# Technical Information
## LSPACK & CSSOCKET or BSSOCKET assembly

**The instructions, (I) and (II), would be important advice to those who use CSSOCKET or BSSOCKET for the first time.**
**CSSOCKET or BSSOCKET is referred as CS/BSSOCKET hereafter.**

**(I) PWB design:**

**1.In case through, or via hole is close to a soldering pad or the hole is drilled in the pad area, the cream solder on pads will flow into the through hole during reflow process. This will cause an open circuit between pads and CSSOCKET.**

**2.If a through hole is located in a soldering pad area, the hole must be closed.**

**3.If a through hole has to be provided close to a soldering pad, solder mask should be applied between the hole and the pad as shown Fig. 1. We recommend that the solder mask should be applied over the through hole pad as well. Solder mask should be applied as shown in Fig. 2.**

Fig. 1.

Through hole

Pad

Oblique lines mean
Solder mask

Fig. 2.

Solder mask

Pad
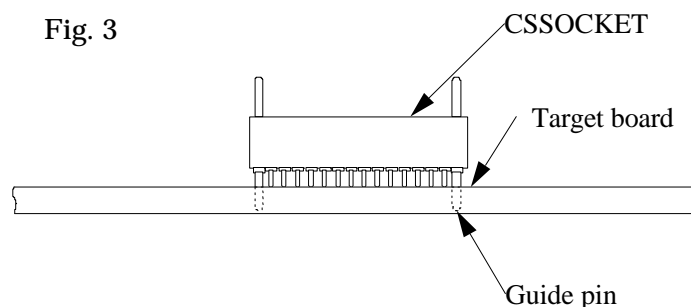
Solder mask

Pad

Solder mask

Pad
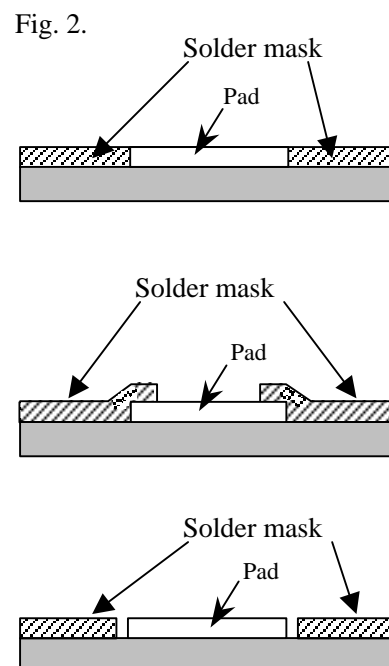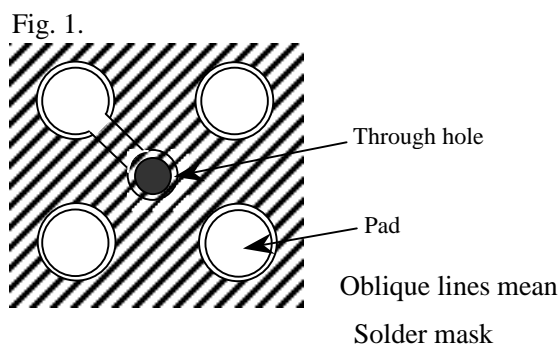
4.Reflow heat will spread over the conductive traces. If the width of the traces is too wide, the temperature of solder balls and pads may not reach to the reflow temperature.

5.Through holes should be provided for assembling CS/BSSOCKET with guide pins. Please refer to the mechanical drawing on the hole location and other dimensions. Two kinds of guide pin are available; the one is plated with gold and the other is made of stainless. The stainless pin cannot be soldered to PWB so this is for mating guide purpose only. The gold pin can be soldered to through holes. This assures to fix CS/BSSOCKET onto PWB firmly, and to relieve CS/BSSOCKET from external stress.

(II) Soldering CS/BSSOCKET on a target board:
1.Please apply solder paste on BGA solder pads on PWB. The solder paste thickness should be between 100 to 150μm. If the thickness is more than 150μm, it may cause short circuit.

2. A polyamide film is stuck on the top of CS/BSSOCKET to protect CS/BSSOCKET from flux vapor during reflow process. Please do not pill off the film until completion of reflow soldering.

3.Please check if the leads of CS/BSSOCKET are placed on the soldering pads accurately. In case CS/BSSOCKET with guide pins, check if the guide pins are placed on the through holes accurately. Please refer to the mechanical drawing on the hole location and other dimensions. Fig. 3 illustrates this assembly.

Fig. 3                                      CSSOCKET

                                             Target board

                                             Guide pin

4.Soldering CS/BSSOCKET onto a target
  1) Outer sizes of CS/BSSOCKET are the same as BGA package sizes.
  2) Big components around CS/BSSOCKET will interfere reflow heat convection.

**Please pay attention to the soldering environment.**

**3) Temperature of reflow process is 210 degree Celsius for 30 to 60 seconds.**

**4) The recommending reflow temperature is as follows.**

**Process Temperature on CS/BSSOCKET surface**

**Preheating 150 to 180 degree Celsius for 180 seconds**

**Soldering 210 degree Celsius for 30 to 60 seconds**

**5.Pill the polyimide film from CS/BSSOCKET.**

**6. CS/BSSOCKET guide pin**

**Two kinds of guide pin are available; the one is plated with gold and the other is made of stainless. The gold pin can be soldered to PWB. This assures to fix CS/BSSOCKET onto PWB firmly, and to relieve CS/BSSOCKET from external stress. We recommend the gold guide pins.**
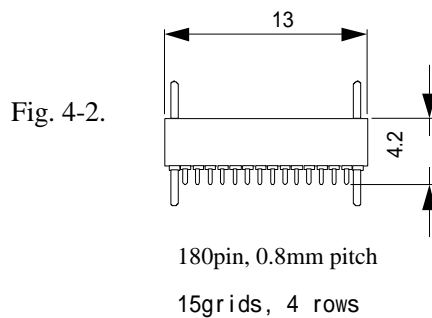
**Fig. 4-1. Reflow soldering temperature profile for 13mm square CSSOCKET. Refer to Fig. 4-2.**

**Reflow equipment:**

**Eightec Techtron Company, Model ARS-301, Air Solder Reflow.**

Fig. 4-1

Fig. 4-2.



180pin, 0.8mm pitch

15grids, 4 rows
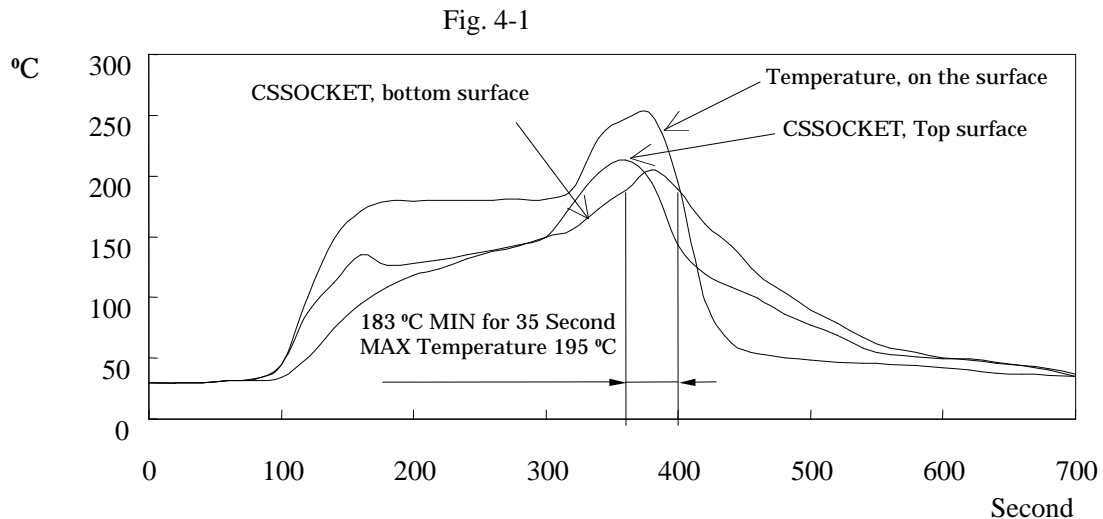
**Warnings:**

**- Flux and cleaning solvent will remain inside of adapters. Flux for soldering DIP components should not be cleaned together with CS/BSSOCKET to prevent the socket from contamination of flux or solvent.**

**-When you solder CS/BSSOCKET with no guide pin, please make it sure that CS/BSSOCKET is placed on the right position of PWB soldering pads.**

**-After soldered CS/BSSOCKET on a target board, we recommend you to solder the guide pins at rear side of PWB. Or CS/BSSOCKET should be fixed onto PCB with a hardening resin for SMT components to increase mechanical strength.**

**-After soldering CS/BSSOCKET with no guide pins onto PWB, fix the grounding portions of the socket with a glue to protect the soldered portions from a stress that would damage the solder joints.**

**(III) Loading BGA Package into LSPACK adapter:**

**After soldered CS/BSSOCKET on a target board, LSPACK can be assembled on the socket.**

**LSPACK includes the guide plate, spacer, and top cover.**

**1.Insert guide pins of LSPACK base into the guide holes of CS/BSSOCKET.**

**2.Place the guide plate on LSPACK base first. Then place the spacer on it. Insert the guide pins of spacer into the through holes of the guide plates and LSPACK base.**

**3.Load BGA package on the guide plate. Check if Pin #1 of BGA is placed on the pogo #1 position of the adapter.**

**4.Place the top cover on the spacer. The fixing holes on the guide plate, spacer, and the top cover are aligned with the same positions. Fix those to CSPACK base with screws attached. Screw driver in side the packing box should be used for**

**fixing the screws. Hold LSPACK base by hand while fixing screws to protect the soldered joints from stress. Torque should be 0.55Kg-cm (0.55N-m)Max, and should be as equal as possible on each screw. Refer to Fig . 5**
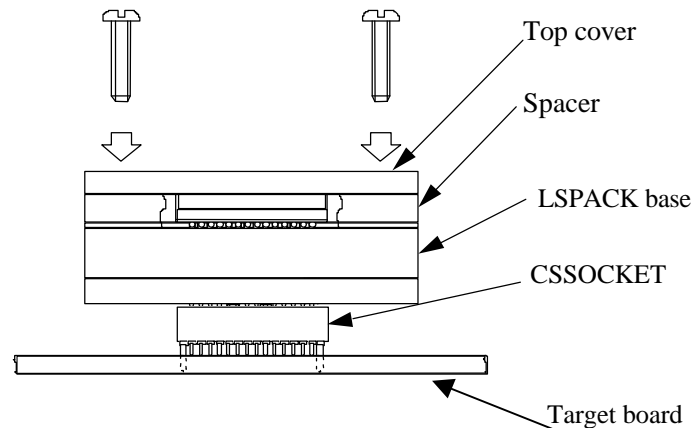


Fig. 5

**5.Hold CSPACK base by hands to protect the solder joints from stress while removing the top cover and the spacer from the base.**

**6.When removing CS/BSSOCKET from LSPACK, loosen LSPACK with a minus driver at its stacked portions with CS/BSSOCKET gradually to protect the soldered joints from the removing stress.**

**(IV) Connecting ICE cable to LSPACK base :**
**ICE cable can be connected to LSPACK base, which is assembled on CS/BSSOCKET soldered on a target board. Refer to Fig. 6.**

**1.The ICE cable must have pads to provide connection to the pogo pins on LSPACK. The pads should have hard gold plating over nickel. Do not make via (through holes) on the pads, since they will damage both pogo pins and pads.**

**2.A stiffener must be placed over the flex circuit because 35 grams pressure per pad is applied between the pogo pins and the pads. A stiffener may be necessary even for a rigid PWB.**

**3.Place ICE cable on LSPACK with the pads side down. Align four fixing holes of the base and the cable.**

**4.Fix ICE cable on LSPACK base with the screws, M 1.6 or M 2.0 type. Screw driver in side the packing box should be used for fixing the screws. Hold**

LSPACK base by hand while fixing screws to protect the soldered joints of CS/BSSOCKET from stress. Torque should be 0.55 Kg-cm (0.55 N-m) Max, and should be as equal as possible on each screw. While removing the cable, hold LSPACK base by hand to prevent the soldered joints from the stress.

5. The optimum contact pressure between the pogo pins and the pads is achieved at 0.8 mm displacement of the pogo pins. Thickness of spacer underneath the cable should be 0.2 mm as shown in the Fig. 7.

Fig. 6



Fig. 7
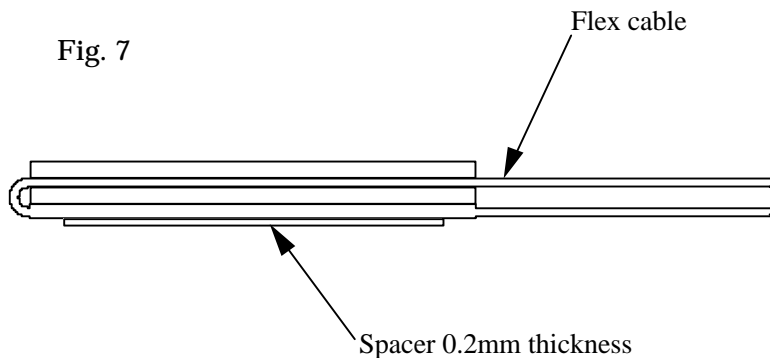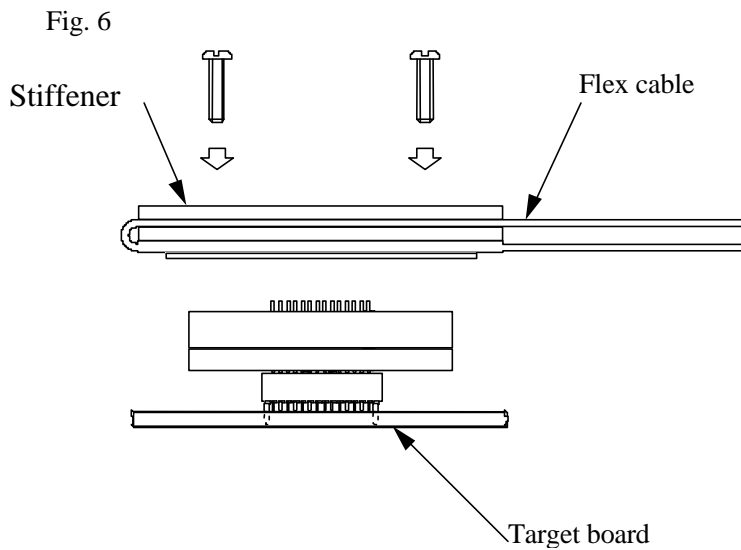


(V) Connecting CSICE to LSPACK base :

CSICE is a conversion board, and can joint TQPACK/NQPACK and LSPACK base together. Furthermore, CSICE can convert the center pitch to different one. Refer to Fig. 8.

After soldered CS/BSSOCKET on a target board, assemble LSPACK on

**CS/BSSOCKET, and then fix CSICE on it.**

**1.Attach CSICE on LSPACK base. Align the fixing holes at each corner.**

**2.Fix CSICE to LSPACK base with the guide pins screws(CS guide) which are enclosed in the packing box. Hold LSPACK base by hand while fixing screws to protect the soldered joints from stress. Torque should be 0.55 Kg-cm (0.55 N-m)Max, and should be as equal as possible on each screw. While removing CSICE, hold CSPACK base by hand to protect soldered joints from the stress.**

Fig.8
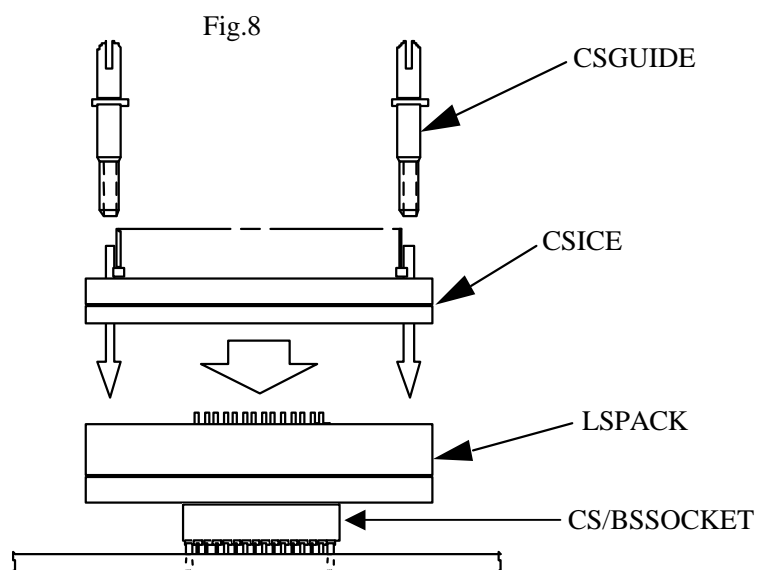


**(VI) Connecting ICE PWB to LSPACK**

**Insert LSPACK plug pins into CS/BSSOCKET soldered on a target board. Then assemble ICE PWB on LSPACK base. Refer to Fig.9-1.**

**1.The ICE PWB must have pads to provide connection to the pogo pins on LSPACK. The pad layout should be the same as those of BGA solder balls. The pads should have hard gold plating over nickel. Do not make via (through holes) on the pads, since they will damage both pogo pins and pads.**

**2.Attach ICE PWB on LSPACK to connect the pads to the pogo pins. Align the fixing screw holes.**

**3.Fix ICE PWB on LSPACK base with the screws, M1.6 or M2.0 type. Screwdriver in side the packing box should be used for fixing the screws. Hold LSPACK base**

by hand while fixing screws to protect the soldered joints from stress. Torque should be 0.55Kg-cm(0.55N-m)Max, and should be as equal as possible on each screw. While removing ICE PWB, hold LSPACK base by hand to prevent the base from stress.

4. The optimum contact pressure between the pogo pins and the pads is achieved at 0.8mm displacement of the pogo pins. Thickness of spacer underneath the cable should be 0.2 mm as shown in Fig.9-2.
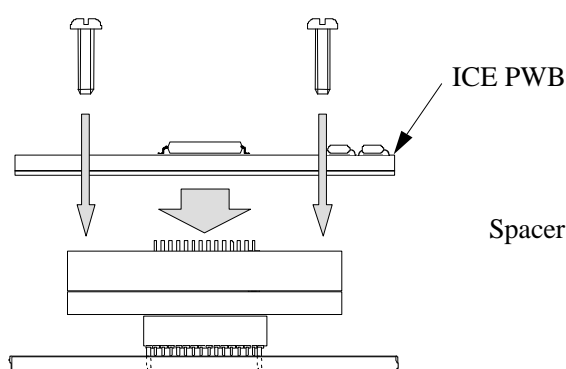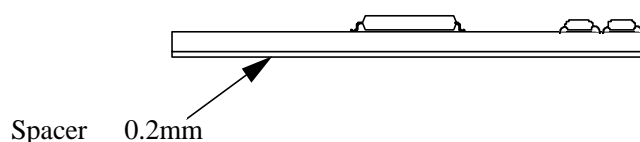
Fig.9-1



Fig.9-2

ICE PWB

Spacer    0.2mm

**(VII) Connecting ICE PWB on to CS/BSSOCKET directly**

1. After soldering CS/BSSOCKET on a target board, assemble CSPLUG/W on CS/BSSOCKET. CSPLUG/W should have been soldered to ICE PWB before assembling CSPLUG/W on CS/BSSOCKET. We recommend CSPLUG/W should be fixed to ICE PWB under dip soldering.

2. Align the CS/BSSOCKET with the plug pins of CSPLUG/W. Then assemble CS/BSSOCKET and CSPLUG/W. Protect the solder joints from stress while assembling CS/BSSOCKET and CSPLUG/W.

3. In case of CSPLUG/W with guide pins, align the guide pins with guide holes on CS/BSSOCKET. Then assemble CSPLUG/W onto CSPLUG/W onto CS/BSSOCKET. Refer to Fig.10.

Fig.10

ICE PWB
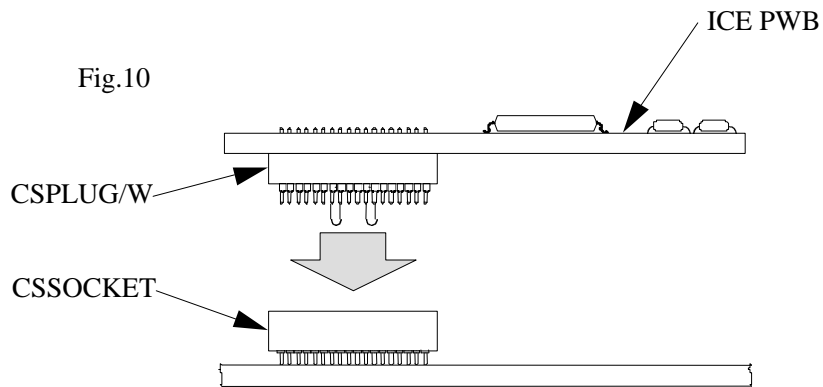
CSPLUG/W

CSSOCKET

**4.As shown in Fig.11, strain relief studs should be provided to protect solder joints of CS/BSSOCKET from stress.**

Fig.11

Pole
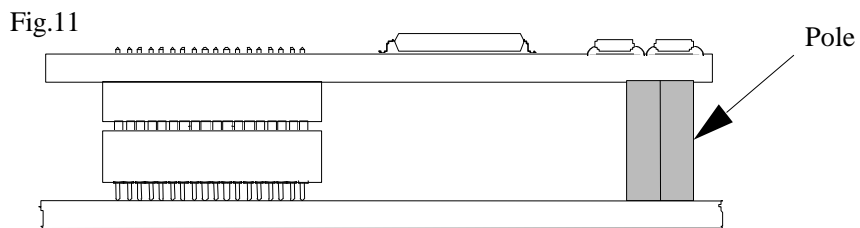
**5.When removing CSPLUG/W from CS/BSSOCKET, loosen CSPLUG/W with a minus driver at its stacked portion gradually to protect the soldered joints from the removing stress. See Fig. 12 shown under. Then extract CSPLUG/W vertical direction. Plug pins of CSPLUG would be damaged when withdraw not straight up direction.**

a cabinet screwdriver

Fig.12
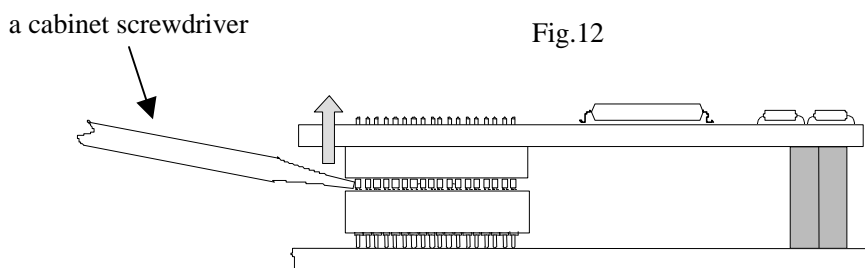
### Notes in handling CSSOCKET and BSSOCKET or CSPLUG/W

Please read Chapter (1) and (2) in the Engineering Report before you mount CSSOCKET or BSSOCKET on PWB.

1. Hold LSPACK by hand, remove packing materials first. Then take LSPACK out of the packing box.
2. While a packing box has been kept under ambient temperature higher than 50 °C for long time, the box might be deformed. The storage place should be free from sun light, and room temperature should be 40 °C or lower.
3. To prevent the solder balls from oxidation, BSSOCKET is packed in a vacuum plastic bag. BSSOCKET should be soldered onto PWB within the same day after opening the bag. Keep it in a dissector after opening the bag. Do not touch the solder balls by fingers to protect the solder ball from poor soldering.
4. A polyimide protection film covers on the top of BSSOCKET to protect the contact pins from fling flux during solder process. The top cover should not be taken away until reflow soldering is finished.
5. Recommending reflow temperature profile on the surfaces of CS/BSSOCKET or CSPLUG/W ;

| Process | Temperature |
|---|---|
| Preheating | 150 to 180 °C for about 180 seconds |
| Soldering | 210 °C or higher for 30 to 60 seconds |

6. Cleaning for CS/BSSOCKET should not be done. The cleaning materials and flux will contaminate in the sockets due to the construction of the socket. Cleaning for dip soldering components should not be done with the sockets since flux will penetrate into the socket.
7. Screw driver in side the packing box or a torque driver should be used for fixing the screws. Four screws should be loosely fasten first, and then firmly fasten the screws. The torque should be 0.55 Kg-cm (0.55N-m) maximum. If one screw only is fastened with excessive torque, this will cause poor or open contact.
8. After soldering CS/BSSOCKET or CSPLUG/W, the guide pins should be soldered at the PWB rear side, or the sockets should be fixed to PWB with a hardening resin to increase physical strength.
9. When CSSOCKET is used for increasing height between LSPACK and

**CS/BSSOCKET or CSPLUG/W, the multi stacking CSSOCKET should be used.**

10. **LSPACK, CS/BSSOCKET and CSPLUG should be used for emulation test purpose only.**

11. **LSPACK, CS/BSSOCKET and CSPLUG/W cannot withstand under vibration or shock environment.**

12. **LSPACK, CS/BSSOCKET and CSPLUG/W were developed for the emulation test or system development purpose only. Therefore, the adapter is not approved by any electrical safely rules or EMI standards.**