

OXMOOR[®]

C O R P O R A T I O N

A Limited Liability Company

DCA-2™ & DCA-2T™ DIGITAL CONTROL ATTENUATOR

RC-16™ REMOTE CONTROL



Installation
&
Operation
Manual

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DCA-2 & RC-16 INTRODUCTION

- UL and CE listed
- Front panel, screwdriver-adjustable gain trims
- Electronically balanced, XLR-type inputs
- Electronically balanced, XLR-type outputs (*DCA-2T only*)
- +18 dBu input signal levels
- +20 dBu output signal levels
- Built-in RF suppression
- Compact, 1U rack space chassis

The Oxmoor DCA-2 Digital Control Attenuator and one or more RC-16 Remote Control units together constitute a unique, high-quality system for the remote control of audio level. The DCA-2 is a compact (1-3/4" high) rack mountable package that can control two discrete audio channels (90 dB of isolation is provided for two unrelated programs) or the two channels can be linked to control a single stereo program. Multiple DCA-2s can be linked, and up to 64 discrete channels can thus be controlled in a single chain with 1/4 dB tracking tolerance between channels. Designed for professional applications, the DCA-2 is equipped with XLR-type input and output connections. The DCA-2T outputs are transformer balanced. Either system is capable of driving 600 ohm or higher impedance loads; maximum output is +18 dBm terminated, +20 dBu unterminated.

Precise volume control can be provided at as many locations as required. The remote units are easily wired, in "daisy-chain" configuration, using simple modular telephone style cables. Up to four RC-16 remotes can be connected to a given control input (and that remote, or string of remotes, can be "daisy-chained" to control up to 64 audio channels). The system provides 29 steps of precise 1.5 dB attenuation from 0 to -43.5 dB, with a 30th step for 90 dB "full kill" attenuation. Virtual display of the set attenuation is simultaneously given at *all* locations via a circular LED array around the knob on each RC-16 Remote Control. The RC-16 can be mounted in a standard two-gang electrical wall box, or a pre-punched 2-gang plate is available from Oxmoor. The maximum cable length from the DCA-2 to the farthest remote is approximately 2,000 feet (*see SPECIFICATIONS, page 13*).

The RC-16 is actually a highly sophisticated shaft encoder which translates knob movements into a string of digital pulses; the pulses then alter the level of the digital attenuator(s) within the DCA-2 chassis. Unlike up/down buttons, the RCA-16 is sensitive to rate-of-change, and thus the faster the knob is turned, the faster the setting is changed. As any interconnected RC-16 knob is turned, the LEDs on all remotes in the chain follow until the upper or lower limit is reached. At that point, the knob

will continue to turn, but the level and Virtual Pointers simply stop changing until any one of the knobs is turned in the opposite direction. Since there are no mechanical stops, a knob cannot be "twisted off" if it is turned beyond what would be the "stop" positions on a conventional level control.

The Oxmoor system includes a number of unique features. A "Preset" control on the DCA-2 rear panel sets the degree of attenuation exhibited when the system is first powered up, avoiding an unpredictable or unknown turn-on state. One or both channels can be switch-reset back to this "Preset" level at any time. Another rear panel control, labeled "Priority," sets a level to which the system can be temporarily forced by an external switch closure. Each RC-16 remote has terminals for preset and priority functions. The switch itself is not included.

Additionally, Channel A & B maximum gains can be adjusted ± 15 dB from the nominal unity gain of the system via recessed, front-panel controls. For applications where access to one or more remote controls must be restricted, a key switch can be installed in place of a jumper on the back of the RC-16; the key switch must then close to activate the RC-16.

Installation of the DCA-2 Digital Control Attenuator and RC-16 Remote Controls is straightforward. However, there are a number of optional configurations. We therefore recommend that you read this entire manual once, quickly. Note those items which apply to the set-up you require, and then read the pertinent sections carefully before installing your system. Basic hookup is shown in the CONNECTIONS section (*see page 5*). More complex hookups are illustrated and discussed in the CONFIGURATION EXAMPLES section (*see pages 6 through 9*).

The logo for Oxmoor, featuring the word "OXMOOR" in a bold, serif font with a registered trademark symbol (®) to the upper right of the letter "R".

DCA-2 CALLOUTS

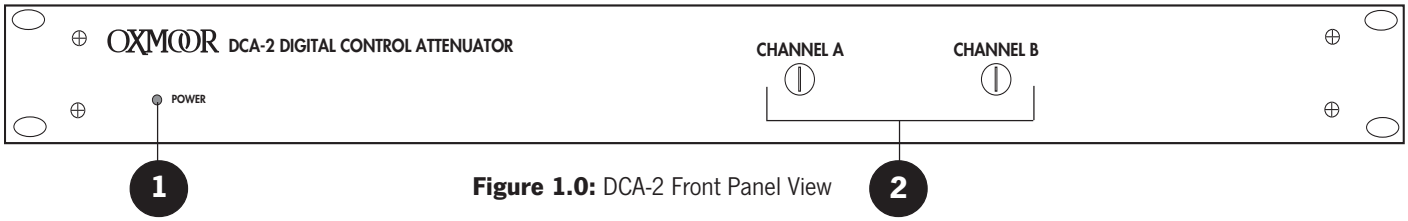


Figure 1.0: DCA-2 Front Panel View

1. **POWER STATUS LED** - Indicator for AC Power On.
2. **INPUT TRIM** - Trim pots, accessed through the front panel with a small flat-blade screwdriver, offer ± 15 dB gain adjustment to match different operating levels or balance levels across channels.
3. **PROGRAM INPUTS** - Audio input, XLR-F-type connector, Pin 2 positive, electronically balanced, accepts balanced or unbalanced signals from line-level devices. Normal input level is +4 dBu with a maximum input level of +20 dBu.
4. **PROGRAM OUTPUTS** - Audio outputs, XLR-M-type connectors, Pin 2 positive, unbalanced. Recommended load impedance is 600 ohms or greater. Maximum output level is +20 dBu.
5. **REMOTE CONTROL INPUTS** - Six-conductor modular telephone jacks. Used to interface external remote control devices. Provides connections to PRESET, PRIORITY, COUNT UP, COUNT DOWN, DISPLAY/POWER, COMMON.
6. **REMOTE CONTROL OUTPUTS** - Six-conductor modular telephone jacks. Used to link the remote control channels

together. Provides connections to PRESET, PRIORITY, COUNT UP, COUNT DOWN, COMMON.

7. **PRESET CONTROL** - Binary pot, adjusted using a small flat-blade screwdriver. It is used to determine the default attenuation level. The DCA-2 returns to the PRESET level whenever it is powered up or the PRESET control line is momentarily taken to COMMON.
8. **PRIORITY CONTROL** - Binary pot, adjusted using a small flat-blade screwdriver. It is used to determine the PRIORITY attenuation level. The DCA-2 goes to the PRIORITY level whenever the PRIORITY control line is taken to COMMON.
9. **FUSE HOLDER** - Replace only with approved type of fuse in a rating appropriate to the mains voltage, as indicated on back panel (see SPECIFICATIONS, page 13).
10. **POWER CONNECTOR** - Standard IEC 3-pin connector for AC power cord. Use only with grounded (3-wire) outlets. Cord sets are available for all world connection standards.
11. **CHASSIS GROUND POST** - A screw with a star washer enables the installer to secure a ground wire to the chassis.

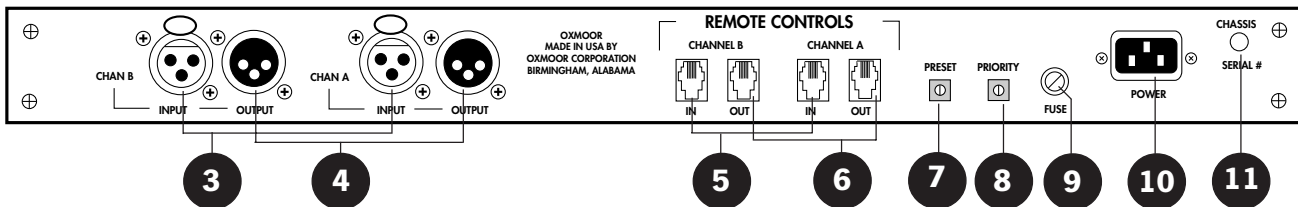


Figure 1.1: DCA-2 Rear Panel View

RC-16 CALLOUTS

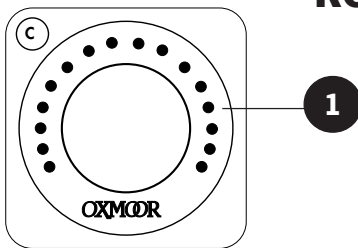


Figure 1.2: RC-16 Front Panel View

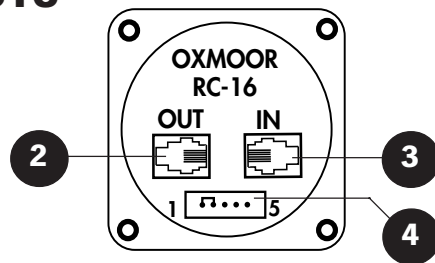


Figure 1.3: RC-16 Rear Panel View

1. **VIRTUAL POINTER** - LED indicates the current volume setting.
2. **REMOTE CONTROL OUTPUT** - Six-conductor modular telephone jacks. Used to link the remote control to the DCA-2's "IN" jack.

3. **REMOTE CONTROL INPUT** - Six-conductor modular telephone jacks. Used to link to the next RC-16 Remote Control.
4. **CONTROL PORT** - Single line, five-pin header, used to extend KEY SWITCH, PRESET, and PRIORITY functions at the remote control location.

DCA-2 BLOCK DIAGRAM

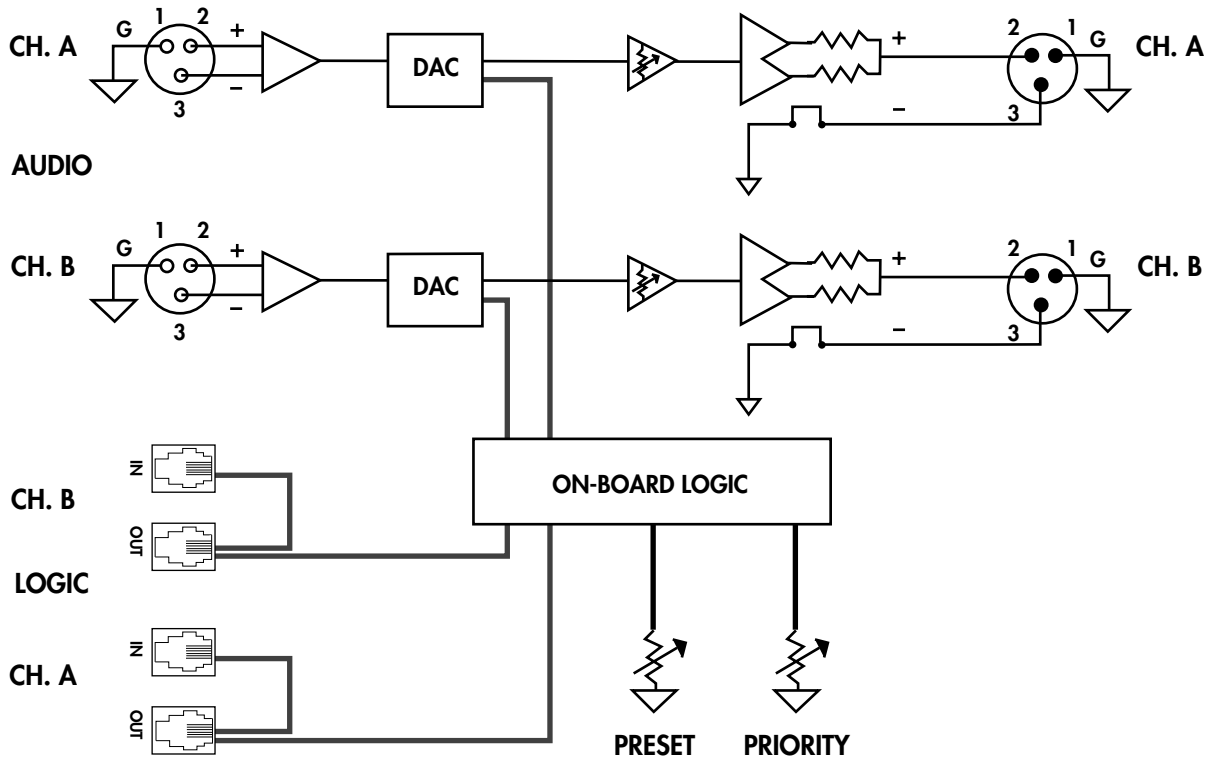


Figure 2.0: DCA-2 Block Diagram

DCA-2T BLOCK DIAGRAM

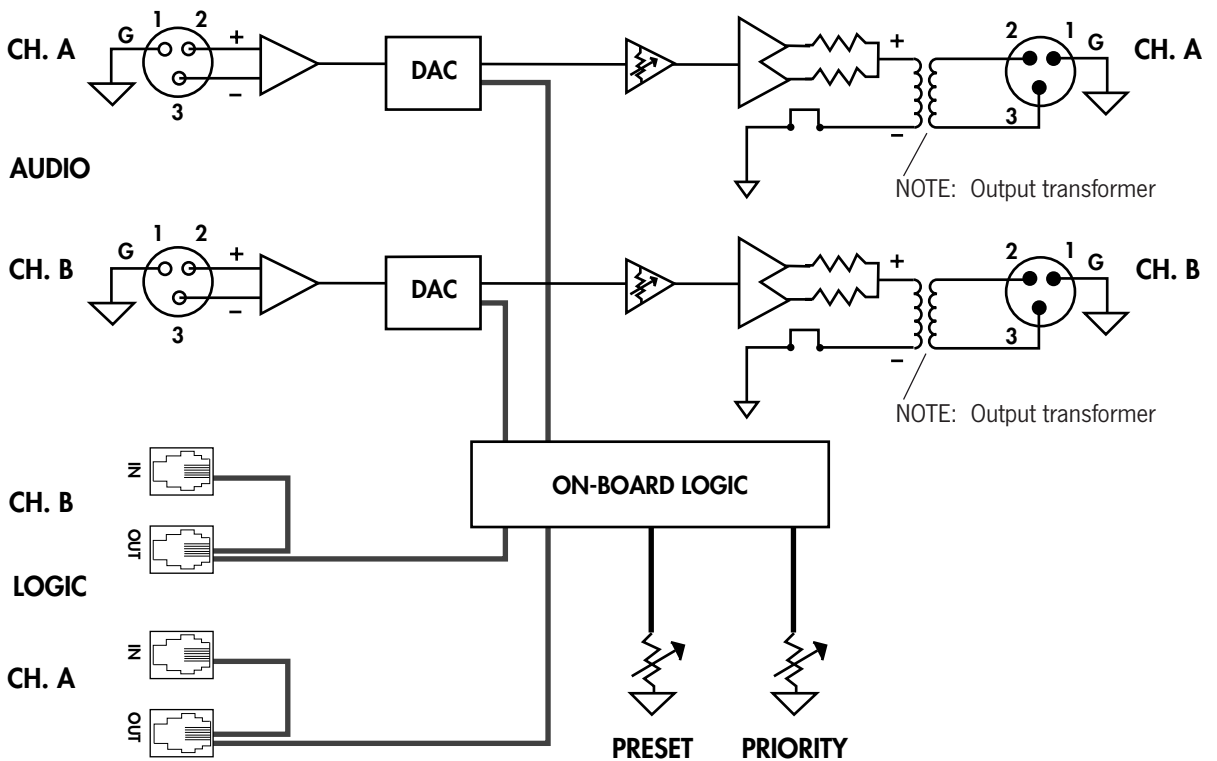


Figure 2.1: DCA-2T Block Diagram

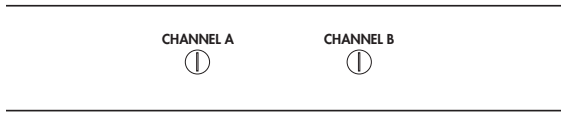
DCA-2 SET-UP

FACTORY SET-UP

The front panel trim pots are factory set to unity gain. The Preset control and the Priority control are factory set to #8 (-21dB reference to 0dB).

TRIM POTS SET-UP

Use a small flat-blade screwdriver to set the trim pots to the desired position between -15 dB and +15 dB. Full counter-clockwise is -15 dB; full clockwise is +15 dB; 12 o'clock is unity.

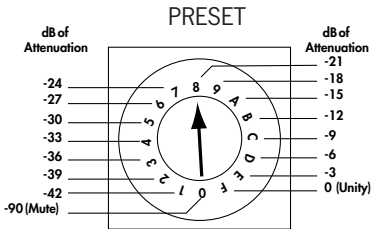


TRIM POTS: Factory set to unity gain (12 o'clock position)

Figure 3.0: Factory Set-Up for Trim Pots

PRESET SET-UP

1. Remove AC power if unit is powered up.
2. Use a small flat-blade screwdriver to set the Preset to the desired position.
3. Connect the AC power.

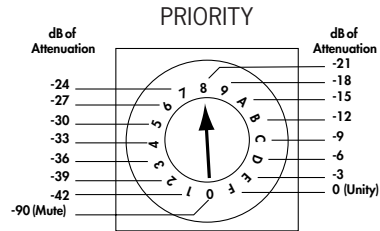


PRESET: Factory set to #8.

Figure 3.1: Factory Set-Up for PRESET Control

PRIORITY SET-UP

Use a small flat-blade screwdriver to set the Priority to the desired position.



PRIORITY: Factory set to #8.

Figure 3.2: Factory Set-Up for PRIORITY Control

PRELIMINARY CHECKOUT

To verify that the DCA-2 and RC-16 are operating when received, we recommend that you use a short jumper cable (one is supplied by the factory with your system) to connect an RC-16 Remote Control to Channel A of the DCA-2. Apply AC power to the DCA-2 and observe the circular LED array (Virtual Pointer) around the RC-16 knob. An LED should indicate the attenuation position. Rotate the knob and verify that the Virtual Pointer is operating (i.e., that the LED moves from -90 dB [mute] to 0 dB [unity gain]). Repeat this procedure for Channel B.

If there is a problem, see TROUBLESHOOTING, page 10.

RC-16 MOUNTING DATA

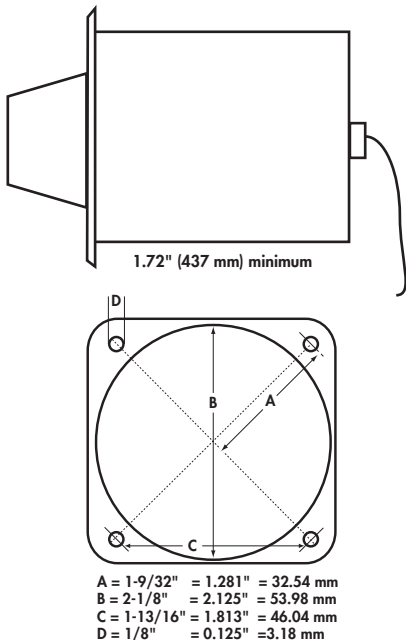


Figure 4.0: Mounting Dimensions

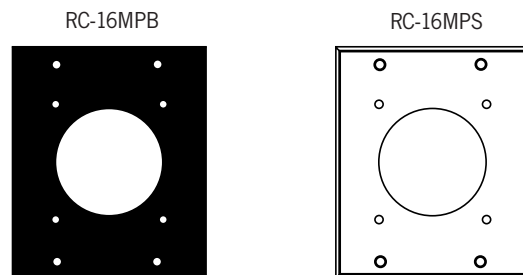


Figure 4.1: Front View of RC-16 Mounting Plates

RC-16 MOUNTING PLATES

(Refer to Figure 4.1)

Optional RC-16 mounting plates are available from Oxmoor Corporation, LLC. The RC-, 16MPB has a matte black finish and the RC-16MPS has a stainless steel finish.

DCA-2 & RC-16 CONNECTIONS

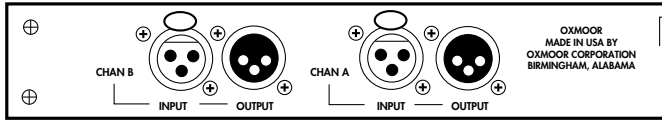


Figure 5.0: Program Inputs and Outputs

DCA-2 PROGRAM INPUT AND OUTPUT CONNECTIONS

(Refer to Figure 5.0)

The DCA-2 Digital Control Attenuator provides connections for two program channels. The unit can operate as a two channel mono or as a stereo unit.

The Program Input connections are made through female, XLR-type, 3-pin connectors. The Program Output connections are made through male XLR-type 3-pin connectors.

DCA-2 PROGRAM INPUTS

(Refer to Figure 5.1)

DCA-2: Pin 1 = Shield, Pin 2 = High, Pin 3 = Low, electronically balanced inputs accept balanced or unbalanced signals from line-level devices. Nominal input level is +4 dBu with maximum input level of +20 dBu.

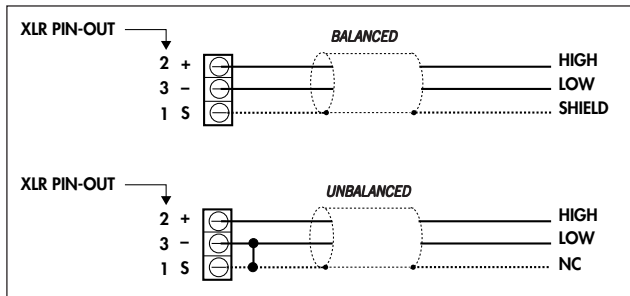


Figure 5.1: Program Input Wiring Schemes

DCA-2 PROGRAM OUTPUTS

(Refer to Figure 5.2)

DCA-2: Pin 1 = Shield, Pin 2 = High, Pin 3 = Low, electronically unbalanced outputs. Recommended load impedance is 600 ohms or greater. Maximum output level is +20 dBu.

DCA-2T: Pin 1 = Shield, Pin 2 = High, Pin 3 = Low, electronically balanced outputs accommodate balanced or unbalanced lines. Recommended load impedance is 600 ohms or greater. Maximum output level is +20 dBu.

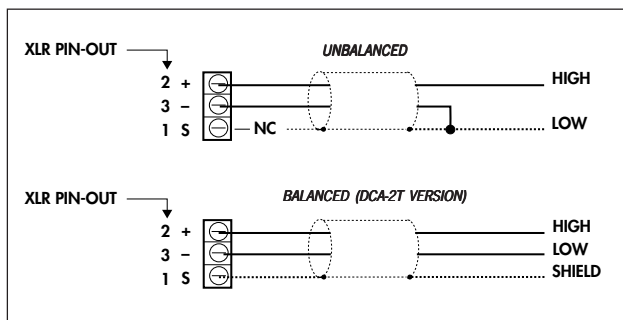


Figure 5.2: Program Output Wiring Schemes

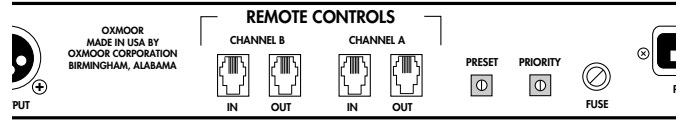


Figure 5.3: Remote Control Inputs and Outputs

DCA-2 PIN-OUTS FOR REMOTE CONTROL

(Refer to Figure 5.4)

The DCA-2 Digital Control Attenuator provides female 6-pin modular TELCO connectors for interface to the Oxmoor RC-16.

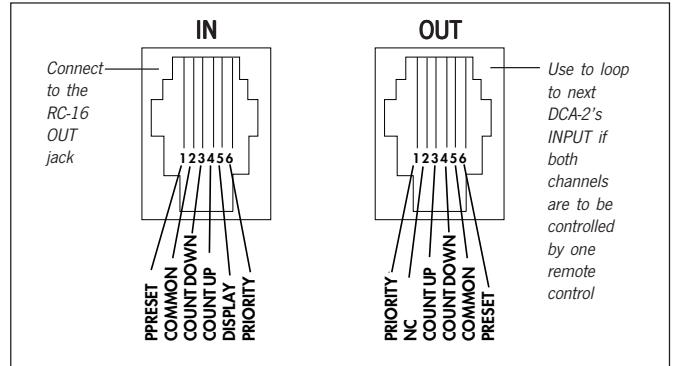


Figure 5.4: Remote Control Input and Output Pin-Outs

RC-16 PIN-OUTS

(Refer to Figure 5.5)

The RC-16 Remote Control provides female 6-pin modular TELCO connectors for interface to the Oxmoor DCA-2 Digital Control Attenuator and other RC-16 Remote Controls.

Connect the OUT jack of the RC-16 to the IN jack of the DCA-2. If using round cable, it is important to connect the RC-16's PRIORITY to the DCA-2's PRIORITY, the RC-16's COUNT UP to the DCA-2's COUNT UP, etc.

When "daisy-chaining" RC-16s, take the OUT jack of one RC-16 to the IN jack of the next RC-16. You can "daisy-chain" a total of eight RC-16s for each DCA-2 unit.

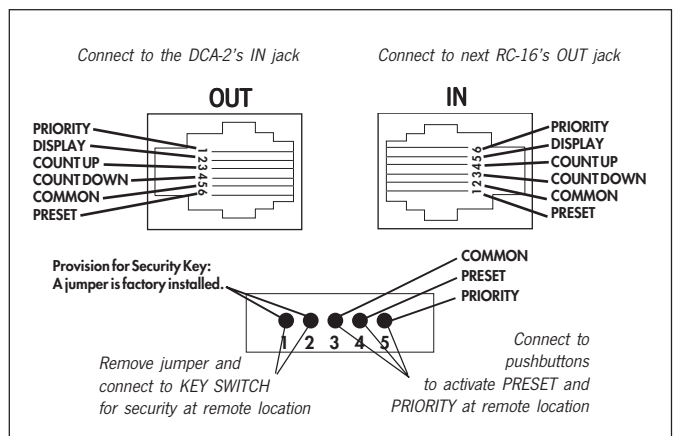


Figure 5.5: RC-16 Pin-Outs

DCA-2 & RC-16 CONFIGURATION EXAMPLES

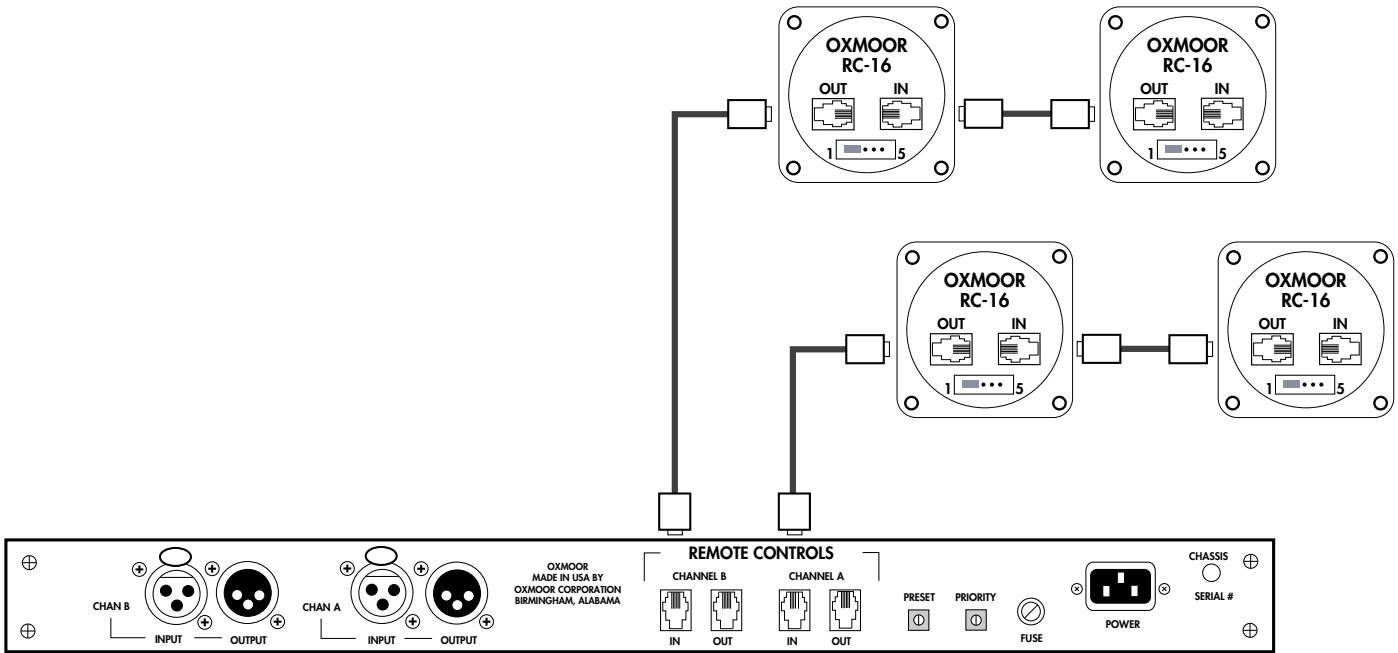


Figure 6.0: DCA-2 Configured as 2 Mono Channels with Two RC-16s in Series on Each Channel

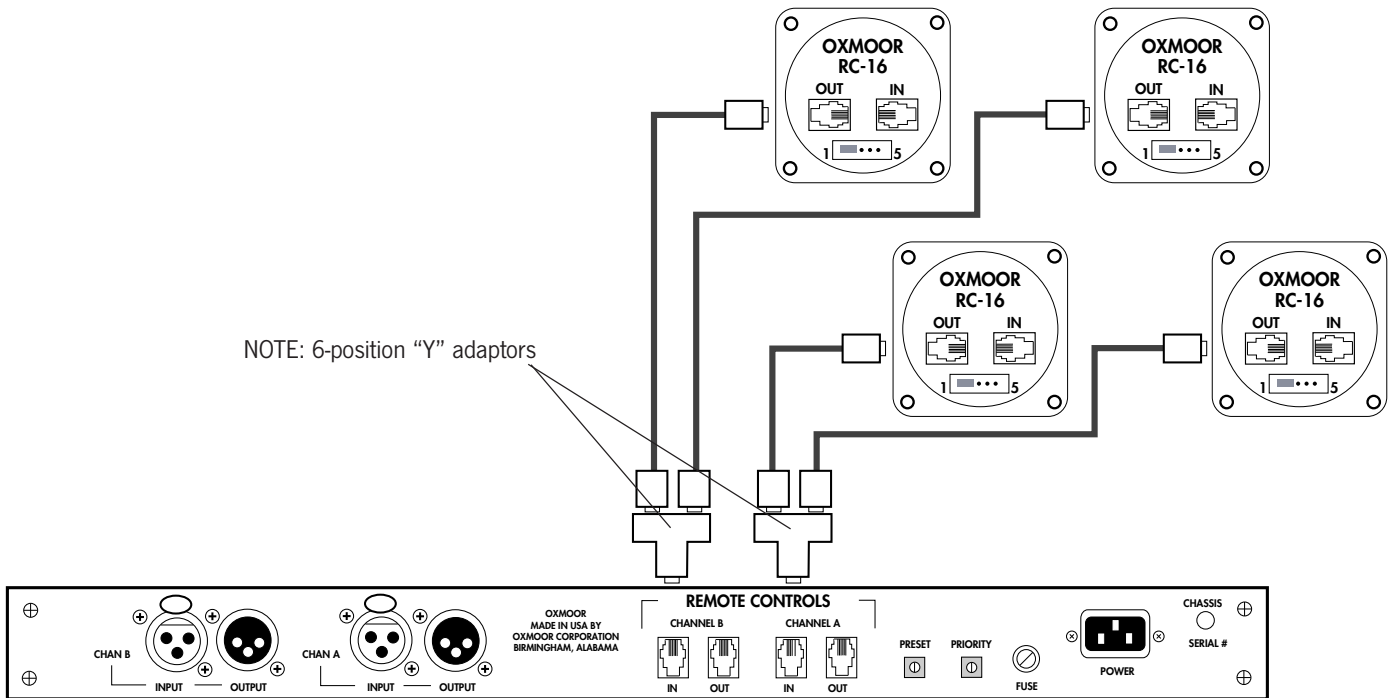


Figure 6.1: DCA-2 Configured as 2 Mono Channels with Two RC-16s in Parallel on Each Channel

DCA-2 & RC-16 CONFIGURATION EXAMPLES (CONTINUED)

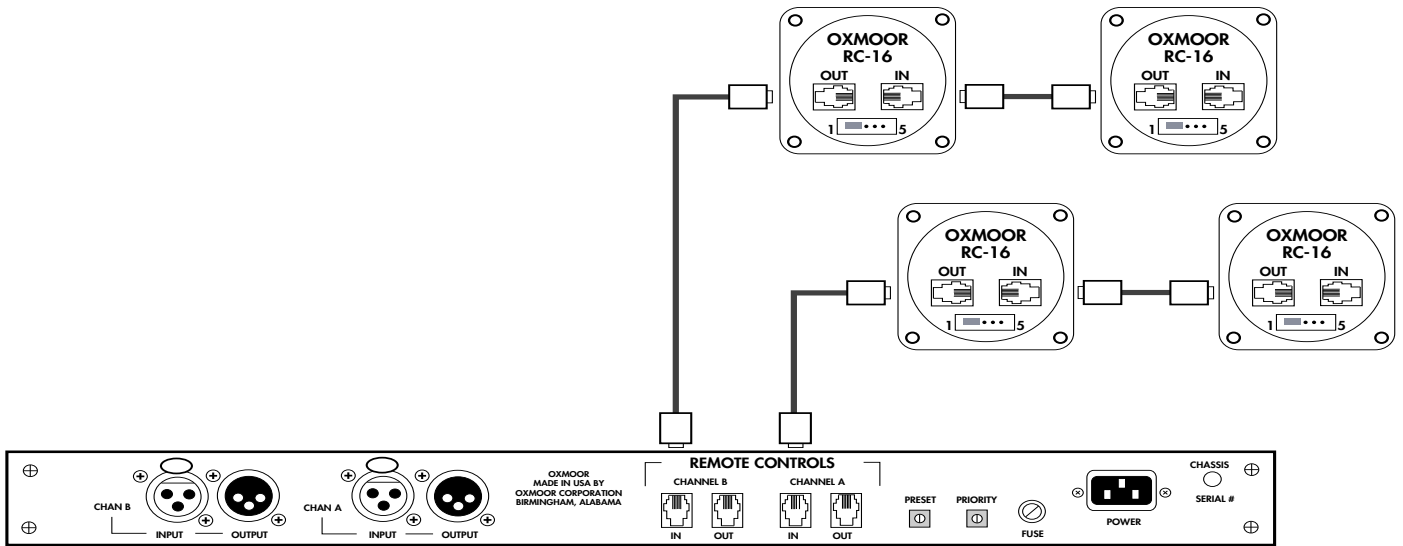


Figure 6.2: DCA-2 Configured as Stereo Unit with RC-16s in Series

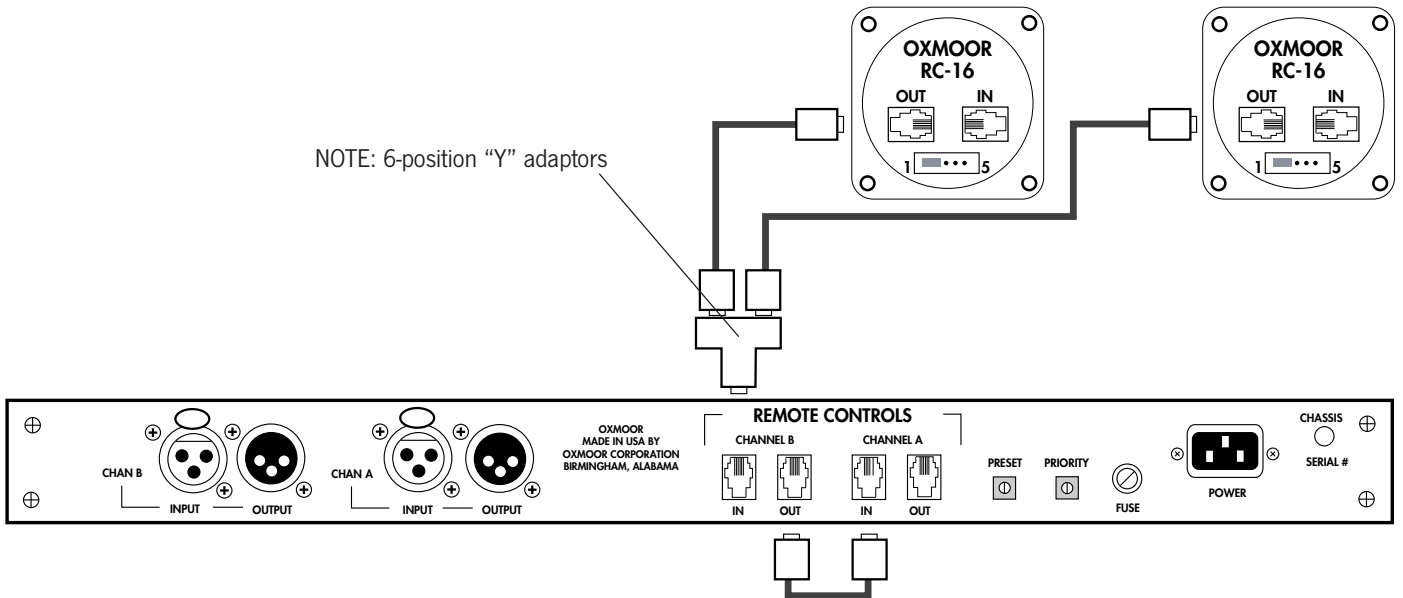


Figure 6.3: DCA-2 Configured as Stereo Unit with RC-16s in Parallel

DCA-2 & RC-16 CONFIGURATION EXAMPLES (CONTINUED)

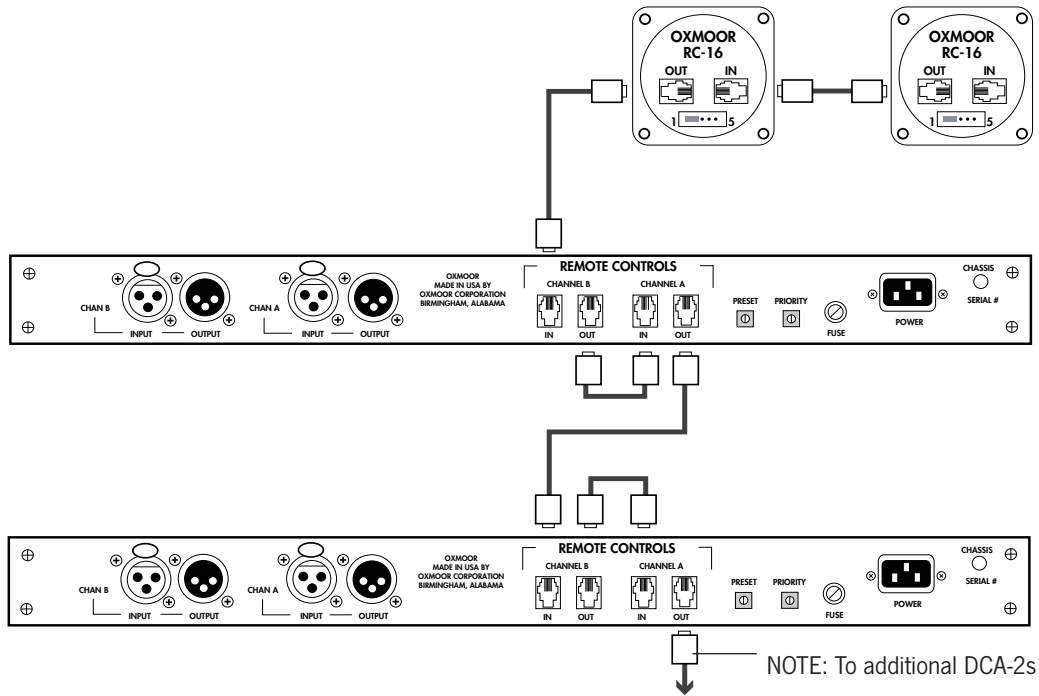


Figure 6.4: RC-16s in Series Controlling Multiple DCA-2s

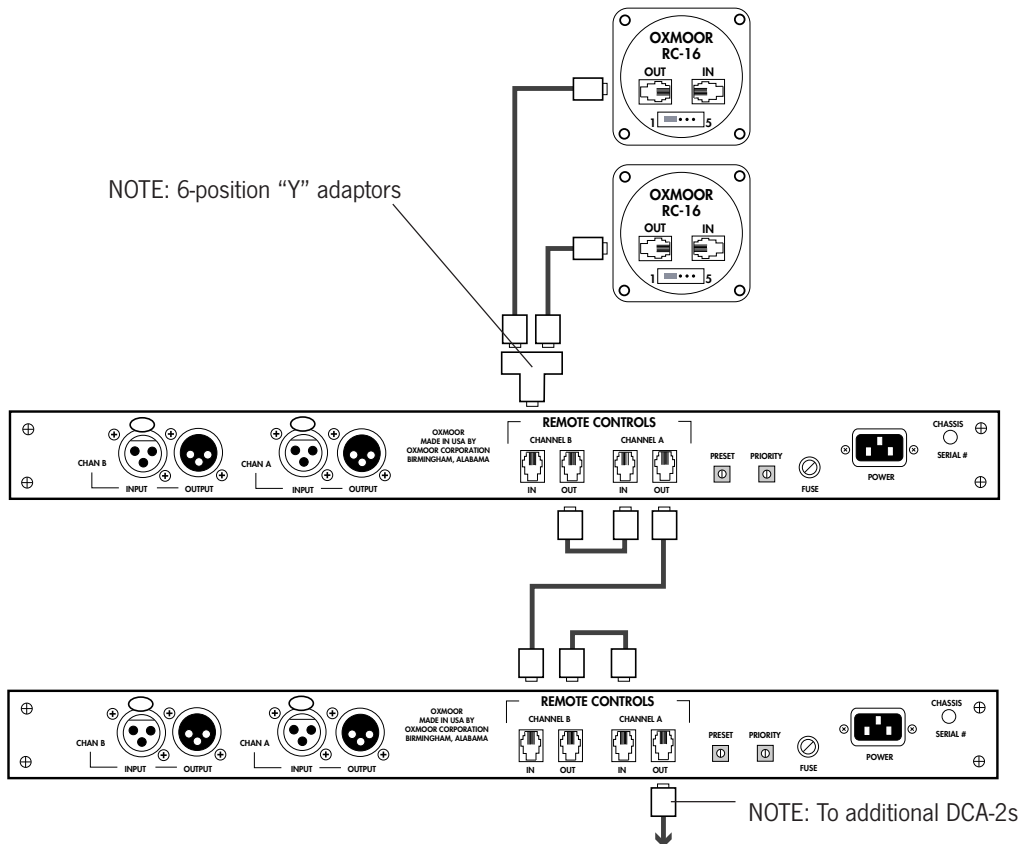


Figure 6.5: RC-16s in Parallel Controlling Multiple DCA-2s

DCA-2 & RC-16 CONFIGURATION EXAMPLES (CONTINUED)

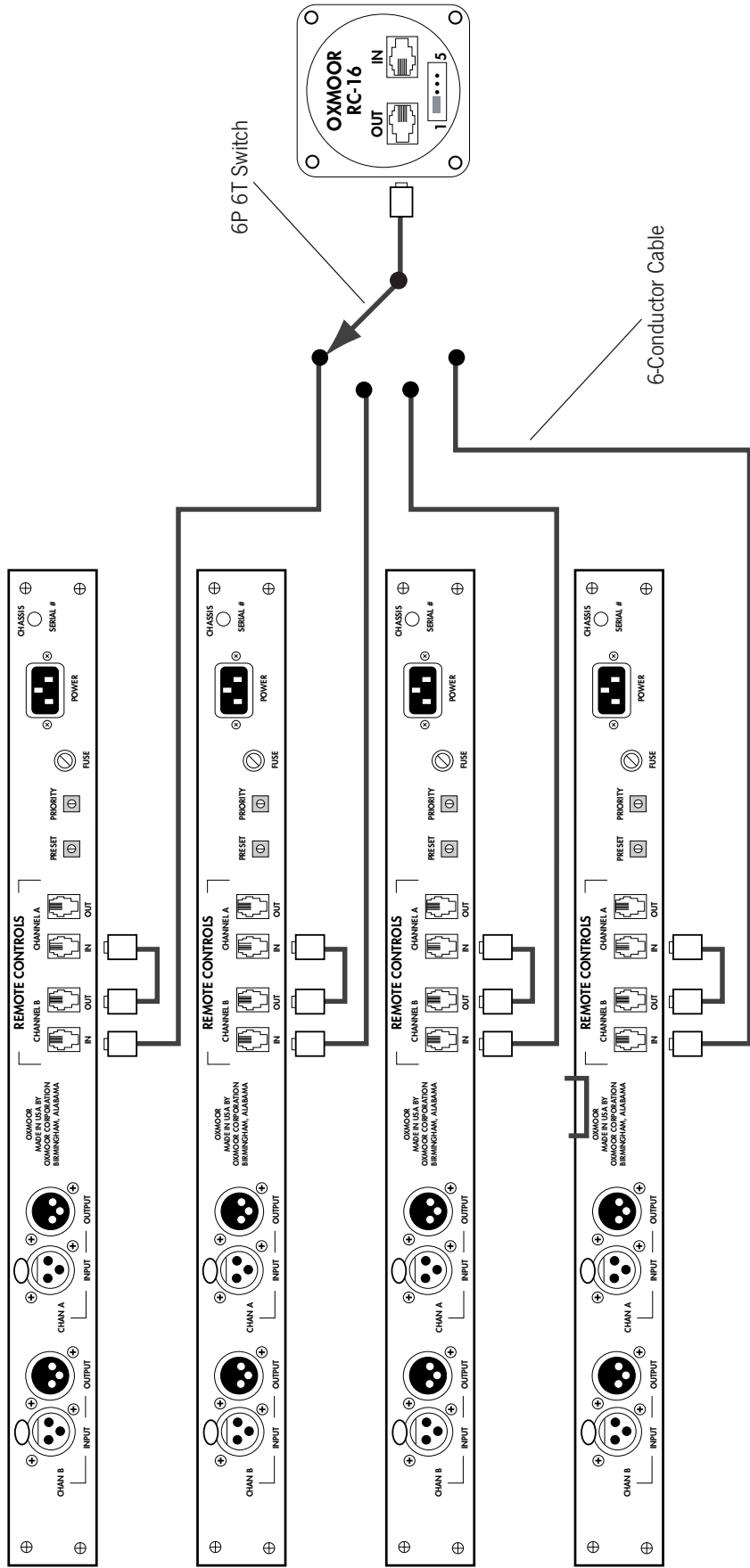


Figure 6: RC-16 Selecting One of Multiple DCA-2s to Control

DCA-2 & RC-16 TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE & CURE
No signal comes out of the DCA-2 with signal applied to the input(s).	Power is not present. Check POWER indicator on front panel, rear-panel fuse, and AC outlet.
	PRESET is turned down all the way to "kill" the sound. Try adjusting an RC-16.
	PRIORITY is turned down all the way to "kill," and a PRIORITY switch is closed somewhere in the system. Try unplugging the REMOTE CONTROL INPUT cables from the DCA-2. Power down the unit, set PRIORITY level to #8, and reapply power.
Signal level is too low, even with the RC-16 set at MAXIMUM.	The recessed gain trim control(s) on the DCA-2 front panel are turned down. Readjust them.
	PRIORITY is turned down and a PRIORITY switch somewhere in the system is closed. Try unplugging the REMOTE CONTROL INPUT cables from the DCA-2. Power down the unit, set PRIORITY level to #8, and reapply power.
	The input level to the DCA-2 is too low. Check output of the device feeding it.
Signal level is so high that the RC-16 must be set nearly to MINIMUM gain.	Recessed gain trim control(s) on the DCA-2 front panel are turned up. Readjust.
	The input level to the DCA-2 is too high. Check output of the device feeding it.
Audio is distorted, regardless of the level setting.	The level applied to the DCA-2 is too high. Be sure it is not over +20 dBu. Turning down the front panel gain trim may yield the correct DCA-2 output level, but it does not prevent overdrive of the input stage.
	The DCA-2 output is terminated with an impedance below 600 ohms.
	The signal applied to the DCA-2 is already distorted. Check it with the DCA-2 out of the circuit.
None of the RC-16s alter the level, and the Virtual Pointers remain fixed.	The PRESET or PRIORITY and GROUND contacts on an RC-16 or the interconnecting cable are shorted together. Try connecting one RC-16 directly to the DCA-2 REMOTE CONTROL INPUT with a known good cable and see if this works. If so, look for the problem in the rest of the system.
One or more of the RC-16s is inoperative.	A security key (or the jumper in its place) is not installed.
	A control cable is miswired.
Two linked channels don't track with the same levels.	The input trim pots (DCA-2 front panel) are set differently.
	The control signals for the two channels were linked after the DCA-2 was turned on. Power down the unit, then reapply power.
Levels move in opposite directions on two DCA-2 channels.	A link cable is miswired between the two channels. The polarity should be reversed.

USER NOTES

DCA-2/DCA-2T & RC-16 SPECIFICATIONS

DCA-2/DCA-2T DIGITAL CONTROL ATTENUATOR

FREQUENCY RESPONSE

20 Hz to 20 kHz +0, -0.3 dB; -3 dB Points Ref. 1 kHz are 4 Hz and 60 kHz (@ +4 dBm, Max. Gain)

HUM AND NOISE

-80 dB Unweighted (Ref. 0dBm Output, Unity Gain);
100 dB Dynamic Range

DISTORTION

-80 dB (0.01%) THD or IMD* (Ref. +4 dBm, 20 Hz to 20 kHz)

CROSSTALK

-90 dB** (20 Hz to 20 kHz)

INPUTS

Type: Electronically Balanced (RF Suppressed)
Input: 100 k Ohms
Max. level: \pm 20 dBu
CMRR: 50 dB (20 Hz to 20 kHz)

OUTPUTS

Type: DCA-2: Electronically Unbalanced
DCA-2T: Transformer Balanced
Source: 75 Ohms
Load: \geq 600 Ohms (stable w/any load)
Max. level: +18 dB into 600 Ohms, +20 dBu Unterminated

GAIN RANGE

-15 dB to +15 dB (Ref. Unity Gain, RC-16 at Max. Level)

DIGITAL ATTENUATOR

Control Range: 0 to -43.5 dB in 29 Steps, Plus a 90 dB Full Attenuation ("Kill") Step
Tracking Accuracy: \pm 0.1 dB, Full Range, Interchannel
Preset & Priority Range: 15 steps (3 dB Each) Plus "Kill"

CONTROL LOOP

4 Controls per Channel (Maximum)
64 Channels per Control Chain (Maximum)
600 m (2,000 ft.) Max. Cable to Farthest RC-16 Remote†

SAFETY LISTINGS

UL and CE

MAINS POWER

100 to 130V AC or 200 to 260V AC (Switchable),
50 or 60 Hz, 8 Watts Maximum

FUSE TYPE

1/8 Amp SB (115V) or 1/16 Amp SB (230V)

ENVIRONMENTAL

Storage Temperature: -25°C to 70°C (-13°F to 158°F)
Operating Temperature: -10°C to 50°C (14°F to 122°F)
Humidity: < 80% Relative, Non-condensing

MECHANICAL

Overall Dimensions: 44 mm H x 482 mm W x 183 mm D
(1.72" H x 19" W x 7.18" D)
Finish: Textured Black Paint
Shipping Weight: 3.9 Kg (8.5 lb)
Net Weight: 3.1 Kg (6.9 lb)

* SMPTE Method, 60 Hz & 7 kHz mixed 4:1 @ \pm 4 dBu output

** Input terminated with 600 ohms, unity gain, adjacent channel driven to maximum output

† Total length based on typical modular telephone cable resistance of 12 ohms per 100 m (330 ft.)

RC-16 REMOTE CONTROL

CONTROL

Type: Incremental Rotary Bi-Phase Encoder with Quadrature-to-Pulse Conversion Circuit

Display: Multiplexed Display Refreshed at Line Frequency Rate by Serial Data Burst; One of 16 Concentric LEDs is Illuminated as a Virtual Pointer

Recomm. Cable: 4-Wire Modular Telephone Cable, or 6-Wire Modular Telephone Cable for Remote Activation of Preset or Priority Function

Connectors: 4-Wire or 6-Wire RJ-11 Type Modular Phone Plug

Wiring Scheme: Daisy-Chain (Loop) or Parallel Using Jacks on Each Device Controlled

CONTACT REQUIREMENTS

Preset or Priority: Single-Pole Dry Closure or Open Collector Transistor to Logic Ground; 128 Milliamp Capacity

Security Key: Single-Pole Dry-Closure Switch; 25 Milliamp Capacity

MECHANICAL

Front: 578mm (2.28") Square
203mm (0.8") Above Panel Surface

Rear: 533mm (2.1") Diameter;
406mm (1.6") Behind Front Panel

Max. Mounting
Panel Thickness: 9.6mm (0.38")

Minimum Depth: 437mm (1.72") Behind Front Panel
(Including Connectors)

Materials/Finish: Matte Black, Injection Molded, High-Impact Plastic Escutcheon and Knob; Black Painted Steel Can

Shipping Weight: 454g (1.0 lb.)
Net Weight: 114g (0.25 lb.)

ENVIRONMENTAL

Storage Temperature: -25°C to 70°C (-13°F to 158°F)
Operating Temperature: -10°C to 50°C (14°F to 122°F)
Humidity: < 80% Relative, Non-condensing

All specifications subject to change without notice.

OXMOOR FACTORY SERVICE

For service information contact:

Oxmoor Product Service Department
309 Cahaba Valley Parkway
Birmingham, Alabama 35124
E-mail: info@oxmoor.com

Telephone: (205) 982-8200
Toll Free: 1 (800) 262-6898
Fax: (205) 982-8250
Internet: www.oxmoor.com

Additional Installation & Operation Manuals are available from Oxmoor. Contact the Oxmoor Sales Department for pricing and other ordering information. Consult warranty statement for cautions concerning unauthorized service.

OXMOOR TWO YEAR LIMITED WARRANTY

Oxmoor warrants that each Oxmoor electronic product shall be free from defects in workmanship and materials and will, at its option, repair or replace any part of the product without charge provided the product is delivered to Oxmoor within two years of date of original purchase from or delivery by an authorized Oxmoor dealer. Excluded from this warranty are finish and appearance items and malfunction resulting from abuse, from use that is not in accordance with instructions, or operation under other than specified conditions. Also excluded are incidental or consequential damages except where precluded by applicable law. This warranty provides the customer with specific legal rights; there may also be other rights which vary from state to state.

Repair by other than Oxmoor Factory Service Department or its authorized service agency, unauthorized modification, or the removal or defacing of the serial number will void this warranty.

Products returned for factory warranty service must be prepaid and packaged in such a way as to insure safe transit and must be accompanied by a sales slip or other valid proof of purchase date.

PRIOR AUTHORIZATION FROM OXMOOR IS REQUIRED FOR RETURN. Contact Oxmoor for a Return Authorization (R.A.) Number and shipping information before returning product for service.



Oxmoor Corporation, LLC, 309 Cahaba Valley Parkway, Birmingham, AL 35124 USA
Toll Free 1 (800) 262-6898 Telephone (205) 982-8200 Fax (205) 982-8250 E-mail info@oxmoor.com

For 24-hour access to product specs and information visit Oxmoor's complete product line on the internet at www.oxmoor.com.

Oxmoor is a registered trademark of Oxmoor Corporation, LLC.

Specifications and design are subject to change without notice.