solderability. Welding is preferred to soldering because less heat travels to the seal area. The coefficients of thermal expansion of the leads and glass are closely matched, but welding and soldering heat the wire more quickly than the glass. The result is that metal expansion can loosen or crack the glass-to-metal seal. Properly heat-sinked welding fixture and optimized welding cycles can produce strong bonds without seal degradation.

Reed Switch Soldering

The materials and procedures for the solder joining of Hamlin reed switches to other parts or wires with a solder iron in extremely important to assure a reliable path for conducting electrical current, while at the same time maintaining the glass seal integrity of the reed switch.

Soldering Iron

The soldering iron size, tip size, voltage rating and wattage should be carefully selected to perform the soldering operation at 350°C ± 10°C in a time not exceeding 3 seconds. The solder tip should be made of copper and plated with a protective material to resist corrosion and be properly tinned.

Solder and Flux

The solder used should be cored, containing 2.5% to 3.5% by weight of mildly activated Rosin, conforming to the requirements of MIL-F-14256, type RMA. The solder composition should be a tin-lead alloy consisting of 60% tin by weight and 40% lead. The diameter of the solder should be 0.8mm (.031").

Thermal Shunts

Thermal shunts (heat sinks) are recommended to provide adequate protection to the reed switch seal and to minimize interference with the soldering procedure. Figure #1 indicates types available commercially. The thermal shunt should afford rapid application removal. They are held in place by friction, spring tension or by other suitable means which will preserve the tin coating of the reed switch lead. Thermal shunts should be employed when soldering within 1 1/2 mm (.059") of the switch seal for all switches except the DRR-129 and DRR-129 CD. For these two switch types, thermal protection is required when soldering closer to the seal than the flattened portion of the lead. It is strongly recommended that thermal shuts be used whenever it is suspected that the soldering iron requirements are being exceeded.

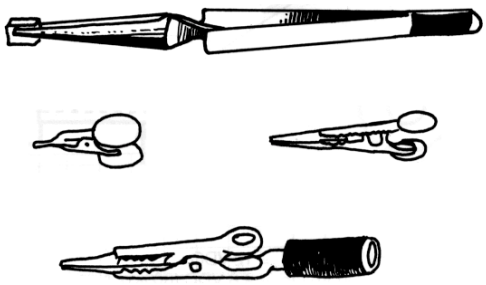

Fig. 1 Thermal Shunts

Soldering Procedure

The item that the reed switch is being solder joined to should be pretinned with solder of a 60-40 tin-lead composition and be free of all grease, oil, dirt, oxides or other forms of contamination.

The parts to be joined should be fastened or held in such manner as to prevent relative movement during soldering. Solder should be applied directly to the joint surfaces. (See Figure #2.)

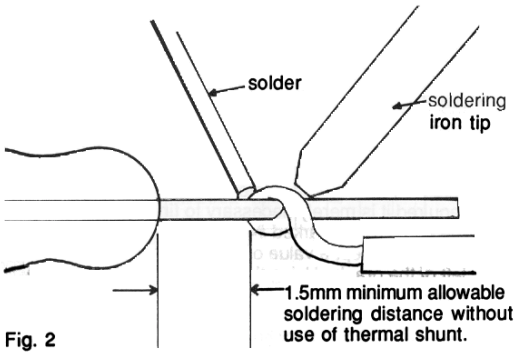

Fig. 2

Solder should not be melted against the iron and flowed to the joint. The joint should not be disturbed before the solder has completely solidified and be room air cooled after soldering. Forced air or use of liquids to speed cooling is prohibited.

Forming

Many of the same rules that pertain to cutting also apply to forming. Stops or guides that use the end of the seal as a reference point for forming can lead to damaged seals. Also, using the seal as a dimensional reference point, invariably results in variation of the lead dimensions. The recommended practice is to use the end of a lead as a reference. Support must be provided between the end of the seal and the form. A clamping device is usually recommended because as the lead is bent stress must not be transferred to the seal area. This approach also allows for normal variations in glass envelope length and the distance between seal and lead ends.

P.C.B. Mounting

P.C. mounting of reed switches via wave soldering is widely accepted. This process makes a very convenient mounting method. Reed switches withstand the thermal cycling, caused by the wave soldering process, with no adverse affects. There is only one thermal condition which can affect reed switches adversely. This is a very rapid thermal shock. Due to the fact that this condition does not exist during normal wave soldering, there should be no reason for concern.

Temperature Effects On Switch Sensitivity

Increased temperature causes a change in the atomic structure of the alloy used for magnetic reed switch leads reducing their magnetic properties until the switch fails to close. The switch may open if closed prior to temperature elevation.

The accompanying graphs show typical sensitivity changes for a typical miniature switch. Intermittant and erratic switch operation may be expected at temperatures where the data line approaches a vertical direction.

It should be noted that in every case more sensitive switches are stable to higher temperatures and should be recommended over high pull-in switches.