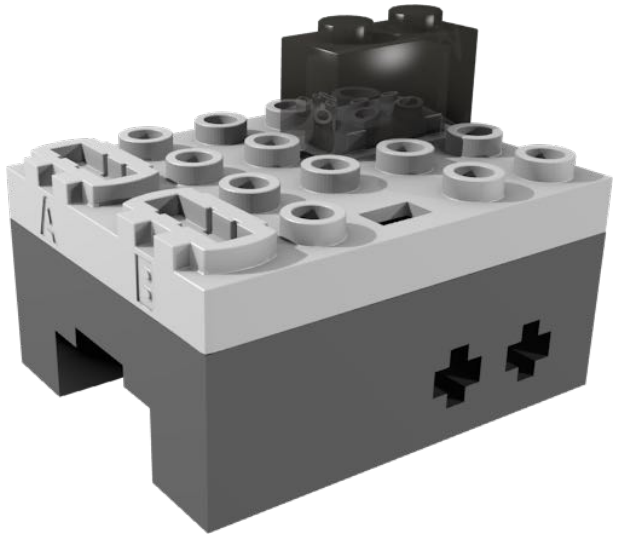
PFx Brick

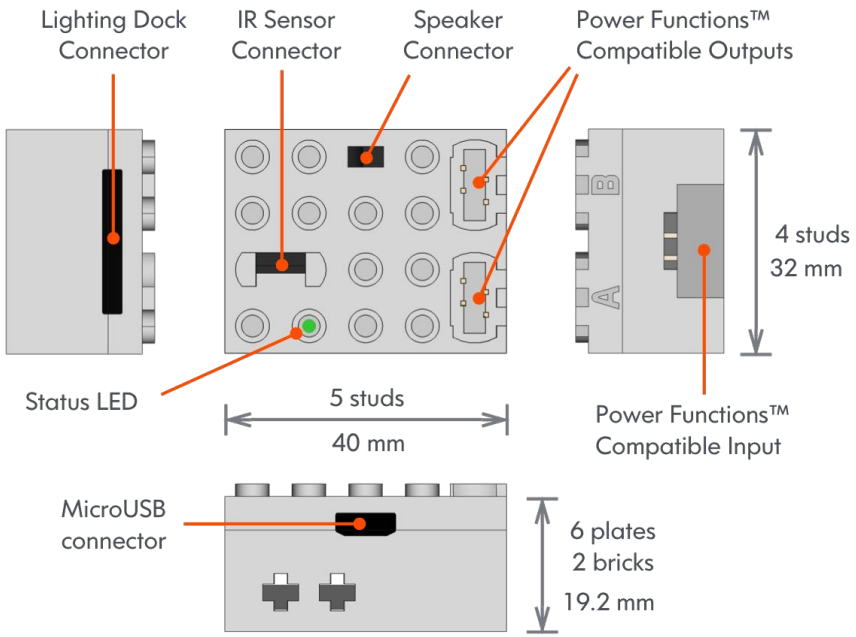
Quick Start Guide



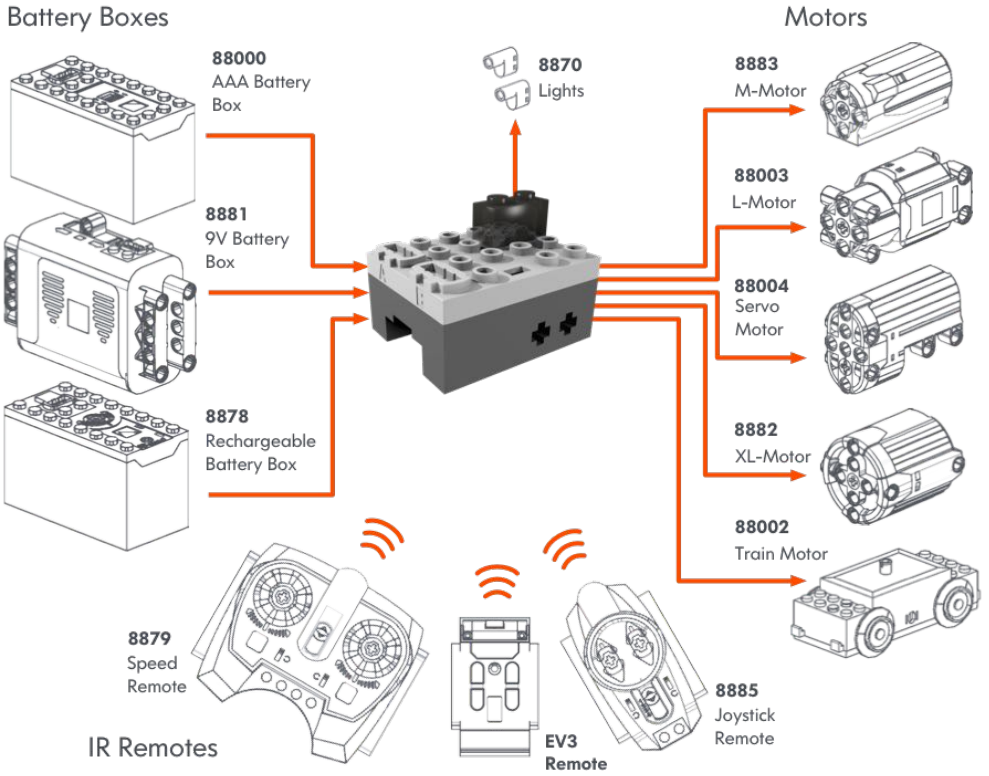
Welcome!

We really appreciate your support of the PFx Brick and hope that you have a lot of fun with it! To get started, please review some of these quick instructions and don't forget to download the PFx App from the Fx Bricks website. The PFx App will let you update the PFx Brick firmware and setup the PFx Brick just the way you want it. Enjoy!

Mechanical Details

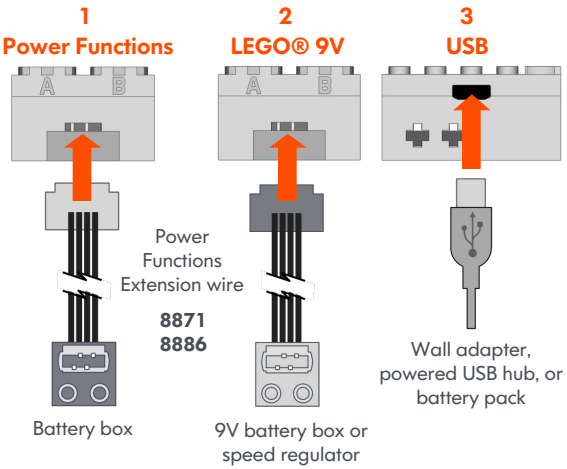


LEGO® Power Functions™ Compatibility



Making Connections

Power

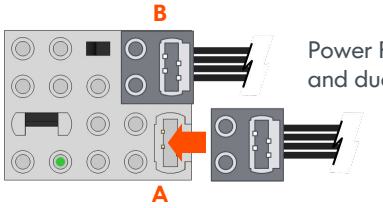


Battery box and USB power connections can be used simultaneously. The PFx Brick will automatically use the best available power source.

Voltage Range: +5 to +12 VDC

+14 VDC absolute maximum

PF Motors & Lights



Power Functions™ motors and dual LED lights

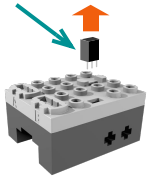
Connect any LEGO® Power Functions motor or LED accessory to the PFx Brick Power Functions compatible outputs A or B located on top of the PFx Brick.

InfraRed (IR)

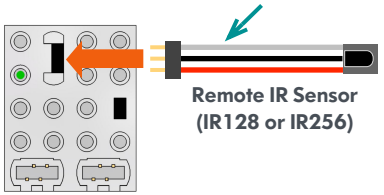
All PFx Bricks are fitted with an InfraRed sensor covered with a transparent 1x2 brick. The IR sensor can be removed and substituted with a remote IR sensor connected via an extension cable.

1. Remove the 1x2 transparent brick cover

2. Carefully remove the built-in IR sensor

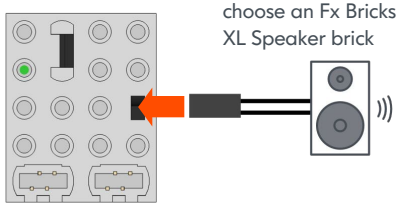


3. Connect the remote IR sensor to the PFx Brick IR connector in the orientation shown, i.e. with gray wire nearest the brick edge.



Delicate Use caution when inserting/removing the IR sensor. The IR sensor pins are delicate and can be bent or damaged if mishandled.

Speakers

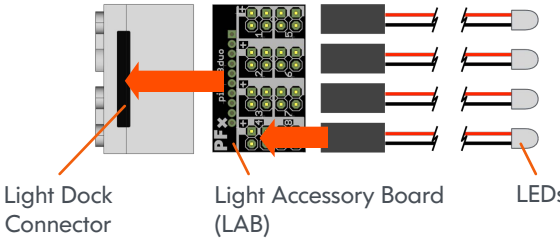


Connect speakers to the 2-pin female socket speaker connector on the top of the PFx Brick.

Speakers can be connected in any orientation:

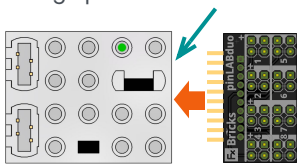
Delicate Use caution when inserting/removing the speaker connector

Lights

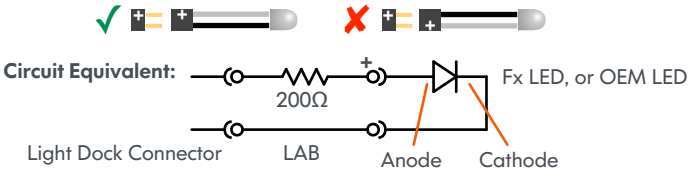


The Light Accessory Board (LAB) allows you to connect LEDs from a variety of manufacturers.

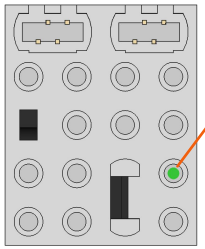
Plug the LAB into the PFx Brick light dock connector with labels facing up.



If using the pinLABsolo, pinLABduo, or pinLABquad with Fx LEDs or OEM LEDs ensure the correct polarity of connection by matching the + label.



Status LED



The status LED shows the operational status of the PFx Brick.

The following table shows some of the indications made by the status LED during operation:

Status LED State	Indicated Condition
Off	Power OFF / Battery too low or Status LED is "inverted"
Solid	Normal Power ON status
1 Flash •	USB, IR, or Bluetooth communication activity
Glowing Bright/ Dim Intensity	IR Lockout / IR Disabled Ignores commands from IR remotes except for command to cancel IR Lockout
4 Slow Flashes • • • •	USB connection made to host PC
5 Fast Flashes • • • • •	USB disconnection from host PC New Bluetooth connection established
6 Fast Flashes • • • • • •	Bluetooth host disconnected
Continuous Fast Flashing ••••••••••••••	Major error condition (requires a restart). Possible causes: over temperature, speaker connection short circuit, voltage overload, etc.

Note: The Status LED can be configured by the PFx App to appear "inverted" to the indications shown above. That is, instead of normally appearing on as the default condition, it appears off. The flashing patterns shown above remain the same in both normal and "inverted" configurations.

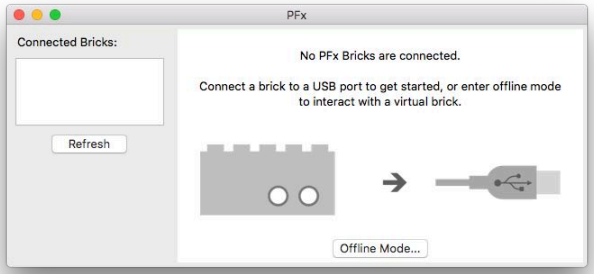
Configuration with the PFx App

Download the PFx App from the Fx Bricks website at:
https://www.fxbricks.com/pfxbrick/pfxapp

Available for both Windows and macOS

1. Launch the PFx App

If no PFx Bricks are connected, you will see this message:



2. Connect the PFx Brick with a mirco-USB cable and click **Refresh**

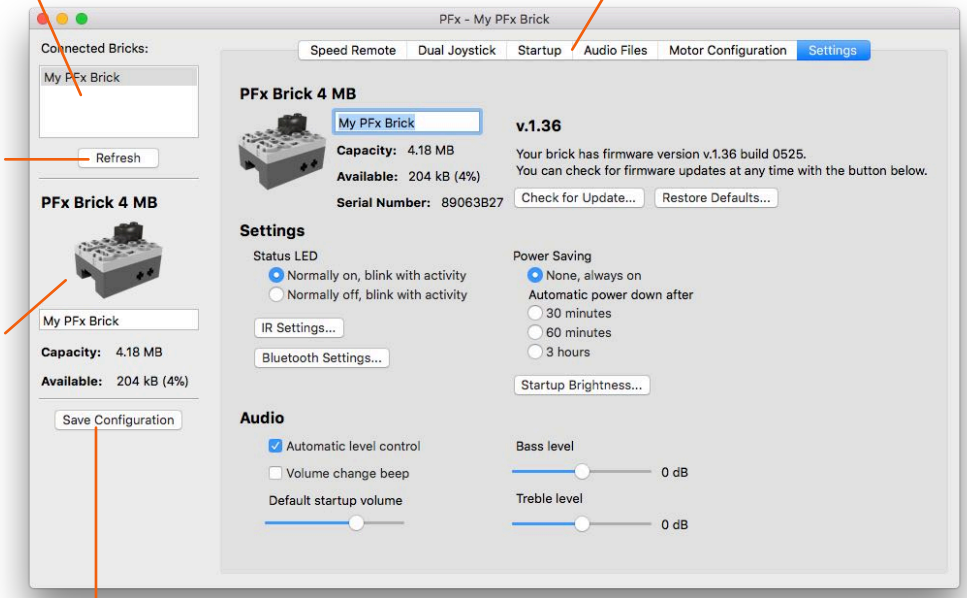
PFx App Main Window

List of connected PFx Bricks

Mode Selection Tab

Search for any PFx Bricks attached to your computer and update the list.

Selected (active) brick information



Save Configuration button
Ensure this is clicked when changes are made to the PFx Brick configuration

Configuration with the PFx App

Settings

Firmware Version Shows the version of firmware installed on your brick

Keep your PFx Brick up to date with the latest firmware. Click the "**Check for Update…**" button to see if new firmware is available for your PFx Brick. (Internet connection required)

Reset your PFx Brick to factory default settings

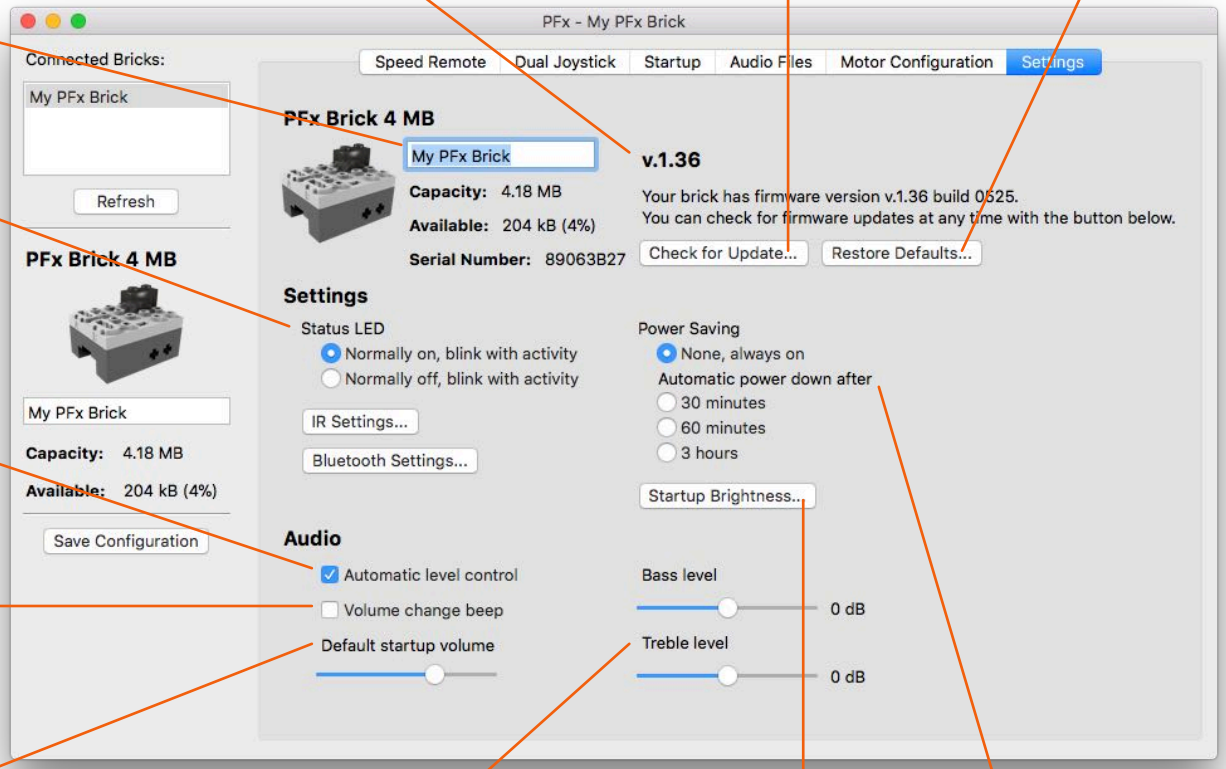
Rename your PFx Brick Personalize your PFx Brick with a custom name up to 24 characters.

Status LED By default, the green status LED on the PFx Brick illuminates when the PFx Brick is powered on. However, it can be configured to remain off by default to save power or to be discreet. In either mode, the status LED will still flash in response to communication activity and other conditions.

Automatic Level Control ALC can automatically adjust the level of audio playback to maximize dynamic range of audio. This can appear to boost the level of "quiet" audio and clip the level of "loud" audio during playback.

Volume change beep If desired, the PFx Brick can make a short audible "beep" sound whenever the audio volume is changed. This can be useful confirmation of desired changes to audio volume without any active audio playback.

Startup Volume The default audio playback volume can be set as desired. It is applied each time PFx Brick is powered on or restarted.



Bass / Treble Level The relative intensity of bass (low frequency sounds) and treble (high frequency sounds) can be adjusted for your desired playback preference. Values > 0 dB increase (amplify) the level, and values < 0 dB decrease (attenuate) the level. Nominally, 0 dB leaves the audio frequency levels unchanged.

Startup Brightness The default brightness of each lighting channel can set as desired. They are applied each time PFx Brick is powered on or restarted.

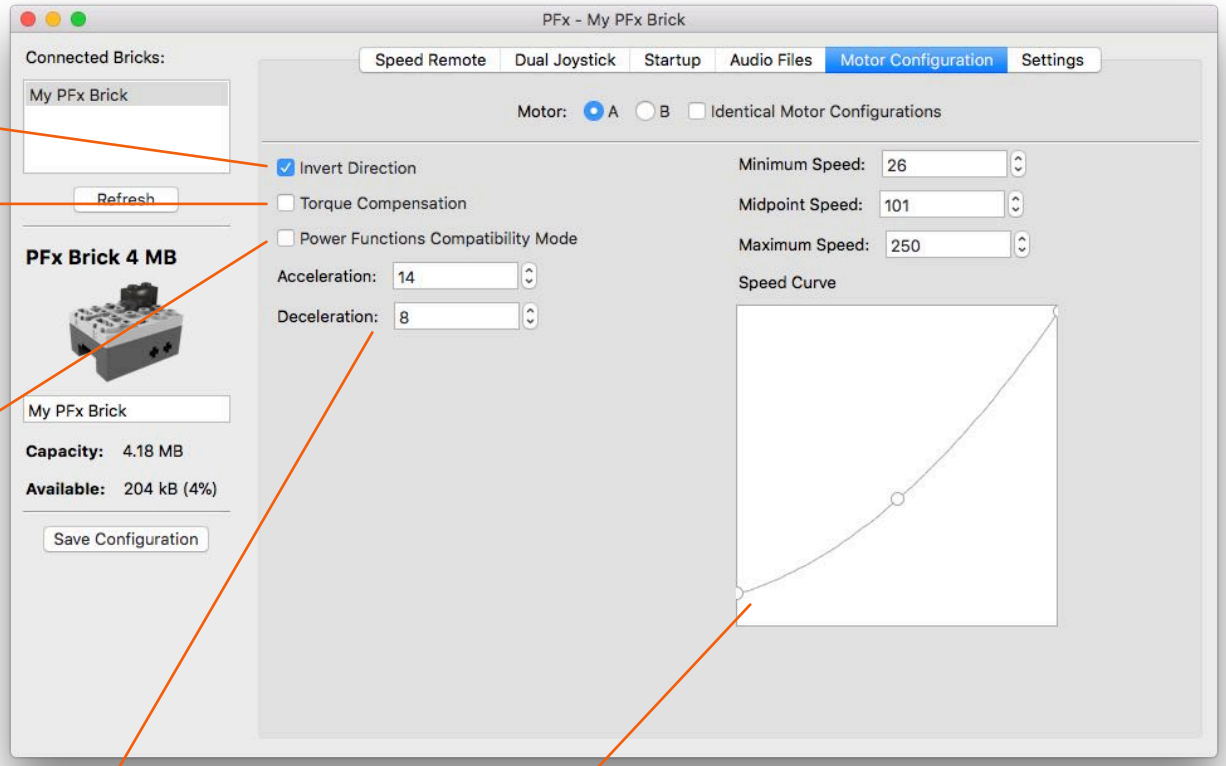
Power Saving The PFx Brick can be configured to automatically power off after a time interval of no activity. That is, if the PFx Brick receives no communication from either the USB, IR or Bluetooth interfaces during the power-off interval, it will automatically shutdown.

Motor Configuration

Invert direction reverses the definition of Forward and Reverse. You can configure each motor channel to have different Forward and Reverse orientation.

Torque Compensation enables automatic low frequency pulse width modulation (PWM) control of the motor during very low speed or when initially started. Torque compensation can help overcome initial startup friction of motors when they are at rest so that they start to rotate sooner at low speed.

Power Functions Compatibility Mode sets the pulse width modulation (PWM) control of the motor to a frequency of 1.1 kHz (the same frequency used by the LEGO® IR receiver). Normally, the PFx Brick uses a PWM frequency of 15 kHz. This ensures motor control noises are outside of audible range for quiet and smooth motor operation. Note that Power Functions M Motors may require Power Functions Compatibility Mode to be *enabled* for optimum performance.



Acceleration / Deceleration When you set or change the desired speed of one of the motor channels (the "target" speed), the actual speed of the motor will depend on acceleration and deceleration. If these factors are zero, then the target motor speed will instantly be applied. However, with increasing acceleration factors, the actual motor speed will approach the target speed at a time proportional to the acceleration factor. This simulates the inertia and momentum of real moving objects for enhanced and smooth motor control.

Speed Curves When you set or change the desired speed of a motor channel, it will be mapped to a different speed based on the speed curve. The x-axis of the speed curve is your "set" or desired speed. The y-axis is re-mapped speed value that is actually applied to the motor.

Examples of how to use the speed curve:
1. A straight line curve from zero to maximum results in no change to applied speed.
2. A minimum speed bigger than zero results in the motor starting at a higher speed immediately. This can be useful to overcome initial startup delay due to torque or mechanical load
3. A lower maximum speed can apply a "speed limit' to the motor so that it can never exceed a desired speed even if the set speed is maximized.
4. The curve shape can give greater emphasis to either low or high speed control making the speed control either more or less "sensitive" to speed commands.