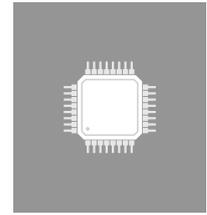


Electronic component technology

Reusing electronic components



Increasingly confronted with electronic component obsolescence, users are implementing palliative solutions to be able to continue producing their equipment despite the disappearance of one of their components. Even if all prior precautions have been taken, unexpected obsolescence may occur, forcing the user to purchase parts from non-official distribution networks. But when there are no more components, even from brokers, which is particularly the case for ASICs, why not recover the components from unused electronic boards in the same way as counterfeiters?

A NEW SUPPLY SOURCE

Returns of boards to customer services, standard board replacements, returned equipment, unsold products... are all possible sources to get the missing ASIC that is impossible to re-manufacture or redesign at a reasonable cost and in a reasonable amount of time. Very often the sources are depreciated, or even not valued at all, and will make it possible to save the project for which the component is essential. The users already have the components they need with all their traceability, they “just” need to recover them to be able to reuse them.

Behind the “just”, you should understand that component manufacturers give no guarantees on their use after 3 re-soldering cycles. Now, a recovered component will be subjected to at least 2 cycles more, one when it is un-soldered, the others when it is re-soldered. When we know that the worst stress suffered by components is during re-soldering phases, it's normal to question whether the process is legitimate.

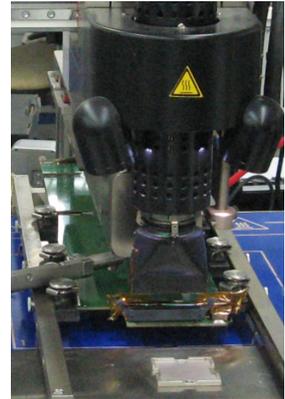
This is why each component reference and each board are the subject of an experimental plan used to determine the best un-soldering tool (soldering iron tip, hot air, etc.) and to optimise the parameters.



AN EXPERIMENTAL PLAN

Component un-soldering is not immediate. On receipt of the boards, sometimes they are cut to only keep the zone of interest, dried, then placed in dry-packs while awaiting un-soldering. Board support tools are created to hold them during un-soldering. The boards are then placed in an oven to limit the thermal shock, then the un-soldering operation can begin. Then the component and its terminals are cleaned.

All these operations must be carried out while preserving the component. To do this, the experimental plan is used to define all the profile parameters, temperatures, durations, resources, while checking that component delamination remains acceptable using acoustic microscopy. The experimental plan is also used to check component condition after re-soldering simulations, or even after thermal and/or hygrometric stresses.



TESTS AND TRACEABILITY

The components recovered in this way are still not ready for use. As the manufacturers provide no guarantees, electric tests will be used to check that they are in working order, especially considering that, if they come from boards that were returned to a customer department, they might be the origin of the failure.

To provide extended traceability, it is possible to combine a serial number with each component in order to be able to link a component to the electric test results. This link is made using a label with a Datamatrix code that can be read on the production line to link the component serial number to the board serial number.

Other tests may be carried out, depending on the experimental plan results. For example, electric temperature tests might be carried out, or the parts sorted using acoustic microscopy as all components were not assembled using the correct precautions on boards produced fifteen or more years ago.



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STANDARDS

J-STD-020: MSL levels, delamination criteria
J-STD-033: Handling MSL level components

CONTACT

Jean BASTID
Tame-Component Manager
Tel. +33 (0)2 51 41 89 35
jbastid@tame-component.com