PEdAL SYnC™

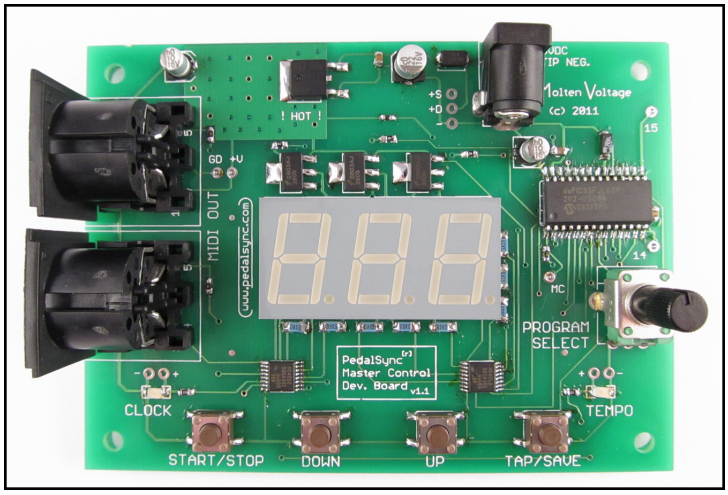
AUDIO CONTROL CHIPS

the future just showed up

PedalSync™

Master Control Development Board

MV-58 and MV-58B



Key Features

- Fully functional stand-alone Master Controller for the PedalSync system
- Large vivid display -- very easy to read
- Backwards-Compatible with MIDI
- Versatile tempo control, including precision tap tempo
- PedalSync and MIDI Clock data output
- Robust, 128 program storage
- Causes other compatible PedalSync chips to self-program
- Simple, intuitive user interface
- Header pads for external connection of switches, jacks, and visual indicators
- Designed as Dev. Board or for mounting in an enclosure for your name-brand PedalSync controller
- Two MIDI Out jacks
- Synchronized Pulse output and Reset for CV sequencer compatibility (*MV-58*)
- MIDI Program Change and Bank Select Input (*MV-58B only*)
- Two Separate Display Options
- Use PedalSync™ trademark on your devices and in advertising

Overview

The PedalSync Master Control Development Board sends Program Change, Clock, and Self-Programming commands to other PedalSync devices.

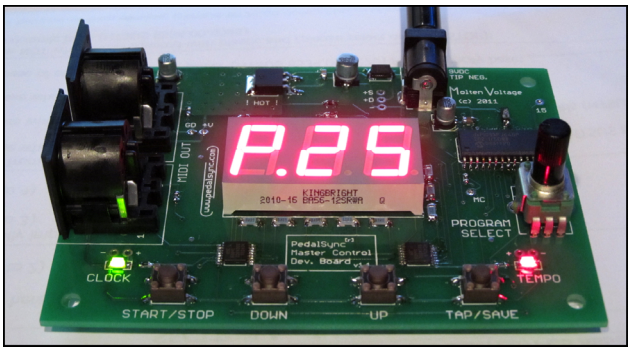
Designed with the End User in mind.

The Master Control interface has been designed to make switching and storing programs as simple as possible so the end-user can concentrate on being creative.

Programs are selected using the Up and Down buttons or by turning the Program Select knob. MV-58B also receives MIDI Program Change and Bank Select numbers on Channel 15.

The selected program number is displayed on a large bright 3-segment LED display. The selected program is engaged by pressing the Start/Stop button or upon receipt of a MIDI Program Change value (*MV-58B only*).

Causing the Dev. Board and all connected PedalSync devices save their current settings is even easier - simply hold down the Tap/Save button for 2 seconds.



Tempo Control

The Master Control interface sends out standard MIDI clock information so all sequencing, oscillating, and repeating PedalSync chips are synchronized.

Tempo can be continually adjusted on-the-fly with the Tap Button, using the Up and Down buttons, using the Program Select pot after an initial tap, or via a pulse input. An LED indicates the current tempo, allowing users to adjust the tempo when the clock output is stopped.

The Master Control chip stores the tempo associated with each of the 128 programs. Alternatively, a program can use the existing tempo, making it easier to use multiple programs during a single song.

Backwards-compatible with MIDI

The PedalSync Master Control chip sends out standard MIDI Start, Stop, and Clock messages as well as Song Select and Program Change messages on Channel 15.

As a result, the PedalSync Master Control chip can synchronize an entire rig, including MIDI-enabled rack effects, pedals, modular synths, and amplifiers.

Follow is a description of the PedalSync Master Control Development Board components:

MIDI OUT

The two MIDI OUT Jacks send PedalSync and MIDI data as well as PedalSync self-programming messages.

Connect a standard 5-pin DIN MIDI cable to either MIDI OUT jack.

The output of both jacks is identical. The jacks are separately buffered and may be used simultaneously.

Display

The .75" x 1.5" Display provides a variety of information.

On startup, the display will show the PedalSync version information, flash Program 1 and show its tempo, then indicate Program 1.

Program number - MV-58 Only

The MV-58 Display shows Program numbers as follows:

Programs 1-99 appear as P. 1 through P.99

Programs 100-128 appear as u.00 through u.28. "u" means "upper".

Program 27

Programs are selected with the UP and DOWN Buttons and the PROGRAM SELECT Pot as described below. If the Display is flashing a program number, a new Program has been selected but not engaged.

Once the new Program is engaged by pressing the START/STOP Button, the Display will stop flashing.

Bank and Program number - MV-58B Only

The 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.”

Bank “F”

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

Banks and Programs are selected via the MIDI Bank/Program Change Input (*see below*).

These changes are sent via the PedalSync MIDI Bank Select Chip MV-65, or any other MIDI device that can transmit Program Changes and Bank Select data on Channel 15.

Banks are selected via MIDI Control Change number “0” on Channel 15. Values 0-15 correspond to Banks 1-16.

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.

Programs are selected via MIDI Program Change values 0-127, which correspond to programs 1-128 (*displayed “b0.1 through “bF.8”*).

Bank 5, Program 2

Note: It is not necessary to select a Bank before sending any Program Change value.

Programs on MV-58B can also be selected using the UP and DOWN Buttons as described below. However, ***it is not recommended*** *to create devices that use these buttons as well as the MIDI Input, as users may be confused*.

Tempo information

If a Program has a fixed tempo associated with it, the far right decimal point (after the last character) will be off. If a Program uses the "oLd" tempo from the prior Program, then the far right decimal point will be *on*.

When the TAP/SAVE Button is pressed (for less than 2 seconds), the current tempo will be displayed. The tempo can then be changed by tapping again, pressing the UP or DOWN Buttons, or turning the Pot, as described below.

Programming information

If the TAP/SAVE Button is pressed and held for 2 seconds, the display will show the letter "P" to indicate that upon release of the button, the selected Program will be stored, as described below.

If the DOWN Button is pressed while the TAP/SAVE Button is being held, the decimal after the "P" will come on to let you know that the program will always use the "oLd" tempo from the prior Program, rather than the current tempo.

Power Connection

The square black Voltage Regulator and the top and bottom copper pads under it get hot. The copper pad is labeled as !HOT! on the circuit board.

> **Do NOT allow wires or other parts to rest against the Voltage Regulator or the copper pads under it.**

The power jack accepts a 2.1mm tip-negative 6-9 volt DC input. Do not exceed 9 volts.

> *Note: the lower the input voltage, the less heat the voltage regulator will generate*

CLOCK LED

When the CLOCK LED is illuminated, MIDI Clock data is being sent over the MIDI OUT jacks. The CLOCK LED is toggled when the START/STOP Button is pressed unless a Program is running and a new Program number has been selected, as described below.

START/STOP Button

The START/STOP Button is used to start and stop the MIDI Clock data output and to change Programs.

Each time the clock is started or stopped, a corresponding MIDI Start or MIDI Stop command is sent.

If a Program is running (*i.e.* currently sending Clock data), pressing the START/STOP Button will stop the clock unless a new Program number has been selected. In that case, pressing the START/STOP Button will send the new Program Change and Song Select messages and the Clock data will continue uninterrupted.

Users will know when a new Program number has been selected but not yet engaged because the Display will be flashing.

If no Program is running, pressing the START/STOP Button will cause a MIDI Start command to be sent, together with Program Change and Song Select data, followed by a constant stream of Clock data. The Tempo will be reset and synchronized when the Program is engaged.

Note: Stopping then re-starting the same Program does not cause additional Program Change and Song Select data to be sent. Furthermore, even if the tempo has been altered, the altered tempo will continue to be used rather than the stored tempo.

If a different Program is used, and later the previous Program is recalled, the previous Program will recall its stored tempo rather than the altered tempo. In order to keep an altered tempo, a Program must be saved, as described below.

DOWN Button (*not used on MV-58B*)

Pressing and releasing the DOWN Button will decrease the Program number by one. Pressing and holding the DOWN Button will quickly decrease the Program numbers.

If the TAP/SAVE Button has been pressed and released, pressing the DOWN Button will decrease the tempo by one bpm. Pressing and holding the DOWN Button will quickly decrease the tempo.

Once the DOWN Button has been pressed, subsequent Taps will not affect the tempo until the 2.5 second tempo change time-out occurs, however the UP Button and PROGRAM SELECT Pot can still be used to change the tempo.

UP Button (*not used on MV-58B*)

Pressing and releasing the UP Button will increase the Program number by one. Pressing and holding the UP Button will quickly increase the Program numbers.

If the TAP/SAVE Button has been pressed and released, pressing the UP Button will increase the tempo by one bpm. Pressing and holding the UP Button will quickly increase the tempo.

Once the UP Button has been pressed, subsequent Taps will not affect the tempo until the 2.5 second tempo change time-out occurs, however the DOWN Button and PROGRAM SELECT Pot can still be used to change the tempo.

TAP/SAVE Button

Tap Tempo

When the TAP/SAVE Button is first pressed, the current tempo is displayed. This provides users with a simple way to check the tempo without altering it.

Pressing the TAP/SAVE Button again within 2.5 seconds will adjust the tempo to the interval between the taps. The Display will show the adjusted tempo and light up the far right decimal point to indicate a new tempo has been received.

Each successive press of the TAP/SAVE Button will adjust the tempo to the interval between the two most recent taps.

Once at least one tap is received, the UP and DOWN Buttons and the PROGRAM SELECT Pot can be used to "fine tune" the tempo.

> *Note: after the UP or DOWN Buttons are pressed or the PROGRAM SELECT Pot is turned, additional taps have no effect.*

The Tempo change times out after 2.5 seconds.

If a single tap was received, then the display again shows the currently selected Program number.

If multiple taps were received, then “tPo” “SEt” (Tempo Set) will be displayed to indicate that a new tempo has been received. The display will then show the currently selected Program number.

> *Note: This new tempo is only temporary and will not be saved unless the Program is saved.*

The tempo (indicated by the flashing TEMPO LED) is adjustable whether or not a Program is running.

Tempo changes affect only the current Program and are not stored unless the SAVE function is used.

Similarly, Tempo changes do not affect any pending Program (indicated by a flashing Program number). However, if the pending Program uses the "oLd" tempo, it will use the existing tempo.

SAVE Function / Programming

Holding down the first press of the TAP/SAVE Button for more than 2.5 seconds causes the Master Controller to save the current tempo at the selected Program location.

> **The Master Controller simultaneously sends a command to all compatible PedalSync chips causing them to self-program and store their settings for the selected Program.**

The selected Program is the one that is shown by the Display. If the Program number is flashing, the selected Program is not the same as the one that is currently running.

As such, ***the current Program can be copied into a new Program location*** by selecting a different program number but not engaging that Program (normally done by pressing the START/STOP Button). Instead, hold down the TAP/SAVE Button until the letter "P" appears. The current settings will be saved to the selected Program when the button is released.

If the DOWN Button is pressed while the TAP/SAVE Button is being held (and after the letter "P" appears), the decimal point after the "P" will turn on. This indicates that the Master Controller will *not* save the current tempo, but instead will set the tempo status to "oLd", meaning that Program will use the then-current tempo when it is recalled.

Following a SAVE, the saved Program becomes the current Program and Program Change and Song Select data is sent.

TEMPO LED

The TEMPO LED always flashes in time with the current tempo.

The tempo corresponds to the standard quarter note interval of 24 MIDI Clocks.

> *Note: MIDI Clock data is not being sent unless the CLOCK LED is illuminated.*

PROGRAM SELECT Pot

Turning the PROGRAM SELECT Pot will cause the program number to rise or fall.

When a new program number has been selected, the Display will flash until the START/STOP Button has been pressed and the selected program is engaged.

If the TAP/SAVE Button has been pressed and released, turning the PROGRAM SELECT Pot will increase or decrease the tempo up to the 24-240 bpm limits. Pressing and holding the UP or DOWN Button will quickly increase or decrease the tempo.

Once the PROGRAM SELECT Pot has been turned after a tap, subsequent taps will not affect the tempo, however the UP and DOWN Buttons can still be used to change the tempo.

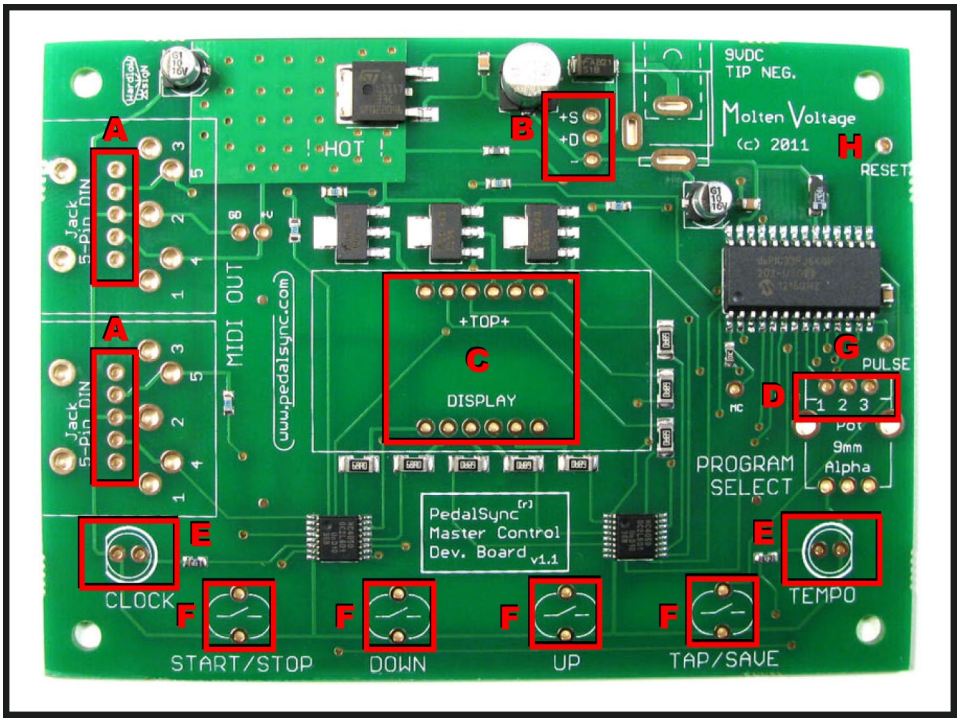
Mounting Holes

Mount the header-exposed version of the Dev. Board using appropriate standoffs and #4 screws.

Header Pads for External Connections

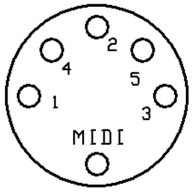
The Master Control Development Board PCB provides header pads (spaced 0.1" apart except the switches spaced 0.2" apart) for all off-board components as well as four #4 screw mounting holes. These features allow the Dev. Board to be mounted in an enclosure.

The off-board connections are as follows:



A) MIDI Out header pins.

Connect pins 4, 2, and 5 to the corresponding pins on a MIDI Jack.



MIDI JACK
Looking from outside

B) Power Jack

+S	Shunt connection
+D	Direct connection for positive voltage (6-9 VDC)
-	Ground

The square black Voltage Regulator and the top and bottom copper pads under it get hot. The copper pad is labeled as !HOT! on the circuit board.

Do not allow wires or other parts to rest against the Voltage Regulator or its rectangular copper pads.

Note: the lower the input voltage (9 VDC max.), the less heat the voltage regulator will generate

C) Display

The Display is included, but is not connected prior to shipping.

If the standard Display placement is used, solder the Display in place, being sure the decimal points are at the bottom.

If your design requires an alternate placement for the Display, remote connection can be achieved by the use of two 6-pin ribbon cables with standard 0.1” spacing.

D) Potentiometer

Connect a B5K potentiometer to the holes marked 1, 2, and 3 at the top of the PROGRAM SELECT pot mounting area.

Note: when holding a potentiometer upright, lugs facing you, lug 1 is on the left

E) LEDs

The CLOCK and TEMPO LED header pins have a direct ground connection (labeled -), and a power connection via a series 330 ohm resistor (labeled +).

F) Momentary Switches

The START/STOP, DOWN, UP, and TAP/SAVE header pins allow the connection of external SPST momentary normally open switches.

CV Output

PULSE Header Pin (G)

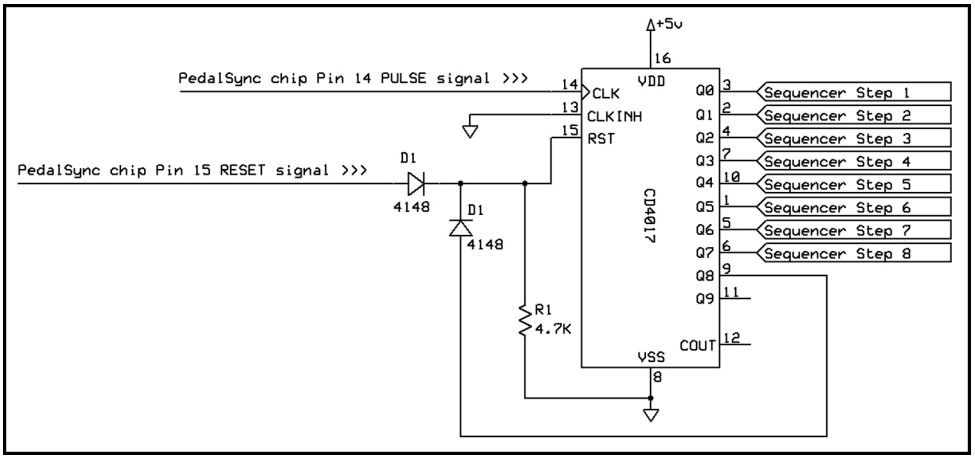
Pin 14 outputs a 50% duty cycle 3.3 volt pulse in time with the quarter-note tempo whenever MIDI is being sent.

> *Note: A buffer for the PULSE output is required if it drives a circuit that draws more than a nominal amount of current.*

RESET Header Pin (H) - MV-58 Only

Whenever Clock data gets re-started, Pin 15 sends a reset signal which overlaps the first pulse, allowing the synchronized reset of sequencer chips such as the 4017 Decade Counter.

The following schematic shows the connection for an 8-step sequencer using a 4017 decade counter:



When sending a Pulse/Reset connection out of an enclosure, consider a TRS jack with PULSE at the Tip, RESET at the Ring, and Ground at the Shield.

CV Tap Input

A Control Voltage (CV) can be connected to the top header pin of the TAP/SAVE switch.

The CV Tap Input can accept a 3.3 or 5 volt pulse to set the tempo.

> *Note: The incoming pulse will <u>not</u> synchronize with the tempo, but instead sets the relative interval.*

Pressing the START/STOP Button while stopped begins the Clock output.

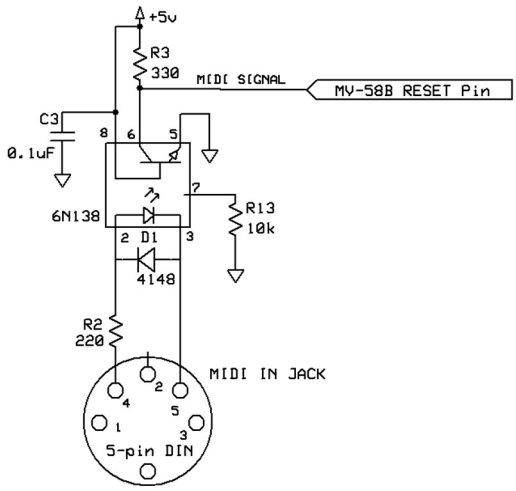
MIDI Bank/Program Change Input for MV-65 - MV-58B Only

The **RESET Header Pin (H)** on MV-58B is the MIDI Bank/Program Change input.

This input can be connected directly to the MIDI Output of PedalSync MIDI Bank Select Chip MV-65 via a 330 ohm series resistor as long as MV-65 and the Dev. Board share a common Power Ground connection. *See the MV-65 datasheet for more information*:

http://www.pedalsync/com/documentation/PedalSync_MV-65_MIDI_Bank_Select_Datasheet.pdf

Alternately, the MIDI Input can be connected in the typical fashion.



Note: The RESET Header Pin (H) is 5-volt tolerant.

Note: MIDI Program and Bank change information must be sent on either Channel 15 or the selected MIDI channel, or it will be ignored.

When MV-58B receives a Program Change message, the corresponding Program Change and Song Select data is immediately transmitted on the selected MIDI Channel.

Factory Preset Values

Programs 1-64 (*b0.1 through bF.8*) are 120 bpm

Programs 65-128 are "oLd" (***MV-58 only***)

MIDI Channel 15

MIDI - Backward Compatibility

The exclusive MIDI channel for the PedalSync system is MIDI Channel 15. All MIDI Program Change messages are sent exclusively on that channel.

PedalSync chips will all read MIDI messages on Channel 15.

Set any other devices to receive MIDI Program Change messages on Channel 15.

Changing MIDI Channel

Although changing the MIDI Output Channel is not recommended because PedalSync chips only read MIDI messages on Channel 15, it *is* possible to change the Master Control MIDI Output Channel as follows:

1) Hold down the DOWN Button as you power the unit on. The unit will display a lowercase "c" with a period after it follow by the current MIDI Channel. (*e.g.* **c.15**)

2) Release the DOWN Button.

3) Repeatedly press the UP Button to cycle through the 16 possible MIDI channels (the cycle will start over at zero after Channel 16 is reached)

4) Once the desired MIDI Channel is reached, press and release the DOWN Button again. The unit will re-start with the new MIDI Channel stored in memory.

Electrical Considerations

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

Related Products

- Control the Tru-Foot™ LFO chips (MV-55 & MV-55B) and Module
- Control the Four Pots chip (MV-56) and Module
- Control the Pulse Output chip (MV-60)
- Control the MIDI Pulse chip (MV-61)
- Control the 9 Switches chip (MV-62)
- Select MV-58B Banks and Programs with an external controller using MIDI Bank Select Chip (MV-65)

  Many more compatible chips available soon!

Support

info@PedalSync.com

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