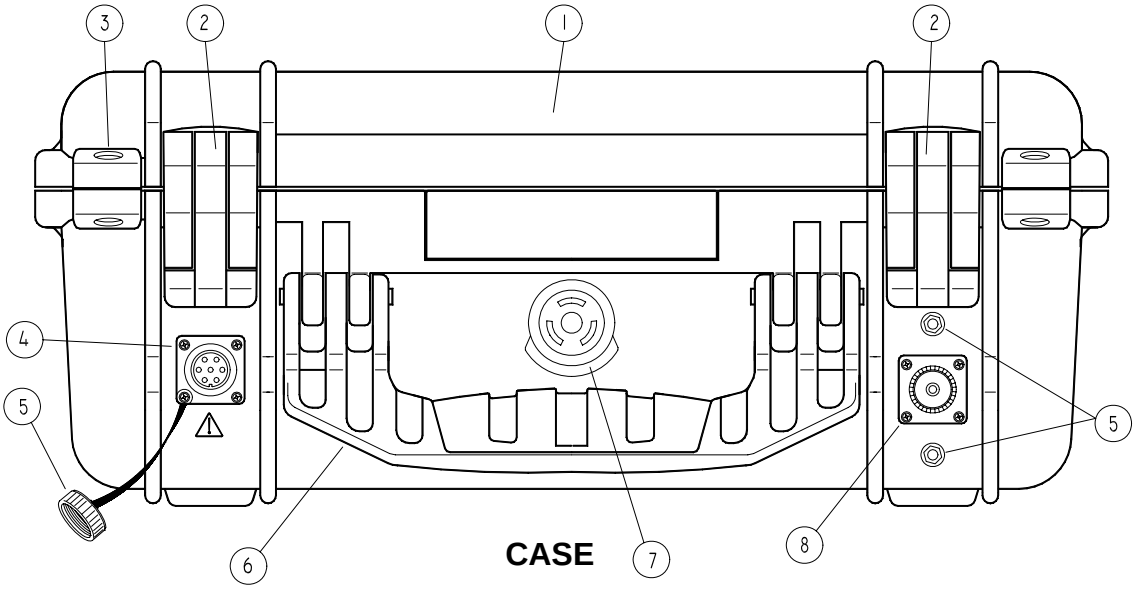
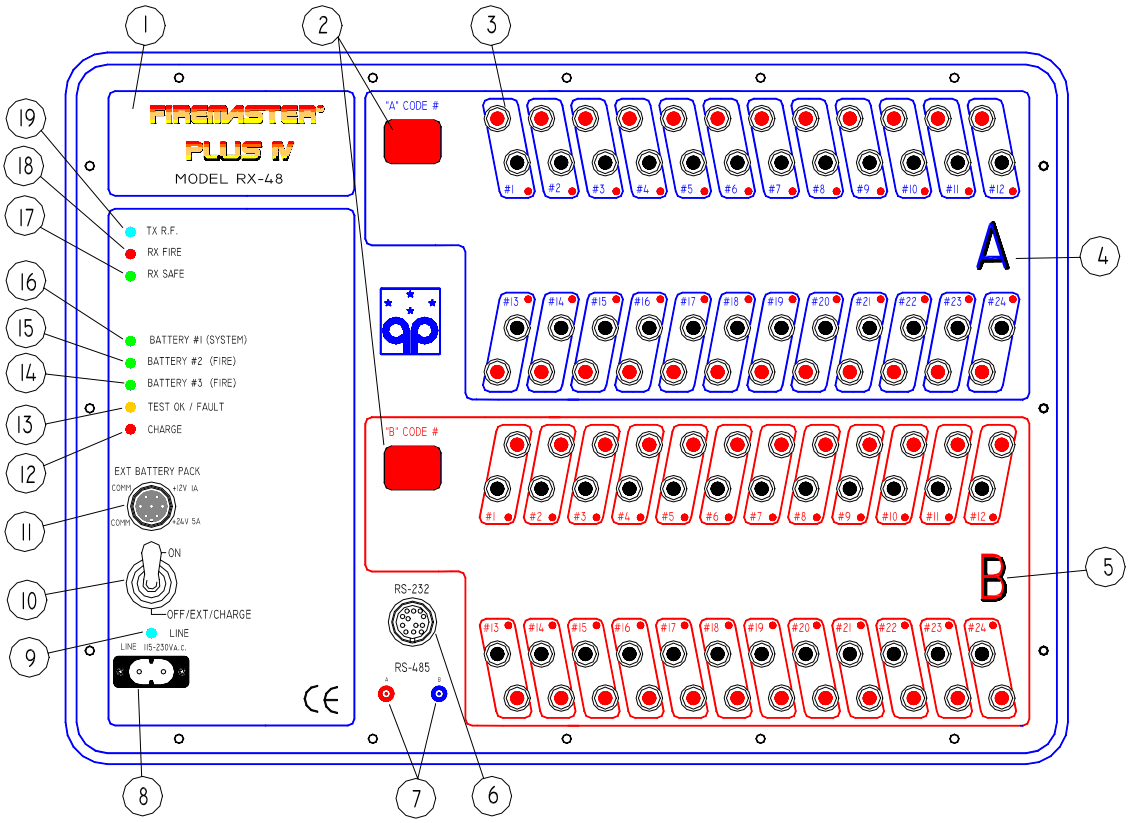
4. REMOTE UNITS RX48 (TWIN RECEIVERS)

4.1 CASE and FRONT-PANEL DIAGRAM



CASE

FRONT-PANEL



4.2 CASE DESCRIPTION

1. IP67 Ultra High Impact Copolymer Polypropylene case. 48.6 x 39.2 x 19.2 cm
2. Double-step latches
3. Stainless steel reinforced padlock protector
4. ⚠ Waterproof 7-pole DIN connector for external emergency battery.
5. Attachments for antenna adapter.
6. Fold-down and rubberized handle
7. Automatic pressure equalization valve
8. Waterproof SO-239 coaxial connector for 50ohm antenna

4.3 COMMANDS DESCRIPTION

1. Polycarbonate waterproof panel.
2. 3-digit LED display for unit number identification and various warning messages. See next chapter for a full description of the messages.
3. BINDING POSTS with quick-connection feature. Nickel-plated metal. Used to connect the squibs lines.
4. Unit "A" section. Each RX48 Remote Unit contains TWO separate and fully-independent 24-line units. Each section is fully compatible with the previous RX-24B model (Firemaster III).
5. Unit "B" section. Each RX48 Remote Unit contains TWO separate and fully-independent 24-line units. Each section is fully compatible with the previous RX-24B model (Firemaster III).
6. Double RS-232 SERIAL PORT. 12-pole DIN female connector. It is used to connect separately each section of the RX48 Unit to a PC. It will be used to *download* eventual update programs, *patches* and customizations, supplied by Parente Fireworks upon specific request only. The serial port can be also used to MODIFY the UNIT NUMBER of the "A" and "B" sections. All the above functions require a special communication program (PARENTERM®) with an access "key" other than a specific cable.
7. RS-485 standard SERIAL Port. 2mm plug connectors. This port is used to connect the base Unit TX5000 to the Remote Units RX48 when a CABLE CONNECTION is required in place of the standard RADIO link (or to implement a mixed-type connection: CABLE+RADIO). The connection wiring requires TWO WIRES ONLY: A and B connections MUST be respected (i.e.: pin A of TX5000 must be connected to ALL

pins A of the RX-48 units and pin B to ALL corresponding pins B of the RX-48 units. Only the LAST RX48 unit must be LOADED with a terminating 120ohm resistor placed between A and B.

8. LINE 110/240Va.c. two-pole mains receptacle. It accepts standard 2-pole cables to be plugged directly into the mains receptacle for battery charging. The internal supply accepts automatically voltages from 110V up to 240V a.c. 50 or 60Hz without need for range switching.

   NOTE: Since the RX-48 Unit IS NOT PROVIDED with a LINE SWITCH, the Unit itself, during the charging process, must be suitably placed in order to allow the easy removal of the LINE CORD at any moment, in case of emergency.

9. Line LED (blue). This LED indicator turns ON whenever the Unit is connected to a suitable MAINS receptacle for battery charging. The charging process takes place automatically when the MAINS is connected and the lever switch is in the OFF/EXT/CHARGE position.

10. Main power switch with 2 positions and rubber lever protection (waterproof).
    - **ON Position:** Unit switched ON and ACTIVE. The INTERNAL batteries **cannot be re-charged while operating**.
    - **OFF/EXT/CHARGE Position:** Unit switched OFF. In this position the internal batteries can be RECHARGED simply connecting the line cord to the mains receptacle. In emergency (failure of one or more of the INTERNAL batteries) the EXTERNAL BATTERY PACK can be connected to DIN connector placed on the CASE front.

11. OPTIONAL CONNECTOR for the EXTERNAL Battery Pack. 7-pole DIN connector male. Normally this connector IS NOT MOUNTED on the front-panel of the RX48 units: it is placed outside on the CASE front (see case diagram, point 4).

12. CHARGE LED (red). This indicator LED turns ON after all the internal batteries have been successfully tested and the charging process is running.

13. TEST OK/FAULT LED (yellow). This indicator LED blinks during the initial test of the internal batteries before the charging process takes place. The TEST LED is turned OFF if the TEST is passed for all the batteries and the charge starts normally. This LED is turned ON (STEADY, with the "FAULT" meaning) if otherwise one or more battery doesn't pass the initial test.

14. BATTERY 3 – FIRE (red/green). This bi-color indicator LED blinks GREEN during the normal charging process and turns ON RED (steady) if the relative battery doesn't pass the initial test or the charging process is terminated with a FAULT condition.

15. BATTERY 2 – FIRE (red/green). This bi-color indicator LED blinks GREEN during the normal charging process and turns ON RED

(steady) if the relative battery doesn't pass the initial test or the charging process is terminated with a FAULT condition.

16. 🟢🔴 BATTERY 1 – SYSTEM (red/green). This bi-color indicator LED blinks GREEN during the normal charging process and turns ON RED (steady) if the relative battery doesn't pass the initial test or the charging process is terminated with a FAULT condition.

17. 🟢 RX SAFE green LED. It flashes shortly every time the Unit receives and decodes a radio signal containing its User's Code (even if the command was not directed to that particular Unit). It could be used as status indicator for the correct performance of the RADIO RECEIVER.

18. 🔴 RX FIRE red LED it flashes shortly every time the Unit receives a FIRE COMMAND addressed specifically to it.

19. 🔵 TX R.F. blue LED It flashes shortly when the TRANSMITTER of the Unit is ON (typically when the Unit is answering to a command of the Base Unit or when it is sending data).

4.4 LED DISPLAYS DESCRIPTION

Each section of the RX48 Units has a 3-digit LED indicator. This display, during the normal operation, shows permanently the UNIT NUMBER assigned to the Unit's section. The Unit numbering can span between 1 and 255: usually the section "A" has ODD numbers (1, 3, 5, 7, etc.), while the "B" section has EVEN numbers (2, 4, 6, 8, etc.).

This rule however is not mandatory since a new RX48 TWIN UNIT can be used by a customer ALREADY owning one or more FIREMASTER III RX24 units. In this case the new RX48 units supplied to the customer WILL FOLLOW the previous numbering in order to avoid "gaps".

E.g.: imagine a Customer, already owning 4 Units RX24 (Firemaster III) numbered 1 to 4 and ordering two new RX48 Units (this is equivalent to purchase FOUR RX24). The new units supplied will be numbered as follows: one unit will have section "A" assigned as Unit 5 and section "B" assigned as Unit 6, while the second RX48 will have section "A" assigned as Unit 7 and section "B" assigned as Unit 8. Of course ALL UNITS (Firemaster III and Firemaster IV) will have THE SAME USER'S CODE.

This is the NORMAL WAY the units are numbered at factory. Upon specific request, it is however possible to supply the new RX48 Units with ANY COMBINATION of section numbering.

The 3-digit LED indicators can display some other messages both during the initial TEST phase and when a problem or a fault condition is detected. The possible messages are listed below:

- **TEST** tst this messages is issued during the initial test of the firing lines (every time the Unit is switched ON).

- **LINE ERROR** F*nn* If a fault should be detected during the line test, the message "F*nn*" will be issued. "*nn* " is the actual number (1 to 24) of the line failing to pass the test. The test will stop, the System will hang-up with this indication permanently displayed. This situation is NOT RECOVERABLE since the LINE FAILURE is considered a SEVERE FAILURE capable to produce destructive effects. The relative section of the RX48 Unit is immediately placed in a SAFE CONDITION. The Unit must be serviced as soon as possible. If the remaining section ("A" or "B") does pass the line test without errors, then this section can be used safely, while the section with one or more line failing to pass the test must remain UNUSED with ALL LINES DISCONNECTED.

- **DATA ERROR** dAt When CORRUPTED DATA (data relative to the LINES parameters) are detected in the memory or when the Unit has been NEVER PROGRAMMED BEFORE (memory blank), the "dAt" message is issued. **This condition doesn't forbid the system's operation:** it will be sufficient to "call" the Unit or even **any single line** of that Unit and to modify a parameter (e.g.: the SEQUENCE number). The error condition will be RESET. **WARNING!**: **this operation doesn't restore other data eventually corrupted**. Since this indication warns about a GENERIC data loss in memory (it could be relative to one or more data), it will be a good choice to **RE-PROGRAM COMPLETELY THE UNIT**.

- **BATTERY ERRORS** FbS The message is issued when the SYSTEM BATTERY (12V 5,7Ah) fails to pass the initial test. **The SYSTEM <u>will remain BLOCKED</u>** for the following cases:
  - The open-circuit of the SYSTEM battery is BELOW 11V
  - The VARIATION between the OPEN-VOLTAGE and the measurement UNDER LOAD of the SYSTEM battery is more than 25%

If otherwise the following condition is detected during the SYSTEM battery test, the UNIT **can be used normally** but one must take into account as the batteries are **NOT FULLY EFFICIENT** and they must be checked and re-charged as soon as possible. The message is displayed ***momentarily*** and at the same time a long buzzer sound is generated:

- The VARIATION between the OPEN-VOLTAGE and the measurement UNDER LOAD of the SYSTEM battery is more than 15% but NO MORE THAN 25%

- **BATTERY ERRORS** FbL The message is issued when the LINE BATTERIES (24V 1,2Ah) fail to pass the initial test. **The SYSTEM <u>will remain BLOCKED</u>** for the following cases:

- The VARIATION between the OPEN-VOLTAGE and the measurement UNDER LOAD of the LINE batteries is more than 20%

If otherwise the following condition is detected during the LINE batteries test, the UNIT **can be used normally** but one must take into account as the batteries are **NOT FULLY EFFICIENT** and they must be checked and re-charged as soon as possible. The message is displayed ***momentarily*** and at the same time a long buzzer sound is generated:

- The VARIATION between the OPEN-VOLTAGE and the measurement UNDER LOAD of the LINE batteries is more than 10%

- **LINE RELAY ERROR** FrL The message is issued when the SAFETY LINE RELAY or the MOS-FET (or both) of either section fails to pass the initial test (usually because the contacts are **STUCK**). **This is A VERY DANGEROUS SITUATION with potentially destructive effects. The SYSTEM <u>will remain BLOCKED</u>** in a SAFE condition: however it is suggested TO SWITCH OFF IMMEDIATELY any Unit showing this message and TO DISCONNECT IMMEDIATELY ALL LINE WIRING. **<u>Avoid ANY ATTEMPT to power ON again this unit while the external lines are still connected!</u>**

4.5 GENERAL DESCRIPTION

- Up to **128** Remote Units RX48 can be used at the same time, (corresponding to 256 RX24 Units of the previous Firemaster III system) for a maximum count of **6144 independent lines**!

- All Remote Units are **individually marked with a progressive number on the case cover**

- Each Unit has **TWO INDEPENDENT SECTIONS with 24 lines, marked 1 to 24:** Unit number **ONE** has lines 1 to 24, Unit **TWO** 25 to 48 and so on for all existing Units. **While the lines are no longer marked INDIVIDUALLY on the front-panel (as in the previous FIREMASTER III System), the TX-5000 will continue to display the number of each individual line as before.**

- The batteries can be charged with the power switch on the OFF/EXT/CHARGE position, simply connecting the line cord to any suitable mains outlet (90 to 240Va.c. 50 or 60Hz). The whole process of test and charge is automatically performed by a dedicated microcontroller. During the test and charge operations, the Unit **cannot be used**.

- The program for the fire sequences is **permanently stored** inside the memory of each single Remote Unit and it is maintained until the operator will overwrite it with new data.

- Any number of remote Units can be added or removed from the System without altering the program of the remaining Units.

- The fire sequences can be altered at any moment , even few minutes before the show take place, with the maximum of ease, REMOTELY, by radio link and without need for the personnel to be present on the fire site.

- The Base Unit TX5000 (when the "SHOW" mode is NOT in use) behaves just as a COMMUNICATOR and doesn't contain any memory of the fire sequences (the sequences are stored inside the Remote Units RX48), the Base Unit, if damaged, can be replaced IMMEDIATELY without any modification of the fire sequences already programmed. In "SHOW" mode the Base Unit TX5000 stores an IMAGE of the whole show: should be necessary to replace at the last moment the Base Unit, it will be also necessary to reload on it the **show image** from a portable PC in few seconds.

4.6 Power ON procedure

- **Power switch to "ON"**

- The 3-digit LED display of each section will show "tst" while all lines are tested in sequence and batteries checked for the charge level.

- If all tests are passed, the 3-digit LED display will show the UNIT NUMBER: the Unit is READY TO OPERATE

- Should otherwise any test fail, the 3-digit LED display will issue one of the warning messages (see the previous paragraph 4.4). In this case: TURN OFF the instrument, wait some seconds and TURN ON IT AGAIN: if now the 3-digit LED displays the UNIT NUMBER, probably it was just a bad reading and all is OK. If otherwise the WARNING MESSAGE should still appear, DISCARD THE UNIT (it must be serviced or the batteries re-charged). **DO NOT ATTEMPT TO SWITCH ON THE UNIT AGAIN IF THE FIRST TEST ISSUED A "FrL" WARNING MESSAGE! THE FAILURE OF THE INTERNAL SAFETY RELAY COULD BE POTENTIALLY DESTRUCTIVE!**

- If a warning message concerning the internal batteries is received, probably the SYSTEM BATTERY or the FIRE BATTERIES voltage is BELOW the minimum value required for a safe operation: the Unit automatically enters a **TOTAL BLOCKING** condition.

- A warning message concerning the batteries not always means a permanent failure of the internal batteries: more frequently the batteries just require A RE-CHARGE CYCLE. Only if, after AT LEAST TWO CHARGING CYCLES, the warning message is still issued, then a permanent failure should be suspected and it is suggested to have the Unit serviced.

- Any low-battery problem (insufficient charge or failure) can be recovered in two modes: if the batteries are just low in charge and the time left before the show is enough, RECHARGE BATTERIES. If otherwise the batteries have a permanent failure or the problem arrived when there is not enough time for a full charging cycle, turn the main switch OFF, and connect an EXTERNAL EMERGENCY BATTERY PACK. This will allow to perform anyway your show.

- During the whole OPERATING PERIOD, the RX48 Units generate an INTERMITTENT TONE: this helps to find the Units in the dark when the show is over and avoid the risk to store the Unit still operating (this will cause the complete battery discharge in few days with the risk of permanent damage)

4.7 Units Field Usage

4.7.1 Protection

1) The Remote Units on field are subject to burning fallout with consistent risk of permanent damage of the plastic front-panel. An excellent protection is offered by the sturdy plastic case an the top cover (the lateral opening on the cover allows the cables to pass and the normal operation is possible while the COVER IS CLOSED) A further protection (mainly to avoid damages to the Unit's case) can be obtained using the special fiberglass covers (supplied upon request as special accessory).

2) Should the user decide to provide otherwise to the Units protection, it is suggested to cover the top panel with aluminum foil paying great attention to avoid any SHORT CIRCUIT between the line wires and mainly to AVOID ANY CONTACT WITH THE ANTENNA CONNECTOR (it must be always perfectly insulated and must be never in contact with other metal parts).

3) The reinforced plastic case of the FIREMASTER IV SYSTEM, thanks to the particular structure and the IP67 grade, grants a perfect protection against water spillage or raining. A partial immersion of the Unit on the water, snow, mud is also possible provided some precautions are respected:

- The protection plug must be applied on the EXT. BATTERY connector, the cover must be CLOSED AND LATCHED (see figure "A")
- When the ANTENNA is connected and the normal operation is required, the immersion is possible ONLY IF THE ANTENNA AND ITS CONNECTORS ARE COMPLETELY ABOVE THE WATER LEVEL: this will reduce significantly the immersion level (see figure "A"
- When the normal operation (with the antenna connected) is required under extreme raining conditions, it is strongly suggested to operate the Unit WITH THE CASE PLACED VERTICALLY: this will give much more space between the ANTENNA base and the water surface or wet soil (see figure "B").

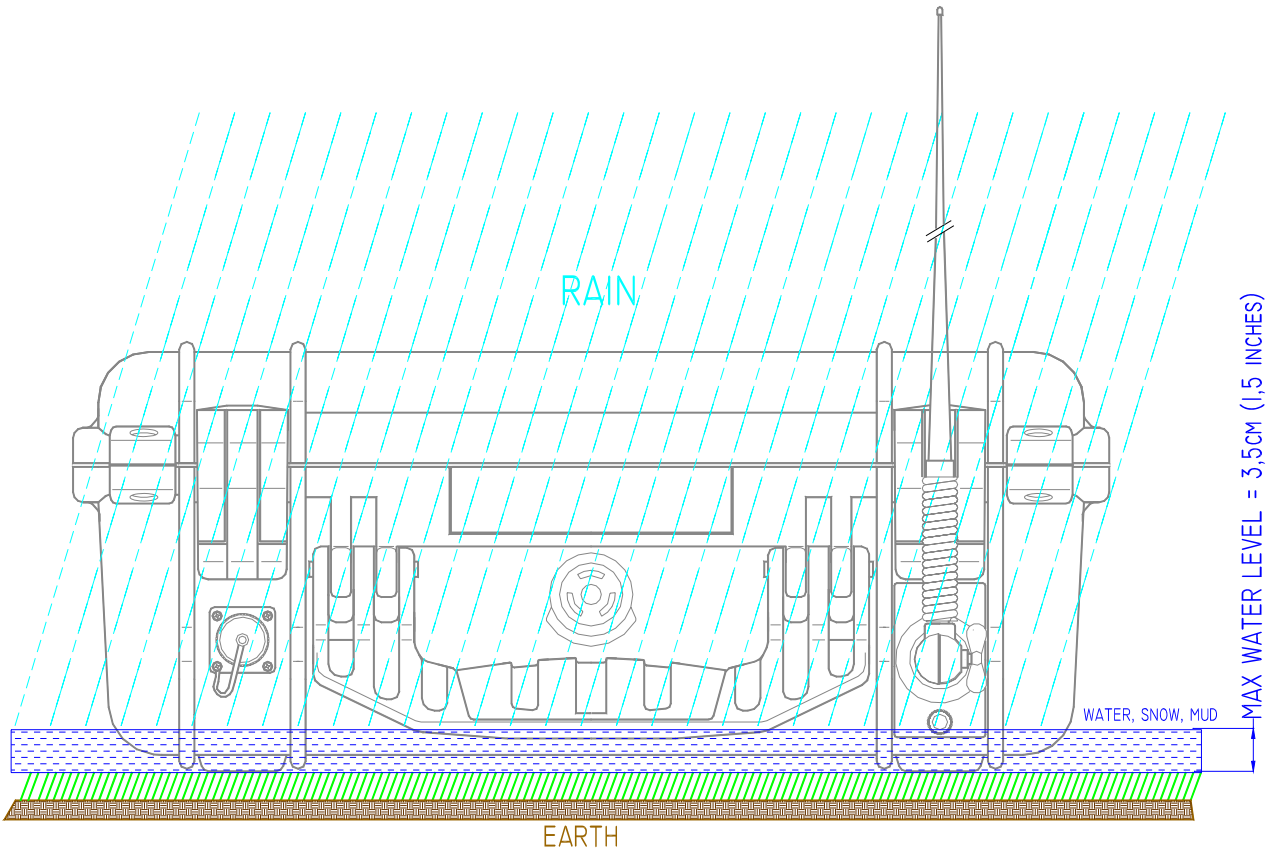


FIGURE "A"

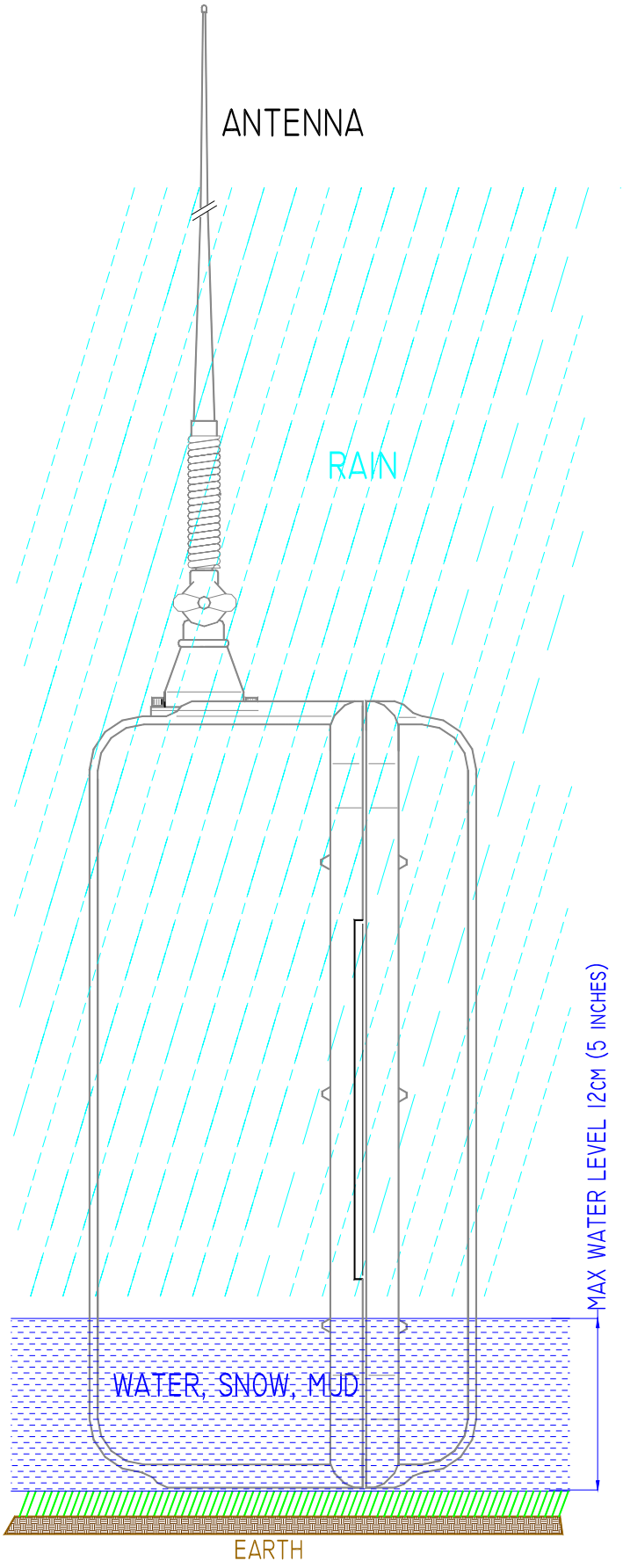
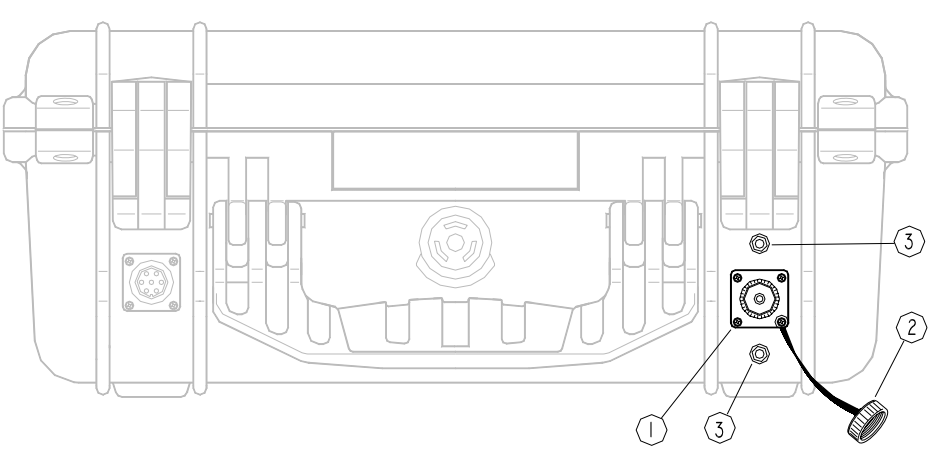

ANTENNA
RAIN
MAX WATER LEVEL 12CM (5 INCHES)
WATER, SNOW, MUD
EARTH

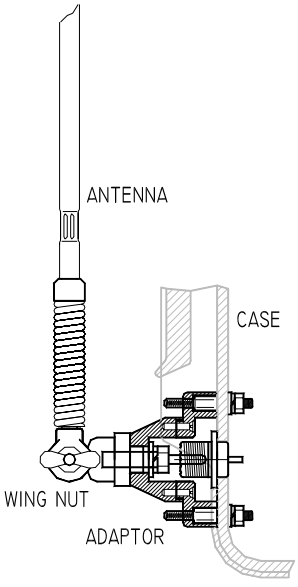
FIGURE "B"

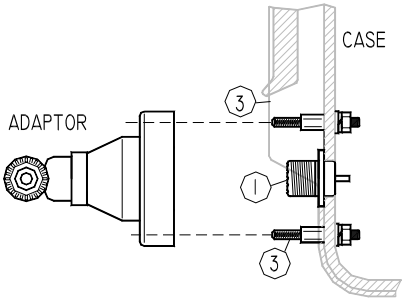
4.7.2 Antennas

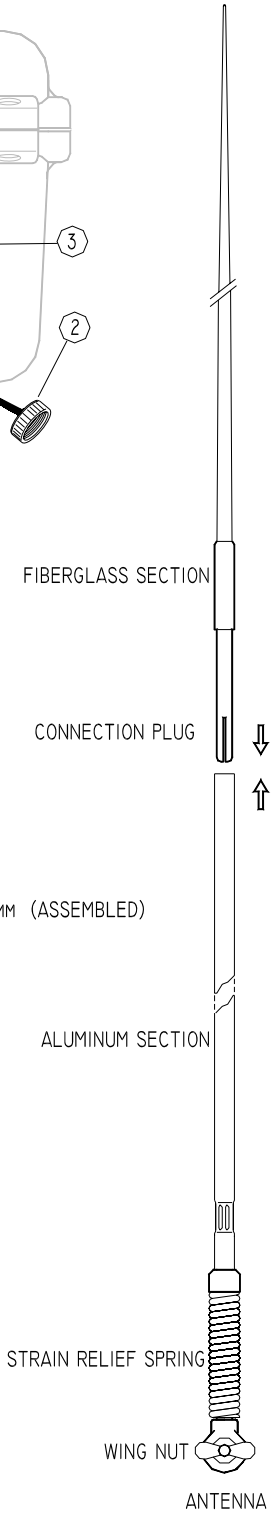
1) The antenna supplied with the FIREMASTER IV *"Millennium Three"*, is INTEGRAL WITH THE INSTRUMENT and it is used the same type both for the Base Unit TX5000 and the Remote Units RX48. These antennas are whip type in λ/4 resonating at 40,700MHz. The antenna is realized completely in fiberglass and aluminum; it is very flexible and fire resistant. The connection to the Unit is pivot-type one with wing nut.
2) The antenna is supplied in TWO PIECES: the bottom one is made of aluminum and is provided with a strain-relief spring and the wing nut. The top section is a fiberglass whip. The two pieces are quickly mounted simply sliding the terminal part of the whip section into the bottom aluminum tube.
3) In order to obtain the best results concerning the radio coverage field, even in presence of natural or artificial obstacles, the Remote Units should be placed at least ONE METER above the ground. Remember as, consistently with the terrain type and the show's needs, **HIGHER THE ANTENNAS ARE PLACED, MORE COVERAGE RANGE IS OBTAINED AND THE SAFETY MARGIN IS INCREASED ACCORDINGLY**.
4) The metal parts of the antennas (CONNECTOR, SPRING, WING NUT) **ARE ELECTRICALLY ACTIVE: AVOID ANY CONTACT WITH ANY OTHER METAL PART OR EXTERNAL WIRING**. Avoid also any contact with the antennas of the next Units and other metal objects. IN GENERAL: the antennas must be installed in VERTICAL POSITION, far from any other object by at least 2 meters.
5) The reading of the field strength, in dBµV, displayed on the base Unit TX5000, give a good indication about the system ability to communicate. Avoid to operate when the reading is BELOW 15dBµV: it could happen some problem of partial data decoding with the result of SOME MISFIRE AT THE FIRST ATTEMPT **(IN ANY CASE IT IS ABSOLUTELY EXCLUDED ANY RISK OF PREMATURE OR UNDUE FIRE!!!).**
6) The RX48 case is provided with a COAXIAL CONNECTOR ("UHF" type SO-239) placed EXTERNALLY near to the handle. This connector allows direct connection for a coaxial cable when the CABLE connection is required in place of the RADIO link or when an EXTERNAL aerial (e.g.: a GROUND PLANE antenna) is preferred in place of the standard antenna (for very critical propagation conditions). This connector however doesn't allow the direct insertion of the standard antenna (provided with a pivot-type attachment and a wing nut). A SPECIAL ADAPTOR is supplied as STANDARD ACCESSORY with the Unit: this adaptor allows a direct connection of the standard antenna but can be very quickly REMOVED if the SO-239 coaxial connector must be used. When not in use, we suggest to REMOVE always the antenna adaptor and to place the cover cap on the SO-239 coaxial connector: this will grant the best protection of the whole Unit against any possibility of humidity or water penetration inside the case.



1) SO-239 COAXIAL CONNECTOR (50OHM R.F. OUTPUT AND ANTENNA)
2) PROTECTION CAP
3) ADAPTOR PLUGS







4.8 Connections

4.8.1 Firing lines

Each section of the RX48 Remote Unit is provided with 24 couples of binding posts to connect a total of **48 independent** firing lines.
Each line is powered by the internal batteries of the Unit itself. The batteries for the lines supply are **exclusively dedicated to this duty** (all other circuits are supplied with a **separate battery**). All Units are supplied with two 12V batteries connected in series for a total of 24V available to the fire lines.
Being these batteries of the **lead-acid type** with gel immobilized electrolyte, the available peak current to each line (during short periods) can be very high (up to 10A peak).
Using standard igniters with a resistance of 1.5 to 2 ohm, it will possible to connect **no more than 10 devices IN SERIES and no more than 8 IN PARALLEL** (the latter configuration **IS NOT SUGGESTED** anyway).
Using non-standard igniters, it will be possible to calculate approximately the maximum number of devices to be connected IN SERIES, taking into account for the resistance value and the minimum firing current (specifications supplied by the manufacturer). Proceed first calculating the maximum allowable resistance on a firing line **Rmax** given by:

$$Rmax = \frac{Vfire}{Imin} - Rline$$

where: **Vfire**=24V
Imin=minimum fire current of each (in amperes, as declared by the manufacturer).
Rline=resistance (in OHM) of the connection wires to the Unit.

It will be then calculated the maximum number of igniters **Nmax** to be connected IN SERIES to a single line using the following equation:

$$Nmax = \frac{Rmax}{Rign} - 2$$

where: **Rmax** is the value obtained from the previous calculation
Rign is the resistance value of a **single igniter**

Eg.: using a standard Unit with a 24V battery, a connection line of 25 meters made of copper wire (section 0,22mm^2), ***daveyfire X_2*** igniters with 5meter of connection cables, it will be obtained:
Vfire=24V, I min=0.8A, Rline=3ohm (about)

$$Rmax = \frac{24}{0.8} - 3 = 27ohm$$

$$Nmax = \frac{27}{3} - 2 = 7$$

From the above calculations, it will be possible to connect IN SERIES up to 7 igniters of this type with a 100% warranty of ignitions. **These calculations are very prudential and theoretical**: in practice it would be possible to connect in series a lot more igniters (giving up some safety margin).
In any case, when more igniters are to be connected in series, IT IS MANDATORY USING DEVICES EACH OTHER IDENTICAL: not only of the same brand and model, but possibly also coming from the SAME PRODUCTION LOT.

THE PARALLEL OR, WHORSE THE MIXED SERIES-PARALLEL CONNECTIONS, MUST BE AVOIDED. ALSO THE SERIES CONNECTIONS SHOULD BE REDUCED TO THE MINIMUM POSSIBLE.

- The line connectors must be clean and free from oxidation (this will increase the total line resistance).
- Make sure the connection wire has a sufficient section in order to grant a good contact to the binding post. Eventually bend several time the terminal part of the wire.
- Make sure the terminal part of the wire inserted in the binding post is completely free from the insulating sleeve (many misfires are due to this inadvertence!)
- Make sure the unprotected parts of the wire, eventually coming out of the connector, don't contact any other metal parts of the Unit (antenna, connectors of other lines, etc.).

4.8.2 Coaxial cable connection

Should extreme conditions require it, the FIREMASTER IV System can be still used with the RADIO LINK ("RADIO" mode), but **with all units connected each other with coaxial cable**: any type of antenna will be in this case REMOVED.

Should the normal RADIO connection be ***forbidden or impractical,*** and the cable connection becomes mandatory, using this type of connection, several advantages are obtained with respect a wire connection using the RS-485 port:

- All the *bi-directional* functions, typical of the FIREMASTER system, remain available (the RS-485 interface allows the communication for the FIRE operations only and NOT for the controls).

- The interconnection of all Units is simply made using sections of coaxial cable of any length and UHF "T" adaptors without need to respect a specific connection order.

- All command signals are sent ON CABLE and cannot be longer interfered nor causing interferences to other sensitive devices. The data transmission integrity is 100% proof!

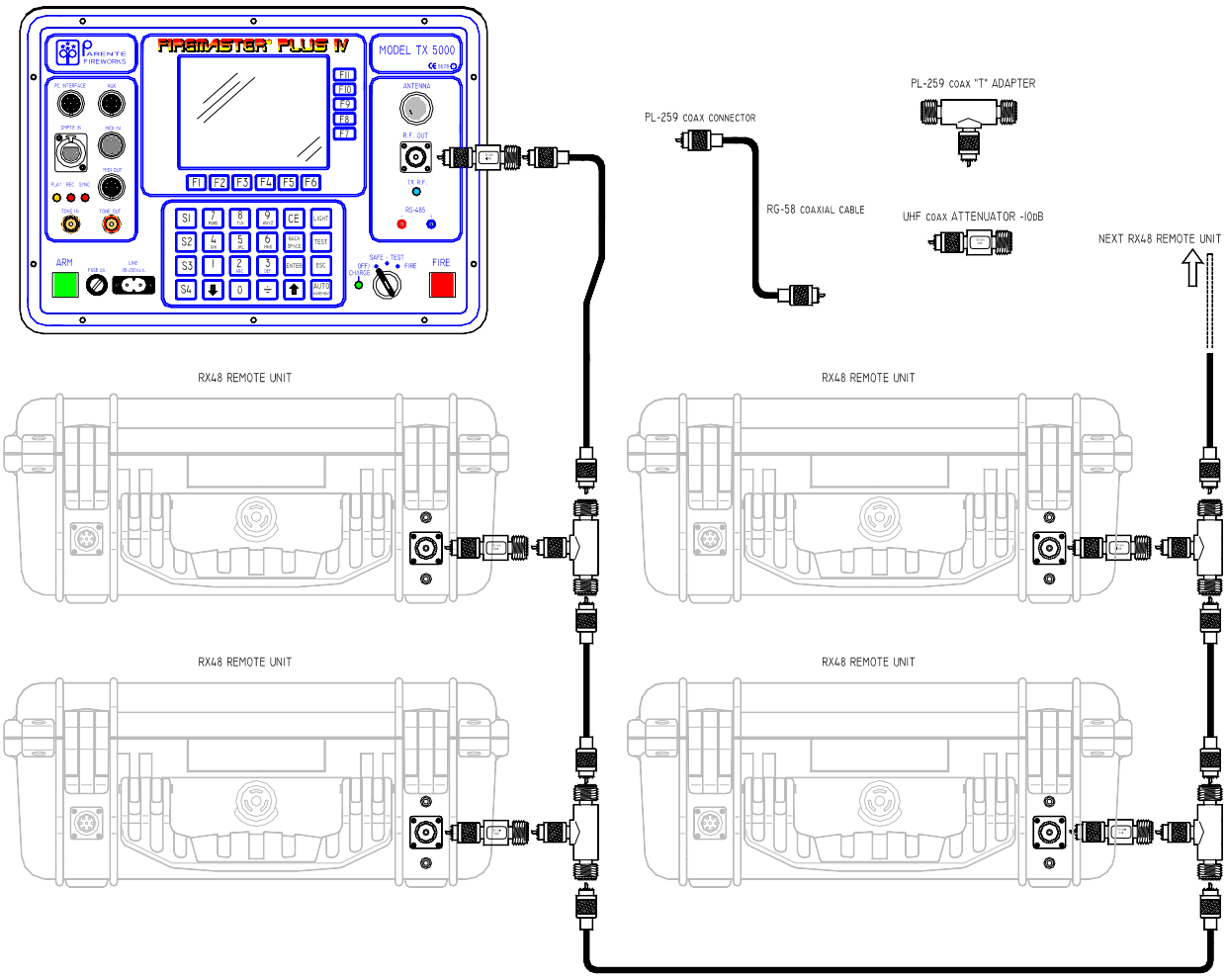
- The available connection range for the Units increases to several miles (provided the cost of the coaxial cable could be justified!).

In order to realize this type of connection, it will be necessary to use A COAXIAL ATTENUATOR at the R.F. OUTPUT of each Unit, before the connection cable to the next Unit is connected.

Coaxial cable, attenuators, "T" adapters and other accessories for this configuration mode, can be supplied on request by Parente Fireworks.

The following figure shows how the different Units can be connected each other to implement this communication mode.

1) Coaxial Attenuator male-female, UHF, 50ohm, -10dB
2) Coaxial "T" adapter, UHF, 50ohm
3) UHF coaxial connector, male with 50ohm coaxial cable, RG58-U



4.8.3 RS-485

The connection using the RS-485 line, allows the FIREMASTER IV System to be used WITHOUT the RADIO circuits.

When this operating mode is used, it will be necessary to take into account for some limitations:

- The maximum number of Remote Units that can be connected together must be limited to about 15

- **The communication by RS-485 serial line is available for the FIRE mode only. All the programming, testing and modify operations to the Remote Units, must be still performed using the RADIO link.**

- The RS-485 port, when in FIRE mode, is always active: this allows to use the Firemaster System with a MIXED MODE (RADIO + CABLE).

- If the MIXED mode is used, then the Remote Units must be programmed in RADIO LINK mode and the antennas must be CONNECTED. Only if ALL THE REMOTE UNITS have been programmed in "CABLE" mode, it will be possible to remove the antennas (FOR THE "FIRE" FUNCTION ONLY).

When the connection by serial RS-485 line is used, all the Units (TX5000 and RX-48) must be connected each other with a TWO-WIRE TWISTED cable (available upon request).

In order to simplify the inter-connection between Units, a special PLUG ADAPTOR is available. The ADAPTOR PLUG can be directly inserted into the two RS-485 connectors on the front panels of both TX5000 and RX48. The wiring is made using two spring-loaded binding posts (similar to the LINE CONNECTORS). The following precautions must be followed for a correct wiring:

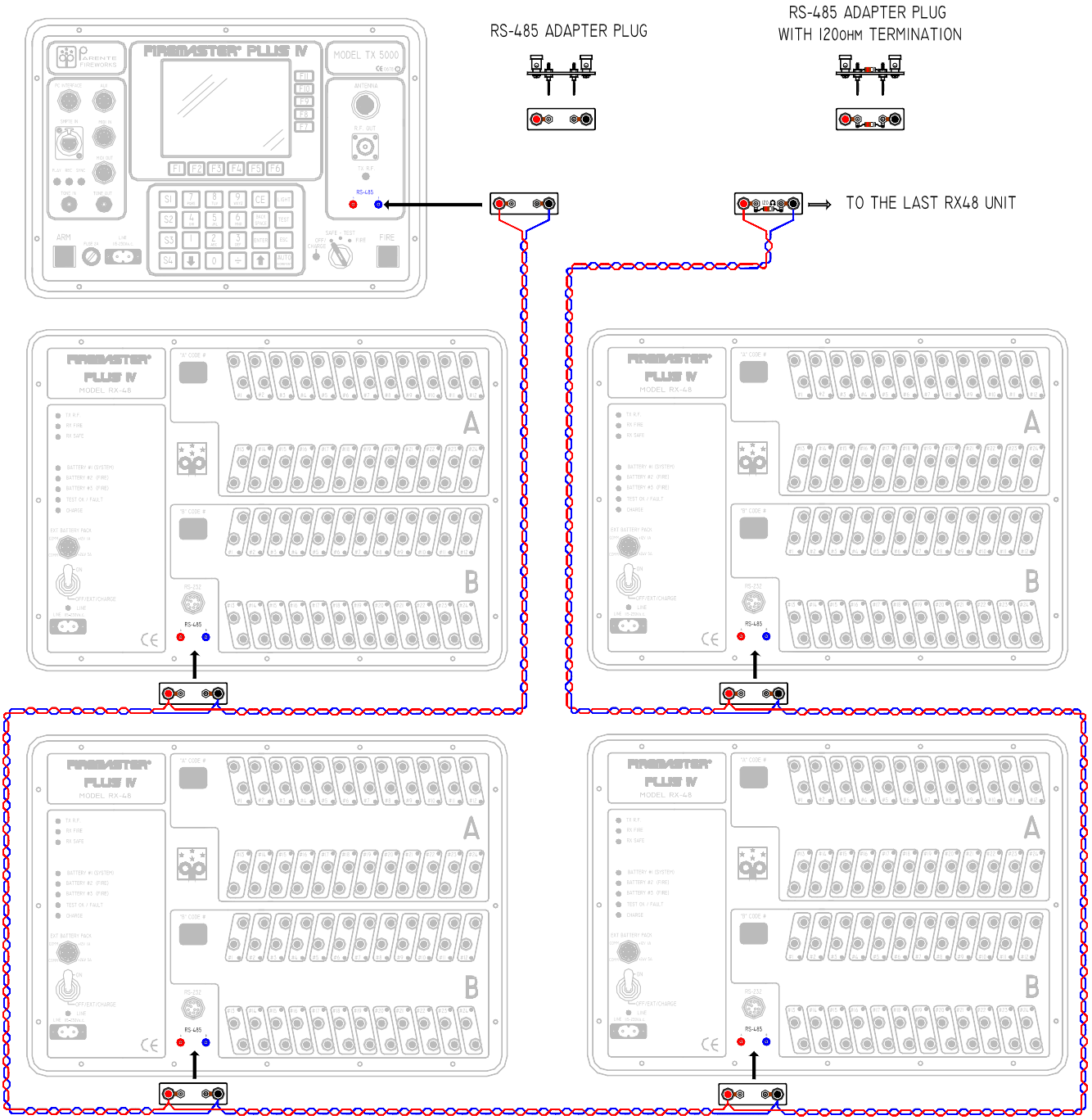
- All RED connectors must be wired together with the RED wire

- All BLACK connectors must be connected together with the WHITE wire

- All ADAPTOR PLUGS (TX5000 and RX48) must be of TYPE "A" i.e.: WITHOUT the loading resistor

- The ADAPTOR PLUG connected to THE LAST UNIT OF THE CHAIN (RX48), must be of TYPE "B" i.e.: provided WITH THE 120ohm TERMINATING RESISTOR.

For other connection details, refer to the diagram below:


RS-485 ADAPTER PLUG
RS-485 ADAPTER PLUG
WITH 120OHM TERMINATION
TO THE LAST RX48 UNIT
FIREMASTER PLUS IV
MODEL TX 5000
MODEL RX-48
A
B

4.8.4 RS-232

The RS-232 interface, installed both on the Remote Units RX48 and the Base Unit TX5000, can be used for three different purposes:

A) Download of data concerning the pyrotechnic show created with specific software (**SHOWLOADER 3**®). This function is possible on the TX5000 ONLY

B) ***Download*** of **new versions, releases, patches and upgrades** for internal firmware of the Firemaster System (supplied by **Parente Fireworks only**).

C) Connection to an external PC to read the data concerning the Unit type or the error messages issued during the test. This function is available on **BOTH** the **TX5000 and the RX48.**

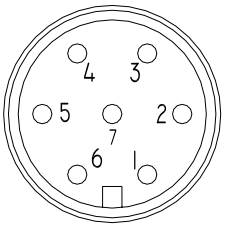
The (A) case is the most common one and it is used to "load" in the internal memory of the Base Unit TX5000 the data concerning a pyrotechnic show created externally on a PC using a dedicated software commonly available on the market (PyroMotion, FireOne, etc.) or manually assembled with the common EXCEL worksheet or even more simply using the NOTEPAD accessory.
The TEXT file containing the show data will be downloaded from the PC to the TX5000 Base Unit using a **SPECIAL SERIAL CABLE** (supplied as STANDARD ACCESSORY with the TX5000). The data download is made using the **SHOWLOADER 3**® program supplied by Parente Fireworks upon specific request.

The (B) mode requires a DIFFERENT RS-232 CABLE supplied only with the program upgrades, a specific "loader" program, the "keys" to access the internal firmware and the specific instructions.

NOTE: modifying the internal firmware of both TX5000 and RX48 Units requires some skill and, if not properly executed, could IMPAIR DEFINITELY the normal operation of the Units other than VOIDING IMMEDIATELY THE WARRANTY. Proceed with this operation ONLY WHEN NECESSARY, WITH THE ORIGINAL SOFTWARE supplied by Parente Fireworks and ONLY WITH THE DIRECT SUPERVISION OF A PARENTE FIREWORK TECHNICIAN.

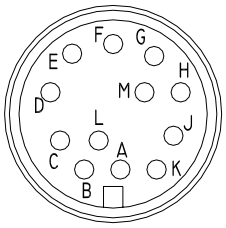
The details of the PC communication ports, data transfer mode and baud rate, are given below:

COMMUNICATION PORT:	serial (COM1 to COM8)
BAUD RATE:	38,400
DATA BITS:	8
STOP BITS:	1
PARITY	NO
HANDSHAKE:	NONE



TX5000

RS-232 CONNECTOR
(7-POLE DIN FEMALE)



RX48

RS-232 CONNECTOR
(12-POLE DIN FEMALE)

RS-232 CONNECTOR – TX5000

Connector type: DIN, circular, female, 7 poles.

1) +5Vd.c. (for programming purposes only)
2) TX data
3) RX data
4) MD1 (for programming purposes only)
5) COMMON
6) RESET (for programming purposes only)
7) SHIELD

RS-232 CONNECTOR – RX48

Connector type: DIN, circular, female, 12 poles.

A) MD1 section "B" (for programming purposes only)
B) AUX section "B" (not implemented)
C) RX data section "A"
D) TX data section "A"
E) MD1 section "A" (for programming purposes only)
F) COMMON
G) AUX section "A" (not implemented)
H) RESET section "A" (for programming purposes only)
J) RX data section "B"
K) TX data section "B"
L) RESET section "B" (for programming purposes only)
M) COMMON

WARNING: all pins marked in RED, are RESERVED for programming purposes and must be left UNCONNECTED.