# User Manual

# Galaxis Showtechnik

PYROTEC

# PFC Advanced

# PFC Advanced Black Edition



**Firmware 2.81**

Revision date: February 16th 2020

Batch Numbers: EUC100100, USC100100, EUBE100100, USBE100100

## Table of contents

# 1 Introduction

## 1.1 Safety instructions

Observe all safety instructions in this documentation! Safety instructions warn of dangers when handling devices and provide information on how to avoid them. They are classified according to the severity of the danger and divided into the following groups:

| | |
|---|---|
| **DANGER**  | Danger signals dangers for persons. If you do not follow the instructions for avoiding the hazard, the hazard will certainly result in death or serious physical injury. |

| | |
|---|---|
| **WARNING**  | Warning indicates dangers for persons. If you do not follow the instructions for avoiding the hazard, the hazard is likely to result in death or serious injury. |

| | |
|---|---|
| **CAUTION**  | Caution indicates danger to persons. If you do not follow the instructions for avoiding the hazard, the hazard is likely to result in minor physical injury. |

| | |
|---|---|
| **NOTICE** | Note signals dangers for objects or data. If you do not follow the instructions for avoiding the hazard, the hazard will probably result in damage to property. |

| | |
|---|---|
| **TIP** | A tip provides additional or supplementary information. |

## 1.2 Requirements the operator has to fulfill and necessary qualification

This product may only be operated by persons of legal age. In Germany the user must be at least 18 years of age.

This product may only be used within the scope of a professional and occupational activity.

| **DANGER**<br>  <br>2.1.1 | **Unintended firing**<br><br>Fatal injuries due to explosion/deflagration of pyrotechnic effects and compositions and secondary effects due to explosion (flying objects)<br><br>• Handling of pyrotechnic items only by personnel qualified for the respective effect.<br>• Intended use of the effects only.<br>• Make sure that the required safety distance to persons is maintained.<br>• Minimize the presence in the danger zone.<br>• Follow all safety instructions and regulations at all times. |
|---|---|

Make sure that all legal requirements for the performance of aerial display fireworks, stage fireworks (also known as close proximity pyrotechnics) and special effects are met in the respective country of use.

| **TIP** | In Germany, these regulations of the employers' liability insurance association and the BAM, among others, apply:<br><br>• DGUV-Vorschrift 213-049: Abbrennen von Feuerwerken<br>• DGUV-Vorschrift 215-312: Sicherheit bei Veranstaltungen und Produktionen<br>• BAM Py/2012/2: Leitfaden zu Sicherheitsmaßnahmen für das Verwenden von Feuerwerk der Kategorie 4 |
|---|---|

## 1.3 Safety Instructions

**Safety instructions for the firing of pyrotechnic effects, fireworks and aerial shells using e-matches:**

**The following instructions are for your understanding about important and basic safety principles.**

**Our general safety requirements are based upon our own experience and feedback from our customers. These rules allow the safe and successful use of all components of our wireless firing systems. With continuing development of our products, we will review and revise the safety standards and procedures accordingly.**

**The following safety instructions are part of all our operation manuals within our product range. These instructions are also available in printed form and can be downloaded via our internet homepage at any time. Please forward these instructions to any relevant persons in your company dealing with this and associated products.**

**Any technical device can potentially cause a fault. This could be encouraged through: misuse, unit damage, unit aging, as well as the wear and tear of the unit. This fundamental thesis was the basic principle when writing these instructions.**

**1. Smoking or naked flames are strictly prohibited within the safety zone!**

**2. Depending on the type, size and quantity of the pyrotechnic effects that are being used and depending on the local conditions, allocate the necessary fire prevention and first aid equipment.**

**3. In all cases respect and follow any national legislation and codes of practice as well as the instruction manuals and data sheets relating to the pyrotechnic effects in use.**

**4. Make sure that no unauthorized persons are within the vicinity of the pyrotechnic effects, and the respective firing system.**

**5. The safety distances required by the manufacturer and authorities are to be respected. Secure the firing area so that no unauthorized persons can gain access to it.**

**6. The operation manuals and safety instructions of the pyrotechnic effect manufacturers must be observed at all times. If in doubt these must be discussed with the relevant safety organizations.**

**7. The use of pyrotechnic effects and associated firing systems must only be used according to their defined functions.**

**8. The components of our firing system are to be covered or protected from burn-off cinders, debris and weather conditions where necessary. Electrical contacts should be protected from corrosion, soiling, damage, and they should be cleaned regularly.**

**9. The contacts of the pyrotechnical articles or their e-matches, which have not yet been connected, must always be short circuited (shunted).**

**10. We recommend having our products inspected every one to two years. Along with the testing of the batteries, a visual test as well as a functional test will prove that the unit is functioning safely and correctly.**

**11. Do not use damaged or faulty equipment. If equipment is damaged or faulty, return it to the manufacturer for professional repair. Our warranty for the proper function for our equipment provides for defective parts or faulty workmanship, and does not include equipment or items that are damaged, or show signs of abuse.**

**12. Any changes made to the devices, or to the firing system as well as repair work on the units other than that done by the manufacturer will invalidate any warranty claims, and our products liability will be void. Should repair of the units be necessary, then we do require a detailed report of the problem.**

**13. Please make sure that when lending or renting equipment, that no damage has occurred during the rental period of the units. Advise your staff, that it is very important to report any possible damage of the units immediately. Customers, that have borrowed or rented the equipment are hereby informed, that it is their duty to report any damage found or suspected on the unit when returning such.**

**14. Wire connections from the firing device to the e-matches should always be insulated. Avoid wire damage, for example through heat, cable twisting, cable pinching and burn-off cinders or through forced piercing. All cables and wiring must be checked before use to ensure that circuits are correctly wired, and within the correct resistance limits. During repeated use of wires and cables we do recommend a continuity and short circuit test between each insulated connection before using it again.**

**15. The firing of igniters in accordance with 'SprengG' (i.e. German explosive law) is not allowed with our products. For this purpose only firing units with a special certification in accordance with 'SprengG' or equivalent are allowed. The same applies to high explosives.**

**16. Avoid unintended firing through electrostatic charging. When using e-matches, make sure that you only use those types which are protected against unintended firing through electrostatic discharges. The e-matches that you use should also have a BAM certification or equivalent.**

**17. Avoid physical contact of e-matches or their firing lines with other conductible materials if it is possible that either a static discharge or potential equalization can arise.**

**18. Make sure that no unintended firing situations can occur. Common causes can be through strong electrical, magnetic, and electromagnetic fields as well as other voltage sources.**

**19. An often underestimated risk, are unintended firings due to live contacts found on equipment such as mobile phones, two way radios, as well as rechargeable battery driven portable power tools. Even when due care and attention is taken, a battery pack or similar can be a hazard when dropped, especially as live contacts are revealed.**

**20. Unintended firing can be caused by thunderstorms or the electrostatic fields built up during the approach of a thunderstorm. We recommend evacuating and securing the pyrotechnics area in this situation.**

**21. Another possible danger for unintended firings is potential equalization currents. Be aware that these currents may occur between conductive building segments themselves, or between these conductive segments and earth potential. Neither e-matches nor wiring should come into contact with such segments.**

**22. Please be aware that through your pyrotechnical effects ionized gases are created. These ions increase the conductivity within the air. This**

**ionization process can cause an electrical arcing especially within the vicinity of high voltage overhead cables. This may lead to lethal consequences for pyrotechnicians and other persons. Please also note that wind conditions can be totally different a few meters above the ground.**

**23. Ensure that the firing of pyrotechnic effects can only be undertaken by the authorized pyrotechnician. Keep the firing system under lock and key when not in use, and ensure it is never left unattended during use, with the key in it! Within our safety concept, all firing systems are set with individual codes, which inhibit unintended and accidental firing through third parties. If requested we can also supply systems with the same coding. This may be necessary if within a company more than one transmitter is used or when companies exchange the units between each other.**

**24. By using the key code numbers 901 and 311, we are using a standard key code, which can also be found in other products. Upon customer request we are able to supply other key codes.**

**25. Please ensure that the relevant safety distances are met by everybody. The safety margins are to be kept in place from the beginning of the event until such time as the pyrotechnician releases the area after firing, and removal of unfired products and effects.**

**26. At all times first connect the e-match to a 100% non-live firing line, which is not connected to a firing unit. A pyrotechnic effect is classed as 'armed' from the time the e-match wires are connected to a firing unit. This is irrespective if the firing unit is switched on or off!**

**27. In the interest of your own safety, and the protection of the devices always use a sufficient length of firing wire.**

**28. Along with sufficient lengths of firing wire you should also ensure the following:**

**In the field of display fireworks: The aerial shells or mines must only be loaded after the mortar tubes have been stabilized and secured. It is only after the loading of the tubes are completed that it is permissible to connect the e-matches to their respective firing units. At all times the most important rule is to never put your head or other body parts into or over a mortar tube. This would also apply to other pyrotechnic effects.**

**In the field of special effects: Depending on the explosive power of the pyrotechnic effects or materials that are being used it is advisable to proceed with more care and attention (lies within the pyrotechnican's responsibility) and this could include for example a short circuit bridge over the contacts of the e-match to prevent unintended firing. Also it is possible to make a physical switch breakage in the firing line, which is only then closed when all safety instructions are met and kept! Should there be any unclarified situations, then discussions with the safety authorities are to take place until everything is clarified and understood by everyone. When it comes to the safety of your projects we are available to assist you to develop a customized safety procedure.**

**29. Make sure the devices are switched off before connecting the e-matches.**

**30. When stripping the cable insulation of the igniters and connecting them, you must ensure that they are not stripped so far back that the exposed conductors can touch each other. Short circuits between different outputs must be avoided because this may cause unwanted firings.**

**31. When checking the various system parameters as well as during firing, nobody is allowed within the danger zone.**

**32. After the effects have been fired, an ample amount of time should be given before disassembling the pyrotechnical setup to ensure that any unfired material can safely be located and dealt with. Before securing possible unfired effects first switch off the receivers, and then disconnect the corresponding wiring. In the field of special effects, care must be taken during disassembly of unfired effects or installations. Work must be conducted in a safe way, and must only be carried out by a competent person.**

**33. When using receivers inside Zarges cases it is important to ensure that the case lid (aluminum top) is closed and latched shut during the fireworks display. There is still enough space for the wires of the e-matches to go out on both sides of the case. This guarantees the safety and protection of the receiver and also prevents the top of the case opening in windy conditions.**

**34. Read the instruction manuals of all the equipment completely and follow all the instructions. Everyone in your company who will work with the equipment must receive information, instruction, training and supervision with regards to the safe use of the equipment.**

**35. Only use original accessories. Otherwise, the safety of the equipment cannot be guaranteed. Further information can be found in the chapter 'Accessories' in the respective user manuals.**

**The most current version of the safety instructions is always available in the download section of our website: www.galaxis-showtechnik.de**

## 1.4 Application fields

This device has been designed for the firing of effects in the field of close proximity pyrotechnics, special effects and aerial or display fireworks. The control of magnetic valves and effect devices is allowed as well. Every other type of application must be approved by the manufacturer prior use. The user has to make sure that persons and property is not endangered at any time.

Please follow all relevant safety instructions for the usage of pyrotechnical firing equipment, the safety instructions given in this manual and the specific laws of the country.

High explosives may not be fired under any circumstances. Specially certified firing systems must be used for this purpose.

# 2 Illustration

## 2.1 PFC Advanced

### 2.1.1 Description of indicators and control elements, standard version

| | | |
|---|---|---|
| 1 | Key switch 'Operation' | To switch the device on and off |
| 2 | Key switch 'Firing mode' | To switch the firing mode on and off |
| 3 | Socket 'Antenna' | The antenna is to be installed here. If you use an RF cable with BNC connector plug it in here, too. |
| 4 | Indicator<br>'Charging / Low battery' | Red if accumulator capacity is lower than 30%.<br>Green if device is being charged. |
| 5 | Socket 'Lamp' | Connector for gooseneck lamp |
| 6 | LCD with touch panel | Display all device data, control over device with touch panel |
| 7 | Multifunctional key | Function varies according to device mode.<br>Current function is being displayed on LCD screen. |
| 8 | Multifunctional key | Function varies according to device mode.<br>Current function is being displayed on LCD screen. |
| 9 | Multifunctional key | Function varies according to device mode.<br>Current function is being displayed on LCD screen. |
| 10 | Multifunctional key | Function varies according to device mode.<br>Current function is being displayed on LCD screen. |
| 11 | Key 'Fire' | Manual firing of firing channels or start of automatic firing, only active if firing mode is switched on |
| 12<br>13 | RS485 / DMX512 | Additional connectors for RS485 interface, a DMX controller can be connected to the PFC Advanced |
| 14 | USB | USB interface to connect to a PC |
| 15 | RS232 | RS232 interface to connect to a PC |
| 16 | Input 'External Fire' | External firing key may be connected here. |
| 17 | CF card slot | hardware installed for future functions, not yet supported |
| 18 | MIDI interface | hardware installed for future functions, not yet supported |
| 19 | SMPTE input | Input for time code signals (SMPTE) |
| 20 | Multifunctional connector | Charging input, interface for communication via cable with 'Advanced' receivers, input for external power supply |

## 2.2 PFC Advanced Black Edition

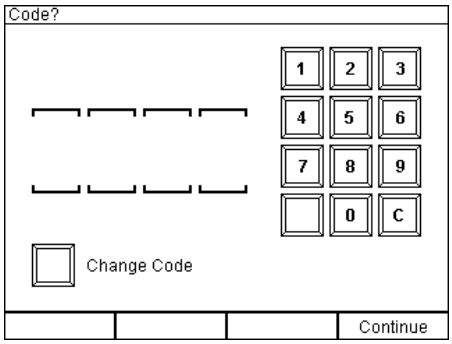
### 2.2.1 Description of indicators and control elements, Black Edition

| | | |
|---|---|---|
| 1 | Magnetic pen slide | To switch the firing mode on and off |
| | | |
| 2 | Magnetic pen arrestor | When pressed the magnetic pen can be pulled out of the slide |
| | | |
| 3 | Button 'Operation' | To switch the device on and off |
| | | |
| 4 | Socket 'Antenna' | The antenna is to be installed here. If you use an RF cable with BNC connector plug it in here, too. |
| | | |
| 5 | LCD with touch panel | Display all device data, control over device with touch panel |
| | | |
| 6 | Indicator 'Charge' | Green if the device is being charged |
| | | |
| 7 | Indicator 'Low Batt.' | Red if the battery is low |
| | | |
| 8 | Indicator 'Humidity' | Yellow if the humidity in the device is higher than 30% |
| | | |
| 9 | Button 'Fire' | Manual firing of firing channels or start of automatic firing, only active if firing mode is switched on |
| | | |
| 10 | Multifunctional key | Function varies according to device mode.<br>Current function is being displayed on LCD screen. |
| | | |
| 11 | Multifunctional-key | Function varies according to device mode.<br>Current function is being displayed on LCD screen. |
| | | |
| 12 | Multifunctional-key | Function varies according to device mode.<br>Current function is being displayed on LCD screen. |
| | | |
| 13 | Multifunctional-key | Function varies according to device mode.<br>Current function is being displayed on LCD screen. |
| | | |
| 14 | Switch 'Backup' | Switches between transmitting mode and backup mode |
| | | |
| 15 | Handle | Can be attached on the front, rear, both sides and under the device for table top usage |
| | | |
| 16 | 12VDC, Amp., RS232 | To connect RS232 cables for communication and 12VDC power output |
| | | |
| 17 | Ext. Fire, SMPTE | To connect an external firing key or input for SMPTE Timecode with 25fps |
| | | |
| 18 | USB | USB connection for PC |
| | | |
| 19 | Ext. Power, Charge, RS485, DMX512 | Charging input, interface for communication via cable with 'Advanced' receivers, input for external power supply and connection for a DMX desk |
| | | |
| 20 | Antenna slide | The antenna can be stored in this slide |

# 3 Differences between PFC Advanced and PFC Advanced Black Edition

The PFC Advanced Black Edition and the PFC Advanced share the same software. There are just small differences:

## 3.1 Switching on, Code request, Switching off




To switch on the PFC Advanced Black Edition, the On/Off button has to be pressed for one second. Immediately after this the language selection screen appears. After selecting the language or waiting a short period of time, you will be forwarded to the code request. For a new Black Edition, the standard code is 0000. The same applies to rental devices.

To change the code, the button 'Change Code' has to be activated. First you have to enter the current code, then the new one. For safety reasons, the new code has to be entered a second time in order to become valid.

Switching the PFC Advanced Black Edition off can only be done in the main menu. If the device is in a submenu like the Manual Firing Mode, the device cannot be switched off. The menu needs to be left first.

| | |
|---|---|
| **TIP** | To avoid that the PFC Advanced Black Edition will be switched on by accident and the battery becomes discharged, for example during transport, the device is switching itself off automatically after 60 seconds if no code is being entered. |

| | |
|---|---|
| **TIP** | If you forgot the code, you can use the master code 16777216. |

| | |
|---|---|
| **TIP** | If the display content of the PFC Advanced Black Edition is not being displayed correctly or graphic errors occur, please switch off the device and wait 10 seconds before you switch it on again. If this occurs in a menu, please try to exit the menu and go back to the main menu.<br><br>If this is not possible, you can use the reset button. This is located behind the breather. Unscrew the breather and insert a pointed object in the threaded hole. This immediately switches off the PFC Advanced Black Edition. |

## 3.2 Arming

To arm the controller you have to navigate to one of the four firing modes. Only after that the magnetic pen can be slid into the left side of the device to activate the firing mode and arm the controller. The provided magnetic pen locks inside the slide and cannot be removed by accident. To release the magnetic pen, the button on the top left corner needs to be pressed while the magnetic pen is being removed at the same.

## 3.3 Humidity indicator

This indicator shows that the relative humidity in the device is higher than 30%. There is need for action, because if the relative humidity in the device is high for a longer period it can causes damages to the electronics. Turn the controller upside down and unscrew the desiccant screw. Remove the desiccant and replace it with new one. Screw in the desiccant screw again.

| | |
|---|---|
| **TIP** | If the indicator lights up shortly after the desiccant has been changed (less than 2 weeks), it can be that seals are not in the right place which can be caused by improper assembling of the PFC Advanced Black Edition. Please contact the manufacturer in that case. |

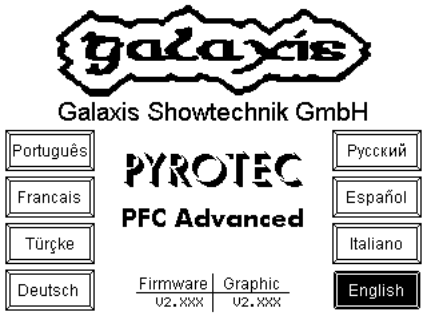
## 3.4 Water tightness

The PFC Advanced Black Edition was designed for applications in extreme places and under extreme conditions. Like the PFE Advanced 10 Output receiver, the PFC Advanced Black Edition is also equipped with a breather, which functions as a pressure equalizer. When you want to make the controller hermetically sealed and absolutely waterproof, please exchange the breather with a M3 housing screw and a seal. For more information on the breather and the exchanging process, please read the topic in the user manual of the PFE Advanced 10 Output receiver.

| | |
|---|---|
| **TIP** | If wetness, moisture, submersion, condensation and/or water is to be expected, it is highly recommended to check all screws of the PFC Advanced Black Edition for strength and to replace the breather with a M3 housing screw with seal. In case of damage caused by wetness and non-observance of this instruction all warranty will be void. |

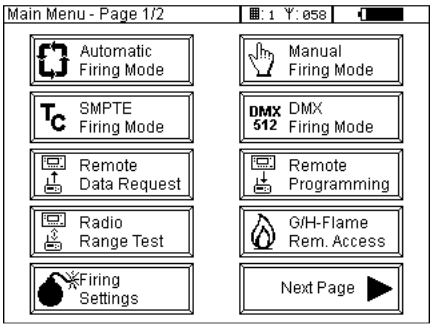
# 4 Basic operation of the device

## 4.1 Switching on, main menu, switching off




After switching the device on by turning the key switch 'operation' this start screen is being displayed.
On this screen you can see, which firmware version and which graphic file has been installed. As long as you see this screen, you may choose one of the languages being displayed. After a short period of time the device enters the main menu automatically.

**The main menu has these two pages:**

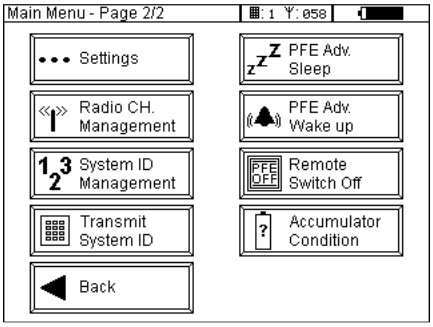



The device is in the main menu, page one is being displayed. By pressing the button 'Next Page' you will enter page two. The accumulator charging level is being displayed always in the battery symbol in the upper right corner of the screen. In this example the remaining capacity is approx. 90%.

Additionally, the selected system ID and radio channel (i.e. frequency) is being displayed in the first line of the screen.

The system ID is prompted right next to the symbol of a keypad, the radio channel right next to the symbol of a radio antenna. Please refer to the relevant sections of this manual to obtain further information regarding these parameters.

If you enter a submenu by pressing any button you will find either this button with the function 'Return' or some other button or key with return function, which will either lead you directly back to the main menu or one step higher in the menu hierarchy.



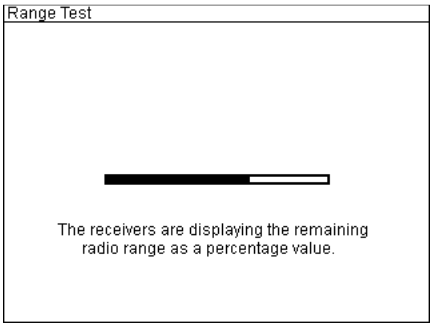

The function 'Radio range test' is the only exception. After pressing the corresponding button, the test is started immediately. After approx. 10 seconds the test is over and the device returns to the main menu automatically.

By pressing the button 'Back' you will reach page one of the main menu again.

The following sections of this manual describe the function of the various menu items.

Before switching off the device you should make sure that the main menu is present in order to avoid that the device is being switched off while any memory access is happening. Then turn the key switch 'operation' in off position in case that you are using a PFC Advanced. In case of a PFC Advanced Black Edition you need to press the button 'Operation'. You should wait at least 10 seconds before switching on the device again to ensure correct display initialization.

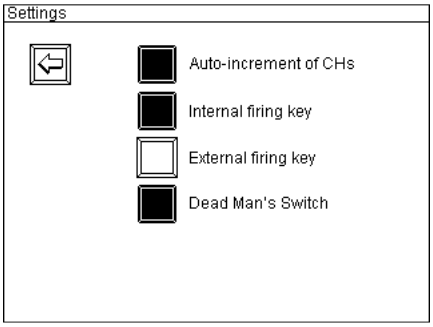
## 4.2 Radio range test




The function 'Radio Range Test' is required if you are using receivers of the 'Profi' series. These receivers do not operate bi-directionally. As a matter of course you may use this function also with receivers of the 'Advanced' series.
Right after pressing the button this screen is being displayed. As long as the progress bar is moving all receivers are displaying the remaining radio range as a percentage value. After finishing the test period, the controller returns back to the main menu automatically.

| **TIP** | Generally, we recommend to do a range test or a remote data request each time before you use the system to make sure that the communication between the devices is good. Values higher than 30% are considered as sufficient. |
|---|---|

## 4.3 Firing settings




By pressing the buttons 'Auto-increment of CHs', 'Internal firing key', 'External firing key' and 'Dead Man's Switch' the corresponding function will be activated or deactivated.

If a function is active its button is displayed inverted (with a black area in the touch button).

The details of the functions are described in the following sections.

### 4.3.1 Auto-increment of CHs (firing channels)

If this function has been activated the firing channel in the manual firing mode is incremented automatically immediately after each firing. In this case there is no need for manual channel adjustment by pressing the buttons 'Up' and 'Down' or by entering the next firing channel on the numeric keypad. This setting affects only manual firing mode.

### 4.3.2 Internal firing key

Firings may be initiated by pressing the red key 'Fire' in the lower right corner on the main panel. This setting affects all firing modes.

### 4.3.3 External firing key

This function enables you to feed in an external firing signal either additional or instead of the standard firing key. This is achieved by connecting a potential-free contact to the three pin XLR socket on the right side panel (connector Ext. Fire) of the PFC Advanced or the Lemo connector 'Ext. Fire' on the rear panel of the PFC Advanced Black Edition. The pin assignment of the XLR connector is described in the section 'Pin assignment of input external firing key' in this manual. External firing keys with a cable and connector are available as accessory parts. This setting affects all firing modes.

### 4.3.4 Dead Man's Switch

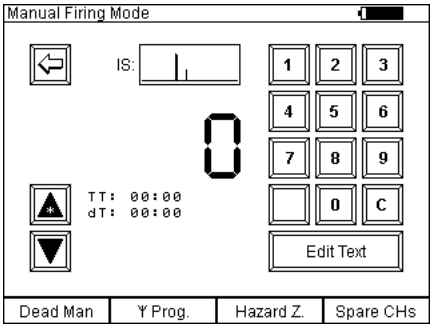
By activating this setting, the key 'Dead Man' has to be pressed in addition to the actual firing key. Normally you will keep the Dead Man's switch pressed all the time in manual firing mode and press the firing button for each cue. The same applies to the automatic firing mode. You will have to keep the Dead Man's switch pressed to start automatic firing. After that you should keep the Dead Man's switch pressed all the time so that all firings can be initiated according to your firing script. Otherwise firings will not be initiated but the countdown proceeds as programmed. As soon as this key is pressed again firings will happen accordingly.

This function offers additional safety during firing and its usage is mandatory in some countries.

This setting affects all firing modes.

# 5 Manual Firing Mode

By pressing the button 'Manual Firing Mode' on the first page of the main menu you will enter the manual firing mode directly.




As long as the key switch firing mode is in 'Off' position no firing can be initiated. This means that you can work in this menu without any danger.
In the example shown on the left the Dead Man's switch has been activated. If this function has been deactivated the text 'Dead Man' does not appear and the key is not illuminated.

The current firing cue is always being displayed in the middle of the screen. After entering manual firing mode, the firing channel is always 0. With channel 0 no firing command can be sent.
The meaning of the information being displayed and the possible functions are described in the following section.

A star symbol in the arrow key 'Increment Firing Channel' shows that the option 'Auto-increment of CHs' has been activated in the Firing Settings menu.

| **DANGER** | **Unintended firing** |
|---|---|
|  2.1.7 | Fatal injuries due to explosion/deflagration of pyrotechnic effects and compositions and secondary effects due to explosion (flying objects).<br>• Only switch on the firing mode when there are no persons in the danger zone (firing area). |

## 5.1 General functions

### 5.1.1 Numeric keypad

Firing channels can be entered directly via the numeric keypad. The keypad is used like a pocket calculator. If numbers are typed in with a short interval time the numbers on the screen are shifted to the left and the entry appears as new digit on the right. Shortly after you have entered the last number you hear an acoustic signal as an acknowledgement (assuming that the loudspeaker has not been disabled). After that you may begin a new entry. The old value is overwritten as soon as the first number is being entered. You may delete your entry by pressing 'C'.

### 5.1.2 Buttons 'Up' and 'Down'

The firing channel can be incremented or decremented by using these buttons. If you keep one of these buttons pressed for a longer time the channel is being increased or decreased automatically.

## 5.1.3 Function 'Hazard Zones'

This function is very useful if you want to disable certain parts of your fireworks display before or during firing show.

To use this function in a meaningful way it is essential that you have assigned different hazard zones to your receivers. Up to 16 different hazard zones, which are distinguished by letters (ranging from A to P) are at your disposal.

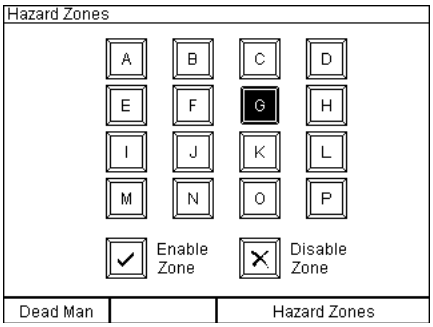
You may assign the same hazard zone to several receivers. Then these receivers will only be disabled together and also later on enabled together.

The hazard zones can be programmed in the receiver's submenu or by remote programming with the PFC Advanced or any PC or notebook with the wireless USB modem.

After switching on a receiver, the hazard zone which is determined in the receiver's memory is activated. This applies also if you change the hazard zone of a receiver. After making your changes the hazard zone on this device is active by default, i.e. firing commands will be executed.

This function can be accessed at all times, no matter if the firing mode is disarmed or armed.

Press the button labelled with 'Hazard Zones' and keep it pressed to display the following screen:




As soon as you see this screen you may disable hazard zones and also enable the zones again.

### 5.1.3.1 Disable hazard zones (Firing commands will be suppressed)

First select the hazard zone which you want to disable on the touch screen. The button will be displayed inverted once you have made your selection. You may also alter your selection by pressing another button on the screen. Now press the touch button 'Disable Zone' and the controller PFC Advanced will send the command that this zone should be disabled to all receivers.

All receivers which have been programmed to this zone will immediately display e.g. the following in the bottom line of their LCD: 'Hazard Zone: Cx'. The symbol 'x' informs you that firings are suppressed on this device. All possibly active outputs will be switched off and all previously startet step sequences will be stopped and terminated. This means that if the hazard zone is enabled again later the device does not continue to process and fire these 'old' step sequences.

The precondition for switching off the outputs and stopping the step sequences and the suppression of following firing commands is that the receiver is within range and receives this command interference-free.

Right after disabling a hazard zone you can select another zone and continue with disabling or enabling.

#### 5.1.3.2 Enable hazard zones (Firing commands will be allowed)

To enable a hazard zone again first select the corresponding button on the touch screen. This button will be displayed inverted. You may also alter your selection by pressing another button on the screen.

Now press the button 'Enable Zone' on the touch screen and the controller PFC Advanced will send the command that this zone should be enabled to all receivers. All receivers within range which have been programmed to this zone will immediately display e.g. the following in the bottom line of their LCD: 'Hazard Zone: C✓'. The symbol '✓' informs you that future firing commands will be processed on this device.

Right after activating a zone you may select another one and enable or disable also this zone.

## 5.2 Function if firing mode is off

### 5.2.1 Key 'Dead Man'

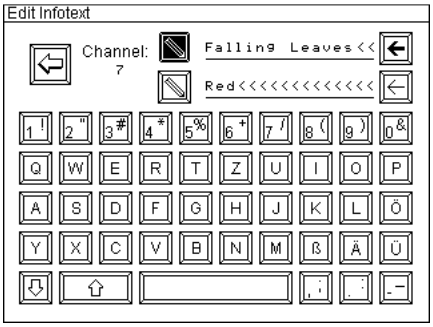
This key has no function if the firing mode is off. Once the key switch firing mode is turned to the 'On' position the key is in operation. The device shows you already here that the 'Dead Man' function has been activated although the firing mode is currently inactive.

### 5.2.2 Key 'Wireless Programming'

This function is intended to program single channels to receivers of the 'Profi' series. By pressing this multifunctional key, which is illuminated now, you can transfer the firing channel, which has been selected by pressing 'Up' and 'Down' or, which has been entered by the keypad to the receivers. The receivers to be programmed need to be in the output programming menu and you have to select the output, which you want to program with the firing channel. Then press the key 'Wireless Programming' after selecting the desired firing channel. This function is ideally suited if you want to program identical firing channels to several receivers.

Receivers of the 'Advanced' series are programmed only by using the bi-directional function 'Remote Programming'. You will find further information regarding this in the corresponding section in this manual.

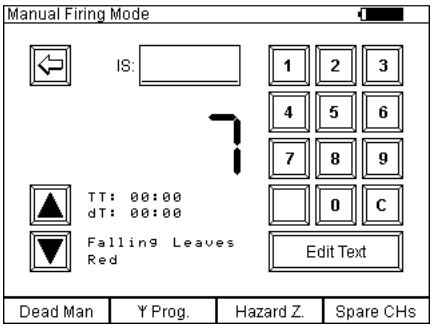
### 5.2.3 Button 'Edit Text'




An information text of two lines (16 characters each) may be assigned to every firing channel by this function. Furthermore, you can edit information text which is already existing (e.g. information texts from a firing script which has been downloaded from the Galaxis PYROTEC COMPOSER).

The line to be edited is selected by the two buttons with the pen symbols. The currently selected line is indicated by an inverted pen button. The arrow buttons to the right of the text lines are used to delete the content. The upper arrow button (bold arrow symbol) deletes the whole line, the lower arrow button deletes only a single character.

The operation of the alphanumeric keypad is based on the keyboard of a PC. The corresponding firing channel is displayed permanently, in this example it is channel 7.




As soon as you return to manual firing mode you see the information text, which has just been entered. Information text is also being displayed if the firing mode is active. The information text is likewise valid for all various firing modes, i.e. information text, which has been entered in manual firing mode will be shown in the automatic firing mode and in the SMPTE timecode firing mode as well.

## 5.2.4 Accumulator capacity indicator

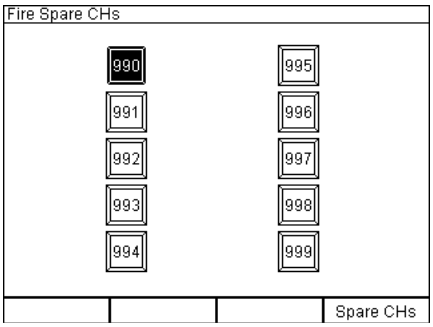
If the firing mode is off the battery symbol, which is indicating the accumulator capacity is being displayed in the upper right corner of the screen. If the charging unit is connected a plug symbol is being displayed additionally next to the battery pictogram.

## 5.2.5 Chart of interfering signal strength, 'IS'

The interfering signal strength is being displayed as a chart in this box. This means that you can determine if there is some interfering carrier on the radio channel (i.e. frequency), which is being used by the device by watching the displayed chart. The graphic is refreshed every 2.5 seconds. The chart shows all interferences of up to 180 seconds in the past. If there is no interference a low line is being displayed from the right to the left. The stronger the interfering signal the higher the graph is being plotted.

## 5.2.6 Preselection of a spare channel

If you press the key 'Spare CHs' and keep it pressed you will see e.g. this screen being displayed:



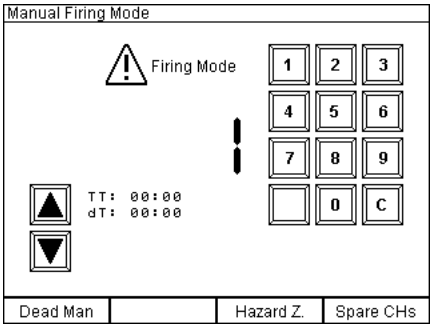

Ten channels, from 990 to 999, are intended as spare channels. Each time after switching the device on channel 990 is preselected as current spare channel. Now you may preselect another spare channel, which should be fired first.
But the spare channel can still be selected also if the firing mode has been activated.

| **TIP** | The setting 'Auto-increment of firing CHs' affects also the spare channels. |
|---|---|

## 5.3 Function if firing mode is active

### 5.3.1 Manual firing

To activate the manual firing mode, turn the corresponding key switch in 'On' position.




After turning the key switch 'Firing Mode' the screen content changes. Instead of the button 'Return to main menu' and the IS chart the warning 'ATTENTION Firing Mode' appears on the screen. This message and the illuminated firing key are indicating that the firing mode has been entered and the device is armed. As long as channel 0 is being displayed no firing command can be sent. If you press the firing button while channel 0 is present you will hear a warning signal (if the loudspeaker is active), which should inform you that you have to choose another firing channel first.
So, you should select the required channel by pressing the buttons 'Up' and 'Down' or by entering the channel on the keypad and press the red firing button afterwards.

Due to reasons of safety there is an interval time of 0.3 seconds between two firings to ensure that all firing commands are being sent and processed. During that short period of time the red firing key is not illuminated as optical indication for this. As soon as the firing key is illuminated again the next cue can be fired.

| **TIP** | The firing delay itself is only approx. 0.05 seconds. |
|---|---|

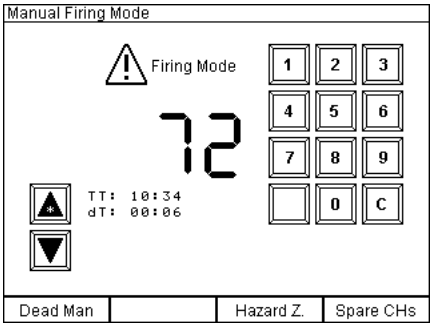
| **TIP** | If you want to fire effects with an interval time of less than 0.3 seconds, we recommend to use the stepping extension of the receivers. This feature is integrated in the receivers upon request (for some extra charge). It enables the receiver to process up to 100 different firings per second with a resolution of 0.01 seconds. |
|---|---|

If you have activated the 'Auto-increment of CHs' in the settings menu the device will increment the channel (channel + 1) after each firing automatically.

### 5.3.2 Stop watch function

With firmware version 2.6Cc or later a stop watch is being displayed next to the 'Up' button.

Two different times are being displayed:
- the total time (TT)
- the interval time (dT), dT is the abbreviation for delta Time




The stop watch is started after entering the manual firing mode with the first firing of any firing channel. The counting of the total time and interval time is started simultaneously.

With the firing of another firing channel the interval time is set to zero and starts counting up again.

You always see the time since the beginning of a manually fired fireworks display and the time since the last cue that has been fired.

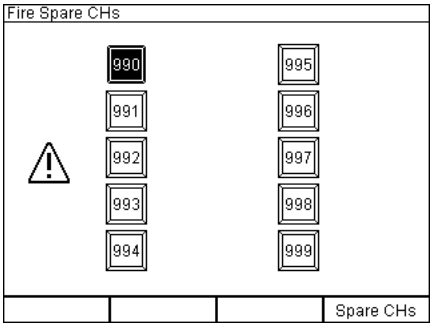
If the manual firing mode is deactivated both stop watches are reset to zero.

### 5.3.3 Dead Man function

The function 'Dead Man' has been activated in the example above. This means that the left multifunctional key is illuminated and as long as this key is not pressed no firing command can be sent. To inform you that the pressing of this key is required for firing the Dead Man's switch is illuminated. As soon as the key is pressed the firing key is illuminated, too. Now you can initiate the firing of the required channels.

### 5.3.4 Firing spare channels

You need to activate the firing mode to fire spare channels.

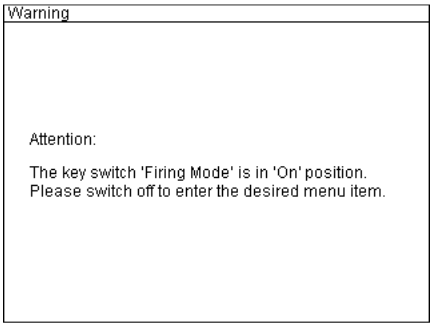



By pressing and holding the right multifunctional button 'Spare CHs' you see this screen being displayed.
Ten channels, from 990 to 999, are designated to be spare channels. The device suggests channel 990 by default each time after switching on (you see the button 990 displayed inverted). If you press fire now this channel will be fired. Afterwards the device jumps to the next channel if 'Auto-increment of CHs' has been activated in the settings menu.
If required you may select another spare channel buy pressing the particular button on the touch screen.
As soon as you release the button 'Spare CHs' the device returns to manual firing mode.

### 5.3.5 Command 'Firing Mode Off'

By switching off the firing mode all currently active stepping sequences of all 'Advanced' receivers are stopped and possibly active outputs are turned off. No more additional step firings are following. When using receivers of the 'Profi' series it depends on the programmed step delay if the stepping process will be stopped. For further information, please refer to the respective user manuals. The precondition for switching off the outputs and stopping the step sequences is that the receiver is within range and receives this command interference-free.

## 5.4 Warning message because of key switch firing mode is on



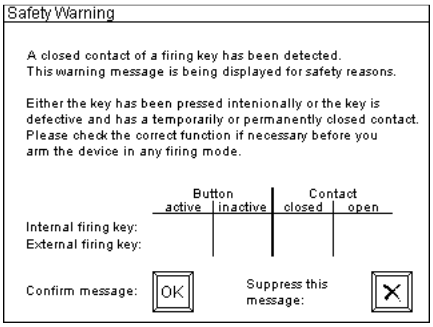

This warning message is being displayed if you enter the manual firing mode with the key switch firing mode being in 'On' position.

Switch off the key switch and do not activate the firing mode again before you intend to fire channels.

The key of the key switch 'Firing Mode' can only be removed in 'Off' position for reasons of safety. You should always remove the key during system installation to prevent firings by unauthorized persons.

In case of the PFC Advanced Black Edition the key switch has been replaced by a slide for the magnetic pen and an optional code request after powering up the device.

## 5.5 Warning message because of a closed contact of a firing key




This warning message is being displayed if the contact of the internal or external firing key is closed. The reason can be a defective firing button, or the firing key has been pressed manually. The warning message can be disabled until restarting the device.

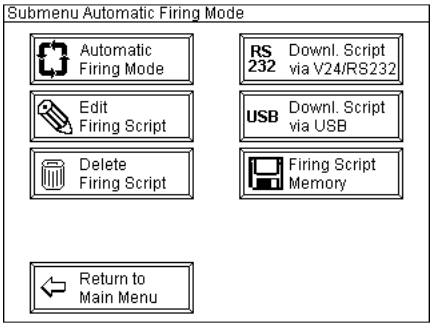
If the contact is closed in a firing mode while the PFC is not armed, the warning message will appear again and cannot be suppressed in the firing mode. This is due to reasons of safety and sequential control.

# 6 Automatic firing mode

The automatic firing mode is used to send firing commands with precise time intervals, which have been programmed before. You have the option of downloading firing scripts from the PC, which have been generated by the PYROTEC COMPOSER, or you can enter the firing script manually.

As a matter of course you can still edit the firing scripts once they are downloaded. To have some overview it is sometimes better to make changes in the COMPOSER and download the script again.

After pressing the button 'Automatic Firing Mode' in the main menu the following screen is being displayed:




You have entered the submenu of the automatic firing mode.

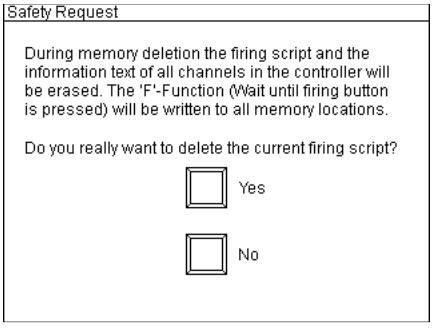
The button 'Return to Main Menu' needs no further explanation.

The other menu items are described below.

| **DANGER**<br>  <br>2.1.7 | **Unintended firing**<br><br>Fatal injuries due to explosion/deflagration of pyrotechnic effects and compositions and secondary effects due to explosion (flying objects).<br><br>• Only switch on the firing mode when there are no persons in the danger zone (firing area). |
|---|---|

## 6.1 Delete firing script

Especially if you want to enter a new automatic firing script you should start from scratch and delete the script memory of the device.

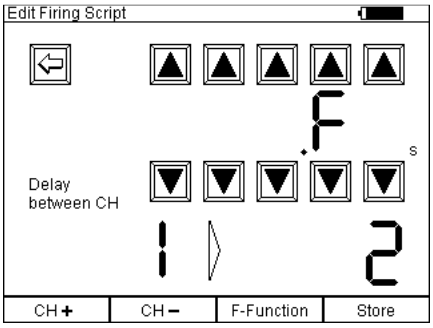



This screen is being displayed after pressing the button 'Delete Firing Script'. If you press 'Yes' all script data, including information texts, which have been entered possibly, will be deleted. All firing delays will be set to 'F' (Wait until firing button is pressed). During the process of deletion, a progress bar will be displayed.

By pressing 'No' the device will return to the submenu of the automatic firing mode again.

| **TIP** | Due to of the fact that the same information texts are used in all firing modes, manual, automatic firing mode and SMPTE timecode firing mode, they will no longer be available in all firing modes after deleting the automatic firing script. |
|---|---|

## 6.2 Edit firing script




This menu item is being used to determine the firing delay between firing channels. The shortest delay is 0.30 seconds, the longest delay is 999.99 seconds. The character 'F' instead of a delay time means, that no delay has been assigned so far. In this case the PFC Advanced will wait until you press the firing button manually. You can insert these 'Wait until firing button is pressed' several times in your automatic firing script, if you want to split the whole show in different segments, which should be triggered manually later.

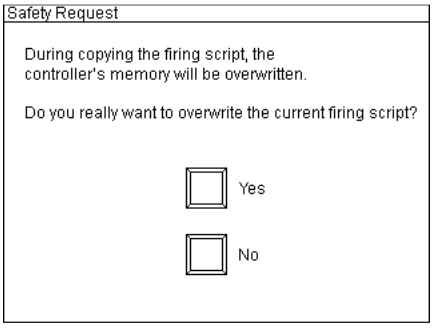
| **TIP** | With version 2.6C5 the programming of delays with a resolution of 0.01 seconds is possible. Also, the download of firing scripts which have been created with this high resolution is supported. An update of your Composer software is required for that. |
|---|---|

Proceed this way to program a script: After pressing the button 'Edit firing script' the screen shown above is being displayed. You see the current delay between firing channel 1 and 2. By pressing the buttons with the arrows pointing up and down you can select the delay time, which you want to program. Press 'Store' after your entry. Now you can proceed to the next pair of firing channels by pressing 'CH +' and enter or edit the next firing delay. With 'CH -' you jump back to the previous pair of channels. By pressing the key 'F-Function' the current delay value will be replaced by the function 'Wait until firing button is pressed'.

| **TIP** | Each time you change something it is required to press the key 'Store' afterwards to update the memory. Otherwise your entry will not be valid. Press this button each time before you change the pair of firing channels. |
|---|---|

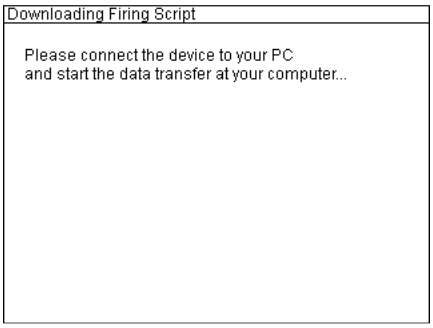
| **TIP** | Due to technical reasons the values between 0.01 and 0.29 seconds cannot be programmed. If you want to fire effects with an interval time of less than 0.30 seconds, we recommend to use the stepping extension of the receivers. This feature is integrated in the receivers upon request (for some extra charge). It enables the receiver to process up to 100 different firings per second with a resolution of 0.01 seconds. |
|---|---|

## 6.3 Download firing script via RS232

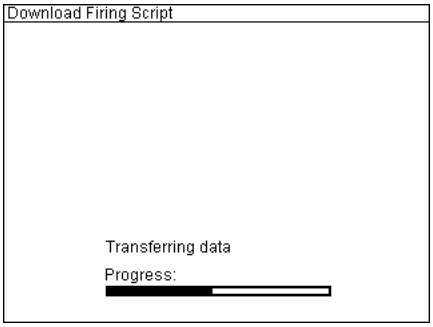



This function is required if you want to download firing scripts which have been designed by the Galaxis PYROTEC COMPOSER from your PC to the PFC by using the RS232/V24 interface.

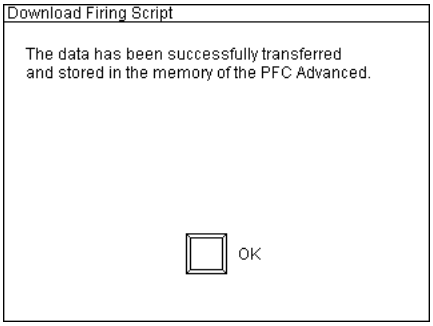
Press 'Yes' to proceed.




You will see this screen afterwards. Now establish the connection between the RS232/V24 port of the PFC Advanced which and the serial port of your PC by using a serial data cable. Then you can start the data transfer in the Galaxis PYROTEC Composer software. Please read also the manual of the software regarding this.

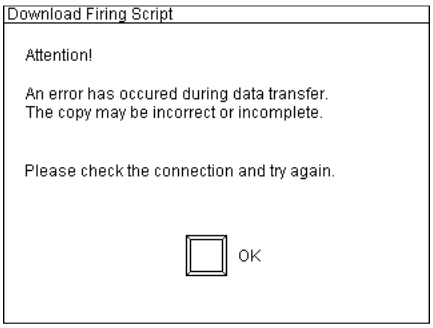



As soon as the data transfer has begun this screen is being displayed. The bar shows the progress of the data being transferred.



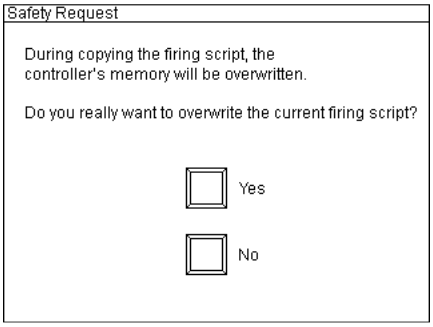

If the data has been transferred successfully you will see this screen. The correct transmission is proved by a complex check sum so that you can be sure that your firing script has been loaded by the PFC without any errors if you see this message. Press the button 'OK' to return to the submenu of the automatic firing mode.

Besides the timing information the PYROTEC Composer also transmits the file name, time and date. This script title is being stored as information text of firing channel 0. It is also visible in the menu 'Firing Script Memory' in the field 'Current Firing Script'.




If the analysis of the check sum led to any non-conformance or the connection has been interrupted this message will be displayed. In this case you should check the connections, then press 'OK' and retry to transfer the firing script.

## 6.4 Download firing script via USB



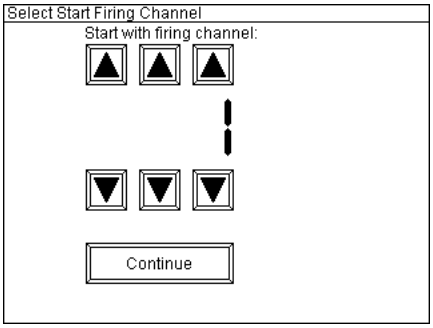

This function is required if you want to download firing scripts, which have been designed by the Galaxis PYROTEC COMPOSER, from your PC to the PFC by using the USB interface.

Press 'Yes' to proceed.

All following steps are identical to the download via RS232/V24.

## 6.5 Enter automatic firing mode

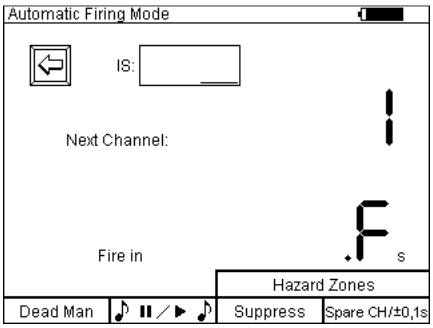
After pressing the button 'Automatic Firing Mode' in the submenu first this screen is being displayed before you enter the actual automatic firing mode:




You may enter a firing channel here if you do not want to start with firing channel 1.

Press 'Continue' to proceed.

Afterwards the firing mode will be entered and you may see the following screen being displayed.




As long as the key switch 'Firing Mode' is off you cannot send a firing command. This means that you can work in this mode without any danger. In the example shown on the left the Dead Man's switch has been activated. If this function has been deactivated the text 'Dead Man' does not appear and the key is not illuminated.

Next to the text 'Next Channel' the current firing channel is being displayed.

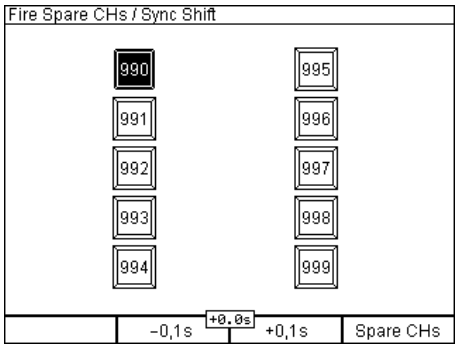
The meaning of the other information being displayed will be explained below.

## 6.6 Interfering signal, spare channels, Dead Man's switch, SYNC Shift

These functions are identical with manual firing mode and need not to be explained again, except one difference: the SYNC Shift function.

If a firing script is fired automatically the firing of spare channels does not impair the automatic firing in any way. All firings will be initiated according to the script. By using the spare channel function additional firings are merely inserted in the automatic sequence.

If the key 'Dead Man' is no longer pressed no firings will be initiated any more but the countdown timer will continue in the background. As soon as the key 'Dead Man' is pressed the next upcoming firing commands will be sent again.




In the automatic firing mode, the spare channel button has two functions and is renamed to 'Spare CHs +/- 0,1s'. When holding down the button, the display switches to the spare channels like in the manual firing mode, but with the difference that the two middle buttons have an additional function: the timing of a running automatic script can be adjusted by tenths of a second. This happens by pressing one of the buttons, '-0,1s' or '+0,1s'. Between the buttons the current SYNC Shift will be displayed. If the fired effects are not synced to the music, the script can be easily adjusted without caring about anything else. In case of a pyromusical you can adjust the timing during the show if necessary. The

maximum time shift is -9,9s or +9,9s. An entry is accepted immediately and does not need to be acknowledged. This means that the script will be accelerated or decelerated immediately after pressing one of the buttons. The result is a timing offset in the script.

## 6.7 Display of the next cue to be fired

Here you see which channel will be fired next. In addition the corresponding information text is being displayed below the digits of the channel number (if there has been any text either downloaded from the Galaxis PYROTEC COMPOSER or manually assigned), which can give you more details regarding the next cue (e.g. type of effect, position, calibre, scene).

## 6.8 Display of the countdown timer

In this screen section you see the remaining time to the next firing displayed in seconds. This time is refreshed regularly and as a result you see a countdown timer in the display as soon as the automatic firing sequence has been started. In the case that the character 'F' is being displayed here the controller waits until you fire manually by pressing the firing key. This is also always the case when starting the automatic firing sequence.

## 6.9 Function 'Hazard Zones'

This function is very useful if you want to disable certain parts of your fireworks display before or during firing show.

To use this function in a meaningful way it is essential that you have assigned different hazard zones to your receivers. Up to 16 different hazard zones, which are distinguished by letters (ranging from A to P) are at your disposal.

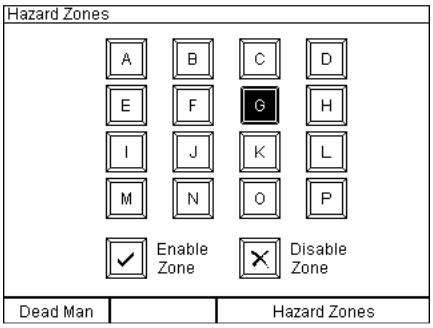
You may assign the same hazard zone to several receivers. Then these receivers will only be disabled together and also later on enabled together.

The hazard zones can be programmed in the receiver's submenu or by remote programming with the PFC Advanced or any PC or notebook with the wireless USB modem.

After switching on a receiver, the hazard zone which is determined in the receiver's memory is activated. This applies also if you change the hazard zone of a receiver. After making your changes the hazard zone on this device is active by default, i.e. firing commands will be executed.

This function can be accessed at all times, no matter if the firing mode is disarmed or armed.

Press the button labelled with 'Hazard Zones' and keep it pressed to display the following screen:
To invoke the hazard zone screen in the automatic firing mode you have to press the two function keys on the right simultaneously and keep these keys pressed. The following will be displayed on the screen:




As soon as you see this screen you may disable hazard zones and also enable the zones again.

| **TIP** | The pre-programmed firing commands on the time line have priority in the automatic firing mode. The hazard zone function can only be entered if no firing command is being sent at this point of time. In this case it takes a short while until the screen appears. If the controller is firing all the time (every 0.3 seconds) this function cannot be entered. You should consider this during show programming and use the stepping function of the receivers instead to avoid this. |
|---|---|

| **TIP** | Alternatively, you could use another PFC Advanced, which should be operated in the manual firing mode. It is important to use the optional backup switch to switch between the two controllers. By doing so you can deactivate and activate hazard zones with the second controller at all times. |
|---|---|

| **TIP** | In automatic firing mode the firing key is also active in the hazard zone mode. Please make sure that you do not press the firing key unintentionally. In this case, the controller would fire the next firing cue immediately and alter the timing of the automatic firing mode. |
|---|---|

### 6.9.1 Disable hazard zones (Firing commands will be suppressed)

First select the hazard zone which you want to disable on the touch screen. The button will be displayed inverted once you have made your selection. You may also alter your selection by pressing another button on the screen. Now press the touch button 'Disable Zone' and the controller PFC Advanced will send the command that this zone should be disabled to all receivers.

All receivers which have been programmed to this zone will immediately display e.g. the following in the bottom line of their LCD: 'Hazard Zone: Cx'. The symbol 'x' informs you that firings are suppressed on this device. All possibly active outputs will be switched off and all previously startet step sequences will be stopped and terminated. This means that if the hazard zone is enabled again later the device does not continue to process and fire these 'old' step sequences.

The precondition for switching off the outputs and stopping the step sequences and the suppression of following firing commands is that the receiver is within range and receives this command interference-free.

Right after disabling a hazard zone you can select another zone and continue with disabling or enabling.

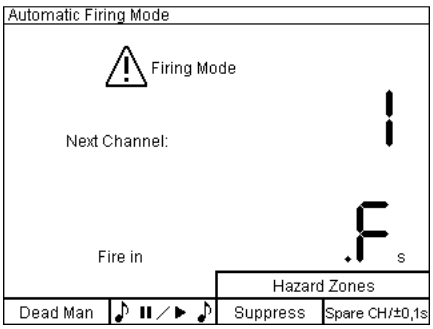
## 6.9.2 Enable hazard zones (Firing commands will be allowed)

To enable a hazard zone again first select the corresponding button on the touch screen. This button will be displayed inverted. You may also alter your selection by pressing anther button on the screen.

Now press the button 'Enable Zone' on the touch screen and the controller PFC Advanced will send the command that this zone should be enabled to all receivers. All receivers within range which have been programmed to this zone will immediately display e.g. the following in the bottom line of their LCD: 'Hazard Zone: C✓'. The symbol '✓' informs you that future firing commands will be processed on this device.

Right after activating a zone you may select another one and enable also this zone.

## 6.10 Start automatic fire

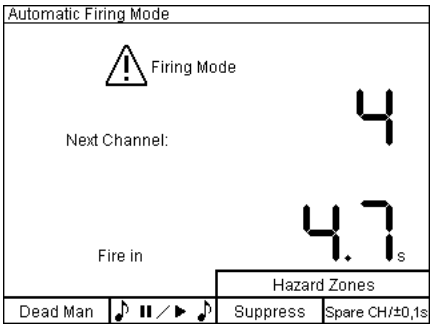



After activating the key switch 'Firing Mode' the display content changes and you see 'Attention Firing Mode' on the screen. This information in the display and the flashing firing key indicates that the device is armed.

Usually an automatic firing sequence begins with firing channel 1 but you are able to choose another start channel after pressing the button 'Automatic Firing Mode' in the submenu of the Automatic Firing Mode, see explanations above.

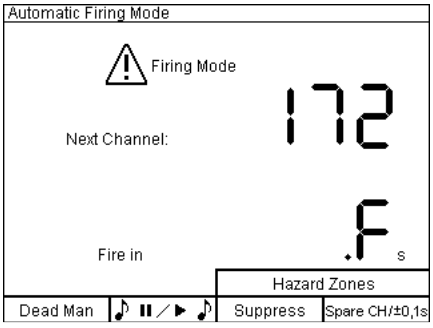
By pressing the red flashing key 'Fire' the automatic firing sequence will be started and e.g. channel 1 will be fired immediately after pressing the button.

If the Dead Man's switch has been activated, like in the examples shown here, the key 'Dead Man' needs to be pressed for initial activation of the automatic firing sequence and also for the firings to follow. When this key is pressed the key 'Fire' is flashing.




You have reached firing channel 4 in the automatic firing mode. According to the countdown timer this channel will be fired in 4.7 seconds.

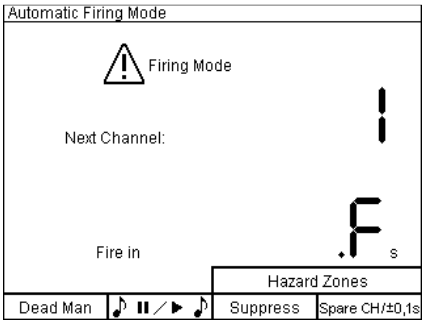
By pressing the key 'Fire' the next cue will be fired immediately. The remaining countdown time will be ignored in this case. In a pyromusical application this will result in a misalignment between pyro and music. In this case it is recommended to use spare channels to fill gaps in the show instead of firing the next cue.




Channel 171 has been fired by the automatic fire function and channel 172 is the next cue. Apparently, no firing delay has been programmed and therefore the device waits for your manual firing by pressing the key 'Fire'.

If delays have been programmed after this channel the device will proceed with automatic firings again.

## 6.11 Function Pause and Audio Pause




The button 'Pause' can only be used when the Firing Mode is activated. If a PFE Profi Audio receiver is used, it will also be paused together with the automatic firing script. As soon as an automatic firing script is started, the function can be used. The button for Pause is always illuminated and flashes when the Pause Function has been activated. For this function a countdown is not necessary in the Automatic Firing Mode, it also works with a so called semi-automatic scheme, which is a mix of delays between cues (countdowns) and F-Functions (wait for manual fire).

If the Pause Function was activated, the firing mode can even be switched off. After enabling the firing mode again, the show can be restarted without any loss in synchronization when pressing the Pause button again.

When the Pause Function is active the symbols above the function key are displayed inverted.

| | |
|---|---|
| **TIP** | When the Pause Function is active, all already initiated stepping sequences will continue to be fired. If this is not desired, the firing mode has to be switched off after activating the Pause Function. |

| | |
|---|---|
| **TIP** | When the Pause Function is enabled, the countdown is shown with a correction of minus 0.3 seconds. This is necessary in order to maintain the synchronization of the show. The same happens when the firing button is used. The time to the next firing cue will also be deducted by 0.3 seconds. |

| | |
|---|---|
| **TIP** | If the firing button is pressed during an activated Pause Function, the next cue will be fired immediately! |

## 6.12 Suppress function

Activation of the multifunctional key 'Suppress' leads to a suspension of firings as long as they key is pressed. The automatic sequence will continue in the background but no firing commands will be sent. This function comes in handy as a safety tool in pyromusicals. The synchronisation between music and pyro is not affected in any way because the automatic sequence is still proceeding while the music is being played back. As soon as the 'Suppress' key is released the firings continue as scheduled.

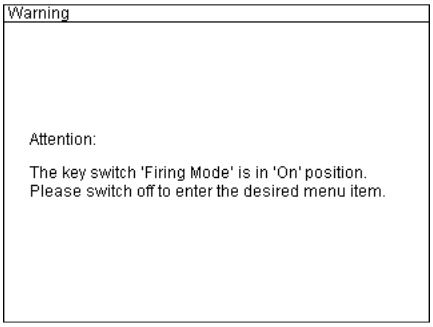
The function is providing additional safety but does not spoil the whole show if it is was necessary to use it. E.g. if a person trespasses your firing site during the show you can suspend firings as long as necessary. Afterwards the show continues as programmed.

| | |
|---|---|
| **TIP** | The function 'Suppress' does not stop step runs once they have been triggered. To stop stepping sequences you have to use the function 'Firing Mode Off'. |

## 6.13 Command 'Firing Mode Off'

By switching off the firing mode all currently active stepping sequences of all 'Advanced' receivers are stopped and possibly active outputs are turned off. No more additional step firings are following. When using receivers of the 'Profi' series it depends on the programmed step delay if the stepping process will be stopped. For further information, please refer to the respective user manuals. The precondition for switching off the outputs and stopping the step sequences is that the receiver is within range and receives this command interference-free.

## 6.14 Warning message because of key switch firing mode is on




This warning message is being displayed if you enter the automatic firing mode with the key switch firing mode being in 'On' position or the magnetic pen in the slide if it is an PFC Advanced Black Edition.

Switch off the key switch or remove the magnetic pen and do not activate the firing mode again before you intend to fire channels.

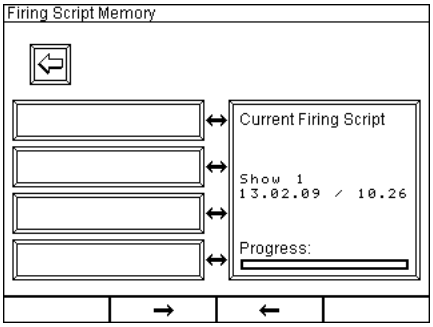
The key of the key switch 'Firing Mode' can only be removed in 'Off' position for reasons of safety. You should always remove the key during system installation to prevent firings by unauthorized persons. In case that you are using the PFC Advanced Black Edition controller you should use the code request after power-up to achieve the same.

## 6.15 The function 'Firing Script Memory'

This menu enables you to manage several firing scripts. The automatic firing mode always refers to the current firing script. It is all the same with downloading a script. A download will always overwrite the data of the current firing script. Also, the editing of the information texts in the manual firing mode refers always to the current firing script.

With the function 'Firing Script Memory' the content of the current firing script can be copied to another location in the internal memory of the device. Altogether four of these memory locations are at your disposal. After copying you may modify the current script or download a new one and then copy the new content to another memory location. Now you may also use the opposite way and recall a script from a memory location and copy it into the current firing script. A total of five scripts can be stored: four memory locations and the current firing script.

Proceed this way to copy a firing script to a memory location:



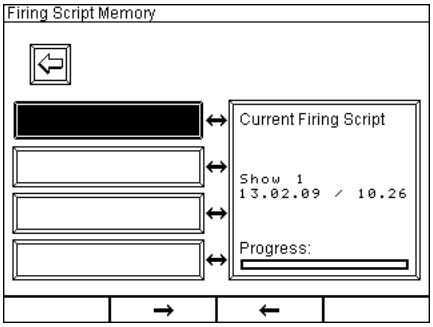

The script which is to be stored is the current firing script, named 'Show 1'.

When downloading to the PFC the Composer transfers also the name, date and the time of the script. This data is being stored as information text of firing channel 0 and can also be modified in the Manual Firing Mode.

In this example the four memory locations are empty and unlabelled.

To copy a script, first select a memory location by touching the screen.

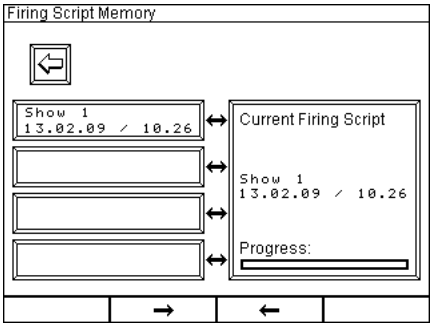
After selecting a memory location, the box will be displayed inverted.




The first memory location has been selected in this example.

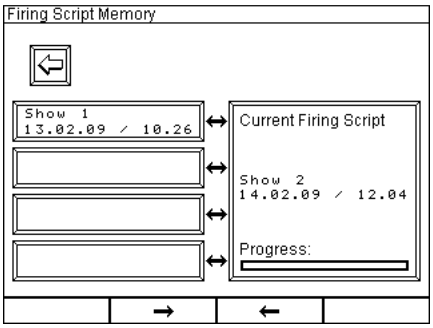
By pressing one of the two function keys in the middle the copying will be started. The arrows indicate the writing direction.

Now press the second button from the right. A process bar which will be displayed shows that the data is being copied. During that all entries of the script memory that is being written to will be overwritten.



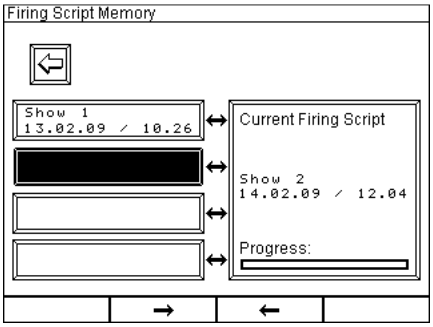

All data has been copied. The result is a copy of the current firing script. The first memory location contains the same data now, too. If you like you could download another script without losing the previous one.

To load a stored script into the current firing script memory first mark the memory location with the script that should be copied (i.e. the source). Afterwards press the second button from the left. Again, you will see a process bar moving from the left to the right until all data has been copied.

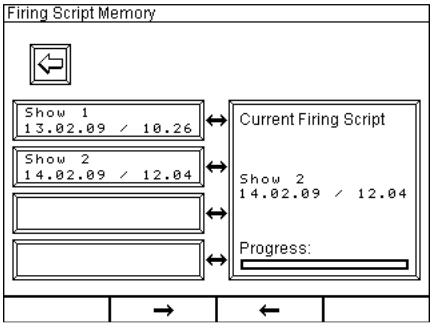



This example shows that another script has been downloaded. It is named 'Show 2'.

If you want to copy it to one of the four memory locations, too, select the desired one.




The second memory location from the top has been selected. Press the second button from the right again to copy the new script into the marked memory location.




Once the data transfer is finished you will see the title of the script being displayed in the memory location.

To erase a stored script first erase the current script (make sure not to lose any data when doing so) in the submenu of the Automatic Firing Mode by using the function 'Delete Firing Script'. Afterwards copy

the emptied script to the memory location which you intend to erase. By doing so all information texts and all firing delays will be deleted.

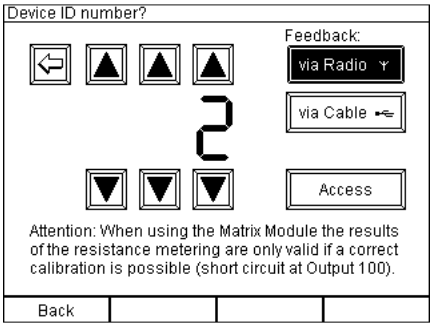
| **TIP** | After entering a script manually, you can assign a title to it, which will be displayed in the menu 'Firing Script Memory'. This title has to be entered in the Manual Firing Mode as information text of firing channel 0. All information texts that are entered in the manual firing mode are also being displayed in all other firing modes. |
|---|---|

# 7 Remote Data Request

With the function 'Remote Data Request' information of up to 999 receivers of the 'Advanced' series can be polled in a very convenient way. You may enter this mode anytime to check the accumulator condition, radio range conditions, output parameters and many other things.

Changes can only be done in the Remote Programming Mode. Therefore, you can request data in this mode without any worries about unintended modifications.

After entering this mode from the main menu, you have to type in the device ID number of the receiver you want to request data from:




Initially you should determine the way the data is transmitted. Normally this is 'via Radio'. If you want to receive the feedback via cable please activate the corresponding button.

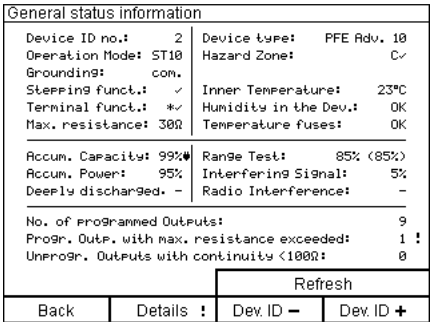
Then select the required device ID by pressing the arrow buttons (in this example ID number 2 has been selected) and press 'Access'. The device ID number 0 is invalid.

The following conditions are to be met to use this function:

1. Data can only be requested from firing modules of the 'Advanced' series.
2. The device you want to access has to be within radio range and it needs to be operated in receiving mode.
3. Specific device ID numbers need to be assigned to the receivers beforehand. Please read the manual of the 'Advanced' receiver for further information on this topic.

After pressing the button 'Access' the following screen may be displayed for example.

## 7.1 General status information




All relevant device parameters of the selected receiver are being displayed on this screen.
Parameters, which need your attention because their value is below or above the relevant threshold are highlighted with an exclamation mark, which is displayed either on the left or right margin.

If there are any output related errors a '!' will be displayed next to the button label 'Details' (from version 2.6C6b of the PFC, from version 2.6C4c of the PFE Advanced 10 / 100 Outputs).

If the two multifunctional keys on the right side are pressed simultaneously the last request will be repeated. The data on the screen will be updated afterwards.

Detailed description of the displayed information:

| | |
|---|---|
| **Device ID no.** | The device ID number of the receiver, which has just been accessed, is being displayed here again. |
| | |
| **Operation Mode** | Either 'ST10' for Standard 10 Outputs or 'M100' for Matrix 100 Outputs. |
| | |
| **Grounding** | Depending on the programmed grounding either 'com.' for common ground or 'sep.' for separated grounding is being displayed. |
| | |
| **Stepping funct.** | If the device is not equipped with a stepping function you see '-' being displayed on the screen. Otherwise the symbol '✓' is being displayed |
| | |
| **Terminal funct.** | If the device is not equipped with the terminal function you see '-' being displayed on the screen. If the receiver has the terminal option '✓' is being displayed. In the case that the receiver is in 10 output mode and a terminal programming is active a star is being displayed right before the check symbol. So, you will see '*✓' on the screen. If the receiver is not transmitting this parameter due to an older firmware a '?' is being displayed. |
| | |
| **Max. resistance** | The value of the maximum resistance, which has been programmed at the receiver, is being displayed here. This parameter is being used as a threshold to determine if a firing line will fire properly. |
| | |
| **Device type** | The type of device is being displayed here, in this case 'PFE Advanced 10 Outputs'. |
| | |
| **Hazard Zone** | The hazard zone (ranging from A to P) that has been assigned to this receiver is being displayed here. After the letter of the hazard zone you see the status of the hazard zone. Either '✓' is being displayed if the hazard zone is enabled or 'x' is being displayed if the device received the command that this hazard zone should be disabled. If the receiver does not manage the hazard zone function due to an older firmware '?' is being displayed. |
| | |
| **Inner Temperature** | The receiver which has been requested to send the status measures the temperature inside. If the receiver does not send the measured temperature (old firmware) you will see '?' instead. |
| | |
| **Humidity in the Device** | Either 'OK' or '>30%' if the value is above the threshold. |
| | |
| **Temperature fuses** | Either 'OK' or 'E', which means 'Error', if at least one temperature fuse is blown. |
| | |
| **Accum. Capacity** | Accumulator capacity of the rechargeable battery in the requested receiver. If the receiver is currently being charged the symbol of a mains connector is being displayed right next to the percentage value. By this you can check remotely if the charging unit is powered with mains supply and if it is still connected to the device. |
| | |
| **Accum. Power** | Power of the rechargeable battery in the requested receiver. |
| | |
| **Deeply discharged** | Number of deep discharges of the requested receiver. |
| | |
| **Range Test** | The value displayed first is the signal strength of the controller measured by the requested receiver. This result is decisive and is the same as if of a conventional range test has been performed. The value in brackets is the signal strength of the feedback signal which has been measured by the controller. |

| | |
|---|---|
| **Interfering Signal** | The interfering signal strength, which has been measured by the requested receiver on its specific position, is being displayed here. |
| | |
| **Radio Interference** | If the receiver has detected a radio interference, then this event will be displayed here. The interference could have happened a long time ago and it was maybe only of short duration. You should watch the current values of the interfering signal and change the radio channel if there is any need. |

A very useful summary of all output related parameters is being display in the lower third of the screen. This is giving you a quick overview if everything is OK with the outputs.

| | |
|---|---|
| **No. of programmed outputs** | You see at a glance how many outputs have been assigned with a firing channel. If the number does not comply with your show planning you should check the channel assignment thoroughly and change it if necessary. By pressing the key 'Details' you will get more detailed information about the outputs. You may change the channel assignment conveniently by entering the function 'Remote Programming', even if the receiver is located at quite a distance. |
| | |
| **Progr. Outputs with max. resistance exceeded** | If there are outputs with some channel assignment with a resistance higher than the programmed maximum resistance (i.e. insufficient continuity) their total number is being display here. If you expect all outputs to have proper connections you should check thoroughly. By pressing 'Details' you will be able to obtain all details regarding the outputs. |
| | |
| **Unprogr. Outputs with continuity <100 Ω:** | If outputs, which have no channel programming, have connections to e-matches it is likely that some mistake has happened. Either somebody forgot to program these outputs or the firing lines were connected at the wrong outputs. In any case you are informed about this inconsistency and you can check what the cause is, e.g. by pressing 'Details' to take closer look at the output parameters. |

| | |
|---|---|
| **TIP** | All receiver related parameters are described in detail in the user manual of the 'Advanced' receiver. |

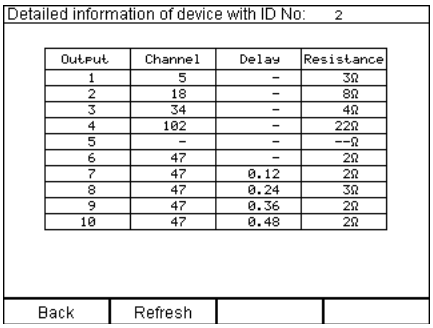
By pressing the multifunctional keys below the display, you can activate these functions:

| | |
|---|---|
| **Back** | By pressing this key, you will return to the previous screen. You may enter additional device IDs directly for remote data requests or you can return to the main menu. |
| | |
| **Dev. ID -1** | By pressing this key, the current device ID is decremented and a remote data request of the device with the device ID, which is right below the previous one, is executed. |
| | |
| **Dev. ID +1** | By pressing this key, the current device ID is incremented and a remote data request of the device with the device ID, which is right above the previous one, is executed. |

Please note that the data request and data transfer take some time. Wait until you see all requested information on the screen and the keys are illuminated again before you select the next device. As soon as the keys are illuminated, the device is ready for new requests. If you want to check only certain device IDs, especially if they are not adjoined, you should access these devices individually by typing in each device ID number. Simply press 'Back' and enter the concerned device ID.

| | |
|---|---|
| **Details** | By pressing this button all output related details of the receiver, which has been accessed right before will be displayed. If there are any output related errors a '!' will be displayed next to the button label 'Details' (from version 2.6C6b of the PFC, from version 2.6C4c of the PFE Advanced 10 / 100 Outputs). |

## 7.2 Display of the output details:

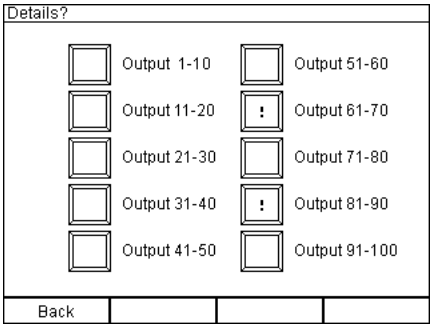



The device ID number is being displayed in the headline again. So, you can always make sure with which device you are dealing with.

A spreadsheet with four columns, in which output number, programmed firing channel, delay values of the stepping function and the measured firing line resistance, is being displayed clearly structured.

Please note that the device can only determine the firing capability according to the measured resistance if the e-matches are connected in series.

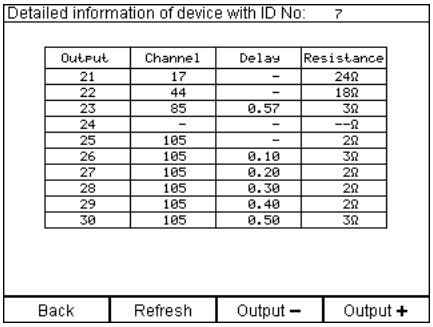
If you made changes at the receiver while this screen is being displayed you can repeat the data request by pressing the multifunctional key 'Refresh'.
If you change the operation mode at the receiver the remote data request needs to be started from the very beginning in order to make sure to receive correct data.




The PFC Advanced will recognize automatically if you are requesting data from a device with Matrix Module.

In this case you will see this screen where you have to select one out of ten buttons representing a group of ten outputs (1-10, 11-20, etc.) before the details are being displayed.

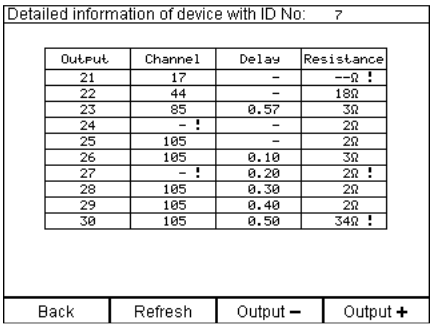
During the previously performed General Status Request it has been detected in which output groups errors occurred. The groups with an error is labelled with an exclamation mark. This makes fault finding more easily (from version 2.6C6b of the PFC, from version 2.6C4c of the PFE Advanced 10 / 100 Outputs).
If you return from the detail screen to the group selection screen a '?' instead of the '!' will be displayed because the errors are probably fixed. Perform another General Status Request to obtain new data regarding the errors.




The screen with the details of a firing module with Matrix Module looks like this for example.

By pressing the two right multifunctional keys you can request the details of the next higher or next lower group of outputs.

In this example everything is OK. No alert symbols (exclamation marks) are being displayed.




Several warnings are displayed in this example.

At Output 21: You see an exclamation mark next to the measurement result. The resistance at the connectors is higher than 99 Ω and therefore also the maximum resistance is exceeded. Most likely either no firing line is connected at all or the connection is interrupted somewhere. Make sure that the line is connected and check the e-matches and the whole line.

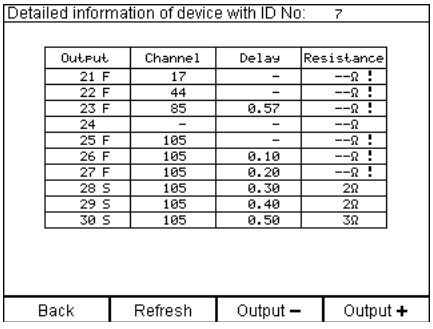
At Output 24: This output has connection to a firing line with continuity but the channel programming is missing. Either the line was connected unintentionally or somebody forgot to assign a firing channel to this output.

At Output 27: A stepping delay has been programmed but no firing channel. Therefore, this output cannot fire. You should check on the channel programming. Another exclamation mark is being displayed next to the result of the resistance metering because it is not logical that e-matches are connected to outputs with no firing channel being programmed.

At Output 30: The programmed threshold of the maximum resistance (normally 30 Ω for e-matches of type 'A') has been exceeded. Check the firing line. Probably too many e-matches have been connected in series or the cable is too long or too thin.

## 7.3 Display of the Event Memory

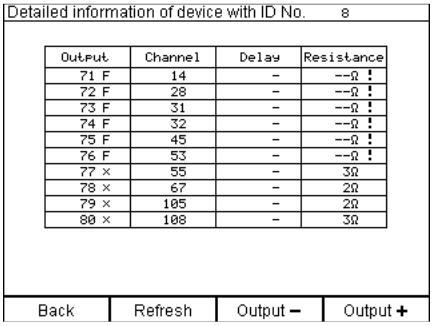
If the receiver's Event Memory contains entries you will see them also in the spreadsheet:




The character 'F' next to the output number informs you that the outputs 21, 22, 23, 24, 25, 26 and 28 have fired since operation of the receiver. Therefore, the lines are open.

A character 'S' is being displayed next to the outputs 28, 29 and 30. This means that a firing command has been received for these outputs and that a stepping process has been initiated. But the device received a Firing Mode Off Command before the delay time elapsed and due to that the firing has been stopped.

The function 'Event Memory' is supporting you in determining the cause of unfired effects. If you see the 'F' being displayed you can be sure that the device executed the firing command.

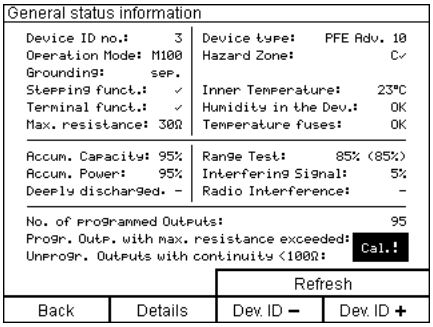



In this example you can see that some outputs have fired as usual. Then the hazard zone that has been assigned to this receiver has been disabled. In this case all outputs which have been programmed with a firing channel and which have not fired yet will be marked with an 'x' in the event memory.

These outputs were not been able to fire because the hazard zone has been disabled.

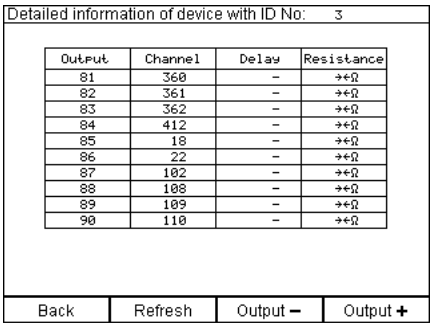
## 7.4 Missing calibration

If you are using the Matrix Module output 100 needs to be shorted to provide zero calibration for the resistance metering. Otherwise no resistance metering is possible. If calibration is missing you will see e.g. these warnings:




It was not possible to determine how many outputs have sufficient continuity and if there are outputs without programming but connection to e-matches because calibration is missing. Instead of the results 'Cal.!' is being displayed.

Short output 100 at the Matrix Module and press the two right multifunctional keys (Refresh) to receive updated information.




Instead of the results of the resistance metering '→←' is being displayed indicating that the calibration is missing.

You will see the same symbol in the remote programming menu after pressing the button 'Read' instead of the resistance value.

Short output 100 at the Matrix Module and press the multifunctional key 'Refresh' to receive updated information.

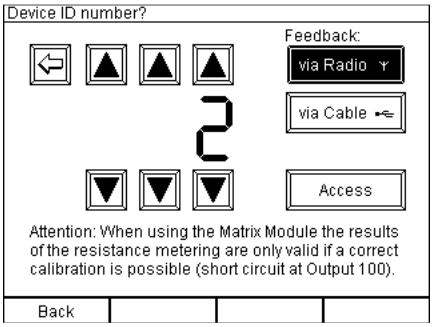
## 7.5 Possible general status information during remote data requests

| Parameter | Value | Warning threshold | Remark |
|---|---|---|---|
| | | | |
| Device ID no. | 1 - 999 | - | Individual number to identify devices |
| Operation Mode | 'ST10'<br>'M100' | - | Standard 10 Outputs<br>Matrix 100 Outputs |
| Grounding | 'com.' / 'sep.' | - | common or separated ground;<br>If Matrix Modules are being used only separated ground is possible. |
| Stepping funct. | '-' / '✓' | - | |
| Terminal funct. | '-' / '✓' / '*✓' | - | If there is an active terminal programming a '*' is being displayed right before the check symbol. |
| Max. resistance | 5 Ω – 50 Ω | as soon as the selected value is exceeded | Can be selected at the receiver |
| Device type | 'PFE Adv. 10 Outputs' | - | Displays the device type of the particular receiver. |
| Hazard Zone | A - P | - | If the hazard zone is enabled '✓' is being displayed right after the letter. 'x' means that the hazard zone has been disabled. |
| Inner Temperature | -50 … +99°C | | See technical data regarding allowed temperature range. |
| Humidity in the Device | 'OK' / '>30%' | >30% | OK, if relative humidity is less than 30% |

| | | | |
|---|---|---|---|
| Temperature fuses | 'OK' / 'E' | as soon as one fuse is blown | Send the device to the manufacturer for proper testing if this error occurs. |
| Accum. Capacity | 0-99% | < 30% | If the device is currently being charged the symbol of a mains connector is being displayed right next to the percentage value in order to signal that the device is being charged. |
| Accum. Power | 0-99% | < 60% | Send device to the manufacturer for battery replacement if battery is fully charged and this value is below 60%. |
| Deeply discharged | 0 - 9 | >= 1 | Send device to the manufacturer for battery replacement if the battery has suffered deep discharges. Avoid deep discharges by using the battery saver function of the PFE Advanced 10/100 Outputs. |
| Range Test | 0-99% | < 30% | Only the first value is decisive. |
| Interfering signal | 0-99% | > 15% | Change radio channel if necessary. |
| Radio interference | '-' / '✓' | as soon as a radio interference has been detected | It is possible that the interference happened long time ago. Change radio channel if necessary. |
| No. of programmed Outputs | | - | |
| Programmed Outputs with max. resistance exceeded | | >= 1 | |
| Unprogrammed Outputs with continuity < 100Ω | | >= 1 | |

# 8 Remote programming

First of all you have to enter the device ID number of the receiver you would like to access, just as it is required with Remote Data Requests.




Initially you should determine the way the data is transmitted. Normally this is 'via Radio'. If you want to receive the feedback via cable please activate the corresponding button.

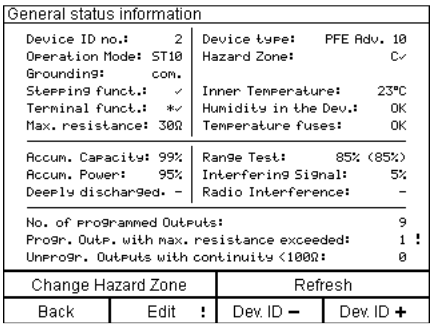
Then select the required device ID by pressing the arrow buttons (in this example ID number 2 has been selected) and press 'Access'. The device ID number 0 is invalid.

The following conditions are to be met to use this function:

1. Data can only be programmed to firing modules of the 'Advanced' series.
2. The device you want to access has to be within radio range and it needs to be operated in receiving mode.
3. Specific device ID numbers need to be assigned to the receivers beforehand. Please read the manual of the 'Advanced' receiver for further information on this topic.

After pressing the button 'Access' the following screen may be displayed for example.

## 8.1 General status information



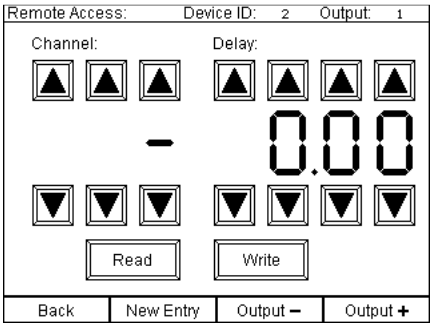

The controller requested the General Status Information and is displaying all relevant parameters. The request is necessary so that the controller knows the selected operation modes. You should get some overview here. Parameters, which need your attention because their value is below or above the relevant threshold are highlighted with an exclamation mark, which is displayed either on the left or right margin. You will find a detailed description of the General Status Information screen in the section 'Remote Data Requests' in this manual.

If the two multifunctional keys on the right side are pressed simultaneously the last request will be repeated. Afterwards the data on the screen will be updated.

By pressing the two left function keys simultaneously the remote programming mode of the hazard zone of the currently accessed receiver will be entered. This function will be explained in detail in a chapter below.

The second multifunctional key on the left side is labelled with 'Edit' in this mode. Press this key if you want to edit the output programming of the receiver.

## 8.2 Invoking the edit screen




In the headline of the edit screen the device ID number of the accessed receiver and the currently selected output number is being displayed always. For a start the controller sets the output number to 1 each time when entering this mode.

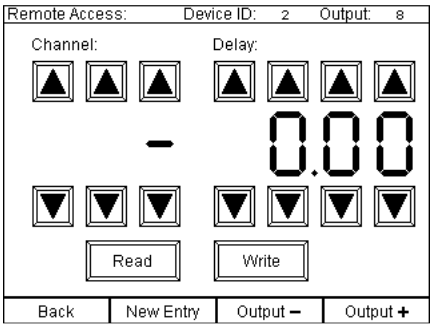
By pressing the key 'Back' you will return to the 'General Status Information' screen.

The display digits in the middle of the screen are placeholders. In the beginning they are always empty because no data has been requested or entered so far. '-' is being displayed for the firing channel and 0.00 for the step delay indicating this.
By pressing the two right multifunctional keys you can change the output number.

In total six arrow buttons, 'Up' and 'Down', are being used to enter the desired firing channel.

Under 'Delay' the delay value for the stepping function is entered with another eight arrow buttons (only present if you are using a receiver which has been equipped with the stepping function, otherwise the right section of the screen is not present).

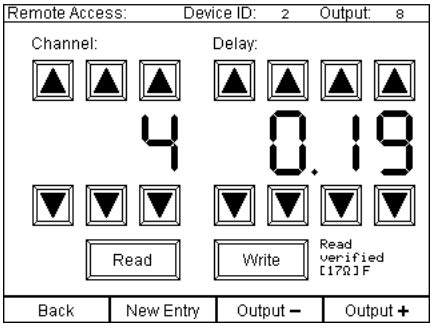
## 8.3 Read data




In remote programming mode you can read data and write data as well.

To find out what firing channel and delay value is programmed select the specific output with the keys 'Output +' and 'Output -'.

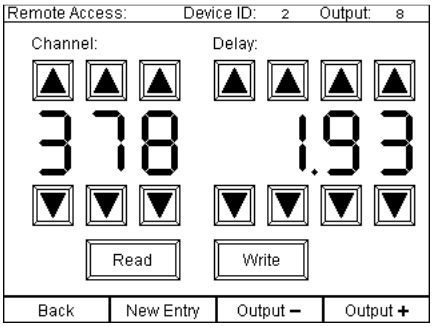
In this example output 8 has been chosen. Press the button 'Read' afterwards.




You see the information, which has been just received, being displayed and the text 'Read verified' is visible in the lower right section of the screen. As long as you can see this text you now that the information on the screen is consistent with the programming of the receiver.

In addition the currently measured resistance of this output is being displayed and the content of the event memory as well ('F' if the output has fired since operation or 'S' if a stepping process has been initiated, but the command Firing Mode Off has been received and the stepping process has been stopped).

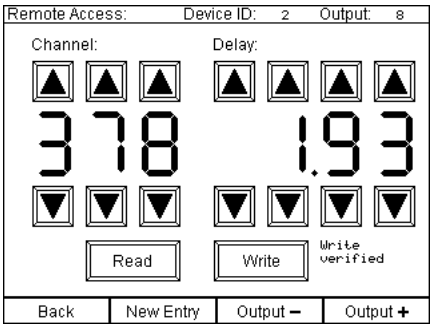
## 8.4 Enter or change data




As soon as you press one of the arrow buttons or the key 'New Entry' the text 'Read verified' vanishes because the information on the screen has changed and is at the moment not consistent with the programming of the receiver. The same applies if you change the output number.

Enter the values for firing channel and/or delay which should be stored in the receiver's memory.

## 8.5 Write data




Now press the button 'Write'. The entered data will be transferred. 'Write verified' will be displayed in the bottom right section of the screen. This is a reliable feedback that the data has been transferred correctly and is now stored in the receiver's memory.

As soon as the data on the screen is being changed or another output is selected the text, which is indicating that the data is consistent, is no longer being displayed.

Any change becomes only valid if you press the button 'Write' again.

You need not read data every time before writing data. To do so just select the next output, make your entries and press 'Write' right after that. The previous programming of the output will be simply overwritten.

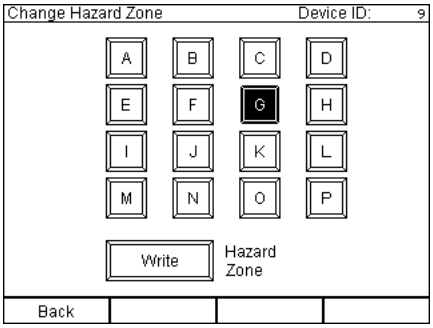
If another output is being selected the data on the screen remains unchanged. This enables fast programming of channels or delays in a consecutive manner. Simply increment first the output number and then e.g. the delay value and then press 'Write'. After receiving the feedback that the data has been successfully written increment the output number again and enter the next required programming for the step delay and so on.

To clear all data on the screen press 'New Entry'.

To delete an output programming press 'Write' right after 'New Entry'.

## 8.6 Remote programming of the receiver's hazard zone

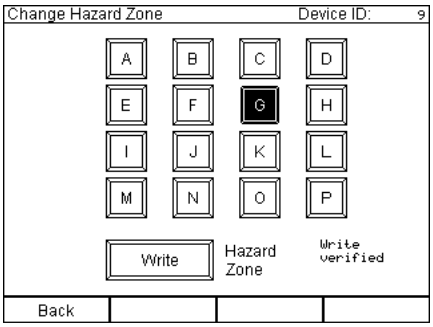
Press the two left function keys simultaneously while the controller is in remote access mode and the screen 'Change Hazard Zone' will be displayed. These keys are labelled with 'Change Hazard Zone'.




Select the hazard zone which you want to assign to the receiver on the touch screen.

After you made your selection the respective button is displayed inverted.

Now press the button 'Write' on the screen. After that the controller is transmitting the programming command to the receiver and waits for the receiver's acknowledgement.




If this acknowledgement is received 'Write verified' is being displayed in the lower right section of the screen.

If the acknowledgement is not received you will read 'no Feedback' instead. Either the receiver is not within range or the receiver has an older firmware which does not handle the hazard zone function. If the latter is the case you see a '?' being displayed instead of the hazard zone on the general status information screen.

# 9 G/H-Flame Remote Access

Like the Remote Programming of a PFE Advanced 10 Outputs, you have to select a device ID of the G- or H-Flame you would like to access.

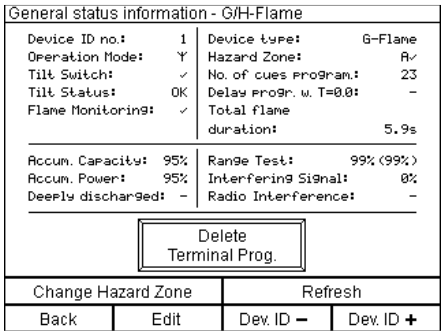
First you have to make sure that the correct feedback 'via Radio' or 'via Cable' is chosen. The H-Flame only responds via radio.

Choose with the arrow buttons the device ID and press 'Access'. The device ID 0 is invalid.

The following requirements have to be fulfilled to use this function:

1. You can only remotely access G-Flames, which have been upgraded with the optional Advanced Wireless module.
2. The device you want to access has to be within range and has to be in receiving mode.
3. You have to assign unique device IDs to the G- and H-Flames beforehand. More information about this topic can be found in the manual of the 'Advanced' receiver and the G-Flame.

When pressing 'Access' you will see e.g. the following screen:




On this screen you see all relevant device information of the accessed device.

If the two multifunctional keys on the right side are pressed simultaneously the last request will be repeated. The data on the screen will be updated afterwards.

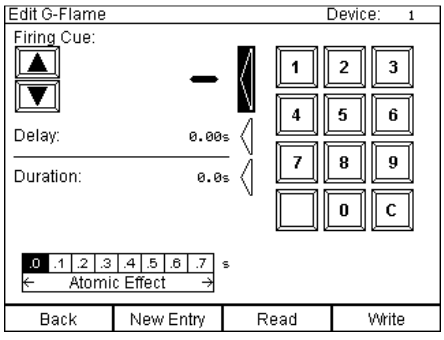
Detailed description of the displayed information:

| | |
|---|---|
| **Device ID no.:** | Shows the device ID of the accessed device. |
| | |
| **Operation Mode** | Shows the chosen operation mode, radio or cable. |
| | |
| **Tilt Switch** | Shows if the tilt switch is activated or deactivated. |
| | |
| **Tilt Status** | Shows if the device is tilted by more than 45°. |
| | |
| **Flame Monitoring** | Shows if flame monitoring is activated or deactivated. |
| | |
| **Accum. Capacity** | Accumulator capacity of the rechargeable battery in the requested device. If the device is currently being charged the symbol of a mains connector is being displayed right next to the percentage value. By this you can check remotely if the charging unit is powered with mains supply and if it is still connected to the device. |
| | |
| **Accum. Power** | Power of the rechargeable battery in the requested device. |
| | |
| **Deeply discharged** | Number of deep discharges of the requested device. |
| | |
| **Device type** | Shows if the device is a G- or an H-Flame. |
| | |
| **Hazard Zone** | Shows the programmed hazard zone (A to P). Next to the letter you see a '✓' if the hazard zone is activated. If the device received the command to disable the current hazard zone, you will see an 'x' next to the letter. |
| | |
| **No. of cues program.** | Shows how many cues have been programmed. |

| | |
|---|---|
| **Delay progr. w. T=0.0** | Shows if a delay (step delay) has been programmed without a flame duration. You will see an exclamation mark if this is the case because this kind of cue programming makes no sense. If the programming is correct, you will see a hyphen. |
| | |
| **Total flame duration** | Shows the total flame duration of all programmed cues in seconds. |
| | |
| **Range Test** | The value displayed first is the signal strength of the controller measured by the requested device. This result is decisive and relates to the result of a conventional range test. The value in brackets is the signal strength of the feedback signals, measured by the controller. |
| | |
| **Interfering Signal** | The interfering signal strength, which has been measured by the requested device on its specific position, is being displayed here. |
| | |
| **Radio Interference** | If the device has detected a radio interference, then this event will be displayed here. The interference could have happened a long time ago and it was maybe only of short duration. You should watch the development of the interfering signal and change the radio channel if there is any need. |
| | |
| **Delete Terminal Prog.** | Deletes all programmed data (cues and step delays) of the G-Flame. It is recommended to delete the Terminal programming before programming a new one. Before the data is being deleted, a message will pop up and asks if you are sure to delete the whole Terminal memory. |
| | |
| **Dev. ID -1** | By pressing this key, the current device ID is decremented and a remote data request of the device with the device ID, which is right below the previous one, is executed. |
| | |
| **Dev. ID +1** | By pressing this key, the current device ID is incremented and a remote data request of the device with the device ID, which is right above the previous one, is executed. |

When pressing both of the right multifunctional keys, the General Status Information will be refreshed and the data on the screen will be updated afterwards.

The second multifunctional key from the left stands for 'Edit'. Press this button to edit the programming of the G-Flame.




You always see the accessed device ID number being displayed in the top line of the Edit screen.

The multifunctional key 'Back' redirects you to the General Status Information screen.

The fields shown in the middle of the screen are placeholders. At the beginning they are always blank because no data was read or written. You see '-' for the Firing Cue and 0.00 for the Delay and Duration parameter.

In order to enter data, you have to select the desired parameter by pressing the touch screen left to the three arrows pointing towards different parameters. Please refer to the manual of the G-Flame regarding the meaning of the various parameters.

To program the G-Flame you can use the arrow keys to jump to the desired cue, or you can use the decimal keypad. The delay and the flame duration have to be selected with the decimal keypad. With the button 'C' you can clear a wrong entry. The flame duration can be assigned between 0.1s and 25.0s. The Atomic effect can be programmed ranging from 0.0 to 0.7s.

After entering firing cue, flame duration, delay and Atomic Effect you can transmit the information to the G-Flame by pressing 'Write'. The G-Flame acknowledges a successful programming with the message 'Write verified'.

By pressing 'Read' the data of the chosen firing cue will be sent from the G-Flame to the controller. This allows you to check if the programming of a specific firing cue is correct.

Individual cues can be deleted by setting the duration of the chosen cue is to 0.0s, the delay to 0.00s and the Atomic effect to 0.0s. This can be easily achieved also by pressing 'New Entry'. You have to press 'Write' in order to achieve that this data is written to the G-Flame.

For a hassle-free programming of many cues of several G-Flames we recommend to use the PYROTEC Composer in combination with the PFM Advanced USB Wireless Modem.

# 10 SMPTE Firing Mode (SMPTE Time code 25fps)

## 10.1 General information

With the SMPTE firing mode it is possible to fire an automatic firing script according to an external time base. A firing script in the memory of the PFC Advanced can be used for the conventional automatic firing mode and for the SMPTE firing mode as well. The decision between these two variants can be made right before the show.

| **DANGER**<br>  <br>2.1.7 | **Unintended firing**<br><br>Fatal injuries due to explosion/deflagration of pyrotechnic effects and compositions and secondary effects due to explosion (flying objects).<br><br>• Only switch on the firing mode when there are no persons in the danger zone (firing area). |
|---|---|

Time code is being used as an external time base.

The basic principle of synchronizing pyrotechnics with music by using time code has been developed at a time when only magnetic tape recorders were available for playing back the audio track. Due to the fact that these tape recorders were not very precise in playing back the music the idea was born to use one of the two tracks for the music in Mono and the other track for a time code signal. Or two tracks for the music in Stereo and an additional track for the time code signal. In a manner of speaking the music and the time code are glued together. By this practise no offset in the timing can occur even if the tape is being played back too slow or too fast.

| **TIP** | It is very important to understand that time code does not necessarily transmit the actual clock time. There may be some situations like a TV studio with live broadcasting where this can be the case. Usually time code is a signal that has been generated or recorded some time ago and is being played back again later for the purpose of synchronizing two or more devices or systems. |
|---|---|

There are many different kinds of time code. In Europe SMPTE 25fps is very common. SMPTE is the name of the organisation who is issuing the standard. 25fps stands for '25 frames per second'.

You can imagine time code as a time signal consisting of a sequence of sinusoidal full and half waves that are transmitting a digital time information. This 'time stamp' is being transmitted 25 times every second. With every transmission the transmitted time information is incremented by one frame.

The following digits are being transferred with every transmission:

| **Valency** | **Transmitted place values (digits)** | **Abbreviation** | **Range** |
|---|---|---|---|
| | | | |
| Hours | Units, Tens | HH | 0...23 Hours |
| Minutes | Units, Tens | MM | 0...59 Minutes |
| Seconds | Units, Tens | SS | 0...59 Seconds |
| Frames | Units, Tens | FF | 0...24 Frames |

Written in one line this format looks this way: HH:MM:SS.FF

The smallest value that can be transmitted is 0 hours, 0 minutes, 0 seconds and 0 Frames.
If written in the format HH:MM:SS.FF this looks this way: 00:00:00.00

The highest value is 23 hours, 59 minutes, 59 seconds and 24 frames, or 23:59:59.24.
With the next frame all digits will be set to 0 and counting starts from the beginning again.

With SMTPTE 25fps 24 hours or a whole day can be expressed. One frame represents 1/25 second. This is 0.04 seconds or 40 ms.

### 10.1.1 Sources of time code

As a basic principle time code can be played back with any audio player. E.g. time code can be saved as a wave file and be played back with every PC. Other possible audio players are tape recorders, CD players or hard disk recorders. The MP3 format and MP3 players are not recommended to be used because the data compression is causing severest distortion on the signal!

If someone else is providing a time code signal you run the risk that the signal quality is bad. Please see the section below regarding this.

If you want to play back time code on an audio player or if you want to provide a wave file with time code to someone it is very easy to generate a time code wave file with the Galaxis PYROTEC Composer. Due to the fact that this time code is sinusoidal and without distortion or interference we strongly recommend doing so.

### 10.1.2 Signal quality

Basically, you should pay attention that only time code signals of good signal quality are used.

The problem is that in practise time code is being recorded by doubtful 'professionals' and being played back again. This is often resulting in distorted signals with ringing, spikes, noise and many other things. Due to the lack of measurement equipment (digital storage oscilloscope) and skills the technicians are not even able to determine if a specific signal or recording is good or not. In addition, the signal quality is decreasing even more on the cable between the audio player and the receiving device.

The detailed requirements are:

- coding and timing according to the SMPTE standard
- signal shape: sine wave
- no noise
- no spikes or other distortions on the signal

Our daily experience is teaching us that frequently very bad signals are provided. This is also because the output signal of sometime code generators (even expensive equipment) is square wave. After some meters of audio cable, a strong ringing is the result of this. If such a signal is being fed in or being recorded and played back again this could cause problems. Square wave (rectangular) time code signals are not suitable to be transmitted on longer cable runs.

If you are using the Galaxis PYROTEC Composer to generate the time code you will have a wave file with a sinusoidal signal without any distortion.

### 10.1.3 Usage of time code regenerators

Especially if you have to use time code that is being played back by the staff members of another company or time code is being transmitted on longer cable runs, we recommend the usage of a so-called time code regenerator. These devices are decoding the signal and generate a new signal. Due to that signal errors can be removed.

Also, if you want to use time code signals other than 25 fps we recommend to use this kind of device.

### 10.1.4 Why 25 fps?

The PFC Advanced and PFC Advanced Black Edition only accept time code with 25 fps for a good reason: 25 fps come out evenly with the system's internal time base of 100 firings per second which is 100 fps. In this case one frame is 0.04 seconds or 40 ms or 4 frames with 100 fps. All other kinds of time code can result in nasty mismatches during show design and the firing of a script because with e.g. 30 fps one frame is 0.033333333... seconds or 33.333333... ms or 3.3333333... frames with 100 fps.

## 10.2 How to determine the show start and the required offset

Normally when time code is being used the goal is to synchronize various systems. A typical application would be music with lights and pyrotechnics.

Usually all show operators agree on a certain point in time as a show start. Furthermore, it is customary to begin with playing back the audio track some minutes earlier (you may call it 'leader', 'prefix' or 'header') so that everybody can check if the synchronisation works and a stable signal is present. By doing so you can cancel everything without anybody noticing or spoiling the event and you can begin from scratch after fault finding.

If you would agree on 00h 00m 00s 00f as a show start the actual beginning of the leader would be e.g. 23h 55m 00s 00f. This would cause an overflow right at the show start. Due to the fact that some equipment with time code input is not able to process that correctly or may even hang up it is strongly recommended to agree on a show start that enables you to play back time code without any overflow. E.g. you could use 01h 00m 00s 00f as a show start and you may set the leader to begin at 00h 55m 00s 00f. In this example the offset is 01h 00m 00s 00f, or one hour.

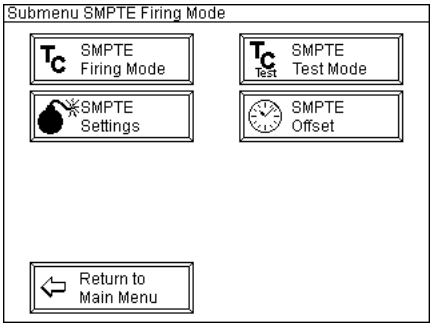
It could make sense to use another offset intentionally at the PFC Advanced than the others do, e.g. if the cues for the pyrotechnics are at the end of a long stage performance.
Small changes in the offset may be used deliberately to fire effects slightly earlier or later. In principle the whole firing sequence is being moved a little that way.

In the following sections we would like to explain the SMPTE submenu and the individual menu items in more detail.

## 10.3 Submenu SMPTE firing mode

If you press 'SMPTE Firing Mode' in the main menu this submenu will be called up.

In this submenu you will find all functions that are related to time code:




'SMPTE Firing Mode' is the actual SMPTE firing mode.

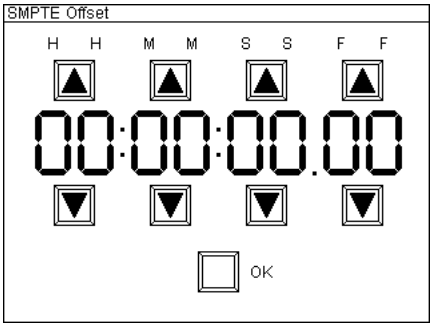
'SMPTE Test Mode' is being used to test a complete show without firing any cue for test purposes or to check if time code is being received or to determine the current time code position.

With 'SMPTE Settings' you enter a submenu in which you can determine the behaviour of the controller in the SMPTE mode.

In the submenu 'SMPTE Offset' you have to enter the offset or in other word the actual start of the show. At this point in time Firing Channel 1 (i.e. Cue 1) will be fired.

## 10.4 SMPTE Offset

The desired point in time for the show start has to be entered in this menu.



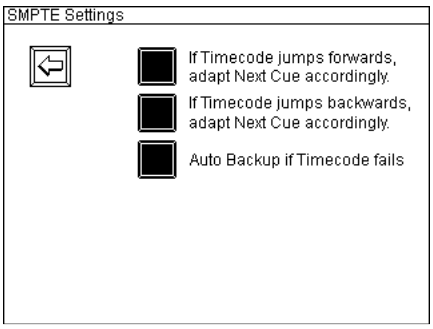

As described in the introduction of the SMPTE firing mode 00:00:00.00 should not be used as start time. Choose a frame that is far later which enables you to begin with playing back the SMPTE track including the leader without transmitting the overflow from 23:59:59:24 to 00:00:00.0.

Enter the offset which is appropriate for your application here and press the 'OK' button. The device is storing the setting permanently in its memory so that it will be present again the next time you use it. After that the device returns to the SMPTE submenu.

Later, provided that the device is being operated in the SMPTE firing mode, Cue 1 (Firing Channel 1) will be fired precisely at the moment when the time code frame is being received that has before been entered in the submenu 'SMPTE Offset'. The other Firing Channels (Cues) are fired accordingly to the delays that have been stored or downloaded to the script memory of the current automatic firing mode. In other words you can use one and the same firing script to fire a display with the Automatic Firing Mode and with the SMPTE Firing Mode as well.

## 10.5 SMPTE Settings

This menu item offers the following settings:




This example shows the default values of a new device.

A filled box indicates that the function is active.

All these functions can be switched on and off independently. The settings are stored permanently in the memory of the device.

The effect of these functions in detail:

### 10.5.1 The setting 'If time code jumps forwards, adapt Next Cue accordingly.'

If you have activated this function and the received time code jumps to a later point in time the controller will synchronize again. In this case it is possible that firing channels are skipped and the next cue is being displayed and fired as soon as the time code is matching with this cue. We recommend this setting for most applications.

Otherwise the device will wait until the time code jumps back again. 'dt: TC > Cue !' is being displayed. Due to that it is possible that cues are not fired.

### 10.5.2 The setting 'If time code jumps backwards, adapt Next Cue accordingly'

If you have activated this function and the received time code jumps to an earlier point in time the controller will synchronize again. In this case the cue which has been calculated as next cue will be displayed and fired as soon as the time code is matching with it. Depending on the actual circumstances it is possible that cues are fired again. For most applications it is recommended to activate this function.

Otherwise the device will wait all the time for the initial cue which was the next cue before the time code jumped to the earlier position. The displayed time to the next cue 'dt' is accordingly higher.

### 10.5.3 The setting 'Auto Backup if time code fails'

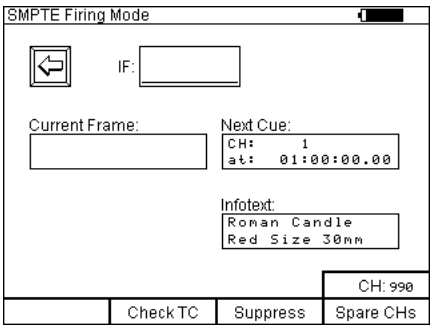
If this function is enabled the device continues to fire the script if the time code signal is lost. In this case the internal crystal-based time base is being used. As soon as the time code is being received again it will determine the firing sequence again. For most applications it is useful to use auto backup.

If this function is disabled the devices stops if the time code signal is lost.

Please see below for a more detailed description of this function.

## 10.6 SMPTE Firing Mode

After entering this mode from the submenu, you see e.g. this being displayed:



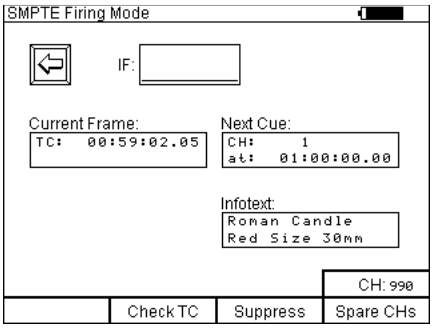

Description of the information in detail:

As you know from the other firing modes the measured radio interference is being displayed graphically.

In the box with the title 'Next Cue' in the upper line the next firing channel is being displayed. In the line below the appropriate SMPTE frame is being displayed.

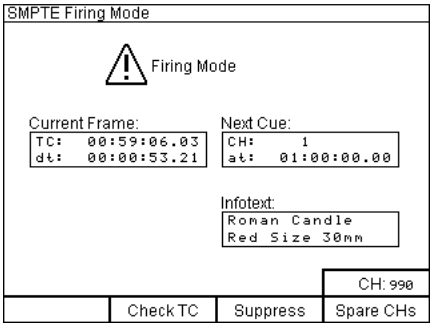
In the box 'Infotext' you can see the information text of the next cue, if there is any.

The function of the 'Suppress' key is identical with the conventional automatic firing mode. Channel 990 is pre-set as first spare channel.




By pressing the function key 'Check TC' the current time code information is being displayed in the box 'Current Frame'. The device is refreshing this readout constantly. In the field 'TC:' you should see frames, seconds and minutes etc. counting up. Simultaneously an acoustic signal like a click sound should be audible with every frame being received.

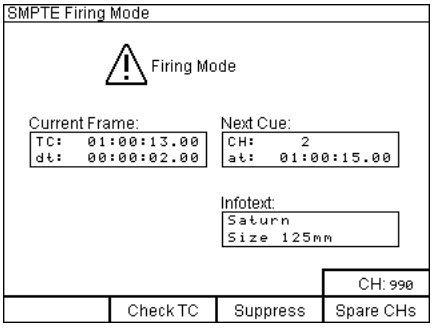
In this example the firing of Cue 1 (Firing Channel 1) is almost one minute ahead. The button 'Check TC' enables you to test if time code is being received correctly and if the signal is stable.




Here the firing mode has been activated. Besides the current time code you see also the time to the next cue being displayed (i.e. delta time, dt).

In this example the Cue 1 (Firing Channel 1) will be fired in 53 seconds and 21 frames.

A value counting down should be visible under 'dt'. After a firing the 'dt' value is set to the particular time between the two cues.




Here you can see that Cue 1 has been fired already. Therefore Cue 2 is being displayed as next cue. In two seconds this cue will be fired.

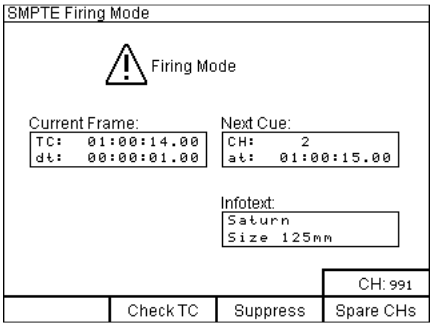
The device is firing one cue after another according to the firing script.

If the time code fails and the backup function has not been enabled the procedure stops. Otherwise you will see 'Backup' being displayed as a warning and the device will continue with firing the script according to the internal time base.

| NOTICE | When using the SMPTE firing mode, it is prohibited to fire effects with Cue 1 (firing channel 1).<br><br>During resynchronizations, such as those that can occur when the time code signal is poor, the unit may accidentally fire Cue 1 (firing channel 1). |
|---|---|

| NOTICE | When switching the time code signal on and off and when plugging and unplugging the time code cable, the firing mode of the PFC Advanced must either be switched off or the functions 'Dead man' or 'Suppress' must be used, to avoid accidental firings.<br><br>When activating the SMPTE firing mode firings must be prevented by using the 'Dead man' or 'Suppress' functions. Firings must not be enabled until it is clear that the unit has synchronized correctly. |
|---|---|

## 10.7 Firing of spare channels in the SMPTE Firing Mode




To fire a spare channel, press the function key 'Spare CHs' and keep it pressed. Then press the button 'Fire'. In the SMPTE firing mode channel 990 is always the first spare channel. The device is incrementing with every firing of a spare channel. In this example spare channel 990 has been fired already and 991 is the next spare channel.

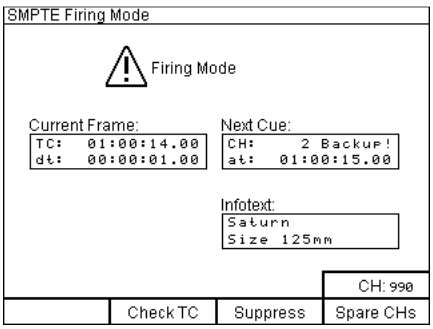
| TIP | If you want to skip the current spare channel you can move on by using the suppress function. First press the button 'Spare CHs' and the button 'Suppress'. Hold both buttons pressed and press the firing key. |
|---|---|

To ensure that the timing of an imminent firing can happen precisely by all means the function 'Firing of spare channels' is locked 0.5 seconds before each firing cue. The function key is not illuminated before each firing to signal that the button is inactive temporarily.

## 10.8 Behaviour of the device if time code fails and backup function

If the backup function has been deactivated in the SMPTE settings the firing sequence stops if no time code is being received. The firing will resume as soon as a signal is present again.

Otherwise the device will switch to an internal time base:




The warning 'Backup!' informs you that no time code signal is being received.

If the controller is firing according to the internal time base for a longer time it is possible that an offset error occurs due to the missing synchronisation.

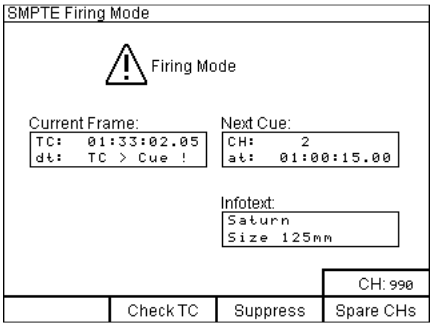
Once a SMPTE signal is present again the backup warning vanishes and the device is synchronized by the external time code.

| TIP | If the time code signal is very bad and the device is displaying 'Backup!' again and again but resumes also to the external synchronization it could be better to remove the external signal by disconnecting the XLR plug. Otherwise it could probably happen that cues are skipped due to the persistent switching between normal and backup mode. |
|---|---|

| TIP | If the warning 'Backup!' is being displayed every now and then although the signal is present all the time most likely the SMPTE signal is bad or it has been recorded with interferences or noise. If using new or unknown signals it is essential to do a test run and watch if this warning is being displayed. The best way is to use a SMPTE wave file that you have generated with the Composer software yourself. |
|---|---|

## 10.9 Behaviour of the device if the time code is skipping

The behaviour in case of a time code skip depends on the settings in the menu 'SMPTE Settings'.




The device will display the information on the left if the received time code jumps to a later frame and one or more cues are skipped and you have disabled the function that the device should adapt the sequence to the next cue accordingly.

The message 'TC > Cue !' is informing you that the controller waits until that the time code jumps back again. Only after that further firings are possible again.

If the time code jumps forward (jump to an earlier frame) and you have disabled that the firing sequence should be adapted the displayed delta time (dt) to the next cue is increased accordingly. If 'old cues' are in between they will not be fired again if this setting has been chosen.

In most cases it is better to enable the new script alignment if the time code skips forward or backward. In this case the device will always determine the next current cue.

## 10.10 Suppress firings

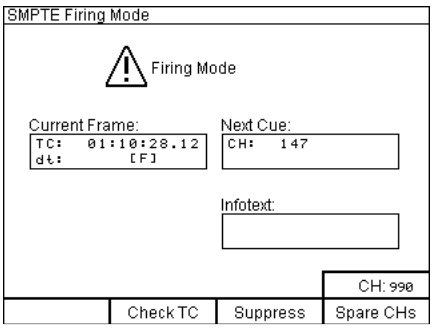
The suppress function is identical to the conventional automatic firing mode. Please refer to the relevant section in this manual.

## 10.11 Firing of the next cue immediately

As you know from the conventional automatic firing mode you can fire the next cue immediately by pressing the fire button.

## 10.12 The function 'Wait for Fire'

You will see e.g. this being displayed at the end of a script:




You can fire additional cues manually at the end of a script.

The last cue has been fired. In this example firing channel 147 is the next cue.

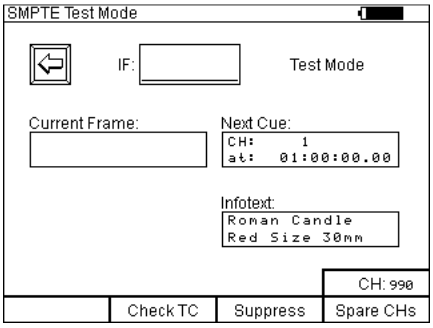
'[F]' stands for 'Wait for Fire'.

By pressing the button 'Fire' the current firing channel is initiated. The firing channel is automatically incremented after that.

| **TIP** | According to the 'F' function in the conventional automatic firing mode it is possible to use firings that have to be triggered manually in a SMPTE controlled sequence as well. |
|---|---|

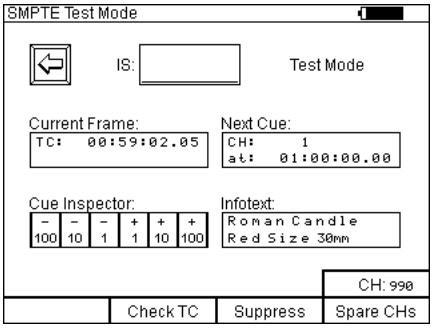
## 10.13 SMPTE Test Mode

After entering the SMPTE Test Mode from the time code submenu you see e.g. this on the screen:



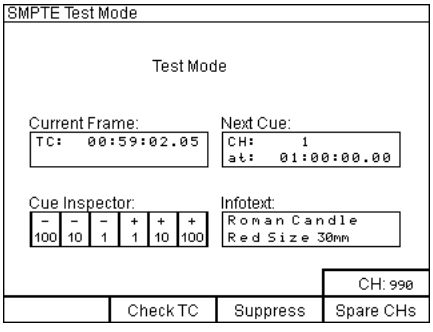

In the upper right section 'Test Mode' is being displayed which is informing you constantly that this mode is active.

All other information is being displayed as you know from the SMPTE firing mode.



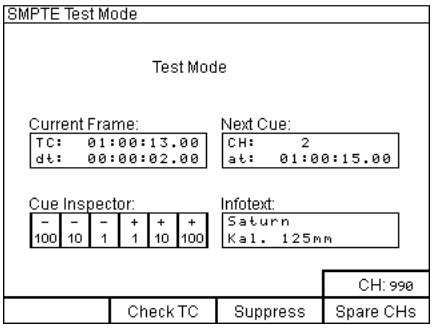

If a SMPTE signal is present and you press the function key 'Check TC' the received frames are being displayed and continuously refreshed.

Please observe thoroughly if the reception of the time code signal is stable.




The key switch 'Firing Mode' has been turned on.

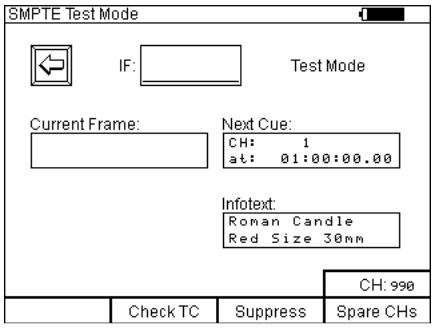
Now the currently received time code frames are visible on the screen. The device is waiting for Cue 1 (Firing Channel 1) and will process the script but will not actually send any firing command.




The device is processing the script but does not send any firing command. Here it is waiting for the frame of Cue 2.

Due to the optical and acoustic signals of the device you can easily judge if the timing of e.g. single shots is matching with the music.

## 10.14 Cue Inspector




With help of the Cue Inspector you can fast and efficiently jump to specific cues to check the related time code time. This can be done with the buttons '-100', '-10', '-1', +'1', '+10' and '+100'. If you want to jump to channel 468 for example, you press 5x '+100', 3x '-10' and 2x '-1'.

Besides that, the time code Test Mode has a so-called F-Scan function. With this function the script is searched for F-Orders (Wait for Fire). If such a value is found, the user will get a warning message which has to be acknowledged with 'OK'.

If you jump over the last programmed channel with the Cue Inspector, a warning message will be displayed. This shows the user that between the first and the actual channel an 'F' was found. A different warning message will be shown when the Cue Inspector jumps back to channel 1 or below. The warning message needs to be acknowledged with 'OK' at the same time the time code Test Mode will be reset.

| **TIP** | It is very easy to test the various time code functions by generating a SMPTE wave file by using the Composer software. This file can be played back on your PC with any media player software. Connect the audio output of your sound card to the SMPTE input of the PFC Advanced. You will require a simple connection cable which also we can manufacture for you. It is easy to change the current position on the time line while the audio track is being played back and you can watch the impact on the controller's SMPTE test or firing mode. |
|---|---|

| **TIP** | If using new or unknown signals it is strongly recommended to do a test run and observe carefully that no 'Backup!' warning appears. If the warning 'Backup!' is being displayed every now and then although the signal is present all the time most likely the SMPTE signal is bad or it has been recorded with interferences or noise. The best way is to use a SMPTE wave file that you have generated with the Composer software yourself. |
|---|---|

# 11 DMX Firing Mode

With the DMX Firing Mode, a DMX desk can be connected to the PFC Advanced. In this firing mode the PFC Advanced translates the DMX signals into Galaxis radio telegrams in order to control receivers as well as G-Flames.

| **DANGER**<br>  <br>2.1.7 | **Unintended firing**<br><br>Fatal injuries due to explosion/deflagration of pyrotechnic effects and compositions and secondary effects due to explosion (flying objects).<br><br>• Only switch on the firing mode when there are no persons in the danger zone (firing area). |
|---|---|

The input for DMX512 is compatible with the DMX standard from 1990 or respectively the standard as defined in DIN 56930-2.

The first and last device on a DMX line must be equipped with a 110 Ohm termination resistor, e.g. an XLR plug with a built-in resistor. In case that the PFC Advanced is the last device on a DMX line we offer suitable plugs or plug modules with integrated termination resistor.

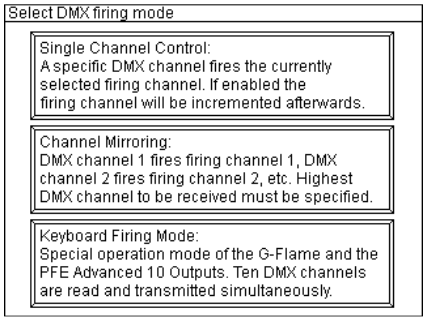
A maximum of 32 bus devices can be used on a single line. If this is not enough, DMX splitters have to be used.

Please note that only 'twisted pair' cables with a lowest possible capacitance and an impedance of 110 Ohm must be used for DMX signals. Only use cables which comply with the DMX standard. In no case e.g. normal microphone cables are suitable.

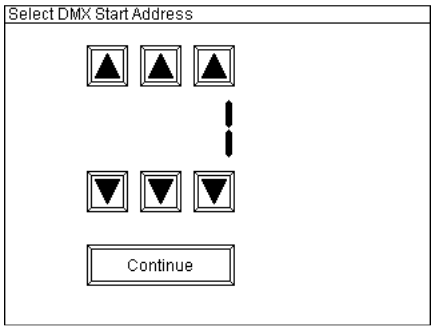
| **NOTICE** | In general, the DMX protocol is unsafe, because no checksum is transmitted. No pyrotechnical effects or similar should be fired in general.<br><br>Only the user is responsible for the risk of potential damage which may occur due to misfiring. In order to improve safety, the usage of a safety channel has been implemented into the PFC Advanced. Firing commands are only sent if the safety channel is correctly received. |
|---|---|

| **NOTICE** | For reasons of safety the PFC Advanced should always be used in a separate DMX universe, which is only used for this application field and not for other devices. On all unused DMX channels, the dimmer value 0% (decimal 0) should be transmitted. |
|---|---|

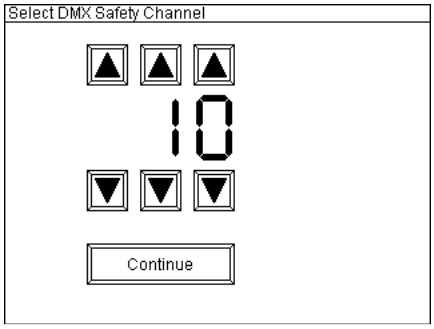
The DMX Firing Mode is divided into three variants:




## 11.1 Single Channel Control



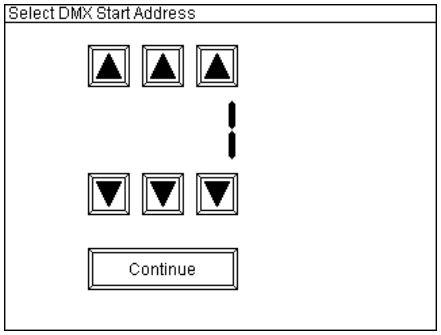

With the Single Channel Control, a single fixed DMX channel is used to trigger Galaxis firing cues. After selecting the Single Channel Control, you have to specify which DMX channel you want to use to trigger the firing cues. As soon as this has been selected, you have to determine a safety channel. The safety at the DMX console must be between 60% and 80%. After arming the PFC, all you have to do is press the DMX-RX button. To quit DMX reception, press the DMX-RX button again, but for a little longer.



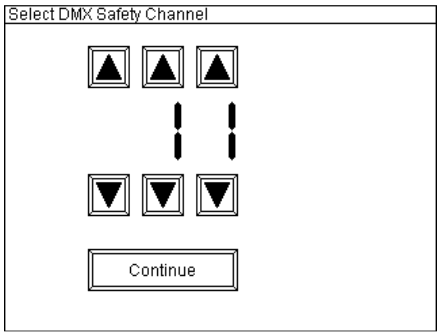

If the function 'Auto-increment of CHs' is active, the firing channel is automatically increased by one channel after ignition. If the function is switched off, the same channel will be fired again and again. The firing channels must have been programmed beforehand on the receivers or G-Flames.

If the safety condition is no longer fulfilled, the corresponding fader must be lowered down completely and set back to a value between 60% and 80%.

## 11.2 Channel Mirroring




If you select the Channel Mirroring option, you have to determine the total number of DMX channels you want to use. The safety channel must be added. For example, if you have a DMX console with 24 channels and want to use only 11 of them to fire Pyro and SFX, you would select 11 channels, where one of them must be the safety channel. After arming the PFC Advanced, DMX reception must be activated. Values between 60% and 80% must be transmitted at the safety channel so that firings can take place. If a fader is pulled up while activating the safety channel, safety is not activated. All faders should be at zero while the safety fader is levelled. The same applies to flash keys that are pressed before the safety channel is activated. Firings can only be triggered after the safety channel has been activated.



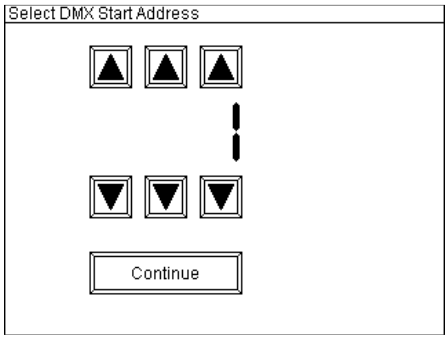

If two or more faders are pulled up at the same time, only the fader that was fastest at 100% is taken over and the others are ignored.

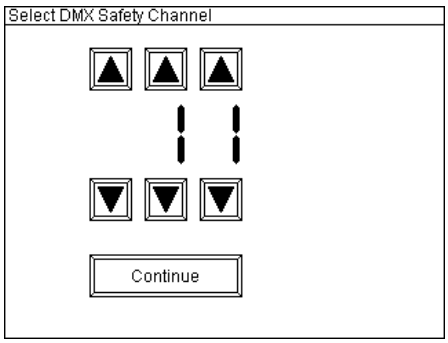
If two DMX channels are set to 100% at the same time, the lower DMX channel always prevails.

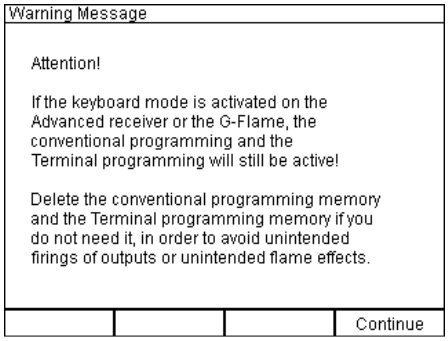
Now you can fire the cues. DMX channel 1 fires Galaxis Cue 1, DMX channel 2 fires Galaxis Cue 2 and so on.

With this function each DMX console can be converted into an external firing keyboard with a fire button for each channel.

## 11.3 Keyboard Firing Mode




In Keyboard Firing Mode, up to ten G-Flames can be controlled independently of each other. This means, for example, that you can control up to ten individual G-Flames at the same time. To do this, you have to program in the menu of the G-Flame which keyboard channel the respective device should listen to. When pressing the flash buttons on the DMX desk, a flame will appear which burns for as long as you keep the button pressed. If you hold down more than one key, exactly the same scene will appear on the G-Flames.

If you want to control more than 10 individual devices, you can use a second PFC Advanced. This can then, for example, control devices 11 to 20. Both PFCs can be programmed with the same safety channel.

Soft Patching is also possible. The same keyboard channel is assigned to several G-Flames. These devices then behave identically.

Of course, you can also use it to control Advanced receivers in 10 Output mode. This is especially useful if you want to use confetti machines, CO2 jets, solenoid valves, etc. with the 24V output of the PFE Advanced. In principle, all ten channels are output simultaneously on the receiver's ten outputs.

After selecting the Keyboard Mode option in the submenu of the DMX Firing Mode, the PFC asks for the first DMX channel of a group of ten DMX channels to be used. As an example, we use DMX channel 1 to 10 as control channels. After that you have to select which DMX channel should be used as safety channel. The safety channel must not be within the 10 control channels.

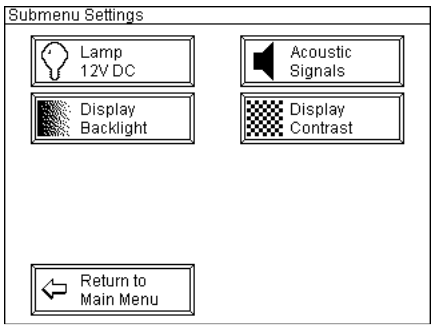
Note that the Keyboard Firing Mode is an additional function. Conventional programming of the G-Flame and the PFE Advanced is still valid. Therefore, make sure to delete them if you do not want to use them. The same applies to terminal programming of the PFE Advanced.

The chaser light control of the DMX console can also be used in conjunction with the Keyboard Firing Mode, e. g. to control entire flame shows from the DMX console.

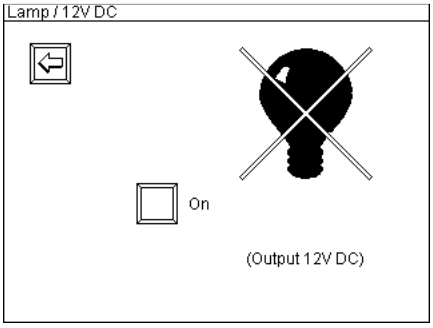
| **TIP** | The cable interface of the PFC Advanced cannot be used at the same time as the DMX Firing Mode. The DMX Firing Mode only works in combination with radio control. |
|---|---|

# 12 Settings

This submenu includes the following settings options:




## 12.1 Lamp 12V DC



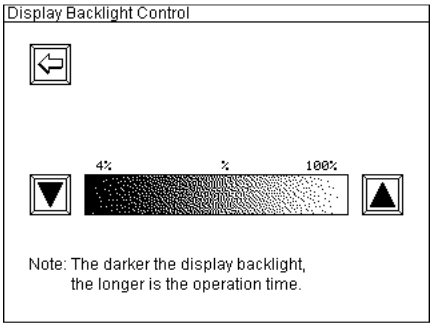

There is an XLR connector with three pins in the upper right section of the main panel of the PFC Advanced. The rubber lid should always be applied to protect the connector from dust and rain drops. Here the supplied LED gooseneck lamp may be installed. Also, ancillary equipment can be supplied with 12V DC.

By pressing the button 'Gooseneck Lamp, 12V DC' in the 'Submenu Settings' you will enter this menu. By pressing the button in the middle of the screen the lamp is switched on and off. If the lamp is switched on the bulb on the screen is not crossed out and the button is labelled with 'Off'.

The reduction in operation time by using the supplied LED gooseneck lamp is insignificant due to its high efficiency.

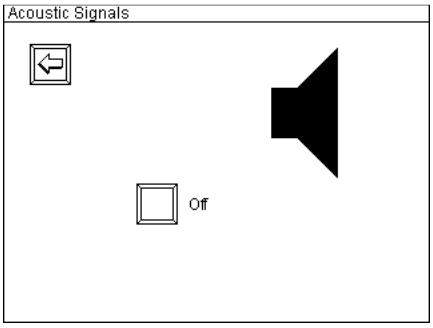
The PFC Advanced Black Edition does not come with a gooseneck lamp but it has a switchable 12V DC output on the rear panel.

## 12.2 Display Backlight Control




In this menu you can adjust the display backlight. A brighter display will increase the battery discharge, a darker display backlight will reduce it. The setting will be stored in the memory. When you restart the device, the last setting will be used. When switching on the device, the start screen will be shown in full brightness. After continuing to the main menu, the stored brightness value will be used.

## 12.3 Acoustic Signals

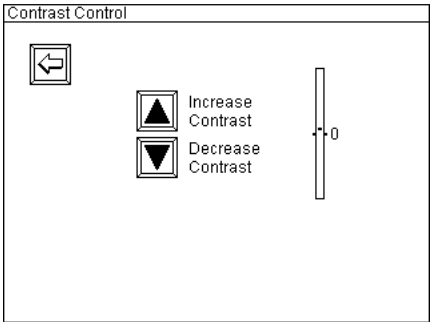



By deactivating this function all beep tones and all acoustic warning signals are turned off.

The acoustic signals are enabled by default after delivery. Turn them off if desired by pressing the button 'Off' in the middle of the screen. If the signals are disabled the loudspeaker symbol is crossed and 'On' is printed next to the button.

This setting is stored in the memory of the device and is present the next time the device is switched on again.

## 12.4 Display Contrast

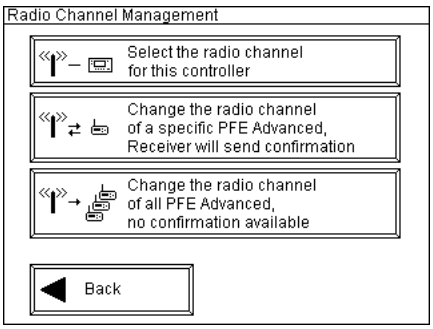



An adjustment of contrast may be required if you have difficulties in reading the information on the screen. By pressing the buttons, the contrast is increased or decreased. The selected setting is stored automatically and will be present the next time the device is operated.

The display contrast is adjusted automatically according to the ambient temperature. Rapid changes in temperature may require manual contrast adjustment.

# 13 Radio Channel Management

All functions to change the radio channel (frequency) are pooled in this submenu.




First of all, you can determine the radio channel of the controller. In addition, you can send a command to the Advanced receivers to change the radio channel.

There are these two variants to remotely change the radio channel of the receivers:

- Changing of the radio channel of a specific PFE Advanced by entering the device ID number, a feedback is being sent

- Command to all PFE Advanced within range and with the same system ID to change the radio channel, without feedback

All devices store the programmed radio channel and the setting will still be present after switching the device off and on again.

To select a menu item, press the button on the touch screen.

## 13.1 General information

If you own more than one controller and you want to split your system, which means to operate several systems within range simultaneously it is not sufficient to assign only different radio channels. To prevent unintended firings, it is required to use different system codes in addition.

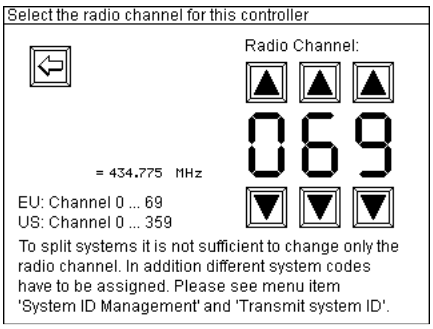
| **WARNING**<br>  <br>2.1.4 | **Unintentional triggering of a firing if the user is splitting a Galaxis firing system into two or more systems**<br><br>Simultaneous operation of systems that vary only in terms of different radio channels bear a safety risk.<br><br>If you split your Galaxis firing system into two or more systems:<br><br>• Make sure that you have assigned different System IDs to the firing systems. |
|---|---|

First select another user specific system ID for the controller by using the menu item 'System ID Management'. After that you have to program the receivers to the new system ID as well (i.e. Teach-in) by using the menu item 'Transmit System ID'. Further explanation is being given in the relevant sections of these menu items in this manual.

| **TIP** | With these new functions you are able to teach-in borrowed or rented receivers of type PFE Profi 3/10/Power and PFE Advanced and G/H-Flames |
|---|---|

## 13.2 Select the radio channel for the controller

In this menu item you can change the radio channel of the controller.




In this submenu you may select the radio channel, i.e. the frequency, which is being used for wireless data transmission.

If you change the frequency of the controller PFC Advanced you have to change the radio channel of all receivers and flame effect devices as a matter of course and vice versa.

The channel number and the corresponding frequency is being displayed in this menu all the time. The selected radio channel is being displayed in the first line of the main menu, too.

### 13.2.1 European Version (and also various other countries):

There are 70 different frequencies available between 433.0500 MHz and 434.7750 MHz in steps of 25 KHz. Normally you should use the frequency that has been assigned by the manufacturer and only switch to another channel if the selected frequency is occupied.

The frequency 433.9250 MHz (radio channel 35) and the two neighboring channels above and below this frequency should not be used. This is a heavily used standard frequency and radio interferences are likely to occur.

In the countries Azerbaijan, Georgia and Russia the European harmonization standards have not been completely implemented so far. If you have an application in these countries, please ask the manufacturer or the appropriate authorities in the specific countries if a license exempt usage is possible or if you can apply for a license or if the usage is prohibited.

Other regulations may apply in non-European countries. Please ask the manufacturer if you need more information about the usage of frequencies. Many non-European countries allow the frequencies used by us. For customers in the USA and Canada we provide devices with a different frequency band. Please see 'Version for USA/Canada'.

### 13.2.2 Version for USA/Canada:

There are 360 different frequencies available between 458.0000 MHz and 462.4875 MHz with a channel spacing of 12.5 KHz.

You need to choose a frequency which allows nationwide use and which is exempt from any duties. More information can be obtained from frequency coordinators, the authority who is in charge of frequency allocation or the manufacturer. Even if the duty-free and nationwide usage of specific frequencies is possible, you have to register as user at the FCC or IC before operating the devices. Upon your request we will provide the contact details of a competent frequency coordinator who will support you in this process.

Alternatively, you can apply for a license. In that case you will get a frequency assigned by a frequency coordinator. The disadvantage of a license is that the usage of the assigned frequency is only allowed in a certain region. You are allowed to use this frequency in a specific radius only. Every usage outside of this radius demands an additional license, except you are using a nationwide frequency (see above).

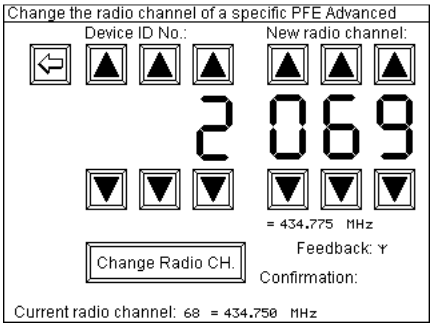
The highest available radio channel is 359. The selection of the number '3' on the hundreds is only possible if no inadmissible values form. For example: Forming radio channel 383 from 283 by pressing the arrow button 'Hundreds +1' is not allowed. Select a value from 0 to 5 in the tens before selecting

the value 3 in the hundreds.

## 13.3 Changing the radio channel of a specific PFE Advanced or G-Flame remotely

We strongly recommend this function compared to the function 'Change the radio channel of all PFE Advanced' because you know for sure that the devices have received the command. This is most useful especially when the devices are not right in front of you.

The current radio channel is being displayed in the bottom section of the screen all the time. Furthermore, the frequency that is linked to this channel number is printed on the display for your information only. It is only possible to change the frequency of receivers that are currently operated on this radio channel and with the same system ID.




The first step is to enter the new radio channel for the receiver. This example shows that the radio channel is being changed from 68 to 69. Right beneath the radio channel the frequency in MHz is being displayed. Then enter the device ID number of the receiver that you want to address.

Press 'Change Radio CH.' on the screen to command the receiver to change its radio channel. As soon as the controller receives acknowledge of the PFE Advanced 'OK' is being displayed in the bottom left section of the screen. Otherwise '?' is being displayed.

The receiver is displaying the new radio channel for some seconds and is transmitting the acknowledgement to confirm that channel has been changed. The confirmation remains on the screen until either a new frequency channel or a new device ID is selected.

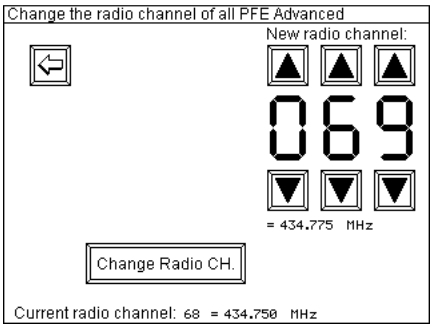
If you do not see any confirmation the receiver is possibly out of range. Or probably only the confirmation has not been received. In this case you should check if the receiver is operating on the new radio channel by a remote data request. If necessary, repeat the process with reduced distance or better conditions.

This function can be used with G-Flames that are equipped with a radio module as well.

## 13.4 Changing the radio channel of all PFE Advanced and all G-Flames remotely

This function enables you to change the radio channel of several receivers at once. This variant of changing the receiver's radio channel is especially recommended if you have the devices right in front of you. Each receiver will display the new radio channel on the LCD. This is an optical feedback so that you can be sure that all devices received this command.

The current radio channel and the related frequency is being displayed in the bottom section of the screen all the time. You can only change the radio channel of receivers that are currently operating on this frequency and that are on the same system ID.




Select the new radio channel that the receiver(s) should use from now on. Right below the digits of the radio channel the related frequency in MHz is being displayed.

By pressing the button 'Change Radio CH.' a command is being sent which will order the receiver(s) to move on to the new radio channel.

If you are in doubt that all receivers are on the new radio channel you can check this by individual remote data requests on the new radio channel. You can also send a range test from the main menu and check if all receivers are responding on the new radio channel. If necessary, repeat the process with reduced distance or better conditions.

This function can be used with G-Flames that are equipped with a radio module as well.

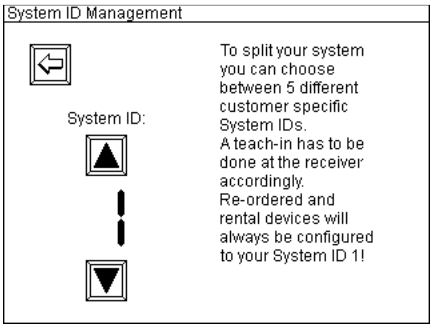
# 14 Controller and Receiver Management

## 14.1 System ID Management

This menu item has been implemented to enable the user to split his system. This means that he can operate the devices simultaneously and independently next to each other. That is very meaningful e.g. if you have two different projects at the same time within theoretical radio range. By this function the user can set the controllers to a different system IDs which are still a customer specific system IDs.

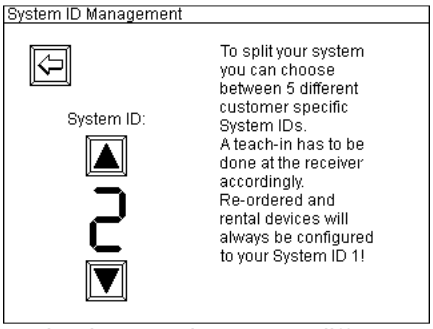
| **WARNING**<br>  <br>2.1.4 | **Unintentional triggering of a firing if the user is splitting a Galaxis firing system into two or more systems**<br><br>Simultaneous operation of systems that vary only in terms of different radio channels bear a safety risk.<br><br>If you split your Galaxis firing system into two or more systems:<br><br>• Make sure that you have assigned different System IDs to the firing systems. |
|---|---|

After entering this menu item from the main menu, you see this screen:




This is the default setting of the controller when being delivered to the customer. System ID 1 is selected. All re-ordered devices or rental devices will be delivered with this setting.

All five system IDs that can be chosen from are customer specific.




Here system ID 2 has been selected. If you change the system ID of the controller you have to teach the receivers which should respond to the commands of this controller to the new system ID afterwards (i.e. Teach-in).

Please see the section 'Transmit System ID' in this manual for further information.

The programmed system ID is being stored in all devices and will still be present again after switching off and on.

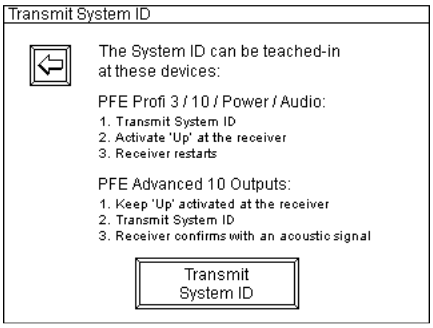
To simultaneously operate different systems within radio range you should program different radio channels (i.e. frequencies) in addition. Otherwise one system may interfere in the communication of the other and vice versa. Regarding this please see the menu items in the submenu 'Radio Channel Management'.

| **TIP** | The selected system ID is always being displayed in the first line of the main menu. This function can be used with G/H-Flames that are equipped with a radio module as well. |
|---|---|

## 14.2 Transmit System ID

This function enables the user to perform a Teach-in of the controller's system ID to all receivers and G-Flames besides PFE Profi Mini 1 Output and PFE Profi Mini 5 Outputs.

After entering the menu, you see this being displayed:




Every time you press the button 'Transmit System ID' on the touch screen the controller will transmit a command and all receivers which receive this will store this ID and they will only respond to this specific system ID in future.

Please follow the steps as explained on the screen to teach in the system ID. One after another all receivers can be programmed with the system ID of your controller.

Receivers of type PFE Advanced 10 Outputs with a firmware version 2.6C1 or later will additionally confirm this with this message in the display: 'Teach-In successful'.

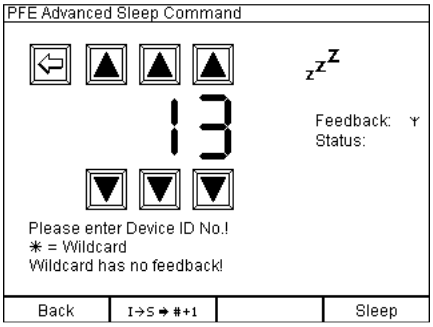
| | |
|---|---|
| **TIP** | The teach-in requires that all devices are operated on the same radio channel (i.e. frequency). |

| | |
|---|---|
| **TIP** | By this function every customer is able to borrow or rent devices from another user and operate them together with his system. After that the devices can be returned and a teach-in can be made to the initial system ID of the owner provided that he has a controller PFC Advanced with a firmware V2.6C3 or higher! |

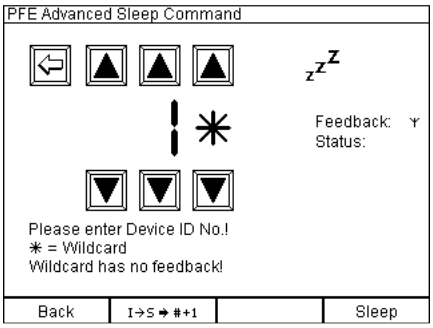
| | |
|---|---|
| **TIP** | As a safety measure 'Up' needs to be activated at the receiver to enable a teach-in. Ensure that no unauthorized personnel gains access to your devices and changes the system ID so that the device responds to another controller. |

## 14.3 PFE Advanced Sleep command

With this function PFE Advanced 10 Output receivers can be put in Sleep Mode. This allows a longer standby time of up to 9 weeks. For more information about the maximum duration of the standby time as well as the requirements please see the user manual of the PFE Advanced 10 Outputs.




To put a receiver into Sleep Mode you have to choose the device ID of the receiver. After selecting a device ID and pressing the button for 'Sleep' the sleep command will be transmitted to the device which will send an acknowledgment. The status can be seen on the right side of the screen.

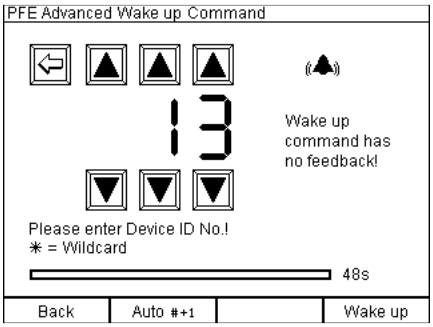



It is also possible to put more than one receiver into Sleep Mode at once. To do so, you can use a so called 'Wildcard' as a placeholder. If you want to put receivers with the device numbers 10 to 19 into Sleep Mode, you would enter the following: 0 (blank) for the hundreds, 1 for the tenths and the '✱' symbol for the wildcard. If you press 'Sleep', all receivers from 10 to 19 will be put into Sleep Mode.

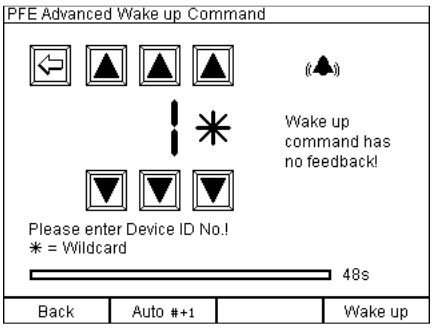
| TIP | When the wildcard is used for putting more than one receiver into Sleep Mode, you will not get a feedback from the receivers for technical reasons. |
|---|---|

With the multifunctional key 'I->S -> #+1' an automatic increment of the device ID can be realized. This comes in handy if a significant number of devices are in use. Then only the key for 'Sleep' needs to be pressed repeatedly. This function is not available in conjunction with wildcards.

## 14.4 PFE Advanced Wake up command




The 'Wake up' function is the opposite of the Sleep Mode. Receivers that are sleeping can be woken up by choosing the device ID of the receiver you want to wake up again. The 'Wake up' command has no feedback for technical reasons.




It is also possible to wake up more than one receiver at once. To do so you can use a so called 'wildcard' as placeholder. If you want to wake up receivers with the device numbers 10 to 19, you would enter the following: 0 (blank) for the hundreds, 1 for the tenths and the '✱' symbol for the wildcard. If you press 'Wake up', all receivers from 10 to 19 will wake up.

With the multifunctional key 'Auto #+1' an automatic increment of the device ID can be realized. This comes in handy if a significant number of devices are in use. Then only the key for 'Wake up' needs to be pressed repeatedly. This function is not available in conjunction with wildcards.

The process of waking up receivers takes up to 48 s per command. A process bar is being displayed while the command is being transmitted.

## 14.5 Remote Switch-off

This function is being used to switch-off receivers of the 'Advanced' series completely, just as if the device is switched-off with the magnetic pen.

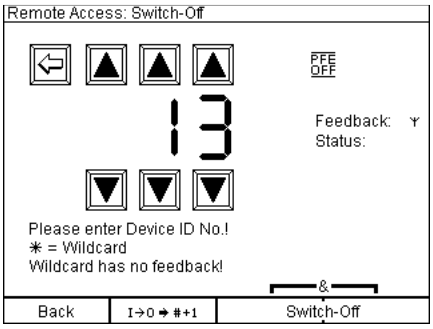
Then the receiver can only be turned on again manually directly at the device.

The intention of this function is to switch-off the receivers remotely if you cannot dismantle your installation or reach the receivers after the show.

The following conditions are to be met to use this function:

1. Only receivers of the 'Advanced' series can be switched-off remotely.
2. The device you want to access has to be within radio range and it needs to be operated in receiving mode.
3. Specific device ID numbers need to be assigned to the receivers beforehand. Please read the manual of the 'Advanced' receiver for further information on this topic.

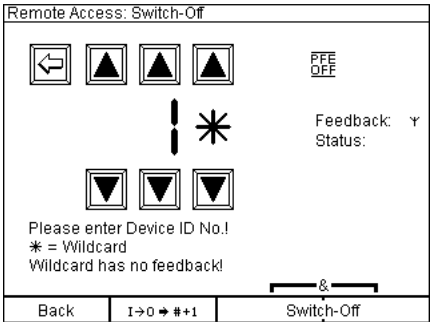
After entering this mode, the following screen is being displayed:




According to the symbol next to 'Feedback' you know if the device will expect to receive the feedback signal either via radio or via cable. You can determine this when selecting the device ID in the menu 'Remote Data Request' and 'Remote Programming'.

Select the device ID number of the receiver, which you intend to switch-off, by using the arrow buttons.

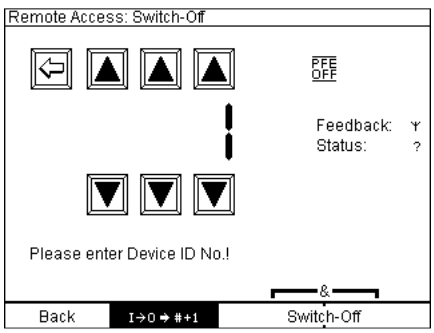
To send the command 'Switch-Off' you have to press the two multifunctional keys at once.




It is also possible to remotely switch off more than one receiver at once. To do so you can use a so called 'Wildcard' as placeholder. If you want to wake up receivers with the device numbers 10 to 19, you would enter the following: 0 (blank) for the hundreds, 1 for the tenths and the '✱' symbol for the wildcard. If you press 'Switch-Off', all receivers from 10 to 19 will be switched off.

| **TIP** | When the wildcard is used for switching off more than one receiver, you will not get a feedback from the receivers for technical reasons. |
|---|---|

If the device received the command 'I → 0' will be displayed as a feedback next to 'Status'. In addition, you hear a short acoustic signal. Afterwards the receiver is powering down itself immediately. This information will be displayed on the screen until a new device ID is selected.




With the multifunctional key 'I->0 -> #+1' an automatic increment of the device ID can be realized. This comes in handy if a significant number of devices are in use. Then only the keys for 'Switch-Off' need to be pressed repeatedly. This function is not available in conjunction with wildcards.

By pressing the key 'Back' you can return to the main menu at any time.

If no feedback is received by the controller you will see '?' being displayed together with an acoustic error signal. Either the receiver is already off or it is not within radio range or not in receiving mode.

If you selected 'Feedback by Radio' in the modes 'Remote Data Request' or 'Remote Programming' before, the controller will also wait for the feedback on the wireless link. If you have selected 'by Cable' the device expects the feedback signal on the cable interface. If you have not used any of these remote access functions since operating the device 'by Radio' is the default setting.

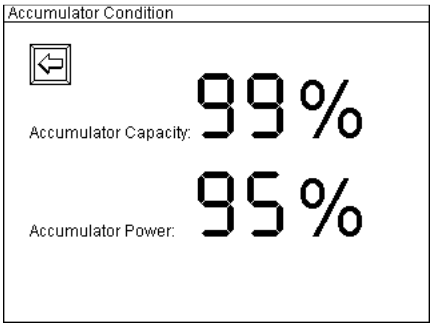
## 14.6 Simultaneous operation of more than one controller / transmitter

Without any special actions the simultaneous operation of more than one controller PFC Advanced or PFS Profi on the same frequency (i.e. radio channel) is not possible. The devices would block each other when transmitting data.

By hardware it is possible to switch between two devices. A special solution is required for this purpose. Please inquire if you have any need for a 'Backup' feature. This additional modification enables you to switch from one controller to another one, which is continuously operated as a backup device during the whole show, without any delay.

The PFC Advanced Black Edition is generally equipped with the backup switch.

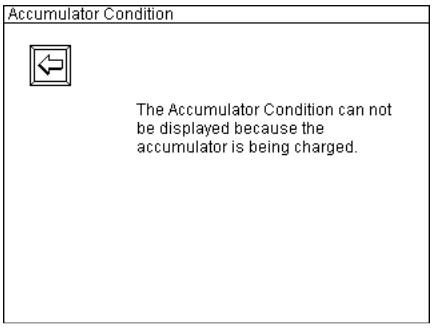
# 15 Accumulator Condition




After pressing the button 'Accumulator Condition' the battery is being tested and accumulator capacity and accumulator power is being displayed.

If you invoke this function while the battery is being charged a message screen will be displayed instead of the results, which informs you that charging is in progress.

It is normal that the percentage value for the accumulator capacity is decreasing at the beginning of operation of the device. The value should stabilize on a high level after a short period of time. The same behavior may be observed if the battery has been charged shortly before operation.




This example shows the message screen, which informs you that the battery is being charged right now. No measurements to determine the battery condition are possible during that.

# 16 Operation time, charging, low battery warning

Your PFC Advanced has been equipped with a high-performance sealed lead acid battery, which is rechargeable. If the battery has been charged completely the operation time is at least 6 hours at an ambient temperature of 20°C. Lower temperatures will reduce the operation time to some extent.

To charge the build-in accumulator only use the supplied charging unit. The charging unit cannot be mixed-up with the devices of the 'Profi' series because the connector is different. All charging units of the 'Advanced' series are interchangeable. These charging units have a wide input voltage range and therefore they can be used worldwide. Only adaptors for the different foreign wall outlets may be required.

While the device is being charged the green LED indicator 'Charging' is active. If the device is being operated during that you see the symbol of a mains connector being displayed next to the battery symbol, indicating that charging is in progress. The accumulator condition cannot be checked as long as the device is being charged. A full charge of the build-in battery takes 14 hours at most.
At the end of the charging process the intelligent charging circuit switches to trickle charge mode. Ideally the device should be always connected to the charging unit when in stock. By this practice it is 100% at your disposal at any time. Damages due to overcharging are not possible!

In addition to the battery charging level symbol, which is not being displayed in all modes, the red LED indicator 'Low Battery' informs you if the remaining capacity is less than 30%. Please recharge the battery soon to avoid damages from deep discharging. Deep discharges reduce the normal battery life of 5 years significantly. In extreme cases it may become useless.

| **NOTICE**<br><br>4.1 | **Charging of the device**<br><br>The device may only be charged in certain positions.<br><br>Only charge the device in the following positions:<br><br>• horizontal position or<br>• standing on the front panel<br>• standing on the rear panel<br><br>Do not charge the unit when it is lying on one of its vertical sides. |
|---|---|

| **TIP** | Continuous operation is <u>not</u> always gained by charging the device constantly. The power consumption is different depending on the current operation mode. To achieve continuous operation, use a special mains adaptor, which is providing supply to the external power input pin of the multifunctional connector. Another option is to drastically reduce the backlight brightness of the LCD and check from time to time if the battery charging level is increasing. |
|---|---|

| **TIP** | If charging is incomplete due to interruption the displayed accumulator capacity is higher than the actual one because the voltage level has not normalized yet. Wait at least an operation time of 10 minutes to measure realistic results. |
|---|---|

# 17 Controlling devices with serial data cable

As a general rule the controller sends its commands on both communication carriers: by radio and on the cable. By this practice you can mix wireless and cable control without any restriction. Only when receiving data, you need to determine which carrier should be used by the device.

How to establish a cable connection is described in the manual of the 'Advanced' receiver.

The controller is the feed-in of data to a line architecture network. There the controller can be at any position. At the beginning and at the end of each line a termination resistor is required. If the controller is located at one end of the line you have to use the termination resistor right next to the controller and another one at the other end of the line.

No further settings are required for cable communication at the controller.

# 18 Handling and cleaning

Protect the PFC Advanced against immersion of humidity and moisture. Always keep the lids of the key switches and of the XLR connector of the gooseneck lamp closed if you do not use them.

Regarding the waterproof design of the PFC Black Edition please see section 'Differences between PFC Advanced and PFC Advanced Black Edition'.

Only use your fingers or at the most a plastic pen (i.e. Stylus) to control the touch panel. Never touch the display with sharp or metal objects. Please take care that no burning or hot cinders of the firework effects fall onto the device, because the touch panel could probably become damaged from that.

Use a piece of cloth, which was moistened with water and at most with rinsing agent, for cleaning the device. Strong detergents and abrasives could damage the surfaces.

If a key became dirty you may remove the pushbutton tray by carefully lifting it with a screwdriver to clean the switching travel. If there is any doubt in the correct function you should have the key replaced by the manufacturer.

# 19 Maintenance

In general, the PFC Advanced and PFC Advanced Black Edition needs no special maintenance if used properly. But we recommend to send the device once a year to the manufacturer to have the battery and all functions tested.

# 20 Warranty

The warranty period is 24 months.

If there is any defect during in this period please pack the device properly and send it to the manufacturer with carriage paid to have it repaired free of charge. Please do not forget to attach a description of the symptoms, which have occurred.
Warranty is excluded if the device was damaged due to wrong usage or excessive stress.
Unauthorized repairs and the use of non-original parts will void all warranty, guarantee and product liability claims with immediate effect.

# 21 Damages caused by misusage, maloperation, malfunction

The devices have been designed for firing of pyrotechnical effects only (Stage / Aerial Displays / SFX). Discuss all other applications with the manufacturer before usage. In the case that one of the events stated above has happened we are only liable if the causation was within our range of influence. The devices have been developed, manufactured and tested to the best of our knowledge and belief.

Especially the user's work must comply with the safety instructions at all times.

A long test period and our practical experience proved that the system is absolutely reliable even if used in difficult conditions.

Please follow the instructions given here e.g. regarding protection against moisture by using covers or similar if you are using the device outdoors.

# 22 Technical data

## 22.1 General data

| | |
|---|---|
| Radio parameters<br>EU version | Frequency Band: 433.05 - 434.79 MHz<br>Maximum radio-frequency power transmitted: <=10 mW<br>Channel Spacing: 25 kHz<br>Number of radio channels: 70 (433.050 - 434.775 MHz)<br>Modulation: FM narrow band<br>Frequency Shift: +/- 3 kHz<br>Duty Cycle: <10%<br>Radio equipment class according to 2014/53/EU (RED): 1<br>Radio equipment type: non-specific short range device, transmitter and receiver (Transceiver)<br>Receiver Category according to ETSI EN 300 220 V3.1.1:<br>demanded by the application: 3 (lowest performance level),<br>fulfilled by the device up to SN C100XXXX584 and SN BE100XXXX126: 1.5 (second-best performance level),<br>fulfilled by the device starting at SN C100XXXX585 and BE100XXXX127: 1 (best performance level);<br>The receiver category indicates how well the device can still receive radio protocols when strong signals are present on frequencies below and above the used frequency (blocking).<br>Receiver Principle: Double superheterodyne<br>Receiver Sensitivity: -119 dBm @ 12 dB SINAD<br>Wave Length: 70 cm<br>Standard antenna included in delivery:<br>Center Frequency: 434 MHz<br>Radiation Pattern: omnidirectional<br>Radiator Length: Lambda/4, not coiled<br>Antenna Gain: 0.00 dBd, 2.15 dBi |
| Radio parameters<br>US version | Frequency Range: 458 - 462.5 MHz<br>License: FCC Part 90, FCC-ID: V9X-LMD400R<br>Maximum radio-frequency power transmitted: <=10 mW<br>Channel Spacing: 12.5 kHz<br>Number of radio channels: 360 (458.0000 - 462.5000 MHz)<br>Modulation: FM narrow band<br>Frequency Shift: +/- 3 kHz<br>Receiver Principle: Double superheterodyne<br>Receiver Sensitivity: -119 dBm @ 12 dB SINAD<br>Wave Length: 65 cm<br>Standard antenna included in delivery:<br>Center Frequency: 460 MHz<br>Radiation Pattern: omnidirectional<br>Radiator Length: Lambda/4, not coiled<br>Antenna Gain: 0.00 dBd, 2.15 dBi |
| Protocol parameters | half-duplex, PCM with Manchestercoding, Checksum: 40 Bit CRC, data rate approx. 2,500 bps |
| Temperature range | Transport und storage: -30 to +70°C<br>Operation: -20 to +65°C<br>The maximum temperature difference between devices must not exceed 60 K in order to enable unimpaired radio communication.<br>Optimal storage temperature for longest battery life: +10 to +20°C |
| Humidity | PFC Advanced: 10 - 90% rH, no condensation<br>PFC Advanced Black Edition: 0 - 100% rH, condensation allowed |
| Allowable altitudes above sea level | Storage and transport: -500 to 12,500 m<br>Operation: -500 to 4,000 m |
| Protection class | III |

**Dimensions (L x W x H) and weight, each without antenna:**
PFC Advanced: 303-210-98 mm; 2.775 kg
PFC Advanced Black Edition: 250-195-67 mm; 3.780 kg

**Power supply and charging concept:**
12 V, 2 Ah, sealed lead acid type rechargeable battery, PYROTEC charging device

**Supplied accessories, included in delivery:**
1 Standard antenna
2 Keys (not with PFC Advanced Black Edition)
1 Charging unit
2 Magnet pens
1 LED Gooseneck lamp (not with PFC Advanced Black Edition)
1 User manual

**Charging unit:**

| | |
|---|---|
| Mains voltage | 100-240 VAC, 50-60 Hz |
| Power consumption | typ. 4.5 Watts |
| Charging time | Full charge within 14 h, no danger of overcharging, automatic trickle charge |
| Dimensions | L-W-H 80-74-29 mm |
| Weight | 0.07 kg |

## 22.2 Compatibility and Firmware Revision History

The PFC Advanced is able to control all devices of the PYROTEC family: 'Profi' and 'Advanced' series. The device is able to communicate bi-directionally with receivers of the 'Advanced' series, i.e. it is able to request data from the receivers. The receiver will answer and transmit the information by radio, which can be received by the PFC Advanced. By this the functions 'Remote Data Request' and 'Remote Programming' become possible.

The firmware of the devices is continuously developed. Information about changes between different firmware versions is available on request. Please inform us about the version you are currently using. We will then send you an easy-to-understand extract from the firmware revision history.

## 22.3 Pin assignment of input 'external firing key'

a) PFC Advanced:

The pin assignment of this three-pole female XLR connector is:
Pin 1 = GND and shielding
Pin 2 = +5V DC, Impedance 100 Ω
Pin 3 = Input 0 / 5 Volt

b) PFC Advanced Black Edition:

The pin assignment of this Lemo connector is:
Lemo shielding = GND and shielding
Pin 5 = Input 0 / 5 Volt
Pin 6 = +5V DC, Impedance 100 Ω

A potential-free contact should be used as an external firing key. The contacts of this pushbutton have to be wired to pin 2 and 3. Only a shielded cable should be used for this purpose. The shielding has to be connected to pin 1 and it should end unconnected at the end of the cable in the housing of the external firing key.

The device can also be controlled by a DC voltage. Thereby 0 Volt represent off and 5 Volt represent on. Interim values are undefined and not allowed. The reference potential for the voltage to be applied is pin 1. This is also used for the shielding. Pin 2 remains unconnected. Pin 3 is the input for the control voltage. Internally there is a pull-down resistor of 2.2 kΩ. The impedance of the voltage source has to be less than 300 Ω. The control cable has to be shielded.

## 22.4 Pin assignment of multifunctional connector

PFC Advanced and PFC Advanced Black Edition:

The multifunctional connecter is being used for:

- The supplied charging unit is connected here.
- The optional, external power supply is connected here.
- This is also the connector for the RS485 interface to control 'Advanced' receivers via serial data cables.

The pin assignment is:
Pin 1 = Charging voltage (min. 18VDC, max. 24VDC, approx. 350mA are required)
Pin 2 = external power supply 13.8VDC, up to 500mA are required here
Pin 3 = GND
Pin 4 = Serial data line, Data+
Pin 5 = Serial data line, Data-
Pin 6 = Shielding for serial data lines

Only use original charging units for charging.

To power the device externally, if the battery charging level is low, we provide power supplies. You should use only original equipment here, too.

High-end data cables for establishing the connection between controller and receivers are available upon request.

## 22.5 Pin assignment of the SMPTE input jack

At the PFC Advanced the SMPTE input is a female XLR connector with three pins. The pin assignment complies with the common standard for symmetrical audio signals:

Pin1 = Ground / Shielding
Pin2 = Positive Signal Line
Pin3 = Negative Signal Line

For the PFC Advanced Black Edition we deliver a cable XLR to Lemo.

# 23 Accessories

## 23.1 Accessories for PFC Advanced Standard

Below is a list of original accessories that can be obtained from the manufacturer or authorized distributors at any time. The device may only be operated with these original accessories. Otherwise, all claims arising from warranty, guarantee and product liability will become void with immediate effect.

| Item No.: | Description: |
|---|---|
| 1341 | Antenna extension cable 1m |
| 1342 | Antenna extension cable 2m |
| 1345 | Antenna extension cable 5m |
| 1343 | BNC-BNC adaptor |
| 1206 | External firing key with XLR cable, 1 output |
| 1207 | External firing key with XLR cable, 2 outputs |
| 1923 | External firing button/deadman 'Pickle' |
| 1303 | Charging unit Advanced series |
| 1311 | Magnetic pen |
| 1024 | Multi charging unit for up to 10 Advanced devices |
| 1312 | Key 901 |
| 1310 | Gooseneck lamp |
| 1320 | Standard antenna |
| 1322 | Superscan 71, high gain antenna. Only approved for being used in receiving mode! |
| 1219 | Upgrade Backup for PFC Advanced |
| 1400 | ZARGES transportation case PFS/PFC/PFC Black Edition |

## 23.2 Accessoires for PFC Advanced Black Edition

Below is a list of original accessories that can be obtained from the manufacturer or authorized distributors at any time. The device may only be operated with these original accessories. Otherwise, all claims arising from warranty, guarantee and product liability will become void with immediate effect.

| Artikelnr. | Artikel |
|---|---|
| 1341 | Antenna extension cable 1m |
| 1342 | Antenna extension cable 2m |
| 1345 | Antenna extension cable 5m |
| 1343 | BNC-BNC adaptor |
| 1412 | Filling cone for desiccant |
| 1924 | External firing button/deadman 'Pickle' for Black Edition |
| 1303 | Charging unit Advanced series |
| 1311 | Magnetic pen |
| 1024 | Multi charging unit for up to 10 Advanced devices |
| 1912 | PFC Advanced Black Edition adaptor cable for external firing button 2 outputs XLR/LEMO |
| 1913 | PFC Advanced Black Edition adaptor cable for Mini RF Amplifier Black Edition <-> PFC standard |
| 1911 | PFC Advanced Black Edition DMX cable |
| 1926 | PFC Advanced Black Edition DMX/Charge Split Box |
| 1910 | PFC Advanced Black Edition external firing button 1 output |
| 1909 | PFC Advanced Black Edition external firing button 2 outputs |
| 1906 | PFC Advanced Black Edition connection cable 30W RF-Amplifier |
| 1908 | PFC Advanced Black Edition connection cable for Mini RF-Amplifier |
| 1907 | PFC Advanced Black Edition connection cable for SMPTE Timecode |
| 1905 | PFC Advanced Black Edition connection cable USB |
| 1320 | Standard antenna |
| 1322 | Superscan 71, high gain antenna. Only approved for being used in receiving mode! |
| 1411 | Desiccant package |
| 1400 | ZARGES transportation case PFS/PFC/PFC Black Edition |

## 23.3 Optional add-on: key switch 'Backup'

To improve the overall system reliability, especially when it comes to important projects, it is desirable to have another controller ready-to-operate which can be used if the actual controller should fail (i.e. backup device).


You need e.g. two PFC Advanced controllers which have been equipped with the backup function. This is an additional key switch on the right side of the front of the device.

As a general rule only one controller is allowed to transmit data. Thus, the backup function has been developed as an add-on for the controllers which enables you to intentionally switch off the transmission carrier.

How to proceed: Make sure that the key switch backup is in the position 'Transmit On' at the main controller and that the backup device is set to 'Transmit Off'. Then activate the relevant firing mode at both controllers (automatic firing mode or SMPTE firing mode) and arm the firing mode.

Now you can start both devices simultaneously, depending on the firing mode either by time code or by simultaneously pressing the firing buttons. Just in case you can switch the faulty device to 'Transmit Off' and the backup device to 'Transmit On'.

The PFC Advanced Black Edition is generally equipped with the backup switch.

## 23.4 Optional accessory: External firing key

The external firing key is available in two versions: With one or two outputs.

The version with one output is intended if you just want to have the firing button in your hand, which is sometimes advantageous for several applications.

The version with two outputs has been designed to control two transmitters simultaneously with one being in backup mode.

Due to the fact that pressing the firing keys of two controllers can result in a timing mismatch we recommend this external firing key with double output as an optional accessory part. The high-end key is installed in a handy grip made of robust plastic.

This accessory item is available for both: PFC Advanced and PFC Advanced Black Edition.

# 24 CE marking of the EU version

The EU version of this device is marked with the CE logo:

Each device intended for operation in the EU is accompanied by an EU Declaration of Conformity.

# 25 Address of the manufacturer and contact details for requesting an EU declaration of conformity

Galaxis Showtechnik GmbH
Lohgerberstr. 2
84524 Neuötting
Germany

Tel.: +49 / 8671 / 73411
Fax: +49 / 8671 / 73513

Homepage: www.galaxis-showtechnik.de
E-Mail: info@galaxis-showtechnik.de

Please use these contact details if you want to request an EU declaration of conformity.

Each device intended for operation in the EU is accompanied by an EU Declaration of Conformity.