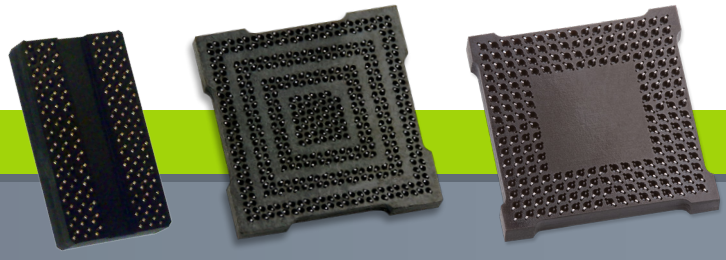
Ironwood ELECTRONICS

Grypper
Grypper G40
Grypper G80

High performance net zero footprint engineering test sockets

ATTACHMENT AND REMOVAL GUIDE



Before You Begin

ABOUT THIS GUIDE

Welcome to the Grypper Product Test Socket Attachment and Removal Guide. This guide contains information regarding the proper preparation and mounting techniques using solder reflow technology for Grypper products with and without solder balls attached to the socket contacts.

NOTE  Always wear clean gloves or finger cots when handling sockets prior to attachment.

NOTATIONAL CONVENTIONS

This manual uses the following conventions:

NOTE  Note is used to indicate important information about the product that is not hazard related.

CAUTION  Caution is used to indicate the presence of a hazard which **will** or **can** cause minor personal injury or property damage if the warning is ignored.

WARNING  Warning is used to indicate the presence of a hazard which **can** cause severe personal injury, death or substantial property damage if the warning is ignored.

DANGER  Danger is used to indicate the presence of a hazard which **will** cause severe personal injury, death or substantial property damage if the warning is ignored.

WHERE TO GET MORE INFORMATION

More information is available from these sources:

Ironwood Electronics test socket support team stands ready to assist our valued test socket customers. Our primary socket support team is based at our Eagan, Minnesota, USA office and is available at 1-952-229-8200 from 8:00AM - 4:30PM CST. If you require after hours support or are interested in regional support, please view our worldwide locations page.

World Wide Web: Ironwood Electronics maintains an active site on the World Wide Web at

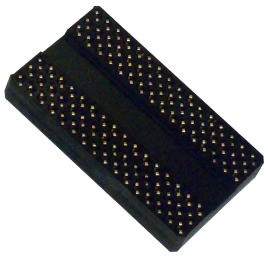
www.ironwoodelectronics.com. The site contains current information about the company and locations of sales offices, new and existing
products, contacts for sales, service, and technical support information. You can also send e-mail to Ironwood Electronics using the web site. Requests for sales, service, and technical support information receive prompt response.

NOTE  When requesting technical support through the website or e-mail, please be sure to include all nomenclature engraved on the test socket, and a detailed description of the problem. This information will allow us to serve you better.

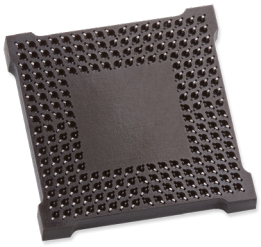
Chapter 1
Overview

COMPONENT TERMINOLOGY (PRODUCT WITH AND WITHOUT SOLDER BALLS)

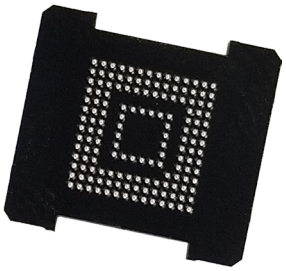
Grypper test sockets consist of one standard part: the test socket assembly.



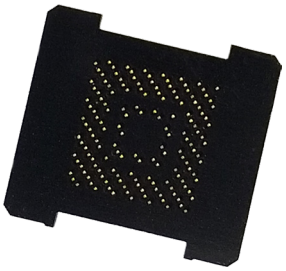
Grypper test socket assembly: without solder balls



Grypper G80 test socket assembly: without solder balls



Grypper G40 test socket assembly: solder balls attached



Grypper G40 test socket assembly: without solder balls

Grypper / G80 with solder balls

SUPPLIES REQUIRED

Product with solder balls:

1. Test socket
2. Loadboard/PCB
3. Compressed air source (dry and clean)
4. Lint-free cloth
5. Eye protection
6. Tacky Flux for Lead Free reflow of SAC305 solder
7. Reflow system
8. Magnification
9. Latex gloves or finger cots

Product without solder balls:

1. Test socket
2. Loadboard/PCB
3. Compressed air source (dry and clean)
4. Lint-free cloth
5. Eye protection
6. Stencil (see Stencil Requirements)
7. Adhesive tape (if using non-polymer stencil)
8. Solder paste
9. Reflow system
10. Magnification

STENCIL REQUIREMENTS (PRODUCT WITHOUT SOLDER BALLS)

A stencil is required for application of solder paste. Either a flexible (i.e., polymer film) or a rigid (i.e., stainless steel) stencil is used.

Examples of flexible stencils include:

1. **StencilQuik™** – for more information visit: www.solder.net
2. **Flextac™** – for more information visit: www.circuitmedic.com

Examples of rigid stencils include:

1. **Mini Micro Stencil** – for more information visit: www.minimicrostencil.com
2. **Stencils Unlimited** – for more information visit: www.stencilsunlimited.com

Choosing the appropriate configuration for the stencil is extremely important. Variations in solder paste composition affect the aperture size required. The volume of the aperture is controlled by a combination of the size of the opening and the thickness of the stencil material. It is important to note that configuration differs between stencils that are left in place (example: StencilQuik) versus stencils that are removed (example: stainless steel, which is conductive) after solder paste is applied. When using a stencil that is left in place, the stencil walls confine the solder, resulting in a larger aperture and a reduced chance of solder bridging to the adjacent feature. When using a stencil that is removed after applying solder paste, there is no stencil material present to confine the solder, resulting in a smaller aperture opening to reduce the chance of solder bridging to the adjacent feature during solder reflow.

Table 1 on page 2 provides volume and aperture size examples of flexible, stay in place stencils that are 0.20 mm thick.

NOTE

The information shown in Table 1 is meant as an example and is not intended as a design or product selection guide. Aperture sizes are based on manufacturing abilities, not optimal configuration.

Ball Diameter	**0.60± 0.05**	**0.50± 0.05**	**0.45± 0.05**	**0.40± 0.05**	**0.35± 0.05**	**0.30± 0.05**	**0.30± 0.05**	**0.30± 0.05**
Minimum Pitch	1.00	0.80	0.80	0.75	0.75	0.65	0.50	0.50
Minimum Aperture	0.70	0.50	0.50	0.45	0.45	0.35	0.25	0.18
Solder Volume Based on 0.20 Thick	0.0769	0.0392	0.0392	0.0318	0.0318	0.0192	0.0098	0.0051
Volume Compared to 1.00 Pitch	100%	51%	51%	41%	41%	25%	13%	7%

Table 1. Example volume and aperture sizes.

Stencil purchasing options include:

1. Purchasing the stencil directly from manufacturer

NOTE

The following option is provided solely as a convenience to our customers. Please note that Ironwood Electronics is a provider of high performance test sockets; not solder reflow experts.

2. Purchasing StencilQuik stencil manufactured by Best, Inc. from Ironwood Electronics

Chapter 2
Preparing the Test Socket

This section describes the procedures for preparing the test socket for attachment to the loadboard/PCB.

NOTE Always wear clean gloves or finger cots when handling sockets prior to attachment.

PRE-ATTACHMENT TEST SOCKET BAKE

A pre-attachment bake (desiccation) ensures that the test sockets are moisture-free.

WARNING Always use eye protection when working with compressed air.

CAUTION If using polymer film stencils, do not pre-bake stencils with test sockets. Baking may damage stencils.

1. Use compressed air to remove any loose debris from test socket.
2. The test sockets must be baked for a minimum of two hours at 125°C. Ideally, the desiccation should take place in a moisture-free environment, such as a nitrogen chamber.
3. After desiccation, the test sockets should be kept in a moisture-free environment, such as a nitrogen chamber. Ridding the test sockets of moisture and keeping them dry is important to ensure trouble-free attachment.

PRE-ATTACHMENT LOADBOARD/PCB PREPARATION

WARNING Always use eye protection when working with compressed air.

1. Use compressed air to remove any loose debris from the loadboard/PCB.
2. Follow the standard procedure for preparation of the BGA package attachment.

STENCIL APPLICATION (PRODUCT WITHOUT SOLDER BALLS)

Adhesive Stencil

If using a stencil with adhesive:

NOTE The stencil will remain in place when the test socket is attached.

1. Remove the adhesive backing from the stencil.
2. Place the stencil in position on the loadboard/PCB.
3. Examine all four corners of the stencil position closely. If the stencil is poorly positioned, adjust it to the correct position. Apply pressure to secure it in place.

Non-adhesive Stencil

If using a stencil without adhesive:

NOTE If using a conductive stencil, the stencil must be removed before the test socket is attached.

1. Place a piece of tape on each of two opposite edges of the stencil, folding one end of each piece of tape under itself to create a tab.
2. Hold the tabs to place the stencil in position.
3. Examine all four corners of the stencil position closely. If the stencil is poorly positioned, peel it back off the board and adjust it to the correct position. Once the stencil is placed properly, apply pressure to secure it in place.

SOLDER PASTE APPLICATION (PRODUCT WITHOUT SOLDER BALLS)

1. Apply a small amount of solder paste to the top of the stencil and spread it using a razor blade or metal squeegee.
2. Examine the paste while the stencil is in place. If any bubbles are visible in the solder apertures, pop the bubbles and reapply solder with the squeegee to fill the voids.
3. If you are using a rigid stencil that is conductive (i.e., stainless steel):
   a. Carefully remove the stencil from the loadboard/PCB after the solder is applied.
   b. Inspect the solder deposits under magnification (10x or higher) to be sure they have not been damaged.
   c. Reapply if the solder paste is not adequate.

Chapter 3a

Attachment Procedure
Product Without Solder Balls

ATTACHING THE TEST SOCKET TO THE LOADBOARD/PCB

Using an appropriate reflow system, position the test socket over the attachment site. Use a split mirror to accurately position the test socket, and then attach using your standard BGA attachment profile. An example profile is shown in Table 2.

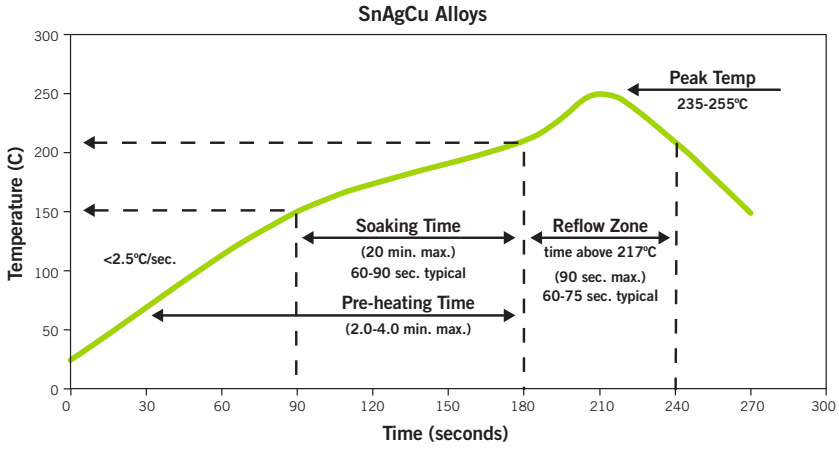
WARNING High temperatures can inflict severe burns. Use appropriate handling procedures.

CAUTION Temperatures above 280°C may damage the test socket.

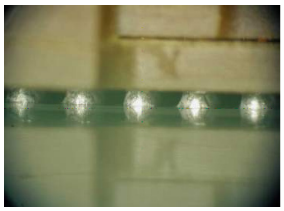
NOTE The profile shown is typical (developed for a 256BGA17-1.00 on a single layer, 1.6 mm thick loadboard/PCB). Variations in loadboard/PCB composition, layers and thickness, and nearby components can affect the solder attachment process.

	Top Heater, °C	Bottom Heater, °C	Heat Ramp, °C/Sec	Dwell Time, Sec
Preheat	205	190	3	55
Reflow	235	215	1.5	50

Table 2. Typical solder attachment profile.



Typical solder attachment profile



Test socket attached to the loadboard/PCB

Chapter 3b

Attachment Procedure
Product With Solder Balls

ATTACHING THE TEST SOCKET TO THE LOADBOARD/PCB

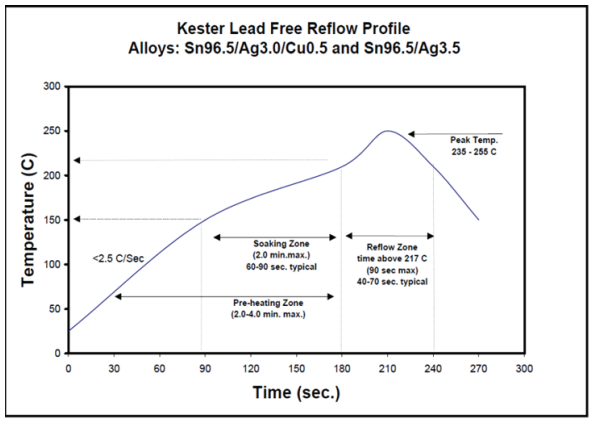
WARNING Always use eye protection when working with compressed air.

CAUTION If using polymer film stencils, do not pre-bake stencils with test sockets. Baking may damage stencils.

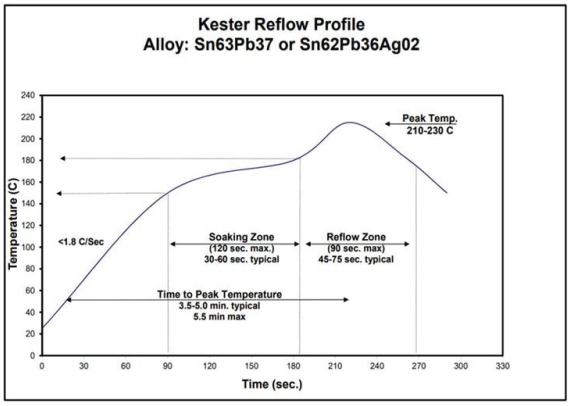
1. Apply a generous layer of tacky flux designed for SAC305 for sockets with SAC 305 solder balls, or tacky flux for Eutectic (Tin/Lead) for sockets with Eutectic solder balls to the circuit board pads or utilize a flux dip method.
2. Using an appropriate reflow system, position the Grypper test socket over the attachment site. Use a split mirror or other method to accurately position the test socket and verify the placement.
3. Reflow the Grypper socket using your standard BGA attachment profile. A peak temperature of less than 260°C is recommended. (Profile should be based on the coolest portion of the socket/board).

The profile shown is typical. Variations in loadboard/PCB composition, layers and thickness, and nearby components can affect the solder attachment process. Ironwood Electronics recommends using your standard device attachment profile to reflow the Grypper socket.

SAC 305

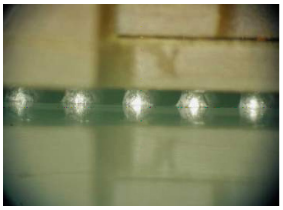


Eutectic (Tin/Lead)



Typical solder attachment profile

4. Clean residual flux residue from the circuit board.



Test socket attached to the loadboard/PCB

Chapter 4
Removal Procedure

REMOVING THE TEST SOCKET FROM THE LOADBOARD/PCB

Remove the test socket using the rework station and your standard BGA removal process. A typical removal profile is shown in Table 1.

WARNING High temperatures can inflict severe burns. Use appropriate handling procedures.

CAUTION Temperatures above 280°C may damage the test socket.

NOTE The profile shown is typical (developed for a 256BGA17-1.00 on a single layer, 1.6 mm thick loadboard/PCB). Variations in loadboard/PCB composition, layers and thickness, and nearby components can affect the solder attachment process. Ironwood Electronics recommends using your standard device attachment profile to reflow the Grypper socket.

	Top Heater, °C	Bottom Heater, °C	Heat Ramp, °C/Sec	Dwell Time, Sec
Preheat	205	190	3	60
Reflow	235	215	1.5	90

Table 1. Typical solder detachment profile.

Notes

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