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ABSTRACT and CONTENTS

This document describes the operation and programming conventions for the teletype and paper tape reader to be used with the micro-scheduler.

The paper tape reader interface, teletype receiver, and teletype transmitter for the micro-scheduler will be built on a single large circuit card. The back panel connector for this card will be near the I/O card, in a (now) spare slot. All signals for the reader which leave the circuit card will be carried on a length of 14 conductor ribbon cable. The TTY cable will be 4 conductor "teletype wire", terminated in a 4 prong plug.

The paper tape reader, teletype transmitter and teletype receiver each constitute a logical device, with a separate device address for the ALERT. There is also a status word, which has a separate device address. This word contains the flag bits for the other three devices. To read a device's input register, the micro-scheduler should execute:

$$DA \rightarrow Z; ALERT$$

$$PIN; TE2Y; VCY$$

Device addresses are:

4B7	Status word
4B7+4	TTY Transmitter
4B7+2	TTY Receiver
4B7+1	Paper tape reader

To load a device's output register, execute:

$$DA \rightarrow Z; ALERT$$

$$OUTPUT \rightarrow Z; POT$$

The teletype receiver will be continuously listening for characters. It will be reset automatically at initialization, and needs no reset thereafter. From the time the receiver flag comes up, the micro-scheduler has at least 5 msec. to read the character without losing data. If it does not read the character by the time the next character begins to arrive, the rate error bit is set. Both the rate error and flag bits are cleared when the receiver input word is read. The receiver has no output word. A POT directed to it has no effect. The format of the input word is:

Bit:	Meaning:
$\emptyset$	Receiver ready with a character
1	Receiver rate error
2-15	Not used ($=\emptyset$)
16-23	The input character

The teletype transmitter has only an output word. The format of the output word is:

Bit:	Meaning:
16-23	The output character

The paper tape reader has both an input and an output word. The format of the input word is:

Bit:	Meaning:
$\emptyset$	Flag
1	Rate error
2	Reader sick (turned off, or in LOAD)

Bit:	Meaning:
3-15	Not used (=∅)
16-23	The input character

The format of the output word is:

Bit:	Meaning:
∅-23	Not used
22	STOP
23	GO

The reader flag is a flip flop which is set when the leading edge of a sprocket hole is encountered in the tape, and reset when the reader is stopped or its input word is read. This ensures that a character will not be read twice if the tape is stopped with the sprocket hole under the read head. The reader brake is sufficiently fast to stop the tape on the data channels if the STOP signal is sent within 50 micro-seconds of the rise of the flag. The sprocket hole duration at full speed is approximately 1 msec. If the micro-scheduler does not read the input word before the sprocket hole is passed, the character may be invalid, and the rate error bit in the input word is set. Rate error is reset either by stopping the reader or by reading the input word.

The status word is a separate logical device, but contains only the flag bits for the three other devices. The status word is insensitive to POT, and reading it does not clear any of the flags, as reading the device registers

of which the flags are a part does. The bits of the
status register are:

Bit:	Meaning:
0-20	Not used (=0)
21	Teletype transmitter flag
22	Teletype receiver flag
23	Paper tape reader flag

Other devices may be accessed by the micro-scheduler I/O interface. The first logical device consists of the STEP and PROCEED latches in CPU1 and CPU2. These latches are set by executing an alert directed to device 4B7+10B, followed by a POT. The Z register at POT time will be interpreted as follows:

Bit:	Meaning:
$\emptyset$-17, 20	Not interpreted
18	Set CPU2 STEP
19	Set CPU2 PROCEED
21	Reset M30
22	Set CPU1 STEP
23	Set CPU1 PROCEED

The second device is included only as a debugging aid. It consists of a cable with a switch at its far end. It plugs into location A3 on the TTY card. If this gadget is connected, all attempts by the micro-scheduler to PIN devices with D.A.$\leqslant$4B7 will return a 1 in bit 22 of E2, and the switch's state in bit 23. This will set COMPUTE mode in the micro-scheduler, with the switch for SELFILL.