PYRO SIM CONTROLLER

PYROTECHNIC SIMULATORS

OWNERS MANUAL

SPARKTACULAR MACHINES

COLD SPARK TECHNOLOGY

877-792-1101 • SparktacularFXmachines.com

- **PLEASE READ THE INSTRUCTION CAREFULLY BEFORE USE.**
- **THIS MANUAL CONTAINS A WARRANTY CARD, PLEASE RETAINFORFUTURE USE.**

Safety and precautions

1) This product must be used according to the operating instructions to avoid improper use or damage to the product.

2) This product has no user servicable parts inside. Opening the controller will void the warranty.

3) The controller should be protected against moisture and water during use, do not use in rainy or snowy conditions without protection.

4) The panel of this product contains fragile devices, avoid excessive abuse or collision to the operating panel and body of the controller.

5) This controller contains Lithium Ion batteries, do not use near extreme heat or fire.

6) United States and International Patent Pending Sparktacular FX Machines

7) Sparktacular FX Machines reserves the right to modify the specifications without prior notice, and the latest version of these documents can be obtained through customer service.

The host controller (SH-05) is designed to control all Sparktacular FX Machines. It is used to communicate with Sparktacular FX Machines to shoot the machines, real-time condition monitoring, settings control, and real-time fault alarms.

The host controller adopts the advanced ARM kernel CPU, combined with the 7" TFT full-color capacitive touch screen display unit. This allows complete control of the Sparktacular FX Machines parameters, settings, and other options. The screen allows precise control of the units through software buttons that are limited by a hardware arm key.

The host controller is compatible with standard DMX communication protocol. This connects the cold firework machines through the standard DMX communication control interface, and sends various control and operation commands. The controller and machines can also use CAN communication mode, which can be switched in the settings on the machines and controller. CAN and DMX communication use the same cable but are not compatible when running in the same eco system.

The host controller has a rechargable battery, which makes it easy for users to work and use in an environment where wall power is not readily available, and allows the controller to be use in an outdoor and indoor environment without needing wall power.

1. The Sparktacular FX Machines host controller is reffered to as the controller

2. The Rainfall and Spark one (or other Sparktaular FX Machines equipment) are referred to as machines.

3. The temperature units mentioned below are all degrees Celsius.

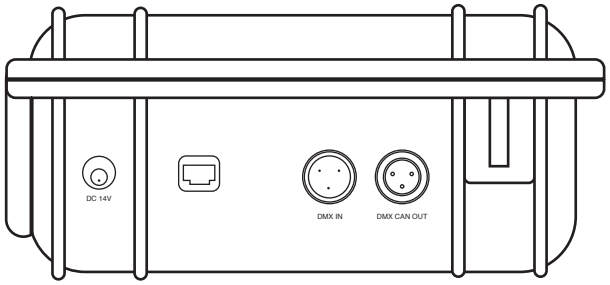
4. The special effect firing refers to the firing operation that starts with the "FIRE" entity button.

5. Special effects refers to a series of programmed firings that are used in a certain sequence of time.

SPARKTACULAR FX MACHINES CONTROLLER

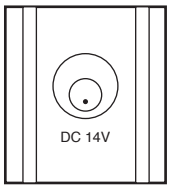
SPECIFICATION	
Size：	L274 x W218 x H93 mm
Weight：	1.55kgs
Display parameter：	7 "TFT full color capacitive multi-touch screen, resolution 800*480.
Power Input:	DC 14.0V/2.0A
Battery Specification：	11.1V/5000mAH /lithium battery pack
USB Output	Max < 5.5V/0.5A
Interface Parameters：	2*DMX, 1*LAN, 1*USB
Communication mode：	1*DMX input, 1*DMX/CAN output, 1*LAN input
Environmental conditions：	ALT：<4000M, temperature：-10°C~ 50 °C

SPARKTACULAR FX MACHINES CONTROLLER SIDE INPUT/OUTPUT DIAGRAM



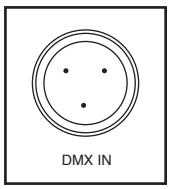
4.1 External power input interface

External power adapter to connect to the power interface of the host controller. The power adapter can not only power the controller but also charge the internal rechargable battery simultaneously.



4.2 DMX communication signal input interface

The DMX Input is used to pass DMX signal through the controller from another lighting board or device. The lighting board takes control of the host controller and then becomes a monitor for the equipment. This allows for more complex controller from an exterior device.



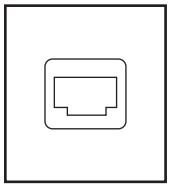
4.3 DMX/CAN communication signal output interface

The host controller connects the stage cold fireworks machine with the DMX/-CAN signal output interface and sends the relevant control commands.

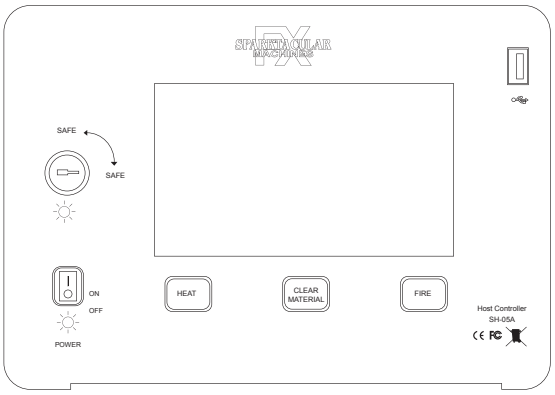
Warning: DMX output mode and CAN communication mode cannot used at the same time. When working with the equioment or controller, the data communication must be selected through the configuration menu, otherwise communication errors will occur.

4.4 LAN Ethernet communication interface

This function is not currently implemented but reserved for future expansion.

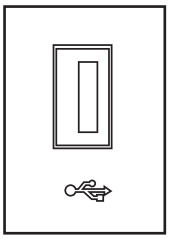


SPARKTACULAR FX MACHINES CONTROLLER USER PANEL DIAGRAM



4.5 USB data communication interface

Standard USB power output. Output parameters: Max < 5.5V/0.5A.
Note: please do not exceed the USB maximum output power device to the USB, otherwise it can cause internal circuit damage



5.1 FIRING

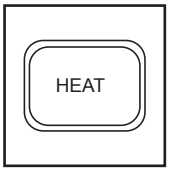
When pressed, the FIRE button will shoot the file that has been selected to fire. This will stay on and fire for the duration of the file. If desired, the cue that is firing can be shut off by pressing the firing button a consecutive time. This will immediately stop the file from firing.

5.2 CLEAR MATERIAL

To clear all machines, press the CLEAR MATERIAL button. This will send the signal to clear all machines. When the machines are done clearing, the CLEAR MATERIAL button can be pressed a consecutive time to stop the clearing process.

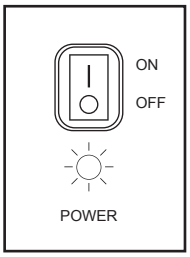
5.3 HEAT

Pressing the HEAT button will send a signal to heat all machines. This signal will remain on until the CLEAR MATERIAL function is used or until the button is pressed a consecutive time to turn the heat on all machines.



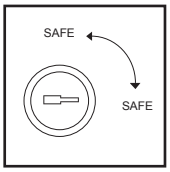
5.4 POWER SWITCH

Turning the power switch to the ON position wil power up the system and start the boot process. This takes several seconds until the system will boot. To shut the system down, push the power switch to the OFF position.



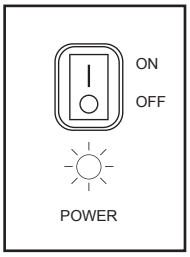
5.5 SAFETY LOCK SWITCH

When the key of the safety lock switch is turned to SAFE position, all shooting signals will be cut off to prevent accidental triggering of the machines. The heat button will stay on while the key is in safe mode. The switch acts as a “deadman switch” while firing.



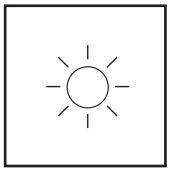
5.6 Battery charging indicator

When connecting the external DC power adapter, the host controller is powered through the external power, and at the same time the internal battery is recharged. When the battery is in normal charging mode, the charging status indicator is red. When the battery pack is full, the charging status indicator changes to green.



5.7 Safety lock status indicator

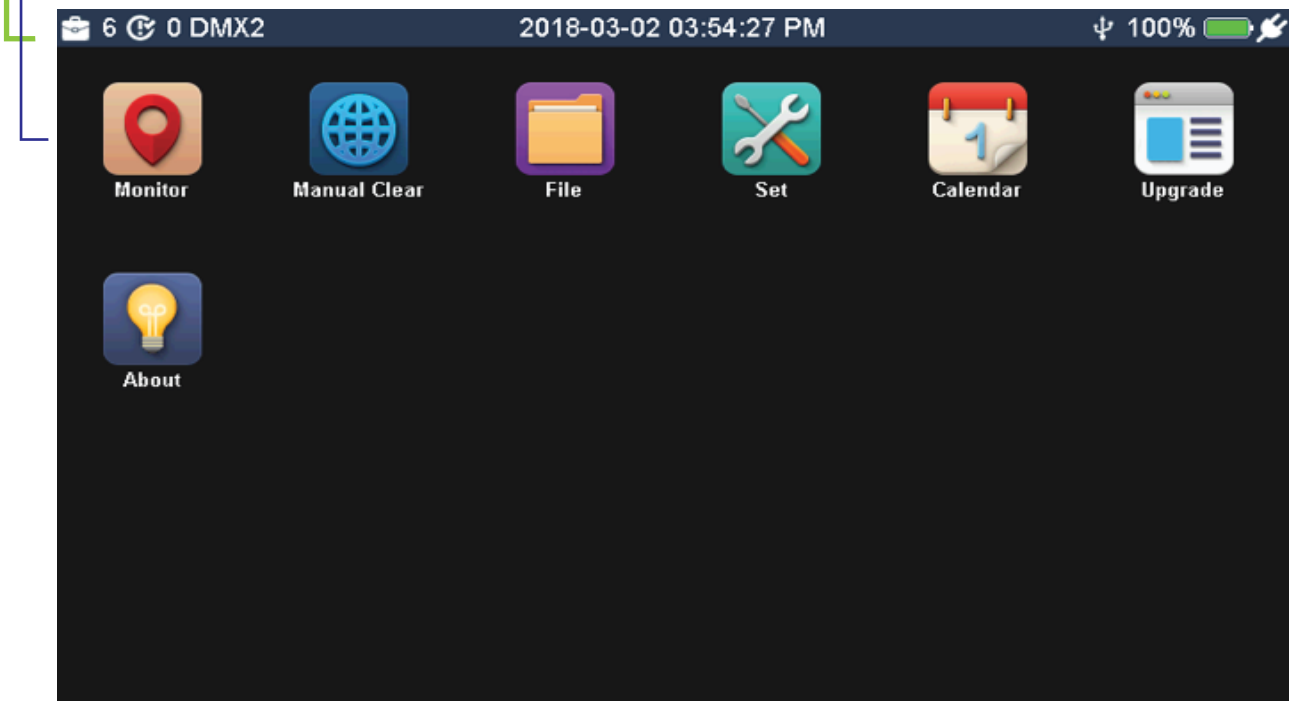
When the controller is powered on, and in normal working condition, the light under the safe/arm key will illuminate when the key is in the armed (effective operation mode) position. When the key is turned to the Safe mode all firing commands will be restricted.



6.1 Interface Introduction

The image below is the main menu you will see when starting the controller. From here all other operating menus can be accessed.

1) The notification bar area (no matter which menu interface is at the top) displays various status, notification message and time, etc.
2) Main menu display area



- The left side shows: The current effects file number, the number of devices being manually fired, where the machines are clearing, the heating state, the special effect execution state and the output communication protocol type
- Middle: shows the current date and time.
- The right side shows: input signal status, USB connection status, battery information and external power input status.

6.3 Notice icon description

When the machine is turned on it will take several seconds to boot. Status icons are shown and are decribed below. To shut the system down the power button can be turned off. There is no special process to turn the system off.

	The current selection of special effects file number, range 1~40
	The number of devices that are currently being manually fired
	Communication protocol types, except DMX2 and DMX4 and CAN (it will be highlighted in the following sections)
	Machines are heating up
	The clear material process is running. A number will display in the background, this indicates how many machines are currently being cleared
	Two machines are being cleared (this can be any number based on how many are being cleared)
	The special effect file is currently shooting
	Represents the remaining time of the file that is being fired
	DMX signal can be input. This option has to be enabled in the settings
	Indicates that a USB device is connected to the controller
	Battery status
	The external power adapter access flag shows that the DC14V is connected to an external power adapter

6.4 The Main menu

Once the controller succesfully goes through the self check, the main menu will be displayed and shows icons much like a computer.

Below is a representation of the seven icons you will see on the main menu. These are the seven main functions that can be clicked into and utlized to shoot, program, and operate the controller.

MONITOR		The monitor displays the state of the device(s) connected (the core temperature, heating status, error information and shooting state) and manual firing control
MANUAL CLEAR		The manual clear allows you to manually clear individual machines.
FILE		Special effects file allows you to view and edit all files that have been created
SET		Set menu, main controller input output parameter setting
CALENDAR		Allows the user to set the time & date
UPGRADE		Updating terminal for upgrading software
ABOUT		Displays all the details of the controller software version, errors, and other pertinent information

6.5 Device monitoring menu

6.5.1 MENU ICON DESCRIPTION

This menu shows the state of the device connected to the controller(core temperature, heating status, error information and firing state) and allows for manual firing. This is the most used menu.

The function area shows the state of the connected device and displays how many machines have been programmed to be recognized by the controller. At the bottom of this menu there are return, control lock, stop all, and edit (file) buttons.

Note: all the menus have a similar structure.

6.5.2 FUNCTIONAL AREAS

Each gray box represents the corresponding machine in relation to address. All files starting out will have 60 gray boxes displayed, this is the maximum machines one controller can be programmed to control. As the files are repogrammed the number of the boxes that are displayed is based off of what the file is programmed for. To manually fire a machine you can press the button, to turn it off a concecutive press is needed.

6.5.2.1 THE DEVICE SERIAL NUMBER CORRESPONDS TO THE DEVICE ADDRESS

The unit number of the machine correlates to the device address and the communication protocol set up：

1. CAN agreement: The machine unit number is equal to the device CAN address, for example, the CAN address of the corresponding device for unit number 5 is 5.

2. DMX protocol: The machine address correlates to the current selection of DMX type (2 or 4 channel). The corresponding relation of unit number and address can be expressed by the formula: ((num - 1) * ch) + 1 =addr
Where num represents machine unit number (1~60), ch represents the number of DMX channels (2 or 4), and addr represents machine DMX address

Note: the user must be aware of the corresponding relationship between the unit number and the device address. The following section will only refer to the unit number.

NO.	1	2	3	4	. . .	57	58	59	60
DMX2	1	3	5	7	. . .	113	115	117	119
DMX4	1	5	9	13	. . .	225	229	233	237
CAN	1	2	3	4	. . .	57	58	59	60

6.5.2.2 Error code

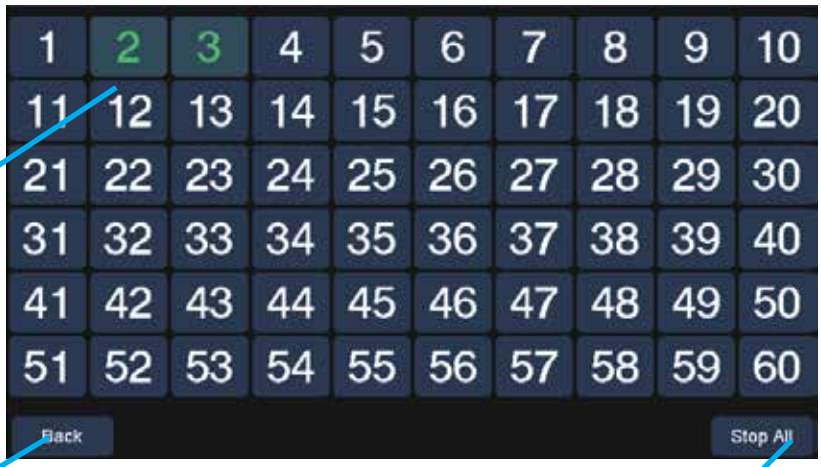
ERROR	Instructions
E0	System error
E1	Retention undefined
E2	The core temperature sensor is damaged.
E3	The temperature of the cabinet is over safe temperature.
E4	Machine is low on time (10 minutes or less remaining)
E5	Temperature of the machine core is over safe temperature.
E6	Heating failure
E7	Machine tip over sensor is active
E8	It takes a long time to spray into the protective state for 20 seconds.
EX	An unknown error

6.6 Manual cleaning menu
6.6.1 THE MENU
Individual machines can be selected to be cleared

6.6.2 THE MENU FUNCTIONAL AREAS

Each box in the control area represents a machine based off of their unit number.
To manually clear a certain machine, press the corresponding unit number and it will clear. Press the box again and it will stop clearing.

If the machine is clearing, the box will turn a light green color, if the machine is not clearing the box will remain gray.



Go back to the previous menu. All menus have this button.

The Stop All button is used to turn off all manually firing machines. PLEASE NOTE: This button DOES NOT stop the effects file from firing

Manual fire Lock/Unlock button, when you use the lock button, no manual firing can be used. When the button is unlocked manual firing can resume. NOTE: This button does not affect special effects file firing.

Enter the special effects file edit menu, to edit the current special effects file

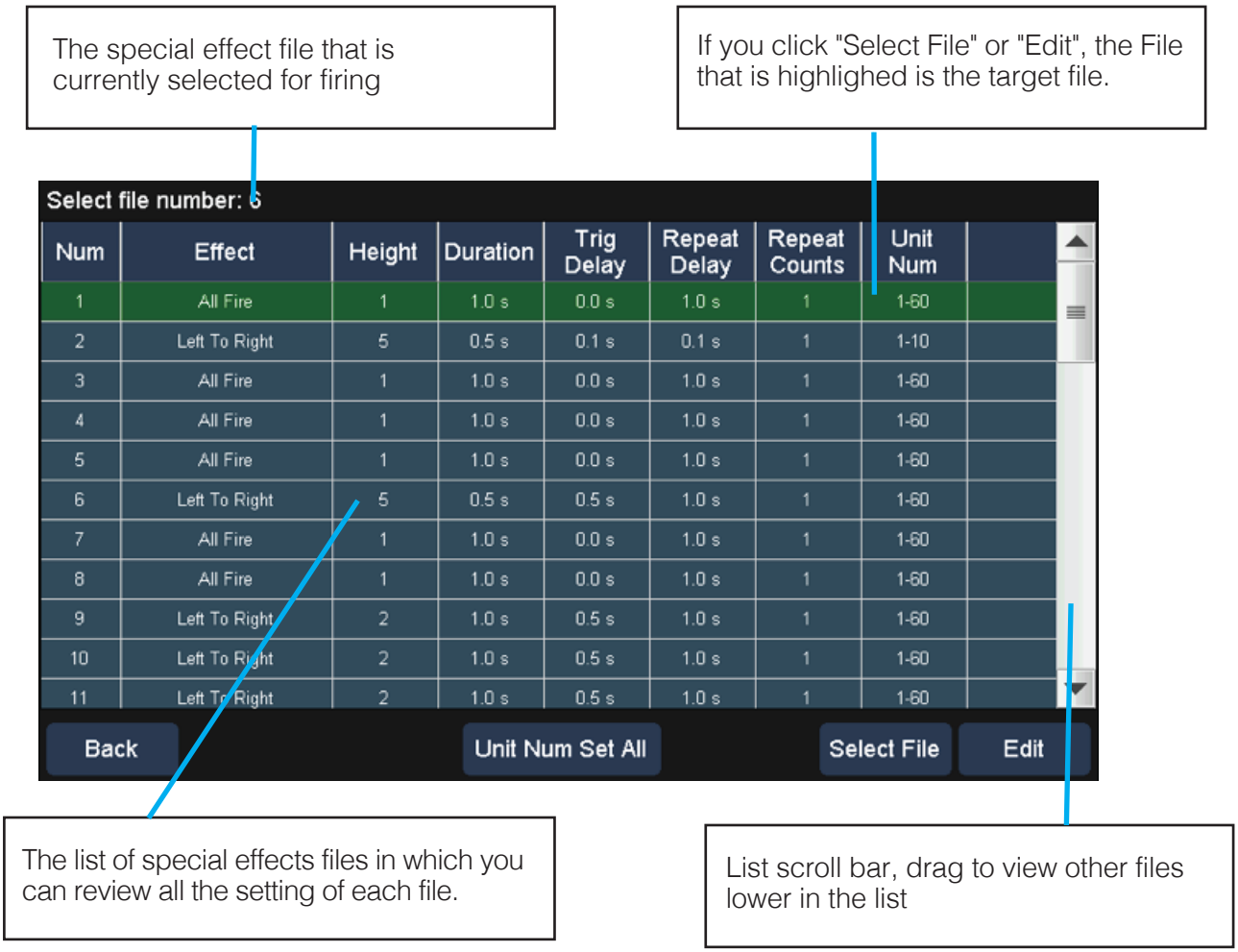
The intermediate 2 indicates the unit number of the machine, and the digital green indicates that the corresponding device is running the clear material process. When the process is shut off, the green turns back to gray

6.7 Special effects file management menu

6.7.1 THE MENU

This menu displays all the special effects file information. You can also select different files from this menu.

6.7.2 FUNCTIONAL AREAS

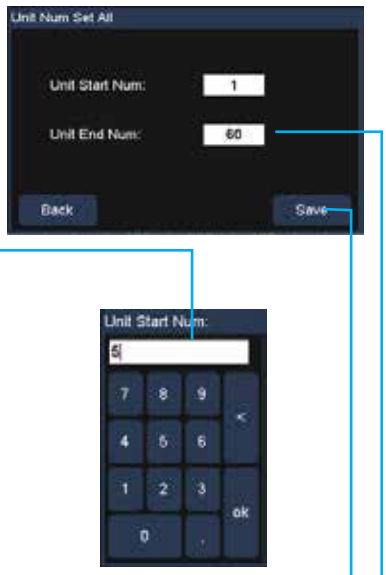


Num: This is the special effects file number. The numbers go from 1 to 40 and can be individually programmed for a certain type. The maximum number of files that can be stored is 40.

Effect: This is the special effect type for the file. There are six different types: All Fire, Left To Right, Right To Left, Center To Ends, Ends to Center, and Randomize

Height:	Firing height range 1~5m
Duration:	Duration of the effect firing(seconds)
Trig Delay:	Trigger Delay time (second)
Repeat Delay:	Repeat Delay time (second)
Repeat Counts:	the number of effect executions
Unit Num:	The range of equipment that is managed by the host controller

6.7.3 THE CONTROL REGION



To set the machine number range for all effects files, click the button to display the following window:

Set the start machine number (including itself), and click the area displayed in the following window:

Click on the number input to set the value, then click "ok" "<" can delete the input most of the parameters are modified by this method.

Set the end device number (including itself);

Note: The end device number must be greater than the starting number and cannot be set greater than 60 or equal to 0, otherwise it will be invalid.

Click "Save" to Save the settings when it has been set correctly. At this time, you will be prompted to Save. Click "OK" to Save, if you wish to not save click “cancel”

If you want to change the special effects, selecting the corresponding file.

Edit the selected file. Before editing the file, you must select the corresponding file. Click this button to enter the editing menueffects file edit menu.

6.8 Special effects file edit menu

6.8.1 THE MENU

THIS MENU IS USED TO EDIT SPECIAL EFFECTS PARAMETERS FOR SPECIAL EFFECTS FILES.

1. The currently selected special effects file
2. The start and end unit number
3. Special effects type editing area;
4. The height of the effect editing area
5. The shooting time editing area (seconds);
6. The delay time editing area (seconds);
7. The repeat delay time editing area (seconds);
8. Special effects execution times editing area
9. Simulation window to show what the file will do

6.8.2.1 UNIT START NUM AND UNIT END NUM

Machine unit number range setting. The unit number range that is set in the effects file sets what machines can be used on the manual fire, manual clear, and the special effects file execution. For example: set the starting unit number as 7, set the end unit number as 20, so the unit numbers are 7 ~ 20. These machines will be visible on the monitor and will be the only machines that can be controlled, be it manual fire, manual clearing, or be fired on the special effects file.

EFFECT TYPE	MIN UNITS
All Fire	1
Left to Right	2
Right to Left	2
Center to Side	3
Side to Center	3
Randomize	2

6.8.2.2 SPECIAL EFFECTS TYPE(EFFECT)

There are six different types of special effects. The special effects types are listed in the drop-down menu, to access the options the drop down must be selected. Press on the effect to select it. Each type is explained below:

All Fire: Fires all machines at once within the specified range. Note that the Trig Delay must be 0, otherwise the file will be invalid.

Left To Right: Based on the range of unit numbers that is set, the machines will shoot from left to right. In example, if the set unit number range is 8 to 18, then the machines will fire from unit number “8 to 18”. NOTE: "Trig Delay" cannot be 0, otherwise the file will be invalid.

6.8.2.2 SPECIAL EFFECTS TYPE(EFFECT)

Right To Left: Based on the range of unit numbers that is set, the machines will shoot from right to left. In example, if the set unit number range is 8 To 18, then the machines will fire from unit number "18 to 8". NOTE: "Trig Delay" cannot be 0, otherwise the file will be invalid.

Center To Ends: Based on the range of unit numbers that is set, the machines will shoot from right to left. In example, if the set unit number range is 8 To 18, then the machines will fire from "13 To 8" and "13 To 18" in two directions at the same time. NOTE: "Trig Delay" cannot be 0, otherwise the file will be invalid.

Ends To Center: Based on the range of unit numbers that is set, the machines will shoot from right to left. In example, if the set unit number range is 8 To 18, then the machines will fire from "8 To 13" and "18 To 13" in two directions at the same time. NOTE: "Trig Delay" cannot be 0, otherwise the file will be invalid.

Randomize: Based on the range of unit numbers that is set, the machines will shoot in a random pattern. NOTE: "Trig Delay" cannot be 0, otherwise the file will be invalid.

6.8.2.3 FIRING HEIGHT

The firing height of the machines while using the special effects files and manual firing, range is 1~5, and the firing height vs levels will be detailed in later chapters.

6.8.2.4、SPECIAL EFFECTS TIME PARAMETER

Special effects time parameter: Duration, Trig Delay, Repeat Delay and Repeat Counts.

1. The minimum accuracy of the time is 0.1 second;
2. Trig Delay must be 0 under the "ALL Fire" special effects type, and must be greater than 0 for other special effects types.

TYPE	RANGE / SECOND
DURATION	.5 - 30s
TRIG DELAY	0 - 50s
REPEAT DELAY	0.1 - 50s
REPEAT COUNTS	1 - 5 times

6.8.2.6 TRIG DELAY

When multiple machines are being fired one after another, the “TRIG DELAY” is the delay between the two machines firing. The time between the first machine stopping firing and the second machine firing is the “TRIG DELAY” in seconds.

6.8.2.7 REPEAT DELAY

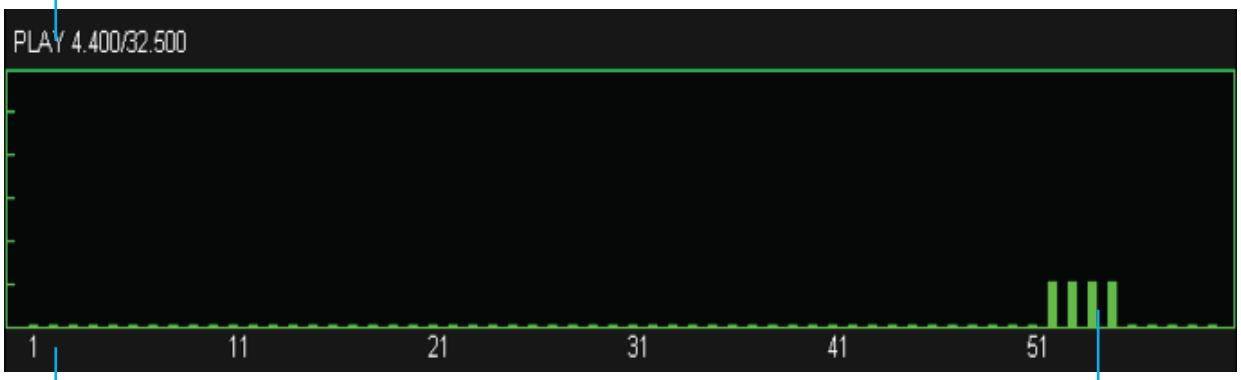
When the last machine in a file finishes firing. Fhere is a delay time before the file repeats again, this is the "Repeat Delay".

6.8.2.8 REPEAT COUNTS

The number of times the effects file will repeatedly fire.

6.8.2.9 SPECIAL EFFECTS PERFORM SIMULATION INTERFACE.

When "PLAY" is displayed, the file is being executed. "STOP" File execution has stopped. The "4.400/32.500" 4.400 in the figure above shows the effect of 4.400 seconds, and 32.500 indicates that the special effects file will be executed for



The unit numbers are labeled on the bottom axis and is always displayed as 1-60

The machines that are currently shooting are represented as columns, and the vertical axis is the firing height.

6.8.3 THE CONTROL REGION

Click "Test Start" to begin the simulation of the effects file. The file will run until complete. If you want to end the simulation before completion, press “Test Stop”. NOTE: if you change the above parameters for the file without saving, the changes will not be saved to the file and will not be implemented.

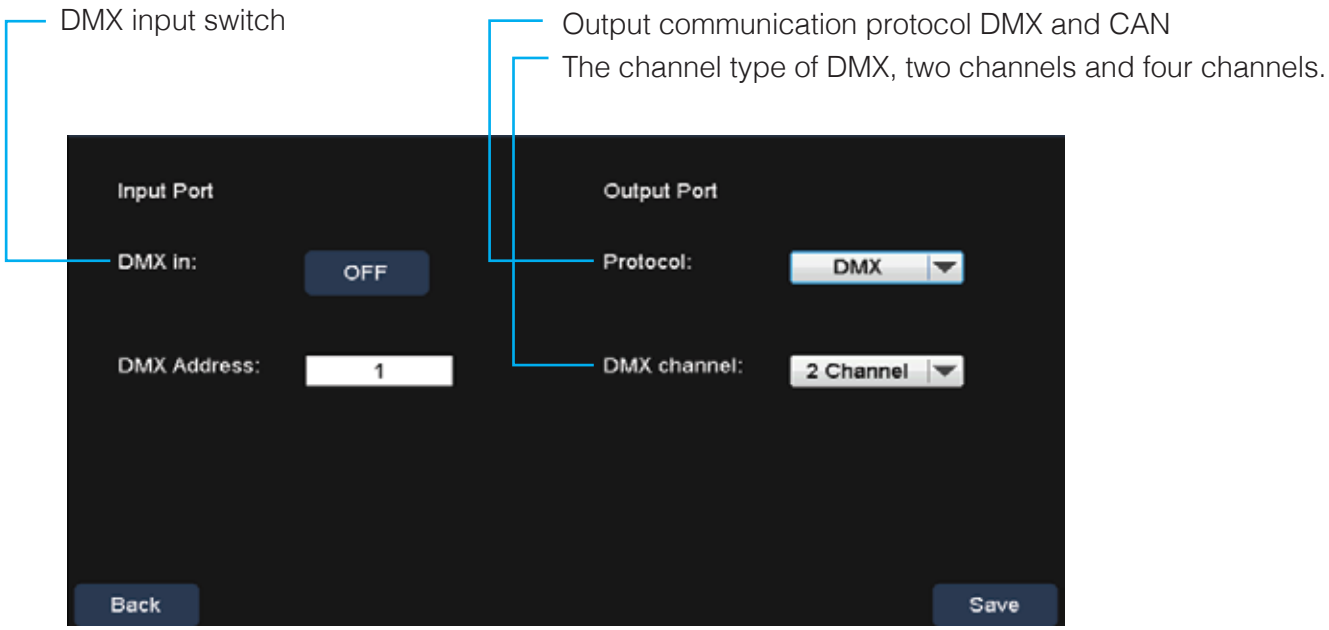
Click the save button if you are satisfied with the settings you have chosen. After the file has saved, if it is valid you will be informed that it has saved, if not you will be alerted with an error.

6.9 Menu SETTING

6.9.1 THE MENU

This menu is used to set the input and output parameters of the host controller.

6.9.2 FUNCTIONAL AREAS



6.9.2.1 DMX input switch

If the button show “OFF” DMX input will be disabled. If the input is set to “ON” DMX input is enabled and allows outside DMX control to be used but allows for the machines to still be monitored. To change the setting, push the buttons to turn the setting on and off.

6.9.2.2 Output communication protocol

There are two communication protocols: DMX and CAN. Note: The selected communication protocal must match on the controller and the machines. Otherwise communication failure will occur.

6.9.2.3 DMX CHANNEL TYPE

Channel type: 2 channel and 4 Channel DMX, the parameter in DMX mode determines the control of the sent data types. When CAN mode is selected (when DMX input is enabled and DMX signal is being sent to the controller) the input data will be converted to CAN, so please set the parameter carefully:

1. When the output communication protocol is DMX, it is necessary to ensure that the setting is set the same on the machines.
2. When the output communication protocol is CAN, it is necessary to ensure that the channel type of the input DMX control data is consistent with the provided parameters.

6.9.3 THE CONTROL REGION

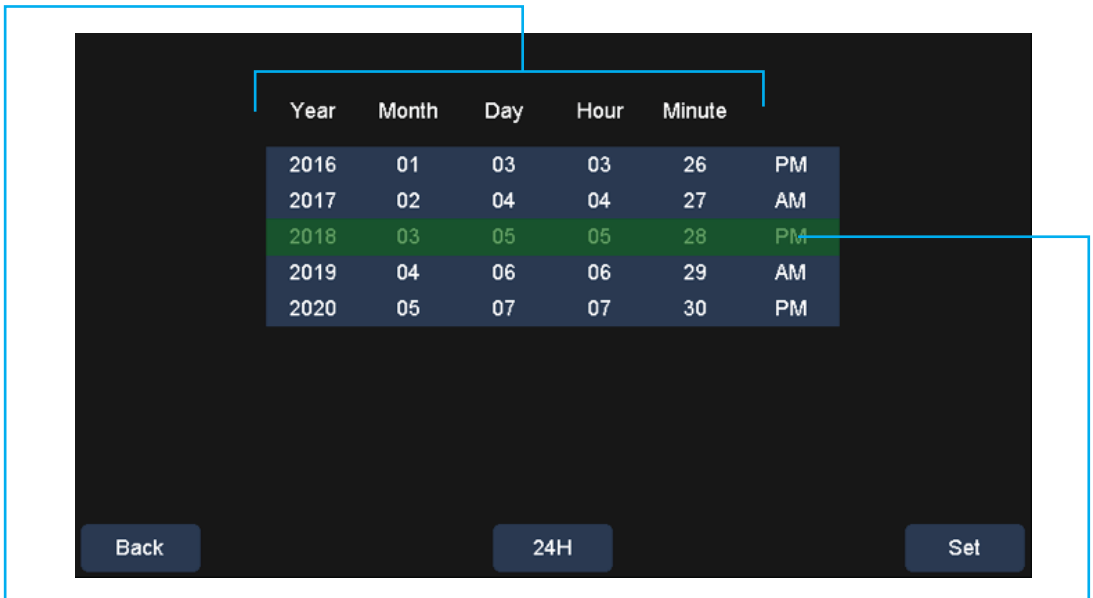
Click this button if the current settings are satisfactory, if the settings are valid, you will be prompted that it has saved. If there is a problem saving, you will be prompted with an error message.

6.10 Time setting menu

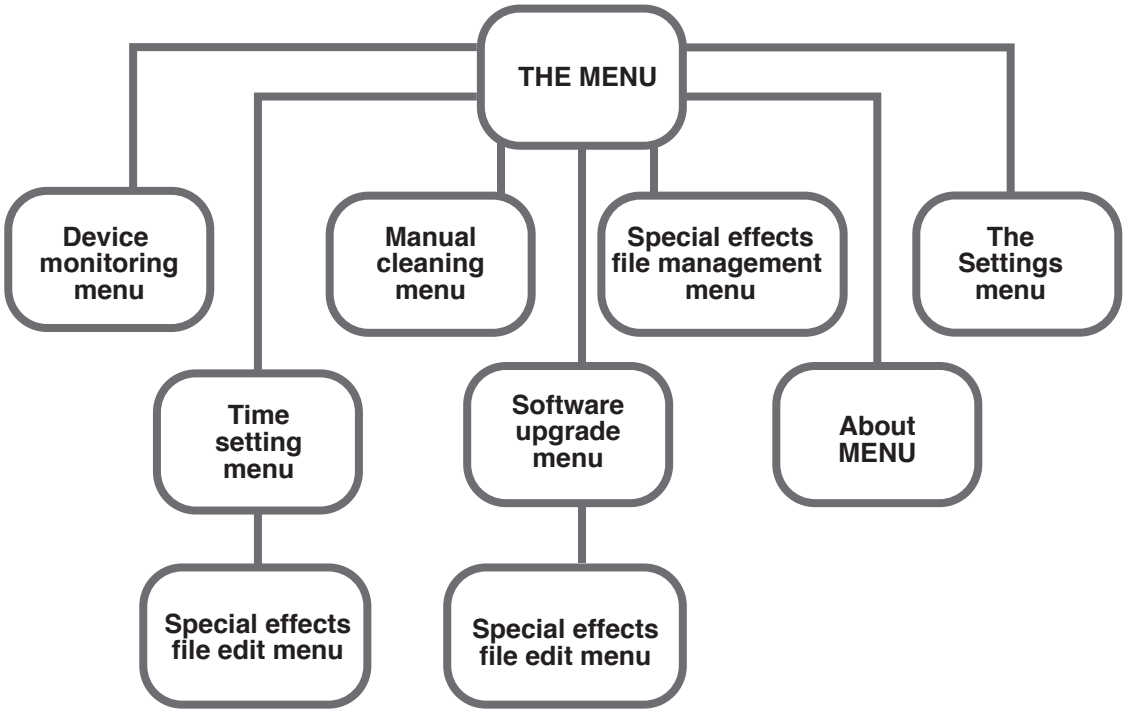
6.10.1 THE MENU

This menu is used for the time setting of the host controller.

6.10.2 FUNCTIONAL AREAS



Year selection, up and down selection.
MONTH SELECTION;
DATE SELECTION;
HOUR SELECTION;
MINUTE SELECTION;
MORNING AND AFTERNOON SELECTION


THE MENU
Device monitoring menu
Manual cleaning menu
Special effects file management menu
The Settings menu
Time setting menu
Software upgrade menu
About MENU
Special effects file edit menu
Special effects file edit menu

DMX 2	
First Channel	**Function**
0-15	Firing Stop
16-63	**Firing Height** 1
64-111	**Firing Height** 2
112-159	**Firing Height** 3
160-207	**Firing Height** 4
208-255	**Firing Height** 5
Second Channel	Function
0-10	Pre-heat stop
20-40	Emergency stop
60-80	Clear Material
240-255	Pre-heat on

DMX 4	
First Channel	**Function**
0-15	**Firing stop**
16-63	**Firing Height 1**
64-111	**Firing Height 2**
112-159	**Firing Height 3**
160-207	**Firing Height 4**
208-255	**Firing Height 5**
Second Channel	**Function**
0-20	**Pre-heat off**
21-255	**Pre-heat on**
Third channel	**Function**
0-20	**Clear material off**
21-255	**Clear material on**
Fourth channel	**Function**
0-20	**Emergency stop(off)**
21-255	**Emergency stop(on)**

Firing Height	Value
Stop	0
Height 1	16
Height 2	64
Height 3	112
Height 4	160
Height 5	208

In CAN mode, if the DMX input is active, the DMX console must be programmed according to the table above.In DMX mode, if DMX input is active and DMX input signal is being sent, then the output will forward directly to the input data (DMX data). If DMX input is active but no DMX input signal is being sent, the host controller will generate its own control data, heating, emergency stop, clearing and firing data based off of user input. Firing height must be paid attention to being that different machines can have different firing heights and control values (see related equipment data manual).The following is the corresponding relationship between the control data of the main controller in DMX mode and the output control data:

The main controller has three basic operations: preheating control, clear material control and firing control. Most of the time, only three physical buttons on the panel are used to "HEAT", "CLEAR MATERIAL" and "FIRE". Note: preheating and cleaning are mutually exclusive.

Press the "HEAT" button to heat the machines (machines must be heated to operating temperature before firing to produce the effect).

- Clear material on all machines by pushing the "CLEAR MATERIAL" button
- Enter the manual clearing menu to precisely control the clearing of individual machines

There are two types of firing: manual firing and special effect firing. No matter which type of firing is used, please turn on the heat until the machines are up to operating temperature prior to firing.
Manual firing: enter the monitoring menu, click the button corresponding to the unit number, and then the firing can be turned on or off.
Special effects firing: press the "FIRE" button to control the start or end of the special effects file. If you want to change the special effects parameters, go to the special effects file editing menu.

When the safety lock on the control panel is in the SAFE position, all firing is stopped. Cleaning and firing cannot be performed. Heating can still be turned on and off while the key is in the SAFE position.

ATTENTION:

1. The host controller and the machines should be connected correctly. Do not connect the machines to the "DMX IN" of the host controller

2. The communication protocol between the host controller and the machines must be the same

3. The DMX channel type of the host controller and the machines must be the same

4. The addresses of the machines connected with the host controller (DMX address and CAN address) cannot be set to the same address. Each machine must use its own individual address.

5. The machine(s) connected with the host controller cannot be set to the wireless host mode.

10. Warranty and description

We sincerely thank you for choosing this product. Our goal is to provide quality after-sale service to every Sparktacular customer.

The warranty period of the product is one year. If there is a quality problem within seven days, the company can exchange the product for one of the same model.

During the warranty period, Sparktacular FX Machines will provide the customer with free maintenance service. Please do not dismantle the machine for repair if hardware failure is caused by the product itself.

Any of the following circumstances do not fall within the scope of warranty service:

- Unit damage caused by improper handling, use, management or maintenance
- The product is disassembled, modified or repaired without authorization
- Damage incurred by external causes (lightning, power supply, etc)
- Damage caused by incorrect installation or use by user

Products that do not fall under the warranty scope may be repaired for a maintenance service fee.

The purchase voucher and warranty card MUST be provided when maintenance is required. Failure to prouduce these documents will render the machine unacceptable for repair at our facility.