Pyrodigital®

CONTROL & RELIABILITY

Pyrodigital®
Eagle Wireless Base

Model PDWBA-1

Operational Description
and Technical Specifications

Innovative Pyrotechnik GmbH - 2019

Contents

General Safety and warning information

1. Ensure compliance with all relevant national and international laws and regulations, such as explosives law, fire protection provisions and valid safety clearances as well as all applicable rules, regulations and laws regarding radio frequency communication.
2. The Pyrodigital® equipment may only be operated by professional and authorized pyrotechnicians with sufficient knowledge of the Pyrodigital® Phase III network and the Pyrodigital® Field Controller to control the Pyrodigital® Phase III network.
3. Protect the devices against fallout and the weather.
4. The Pyrodigital® System is intended exclusively for firing approved electric matches. The user is responsible for the safe handling and use of the electric matches. This also includes excluding the risk of unwanted firing caused by electrical, magnetic and electromagnetic sources, for example.
5. The user is obligated to read the operating instructions of the Eagle Wireless Base before use and operation. This document is not the operating instructions. Contact Innovative Pyrotechnik GmbH if you do not have a copy of the operating instructions.
6. Do use the Eagle Wireless Base only in conjunction with original Pyrodigital equipment like Pyrodigital® field controllers, Pyrodigital® firing modules and Phase III network cables recommended by the Pyrodigital® (Innovative Pyrotechnik GmbH). Please contact Pyrodigital® (Innovative Pyrotechnik GmbH) for an up-to-date overview of the recommended Pyrodigital® Phase III network components.

For USA:

Contains FCC ID: MCQ-XBPSX

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

For Canada:

Contains Model XBPSX Radio, IC: 1846A-XBPSX

Operational Use

This Document gives you the user an overview of the operating modes and the technical specifications of the Eagle Wireless Base. This document is not the 'operating instructions' of the device.

Wireless Link Point-to-Point

The Eagle Wireless Base (EWB) allows to replace long cable runs in a Pyrodigital Phase III Network to connect a Pyrodigital Field Controller (bus master) with Pyrodigital Firing Modules (bus slaves). Figure 1 shows a typical setup. The input of the left EWB is in connection with a Pyrodigital Field Controller via a Phase III network cable. The wireless link between the two EWBs connects the Firing Modules on the outputs of the right EWB to the Phase III Network of the Field Controller that is connected to the input of the left EWB.

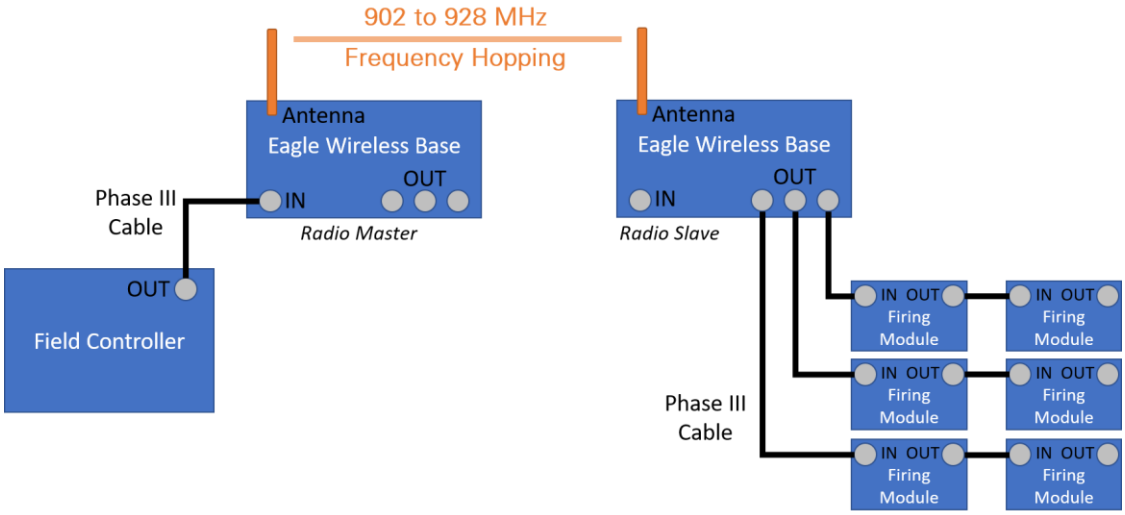

Figure 1: Establish wireless point-to-point link in a Phase III Network using the Eagle Wireless Base

Wireless Link Point-to-Multipoint

As figure 2 shows, the EWB also allows point-to-multipoint connections to extend the network with several EWB as radio slaves (max. 12 radio slaves). Each Radio Slave can be addressed by an individual Slave Number (This parameter can be set using the keyboard and display of the Eagle Wireless Base. MENU → GENERAL SETTINGS → SLAVE NUMBER).

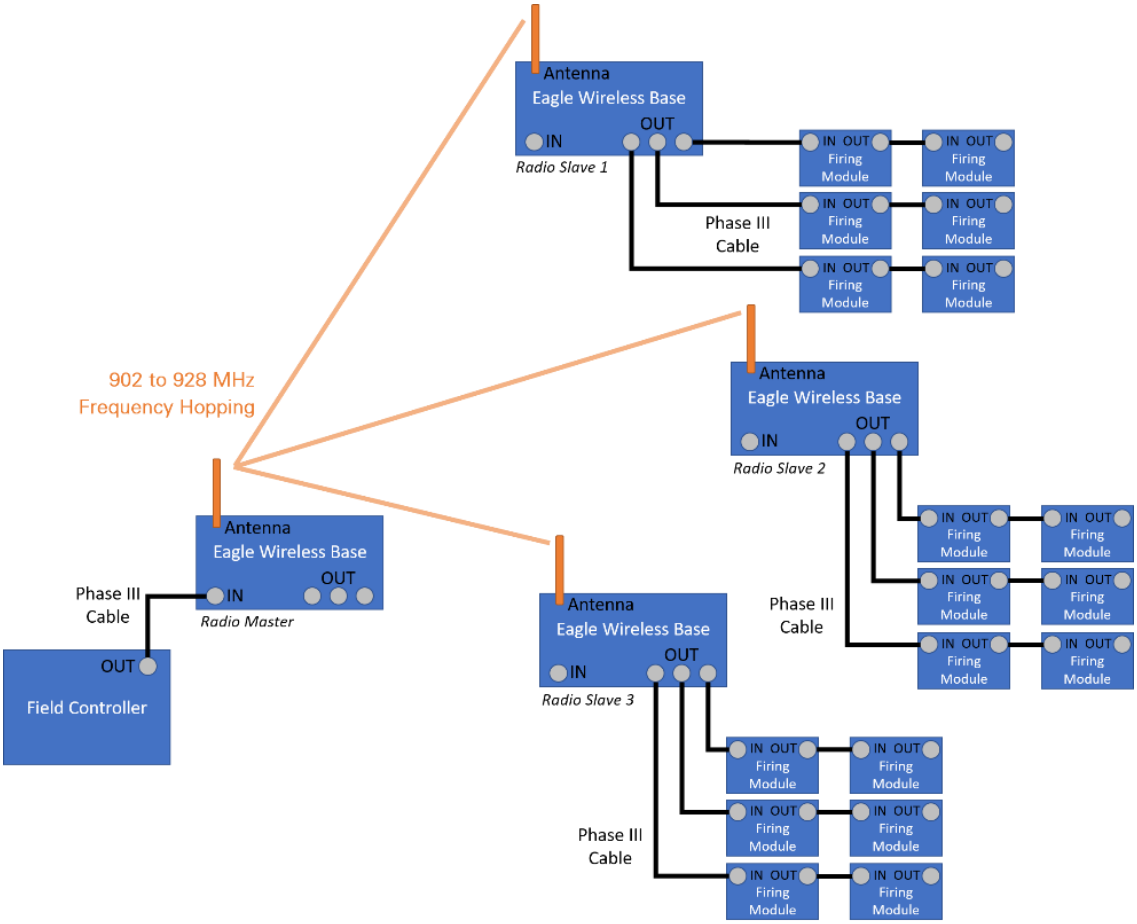

Figure 2: Establish wireless point-to-multipoint link in a Phase III Network using the Eagle Wireless Base

Isolating Booster

Figure 3 shows how the Eagle Wireless Base can be used to re-boost a Phase III Network Signal. The input and output networks are galvanically isolated to each other (so they do not share the same ground).

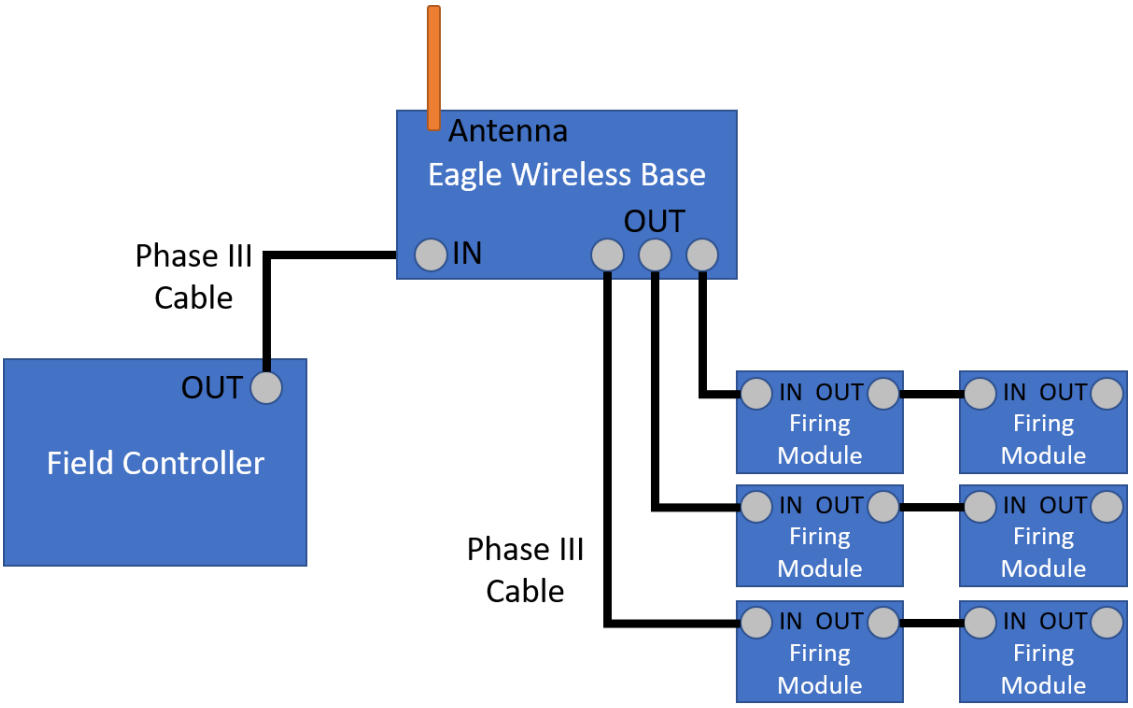

Figure 3: Re-boosting the network signal in a Phase III network using the Eagle Wireless Base

Wireless Link Settings

The user can set several parameters to ensure a safe and unique wireless network using the Eagle Wireless Base:

CUSTOMER ID

Range: 000000 to 999999

Purpose: **Specific to every customer**. Ensures that only the user's company (or company subdivision) has access to the network. This number should be treated confidential.

Info: The Customer ID is used by the user to generate a unique encryption for his company (or company division). Rental equipment can easily be set to the required Customer ID

Access: The parameter can be set using the keyboard and display of the Eagle Wireless Base. MENU → GENERAL SETTINGS → CUSTOMER ID → *customer ID* → ENTER

NETWORK ID

Range: 0 to 32767

Purpose: **Specific to every show.** Ensures that parallelly running shows of the same company do not interfere. E.g. unintended control over a Slave Bases of Show A (in Town A) by the Master Base of Show B (in Town B). ATTENTION: The Eagle Wireless Bases establish a very strong wireless connection. Therefore, there is the potential danger of unintended control over equipment that is several miles away, if the networks are operate on the same Network ID (and the same Channel and same the Customer ID).

Info: Eagle Wireless Bases only communicate with each other if they are set to the same Network ID. The recommendation is to use a unique Network ID for every show. The easiest way of doing this is to simply count up with every show (e.g. first show = 00001, 8th show = 00008, 245th show = 00245). This way the user can always be sure to never have duplicated Network IDs on different shows.

Access: The parameter can be set using the keyboard and display of the Eagle Wireless Base. MENU → GENERAL SETTINGS → NETWORK ID → *select network ID* → ENTER

CHANNEL

Range: 1 to 6

Purpose: Assign the physically used frequencies. **Several networks on different Channels can be used simultaneous.**

Info: The Eagle Wireless Base PDWBA-1 for the US and Canada market uses a frequency hopping algorithm, meaning that the network jumps several times per second to another radio frequency. This technique is very powerful and results in very high communication stability. The set of frequencies used (called the hopping set) can be selected by the channel parameter. All combinations can be used and also all 6 channels can be operated at the same time! If only two Channels are in use, the best physical separation is achieved with the following Channel pairs: 1&2 or 3&4 or 5&6. Following best practice, shows that are locally close to another should of course preferably use different channels, if possible. This helps to prevent unintended control over other networks (see also Network ID).

Access: The parameter can be set using the keyboard and display of the Eagle Wireless Base. MENU → GENERAL SETTINGS → CHANNEL → *select channel* → ENTER

Technical Specifications

General Information

Manufacturer:	Innovative Pyrotechnik GmbH
Brand name:	Pyrodigital
Type:	Eagle Wireless Base
Model:	PDWBA-1
Operating temperature:	-40 °C to 85 °C
Power Ratings:	Internal 24 VDC Battery Supply, 7.2 Ah (2x 12 VDC in series) Battery Technology: Valve Regulated Lead Acid (LRVA) Batterie Manufacturer: Panasonic Corporation Type Number: UP-VW1245P1 Batteries satisfy special provision 238 added UN No. 2800 (non-spillable) and IATA satisfies this battery with special provision A 48, A 67, A 164 prescribed in DANGEROUS GOODS REGULATIONS.
Dimensions (W x H x D):	45 cm x 24 cm x 41 cm 17.7" x 9.5" x 16.2"
Weight:	12.8 kg / 28.2 lbs

RF Specifications

Contained RF Module:	Digi International XBee Pro SX FCC ID: MCQ-XBPSX IC: 1846A-XBPSX
Modulation:	Gaussian Frequnecy Shift Keying (GFSK)
Spreading technology:	Frequency Hopping Spread Spectrum (FHSS)
RF network topologies:	point-to-point/point-to-multipoint
Encryption:	256-bit Advanced Encryption Standard (AES) cipher block chaining (CBC) Encryption
Frequency range:	ISM 902 to 928 MHz
RF Data Rate:	110 kb/s
RF Transmitted power:	30 dBm
RF Receiver sensitivity:	-106 dBm
Antenna connector:	RP N-Type female socket
RF Antenna impedance:	50 Ω unbalanced
Maximum input RF level at antenna port:	6 dBm

Pyrodigital Phase III Network Specifications	
Phase III Inputs	1
Phase III Outputs	3 integrated passive splitter with individually fused outputs
Max. driving capabilities	128 Pyrodigital Firing Modules FM-A, FM2, FM3, FM4, FM5, FM7

IMPORTANT: Do use the Eagle Wireless Base in conjunction with original Pyrodigital equipment only!

Included Accessories

- worldwide universal charger (110 to 230 VAC, 50 to 60 Hz)
- two keys (to arm the PD Phase III Outputs of the Eagle Wireless Base)
- angled half-lambda antenna (omni-directional)
- rubber feet (to place the Eagle Wireless Base on tables)
- lifting metal feet (to place the Eagle Wireless Base in the field)
- mount angles of 19" rack

Further Accessories

- worldwide universal external power supply (110 to 230 VAC, 50 to 60 Hz)
- extra spare keys (to arm the PD Phase III Outputs of the Eagle Wireless Base)
- compliant Yagi antennas (directional antennas)

Disclaimer

The Pyrodigital® Eagle Wireless Bases are devices only for use in professional pyrotechnics, used to fire standard industrial electric matches as part of fireworks displays or special effects. These devices may not be used to connect or trigger detonators. The Pyrodigital® Eagle Wireless Bases are intended exclusively for the purpose of firing pyrotechnic special effects and fireworks in conjunction with other original Pyrodigital® products and may only be used for this purpose. The Pyrodigital® Eagle Wireless Base allows to establish wireless connectivity in Pyrodigital® Phase III networks, and may only be used together with other original Pyrodigital® equipment. The user must have specialist knowledge of the Pyrodigital® Phase III network and the Pyrodigital® field controller used as well as of all other connected equipment. This is required to set up Phase III networks and to operate the Pyrodigital® Eagle Wireless Base as well as Phase III networks in general. The Pyrodigital® Eagle Wireless Base is designed and intended solely for professional use by trained and authorized pyrotechnicians, and may only be operated by such personnel. The Pyrodigital® Eagle Wireless Base may only be used by professional and authorized pyrotechnicians in conditions and environments that are approved by the responsible authorities. The operator has to ensure to be compliant with all relevant laws, applicable regulations and provisions regarding radiofrequency communication in the country, area or region he/she operates the Eagle Wireless Base. For the USA, the authorities for radiofrequencies communication are the FCC (Federal Communications Commission). For the Canada, the authorities for radiofrequencies communication are the Certification and Engineering Bureau of Industry Canada. The designers, authors, manufacturer and sales partners of the Pyrodigital® Eagle Wireless Base assume no liability for critical and unforeseeable factors outside their control related to the handling of the Pyrodigital® Eagle Wireless Base and the resulting risks. These risks include but are not limited to severe personal injury or death due to unintentional or incorrect firing of electric matches, operating errors and incorrect execution due to system errors during a fireworks display, performance or special effect show. Such risks exist even though the Pyrodigital® Eagle Wireless Bases are suitable within reason for all applications indicated in advertising material, brochures and documentation. This is also the case even when all instructions and guidelines for use, including those for the Pyrodigital® field controller and other Pyrodigital® products are observed. ENSURING SAFETY IS YOUR RESPONSIBILITY, and is outside of the control of Innovative Pyrotechnik GmbH (Pyrodigital®). By purchasing and/or using the Pyrodigital® Eagle Wireless Bases, both the buyer and user assume full responsibility for all risks and liabilities resulting from the use of the Pyrodigital® Eagle Wireless Base. Furthermore, they also agree to indemnify Innovative Pyrotechnik GmbH (Pyrodigital®) and its sales partners against any claims resulting from injuries, loss and any damages caused directly or through use, as well as damages caused by failure. Innovative Pyrotechnik GmbH (Pyrodigital®) assumes no guarantee or liability for repairs or modifications to the device that are not performed or authorized by Innovative Pyrotechnik GmbH (Pyrodigital®), as well as for the resulting risks. Each sales partner is also bound to the conditions described here for the purposes of sales.

Do the unthinkable.

Pyrodigital®