

# Using the California Computer Systems 2810 Z80 CPU in an Altair or IMSAI

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## MWRITE Conflict

The CCS 2810 CPU generates and drives the MWRITE signal onto the S-100 bus, pin 68. This MWRITE signal is also generated by the front panel of Altair and IMSAI computers that have front panels. Thus, an unmodified CCS 2810 CPU's MWRITE will conflict with the front panel's MWRITE signal.

This conflict will not normally cause a problem, as the two signals will be the same when running. However, the front panel needs to generate an independent MWRITE signal when the CPU is stopped, when the user toggles the DEPOSIT switch. The result of this MWRITE conflict is flaky or nonfunctional DEPOSIT operations from the front panel.

The solution is quite simple, and can be done without damaging the CCS 2810 or the Altair/IMSAI: disconnect the 2810's MWRITE signal by removing U37 from its socket, bending pin 13 out, and then reinstalling U37. (If U37 is not socketed, then you will need to cut its pin 13.)

Note: This document assumes a revision 'A' CCS 2810, which is designated CCS2810A on the board. This MWRITE issue may or may not exist on later revisions of the CCS 2810. Also, the particular IC and pin that generates the MWRITE signal may be different on later board revisions.

## Front Panel Connector

The CCS 2810 has a 16-pin DIP connector for the front panel interface that is compatible with an IMSAI. To use the CCS 2810 in an Altair, you will either need to replace the Altair's 10-pin wafer connector with a 14-pin DIP connector, or you can build a short adapter cable. Here is the pinout for an adapter cable. Note that the data signals are not in sequential order on the Altair CPU board and cable. On the CCS 2810, connect to either of the pins listed for each signal - the pin pairs are wired together.

Signal	Altair Pin	CCS 2810 Pins
D0	5	8,9
D1	6	7,10
D2	7	6,11
D3	8 (leftmost)	5,12
D4	4	4,13
D5	3	3,14
D6	2	2,15
D7	1 (rightmost)	1,16