

FIRESTORM
SEQ18 / SEQ36
USER GUIDE

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SPECIFICATION

Power	2 x 12V SLA battery
Charger	110 / 230V charger UK : EU : USA
Output Current	6A peak per channel, max of 6A per block of 18 channels.
Output Voltage	24V
Timing Resolution	10ms
Max time between Channels	9m59.99s
Channels	SEQ18 = 18 SEQ36 = 36
Trigger Input	1.5V - >24V or Contact Closure
Trigger Threshold Current	<25mA = No Trigger. >35mA Guaranteed Trigger.
Operating Modes	Equal : Different : Clock : Step : Burst

DESCRIPTION

The FireStorm SEQ18 / SEQ36 are highly flexible pyrotechnic, firework and SFX sequencers. They are intended for the safe and reliable ignition of pyrotechnics and control of solenoid valves and other SFX equipment.

Each sequencer allows time delays and pulse durations to be easily setup in various ways.

Please familiarise yourself with the operation of the units before use, and adhere to all industry best practices.

OPERATING MODES

The sequencer has 5 operating modes.

Equal : Different : Clock : Step : Burst

EQUAL MODE

Equal Mode sets the same interval between all channels.

The channels can be fired in **groups**. Each successive Trigger Input will fire the next group of channels. After all channel are fired the Trigger Output will pulse on each successive Trigger Input pulse. This is to enable linking multiple sequencers for longer sequences.

Example 1

[1 Group of 18 Channels]

```
Equal
1x18      0m01.50s
```

Channel 1 - 18 will fire with 1.5 seconds between each channel when the 1st Trigger Input is received.

Trigger Output will then pulse on each successive Trigger Input.

Example 2

[3 Groups of 6 Channels]

```
Equal
3x6       0m05.00s
```

Channel 1 - 6 will fire with 5 seconds between each channel when the 1st Trigger Input is received.

Channel 7 - 12 will fire with 5 seconds between each channel when the 2nd Trigger Input is received.

Channel 13 - 18 will fire with 5 seconds between each channel when the 3rd Trigger Input is received.

Trigger Output will then pulse on each successive Trigger Input.

Settings Table

SETTING	TRIGGER #	RESULT
ALL	1st	Channel 01 - 18 including Trigger Out
1x18	1st	Channel 01 - 18
2x9	1st	Channel 01 - 09
	2nd	Channel 10 - 18
3x6	1st	Channel 01 - 06
	2nd	Channel 07 - 12
	3rd	Channel 13 - 18
6x3	1st	Channel 01 - 03
	2nd	Channel 04 - 06
	3rd	Channel 07 - 09
	4th	Channel 10 - 12
	5th	Channel 13 - 15
	6th	Channel 16 - 18
9x2	1st	Channel 01 - 02
	2nd	Channel 03 - 04
	3rd	Channel 05 - 06
	4th	Channel 07 - 08
	5th	Channel 09 - 10
	6th	Channel 11 - 12
	7th	Channel 13 - 14
	8th	Channel 15 - 16
	9th	Channel 17 - 18

DIFFERENT MODE

Different Mode sets the interval between channels *relative to the last channel*.

Example 1

```
Different  
01-02 0m00.50s
```

Channel 2 will fire 0.5 seconds after Channel 1.

Example 2

```
Different  
04-05 1m18.40s
```

Channel 5 will fire 1 minute 18.40 seconds after Channel 4.

CLOCK MODE

Clock Mode sets the **absolute time a Channel will fire**, relative to a clock that starts when the first Trigger Input is received.

Example 1

```
Clock  
01      0m00.50s
```

Channel 1 will fire 0.5 seconds after the Trigger Input is received.

Example 2

```
Clock  
02      0m02.35s
```

Channel 2 will fire 2.35 seconds after the Trigger Input is received.

Example 3

```
Clock  
03      0m06.00s
```

Channel 3 will fire 6 seconds after the Trigger Input is received.

Note: Channels do not have to fire in order. For example, Channel 2 could fire at 0m05:00 and Channel 1 could fire at 0m02:00.

Note: Channels that have identical times will fire together. For example, if Channel 1 and Channel 4 are both set to 0m05:00 they will both fire 5 seconds after the Trigger Input is received.

STEP MODE

Step Mode will step to the next channel on each successive Trigger Input received. No timing setup is required. Once all channels are fired the Trigger Output will pulse on each successive Trigger Input. This allows multiple sequencers to be connected together for longer sequences.

```
Step      ARM
```

BURST MODE

Burst Mode will fire a user selected group of channels with an equal time delay between each channel in a group, on each successive Trigger Input. It is similar to Equal Mode, but allows greater flexibility in programming which channels to fire.

TRIGGER	START CHANNEL	END CHANNEL	DELAY	DESCRIPTION
T01	01	12	0.05s	The 1st trigger pulse fires channel 1 to 12 with 0.05 seconds between channels.
T02	13	14	2.00s	The 2nd trigger pulse fires channel 13 to 14 with 2.00 seconds between channels.
T03	15	19	1.55s	The 3rd trigger pulse fires channel 15 to 19 with 1.55 seconds between channels.
...
...
T18	32	36	0.75s	The 18th trigger pulse fires channel 32 to 36 with 0.75 seconds between channels.

Example 1

```
Burst  
T01  01-02  0.50s
```

[Trigger Number] [Start Channel] - [End Channel] [Delay]

Channel 1 to 2 will fire with 0.5 seconds delay between them when the first Trigger Input is received.

Example 2

```
Burst  
T02  10-15  1.50s
```

[Trigger Number] [Start Channel] [End Channel] [Delay]

Channel 10 to 15 will fire with 1.50 seconds delay between them when the second Trigger Input is received.

SETUP

Various options can be selected in the setup menu.

SETTING	
Pulse	Independently set how long each channel fires for, range 0.01 - 9.99 seconds.
Language	English : Spanish : German : Italian : French
Reset	Reset all settings to default.

MEMORY

An entire series of delays can be saved in each mode. This allows commonly used sequences to be stored for future use.

Note: *The sequencer will automatically store the current setup. If the sequencer is powered off and on it will retain the current settings.*

At the end of each menu there is the option to save the show in 1 of 3 possible memory locations. If a sequence is already saved in a memory location, it will be displayed with an * next to the location. It can be overwritten if required.

```
Different
Save Show?    01
```


GENERAL OPERATION

CONTROLS

BUTTON	
Menu	Press to return to the main menu / go back.
Run	Simulate the current settings on the LEDs. The channels will not fire. This is useful for visualizing the current settings.
Test	Press and hold to check continuity on all channels.
Fire	Only operational when sequencer is ARMED. Press to Trigger the sequencer if no external Trigger is used.
Rotary Knob	Rotate to increase / decrease selected digit. Press for OK.
Key Switch	Power OFF / ON / ARM.

MENU

MENU ITEM	
1] Equal (ALL, 1x18, 2x9, 3x6, 9x2 etc)	Set an equal time interval between all channels. Channels may be split into preset groups.
2] Different	Set relative interval between channels.
2.1] Setup	Setup a series of intervals.
2.2] Load Show	Load a stored series of intervals.
2.3] Clear Show	Clear a stored series of intervals.
3] Clock	Set absolute time channel will fire.
3.1] Setup	Setup a series of times.
3.2] Load Show	Load a stored series of times.
3.3] Clear Show	Clear a stored series of times.
4] Step	Step to the next channel on each Trigger Input.
5] Burst	Set varying time intervals between user designated groups.
3.1] Setup	Setup a series of intervals.
3.2] Load Show	Load a stored series of intervals.
3.3] Clear Show	Clear a stored series of intervals.
6] Setup	Device configuration options.
6.1] Pulse	Set the duration of the firing pulse per channel.
6.2] Language	Set menu language.
6.3] Reset	Restore factory defaults.

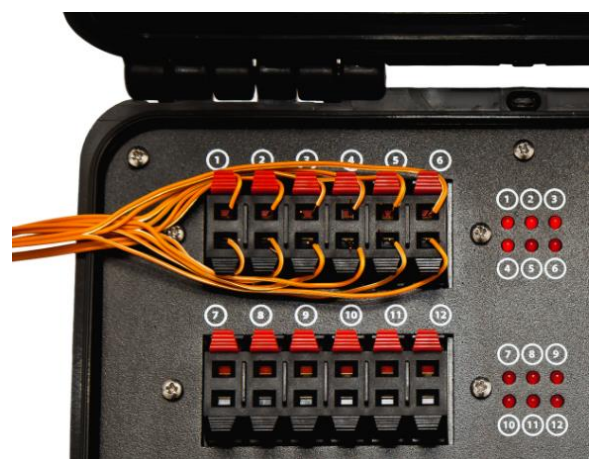
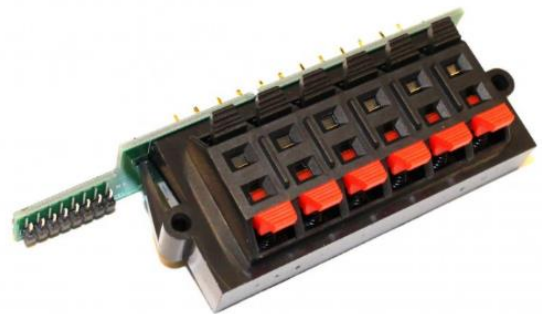
METHOD OF OPERATION

Note: We recommend minimising the amount of time the unit is switched on when pyrotechnics are connected. This minimises the chance of an accidental firing.

1. Set key to ON. Ensure unit passes self test.
2. Set mode using rotary knob.
3. Set intervals using rotary knob.
4. Press PLAY button to run the sequence on LEDs. No channels will be fired.
5. When satisfied sequence is correct, carefully connect igniters to terminals.
ENSURE AREA IS CLEAR AND SAFE FOR CONTINUITY CHECK!
6. Press TEST to check channel continuity on LEDs.
7. Set key to ARM.
UNIT IS NOW DANGEROUS AND READY TO FIRE.
8. Press FIRE button or provide external Trigger Input to start the sequencer.

TIPS

1. Do not fire ALL the cues at the same time. The total current available is limited to about 6.5 Amps per block of 18 channels to protect the internal circuitry. To fire many channels at once we recommend setting a very small delay between channels, eg 10ms. This will be almost imperceptible to the human eye but will allow each effect to be fired individually.
2. Remove igniter wires carefully by pressing both terminals down together and removing the wires. Grabbing a bunch of wires and pulling them out roughly may damage the connections. Spare user replaceable terminal strips are available should this happen.
3. Wires can be connected neatly and securely by wrapping each leg around the terminals as shown opposite.



TRIGGER INPUT

The sequencer is very flexible and may be triggered in several ways.



The Trigger Input LED will light whenever an external trigger is sensed. This is useful for setup and testing.



The sequencer will only fire channels when key is in the ARM position. The ARM LED will be on whenever the key is in ARM position.

Fire Button Trigger


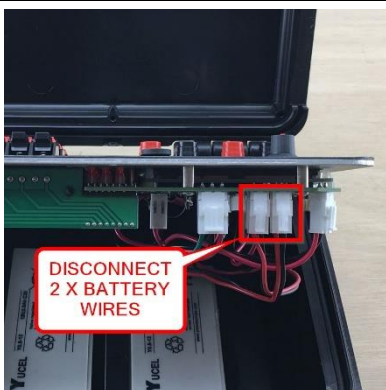
The sequencer can be triggered by pressing the FIRE button on the front panel.

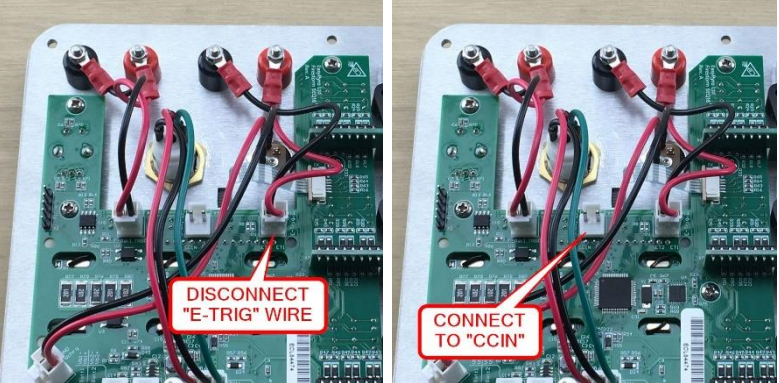
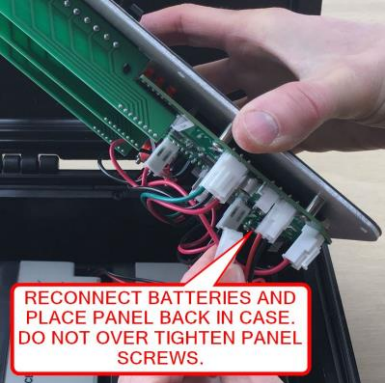
Current Trigger (default)

Current from an external firing system or our dedicated trigger unit can trigger the sequencer. By default, the Trigger Input terminals are connected to the Current Mode input on the circuit board.

Contact Closure Trigger (optional with cable swap)

Contact Closure Trigger means that shorting the Trigger Input terminals will start the sequencer. This is the same as simply closing a switch to start the unit. This needs to be enabled by opening the unit and swapping the cable from the Trigger Input terminals from the "E-TRIG" header to the "CCIN" header on the circuit board.

	<p>Unscrew 6 x panel screws and lift up panel.</p>
	<p>Disconnect 2 x battery wires connecting the panel to the batteries.</p>

	<p>Lift the panel out and flip over.</p> <p>Unplug the cable connected to the E-TRIG (external trigger) connector and plug it into the CCIN (contact closure) connector.</p>
	<p>Ensure the panel screws are not over-tight as the plastic membrane keypad may be damaged.</p> <p><u>Do not apply a voltage to the Trigger Input when the cable is connected to the CCIN (contact closure) connector.</u></p> <p>You may find it useful to place a label on the outside showing which mode the Trigger Input is connected to.</p>

TRIGGER OUTPUT

The Trigger Output terminals can be used to connect the sequencer to another sequencer. Several units can be chained for more shots. When operating in EQUAL and STEP mode the Trigger Input pulses will be passed through to the second sequencer and so on.

Note: *The Trigger Input must be internally connected to the Current Trigger (not Contact Closure Trigger) for the sequencers to be chained.*



The Trigger Output LED will light whenever there is a Trigger Output pulse.

Example 1

3 x 18 shot sequencers all in **STEP** mode require $3 \times 18 = 54$ Trigger Input pulses to fire all channels.

Example 2

2 x 18 shot sequencers all in **EQUAL [1x18]** mode would require $2 \times 18 = 36$ Trigger Input pulses to fire all channels

Example 3

3 x 18 shot sequencers all in **EQUAL [3x6]** mode would require $3 \times 3 = 9$ Trigger Input pulses to fire all channels.

BATTERY CHARGE

The sequencer has 2 x 12V lead acid batteries installed.

Only use the supplied smart charger to charge the batteries.

The charge port **should not** be used to power the device directly.

The battery charger LED will flash orange when charging and steady green when battery is full.

The unit may be switched on while charging. However, it is recommended to keep the unit switched off to avoid false 'end of charge' detection.

We recommend to keep the batteries in good condition by avoiding very low discharge.

The battery voltage and firmware version are displayed on startup.



FIRESTORM SEQ36
24.2V v1.0

Note: Charge the battery every 3 months even if sequencer has not been used.

Note: The battery voltage should be above 23V for best operation.

SELF TEST ERROR CODES

The sequencer runs a self test on startup.

This may warn you of defects by displaying an error code.

Pressing OK will move past this error and allow operation of the sequencer.

PROCEED WITH CAUTION WHEN AN ERROR CODE IS SHOWN.

ERROR #	DESCRIPTION
ERROR 01	ARM MOSFET stuck ON. Sequencer will not be operational. Do not use. Contact manufacturer for repair.
ERROR 02	Any channel MOSFET stuck ON. Bank with problem channel will flash. Press OK to proceed. Be aware that a channel(s) are PERMANENTLY ON and could fire as soon as an igniter is connected. PROCEED WITH CAUTION. Contact manufacturer for repair.
ERROR 03	Any channel MOSFET stuck OFF. Channel LED will flash. Press OK to proceed. Be aware that channel(s) are permanently off and may not function. Contact manufacturer for repair.