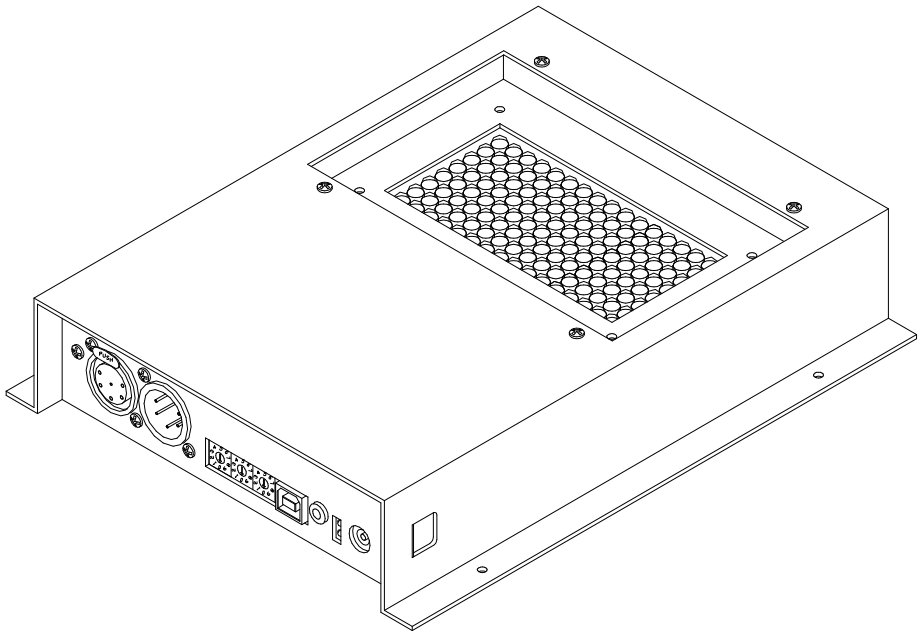
FD-128D FiberDriver - DMX Fiber Optic Illuminator

The FD-128 DMX unit is an illuminator for displays based on fiber optics, or those using remote LED (Light Emitting Diode) devices. The unit is operated by a computer microprocessor, and is controlled by the lighting industry standard DMX-512 digital interface, or by setting stand-alone software parameters. The unit directs the operation of an array of 128 super bright LED devices to create variable illumination of the LED's in the array with programmable speed, direction, intensity, and many other parameters. Multiple FD-128 units may be used to illuminate displays as large as necessary.



The FD-128 DMX unit has many advantages in comparison with other fiber optic illuminators. The unit is smaller, lighter, lower power, more durable, and requires less maintenance than other fiber illuminators. The LED light sources are long lifetime, with no need for lamp changes. The animation is controlled by DMX data parameters, eliminating the need for specialized artwork or animation masks. Since animation is programmable, there are no motors or other mechanical systems which require maintenance. The LED light sources generate very little heat, and cannot cause thermal damage to the fiber optic array.

The latest version of the FD-128 unit includes user selection of several DMX control profiles, including a specialized "Twinkle" program for starfield applications. The unit also includes a "Snapshot Mode", which will store a DMX animation profile, and recall the same animation on power up, eliminating the need for a DMX data system in many applications. The new unit features a "Trigger" line, which can enable and disable the "Snapshot" display, or can be used to trigger operation of other units. The latest unit includes connectors for optional cabling to up to 128 remote LED emitters. The same connectors can be used to install an optional RGB display board, which can create full color animation from a set of 42 individual RGB LED emitters, with total control over color and intensity of each point through DMX.

PRECISION PROJECTION SYSTEMS INCORPORATED
17508 STUDEBAKER ROAD, CERRITOS, CA 90703-3638
TELEPHONE: 562 865-8552 FACSIMILE: 562 924-7133
WEBSITE www.ppsfx.com EMAIL: info@ppsfx.com

Recommended Use

The FD-128 DMX unit is intended for use in applications where controlled light must be delivered through fiber optic strands or to LED emitters in a remote area. Although the fiber optics may be routed to outdoor or wet locations to provide illumination without any electrical hazards, the FD-128 DMX unit itself is not suitable for installation in these environments.

CAUTION

The fixture is intended only for indoor use in dry locations. The unit is not intended for outdoor use, or for indoor use in close proximity to water. The fixture is not rated for, nor protected against water splash, droplets, or mist.

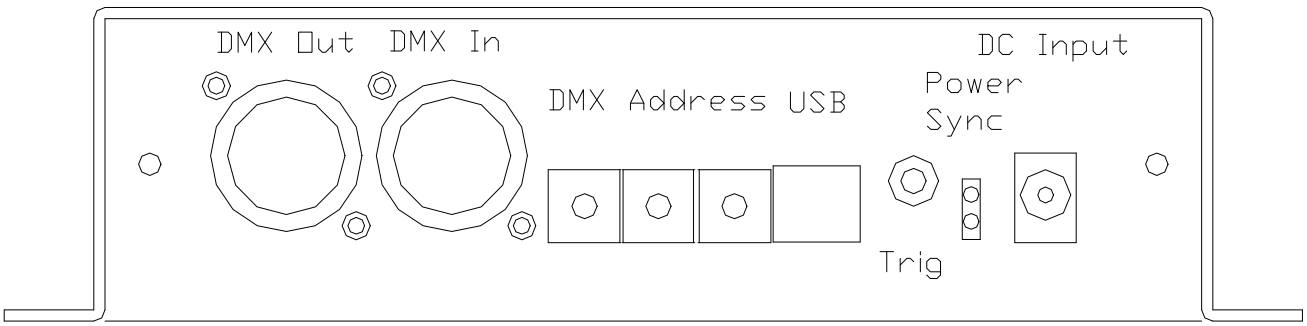
Installation Instructions

The FD-128 DMX unit may be mounted in any position which provides the best orientation and access for fiber optic and control connections using the mounting flanges at each side of the unit. Power and DMX connections are made to the front of the unit on the control panel, and fiber optic or remote LED cable connections are made to the fiber bushing block area located on the top surface.

Controls and Indicators

The FD-128 DMX unit is intended primarily for operation with control through the DMX interface, and has only those controls necessary to establish this connection. The only controls on the unit are the DMX address selection switches, which set the location of the FD-128 DMX unit within the normal range of 512 DMX channels. The only indicators are the Power and Sync LED's, which monitor the status of DC power and DMX data applied to the unit.

Control Panel Connections



Power Connections

The FD-128 DMX is intended to operate from a 5 volt DC power source, or a suitable AC adapter capable of providing 5 volts DC at a maximum current of 3 amperes. The unit is provided with a 2.1mm coaxial DC power socket for connection to the DC power source. To connect the FD-128 DMX to the power supply, first make sure that the power supply is turned off, and make sure to confirm the correct DC polarity. Insert the supply plug into the socket on the FD-128 DMX control panel, and activate the power supply to operate the unit.

When power is applied to the unit, the green "Power" indicator will illuminate to confirm that the unit is active. The "Sync" indicator may illuminate depending on the DMX settings and data status.

WARNING

The FD-128 DMX operates on 5 volt DC electrical power. Application of AC voltage or DC voltages greater than 5 volts, or any DC voltages with reversed polarity to the FD-128 DMX unit may cause serious damage to the fixture, and may cause increased risk of electrical shock or fire, potentially resulting in serious injury or death. Do not attempt to operate the FD-128 DMX unit with incorrect or unknown power supply voltages.

WARNING: AVOID LOOKING DIRECTLY INTO THE LED ARRAY

Due to the high intensity produced by current LED emitters, the direct output of the LED array is uncomfortably bright, and may be hazardous to observe in some conditions, or for long periods.

The LED emitters installed do not produce hazardous ultraviolet light output common to arc lamp sources used in fiber optic applications, but they are too bright to look at directly without discomfort. The output may easily and safely be observed by looking at the LED array from "off axis" or to the side, or by placing a diffuser such as a plain sheet of paper over the LED array to absorb and scatter the light output. Under these conditions, the light output from the unit is harmless. The output from the fiber optic array is also totally harmless under any conditions.

Demonstration Mode Operation

The FD-128-DMX unit may be operated without a DMX signal for demonstration purposes, or for limited stand alone displays if necessary. Demonstration modes are accessed by removing power from the unit, and setting the DMX address switches to the 700, 800, or 900 address ranges. These settings are outside the range of valid DMX addresses, and are available for non-DMX displays. Restoring power to the FD-128-DMX unit with the DMX switches set to these ranges will enter a specific demonstration mode.

The "700" demonstration mode produces a simple sequential display, with the "100's" switch selecting the sequential mode, the "10's" switch selecting the rate of animation for the demonstration display, and the "1's" switch selecting the number of LED emitters which are active, from a minimum of 1 to a maximum of 10. The animation rate and number of active LED emitters may be set or reset as needed while sequential demonstration mode is active.

The "800" demonstration mode produces a "Twinkle" display from the entire array, with the "100's" switch selecting the twinkle mode, the "10's" switch selecting the number of twinkling points, and the "1's" switch selecting the rate at which the points twinkle. The animation rate and twinkle density may be set or reset as needed while twinkle demonstration mode is active.

The "900" demonstration mode produces a "Sparkle" display from the entire array, with the "100's" switch selecting the sparkle mode, the "10's" switch selecting the persistence of the points, and the "1's" switch selecting the rate at which the points are regenerated. The persistence and regeneration rates may be set or reset as needed while the sparkle demonstration mode is active.

To restore normal operation, remove power from the unit, and set the DMX address switches to within the normal range. DMX controlled operation will resume once power is applied to the unit.

.

DMX Mode Operation

The FD-128DMX unit is primarily intended for operation under DMX control, using the lighting industry standard DMX-512 control protocol. The unit features a standard 5 pin DMX input and output connectors for the DMX signal to allow the usual DMX "daisy chain" connections. The connections for DMX input and output are wired directly in parallel, and there is no buffering or conditioning of the DMX signal, other than the signal used for control over the unit. The DMX input section is electrically and optically isolated from the rest of the unit circuitry to insure that the DMX data stream is not affected by the unit.

DMX Channel Assignments

As with most DMX controlled fixtures, the Model FD-128 DMX will use consecutive DMX control channels beginning with the channel selected as the base address on the DMX address selection switches. A unit set to a base DMX address of 100 would occupy and respond to information on DMX channels 100 and up. The three rotary address selector switches are set to choose the base DMX address for the unit, and the selected address is read and stored when DC power is first applied to the unit. Power must be removed from the unit and restored before a new address setting will become functional. Units with different control software options will require a different number of DMX channels, but will operate in a similar manner. Refer to the Control Software Options section for the number of DMX channels required by each of the available control modes.

DMX Data Connection

Once the base DMX address setting is complete, the unit may be connected to a DMX data source. The green "Sync" indicator below the "Power" light will illuminate steadily if valid DMX data is being received by the unit. In normal operation, the unit will respond to changes in the DMX data for the selected channels according to the channel functions as described in the Software Options section of this document. When normal DMX data is being received, the unit will retain the last valid data for about 5 seconds after the DMX data is removed. This data retention allows the unit to tolerate minor interruptions in the DMX data stream caused by poor connections or brief "dropouts". After this interval, the unit will default to the normal "no DMX data" state, with all output inactive. Normal operation will resume immediately when the normal DMX data stream is restored.

DMX Troubleshooting

If the "Sync" indicator is not steadily illuminated when DMX data is connected, then there is either a problem with the DMX data or cables, or an internal problem with the FD-128 DMX unit. If the unit does not operate, and the "Sync" indicator flashes at a regular interval, the DMX address is set to an invalid range, either to zero, or to a number higher than the highest base address setting which will allow for control of all required channels in the selected control mode. If the "Sync" indicator is erratic, then the DMX data connection is either intermittent due to a poor electrical connection, or the DMX data is dropping out, which can be caused by poor connections, poor quality cables, long data runs, or poor signal quality in general. Test the unit with different cables, or in a different location closer to the DMX data source to determine what the problem is. A "Sync" display of repeated bursts of flashes at a regular interval indicates an internal malfunction in the FD-128 DMX unit.

Control Software Options

The FD-128 unit may be configured to operate in any one of several control modes, which are determined by the setting of internal jumpers. The control software selection is set when the unit is powered up or reset, and reads the configuration of the program selection jumpers located on the J5 terminal block inside the unit. A brief description of each of the available modes is provided here, along with the number of DMX channels required for each, followed by detailed instructions on how to select and use each mode.

Full Parametric Mode

Full parametric mode occupies 12 consecutive DMX control channels. The 12 DMX control channels are divided into 2 groups of 6 channels each. The first block of six channels is the "Analog" control section, and the second block of 6 channels is the "Digital" control section. Full parametric mode is selected by setting the Program 1 and Program 2 jumpers on the J5 terminal block to "00", or both left open.

Within each block of 6 channels, the function of channels is similar. The first DMX channel determines the number of LEDs which are "ON", and the second determines the number which are "OFF". The third channel determines the "OFFSET" or position of the display, and also the direction in which it moves. The fourth channel determines the "ANIMATION", or the rate of motion. The fifth channel in each group functions differently. In the "Analog" section, the fifth channel controls the "SYMMETRY" of the intensity across the active display. In the "Digital" section, the fifth channel controls the "DISPLAY LOGIC" or how the signals from the "Analog" and "Digital" sections are combined. The sixth channel in each group provides control over the "INTENSITY" of the display produced by that group.

Basic Parametric Mode

Basic parametric mode operation requires 4 DMX control channels. These functions control the intensity of the display, the speed at which they move, the direction in which they may move, and the number of consecutive LED emitters which are active. Basic Parametric mode is selected by setting the Program 1 jumper open, and the Program 2 shorted, or "01".

Absolute Mode

Absolute control mode requires 128 consecutive DMX control channels. As the name and the number of channels implies, this mode assigns one DMX channel to each of the LED emitters in the array, with each DMX channel controlling the intensity of a single LED emitter. Absolute mode is selected by shorting the Program 1 jumper, and leaving the Program 2 selection jumper open, or "10".

Twinkle Mode

Twinkle Mode requires 6 consecutive DMX control channels. The first two channels determine the lowest and highest intensity allowed for the twinkle variations. The third and fourth channels select the slowest and fastest rates at which a twinkle variation may occur. The fifth channel selects the maximum number of points which may actively twinkle at one time, The sixth channel controls the overall intensity of the twinkle display. Twinkle mode is selected when the both Program 1 and the Program 2 selection jumpers on the J5 terminal block inside the unit are shorted, or "11" .

Full Parametric Mode Selection and DMX Channel Assignments

Full parametric mode is selected by setting the Program 1 and Program 2 jumpers on the J5 terminal block to "00", or both left open. When the unit is powered up or reset, this control mode becomes active.

In this mode, each fixture occupies 12 consecutive DMX control channels, beginning with the channel selected as the base address on the DMX address selection switches. The selected address is read and stored when power is applied to the controller, and new address settings will require that power be removed from the fixture and restored before the new address setting will become operational.

The 12 DMX control channels are divided into 2 groups of 6 channels each. The first block of six channels is the "Analog" control section, and the second block of 6 channels is the "Digital" control section. The function of the DMX channels in each of these sections is described below:

Analog Display Section

Channel 1: This channel controls the "ON Interval", or the number of consecutive LED emitters which are turned ON in the "Analog" display. The number of active emitters is the DMX value for this channel divided by two.

Channel 2: This channel controls the "OFF Interval", or the number of consecutive LED emitters which are turned OFF in the "Analog" display. The number of inactive emitters is the DMX value for this channel divided by two.

Channel 3: This channel controls the "OFFSET" or physical position of the pattern of ON and OFF LED emitters in the "Analog" display as determined by Channels 1 and 2, and should initially be set near mid-scale for the greatest range of motion in either direction. The setting of this channel also determines the direction of motion when animation is active.

Channel 4: This channel controls the "ANIMATION ", or speed of motion for the selected pattern of ON and OFF LED emitters in the "Analog" display, as determined by the settings of Channels 1 and 2. A minimum setting will result in no motion, with the animation speed increasing with the channel setting until the motion is rapid enough for the display to appear as if it is entirely illuminated. The display will move in a positive or negative direction as determined by the setting of the OFFSET control, (Channel 3). The direction of motion will change immediately as the OFFSET control is set above or below mid-scale

Channel 5: This channel controls the "SYMMETRY" or balance of the intensity profile of the "Analog" display in conjunction with the "INTENSITY" setting, as determined by the value of Channel 6. The SYMMETRY control will have no visible effect when the "ANALOG INTENSITY" is set to either minimum, which will produce no output, or at maximum values, which will produce a digital transition. For the "SYMMETRY" control to have the greatest effect, the "INTENSITY" setting should be at mid-scale.

With this setting. as the SYMMETRY control is moved towards minimum or maximum, the intensity profile in the "On Interval" will display a high intensity at one end, trailing off to a lower intensity at the other. At a mid-scale value, the SYMMETRY control will produce a symmetrical intensity profile with peak intensity in the center of the ON Interval, and reduced intensity at either end.

Channel 6: This channel is the “ANALOG INTENSITY” control, which sets the overall intensity, and the intensity profile within the ON Interval of the “Analog” display in conjunction with the “SYMMETRY” control on Channel 5. A zero setting will result in no display from the Analog Display Section. At low settings, the intensity profile will gradually increase from minimum to brighter levels, following the profile established by the “SYMMETRY” control on Channel 5. As the “INTENSITY” setting is increased, the peak intensity will gradually increase until the display varies from minimum intensity to full intensity across the “ON Interval” when the “INTENSITY” control setting is at mid-scale. Increasing the “INTENSITY” control setting further will cause the low intensity levels within the “ON Interval” to gradually increase, with the maximum setting resulting in an immediate ON/OFF transition, and maximum intensity across the entire “ON Interval”.

Digital Display Section

Channel 7: This channel controls the “ON Interval”, or the number of consecutive LED emitters which are turned ON in the “Digital” display. The number of active emitters is the DMX value for this channel divided by two.

Channel 8: This channel controls the “OFF Interval”, or the number of consecutive LED emitters which are turned OFF in the “Digital” display. The number of inactive emitters is the DMX value for this channel divided by two.

Channel 9: This channel controls the “OFFSET” or physical position of the pattern of ON and OFF LED emitters of the “Digital” display, as determined by Channels 1 and 2, and should initially be set near mid-scale for the greatest range of motion in either direction. The setting of this channel also determines the direction of motion when animation is active.

Channel 10: This channel controls the “ANIMATION “, or speed of motion for the selected pattern of ON and OFF LED emitters of the “Digital” display, as determined by the settings of Channels 1 and 2. A minimum setting will result in no motion, with the animation speed increasing with the channel setting until the motion is rapid enough for the display to appear as if it is entirely illuminated. The display will move in a positive or negative direction as determined by the setting of the OFFSET control, (Channel 9). The direction of motion will change immediately as the OFFSET control is set above or below mid-scale

Channel 11: This control determines the DISPLAY LOGIC of the fixture, by establishing how the outputs of the “Analog” and “Digital” displays are combined to produce the pattern of the display, and will greatly affect the appearance of the fixture. There are four general classes of logical combinations, and two variations of each type for a total of eight settings. Each range covers a numerical span of 32 steps in the settings of the “DISPLAY LOGIC” channel. The display logic control allows the analog and digital patterns to be simply combined with each other, or used as masks to define the boundaries of each other, and several other combinations as determined by the logic setting selected. The available DISPLAY LOGIC combinations and their respective numerical DMX ranges are as follows:

Display Logic

Range 0-31: LOGICAL “OR” with Digital Priority. If the ON Interval of either the “Analog” or “Digital” display is active, the display will be active, with the “Digital” effect taking priority over the “Analog” effect for intensity control.

Range 32-63: LOGICAL “OR” with Analog Priority. If the ON Interval of either the “Analog” or “Digital” display is active, the display will be active, with the “Analog” effect taking priority over the “Digital” effect for intensity control.

Range 64-95: LOGICAL “XOR” with Digital Priority. If the ON Interval of either the “Analog” or “Digital” display is active, but not both, (Exclusive OR), the display will be active, with the “Digital” effect taking priority over the “Analog” effect for intensity control.

Range 96-127: LOGICAL “XOR” with Analog Priority. If the ON Interval of either the “Analog” or “Digital” display is active, but not both, the display will be active, with the “Analog” effect taking priority over the “Digital” effect for intensity control.

Range 128-159: LOGICAL “AND” with Digital Priority. The ON Interval of both the “Analog” and the “Digital” display must be active for the display to be active, with the “Digital” effect taking priority over the “Analog” effect for intensity control.

Range 160-191: LOGICAL “AND” with Analog Priority. The ON Interval of both the “Analog” and the “Digital” display must be active for the display to be active, with the “Analog” effect taking priority over the “Digital” effect for intensity control.

Range 192-223: LOGICAL “NAND” with Digital Priority. This pattern is a NOT AND, or a visual “Negative” of the corresponding “AND” display, with the “Digital” effect taking priority over the “Analog” effect for intensity control.

Range 224-255: LOGICAL “NAND” with Analog Priority. This pattern is a NOT AND, or a visual “Negative” of the corresponding “AND” display, with the “Analog” effect taking priority over the “Digital” effect for intensity control.

Channel 12: This channel is the “DIGITAL INTENSITY” control, which sets the intensity of the “On” interval of the Digital display section. Setting this control to a minimum level will produce no output from the selected “Digital” display or pattern, and a maximum setting will operate the selected display at maximum intensity.

Basic Parametric Mode Selection and DMX Channel Assignments

Basic Parametric mode is selected by by setting the Program 1 jumper open, and the Program 2 jumper shorted, or a setting of "01". When the unit is powered up or reset, this control mode becomes active.

In basic parametric mode, each fixture occupies 4 consecutive DMX control channels, beginning with the channel selected as the base address on the DMX address selection switches. The 4 DMX channels used are assigned to control the following display functions. :

Channel 1: This channel is the "ANALOG INTENSITY" control, which sets the overall intensity of the display. A zero setting will result in no display, and the intensity will gradually increase from minimum to maximum as the channel setting is increased to the maximum level at a setting of 255.

Channel 2: This channel controls the "ANIMATION RATE", or speed of motion for the selected pattern of LED emitters in the display. A value of zero will result in no motion, with the active display resetting to one end of the display. As the channel setting is increased, the animation speed will increase until the motion is rapid enough for the display to appear as if it is entirely illuminated. The display will move in one direction or the other, determined by the setting of the "DIRECTION" control, (Channel 3). The direction of motion will change immediately as the "DIRECTION" control is set above or below mid-scale

Channel 3: This channel controls the "DIRECTION" of animated motion of the pattern of LED emitters in the display. Any setting below the mid scale DMX value of 127 for this channel will result in motion in one direction, and any setting above this value will result in motion in the opposite direction.

Channel 4: This channel controls the "ON Interval", or the number of consecutive LED emitters which are turned ON in the display. The minimum number of active emitters is one at a DMX value of from zero to 63, two for DMX values of from 64 to 127, four for DMX values from 128 to 191, and a maximum of 8 when the DMX value is 192 or higher.

Absolute Mode Selection and DMX Channel Assignment

Absolute mode is selected shorting the Program 1 jumper, and leaving the Program 2 selection jumper open, or a setting of "10". When the unit is powered up or reset, this control mode becomes active.

Absolute control mode requires 128 consecutive DMX control channels. In this mode, each of the 128 DMX channels controls the intensity of one LED emitter in the array. A DMX channel value of zero will result in no output from the corresponding LED, and a maximum value of 255 will produce full intensity. All animation relies on proper control of the applied DMX values to each emitter in the LED array.

Twinkle Mode Selection and DMX Channel Assignments

Twinkle mode is selected when the both Program 1 and the Program 2 selection jumpers on the J5 terminal block inside the unit are shorted, or a setting of "11" . When the unit is powered up or reset, this control mode is active.

In this mode, each fixture occupies 6 consecutive DMX control channels, beginning with the channel selected as the base address on the DMX address selection switches. The 6 DMX control channels are assigned to control the following display functions. :

Due to the high intensity produced by the current LED emitters, the effects of "Twinkle Mode" may be difficult to see, and perhaps even hazardous to observe by looking directly at the LED array. The effects may easily and safely be observed by looking at the LED array from "off axis" or to the side, or by placing a diffuser such as a plain sheet of paper over the LED array to absorb and scatter the light output. More importantly, twinkle settings should be established by looking at the fiber optic display itself, and adjusting the settings for the best results there, rather than by the appearance of the illuminator array.

Channel 1: This channel is the "MINIMUM RANDOM INTENSITY" control, which sets the lowest intensity possible for a random variation. A zero setting will result in the widest variation, and the allowed minimum intensity will gradually increase from minimum to maximum as the channel setting is increased to the maximum level.

Channel 2: This channel is the "MAXIMUM RANDOM INTENSITY" control, which sets the highest intensity possible for a random variation. A zero setting will result in the least variation, with the allowed maximum intensity gradually increasing as the channel setting is increased to the maximum level.

Channel 3: This channel controls the "MINIMUM BLINK RATE", or speed of variation for the transition between minimum and maximum intensity variations. A value of zero will allow the slowest variations, while higher values will result in faster and more dynamic transitions.

Channel 4: This channel controls the "MAXIMUM BLINK RATE", or speed of variation for the transition between minimum and maximum intensity variations. A value of zero will allow only the slowest variations, while higher values will result in faster and more dynamic transitions.

Channel 5: This channel controls the "TWINKLE COUNT" or the number of points which may be actively changing at any one time. A minimum setting will result in the fewest number of varying points, and a maximum setting will result in the largest number of variations, and the most dynamic display.

Channel 6: This channel controls the "MASTER INTENSITY", or the overall brightness of all of the emitters in the twinkle display. This setting may be used to fade the entire display up and down with a single control for sunset and sunrise simulations. A zero setting will result in no output from the display, and a maximum setting will produce output at full intensity.

DMX Snapshot Mode

For applications where the illuminator is intended to be operated as a "Stand Alone" display, the unit can be configured to store a set of DMX variables, and operate from that data without the need for a DMX data source. Selecting this mode will require opening the unit to gain access to the controller circuit board, a pair of programming or shorting jumpers, and a DMX data source to generate the display data.

With the controller board accessible, apply power and DMX data to the unit, and adjust the DMX data to provide the animation or display you wish to store. Locate the J5 jumper block, which is near the middle of the circuit board about 3 inches or 75 mm behind the DMX address switches. Install a programming jumper to short the "DMX SS" terminals to store the current DMX parameters as a snapshot.

When the "DMX SS" jumper is installed, the unit will store the current DMX data values into internal memory. When the unit is powered up with this jumper in place, it can then operate either continuously or intermittently using the stored DMX data to determine the display properties. DMX data inputs will be ignored if the "DMX SS" jumper is installed when the unit is powered up.

Normal DMX controlled operation can be restored by removing the jumper. When power is applied to the unit, normal DMX control will resume. The stored DMX data values will remain in memory until they are overwritten, which requires reinstalling the "DMX SS" jumper with DMX data to the unit.

Stored DMX values which have not been overwritten may be recalled by removing DMX data and power from the unit, reinstalling the "DMX SS" jumper, and applying power to the unit. The previously stored DMX data will not be overwritten until the "DMX SS" jumper is installed while new DMX data is applied to the unit. Stored DMX values are lost when new DMX data is written into memory.

Continuous and Triggered Operation

For "Stand Alone" operation, where the display must operate continuously, a second jumper must be installed on the J5 jumper block in the "RUN" position just below the "DMX SS" position. With this jumper installed, the unit will display the pattern corresponding to the stored DMX data as soon as power is applied, and will continue the display until power is removed from the unit.

For applications where the desired DMX display pattern is needed only intermittently, the "RUN" jumper position should be left open, and an external "Trigger" signal may be applied to the unit through the Trigger input connection on the front panel of the unit. The operation of the Trigger circuit may be tested using the SW2 "Trigger Test" switch near the lower left corner of the PC board. The stored "Snapshot" display will operate only as long as this switch is closed.

The front panel "Trigger" input connection is a standard 1/8 inch or 3.5mm stereo audio jack. The trigger signal is a DC voltage of from 5 to 12 volts DC, and should be present only when the display is required. The positive trigger signal should be wired to the "tip" connection of the plug, and the negative trigger signal to the "ring" connection. The body or sleeve of the jack is connected to the unit ground, which is optional, as the positive and negative trigger signals are optically isolated from the FD-128 circuitry.

To accept the trigger input signal, the trigger connection switch SW3 must be set to the "IN" position, or towards the center of the PC board. When wired correctly, the "Snapshot" display will operate only as long as the external trigger signal is applied. Once the "Snapshot" and "Trigger" operation is confirmed, the unit may then be powered down, and reassembled for "Stand Alone" operation.

LED Count Programming

As the size of fiber optic displays may vary considerably, the number of LED emitters required to illuminate the display is adjustable. The FD-128 DMX controller may be programmed as necessary to match the number of LED emitters required for the display. The LED count setting applies to all control software modes, and to the demonstration modes as well.

The default LED count is 128, which corresponds to the entire LED array. Displays which utilize the entire LED array do not require LED count programming, unless the controller has been previously programmed for a different number of emitters. Fixtures operated with smaller fiber optic displays may disable the unused LED emitters by using this procedure.

Setting the LED count will require access to the controller PC board, a .1 inch jumper plug or a short set of clip leads, a small screwdriver, and the standard DC power supply to power the controller during the procedure. The FD-128 DMX unit should be disconnected from DC power, and the fiber optic bundle should be removed from the unit to gain access to the controller PC board. Once the fiber bushing is detached, the controller PC board may be fully or partially removed from the enclosure by loosening the two screws at the left and right edges of the control panel, and sliding the control panel and PC board out of the housing to gain access to the front portion of the PC board. .

LED Count Programming Procedure

1) To activate the programming function, install a jumper plug across the two “Count” terminals on the J5 terminal block on the circuit board. The J5 terminal block is located near the middle of the circuit board about 3 inches (75mm) behind the control panel.

CAUTION

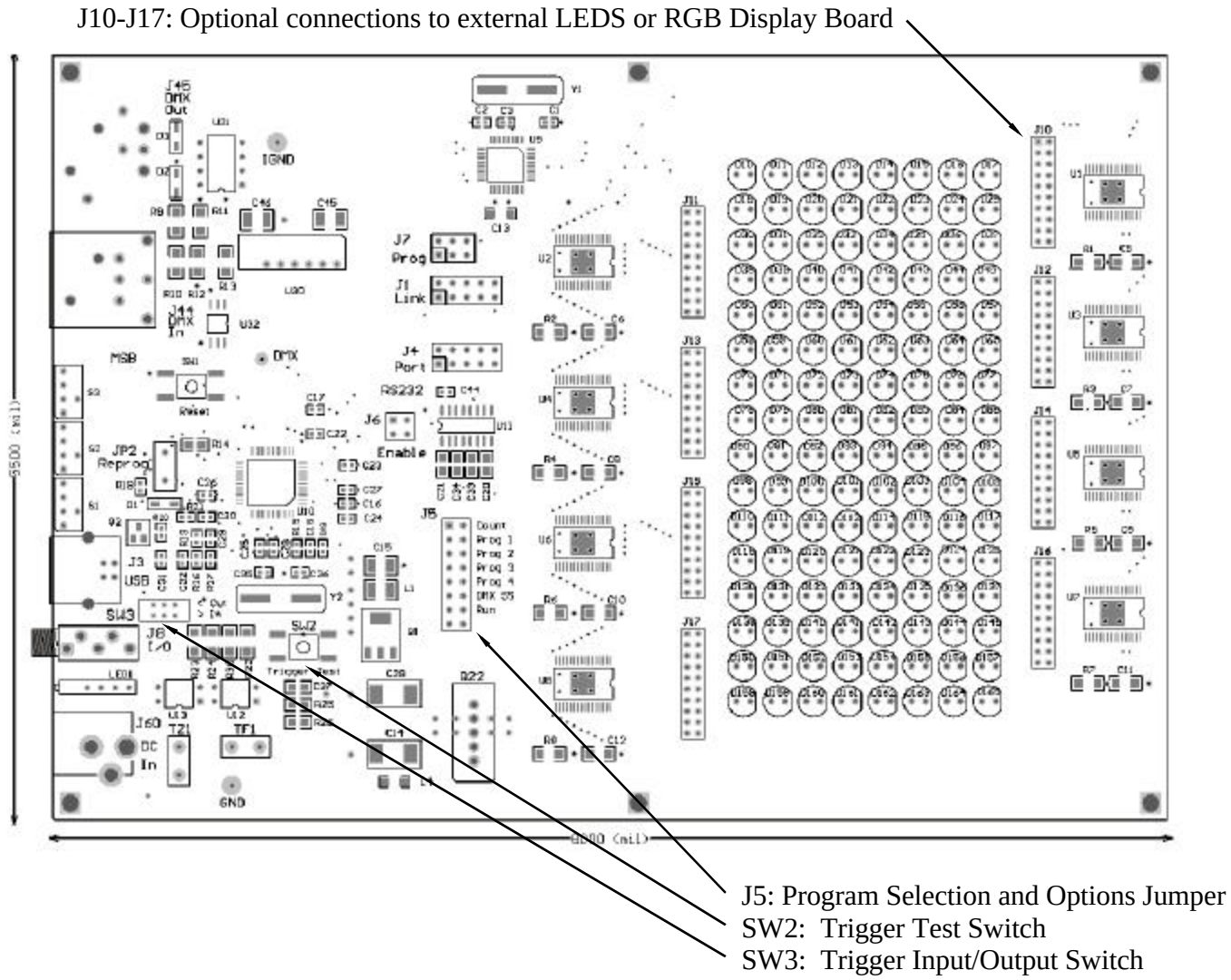
Do NOT install jumpers across the two JP2 terminals directly behind the DMX address switches, as this jumper prepares the controller for a firmware update, and may render it inoperable if the controller is powered up, and no update is downloaded.

2) Set the desired LED count for the fixture using the three DMX address switches in the usual manner. The valid LED count range is from 1 minimum to 128 maximum. Setting a value outside of this range will result in the controller returning to the default value of 128.

3) With the desired LED count set on the DMX address switches, and the ”Count” jumper installed on J5, apply DC power to the controller. The selected LED count will now be stored into the controller memory. The first eight emitters in the LED array will immediately display the selected LED count as a binary number to confirm that the count programming operation is complete.

4) Remove power from the controller, remove the jumper from the J5 “Count” terminals, and reset the DMX address switches to the desired DMX control settings for the fixture. The fixture will now operate at the programmed LED count when DC power is restored. LED emitters above the selected LED count will be inoperative regardless of the control software mode or DMX control settings, unless the LED count is reset once again to include them in the active display.

FD-128 Internal Jumper and Control Locations



This drawing illustrates the location of the internal controls required for selecting the control program, selecting and testing the DMX snapshot mode, and configuring the unit to accept an external trigger signal. Other jumper locations on the unit are required either for initial unit programming, or are needed for normal operation, and should not be disturbed.

The J10 through J17 connections are optional, and are available for units intended to operate remote LED displays rather than fiber optics. The same connectors are used to install the optional RGB display board.

Jumpers and connectors with functions which are not described in the current documentation are reserved for use in future applications of the FD-128 unit.

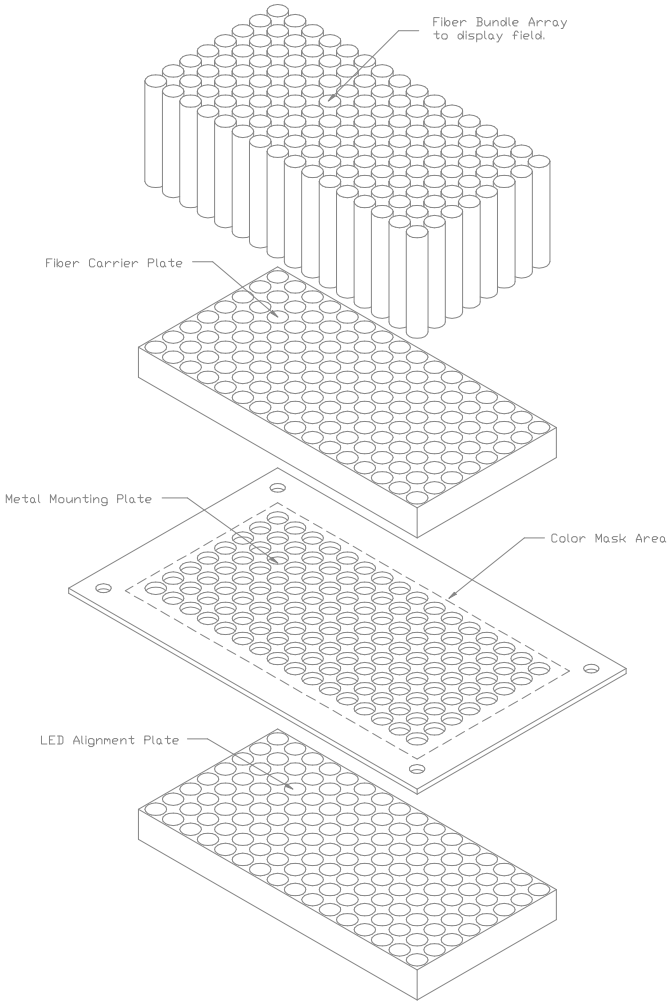
Fiber Optic Bundle Attachment

The low heat and high brightness from the LED array makes it possible to attach the fiber optic bundle directly to the light sources without lenses or heat filters, lighting displays through fiber optic bundles of any normal length. The fiber optic bundle may be easily removed if necessary, although the orientation should be noted to insure the correct animation when the bundle is reinstalled.

Connections from the FD-128 illuminator to the fiber optic display are made using an array of up to 128 fiber bundles arranged to fill an 8 by 16 array which is aligned with the LED matrix. The attachment is simplified by the use of a fiber carrier assembly which consists of two drilled plastic pieces separated by a metal plate. One of the plastic pieces carries the fibers, which may be pre-assembled into bundles, or epoxied into plastic tubes for sequencing. Once the fiber bundles or tubes are epoxied into place in the carrier, they may be sanded and polished flush with the surface of the carrier in the usual manner. The fiber carrier is then installed onto the drilled metal mounting plate.

The second drilled plastic piece is installed on the opposite side of the main mounting plate, and serves to guide the individual LED's into alignment with the fibers, and to reduce any scattered light and cross illumination between LED's. If necessary, a color mask may be installed between these pieces. The edge of the metal plate provides the mount used to attach the fiber bundle assembly to the illuminator.

<u>Fiber Bundle Assembly</u>



Fiber Capacity

The number of fibers which can be connected to an FD-128 unit depends on the diameter of the fibers which are used. Typical fiber diameters vary from as small as .010 inch to .1 inch or larger. The bundle diameter is limited to about .2 inch or 5 millimeters maximum by the hole size in the fiber carrier plate.

The approximate maximum number of fibers of typical sizes which can be installed into a single cell, or into a total of 42 cells for RGB applications, or into 128 cells for white or monochrome applications is provided in the following chart.

Fiber Size	Cell Capacity	Capacity in 42 Cells (RGB)	Capacity in 128 Cells (White)
10 mil	340	14,280	43,520
20 mil	85	3,570	10.800
30 mil	36	1,512	4,600
40 mil	18	756	2,300
60 mil	7	294	896
100 mil	2	84	256

Typical Applications

Most fiber optic installations fall into one of two categories, those which require viewing of the fiber tips only, or “End Light” applications, and those which require viewing along the length of the fiber, or “Side Glow” applications. Some displays may require a mixture of both techniques. As most fiber optic strands are designed to transmit light efficiently, “End Light” applications are much easier to create than “Side Glow” displays, where the length of the fiber must be uniformly lit.

The light output available from the LED light sources used in the FD-128 unit is generally more than adequate for any “End Light” applications, such as starfields and signage. The FD-128 output may also be satisfactory for “Side Glow” applications as well, but some displays of this type may require more light than can be delivered by the FD-128 emitters at present.

Light output in “Side Glow” displays can be increased by specialized lensing on the FD-128 unit, by stressing or degrading the fiber to increase the amount of light scattered and improve visibility, or by reflecting the light at the far end of the fiber back down the length. There are also specialty fibers which are specifically designed for “Side Glow” displays which may be used in these applications.

General Precautions

Fiber optic displays can provide years of trouble free operation, but require a significant amount of labor to install. Fiber optic displays which require sequencing of fibers for animation require proportionately more labor As labor is likely to be the most costly portion of any fiber display, the work should be done carefully to avoid fiber breakage, and the time and expense of rework and repairs.

The individual fiber strands are easily damaged, and should be handled carefully and protected with sleeving when routed from the illuminator to the display area. Once installed, the fibers should not be disturbed to avoid damage and loss of display points.