



Corsham Technologies, LLC

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KIM Clone I/O

Introduction

As are most of our designs, this board was meant to address something that we wanted for our own use, and figured others might find a use for it. This was designed as a way to easily hook up partial circuits for other projects and control the inputs and monitor outputs using software. This allowed a much more complete test of the circuit under test in terms of proper operation under all expected and unexpected inputs. It also gives another serial output method for debugging programs that use the main terminal interface.

Features

- Two WDC 6522 Versatile Interface Adapters (VIAs). Each VIA has two parallel ports, two 16 bit timers, shift registers, etc. Very powerful chips.
- All digital I/O pins of both VIAs brought to headers along top of board.
- RS-232 port with on-board baud rate generator providing 1200, 2400, 4800 and 9600 baud.
- Serial port uses a 6850 ACIA.
- Can generate IRQ interrupts.

Base Address Selection – JP1

The I/O board can be placed at three different base addresses which is set via JP1. Any of the first three positions on the jumper block will select the base address; the last jumper is not connected to anything and will result in the board not responding.

Baud Rate Selection – JP6

The on-board baud rate generator provides x16 clocks for 1200, 2400, 4800 and 9600 baud. The baud rate is set via a jumper block.

Digital Lines and Power – JP2, JP3, JP4 and JP5

The parallel port lines, +5 VDC and ground are brought to the top set of pins. Be aware that current draw is limited to about 1 amp total.

RS-232 Interface Options – JP7, JP8, JP9 and JP11

There are several different options for which control lines from the DB-9 connector can reach the MC6850 ACIA. The most typical case is to ignore any hardware handshaking and control lines. This is the normal configuration shipped:

Jumper	Jumper pins	Use
JP7	2 to 3	Forces CTS always on
JP8	2 to 3	Brings DCD from MAX233 to ACIA
JP9	2 to 3	Connects DCD from DB-9 to MAX232

If CTS flow control is desired then these are the jumper settings:

Jumper	Jumper pins	Use
JP7	1 to 2	Gets CTS from JP8
JP8	1 to 2	Brings CTS from MAX232 to JP7
JP9	1 to 2	Connects CTS from DB-9 to MAX232

Note that the MC6850 requires CTS to be low in order to transmit. If CTS is left floating then you might experience problems transmitting as it depends on how the line floats.

JP11 is used when you wish to disconnect the receive data line from the MAX232 line receiver, such as when driving the serial lines directly with TLT signals. This jumper is normally installed but can be removed to isolate the receive line from the ACIA.

TTL Access to ACIA Lines – JP10

Most people will normally just use the serial port with RS-232 level signals, but for those who wish to work directly with TTL level signals, all of the ACIA's external lines are available on JP10. It should be noted that the jumper JP11 should probably be removed or else the receive data from the MAX233 driver chip will be presented to the ACIA's RX line.

Memory Map

Once the base address is selected, there are fixed offsets to each of the three chips on-board:

Offset	Use
00-0F	First 6522, U3
10-1F	Second 6522, U4
20-2F	68B50 ACIA

Why a 6850?

Simple: (A) It works, and (B) It's easy to write drivers for. The WDC 6551 would have been the obvious choice but there is a major bug in the current production parts that WDC probably won't fix until their current inventory is used up. Basically, the status register always indicates the transmit holder register (THR) is empty even when it is not. The solution is to use a timer; send a byte, set a timer, then don't send another byte until the timer expires. Quite workable but it makes the driver a bit more complicated. On the other hand, the 6850 just works the way it is supposed to, making code a lot simpler.

Revision History

Version	Changes
1	Initial beta release
2	Added U8 to properly interface with open collector signal

Parts List

Part	Number	Description
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PCB	1	Printed Circuit Board (Corsham Tech)
J1	1	30 pin male right angle connector
J1 (second)	1	40 pin male right angle connector
J2	1	Female DB-9 right angle connector
JP1, JP2, JP5, JP6	4	2x4 jumper block
JP3, JP4	2	2x8 jumper block
JP7, JP8, JP9	3	1x3 jumper block
JP10	1	1x7 jumper block
JP11	1	1x2 jumper block
QG1	1	2.4576 MHz oscillator
VR1	1	7805 5 volt voltage regulator
C1	1	22uf, 25v electrolytic capacitor
C2-C6	5	.1 uf disc capacitor
U1, U2	2	74LS138 decoder
U3, U4	2	WDC6522 VIA
U5	1	MC68B50 ACIA
U6	1	MAX233 RS-232/TTL interface
U7	1	4060N counter
U8	1	74LS07
	3	16 pin IC sockets for U1, U2, U7
	2	40 pin IC sockets for U3, U4
	1	24 pin wide IC socket for U5
	1	20 pin IC socket for U6
	1	14 pin IC socket for U8
	5	Jumpers