

ComSpec II



**OPERATING
MANUAL**



APOLLO
DESIGN TECHNOLOGY, INC.

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(1) Product Overview

The **ComSpec II** color mixing system takes scroller technology to a new level. Hundreds of different colors can be achieved. The **ComSpec II** is designed to give years of trouble free use, providing that it is regularly maintained and is used in accordance with the instructions detailed in this manual. If you should experience any problems that fall outside of the scope of this manual, please contact the selling dealer for further details.

If the selling dealer is unable to satisfy your servicing needs, please contact the following, for full factory service:

Apollo Design Technology Inc.

4130 Fourier Drive
Fort Wayne, IN. 46818
Telephone 260-497-9191
Fax 260-497-9192

(2) Product Description

The **ComSpec II** is designed to operate on the USITT DMX512 (1990) protocol. This multiplexed serial data system allows for the individual addressing of multiple units on one data cabling system. The unit utilizes one or two DMX channels depending on the mode of operation.

The unit is addressed by setting the three rotary BCD switches, on the rear panel. Next to these rotary switches are four DIPswitches. These switches are used to select mode of operation, scrolling speed, and cooling fan speed.

(Details of these settings are given later in this manual. Section 3.3)

The unit operates using the subtractive color mixing method. This method relies on having a full spectrum source (white light) and then filtering out some of the colors to achieve the desired hue and saturation. The secondary (subtractive) colors are Cyan, Magenta and Yellow. By mixing two of the basic subtractive filters at different saturations, you are able to mix hundreds of different colors within one unit. To further the creative process, the primary (additive) colors (red, green and blue) have been added to the back gel string.

This unit combines the secondary colors by using two gel strings to get maximum reliability, maximum light output and to keep the dimensions and weight to a minimum.

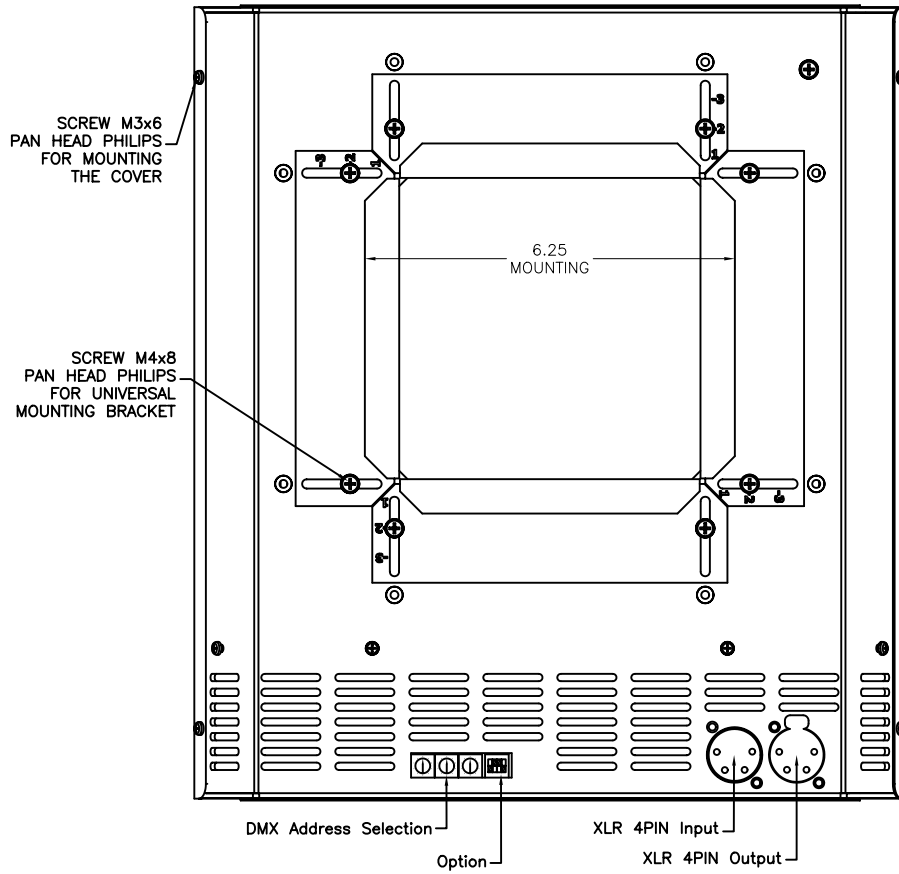
The **ComSpec II** is supplied power and control signals by means of two 4-pin XLR style connectors on the rear panel, allowing multiple units to be 'daisy-chained' into the same line of cabling. Patching the output from the last unit back into the power supply will terminate the DMX for each chain line and ensure even power voltage across all scrollers in that chain.

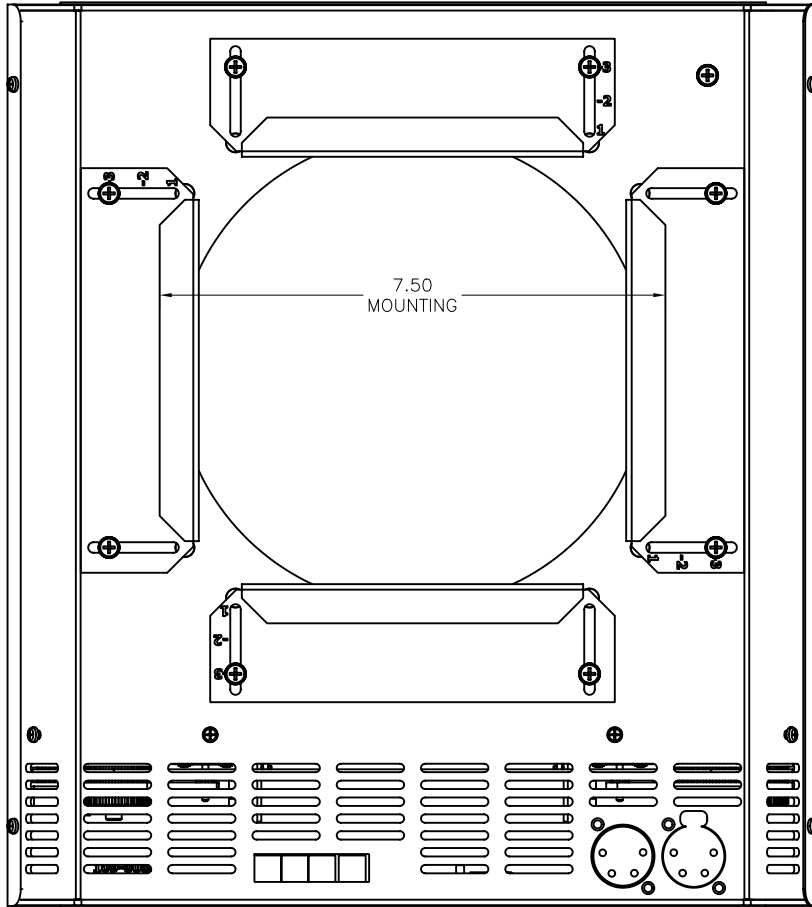
Note: The quantity of **ComSpec II** color changers, and maximum cable length per power supply output is dependant upon the size of PSU / Splitter box used.

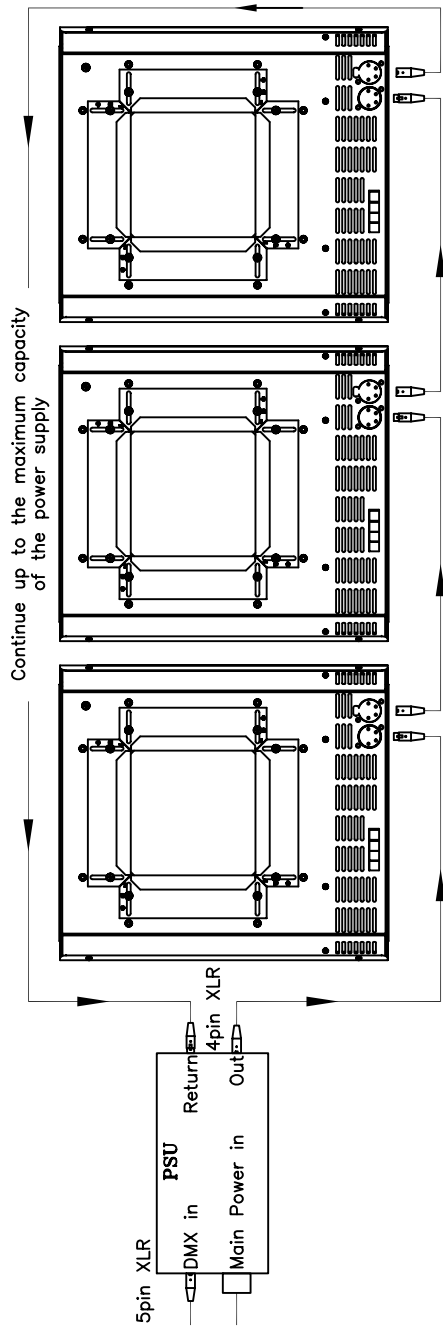
(See later in this manual for details.)

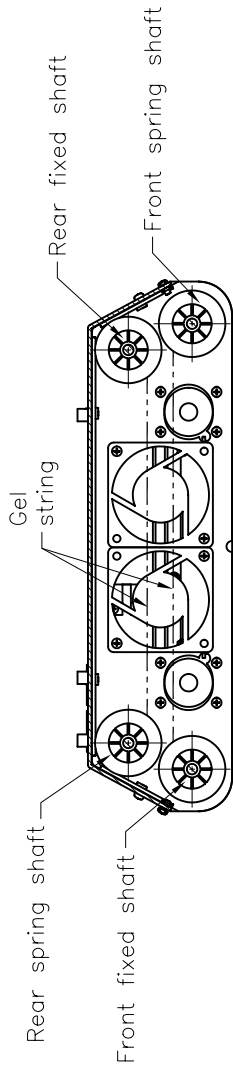
The **ComSpec II** is equipped with two internal cooling fans and two diagnostic LED indicators (found on the underside of the unit) showing Power and DMX signal presence.

Notes

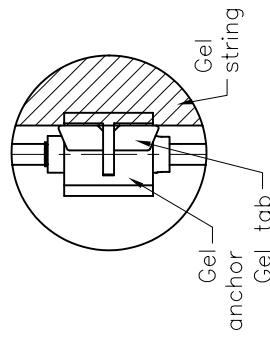
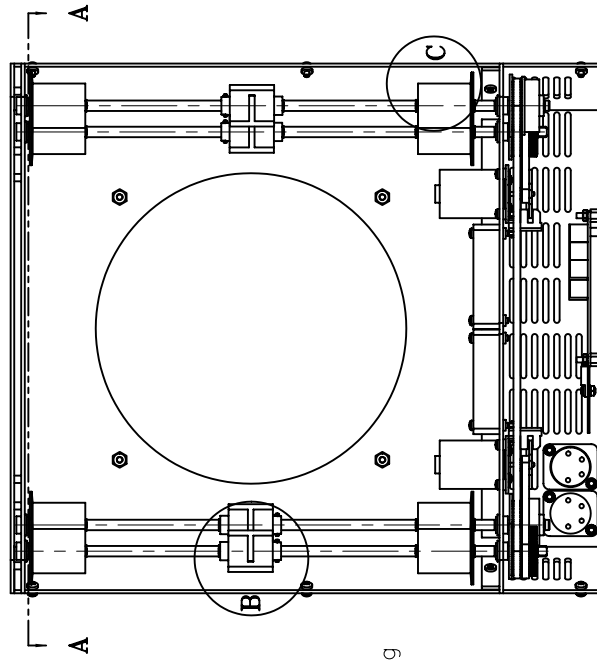




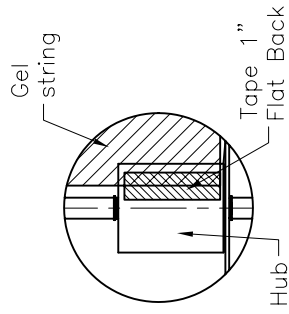




SECTION A-A



DETAIL B
OF MOUNTING THE
GEL STRING ON TUR
(INSERTING GEL TAB
ON THE GEL ANCHOR)



DETAIL C
OF MOUNTING THE
GEL STRING ON TUR
(TAPING GEL ON
THE FLANGED HUB)

(3.6) Technical specifications:

Dimensions:	12"(w) X 13.5"(h) X 3.625"(d) 305mm X 343mm X 92mm
Weight:	4.95 lb / 2.25 Kg (without mounting plate)
Rear aperture:	7" / 178mm
Front aperture:	9.5" / 241mm
Color Media:	Proprietary design long life substrate
Cooling:	2 fan design
Cooling speed:	3 speeds
Addressing:	3 x rotary BCD switch (512 channels)
Working voltage:	24 VDC (+/- 10%)
Power consumption:	1 unit (See note below)
Protocol:	USITT DMX512 (1990)
Body material:	Aluminium
Color:	Black Powder Coat (other colors available P.O.A.)
Mounting Plate:	Universal mounting system fits 6¼" to 10" fixtures
Connectors:	XLR-4 (male) in and XLR-4 (female) through
European approvals:	Pending
North American approvals:	Pending

Note: A power unit is used to simplify the load calculation on any given power supply. For example a PSU-10 will supply up to 10 units of power. You can plug-in 10 SpectraQ3, 10 ComSpec II , or a combination of 5 SpectraQ3 and 5 ComSpec II on one PSU-10.

(3.5) Technical overview

The **ComSpecII** unit is essentially two scrollers in one package. The color mixing system employs an opto-electronic system for accurate positioning of the gel. When the unit initially receives power, it will go through a calibration sequence. The purpose of the initial calibration sequence during power up is to determine the total length of the gel string, and therefore the position of the different gels. (**Please note** that over time the gel string may warp slightly. This may alter the positions of the gels relative to their pre-programmed DMX values and therefore some 'fine-tuning' may be required.)

The motors have an optical encoder feedback system. The purpose of this is to convert motor revolutions into electronic pulses, and also to determine which direction the motor is turning.

The electronic cards consist of three key components: L298 motor driver, 75176 Transceiver and the PIC Processor. The L298 is a true digital device receiving two PWM signals to operate speed and direction. The 75176 transceiver operates in the receive configuration to convert serial protocol to a TTL level. The processor is an OTP part containing proprietary software.

The majority of electronic problems are usually created by external factors such as shorted cables, etc. The 75176 transceivers are susceptible to damage if 24VDC is present on the DMX signal lines.

Routine maintenance can prevent most mechanically based problems. The motor mounting plate can be adjusted to control tension on the belt. Excessive belt tension is often the cause of noise and poor performance. Conversely, loose motor belts can cause accuracy problems.

Troubleshooting is a process of elimination. First, rule out the other field factors (i.e. faulty cables, power sources). If an electronics problem is suspected try replacing the electronics card first. If accuracy problems should occur and mechanical problems have been ruled out, replace optical sensors. For technical advice and/ or parts, please contact your selling dealer or the offices listed in this manual.

Replacing the front gel string (yellow/cyan)

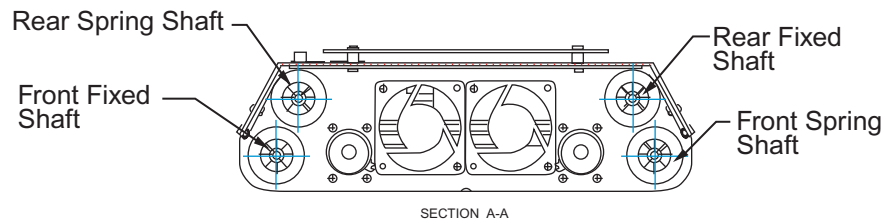
- (1) Place the unit on a flat surface with the motor/fan/electronics section on your left-hand side. Take the yellow/cyan gel string and attach the gel tab (on the yellow end) to the hook on the TUR anchor of the front fixed shaft.
- (2) Use a small piece of flat back tape 1" x 1" (25 x 25mm) to secure each side of the gel to the TUR hubs on either side.
- (3) Manually turn the fixed gear of the shaft to slowly roll the gel string onto the TUR. Continue rolling the gel onto the TUR until the other end is reached.
- (4) Firmly holding the gear of the front fixed shaft (to stop it moving), gently pull the gel tab towards you. This ensures that the gel is tightly rolled onto the TUR.
- (5) Rotate whole unit so that the motor/fan/electronics section is on your right-hand side. Place the gel tab beside the anchor on the rear spring shaft.
- (6) With your left hand, firmly hold the gel tab next to the anchor hook. (Do not attach it yet). With your right hand, turn the anchor hub (of the spring shaft) towards you (counter-clockwise) for **five complete turns**. (As you turn the shaft you should feel the spring tension increasing).
- (7) After tensioning, hold the anchor steady and then hook the gel tab onto the anchor.
- (8) Use a small piece of flat back tape 1" x 1" (25 x 25mm) to secure each side of the gel to the TUR hubs on either side.
- (9) Manually roll some of the gel string onto the spring TUR to check it is seating itself properly.

Completion and testing

- (1) Plug in the scroller, and check that it goes through the initialization sequence correctly. Check that the gels run smoothly and do not bind up on the TUR's.
- (2) Unplug the unit, replace the front cover and secure with the M3 screws.
- (3) Run a test sequence to allow the gel strings to 'bed' in. The unit does not have to be attached to a lighting fixture to perform this operation. This sequence can either be programmed on your control desk, or you can use the unit's inbuilt test sequence by setting the address switches to 601. It is recommended to run this sequence for 10 minutes (or four times, end-to-end).

Please Note: The number of turns may vary slightly between take up reel spools due to tolerances in the tension spring, however **no more than five turns** should be required to tension gel string.

<p>NOTE: Poorly optimized lamps in ellipsoidal fixtures may result in premature gel failure.</p>



Top sectional view

Replacing the rear gel string (yellow/magenta)

Note: See also the drawing section (4.1) of this manual.

- (1) Place the unit on a flat surface with the motor/fan/electronics section on your right-hand side. Take the yellow/magenta gel string and attach the gel tab (on the yellow end) to the hook on the TUR anchor of the rear fixed shaft.
- (2) Use a small piece of flat back tape 1" x 1" (25 x 25mm) to secure each side of the gel to the TUR hubs on either side.
- (3) Manually turn the fixed gear of the shaft to slowly roll the gel string onto the TUR. Continue rolling the gel onto the TUR until the other end is reached.
- (4) Firmly holding the gear of the rear fixed shaft (to stop it moving), gently pull the gel tab towards you. This ensures that the gel is tightly rolled onto the TUR.
- (5) Rotate whole unit so that the motor/fan/electronics section is on your left-hand side. Place the gel tab beside the anchor on the rear spring shaft.
- (6) With your left hand, firmly hold the gel tab next to the anchor hook. (Do not attach it yet). With your right hand, turn the anchor hub (of the spring shaft) towards you (counter-clockwise) for **five complete turns**. (As you turn the shaft you should feel the spring tension increasing.)
- (7) After tensioning, hold the anchor steady and then hook the gel tab onto the anchor.
- (8) Use a small piece of flat back tape 1" x 1" (25 x 25mm) to secure each side of the gel to the TUR hubs on either side.
- (9) Manually roll some of the gel string onto the spring TUR to check it is seating itself properly.

(3.4) Gel Loading/Replacing

- Notes:** (a) See also the drawing section (4.1) of this manual.
(b) The power does not have to be on to load gels.

Introduction

The **ComSpecII** comes with two specially graduated color strings already installed. Should these 'gel' strings become damaged, or worn out, they must be replaced to ensure the optimum performance of the color scroller. The gel material is a proprietary design long-life substrate. Replacement gel strings may be purchased from your distributor, or from Apollo at the address listed.

Substitute gels strings should not be used, as these will affect the operation of the unit, and may cause damage to the unit itself.

Each gel string consists of two series of graduated colors.

The rear gel string (yellow/magenta) starts with yellow, then clear in the middle, then magenta at the end (plus primary red, green, and blue).

The front gel string (yellow/cyan) starts with yellow, then clear in the middle, then cyan at the end.

Changing the gel strings is not difficult, but it may take some time and practice to accomplish if the user is not familiar with these types of scrollers.

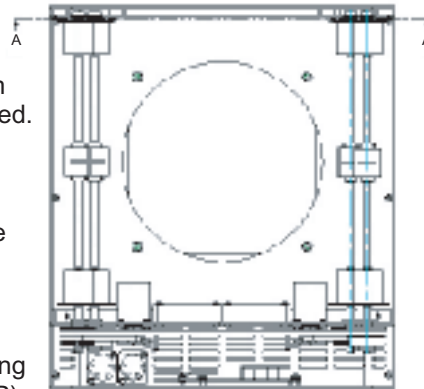
You will need

- 1 x Set of **ComSpecII** gel strings
- 1 x Roll of flat back adhesive tape (i.e. 'Artists' tape)
- 1 x Phillips No.1 screwdriver

Preparation

(1) Unplug the unit and remove it from the lighting fixture to which it is attached. Using a Phillips No. 1 screwdriver, remove the four (4) M3 x4mm screws holding the front cover onto the unit. Place the unit, with the mounting plate facing down, on flat surface, and carefully remove the front cover.

(2) Remove all the pieces of the old gel strings. (This may involve unwinding the gels from the Take-Up Reels (TUR). Exercise caution, and do this slowly, to avoid damaging the gel transport mechanism.)

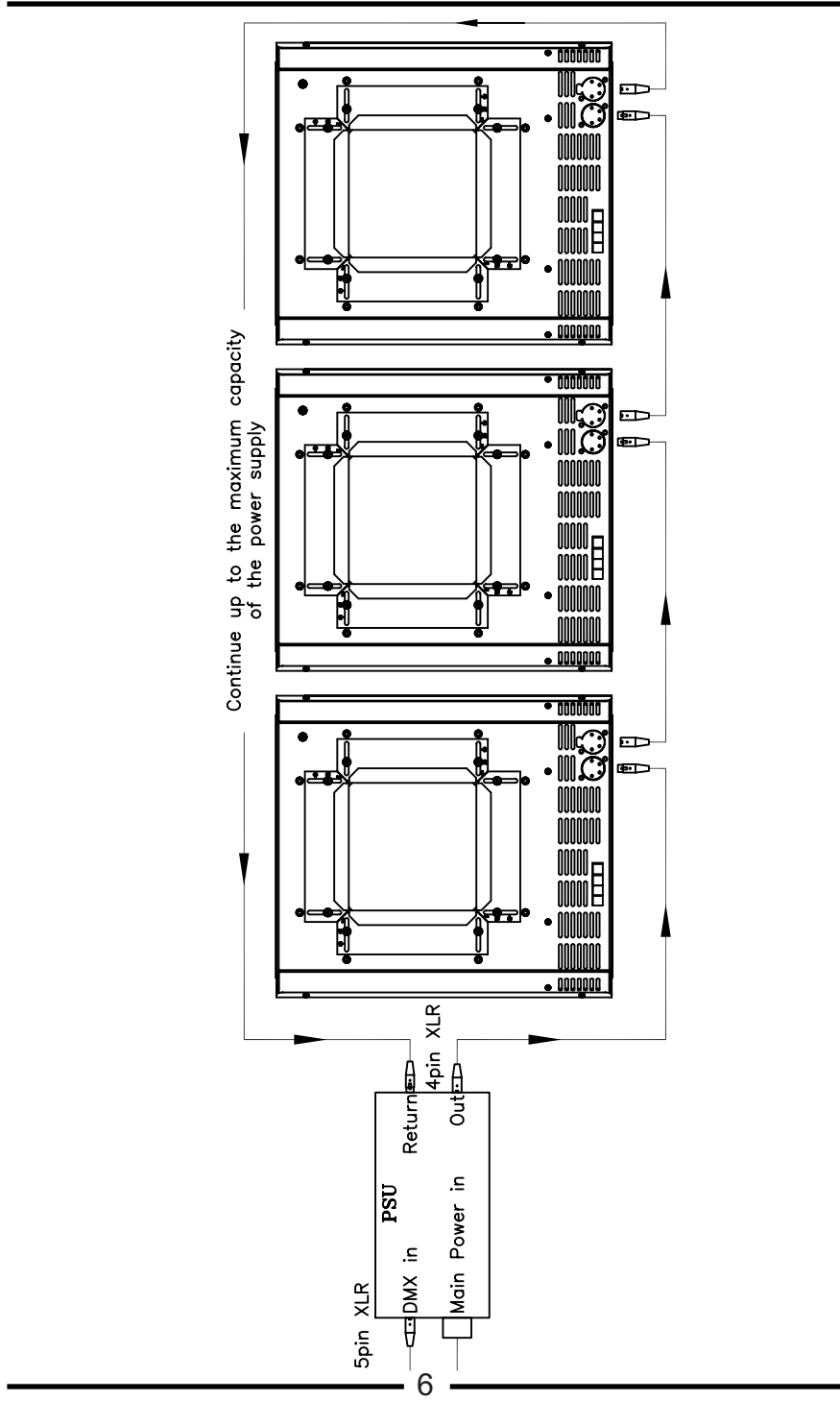


(3.3) Trouble shooting

The 2 LED indicators aid in the trouble shooting of the **ComSpec II** system. These indicators are located on the underside of each unit.

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Unit does not respond to DMX control. But DMX LED indicator is on.	Rotary switch settings may not be correct. Wrong Address selected.	Check rotary switch settings.
Unit does not respond to DMX & LED indicator is off.	Bad Cable. No DMX present at Splitter/ PSU unit.	Check cable and DMX run from console.
Units run at different speeds.	Dipswitch settings may be different. Cable lengths are too long.	Check dipswitch settings. Check the cable length configuration. Ensure there is a cable return line in the system.
ComSpecII units have dim LED indicators and run slowly.	Over loading of Scroller chain or cable runs too long. PSU overloaded.	Check voltage levels on last unit. Should not be below 20VDC.
Green DMX indicator light is off on one unit.	Bad cable or blown transceiver IC in the scroller.	Check cable or send unit back for repair.
Only one gel string runs.	Mechanical (or electrical) failure in the unit.	Turn unit on and off. Return unit for repair.
Gel burns too quickly.	Fans have failed or too slow. Poorly optimized lamp focus in fixture. IR filter medium not fitted.	Check fans are operating. Optimize bulbs focus. Replace gel strings and install IR filter.

Note: A high percentage of problems are a direct result of poor cable and corrupt DMX control signals.



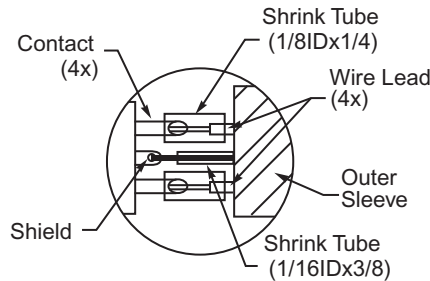
(3.2) Control and Power Cables

Please contact your dealer for appropriate cable manufacturers as specifications for cable may vary. We suggest using Apollo Design Technology data cable for trouble-free operation.

The **ComSpecII** utilizes an XLR 4-pin cable system. This is used for power and data transfer. Pins 2 and 3 are for data. Pins 1 and 4 are for power.

Note: It is very important to ensure that the drain wire from the cable shield is connected to both XLR connector cases. When assembling XLR 4-pin cables, heat shrink should be used on each individual pin to prevent short circuits.

Damage will occur if power connections short to data connections.
(See below)



Detail of connector wiring (typical)

The correct wiring between male and female connectors is 'one to one'.

PIN #	Function	Minimum Cable size
1	GND (-ve)	14 AWG (2.00mm ²)
2	Control data minus (-)	22 AWG (0.35mm ²)
3	Control data plus (+)	22 AWG (0.35mm ²)
4	24 VDC (+ve)	14 AWG (2.00mm ²)
Chassis	Cable shield/Drain wire	24 AWG (0.25mm ²)

Note: Cable length should not exceed more than 250'
(75 M), with the return line included.

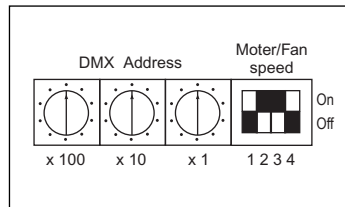
Connections (See also diagram on the next page)

Proper connection of the units to the power supply will decrease the chances of units malfunctioning due to cabling problems. Please follow these basic rules.

- (I) Use the type (gauge) of cable with proper connectors.
- (II) Keep cable runs as short as possible, to reduce line loss.
- (III) Always use a return cable for each run. This will ensure balanced DC power to all units, that the line is correctly terminated, and all units receive power if one link of the chain is faulty.

(3.1) Operation

DMX Addressing



The unit is addressed by setting the three rotary switches to the required DMX address.

Remember to allow for the number of channels used, which is dependant on the units mode of operation. (See below)

Note: The DIP switches are 'on' when the lever is moved to the top position.

Modes of operation

The **ComSpec II** has two modes of operation, Creative mode and Library mode.

The Creative mode is enabled by setting dipswitch #1 to the "off" position.

In this mode you use one DMX channel to control the each individual color string, giving you maximum flexibility. The first DMX channel will control the front string (Yellow-Cyan) and the second DMX channel controls the back string (Yellow-Magenta). You can speed up the movement of the scrollers by turning dipswitch #2 on in this mode.

The Library mode is designed to give you quick access to a 100 pre-programmed colors. Turning on the dipswitch #1 "on" will give you access to the Library mode. This is achieved by entering a percentage value in the console (from 0% to 100%). You can refer to the chart to find which percentage matches with its color. In this mode dipswitch #2 will select between fixed speed between colors when it is in the "off" position, or variable speed controlled by the next DMX channel if it is in the "on" position.

SW1	SW2	SW3	SW4	Mode	Channels
				Creative	2
OFF	OFF	X	X	Regular gel speed	2
OFF	ON	X	X	High gel speed	2
				Library	1 or 2
ON	OFF	X	X	Fixed gel speed	1
ON	ON	X	X	Controlled gel speed	2
				Fan speed	
X	X	OFF	OFF	High Fan speed	
X	X	ON	OFF	Medium Fan speed	
X	X	OFF	ON	Medium Fan speed	
X	X	ON	ON	Low Fan speed	

Important Notes:

1. Do not power lights without powering up the scroller first. Fan must be running in order to protect gels from premature failure.
2. High fan speed is recommended on all lighting fixtures of 750 Watts and above.
3. Use of Apollo's Gel Shield (a high quality IR filter medium) on ellipsoidal lighting fixtures is strongly recommended, especially those with beam angles of less than 30 degrees. One is included with the unit.
(See also the drawing section of this manual.)

(3) Operation of the Unit

- (3.1) Operating the unit
- (3.2) Control and power cables
- (3.3) Troubleshooting
- (3.4) Gel loading/Replacing
- (3.5) Technical overview
- (3.6) Technical Specifications

Notes

Other products available from Apollo:

- Stainless Steel Gobos
- Aluminum Gobos
- Glass Gobos
- Dichroic Glass Filters
- Gel Filters
- Gel Frames
- Gel Cabinets
- Donuts
- Pattern Holders
- Stage Foil
- Intelligent Lighting Wheels
- Gaffer Tape
- Gobo Rotators
- Apollo Gel Shield

ComSpec II Repairs

- ComSpec II is covered by a 12-month parts and labor warranty.
- Need assistance? Call Apollo Technology, Inc.
at 800-288-4626 for details.

Serial Number: _____

Date Purchased: _____

Purchased From: _____

APOLLO[™]

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