



**ELECTRONIC DATA
PROCESSING SYSTEM**

FUNCTIONAL SPECIFICATIONS



RADIO CORPORATION OF AMERICA

**Electronic Data
Processing Division
Camden, New Jersey**



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INTRODUCTION

INTRODUCTION

GENERAL

The RCA 601 Functional Specifications provide a description of individual system elements, or units, which can be combined to form an RCA 601 Electronic Data Processing System.

UNIT INTERCONNECTION

Computer Units

The basic "building block" of an RCA 601 System is the computer unit. One or more of these units provides decision making, computation, and control capability for an RCA 601 System. Processing units and input/output transfer channels can be added to an RCA 601 System Computer to achieve a desired degree of performance.

Input/Output Transfer Channels

Input/output transfer channels can be added to an RCA 601 computer unit to permit the on-line operation of selected input/output devices by the Computer. In general, an input/output channel permits one or more of the appropriate input/output devices to be operated concurrently with other computer operations. RCA 601 input/output transfer channels can be added to an RCA 601 computer unit at any time without modification of the computer circuits. Transfer channels can be added to permit the Computer to operate up to 16 concurrent input/output devices. The number of concurrent devices which can actually be operated by the Computer at a given time is limited by the condition – the sum of the speed weights of the individual concurrent input/output operations (as specified in the appropriate transfer channel specifications) does not exceed unity.

Input/Output Switching Units

One or more input/output switching units can, in general, be connected to an input/output transfer channel, permitting the channel to be shared between a multiplicity of input/output devices. Switching units also can be combined in configurations, permitting multiple input/output transfer channels to be shared by a group of input/output devices. In the latter configurations, the input/output channels may be located in different computers thereby permitting operation of the same input/output devices by more than one computer.

On-Line Input/Output Devices

On-line input/output devices can be added to an RCA 601 computer unit at any time through appropriate input/output transfer channels and switching units.

PHYSICAL CHARACTERISTICS

Standard RCA 601 Equipment Module

The dimensions of a standard RCA 601 equipment module are approximately 10-inches wide, 25-inches deep, and 24-inches high. The weight of this module is approximately 80 lbs. These modules are contained in standard RCA 601 equipment cabinets.

Standard RCA 601 Equipment Cabinet

The dimensions of a standard RCA 601 equipment cabinet are approximately 22-inches wide, 25-inches deep, and 72-inches high. The weight of this cabinet alone is approximately 300 lbs. Sufficient cabinets are supplied, by RCA, to contain all units of a desired system complement.

OPERATING REQUIREMENTS

Power

The following conversion to required RCA 601 computer input power can be made when the power requirements for a unit are given in terms of standard RCA 601 power units:

A standard RCA 601 power unit is equivalent to 3.6 KVA.

System input power must be supplied from a Y-connected, grounded neutral, 3-phase source of 208 volts, $\pm 10\%$ at 60 cycles, $\pm 1/2$ cycle.

Average dissipated heat for a unit is approximately 10,000 Btu/hr. per standard RCA 601 power unit required.

Cooling

For proper operation of an RCA 601 System, the environment must be maintained at a temperature between 65° F and 85° F. Below 70° F and above 80° F, the temperature should not be allowed to vary more than $\pm 2^\circ$ F from a reference point over a 6-hour period. The relative humidity must not drop below 20% nor exceed 65% with a maximum dew point of 58° F. Within a 6-hour period, the relative humidity should not vary more than $\pm 5\%$ from a nominal operating point.

COMPUTER UNITS

COMPUTER, MODEL 603

1. DESCRIPTION

1.1 GENERAL.

The Computer, Model 603, is a general-purpose, stored-program, digital computer, utilizing transistor and diode circuitry. It provides high-speed storage, processing, and on-line input/output device control capabilities for the RCA 601 System.

1.2 SUB-UNITS

Basic Processing Unit

Provides circuits for program control, on-line input/output device control, and processing of elementary operations.

Instruction Control Unit

Provides the circuits required to control the execution of a selected set of computer instructions including those utilizing the decimal arithmetic unit, those concerned with program modification, character and half- and full-word data handling operations.

High-Speed Storage Unit

Provides 8,192 words of magnetic-core storage with characteristics similar to the High-Speed Storage Unit, Model 661.

Decimal Arithmetic Unit

Provides the circuits required for parallel-word decimal arithmetic.

Paper Tape Transfer Channel

Provides the circuits required for the basic processing unit to connect to and operate the Paper Tape Reader, Model 621 and the Computer Punch Model 512.

Console Transfer Channel

Provides the circuits required to connect the console to the basic processing unit.

Console

Provides switches and indicating lights for manually controlling and monitoring the operation of the system. A 10-character-per-second monitor printer is also provided for on-line printing of pertinent data, or on-line manual entry of data to the system.

Power Supply Control Unit

Provides the controls for cycling on and off, as well as maintaining the correct voltage levels in the system.

Power Supply

Supplies the d-c voltages required for operation of the system circuits.

A-C Distribution Center

Provides a regulated source of a.c. for the RCA 601 System.

1.3 OPERATION

Programming

Two types of commands are performed by the Computer: half-word-length elementary operations and variable-length instructions. Provision is made for the addition of new instructions to the Computer at any time. Provision is also made for the addition of instruction control units for achieving increased instruction execution speeds.

Internal Storage

8,192 words of high-speed storage are available with characteristics similar to those of the Model 661 High-Speed Storage Unit. Provision is made for the addition of up to three of the latter type units to the Model 603 Computer thereby providing a maximum storage capacity of 32,768 words.

Input/Output

Provision is made for the addition of simultaneous input/output transfer channels and demand operated input/output channels to the Computer. Electronic switches can be added to each channel to permit an excess of 64 input/output devices to be operated on-line by the Model 603 Computer.

Simultaneity and Parallel Processing

In addition to the capability of achieving simultaneous operation of input/output devices within one program, provision is made for concurrent operation of a number of independent programs.

Accuracy Control

Special error detecting circuits provide machine malfunction alarms. In addition, a real-time clock, memory lock-out facilities, and other checking features permit the detection of a wide range of programming errors.

2. SPECIFICATIONS

2.1 DATA FORMAT

Data can be directly addressed and manipulated as 56-bit words; 28-bit half words; and eight-bit, six-bit, four-bit, or three-bit characters. A 28-bit half word consists of 24 information bits, a three-bit tag, and a parity bit.

2.2 PERFORMANCE

High-Speed Memory Capacity

8,192 directly-addressable 56-bit words (expandable up to 32,768 words).

Memory Cycle Time

1.5 microseconds.

Internal Data Transfer Rate

333,333 words per second, with 8,192 word memory. Up to 600,000 words per second with expanded memory.

11 Digit X 11 Digit Multiply Time

70 microseconds.

Simultaneously Operating On-Line Input/Output Devices

Expandable up to 16.

Combined Input/Output Data Transfer Rate

Up to 120,000 words per second (in an expanded system).

Instructions

Variable length with assumed and multi-level indirect address options.

Indexing

Eight index registers are provided, and multi-level indexing is permitted.

2.3 INTERCONNECTION

2.3.1 With Other Units

603 Computer to:

Optional processing or storage unit – 15 feet maximum

Input/output transfer channel – 20 feet maximum

Model 621 Paper Tape Reader – 50 feet maximum

Model 512 Computer Punch – 50 feet maximum.

2.3.2 With Sub-Units

All sub-units with the exception of the console are physically adjacent to each other. The console may be located remotely, but the interconnecting cable may not exceed 50 feet in length.

2.4 PHYSICAL CHARACTERISTICS

Dimensions (Approximate)

Control, processing, storage, and power supply elements are contained in eight standard RCA 601 System equipment cabinets.

Console with monitor printer: Height – 42 inches, Width – 68 inches, Depth – 36 inches.

Weight (Approximate)

4,500 lbs.

2.5 OPERATING REQUIREMENTS

Power

The Model 603 Computer requires 4.4 standard RCA 601 power units for its operation. It is capable of supplying power for expanded system requirements.

COMPUTER, MODEL 604

1. DESCRIPTION

1.1 GENERAL

Computer, Model 604, is a general-purpose, stored-program, digital computer utilizing transistor and diode circuitry. It provides high-speed storage, processing, and on-line input/output device control capabilities for the RCA 601 System. The Computer performs arithmetic operations at exceptionally high speeds.

1.2 SUB-UNITS

Basic Processing Unit

Provides circuits for program control, on-line input/output device control, and processing of elementary operations.

Instruction Control Unit

Provides the circuits required to control the execution of a selected set of computer instructions including those utilizing the high-speed arithmetic unit, those concerned with program modification, and half- and full-word data handling operations.

High-Speed Storage Unit

Provides 8,192 words of magnetic-core storage with characteristics similar to the High-Speed Storage Unit, Model 661.

High-Speed Arithmetic Unit

Provides the circuits required for high-speed, parallel word, fixed- and floating-point binary and decimal arithmetic operations.

Paper Tape Transfer Channel

Provides the circuits required for the basic processing unit to connect to and operate the Paper Tape Reader, Model 621, and the Computer Punch, Model 512.

Console Transfer Channel

Provides the circuits required to connect the console to the basic processing unit.

Console

Provides switches and indicating lights for manually controlling the operation of the system. A 10-character-per-second monitor printer is also provided for on-line printing of pertinent data or on-line manual entry of data to the system.

Power Supply Control Unit

Provides the controls for cycling on and off, as well as maintaining the correct voltage levels in the system.

Power Supply

Supplies the d-c voltages required for operation of the system circuits.

A-C Distribution Center

Provides a regulated source of a.c. for the RCA 601 System.

1.3 OPERATION

Programming

Two types of commands are performed by the Computer: half-word length elementary operations and variable length instructions. Provision is made for the addition of new instructions to the Computer at any time. Provision is also made for the addition of instruction control units for achieving increased instruction execution speeds.

Internal Storage

8,192 words of high-speed storage are available with characteristics similar to those of the Model 661 High-Speed Storage Unit. Provision is made for the addition of up to three of the latter type units to the Model 604 Computer thereby providing a maximum storage capacity of 32,768 words.

Input/Output

Provision is made for the addition of simultaneous input/output transfer channels and demand operated input/output channels to the Computer. Electronic switches can be added to each channel to permit an excess of 64 input/output devices to be operated on-line by the Model 604 Computer.

Simultaneity and Parallel Processing

In addition to the ability to achieve the simultaneous operation of input/output devices within one program, provision is made for concurrent operation of a number of independent programs.

Accuracy Control

Special error detecting circuits provide machine malfunction alarms. In addition, a real-time clock, memory lock-out facilities, and other checking features permit the detection of a wide range of programming errors.

2. SPECIFICATIONS

2.1 DATA FORMAT

Data can be directly addressed and manipulated as 56-bit words; 28-bit half words; and eight-bit, six-bit, four-bit or three-bit characters. A 28-bit half-word consists of 24 information bits, a three-bit tag, and a parity bit.

2.2 PERFORMANCE

High-Speed Memory Capacity

8,192 directly addressable 56-bit words (expandable up to 32,768 words).

Memory Cycle Time

1.5 microseconds

Internal Data Transfer Rate

Up to 333,333 words per second with 8,192 word memory. Up to 600,000 words per second with expanded memory.

11 Digit X 11 Digit Floating- or Fixed-Point Multiply Time

10 microseconds

Simultaneously Operating On-Line Input/Output Devices

Expandable up to 16.

Combined Input/Output Data Transfer Rate

Up to 120,000 words per second (in an expanded system).

Instructions

Variable length with assumed and multi-level indirect address options.

Indexing

Eight index registers are provided, and multi-level indexing is permitted.

2.3 INTERCONNECTION

2.3.1 With Other Units

Model 604 Computer to:

Optional processing or storage unit – 15 feet maximum

Input/output transfer channel – 20 feet maximum

Model 621 Paper Tape Reader – 50 feet maximum

Model 512 Computer Punch – 50 feet maximum

2.3.2 With Sub-Units

All sub-units with the exception of the console are physically adjacent to each other. The console may be located remotely, but the interconnecting cable may not exceed 50 feet in length.

2.4 PHYSICAL CHARACTERISTICS

Dimensions (Approximate)

Control, processing, storage, and power supply elements are contained in nine standard RCA 601 System equipment cabinets.

Console with monitor printer: Height – 42 inches, Width – 68 inches, Depth – 36 inches.

Weight (Approximate)

5,000 lbs.

2.5 OPERATING REQUIREMENTS

Power

The Model 604 Computer requires 4.8 standard RCA 601 power units for its operation. It is capable of supplying power for expanded system requirements.

HIGH-SPEED STORAGE UNIT, MODEL 661

1. DESCRIPTION

1.1 GENERAL

High-Speed Storage Unit, Model 661, is a magnetic-core random-access memory with a storage capacity of 8,192 56-bit words. Up to three of these units may be added to the Computer, enabling its total directly-addressable internal storage capacity to be expanded to 32,786 words.

1.2 SUB-UNITS

Memory Unit

Contains the necessary registers, addressing logic, core arrays and control to provide for data storage and retrieval.

Power Supply

Provides the voltage levels required by the unit.

1.3 OPERATION

General

Under direction of the Computer, data in the form of parallel groups of 56 bits or 28 bits may be stored in or retrieved from a storage location specified by an address.

Read-Regenerate Cycle

This is the basic memory cycle which is executed in its entirety in 1.5 microseconds. During this cycle, the contents of a specified memory location are retrieved from the storage unit without changing the original contents of this location.

Write Cycle

During this cycle, a specified storage location is cleared and new data, supplied by the Computer, is stored in the cleared location. This cycle is executed in the same time as a read-regenerate cycle.

Split-Cycle Read

During this cycle, the contents of a specified storage location are retrieved and the location is left in its cleared state. This cycle requires less time than the read-regenerate cycle; it must be followed by a split-cycle write.

Split-Cycle Write

During this cycle, new data supplied by the Computer is stored in the specified location, which was previously cleared by a split-cycle read.

2. SPECIFICATIONS

2.1 DATA FORMAT

Address

A high-speed storage unit address consists of 20 bits allocated as follows: 13 bits specify one out of the 8,192 unique word locations in a single storage unit; 2 bits specify one out of the possible four storage units associated with the Computer; the remaining 5 bits are used to specify partial word bit groupings, and for accuracy control purposes.

Data

The High-Speed Storage Unit handles data as 56-bit words or 28-bit half words.

2.2 PERFORMANCE

Cycle

1.5 microseconds.

Capacity

8,192 56-bit words

Expandability

Up to three High-Speed Storage Units may be added to the Computer.

2.3 INTERCONNECTION

High-Speed Storage Unit to Computer – 15 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

Dimensions

The High-Speed Storage Unit is contained in two standard RCA 601 System equipment cabinets.

Weight (Approximate)

750 lbs.

2.5 OPERATING REQUIREMENTS

Power

Power for this unit is obtained from the High-Speed Storage Power Supply. Each additional High-Speed Storage Unit increases input power to the System by 2.0.

INPUT/OUTPUT TRANSFER CHANNELS

MAGNETIC TAPE TRANSFER CHANNEL, MODEL 610

1. DESCRIPTION

1.1 GENERAL

Magnetic Tape Transfer Channel, Model 610, permits the Computer to control, write, and read information on Magnetic Tape stations of the RCA 501 series, i.e., 22-kc, 33-kc, 66-kc tapes. Provision is made for writing and reading tagged information as well as standard alpha-numeric data. If desired, data may also be tagged as it is read.

1.2 SUB-UNITS

Read Buffer

Permits the Computer to control and read information from Magnetic Tape Stations.

Write Buffer

Permits the Computer to control and write information to Magnetic Tape Stations.

1.3 OPERATION

The Magnetic Tape Transfer Channel permits simultaneous operation of two Magnetic Tape Stations (one reading, one writing) concurrently with other Computer operations. It provides two-level word-length buffer stores from which characters are written to or read from magnetic tape. Each buffer is preset by the Computer to operate in either the alpha-numeric or the tag mode. In the alpha-numeric mode, only the most significant 24 bits of a memory half word are written to or read from the tape. These 24 bits are put on tape as four 6-bit characters. In the tag mode, the most significant 27 bits are put on tape as five 6-bit characters. Parity is checked or generated on all data which is received by or transmitted from the buffers. A read-after-write check is automatically executed when writing to 66-kc tapes.

2. SPECIFICATIONS

2.1 DATA FORMAT

Each buffer receives or transmits data (in two half words) to or from the Computer. Data is received from or transmitted to Magnetic Tape Stations in 7-bit characters (six bits plus parity).

2.2 PERFORMANCE

Data Transfer Rate

Nominal rates to or from magnetic tape of 22,222, 33,333 or 66,666 seven-bit characters per second.

Speed Weight

When reading from tape:

10/64 at 66 kc, 6/64 at 33 kc, and 4/64 at 22 kc.

When writing to tape:

8/64 at 66 kc, 4/64 at 33 kc, and 3/64 at 22 kc.

2.3 INTERCONNECTION

Magnetic Tape Transfer Channel to Computer – 20 feet maximum

Magnetic Tape Transfer Channel to Electronic Tape Switch – 50 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

The Magnetic Tape Transfer Channel is contained in two standard RCA 601 System equipment modules.

2.5 OPERATING REQUIREMENTS

The Magnetic Tape Transfer Channel requires 0.54 standard RCA 601 power unit for its operation.

MAGNETIC TAPE TRANSFER CHANNEL, MODEL 611

1. DESCRIPTION

1.1 GENERAL

Magnetic Tape Transfer Channel, Model 611 permits the Computer to control, write, and read information on 120-kc Magnetic Tape Stations, Model 681. Provision is made for automatic error correction of characters read from tape. Reading or writing tagged information is possible in addition to reading or writing standard alpha-numeric data. Provision is made for tagging data as it is read.

1.2 SUB-UNITS

Read Buffer

Permits the Computer to control and read information from Magnetic Tape Stations.

Write Buffer

Permits the Computer to control and write information to Magnetic Tape Stations.

1.3 OPERATION

The Magnetic Tape Transfer Channel permits simultaneous operation of two Magnetic Tape Stations (one reading, one writing) concurrently with other computer operations. It provides two-level double-word-length buffer stores from which characters are written to or read from magnetic tape.

Six-bit characters in the write buffer are converted to 10-bit self-correcting code for recording on tape. When reading from tape, the 10-bit characters are converted back into six-bit code for accumulation in the buffer store. Special circuits provide automatic error correction for characters read from tape. A read-after-write check is automatically executed when writing data onto tape.

Each buffer is preset by the Computer to operate in either the alpha-numeric or tag mode. In the alpha-numeric mode, only the most significant 24 bits of a memory half word are written on or read from tape. These 24 bits are put onto tape in the form of four 6-bit characters. In the tag mode, the most significant 27 bits of a memory half word are written on or read from tape. These 27 bits are put onto tapes in the form of five 6-bit characters.

Parity is checked or generated on all data which is received or transmitted by the sub-units.

2. SPECIFICATIONS

2.1 DATA FORMAT

Four half words of data are received from or transmitted to the Computer each time a buffer is serviced. Data is received from or transmitted to the Magnetic Tape Station, ten bits in parallel (six-bit characters plus four error correcting bits).

2.2 PERFORMANCE

Data Transfer Rate

Nominal rates of 120,000 ten-bit characters per second, to or from magnetic tape.

Speed Weight

When reading from tape, the speed weight is 10/64.

When writing on tape, the speed weight is 8/64.

2.3 INTERCONNECTION

Magnetic Tape Transfer Channel to Computer – 20 feet maximum.

Magnetic Tape Transfer Channel to Electronic Tape Switch – 50 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

The Magnetic Tape Transfer Channel is contained in three standard RCA 601 System equipment modules.

2.5 OPERATING REQUIREMENTS

The Magnetic Tape Transfer Channel requires 1.05 standard RCA 601 power units for its operation.

PRINTER TRANSFER CHANNEL, MODEL 612

1. DESCRIPTION

1.1 GENERAL

Printer Transfer Channel, Model 612 permits the Computer to operate On-Line Printer, Model 632, concurrently with other computer operations.

1.2 OPERATION

Either alpha-numeric or numeric characters can be printed. The maximum field that can be printed is 120 characters. The paper is advanced one line upon completion of a field. In addition, three modes of paper advance can be initiated: line shift, page change, and vertical tab.

2. SPECIFICATIONS

2.1 DATA FORMAT

An integral number of half words is sent to the Printer Transfer Channel from the Computer during the print cycle. A maximum of four half words is transmitted during each service cycle.

Synchronization is supplied by the printer in the form of seven-bit characters.

2.2 PERFORMANCE

Alpha-Numeric Printing Rate

Up to 600 lines per minute.

Speed Weight

The speed weight for printing is 10/64.

The speed weight for paper advance is 1/64.

2.3 INTERCONNECTION

Printer Transfer Channel to Computer – 20 feet maximum.

Printer Transfer Channel to On-Line Printer – 100 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

The Printer Transfer Channel is contained in one standard RCA 601 System equipment module.

2.5 OPERATING REQUIREMENTS

The Printer Transfer Channel requires 0.35 standard RCA 601 power units for its operation.

CARD TRANSFER CHANNEL, MODEL 613

1. DESCRIPTION

1.1 GENERAL

Card Transfer Channel, Model 613, permits the Computer to operate a Model 634 Card Punch and a Model 623 Card Reader. It permits simultaneous operation of both the punch and reader with other computer operations.

1.2 SUB-UNITS

Read Buffer

Contains the circuits required to control the card-reading operation and provide temporary storage for data read from cards.

Punch Buffer

Contains the circuits required to control the card-punching operation and provide temporary storage for data to be punched.

1.3 OPERATION

Read Operation

Each column of the card is read by two sensing stations, and the outputs of these stations are transmitted to the Card Transfer Channel where they are compared. Two columns are accumulated in a half-word buffer before they are transmitted to the Computer. Tag and parity bits are added to the 24 information bits at the time of this transmission.

Punch Operation

Information for punching is stored in a maximum of 40 consecutive half-word locations of the computer memory. Each half word contains the code to be punched in two adjacent card columns. As each half word is transmitted to the Card Transfer Channel, the correct bits for the row being punched are selected and stored. When the bit pattern for the row is accumulated, it is transmitted to the Card Punch. Read-after-punch returns are checked against the information previously transmitted to the Card Punch.

2. SPECIFICATIONS

2.1 DATA FORMAT

Cards are read column by column, therefore, 12 bits at a time are sent from the read station to the Card Transfer Channel.

Punching is done by row; 80 wire lines are used for transmitting data from the Card Transfer Channel to the punching station.

Information, sent between the Card Transfer Channel and the Computer, is in half-word format.

2.2 PERFORMANCE

Read

Up to 400 half words per second.

Punch

Up to 67 half words per second.

Speed Weight

The speed weight for either operation is 4/64.

2.3 INTERCONNECTION WITH OTHER UNITS

Card Transfer Channel to Card Punch, Model 634 – 100 feet maximum.

Card Transfer Channel to Card Reader, Model 623 – 100 feet maximum.

Card Transfer Channel to Computer – 20 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

The Card Transfer Channel is contained in one standard RCA 601 System equipment module.

2.5 OPERATING REQUIREMENTS

Power

The Card Transfer Channel requires 0.35 standard RCA 601 power unit for its operation.

PAPER TAPE TRANSFER CHANNEL, MODEL 614

1. DESCRIPTION

1.1 GENERAL

The Paper Tape Transfer Channel, Model 614, permits the Computer to receive data from 5- or 7-level paper tape and to punch paper tape in either a 5- or a 7-bit code.

1.2 SUB-UNITS

Read Register – Permits half-word accumulation of characters from the Paper Tape Reader.

Write Register – Half words from the storage unit are sent to this unit for character serial transmission to the Paper Tape Punch.

1.3 OPERATION

Reading – Information may be received in either 5-bit-teleprinter code or 6-bit plus parity alpha-numeric code from the Paper Tape Reader. Four characters are accumulated in the half-word register for transmission to the storage unit.

Writing – Information in 6-bit code is received from the Computer in half word multiples and stored in the write register. Five bits from each of the 4 characters in a half word are used to punch 5-level tape. For 7-level tape, the full 6 bits plus a parity bit are used.

2. SPECIFICATIONS

2.1 DATA FORMAT

All data transferred to and from the Computer are in standard half-word format.

Transmissions to and from the Paper Tape Reader or Punch are character serial, and the character may contain either 5 or 7 bits.

2.2 PERFORMANCE

Data Rate – up to 25 half words per second (read or punch)

Speed Weight – 1/64 (read or punch)

2.3 INTERCONNECTION

Paper Tape Transfer Channel to Computer – 20 feet maximum

Paper Tape Transfer Channel to Paper Tape Reader or Punch – 100 feet maximum

2.4 PHYSICAL CHARACTERISTICS

The Paper Tape Transfer Channel is contained in one standard RCA 601 module.

2.5 OPERATING REQUIREMENTS

The Paper Tape Transfer Channel requires 0.35 standard RCA 601 power unit for its operation.

INQUIRY TRANSFER CHANNEL, MODEL 617

1. DESCRIPTION

1.1 GENERAL

Inquiry Transfer Channel, Model 617, permits the connection of up to four Inquiry Consoles to the Computer. It provides a path for the transfer of information and command signals. The command signals cause the Computer to initiate a routine that performs supervisory action or that locates desired information. This information is printed on the associated monitor printer provided with the Inquiry Console.

1.2 OPERATION

Entering Criteria

Criteria are received from an Inquiry Console in the form of six-bit characters, and accumulated in an inquiry register. After four characters are entered, the half word is transferred to the Computer. After all the criteria have been entered, the Inquiry Transfer Channel will signal the Computer to search for the requested data.

Printing Data

After the information has been located, the Computer will transfer it to the inquiry register in single half words. The data is then transmitted to the requesting Inquiry Console in six-bit characters.

Accuracy Control

Parity is checked or generated on all half words received from or transmitted to the Computer. Parity is checked on all characters received from the Inquiry Console.

2. SPECIFICATIONS

2.1 DATA FORMAT

Data is received or transmitted to the Computer in single half words. Data is received or transmitted to the Inquiry Console in the form of six-bit characters.

2.2 PERFORMANCE

Data Rate

Data is transferred to the Inquiry Console at a maximum of 10 characters per second.

Speed Weight

The speed weight of the Inquiry Transfer Channel is 1/64.

2.3 INTERCONNECTION

Inquiry Transfer Channel to Computer – 20 feet maximum.

Inquiry Transfer Channel to Inquiry Console – 250 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

The Inquiry Transfer Channel is contained in one standard RCA 601 System equipment module.

2.5 OPERATING REQUIREMENTS

The Inquiry Transfer Channel requires 0.26 standard RCA 601 power unit for its operation.

INPUT/OUTPUT SWITCHING UNITS

ELECTRONIC TAPE SWITCH, MODEL 640

1. DESCRIPTION

1.1 GENERAL

Electronic Tape Switch, Model 640 permits up to six Magnetic Tape Stations* to be connected to two Model 610 Magnetic Tape Transfer Channels. This permits simultaneous operation of up to four from a group of six tape stations (two reading, two writing). Electronic Tape Switches may be interconnected to permit additional groups of six tape stations to be connected to the same two Magnetic Tape Transfer Channels, or to permit additional transfer channels to be connected to a given group of tape stations.

1.2 OPERATION

The Computer selects the appropriate Magnetic Tape Station which is to be operated and causes the corresponding switch points to be closed, thereby connecting this tape station to a transfer channel for subsequent operation

2. SPECIFICATIONS

2.1 DATA FORMAT

Data is transmitted to or from tape stations in the form of seven-bit characters.

2.2 PERFORMANCE

Switching Time

A selected switch point can be closed within one microsecond.

Connection To More Than Six Tape Stations

A maximum of eight Electronic Tape Switches, Model 640, can be combined for connecting up to 48 tape stations to two Magnetic Tape Transfer Channels.

Connection To More Than Two Tape Transfer Channels

A maximum of three Electronic Tape Switches can be combined for the connection of common tape stations to more than two Magnetic Tape Transfer Channels.

2.3 INTERCONNECTION

Electronic Tape Switch to Magnetic Tape Transfer Channel – 50 feet maximum.

Electronic Tape Switch to Electronic Tape Switch – 10 feet maximum.

Electronic Tape Switch to Magnetic Tape Station – 100 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

The Electronic Tape Switch is contained in one standard RCA 601 System equipment module.

2.5 OPERATING REQUIREMENTS

The Electronic Tape Switch requires 0.22 standard RCA 601 power unit for its operation.

*Only models specified by RCA.

ELECTRONIC TAPE SWITCH, MODEL 641

1. DESCRIPTION

1.1 GENERAL

Electronic Tape Switch, Model 641 permits up to six Magnetic Tape Stations* to be connected to two Magnetic Tape Transfer Channels, Model 611 for the simultaneous operation of up to four from a group of six tape stations (two reading, two writing). Electronic Tape Switches may be interconnected to permit additional groups of six tape stations to be connected to the same two Magnetic Tape Transfer Channels, or to permit additional transfer channels to be connected to a given group of tape stations.

1.2 OPERATION

The Computer selects the appropriate Magnetic Tape Station which is to be operated and causes the corresponding switch points to be closed, thereby connecting this tape station to a tape transfer channel for subsequent operation.

2. SPECIFICATIONS

2.1 DATA FORMAT

Data is transmitted to or from tape stations in the form of 10-bit characters.

2.2 PERFORMANCE

Switching Time

A selected switch point can be closed within one microsecond.

Connection To More Than Six Tape Stations

A maximum of eight Electronic Tape Switches can be combined for connecting up to 48 tape stations to two Magnetic Tape Transfer Channels.

Connection To More Than Two Tape Transfer Channels

A maximum of three Electronic Tape Switches can be combined for the connection of common tape stations to more than two Magnetic Tape Transfer Channels.

2.3 INTERCONNECTION

Electronic Tape Switch to Magnetic Tape Transfer Channel – 50 feet maximum.

Electronic Tape Switch to Electronic Tape Switch – 10 feet maximum.

Electronic Tape Switch to Magnetic Tape Station – 100 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

The Electronic Tape Switch is contained in one standard RCA 601 System equipment module.

2.5 OPERATING REQUIREMENTS

The Electronic Tape Switch requires 0.3 standard RCA 601 power unit for its operation.

* Only models specified by RCA.

ON-LINE INPUT/OUTPUT DEVICES

INQUIRY CONSOLE, MODEL 607

1. DESCRIPTION

1.1 GENERAL

The Inquiry Console, Model 607, is an on-line device into which criteria may be entered via a keyboard. Receipt of this criteria generates a signal which initiates a computer search subroutine. When the desired record is located by the Computer, information is typed out on the monitor printer associated with the Inquiry Console. Additional system control and monitoring functions can be executed from the Inquiry Console. These are limited only by the particular computer subroutine initiated.

1.2 SUB-UNITS

Monitor Printer

Standard keyboard operated device which generates characters in alpha-numeric code and which will type characters represented in the same code.

Control Panel

Facilitates checking of the unit when it is not connected to the Computer.

Power Supply

Furnishes the necessary power at the proper voltage levels for operation of the unit.

1.3 OPERATION

Criteria characters are entered on the keyboard of the monitor printer, and a control panel switch is depressed when the full criteria has been entered. When the desired information is located by the Computer, the data is typed out on the monitor printer. Indicators on the control panel indicate when criteria may be introduced into the system, when the Computer is searching for the data, and when all the data has been typed.

2. SPECIFICATIONS

2.1 DATA FORMAT

Data is received from or transmitted to the Inquiry Transfer Channel in the form of six-bit characters.

2.2 PERFORMANCE

Output Rate

Up to 10 characters per second.

Input Rate

Up to 10 characters per second.

2.3 INTERCONNECTION

Inquiry Console to Inquiry Transfer Channel – 250 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

Over-all Dimensions (Approximate)

Height – 42 inches, Width – 34 inches, Depth – 36 inches.

Weight (Approximate)

550 lbs.

2.5 OPERATING REQUIREMENTS

Power (Approximate)

0.24 KW at 115 volts, $\pm 10\%$, 60 cycles, single phase; 0.3 KVA max.

Average dissipated heat = 820 Btu/hr.

PAPER TAPE READER, MODEL 621

1. DESCRIPTION

1.1 GENERAL

Paper Tape Reader, Model 621, provides paper tape input for the Computer. This unit will read punched paper tape under command of the Computer at the rate of 1,000 characters per second in the forward direction.

1.2 OPERATION

This unit senses, by photo-electrical methods, a one-inch wide, seven-level punched-paper tape.* Paper tape may be read while mounted on reels, or in strip form. The reader will accept tape strips with over 15 feet of recording, if a four-foot leader and a four-foot trailer are provided. Shorter strips require a two-inch leader and are read without the reel servomechanism in operation.

2. SPECIFICATIONS

2.1 DATA FORMAT

Data is read from paper tape in the form of seven-bit characters.

2.2 PERFORMANCE

Reading Rate

1,000 characters per second (nominal)

Tape Speed

100 inches per second (nominal) either reading or rewinding.

Packing Density

10 characters per inch.

Tape Width

1 inch.

Stop Distance

0.6 inch maximum.

Tape Reels

Accommodates up to 800-foot reels.

Start-Stop Gap

7 to 10 character positions.

*Only paper tape specified by RCA should be used.

2.3 INTERCONNECTION

Paper Tape Reader to Input Transfer Channel – 50 feet maximum.

Paper Tape Reader to Input Switch Unit – 50 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

Dimensions (Approximate)

Height – 42 inches, Width – 34 inches, Depth – 36 inches.

Weight (Approximate)

250 lbs.

2.5 OPERATING REQUIREMENTS

Power

0.5 KVA of regulated power and 0.5 KVA of unregulated power required from the a-c distribution center.

CARD READER, MODEL 623

1. DESCRIPTION

1.1 GENERAL

Card Reader, Model 623, is an on-line computer input device which automatically reads information punched in 80-column cards.* The cards are read column by column.

1.2 SUB-UNITS

Card Reader

Provides the circuits and mechanisms required to handle and read cards under control of the Computer.

Power Supply

Provides the proper voltage for operation of the Card Reader.

1.3 OPERATION

A punched card is read upon computer demand. Each column on a card is read twice, thereby facilitating a check of the reading operation by the Computer. The Card Reader stops upon sensing a card jam, empty input hopper, full output hopper, or full reject hopper.

2. SPECIFICATION

2.1 DATA FORMAT

Each card may contain a maximum of 80 columns with 12-punch positions in each column.

2.2 PERFORMANCE

Reading Rate

The Card Reader may be operated on a demand basis under control of the Computer at a maximum rate of 600 cards per minute.

Card Capacity

Approximately 2,000 cards.

Reject Card Capacity

Approximately 500 cards.

2.3 INTERCONNECTION

Card Reader to Card Transfer Channel – 100 feet maximum.

* Only cards specified by RCA should be used.

2.4 PHYSICAL CHARACTERISTICS

Over-All Dimensions (Approximate)

Height – 45 inches, Width – 48 inches, and Depth – 30 inches.

Weight (Approximate)

500 lbs.

2.5 OPERATING REQUIREMENTS

Power (Approximate)

0.5 KVA of regulated power and 1.7 KVA of unregulated power required from the a-c distribution center.

Average dissipated heat = 6,200 Btu/hr. (1.8 KW).

ON-LINE PRINTER, MODEL 632

1. DESCRIPTION

1.1 GENERAL

On-Line Printer, Model 632, is an on-line computer output device. It provides the mechanism to print a line of up to 120 characters on edge-perforated paper.

1.2 SUB-UNITS

Printer

Provides the circuits and mechanisms required to print a line of characters and to advance the paper.

Power Supply

Provides the proper voltages for operation of the printer.

1.3 OPERATION

Printing

Output data supplied by the Computer is printed one line at a time. The Printer provides the Computer with the timing information required for control of the Printer. The vertical printing format is also controlled by the Computer, either directly or through a punched paper tape loop in the Printer.

Paper Advance

The Computer can initiate either a single- or multiple-line paper shift. A vertical tabulation or page change can also be initiated which causes the paper to be advanced to a specified line within a page, or to the beginning of the next page. Both the specified line within a page and the beginning of a page are designated on a paper tape loop in the Printer. During the paper advance function, the Computer is notified if the paper supply is low.

2. SPECIFICATIONS

2.1 DATA FORMAT

Maximums of 120 characters per line, 10 characters per inch horizontally, and 6 lines per inch vertically can be printed. A total of 51 printable characters are available, i.e.: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9 : \$ % ; / + - * . , # () " = .

2.2 PERFORMANCE

Vertical Printing Rate

Up to 600 lines per minute.

Vertical Paper Motion Speed

70 lines per second minimum (when more than 3 lines).

Paper Stock

Single- or multiple-sheet fanfold, from 3 to 17 inches in width and up to 17 inches in sheet length, provided the length is a multiple of the standard sprocket distance (1/2 inch). One original plus 3 copies; hecto or multilith master stock may also be used. Paper stock is subject to RCA approval.

2.3 INTERCONNECTION

On-Line Printer to Printer Transfer Channel – 100 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

Dimensions (Approximate)

Power supply contained in the base of standard RCA 601 System equipment cabinets.
Printer: Height – 45 inches, Width – 30 inches, Depth – 45 inches.

Weight (Approximate)

1,500 lbs.

2.5 OPERATING REQUIREMENTS

Power (Approximate)

2.0 KW running, 1.0 KW standby at 115, 208 or 230 volts, $\pm 10\%$, 60 cycles; single phase, 2.5 KVA maximum.

Average dissipated heat = 5,460 Btu/hr., running
3,413 Btu/hr., standby

CARD PUNCH, MODEL 634

1. DESCRIPTION

1.1 GENERAL

Card Punch, Model 634, is an on-line Computer output device. It provides the mechanism required to record data in the form of punched holes in an 80-column card.*

1.2 SUB-UNITS

Card Punch

Provides the circuits and mechanisms required to handle and punch cards under control of the Computer.

Power Supply

Provides the proper voltages for operation of the Card Punch.

1.3 OPERATION

A new card is punched upon computer demand. Each card is read after it is punched, thereby facilitating a check by the Computer on the punching operation. The Card Punch automatically halts when either the card supply is exhausted or the output hopper capacity is exceeded.

2. SPECIFICATIONS

2.1 DATA FORMAT

A maximum of 80 columns may be punched on each card. There are 12-punch positions in each column.

2.2 PERFORMANCE

Punching Rate

The Card Punch may be operated under control of the Computer on a demand basis at a maximum rate of 100 cards per minute.

Card Capacity (Approximate)

Input hopper – 800 cards; Output hopper – 1,000 cards.

2.3 INTERCONNECTION

Card Punch to Card Transfer Channel – 100 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

Over-All Dimensions (Approximate)

Height – 47 inches, Width – 30 inches, Depth – 19 inches.

*Only cards specified by RCA should be used.

Weight (Approximate)

400 lbs.

2.5 OPERATING REQUIREMENTS

Power (Approximate)

1.5 KVA of regulated power and 1.7 KVA of unregulated power required from the a-c distribution center.

Average dissipated heat = 8,750 Btu/hr. (2.6 KW).

MAGNETIC TAPE STATION, MODEL 681

1. DESCRIPTION

1.1 GENERAL

Magnetic Tape Station, Model 681, is a transistorized unit which is used for reading, writing, and erasing binary-coded characters on magnetic tape in response to applied control signals. Recording is done simultaneously on 10 channels: six for information, four for accuracy control.

The Magnetic Tape Station is designed to facilitate manual interchange of tape reels, which can be accomplished in less than one minute.

1.2 SUB-UNITS

Rack Assembly

Contains all components necessary for reading, writing and erasing on magnetic tape; it includes a tape transport mechanism, reel servo amplifiers, control circuits, read and write amplifiers, and a power supply. The rack assembly is mounted on rollers for ease of removal and replacement in its cabinet.

Cabinet

The enclosure for housing the rack assembly.

1.3 OPERATION

The Magnetic Tape Station uses a tape transport mechanism to move magnetic tape past recording heads such that signals can be properly written on or read from the tape. Amplifiers are provided for both reading and writing on the tape. Control circuits and mechanisms are provided to respond to commands from the Magnetic Tape Transfer Channel, to respond to commands from the control panel on the Magnetic Tape Station, and to respond to local conditions which have rendered the Magnetic Tape Station inoperable.

2. SPECIFICATIONS

2.1 DATA FORMAT

Data is recorded simultaneously on 10 channels: six for information, four for accuracy control.

2.2 PERFORMANCE

Data Transfer Rate

Up to 120,000 alpha-numeric characters per second.

Recording Density

800 characters per inch nominal.

Tape Capacity

One 10.5-inch take-up reel is supplied. This reel accommodates 2,400 feet of magnetic tape of which a minimum length of 2,300 is available for recording information.

Reading

The Magnetic Tape Station is capable of reading tape in both the forward and reverse directions.

Writing

The Magnetic Tape Station is capable of writing on tape in the forward direction only. Read-after-write is provided.

Start-Stop Time

6 milliseconds, nominal.

Start-Stop Gap

Nominally, 0.9 inches.

2.3 INTERCONNECTION

Magnetic Tape Station to Electronic Tape Switch – 100 feet maximum.

Magnetic Tape Station to Magnetic Tape Transfer Channel – 100 feet maximum.

2.4 PHYSICAL CHARACTERISTICS

Over-All Dimensions (Approximate)

Height – 69 inches, Width – 44 inches, and Depth – 24 inches including trim.

Weight (Approximate)

550 pounds.

2.5 OPERATING REQUIREMENTS

Power (Approximate)

3.0 KVA of regulated power and 0.75 KVA of unregulated power required from the a-c distribution center.

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