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Mini CV Controller

Abstract

The Mini CV Controller is a low cost, entry level CV to MIDI / MIDI to CV converter suitable for integration into third party instruments. Additionally, the Mini CV Controller can be upgraded for wireless operation using Bluetooth, which generates Open Sound Control messages.

Introduction

Since the development of the Dumb Controller, which provided many Australian computer musicians a low cost alternative to imported devices, computer music students have requested an even lower cost alternative for entry level interactive instrument design. Additionally, some artists have requested that a low cost wireless instrument be made available. These requests have been realised in the Mini CV Controller.

Although some of the ideas in the Mini CV Controller were gleaned from Eric Singer's MidiTron,[1] including the ability for users to connect to the device using screw terminals, and to control robotic controllers using pulse width modulation; the Mini CV Controller is not just a copy of a foreign instrument.

Low Power and Small Size

In order to keep the cost and power usage to a minimum, a low chip count was targeted for the device. Additionally, the number of I/O pins was reduced to a total of sixteen, as opposed to the sixty-four on the Dumb and Smart Controllers. Eight inputs were assigned as CV inputs while each of the remaining eight pins can be configured as digital inputs or CV outputs.

CV inputs and outputs were applied direct to the microcontroller instead of being buffered through additional circuits; this meant that only eight CV inputs were possible instead of the sixteen available on the Dumb and Smart Controllers.

In order to reduce the overall size, the +5 and 0V sensor references are provided on a single pair of outputs with the inputs and outputs being available as a single screw terminal or through an IDC 16 pin plug. This is different from the Dumb Controller, which provides a bus bar for the +5 and 0V rails.

These changes resulted in a device that is only 7.5cm x 7.5 cm, which is significantly smaller than the Dumb Controller; and drawing only 10mA of Current (not including the current for each attached sensor), which means that the device can run comfortable on a 9V battery.

Wireless Connectivity

The Mini CV Controller can be upgraded for wireless performance through the use of the BlueWave Wireless terminal,[2] a class 1 Bluetooth device capable of 100m transmission range. In combination with a Bluetooth personal computer (PC or Macintosh), the device data can be converted to Open Sound Control messages. In this configuration, the number of inputs can be multiplied by daisy-chaining Mini CV Controllers to the Bluetooth enabled device, enabling the user to expand their system as their requirements change. Figure 1 shows a picture of the Mini CV Controller.
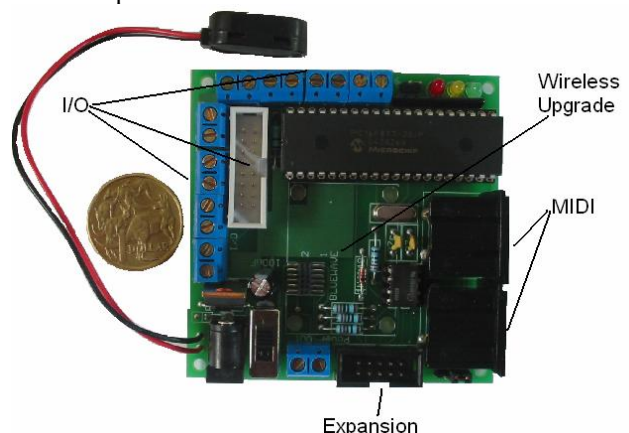

Figure 26 Mini CV Controller

High Resolution

The CV inputs have a 10 bit resolution and are scanned every 6ms, while the Digital Inputs have are scanned every 1ms. The PWM frequency ranges from 1.25kHz for 2 bit resolution down to 66Hz for 8 bit resolution.

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[1] http://www.eroktronix.com/

[2] http://www.wirelessfutures.co.uk/