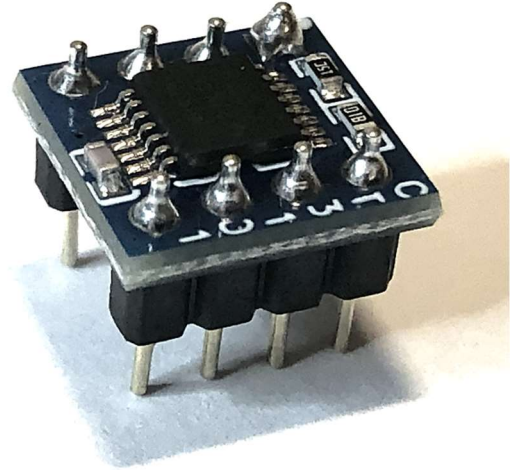


## CT3101 BBD Clock Generator – Datasheet

The Cabintech CT3101 is a hybrid module designed to generate the 2-phase clock signals required by 300X series BBD (Bucket Brigade Device) analog delay chips such as the MN3007, MN3008, MN3009, MN3011, etc. The module is packaged as a standard 8-pin DIL and is pin-for-pin compatible with the discontinued Panasonic MN3101.

The CT3101 can be used as a drop-in replacement for the MN3101 to repair vintage equipment, used to build classic delay-based circuits such as guitar pedals, or used in new designs to clock current production 300X series BBDs. The 8-pin DIL package can be used in a socket or soldered directly in through-hole PCB designs. This module can be used in any circuit designed for the MN3101 and matches the function and mechanical footprint of the MN3101.

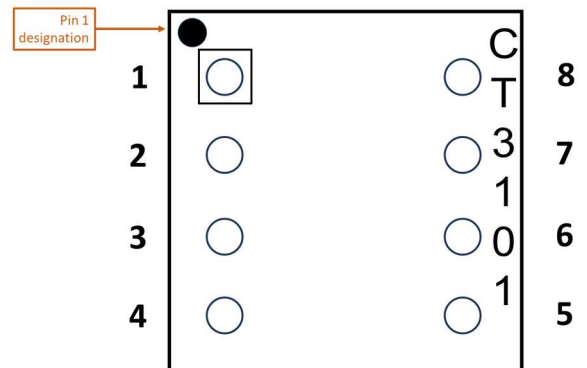


### Features

- Power supply range -3V to -18V
- Self-oscillating and external trigger modes
- 50% duty cycle independent of trigger pulse width (in external excitation mode)
- $V_{gg}$  output voltage (14/15  $V_{dd}$ ) for BDD supply
- 8-pin DIL package
- Direct “drop in” MN3101 replacement
- Low power consumption (about ½ of MN3101)
- Socket friendly round pins

### Pinout

| Pin | In/Out | Function | Description                                    |
|-----|--------|----------|--|
| 1   |        | GND      | Circuit ground                                 |
| 2   | Out    | CP1      | Clock Phase 1                                  |
| 3   |        | $V_{dd}$ | Supply Voltage -3V to -18V                     |
| 4   | Out    | CP2      | Clock Phase 2                                  |
| 5   | Out    | OX3      | Oscillator Out (N.C. in external trigger mode) |
| 6   | Out    | OX2      | Oscillator Out (N.C. in external trigger mode) |
| 7   | In     | OX1      | Oscillator In                                  |
| 8   | Out    | $V_{gg}$ | 14/15 $V_{dd}$ output                          |



## Maximum Ratings

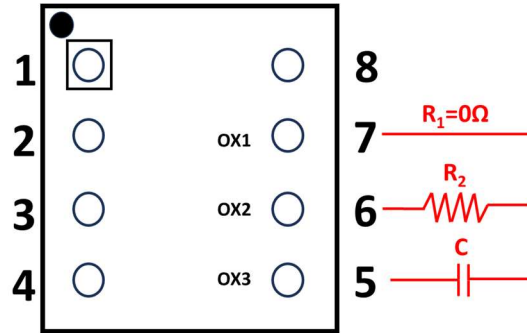
| Item                  | Symbol          | Range                      | Notes                   |
|-----------------------|-----------------|----------------------------|-------------------------|
| Drain Supply Voltage  | V <sub>dd</sub> | -3V to -18V                | Referenced to Pin 1 GND |
| OX1 Input Voltage     | OX1             | 0 to V <sub>dd</sub> +0.5V |                         |
| Operating Temperature | T <sub>A</sub>  | -55°C to +125°C            |                         |
| Power Dissipation     | P <sub>D</sub>  | 500mW                      | Maximum                 |

## Typical Electrical Characteristics at +25°C

| Characteristic                | Symbol          | Value  | Notes   |
|-------------------------------|-----------------|--|---------|
| Output Sink Current           | I <sub>OL</sub> | -6.8mA   |         |
| Output Source Current         | I <sub>OH</sub> | 6.8mA  |         |
| Output Voltage Low            | V <sub>OL</sub> | 0V   |         |
| Output Voltage High           | V <sub>OH</sub> | V <sub>dd</sub>  |         |
| OX1 Input Voltage Low         | V <sub>IL</sub> | -1.5V (V <sub>dd</sub> = -5V)<br>-3.0V (V <sub>dd</sub> = -10V)<br>-4.0V (V <sub>dd</sub> = -15V)  |         |
| OX1 Input Voltage High        | V <sub>IH</sub> | -3.5V (V <sub>dd</sub> = -5V)<br>-7.0V (V <sub>dd</sub> = -10V)<br>-11.0V (V <sub>dd</sub> = -15V) |         |
| OX1 Input Current             | I <sub>IN</sub> | 0.1μA  | Maximum |
| Deviation from 50% duty cycle | D <sub>C</sub>  | ±0.5% (V <sub>dd</sub> -3V to -10V)<br>±0.1% (V <sub>dd</sub> -15V)                                |         |

## Self-Oscillation Mode

In this mode of operation an RC network on pins OX2 and OX3 define a time constant that determines the oscillation frequency.



The MN3101 datasheet specifies an additional resistor ( $R_1$ ) on pin 7 to reduce power dissipation at higher frequencies. That additional resistor is not necessary for the CT3101 but it does not affect proper operation if present.

The rate of each clock phase output is  $\frac{1}{2}$  the oscillation frequency. The period time will be approximately:

$$t_A = 4.40 \times R_2 \times C$$

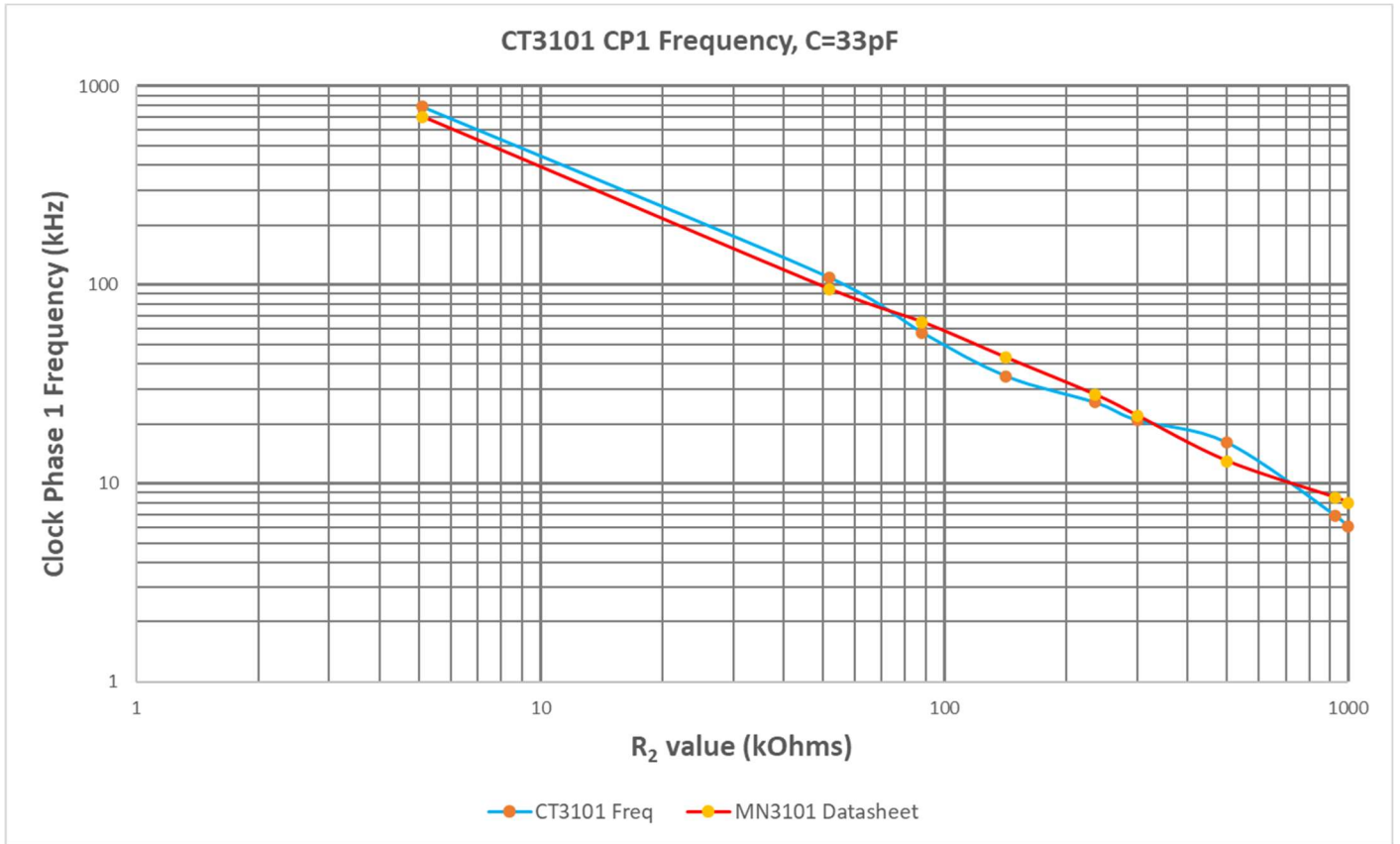
For example, for  $C=33\text{pF}$  and  $R_2=100\text{k}\Omega$ :

$$t_A = 4.4 \times 100,000 \times 0.000000000033 = 0.00001452 \text{ seconds}$$

$$\text{Frequency} = 1/t_A = \sim 69\text{kHz}$$

This is only an approximation due to variance in parasitic capacitance and internal circuit resistance. Measured CP1 frequency at  $C=33\text{pF}$  is given in the following graph (note the scale is log-log). For comparison, the MN3101 datasheet graph for the same RC values is also shown.

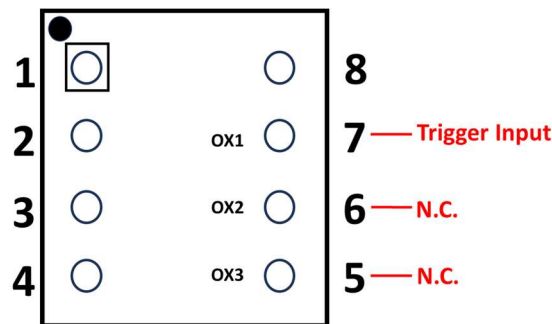
It is common to use a variable resistor and switch in different capacitors to achieve various frequency ranges.



## External Triggering Mode

The CT3101 can also generate the BBD 2-phase clocks from a periodic trigger source instead of self-oscillation. In this mode pins 5 and 6 (OX3 and OX2) are left unconnected and the trigger is applied to pin 7 (OX1). The CT3101 will trigger on the falling edge of the OX1 input and produce the 2-phase 50% duty cycle clocks regardless of the width of the trigger pulse (e.g. the trigger pulse does not have to have a 50% duty cycle).

Note that this trigger is the CT3101 oscillation frequency which is 2X the frequency of the generated phase clocks (CP1, CP2).



## Package Dimensions

Pin footprint is standard JEDEC 8-pin DIL:

Pin spacing 2.54mm (0.1in)

Row spacing 7.62mm (0.3in)

