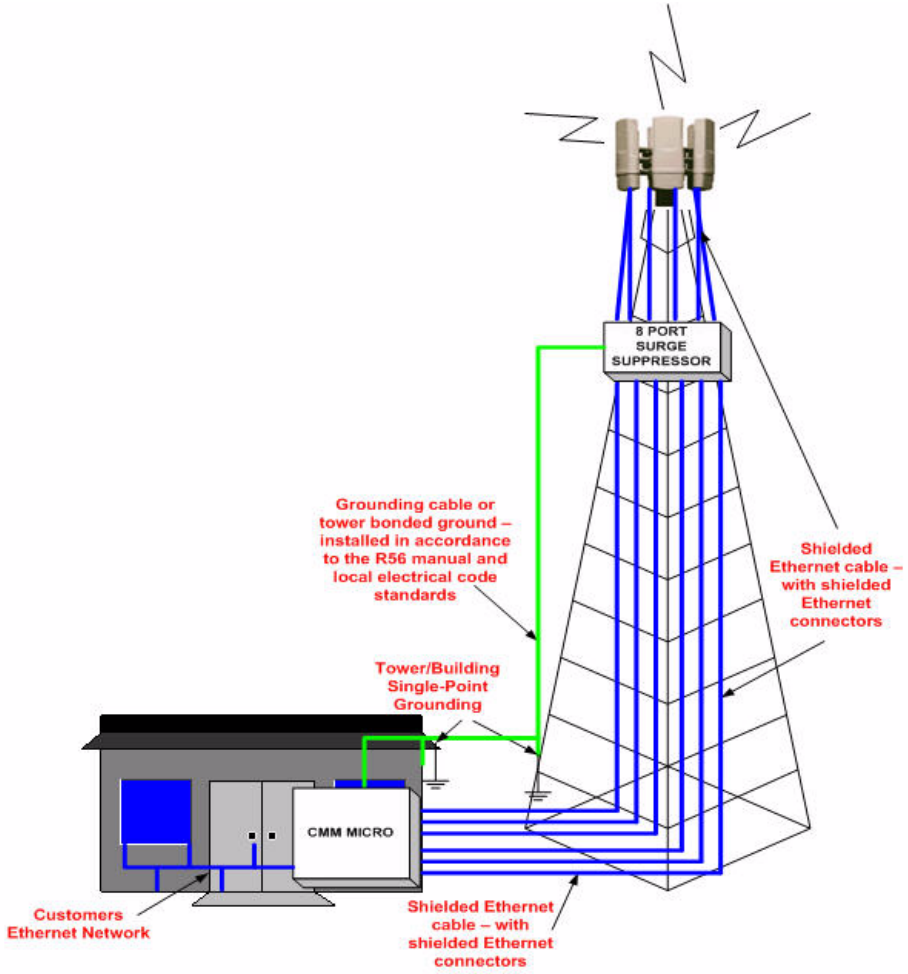
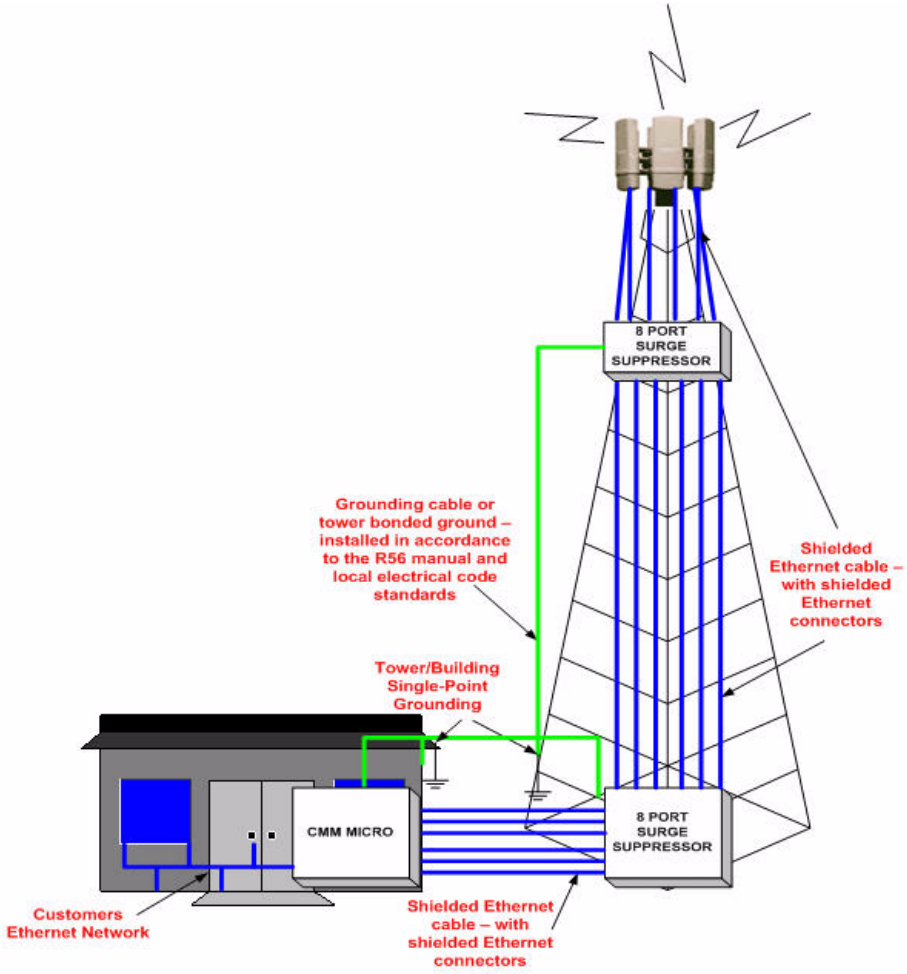


Figure 3-6 represents the suggested equipment location, interconnect wiring, and grounding recommendations for sites where multiple Canopy radios will be located (with the CMM unit located inside of a controlled environment structure) - with existing radio equipment (i.e. with a substantial amount of RF interference).

NOTE

The maximum distance between the customers network and the CMM, and the CMM and the Canopy radios would be 328 ft. (for each segment).

FIGURE 3-6 TOWER SITE - SUBSTANTIAL AMOUNT OF RF INTERFERENCE



MULTI-FREQUENCY SITE WIRING DIAGRAM/ RECOMMENDATIONS

FIGURE 3-7 SAMPLE DIAGRAM OF A SINGLE-BAND CANOPY ACCESS POINT CLUSTER

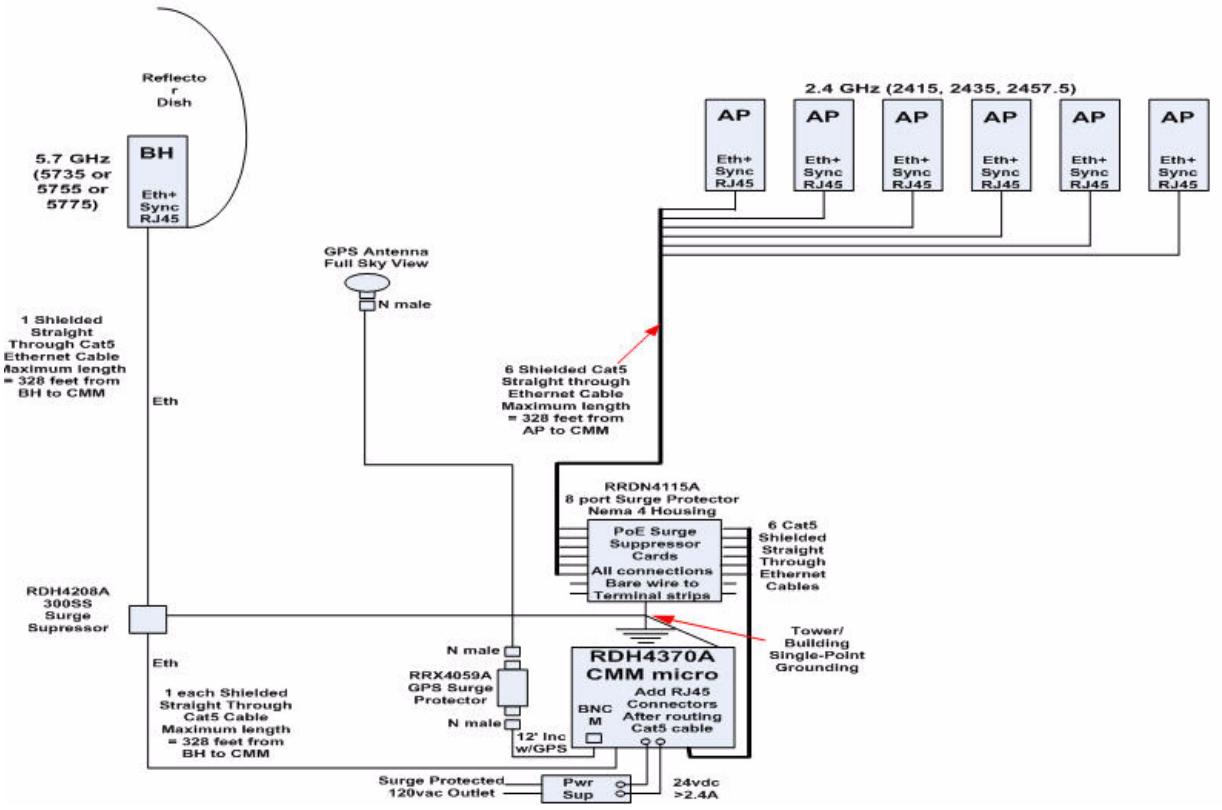


FIGURE 3-8 SAMPLE DIAGRAM OF A DUAL-BAND CANOPY ACCESS POINT CLUSTER

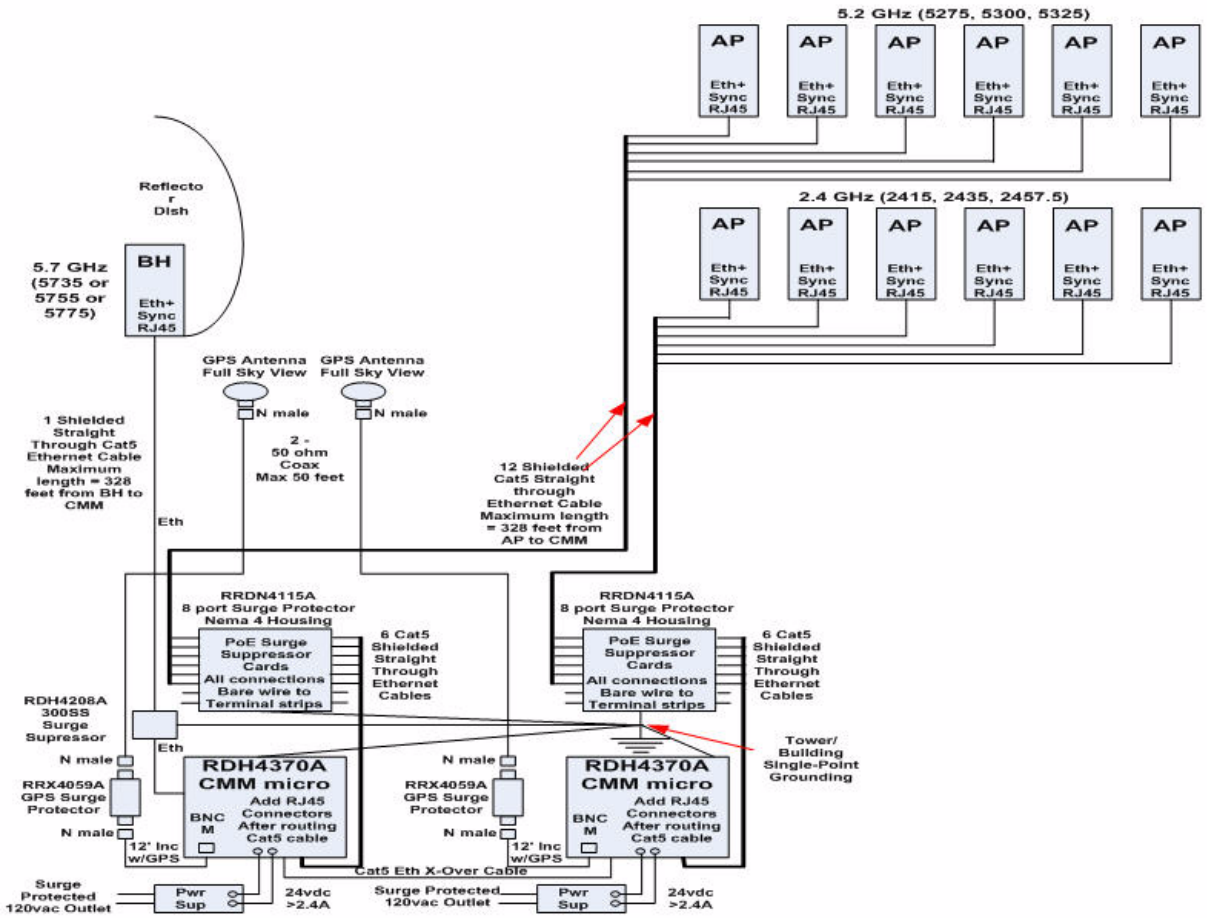
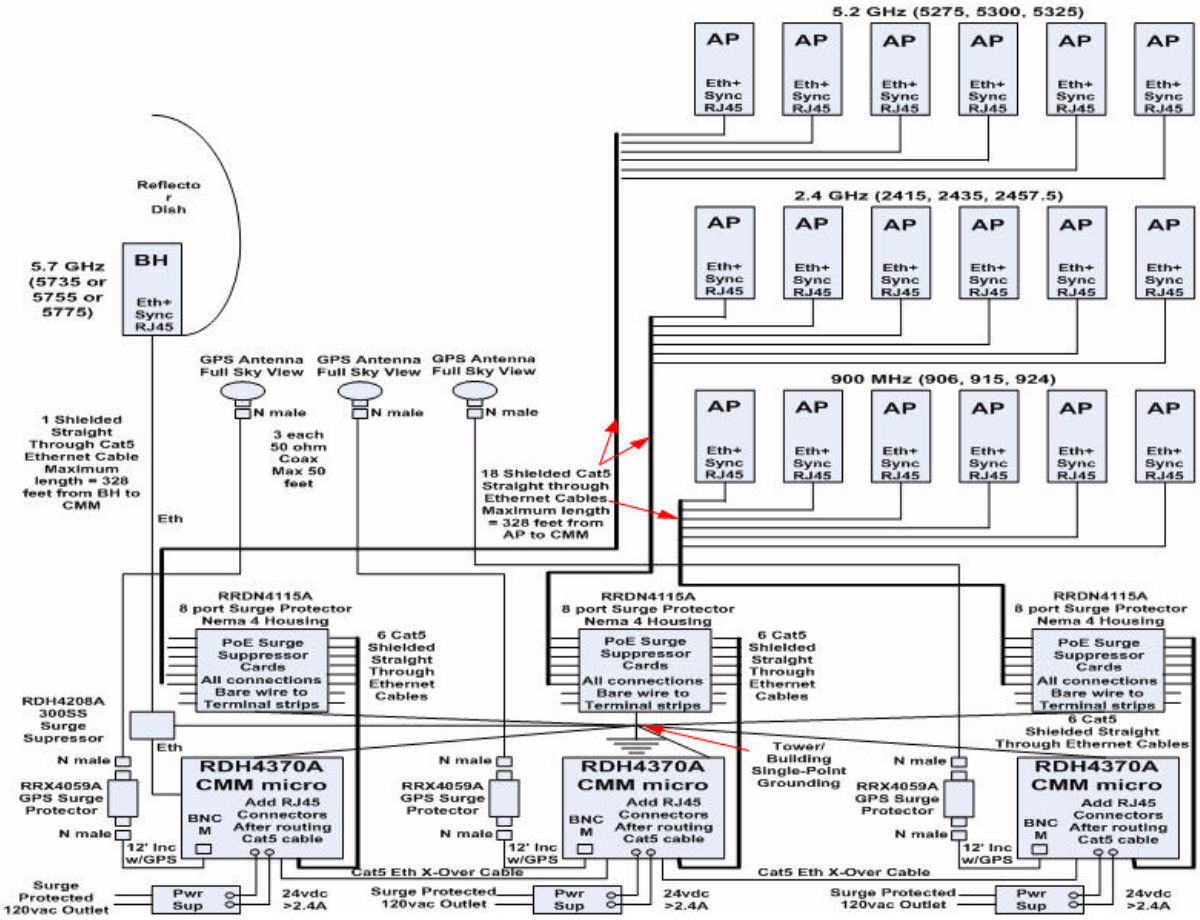


FIGURE 3-9 SAMPLE DIAGRAM OF A TRI-BAND CANOPY ACCESS POINT CLUSTER

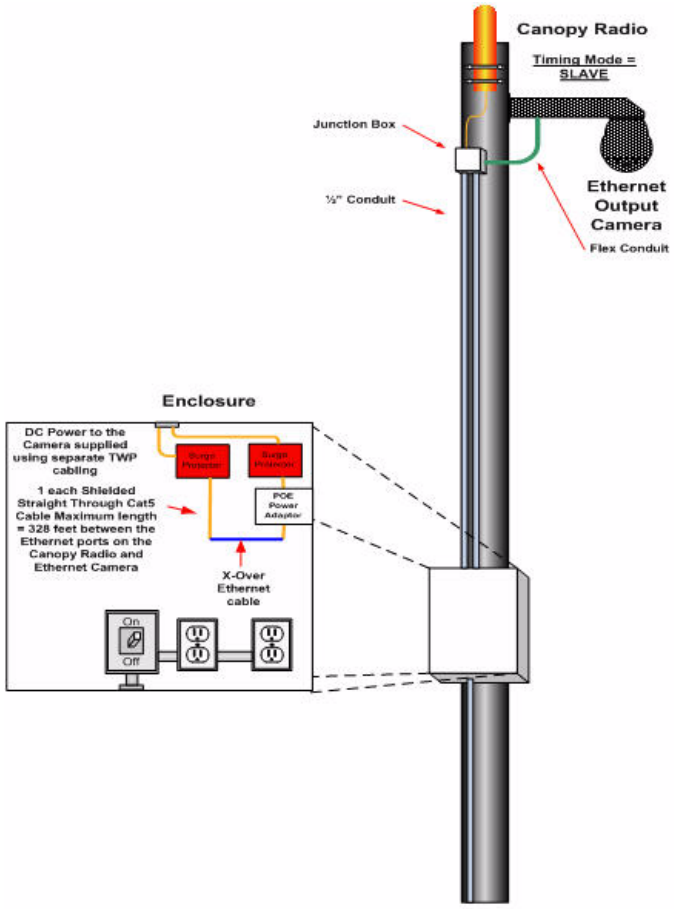


REMOTE SITE EQUIPMENT LOCATION DIAGRAMS/RECOMMENDATIONS

TYPICAL WIRING SCENARIOS

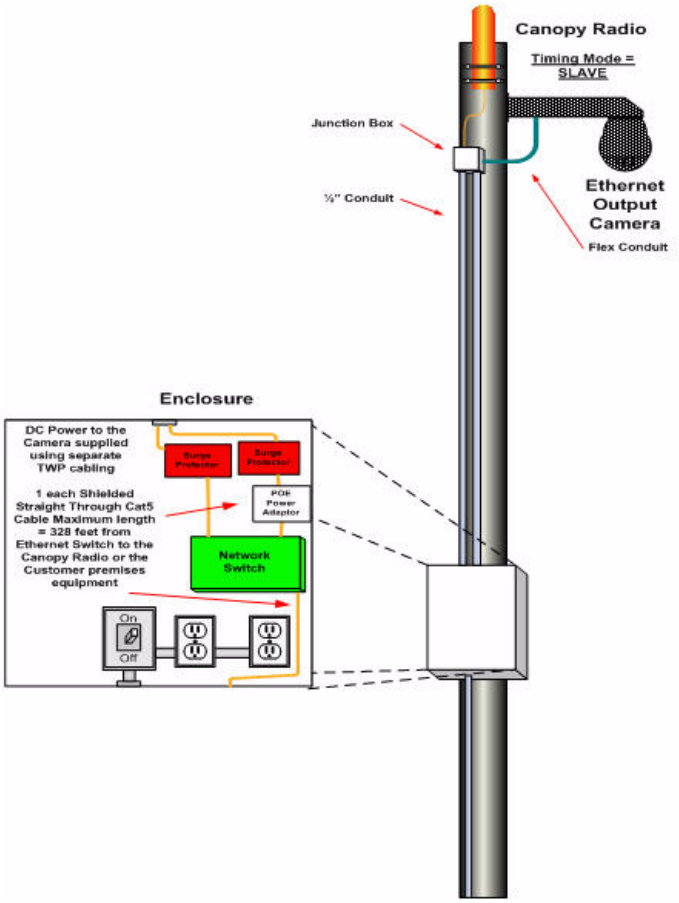
WIRELESS INTERCONNECT TO A REMOTE SITE WHERE ONLY A CAMERA ETHERNET CONNECTION IS REQUIRED

FIGURE 3-10 TYPICAL WIRING SCENARIO - CAMERA ETHERNET CONNECTION



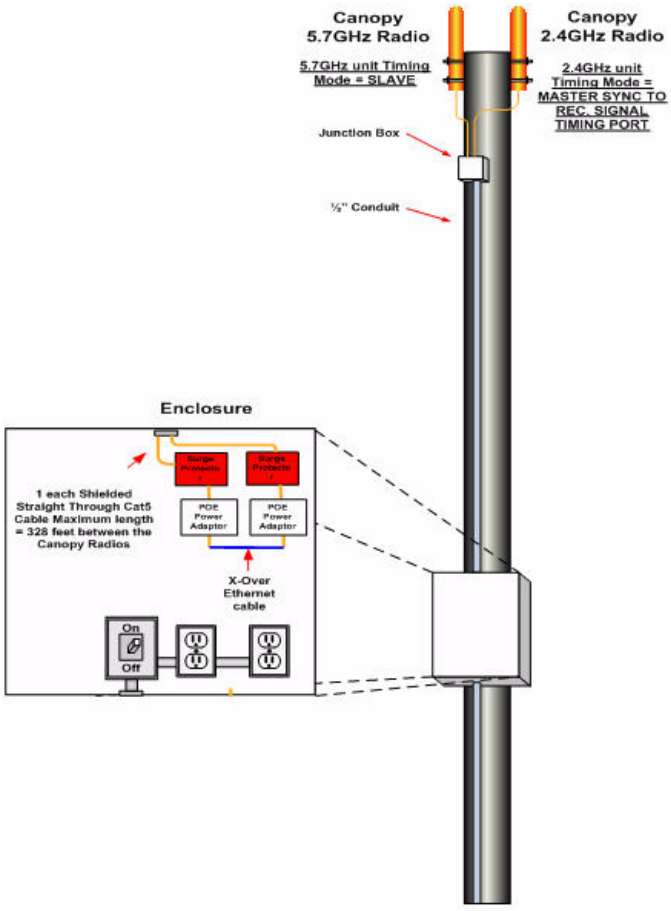
WIRELESS INTERCONNECT TO A REMOTE SITE WHERE A CAMERA AND ETHERNET USER TRAFFIC IS REQUIRED

FIGURE 3-11 TYPICAL WIRING SCENARIO - CAMERA AND ETHERNET USER TRAFFIC



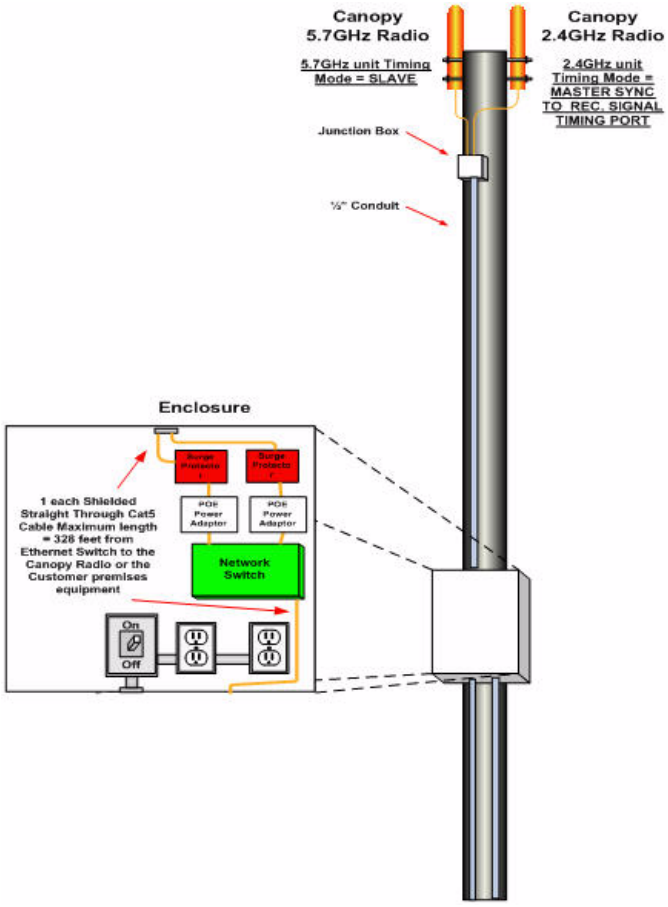
WIRELESS INTERCONNECT TO A REMOTE/"HOP" SITE WHERE USER ETHERNET TRAFFIC IS NOT REQUIRED

FIGURE 3-12 TYPICAL WIRING SCENARIO - USER ETHERNET TRAFFIC IS NOT REQUIRED



WIRELESS INTERCONNECT TO A REMOTE/"HOP" SITE WHERE USER ETHERNET TRAFFIC IS REQUIRED

FIGURE 3-13 TYPICAL WIRING SCENARIO - USER ETHERNET TRAFFIC IS REQUIRED



CHAPTER

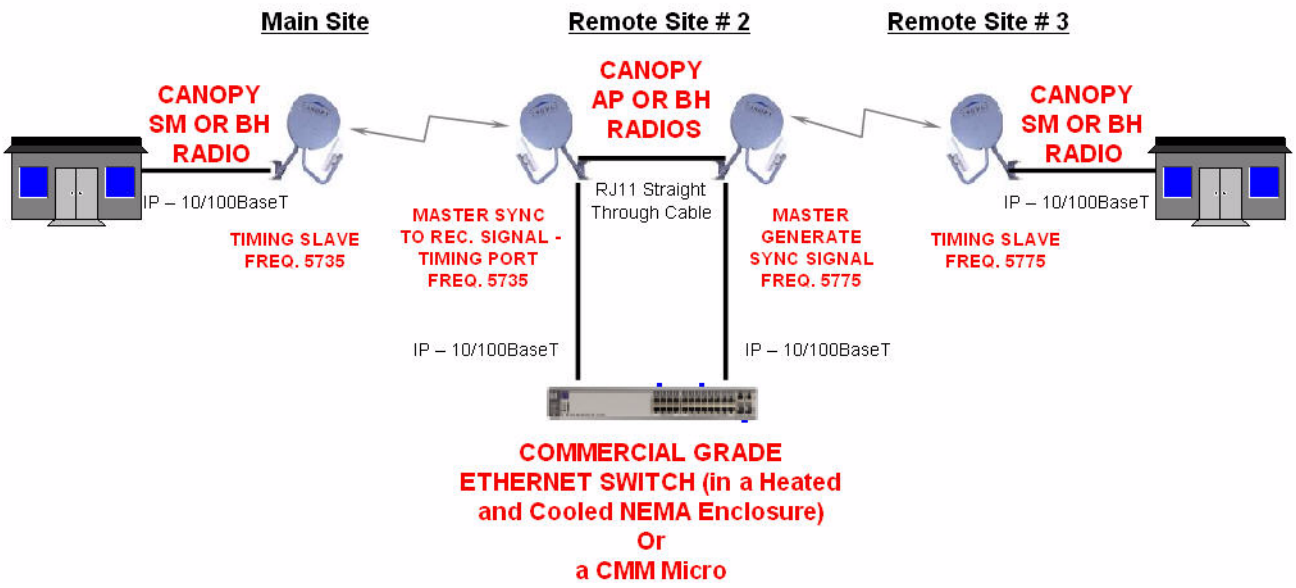
4

"DAISY CHAINED" CANOPY RADIO CLOCKING/INTERCONNECT WIRING RECOMMENDATIONS/ SUGGESTIONS

TYPICAL CLOCKING AND FREQUENCY SETTING SCENARIO WITH EXTERNAL ETHERNET CONNECTION

FIGURE 4-1 REPRESENTS A TYPICAL CLOCKING AND FREQUENCY SETTING SCENARIO FOR A "DAISY CHAINED"/ONE "HOP" CANOPY RADIO APPLICATION - WITH AN EXTERNAL ETHERNET CONNECTION AT THE "HOP" SITE

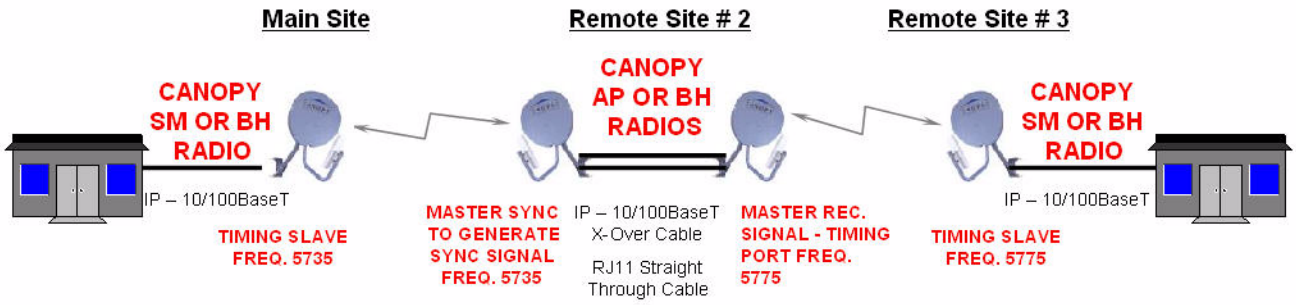
FIGURE 4-1 DAISY CHAINED/ONE "HOP" – WITH EXTERNAL ETHERNET CONNECTION



TYPICAL CLOCKING AND FREQUENCY SETTING SCENARIO WITHOUT AN EXTERNAL ETHERNET CONNECTION

FIGURE 4-2 REPRESENTS A TYPICAL CLOCKING AND FREQUENCY SETTING SCENARIO FOR A "DAISY CHAINED"/ONE "HOP" CANOPY RADIO APPLICATION - WITHOUT AN EXTERNAL ETHERNET CONNECTION AT THE "HOP" SITE

FIGURE 4-2 DAISY CHAINED/ONE "HOP" – WITHOUT EXTERNAL ETHERNET CONNECTION



MAIN SITE RADIO CLOCKING (FREQ. - 5735) – TIMING SLAVE

FIGURE 4-3 MAIN SITE RADIO CLOCKING (FREQ. - 5735) - TIMING SLAVE

Status
Configuration
IP Configuration
Event Log
AP Eval Data
Ethernet Stats
Copyright
Expanded Stats

Device Information	
5.7GHz - BackHaul - Timing Slave - 0a-00-3e-f0-7e-03	
Parameter	**Value**
Timing Mode	○ Timing Master ◉ Timing Slave
High Priority Data Queue	○ Enable ◉ Disable
Modulation Scheme	◉ 10 Mbits/Second (2 Level) ○ 20 Mbits/Second (4 Level)
Link Negotiation Speeds	☐ 10 Base T Half Duplex ☐ 10 Base T Full Duplex ☐ 100 Base T Half Duplex ☑ 100 Base T Full Duplex
Custom RF Frequency Scan Selection List	☑ 5735 ☐ 5740 ☐ 5745 ☐ 5750 ☐ 5755 ☐ 5760 ☐ 5765 ☐ 5770 ☐ 5775 ☐ 5780 ☐ 5785 ☐ 5790 ☐ 5795 ☐ 5800 ☐ 5805 ☐ 5810 ☐ 5815 ☐ 5820 ☐ 5825 ☐ 5830 ☐ 5835 ☐ 5840 ☐ None
Color Code	0
Display-Only Access	Password: **No Password** Password:
Full Access	Password: **No Password** Password:
Authentication Key	**(Using All 0xFF's Key)** (Only Used if Authentication Required)
Webpage Auto Update	0 Seconds (0 = Disable Auto Update)
SM Power Up Mode With No 802.3 Link	◉ Power up in Aim Mode ○ Power up in Operational Mode
Bridge Entry Timeout	25 Minutes (Range : 25 -- 1440 Minutes)
Frame Timing Pulse Gated	◉ Enable (If SM out of sync then dont propagate the frame timing pulse) ○ Disable (Always propagate the frame timing pulse)

REMOTE "HOP" SITE 2 RADIO SETTINGS (FREQ. – 5735) - TIMING MASTER, GENERATE SYNC SIGNAL

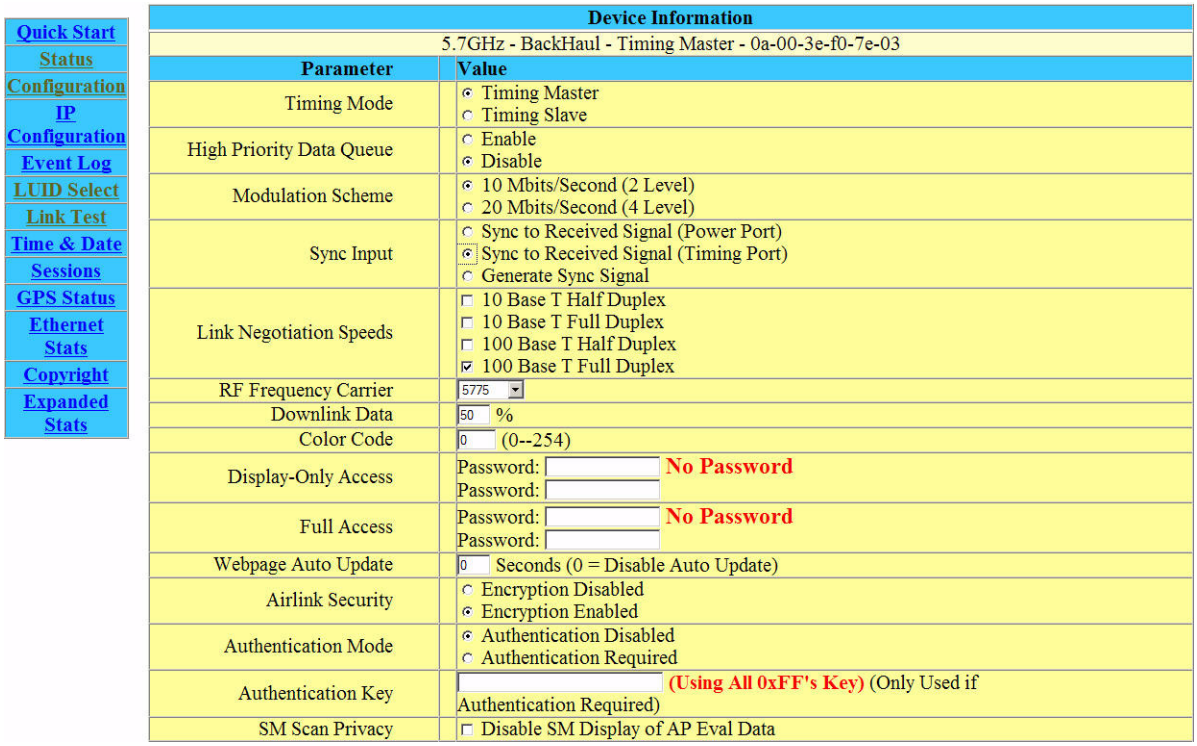
FIGURE 4-4 REMOTE "HOP" SITE 2 RADIO SETTINGS (FREQ. – 5735)

Quick Start
Status
Configuration
IP Configuration
Event Log
LUID Select
Link Test
Time & Date
Sessions
GPS Status
Ethernet Stats
Copyright
Expanded Stats

Device Information	
5.7GHz - BackHaul - Timing Master - 0a-00-3e-f0-7e-03	
Parameter	**Value**
Timing Mode	(•) Timing Master ( ) Timing Slave
High Priority Data Queue	( ) Enable (•) Disable
Modulation Scheme	(•) 10 Mbits/Second (2 Level) ( ) 20 Mbits/Second (4 Level)
Sync Input	( ) Sync to Received Signal (Power Port) ( ) Sync to Received Signal (Timing Port) (•) Generate Sync Signal
Link Negotiation Speeds	[ ] 10 Base T Half Duplex [ ] 10 Base T Full Duplex [ ] 100 Base T Half Duplex [x] 100 Base T Full Duplex
RF Frequency Carrier	5735
Downlink Data	50 %
Color Code	0 (0--254)
Display-Only Access	Password: **No Password** Password:
Full Access	Password: **No Password** Password:
Webpage Auto Update	0 Seconds (0 = Disable Auto Update)
Airlink Security	( ) Encryption Disabled (•) Encryption Enabled
Authentication Mode	(•) Authentication Disabled ( ) Authentication Required
Authentication Key	**(Using All 0xFF's Key)** (Only Used if Authentication Required)
SM Scan Privacy	[ ] Disable SM Display of AP Eval Data

REMOTE "HOP" SITE 2 RADIO SETTINGS (FREQ. – 5775) – TIMING MASTER, SYNC TO RECEIVED SIGNAL

FIGURE 4-5 REMOTE "HOP" SITE 2 RADIO SETTINGS (FREQ. – 5775)



Quick Start
Status
Configuration
IP Configuration
Event Log
LUID Select
Link Test
Time & Date
Sessions
GPS Status
Ethernet Stats
Copyright
Expanded Stats

Device Information	
5.7GHz - BackHaul - Timing Master - 0a-00-3e-f0-7e-03	
Parameter	**Value**
Timing Mode	◉ Timing Master ○ Timing Slave
High Priority Data Queue	○ Enable ◉ Disable
Modulation Scheme	◉ 10 Mbits/Second (2 Level) ○ 20 Mbits/Second (4 Level)
Sync Input	○ Sync to Received Signal (Power Port) ◉ Sync to Received Signal (Timing Port) ○ Generate Sync Signal
Link Negotiation Speeds	☐ 10 Base T Half Duplex ☐ 10 Base T Full Duplex ☐ 100 Base T Half Duplex ☑ 100 Base T Full Duplex
RF Frequency Carrier	5775
Downlink Data	50 %
Color Code	0 (0--254)
Display-Only Access	Password: **No Password** Password:
Full Access	Password: **No Password** Password:
Webpage Auto Update	0 Seconds (0 = Disable Auto Update)
Airlink Security	○ Encryption Disabled ◉ Encryption Enabled
Authentication Mode	◉ Authentication Disabled ○ Authentication Required
Authentication Key	**(Using All 0xFF's Key)** (Only Used if Authentication Required)
SM Scan Privacy	☐ Disable SM Display of AP Eval Data

REMOTE SITE 3 RADIO SETTINGS (FREQ. - 5775) – TIMING SLAVE

FIGURE 4-6 REMOTE SITE 3 RADIO SETTINGS (FREQ. - 5775)

Status
Configuration
IP Configuration
Event Log
AP Eval Data
Ethernet Stats
Copyright
Expanded Stats

Device Information	
5.7GHz - BackHaul - Timing Slave - 0a-00-3e-f0-7e-03	
Parameter	**Value**
Timing Mode	○ Timing Master ◉ Timing Slave
High Priority Data Queue	○ Enable ◉ Disable
Modulation Scheme	◉ 10 Mbits/Second (2 Level) ○ 20 Mbits/Second (4 Level)
Link Negotiation Speeds	☐ 10 Base T Half Duplex ☐ 10 Base T Full Duplex ☐ 100 Base T Half Duplex ☑ 100 Base T Full Duplex
Custom RF Frequency Scan Selection List	☐ 5735 ☐ 5740 ☐ 5745 ☐ 5750 ☐ 5755 ☐ 5760 ☐ 5765 ☐ 5770 ☑ 5775 ☐ 5780 ☐ 5785 ☐ 5790 ☐ 5795 ☐ 5800 ☐ 5805 ☐ 5810 ☐ 5815 ☐ 5820 ☐ 5825 ☐ 5830 ☐ 5835 ☐ 5840 ☐ None
Color Code	0
Display-Only Access	Password: **No Password** Password:
Full Access	Password: **No Password** Password:
Authentication Key	**(Using All 0xFF's Key)** (Only Used if Authentication Required)
Webpage Auto Update	0 Seconds (0 = Disable Auto Update)
SM Power Up Mode With No 802.3 Link	◉ Power up in Aim Mode ○ Power up in Operational Mode
Bridge Entry Timeout	25 Minutes (Range : 25 -- 1440 Minutes)
Frame Timing Pulse Gated	◉ Enable (If SM out of sync then dont propagate the frame timing pulse) ○ Disable (Always propagate the frame timing pulse)

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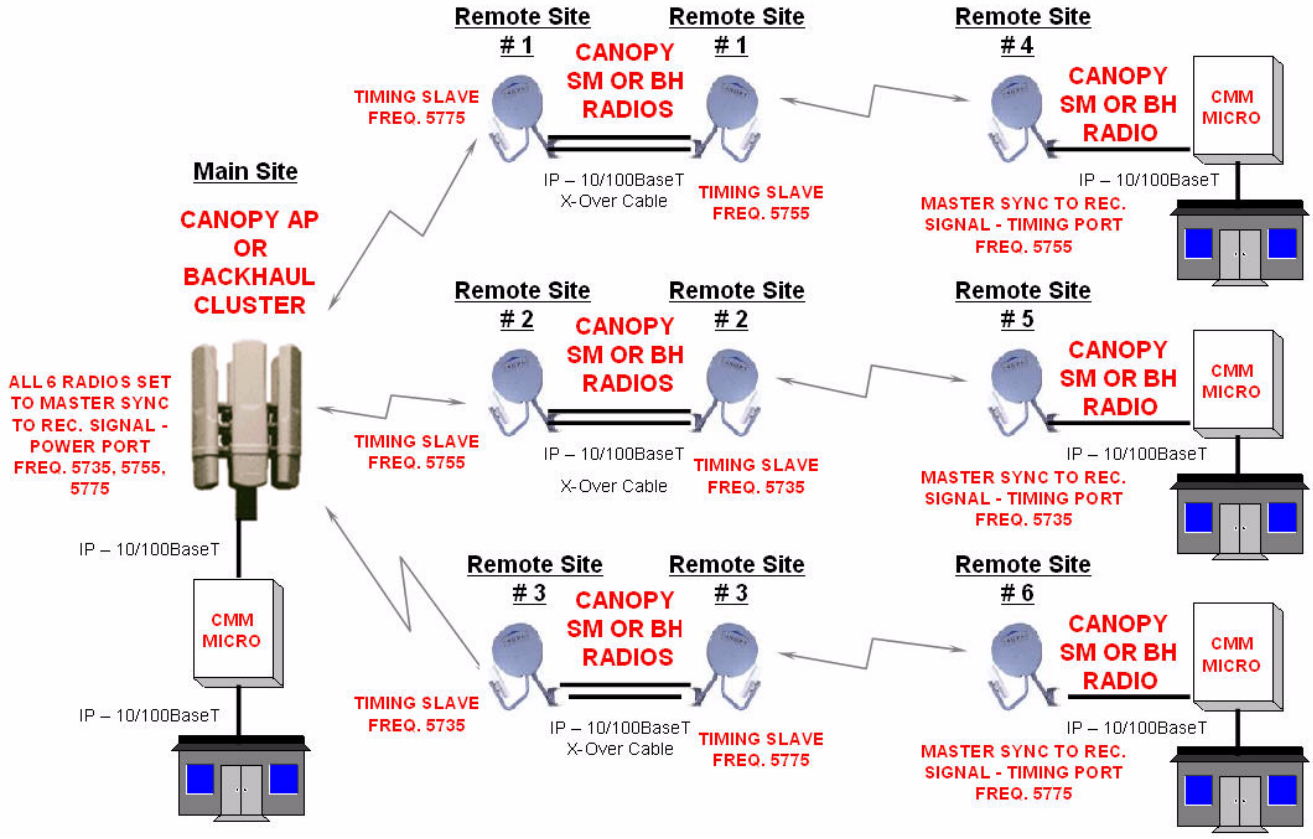
CHAPTER

5

MULTI-POINT CANOPY RADIO CLOCKING/INTERCONNECT WIRING RECOMMENDATIONS

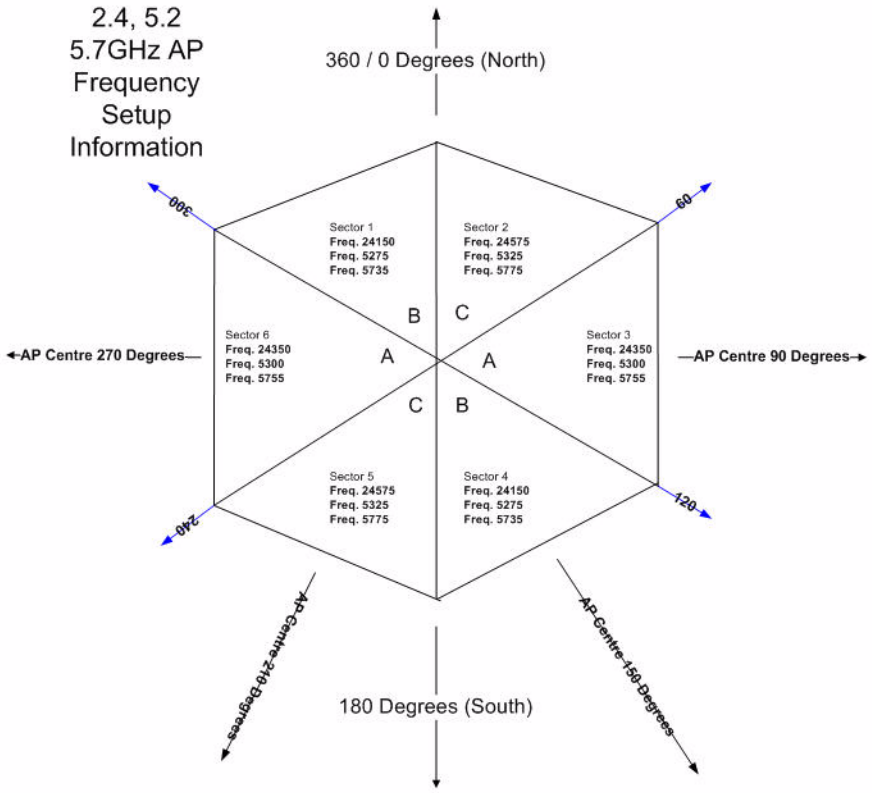
TYPICAL CLOCKING AND FREQUENCY SETTING SCENARIO FOR A MULTIPOINT CANOPY RADIO APPLICATION

FIGURE 5-1 TYPICAL CLOCKING AND FREQUENCY SETTING SCENARIO



SUGGESTED FREQUENCY LAYOUT FOR A 2.4, 5.2, AND 5.7GHZ CANOPY RADIO CLUSTERS

FIGURE 5-2 SUGGESTED FREQUENCY LAYOUT FOR A 2.4, 5.2, AND 5.7 GHZ



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D 0.1

MAIN SITE RADIO CLOCKING (FREQ. - 5735, 5755, 5775) - TIMING MASTER, SYNC TO RECEIVED SIGNAL

FIGURE 5-3 MAIN SITE RADIO CLOCKING

Quick Start
Status
Configuration
IP Configuration
Event Log
LUID Select
Link Test
Time & Date
Sessions
GPS Status
Ethernet Stats
Copyright
Expanded Stats

Device Information	
5.7GHz - BackHaul - Timing Master - 0a-00-3e-f0-7e-03	
Parameter	**Value**
Timing Mode	◉ Timing Master ○ Timing Slave
High Priority Data Queue	○ Enable ◉ Disable
Modulation Scheme	◉ 10 Mbits/Second (2 Level) ○ 20 Mbits/Second (4 Level)
Sync Input	◉ Sync to Received Signal (Power Port) ○ Sync to Received Signal (Timing Port) ○ Generate Sync Signal
Link Negotiation Speeds	☐ 10 Base T Half Duplex ☐ 10 Base T Full Duplex ☐ 100 Base T Half Duplex ☑ 100 Base T Full Duplex
RF Frequency Carrier	5735
Downlink Data	50 %
Color Code	0 (0--254)
Display-Only Access	Password: **No Password** Password:
Full Access	Password: **No Password** Password:
Webpage Auto Update	0 Seconds (0 = Disable Auto Update)
Airlink Security	○ Encryption Disabled ◉ Encryption Enabled
Authentication Mode	◉ Authentication Disabled ○ Authentication Required
Authentication Key	**(Using All 0xFF's Key)** (Only Used if Authentication Required)
SM Scan Privacy	☐ Disable SM Display of AP Eval Data

REMOTE SITES 1, 2, AND 3 RADIO SETTINGS (FREQ. - 5735, 5755, 5775) - TIMING SLAVE

FIGURE 5-4 REMOTE SITES 1,2, AND 3 RADIO SETTINGS

Status
Configuration
IP Configuration
Event Log
AP Eval Data
Ethernet Stats
Copyright
Expanded Stats

Device Information	
5.7GHz - BackHaul - Timing Slave - 0a-00-3e-f0-7e-03	
Parameter	**Value**
Timing Mode	○ Timing Master ◉ Timing Slave
High Priority Data Queue	○ Enable ◉ Disable
Modulation Scheme	◉ 10 Mbits/Second (2 Level) ○ 20 Mbits/Second (4 Level)
Link Negotiation Speeds	☐ 10 Base T Half Duplex ☐ 10 Base T Full Duplex ☐ 100 Base T Half Duplex ☑ 100 Base T Full Duplex
Custom RF Frequency Scan Selection List	☑ 5735 ☐ 5740 ☐ 5745 ☐ 5750 ☐ 5755 ☐ 5760 ☐ 5765 ☐ 5770 ☐ 5775 ☐ 5780 ☐ 5785 ☐ 5790 ☐ 5795 ☐ 5800 ☐ 5805 ☐ 5810 ☐ 5815 ☐ 5820 ☐ 5825 ☐ 5830 ☐ 5835 ☐ 5840 ☐ None
Color Code	0
Display-Only Access	Password: **No Password** Password:
Full Access	Password: **No Password** Password:
Authentication Key	**(Using All 0xFF's Key)** (Only Used if Authentication Required)
Webpage Auto Update	0 Seconds (0 = Disable Auto Update)
SM Power Up Mode With No 802.3 Link	◉ Power up in Aim Mode ○ Power up in Operational Mode
Bridge Entry Timeout	25 Minutes (Range : 25 -- 1440 Minutes)
Frame Timing Pulse Gated	◉ Enable (If SM out of sync then dont propagate the frame timing pulse) ○ Disable (Always propagate the frame timing pulse)

REMOTE SITES 4, 5, AND 6 RADIO SETTINGS (FREQ. - 5735, 5755, 5775) - TIMING MASTER

FIGURE 5-5 REMOTE SITES 4,5, AND 6 RADIO SETTINGS

Quick Start
Status
Configuration
IP Configuration
Event Log
LUID Select
Link Test
Time & Date
Sessions
GPS Status
Ethernet Stats
Copyright
Expanded Stats

Device Information	
5.7GHz - BackHaul - Timing Master - 0a-00-3e-f0-7e-03	
Parameter	**Value**
Timing Mode	(•) Timing Master ( ) Timing Slave
High Priority Data Queue	( ) Enable (•) Disable
Modulation Scheme	(•) 10 Mbits/Second (2 Level) ( ) 20 Mbits/Second (4 Level)
Sync Input	(•) Sync to Received Signal (Power Port) ( ) Sync to Received Signal (Timing Port) ( ) Generate Sync Signal
Link Negotiation Speeds	[ ] 10 Base T Half Duplex [ ] 10 Base T Full Duplex [ ] 100 Base T Half Duplex [x] 100 Base T Full Duplex
RF Frequency Carrier	5735
Downlink Data	50 %
Color Code	0 (0--254)
Display-Only Access	Password: No Password Password:
Full Access	Password: No Password Password:
Webpage Auto Update	0 Seconds (0 = Disable Auto Update)
Airlink Security	( ) Encryption Disabled (•) Encryption Enabled
Authentication Mode	(•) Authentication Disabled ( ) Authentication Required
Authentication Key	(Using All 0xFF's Key) (Only Used if Authentication Required)
SM Scan Privacy	[ ] Disable SM Display of AP Eval Data