SPECTRUM
DESIGN & DEVELOPMENT, INC.

INSTRUCTION MANUAL FOR THE DZN-2C SERIES LIGHTING CONTROLLER - Models 1 & 2

DESCRIPTION

The DZN-2C lighting controller is a 12-channel 2 scene lighting controller. It is a professional device designed to provide professional results. It offers all of the features necessary for the operator to effectively and efficiently create the moods and effects for every type of performance. Packaged in a light but tough rack mountable cabinet, it is ideal for use by road bands and touring groups as well as being applicable for permanent installations in clubs and theatres. And the DZN-2C's expandability feature makes it ideal for anyone who wants to be prepared for future needs.

The DZN-2C is offered in two versions, Model 1 and Model 2. Both models are, from the operator's point of view, functionally the same. The differences are as follows: Model 1 is designed for use with Spectrum's four channel QEP power modules and has three control out connectors on the rear panel. Model 2 is designed for Spectrum's OX-12 and OX-24 series power modules and has only two control connectors. In addition, the two models have inverted control voltages (i.e., on Model 1 a high control setting is a low control voltage output. On Model 2 a high control setting is a high control voltage output.)

MOUNTING

The DZN-2C is housed in a tough but lightweight 19" EIA rack mountable cabinet. It can be used in a simple desk top fashion, mounted in a permanent rack enclosure, or mounted in a flight style road case for touring use. For the latter application a road case is definitely recommended.

SET UP

Place the DZN-2C at the location desired. Plug in the applicable control cables. For Model 1 up to three QECC style cables may be required, grouped as channels 1-4, 5-8, 9-12. For Model 2 up to two OXC style cables will be necessary grouped as channels 1-6 and 7-12. Run these cables to your power packs and connect as desired.

OPERATION

The DZN-2C is a 12 channel 2 scene controller with grand and independent masters, X & Y scene masters, split cross faders, individual flash buttons, and Scene/Ind master select switches and a master blackout switch. The functions of these controls are described below:

Grand Master:	Controls all 12 channels, overrides all other masters. Will fade all channels proportionally between their "on" setting and the preset minimum intensity.
Independent Master:	Controls channels that have been assigned to it via Scene/Ind Master select switches. Operates over both scenes. It will not function over a scene that is faded with the cross-fader.
Scene Masters, X & Y:	Controls channels in their respective scene that have been assigned to them via Scene/Ind Master select switch.
Split Cross-Faders:	Will perform a dipless x-fade from one scene to another by sliding both sliders up or down together. A pile-on can be performed simply by sliding the slider that is off to its on position.
Scene Mas/Ind Mas Select Switch:	Assigns either the Independent Master or the respective Scene Master to a specific channel.
Individual Fader, X or Y Scene:	Sets and controls the output of a specific channel for its respective scene between full intensity and the preset minimum intensity.
Flash Button:	Provides instant full intensity output for a specific channel when pressed and resumes normal fader settings when released.
Blackout Switch:	Forces all outputs to minimum intensity when in. Returns normal operation when out. Switch operates in a push-on, push-off mode.

Trim:	Adjusts "minimum" or "off-state" outputs across the board.
Master/Slave Switch:	Puts DZN-2C in slave mode for multiple board set-ups.

Actual operation of the DZN-2C is straightforward. The purpose of having two scenes is that while one scene is active, the other can be preset to the arrangement desired and then cross-faded to. The other scene can then be preset and so on. When desired, the dormant scene can be piled-on to the active scene. By strategically assigning the Scene/Ind Masters, additional effects can be obtained. Keep in mind that the Independent Master functions on both scenes and the Scene Masters work only their respective scenes. This way you can assign channels to the Independent Master that you want to master together regardless which scene is active and the rest can be mastered with the scene master. The Scene/Ind Master assign switches can be used as "on/off" switches if one master is set at 10 and the other at 0. They can also be set at other relative values for different effects.

The flash buttons are great for fast paced and hard, drastic effects. Keep in mind that their function is more effective if used sparingly and in contrast to smooth fades. The Blackout Switch is self-explanatory.

Obviously there are many different ways to operate the DZN-2C. Remember, practice makes perfect. The best way to become good with it is to use it.

EXPANSION

If you want to add more channels to your system, another DZN-2C can be connected to your present one via the Master I/O connector and DZN-2CX cord. This will expand your system to 24 channels.

To do this, hook up both DZN-2C's to their respective power packs (don't mix Models 1 and Models 2). Then plug one end of the DZN-2CX cord into the Master I/O of each DZN-2C. Put the Master/Slave switch of the DZN-2C to be slaved in the Slave position. Now the master controls of the slave board are inoperative and its 12 channels will be mastered by the master controls of the master board.

If you want to expand to more channels (i.e., 36, 48, etc.) you need only use a DZN-2CXY "Y" cord and repeat the above procedure. Simply connect all the Master I/O connectors together and put all but the Master DZN-2C in the slave mode.

SERVICE & LIMITED WARRANTY

The DZN-2C was designed to provide years of trouble free service. Performance, portability, and economy were prime considerations during its development, but reliability was of equal importance. Years of experience in equipment design have culminated in the DZN's clean and functional form. For any service requirements on the DZN-2C, the factory should be contacted. Upon properly completing and returning the enclosed warranty card, we confidently extend the following warranty:

Spectrum Design warrants its products against defects in material and workmanship for a period of one year from date of shipment under normal use and service with the following limitations. Spectrum Design does not warrant any unit used on a rental basis. Maximum liability is limited to the cost of the unit purchased and we assume no liability for damages beyond that of our product. Spectrum Design does not warrant cables. All equipment requiring factory repair must be returned to the factory, shipping costs prepaid, with prior factory approval. This warranty applies to the original owner only and is not transferrable. It does not apply to repairs done other than by the factory. This warranty shall be cancelled by Spectrum Design if the unit is subjected to physical abuse or is modified, electrically or mechanically, without written factory authorization.

Before returning any unit for repairs, contact the factory. Most problems can be solved without return being necessary.

SPECIFICATIONS

Mechanical

Housing - 19" standard Rack Mounting
7 U High (12.25")

Size: 5.00D x 12.25H x 19.00W

Weight: 6.5 lbs.

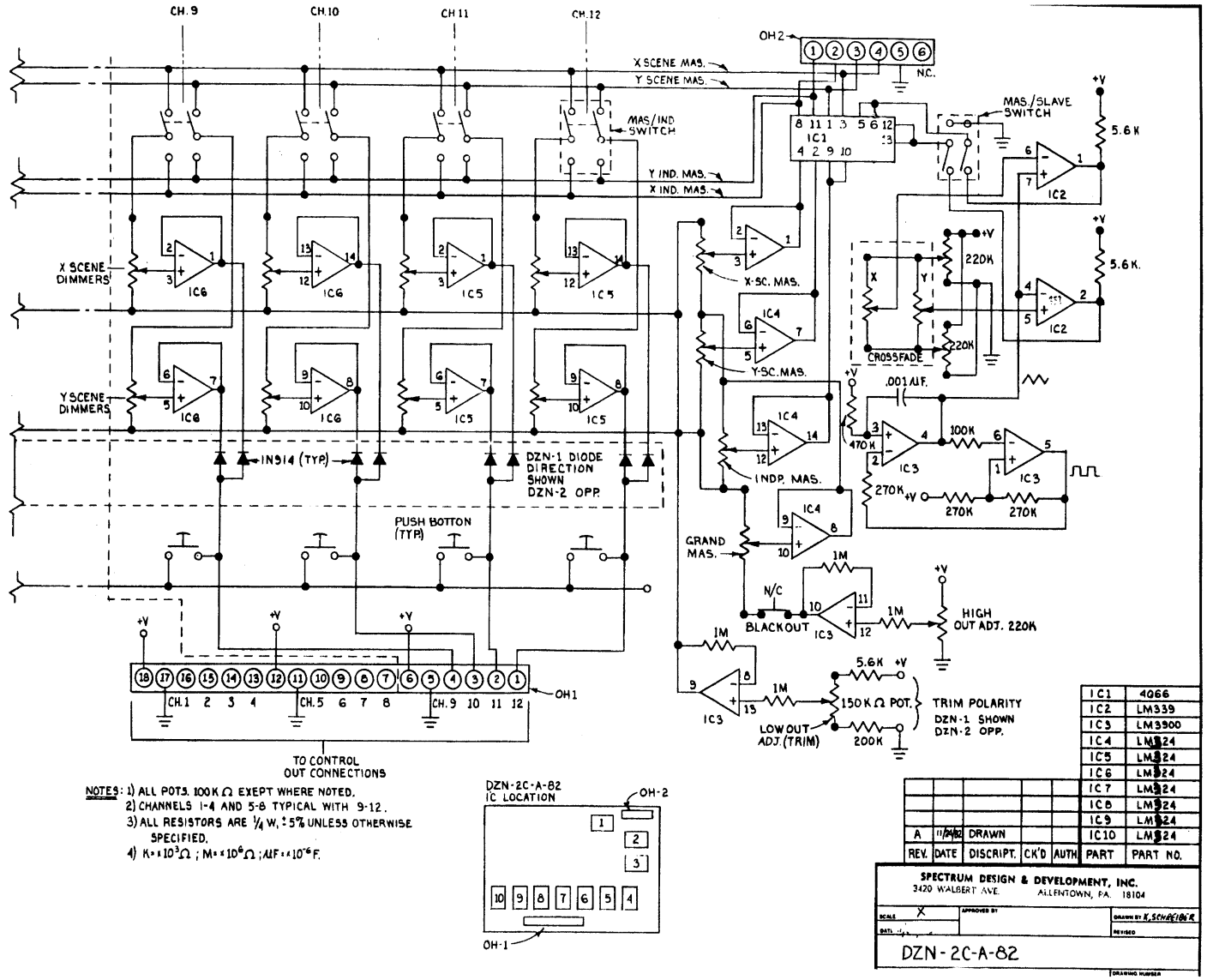
Electrical

Power Required: 10-15 VDC, power must be supplied through control cables

Control Voltage Output: 2 VDC to 10 VDC Factory Set (adj. from 1 VDC to 1 VDC less than power supply voltage)

Note: On Model 1 a high intensity slider setting produces a low control voltage output. On Model 2 a high intensity slider setting produces a high control voltage output.

Control Output Connectors:	Model 1	Model 2
Style	Beau P-3306-DB	AMP CPC 11-8
Quantity	3	2
Channel Arrangements:	1-4, 5-8, 9-12	1-6, 7-12
Pin Out:	1 - GRD 2 - CHAN.1 3 - " 2 4 - " 3 5 - " 4 6 - +V	1 - GRD 2 - CHAN. 1 3 - " 2 4 - " 3 5 - " 4 6 - " 5 7 - " 6 8 - +V



NOTES: 1) ALL POTS. 100K Ω EXEPT WHERE NOTED.
2) CHANNELS 1-4 AND 5-8 TYPICAL WITH 9-12.
3) ALL RESISTORS ARE 1/4 W, ± 5% UNLESS OTHERWISE SPECIFIED.
4) K = $\times 10^3 \Omega$; M = $\times 10^6 \Omega$; M.F. = $\times 10^{-6}$ F.

IC1	4066
IC2	LM339
IC3	LM3900
IC4	LM324
IC5	LM324
IC6	LM324
IC7	LM324
IC8	LM324
IC9	LM324
IC10	LM324

REV.	DATE	DISCRIPT.	CK'D	AUTH.	PART	PART NO.
A	11/24/82	DRAWN				

SPECTRUM DESIGN & DEVELOPMENT, INC.
3420 WALBERT AVE. ALLENTOWN, PA. 18104

SCALE: X | APPROVED BY | DRAWN BY K. SCHAEFFER | REVISED

DZN-2C-A-82

DRAWING NUMBER

SPECTRUM
DESIGN & DEVELOPMENT, INC.

CALIBRATION PROCEDURES FOR DZN & DZN-2C CONTROLLERS
Addendum to Operators Manual
SPECTRUM DESIGN & DEVELOPMENT, INC.

This addendum describes how to calibrate Spectrum's DZN and DZN-2C controllers. All adjustments can be made with a voltmeter, however, an oscilliscope makes the crossfade calibration of the DZN-2C controllers more accurate. Factory settings, trimmer locations and connector pin-outs are listed at the end of this addendum. It is suggested that you review this information before attempting these procedures. Only qualified personnel should perform the procedures described.

SET UP

To perform these procedures the controller must be connected to an appropriate power module, either a QEP or OX series. It is not necessary to plug any lighting instruments into the power module.

Control voltage measurements are most easily made by removing the rear cover of the controller. On model -1 controllers test probes can be attached to the control connector wire lugs. On model -2 controllers the best test points are at the solder pads of the 18 pin connector that connects the control connector wire harness to the circuit board. Refer to the tables at the end of this addendum for connector pin configuration and wire color codes.

It is a good idea to check for proper power supply voltage at the controller before calibrating. Refer to the specifications at the end of this addendum for the correcr values. If the voltage measured is not within the range specified, the power module or the controller may require service before it can accurately be calibrated.

CONTROL OUTPUT VOLTAGE ADJUSTMENT: all models
(Refer to specifications at the end of this addendum for trimmer locations.)

1. Set all sliders on 10. On DZN-2C set the X crossfader UP to 10 and the Y crossfader DOWN to 10.

2. Set Blackout switch to off (i.e. not blacked out).

3. Measure Channel #1 output and adjust trimmer R(u) to attain V(u) or other desired voltage.

4. Engage Blackout switch (i.e. blacked out).

5. Measure Channel #1 output and adjust trimmer R(d) to attain V(d) or other desired voltage.

6. Repeat steps 2 to 5 to confirm settings. Readjust if needed.

CROSSFADE CIRCUIT CALIBRATION PROCEDURE: DZN-2C-1, DZN-2C-2

1. Make sure that the Control Output Voltage Adjustment, previously described, has been performed prior to performing this procedure. Make note of the actual V(u) and V(d) voltages measured.

2. Connect meter (or scope) to measure Channel #1 output.

3. Set DZN-2C as follows;
   Blackout off (i.e. not blacked out)
   Channel #1 Scene X slider at 10
   Channel #1 Scene Y slider at 0

4. Set trimmer R(x) to the extreme counter-clockwise position. Set trimmer R(y) to the extreme clockwise position.

5. Slide both crossfade sliders UP (i.e. X on, Y off).

6. Channel #1 output level should equal V(u). Rotate R(x) clockwise until the voltage begins to drop, or, if you're using a scope, until negative going pulses appear. Back up slowly until the voltage equals V(u) or the pulses dissappear.

7. Slide both crossfade sliders down (i.e. X off, Y on).

8. Channel #1 output level should equal V(d). Rotate R(y) counter-clockwise until the voltage begins to rise, or, if you're using a scope, until the positive pulses appear. Back up slowly until the voltage equals V(d) or the pulses disappear.

9. Repeat steps 5 through 8 until no further adjustment is required (i.e. in step 5, when attempting to rotate R(x) clockwise, the voltage changes, or pulses appear immediately).

FINAL CHECK OF PROPER CROSSFADE CALIBRATION:

1. Slide both crossfade sliders UP.
   Slide the Channel #1/Scene Y slider up and down while reading the output voltage on Channel #1.

It should not vary more than +/-10 mv.
Return the Channel #1/Scene Y slider to 0.

2. Slowly slide both crossfaders down while reading the Channel #1 output voltage. The voltaged should begin to change within the first 1/4" of slider travel.

3. Slide both crossfaders down.
Slide the Channel #1/Scene x slider up and down while reading the output voltage on Channel #1.
It should not vary more than +/-10 mv.
Return Channel #1/Scene X slider to 10.

4. Slowly slide both crossfaders up while reading the Channel #1 output voltage. The voltage should begin to change within the first 1/4" of slider travel.

DZN-1, DZN-2C-1 Specifications

Control output voltages: V(d)=10.00 VDC (dimmest level)
(factory settings) V(u)= 2.00 VDC (brightest level)

Power Supply Voltage: V(cc)=12.00 VDC+/-.50 VDC
(supplied by QEP power module)

Control-Out Connector Pin-outs:

Pin no.	Color	Channels 1 - 4	Channels 5 - 8	9-12
Pin 1	Green	Ground	Ground	Ground
Pin 2	White	Chan 1	Chan 5	Chan 9
Pin 3	Yellow	Chan 2	Chan 6	Chan 10
Pin 4	Blue	Chan 3	Chan 7	Chan 11
Pin 5	Red	Chan 4	Chan 8	Chan 12
Pin 6	Black	(Vcc)	(Vcc)	(Vcc)

Trimmer functions and locations:

R(d): adjusts V(d) (dimmest level)

When facing the DZN from the operator's position, R(d) is located at the upper right hand corner on the front panel. On model -1 controllers this trimmer has a plastic shaft which can be adjusted by hand. Model -2 controllers require a screwdriver for this adjustment.

R(u): adjusts V(u) (brightest level)

The trimmer access hole for R(u) is located just to the left, at the top of the "B" master slider.

DZN-2 and DZN-2C Specifications

Control output voltages: V(d) = 2.00 VDC (dimmset level)
(factory settings) V(u) =10.00 VDC (brightest level)
Power Supply Voltage: V(cc) = 15.00 VDC +/- .50 VDC
(Supplied be OX power module)

Control-Out Connector Pin-outs:

Pin no.	Color	Channels 1-6	Channels 7-12
Pin 1	Green	Ground	Ground
Pin 2	White	Chan 1	Chan 7
Pin 3	Yellow	Chan 2	Chan 8
Pin 4	Blue	Chan 3	Chan 9
Pin 5	Red	Chan 4	Chan 10
Pin 6	Orange	Chan 5	Chan 11
Pin 7	Brown	Chan 6	Chan 12
Pin 8	Black	V(cc)	V(cc)

TRIMMER LOCATIONS

R(d): adjusts V(d) (dimmest level)

When facing the DZN-2C from the operator's position, R(d) is lacated at the upper right hand corner on the front panel. On model -1 controllers, this trimmer has a plasstic shaft which can be adjusted by hand. Moder -2 controllers require a screwdriver for this adjustment.

R(u): adjusts V(u) (brightest level)
R(x): adjusts the crossfaders' uper voltage limit
R(y): adjusts the crossfaders' lower voltage limit

There are threee trimmer access holes to the right of the Y crossfader. The upper hole is R(x), the middle one is R(u), and the lower one is R(y).