

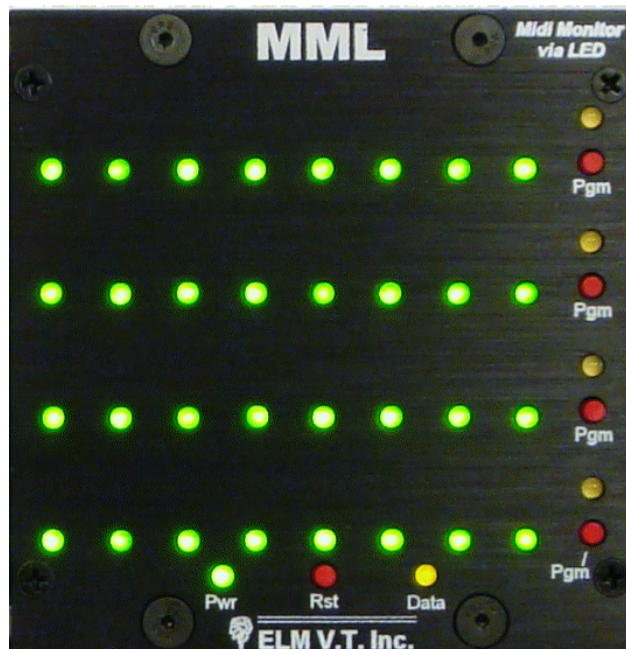
# MML

## Midi Monitor via LED

M Series Module



**ELM Video  
Technology, Inc.**  
*"Innovative Midi and DMX Products"*





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## Important Safeguards

Read and follow all instructions BEFORE installing or using this product.

Do not attach any product or accessories that the manufacturer does not recommend.

Keep in a well ventilated environment.

Never use or store the unit in places that are:

- Subject to temperature extremes (direct sunlight, in an enclosed vehicle, near a heating duct)

- Wet, damp and humid areas

- Dusty

- Subject to high levels of vibration

Use proper Power Sources. This product should be operated only from the type of power source indicated on the marking label or as is described in this manual.

Route power cord safely. Don't allow twists, bend the power cord, or place heavy objects on it.

Ground your equipment whenever possible.

Do not attempt to service this product unless noted otherwise.

If the unit stops working for any reason, unplug the power and other connections until repaired.

This unit should be used only with a rack or chassis that is recommended by the manufacturer.

Unplug the device when not in use.

Keep away from small children.

## PRODUCT OVERVIEW

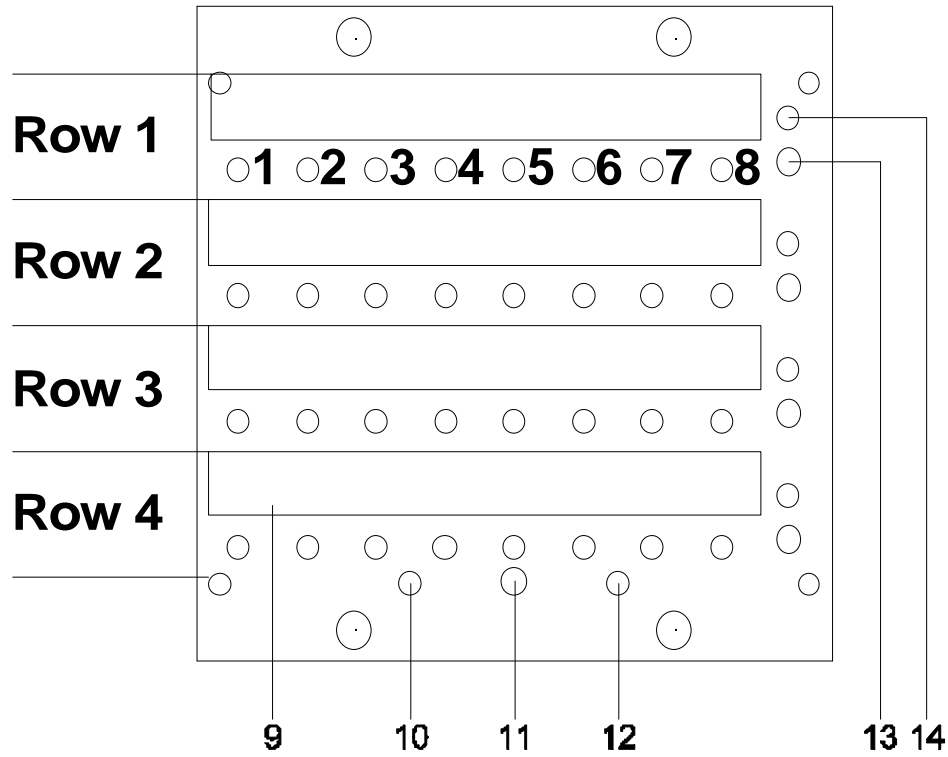
The MML is a fully input isolated midi message monitoring system. Each of the 32 LED's are programmable to a specific message and will respond each time that message is received. Program Change, Channel After touch, and System Exclusive messages turn the respective LED's on and automatically turns off after 3 seconds. Note On, Polyphonic After touch, Control, Channel After touch, and Pitch Wheel messages will vary the brightness of the LED's via the velocity or data byte. Ideal for show control configurations. If the LED's are programmed as NOTE positions then the LED's will respond to NOTE OFF, CHANNEL VOLUME (controller 7), and ALL NOTES OFF messages. ANY MIDI message can be assigned to ANY LED and each row can be programmed to respond or ignore CHANNEL information.

Each row has a 33%, 66% and 100% brightness and lamp test and an optional (programmable) data indicator LED to verify data to that row and a reset button, and a power & data indicator for the entire module.

The rows are spaced for easy labeling of each LED.



## SWITCH & CONNECTION OVERVIEW



Each row of 8 LED's are independently programmed and operated sharing only the same data and power line.

1-8 LED's - MIDI message indicators.

9. Labeling area

10. Green power indicator

11. Reset for local module only. Resets ALL 4 rows

12. Yellow data indicator

13. PGM button - row 1 lamp test and programming button

14. Row 1 data / programming indicator



## Installation

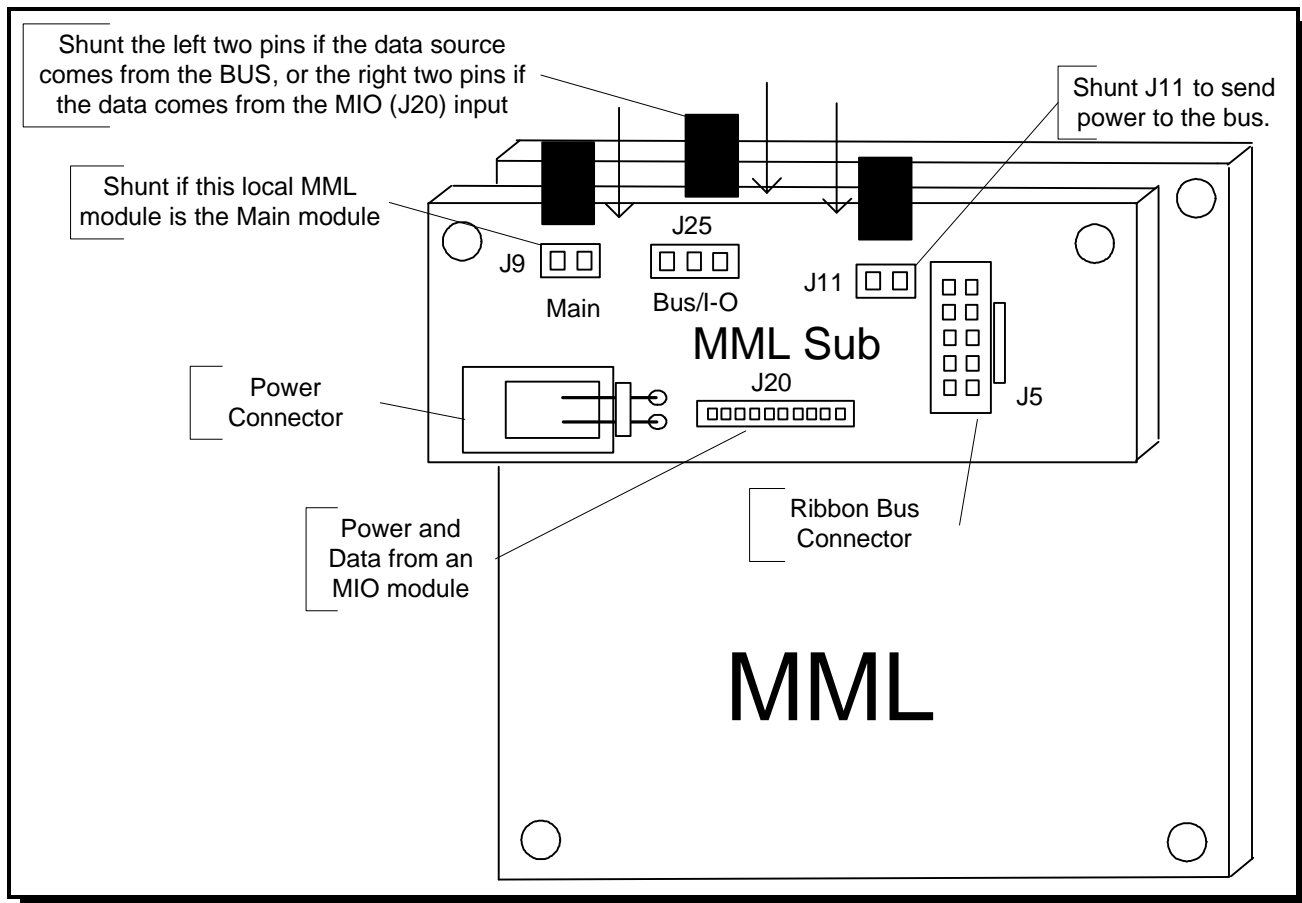
### Note

\* Take care not to touch the component pins or the inner pins of the connectors. Electrostatic discharge may cause permanent damage to the unit.

Before placing the module into the M Series frame make any necessary jumper changes. If the MML does NOT have the optional MML Sub (rear power and Mdi input and output connectors) then skip to step 2.

For each chassis one and ONLY one module should be set up as the 'MAIN' module, all other modules are considered 'SECONDARY' modules. The MAIN module has the power supply connected and supplies the other 4 SECONDARY modules the power via the BUS (ribbon cable) or the 2 conductor power cable. The MAIN module also can send the received data to the ribbon cable or can be an independent module. Factory jumper settings are not preset and must be properly jumpered to operate.

Jumper J11 on the MML board if power is to be taken from the Ribbon Cable. If the MML has an "MML Sub" board attached (needed to deliver the MIO data and power to the local MML and to the BUS), Jumper J11 to send power to the Ribbon Bus cable. Use the Power Connector with the 2 conductor power cable to deliver power to other modules that do not have a ribbon connector (J5). Jumper J9 if the local MML is the MAIN module. Jumper the left two pins of J25 if this local MML module gets its data from the Bus, jumper the right two pins if the data comes from the MIO module via (J20). ONLY 1 unit per chassis should have J9 jumpered.





## Step 2

Set the 'DIM' jumper on the LED board to adjust the LED's brightness. To make the LED's dimmer, move the jumper in the direction of the arrow on the PCB.

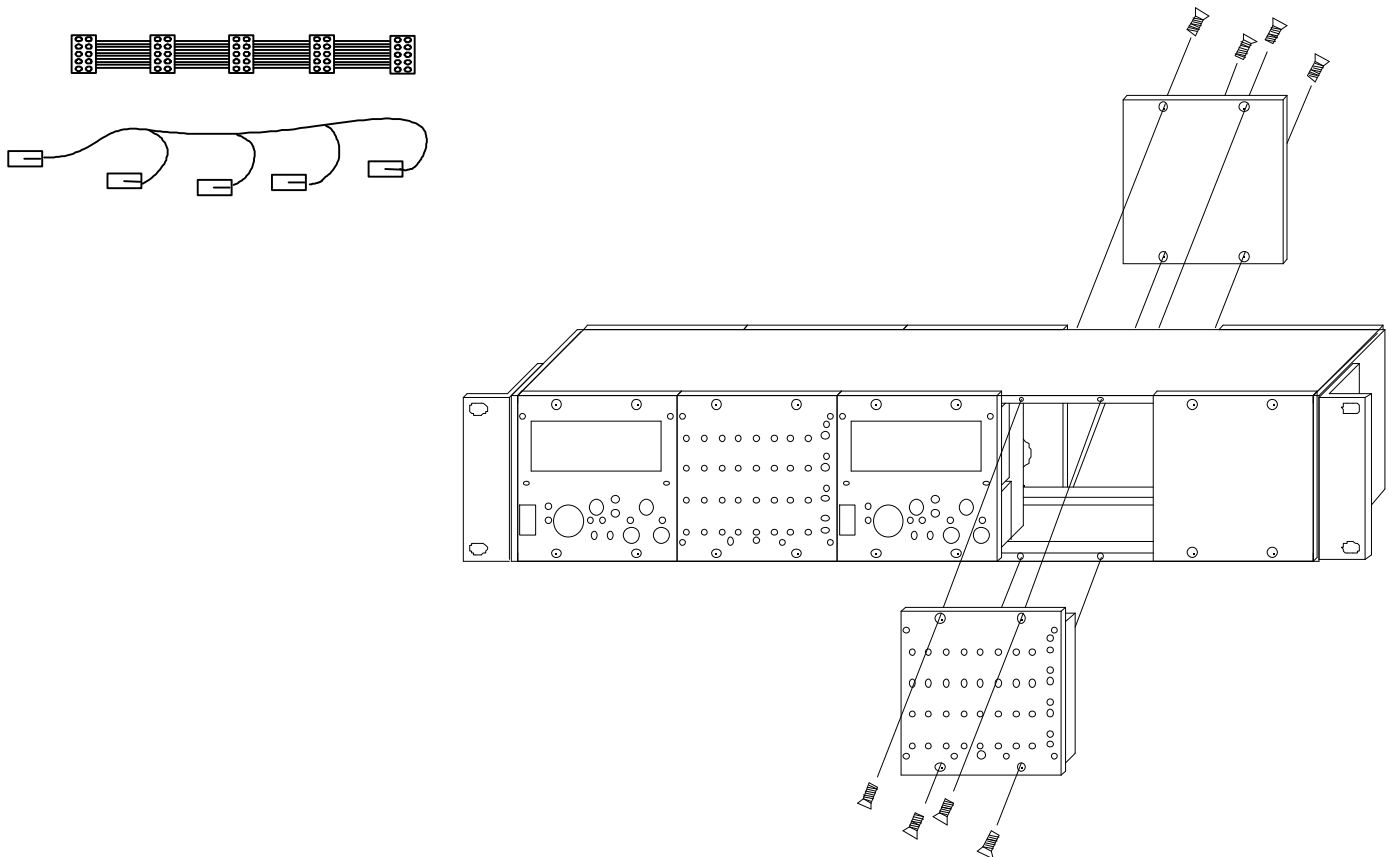
The MML can be installed in any of the 5 module positions using (4) 6-32 screws (supplied with the M series Enclosure). If the unit is to be set up as the 'MAIN' module, it is recommended (but optional) to place it in the left most position. Once the jumper settings are set and the module is mounted, flip the unit over and attach the ribbon cable (supplied with the M series Enclosure) to the PCB (s) 10 pin connector (J5), note the polarizing plug faces the edge of the board. Inspect the ribbon cable alignment before powering the unit. Install the rear module using (4) 6-32 screws (supplied with the M series Enclosure).

After the unit has been installed, check that the unit powers up and that data is being received via LED's (10), (12). Now you're ready to program the unit.

**Labels** - The labels can be laser, ink jet printed or hand written and are removable. Label each LED as desired and place above the appropriate row. Be sure to include in your labeling whether the row is set for channel response or not.

*Never use any modified or other modules other than genuine ELM V.T. Inc. modules.*

*Never allow 2 power supplies to run in parallel or 2 'Data Outputs' (J9) to be connected at the same time within a chassis.*





## Operation

After the jumpers are set and assembly is complete power the module. There are 2 modes of operation per row: **PROGRAM** and **RECEIVE** mode. The module powers up in the receive mode.

**PROGRAM MODE** - Before entering the program mode, stop ALL data being received except from a controlled source. By entering the program mode with stray or unknown data/messages, (for example a keyboard, or MIDI software being played), the unit will be programmed to the next few messages received and you will lose your current settings.

The MML is very flexible in its programming. Any LED can be programmed for any Midi Message (except 'Note Off', which will turn off the LED) and can be programmed for the same message if desired. To assign a specific message to an LED simply go into the program mode and send the message, when then the LED position advances to the next position the message is stored. (Always verify your message programming by exiting the program mode and resending.)

While in the program mode the only data that will be ignored is: Note Off (8X) [see Receive Mode], Midi Time Code (F1), Timing Clock (F8), and Active Sense (FE) These messages are assigned differently. [See Assigning F1, F8, FE to an LED below.] To enter the pgm mode in that ROW, press and hold the 'PGM' button and reset or toggle the power, the yellow LED will light. Once in the pgm mode the 1st LED will light waiting on the next message to assign to that position. Once there has been a message received it will immediately advance to the next position or may pause (indicated by a blink) for 3 seconds and then advance. Upon advancing, the message is stored IMMEDIATELY into permanent memory. Continue to assign all eight positions by sending the desired messages while the respective LED is on. **To EXIT the program mode at any time press the RESET button.**

**Assigning Midi Time Code (F1), Timing Clock (F8), and Active Sensing (FE) to an LED** If you want to skip any position without changing the stored setting, simply TAP the pgm button. If you want to assign Midi Time Code (F1), Timing Clock (F8), and Active Sense (FE) to the lit position then press and hold the pgm button until the LED blinks. 1st you'll see a slow blink, this represents (F1), if you TAP the pgm button again it will blink at a medium rate, this represents (F8), if you TAP the pgm button again it will blink fast and this represents (FE). You can continue to cycle through these settings, once you've selected the desired setting press and hold the pgm button, this will store the setting and advance to the next position. **NOTE a reset while in this setting will keep the OLD message.**

**Assigning PROGRAM CHANGE messages**-PROGRAM CHANGE messages have 2 modes of response; ANY program change message, or PROGRAM NUMBER response. This setting is set by the sending a PROGRAM CHANGE message and within the 3 second window press Program number 00. This will set the ENTIRE ROW that has a 'PROGRAM CHANGE' position programmed to respond EVERY TIME a program change is sent regardless of the number. To cancel this feature simply program ANY position as a 'PROGRAM CHANGE' with OUT sending the Program 00 command within 3 seconds.

**Channel Response On/Off**- The next setting toggles between; Channel response/no response. The current setting is displayed, to keep the current setting and skip to the next press and hold the pgm button until the LED('s) turn off. To make a change, toggle by TAPPING the pgm button. If you want channel information to be ignored then select the 'no response' setting indicated by the green LED's 1,2,3 and 4 on. If you want the unit to 'respond' to channel information then toggle the setting indicated by the green LED's 5,6,7 and 8 on. Once you've selected the desired setting press and hold the pgm button to EXIT the program mode.

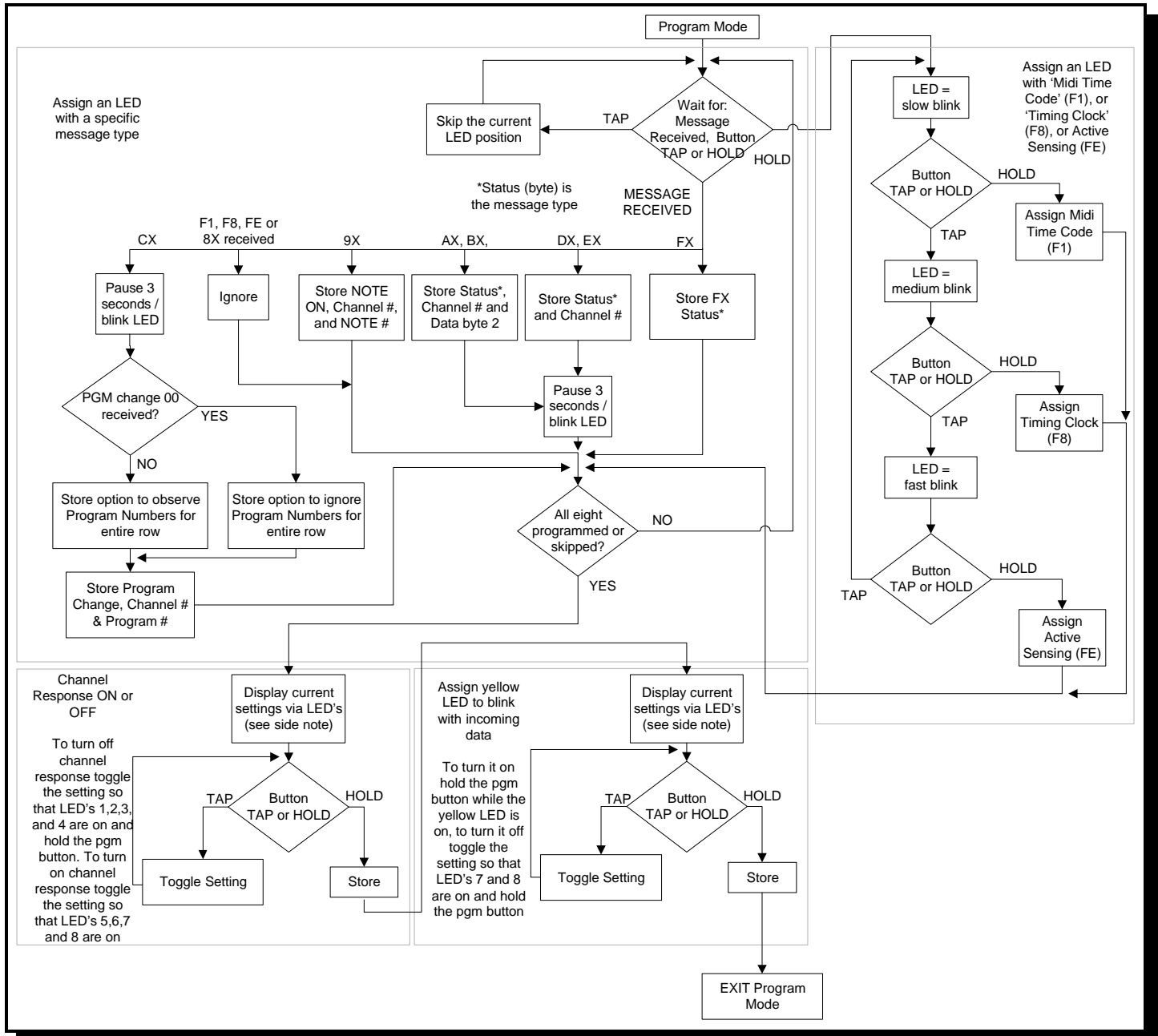
**Data Indicator On/Off**- Once you pass the 8th position the unit will allow you to toggle between 2 settings; data indicator on (yellow LED on) or data indicator off (yellow LED off, green LED's 7 & 8 on). The current setting is displayed, to keep the current setting and skip to the next press and hold the pgm button until the LED('s) turn off. To make a change toggle by TAPPING the pgm button. Once you've selected the desired setting press and hold the pgm button.

See the 'Program Mode Flow Chart' for further explanation.

**Note - Each time you program a position the channel information is stored whether your unit is set up to respond to it or not. If you turn the 'channel response' feature on you may need to reprogram the message with the correct channel number.**



## Program Mode Flow Chart



Once you exit the program mode your in the receive mode.

**ALWAYS TEST ALL 8 PROGRAMMED MESSAGE POSITIONS AFTER EXITING THE PROGRAM MODE WHETHER CHANGES WERE MADE OR NOT**

All changes made will be stored in permanent memory. (The unit does not have to be powered to retain settings.)



**RECEIVE MODE** - After the unit is installed and programmed it is ready for displaying incoming messages. The green LED (10) indicates power is present to the unit. The reset button (11) will reset ALL 4 rows and return them to a receive mode. The yellow LED (12) is a data indicator and will blink rapidly while any data is present to ALL of the rows.

Each row is completely independent of the other, if one row is in the program or lamp test mode the other rows are in a normal receive mode. The unit will ignore all incoming messages except the 8 programmed messages. When a matching message is received the programmed LED(s) will respond either by brightness via the 2nd data byte or turn on full brightness and may stay on until an appropriate message is received to turn it off or until the 3 second timer elapses. See the 'LED Response Table' for further explanation.

One of the main features of the unit is the way the MML responds to NOTE messages. If an LED is programmed as a NOTE ON, then it will respond to other messages too. For example if an LED is programmed as NOTE C# 3 channel 01 then each time a NOTE C# 3 channel 01 is received the unit will light that LED at the brightness of the 'VELOCITY' information (Visit the Midi Manufacturers Association for MIDI specifications. (<http://www.midi.org/>)). If another NOTE C# 3 is sent the LED will change it's brightness to the new velocity number. This LED will stay on indefinitely until the unit receives;

C# 3 Channel 01 (if channel response is turned on) Note off message or,  
an 'ALL NOTE OFF' (Control 123) message or,  
a 'CHANNEL VOLUME' (Control 07) Channel 01 (if channel response is turned on) message is received

If the NOTE OFF or the 'ALL NOTE OFF' message is received the LED will turn off, if the 'CHANNEL VOLUME' message is received and the channel information is correct the LED will change brightness. The formula for brightness is  **$(\text{note velocity} - (128 - \text{channel volume})) = \text{LED brightness (negative result} = 0)$**  Note that if a 'CHANNEL VOLUME' (Control 07) message is received, this 'master brightness' will be stored and ALL subsequent NOTES on that channel will use the same formula to set it's brightness. To correct this simply send another 'CHANNEL VOLUME' (Control 07) at 127 velocity.

**Lamp Test** - Anytime while in the receive mode the unit can enter the lamp test mode by tapping the program button in that row. The 1st tap will light the LED's at 33%, the 2nd tap at 66% and the 3rd tap at 100% brightness. Tapping the program button once more will turn off the LED's and return to the receive mode. Note that the previous LED's status will be and erased and there will not be any data received while in the lamp test mode.

Visit the Midi Manufacturers Association for MIDI specifications.  
( <http://www.midi.org/> )



## LED Response Table

Message Received	Match means LED =	Timed Turn off ?	Programming Delay? (5)	LED Pos Assignable
<b>Note Off (8X)</b>	OFF	N/A	N/A (1)	NO
<b>Note On (9X)</b>	velocity = brightness	NO / (2)	NO	YES
<b>Polyphonic Aftertouch (AX)</b>	velocity = brightness	NO	YES	YES
<b>Control Change (BX)</b>	data 2 = brightness (3)	3 seconds	YES	YES
Control Change (BX) Exceptions Control Damper Pedal (64)	= > 63 OFF, = < 64 ON	NO	YES	YES
Control Portamento (65)	= > 63 OFF, = < 64 ON	NO	YES	YES
Control Sostenuto (66)	= > 63 OFF, = < 64 ON	NO	YES	YES
Control Soft Pedal (67)	= > 63 OFF, = < 64 ON	NO	YES	YES
Control Legato Ft Switch (68)	= > 63 OFF, = < 64 ON	NO	YES	YES
Control Hold 2 (69)	= > 63 OFF, = < 64 ON	NO	YES	YES
Control Local Control On/Off (122)	0 = OFF, 127 = ON, all other = no change	NO	YES	YES
<b>Program Change (CX)</b>	pgm # = brightness (4)	3 seconds	YES (6)	YES
<b>Channel Aftertouch (DX)</b>	velocity = brightness	NO	YES	YES
<b>Pitch Wheel (EX)</b>	position = brightness	3 seconds	YES	YES
<b>System Exclusive (F0 / F7)</b>	ON full	3 seconds	NO	YES
<b>Midi Time Code (F1)</b>	ON full	3 seconds	NO	YES
<b>Song Position Pointer (F2)</b>	ON full	3 seconds	NO	YES
<b>Song Select (F3)</b>	ON full	3 seconds	NO	YES
<b>Undefined (F4)</b>	ON full	3 seconds	NO	YES
<b>Undefined (F5)</b>	ON full	3 seconds	NO	YES
<b>Tune Request (F6)</b>	ON full	3 seconds	NO	YES
<b>Timing Clock (F8)</b>	ON full	3 seconds	NO	YES
<b>Undefined (F9)</b>	ON full	3 seconds	NO	YES
<b>Start (FA)</b>	ON full	3 seconds	NO	YES
<b>Continue (FB)</b>	ON full	3 seconds	NO	YES
<b>Stop (FC)</b>	ON full	3 seconds	NO	YES
<b>Undefined (FD)</b>	ON full	3 seconds	NO	YES
<b>Active Sensing (FE)</b>	ON full	3 seconds	NO	YES
<b>System Reset (FF) (7)</b>	ON full	3 seconds	NO	YES

(1) A 'NOTE OFF' cannot be assigned. This function is only used to turn off a matched LED.

(2) Any position programmed as a NOTE ON will be changed by; a velocity change, a 'Note off' message, Control Change (07) Channel volume and Control Change 'ALL NOTES OFF'.

(3) A message with a velocity of 0 (on a matched LED position) will cause the LED to turn off if it's on or will NOT turn on if it's already off. For example; if a message of Controller Change / # 15 / data byte of 125 is received the LED will light at 125th of 127th brightness, but if a data byte of 0 is sent the LED will turn off if it's on, and will NOT come on if it's off.

(4) While in the programming mode, the Program change can be programmed per row to turn on full for ANY program change, see the program mode section.

(5) The 'programming delay' indicates whether there is a delay of 3 seconds if a specific message is received, after the delay the unit can then receive messages again to program the next positions.

(6) During the 3 second pause a program change of '00' can be received to turn on "any program change" feature - see the programming mode.

(7) A 'System Reset' message will NOT reset the unit.



## Troubleshooting

<b>PROBLEM</b>	<b>CHECK</b>
Unit won't power up	check fuse and power connections check the ribbon cable
Won't receive data on local module	verify data is being sent from source check that the ribbon cable is connected properly
MAIN module will receive data but the SECONDARY modules do not	check that J9 is jumpered on MAIN module check that the ribbon cable is connected properly make sure that two data signals are not on the ribbon cable (see jumper settings section)
LED's won't respond to anything	check that the channel number being sent is correct reprogram AND immediately check a specific LED for operation
Midi out connector is not sending data	check thru jumper is installed
LED's are responding to messages on other channels	Turn on 'channel response' in the program mode
'Program Change' LED's are responding to ALL program change messages not to the program #	Turn on 'program change # response' in the program mode

## Specifications

Power Consumption	.32 Amps with all LED's on at full brightness
Dimensions	3.385" Width X 3.485" Height X 1.1" Depth
Data Type	MIDI 31.5 Khz
Memory Storage Cycles	10,000 times

SV 01.11 MR 1