PLL as the FM Demodulator

Object:- (a) Determine the lock-range and the Capture-range of the given PLL kit.

(b) Plot the demodulation characteristics **(V_D vs Δf)** and verify that the given PLL circuit is working as the Demodulator. Of the FM signal.

Apparatus Used :- 1. The PLL Kit,
2. A Function generator with digital frequency display (1 MHz)
3. A Dual Trace CRO (20 MHz)

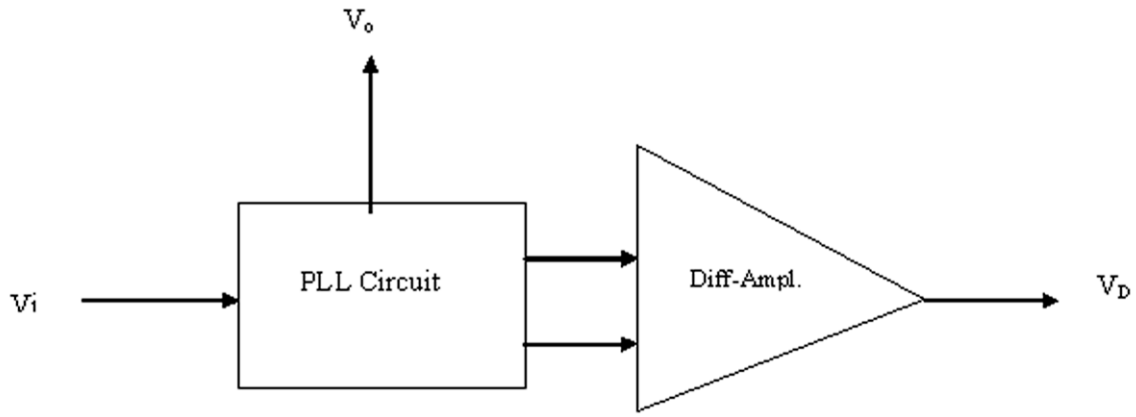

Figure 1

Experimental Setup

Figure 1 shows the experimental set-up & fig. 2 shows the Block-diagram of a PLL chip

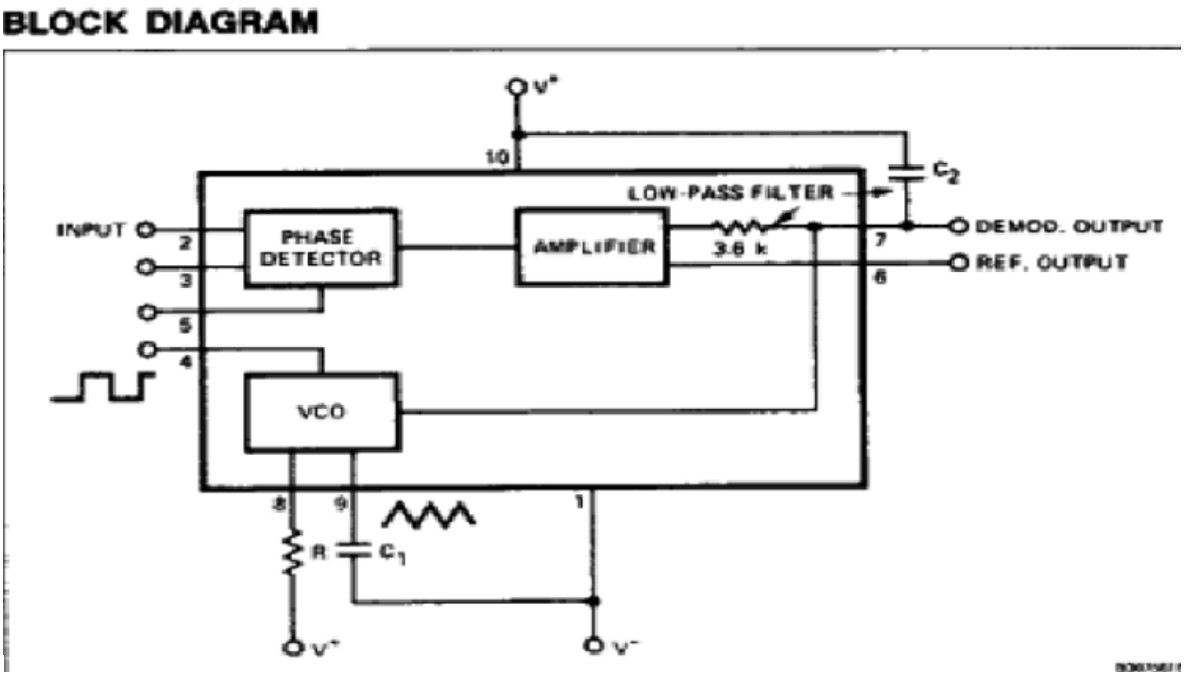

Figure 2

Theory :- The functional characteristics of the PLL are described in the Data-sheet supplied by the manufacturer of PLL chip NE565. Refer to the data-sheet of NE565.

Observations:- (a) Free-running frequency, f_o = ------- KHz ; ($f_o = 1/T_o$,)

f_1 = ……KHz ; (L -- UL)

f_2 = …… KHz ; (UL -- L)

f_3 = ……KHz ; (L -- UL)

f_4 = ……KHz ; (UL -- L)

(b) Lock-range (f_L) = ($f_1 - f_3$) = KHz

(c) Capture-range (f_c) = ($f_2 - f_4$) = KHz ; (Verify that $f_L > f_c$)

(d) Readings for Demodulation Characteristics:

S. No.	Incoming signal frequency (f_i)	DC Level of the Differential output (V_D)	$\Delta f = (f_i - f_o)$

Vi = a sinusoidal signal having variable frequency & amplitude around 8 volts p-p (obtained from an external signal generator) to be connected at input of the PLL marked V_i ; for the purpose of determination of the lock-range, capture-range & the Demodulation characteristics of the PLL circuit.

Result:-

A curve between V_D versus Δf shows the Demodulation characteristics of the PLL and is linear, which justifies that the given circuit of the PLL (NE565) is working as a demodulator of a FM signal having maximum frequency deviation less than the lock-range of the PLL..

Report:-

1. Draw the circuit diagram of the PLL and give an expression for its free-running frequency.
2. Discuss the applications of the PLL in actual practice.

Circuit diagram of FM Demodulator using PLL NE565 / LM565

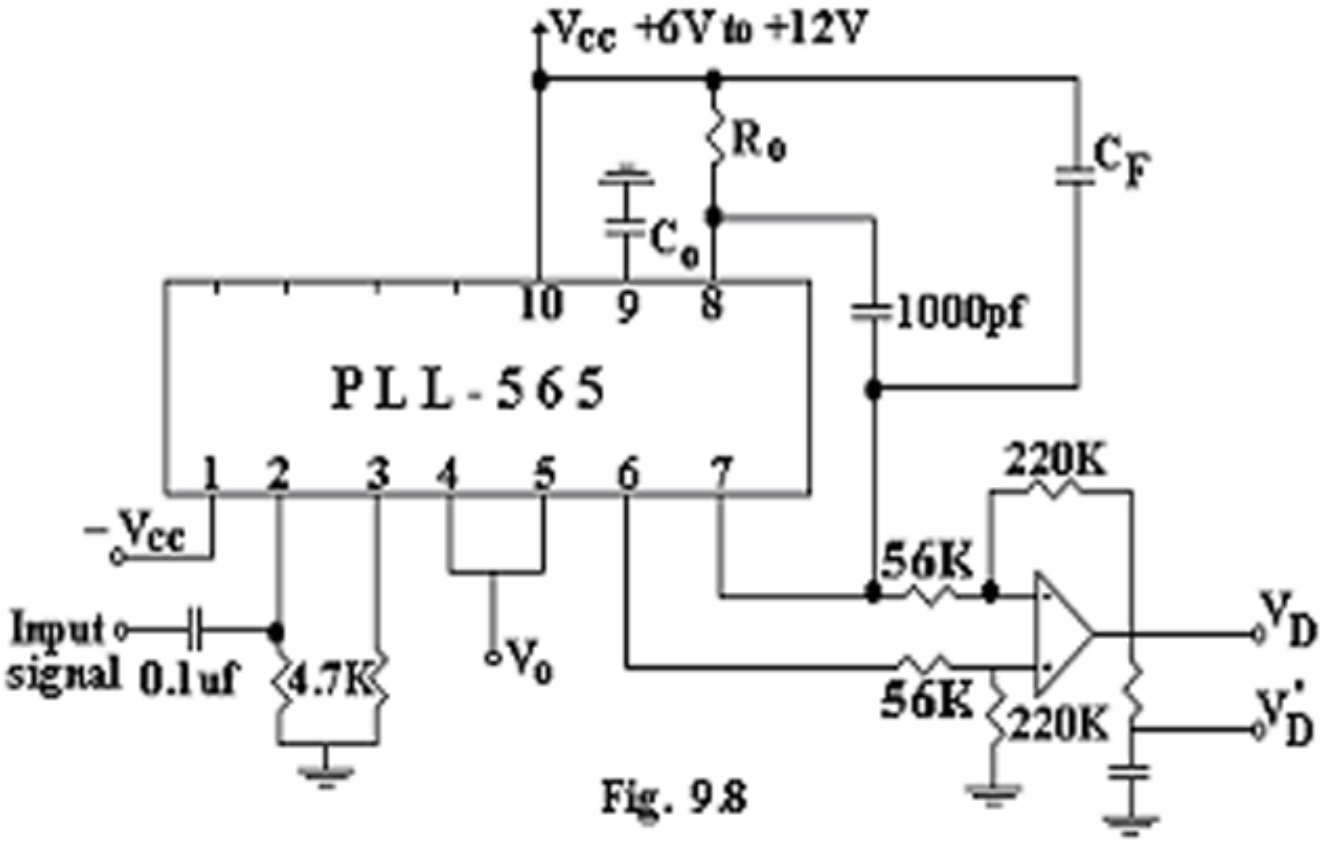

Fig. 98

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