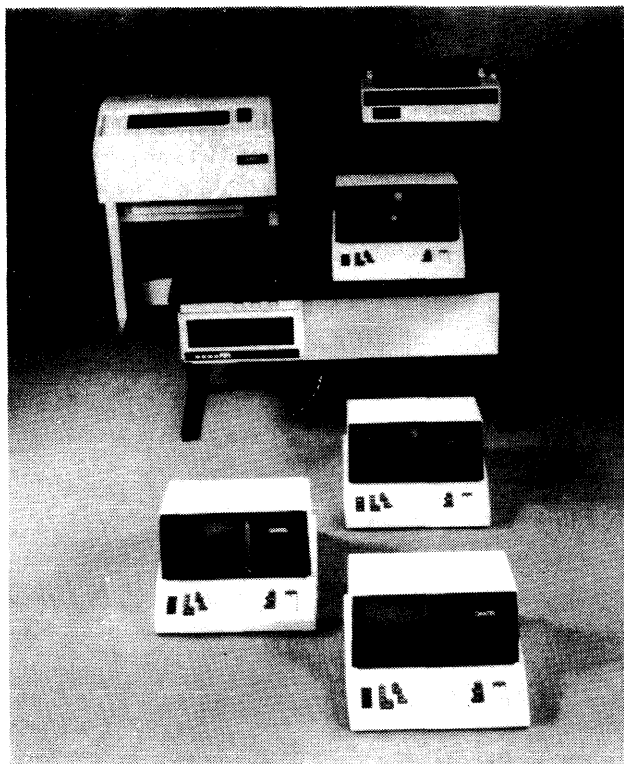# Qantel 210, 900, and 1400 Systems

Qantel's line of 8-bit minicomputer systems range from the single-station 210 to the 1450-2 system that can support up to 64 work-stations, 1024K bytes of memory, and 900 million bytes of disk storage. Also available are floppy disk drives, magnetic tape units, serial printers, and line printers with speeds up to 600 lpm. Basic system prices range from $11,950 to $74,900.

> The Qantel family of small business computers ranges from the System 210, designed for entry-level use, to the System 1450-2, which will support over 32 simultaneous jobs, 64 terminals, and up to twelve sealed disk drives with a maximum total storage capacity of 900 million bytes. Software includes Qantel's BEST operating system, QICBASIC, a Report Generator, and QICPLAN. Prices for basic systems range from $11,950 to $74,900.

MANAGEMENT SUMMARY

Qantel's first product announcement came in 1969 with the introduction of the company's V and Q Series computer systems. Four years later, in November 1973, Qantel announced the 1100 and 1200 systems. The inspiration and direction for these new models came from a popular Qantel business computer which had preceded them, the Answer System. By mid-1975, the product line had been expanded to include three smaller models—the 800, 900, and 950—and May 1976 saw the announcement of the System 1300. The low-end 210, the 1400, and the 1400-2 were introduced in 1977. Currently, the Qantel product line consists of the 210; the 950, 960, and 970; the 1450 and 1450-2, announced in 1978; and the recently-announced 965 and 975, which are variations on the 960 and 970.

The current series is characterized by four processors: two standard processors for Models 210 and 950; a faster processor for Models 960 and 965; and a high-speed processor used in Models 970, 975, 1450, and 1450-2. The high-speed processor represents an improvement of up to four times the speed of the standard CPU. All of Qantel's systems use MOS memory divided into ▷

CHARACTERISTICS

MANUFACTURER: Qantel Corporation, 3525 Breakwater Avenue, Hayward, California 94545. Telephone (415) 783-3410.

Qantel is a privately held corporation that has been supplying small business computer systems since 1969. Systems are available on a purchase or lease basis only, through a network of distributors. Maintenance service is handled by Qantel's own field engineers staff.

MODELS: Systems 210, 950, 960, 965, 970, 975, 1450, and 1450-2.

DATE ANNOUNCED: 210, June 1977; 950, January 1975; 960, May 1975; 965, December 1978; 970, October 1978; 975, October 1979; 1450, October 1978.

DATE OF FIRST DELIVERY: 210, January 1978; 950, January 1975; 960, May 1975; 965, March 1979; 970, March 1979; 975, January 1980; 1450, March 1979.

NUMBER INSTALLED: Over 2,500.

DATA FORMATS

BASIC UNIT: Eight-bit byte.

FIXED-POINT OPERANDS: Variable length with three, six, or eight bytes specifying the operand.

FLOATING-POINT OPERANDS: None.

INSTRUCTIONS: Instructions are of two types: one-address and two-address instructions. Single-address instructions are three bytes long, with the operand address occupying the first two bytes and the op code and modifier occupying the low-order byte. Double-address instructions are six bytes long. The op code and instruction length are in the first two bytes; the next two bytes contain the second operand address; and the remaining two bytes hold the op code and instruction length. Indirect and direct addresses are both available, as well as decimal arithmetic instructions.

INTERNAL CODE: ASCII.

MAIN STORAGE

STORAGE TYPE: MOS integrated circuits.

CYCLE TIME: See below under CAPACITY. ▶

Qantel 210, 900, and 1400 Systems

▷ user and operating system areas, an operating system called the Business Executive System for Timesharing (BEST), a built-in-the-desk cartridge disk system or sealed fixed-disk system, the facility to handle multiple jobs simultaneously, support for multiple terminals, and QICBASIC, a BASIC-like interactive programming language.

The low-end member of the line is the System 210, which sells for $11,950 or leases (third party lease) for about $380 per month including maintenance. The system includes a standard CPU, 16K bytes of user memory which can be expanded to 32K, a 1.3-megabyte integral floppy disk drive, a 1728-character intelligent CRT terminal, and the BEST software. The system will support two jobs simultaneously. Various peripheral devices are available, including disk drives, line printers to 300 lpm, and a communications controller.

The System 950 is the next model up the scale and includes nonexpandable user memory of 16K bytes, a 6-megabyte disk drive, a 1728-character intelligent CRT terminal, a 55-cps printer, and the BEST software. The 950 is capable of supporting 16 terminals and four simultaneous jobs and sells for $24,950 or leases for $819 per month including maintenance.

The System 960 has a CPU which Qantel claims is 2.5 times more efficient than that used in the 950. The 960 also includes a 16K-byte user memory which is expandable to 32K, but the 960 is otherwise similar to the 950. Selling price is $29,900, and monthly rental is $963 with maintenance. The 965 is a version of the 960 which substitutes a Model 3401 25-megabyte sealed fixed-disk drive and a 120-cps printer for the disk drive and printer of the 960 and also includes a 1600-bpi, 45-ips magnetic tape drive in its configuration. The 965 sells for $44,900 and leases for $1,363 per month including maintenance. The 960 and 965 both support 16 terminals and four simultaneous jobs.

The next models, the 970 and 975, feature a CPU with a reported 10-20 percent improvement over the 960/965 CPU. The 970 also includes 64K bytes of user memory which can be expanded to 192K, 12 megabytes of disk storage, a 1728-character intelligent CRT terminal, a 120-cps printer, and the BEST software. The 970 has a selling price of $37,900 and leases for $1,214 per month including maintenance. The 975 is a repackaged version of the 970 with a Model 3401 25-megabyte sealed fixed-disk drive and a 1600-bpi, 45-ips magnetic tape drive. The sale price is $59,900, and the monthly lease is $1,830 including maintenance. The 970 and 975 accommodate up to 32 terminals and eight simultaneous jobs.

The System 1450 offers 64K bytes of user memory, which can be expanded to 960K bytes, a 12-megabyte fixed/removable disk drive, a 1728-character intelligent CRT terminal, a 300-lpm printer, and the BEST software for $44,900 or $1,368 per month including maintenance. The 1450 can support up to 64 terminals and 20 separate jobs simultaneously. ▷

▶ CAPACITY: The System 210 has a 16K-byte user memory (expandable to 32K) and a 48K-byte total memory (expandable to 64K). Memory cycle time is 0.8 microseconds.

The System 950 has a total nonexpandable memory of 48K bytes which includes a nonexpandable 16K-byte user memory. Memory cycle time is 1.5 microseconds.

The Systems 960 and 965 user memory starts at 16K bytes and can be expanded to 32K bytes. Total memory can be expanded from 48K bytes to 64K bytes. Memory cycle time is 1.1 microseconds.

The Systems 970 and 975 include 64K bytes of "user-dedicated" main memory and 64K bytes of "system-dedicated" memory. Total memory can be expanded to 256K bytes in 32K-byte increments. Memory cycle time is 0.95 microseconds.

The Systems 1450 and 1450-2 both have user memories of 64K bytes which can be expanded to 960K bytes and total memories of 128K bytes which are expandable to 1,024K bytes. Memory cycle time is 0.95 microseconds.

CHECKING: None on Systems 210 and 950; parity checking on all other systems.

STORAGE PROTECTION: None.

RESERVED STORAGE: 32K bytes are reserved for the operating system on Systems 210, 950, 960, and 965; 64K bytes are reserved for the operating system on Systems 970, 975, 1450, and 1450-2.

CENTRAL PROCESSOR

GENERAL: A microprocessor is used in System 210; a "standard" central processor is used in System 950; and a "high-speed" processor is used in Systems 960 and 965. The high-speed processor is 100 percent compatible with all QICBASIC programs, memory, and I/O controllers used by the standard processor and can address up to 128K bytes of memory through the use of base registers. The increase in speed averages two to three times but can go as high as five times due to a wider internal data path, more efficient microinstructions, parallel execution of some microsteps, and faster electronic components. Systems 970, 975, 1450, and 1450-2 contain a new high-performance/large-scale-memory processor which is "substantially more powerful than the high-speed model."

REGISTERS: None which are directly addressable. Operations normally associated with register functions are firmware-controlled by Qantel's operating system.

INDIRECT ADDRESSING: Available to multiple levels.

INDEXING: None.

INSTRUCTION REPERTOIRE: There are 101 standard instructions and no optional instructions. The instructions include the following five categories, with the number of instructions shown for each category:

Data Handling	30
Arithmetic and Logic	21
Decision and Control	20
Input/Output	14
Special Instructions	16
Total	101

INSTRUCTION TIMINGS: Times are per byte (where applicable) and are given in microseconds: ▶

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PERIPHERALS/TERMINALS

DEVICE	DESCRIPTION & SPEED	MANUFACTURER
MAGNETIC TAPE UNITS		
5204	Industry-compatible tape drive, 800 bpi, 2400-ft. reel, 45 ips, 36 KCS	Digi-Data
5214	Industry-compatible tape drive, 1600 bpi, 2400-ft. reel, 45 ips, 72 KCS	Digi-Data
PRINTERS		
4421, 4426, 4441, 4446, 4451, 4456	Auxiliary character printer, 55 cps, serial interface	NEC
5003, 5004	64-char. serial printer, 120 cps, bidirectional	Centronics
5006	64-char. serial video printer, 120 cps, bidirectional	Centronics
5041	64-char. line printer, 300 lpm, drum, upper case only	Dataproducts
5042	96-char. line printer, 240 lpm, drum, upper/lower case	Dataproducts
5051	64-char. line printer, 600 lpm, drum, upper case only	Dataproducts
5052	96-char. line printer, 420 lpm, drum, upper/lower case	Dataproducts
5063, 5065	64-char. line printer, 300 lpm, band, upper case only	Teletype
5101, 5103, 5106	Serial matrix line printer, 75 cps, 8-inch print line	Qantel
5111, 5113, 5116	Serial matrix line printer, 150 cps, 8-inch print line	Qantel
5121, 5123, 5126	Serial matrix line printer, 75 cps, 13.6-inch print line	Qantel
5131, 5133, 5136	Serial matrix line printer, 150 cps, 13.6-inch print line	Qantel
TERMINALS		
4012	1728-character video terminal, 960 cps (120 cps remote)	Qantel

▷ The top-of-the-line 1450-2 consists of 64K bytes of user memory expandable to 960K, a 75-megabyte sealed fixed-disk drive, two 1728-character intelligent CRT terminals, a 300-lpm printer, a 1600-bpi, 45 ips magnetic tape drive, and the BEST software. The system supports 64 terminals and 32 simultaneous jobs, sells for $74,900, or can be leased for $2,253 per month including maintenance.

The disk drive used with the 965, 975, and 1450-2 is a "Winchester"-type sealed fixed-disk drive with a storage capacity of either 25 or 75 megabytes. Up to four disk drives can be attached to an "intelligent" disk controller, which includes its own 16K bytes of memory and retains the last 15 sectors accessed by the CPU. Before a new sector is read from disk, the controller checks its memory to determine whether the sector is already present, thus making another disk access unnecessary. In addition, the controller allows simultaneous accesses on all four of its drives, automatically detects bad disk sectors, and substitutes reserved sectors. Up to three disk controllers are allowed, providing a maximum storage capacity of 900 megabytes per system.

Because of the modular design of Qantel systems, all systems (with the exception of the 210) can be upgraded to higher systems while retaining their original peripherals. Qantel claims that because of this modularity a Qantel system is the "first and last" system you'll need. To back up that promise, all software is upward-compatible throughout the product line.

As for peripherals, Qantel offers an assortment of printers that range to 600 lines per minute, magnetic tape drives, a punched card reader, and both CRT and ▷

▶

	Micro-processor	STD CPU	High-Speed CPU	High-Speed/ Large-Memory CPU
Load	8	10	4	2
Store	8	14	3	3
Add/Subtract	22	18	6	6
Multiply	88	118	15	20
Divide	132	107	20	26
Compare and Branch	39	18	8	8

INTERRUPTS: One external interrupt level on all models. The interrupt system services peripheral devices. One internal interrupt is provided.

PHYSICAL SPECIFICATIONS: Qantel systems do not normally require raised flooring or special air conditioning. The 210's dimensions are 18 inches wide, 28 inches deep, and 15 inches high. The 950, 960, 965, 970, and 975 are housed in a desk 56 inches wide, 32 inches deep, and 28 inches high.

The main enclosure of the 1450 and 1450-2 is 21 inches wide, 32 inches deep, and 37 inches high. For servicing and operator convenience, a floor area of 10 feet by 8 feet is generally adequate. Power requirements are 115 VAC, 60 Hz. Temperature may range from 50 to 105 degrees F. with relative humidity up to 80 percent.

I/O CONTROL

I/O CHANNELS: The System 210 has 5 channels. On the Systems 950, 960, and 965, there are six I/O channels, four equipped for DMA; on the Systems 970 and 975, there are 11 I/O channels; and on the 1450, there are 15 I/O channels.

CONFIGURATION RULES

A minimal System 210 consists of a standard microprocessor, 16K bytes of user memory (expandable to 32K) ▶

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▷ hard-copy terminals. Data communications can be added through a microprocessor-controlled communications controller that allows synchronous or asynchronous transmissions in either half-duplex or full-duplex mode.

In addition to its hardware, Qantel has three software generators that are supported by the BEST operating system. Qantel's Report Generator allows non-programmers to answer a series of questions in simple English-like statements while being prompted by the system. If the operator doesn't know the answer to a question, typing in "HELP" brings a menu of legal answers. By specifying the files that are to be accessed and the data within those files, the generator can be instructed to produce a report that includes break points, ascending or descending sequences, exclusion based on values, subtotals, grand totals, and customized headings.

The second software offering is Qantel's Program Generator. In many cases, different programs that access the same files (data entry, file maintenance, inquiry, forms printing, etc.) use identical routines for reading from the disk, writing to the disk, specifying the file's contents, and other functions. The Program Generator takes advantage of existing routines to assist a programmer in putting together the pieces that make up a complete program. In addition, the Program Generator prints documentation and flow charts.

QICPLAN, Qantel's modeling and control plan for business, combines sophisticated forecasting tools and historical data base reference in a plain-English environment. Oriented to the general executive, QICPLAN emphasizes the practical control aspects of business projection.

The BEST operating system has evolved to its present status through six years of improvements. The current version supports over 32 simultaneous jobs and 64 terminals on the various systems, depending on the system's hardware configuration and the mix of applications being processed. In addition, BEST supports Qantel's QICBASIC language, which is an enhancement of Dartmouth's BASIC. The only other currently supported programming language besides QICBASIC is REAL (RElocatable Assembly Language), which is capable of running either alone or linked to a QICBASIC program.

At present, Qantel has about 89 distributors and agencies throughout the world, with further expansion planned. Dealers generally handle applications programming for Qantel's customers, either in-house or by independent contract.

Competition for Qantel systems comes in various forms. The 210 competes with the smallest end of all competing firms' products. The Systems 950, 960, 965, 970, and 975 draw fire from Basic Four, Microdata, Wang's 2200 ▷

▶ and 48K bytes of total memory (expandable to 64K), an integral video terminal (1,728 characters), and an integral flexible disk drive (1.3 megabytes).

A minimal System 950 consists of Qantel's standard CPU, 16K bytes of nonexpandable user memory and 48K bytes of nonexpandable total memory, a 1728-character intelligent CRT terminal, a 6-megabyte fixed/removable disk drive, and a 55-cps printer.

A minimal System 960 includes a higher performance CPU than the System 950, a 16K-byte user memory which can be expanded to 32K bytes, and a 48K-byte total memory which can be expanded to 64K bytes. The other features are those found on the System 950. The System 965 is a version of the 960 that features a 25-megabyte sealed fixed-disk drive, a 120-cps printer vs. the 960's 55-cps printer, and a 1600-bpi magnetic tape drive.

The basic System 970 has Qantel's new high-performance CPU, 64K bytes of user memory and 64K bytes of system memory (expandable to 256K bytes in 32K-byte increments), a video terminal, a 12-megabyte disk drive, and a 120-cps printer. The System 975 is a repackaged 970 with a 25-megabyte sealed fixed-disk drive and a 1600-bpi magnetic tape drive.

A minimal System 1450 consists of a high-speed CPU, 64K bytes of user memory and 128K bytes of total memory, a 12-megabyte fixed/removable disk drive, a 1728-character intelligent CRT terminal, and a 300-lpm printer. The minimal System 1450-2 includes a high-speed CPU, 64K bytes of user memory and 128K bytes of total memory, a 75-megabyte sealed fixed-disk drive, two 1728-character intelligent CRT terminals, a 300-lpm printer, and a 1600-bpi magnetic tape drive.

The 1450 system can be expanded to include a maximum of twelve 75-megabyte disk drives, 64 terminals, two line printers (300/600 lpm), four magnetic tape drives, and 960K bytes of user memory.

Standard CPU's can be upgraded to "high-speed" status; please see the Equipment Prices section of this report.

MASS STORAGE

MODEL 3011, 3111 DISK DRIVES: Integral with the Model 950, 960, and 970 processor cabinets, these drives feature a 10-millisecond minimum arm positioning time and a 35-millisecond average. Average rotational delay is 12.5 milliseconds. The disk drives each have one fixed and one removable disk; the 3011 has a 6-megabyte capacity, and the 3111 a 12-megabyte capacity. Each has 768 bytes per sector (with ten sectors per track), two tracks per cylinder, and 200 (3011) or 400 (3111) cylinders per disk.

MODEL 3112 DISK DRIVE: A stand-alone version of the 3111, with a capacity of 12 megabytes. The drive is mounted in a Model 950-style cabinet.

MODEL 3113 DISK DRIVE: Another stand-alone version of the 3111, with a capacity of 12 megabytes. This drive is mounted in a Model 1450-style cabinet and is standard equipment with the 1450.

MODEL 3301, 3302, 3303 DISK DRIVES: Internally mounted on the Model 210 and not sold separately, the 3301 has a 1.3-megabyte capacity on dual removable floppy disks. The drives feature a 10-millisecond minimum arm positioning time and a 55-millisecond average. Average rotational delay is 83 milliseconds. There are 768 bytes per sector, 11 sectors per track, one track per cylinder, and 77 cylinders per disk. The 3302 is a stand-alone model of the ▶

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▷ and WCS series, IBM's System/32, and Burroughs' B 80. These generalized small business systems lend themselves to typical accounting functions in environments where a few CRT terminals are sufficient. The Systems 1450 and 1450-2 will do battle with the likes of DEC's PDP-11/70 and Hewlett-Packard's HP 3000 Series for installations where multiple terminals and multiprogramming are required. Qantel offers sophisticated generative software but is limited if a user desires any language other than QICBASIC.

Qantel's current strength is in the distribution industry, where approximately 60 percent of its installed systems have been placed. The banking/financial industry accounts for another 10 percent, and the rest of the current users are divided among other industries.

Of Qantel's over 4000 installed systems, 10 percent are System 210's, 15 percent are 950's, 30 percent are 960's and 965's, 20 percent are 970's and 975's, 10 percent are 1450's and 1450-2's, and 15 percent are various other models.

USER REACTION

Datapro contacted eight users of Qantel systems during March 1980. These users had seven 1400's, two 1450's, and one each of Models 210, 950, 960, 965, and 1450-2, making an overall total of fourteen systems. One of the 1450's is supporting sixteen CRT's, and plans are to increase this number to 22 in the near future. The other 1450 is supporting five CRT's, and one 1400 is supporting eight.

Applications included training and testing, business data processing, data communications, and data base management. Among the users were a soft drink bottler and manufacturer, a jewelry retailer with four stores, a bookkeeping and tax service, a metal stamping company, a pharmaceutical lab, and a computer services company. All were using QICBASIC and the BEST operating system. Only two were using applications programs written by in-house personnel, and other sources given for applications programs were "ready-made" programs from the vendor, proprietary software packages, and contract programming houses.

Tabulated below are the results of the survey.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	5	3	0	0	3.6
Reliability of mainframe	6	2	0	0	3.8
Reliability of peripherals	4	3	0	0	3.6
Maintenance service:					
Responsiveness	6	2	0	0	3.8
Effectiveness	3	5	0	0	3.4
Technical support	3	3	2	0	3.1
Manufacturer's software:					
Operating system	4	4	0	0	3.5
Compilers and assemblers	4	3	0	0	3.6
Applications programs	4	2	1	0	3.4
Ease of programming	5	1	0	0	3.8
Ease of conversion	3	1	1	0	3.4
Overall satisfaction	4	4	0	0	3.5

*Weighted Average on a scale of 4.0 for Excellent. ▷

▶ 3301, also for use on the 210. The 3303 is a stand-alone model for use on Models 950, 960, 965, 970, 975, and 1450.

MODEL 3311, 3312, 3313 DISK DRIVES: These drives feature a 2.6-megabyte capacity on dual removable floppy disks. The minimum arm positioning time is 10 milliseconds and the average is 55 milliseconds. Average rotational delay is 83 milliseconds. Sector capacity is 768 bytes, with 11 sectors per track, 2 tracks per cylinder, and 77 cylinders per disk. The 3311 can be substituted on a 210 (at the time of ordering) for a 3301 and is not sold separately. The 3312 is a stand-alone model for use on the 210, and the 3313 is a stand-alone model for use on Models 950, 960, 965, 970, 975, and 1450.

MODEL 3401 DISK DRIVE: Up to four of these "Winchester"-type sealed fixed-disk drives can be attached to a Model 965 or 975 processor. Each drive provides 25 million bytes of storage using 2 surfaces with 700 tracks per surface, 22 sectors per track, and 768 bytes per sector. The data transfer rate is 885K bytes per second. One Model 3401 drive is standard with the Model 965 and 975 systems.

MODEL 3421 DISK DRIVES: Up to four of these "Winchester"-type sealed fixed-disk drives can be attached to a Model 965 or 975 and up to twelve on a 1450-2 processor. Each drive provides 75 million bytes of storage using 6 surfaces with 700 tracks per surface, 22 sectors per track, and 768 bytes per sector. The data transfer rate is 885K bytes per second.

INPUT/OUTPUT UNITS

See Peripherals/Terminals table.

COMMUNICATIONS CONTROL

The Qantel communications controller is built around a microprocessor with a 16K-byte memory which enables it to operate as either a synchronous or asynchronous controller. It can handle half-duplex and full-duplex communications over leased lines of the public telephone network. Software packages are available to emulate widely used remote devices, such as HASP, 2780, 3780, and 3741.

SOFTWARE

OPERATING SYSTEM: All Qantel systems operate under BEST (Business Executive System for Timesharing), a disk-resident operating system designed for simple use by non-professionals. BEST constitutes a disk and file management system which is powerful but large (24K bytes to 32K bytes). Some of this area may be available to the user in certain configurations.

Major features are dynamic disk allocation, tree structural files, direct or sequential record access, and automatic record blocking. The executive system also optimizes memory and provides memory-resident user programs and multiple access to a single program.

BEST supports in excess of 32 simultaneous jobs and 64 terminals on the various systems, depending on the hardware configuration and the mix of applications being processed. The QICBASIC compiler can run as a "job" in a 16K partition.

LANGUAGES: QICBASIC, an interactive programming language, is designed specifically for Qantel processors in a business environment. The language is self-documenting and provides execution of machine-code programs separately from compilation and debugging. QICBASIC is an enhanced version of Dartmouth BASIC. ▶

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▷ The positive comments from the eight users were highly complimentary, and the users who expressed them seemed barely able to contain their enthusiasm. One user described his 210 as a "hell of a computer" and added that the "maintenance service is impeccable." Another user with multiple systems throughout the country said that he wouldn't have anything else, that his systems run 24 hours a day, and that "Qantel really delivers what they say they will." Other praise was expressed for the ease with which non data-processing people learn to use the system and for the Report Generator.

The only expressions of complaint which were voiced concerned the software and the service of the distributors. One user said that "Accounts Payable furnishes no history of an account," another felt that the software was slow in clearing out year-end work, while a third said that his complaints had been only minor and had always been corrected. But for the hardware, there was only praise.□

▶ *REAL* is a relocatable assembly language also supported by BEST. REAL programs can be linked with QICBASIC programs or can be run independently.

Report Generator is a software tool that allows non-programmers to specify parameters for reports in simple English-like statements, while being prompted by the system. Typical parameters include the file name, file elements, sorting key elements, ascending or descending sequence, exclusionary values, total and sub-total break points, report headings, and other information. If an operator doesn't know the answer to a question, simply typing "HELP" causes the generator to respond with a "shopping list" of permissible answers.

Program Generator is a software package currently available only to Qantel distributors. Once file structure information has been defined for file maintenance programs, the Program Generator can prompt the operator/programmer in designing data-entry programs and can later use the same information to hasten the writing of inquiry and printing programs. The generator keeps building on existing routines for entry, inquiry, and updating files, to re-use the standardized instructions to aid in more complex programs. The generator also provides automatic flow charts and documentation.

QICPLAN is a planning and forecasting tool for business that allows the user to make projections of what he hopes will happen and then to make changes to the projections to find out "what will happen if so and so occurs." QICPLAN gives prediction and projection through "modeling," and the model of the user's business can be as simple or as sophisticated as desired. QICPLAN can be used for budgeting, P & L planning, tax planning, cash flow forecasting, new product projections, acquisition planning, capital expenditure timing, liquidation profiling, production lot release planning, lease vs. buy evaluations, and new venture analysis.

UTILITIES: Several standard utilities, including a language editor, disk sort, and file copy are available.

APPLICATIONS: Qantel currently supplies one applications package on a national basis. Distributors for Qantel will develop individual packages for specific accounts. The national package is called SOLUTION and is designed to handle common business functions such as invoicing, inventory control, accounts receivable and payable, order entry, information inquiry, sales analysis, general ledger, and payroll. It has been used in such industries as garment manufacturing, newspaper production, and electrical manufacturing.

PRICING

POLICY: Qantel systems are available on a purchase or lease basis. Individual models are offered as a package, including the processor, required peripherals, and system software (BEST and QICBASIC).

SUPPORT: Maintenance is separately priced and is handled by Qantel's own field engineering staff, with locations in 30 states.

EQUIPMENT: Purchase and lease prices for basic system configurations are shown in the following Equipment Prices.■

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Monthly Rental*
SYSTEMS				
210	System 210; includes standard CPU, 16K bytes user memory (expandable to 32K), 48K bytes total memory (expandable to 64K), integral video terminal (1,728 characters), integral floppy disk drive (1.3 megabytes)	$11,950	$105	$ 380
950	System 950; includes 16K bytes user memory (not expandable), 48K bytes total memory (not expandable), Model 3011 disk drive (6 megabytes), Model 4012 video terminal (1,728 characters), Model 4441 auxiliary character printer (55 cps)	24,950	245	819
960	System 960; includes 16K bytes user memory (expandable to 32K), 48K bytes total memory (expandable to 64K), Model 3011 disk drive (6 megabytes), Model 4012 video terminal (1,728 characters), Model 4441 auxiliary character printer (55 cps)	29,900	275	963
965	System 965; includes 16K bytes user memory (expandable to 32K), 48K bytes total memory (expandable to 64K), Model 3401 disk drive (24 megabytes), Model 4012 video terminal (1,728 characters), Model 5003 120-cps printer, Model 5214 magnetic tape drive (1600 bpi, 45 ips)	44,900	330	1,363

*Monthly rental price includes typical lease-purchase payment and maintenance costs.
**Monthly rental increment.

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EQUIPMENT PRICES (Continued)

		Purchase Price	Monthly Maint.	Monthly Rental*
SYSTEMS (Continued)				
970	System 970; includes 64K bytes user memory (expandable to 192K), 128K bytes total memory (expandable to 256K), Model 3111 disk drive (12 megabytes), Model 4012 video terminal (1,728 characters), Model 5003 120-cps printer	37,900	342	1,214
975	System 975; includes 64K bytes user memory (expandable to 192K), 128K bytes total memory (expandable to 256K), Model 3401 sealed fixed-disk drive (25 megabytes), Model 4012 video terminal (1,728 characters), Model 5214 magnetic tape drive (1600 bpi, 45 ips), Model 5003 120-cps printer	59,900	452	1,830
1450	System 1450; includes 64K bytes user memory (expandable to 960K), 128K bytes total memory (expandable to 1,024K), Model 3113 disk drive (12 megabytes), Model 4012 video terminal (1,728 characters), Model 5065 300-lpm printer	44,900	335	1,368
1450-2	System 1450-2; includes 64K bytes user memory (expandable to 960K), 128K bytes total memory (expandable to 1,024K), Model 3421 sealed fixed-disk drive (75 megabytes), two Model 4012 video terminals (1,728 characters), Model 5065 300-lpm printer, Model 5213 magnetic tape drive (1600 bpi, 45 ips)	74,900	530	2,253
Field Upgrades				
9506	System 800 to System 950	6,950	—	160**
9507	System 900 to System 950	6,950	—	160**
9521	System 900 (with standard processor) to System 1400	16,950	—	390**
9522	System 900 (with high-performance processor) to System 1400	13,950	—	321**
9523	System 950 (with standard processor) to System 1400	12,950	—	298**
9524	System 950 (with high-performance processor) to System 1400	9,950	—	229**
9525	System 1100 or 1200 to System 1400	12,950	—	298**
9526	System 1300 to System 1400	9,950	—	229**
9527	System 900 to System 970	22,950	—	528**
9528	System 950 to System 970	20,950	—	482**
9529	System 960 to System 970	17,950	—	413**
9530	System 900 to System 1450	27,950	—	643**
9531	System 950 to System 1450	25,950	—	597**
9532	System 960 to System 1450	22,950	—	528**
9533	System 970 to System 1450	17,950	—	413**
9534	System 1200 to System 1450	25,950	—	597**
9535	System 1300 to System 1450	22,950	—	528**
9536	System 1400 to System 1450	17,950	—	528**
9551	Standard to high-performance processor on Systems 800 and 900	6,950	30	190**
9552	Standard to high-performance processor on System 950	6,950	30	190**
9553	Standard to high-performance processor on Systems 1100 and 1200	6,950	30	190**
Processor Options				
2901	Real-time clock	950	15	37
MEMORY				
2102	Additional 8K bytes	1,450	7	41
2104	Additional 16K bytes	2,450	14	71
2107	Memory expansion option (holds up to eight 2108 modules; must be ordered when memory is expanded beyond each 256K-byte boundary)	500	—	12
2108	Additional 32K bytes	2,950	15	83
2204	Additional 16K bytes for System 210	1,450	15	49
MASS STORAGE				
3112	Disk drive; 12 megabytes (6 fixed, 6 removable), stand-alone model in enclosure	9,950	97	326
3113	Disk drive; 12 megabytes (6 fixed, 6 removable), stand-alone model in enclosure, for System 1450	9,950	97	326
3302	Dual flexible disk drive; 1.3 megabytes, removable media, stand-alone model, for System 210	4,950	40	154
3303	Dual flexible disk drive; 1.3 megabytes, removable media, stand-alone model	5,950	45	182
3312	Dual flexible disk drive; 2.6 megabytes, removable media, stand-alone model, for System 210	5,950	65	202
3313	Dual flexible disk drive; 2.6 megabytes, removable media, stand-alone model	6,950	70	230

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**Monthly rental increment.

Qantel 210, 900, and 1400 Systems

EQUIPMENT PRICES (Continued)

		Purchase Price	Monthly Maint.	Monthly Rental*
MASS STORAGE (Continued)				
3401	Fixed-media sealed disk drive; 25 megabytes, for System 965, 975, and 1450	19,950	105	564
3421	Fixed-media sealed disk drive; 75 megabytes, for Systems 965, 975, and 1450	24,900	150	723
3481	Disk drive controller; for use with 3401 and 3421, supports up to four drives, for System 965	2,950	15	83
3485	Disk drive controller; for use with 3401 and 3421, supports up to four drives, for Systems 975 and 1450	2,950	15	83
Substitutions				
9101	3111 disk drive (12 megabytes) for 3011 (6 megabytes); standard disk drive, both internally mounted (Systems 900, 950, 960); at time of order only	3,900	37	127
9104	3241 disk drive (75 megabytes) for 3401 (25 megabytes); at time of order only	4,950	45	159
9105	3311 dual flexible disk drive for 3301 dual flexible disk drive, for System 210; at time of order only (not available as field upgrade after installation)	2,000	25	71
Field Upgrades				
9601	3011 disk drive (6 megabytes) to 3111 disk drive (12 megabytes)	5,900	37	173
9602	3401 disk drive (25 megabytes) to 3421 disk drive (75 megabytes)	9,950	45	274
MAGNETIC TAPE UNITS				
5204	Tape drive; 800 bpi, 45 ips, 36KC, 2400 ft., requires 5285 controller	7,950	60	243
5214	Tape drive; 1600 bpi, 45 ips, 72KC, 2400 ft., requires 5286 controller	7,950	60	243
5285	Controller; 800 bpi, handles up to four drives	1,500	16	51
5286	Controller; 1600 bpi, handles up to four drives	2,000	27	73
Substitution				
9403	5204 tape drive and 5285 controller for 5214 tape drive and 5286 controller, for 1400-2 only; at time of order only	—	—	—
PRINTERS				
4421	Auxiliary character printer; 55 cps, with serial interface, includes 6-ft. data cable and forms tractor, does not include table	7,450	45	217
4426	Bottom/rear feed version of 4441	7,950	45	228
4441	Auxiliary character printer; 55 cps, with serial interface, includes 6-ft. data cable and forms tractor, does not include table, for all systems except System 210	7,450	45	217
4446	Bottom/rear feed version of 4441	7,950	45	228
4451	Same as 4441, for System 210	6,450	45	194
4456	Same as 4446, for System 210	6,950	45	205
5003	Serial printer; 120 cps, bidirectional, includes interface and 6-ft. data cable	5,950	65	202
5004	Serial printer; 120 cps, bidirectional, includes interface and 6-ft. data cable, for System 210	4,950	65	179
5006	Serial video printer; 120 cps, bidirectional, includes interface, does not include video terminal	5,950	65	202
5041	Line printer; 300 lpm, drum, 64-character (upper case only)	15,500	120	477
5042	Line printer; 240 lpm, drum, 96-character (upper/lower case)	17,500	130	533
5051	Line printer; 600 lpm, drum, 64-character (upper case only)	22,500	190	708
5052	Line printer; 420 lpm, drum, 96-character (upper/lower case)	24,500	200	764
5063	Line printer; 300 lpm, band, 64-character (upper case only), with serial interface and 15-ft. data cable, for System 210	9,950	75	304
5065	Line printer; 300 lpm, band, 64-character (upper case only), with serial interface and 15-ft. data cable	9,950	75	304
5101	Serial matrix line printer, 75 cps, 8-inch print line, for all systems except System 210	2,450	45	102
5103	Same as 5101, for System 210	2,450	45	102
5106	Same as 5101, for use with 4012 terminal	2,450	45	102
5111	Serial matrix line printer, 150 cps, 8-inch print line, for all systems except System 210	2,950	50	118
5113	Same as 5111, for System 210	2,950	50	118
5116	Same as 5111, for use with 4012 terminal	2,950	50	118
5121	Same as 5101 but with 13.6-inch print line	3,450	45	125
5123	Same as 5103 but with 13.6-inch print line	3,450	45	125
5126	Same as 5106 but with 13.6-inch print line	3,450	45	125
5131	Same as 5111 but with 13.6-inch print line	3,950	50	141
5133	Same as 5113 but with 13.6-inch print line	3,950	50	141
5136	Same as 5116 but with 13.6-inch print line	3,950	50	141

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**Monthly rental increment.

Qantel 210, 900, and 1400 Systems

EQUIPMENT PRICES (Continued)

		Purchase Price	Monthly Maint.	Monthly Rental*
Substitutions (at time of original order only)				
9309	Model 5041 300-lpm line printer for Model 4441 auxiliary character printer	13,000	65	364
9310	Model 5042 240-lpm line printer for Model 4441 auxiliary character printer	15,000	75	420
9313	Model 5051 600-lpm line printer for Model 4441 auxiliary character printer	20,000	130	590
9314	Model 5052 420-lpm line printer for Model 4441 auxiliary character printer	22,000	140	646
9322	Model 5003 120-cps serial printer for Model 4441 auxiliary character printer	2,450	20	77
9323	Model 5065 300-lpm line printer for Model 4441 auxiliary character printer	5,450	30	156
9324	Model 5041 300-lpm line printer for Model 5003 120-cps serial printer	11,500	35	300
9325	Model 5042 240-lpm line printer for Model 5003 120-cps serial printer	13,500	45	356
9326	Model 5051 600-lpm line printer for Model 5003 120-cps serial printer	18,500	100	526
9327	Model 5052 420-lpm line printer for Model 5003 120-cps serial printer	20,500	110	582
9328	Model 5065 300-lpm line printer for Model 5003 120-cps serial printer	5,450	30	156
9329	Model 5041 300-lpm line printer for Model 5065 300-lpm line printer	10,500	35	277
9330	Model 5042 240-lpm line printer for Model 5065 300-lpm line printer	12,500	45	333
9331	Model 5051 600-lpm line printer for Model 5065 300-lpm line printer	17,500	100	503
9332	Model 5052 420-lpm line printer for Model 5065 300-lpm line printer	19,500	110	559
Field Upgrades				
9712	Model 4441 auxiliary character printer to Model 4451 auxiliary character printer	1,950	—	45**
9713	Model 4451 auxiliary character printer to Model 4441 auxiliary character printer	1,950	—	45**
9802	Model 5006 serial video printer (serial interface) to Model 5003 120-cps serial printer (serial interface)	1,950	—	45**
Miscellaneous options				
5163	Font belt for all Model 506x line printers, 64 characters, Roman (serif) font	1,000	—	23
5165	Gothic (sans serif) font version of 5163	1,000	—	23
5166	96-character version of 5165	1,000	—	23
5191	Paper basket for Model 506x line printers	275	—	7
TERMINALS				
4012	Video terminal; 1,728 characters	3,450	40	120
4801	Video terminal controller	1,500	15	50
4803	Video terminal controller	1,500	11	46
Miscellaneous options				
4901	Accessory table	450	—	11**
Field Upgrades				
9711	Model 4011 video terminal (for use only with 4801 controller) to Model 4012 video terminal (for use only with 4803 controller)	450	—	11**
COMMUNICATIONS				
4804	Communications controller, asynchronous, Qantel standard protocol	1,500	11	46
6111	Communications controller, asynchronous, Qantel standard protocol, for System 210	950	15	37
6251	Communications controller, two individual lines, asynchronous or synchronous	2,500	33	91
6852	Synchronous communications converter, for 4012 terminal, supports speeds of 2400, 4800, and 9600 bps	950	10	32

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**Monthly rental increment.