



Firelinx Gen 3 Manual

Command & Firing Module Instruction Manual



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IMPORTANT SAFEGUARDS

The following terms are used to identify safety and highlight the level of hazard throughout the manual.



SAFETY ALERT SYMBOL – Alerts potential personal injury hazards. Please obey all safety messages that follow this symbol to avoid possible injury or death.

WARNING – Indicates potentially hazardous situations, which, if not avoided, could result in serious injury or death.

CAUTION – Indicates potentially hazardous situations, which, if not avoided, may result in minor/moderate injury.

NOTICE – Important Information applicable to operation of the system and/or prevention of property damage

Read all instructions and warnings carefully before operating units to ensure safe and appropriate use of this equipment.

WARNING – This product contains a lithium polymer battery. Please read the following cautions for proper handling and charging.



- This product may ignite under certain conditions
- Use specific Lithium Polymer charger only
- Do not use Ni-Cd or Ni-MH charger – may cause fire
- Never exceed 1C (1xCapacity) charger rate
- Never leave batteries unattended while charging
- Do not short circuit
- May explode if damaged or disposed in fire

Please make sure to carefully thoroughly read this manual before using Firelinx to ensure its safe and proper use.

NOTICE - This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions in this manual may cause harmful interference to radio and television reception.

24-Channel Firing Module (FM-24)

Section 1: Panel Diagram

Power Button

Press and hold the power button to turn on the Firing Module (FM). Hold the power button until the internal lights come on (about two seconds). If the FM does not power on, plug the charging cord into the barrel jack power input and wait one minute before trying again. Press and release the power button to turn off the FM.

Repeater Button

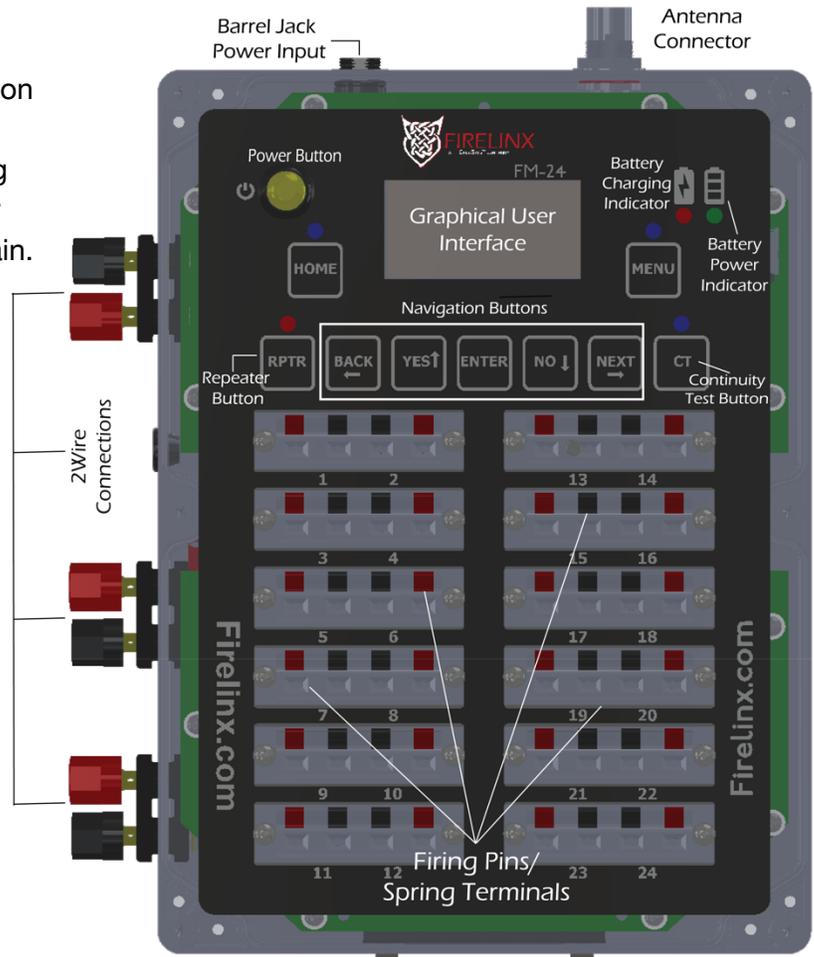
The repeater (RPTR) button enables the FM's repeater function.

Navigation Buttons

The navigation buttons are used to navigate between menus on the FM.

Battery Charging Indicator + Battery Full Indicator

Charging turns on when plugged in (red). Green turns on when charging is complete.



Continuity Test

The continuity test (CT) button allows the user to view the continuity results for an individual FM. Continuity testing is solely controlled/performed by the CM.

CAUTION – You cannot ARM while in Continuity Test (CT) Mode and you cannot run CT while Armed. They are mutually exclusive for safety reasons. Please be advised that the FM screen will display the results from the last continuity check when CT Mode is NOT active. For live CT results you must have CT Mode enabled. While CT mode is enabled, you will be able to view live results on each FM or all results on the CM. This will ensure that you are viewing the data live.

Firing Pins

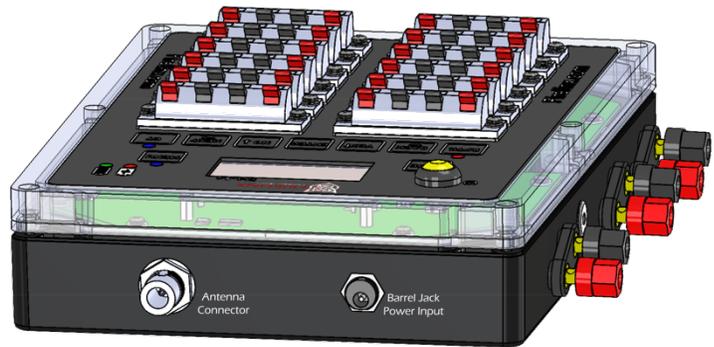
Firing pins are easily detachable for cleaning, replacement, or upgrade.

Power Input

The power port is used to charge the FM. If the FM battery dies, a 12V power supply can be connected to this port. A compatible power supply or battery should be able to produce at least 3A of current.

Antenna Input

The radio antenna is necessary for shows requiring wireless communication. The antenna should always be installed as a backup communication device, even if 2Wire communications are connected. For greater signal strength and range, raise the height of the module so that the antenna is at least eight inches (200 millimeters) off the ground. Line of sight between modules is the key to successful and reliable communication.



2Wire Input/Output

Only one connection can be made per set of 2Wire terminals

The three 2Wire ports are used for 2Wire communications between the CM and all FMs. The color of each terminal is not important. The polarity of the two wires (when plugged into the next unit) is not important. Connections can be made in “daisy-chain order” (one cable in, one cable out) or “star order” (one cable in, two cables out) or any other order in the network. For ease of debugging, use the single input terminal set on the FM (near the top) for the input, and one or both terminal sets (near the bottom) as outputs.

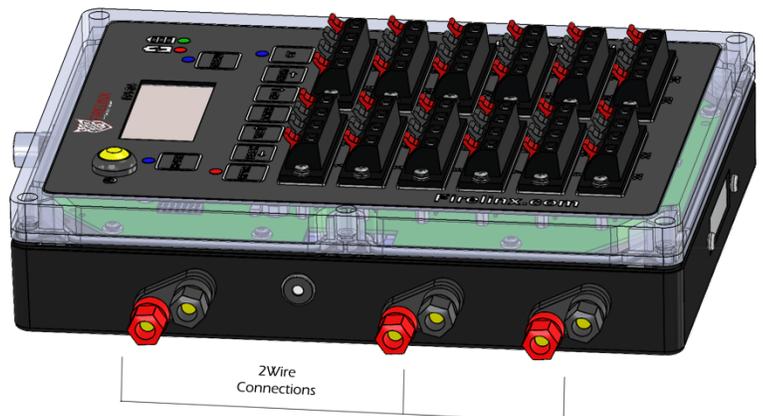


Figure 3

Section 2: Basic Setup

1. **Turn on FM(s)** - Press and hold the power button until internal lights turn on. A logo splash screen will appear before the Home screen.
2. **Name all FMs** – Each FM must have a unique ID number before joining a CM. On each FM press MENU, the NAME option on the menu will be pre-selected, press ENTER. Use the left (←), up (↑), right (→), and down (↓) arrow keys to choose a unique ID. Press ENTER to set ID – valid ID numbers are 001 to 999.
3. **Join all FMs to CM** – On the CM, press MENU-> (3): JOIN, ENTER. On the FMs, press MENU and use the arrow keys to select JOIN MODE. Press ENTER. If the screens match, on both the CM and FMs, press YES on the FMs first – then press HOME. Press HOME on the CM when all FMs have been joined. If the numbers do not match, press NO on the FMs. The FM will then display the ID number of the next CM detected in the area. Continue until both numbers are the same, then press HOME on the CM. If no

number is displayed on the FMs, then the FMs might not be on the same RF channel. To set the RF channel manually, go to MENU and select RF CHANNEL.

4. **Wire FM(s)** – To wire an e-match to an FM, strip the wire of the e-match about one inch (25mm) long each and separate down the center into two wires for about two inches(50.8mm) long. (See figure 4) Bend the tips of both ends into a U-shape and insert each end into the spring terminals of the respective slot of the FM. Each slot number corresponds to a channel. (See figure 5)

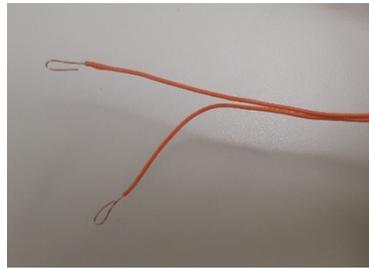


Figure 4



Figure 5

5. **Perform continuity test –**

CAUTION – You cannot ARM while in Continuity Test (CT) Mode and you cannot run CT while Armed. They are mutually exclusive for safety reasons. Please be advised that the FM screen will display the results from the last continuity check when CT Mode is NOT active. For live CT results you must have CT Mode enabled. While CT mode is enabled, you will be able to view live results on the FM or the CM. This will ensure that you are viewing the data live.



Figure 6

From the CM, press the CT button to open the CONTINUITY TEST page. Press OK to start the continuity test. The FM's backlight LEDs will turn either blue, magenta, or yellow. Blue means there are no shots detected, magenta means one or more shots have been detected, and yellow means there is no current flowing through the firing pins. If the FM's LEDs turn yellow, contact Firelinx support at www.firelinx.com. If you press the up arrow (2) two times, it will bring you to the page that shows the icon descriptions for the CT check results. When you are done with the continuity check make sure to press OK on the CM to turn the test off.

The FM will display the following symbols to indicate the status of each channel:

Symbol	Meaning
=	There is a loaded shot currently in the choreography. This shot is ready to be fired.
?	There is a loaded shot NOT in the choreography. This shot can still be fired manually.
X	There is no shot loaded, but this channel is currently in the choreography. This should be corrected; however, a show will still run if it is left disconnected.
*	There is a loaded shot in the choreography with too much resistance. This shot might not fire on command. This must be corrected.

6. **Arm system** – To arm the system, insert the ARM key into the key slot of the CM and turn clockwise to the ARM position, then press the ARM/SAFE button. The FM's backlight LEDs will turn red to indicate the module is armed and ready to fire.

Section 3: Home Page

1. **Clock Icon** – The clock icon is displayed when the FM and the CM are synchronized.
2. **File Icon** – The file icon indicates if a show file is downloaded on the FM. An "X" over the file icon indicates there is no file downloaded. If no file is downloaded, the name ID will read MANUAL.
3. **Link Quality (LQ) Icon** – The LQ icon displays the current signal strength between the FM and CM.
4. **Battery Level Icon** – The battery level icon displays the current battery charge level of the FM.
5. **Name ID Number** – Each FM must have a unique name ID number.
6. **Status Icon** – The status icon appears when the FM is firing/has fired a shot. This icon will stay on the screen until the next cycle so that the operator may check FM firing status before, during, and after the show.
7. **Messages** – Messages generated by the FM are displayed here, such as CONNECTED if the FM is currently connected to the CM.
8. **Find Software Version** – Press the down (↓) arrow key to display the current software version installed on the FM.



Figure 7

Section 4: Menu

NAME

Each FM must have a unique ID number before joining a CM. Use the left (←), up (↑), right (→), and down (↓) arrow keys to choose a unique ID. Press ENTER to set ID – valid ID numbers are 001 to 999.



Figure 8

RF CHANNEL

Use the WIRELESS WIZARD (WW) function on the CM to determine the best RF channel in the surrounding area and to automatically change the RF channel of all connected FMs. To manually set an FM RF channel, from the Menu chose RF CHANNEL, ENTER use the up (↑) and down (↓) arrow keys to select the channel, then press ENTER. Doing so will **only** change the RF channel of that FM.



Figure 9

JOIN MODE

JOIN MODE is used for joining the FM to the CM. When the CM's ID number is displayed on the FM (see Figure 10) press YES to join. If the FM displays a different ID than the CM ID you're trying to join, press NO. See Section 11.2 for further instructions.



Figure 10

Disconnecting Units

The FM will take approximately ten (10) seconds to disconnect from the CM and for the CM and FM to display the disconnection.

OPN MODE

Detects the existence of the OPN PCB and OPN functions.



Figure 11

REPEATER

Press RPTR to designate an FM as a repeater. A repeater will rebroadcast messages received from the CM to other FMs. Use repeaters if some FMs are not within range of the CM or behind an obstruction that is not within line-of-sight to the CM. If firing manually, only designate the **minimum** number of repeaters necessary. If needed, more FMs can be designated as repeaters, the Link Quality (LQ) of the system will decrease proportionally as more repeaters are added. Use only the minimum number of repeaters needed to bridge the gaps between FM positions. The repeater function should not be used if you have good signal strength and line-of-sight to the modules.

CONTINUITY

CAUTION – You cannot ARM while in Continuity Test (CT) Mode and you cannot run CT while Armed. Arming while in CT Mode will disable continuity and automatically ARM. They are mutually exclusive for safety reasons. Please be advised that the FM screen will display the results from the last continuity check when CT Mode is NOT active. For live CT results you must have CT Mode enabled on the CM. While CT mode is enabled, you will be able to view live results on the FM or the CM. This will ensure that you are viewing the data live.



Figure 12

From the CM, enable continuity testing. Press the CT button on the FM to view individual continuity results. See Section 5 and Section 11.4 for more details and further instructions.

Please note that Continuity Test Mode will only run with e-matches. The LEDs Test Lights do not pass continuity, as the LED acts as a diode (instead of a short-circuit like an e-match) and will not allow enough current through it to show continuity is viable.

64-Channel Command Module (CM-64)

Section 1: Panel Diagram

Power Button

Press and hold the power button to turn on the Command Module (CM). Hold the power button until the internal lights turn on (about two seconds). If the CM does not power on, plug the charging cord into the power port and wait one minute before trying again. Press and release the power button to turn off the CM.

ARM Key

CAUTION – You cannot ARM while in Continuity Test (CT) Mode and you cannot run CT while Armed. They are mutually exclusive for safety reasons. Please be advised that the FM screen will display the results from the last continuity check when CT Mode is NOT active. For live CT results you must have CT Mode enabled. While CT mode is enabled, you will be able to view live results on the FM or the CM. This will ensure that you are viewing the data live.

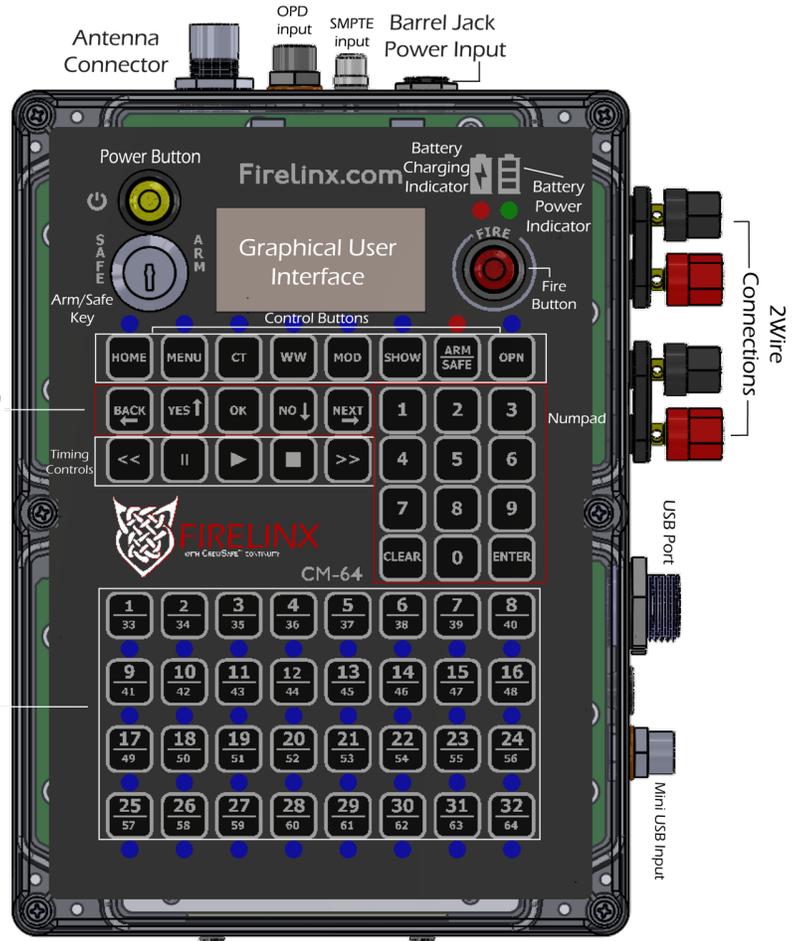


Figure 13

To arm the system, insert the ARM key into the key slot and turn clockwise to the ARM position, then press the ARM/SAFE button. The key cannot be removed when in the ARM position. To disarm the system, turn the key counterclockwise. If the CM has its ARM key turned prior to power on, you will need to turn the key to SAFE then back to ARM for it to be accepted.

Fire Button

When in manual show mode, the fire button will fire the next channel on the selected module. When in SMPTE mode or Internal clock, the FIRE button will begin firing the selected script.

Charge LEDs

Charge LEDs indicate the power status of the CM. The red LED indicates the battery is charging. The green LED indicates the battery is fully charged.

Navigation Buttons

The navigation buttons are used to navigate between menus on the CM.

Control Buttons

The control buttons are used to select which screen the CM will display. The CM may display the HOME, MENU, CONTINUITY TESTING, WIRELESS WIZARD, MODULE STATUS, or SHOW screen. The ARM/SAFE button is used with the ARM key to arm/disarm the system.

Timing Controls

The timing controls are used to pause and stop the internal clock show. With future updates, these controls will control the Audio Module, to reverse, pause, play, stop, or forward the show.

Open Pyro Network (OPN) Button

The Open Pyro Network (OPN) button opens the OPN CONFIGURATION menu. This menu is used to configure whichever OPN module is installed, whether that be an Ethernet card, a DMX card, or a 32-shot expansion card.

10-Key Number Pad (Numpad)

The 10-key number pad (Numpad) is used to view, navigate, and select menus and modules. To select a module, enter the module ID number on the Numpad. Some numbers, like the module ID, show as "001;" these leading zeros do not need to be entered to select that module.

Channel Selection Buttons

The channel selection buttons are used to navigate the SHOW menu and to select caliber/disable functions. When firing a manual show, these buttons are used to select which firing pin will fire next. These buttons only **select** the channel, they **do not fire** the channel. The fire button must be pushed to fire the selected channel. Once fired, the selected channel will automatically advance to the next available shot. If a continuity test has been performed, the LEDs will only show blue indicating a shot is loaded. When the shot is fired, the blue LED will turn off indicating it is now empty.

When firing a scripted show, the channel selection buttons are used to activate the caliber/disable functions (if these functions are written into the show file). The CALIBERS/DISABLES page can be reached via the SHOW screen or the MENU->1 function.

Mini USB Input

The mini-USB port is currently not in use. In future releases, this port will allow a tablet device to control the CM.



Figure 14

USB Input

The USB port is used to load choreography or software updates. This port cannot be used to connect anything other than a USB storage device. Files must be stored in the root directory of the USB storage device to be uploaded; files not stored in this directory will not be uploaded.

2Wire Input/Output

The two 2Wire ports are used for 2Wire communications between the CM and all Firing Modules (FMs). The color of each terminal is not important. The polarity of the two wires (when plugged into the next unit) is not important. Connections from the CM are always “out” rather than “daisy-chain” like in the FMs. Only one set of cables can be used per 2Wire terminal on the CM.

Power Input

The power port is used to charge the CM.

SMPTE Input

The SMPTE port is used to run SMPTE timecode to the CM via an RCA cable. SMPTE is then automatically distributed to the other FMs on the network.

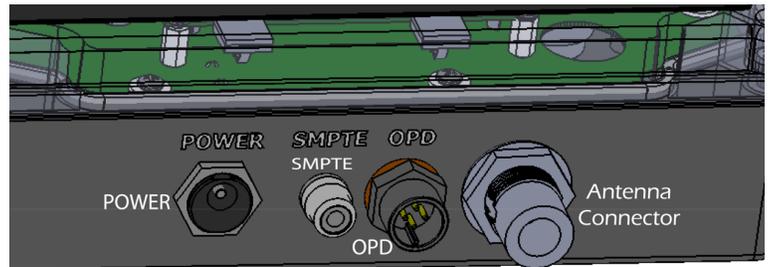


Figure 15

Operator Presence Device (OPD) Input

The Operator Presence Device (OPD) port is used to connect the OPD cable to the CM.

Antenna Input

The radio antenna is necessary for shows requiring wireless communication, however, the antenna should always be installed as a backup communications device, even when 2Wire communications are connected. For greater signal strength and range, raise the height of the module so that the antenna is at least eight inches (200 millimeters) off the ground.

Graphical User Interface (GUI)

The Graphical User Interface (GUI) is a 128x64- pixel OLED display at the top of both the CM and FMs. Different pages of the display are used to control different functions. The HOME, MENU, CT, WW, MOD, SHOW, and OPN buttons direct the user to the associated function page. Other functions and displays may be reached from each of these function pages.

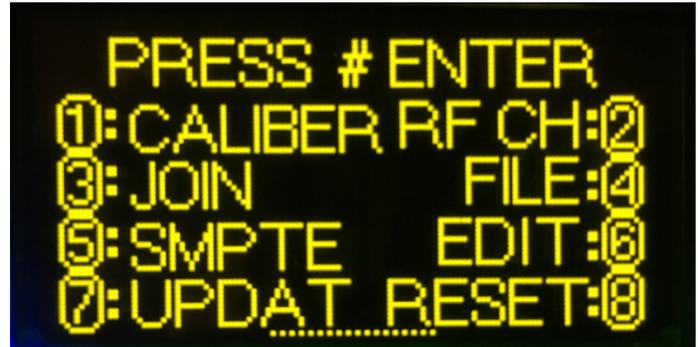


Figure 16

The circled number icons on the MENU screen shown in Figure 16 each represent a button on the Numpad. Pressing any number on the Numpad will bring up a small entry box. Fill in the number of the desired selection and press ENTER. Use the CLEAR button to erase all numbers in the entry box. The line of dots that appear at the bottom of the screen indicate that another screen is available by pressing the DOWN (↓) arrow button. A line of dots may also appear on all four sides of the screen (as shown in Figure 13), indicating other pages are available in all four scroll button directions: left (←), up (↑), right (→), and down (↓).



Figure 17

Section 2: Basic Setup

1. **Turn on FMs, name FMs, and place in the field** – Press and hold the CM power button until internal lights turn on, join all mods, and wire and position your firing modules on the field. Before performing CREWSAFE™ continuity testing, the show file must be loaded into the CM and downloaded to all FMs. Continuity testing must still be turned on and off by the CM, but it can be displayed on the screen of the FM by pressing the CT button. If needed, test the RF channel (see Section 4.2 for further instructions) before placing it in the field. All FMs must also be joined to the CM before placing in the field (see Section 2.4 for further instructions).
2. **Turn on CM** – Press the CM power button and hold until internal lights turn on. A logo splash screen will appear before the HOME screen.

3. **Load show file** - In some cases, certain USB sticks are not recognized by the Firelinx Command Module. If you place the USB stick into the Command Module and cannot load files from it, we suggest trying a lower storage device such as 1 or 2GB drives. Most stores sell SanDisk brand low storage drives which work great.

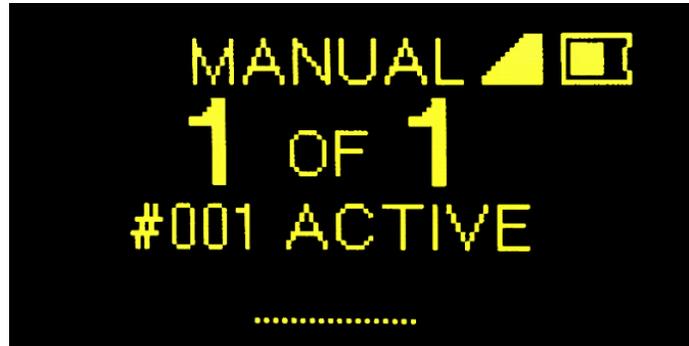


Figure 18

To load a show file, insert a USB storage device with the show file saved in .CSV format in the root directory, then go to MENU->FILE by pressing key number four on the Numpad and then pressing ENTER. A folder icon next to the name of the loaded show file will appear in the top left of the HOME screen. If the screen displays MANUAL and no folder icon (see Figure 18), then no show file has been uploaded, and you may only fire manually.

Once in the FILES PAGE (see Figure 19), select the desired show file. If there are more than four show files on the USB storage device, the top of the FILES PAGE will display 1/1, 1/2, 1/3, etc. The up (↑) and down (↓) arrows can be used to scroll between pages. The CM will display the current download and upload progress. When the FM displays a folder icon next to the word FILE, the FM has received the full show information. The CM will give a final notification (see Figure 20) when the download is complete.

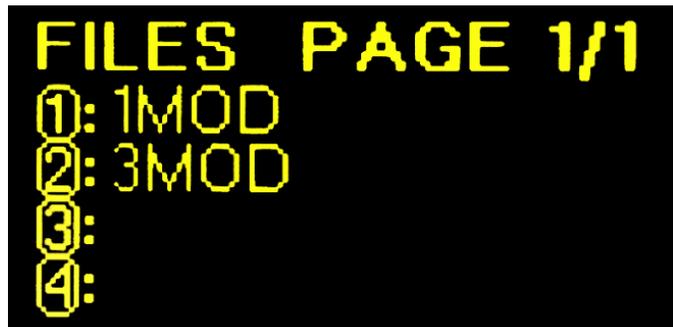


Figure 19

The HOME screen will show the number of modules detected on the left and the number of modules in the choreography on the right. The number of modules detected may be larger or smaller than the number of modules in the choreography.

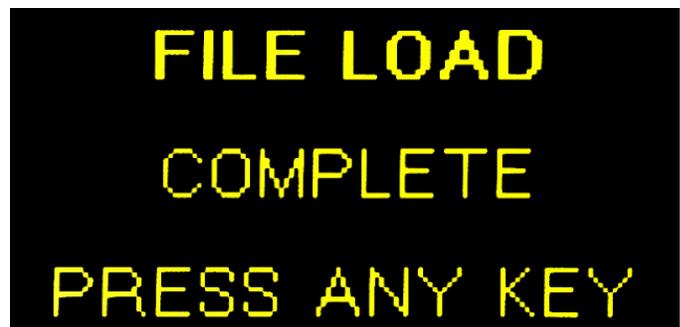


Figure 20

4. **Perform continuity test –**

CAUTION – You cannot ARM while in Continuity Test (CT) Mode and you cannot run CT while Armed. They are mutually exclusive for safety reasons. Please be advised that the FM screen will display the results from the last continuity check when CT Mode is NOT active. For live CT results you must have CT Mode enabled on the CM. While CT mode is enabled, you will be able to view live results on the FM or the CM. This will ensure that you are viewing the data live.

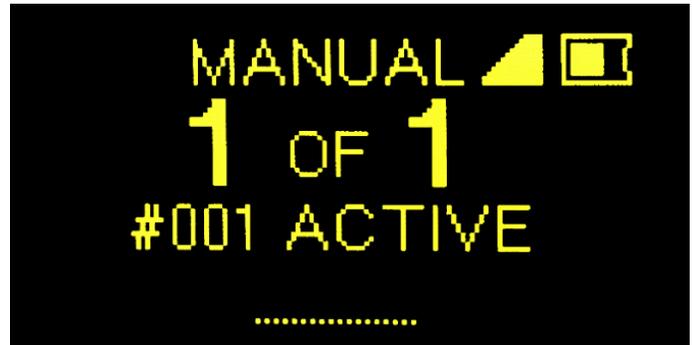


Figure 21

Continuity Test Mode must be initiated from the CM. To perform the Continuity Test, press the CT button on the CM to open the CONTINUITY TEST page. Press OK to enable continuity testing. **NFPA regulations require that the field is clear while continuity testing is being performed.** Use CREWSAFE™ continuity circuitry to check all connected FMs for errors and to ensure good continuity while pinning. **Use this feature only if the leading pyrotechnician and the jurisdiction authority concur that it is safe to do so.** Individual continuity testing results can also be viewed on individual FMs.

Symbol	Meaning
=	There is a loaded shot currently in the choreography. This shot is ready to be fired.
?	There is a loaded shot currently NOT in the choreography. This shot can still be fired manually.
X	There is no shot loaded, but this channel is currently in the choreography. This should be corrected; a show will still run if it is left disconnected.
*	There is a loaded shot in the choreography with too much resistance. This shot might not fire on command. This must be corrected.

Once testing is complete, go to the CONTINUITY TEST page and press OK to disable continuity testing. Continuity testing is automatically disabled when the system is armed, however, it is wasting battery power if left on when not in use.

From the CONTINUITY TEST page, you may also change the display mode to view all shots at any time or to show all errors discovered during testing.



Figure 22

5. **Arm system** – Note – You cannot Arm while in Continuity Test and you cannot run CT while Armed. To arm the system, turn the ARM key clockwise to the ARM position, then press the ARM/SAFE button. FMs will blink yellow and red for three seconds as the capacitor bank charges. Once the capacitor bank is fully charged, the FMs will turn RED and the CM will automatically transition to the SHOW page.

6. **Fire show.** – Either a Manual, SMPTE, or Internal Clock show may be fired from the SHOW page (see Figure 9). Use the left (←) and right (→) arrow keys to navigate between pages (this may be done even while a show is running).

- **Manual** – From the MANUAL FIRING page, use the up (↑) and down (↓) arrow keys to scroll through FMs in numerical order. Use the Numpad to select any FM. Use the channel selection buttons to select which shot to fire. Use the FIRE button to fire each shot. With each press of the FIRE button, the system will automatically advance to the next shot and, when appropriate, to the next FM.

- **SMPTE** – Before firing a SMPTE show, test the SMPTE timecode in the MENU->SMPTE page. Once testing is complete, navigate to the SMPTE FIRING page using the arrow keys. From the SMPTE FIRING page, select the cue list that you would like to fire with the Numpad. After the cue has been selected, start the external SMPTE time clock to begin time sync. **At least 30 seconds should pass before the first show cue to ensure that the SMPTE timecode has been captured by all FMs.** Press the FIRE button once to begin firing the show; the show will not fire until the FIRE button has been pressed. Show cues will advance automatically.

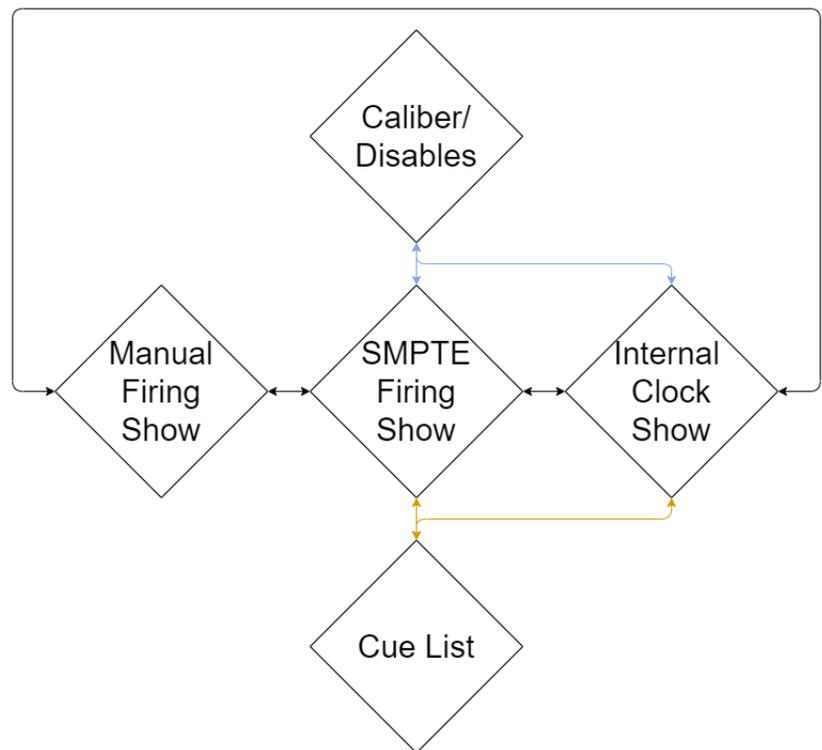


Figure 23

- **Internal Clock** – From the INTRL FIRING page, set all show cues (if necessary). Once a valid show file has been uploaded, press the FIRE button to begin the show. To advance to the next cue, press

the FIRE button again. The Internal Clock show should begin as soon as the clock on the CM begins to roll. To fire a SMPTE show and an Internal Clock show simultaneously, both shows must be defined in the choreography as different scripts. Your choreography can have any number of defined cues. To change scripts, enter the cue number on the Numpad from the SMPTE FIRING or INTRL FIRING page.

Section 3: Home Page



Figure 24

1. **File Icon** – The file icon and file name, shown above in Figure 24, are displayed once a show file has been successfully uploaded to the CM. If there is no file icon and no file name, and only the word MANUAL, then no show file has been uploaded. You can fire manually at any time, with or without a show file. If a file has been uploaded, but you wish to use manual-only mode, return to the FILE menu, without a USB inserted and press YES to switch to manual-only mode.
2. **Link Quality Icon** – The Link Quality icon displays the average Link Quality between the CM and the FM(s).
3. **Battery Level Icon** – The battery level icon displays the current battery charge level of the CM.
4. **Connected Module Status** – The first number in the connected module status displays the number of FMs connected to the CM. The second number in the status displays the number of defined FMs in the choreography show file. If there is no show file loaded, the second number will always be the same as the first number.
5. **Messages** – Messages sent to the CM are displayed here, such as the names of active and/or offline FMs.
6. **Find Software Version** – Press the DOWN (↓) arrow key to display the current software version installed on the CM.

Section 4: Menu

Navigate to different functions/pages by entering a circled number icon (as shown in Figure 25) on the Numpad.

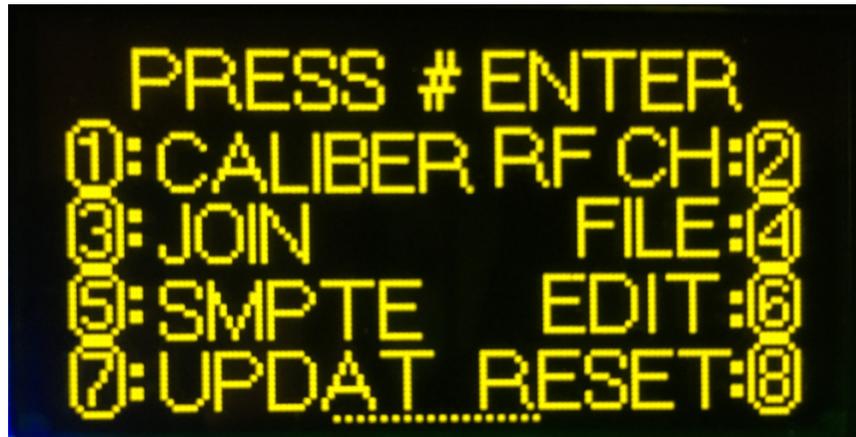


Figure 25

1. CALIBER

Calibers are used to disable one or more specific sets of shots. When creating a show file, a caliber is assigned to the shot; the CALIBERS/DISABLES page can be used to enable or disable these calibers. The show file can be edited in any .csv editor to allow for any groupings desired. The available disables will be listed on the CALIBER LIST screen (as shown in Figure 26). ENA indicates these shots are enabled and ready to be fired. DIS indicates these shots are disabled and are not ready to be fired.

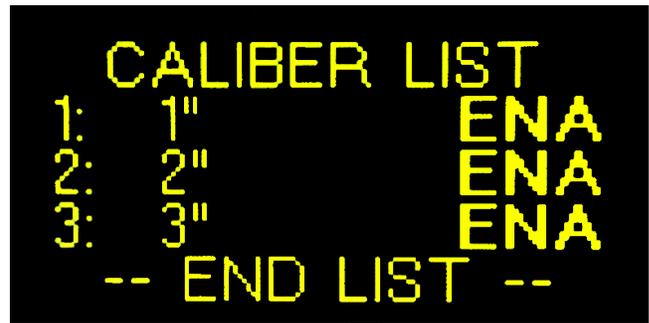


Figure 26

2. RF CH

Use the WIRELESS WIZARD (WW) function to automatically determine the best RF channel or manually set the RF channel by going to MENU > RF CH:(2) > ENTER. From the RF CHANNEL screen, use the Numpad and click on ENTER to change to the desired RF channel, or press the UP/DOWN buttons to scroll through the available channels. The CM will automatically change the RF channel of any currently connected FMs to the selected RF channel. FMs not connected at this time will need their RF channels set manually.



Figure 27

3. JOIN

The join process is used to protect your system from outside interference by encrypting all communications. Every FM must be joined with a single CM. Once an FM is joined, any other CM in the surrounding area cannot connect to that particular FM.

To begin the join process, go to the JOIN MODE menu screen (see Figure 28) on the CM. The menu displays the CM's unique three-digit module ID number. Now go to your FM and press the MENU button. Use the arrow keys to scroll down to the JOIN MODE function; press ENTER. If the ID numbers on both the CM and FM are identical, press YES and HOME on the FM. Press HOME on the CM when all FMs have been joined. If the FM displays a different ID number than the CM, then another CM is on the same RF channel. Press NO to display the next CM ID number. Continue pressing NO until the correct CM ID number is displayed. If this happens, you may want to change the RF channel of your system.



Figure 28

There are only 256 unique CM ID numbers. It is possible (although highly unlikely) that two CMs with the same ID number can be in the same area at the same time. If this happens, you will be able to tell your FM is joined to the wrong CM because your FM will not appear to be “talking” to/connect to your CM. You will need to wait ten minutes before attempting the join process again. Although there is a limited number of unique CM IDs, each encryption ID is unique. Once joined, no other CM can communicate with your FM, even if two CM ID numbers are the same.

Disconnecting Units - The FM will take approximately ten (10) seconds to disconnect from the CM and for the CM and FM to display the disconnection

4. FILE

Firelinx can accept Finale Generic .csv files, Firelinx LT .csv files, or Firelinx generic show file formats. (To view a sample of what the Firelinx generic show file looks like, see “Simple File Format” located on page 20 of this manual or visit www.firelinx.com). Show files should be stored in the root directory of your USB storage device drive before connecting said device to the CM. If there are more than four show files on your USB, press the up and down arrow keys to scroll between files. The CM can display a maximum number of sixteen (16) files. Use the Numpad to select the file you wish to download. If FMs are connected to the CM during this process, the CM will automatically upload your selected show file to each of the connected FMs. To remove a show file from the CM, either download a new show file or, with no USB storage device inserted, go to the FILE menu and switch to manual-only mode.

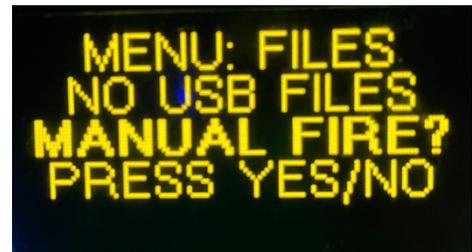


Figure 29

5. SMPTE

The SMPTE page (see Figure 30) is used to monitor the incoming SMPTE timecode and to adjust the SMPTE frame rate. To change the frames per second of the incoming SMPTE timecode, press the corresponding number(s) on the Numpad and then press ENTER. If the SMPTE timecode is currently detected by the CM, the clock icon will appear. If there is no clock icon, the SMPTE is not currently running to the CM, however, the CM will continue to count time. If the SMPTE signal is temporarily corrupted or the wire is broken, the firing system will continue operating. If the clock icon flickers on and off, the SMPTE frame rate may be incorrect. Adjust the frame rate until the SMPTE clock icon is steady for at least ten seconds. If no frame rates seem steady, choose the steadiest rate and allow the system to adapt to it.

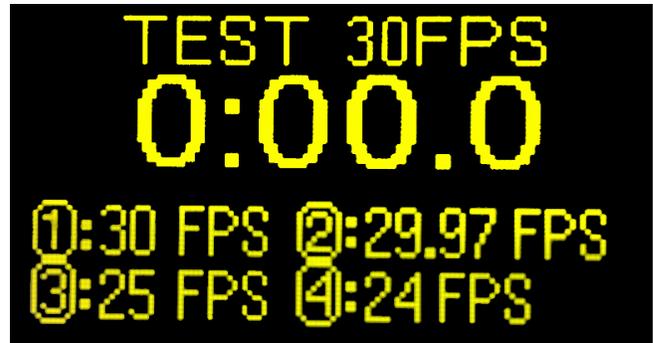


Figure 30

6. EDIT

The EDIT function is currently not in use. In future releases, the EDIT function will be used to create simple scripts from within the CM without the need to first create a show file on a computer.

7. UPDATE

Updates must be saved in the root directory of a USB storage device before they can be installed to the CM. To download updates, go to www.firelinx.com/update and save the update file(s) to your USB storage device. Insert the USB storage device containing the updated files into the CM. Only one update should be on the USB device at a time. The MENU screen will display whether the update is a CM or FM update as well as the update's version number. Make sure to join all FMs before running the FM update so they update simultaneously.



Figure 31

If both a CM and FM update exists, FM updates will be installed first, followed by CM updates. Press YES to install the update(s) to the FM. Once the FMs update occurs the FMs will turn off completely, leave them turned off if you have a CM update to run. Before each update, the CM should be power cycled (powered off) wait 5 seconds and then power the CM back on. This ensures the CM sees its updates and not anyone else's in the field. To update the CM, insert the USB, click on MENU > press 7 on the Numpad and press ENTER. Then follow the instructions on the screen.

8. RESET

Once your show is finished, press the RESET button to reset the show clock and shot list of all modules. The system is now ready to perform the same show again.

9. STEALTH MODE

The stealth mode function is used to hide module LEDs in situations where they may be too bright or distracting, such as in a stage environment where the modules are visible to the audience. To reach the stealth mode setting press MENU, then press the down arrow/NO key.

Modules should stay illuminated during system setup, wiring, and continuity testing. Once the system is armed, modules will remain illuminated until stealth mode is enabled. Once stealth mode is enabled, LEDs will remain off until the system is disarmed. Once disarmed, stealth mode will be disabled, and LEDs will be reilluminated.

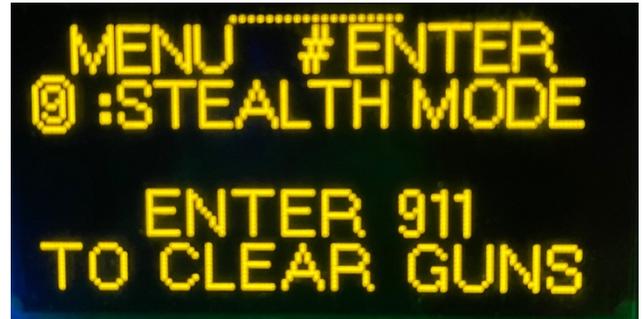


Figure 32

10. CLEAR GUNS

From the menu page, there is the ability to 'Clear Guns', which fires all channels on all modules at once. This can be useful for ensuring the field is clear after firing has completed (and possibly send up a second finale if in case one or matches didn't fire the first time). By entering 911 on the number pad and pressing ENTER you will be brought to a final warning screen to ensure you understand what will happen. The CM must be ARMED for Clear Guns to work. To continue with firing all the channels, press the YES key on the CM, any other key will abort the process.

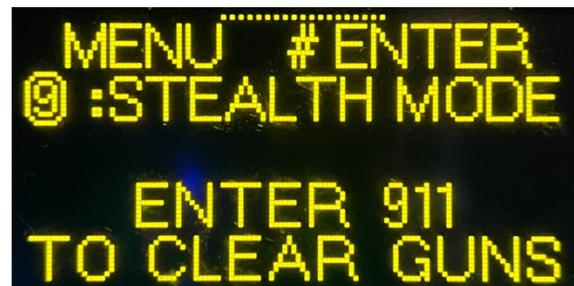


Figure 33



Figure 33



Figure 33

Section 5: Continuity Testing

CAUTION – You cannot ARM while in Continuity Test (CT) Mode and you cannot run CT while Armed. They are mutually exclusive for safety reasons. Please be advised that the FM screen will display the results from the last continuity check when CT Mode is NOT active. For live CT results you must have CT Mode enabled. While CT mode is enabled, you will be able to view live results on the FM or the CM. This will ensure that you are viewing the data live.



Figure 34

Press the CT button on the CM to open the CONTINUITY TEST page. Press OK to enable continuity testing. **NFPA regulations require that the field is clear while continuity testing is being performed.** Use CREWSAFE™ to check all connected FMs for errors and to ensure good continuity while pinning. **Use this feature only if the leading pyrotechnician and the jurisdiction authority concur that it is safe to do so.** Individual continuity testing results can also be viewed on each FM.

Once testing is complete, return to the CONTINUITY TEST page and press OK to disable continuity testing. Continuity testing is automatically disabled when the system is armed, however, it is wasting battery power if left on when not in use.

From the CONTINUITY TEST page, you may also change the display mode to view all shots at any time or to show all errors discovered during testing.

Symbol	Meaning
=	There is a loaded shot currently in the choreography. This shot is ready to be fired.
?	There is a loaded shot currently NOT in the choreography. This shot can still be fired manually.
X	There is no shot loaded, but this channel is currently in the choreography. This should be corrected; a show will still run if it is left disconnected.
*	There is a loaded shot in the choreography with too much resistance. This shot might not fire on command. This must be corrected.

Section 6: Wireless Wizard (WW)

The Wireless Wizard (WW) is used to scan the surrounding area and automatically determine the best RF channel. While a certain RF channel may be best at the beginning of the day, the RF environment may change over the course of several hours. WW should be used to scan the surrounding area again an hour or so before showtime, to ensure the recommended channel has not changed.



Figure 35

To begin, press the WW control button. The CM will display the RF WIZARD menu (see Figure 35). Press OK to begin scanning the RF space. Once scanning is complete, the CM will display the suggested RF channel. If you wish to accept the suggested channel, press OK. Pressing OK will update the RF channel of the CM and all connected FMs. If any FMs are turned off or not currently connected to the CM at this time, their RF channels will not be updated. FMs will need to be manually set to a new channel.

Section 7: Module Status

Module status is used to monitor the status of FMs before, during, and after a show. The first page of the MODULE STATUS menu displays the number of modules currently connected. Use the navigation buttons and Numpad to view and select individual modules.

The second page of the MODULE STATUS menu (see Figure 36) shows (1) the module ID number, (2) if the module is getting and responding to heartbeats, (3) if the CM is synchronized with the module (4) if the module is armed (5) if the module is currently firing or has fired (6) if the module is connected (7), the module's battery level (8), the module's current Link Quality (LQ), and (9) the choreography show file. The third page of the MODULE STATUS menu can be accessed by pressing UP – this will bring up an additional menu allowing you to turn off an FM remotely (Disable Mod) or force the FM to re-download its choreography file (Download). Pressing DOWN twice from this menu screen will bring up a guide showing what the icons mean.

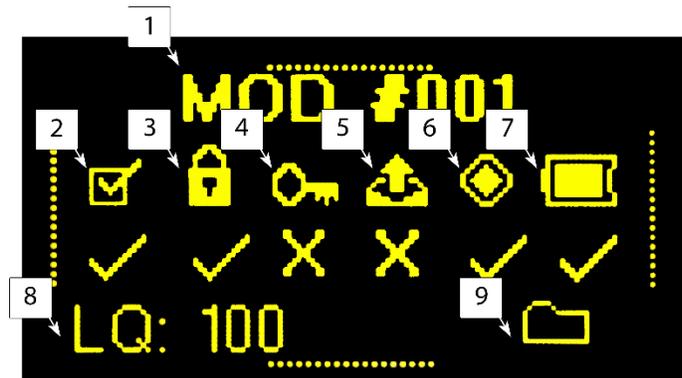


Figure 36

Link Quality (LQ)

Link Quality (LQ) is the percentage of RF messages successfully received by the module. LQ will typically be anywhere from 80-100%. Scripted show files, such as SMPTE and Internal Clock files, will still fire even if LQ drops as low as 50%. For manual firing, LQ should not drop below 90%. If LQ does drop below 90%, designate more FMs as repeaters and raise all modules at least eight inches (200 millimeters) off the ground.

Section 8: Operator Presence Device (OPD) - Optional equipment

When an Operator Presence Device (OPD) is plugged into the CM, the OPD will automatically be activated. To fire a show, press and hold the OPD button before pressing the fire button. Release the OPD button to pause a show. Press and hold the OPD button and then press the fire button to resume a show.



Figure 37

Section 9: Open Pyro Network (OPN) - Optional equipment

An OPN card can be purchased separately and installed in any CM or FM to expand the abilities of both modules. An Ethernet or DMX module allows the CM/FM to send and receive signals via Ethernet or DMX. A 32-pin expansion (OPN-32) card installed in the FM adds 32 firing pins to an FM. The OPN-32 card has an industry-standard Centronics-36 D-style connector on the front side of the module which attaches to a standard 32-shot slat.

General Troubleshooting and Maintenance

How to Change a Wiring Terminal Block- Replacement Spring Terminals are available for purchase by visiting our website.

When performing a continuity test and a channel displays as OPEN, then remove the E-match and place a short length of wire across the two terminals. If the channel still displays as OPEN, then there is a problem with the wiring terminal block.

Remove the two screws on either side of the wiring terminal block and pull the block upwards. (See figure 38) Replace with a Firelinx-approved Spring Terminals (go to <http://www.firelinx.com/shop> to purchase replacements/spares). To reinsert a wiring spring terminal, insert the two screws and lower into the two screw holes. Hold the wiring spring terminal 90 degrees to the module and check that both left and right pads and all PCB pins are aligned as you slowly seat the terminal. Tighten screws until snug and lock washer has slightly collapsed. Repeat the continuity test to ensure the block is correctly seated.



Figure 38

If you have recently replaced the wiring terminal block (or disconnected it from the FM), and the channel is still displayed as OPEN on Continuity check, then the two small connectors between the spring terminal and the FM PCB may not be seated properly.

How to Clean Modules

Use a microfiber cloth and warm water to clean module surfaces and a soft-bristle toothbrush to clean the tops of terminals and the narrow spacing between terminals. **Do not** immerse the unit in water or put the unit under running water. **Do not** use any harsh chemicals or cleaners on the unit.

Battery Specifications

WARNING - Use of any other battery type voids your warranty. Do not store batteries in an environment over 60 degrees Celsius or 140 degrees Fahrenheit

The Lithium-Polymer internal batteries (7.4V 5200mAH) should be replaced every five years with a Firelinx-approved battery (go to <http://www.firelinx.com/shop> to purchase). With normal use, batteries should last 8-12 hours. For best battery performance, store at 40% to 50% battery capacity. Do not store the unit plugged into the charger. A second battery pack may also be installed if needed (see “Installing/Replacing Components” on page 23 of this manual for further instructions). If a second battery is installed, there will not be enough room to install an Open Pyro Network (OPN) expansion card.

Installing/Replacing Components

To install an OPN expansion card or install/replace a battery or other component, the outer case must be opened according to the following procedure:

CAUTION Contains parts and assemblies susceptible to damage by Electrostatic Discharge (ESD)

1. Remove the (12) spring terminal blocks, (See figure 39)

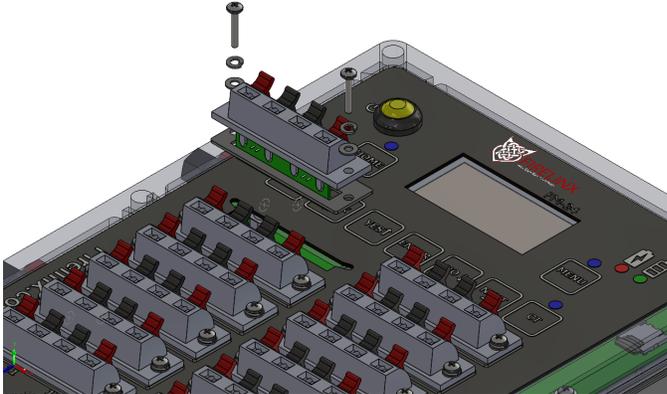


Figure 39

2. Remove the (6) outer enclosure screws (see figure 40)
3. Carefully remove the top of the enclosure by slowly opening it to the left side (as you would open a book).
4. Remove the (11) screws holding the FM PCB. (see figure 41)

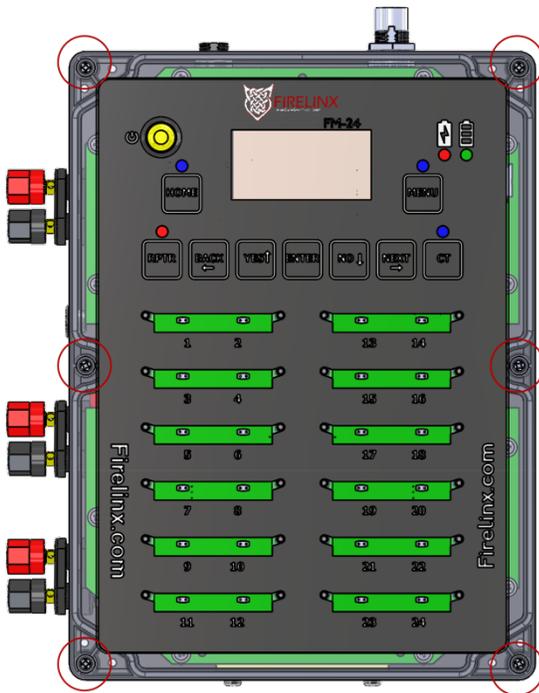


Figure 40

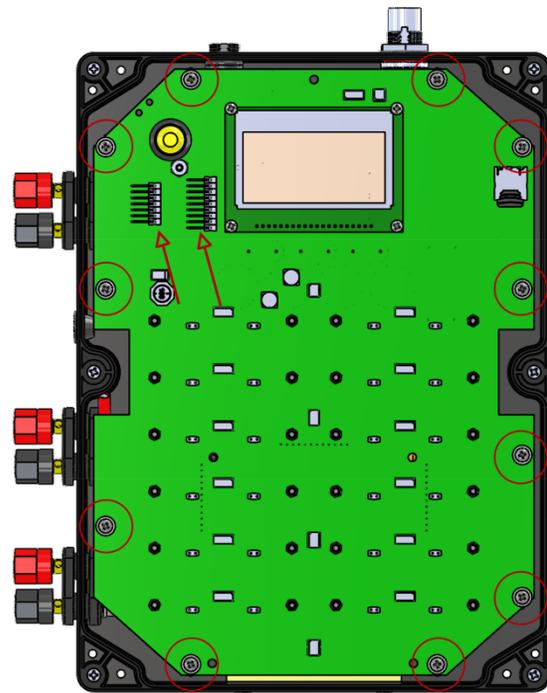


Figure 41

5. Carefully remove the top of the enclosure by slowly opening it to the left side (as you would open a book).
6. Remove the 11 screws holding the board to the outer case; carefully remove the ribbon cables before opening the board (See Figure 41).
7. After installing or replacing your component(s), replace the PC board, reconnect the ribbon cables (location shown by red arrows in figure 41), install the (11) PC board screws, (6) outer enclosure screws, and (12) spring terminal blocks and hardware. Tighten all screws until snug and lock washer has collapsed. Repeat the continuity test to ensure the block is correctly seated.

Installing an OPN Expansion Card

Follow steps 1-2 listed above, remove the (2) nuts on the back of the PC board. Insert standoffs and screw the standoffs into the OPN card as shown. Line up the pins of the OPN expansion card (see Figure 43) with the connectors located on the FM board and gently press until headers on OPN seat against connectors on the FM PCB. (see Figure 42). Secure with provided screws. Tighten until snug.

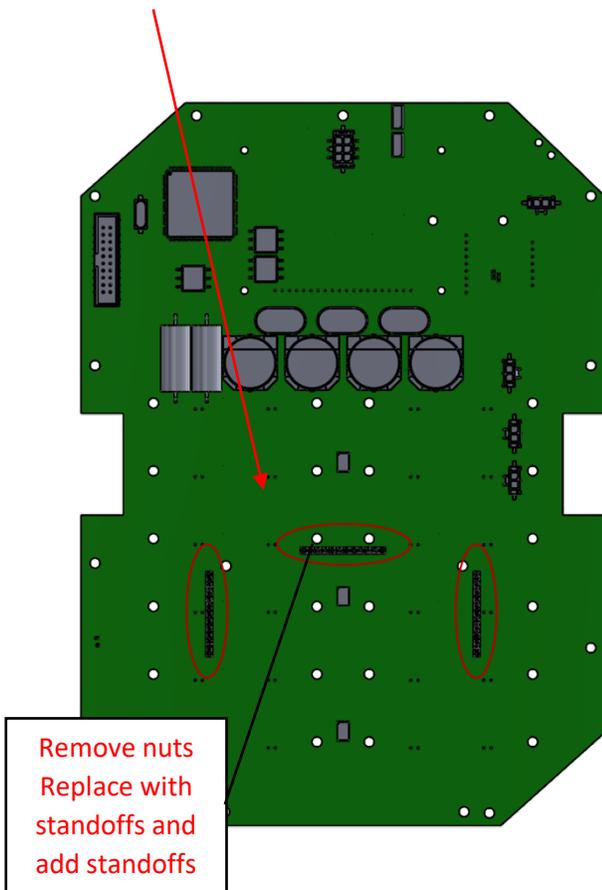


Figure 42

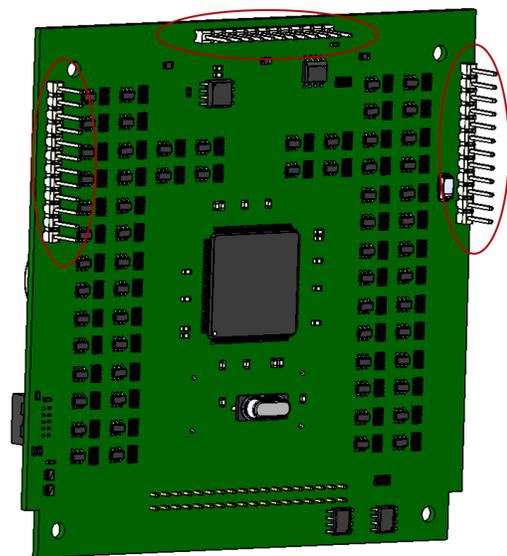


Figure 43

Simple File Format

#FirelinxShortForm

Cue	Shot Time	Module	Pin	Caliber	Description
1	10	1	1	2"	1 st Shot
1	11	1	2	2"	
1	12	1	3	2"	
1	13	1	4	2"	
1	14	1	5	4"	Dual Fire Start
1	14	1	6	4"	
1	15	1	7	4"	
1	15	1	8	4"	
1	16	1	9	4"	
1	16	1	10	4"	
1	17	1	11	6"	Ripple Fire Start
1	17.1	1	12	6"	
1	17.2	1	13	6"	
1	17.3	1	14	6"	
1	17.4	1	15	6"	

Glossary

- **Caliber** – The diameter of a shell of fireworks. Used in a Firelinx system to disable certain-sized shells from the CM.
- **Choreography** – Data included in a show file of what time which show cues will fire. This data must be created on a computer and uploaded to the CM via a USB storage device.
- **CM** – Command Module
- **Continuity Test** – A test used to check that a squib or e-match(es) is connected properly by running a low current through the firing pin.
- **CREWSAFE™** – A combination of Firelinx’s safety circuitry and power systems used to perform continuity tests.
- **Firing Channel** – Reference to a firing pin pair. This pair includes a ground and a power line.
- **FM** – Firing Module
- **FPS** – Frames Per Second. Used in SMPTE timecode to determine the speed of time synchronization.
- **Heartbeat** – The time signal is sent to FMs in the field to keep FMs on time and to ensure they are communicating with the CM. If an FM does not receive this signal from the CM, the FM will cease firing.
- **Link Quality** – A number determined by the strength of the radio signal. Used to ensure CM and FMs are communicating effectively.
- **System Network** – The connection between multiple FMs and the CM is supported by a wireless network and 2Wire communication. A system can also communicate via Ethernet if connected to an OPN.
- **OLED** – A type of LED graphical interface. Used to create the pictures displayed on module screens.
- **OPD** – Operator Presence Device, also known as dead man’s switch. Used for extra safety to ensure a qualified person is presently operating the system and that the operator is able to quickly pause or stop a show.
- **OPN** – Open Pyro Network. Optional PCB that expands the capabilities of an FM or a CM, depending on the type of OPN inserted. Also used to expand an FM by 32 firing pins.
- **Pyrotechnician** – A person responsible for the safe storage, handling, and use of pyrotechnics and pyrotechnic devices.
- **RCA** – Connector used with a Firelinx system to receive timecode data.
- **SMPTE Timecode** – Used in a Firelinx system to synchronize choreography to music. (Used in other entertainment show systems to synchronize timing between systems).

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