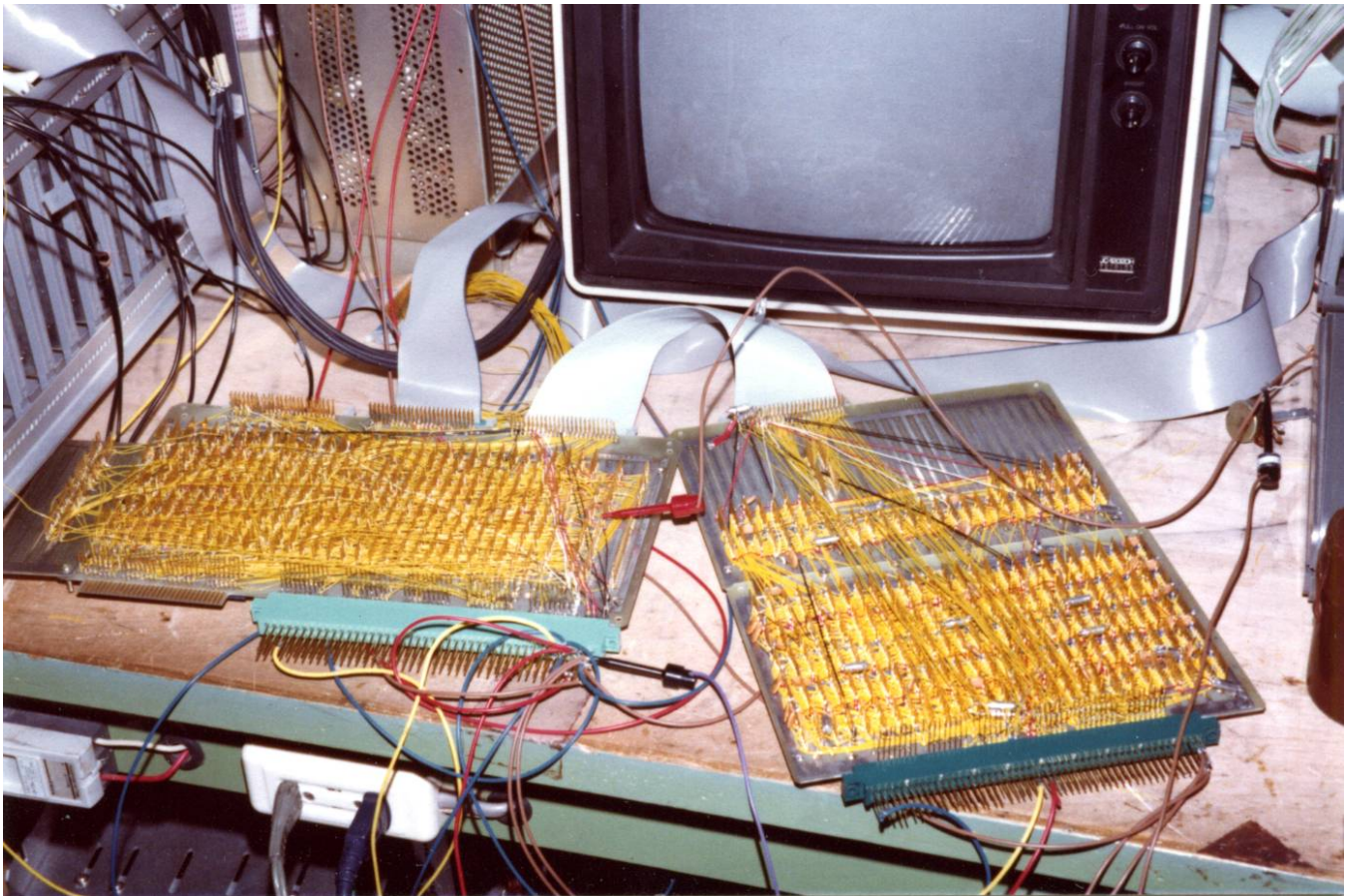




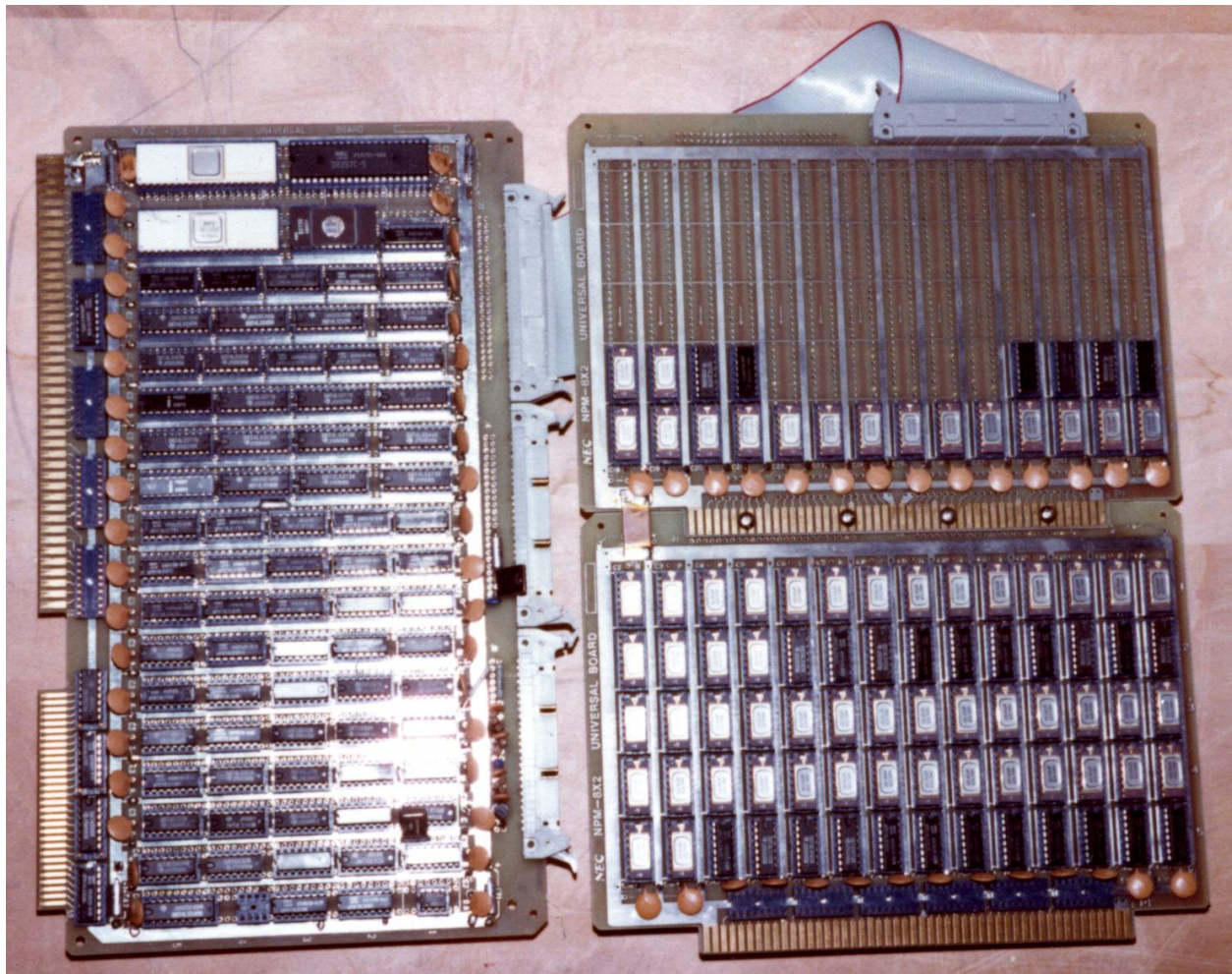
With Jeff Wise, product specialist of NEC Microcomputers Wellesley, MA, at Lab in NEC (1/1981)

On the lower desk, there are breadboards of μ PD7220 GDC (Graphics Display Controller), demonstration board, graphics memory board, [Tandy TRS-80](#) (first generation of 8 bit personal computer) working as graphics system debugger and programmer. On upper desk, a high resolution monitor TV (the horizontal frequency is 64KHz, not regular 32KHz) is displaying the graphics drawing result on screen.



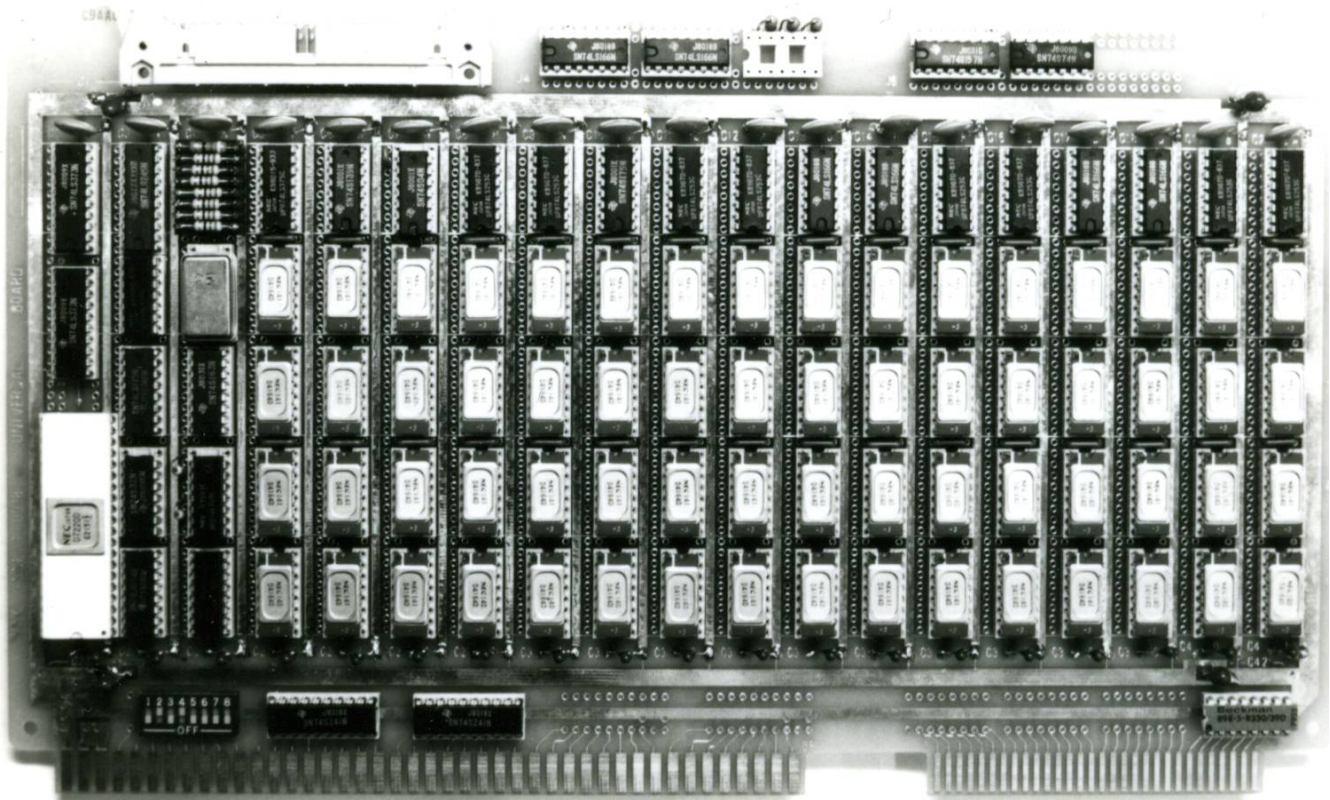
Breadboards, demonstration board (rear side), graphics memory board (rear side), and Tandy TRS-80

I designed the board schematics, [soldered](#), [wire-wrapped](#), and debugged all things myself.

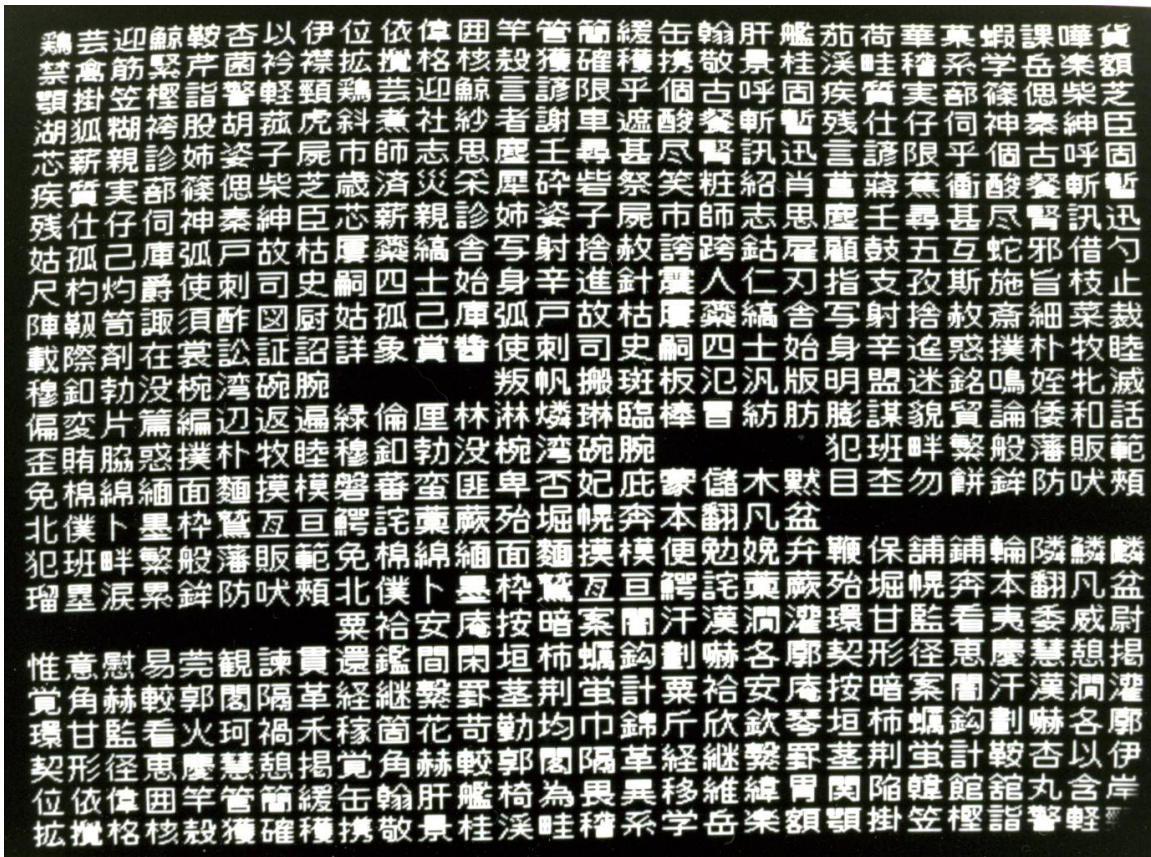


Front side of demonstration board and graphics memory board

The memory board installed 64 μ PD4164s, 64Kx1 DRAM which newly started the sampling at that moment.

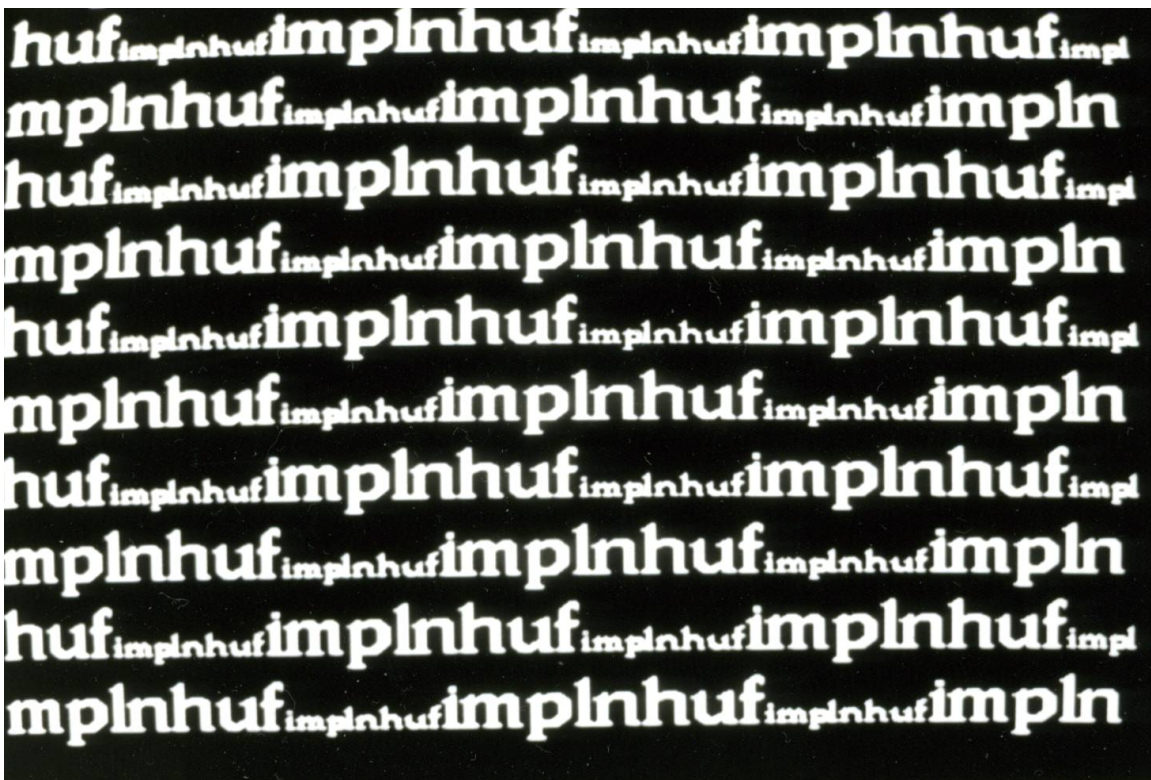


Older graphics expansion board assembling 64 μ PD4116s, 16Kx1 DRAM



Graphics Kanji font drawing result by μPD7220

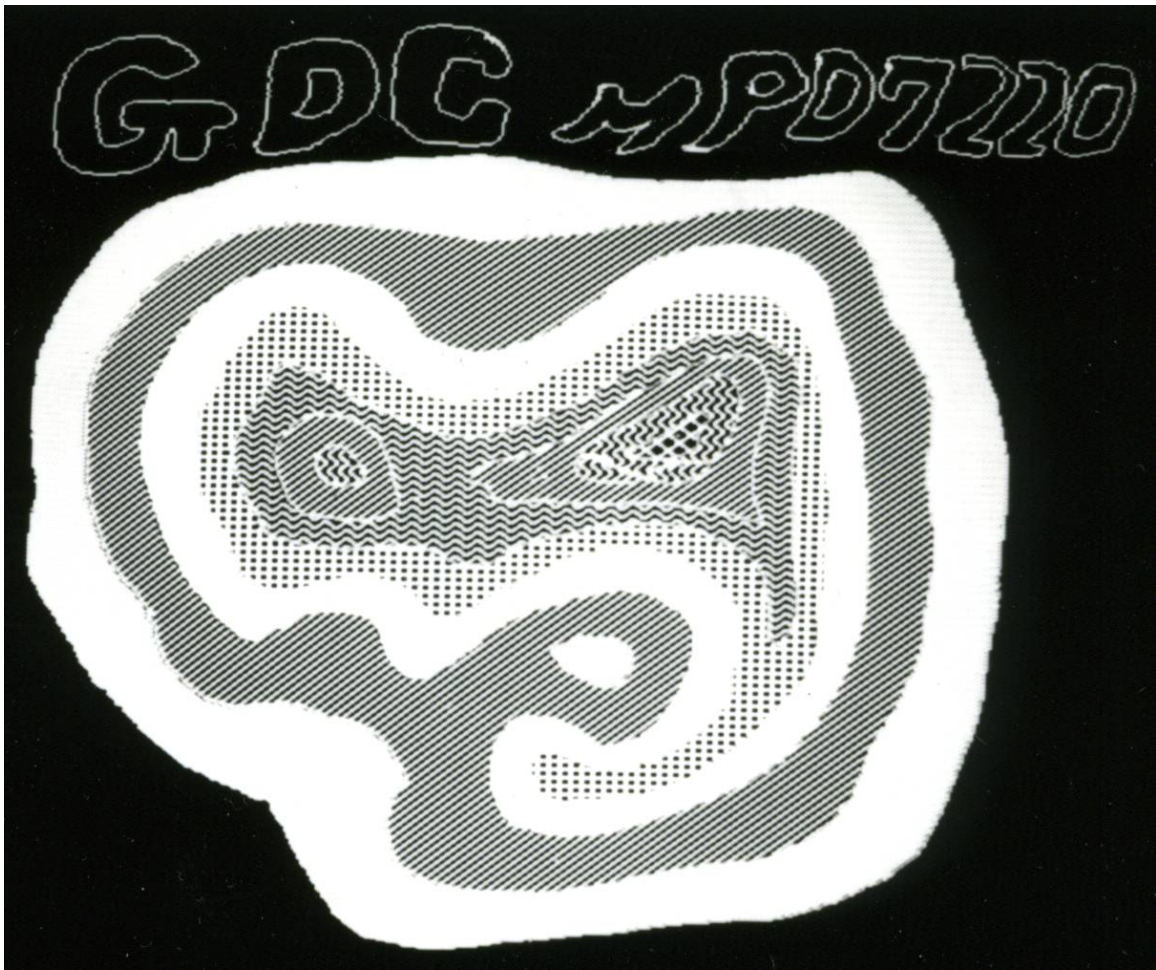
As basic display function, Japanese personal computers and graphics terminals needed [Kanji](#) display which font size was regularly 16x16 or 24x24 unlike 8x8 of English alphanumerics. Accordingly, higher screen resolution as well as two byte character coding were indispensable for Japanese machines.



Graphics alphanumerics font drawing using proportional typeface

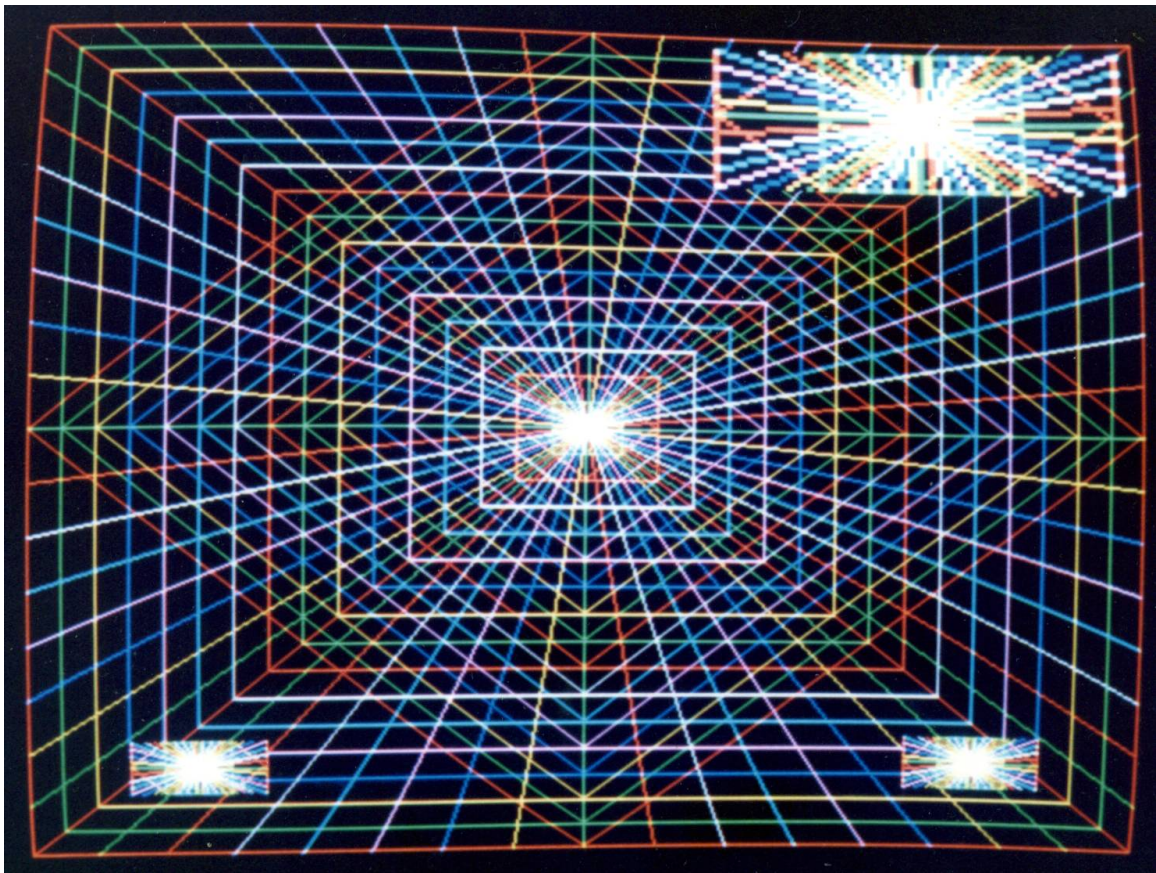
The width of typeface on text display is fixed like typewriters (mono spaced typeface). Graphics system enables [proportional typeface](#) as English newspapers prints with proportional typesets.

I made the font and typeface width information for the purpose of μPD7220 graphics system demonstration.



Line drawing by stylus handled on tablet and fill the closed area with various patterns

I made this ugly picture using a stylus and a tablet as man-machine interface. I wrote the [application software by Z80 assembly language](#) (CPU of Tandy TRS-80 was a 6MHz [Zilog Z80](#)) as well.





With Jeff Wise, ex-product specialist of NEC Microcomputers Wellesley, MA, at hotel in MA (2/1984)

In the middle of way to visit international customers in Europe and USA for introduction of features of μ PD72120 (successor of μ PD7220) and technical discussion, we reunited in Massachusetts, USA. He suggested various features and processing approaches to be implemented on future product of μ PD72120 (AGDC; Advanced Graphics Display Controller).