

CAT FIRE



CFWFS-1

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CATFire – CFWFS-1 Windows Firing Studio

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS, FEATURES, FIRMWARE AND ITS FEATURES, SOFTWARE AND ITS FEATURES, DOCUMENTATION AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Errors and Omissions Excepted (E&OE).

Revision history

Revision	Changes
1	First; Supports from version 1.1.27.0 of the software.
2	Installation revision. From 1.1.34.0 of the software.
3	Enhancement to material colour selection. From 1.1.35.0 of the software.
4	Site plan designer changes from 1.1.37.0 of the software.
5	Addition of manual firing timing clocks; Firing page UI layout rework; Clarification surrounding updating to a new version of the software; Clarification on fair use surrounding repeated licence/machine reassignment.
6	Improvement to firing units page: 1. additional and clearer scanning layout / information display. Improvement to design page: 1. UI layout cleanup (relocate timeline to bottom of screen; make timeline area resizable; soften the icons on the timeline and make them easier to select with mouse). Make material and positions selections for a sequence clearer. 2. Rework wiring & reports: section the different reports and labels – make ui clearer in this respect / pave way for more features to come.
7	From 1.1.51.0 of the software. 1. Add quicker cue entry through the cue program option on the script design sequence editor. 2. Show licence code assigned to the app under Settings & Tools.
8	From 1.1.52.0 of the software. 1. Revise the join operation steps. 2. Add protected feature password and lock/unlock feature sections for interface units.
9	1. Document formatting fixes

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Errata

Item	Errata
1	Print preview for some printers do not always show images. Images always print correctly.
2	Changing the duration of a material database record does not cause the script timeline representation of a sequence or cue that is using that material to change its visual length. Workaround: Re-generate those sequences manually by selecting those and clicking Apply or reload your script. Note that "wiring up" and firing file creation is not affected by this.

Installing the CFWFS-1

The CATFire Windows Firing Studio is installed on Windows 10 (and later) desktop computers.

It is installed by downloading the MSIX package from our web site.

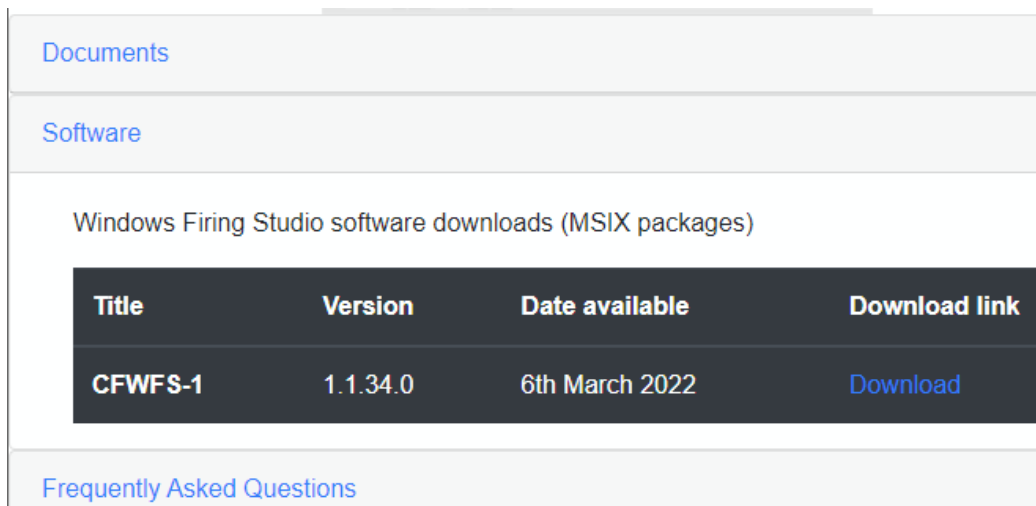
CATFire CFWFS-1 requires a licence. These can be purchased from our Amazon store. Some of our bundles contain licenses as part of the deal so do check those out.

Download the MSIX file

Open this page in a browser:

https://www.trinitydigital.co.uk/support_cfwfs-1.html

Look under the Software section for the latest version available.



The screenshot shows a navigation menu with 'Documents' and 'Software' links. Below the 'Software' link, there is a heading 'Windows Firing Studio software downloads (MSIX packages)' followed by a table with the following data:

Title	Version	Date available	Download link
CFWFS-1	1.1.34.0	6th March 2022	Download

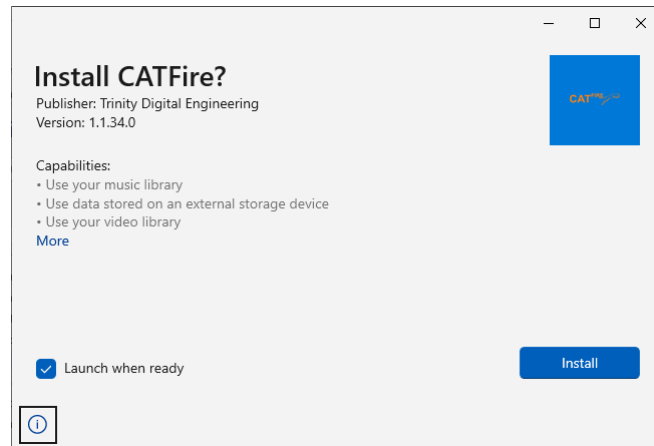
At the bottom of the screenshot, there is a link for 'Frequently Asked Questions'.

Install (or update)

Run the MSIX file you downloaded by double clicking on it; the installer runs. Click Install button.

NOTE: If you are updating your software to a new version do not uninstall your old version first, simply install the new one as per these steps.

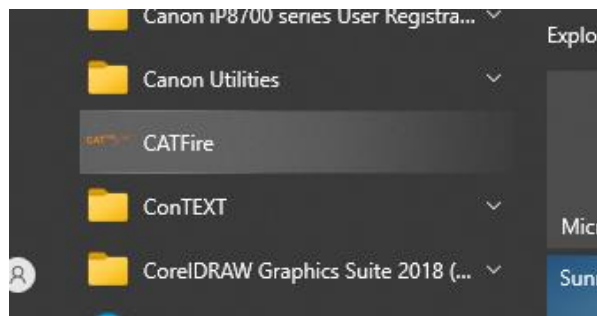
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Installation may take some time as the software installs, performs updates and downloads & installs dependencies.

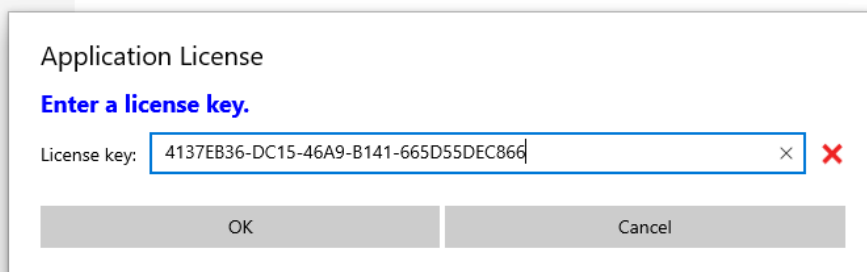
Launch the app

Launching the app is done by typing CATFire in the task bar search box or, alternatively, from the programs menu



Licensing

If your software is requiring a licence, you will be prompted for one.



Enter the licence code exactly as it is printed on your licence sheet.

IMPORTANT: The code is case sensitive. Your Windows device must be online.

Click OK, the licence is validated and activated.

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Licensing notes

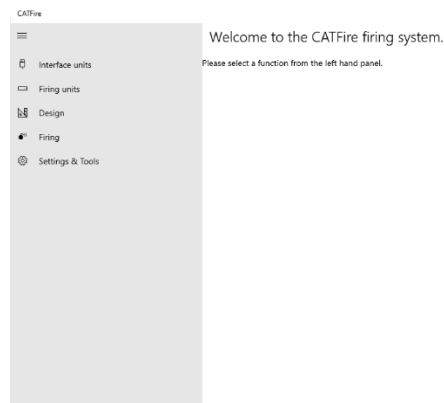
Your licence is not a subscription, you do not have to pay to renew it when installing new versions of the software. Simply download the latest version and install it as per the above instructions.

Each licence entitles the application to be installed on one device, for additional devices you will require additional licenses.

If your Windows device becomes damaged and you need to re-use a licence on a new device contact Trinity Digital to reset your licence, we apply a fair use policy regarding repeated licence resetting.

Finding your way around

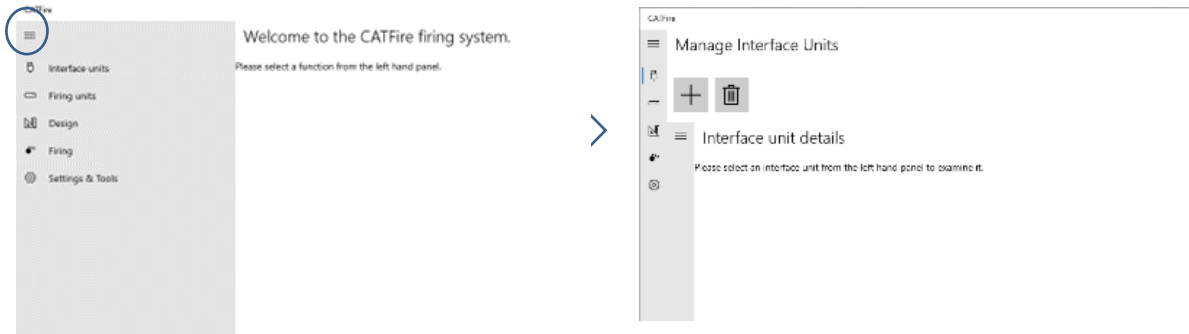
Once the app is launched you are greeted with a welcome screen, the main sections of the app are shown on the left hand side.



Section	Purpose
Interface units	Devices connected to your computer via USB are connected to the App here.
Firing units	Firing units in your network are detected and shown here.
Design	This is where you manage your material database (pyrotechnics), manage safety groups and design your shows – including printing reports and labels.
Firing	Perform show time diagnostics, modifications and fire your show.
Settings & Tools	Label and log viewer tools.

Making the most of your screen space

The navigation bars on the left-hand side may take up a large amount of screen space, you can collapse these to smaller icons – thereby gaining more screen space – by clicking the top left button.





Interface units

CATFire equipment, known as Interface units, such as our CFCIU-1 or CFTIU-1 are devices you connect to your desktop computer via USB cable.

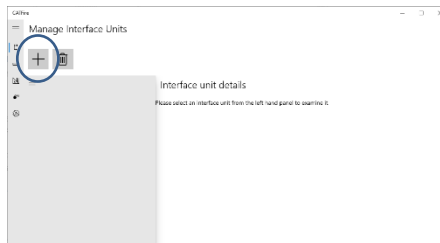
In this example the CFCIU-1 allows the App to interface wirelessly to your firing units.

Ensure your computer has Internet access (for driver download as may be necessary) and then connect the CFCIU-1 to your Windows computer using the USB cable supplied.

NOTE: Once the Windows computer has installed the driver for the CFCIU-1 you won't need Internet access again. Many computers already have the necessary drivers installed.

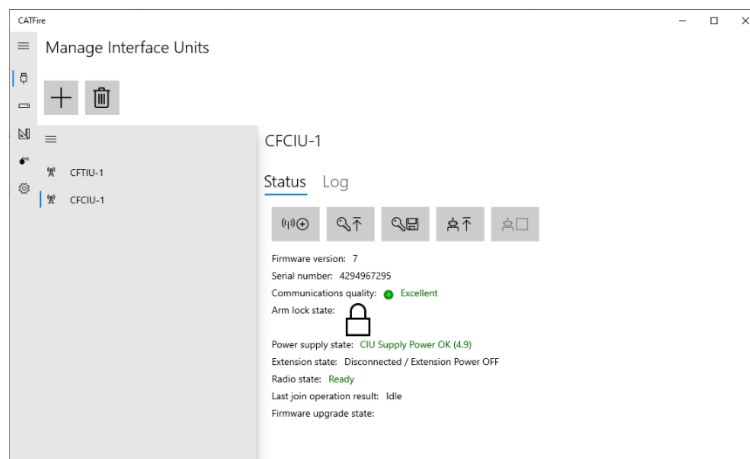
Detect attached interface units.

Click the + button to scan your USB devices for attached CATFire equipment.



In this example below we have attached both the CFCIU-1 wireless communications interface unit and our CFTIU-1 Timecode interface unit to the computer.

The interface unit names are shown in the navigation pane to the left, click on one to display its properties.



Remove an interface unit from the list

You can remove an interface unit from the list by first selecting that unit from the list, then clicking the trash can icon.



CFCIU-1 Interface unit

The page for this interface shows the unit status and has a number of buttons to control its operation, described in this section.

CFCIU-1

Status Log



Firmware version: 10

Serial number: 4294967295

Communications quality: ● Excellent

Arm lock state:

Power supply state: CIU Supply Power OK (4.8)

Extension state: Disconnected / Extension Power OFF

Radio state: Ready

Last join operation result: Idle

Firmware upgrade state:

Parameter	Notes
Firmware version	This shows the version of the software running on the CFCIU-1, new firmware may be downloaded from our web site and installed on the unit. Installing firmware is described later.
Serial number	The unique serial number of the unit, this is needed for your own asset tracking and also when speaking with Trinity Digital about your equipment.
Communications quality	This is the USB link quality with this device, anything other than Excellent may indicate a poor USB link.
Arm lock state	Shows the ARM lock state. When locked system ARM is not possible. When unlocked system ARM is possible.
Power supply state	This indicates the quality of power supplied from your computer to this interface unit. If the supply is showing as bad not enough power is getting through – the USB interface on your computer may have a problem or the USB cable may be too long or of insufficient quality.
Extension state	This indicates the state of the EXT connection of your interface unit, it will identify if it is connected and the state of the power supplied by it to connected devices.
Radio state	The radio should be showing as Ready, if it is not there may be a problem with the hardware, contact Trinity Digital for advice.
Last join operation result	Wireless firing units such as our CFTFU-X16 must be joined to your CFCIU-1 interface unit – they must be talking using the same security parameters. See later on Join operations, this is where you connect your firing units to this CFCIU-1 for secure communications. This parameter tells you the state of the last

	join operation you performed, if any.
Firmware upgrade state	When updating the firmware of the interface unit, this parameter will tell you the status of that upgrade, see later on firmware updates.

Join operations

Before your wireless firing units can communicate with the App, via the CFCIU-1, they must join the CFCIU-1 – this is a process where the CFCIU-1 shares its security key so they may talk privately and not be interfered with by any other radio operators.

Before you join firing units you should set up your CFCIU-1 to have a new security key.

Setting a new security key

The CFCIU-1 may have one key set upon it at any one time. It will remember that key even after being powered off.

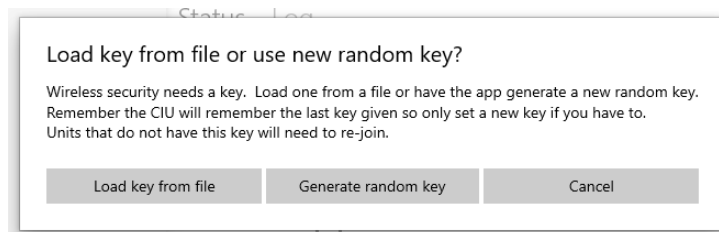
Setting a new security key on your CFCIU-1 is typically done:

- On the first use of your CFCIU-1 to make sure you have a unique security key.
- When you need to change it because you think the key has been compromised.
- When you need to use a key from a key file
 - Restoring a key from a backup key file – perhaps this CFCIU-1 is a backup to an existing one and you want it to have the same key as your other CFCIU-1(s)
 - When some of your equipment has different keys and you need to re-establish communication with that equipment. This is sometimes done when you are doing more than one show close together – each show would have a different key for its equipment so as to avoid radio conflict.
 - You want to connect to someone else’s firing units that have a different key already and the owner has provided you with the key file.



Click the key upload button :

You are then asked whether to generate a new random key or upload one from a key file:



Option	Description
Load key from file	Click this to select a .cfk key file you have been given or saved to disk previously

Generate random key	Select this option to load a completely random key to the CFCIU-1, typically do this when you first set up your CFCIU-1 or you want a new key because you think your previous one has become compromised (e.g. someone has stolen a backup key file)
---------------------	--

Backing up your security key



Click the key save button, shown above, to save the last key you uploaded to the CFCIU-1 as a .cfk key file. Keep this file safe – you may need it to restore your key in the event you need to use a different CFCIU-1 interface unit.

Lost security keys

If you lose your key file you can save another backup of it from your CFCIU-1 at any time.

If you think your key file has been compromised, e.g. stolen, then generate a new random key for your CFCIU-1. In this instance you will also need to re-join all of your firing units.

Joining a new firing unit



Once your CFCIU-1 is set up with a key it's time to join your firing units to the system.

This securely shares your key to the firing units so they may communicate with your App.

NOTE: The following join operation should be done swiftly or the process may 'time out' and you will fail to complete the Join operation.

1. Prepare your firing unit for joining
 - a. Power on a CFTFU-X16 firing unit (or similar).
 - b. Go to the Addressing menu of your firing unit
 - c. Navigate to the Join menu option
NOTE: Refer to the firing unit user manual for more information

```
Join master?
<SET> to begin
```

- d. Press SET button to begin the join operation

```
JOIN IN PROGRESS
Any key to stop.
```

2. Swiftly click the Join button shown in the App.



3. Observe the status display on the App and on the firing unit itself.

```
Extension state: Disconnected / Extension Power OFF
Radio state: Ready
Last join operation result: Join in prgogress
Firmware upgrade state:
```



```
EXTENSION STATE: DISCONNECTED / EXTENSION POWER OFF
Radio state: Ready
Last join operation result: Successfully shared key and address to unit
Firmware upgrade state:
```

4. Join is completed. Repeat this process for all firing units to be joined.

NOTE: Once all join operations are done, ensure your firing units have unique Unit Addresses (UA) before you proceed to the Firing Units section of this App and scan for that.

NOTE: Once a firing unit has 'joined' your secure network the join process does not need to be done again for that firing unit. Unless you change the security key of course.

Updating firmware

The CFCIU-1 may, from time to time, need its firmware updating.

This can be done from this App.

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Click the firmware upload button as shown.

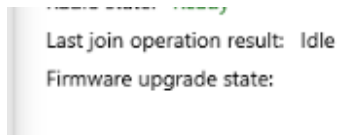
Select the .cfi image file you downloaded from our web site.

Only firmware compatible with this CFCIU-1 will be accepted.

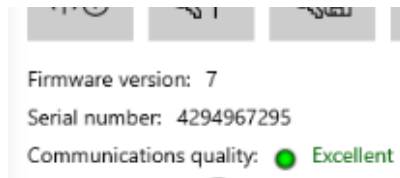
You cannot 'downgrade' to an earlier firmware version.

Once the .cfi file is selected, firmware update begins.

Observe the firmware update progress:



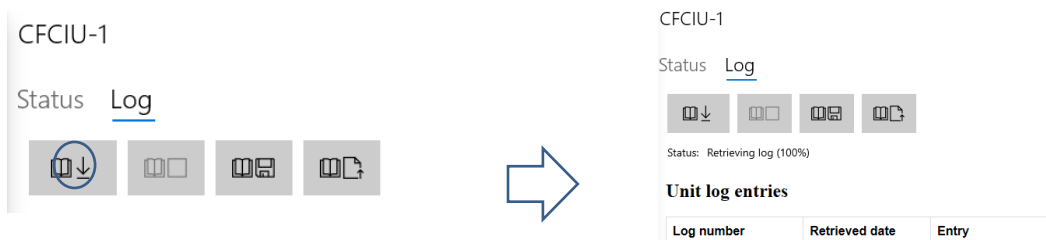
Once successfully updated observe the firmware version shown on the screen matches that which you expected.



Unit log

The CFCIU-1 logs diagnostic data, this log may be useful to you and Trinity Digital when identifying any issues you may have.

Select the log page and click the log download button to retrieve the log from the CFCIU-1.



Merging in an existing log

The CFCIU-1 can store hundreds of log entries, eventually the oldest entries will be replaced with newer ones.

To prevent loss of log entries you can periodically merge previously saved log entries into the latest ones.

To do this:

1. Retrieve the log from the unit as described above.
2. Merge in a prior saved log with those displayed on screen:



Select the log file to merge in – only the log file for this unit can be loaded.

Log entries will be merged and the new completed list displayed.

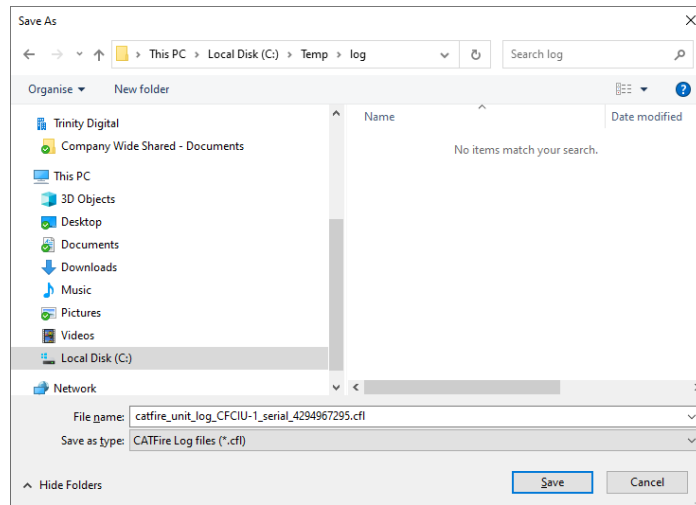
You can then save this log back to the same file to keep a full history of log entries.

Saving the log



Click the log save button shown above to save the displayed log to a file.

You are prompted with a dialog to select where to save the file. A file name is suggested which is tied to the unit type and its serial number for easy identification.



Protected feature password



The interface unit has a built-in password, defaulting to 1234.

NOTE: The password is stored in the interface unit itself. If you lose the password you must return the unit to Trinity Digital for repair. Different interface units may have different passwords.

The password may be changed to anything you like, from 4 to 16 characters. Only simple characters are permitted (0-9, a-z, A-Z).

Some features require you to enter the password before that feature can be changed.

Such features are considered 'protected' features because they have a direct impact on the safety of a system.

Arm lock/unlock setting



NOTE: This is a protected feature and requires you to enter a password whenever you change it.

The interface unit will prevent the system from becoming ARMED unless the key is inserted and turned to unlock the arming capability.

It is possible to turn this feature off so that the unit is always 'unlocked' and does not require a key to be inserted at all.

This feature can be useful if you lose the key or the key mechanism becomes damaged and you are in an emergency situation.

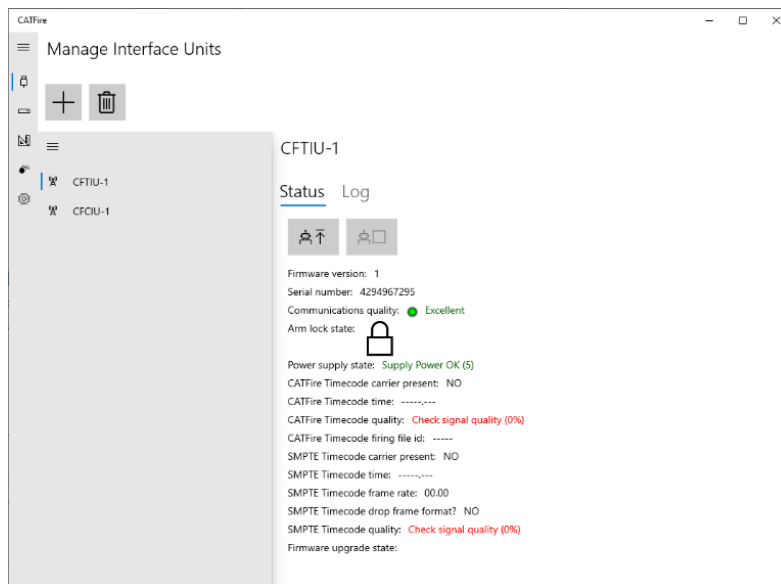
Ignore ARM Lock keyswitch. ALWAYS UNLOCKED FOR ARMING
 Require keyswitch to be in UNLOCKED position to allow arming

Show password

Option	Description
Ignore ARM Lock keyswitch. ALWAYS UNLOCKED FOR ARMING	When this is selected the keyswitch is ignored – there is no need to insert a key at all. The unit is always in an ARM UNLOCKED state and will allow the system to become armed. NOTE: In any case, all interface units attached to your device must be unlocked for the system to become armed.
Require keyswitch to be in UNLOCKED position to allow arming	Select this to require a keyswitch to be inserted and turned to unlock arming, the system can only be armed when the key is inserted and turned.

CFTIU-1 Interface Unit

The CFTIU-1 interface unit provides timecode information, timecode is a signal that contains time information used to synchronise a show to music or other media.



Parameter	Notes
Firmware version	Refer to CFCIU-1.
Serial number	Refer to CFCIU-1.
Communications quality	Refer to CFCIU-1.
Arm lock state	Refer to CFCIU-1.
Power supply	Refer to CFCIU-1.

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state											
Firmware upgrade state	Refer to CFCIU-1.										
CATFire Timecode	<table border="1"> <tr> <td>Carrier present</td> <td>Indicates if the unit has detected a FSK carrier signal, this does not mean there is timecode being received. If this is YES and no timecode is being received check the audio quality and ensure that no filtering is applied to the signal and that there is no cross channel interference in the signal.</td> </tr> <tr> <td>Time</td> <td>This is the CATFire FSK time in seconds currently being received. This is updated periodically and is not a free running timer.</td> </tr> <tr> <td>Quality</td> <td>Indicates the quality of the FSK time signal being received, if the quality is poor ensure that the cabling and signal received are clean, free of filtering and is at the correct signal level. Ensure there is no cross channel interference.</td> </tr> <tr> <td>Firing file id</td> <td>This is the firing file id of the signal being received. This number must match the firing file being fired or timecode will be ignored. The firing file ID prevents accidentally firing your show to the wrong audio/timecode feed.</td> </tr> </table>	Carrier present	Indicates if the unit has detected a FSK carrier signal, this does not mean there is timecode being received. If this is YES and no timecode is being received check the audio quality and ensure that no filtering is applied to the signal and that there is no cross channel interference in the signal.	Time	This is the CATFire FSK time in seconds currently being received. This is updated periodically and is not a free running timer.	Quality	Indicates the quality of the FSK time signal being received, if the quality is poor ensure that the cabling and signal received are clean, free of filtering and is at the correct signal level. Ensure there is no cross channel interference.	Firing file id	This is the firing file id of the signal being received. This number must match the firing file being fired or timecode will be ignored. The firing file ID prevents accidentally firing your show to the wrong audio/timecode feed.		
Carrier present	Indicates if the unit has detected a FSK carrier signal, this does not mean there is timecode being received. If this is YES and no timecode is being received check the audio quality and ensure that no filtering is applied to the signal and that there is no cross channel interference in the signal.										
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Quality	Indicates the quality of the FSK time signal being received, if the quality is poor ensure that the cabling and signal received are clean, free of filtering and is at the correct signal level. Ensure there is no cross channel interference.										
Firing file id	This is the firing file id of the signal being received. This number must match the firing file being fired or timecode will be ignored. The firing file ID prevents accidentally firing your show to the wrong audio/timecode feed.										
SMPTE Timecode	<table border="1"> <tr> <td>Carrier present</td> <td>Indicates if SMPTE LTC timecode is being received</td> </tr> <tr> <td>Time</td> <td>The SMPTE LTC time update. This is updated periodically and is not a free running timer. This is displayed as HH:MM:SS:MSEC NOTE: The final parameter MSEC is in milliseconds and not frames.</td> </tr> <tr> <td>Frame rate</td> <td>This is the frequency of the incoming time updates, expressed in frames per seconds.</td> </tr> <tr> <td>Drop frame format</td> <td>When YES this indicates the incoming signal is using the drop-frame format and the frame rate is 29.97 frames per second rather than 30 fps. The system is compensating for the dropping of time to keep up with the lower frame rate.</td> </tr> <tr> <td>Quality</td> <td>Indicates the quality of the SMPTE LTC time signal being received, if the quality is poor ensure that the cabling and signal received are clean, free of filtering and is at the correct signal level. Ensure there is no cross channel interference.</td> </tr> </table>	Carrier present	Indicates if SMPTE LTC timecode is being received	Time	The SMPTE LTC time update. This is updated periodically and is not a free running timer. This is displayed as HH:MM:SS:MSEC NOTE: The final parameter MSEC is in milliseconds and not frames.	Frame rate	This is the frequency of the incoming time updates, expressed in frames per seconds.	Drop frame format	When YES this indicates the incoming signal is using the drop-frame format and the frame rate is 29.97 frames per second rather than 30 fps. The system is compensating for the dropping of time to keep up with the lower frame rate.	Quality	Indicates the quality of the SMPTE LTC time signal being received, if the quality is poor ensure that the cabling and signal received are clean, free of filtering and is at the correct signal level. Ensure there is no cross channel interference.
Carrier present	Indicates if SMPTE LTC timecode is being received										
Time	The SMPTE LTC time update. This is updated periodically and is not a free running timer. This is displayed as HH:MM:SS:MSEC NOTE: The final parameter MSEC is in milliseconds and not frames.										
Frame rate	This is the frequency of the incoming time updates, expressed in frames per seconds.										
Drop frame format	When YES this indicates the incoming signal is using the drop-frame format and the frame rate is 29.97 frames per second rather than 30 fps. The system is compensating for the dropping of time to keep up with the lower frame rate.										
Quality	Indicates the quality of the SMPTE LTC time signal being received, if the quality is poor ensure that the cabling and signal received are clean, free of filtering and is at the correct signal level. Ensure there is no cross channel interference.										

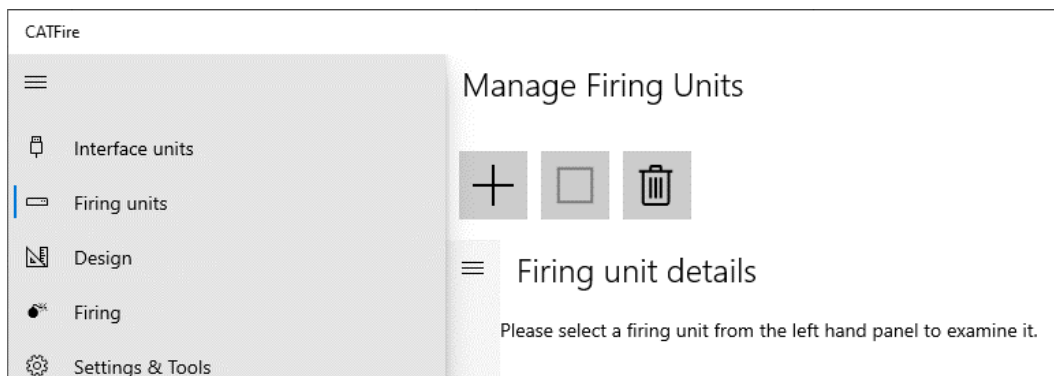
Unit log

Refer to the CFCIU-1 section for how to manage the unit log.

Updating firmware

Refer to the CFCIU-1 section for how to update firmware.

Firing units



Once the CFCIU-1 device is detected in the Interface Units section of the App you can then 'scan' for your firing units.

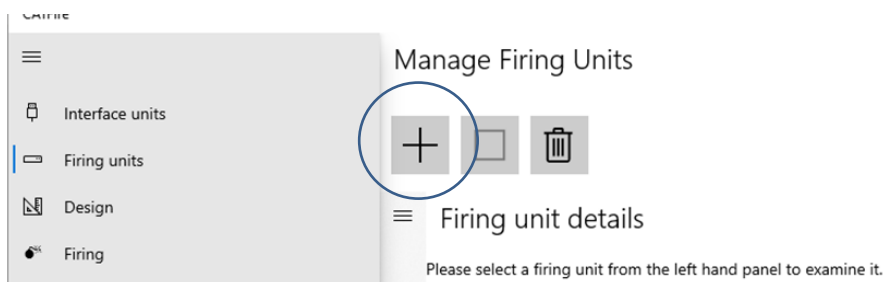
Scanning allows the application to detect the presence of your firing units in the network.

NOTE: Ensure your firing units have their antennas fitted, are switched ON and they each have a unique Unit Address (UA).

NOTE: New firing units must have been previously 'joined' to your CFCIU-1 so they share the same security key.

NOTE: If your firing units have been powered on for some time they will have entered a low power mode. Wait at least 10 seconds after adding your CFCIU-1 to the application before running a scan for firing units.

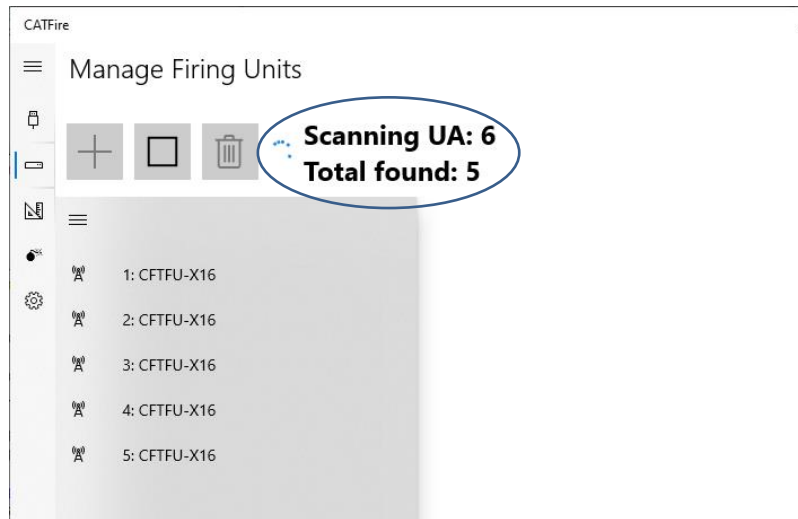
Begin the scan for your firing units, press the scan button:



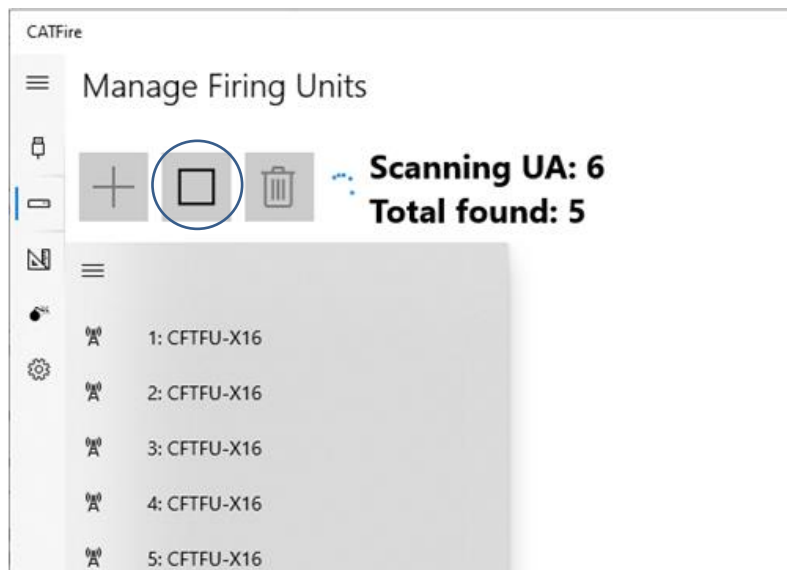
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The App will begin scanning addresses, it will start from the lowest undetected unit address and scan all undetected addresses up to 256.

A summary of scanning progress is shown at the top of the screen:



When all your firing units have been detected you should stop scanning with the following button:

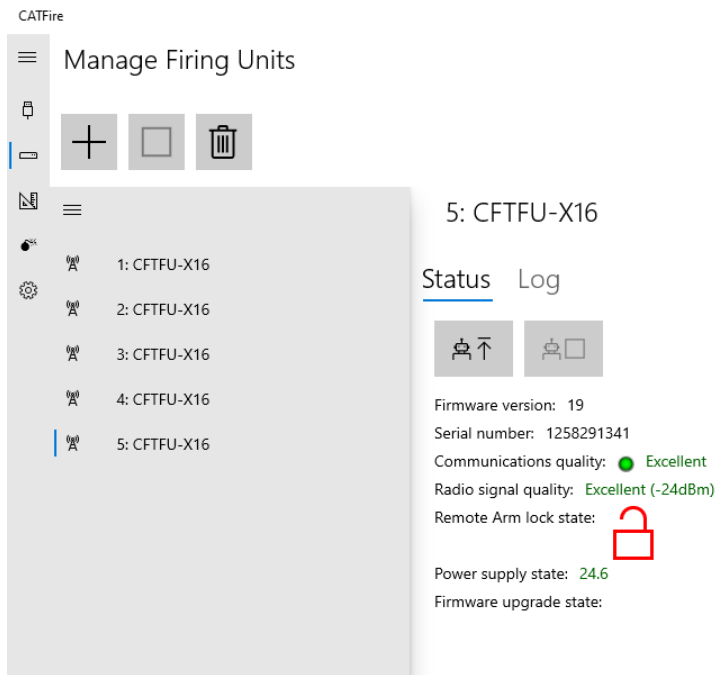


IMPORTANT: If a firing unit does not get detected it may be that it is waking from power saving mode – it can take from 10 to 30 seconds for a firing unit to awaken. Stop the scan and perform another.

You can view properties of your firing units by clicking the unit in the list.

Each unit is identified by its Unit Address followed by its product name.

CFTFU-X16



Parameter	Notes
Firmware version	This shows the version of the software running on the firing unit, new firmware may be downloaded from our web site and installed on the unit. Installing firmware is as described for CFCIU-1, the process is identical.
Serial number	The unique serial number of the unit, this is needed for your own asset tracking and also when speaking with Trinity Digital about your equipment.
Communications quality	This is the communications quality with this device – the reliability of talking to the device. This parameter is more important than “Radio signal quality” but the two together can help to diagnose communications issues, see later.
Radio signal quality	Expressed in dBm, this is the radio signal strength with the unit.
Remote arm lock state	Identifies if this unit is locked for remote arming or is unlocked (arm permitted via radio control).
Power supply state	State of the battery and its voltage. More advanced testing can be performed Firing section of the app, see later.
Firmware upgrade state	When updating the firmware of the interface unit, this parameter will tell you the status of that upgrade, see later on firmware updates.

Communications quality

Two parameters are given: Communications quality and Radio signal quality. Communications quality is the clarity of talking with the unit.

NOTE: Both parameters take some time to compute as the system learns these qualities.

NOTE: Communications quality is more important than Radio signal quality.



When Communications quality is showing issues, the Radio signal quality can be a useful diagnostic aid.

It is possible to have excellent Communications quality with poor signal quality – this just means the signal is weak but perfectly clear:

1. Check for obstacles.
2. Antennas are screwed on properly and undamaged. Do not overtighten, finger tight only.
3. Antennas are the same orientation.
4. Raise units off the ground.

Equally it is possible to have poor Communications quality with high signal quality – this could mean a number of things:

1. Antennas are too close (signal saturation)
2. Metal structures or other obstacles are causing destructive reflections
3. Other transmitters in the area using the same bands are interfering with these units
4. Antennas are damaged (detuned)
5. Antennas not screwed on properly or connectors are dirty
6. Antennas are not aligned (all vertically positioned is better).

Ensure that antennas have clear line of sight where possible – even raising the unit off the ground will improve the signal as more energy is emitted rather than absorbed through the ground.

Script editing section

Script editing is where you design your shows and manage your material database (pyrotechnic database) and safety groups.

Before you get into designing your show you need to first configure your Material Safety Groups, your Position Safety Group Defaults and also add in some records in your material database – the database of your fireworks.

Safety Groups

Safety groups in CATFire are, essentially, a way to enable or disable firing of cues during your show.

As conditions change during your show you may want, for example, to disable shells from firing, or perhaps a pontoon has become loose from its mooring so needs to be disabled from further firing.

In CATFire you have thirty-two safety groups for **types of material** and thirty-two **position related** groups.

You give each of these groups a simple meaningful name – meaningful to you – so you know what you are enabling and disabling during your show.

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When designing your scripts you work with material (e.g. fireworks) and also positions (places on your firing site that materials are fired from).

In CATFire both materials AND positions can be assigned to *any number* of their 32 safety groups.

Ultimately material (and its safety groups) are placed at a position (with its safety groups) and assigned to a Firing Address (FA) and cue number.

It is this electrical cue that is then given the combined total of safety groups.

That cue may only fire if ALL safety groups that are assigned to it are enabled.

Example:

You are designing a show and you want to launch a 5” shell (a blue peony) from your waterfront setup. You have several pontoons but you want to launch it from pontoon number 3.

You design a sequence (see later in script design) that places the 5” blue peony on the pontoon number 3.

When you created the material database record for the 5” blue peony you assigned that shell to two safety groups ‘All shells’ and ‘5” shells’.

When you created your script, its position safety groups take on the default position safety groups you have established and might look something like this (reduced for clarity):



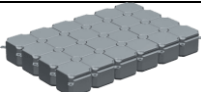
Waterfront	Pontoon 1	Pontoon 2	Pontoon 3
Front 1	Front 2	Front 3	Front 4


Etc.

When you created the Pontoon 3 position in your script you assigned it to two safety groups: Waterfront (all positions on your waterfront will be assigned to this) and also a safety group specifically for Pontoon number 3 – “Pontoon 3”.

You then decide to add a cake to Pontoon 3 too, the material is assigned to the Cakes safety group.

When you are done with your script design you ‘wire up’ your script which matches the material and positions to firing addresses and electrical cue numbers.

Item	Safety groups assigned	Wiring up	Firing Address	Cue number	Safety groups assigned to the cue
	All shells 5” shells		37	14	All shells 5” shells Waterfront Pontoon 3
	Waterfront Pontoon 3				

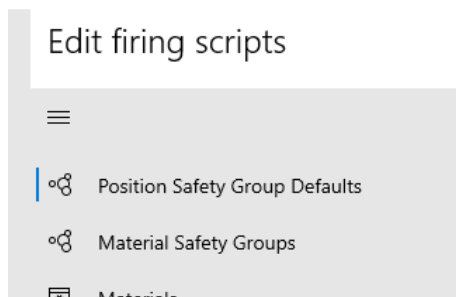
	Cakes		37	15	Cakes Waterfront Pontoon 3
---	-------	--	----	----	----------------------------------

Scenarios:

Scenario 1: During your show the wind speed picks up, you decide to disable the larger 5” shells. FA 37 Cue 14 will be disabled, but FA 37 Cue 15 will still fire.

Scenario 2: During your show Pontoon 3 becomes detached from its mooring, you decide to disable Pontoon 3. Nothing on Pontoon 3 will fire – other positions will still fire even if they contain cakes and 5” shells too.

Scenario 3: During your show a wave is approaching your waterfront, you disable “Waterfront” safety group for the duration of the wave to see how it affects your pontoons. No cues on any of your waterfront positions will fire, FA37 Cue 15 was due to fire but it was disabled from doing so. The wave had minimal impact on your set up so you re-enable the “Waterfront” safety group. FA37 Cue 15 will still not fire – it missed its opportunity to do so – but the Blue peony shell will still fire when it’s time comes.



Two sections shown above allow you to configure safety group defaults for positions and safety groups that your material database will use. Both sections work in a similar way, described next.

Position Safety Group Defaults

CATFire comes with 32 pre-defined position-related safety groups.

A script will use these defaults unless you customise them for that script – see later.

NOTE: Care should be taken when changing defaults: Changing a default group will change any script that is still relying on it.

Material Safety Groups

Each item of material defined in your database can be assigned to one or more material safety groups.

This section allows you to configure your material safety groups – which your database records can use.

NOTE: Care should be taken when changing these: Changing a group will change any material that is using it. For example, changing a “Shell” safety group to a “Cake” safety group will effectively re-assign shell type material to be in the cakes safety group – clearly very wrong and can impact on safe operation of your display.

Initial set up

The defaults supplied with CATFire may not match your intended ideals, so before creating material database records consider how they work with the kind of material you typically have.

The same goes for position default safety groups – think of the kinds of positions you typically use in a show and customise them to make starting a new script design easier. Keep in mind that position safety group defaults can be customised on a per-script basis.

Changing group names

You can edit the description of a safety group at any time e.g. correcting a spelling mistake or enhancing the description, but once material is assigned to a safety group you **MUST** exercise caution that you do not fundamentally change the *meaning* of a safety group.

For example, changing a material safety group description from ‘3” Shells’ to ‘Candles’ when you already have some shells in your database assigned to ‘3” Shells’ would have disastrous consequences because these shells would now be described as in the ‘Candles’ safety group – very wrong when controlling safety during your show.

The following picture shows the Position Safety Group Defaults section:

Position Safety Group Defaults

◉
◉←
◉→

Safety group number:

Group name:

Groups:

0Front 1	1Front 2	2Front 3	3Front 4
4Front 5	5Front 6	6Front 7	7Front 8
8Front 9	9Front 10	10Front 11	11Shells/Rockets 1
12Shells/Rockets 2	13Shells/Rockets 3	14Shells/Rockets 4	15Shells/Rockets 5
16Pontoon 1	17Pontoon 2	18Pontoon 3	19Rooftop 1
20Rooftop 2	21Rooftop 3	22Close proximity	23Stage
24Water	25Overhead	26Lines	27Bridge
28Body worn	29Gantry	30Scaffold	31Wall

Making changes

Click a safety group, its group number and its description are loaded into the record editor fields.

— □ ×

Position Safety Group Defaults

◉
◉←
◉→

Safety group number:

Group name:




Groups:

0Front 1	1Front 2	2Front 3	3Front 4
4Front 5	5Front 6	6Front 7	7Front 8
8Front 9	9Front 10	10Front 11	11Shells/Rockets 1
12Shells/Rockets 2	13Shells/Rockets 3	14Shells/Rockets 4	15Shells/Rockets 5
16Pontoon 1	17Pontoon 2	18Pontoon 3	19Rooftop 1
20Rooftop 2	21Rooftop 3	22Close proximity	23Stage
24Water	25Overhead	26Lines	27Bridge
28Body worn	29Gantry	30Scaffold	31Wall

Edit the text in "Group name" box and click "Save record" button.


Important: Saving the record changes the App immediately but does not save the change permanently, restarting the App now will load in its prior value. Be sure to save the changes back to disk for a permanent change.

Position Safety Group Defaults

Safety group number:


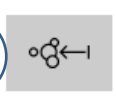

Group name:




Groups:

⁰ Front 1	¹ Front 2	² Front 3	³ Front 4
⁴ Front 5	⁵ Front 6	⁶ Front 7	⁷ Front 8
⁸ Front 9	⁹ Front 10	¹⁰ Front 11	¹¹ Shells/Rockets 1
¹² Shells/Rockets 2	¹³ Shells/Rockets 3	¹⁴ Waterfront	¹⁵ Shells/Rockets 5
¹⁶ Pontoon 1	¹⁷ Pontoon 2	¹⁸ Pontoon 3	¹⁹ Rooftop 1
²⁰ Rooftop 2	²¹ Rooftop 3	²² Close proximity	²³ Stage
²⁴ Water	²⁵ Overhead	²⁶ Lines	²⁷ Bridge
²⁸ Body worn	²⁹ Gantry	³⁰ Scaffold	³¹ Wall


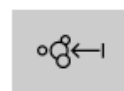

Once you are happy with your changes be sure to save everything to disk to make the change permanent:


  



Safety group number:

Backup / restore / share

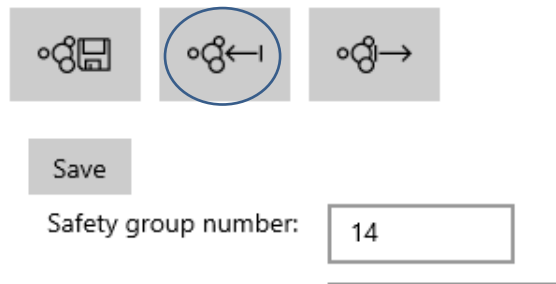


Safety group number:

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The above button allows you to save your safety group definitions to a .csgx file for backup or sharing purposes.

Similarly, the below button will import backed up groups – but be sure that you are not fundamentally changing the meaning of groups already assigned to materials.



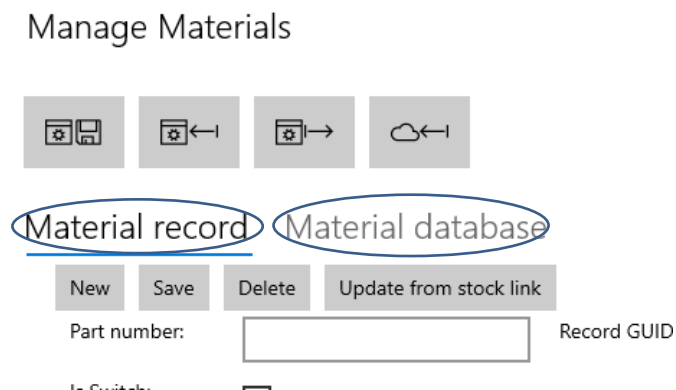
Important: Once you have restored groups from a backup file and have verified everything to be okay, be sure to save the safety groups back to disk.

Materials

When designing your script you work with positions and material, you are placing pyrotechnic material such as cakes at certain firing positions in your show.

The Materials section is your database of this pyrotechnic material.

The Materials section has two sub-sections you can click between.

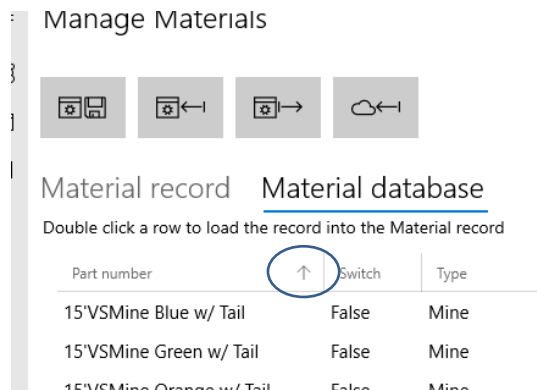


Material Database

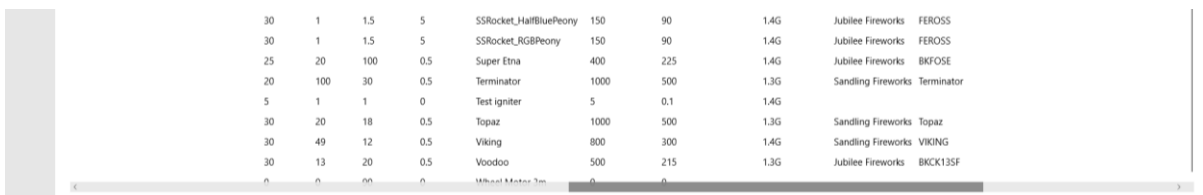
The Material database is a list of all your pyrotechnic material, it is shown in tabular form.



Every column in the table is sortable, just click the column header to change the sorting order.



Use the horizontal scroll bar at the bottom of the window to see all columns and the vertical scroll bar to scroll through all records.



Selecting a record for editing

To load a record into the “Material record” - so you can make changes - is easy: just double click the database row.

The record will be loaded into the editor and the screen will change to the “Material record” screen.

Material record

A material record contains many fields of information, not all have to be completed, so don't be daunted by them all.

CATFire

Edit firing scripts

Manage Materials

Material record Material database

New Save Delete Update from stock link

Part number: Record GUID: 2c06d563-599e-4923-9770-c114053d9c16

Is Switch:

Type: Classification:

Supplier: Supplier part number:

Manufacturer: Manufacturer part number:

Description:

Label description: Mortars needed: Muzzle velocity: m/s

Gross weight: grams Net explosive content: grams Projectile mass: grams

Calibre: millimetres Shots: Projectile diameter: mm


Duration: seconds Lift time: seconds Burst diameter: m

Unit price: Stock level:


Stock link URL:

Stock link ID: GUID PN SPN MPN Last Updated:

Stock location:

Main colours: 

Media:



Add file

Add url

Add YouTube ID

Remove media

Safety Group assignments:

<input type="checkbox"/> ⁶ Wheels ALL	<input type="checkbox"/> ¹ Setpieces ALL	<input type="checkbox"/> ² Maroons/Salutes ALL	<input type="checkbox"/> ³ Whistles ALL	<input type="checkbox"/> ⁴ Flares ALL
<input type="checkbox"/> ⁵ Strobes ALL	<input type="checkbox"/> ⁶ Petrol lifters ALL	<input type="checkbox"/> ⁷ Mines ALL	<input type="checkbox"/> ⁸ Gerbs ALL	<input checked="" type="checkbox"/> ⁹ Cakes ALL
<input type="checkbox"/> ¹⁰ Confetti ALL	<input type="checkbox"/> ¹¹ Rockets ALL	<input type="checkbox"/> ¹² Rockets BIG ALL	<input type="checkbox"/> ¹³ Candles ALL	<input type="checkbox"/> ¹⁴ Single shots ALL
<input type="checkbox"/> ¹⁵ Fan slices ALL	<input type="checkbox"/> ¹⁶ Shells ALL	<input type="checkbox"/> ¹⁷ Shells 50mm/2in	<input type="checkbox"/> ¹⁸ Shells 75mm/3in	<input type="checkbox"/> ¹⁹ Shells 100mm/4in
<input type="checkbox"/> ²⁰ Shells 125mm/5in	<input type="checkbox"/> ²¹ Shells 150mm/6in	<input type="checkbox"/> ²² Shells 200mm/8in	<input type="checkbox"/> ²³ Shells 300mm/12in	<input type="checkbox"/> ²⁴ Shells 400mm/16in

In the above record – split across two pictures here (use the vertical scroll bar to move through the fields of the record on your screen) – you can see the Night Tracer cake fields – many don't apply or are not used so just set 0's for these. You can also see we have recorded a YouTube™ video for this (you can associate many videos or pictures as necessary) and you can see this cake is assigned to the "Cakes ALL" safety group.

If you do enter an incorrect field a red X will indicate the problem when you attempt to save it.

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Supplier part number:	<input type="text" value="BKCK42NT"/>
Manufacturer part number:	<input type="text"/>
ard before splitting into colourful crossettes.	
Mortars needed:	<input type="text" value="-2"/> ✘
Net explosive content:	<input type="text" value="465"/> grams
Shots:	<input type="text" value="42"/>
Lift time:	<input type="text" value="0.5"/> seconds


Creating a new material record

Be sure to fill in the fields of the record, each field is described later – or load in an existing record that is similar to one you want to create then click New:


New

CATFire will generate a new Record GUID (see later)

Record GUID: *2c0dd563-5f9a-4923-9770-c11d053d9c16*

Clicking  stores this new record in the database but does not store it to disk.

This is enough to create a brand-new record.


Clicking  saves your database to disk. Be sure to always click this after making a batch of changes or you will lose them when you close the App.

Deleting a record

Load the record into the record editor (double click the record on the “Material database” list to load that record in).

Then click 

The record is removed from the database but remains in the record editor, but be sure to click

 to permanently save the database back to disk.

Now let’s look the fields and how and when to use them.

Part number

New Save Delete Update from stock link

Part number: Re

Is Switch:

This is a simple text field that identifies this material in your database, you specify this when adding material to your scripts.

It may seem odd but this field does not have to be unique – it’s possible to have more than one “Night Tracer” part numbers which may happen if different manufacturers use the same name.

This isn’t always practical, of course, so if this happens – which might when importing material from somewhere else, e.g. a retailer or supplier or friend, just change the Part number to suit yourself – it won’t affect the identity of the record which is the Record GUID.

Record GUID

Every item of material in CATFire is given a Record GUID. You cannot define it yourself, it is automatically generated when you press “New”.

Every item of material ever created in CATFire anywhere in the world will have a unique Record GUID – so even if two manufacturers create identical material they will have different Record GUID’s so will always be treated as different materials. This is why Part Number does not have to be unique and you can change the Part Number to suit yourself.

Delete Update from stock link

Record GUID: [2c0dd563-5f9a-4923-9770-c11d053d9c16](#)

As a technical note the App uses the Record GUID to track the material you have added to your scripts, not the Part Number.

Is Switch

Is Switch:

Keep unticked for all pyrotechnic material. This checkbox tells CATFire how to control the firing pulses for this material.

In CATFire a cue can be used for firing pyrotechnics but they can also be used as general on/off switches – perhaps to control motors, relays, valves etc.

When Is Switch is ticked this tells CATFire that this material is not pyrotechnic and instead it is a general switch operation.

Usually CATFire will operate the cue (on/off) according to the firing pulse time used for your show. The firing time is also adjusted automatically for lift and ignition times – so ensuring you see the effect when you intend to see it in your show.

However material flagged as “Is Switch” changes this behaviour.

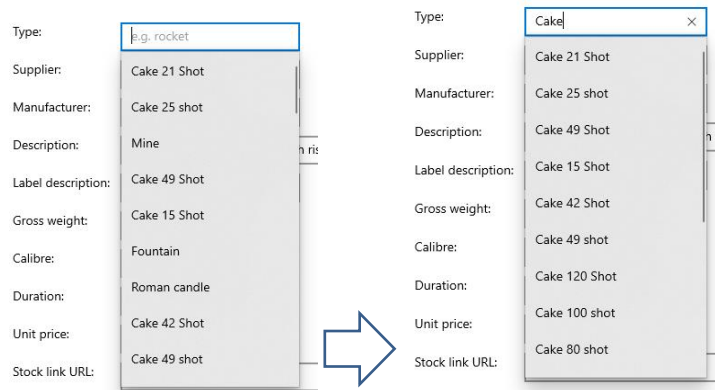
Here the cue will be turned on precisely where you place that material in your script time line. And it will be kept switched on for the Duration field of the material.

Example a motor is to be operated as a simple switch. The motor is designed to turn a wheel for 60 seconds. The Is Switch would be checked and the Duration set at 60 seconds.

Type

This is a simple description of this type of material e.g. 3” Shell. It can be useful when searching for a type of material on the script design page.

CATFire has a number of pre-sets here but you can enter whatever you like. CATFire will make suggestions for you as you type in the type so you can ensure consistency throughout your database.



Supplier / Supplier part number

Supplier: Supplier part number:

Fields to allow you to record where you obtain this material from.

Manufacturer / Manufacturer part number

Manufacturer: Manufacturer part number:

Fields to allow you to record who makes this material.

Description

Description:

This is a full description of this material.

Label description

Label description:

This is a short description of this material suitable for printing to a label, no more than about 20 characters.

Gross weight / Net explosive content / Classification

Gross weight: grams Net explosive content: grams
Classification:

For classification this is the risk class for this item, for example 1.3G or Category 4 etc.

CATFire has built in suggestions but you can specify how you prefer to classify the material. It is important to specify the classification and keep them consistently named as the classification is used on the weights report.

The weights are expressed in grams, Gross weight is the total weight of the material. And Net explosive content is the weight of the composition inside the firework. You must specify these values. Net explosive weight is always less than Gross weight.

When printing the weights report, these fields are used to build up a table of risk/explosive content which is useful if you are subject to transport regulations such as ADR.

Mortars needed

Mortars needed:

Mortars needed should indicate how many mortar tubes are needed for this material, if this a single shell this would be 1. If this is a string of 10 – perhaps on a delay string – this would be 10. It is expected they are all the same calibre.

This field is used for the mortar report, which tells you how many mortars of which calibre are needed - helpful when picking the kit you need for your show.

Calibre

Calibre: millimetres

Calibre is expressed in millimetres, e.g. 75 for 3", 100 for 4" etc.

Calibre is essential for shells and should denote the mortar calibre needed – the mortar report uses this to produce its table of needed mortars.

For other items of material such as cakes it would denote the typical tube calibre of the cake or candle which can be useful when identifying similar items which have a different impact.

Shots

Shots:

How many individual hits this material has, for example, a single shell might have 1 shot. A 100 shot cake obviously 100.

For shell strings this might denote the number of shells, e.g. 10 for a string of ten 3" shells.

It can be useful when differentiating between cakes of the same name, for example, there are many "thunder cakes" with different shot counts, 25, 40, 100 etc.

Muzzle velocity / Projectile mass / Projectile diameter / Burst diameter

These fields are specified as all 0 when not needed.

When specified they are used on the Site plan of your script to plot trajectories – which is very useful when double checking safety distances, especially for shells.

Muzzle velocity: m/s
Projectile mass: grams
Projectile diameter: mm
Burst diameter: m

Projectile mass is the mass of the shell – this may not be the same as the "gross weight" – which may be the weight of the product for shipping and handling purposes. This is the actual mass in grams of the shell as will be fired from the mortar and will be less the mass of the lift too.

Muzzle velocity in metres per second is the typical speed at which the shell is ejected from the mortar, this should be obtained from the manufacturer data sheet.

The projectile diameter for a shell is in millimetres is usually the same as the calibre.

Burst diameter in metres is the worst case spread of stars from the shell. This is obtained from the shell datasheet.

When the material denotes a string of shells this should be the worst case shell in that string.

Duration / Lift time

Duration: seconds

Lift time: seconds

Expressed in seconds, the duration is the time the pyrotechnic material performs its effect for, for a cake this is the time the cake runs for once ignited. For a shell this is how long the visual effect lasts



for. It does not include the time it takes for the material to begin its effect, e.g. time to lift into the air.

Lift time, also in seconds, is the amount of time once ignited before the effect begins. For a shell this is the typical time it takes for the shell to reach its peak height before bursting.

For a cake this might be very small indeed or a nominal value.

Some material have a delayed beginning, e.g. mine with fountain start. If you are not interested in the fountain start and wish your material to be fired according to its mine effect, the lift time might denote this fountain duration – CATFire will then ignite the material earlier so that you see the mine effect occur at your intended position on the script time line.

For “Is Switch” material the duration is how long you want the switch to remain on for.

Unit price / Stock level / Stock location

Unit price:	<input type="text" value="50"/>	Stock level:	<input type="text" value="0"/>
Stock location:	<input type="text"/>		

The unit price is the cost to you of this material – it is used on the pick list of your script to keep a track of how much your display is costing you in terms of material costs.

It is expressed as an arbitrary number of units of your choosing, e.g. 5.60 might be in GBP or USD for example.

The stock level denotes the number of these items you have in your possession, if any.

These two fields can be completed by you, but they can also be updated automatically using the “Stock link” feature, this is described later.

Stock location is a simple text field that you can use to describe where this material is located in your stores.

For example, you might have several sites and magazines on each site. Each magazine might be split into shelving and bins etc. You might have a structured field such as SITE_MAG_SHELF_BIN, e.g. GREENACRES_2_3_A would be your GREENACRES site, magazine 2, shelf 3, bin A. It’s up to you how you organise your storage and how you define the format of this field.

Stock link

Refer to the appendices for more information on Stock Link technical features.

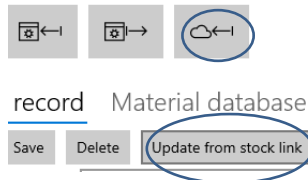
Stock link is a way to automate the stock pricing and stock level for your materials.

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Stock link URL:



Stock link ID: GUID PN SPN MPN Last Updated:

Use the buttons to set the Stock link ID from the Record GUID (GUID), Part Number (PN), Supplier Part Number (SPN) or the Manufacturer Part Number (MPN) for quickness.



The use of stock link depends on who you are and how you intend to use it.

Who	How Stock link can help
Hobbyist	Stock links would be provided in material imported from files obtained from retailers, you simply click the “Update from stock link” on a material record to pull in latest pricing and stock level from the Supplier of that material. Alternatively click the cloud import button at the top to update your entire database with latest stock data.
Semi-pro designer	Similar to hobbyist, use this to keep track of stock levels and pricing from your suppliers. You may also choose to keep a local database or simple file the link can refer to so you can update your material database from that instead – keeping up to date with what you have in your magazines.
Pro	Professional users typically use Stock link to refer to their own in house stock keeping database or even just a simple file located on your internal servers, ensuring your design staff have latest stock level and pricing info.
Manufacturer	As a manufacturer you would provide a stock link file or server available in the cloud. You might choose to supply a material database file your customers can import saving them the hassle of manual entry – with stock links pre-set - so all customers need do is regularly update stock data from the cloud. Alternatively, you can provide a stock link url to a simple file on your cloud web server that stock links can be set to, customers can pull in latest stock info from that. You can even give customers tailored Stock link URL for customer specific data.
Supplier	Like manufacturer
Retailer	Like Supplier, you would likely keep a smaller scale operation by using the App materials database to record the materials you supply (saving your customers manual entry). You would export your materials database and place the file on your web server for customers to download and import into their App. This export file can include your latest pricing and stock data. You would export an updated file periodically. Alternatively to avoid exporting the database periodically – which can be a large file - you would provide a stock link JSON file. You would update your database records with new stock level and pricing

	<p>data and then generate a stock link file by pressing:</p>  <p>Then upload this file to your web server. Your database records – which customers have imported - would already have a stock link URL to point to this JSON file. Customers can quickly update their stock availability and pricing by doing a cloud update with:</p> 
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The stock link url is a simple cloud based url, like:

https://www.myfireworkco.com/stock_link_file.json

The Stock link ID might be your own internal stock management identifier or you might use your Part Number or even the Record GUID – whatever you want to use to identify your internal records that match to this Material record.

This file – a simple text file – contains the information on pricing and stock levels you hold. Each record in the file is associated to the material record using the Stock Link ID.

When CATFire reads the stock link file it searches the file for the Stock Link ID, when found it updates the stock and pricing information.

You can even use a more complex stock link url such as:

<https://www.myfireworkco.com/stocklink.cgi?SupplierPart=CKHATBZ8686>

In this example your cloud server would invoke a cgi utility (here called stocklink.cgi) and pass it a parameter – perhaps specific to this material item or customer id if you have per-customer pricing. The utility would return a json file containing stock level and pricing pertinent to this material item.

You can use this form to query a live cloud based database perhaps updated in real time from your own in house stock system.

In all situations the result returned from the stock link url is a simple json file – a well formed text file. Please refer to the appendices for more technical details on this.

Stock link file

Refer to the appendix for more technical information on the stock link feature.

If you are a retailer (or perhaps manufacturer) and you are using CATFire App to record a database of material you supply to your customers, perhaps you export your database and provide that file to your customers for easy importing to save customers manual data entry, you can also export a stock link file too.

You can periodically update the unit price and stock level for your stocked items, generate the Stock link file and upload that to a public webserver.

Ensuring the Stock link ID's are set, and Stock link URL is pointing to your public Stock Link JSON file customers can pull in latest pricing and stock availability.

You can generate a stock link JSON file using this button:

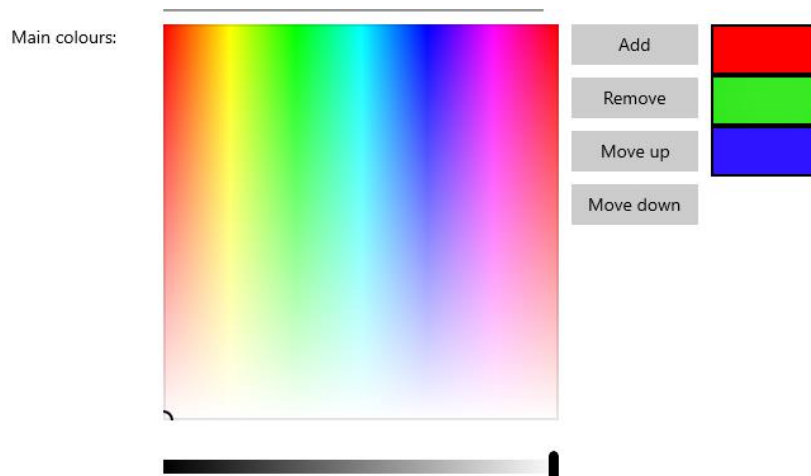


Simply click it, select a file to save.

The JSON file is generated from your database records for all that have a Stock link ID the pricing and stock level information is written.

You can then upload this file to your web site.

Main colours



A simple palette where you can select the predominant colours of this material. E.g. a red mine would have its main colours set to Red.

Defining colours this way is useful when searching for material for a particular colour theme in your display.

It is also very useful on the visualiser tool to ensure your sequence programme has the effects configured correctly.

Simply click on the palette to select the colour desired, adjust the slider if you want to change the colour intensity. Click Add button. The colour appears in the right hand list.

Tip: If you want to define black, select any colour and slide the intensity bar to the left.











Tip: If you want to define shades of grey, select white and adjust the intensity bar.

Of course, some material are multi-coloured so you can add more than one to define the colours that comprise the effect.

If the ordering of colours is important then click a colour you have added (right hand list) and click "Move up"/"Move down" as appropriate.

Material record [Material database](#)

Double click a row to load the record into the Material record

Part number	Switch	Type	Colour	Description
Niagra	False	Cake 49 Shot		30mm coloured shots displaying bea
ChaosMine	False	Mine		huge eruptions of deep red streak m
MayhemMine	False	Mine		huge flash of brocade glitter mines in
HavocMine	False	Mine		eruptions of coloured peony mines t
KingOfPalms	False	Cake 15 Shot		red blinking tails rising to massive tr
Super Etna	False	Fountain		forceful eruption of silver crackling
Royal Palm	False	Roman candle		bright blue pearls launch skyward fr
Blinking Tails to Silver Butterfly	False	Cake 42 Shot		silver blinking tails transforming to si
Viking	False	Cake 49 shot		quiet 49 x 30mm shot fanned shape
Prism	False	Cake 120 Shot		blue tail to blue star red fish; blue tai
Night Tracer	False	Cake 42 Shot		red, green and blue stars which rise s
Topaz	False	Cake 49 Shot		quiet 49 shot wiper cake with big 30r
Terminator	False	Cake 100 shot		100 shots of total mayhem! Rising wl
Coliseum	False	Cake 80 shot		massive brocade pine tails in a stunn
Voodoo	False	Cake 13 shot		Voodoo
SI-FU	False	Cake 13 shot		SI-FU
Encounter	False	Cake 13 shot		Encounter
Insomnia	False	Cake 13 shot		Insomnia
TestIgniter	False	Igniter		Test Igniter NOTE: Offset by firing pu
SSRocket_Brocade_Strobe_Stars	False	Rocket		brocade crown with bright white strc
SSRocket_Cauli	False	Rocket		golden crackling cauliflower
SSRocket_Hellfire	False	Rocket		red blue yellow red red red red red

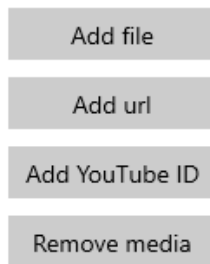
Media

Media:



Media section is where you can associate videos and images of your material – this can be very useful when hunting out the perfect effects in your design but also when showing customers what effects you can do for them.

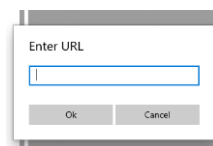
You can add as many media items as you like.



Buttons to the right hand side allow you to manage the media for this material item.

Add file – this would be the path to a file on your hard drive, when clicked a dialog appears to allow you to select the file.

Add url - Clicking this presents you with a dialog where you can link to a cloud based url, or perhaps an url on an in house server, e.g.
<http://www.bigshowfireworks.com/images/NightTracer.jpg>.



The url might also be an url to a movie file too, not just jpeg images etc.

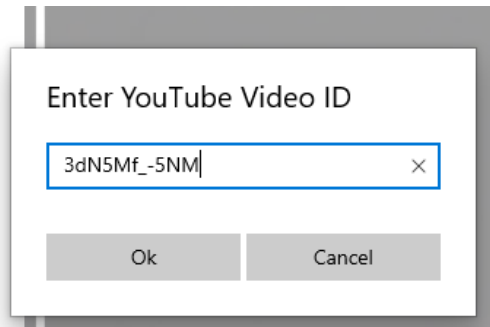
Add YouTube ID - YouTube™ movies have a unique identifier, rather than specifying the URL to the YouTube™ movie you specify its id instead.

When viewing a movie on youtube the browser url contains its id, example:

https://www.youtube.com/watch?v=3dN5Mf_-5NM

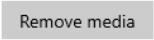
The id here is 3dN5Mf_-5NM

And it is this you enter in the box



To scroll through the media you have added to this record place your mouse pointer over the area and use the mouse wheel to scroll through the media.



Removing an item of media is as simple as scrolling to that image or movie on screen and clicking the  button. It will only remove the media item you are viewing on screen.

TIP: It is better to use URL's to link to cloud based images and movies. Storing images and movies on your hard drive will be quicker to access – and will work when the cloud is not available, useful when visiting customer sites perhaps – but when exporting your material to a file for others to import, including media with each record the resulting file will be very large because all non-cloud based media will be embedded into the file itself.

TIP: When keeping images and movies on your computers disk store all images in your "Pictures" windows folder (or subfolder of it). Movies should be in the "Videos" folder or a subfolder. You can store them elsewhere but for best access and backup use these two official folders for this purpose.

Safety Group assignments

It's important that material is assigned to the correct safety group or groups.

An material record can be assigned to any number of safety groups – during firing, disabling any one of the assigned groups will stop further firing for material that are in those groups.

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Safety Group assignments:

<input type="checkbox"/> ⁰ Wheels ALL	<input type="checkbox"/> ¹ Setpieces ALL	<input type="checkbox"/> ² Maroons/Salutes ALL	<input type="checkbox"/> ³ Whistles ALL	<input type="checkbox"/> ⁴ Flares ALL	<input type="checkbox"/>
<input type="checkbox"/> ⁵ Strobes ALL	<input type="checkbox"/> ⁶ Petrol lifters ALL	<input type="checkbox"/> ⁷ Mines ALL	<input type="checkbox"/> ⁸ Gerbs ALL	<input checked="" type="checkbox"/> ⁹ Cakes ALL	<input type="checkbox"/>
<input type="checkbox"/> ¹⁰ Confetti ALL	<input type="checkbox"/> ¹¹ Rockets ALL	<input type="checkbox"/> ¹² Rockets BIG ALL	<input type="checkbox"/> ¹³ Candles ALL	<input type="checkbox"/> ¹⁴ Single shots ALL	<input type="checkbox"/>
<input type="checkbox"/> ¹⁵ Fan slices ALL	<input type="checkbox"/> ¹⁶ Shells ALL	<input type="checkbox"/> ¹⁷ Shells 50mm/2in	<input type="checkbox"/> ¹⁸ Shells 75mm/3in	<input type="checkbox"/> ¹⁹ Shells 100mm/4in	<input type="checkbox"/>
<input type="checkbox"/> ²⁰ Shells 125mm/5in	<input type="checkbox"/> ²¹ Shells 150mm/6in	<input type="checkbox"/> ²² Shells 200mm/8in	<input type="checkbox"/> ²³ Shells 300mm/12in	<input type="checkbox"/> ²⁴ Shells 400mm/16in	<input type="checkbox"/>
<input type="checkbox"/> ²⁵ Shells BIG (200mm/8in+)	<input type="checkbox"/> ²⁶ Water cakes ALL	<input type="checkbox"/> ²⁷ Parachutes ALL	<input type="checkbox"/> ²⁸ Pigeon ALL	<input type="checkbox"/> ²⁹ Lancework ALL	<input type="checkbox"/>
<input type="checkbox"/> ³⁰ Fire rope ALL	<input type="checkbox"/> ³¹ Close Proximity ALL	<input type="checkbox"/>			

Be sure to have configured your material safety groups first before adding in database records, refer to the section earlier in this document on Material Safety Groups.

Select the safety groups for which this material item is applicable.

You can select as many as needed.

For example a cake may be added to “Cakes ALL” as in the example above.

A five inch shell may select both “Shells ALL” and “Shells 125mm/5in”.

An 8” shell might be in “Shells ALL”, “Shells 200mm/8in” and “Shells BIG (200mm/8in+)”

A 12” shell might be in “Shells ALL”, “Shells 300mm/12in” and “Shells BIG (200mm/8in+)”

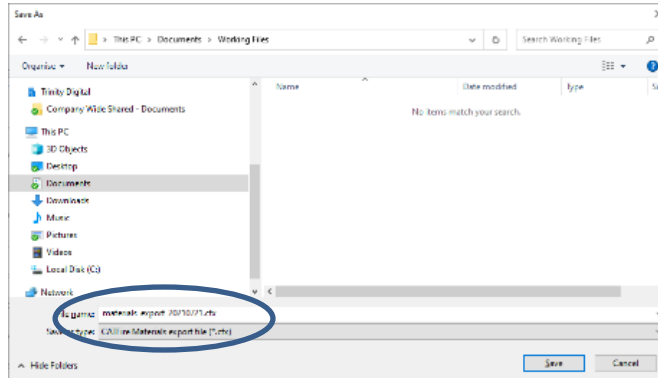
Think about how you might have to react to changing firing conditions and how you might want to have control over firing.

Exporting materials



You can export your materials database to a file for backup or sharing purposes – perhaps to a colleague, friend, or perhaps you are a retailer and giving the file to your customers as a convenience.

When you click this button you are asked where to save the file, a file name is suggested for you;



Clicking save then presents you with your export settings:

Material export settings

Copy part number to supplier part number Supplier name becomes:

Blank part number

Blank supplier detail Blank manufacturer detail

Blank unit price Blank stock level

Blank stock link detail Blank stock location

Set stock link URL:

Stock link ID untouched Part number as ID Supplier PN as ID Record ID as ID

Export all media Only cloud media No media is exported

OK Abort

If you are making a full backup or sharing this with a friend or colleague the defaults are usually fine.

If you are a supplier or retailer you might want to ensure the export changes some fields to suit your needs.

Changing the supplier

As a retailer, your material database may have the supplier set to whom you sourced the material from. This may not be appropriate for your customers to see.

You can click “Blank supplier detail” and the supplier name and part number will be erased.

Alternatively you can get your customers to see the supplier as being your business instead. Here you would “Copy part number to supplier part number” and then specify your own business name in “Supplier name becomes”. Customers would see your business as the supplier.

If the Part Number is your internal part number and not appropriate for customers to see you can just click “Blank part number” – you can still set the supplier name to match your business name and your customers would see you as the supplier but there would be no part number in this case, the customer would have to set this to something meaningful to them.

Changing the manufacturer

You may also not wish your customers to see who made the material, click “Blank manufacturer detail” for this purpose.

Unit price and stock level changes

As a retailer the unit price and stock level may be pertinent to your business, but this may not reflect what you want customers to see – they might get different pricing and stock level availability.

Clicking “Blank unit price” and “Blank stock level” hides these details, similarly for Stock link which might be to your supplier or to your own internal database, you can “Blank stock link detail” to hide this from your own customers.

If erasing the stock price and level information you can still set every record exported to a stock link url – this could be your customer facing stock link file with pricing and availability for your customers. Set the “Set stock link URL” field to match your customer facing stock link file or database url. Refer to the appendices for technical information on this format.

If you are providing a stock link url you also need to ensure every record has a stock link id. You may have already done this in your database, but equally it may be that your database is linking to your supplier and so using their id’s may be inappropriate for your customers to use.

Use the options to choose how to set the stock link id for each record if you need to:

Stock link ID untouched Part number as ID Supplier PN as ID Record ID as ID

Stock link ID untouched – the stock link id will be kept as per your own database records

Part number as ID – the part number in your own records becomes the stock link id

Supplier PN as ID – the supplier part number from your own records becomes the stock link id, this can be useful if your stock links are referring to your own in house database and you want the person receiving your exported file to refer to the supplier instead of your own id’s.

Record ID as ID – this will set the Stock Link ID to its Record GUID. This is guaranteed to be globally unique and might be the best way to ensure no conflicts between records occurs.

Media

Exporting all media may create a huge file if media is linking to files on your computer – CATFire will embed a copy of all the media into the export file.

If your media contains only URL’s and YouTube™ id’s these are compactly stored in the export file.

But when making a backup this is a good way to also back up your private media from your hard drive.

If you have a mix of files and cloud URLs and ID’s then click “Only cloud media” will remove any files but keep the media links that are in the cloud.

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You can also choose to remove all media from records too, this is not recommended when making backups.

Testing your export


You may want to see what your exported file looks like – to be sure your customers or friends are going to get the right information.

This can be done easily, as follows:


STEP 1: Create a FULL export of your database for backup purposes in case of disaster.

STEP 2: Prepare your intended export file.

STEP 3: Clear your database  but **DO NOT** save the empty database to disk with .

STEP 4: Import the file created in step 2 and examine its look and ensure things like stock link work but **DO NOT** save the database changes to disk with .

STEP 5: Close down the App and re-open it, your original database will be re-loaded from disk.

Tip: If you accidentally save your cleared or imported database to disk you will need to clear the database once more and import the backup created in step 1 then save to disk with .

Importing materials



Importing materials from a file – perhaps from a colleague, friend or from a retailers or suppliers web site into your database is straightforward.

Always make a full backup first.

Once the file is on your computer click the import materials button, select the materials file using the open file dialog box.

You are presented with an import options dialog.

Material merge settings

Accept only new records?

When the part number exists in your materials what do you want to update?

Accept part number changes

Accept projectile mass changes Accept muzzle velocity changes

Accept projectile diameter changes Accept burst diameter changes

Accept unit price changes Accept stock level changes

Accept stock link changes Accept stock location changes

Accept type changes Accept classification changes

Accept description changes Accept label description changes

Accept mortar count changes

Accept Gross weight changes Accept Net expl. weight changes

Accept calibre changes Accept shots changes

Accept lift time changes Accept duration changes

Accept safety group changes

Accept Manufacturer changes Accept Manufacturer part number changes

Accept Supplier changes Accept Supplier part number changes

Accept predominant colour changes

Replace all media Accept additions to media No changes to media

If you make changes to your records and want to be sure none of your existing records are updated just check “Accept only new records?” to import records that you don’t have - all others will be untouched.

If you do accept updates to records you already have then you need to pay closer attention to the import options – ensure that the fields you want updating are selected, ones that you change and don’t want to be affected by the import should be unchecked.

For example, if you customise the label descriptions and don’t want to accept what has been given to you in this import file, be sure to UNTICK “Accept label description changes”.

A few options are unticked by default, we explain why here:


Field	Unticked why
Accept only new records?	Generally you want to accept updates to records, they may contain new stock level and pricing, new media, and changes to their technical spec such as weights etc.
Accept part number changes	This is unchecked because the part number may be changed to suit your own stock needs, you may refer to material using names you are comfortable with and not the suppliers chosen ones. Also where a supplier uses the same part number as another you may tweak names to differentiate and you don’t want them resetting back.
Accept stock link changes	This is disabled since you may change the stock links to match an

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	internal database you set up
Accept stock location changes	This is generally business-private field so you don't want to have your records changed to match the suppliers.
Accept lift time changes	This is often tweaked to suit the timing needs of your designs, you may not want these resetting back to the suppliers data.
Accept safety group changes	Extremely unlikely you want to accept safety group assignments as these will generally not match your own defaults. However if you are importing from a colleague your company might have a common wide set of defaults so it's okay to accept these changes.
Accept supplier changes	You might change this field to a more preferred supplier but accepting updates from a non-preferred supplier so you don't want this to be changed
Accept supplier part number changes	For the same reason
Accept additions to media	This will never remove any media that is already set on this record, this enables you to accept new media while also allowing you to set your own media too without risk of them being lost in the update

You might also want to untick "description" and "label description" changes – as you may wish to tweak these to suit your own labelling and don't want them resetting during the import.

Always make a full backup of your materials database before importing another – that way you have an opportunity to revert back if you find unacceptable changes have been made.

Remember after the import, and you are happy, save the database with , if you don't after an App restart you will lose your changes.

Script design

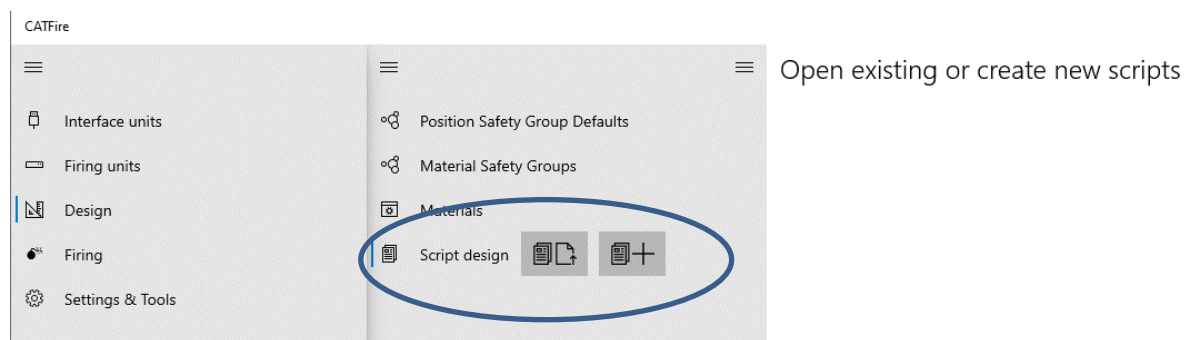
This section allows you to design shows that are automatically fired by CATFire including pyromusicals.

Semi-auto scripts are also supported, meaning that automatic firing will pause and require manual resume. Semi-auto is a great way to wait for some unpredictable moment in the show, requiring manual resume, then automate a complex firing sequence with/without audio.

An example of semi-auto would be for the firing sequence to pause waiting for live actors, dressed as witches, to throw ingredients into a cauldron and say the magic incantation.

This is completely at the whim of how the theatre is progressing and the actors possibly ad-libbing, but upon hearing the incantation the firing operator will resume the show to do complex firing sequences around the stage before pausing again and wait for the next point in the show.

Many designers use semi-auto to pause during show transitions to allow for smoke to clear.



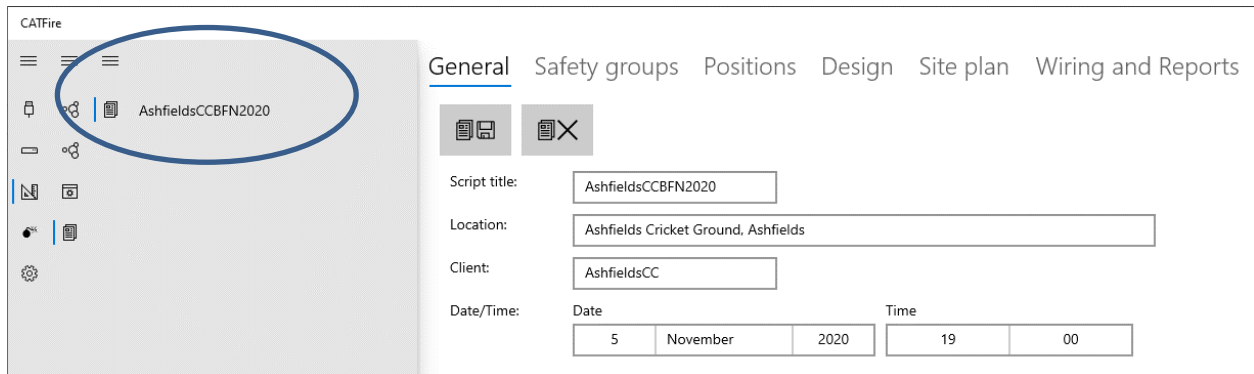
Loading in an existing script



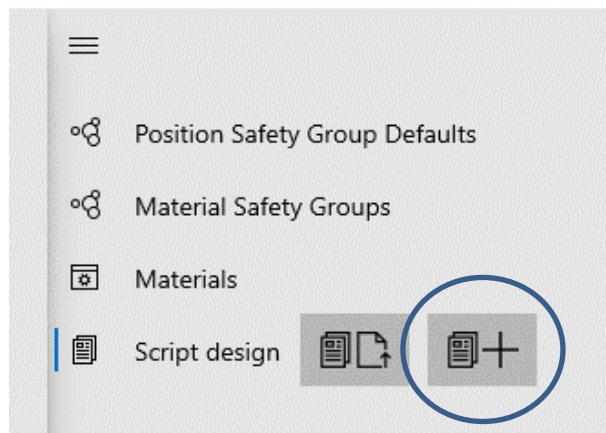
Upon clicking this button you will be presented with an open dialog box to select a CATFire .cfs script file.

Opened scripts are shown on the left hand list.

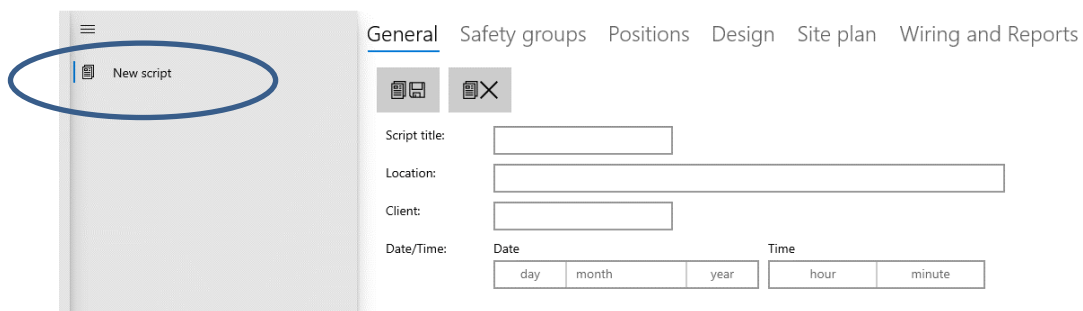
Note that if the script contains audio it will take a while to process the file before you can access it.



Creating a new script



Click the new script button, a new script is shown.



Click the "New script" tab to access it.

General Safety groups Positions Design Site plan Wiring and Reports



Script title:

Location:

Client:

Date/Time:

Date			Time	
day	month	year	hour	minute

Script sections

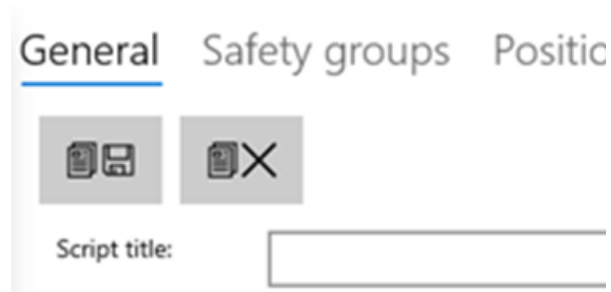
A script has a number of sections each one allowing you to configure and design your show, described next.

General

Simple parameters for your show such as the Name which must be chosen.

Client, if you are a professional designer, Location of your show and the date/time of the show.

Saving and closing



Regularly save changes you have made to your script with the save button.



When you are finished with your script session, close it with the X:



Safety groups

Please refer to the earlier section on Safety Groups as it is important to understand how these work.

General Safety groups Positions Design Site plan Wiring and Reports

Safety group number:

Group name:

Save

Groups:

⁰ Front 1	¹ Front 2	² Front 3	³ Front 4
⁴ Front 5	⁵ Front 6	⁶ Front 7	⁷ Front 8
⁸ Front 9	⁹ Front 10	¹⁰ Front 11	¹¹ Shells/Rockets 1
¹² Shells/Rockets 2	¹³ Shells/Rockets 3	¹⁴ Waterfront	¹⁵ Shells/Rockets 5
¹⁶ Pontoon 1	¹⁷ Pontoon 2	¹⁸ Pontoon 3	¹⁹ Rooftop 1
²⁰ Rooftop 2	²¹ Rooftop 3	²² Close proximity	²³ Stage
²⁴ Water	²⁵ Overhead	²⁶ Lines	²⁷ Bridge
²⁸ Body worn	²⁹ Gantry	³⁰ Scaffold	³¹ Wall

Safety groups for a script are based on your Position Safety Group Defaults, unless you change these for your script they will always match the latest defaults – even for scripts you created some time ago and re-visit.

Think about the positions you are firing from and how they could be grouped for safer control in the event of a problem during firing.

For example you might have several Pontoons and want a safety group for each but you might also have a “On-Water” group to which all pontoon positions are also added – this way you can disable all pontoons with a single click.

To change one simply click the safety group, which loads it into the editor and change. Then click save.

General Safety groups Positions Design Site plan Wiring and Reports

Safety group number:

Group name:

Groups:

⁰ Front 1	¹ Front 2	² Front 3	³ Front 4
⁴ Front 5	⁵ Front 6	⁶ Front 7	⁷ Front 8
⁸ Front 9	⁹ Front 10	¹⁰ Front 11	¹¹ Shells/Rockets 1
¹² Shells/Rockets 2	¹³ Shells/Rockets 3	¹⁴ Waterfront	¹⁵ Shells/Rockets 5
¹⁶ Pontoon 1	¹⁷ Pontoon 2	¹⁸ Pontoon 3	¹⁹ Roof top 1
²⁰ Roof top 2	²¹ Roof top 3	²² Close proximity	²³ Stage
²⁴ Water	²⁵ Overhead	²⁶ Lines	²⁷ Bridge
²⁸ Body worn	<input type="text" value="29 Gantry"/>	³⁰ Scaffold	³¹ Wall

In our example we will have three shells positions, four pontoons and a couple of land based front positions. In total we have nine positions and we decide to assign safety groups as follows:

Position	Will be assigned to these safety groups...
Shells left	Shells left
Shells centre	Shells centre
Shells right	Shells right
Pontoon 1	Pontoon 1 On-Water
Pontoon 2	Pontoon 2 On-Water
Pontoon 3	Pontoon 3 On-Water
Pontoon 4	Pontoon 4 On-Water
Front Left	Front Left Frontage
Front Right	Front Right Frontage

We know that we can disable firing for any position but we can also disable with one click all water based or all front based positions too.

Notice we did not create an “All shell positions” safety group – this is because we already have a safety group for material called “Shells ALL” so we know if we disable that no shell will fire – providing of course our material database has assigned every shell to this group too.

However, if we were to fire other types of material from these shell positions, maybe rockets, then we might decide to do so.

This is what our script position safety groups looks like:

Reverting a safety group back to default

If you want to change a safety group back to whatever the default is for that group, simply select that group from the list, blank out its Group name and click Save. It will revert back to whatever the default is for that group.

Positions

A pyrotechnic show has one or more positions – these are on-site locations the material is fired from.

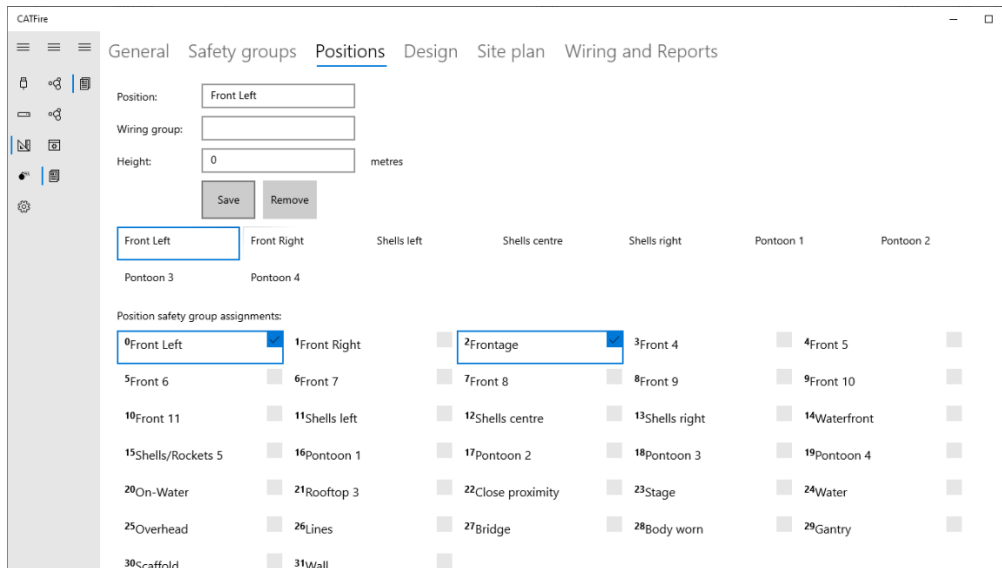
In our example we may be firing from Pontoon 1, 2, 3 and 4.

But we may also be firing from the land “Front Left”, “Front Right” and maybe some shell positions at the far side of the lake “Shells Left”, “Shells Right”, “Shells Centre”.



In our example here we have nine positions to set up.

While setting up these positions we make sure we assigned them to the correct safety groups.



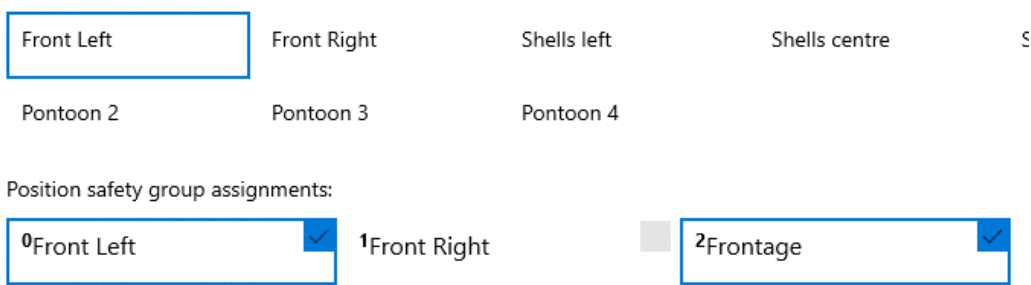
To add a new position:

1. ensure no position is selected in the list of positions
2. create a new name and specify a height in metres from ground level (not sea level!)
3. Click the safety groups to be assigned to this position
4. click Add/Change.

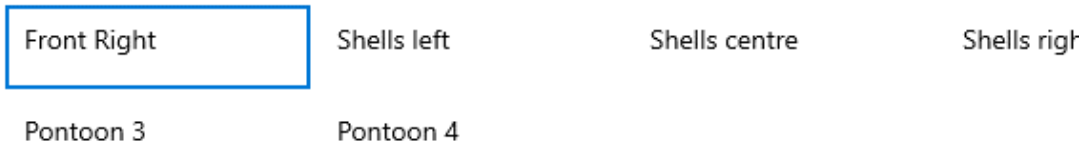
If you want to change an existing position:

1. Click the position in the list, the details are loaded into the editor fields
2. Edit the fields or safety group assignments as needed
3. Click Add/Change

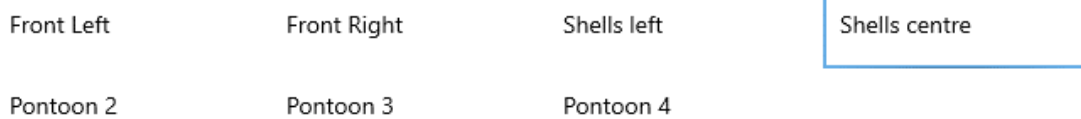
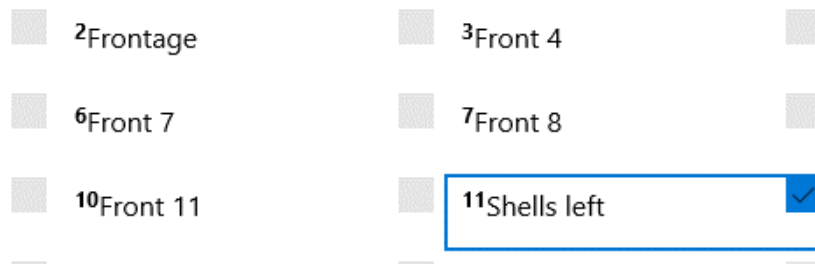
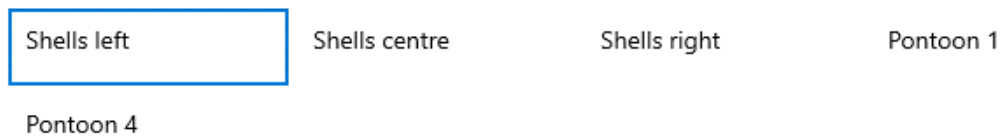
In our example, we configure our positions like the following (notice the safety groups each position is assigned to):



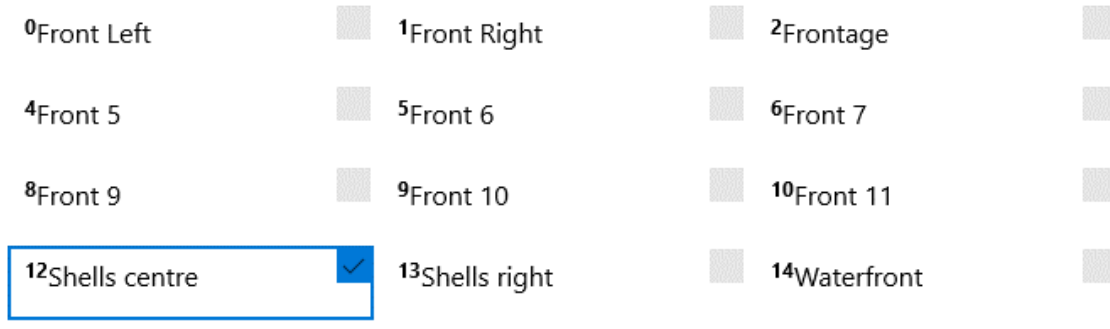
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Assignments:



Position safety group assignments:



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Right	Shells left	Shells centre	<input type="text" value="Shells right"/>
on 3	Pontoon 4		
<input type="checkbox"/> 1Front Right	<input type="checkbox"/> 2Frontage	<input type="checkbox"/> 3Front 4	
<input type="checkbox"/> 5Front 6	<input type="checkbox"/> 6Front 7	<input type="checkbox"/> 7Front 8	
<input type="checkbox"/> 9Front 10	<input type="checkbox"/> 10Front 11	<input type="checkbox"/> 11Shells left	
<input type="text" value="13Shells right"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> 14Waterfront	<input type="checkbox"/> 15Shells/Rockets 5	

<input type="text" value="Pontoon 1"/>	Pontoon 2
Position safety group assignments:	
<input type="checkbox"/> 0Front Left	<input type="checkbox"/> 1Front
<input type="checkbox"/> 4Front 5	<input type="checkbox"/> 5Front
<input type="checkbox"/> 8Front 9	<input type="checkbox"/> 9Front
<input type="checkbox"/> 12Shells centre	<input type="checkbox"/> 13Shel
<input type="text" value="16Pontoon 1"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> 17Pont
<input type="text" value="20On-Water"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> 21Roo
<input type="checkbox"/> 24Water	<input type="checkbox"/> 25Ove

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Pontoon 1

Pontoon 2

Pontoon 3

Position safety group assignments:

0Front Left



1Front Right



4Front 5



5Front 6



8Front 9



9Front 10



12Shells centre



13Shells right



16Pontoon 1



17Pontoon 2



20On-Water



21Rooftop 3



Pontoon 1

Pontoon 2

Pontoon 3

Pontoon 4

Position safety group assignments:

0Front Left



1Front Right



2Frontage



3F

4Front 5



5Front 6



6Front 7



7F

8Front 9



9Front 10



10Front 11



11

12Shells centre



13Shells right



14Waterfront



15

16Pontoon 1



17Pontoon 2



18Pontoon 3



19

20On-Water



21Rooftop 3



22Close proximity



23

Pontoon 1	Pontoon 2	Pontoon 3	Pontoon 4
0Front Left	1Front Right	2Frontage	3Front 4
4Front 5	5Front 6	6Front 7	7Front 8
8Front 9	9Front 10	10Front 11	11Shells left
12Shells centre	13Shells right	14Waterfront	15Shells/Rockets 5
16Pontoon 1	17Pontoon 2	18Pontoon 3	19Pontoon 4
20On-Water	21Rooftop 3	22Close proximity	23Stage

Wiring group

Refer to *Wiring and Reports* section on “Wiring up” for more information.

The wiring group field of a position allows you to treat several positions the same for wiring purposes.

A wiring group name cannot be the same as a position name, and vice versa.

Several positions may have the same wiring group name.

General Safety groups Positions Design Site plan Wiring and

Position:

Wiring group:

Height: metres

Front Left	Front Right	Shells left	Shells centre	Shel
Pontoon 1	Pontoon 2	Pontoon 3	Pontoon 4	

Position safety group assignments:

0Front Left	1Front Right	2Frontage	3Fr
4Front 5	5Front 6	6Front 7	7Fr

Design

The design section of the script is where you place your material on a virtual timeline.

Your timeline can also contain audio and pause points (semi-auto scripting). These are described later in this section.

During firing of your show, as the time progresses, the pyrotechnics are fired in accordance with this time line.



CATFire Design is a *sequence editor* rather than the usual *cue editor*.

In CATFire Design you don't add cues (together with the time, firework, firing address and cue number etc. - which is typical of other systems) instead you add *sequences* – a program from which cues are automatically generated and managed.

You can still see the cues that are generated from these if you want to, and you can even visualise the effect of the sequence too, to make sure you are getting when you intend.

In CATFire Design you don't worry about assigning cues to Firing Addresses and Cue numbers like other systems – that is all done automatically for you in “Wiring and Reports” – see later – allowing you to get on with being creative.

A sequence may be as simple as one item of material, perhaps a shell, at one position. You give the sequence a time and angle and that's it.

Sequences however can be very powerful – generating complex patterns with multiple items of material, multiple positions, angles and timing.

Quite effortlessly you can create fans of single shots spreading across your display, with different timing and angle patterns if you wish.

You can even create patterns at a position, across positions, again with variations too.

Simply move a sequence on the timeline and CATFire will adjust all timings for every cue that sequence manages without worrying about editing rows in a table of cues by hand.

A sequence can be placed manually or by simple clicking on the timeline where you want to add it. Alternatively you can play your timeline and just click or paste at the right moment to the beat of the music that is playing.

Want to change the material involved for a sequence e.g. change a Bengal for a blinker? Just change it – the sequence will re-generate all the cues automatically for you.

Design screen overview

General Safety groups Positions **Design** Site plan Wiring and Reports

Sequence identifier:

Sequence hint:

Sequence positions program:
Function: Loop Z W-in W-out Pause-Point

Sequence materials:
Prism

Sequence positions:
Front Left Front Right

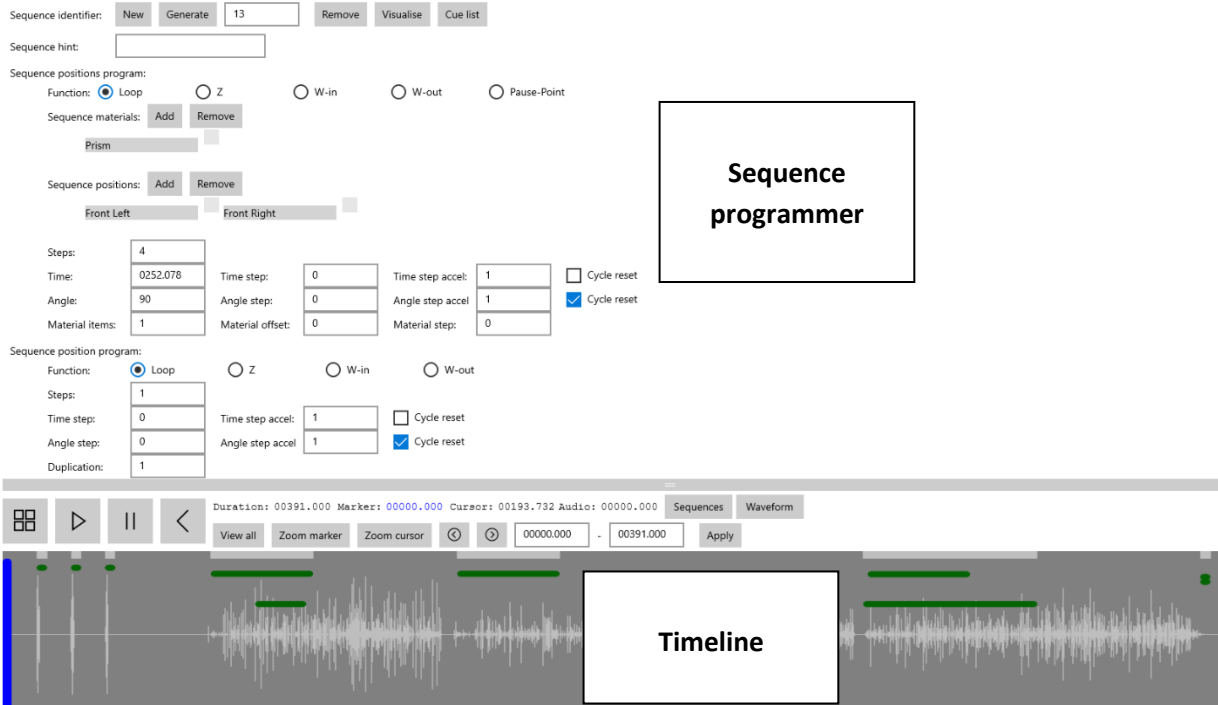
Steps:
Time: Time step: Time step accel: Cycle reset
Angle: Angle step: Angle step accel: Cycle reset
Material items: Material offset: Material step:

Sequence position program:
Function: Loop Z W-in W-out
Steps:
Time step: Time step accel: Cycle reset
Angle step: Angle step accel: Cycle reset
Duplication:

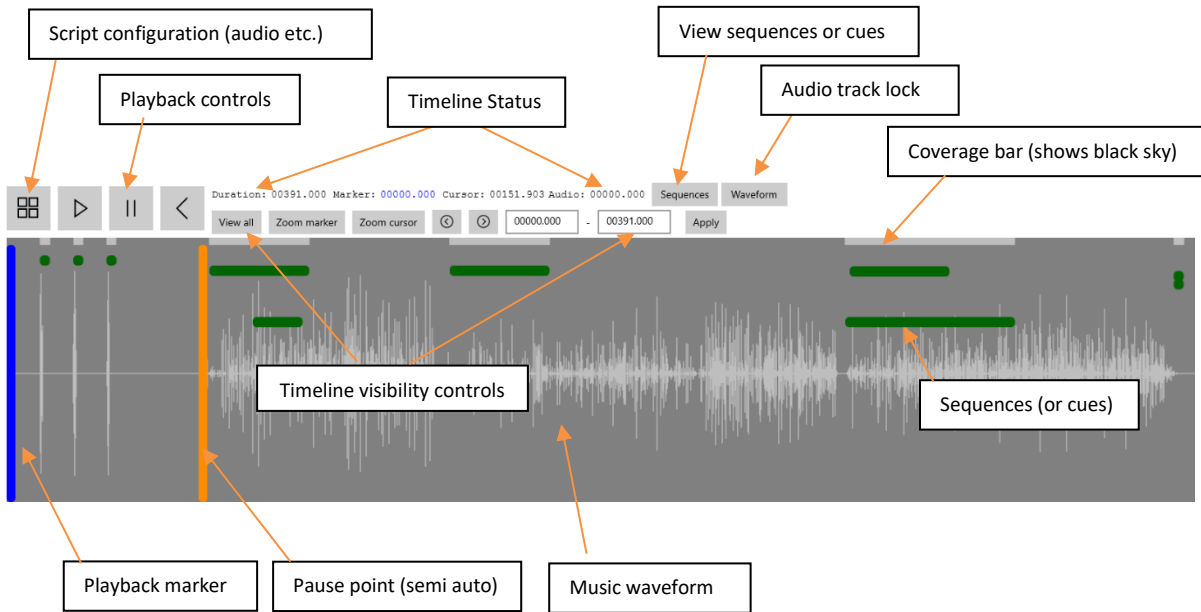
Duration: 00391.000 Marker: 00000.000 Cursor: 00193.732 Audio: 00000.000

Sequence programmer


Timeline



Timeline



Script configuration

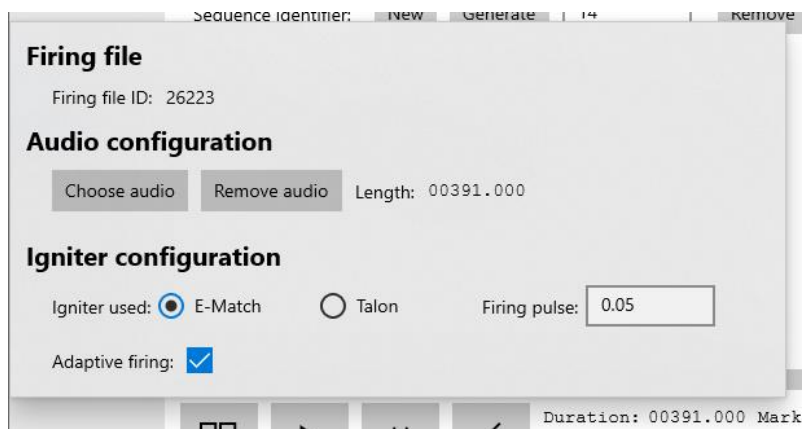
On the timeline click  the script configuration dialog is shown.

Click anywhere or press ESC button to cancel the dialog.

Use the script configuration dialog to choose or remove audio from your script.

Also use this page to configure the firing pulse needed, this depends on the type of igniters you intend to use in your show.

The firing file ID is shown, this is automatically selected by CATFire and cannot be changed, if you will be firing your show with timecode this ID is embedded into the timecode. See the section on timecode for more information.



Timeline visibility controls

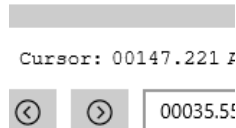




Click “View all” to scale the timeline to show your entire show, the timeline will be shown from 0 to the duration of your show.

Click “Zoom marker” to zoom into the timeline around the marker position, the visible amount of time before and after the marker will get smaller and smaller on each press of the button thereby viewing the span with increasing detail.

Click “Zoom cursor” to zoom into the timeline around the last cursor position, the visible amount of time before and after the cursor position will get smaller and smaller on each press of the button thereby viewing the span with more detail.

NOTE: The Cursor status will reflect the time your mouse pointer was last over.



Click or hold down   to pan the timeline left or right, this does not change the visible amount of time.

Use the manual span box to enter a time span you wish to view:



Enter in the time span and press “Apply”.

All of these controls function during playback of audio.

During playback of audio the marker advances along the timeline and “Cursor” tracks that position instead of your mouse pointer.

Mouse

You can also use the mouse to zoom in/out the visible span on the timeline.

Simply position your mouse pointer to where you wish to zoom in/out and use the mouse scroll wheel to zoom.

Status

Duration: 00391.000 Marker: 00000.000 Cursor: 00151.903 Audio: 00000.000

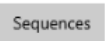
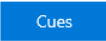
Duration indicates the length of time of your script, in seconds.

Marker shows the marker placement, during playback of audio this does not change, so stopping playback will return the marker to this time.



Cursor tracks the mouse position over the timeline, during audio playback this advances and the marker tracks it.

Audio shows the position where audio begins in your timeline, it does not have to start at 0.

Sequence / cue display

Press the  button to toggle between showing sequence on your timeline or the  that are generated by those sequences.

Locking the audio waveform

Press the  button to unlock () the audio waveform – this allows you to position the waveform on your timeline, adjusting its vertical position and its playback starting position.


The status line will show the new audio start position.



Playback controls



Playback controls permit the playing of your timeline, if there is audio on your timeline then it will play too.

During playback the programmed sequence can be added to the timeline by simple click of the mouse on the timeline itself or by pasting (CTRL-V) the last copied (CTRL-C) sequence(s). New sequences will be added at the marker.

Begin playback with . During playback pressing this again will restart playback from the original marker position, this allows you to quickly replay once again – useful to concentrate on a part of your music.

Pause playback with  the marker remains where it is, resume with .

Stop playback with  the marker returns to its original position.

Sequence programmer

The sequence programmer may look daunting but once explained is straightforward to understand.

However, if you want fast and simple cue input then read later in this section on “Simple and Quick Cue Entry”

A sequence has four parts to it:

1. The material you want the sequence to work with, e.g. “5” Blue Peony shell”.
2. The positions you want the sequence to work with, e.g. “Shells centre”.
3. The **positions** program: how the positions in the sequence are to be handled.
4. The **position** program: special handling **per** position.

Example 1

Let’s begin with a simple example: adding a “5” Blue Peony” shell to “Shells centre” position. It will fire vertically, and we want to see the shell effect at 60 seconds into the show.

Step 1: Every sequence needs a unique number, create a new sequence number with a press of:

Sequence identifier:

Step 2: Add the shell to the materials of your sequence.

Sequence materials:

Click Add

A dialog is shown, filter on what you want (here we want to look for shells).

Select the 5” Blue Peony shell and click Add.

Part number	Type	Colour	Description	Calibre	Shots	Duration	Lift time	Label description	Gross weight	Net
5" Blue Peony	Shell 125mm/5in	Blue	5" Blue Peony	125	1	3	2.5	5" Blue Peony	744	500
8" Blue Peony	Shell 200mm/8in	Blue	8" Blue Peony	200	1	3	2.5	8" Blue Peony	2649	240

Dismiss the dialog with press of ESC or click elsewhere on the screen.

The material is added to our sequence:

Sequence materials:

5" Blue Peony

Step 3: Next add the Shells centre position into the sequence.

Sequence positions:

Click Add:

A dialog of your positions are shown, select Shells centre and click add.

Dismiss the dialog.

Add positions to the sequence

Add

Position

Front Left

Front Right

Shells left

Shells centre

Shells right

Pontoon 1

The position is shown added into your sequence:

Sequence positions: Add Remove

Shells centre

Step 4: Select the time and angle:

Steps: 1

Time: 60 ×

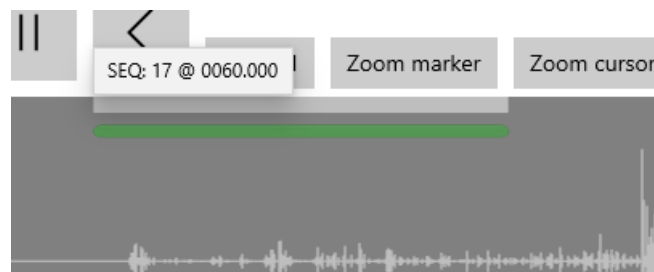
Angle: 90

Material items: 1

Step 5: Click “Generate” to add the sequence and create the cues.

Sequence identifier: New Generate 1

The sequence is added into the timeline:



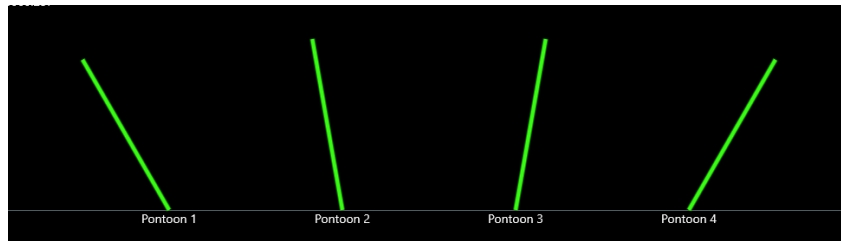
Example 2

For our next example we will create a fan of green mines across each of our four pontoons.

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Each pontoon will get a green mine, the green mine at Pontoon 1 will be angled at 60 degrees, Pontoon 2 at 80 degrees, Pontoon 3 at 100 degrees and Pontoon 4 at 120 degrees.

We want it to look like this across our pontoons:



Step 1: Click New to get a new sequence ID.

Step 2: Remove the 5" Blue Peony shell and Add the green mine.

Step 3: Remove the Shells centre from the position list and Add in Pontoon 1 through 4.

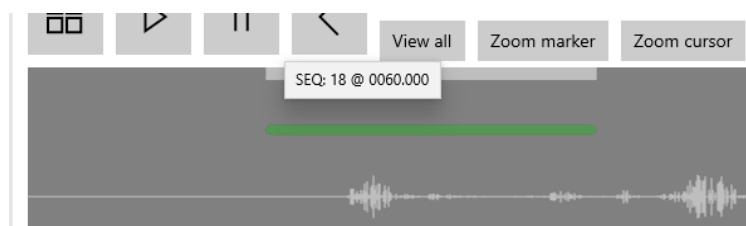
Step 4: The *positions program* will need to run 4 steps (for the 4 pontoons added into it), the time to fire will be 60 seconds. The first angle will be 60 and each step will advance by 20 (60, 80, 100, 120).

Steps:	<input type="text" value="4"/>	Time step:	<input type="text" value="0"/>	Time step accel:	<input type="text" value="1"/>
Time:	<input type="text" value="60"/>	Angle step:	<input type="text" value="20"/>	Angle step accel:	<input type="text" value="1"/>
Angle:	<input type="text" value="60"/>	Material offset:	<input type="text" value="0"/>	Material step:	<input type="text" value="0"/>
Material items:	<input type="text" value="1"/>				

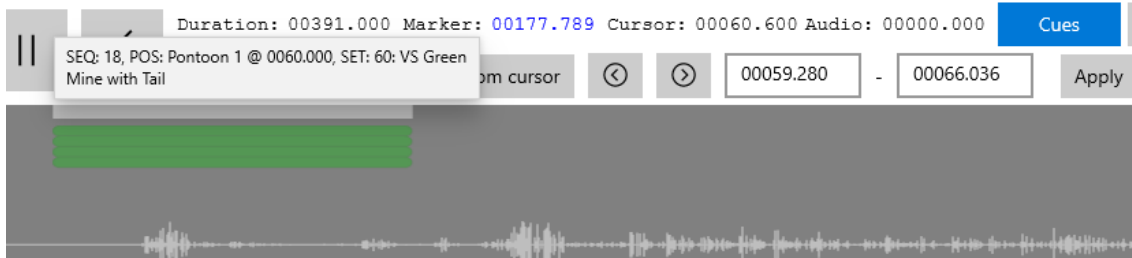
Step 5: Click Visualise to see the effect of the sequence. A dialog showing a simple line animation of the program is displayed.

Step 6: Click generate to create the sequence and the cues.

The sequence is added to the timeline:



To observe the cues this sequence manages change to cue view:



Floating your mouse over a cue will highlight all cues in the same sequence, further information is displayed on the cue as a tool-tip pop up.

Here is what this program looks like:

Sequence identifier:

Sequence hint:

Sequence positions program:

Function: Loop Z W-in W-out Pause-Point

Sequence materials:

Sequence positions:

Steps:

Time: Time step: Time step accel: Cycle reset

Angle: Angle step: Angle step accel: Cycle reset

Material items: Material offset: Material step:

Sequence position program:

Function: Loop Z W-in W-out

Steps:

Time step: Time step accel: Cycle reset

Angle step: Angle step accel: Cycle reset

Duplication:

Programming

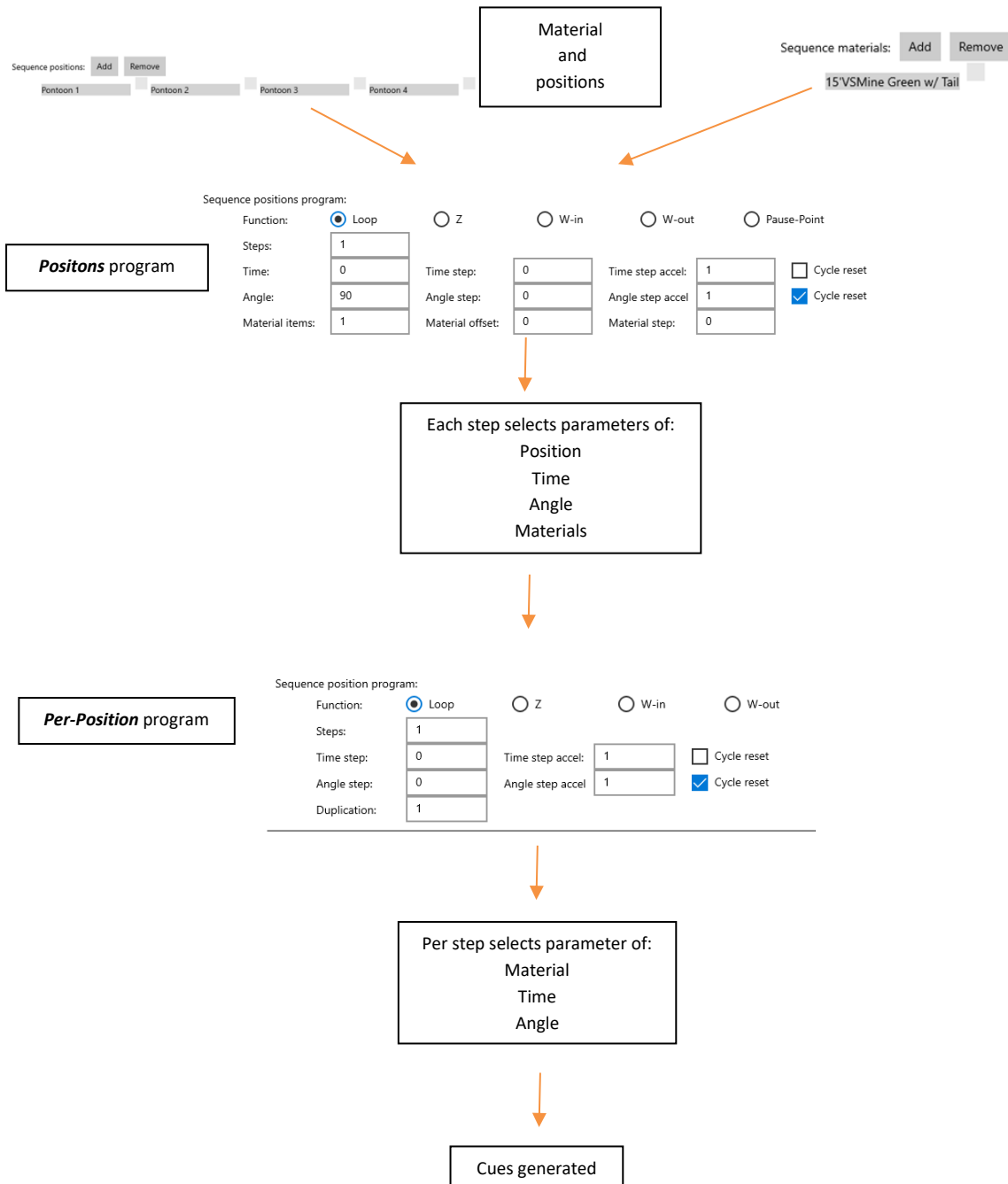
Let's expand a bit more on Example 2 above.

A sequence generates its cues using a program consisting of two parts – the **positions** programme and the **per-position** program.

The **positions** program executes for a number of steps, each step processes the next **position** you have added into it (Pontoon 1 through 4 in our example here).

Each step selects the next position, updates the time and angle variables, selects material and then passes these parameters to the next part of the program – the **per position** program.

This is visualised here:



Every sequence must have a unique number, in our example let's start by clicking New:

Sequence identifier:

This doesn't create a sequence, rather assigns the next new number available – if we were to specify an existing sequence number we would be changing that one instead.

Next we add a hint if we want to – a helpful label that lets us know what this sequence does.

Sequence hint:

Now we define our **positions** function:

Sequence positions program:

Function: Loop Z W-in W-out Pause-Point

Steps:

Time: Time step: Time step accel: Cycle reset

Angle: Angle step: Angle step accel: Cycle reset

Material items: Material offset: Material step:

We chose the Loop program – each position we added to this sequence will be looped through from the first to the last, this is explained further in this manual under the “Sequence patterns” section in the appendix.

Put simply, here we are going to have 4 steps – so we step through each of the four positions in our sequence, in the order we defined them earlier.

The sequence will start at 60 seconds into our timeline. Each “Time step” is set to 0 so each step will see no time change, in other words: Every step will be at 60 seconds.

The sequence will start at 60 degrees and we set the “Angle step” to 20 degrees – so each step will add 20 degrees from this, i.e. 60, 80, 100, 120.

On each step we will pass one item of material (“Material items”) – we only added one material to this sequence anyway so every step will select the Green Mine we selected earlier.

The four steps will execute the **per position** program as follows:

Step 1 Time 60 Angle 60 Material: Green mine	Step 2 Time 60 Angle 80 Material: Green mine	Step 3 Time 60 Angle 100 Material: Green mine	Step 4 Time 60 Angle 120 Material: Green mine
---	---	--	--

Now we know what each position will get, we define the per-position program which in this example is very simple indeed.

Per-Position program

Sequence position program:

Function: Loop Z W-in W-out

Steps:

Time step: Time step accel: Cycle reset

Angle step: Angle step accel: Cycle reset

Duplication:

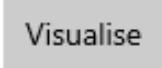
In this example the **per-position** program will take what it is given, step once and emit a single cue.

As it doesn’t do anything more than one step it won’t have any variations on what it has been given.

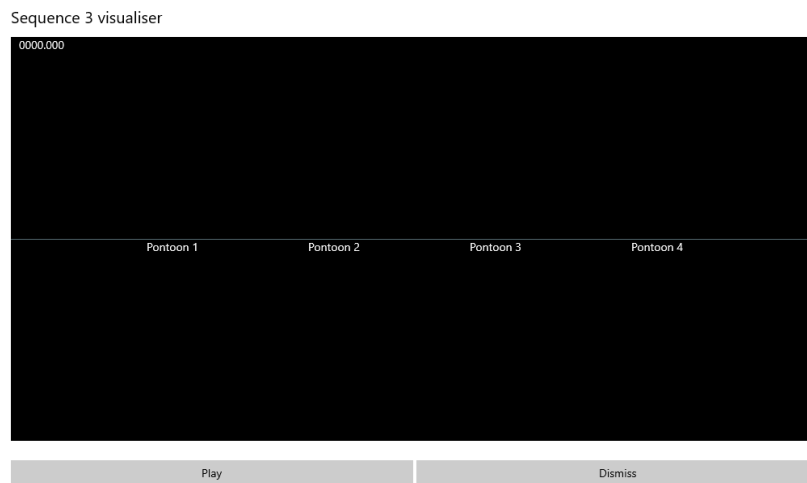
Visualising

A handy feature is the sequence visualiser.

This is a simple tool to see graphically what the sequence will generate for us – so we know we got the program right.

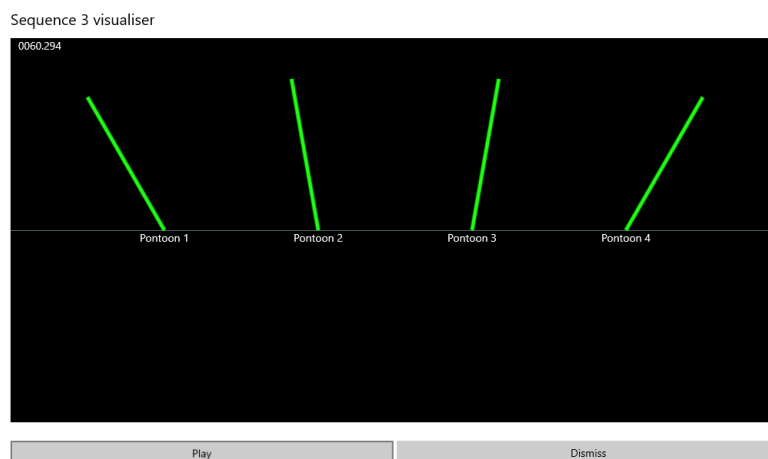
Click 

A dialog box appears:



Each of the positions are shown, click play to show the effect of the sequence. Close the box with Dismiss.

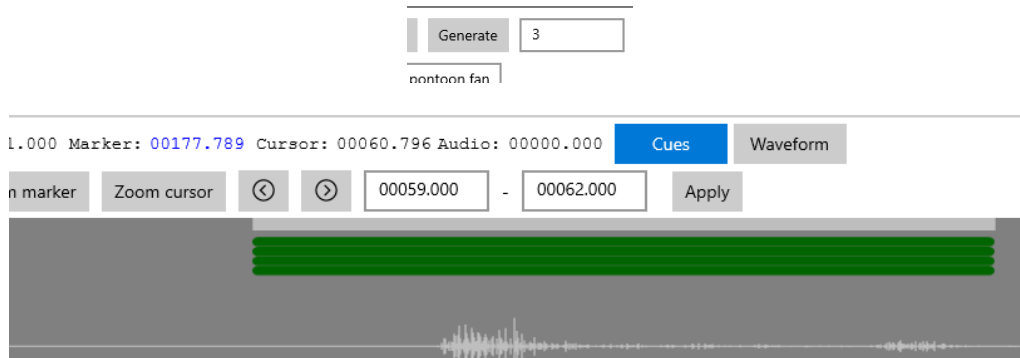
The visualiser will demonstrate the pattern generated for each position.



You can see that we have a green mine on each of the four pontoons and our angle with its 20 degree variance is spread evenly across the pontoons. The predominant colour green selected for the mine is useful here.

Generating

Once you have tested your sequence is correct, dismiss the visualiser and click Apply – Click this button whenever you make changes to your sequence program settings.



The cues are placed at 60 seconds.

All mines will fire at 60, each mine lasts for 1 seconds duration, so the cues are shown as 1 second long.

The coverage shows the time the sky is not 'black'.

Helpful tips:

1. Hovering your mouse over a sequence highlights it and shows its detail
2. Clicking a sequence selects its and loads its program into the sequence editor fields – so you can make adjustments.
3. Once a sequence is selected (after clicking on it) you can drag it anywhere on the timeline – the sequence time is automatically updated and the cues are automatically regenerated.

Generated Cues List

All cues generated from sequences can be displayed in a list.

Sequence identifier:

Total generated cues: 26

Select a cue to load its sequence program into the editor

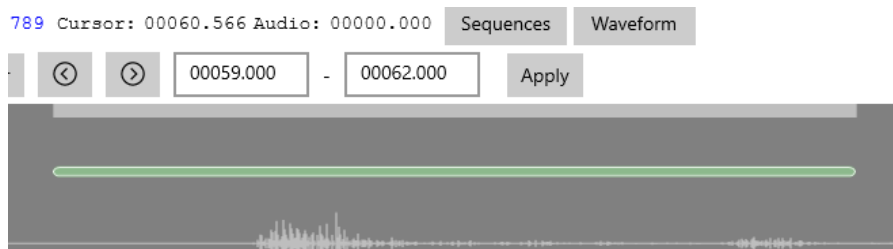
Cue time	Sequence	Hint	Position	Duration	Angle	Part number	Description
10.015	1	Test	Shells centre	3	90	5" Blue Peony	5" Blue Peony
20.045	2	Test	Shells centre	3	90	5" Blue Peony	5" Blue Peony
30.015	3	Test	Shells centre	3	90	5" Blue Peony	5" Blue Peony
60	18		Pontoon 3	1	100	15'VSMine Green w/ Tail	VS Green Mine with Tail
60	18		Pontoon 2	1	80	15'VSMine Green w/ Tail	VS Green Mine with Tail
60	18		Pontoon 4	1	120	15'VSMine Green w/ Tail	VS Green Mine with Tail
60	18		Pontoon 1	1	60	15'VSMine Green w/ Tail	VS Green Mine with Tail
63.925	17		Shells centre	3	90	5" Blue Peony	5" Blue Peony
73.969	11		Pontoon 4	15	90	Coliseum	massive brocade pine tails in
73.969	11		Pontoon 3	15	90	Coliseum	massive brocade pine tails in
73.969	11		Pontoon 2	15	90	Coliseum	massive brocade pine tails in
73.969	11		Pontoon 1	15	90	Coliseum	massive brocade pine tails in
133.189	8		Front Right	30	90	Blue Nebula	25 shot Fountain multi effect
133.189	8		Front Left	30	90	Blue Nebula	25 shot Fountain multi effect
138.511	7		Front Right	30	90	Blue Nebula	25 shot Fountain multi effect
138.511	7		Front Left	30	90	Blue Nebula	25 shot Fountain multi effect
252.078	13		Front Right	51	90	Prism	blue tail to blue star red fish; l
252.078	13		Front Left	51	90	Prism	blue tail to blue star red fish; l

Tip: You can click on any column header to sort them

Tip: If you click on a cue it will load the sequence that generated it into the sequence program editor – you can then modify the sequence or even generate copies of it.

Selecting / Cut-Copy-Paste

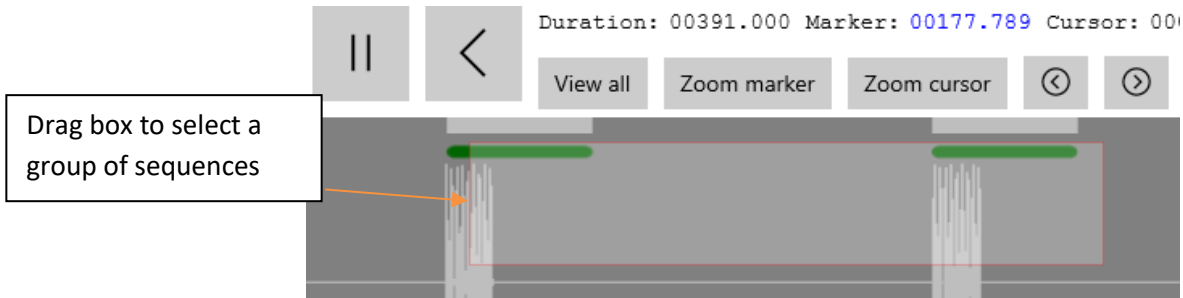
A sequence (or its cues) can be selected by clicking it in the timeline.



You can drag a selection box over a number of items on the timeline to select them all.

Tip: Hold down the SHIFT button to add more selections to an existing set of selections. Holding shift and clicking an item already selected will unselect it.

Tip: Pressing ESC on the keyboard will clear all selections.



You can cut items from the timeline with CTRL-X.

You can copy items from the timeline with CTRL-C.




You can paste cut/copied items to duplicate them, see next, with CTRL-V.

Copy and paste also works between scripts – so you can copy a sequence(s) from one script into another quite easily to reuse a design, safety groups and automatically assigned where possible and positions are also copied over.

Duplicating / placing a sequence

You may want the same sequence (or sequences) to be replicated many times in your show, perhaps a common pattern of firing copied to the beat of the music.

There are a few ways to do this.

1. Editor
 - a. Load the sequence you want into the editor by clicking on an existing sequence
 - b. Edit the **positions** program, adjust the “Time” manually by editing the box.
 - c. Press New to create a new sequence number for it
 - d. Press Generate
 - e. NOTE: If you manually enter a sequence number for an existing sequence you will re-program that with the program in the editor.
2. Copy/paste
 - a. Click to select one or more sequences
 - i. You can also drag a selection box in the timeline to select multiple sequences
 - b. Press CTRL-C to copy
 - c. Move your mouse cursor to the time you want the sequences to start at
 - d. Press CTRL-V to paste
3. Click to place
 - a. Once a sequence program is loaded into the editor just click on any blank area of the timeline and a new sequence will be placed at the time of the mouse cursor position
4. Playback placement
 - a. Ensure the sequence you want is loaded into the editor (or in the copy buffer)
 - b. Click the play button   



- c. The timeline begins playback from the playback marker (audio will also play)
- d. Click on the timeline (anywhere), the sequence in the editor is placed at the playback marker position
- e. Press CTRL-V, the sequence(s) in the copy buffer are placed at the current playback marker position

Simple and Quick Cue Entry

Designing a show using sequence programming requires your script to have the positions established and the material database to have the items you need.

But when all you need is quick entry of cues without the hassle of entering new records in the material database – or even adding positions beforehand – use the **Cue** sequence positions option:

General Safety groups Positions Design Site plan Wiring and Reports

Sequence identifier:

Sequence hint:

Sequence positions program:

Function: Loop Z W-in W-out Pause-Point Cue

Position:

Part number: Record GUID:

Using this program you can directly enter cues with the minimum of information about positions and the pyrotechnic material existing in your material database.

- The app will automatically add new positions into your script as you enter them.
- The app will automatically add new material records into your database as you enter them too.

The absolute minimum information needed for a new cue is shown below:

- Position name
 - If the position doesn't exist, it will be created.
- Part number
 - If the part number doesn't exist in your material database a new record will be added.
 - If more than one record exists with a matching part number, you will be prompted to choose one.
- The duration of the effect must be specified.

Sequence identifier:

Sequence hint:

Sequence positions program:

Function: Loop Z W-in W-out Pause-Point Cue

Position:

Part number: Record GUID:

Cue Time: seconds Angle: degrees

Description:

Duration: seconds Lift time: seconds

Type: Classification:

Entering just these three pieces of information and then clicking to place it on the timeline (at the time you want it to fire) is enough to create a new sequence with a single cue ignition, as follows:

Sequence identifier:

Sequence hint:

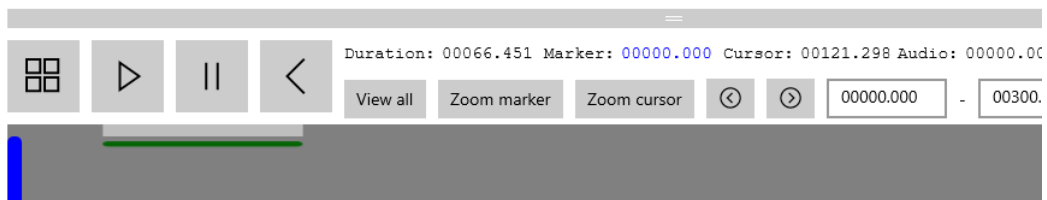
Sequence positions program:

Function: Loop Z W-in W-out Pause-Point Cue

Position:

Part number: Record GUID: 2c862f9e-8bd7-43e2-98cb-43e1687061e4

Cue Time: seconds Angle: degrees



Notice that the screen has changed somewhat.

Now a material database record has been created some of the fields are no longer available – where the part number exists in the material database the information for that part now comes from that and must be edited in the material database if you need to make changes.

The app has created you a simple sequence shown on the timeline that contains the material and the position.

You can interact with it just the same as any other sequence.

You can even ‘promote’ the Cue sequence to a regular sequence by clicking on it and choosing one of the other sequence types (Loop, Z, W-in etc..) and reapplying the changes.

When new records have been added to the material database the database must be saved before you can save your script, you will be prompted to do so. Ensure your material database has no undesired changes or you will save them too as part of saving your script.

IMPORTANT:

When adding new positions be sure to visit the Positions section of your design to ensure correct safety groups have been set for those positions, the app will not assign safety groups for you.

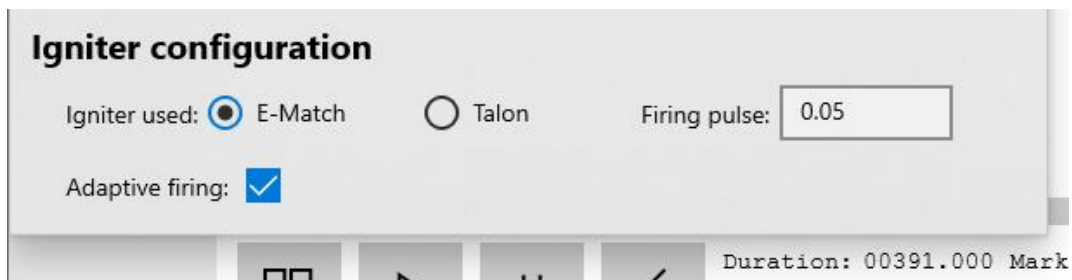
When adding a new part number you can specify the safety groups for that, as desired, if you chose not to it will not be possible to disable firing of those pyrotechnic items using safety groups.

Hint: As you type in a position - or a part number - a list of existing ones is shown, select from the list to choose an existing one.

Hint: Once the app has created new material records for you, you can then go to the material database and add more or change information to the records as desired.

Igniter

The script is expected to use a single style of igniter throughout, you can choose between the defaults of E-Match or Talon® or you can enter your own firing pulse time:



In the above example the default E-Match is selected with its firing pulse of 0.05 seconds (50 milliseconds).

You should ensure you select the firing pulse carefully – use the defaults is recommended but if you do change them be sure to consult the datasheet of the igniter used.

Adaptive firing can also be selected to be enabled for the script. Refer to the firing unit manual (CFTFU-X16) for more information on this feature.

Lift and fire time

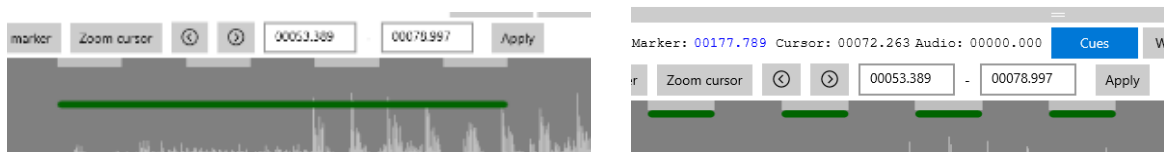
When you place a sequence on the timeline its starting time is the first effect in that sequence to be seen.

The length of the sequence shows the duration of the entire sequence.

It is important to note that this length is not necessarily continuous firing of the sequence.

The sequence may generate many cues, spread in time – if the sequence spreads out firing then there may be gaps between firing.

In this example we modify the pontoon fan to have a 2 second delay between each pontoon:



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Cue time	Sequence	Hint	Position	Duration	Angle	Part number	Description
60	18		Pontoon 1	1	60	15'VSMine Green w/ Tail	VS Green Mine with Tail
62	18		Pontoon 2	1	80	15'VSMine Green w/ Tail	VS Green Mine with Tail
64	18		Pontoon 3	1	100	15'VSMine Green w/ Tail	VS Green Mine with Tail
66	18		Pontoon 4	1	120	15'VSMine Green w/ Tail	VS Green Mine with Tail

Here the sequence is 7 seconds long, starting at 60. But it's not a continuously firing sequence – you can see the black sky in between each ponton firing.

When a cue is fired it is rarely fired at the time you have specified for the sequence.

It is fired earlier than when you want the visual effect.

This is more clear with Shells – you want the effect to occur at 300 seconds, but the shell might take 3 seconds from ignition to *lift* into the sky and burst.

CATFire will fire the cue <Lift time> + <Ignition time> *before* the time you placed it on the timeline. So in this case the cue will fire at 296.95 seconds in.

This gives the shell time to ignite and launch to height before bursting into the effect you want to see.

It's something you don't normally have to think about in CATFire but you do need to consider "Lead in" and "Pause points" discussed next.

NOTE: For material that is flagged as "Is switch" there is no lead in – the cue is activated at the sequence time.

Lead in

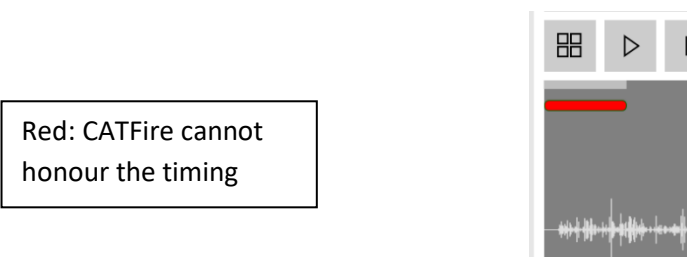
Consider a shell that has a 2.5 second lift time and 2 second Talon® ignition time.

Your music starts with a rousing boom and you want the shell to appear at the same time.

The music starts at time 0.

So you place your sequence at time 0 also.

You get this on your timeline:



The sequence is normally shown in green but now it is shown in red.

CATFire Design is telling you that timing cannot be honoured.

You want to see the shell burst immediately the script starts but CATFire would need to fire it before the show even starts – impossible because CATFire doesn't know when you are going to start the show.

“Lead in” is quiet time after the script starts but before the show starts.

1. It gives the system time to fire cues so you see the effect when you want it to occur
2. A good lead also allows you to check that the system is working properly.
 - a. Many professionals will fire test igniters before the show begins – spectators do not see these – spotters look out for these and report back to show control if they do not fire. A good lead in will allow time for the firing team to pause the display if something has gone wrong.
3. When using timecode a good lead in allows the system to train to the incoming signal and ensure that the signal is of good quality.

How much lead in you give is up to you, “as much as possible” is usually the right answer.

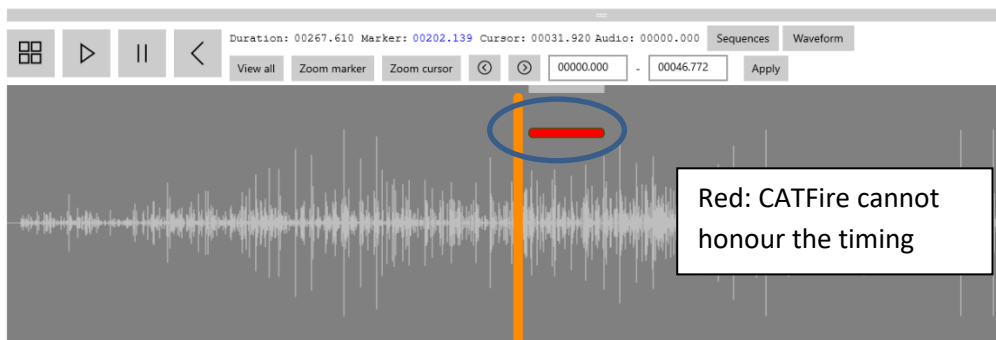
Pause points (Semi auto)

CATFire Design supports pause points to allow for the creation of semi-auto scripting.

This is where the script will operate autonomously before pausing and waiting for the operator to manually resume firing, a classic example is waiting for actors to be in position / take some action on stage before firing a pre-defined sequence of pyrotechnics.

You can have as many pause points as you like.

You add a pause point by adding a simple sequence with no positions or material and specify the “Pause point” sequence function:



Add as many pause points this way as you like.

Notice here that the shell sequence following the pause point is shown in red.

CATFire is telling you that timings cannot be honoured, but why?

Well here the shell is to be seen bursting at 20 seconds:



This would mean that the ignition would have to be at 17.45 (2.5 lift and 0.05 ignition in this example).

The pause point is here:



This would mean that the pause point (placed at 19 seconds) would *straddle* the time between ignition and burst.

CATFire is warning you that the shell will be ignited before the pause and the effect seen after the pause – something the pause point could not honour the timings of. If this is what you want, fine, but if you are expecting the shell to not fire until you resume you will be disappointed – because ignition will occur before the script pauses!

Pause points and audio

When CATFire is firing to the “Computer clock” – see section on firing – the audio is played by the computer and you connect your computer to a PA system in this case.

Pause points will also pause the audio, and resume the audio as the script is resumed.

This is not so with timecode.

Pause points and timecode

With timecode, the script is fired to the timecode clock.

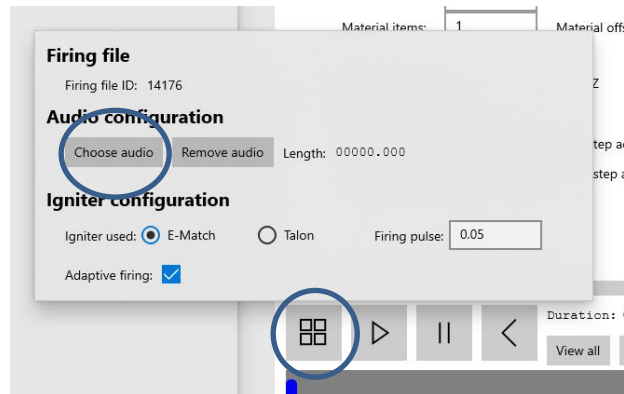
The script can pause and resume as timecode is stopped/started but adding in pause points will also pause firing – however in this case the timecode time may continue to tick onwards – care needs to be taken with pause points and timecode firing because the firing clock and the timecode time may become out of step, refer to the “Firing” section for more information on how CATFire handles this.

Adding audio

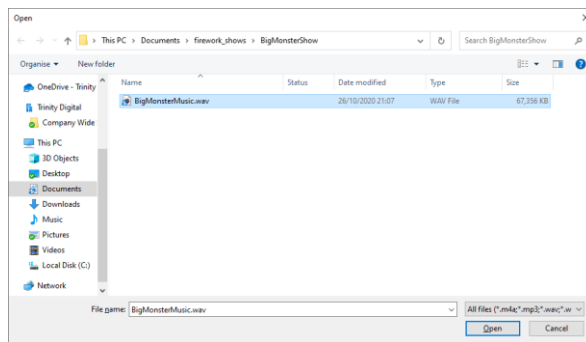
Adding audio into your script is straightforward, you can add/remove whenever you want.

Click the script configure button.

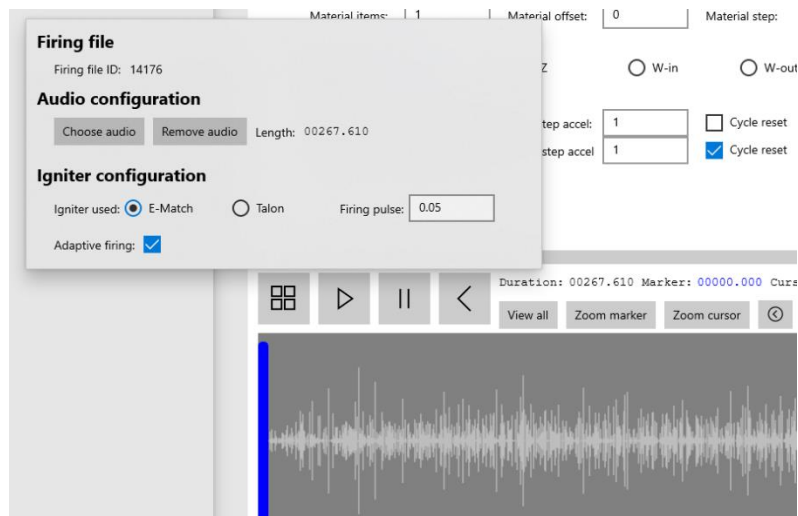
Click Choose audio from the dialog that appears:



Select the audio file using the dialog box that appears and click open:



CATFire loads in the music and generates the waveform on the timeline:



Tip: You may need to change the visible timeline time span to see all of the waveform or just click “View all” button.

Moving the audio

The audio does not have to start at 0 seconds, indeed, it is good practice to always start your show with a silent ‘lead in’ – this permits sequences to be placed that would otherwise not be possible due to lift times being before the show even starts, see earlier.

To move the audio in your timeline first unlock the waveform (so you can select and move it):

Waveform

Click the waveform to select it and then drag it to the new time: it’s as simple as that.

Observe the Audio “cue in” time to see what time the audio will begin playing.



Disabling timeline audio selection

Since the audio waveform takes up a large amount of timeline and is selectable it can sometimes get in the way when selecting sequences.

Waveform

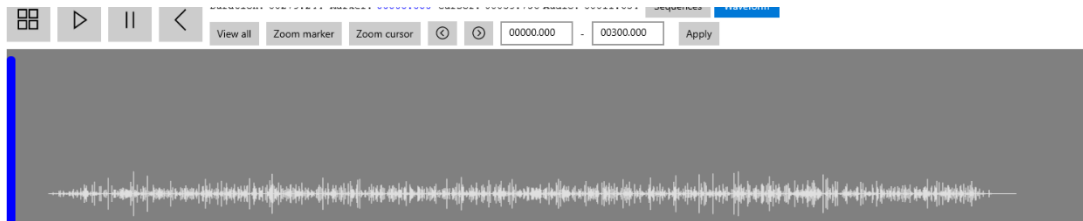
Click **Waveform** to lock it – this prevents the audio from being selected and moved accidentally, it also prevents it getting in the way of selecting sequences.

Waveform visibility

The waveform by default takes up the height of the timeline, sequences are placed over this.

With a heavy design this can obscure the waveform.

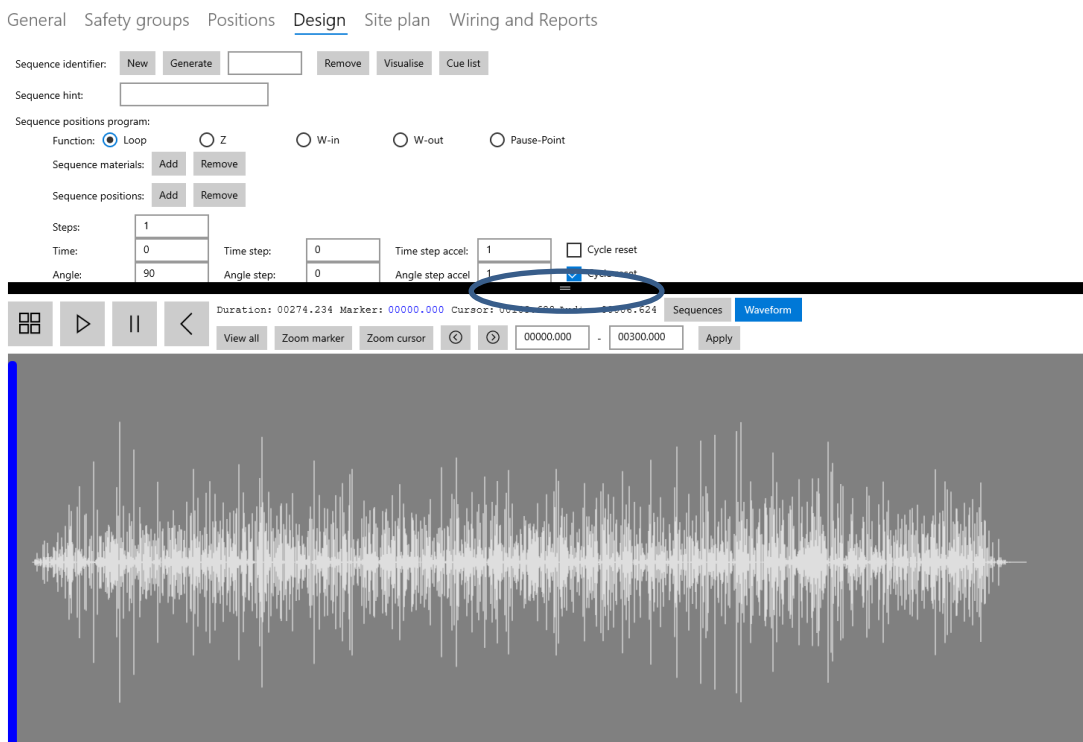
You can drag the waveform to the top/bottom edges of the timeline to make the waveform smaller but out of the way of sequence placement. Here we have dragged the waveform to the bottom of the timeline area.



Timeline area size

The timeline is shown at the bottom of the screen, due to scaling the sequences may appear small and when working with the mouse to move them may be tricky.

You can make the timeline area larger – vertically – by dragging the sizing bar:



Site plan

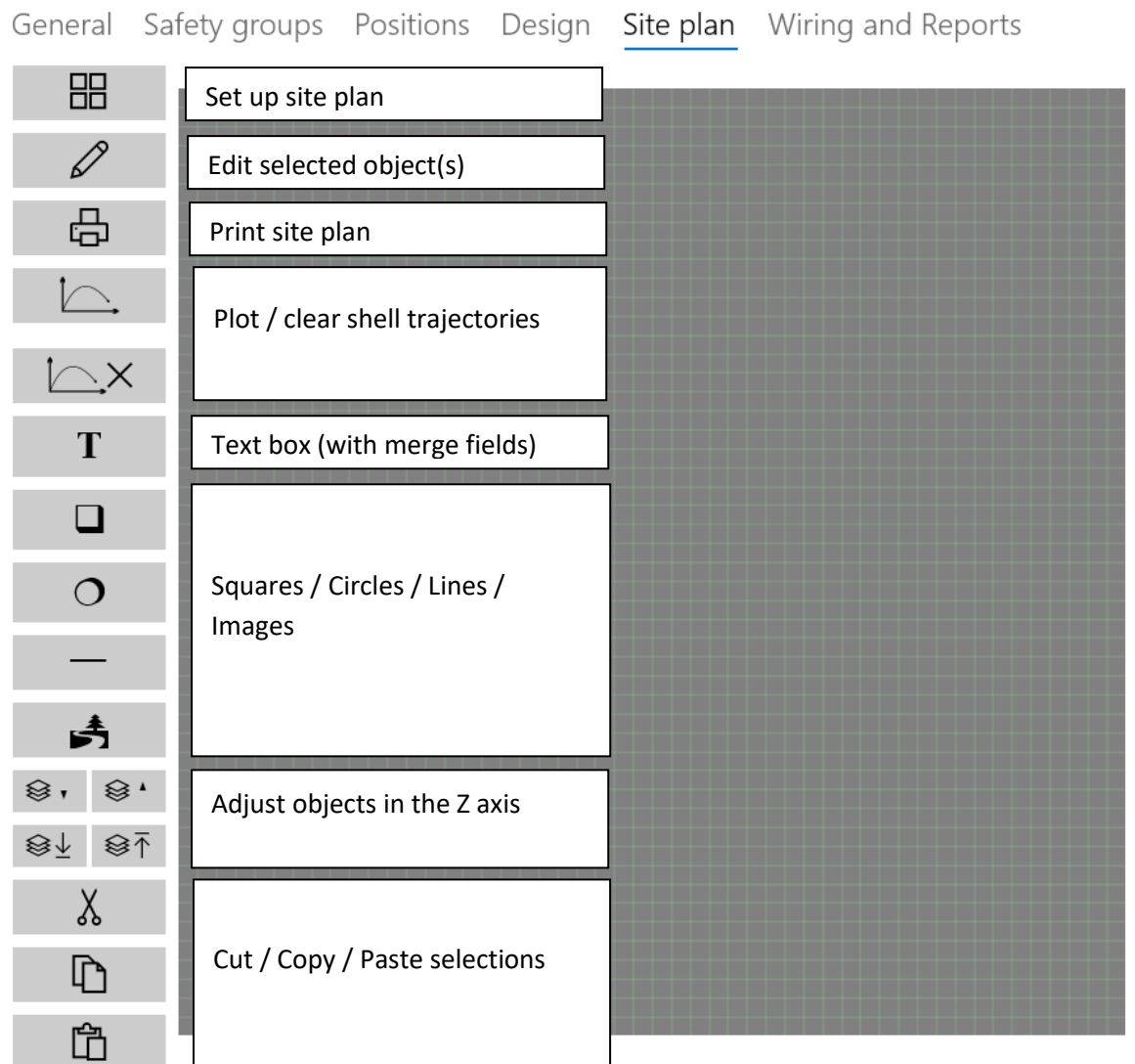
The site plan is a useful tool in your due-diligence toolbox, allowing you to design the layout of your show and test for shell fallout regions.

Your site operators can also use it as a simple map to ensure they place positions and equipment exactly where you, the designer, intended.

On Site plan you can:

1. Add a site image

2. Set scaling of your site
3. Add incidental imagery
4. Add coloured areas
5. Add text with merge tags to pull in script data at print time
6. Plot trajectories and observe fallout zones
7. Select / Move things around
8. Print
9. Copy/paste between scripts with CTRL-X, C and V
 - a. Positions and safety groups will also be copied where possible



Site image

The first thing to do is to select a good aerial image of your intended site – certainly one that covers a larger expanse of area so you can see the effect of trajectories of your shells, for example. You want to encompass sites of special consideration for your risk assessment.

Ensure that whatever image you select is to-scale and you know the width and height it represents in metres.

Aspect ratio

An important point to get as right as possible is matching the aspect ratio of the site image to that of the site dimensions you set in the app. If you don't you may get a squashed looking site plan.

The aspect ratio of your site dimensions is the width divided by the length. If your site is 1500m wide by 1000m length your aspect ratio is $1500 / 1000$ or 1.5.

For the best site plan image make sure its aspect ratio matches as closely as possible, so in this example a perfect site plan image might be 3000 pixels wide by 2000 pixels high. Again $3000 / 2000$ is 1.5 so this is a perfect match and shapes won't look squashed.

Equally an image 750 pixels wide by 500 pixels high would do, as this is also an aspect ratio of 1.5 though the image may look grainy when scaled into a large screen.

Example

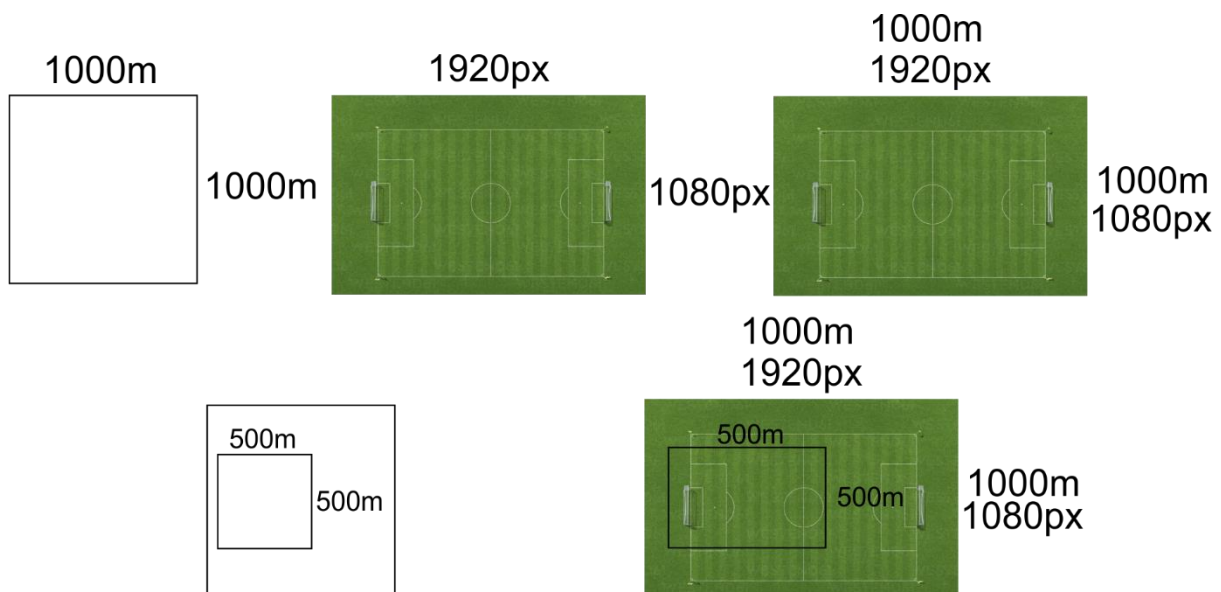
An example of when aspect ratios caused squashed images on your site plan, consider this example.

Site dimensions are 1000m wide by 1000m long.

You have a photograph of the site image which was taken on a wide-angle lens of pixels 1920 x 1080.

The aspect ratios don't match. Aspect ratio of the site dimensions is 1.0 whereas the aspect ratio of the image is 1.77.

CATFire will fit your 1000m x 1000, onto the image of 1920 x 1080:

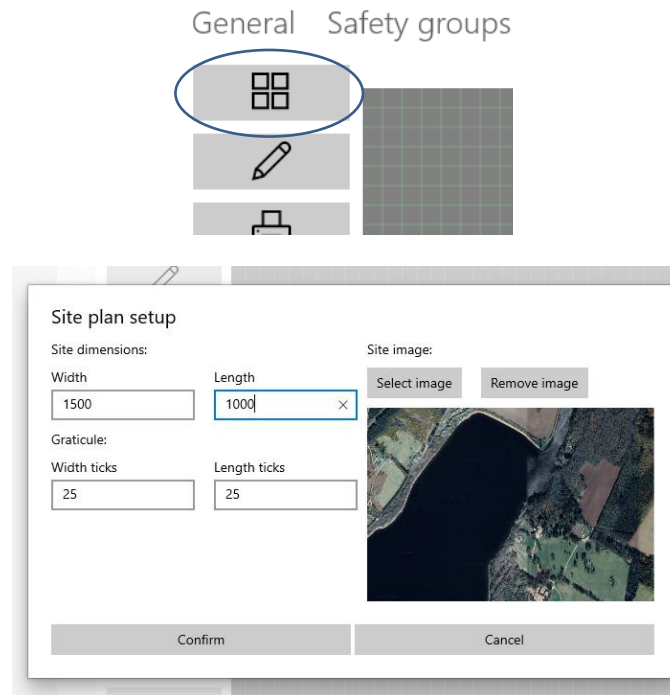


As you can see the site dimensions are square, placing a square inside of it should remain square.

But since the site plan image has a different aspect ratio the vertical component is squashed to fit the dimensions resulting in a rectangular shape.

Configure the site plan

Click the site plan setup button shown, enter the site plan dimensions in metres and select the site plan background image.



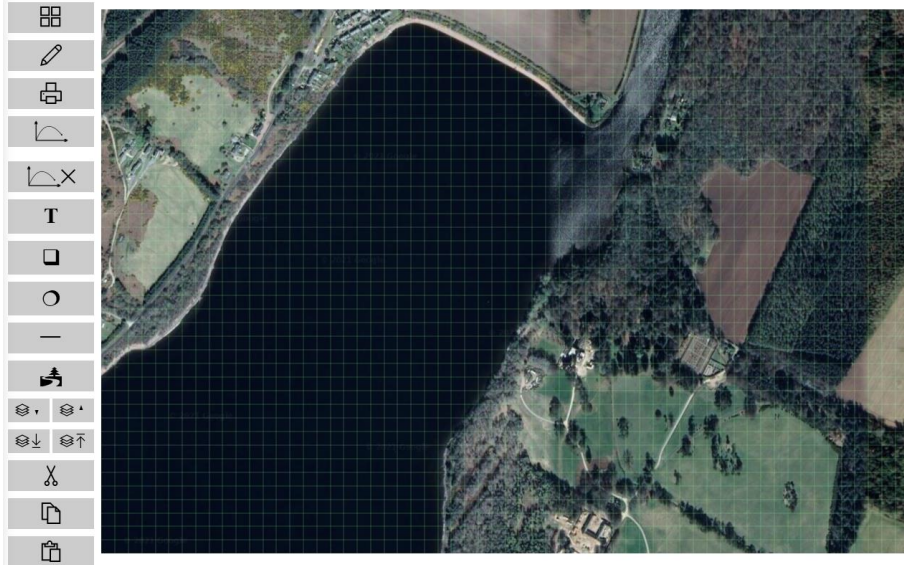
In our example our image represents land 1500m wide x 1000m length.

NOTE: 1500m / 1000m is 1.5 aspect ratio. In this example the image is 5178px / 3490px which is 1.48 and is a close enough match to the aspect ratio of the site dimensions.

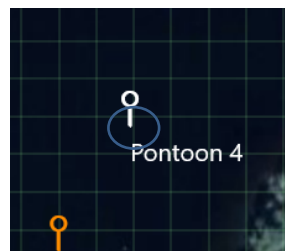
The image is overlaid with a green mesh graticule so you can place positions and other things roughly where you intend them to be.

In this example we set the graticule to represent squares of 25x25 metres, see above.

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You can see from the image above that we have placed our position markers – which are added to the site plan automatically – roughly where we intend them to be.



Just as with designing your sequences on the timeline, you can click to select a position marker (click the circle on the marker) and move it where you want. You can also select a group of on-screen items by dragging a selection box over them:



Position markers

Position markers are added automatically, you can customise their colouring, size and whether the position name is shown.

NOTE: The sharp marker point is considered where your position is needed.

Click a position marker and click edit button


A dialog box titled 'Marker setup for Pontoon 3'. It contains input fields for 'Left' (602.123064003872), 'Top' (428.286255667885), 'Width' (100), and 'Height' (100). There is a checked checkbox for 'Show position name'. To the right is a color selection tool with a rainbow gradient and a 'Light green' marker. Below the color tool are two sliders: 'Colour intensity' and 'Opacity'. At the bottom are 'Confirm' and 'Cancel' buttons.


The width and height of the marker is in site dimension units, use the graticule (and the size you configured them for) to determine the best size for your marker on the plan.

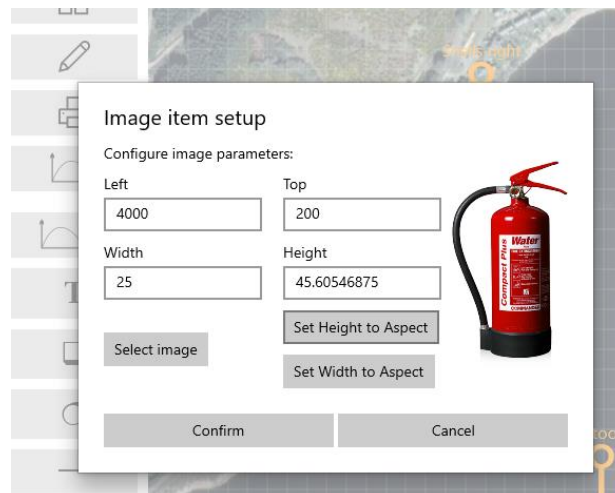
In our example the site plan has a graticule set to 25m x 25m. The marker will therefore take up 4 x 4 of the graticule.



Adding images

You can add as many images as you like, click , all images are positioned to the real-world coordinates and to site dimension size. Use the graticule to determine how big you would like your image to appear.

Click , a dialog appears:



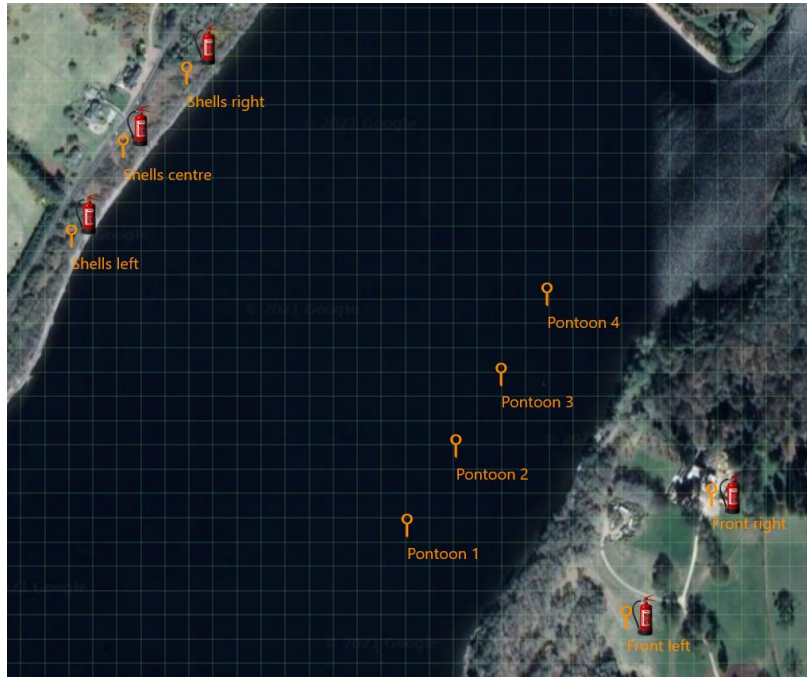
Specify the real-world left and top position in metres from the top/left of the site image.

Set the width and height of the image in real-world metres, alternatively set the width or height and click “Set Height to Aspect” or “Set Width to Aspect” – this will calculate the other dimension in real-world metres according to the aspect ratio of the image. This ensures the image looks in proportion.

Once you have added the image, click and drag it anywhere you want.


You can also make copies easily too:

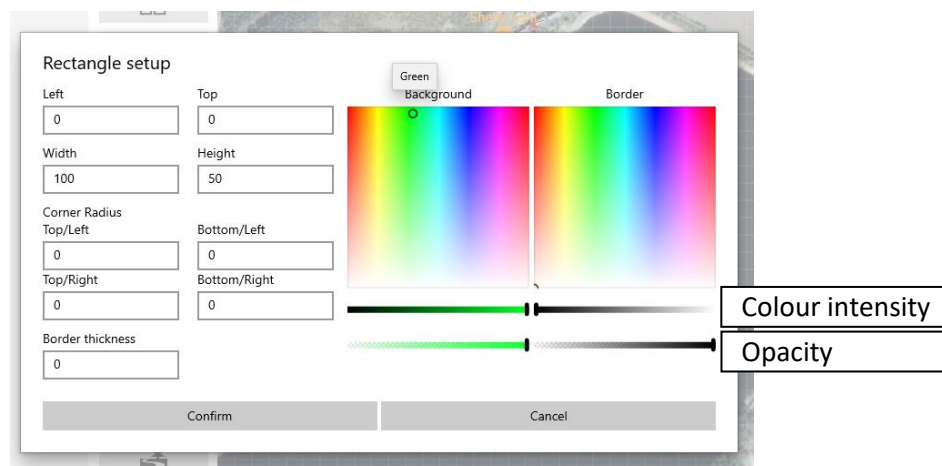
1. Click the image to select it
2. CTRL-C to copy
3. Move your mouse where you want the copy to be pasted
4. CTRL-V to paste a copy



To make changes to an image, click one then click “Edit selection” – you can select multiple items and “Edit selection” to adjust each one in turn.

Adding squares and rectangles

Adding a square or rectangle is done by clicking  , a dialog appears:



Specify the site co-ordinates and width/height of the object. You can specify a fill colour with optional opacity (if you want no fill colour set it to transparent).

You can also specify a border colour and thickness.

Remember that the border thickness is in site dimensions.

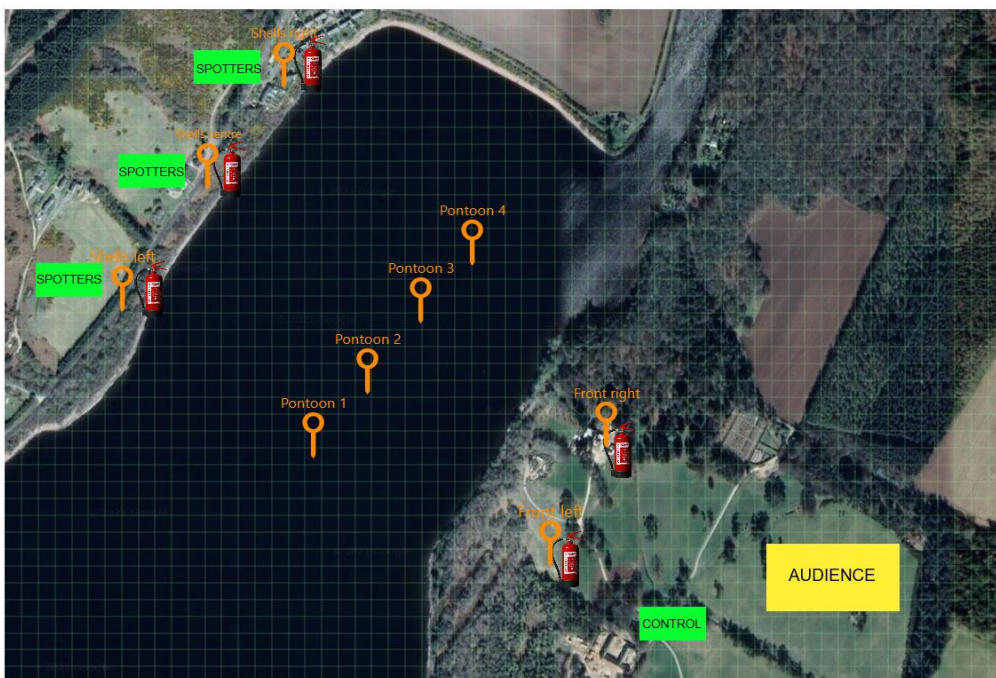
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Corner radii can also be specified to round or sharpen corners. Again these are specified in site dimension units so, for example, if your graticule was set at 25 x 25 then a 25 corner radius would consume one graticule box.




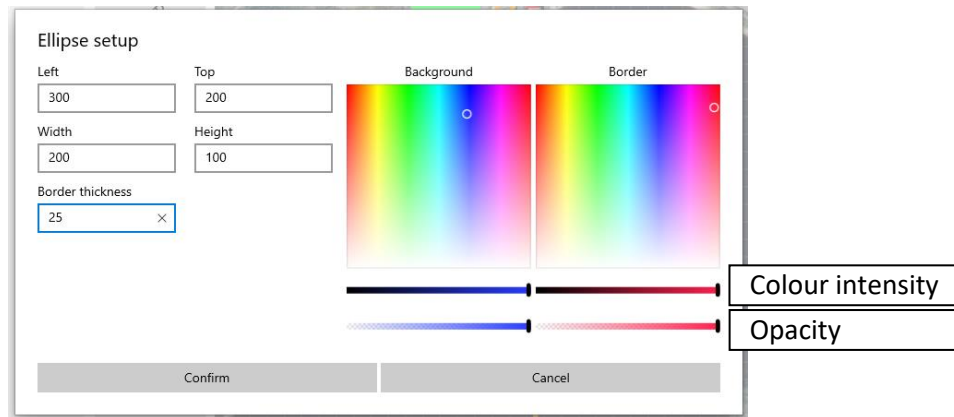
Above image is an example with a top/left corner radius being 25 metres. Our graticule in this example has been set to 25x25 so you can see that it has rounded the corner to one graticule square.

Here we have added some coloured boxes and then put some text over them to inform the crew where the audience will be and where fallout spotters need to be positioned at show time.



Adding circles and ellipses

Adding a circle or ellipse is done by clicking  , a dialog appears:




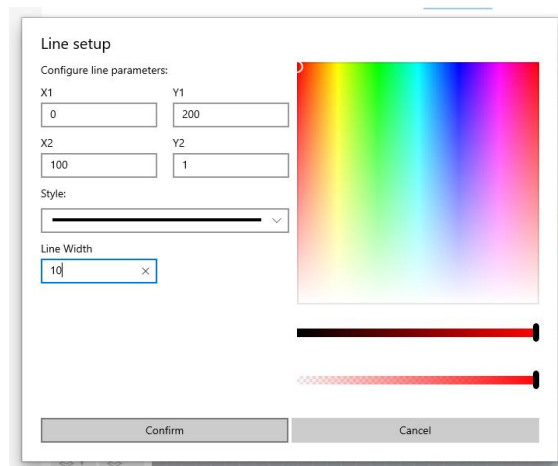
Circles and ellipses are formed within a bounded square or rectangular area of the site. So a circle of diameter 100 metres would be contained in a box whose width is 100 and height 100.

A circle may be given a background colour and border colour with thickness like that of a rectangle shape.

Opacity is also selectable for the colour too.

Adding lines

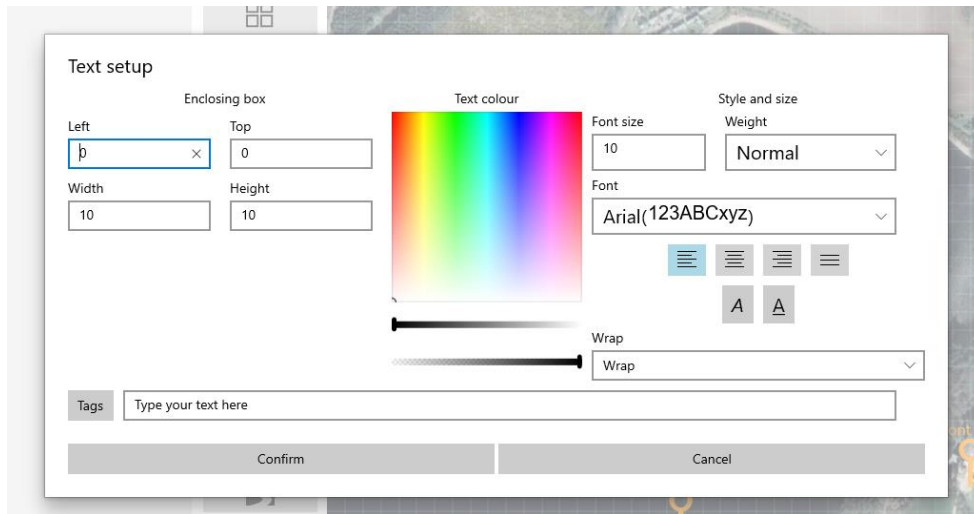
Adding a line is done by clicking  , a dialog appears:



Exact site positions in metres are given as an (X1, Y1)->(X2, Y2) line.

Adding text

Adding text is done by clicking  , a dialog appears:



Text is placed inside of a defined rectangular area. All sizes are in site-dimension in metres.

Also remember that the font size denotes the height of the font – also in metres too, so use the graticule to define how big you want the text to appear on screen in site units.

Justification and wrapping of the text occurs within the defined width/height of the box given.

Remember that everything on a site plan is sized to the scaling of that plan, this also applies to areas too, make the area large enough to be visibly useful on the screen.

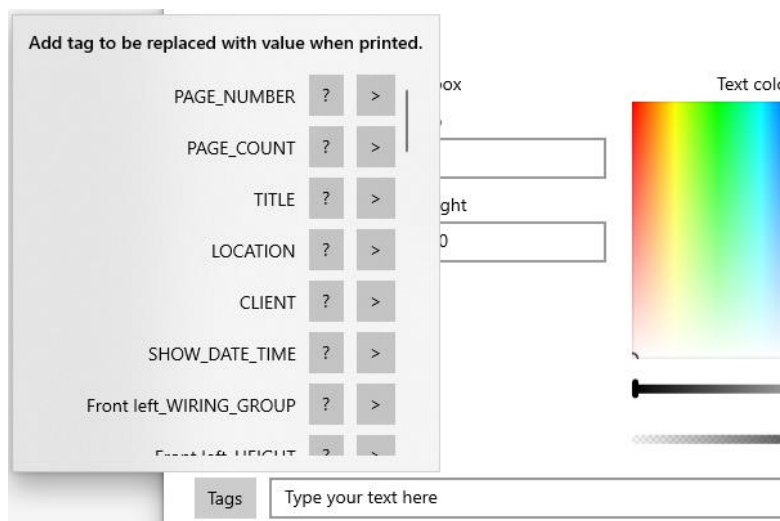
Tags

Text may also have Tags.

Tags are specially formatted pieces of text that are, at print time, replaced with script information.

Press the tags button to bring up a list of permitted tags that you can add into your text.

Here are some examples of tags for the site plan.



Press the ? button for more help on a tag, and press > to insert a tag into your text or type it manually.



In the above example we have added some text with the text for the Pontoon 1 Firing Address list. This will produce a comma separated list of all firing addresses used at that position.

Copy/paste

You can copy and paste positions and imagery/areas between scripts with the usual CTRL-X, C and V combinations or use the on-screen buttons to do the same.

It is best to ensure that the size of the site plan into which you are pasting items is as large (width/height) or larger than the script you are copying from. If smaller then some items may be cropped out of view.

When copying positions the safety groups assigned will also be copied over providing the safety group name already exists in the script to which you are pasting. Any groups that do not exist in the target script will be unassigned from the position you are pasting – be sure to check that the positions you have copied have the correct safety groups assigned.

Trajectory plotting

Trajectory plotting in CATFire is a Site Plan feature that permits you to see the fallout zone for shells, typically.

It is important you understand what CATFire trajectory plotting can and cannot do when interpreting its results for risk assessment purposes. If in doubt do not fire any material you think could be compromising safety.

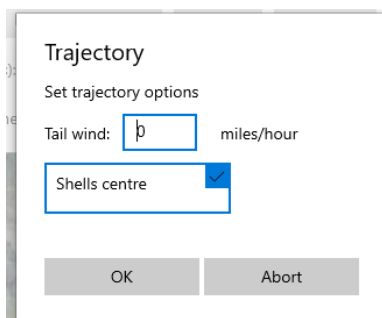
Some things to consider about CATFire trajectory plotting:

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1. The results are only as good as the data input
 - a. The shell, for example, being plotted should have the correct parameters specified for Muzzle Velocity; Projectile mass; Projectile diameter; Burst diameter.
2. The real world behaviour will be different (mother nature and hand made fireworks - together with their tolerances - make an interesting mix) so if your safety margins are tight this should be a warning sign to reconsider your site and what is possible to fire.
3. CATFire adds no variance into the equation e.g. spin and drift on the projectile as it is rising.
4. Does not calculate for self consuming projectiles such as shots from a single shot tube, it calculates for the mass given throughout.
5. Does not compensate for changes in air density, it uses typical air density at sea level only.
6. Assumes a spherical projectile with a smooth surface.
7. The height given for a position, e.g. on a rooftop or hillside, should be the height in metres from ground level where spectators are standing.
8. CATFire is not a 3-dimensional renderer, while it will calculate the trajectory using the firing angle of the projectile it does not understand the relative direction of that trajectory from, say, the audience. The designer must interpret the results given.
9. For each position CATFire will plot you up to three zones per position:
 - a. The largest muzzle break burst
 - b. The furthest blind shell travel
 - c. The furthest near-blind shell reach (shell fails to ignite at height, rather falls back to near ground then bursts).
10. The worst case results of a position is displayed – across all material fired from that position, not every one. Results are combined here so the three zones given for a position won't necessarily correlate to a single shell, say, each of the three zones may be from different material fired at that position.
 - a. Hover your mouse over the zone to bring up information that caused that zone.
11. The scaling in real world units of your site plan should be as accurate as possible with respect to the image given.
12. When specifying wind, CATFire assumes a tail wind, but be aware that wind speed can vary dramatically at different heights.

Here in our example we launch a 5" blue peony vertically (90 degrees) with typical parameters from "Shells centre".

We click "Update trajectories" and specify 0 for wind speed in the dialog box that appears.



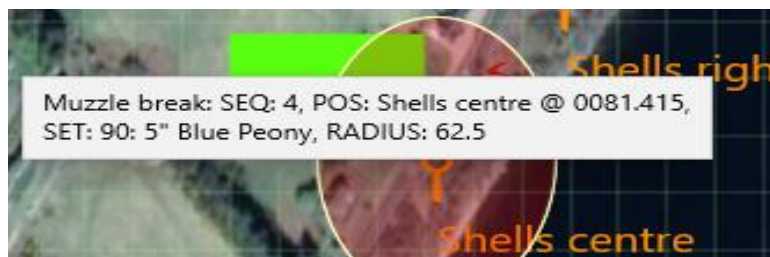
TRINITY DIGITAL

The dialog box shows all positions that have material on them for which trajectories can be calculated. You can uncheck positions to concentrate your analysis on specific positions.



What we are seeing in the above image of our site plan is the worst-case fallout scenario for a perfectly vertically launched shell – essentially the burst diameter of the shell, or muzzle break if the shell were to burst immediately after leaving the mortar.

Hover your mouse over the zone to bring up information on that:



The radius of the muzzle break here is 62.5 metres caused by a 5 inch peony shell fired at 90 degrees on sequence 4 at 81.415 seconds.

Because CATFire adds no variance it is calculating the shell firing vertically up and vertically down. So the only real impact here is the burst diameter of the shell.

The following example is more dramatic with only a slight change to our shell firing.

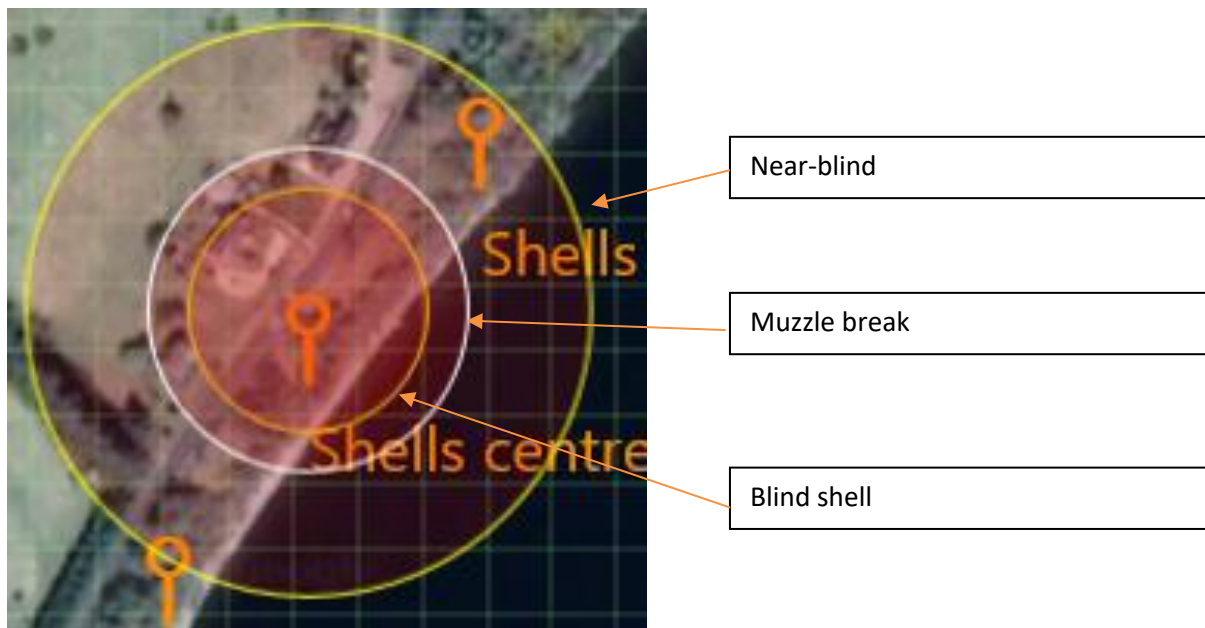
We set a launch angle of 85 degrees (5 from vertical). The results are very different:

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Now the shell follows a curved trajectory – rather than just up and, for blind shells, straight down again.

CATFire plots three zones:

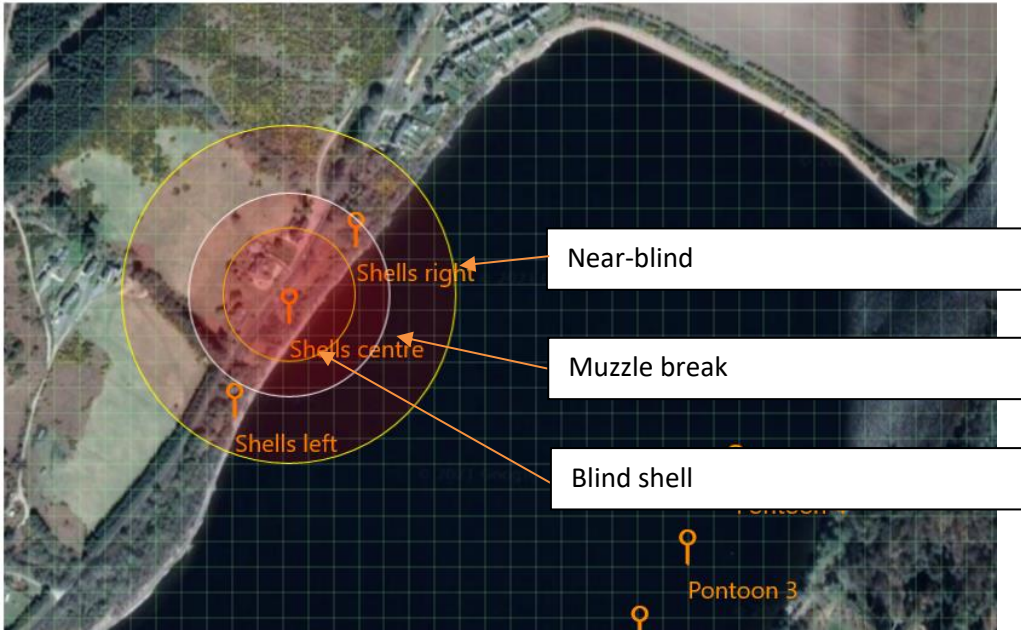


Each zone has a different coloured ring:

Ring colour	Zone
White	Muzzle break
Orange	Blind
Yellow	Near-Blind

In the following example we change the 5" Blue Peony for an 8" one for more effect.

We recalculate the trajectories and observe the new results:



Now we add a 5" blue peony at 85 degrees to the left and right shells position, again with 0 wind:

Trajectory
Set trajectory options
Tail wind: miles/hour
Shells left Shells centre Shells right
OK Abort



You should have noticed that the blind shell zones (orange border) are smaller in diameter than the muzzle break (white).

If we made the firing angle steeper (80 degrees rather than 85), the results reflect the effect on the blind and near blind zones:

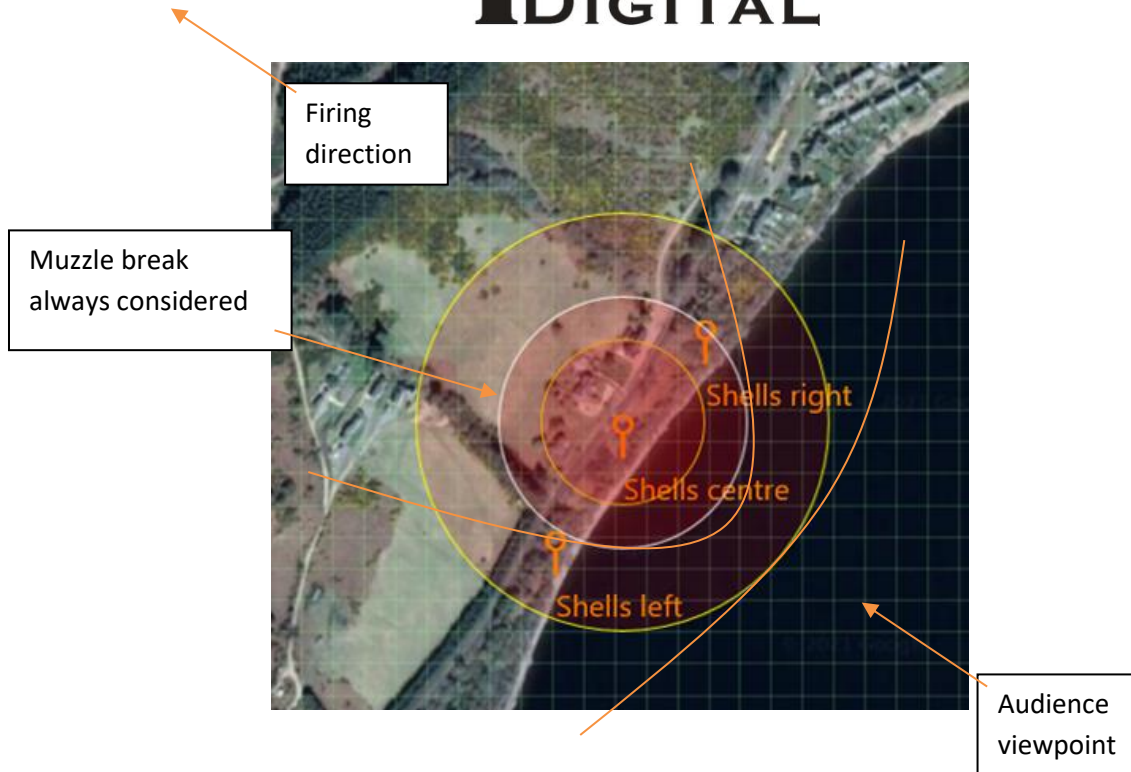


Interpreting trajectory plots

It should be obvious that because CATFire doesn't understand the direction of the shell only the fired angle, it plots a circle, because the direction could be anywhere in a 360 degree direction.

While it's highly unlikely you will be firing a shell toward the audience, CATFire will make no assumptions because it does not know where the audience is.

Let's take a look at this trajectory plot, in this example we are firing the shell at 85 degrees – but as a designer we know it will be 5 degrees **away** from the audience:



A muzzle break zone should always be considered in any direction - the shell breaks very low immediately upon exiting the mortar with little or no ground travel.

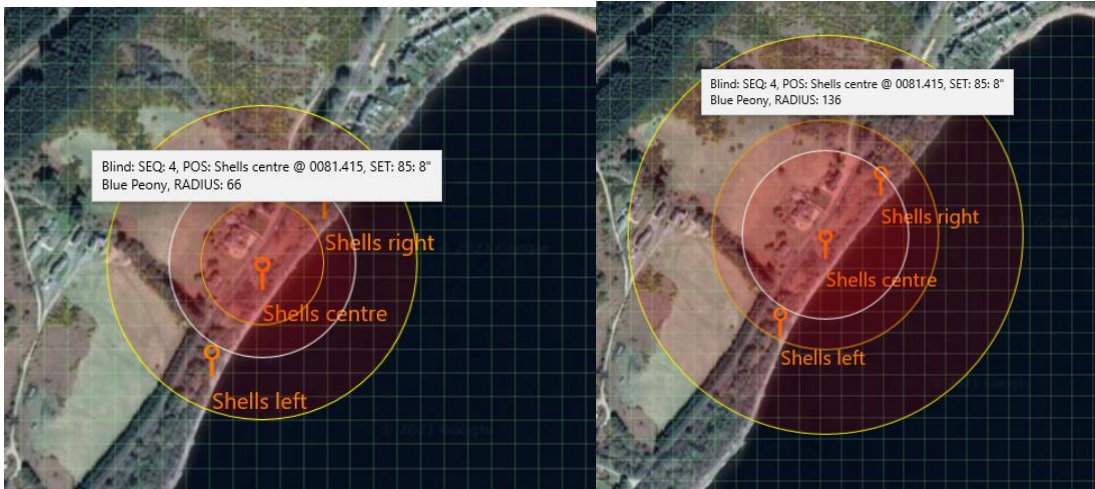
Consider the orange curved lines - as the shell rises the risk of the muzzle break / low break shifts further from the mortar.

It's less likely to affect the area in audience side of the mortar.

Effect of wind

Specifying a non-zero wind direction in miles per hour causes the distances of blind and near-blind to increase as the wind pushes the projectile from its natural path. Again direction is not considered, the zones are widened further.

Here we specify 0 and then 20 miles per hour to see the differences:

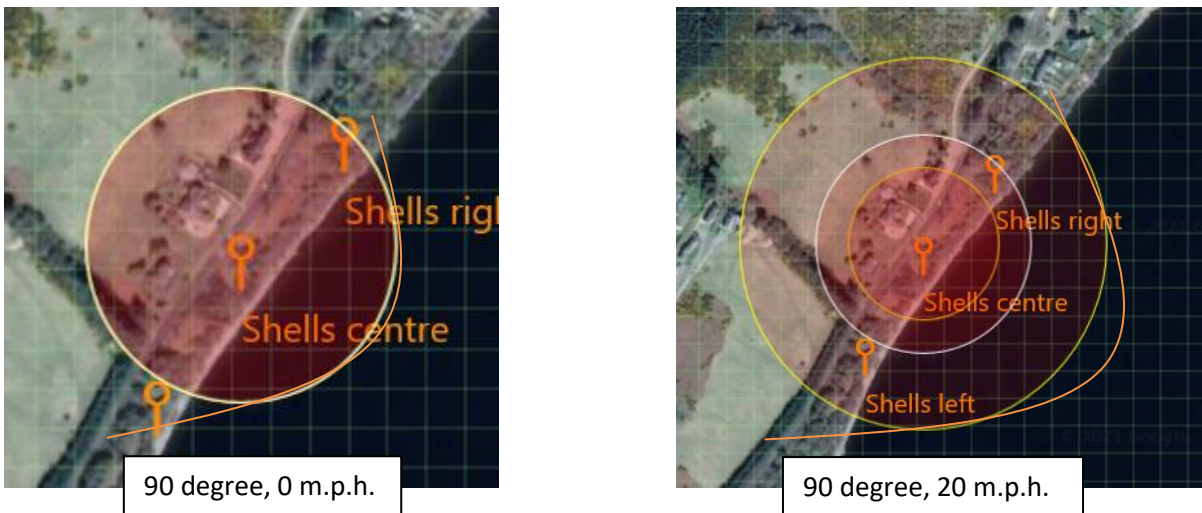


The effect of wind is always assumed to be in the direction of the firing angle, thereby calculating for worst case.

You can see here that a 20 mph wind on this 8 inch shell is strong enough to have a dramatic effect on blind shell zone!

What is not considered is the effect of the 5 degree firing angle *away* from the audience with a 20 m.p.h wind toward the audience.

The effect of wind can be observed more by looking at the differences between 0 m.p.h. and 20 m.p.h. with a perfectly 90 degree vertically fired shell



Because CATFire adds no variance the vertically fired shell with 0 wind speed is straight up/down so the only zone shown is the muzzle break (burst diameter).

With 20 m.p.h. wind the effect on blind and near-blind becomes more visible.

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When interpreting the effect of that 20 m.p.h. wind toward the audience with a 5 degree firing angle away from the audience the risk of fallout toward the audience increases because the shell will be pushed toward the audience and the peak risk will be somewhere in between these above two sets of zones.



Variance

While your design may call for material, for example a shell, to be fired vertically (90) it is rare for a mortar to be perfectly set at 90.

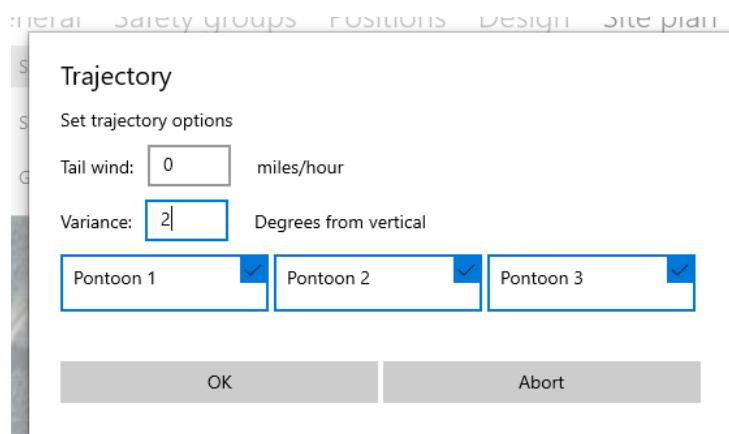
For material fired vertically you can add up to 8 degrees of variance when plotting trajectories.

The variance specified is subtracted from the 90 degrees assigned to any material and the trajectory is calculated. This does not affect your script design – which will still indicate 90 on reports and labels - only the trajectory plotting is affected.

Material fired at any other angle is not affected by variance.

Typically you might specify 2 or 4 degrees to reflect the error during setup of your mortar racks etc.

This is useful when on a tighter site to check blind and near blind distances are still acceptable.



Wiring and Reports


Wiring and reports allows you to examine script information, print reports and labels.

It's also the place you convert your sequences to cues on firing units.

And is also the place you can generate CATFire FSK timecode audio sources for your show.

Wiring up



Clicking “Wire up cues”  will create a plan of what cue should be connected to what Firing Address (FA) and Cue terminal.

Here the system will work out how many firing units are needed on which position and what should be connected.

It will create a programming plan that, when you arm your system, will be programmed into the firing units.


NOTE: “Wire up cues” will remove any obsolete wiring report, possibly generating a new one too.

Wiring up will preserve as far as possible the existing wiring plan.

If you are continuously designing while “wiring up” – possibly adding/removing material from your show – this can create “gaps” in the wiring plan for cues of one or more firing units, meaning that cue assignments on a firing unit may not be sequential.

On site, some operators expect cues to be sequential and if they see a cue not connected while ones surrounding it are is flagged as a problem.

If you are used to seeing all cues that need to be connected arranged sequentially then you should not wire up until your display is fully complete.

“Reset wiring”  will erase all of the existing wiring plan, when wiring up once more this can create significant changes to your labelling and reports.

Wiring groups

Wiring groups can make more efficient use of your firing units – possibly at the expense of more complex on site wiring.

During wiring up each position is wired in isolation to other positions.

This means that some positions may have spare ‘capacity’ on their firing units where not all cues are needed.

Example:

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1. You have a position called “Front cakes” with, say, 6 cakes.
2. You have a position called “Front Single Shots” with, say, 10 single shot comets.

When wiring up CATFire will require two firing units, one for each position.

The firing unit for “Front cakes” will utilise 6 cues. The firing unit for “Front Single Shots” will utilise 10 cues.

If you have limited inventory this may be an inefficient utilisation of your firing units. The obvious answer is to buy more firing units, if this is not practical you can use wiring groups, as follows:

Position:

Wiring group:

Height: metres

Position:

Wiring group:

Height: metres

By giving both positions the same Wiring group name they will be treated the same during wiring up.

In this example only one firing unit will be needed and all 16 cues will be utilised.

This can be at the expense of more complex and longer on site wiring – understand your site topology and only group positions that are geographically near to cut down on extension lead length.

Even if you need longer extension wires CATFire resistance checks will help here to ensure that the wiring resistance is not too great. However you should test prior to being on site with the intended igniter and extension wires – if CATFire shows an issue with wire resistance try using a heavier gauge wire that has a lower resistance or use external power to the firing unit and a higher voltage to compensate for the increased resistance.

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Instead of using Wiring Group names you could put all of your sequences on one position.

However to make on site prep / setup easier it can be beneficial to use position names to clarify the purpose of that position (“Left cakes”, “Left candles”, “Left single shots” etc.).

Wiring groups do not affect material labels which continue to show their position rather than wiring group.

Wiring groups do affect firing unit report and label printing and the wiring group rather than the position(s) will be shown instead.

Save firing file



Your design file (.cfs file) is not used for firing, rather you generate a firing file (.cff).

Generate this after design and wiring up is completed.

The firing file is a crystallisation of your show – everything is included in your firing file, even the music for your show, so it can be a large file.

This single file can be given to your display operator so they have everything they need to fire and you don't have to worry if their firing computer has all the other settings necessary (safety groups, material etc.), they just need this one file.

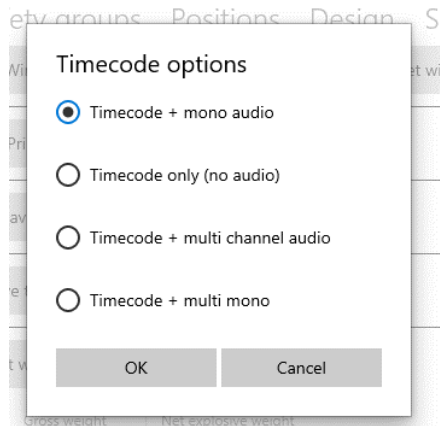
Save timecode file



If you are working with other trades such as video, lighting, sound etc. you often fire your display to timecode.

CATFire supports our own robust FSK timecode but we also support SMPTE LTC timecode too.

The “Save timecode file” will generate CATFire FSK timecode into an audio file with or without music included.



Timecode + mono audio

This generates a stereo .wav file. The left channel will be your audio converted to mono. The right channel will contain FSK timecode.

Timecode only (no audio)

This will generate a mono .wav file with only one channel. The channel will contain FSK Timecode.

Timecode + multi channel audio

All channels in your music will be preserved in the .wav file. An additional channel (the last one) will contain the timecode.

If the music in your display is stereo this will generate a three channel .wav file. Left and right will be preserved as your music and an additional channel added for the timecode.

Similarly if your music is 5.1 (6 channel) this will generate a 7 channel audio file. The 7th being timecode.

Timecode + multi mono

Multiple .wav files will be created, each one with a single channel.

All channels of your music will be output, each in its own file. For example, a stereo music source will generate two wav files, one will contain the left channel and one will contain the right channel.

The CATFire FSK will also be written to its own wav file too as a single channel.

This option is useful for digital mixing consoles (e.g. the Zoom LiveTrack L12) where each wav file can be assigned to a mixer channel.

Firing file id (FF ID)

Located on the design configuration dialog, every design has a firing file id, you cannot change this.

Firing file

Firing file ID: 35952

Audio configuration

Choose audio

Remove audio

Length: 00391.000

CATFire FSK contains this FF ID when it is generated.

When firing your display you must use the correct timecode for your show – or it will not fire. This is a safety feature to protect you against errant timecode signals being fed into the system or simply the wrong music/timecode being played.

Cue list



The cue list shown on the design page can be printed in full by pressing from the overall functions.

Reports

The wiring and reports section is arranged into different sub sections.

General Safety groups Positions Design Site plan Wiring and Reports



Wiring Obsolete wiring Picking Weights Mortars Positions Firing units



Printed	Position	Firing address	Cue terminal	Angle	Part number	Shots	Calibre
---------	----------	----------------	--------------	-------	-------------	-------	---------

1. Wiring
 - a. Assigning sequences to firing units and cue terminals
 - b. Printing wiring reports and igniter labels
2. Obsolete wiring
 - a. As design progresses and wiring up is completed in stages this page allows you to see significant changes in your display that require material to be removed and either returned to store or re-labelled.
3. Picking
 - a. Stock pick, reports and labels
4. Weights
 - a. Hazard class, gross and net explosive content weights. Useful for transport regulations such as ADR.
5. Mortars
 - a. When mortars are required in your show this assists in picking the right type and number of kit e.g. shell racks
6. Positions

- a. Reports on what material is to be placed at what position.
 - b. Labels for fixing to boxes / transport containers for correct placement on site
7. Firing units
- a. How many firing units needed and what addresses to be assigned.
 - b. Labels for fixing to units for correct configuration and placement on site.

Wiring

This is an essential report for any show.

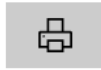
A full report on all material used, positions and angle placement together with the Firing Address (FA) and Cue number that material igniter is to be attached to.

General Safety groups Positions Design Site plan Wiring and Reports

Wiring Obsolete wiring Picking Weights Mortars Positions Firing units

Print descriptive angles

Printed	Position	Firing address ↑	Cue terminal	Angle	Part number	Shots	Calibre	Type	Label description	Description
NO	Centre	1	2	UP	imperial_blink	20	25	Cake 21 Shot	Imperial Blink	21 big burst shots in 30 seconds of silver tails to silver blink,
YES	Centre	1	5	UP	KingOfPalms	20	25	Cake 15 Shot	KingOfPalms	red blinking tails rising to massive titanium palms with gree
NO	Centre	1	7	LEFT 75	Blinking Tails to Silver Butterfly	42	20	Cake 42 Shot	BlinkTails/Silver Buttflly	silver blinking tails transforming to silver butterflies with blu
NO	Centre	1	8	UP	15'VSMine Silver Fizz	1	30	Mine	15'VS SILVER FIZZ	VS Silver Fizz
YES	Centre	1	6	UP	Super Etna	20	25	Fountain	Super Etna	forceful eruption of silver crackling
NO	Centre	1	3	LEFT 60	15'VSMine Purple w/ Tail	1	30	Mine	15'VS PURPLE w/TAIL	VS Purple Mine with Tail
NO	Centre	1	4	RIGHT 60	15'VSMine Purple w/ Tail	1	30	Mine	15'VS PURPLE w/TAIL	VS Purple Mine with Tail
NO	Centre	1	9	LEFT 70	15'VSMine Silver Fizz	1	30	Mine	15'VS SILVER FIZZ	VS Silver Fizz
NO	Centre	1	11	LEFT 50	15'VSMine Silver Fizz	1	30	Mine	15'VS SILVER FIZZ	VS Silver Fizz
NO	Centre	1	13	UP	Prism	120	25	Cake 120 Shot	Prism	blue tail to blue star red fish; blue tail to blue star green fish
NO	Centre	1	12	RIGHT 50	15'VSMine Silver Fizz	1	30	Mine	15'VS SILVER FIZZ	VS Silver Fizz



After wiring up is completed the wiring report can be printed with

Wiring labels are small format labels typically attached to the material item or the igniter wiring that is inserted into the material.



Print these with

```

↑ Centre
└─ UP
  F/A:1          CUE:5
-----
Cake 15 Shot  25mm      20
      KingOfPalms
      KingOfPalms
  
```

To print wiring labels select one or more cues from the list – the “Printed” column can be helpful to determine labels not yet printed (these might be newly added to your script since you last printed some). Sort on the printed column to quickly identify the cues you have not yet prepared.

This can be useful for your display support team -who may be prepping for your display while you are continuously designing it – to know what is changing.

Descriptive angles

Refer to the Appendix on “Sequence Patterns” / “Understanding angles” for more information.

Print descriptive angles

Select to print angles described as left/right/up/down. Alternatively unselect to use CATFire absolute angles from 0 to 359 degrees.

Many operators prefer descriptive angles as they work better with inclinometer equipment and is more intuitive for them.

Obsolete wiring

Position	Firing address	Cue terminal	Angle	Part number	Label description	Description
Left	2	4	UP	Super Etna	Super Etna	forceful eruption of silver crackling
Centre	1	6	UP	Super Etna	Super Etna	forceful eruption of silver crackling
Right	3	4	UP	Super Etna	Super Etna	forceful eruption of silver crackling

As you design your show you may be removing or changing significant properties of sequences.

If you have a display support team that is preparing in advance – and following your progress with the display design – the obsolete wiring report can be a useful in knowing what material they have already prepped should be removed from the prep.

The obsolete wiring report is generated whenever you “wire up”. The obsolete wiring report should be checked and printed immediately, it is not saved.

You should always check this in tandem with the wiring report- it may be that the same material is needed in a new context, perhaps just a simple relabelling of existing material is needed.

Picking

The material picking report is essential for ordering or picking items from stores.

The total cost of all material is also shown so you can keep track of the cost of your display as you design.

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Wiring Obsolete wiring Picking Weights Mortars Positions Firing units

Total material price: 966.19

Part number	Location	Shots	Calibre	Type	Class	Quantity	Stock level	Sub total price	Gross Weight	Net Explosive Weight	Description
Niagra		49	30	Cake 49 Shot	1.4G	1	0	75	800	500	30mm coloured shots displaying beautiful glittering colour
imperial_blink		20	25	Cake 21 Shot	1.3G	1	130	21.99	500	315	21 big burst shots in 30 seconds of silver tails to silver blink,
15'VSMine Purple w/ Tail		1	30	Mine	1.4G	6	0	40.2	300	39	VS Purple Mine with Tail
ChaosMine		1	30	Mine	1.4G	2	0	30	500	270	huge eruptions of deep red streak mines to large silver strol
KingOPalms		20	25	Cake 15 Shot	1.4G	1	0	20	500	370	red blinking tails rising to massive titanium palms with gree
Super Etna		1	25	Fountain	1.4G	3	0	51	1200	675	forceful eruption of silver crackling
Blinking Tails to Silver Butterfly		42	20	Cake 42 Shot	1.4G	1	0	50	800	300	silver blinking tails transforming to silver butterflies with blu
15'VSMine Silver Fizz		1	30	Mine	1.4G	5	0	33.5	250	32.5	VS Silver Fizz
Prism		120	25	Cake 120 Shot	1.3G	1	0	20	1500	820	blue tail to blue star red fish blue tail to blue star green fish

Weights

This report shows gross and net explosive weights per category and a total.

This is useful for professional operators who may be subject to ADR – knowing when to use ADR drivers, for example.

It is important the risk classes for your material and their weights are set correctly for this to be effective.

Mortars

The mortar pick list can be of use during preparing for your show.

Position	Angle	Calibre	Quantity needed
Shells left	LEFT 60	125	7
Shells centre	LEFT 80	125	7
Shells right	RIGHT 80	125	7
Shells left	LEFT 60	200	2
Shells centre	LEFT 80	200	1
Shells right	RIGHT 80	200	1

CATFire will total up the mortars, per calibre, per angle, for each position and display the result.

CATFire is not aware of your rack designs: how your racks are arranged in multiples or handle angles, so totals are grouped as shown.

When picking kit from your stores you would need to pick a rack multiple, for an angle, that at least satisfies the total for a particular position.

Example, your 5" (125mm) racks are in multiples of 5. Each rack of 5 can be angled but not individually.

Your 200mm racks are in multiples of 4, again each rack of 4 can be angled, but not individually.

Interpreting our example report above, you would need to pick from your stores:

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1. Two racks of five 125mm mortars (so 10 mortars) for Shells left
2. Two racks of five 125mm mortars (so 10 mortars) for Shells centre
3. Two racks of five 125mm mortars (so 10 mortars) for Shells right
4. One rack of four 200mm mortars (so 4 mortars) for Shells left
5. One rack of four 200mm mortars (so 4 mortars) for Shells centre
6. One rack of four 200mm mortars (so 4 mortars) for Shells right

You would also need to ensure you pick the correct number of frames and bracing methods too.

Positions

In this subsection you can print large format labels for each position, use these labels to stick onto boxes, equipment etc. for on-site placement.

General Safety groups Positions Design

Wiring Obsolete wiring Picking Weigl

Material Position Position labels

Quantity per label:

Position

Front cakes

Front single shots

Specify a quantity per label to create many copies of the same position information label.

Select the positions you wish to print labels for.

📍 Front cakes

**AshfieldsCCBFN2020, Ashfields Cricket
Ground, Ashfields (AshfieldsCC) @
05/11/2020 19:00:00**

The material position report:

Material Position Position labels



Position ↑	Part number	Shots	Calibre	Type	Description
Centre	imperial_blink	20	25	Cake 21 Shot	21 big burst shots in 30 seconds of silver tails to silver blink,
Centre	KingOfPalms	20	25	Cake 15 Shot	red blinking tails rising to massive titanium palms with gree
Centre	Blinking Tails to Silver Butterfly	42	20	Cake 42 Shot	silver blinking tails transforming to silver butterflies with blu
Centre	15'VSMine Silver Fizz	1	30	Mine	VS Silver Fizz
Centre	Super Etna	1	25	Fountain	forceful eruption of silver crackling

Allows you to print a simpler report detailing which material is to be placed at each position, while this information is available in other reports, this is a simpler format avoiding the clutter of unrelated information, it can be used by display support teams to organise their work.

You can also print material position labels that can help in on-site placement of material.

 **Centre**
Imperial Blink
P/N: imperial_blink
Cake 21 Shot 25mm 20
21 big burst shots in 30 seconds of silver tails to silver
blink, red tails to red blink, green tails to green blink
culminating in a golden tail with gold blink finale
AshfieldsCCBFN2020, Ashfields Cricket Ground,
Ashfields (AshfieldsCC) @ 05/11/2020 19:00:00

Firing units

The firing units report, available when “wiring up” is completed, will show you the number of firing units needed for each position and what Firing Address (FA) to assign to each.

You can also print labels for fixing to each firing unit to assist in kit placement on site.

Position	Firing address
Pontoon 1	1
Pontoon 2	2
Pontoon 3	3
Pontoon 4	4
Shells left	5
Shells centre	6
Shells right	7

When printing labels you need to select one or more from the list and click print. Only the selected ones will be printed.

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Y Right
CFTFU-X16 F/A: 3
AshfieldsCCBFN2020, Ashfields
Cricket Ground, Ashfields
(AshfieldsCC) @ 05/11/2020
19:00:00

Please note that when a position is part of a wiring group, the wiring group will be shown instead of the position on firing unit reports and labels – this can help to clarify on site that the firing unit is wiring up more than one position.

Firing

Firing file

The firing file section is where you load in the file of commands for automated firing.

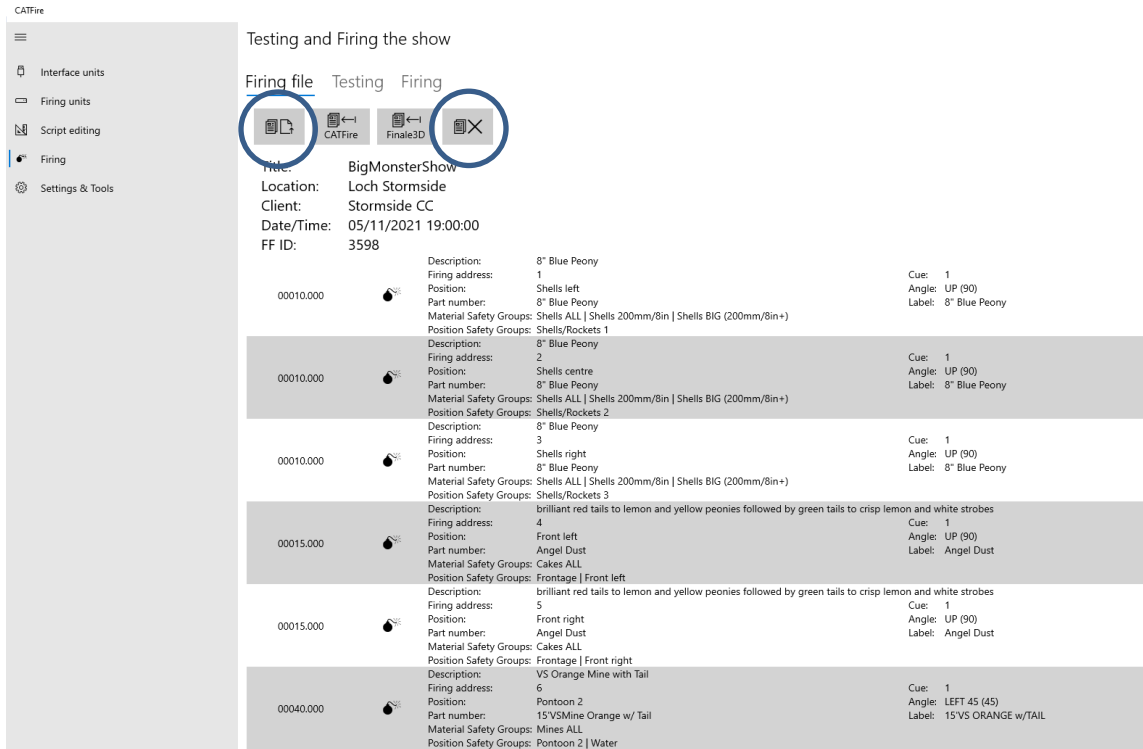
CATFire supports .cff files created in the visual script design section but also CATFire CSV and Finale Generic CSV (Full show export format).

For CATFire CSV format refer to the Appendices.

CATFire firing file

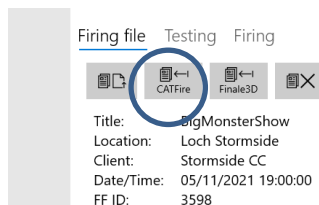
Created in the script design, it also contains the audio too, so for smaller shows the firing computer can be connected to a PA system for music playback.

You can open and close firing files with the two buttons shown.



Once the firing file is loaded you can see the list of cues defined within it, scroll through for more detail.

CATFire CSV



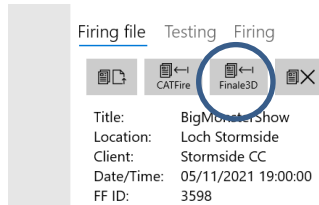
As well as the visual script design described earlier, CATFire also supports its own CSV format for those that prefer a more traditional way to design shows.

CSV files (also known as Comma Separated Values files) are simple text files where lines of text define a record and individual information items (values) are separated by commas.

Refer to the appendix on CATFire CSV for this format and how to create a CATFire CSV file.



Finale 3D (Finale Generic CSV Full show export format)



You can import a Finale 3D Generic Full .csv file.

When configuring your Finale 3D App we recommend you set a custom addressing template to:

#256-#16

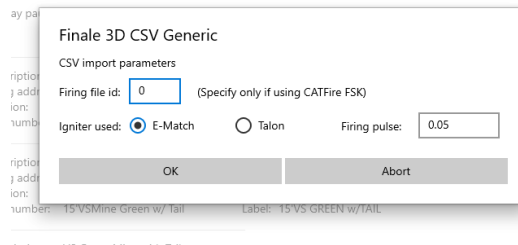
Addresses are from 1 to 256.

Cues from 1 to 16.

When “addressing” your show use the File -> Export -> “Export Script as Finale Generic csv”.

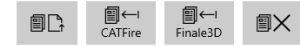
There are no banks or firing order restrictions. Timing resolution is 1 millisecond (0.001), CATFire will work fine with Finale3D 10ms resolution of 0.01 without modification.

When importing you must manually specify the firing pulse at the time of loading the file.



Testing and Firing the show

Firing file Testing Firing



Title: Finale3DGeneric
 Location: Not defined
 Client: Not defined
 Date/Time: 24/11/2021 17:51:54
 FF ID: 3116

00005.050		Description: Red Chrysanthemum Firing address: 1 Position: XXPOS-01 Part number: G2SH1000 Material Safety Groups: SHELLS Position Safety Groups:	Cue: 1 Angle: UP (90) Label: G2SH1000
00005.050		Description: Red Chrysanthemum Firing address: 1 Position: XXPOS-01 Part number: G2SH1000 Material Safety Groups: SHELLS Position Safety Groups:	Cue: 5 Angle: UP (90) Label: G2SH1000
00007.250		Description: Red Chrysanthemum Firing address: 2 Position: XXPOS-02 Part number: G2SH1000 Material Safety Groups: SHELLS Position Safety Groups:	Cue: 1 Angle: UP (90) Label: G2SH1000
00009.450		Description: Red Chrysanthemum Firing address: 3 Position: XXPOS-03 Part number: G2SH1000 Material Safety Groups: SHELLS Position Safety Groups:	Cue: 1 Angle: UP (90) Label: G2SH1000
00011.650		Description: Red Chrysanthemum Firing address: 4 Position: XXPOS-04 Part number: G2SH1000 Material Safety Groups: SHELLS Position Safety Groups:	Cue: 1 Angle: UP (90) Label: G2SH1000
00013.850		Description: Red Chrysanthemum Firing address: 5 Position: XXPOS-05 Part number: G2SH1000 Material Safety Groups: SHELLS Position Safety Groups:	Cue: 1 Angle: UP (90) Label: G2SH1000

Cue time

The cue time shown on screen is when the effect is due to be seen, as is usual for CATFire.

This calculation is performed to compute it:

Cue display time = Ignition event time + prefire delay + device delay + firing pulse

CATFire will fire the cues at the Ignition event time – firing pulse.

Safety groups

CATFire will import Lockout Identifiers and assign them to cues automatically as material safety groups.

If there are more than 32 unique lockout identifiers CATFire cannot import the file.

Be certain to inspect the list of cues to ensure the correct import has occurred!

Device strings

CATFire will take the firing time of the first device to fire in a device string, information from that csv record is taken for on-screen purposes such as effect name.

Other devices in a device string will have their lockout identifiers recorded in safety groups for this cue as expected, their device and effect detail will not be imported.

Angles and other measurements

CATFire will import angles and convert from inches to millimetres. It should be noted however that the inch to mm conversion will produce some unexpected results, for example 2” converts to 50.8mm, this is expected and normal.

Pause points

CATFire converts tracks into pause points.

If the Track Identifier field of the csv record indicates a new track a pause point will be generated at Ignition event time for that new track.

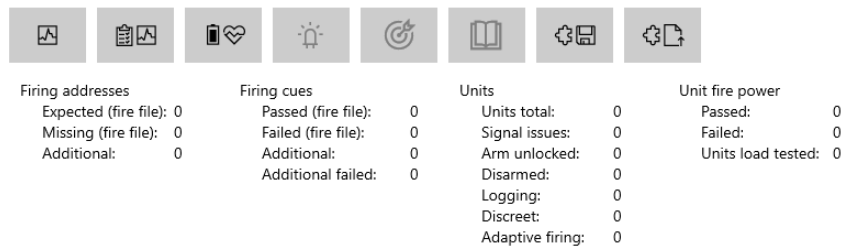
The text in the Track Identifier field is used as the “hint” text, as per CATFire pause point sequences.

Timecode

If you wish to fire your Finale 3D CSV file to timecode you can generate a timecode file under Settings & Tools -> CATFire FSK Timecode. Be sure to make the length of the timecode exceeds your farthest out cue to be fired and also the Firing File ID (FF ID) you have specified on the dialog box at time of loading the CSV matches.

Testing

For testing ensure you have connected the CFCIU-1 unit and have scanned for firing units.



At the top of the testing window you can see a set of control buttons and a simple test summary, described here.

Section	Parameter	Description
Firing addresses		This section provides statistics on your firing addresses (FA's). NOTE: This is NOT the same as firing units. Many firing units may have the same firing address (so as to duplicate firing behaviour)
	Expected (fire file)	This is the number of firing addresses defined in the firing file
	Missing (fire file)	This is the number of firing addresses not detected but are defined in the firing file. This should be 0, if this is not zero you have misconfigured one or more firing units with the wrong firing address (FA)
	Additional	This is a number of firing addresses detected that are not defined in your firing file, this may be acceptable if you














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		have some firing addresses to be fired manually.
Firing cues		
	Passed (fire file)	This is the number of cues that are to be fired in your firing file
	Failed (fire file)	The number of cues that are to be fired in your firing file but have not passed testing
	Additional	Cues not defined in a firing file but have passed testing – this may indicate a misconnected cue or maybe just cues you are manually firing, in which case this is okay.
	Additional failed	Cues not defined in a firing file but have failed testing such as stuck on/off or the resistance is reading but unacceptably high
Units		
		These are stats for physical firing units, they refer to your Unit Addresses (UA).
	Units total	The number of firing units detected
	Signal issues	Some firing units have radio reception issues when this is more than 0
	Arm unlocked	Of the firing units detected if this is 0 then no units are unlocked for arming – this should normally be the case during testing for safety purposes. When it's time to fire your display all units should be unlocked.
	Disarmed	This is the number of units that are currently disarmed. Once your show has finished and you disarm from the firing page, return back to this testing page and update status for the units to check all are disarmed. Don't allow operators back into the firing site until all are disarmed.
	Logging	The number of units that have logging feature enabled.
	Discreet	The number of units that are operating in discreet mode – if some are discreet you should inform your operators that need to take caution when approaching the site because they will not be aware of the disarmed state of a unit.
	Adaptive firing	The number of units that have the adaptive firing feature enabled.
Unit fire power		
		Refers to physical firing units
	Passed	The number of units that have passed battery testing. NOTE: Until units have been load tested their results are based on battery voltage only. Perform a load test to be sure the batteries are in good condition.
	Failed	The number of units showing poor battery state
	Units load tested	This is the number of units that have had a load test performed, for best experience be sure to load test all units and all fire power is passed.


Testing master control

The control buttons at the top of the testing window will perform operations on all firing units connected to your network



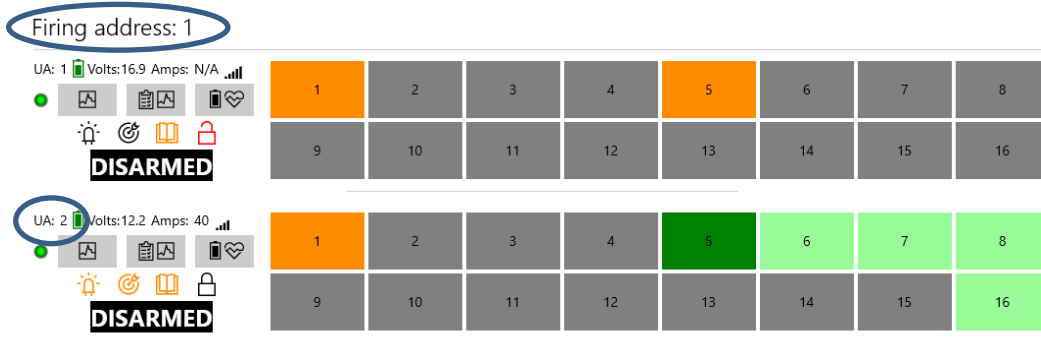
	<p>Will scan all detected firing units and update their status. NOTE: CATFire will not update automatically, you must scan for status updates. NOTE: Each firing unit has an equivalent button to pull fresh status for that units no need to scan all again for a small number of updates.</p>
	<p>Will run a cue test on all detected firing units and update their status. NOTE: CATFire will not run tests automatically, you must initiate tests. NOTE: Each firing unit has an equivalent button to do a test on just that unit.</p>
	<p>Will run a battery load test on all detected firing units and update their status. NOTE: CATFire will not run tests automatically, you must initiate tests. NOTE: Each firing unit has an equivalent button to do a test on just that unit.</p>
  	<p>Discreet mode options for all firing units. Click this to cycle between three states:</p> <ol style="list-style-type: none"> 1. (greyed) Discreet mode will be as per local unit setting, permitting some units to be discreet while others not 2. (black) Discreet mode is ENABLED on all units 3. (orange) Discreet mode is DISABLED on all units <p>These latter two do not change the unit configuration, rather temporarily override them.</p>
  	<p>Adaptive firing mode options for all firing units. Click this to cycle between three states:</p> <ol style="list-style-type: none"> 1. (greyed) Adaptive firing mode will be as per local unit setting 2. (black) Adaptive firing mode is DISABLED on all units 3. (orange) Adaptive firing mode is ENABLED on all units <p>These latter two do not change the unit configuration, rather temporarily override them.</p>
  	<p>Logging options for all firing units. Click this to cycle between three states:</p> <ol style="list-style-type: none"> 1. (greyed) Logging will be as per local unit setting 2. (black) Logging is DISABLED on all units 3. (orange) Logging is ENABLED on all units <p>These latter two do not change the unit configuration, rather temporarily override them.</p>
	<p>Save adjustments to a .caf file Adjustments, described later, allow you to manually override testing results and to re-map cues to other locations as necessary Saving adjustments made can be useful if you are performing the same show over several nights (or you need to power off the App and don't want to lose your</p>

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	adjustments)
	Load an adjustments .caf file

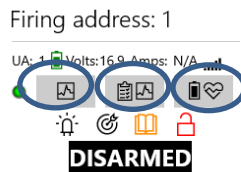
Testing unit control

Each firing unit is shown in the list, grouped by firing address:



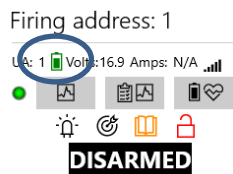
Where more than one unit has the same firing address they will fire identically, you can differentiate between them using the UA (Unit Address) as shown, this is useful when you are tracking down which unit has which issues.

Each unit has its own status and control panel:

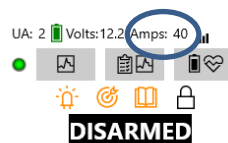


The three buttons circled have identical function to the master control buttons at the top of the testing screen – this permits selective status retrieval and testing of unit(s) rather than all. If you have several units you wish to pull the status or run tests for – just click their buttons, you don't have to wait for one to complete before starting another.

Battery level is shown with the battery icon, during battery load testing or before status is pulled this may show incorrectly, pull status for the unit(s) to read the latest battery level.

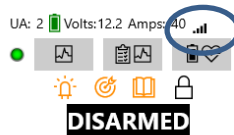


For a unit that has been load tested the firing amps will be shown:

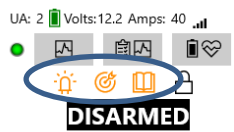


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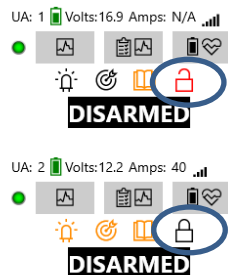
The radio signal strength is shown using a simple meter, for more advanced signal level detail go to the firing unit status page in the “Firing units” section.



The unit indicators tell of discreet, adaptive firing and logging on/off states but these will not automatically update when changing these on the unit or using the master controls – you need to pull a status update for all or for specific units as needed:



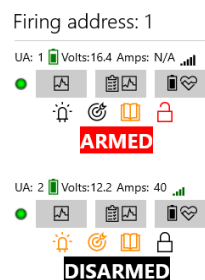
Arm lock status for firing units is shown with the usual padlock symbology, use this to identify which units will not arm and fire, this may or may not be acceptable for your show depending on what you intend to fire and when:



The unlocked padlock (🔓) means the unit is unlocked for arming – it will arm and fire when needed.

The armed status indicator shows whether the unit is disarmed, testing, not disarmed or armed.

Note that when transitioning between arm<>disarm status are not automatically updated – after arming or disarming the system (on the Firing page) you can pull status back for units at any time to check all are armed or all are disarmed.



In the above example we armed the system, pulled status back but UA2 was locked so is still showing as disarmed.

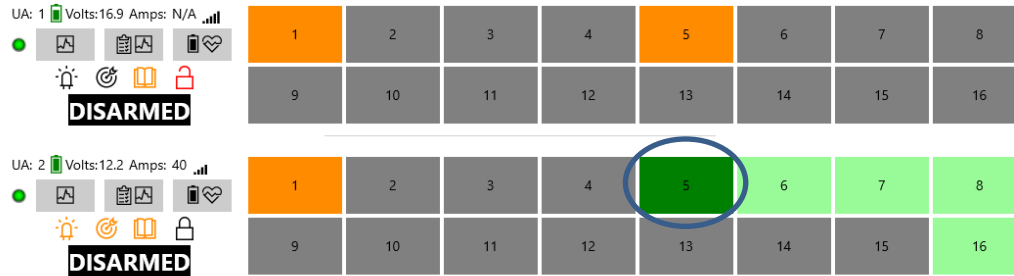
Cue status

Each unit has a set of 16 cues shown, these cues are buttons that are shown coloured according to their testing status. When clicked they bring up further information on that cue.

A handy legend is shown to describe the colourings:

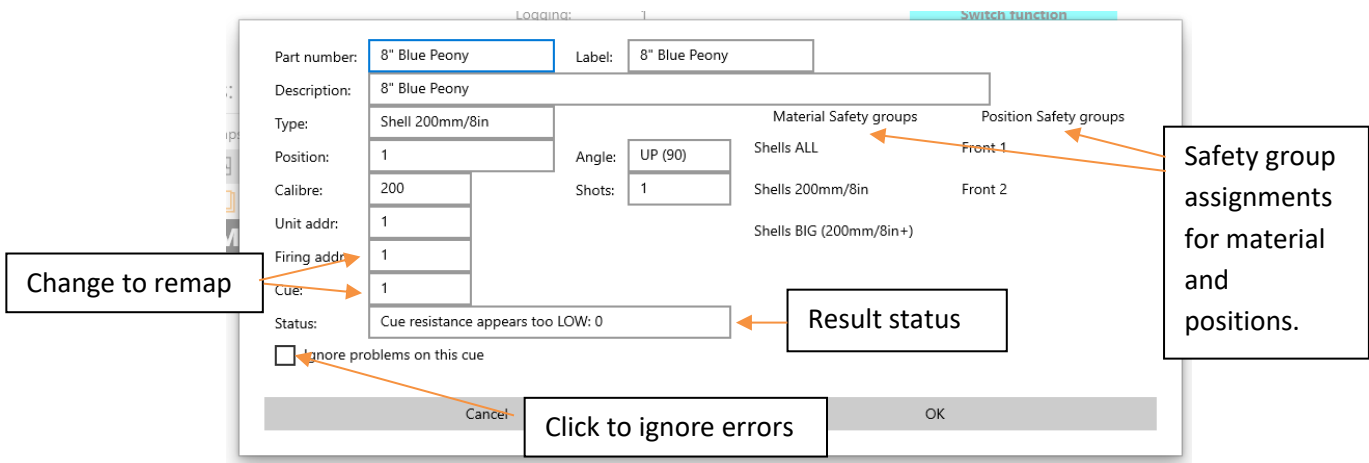
Pass firing file cue	Cue is defined in a firing file and continuity tests pass for this cue.
Pass additional cue	Cue is not defined in a firing file, this may be a manually fired cue. Continuity tests pass. If this is unexpected it may be connected to the wrong cue, especially if a firing file cue is showing as bad/missing.
Failed continuity	Cue is showing poor continuity but should not. Be sure to check electrical connection and also check the resistance and system voltage, poor continuity may also indicate inability to deliver 1 Amp of current.
Faults ignored	You have chosen to ignore problems on this cue, it will show as a 'pass' in the test results.
Remapped	This cue has been mapped to another FA/CUE and the cue being mapped to will take on the function of this cue – see later on remapping. This may be necessary if you have a damaged cue or need to move material around on the day and need to connect it to a different unit.
Switch function	This cue is operating as an electrical switch rather than a firing function, e.g. to control lighting, relays, smokes, wheel motors etc.
FAULT: Stuck on/off	The unit has detected this cue cannot be switched on (stuck off) or switched off (stuck on). An inability to switch a cue off is more severe – because it indicates a short circuit is occurring somewhere. Arming the system may cause instant ignition or system short circuit. It could be that the wiring connected to the cue is shorting to another, or to a power connection. Check all cue wiring and ensure the wires touch no other connections or metalwork on the unit. The test is very sensitive, rarely, under salt-water conditions a cue can appear “stuck on” as conductivity on the unit surface increases, clean and dry the unit and shield it from salt spray. If it is too late or not possible to do you can “ignore errors” – salt water will not affect the firing of the unit.
n/a	This cue appears unused and does not get recorded in the test results.

Firing address: 1



Cue detail

Clicking on a cue shows further information about that cue



Making adjustments

Ignoring errors

If you are convinced that an error can be safely ignored, and show as a pass for your results, open the specific cue detail dialog (above) and click the "Ignore problems on this cue". Click ok to make this adjustment.

Remapping

Sometimes it is necessary to move a cue to another cue – perhaps the cue terminal is broken.

Sometimes material on site needs to be moved and makes wiring difficult.

In both of these conditions it is possible to remap a cue from its original FA/Cue to a different cue or even a different FA/Cue.

Open the cue dialog you want to remap and change the Firing address and/or Cue assignment.

IMPORTANT: Remember that remapping affects the Firing Address and Cue number (not Unit Address UA). Remapping will affect ALL units using the same firing address even if you only change the cue number – all firing units with the same firing address will have their cue remapped.

In the below example we have remapped the cue from its original 1 to 2 on the same firing unit.

Logging: 1

Switch function

Part number: 8" Blue Peony Label: 8" Blue Peony

Description: 8" Blue Peony

Type: Shell 200mm/8in Material Safety groups Position Safety groups

Position: 1 Angle: UP (90) Shells ALL Front 1

Calibre: 200 Shots: 1 Shells 200mm/8in Front 2

Unit addr: 1 Shells PIC (200mm/8in)

Firing addr: 1

Cue: 2 Originally 1

Status: Remapped

Ignore problems on this cue

Cancel OK

Where a cue is *mapped to* now takes over the firing function, bringing up it the status for that shows where the mapping was made from. Use the original mapping to get information.

Logging: 1

Part number: Label:

Description:

Type: Angle:

Position: Shots:

Calibre: Unit addr: 2

Firing addr: 1

Cue: 2 Mapped from 1

Status: Cue resistance appears too HIGH: 54.2

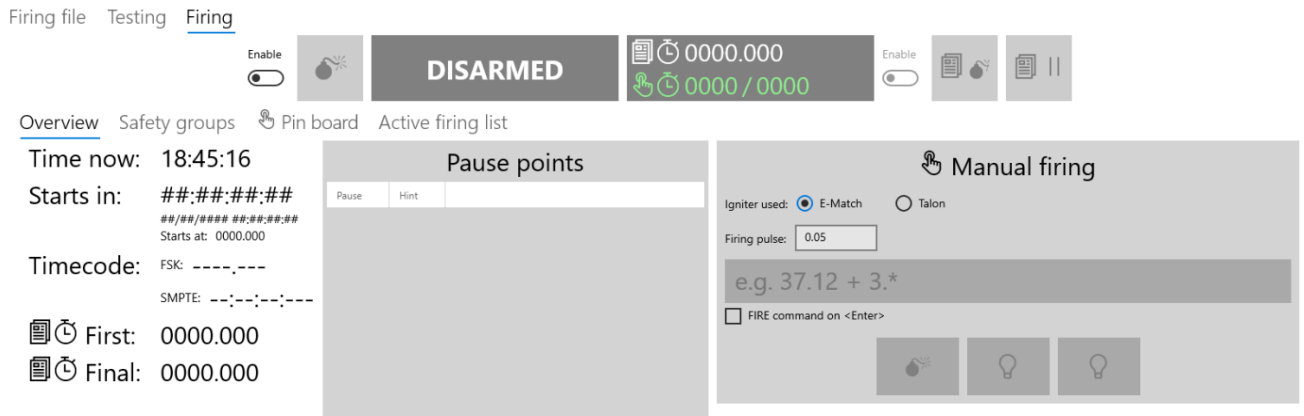
Ignore problems on this cue

Cancel OK

Note that a remapped cue affects both scripted and manual firing.

Arming

Arming, disarming and firing is done through the Firing page, when a firing file is loaded safety groups are also shown, all enabled.



Arming the system involves a number of steps:

1. Make sure all firing units that should fire are unlocked for arming, continuity tests are good and fire power is good, execute load tests ensures good fire power in batteries.
2. Unlock the interface units (CFCIU-1, for example). NOTE: There is a short time delay of 5 seconds after unlocking these units before they will show as unlocked. Locking is instant.
3. Enable the arming button:

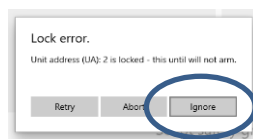


4. Arm the system:



Once you begin the arming process CATFire will warn you of any detected firing units being locked – you can safely ignore these if it's too late to change them or if the locked status is expected.

The unit address is shown for identification of the offending unit.



Once locked status checks have been cleared arming begins.

IMPORTANT: Should any *interface* units be locked e.g. the CFCIU-1 then arming is not possible – you must unlock all connected interface units.

IMPORTANT: Arm unlock/lock is not an enable/disable function – once the system is armed locking units will not disarm the system.

IMPORTANT: Locked firing units will not fire.

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If you have a firing file then all firing units will be programmed with their firing sequences, progress is shown in the information bar at the top.

Once programming is completed you will then see an armed indication:



Your system is now armed.

Manual firing can now occur at any time.

You can go back to the testing page and scan for status of the units to ensure all are armed as necessary.

Automatic firing of a firing file (script firing) requires additional steps, described later in “Script firing”.

IMPORTANT: Programming firing units with script sequences occurs when the system is first armed as described above, see later in “Script firing” for more information.

Disarming

Click the button to disarm the system. This will also stop any firing file firing too:



Typically the display will then revert to:



The “Not disarmed” indication will persist until you go to the testing page and scan all units to detect their true status.

Do not allow operators to enter the firing site until all units are once more disarmed.



Script firing

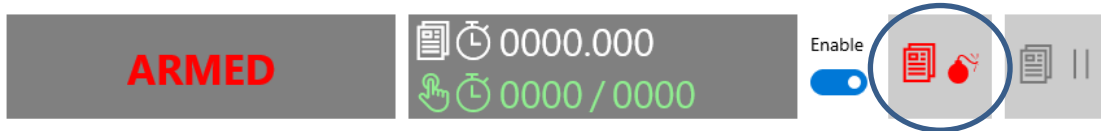
Arming script firing

If you have opened a firing file (or imported a CSV file) AND the system has been armed (see previously) you can then arm for script firing.

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Click the “Enable” button shown above to allow you to click the script arm button:



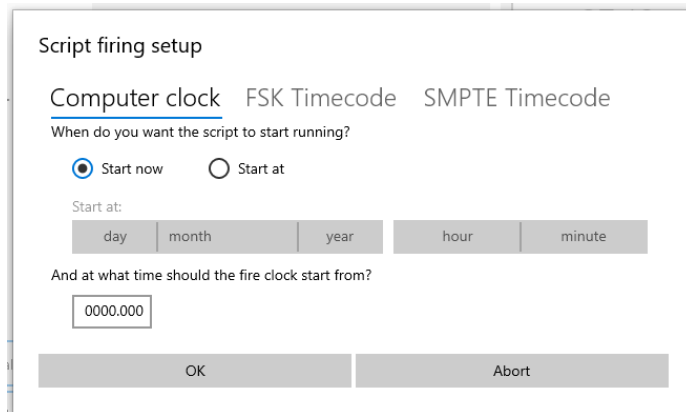
You are then presented with a dialog box where you configure how the script firing is to be controlled.

Computer firing

Computer clock firing is where the computer will drive the firing of the firing file.

Using the timing information from the computer internal clock.

This is the mode you need to use if you are not using the CFTIU-1 timecode interface unit.



Parameter	Function
Start now	When you click OK, script firing will begin immediately from the “Start from” parameter
Start at	A date/time is specified and will cause firing to be delayed until then. This is also known as “Unattended start” and extreme caution should be taken when using this feature because firing will start automatically – tight crowd control and observing of the firing site is needed. An operator should always be present at the firing computer to abort the firing. IMPORTANT: Ensure your computers clock is showing the correct time and is in the correct timezone.
Start from	Usually 0 (start of timeline). You can start your script from any time, useful if resuming from stopped script or you need to cut off part of your script.

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NOTE: Starting from any time other than 0 will not cause a huge ignition of cues prior to the start time.
 When CATFire firing units start firing from a paused state they will disregard cues prior to the start time.
 Please see "Re-arming script firing" for more information.

Local time

Enable **ARMED** 0000.000
0000 / 0000

Overview Safety groups Pin board Active firing list

Time now: 19:26:23
 Starts in: 00:00:33:37
 17/12/2022 20:00:00
 Starts at: 0000.000

Timecode: FSK: ---
 SMPTE: ---

Pause	Hint
0000.000	Auto starting at 17/12/2022 20:00:00

Manual firing
 Igniter used: E-Match Talon
 Firing pulse: 0.05
 e.g. 37.12 + 3.*
 FIRE command on <Enter>

For unattended start this is how long before the script begins.

With delayed start a pause point is added which will auto-resume when the firing is to start.
 If you need to override this and begin firing immediately you can press the Resume button:

Audio

If your firing file contained audio, audio is also played automatically. In this scenario you can connect your firing computers audio output to a PA amplifier / speaker system.

When pausing the script (pause point or manual pause) audio will also pause.

Timecode – CATFire FSK

Script firing setup

Computer clock FSK Timecode SMPTE Timecode

How will the script start?
 Starts when timecode is received Start manually

What happens on loss of timecode?
 Script pauses Script continues

After a loss of timecode, what happens when the timecode returns?
 Script resumes Resume manually

OK Abort

CATFire FSK timecode will fire your script according to the timecode signal given.

Firing will remain in sync with the timecode, which is in sync to the audio - typically provided by a Public Address (PA) system.

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Only timecode with the correct firing file ID encoded into it will be accepted preventing accidental firing to the wrong audio/timecode or upon reception of errant signals.

CATFire will start and stop the script as timecode arrives / is lost. This way pausing of the script is as simple as pausing the audio playback (usually causes a timecode signal loss as the signal mutes).

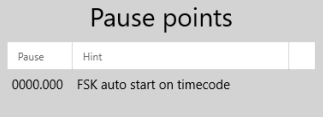

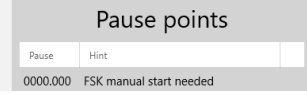

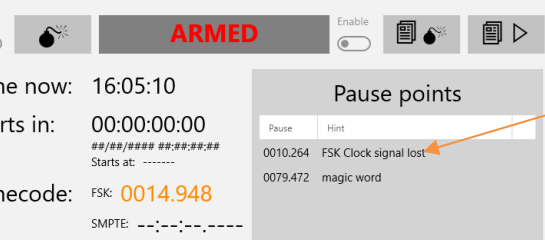
The FSK timecode clock can be seen here:

Timecode: FSK: 1742.246

The **colour** of the timecode signal is important:

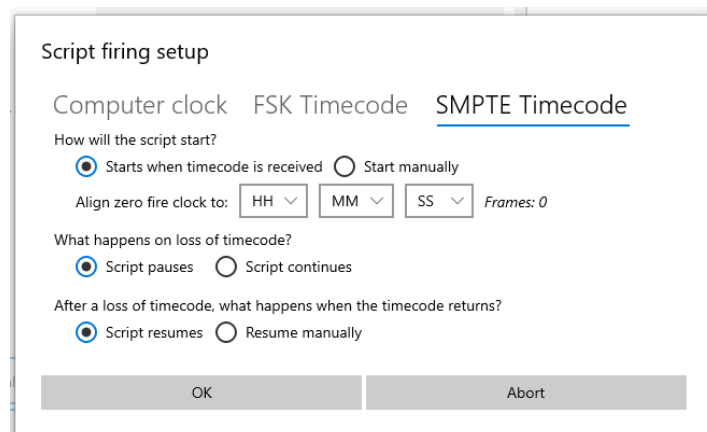
Colour	State	Description
Timecode: FSK: 0006.830	Good	Good time code is being received
Timecode: FSK: 1742.246	Backup	Timecode was received, the signal has been lost. Timecode is continuing to increment from last known timecode parameters. The script may be set to pause on timecode loss, but this clock will continue to increment in case you choose to override and manually resume. If the script is set to resume when the signal is received once more, the clock will reset to whatever the time signal is received at that moment.
Timecode: FSK: 0002.294	Computer	Timecode never received. User has overridden and resumed the script manually and the clock is being derived from the internal computer clock. If timecode signal arrives now it will be ignored.

Parameter	Option	Description
Script start		
	On timecode reception	Script will not start firing until a good timecode is received. A backup or computer timecode will be ignored. A pause point is added which will wait for the timecode signal to be received. Firing will start from whatever time the signal gives, not necessarily from the beginning – cues prior to this will not fire. You can manually start if there is an emergency by pressing the script resume button, in which case the script will fire only using

		<p>the computer clock. When firing from the computers clock timecode received thereafter will be ignored.</p>  <p>Script resume button:</p> 
	<p>Start Manually</p>	<p>A pause point is added to require manual start of script firing.</p>  <p>Begin script firing with</p>  <p>Wait until a good timecode signal is incoming then begin script firing – which will begin from the received time.</p> <p>If you begin firing and the clock is in backup mode it will pause once more to warn you of timecode loss. Resume once more to run from the backup clock time. If there is no timecode at all then the firing will use only the computer clock and timecode signal received thereafter will be ignored.</p>
<p>Timecode loss</p>		
	<p>Pauses</p>	<p>When good timecode signal is lost the script will pause and a pause point is added to show the reason and the time of the loss.</p>  <p>The clock will begin to run in backup mode.</p> <p>If there is an emergency you can chose to override and resume manually. Caution is needed in this case.</p> <p>The clock will continue to count in backup mode and overriding</p>

		<p>manually will start firing from whatever the time clock is showing.</p> <p>When a good timecode signal arrives once more the script will pick up from the received timecode.</p> <p>If the good timecode jumps ahead in time it will fire cues that should have occurred in the time gap.</p>
	Continues	<p>When the timecode signal is lost it will run in backup mode and the script will continue from that.</p> <p>When a good signal is received once more it will pick up from that time.</p> <p>If the good timecode jumps ahead in time it will fire cues that should have occurred in the time gap.</p>
Timecode returns		
	Resumes automatically	<p>If the script paused on timecode loss, the script will resume when a good signal is received once more.</p> <p>If the clock jumps ahead missed cues will not fire.</p>
	Resume manually	<p>If the script paused on timecode loss it will be running in backup mode.</p> <p>Wait for a good signal and resume manually.</p> <p>If you resume while running on backup the script will resume from the current backup time.</p> <p>If the clock jumps ahead missed cues will not fire.</p>

Timecode – SMPTE LTC



Many of the same behaviour for FSK applies to SMPTE LTC.

However the parameter to understand is the clock alignment:

Align zero fire clock to: *Frames: 0*

SMPTE LTC time is expressed in terms of hours, minutes and seconds.

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CATFire firing is expressed in terms of fractional seconds to 1 millisecond e.g. 0.001 is 1 thousandth of a second.

CATFire needs to map the incoming SMPTE LTC to its own timings.

For absolute mapping simply set the alignment to 0 hours, 0 minutes and 0 seconds.

When the SMPTE LTC signal received is 1 minute, say, CATFire will convert this to 60 seconds for its own clock use.

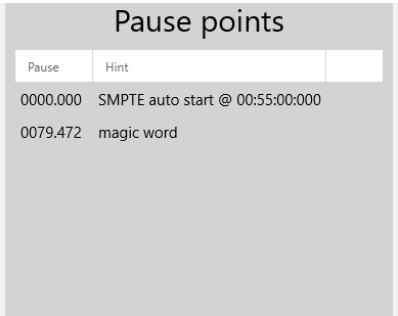
CATFire scripts are designed from a timeline that starts at 0 seconds.

Where the incoming SMPTE LTC signal is from a broadcaster it may be the case that the broadcaster wants the show to begin much later in the broadcast, the broadcaster may say the script should start 0 hours, 55 minutes and 0 seconds into the broadcast signal.

You would set the alignment to this time.

When the SMPTE LTC signal received reaches this time the firing clock will begin running from 0 and in synch with the incoming clock.

NOTE: SMPTE LTC is not allowed to run backwards.



Pause	Hint
0000.000	SMPTE auto start @ 00:55:00:000
0079.472	magic word

A pause point is added and firing will start from 0 firing clock when the incoming SMPTE LTC is at least at this time.

Should the clock jump ahead of this alignment when the script starts missed cues will not fire.

Timecode – understanding clock jumps

Clock jumps are time discontinuities – e.g. a clock change that is not linear but jumps forward by a number of seconds, say.

Clock jumps can also be backwards in time.

Reading the previous sections on timecode you should have noticed that sometimes jumps in time will cause cues that should have fired in the time gap will fire immediately, sometimes they will not and will simply be missed.



Why is this and how does CATFire handle clock jumps?

Put simply: If the script is paused, when the script resumes any missed cues caused by a clock jump will not fire. The action of resuming from pause throws out missed cues.

So, let's say your script is 300 seconds long. If the clock were to begin at 0 then pause. Then resume at 300. Nothing will fire.

However, if your script is running and the clock jumps with no loss of signal then cues missed in the time gap will fire immediately.

Example: if the timecode being received starts at 0 then immediately jumps to 300 your entire display will fire instantly.

If clocks jump backwards the time is simply honoured and continues from there but since cues would have fired already they will not fire again.

SMPTE LTC is an exception here.

SMPTE LTC is not a robust time signal – it was designed for video editing where noise is not an issue, the computer can just read the signal again from the video tape. SMPTE LTC was not designed for controlling explosives.

However many people do especially when working with broadcasters that need to synchronise a live display to broadcast music.

Noise in the signal can lead to huge time discontinuities even if just for a fraction of a second.

For SMPTE LTC the CFTIU-1 adds heavy filtering and testing to the signal to weed out noise. However some time jumps could still occur. Time jumps of more than 1 second are ignored, CFTIU-1 expects to see a linear positive progression of time.

If the jump was simply noise this will be weeded out.

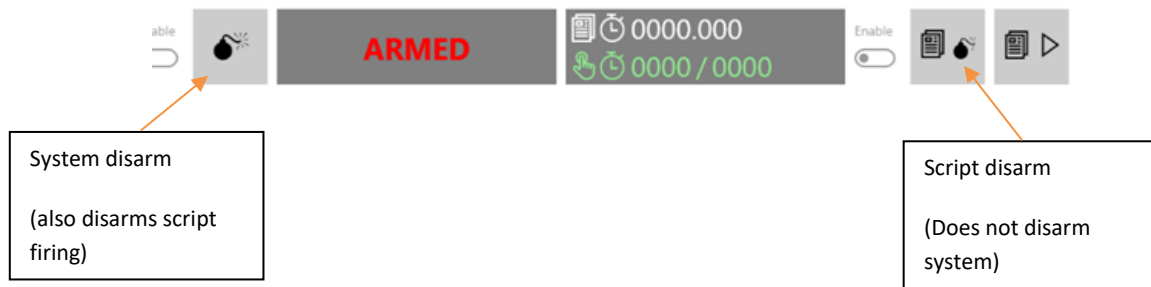
But if the jump was intentional and permanent the CFTIU-1 will also weed this out as noise and will eventually register this as a clock signal failure.

The display will pause – if configured to do so.

The CFTIU-1 will eventually retrain to the incoming signal which will go good again and the display will resume from that new time. Since there was a running->paused->running transition any cues that should have fired in the time gap will be missed.

Disarming script firing

Scripts can be stopped / disarmed using the script disarm button or the system disarm button, either will do. The system disarm button will disarm the entire system. Script disarming will stop script firing.



NOTE: Disarming the script still permits manual firing to occur, provided the system is still armed.

Re-arming script firing

If a script has to be stopped during the display you may wish to resume it.

You can simply re-arm the script as described in the earlier sections – perhaps setting the initial clock to the point you want to resume. For timecode the signal should resume at the point you want the script to start again.

An important consideration is that the firing units have the cue firing sequences programmed when the system is armed – NOT when the script is armed.

This means that any cues that have fired will have been removed from their programs and will not fire again, this is evident if you start again from firing clock time 0.

If you need all cues to fire again from the start, you must disarm the entire system then re-arm, the units will be programmed afresh.

Arming signal loss

During firing of your script the arming command is sent continuously.

If firing units do not receive any arm signal for 30 seconds they will disarm.

It is possible for radio signals to become intermittent during firing – perhaps equipment has fallen over and is causing a radio signal to become blocked and weaker.

Provided at least one arming command is received once every 30 seconds units will continue to run as expected.

However if they disarm themselves automatically it is possible for them to re-arm later should they get another arm signal received.

In this situation firing units will not fire any missed cues, they will simply pick up from the new time signal received.

Clock information displays

Overview Safety groups Pin bc

Time now: 19:37:38

Starts in: ##:##:##:##
 ##/##/#### ##:##:####
 Starts at: 0000.000

Timecode: FSK: ----.----
 SMPTE: --:--:--:----

📄🕒 First: 0000.000
 📄🕒 Final: 0000.000

Time of day (make sure your computer clock is correct)

Unattended start parameters

Timecode signal reception
 More information can be seen on the CFTIU- status page

Counts down to the first and last cue that fires.
 Note that this may be a switch operation.

Enable **ARMED** 0000.000 0000 / 0000 Enable

Firing clock the script is firing to right now.

Manual firing command clock.
 Begins to count when first manual firing command is issued (command line or pin board).
 Use this to pace manual firing operations.

Manual firing command clock.
 Starts from 0 on each manual firing command.
 Use this to time the duration of the last firing command, e.g. duration of fireworks.

Safety groups

If you arm the system with a firing file or CSV file, the safety groups contained within are shown in the “Safety groups” section of the firing page.

Firing file Testing Firing

Enable **ARMED**

Overview Safety groups Pin board Active firing list

Material safety Position safety

0Wheels ALL	1Setpieces ALL	2Maroons/Salutes ALL	3Whistles ALL
-------------	----------------	----------------------	---------------

Further arranged by material and position, simply click or tap on the “Material safety” and “Position safety” to see each set of controls.

Material safety		Position safety					
<input checked="" type="checkbox"/> 1Wheels ALL	<input checked="" type="checkbox"/> 15Setpieces ALL	<input checked="" type="checkbox"/> 2Maroons/Salutes ALL	<input checked="" type="checkbox"/> 3Whistles ALL	<input checked="" type="checkbox"/> 4Flares ALL	<input checked="" type="checkbox"/> 5Strobes ALL	<input checked="" type="checkbox"/> 6Petrol lifters ALL	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> 7Mines ALL	<input checked="" type="checkbox"/> 8Gerbs ALL	<input checked="" type="checkbox"/> 9Cakes ALL	<input checked="" type="checkbox"/> 10Confetti ALL	<input checked="" type="checkbox"/> 11Rockets ALL	<input checked="" type="checkbox"/> 12Rockets BIG ALL	<input checked="" type="checkbox"/> 13Candles ALL	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> 14Single shots ALL	<input checked="" type="checkbox"/> 15Fan slices ALL	<input checked="" type="checkbox"/> 16Shells ALL	<input checked="" type="checkbox"/> 17Shells 50mm/2in	<input checked="" type="checkbox"/> 18Shells 75mm/3in	<input checked="" type="checkbox"/> 19Shells 100mm/4in	<input checked="" type="checkbox"/> 20Shells 125mm/5in	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> 21Shells 150mm/6in	<input checked="" type="checkbox"/> 22Shells 200mm/8in	<input checked="" type="checkbox"/> 23Shells 300mm/12in	<input checked="" type="checkbox"/> 24Shells 400mm/16in	<input checked="" type="checkbox"/> 25Shells BIG (200mm/8in+)	<input checked="" type="checkbox"/> 26Water cakes ALL	<input checked="" type="checkbox"/> 27Parachutes ALL	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> 28Pigeon ALL	<input checked="" type="checkbox"/> 29Lancework ALL	<input checked="" type="checkbox"/> 30Fire rope ALL	<input checked="" type="checkbox"/> 31Close Proximity ALL	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Material safety		Position safety					
<input checked="" type="checkbox"/> 1Front 1	<input checked="" type="checkbox"/> 1Front 2	<input checked="" type="checkbox"/> 2Front 3	<input checked="" type="checkbox"/> 3Front 4	<input checked="" type="checkbox"/> 4Front 5	<input checked="" type="checkbox"/> 5Front 6	<input checked="" type="checkbox"/> 6Front 7	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> 7Front 8	<input checked="" type="checkbox"/> 8Front 9	<input checked="" type="checkbox"/> 9Front 10	<input checked="" type="checkbox"/> 10Front 11	<input checked="" type="checkbox"/> 11Shells/Rockets 1	<input checked="" type="checkbox"/> 12Shells/Rockets 2	<input checked="" type="checkbox"/> 13Shells/Rockets 3	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> 14Shells/Rockets 4	<input checked="" type="checkbox"/> 15Shells/Rockets 5	<input checked="" type="checkbox"/> 16Pontoon 1	<input checked="" type="checkbox"/> 17Pontoon 2	<input checked="" type="checkbox"/> 18Pontoon 3	<input checked="" type="checkbox"/> 19Rooftop 1	<input checked="" type="checkbox"/> 20Rooftop 2	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> 21Rooftop 3	<input checked="" type="checkbox"/> 22Close proximity	<input checked="" type="checkbox"/> 23Stage	<input checked="" type="checkbox"/> 24Water	<input checked="" type="checkbox"/> 25Overhead	<input checked="" type="checkbox"/> 26Lines	<input checked="" type="checkbox"/> 27Bridge	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> 28Body worn	<input checked="" type="checkbox"/> 29Gantry	<input checked="" type="checkbox"/> 30Scaffold	<input checked="" type="checkbox"/> 31Wall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

During firing the safety groups enable/disable states are continuously transmitted to the firing units.

Simply clicking a safety group on/off will be enough to control whether firing occurs for that group.

It goes without saying that any chains of pyrotechnics that are burning cannot be stopped once ignited, greater control can generally be obtained by having less chains and more single cue ignitions.

You should make your decisions on whether to disable a safety group in good time.

A technical note is that safety group information is transmitted together with the arming commands to the firing units – which occur continuously when armed.

Since firing units will disarm themselves if they do not receive an arming command (and therefore safety group information too) for 30 seconds, try to make your safety group decisions at least 30 seconds in advance.


This way you know that if a safety group change cannot be received by firing units (signal issues have occurred during your show) then natural disarming will occur anyway.

If the radio signal is becoming intermittent, it is possible for a unit to re-arm itself sometime later upon reception of an arm signal once more, one might consider the impact on safety group information in this case.

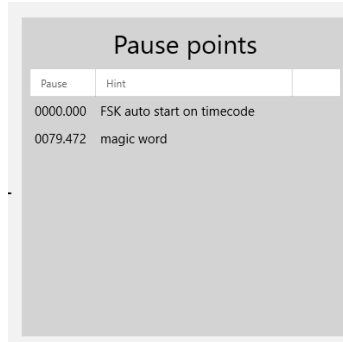
However there is no concern, since the firing unit(s) will also receive the new set of safety groups along with that arm command received and take appropriate action with them to control any new firing of cues.

Pause points (semi-auto and timecode events)

The pause point list shows the upcoming pauses and, when paused, the current reason why.

NOTE: Script firing is currently paused when the resume button has become enabled: 

You can always manually resume any pause point, but some will auto-resume when their condition is met.



The pause list is only shown when the script is armed.

Active firing list



With a script file opened, the active firing list can be viewed by clicking on the bar shown above.



The active firing list is shown:

Overview	Safety groups	Pin board	Active firing list
00135.950	00139.000	BLUE CHRYS 75MM	SHELLS_LEFT SHELLS_75 ALL_SHELLS SHELLS_LEFT
00135.950	00139.000	BLUE CHRYS 75MM	SHELLS_RIGHT SHELLS_75 ALL_SHELLS SHELLS_RIGHT
00135.950	00139.000	BLUE CHRYS 75MM	SHELLS_CENTRE SHELLS_75 ALL_SHELLS SHELLS_CENTRE
00141.850	00142.000	WHEEL R G B TRANSITION	WHEEL_RIGHT DROSSY WHEELS FRONTAGE
00141.850	00142.000	WHEEL R G B TRANSITION	WHEEL_CENTRE DROSSY WHEELS FRONTAGE
00141.850	00142.000	WHEEL R G B TRANSITION	WHEEL_LEFT DROSSY WHEELS FRONTAGE
00142.100	00142.100	WHEEL MOTOR	WHEEL_RIGHT
00142.100	00142.100	WHEEL MOTOR	WHEEL_CENTRE
00142.100	00142.100	WHEEL MOTOR	WHEEL_LEFT
00169.850	00170.000	BIG RED BURSTS	POS3 CAKES_30MM FRONTAGE
00179.850	00180.000	BIG RED BURSTS	POS4 CAKES_30MM FRONTAGE
00179.850	00180.000	BIG RED BURSTS	POS2 CAKES_30MM FRONTAGE
00189.850	00190.000	BIG RED BURSTS	POS1 CAKES_30MM FRONTAGE

Both firing and switch operations are shown.

Consider a line in the active firing list as follows:

00135.950	00139.000	BLUE CHRYS 75MM	SHELLS_CENTRE	SHELLS_75 ALL_SHELLS SHELLS_CENTRE
-----------	-----------	-----------------	---------------	---

  or	Firing or switch operation indication
00135.950	<p>The active firing list is ordered by the firing time – not the cue time.</p> <p>The firing time is the precise time the cue will be activated, which accounts for ignition and lift times.</p> <p>This is a different order than the master cue list contained in your firing file.</p> <p>NOTE: Pause points are not shown in the active firing list.</p> <p>The number shown in brackets is the cue time.</p>
00139.000	The second number shown is the cue time, the time of the effect being seen.
BLUE CHRYS 75MM	Description of the material being fired
SHELLS_CENTRE	Position the material is being fired from
SHELLS_75 ALL_SHELLS SHELLS_CENTRE	<p>Safety groups assigned.</p> <p>The first row are the material safety groups assigned, each group is separated by a bar </p> <p>The second row is the position safety groups.</p>

Updating

During firing the active firing list will colourise the rows to show what action is being taken.

An orange row has ignited and is now in its lifting phase, this will be more evident for shells and rockets and that have a longer lift time.

00135.950	00139.000	BLUE CHRYS 75MM	SHELLS_RIGHT	SHELLS_75 ALL_SHELLS SHELLS_RIGHT
-----------	-----------	-----------------	--------------	--

A red row is now firing its effect (or switching is on).

00179.850	00180.000	BIG RED BURSTS	POS2	CAKES_30MM FRONTAGE
-----------	-----------	----------------	------	------------------------

A green row has been disabled by a safety group.

00059.950	00060.000	SALUTE	POS2	SALUTES FRONTAGE
-----------	-----------	--------	------	---------------------

NOTE: When time comes to fire a cue disabled by safety group, the cue will be immediately removed from the list, re-enabling a safety groups will not cause ignition of missed firings.

Adaptive firing

The active firing list cannot mimic adaptive firing behaviour.

Where adaptive firing features are used the behaviour of the firing site and this list may differ slightly.



Each firing unit can have its own adaptive firing behaviour, indeed several firing units could have the same firing address (FA) but with different adaptive behaviour, it is not possible to mimic this dynamic firing unit response here.

The active firing list will use absolute timings and will behave as if adaptive firing is disabled.

List refresh

The active firing list will be re-populated afresh when the system is disarmed.

If you disarm the script only, the active firing list is not re-populated.

Script Run-through

You can run through your firing file ahead of show time to check all is okay and cues fire as expected.

To do this:

1. Do not connect any CFCIU-1.
2. Connect the CFTIU-1 timecode unit if you want to test using a timecode feed.
 - a. If music is needed ensure speakers and amplifiers etc. are also set up.
3. Open the firing file.
4. Go to the firing page and Arm the system.
5. Now arm the script – selecting the clock source required.
6. Start the firing (e.g. begin the timecode feed)
7. Show the active firing list.
8. Observe the active firing list, ensure the music is playing and the cues are firing as expected.
 - a. Understand that when a firing list row turns Red that is the point at which users will see the effect of that pyrotechnic item, the colour will remain red for the duration of the effect.

You can also test using firing units connected via the CFCIU-1, in this case you should connect LED's or other lamps to the cues of your firing units. Observe that the LED/Lamp will flash for the firing pulse configured the moment the active firing list entry turns yellow (ignition + lift).

NOTE: The LED/Lamp will only flash for the configured firing pulse time which when using E-Matches is very brief.

Ensure that the LED/Lamp you intend to use can tolerate the voltage of the firing unit, e.g. 18 volts.

Manual firing

Manual firing of cues can occur at any time, before, during or after script firing.

CATFire provides two methods of manual firing.

Command based

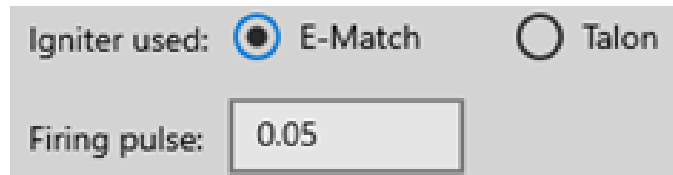
The main firing screen contains a command area where entering commands can initiate firing or switching operations:

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Manual firing commands are best typed using the numeric keypad on a computer keyboard, when a laptop is being used, an external USB connected keypad can be used for convenience.




First ensure the correct firing pulse is selected for the igniters you use, select E-Match or Talon™ igniters or type your own value (in seconds, e.g. 0.2 is 200 milliseconds of firing pulse):



All firing commands take the form of:

Firing Address DOT Cue number

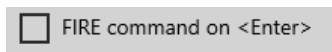
For example entering 1.3 and pressing  will fire cue 3 on FA 1 with the firing pulse selected for manual commands.

Command	Action
	Command will cause cues to be fired using the firing pulse configured
	Command will cause cues to be turned on
	Command will cause cues to be turned off

For more convenient firing you can permit pressing the Enter key on the keypad to act as a press of



and fire the cues.



Command forms

Complex manual command sequences can be entered – all cues will fire (or be turned on/off) at the same time.

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Form	Examples	Effect
FA.Cue	1.3 67.9	FA 1, cue 3 is fired FA 67, cue 9 is fired
FA.Cue.	1.3. 1.3.. 3.9... 128.15. 128.15..	FA 1, cues 3 and 4 are fired FA 1, cues 3, 4 and 5 are fired FA 3, cues 9, 10, 11 and 12 are fired FA 128, cues 15 and 16 are fired Error: There is no cue 17
FA.Cue+	1.3+5.7 1.3.+5.10..	FA 1, cue 3 and FA 5 cue 7 are fired FA 1, cues 3 and 4 and FA 5 cue 10, 11 and 12 are fired
FA.*	1.* 3.*+9.2..	All cues on FA 1 will fire All cues on FA 3 and cues 2, 3 and 4 on FA 9 will fire
*.4	*.4 *.10... *.1+*.10.	Cue 4 on all firing addresses will fire Cue 10, 11, 12 and 13 will fire on all firing addresses Cue 1, 10 and 11 will fire on all firing addresses
.	*.*	Everything will fire. Use with caution.

You can use + to combine as many commands as you like.

The use of dot (.) to add consecutive cues can be added up to the 16 cue limit for a firing address given.

If you enter a bad command, the part that is bad is shown in red, the command is not actioned.

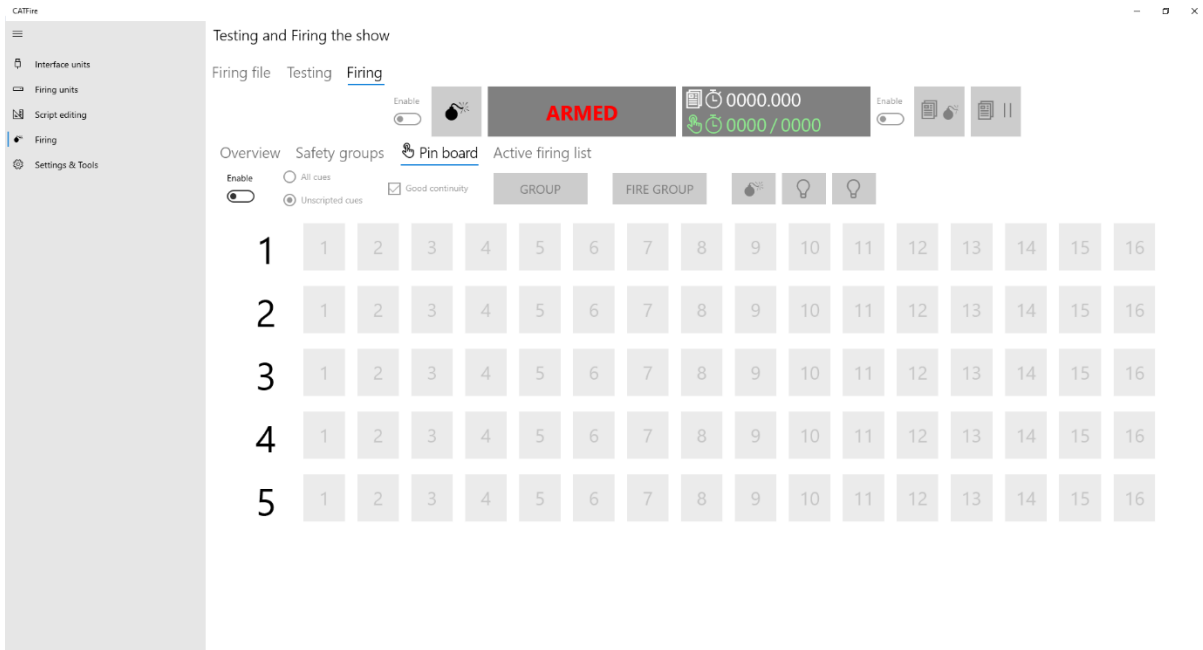
1.1+3.1

In the above example the form looks correct, however you can only add firing addresses that have been scanned in “Firing units” section – any firing address that is not known is an error.

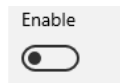
Pin board

For those that wish to use a traditional pin board approach, perhaps you have a touch screen and it's easier to simply tap on the screen to fire (or turn on/off) you can expand out the pin board.

At the right hand side of the firing page click the pin board bar to expand it out:



In the above example firing addresses 1 thru 5 are known to the system and shown in the left hand side of the pin board.



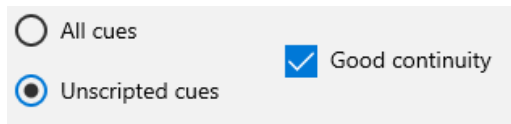
The pin board must be enabled with

Once enabled care must be taken especially if you have a touch screen as firing will be immediate.

Selecting what can be fired

Once enabled the pin board will allow you to click cues on each Firing Address shown, firing commands are transmitted immediately.

To make it less likely you will fire incorrect cues you can enable and disable certain cues with the control options:




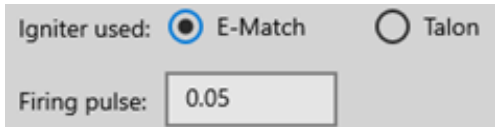


Control option	Good continuity checked?	What cues are enabled
Unscripted cues	Yes	Only cues that are not in a firing file and also have good continuity may be fired using the pin board. This prevents accidental firing of cues that should be fired by the script instead.
Unscripted cues	No	All cues whether good or bad continuity that are not to be fired from a script can be fired using the pin board.
All cues	Yes	All cues that show good continuity may be fired

		using the pin board – including cues that are to be fired in a firing file.
All cues	No	Every available cue can be fired using the pin board

Unticking “good continuity” may be necessary for some cues that have devices such as motors, relays or lights attached because they will not test for good continuity.

Pin board firing action

Pin board can be used to fire, turn on and turn off cues (operate them as switches), select the action desired:

	Cues will fire according to the firing pulse selected on the manual firing command screen 
	Cues will be turned on
	Cues will be turned off

A red border will appear around the selected action:



Cue action indicators

For cues fired from the pin board, each cue is marked with the action last taken on it:

1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

This helps you to know what you have fired or turned on/off.

The colour coding corresponds to the action taken.

Group firing

Groups of cues can be fired (or turned on/off as desired) all as one group.

You can mix firing, turning on and off all as one group.

To group fire press the GROUP button which highlights in blue.



Then:

1. Select the action you want to perform (fire, on or off)
2. Select the cue(s) you want to action.
 - a. The action indicator for each cue begins to flash in the intended action colour.
 - b. If you make a mistake, click the cue again and its action will be removed.
3. Repeat from 1 to change the action and select more cues as needed.
4. Press FIRE GROUP when happy.

NOTE: To cancel all of your pending selections without any firing click the GROUP button to cancel group firing.

Reordering the pin board

Firing addresses are shown in FA order.

It may be that you need some firing addresses to be ordered differently – perhaps for more convenient access / save you from scrolling through the list of available firing addresses.

To reorder the pin board simply:

1. Position your mouse over the firing address number on the left hand side of the row
2. Hold your mouse button down
3. Drag the row to its intended position – other rows will ‘move out of the way’ to allow this row to be ‘dropped’ into its new place
4. Release the mouse to drop the row into its new place.

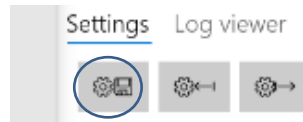


Be sure to save the adjustments file (on the testing screen) so you can restore your arrangements if you need to restart the app.

Settings & Tools

Saving settings

Whenever you make any changes to your settings you are changing runtime settings. You must remember to save them back to disk by pressing the button shown here.

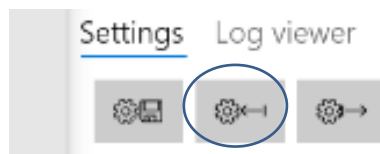


This allows you to make changes to your settings and use them within the app without saving them to disk until you are happy with them.

Import/restore settings

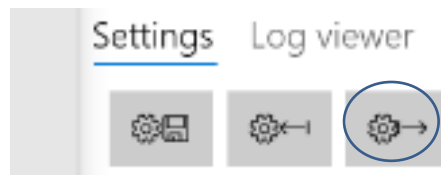
If you wish to restore your settings to an earlier backup, or perhaps set your App up to match a colleagues settings you can import a .casx settings file with this button.

Once imported remember to save them back to your own disk file with the save button above!



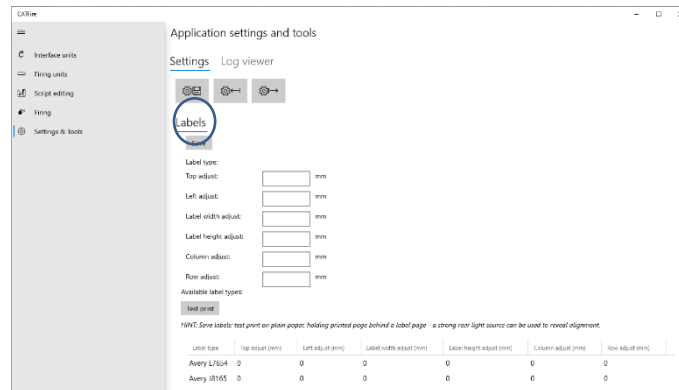
Export/backup settings

If you wish to make a copy of your settings and store them for backup purposes or perhaps to share with someone else you can export your .casx settings file with this button.



Settings - Labels

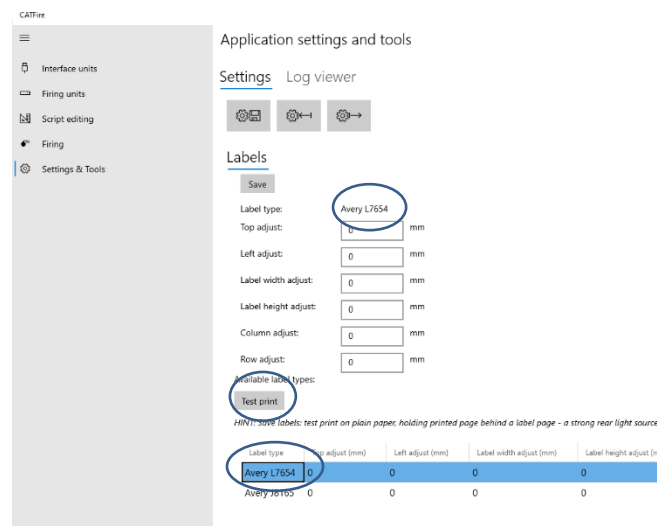
Within settings you can find the Labels adjustment, this allows you to adjust the label alignment to your printer.



Making label adjustments

From the list of available label types select a label.

Its parameters are loaded into the editor above.



Next, load plenty of low weight (gsm) plain white paper into your printer and click Test print button. Print the test sheet to plain paper – don't waste label paper which is more expensive.

Take a sheet of your label paper and hold the two sheets together, with the test print behind.

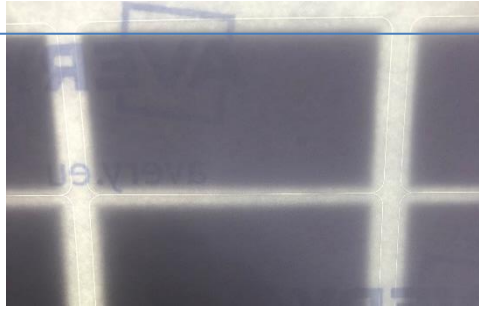
Shine a strong light behind them both – you will be able to see the alignment of the black boxes to the labels.

Run through the following process to get your labels aligned to your printer.

STEP 1: Align the TOP row of labels only. Ensure the black boxes are just within the top border of the labels. Specify a positive or negative (e.g. -5.00) value in millimetres.

A negative value will move the black boxes toward the top of the page, a positive one further down the page. Type in the adjustment value into the "Top Adjust" and click SAVE, then print another test page.

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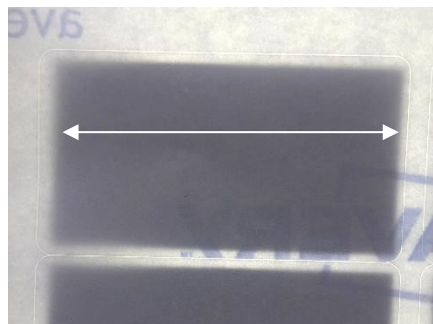


STEP 2: Align the LEFT column labels only, enter your adjustment into the “Left Adjust” box, click save then another test page. A negative value will move the labels to the left hand edge, a positive further away from the left hand edge.



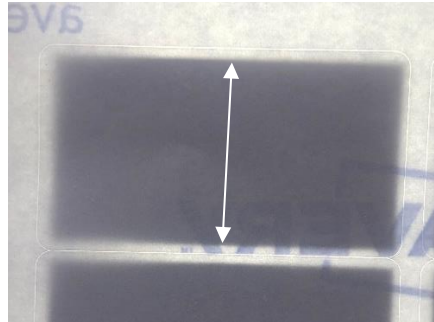
STEP 3: Now you have your top row and left hand column edges set, ensure the WIDTH of the LEFT HAND column only is correct. Type this adjustment into the “Label width adjust” box. Click Save the print another test page.

A negative will make the box smaller, a positive wider.



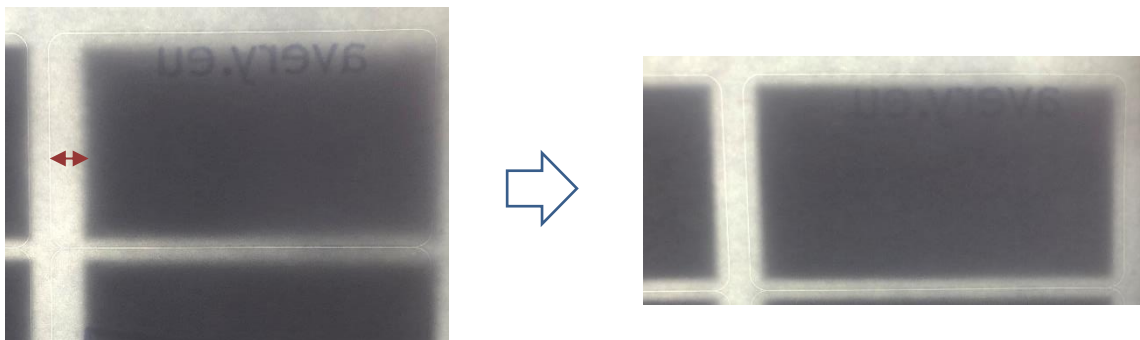
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STEP 4: Now do the same for the HEIGHT of the TOP ROW only is correct. Enter your adjustment into the “Label height adjust” box, and click Save button before printing the test page.



STEP 5:

Now look at the RIGHTMOST COLUMN of the TOP ROW, the black box should be aligned to the left of the label as accurately as the leftmost column box is in STEP 2. If not then adjust the “Column adjust” to space them correctly. This is a fine adjustment – possibly fractions of a millimetre (e.g. +/- 0.5) because the adjustment accumulates across the row.



Once the left edge of rightmost column is correct all columns should have their left edges aligned.

If they are not it is likely the width of the labels is incorrect – go back to step 3.

STEP 6: Do the same for the rows. Align the top edge of the last row of labels to the top edge of the black boxes. Adjust “Row adjust” accordingly. Once again this is a fine adjustment.

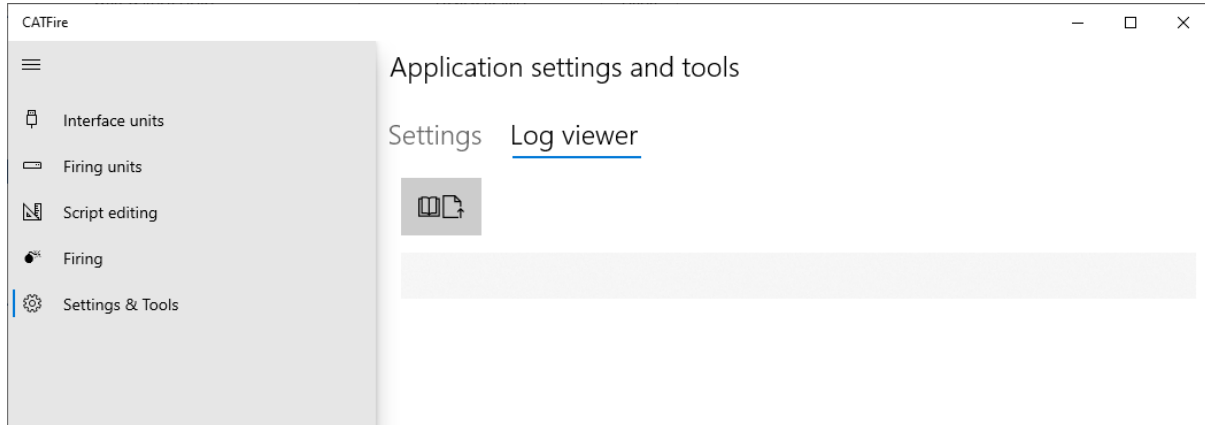
If they are not it is likely the height of the labels is incorrect – go back to step 4.

Once completed and happy save your settings with a press of

[Settings](#) [Log viewer](#)



Log viewer

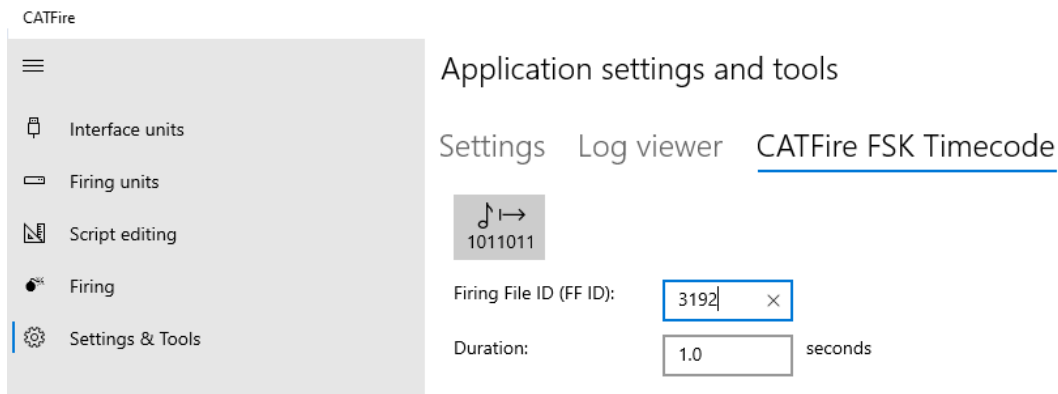


The log viewer allows you to open a log file that you have saved previously or received from someone else. This is useful where the device for which you want to examine the log is not available.

Opening the log file is described earlier in this document under CFCIU-1 Interface “Unit Log”.

CATFire FSK Timecode generation

FSK Timecode generation feature allows you to create a mono wave file containing CATFire FSK Timecode.



Usually, timecode is generated as part of your visual script design in its Wiring and Reports section.

However, when working with CSV files such as CATFire CSV or Finale 3D Generic CSV you may need this feature when wanting to fire your CSV script to timecode.

The audio file generated can be any number of seconds long, minimum 1 second. It must be longer than the last cue time to be fired in your CSV file.

You should also include lead in time – timecode time before the first cue fires.

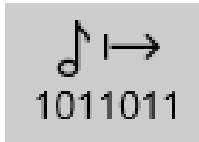
Timecode always starts from 0 seconds.

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You specify the Firing File ID to match to the firing file being fired, this is defined in the CATFire CSV INFO record's FF_ID field. For Finale 3D CSV this is specified by you on the import dialog.

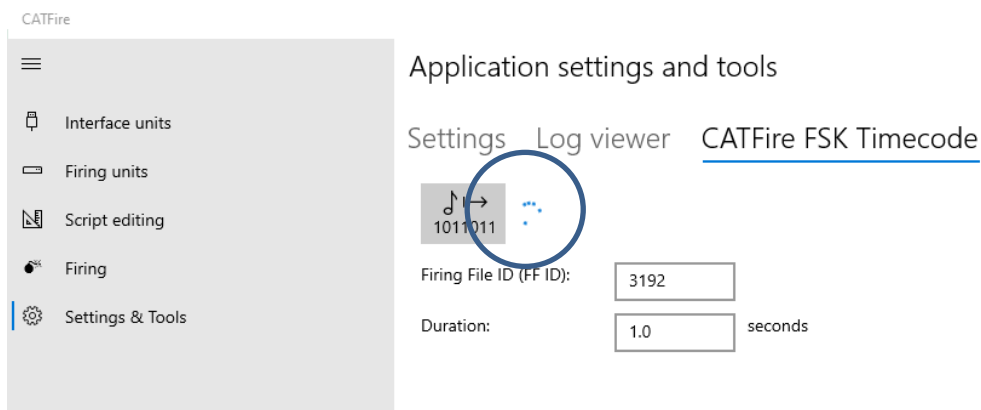
Enter the number of seconds of timecode you want to generate.

Click the generate button:



You are prompted to specify where the file is to be saved. A default name is chosen but you can change this.

Generation of timecode can take a while, timecode is being generated when the processing wheel spins:



CFWFS-1 Licence

This section shows the licence code assigned to this app.

Appendices

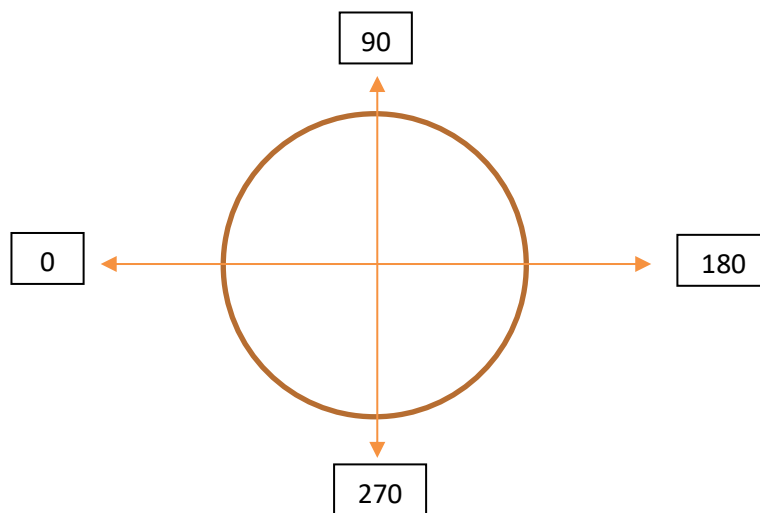
Sequence patterns

Understanding angles

Absolute

Angles in CATFire Design are from 0 to 360 degrees.

Viewed from the front, 0 is hard left, 90 is vertical upwards, 180 is hard right, 270 is vertical downwards.



Descriptive

On labels and reports it is possible to have CATFire convert these absolute angles into descriptive ones.



CATFire will translate into form that is easier for operators to follow and is compatible with many inclinometers that will give an incline from 0 to 90.

Angle	Descriptive example
45	LEFT 45
135	RIGHT 45
225	DOWN/RIGHT 45
315	DOWN/LEFT 45

Positions functions

Positions functions perform one or more steps across a range of given positions:

Sequence positions program:

Function: Loop Z W-in W-out Pause-Point

Steps:

The order of the positions and material given in the program is important as the steps will operate over them in the order given.

You can specify more steps than there are positions – in which case the program will re-iterate over the positions given according to the function.

The special pause point function requires no positions or material: it adds a pause into the display for semi-auto purposes. It only requires Time to be specified.

The program starts at the given Time and Angle.

For each step the Position(s) and Material(s) are selected according to the function and the per-position function is invoked with these parameters as its starting point.

Then the step counter is advanced and a new Time, Angle, Positions and materials are selected. Time and Angle are advanced according to Time step and Angle step and acceleration specified.

Each step a number of material items are selected to be given to the per-position function (Material items defines this amount).

Each step of the program advances through the materials in the program by “Material Step”.

Material offset can be used in some special cases to begin selecting material from within the set of assigned material rather than from the first material items in the set.

Step Acceleration

Both time and angle have an acceleration option.

The acceleration modifies the Angle or Time step on each step of the program.

This is a multiplier, so 1 means no change occurs.

For time a value from 0 to 1 means to make the time step smaller each time (speeding up) and a value greater than one will progressively slow down.

For angles a value from 0 to 1 means to make the angles advance progressively smaller, while a value greater than 1 will make the angles progressively larger.

Time example

1. Time is set to 60
2. Time step is 2
3. Time step accel is 0.9

Step	Time	Time step	Time step accel	Time step
------	------	-----------	-----------------	-----------

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1	60			
2	62	2	0.9	$2 * 0.9 = 1.8$
3	63.8	1.8	0.9	$1.8 * 0.9 = 1.62$
4	65.42	1.62	0.9	$1.62 * 0.9 = 1.458$
5	66.878	1.458	0.9	$1.458 * 0.9 = 1.312$

Angle example:

1. Angle is 60
2. Angle step is 5
3. Angle step accel is 2

Step	Angle	Angle step	Angle step accel	Angle step
1	60			
2	65	5	2	$5 * 2 = 10$
3	75	10	2	$10 * 2 = 20$
4	95	20	2	$20 * 2 = 40$
5	135	40	2	$40 * 2 = 80$

Cycle reset

Time and angles have a cycle reset option which applies when your steps would cause a re-iteration over the same set of positions. This is function dependent as to when this occurs.

When ticked the time step will reset back to that programmed in.

When ticked for angles both the angle and the angle step will be reset back.

Material

Each step of the positions program will select a number of material items from that assigned to the program.

“Material Items” indicates the number of materials from the set assigned, to be passed to the per-position program for that step.

“Material step” then advances an internal “window” over that material so that on the next step another set of material items is selected.

For example, you want a rainbow spanning 7 positions.

You assign seven items of material to the program, each a different colour of the rainbow.

3"red	3"orange	3"yellow	3"green	3"blue	3"indigo	3"violet
-------	----------	----------	---------	--------	----------	----------

You set Material items to 1. Meaning that on each step 1 item of material is passed to the per-position program.

You set the Material step to 1 so on each step the next material item is selected from the set.

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3"red 3"orange 3"yellow 3"green 3"blue 3"indigo 3"violet

The green box here represents the 'window' over the set of material.

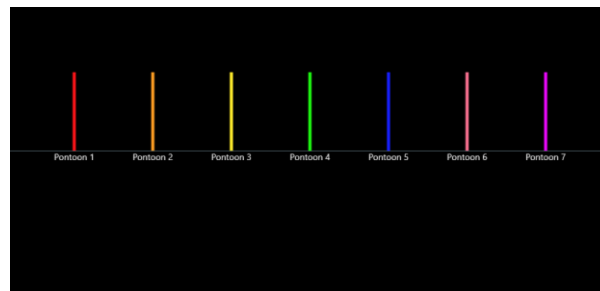
As each step progresses the Material step moves the window according to the function.

3"red 3"orange 3"yellow 3"green 3"blue 3"indigo 3"violet

Example: You have 7 positions so you set the programs steps to 7.

Step	Position	Material given to per-position program
1	Pontoon 1	3"red
2	Pontoon 2	3"orange
3	Pontoon 3	3"yellow
4	Pontoon 4	3"green
5	Pontoon 5	3"blue
6	Pontoon 6	3"indigo
7	Pontoon 7	3"violet

Programming this in a simple loop program will produce this:



Let's say we wanted a rainbow *per* position – we would need to pass the 7 Material Items to each position in the program, we set the Material Items to 7 to pass 7 each time. We set Material step to 0 – because we want each set of 7 to begin at 3" red each time.

3"red 3"orange 3"yellow 3"green 3"blue 3"indigo 3"violet

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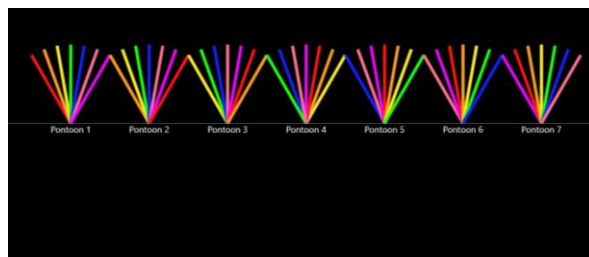
The *per-position* program now is given seven items to deal with on each invocation of it and so we iterate them 7 times in the per-position program, with a 60 degree initial angle to show the effect of the rainbow on each position when adjusted by 10 degrees for each material item:

If we want to mix up the rainbow we could set the material step to, say, 1.

Each step of the positions program would advance the initial colour by 1 item, but still pass seven to each per-position. In this case the material items will just re-iterate over the given set:

- | | | |
|-----------------|-----------------|-----------------|
| Step 1: ROYGBIV | Step 2: OYGBIVR | Step 3: YGBIVRO |
| Step 4: GBIVROY | Step 5: BIVROYG | Step 6: IVROYGB |
| Step 7: VROYGBI | | |

And looks like:



Loop

Each step will select the next position in the set given.

If there are more steps than positions, the program will begin at the first given in the set.

Positions set: POS1 POS2 POS3 POS4 POS5



Steps: 8

Per position executes for:

POS1 POS2 POS3 POS4 POS5 **POS1 POS2 POS3...**

Cycle reset for loop program occurs when iteration begins from POS1 once more.

Z

Similar to Loop but will reverse direction over the positions

Positions set: POS1 POS2 POS3 POS4 POS5

Steps: 11

Per position executes for:

POS1 POS2 POS3 POS4 POS5 **POS4 POS3 POS2 POS1 POS2 POS3**

Cycle reset for z program occurs on direction change (...POS5->POS4...POS1->POS2).

W-In

Works from the first position to the centre position in the given set, and changes direction if there are more steps to go.

Mirrors the angle to the opposite position in the set on each step, so effectively works in pairs.

Positions set: POS1 POS2 POS3 POS4 POS5

Steps: 3 Angle: 70 Angle step: 10

Steps should be enough to get you to the centre position, i.e. 3 steps in this example.

Per position executes for:

Step 1:	POS1 @ 70	mirrors to	POS5 @ 110
Step 2:	POS2 @ 80	mirrors to	POS4 @ 100
Step 3:	POS3 @ 90	(odd centre not mirrored)	

When steps is more, e.g. 5 the W-in will do this:

Step 1:	POS1 @ 70	mirrors to	POS5 @ 110
Step 2:	POS2 @ 80	mirrors to	POS4 @ 100
Step 3:	POS3 @ 90	(odd centre not mirrored)	
Step 4:	POS2 @ 80	mirrors to	POS4 @ 100
Step 5:	POS1 @ 70	mirrors to	POS5 @ 110

Cycle reset will be on every direction change.

W-Out

Identical to W-In but works from the innermost positions of the set, outwards.

Pause point

Simple function requires no material or positions.

Only need to set the Time.

Sets a pause in the display for semi-auto function.

Per-Position functions

A sequence consists of material and positions.

The *positions* program runs “Step” number of times, for each step:

1. Selects a position according to its function
2. Selects time, angle and “material items” from the set of material assigned to the sequence.
3. Invokes the per-position function with this information

(positions, material, angle, time) -> (position, material items, angle, time)

While the *positions* function operates over its set of positions, the *per-position* function operates over the set of material items given to it.

Sequence position program:

Function:	<input checked="" type="radio"/> Loop	<input type="radio"/> Z	<input type="radio"/> W-in	<input type="radio"/> W-out
Steps:	<input type="text" value="1"/>			
Time step:	<input type="text" value="0"/>	Time step accel:	<input type="text" value="1"/>	<input type="checkbox"/> Cycle reset
Angle step:	<input type="text" value="0"/>	Angle step accel:	<input type="text" value="1"/>	<input checked="" type="checkbox"/> Cycle reset
Duplication:	<input type="text" value="1"/>			

The per-position operates for a number of steps. Each step it selects an item of material from the set given to it and then generates a cue.

Each step advances the time given to it, as well as the angle too.

For each step duplication will create an identical cue, this might be useful if you want to fire the same material item several times, perhaps to “thicken” out the effect.

Loop

Steps: The number of material items given to it to operate over. When steps is larger than the number of material items given to it loop will begin from the first material item again.

Example:

Material items given to it:

GreenMine RedMine YellowMine

Steps: 5

Will iterate three times for each material item:

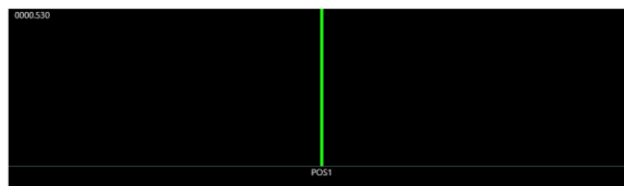
GreenMine RedMine YellowMine GreenMine RedMine

Positions function

Function:	Loop				
Steps:	1				
Time:	<time wanted>	Time step:	0	Time step accel:	1
Angle:	90	Angle step:	0	Angle step accel:	1
Material items:	1	Material offset:	0	Material step:	0
				Cycle reset:	NO
				Cycle reset:	YES

Position function

Function:	Loop				
Steps:	1				
Time step:	0	Time step accel:	1	Cycle reset:	NO
Angle step:	0	Angle step accel:	1	Cycle reset:	YES
Duplication:	1				



Variations:

- Change angle from 90

Trident @ single position

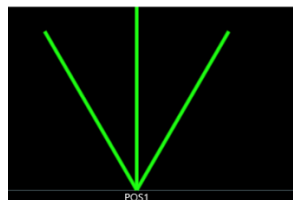
Positions selected: **POS1**
Material selected: **GreenMine**

Positions function

Function:	Loop				
Steps:	1				
Time:	<time wanted>	Time step:	0	Time step accel:	1
Angle:	60	Angle step:	0	Angle step accel:	1
Material items:	1	Material offset:	0	Material step:	0
				Cycle reset:	NO
				Cycle reset:	YES

Position function

Function:	Loop				
Steps:	3				
Time step:	0	Time step accel:	1	Cycle reset:	NO
Angle step:	30	Angle step accel:	1	Cycle reset:	NO
Duplication:	1				



Variations:

- Change angle from 60, also adjust the position Angle step to maintain symmetry.
- Add a position function Time step between each effect of the trident.
- Change position steps from 2 upwards. Observe Angle and Angle step to maintain symmetry.

Trident (multi-effect) @ single position

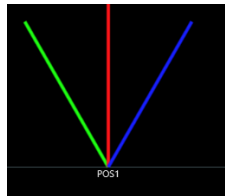
Positions selected: **POS1**
 Material selected: **GreenMine** **RedMine** **BlueMine**

Positions function

Function: Loop
 Steps: 1
 Time: **<time wanted>** Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle: **60** Angle step: 0 Angle step accel: 1 Cycle reset: YES
 Material items: **3** Material offset: 0 Material step: 0

Position function

Function: Loop
 Steps: **3**
 Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle step: **30** Angle step accel: 1 Cycle reset: **NO**
 Duplication: 1



Variations:

- Change angle from 60, also adjust the position Angle step to maintain symmetry.
- Add a position function Time step between each effect of the trident.
- Change position steps from 2 upwards. Observe Angle and Angle step to maintain symmetry.

Trident (multi-effect) / 3 position

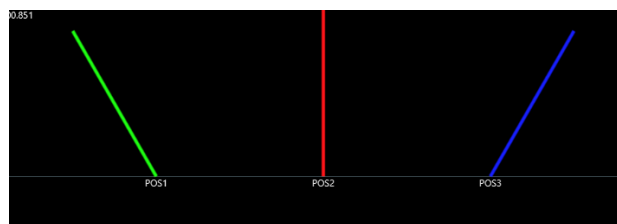
Positions selected: **POS1** **POS2** **POS3**
 Material selected: **GreenMine** **RedMine** **BlueMine**

Positions function

Function: Loop
 Steps: **3**
 Time: **<time wanted>** Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle: **60** Angle step: **30** Angle step accel: 1 Cycle reset: YES
 Material items: 1 Material offset: 0 Material step: 1

Position function

Function: Loop
 Steps: 1
 Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle step: 0 Angle step accel: 1 Cycle reset: YES
 Duplication: 1



Variations:

- Change Angle from 60, also adjust the positions Angle step to maintain symmetry.
- Change Positions Time step to add a delay between each position igniting.
- Change position steps from 2 upwards. Observe Angle and Angle step to maintain symmetry.
- Alter the order of the positions and/or material added to the sequence to change the order of ignition e.g. right to left
 - You can also set the Material offset to, say, 2 in this example to start from BlueMine and set the Material step to -1 to assign material items backwards.
- Add more positions for a 'mega fan' spreading across a large front. Set angle step accordingly for finer angles between positions.

Inverted Trident (multi-effect) / 3 position

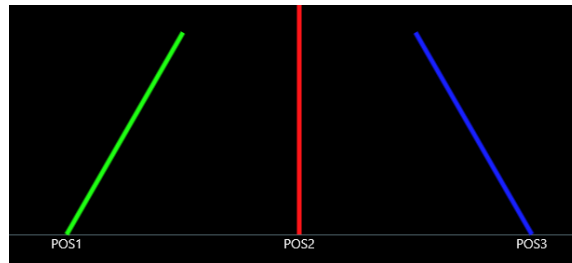
Positions selected: **POS1** **POS2** **POS3**
 Material selected: **GreenMine** **RedMine** **BlueMine**

Positions function

Function: Loop
 Steps: **3**
 Time: <time wanted> Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle: **120** Angle step: -30 Angle step accel: 1 Cycle reset: YES
 Material items: 1 Material offset: 0 Material step: 1

Position function

Function: Loop
 Steps: 1
 Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle step: 0 Angle step accel: 1 Cycle reset: YES
 Duplication: 1



Variations:

- Change angle from 60, also adjust the positions Angle step to maintain symmetry.
- Change Time step to add a delay between each position igniting.
- Change position steps from 2 upwards. Observe Angle and Angle step to maintain symmetry.
- Alter the order of the positions and/or material added to the sequence to change the order of ignition e.g. right to left
 - You can also set the Material offset to, say, 2 in this example to start from BlueMine and set the Material step to -1 to assign material items backwards.
- Add more positions for a 'mega fan' spreading across a large front. Set angle step accordingly for finer angles between positions.

Arc anti-clockwise / 6 position

Positions selected: **POS1** **POS2** **POS3** **POS4** **POS5** **POS6**
 Material selected: **GreenMine**

Positions function

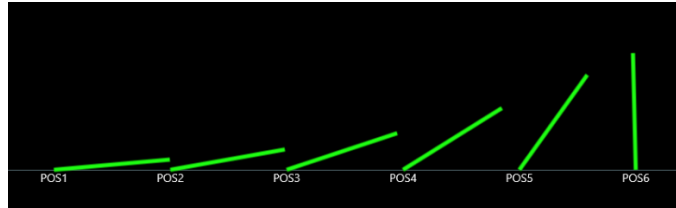
Function: Loop
 Steps: **6**
 Time: <time wanted> Time step: 0.1 Time step accel: 1 Cycle reset: NO

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Angle: **175** Angle step: -5 Angle step accel: **1.65** Cycle reset: YES
 Material items: 1 Material offset: 0 Material step: 0

Position function

Function: Loop
 Steps: 1
 Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle step: 0 Angle step accel: 1 Cycle reset: YES
 Duplication: 1



Arc clockwise / 6 position

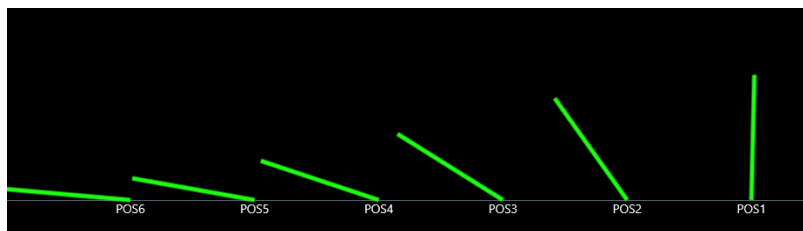
Positions selected: **POS6 POS5 POS4 POS3 POS2 POS1**
 Material selected: **GreenMine**

Positions function

Function: Loop
 Steps: **6**
 Time: **<time wanted>** Time step: **0.1** Time step accel: 1 Cycle reset: NO
 Angle: **5** Angle step: **5** Angle step accel: **1.65** Cycle reset: YES
 Material items: 1 Material offset: 0 Material step: 0

Position function

Function: Loop
 Steps: 1
 Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle step: 0 Angle step accel: 1 Cycle reset: YES
 Duplication: 1



NOTE: Positions are reordered from POS6 (rightmost) to POS1 (leftmost).

The angles are changed to reflect a clockwise direction for the angles e.g. 5 degrees initial is to the left starting at POS6.

X / 1 position

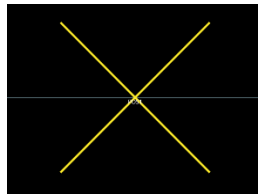
Positions selected: **POS1**
 Material selected: **GoldGlitterGerb**

Positions function

Function:	Loop						
Steps:	1						
Time:	<time wanted>	Time step:	0	Time step accel:	1	Cycle reset:	NO
Angle:	45	Angle step:	0	Angle step accel:	1	Cycle reset:	YES
Material items:	1	Material offset:	0	Material step:	0		

Position function

Function:	Loop				
Steps:	4				
Time step:	0	Time step accel:	1	Cycle reset:	NO
Angle step:	90	Angle step accel:	1	Cycle reset:	NO
Duplication:	1				



Useful for gerb setpiece

Wave left->right>left / 6 position

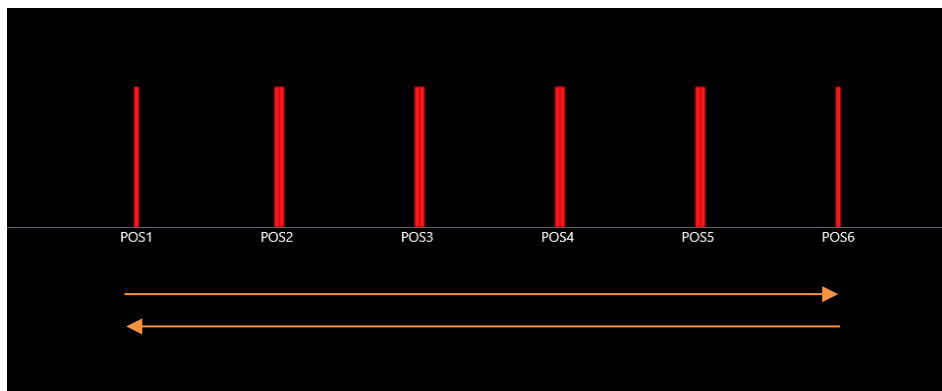
Positions selected:	POS1	POS2	POS3	POS4	POS5	POS6
Material selected:	RedMine					

Positions function

Function:	Z						
Steps:	11						
Time:	<time wanted>	Time step:	0.1	Time step accel:	1	Cycle reset:	NO
Angle:	90	Angle step:	0	Angle step accel:	1	Cycle reset:	YES
Material items:	1	Material offset:	0	Material step:	0		

Position function

Function:	Loop				
Steps:	1				
Time step:	0	Time step accel:	1	Cycle reset:	NO
Angle step:	0	Angle step accel:	1	Cycle reset:	YES
Duplication:	1				



A wave from left to right (6 positions) then back to left (5 positions) total 11. In the image above you can see the overlap of the mines – the 0.1 second firing interval means there will be firing overlap as the wave progressed rightwards then leftwards once more.

Variations:

- Change position order to get a right -> left -> right wave
- Change positions Time step accel to make wave progressively faster e.g. 0.9 or slower e.g. 1.2

Wave outer->inner / 6 position

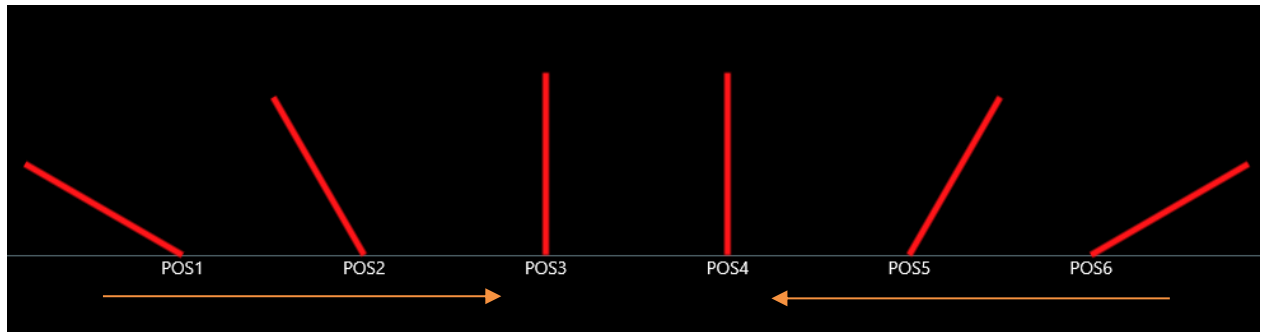
Positions selected: POS1 POS2 POS3 POS4 POS5 POS6
Material selected: RedMine

Positions function

Function: W-In
Steps: 3
Time: <time wanted> Time step: 0.1 Time step accel: 1 Cycle reset: NO
Angle: 30 Angle step: 30 Angle step accel: 1 Cycle reset: YES
Material items: 1 Material offset: 0 Material step: 0

Position function

Function: Loop
Steps: 1
Time step: 0 Time step accel: 1 Cycle reset: NO
Angle step: 0 Angle step accel: 1 Cycle reset: YES
Duplication: 1



A wave from outer positions to inner positions. Here with strong starting angled ending with two inner verticals.

Variations:

- Change to an inner to outer wave. Set positions function to W-Out. Adjust the position Angle to 90. Then adjust the Angle step to -30.
- Add odd number of positions e.g. 5 to get a single central ignition.

Wave in->out / 7 position

Positions selected: POS1 POS2 POS3 POS4 POS5 POS6 POS7
Material selected: RedMine

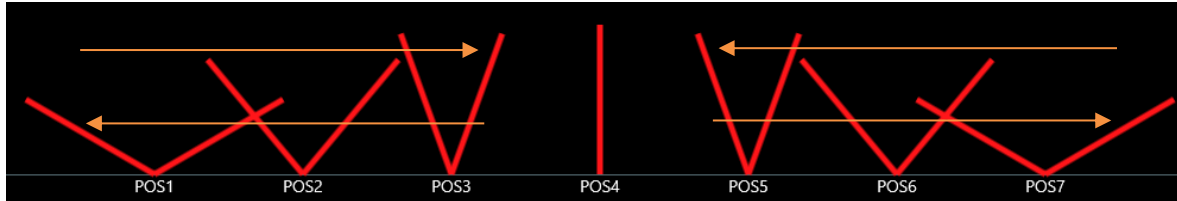
Positions function

Function: W-In
Steps: 7
Time: <time wanted> Time step: 0.1 Time step accel: 1 Cycle reset: NO

Angle: **150** Angle step: **-20** Angle step accel: 1 Cycle reset: **NO**
 Material items: 1 Material offset: 0 Material step: 0

Position function

Function: Loop
 Steps: 1
 Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle step: 0 Angle step accel: 1 Cycle reset: YES
 Duplication: 1



An inwards pointing wave from outer positions to inner positions continuing on with an outer pointing wave from inner positions to outer ones.

Variations:

- Reduce positions steps from 7 to 5 to sweep fully inwards but only one position outwards
 - Remember for W-In: 4 steps are (POS1,7) (POS2,6) (POS3,5) (POS4)
 - Remember for W-In: 7 steps are (POS1,7) (POS2,6) (POS3,5) (POS4) (POS3,5) (POS2,6) (POS1,7)
- With a larger number of positions, change Positions Time step accel to produce a rapidly increasing sweep e.g. set to 0.9 to make the time step progressively faster

Lattice 7 position

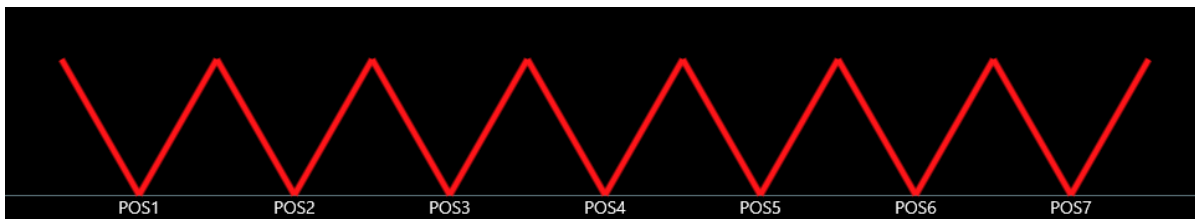
Positions selected: **POS1 POS2 POS3 POS4 POS5 POS6 POS7**
 Material selected: **RedComet**

Positions function

Function: **Loop**
 Steps: **7**
 Time: **<time wanted>** Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle: **60** Angle step: 0 Angle step accel: 1 Cycle reset: YES
 Material items: 1 Material offset: 0 Material step: 0

Position function

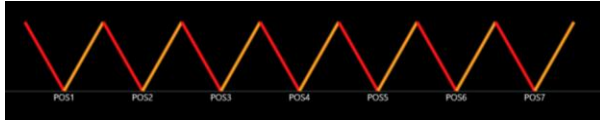
Function: Loop
 Steps: **2**
 Time step: 0 Time step accel: 1 Cycle reset: NO
 Angle step: **60** Angle step accel: 1 Cycle reset: **NO**
 Duplication: 1



Single shot comets produce a lattice effect when fired in a V across multiple positions.

Variations:

- Add a second item of material then set positions Material items to 2 (passing the two items to the position) – the lattice will be made of two types of material, here red and orange comet



Outward Wave Lattice 7 position

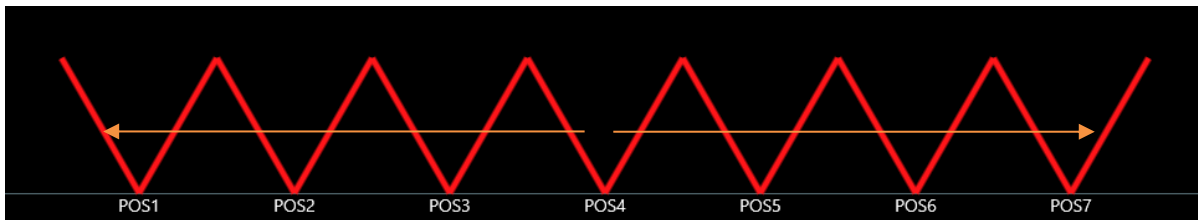
Positions selected: **POS1 POS2 POS3 POS4 POS5 POS6 POS7**
 Material selected: **RedComet**

Positions function

Function: **W-Out**
 Steps: **4**
 Time: **<time wanted>** Time step: **0.2** Time step accel: **1** Cycle reset: **NO**
 Angle: **60** Angle step: **0** Angle step accel: **1** Cycle reset: **YES**
 Material items: **1** Material offset: **0** Material step: **0**

Position function

Function: **Loop**
 Steps: **2**
 Time step: **0** Time step accel: **1** Cycle reset: **NO**
 Angle step: **60** Angle step accel: **1** Cycle reset: **NO**
 Duplication: **1**



In this example the lattice fans outwards from the inner to the outer positions with a 0.2 second delay.

Fire left then right 7 position

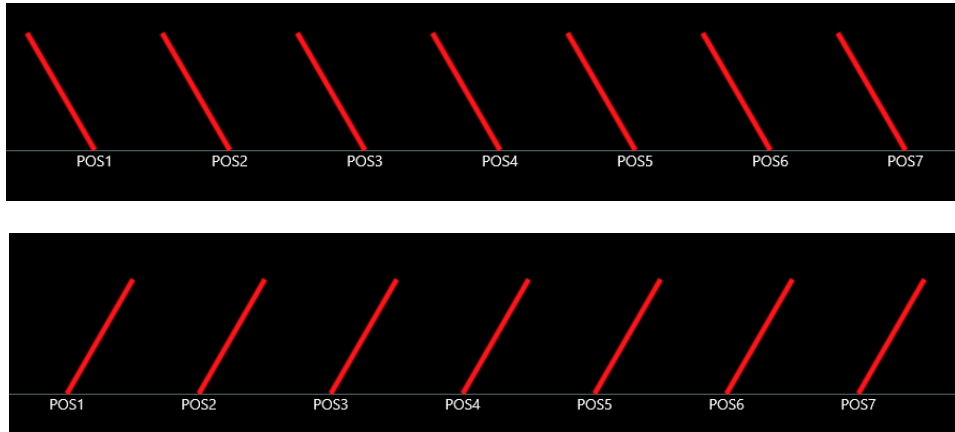
Positions selected: **POS1 POS2 POS3 POS4 POS5 POS6 POS7**
 Material selected: **RedComet**

Positions function

Function: **Loop**
 Steps: **7**
 Time: **<time wanted>** Time step: **0** Time step accel: **1** Cycle reset: **NO**
 Angle: **60** Angle step: **0** Angle step accel: **1** Cycle reset: **YES**
 Material items: **1** Material offset: **0** Material step: **0**

Position function

Function: **Loop**
 Steps: **2**
 Time step: **2** Time step accel: **1** Cycle reset: **NO**
 Angle step: **60** Angle step accel: **1** Cycle reset: **NO**
 Duplication: **1**



Note the position time step is set to 2 second. Each comet in this example lasts for one second so all will fire left, then two seconds later all will fire right.

Variations:

- Change positions angle to 120, then position angle step to -60 to fire right then left
- Add a positions time step to progressively fire across the positions given

Motorised wheel

Positions selected: **POS1**
 Material selected: **30SecWheel** **30SecMotor**

Positions function

Function:	Loop						
Steps:	1						
Time:	<time wanted>	Time step:	0	Time step accel:	1	Cycle reset:	NO
Angle:	90	Angle step:	0	Angle step accel:	1	Cycle reset:	YES
Material items:	2	Material offset:	0	Material step:	0		

Position function

Function:	Loop				
Steps:	2				
Time step:	1	Time step accel:	1	Cycle reset:	NO
Angle step:	0	Angle step accel:	1	Cycle reset:	YES
Duplication:	1				

In this example we add two items of material:

1. A wheel whose duration is 30 seconds
2. A wheel motor that is configured as “Is Switch” and configured with a duration of 30 seconds

The idea is to ignite the wheel then 1 seconds later activate the motor.

This allows the wheel to ignite then begin rotation – the ordering here is important, since if the wheel were to rotate at or before the ignition the igniter lead wire for the wheel could be ripped out by the rotation of the motor.

Variations:

- Frontage of wheels: Add additional positions and set the positions Steps to match the number of positions.

Stock link

Each material item has an optional “Stock link URL” and a “Stock link ID”.

Stock link URL:

Stock link ID: Last Updated:

When the URL and ID are specified the pricing and stock level can be updated automatically using this.

Where an item of material uses Stock Link it must have a unique Stock link ID, the URL must be specified also.

The URL points to a JSON file. Many items of material may use the same URL or may use an URL specific to it.

The CATFire App will open this URL using a HTTP GET request and read its contents as if a file.

The file is a simple text file with JSON formed content containing the stock link information, in this example we created it using the ConTEXT editor.

```
stock_link_example.json
1 {
2     "version": 1,
3     "stock_records": [
4         {
5             "version": 1,
6             "stock_link_id": "adeeadbd-a159-4b38-9be3-236e79eb9a23",
7             "stock_level": 130,
8             "unit_price": 21.99
9         }
10    ]
11 }
```

The above example shows a single product in the stock link file.

This file is placed on a public or private web server, and we can refer to this on the material database record as follows:

Material record Material database

New	Save	Delete	Update from stock link
Part number:	<input type="text" value="imperial_blink"/>	Record GUID: <i>adeeadbd-a159-4b38-9be3-236e79eb9a23</i>	
Is Switch:	<input type="checkbox"/>		
Type:	<input type="text" value="Cake 21 Shot"/>	Classification:	<input type="text" value="1.3G"/>
Supplier:	<input type="text" value="Jubilee Fireworks"/>	Supplier part number:	<input type="text" value="BKCK21IB"/>
Manufacturer:	<input type="text"/>	Manufacturer part number:	<input type="text"/>
Description:	<input type="text" value="21 big burst shots in 30 seconds of silver tails to silver blink, red tails to red blink, green tails to"/>		
Label description:	<input type="text" value="Imperial Blink"/>	Mortars needed:	<input type="text" value="0"/>
Gross weight:	<input type="text" value="500"/> grams	Net explosive content:	<input type="text" value="315"/> grams
Calibre:	<input type="text" value="25"/> millimetres	Shots:	<input type="text" value="20"/>
Duration:	<input type="text" value="30"/> seconds	Lift time:	<input type="text" value="0.5"/> seconds
Unit price:	<input type="text" value="20"/>	Stock level:	<input type="text" value="0"/>
Stock link URL:	<input type="text" value="http://www.trinitydigital.co.uk/stock_link_example.json"/>		
Stock link ID:	<input type="text" value="adeeadbd-a159-4b38-9be3-236e79eb9a23"/>	Last Updated:	

In the above example we set the Stock link ID to the Record GUID for simplicity.

When we click on **Update from stock link** this resource is read.

The file is scanned for the Stock link ID and if an entry is found the stock price and level is updated.

Unit price:	<input type="text" value="21.99"/>	Stock level:	<input type="text" value="130"/>
Stock link URL:	<input type="text" value="http://www.trinitydigital.co.uk/stock_link_example.json"/>		
Stock link ID:	<input type="text" value="adeeadbd-a159-4b38-9be3-236e79eb9a23"/>	Last Updated:	<input type="text" value="03/08/2021 20:48:54"/>

You can see the unit price has changed from 20 to 21.99 and the stock level from 0 to 130.

The Last Updated field records the date/time the stock link retrieved the information.

Be sure to save both the record and database once you updated the stock link.

The stock link JSON file can contain many product records, here is a simple example:

```
stock_link_example.json
1 {
2     "version": 1,
3     "stock_records": [
4         {
5             "version": 1,
6             "stock_link_id": "adeeadbd-a159-4b38-9be3-236e79eb9a23",
7             "stock_level": 130,
8             "unit_price": 21.99
9         },
10        {
11            "version": 1,
12            "stock_link_id": "b50b2e8a-aa86-4f5d-9ccc-2e8d56b3ac03",
13            "stock_level": 15,
14            "unit_price": 120.99
15        },
16        {
17            "version": 1,
18            "stock_link_id": "c25ebbcd-cc22-4e4e-bf70-a7676551936b",
19            "stock_level": 35,
20            "unit_price": 10
21        },
22        {
23            "version": 1,
24            "stock_link_id": "6529f917-b942-489c-b303-03a82015bab9",
25            "stock_level": 12,
26            "unit_price": 85.00
27        },
28        {
29            "version": 1,
30            "stock_link_id": "ee5cf4a7-29ed-47d3-acc3-d5a3f3a84c95",
31            "stock_level": 60,
32            "unit_price": 29.99
33        },
34        {
35            "version": 1,
36            "stock_link_id": "9425a726-1843-44f8-8591-e23f3940a3d7",
37            "stock_level": 51,
38            "unit_price": 18.99
39        }
40    ]
41 }
```

Multiple stock records are separated with commas as shown.

Stock link URL

The Stock link URL can take many forms but CATFire App will always perform a HTTP GET request.

The URL may point to a:

1. Public web server resource as in our example here.
2. Private web server resource.
3. The URL may refer to a server side action such as cgi or similar invocation that returns a JSON resource.
4. The URL may have parameters that invokes a server side database to return the necessary response, or the cgi (or other server side action) can query a database and return the JSON response.

CATFire CSV

CATFire CSV is a simple way to design a scripted show rather than using our visual script designer described earlier in this document.

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Using a text editor (such as Notepad or ConTEXT editor, for example) you can define all the cues and pause points in your show. Full control over show information and safety groups are possible as desired.

This section of the document describes the CATFire CSV file format and how to use it.

For a more sophisticated way to create a CATFire CSV use Microsoft Excel to maintain the format as an Excel spreadsheet then “Save As” CSV (Comma Delimited) file when you are finished. This way you get to use font formatting and colouring together with organising column and row widths. Saving as CSV is essential when your design is finished but you can maintain your primary design in Excel format for easier editing.

CSV records and fields

Each line of text in a CSV file is called a “record” of information.

A record of information may be, for example, a cue to be fired or perhaps a pause point.

Each item of information in that record is called a “field”, fields are comma (,) separated.

There are different types of record in a CATFire CSV file, the fields of information are specific to that record.

The first field for a record tells CATFire what type of record it is, for example:

```
PAUSE_POINT, 300, Wait for magic incantation
```

In the above record we are defining a pause point at 300 seconds into the show. The hint is specified as “Wait for magic incantation”.

Record types

A CATFire CSV can have the following types of record:

Record type (first field on a line)	Meaning
INFO_FIELDS	Tells CATFire what the format of subsequent INFO records will look like.
INFO	Script information such as client, location, firing file ID etc.
CUE_FIELDS	Tells CATFire what the format of subsequent CUE records will look like.
CUE	A cue to be fired or a switch to be operated.
PAUSE_POINT_FIELDS	Tells CATFire what the format of subsequent PAUSE_POINT records will look like.
PAUSE_POINT	A pause point at which automatic script firing will pause and wait for you to resume the show.
COMMENT	A comment line for your own information. Fields that follow on the same line as COMMENT are ignored by CATFire.

Fields

There are many different types of field in CATFire CSV and many may be unnecessary for your script.



Some fields are mandatory.

To make CATFire CSV more practical to work with you can tell CATFire what fields to expect and the order in which to expect them in your records.

INFO_FIELDS, CUE_FIELDS and PAUSE_POINT_FIELDS record types tell CATFire what to expect in subsequent INFO, CUE and PAUSE_POINT records.

You must always create one of these records before creating a corresponding INFO, CUE or PAUSE_POINT record otherwise CATFire will be unable to understand what it is reading.

NOTE: You can redefine the format of a INFO, CUE or PAUSE_POINT record at any time in your CSV file, simply define a new INFO_FIELDS, CUE_FIELDS or PAUSE_POINT_FIELDS before changing your record style. The new format will apply to subsequent entries.

This way you can create simpler CSV files and only use more complex forms when you need to.

INFO_FIELDS and INFO records

You must specify an INFO_FIELDS record before any subsequent INFO record(s).

NOTE: Information from fields in an INFO record will overwrite information specified in a prior INFO record.

Create an INFO_FIELDS record in your CSV file and define what fields CATFire will expect in a subsequent INFO record and in what order:

INFO_FIELDS	Mandatory	Meaning
FILE_VERSION	YES	INFO record must specify 1 for this value
TITLE	NO	Title of this script
LOCATION	NO	Location of show
CLIENT	NO	Client
SHOW_DATE_TIME	NO	Date/time of the show. e.g. 30/10/2021 19:00
FIRING_PULSE	YES	The firing pulse to use for cues in seconds, e.g. 0.05 for 50ms or 2 for 2 seconds.
FF_ID	NO	The firing file ID to use / must match any FSK timecode being used.

Example:

```
INFO_FIELDS, FILE_VERSION, TITLE, FIRING_PULSE
```

```
INFO, 1, Big Monster Show, 0.05
```

NOTE: Not every field needed to be defined, mandatory ones must be of course.



NOTE: INFO record fields must specify the information in the order defined as per INFO_FIELDS record.

It is equally possible to reorder the fields, this example is identical to the previous one shown:

```
INFO_FIELDS, FIRING_PULSE, TITLE, FILE_VERSION
INFO, 0.05, Big Monster Show, 1
```

PAUSE_POINT_FIELDS and PAUSE records

You must specify a PAUSE_POINT_FIELDS record before any subsequent PAUSE_POINT record(s).

Create a PAUSE_POINT_FIELDS record in your CSV file and define what fields CATFire will expect in a subsequent PAUSE_POINT record and in what order:

PAUSE_POINT_FIELDS	Mandatory	Meaning
PAUSE_TIME	YES	The time in seconds in your show at which automatic firing will pause and you will need to manually resume the firing
HINT	NO	Simple text hint to tell the operator why the show has paused and when to resume

Example:

```
PAUSE_POINT_FIELDS, PAUSE_TIME, HINT
PAUSE_POINT, 300, Wait for magic word
```

CUE_FIELDS and CUE records

You must specify a CUE_FIELDS record before any subsequent CUE record(s).

Create a CUE_FIELDS record in your CSV file and define what fields CATFire will expect in a subsequent CUE record and in what order:

CUE_FIELDS	Mandatory	Meaning
CUE_TIME	YES	The time in seconds the pyrotechnic effect is to be seen. NOTE: This is not when the cue will be fired which is CUE_TIME less (FIRING_PULSE + MATERIAL_LIFT_TIME)
FIRING_ADDRESS	YES	The firing address from 1 to 256
CUE_NUMBER	YES	The cue number from 1 to 16
MATERIAL_IS_SWITCH	NO	TRUE or FALSE (default). When TRUE you must specify MATERIAL_DURATION to be greater than zero.
MATERIAL_DURATION	NO unless MATERIAL_IS_SWITCH is TRUE	The duration of the pyrotechnic article, e.g. a cake may fire for 30 seconds.
MATERIAL_GUID	NO	GUID of the material part

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MATERIAL_PART_NUMBER	NO	Part number
MATERIAL_LABEL_DESCRIPTION	NO	Short label description of the material
MATERIAL_DESCRIPTION	NO	Longer form description
MATERIAL_TYPE	NO	Type of material e.g. Cake
MATERIAL_CALIBRE	NO	Calibre of the shot tubes e.g. 30 for 30mm or 75 for a 75mm shell. Can also qualify the value with mm or “, e.g.: 75mm or 3”
MATERIAL_SHOTS	NO	Number of shots e.g. 20 for a 20 shot cake
MATERIAL_LIFT_TIME	NO	Defaults to 0, for shells this will be the time from ignition to the burst.
MATERIAL_SAFETY_GROUP_ASSIGNMENTS	NO	The names of the safety groups to be assigned to this material. Multiple safety groups are separated using a bar i.e. E.g. for a Shell this may be: All Shells Big Shells 200mm+ 250mm Shell
POSITION_SAFETY_GROUP_ASSIGNMENTS	NO	The names of the safety groups to be assigned to the position of this material. Multiple safety groups are separated using a bar i.e. E.g.: Water Pontoon 1
ANGLE	NO	Firing angle of the material, defaults to 90
POSITION_NAME	NO	Name of the position at which this material is firing
WIRING_GROUP	NO	Group of positions common for wiring up purposes
HINT	NO	Hint for this cue

Example:

CUE_FIELDS,CUE_TIME,FIRING_ADDRESS,CUE_NUMBER,MATERIAL_DESCRIPTION,HINT

CUE,600,21,16,"10"" blue brocade",Big finish

Duplicate cues

It is perfectly okay for the same firing address and cue number to appear in the CSV file more than once. This can be very useful in the following scenarios:

1. The cue is connected to stepper/sequencer and each firing of the cue will cause the sequencer to take the next programmed action.
2. The cue is controlling effect lighting .
3. The cue is controlling a motor or relay etc.
4. The cue is controlling cryo, flame or smoke machines and you need multiple bursts throughout your show.

Use of double quotation marks (") and commas (,)

Using double quotation marks (") and commas (,) in CSV files require special handling because they have special meaning to the CSV format.

A double quotation mark is usually used to denote inches, e.g. 10" especially in the MATERIAL_CALIBRE field.

When creating your CSV file in Excel you don't need to worry about this at all - simply use the quotation mark as you would like, Excel will take care of the CSV file for you.

When creating a CSV file in a text editor and using double quotes in a field you must ensure the field value is itself inside quotation marks and then, further, duplicate the double quote. To explain this here are some examples for a MATERIAL_CALIBRE field value.

Field value	Result
3	3mm
3mm	3mm
3"	ERROR – INCORRECT FORMAT
"3"	3mm
"3"	ERROR – INCORRECT FORMAT
"3""	75mm Value is in "double quotes" Inches indicator is duplicated "3""

As the examples show:

When using a double quote in a fields value you must enclose the entire value with double quotes.

And wherever you use a double quotation mark in the value itself you must duplicate it.

Here is another example of using " as an inch delimiter in a description:

"Cake 2"" calibre overall diameter 3"" height 12""."

The same applies to using commas in a description, you must put quotes around the whole value, e.g.:

"3"" Blue Peony, comet tailed"

Custom fields

Any field defined with a preceding underscore (_) is treated as user defined and is ignored by CATFire.

While CATFire will ignore custom fields, these additional fields can be useful for your own use.

For example, some designers like to use ascii art to show, textually, the expected arrangement of candles or maybe more explicitly define setup angles. For example:

CUE_FIELDS, CUE_TIME, FIRING_ADDRESS, CUE_NUMBER, MATERIAL_DESCRIPTION, _PLAN, _ANGLES



CUE,600,21,16,Gold+Glitter Dragon x 3,\ | /,L60-90-R60

CUE,600,21,15,"3"" gold peony x5 4 sec",\ \ \ \ \,L1

Ordering of records

You may create your CUE and PAUSE_POINT records in any time order in the CSV, CATFire will order them in ascending order of CUE_TIME (for CUES) and PAUSE_TIME (for PAUSE_POINTS).

NOTES