MEMORANDUM

To: RA, JGC, PJR

From: B. Cosell and B. Barker

Subject: PDP-1 Interface to the Network

Date: 29 November 1971

We have made a preliminary pass at defining the PDP-1 interface
to the network. The interface will be full duplex and will
transfer a word-at-a-time through the I/O register. The inter-
face will take 16 bits at a time from the network and will put
them in the low order 16 bits of the PDP-1 word leaving the two
high order bits 0. Similarly, on output it will transfer the
low order 16 bits of the I/O to the network, ignoring the two
high order bits. The interface will have the ability to inter-
rupt the processor either when the 16th bit of a word comes
over from the network, or when it has just shifted the 16th
bit of a word out to the network; that is, when the input shifter
becomes full, or when the output shifter becomes empty. Both
interrupts are capable of being independently enabled or dis-
abled by the CPU, but will come in on the same channel. We
haven't yet selected an interrupt channel or an IOT code for
the interface.

INPUT SIDE

There will be 7 IOTs dealing with accepting input from the net-
work:

1. SKIP IF WORD DONE — This will skip if the shifter has a
                        complete word ready to be transferred
                        to the PDP-1's I/O.

2. INPUT A WORD — This will jam the current state of the in-
                   put shifter into the PDP-1's I/O. Note
                   that if the shifter was in the middle of
                   assembling a word from the network, garbage
                   will be transferred into the I/O.

3. SKIP ON NO ERROR — This IOT will skip if the IMP's ready
                       line has not been down since the last
                       time a CLEAR ERROR was done.

4. CLEAR ERROR — This will clear the flip-flop which captures
                  the IMP's ready line being down.

5. SKIP IF IMP READY — This IOT will skip if the IMP's ready
    line is up.

6. SKIP IF FINAL INPUT WORD — This IOT will skip if the last
    bit that was shifted into the
    interface had "Last Bit" set
    along with it. Note that this
    must be done before the word
    in question is transferred into
    the I/O.

7. ACTIVATE INPUT INTERRUPT — This will cause an interrupt to
    be generated the next time the
    input shifter is full and then
    will clear the interrupt-
    activated flop. Note that this
    may cause an immediate interrupt.

OUTPUT SIDE

There are 6 IOTs for transferring data to the network:

1. SKIP IF OUTPUT SHIFTER EMPTY — This IOT will skip if the
    interface is able to accept
    another word from the PDP-1
    to be shifted out to the
    network.

2. OUTPUT WORD — This will jam the I/O into the output shifter.
    Note that this can give highly confusing
    results if the shifter is not empty when this
    IOT is done.

3. FINAL OUT — Jams a word out to the shifter (as in 2, above)
    but will set the last bit indicator with the
    low order bit of the word.

4. PUT 1 UP — This will bring up the PDP-1's ready line.

5. PUT 1 DOWN — This will take the PDP-1's ready line down.

6. ACTIVATE OUTPUT INTERRUPT — This will cause the CPU to get
    interrupted the next time the
    output shifter is empty and
    then will clear the interrupt
    activated flop. Note that this
    may cause an immediate interrupt.

BC:BB/nlg

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