

RC4Magic **DMXfb** Full-Bridge Versatile Wireless Dimmer



Quick Start Guide

The RC4Magic **DMXfb** is the most versatile wireless dimmer/power controller ever created. This small wireless device can **ring a telephone** bell; silently and smoothly **dim EL-wire** and other electroluminescent materials (no buzz or hum at all!); **control a DC motor with full direction and speed control**; and **smoothly dim lamps and LEDs**, flicker free with no visible stepping.

This is a single-output device in the same package size as our popular DMX4dim 4-channel dimmer.

AC Wave Modes

Many of the unique capabilities of the DMXfb result from the ability to output synthesized AC waves. AC modes are used to ring a telephone, dim EL-Wire, or deliver AC power to small devices.

There are three “flavors” of AC Wave Mode on the DMXfb: AC Flex Mode, AC EL Mode, and AC Telephone Mode.

Step-Up Transformers

The DMXfb uses a full-bridge driver under software control to synthesize waveforms. The highest amplitude it can produce is a peak-to-peak voltage

that is double the input battery voltage. For example, with a 12V battery, the DMXfb can output a full-scale AC wave that is 24VACp-p (peak to peak) which is equal to approximately 8.5VACrms (root mean square).

For loads that require a higher AC voltage, a small transformer can be used. Transformers intended to step line voltage down to 10V or less are very common and readily available. They can be used “backwards” to step a low AC voltage up to a higher one.

Connect the output of the DMXfb to the secondary (low voltage) side of a transformer. When the DMXfb generates an AC output, a much higher AC voltage will appear on the transformer primary.

BE CAREFUL! HIGH VOLTAGE GENERATED THIS WAY IS JUST AS DANGEROUS AS ANY OTHER HIGH VOLTAGE. Don't be fooled into thinking it is safer because it is coming from a battery. HIGH VOLTAGE AC CAN KILL YOU.

AC Flex Mode (Amplitude & Frequency Control)

AC Flex Mode uses two adjacent DMX channels, the first for AC amplitude (similar to “volume”), and the second for AC frequency (or “pitch”). When you select the DMX start channel, the second channel is automatically the next channel up. For example, if you set the DMXfb to DMX channel 28, then 28 will control amplitude and 29 will control frequency.

The DMX start channel, for amplitude, is set with the same method used for all other RC4Magic Series 2 devices. Modes are selected in the same way dimmer curves are selected on other RC4Magic Series 2 devices.

The AC Flex mode is selected by setting the target DMX channel to approximately 30% and pressing the SetA (or ID0) button. Follow these steps:

1. Clear your DMX console so that all channels are at zero.
2. Bring the one channel that you wish to assign to the DMXfb up to 30% (anywhere in the range of 20 – 39%). This level selects the AC Flex Mode.
3. Press the SetA button (also labeled ID0).

The AC output of the DMXfb will now be controlled by the channel you selected. The frequency will be controlled by the next channel up.

AC EL Mode (for Electroluminescent Materials)

Electroluminescent materials, as used in EL-Wire, EL tape, and EL panels, glow when connected to high voltage AC with a high frequency. For best results with the DMXfb, use a step-up transformer with a 240V primary and a 10V secondary. To drive up to 200 feet of continuous EL-Wire, use a transformer rated for at least 10VA (volt/amps). For shorter lengths, a smaller transformer will suffice.

AC EL Mode uses one DMX channel to linearly, smoothly, and quietly control the brightness of EL Wire. The AC frequency is fixed at a high frequency that is optimal for bright crisp EL output.

The AC EL Mode is selected by setting the target DMX channel to approximately 50% and pressing the SetA (or ID0) button. Follow these steps:

1. Clear your DMX console so that all channels are at zero.
2. Bring the one channel that you wish to assign to the DMXfb up to 50% (40 – 59%). This level selects the AC EL Mode.
3. Press the SetA button (also labeled ID0).

The AC output of the DMXfb will now be controlled by the channel you selected. The frequency will be quite high, optimized for EL Wire dimming. Use a step-up transformer with a fairly high output voltage.

EL wire and other electroluminescent materials will glow brighter with higher voltages, but increasing the voltage only works until arcing occurs inside the material. In general, it is best to stay under 240VACrms. With low-cost or economy EL wire, arcing may occur at voltages as low as 150VAC. Higher quality materials, which are better constructed, will withstand higher voltages more successfully and can be run more brightly as a result.

AC Telephone Mode

Mechanical telephone bells are designed to ring with 90VAC at a frequency between 15 and 30 Hertz. North American telephone companies have typically used a 20Hz bell voltage frequency, while European companies are closer to 25Hz. Many telephones have internal filtering that prevents incoming power from reaching the bell unless it falls within the specified range.

Use a step-up transformer with a 120V primary and a 10V secondary. Telephone bells demand very little power, so a transformer rated for less than 1VA will work fine. These are very small and light.

AC Telephone Mode uses one DMX channel to control the amplitude of power driving a telephone bell. The AC frequency is fixed at 20Hz, typical of North American telephone companies. (To operate at 25Hz or other frequencies, use the AC Flex Mode.)

Turn on the DMX channel to ring, turn it off to stop ringing. If you dim the channel up and down, you will hear the bell mechanism chatter at lower levels until a threshold is crossed where the bells begin to ring.

Create the desired ring cadence with your lighting console by turning the amplitude channel on and off as desired.

The DMX channel for telephone bell voltage is set with the same method used for all other RC4Magic Series 2 devices:

1. Clear your DMX console so that all channels are at zero.
2. Bring the one channel that you wish to assign to the DMXfb up to 70% (60 – 79%). This level selects the AC Telephone Mode.
3. Press the SetA button (also labeled ID0).

The AC output amplitude of the DMXfb will now be controlled by the channel you selected. The frequency will be 20Hz. In most cases, there is no need to “fade” telephone bell voltage – simply turn it on full to ring, and off to stop ringing.

In some cases, it may be desired to ring a telephone bell at a frequency other than 20Hz, or to modulate frequency and level for unusual bell effects. For those rare cases, use the AC Flex Mode.

DC Motor Control

The polarity of DC voltage delivered to a DC motor determines direction of rotation. The full-bridge driver in the DMXfb is capable of delivering DC voltage in either polarity, without the need for relays or other hardware.

The firmware in the DMXfb is capable of controlling motor speed using PWM (pulse width modulation).

The DMXfb DC Motor Mode uses one DMX channel to control a DC motor bidirectionally. The motor is stopped when the DMX control level is centered (50%). As the level increases upward, motor speed increases in one direction. As the level decreases downward from center, motor speed increases in the other direction. Return the channel to center to stop the motor.

With the DMXfb in DC Motor Mode, a DMX level of 128, expressed at 50% on many consoles, is Motor OFF, or functional zero. When possible, use a control profile that is center off and treats the DMX control range as:

```
-127 ----- 0 ----- +128
              ^ motor off
```

In this case, the sign (- or +) is the motor direction, and the numeric value is the speed.

If such a profile is not available, normal DMX levels map this way:

```
0 ----- 128 ----- 255
              ^ motor off
```

To avoid unexpected motor movement when a control system is first initialized, DC Motor Mode will not deliver motor power until the DMX channel reaches or passes through center (50%).

After power-up, the DMXfb must see a DMX level of 50% before it will operate in DC Motor Mode.

The DMX channel for DC motor speed and direction is set with the same method used for all other RC4Magic Series 2 devices:

1. Clear your DMX console so that all channels are at zero.
2. Bring the one channel that you wish to assign to the DMXfb up to 100% (80 – 100%). This level selects the DC Motor Mode.
3. Press the SetA button (also labeled ID0).

The DMXfb, and DC Motor Mode in particular are not intended for devices or systems where human safety may be at risk. Do not use this device to control large motors or motors that are in any way a safety risk if they fail to move as intended.

The DMXfb is not certified or intended to use where human safety may be at risk. Do not use the DMXfb in such cases.

Summary of Modes and Selection Levels

When setting DMXfb modes, the following chart illustrates the DMX level that corresponds to each available mode. These modes on the DMXfb are similar to dimmer curves on other RC4Magic Series 2 devices, and are selected using the same method.

<u>DMXfb Mode</u>	<u>Level Percentage</u>	<u>Level Dec (0-255)</u>	<u>Level in Hex (0-FF)</u>
DC Motor Mode	100% (80% or higher)	255 (205 or higher)	0xFF (0xCD or higher)
AC Telephone Mode	70% (60% - 79%)	180 (154-204)	0xB4 (0x9A-0xCC)
AC EL Mode	50% (40% - 59%)	128 (103-153)	0x80 (0x67-0x99)
AC Flex Mode	30% (20% - 30%)	77 (52-102)	0x4D (0x34-0x66)
Channel Ignored	Less than 12%	Less than 32	Less than 0x20