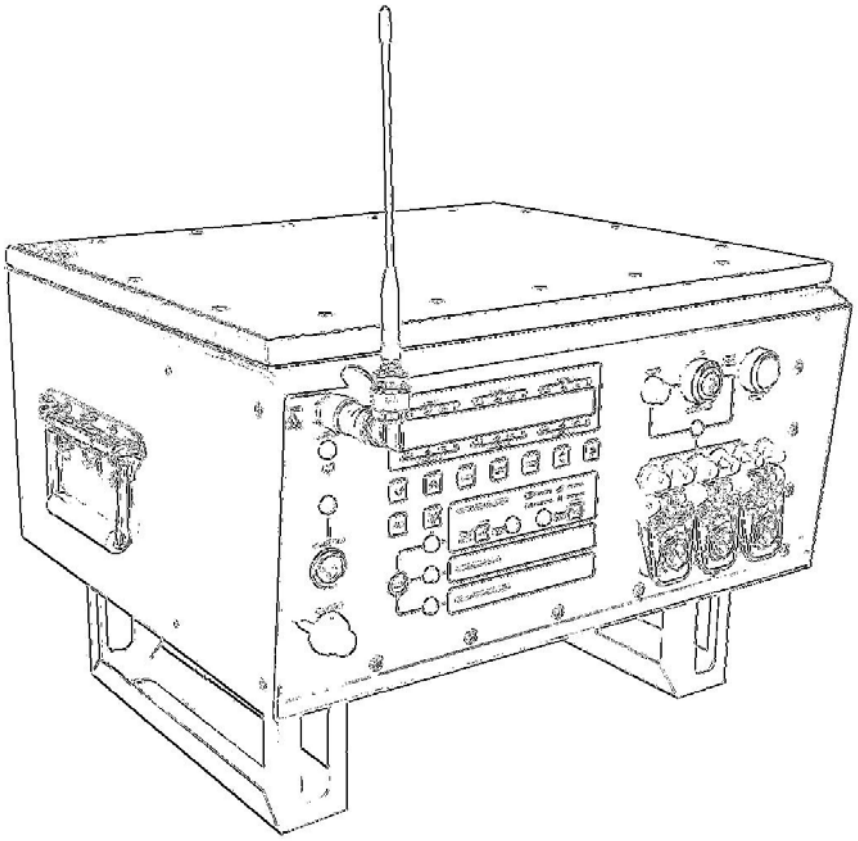
Pyrodigital®

CONTROL & RELIABILITY



THE NEW “EAGLE” WIRELESS BASE

operating instructions

PYRODIGITAL®
EAGLE WIRELESS BASE
OPERATING INSTRUCTIONS

This document applies to the

Pyrodigital® Eagle Wireless Base

Software Version 1.1

(September 2019).

Innovative Pyrotechnik GmbH

Steinwerkstr.2

71139 Ehningen, Germany

Pyrodigital®

CONTROL & RELIABILITY

INNOVATIVE PYROTECHNIK GMBH

RoHS Compliant

!!! IMPORTANT !!!

Before operating the Pyrodigital® Eagle Wireless Base, the owner **MUST send a notification** to Innovative Pyrotechnik GmbH that these operating instructions have been received. Please fill out and sign the following form and send a photograph or photo to:

pd@pyrodigital.com

Notification about Receipt of the Pyrodigital® Eagle Wireless Base Operating Instructions.

Herewith, I confirm that a copy of the Operating Instructions for the Pyrodigital® Eagle Wireless Base has been received by our company, either printed or in electronic form.

Device Serial Number: _____

Receiver (Company): _____

Date (mm/dd/yyyy): _____

Signer (Surname, Forename): _____

Signature: _____

WELCOME TO PYRODIGITAL®

Visit us on pyrodigital.com

or contact by email pd@pyrodigital.com.

Contents

Chapter 1

Feature Overview

The Pyrodigital® Eagle Wireless Base is a robust, versatile and powerful wireless solution for digitally choreographed fireworks displays and special effect shows. The devices allow to establish Pyrodigital® network connection through radio link and provide the following features:

- Interconnecting Pyrodigital® networks via a wireless point-to-point or point-to-multipoint connection
- Up to 3.7 miles (6 km) range in rural environment with direct line of sight (using Yagi-Antennas).
- Up to 1 miles (1.6 km) range in urban environment with direct line of sight (using Yagi-Antennas).
- Standby time approx. 40 hours, Active time (with full network of 128 modules) approx. 8 hours
- Full backwards-compatibility with all prior Pyrodigital® devices (Firing Modules as well as Field Controllers)
- Intuitive design and operation.

- The device can also be used as galvanically isolating booster (signal and power) for cabled Pyrodigital® networks
- Local Check Status without the need of a Field Controller
- Waterproof housing and RF shielded housing
- Status information monitoring for all wireless slave devices directly on master unit
- Three Pyrodigital Phase III Network Outputs, each separately fused with thermal circuit breakers
- Integrated Pyrodigital® Network Power Booster Technology of the Pyrodigital® FC-A Field Controller for extra network range
- 3-way Safety Arm Key: Remote - Off - Direct Enable
- Remote terminal allows to connect an optional deadman pickle to the Pyrodigital® Eagle Wireless Base to have a spotting operator next to the device.
- Highly reliable terminal components
- Valve Regulated Lead-Acid (VRLA) batteries for reliable and safe performance and easy air transportation. No *'dangerous goods'* lithium batteries.
- Integrated signal strength monitoring system
- Integrated battery monitoring system
- Integrated temperature monitoring system
- 2 years warranty
- Included worldwide universal charger (100-240 VAC, 50-60 Hz)
- Optional external power supply for 100-240 VAC, 50-60 Hz available for purchase.

Chapter 2

Technical Data

General Specifications

Type:	Eagle Wireless Base
Model:	PDWBA-1
Manufacturer:	Innovative Pyrotechnik GmbH
	Steinwerkstr. 2, 71139 Ehningen
	Germany
Software Version:	1.1
Operating Temperature:	-20°C/-5°F to +85°C/+185°F Electronics
	-20°C/-5°F to +55°C/130°F Batteries

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 (1 Watt)
RF Receiver sensitivity	-106 dBm
Antenna connector	RP N-Type female socket
RF Antenna impedance	50 Ω unbalanced
Maximum input RF level	6 dBm
at antenna port	

For FCC regulations:

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 ISED regulations:

Contains Model XBPSX Radio, IC: 1846A-XBPSX

The integrator is responsible for its product to comply with IC ICES-003 and FCC Part 15, Sub. B - Unintentional Radiators. ICES-003 is the same as FCC Part 15 Sub. B and Industry Canada accepts FCC test report or CISPR 22 test report for compliance with ICES-003.

Pyrodigital® Phase III Network Specifications

Phase III Inputs	1 (galvanically isolated)
Phase III Outputs	3 (integrated passive splitter with individually fused outputs)
Phase III Network Output Voltage:	28.5 VDC (only if Safety Arm Key is armed)
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!

Power Specifications

Internal Battery Type:	Valve Regulated Lead-Acid (VRLA) Battery
Internal Battery Voltage:	24 VDC (2x 12 VDC in series)
Standby time on internal Battery only	approx. 40 hours
Active time on internal Battery only	with 128 modules approx. 8 hours
Total Internal Battery Capacity:	7.2 Ah
Maximum Charge Current:	1.2 Ah @ <29.5 VDC
Maximum Constant Output Current (resp. Power) per Phase III Network Output:	3A (resp. 85.5 W)
External DC Power Input	27-30 VDC (max. 280 W)

Chapter 3

Introductions and Requirements

!!! ATTENTION !!!

ALWAYS ENSURE TO HAVE THE LATEST VERSION OF THIS DOCUMENT!
(You can find all documents on pyrodigital.com .)

3.1 General Safety and Warning Information

Pyrodigital® Eagle Wireless Base is professional level equipment. This equipment, when used withing a Pyrodigital® Phase III Network, becomes an integrated hardware system (Pyrodigital® Phase III Firing System) which provides means to fire industry standard pyrotechnic electric matches.

WARNING - EXTREME DANGER

THE PURPOSE OF THE PYRODIGITAL® PHASE III FIRING SYSTEM IS TO CAUSE INITIATION OF INDUSTRY STANDARD PYROTECHNIC ELECTRIC MATCHES TO IGNITE FIREWORK PRODUCTS AND PYROTECHNICAL PRODUCTS IN DISPLAYS OR PYROTECHNIC SPECIAL EFFECTS. IF YOU DO NOT UNDERSTAND THIS USAGE OR INTEND TO USE THE PYRODIGITAL® PHASE III SYSTEM FOR ANY OTHER PURPOSE DO NOT USE THE PYRODIGITAL® PHASE III FIRING SYSTEM.

The Pyrodigital® Eagle Wireless Base as a Professional Level Tool is designed, intended, and only to be used by Professional Pyrotechnic Operators in a controlled Professional Environment for the use with Pyrotechnical Products and Devices, Fireworks and Special Effects. The USER must ensure compliance with all relevant national and international laws and regulations, such as explosive law, fire protection regulations and safety clearances in force. *(For the United States of America: The surrounding area needs to be permitted by the Fire Authority having jurisdiction, in conjunction with UN 1.4S / UN 1.4G (Class C) or UN 1.3G (Class B) ONLY explosives that have been examined and have been issued Federal EX numbers by the US Department of Transportation. The Pyrodigital® Eagle Wireless Base is not designed nor shall be used to ignite any Class A explosive or "High" Explosives.)*

WARNING - EXTREME DANGER

FIREWORKS, PYROTECHNICAL PRODUCTS AND SPECIAL EFFECTS MATERIALS ARE EXPLOSIVES WHICH CAN AND MAY CAUSE PERSONAL INJURIES OR DEATH TO YOURSELF AND OTHER PEOPLE INCLUDING SPECTATORS OR INNOCENT BYSTANDERS, IN ADDITION TO PROPERTY DAMAGE. THE USE OF THE PYRODIGITAL® PHASE III FIRING SYSTEM IN NO WAY ALLEVIATES ANY SAFETY, LEGAL, OR MORAL RESPONSIBILITIES INCLUDING BUT NOT LIMITED TO THE USE, LOADING, TRANSPORTATION, STORAGE, OR DISCHARGE OF FIREWORKS, PYROTECHNICAL PRODUCTS OR SPECIAL EFFECTS. THE USER MUST BE FULLY COMPETENT AND ASSUMES ALL RESPONSIBILITY AND LIABILITY IN BOTH THE USE OF PYROTECHNIC DEVICES AND THE USE OF THE PYRODIGITAL® PHASE III FIRING SYSTEM. IF YOU ARE NOT QUALIFIED, OR HAVE ANY DOUBT REGARDING YOUR QUALIFICATION, DO NOT USE ANY PART OF THE PYRODIGITAL® PHASE III FIRING SYSTEM. SEEK PROFESSIONAL ASSISTANCE AND BE AWARE OF AND FOLLOW ALL SAFETY PROCEDURES INCLUDING COMPLIANCE WITH ALL INTERNATIONAL, NATIONAL AND FEDERAL AUTHORITIES, STATE, AND LOCAL LAWS AND/OR LAWS IN THE COUNTRY IN WHICH YOU ARE USING THE PYRODIGITAL® PHASE III FIRING SYSTEM.

Also ensure compliance with all relevant and applicable national and international laws, rules and regulations regarding radio frequency communication.

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.

Protect the devices well against fallout.

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.

The user is obligated to read the operating instructions of the Eagle Wireless Base before use and operation. Contact pd@pyrodigital.com if you do not have a copy of the operating instructions.

Do use the Eagle Wireless Base only in conjunction with original Pyrodigital® Phase III Firing System equipment like Pyrodigital® field controllers, Pyrodigital® firing modules and Pyrodigital® Phase III Network Cable recommended by Pyrodigital® (Innovative Pyrotechnik GmbH). Please contact Pyrodigital® (Innovative Pyrotechnik GmbH, pd@pyrodigital.com) for an up-to-date overview of the recommended Pyrodigital® Phase III Firing System components.

SAFETY IS YOUR RESPONSIBILITY and is beyond the control of the designer, manufacturer, seller, or their agents.

The user is expected and encouraged to operate the complete Pyrodigital® Phase III Firing System in an inert Test Environment for training in which no Pyrotechnic Material is present.

IF YOU DO NOT UNDERSTAND THIS USAGE OF THE PYRODIGITAL® EAGLE WIRELESS BASE AND/OR THE PYRODIGITAL® PHASE III FIRING SYSTEM OR YOU HAVE ANY QUESTIONS RELATING TO THE OPERATION OF THE PYRODIGITAL® PHASE III FIRING SYSTEM CONTACT INNOVATIVE PYROTECHNIK GMBH (PYRODIGITAL®). Innovative Pyrotechnik GmbH is available at: pd@pyrodigital.com

IF YOU INTEND TO USE THE PYRODIGITAL® EAGLE WIRELESS BASE AND/OR PYRODIGITAL® PHASE III FIRING SYSTEM FOR ANY OTHER PURPOSE THEN THE FIRING OF ELECTRIC MATCHES FOR FIREWORKS DISPLAYS OR PYROTECHNICAL SPECIAL EFFECT SHOWS - STOP - DO NOT PROCEED ANY FURTHER. CONSULT INNOVATIVE PYROTECHNIK GMBH ABOUT CANCELLATION OF YOUR ORDER OR A REPURCHASE OF YOUR PYRODIGITAL® EAGLE WIRELESS BASE.

3.2 Definitions - System Controller and System Network

The Pyrodigital® Phase III Firing System can be divided into two major subsystems, the Pyrodigital® Field Controller and the Pyrodigital® Phase III Network, whereby the Pyrodigital® Field Controller is master over the Pyrodigital® Phase III Network. The Pyrodigital® Field Controller is located at the control location, at the place where the operator/user controls the fireworks display, special effects or other pyrotechnical products or devices. The Pyrodigital® Phase III Network (with its different sub-components) is distributed over the firing site, stage, place of event, or etc.. The Pyrodigital® Phase III Network also includes Pyrodigital® Firing Modules that are in direct physical connection to electric matches. The only intended and permissible use of electric matches connected

to the Pyrodigital® Phase III Firing System is the ignition of pyrotechnical effects and fireworks for firework displays, special effect shows and theatrical shows.
At the moment of publication of this document the following Pyrodigital® Field Controllers exist and are approved by Pyrodigital® (Innovative Pyrotechnik GmbH) for the use in conjunction with the Pyrodigital® Eagle Wireless Base:

- Pyrodigital® FC1 Field Controller
- Pyrodigital® FC3 Field Controller
- Pyrodigital® FC-A Field Controller
- Pyrodigital® FC-E "Raptor" Field Controller

The Pyrodigital® Phase III Network consists of Pyrodigital® Firing Modules interconnected by Pyrodigital® Phase III Network Cable (specific to the Pyrodigital® Phase III Firing System) and Pyrodigital®-specific Splitter Boxes. Splitter Boxes allow to branch the network by interconnecting three or more Pyrodigital® Phase III Network Cable with each other. To ensure Pyrodigital® Phase III Network Cable are in accordance to the Pyrodigital® specification contact Pyrodigital® (Innovative Pyrotechnik GmbH- pd@pyrodigital.com). The Pyrodigital® Field Controller is connected via the main Pyrodigital® Phase III Network Cable to the Pyrodigital® Phase III Network. At the moment of publication of this document the following Pyrodigital® Firing Modules exist and are approved by Pyrodigital® (Innovative Pyrotechnik GmbH) for the use in conjunction with the Pyrodigital® Eagle Wireless Base:

- Pyrodigital® FM1 Firing Module
- Pyrodigital® FM2 Firing Module

- Pyrodigital® FM3 Firing Module
- Pyrodigital® FM4 Firing Module
- Pyro Studios FM5 Firing Module
- Pyro Studios FM7 Firing Module
- Pyrodigital® FM-A Firing Module

3.3 The Eagle Wireless Base within the Phase III Network

The Pyrodigital® Eagle Wireless Base can be used within the Pyrodigital® Phase III Network to establish a wireless link to interconnect sub-networks in spatial separated areas to one common Pyrodigital® Phase III Network as well as to re-boost signals and network power. See chapter 5 Basic Operations Overview for more details.

3.4 Operator and Site Requirements

The procedures, functions, and all information outlined and described in these Operating Instructions assume certain requirements concerning the 1) Operator in Charge, or user, who is operating the Pyrodigital® Firing System or directly responsible for the System Operator if he/she is not the System Operator, or user, and 2) the physical site at which the Firing Operations take place. It is, assumed that in all cases, the System Operator, or user, is a working member of a professional team that prepares for, sets up, and executes Display Fireworks or Special Effects. It is assumed that these operations, including the Operation of the Pyrodigital® Eagle Wireless Base are supervised and controlled in a Top Down fashion by a Master or Journeyman Pyrotechnician who has substantial qualifications and experience in these operations. The Pyrodigital® Eagle Wireless Base and all components

relating thereto are Professional Level Tools, designed for and intended to be used by working, fully qualified, and extensively experienced Master Pyrotechnicians.

These Operating Instructions will only cover the operation of the Pyrodigital® Eagle Wireless Base. The user MUST also refer to all Operating Instructions of all components used withing the Pyrodigital® Phase III Firing System.

These Operating Instructions will NOT cover specific information relating to general Safety related background material in handling explosive products including pyrotechnic materials. These Operating Instructions assume that the user has prior knowledge and experience and that the user brings that knowledge and experience with him/her as he/she reads these Operating Instructions and gains understanding of how to use the Pyrodigital® Eagle Wireless Base. If you do not have this prior experience you should stop here. Proceed no further. Explain to your supervisor or to Innovative Pyrotechnik GmbH that you do not have the necessary qualifications to proceed with operation of the Pyrodigital® Firing System.

This prior knowledge and experience are assumed to exist and remain up to date regarding the person responsible for use of the Pyrodigital® Firing System. This person will hereafter be called “the Operator” or “the Operator in Charge” or “the System Operator”, or simply “the User”. It will be your responsibility, as the Operator in Charge, to continuously monitor and insure that at every site at which the Pyrodigital® Phase III Firing System may be in use, this set of assumed conditions exists, and further that it does not change or deteriorate over time.

WARNING - EXTREME DANGER

IT WILL NOT BE POSSIBLE TO SAFELY OPERATE AT ANY SITE ON WHICH THE INITIAL SET OF ASSUMPTIONS, OR CONDITIONS IS NOT IN PLACE. SEVERE BODILY HARM, INJURY OR DEATH TO YOURSELF, YOUR CO-WORKERS, AND INNOCENT BYSTANDERS MAY OCCUR FROM IRRESPONSIBLE OPERATIONS WITH LIVE PROFESSIONAL DISPLAY FIREWORKS AND SPECIAL EFFECTS PYROTECHNICS.

Make sure that you are qualified as explained in the following and preceding paragraphs. If you do not feel to posses the proper qualifications as outlined above and below you should not proceed with attempting operation of the Pyrodigital® Eagle Wireless Base or the Pyrodigital® Firing System. Contact your Supervisor or Innovative Pyrotechnik GmbH and let clarify any questions that you may have before taking it upon yourself to proceed. General Safety knowledge is gained through familiarity with applicable laws and regulations, as well as field experience under the supervision of a competent Pyrotechnics Operator.

Electrical Firing Safety is considered as part of General Safety Knowledge. Safety is a conscious effort to prevent accidents through intelligent understanding of the hazards involved. Anyone responsible for operating the Pyrodigital® Phase III Firing System must have at least the following prior qualifications:

1. A valid license/allowance for operating pyrotechnics from the authorities having jurisdiction. *(For the United States of America: A state Explosives, Pyrotechnician, or Special Effects License.)*

2. A minimum of two years prior experience under the direct supervision of Professional Operators or an adequate education.

For the United States of America:

The physical site at which any operations take place must have at least:

1. *Have been permitted by the local authority having jurisdiction.*
2. *Be covered by a general liability insurance policy that names the display operator and the system operator.*
3. *The display items must be UN 1.4S / UN 1.4G (Class C) or UN 1.3G (Class B) Display Pyrotechnics ONLY, and these items must have been examined by the US Department of Transportation and have been issued Federal EX Numbers.*

3.5 Additional General Safety Guidelines for Electric Matches

WARNING - EXTREME DANGER
THESE ADDITIONAL GENERAL SAFETY GUIDELINES CANNOT, IN ANY WAY, BE CONSIDERED AS COMPLETE AND ARE ONLY PRESENTED HERE TO REMIND THE USER OF THE POTENTIAL HAZARDS AND PRECAUTIONS, OF WHICH THE USER SHOULD ALREADY BE INTIMATELY AWARE.

Having the Pyrodigital® Eagle Wireless Base (or the Pyrodigital® Phase III Firing System in general) in a safe or non armed condition does not mean that anything is SAFE.

- Electric matches are very sensitive devices and can ignite when subjected to friction, external impact, and sufficient electrical energy. Some potential sources of electrical energy are static discharges (human, dust, snow, & electrical storms) and radio frequency energy from TV, microwave, and radio transmitters, as well as the applied electrical energy used to initiate the electric match.

- Keep your electric matches shunted (leg wires (shorted) twisted together) until actual connection into the circuit.
- Do not pull on the leg wires of an electric match - separation of the match head from the leg wires can cause initiation of the electric match.

For the United States of America:

- *Keep your electric matches stored in a sealed METAL container located remote from all other pyrotechnic material (the METAL of the container provides radio frequency shielding).*
- *Don't allow Radio transmitters (police, fire, communications, etc.) within 50 feet as a standard safety procedure. Consult IME (Institute of Makers of Explosives) publication # 20 "Safety Guide for the Prevention of Radio Frequency Radiation Hazards" for safe distances at known transmitter power and frequencies.*

If one assumes that any one of the electric matches may ignite at any time for whatever reasons, then one can plan safe handling and deployment procedures which will minimize injuries and eliminate any possible fatality should any such ignition occur.

3.6 General Disclamer

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 Pyrodigital® Phase III Networks and to operate the Pyrodigital® Eagle Wireless Base as well as Pyrodigital® 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 Pyrodigital® Eagle Wireless Base. For the USA, the authorities for radio communication are the FCC (Federal Communications Commission). For Canada, the authorities for radio 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, erratic 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® Eagle Wireless Base 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.

By proceeding with the use of the Pyrodigital® Eagle Wireless Base operating the Pyrodigital® Phase III Network you hereby assume all risks and liability resulting from the use thereof.

3.7 About the Operating Instructions Document

THESE OPERATING INSTRUCTIONS ONLY DESCRIBE THE HANDLING OF THE PYRODIGITAL® EAGLE WIRELESS BASE.

FOR OPERATION OF THE PYRODIGITAL® PHASE III FIRING SYSTEM PLEASE REFER TO THE PHASE III SYSTEM NETWORK USER'S GUIDE. THE USER ALSO HAS TO BE FAMILIAR WITH THE OPERATING INSTRUCTIONS OF ALL OTHER PYRODIGITAL DEVICES WHICH ARE IN USE WITHIN THE PYRODIGITAL® PHASE III FIRING SYSTEM.

ENSURE YOU ALWAYS HAVE THE LATEST COPY OF ALL OPERATION INSTRUCTIONS AND IMPORTANT DOCUMENTATION REQUIRED TO OPERATE THE PYRODIGITAL® PHASE III FIRING SYSTEM.
(You can find all documents on pyrodigital.com .)

No part of the Operating Instructions is in any sense a tutorial, instruction guide, or educational text for learning about Display Fireworks Operations, Pyrotechnic Special

Effects Operations, or the subject of safely handling explosives or pyrotechnical materials.

WARNING - EXTREME DANGER

SPECIFIC PROCEDURES PERTAINING TO THE USE AND OPERATION OF THE PYRODIGITAL® EAGLE WIRELESS BASE ARE OUTLINED IN THESE OPERATING INSTRUCTIONS. DEVIATION FROM ANY OF THE PROCEDURES OUTLINED IN THESE OPERATING INSTRUCTIONS ARE SPECIFICALLY FORBIDDEN AND ABSOLUTELY NOT RECOMMENDED BY INNOVATIVE PYROTECHNIK GMBH (PYRODIGITAL®). INJURY OR DEATH TO YOURSELF AND OTHERS, AS WELL AS PROPERTY DAMAGE, COULD RESULT FROM DEVIATIONS TO THE PROCEDURES AS OUTLINED IN THE OPERATING INSTRUCTIONS. ANY DEVIATION FROM THE PROCEDURES AS OUTLINED IN THESE OPERATING INSTRUCTIONS ARE CLEARLY AT YOUR OWN RISK.

It is assumed and required that you bring this experience and prior knowledge with you BEFORE you attempt to read or understand the subject matter of these Operating Instructions.

Like all technical references on a specific advanced subject, these Operating Instructions immediately concern themselves with the subject matter and may dispense with or not include explanations of foundations or basic knowledge regarding the subject. It is assumed that the reader is already familiar with such foundations and background, and additionally it is assumed that the reader is familiar with A UNIQUE TECHNICAL LEXICON, OR TERMINOLOGY, THAT IS GENERALLY ACCEPTED IN THE INDUSTRY.

If you find yourself at a loss to understand the technical terms used in these Operating Instructions, or you are unclear as to the general subject matter, then this should be your clue that you DO NOT have the necessary background or qualifications to proceed.

In this case STOP! PROCEED NO FURTHER! Show your supervisor this paragraph and explain your doubts about your prior knowledge and abilities. If you have no Supervisor, then contact Innovative Pyrotechnik GmbH directly and obtain clarification or further assistance before proceeding.

WARNING - CAUTION

IT IS INTENDED AND REQUIRED THAT EACH AND EVERY OPERATOR RESPONSIBLE FOR THE USE OF THE PYRODIGITAL® EAGLE WIRELESS BASE SHALL HAVE THEIR OWN COPY OF THESE OPERATING INSTRUCTIONS. EACH OPERATOR'S OPERATING INSTRUCTIONS SHOULD BE WITH EACH OPERATOR WHILE OPERATIONS INVOLVING THE USE OF THE PYRODIGITAL® EAGLE WIRELESS BASE ARE ONGOING.

To request additional copies of these Operating Instructions contact Innovative Pyrotechnik GmbH (pd@pyrodigital.com) or download the PDF version from pyrodigital.com . For the print version there is a nominal charge to cover printing costs. These Operating Instructions, in its entirety, are a technical reference for the operation of the Pyrodigital® Eagle Wireless Base.

It is beyond the scope of these instructions or these Operating Instructions to give general safety instructions pertaining to the use of Pyrotechnial Products and Devices, Fireworks and Special Effects, including but not limited to storage, handling, transportation, discharge, disposal, and compliance with all applicable laws. General safety knowledge is gained through familiarity with applicable Laws and field experience under the supervision of a competent pyrotechnic operator.

ELECTRICAL FIRING SAFETY IS CONSIDERED AS GENERAL SAFETY KNOWLEDGE.

Specific Safety procedures applicable to the use of Phase III Firing System are highlighted throughout these Operating Instructions. These Safety related warnings or procedures are indicated as:

WARNING - CAUTION
WARNING - DANGER
WARNING - EXTREME DANGER

OBEY THESE SAFETY PROCEDURES. THESE SPECIFIC PROCEDURES CANNOT GUARANTEE SAFETY. SAFETY IS A CONSCIOUS EFFORT TO PREVENT ACCIDENTS THROUGH INTELLIGENT AND THOROUGH UNDERSTANDING OF THE HAZARDS INVOLVED. IF YOU DO NOT KNOW WHAT YOU ARE DOING AND THE CONSEQUENCES OF YOUR ACTIONS DO NOT PROCEED.

3.8 Customer Support

If you are having difficulty in operating the Pyrodigital® Eagle Wireless Base, please:

1. Re-read the sections of these Operating Instructions, or other supporting User Guides and Operating Instructions, concerning the area you are having difficulty with. Please also check the website pyrodigital.com for video tutorial material.

2. Assuming that you are in an inert Test Environment, try some other actions and work through your difficulty. Since you are in an inert Test Environment, do not worry about making mistakes, you can't break anything or fire any live material. We all learn from mistakes and if you are not practicing with the Pyrodigital® Phase III Firing System in an inert Test Environment, then you are not learning as intended.

3. You may wish to consult with your Supervisor or other Experienced Users of Pyrodigital® Equipment.

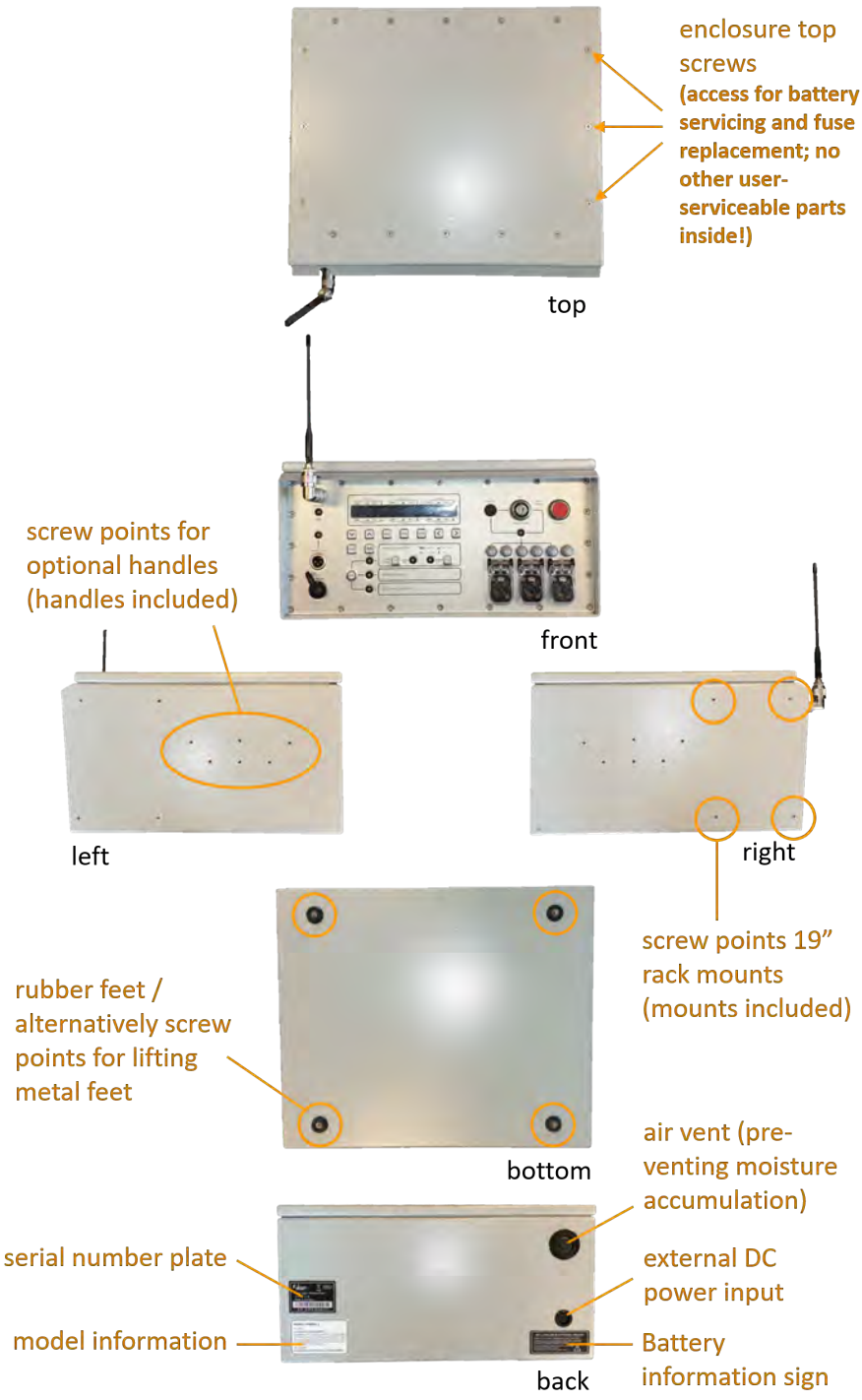
4. Contact us at Innovative Pyrotechnik GmbH: pd@pyrodigital.com

Chapter 4

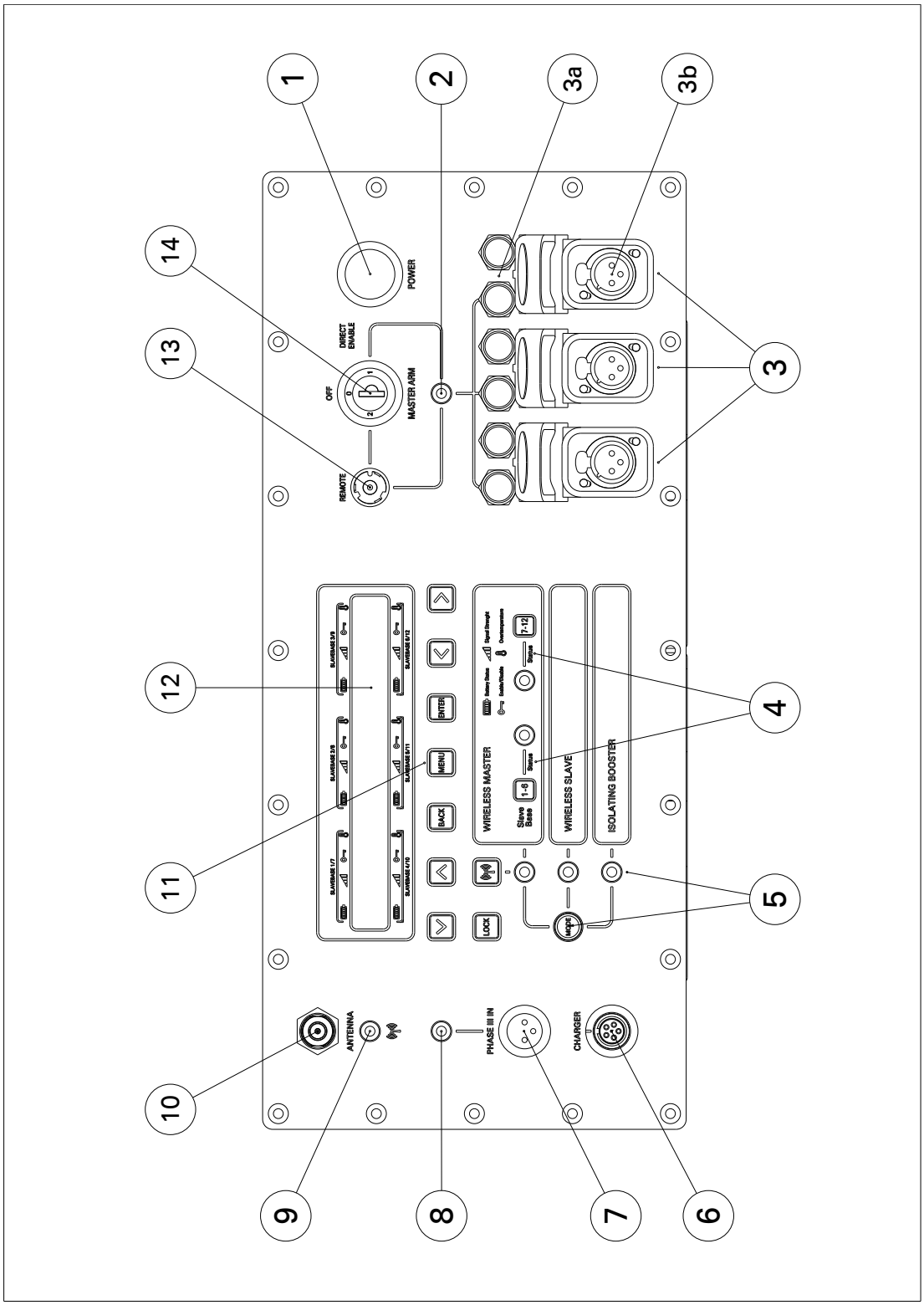
Device Overview

The Pyrodigital® Eagle Wireless Base

4.1 Housing


enclosure top screws
(access for battery servicing and fuse replacement; no other user-serviceable parts inside!)
top
front
screw points for optional handles (handles included)
left
right
screw points 19" rack mounts (mounts included)
rubber feet / alternatively screw points for lifting metal feet
bottom
air vent (pre-venting moisture accumulation)
external DC power input
serial number plate
model information
Battery information sign
back

4.2 Front Panel



1. **Power Switch** - Turn the device on and off
2. **Monitor Indicator** - for the Phase III Network Output
3. **Phase III Network Output** - integrated passive 3-way splitter
   a) Thermal Circuit Breaker (two per output)
   b) 3-pin XLR output connector with enclosure (three times).
4. **Slave Base Status Section** - Used to check the current status of Slave Bases within the RF Network
   1-6 Key with Indicator: Check Slave Bases 1 to 6
   7-12 Key with Indicator: Check Slave Bases 7 to 12
5. **Mode Selector** - Allows to switch between the Operating Modes by pressing the MODE Key. The three Indicators show the current Operating Mode:
   WIRELESS MASTER
   WIRELESS SLAVE
   ISOLATING BOOSTER
6. **Charger Input** - for Phase III Network Output
7. **Phase III Network Input** - for Phase III Network Output
8. **Phase III Network Input Indicator** - indicates power and communication on the Phase III Network Input
9. **RF Communication Indicator** - indicates enabled RF functionality and ongoing communication
10. **RF Antenna Connector** - female N-type revers pole

11. **Key Section:**

DOWN Key	menu navigation and parameter setting
UP Key	menu navigation and parameter setting
BACK Key	menu navigation and parameter setting
MENU Key	enters the top menu
ENTER Key	menu navigation and parameter setting
LEFT Key	menu navigation and parameter setting
RIGHT Key	menu navigation and parameter setting
LOCK Key	locks and unlocks the device (blocking/unblocking of all buttons)
ANTENNA Key	Allows to send the system to standby or activate it independent of the Phase III Network Input

12. **Display** - 40×2 alphanumeric OLED

13. **Remote Interlock Connector** - For additional safety a local operator can connect an addition deadman interlock pickle (not included).

14. **Safety Arm Key** - powers up (left and right position) and down (middle position) the Phase III Network Output. On the right Key position the interlock is constantly closed and thus the Phase III Network Output are fully under the control of the master source (when the device is in Slave Mode, then the master source is the Master Base; when the device is in Isolating Booster Mode, then the master source is its own Phase III Network Input.) On the left Key position, the interlock in in control of an operator (using the Remote Interlock Connector).

4.3 Device on Rubber Feet with Handles

4.4 Device on lifting Metal Feet with Handles

4.5 Device with 19" Rack Mounts

4.6 Optional Deadman Pickle

1. **Enable Button** - Closes Enable Interlock
2. **Fire Trigger** - Triggers a Fire Command
3. **Connector Plug**

The Deadman Pickle is not an included accessory of the Pyrodigital® Eagle Wireless Base. If you require a Deadman Pickle (also left-handed version) please contact us at Innovative Pyrotechnik GmbH: pd@pyrodigital.com.

Chapter 5

Basic Operations Overview

5.1 Wireless Link Point-to-Point

The Pyrodigital® Eagle Wireless Base allows to set up a wireless radio link to replace long cable runs within Pyrodigital® Phase III Networks. Figure 5.1 shows such a typical setup. The Phase III Network Input of the left Eagle Wireless Base is in connection with a Pyrodigital® Field Controller via a Phase III Network Cable. This Eagle Wireless Base acts as the radio master and is thus referred to as the Master Base. The Phase III Network Outputs of the second Eagle Wireless Base are connected with three Phase III Sub-Networks (each comprising two Pyrodigital® Firing Modules). This Eagle Wireless Base acts as a radio slave and is thus referred to as the Slave Base. The wireless radio link between the two Eagle Wireless Bases connects the Firing Modules on the Network Outputs of the Slave Base to the Network of the Field Controller that is connected to the Network Input of the left Master Base.

To set the Eagle Wireless Bases to be a Master Base respectively a Slave Base refer to the sections 10.1.1 Master Mode and 10.1.3 Slave Mode.

The Master Base and the Slave Base have to share the same Customer ID, Network ID and have to be set to the same Channel setting.

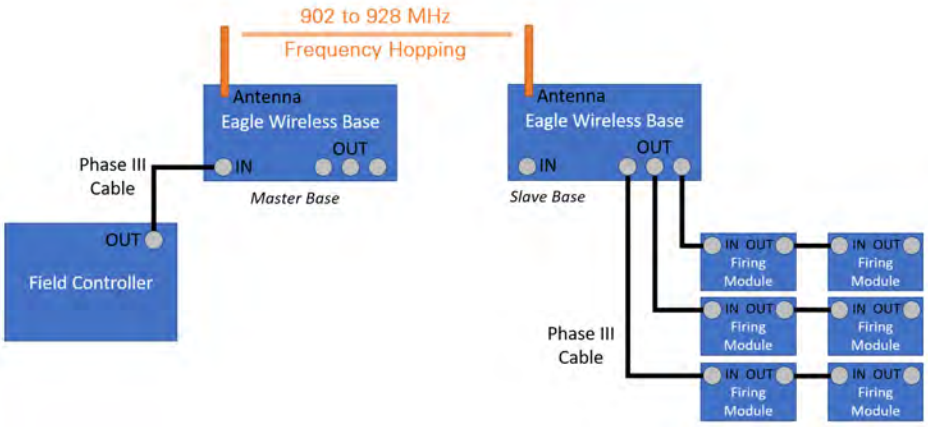


Figure 5.1: Establish wireless point-to-point link in a Phase III Network using the Pyrodigital® Eagle Wireless Base

5.2 Wireless Link Point-to-Multipoint

As figure 5.2 shows, the Pyrodigital® Eagle Wireless Bases also allow to set up point-to-multipoint radio connections to extend the Phase III Network with several Eagle Wireless Bases as Slave Bases (radio slaves) with a maximum of 12 Slave Bases (per Master Base). Each Radio Slave gets addressed by an individual Slave Number (This parameter can be set using the keyboard and display of the Eagle Wireless Base like described in section 8.4 Slave Number). In the point-to-multipoint configuration shown below in figure 5.2, the resulting Phase III Network will operate the same way as if all 18 Firing Modules would be connected to the Field Controller via Pyrodigital® Phase III Network Cable and splitter boxes directly.

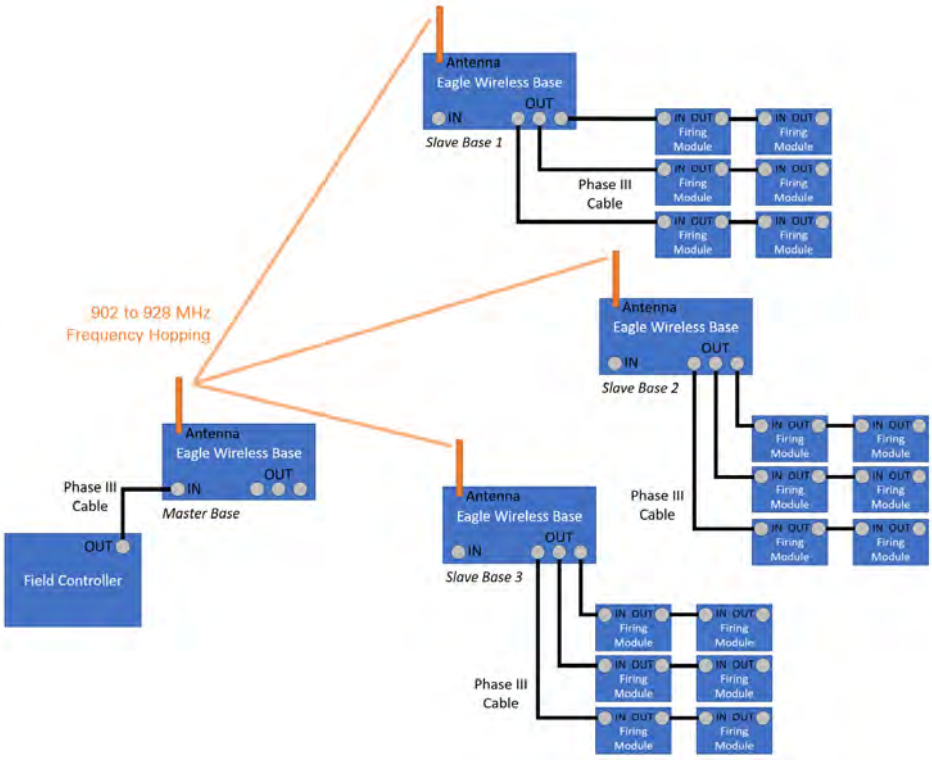


Figure 5.2: Establish wireless point-to-multipoint link in a Phase III Network using the Pyrodigital® Eagle Wireless Base

To set the Eagle Wireless Bases to be a Master Base respectively a Slave Base refer to the sections 10.1.1 Master Mode and 10.1.3 Slave Mode.

5.3 Multiple Wireless Links

The Pyrodigital® Eagle Wireless Bases also allow to operate several wireless links in parallel. Figure 5.3 shows such an example setup. The Field Controller 1 is connected to the upper Master Base. This Master Base controls the upper two Slave Bases via Channel 1. Thus, the upper 8 Firing Modules are in connection with Field Controller 1. The lower Field Controller 2 is in connection with the lower two Firing Modules via the radio link on channel 2 of the lower Master Base and Slave Base. As the two radio links are on different Channel Settings, the two Phase III Networks (of Field Controller 1 and 2) are independent of each other and can also be operated simultaneously. As described in section 8.3 Channel using Channels 1 and 2 for this setup is beneficial. Further, it is strongly recommended to give the two different links also different Network IDs (also read 8.2 Network ID) to avoid unintended control of one network over the other in case the operator selects the wrong channel on one of the devices. This is best practice to ensure to be double fail-safe with regards to the wireless link settings.

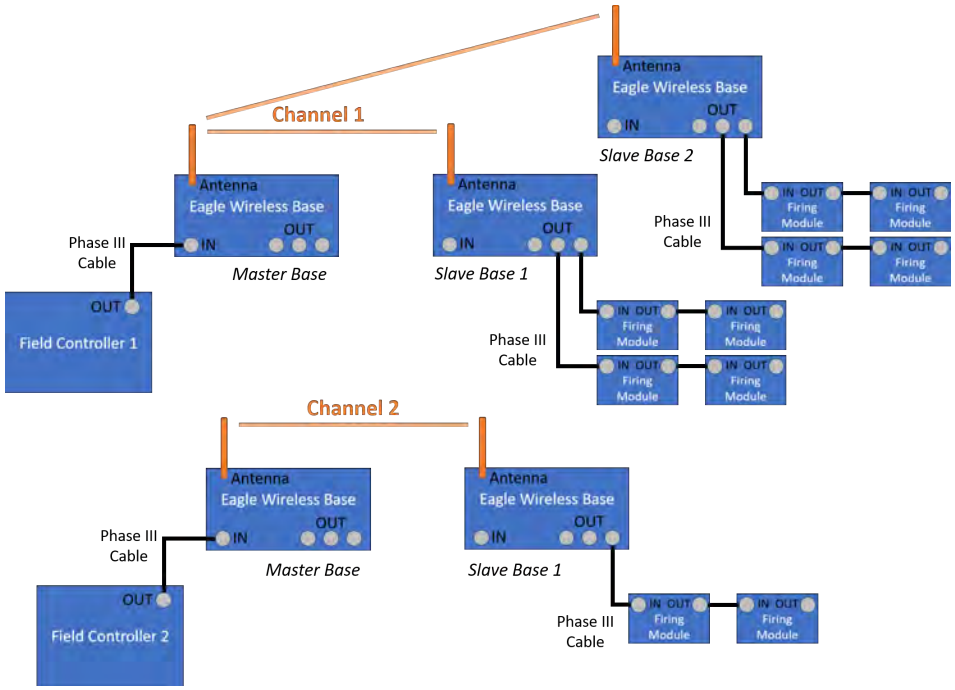


Figure 5.3: Establish several wireless links running in parallel using Pyrodigital® Eagle Wireless Bases

5.4 Isolating Booster

Figure 5.4 shows how the Pyrodigital® Eagle Wireless Bases can be used to re-boost a Phase III Network Signal. The input Network is galvanically isolated from the output networks Network (so input and outputs do not share the same ground). This setup can make sense when:

- The connection from the Field Controller to the Firing Modules is a very long cable run
- The quantity of Firing Modules at the end of the cable run is high
- Older Firing Module types (FM1, FM2, FM3, FM4, FM5, FM7) and older Field Controller type (FC1, FC3) are used

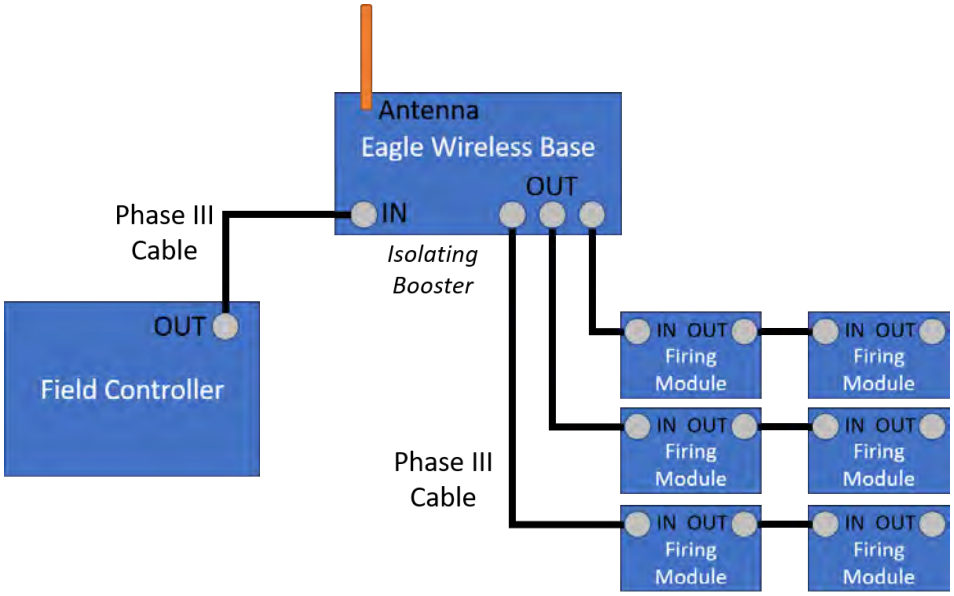


Figure 5.4: Re-boosting the network signal in a Phase III network using the Eagle Wireless Base

Note: An Pyrodigital® FC-A Field Controller in combination with Pyrodigital® FM-A Firing Modules can handle way longer cable runs than the older legacy system.

Chapter 6

Phase III Network Terminals

6.1 Phase III Input

The Phase III Network Input of the Pyrodigital® Eagle Wireless Base is a galvanically isolated input. In MASTER MODE and ISOLATING BOOSTER MODE this Network Input controls PHASE III operations of the downstream Phase III Network (the Slave Bases in a Wireless Radio Link or the Network Output of the Eagle Wireless Base when used as Isolating Booster).

WARNING - EXTREME DANGER
NEVER POWER UP THE PHASE III NETWORK INPUT OF A PYRODIGITAL® EAGLE WIRELESS BASE UNLESS IT IS SAFE TO DO SO. POWERING UP THE PHASE III NETWORK INPUT CAN CAUSE DOWNSTREAM PHASE III NETWORK TO GET POWERED UP AS WELL. MAKE ABSOLUTELY SURE THAT THE FIRING AREA IS CLEAR OF ALL PERSONNEL AND THAT IT IS SAFE TO PROCEED BEFORE APPLYING POWER TO THE PHASE III NETWORK INPUT OF A PYRODIGITAL® EAGLE WIRELESS BASE, E.G. BY ARMING THE SAFETY ARM KEY OF A PYRODIGITAL® FIELD CONTROLLER. ALSO DO NOT ARM THE SAFETY ARM KEY OF OF A PYRODIGITAL® FIELD CONTROLLER UNLESS INSTRUCTED TO DO SO BY ITS DISPLAY.

6.1.1 Input Monitor

The Phase III Network Input Indicator will turn green when the Phase III Network Input is powered up and this power-up is permitted to control the Eagle Wireless Base. In case the Phase III Network Input is not permitted to control the downstream Network but the Phase III Network Input powered up, the Phase III Network Input Indicator will turn red. When a valid FIRE COMMAND or CHECK STATUS COMMAND is received on the Phase III Network Input, the Phase III Network Input Indicator will blink yellow. In the case a reply was found for a CHECK STATUS the Phase III Network Input Indicator will turn statically yellow.

6.2 Phase III Outputs

The Pyrodigital® Eagle Wireless Base is equipped with three Phase III Network Outputs. The three Network Outputs are run by the same Output Driver but are passively splitted by individual Thermal Circuit Breakers. If a short circuit on one Network Output occurs,

the corresponding Circuit Breaker will pop. The other two Network Outputs will work on unaffected.

6.2.1 Output Monitor and Circuit Breakers

The internal Phase III Network Output Driver has got a secondary micro-controller that monitors the connected Pyrodigital® Phase III Network. This monitor meters the drawn current, keeps track of the Operating Mode, the supply voltage applied by the Safety Arm Key and the state of the ENABLE Interlock. The Monitor micro-controller also controls the Monitor Indicator LED (red - green - yellow) to give the operator a visual feedback about the state of the Phase III Network Output.

Whenever the Phase III Network Output is powered up, the Output Monitor Indicator is illuminated in GREEN. If a too high current is draw (higher than it can be during normal operation of a full Pyrodigital® Phase III Network, but lower than the limit of the thermal circuit breaker) the color turns to RED. This indicates the operator that there is a too high current draw on this network. In this event it is up to the operator to react correspondingly. If the current is even higher than the thermal circuit breakers limit, the thermal circuit breaker pops and the corresponding Phase III Network Output gets disconnected from power.

NOTICE: IF THE THERMAL CIRCUIT BREAKER POPS IT TAKES SOME TIME UNTIL IT COOLED DOWN ENOUGH TO BE SWITCHED ON AGAIN BY PRESSING IT IN. This can take up to a minute.

Besides the color, the Output Monitor Indicator can either be statically on or blinking. The Output Monitor Indicator will blink if the Operating Mode of the Field Controller is set to "SLAVE MODE" or "ISOBOOSTER MODE" but the ENABLE Interlock is not detected to be closed. As soon as the ENABLE Interlock gets closed (by the Safety Arm Key directly or by a connected Deadman Interlock Pickle) the Output Monitor Indicator becomes static. This shall help the Operator to keep track of whether the Enable Button is pressed or not.

Further the Monitor also indicate with a yellow flash, whenever fire commands or check status requests are sent out on the Phase III Network Output. Also, when performing a Status Check the Monitor Indicator will turn static yellow when a Firing Module with the requested Address is found.
During booting of the Eagle Wireless Base, the Output Monitor Indicator first fades in red then in green. This sequence indicates you that the Phase III Network Output Driver works correctly and is ready for operation.

6.3 Shorts in the Phase III Network

If one of the thermal circuit breakers pops, there is a short in your network. A too high current had been drawn on the corresponding Phase III Network Output. High enough, to pop the thermal circuit breaker, which protects the Eagle Wireless Base. But you could also have shorts in your network that draw less current, e.g. when those shorts are at the very end of a network with long cable runs. The Monitor would then see a atypically high current, even though it is not high enough to harm the Eagle Wireless Base in any way. If such an atypically high current on one of the Network Outputs is detected, the Output Monitor Indicator turns red (as explained above). If the Output Monitor Indicator is red, large parts of the connected network might still work correctly. However, this network state must of course be avoided. ALTHOUGH THE THERMAL CIRCUIT BREAKER OF ONE OF THE PHASE III OUTPUTS POPS OR ONE OF THE MONITORS INDICATES A "SOFT" SHORT BY A RED LED, ALL THE OTHER PHASE III OUTPUT STAY UNAFFECTED AND RUN ON.
Finding a shorted cable(s) or component(s) is a simple matter of logically isolating the fault by a progression of disconnecting (unplugging) the Phase III Network at various points. Start your search at the Phase III Network Outputs. If several Network Outputs are in use, check them separately by connecting one after the other. If the shorted Network Output is identified, Divide the Phase III Network that is connected to this Network Output into smaller networks and see on which of those subnetworks the fault is present.

If you have found the faulty part of the network, you can proceed to further subdivide the faulty subnetwork into smaller and smaller parts.
Do this as follows:

1. Go back to STOP MODE, turn the Safety Arm Key of your Pyrodigital® Field Controller to "OFF" and disconnect the Phase III Network Cable from the Phase III Network output of your Field Controller.

2. Turn the Safety Arm Key of the Pyrodigital® Eagle Wireless Base to "OFF" and disconnect the Phase III Network Cable from the Phase III Network Outputs of your Eagle Wireless Base.

3. Ensure all Firing Modules are turned to OFF respectively SHUNT (Please check the Operating Instructions of the corresponding devices to ensure safe operation).

4. Divide your network to a smaller subnetwork respectively try the next subnetwork.

5. In case the thermal circuit breaker has popped wait until you can press it in again. It can take up to approximately a minute until it cooled down enough to be restarted.

6. Unshunt/turn ON all required Firing Modules, reconnect the network cable to the Phase III Output plug.

7. Select Check Status, BRIEFLY AND ONLY FOR A VERY SHORT PERIOD OF TIME, ARM the PHASE III OUTPUTS BY TURNING THE Safety Arm Key TO "CHECK" POSITION. Check if the Monitor Indicator of the Eagle Wireless Base gets red after a second. Turn back the Safety Arm Key to "OFF" position if this is the case.

8. Re-check to be sure the Circuit Breaker did not trip.

9. Depending on the result check the next subnetwork or further divide the faulty network part, restarting at Step 1.

WARNING - EXTREME DANGER

DO NOT UNPLUG OR PLUG ANY PHASE III NETWORK COMPONENTS DURING THE PHASE III NETWORK IS POWERED UP. ALWAYS GO BACK TO STOP MODE AND TURN THE SAFETY ARM KEY OF THE FIELD CONTROLLER AS WELL AS THE EAGLE WIRELESS BASE TO THE "OFF" POSITION AND SHUNT ALL FIRING MODULES BEFORE YOU UNPLUG OR PLUG ANYTHING IN THE PHASE III NETWORK.

Chapter 7

Safety Arm Key and Remote Interlock

WARNING - EXTREME DANGER
NEVER TURN THE SAFETY ARM KEY TO "REMOTE" OR "DIRECT ENABLE" POSITION UNLESS YOU ENSURED IT IS SAFE TO DO SO.

The Pyrodigital® Eagle Wireless Base is equipped with a 3-position Safety Arm Key Switch that allows local control about the arm state of the Phase III Network Outputs. The Safety Arm Key Switch also enables the user (at the Eagle Wireless Base) to control the supply of voltage to the Phase III Networks connected to the Eagle Wireless Base. When the Key is removed or the Key Switch is set to the middle position "OFF", the Phase III Network Outputs are disconnected from power.
In the positions "REMOTE" and "DIRECT ENABLE" the Eagle Wireless Base is allowed to supply voltage to the Phase III Network Outputs and, therewith, to the connected Phase III Networks. The Eagle Wireless Base will only power up the Phase III Network Outputs if the device is set to either SLAVE MODE or ISOLATING BOOSTER MODE

and the corresponding Input Control conditions are met.

The Safety Arm Key, of course, is only a part of a machine which cannot think or make judgmental decisions, and is subject to error or failure. Clearly, the Safety Arm Key cannot, in any way, ensure Safety or imply Safe actions under all possible conditions. The responsibility for operation of the Eagle Wireless Base clearly rests with the user, regardless of the action directed by the Eagle Wireless Base.

7.1 In Slave Mode and Isolating Booster Mode

7.1.1 Power on the Phase III Outputs

In SLAVE MODE (see section 10.1.3 Slave Mode) the Eagle Wireless Base will only power up the Phase III Network Outputs if its controlling Master Base tells it to do so (and its Safety Arm Key is in "REMOTE" or "DIRECT ENABLE" position). The Master Base will send the command to power down the Slave Base Outputs when its own Phase III Network Input is powered down. When the Network Input of the Master Base is powered up, the Master Base will tell the Slave Bases to power up their Network Outputs.

In ISOLATING BOOSTER MODE (see section 10.2 Isolating Booster) the Eagle Wireless Base powers up its Phase III Network Outputs if its Phase III Network Input is powered up as well and powers down its Phase III Network Outputs if its Phase III Network Input is powered down.

WARNING - EXTREME DANGER
TURNING THE SAFETY ARM KEY TO THE "REMOTE" AND "DIRECT ENABLE" POSITION IMPOSES EXTREME SAFETY HAZARDS BECAUSE VOLTAGES CAPABLE OF FIRING THE ELECTRIC MATCHES (TO WHICH THE PYROTECHNIC DEVICES ARE CONNECTED) IS NOW INTENTIONALLY ALLOWED TO BE PRESENT AT ALL POINTS IN THE PHASE III NETWORKS CONNECTED TO THE PHASE III NETWORK OUTPUTS OF THE EAGLE WIRELESS BASE.

NEVER TURN THE SAFETY ARM KEY TO "REMOTE" OR "DIRECT ENABLE" POSITION UNLESS YOU ENSURED IT IS SAFE TO DO SO.

7.1.2 Enable Interlock

If the Safety Arm Key gets turned to "REMOTE" position, the Pyrodigital® Eagle Wireless Base will only execute fire commands, when the enable interlock gets held down on the Deadman Pickle. This allows to have an additional Spotter Operator at the Eagle Wireless Base for extra safety.
If the Safety Arm Key is turned to "DIRECT ENABLE" position, the enable interlock is cleared by the Safety Arm Key directly. In this case the Main Operator has unrestricted control over the Network Outputs of the Eagle Wireless Base. When this Eagle Wireless Base is set to SLAVE MODE, the Main Operator controls the corresponding Master Base. When this Eagle Wireless Base is set to ISOLATING BOOSTER MODE, the Main Operator controls the Network Input of the Eagle Wireless Base.

7.1.3 Check Status

The enable interlock state does NOT restrict continuity checking ("Check Status") on the Network Outputs. To conduct a Check Status the Safety Arm Key has to be either in

"REMOTE" or in "DIRECT ENABLE" position.

WARNING - CAUTION
DO NOT QUIT "CHECK STATUS" BY TURNING THE SAFETY ARM KEY TO "OFF" POSITION! STOP THE ONGOING CHECK STATUS BEFORE YOU TURN THE SAFETY ARM KEY. ALSO, DO NOT TURN THE SAFETY ARM KEY TO "REMOTE" OR "DIRECT ENABLE" POSITION IF A "CHECK STATUS" IS ALREADY ONGOING BUT THE SAFETY ARM KEY IS CURRENTLY IN "OFF" POSITION. ALWAYS STOP THE ONGOING "CHECK STATUS" FIRST, BEFORE YOU CHANGE THE SAFETY ARM KEY POSITION!

7.2 In Master Mode

In MASTER MODE (see section 10.1.1 Master Mode) the Phase III Network Output always stays powered down!

WARNING IN MASTER MODE, ALWAYS ENSURE THE SAFETY ARM KEY IS IN "OFF" POSITION AND THE KEY IS NOT IN THE LOCK. IN THIS MODE, THERE IS NO NEED TO HAVE THE SAFETY ARM KEY ON ANOTHER POSITION, OR EVEN HAVE THE KEY IN THE LOCK AT ALL. HOWEVER, THIS BEST PRACTICE WILL PREVENT YOU FROM UNINTENTIONALLY ARMING THE SYSTEM WHEN CHANGING THE OPERATION MODE OF THE EAGLE WIRELESS BASE.

7.3 In Local Check Status

The Pyrodigital® Eagle Wireless Base is capable of conducting continuity checking (Check Status) on the Phase III Networks connected to its Phase III Network Outputs. This is called a LOCAL CHECK STATUS. For more details refer to chapter 11 Local Check Status Mode. To conduct a Check Status the Safety Arm Key has to be either in "REMOTE" or in "DIRECT ENABLE" position. The enable interlock state does NOT restrict the Local Check Status on the Network Outputs.

In the "REMOTE" or the "DIRECT ENABLE" Position the Phase III Network Outputs get connected to the supply voltage and, thus, the connected Phase III Networks get powered up in LOCAL CHECK STATUS.

WARNING - CAUTION

DO NOT QUIT "LOCAL CHECK STATUS" BY TURNING THE SAFETY ARM KEY TO "OFF" POSITION! STOP THE ONGOING "LOCAL CHECK STATUS" BEFORE YOU TURN THE SAFETY ARM KEY. ALSO, DO NOT TURN THE SAFETY ARM KEY TO "REMOTE" OR "DIRECT ENABLE" POSITION IF A "LOCAL CHECK STATUS" IS ALREADY ONGOING BUT THE SAFETY ARM KEY IS CURRENTLY IN "OFF" POSITION. ALWAYS FIRST STOP THE ONGOING "LOCAL CHECK STATUS", BEFORE YOU CHANGE THE SAFETY ARM KEY POSITION!

Chapter 8

Wireless Link General Settings

8.1 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 → *set customer ID* → ENTER
The parameter change has to be acknowledged by pressing ENTER in order to be conducted.

8.2 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 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 operated 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 → *set network ID* → ENTER
The parameter change has to be acknowledged by pressing ENTER in order to be conducted.

8.3 Channel

Range 1 to 6

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

Info The Pyrodigital® Eagle Wireless Base Model 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 → *set channel* → ENTER

The parameter change has to be acknowledged by pressing ENTER in order to be conducted.

8.4 Slave Number

Range 1 to 12

Purpose Identifies each Salve Base in a wireless radio link with a unique Number.

Info In a Point-to-Multipoint Configuration (see section 5.2 Wireless Link Point-to-Multipoint) up to 12 Slave Bases can be controlled by one Master Base. In order to check the individual states of the Slave Bases in SLAVE BASE MONITORING using the Master Base (see section 10.1.4 Slave Base Monitoring) each of the Slave Bases need to be set to an individual Slave Number.

Access The parameter can be set using the keyboard and display of the Eagle Wireless Base. MENU → GENERAL SETTINGS → SLAVE NUMBER → *set slave number* → ENTER

The parameter change has to be acknowledged by pressing ENTER in order to be conducted.

8.5 Factory Reset

In order to conduct a full reset of the Pyrodigital® Eagle Wireless Base to its original factory settings, select the factory reset option in the GENERAL SETTINGS and follow the instructions on the display.

MENU → GENERAL SETTINGS → FACTORY RESET → ENTER → *follow the displayed instructions*

The option is found below the "NETWORK ID" option in the GENERAL SETTINGS MENU.

Chapter 9

Monitoring Systems

The Pyrodigital® Eagle Wireless Base integrates several monitoring systems as described in the following.

9.1 Battery Charge State

The battery charge state is displayed on the main screen:

- 5/5: 100% to 80%
- 4/5: 79% to 60%
- 3/5: 59% to 40%
- 2/5: 39% to 20%
- 1/5: 19% to 10%
- 0/5: 9% to 0%
- toggling between !/5 and 0/5: less then 0%

100% corresponds to a standby time of approx. 40 hours or an active time (Network Output powered up with full network of 128 modules) of approx. 8 hours.

9.2 External Power

If an external power source is recognized on the External DC Power Input, the display will add a **+ex** to the right of the Battery Charge State.
E.g.: **3/5+ex** to indicate a battery charge state between 59% to 40% and a detected external power source.
If a external battery source is connected it will fully supply the Pyrodigital® Eagle Wireless Base and the battery will not be depleted anymore.
If you are interested to make use of an external supply, please get in contact with us via pd@pyrodigital.com.

9.3 RF Signal Strength

During SLAVE BASE MONITORING (see section 10.1.4 Slave Base Monitoring) the Signal Strength is displayed on the screen:

- 3 bars: very good signal strength
- 2 bars: good signal strength
- 1 bars: sufficient signal strength
- no bar: no signal

9.4 Enable Interlock State

In SLAVE MODE and ISOLATING BOOSTER MODE, the main screen always shows the current Enable Interlock State of the Phase III Network Outputs. The following states can be displayed:

- **DISABLED** - Enable Interlock is NOT CLEARED and the controlling input source does NOT TRY TO ARM the Phase III Network Outputs. **Phase III Network Outputs are powered down.**

- **ENABLED** - Enable Interlock is CLEARED and the controlling input source does NOT TRY TO ARM the Phase III Network Outputs. **Phase III Network Outputs are powered down.**

- **KEY BLOCK** - Enable Interlock is NOT CLEARED but the controlling input source DOES ARM the Phase III Network Outputs. **Phase III Network Outputs are powered UP but FIRE COMMANDS are BLOCKED** (will not be sent out the Phase III Network Outputs)! Check status is allowed.

- **PD ARMED** - Enable Interlock is CLEARED and the controlling input source DOES ARM the Phase III Network Outputs. **Phase III Network Outputs are powered UP and FIRE COMMANDS are ALLOWED** on the Phase III Network Outputs.

9.5 Over-Temperature Warning

The Pyrodigital® Eagle Wireless Base is equipped with temperature sensors. There is one sensor to check the battery temperature and another sensor to check the main board temperature.

If the temperature is within normal operating values the main screen will state: **Temp: OK**.

If the system detects a battery temperature that is too high (higher than +55°C) the main screen will state: **Temp: hi**.

In case the system detects detects a too high temperature on the main board (higher than +85°C) the main screen will state: **Temp: !!**.

WARNING - EXTREME DANGER

If over-temperature is detected a reliable operation of the Pyrodigital® Eagle Wireless Base cannot be guaranteed! STOP immediately to operate with the Pyrodigital® Eagle Wireless Base and ensure the device cools down until the over-temperature alarm is not indicated anymore before you proceed to operate the device.

9.6 Phase III Output Monitoring

The Phase III Network Outputs are constantly monitored when powered up. For more details read subsection 6.2.1 Output Monitor and Circuit Breakers.

Chapter 10

Operating Modes

WARNING - EXTREME DANGER
IT IS THE OPERATOR'S RESPONSIBILITY TO APPROPRIATELY USE THE Safety Arm Key. NEVER turn the Safety Arm Key, UNLESS IT IS SAFE TO DO SO. MAKE ABSOLUTELY SURE THAT THE FIRING AREA IS CLEAR OF ALL PERSONNEL AND THAT IT IS SAFE TO PROCEED BEFORE APPLYING POWER TO THE SYSTEM NETWORK BY ARMING THE Safety Arm Key.

10.1 Wireless Link

To establish a wireless link (see section 5.1 Wireless Link Point-to-Point and 5.2 Wireless Link Point-to-Multipoint for a general overview) you need one Pyrodigital® Eagle Wireless Base to be in Master Mode and one or more Eagle Wireless Bases to be in Slave Mode. The Master Base and all Slave Bases have to be set to the same Customer ID, Network ID and Channel Number to operate in the same wireless Network (see Chapter 8 Wireless Link General Settings). Further, each Slave Base needs to be set to a different Slave Number (see Section 8.4 Slave Number).

IMPORTANT

Ensure you use the wireless link parameters (CUSTOMER ID, NETWORK ID, CHANNEL NUMBER) as explained in Chapter 8 Wireless Link General Settings to ensure a reliable operation!

10.1.1 Master Mode

Figure 10.1 shows the Master Mode Screen. In the top left corner the device states that it is set to Master Mode. Further it shows information about the Battery Charge State (and External Power Supply, if connected), the selected Channel Number and the temperature state of the device. For further information also read 9.1 Battery Charge State, 9.2 External Power, 8.3 Channel and 9.5 Over-Temperature Warning.
The following section will explain the System State (middle upper line on screen) and the Arm State (right upper line on the screen).

10.1.2 Active/Standby and Arming

IMPORTANT

For a general understanding (which is mandatory to operate the Eagle Wireless Base), the operator also needs to read section 9.4 Enable Interlock State

The Master Mode Screen indicates the current System State, which can be either *active* or *standby*. The screen also indicates if the Phase III Network Outputs of the controlled Slave Bases are commanded to be armed (*PD ARMED*) or if they are commanded to be *DISARMED*.
When the Phase III Network Input gets powered up, the Master Base will activate the whole wireless network and the indicated state will change from *standby* to *active*. As the

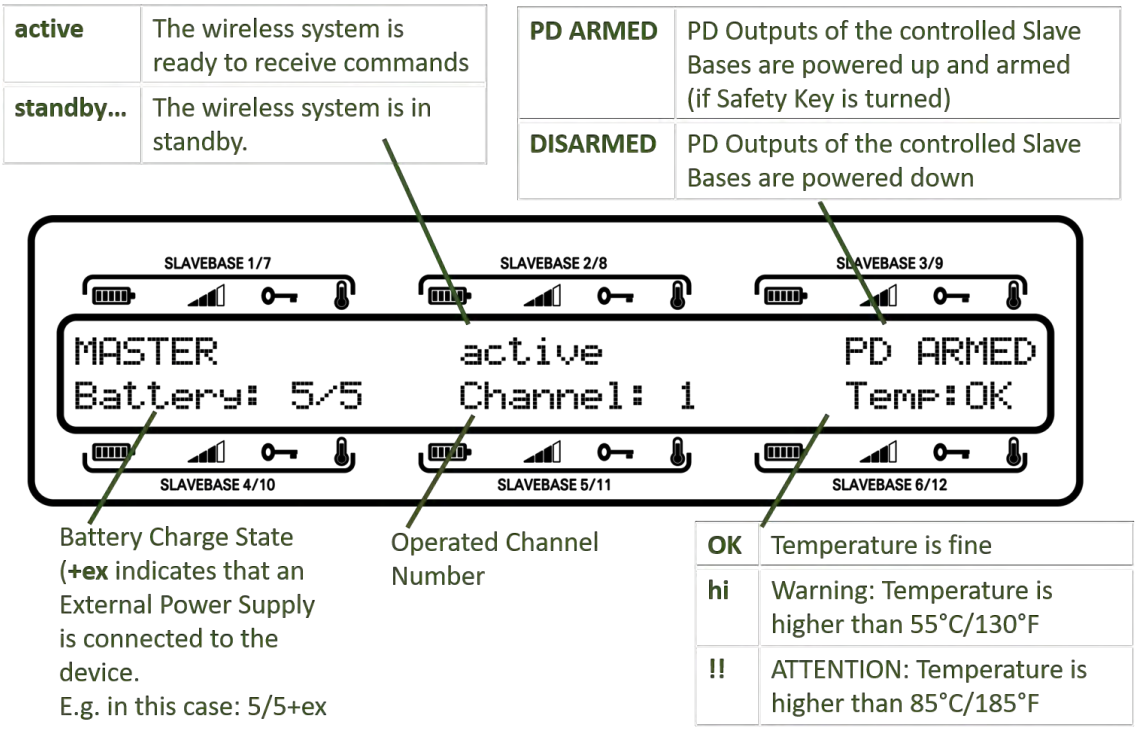


Figure 10.1: Overview of Master Mode Screen

Phase III Network Input is powered up, the Master Base will also tell the Slave Bases to power up and arm their Network Outputs. The Slave Bases will power up their Network Outputs, but they will only allow firing if their Safety Arm Key is turned (and remote interlock is closed, in case it is used). The master screen will then also display PD ARMED to let the operator know that the Slave Bases are commanded to fire (when Safety Arm Key condition is OK). If the Phase III Network Input gets powered down, the Master Base will send back the wireless network to *standby* and will indicate that the Slave Base Phase III Network Outputs are *DISARMED*.

The system also gets activated if the operator conducts a Slave Base Monitoring (see section 10.1.4 Slave Base Monitoring). However, the Slave Base Phase III Network Outputs will not get powered up or armed by that action! If the Slave Base Monitoring is ended, the Master Base will send the wireless network back to *standby*.

Further, the operator can use the ANTENNA KEY to manually send the wireless network to *active* or *standby* state, no matter in which state the wireless network currently is. In *standby* state the Slave Base Phase III Network Outputs will always be powered down and disarmed. This allows the operator to safe power on the Slave Bases during a longer show. E.g. the show is running for several hours, but the pyro ques over the wireless network are only on the opening and the closing part of the show. In the middle part the operator does not want to power down the PD power on the Network Input of the Master Baser but still wants the wireless network to go to *standby*. This saves power on the Slave Bases, as those do not supply their connected, wired Network. If the ANTENNA KEY is pressed again, the wireless network will get activated again (*active*). If the Slave Base Phase III Network Outputs will get powered up and armed depends on if there is power on the Master Base Network Input at that moment (like it is in the example above).
Please make sure you also read section 9.4 Enable Interlock State.

10.1.3 Slave Mode

WARNING - EXTREME DANGER
WHEN THE SAFETY ARM KEY IS TURNED TO REMOTE OR DIRECT, THE PYRODIGITAL® PHASE III NETWORK OUTPUTS ARE FULLY UNDER CONTROL OF THE PYRODIGITAL® EAGLE WIRELESS BASE SET AS NETWORK MASTER. THE PHASE III NETWORK OUTPUT WILL BE POWERED UP IF COMMANDED BY THE NETWORK MASTER!

Figure 10.2 shows the Slave Mode Screen. In the top left corner the device shows the Slave Number (8.4 Slave Number). Further it shows information about the Battery Charge State (and if connected an External Power Supply), the selected Channel Number and the temperature state of the device. For further information also read 9.1 Battery Charge State, 9.2 External Power, 8.3 Channel and 9.5 Over-Temperature Warning. Like in

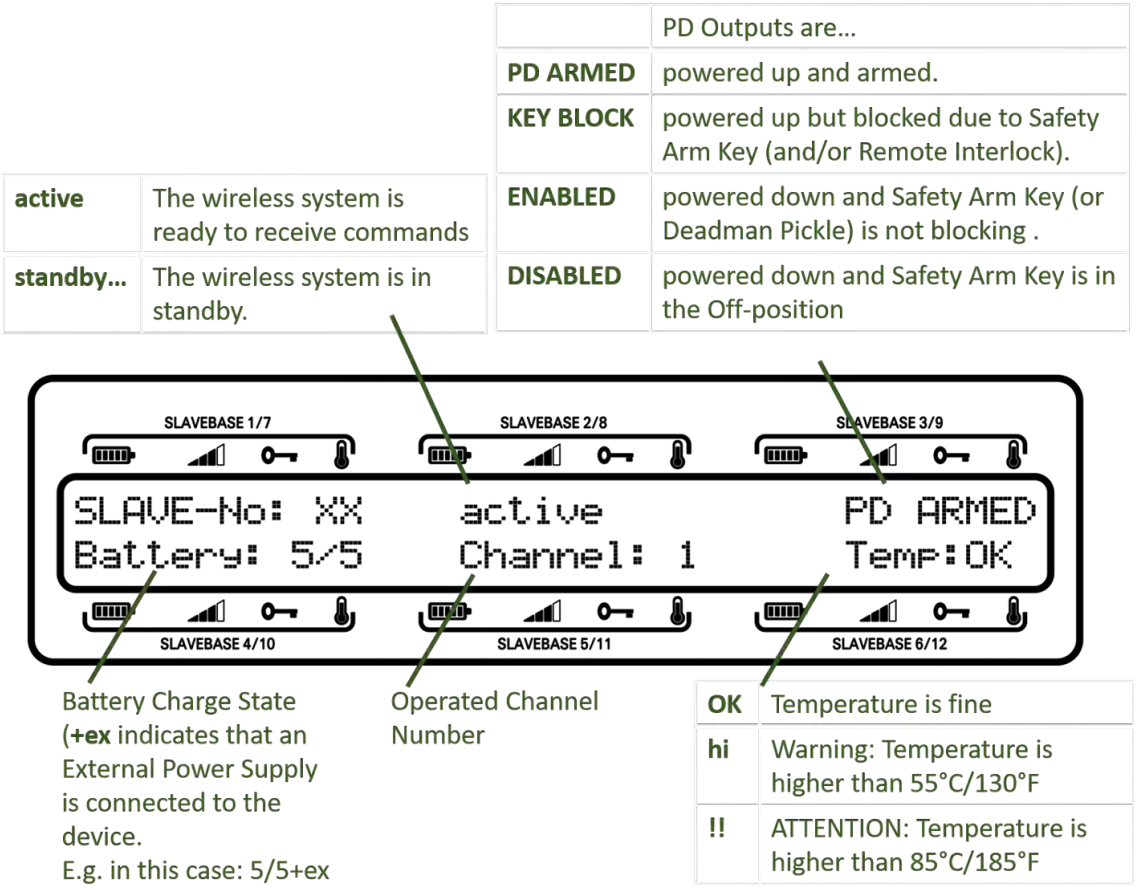


Figure 10.2: Overview of Slave Mode Screen

Master Mode, the Eagle Wireless Base shows on the Slave Mode Screen as well if the device is active or in standby.

Further the Slave Mode Screen indicates the state of the Network Outputs. Like figure 10.2 explains, the Network Outputs can be powered up or down and the Enable Interlock can block or allow firing commands. For more information on the Enable Interlock State please also read 9.4 Enable Interlock State. The Enable Interlock can be used to have an additional spotter at the Eagle Wireless Base.

In this mode the Network Outputs are controlled by the Network Input of its Master Base. When the Network Input of the Master Base gets powered up, the Network Outputs of

the Slave Base will get powered up as well.

Like stated in 7.1.2 Enable Interlock:
If the Safety Arm Key is on the "REMOTE" position, the Pyrodigital® Eagle Wireless Base will only output fire commands on its Phase III Network Outputs when the enable interlock is cleared by the Deadman Pickle connected to the Remote Interlock Connector (left of the Safety Arm Key). This allows to have an additional Spotter Operator at the Eagle Wireless Base for extra safety.
If the Safety Arm Key is on the "DIRECT ENABLE" position, the enable interlock is cleared by the Safety Arm Key directly. In this case the Main Operator has unrestricted control over the Network Outputs of the Eagle Wireless Base. When this Eagle Wireless Base is set to SLAVE MODE, the Main Operator controls the corresponding Master Base. When this Eagle Wireless Base is set to ISOLATING BOOSTER MODE, the Main Operator controls the Network Input of the Eagle Wireless Base.

10.1.4 Slave Base Monitoring

On the Master Base, use the Keys of the Slave Base Status Section to check the monitoring parameters of the Eagle Wireless Bases in Slave Mode. With the key named "1..6" the information for the Slave Bases with the Slave Numbers 1 to 6 are displayed. With the key named "7..12" the Slave Bases with the Slave Numbers 7 to12 are displayed. When starting the Slave Base Monitoring the first time it might take some seconds until the states are displayed.
Figure 10.3 does show a Slave Base Monitoring e.g. for the Slaves with the Slave Number 1 to 6.
To end the Slave Base Monitoring press the BACK Key or simply repress the Key "1..6"

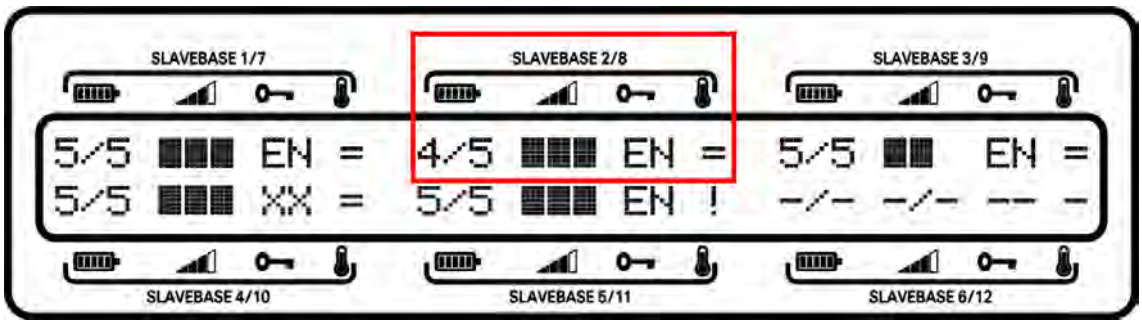


Figure 10.3: Slave Base Check Screen

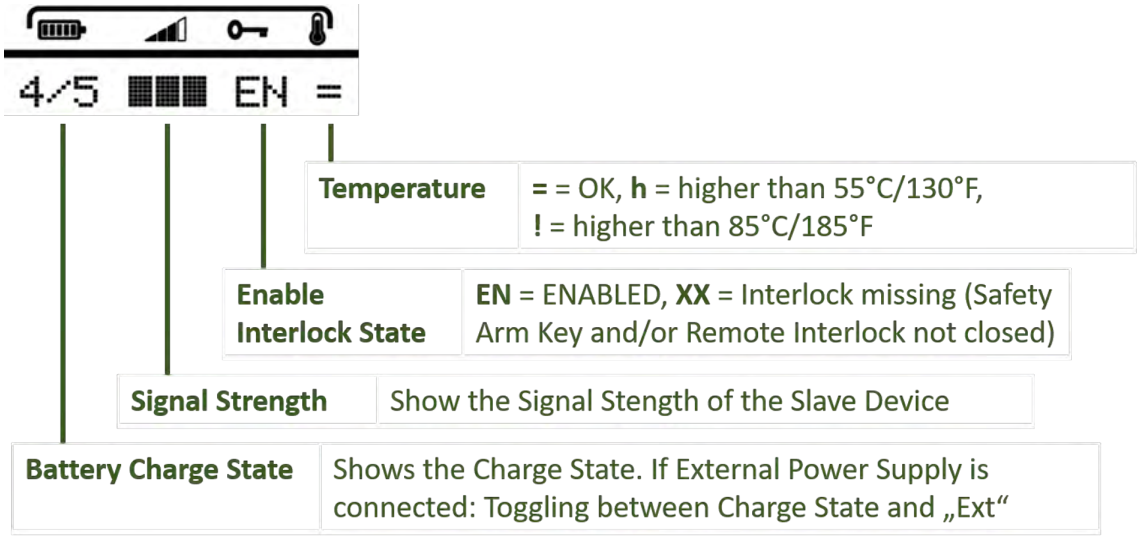


Figure 10.4: Slave Base Check Screen Details

(respectively "7..12"). For safety reasons, the Slave Base Monitoring can only be entered if the Pyrodigital® Phase III Network Input of the Master is NOT powered up.

Figure 10.4 explains the details displayed for the Slave Bases, here for Slave Number 2.

10.2 Isolating Booster

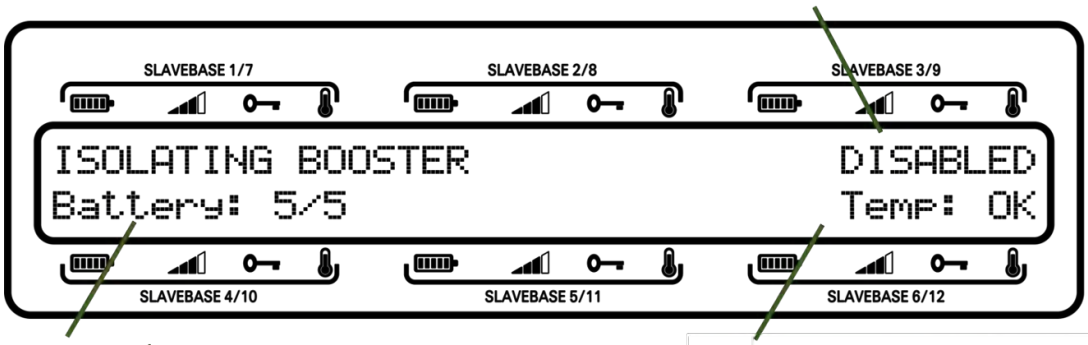
WARNING - EXTREME DANGER
WHEN THE SAFETY ARM KEY IS TURNED TO REMOTE OR DIRECT, THE PYRODIGITAL® PHASE III NETWORK OUTPUTS ARE FULLY UNDER CONTROL OF THE PYRODIGITAL® PHASE III NETWORK INPUT OF THE PYRODIGITAL® EAGLE WIRELESS BASE. THE PHASE III NETWORK OUTPUT WILL BE POWERED UP IF PYRODIGITAL® PHASE III NETWORK INPUT IS POWERED UP!

Figure 10.5 shows the Isolated Booster Screen. In the top left corner of the display, it is displayed, that the device is set to ISOLATED BOOSTER MODE. Further it shows information about the Battery Charge State (and if connected an External Power Supply) and the temperature state of the device. For further information also read 9.1 Battery Charge State, 9.2 External Power and 9.5 Over-Temperature Warning.

Further the Isolated Booster Screen indicates the state of the Network Outputs. Like figure 10.2 explains, the Network Outputs can be powered up or down and the Enable Interlock can block or allow firing commands. For more information on the Enable Interlock State please also read 9.4 Enable Interlock State. The Enable Interlock can be used to have an additional spotter at the Eagle Wireless Base.

In the Isolated Booster mode the Network Outputs are controlled by the Network Input of the device.

	PD Outputs are...
PD ARMED	powered up and armed.
KEY BLOCK	powered up but blocked due to Safety Arm Key (and/or Remote Interlock).
ENABLED	powered down and Safety Arm Key (or Deadman Pickle) is not blocking .
DISABLED	powered down and Safety Arm Key is in the Off-position



Battery Charge State (**+ex** indicates that an External Power Supply is connected to the device. E.g. in this case: 5/5+ex

OK	Temperature is fine
hi	Warning: Temperature is higher than 55°C/130°F
!!	ATTENTION: Temperature is higher than 85°C/185°F

Figure 10.5: Overview of Isolated Booster Mode Screen

Like stated in 7.1.2 Enable Interlock:

If the Safety Arm Key is on the "REMOTE" position, the Pyrodigital® Eagle Wireless Base will only output fire commands on its Phase III Network Outputs when the enable interlock is cleared by the Deadman Pickle connected to the Remote Interlock Connector (left of the Safety Arm Key). This allows to have an additional Spotter Operator at the Eagle Wireless Base for extra safety.

If the Safety Arm Key is on the "DIRECT ENABLE" position, the enable interlock is cleared by the Safety Arm Key directly. In this case the Main Operator has unrestricted control over the Network Outputs of the Eagle Wireless Base. When this Eagle Wireless Base is set to SLAVE MODE, the Main Operator controls the corresponding Master Base. When this Eagle Wireless Base is set to ISOLATING BOOSTER MODE, the Main Operator controls the Network Input of the Eagle Wireless Base.

Chapter 11

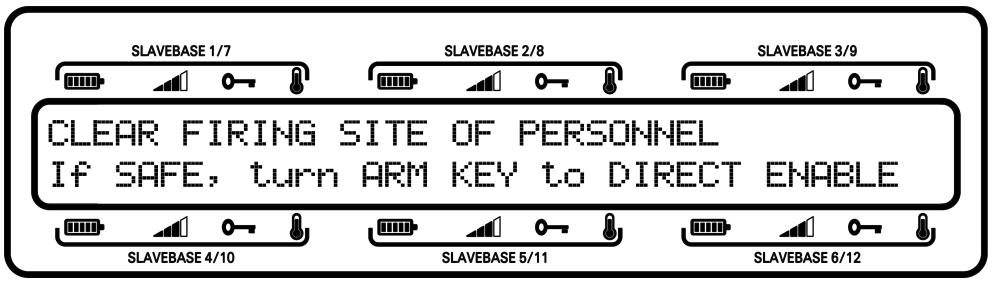
Local Check Status Mode

WARNING - EXTREME DANGER

THE SAFETY ARM KEY MUST BE ARMED IN ORDER TO ACCESS THE LOCAL CHECK STATUS MODE. BE ABSOLUTELY SURE IT IS SAFE TO APPLY POWER TO THE PYRODIGITAL® PHASE III NETWORK. THESE OPERATING INSTRUCTIONS ONLY DESCRIBE DIRECT OPERATION OF THE PYRODIGITAL® EAGLE WIRELESS BASE AND DO NOT INCLUDE ALL INFORMATION ON THE SAFE OPERATING PROCEDURES OF THE PYRODIGITAL® PHASE III FIRING SYSTEM. ALL PROCEDURES FOR THE SAFE OPERATION OF THE PHASE III NETWORK ARE INCLUDED IN THE PHASE III SYSTEM NETWORK USER'S GUIDE. ALSO READ THE OPERATING INSTRUCTION OF ALL PHASE III NETWORK COMPONENTS AND PYRODIGITAL® FIELD CONTROLLERS. (YOU CAN FIND ALL DOCUMENTS ON PYRODIGITAL.COM .) THE USER MUST ABSOLUTELY BECOME FAMILIAR WITH ALL PROCEDURES IN THE PHASE III SYSTEM NETWORK USER'S GUIDE BEFORE THE SAFETY ARM KEY OF THE FIELD CONTROLLER OR EAGLE WIRELESS BASE IS EVER ARMED.

In order to access the LOCAL CHECK STATUS Mode, press the MENU key and select LOCAL CHECK STATUS.

The device will display the following message:



To enter the LOCAL CHECK STATUS MODE the Safety Arm Key must be ARMED by turning it to the REMOTE position. Besides turning the Safety Arm Key to the REMOTE position, the operator can also turn the Safety Arm Key to the DIRECT position. However, the REMOTE position is recommended. Also read chapter 7 Safety Arm Key and Remote Interlock to ensure to understand how the Safety Arm Key operates.

WARNING - EXTREME DANGER

If it is safe to proceed, per the above Warning, and all Warnings and Safety Procedures outlined in the Phase III System Network User's Guide, the user may then power up the Phase III Network Output by turning the Safety Arm Key to the DIRECT or REMOTE position. (You can find all documents on pyrodigital.com .)

WARNING - EXTREME DANGER

USE THE ACTIVE PHASE III NETWORK OUTPUT INDICATOR TO CHECK FOR SHORTS. Check Status should be used to find any Shorts in the System Network first. Also, read chapter 6 'Phase III Network Terminals' to understand how the Phase III Network Outputs and the Phase III Network Output Indicator operate. ABSOLUTELY FIND AND ELIMINATE ANY SHORTS BEFORE PROCEEDING

11.1 Purpose of Check Status

The purpose of the LOCAL CHECK STATUS Operating Mode is to:

1. Verify the System Network is operating correctly before any Pyrotechnic Material is connected to the Phase III Firing System. SEE THE PHASE III SYSTEM NETWORK USER'S GUIDE, 'INERT SYSTEM CHECK-OUT'. (You can find all documents on pyrodigital.com .) Read also chapter 6 'Phase III Network Terminals.'

2. Provide a means to check the electrical connections of the Pyrotechnic electric matches to the Phase III Firing System Network. SEE THE PHASE III SYSTEM NETWORK USER'S GUIDE, 'OPERATION WITH LIVE PYROTECHNICS'. ALSO READ THE OPERATING INSTRUCTION OF THE FM-A FIRING MODULE. (You can find all documents on pyrodigital.com .)

In Check Status, continuity status information of each and every circuit in the System Network is sent back to the Eagle Wireless Base. This information consists of whether continuity is found on each of the single electronic match clamp terminals of the Firing Modules. Thus, the Phase III System can only detect if a electric match is connected to a particular clamp. (Obviously, the system cannot tell if this is the correct Pyrotechnic Device.)

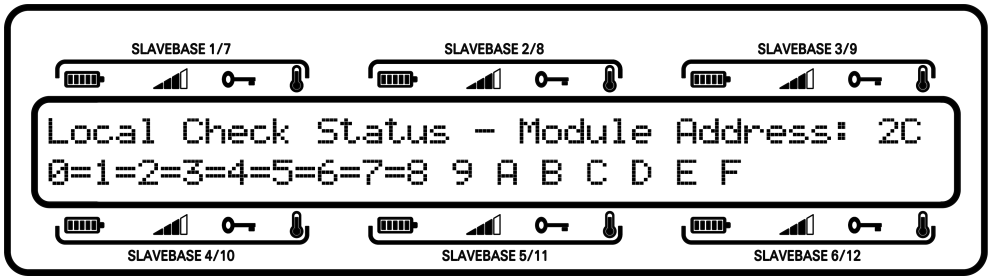
11.2 Selection of Module Address

After entering the LOCAL CHECK STATUS MODE the operator can navigate through the Module Addresses using the "UP" and "DOWN" Key (lower module address digit) as well as the "LEFT" and "RIGHT" Key (higher module address digit). Please note that in a Pyrodigital® Phase III Network the module address is a 2-digit hexadecimal number. So, e.g. 00 to 09 will be followed by 0A to 0F, which is then followed by 10 t0 1F and so on. The highest module address in a Pyrodigital® Phase III Network is 7F.

11.3 Continuity Status

During the LOCAL CHECK STATUS is ongoing the displayed Module Address is checked repetitively. Remember: The Fire Address is a 3 digit hexadecimal Number. The first 2 digits are the Module Address. The third digit represents the Electric Match Clamp of the Firing Module. For each Electronic Match Clamp continuity is either found or not. For the Pyrodigital® Eagle Wireless Base there are only two symbols that represent the Continuity Status are "=" for a found continuity and a blank " " representing no continuity on the corresponding Firing Address.

Note that the Eagle Wireless Base does not have knowledge about the script that you intend to execute. Thus, the Eagle Wireless Base cannot tell you if the found continuity information matches your script. We recommend you to have a printed overview of your show sorted by the Firing Address (like the Loading Report in Infinity Visions Show Director) with you to ensure the found continuity information matches your script.



The symbols 0 to 9 and A to F represent the corresponding 16 Electric Match Clamps on the Firing Module. The State Symbols represent the following information:

- = this clamp address was found on the firing module to have continuity
- **blank** this clamp address was found on the firing module to have NO continuity

The State Symbols will appear right next to the corresponding clamp number.
In this example the Module Address 2C is checked. E.g. on clamp terminal 7 continuity is found (firing address 2C7) and on clamp terminal 8 no continuity is found (firing address 2C8).

11.4 Exit Local Check Status

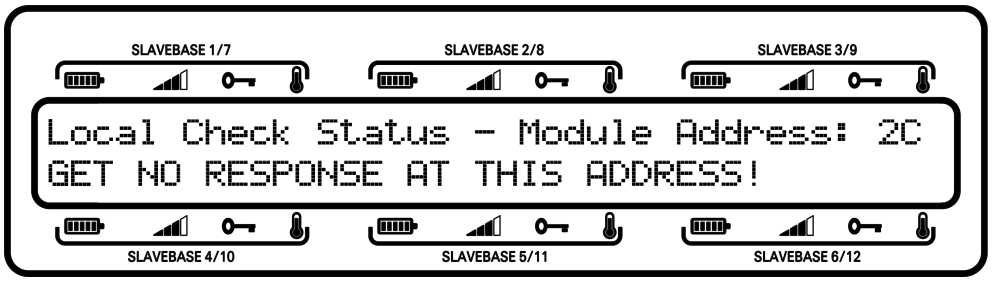
To leave the LOCAL CHECK STATUS Mode simply press the BACK or the MENU Key.

WARNING - EXTREME DANGER

TURN BACK THE SAFETY ARM KEY TO THE OFF POSITION IF THE PHASE III NETWORK OUTPUTS ARE NOT INTENDED TO BE UNDER REMOTE CONTROL (SEE 10.1.3 Slave Mode RESPECTIVELY 10.2 Isolating Booster).

11.5 Status Check Display - Common Faults and Troubleshooting

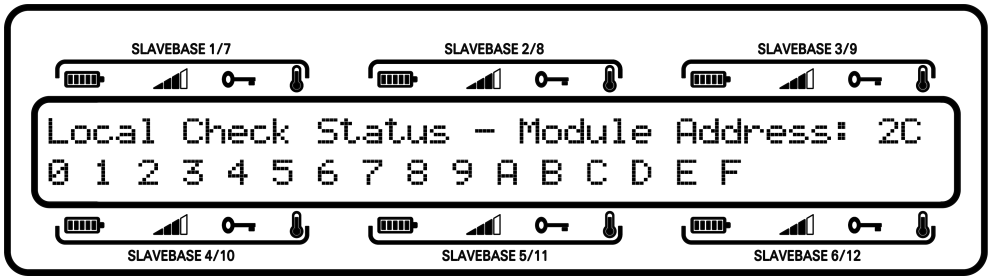
If the following message is displayed, this means that the corresponding Module Address has not been found:



Various reasons are possible:

- The device with this Module Address is not connected to the Pyrodigital® Phase III Network.
- The device that is supposed to be set to this Module Address is accidentally set to a wrong Module Address.
- The network is not connected to the Phase III Network Outputs.

Another typical Response:



If you find all Clamps to be indicated as blanks " ", there are two possible reasons:

- None of the clamps do have an Electric Match connected and thus there is no continuity found.
- The ON/OFF-Switch (respectively the Arm/Shunt-Switch for Firing Module versions older than the FM-A Firing Modules) is set to OFF (resp. Shunt). In this case the Firing Modules will always reply that all Clamps are open (no continuity).

DOUBLE ADDRESSING:

If two Firing Modules are set to the same Module Address, the Firing Modules will both answer to the same Check Status Request. The replies then compete against each other on the Pyrodigital® Phase III Network. This might result in a FLICKERING CHECK STATUS RESPONSE on the display. Therefore, if such a flickering appears, it is most likely due to unintended Double Addressing. Simply correct the Double Addressing.

Chapter 12

Keyboard Illumination

The Keyboard Illumination of the Pyrodigital® Eagle Wireless Base will turn on when a Key is pressed. Also a Eagle Wireless Base in SLAVE MODE will light up the Keyboard Illumination when getting activated by the Master Base.
To safe power, The Keyboard Illumination will turn off by itself after approx. 60 second (or 20 seconds; depends on event).

Chapter 13

Lock Key

The LOCK Key of the "Key Section" can be used to block the whole Keyboard. This prevents unintended modifications on the current operation mode or the wireless link settings.
If the LOCK Key is pressed the first time after booting, the Keyboard will get blocked.
If the LOCK Key is pressed again, this will unblock the Keyboard again.

Chapter 14

Battery, Power and Fuses

14.1 General Information

WARNING - LIABILITY AND WARRANTY RELEVANT

This chapter describes the procedure to exchange the batteries and to replace the fuses. The User must strictly follow the given instructions. Not following the instructions, using non-original parts, manipulation of non-user-serviceable parts or not performing servicing as required, will render the warranty void and the liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the battery fuse and the charger fuse.

The Pyrodigital® Eagle Wireless Base is powered by two 12V Valve Regulated Lead-Acid (VRLA) Batteries. This battery type provides high reliability and the power required to drive the Pyrodigital® Phase III Network Outputs. This battery is very robust and is accepted for flight transportation. The Pyrodigital® Eagle Wireless Base does have NO LITHIUM BATTERIES OR LITHIUM-ION BATTERIES INSIDE. The two batteries

are in series and provide 24 VDC to the Eagle Wireless Base. In order to provide a constant and decent voltage level for the Phase III Network Outputs, the Pyrodigital® Eagle Wireless Base is equipped with a powerful 350 W booster unit that ensures a constant 28.5 VDC output voltage at the Phase III Network Outputs. This BOOSTER TREMENDOUSLY ENHANCES THE PERFORMANCE OF a PHASE III NETWORK. IMPORTANT: The VRLA Batteries need to be replaced every 2 years. This is a natural property of the batteries. The replacement of batteries is excluded from the warranty for the Pyrodigital® Eagle Wireless Base given by Innovative Pyrotechnik GmbH. The lifetime of the batteries strongly depend on the handling by the user and do have a restricted lifetime.

The Pyrodigital® Eagle Wireless Base has three internal fuses besides the externally accessible thermal circuit breakers. The main fuse (Mini Blade Fuse 20A 32V slow type) that secures the overall circuitry. The charger fuse (G 1.6A 250V 5x20mm slow type) that secures the CHARGE plug. And the External Battery Fuse (Mini Blade Fuse 20A 32V slow type) that secures the EXT BATT plug.

To replace the batteries and/or the fuses please follow the instructions in the corresponding sections of this chapter.

14.2 Charging the Battery

The integrated batteries need to be charged using an appropriate charging device for 24 VDC Valve Regulated Lead-Acid (VRLA) Batteries. This charger needs to be plugged into the "CHARGE" plug in the bottom left corner on the front of the Pyrodigital® Eagle Wireless Base. The maximum charge current for the Eagle Wireless Base is 1.2 Ampere. Only use charging devices endorsed by Innovative Pyrotechnik GmbH. Your Eagle Wireless Base comes with an appropriate charging device that provides a universal input voltage range (90-264 VAC, 50-60 Hz). Contact us at Innovative Pyrotechnik GmbH or our sales partners if you require another than the delivered mains cable to connect your charger to the mains or if you require additional chargers.

IMPORTANT: It is not possible to charge the batteries while operating the Pyrodigital® Eagle Wireless Base. To charge the batteries device has to be turned OFF.

If you require to extend the battery operating time or you run shows in permanent installation with the Pyrodigital® Eagle Wireless Base, then use an external supply device recommended by Innovative Pyrotechnik GmbH. For further information see section 14.9.

14.3 Open the Eagle Wireless Base

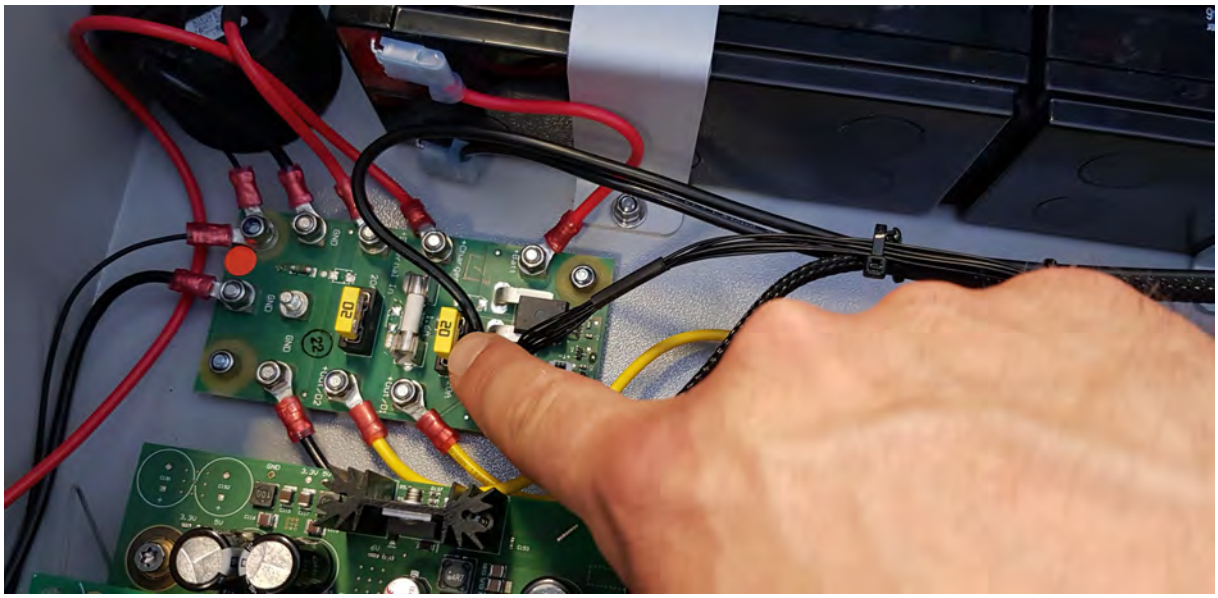
WARNING - LIABILITY AND WARRANTY RELEVANT

This section describes the procedure to open the Pyrodigital® Eagle Wireless Base. The User must strictly follow the given instructions. Not following the instructions, using non-original parts, manipulation of non-user-serviceable parts or not performing servicing as required, will render the warranty void and the liability will be excluded.

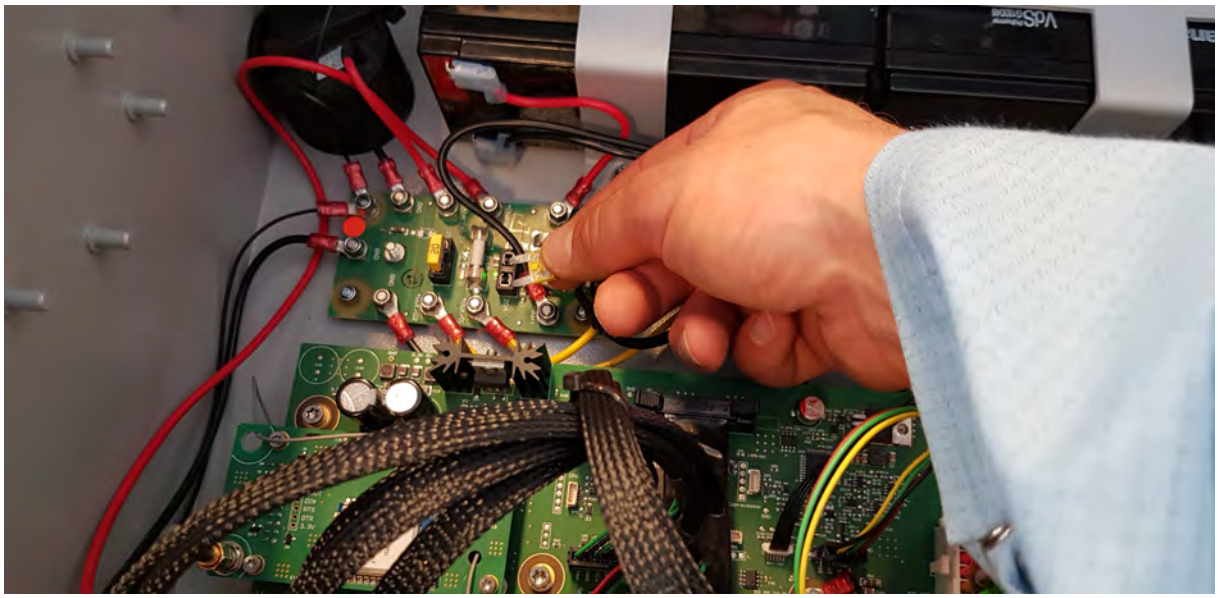
Always ensure to work in an ESD safe environment whenever the Pyrodigital® Eagle Wireless Base needs to be opened or is open! Properly ground yourself and the ESD mat underneath the device. Never open the Pyrodigital® Eagle Wireless Base outside of an ESD safe environment. Please ask Innovative Pyrotechnik GmbH or your local vendor for advice, if you are unsure about ESD safe environments.

Place the Eagle Wireless Base on an ESD safe underground, e.g. an ESD mat. Ensure the ESD mat has a proper 1 MOhm connection to earth ground. The device has to be turned OFF.

Now, unscrew all 16 screws of the lid and take the lid off.



This is the location of the Main Fuse.



IMPORTANT: Before proceeding any further disconnect the Main Fuse!!!

You successfully opened the Eagle Wireless Base.

14.4 Replacing the Batteries

WARNING - LIABILITY AND WARRANTY RELEVANT

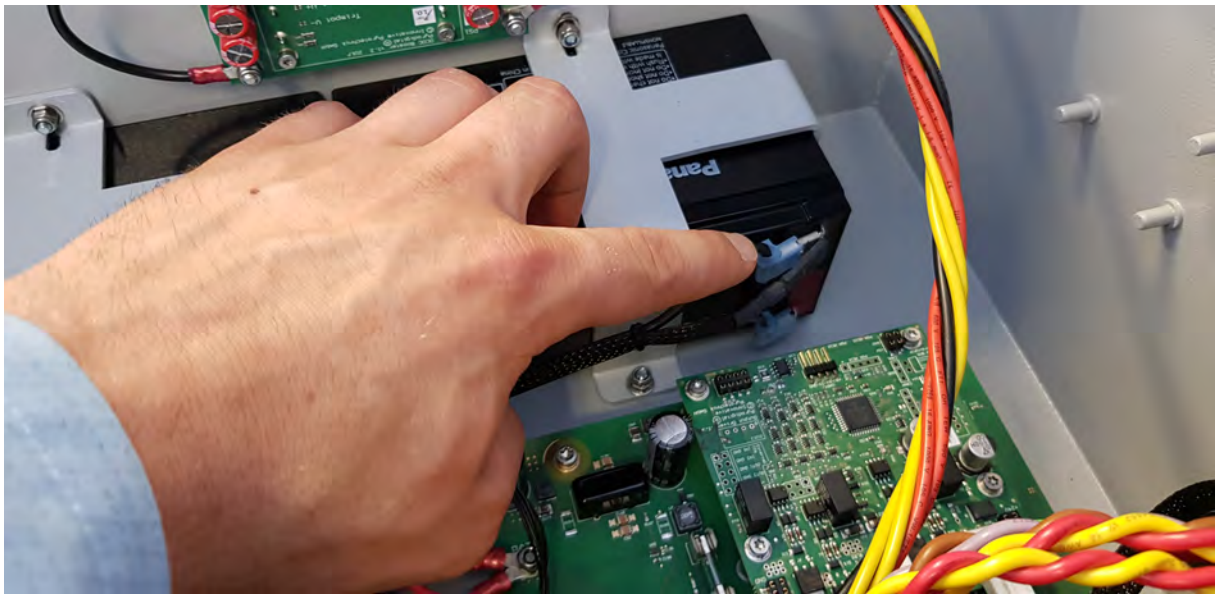
This section describes the procedure to replace the batteries of the Pyrodigital® Eagle Wireless Base. The User must strictly follow the given instructions. Not following the instructions, using non-original parts, manipulation of non-user-serviceable parts or not performing servicing as required, will render the warranty void and the liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the battery fuse and the charger fuse.

IMPORTANT: As mentioned above, the VRLA Batteries need to be replaced every 2 years. This is a natural property of this battery type. The replacement of batteries is excluded from the warranty of the Pyrodigital® Eagle Wireless Base given by Innovative Pyrotechnik GmbH. The lifetime of the batteries is naturally restricted and strongly depends on the handling by the user.
IMPORTANT: ONLY USE BATTERIES ENDORSED BY INNOVATIVE PYROTECHNIK GMBH FOR BATTERY REPLACEMENT.
Always Endorsed Batteries are the Panasonic LC-R127R2PG1.

WARNING - DANGER / CAUTION If you do not feel confident replacing the batteries or if you have any doubts, immediately contact us at Innovative Pyrotechnik GmbH: pd@pyrodigital.com. We will assist you, conduct or arrange the battery replacement for you.

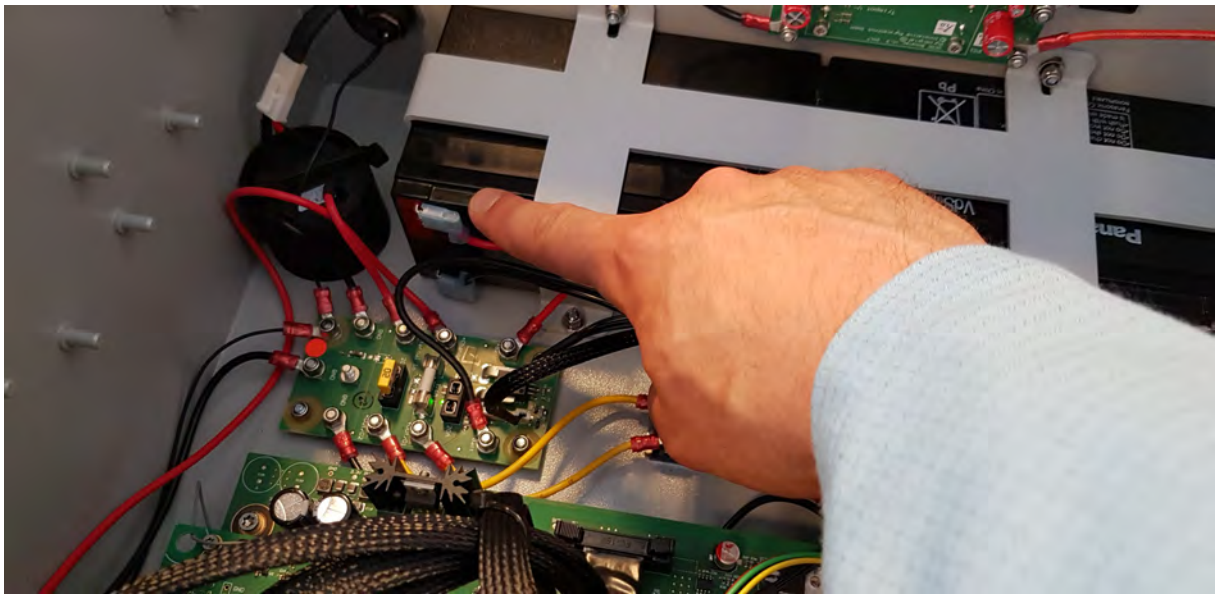
To replace the batteries, first follow the instruction to open the Pyrodigital® Eagle Wireless Base in the previous section Open the Eagle Wireless Base. Then strictly follow

the procedure described in this section and finally close the device like described in the following section Closing the Eagle Wireless Base.

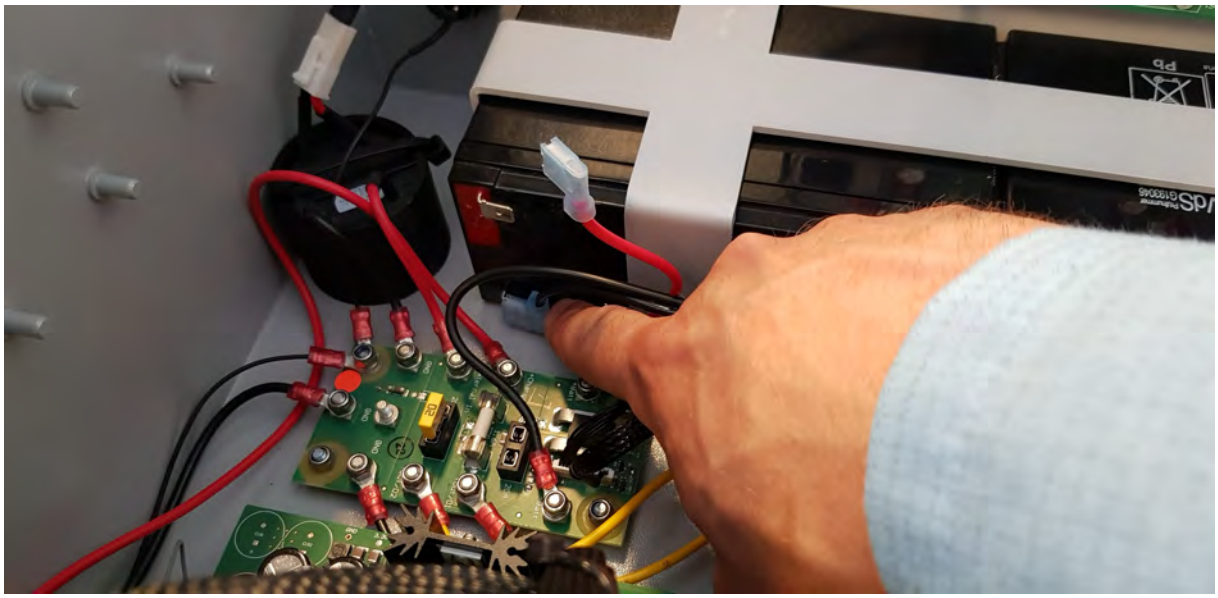


Unplug the Battery Minus Cable from the negative pole of the right hand side battery. Be very careful unplugging this connector as it includes also the temperature sensor of the battery.

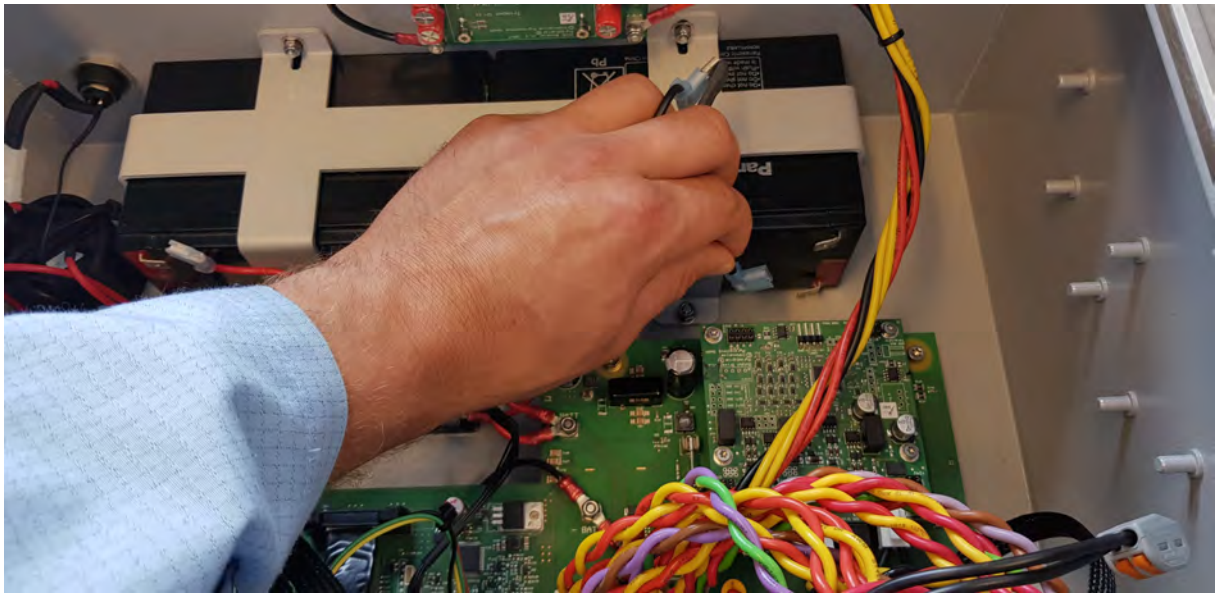
UNPLUG THE WHOLE PART INCLUDING THE SENSOR FROM THE BATTERY, LIKE SHOWN IN THE PICTURE ABOVE.



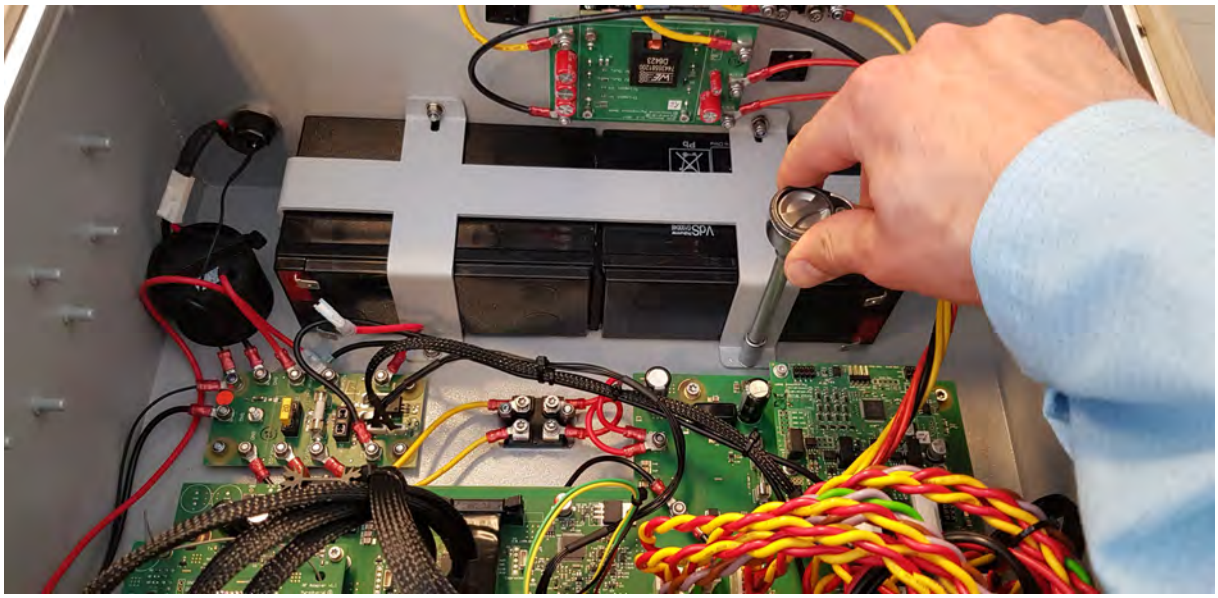
Unplug the Battery Plus Cable from the positive pole of the left hand side battery.



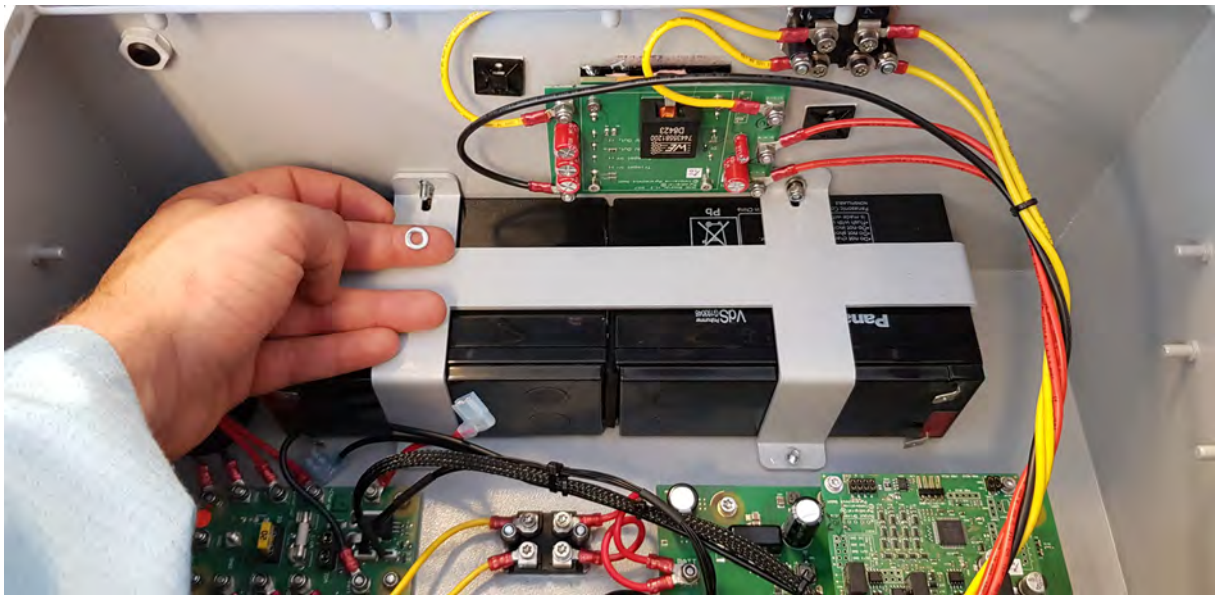
Unplug the Battery Interconnection Cable from the negative pole of the left hand side battery. Be careful not to harm the PCB board next to it and the cables connected to it.



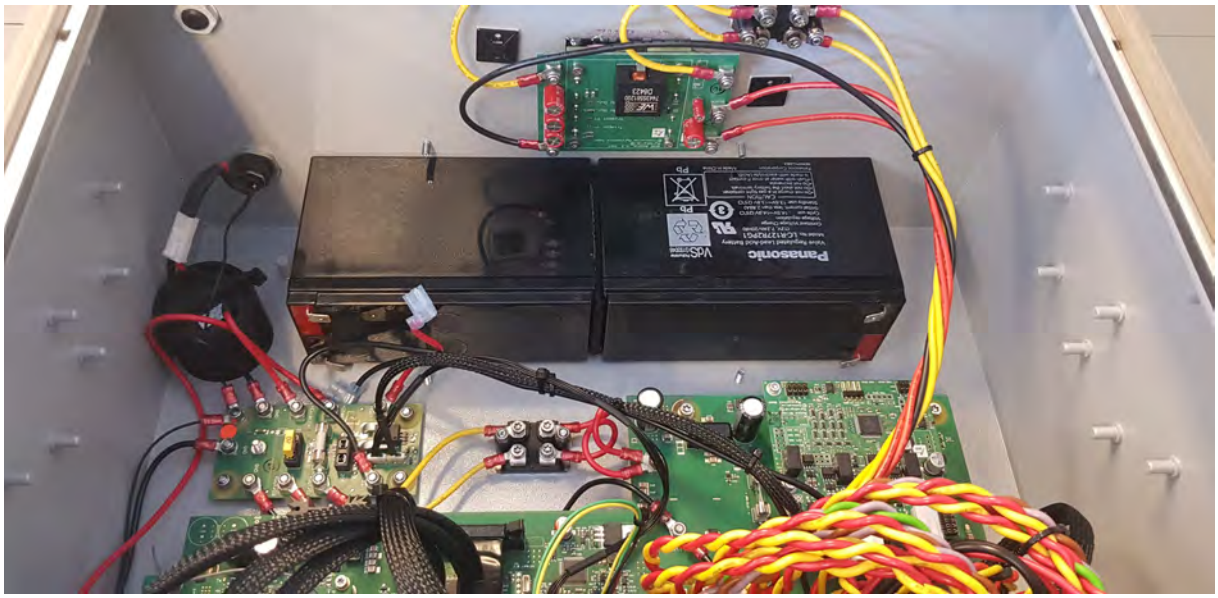
Unplug the Battery Interconnection Cable from the positive pole of the right hand side battery. All four battery connectors should be loose now.



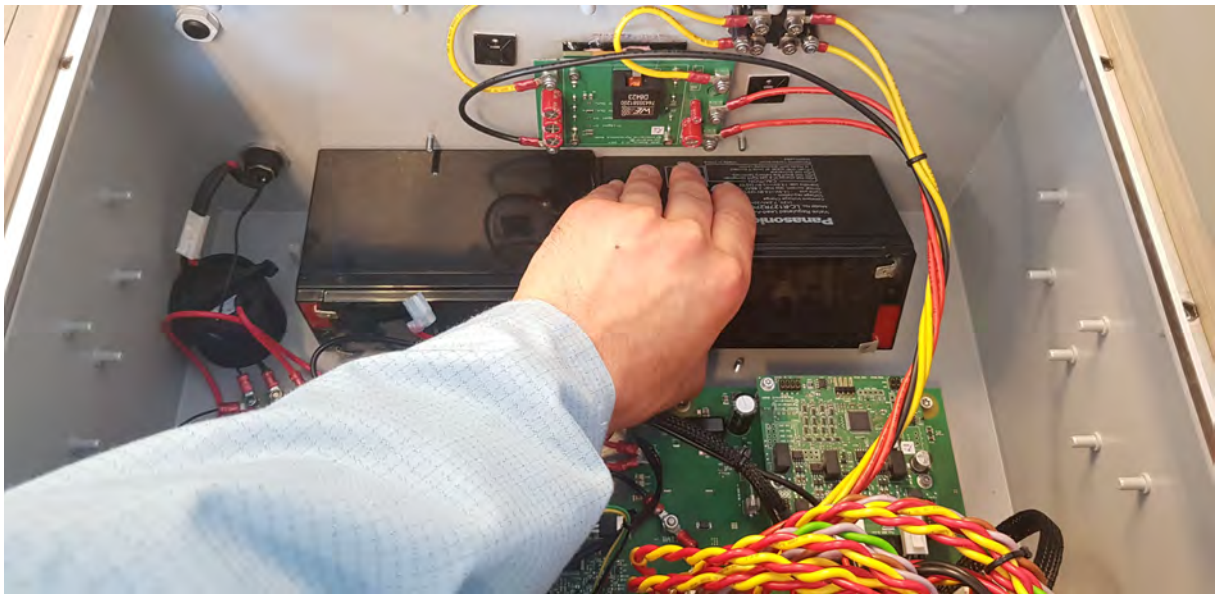
Unscrew the battery holder. Use a socket SW 7mm to open the M4 nuts.



A washer is put under each M4 nut of the battery holder. Be careful not to loose these washers, while disassembling the holder. Loose metal parts inside the housing could seriously harm the device.



Lift off the holder. The batteries are free now.



Take the batteries out very carefully. Pay attention to take batteries out without touching any electronics accidentally.

Replace the old batteries for batteries endorsed by Innovative Pyrotechnik GmbH (Always endorsed: Panasonic LC-R127R2PG1). Use self-adhesive EPDM Sponge Rubber Foam to

fill the small gap inbetween the two batteries and the bottom of the housing to secure pressure to the holder.
Now reverse the actions. Put the holder back on the new batteries, put washers on the bolts, fasten the holder with the M4 nuts and then reconnect the battery in the following order:

1. Plug in the Battery fused Interconnection Cable to the positive pole of the right hand side battery.
2. Plug in the Battery fused Interconnection Cable to the negative pole of the left hand side battery.
3. Plug in the Battery Plus Cable to the positive pole of the left hand side battery.
4. Plug in the Battery Minus Cable to the negative pole of the right hand side battery. Be careful not to harm the temperature sensor.

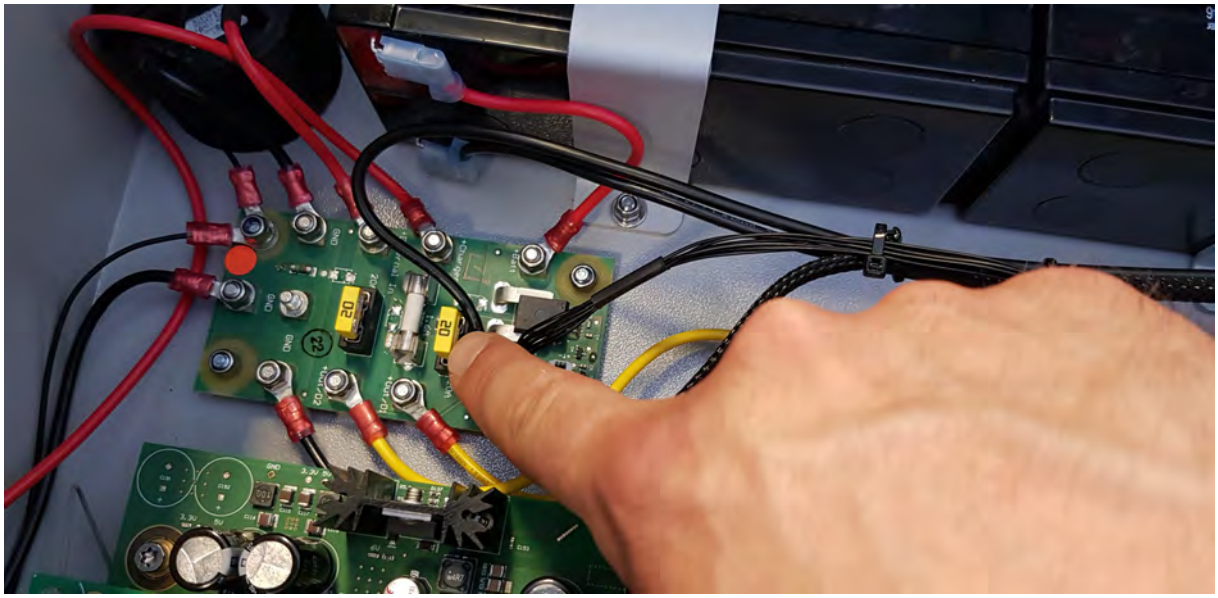
You successfully replaced the batteries. Now close the device following the instructions in section Closing the Eagle Wireless Base.

14.5 Replacing the Main Fuse

WARNING - LIABILITY AND WARRANTY RELEVANT

This section describes the procedure to replace the main fuse of the Pyrodigital® Eagle Wireless Base. The User must strictly follow the given instructions. Not following the instructions, using non-original parts, manipulation of non-user-serviceable parts or not performing servicing as required, will render the warranty void and the liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the battery fuse and the charger fuse.

To replace the Main Fuse first follow the instruction to open the Pyrodigital® Eagle Wireless Base in the previous section Open the Eagle Wireless Base. Then strictly follow the procedure described in this section and finally close the device like described in the following section Closing the Eagle Wireless Base.



This is the location of the Main Fuse. If you strictly followed instructions, the Main Fuse is already unplugged. Replace it for a new fuse (Mini Blade Fuse 20A 32V slow type). A small indicator LED, next to its socket, gets lit, if the fuse has tripped. If you are not sure whether the Main Fuse is gone or not, use a common multimeter to test the fuse for continuity. If you cannot find continuity, the fuse is gone and needs to be replaced.

Proceed with the procedure to close the device like described in section 14.8 'Closing the Eagle Wireless Base'.

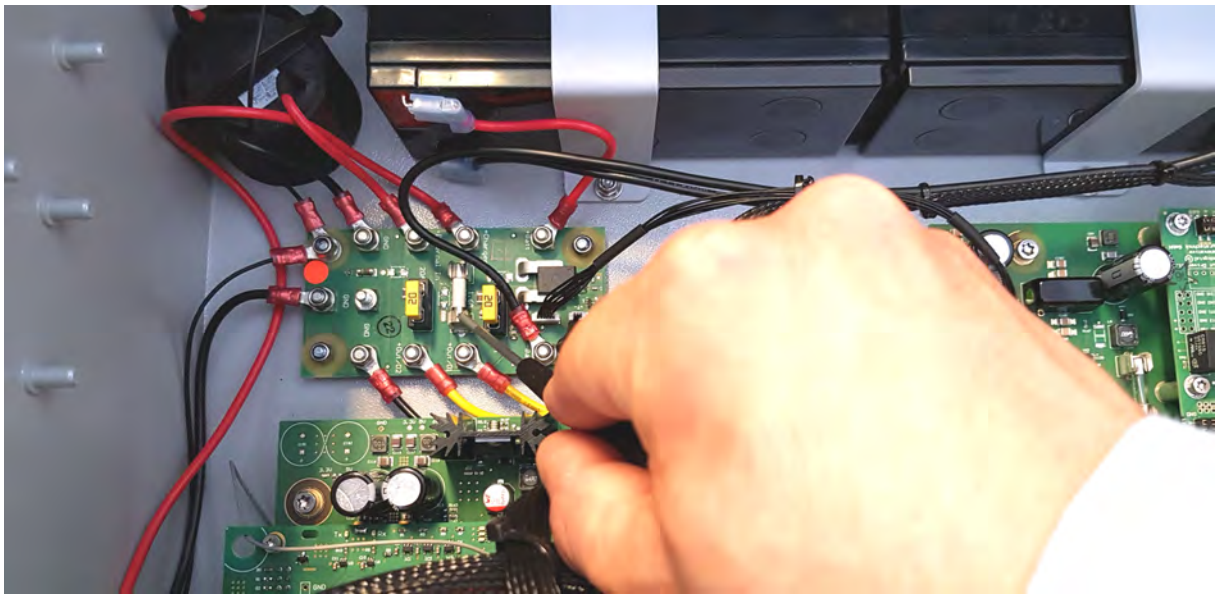
If you need spare fuses, please contact us at pd@pyrodigital.com.

14.6 Replacing the Charger Fuse

WARNING - LIABILITY AND WARRANTY RELEVANT

This section describes the procedure to replace the charger fuse of the Pyrodigital® Eagle Wireless Base. The User must strictly follow the given instructions. Not following the instructions, using non-original parts, manipulation of non-user-serviceable parts or not performing servicing as required, will render the warranty void and the liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the battery fuse and the charger fuse.

To replace the Charger Fuse first follow the instruction to open the Pyrodigital® Eagle Wireless Base in the previous section Open the Eagle Wireless Base. **Take out the mainfuse before proceeding any further.** Then strictly follow the procedure described in this section and finally close the device like described in the following section Closing the Eagle Wireless Base.



This is the location of the Charger Fuse. Gently lift the fuse using a non-scratching tool, e.g. a wooden pencil. Do not use metal tools! You could harm the Printed Circuit Board (PCB) underneath the fuse. If the fuse is gone, replace it (G 1.6A 250V 5x20mm slow type). If you are not sure whether the Charger Fuse is gone or not, use a common multimeter to test the fuse for continuity. If you cannot find continuity, the fuse is gone and needs to be replaced.

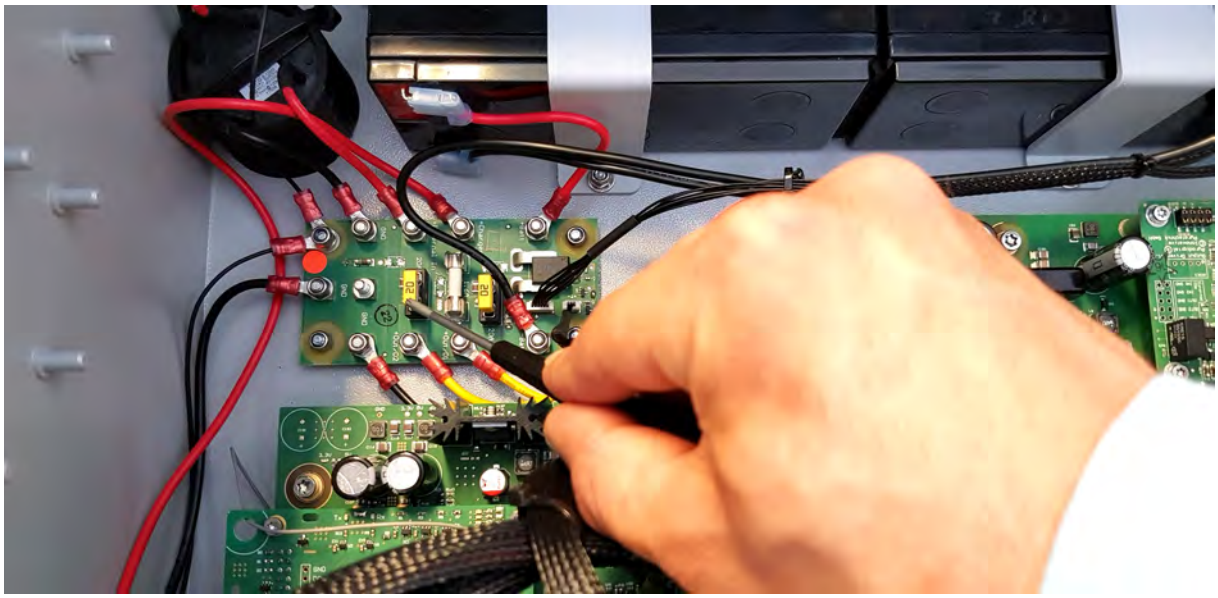
If you need spare fuses, please contact us at pd@pyrodigital.com.

14.7 Replacing the External Battery Fuse

WARNING - LIABILITY AND WARRANTY RELEVANT

This section describes the procedure to replace the External Battery Fuse of the Pyrodigital® Eagle Wireless Base. The User must strictly follow the given instructions. Not following the instructions, using non-original parts, manipulation of non-user-serviceable parts or not performing servicing as required, will render the warranty void and the liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the battery fuse and the charger fuse.

To replace the External Battery Fuse first follow the instruction to open the Pyrodigital® Eagle Wireless Base in the previous section Open the Eagle Wireless Base. **Take out the mainfuse before proceeding any further.** Then strictly follow the procedure described in this section and finally close the device like described in the following section Closing the Eagle Wireless Base.



This is the location of the External Battery Fuse. If you are not sure whether the External Battery Fuse is gone or not, use a common multimeter to test the fuse for continuity. If you cannot find continuity, the fuse is gone and needs to be replaced.

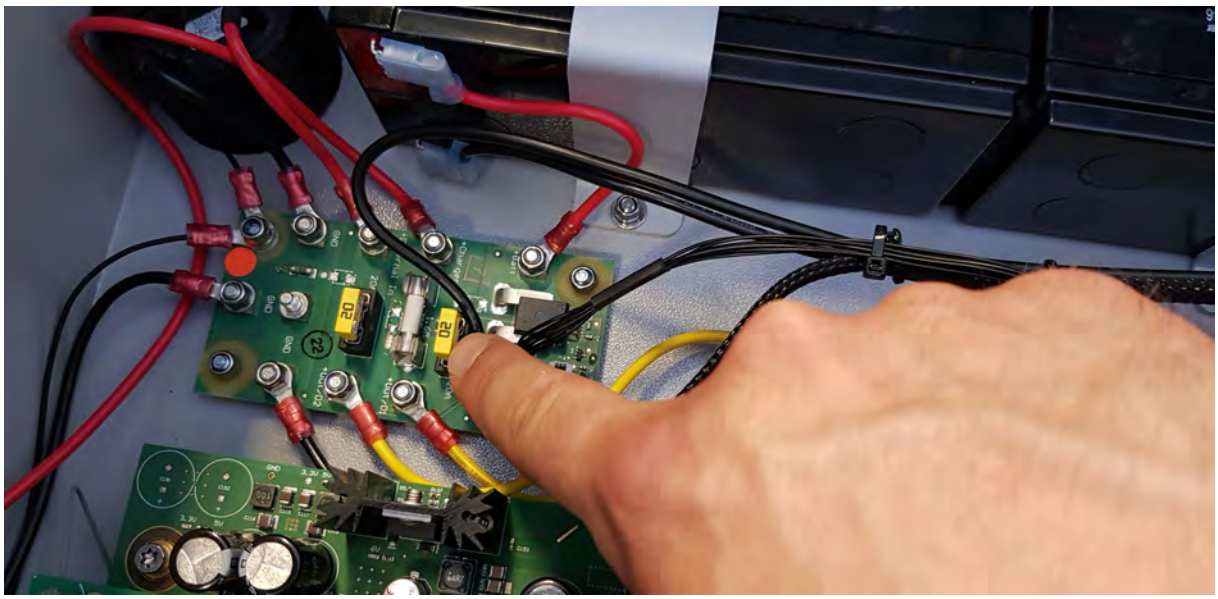
Proceed with the procedure to close the device like described in section Closing the Eagle Wireless Base.

If you need spare fuses, please contact us at Innovative Pyrotechnik GmbH.

14.8 Closing the Eagle Wireless Base

WARNING - LIABILITY AND WARRANTY RELEVANT

This section describes the procedure to close the Pyrodigital® Eagle Wireless Base. The User must strictly follow the given instructions. Not following the instructions, using non-original parts, manipulation of non-user-serviceable parts or not performing servicing as required, will render the warranty void and the liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the battery fuse and the charger fuse.



Plug in the Main Fuse before closing the device.

Put the lid back on and screw the 16 screws in half way. By doing this, the lid gets aligned automatically. Now tighten the screws.
You successfully closed the Field Controller.

14.9 External Battery Supply

The External Battery plug of th Eagle Wireless Base is found in the bottom right corner on the back. This plug can be used to connect an external power source to the Pyrodigital® Eagle Wireless Base. Universal power supplies (100-240 VAC, 50-60 Hz) for the Eagle Wireless Base are available at Innovative Pyrotechnik GmbH. Please contact us or our sales partner for more information.
IMPORTANT: The External Power Supply supplies the complete Eagle Wireless Base and all connected devices of the Pyrodigital® Phase III Network. Only for short high peak current (e.g. during firing) the internal battery will spare in. However, the energy drawn during these short current peaks is very few and can almost be neglected. Using the External Power Supply provides a hybrid-supply of the Pyrodigital® Eagle Wireless Base. In the event of a power shortage for the mains, the Eagle Wireless Base automatically turns

over to the internal battery. Therefore, even if you use the External Power Supply, keep the internal batteries charged. The self-discharge rate of the VRLA battery technology is roughly 3% per month. So even if you do not make use of the battery, you need to recharge it from time to time (like every battery).

Chapter 15

RF Exposure Statements

WARNING!

This equipment is approved only for mobile and base station transmitting devices. Antenna(s) used for this transmitter must be installed to provide a separation distance of at least 34 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Chapter 16

List of Precertified Antennas

WARNING!

This device has been tested with the antennas listed in the tables of this section. When integrated into products, fixed antennas require installation preventing end users from replacing them with non-approved antennas. Antennas not listed in the tables must be tested to comply with FCC Section 15.203 (unique antenna connectors) and Section 15.247 (emissions).

Pyrodigital® Eagle Wireless Base antenna options (30 dBm maximum RF power)

The following tables cover the antennas that are approved for use with the Pyrodigital® Eagle Wireless Base. If applicable, the tables show the required cable loss between the device and the antenna.

Dipole antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Connector	Gain	Required antenna cable loss	Application
A09-HSM-7 [1]	Straight half-wave	RPSMA	2.1 dBi	0.4 dB	Fixed / mobile
A09-HASM-675	Articulated half-wave	RPSMA	2.1 dBi	0.4 dB	Fixed / mobile
A09-HABMM-P5I	Swivel half wave with 5" pigtail	MMCX	2.1 dBi	0.4 dB	Fixed / mobile
A09-HBMM-P5I	Straight half-wave with 6" pigtail	MMCX	2.1 dBi	0.4 dB	Fixed / mobile
A09-HASM-7*	Articulated half-wave	RPSMA	2.1 dBi	0.4 dB	Fixed
A09-HRSM*	Right angle half-wave	RPSMA	2.1 dBi	0.4 dB	Fixed
A09-HG*	Glass mounted half-wave	RPSMA	2.1 dBi	0.4 dB	Fixed
A09-HATM*	Articulated half-wave	RPTNC	2.1 dBi	0.4 dB	Fixed
A09-H*	Half-wave dipole	RPSMA	2.1 dBi	0.4 dB	Fixed

Yagi antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A09-Y6NF*	2 element Yagi	6.1 dBi	N	2.0 dB	Fixed/mobile
A09-Y7NF*	3 element Yagi	7.1 dBi	N	3.0 dB	Fixed/mobile
A09-Y8NF	4 element Yagi	8.1 dBi	N	4.0 dB	Fixed/mobile
A09-Y9NF*	4 element Yagi	9.1 dBi	N	5.0 dB	Fixed/mobile
A09-Y10NF*	5 element Yagi	10.1 dBi	N	6.0 dB	Fixed/mobile
A09-Y11NF	6 element Yagi	11.1 dBi	N	7.0 dB	Fixed/mobile
A09-Y12NF*	7 element Yagi	12.1 dBi	N	8.0 dB	Fixed/mobile
A09-Y13NF*	9 element Yagi	13.1 dBi	N	9.0 dB	Fixed/mobile
A09-Y14NF*	14 element Yagi	14.0 dBi	N	9.9 dB	Fixed/mobile
A09-Y6TM*	2 element Yagi	6.1 dBi	RPTNC	2.0 dB	Fixed/mobile
A09-Y7TM*	3 element Yagi	7.1 dBi	RPTNC	3.0 dB	Fixed/mobile
A09-Y8TM*	4 element Yagi	8.1 dBi	RPTNC	4.0 dB	Fixed/mobile
A09-Y9TM*	4 element Yagi	9.1 dBi	RPTNC	5.0 dB	Fixed/mobile
A09-Y10TM-P10I	5 element Yagi	10.1 dBi	RPTNC	6.0 dB	Fixed/mobile
A09-Y11TM*	6 element Yagi	11.1 dBi	RPTNC	7.0 dB	Fixed/mobile
A09-Y12TM*	7 element Yagi	12.1 dBi	RPTNC	8.0 dB	Fixed/mobile
A09-Y13TM*	9 element Yagi	13.1 dBi	RPTNC	9.0 dB	Fixed/mobile
A09-Y14TM*	14 element Yagi	14.0 dBi	RPTNC	9.9 dB	Fixed/mobile

Figure 16.1: Antennas part 1

Omni-directional base station antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A09-F0NF*	Fiberglass base station	0 dBi	N	-	Fixed
A09-F1NF*	Fiberglass base station	1.0 dBi	N	-	Fixed
A09-F2NF-M	Fiberglass base station	2.1 dBi	N	-	Fixed
A09-F3NF*	Fiberglass base station	3.1 dBi	N	-	Fixed
A09-F4NF*	Fiberglass base station	4.1 dBi	N	-	Fixed
A09-F5NF-M	Fiberglass base station	5.1 dBi	N	-	Fixed
A09-F6NF*	Fiberglass base station	6.1 dBi	N	0.9 dB	Fixed
A09-F7NF*	Fiberglass base station	7.1 dBi	N	1.9 dB	Fixed
A09-F8NF-M	Fiberglass base station	8.1 dBi	N	2.9 dB	Fixed
A09-F0SM*	Fiberglass base station	0 dBi	RPSMA	-	Fixed
A09-F1SM*	Fiberglass base station	1.0 dBi	RPSMA	-	Fixed
A09-F2SM*	Fiberglass base station	2.1 dBi	RPSMA	-	Fixed
A09-F3SM*	Fiberglass base station	3.1 dBi	RPSMA	-	Fixed
A09-F4SM*	Fiberglass base station	4.1 dBi	RPSMA	-	Fixed
A09-F5SM*	Fiberglass base station	5.1 dBi	RPSMA	-	Fixed
A09-F6SM*	Fiberglass base station	6.1 dBi	RPSMA	0.9 dB	Fixed
A09-F7SM*	Fiberglass base station	7.1 dBi	RPSMA	1.9 dB	Fixed
A09-F8SM*	Fiberglass base station	8.1 dBi	RPSMA	2.9 dB	Fixed
A09-F0TM*	Fiberglass base station	0 dBi	RPTNC	-	Fixed
A09-F1TM*	Fiberglass base station	1.0 dBi	RPTNC	-	Fixed
A09-F2TM*	Fiberglass base station	2.1 dBi	RPTNC	-	Fixed
A09-F3TM*	Fiberglass base station	3.1 dBi	RPTNC	-	Fixed
A09-F4TM*	Fiberglass base station	4.1 dBi	RPTNC	-	Fixed
A09-F5TM*	Fiberglass base station	5.1 dBi	RPTNC	-	Fixed
A09-F6TM*	Fiberglass base station	6.1 dBi	RPTNC	0.9 dB	Fixed
A09-F7TM*	Fiberglass base station	7.1 dBi	RPTNC	1.9 dB	Fixed
A09-F8TM*	Fiberglass base station	8.1 dBi	RPTNC	2.9 dB	Fixed
A09-W7*	Wire base station	7.1 dBi	RPN	1.9 dB	Fixed
A09-W7SM*	Wire base station	7.1 dBi	RPSMA	1.9 dB	Fixed
A09-W7TM*	Wire base station	7.1 dBi	RPTNC	1.9 dB	Fixed

Figure 16.2: Antennas part 2

Dome antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A09-D3PNF*	Omnidirectional permanent mount	3.0 dBi	N	0.4 dB	Fixed/mobile
A09-D3NF*	Omnidirectional magnetic mount	3.0 dBi	N	0.4 dB	Fixed/mobile
A09-D3PTM*	Omnidirectional permanent mount	3.0 dBi	RPTNC	0.4 dB	Fixed/mobile
A09-D3PSM*	Omnidirectional permanent mount	3.0 dBi	RPSMA	0.4 dB	Fixed/mobile

Monopole antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A09-QRAMM	3" Quarter wave wire	2.1 dBi	MMCX	-	Fixed/mobile
A09-QRSM-2.1*	Quarter wave 2.1" right angle	3.3 dBi	RPSMA	0.4 dB	Fixed/mobile
A09-QW*	Quarter wave wire	1.9 dBi	Permanent	-	Fixed/mobile
A09-QSM-3*	Quarter wave straight	1.9 dBi	RPSMA	-	Fixed/mobile
A09-QSM-3H*	Heavy duty quarter wave straight	1.9 dBi	RPSMA	-	Fixed/mobile
A09-QBMM-P6I*	Quarter wave w/ 6" pigtail	1.9 dBi	MMCX	-	Fixed/mobile
A09-QHSM-2*	2" straight	1.9 dBi	RPSMA	-	Fixed/mobile
A09-QHRSM-2*	2" right angle	1.9 dBi	RPSMA	-	Fixed/mobile
A09-QHRSM-170*	1.7" right angle	1.9 dBi	RPSMA	-	Fixed/mobile
A09-QRSM-380*	3.8" right angle	1.9 dBi	RPSMA	-	Fixed/mobile
A09-QAPM-520*	5.2" articulated screw mount	1.9 dBi	Permanent	-	Fixed/mobile
A09-QSPM-3*	3" straight screw mount	1.9 dBi	Permanent	-	Fixed/mobile
A09-QAPM-3*	3" articulated screw mount	1.9 dBi	Permanent	-	Fixed/mobile
A09-QAPM-3H*	3" articulated screw mount	1.9 dBi	Permanent	-	Fixed/mobile

Figure 16.3: Antennas part 3

Pyrodigital®

CONTROL & RELIABILITY

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