

STAGEHAND FX ™

REFERENCE MANUAL V1.3

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Our experts. Your scenery. Let's get moving.

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GETTING STARTED

Congratulations on your purchase of the *Stagehand FX*. The *Stagehand FX* has been a member of the Stagehand family for a long time proving to be a versatile I/O controller. Give it 120VAC power, an ethernet connection, and a Showstopper cable and you're ready to control simple effects with Spikemark. With the *Stagehand FX*, you can coordinate both simple switched devices and motors being run by Stagehand motion controllers all from within Spikemark.

Each *Stagehand FX* operates 4 relay outputs (rated for 3A at 30VAC/42VDC), and can sense 4 dry-contact inputs. You can connect various power sources to the relay outputs making it easy to control solenoid valves and small motors from a single *Stagehand FX*. Also, any 12VDC tolerant switch can be connected to the *Stagehand FX* inputs and used to trigger cues and other actions.

Each *Stagehand FX* integrates with the Showstopper emergency stop system to ensure that all effects can be halted in an instant with the press of any connected e-stop button.

The *Stagehand FX* uses pluggable terminal blocks for the I/O connections, making it easy for you to connect any device. Get ready to *Make It Move!* I/O style.

This manual will guide you through:

- Unpacking
- Installation
- Powering Up
- Operation
- Troubleshooting

If you need help along the way contact us on our website (<u>creativeconners.com</u>), via email

(support@creativeconners.com), or by phone (401-289-2942 x2). We want your automation to succeed and we are eager to help you through any head-scratching issues.

WHAT'S IN THE BOX

Inside the box you should find:

- 1. Reference Manual (this document)
- 2. Stagehand FX
- 3. IEC Power Cord

STAGEHAND FX FEATURES

The *Stagehand FX* performs two functions: switching relay outputs & sensing switch-closure inputs. This means that *Stagehand FX* can:

- 1. Turn on & off a power source to a simple effect like a solenoid valve, lights, or small motors.
- 2. Detect when a switch has been closed (eg. a limit switch or pushbutton).

INSTALLATION

MOUNTING THE STAGEHAND FX

The *Stagehand FX* is packaged in a 2U 19" rackmount case. You can mount in a rack, or simply set it on any flat surface.

FRONT VIEW



- 1. Knob The knob is used to set the IP address or Subnet. Press the knob (it's also a button) and then turn the knob to adjust the address.
- LCD Display The display shows information about the Stagehand's status. When idle, it shows the current IP address and the status of the network connection between the Stagehand and a PC running Spikemark. If an E-Stop has been activated, the condition will be displayed. In address mode, it will let you alter the current IP address or Subnet.
- 3. Output Indicators When the *Stagehand FX* closes an output switch, the corresponding indicator light will illuminate green.
- 4. Output Contacts The pluggable terminal block provides screw terminals to make connections to the four (4) relay outputs. The relay outputs are dry contact closures allowing you to switch any power source you need.

a. The contacts are rated for 3A 30VAC/42VDC maximum.

- Input Contacts The pluggable terminal block provides screw terminals to make connections to the four (4) inputs. The *Stagehand FX* will supply 12V on one terminal of each input and sense the presence of that voltage on the other terminal of the input. You can wire any normally open (N.O.) switch rated for at least 12VDC to the inputs.
- E-Stop The E-Stop (a.k.a. emergency stop) receptacle is a 5-pin XLR connector. This receptacle receives a
 dedicated emergency signal (+24VDC) from the Showstopper system. If this signal is present, the *Stagehand FX*is free to close any output, when the signal is interrupted it will immediately open all relay outputs.
 - a. Wire all output actions to FAIL SAFE when the e-stop is engaged
- 7. Ethernet The Ethernet receptacle accepts both Ethercon and standard RJ45 network cables. The *Stagehand FX* uses Ethernet as the control protocol to communicate with a PC running Spikemark software.

REAR VIEW

| INPUT POWER OSA FLA NOVIC SOROHE | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| | |
| | Stagehand FX ™ |
| Supply proper branch circuit protection using UL Class T fuses or a Listed UL 489 Molded Case Circuit Breaker (MCCB) with a maximum allowable rating of 20A. Short Circuit Current Rating (SCCR) 5000A. | MADE BY CREATIVE CONNERS. INC. |
| | |
| | |

1. Input Power - 120VAC, 0.5A IEC Socket

INPUT POWER

The *Stagehand FX* requires a 120VAC, 0.5A input power. Connect with a standard or locking IEC cable to power your *Stagehand FX*. Once power is connected to a live outlet, the *Stagehand FX* will be powered up and ready for Showstopper and Ethernet.

SHOWSTOPPER INPUT

The Showstopper is Creative Conners, Inc's emergency stop safety controller. Each Stagehand and smart machine requires a direct connection to a Showstopper 3 Base or Showstopper 3 Hub. These connections are made with a Neutrik 5-pin XLR cable. There's no tech wizardry here, any 5-pin XLR cable will work as long as the polarity is correct. See below for connection details.

| PIN | CONNECTION |
|-----|------------|
| 1 | СОМ |
| 2 | N.C. |
| 3 | N.C. |
| 4 | N.C. |
| 5 | +24VDC |

ETHERNET

The real power of the *Stagehand FX* is realized when connected through the network to Spikemark software. As with all Stagehands, each controller must be connected to the network with an Ethernet (CAT5/CAT6) cable back to a network

switch. The *Stagehand FX* has a Neutrik etherCON receptacle which accepts the rugged etherCON connector or a standard RJ45.

IP ADDRESS

Once the *Stagehand FX* is physically connected to the network you will need to set the IP address in order to communicate with Spikemark. This is accomplished the same way as any other Stagehand controller.

- Click the jog wheel, the SET IP screen will be displayed
- Scroll to the octet you want to change and click the wheel
- Turn the wheel to increase or decrease the number until you reach your desired value. Click the jog wheel to set the value.
- Repeat the process for all octets that need to be adjusted.
- Once complete use the jog wheel to highlight 'OK' and click the wheel

SUBNET MASK

In addition to the IP address each Stagehand controller also has the ability to set the subnet mask. The default subnet mask is 255.255.255.0. If you find yourself in a position where you need to adjust the subnet mask, please take a step back and ask yourself if it is really necessary. If the answer is yes, click and hold the scroll wheel to reveal the SET SUBNET screen. Follow the same procedures used to set the IP address to adjust the subnet mask.

CONNECTING EFFECTS

HOOKING UP A SWITCHED EFFECT

The *Stagehand FX* has four (4) switched outputs that can be used to control any simple on/off device. The switched outputs located on the front panel are dry contact closures. In other words, the *Stagehand FX* doesn't provide any power from those outputs just a switch closure. The figure below shows a typical output connection.



Reminder: The contacts are rated for 3A 30VAC/42VDC maximum. This means you may need to add a relay into the mix in order to fire higher voltage/amperage effects.

HOOKING UP AN INPUT SWITCH

The *Stagehand FX* has four (4) inputs that can be used to detect a switch closure. By using normally open switch connected to a *Stagehand FX* input, you can trigger cue links and other actions in SpikeMark software when the switch is closed. The figure below shows a typical input connection.



OPERATION

CONTROLLING YOUR STAGEHAND FX IN SPIKEMARK

STAGEHAND FX CONFIGURATION

1. Select the *Stagehand FX* you wish to update in the Cue Grid.



The selected *Stagehand FX* will be indicated with an orange outline.

 Once you have selected an FX in the Cue Grid, you can begin editing its parameters in the FX Properties Panel, the scrolling window on the right side of the Spikemark screen that contains sections of parameters grouped by function.

You can collapse or expand these sections to show or hide the information.

| Network |
|--------------------------|
| Network Connected |
| IP Address 192.168.10.32 |
| Auto-repair |
| Connect |
| Disconnect |
| |
| Input 1 Input1 |
| Input 2 Input2 |
| Input 3 Input3 |
| Input 4 Input4 |
| |
| Output 1 Output1 |
| Output 2 Output2 |
| Output 3 Output3 |
| Output 4 Output4 |
| 1 2 3 4 |

RENAMING AN FX

To help identify all the *Stagehand FX* devices in your show, you can give each FX a unique name. Additionally, you can rename all of the Inputs and all of the Outputs for an FX to help remember the purpose of each switch in the *Stagehand FX*.

- Select the *Stagehand FX* to be edited in the Cue Grid and then select the field that contains the default name.
- 2. Type a new name into the field and press the Tab key or click out of the field to update the name in the Cue Grid.



In the figure, the default name is "FX".



In the figure, the new name is "Trap Door".

RENAMING FX INPUTS AND OUTPUTS

- 1. Select the *Stagehand FX* to be edited in the Cue Grid
- 2. In the Inputs section of the FX Properties Panel, enter the new Input name(s) and in the Outputs section of the FX Properties Panel, enter the new Output name(s).

| Inputs | 5 | | | |
|----------|-------------|--|--|--|
| Input 1 | Lift Limit | | | |
| Input 2 | Input2 | | | |
| Input 3 | Input3 | | | |
| Input 4 | Input4 | | | |
| Outputs | | | | |
| Output 1 | SR Lock | | | |
| Output 2 | 2 SL Lock | | | |
| Output 3 | SR Cylinder | | | |
| Output 4 | SL Cylinder | | | |
| 1 | 2 3 4 | | | |

FX STATUS

Stagehand FX status information is displayed in the Cue Grid column headers and the Properties Pane for the *Stagehand FX*. The status of the *Stagehand FX* device is indicated by various icons - several of which are shared with other Stagehand controllers. Each icon status is described below.

| lcon | Status |
|-------------|----------------------------------------------------------------|
| | FX disconnected from the network. |
| | FX connected to the network, but idle. |
| *(* | FX is inactive and won't run cues or affect cue links. |
| | FX has completed a cue. |
| STOP | Emergency stop. |
| 2 01 | Cue loaded. |
| V | Soft stopping, but not yet fully stopped. |
| | Stopped mid-cue by a soft-stop command. |
| H | An output is active in manual mode. |
| | One (or more) output(s) is running in a cue. |
| | All outputs have been turned off because of a fault condition. |

MANUAL OPERATION

After you have made all the connection and have connected to your *Stagehand FX* by setting your IP Address, you are ready to manually test your *Stagehand FX*. To manually test your *Stagehand FX*, you will need to use the manual output buttons in the *Stagehand FX* Properties Panel in Spikemark. Press the button that corresponds to the output you wish to activate. The button behaves like a momentary switch; the FX Output will be active as long as the button is held down. When you release the button, the FX Output will deactivate.

- 1. Select the *Stagehand FX* you wish to activate in the Cue Grid.
- 2. Click and hold down one of the output buttons in the Outputs section of the FX Properties Panel.

| 🔿 Outputs | | | | | |
|-----------|---------|---|--|---|--|
| Output 1 | Output1 | | | | |
| Output 2 | Output2 | | | | |
| Output 3 | Output3 | | | | |
| Output 4 | Output4 | | | | |
| 1 | 2 | 3 | | 4 | |

3. Release the button to deactivate the output.

SETTING THE FX ACTIVE MODE

Most of the time, you will want the *Stagehand FX* to load and run cues normally. However, there are occasions when an effect needs to be temporarily removed from the show. Perhaps there is a problem with the scenery on a winch track, or perhaps you need to run through movements using only the Stagehands downstage and don't want anything upstage to move.

- Select the Stagehand FX you wish to disable temporarily in the Cue Grid.
- In the Cue Behavior section of the *Stagehand FX* Properties Panel, deselect the Active field.

| O Cue Behavior | |
|-------------------|--|
| Active (Run Cues) | |

The FX will not run cues until the Active field is selected again.

• You can also set the Active mode by right-clicking on the Cue Grid header as shown.



The Active state of a *Stagehand FX* can be controlled through any FX Input action. Using an input on a *Stagehand FX*, you can quickly deactivate one or many Stagehand Motors or FXs. See the "FX Input Action" section below for more information.

FX INPUT ACTION

Input Actions introduce a way to trigger events in the show that are not directly related to a cue. FX Input Actions give you a way to tell Spikemark to do something whenever an input is activated, regardless of what cue is running. There are five input actions:

- Deactivate Stagehand
 - a. Deactivate the selected Stagehand when the input is triggered
- Soft Stop Stagehand
 - a. Execute a Soft Stop for the selected Stagehand
- Run Cue
 - a. Run a specific cue
- Run Next Cue
 - a. Run the next cue in the stack
- Activate FX Output
 - a. Activates the selected FX Output
- Disable FX Output
 - a. Disables the selected FX Output

The below each input action you will see a Debounce Seconds input box – the default value is 0 seconds. The Debounce field adds stability to the way Spikemark listens to input actions. For example, if you have a momentary push button connected to the input of a Stagehand FX, there is the possibility that the button contacts could engage and disengage multiple time within the action of you physically pushing the button. The debounce time is the amount of time between contacts closing before Spikemark will register another button pushed. This way when you push your button, it only registers once rather than multiple times in your one button push. If this time is too long, you could miss another button press. Usually 0-0.5 sec is good choice for debounce time, but we leave open for adjustment in case you have the need.

LINKING CUES BY FX INPUT

You can link a Child Cue to a Parent Cue so it runs as soon as an input switch is detected from a *Stagehand FX*. This can be handy if you have two cues that need to run in close proximity but require a crew member to give a "Clear" signal for the second cue. In such a case, you could wire a pushbutton to the input of a *Stagehand FX*. When the Parent Cue runs, the crew member would push the button to start the Child Cue when appropriate.

1. Click the Add Link button next to the Child Cue.

2. Select the Parent Cue from the drop-down list and select Input Link, then press OK.

3. The new link will appear in the left margin of the Cue Grid. Select the *Stagehand FX* and the input that should trigger the Child Cue.



| 🔎 Add Cue | Link | _ | | × | | | |
|-----------------------------|----------------------|--------|-----------------|---------|--|--|--|
| Select a trigger for Cue #1 | | | | | | | |
| Parent Cue | Cue #4 | - | | v | | | |
| | O Completion Link | | | | | | |
| | ⊖ Time | e Link | | | | | |
| | O Position Link | | | | | | |
| | Inpu | t Link | | | | | |
| | | | | | | | |
| Cancel 🔀 OK | | | | | | | |
| | | | | | | | |
| Iink to 4 | | Cue | 2 1 11.7 | 1s | | | |
| Input Link | | | | | | | |
| Fx FX | Cue N | umber | | 1 | | | |
| Input Inpu | t1 Descri t2 Ramo | ption | | 2.0 | | | |
| | t3 Total T | lime | | 11.08 s | | | |
| Inpu | t4 | | | | | | |

DEACTIVATING STAGEHAND FX ACTION

You can define an Input Action that will toggle the Active state of one or more Stagehand Motors or FXs to temporarily keep them from running cues during the show. This may be handy if you have a scenic element that is involved in a number of cues but requires tight synchronization with



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an actor's movements. Some nights the computer sequencing works fine, but some nights you need to take manual control of the motor and jog it to match the actor. When that happens, you don't want to mess up all the other cues in the sequence, so you wire an "Override" button into a *Stagehand FX* and configure it as illustrated in the steps below.

1. Select the *Stagehand FX* you wish to configure in the Cue Grid.



- 2. In the Input (1, 2, 3 or 4) Action section of the FX Properties Panel, click the Add Action button.
- 3. Select Deactivate Stagehand as the action type.



4. From the Deactivate Stagehand drop down menu, select the FX or Motor that should be deactivated when the FX Input is closed.

5. Repeat as necessary if you would like a single FX Input to deactivate multiple Stagehands—Motors or FXs.

| Input 1 Actions |
|----------------------------------------------|
| Add Action Remove Action |
| Deactivate Stagehand: |
| SR wagon SR tab SL tab |
| Input 1 Actions Add Action Remove Action |
| Deactivate Stagehand: |
| SR wagon 🗸 |
| Debounce seconds: |
| 0 |
| Deactivate Stagehand: |
| SR wagon |
| SL tab |

SOFT STOPPING FX ACTION

There are times when you may need to soft stop a device in a show based on actor timing. For example, maybe you have two concentric turntables, which both start moving at the same time, but one will need to stop when an actor says a specific line. In this example, you would not want to set up a cue in which the turntable reached a target position, but, instead, you could use an FX input and set it so that when manually activated after the actor spoke the line, the motor would slow down at its programmed deceleration rate and then stop.

1. Select the *Stagehand FX* you wish to configure in the Cue Grid.

2. In the Input (1, 2, 3 or 4) Action section of the FX Properties Panel, click the Add Action button.

3. Select Soft Stop Stagehand as the action type.

4. From the Soft Stop Stagehand drop down menu, select the FX or Motor that should be soft stopped when the FX Input is closed.

| Input 1 Actions | | | | |
|---------------------|---------------------|--|--|--|
| Add Act | ion Remove Action | | | |
| De | eactivate Stagehand | | | |
| Soft Stop Stagehand | | | | |
| Ru | in Cue | | | |
| Ru | in Next Cue | | | |
| Ac | tivate Output | | | |
| Di | sable FX Output | | | |

| Input 1 Actions | | |
|-----------------|----------------|--|
| Add Action | Remove Action | |
| Deacti | vate Stagehand | |
| Soft St | op Stagehand | |
| Run Cu | ie 12 | |
| Run Next Cue | | |
| Activat | te Output | |
| Disable | EV Output | |

| 📀 Input 1 Ac | tions | |
|--------------|-----------|-------|
| Add Action | Remove A | ction |
| Soft Stop S | tagehand: | |
| SR wagon | ~ | |
| SR wagon | | |
| SR tab | 3 | |
| SL tab | | |

5. Repeat as necessary if you would like a single FX Input to deactivate multiple Stagehands—Motors or FXs.

| Input 1 Actions | | |
|--------------------------|--|--|
| Add Action Remove Action | | |
| Soft Stop Stagehand: | | |
| SR wagon | | |
| Debounce seconds: | | |
| 0 | | |
| Soft Stop Stagehand: | | |
| SR tab ~ | | |
| Debounce seconds: | | |
| 0 | | |
| | | |

RUN NEXT CUE FX ACTION

In some environments, particularly interactive exhibits, you may want Spikemark to run through a series of cues in sequential order by repeatedly pressing a single button.

For instance, a museum exhibit may have scenery or props that need to move in sync with A/V. The media server can trigger a contact closure connected to an FX Input, executing the Next Cue in Spikemark. This reduces the required number in inputs and complexity in programming, maintaining a straight line through the cue stack. While this action is rarely useful in live theatre, it does find use in non-traditional applications.

NOTE:

The "Run Next Cue" action will effectively create an always armed GO button. Use caution where the triggered effect could pose a safety risk.

To add a Run Next Cue FX action:

- 1. Select the *Stagehand FX* you wish to configure in the Cue Grid.
- 2. In the Input (1, 2, 3, or 4) Action section of the *Stagehand FX* Properties Panel, click the Add Action button.



3. Select Run Next Cue as the action type.

REMOVING A STAGEHAND FX INPUT ACTION

1. Select the *Stagehand FX* for which you wish to remove the Input Action in the Cue Grid.

2. In the Input (1, 2, 3 or 4) Action section of the FX Properties Panel, highlight the desired action and press Remove Action.

| Add Action Remove Action Deactivate Stagehand: SR wagon ~ Debounce seconds: | | |
|--------------------------------------------------------------------------------------|--|--|
| Deactivate Stagehand: SR wagon ~ Debounce seconds: | | |
| SR wagon Y Debounce seconds: | | |
| Debounce seconds: | | |
| Debounce seconds: | | |
| 0 | | |
| Deactivate Stagehand: | | |
| SR tab \sim | | |
| Debounce seconds: | | |
| 0 | | |

UNDERSTANDING THE STATUS DISPLAYS

The two-line alphanumeric display on the *Stagehand FX* motion controller uses an LCD screen to give you feedback about the *Stagehand FX*. The Stagehand is primarily used through our Spikemark software, but it is handy to have some bits of information displayed on the Stagehand faceplate for those times that you are working onstage near the machinery and not sitting in front of a computer running Spikemark. The following list explains the information that you can glean from the Stagehand display.

NETWORK CONNECTIVITY



When sitting idle, the Stagehand will display its IP address on the bottom line and whether the Stagehand is actively connected to Spikemark. Connected means that the Stagehand has an active connection with a Spikemark computer, Disconnected means that the Stagehand is not actively communicating with Spikemark.

EMERGENCY STOP

EMERGENCY STOP 0101 192.168.100.100

When the Emergency Stop circuit is activated, or unplugged, the Emergency Stop fault message will be added to the flashing fault messages. Any motion that was occurring when the Emergency Stop was detected will be stopped. To clear the fault, release the Emergency Stop button on the Showstopper. Once the fault is cleared, any motion that you wish to execute will have to be restarted. If you were running a cue through Spikemark, that cue will need to be re-loaded and

run again. At no time will the Stagehand immediately restart after an Emergency Stop fault is cleared, since such behavior could pose a serious safety risk.

INPUT CONTACT INDICATORS



In the top right of the LCD display, there are 4 values to indicate whether or not an Input Contact is open or closed. The value will either be a 1 or a 0. A value of 1 indicates that an Input Contact is closed while a value of 0 indicates that the Input Contact is open. For example, if "0101" is displayed on your LCD display, The contacts of Input 1 and 3 are open(or off) and the contacts of Input 2 and 4 are closed(or on).

TECHNICAL SUPPORT

We strive to provide all the details required to operate and troubleshoot issues here. But if you are stuck and getting frustrated, have no fear, we are here to help! The best and quickest way to reach us is via email:

support@creativeconners.com. Someone is on call, weekdays/evenings/showcall/ weekends and will get back to you quickly. We are also here to talk - call us at 401-289-2942 x2. If we don't answer leave a message, we'll call you back as quickly as we can.

TROUBLESHOOTING

| ISSUE | CHECK POINT |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| OLED Display is blank | Confirm input power is connected |
| OLED displays EMERGENCY STOP | Confirm showstopper connection to Base Confirm e-stop system is in "Ready" state |
| When e-stop is engaged my effect triggers | Rewire the effect to remain in a safe state when the output is open |
| A different output is triggering than what is cued | Check wiring - most likely miswired outputs |
| OLED display shows DISCONNECTED | Check Ethernet cable Confirm network switch is connected and on Confirm Spikemark is in LIVE mode |

SPECIFICATIONS

PHYSICAL SPECIFICATIONS

The *Stagehand FX* is packaged in a standard 19" x 2U rackmount case. The overall dimensions are: 17"W x 8"D x 3-7/16"H.

ELECTRICAL SPECIFICATIONS

| Description | Value |
|----------------------------|-----------------------------------|
| Input Voltage | 120VAC 50/60hz single phase input |
| Max Input Current | 0.5A |
| Input Contact Voltage | 12V |
| Input Contact Type | Dry Contact |
| Output Contact Max Voltage | 30VAC/42VDC |
| Output Contact Max Current | 3A |
| Output Contact Type | Dry Contact |

DRAWINGS

WIRING DIAGRAM



LINE DRAWING

