Technical Note 39 - Signal Rise Time

Background

In many "professional" computers the use of Socketed Integrated Circuits is avoided due to the lowered reliability of the Socketed I.C.'s. This is caused by a predisposition towards contact generated noise, signal loss in the contact means, and a slower rise time on waveforms. The latter is a consequence of the higher connector resistance in the signal lead together with the internal capacitance of the I.C. The result of increased rise times is an occasional system failure, as certain signal paths are not enabled by other timing signals, within the "windows" necessary to keep the equipment operating.

Hypothesis

If the resistance in the I.C. Socket to I.C. pin contact means could be kept at a low level or lowered to that of a new I.C. Socket, then the rise time could be kept within the specifications necessary to maintain the critical timing of the signals.

Method

An old and unreliable S-100 type 64k memory board was set up on a connector extender in a Z-80 based computer, and measurements were made of the rise time of the chip refresh signals using a very high impedance low capacitance probe. The measurements were made:

A. On the contact where it was soldered to the circuit board (on the back of the board) and,
B. to the I.C. pin itself using needle sharp spring loaded probes so as not, in the latter case, to disturb the seating of the I.C. in its socket.

The measurements were made before and after the application of Stabilant to the I.C. contacts.

The procedure was duplicated on 10 of the memory chips.

Results

Upon using the stabilant there was an average reduction in rise time of 40% with one contact having a reduction of 70% in its signal rise time. The board, which had hitherto been unreliable, now functioned properly once all I.C.'s were treated.

Conclusions

The tests demonstrate that in the case of Dynamic Memory I.C.'s, the reduction in rise time could well be the difference in the I.C. performing acceptably, and failing.

Comments

If manufacturer did not require soldered-in-I.C.'s to ensure reliability, the cost of repairing boards

because of bad I.C.'s could be reduced. Lower cost I.C.'s might be employed in manufacturing in the knowledge that a marginal I.C. could be replaced. This could cut the cost of parts.

Caution

With very high speed memory applications or where very high rise times are encountered, it must be remembered that the capacitance between adjacent contacts is increased by the application of Stabilants on the socket insulation. In most applications any effect of this added capacitance will be offset by the reduced resistance of the contact; however in very high speed applications using chip carriers with very small spacings between contacts it may be necessary to remove the IC's - applying the Stabilants only to the metal contacts themselves. This can be accomplished by using a piece of thin felt (saturated with Stabilant 22a) as the applicator. Remember, only a very thin film of Stabilant is needed in this type of application.

Revision 4

NATO/CAGE Supply Code 38948

The 15 mL size has NATO Part # 5999-21-900-6937

The Stabilants are patented in Canada - 1987; US Patent number 4696832. World-wide patents pending. Because the patents cover contacts treated with the material, a Point-of-sale License is granted with each purchase of the material.

SAFETY DATA SHEETS ARE AVAILABLE ON REQUEST

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COMPANY AND CREDO
LISTING OF SDS's AND NOTES

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