System 21 is NOW!

The Concept

System 21 is unique. You saw the ads that introduced this low cost system to prepare, communicate, input, process, retrieve, output, display and print data. Anywhere. Anytime. A system that would greatly increase your data processing capabilities. A system that would put data processing within the reach of every business. A system that wasn’t too expensive or too complex for people to use.

Mass production and delivery

System 21 components are now being mass produced. Initial deliveries to customers have begun. The schedule for city-by-city expansion of deliveries is printed below.

Pricing

You can rent or buy VIATRON System 21 data processing equipment for half, a third — a quarter of what you’re presently paying for equipment with similar capabilities.

Marketing

To bring System 21 to businesses from coast-to-coast VIATRON is establishing a nationwide dealer organization that can provide on-the-spot local service and systems support to everyone who needs data processing capabilities.

Sale and rental options

Your local VIATRON dealer can arrange delivery on terms to suit your needs — you can purchase System 21 outright, buy it on time, rent it by the month or rent it and then buy it outright with a portion of your rentals credited against purchase price. You can determine the sale price of any System 21 configuration simply by multiplying the monthly rental of the configuration by 48.

Your dealer can help you select the plan that best meets your needs — help you choose the service plan that you require to go with it.

Depot servicing

VIATRON uses the concept of replacement rather than repair service as the basis for normal maintenance. When we deliver equipment to you there will be a local service depot to provide the kind of service you need.

Emergency Service

In addition to normal maintenance available at the depot, VIATRON will provide immediate on-site repair or replacement under the VIATRON Emergency Service Plan. You don’t have to pay for service you don’t need. Emergency service will be available 24-hours a day.

Distribution

Initial System 21 deliveries are scheduled in the following cities where customer support and service facilities are being established.

DElIVERY SCHEDULE

<table>
<thead>
<tr>
<th>CITY</th>
<th>DATE</th>
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<tbody>
<tr>
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<td>Fort Worth</td>
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The
Perfectly
Balanced System

Extended Precision
Key → Printer

Program Debugging  Format Control  Field Select  Remote Concentrator
VIATAPE ←→ Computer-Compatible Tape

Data Collection  Character Select
Key → VIATAPE

Factory Feedback  Multiple Displays
Auto Skip

Multiplexer  Auto Dup
Remote Batch

Conditional Select
VIATAPE → Printer

Distributed Data Processing
Auto Left Zero Fill

Program Sequence Control
Card ←→ Communication

Automatic Reformatting
VIATAPE ←→ Computer

Batch Transmission
Auto Turnaround

Computation  Color Video Display
Key → Computer-Compatible Tape

Text 128-Character ASCII Code
Computer-Compatible Tape → Printer

Floating Point  Record Retrieval

Man-Machine Communications  Time Sharing  Parity Check
Computer-Compatible Tape ←→ Communication Devices

On-Line Updating

Key Verification  Message Switching
VIATAPE ←→ Card

Remote Job Entry
Editing

Modems  Polling
Card → Printer

Sight Verification
Key → Computer

On-Line/Off-Line Operation
Certified VIATAPE

High-Speed Communication
Key → Communication Devices

Automatic Tape Search
VIATAPE ←→ VIATAPE

Buffered Input/Output
Printer Formatting

Multiple Input/Output
VIATAPE ↔ Communication Devices

Upper/Lower Shift  On-Line Inquiry
Key → Card

Tape Validation  Data Conversion

System 21 Terminals — Now
System 21 Computers — Spring 1970
General Purpose Computers

The VIATRON Models 2140 and 2150 are the first of a family of general purpose computers using fourth generation LSI/MOS technology. VIATRON computers offer the flexibility and power normally found in much more expensive computer hardware. They are designed and priced to be placed wherever a general purpose computer is needed — in the office, the factory, the warehouse, the school, the laboratory, or anywhere — to satisfy a multitude of applications.

MODEL 2140 $99 a Month

The VIATRON Model 2140 uses an LSI/MOS Central Processing Unit and 4,096 16-bit words of core memory. It offers extensive computational and data manipulation capabilities through 85 powerful instructions.

Arithmetic operations may be single, double, or even triple precision (16, 32, or 48 bits) using three general purpose registers (accumulators) which are available to the programmer. Computational routines may therefore be easily programmed for the simplest or the most complex business or scientific calculations. Load, Store, Move and Test instructions may also be performed in all three registers.

Software available with the 2140 and 2150 will be upgradable with future VIATRON computers. The software includes a FORTRAN compiler, an assembler, a math subroutine library and utility programs for manipulating data from System 21 Data Management Terminals. In addition, a language for communicating with multiple data management terminals is available in DDL-1 (Distributed Data Language). This gives the user a powerful systems capability by supplying software control of terminals.

The Input/Output capability is accomplished through an Automatic Polling Controller, which allows the attachment of up to 8 System 21 Data Management Terminals, and a wide band High Speed Data Channel, which may be used for data communications. System 21 Terminals may, of course, be configured to support any of the peripherals in the System 21 product line, adding extensive data input, data storage, data display, and data print-out capabilities to the Model 2140 computer.

MODEL 2150 $199 a Month

The Model 2150 expands the capability of VIATRON's general purpose computers to serve more terminals and a wider variety of applications.

More Memory

8,192 16-bit words of core memory are standard on the Model 2150, twice the core capacity of the Model 2140. Larger, more complex programs and more on-line data storage is available to the programmer and to the user.

More System 21 Terminals

Three Automatic Polling Controllers are standard on the Model 2150, permitting the attachment of up to 24 System 21 Data Management Terminals. With more memory and more terminals, the Model 2150 is ideal for use in large data input centers, in private wire communications networks for message switching, for data transmission to computer centers, and a host of other terminal-oriented application areas.

More Software

A FORTRAN IV Compiler is standard on the Model 2150, bringing to the engineer, the scientist, and the mathematician a language which is both familiar and easy to use. For the engineer, or group of engineers, who has been concerned by the high cost and inflexibility of commercial time sharing services, or who has been unable to gain access to his centralized batch processing computer, the Model 2150 offers a cost saving, efficient alternative. Put the computer where the problems are for maximum accessibility and utility.

Specifications

**CORE MEMORY**

<table>
<thead>
<tr>
<th>Cycle Time (Full Cycle)</th>
<th>Model 2140</th>
<th>Model 2150</th>
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</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>2 μsec</td>
<td>2 μsec</td>
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<tr>
<td>Word Length</td>
<td>4096 words</td>
<td>8192 words</td>
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<tr>
<td></td>
<td>16 bits</td>
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**INSTRUCTIONS**

| Arithmetic             | 12         |
| Logic                  | 9          |
| Load                   | 13         |
| Store                  | 13         |
| Branch                 | 11         |
| Shift                  | 13         |
| Modify Memory          | 1          |
| I/O                    | 1          |
| Operate                | 12         |
| **TOTAL**              | 85         |

| Number of 8 bit operations | 12         |
| Number of 16 bit operations | 61         |
| Number of 32 bit operations | 8          |
| Number of 48 bit operations | 4          |
| **TOTAL**              | 85         |

**INSTRUCTION FORMATS:** Short and Extended

**SHORTH (S)**

<table>
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<tr>
<th>0</th>
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<th>2 Bits</th>
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<table>
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<th>16</th>
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**EXTENDED (E)**

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</thead>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>16</th>
</tr>
</thead>
</table>

**DATA FORMAT**

16, 32 or 48 bit Arithmetic

Positive Numbers: Sign and Magnitude

Negative Numbers: 2's complement

**ADDRESSING MODES**

Extended Format: Direct addressing of up to 32,768 locations

Direct and Indexable

Short Format: 256 Locations relative to Program Counter

Indexable

**INDEX REGISTERS**

3

**GENERAL REGISTERS**

3

**INPUT/OUTPUT**

Up to 8 terminals (local or remote)

Up to 24 terminals (local or remote)

High-Speed Data Channel

High-Speed Data Channel

**INTERRUPT LEVELS**

Assembler

Assembler

DD1 (Multi-User language)

DD1 (Multi-User language)

FORTAN IV

All programs stored on removable VIATAPE cartridges

**POWER REQUIREMENTS:** 115 V AC, 60 cycle, 350 watts
INTRODUCTION
The VIATRON Programming System (VPS) uses VIATAPE, compact and reliable pocket-sized cartridges of magnetic tape, for storage and distribution of system and user programs.

The VPS programs use advanced programming techniques, including relocatable subroutines, highly compressed format for data and programs, and flexible input and output command structures, which facilitate data conversion and manipulation.

VPS consists of five components stored on VIATAPE cartridges:
- DDL-I Distributed Data Language-I
- FORTRAN IV Compiler
- Assembler Language with Compressor
- Subroutine Library
- Utility Program Library

The VIATRON Programming System provides the user with:
- Easy program preparation via the System 21 Data Management Terminal.
- Higher level language translators to aid the user in adapting his problem statement to the computer.
- A complete subroutine library to eliminate the necessity for programming of routine and repetitive functions.
- A utility library which provides programs to assist in organizing and maintaining user written object modules.

Computer configurations supported by the VIATRON Programming System are:
- Model 2140 CPU with 4K of core storage
  - Automatic Polling Controller
  - Up to 8 System 21 Data Management Terminals
  - High-Speed Data Channel
- Model 2150 CPU with 8K of core storage
  - Automatic Polling Controller
  - Up to 24 System 21 Data Management Terminals
  - High-Speed Data Channel

DISTRIBUTED DATA LANGUAGE — I (DDL-I)
The Distributed Data Language is the first of a family of unique VIATRON languages. It provides a processing sequence which begins at the System 21 Data Management Terminal, is continued at a higher level on the System 21 computer, and may extend to another computer system. DDL-I is highly flexible, and easy to use. Programs may be specified in DDL-I, which will accommodate multiple interactive users simultaneously sharing the computational resources of the computer.

DDL-I Programs are defined through the use of specification sheets similar to those used for the familiar report program generators available on most large scale computers. These specification sheets, once recorded on a VIATAPE cartridge, are translated into machine language instructions. Storage areas, buffers, and constants are automatically dimensioned and assigned. The compiled program contains the linkages to the data management and functional routines required. Data management provides input/output control, decision capability, and editing. Functional operations include arithmetic, data manipulation, and program logic control.

FORTRAN IV
The VIATRON FORTRAN IV Compiler enables the engineer, scientist, or student to utilize the computer for problem solving without requiring extensive knowledge of the computer itself. This one pass compiler conforms to the basic USASI standards and is compatible with other FORTRAN IV Compilers. The FORTRAN program is a set of statements composed of expressions and operations which, when recorded on a VIATAPE cartridge, can be translated by the compiler into an object program.

ASSEMBLER
The Assembler program accepts symbolic language and translates it into binary machine language. The symbolic language provides mnemonic operation codes, special characters, and other symbols to aid the programmer. Linkage to the Subroutine Library is provided through macro instructions, which work in conjunction with the system loaders. The Assembler produces a relocatable binary output tape suitable for processing by the Compressor program, which consolidates the binary output to improve loader efficiency.

SUBROUTINE LIBRARY
The Subroutine Library for the VIATRON Programming System is a package of commonly used routines for data input/output, data conversion, and arithmetic functions. Only the subroutines required for the operation of an object program are selected by the linkage loader or linkage editor program when the object program is being processed.

Included in the Subroutine Library are:
- Input/Output Subroutines
  - Terminal Master Control Package
  - Communications Adapter Control Package
- Mathematical Function Subroutines
  - Trigonometric sine/cosine
  - Trigonometric arctangent
  - Square root
  - Natural logarithms
  - Exponentials
- Arithmetic Subroutines
  - This group includes subroutines designed to augment the CPU arithmetic instructions. The subroutines perform the functions of floating-point operations (single and extended precision) for add, subtract, multiply, and divide.
- Conversion Subroutines
  - This group includes subroutines to convert data transferred between memory and the I/O devices that can be attached to the computer through High-Speed Data Channel and the Automatic Polling Controller.

UTILITY PROGRAM LIBRARY
The Utility Program Library includes the following:
- Dump Routines
  - These are used to output the contents of core memory to a System 21 Terminal. The output may be in either decimal or hexadecimal form.
- Load Routines
  - The Linkage Editor and Linkage Loader accept the binary output of the Compressor and language translators. The Linkage Loader loads the compiled object program and the required subroutines directly to core storage for execution. The Linkage Editor creates a self-loading core-image tape containing the compiled program and the required subroutines. This facility enables repeated program loadings without the further requirement for reference to the Subroutine Library.

Subroutine Library Manager
The Subroutine Library Manager allows the user to build, edit, and maintain library tapes.

LOCAL SUPPORT
VIATRON's growing dealer organization will be available to provide economical and comprehensive systems and programming support for users of the Model 2140 and 2150 computers. Each VIATRON authorized dealer is a software specialist, located near the customer, and well trained to provide local support on a professional basis.

Dealer services include professional consultation, training, systems design, programming assistance, and completely programmed packages. Whatever your requirements may be, we are ready to help you get started and to help you keep going once your applications are underway.

Standard software provided by VIATRON will be supplied and supported by VIATRON at no additional cost. On a contract basis, the Dealer will extend or modify the standard software to further tailor it to your specific use.

Your VIATRON Dealer will help you optimize the use of System 21 computers and terminals to achieve the lowest cost solution to your application requirements. And with his widespread experience, he will help integrate System 21 into your overall data processing plans.
System 21 lets you do your thing

System 21 terminals and computers will let you build application-oriented systems to solve your data input, communications, and processing problems.

Scientific Computation
- General Mathematical Analysis
- Statistical Evaluation of Data
- Engineering Design
- Laboratory Experiment Evaluation
- Time-Shared Problem Solving

Business Data Processing
- Credit Checking
- Material Management
- General Accounting
- Production Control
- Operations Research

Data Acquisition
- Order Entry
- Remote Job Entry
- On-Line Unit Record Preparation
- Information Retrieval
- Media Conversion

Education
- Classroom, Student, and Instructor Scheduling
- Computer Programmed Instruction
- Career Counseling
- Student Computation Aid
- Computer Training
DATA ENTRY

Information entered at a System 21 data management station can be recorded, converted or transmitted in several ways for subsequent processing by a central computer.

1. Keyed onto VIATAPE, and then converted to computer compatible tape.
2. Keyed directly onto computer compatible tape.
3. Keyed onto VIATAPE, and then converted to punched cards.
4. Keyed directly onto cards.

TIME SHARING

A System 21 computer, acting as a concentrator or line controller, can minimize data communication costs in a time sharing network by reducing line charges and by reducing the number of I/O channels required on the central time-shared computer.

REMOTE BATCH

Data or programs may be recorded off-line on VIATAPE or computer compatible tape, and then batch transmitted to the central computer. After processing, the results may be batch transmitted back to the System 21 terminal and recorded on VIATAPE or computer compatible tape for subsequent print-out, or for black and white or color display.
Computer Architecture

INTRODUCTION
The VIATRON approach to computer architecture required harmonious coordination of design philosophy with present-day LSI technology. The resultant computer organization uses the simplicity of Read Only Memories for controlling the flow of data between memory, the central processing unit and Input/Output, while still retaining the capability for performing complex operations.

Within the central processors of the 2140 and 2150 (which are identical) there will be two data buses, a read only control memory and two arithmetic units (I and II) each operating independently.

CENTRAL PROCESSOR
Arithmetic Unit I: Registers A, B, C, & D
In the first arithmetic unit, there are three general accumulator registers (A, B, & C), each with identical capabilities.

The A, B, & C Registers can perform arithmetic operations such as addition and subtraction with memory. Any of the three can be masked with memory, merged with memory, or exclusive OR-ed with memory. They can transfer data to or from memory in 16 bit or 8 bit byte format. Data can be moved from sub-register to any other register. Any of the three registers can be used as a shift register. Carry and Overflow tests can be performed on all three. Multiply and Divide are performed in conjunction with the extended accumulator (Q), which is in arithmetic unit II.

The D Register can be used as an operand buffer which holds data from memory or from the other arithmetic unit.

The arithmetic unit operates in two modes: In one mode, registers A, B, or C can be uniquely modified, and in the other mode they perform a joint operation on an operand in the D Register.

Arithmetic Unit II: Registers P, Q, R, & E
In the second arithmetic unit, both arithmetic and addressing operations are performed.

The P Register can be used as a program counter which contains the current program address.

The Q Register can be used for extended arithmetic operations. These include double-length (32 bit) operations such as add, subtract, store and load. Triple-length (48 bit) operations are performed with A and B as the high order registers and Q as the lower order register. Q is also the Multiplier/Quotient register in the conventional sense.

The R Register can be used both as an operator’s console buffer and as an auxiliary register for generating effective addressing.

The E Register can be used as a buffer for data which operates on P, Q, or R.

Control
Two control units handle all data flow through the buses. The CPU control unit consists primarily of Read Only Memory which contains all the micro programs for controlling processor operations. The I/O controller handles all I/O interrupts and data flow between memory and I/O. It is given a higher priority than the CPU control so as to facilitate data flow between peripherals and memory.

The other components of the computer system include the core memory and the operator’s console.

The Core Memory is organized into 4,096 words of 16 bits each. The 2140 contains a single 4,096 word unit, while the 2150 contains two units with a total of 8,192 words.

The Operator’s Console for the 2140/2150 provides the necessary indicators and switches for control and monitoring of the system. The operator control switches are designed for simplicity of operation. Provided on the panel are switches which control initial program load, single step of instructions, automatic run control, and stop.

The Console Display contains sixteen indicators which may selectively monitor one of three accumulators (A, B, C), the quotient register (Q), the carry/overflow status (S), the program counter (P), and the console address register (R). In addition, the contents of sequential core memory location (M) and the next instruction (I) may be examined by the operator.

For Console Data Entry, data or address information may be entered selectively into one of three accumulators (A, B, C), the quotient register (Q), the carry/overflow register, the program counter (P), and the console address register (R) via sixteen entry toggles. In addition, the operator may enter data into sequential core memory locations.

INPUT/OUTPUT CONTROL
An integral part of the 2140 and 2150 is an I/O Controller, which manages all data transfers between the peripheral devices and the computer memory. These data transfers are performed as 8 bit or 16 bit parallel operations on a request/acknowledge basis. The I/O is capable of transferring data to memory independent of the central processor, i.e., the CPU may perform operations while cycle steal transfers between memory and the I/O Controller are taking place. Since memory is not tied directly to the CPU, the CPU and the I/O Controller must request memory with the I/O Controller having the higher priority.

There are two types of data transfers available in the Models 2140 and 2150, namely, single-word transfers and block transfers.

Single-word Transfers are accomplished via the Automatic Polling Controller (APC). Up to eight System 21 Data Management Terminals can be attached to one APC. The APC continually scans the request lines of each of the terminals until a terminal requires service. When a service request is made, the APC stops scanning and transfers data under program control between the computer memory and the terminal. Once the data transfer is complete, the APC resumes scanning.

Block Transfers (up to 16 bits per transfer) are accomplished on a cycle-stealing basis via the high-speed channel. This channel can execute up to 300,000 transfers per second. The high-speed channel may be used for connection to high-speed communications equipment or other customer supplied equipment.

Interrupt Levels are associated with each APC and high-speed channel. In both the 2140 and 2150, the high-speed channel has the highest priority interrupt level. The Model 2140 has one APC and one high-speed channel while the Model 2150 has three APC’s and one high-speed channel. Thus, the 2140 has two interrupt levels and the 2150 has four interrupt levels.

PERIPHERALS
The entire current System 21 line of equipment may be attached to the Model 2140 and Model 2150 computing systems. This line includes —

VIATAPE Recorder
Computer Compatible Tape Recorder
Robot Printer
Card Reader/Punch
Color or Black and White Displays
Keyboard
Unit Card Reader

VIATRON has a company commitment to supply the System 21 user with the largest range of peripherals compatible with high-volume, low-price production. Additional peripherals will be announced shortly.
The System 21 Terminal
new styling, new features, new performance

Data Channel Attachments
Two peripheral devices can be attached simultaneously to the data channels of the 2101 and 2111 microprocessors. These peripherals currently include a System 21 Printing Robot, a Card Reader Punch, a Communication Adapter and a Foreign Device Attachment. The system illustrated is equipped with a Printing Robot and a Communication Adapter.

PRINTING ROBOT drives an IBM Selectric® typewriter to provide formatted or unformatted hardcopy printout.
EXECUTE Switch. LIST mode provides 80-character listing of data records. "A" and "B" provide formatted output by interpreting control characters in the data record. These characters are carriage return, line feed, back space and tabulate.
Diode Pin Matrix allows selection of "tab begin" positions without requiring the use of control characters within the data record.
COMM DEVICE allows the transmission or receipt of standard ASCII characters over voice-grade lines operating in a half-duplex mode at speeds ranging up to 1200 bits per second. Panel switches allow: 1. Speed selection as dictated by the modem used. 2. Synchronization in transmission between System 21 terminals. 3. Attended or unattended operations.
Card Reader-Punch allows direct data transfer to and from an IBM 29 card punch. Data from the microprocessor can be punched on cards, or data on cards can be read into the microprocessor memory on a single-record or batch basis.
Mode Switch allows you to (1) read cards, (2) punch cards, or (3) disengage.
Record Length Switch. In the "short" position, this switch allows the release of a card when fewer than 80 characters are punched.
Foreign Device Attachment (Not Illustrated)

Tape Channel Attachments
There are two channels to which VIATAPE and Computer Compatible Tape Recorders can be attached. The system illustrated has one of each.

VIATAPE Recorder reads and records 80-character records on VIATAPE.
1 RECORD/FAST Switches permit tape movement forward or backward.
COMPUTER TAPE Recorder also has standard LOAD, RESET, REWIND and FILE GAP controls.

Keyboard
Typewriter and keypunch keyboard with color coding characters.

L-5 — Position 1 (2111)
Moves the key entry cursor to position 1.

L-4 — Go (2111)
Starts program execution after a programmed halt.

L-3 — Delete (2111)
Removes the character at the cursor position and closes up the remaining characters in the same field (optional).

L-2 — Field Select (2111)
Moves the key entry cursor to the first position of the field indicated by one numeric key stroke following (optional).

L-1 — Position Select (2111)
Moves the key entry cursor to the numeric position indicated by two numeric key strokes following (optional).

ERROR — Releases a keyboard lock resulting from an error condition.
INPUT — Initiates input to the microprocessor from the device selected by the STATUS Input rotary switch.
OUTPUT — Initiates output from the microprocessor to the device selected by the STATUS Output rotary switch.
READY — Prepares the microprocessor for input from keyboard or any external device.
— (Back Space) — Back-spaces cursor one character.

REPEAT — When this key and any other key are held down, the other character is repeatedly entered into the microprocessor.
SHIFT UPPER — Selects characters shown.
SHIFT X — Allows generation of standard ASCII communication control characters.
BACK TAB — When in "Program Control", this key moves the cursor back to the previous "Field Begin" character. In "Manual Control" the cursor is moved to the first position of the record.
CLEAR — Sets the microprocessor to initial conditions.
DISPLAY Controls
The 3001 video subsystem displays the contents of four of the five 80-character memory areas in the 2101/2111 microprocessor. Each memory area is divided into four lines of 20 characters. These areas are called READ, WRITE, MASTER and CONTROL.

READ, WRITE, MASTER and CONTROL switches control the display or suppression of the individual areas.

FIELD MKR allows the display of markers which locate the beginning of the data fields within the 80-character area being entered.

FORMAT switch interleaves the four lines of the MASTER area with the four lines of the WRITE area. The MASTER area usually functions as a form. This control lets the operator fill in the blanks on the interleaved WRITE area.

COLOR — In stations equipped with color displays, COLOR A allows the operator to select any of 8 colors. They may be used for either characters or background in any combination. COLOR B assigns 4 fixed colors to all (1) upper case, (2) lower case, (3) numeric and (4) communication control characters.

OPTIONS Control
Switches allow automatic input or output to or from selected channels.

INPUT A — Automatic input from selected channel. (optional on the 2101, standard on the 2111)

INPUT B — Automatic input of one program and associated format from Tape Channel 1 (optional on the 2101/2111)

INPUT C — Automatic input of two programs and associated format from Tape Channel 1 (optional on the 2101/2111)

OUTPUT A — Automatic output to selected channel. (standard on the 2101/2111)

OUTPUT B — Automatic output to Data Channel 1, then Tape Channel 2. (optional on the 2101/2111)

OUTPUT C — Automatic output to Data Channel 1, then Data Channel 2. (optional on the 2101/2111)

OUTPUT D — Automatic output to Data Channel 1, then Data Channel 2, then Tape Channel 2. (optional on the 2101/2111)

R2 (Duplication) — Duplicates characters from the READ record into the selected record.

R1 (Master Duplication) — Duplicates characters from the MASTER record into the selected record.

OPTION ON/OFF — Turns selected input/output options on or off.

ERASE — Clears the memory area selected by the STATUS Record rotary switch.
<table>
<thead>
<tr>
<th>Model Feature</th>
<th>Model Feature Code</th>
<th>Description</th>
<th>Monthly Rental</th>
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<td>MICROPROCESSOR</td>
<td>2101</td>
<td>512-word, Read-Only Memory</td>
<td>$20</td>
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<td></td>
<td>For IBM Selectric®, 13” or 15”</td>
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<td>Two Tape Channels</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Left Zero Fill</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Upper and Lower Shift Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Output to selected data or tape channel</td>
<td></td>
</tr>
<tr>
<td>AUTOMATIC MULTIPLE INPUT feature</td>
<td>101</td>
<td>One record from Selected Channel or medium</td>
<td>$9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One master and one control record from Tape Channel #1</td>
<td></td>
</tr>
<tr>
<td>AUTOMATIC MULTIPLE OUTPUT feature</td>
<td>102</td>
<td>To Data Channel 1 and Tape Channel 2</td>
<td>$4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To Data Channels 1 and 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plus Tape Channel 2 feature</td>
<td></td>
</tr>
<tr>
<td>SHORT RECORD feature</td>
<td>103</td>
<td>Automatic input or output of a record less than 80 characters</td>
<td>$10</td>
</tr>
<tr>
<td>MICROPROCESSOR</td>
<td>2111</td>
<td>1024-word, Read-Only Memory</td>
<td>$36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>400-character Read/Write Memory</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two Tape Channels</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Skip</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Duplication</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Left Zero Fill</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Upper and Lower Shift Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Output to selected data or tape channel</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Input from selected data or tape channel</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Tape Search</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic Tape Validation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Editing, Automatic Reformatting</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Key Verification</td>
<td></td>
</tr>
<tr>
<td>AUTOMATIC MULTIPLE OUTPUT feature</td>
<td>102</td>
<td>To Data Channel 1 and Tape Channel 2</td>
<td>$4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To Data Channels 1 and 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plus Tape Channel 2</td>
<td></td>
</tr>
<tr>
<td>SHORT RECORD feature</td>
<td>103</td>
<td>Automatic input or output of a record less than 80 characters</td>
<td>$10</td>
</tr>
<tr>
<td>AUTOMATIC MULTIPLE INPUT feature</td>
<td>104</td>
<td>One master and one control record from Tape Channel</td>
<td>$9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One master and two control records from Tape Channel</td>
<td></td>
</tr>
<tr>
<td>FIELD AND POSITION SELECT feature</td>
<td>105</td>
<td>Direct Access to selected field or character position</td>
<td>$5</td>
</tr>
<tr>
<td>GENERAL PURPOSE COMPUTER*</td>
<td>2140</td>
<td>CPU — 4K words of core memory</td>
<td>$99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16-bit words</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 Input/Output channels for local or remote attachment of System 21 Data Management Terminals</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software, Utility subroutines, Assembler, and MACRO languages</td>
<td></td>
</tr>
<tr>
<td>GENERAL PURPOSE COMPUTER*</td>
<td>2150</td>
<td>CPU — 8K words of core memory</td>
<td>$199</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16-bit words</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hardware Multiply and Divide</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>32 Input/Output channels for local or remote attachment of System 21 Data Management Terminals</td>
<td></td>
</tr>
<tr>
<td>VIDEO DISPLAY SUBSYSTEM</td>
<td>3001</td>
<td>Allows the attachment of several types of video displays to a microprocessor</td>
<td>$5</td>
</tr>
<tr>
<td>BLACK &amp; WHITE VIDEO DISPLAY</td>
<td>301</td>
<td>Black &amp; White Video Display</td>
<td>$8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>320-character display, divided into four 80-character records</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Suppression or display of any or all records</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cursor in operational record</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interfacing capability of Write and Master Records</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(No charge for first Black &amp; White Video Display when Feature 304 is not ordered.)</td>
<td></td>
</tr>
<tr>
<td>RECORD SUPPRESS feature</td>
<td>302</td>
<td>Permanent suppression of any combination of 80-character records on local or remote displays</td>
<td>$2</td>
</tr>
<tr>
<td>SELECTED DATA DISPLAY feature</td>
<td>303</td>
<td>Requires Selected Data Display feature 305</td>
<td>$4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(320-character display, divided into four 80-character records)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Suppression or display of any or all records</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cursor in operational record</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interfacing capability of Write and Master Records</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control characters for 8 Data and 8 Background Colors</td>
<td></td>
</tr>
<tr>
<td>BLACK &amp; WHITE RF MODULATOR</td>
<td>305</td>
<td>Connection for up to 12 RF displays Displays may be VITRON (Feature Code 306) or any commercial television display</td>
<td>$2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up to two RF Modulators may be connected to Microprocessor</td>
<td></td>
</tr>
<tr>
<td>BLACK &amp; WHITE RF VIDEO DISPLAY</td>
<td>306</td>
<td>Connection for up to 12 RF displays Displays may be VITRON (Feature Code 306) or any commercial television display</td>
<td>$8</td>
</tr>
<tr>
<td>KEYBOARDS (prices include Parallel Data Channel at $1/month)</td>
<td>4001</td>
<td>400-keyboard</td>
<td>$6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard typewriter characters</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard card punch characters</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Microprocessor control characters</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communications Control characters</td>
<td></td>
</tr>
<tr>
<td>COMPUTER-COMPATIBLE TAPE RECORDER</td>
<td>5002</td>
<td>6-track, 800 bpi</td>
<td>$60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-inch miniature of computer-compatible tape</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000 cps synchronous read/write rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complete blocking capability</td>
<td></td>
</tr>
<tr>
<td>COMPUTER-COMPATIBLE TAPE RECORDER</td>
<td>5003</td>
<td>7-track, Selectable density 800 bpi or 556 bpi</td>
<td>$60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-inch miniatures of computer-compatible tape</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000 cps synchronous read/write rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complete blocking capability</td>
<td></td>
</tr>
<tr>
<td>DATA CHANNEL ATTACHMENTS (prices include Serial Data Channel at $1/month)</td>
<td>6001</td>
<td>Card Punch/Reader Adapter</td>
<td>$37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transmits any of the card punch’s standard 64 characters</td>
<td></td>
</tr>
<tr>
<td>RECORD TRANSFER BUFFER</td>
<td>601</td>
<td>80-character buffer permitting simultaneous microprocessor operation and card punch operation</td>
<td>$18</td>
</tr>
<tr>
<td>SHORT RECORD feature</td>
<td>602</td>
<td>20 character buffer permitting simultaneous microprocessor operation and card punch operation</td>
<td>$2</td>
</tr>
<tr>
<td>SPACE INSERTION feature</td>
<td>603</td>
<td>In punch mode, adapter spaces over an illegal character instead of punching a question mark</td>
<td>$3</td>
</tr>
<tr>
<td>PRINTING ROBOT</td>
<td>6002</td>
<td>IBM Selectric®, 13” or 15” Carriage</td>
<td>$25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Includes Format Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Printing speed of 12 cpm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Easily removed for normal typewriter operation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic backspace, tab, carriage return, and index by code detection in data stream</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Three print modes for straight line or formatted printing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upper and lower case</td>
<td></td>
</tr>
<tr>
<td>COMMUNICATIONS ADAPTER</td>
<td>6003</td>
<td>High/Low speed selection 110 and 247 BAUD</td>
<td>$11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1032A-Compatible</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asynchronous communication in half-duplex mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7-level, ASCII code, record synchronization, optional parity check, 15-second time out</td>
<td></td>
</tr>
<tr>
<td>AUTOMATIC ANSWER feature</td>
<td>604</td>
<td>80-character buffer permitting simultaneous microprocessor operation and printing robot operation</td>
<td>$5</td>
</tr>
<tr>
<td>MODEM 110-247 BAUD</td>
<td>605</td>
<td></td>
<td>$10</td>
</tr>
<tr>
<td>ACOUSTIC COUPLER</td>
<td>606</td>
<td>Data transmission up to 300 bps</td>
<td>$15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Includes modem</td>
<td></td>
</tr>
<tr>
<td>COMMUNICATIONS ADAPTER</td>
<td>604</td>
<td>High/Low speed selection—600 and 1200 BAUD</td>
<td>$11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 C/D-Compatible</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asynchronous communication in half-duplex mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7-level, ASCII code, record synchronization, optional parity check, 15-second time out</td>
<td></td>
</tr>
<tr>
<td>AUTOMATIC ANSWER feature</td>
<td>604</td>
<td></td>
<td>$5</td>
</tr>
<tr>
<td>MODEM 600-1200 BAUD</td>
<td>607</td>
<td></td>
<td>$20</td>
</tr>
<tr>
<td>COMMUNICATIONS ADAPTER</td>
<td>6005</td>
<td>Single special speed up to 1200 BAUD</td>
<td>$21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1032A- or 200 C/D-Compatible</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asynchronous communication in half-duplex mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7-level, ASCII code, record synchronization, optional parity check, 15-second time out</td>
<td></td>
</tr>
<tr>
<td>FOREIGN DEVICE ATTACHMENT</td>
<td>6006</td>
<td>Allows the input and output of ASCII code foreign devices to the microprocessor</td>
<td>$18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parallel transfers to aid from foreign device</td>
<td></td>
</tr>
<tr>
<td>FOREIGN DEVICE ATTACHMENT</td>
<td>6007</td>
<td>Allows the input and output of Hollerith code foreign devices to and from the microprocessor</td>
<td>$23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parallel transfers to and from foreign device</td>
<td></td>
</tr>
<tr>
<td>UNIT CARD READER</td>
<td>6008</td>
<td>Hollerith code</td>
<td>$25</td>
</tr>
<tr>
<td>COMPUTER ADAPTER,</td>
<td>6009</td>
<td>Model 2140 &amp; 2150</td>
<td>$12</td>
</tr>
</tbody>
</table>

* Planned for delivery in the spring of 1970
A total computer system ready to use

1 2140 computer
1 2112 master terminal
2 VIATAPE recorders
1 color display
1 keyboard
1 printing robot

Total cost: $10,608

The 2140 computer
- general purpose
- 4K, 16 bit data word storage
- 8K bytes
- 8 I/O channels for terminals
- 5 general purpose registers
- 3 index registers
- hardware multiply/divide
- basic USASI FORTRAN
- assembler
- subroutine library
- utility program library

The 2112 terminal:
- hardwired microprogram—1024 words
- 4 I/O channels
- 400 character dynamic memory
- programmable format control

The VIATAPE recorders
- reusable cartridges
- 416, 80 character records
- 100 characters/sec read/write
- certified digital tape

The keyboard
- 128 ASCII character set
- typewriter/keypunch compatible
- communications and control keys

The robot printer
- upper and lower case
- full format control
- up to 130 character line
- continuous forms
- multiple copies

The color display
- 8 character colors
- 8 background colors
- 2 color modes
- 320 character display
- scrolling capability
A 24-user on-line multiprogramming total computer system ready to use

1  2150 computer
1  2112 master terminal
23  2111 user terminals
47  VIATAPE recorders
1  computer tape recorder
1  color display
23  black and white displays
24  keyboards
1  printing robot

Total cost per user: $3,858

The 2150 computer
- general purpose
- 8K, 16 bit data word storage
- 16K bytes
- 24 I/O channels for terminals
- 5 general purpose registers
- 3 index registers
- hardware multiply/divide
- FORTRAN IV
- DISTRIBUTED DATA LANGUAGE I
- assembler
- subroutine library
- utility program library

The 2111 terminal
- hardwired microprogram—1024 words
- 4 I/O channels
- 400 character dynamic memory
- programmable format control
- automatic tape search
- automatic tape validation
- key verification

The VIATAPE recorders
- reusable cartridges
- 416, 80 character records
- 100 characters/sec read/write
- certified digital tape

The computer tape recorder
- 7 or 9 track
- 556 or 800 BPI
- zero defect recording

The color display
- 8 character colors
- 8 background colors
- 2 color modes
- 320 character display
- scrolling capability

The black & white displays
- 320 character display

The keyboard
- 128 ASCII character set
- typewriter/keypunch compatible
- communications and control keys

The robot printer
- upper and lower case
- full format control
- up to 130 character line
- continuous forms
- multiple copies
GUARANTEED
TO KEEP YOU SELL

For more information
Your local VIATRON dealer can give you the complete cost/performance story. For the name of the dealer nearest you, write VIATRON Computer Systems Corporation, Dept. D-14, Crosby Drive, Bedford, Massachusetts 01730. Telephone (617) 275-6100.

VIATRON
SYSTEM 21

The standard of the 70's