

PCK-240 UNIVERSAL CLOCK
USER'S MANUAL

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CONTENTS

Function Description	3
Electrical Specifications	3
Outline	4
Pin assignment	5
Pin name and description	6
Frequency setting	7
by Parallel data.....	7
by Serial data	8
Alignment for external 10MHz clock mode ..	9

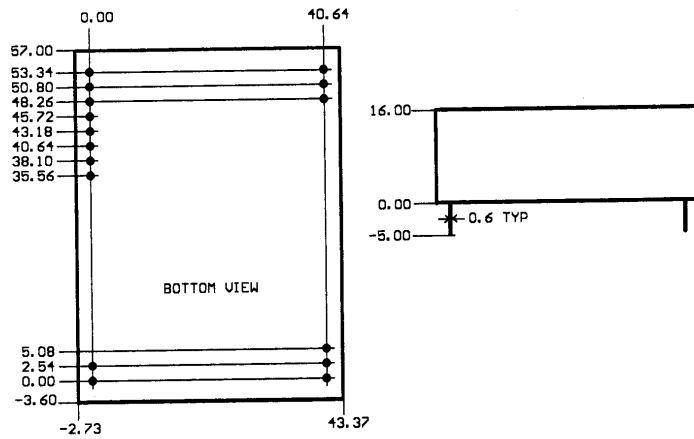
Function Description

PCK-240 is wide band clock source utilizing 32 Bits Direct Digital Synthesis and Phase Locked Loop technique. It provides any frequency output from 1MHz to 240MHz in 1Hz step. The frequency can be controlled by parallel data such as DIP SW or a serial data which can be connected to PC communication port. A frequency can be memorized into the EEPROM and the last saved frequency can be recalled even if power is off. High frequency accuracy can be obtained in external clock mode applying 10MHz clock.

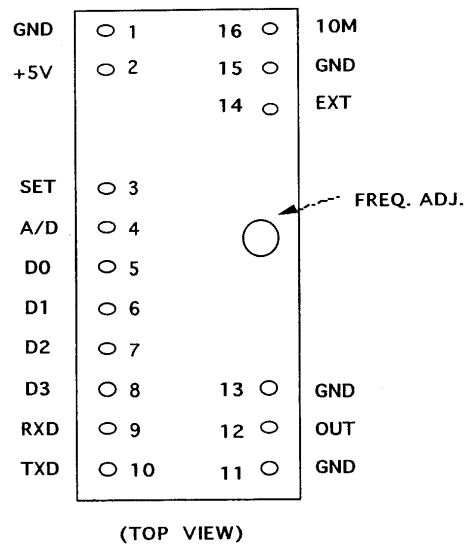
Electrical Specifications

Power Supply/Current	+5V \pm 5%, 300mA
Output impedance	50 Ω
Output level	1Vp-p (50 Ω termination)
Output wave	Square wave
Output wave duty	50% \pm 20%
Output frequency range	1MHz ~ 240MHz
Frequency resolution	1Hz
Frequency accuracy	
Internal	\pm 20ppm, 0°C~50°C(adjustable)
External	depends on external clock accuracy
Jitter	less than 1ns
Spurious	1MHz~100MHz more than -40dB 100MHz~240MHz more than -35dB (except harmonics)
Frequency save times	more than 10,000 times
Frequency control	
Parallel input	Six(6) control pins 4-bit BCD input, 1 bit digit/data selection
Serial input	1 bit strobe signal two(2) data pins 9600 BPS, 8 bit non parity 1 stop bit, ASCII 9 digit numeric data and carriage return code
External clock input	10MHz(TTL or CMOS)
Frequency switching time	within 2mS(time from the end of data loading)
Dimensions	61 x 46 x 16mm

OUTLINE



PIN ASSIGNMENT



PIN DESIGNATION AND DESCRIPTION

Pin #	Designation	Description
1	GND	GND of power supply and signal
2	+5V	Power supply pin. Supply $+5V \pm 5\%$
3	SET	Strobe signal to be set by parallel data. Pulled-up internally, the data of A/D, D0-D3 can be read by falling edge.
4	A/D	Select the digit or value of parallel data D0-D3. Select the digit to be changed from the 9-digit frequency data, with A/D pin high(open). Set the value of selected digit with A/D pin low(short to GND). Pulled up internally.
5	D0	Input of bit 0(2^0) of frequency data digit or value data. Internally pulled-up, 1 for H(open), 0 for L(short to GND).
6	D1	Input of bit 1(2^1) of frequency data digit or value data.
7	D2	Input of bit 2(2^2) of frequency data digit or value data.
8	D3	Input of bit 3(2^3) of frequency data digit or value data.
9	RXD	A synchronous serial RX data, CMOS/TTL. Input is pulled-up, keep open when not used.
10	TXD	A synchronous serial TX data, CMOS/TTL. Keep open when not used
11	GND	GND of power supply and signal
12	OUT	Pin of output signal
13	GND	GND of power supply and signal
14	EXT	External clock enable pin. Connect to H(+5V) in order to operate by external clock mode. Internally pulled-down, make it open in the internal clock mode.
15	GND	GND of power supply and signal
16	10M	External clock input pin. In the external clock mode, apply an accurate 10MHz external clock to this pin.

How to set frequency

- (1) Setting frequency by parallel data
In case of setting 9-digits frequency data, select the digit to be input first, and set the frequency data then. Selection of either the digit or frequency data of BCD SW can be made by A/D input. Here explains how to set 160,000,000Hz for example:
- (a) With S2 open, set DIP SW to 0(digit of 1Hz) and push S1(short to GND).
 - (b) Close S2(short to GND), set BCD SW to 0(frequency data of 1Hz digit), and push S1. Thus the frequency of 1Hz digit is to be set.
 - (c) For 10Hz digit, similarly shown above (a) and (b), set BCD SW to 1(10Hz digit) when setting the digit, and push S1.
 - (d) Set the frequency data 0 from the 100Hz digit to 1MHz digit in the same way.
 - (e) In order to set 10MHz digit, open S2, set BCD SW to 7 and push S1, and then, close S2, set BCD SW to 6, and push S1.
 - (f) In case of 100MHz digit, with S1 open, set BCD SW to 8 and push S1, then close S2 and set BCD SW to 1, and push S1.
 - (g) The desired frequency can be obtained in this way. In case of memorizing the set frequency into the built-in EEPROM semi-permanently, with S2 open and set BCD SW to A(10), then push S1 to memorize.

(Remarks)Immediately after the power is applied, input buffer of the parallel data is initially set to "0", data with 0 can be omitted. In the above example, procedure (a)~(d) can be skipped.

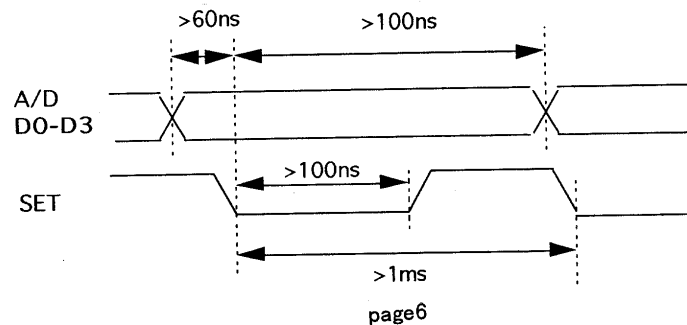
<How to memorize frequency>

The current frequency can be memorized into the built-in EEPROM semi-permanently by making S2 open and setting BCD SW to A(10), then pushing S1.

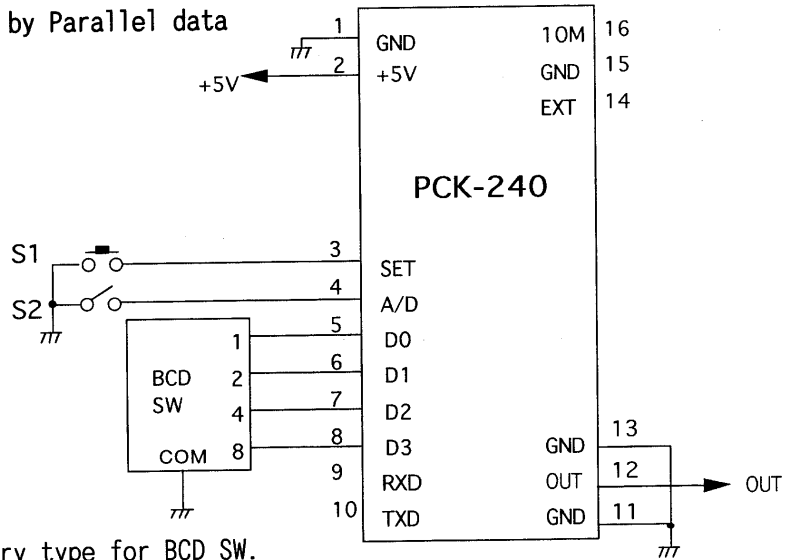
<Caution to set the data consecutively>

Since PCK-240 proceeds frequency setting immediately after setting the frequency data, this process cannot be done in time, if frequency setting is made consecutively. One frequency has been set, wait 1mS to set a new frequency(refer to the following timing chart.)

Parallel data timing chart



Circuit example by Parallel data



Use complementary type for BCD SW.

Function Table

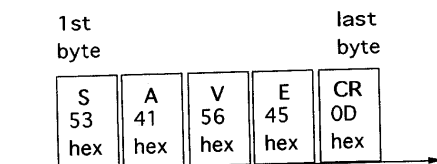
A/D	D3	D2	D1	D0	Function
L	L	L	L	L	Frequency Data 0
L	L	L	L	H	Frequency Data 1
L	L	L	H	L	Frequency Data 2
L	L	L	H	H	Frequency Data 3
L	L	H	L	L	Frequency Data 4
L	L	H	L	H	Frequency Data 5
L	L	H	H	L	Frequency Data 6
L	L	H	H	H	Frequency Data 7
L	H	L	L	L	Frequency Data 8
L	H	L	L	H	Frequency Data 9
H	L	L	L	L	Set 1 Hz digit
H	L	L	L	H	Set 10 Hz digit
H	L	L	H	L	Set 100 Hz digit
H	L	L	H	H	Set 1 KHz digit
H	L	H	L	L	Set 10 KHz digit
H	L	H	L	H	Set 100 KHz digit
H	L	H	H	L	Set 1 MHz digit
H	L	H	H	H	Set 10 MHz digit
H	H	L	L	L	Set 100MHz digit
H	H	L	H	L	Memory frequency

H: open L: short to GND

Input data of D0~D3 and A/D is taken into at the falling edge SET signal.

<How to memorize the frequency from serial port>

In order to memorize the frequency into the built-in EEPROM, enter "SAVE" command as shown below. "EEPROM SAVED!" message is returned, if the command is received correctly.



Sample programming example using serial data

Programming sample in BASIC, using PC and realizing the sweep generator sweeping 1MHz to 200MHz by 1MHz step is under-mentioned.

```
10 OPEN "COM1:9600,N,8,1"AS#1
20 FOR FREQ = 1 TO 200
30 D$=STR$(FREQ)
40 C$=MID$(D$,3,4)+"000000"
50 PRINT C$
60 PRINT#1,C$
70 C$=INPUT$(LOC(1),#1)
80 NEXT FREQ
90 END
```

ALIGNMENT PROCEDURE TO OPERATE BY EXTERNAL 10MHz CLOCK

In case the accurate 10MHz clock is available externally, the synchronizing frequency to the clock can be obtained. In this case, please use the signal source having the frequency accuracy of less than 10MHz \pm 10ppm. This is to lock the built-in clock of PCK-240 using the external signal.

On the other hand, alignment is required to get the stable clock in using external clock. This alignment requires to turn the trimmer capacitor for frequency alignment under the condition of giving external clock in order to lock in a stable condition. This alignment requires a oscilloscope. Following is to show the alignment procedure using the external clock mode.

ALIGNING METHOD

(a) Add the external 10MHz to 10MHz pin of PCK-240, and add +5V to the external clock pin.

(b) Set frequency at 10MHz, connect the PCK-240 output to the CH.1 of oscilloscope to display the wave form.

(c) Connect the external 10MHz clock to the extra trigger or CH2, input of oscilloscope and adjust the trigger level to make synchronization.

(d) Turn the trimmer of PCK-240 for the frequency alignment, and align to the point where the wave form comes to stopped.

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