

Frequency Synthesizer Circuit

The Frequency synthesizer is an indirect frequency synthesizer PLL(Phased Locked Loop). It consists of a VCTCXO(U705), PLL IC(703), VCO(U702), and loop filter.

VCTCXO

The VCTCXO is a reference source of the frequency synthesizer. It provides 19.68MHz reference frequency to PLL. The VCTCXO is a Voltage Controlled Temperature Compensated Crystal Oscillator having 19.68MHz $\pm$ 2.5 ppm frequency stability over all useful temperature range. A correct frequency tuning is made by the control voltage.

VCO

The VCO(U702) generates the signal having 966 $\pm$ 12.5MHz center frequency with the voltage control. PLL IC controls this signal.

PLL IC

The PLL IC(U703) includes prescalers and charge pump. The reference divider in PLL IC divides the frequency of VCTCXO by 1968 and makes reference frequency 10KHz. This reference frequency is supplied to one of the input of phase detector. The signal generated at VCO goes into another input stage of the phase detector through a prescaler and the main divider. At this point, the error proportional to the phase difference of two inputs is occurred. This error signal is supplied to the frequency control input stage of VCO through the loop filter consisted RC.

Spurious Radiation Suppression Circuit

The spurious signal from antenna is suppressed at the duplexer. The duplexer has a flat characteristics to the receive signal and a high attenuation characteristics to the harmonic signal of transmission. So it suppress the spurious radiation

Table: The characteristic of duplexer filter(F700)

Parameter	Value
T X	
Center Frequency	836.5 MHz (FT)
Bandwidth	FT ₁ ±12.5 MHz
Insertion Loss at BW	+10 ₁ É ~ +35 ₁ É 2.6dB Max -30 ₁ É ~ +85 ₁ É 2.8dB Max
VSWR at BW	1.7 Max
Input power	2.0W Max
Attenuation absolute value relative value	869 ~ 894MHz 43dB Min 1648 ~ 1698 MHz 27dB Min 2472 ~ 2547 MHz 30dB Min
Ripple at BW	1.9dB Max
R X	
Center Frequency	881.5 MHz (FR)
Bandwidth	FR ₁ ±12.5 MHz
Insertion Loss at BW	3.7dB Max
VSWR at BW	1.8 Max
Input power	1W Max
Attenuation absolute value relative value	824 ~ 849 MHz 50dB Min 914 ~ 939 MHz 10dB Min 959 ~ 984 MHz 30dB Min
Ripple at BW	1.3dB Max

7. BLOCK DIAGRAM