

# Mechanical and Soldering Considerations for HDC Modules

## General Description

Rantec HDC modules have proved to be extremely rugged and reliable when properly installed on printed wiring board assemblies. HDC modules can withstand all the normal mechanical forces for circuit boards and circuit board mounted components. Reasonable care must be exercised during fabrication of PWB assemblies to prevent excessive mechanical and thermal stresses to the HDC electrical interface pins, baseplate, and case.

## Implementation

### Design

Good mechanical engineering practices must be observed when installing modules onto power supply PWB assemblies to prevent excessive mechanical stresses and bending forces on the module baseplate and electrical interface pins. Circuit board holes and/or sockets must be properly located as specified in the appropriate HDC outline drawing. Mechanical attachment to heat sinks and circuit boards must be designed to prevent excess shear, compression, or tensile forces on the pins and all module interfaces.

### Storage And Shipping

Modules should be kept in their original shipping containers to provide adequate protection prior to securely mounting to printed wiring boards. In the event that individual modules are shipped as a component, and not in a circuit board assembly, adequate protection must be provided to the pins to

prevent damage. Use of the original plastic shipping tube is strongly recommended.

### Assembly

Good manufacturing procedures must be observed when assembling modules to power supply assemblies to prevent excessive stress on the modules' baseplate and electrical pins. Reasonable care must be exercised while inserting, and removing, modules into printed wiring boards. Prior to soldering, modules should be securely attached to heat sinks and printed wiring boards using appropriate mounting hardware (bolts/screws and stand-offs). Suggestion: During the soldering process, fixturing modules and power supply assemblies should be a consideration to insure that baseplates are co-planer to heat sinks (heat sinks must be flat) and pin forces are reasonable during and after assembly.

### Cleaning

Do not clean HDC modules, or the assemblies to which they are soldered, by immersion in any type of liquid cleaning medium. There are two reasons for this: 1) solvents may leach out trace amounts of the silicone encapsulant, which could cause surface contamination of the assembly, and 2) water-based fluids may become trapped at the module card surface, causing latent defects. Use only hand cleaning techniques after soldering HDC modules into power supply assemblies.

Hand cleaning of soldered connections can be accomplished by the use of industry standard defluxing solvents (isopropyl alcohol, alcohol blends, n-propyl bromide) and clean swabs. Repeat



cleaning with fresh solvent and swabs until all visible residues are removed.

Do not use water-based organic acid (OA) fluxes to solder modules to circuit cards. OA flux residues are highly corrosive. Use RMA flux (ANSI-J-STD-004 Type ROM1) to solder modules to circuit cards. RMA flux residues are easily cleaned off using the described technique, and any RMA residues left on the assembly are non-corrosive and non-conductive.”

#### Installation onto Printed Wiring Board

During production or prototype fabrication, reasonable care must be exercised when inserting the pins of the modules into the sockets or plated holes of a printed wiring board. The pins must all be properly aligned with the holes or sockets before pressure is evenly exerted to the surface of the module to seat it onto the PWB. Otherwise, overstressed or bent pins could result in external pin breakage, internal damage, or degradation of the module performance. Warning: Overheating of the pins during soldering could cause reflow of the solder at the internal base of the pin and result in loss of connection to the internal printed wiring board (see Soldering, page 2).

#### Evaluation and Prototype Testing

The use of sockets is recommended for evaluation and testing of the modules to prevent overheating and stress to the module interface pins. Socketed mounting-boards and/or individual socket kit sets are available from Rantec. (See data sheets for HDM-MB mounting boards or HDM-SK socket kits)

#### Removal from Printed Circuit Board

Soldered applications: Solder must be carefully removed from the pin/pad connections and each pin must be observed to be mechanically free from its

pad. Again, care must be taken not to overheat pins which could cause reflow of the solder at the internal base of the pin and loss of connection to the internal printed wiring board.

For socket or solder applications, once the solder is adequately removed, the module must be removed using both hands, one on either end of the module, evenly distributing the force and carefully lifting the module off the board. The plane of the module baseplate must remain parallel to the plane of the circuit board, otherwise, the pins may be overstressed or bent resulting in degradation or failure.

#### Soldering

In addition to the cleaning instructions mentioned above and avoiding the use of water soluble fluxes, soldering Rantec HDCs into customer host assemblies requires adherence to the cleanliness process and verification requirements of J-STD-001.

When soldering HDC modules to the next level assembly, if the user has a choice between wave soldering or hand soldering, wave soldering is the most desirable.

Use only RMA flux (ANSI-J-STD-004 Type ROM1) to solder modules to circuit cards. RMA flux residues are easily cleaned off using the described cleaning technique, and any RMA residues left on the assembly are non-corrosive and non-conductive.” Do not use water-based organic acid (OA) fluxes to solder modules to circuit cards. OA flux residues are highly corrosive.

**Warning:** Overheating of the pins could cause reflow of the solder at the internal base of the pin and loss of connection to the internal PWB.

#### Wave Soldering

- Bath temperature **not** to exceed 500° F (260°C)
- Dwell time **not** to exceed 5 seconds
- Topside preheat **not** to exceed 200° F (93°C)



- Large pins to enter bath last, if applicable.

### **Hand Soldering**

Wave soldering is strongly recommended. If hand soldering is the only option, the following procedure must be applied:

- Care must be taken to ensure that the pin temperature does not exceed the melting point of the solder between the pin and internal PWB (360°F/182°C)
- Use constant temperature soldering iron (i.e. Metcal STSS-002 w/ STTC-117 or STTC-136 tip, or equivalent)
- Tip temperature should **not** exceed 700° F (371°C) with dwell time not exceeding 5 seconds
- Flux core solder should be used.

### **Conclusion**

Please feel free to consult Rantec if you have any questions or we can be of assistance with your implementation of the Rantec modules.