THE UNIVERSITY OF MICHIGAN

Memorandum

PDP-8/103A DATAPHONE INTERFACE

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ABSTRACT

The Concomp Project's DEC 338 Display system is now interfaced to two Bell System 103A Dataphones. This memorandum describes the use of the system as well as the interface construction.
I. GENERAL DISCUSSION

The interface to the 103A Dataphones required only minimum hardware additions. It involved the use of the teletype control built into the PDP-8. Figure 1 shows the standard system configuration.

![Diagram of standard PDP-8 TTY I/O Configuration]

Figure 1. Standard PDP-8 TTY I/O Configuration.

Figure 2, below, shows the additions to the above basic system.

![Diagram of modified PDP-8 TTY I/O Configuration]

Figure 2. Modified PDP-8 TTY I/O Configuration.
Notice that the console typewriter is now essentially an independent console since it is connected to its own dataphone. In particular, it may be connected to the PDP-8 to operate as a normal online teletype with one exception: the tape reader on the ASR 33 will advance as long as there is tape in the reader (similar to handling tape in the reader during interrupt control of the normal online configuration).

II. PROGRAMMING CONSIDERATIONS

The new system is programmed using the standard PDP-8 IOT Instructions for teletype I/O (see the PDP-8 User's Handbook). The programmer should note the comment above concerning the independence of tape advance from the TTY reader flag. Also, the programmer should note that many standard Bell System teletypes automatically generate a parity bit which appears as the high order bit of the 8-bit character code. In such cases, there will be no guarantee that the high order bit is set during input from the keyboard as is the case with the ASR 33 supplied with the PDP-8.

III. SYSTEMS CONSIDERATIONS

The new PDP-8 I/O configuration allows a wider degree of flexibility in the integration of the 338 Display into The University of Michigan timeshared system. Both the teletype and the PDP-8 may be connected to the U of M Computing Center's IBM System 360 through standard teletype input ports. Thus, both the teletype and the PDP-8 may take direct advantage of System 360 programming support of typewriter terminals such
as device control, symbolic file storage and editing, assembly
or compilation of symbolic file, or data transmission control,
and may be particularly useful when the additional interface
to the Bell System 201A Dataphone is provided. This device
is a higher speed device than the 103A Dataphone. However,
the 201A Dataphone can communicate in only one direction at
a time (half-duplex) rather than two directions at a time
(full-duplex) as can the 103A Dataphone. Thus, if the slow
speed 103A Dataphone lines are used only for control communi-
cation, the 201A Dataphone line would handle only data, re-
sulting in a higher effective data transmission rate.

IV. INTERFACE HARDWARE

The interface used in the modification described here
was developed by David L. Mills and will be described in
forthcoming publications on the data concentrator. It is
included herein for completeness. The interface was wired
onto a spare section of the 338 Display's Rand Tablet
interface.

Figure 3 is the logic diagram of the PDP-8 TTY I/O modi-
fications. The module marked "E1A RCVR" in Figure 3 was made
by modifying a standard R11 Diode Gate as shown in Figure 4.
The modified module is less expensive than either of the
special purpose Input Converter modules (W510, W511) and is
more resistant to overloads.

Figure 5 is the actual module layout used. Table 1 is
the wire list.
Figure 3. PDP-8 Mainframe and Teletype Interfaces for 103A Data Sets.
STANDARD R111

IN3606  (2)IN645  2N3639
E
D
IN3606
15K
-15V

7.5K
-15V
H
OUT
+10V
100K

-3V
IN3606

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MODIFIED R111

IN
E  3.3K  (2)IN645  2N3639
IN3606
D
10K
-15V
100K
+10V

-3V
IN3606

Figure 4. R111 Modifications for Use as ElA Receiver.
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Figure 5. 103A Dataphone Interface Module Layout.
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