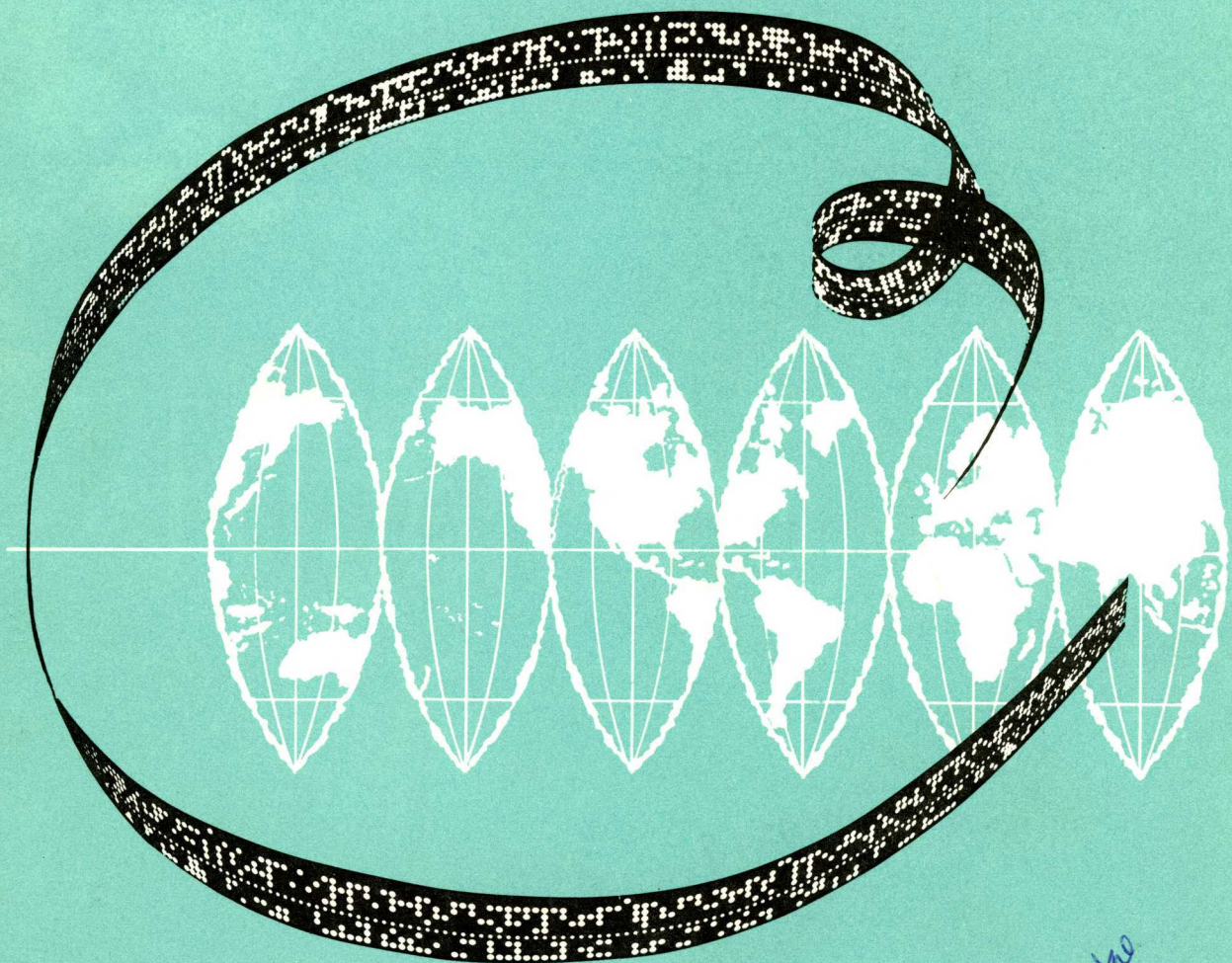


Friden

Communications Systems

AND EQUIPMENT

TECHNICAL
MANUAL



R. H. H. H.
March 1963

Composition for this manual was set on the Friden Justowriter®
automatic tape-operated composing machine, a product of
FRIDEN, INC.

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Friden

Communications Systems

AND EQUIPMENT



**TECHNICAL
MANUAL**

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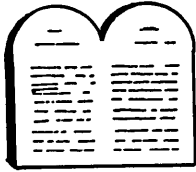
COMMUNICATIONS THROUGH THE YEARS



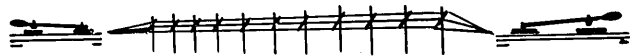
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HELIOGRAPH



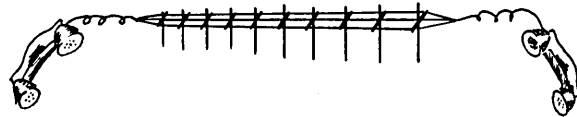
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TABLET



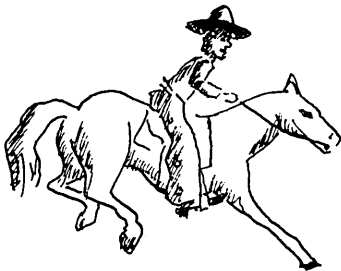
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TELEGRAPH



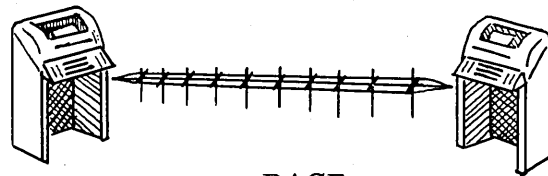
RUNNER



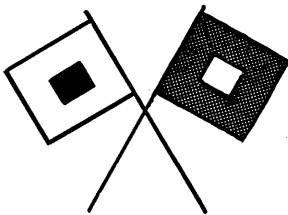
TELEPHONE



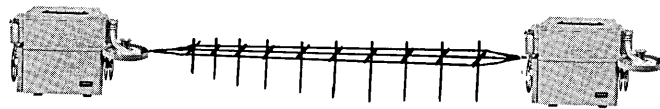
PONY
EXPRESS



PAGE
PRINTER



SEMAPHORE



FRIDEN
TELEDATA

COMMUNICATIONS

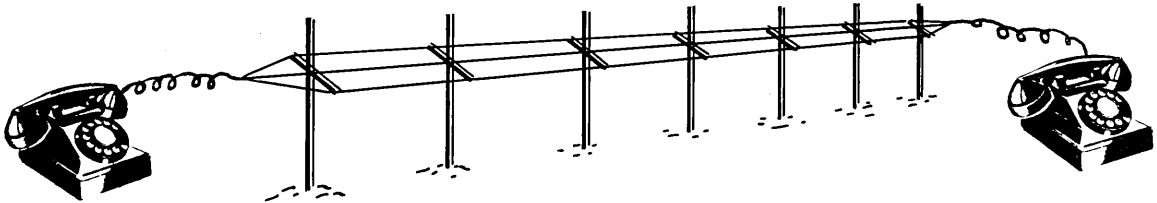
AN INTRODUCTION

The life-blood of modern business today is Communications, the instantaneous transmission of data from one geographical point to another. This may take the form of a simple "ticker-tape" containing Stockmarket quotations, to the highly accurate transmission of data for electronic computers. The purpose of this release is to survey the methods and equipment presently in use in this field, as they relate to modern Integrated Data Processing methods.

There are many ways to transmit and receive data from one point to another, but the method most adaptable to business is Wire Transmission.

WIRE TRANSMISSION

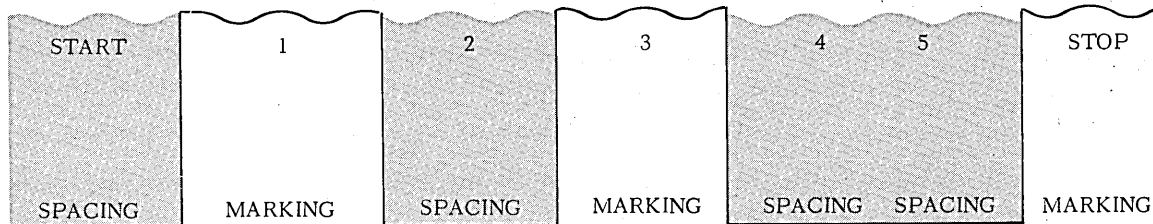
You use Wire Transmission every time you make a telephone call, or send a telegram. In both cases an electric current "carries" your voice or message to your connection or station over wires.



There are many businesses whose purpose is to rent or lease the use of these wires. To familiarize you with names in the wire leasing field, there are only a few of national scope, among them, American Telephone and Telegraph Company, General Telephone Company, and Western Union. American Telephone and Telegraph Company, often referred to as "A.T. & T.", is a holding company for a large number of subsidiary companies, such as Bell Systems, which probably includes your own telephone company. It is pertinent here to point out that Western Electric and its subsidiary Teletype Corporation, manufacturers of communications equipment, are in themselves subsidiary companies of A.T. & T. Western Union and General Telephone, are separate organizations and are generally free to purchase equipment from anyone, where subsidiary companies of A.T. & T. generally purchase from Western Electric and Teletype Corporation. All wire leasing companies use each others lines where convenient.

When sending a telegram, or a written message by wire transmission, this message is broken down into a series of codes. There are many different coding systems, but the basic coding system used in the communications field today is the 5-Channel Code, that is, the code combination for each character in the message is made up of five pulses. These pulses may be either Marking Pulses or Spacing Pulses. Marking Pulses are when the electrical current is on for a certain length

of time, and Spacing Pulses are when the electrical current is off for the same length of time. In addition, each code combination when transmitted, is preceded by a Start Pulse (always Spacing), and followed by a Stop Pulse (always Marking). The Start and Stop Pulses keep the Receiver synchronized with the Transmitter. As an example, the code combination for the letter "S" is the 1 and the 3 Marking Pulses. When transmitted, the electrical current, indicated by the wavy line, would look like this:

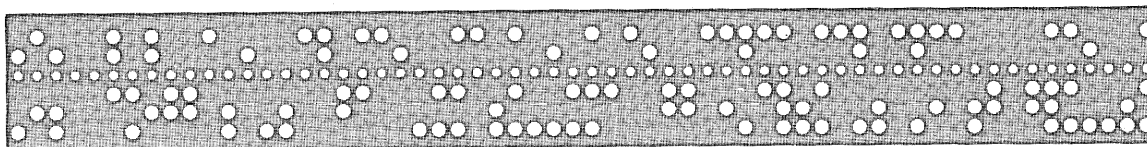


Data may be transmitted in the form of page copy, by someone manually operating a transmitter at one end of the line, and received in that form by a receiver at the other end of the line. Data may also be converted into a series of holes in a paper tape, each hole corresponding to a marking pulse, and received in the same way. This is called Tape-to-Tape Transmission. Since punched tape may be prepared when convenient, corrected where necessary, transmitted, stored, used and re-used as desired, this is the most popular and flexible form of data transmission.

TAPE-TO-TAPE TRANSMISSION:

Convenience is not the only reason for the popularity of Tape-to-Tape Transmission. Punched paper tape can also be used to operate a large variety of data processing equipment, including certain electronic computers. Also, the most efficient use of transmission time is effected, since the tape can be prepared beforehand, and transmitted when time is available. Data, stored in punched tape may be reused and stored indefinitely. Also, transmission speed of punched tape is faster than manual transmission.

A sample of 5-Channel tape with code holes corresponding to the Marking Pulses of the 5-Unit Code is shown below:

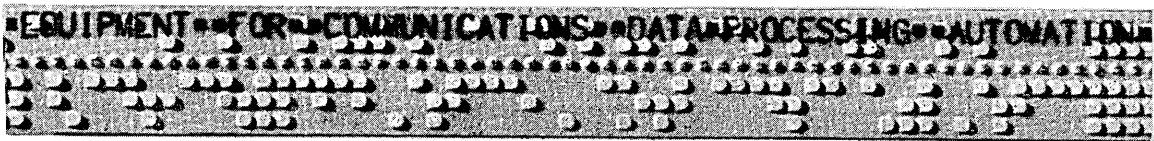


5 CHANNEL TAPE

The 5-Unit, or 5-Channel Code allows a total of thirty-two code combinations. This is derived in the following manner: two possibilities, either a hole or no-hole in each of five positions (channels), therefore, $2^5 = 32$ code combinations. Twenty-six codes are used for the alphabet, and six codes are used for machine functions. Of these six, two are known as "precedence codes", and are called LETTERS and FIGURES Shift Codes. This is similar to the upper and lower case shift on a typewriter. All alphabetic data is preceded by a LETTERS Shift Code, while numbers and special characters are preceded by a FIGURES Shift Code. A typical coding arrangement is shown below:

FIGS.	-	?	:	\$	3	!	&	8	'	(	)	.	,	9	0	1	4	5	7	;	2	/	6	"	ST	PT	FIGS	C.	L.	SP
LTTRS	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				
1	1	1		1	1	1			1	1						1	1		1		1	1	1	1		1	1			
2	2		2				2	2	2	2					2	2	2			2	2	2				2	2			2
Feed Hole	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3			3		3		3	3		3		3	3		3	3		3		3	3		3	3		3				3
4		4	4	4		4	4		4	4		4	4	4		4			4		4	4				4	4	4		
5		5				5	5			5	5		5	5	5			5		5	5	5	5	5		5	5			

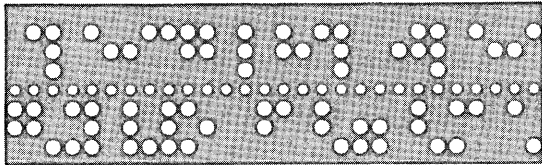
Another form of 5-Channel Tape is called "Chadless Tape". In Chadless Tape, the code hole perforations are not completely punched out, but are left attached to the tape. This permits the tape to be imprinted so that the coded information may be read. A sample of Chadless Tape is shown below:



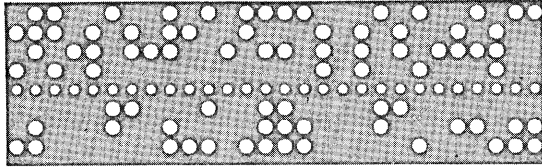
The 5-Unit Code was invented in the late 19th Century, and is often called the "Baudot Code", after its inventor. Its original purpose was the sending of written messages (telegrams). With the coming of the principles of Office Automation, the 5-Channel Code has been adapted to fit, or rather, Office Automation has been adapted to fit the 5-Channel Code. In this new role, the 5-Channel Code has two principal disadvantages: too few code combinations, and the difficulty of checking these codes for accuracy of punching. The importance of accuracy checking will be discussed later in this release.

Aside from its use as a communications medium, 5-Channel tape will operate the IBM 046-047 Tape-to-Card Converter, the Remington-Rand 308-55 Tape-to-Card Converter, certain automatic Graphotypes and certain automatic writing machines, such as the Friden Flexowriter Model FC, and the Friden Programatic Flexowriter Model FPC-5.

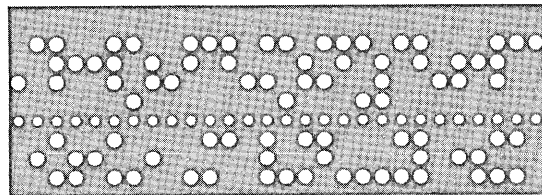
Because of the disadvantages of 5-Channel tape in the Integrated Data Processing field, tapes with more code channels, and more suited to IDP, have been making increasing headway into the Communications field. Some of these tapes and their uses are shown on the next page.



6-Channel Tape has a total capacity of 64 code combinations ($2^6=64$).



7-Channel Tape has a total capacity of 128 combinations ($2^7=128$). In most cases, however, the 7th Channel is used for accuracy checking purposes.



8-Channel Tape has a total capacity of 256 code combinations ($2^8=256$). Generally this is the same as 7-Channel tape, with the 8th Channel being used to visually mark a machine function, such as Carriage Return.

Aside from the increased number of code combinations available, 6, 7, and 8-Channel Tapes are used because of their adaptability to accuracy checking methods.

ACCURACY CHECKING SYSTEMS

The importance of checking codes for error due to mechanical failure of the Transmitter or Receiver Units, varies with the individual application. In cases where mostly alphabetic information is used, it is generally possible to "read through" obvious errors. For instance, "Rochster", or "Rochezter", can easily be "read through" as "Rochester". However, in cases where digital information predominates, and where this information is to be used in a high-cost electronic computer, for instance, even an isolated error can be intolerable. The most commonly used methods of error detection are described below:

CHECK TOTALS: A Check Total is an additional figure transmitted, which is equal to the sum of all the figures contained in the transmission. With this method, the operator at the receiving end can determine with a fairly high degree of accuracy, whether or not an error, in the form of a dropped or mistranslated digit has taken place. If an error has been made, however, the correction procedure is time-consuming. It involves a request for retransmission of totals, and verification of the corrections. Also, with a long transmission, there is usually no easy way to discover just where the error has been made.

DUPLICATE TRANSMISSION: This consists of merely sending the message twice, thereby reducing the possibility of error. A variation of this, consists of sending only the digits contained in the message in the second transmission. Again the error correction procedure is time-consuming, as the receiving operator has no way of telling for sure, whether the original or the duplicate transmission is in error.

In another variation, only the odd-bit (or even-bit) code combinations are ever used. Since 6-Channel tape, for instance, has a total code possibility of 64 combinations, then only half, or 32 codes are available with an odd number of bits. This makes the total usable code combinations equal to 5-Channel tape with one redundant code channel. Hence the name, "Redundant Coding". This method is also used in 7 and 8-Channel tape. The advantage of this method over the previous one is that the codes may be checked while they are being punched originally. Thus, to begin with, the transmitter is provided with a correct tape.

Double Parity Check, a more accurate method, may be used in transmitting 7 or 8-Channel tape. This variation of Double Parity Check consists of independently checking the parity value of each of two groups of bits within the same code. The sequence of transmission is arranged so that the Marking or Spacing Pulses are sent alternately from the two groups. The received code is checked automatically, and the punching of an even number of bits in either group will result in an error being registered.

A variation of Double Parity Check may be used in transmitting 5 or 6-Channel tape. In the transmitter, each code is broken into two groups, and a redundant code bit is added to each group if necessary, to make it odd parity. Each of the two groups is independently checked at the receiving end, and the redundant bits are dropped when the tape is reperfored.

WIRE LEASING COSTS

On page 1 of this release is a discussion of some of the companies that rent telephone and telegraph lines under Federal Communications Commission franchise. These companies rent two types of circuits:

HALF-DUPLEX CIRCUIT: Allows transmission in only one direction at a time.

FULL-DUPLEX CIRCUIT: Allows transmission in both directions simultaneously.

The basic cost of a Half-Duplex Circuit, in use Monday to Friday, from 9 am to 5 pm, is \$.72 per airline mile per month. This is at normal transmission speed of 65 wpm (words per minute). For a transmission speed of 75 wpm, add 10% to this cost; for 100 wpm add 25%. Full-Duplex Circuits rent for 25% more per month. The chart below shows the basic rates and allowable discounts:

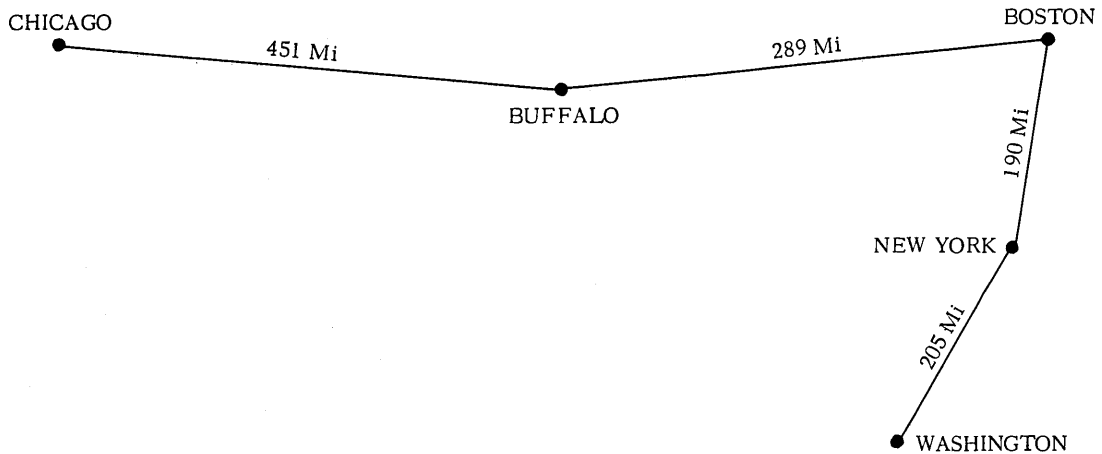
PRICE MILEAGE	CHARGE	PER MILE SINGLE	PER MONTH DUPLEX
1st 250 mi. (0 - 250)	100%	.72	.90
2nd 250 mi. (251 - 500)	90%	.648	.81
next 500 mi. (501 - 1000)	80%	.576	.72
next 500 mi. (1001 - 1500)	70%	.504	.63
over 1500 mi.	60%	.432	.54

*Prices from supplier. May 1960.

LOOP CHARGES: The Loop is the section of the circuit from the terminal city to the Customer's office. The Loop Charge on interstate service is a flat \$6.00 per month.

DROP CHARGES: The Drop Charge applies to all circuits involving three or more cities. The Drop Charge for the third, and all additional cities on the circuit is \$10.00 per city per month in interstate service.

An example of how these charges are applied is shown below:



<u>TERMINALS</u>	<u>@.72</u>	<u>@.648</u>
CHICAGO TO BUFFALO	250	201
BUFFALO TO BOSTON	250	39
BOSTON TO NEW YORK	190	
NEW YORK TO WASHINGTON	205	
	<u>895 mi.</u>	<u>240 mi.</u>

895 mi.	@ .72	\$644.40 per mo.
240 mi.	@ .648	\$155.52 per mo.
5 Loops	@ \$6.00	\$ 30.00 per mo.
3 Drops	@ \$10.00	\$ 30.00 per mo.

\$859.92 Total rental per month

*Prices from supplier. May 1960.

FRIDEN COMMUNICATIONS EQUIPMENT

FRIDEN 5-CHANNEL FLEXOWRITERS:

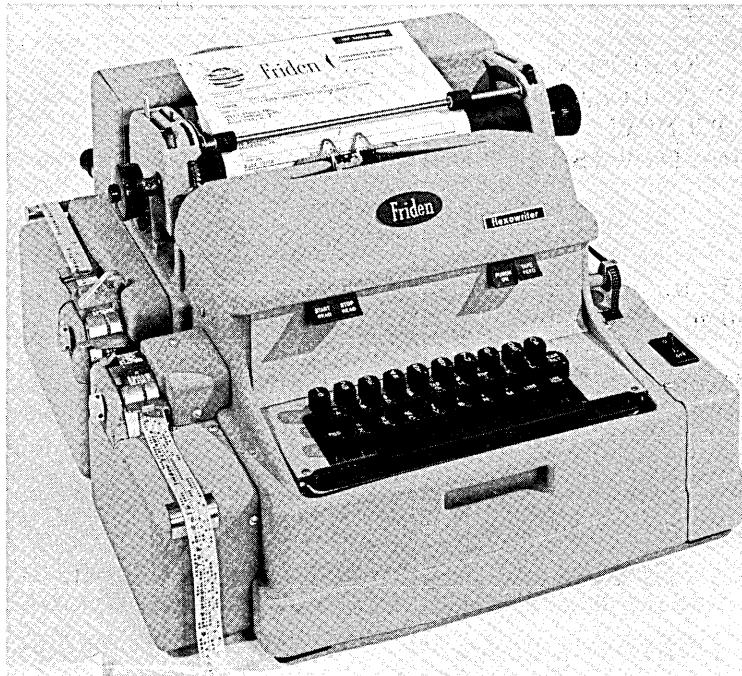
Friden 5-Channel Flexowriters are heavy-duty automatic writing machines with the ability to punch 5-Channel tape as a by-product of writing a document, and to read 5-Channel chad or chadless tape for automatically writing documents.

Three Carriage lengths are available on all Flexowriters:

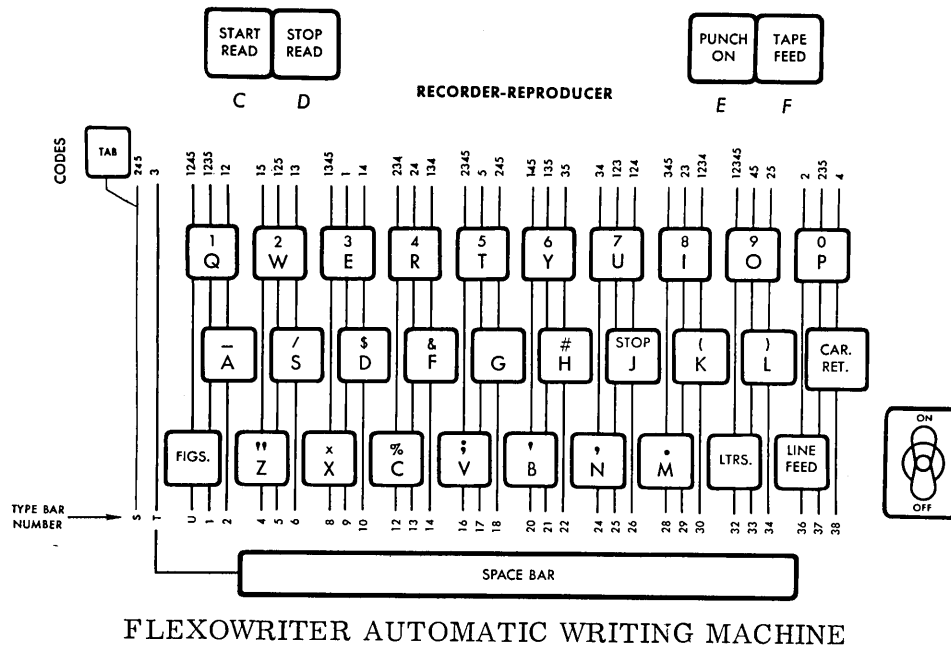
<u>Carriage Length</u>	<u>Maximum Sheet Size</u>	<u>Maximum Writing Line</u>
12''	11''	9-1/2''
16''	15''	13-1/2''
20''	19''	17-1/2''

Three Flexewriter Models give a wide range of flexibility for office systems applications:

FRIDEN MODEL FC - This model, pictured below, is available as a Recorder (punches tape only), a Reproducer (reads tape only), or a Recorder-Reproducer (punches and reads tape). It is equipped with the standard 3 Bank Communications Keyboard, which means that it contains three banks (rows) of keys, as opposed to the usual four banks of keys, normally found on typewriter keyboards (see next page).



FRIDEN MODEL FC FLEXOWRITER



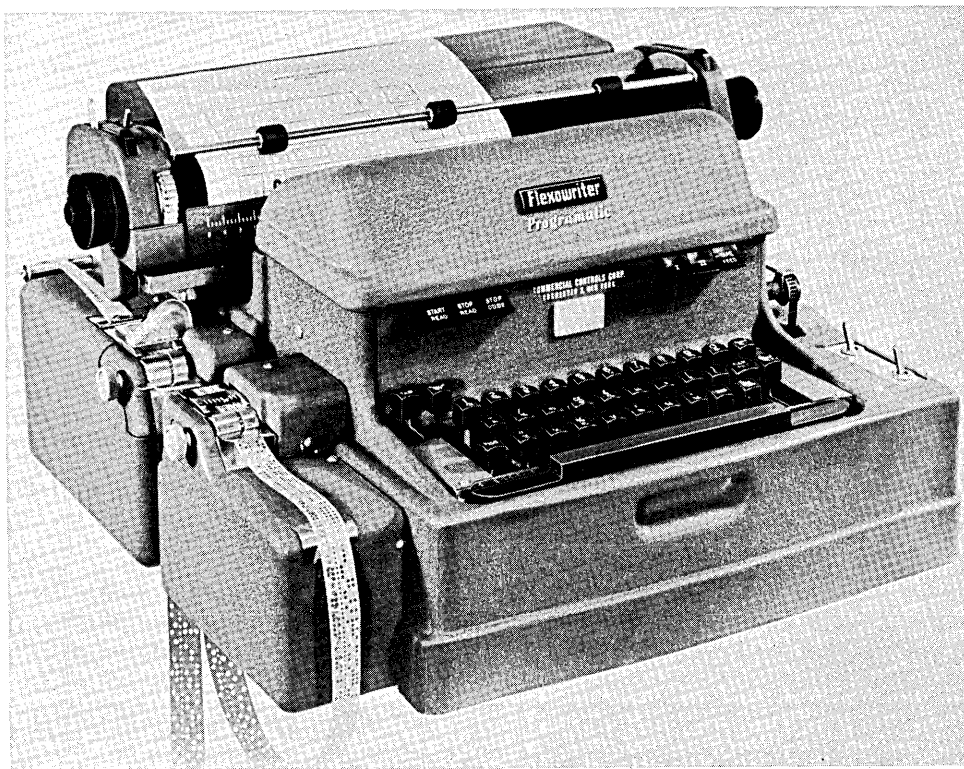
The Friden Model FC Recorder-Reproducer is equipped with four Panel Switches as shown above:

- START READ - Starts tape reading
- STOP READ - Stops tape reading
- PUNCH ON - A locking-type switch which when depressed will turn on the Tape Punch.
- TAPE FEED - Feeds tape through the Tape Punch as long as it is held depressed. The Tape Feed Code on the Friden Model FC is feed hole only.

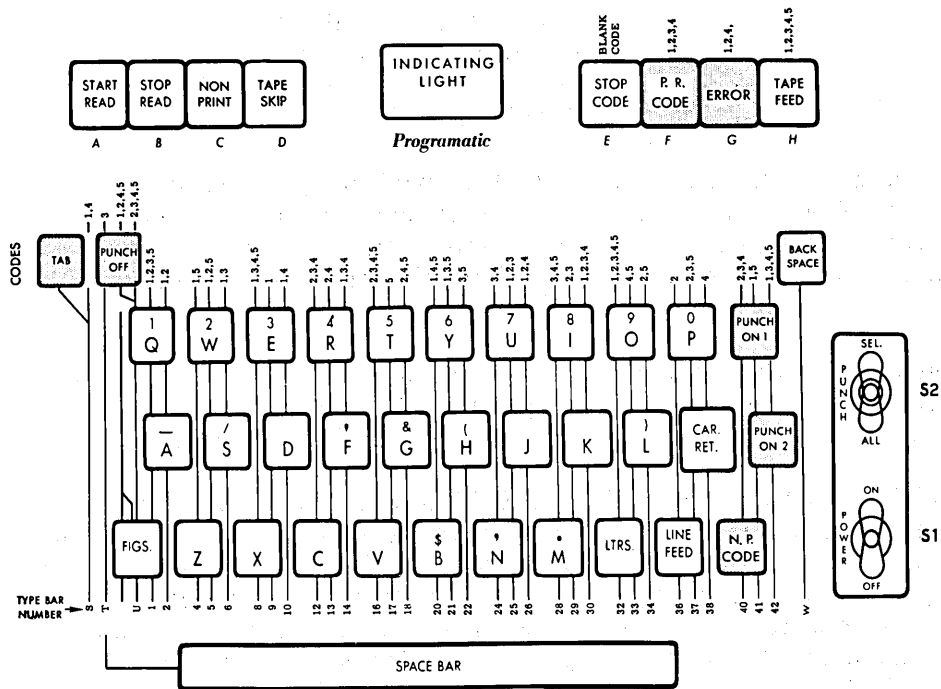
The Carriage Return key returns the Flexowriter Carriage to the left Margin, and indexes the Platen. The Line Feed key punches the Line Feed Code into the tape for operation of allied Receiver equipment, such as a Page Teleprinter. On these machines, returning the Carriage and indexing the Platen are two separate operations.

Tape punched on the Friden Model FC may be transmitted on any 5-Channel Tape Transmitter, and may be used to operate other allied 5-Channel equipment, such as IBM or Remington-Rand 5-Channel Tape-to-Card Converters.

FRIDEN MODEL FPC-5, 3-BANK PROGRAMATIC - This model, shown on the next page is designed especially for business systems use, where the application involves 5-Channel tape communications. It has the ability to be programmed, enabling it to automatically write all constant non-variable information on the form; to automatically control all horizontal and vertical line spacing; and to automatically control tape punching. It has the further ability to connect an auxiliary Punching Unit, and automatically control the punching of two tapes independently of one another. Edge Card Punch and Reader units may also be installed. The Friden Model FPC-5, 3-Bank Programatic Flexowriter is equipped with the standard 3-bank communications keyboard.

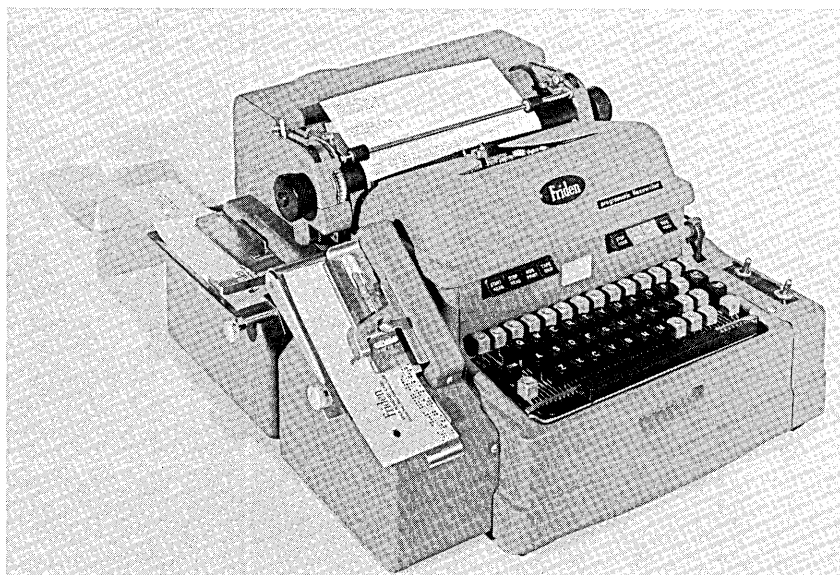


Friden FPC-5, 3-Bank Programatic Flexowriter

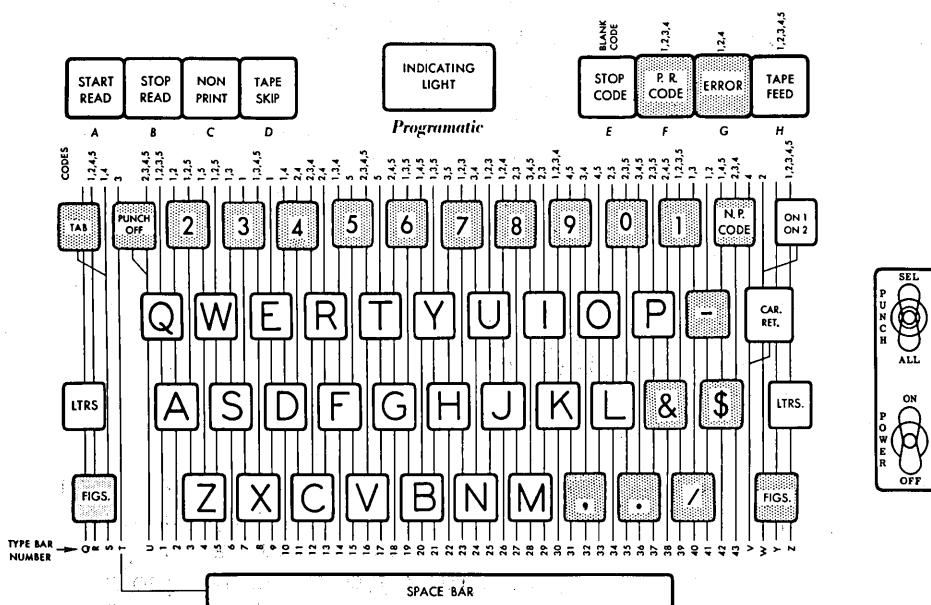


FLEXOWRITER AUTOMATIC WRITING MACHINE
Friden FPC-5, 3-Bank Programatic Flexowriter

FRIDEN MODEL FPC-5, 4-BANK PROGRAMATIC - This model is the same as the 3-Bank Programatic, except that the keyboard contains four banks of keys, and is more nearly like a standard typewriter keyboard. All keys are interlocked, so that the "1" key, for instance, cannot be operated while the Flexowriter is in a LETTERS Shift condition. No alphabetic key can be operated while the Flexowriter is in a FIGURES Shift condition. This feature eliminates the special training necessary for the average typist to operate a communications keyboard.



Friden FPC-5, 4- Bank Programatic Flexowriter



FLEXOWRITER AUTOMATIC WRITING MACHINE
MODEL FPC-5 PROGRAMATIC 4-BANK

FRIDEN 8-CHANNEL FLEXOWRITERS

Friden 8-Channel Systems Model Flexowriters can be used in communications systems involving 8-Channel Tape Transmission, especially the Friden Teledata. There are three models:

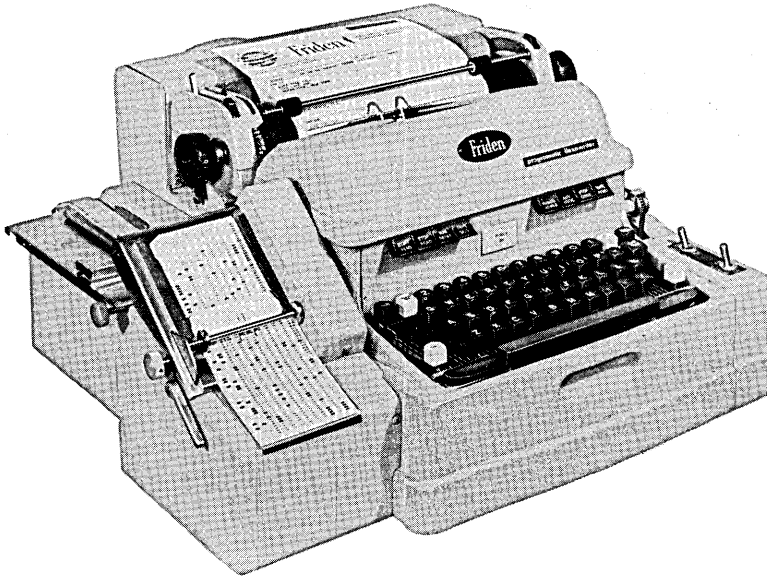
FRIDEN MODEL SFD - The Friden Model SFD (Systems Flexewriter Double Case), is a double case (capital and small letters) automatic writing machine, with tape punch and tape reader. The Model SFD may also be equipped with Edge-Punched Card Units, or the Friden Tab Card Reader. In addition, an Input Connector allows cable connection of any of the Friden Auxiliary Readers, Selectadata Readers, Synchro-Duplex Readers, or an Input Adding Machine, for flexibility of programming and operation.



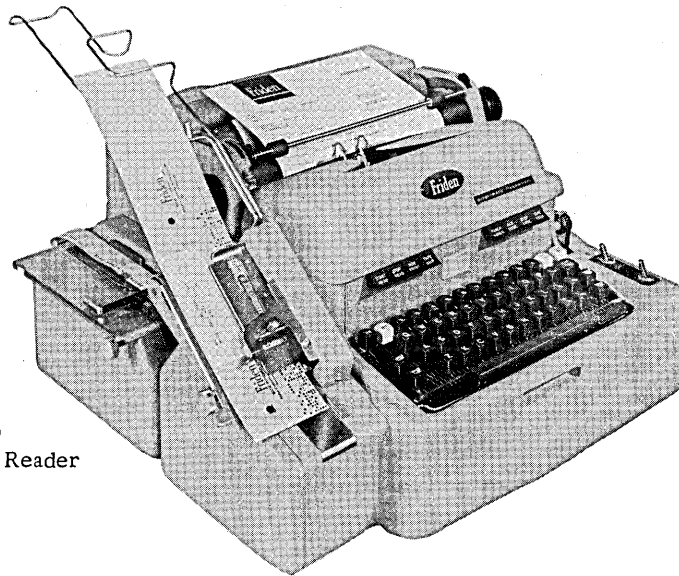
FLEXOWRITER SFD
with Tape Punch and Reader

FRIDEN MODEL SPS - The Friden Model SPS (Systems Programatic Single Case) is a single case (capital letters and figures only) automatic writing machine with features similar to the Model SFD, described above. The Model SPS has the added feature of an Output Connector, allowing cable connection of any of the Friden Auxiliary Punch Units, Model TCPC (Tab Card Punch Control), Receiver Model Flexowriters, and an Output Adding Machine. In addition, the Model SPS also features Field Control (control of the Output Units by carriage position), Manual and Automatic Non Print, and Tape Skip.

FRIDEN MODEL SPD - The Friden Model SPD (Systems Programatic Double Case), is the double case version of the Model SPS, and is identical to the Model SPS in every other feature.



FLEXOWRITER SPS
with Tab Card Reader
and Edge Card Punch



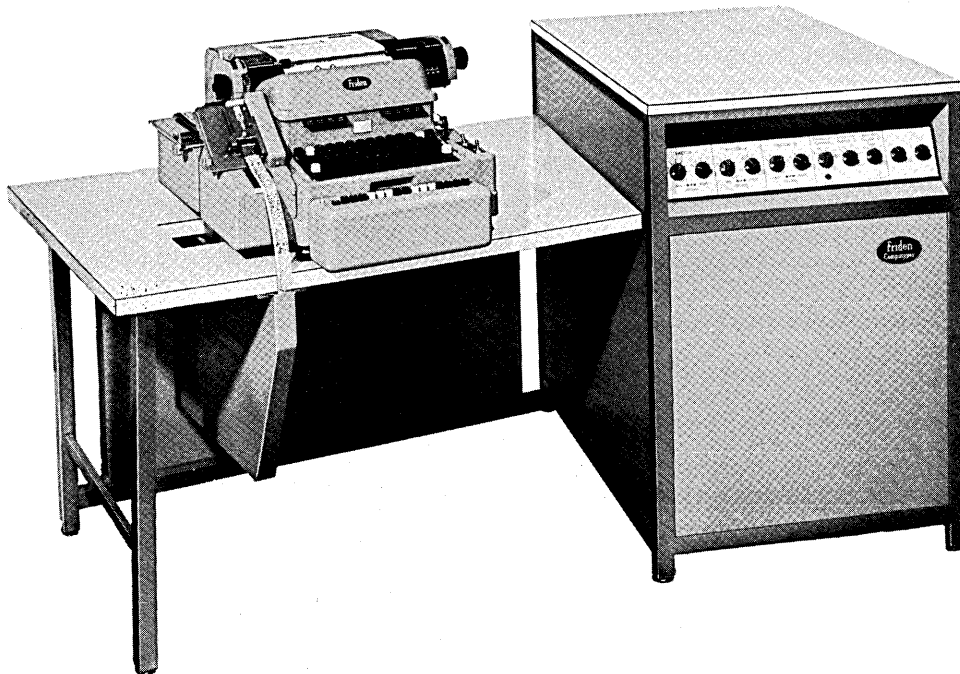
FLEXOWRITER SPD
with Edge Card Punch and Reader

For further information as to the features and specifications of these Flexowriters, Input, and Output Units, refer to the manuals titled, "The Friden Flexowriter Model SFD", Form Number SP - 8672, and "The Friden Flexowriter Model SPS", Form Number SP - 8673.

FRIDEN COMPUTYPERS

Friden Computypers are also used for applications involving communications systems. There are two basic models: the Friden Computyper Model CTC-5, using 5-Channel Tape, and the Friden Computyper Model CTS, using 8-Channel tape. Computypers are Automatic Billing Machines with punched tape input and output. They have the ability to automatically compute and write line extensions, discount extensions, totals, sub-totals, and quantity totals, take a discount and a tax on the total, and to add and subtract from the total. The Computypers are programmed to operate automatically from punched tape or other punched media, and to punch tape which may be used in communications systems.

FRIDEN COMPUTYPER MODEL CTS - This model uses the Friden Programmatic Flexowriter Model SPS (see page 12) as its base writing unit. All features including Input and Output Units are retained. Tape punched on the Model CTS may be used in 8-Channel communication systems.

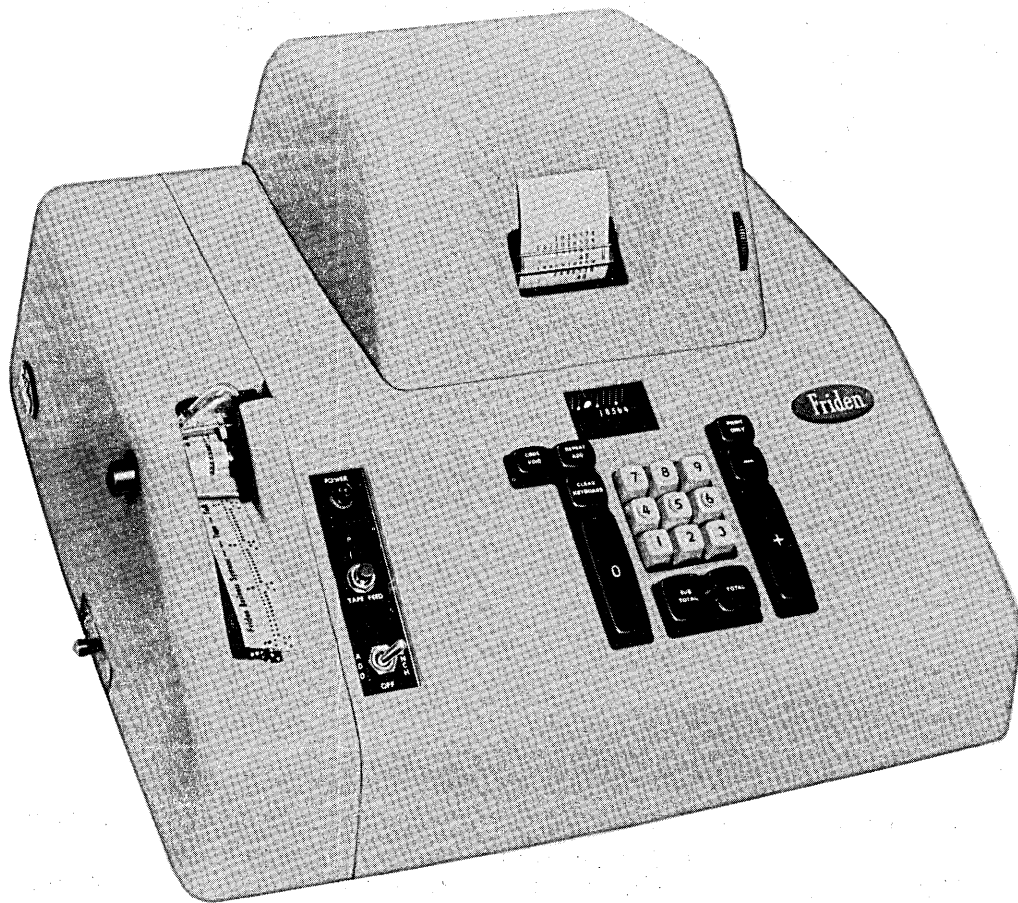


COMPUTYPER CTS

THE FRIDEN ADD-PUNCH

The Friden Add-Punch, Model APT, combines the Friden Adding Machine with a Tape Punch in one compact unit. A variety of models are available, using 5, 6, 7, and 8-Channel tape. Operation of the Add-Punch not only prints, but also punches the digital information into tape at the rate of 1,400 codes per minute. A programming panel allows the Friden Add-Punch to be programmed for specific applications.

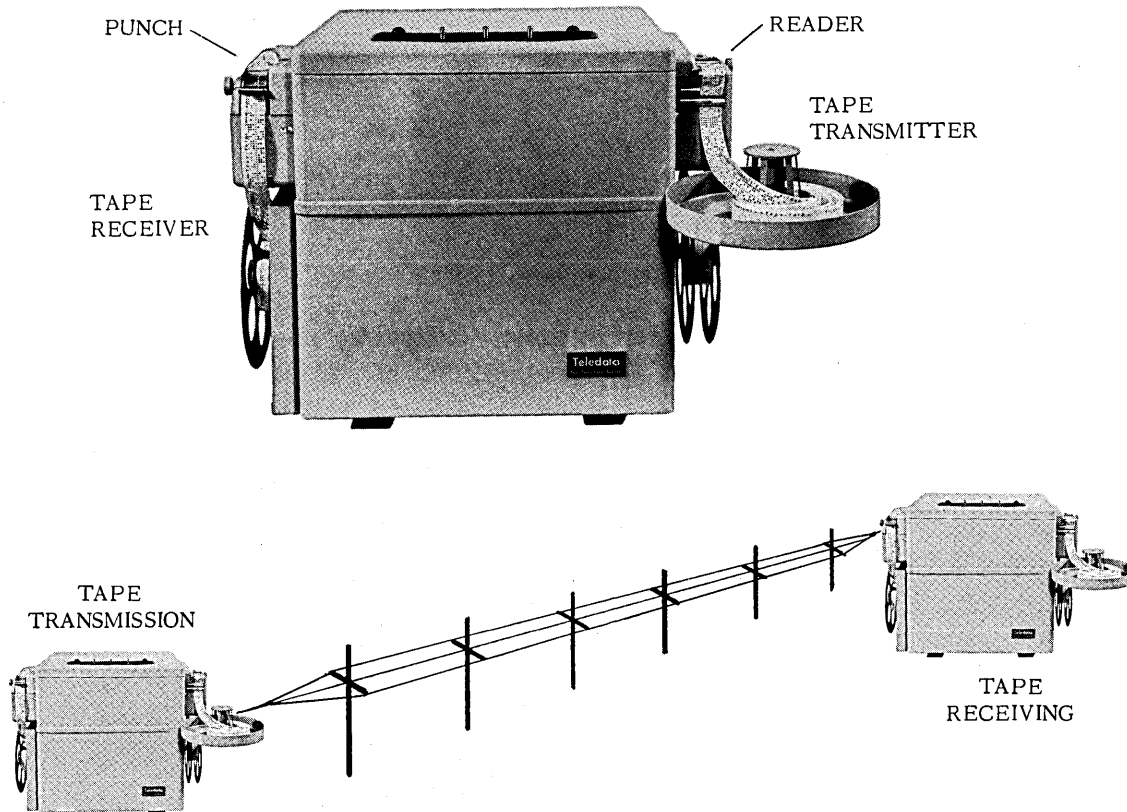
Some applications of the Friden Add-Punch include: coding payroll data for tape-to-card conversion, inventory, sales audit accounting, and bank accounting. Tape punched on the Friden Add-Punch may be used for transmission over standard tape transmitters.



The Friden Model APT Add-Punch

FRIDEN TELEDATA TRANSMITTER-RECEIVERS

The Friden Teledata is a single-unit, transmitter-receiver, which transmits and receives messages in the form of punched tape. A variety of units transmit and receive 5, 6, 7, and 8-Channel punched tape. All Teledata Models provide accuracy checking circuits as standard equipment. Simple controls allow a minimum of operator training.



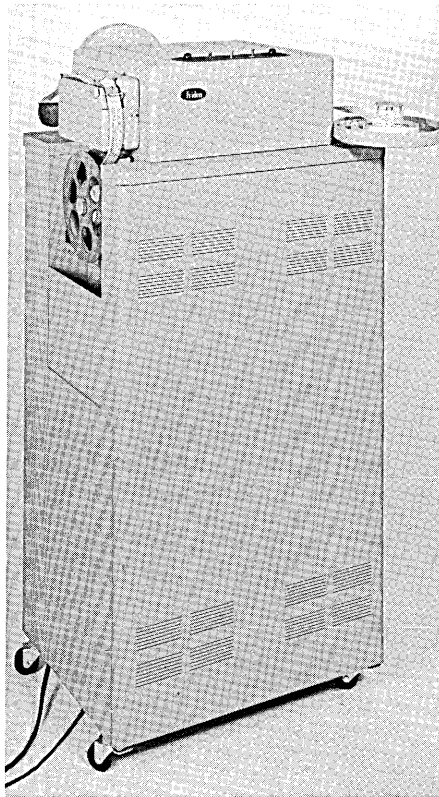
Basic models and variations include:

- MODEL 5 - For 5-Channel tape. Provides parity checking by words, or groups of characters between spaces.
- MODEL 6 - For 6-Channel tape. Provides Single Parity Check.
- MODEL 6A - For 5-Channel tape. Provides Single Parity Check.
- MODEL 7 - For 8-Channel tape. Provides Single Parity Check.
- MODEL 7B - For 5-Channel tape. Provides Double Parity Check.
- MODEL 8A - For 8-Channel tape. Provides Double Parity Check.
- MODEL 8B - For 6-Channel tape. Provides Double Parity Check.
- MODEL 8C - For 8-Channel tape. Provides Double Parity Check. For use with Dataphone service.

Transmission in one direction at a time requires the use of a Half-Duplex circuit. Transmission in both directions simultaneously requires the use of two Half-Duplex circuits. Teledata is generally used where accuracy of transmission and reception is of paramount importance.

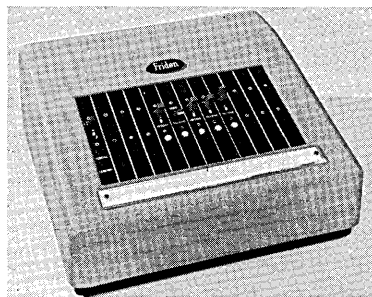
FRIDEN DUAL TELEDATA TRANSMITTER-RECEIVERS

The Friden Dual Teledata is a special high-speed transmitter-receiver especially constructed to operate over leased or private voice line circuits. Transmission speed is 851.4 codes per minute (about 141 words per minute). Dual Teledata transmits and receives odd-bit 7 or 8-Channel tape, and is equipped with Double Parity Check circuits.



FRIDEN TELEDATA SWITCHING CONTROL

The Friden Teledata Switching Control provides for regulation of two-way Teledata transmission in a multi-station hookup. The Control simplifies methods for signaling that data is to be transmitted, for selection of the receiving station, and speeds the entire systems procedure. It also provides a simple method of isolating machine malfunction and line faults.



SOME FRIDEN COMMUNICATIONS APPLICATIONS

SALES ORDER - INVOICING

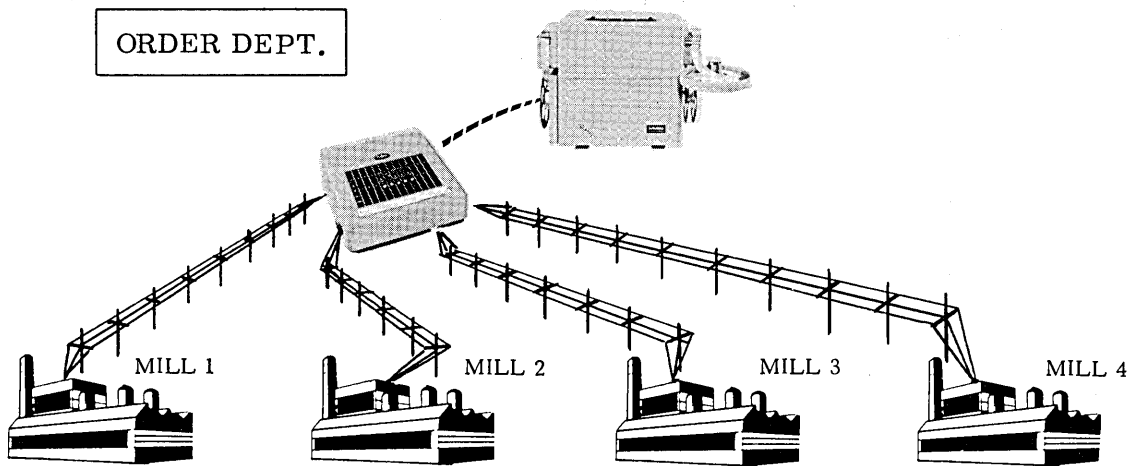
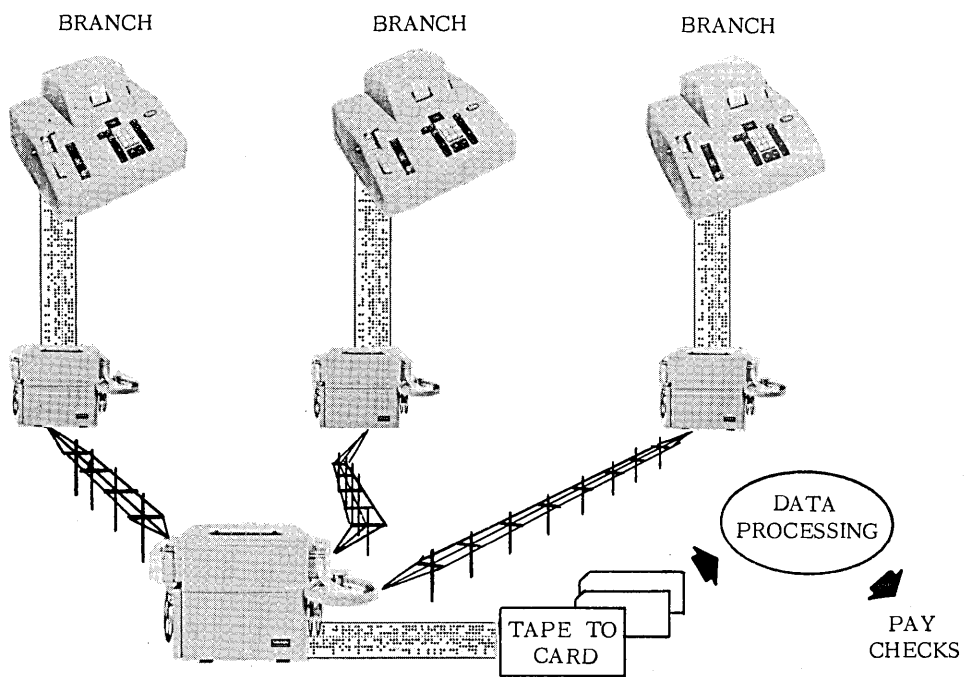
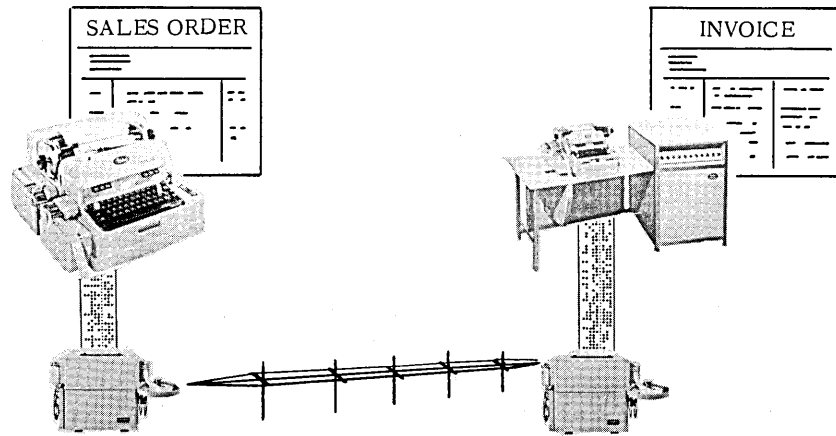
In this application, illustrated at the right, a Sales Order is written from Edge-Punched Cards on the Friden Model SPS Programatic Flexowriter. The by-product tape (8-Channel) from this writing is transmitted by Friden Teledata to the Home Office. At the Home Office, the tape is used to write the Invoice automatically on the Friden Model CTS Computyper. A by-product tape from this writing is used for Tape-to-Card Conversion to produce Tab Cards for Machine Accounting.

PAYROLL REPORTING

Weekly, each Branch Office uses the Friden Add-Punch to prepare a tape containing employee number, hours worked, and rate. This tape is transmitted by Friden Teledata to the Main Office Accounting Department, where it is processed into individual paychecks.

SHIPPING ORDERS

Shipping Orders are written on the Friden Model SPS Programatic Flexowriter. A by-product tape from this writing is transmitted by Friden Teledata to the Mill or Mills from which the shipments will be made. The Friden Teledata Switching Control is used to route the orders to the correct Mills.

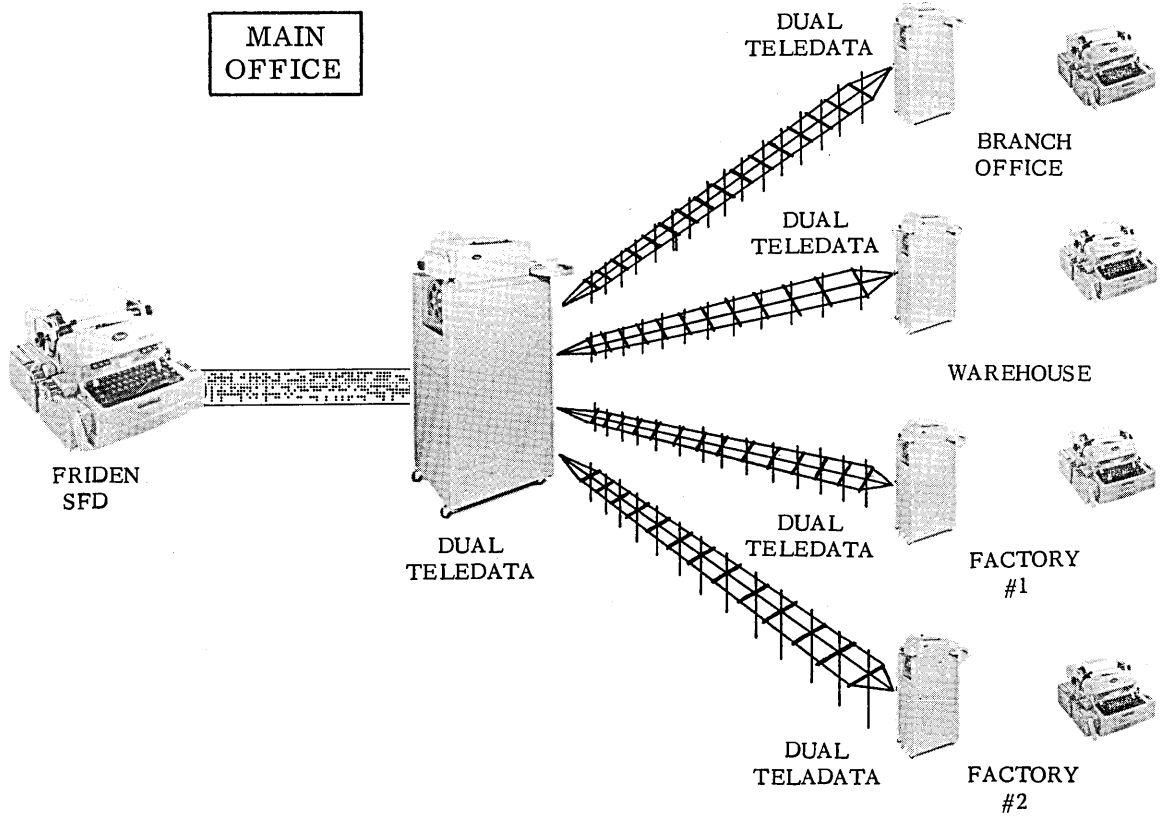
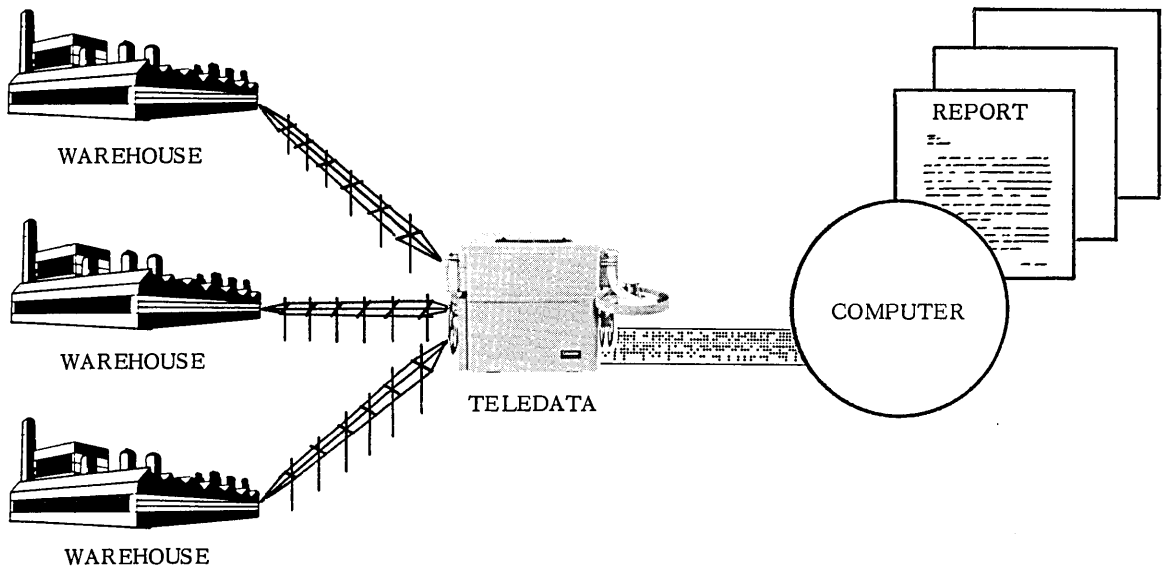


REPORTING

Each of the Warehouses uses Friden 8-Channel Programatic Flexowriters to prepare reports, and by-product tapes, which are transmitted by Friden Teledata to the Main Office for input into a Computer. From the Computer, up-to-date reports on inventory, payroll, and cost accounting are prepared, giving management the latest information.

GENERAL COMMUNICATIONS

The Friden Flexowriter Model SFD, and Friden Dual Teledata provide High-speed communications between Branch Offices, Factories, Warehouses, and the Main Office for the everyday message sending and receiving demanded by today's business methods.



Allied Equipment

THE TELETYPE TYPE 19 TELEPRINTER SET

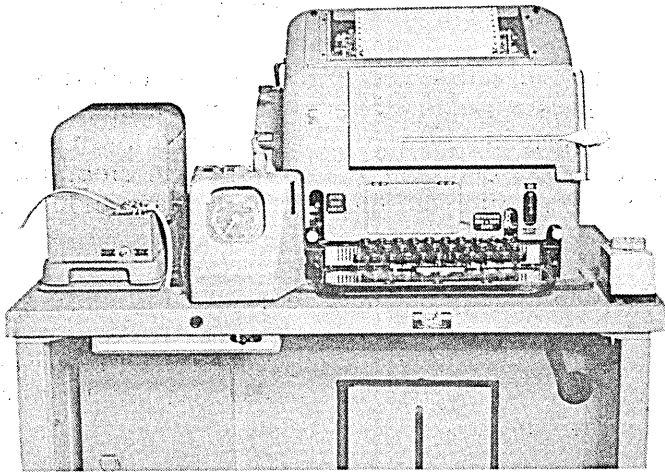
The Type 19 Set is a Transmitter-Receiver which can send and receive written messages (page to page), and can send messages in the form of 5-Channel tape. It consists of a combination of units: a page printer, keyboard, tape punch ("off-line" only), and an automatic transmitter. Provision is also made for a tape reperforator, to enable the Type 19 Set to receive messages in the form of 5-Channel punched tape. The maximum form width that can be used on the Type 19 Set is 8-1/2 inches, with a maximum number of 72 characters per line.

THE TELETYPE TYPE 15 TELEPRINTER

The Teletype Type 15 Teleprinter comes either with or without a keyboard. With the keyboard it can send and receive written messages (page to page). Without the keyboard it can only receive written messages. The maximum form width that can be used is 8-1/2 inches. The maximum number of characters per line is 72.

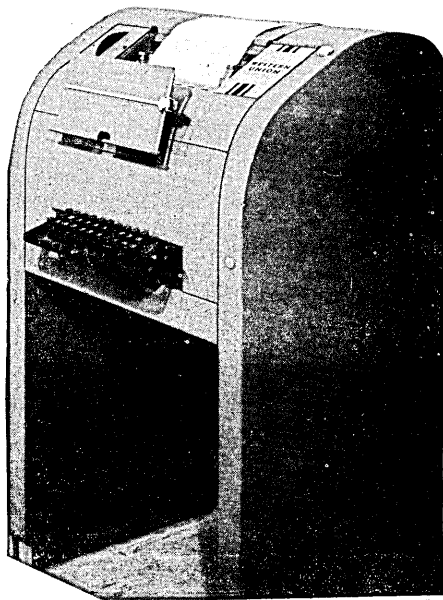
THE TELETYPE TYPE 14 PRINTING TAPE PUNCH

The Type 14 Printing Tape Punch (Typing Reperforator) comes either with or without a keyboard. Without the keyboard, it can only receive messages in the form of 5-Channel punched tape. With the keyboard, it can punch tape in an "off-line" condition for future transmission. This is a "blind" punching operation, that is, no "hard copy" (document) will be produced from this punching. The Type 14 Tape Punch also comes with or without the ability to print on the tape. This printing is six characters behind the punching.



TYPE 19 SET

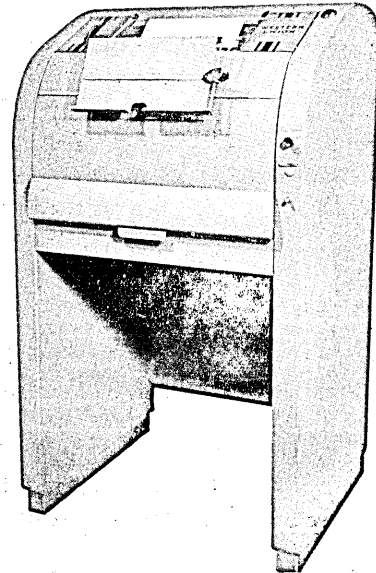
Lease \$80.00
(Per Mo.)



with Keyboard
Lease \$40.00
(Per Mo.)

TYPE 15
TELEPRINTER

without Keyboard
Lease \$35.00
(Per Mo.)



TYPE 14 PRINTING TAPE PUNCH

Lease \$45.00
(Per Mo.)



*Prices from supplier. May 1960.

THE TELETYPE MODEL 28 AUTOMATIC SEND-RECEIVE SET

This model is a combination of component units and is the most complete and newest set on the market. It has the ability to send and receive written messages (page to page); to send and receive messages in the form of punched 5-Channel tape (tape to tape); or any combination of these. The basic unit is an electrical service unit, console, and motor. To this is attached the keyboard, page printer, tape punch and a tape reader.

Any one of four different tape punching units may be installed:

TAPE PUNCH (Non-Typing Perforator) - This unit is for "off-line" preparation of 5-Channel tape from the keyboard. There is no printing on the tape of the characters punched.

PRINTING TAPE PUNCH (Typing Perforator) - Same as above with the added ability to print on the tape. Printing is six characters behind the punching.

RECEIVING TAPE PUNCH (Non-Typing Reperforator) - This unit can function either "on-line", to receive message in the form of 5-Channel punched tape, or in an "off line" condition to punch tape from the keyboard. No printing will occur on the tape.

RECEIVING AND PRINTING TAPE PUNCH (Typing Reperforator) - Same as above except printing will occur six characters behind punching.

Also, any one of four tape readers (Transmitter-Distributors) can be installed.

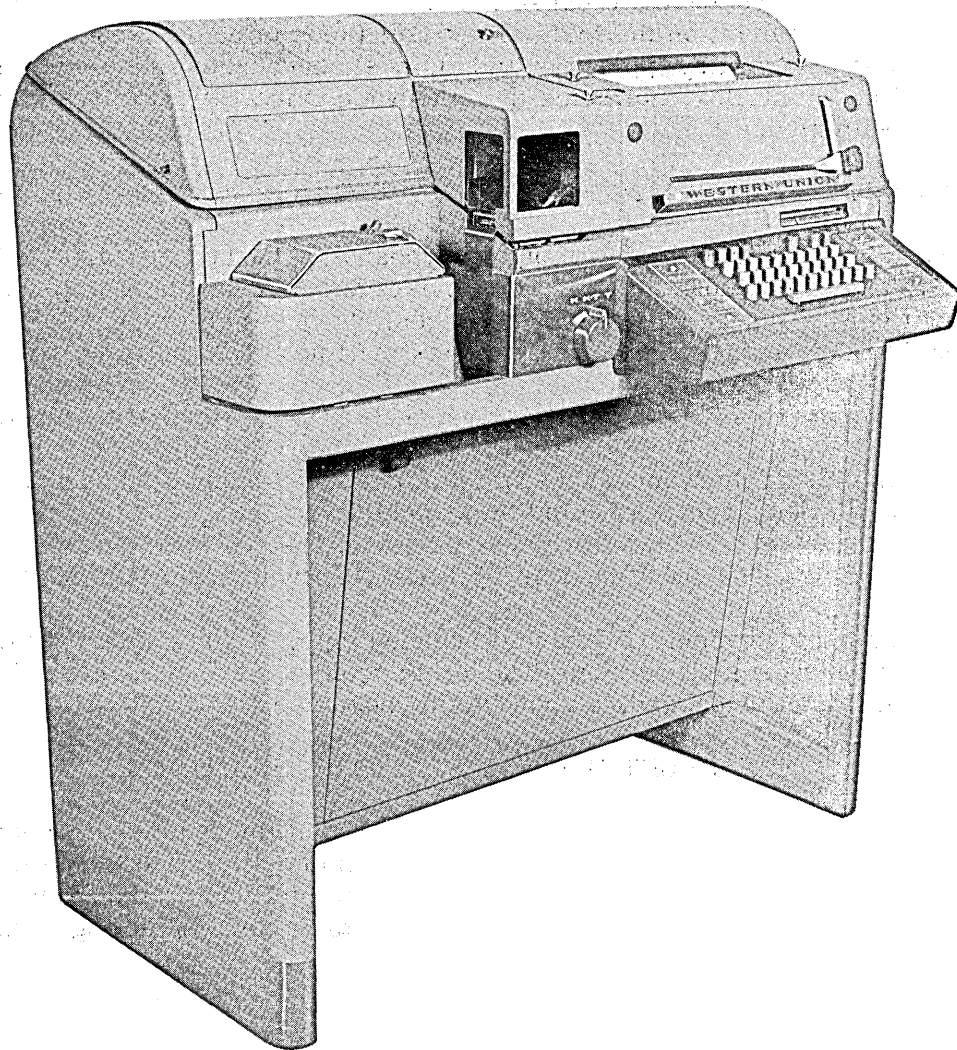
FIXED HEAD SINGLE CONTACT TRANSMITTER-DISTRIBUTOR - This unit reads and transmits 5-Channel punched tape.

FIXED HEAD MULTI-CONTACT TRANSMITTER-DISTRIBUTOR - Same as above, except it can also be wired to control similarly-wired business machines and other compatible equipment.

PIVOTED HEAD MULTI-CONTACT TRANSMITTER-DISTRIBUTOR - This unit is the same as above, with the added ability that the tape reading head can move along the tape and read the last code punched from the Tape Punch unit. This allows messages to be transmitted one after the other, without tearing the tape and inserting each message tape into the transmitter separately.

PIVOTED AND FIXED HEAD MULTI-CONTACT TRANSMITTER-DISTRIBUTOR - This unit has the two types of reading heads, and a single signal distributor.

The Model 28 ASR (Automatic Send-Receive) Set can transmit and receive messages at any one of three speeds: 60 words per minute, 75 words per minute, or 100 words per minute. Speeds are altered by changing gears. The maximum form width that can be used with the Model 28 ASR, is 8-1/2 inches. The maximum writing line is 72 characters.



TELETYPE MODEL 28 ASR SET

Lease \$105.00 ——— \$120.00
(Per Mo.)

Cost \$3200

*Prices from supplier. May 1960.

THE TELETYPE MODEL 28 STUNT BOX (not shown)

The Model 28 Stunt Box is a mechanism which gives the Model 28 Teleprinter (Page Printer), the ability to use a sort of "third-shift" operation to control machine functions only. This is a mechanical operation which is actuated by a series of codes that would be unlikely to appear on page copy. When in "Stunt", certain keylevers are wired to cause machine functions, punch their respective codes, but will not print on the form. The Stunt Box can be used as a station selector, to control auxiliary apparatus, light lamps, ring buzzers, and other special functions. The Stunt Box increases the otherwise limited flexibility of Teletype 5-Channel equipment.

THE TELETYPE MODEL 28 PAGE PRINTER (Teletypewriter, Teleprinter)

This unit comes either with or without a keyboard. With the keyboard (Teletypewriter), it can send and receive written messages. Without the keyboard (Teleprinter), it can only receive written messages. The maximum form width on both machines is 8-1/2 inches. The maximum writing line is 72 characters.

THE TELETYPE MODEL 28 RECEIVING PUNCH (Typing Reperforator)

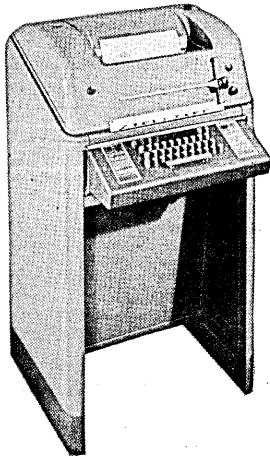
This unit can only receive messages in the form of 5-Channel punched tape. The tape is printed six characters behind the punching.

THE TELETYPE MODEL 28 TAPE READER (Transmitter-Distributor)

This unit is used to transmit 5-Channel punched tape. It can transmit at the rate of 60, 75, or 100 words per minute. There is a wide variety of shapes, sizes and capacities of this unit, depending upon the intended use.

THE TELETYPE WAY STATION SELECTOR

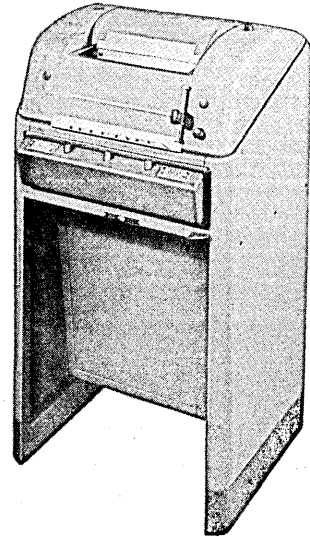
This unit, made especially for use on Western Union lines, is used where there are many stations on the same circuit. It allows one station to transmit to any other station or stations, without activating all the stations on the same circuit. This unit also comes in a wide variety of models with various selecting capacities, and for use with a variety of equipment.



with Keyboard
Lease \$55.00
(Per Mo.)

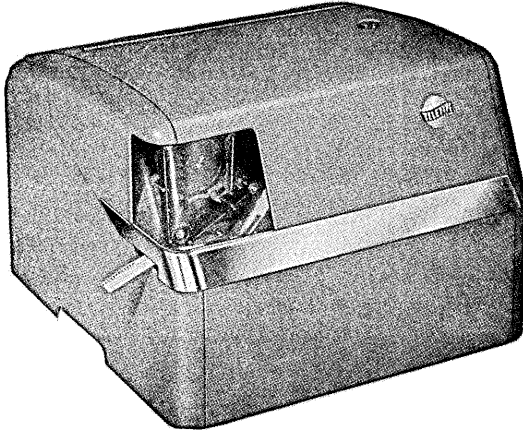
Cost \$2100

MODEL 28
PAGE PRINTER



without Keyboard
Lease \$50.00
(Per Mo.)

Cost \$1700



MODEL 28
RECEIVING TAPE PUNCH

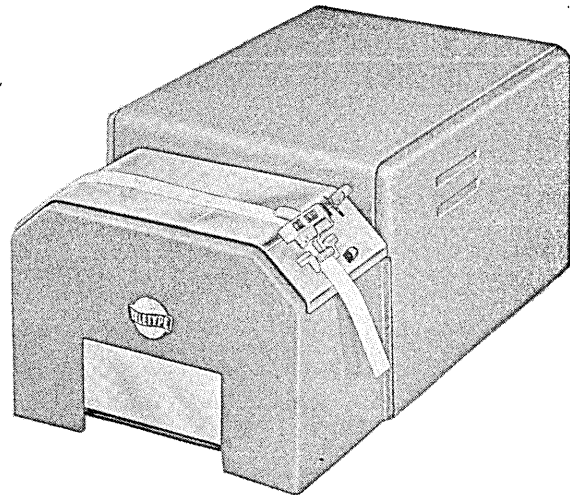
Lease \$40.00
(Per Mo.)

Cost \$975

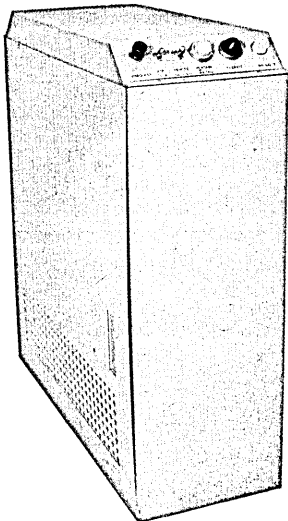
MODEL 28
TAPE READER

Lease \$45.00
(Per Mo.)

Cost \$625



*Prices from supplier, May 1960.



WAY STATION SELECTOR

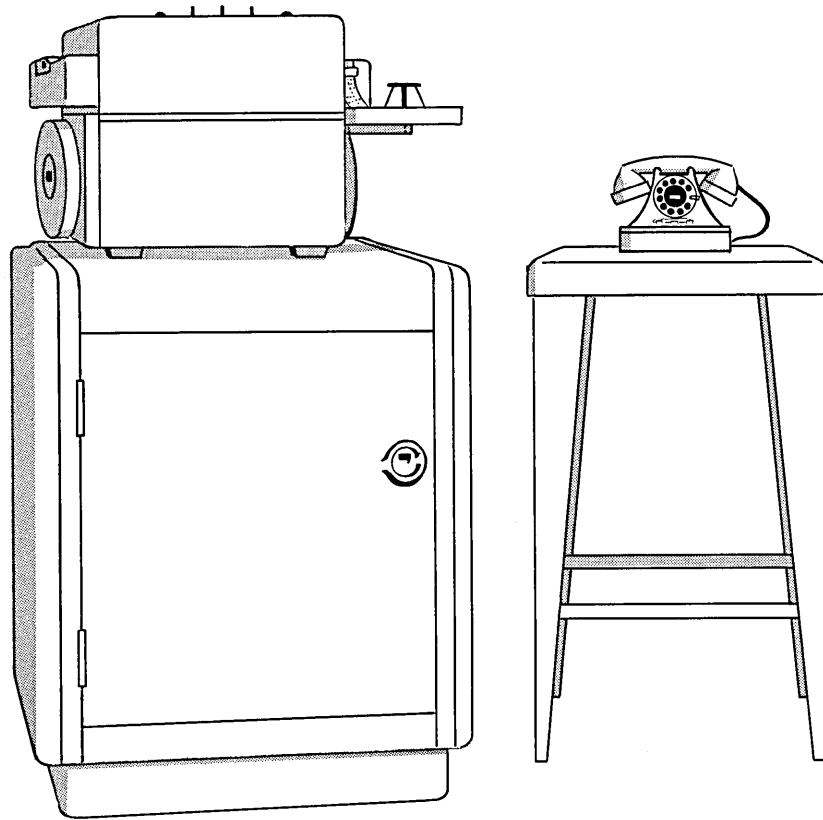
Lease \$13.00 to \$25.00
(Per Mo.)

THE BELL SYSTEM DATAPHONE

Dataphone is a system for transmitting data at high speeds over regular telephone and private lines. It is essentially a device for coupling transmission equipment to regular telephone service.

The basic unit is the Digital Subset, which connects transmitting equipment such as the Friden Teledata, and Teletype Transmitter-Distributors through telephone lines to identical Receivers at the other end. Transmission speeds of up to 1,300 words per minute may be obtained.

When a Dataphone transmission is desired, a telephone call is made to the other location. After the connection is made, both parties depress a button on their respective subsets, which connects the subset to the telephone line. Dataphone transmission may now begin. The Dataphone has the advantage that the customer pays for the lines used, only for the time the lines are actually in use.

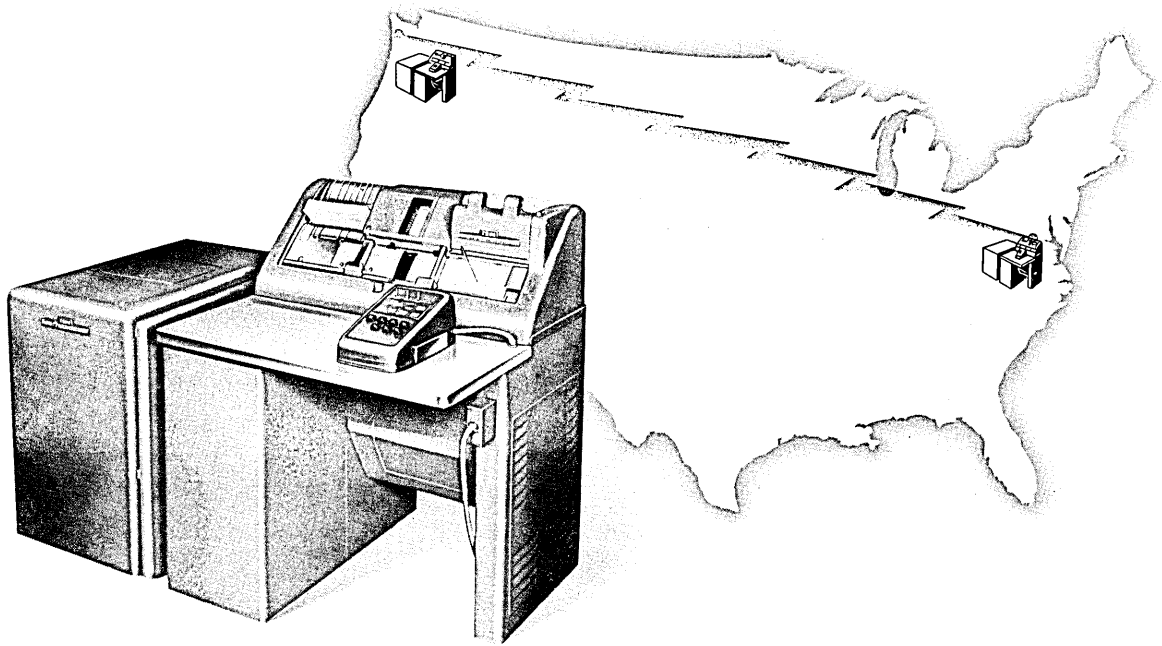


BELL SYSTEM DATAPHONE

**with Digital Subset
and Friden Teledata
Transmitter-Receiver**

IBM MODEL 65 - 66 DATA TRANCEIVER

The IBM Data Tranceiver connects Card Punching units to regular telephone and telegraph lines. It allows data in the form of IBM punched Cards to be transmitted from one station to another, and be received in the form of identical Punched Cards from a unit at the other end. The machines at either end are the same, and can be used for both transmitting and receiving, but not simultaneously.



IBM TYPE 65-66 DATA TRANSCEIVER

THE KLEINSCHMIDT MODEL 154 COMPLETE STATION TELEPRINTER

The Model 154 (not shown), manufactured by Kleinschmidt Inc., division of Smith Corona Marchant Inc., consists of a sending-receiving Page Teleprinter, and a Typing Reperforator which serves the tape perforator, automatic transmitter, and tape reperforator. The set may be operated at speeds of 60, 66, 75, or 100 words per minute. For tape operation, it punches 5-Channel "chad" tape, 7/8" wide, and prints along the bottom of the tape, six characters behind the punching. It can transmit 5-Channel punched tape either 7/8" or 11/16" wide. The maximum form width that can be used is 8-1/2" wide, with a maximum of 72 characters per line. No error checking facilities are included at this time. The Model 154 sells for \$2,700, and leases for \$70 per month.

The installation charge for all units on this page is \$25 per unit. Service is included in the lease rate. For purchase, the service contract is \$15 per month at this time.

THE KLEINSCHMIDT MODEL 150 PAGE TELEPRINTER

The Model 150 Page Teleprinter transmits and receives written messages (page to page). It can transmit and receive at speeds of 60, 66, 75, or 100 words per minute. The maximum form width that can be used is 8-1/2", and the maximum number of characters per line is 72.

THE KLEINSCHMIDT MODEL 140 TAPE TRANSMITTER

The Model 140 Tape Transmitter transmits 5-Channel punched tape, chad or chadless, either 7/8" or 11/16" wide. It can transmit at speeds of 60, 66, 75, or 100 words per minute.

THE KLEINSCHMIDT MODEL 120 TYPING REPERFORATOR, TAPE TRANSMITTER

The Model 120 Typing Reperforator, Tape Transmitter, can transmit and receive messages in the form of 5-Channel punched tape. The keyboard allows punching of 5-Channel chad tape 7/8" wide in an "off-line" condition for future transmission. The Model 120 can transmit 5-Channel tape, chad or chadless, either 7/8" or 11/16" wide. The tape (7/8" only) is also imprinted. This printing is along the bottom of the tape and is 6 characters behind the punching. Transmission speed is 60, 66, 75, or 100 words per minute.

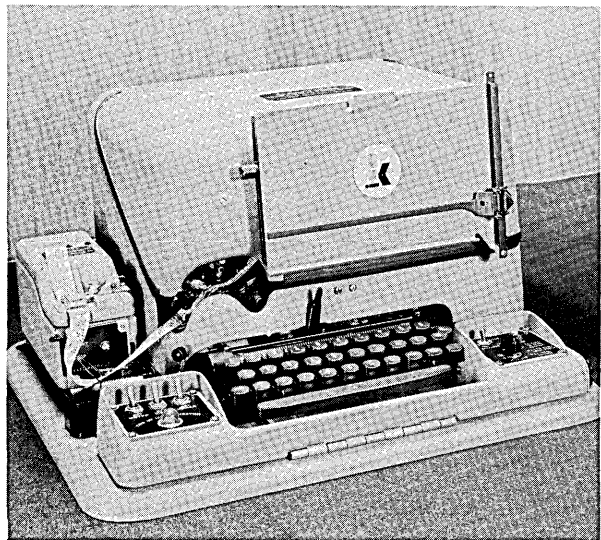
*Prices from supplier. May 1960.



**KLEINSCHMIDT
MODEL 150**

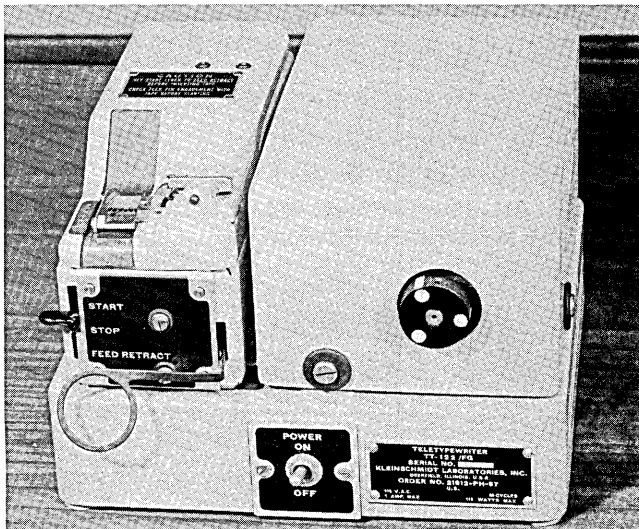
Page Teleprinter
Price \$1,475.00
Lease \$40.00
(Per Mo.)

*Prices from supplier. May 1960.



**KLEINSCHMIDT
MODEL 140**

Tape Transmitter
Price \$250.00
Lease \$10.00
(Per Mo.)



**KLEINSCHMIDT
MODEL 120**

Typing Reperforator -
Tape Transmitter
Price \$1,400.00
Lease \$40.00
(Per Mo.)

Friden, *Inc.*

SAN LEANDRO • CALIFORNIA

PLANTS IN:

SAN LEANDRO, CALIFORNIA • ROCHESTER, NEW YORK

LEWISTOWN, PENNSYLVANIA • NIJMEGEN, HOLLAND

SALES AND SERVICE THROUGHOUT THE WORLD