PRECAUTIONS FOR THE PROTECTION OF STATIC SENSITIVE DEVICES

All intergrated circuits are static sensitive, differing only in the threshold level at which damage occurs.

An alternative summary of ESD susceptibility is shown in the Rome Air Defence classification of ESD sensitivity and sub-divides components into four categories of sensitivity, Classes, 1,2,3 and 4 which are shown as follows:-

	BREAKDOWN RANGE	
Class 1	0-1000V	Most sensitive devices.
Class 2	1KV - 4KV	Sensitive devices.
Class 3	4KV - 15KV	Less sensitive devices.
Class 4	15KV & over	Insensitive devices.

Class 1 contains:
- Unprotected MOS devices.
- Small geometry Schottky logic.
- JFETS
- Low Power SCR's
- Microwave + VHF Transistors.
- IC Voltage regulators.
- Thin film resistors.
- VLSIC's with double layer metal.

Class 2 contains:
- Input protected MOS I.C's.
- Schottky logic, descrete products.
- Bipolar linear I.C's.
- High speed bipolar logic (ECL).
- Monolithic Ceramics Capacitors.

Class 3 contains:
- Low power discrete diodes + Transistors.
- TTL
- Quartz + Pizoelectric crystals.
- Power devices.
- Zener diodes.

It has also been shown that device degradation - potentially more harmful and expensive to correct than total failure - can occur at only 25% of the above values and in a ratio of approximately 9 to 1 compared with total failure.

Static charge affects devices in two ways - by discharge (current) and by field (voltage), depending upon the type of device.

Damaging levels of static are created in many ways, but all resulting from the separation of two surfaces such as occurs with packaging and handling by personnel.

Two simple "rules" should be applied to protect devices whenever handled:

(1) Handle all static-sensitive components at a static-safeguarded work area.

A static-safe area is any area that is capable of controlling static charge on conductive materials, people and non-conductive materials.

(2) Transport all static-sensitive components in static-shielding containers or packages.

A static shield must be capable of protecting from static discharge as well as static fields.

Within these two rules several specific protection steps are recommended.

Personnel handling devices should be maintained at common potential with the work surface and devices by use of a wrist strap (3M model 2066/7) and a table top (3M models 1872 and 8210). To simplify device handling a shorted insertion tool (Jermyn part no. J50-4016) is recommended.

For shipping and parts storage, a range of conductive bins, boxes, trays and bags will provide static shield protection throughout the plant.

Should you require any assistance in designing and installing adequate protection systems in your facility we should be happy to provide advice and recommendations in conjunction with 3M Static Control Systems Group whose range of products is readily available from our warehouse.