

Burroughs

**SERIES L ELECTRONIC BILLING COMPUTER
AND
SERIES TC TERMINAL COMPUTER**

OPERATOR MANUAL

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INTRODUCTION

The Series L Electronic Billing Computer has been designed to help process the ever increasing paperwork demands of modern business, especially in the billing area. The TC Series has been created for the on-line, data communications environment. From the operator's viewpoint, the basic characteristics of both Series L and TC are similar.

This Operator's Manual is intended to cover many of the basic operating features of the Series L and TC, and make your installation productive more quickly. Should you have need for additional information, please contact your local Burroughs Representative.



Figure 1 - Series TC 500

SECTION 1

KEYBOARD OPERATIONS

1.1 INTRODUCTION

For the purpose of explaining key functions and keyboard instructions, the console is considered as having three separate keyboards: Typewriter, Numeric, and Program Selectors.

Use of the keyboard does not provide any direct result, other than to enter codes into a keyboard buffer, which is a temporary storage area in the machine. A program instruction is required to accept the data from the buffer into the system for processing and/or printing.

All keys – Typing, Numeric, and Program Select keys – are interlocked to prevent simultaneous depression.

When power is off to the machine, keys are not locked against depression. However, if the keys are depressed, no action will result from the depressed key or control when the power is turned on.

1.2 INDICATOR LAMPS AND ERROR INDICATION

Lamps are provided to communicate various operating conditions to the operator. These indicate which keyboard and/or program keys have been enabled, whether an operator error has occurred, and the status of input/output adjuncts (see Fig. 2). Each lamp is discussed with its associated key or function.

Failure of an indicator lamp will not prevent the function associated with the lamp.

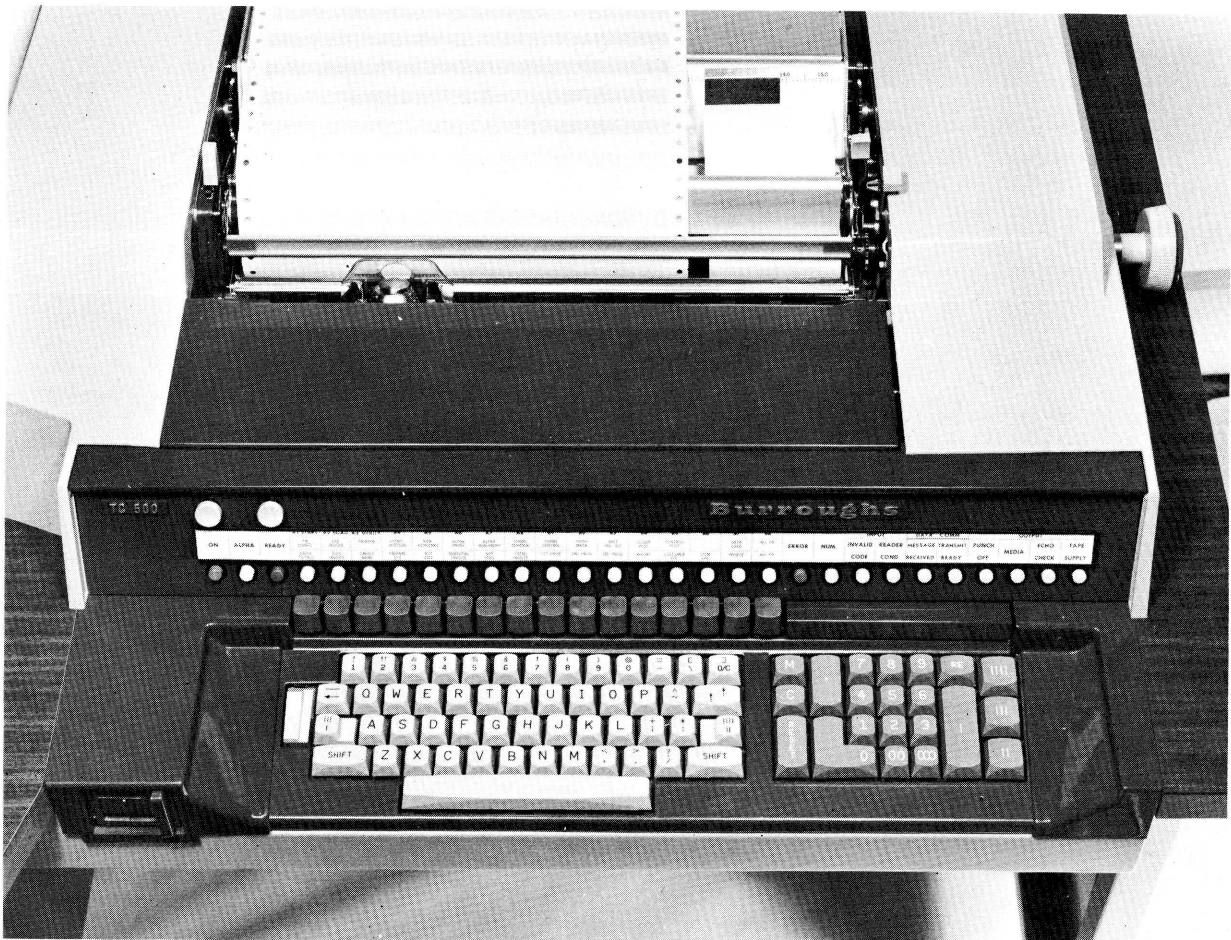


Figure 2 - Keyboard, Printer Carrier and Forms Transport

1.3 NUMERIC KEYBOARD

The Numeric Keyboard consists of 12 Numeral Indexing keys, a Decimal-Fraction key, Reverse Entry key, Per Hundred key and Per Thousand key, Reset key and four Operation Control keys (OCK's). The Numeric Keyboard Indicator Light is "on" when the program calls for a numeric data entry.

If a number is indexed when Typewriter Keyboard instruction is called for, the numeric keyboard codes (except OCK's) are rejected, the Keyboard Error light is turned on and the alarm sounds once.

The numeric keyboard may be programed for operator entry of a maximum of 15 digits, most significant digit first. Indexing capacity is a function of the numeric keyboard instruction on each entry. If the programed capacity is exceeded, the Error light is illuminated and sounds the alarm.

1.3.1 Numeral Indexing Keys

The Numeral keys consist of keys for "0 through 9", a Two-Cipher key and a Three-Cipher key. The maximum number of digits that may be indexed is specified in the instruction.

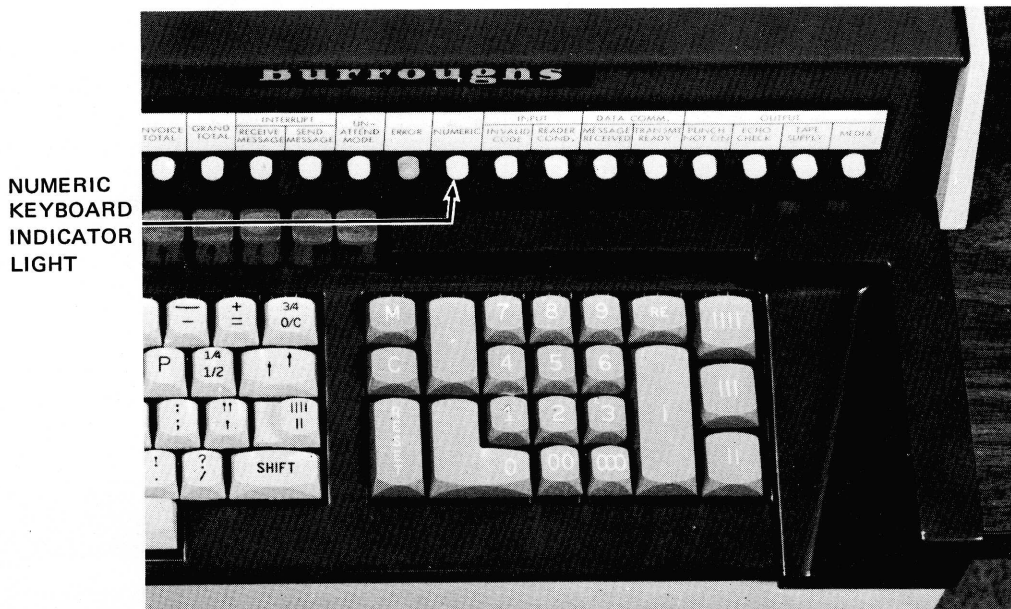


Figure 3 - Numeric Keyboard

1.3.2 Decimal-Fraction Key

Numeric Keyboard entry is modified by the depression of the Decimal-Fraction key. Keys indexed prior to depression of the Decimal-Fraction key cause digits to be aligned to the left of the programed decimal. Depression of the Decimal-Fraction key causes digits entered after depression to be aligned to the right of the programed decimal. The position of the programed decimal is determined by each numeric keyboard instruction.

1.3.3 Reverse Entry Key – RE

Depression of this key changes the sign of data entered from plus to minus. It is used to enable proper arithmetic and provide printing of special symbols. The key may be used only when programed. Use of the key without programing will cause the error light to illuminate and sounds the alarm.

1.3.4 Per Hundred Key – C

Depression of this key causes proper decimal alignment of calculations involving prices “per hundred”. The key may be used only when programed. Use of the key without programing will cause the error light to illuminate and sounds the alarm.

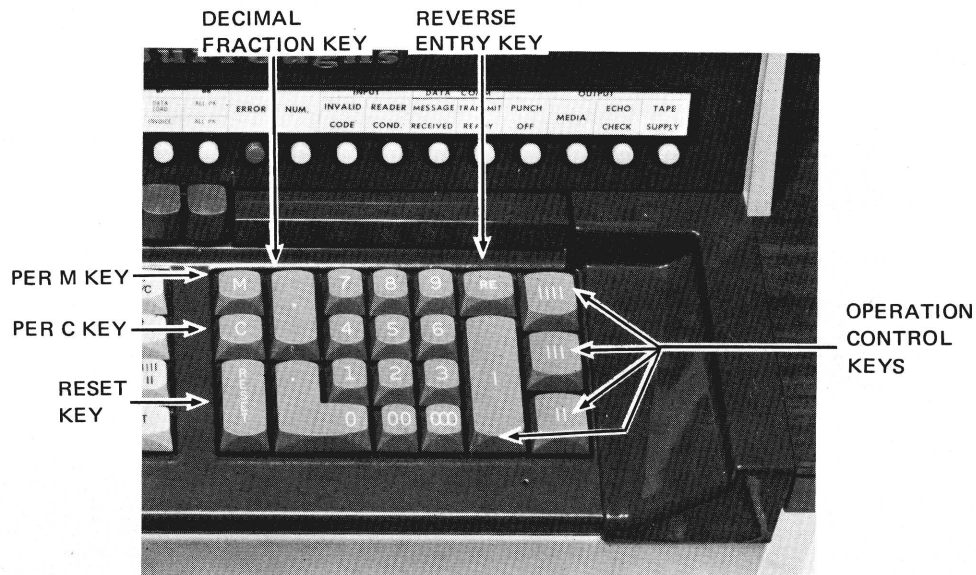


Figure 4 - Numeric Keyboard

1.3.5 Per Thousand Key – M

The depression of this key causes proper decimal alignment of calculations involving prices “per thousand”. The key may be used only when programed. Use of the key without programing will cause the error light to illuminate and sounds the alarm.

1.3.6 Reset Key

This key can be used with either the Typewriter or Numeric keyboards. When used with the Numeric keyboard after a keyboard error alert, or prior to use of an OCK, it performs the following functions:

1. Clears the Accumulator.
2. Turns off the Keyboard Error light, if light is ON.
3. Re-initiates the active Numeric Keyboard instruction.

1.3.7 Operation Control Keys (1, 2, 3, 4) (OCK)

The four Operation Control keys located on the Numeric keyboard are all used to terminate keyboard entry, thus allowing the program to continue to the next instruction in sequence.

Depression of an OCK sets a corresponding "OCK flag" in the control section of the computer. This "flag" can be used by the program to select alternate routines or functions.

1.4 TYPEWRITER KEYBOARD

The Typewriter Keyboard consists of 53 keys: — 44 typing keys, 2 Shift keys, a Space Bar, a Backspace key, an Open/Close key, a Line Advance key, 2 Operation Control keys and a memory load switch. Touch is that of an electric correspondence typewriter. Sustained manual input of 15.5 digits or characters per second (186 words per minute) is possible. Keyboard entry of alphanumeric data can be enforced by the program and complete control over the "size" (number of characters) of the data entered is available to the programmer.

The Reset key, on the Numeric keyboard, is available for use during a Typewriter Keyboard instruction. (See Section 1.4.9 for special conditions of use.)

The Typewriter keyboard is enabled only when any typewriter instruction is programed. The typewriter indicator lamp (ALPHA) is illuminated. If the Numeric keyboard is used when the Typewriter keyboard is called for, the numeric codes are rejected and the alarm sounds once.

1.4.1 Typing Keys

There are 26 alpha keys which transmit the same code whether in the shift or non-shift position. There are 20 typing keys (including the Open/Close and Backspace keys) which transmit a different code depending on whether they are used in a shift or non-shift position. Depression of any key sends its corresponding code to the buffer, and may or may not result in printing, depending on the instruction.



Figure 5 - Typewriter Keyboard (Data Communication Keyboard)

1.4.2 Shift Keys (2) "SHIFT"

The two shift keys, marked "SHIFT", when depressed with any shift character key, shifts character to upper case. A shift key used with any non-shift character key is ignored.

1.4.3 Space Bar (Not Marked)

The Space Bar (not marked) when depressed will cause the printer carrier to space 1/10 inch to the right if printing is enabled. When depressed to a second actuation point, it will space until released or until the programed typing capacity is exceeded.

1.4.4 Backspace/Underscore Key “←”

When depressed, this key will cause the printer carrier to space 1/10 inch to the left if printing is enabled. If the typing instruction is entering the data into memory, the Backspace key also decrements memory one character position for each 1/10 inch backspace. When depressed and held to a second actuation point, the printer carrier will continue to space to the left until the carrier reaches the location at which it began the Type instruction or until the key is released, whichever is first. The underscore results when the key is used with any shift key.

1.4.5 Line Advance Key “↑”

This key, marked as shown, when depressed will cause the forms in the forms transport to be vertically spaced 1/6 of an inch. On systems equipped with a split platen, with the shift key depressed while depressing the Line Advance key, the right side of the platen will space; without the shift key, the left side of the platen will space.

If the Line Advance key is depressed to the second actuation point, it will cause the forms to space continually until released.

1.4.6 Open/Close Key – “1”

The Open/Close key, marked as shown, when depressed will cause the lower pressure rolls to open if closed, or to close if open. In addition, this key will open the Form Guide Bail from a closed position. When the Form Guide Bail is in an open position, depression of the Open/Close key will not close the bail immediately, but will cause it to close after the next 10 line advances have occurred.

The O/C key is operative in the Ready Mode and during any keyboard instruction, both alpha and numeric. If the O/C key is depressed during an operation, the O/C code is stored in the buffer until the operation is completed, then the transport will open.

The shift position provides the code for printing “]” as a single character.

1.4.7 Hyphen Key “≡”

The Hyphen key, marked as shown, sends a code for the appropriate symbol and has a second actuation point which causes the hyphen to send codes continuously until the key is released or until the programmed typing capacity is exceeded. The “=” sign is the upper case code.

1.4.8 Numeral Keys – Variouslly Marked

The numeral keys “0” through “9” have a dual function. When used under an alpha instruction, these keys send codes for typing; when used under a numeric instruction, they may be used in place of the numerals on the numeric keyboard. When the shift key is used, each key sends a special character code to the buffer, acceptable only to an alpha instruction.



Figure 6 - Typewriter Keys (Data Communication Keyboard)

1.4.9 Reset Key "Reset"

If the system is not in an error condition the depression of the Reset key will re-initiate a Typewriter Keyboard instruction and position the print head to the start position. If the programmed capacity of the type instruction is exceeded, the error lamp is illuminated and the alarm sounds. Depression of the Reset key will extinguish the error indicator (Fig. 7). The print head will not move. If the system is in an error condition, and it is desired to re-initiate the Typewriter Keyboard instruction, a second depression of the Reset key is required.

On Typewriter Keyboard entries which do not print, the Reset key will remove an error condition (if present) without moving the print head or erasing any part of the entry into memory. If the Reset key is depressed when no error is present, or as a second depression following an error condition, the instruction is re-initiated; subsequent entry of data destroys and replaces the previously entered data.



Figure 7 - Error Indicator Light

1.6 PROGRAM SELECT KEYBOARD

Program keys (PK's), located immediately above the typewriter and numeric keyboards, permit operator selection of alternate routines and functions. The Series L/TC is equipped with up to 16 PK's.

PK's are usable only when the computer is performing Typewriter or Numeric Keyboard instructions (these "halt" the program allowing the operator to select a PK). However, the individual PK or PK's that are available at a keyboard instruction are determined in advance by programming.

For the purpose of setting up a key pattern, PK's are divided into two groups of eight keys each. Keys are numbered "1" to "8" from left to right within each group, A and B (see Figure 8).

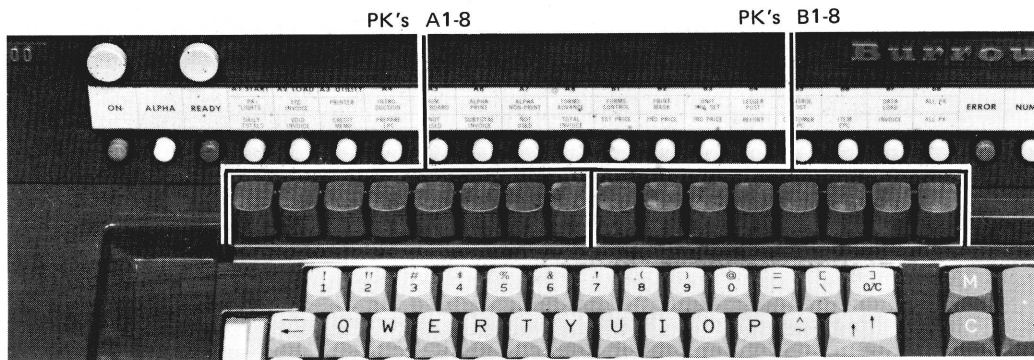


Figure 8 - Program Select Keyboard

An indicator light associated with each PK informs the operator which key(s) has been enabled. An identification strip is used to describe the individual lights and PK functions. Since PK functions can be changed from one application to another, the identification strip is designed to be easily changed by the operator. PK functions can be reassigned within the same program.

An interlock is provided to prevent simultaneous depression of PK's. The entire keyboard will remain interlocked until the PK is released. Depression of an inactive PK will cause an error condition, sounding the alarm.

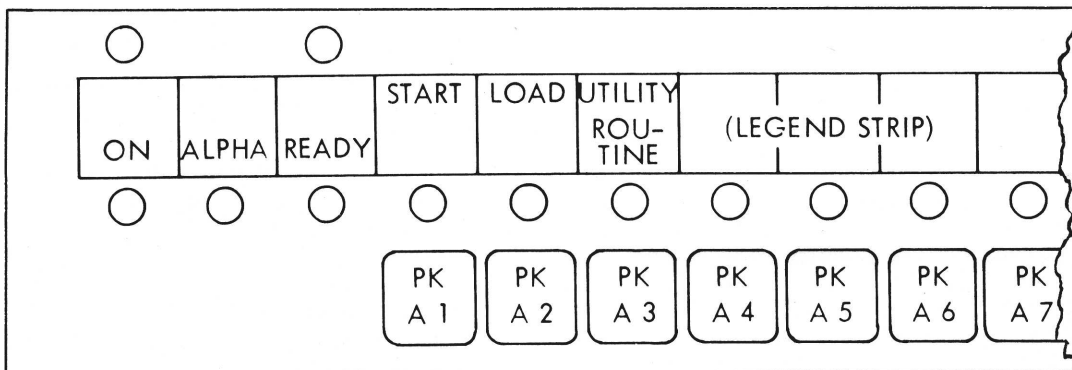


Figure 9 - Program Keys and Indicator Lights

1.7 POWER "ON" PUSH BUTTON

The Power ON push-button switch and associated indicator (green) are located at the upper left end of the PK's. The legend strip insert is marked ON (see Figure 9).

Depression of the button will turn power ON to the system and all indicators are illuminated. After approximately 30 seconds, only the Ready Indicator and PK's A1, A2 and A3 are illuminated and the alarm sounds, indicating that the computer is in the READY MODE.

1.8 READY PUSH BUTTON

The Ready push-button switch and associated indicator (green) are located at the upper left end of the PK's. The legend strip insert is marked READY (see Figure 9).

If the Ready button is depressed immediately after the power is turned ON or when the system is in the Ready Mode, it turns off power to the system. If depressed when the system is under control of the program, it returns the system to the Ready Mode upon encountering the next keyboard instruction or immediately if on a keyboard instruction when depressed. PK's A1, A2 and A3, and Ready indicators are illuminated when in the Ready Mode. Depression of the Reset key when in the Ready Mode will re-establish the instruction that the system was on when the Ready button was depressed (see Section 1.5.3).

1.9 KEYS WITH SPECIAL FUNCTIONS ONLY WHEN IN THE READY MODE

The Ready Mode assigns special functions to PK's A1, A2 and A3 which are completely independent of the functions that may be given to these PK's under the Program Mode. Upon entering the Program Mode, these PK's operate according to the function given them by the program currently in the Normal area of memory; but anytime that the computer enters the Ready Mode, these PK's operate as special Control Keys whose functions are provided by the Firmware. Also, the Reset key has a special function while the computer is in the Ready Mode (see Section 1.5.3).

1.9.1 PKA 1 – Start

Depression of this PK places the computer in the Program Mode and starts the execution of the user program.

1.9.2 PKA 2 – Load

Depression of this PK places the computer in the Program Load Mode, thus enabling an operator to load a program into memory. The program tape is placed in the Memory Loader device and depression of the Memory Load switch (after depression of PKA 2) causes the tape to be read at a speed of 15.5 characters per second. The computer is now in Load Mode. It stays in Load Mode, even after the tape has been read in completely and the Memory Load switch is turned off, until the operator touches the Reset key to return the computer to the Ready Mode.

1.9.3 PKA 3 – Utility Routine

Depression of this PK starts the execution of a special utility routine residing in a reserved portion of control memory (such as the Memory Modify or Memory Punch routine). The resulting operation depends upon which of these utility routines has been loaded into memory as they all occupy the same storage area in memory. After completion of the utility routine, the Ready button will return the computer to the Ready Mode.

1.10 EMERGENCY LINE SWITCH

The Line switch is an ON-OFF toggle type switch and is located on the left inside panel under the keyboard (above the Halt button). In the OFF position, power is OFF to the system. In the ON position, power is ON and permits the system to be turned ON by the Power On button. This switch normally remains ON, untouched by the operator. When the system is operating, it should be used only in emergencies to turn off power, and then only while holding the Program

Halt button depressed. Otherwise, use of the Line switch alone may cause a parity error in the stored program and/or micro program. Holding the Program Halt button depressed when turning the Line switch to OFF prevents the parity error possibility. A power failure or unplugging the line cord during system operation could also endanger the programs. If the program does not operate properly after such emergency action, call your local Burroughs Field Engineering Department for assistance.

1.11 PROGRAM HALT BUTTON

The Program Halt button is a push-button type switch located on the left inside panel just below the line switch. Depression of the button will cause the computer to restore to the Ready Mode.

The Program Halt button may be used when a program is in progress. When depressed, it will permit the completion of the instruction being executed, and then restore to the Ready Mode. This differs from the Ready button, which can only be used when the program has halted for a keyboard entry.

1.12 MEMORY LOADER

The Memory Loader is a special purpose paper tape reading device which automatically loads programs into memory. The Memory Loader is located at the lower left-hand corner of the keyboard. It contains a self-threading paper tape cartridge (removable), a feeding device, and a tape reader to read program tape into memory. This device is under control of the Memory Load switch, enabled by PKA 2 – (LOAD) – in the Ready Mode (see Section 1.9.2).

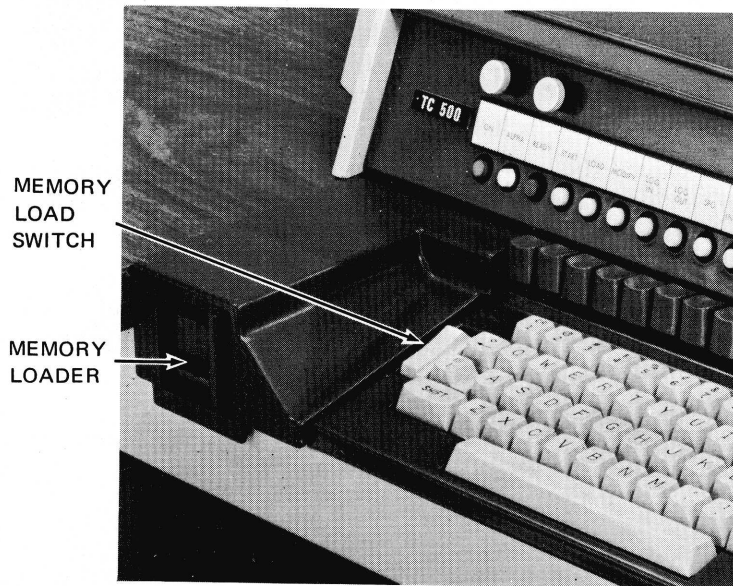


Figure 10 - Memory Loader and Memory Load Switch

The Memory Loader is capable of reading program tape at the rate of 15.5 codes per second. Program tape (8 channel) is inserted into the lower slot of the self-threading tape cartridge with the reference edge (three punched holes below the feed holes) of the tape to the right. The tape is ejected through the upper slot.

This device is to be used only for initial loading of memory or changing of programs. It is not for use for input of transaction data during program operation. A punched-paper tape reader is available for the reading of data during program operation.

1.12.1 Memory Load Switch

The two-position rocker type Memory Load switch (not marked) is located on the left side of the typewriter keyboard, and is adjacent to the backspace key and OCK 1. The switch is used to turn power ON and OFF to the Memory Loader.

PKA 2 (LOAD) must be depressed prior to turning the Memory Load switch ON; otherwise the tape would feed without loading Memory.

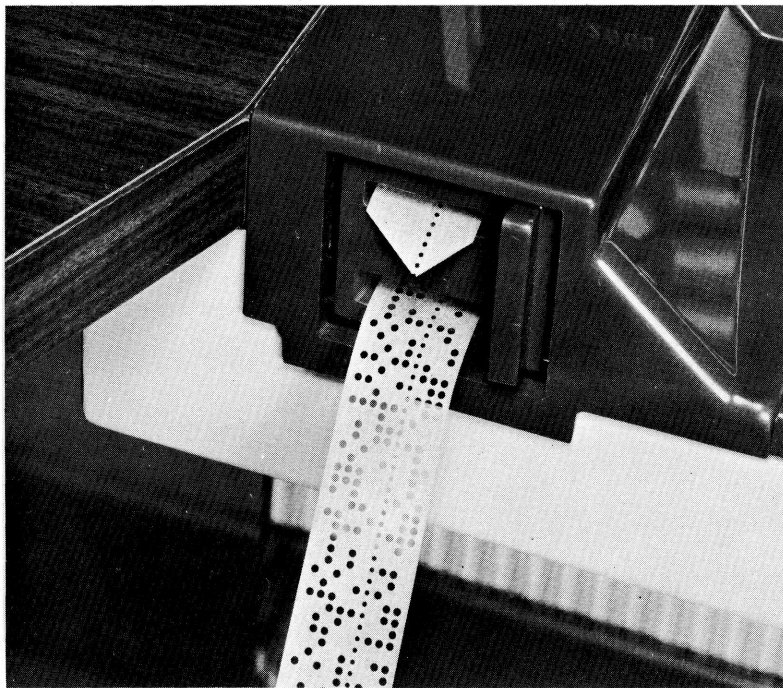


Figure 11 - Tape Loading

SECTION 2

FORMS TRANSPORT

2.1 INTRODUCTION

The Forms Transport is designed to permit rear feeding of individual cut forms or continuous forms of various lengths and widths. It includes a stationary 15.5 inch platen. The length of the print line is 150 characters, at 10 characters per inch.

2.2 VERTICAL SPACING

Standard vertical spacing is in 1/6 inch increments. Vertical spacing may be automatic with a program instruction, or manual by using the platen twirlers, or Keyboard Line Advance key.

2.3 PLATEN TWIRLERS, RIGHT AND LEFT

The forms may be manually spaced in either direction 1/6 inch by turning the platen twirlers at either end. Fine adjustment of less than 1/6 inch spacing is provided by pressing the button on the end of the left platen twirler inward while turning.

There is an interlock active when the transport is closed that prevents back spacing the platen manually until 3 form spaces have occurred. However, fine adjustment is not prevented.

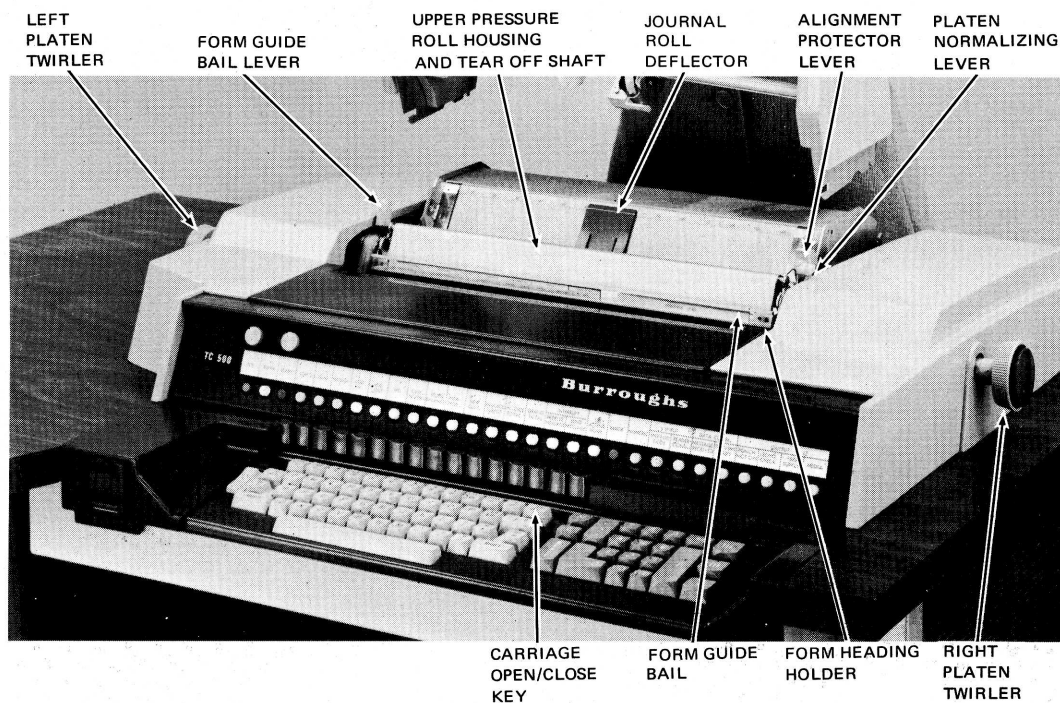


Figure 12 - Forms Transport Controls

2.4 PLATEN, SPLIT AND NORMAL

Split and Normal platens are provided to facilitate forms handling flexibility. The standard split location is 11.4" from the left end of the printing line.

2.5 PLATEN NORMALIZING LEVER

The Platen Normalizing Lever is located on the right end of the transport. Depression of the lever and turning the right platen twirler clockwise (in the direction of paper advance) will couple the platen, and counterclockwise will uncouple the platen.

When the platen is uncoupled (split), both the right and left platen twirlers are variable. The right and left fine adjustment buttons are enabled. When the platen is normalized (coupled), the right fine adjustment button is disabled. The left fine adjustment button is used for adjusting the entire platen.

2.6 FORM LIMIT STOP – REAR FED UNIT FORMS

When a rear-fed unit document is inserted into the forms transport, the Form Limit Stop limits the document to a given position. Alignment to the first printing line is usually accomplished programmatically.

2.7 TRANSPORT OPEN AND CLOSE

From a closed position, the Form Guide Bail and the lower pressure rolls open when either the O/C key is depressed or when an Open Transport Instruction is executed. From an open position, the lower pressure rolls close when the O/C key is depressed, when printing occurs, or when a Close Transport Instruction is executed.

2.8 FORM GUIDE BAIL AND FORM HEADING HOLDER

The removable form heading holder contains a plastic insert and is capable of accommodating a paper insert 7/8 inch wide. When the transport opens, the bail will open. When the transport closes, the bail will close after 10 line advances or if the Form Guide Bail Lever is depressed.

2.9 FORM GUIDE BAIL LEVER

The Form Guide Bail Lever is located on the left end of the platen. The lever pushed rearward causes the form guide bail to close if the form guide bail is open and the transport is closed. If the bail and transport are open, the depression of the O/C key followed by depression of the Form Guide Bail Lever will close the bail.

2.10 ALIGNMENT PROTECTOR LEVER

An Alignment Protector Lever is located on the right end of the platen and is used for manually opening and closing the lower pressure rolls. The lever, in the forward position, opens the pressure rolls and holds them open during all operations. The lever, in the rearward position, permits the pressure rolls to close during operations that close the transport and permits the pressure rolls to open during operations that open the transport.

The lever must be in the rearward position when a rear-fed unit document is used, and in the forward position if pin feed paper is used.

2.11 UPPER PRESSURE ROLL HOUSING AND TEAR-OFF SHAFT

This mechanism is located above the platen and is manually tilted rearward to permit insertion of roll or cut journals. Once the journal or roll is aligned tilted around the platen properly, the mechanism is restored against the platen by pressing down on it.

When the journal roll is to be torn off, the tear off blade is used, as it is exposed at all times and runs the full length of the platen. The paper is pulled upward against the blade.

2.12 ADJUSTABLE FORM GUIDES, RIGHT AND LEFT

Form Guides, right and left, are provided to ensure the square alignment of both single forms and roll journals. They are adjustable and are located on the rear form deflector panel.

2.13 REAR FORM DEFLECTOR PANEL

The Rear Form Deflector panel includes a graduated scale in increments of 1/10th inch from -5 to 155 with the inch graduations marked with numeral markings. The graduation 1 through 150 corresponds to the print positions of the computer.

2.14 ROLL PAPER HOLDER

A removable roll paper holder includes a shaft with right and left adjustable guides. The right and left guides include a lever to lock the guide in the position it is placed. The guides can be positioned at the extreme right or left edge of the transport or at any point between these extremes. They are easy for the operator to adjust, reposition, or remove. More than one pair of guides may be used.

The roll paper holder can accommodate a roll of paper up to 3½ inches in diameter and from 2¼ inches to 15½ inches in width. The roll paper holder guides permit the inside edges of two adjacent rolls to be located within 5/8 inch of each other.

A Journal Roll Deflector prevents the journal (roll or uncut) from rewinding around the platen.

SECTION 3

CONTINUOUS PIN FEED DEVICE

3.1 INTRODUCTION

To facilitate handling of continuous forms, a Continuous Forms Pin Feed Device in three styles is available. The pin feed device can be easily removed or attached to the Forms Transport by the operator. It is important to note that when the device is used, it prevents manual insertion of rear fed unit forms.

The purpose of the Pin Feed Device is to allow programmatic control over the "slewing" of continuous forms. "Slewing" means to advance the forms several lines at a time automatically; e.g., the advancing of the forms from the last line printed on one form to the first printing line on the next form, or to a specific line on a form from any previous line.

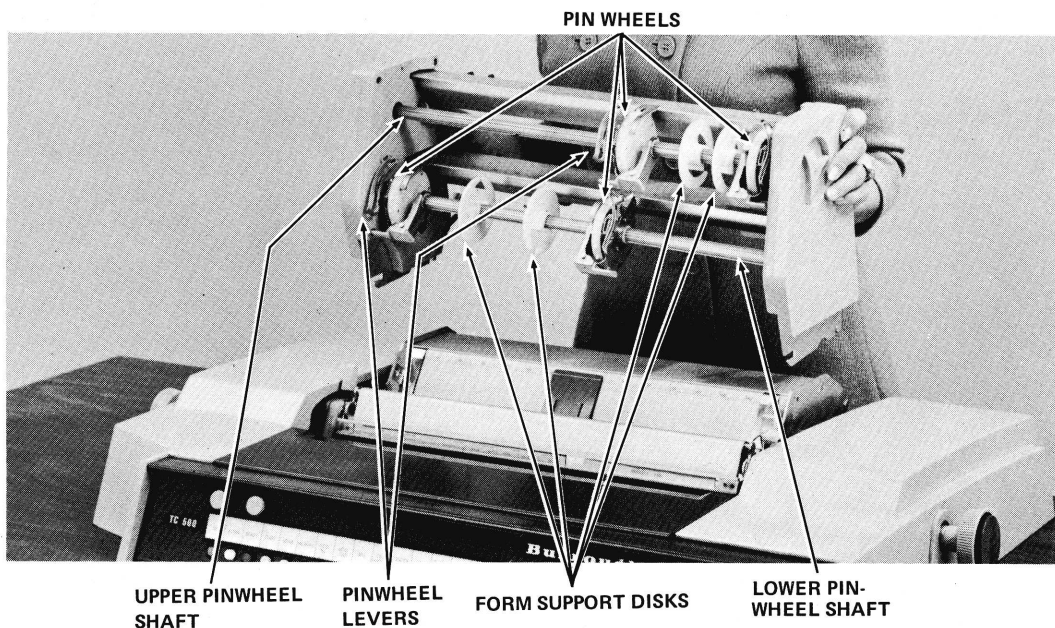


Figure 13 - Continuous Forms Pin Feed Device (Dual)

Another very important purpose of the Device is to prevent the forms from "skewing". This is misalignment caused by one side of the form advancing ahead of the other, and results in printing at an angle. Without a positive means of control, forms advanced several lines at a time tend to skew, thus the advantage of using the Pin Feed device.

The Pin Feed Device contains 2 pin wheels upon which the forms are aligned; then a lever is locked down on the forms holding them in place. "Sprocket holes" in the margin of the forms ride over the pins. Thus, control over the spacing of the forms is enabled. The pin wheels are horizontally adjustable on the shaft which permits placement of the forms in any position in the transport.

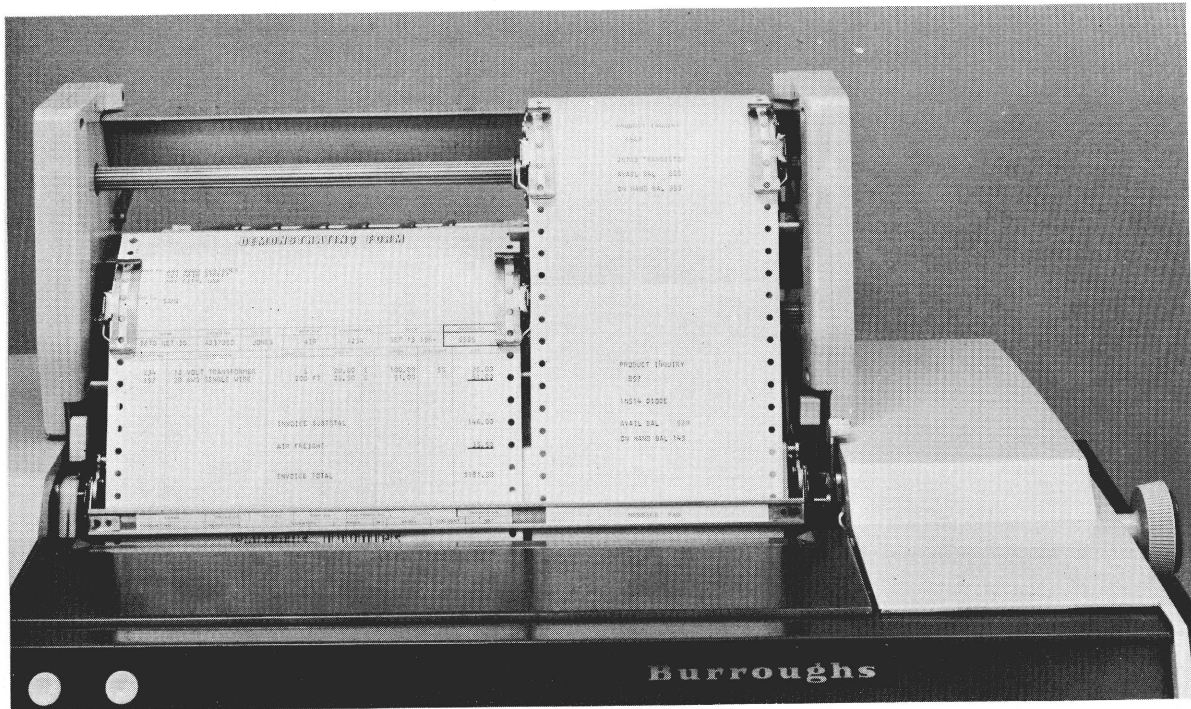


Figure 14 - Dual Pin Feed Device (Front View)

Two removable Form Support Disks are located between the pin wheels. The shaft is graduated in 1/10 increments from a -4 to 154 with numeral markings at each inch position. The scale is used to locate the form in accordance with the print positions.

A removable Tear-Off Blade is provided as an optional feature.

The pin feed device may be used with a solid platen or with a split and normal platen, as desired.

When the continuous pin feed forms device is used, it is necessary to open the lower pressure rolls in the Forms Transport (Alignment Protector lever in the forward position).

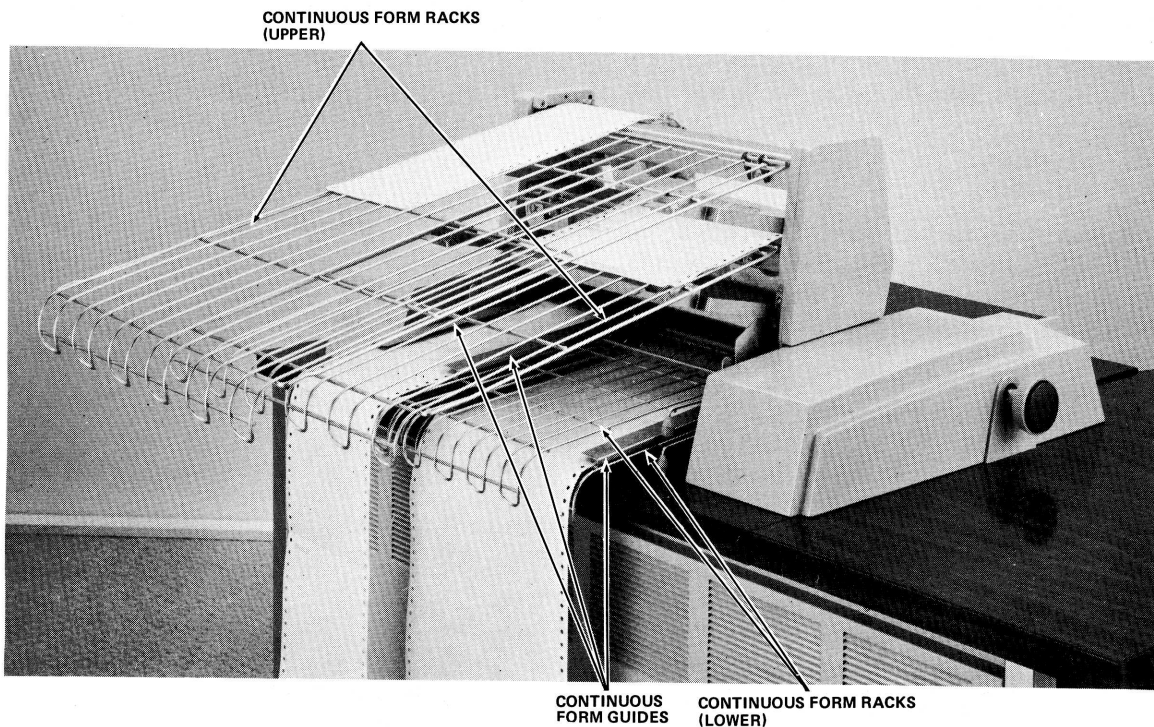


Figure 15 - Dual Pin Feed Device (Rear View)

3.2 FORMS LOADING PROCEDURE – BASIC OPERATION

Remove the Pin Feed Device.

Install the lower Continuous Form Rack for either the first or second form being fed.

Move the Alignment Protector Lever rearward (closed).

Depress the open/close carriage key to open bail and lower pressure rolls.

Place form in alignment path so leading edge contacts under side of the platen as far as possible (Form Limit Stop).

Depress open/close carriage key to close pressure rolls on form.

Depress and hold down “↑↑” key and feed form for 15 spaces.

Open carriage and complete insertion either under upper pressure roll housing or on pin feed sprockets, as required.

SECTION 4

SPECIAL CONDITION LIGHTS

4.1 INPUT INDICATOR LIGHTS – TAPE READER

Two indicator lights are provided to enable program and operator control over the paper tape reader.

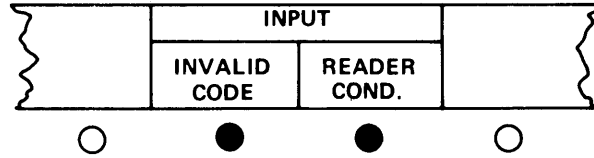


Figure 16 - Input Indicator Lights

4.1.1 Invalid Code Indicator Light

This indicator light will be turned on when an invalid tape code is read. Reading is not halted on the invalid tape code; the code will count as a code read and will be processed. The next read instruction will turn off the indicator.

4.1.2 Reader Condition Indicator Light

The Reader Condition Indicator advises the operator if the paper tape reader is not operable and is active when the program reaches a tape read instruction. The following conditions must be satisfied for the paper tape reader to be operable:

- a. The Paper Tape Reader must be connected to the system, and must be turned on.
- b. Media (paper tape or an edge punched card) must be positioned in the reader.
- c. The media clamp must be closed.
- d. The Reader light (photoelectric device) must be illuminated.

When the program reaches a tape read instruction and all of these conditions are not satisfied, the Reader Condition Indicator Light (Input Indicator 2) is turned on, the keyboard buffer is cleared, and the instruction is held up from execution pending operator action. This action is based on one of two conditions:

- a. The reader is intended to be used: In this case, the operator may correct the condition(s) (place media in the reader, close the media clamp, etc.) and depress the Read Key. This re-initiates the read instruction, causing reading of the tape in accordance with the instruction; the indicator is turned off.
- b. The reader is not intended to be used: In this case, the operator may make a manual entry through the keyboard. As this action is started, the instruction reverts to its keyboard instruction counterpart, and is executed accordingly. Once the keyboard entry has begun and prior to termination with an OCK or PK, the use of the Reset Key will re-initiate the Tape read instruction.

4.2 OUTPUT INDICATOR LIGHTS AND PUNCH TAPE

Four punch indicator lights are provided on the keyboard of systems with Input/Output capability to alert the operator as to the status of the perforator.

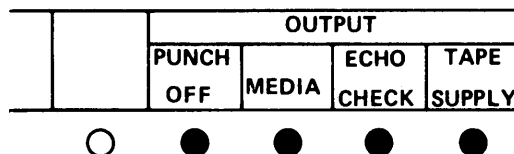


Figure 17 - Output Indicator Lights

4.2.1 Punch Off Indicator

The Punch Off Indicator light is turned on if the paper tape perforator ON/OFF switch is in the OFF position during the execution of a punch instruction. The instruction will be executed; however, the punching portion of it will be inhibited. The correction of the condition by turning on the perforator will cause the indicator to be turned off.

4.2.2 Media Not Present Indicator

If the program is attempting to execute a punch instruction and media is not present in the punch station, the instruction is held up; the Media indicator light is turned on. The subsequent placing of an edge punched card in the punch and depression of the Card Lock button, or the placing of tape in the punch will cause the system to resume execution of the punch instruction. During the execution of the instruction, the indicator light is turned off.

4.2.3 Echo Checking Indicator

If the Echo Checking feature indicates that incorrect punching has occurred during a punch instruction, the Echo Check Indicator light is turned on. Punching is not inhibited; the indicator remains on during subsequent punch instructions.

4.2.4 Tape Supply Indicator

When reel tape is being used and the supply is nearly exhausted (approximately 20 feet remaining), the Tape Supply Indicator light is turned on. Correction of this condition by placing a new roll of tape in the supply reel will turn off the indicator. This condition does not halt execution of the program nor inhibit the punching.

4.3 DATA COMMUNICATION INDICATOR LIGHTS (TC SERIES ONLY)

Two lights are provided on the Series TC keyboard which indicate the status of the terminal when operating in an on-line mode. The lights, located as indicated in the diagram below, are the MESSAGE RECEIVED light and the TRANSMIT READY light.

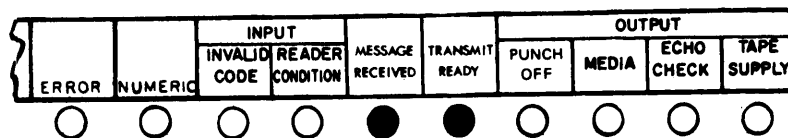


Figure 18 - Data Communication Indicator Lights

4.3.1 Message Received Light

This light is turned on automatically which indicates having successfully received a good message. The Message Received light is turned off by the user program.

4.3.2 Transmit Ready Light

This light is turned on automatically by the user program, when it is known that a message has been completed and is ready for transmission. The light remains on until the Data Communication processor completes a successful transmission.

4.4 INPUT INDICATOR LIGHTS - 80 COLUMN CARD READER

Two Input Indicator lights are provided to enable program and operator control over the 80 column card reader.

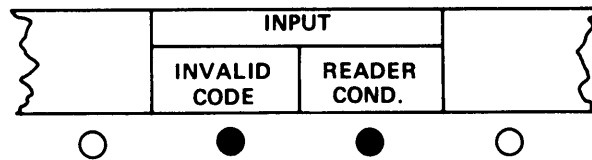


Figure 19 - Input Indicator Lights

4.4.1 Invalid Code Indicator Light

This indicator light will be turned on when an invalid card code is read, or when an alphabetic field is transferred to the accumulator. Reading is not halted on the invalid code; the code will count as a code read and be processed. The next instruction will turn off the indicator.

4.4.2 Reader Condition Indicator Light

The Reader Condition Light advises the operator if the Card Reader is not operable and is active when the program reached a Card Read instruction. Check, in the following order, for these possible corrective actions:

- a. Turn the Reader ON.
- b. Turn the Feed ON.
- c. Place a card in the Read hopper, and depress the Restart key.

Once the Reader is on, the program will remain halted on the Read instruction until a card is read, or the reader is turned off.

4.5 OUTPUT INDICATOR LIGHTS – 80 COLUMN CARD PUNCH

Three Punch Indicator lights are provided on the keyboard to alert the operator to the status of the Card Punch. The Tape Supply light is not used with the Card Punch.

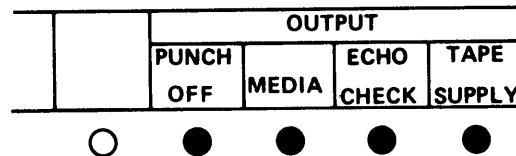


Figure 20 - Output Indicator Lights

4.5.1 Punch Off Indicator

The Punch Off indicator is turned on if the Card Punch ON switch is in the OFF position during the execution of a punch instruction. The instruction will be executed; however, the punching portion of the instruction will be inhibited. Turning the Card Punch ON will correct the condition and turn out the light.

4.5.2 Media Not Present Indicator

If the program is attempting to execute a punch instruction and media is not present in the punch station, the instruction is held up and the Media indicator is turned on. Feeding a card into the punch station will cause the system to continue execution of the punch instruction and turn off the indicator light.

4.5.3 Echo Check (Error) Indicator

During card punching, this light indicates a malfunction in the card punch; e.g. jamming. Clearing the malfunction turns out the indicator.

4.5.4 Tape Supply Indicator

Not used during card punching.



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