

The Model II wins when compared to the IBM 5150.

Radio Shack vs IBM

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Comparisons of small business micro-computer systems help make the decision about which system to buy. This article compares IBM's 5150 Model 824 and Radio Shack's TRS-80 Model II.

Most computer systems are made up of the following major components: processor, memory, disk, tape, console, printer, communications, and software. My analysis covers each of these components in turn.

The Basic System

Table 1 shows the small business configuration plus display and printer options of the IBM 5150 Model 824. Table 2 shows the 64K small business configuration plus printer option of the Radio Shack TRS-80 Model II. Both models have power-up diagnostics, user manuals and 90-day warranties. Both vendors provide field service at special service centers and optional main-

IBM 5150 Model 824

- 1 System unit with 40K bytes of Read Only Memory and 64K bytes of user memory
- 1 Keyboard
- 1 5 1/4" disk expansion drive adapter
- 2 5 1/4" 160K byte disk drives (total 320K bytes on line)
- 1 Asynchronous communications adapter
- 2 Additional expansion slots
- 1 Cassette attachment jack
- 1 Tone speaker
- 1 Monochrome display and printer adapter
- 1 Monochrome display
- 1 80 character per second dot matrix printer
- 1 Printer cable
- 1 Disk Operating System and advanced level Basic language software
- 1 Asynchronous communications support software

Total cost \$4615.00

Table 1. IBM System.

tenance contracts. Radio Shack provides an on-site maintenance service option.

The IBM system is less expensive than Radio Shack's by \$483.00. If you substitute word processing quality printers for the matrix printers (a NEC Spinwriter 3530 33cps on the IBM system, and a Daisy Wheel II 43cps on the Radio Shack system) the prices are: IBM \$6410, Radio Shack \$5898, a difference of \$515 in Radio Shack's favor.

Processor

Comparison criteria for processors are speed (in cycles per second), word size (in bits), addressing capacity and instruction set. One character can be stored in eight bits. An instruction takes 4-20 machine cycles and 1-6 words. Roughly 10 instructions execute one line of Basic code.

The IBM's processor is an Intel 8088 eight bit chip, which runs at 4.77 million cycles per second. It can perform a 16 bit multiplication or division and address one million bytes of memory.

The Model II's processor is a Zilog Z80A eight bit chip which runs at four million cycles per second. It can address up to 64K bytes of memory, the full capacity of the package.

IBM's chip is 20 percent faster and has substantially more addressing and computational capability. You cannot use the full addressing capability in IBM's package, however. Radio Shack's widely used micro-processor has high reliability and is compatible with virtually every program written for microprocessors.

Memory

Computer memory is measured in bytes (a byte is computerese for a character such as A-Z, 0-9, and other special marks or symbols). Not all of a computer's memory is available to an application program.

Starting with 64K bytes, IBM's disk operating system uses 12K. The advanced disk Basic programming language required for communications uses 30.5K and allows 33.5K bytes for user programs and data.

Starting with 64K, Radio Shack's operating system uses 10.25K bytes. Basic uses 18K and allows 35K bytes of usable memory.

Both systems have enough memory for approximately a 1000 line Basic program; IBM's operating system is slightly larger.

Disk

Both machines have floppy disk storage. The significant characteristics of disks are capacity and transfer rate.

The IBM system has two 5 1/4" disk drives, using removable minifloppy disks. Each disk holds 160,000 characters, a total of 320,000 characters of online storage. After the space required by the Disk Operating System and Basic is subtracted, available storage for programs and data is at most 277,500 characters (probably less due to disk overhead such as directory tracks). The IBM drive transfers data at 20,480 characters per second.

The Model II has one 8" double density disk drive, using removable floppy disk storing up to 509,184 characters each. When the directory tracks, operating system and Basic storage is subtracted, available space is 416,000 characters. The Radio Shack disk drive transfers data at 62,500 characters per second.

Radio Shack's disk holds at least 50 percent more information than both of IBM's and transfers that information 300 percent faster. Radio Shack's disk storage can be increased to a total of 35,000,000 characters.

Tape

The IBM 5150 supports cassette tape storage (the user supplies the tape deck), but this is not a practical option for a business computer. The Radio Shack Model II does not support tape.

Console

Both systems have similar keyboards, with calculator pads, a tilt (IBM's is adjustable), and user-defined function keys (IBM

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has 10, Radio Shack has 2). IBM’s keys repeat when held down; Radio Shack has a Repeat key.

The display units are both 80-character columns and 24 or 25 rows. Both allow double-size character display, line graphics, reverse image, and lowercase with true descenders. The IBM unit has high intensity, underlining and blink features. Radio Shack’s screen is black and white, IBM’s is green. Radio Shack’s screen is built into the cabinet, IBM’s plugs in separately. (IBM allows a tv instead of monochrome display, but does not sell the tv set or RF modulator.)

Printer

The IBM printer (an Epson printer) prints bidirectionally at 80 characters per second on pin fed continuous form fan-fold. The paper may be up to 10” wide, including tear-off pin feed strips.

The Radio Shack Line Printer VI prints bidirectionally at 100 characters per second. A removable tractor allows both pin fed and sheet fed paper. The paper can be from 4” to 14 7/8” wide (standard computer size).

The Radio Shack unit has a sheet feed feature and 25 percent greater speed than the IBM. The sheet feed feature is essential for word processing applications.

Radio Shack sells two less expensive printers (not recommended for business purposes) and two more expensive printers, one for heavy duty business use (such as label production, personalized form letters, large inventory reports), and a letter quality Daisy Wheel printer with proportional spacing and different type styles (ideal for word processing). IBM does not have any other printer, but other makes of printer (such as a NEC Spinwriter) can be attached if a parallel interface is added to the configuration.

Communications

A computer system communications ability is described in terms of its protocols (how it shakes hands with the computer it talks to), and rate, measured in bits per second. Both these systems support asynchronous communications (a commonly used protocol) through their RS-232C ports.

IBM’s asynchronous communications support option, not included in the standard configuration, allows communications with other microprocessors and larger computers which support this protocol (most do). It allows transfer rates of 75-2400 bps.

The Model II comes with asynchronous software. In addition, Radio Shack sells two bisynchronous communications packages —3780 and 3270 protocols—allowing the TRS-80 to communicate with host computers (IBM 370 and 30 main frames) as a re-

mote job entry terminal or as a special input terminal for software such as IBM’s TSO, CICS, VM/CMS, and IMS. Transfer rates on this model can vary from 110 to 9600 bits per second.

Radio Shack’s system provides a more complete set of communications software than the IBM system, and supports higher transfer rates.

Software

The measure of any computer system is its software. Both systems use variants of Microsoft’s Basic. IBM supports color graphics (requiring a color display) and tones; Radio Shack does not. Radio Shack has a compiler Basic (which runs much faster than either vendor’s interpretive Basic), a multi-key access Cobol (for business application programming), Fortran (for engineering and mathematical applications), and an Assembler. IBM has Pascal (a teaching language for computer professionals), but this language requires twice the memory (128 thousand bytes).

Both models allow automatic job stream execution at start up. Both systems have Accounts Receivable, Payable and General Ledger, Visicalc (a powerful calculating tool), and word processing. Radio Shack has the software shown in Table 3. IBM has only Microsoft Adventure, a game.

Much more software has been written for Radio Shack’s small business system than for IBM’s, and Radio Shack can support several higher level languages. IBM’s system can support one higher level language if its memory is doubled (for \$540).

In Conclusion

The IBM small business configuration is \$483.00 less, the word processing configuration \$515.00 more, than Radio Shack’s. IBM’s processor is 20 percent faster and has more addressing and machine instruction capability.

The Radio Shack’s usable memory is slightly more than IBM’s. Both machines will handle approximately a 1000 line Basic program. Radio Shack’s disk stores at least 50 percent more information than both of

IBM’s combined, and transfers that information 300 percent faster. Much more disk storage can be added to the Radio Shack system.

The consoles and printers are very similar, but the Radio Shack printer has a sheet feed feature and is 25 percent faster.

Radio Shack sells more communications software and supports higher transfer rates than IBM does for its system.

Much more software has been written for Radio Shack’s small business system than for IBM’s. Radio Shack supports faster Basic, Cobol and Fortran compilers and an assembler. The IBM system supports Pascal if its memory is doubled.

The two machines are about equal in power and price, but Radio Shack supports a much faster and larger disk and much more development and application software than IBM’s small business system. It also has more hardware options (printers, disks and plotters) to fit the user’s needs. ■

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Radio Shack TRS-80 Model II

- 1 System unit with 64K bytes of memory
 - 1 Keyboard
 - 1 8” double density 500K byte disk drive
 - 1 Video display
 - 1 Bootstrap read only memory
 - 4 Additional expansion slots
 - 1 Parallel port (for printer)
 - 2 RS-232C serial ports
 - 1 External disk bay port
 - 1 Line printer VI (100 character per second print speed)
 - 1 Printer cable
 - 1 TRSDOS (Disk Operating System) and Basic language software
- Total cost \$5098.00**

Table 2. Radio Shack System.

Payroll	Order Entry
Inventory Control	Sales Analysis
Profile II, a filing system	Mailing List
Medical Office System	Manufacturing Inventory System
Job Costing	Personnel Search
Litigation Support Package	WESTLAW
Time Accounting for Professionals	Statistical Analysis
Scrispit Dictionary	Color Plotting Printer Package

Table 3. Radio Shack Software.