

to the punch buffer one at a time by means of another IOT. This IOT includes special checks for buffer-empty and buffer-full conditions. If the buffer is empty when a character is sent to it, the IOT causes an interrupt on the paper-tape punch level which "awakens" the punch service routine. If the transmission of a character from the user program to the buffer causes the buffer to be filled, the IOT places the user program in "punch-hung" status and notifies the Swapper that an evaluation of user program status should be made.

The punch service routine, upon receipt of an interrupt, locates the next character in its buffer and transmits it to the punch. The routine then checks to see if the buffer is "almost empty," i.e., within a few characters of being empty. If the buffer is almost empty, the routine places the punch user in one of the highest queues, cancels the "punch-hung" status, and notifies the Swapper that an evaluation should be made. If the buffer is completely emptied, the routine merely debreaks; it will be restarted by the character-transfer IOT when the buffer-empty condition is discovered.

Finally, when the user program has completed transmission of its message, another IOT is used to relinquish control of the punch. Even if the user program omits this step, the "halt" IOT causes all devices held by the program which is halting to be released.

Input is handled in much the same way as output. For example, to read a message from paper tape the user program would first obtain control of the paper-tape reader and then request a character. This request would cause the reader to be activated by an interrupt and the user program placed in "reader-hung" status.