PCK-820 UNIVERSAL CLOCK

USER'S MANUAL

DIGITAL SIGNAL TECHNOLOGY INC.

1-6-28, HIGASHI BENZAI, ASAKA CITY
SAITAMA, JAPAN 351-0022
TEL: 048-468-6094 FAX: 048-468-6210

CONTENTS

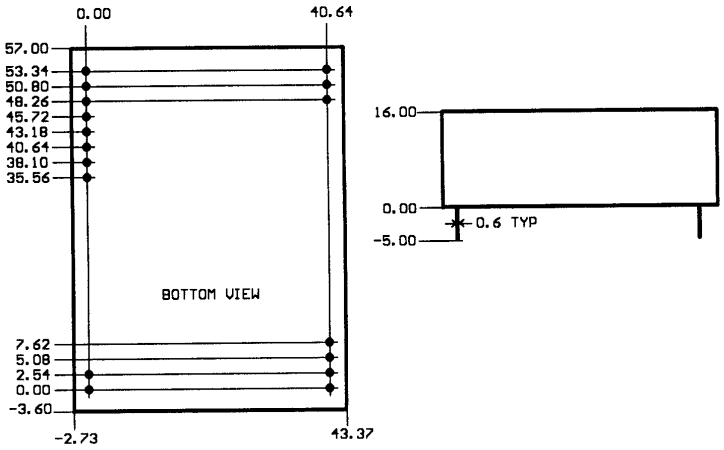
Function Description

PCK-820 is wide band clock source utilizing 32 Bits Direct Digital Synthesis and Phase Locked Loop technique. It provides any frequency output from 1MHz to 820MHz in 1Hz step. The frequency can be controlled by parallel data such as DIP SW or 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.

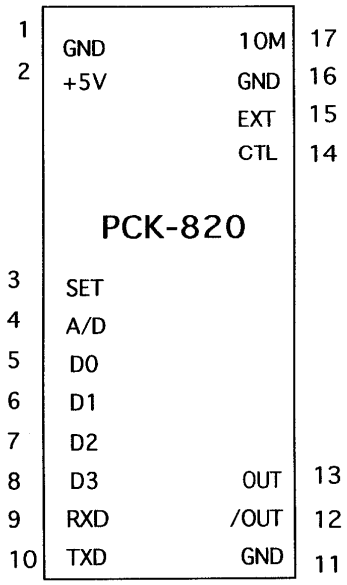
Electrical Specifications

Power Supply/Current	+5V ±5%, 300mA
Output Impedance	50Ω
Output level	Differential PECL output
Output wave	Square wave
Output wave duty	50%±20%
Output frequency range	1,000,000Hz - 820,000,000Hz
Frequency resolution	1Hz
Frequency accuracy	Internal : ±20ppm, 0°C~50°C (adjustable) External : depends on external clock accuracy
Spurious	1MHz~100MHz more than -45dB 400MHz~820MHz more than -32dB (except harmonics)
Frequency save times	more than 10,000
Frequency control	
Parallel input	Six(6) control pins 4-bit BCD input, 1 bit digit/ data selection 1 bit strobe signal
Serial input	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)
External control supply	0~+5V, input impedance more than 10KΩ
VCXO range	typical ±100ppm
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±5%
3	SET	Strobe signal to 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 8-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 bit3(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	Differential PECL output pin
13	OUT	Differential PECL output pin
14	CTL	Frequency control voltage input pin Keep open when not used. Biased internally with +2.5V.
15	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.
16	GND	GND of power supply and signal
17	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:

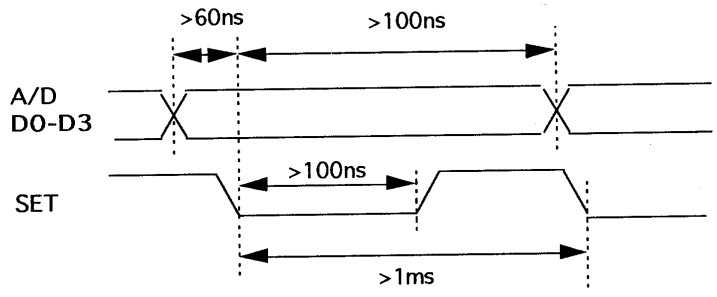
(a) With S2 open, set DIP SW to 0(digit of 1Hz) and push S1(short to GND).
(b) Close S2(short to GND), set BCD SW to 0(frequency data of 1Hz digit), and push S1. Thus the frequency of 1Hz digit is to be set.
(c) For 10Hz digit, similarly shown above (a) and (b), set BCD SW to 1(10Hz digit) when setting 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.

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

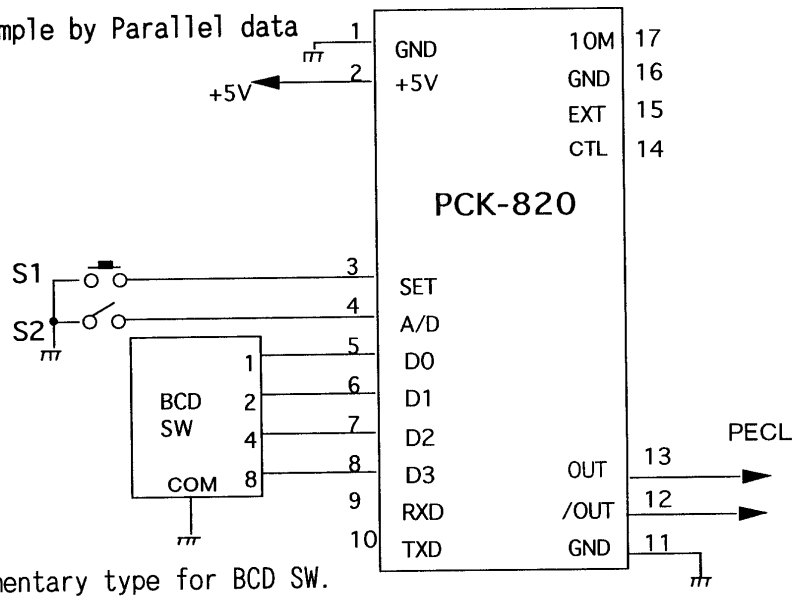
<How to memorize frequency>
The current frequency can be memorized into the built-in EEPROM semi-permanently by making S2 open and setting BCD SW to A(10), then push S1.

<Caution to set the data consecutively>
Since PCK-820 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 of frequency

H: open L: short to GND

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

(2) Setting frequency by serial data

The following message is returned when power on.

```
PCK-820 UNIVERSAL CLOK VX.X
*
```

After prompt * is returned from PCK-820, frequency data can be entered. The frequency data has three formats; MHz unit input, KHz unit input and Hz unit input.When the PCK-820 received the data correctly and completed the frequency setting, it returns "*" code(24hex) as a prompt. When the data received in-correctly or some errors occurred during the transfer, it returns "INVALID DATA". In case of setting the frequency data consecutively, make sure whether "*" code is returned.

MHz unit

The following table shows the data in case inputting 300MHz on MHz unit.

3	0	0	M	CR
33 hex	30 hex	30 hex	4D hex	0D hex

The data below 100KHz is set at "0" automatically.

KHz unit

The following table shows the data in case inputting 300,000KHz on KHz unit.

3	0	0	0	0	0	K	CR
33 hex	30 hex	30 hex	30 hex	30 hex	30 hex	4B hex	0D hex

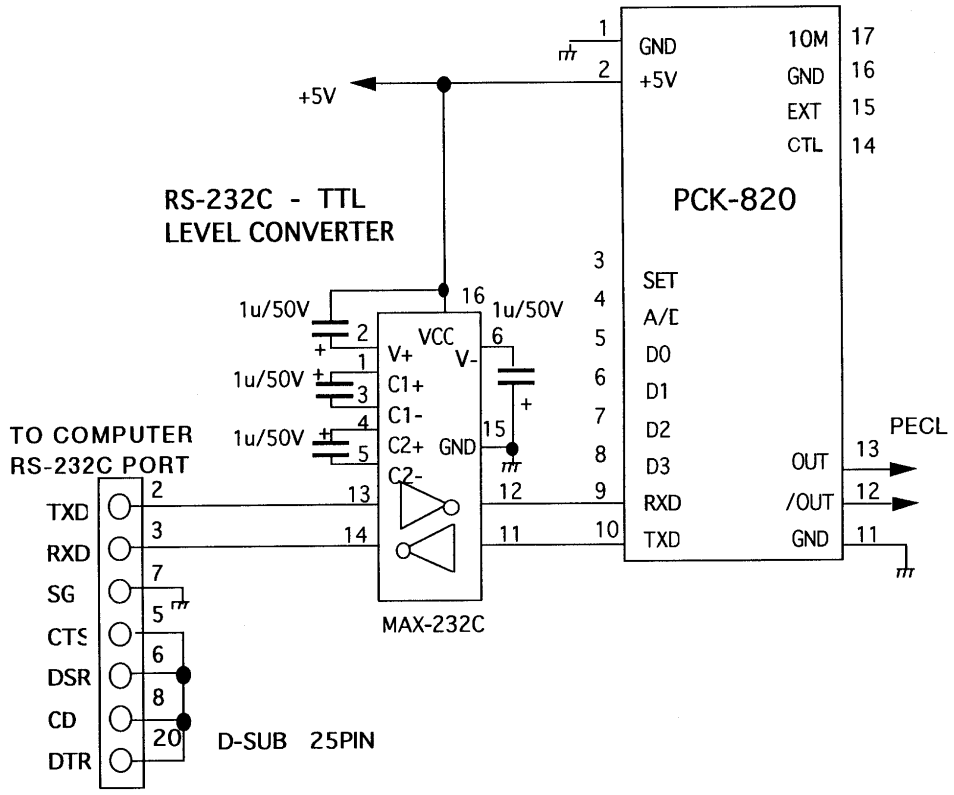
The data below 100Hz is set at 0 automatically.

Hz unit

The following table shows the data in case inputting 300,000,000Hz on Hz unit.

3	0	0	0	0	0	0	0	0	CR
33 hex	30 hex	30 hex	30 hex	30 hex	30 hex	30 hex	30 hex	30 hex	0D hex

Serial data frequency setting circuit example



<How to memorize the frequency from serial port>

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

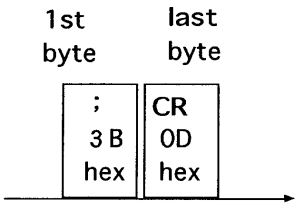
S	A	V	E	CR
53 hex	41 hex	56 hex	45 hex	0D hex

<How to read-out frequency data from serial port>
The current frequency can be read out with "READ" command as below.

R	E	A	D	CR
53 hex	45 hex	41 hex	44 hex	0D hex

1～9 digit frequency data of ASCII code can be returned by inputting the above command.

<How to adjust the internal reference clock>
The following command adjust the frequency of the internal reference clock on frequency adjustable mode of serial data.



As the frequency is changed by entering the following code, adjust it keeping watch the frequency readout from a frequency counter.For the end,input any other code except the below.

To step the frequency up finely : "u" 75hex
To step the frequency up coarsely : "u" 55hex
To step the frequency down finely : "d" 65hex
To step the frequency down coarsely : "D" 45hex

The new data is memorized into the built-in EEPROM when it exists.

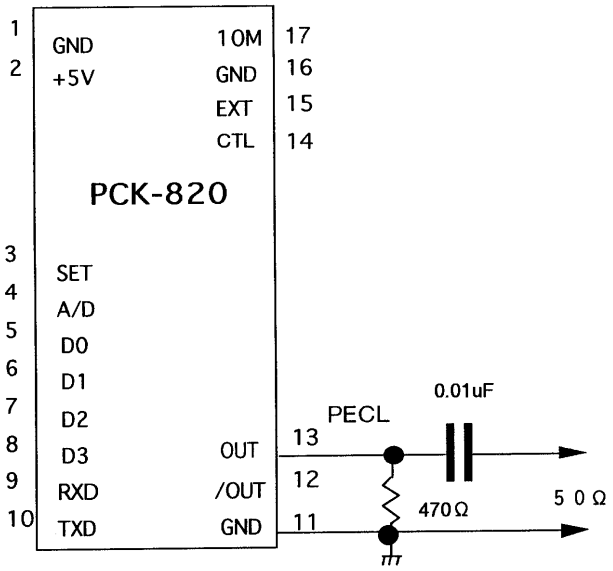
<How to convert the output level>

If you needed other than PECL level, Use the level conversion IC as shown below.

(1) TTL level
MOTOROLA MC10ELT21
MOTOROLA MC100ELT23
MOTOROLA MC10ELT25

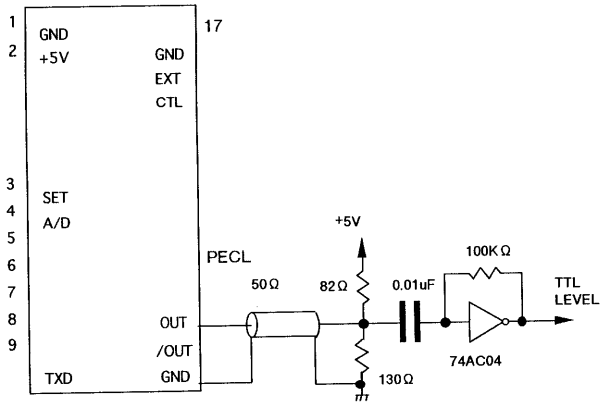
(2) ECL level
MOTOROLA MC10ELT91
MOTOROLA MC100ELT91
MOTOROLA MC100EVEL91

(3) 50Ω AC level
refer to the following circuit.



<CAUTION>
Do not connect the output OUT, /OUT directly to 50Ω resistance load,internal ECL drive IC will be destroyed.

(4)Circuit example for converting TTL .
It works well below 100MHz TTL level.



<CAUTION>
Do not connect the output OUT, /OUT directly to 50Ω resistance load, not to destroy the internal ECL drive IC.

Descriptions of this manual are subject to change without notice.

No portion of this manual can be reproduced without the permission of DS Technology.

DS Technology assumes no liability for damages that may occur as a result of handling by users.

The contents of this manual do not apply to the warranty in executing an industrial property or other rights, nor permission for the right of execution.

DS Technology assumes no responsibility for the third party's industrial property occurred from using the circuits described in this manual.

Printed in Japan