

uSSD Host Test Adapter Direct-Mounting Reference



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Introduction

The uSSD Host Test Adapter (uSSD-TPA-H) is available for purchase in two basic forms... Un-assembled, for use where the uSSD-TPA-H will be direct-mounted to the UUT (Unit Under Test). Or fully-assembled, for use with UUT's having Wells-CTI 156-pin TFBGA sockets. This document details the "Direct-Mounted" form of the uSSD Host Test Adapter only. For additional information about the two forms of the uSSD Host Test Adapter, refer to Wilder Technologies reference document titled "uSSD Host TPA Mounting Options", available at www.wilder-tech.com.

This document provides reference information that facilitates the end-user's application and assembly of a test configuration. Dimensional details, material reference, preparation recommendations, access to the associated Solder Paste Gerber file, and SATA connector "hand-add" mounting recommendations are presented.

The following figure illustrates the component parts of the un-assembled "Direct-Mounted" form of uSSD-TPA-H.

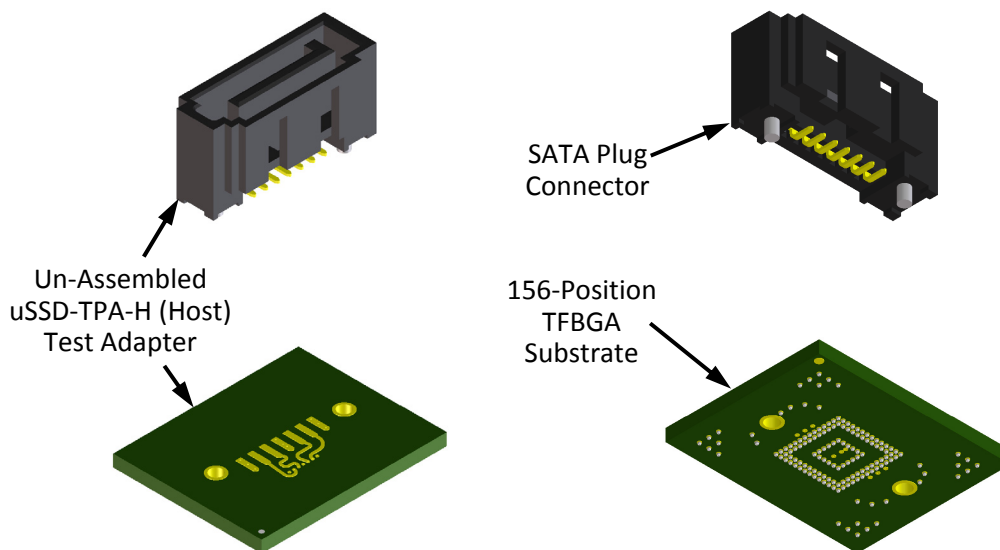


Figure 1. The Un-Assembled uSSD Host Test Adapter (Top and Bottom View)

This version is intended for use where the uSSD-TPA-H will be direct-mounted to the UUT.

uSSD-TPA-H 156-pin TFBGA Substrate Physical Attributes

Dimensional details and materials for the uSSD Host Test Adapter 156-pin TFBGA substrate are presented in this section.

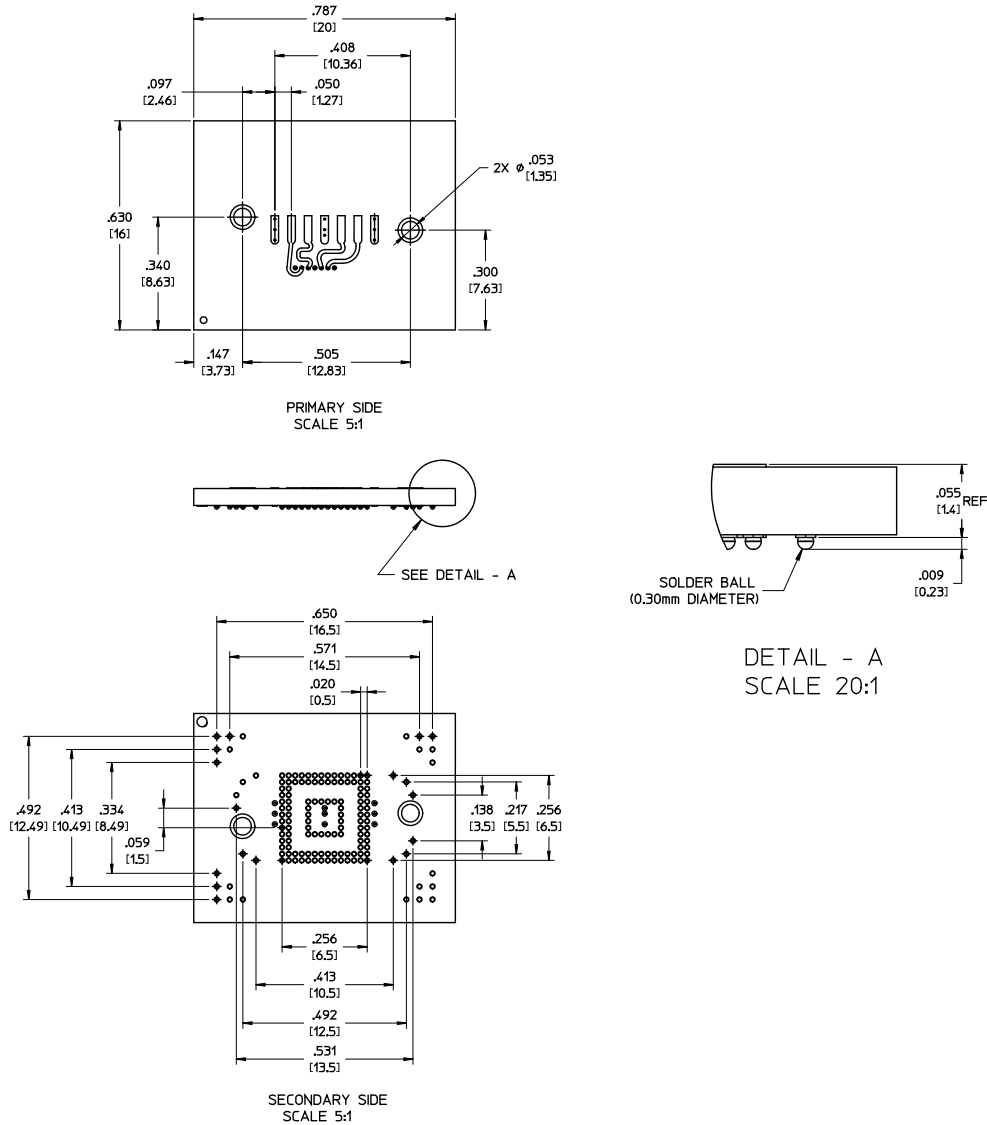


Figure 2. Dimensional Details of the uSSD Host Test Adapter substrate

Additional construction details may be found in JEDEC Solid State Product Outline document number MO-276, Variation AK, and in SATA-IO Technical Proposal #035, titled SATA BGA SSD, (SATA31_TPR_C107_BGA_SSD_V12a).

Links to these documents are as follows (control-click):

<http://www.jedec.org/standards-documents/results/mo-276> (requires registration)

http://www.sata-io.org/members/members_home_noncontributors.asp (requires membership)

Table 1. uSSD-TPA-H Substrate Materials

| ITEM | DESCRIPTION |
|-----------------------|---|
| Multi-Layer Substrate | 4-Layer, Nelco 4000-13 Copper-Clad Laminate |
| Solder Balls | 0.30mm Diameter, Lead-Free Solder Balls |
| Solder Ball Quantity | 152 actual solder balls used per substrate. (4 total removed in the SATA connector alignment hole areas.) |

uSSD Host Test Adapter 156-pin TFBGA Substrate Installation Recommendations

To ensure the best possible test environment, it is very important that the end-user considers the uSSD Host Test Adapter substrate as a component part of the overall Unit Under Test (UUT) assembly. As such, Wilder Technologies emphasizes that the uSSD Host Test Adapter substrate be part of a new-build UUT component bill of materials and installed along with all other UUT components at the time of assembly.

uSSD-TPA-H Substrate Pre-bake

It is recommended that the uSSD-TPA-H substrate be “pre-baked” prior to installation on the UUT (Unit Under Test) circuit board. The common reason for pre-baking is to remove moisture to prevent outgassing, warpage, and other defects. Commonly, a 105 degrees Centigrade temperature for eight to twelve hours duration is used to pre-bake substrates. However, consult with your contract circuit board assembler for further process recommendations.

Lead-Free Solder Balls

The uSSD Host Test Adapter substrate uses lead-free 0.3mm diameter solder balls. Considerations for reflow temperatures and dwell time should be made by the contract circuit board assembler if lead-free solder paste is not used.

Substrate Orientation

The uSSD Host Test Adapter substrate contains an identifiable mark that is used to indicate the “Pin-A1” corner of the substrate. Verify proper orientation prior to installation.

Pick-and-Place, Reflow, and Inspection

The uSSD Host Test Adapter substrate is designed to be installed using standard surface mount pick-and-place equipment. Substrate orientation should be verified before reflow. Reflow as prescribed by the contract assembler’s analysis of the overall UUT. The uSSD-TPA-H substrate should be x-ray inspected to ensure proper alignment and reflow.

uSSD Host Test Adapter 7-Position SATA Connector Installation

Following installation of the uSSD Host Test Adapter substrate to the UUT, the 7-position vertical mount SATA connector is to be hand-added and soldered to the substrate. The 7-position vertical mount SATA connector included with the uSSD-TPA-H has been modified such that the alignment pins are shortened in length to prevent shorting to the UUT as they pass through the uSSD-TPA-H substrate. See figure, below.

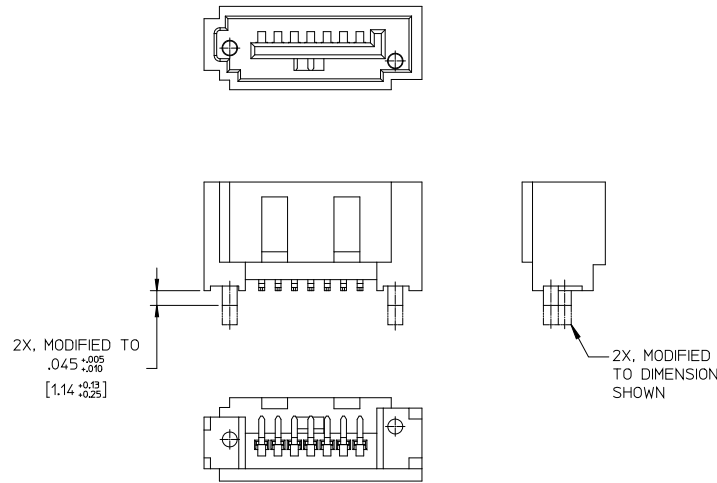


Figure 3. uSSD Test Adapter 7-Position Vertical Mount SATA Connector Alignment Pin Modifications

Connector-Substrate Orientation and Installation

Referring to the following illustration, the uSSD Host Test Adapter SATA connector is to be positioned on the uSSD-TPA-H substrate as shown, verifying orientation to the pin A-1 corner mark on the substrate. Using lead-free solder, hand-solder the connector at each of the seven contacts to the substrate. It is important to keep the volume of solder at a moderate amount to ensure proper high-speed performance. To prevent mechanical failure of the connector to the substrate, perimeter bonding of the connector to the substrate following installation may be optionally added along three sides, away from the contacts and high-speed traces.

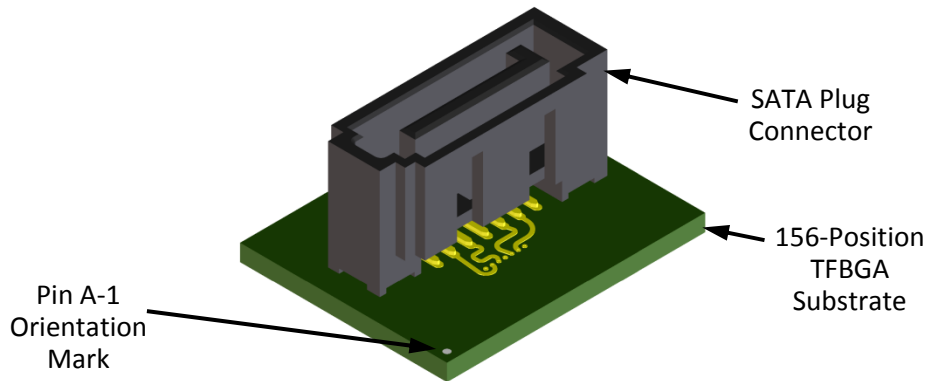


Figure 4. uSSD Test Adapter 7-Position Vertical Mount SATA Connector Installation

uSSD Host Test Adapter Substrate Installation Recommendations (Alternate “Rework Version”)

As an alternate to installing the uSSD Host Test Adapter substrate as part of a “new-build” UUT, the user may choose to utilize a “rework” type process for placing the substrate on a previously build UUT. While this method is possible, it is not preferable because of the added difficulties in managing interference from components in the areas local to the substrate, managing solder-paste application, placement, reflow, and inspection.

NOTE: Wilder Technologies does not offer installation services or offer referrals to outside services for BGA installation or removal.

Because of the wide variety of BGA rework equipment and tools, this section presents a generalized view of processes to be used.

uSSD-TPA-H Substrate Pre-bake

It is recommended that the uSSD-TPA-H substrate be “pre-baked” prior to installation on the UUT (Unit Under Test) circuit board. The common reason for pre-baking is to remove moisture to prevent outgassing, warpage, and other defects. Commonly, a 105 degrees Centigrade temperature for eight to twelve hours duration is used to pre-bake substrates. However, consult with your contract circuit board assembler for further process recommendations.

Lead-Free Solder Balls

The uSSD Host Test Adapter substrate uses lead-free 0.3mm diameter solder balls. Considerations for reflow temperatures and dwell time should be made by the BGA rework technician, depending of the type of solder used and the construction of the UUT.

Solder Paste Micro-Stencil and Solder Type

The Gerber file needed to create the solder paste micro-stencil is accessible through the Wilder Technologies web site. (File Name: uSSD_156-TFBGA_pmtop.art) The substrate uses 0.3mm diameter, lead-free solder balls. Lead-free solder paste is recommended.

Substrate Orientation

The uSSD Host Test Adapter substrate contains an identifiable mark that is used to indicate the “Pin-A1” corner of the substrate. Verify proper orientation prior to installation.

BGA Rework Equipment Nozzle Selection

Refer to the dimensional details of the substrate shown on page 3 of this document when selecting an appropriately sized BGA pick-and-place/reflow nozzle compatible with your BGA rework equipment.

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Pick-and-Place, Reflow Profile, and Inspection

The software that is typically supplied with the user's BGA rework equipment contains sample profiles for various types and sizes of BGA's. It is recommended that the technician responsible for performing the uSSD-TPA-H substrate installation refer to those sample profiles when determining an appropriate profile for applying the substrate to the user UUT.

For a sample of a BGA Component Rework Profile Development process, refer to the following web address... <http://www.circuitrework.com/guides/9-2-2.shtml>

Substrate orientation should be verified before reflow. Following solder paste application, place and reflow using the previously determined rework profile. The uSSD-TPA-H substrate should be x-ray inspected to ensure proper alignment and reflow.

7-Position SATA Connector-Substrate Orientation and Installation

Refer to page 5 of this document for mounting the 7-position SATA connector to the previously installed uSSD Host Test Adapter substrate.

Visit our website at www.wilder-tech.com



Wilder Technologies, LLC
6101A East 18th Street
Vancouver, WA 98661
Phone: 360-859-3041
Fax: 360-859-3105
www.wilder-tech.com

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