MEMO TO:	Mr. D. W. Sweeney
SUBJECT:	Card Punching for Project 7000
Reference:	Memo by E. W. Coffin, of November 25.

I find myself thoroughly disagreeing with the conclusions presented because the reasoning is faulty. Card punching is expensive on large computers because of the low utility of the punching equipment which stands idle 80 to 95% of the time (using figures quoted in the above report). Hence, consider the stand-by rental of the equipment:

A.	Projected rental of Project 7000 on-line punch	$3,000
B.	Off-line punch system with "column binary"	2,375
C.	On-line punch for 704	600
D.	On-line Project 7000 printer with microcode	NIL

The point is not how much more costly is "A" than "B" because the cost of "B" is already excessive. No wonder customers like on-line punching for the 704 ("C")! Does this prove that they would prefer on-line punching for 7000 ("A"), particularly when "D" may be made available instead? Note the real implication of the study by Don Furth quoted in the memo: The reason why the whole 704 used as a punch, while doing nothing else, is cheaper per month than an off-line punch is, of course, that there is so little punching to do.
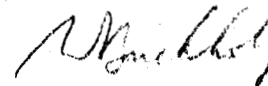
We can agree that tape storage of programs presents file maintenance problems. A recent conversation with W. Ramshaw and his United Aircraft group revealed their thinking: They would like a disk file in the middle of their 704's to hold all active programs. They are prepared to exercise the necessary control. This would, in their opinion, eliminate all program punching, except for possibly punching one card per program for subsequent recall of that program.

This "calling card" reveals a major weakness of our present punching approach. A printed card with several lines of descriptive printing and one line of machine readable code is obviously much more desirable.

H. D. Kolsky

Microcode printing is proposed for its lower cost and more attractive output, assuming speed is a secondary factor. Yet the speed is not bad. Assuming one line per document (for comparison, since cards are not interpreted either), a speed of around 250 documents per minute should be practical. The net information rate is then at least half the rate of present 100 cpm punches. With interpretation, a comparison is impossible because the punched card approach falls flat on its face.

It seems to me that the only constructive approach is to pursue microcode printing (or some equivalent) as both cheaper and better, with off-line punching as a backstop for the occasional customer with special problems. In your judgment, what specific customer objections, if any, would there be to microcode printing? What volume of daily output of machine readable documents (punched card or equivalent) do we expect in large scientific installations? How will the large commercial customers solve the returnable document problem? Are any of them using cards for this purpose or have we forced them to keypunch everything?

W. Buchholz
Manager
Project 7000 Planning

WB/pkb

cc: Mr. S. W. Dunwell
      Mr. D. W. Pendery
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