

Speech Synthesizer

FEATURES

- Double Buffered Input Memory
- Single +5 Volt Supply
- On Chip Oscillator with External Crystal Control
- On Chip Digital to Analog Converter
- 12 Coefficient Registers
- Vocal Tract Model

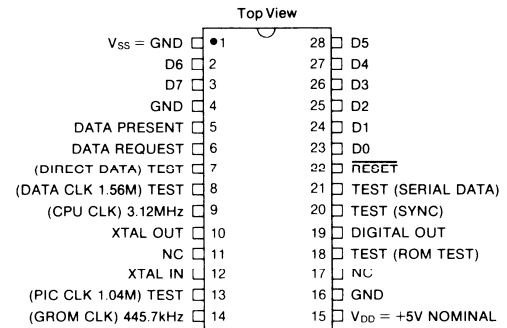
DESCRIPTION

The SP-0250 is a single chip speech synthesizer with a time shared 2 stage filter section which simulates a 12 stage cascade filter. This filter is a model of the human vocal tract. The SP-0250 can be interfaced with the General Instrument microcomputer PIC1650, and requires a single +5 volt supply.

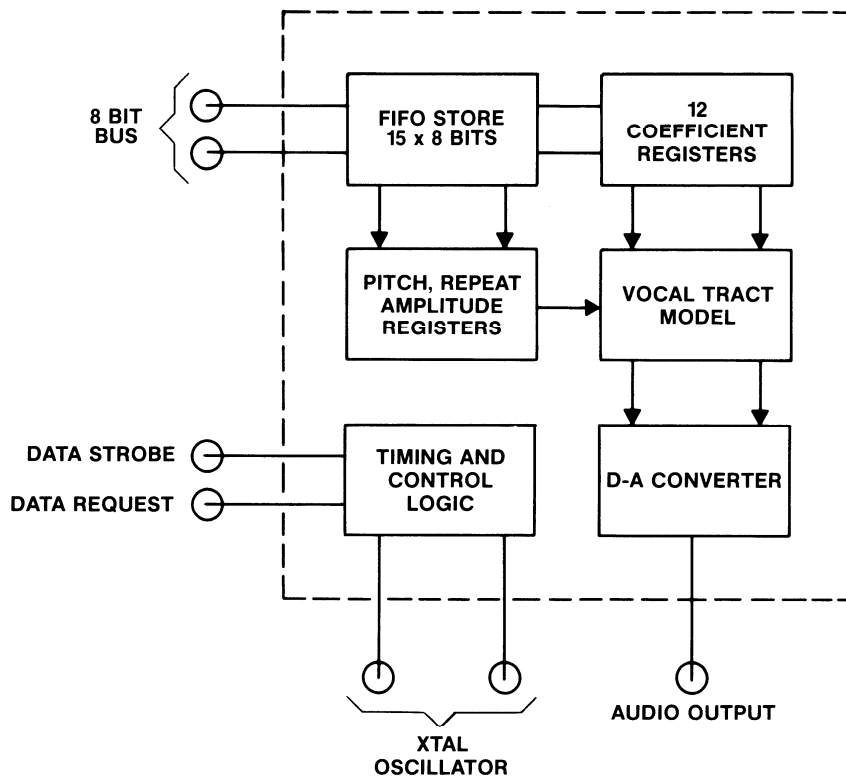
The SP-0250 is fabricated with N-channel Ion Implant technology resulting in a high performance product with proven reliability and production history.

PIN CONFIGURATION

28 LEAD DUAL IN LINE



BLOCK DIAGRAM OF SP-0250



PIN FUNCTIONS

Pin Number	Name	Function
15	V _{DD}	Positive Power Supply
1	V _{SS}	Ground
Clock		
12	XTAL IN	The 3.12MHz crystal and associated circuitry are connected here.
10	XTAL OUT	
Inputs		
22	Reset	A logic "0" on this input resets the chip.
23-28, 2, 3	D0-D7 Data Bus	The input 8 bit data bus.
5	Data Present	This input strobes the data on D0-D7 into the chip.
4, 16, 7, 18		Must be grounded for proper chip operation.
Outputs		
6	Data Request	This output requests data be sent to the chip.
19	Digital Out	The output of the chip. This output is open collector and requires a pull-up.
9	3.120MHz CPU Clock	A buffered push-pull output.
14	0.4457MHz GROM Clock	A buffered push-pull output with a 3:4 high to low ratio.

TEST PINS

Pin Number	Name	Function
Test Inputs		
7	Direct Data Mode	A logic "1" on this input causes the data bus to be loaded directly into the source register in the chip.
18	ROM Test	A logic "1" on this input causes the ROM outputs to appear on the "SERIAL DATA" Pin.
Test Outputs		
20	SYNC	A buffered push-pull test output that is a 640ns positive pulse with a duty cycle of 312 clocks.
21	Serial Data	A buffered push-pull test output that monitors a point in the internal data bus.
8	1.56MHz Data Clock	A buffered push-pull output square wave.
13	1.04MHz PIC Clock	A buffered push-pull output with a 1:2 high to low ratio.

ELECTRICAL CHARACTERISTICS

Maximum Ratings*

V_{CC}..... -0.3V to +12V
 Storage Temperature -25°C to +125°C
 Lead Temp (Soldering) 10Sec @ +330°C

*Exceeding these ratings could cause permanent damage. Functional operation of this device at these conditions is not implied—operating ranges are specified below.

Standard Conditions (unless otherwise stated)

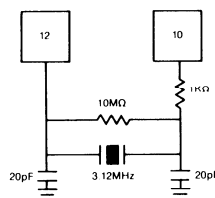
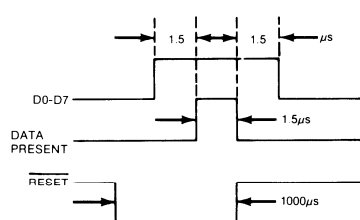
V_{CC} = +4.6V to +5.5V
 Operating Temperature = 0°C to +55°C

DC CHARACTERISTICS

Characteristic	Min	Typ	Max	Units	Conditions
10 Inputs:					
Reset D0-D7, Data Present					
Logic 0	0.0	—	0.6	V	5.5V
Logic 1	2.4	—	V _{CC}	V	
Leakage	—	—	10	μA	
1 Clock Input:					
Logic 0	0.0	—	0.6	V	5.5V
Logic 1	4.0	—	V _{CC}	V	
Leakage	—	—	10	μA	
2 Test inputs					
Direct Data Mode, ROM Test					
Logic 0	0.0	—	0.6	V	5.5V
Logic 1	2.4	—	V _{CC}	V	
Capacitance	—	—	10	pF	
Leakage	—	—	10	μA	
3 P/P Outputs					
Data Request, CPU CLock, GROM Clock					
Logic 0	0.0	—	0.6	V	.72mA
Logic 1	3.50	—	V _{CC}	V	-50μA
1 O/C Output					
Digital Out					
Logic 0	0.0	—	0.6	V	2.2K
Logic 1	—	—	10	μA	5.0V Source
Power on V _{DD} = I _{CC}	—	50	75	mA@ 25°C	V _{DD} =5.5 V _{SS} =0.0 No Loads

AC CHARACTERISTICS

Characteristic	Min	Typ	Max	Units	Conditions
Clock Frequency	—	3.12	—	MHz	Square Wave
	—	320	—	ns	
Data Present					No Load
Logic 1	1.5	—	—	μs	
Logic 0	10.0	—	—	μs	
Reset D0-D7	1000	—	—	μs	
Set Up	1.5	—	—	μs	
Hold	1.5	—	—	μs	
P/P Test Output					
Serial Data					
Logic 0	0.0	—	0.6	V	No Load
Logic 1	3.50	—	V _{CC}	V	



CHIP WILL OSCILLATE WITH PASSIVE COMPONENTS SHOWN F 3.12

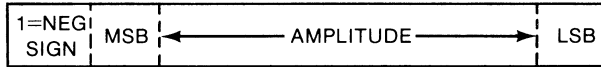


PARAMETER ASSIGNMENT

The 15 parameters are input in the following manner:

Byte	Name	Data Bus Pins						
		3	2	28	27	26	25	24
0	C21	1=POS SIGN	MSB	COEFFICIENT				LSB
1	C11							
2	Amplitude*	← EXP →		← AMPLITUDE →				
3	C22							
4	C12							
5	Pitch	MSB	← PITCH →				LSB	
6	C23							
7	C13							
8	Repeat	0	V(u)	MSB	REPEAT			LSB
9	C24	1=POS SIGN	MSB					LSB
10	C14							
11	C25							
12	C15							
13	C26							
14	C16							

* Amplitude Direct Data Mode



Exponent From Normal Mode Remains Until Changed

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