8279 Keyboard/Display Controller

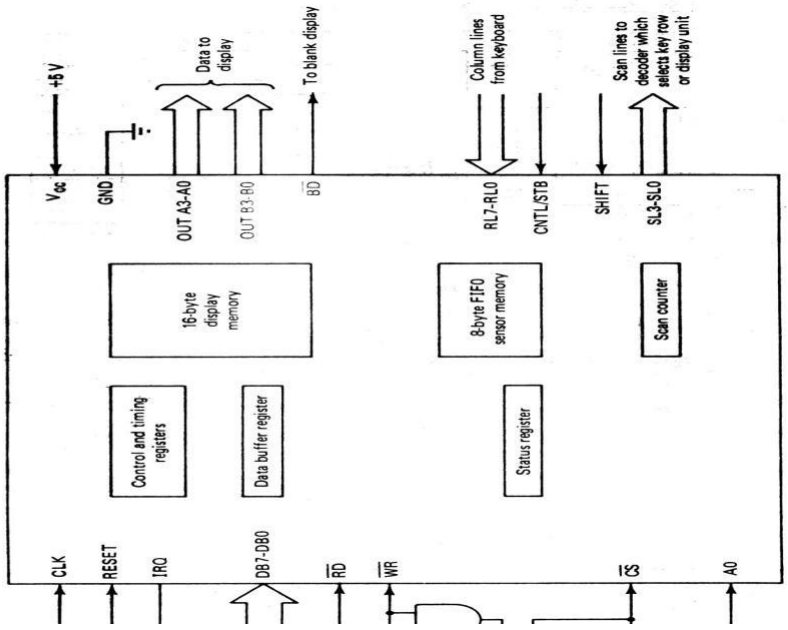


Figure shows the structure of 8279 and its interface to the bus. Addressing is according to the following table

CS	RD	W R	AO	Transfer Description
0	1	0	0	Data bus to data bus buffer
0	1	0	1	Data bus to control register
0	0	1	0	Data buffer register to data bus
0	0	1	1	Status register to data bus

8279 scans each row of the keyboard by sending out row addresses on SL2-SL0 and inputting signals on the return lines RL7-RL0, which are column addresses. When a depressed key is detected the key is automatically debounced by weighting 10 ms to check if the same key remains depressed. If a depressed key is detected and 8 bit code word corresponding to key

position is assembled by combining column, row position and shift and control status as follows

CNTL	SHFT	R	R	R	C	C	C

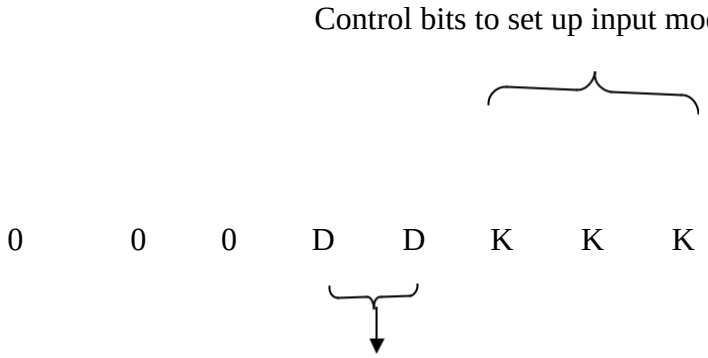
R-row (scan line address)

C-column(return line address)

The SHFT and CNTL pins are used to support shift and control keys. The key position is then entered into 8x8 FIFO sensor memory and IRQ(Interrupt Request) line is activated if sensor memory was previously empty.

The control and timing registers are collection flags and registers that are accessed by commands. The 3 MSBs of command determine its type and meaning of the remaining 5 bits. Out of 8 types of commands 3 commands are important the formats of the 3 commands are as follows

Key board display mode set- it specifies the input and display methods and is used initialize the 8279. Its format is:



DD Control bits to set display
modes 00-left entry,8 8 bit display

01- left entry,16 8 bit display

10-right entry ,8 8 bit display

11-right entry ,16 8 bit display

KKK

000 encoded keyboard scan mode with 2-key lockout 001 Decoded keyboard scan mode with 2 key lockout. 010 encoded keyboard scan mode with N-key rollover 011 Decoded keyboard scan mode with N-key rollover 100 encoded sensor matrix scan mode

101 Decoder sensor matrix scan mode

110 strobed input with encoded display scan

111 strobed input with decoded display scan

Read FIFO Sensor Memory:

Indicates that a read operation from the data buffer register inputs a byte from the FIFO memory. In the sensor mode it specifies which row has to be read. This command is needed before inputting data from the FIFO memory. Its format is

0101XAAA

Row address to be read in a sensor mode

X-don’t

Bit 4 is autoincrement bit. If 1 next input is from the next byte in the FIFO

Write to display memory:

Indicates that write to data buffer register will put data in display memory

Its format is

1001AAAA

Address of the location in the display memory where the data for the next write will be stored
8279 provides two options for handling the situation in which more than 1 key is depressed at about the same time. With the two-key lockout option ,if another key is depressed while the first key is being debounced, the key which is released last will be entered into the FIFO. If the second key is depressed within two scan cycles after the first is debounced and the first key remains depressed after the second one is released, then the first key is recognized. If more than one is depressed, after they are depressed they are all entered in the order they were sensed.

8279 has a sensor matrix mode in which signals in the return lines are stored into the FIFO at the row corresponding to the scan address.
8279 provides a 16 byte display memory and refresh logic. Each address in the display memory corresponds to a display unit with address 0 representing the leftmost display unit. Output is

accomplished by 8279 repeatedly sending out characters over the lines OUT A3-A0 and OUT B3-B0 and unit select address is over SL3-SL0.

For the auto increment left entry, after each write to the display the addresses incremented by one, so that the next character appears in the display unit to the right. Auto increment right entry allows character to be displayed in electronic calculators form. It causes the display to be shifted left to one character and stores the next character from the right.