The SP0256 Speech Board Interface

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1 Interface Details

This documents the interface between the SP0256 Speech Board and the **TINI TutorIO** microprocessor board. The TutorIO board PIA connector is a 26-way IDC socket known as **CONN3**. This carries the signals of the three 8-bit Ports A, B and C, ground and Vcc (5V). Only Port A is employed by the Speech Board; Ports B and C remain unused. Power to drive the Speech Board is also obtained from the TINI board via the CONN3 interface.

The command interface with the SP0256 Speech Board comprises 6 address lines (**A1**...**A6**) and the **ALD** (Address LoaD) and **LRQ** (Load ReQuest) signals, 8 bits in total. The interface is illustrated in **Figure 1**

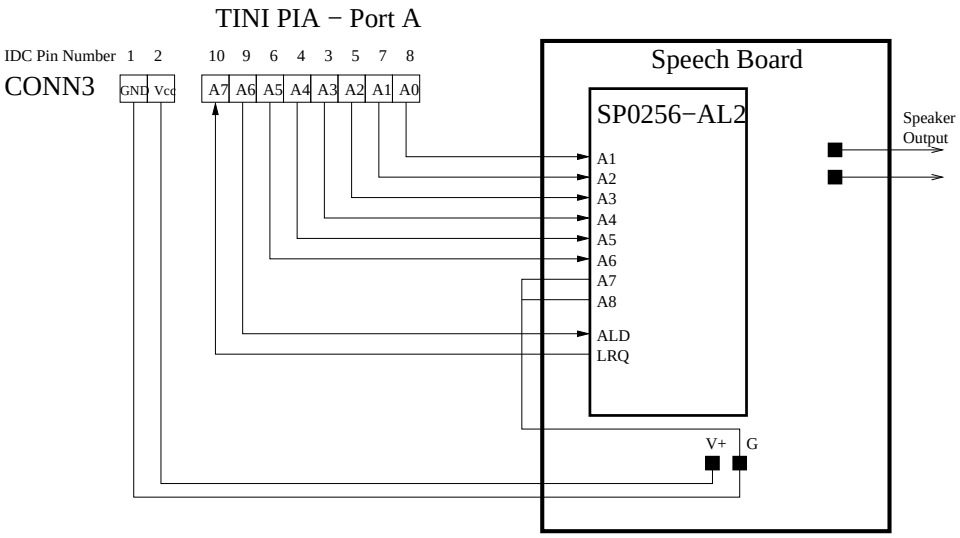

Figure 1: SP0256 Interface

The AL2 varant of the SP0256 used here possesses 8 address lines, A1..A8. However, only A1..A6 are employed to select one of 64 phonemes. The address lines A7 and A8 are tied to Ground on the Speech Board. Port A should be configured for output on bits A0..A6 and for Input on A7.

2 Speech Commands

The SP0256 employes the control signals **ALD** and **LRQ** to latch addresses and start processing, as follows:
The ALD strobe is a short positive pulse and the LRQ indicates the state of the SP0256 Input buffer:

- ALD:
  - 0: Load a new address into the Input Buffer
  - 1: Latch a new address into the Input Buffer and start outputting the speech patten at that address
- LRQ:
  - 0: The Input Buffer is empty and can accept a new address
  - 1: The Input Buffer is full and cannot accept a new address

A speech command may be issued to the Speech Board as follows:

```
begin( Simple SP0256 command ) {
  Setup command address on A1..A6;
  Strobe ALD line;
}
```

The ALD strobe should conform to the following bounds:

$$200ns <= ALD <= 1100ns$$

The above assumes that the SP0256 input buffer is free and the device is able to respond to a new command. It is better to check the status of the command buffer prior to sending a new command; This is performed by synchronising on the LRQ signal, as follows:

```
begin( Synchronous SP0256 command ) {
  Wait for LRQ == 0;
  Setup command address on A1..A6;
  Strobe ALD line;
}
```

This protocol is illustrated in **Figure 2**

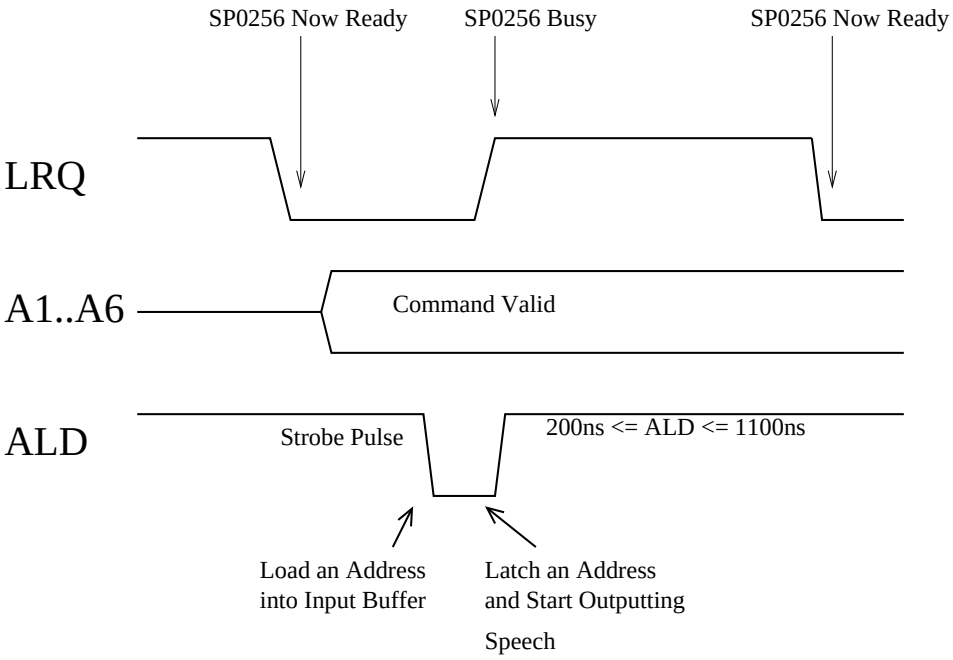

Figure 2: SP0256 Command Protocol

Consult the Timing Diagram in the SP0256 documentation for detailed AC characteristics of the device.

3 Further Information

- Experiments with the SP0256 Speech Synthesiser, http://www.robotprojects.com/voice/sp0256.htm
- TutorIOIntroduction.html
- Archer Technical Data - SP0256 Speech Processor