

FIREMASTER 1 FM

WIRELESS firing system



- NEW TRANSMITTER, LIGHT WEIGHT, HAND-HELD WITH IMPROVED DISPLAY**
- AUTOMATIC BATTERY CHARGER WITH MICROPROCESSOR CONTROL**
- INCREASED R.F. OUTPUT POWER**
- SOFT CARRYING CASE**
- NEW RECEIVERS WITH FULL-METAL, WATERPROOF CONTAINER**
- PROFESSIONAL-TYPE, ALL-METAL LINE CONNECTIONS WITH FAST INSERTION**
- INTERNAL BATTERY WITH DOUBLED CAPACITY**
- IMPROVED SENSITIVITY FOR THE RECEIVER RADIO MODULE**
- REDUCED DIMENSIONS AND WEIGHT**
- NO-COMPROMISE PROFESSIONAL CIRCUITS AND COMPONENTS**
- FULLY COMPATIBLE WITH ALL PREVIOUS FIREMASTER I VERSIONS**
- LOW-PRICE**

GENERAL DESCRIPTION

The common systems on the market, use electric cables to connect the squibs to the firing console and exhibit serious problems due to the huge quantity of connecting wire (in most cases up to several miles!). This, apart the high costs and large time wasting, also presents risk of contact uncertainties and circuit failures, high overall system complexity, high error rate, impossibility to make "last minute" substantial changes.



Recently, some radio-controlled systems appeared on the market with the declared intention to overcome all of the above problems. The radio-link concept certainly reduces the wiring problems and improves the overall reliability. Nevertheless, most of the radio systems today on the market, still suffer of some residual problem: this, added to the poor safety of the radio link, the simple security code adopted and the amateur-like construction of these systems, created several (sometime justified!) mental reserves about radio-controls for pyrotechnic applications.

The "FIREMASTER I ®" system has been conceived to eliminate once for all these problems, to make easy and rapid the assembly of large pyrotechnic shows, allowing the maximum freedom and flexibility concerning the position of the firing points. The "FIREMASTER I ®" system being completely controlled via a RADIO

LINK, eliminates any wiring and allows to set off fireworks devices even from the most difficult and inaccessible places such as: rivers, lakes, pontoons, towers, steeples, roofs, etc.

The highly professional construction, the use of modern and sophisticated MICROPROCESSOR CIRCUITS, and the proprietary communication system on ALL UNITS, make the "FIREMASTER I ®" system totally safe and grant the maximum reliability in any operating conditions, even the most prohibitive ones!

The "FIREMASTER I ®" system is composed by two units:

- A hand-held unit containing the radio transmitter and the programming circuits with a membrane keyboard and a LCD ALPHA-NUMERIC DISPLAY with backlight. With this console the shooter can safely manage all the show phases standing far from the fire site.
- An indefinite number of "remote units" with a maximum of 999 programmable sequences. Each unit has 8 fully independent firing lines with direct connection to the squibs. Each "remote unit" contains a high-sensitivity radio receiver, a microprocessor to decode the firing command, its INTERNAL BATTERY with the charging circuitry and the power circuits to directly drive the electrical squibs.

CONTROL BOX – TRANSMITTER - TX-3K



It is contained in a compact, light-weight container of reinforced plastic. Its extremely small dimensions, allows an easy and practical access to all possible functions in any operating conditions. The internal Ni-MH rechargeable batteries grant a continuous autonomy of more than 10 hours. The automatic battery charger is controlled by the internal microprocessor in order to grant the optimum charging level and the operating life of the batteries.

The TX3 – K controller/transmitter is provided with:

- A splash-proof membrane keyboard with 21 keys
- An ALPHA-NUMERIC LCD display with 4 lines of 16 characters for the real-time display of the sequence, selected line and other relevant operating parameters.
- Keyboard-selectable operating modes: TEST/SAFE (PROGRAMMING), FIRE, AUTO-INCREMENT, SPARE EMERGENCY LINES.
- LED indicators for: SAFE/TEST, FIRE, R.F. power
- Separate keys for ARMING and FIRE operations with interlock safety.
- Internal battery charger with automatic charging control and automatic shut-off. The EXTERNAL line power supply is INCLUDED.
- SMA antenna connector (1/4" whip antenna INCLUDED)
- Direct connection for the external PYROMUSICAL SYNCHRONIZER.

The radio transmitter, is a PSK-modulated, SAW-controlled, four stages model and can provide a continuous R.F. output power in excess of 1W at the operating frequency of 433.92MHz, granting a minimum coverage area of ONE MILE for the worst operating conditions (artificial obstacles such as buildings, railways, bridges, power lines, etc.) and more than 5km with open field conditions. The transmission code is a very complex sequence of 36 binary numbers granting the uniqueness of the fire command with one probability on 236. This very particular coding system, along with the large transmission power, gives a total insensitivity to the external interfering signals.



Very seldom the firing sequence of the various devices in a pyrotechnic show, does follow the natural number sequence, more frequently the sequence looks "random" due to the decision to add or eliminate a device or to the need to place the tubes in a different manner when the show is already installed. This common situation imposes to the shooter to proceed by random steps during the show following a written program with the risk to skip a number, to fire twice the same number or to fire the wrong number at the wrong moment.

The "FIREMASTER I ®" system is fitted with two separate indications on the LCD display: one for the fire sequence (show progression number) and one for the physical line(s) associated with that sequence. The shooter has full freedom to program (even largely in advance and with full ease) the real firing sequence whatever it be. The sequence will be permanently stored inside the microprocessor memory of the control box until it will be decided to replacing it with another one. Small, large or total changes can be made at any moment simply and very easily without touching at the existing connections on the already-installed devices.

This absolutely unique feature, allows the shooter to install the show with the greatest freedom without need to care for a particular sequence of the remote receiver boxes: the needed firing sequence will be decided and recorded with the show already wired, operating safely and REMOTELY on the control box from the firing position.

When the show will begin, the shooter will send only a generic fire command at the right moment and the pre-programmed sequence will be automatically executed.

The "FIREMASTER I ®" control box allows programming a sequence of up to 999 firing shots for an unlimited number of physical lines: this is largely beyond the real needs of any practical show. In addition it is also possible to program 10 "spare" sequences to be used in an emergency if the main sequence should be interrupted by some external, unexpected problem. The shooter can step back to the main sequence when the problem has been fixed.

The "FIREMASTER I ®" firing system exhibits another interesting characteristics: every customer purchasing a new control box and one or more remote units (even at differed times), is given an exclusive personal code number. This code is permanently stored in all memories of his system units and grants that the remote units recognize the fire command code coming from the companion control box and no other one.

This unique feature allows several displays companies to use the "FIREMASTER I ®" system at the same time and in the same place (i.e. during the great international contests) without risk of cross-interference and avoiding any possibility of accidental firing caused by the competitor's signals.

Of course we can supply to the same customer as many different control boxes he needs with the same customer code: it could be a nice safety rule to have always on stock, other than obviously several additional remote units, also a spare control box to be used in emergency (stealing, destruction or severe damage of the main control box).

The "FIREMASTER I ®" TX3-K is a COMPLETELY REVISED and IMPROVED version of the previous Model FM - TX3. Even if the NEW TX3-K has a lot of new functions and possibilities, THE COMPLETE COMPATIBILITY WITH ALL PREVIOUS MODELS OF THE FIREMASTER I ® SERIES HAS BEEN MAINTAINED.

REMOTE UNITS – RECEIVERS - RX IV-8CH

Each unit is housed in a robust METAL box with water-proof sealing; it can be safely used in any adverse climatic condition and tolerates shocks, incandescent fall-out and moderate blasts.

Each remote unit is totally autonomous and provided with 8 independent firing lines. It has been conceived to be installed as near as possible to the mortar muzzle in order to reduce to the minimum possible (and eventually to avoid completely) the connection wires to the firing lines. Any SERIES/PARALLEL CONNECTION of the squibs (up to a maximum of 10 devices for each line) and with long connections, is allowed. Each line output supplies 12V with a continuous current in excess of 1A (up to 10A peak).

The remote units allow to have their channels independently programmed with any one of the 999 available codes, have a built-in circuit for the automatic measuring of the squibs and line electrical resistance, an LCD display to set the sequence for each one of the available 8 lines and to read directly both the line resistance and the battery voltage, a complete membrane keyboard for testing and programming, a 3-position key selector (OFF-SAFE/TEST-FIRE). Each remote unit also contains: a microprocessor to decode the firing command, a FM, super heterodyne, quartz-controlled radio receiver, LED indicators for the R.F. received signal, fault conditions, power ON, battery under charge, a complete, built-in, battery charger, a sealed lead-acid gel battery and the MOS-FET power driving circuitry for the firing lines.





Any one of the available 8 lines of the remote units, can be independently programmed with the local keyboard and display. It is allowed to give any channel any code in the range 1 to 999 and no limitation exists in programming as many lines as needed with the same code: with a single firing command transmitted by the control box, it will be possible to set-off at the same time hundreds of lines placed at great distance and connected to different remote units. This possibility allows realizing with the greatest ease and low costs special effects such as barrages, large flares arrays, waterfalls, etc.

Each line is driven by solid-state MOS-FET devices instead of the more commonly used mechanical relays. The mechanical relays are prone to various failures such as: contacts oxidation, vibrations sensitivity, contacts sticking, etc. with the serious risk of line interruptions or, worse, of premature firing when the squib is connected to the line. Mechanical relays are also quite sensitive to shocks and vibrations: this could cause unwanted, multiple firing by interaction due to the strong vibrations produced by the first tube set-off.



The "FIREMASTER I ®" system completely eliminates these problems by removing one of the weakest points of most traditional firing systems. The LINE connectors are professional, full-metal type with quick-connect feature and grant a reliable operation under adverse climatic conditions for a very longtime.

In order to protect the front-panel and the membrane keyboard from incandescent fallout (when the Units are placed very near to the mortars), a SPECIAL PROTECTIVE BLANKET is available (optional accessory available upon request). The blanket is made of soft, special and INCOMBUSTIBLE tissue. The Unit, with all wire connections to the squibs in place, can be "wrapped" in this blanket: in this way a complete protection of the Unit against the burning fallout is granted and also the electric connections remain protected from accidental contacts with unwanted objects.

The "FIREMASTER I ®" RX IV – 8CH is a COMPLETELY REVISED and IMPROVED version of the previous Model FM - RX3/8. Even if the NEW RX IV – 8CH has several new features and characteristics, THE COMPLETE COMPATIBILITY WITH ALL PREVIOUS MODELS OF THE FIREMASTER I ® SERIES HAS BEEN MAINTAINED.



TECHNICAL SPECIFICATIONS

CONTROL UNIT - PROGRAMMING CONSOLE - TRANSMITTER MODEL TX3-K

- * CODES TRANSMISSION SYSTEM: radio link
- * TRANSMITTER: three-stage circuit with quartz-controlled oscillator (SAW)
- * TRANSMISSION FREQUENCY: 433,92MHz \pm 80kHz
- * TRANSMISSION POWER: 10mW R.F. E.R.P (up to 1W available)
- * TRANSMISSION CODES: 36-bit binary sequence with protected fire codes, user's code and parity
- * R.F. CARRIER MODULATION: PSK
- * DISPLAY: LCD alpha-numeric, 4 lines of 16 characters, LED backlight
- * OTHER LED INDICATORS: ARM/TEST, TX (R.F.), FIRE LED
- * BATTERY CHARGE VERIFY: direct reading of the battery voltage
- * INDICATION OF THE EMITTED R.F. CARRIER: direct with LED indicator
- * BATTERY CHARGING SYSTEM: internal, constant-current type
- * BATTERY CHARGER: external switching power supply. Line voltage 90 – 230V a.c.
- * BATTERY: 3 cells Ni-MH, 2300mA/h rechargeable
- * RECHARGE TIME: 12 hours with automatic shut-off
- * SYSTEM AUTONOMY WITH BATTERY FULLY CHARGED: more than 10 hours
- * ON/OFF CONTROL: pushbutton
- * SAFE/FIRE CONTROL: keyboard (double keystroke)
- * KEYBOARD: membrane-type with 21 keys
- * CODES GENERATION AND SYSTEM SUPERVISION: 8-bit microcontroller
- * CODES MEMORY: permanent type re-writable EEPROM
- * MAIN SEQUENCE OF THE FIRE LINES: 1 to 999 sequential positions. Selection is made with increment/decrement keys or randomly with a numeric keypad.
- * AUTO-INCREMENT function selectable.
- * AUXILIARY SEQUENCE FOR THE SPARE LINES: 10 lines, 0 to 9 with separate storage. Fast switching between the main and spare lines.
- * FIRE LINES: 999 programmable from 1 to 999 in any random sequence
- * Connection for the EXTERNAL pyromusical synchronizer
- * DIMENSIONS: hand-held reinforced plastic case. 200x100x40mm – 500g (with batteries)
- * SOFT protection carrying case available upon request



REMOTE UNIT - MODEL RXIV-8CH (8 lines)

- * RECEIVER: super heterodyne quartz-controlled
- * RECEIVE FREQUENCY: fixed for all Units. 433,92MHz
- * BANDWIDTH: ± 120 kHz
- * SENSITIVITY: better than $3\mu\text{V/m}$
- * CODES DETECTION: 8 bit microcontroller
- * CODES MEMORY: permanent memory, re-writable EEPROM
- * MEAN TIME NEEDED TO DECODE A VALID COMMAND: 0,2 seconds
- * FIRE PULSE DURATION: 1,2 seconds
- * CODES PROGRAMMING: selection keys, increment/decrement and LCD display
- * NUMBER OF MAX DETECTABLE CODES: 999, 1 to 999
- * SQUIB VERIFY: automatic, when the device is connected to the Remote Unit
- * SQUIB TEST CURRENT: 1mA max.
- * LINE DRIVERS: solid-state with MOS-FET devices
- * FIRE LINES: 8 fully-independent lines. Fast-connecting metal terminals
- * FIRE VOLTAGE: 12V D.C.
- * LINE CURRENT: 1A continuous, up to 8A peak
- * LINE RESISTANCE MEASUREMENT: direct reading in ohm
- * BATTERY VOLTAGE MEASUREMENT: direct reading under load
- * BATTERY CHARGER: directly from line 90 - 230Va.c. External switching power supply INCLUDED
- * BATTERY TYPE: lead-acid, sealed, gel type, 12V - 2,2Ah
- * DIMENSIONS: 230x150x80mm - 2,5kg (with battery)

WARNING NOTE: PARENTE FIREWORKS completely disclaim any responsibility about damages, injury to peoples, objects and property that could originate from the use of the FIREMASTER system and, in particular: improper use, abuse, use by unqualified personnel or use for any other purpose than pyrotechnic shows firing.

PARENTE FIREWORKS cannot assume responsibility for any malfunction or failure occurring during a pyrotechnic show even when the failure could produce the complete show repeal. PARENTE FIREWORKS will only provide to the system repair (free-of-charge if still under warranty).

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PRICE LIST 2009

TX-3K	CONTROL BOX - TRANSMITTER	euro 1.000,00
RX IV-8CH	REMOTE UNITS - 8 channels	euro 800,00
SY-1024	PYROMUSICAL synchronizer	euro 1.500,00
BHV-01	BOOSTER high voltage	euro 1.200,00
ANT-30	additional 30 cm ANTENNA 30 cm	euro 30,00

SALES TERMS :

- ✚ Prices: ex-factory
- ✚ Payment: advanced bank transfer
- ✚ Delivery: immediate
- ✚ Warranty: 12 months (batteries excluded)

PARENTE FIREWORKS S.R.L.

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