Aria Lights Forte DMX Transmitter User Guide
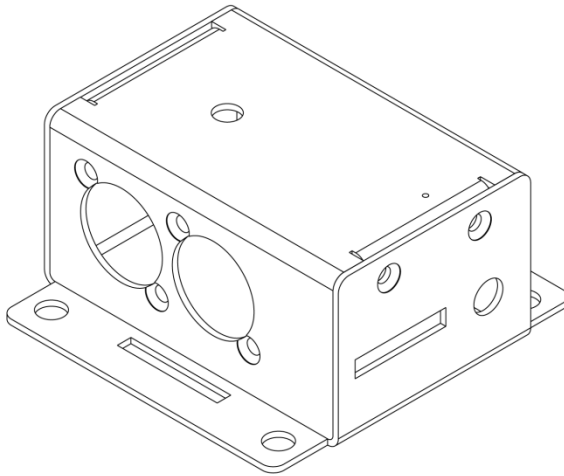## Model FDMX1, Revision D

Aria Lights Forte DMX Transmitter User Guide
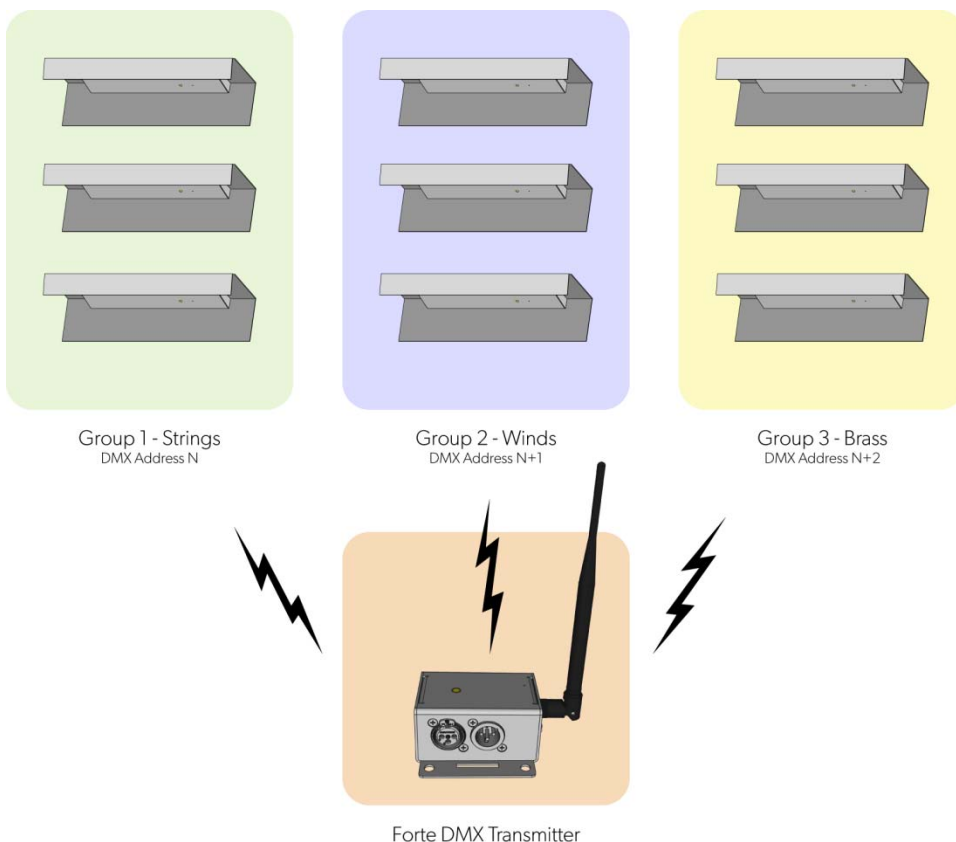Revision D

Introduction

The Aria Lights Forte DMX Transmitter is designed to allow an unlimited number of Aria Forte Orchestra music stand lights to be dimmed wirelessly from a central lighting console. It serves as both a DMX decoder and a 900MHz wireless transmitter. Lights can be dimmed in up to eight separate banks, and eight channels are available to prevent cross-talk from other nearby transmitters. 256 dimming levels allow fine control over lighting conditions.

Warnings

- This device is not intended for use in wet environments. Make sure that the transmitter, lights, and all cables are free from moisture.
- Do not use with any devices other than Aria Lights brand Forte Orchestra LED music stand lighting.
- Use only the supplied USB wall charger to supply power to the transmitter unless being used with a USB battery pack. Incorrect voltages or reduced operating current could cause damage.
- Do not extend the USB cable.
- Modifications to the hardware will void the warranty and could void your authority to operate the equipment by law.
- Use only the supplied antenna with the transmitter. Using another antenna could cause damage, will void the warranty and could void your authority to operate the equipment by law.
- Do not exceed DMX voltages on the DMX inputs as damage to the transmitter may result.
- Do not use a dimmed outlet to power the transmitter or damage may result. A steady 120VAC power source is to be used with the supplied USB charger.
- Ensure that all cables are free from damage and not pinched before operating. If cables are damaged, discontinue use at once.

Overview

The Forte DMX Transmitter provides wireless dimming of your music stand lights on a stage, in a pit or even outdoors (in dry conditions). It can be used to reduce the light intensity on stage during movie presentations, to darken one section of the orchestra while another is performing, or provide pit blackouts in theatrical productions. Manual operation allows control when no DMX system is present, such as concerts on the lawn, and a USB battery pack can be used to power the transmitter so that no wall power is required at all for the lights or the transmitter.

Group 1 - Strings
DMX Address N

Group 2 - Winds
DMX Address N+1

Group 3 - Brass
DMX Address N+2

Forte DMX Transmitter

Operation

The Forte DMX Transmitter operates in three modes:

- DMX control mode
- Manual control mode
- Diagnostics mode

DMX Control Mode

When the dimmer switch is OFF, the transmitter is in DMX control mode. It receives DMX dimming information from the DMX In port, and adjusts the music stand light intensity appropriately from 0 (off) to 255 (full on).

The base DMX address is set on the DIP switches. The transmitter responds to eight DMX addresses starting from there, which correspond to eight lighting groups (see *About Channels and Groups* on page 5). In most cases, not all eight groups will be used. Light intensity information for the unused groups is transmitted whether or not lights are configured to receive it. DMX addresses for unused groups can be used for other stage lighting fixtures without issue. For instance, if three groups are actually used with the Forte DMX Transmitter, the DMX base address+3 is available for other fixtures in the hall.

Manual Control Mode

When the dimmer switch is ON, the transmitter is in manual control mode. The intensity of the music stand lights can be adjusted simply by rotating the thumbwheel. The thumbwheel affects the intensity of lights in *all eight* groups at the same time.

This mode is useful for locations where DMX signals are not available. The Forte DMX Transmitter can be handheld to the side of the performance area and adjusted at specific cues.

For extra flexibility, a USB power bank can be used with the transmitter so that no wall power is required. The transmitter's USB cable is simply plugged into the power bank. The Forte DMX Transmitter draws at most 140mA of power, so a 1400mAh power bank can power the transmitter for up to 10 hours.
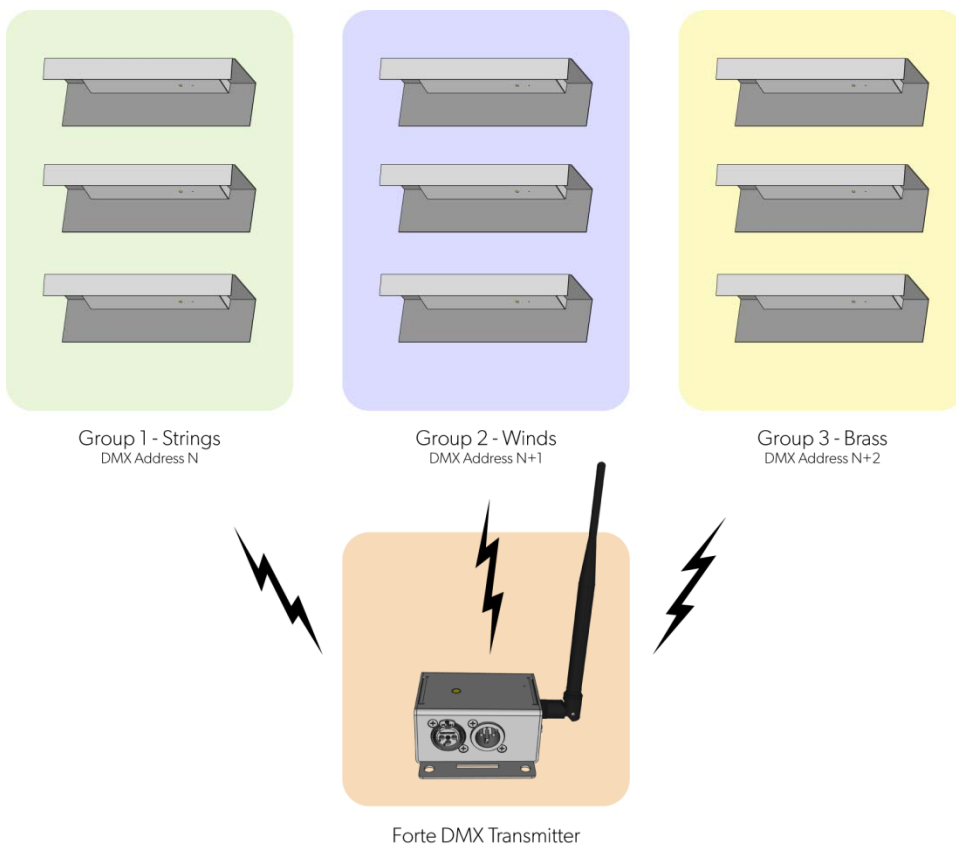
Diagnostics mode

Diagnostics mode is enabled when the "FUN" DIP switch is turned on. Diagnostics mode is can be used to test that all of the music stand lights are receiving the signal from the transmitter. All eight groups are affected. Two patterns are available – a slow fade and an on/off pattern. See the *Testing the Lights* on Page 11.

About Channels and Groups

The Forte DMX Transmitter uses frequency-hopping spread spectrum radio in the 900MHz band. That means that the transmitter constantly changes frequencies to prevent interference and allow for greater transmit power. Every transmitter uses the same band and same frequencies within the band among which to hop. Therefore it is possible for conflicts to arise when two transmitters to attempt to control Aria lights nearby.

A *channel* is a unique number assigned which allows each light to only respond to a specific transmitter. There are eight channels available. By default, all Forte DMX Transmitters and corresponding lights are set to respond on channel 1, but the channel can be changed in both if needed. Unless there is a venue close by using the same system, there should be no need to change channels. To change channels, see *Changing the Channel* on page 10.

Within a channel, there are eight groups. A *group* is a collection of music stand lights controlled for a single purpose. For instance, you may want to turn off the lights for the wind section while the string section is performing a string-only piece. In this scenario, the strings, winds, and brass might be placed in different groups.

Group 1 - Strings
DMX Address N

Group 2 - Winds
DMX Address N+1

Group 3 - Brass
DMX Address N+2

Forte DMX Transmitter

Note that each group uses a different DMX address. Group 1 uses the base DMX address (set by the DIP switches), group 2 uses the base DMX address plus one, and so forth until group 8 which uses the base DMX address plus 7. The easiest arrangement is to leave all the lights assigned to a single group. But if several groups are required, be sure to label which lights are in which group so they can be properly arranged the next time the stage is set. See *Changing Group Assignments* on page 9.

Inputs and Controls

The DMX In and DMX Out ports accept 5-pin DMX512 XLR connectors. Use an appropriate 3 to 5-pin adapter, if needed.

Connect power from the provided 5 volt USB adapter to the DC power jack. Although the Forte DMX Transmitter uses only 140mA, we recommend using the 2A USB adapter provided.

The DIP switch sets the base DMX address for the transmitter (1 to 512) when the FUN switch is set to *off*. The DIP switch determines the diagnostic mode with the FUN switch is set to *on*. (*Off* is the switch flipped down and *on* is the switch flipped up.)

Switch	Purpose
1	On – Ramp up and down all lights on all groups in this channel Off – Blink all lights on all groups in this channel
2-9	Reserved
10 (FUN)	On – Enable diagnostic mode Off – Normal operation

The manual control knob sets the current brightness on all eight groups manually. It must be in the fully clicked off position for the transmitter to respond to DMX commands.

The antenna connector is designed only for the supplied right-angle antenna. The antenna should be securely attached to the connector and finger-tightened. Do not over tighten the antenna, or damage could result.

The status LED flashes when the transmitter is transmitting or during channel programming.

The channel button is accessed with a stiff paper clip inserted perfectly perpendicularly to the housing.

Setting up the Transmitter

Attaching the Antenna

Securely attached the antenna to the antenna connector and finger-tighten it. Do not over tighten the antenna, or damage could result.

Locating and Orienting the Transmitter

The transmitter should be located within 100 feet of the most distant Aria Forte Orchestra music stand light and have an unobstructed view of all the lights if possible.

In stage settings, the transmitter can be placed above the stage, in the wings, behind the scrim, or on the front lip of the stage. If an orchestra shell is used, avoid obscuring the transmitter with it, if possible. In pit settings, locate the transmitter close to the center of the pit. In outdoor settings, keep the transmitter as close as possible. If manual control is needed, it is best to do so from the side or rear of the stage. Packing the transmitter at the opposite end of the venue (e.g. across a lawn, or in a light booth) is not recommended.

The antenna is hinged to allow a wide variety of orientation. Changing the orientation of the antenna by 90 degrees can have a dramatic impact on the range. The range is very much dependent on the shape of the venue. There is no single orientation which works better in every venue. Once the transmitted has been located, enable the diagnostic mode and ensure that every light on stage is dimming as expected.

Bear in mind that the presence of people on stage can affect the radio signal. Therefore, it is best to do a final adjustment during a full rehearsal, if possible.

The Forte DMX Transmitter can be pole-mounted with the supplied Velcro strap or affixed permanently using the four screw holes. (Screws are not included.)
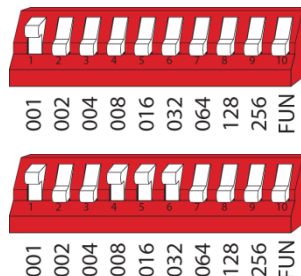
Regardless of the mounting method of the transmitter, the USB charger, power cable, and DMX cables should be secured as well to ensure a constant supply of power and data. The USB charger must be used on a non-dimmable circuit or damage could result.

Selecting a DMX address

The Forte DMX Transmitter can be assigned any DMX512 base address from 1 to 512. (Note that addresses above 504 will limit the number of groups which can be used, as each of the eight groups is assigned a separate DMX address starting at the base address.) DMX address zero is never used.

The diagram to the right shows the setting for DMX base address 1.

The numbers below the DIP switches are added together to form the base address. For instance, here the decoder is set to operate at base address 57 (1+8+16+32 = 57).

Changing Group Assignments

Music stand lights can be assigned to one eight groups for separate control. Each group is associated with a single DMX address. Group 1 uses the base DMX address (set by the DIP switches), group 2 uses the base DMX address plus one, and so forth until group 8 which uses the base DMX address plus 7.

There are no changes needed to the transmitter to place music stand lights in groups. Each music stand light must be individually set to the appropriate group.

To change the group on the Forte Orchestra music stand light, insert a paper clip in the hole on the cover (which is unmarked). The paperclip should be perfectly perpendicular to the housing to ensure that you meet the pushbutton below properly. Hold the paperclip down briefly and release it. The yellow status LED should blink the current group number (1 to 8 blinks representing group 1 through 8). The next press will increment the group number by one. After group 8, it will cycle back to group 1. When you are satisfied with the group setting, simply stop pressing the button. Waiting 10 seconds without pressing the button releases the programming mode and returns the light to normal operation.

Changing the Channel

You should not need to change the channel unless there is another nearby venue also using the Forte DMX Transmitter. (See *About Channels and Groups* on page 5.) With the built-in error checking in the communication protocol, a broadcast from another kind of radio affecting the light levels is nearly impossible. Changing the channel does not change the radio frequencies at all. It simply sets a different code sent to each light. However, if you are using the system near another similarly-equipped venue, it's a good idea to use a unique channel for yours.

Changing the channel requires changing *both* the transmitter and every music stand light to the new channel. It's worth setting aside some time to make this change.
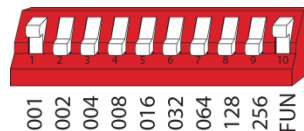
To change the channel on the Forte DMX Transmitter, insert a paper clip in the hole marked "Channel". The paperclip should be perfectly perpendicular to the housing to ensure that you meet the pushbutton below properly. WARNING: It is possible to cause damage by inserting the paperclip at another angle. Hold the paperclip down for three seconds and release it. The yellow status LED should blink three times and then separately blink the current channel number (1 to 8 blinks representing channels 1 through 8). The next press will increment the channel number by one. After channel 8, it will cycle back to channel 1. When you are satisfied with the channel setting, simply stop pressing the button. Waiting 10 seconds without pressing the button releases the programming mode and returns the transmitter to normal operation.

To change the channel on the Forte Orchestra music stand light, insert a paper clip in the hole on the cover (which is unmarked). The paperclip should be perfectly perpendicular to the housing to ensure that you meet the pushbutton below properly. Hold the paperclip down for **ten** seconds and release it. The yellow status LED should blink three times and then separately blink the current channel number (1 to 8 blinks representing channels 1 through 8). The next press will increment the channel number by one. After channel 8, it will cycle back to channel 1. When you are satisfied with the channel setting, simply stop pressing the button. Waiting 10 seconds without pressing the button releases the programming mode and returns the light to normal operation.

Testing the Lights

To test that the music stand lights will dim properly or to identify which lights will be controlled in a single bank, diagnostic mode may be used. Diagnostic mode turns on and off all of the lights (in all eight groups) on the current channel. Two styles of transmission can be used: blinking the lights on and off or a ramp up and down of intensity.

The DIP switch determines the diagnostic mode with the FUN switch is set to *on*. (*Off* is the switch flipped down and *on* is the switch flipped up.) The switch settings on the right show diagnostic mode with the ramp up and down. Turning switch 1 off will blink the lights.

Switch	Purpose
1	On – Ramp up and down all lights on all groups in this channel Off – Blink all lights on all groups in this channel
2-9	Reserved
10 (FUN)	On – Enable diagnostic mode Off – Normal operation

Once testing is complete, be sure to restore the DMX address to the DIP switch and set switch 10 to off (down).

Troubleshooting

If you are having difficulty with the Forte DMX Transmitter, check the troubleshooting table below. If you cannot resolve the issue, contact Aria Lights at support@arialights.com.

Problem	Troubleshooting Tips
Lights will not turn on through DMX commands	• Ensure that the DMX decoder is plugged in to a working 120VAC outlet which is <u>not</u> controlled by a lighting system. • Ensure that the DIP switches are set to the correct DMX address and switch 10 is OFF (down). Remember that down is OFF and up is ON. • Make sure that the music stand lights are all switched on. • Remember that the transmitter occupies eight sequential DMX addresses, so although the DMX decoder switches may be set for address 7, your lights in group three would be controlled by DMX address 9. • Ensure that the DMX cable you used is wired correctly and does not have a short circuit. Test the DMX cables in another DMX fixture to ensure that they work. • Use the test mode to make sure that the lights turn on. If they do, check that the DMX system is providing the correct address. If they do not, make sure the lights are within 100 feet of the transmitter and turned on.
Some lights do not reliably respond to the transmitted signal	• Check or alter the location of the transmitter. Make sure it is within 100 ft. (33m) of your lights and free from obstruction. • Check the orientation of the antenna. Try changing the orientation by 90 degrees. • Check for interference from other 900 MHz sources.

Some lights never respond to the transmitted signal, regardless of how close they are to the transmitter	• Make sure that those lights are on the same channel and group which you are using. • Make sure that the music stand lights are all switched on and fully charged.
Lights mysteriously turn on (or off) without any changes at the lighting console.	• There may be another nearby venue using a Forte DMX Transmitter as well. Change to another channel to prevent the overlap. See *Changing the Channel* on page 10 for details on changing channels.

FCC (U.S.A.) Radio Compliance

FC

FCC ID: 2AV7F-FDMX1

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The only antennas authorized by the FCC for use with the Forte DMX Transmitter are listed in the table below. Detailed information on each antenna is available from their respective manufacturers. Antennas not included in this list or having a gain greater than 2.2 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Manufacturer	Type	Manufacturer Part number	Gain
Linx Technologies Inc.	Half-wave dipole whip	ANT-916-OC-LG-RPS	2.2dBi

IC/ISED (Canada) Radio Compliance

Innovation, Science and
Economic Development Canada
Innovation, Sciences et
Développement économique Canada

IC:26036-FDMX1

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

> Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This equipment complies with the ICES RF radiation exposure limits set forth for an uncontrolled environment.

> Cet équipement est conforme aux limites d'exposition aux radiations ICES définies pour un environnement non contrôlé.

This radio transmitter Model: FDMX1, IC: 26036-FDMX1 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

> Le présent émetteur radio Model : FDMX1, IC : 26036-FDMX1 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Manufacturer / Fabricant	Type / Catégorie	Part number / Numéro d'article	Gain	Impedance / Impédance
Linx Technologies Inc.	Half-wave dipole whip	ANT-916-OC-LG-RPS	2.2dBi	50 ohms