

TO: Laboratory Advisory Committee and Systems Group

FROM: Charles Grant, Mark Greenberg

RE: Hard-copy terminals

The basic requirements for a laboratory hard-copy terminal include:

- a) Provision of both an APL character set and standard alphanumeric character set so that the terminal may double as a subject terminal and a program-development terminal,
- b) Capability of full-duplex operation to allow maximum flexibility in the use of the terminal.

These two requirements have narrowed our selection to five manufacturers who are currently producing terminals:

- a) Compunetics (14.8 cps , \$3000)

This terminal has an IBM Selectric typewriter print mechanism and an electronic keyboard packaged in an office typewriter case. Unfortunately, this terminal is poorly constructed and has proven highly unreliable. Coupled with the lack of potential for any acceptable service arrangement, this terminal would not meet laboratory use requirements.

- b) Teletype (15 cps , \$1500)

The Model 38 teletype is an upgraded version of the standard Teletype Corporation product. An interchangeable type drum

permits the use of multiple character sets (An APL set will be available.). This terminal suffers from four problems which reduce its attractiveness as a subject terminal:

- 1) It is moderately noisy.
- 2) It is physically bulky.
- 3) The print quality is poor.
- 4) It is highly mechanical and, therefore potentially unreliable.

c) I/O Devices (30⁺ cps , \$3500)

This terminal utilizes a type drum similar to Teletype's, but is considerably speeded up. We currently have a demonstrator in the laboratory which has developed several minor operational flaws. Furthermore, the terminal is packaged in a large console and is extremely heavy. The print quality has been observed to vary from poor to good.

d) GTE Novar (30 cps , \$3995)

This terminal utilizes the Diablo Hy-Type print mechanism. The print mechanism is an impact hammer which strikes a spoked rotary print wheel when the desired character is in position. An APL print wheel is scheduled for delivery in November. Diablo has delivered some 2000 of these printers and they appear to be quite well constructed. The print mechanism has relatively few mechanical parts with most functions performed in electronics. The

print quality is comparable to Selectric mechanisms. Furthermore, the printer has additional capabilities such as horizontal and vertical tabs as well as movement resolution suitable for plotting. The GTE terminal does not exploit the printer plotting capabilities. Also, the GTE packaging is unattractive and there are many control lights and buttons adjacent to the keyboard. The keyboard is quite sensitive and since the roll-over (multiple key strike) algorithm is not done correctly, typists not used to the terminal would be prone to typing errors.

e) Data Terminals Corporation (30 cps , \$3650)

This terminal also uses the Diablo Hy-Type printer. However, in this case the plotting capabilities of the printer are fully available. The terminal is attractively packaged and mounted on casters for mobility. This was the only terminal we saw for which no operational errors or flaws were noted during the demonstration. The functions of the terminal are implemented in the control store of a small microprocessor inside the terminal. This construction technique (which should be familiar to CRMS people) provides a simple architecture, easy maintainability and relatively painless modificability. DTC will sell the terminal with a one-year warranty, and, as they currently do an excellent job of maintaining our teletypes, should be able to provide good maintenance.

DTC is a 10-man, 4 1/2 year old company located in Cambell, California. They have delivered no terminals to date, but have orders for over 100. Production at a rate of 50 per month is scheduled to start very soon, and they are quoting 60 day delivery for small orders.

We strongly recommend a decision to purchase 18 DTC terminals. We have confidence that any problems that show up in the terminals will be quickly solved by DTC. This is based on

- a) our positive experience with their service policies,
- b) the architecture of the terminal,
- c) a general feeling that they are motivated to do things well.

A one day house demonstration will be arranged in the very near future.

