

# FSK Modulator/Demodulator

## GENERAL DESCRIPTION

The XR-210 is a highly versatile monolithic phase-locked loop system, especially designed for data communications. It is particularly well suited for FSK modulation/demodulation (MODEM) applications, frequency synthesis, tracking filters, and tone decoding. The XR-210 operates over a power supply range of 5V to 26V, and over a frequency band of 0.5 Hz to 20 MHz. The circuit can accommodate analog signals between 300 $\mu$ V and 3V, and can interface with conventional DTL, TTL, and ECL logic families.

## FEATURES

Wide Frequency Range	0.5 Hz to 20 MHz
Wide Supply Voltage Range	5V to 26V
Digital Programming Capability	
RS-232C Compatible Demodulator Output	
DTL, TTL and ECL Logic Compatibility	
Wide Dynamic Range	300 $\mu$ V to 3V
ON-OFF Keying & Sweep Capability	
Wide Tracking Range	$\pm 1\%$ to $\pm 50\%$
Good Temperature Stability	200 ppm/ $^{\circ}$ C
High-Current Logic Output	50 mA
Independent "Mark" and "Space"	
Frequency Adjustment	
VCO Duty Cycle Control	

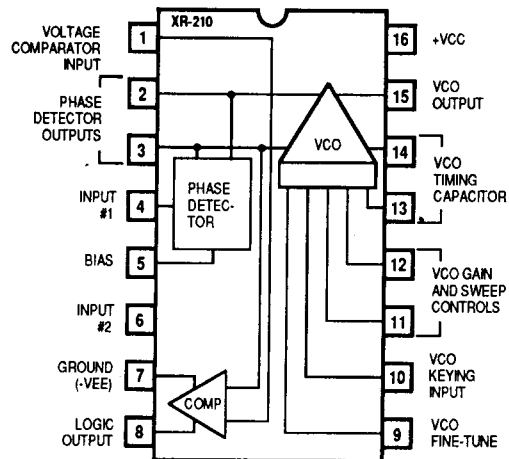
## APPLICATIONS

- Data Synchronization
- Signal Conditioning
- FSK Generation
- Tone Decoding
- Frequency Synthesis
- FSK Demodulation
- Tracking Filter
- FM Detection
- FM and Sweep Generation
- Wideband Discrimination

## ABSOLUTE MAXIMUM RATINGS

Power Supply	26 Volts
Power Dissipation	750 mW
Derate Above +25 $^{\circ}$ C	6.0 mW/ $^{\circ}$ C
Storage Temperature	- 65 $^{\circ}$ C to + 150 $^{\circ}$ C
Rev-C	

## FUNCTIONAL BLOCK DIAGRAM



## SYSTEM DESCRIPTION

The XR-210 is made up of a stable wide-range voltage-controlled oscillator (VCO), exclusive OR gate type phase detector, and an analog voltage comparator. The VCO, which produces a square wave as an output, is either used in conjunction with the phase detector to form a phase-locked loop (PLL) for FSK demodulation and tone detection or as a generator in FSK modulation schemes. The phase detector when used in the PLL configuration produces a differential output voltage with a 6 K $\Omega$  output impedance, which when capacitively loaded forms a single pole loop filter. The voltage comparator is used to sense the phase detector output and produces the output in the FSK demodulation connection.

# XR-210

## ELECTRICAL PERFORMANCE CHARACTERISTICS - XR-210

TEST	SYMBOL	CONDITIONS	TEMPERATURE	LIMITS		UNIT	GROUP A SUBGROUP
				MIN	MAX		
Supply Current	$I_{CC}$	$V_{CC} = \pm 6V$	$T_A = +25^\circ C$	5.0	16.0	mA	1
			$-55^\circ C \leq T_A \leq +125^\circ C$	5.0	20.0	mA	2,3
Supply Current	$I_{CC}$	$V_{CC} = \pm 13V$	$T_A = +25^\circ C$		26.0	mA	1
			$-55^\circ C \leq T_A \leq +125^\circ C$		26.0	mA	2,3
VCO Power	PSR	$\pm 6V \leq V_{CC} \leq \pm 12V$	$T_A = +25^\circ C$		0.5	%/V	9
Supply Stability			$-55^\circ C \leq T_A \leq +125^\circ C$		1.0	%/V	10,11
VCO Sweep Range	FSW		$T_A = +25^\circ C$	5:1			9
			$-55^\circ C \leq T_A \leq +125^\circ C$	3:1			10,11
VCO Duty Cycle Asymmetry	DC		$T_A = +25^\circ C$		$\pm 3$	%	9
			$-55^\circ C \leq T_A \leq +125^\circ C$		$\pm 10$	%	10,11
Phase Detector Output Offset Voltage		Measured Across Pin 1	$T_A = +25^\circ C$		$\pm 150$	mV	1
		and Pin 3, $V_{IN} = 0$	$-55^\circ C \leq T_A \leq +125^\circ C$		$\pm 150$	mV	2,3
Logic Output Leakage Current	$I_{OH}$	$V_{CC} = \pm 12V$	$T_A = +25^\circ C$		10.0	$\mu A$	1
		$V_{CC} = \pm 6V$	$-55^\circ C \leq T_A \leq +125^\circ C$		100.0	$\mu A$	2,3
Logic Output Low Voltage	$V_{OL}$	$I_L = 10 \text{ mA}$	$T_A = +25^\circ C$		0.4	V	1
			$-55^\circ C \leq T_A \leq +125^\circ C$		0.7	V	2,3
Logic Output Sink Current	$I_{SINK}$	$V_O \leq 1V$	$T_A = +25^\circ C$	30		mA	1
			$-55^\circ C \leq T_A \leq +125^\circ C$	25		mA	2,3