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ELM Video Technology DPM8 DMX to PWM Controller Driver User Guide

Contents

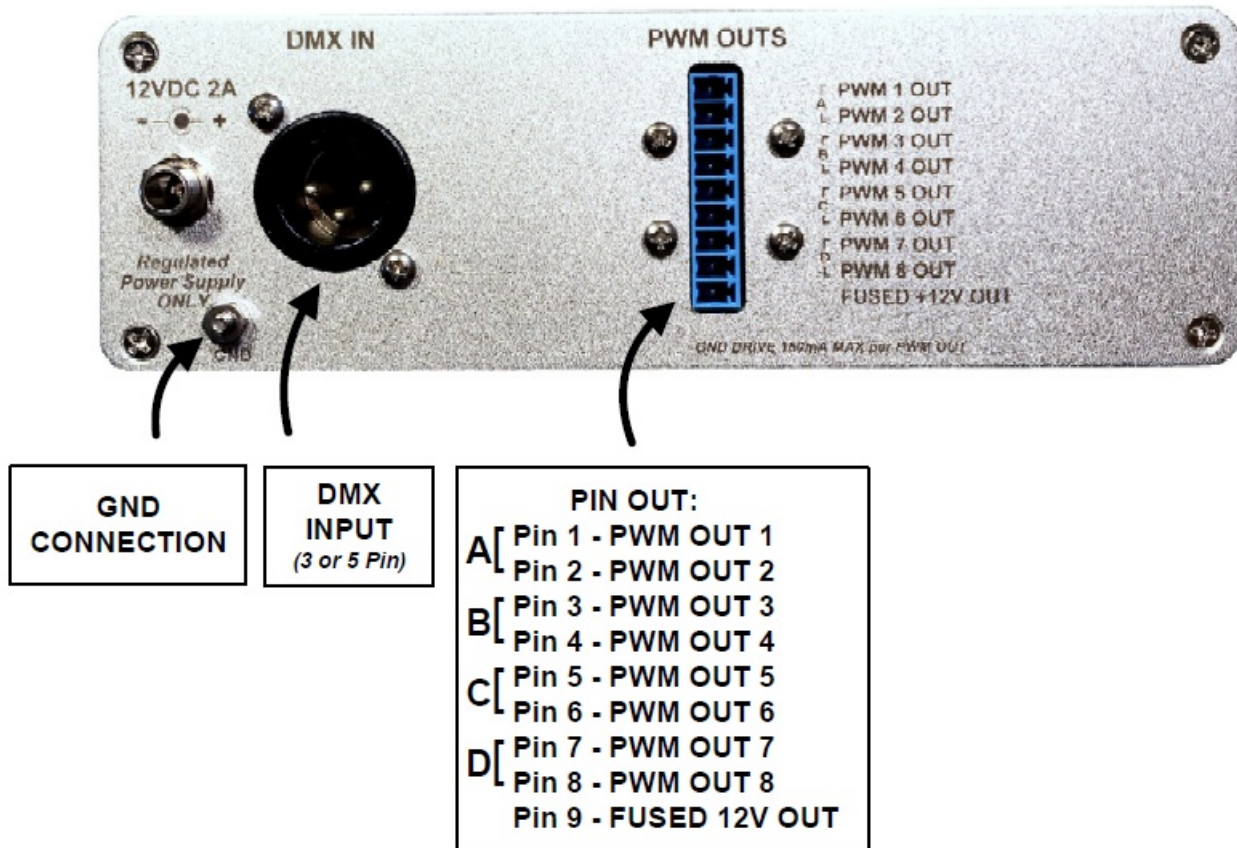**ELM Video Technology DPM8 DMX to PWM Controller Driver**

INTRODUCTION

The DPM8 PCB is a DMX to 8 channel PWM (Pulse Width Modulation) controller driver with a wide range of tunable frequencies that can be user set. This PCB will allow up to 4 different frequencies to be tuned (2 independent outputs per frequency). The low speed frequency range is from 123hz – 31.25Khz and the high speed frequency range is from 980hz – 250Khz. There are 8 independent outputs that will vary the duty cycle in respect to the assigned DMX channel level. Optionally there are 4 pairs (A, B, C, D) of frequency settings that can be user set. PWM outputs 1 & 2 (pair A), can be set to any frequency within the set low/high range, PWM outputs 3 & 4 (pair B) and another frequency, etc.

Note: The low/high-frequency range setting is set for all 4 pairs and the unit will only operate in either low or high ranges. Once powered with a frequency range set all programmed frequencies will be in either the low or high ranges.

Each PWM output is a ground drive output that allows multiple control voltages to be used. Each PWM output can drive up to 150mA at 12VDC (30VDC Max). Designed to control SSR (Solid State Relays) that could then directly power high-power LED engines or fixtures, or any PWM circuits that uses a PWM control input (pending ground drive capability).
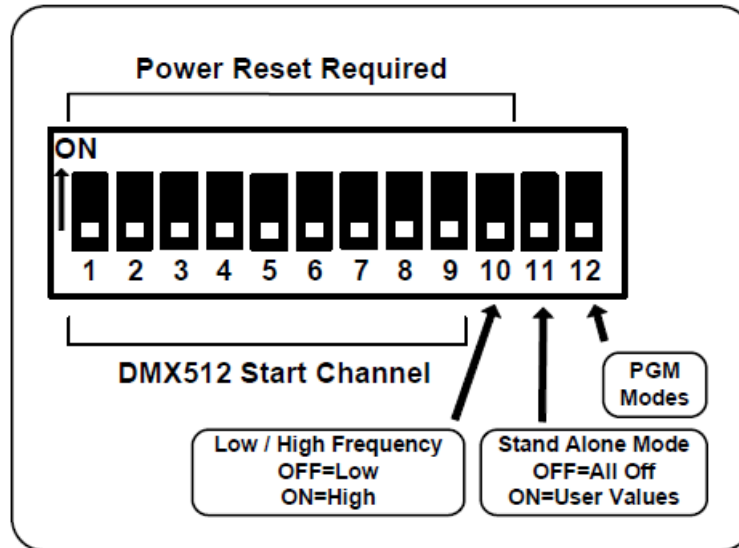
OVERVIEW

Connections

- **12VDC POWER INPUT** Insert the power supply connector and screw the locking barrel to secure
- **GROUND CONNECTION** If an external power supply is used to provide power to connected relay's or equipment, this connection can be used to connect to the power supply grounds.
- **DMX INPUT XLR** (3 or 5 pin) connector standard DMX protocol. The input is self terminated.
- **FOR GROUND DRIVE PWM OUTS** Connect the PWM Outs as shown for ground drive units. The +12V output is internally fused with a 2A fuse and can be used to provide +V for SSR (Solid State Relay's), or mechanical relay's, or LED's directly insuring that the maximum current is not exceeded.
- **FOR POSITIVE CONTROL VOLTAGE PWM OUTS** Connect the PWM Outs as shown for positive control voltage units. The PWM outs will output a positive voltage low current signal to control other equipment. Reference the equipment to the ground connection of the DPM8. Insure that the maximum current is not exceeded per output.

EXAMPLE: Ground Drive

EXAMPLE: Positive Control Voltage

Operation

- **DIP SWITCHES –** It is recommended to have a DMX Start Channel value of 503 or less to have channels assigned to 8 PWM outputs and 2 for frequency programming and setup. See the Frequency Setup

Procedures for more information.

NOTE – A RESET/REPOWER IS REQUIRED FOR DMX START CHANNEL and LOW / HIGH SPEED FREQUENCY SETTINGS

- **DIP SWITCHES 1-9 – DMX START CHANNEL:** [POWER RESET REQUIRED] sets the DMX512 start channel (see the DMX512 Channel Assignment Document). PWM output 1 will be the DMX assigned start channel and the 2nd PWM output is controlled by the assigned DMX start channel +1 (consecutively) and so on.

- **DIP SWITCH 10 – FREQUENCY RANGE:** [POWER RESET REQUIRED] sets the low or high frequency ranges for all outputs. OFF (down position) = low frequency range. ON = high frequency range.

- **DIP SWITCH 11 – STAND ALONE (No DMX):** OFF (down position) = With no DMX signal the all PWM outputs will turn off. ON (up position) = With no DMX signal the PWM outputs will be the user preset (8 independent) values. See the Stand Alone programming setup instructions

- **DIP SWITCH 12 – ENTER PROGRAM SETUP MODES:** OFF = normal operation. If the DPM8 is powered and DIP 12 is turned on the stand alone values can be programmed (see the stand alone programming setup instructions). When powering up the DPM8 and DIP 12 is ON then the frequency settings can be programmed, modified and stored. See the Frequency Setup Procedure instructions

- **STANDALONE MODE –** The Stand Alone Mode is activated when there is no valid DMX present indicated by the status indicator off. The PWM duty cycle values are all off if the Stand Alone Dip Switch is in the OFF position. The user set PWM duty cycle values are applied when the Stand Alone Dip Switch is in the ON position. Take care to setup the values and place the dip switch in the desired position. Test the unit to insure the desired results.

- **LED INDICATOR –** The Power LED will illuminate indicating power is applied. The Status LED will indicate the status and modes of the DPM8.
  - **STATUS LED:**
  - **ON:** indicates DMX data is being received.
  - **OFF:** indicates no DMX data is being received and the unit is in Stand Alone Mode
  - **SLOW BLINK:**
    - DMX receive error – [overrun error] (reset clears)
    - Pre-Program/Setup Mode, waiting on user to apply settings
  - **MEDIUM BLINK:** Programming/setup mode

- **RAPID BLINK:** Programming/setup mode can't be entered, check settings
- **PULSE:** Programming/setup complete – Reset DIP Switches if needed and RESET POWER

Programming & Setup

STAND ALONE PROGRAMMING SETUP PROCEDURE

- To ABORT any changes from storing turn off the power and reset the dips switches as desired
- If the Status LED has a rapid blink this indicates either No DMX present, the Start Channel is above 505, or dip 11 or 12 are not in the respective position or order of switching

To store the 8 desired stand alone PWM values:

- Connect a valid DMX signal – Status LED on solid
- Set the respective DMX levels to the desired stand alone values
- Turn on Dip 11
- Turn on Dip 12 – Status LED medium blink
- Toggle Dip 11 – OFF and then ON – Status LED pulses (waiting)
- Turn of Dip 12 – The new values are stored in permanent memory – Status LED blinks twice to confirm

FREQUENCY SETTINGS

The DPM8 has 4 groups (A, B, C, D) that can each have a set frequency within the Low or High frequency range selected by the FREQUENCY RANGE dip switch. 1A and 2A will have the same frequency, 3B and 4B the same etc. The 4 groups can only be set within the selected Low or High range upon powering up. It isn't possible to have a Low and High range frequency at the same time. The Low frequency range is from 123 to 31.250Khz. The High frequency range is from 980 to 250Khz. The frequency setting can be changed per the usage requirements for example if the DPM8 is used to control LED fixtures for film or television and the frame rate shows a pulsing or strobing effect on the LEDs, then the DPM8 PWM frequencies can be adjusted to possibly eliminate that effect. Standard television frame rates are 30FPS or 60FPS and a 30x multiple of the frame rates, 30×30 is 900hz and 30×60 is 1800hz. Both frequencies can be programmed. If the DPM8 is used to control LED's or other circuits that require a PWM source and the frequency isn't important then a 150 to 400hz frequency is suggested offering a squarer PWM waveform. Note: The DPM8 PWM produce a small ripple voltage at all start and end of duty cycles. Most circuits including SSR (solid state relays) will not be affected by the ripple. NOTE: DO NOT CONTROL MECHANICAL RELAYS WITH PWM.

FREQUENCY PROGRAMMING

For both the Low and High ranges there are 4 (A, B, C, D) frequency values that can be stored and recalled depending on the power up selected Low or High frequency range. There are 3 presets that can be selected, or using the DMX assigned start channel +9 and +10 allows setting variable frequencies with coarse and fine adjustments. For precisely setting a specific frequency an oscilloscope is required.

- To calculate the approximate desired frequency (df) for Low range $100-((31,372 / df) / 2.55)$ = coarse %
- To calculate the approximate desired frequency (df) for Low range $100-((250,000 / df) / 2.55)$ = coarse %

Table FPP-1

ON 1 2 3 4	Dip 1 ON = PWM A 1/2 Dip 2 ON = PWM B 3/4 Dip 3 ON = PWM C 5/6 Dip 4 ON = PWM D 7/8

Set duty cycles for each PWM output in respect to the DMX channel(s). Select one or more many PWM groups at a time. For each PWM group any frequency within the selected low or high range can be set & viewed. Repower to abort, toggle dip switch 12 to store.

| ON
5 6 | VARIABLE
Frequency setting using DMX coarse (9th) and DMX fine (10th) values | ON
5 6 | PRESETS
Low Freq 300hz
High Freq 50Khz | ON
5 6 | PRESETS
Low Freq 900hz
High Freq 100Khz | ON
5 6 | PRESETS
Low Freq 1800hz
High Freq 250Khz |

FREQUENCY PROGRAMMING SETUP PROCEDURE:

- While programming if the Status LED has a rapid blink this indicates either no DMX present, the Start Channel is above 503.
- To ABORT any changes from storing turn off the power and reset the dips switches as desired.

To store any of the 4 PWM group frequency values:

- Unplug any PWM outputs that are sensitive to level and frequency adjustments
- Connect a valid DMX signal – Status LED on solid
- Turn off power, turn on dip 12, set DMX Start Channel to 503 or less
- Turn on power – [Waiting on user to preset dips switches 1-6] (all can be set to OFF) – LED BLINKS FAST
- Toggle Dip 12 off then on to enter programming setup mode, PWM outputs will be responsive to settings –
- Status LED medium blink
- Set dip switches according to table FPP-1 until any or all of the frequencies are as desired
  - Turn on DIPs 1-4 respectively for the PWM(s) to adjust
  - Turn on DIPs 1, 2, 3, and/or 4 respectively for the PWM(s) groups (A, B, C, and/or D) to adjust
  - For variable frequency adjust dips 5 & 6 should be OFF, use the 9th channel to coarse adjust and the 10th channel to fine adjust the desired frequency.
  - For preset frequency(s) dips 5 and 6 should be set per table FPP-1
  - Continue to repeat PWM group(s) selections and adjustments until any or all frequencies are set
- Once the PWMs are set as desired turn off DIP 12 to store settings – 2 confirm blinks
- Repower and test the new frequencies are as desired

Specifications

DMX CONTROL WARNING: NEVER use DMX data devices where human safety must be maintained. NEVER use DMX data devices for pyrotechnics or similar controls.

- **MANUFACTURER:** ELM Video Technology
- **NAME:** DMX to PWM Controller and/or Driver
- **DESCRIPTION:** The DPM8 converts DMX to variable duty cycle PWM (Pulse Width Modulation)
- **MPN:** DPM8-DC3P
- **MODEL:** DPM8
- **CHASSIS:** Anodized Aluminum .093″ thick RoHS compliant
- **PCB FUSE:** SMT 2A
- **PWM OUT FUSE:** Inline 2A (installed if unit has a 12V output)

- **POWER INPUT:** +12VDC 80mA + sum of PWM outputs
- **PWM VOLT/AMP:**
    - Ground Drive Unit outputs a ground signal for the duration of the respective duty cycle at a max of 150mA. If an alternate external power supply max voltage 30VDC.
    - 3.4V Control Voltage Unit outputs a +3.4 volt signal for the duration of the respective duty cycle at a max of 5mA
- **DATA TYPE:** DMX 512 (250Khz)
- **DATA INPUT:** 3 (or 5) pin male XLR [Pin 1 Not connected, Pin 2 Data -, Pin 3 Data +]
- **DATA LOOP OUT:** (If equipped) 3 (or 5) pin female XLR, [Pin 1 Looped from pin 1 of input XLR, Pin 2 Data -, Pin 3 Data +]
- **CHASSIS GND:** Input power connector negative shorts to chassis
- **RDM CAPABLE:** No
- **DIMENSIONS:** 3.7 x 6.7 x 2.1 inches
- **WEIGHT:** 1.5 pounds
- **OPERATING TEMP:** 32°F to 100°F
- **HUMIDITY:** Non condensing
- **OUTPUT CONN.:** 9 pin terminal block
- **POWER SUPPLY:** +12VDC wall mount
    - **Voltage Input:** 100 ~ 132 (or 240) VAC
    - **Current Output:** 1A or 2A depending on unit/options
    - **Polarization:** Positive Center
    - **Output Conn.:**
        - 12V unit – Locking Barrel Plug, 2.1mm I.D. x 5.5mm O.D. x 9.5mm
        - 5V unit – Locking Barrel Plug, 2.5mm I.D. x 5.5mm O.D. x 9.5mm

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Documents / Resources

ELM Video Technology DPM8 DMX to PWM Controller Driver [pdf] User Guide
DPM8 DMX to PWM Controller Driver, DPM8 DMX, to PWM Controller Driver, Controller Driver

References

- **DMX and Midi Products | Home | ELM Video Technology**