

SYSTEM ELEMENTS

Membrane switch keyboard has 81 positions

An 81-position version of the Full Travel Membrane (FTM[®]) keyboard utilizes membrane switches that have 1 flexible surface membrane made conductive, usually by application of a conductive ink. This surface is slightly separated from a rigid substrate bearing a conductive circuit. Open-switch gaps are closed when the membrane is pressed down to contact the substrate. A PCB substrate, either single- or double-sided with plated-through holes, is used, depending on required switch density and mounting components, such as LEDs, connectors, and output pins. A single-sided circuit can also be produced by screening a conductive ink or paint onto a rigid support or onto a flexible membrane for later application to a rigid backing. Spacing between membrane and substrate is maintained by an insulating spacer, such as a polyester film. Holes cut into the spacer allow contact at desired switch positions.

Membrane keyboard is not directly actuated by the user's finger, but by a full-travel key. Keycap fits on a plunger mounted in a housing and supported by a return spring. An actuator spring is located at the bottom of the housing. Depressing the plunger brings it into contact with the actuator spring. The spring then presses on the membrane, forcing it into contact with the substrate. When the key is released, the return spring travels it to its original up position. Key touch and feel are virtually indistinguishable from a std typewriter keyboard. Keys with alternate action, such as shift lock, are provided with a series of small ramps in the plunger and a cam follower hook. When key is depressed, the hook engages ramps and the key stays latched down. Repeating the key disengages the hook. Smooth action of the spacer bar is maintained by a torsion wire attached to 2 housings and to rectangular inserts in either end of the bar to prevent the bar from binding when it is operated at either end.



The FTM keyboard is available with optional encoder that mounts directly on the back of the keyboard and converts the row/col matrix to a choice of industry std codes. Standard encoder provides TTL ASCII coded 8-line parallel output with strobe. With add-on options, it can be converted to 3-state, open collector ASCII or to RS-232-C serial output. Encoder provides debouncing for all keys, and selectable auto-repeat for all noncontrol keys. It is specifically designed for microprocessor interface. Coding is 4-level, with unshift, shift, caps-lock, and control. Included is a choice of 2-key rollover or the

company's Entry Error Elimination (E³), a microprocessor based N-key rollover function with phantom key lockout provided for all data keys. **Oak Switch Systems, Inc.**, PO Box 517, Crystal Lake, IL 60014.

See at Booth M235

Circle 515

Ceiling mounted micro/mini air conditioner

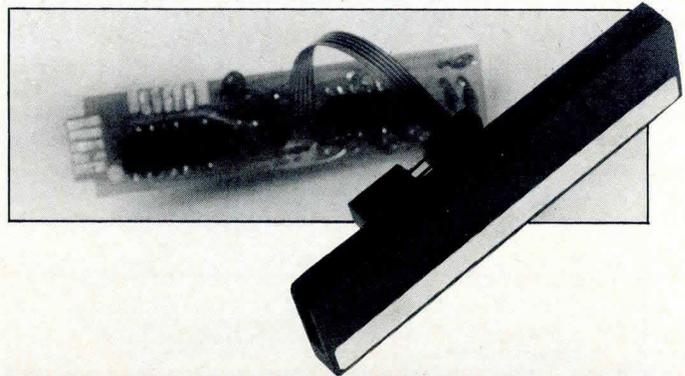
Hilander, a 1.5-ton capacity air or water cooled environment controller for micro- and minicomputer systems, installs in place of a std 2' x 4' (61- x 122-cm) ceiling tile. Unit runs at 208/230 or 277 V single phase. Made from epoxy coated galvanized steel, 1-piece construction can be installed flush with suspended ceiling, semi-recessed, or fully exposed. Temperature and humidity controls are independent of the building's air conditioning system, outside temperature, or humidity. Reliability has been improved through replacement of the expansion valve that usually controls refrigerant flow with a static capillary tube. Multiple-redundancy water collection and drainage system is std. Finned electrical resistance heater and 3-lb/h humidifier, centrifugal blower, automatic condensate pump, wall mounted stop/run control, and installation rig for positioning unit 10' (3 m) above ground level are optional.

Also displayed will be 3- or 5-ton capacity Spacemaker II, which is available for mid-size systems in air, water, glycol, or chilled water models, upflow or downflow. Unit operates at 208/230 or 460 V triple phase, and can be used in master/slave or multiple-independent configuration. The Energy Conservation System (ECOS) provides 10- to 20-ton capacity for large data centers. **Hiross Inc.**, PO Box 290, 2107 Liberty Dr, Niagara Falls, NY 14304.

See at Booth 3110

Circle 516

Wafer thin card reader



Magnetic stripe card reader, the Eaglet, measures 3.5" x 0.285" x 1.1" (8.9 x 0.724 x 2.8 cm), with magnetic head protruding an additional 0.3" (0.8 cm). Decoding electronic board, measuring 3.4" x 0.51" x 1.05" (8.6 x 1.3 x 2.67 cm), is connected to head by flexible cable. Separation of reader and decoding board allows max flexibility and simplicity in reader utilization. Reader features spatial decoding technology that requires no compensation for speed or acceleration as the card is passed through the reader. It features a special spring and mounting arrangement for reliability in reading warped and contaminated cards. Reader is virtually maintenance free. OEM quantity price is \$29.30. **American Magnetics Corp.**, 740 Watsoncenter Rd, Carson, CA 90754.

See at Booth 1928

Circle 517