OneWireless
Standard Temperature Multinode
Professional Installation Guide

Honeywell Industrial Automation and Control
Ft. Washington, Pennsylvania

APPROVAL SIGNATURES

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Revision Record

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1 DESIGNATION, SCOPE AND PREFACE

1.1 Designation

HONEYWELL ONEWIRELESS MULTINODE DEVICE.

1.1.1 Model Numbers and Revisions :

This document is valid for the following Multinode assembly number:

Model Number	Hardware Assembly # / Revision	Description
WNMN	51153884-100 / C	Multinode Standard Temperature – 802.11a/b/g and 2.4GHz FHSS Radios
WNMX	51153884-101/ C	Multinode Standard Temperature – 802.11a/b/g and 2.4GHz DSSS Radios

Table 1 – Assembly Number and Revision

1.2 Scope

This document outlines professional installation requirements for the Honeywell Multinode Device for the Honeywell OneWireless Network. Professional installation is required to comply with certification agency and legal requirements. This document must be adhered to for all installations of the Honeywell OneWireless Multinode device.

1.3 Preface

This manual covers professional installation of the optional external antennas for use with the Honeywell OneWireless Multinode device. Since this device requires manual power limit settings for use with the higher gain antennas, it is classified by the FCC as a professional install device. To be in compliance with FCC requirements, the radio must be installed with one of several approved antennas listed in this document. The Honeywell OneWireless Multinode device works in conjunction with Honeywell XYR5000 and XYR6000 wireless transmitters and Wi-Fi access point devices. See the Getting Started with Honeywell OneWireless, Honeywell OneWireless Planning Guide and Honeywell OneWireless Multinode User's Guide, for general information on overall system implementation, configuration, and management of the multimode.

1.4 Abbreviations & Definitions

The term Honeywell Multinode Device (or simply Multinode) will be used to describe the composite unit which includes the Honeywell DSSS or FHSS Radio Board, 3eTI Mesh Board, Power Supply board, and all subassemblies housed inside the Multinode enclosure.

ACMA	Australian Communications and Media Authority
ATEX	Potentially Explosive Atmospheres Directive
AWG	American Wire Gauge
Co-located	Two or more radios transmitting simultaneously and with less than 20cm of separation distance.
COTS	Commercial Off-The-Shelf
CSA	Canadian Standards Association
DFS	Dynamic Frequency Selection
DSSS	Direct Sequence Spread Spectrum
EMC	Electromagnetic Compatibility
ETSI	European Telecommunications Standards Institute
EU	European Union
FCC	Federal Communications Committee
FHSS	Frequency-Hopping Spread Spectrum
FM	Factory Mutual
IC	Industry Canada
IEEE	Institute of Electrical and Electronics Engineers
IR	Infrared
IrDA	Infrared Data Association
LED	Light Emitting Diode
MPE	Maximum Permissible Exposure
MTBF	Mean Time Between Failures
NEMA	National Electrical Manufacturers Association
PCB	Printed Circuit Board
PCI	Peripheral Components Interconnect
RAM	Random Access Memory
RJ-45	Registered Jack-45
RPN	Reverse Polarity N-type
SQA	Supplier Quality Assurance
Wi-Fi	Wireless Local Area Network based on IEEE 802.11 Specifications
WNSIA	Wireless Network for Secure Industrial Application

Table 2 –Table of Abbreviations and Definitions

2 FEDERAL COMMUNICATION COMMISSION (FCC)

2.1 FCC Compliance Statements

- This device complies with Part 15 of FCC Rules and Regulations. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radiofrequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- Intentional or unintentional changes or modifications must not be made to the Multinode unless under the express consent of the party responsible for compliance. Any such modifications could void the user's authority to operate the equipment and will void the manufacturer's warranty.

3 INDUSTRY CANADA (IC)

3.1 IC Compliance Statements

- To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropic radiated power (EIRP) is not more than that permitted for successful communication.
- Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
- This Class A digital apparatus complies with Canadian ICES-003.
- French: Cet appareil numérique de la classe **A** est conforme à la norme NMB-003 du Canada.

4 RF Safety Statement:

To comply with FCC's and Industry Canada's RF exposure requirements, the following antenna installation and device operating configurations must be satisfied.

- *Remote Point-to-Multi-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20cm and a separation distance of at least 20cm from all persons.*
- *Remote Fixed Point–to-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20cm and a separation distance of at least 100cm from all persons.*
- *Furthermore, when using integral antenna(s) the Multinode unit must not be co-located with any other antenna or transmitter device and have a separation distance of at least 20cm from all persons.*

5 FCC and Industry Canada (IC) Identification Numbers:

5.1 FCC Identification Numbers:

- Honeywell Multinode DSSS Radio
  - Limited Modular Approval
  - Federal Communication Commission Identification: **S57 – 51306343**

- Honeywell Multinode FHSS Radio
  - Limited Modular Approval
  - Federal Communication Commission Identification: **S57 – WNMNFHSS**

- Honeywell Standard Temperature Multinode 802.11a/b/g Radio
  - Limited Modular Approval
  - Federal Communication Commission Identification: **S57 – WNMNCM9**

5.2 Industry Canada Identification Numbers:

- Honeywell Multinode DSSS Radio
  - Limited Modular Approval
  - *Industry Canada Identification:* ***573I – 51306343***

- Honeywell Multinode FHSS Radio
  - Limited Modular Approval
  - Industry Canada Identification: **573I – WNMNFHSS**

- Honeywell Standard Temperature Multinode 802.11a/b/g Radio
  - Limited Modular Approval
  - Industry Canada Identification: **573I – WNMNCM9**

6 INTENDED COUNTRY USAGE

6.1 NORTH AMERICA

Country	ISO 3166 2 letter code
UNIIITED STATES	US
CANADA	CA

6.2 AUSTRALIA AND NEW ZEALAND

Country	ISO 3166 2 letter code
AUSTRALIA	AU
NEW ZEALAND	NZ

6.3 EUROPEAN UNION

Country	ISO 3166 2 letter code	Country	ISO 3166 2 letter code
Austria	AT	Latvia	LV
Belgium	BE	Liechtenstein	LI
Bulgaria	BG	Lithuania	LT
Cyprus	CY	Malta	MT
Czech Republic	CZ	Netherlands	NL
Denmark	DK	Norway	NO
Estonia	EE	Poland	PL
Finland	FI	Portugal	PT
France	FR	Romania	RO
Germany	DE	Slovakia	SK
Greece	GR	Slovenia	SI
Hungary	HU	Spain	ES
Iceland	IS	Sweden	SE
Ireland	IE	Switzerland	CH
Italy	IT	United Kingdom	BG

7 MULTINODE GENERAL DESCRIPTION

7.1 Intended Use

The Multinode unit is a key component of the Honeywell *Wireless Network for Secure Industrial Application* (WNSIA). It provides wireless mesh connectivity for wireless sensor networks and wireless worker appliances. The Multinode uses powerful radios to communicate with gateway devices connected to a wired DCS network, and a low-powered radio to communicate with wireless sensors. The Multinode unit consists of two types of radios: a sensor radio for communication with XYR 6000 transmitters and IEEE 802.11a/b/g radios for mesh (bridge) network and communication with mobile access point (client) devices.

7.2 Multinode Device Diagrams

Error! Reference source not found. shows the unit-level drawing of the Multinode Device. All cables exit the unit via a ¾" conduit hub. The conduit hub allows end user to land conduit on the Multinode Device. **Error! Reference source not found.** shows the Multinode and all of external interfaces.

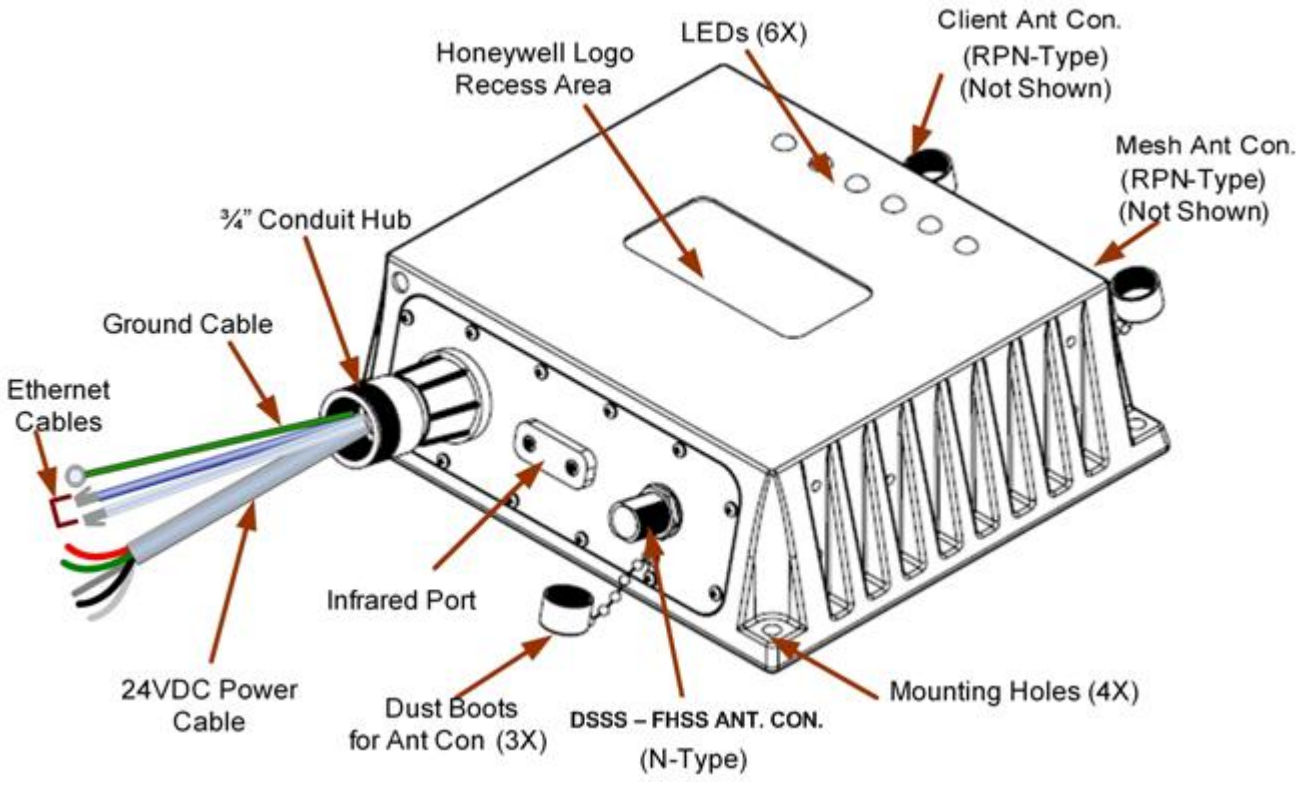

Figure 1 – **Diagram of Multinode Unit showing various external attributes**

8 PRODUCT SPECIFICATIONS

8.1 Frequency Hopping Spread Spectrum (DSSS) Radio, 2.4GHz

Warning! The Multinode unit must be Professionally Installed in accordance with the requirements specified in this document. See Section 10, for professional installation maximum power setting requirements. Only the specified power settings, antenna types and gains and cable lengths (attenuation) as outlined in this document are valid for Multinode installations.

Item	Specification
Wireless Standard	Direct Sequence Spread Spectrum 2.4GHz
Data Rates and Modulation	Data Rate: 250kbps Modulation: OQPSK – DSSS
Frequency Band	2,405 – 2,475MHz
Transmit Power	Maximum: 19dBm (Maximum transmit power will vary by channel and individual country regulations.
Receive Sensitivity (typical)	-95dBm

Table 3 – Specifications of DSSS Radio in Multinode Device.

8.2 Frequency Hopping Spread Spectrum (FHSS) Radio, 2.4GHz

Warning! The Multinode unit must be Professionally Installed in accordance with the requirements specified in this document. See Section 10, for professional installation maximum power setting requirements. Only the specified power settings, antenna types and gains and cable lengths (attenuation) as outlined in this document are valid for Multinode installations.

Item	Specification
Wireless Standard	Frequency Hopping Spread Spectrum (FHSS), 2.4GHz
Data Rates and Modulation	Data Rate: 250kbps Modulation: Gaussian Frequency Shift Keying (GFSK)
Frequency Band	2,402 – 2,482MHz
Transmit Power	Maximum: 19dBm (Maximum transmit power will vary by channel and individual country regulations.
Receive Sensitivity (typical)	-98dBm

Table 4– Specifications of FHSS Radio in Multinode Device.

8.3 IEEE 802.11a/b/G (Wi-Fi) Radios

The Multinode has two IEEE 802.11 radios for implementing client (access point) and mesh (bridge) networks.

Warning! The Multinode unit must be Professionally Installed in accordance with the requirements specified in this document. See Section 11, for professional installation maximum power setting requirements. Only the specified power settings, antenna types and gains and cable lengths (attenuation) as outlined in this document are valid for Multinode installations.

Item	Specification
Wireless Standards	IEEE 802.11a/b/g
Data Rates and Modulation	• 802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps, Orthogonal Frequency Division Multiplexing (OFDM) • 802.11b: 11, 5.5, 2, 1 Mbps, Direct Sequence Spread Spectrum (DSSS) • 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps, OFDM
Frequency Bands and Operating Channels	**United States and Canada (FCC and IC):** • 802.11b/g: 2,412 – 2,462MHz, Channels 1 – 11 • 802.11a: 5,745 – 5,825, Channels 149,153,157,161,165 **Europe (ETSI):** • 802.11b/g: 2,412 – 2,472MHz, Channels 1 – 13 • 802.11a: 5,500 – 5,700, Channels 100,104,108,112,116,120,124,128,132,136,140 **Australia (ACMA):** • 802.11b/g: 2,412 – 2,472MHz, Channels 1 – 13 • 802.11a: 5,745 – 5,825, Channels 149,153,157,161,165
Transmit power (Maximum transmit power will vary by channel, data rate, and individual country regulations.	**Maximum:** • 802.11a: 23 dBm • 802.11b: 16 dBm • 802.11g: 16 dBm
Receive sensitivity (typical)	**802.11a:** -88dB@6Mbps, -87dB@9Mbps, -85@12Mbps, -83dB@18Mbps, -80dB@24Mbps, -75dB@36Mbps, -73dB@48Mbps, -71dB@54Mbps **802.11b:** -95dB@1Mbps, -94dB@2Mbps, -92dB@5.5Mbps, -90dB@11Mbps **802.11g:** -90dB@6Mbps, -89dB@9Mbps, -87@12Mbps, -85dB@18Mbps, -82dB@24Mbps, -79dB@36Mbps, -76dB@48Mbps, -74dB@54Mbps

Table 5 - IEEE 802.11a/b/g Wi-Fi Radio Specifications.

8.4 Multinode User Environment

Item	Specification
Operating Temperature:	-20 ^{O}C to +60 ^{O}C
Storage Temperature:	-20 ^{O}C to +60 ^{O}C
Operating Humidity:	0 to 100% RH

Table 6 – Specifications User Environment Multinode Device.

8.5 Multinode Power Specifications

Item	Specification
Operating Voltage:	20.4Vdc to 26.4Vdc
Power Consumption (typical):	25W

Table 7 – Power Specifications Multinode Device.

8.6 Weight

The weight of the complete Multinode units shall be 7.0 lb. (3.2 kg) maximum. This weight does not include the integral antennas or other external accessories.

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8.7 Dimensions

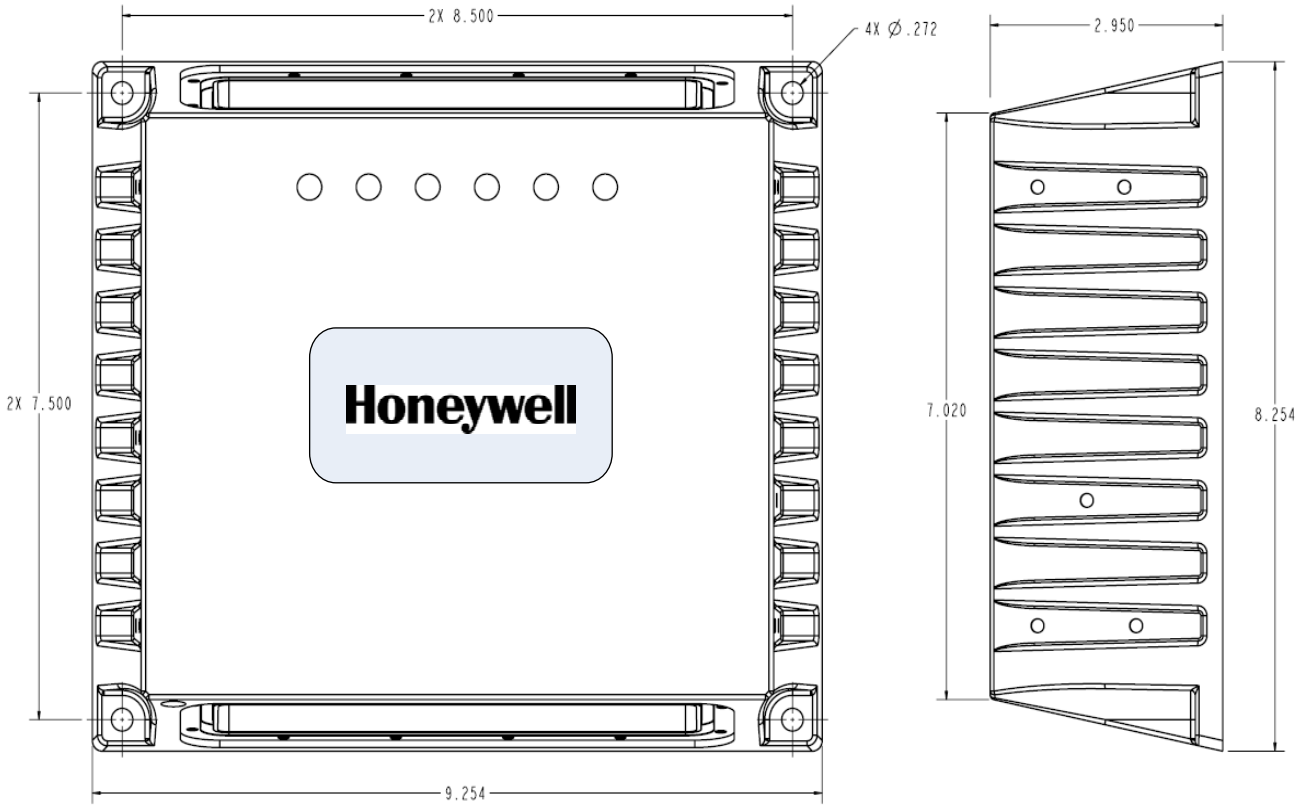


Figure 2 – **Dimension of the Multinode Device**

9 Cables

9.1 External Interface Cables

Cable Type	Specification	Qty	Comments/Specification
External Ethernet	CAT5E Stranded Core	2	Routed through conduit hub. Termination = RJ-45 Modular Plug Finished Length = 24 inches
24VDC Power	Multi-conductor, AWG	1	Finished Length = 24 inches Routed through conduit hub Conductor Color: Red & Green = 24VDC White & Black = Common Drain wire = Chassis potential
Ground Conductor	AWG10	1	Routed through conduit hub Color = Green or Green with yellow stripes. Finished length = 24 inches

Note:

- Finished length is measured from conduit hub to outside tip of cable.
- Ground conductor must be attached to product safety protective earth and building steel ground.
- All external wiring must be routed through metal conduit.

Table 8 – External Cable Specification for Multinode Device.

9.2 Antenna Cables

Cable Application	Honeywell Part #	Cable Type	Connector Type	Frequency (GHz)	Length (m)	Loss (dB)
DSSS, FHSS	50018278-001	400 Series	N male to N male	2.4	1	0.9
DSSS, FHSS	50018278-003	400 Series	N male to N male	2.4	3	1.1
DSSS, FHSS	50018278-010	400 Series	N male to N male	2.4	10	2.4
802.11a/b/g	51202358-001	400 Series	RPN plug to N male	2.4/5.8	1	0.9 / 1.8
802.11a/b/g	51202358-003	400 Series	RPN plug to N male	2.4/5.8	3	1.1 / 2.3
802.11a/b/g	51202358-010	400 Series	RPN plug to N male	2.4/5.8	10	2.4 / 3.8

Table 9- Antenna Cable Specifications for Multinode Device.

10 Antenna Lightning Arrestors

10.1 For use with Integral Antenna(s)

Application	Honeywell Part Number	Specification	Connector Type	Frequency (GHz)	Attenuation (dB)
DSSS, FHSS	51202359-200	50 ohm	NM - NF	0 – 6	0.4 (max)
802.11 a/b/g	51202359-300	50 ohm	RPN Plug - NF	0 - 6	0.5 (max)

Table 10– Lightning Arrestor Specifications for Integral Antenna(s)

10.2 For use with Remote Antenna(s)

Application	Honeywell Part Number	Specification	Connector Type	Frequency (GHz)	Attenuation (dB)
DSSS, FHSS	50018279-090	50 ohm	NF to NF	0 – 3	0.4 (max)
802.11 a/b/g	51202359-100	50 ohm	NF toNF	0 - 6	0.5 (max)

NOTE: Depending on application needs, the “integral” arrestors may be used for remote antennas.

Table 11– Lightning Arrestor Specifications for Remote Antenna(s)

11 Approved Antenna Types/Gains

11.1 DSSS, FHSS 2.4GHz Radio:

Antenna Type	Antenna Application	Manufacturer	Manufacturer Part Number	Honeywell Part Number	Beam Width	Peak Gain (dBi)	Freq. (GHz)	Agency Compliance
Omni (integral)	Point to Multi-Point	PacWireless	OD24M-5	51506534-101	Omni	5	2.4	FCC, IC, ETSI, ACMA
Omni (integral)	Point to Multi-Point	SMARTANT	SAA04-051000	51506534-101	Omni	5	2.4	FCC, IC, ETSI, ACMA
Omni (integral)	Point to Multi-Point	SMARTANT	HON04-052160	51506534-100	Omni	5	2.4	FCC, IC, ETSI, ACMA
Omni (remote)	Point to Multi-Point	HYPERLINK	HGV-2409U	50018414-001	Omni	8	2.4	FCC, IC, ETSI, ACMA
Sector (remote)	Point to Multi-Point	HYPERLINK	HG2414SP-120	NA	120°	14	2.4	FCC, IC, ETSI, ACMA

Table 12 – Approved Antenna Types/Gains, DSSS, FHSS Radio

11.2 802.11a/b/g Access point and Bridge (Mesh) Radio

Antenna Type	Antenna Application	Manufacturer	Manufacturer Part Number	Honeywell Part Number	Beam Width	Peak Gain (dBi)	Freq (GHz)	Agency Compliance
Omni (integral)	Point to Multi-Point	SMARTANT	SAA04-220080	51153883-305	Omni	4.5	2.4 802.11b/g	FCC, IC, ETSI, ACMA
						7	5.4 802.11a	ETSI
							5.8 802.11a	FCC, IC, ACMA
Omni (remote)	Point to Multi-Point	HYPERLINK	HGV-2409U	50018414-001	Omni	8	2.4 802.11b/g	FCC, IC, ETSI, ACMA
Omni (remote)	Point to Multi-Point	HYPERLINK	HG5412U	NA	Omni	12	5.4 802.11a	ETSI
Omni (remote)	Point to Multi-Point	HYPERLINK	HG5812U-PRO	NA	Omni	12	5.8 802.11a	FCC, IC, ACMA
Sector (remote)	Point to Multi-Point	HYPERLINK	HG2414SP-120	NA	120°	14	2.4 802.11b/g	FCC, IC, ETSI, ACMA
Sector (remote)	Point to Multi-Point	HYPERLINK	HG5417P-090	NA	90°	17	5.4 802.11a	ETSI
Sector (remote)	Point to Multi-Point	HYPERLINK	HG5817P-090	NA	90°	17	5.8 802.11a	FCC, IC, ACMA
YAGI (remote)	Point to Multi-Point	TELEX	5816AB	NA	19°	16.5	5.8 802.11a	FCC, IC, ACMA
DISH (remote)	Fixed Point to Point	HYPERLINK	HG5423D	NA	9°	23	5.4 802.11a	ETSI
DISH (remote)	Fixed Point to Point	HYPERLINK	HG5824D	NA	9°	24	5.8 802.11a	FCC, IC, ACMA

Table 13 – Approved Antenna Types/Gains, 802.11a/b/g Radios

12 Equivalent Isotropically Radiated Power (EIRP)

In radio communication systems, Equivalent isotropically radiated power (EIRP), or alternatively, Effective isotropic radiated power is the amount of power that would have to be emitted by an isotropic antenna (that evenly distributes power in all directions and is a theoretical construct) to produce the peak power density observed in the direction of maximum antenna gain. EIRP can take into account the losses in transmission line and connectors and includes the gain of the antenna. The EIRP is often stated in terms of decibels over a reference power level, that would be the power emitted by an isotropic radiator with an equivalent signal strength. The EIRP allows making comparisons between different emitters regardless of type, size or form. From the EIRP, and with knowledge of a real antenna's gain, it is possible to calculate real power and field strength values.

EIRP(dBm) = (Radio Power (dBm)) – (Cable Loss (dB)) + (Antenna Gain(dBi))

Antenna gain is expressed relative to a (theoretical) isotropic reference antenna (dBi).

13 EIRP LIMITS, DSSS 2.4GHz RADIO

Antenna Type	Radio Usage / Application		Freq. (GHz)	Max. Ant. Gain (dBi)	Min. Cable Length (m)	Min. Cable Loss (dB)	Max. Radio Output Power (dBm)	Max. EIRP (dBm)	Agency/ Country
Omni	Point to Multi-Point	Integral	2.4	5	0	0	**20**	**25**	FCC, IC
							6	**11**	ETSI [5], ACMA
Omni	Point to Multi-Point	Remote	2.4	8	1	0.9	**19**	**26**	FCC, IC
							5	**12**	ETSI [5], ACMA
Sector	Point to Multi-Point	Remote	2.4	14	1	0.9	**15**	**28**	FCC, IC
							0	**13**	ETSI [5], ACMA

Notes:

1. The values in the above table have been determined through agency certification testing.
2. Maximum transmit power will vary by channel, data rate, and individual country regulations.
3. The following shall apply for antenna type, frequency range, application/usage and agency/country compliance:
   - Antenna gains above the maximum values shown shall not be used.
   - Cable length/loss below the minimum values shown shall not be used.
   - Maximum overall radio output power shown shall not be exceeded.
   - Maximum EIRP values shown above shall not be exceeded.
4. Beam width, for sector and dish antenna, may range between 0 – 180degress.
5. **France** restricts outdoor use to 10mW (10dBm) EIRP in the frequency range of 2,454-2,483.5 MHz. Installations in France must limit EIRP to 10dBm, for operating modes utilizing frequencies in the range of 2,454 – 2,483.5MHz.
6. Industry Canada Compliance Statement: This device has been designed to operate with the antenna types listed in this document, and having a maximum gain of 14dBi. Antenna types not included in this list or having a gain greater than 14dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Table 14 – EIRP Limits, DSSS 2.4GHz Radio

14 EIRP LIMITS, FHSS 2.4GHz RADIO

Antenna Type	Radio Usage / Application		Freq. (GHz)	Max. Ant. Gain (dBi)	Min. Cable Length (m)	Min. Cable Loss (dB)	Max. Radio Output Power (dBm)	Max. EIRP (dBm)	Agency/ Country
Omni	Point to Multi-Point	Integral	2.4	5	0	0	**19**	**24**	FCC, IC
							14	**19**	ETSI [5], ACMA
Omni	Point to Multi-Point	Remote	2.4	8	1	0.9	**17**	**24**	FCC, IC
							12	**19**	ETSI [5], ACMA
Sector	Point to Multi-Point	Remote	2.4	14	1	0.9	**12**	**25**	FCC, IC
							6	**19**	ETSI [5], ACMA

Notes:

7. The values in the above table have been determined through agency certification testing.
8. Maximum transmit power will vary by channel, data rate, and individual country regulations.
9. The following shall apply for antenna type, frequency range, application/usage and agency/country compliance:
   - Antenna gains above the maximum values shown shall not be used.
   - Cable length/loss below the minimum values shown shall not be used.
   - Maximum overall radio output power shown shall not be exceeded.
   - Maximum EIRP values shown above shall not be exceeded.
10. Beam width, for sector and dish antenna, may range between 0 – 180degress.
11. **France** restricts outdoor use to 10mW (10dBm) EIRP in the frequency range of 2,454-2,483.5 MHz. Installations in France must limit EIRP to 10dBm, for operating modes utilizing frequencies in the range of 2,454 – 2,483.5MHz.
12. Industry Canada Compliance Statement: This device has been designed to operate with the antenna types listed in this document, and having a maximum gain of 14dBi. Antenna types not included in this list or having a gain greater than 14dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Table 15 - EIRP Limits, FHSS 2.4GHz Radio

15 EIRP LIMITS, 802.11a (5.8GHz) Access Point and Bridge Radio

Ant. Type	Radio Usage / Application		Freq. (GHz)	Max. Ant. Gain (dBi)	Min. Cable Length (m)	Min. Cable Loss (dB)	Max. Radio Output Power (dBm)	Max. EIRP (dBm)	Pro-Install Power Setting	Agency/ Country
Omni	Point to Multi-Point	Integral	5.8 802.11a	7	0	0	**23**	**30**	**25**	FCC, IC
							23	**30**	**25**	ACMA
Omni	Point to Multi-Point	Remote	5.8 802.11a	12	1	1.8	**23**	**33**	**25**	FCC, IC
							20	**30**	**2**	ACMA
Sector	Point to Multi-Point	Remote	5.8 802.11a	17	1	1.8	**17**	**32**	**-7**	FCC, IC
							14	**30**	**-12**	ACMA
Yagi	Point to Multi-Point	Remote	5.8 802.11a	16.5	1	1.8	**17**	**31**	**-7**	FCC, IC
							15	**30**	**-11**	ACMA
Dish	Fixed Pt. to Pt.	Remote	5.8 802.11a	24	1	1.8	**23**	**45**	**25**	FCC, IC
							8	**30**	**-24**	ACMA

Notes:

1. The values in the above table have been determined through agency certification testing.
2. Maximum transmit power will vary by channel, data rate, and individual country regulations.
3. The following shall apply for antenna type, frequency range, application/usage and agency/country compliance:
   - Antenna gains above the maximum values shown shall not be used.
   - Cable length/loss below the minimum values shown shall not be used.
   - Maximum overall radio output power shown shall not be exceeded.
   - Maximum EIRP values shown above shall not be exceeded.
4. Beam width, for sector and dish antenna, may range between 0 – 180degress.
5. Industry Canada Compliance Statement: This device has been designed to operate with the antenna types listed in this document, and having a maximum gain of 24dBi. Antenna types not included in this list or having a gain greater than 24dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Table 16– EIRP Limits, 802.11a (5.8GHz) Radios

16 EIRP LIMITS, 802.11a (5.4GHz) Access Point and Bridge Radio

Ant. Type	Radio Usage / Application		Freq. (GHz)	Max. Ant. Gain (dBi)	Min. Cable Length (m)	Min. Cable Loss (dB)	Max. Radio Output Power (dBm)	Max. EIRP (dBm)	Pro-Install Power Setting	Agency/ Country
Omni	Point to Multi-Point	Integral	5.4 802.11a	7	0	0	**23**	**30**	**2**	ETSI
Omni	Point to Multi-Point	Remote	5.4 802.11a	12	1	1.8	**19**	**30**	**-6**	ETSI
Sector	Point to Multi-Point	Remote	5.4 802.11a	17	1	1.8	**14**	**30**	**-17**	ETSI
Dish	Fixed Pt. to Pt.	Remote	5.4 802.11a	23	1	1.8	**8**	**30**	**-35**	ETSI

Notes:

1. The values in the above table have been determined through agency certification testing.
2. Maximum transmit power will vary by channel, data rate, and individual country regulations.
3. The following shall apply for antenna type, frequency range, application/usage and agency/country compliance:
   - Antenna gains above the maximum values shown shall not be used.
   - Cable length/loss below the minimum values shown shall not be used.
   - Maximum overall radio output power shown shall not be exceeded.
   - Maximum EIRP values shown above shall not be exceeded.
4. Beam width, for sector and dish antenna, may range between 0 – 180degress.
5. Industry Canada Compliance Statement: This device has been designed to operate with the antenna types listed in this document, and having a maximum gain of 23dBi. Antenna types not included in this list or having a gain greater than 23dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Table 17 – EIRP Limits, 802.11a (5.4GHz) Radios

17 EIRP LIMITS, 802.11b/g (2.4GHz) Access Point and Bridge Radio

Ant. Type	Radio Usage / Application		Freq. (GHz)	Max. Ant. Gain (dBi)	Min. Cable Length (m)	Min. Cable Loss (dB)	Max. Radio Output Power (dBm)	Max. EIRP (dBm)	Pro-Install Power Setting	Agency/ Country
Omni	Point to Multi-Point	Integral	2.4 802.11b/g	4.5	0	0	**16**	**21**	**40**	FCC, IC
							15	**19**	**2**	ETSI, ACMA
Omni	Point to Multi-Point	Remote	2.4 802.11b/g	8	1	0.9	**16**	**23**	**40**	FCC, IC
							12	**19**	**-4**	ETSI, ACMA
Sector	Point to Multi-Point	Remote	2.4 802.11b/g	14	**10**	**2.4**	**16**	**28**	**40**	FCC, IC
					1	0.9	**6**	**19**	**-23**	ETSI, ACMA

Notes:

1. The values in the above table have been determined through agency certification testing.
2. Maximum transmit power will vary by channel, data rate, and individual country regulations.
3. The following shall apply for antenna type, frequency range, application/usage and agency/country compliance:
   - Antenna gains above the maximum values shown shall not be used.
   - Cable length/loss below the minimum values shown shall not be used.
   - Maximum overall radio output power shown shall not be exceeded.
   - Maximum EIRP values shown above shall not be exceeded.
4. Beam width, for sector and dish antenna, may range between 0 – 180degress.
5. **France** restricts outdoor use to 10mW (10dBm) EIRP in the frequency range of 2,454-2,483.5 MHz. Installations in France must limit EIRP to 10dBm, for operating modes utilizing frequencies in the range of 2,454 – 2,483.5MHz.
6. Industry Canada Compliance Statement: This device has been designed to operate with the antenna types listed in this document, and having a maximum gain of 14dBi. Antenna types not included in this list or having a gain greater than 14dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Table 18 – EIRP Limits, 802.11b/g (2.4GHz) Radios

18 Setting Power and Country Code: FHSS Radio

Warning! The Multinode unit must be Professionally Installed in accordance with the requirements specified in this document. Only the specified power settings, antenna types and gains and cable lengths (attenuation) as outlined in this document are valid for Multinode installations.

Set the radio power level using the Authentication Device application. Due to regulations, this command is only available if professional installer options have explicitly been enabled on your PDA. If you have not enabled professional installer options and would like to do so, please contact Honeywell DE or TAC. A separate application, AuthDev Power Settings, is required to enable the "Write TX Power Level" option.

Perform the following procedure to read and change the radio power level on your multinode or wireless device:

- Open the Authentication Device application on your Windows Mobile PDA.
- From the main menu, choose the Advanced Options menu to open the Advanced Options form.
- From the Advanced Options form, choose "Read TX Power Level" from the command drop down box.
- Aim the Authentication Device at your node and press the Transmit Command button to read the data from the node. The TX Power reading will be presented on your screen.
- If you have enabled professional installer options within the Authentication Device, choose the "Write TX Power Level" from the command drop down box.
- Choose a new power level. Aim the Authentication Device at your node and press the Transmit Command button to write the data to the node.

19 Setting Power & Country Code: 802.11 Access Point & Bridge Radio

Warning! The Multinode unit must be Professionally Installed in accordance with the requirements specified in this document. Only the specified power settings, antenna types and gains and cable lengths (attenuation) as outlined in this document are valid for Multinode installations.

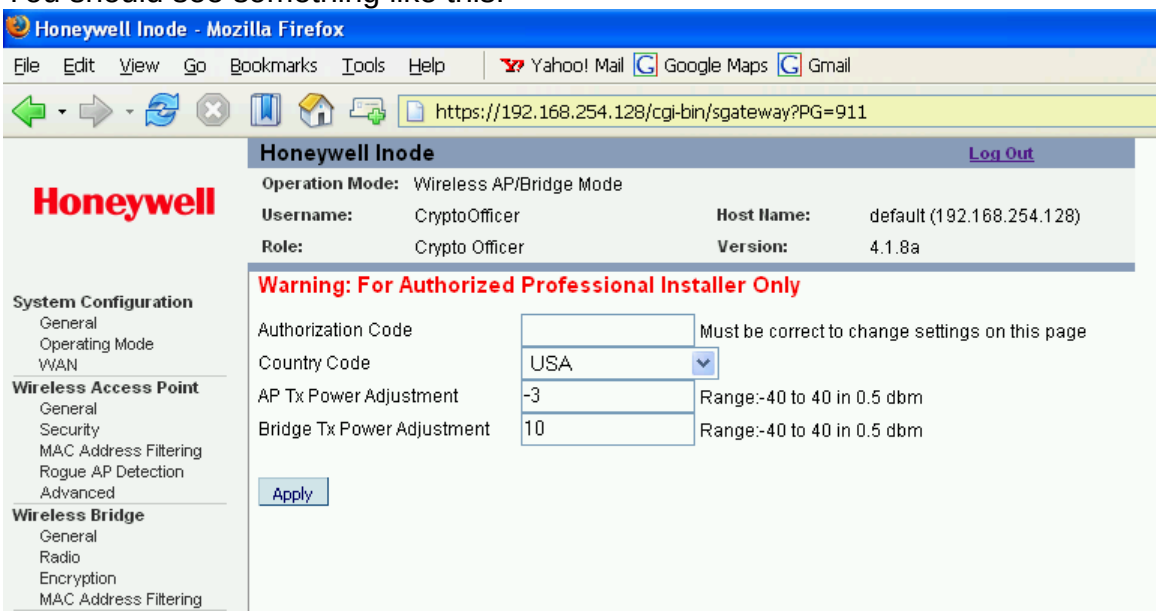
Programming the Country Code

A hidden page on the Multinode Configuration Tool has been designed for professional installers to change country code and radio output power settings. A valid authorization code has to be entered for the any information to be modified. **This authorization code is hard-coded in the firmware and shall be kept as a SECRET at all times.**

To access the hidden page, type the following URL in your browser:

https://192.168.254.128/cgi-bin/sgateway?PG=911
Change 192.168.254.128 to the IP address of your unit, and make sure you login as:
Login: CryptoOfficer, **Password:** CryptoFIPS

You should see something like this:

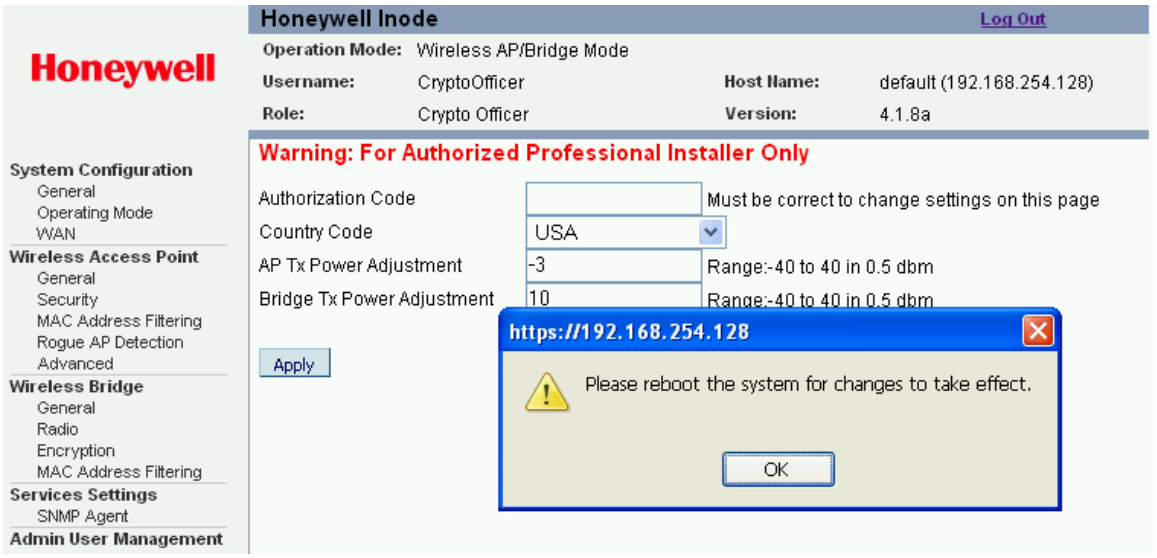


The authorization code is: “XXXXXXXXXX” without the quote **(YOU MUST KEEP THIS AS A SECRET)**

Change the following options based on values you determined in Section 11:

- Country Code
- Adjustment to Max TX power of Access Point Radio (increase or decrease)
- Adjustment to Max TX power of Bridge Radio (increase or decrease)

After applying the changes, you will be notified to reboot the unit for any changes to take effect.



Note that the adjustment of radio Max TX power has limits. It will level off on both the low end and high end. This feature is provided for professional installers to adjust the card output power to match the specific selection of antenna and keep the total output power under the regulatory threshold.

The setting here are saved in non-volatile memory inside the unit. Restoring the unit to factory default settings does not change these values.

19.1 Power Setting Reference Table, 802.11 Access Point & Bridge Radio:

Multinode Bridge and Access Point Radio Ports				
WIRELESS MODE	802.11a	802.11a	802.11b/g mixed	802.11b/g mixed
CHANNEL	120 (5.6GHz)	157 (5.785GHz)	7 (2.442GHz)	6 (2.437GHz)
TX PWR MODE	FIXED, 8	FIXED, 8	FIXED, 8	FIXED, 8
Professional Installer TX Power Setting	**MEASURED OUTPUT POWER (dBm)**	**MEASURED OUTPUT POWER (dBm)**	**MEASURED OUTPUT POWER (dBm)**	**MEASURED OUTPUT POWER (dBm)**
40	24.0	23.0	17.2	16.2
35	24.0	23.0	17.2	16.2
30	24.0	23.0	17.2	16.2
25	24.0	23.0	17.2	16.2
20	24.0	23.0	17.2	16.2
15	24.0	23.0	17.2	16.2
10	23.9	20.7	17.2	16.2
5	23.7	20.1	15.7	16.2
0	21.8	19.6	13.8	16.1
-5	19.7	17.2	11.3	12.4
-10	17.0	15.7	9.0	10.7
-15	15.0	11.8	7.4	8.4
-20	12.5	8.9	6.7	6.4
-25	9.7	7.3	5.2	4.9
-30	8.5	5.2	2.4	2.8
-35	8.4	4.6	2.3	1.6
-40	8.4	4.6	2.3	1.4

Table 19: 802.11 Radio Power Setting Reference

20 RF Safety, Maximum Permissible Exposure (MPE) statement

To comply with FCC's and Industry Canada's RF exposure requirements, the following antenna installation and device operating configurations must be satisfied.

- *Remote Point-to-Multi-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20cm and a separation distance of at least 20cm from all persons.*
- *Remote Fixed Point–to-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20cm and a separation distance of at least 100cm from all persons.*
- *Furthermore, when using integral antenna(s) the Multinode unit must not be co-located with any other antenna or transmitter device and have a separation distance of at least 20cm from all persons.*

21 AGENCY COMPLIANCE

21.1 Radio and EMC Certifications

21.1.1 Federal Communication Commission (FCC)

- Specification: FCC Part 15.247 Subpart B for unintentional radiators
- Specification: FCC Part 15.247 Subpart C for intentional radiators

21.1.2 Industry Canada (IC)

- Method: RSS-210, Issue 7
- RSS-Gen, Issue 2
- ICES-003, Issue 4

21.1.3 European Telecommunications Standards Institue (ETSI)

- Emissions Specification and Method: EN 300 328 V1.7.1
- Emissions Spec and Method: EN 301 893 V1.3.1
- Immunity Specification: EN 301 489-17 V1.2.1
- Immunity Method: EN 301 489-1 V1.6.1
- Product Standard: IEC61326-1 (1st Edition, 2002-02, Industrial Locations)

21.1.4 Australian communications and media authority (ACMA)

- Specification: AS NZS 4771-2000

21.2 Product Safety Agency Certifications

21.2.1 Canadian Standards Association (CSA)

CSA electrical equipment requirements for use within Division 2 and Zone 2 hazardous locations.

IEC61010-1 (2nd Edition, 2001-02), "Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, part 1: General Requirements

Canadian Standards Association Standard C22.2 No. 213-M1987, "Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations"

Canadian Standards Association Standard E60079-0:02, “Electrical Apparatus for explosive gas atmospheres – General Requirements”

Canadian Standards Association Standard E60079-15:02, “Electrical Apparatus for explosive gas atmospheres – Type of Protection “n””

- Temperature code: T4 (135°C) based on the maximum specified ambient of 60°C.

21.2.2 Factory Mutual (FM)

FM electrical equipment requirements for use within Division 2 and Zone 2 hazardous locations.

Factory Mutual Approval Standard Class No. 3600, "Electrical Equipment for Use in Hazardous (Classified) Locations - General Requirements

Factory Mutual Approval Standard Class No. 3810, "Electrical and Electronic Test, Measuring, and Process Control Equipment

Factory Mutual Approval Standard Class No. 3611, "Electrical Equipment for Use in Class I, Division 2, Class II, Division 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations

ANSI/ISA 12.00.01-2002, “Electrical Apparatus for Use in Class I, Zones 0, 1 & 2 Hazardous (Classified) Locations: General Requirements”

ANSI/ISA 12.12.02-2003, “Electrical Apparatus for explosive gas atmospheres – Type of Protection “n””

- Temperature code: T4 (135°C) based on the maximum specified ambient of 60°C.

21.2.3 European ATEX Certification (ATEX)

The completely assembled Multinode will conform to European electrical equipment requirements for use within Zone 2 Hazardous Locations.

IEC 60079-0:2004-01, “Electrical Apparatus for explosive gas atmospheres – General Requirements

IEC 60079-15:2005-03, “Electrical Apparatus for explosive gas atmospheres – Type of Protection “n”

- Temperature code: T4 (135°C) based on the maximum specified ambient of 60°C.

21.3 European Union Certification (CE-mark)

- Compliance with:
  - R&TTE Directive 1999/5/EC
  - EMC Directive 2004/108/EC
  - LVD Directive 73/23/EEC
  - ATEX Directive 94/9/EC

22 Reference Documents

1	Getting Started with Honeywell OneWireless
2	Honeywell OneWireless Planning Guide
3	Honeywell OneWireless Multinode User’s Guide
4	Radio Antenna: A Primer White Paper
5	Honeywell OneWireless System Administration Guide
6	Honeywell OneWireless Field Network Dictionary
7	OneWireless Builder Parameter Reference
8	OneWireless Builder User’s Guide