212A/V.22 Modem Filter

GENERAL DESCRIPTION

The XR-2120A is a filter system for performing the complete filter function for Bell 212A or CCITT V.22 type modems. The XR-2120A supplies both transmit and receive filtering functions for the standard 1200 Hz and 2400 Hz 212A/V.22 carrier frequencies. Also supplied are mode switching, internal clock generators, input anti-aliasing filters, output reconstruction filters, and digitally controlled transmit and receive gains. Additional features included are CCITT notch filters, additional pin selectable equalization for worst case phone lines and complete analog loopback function.

The XR-2120A utilizes silicon gate CMOS technology and switched-capacitor circuit techniques to minimize external components and enhance overall performance.

The XR-2120A, available in a 24-Pin Package, is designed to operate from dual 5 volt or a single 10 volt power supply.

FEATURES

1200 Hz/2400 Hz Transmit and Receive Bandpass Filters
Mode Switching for Answer/Originate
Internal Anti-Aliasing Filters
Complete On-Board Output Reconstruction Filters
Self-Contained Analog Loopback Function
Digitally Programmable Transmit and Receive Gains
Additional Pin-Selectable Equalization for Worst Case Phone Lines
Single or Split Supply Operation
Low Supply Current
CCITT Notch Filter (1800 Hz)
Center Frequencies Movable with Clock Input

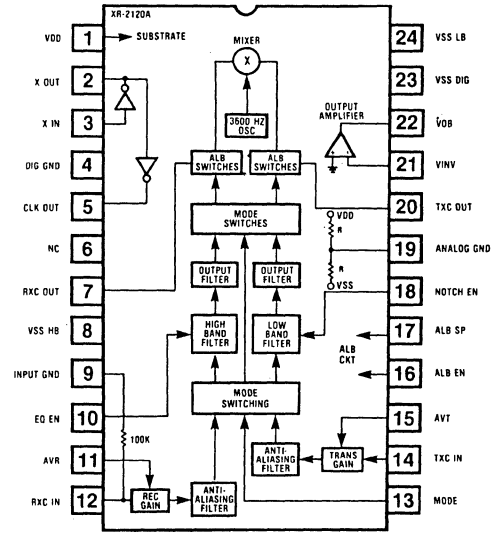
APPLICATIONS

Bell 212A/CCITT V.22 Transmit and Receive Filtering
Answer Back Signal Filtering

ABSOLUTE MAXIMUM RATINGS

Power Supply	11V
Power Dissipation	1.0W
Derate Above 25° C	5 mW/°C
Operating Temperature Range	0° C to 70°C
Storage Temperature Range	−65° C to 150°C
Any input Voltage	$V_{SS}-0.3V$ to $V_{DD}+0.3V$

FUNCTIONAL BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-2120ACN	Ceramic	0°C to 70°C
XR-2120ACP	Plastic	0°C to 70°C

SYSTEM DESCRIPTION

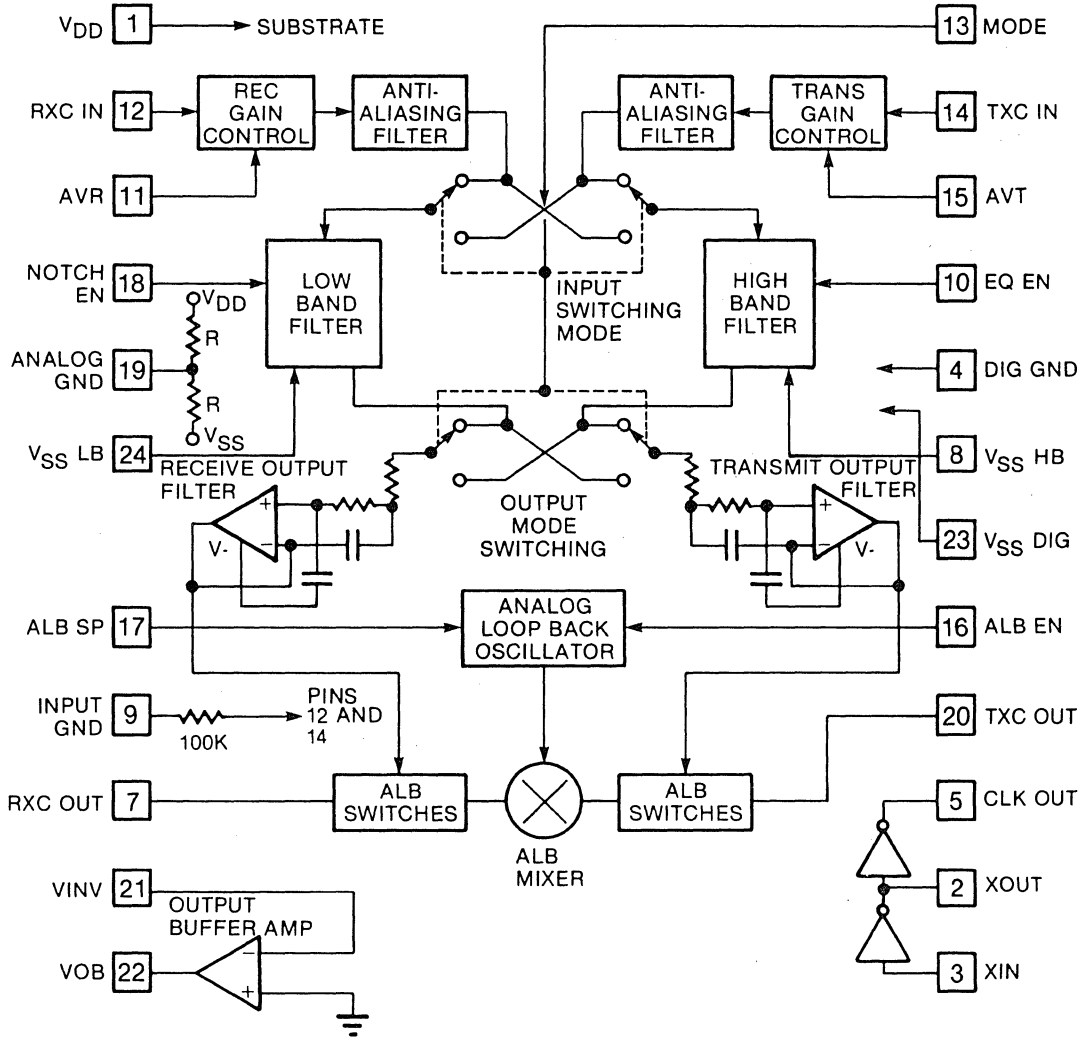
The XR-2120A is made up of five main signal blocks; Digitally programmable gain transmit and receive amplifiers, input anti-aliasing filters, switched capacitor bandpass filters centered at 1200 Hz and 2400 Hz, output RC active filters, and 3600 Hz oscillator and mixer. These blocks serve to (1) Amplify and condition incoming signals, (2) Remove noise and signals which may cause aliasing problems in the bandpass filters, (3) Provide precise bandpass filtering and phase equalization, (4) Provide output reconstruction and filtering, and, (5) Perform analog loop back functions.

ELECTRICAL CHARACTERISTICS

Test Conditions: V_{DD} = 5V, V_{SS} = −5V, X_{IN} = 1,8432 MHz, T_J = 25°C, unless otherwise specified.

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
V_{DD}	Power Supply	4.75	5.0	5.25	V	
V_{SS}	Voltage	4.75	−5.0	−5.25	V	
I_{DD}	Power Supply		20	40	mA	
I_{SS}	Current		−20	−40	mA	
DIGITAL SECTION						
CLK OUT	CLK OUT Drive Capability			50	pF	
I_I	Digital Input Current			10	μA	V_{IN} = V_{DD} or GND
V_{IH}	Input High Voltage	2.4			V	
V_{IL}	Input Low Voltage			0.8	V	
V_{OH}	Output High Voltage	2.6			V	I_{OH} = 400 μA
V_{OL}	Output Low Voltage			0.5	V	I_{OL} = 1.6 MA
ANALOG SECTION						
f_{ol}	Bandpass Center	1190	1200	1210	Hz	See Note 1
f_{ob}	Frequencies	2380	2400	2420	Hz	See Note 1
BW	3 dB Bandwidth of Filters		±480		Hz	Either Band
						See Note 1
A_{vt}	Transmit Gain at	5	6	7	dB	A_{vt} = HIGH
A_{vt}	Center Frequency	14	15	16	dB	A_{vt} = LOW
A_{vr}	Receive Gain at	10	11	12	dB	A_{vr} = LOW
A_{vr}	Center Frequency	19	20	21	dB	A_{vr} = HIGH
R_i	Input Impedance		100		Kohm	
C_i	Input Capacitance			10	pF	
e_i range	Input Dynamic Range		80		dB	R_L = 600 ohm
Vo swing	Output Voltage Swing	7.2	8.2		Vp-p	
CHSEP	Channel Separation	60			dB	See Note 2

Note: 1. Filter Characteristics Shown in Figure
2. Test Circuit Shown in Figure



EQUIVALENT SCHEMATIC DIAGRAM