# USB Test Software Manual

The JFW USB GUI provides an interface to control and script one or multiple JFW USB attenuators.  Attenuators are automatically added to the GUI interface when connected to the computer.  Each USB attenuator has a control that can be used to control a single device, or test scripts can be made to run automated testing.

**Requires**
> Microsoft Windows Vista or greater
> Dot Net Framework version 4.0 or greater

**Basic Features**
> Auto-discovery of any JFW USB attenuators connected to the computer.
> Control attenuator(s) using a slider bar, increment buttons, or manually entering the attenuation value.
> Set persistent device *names* for better organization for complex test scenarios.

**Script Features**
> Create test scripts that can control many attenuators.
> Fade and Handover commands can be executed in Sequential or Synchronous mode.
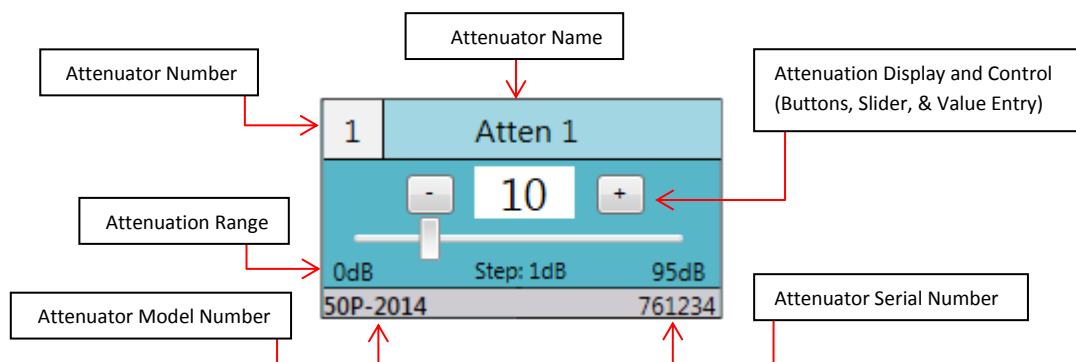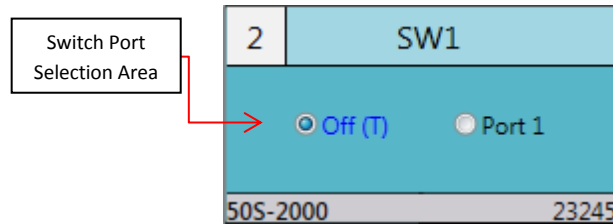> Saving and Loading of scripts in JSON format.

When a JFW USB attenuator is connected a new *Attenuator Control* for that attenuator is added to the Test Software GUI. The *Attenuator Control* shows detailed information and allows for direct control of the device.

The *Name* of the attenuator can be changed by clicking in the area that shows the current device name and typing in the new name followed by the "Enter" key. Names can be up to 15 characters long and are stored on the device.  When selecting a device in the script drop downs, the attenuator will be identified by its number and name.

The *Attenuator Control* gives easy access to the attenuation level of individual devices.  The plus and minus button on each side of the attenuation display can be used to manually step the attenuator up or down by the step size of the device. Use the slider below the display to quickly change the attenuation.  Finally clicking the displayed attenuation allows for manual entry of a new attenuation setting.

The Attenuator Control slider and value are updated during script execution if the dB value changes. If the attenuation value is at the devices default setting the value text will be shown in blue. The default value is the attenuation level that is auto set when the attenuator is first connected to a USB port. The default value can be changed by setting the device to the desired attenuation, then left clicking on the attenuator number box.

A device can be set to factory settings by right clicking the devices model number and selecting the Factory Reset option from the drop down. It is advisable to restart the Test Software after performing factory resets.

Switch Port Selection Area

When a JFW USB switch is connected a new Switch *Control* for that device is added to the Test Software GUI. The Switch *Control* shows detailed information and allows for direct control of the device. The switch control is laid out the same manner as the attenuator control. The only difference is the center body of the switch control has radio buttons that are used to select the current switch port.

If the switch has an "Off" state, a radio button will be shown labeled "Off" and a T (Terminated) or R (Reflective).
The default port is assigned by selecting the corresponding radio button for the desired port, and then left clicking the switch controls device number. The radio button of the default port will be displayed in blue.

A switch can be set to factory defaults by right clicking on the model number and selecting the Factory Reset Option.

Script operations are added to the script list by picking the operation and filling in the details of that operation in the *Parameters* section.  The *Information* section provides a detailed description of how the selected operation works.  Once script entries are added to the script list they can be modified by selecting them from the list and changing the settings in the *Parameters* section.  When a script is running the *Parameters* and *Information* section are updated to show the details of the script entry that is being performed.
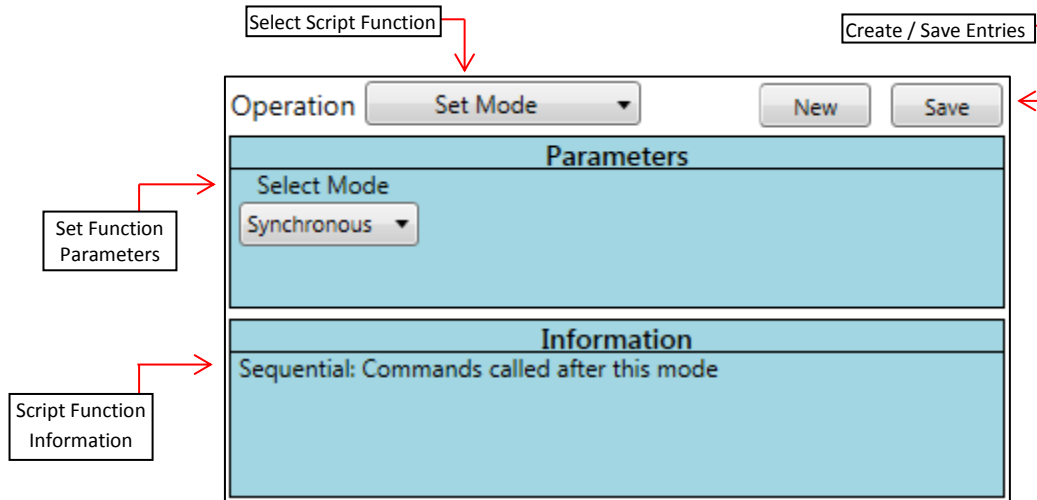


**Procedure**
1) Click "New" or select a command in the script list.
2) Select an Operation from the drop down list.
3) Provide the details for the operation in the Parameters section.
4) Click the "Save" button to add the command to the script list.

| Operations | Name | Description |
|---|---|---|
| | Fade | Incremental step an attenuator over a period of time. |
| | Handover | Incremental step two attenuators over a period of time. |
| | Pause | Stop script execution for a period of time. |
| | Set Mode | Change how the Fade and Handover commands are executed. |
| | Set Attenuator | Set the attenuation of a device. |
| | Set All Attenuators | Set the attenuation of all connected devices. |
| | Set Switch | Set the port of a switch. |
| | Set All Switches | Set the port of all switches. |

## Pause

### Description
Stop script execution for a defined period of time. If the current script execution mode is set to synchronous then the pause command acts as a barrier to which no further commands will be executed (including the pause operation) until the previous commands have finished.

### Parameters
Interval:    Amount of time in milliseconds.  Range [0 –3,600,000]ms

## Fade

### Description
Incrementally step the attenuation of a device from a starting value to an ending value over a period of time.

### Parameters
| | |
|---|---|
| Device: | Attenuator denoted by number and device name. |
| Start dB: | Initial setting. Range is determined by device. |
| Stop dB: | Final setting. Range is determined by device. |
| Interval: | Amount of time in milliseconds. Range [0 –3,600,000]ms |
| Step dB: | A positive increment of each state change. If the Start value is greater than the Stop value Then the Step is additive, else the step is subtractive. |
| On Loop: | If a script's "Repeat" option is enabled, set the action to take when this fade is repeated. |
| | Reset:    Execute the operation as if it is its first. |
| | Reverse:  Swap the Start and Stop after each repeat. |
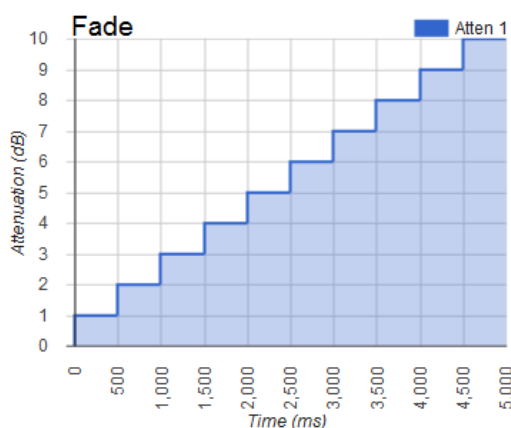


## Handover

### Description
Incrementally step the attenuation of two devices. The first device is stepped from Start to Stop attenuation value, while the second device is stepped from the Stop to Start attenuation value.

### Parameters
| | |
|---|---|
| Devices: | Attenuator denoted by number and device name. |
| Start dB: | Initial setting. Range is determined by device. |
| Stop dB: | Final setting. Range is determined by device. |
| Interval: | Amount of time in milliseconds. Range [0 –3,600,000]ms |
| Step dB: | A positive increment of each state change. If the Start value is greater than the Stop value Then the Step is additive, else the step is subtractive. |
| On Loop: | If a script's "Repeat" options is enabled, set the action to take when this fade is repeated. |
| | Reset:    Execute the operation as if it is its first. |
| | Reverse:  Swap the Start and Stop each repeat. |
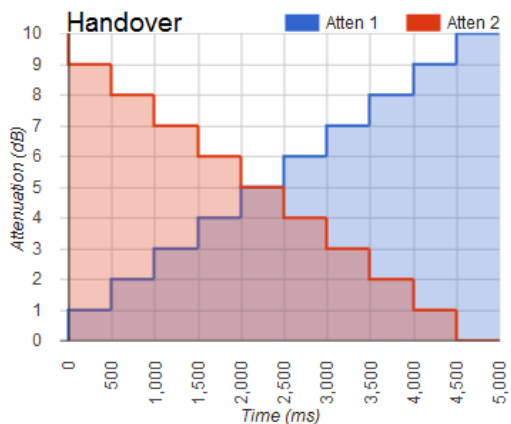
## Set All Attenuators

**Description**

Set all connected attenuators to the same attenuation value.

**Parameters**

Value:        Attenuation value

## Set Attenuator

**Description**

Set an individual attenuator to the defined attenuation value.

**Parameters**

Device:      Attenuator denoted by number and device name.

Value:        Attenuation value

## Set All Switches

**Description**

Set all connected switches to the same port.

**Parameters**

Value:        Port of switch to set

## Set Switches

**Description**

Set an individual switch to the defined switch port.

**Parameters**

Device:      Switch denoted by number and device name.

Value:        Port of switch to set

## Set Mode

**Description**

Set script execution order.

**Parameters**

Sequential: Commands following this mode are executed in a first-in-first-out manner. Fade and Handover commands are processed as separate operations.

Synchronous: Commands following this mode are executed all at once. Fade and Handover commands will not wait for the previous fade or handover command to finish before executing the next command. In this mode the PAUSE command is not executed until all the previous commands have finished.

Sequential Script Example

Set Mode: Sequential
Fade: Device 1:Atten 1 Start=1dB Stop=2dB Step=1dB Interval=2000ms
Fade: Device 2:Atten 2 Start=0dB Stop=4dB Step=1dB Interval=500ms
Pause 2000ms
Set Attenuator 1:Atten 1 Value=4dB
Set Attenuator 2:Atten 2 Value=6dB
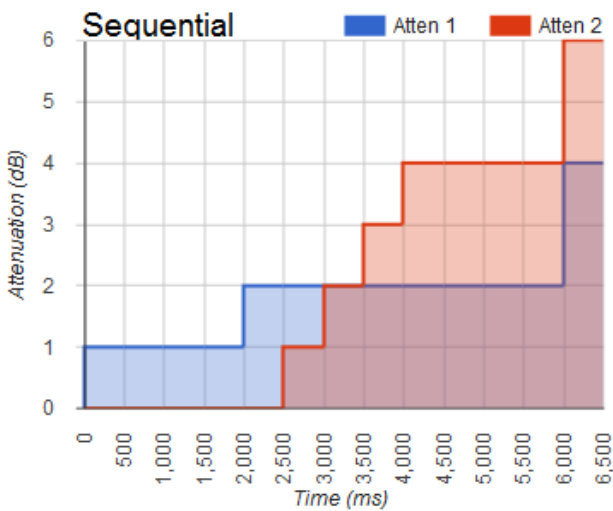
Synchronous Script Example

Set Mode: Synchronous
Fade: Device 1:Atten 1 Start=1dB Stop=2dB Step=1dB Interval=2000ms
Fade: Device 2:Atten 2 Start=0dB Stop=4dB Step=1dB Interval=500ms
Pause 2000ms
Set Attenuator 1:Atten 1 Value=4dB
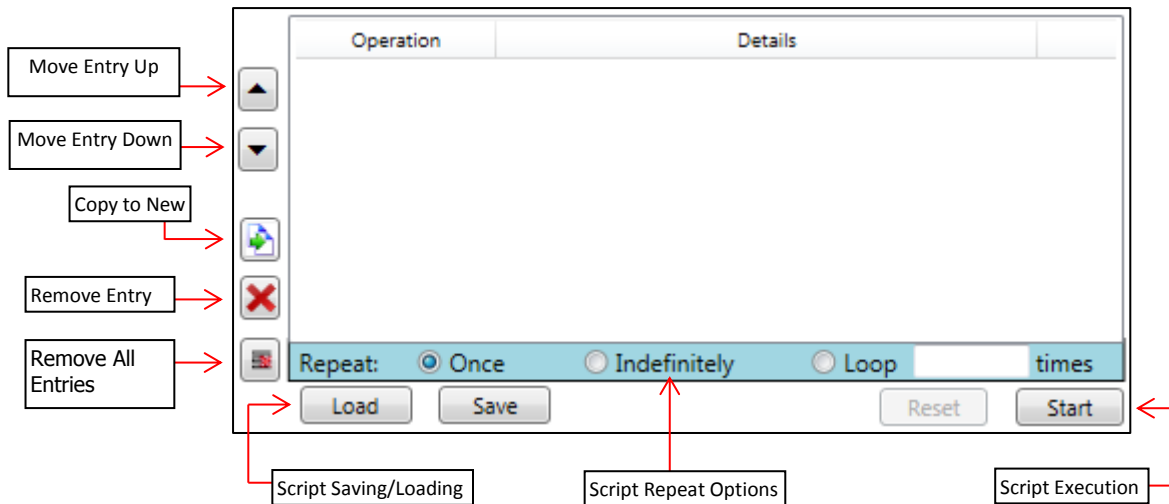Set Attenuator 2:Atten 2 Value=6dB
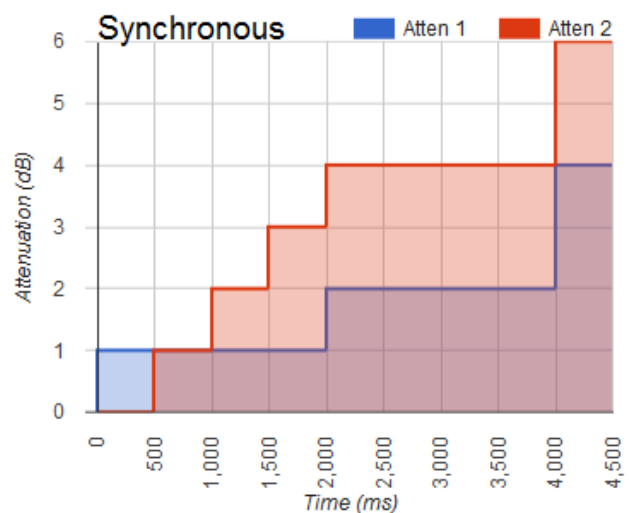
**Entry Order Controls**
Reposition script entries by moving individual entries up/down in the list.

**Copy to New**
Copy the selected script operation and add that copy to the end of the list.

**Remove Entries**
The button with the large *red X* removes the selected script operation from the list.
The button on bottom removes all entries from the list.

**Script Saving/Loading**
Save: Save the script command list to a *JSON* file so it can be recalled later.
Load: Add entries from a saved script. If the script to be loaded contains entries for devices that are no longer connected then a window will pop up to allow the user to redirect those entries to another connected attenuator.

**Script Execution**
Start: Begin script execution of the script command list. The *Start* button will then be replaced by the *Pause* button that suspends script execution when pressed.
Reset: Stop script execution and return to the first script entry when the *Start* button is pressed.

**Script Repeat Options**
Once: Execute the script once and stop.
Loop: Specify the number of times to execution the script.
Indefinitely: Continuous script execution.


During script execution or when a script entry is selected, the script operation and parameter controls sections are updated to show the script entry details.  While not processing a script this feature allows for quick modification of script entries. Use the *New* button to add a new script entry when using this feature.