DISCRETE WIRING

DEADBugs

The term “Deadbugs” is an industry nickname for the discrete components added and wired into a printed wiring assembly (PWA) to facilitate active circuit modifications, rather than redesign and manufacture a new board. The nickname comes from their general appearance on the board: upside down, with their termination leads (legs) up in the air – like a dead bug.

While their use is an accepted practice, the customer must grant approval prior to their use and installation.

PREFERRED AXIAL-LEADED COMPONENT
Component is properly mounted. Lead bends are within limits. Terminations are properly wrapped. The solder joints meet all minimum requirements. Jumper wires have appropriate stress relief.
Best Workmanship Practice

PREFERRED GLASS-BODIED COMPONENT
Component is covered with a transparent resilient sleeving, and properly mounted. Lead bends are within limits. Terminations are properly wrapped. The solder joints meet all minimum requirements. Jumper wires have appropriate stress relief.
Best Workmanship Practice

PREFERRED DUAL-INLINE PACKAGE (DIP)
Component is properly mounted and terminated. Jumper wires are properly terminated, with appropriate stress relief. The solder joints meet all minimum requirements.
Best Workmanship Practice

PREFERRED RADIAL-LEADED COMPONENT
Component is properly mounted and terminated. Lead bends are within limits. Terminations are properly wrapped. The solder joints meet all minimum requirements. Jumper wires have appropriate stress relief.
Best Workmanship Practice

NASA WORKMANSHIP STANDARDS
UNACCEPTABLE
IMPROPER TERMINATION WRAP
Jumper wires shall be wrapped at least 180° to 270° around the component lead prior to soldering, and shall not be located closer than one (1) lead diameter to end of the component lead.
Best Workmanship Practice

UNACCEPTABLE
PIGGY-BACK / STACKING CYLINDRICAL / MELF COMPONENTS
The piggy-backing / stacking of cylindrical / glass-bodied / MELF components is not recommended.
Best Workmanship Practice

UNACCEPTABLE
TOMBSTONED TERMINATION
Deadbugged components shall be mounted parallel to and in contact with the base laminate, or base component (if applicable). Tombstoning places unacceptable stress on the component/solder pad termination.
Best Workmanship Practice

PREFERRED
SURFACE MOUNT TECHNOLOGY CHIP / MELF / METALLIZED TERMINALS
Component is properly mounted and terminated. Jumper wires are properly terminated, with appropriate stress relief. The solder joints meet all minimum requirements.
Best Workmanship Practice

PREFERRED
SURFACE MOUNT TECHNOLOGY GULL-WING / J-LEAD / LEADED DEVICES
Component is properly mounted and terminated. Jumper wires are properly terminated, with appropriate stress relief. The solder joints meet all minimum requirements.
Best Workmanship Practice

PREFERRED
TO-CAN COMPONENT
Component is properly mounted and terminated. Lead bends are within limits. Terminations are properly wrapped. The solder joints meet all minimum requirements. Jumper wires have appropriate stress relief.
Best Workmanship Practice

ACCEPTABLE
AXIAL COMPONENT PIGGYBACK
Axial components may be piggybacked to axial components in a vertical or horizontal orientation, but shall be staked. Terminations shall meet minimum lead seal spacing, lead bend, wrap, and solder fillet requirements.
Best Workmanship Practice

ACCEPTABLE
CHIP / MELF / METALLIZED TERMINALS ALTERNATE MOUNT
Chip component mounting to a single pad is acceptable, provided the component is properly staked to prevent stress to the solder joints or the component body.
Best Workmanship Practice

ACCEPTABLE
PIGGYBACKING / STACKING SMT (3-5 SIDE) CHIP COMPONENTS
The components are in vertical alignment, with no overhang. The terminations exhibit fully wetted solder fillets and the stack does not exceed two (2) components high.
Best Workmanship Practice

DISCRETE WIRING
DEADBugs (cont.)

DISCRETE WIRING
DEADBugs (cont.)

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