

# Ampro Global Manufacturing & Test Capabilities

Advanced assembly, test, inspection and packaging delivers reliability

Ampro has established a global network of leading contract manufacturing (CM) partners. A thorough Supplier Qualification program helps Ampro deliver high quality products that adhere to the company's strict production quality standards.

**Assembly.** Ampro's contract manufacturers feature state-of-the-art facilities, equipment and processes to build reliability into Ampro's rugged and low-cost products. Dozens of SMT lines worldwide provide the scalable capacity that you require to grow with your business. Precision placement tools are used, with placement capabilities that even include the new micro-BGA technology. For rugged Ampro products, a 50 percent thicker



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circuit board provides the rigidity needed in demanding applications. A silver immersion process is used to provide flatter pads for component attachment, and an aqueous wash process is used to ensure good surface contact for conformal coating and a nice appearance over the  $-40^{\circ}$  to  $+85^{\circ}\text{C}$  extended operating temperature range. Press fit connectors are used extensively for better quality connection technology. Serial numbers and bar codes are used to track the progress and history of each board over time. Valor Trilogy tools are used for Design for Manufacturability (DFM) analysis early in the design phase, ensuring designs are op-

timized for high yield early in the product development process.

In addition to circuit board assembly, Ampro's CM partners can perform custom box builds, with Ampro SBCs and I/O modules assembled into enclosures and tested as a unit.

**Test.** Ampro's CM partners perform manufacturing in-circuit testing (ICT) for many of Ampro's products. Additionally, all of Ampro's products undergo functional testing prior to shipment to our customers. To meet the thermal requirements of many customers, Ampro rugged products are placed in large-capacity thermal testing chambers to confirm operation at high and low temperatures and to provide thermal shock in the form of rapid temperature transitions.

**Inspection.** Ampro's rugged and low-cost products are inspected using automatic optical inspection systems. For BGA and micro-BGA packages, 3D X-ray equipment is used to confirm the integrity of solder joints.

**Packaging.** Ampro has designed an innovative ISTA-approved, electrostatic dissipative clamshell packaging which supports and secures the boards at the corners to prevent damage to components and connector pins. Both rugged and low-cost products are shipped in this clamshell packaging which has been drop tested to withstand the shock associated with shipments.

