

### INPUT TEST INDICATIONS

D - ON	Data present on incoming DMX line
D + ON	
D - OFF	D- signal missing
D + ON	or shorted to common
D - ON	D+ signal missing
D + OFF	or shorted to common
D - OFF	No data present on incoming DMX line
D + OFF	

### OUTPUT TROUBLESHOOTING

DMX Repeater outputs should be tested in stages to determine if a problem exists in the repeater output circuitry or in a cable or device connected to that repeater channel. First, ensure that the repeater is correctly receiving DMX512 data via the input connection, as per the previous instructions. Once that is verified, disconnect the cable to the suspect output channel and depress the corresponding ISO OUT TEST button. If both the corresponding D- and D+ symbols illuminate, this shows that the isolated output circuitry inside the repeater is working properly and is transmitting both DMX512 signals. If not, there is likely a problem with the output circuitry for that channel. Try using the spare transceiver chip to remedy the problem. Now reconnect the cable to the suspect output and perform the same test. If both of the D- and D+ LEDs illuminate, this shows that there are no shorts in the output cabling or connected receiving devices. If one or both of the LEDs is off or dim, a cable or device problem is indicated. NOTE: if an output TEST button is pushed when a proper input signal is not being received by the DMX Repeater, the outputs will be in their normal "idle" state (i.e. D- low level, D+ high level), therefore the D+ symbol will illuminate.

### CAUTION!



DMXRepeaters are designed to work on voltages from 90-250 volts AC. It will automatically sense the incoming voltage and adjust accordingly. The power inlet is an IEC 60320-C14 type. Be sure to use the correct, matching, power cord if your location requires something other than the 120V U-ground cord included with the unit.

### Model Descriptions

Models with Rear Mounted Connectors

- 8895** 1 in - 6 out **DMX Repeater**, 5 pin XLR
- 8893** 1 in - 6 out **DMX Repeater**, 3 pin XLR
- 8894** 1 in - 6 out **DMX Repeater**, 3-3pin & 3-5 pin
- 8897** 1 in - 6 out **DMX Repeater**, terminals

Models with Front Mounted Connectors

- 8875** 1 in - 6 out **DMX Repeater**, 5 pin XLR
- 8873** 1 in - 6 out **DMX Repeater**, 3 pin XLR
- 8874** 1 in - 6 out **DMX Repeater**, 3-3pin & 3-5 pin

### Specifications

<b>Power Supply:</b>	Universal input (90-250V, 50/60Hz), 0.2A
<b>Connections:</b>	5 pin XLR, 3 pin XLR, or terminals
<b>Isolation:</b>	2500V Opto-isolation on DMX lines 4000V Mains isolation
<b>Protection:</b>	Up to 250VAC/DC on all port pins
<b>Protocols:</b>	DMX512, DMX512-A, or any EIA422 or 485 based protocol
<b>Size:</b>	17 x 6 x 1.75" (432 x 152 x 44mm)
<b>Unit Weight:</b>	5.0 lbs. (1.86 kg)



# USER'S MANUAL

## DMX Repeater

8870 series  
& 8890 series



**An essential component of any DMX512 distribution system, the DMX Repeater permits star wiring installations while isolating and protecting connected equipment from harmful electrical faults. Gray 8870/8890 Series DMX Repeaters feature self-healing protection devices on all ports to prevent internal damage when severe faults of up to 250V are accidentally applied to the connected DMX cabling. And to help you resolve any cable, signal or component issues fast, there are useful test functions built right into the product!**

### Operational Philosophy

To ensure trouble free operation, DMX512 standards require that DMX devices be installed in a daisy chain, with no tees, wyes or stars in the DMX wiring. However, site conditions may make star wiring desirable or even mandatory. A Gray DMX Repeater permits star wiring by making each branch of the star function electrically as its own entity, unaffected by the other branches of the star. Additionally, opto-isolation circuitry isolates each branch to prevent ground loops or accidental damage from fault voltages on DMX lines.

### DMX Basics

- All wiring must be in a continuous run, daisy-chained, no "Tees" are permitted
- "Stars" are permitted only in conjunction with a repeater
- Cable shield may be earth-grounded at one end only, preferably at the control console
- Maximum length of one cable segment is 1,800 ft. (550m).
- Receiving devices have male connectors, transmitters have female
- The last DMX device on the line must be terminated with a termination switch or resistor with a value of 100 to 120 ohms between pins 2 and 3.
- 5 pin XLR type DMX connectors are standard:
  - Pin 1: *Common*
  - Pin 2: *Data (-)*
  - Pin 3: *Data (+)*
  - Pin 4: *Optional Data (-)*
  - Pin 5: *Optional Data (+)*
- 3 pin XLR type connectors are a non-standard alternative:
  - Pin 1: *Common*
  - Pin 2: *Data (-)*
  - Pin 3: *Data (+)*
- Wire must be Belden 9842 (120Ω), 9829 (100Ω), ISO/IEC 11801 (Cat5) or equivalent
- A maximum of 32 DMX receiving devices can be present on a single DMX line

## Connections

Typically, Gray DMX Repeaters are used in the following configuration:

- **DMX Input** is connected to the control console DMX output
- **DMX Outputs** (ISO Out A,B,C,D,E, & F) are connected to the remote DMX devices or receptacles for the equipment receiving the console signal. These may be dimmers, scrollers or moving lights, for example.
- **DMX Thru** passes the console signal to additional DMX Repeaters or other similar devices, and would in turn be connected to DMX Input on the next unit in line.

## Screw Terminal Connections

On the 8897 model, 2-piece screw terminal connectors are provided on the rear panel. The pin arrangement of these connectors is the same as that of 5 pin XLR connectors.

## Recommended Wiring Practice

Keep all DMX cabling away from high voltage/power cables to maintain data integrity. Wire must be Belden 9842 (120Ω), 9829 (100Ω), ISO/IEC 11801 (Cat5) or equivalent

## WARNING!



**All DMX input/output ports must only be connected to low-voltage data lines. Do not connect high voltage sources to these connectors.**

## Wall or Truss Mounting

Optional wall (8812) or truss mount (8811) kits are available.

## Rack Mounting

DMX Repeaters can be rack mounted by using an included 19" rack mount bracket kit. The kit consists of two rack mount ears that are attached to the DMX Repeater using the 4-40 screws included in the kit. Note that two screws will have removed before the ears can be installed.

## Indicators

The PWR LED on the front left of your DMX Repeater will illuminate when AC power is connected to the unit. There is no on/off switch.

The DATA LED will illuminate and flicker rapidly to indicate that DMX data is being received.

Two TEST indicators are associated with the input and each of the six outputs. Refer to the *Cable Test Feature* instructions.

## Location

DMX Repeaters are designed for indoor use, in a dry location. Since there is no power switch, it should be installed near a power socket-outlet, which must be easily accessible.

## DMX512-A Compliance

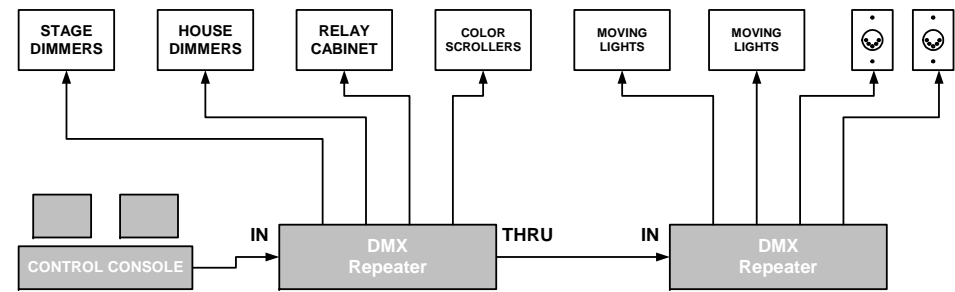
When equipped with 5-pin XLR connectors, this product complies with the new DMX512-A standard.

Terminal strip versions are also compliant with DMX512-A under the non-compatible connector (NCC) provision.

All ports are DMX512-A protected to 250V.

## DMX Termination

If only one DMX Repeater is used, and nothing is connected to the DMX THRU receptacle, the termination switch must be set in the 'in' position (ON) to terminate the incoming DMX signal from the console. If several DMX Repeaters are connected together using the DMX



Typical Application

## DMX Termination cont.

THRU connector on each unit, only the last DMX Repeater in the chain is terminated, all the others are not terminated (switch in the 'out' position).

DMX receiving devices such as dimmers or scrollers are generally provided with a termination switch, termination jumper or other means of connecting the required termination resistance across the DMX line. Always make sure that the last receiving device connected to any output line is properly terminated.

## Cable Test Feature

GRAY 8870/8890 series DMX Repeaters provide users with the unique ability to test the integrity of the incoming and outgoing DMX signal and cabling. This feature makes troubleshooting most DMX communication problems easy and can be accomplished right at the repeater, without any additional test gear. "TEST" pushbuttons are provided on the face of the unit for the DMX input and each of the six outputs.

The DMX signal runs on two separate data lines: D- (XLR pin 2) and D+ (XLR pin 3). Both are referenced to signal common (XLR pin 1). For DMX512 to work reliably, the D- and D+ signals and common must be present and properly connected at both ends of the cable. Often, a system will seem to work fine most of the time with one of the three connections missing or with two wires shorted – this simply shows how fault

## Cable Test Feature cont.

tolerant DMX can be! But intermittent problems will usually appear at random, often at the worst possible time.

### INPUT TROUBLESHOOTING

Normally when troubleshooting a communications problem it is common practice to start with the DMX512 source (console signal). The DATA indicator may or may not be illuminated at this point. If it isn't, first make sure that the console is on and sending a DMX signal. Then, depress the DMX INPUT test button on the repeater; this will disconnect the incoming signal from the receiver circuitry and apply it to the D- and D+ LEDs. Both of them should illuminate (the DATA indicator will go out). This shows that the console's DMX transmitter is capable of sending a strong enough signal to drive the two LEDs, and that all three pins are connected. If the DATA indicator is always off and both of the D- and D+ LEDs work with the TEST button depressed, the DMX Repeater's receiver may be defective ( a spare transceiver chip is located on the main circuit board, inside the unit. If either or both of the D- and D+ LEDs stay off when the TEST button is pushed, there is a problem with the console's transmitter or the input cable.

**NOTE:** the TEST LEDs can also detect whether the D-/D+ wires are swapped. With a DMX signal present, set all console channel levels to zero and depress the Input TEST button. The D- LED should be brighter than D+. When all channels are set to full, D+ should be the brightest.