

Tapper

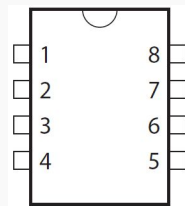
Tap Tempo for PT2399
Version 1.1

Overview

Tapper is a tap tempo controller for PT 2399. It controls the PT 2399 by outputting the PWM signal according to the delay time. It also has a calibration mode that allows calibration against PWM data and delay time errors. This allows you to control according to your environment.

The delay time can be set by inputting a DC voltage source using a variable resistor or by tap input conforming to the delay time. When setting by tap input, it is possible to switch three kinds of divisions of "1/4, Dotted 1/8, 1/8" by DIV switch input.

Pin Configuration



Pin Number	Function
1	VDD
2	Clock Input from PT2399
3	Tempo LED Output
4	Tap Tempo Switch Input
5	PWM Output
6	DIV Switch Input
7	Variable Resistance Input
8	VSS

Specification

Characteristic	Conditions	Min	Typ	Max	Units
Delay Time Setting Range	VDD = 5V	50	-	700	ms
PWM Frequency	VDD = 5V	-	125	-	kHz
Clock Input from PT2399 Frequency Range	VDD = 5V	0.008	-	14.8	MHz

Variable Resistance Input Voltage Range	-	VSS	-	VDD	V
Tap Tempo Switch Input Voltage Range	VDD = 5V	0	-	5	V

■ Clock Input from PT2399

Connect to pin 5 (CLK_O) of PT2399. The clock signal is monitored during calibration in the calibration mode. Since high frequency signals are output, please pay attention such as shortening the wiring length as much as possible.

■ Tempo LED Output

In normal operation, HIGH / LOW level signals are alternately output at the set reference tempo interval (J). In the calibration mode, a signal for status confirmation is output.

■ Tap Tempo Switch Input

Please use a momentary type switch. Start the tempo count at the first tap and set the reference tempo at the interval from the second and subsequent taps. The combination of this reference tempo and the DIV switch input establishes the set value of the delay time. The delay time setting range is 50 ms to 700 ms. If the second tap can not be detected for 1 second from the first tap, the measurement during that time will be invalid.

If the delay time is set by variable resistance input, the setting will change automatically when the tempo is confirmed by the tap.

■ PWM Output

Based on the data stored inside the chip, the PWM signal with the duty ratio corresponding to the specified delay time is output. Control the PT2399 by connecting this PWM output to "PWM→Current Conversion Circuit (Recommended Circuit)".

■ DIV Switch Input

You can select the delay time with respect to the reference tempo set by tap tempo input by switching input voltage from 3 types, "1/4, Dotted 1/8, 1/8".

DIV Input Voltage	Ratio	Beat
VDD	1/2	♪
0.5VDD	3/4	♪ ·
VSS	1/1	J

■ Variable Resistance Input

You can set the delay time by connecting a DC voltage source with a variable resistor. Please set the DC voltage source within the supply voltage range. The delay time setting range is 50 ms to 700 ms, similar to the tap tempo input. In order to obtain a linear change amount on auditory sense, it is set so that the delay time increases and decreases in proportion to the DC voltage.

If the delay time is set by the tap tempo input, the setting will change automatically when the DC voltage change is detected.

If this pin is not used, connect it to VSS or VDD.

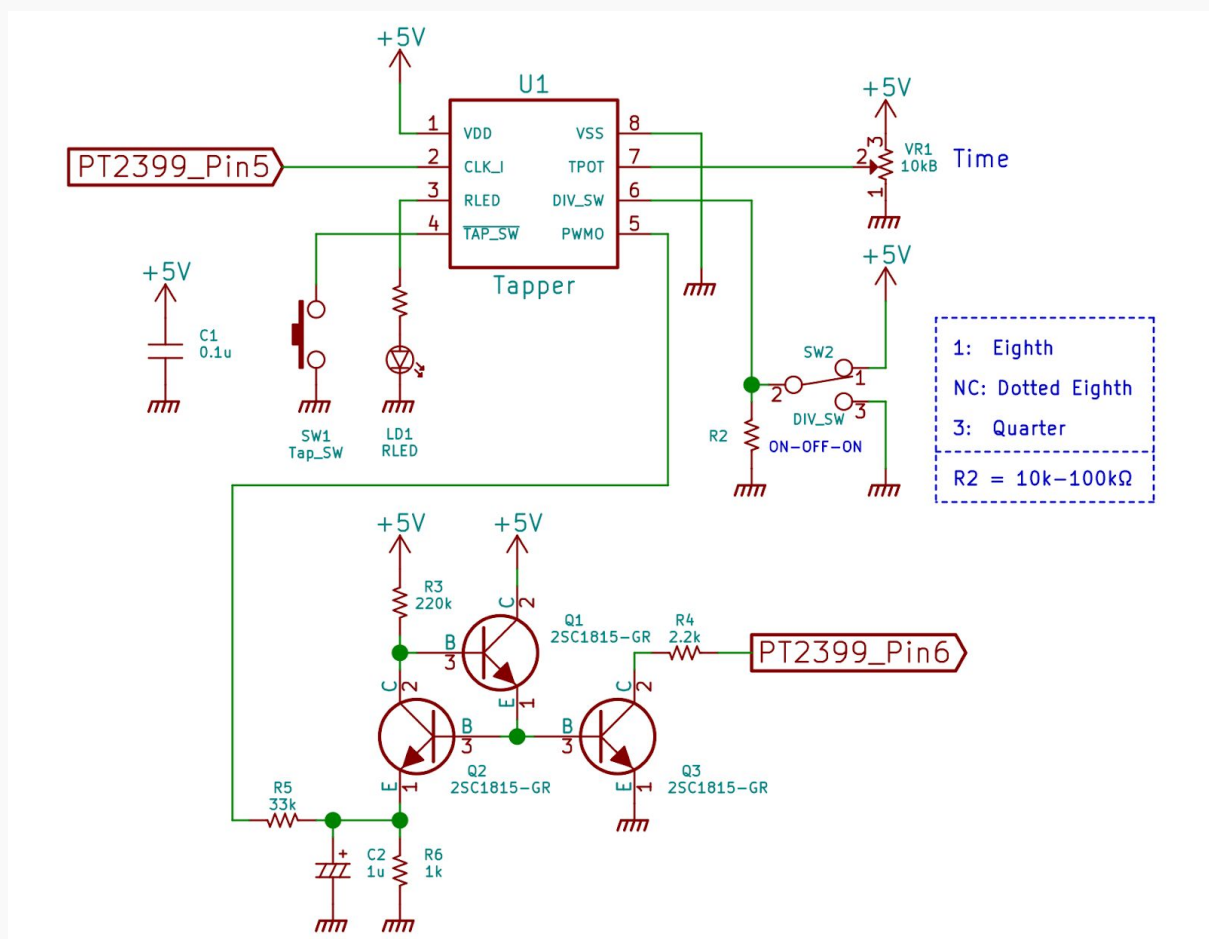
■ Calibration Mode

When the power is turned on with the tap tempo input set to the LOW level (pressing the tap tempo switch), the calibration mode is entered.

In the calibration mode, the frequency from the PT2399 clock input is counted, and the delay time is calibrated accordingly. Calibration time is up to 60 seconds. The tempo LED blinks during calibration, and when it is finished, it transitions to the normal operation state. If the tempo LED does not flicker and transits to the normal operation state in a short time, calibration is not necessary because the delay time synchronization has already been completed. Since the calibrated delay time data is recorded in the chip built-in EEPROM, it is retained even after the next power-on.

In order to maintain accurate delay time, we recommend that you perform this automatic calibration when using.

Recommended Circuit



Electrical Characteristics

■ Absolute Maximum Ratings

Characteristic	Rating
Ambient Temperature under Bias	-40°C to +125°C
Storage Temperature	-65°C to +150°C
Voltage on VDD with Respect to VSS	-0.3V to +6.5V
Voltage on all other Pins with Respect to VSS	-0.3V to (VDD + 0.3V)
Max Output Current Sourced by any I/O pin	25mA

■ DC Characteristics

Characteristic	Conditions	Min	Typ	Max	Units
Supply Voltage	-	2.5	5.0	5.5	V
Supply Current	VDD = 5V	-	2.3	3.6	mA
Input Low Voltage	VDD = 2.5 - 5.5V	-	-	0.2VDD	V
Input High Voltage	VDD = 2.5 - 5.5V	2.0	-	-	V
Output Low Voltage	VDD = 5V 8mA	-	-	0.6	V
Output High Voltage	VDD = 5V 3.5mA	VDD -0.7	-	-	V