SP5060

2.0GHz FIXED MODULUS FREQUENCY SYNTHESISER

The SP5060 is for use in outdoor (head end) units of satellite TV receivers and together with an appropriate voltage controlled oscillator (VCO), forms a complete phase locked loop (PLL) synthesiser. The circuit consists of a prescaler with preamplifier and a fixed modulus divider. The phase comparator is fed with a reference frequency derived from an external oscillator or crystal. The comparator has a charge pump output with an output amplifier stage around which feedback may be applied. Only one external transistor is required for varicap line driving.

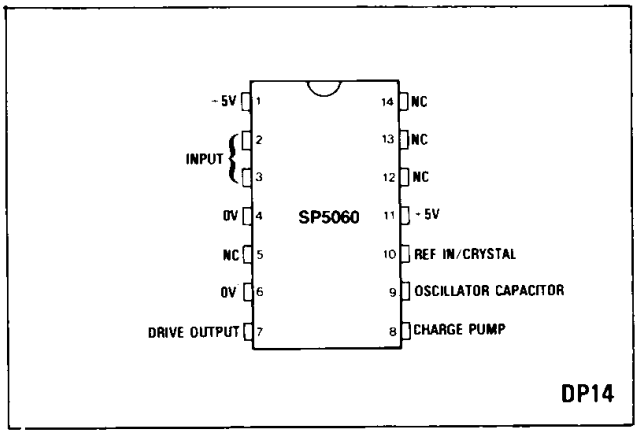

Fig.1 Pin connections - top view

FEATURES

- +5V, 50mA Supply
- Prescaler and Preamplifier Included
- High Comparator Frequency for Easier Filtering
- Charge Pump Amplifier with Feedback Point
- Synthesises Frequencies up to 2.0GHz
- For use at C-Band with Frequency Doubling Mixer

ABSOLUTE MAXIMUM RATINGS

Operating temperature range	**-10°C to +70°C**
Maximum junction temperature	175°C
Storage temperature	-55°C to +125°C
Supply voltage Pin 1 and Pin 11	7V
Prescaler input voltage	2.5V p-p

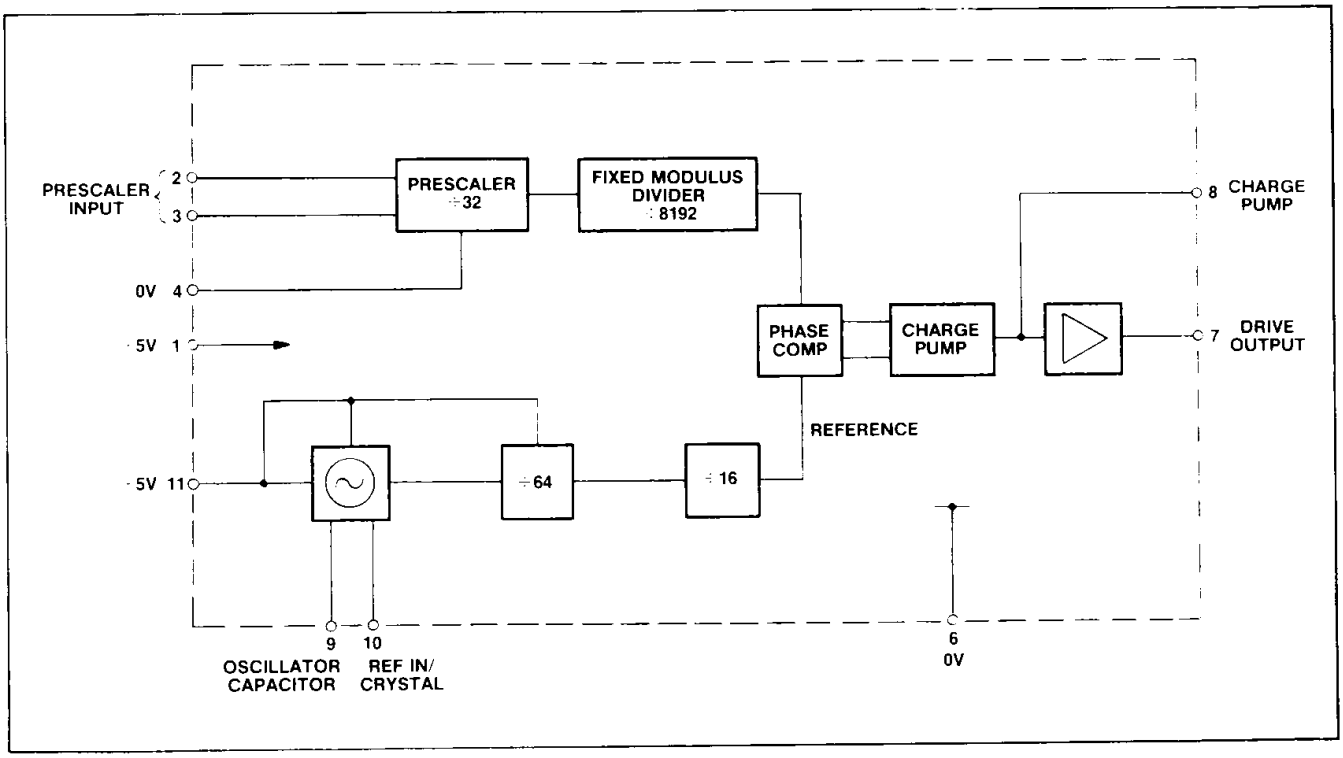

Fig.2 Block diagram

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ELECTRICAL CHARACTERISTICS

Test conditions (unless otherwise stated):
T_{amb} = +25°C V_{CC} = +4.5V to 5.5V

Characteristic	Symbol	Pin	Value			Units	Conditions
			Min.	Typ.	Max.		
Operating voltage	V_{CC}	1,11	4.5		5.5	V	
Supply current	$I_{CC}(1)$	1		50	60	mA	
Supply current	$I_{CC}(11)$	11		1		mA	
Prescaler input voltage		2,3	100			mV	300MHz to 2.0GHz sinewave
Prescaler input impedance		2,3		50		Ohms	
Charge pump output current		8	±75	±100	±125	μA	V pin 8 = 2.0V
Charge pump leakage current		8			±1	μA	V pin 8 = 2.0V
Charge pump drive output current		7	1			mA	V pin 7 = 0.7V
Drift due to leakage				5		mV/s	At collector of external varicap drive transistor
Oscillator temperature stability		9,10		0.12		PPM/°C	Over 0 to 65°C temperature range IC variation only
Oscillator stability with supply voltage		9,10		0.25		PPM/V	V_{CC} = 4.5V to 5.5V
Reference clock frequency		10	2		8.0	MHz	
External reference amplitude		10	100		500	mV rms	
Reference input impedance		10		25		kohms	

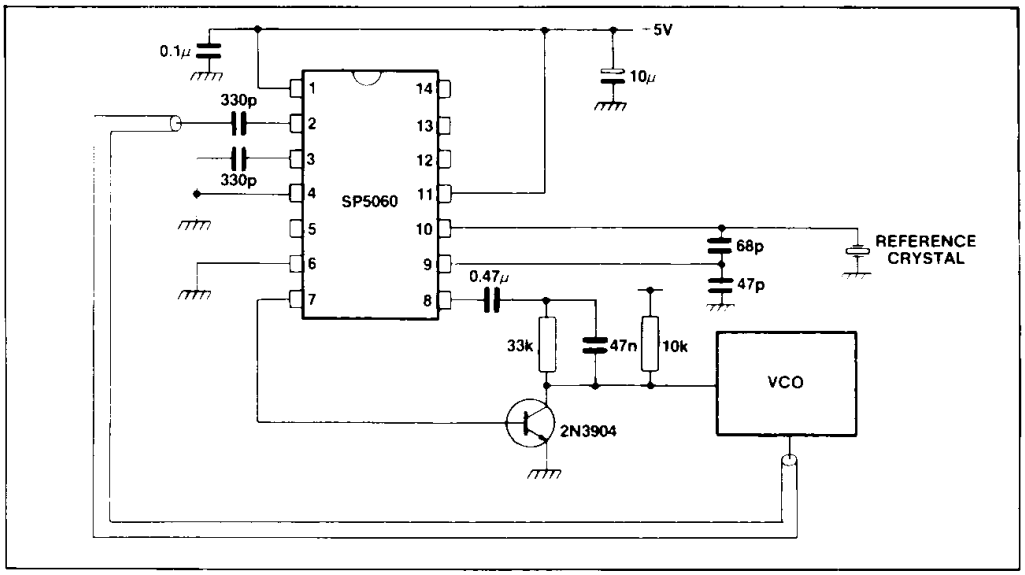

Fig.3 Typical application and test circuit (1024MHz with 4MHz reference crystal)

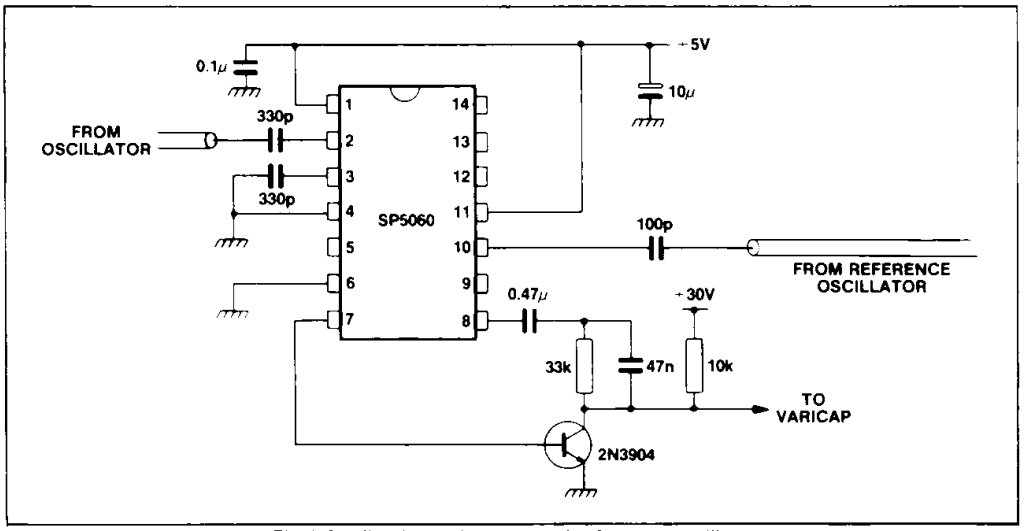

Fig.4 Application using external reference oscillator

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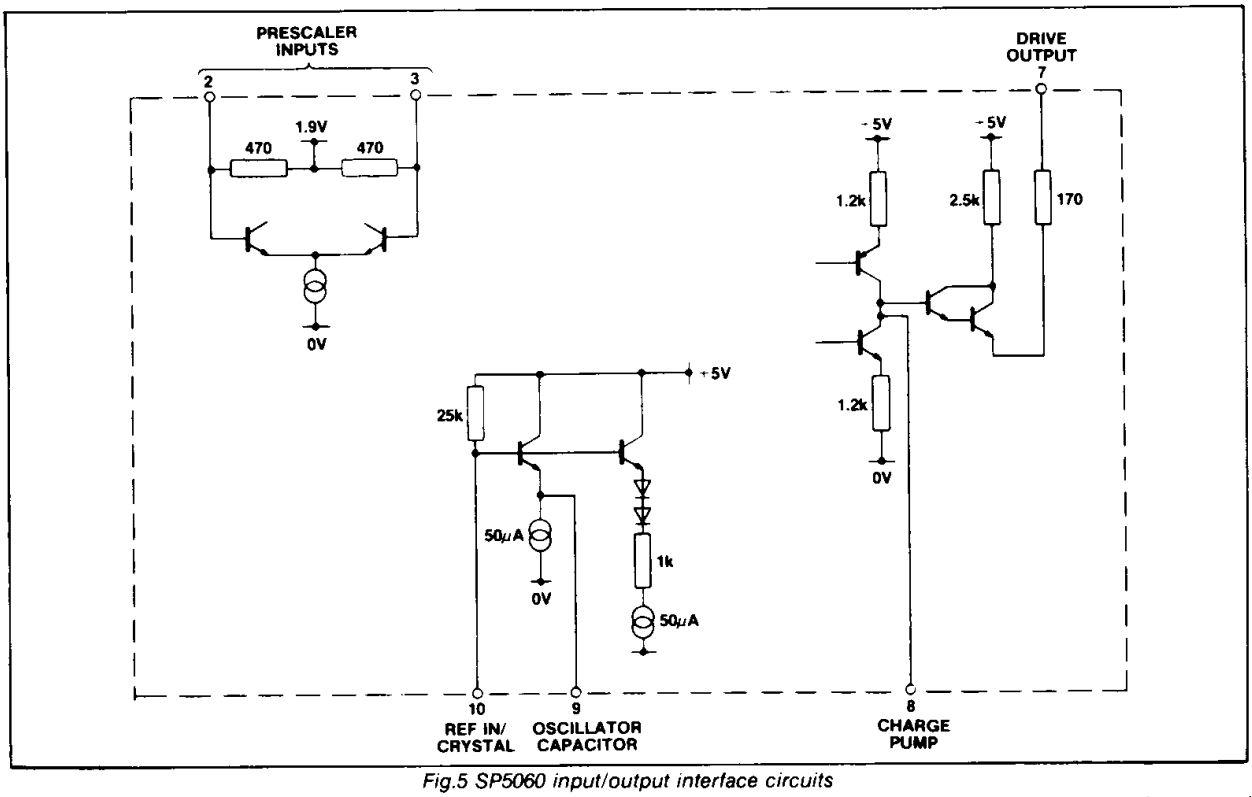

Fig.5 SP5060 input/output interface circuits

DESCRIPTION

The SP5060, when used with a voltage controlled oscillator, forms a complete phase locked loop frequency synthesiser.

The phase comparator reference frequency is obtained by dividing the reference frequency. This may be generated on chip, by means of a crystal, or from an external reference oscillator.

The output of the prescaler is divided by the fixed modulus divider, producing an output frequency which is phase locked to the reference frequency.

The divider stages are arranged to give a fixed ratio, between the synthesised frequency and the reference, of 256:1.

Any frequency within the range 300MHz to 2.0GHz may be achieved using the appropriate reference or crystal frequency.

A single external transistor, driven from the charge pump output, provides the output swing necessary for the oscillator varicap line.

To improve device stability the +5V and ground supplies to the chip are split and brought out to separate pins. It is therefore essential to connect all the supply pins for the device to operate correctly.

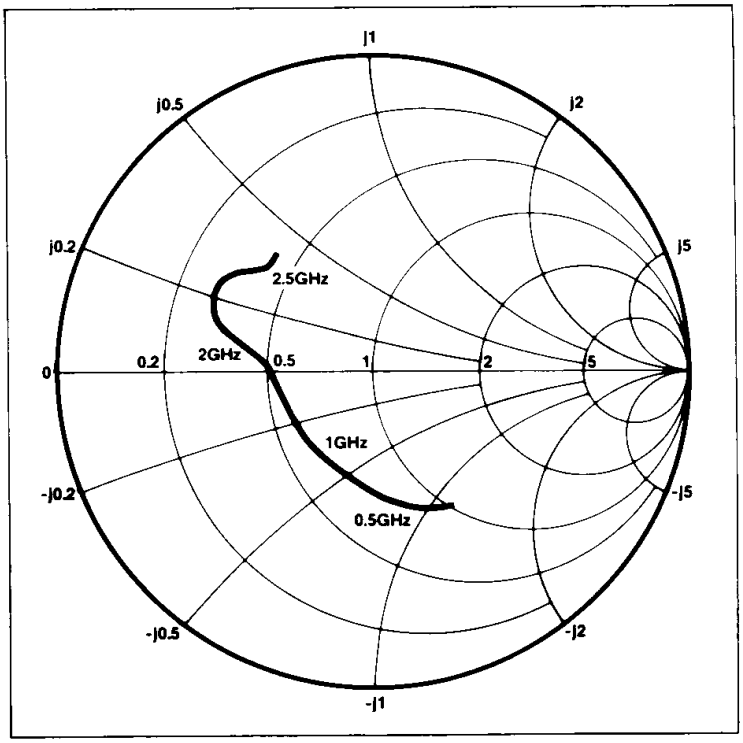

Fig.6 Typical input impedance Normalised to 50Ω

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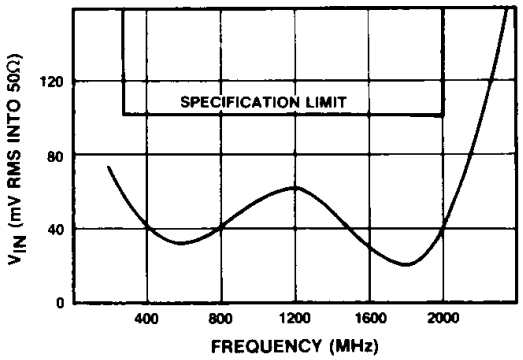

Fig.7 SP5060 typical input sensitivity

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