Two-chip keyboard makes intelligence a movable choice

A two-chip keyboard design allows a terminal designer to decide where to put the validation and encoding intelligence—in the keyboard or in the terminal. Designed by Key Tronic (Spokane, WA), the keyboard contains one drive and one sense chip, which serve as an interface between a capacitive switch matrix and a microprocessor.

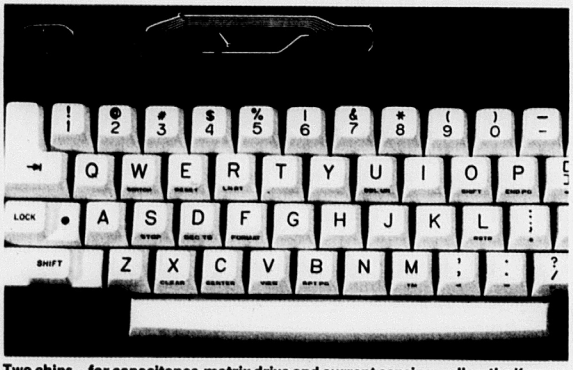
The 20-pin drive chip has four address, one strobe, one latched-output (for hysteresis control), two power and 12 matrix-drive lines. The sense chip contains eight individually latched current-sensing detectors with a common threshold control and an output latch reset line in common with the drive chip's strobe line. The resulting 96-location matrix can be easily doubled by adding another drive chip.

A typical matrix interrogation routine begins by bringing the strobe line low (resetting the eight data latches of the detector chip) and presenting a 4-bit address to the drive chip. Bringing the strobe line high causes the appropriate matrix drive line to be selected and driven. This voltage transition causes a current pulse on every sense line that has a key closed in common with the selected drive line.

The detector chip senses the current pulses and sets the corresponding output latches. The status of eight keys can then be read from the data bus. Loading this information into RAM completes the routine and gives the processor all the information necessary for N-key rollover.

A complete 96-key interrogation routine takes less than 0.5 ms, using an Intel 8048 or similar μP. Even with validation and output subroutines included, the microprocessor uses at most 20% of its time servicing the keyboard. Consequently, the keyboard can be connected directly to a μP in a terminal.

Both sense and drive chips use bipolar technologies. In addition, their matrix-drive and sense lines have been designed to exhibit low impedance to the supply in their normal modes of operation. Although isolation is still required between drive and sense lines (to keep key-up capacitance to a minimum), this low-impedance concept reduces the amount of grounding required.■■



Two chips—for capacitance-matrix drive and current sensing—allow the Key Tronic keyboard to use a μP either on-board or within the terminal.