

NEC PC-8201 Portable Computer

A new contender with Tandy's Model 100

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With its PC-8201, Nippon Electric Company has introduced another contender in the fight for a place in the executive briefcase. Scheduled to be released in the U.S. this summer, the PC-8201 (see photo 1) is expected to compete directly with Tandy's new Model 100. Among other similarities, both machines use the 80C85 microprocessor, a low-power CMOS (complementary metal-oxide semiconductor) version of the 8085 running at 2.4576 MHz. But, and this is an important difference, the PC-8201's 16K bytes of CMOS RAM (random-access read/write memory) can be expanded to 64K bytes internally. And the machine can accept an optional 32K-byte CMOS RAM cartridge. The list price converted into U.S. dollars is about \$675 at the time of this writing.

The 8201's 32K bytes of CMOS ROM (read-only memory) contain the operating system, Microsoft BASIC, a simple text-editing program, and a telecommunications program. As with the RAM, the internal ROM can be expanded to 64K bytes, and NEC provides an optional 64K-byte ROM cartridge.

Looking at the rear of this machine (see photo 2), you can see that NEC tried to include connections for all necessary options. An interface for a cassette tape recorder, a Centronics-type parallel printer port, an RS-232C serial port, an interface for an optional bar-code reader, and connectors for as yet unannounced RAM modules and a floppy-disk drive are all there. Additionally, the reset switch, the memory-protection switch, and power input jack were squeezed in. On the right side of the case, you'll find the power on/off switch and an adjustment for the display's viewing angle.

Battery-powered and light (about 3.8 pounds), the 8201 uses four alkaline AA batteries, a rechargeable nickel-cadmium battery pack, or an AC adapter. It's housed in a red, white, or silver case that's 11.8 inches wide by 8.4 inches deep by 1.3 to 2.4 inches high, just slightly larger and approximately three times as thick as the copy of BYTE you're now holding.

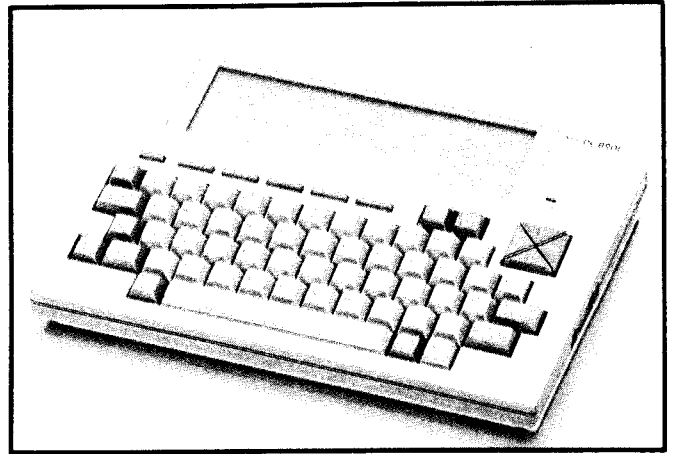


Photo 1: The NEC PC-8201 Portable Computer features a 40-character by 8-line LCD, software in ROM, and your choice of a red, white, or silver case.

Display

The liquid-crystal display (LCD) has 8 lines of 40 characters with each character comprising a 6 by 8 matrix (see photo 1). The 8201 can display the full 128-character set of the American National Standard Code for Information Interchange (ASCII), the Japanese katakana character set, and 61 user-definable characters.

The 8201 display is the minimum practical size; anything smaller (e.g., Epson HX-20) becomes too difficult to work with. Even in the simplest writing task, you need to see a certain amount of text. This amount may vary, according to individual preferences or the type of material you are working on. While the 8 by 40 display is adequate for writing or programming, it is too small for use with tabular information or spreadsheet programs.

The display, suffering from the same faults that plague all devices using LCDs, is visible only at an ideal viewing angle of about 60 degrees. A bright light or sunlight obscures the display because of the reflections on the

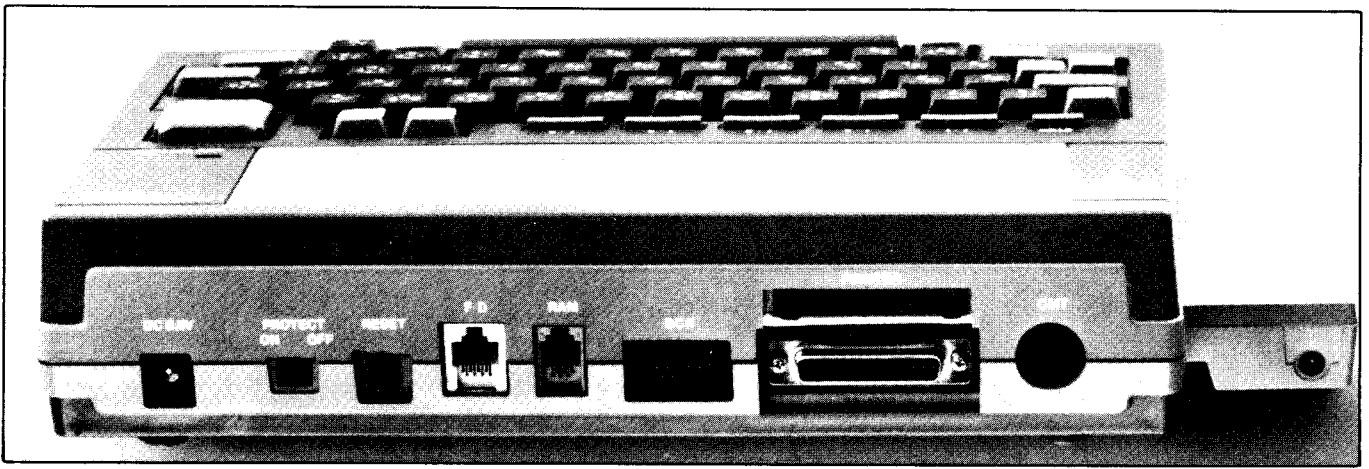


Photo 2: Rear view of the NEC PC-8201. From left to right are the AC power input jack, memory-protection switch, reset switch, and connectors for the floppy-disk controller (not yet released), memory-expansion modules, and bar-code reader. The Centronics-type parallel printer port is located above the RS-232C serial port, which is next to the cassette tape input/output port. An optional RAM cartridge is shown plugged into the side of the computer.

cover. LCDs can't be easily used in low-light conditions because they function by reflecting ambient light rather than by producing a lighted display as does a standard video monitor. For most office use, however, the 8201's display is effective and poses no problems when used under average lighting conditions. If necessary, the contrast can be adjusted using a control on the right side of the case.

Keyboard

Surprisingly, the 8201 has a very usable keyboard for such a small package. It has 55 keys in the popular Selectric-style layout (see photo 3) and five programmable function keys, initially defined for use with the text-editing and telecommunications programs. The four triangular-shaped cursor-control keys form a square on the right side of the keyboard, an excellent arrangement.

Two special keys, Paste/Insert and Delete/Backspace, provide text-editing functions. As its name implies, the first inserts characters in text or a program. A Shift-Paste inserts the contents of a Paste buffer (more on this later) into the text or program at the cursor location. The Delete key deletes the previously entered character and Shift-Delete deletes a character indicated by the cursor. A third special key, Stop, generates a Control-C and halts program operation.

Admittedly, the keyboard is a little cramped for my fingers, but the tactile response is fine. The only annoyance was with the confusing combination of English/katakana legends on the keytops. The American version of the computer will have only the English letters on the keytops.

Memory

NEC provided the 8201 with an impressive capacity for memory expansion. The evaluation unit had 32K bytes of ROM (standard) and 32K bytes of RAM, both of which could be expanded with optional memory modules. With

the addition of both internal and external RAM, the 8201 gives you a total of 96K bytes. The ROM can also be increased internally to 64K bytes and, with plug-in cartridges, to 128K bytes.

Managing that amount of memory presents an interesting problem, which NEC solved by giving the 8201 a BANK command. A programmer can specify which 32K bank of both RAM and ROM the processor must look at. This method enables the 8201 to store very large programs in memory with enough memory left over to use other programs.

The plug-in cartridges offer you an alternative to program storage on floppy disks. Because the cartridges include battery power for the CMOS RAM, you could load a program into a cartridge, remove the cartridge, and plug in a different cartridge in order to use or store other programs. This is hardly an inexpensive solution, but it is convenient and portable.

Although the 8201 manual does not mention what programs will be available to fill 128K bytes of ROM, the needs of the market suggest a simple electronic spreadsheet and executive software such as a daily appointment record and phone/address records. Software developers have the opportunity to develop custom ROM cartridge programs.

Software

A characteristic feature of most microcomputers is the required loading of software through cassette recorders and floppy-disk drives. The NEC PC-8201 is a true portable because it eliminates this dependence on peripherals by having programs in ROM or saved in RAM.

When the 8201 switches on, the operating system's main menu appears, showing the date, the time, a directory of all programs in memory, and which bank of memory is being accessed. In the directory, extensions indicate the type of information in the file. Text files use the extension DO for document, BASIC programs have the

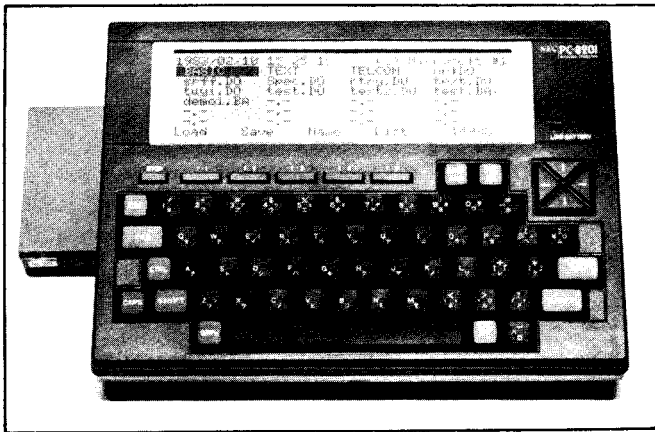


Photo 3: Screen display and keyboard layout of the PC-8201. Note that the keytop legends show both English characters and Japanese katakana characters. The special-function keys are labeled by the last line of the display.

BA extension, and machine-language files use CO. You can identify applications programs such as BASIC, TEXT, and TELCOM by the lack of an extension. The bottom line of this initial display presents labels for the special-function keys and indicates the amount of free memory. (The similarity between the display of the 8201 in photo 3 and the Tandy Model 100's shouldn't be surprising because Microsoft designed the software for both systems.)

The user interface makes ease of use as strong an asset as portability with this computer. To choose a program to run or a file to edit, you simply position the cursor over the file name and press the return key. With a BA file extension, the system enters BASIC, and with DO, the text editor is invoked. Even machine-language programs with a specific execution address run automatically if selected from the menu. Another simplifying feature is available when you finish any application program or file. Just by typing "MENU," you close the files and

At a Glance

Name

NEC PC-8201 Portable Computer

Use

Portable general-purpose computer

Manufacturer

NEC Home Electronics
(U.S.A.) Inc.
Personal Computer Division
1401 Estes Ave.
Elk Grove, IL 60007
(312) 228-5900

Price

Approximately \$675 (depending on exchange rates)

Dimensions

11.8 inches wide by 8.4 inches deep by 1.3 to 2.4 inches high

Weight

3.8 pounds

Software

Microsoft BASIC, telecommunications program, and text-editing program in ROM

Audience

Anyone needing a portable computer for telecommunications, word processing, and general-purpose applications

return to the menu display.

One bundled application, TEXT, is a simple editing program for text or BASIC files and will probably be the most used program. To invoke the TEXT program, you choose the program from the main menu, select a document file that automatically invokes the editor, or use the EDIT command while in BASIC to edit a program.

The special-function keys make the TEXT program especially easy to use. For example, you search for text strings with FIND, locate the next occurrence of the string with NEXT, select text to be cut or copied with SELECT, and transfer copy to a Paste buffer with either CUT or COPY.

A safety feature prevents you from typing over previously entered copy. Whenever you want to insert text, you must first press the Insert key. The Paste buffer lets you put all or part of your text into a buffer with the COPY or CUT commands. Then, with the PASTE command, you reinsert that copy elsewhere in the text. An

added benefit of the Paste buffer is that it saves any entered text. With a little bit of effort, you can combine this benefit with the FIND and NEXT commands to perform operations similar to search and replace operations found in more powerful text-editing programs.

The same easy-to-use features of TEXT are in the TELCOM program, a fairly simple telecommunications program. Designed primarily to access online databases or information services (The Source, CompuServe, Dow Jones, etc.) or to exchange programs between two computers, it uses the special-function keys and Escape/character key sequences to control the program's operation. A two-page memory buffer, totaling 16 lines, lets you halt the display in order to refer to previously received information. You can set the program for half- or full-duplex operation and "echo" the screen display to a printer.

The UPLOAD and DOWNLOAD commands transfer files through the RS-232C port. The telecommunications program asks for the name of the file to send or receive, performs the operation, indicates the task's completion, and finally asks if you want to disconnect. With the STAT command, the 8201 provides a simple method of setting the data rate, parity, bit length, stop bits, and XON/XOFF sequence.

BASIC

The implementation of Microsoft's BASIC ensures an easy transference of programs to the 8201 without costly translation. Additionally, this interpreted BASIC includes the statements and functions needed to write almost any type of program. By integrating BASIC with the TEXT program, you get two editing methods—a line-oriented program or the character-oriented TEXT program.

Peripherals

Several related peripherals are due to be released with the computer. Of most interest are the floppy-disk controller (PC-8233) and disk drives. Apparently, the controller regulates several different types of drives (PC-8031-1W, PC-8031-2W, and PC-80S31), one of which is probably some version of the 3½-inch microfloppy. Another useful peripheral is the PC-8240 video monitor adapter, which enables you to connect the 8201 to a video monitor.

Peripherals in the planning stage include an intelligent telephone, an acoustic coupler modem, and a bar-code reader.

Summary

With the portable computer market becoming crowded with contenders, more functions are being squeezed into smaller packages. The 8201 takes its place as a transition machine designed to determine just what features people want in a portable computer.

Overall, it looks as if NEC has developed an effective integrated package of hardware and software useful to anyone with a need for a computer to go. ■