

## XPAND 3D Cinema Glasses



### Instructions for 3D cinema glasses

The active glasses X101 work in automatic mode – there is no power switch to turn the glasses "ON" or "OFF". Upon receiving the glasses, they are in the off-mode, meaning that the glasses periodically check for the valid IR signal. In the off-mode the lenses appear green. Upon receiving the IR signal, the glasses start a warm-up sequence.

**Warm-up sequence** - During the warm-up period the lenses remain opaque for the entire warm-up period which lasts for two seconds. At the end of a warm-up period the glasses go into normal run-mode. In this mode, the lenses open and close in sync with the projector to deliver the 3D experience to the viewer.

**Clear mode** - When in run-mode, after the glasses loose a valid synchronization signal, they go to a clear mode (both lenses clear). In the clear mode, both lenses remain open, so that the viewer can see normally through the glasses. The lenses remain open until the glasses are able to receive a sync signal. If they don't receive the signal in five minutes they go to an off-mode.

**Battery life** - The glasses check for a low battery condition just before going to the "off-mode". If the battery life is insufficient the lenses will begin blinking slowly (the lenses are closed and briefly flash open simultaneously once every two seconds) to indicate a low battery condition and prevent the glasses from going to run-mode. The control circuit is designed so that a low battery condition does not appear during the run-mode when watching a movie.

**Replacing the battery** - Access to the battery is provided through an opening on the interior side of the frame that is sealed off by a cover. In the case of dead battery, the seal is opened using a key,

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rotating it leftwise from "c" position to "o" position. The battery should provide enough energy for 250 hours of use in run-mode when the projector is set for "Triple Flash, 6:2", and 300 hours of use in run-mode when the projector is set for "Double Flash, 4:2".

### Testing of the glasses

Testing of the glasses prior to distribution to a user can be performed using the AT100 Active Glasses Tester. The AT100 is "ON" if the "ON/OFF" button is pressed and the red LED is lit. The AT100 is designed to generate a low intensity IR signal that when passed within 2 feet of the X101 glasses causes the lenses to flicker in response to the IR signal. Both lenses should flicker at a slower rate that is visible to a user and in doing so indicate that the glasses are functioning properly and are ready for distribution. If the lenses do not flicker the battery is dead and the glasses should not be used. The AT100 will shutoff automatically after several hours or you can turn it off manually.

### Handling Instructions

Parameter	Instructions
Storage	It is recommended that the glasses be stored away from any IR source such as fluorescent lights or be covered so the IR does not trigger the glasses to switch to the on-mode. The storage temperature should be standard office temperatures as high temperature environments reduce battery life.
Handling	The glasses are generally pretty durable, but the lenses can be cracked if the glasses are rotated around the focal point of the nose piece. When distributing the glasses to users care should be taken to handle the glasses by the frame in order to avoid getting fingerprints on the lenses.
Cleaning	The glasses are designed to be washed in a conventional or commercial dishwasher at temperatures not to exceed 55° C (131° F). Recommended temperature is 50° C (122° F). For a conventional dishwasher a Fisher&Paykel DishDrawer DD603 or DD 603I are recommended. If cleaning by hand you can use a standard cleaning agent that is not ammonia based. Windex has an anti-bacterial cleaning product that works quite well. The glasses can also be washed under a faucet using liquid soap and warm water. When cleaning by hand you should dry the lenses using a lint free, soft, drying cloth. (DO NOT USE PAPER TOWELS AS THEY CAN SCRATCH THE LENS)

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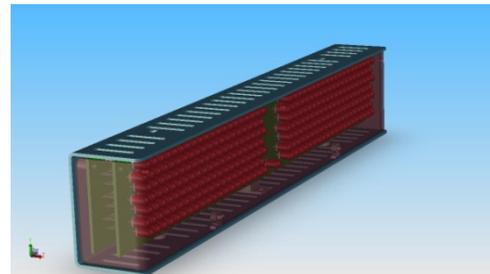
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## XPAND 3D Cinema IR Emitter System

XPAND 3D IR emitter system generates the infrared signal that synchronizes the active 3D glasses with the digital projector. The family of emitters consists of four members and a sync distribution module:

### **AE210-Emitter, Long-Range, Narrow Angle (Requires the AD1000 for power and signal)**

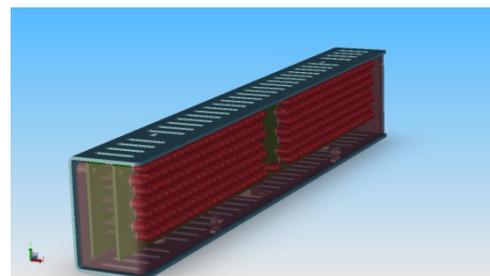
This is a powerful emitter built in a small form factor, designed to be mounted either in the theater or in the projection booth behind a standard projection window and aimed at the screen. Small to medium size theaters need two emitters. And, for large theaters and theaters with a balcony consult an XPAND representative. (Up to 4 units can be installed to increase coverage or provide redundancy.) It contains 280 high-power, narrow-angle ( $\pm 10^\circ$ ), IR diodes and consumes five watts of power in active operation. The unit includes a laser pointer that can be turned on to align it with the screen. It's dimensions are 12.0"(304.8 mm)x 2.2"(55.9 mm)x1.5"(38.1 mm) (width/height/depth). It weighs 1.5 pounds (.68 Kg).



The narrow angle emitter is designed to be placed near the projector and aimed at the screen. The IR signal will be reflected back to the audience from the screen. The narrow angle of coverage will insure that the IR energy is concentrated on the screen, not the walls and ceiling which may absorb rather than scatter it.

### **AE225-Emitter, Long-Range, Wide Angle (Requires the AD1000 for power and signal)**

This is a powerful emitter built in a small form factor, designed to be mounted either in the theater or in the projection booth behind a standard projection window and aimed at the screen. Small to medium size theaters need two emitters. And, for large theaters and theaters with a balcony consult an Xpand representative. (Up to 4 units can be installed to increase coverage or provide redundancy.) It contains 280 high-power, wide-angle ( $\pm 25^\circ$ ), IR diodes and consumes five watts of power in active operation. The unit includes a laser pointer that can be turned on to align it with the screen. Its dimensions are 12.0"(304.8 mm)x 2.2"(55.9 mm)x1.5"(38.1 mm) (width/height/depth). It weighs 1.5 pounds (.68 Kg).



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The wide angle emitter should be used if the geometry of the room is such that a +/-10 degree cone of radiation will cover only a small portion of the screen. It also may be placed near the screen and aimed at the audience.

### **AE110-Emitter, Mid-Range, Narrow Angle**

This is a medium range emitter designed for small theaters and screening rooms with up to 100 seats. It is designed to be placed near the projector and aimed at the screen. It contains 56 high-power, narrow-angle ( $\pm 10^\circ$ ), IR diodes and consumes four watts of power in active operation. It's dimensions are 4.4"(111.8 mm)x 1.4"(35.6 mm) x 3.0"(76.2 mm), (width/height/depth). It weighs 6 ounces (.17 Kg).



### **AE125-Emitter, Mid-Range, Wide Angle**

This is a variation of the Medium range emitter designed to be mounted at the front of the theater and aimed at the audience. It provides fill coverage in special situations such as very wide theaters where bouncing the IR signal off the screen proves inadequate. It contains 56 high-power, wide-angle ( $\pm 25^\circ$ ), IR diodes and consumes four watts of power in active operation. It's dimensions are 4.4"(111.8 mm)x 1.4"(35.6 mm) x 3.0"(76.2 mm), (width/height/depth). It weighs 6 ounces (.17 Kg).



### **AD1000- Sync Distribution Module**

The Distribution Module receives the frame sync signal from the projector or other source, converts it to XPAND's proprietary synchronization pulse code and sends it to the IR emitter arrays. It also supplies power to the emitter arrays and monitors their performance. It can control up to four IR emitter arrays simultaneously. In addition to the external IR arrays, the unit has its own set of IR emitters that will flood the projection booth with the IR signal. These IR diodes can be turned off if desired. The module is designed to be mounted on the front wall of the projection booth. Its dimensions are 8.6"(218,4 mm) x 4.2"(106.7 mm) x 2.3"(58.4 mm), (width/height/depth). It weighs 15 ounces (.43 Kg)



To conserve power and extend life, the distribution module activates the IR emitter arrays only if the frame sync signal is of a frequency higher than 36 Hertz and less than 80 Hertz. 3D movies use a sync rate of 48 to 72 Hertz while 2D movies use a sync rate of 24 Hertz. For this reason the unit does not have to be deactivated when 2D movies are being shown or the projector is idle.

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When the system is first installed or verification of system operation is desired, the distribution module is supplied with a 60 Hertz frame sync generator built into the module. It is activated by pushing the on/off switch for "Setup Frame Sync" to the "on" position. If the sync generator is operating and a valid (36 to 80 Hertz) external frame sync signal is received from the projector or other source, operation of the test generator will cease and the emitter arrays will be synchronized to the external signal.

The long range emitter array includes a laser pointer to assist in aiming the emitter array at the screen. The laser pointer is activated by a switch on the distribution module labeled "Laser Pointer", but can only be activated when the "Setup Frame Sync" generator is operating. This prevents the laser diode from being turned on while a 3D video is being shown.

For diagnostic purposes, the following indicator lights are provided:

1. A green power LED indicating that the module has power.
2. A green sync LED positioned over the input connector indicating that a valid (36 to 80 Hertz) sync signal is being received.
3. A flashing yellow LED positioned near the "Setup Frame Sync" label indicating that the test generator is active.
4. A green and red LED are positioned over each of the four output connectors. The green LED indicates that an IR array is connected to the output and is receiving power, and a frame sync input signal is transmitting IR. The red LED indicates that an array is connected and should be emitting IR radiation, but is not. A red LED indicates a fault condition that requires attention. The green LED is designed to provide the projection personnel assurance that everything is hooked up and operating normally or will work normally when an input sync signal is received. Should the operator wish to completely test the system, he can activate the sync generator by turning "ON" the "Setup Frame Sync" feature. The green LED with the absence of the red LED will now indicate that the system is working and emitting IR pulses. Alternatively, he can put on a pair of glasses and look through the projection window. In the absence of the IR sync signal, the glasses will be in a clear state (both lenses clear – at least as clear as they get - 100% of the time). In the presence of an IR sync signal, the lenses will alternate between the opaque and clear state in synchronization with the IR signal. They will alternate too quickly to have the flicker perceived, but the effective transmission will drop by 50%. This is detectable by the viewer, but not objectionable so it is a suitable test condition just before the movie is started even in the presence of an audience, if needed.

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