

PedalSync™

MIDI Program Change and Bank Select chip

MV-65



Chip MV-65

PedalSync MIDI Program Change and Bank Select chip MV-65 is designed to add additional functionality to the PedalSync Master Control Dev. Board (MV-58B), by providing the brains for an external controller which uses discrete switches for bank up/down and for each program.

MV-65 sends MIDI Bank Select and Program Change messages in 16 banks of 8 program each.

Key Features

- Provides an alternative interface to the PedalSync Master Control Dev. Board (MV-58B) which is more familiar to some musicians.
- Featuring Bank Up and Down buttons, and
- SPST inputs with corresponding LED outputs for selecting MIDI Programs 1-8 in each Bank
- Simple, familiar user interface
- Efficiently Designed to ensure Low part count
- Uses low-cost momentary switch inputs
- Thru-Hole or SMT
- Use PedalSync™ trademark on your devices and in advertising

User Interface

Switch Inputs

All switch inputs have an internal weak pull-up resistor and will be held high if not connected.

Connect one lug on an SPST momentary switch to the desired input pin, and the other lug to the power ground.

Bank Select Inputs

(pins 23 & 24)

Pin 24 is the “Bank UP” Input, while Pin 23 is the “Bank DOWN” Input. When these inputs are pulled low, the MIDI Bank number is incremented or decremented, and the corresponding MIDI Bank Select message is sent on Channel 15.

Note: MIDI Bank Select is Control Number “0” and the literal values sent are 0-15, corresponding to banks 0-F (hex).

Program Change Inputs

(pins 2, 3, 7, 9, 10, 11, 12, & 25)

When a given Program Change Input is pulled low, the corresponding MIDI Program Change data is sent over Pin 21, as set forth in the *Table of Literal MIDI Program Change values, below*.

Note: MIDI Program Change messages are not channel-specific.

Pulling a Program Change Input low also sets the corresponding LED Output Pin high, while setting all other LED Output Pins low.

Program	Input Pin	LED Output Pin
8	2	4
7	3	5
6	7	18
5	9	6
3	10	22
4	11	15
1	12	14
2	25	26

Although there are eight (8) Program Change Inputs, devices can be designed with any number of Programs (up to 8) per Bank. The number of available programs will be 16x the number of Program Change Inputs used.

LED Outputs

(pins 4, 5, 6, 14, 15, 18, 22, & pin 26)

Pulling a Program Change Input low sets the corresponding LED Output Pin high, while setting all other LED Output Pins low.

Be sure to observe the current limits set forth in the *Table of Pin Voltage and Current Limits, below*

MIDI Data Transmit Output

(pin 21)

MIDI data is sent out Pin 21 (MIDI TX).

MV-65 can be connected directly to the PedalSync Master Control Dev. Board "RESET" pin via a 330 ohm series resistor, as long as MV-65 and the Dev. Board share a common Power Ground connection.

Alternately, use a standard 5-pin DIN MIDI cable as shown in the schematic, *below*.

Connecting to PedalSync Master Control Dev. Board (version MV-58B)

MV-65 can be powered by the Master Control Dev. Board (*version MV-58B*) using the +V and GD pins. Be sure to still use capacitors C1, C2, and C16 as shown in the schematic.

Using a series 330-ohm resistor, the MV-65 MIDI TX Pin (*pin 21*) is connected to the **RESET Header Pin (H)** on the Master Control Dev. Board. This is the MIDI Bank/Program Change input on MV-58B.

Direct connection is only possible when MV-65 and the Dev. Board share a common Power Ground connection. See the [*Master Control datasheet*](#) for more information:

http://www.pedalsync.com/documentation/PedalSync_Master_Control_Development_Board_Datasheet.pdf

Alternately, the MIDI Input can be connected in the typical fashion, as shown on the schematic, *below*.

Note: *Although programs on Master Control version MV-58B can also be selected using the UP and DOWN Buttons, **it is not recommended** to create devices that use these buttons as well as the MIDI Input, as users may be confused.*

Display of Bank and Program numbers on the Master Control

The Master Control Dev. Board *MV-58B* display shows programs in 16 Banks of 8 Programs each.

Bank values 1-16 are shown as "b0.", "b1.", "b2.", "b3.", "b4.", "b5.", "b6.", "b7.", "b8.", "b9.", "bA.", "bB.", "bC.", "bD.", "bE.", and "bF."

Program numbers 1-8 for each Bank appear after the Bank values as "b0.1" through "bF.8"

If the Display is flashing a Bank number, a new Bank has been selected but not engaged. The pending Bank will become the current Bank as soon as a Program Change value has been received. Once the Program Change is received, the Display stops flashing.

Electrical Considerations

Place C16 and C2 as close as possible to Pin 13 and Pin 20, respectively.

Place C1 as close as possible to Pins 27 and 28.

Connecting Pin 2 of the MIDI Out jack to Digital Ground (DG) will reduce digital noise.

Pin Voltage and Current Limits

Pin	Max Voltage	Max Current*
1	5	4
2	3.3	12
3	3.3	12
4	3.3	12
5	3.3	12
6	3.3	4
7	3.3	4
8	GND	
9	3.3	4
10	3.3	25
11	3.3	12
12	3.3	4
13	3.3	
14	5	12
15	5	12
16	5	4
17	5	12
18	5	12
19	GND	
20	N/A	
21	5	12
22	5	12
23	3.3	4
24	3.3	4
25	3.3	4
26	3.3	4
27	GND	
28	3.3	

* 200 mA max current sink or source for the whole chip at any given time, except on the Module which is limited to ~50 mA. Keep your currents low to minimize noise.

The schematic below shows the necessary connections. Note that you can use different resistors for the LEDs depending on the type of LED used. Be careful not exceed the current limits of the underlying chip. If you require brighter LEDs, consider using buffers for the LEDs that connect directly to the chip, or use ultra-bright LEDs.

The datasheet for the underlying dsPIC33FJ64GP202 chip can be found [here](http://www.microchip.com/wwwproducts/Devices.aspx?dDocName=en532310):
<http://www.microchip.com/wwwproducts/Devices.aspx?dDocName=en532310>

Noise

It is very important to properly filter your power supply as shown in the schematic.

To minimize digital noise bleeding into your audio circuit, be careful to run separate grounds as indicated on the schematic.

Follow proper PCB layout design rules and isolate the digital and analog sections of your circuit as much as possible, connecting the grounds at a common point at the power supply when possible.

MIDI - Backward Compatibility

The exclusive MIDI channel for the PedalSync system is MIDI Channel 15. MV-65 MIDI Program Change and Bank Select messages are sent on this channel only

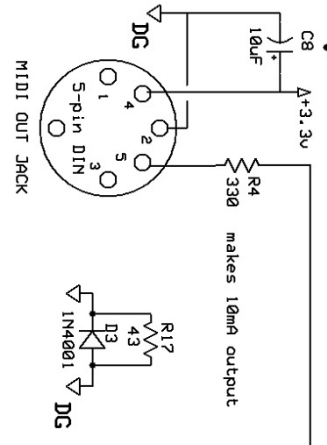
Table of Literal MIDI Program Change values

		Bank															
		0	1	2	3	4	5	6	7	8	9	A	b	C	d	E	F
Program	1	0	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	2	1	9	17	25	33	41	49	57	65	73	81	89	97	105	113	121
	3	2	10	18	26	34	42	50	58	66	74	82	90	98	106	114	122
	4	3	11	19	27	35	43	51	59	67	75	83	91	99	107	115	123
	5	4	12	20	28	36	44	52	60	68	76	84	92	100	108	116	124
	6	5	13	21	29	37	45	53	61	69	77	85	93	101	109	117	125
	7	6	14	22	30	38	46	54	62	70	78	86	94	102	110	118	126
	8	7	15	23	31	39	47	55	63	71	79	87	95	103	111	119	127

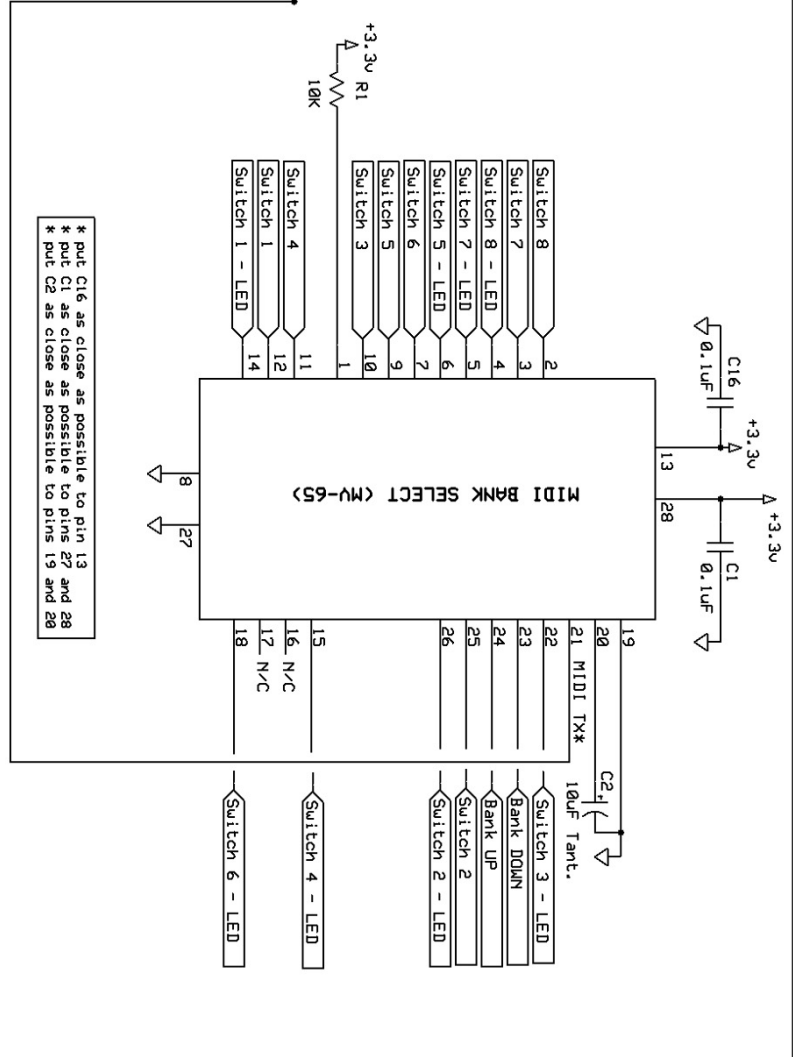
SM
 All Switch INPUTS
 get connected to separate
 momentary switches > Ground

Observe current limits on LED output pins
 as set forth in the Datasheet

Put the 10uF cap right on any OUT Jack

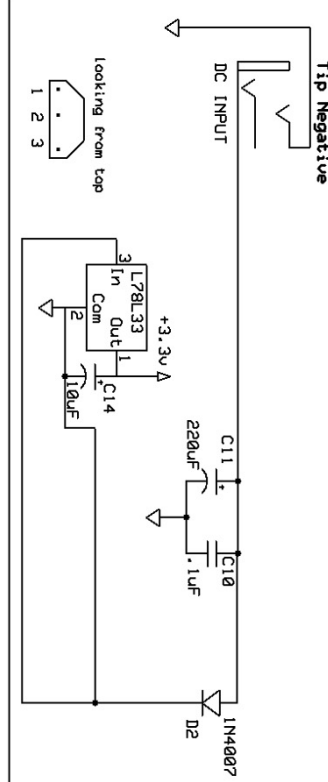


NOTE:
 2 Different Grounds



* put C16 as close as possible to pin 13
 * put C1 as close as possible to pins 27 and 28
 * put C2 as close as possible to pins 19 and 28

* MV-65 can be connected directly to the PedalSync Master Control Dev. Board "RESET" pin with a 330 ohm series resistor, as long as MV-65 and the Dev. Board share a common Power Ground connection.
 MV-65 can also be powered by the Master Control Dev. Board at the +V and GD pins. Be sure to still use C1, C2, and C16.



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Related Products

- Use with the PedalSync Master Control Dev. Board *version MV-58B* to recall MIDI Banks 1-16 and Programs 1-128 on Channel 15.

Support

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DISCLAIMER

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