

SOFTWARE DEVELOPMENT
BULLETIN NO. 4
APRIL 4, 1983

TO: Distribution

SUBJECT: MODIFICATIONS TO ZAX EMULATOR PROBE FOR AQUARIUS

Software Development Bulletin Number 3 detailed modifications that may be required to the Aquarius Home Computer to work with the Zax Emulator. It has been determined that improving the wait signal on PLAL is not always sufficient to solve the problems encountered during emulation.

The attached documentation shows the required modification to the Zax probe. Basically, the modification removes a pull-down resistor from the wait line on the Z80 in the Zax probe. This brings the signal voltage over the 4.2V threshold as required in the Z80 specification.

Note: This document is informational. Zax has been informed of the problem and they have indicated that all units that they ship to us will have this modification included. If the Zax is being used for emulation of a target other than an Aquarius, the modification of the Zax probe may have to be reversed.

Programmer: Harold Schlaifer

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APPLICATION NOTE #1

Topic: Interface of the ICD-178/Z80 to a Gate Array

Consumer electronics is a low cost, high volume market. The product designer must use cost effective design methods and manufacturing techniques in order to be competitive. The use of a Gate Array is the best method to accomplish this task. Advantages to the product designer is that a gate array eliminates MSI, SSI, TTL components count, reduces current consumption, gives manufacturer proprietary chip design. Various video games manufacturers such as Mattel, Atari, Coleco Vision have implemented this product design concept.

The proper use of a Gate Array with an ICD-178/Z80 will now be discussed. Figure one shows an unmodified ICD-178/Z80 probe (S-754B). Point one is the wait signal that is being generated by the Gate Array. This voltage ranges from 1.1V to 2.1V with a 4.7K resistor. With the proper resistor change this voltage will reach a maximum value of 3V. Point two is the attenuated wait signal after it has been through the voltage divider network composed of R1, R2. The 74LS244 hex buffer requires a high-level input voltage $V_{IH} = 2V$ MIN. This attenuated wait signal at this input produces an unrecognizable wait signal at the 74LS244 output for the ICD-178/Z80 emulator. This unmodified interface will produce a target system memory read error.

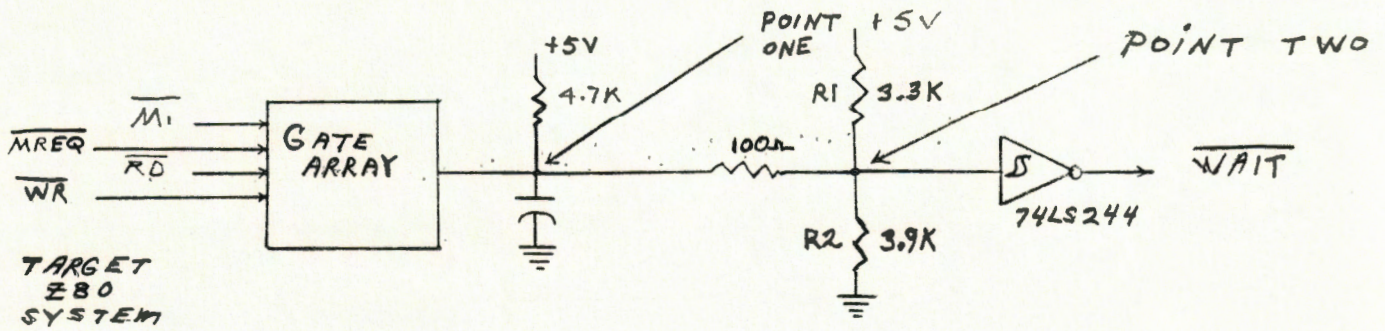
In order to correct this problem the ICD-178 probe (S-754B) must be modified. This change must be made when attempting to interface to a Gate Array generated output signal. Figure two demonstrates the proper interface requirement. The removal of R2 in the voltage divider network now ensure the voltage level will rise to the proper V_{IH} . The measured value for V_{IH} was 4.2 volts. This meets the 74LS244 high level input voltage specification.

The ICD-178 probe modification should be performed as follows:

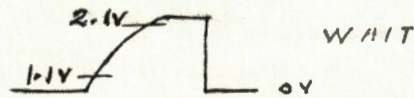
- #1 Remove the four screws from the probe cover
- #2 Desolder entire 3.9K resistor sip pack (RA2) and cut off pin #4
- #3 Re-insert resistor sip pack
- #4 Or use diagonal to remove pin #4 from P.C. board
- #5 Put cover back on probe and test

Refer to attached ICD-178 probe logic for additional hardware information.

If further questions arise, contact: Curt Lewis 1-714-898-2373



POINT ONE VOLTAGE



POINT TWO VOLTAGE

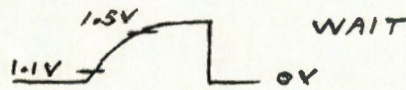
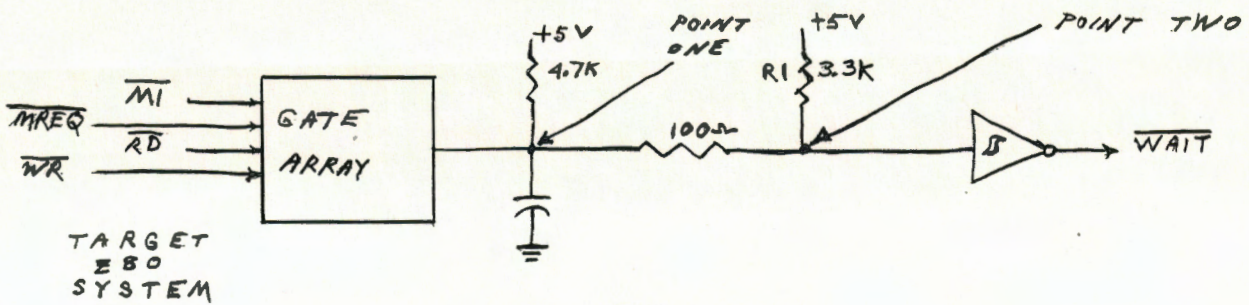


FIGURE ONE



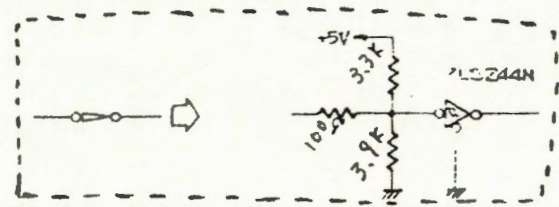
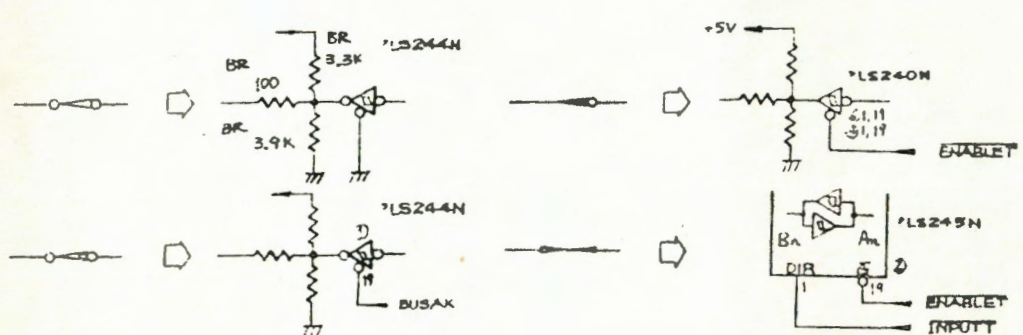
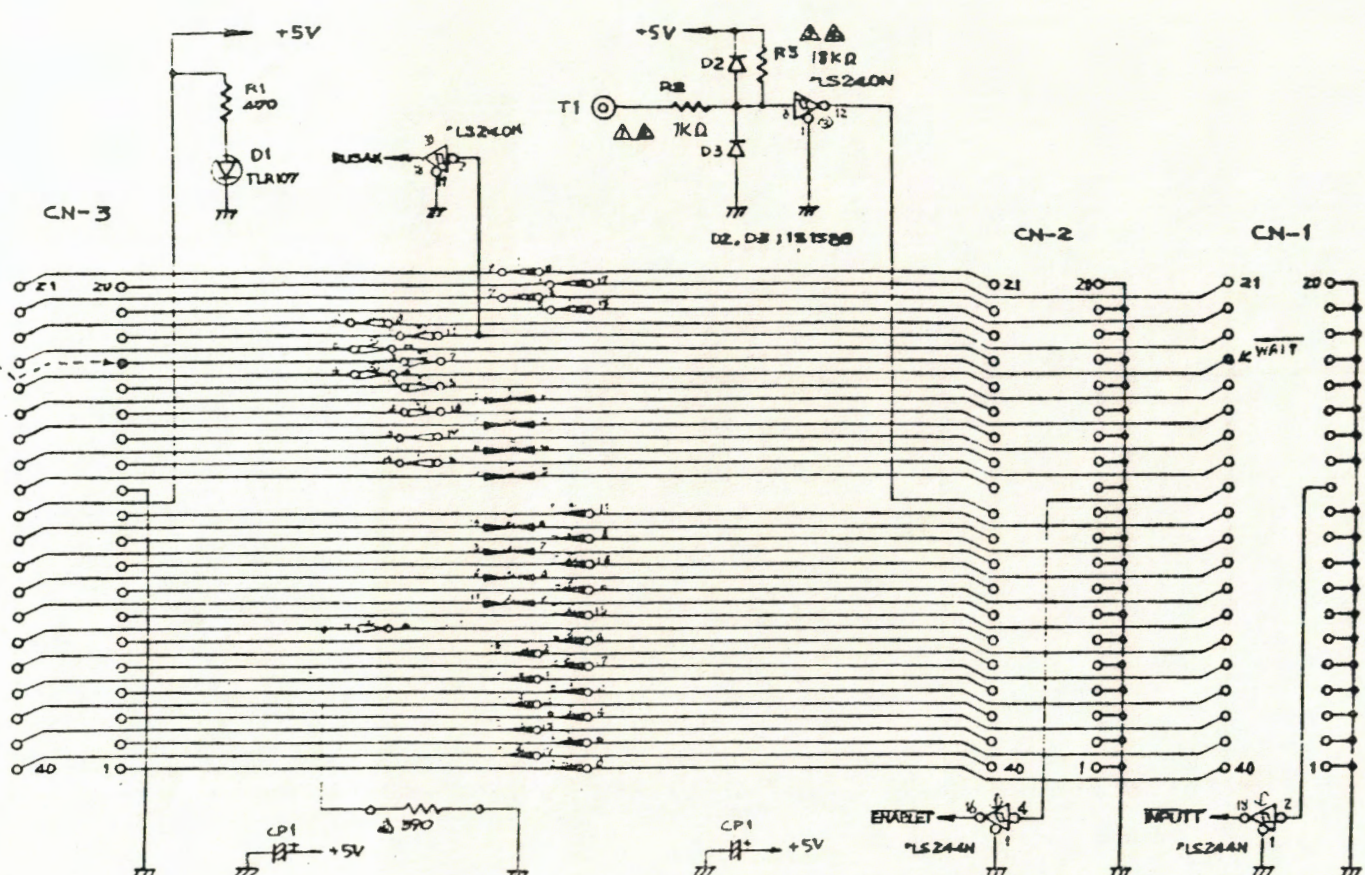
POINT TWO VOLTAGE



FIGURE TWO

- ICD10
- WRES
- HALT
- WAIT
- INT
- D1
- D8
- D9
- D2
- +5V
- D6
- D5
- D3
- D4
- E
- A16
- A14
- A13
- A12
- A11

- RD
- WM
- BUSAK
- WAIT
- BUSRD
- RECET
- INT
- RFSH
- GND
- A0
- A1
- A2
- A3
- A4
- A5
- A6
- A7
- A8
- A9
- A10



- △ 电阻值变更 '82-5-10 100Ω → 1kΩ
- △ 电阻值变更 '82-3-25 4.7kΩ → 10kΩ
- △ 电阻器追加 '82-3-19
- △ 电阻器变更 '82-3-19 1kΩ → 100Ω

CHIEF		ICD-178 for Z80	DRAWING NO.	REV						
DESIGNED BY	Yanaka '81-12-7				TITLE	DRAWING NO.	REV			
CHECKED BY	Hirada '82-5-10							PROBE 9-784B	A3EC 1041	REV
DRAWN BY										

ZAX CORPORATION