1.1.3 The Operator's Keyboard

The Operator's Keyboard (Figure 1-3) is a flat, chemically resistant, membrane keyboard installed in a metal frame, placeable by the operator, and connected to the keyboard connector on the transition panel. A three-function annunciator horn is built into these keyboards.

Unmarked keys on the left side of the operator's keyboard may be configured by the user (or, perhaps, be preconfigured at the factory). An insert sheet is available that is placed between the outside protective membrane and the keyboard electronics. To replace or install a new insert, remove the two corner screws beneath the metal frame. Lift the frame from the keyboard assembly, grasp the plastic insert using the thumb-slot at the top of the keyboard and remove it. Replace it with the new insert. Reassemble the keyboard and frame, then install and tighten the two corner screws.

Additional operator's keyboards are supplied with optional Universal Stations.

1.1.4 The Engineer's Keyboard

At least one engineer's keyboard (Figure 1-3), similar in design to a personal computer keyboard, will be connected to the system. The engineer's keyboard is especially designed so that it may be disconnected and/or reconnected while the system is in operation. This way, the keyboard may be removed when an engineer wishes to deny operator access to special engineering functions, or the engineer may carry "his" keyboard to any operating system.

To connect this keyboard, insert the plug on its cable into the small connector located on the side of the operator's keyboard. Note that the plug will only fit one way.

An engineer's keyboard is optionally available, but not supplied with, the optional second, third, or fourth Universal Station.

1.1.5 The Local Control Networks

All the nodes in both towers communicate with each other through the TPLCN (Twisted Pair Local Control Network) data communications network, using the RS-485 communications interface standard. This network is similar to the LCN (Local Control Network) used in other TDC 3000^{X} equipment, but the noncoaxial RS-485 (twisted pair) network has been chosen here because of its simplicity and the short physical distances between nodes.

High-speed serial data is passed between nodes at 5 megabits per second (mega = million) and follows a token-passing protocol. This protocol is identical to that used on the LCN.

There is a user-installed kit that connects the base Enhanced Micro TDC 3000 to a standard LCN system. The kit includes an LCN cabinet that accommodates 4 or 6 empty chassis; a fan module, power supply, and I/O card for each chassis; Winchester Disk Adapter (WDA) Module; and History Module. Refer to subsection 2.9 for additional information on the LCN upgrade.

1.2 OPERATING PRACTICES AND HOUSEKEEPING

Listed here are some do's and don'ts pertaining to operating practices and general housekeeping that should be followed during startup and normal everyday operations.

1.2.1 Before Startup

- 1. Thoroughly clean all operating areas, subfloor areas, cable raceways, heating and airconditioning ducts, and plenums.
- 2. Make sure that all control-room windows are sealed.
- 3. Place impregnated mats at each entrance to a control area to prevent dirt and dust from being tracked in.
- 4. Provide a coat rack and/or closet outside the operating area for removal of any outer clothing made of nylon or other synthetic fabrics, except where flame-retardant uniforms are mandatory at all times.
- 5. Make sure that the furniture and carpets are not made of materials that can combine with clothing to create static electricity.
- 6. Prepare a regular cleaning schedule for specific area requirements and for cleaning of consoles, cabinets, and peripheral devices where necessary. (Caution: Do not attempt to clean the printed-wiring boards themselves.)
- 7. Establish a "no-smoking" rule in the operating area. Smoke and other fine dust particles can damage cartridge disks and drives.
- 8. When swapping or handling printed-circuit cards, use a static-control device, such as a wrist strap; see *Circuit Card Handling*, subsection 1.3 of this manual.

1.2.2 After Startup

- 1. Continue your "no-smoking" rule in the operating area. Smoke and fine dust particles can damage cartridge disks and drives.
- 2. Maintain humidity levels (ideally) between 40 and 60% (lower humidity may cause static-discharge problems).
- 3. Control humidity fluctuations to a rate-of-change less than 6% per hour.
- 4. Do not defeat temperature and humidity controls by opening doors and windows (for example, to enhance operator comfort).
- 5. Keep traffic in the control-room operating areas to a minimum. Restrict access to authorized personnel, whose duties require control room entry.
- 6. Review procedures for extinguishing electrical fires and establish fire-fighting procedures. Refer to a qualified fire-fighting systems contractor for assistance.

- 7. Plant personnel frequently use hand-held radios ("walkie-talkies"), or citizens-band radios mounted in maintenance vehicles, for communications. To avoid RFI problems, review the following:
 - If radio communications must take place within an operating area or process controller area, a base-station transceiver with an external antenna should be used.
 - For other applications, radio transmitters with outputs rated as high as 5 watts must be kept at least 3 meters (10 ft.) from the Enhanced Micro TDC 3000 equipment during operation. Transmitters with outputs higher than 5 watts must be kept as far as possible from your equipment. Keep equipment doors closed while operating.

Other sources of RFI include generators, arcing relays, or motor contacts, etc.

- 8. Follow proper cleaning procedures when cleaning the operator area or the control room:
 - Do not use water freely. Mop should be only dampened, not wet or dry.
 - Use a lint-free, antistatic-type dust cloth to remove dust.
 - Do not sweep around areas containing cartridge disks or drives.
 - Use a vacuum cleaner on carpets—preferably one connected to an external system.
 - Do not allow liquids to be placed on the Enhanced Micro TDC 3000 keyboards and equipment. Liquid spills will damage electronic components.
- 9. Clean the cartridge disk drive as outlined in the *Universal Station Service* manual in the *LCN Service 1* binder to prevent errors and loss of data when loading programs.
- 10. Regularly clean the CRT face to minimize operator fatigue. Cleaning procedures are found in *Universal Station Service* manual in the *LCN Service* 1 binder.
- 11. Clean the printer before startup and periodically thereafter, as described in the *Universal Station Service* manual in the *LCN Service* 1 binder.
- 12. Periodically clean the operator and engineer keyboards by dampening a cloth with mild detergent and wiping the keys. Do not spray detergent solution on the keys as moisture may ruin the circuits underneath.
- 13. Periodically check and clean or replace the air filters in each cabinet. Refer to subsection 6.3.1 of this manual for filter removal and cleaning procedures.