Interfacing a Joystick to a Microtan System

Introduction

The Microtan was never targeted as a games machine, despite its graphical capabilities being relatively sophisticated for the time. One particular challenge is the full keyboard interface which only allows the software to see that a key has been pressed, not what it is held down or when it released. The hex keypad solves this problem, but of course has very limited functionality. The Invaders game made popular by the Electronics Today Magazine used the hex keypad for this reason.

Geoff Macdonald wrote a number of arcade style games for the Microtan in the 1980s, which have been immortalised through his Microtan emulator. Geoff got around the keyboard problem by interfacing a joystick to his Microtan, and his emulator maps this joystick to the PC cursor keys. To play these games on a physical Microtan requires connecting a joystick to some of the I/O lines on the VIA on TANEX.

Joysticks

The dominant standard for the joystick interface in the early 80s was the Atari DB9 interface. This, or slight variations of it, was supported by Atari consoles, the Commodore VIC20 and C64, ZX Spectrums and a wide range of other machines. A large number of third party joysticks were available with auto fire functions and a multitude of extra buttons.

The original Atari interface supported only 4 directional switches, 2 analogue paddle inputs and a single fire button.

Pin 1 = Up
Pin 2 = Down
Pin 3 = Left
Pin 4 = Right
Pin 5 = Paddle B
Pin 6 = Trigger or fire
Pin 7 = +5 volts power
Pin 8 = Ground
Pin 9 = Paddle A

Buttons and direction switches simply connect the relevant signal to ground, the +5vdc is only used for analogue paddles.

Many of the third party joysticks have multiple fire buttons, but often they are all connected in parallel to the single fire input. There were several different standards for supporting a second button, most used one of the analogue paddle inputs. Some joysticks had switches to select which console they would be compatible with.

Microtan interface.

Geoff's games read port A on the first VIA on Tanex and interpret it as follows:

Bit 7 = Down
Bit 6 = Right
Bit 5 = Up
Bit 4 = Left
Bit 3 = Button 2 (Shift on the emulator)
Bit 2 = Button 1 or fire (Ctrl on the emulator)

The NMOS 6522 VIA does not require pull ups, an open connection will be read as a 1, pulling it to ground by the joystick switch will be read as a 0. All of the required signals are available on connector A1 on TANEX.

Connections

The Joystick in this example was a Cheetah 125. It originally had 4 buttons connected to a single fire connection but was modified with a new cable leaving the stick buttons connected as originally and the changing the base buttons to be connected to Pin 9.

A 14DIP header (sometimes called a transition connector) is connected to a DB9 Male connector with a piece of ribbon cable, note that the ribbon cable cores do not correspond to the A1 Pin numbers.

6522 VIA Port	**Tanex Socket A1**	**Ribbon Core**	**Signal Function**	**Atari DB9**
PA0	Pin 2	4		
PA1	Pin 3	6		
PA2	Pin 4	8	Fire 1	Pin 6
PA3	Pin 5	10	Fire 2	Pin 9
PA4	Pin 6	12	Left	Pin 3
PA5	Pin 9	11	Up	Pin 1
PA6	Pin 10	9	Right	Pin 4
PA7	Pin 11	7	Down	Pin 2
	Pin 7	14	GND	Pin 8
	Pin 14	1	5v	Pin 7

The modern 14 way DIL transitions connector (made by Multicomp) interfers with the 6522 on my board, so I plugged a 14 way socket inbetween to raise it up.