

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

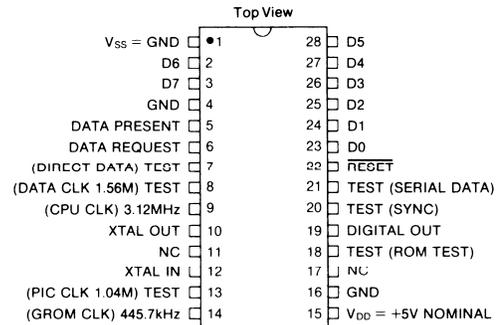
DESCRIPTION

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.

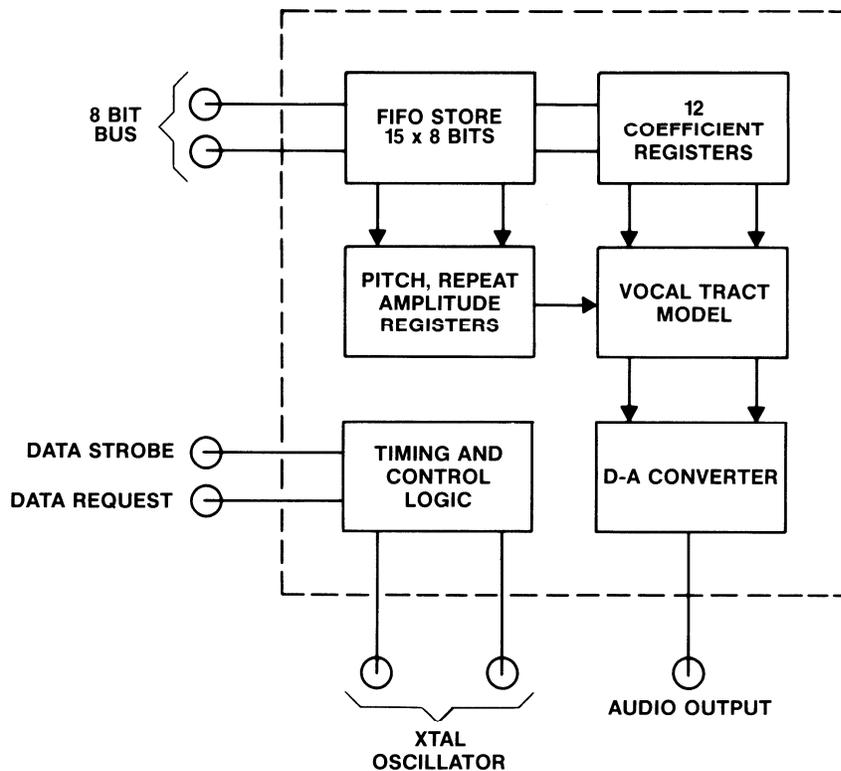
The SP-0250 is fabricated with N-channel Ion Implant technology resulting in a high performance product with proven reliability and production history.

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)

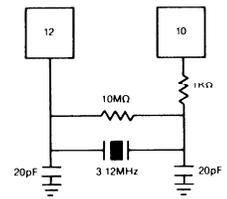
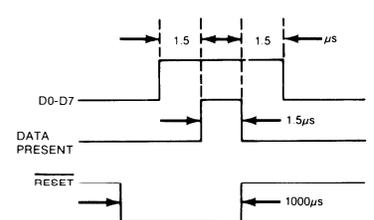
V_{CC} = +4.6V to +5.5V
 Operating Temperature = 0°C to +55°C

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

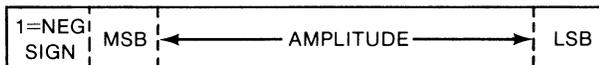


PARAMETER ASSIGNMENT

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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