Pyrodigital®

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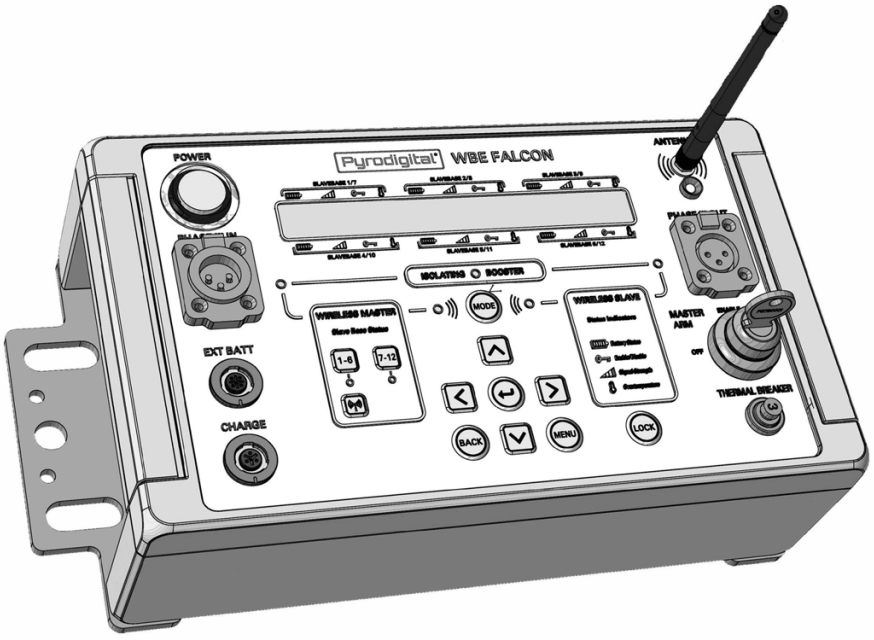

THE NEW "FALCON" WIRELESS BASE

operating instructions

PYRODIGITAL®
FALCON WIRELESS BASE
OPERATING INSTRUCTIONS

This document applies to the

Pyrodigital® Falcon Wireless Base WBE

Model PDWBE-1

Software Version 1.1

(June 2022).

Innovative Pyrotechnik GmbH

Steinwerkstr.2

71139 Ehningen, Germany

Pyrodigital®

CONTROL & RELIABILITY

INNOVATIVE PYROTECHNIK GMBH

RoHS Compliant

!!! IMPORTANT !!!

Before operating the Pyrodigital® Falcon 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® Falcon Wireless Base Operating Instructions.

Herewith, I confirm that a copy of the Operating Instructions for the Pyrodigital® Falcon 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.

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Chapter 1

Feature Overview

The Pyrodigital® Falcon 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:

- Intuitive design and operation.
- 2 years warranty
- The Falcon Wireless Bases establish wireless connections within Phase III Networks, acting like “virtual cable connections”.
- 3-in-1 device: Each Falcon Wireless Base can either be used as wireless master (sender), as wireless slave (receiver) or isolating booster.
- Point-to-multipoint Connectivity: One Falcon Wireless Base set as master can control up to 12 Falcon Wireless Bases set as slave. This wireless connection acts like a “virtual 12-way network splitter”.
- Full Field Controller functionality supported, just like in a cabled network, including realtime continuity checking (Check Status), assignment scanning (FC-A Advanced

Mode) and many more, for both, wireless point-to-point and point-to-multipoint connections.

- Up to 46 hours Standby and 16 hours Active Time. Unlimited operating time with External Power Supply connected.
- 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).
- Seamless Firing: Ultra-fast wireless solution with outstanding performance in the market.
- Further, most wireless solutions of other firing systems do not allow to send a fire command immediately after a previous fire command. After sending a fire command other systems require a significant duration of time until the next fire command can be triggered. This is very limiting, especially for manually fired live performances. **The Falcon Wireless Base is free of any such limitations!** Using the Falcon Wireless Base, fire commands can be triggered at any time!
- Realtime Status Monitoring of wireless slave units:
  - signal strength
  - battery charge state
  - presents of a external power supply
  - temperature monitoring
  - arm state of the key switch
- Galvanically isolating booster functionality, to re-power a Pyrodigital® Phase III Network after a long cable run and/or to protect from ground loops (e.g. on trussing).

- Continuity Checking (Local Check Status) without the need of an additional Field Controller at its location.
- A removable Safety Arm Key allows the operator to arm and disarm the Falcon Wireless Bases directly at their position.
- Individual Customer IDs and Network IDs to protect your wireless link against unintentional and unauthorized control.
- State-of-the-art GFSK Gaussian Frequency Shift Keying Modulation.
- Blockchain and AES Encryption (CBC cipher block chaining Encryption and 256-bit AES Advanced Encryption Standard).
- Frequency spreading using FHSS Frequency Hopping Spread Spectrum.
- Highly-reliable terminal components, as well as waterproof and RF shielded housing.
- Full backward compatibility with all original Pyrodigital® equipment.
- Full Compatibility with the Pyrodigital® Eagle Wireless Bases. The devices are completely ex- and interchangeable.
- For reliable and safe performance and easy air transportation, the Falcon Wireless Base comprises non-spillable Valve Regulated Lead-Acid (VRLA) batteries: No *'dangerous goods'* lithium batteries.
- Worldwide universal battery charger (100-240 VAC, 50-60 Hz) included.
- An optional external power supply for 100-240 VAC, 50-60 Hz is available.

Chapter 2

Technical Data

2.1 General Specifications

Type:	Falcon Wireless Base
Model:	PDWBE-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

2.2 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 SMA 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.

2.3 Pyrodigital® Phase III Network Specifications

Phase III Inputs	1 (galvanically isolated)
Phase III Outputs	1 (galvanically isolated) with individually fused outputs)
Phase III Network Output Voltage:	24.0 VDC (only if Safety Arm Key is armed)
Recommended driving capability	40 Pyrodigital Firing Modules (no general limit)

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

2.4 Power Specifications

Internal Battery Type:	Valve Regulated Lead-Acid (VRLA) Battery
Internal Battery Voltage:	24 VDC (2x 12 VDC in series)
Standby time using internal Battery:	up to 46 hours
Active time using 40 FM-As on internal battery supply:	up to 16 hours
Active time using 40 legacy modules on internal battery supply:	up to 7.5 hours
Standby and Active Time with Ext. Power Supply connected:	unlimited
Total Internal Battery Capacity:	2.3 Ah
Maximum Charge Current:	0.56 Ah @ <29.4 VDC
Maximum Constant Output Current (resp. Power) per Phase III Network Output:	3A (resp. 85.5 W)
External DC Power Input:	28 VDC

Chapter 3

Read before Use

3.1 Important User Information

WARNING - CAUTION

DO NOT TURN ON THE DEVICE WITHOUT AN ANTENNA ATTACHED TO ITS RF SOCKET! Due to the powerfull radiofunctionality, this could harm the electronics. Damages due to disrigard, render the warranty void.

WARNING - CAUTION

DO NOT TURN ON THE DEVICE, IF ANOTHER Pyrodigital® Falcon Wireless Base IS LESS THAN 3 FEET AWAY! Due to the powerfull radiofunctionality, this could harm the electronics. Always ensure that the Falcon Wireless Base is at all times more than 3 Feet away from other wireless devices. Damages due to disrigard, render the warranty void.

WARNING - CAUTION

Always ensure that the Falcon Wireless Base is at all time more than 3 Feet away from other wireless devices. Due to the powerfull radiofunctionality, this could harm the electronics of the Falcon Wireless Base and surrounding radiodevices. Damages due to disrigard, render the warranty void. Damages due to disrigard render the warranty void. Also, for damages to third parts devices due to disregard the manufacturer and Vendors can not be hold responsible.

Chapter 4

Introductions and Requirements

!!! ATTENTION !!!

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

4.1 General Safety and Warning Information

The Pyrodigital® Falcon 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® Falcon 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, but not limited to 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® Falcon 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 Falcon Wireless Base before use and operation. Contact pd@pyrodigital.com if you do not have a copy of the operating instructions.

Do use the Falcon 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® FALCON 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® FALCON 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® FALCON WIRELESS BASE.

4.2 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® Falcon 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® Falcon 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

4.3 The Falcon Wireless Base within the Phase III Network

The Pyrodigital® Falcon 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 6 Basic Operations Overview for more details.

4.4 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® Falcon 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® Falcon 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® Falcon Wireless Base. The user MUST also refer to all Operating Instructions of all components used within 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® Falcon 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® Falcon 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.*

4.5 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® Falcon 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.

4.6 General Disclamer

The Pyrodigital® Falcon 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® Falcon 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® Falcon 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® Falcon Wireless Base as well as Pyrodigital® Phase III Networks in general. The Pyrodigital® Falcon 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® Falcon 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® Falcon 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® Falcon Wireless Base assume no liability for critical and unforeseeable factors outside their control related to the handling of the Pyrodigital® Falcon 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® Falcon 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® Falcon 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® Falcon Wireless Bases, both the buyer and user assume full responsibility for all risks and liabilities resulting from the use of the Pyrodigital® Falcon 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® Falcon Wireless Base operating the Pyrodigital® Phase III Network you hereby assume all risks and liability resulting from the use thereof.

4.7 About the Operating Instructions Document

THESE OPERATING INSTRUCTIONS ONLY DESCRIBE THE HANDLING OF THE PYRODIGITAL® FALCON 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® FALCON 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® FALCON 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® FALCON 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® Falcon 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.

4.8 Customer Support

If you are having difficulty in operating the Pyrodigital® Falcon 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.

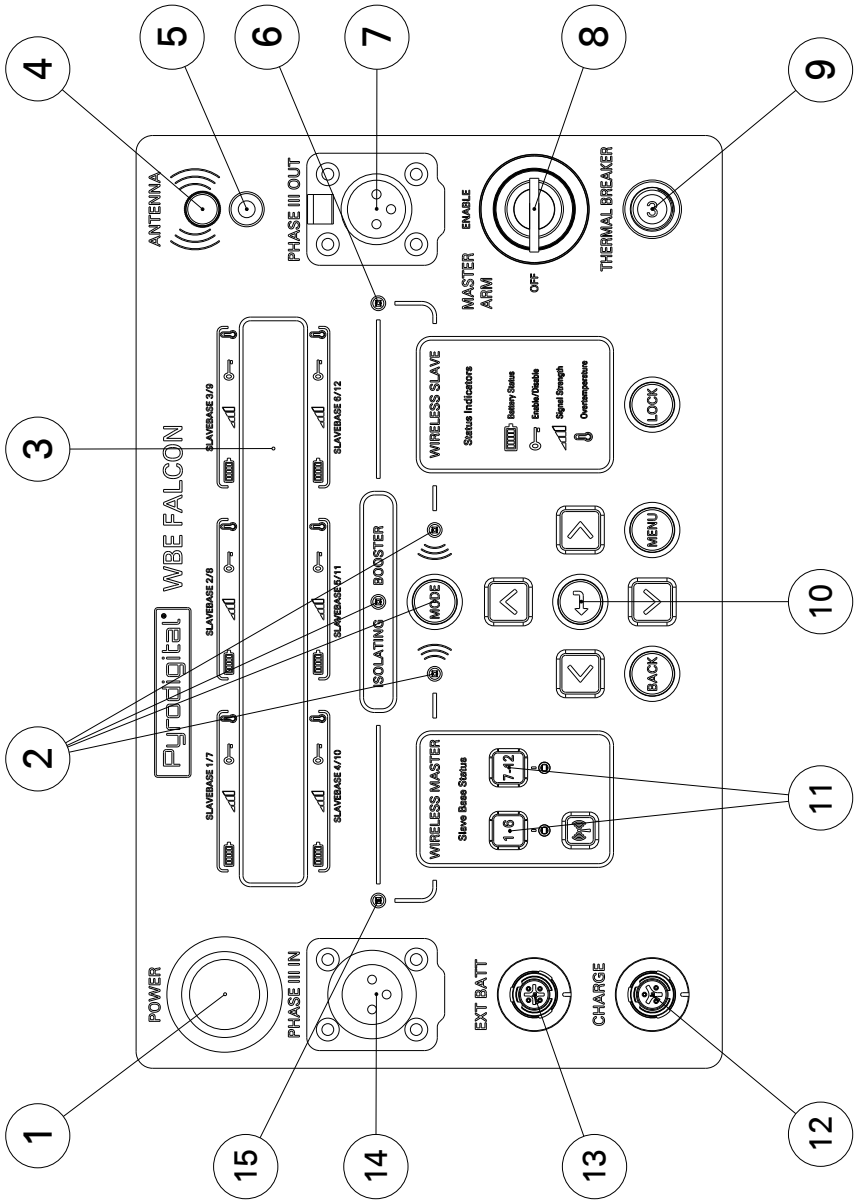
4. Contact us at Innovative Pyrotechnik GmbH: pd@pyrodigital.com

Chapter 5

Device Overview

The Pyrodigital® Falcon Wireless Base

5.1 Front Panel



1. **Power Switch** - Turns the device on and off

2. **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

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

4. **RF Antenna Connector** - RP SMA socket

5. **RF Communication Indicator** - indicates enabled RF functionality and ongoing communication

6. **Phase III Network Output Indicator** - indicates power and communication on the Phase III Network Output

7. **Phase III Network Output** - 3-pin XLR output connector

8. **Safety Arm Key** - Arms the Phase III Network Output in Slave and Isolating Booster Mode

9. **Thermal Circuit Breaker** - Protects the Phase III Network Output from short circuits

10. **Keyboard:**

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

11. **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

12. **Charger Input** - Connect endorsed battery charger here

13. **External Supply Input** - Connect endorsed external supply here

14. **Phase III Network Input** - 3-pin XLR input connector

15. **Phase III Network Input Indicator** - indicates power and communication on the Phase III Network Input

Chapter 6

Basic Operations Overview

6.1 Wireless Link Point-to-Point

The Pyrodigital® Falcon Wireless Base allows to set up a wireless radio link to replace long cable runs within Pyrodigital® Phase III Networks. Figure 6.1 shows such a typical setup. The Phase III Network Input of the left Falcon Wireless Base is in connection with a Pyrodigital® Field Controller via a Phase III Network Cable. This Falcon Wireless Base acts as the radio master and is thus referred to as the Master Base. The Phase III Network Output of the second Falcon Wireless Base is connected to a Phase III Sub-Network (comprising mupltiple Pyrodigital® Firing Modules). This Falcon Wireless Base acts as a radio slave and is thus referred to as the Slave Base. The wireless radio link between the two Faclon Wireless Bases connects the Firing Modules on the Network Output of the Slave Base to the Network of the Field Controller that is connected to the Network Input of the Master Base.

To set the Falcon Wireless Bases to be a Master Base respectively a Slave Base refer to the sections 11.1.1 Master Mode and 11.1.4 Slave Mode.

To establish a radio link, 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.

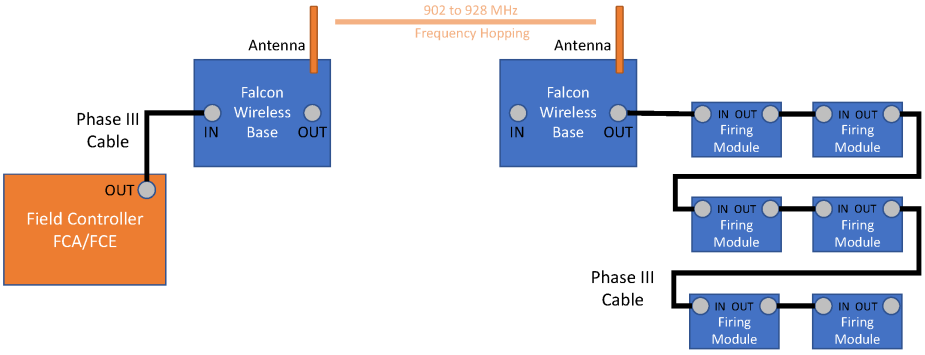


Figure 6.1: Establish wireless point-to-point link in a Phase III Network using the Pyrodigital® Falcon Wireless Base

6.2 Wireless Link Point-to-Multipoint

As figure 6.2 shows, the Pyrodigital® Falcon Wireless Bases also allow to set up point-to-multipoint radio connections to extend the Phase III Network with several Falcon 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 Base Number (This parameter can be set using the keyboard and display of the Falcon Wireless Base like described in section 9.4 Slave Number). In the point-to-multipoint configuration shown below in figure 6.2, 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.

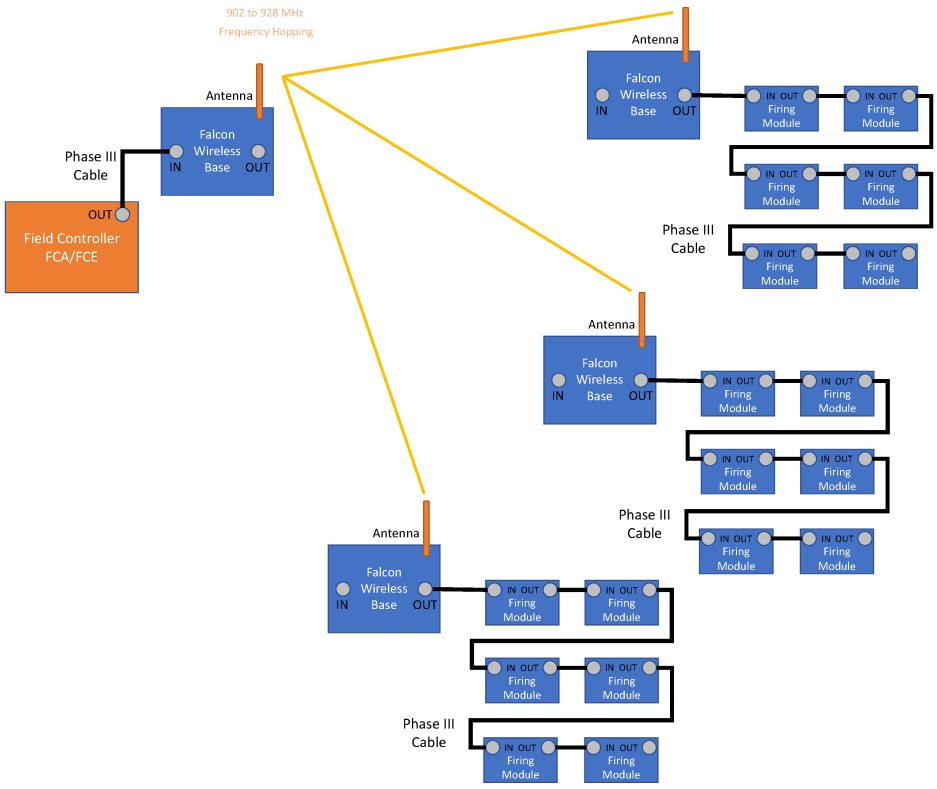


Figure 6.2: Establish wireless point-to-multipoint link in a Phase III Network using the Pyrodigital® Falcon Wireless Base

To set the Falcon Wireless Bases to be a Master Base respectively a Slave Base refer to the sections 11.1.1 Master Mode and 11.1.4 Slave Mode.

6.3 Multiple Wireless Links

The Pyrodigital® Falcon Wireless Bases also allow to operate several wireless links in parallel. Figure 6.3 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 4 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 9.3 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 9.2 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.

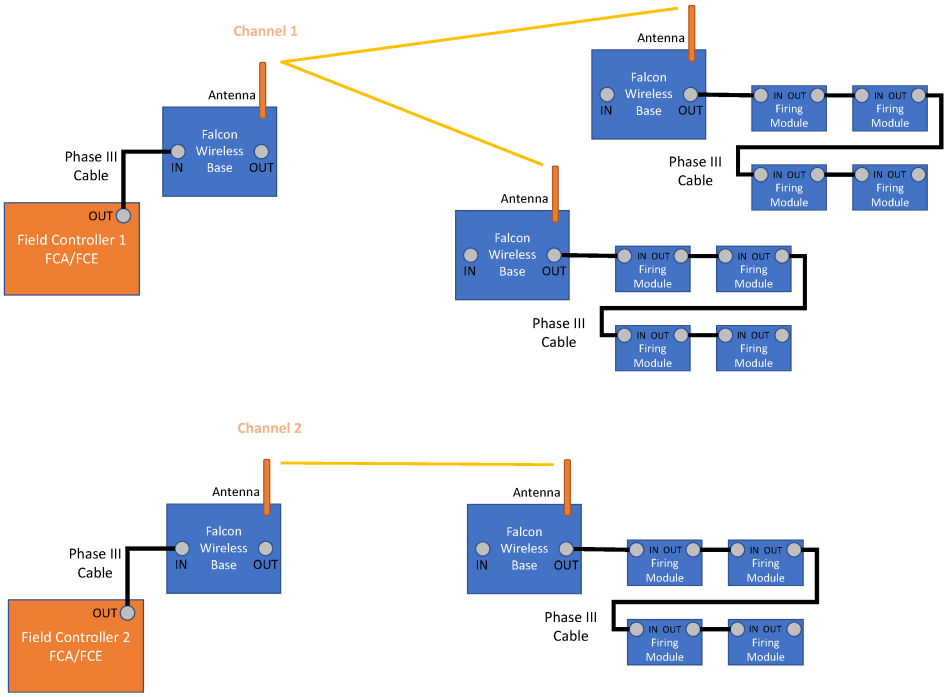


Figure 6.3: Establish several wireless links running in parallel using Pyrodigital® Falcon Wireless Bases

6.4 Mixed Wireless Network Setup

The Pyrodigital® Falcon Wireless Base and Eagle Wireless Base are completly compatible and interchangable. Therefor a wireless network can be set up using a mix of Eagle and Falcon Wireless Bases. Figure 6.4 shows two example setups. As shown in Case 1, an Eagle Wireless Base can function as Master within the network and establish wireless connections to both Falcon and Eagle Wireless Slave Bases at the same time. Case 2 shows the same Slave Base setup, using a Falcon Wireless Base as Master Base. Any mix of Eagle and Falcon Wireless Bases ist possible.

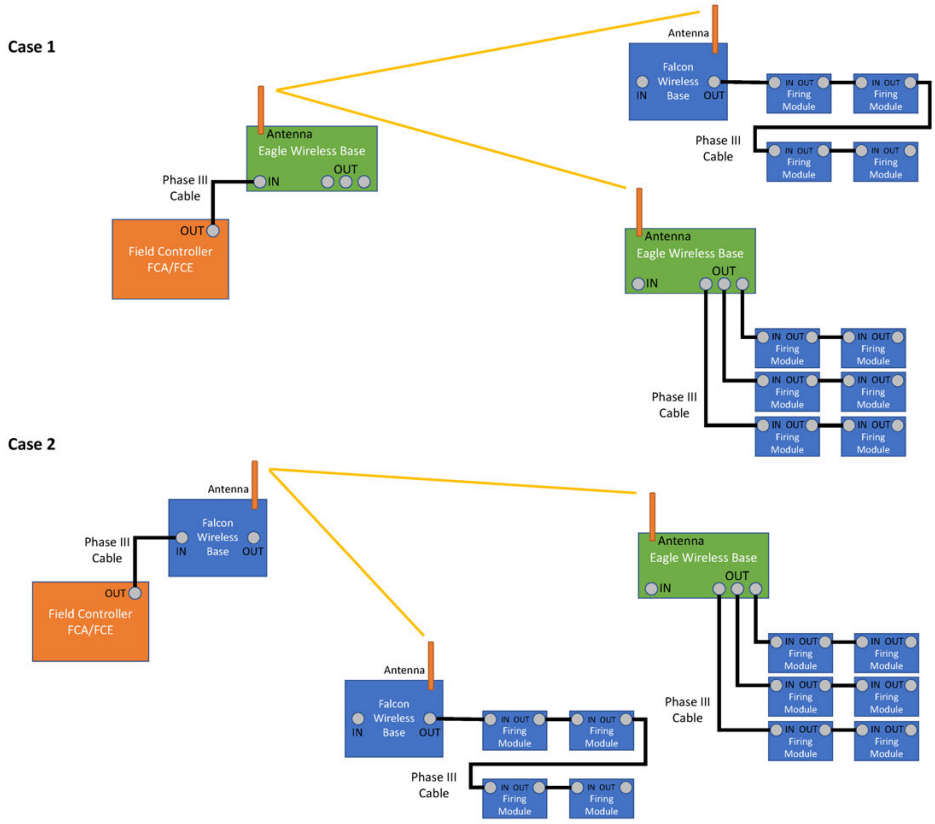


Figure 6.4: Establish a wireless link using a mix of Eagle and Falcon Wireless Bases

6.5 Isolating Booster

Figure 6.5 shows how the Pyrodigital® Falcon 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
- To prevent ground loops, e.g. from trussing

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.

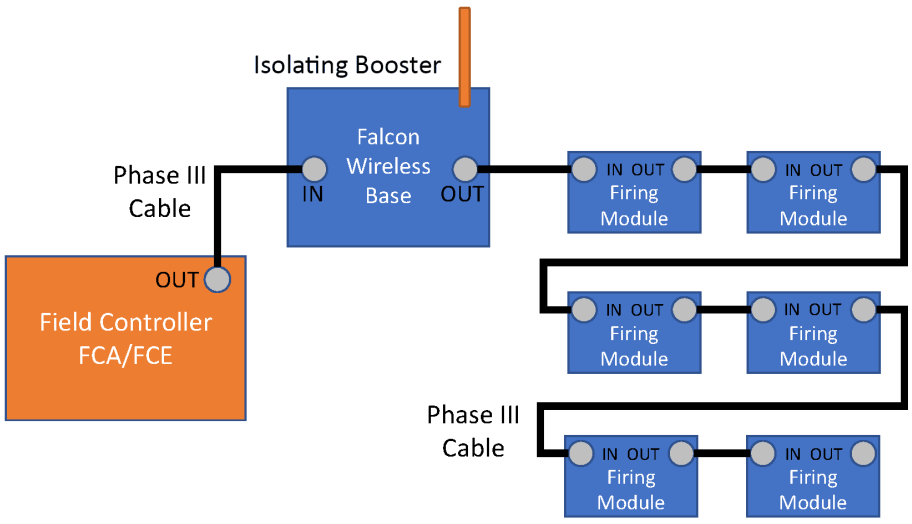


Figure 6.5: Re-boosting the network signal in a Phase III network using the Falcon Wireless Base

Chapter 7

Phase III Network Terminals

7.1 Phase III Input

The Phase III Network Input of the Pyrodigital® Falcon 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 Falcon Wireless Base when used as Isolating Booster).

WARNING - EXTREME DANGER
NEVER POWER UP THE PHASE III NETWORK INPUT OF A PYRODIGITAL® FALCON WIRELESS BASE UNLESS IT IS SAFE TO DO SO. POWERING UP THE PHASE III NETWORK INPUT CAN CAUSE DOWNSTREAM PHASE III NETWORKS 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® FALCON WIRELESS BASE, E.G. BY ARMING THE SAFETY ARM KEY OF A PYRODIGITAL® FIELD CONTROLLER. ALSO DO NOT ARM THE SAFETY ARM KEY OF A PYRODIGITAL® FIELD CONTROLLER UNLESS INSTRUCTED TO DO SO BY ITS DISPLAY.

7.1.1 Input Monitor

The Phase III Network Input Indicator will turn blue when the Phase III Network Input is powered up and this power-up is permitted to control the Falcon Wireless Base. In case the Phase III Network Input is not permitted to control the downstream Network but the Phase III Network Input is powered up, the Phase III Network Input Indicator will turn red. If the indicator LED turns red, ask yourself if you intend this condition and if the Phase III Network Input should really be powered up in this situation. In this case, check if the Falcon Wireless Base is set to the right Operating Mode or that the input needs to be powered up at the moment.

Note: While a master base activates/deactivates the downstream slave bases upon a power-up/power-down of the Phase III Network Input, the Phase III Network Input Indicator will turn red for a short moment. This is normal behavior.

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 purple. In the

case a reply was found for a CHECK STATUS the Phase III Network Input Indicator will turn statically purple.

7.2 Phase III Output

The Pyrodigital® Falcon Wireless Base is equipped with a powerful, galvanically isolated Phase III Network Output, that uses the same output driver as the FCA or FCE Pyrodigital Field Controller.

Note: The Phase III Network Output is galvanically isolated from the Phase III Network Input. However, the Phase III Network Output shares the electrical ground of the Charger Input Terminal and the External Supply Input Terminal.

7.2.1 Output Monitor and Circuit Breakers

The internal Phase III Network Output Driver also monitors the connected Pyrodigital® Phase III Network. This monitor meters the drawn current, keeps track of the Operating Mode and the supply voltage applied by the Safety Arm Key. The Monitor Indicator LED 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 BLUE. If the current drawn is too high (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 to the operator that there is a too high current drawn on the 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.

The Monitor also indicates with a purple 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 purple when a Firing Module with the requested Address is found.

7.3 Shorts in the Phase III Network

If the thermal circuit breakers pops, there is a short in your network. A too high current had been drawn on the Phase III Network Output. High enough, to pop the thermal circuit breaker, which protects the Falcon 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 Falcon Wireless Base in any way. If such an atypically high current on the Network Output is detected, the Output Monitor Indicator turns red. 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.
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 Output. Divide the Phase III Network that is connected 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. On the Field Controller: Go back to STOP MODE, turn the Safety Arm Key of your Pyrodigital® Field Controller to "OFF". *Note: The Field Controller's Phase III Network output is connected to a Falcon Wireless Base. This Falcon Wireless Base is either set to Master Mode to establish a wireless link or set to Isolating Booster Mode.*

2. Disconnect the Phase III Network Cable from the Phase III Network output of your Field Controller.

3. Turn the Safety Arm Key of the Falcon Wireless Base set to Slave Mode (in case of a wireless link) or respectively the Safety Arm Key of the Falcon Wireless Base set to Isolating Booster Mode to "OFF" and disconnect the Phase III Network Cable from the Phase III Network Outputs of this Falcon Wireless Base.

4. Ensure all Firing Modules are turned to OFF or SHUNT respectively *Note: Please check the Operating Instructions of the corresponding devices to ensure safe operation.*

5. Divide your network into a smaller sub-network that shall be tested in the following steps.

6. 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 reset.

7. Unshunt/turn ON all required Firing Modules of the chosen sub-network.

8. Re-connect the sub-network to the Phase III Output plugs of the Falcon Wireless Base set to Slave Mode or Isolating Booster Mode respectively and turn the Safety Arm Key to the ENABLE position.

9. Re-connect the Falcon Wireless Base set to master mode to the Phase III Output of the Pyrodigital® Field Controller.

10. On the Field Controller: 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 Output Monitor Indicator of the Falcon Wireless Base gets red after a second. Turn back the Safety Arm Key to "OFF" position if this is the case.

11. Double-check that the Circuit Breaker did not trip.

12. Depending on the result either check the next sub-network or further subdivide the found faulty sub-network and start over the procedure again, on from Step 1. Repeat this until the origin of the issue is identified.

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 SAFETY ARM KEY OF THE FALCON WIRELESS BASE TO THE "OFF" POSITION AND SHUNT ALL FIRING MODULES BEFORE YOU UNPLUG OR PLUG ANYTHING IN THE PHASE III NETWORK.

Chapter 8

Safety Arm Key

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

The Pyrodigital® Falcon Wireless Base is equipped with a 2-position Safety Arm Key Switch that allows local control over the arm state of the Phase III Network Output. The Safety Arm Key Switch also enables the user (at the Falcon Wireless Base) to control the supply of voltage to the Phase III Network connected to the Falcon Wireless Base. When the Key Switch is set to the "OFF" position, the Phase III Network Output is disconnected from power.

In the "ENABLE" position the Falcon Wireless Base is allowed to supply voltage to the Phase III Network Output and, therewith, to the connected Phase III Network. The Falcon Wireless Base will only power up the Phase III Network Output if the device is set to either SLAVE MODE or ISOLATING BOOSTER MODE and the corresponding Input Control conditions are met (see subsection 8.1.1 Power on the Phase III Outputs for more details).

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 Falcon Wireless Base completely rests with the user.

8.1 In Slave Mode and Isolating Booster Mode

8.1.1 Power on the Phase III Outputs

In SLAVE MODE (see section 11.1.4 Slave Mode) the Falcon Wireless Base will only power up the Phase III Network Output if its controlling Master Base tells it to do so (and its Safety Arm Key is in "ENABLE" position). The Master Base will send the command to power down the Slave Base Outputs when its own Phase III Network Input gets powered down. When the Network Input of the Master Base gets powered up, the Master Base will tell the Slave Bases to power up their Network Outputs.

In ISOLATING BOOSTER MODE (see section 11.2 Isolating Booster) the Falcon Wireless Base powers up its Phase III Network Output if its Phase III Network Input is powered up as well and powers down its Phase III Network Output if its Phase III Network Input is powered down.

WARNING - EXTREME DANGER

TURNING THE SAFETY ARM KEY TO THE "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 NETWORK CONNECTED TO THE PHASE III NETWORK OUTPUT OF THE FALCON WIRELESS BASE.

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

8.1.2 Check Status

To conduct a Check Status the Safety Arm Key has to be in "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 "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!

8.2 In Master Mode

In MASTER MODE (see section 11.1.1 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 THAN "OFF", 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 FALCON WIRELESS BASE.

8.3 In Local Check Status

The Pyrodigital® Falcon Wireless Base is capable of conducting a stand-alone continuity checking (Check Status) on the Phase III Network connected to its Phase III Network Output without the need on an additional Pyrodigital® Field Controller. This is called a LOCAL CHECK STATUS. For more details refer to chapter 12 Local Check Status Mode.

In the "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 "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 9

Wireless Link General Settings

9.1 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 Falcon 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.

9.2 Network ID

Range 0 to 32767

Purpose Specific to every show. Ensures that shows running parallelly 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 Falcon 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 Customer ID).

Info Falcon 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 Falcon 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.

9.3 Channel

Range 1 to 6

Purpose Assign the physically used frequencies. Several networks on different Channels can be used simultaneously. *Important: Following best practice, also always use different Network IDs along with differnet channels when using several networks simultaneously.*

Info The Pyrodigital® Falcon Wireless Base Model PDWBE-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 along with different Network IDs. 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 Falcon Wireless Base.

MENU → GENERAL SETTINGS → CHANNEL → *set channel* → ENTER

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

9.4 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 6.2 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 11.1.5 Slave Base Monitoring) each of the Slave Bases needs to be set to an individual Slave Number.

Access The parameter can be set using the keyboard and display of the Falcon 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.

9.5 Factory Reset

In order to conduct a full reset of the Pyrodigital® Falcon 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 10

Monitoring Systems

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

10.1 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 25%
- 1/5: 24% to 10%
- 0/5: 9% to 0%
- toggling between !/5 and 0/5: less then 0%

10.2 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 supply.
If a external battery source is connected it will fully supply the Pyrodigital® Falcon 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.

10.3 RF Signal Strength

During SLAVE BASE MONITORING (see section 11.1.5 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

10.4 Safety Arm Key State

In SLAVE MODE and ISOLATING BOOSTER MODE, the main screen always shows the current Safety Arm Key State of the Phase III Network Output. The following states can be displayed:

- **DISABLED** - Safety Arm Key is NOT ENABLED and the controlling input source is not powered and, thus, does NOT TRY TO ARM the Phase III Network Output. **Phase III Network Output is powered down.**

- **ENABLED** - Safety Arm Key is ENABLED and the controlling input source is not powered and, thus, does NOT TRY TO ARM the Phase III Network Output. **Phase III Network Output is powered down.**

- **KEY BLOCK** - Safety Arm Key is NOT ENABLED but the controlling input source is powered up. The Phase III Network Output. **Phase III Network Output is NOT ARMED NOR POWERED UP and, thus, will not send FIRE or CHECK STATUS COMMANDS.**

- **PD ARMED** - Safety Arm Key is ENABLED and the controlling input source is powered up and, thus, DOES ARM the Phase III Network Output. **Phase III Network Output is powered UP and FIRE and CHECK STATUS COMMANDS are PERMITTED** on the Phase III Network Output.

10.5 Over-Temperature Warning

The Pyrodigital® Falcon 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 temperature that is unusually high the main screen will state: **Temp: hi**. In case of hot weather conditions try to get the Falcon Wireless Base out of direct sunlight.

In case the system detects a temperature higher than +85°C the main screen will state: **Temp: !!**.

WARNING - EXTREME DANGER

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

10.6 Phase III Output Monitoring

The Phase III Network Output is constantly monitored when powered up. For more details read subsection 7.2.1 Output Monitor and Circuit Breakers.

Chapter 11

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.

11.1 Wireless Link

To establish a wireless link (see section 6.1 Wireless Link Point-to-Point and 6.2 Wireless Link Point-to-Multipoint for a general overview) you need one Pyrodigital® Falcon Wireless Base to be in Master Mode and one or more Falcon 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 9 Wireless Link General Settings). Further, each Slave Base needs to be set to a different Slave Number (see Section 9.4 Slave Number).

IMPORTANT

Ensure you use the wireless link parameters (CUSTOMER ID, NETWORK ID, CHANNEL NUMBER) as explained in Chapter 9 Wireless Link General Settings to ensure a reliable operation following best practice!

11.1.1 Master Mode

Figure 11.1 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 10.1 Battery Charge State, 10.2 External Power, 9.3 Channel and 10.5 Over-Temperature Warning.

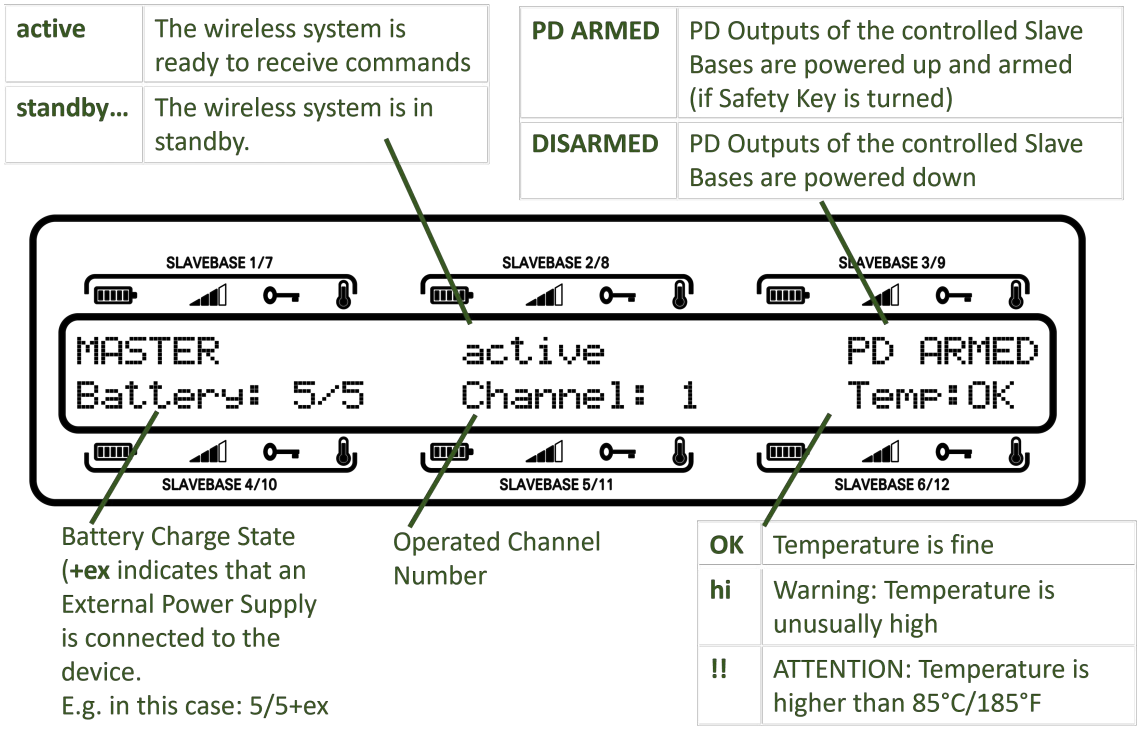


Figure 11.1: Overview of Master Mode Screen

The following section will explain the System State (middle upper line on screen) and the Arm State (right upper line on the screen).

11.1.2 Active/Standby and Arming

IMPORTANT

For a general understanding (which is mandatory to operate the Falcon Wireless Base), the operator also needs to read section 10.4 Safety Arm Key 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 Phase III Network Input is powered up, the Master Base will tell the Slave Bases to power up and arm their Network Outputs. The Slave Bases will only power up and arm their Network Outputs when the Safety Arm Keys of the indivitual Slave Bases are turned to ENABLE. The master screen will display PD ARMED to indicate that the Slave Bases are commanded to power up and arm their Network Outputs (when Safety Arm Key position of corresponding Slave Base is on ENABLE). If the Phase III Network Input gets powered down, the Master Base will send back the wireless network to *standby* and also commands to power down and disarm the Network Outputs of the Slave Bases. The display will then state *standby* and *DISARMED*.

The system also gets activated if the operator conducts a Slave Base Monitoring (see section 11.1.5 Slave Base Monitoring). However, the Slave Base Phase III Network Output 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*.

Please make sure you also read section 10.4 Safety Arm Key State.

11.1.3 Antenna Key

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 Output will always be powered down and disarmed. This allows the operator to reduce the energy consumption of the Slave Bases during a long show event. E.g. the show is running for several hours, but pyro ques over the wireless network are only required at the opening and the closing part of the show. In the middle part of the show the operator does not want to power down the PD power on the Network Input of the Master Base (for any given reason) but still wants the wireless

network to go to *standby*. The *standby* state reduces the energy consumption of the Slave Bases, as the devices do not power the Networks connected to their Phase III Network Outputs. If the ANTENNA KEY is pressed again, the wireless network will get activated again (*active*). If the Slave Bases Phase III Network Outputs will get powered up and armed depends on the presents of power on the Master Base Network Input at the given moment. In the example above, the Network Input is still powered when the ANTENNA KEY is pressed again to *active* the Slave Bases and, thus, will also power up and ARM the Phase III Network Output of the Slave Bases.
Please make sure you also read section 10.4 Safety Arm Key State.

11.1.4 Slave Mode

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

Figure 11.2 shows the Slave Mode Screen. In the top left corner the device shows the Slave Number (9.4 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 10.1 Battery Charge State, 10.2 External Power, 9.3 Channel and 10.5 Over-Temperature Warning. Like in Master Mode, the Falcon 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 Output. Like figure 11.2 explains, the Network Output can be powered up or down and the Safety Arm Key

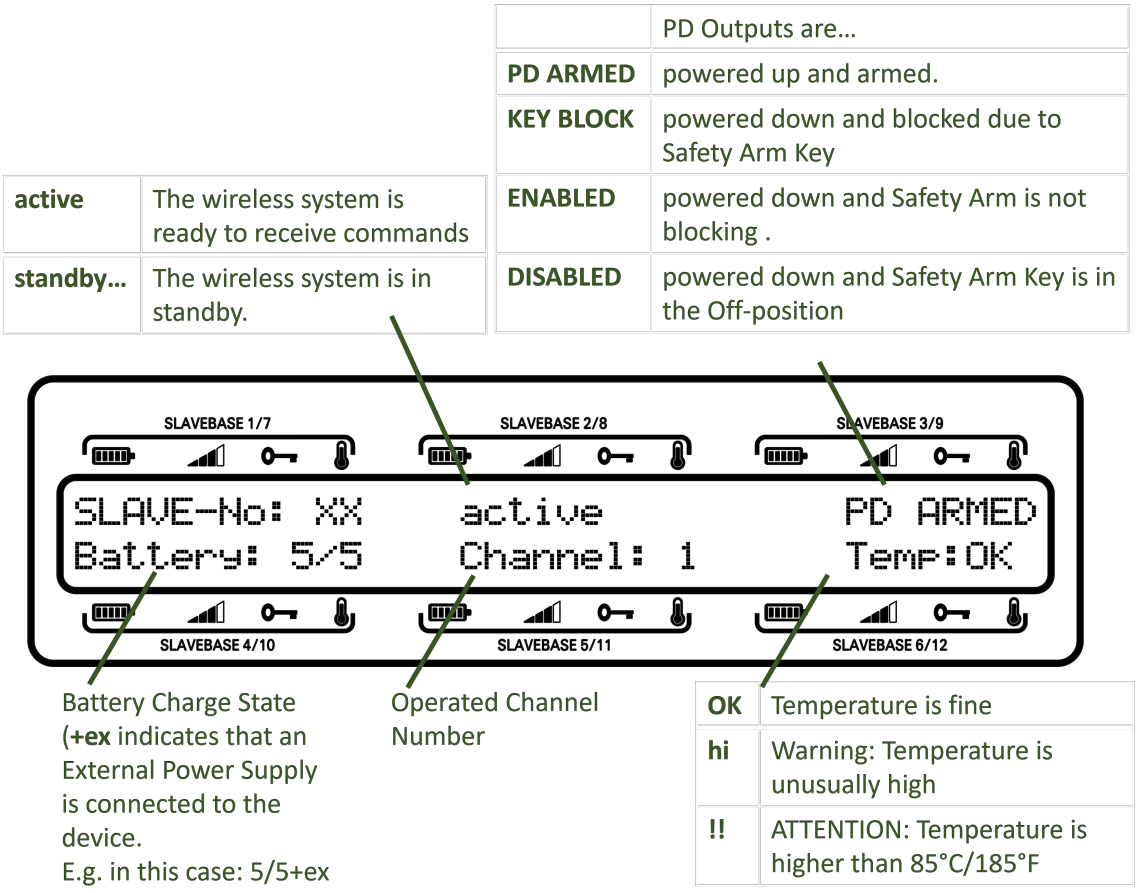


Figure 11.2: Overview of Slave Mode Screen

can block or allow firing commands. For more information on the Safety Arm Key State please also read 10.4 Safety Arm Key State.

In this mode the Network Output is controlled by the Network Input of its Master Base. When the Network Input of the Master Base gets powered up, the Network Output of the Slave Base will get powered up as well when the Safety Arm Key is on the ENABLE position.

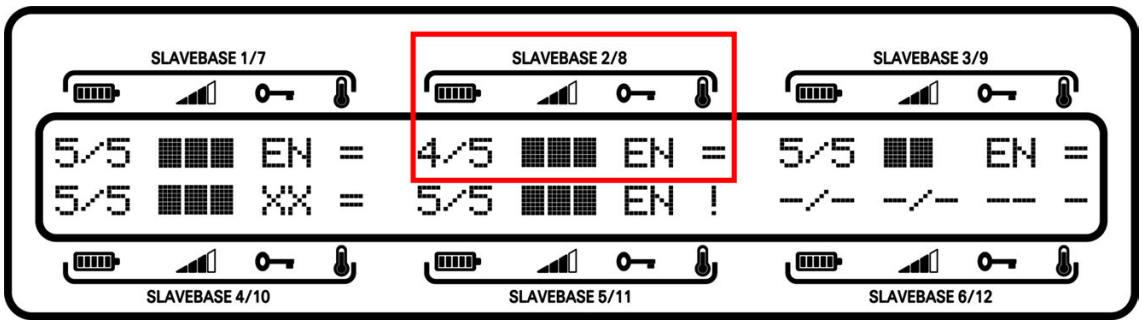


Figure 11.3: Slave Base Check Screen

11.1.5 Slave Base Monitoring

On the Master Base, use the Keys of the Slave Base Status Section to monitor the parameters of the Falcon 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 11.3 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" (respectively "7..12") again. 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 11.4 explains the details displayed for the Slave Bases, here for Slave Number 2.

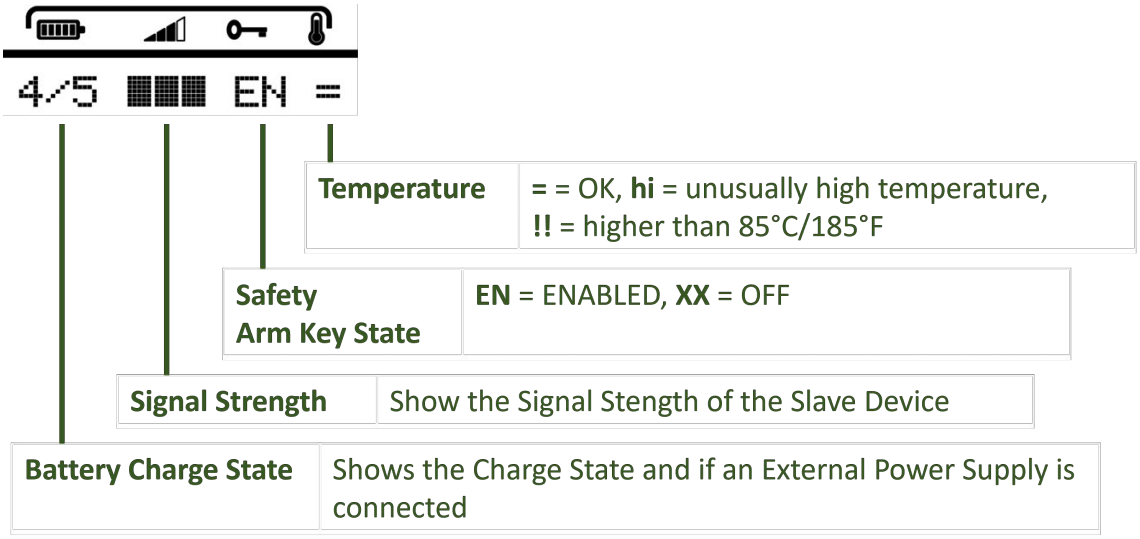


Figure 11.4: Slave Base Check Screen Details

11.1.6 Important Note: Standby of Slave Bases

The Slave Bases will follow Master Base's commands to either be *active* or in *standby*. Thus, when the Slave Bases shall remain in *standby* at a remote location, it is absolutely indispensable that the Master Base sends the Slave Bases to *standby* (after those were *active*). If Slave Bases are *active* and the operator would turn off the Master Base before sending the Slave Bases to *standby*, then consequently the Slave Bases would remain to be *active*, which could result in unintended energy consumption for the Slave Bases. To avoid this situation, always ensure the Master Base shows *standby* before turning off the Master Base. This strong recommendation can be easily followed by the best practice to always first power down the Phase III Network Input of the Master Base before turning off the Master Base.

Note: The standby time of the Pyrodigital® Falcon Wireless Base is up to 46 hours on internal batteries. The current consumption of the Falcon Wireless Base when active and with the Phase III Network Output powered up depends on the network connected. E.g., with 40 FM-A Firing Modules connected the active time is up to 16 hours on internal batteries. E.g., with 40 legacy Firing Modules connected the active time is up to 7.5 hours

on internal batteries. See also 2.4 Power Specifications as well as 10.4 Safety Arm Key State.

For unlimited active time a external power supply is optionally available. See also 15.9 External Battery Supply.

11.2 Isolating Booster

WARNING - EXTREME DANGER

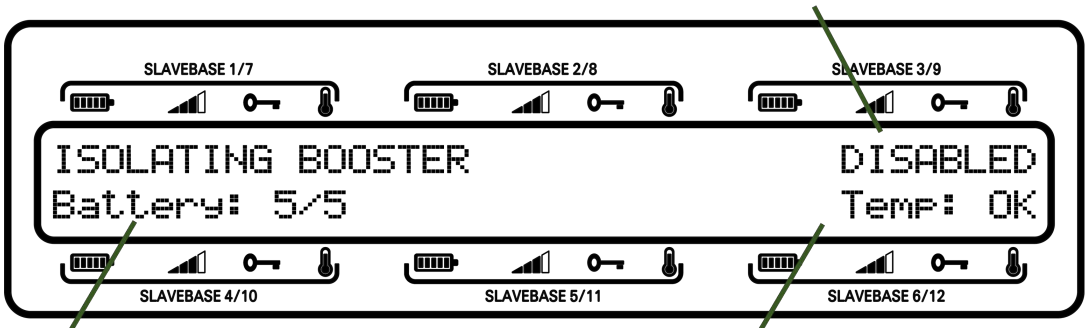
WHEN THE SAFETY ARM KEY IS TURNED TO "ENABLE", THE PYRODIGITAL® PHASE III NETWORK OUTPUT IS FULLY UNDER CONTROL OF THE FIELD CONTROLLER CONNECTED TO PHASE III NETWORK INPUT OF THE PYRODIGITAL® FALCON WIRELESS BASE. THE PHASE III NETWORK OUTPUT WILL BE POWERED UP IF THE PYRODIGITAL® PHASE III NETWORK INPUT IS POWERED UP!

Figure 11.5 shows the Isolating Booster Screen. In the top left corner of the display the device indicates to be in ISOLATING 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 10.1 Battery Charge State, 10.2 External Power and 10.5 Over-Temperature Warning.

Further, the Isolated Booster Screen indicates the state of the Network Output. Like figure 11.2 explains, the Network Output can be powered up or down depending on the state of the Network Input (powered up / powered down) and the Safety Arm Key position (ENABLE / OFF). For more information on the Safety Arm Key State please also read 10.4 Safety Arm Key State.

In the Isolated Booster mode the Network Output is controlled by the Network Input of the device.

	PD Outputs are…
PD ARMED	powered up and armed.
KEY BLOCK	Powered down and blocked due to Safety Arm Key.
ENABLED	powered down and Safety Arm 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 unusually high
!!	ATTENTION: Temperature is higher than 85°C/185°F

Figure 11.5: Overview of Isolated Booster Mode Screen

Chapter 12

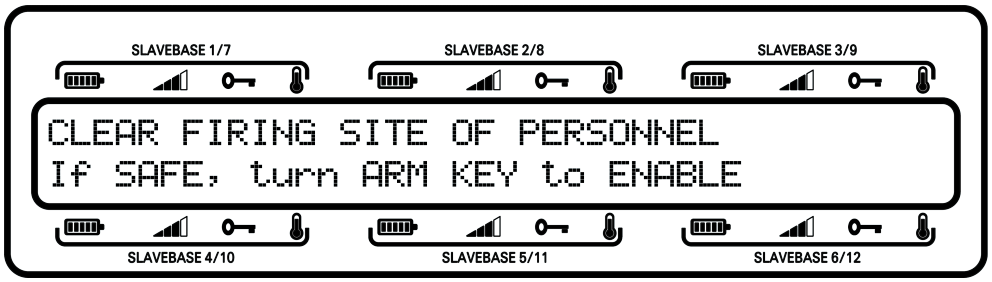
Local Check Status Mode

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® FALCON 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 FALCON 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 "ENABLE" position. Also read chapter 8 Safety Arm Key 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 "ENABLE" 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 7 'Phase III Network Terminals' to understand how the Phase III Network Output and the Phase III Network Output Indicator operate. ABSOLUTELY FIND AND ELIMINATE ANY SHORTS BEFORE PROCEEDING

12.1 Purpose of Local 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 7 '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 Falcon 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.)

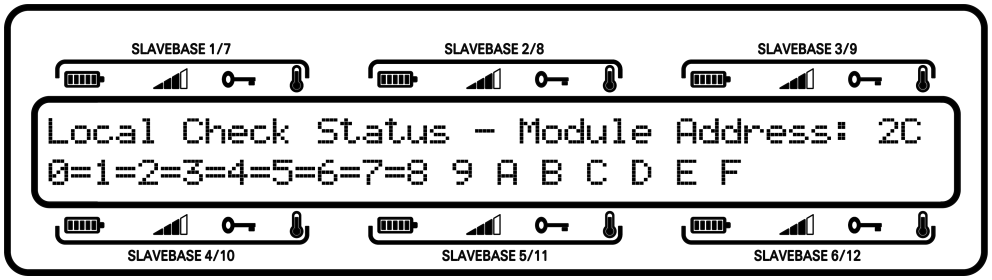
12.2 Selection of Module Address

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.

12.3 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® Falcon 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 Falcon Wireless Base does not have knowledge about the script that you intend to execute. Thus, the Falcon 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).

12.4 Exit Local Check Status

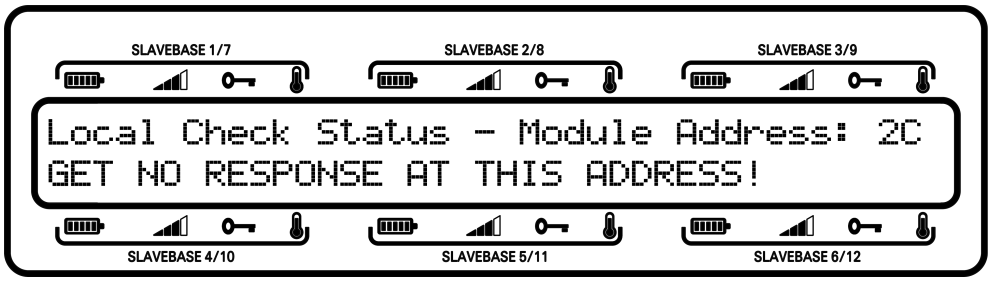
To leave the LOCAL CHECK STATUS Mode simply press the BACK or the MENU Key.

WARNING - EXTREME DANGER

TURN BACK THE SAFETY ARM KEY TO THE OFF POSITION IF THE PHASE III NETWORK OUTPUT IS NOT INTENDED TO BE UNDER REMOTE CONTROL (SEE 11.1.4 Slave Mode RESPECTIVELY 11.2 Isolating Booster).

12.5 Status Check Display - Common Faults and Troubleshooting

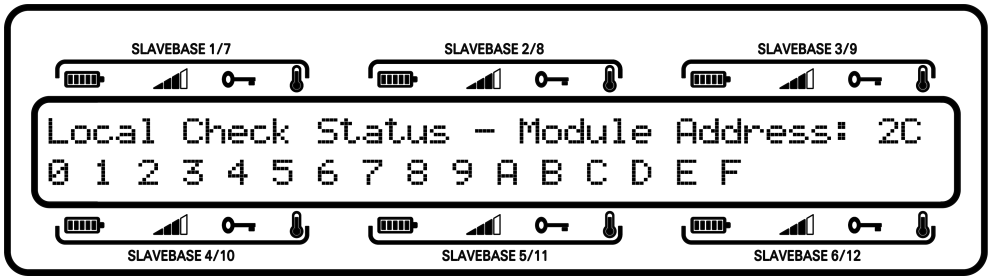
If the following message is displayed, this means that the corresponding Module Address has not been found:



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 (or more) 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 13

Notes regarding Assignment Scanning

When using the "Assignment Scan" option of the Pyrodigital® FC-A Field Controller, always first conduct a manual check status before running the assignment scan to ensure the Slave Bases are responding correctly!

Chapter 14

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.

To block the keyboard press the LOCK Key three times.

To unblock the keyboard press the LOCK Key three times again.

Note: After booting the Pyrodigital® Falcon Wireless Base, the keyboard is always initialized to be unblocked.

Chapter 15

Battery, Power and Fuses

15.1 General Information

WARING - 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 any liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the external power supply fuse and the charger fuse.

The Pyrodigital® Falcon 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. The original batteries the Falcon Wireless Base comes equipped with are very robust and are accepted for flight transportation. The Pyrodigital® Falcon Wireless Base does NOT HAVE LITHIUM BATTERIES OR

LITHIUM-ION BATTERIES INSIDE. The two batteries are in series and provide 24 VDC to the Falcon Wireless Base.
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® Falcon Wireless Base given by Innovative Pyrotechnik GmbH. The lifetime of the batteries strongly depend on the handling by the user and is restricted.
The Pyrodigital® Falcon Wireless Base has three internal fuses besides the externally accessible thermal circuit breakers. The main fuse (Mini Blade Fuse 20A 32V slow type) that secure the overall circuitry, the charger fuse (Cartridge Fuse 0.75A 350V 5x15mm slow type) that secures the CHARGE socket, and the External Battery Supply Fuse (Cartridge Fuse 2.0A 350V 5x15mm slow type) that secures the Ext Batt socket.
To replace the batteries and/or the fuses please follow the instructions in the corresponding following sections of this chapter.

15.2 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 get plugged into the "CHARGE" socket on the bottom left of the Falcon Wireless Base front panel. The maximum charge current for the Falcon Wireless Base is 0.56 Ampere. Only use charging devices endorsed by Innovative Pyrotechnik GmbH. The Falcon Wireless Base comes with an appropriate charging device that provides a universal input voltage range (100-240 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® Falcon Wireless Base. To charge the batteries the device has to be turned OFF. When turned ON the device will automatically break the connection from the charger to the internal batteries. Thus, while the device it turned on charging is not possible.

If you need to extend the operating time or you run shows in permanent installation with the Pyrodigital® Falcon Wireless Base, then use an external supply device recommended by Innovative Pyrotechnik GmbH. For further information see section 15.9.

WARNING - CAUTION

It is not possible to charge the Pyrodigital® Falcon Wireless Base while the device is powered up! To charge the batteries the device has to be turned OFF.

15.3 Open the Falcon Wireless Base

WARING - LIABILITY AND WARRANTY RELEVANT

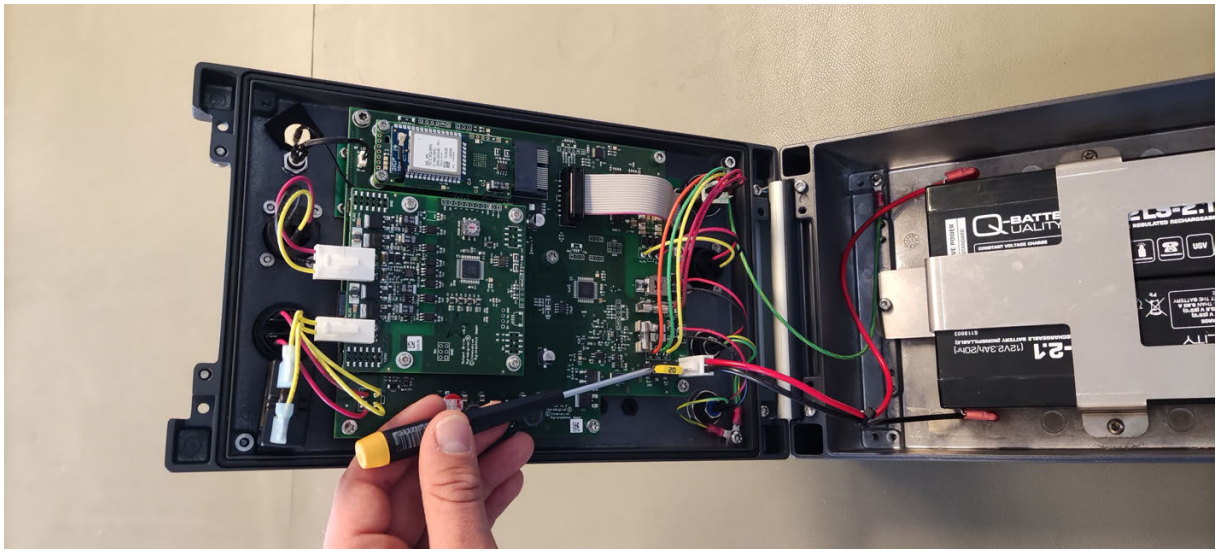
This section describes the procedure to open the Pyrodigital® Falcon Wireless Base. The User must strictly follow the given instructions. Not following the instructions, using non-original parts, manipulation of non-user-serviceable parts or not performing servicing as required, will render the warranty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

Always ensure to work in an ESD safe environment whenever the Pyrodigital® Falcon Wireless Base needs to be opened or is open! Place the Falcon 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. Properly ground yourself and the ESD mat underneath the device. Never open the Falcon 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.

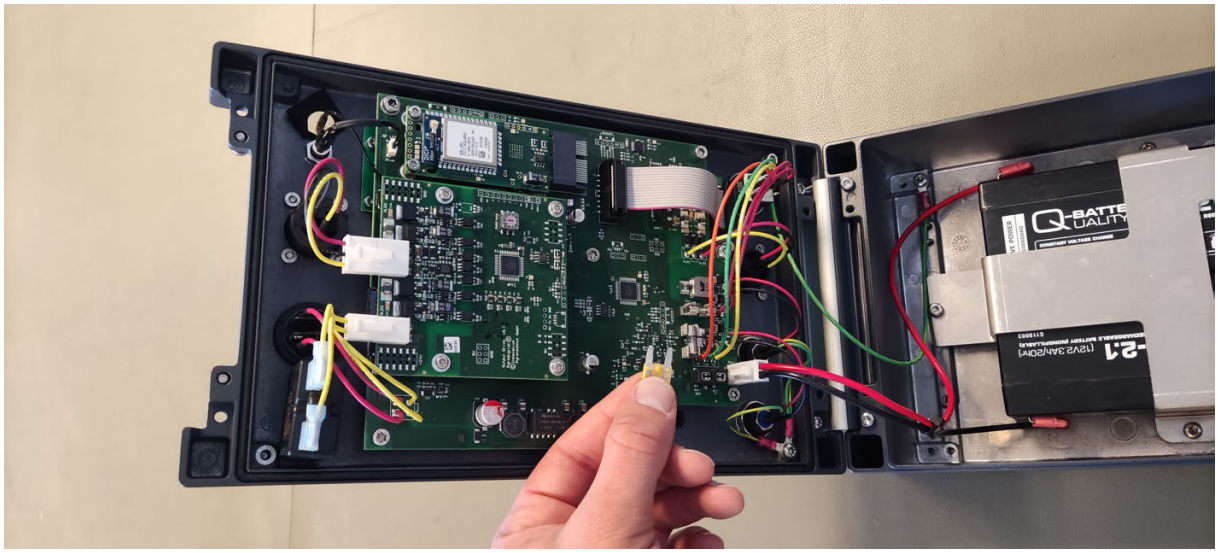
First, flip the right cover to the side, to access the two screws underneath.

Unscrew the two screws that secure the lid using a TX20 screwdriver.

Flip the lid open. And locate the mainfuse.



Detach the main fuse.



You successfully opened the Pyrodigital® Falcon Wireless Base.

15.4 Replacing the Batteries

WARING - LIABILITY AND WARRANTY RELEVANT

This section describes the procedure to replace the batteries of the Pyrodigital® Falcon 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 any liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the charger fuse and the External Power Supply 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® Falcon Wireless Base given by Innovative Pyrotechnik GmbH. The lifetime of the batteries is naturally restricted and strongly depends on the handling by the user.

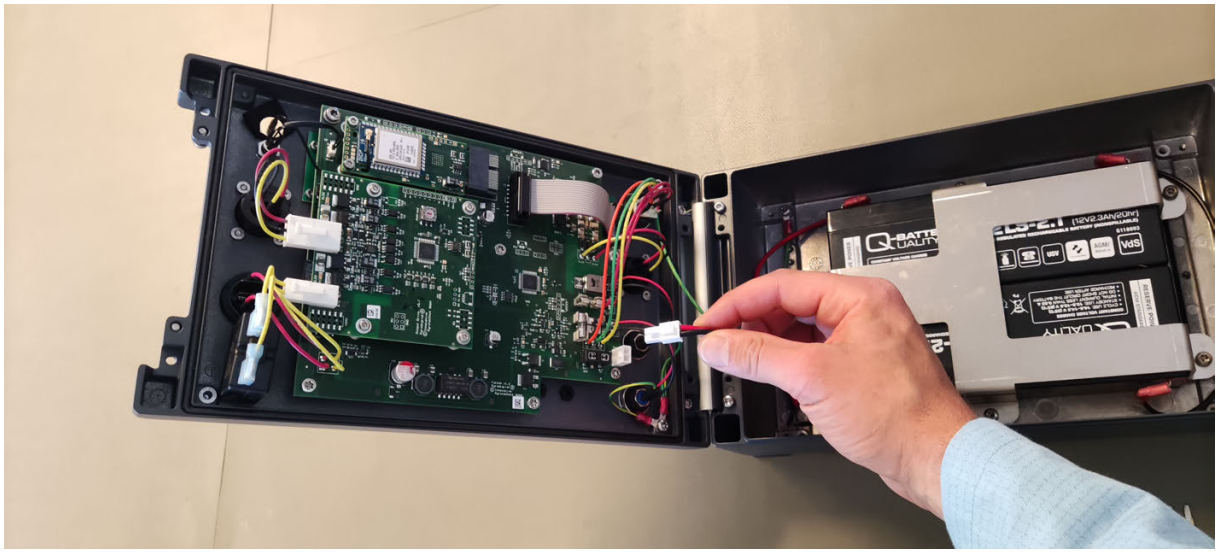
IMPORTANT: ONLY USE BATTERY ENDORSED BY INNOVATIVE PYROTECHNIK GMBH FOR BATTERY REPLACEMENT.

For information about endorsed batteries contact our local sales partners or us directly at Innovative Pyrotechnik GmbH: pd@pyrodigital.com.

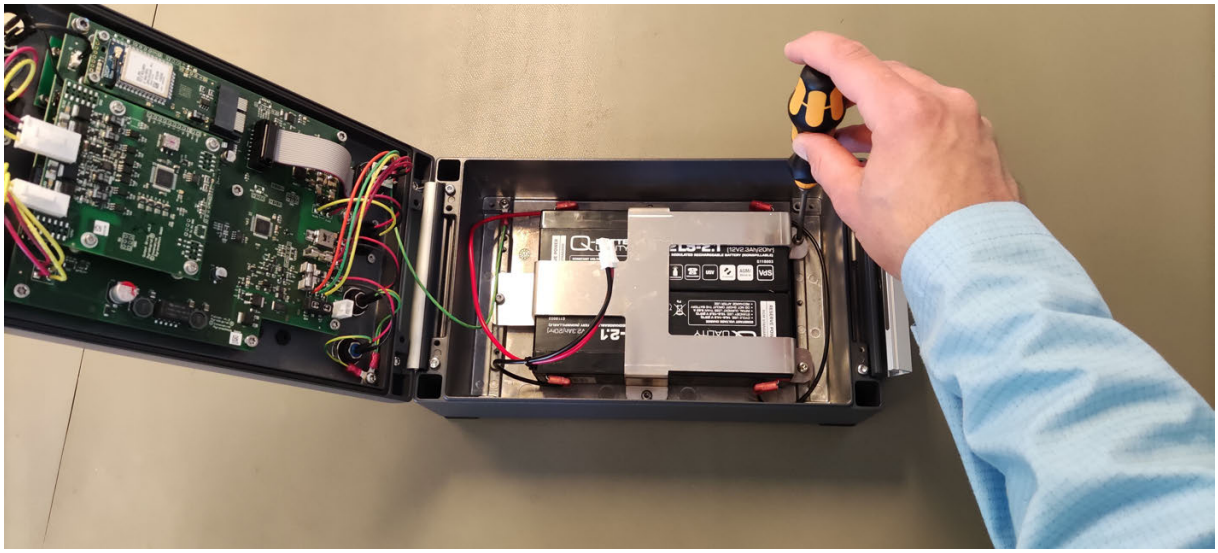
WARING - DANGER / CAUTION If you do not feel confident replacing the batteries or if you have any doubts, do not hesistate to contact us at Innovative Pyrotechnik GmbH: pd@pyrodigital.com. We will assist you, conduct or arrange the battery replacement for you.

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

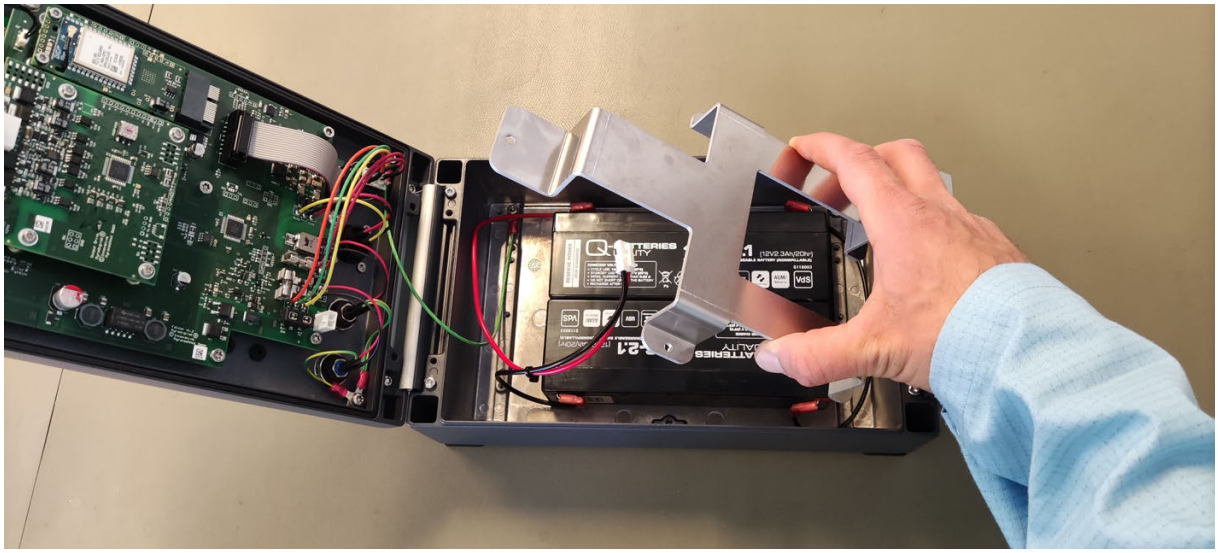
Unplug the Battery Main Cable from the main PCB.



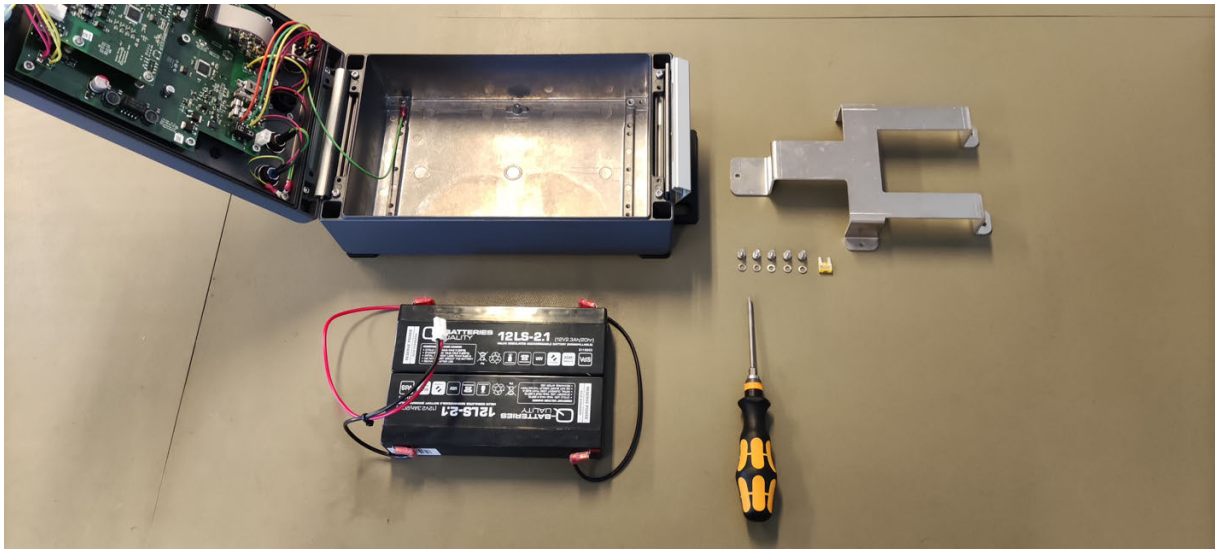
Unscrew the batteryholder with a TX20 screwdriver. Each screw is additionally secured with a washer. Make sure, that all washers are getting removed with its corresponding screws. Loose metalparts wihtin the housing could damage the device.



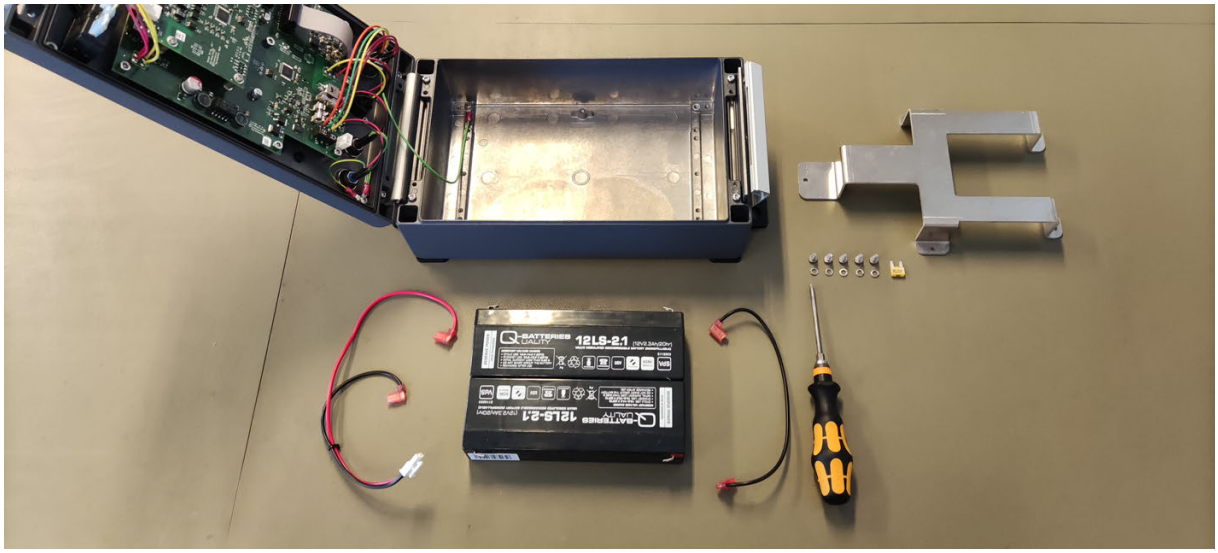
Take out the batteryholder.



Now, take out the two batteries with its cables still attached.



Unplug the Battery Interconnection Cable. Afterwards detach the Battery Main Cable.



Replace the old batteries for fresh ones endorsed by Innovative Pyrotechnik GmbH (Always endorsed: Q-Batteries 12LS-2.1). Use self-adhesive EPDM Sponge Rubber Foam to fill the small gap inbetween the batteries and holder to secure pressure to the holder (only if necessary!).

To connect the replaced batteries

1. Plug in the Battery Interconnection Cable to the positive pole on the right hand side of the battery in front.

2. Plug in the Battery Interconnection Cable to the negative pole on the right hand side of the rear battery.

3. Plug in the red Battery Main Cable to the positive pole on the left hand side of the rear battery.

4. Plug in the black Battery Main Cable to the negative pole of the left hand side battery in front.

Now repeat the process necessary to take out the batteries in reversed order. Put the two batteries back into the device, with its cabling already attached. Place the holder on top

and secure it with M4x8 TX20 screws and the corresponding washers. Then connect the Battery Main Cable to the socket on the electronics.

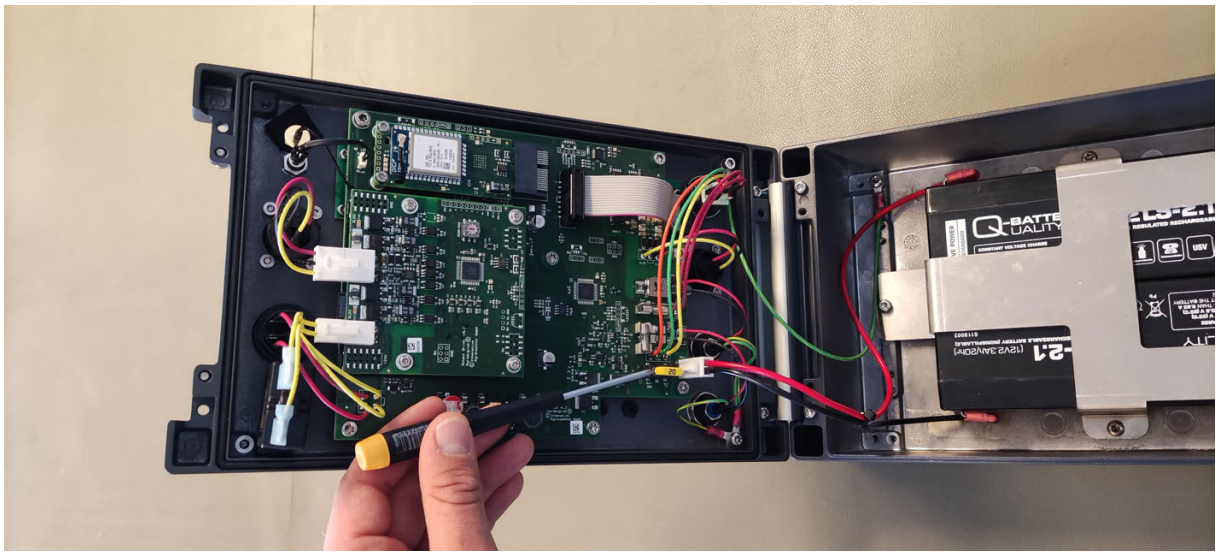
You successfully replaced the batteries. Now close the device following the instructions in section Closing the Falcon Wireless Base.

15.5 Replacing the Main Fuse

WARING - LIABILITY AND WARRANTY RELEVANT

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

To replace the Main Fuse first follow the instructions to open the Pyrodigital® Falcon Wireless Base in the previous section Open the Falcon Wireless Base. Then strictly follow the procedure described in this section and finally close the device like described in the following section Closing the Falcon 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). 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. Use the original Replacement Fuses that came with our device or contact us at Innovative Pyrotechnik GmbH for Replacement Fuses. Only use fuses endorsed by Innovative Pyrotechnik GmbH. Take this fuse and put it into the holder of the Main Fuse. Do not forget to refill the SPARE FUSES, so you always have a spare with you.

Proceed with the procedure to close the device like described in section 15.8 'Closing the Falcon Wireless Base'.

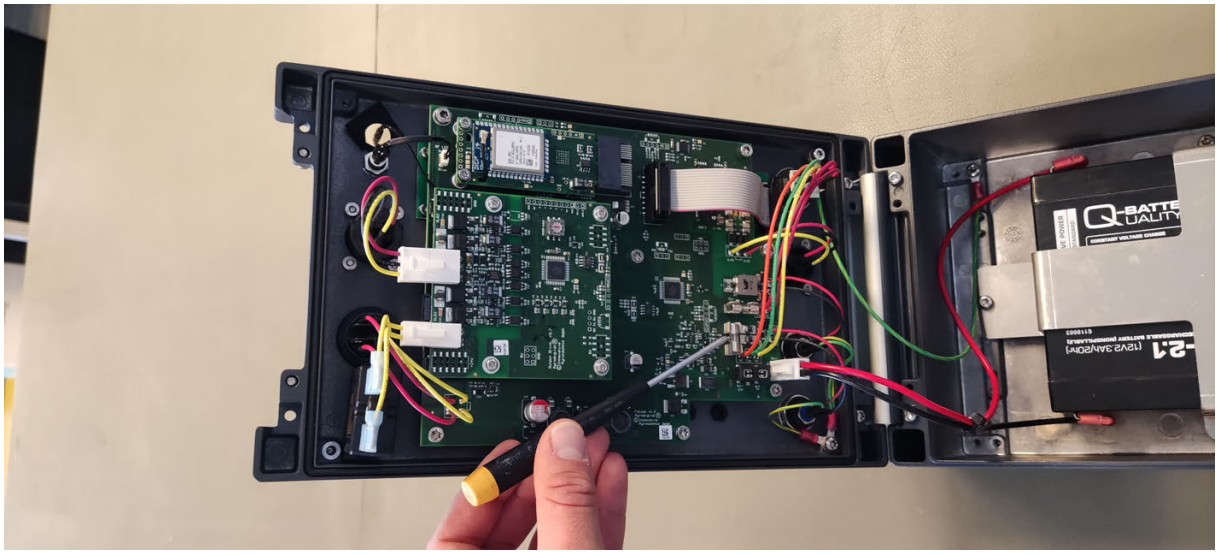
If you need spare fuses, please contact us at Innovative Pyrotechnik GmbH.

15.6 Replacing the Charger Fuse

WARING - LIABILITY AND WARRANTY RELEVANT

This section describes the procedure to replace the charger fuse of the Pyrodigital® Falcon 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 any liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the charger fuse and the External Power Supply Fuse.

To replace the Charger Fuse first follow the instructions to open the Pyrodigital® Falcon Wireless Base in the previous section Open the Falcon Wireless Base. Then strictly follow the procedure described in this section and finally close the device like described in the following section Closing the Falcon 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. Then replace it for a new one (Fine Wire Fuse 750mA 350V 5mm x 15mm 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. Use the original Replacement Fuses that came with our device or contact us at Innovative Pyrotechnik GmbH for Replacement Fuses. Only use fuses endorsed by Innovative Pyrotechnik GmbH. Take this fuse and put it into the holder of the Charger Fuse. Do not forget to refill the SPARE FUSES, so you always have a spare with you.
Proceed with the procedure to close the device like described in section 15.8 'Closing the Falcon Wireless Base'.

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

15.7 Replacing the External Power Supply Fuse

WARING - LIABILITY AND WARRANTY RELEVANT

This section describes the procedure to replace the expansion fuse of the Pyrodigital® Falcon 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 any liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the charger fuse and the External Power Supply Fuse.

To replace the External Power Supply Fuse, first follow the instructions to open the

Pyrodigital® Falcon Wireless Base in the previous section Open the Falcon Wireless Base. Then strictly follow the procedure described in this section and finally close the device like described in the following section Closing the Falcon Wireless Base.

This is the location of the External Power Supply Fuse. If the fuse is gone, replace it (Fine Wire Fuse 2.0A 350V 5mm x 15mm slow type). If you are not sure whether the External Power Supply 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. Use the original Replacement Fuses that came with our device or contact us at Innovative Pyrotechnik GmbH for Replacement Fuses. Only use fuses endorsed by Innovative Pyrotechnik GmbH. Take this fuse and put it into the holder of the External Power Supply Fuse. Do not forget to refill the SPARE FUSES, so you always have a spare with you.

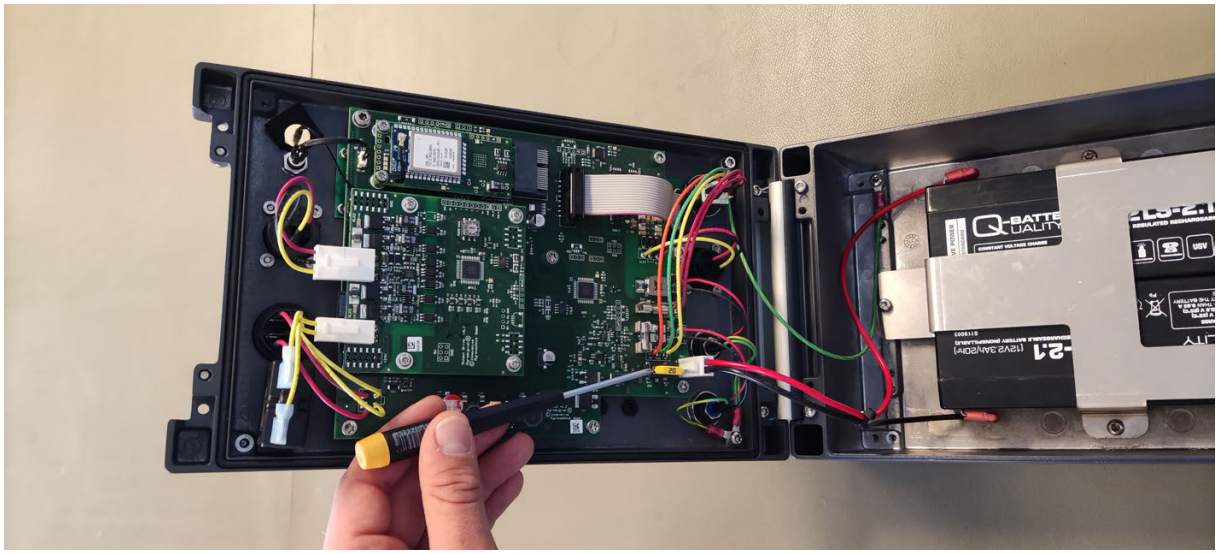
Proceed with the procedure to close the device like described in section Closing the Falcon Wireless Base.

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

15.8 Closing the Falcon Wireless Base

WARNING - LIABILITY AND WARRANTY RELEVANT

This section describes the procedure to close the Pyrodigital® Falcon 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 any liability will be excluded. The only user-serviceable parts are the batteries, the main fuse, the charger fuse and the External Power Supply Fuse.



Plug in the Main Fuse before closing the device. Now close the lid. Make sure, that no cables are getting caught and pinched in between the lid and the bottom part of the housing, while closing the lid.

Push the lid down gently while tightening the two screws on the right, then close the cover.

You successfully closed the Falcon Wireless Base.

15.9 External Battery Supply

The Pyrodigital® Falcon Wireless Base provides the "EXT BATT" External Power Supply socket on its front panel. This socket can be used to connect an external power source to the Falcon Wireless Base. Universal power supplies (100-240 VAC, 50-60 Hz) for the Falcon Wireless Base are available at Innovative Pyrotechnik GmbH. Please contact us or our sales partners for more information.

The External Power Supply supplies the complete Falcon 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 might spare in. However, the energy drawn during these short current peaks is very low and can almost be neglected. Using the External Power Supply, provides a hybrid-supply of the Falcon Wireless Base. In the event of a power shortage for the mains, the Falcon 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 of this kind).

Chapter 16

Regulatory Information

16.1 Regulatory Information for the United States of America

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

16.1.1 Class B device notice

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or

television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

16.1.2 RF exposure safety

This product is a radio transmitter and receiver to be used in mobile conditions. It is designed not to exceed the emission limits for exposure to radio frequency (RF) energy set by the FCC. The antenna must be installed and operated with minimum distance of 34 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

16.2 Regulatory Information for Canada

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This device complies with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

16.2.1 RF exposure safety

This product is a radio transmitter and receiver to be used in mobile conditions. It is designed not to exceed the emission limits for exposure to radio frequency (RF) energy set by the ISED. The antenna must be installed and operated with minimum distance of 34 cm between the radiator and your body.

16.2.2 CAN ICES-3 B

This Class B digital apparatus complies with Canadian ICES-003.

Chapter 17

List of Precertified Antennas

WARNING!

The RF module integrated into 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® Falcon Wireless Base antenna options (30 dBm maximum RF power)

The following tables cover the antennas that are approved for use with the Pyrodigital® Falcon 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 17.1: 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 17.2: 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 17.3: Antennas part 3

Pyrodigital®

CONTROL & RELIABILITY

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