OSI Computers

Ohio Scientific Instruments (OSI) was founded in 1975 in Ohio. First product was the OSI 300 trainer board in 1976. 128 bytes of RAM, switches, and LED’s. In 1976 they introduced the model 400 CPU board which had a proprietary 48 pin bus using huge pin and socket Molex connectors that allowed you to build systems. sold in 1981 to M/A-COM, and its products were discontinued in 1983. The introduction of the IBM PC in 1981 made it difficult to continue.

OSI was an odd company that seemed to have the engineers in charge. It had a large selection of boards for the system but a number of odd ones that were interesting designs but questionable how many would sell. They targeted both the hobbyist and business market. Documentation was nowhere near Heathkit quality. It would be hard to be successful building the boards unless you had

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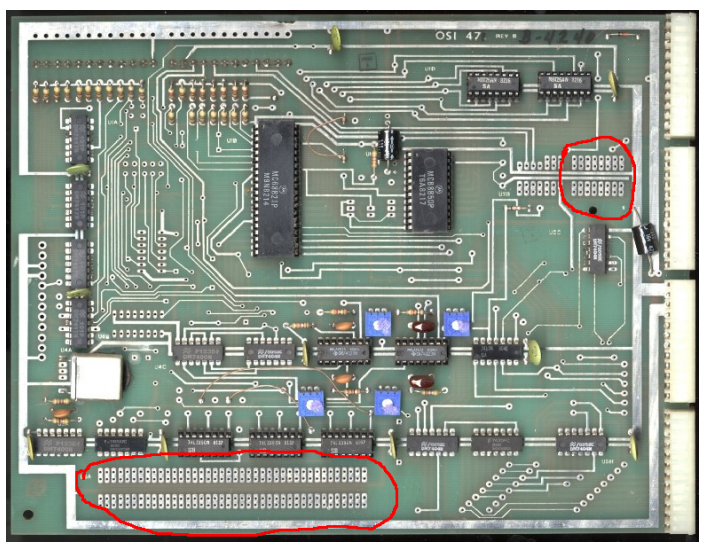
enough electronics and software background to figure out the wrong and missing information in the documentation. See later issues with the 430B board.
Their software also was pretty primitive. For boards like the 560Z and 430B just simple support code was provided to show functionality. Anything more was left to the user.

Many boards had prototyping areas on them were you could add chips to modify them. Frequently unused gates had extra pads to allow them to be used.



For the OSI Bus they made at least 43 different cards not including revisions of the same model number. Last board was released in 1982. It was interface for Shugart SA1004 8” hard disk.

- 7 CPU Boards. Main processor was 6502 but also supported 6501, 6512, 6800 series, Z80, PDP-8 6100, Signetics 2650, Fairchild F8, RCA 1802. Only 6502 and Z80 had significant software support.
- 9 Memory boards from 4kx8 or 12 to 64kx8. Most SRAM but some DRAM.
- 8 I/O boards. Digital, DAC, ADC. Interface for “Head end Cards” which were small interface cards that connected with 16 pin cable.

- 3 Video boards. Black & white, color text, and graphics.
- 3 Oddball. Telephone, voice synthesis.
- 3 EPROM memory and EPROM programmer
- 4 Disk controllers. Floppy and hard disk.
- 5 Backplanes. 4 to 18 slot. Could be chained to support 250 slots.
- 2 Prototyping, extender etc boards.

Head end cards did digital I/O, sound generation, home security interface, AC control, X-10 control etc.

Was cloned in UK as Compukit-UK101.

There were a few companies like D&N Micro Products that made boards for the OSI bus. There were a number of software vendors. Since OSI software wasn’t the best a number of companies made better software for the boot ROM and BASIC, and others released applictions.

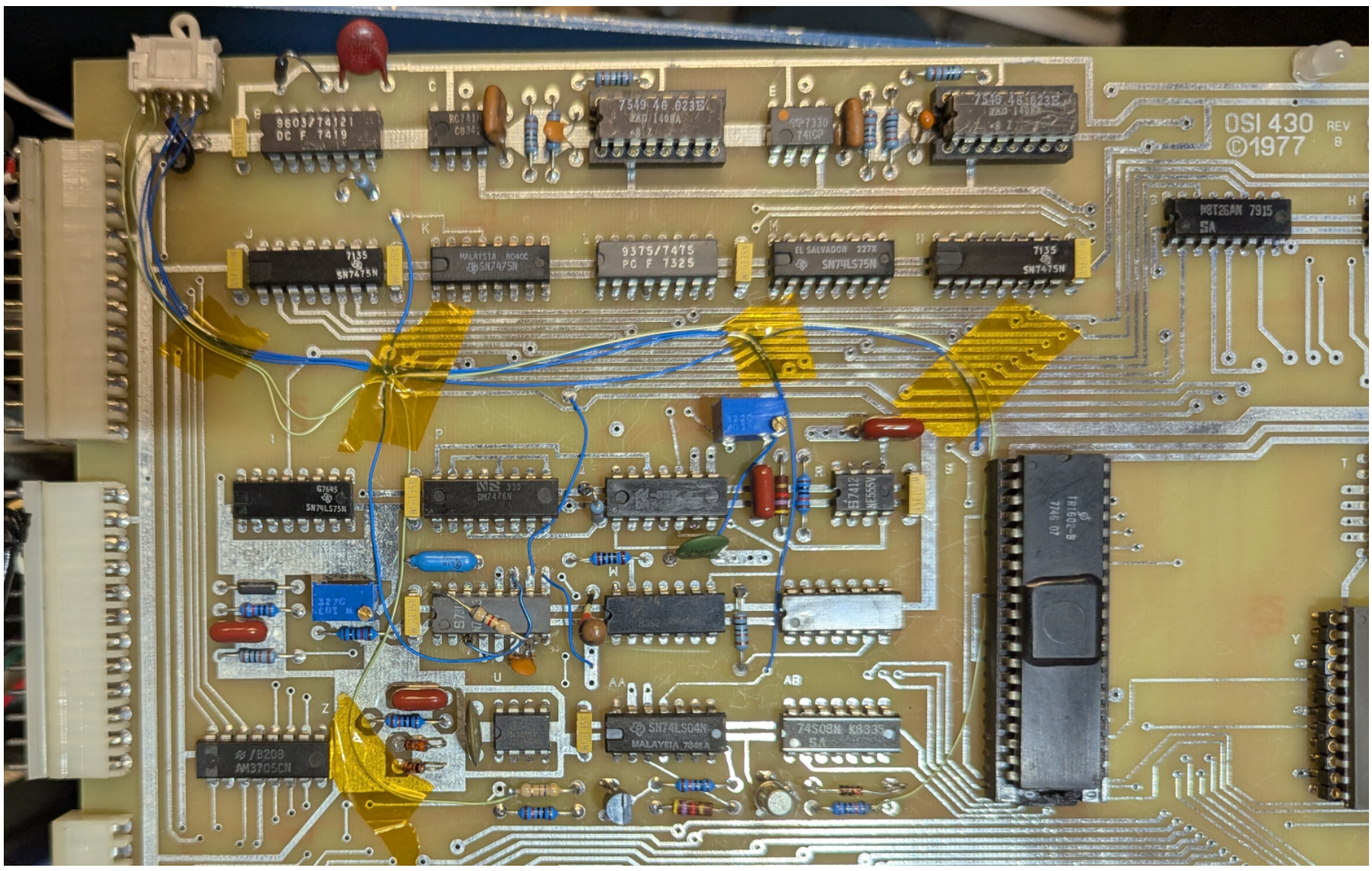
Main single user operating system was OS-65D. I and other people I knew improved the OS-65D operating system but never tried to release it. OSI also had OS-65U for multi user business systems. The bus was capable of addressing 1024k. They had a version of CP/M for the optional Z80 processor.

My OSI Configuration

- 505A CPU board which has floppy interface, serial port, and PROM's. Modified to select either serial or separate video board support.
- 470 configured as parallel printer interface. Can be populated as floppy interface instead. Not installed. At +5V current limit.
- 524 64k static RAM board populated with 48k.
- 540B video board. 32x32 or 64x32 character display. Keyboard interface. B rev added color, tone control and AC home control. I had to disable color memory to use 560Z board.
- Reproduction 560Z CPU board with Z80 and PDP-8 6100.
- Two 460 memory boards on 560Z bus.
- Reproduction 430B Cassette/RS-232, Analog I/O, and digital I/O on 560Z bus.

560Z Board adds Z80 and 6100 processor that can run in parallel with the main processor using a local OSI bus. Successor to 460Z board. All other multiple processor boards allow only one processor to run at a time. The 560Z board has a 4k memory window on the main OSI bus that can access everything on the local bus using window select. It also has 4 PIA chips providing 64 bits to control and monitor the processors.
It can single step the processor allowing viewing of processor activity. It will also halt the processor if

I/O instructions are executed, allowing the main processor to emulate the I/O.
The 430B board has two 8 bit DAC outputs and one 8 bit tracking ADC. Tracking ADC uses an up/down counter to drive a DAC which is compared to the analog voltage to determine count direction. It can only track a voltage up to a certain slew rate. It can track up to a 620 Hz full scale triangle wave with 1 MHz clock. Also does strange things if signal is overrange. The DAC have an unblank output for driving XYZ vector monitor which I’m demonstrating with the Z80. The 6100 is limited to addressing 4k of memory. I tried to add the 6102 chip to allow addressing 32k memory but couldn’t get it stable so removed it. Without it the 6100 can’t talk to the 430B board.



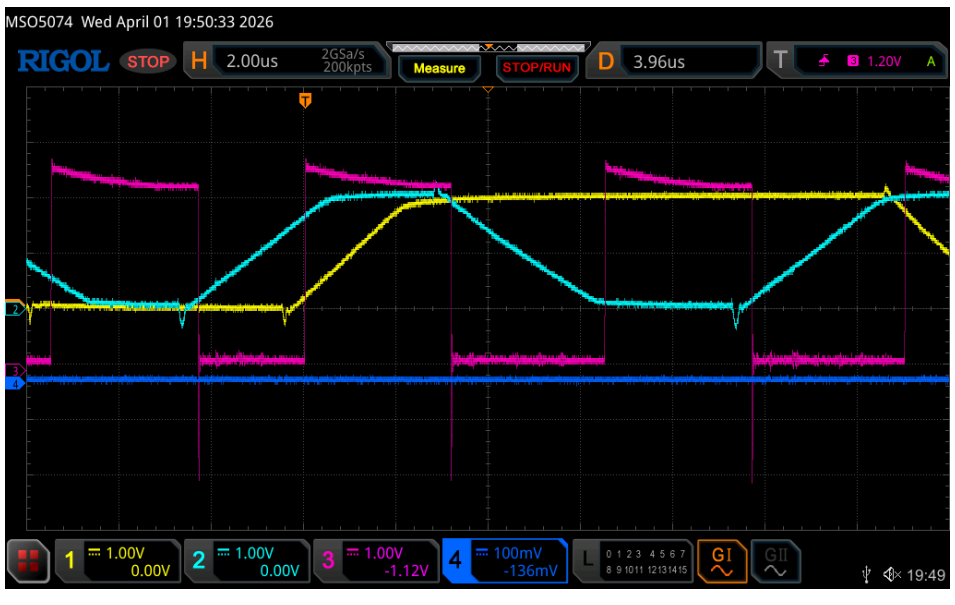
Modifications to 430B Board

Issues with 430B Board

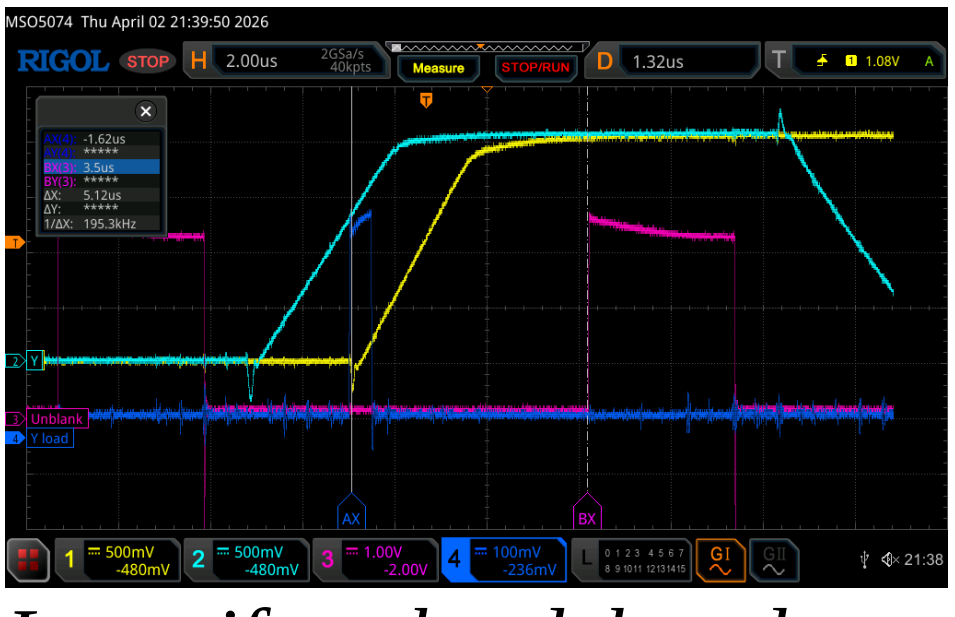
OSI had problems with attention to details. I had these issues with the 430 board:

- Documentation says ADC input voltage range is +-1V. To actually get that R33 needs to be 1k not the 4.7k in the documentation.
- The I/O ports aren’t fully documented. To determine UART port bit definition you need to see how they are mapped on the schematic and read the datasheet to see what the bits do. Datasheets were included in manual.
- Pinouts aren’t fully specified. Documentation never shows which pins the RS-232 serial input and output are connected to.
- You could install an 8 channel mux for the ADC but it noticeably degrades the accuracy. At -20V supply, the mux on resistance is specified as 120 to 100 ohms giving 6 LSB error with 4.7k load. With -9V used on board it has 11 LSB error at 1V and 20 LSB error at -1V.
- The reproduction board was missing a connection between C1 and R1. Original OSI board is correct.
- The unblank output pulse starts with writing to the Y DAC. The DAC settling time is 300ns but it’s followed by a 741 op amp buffer so output is much slower. My display only has 1 MHz bandwidth so even if I used much faster op amp

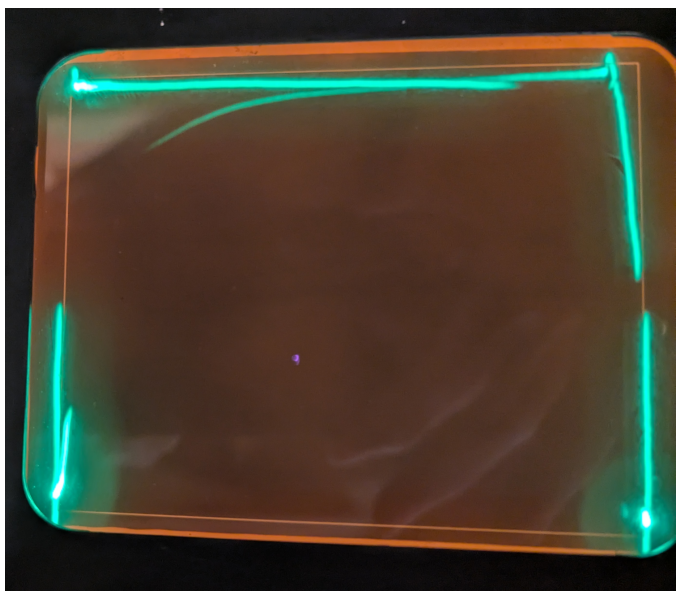
and changed op amp feedback capacitor, the display needs its intensify pulse delayed.



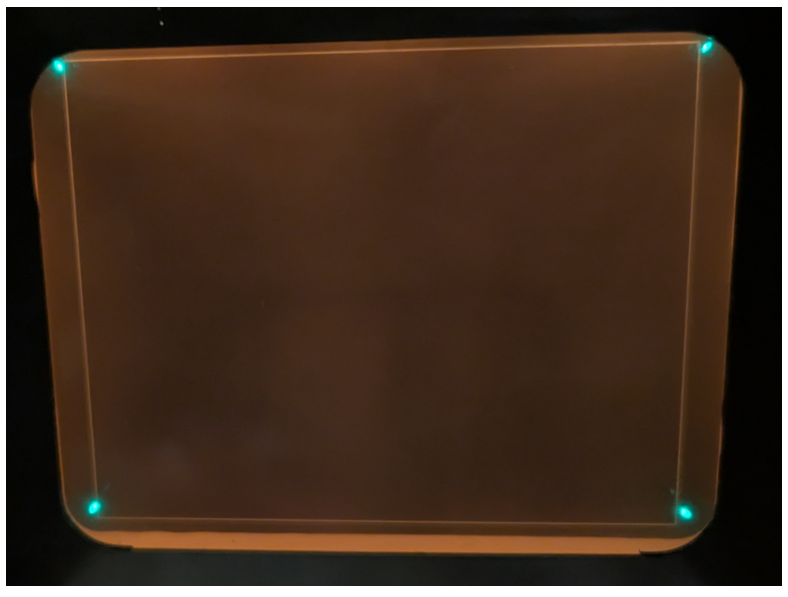
Unmodified



Intensify pulse delayed



Without delay



With delay

OSI did nicely list all the unused portions of IC's. They expected people to modify their boards. I wired the spare half of 74123 to delay the Y DAC load pulse triggering the unblank pulse.
OSI also added pad with 2 holes to the unused IC pins. No proto area on this card. The IC with the resistor on it is the mod. The manual said you could only populate for cassette or RS-232. I'm not going to be told what I can do. The connector in the upper left is to allow either RS-232 or cassette to be used.