Bell System

TECHNICAL REFERENCE

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4200 SERIES MAGNETIC TAPE TERMINALS

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Bell System Data Communications

TECHNICAL REFERENCE

4200 Series
Magnetic Tape Terminals

August, 1970

ENGINEERING DIRECTOR - TRANSMISSION SERVICES

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TABLE OF CONTENTS

		Page
1.	**INTRODUCTION**	**1**
1.1	General Description	1
1.2	Physical and Electrical Characteristics	1
1.3	Magnetic Tape Set Description	2
1.4	Magnetic Tape Set Components	2
1.5	Station Arrangements	3
1.6	Terminal Capabilities	3
2.	**OPERATOR CONTROLS**	**4**
2.1	Mode Selector Switch	4
2.2	Send Switch	4
2.3	Receive Switch	4
2.4	Stop Switch	4
2.5	Search Forward Switch	5
2.6	Search Reverse Switch	5
2.7	Search and General Function Selector Switch	5
2.8	Error Switch	5
2.9	Forward/Reverse Single Step Switch	5
2.10	Forward/Reverse Fast Access Switch	5
2.11	Alarm Indicators	5
3.	**SYSTEM OPERATION**	**5**
3.1	Tape Handling	6
3.2	Record Clock Track	6
3.3	Mode Selection	6
3.4	Attended and Unattended Operation	6
3.5	Record Interlock	7
4.	**INTERFACE INFORMATION**	**7**
4.1	Data Set Interface	7

LIST OF FIGURES

FIGURE 1 4200 Series Magnetic Tape Set with a 200 Series Data Set

FIGURE 2 4200 Series Magnetic Tape Set with a 200 Series Data Set Associated with a Model 37 KSR Set

FIGURE 3 4200 Series Magnetic Tape Set Associated with a DATASPEED® KSR Set

FIGURE 4 Typical Magnetic Tape Set Station Arrangements

FIGURE 5a. Basic Control Panel for 4200 Series Magnetic Tape Set

FIGURE 5b. Control Panel for 4200 Series Magnetic Tape Set Associated with DATASPEED KSR Set

FIGURE 6 Attended Operation – On-Line via 200 Series Data Set – Sender Originates Call

FIGURE 7 Attended Operation – On-Line via 200 Series Data Set – Receiver Originates Call

FIGURE 8 Unattended Receiver Operation – On-Line via 200 Series Data Set – Sender Originates Call

FIGURE 9 Unattended Sender Operation – On-Line via 200 Series Data Set – Receiver Originates Call

1. INTRODUCTION

This Technical Reference describes low-speed and high-speed (100 wpm to 2400 wpm) data transmission systems using 4200 Series Magnetic Tape Sets. The 4200 Series Magnetic Tape Set will send data from or receive data and record it on magnetic tape in a 150,000-character capacity cartridge.

The information presented here is intended to describe:

(1) On-line and local signaling and terminal characteristics which are critical to the design of other data equipment with which the 4200 Series Magnetic Tape Set will communicate.

(2) The 4200 Series Magnetic Tape Set operating characteristics with which a user should be acquainted.

1.1 General Description

The 4200 Series Magnetic Tape Sets can be used in 100 to 2400 wpm data communications systems using either private or conventional telephone lines. Provisions are made for serial or parallel interfacing, and a particular set may be equipped with either or both a low- and a high-speed interface. The magnetic tape set will transmit data from magnetic tape or receive and record data on magnetic tape in half-duplex operation. The magnetic tape sets may be used for point-to-point data gathering or distribution; for exchanging data (from outlying stations) with a central data processing terminal such as a computer; for local or on-line message preparation, transmission, and recording in conjunction with a local teletypewriter terminal; and for linking high- and low-speed data communication facilities.

The data medium used in the 4200 Series Magnetic Tape Sets is one-half inch wide computer grade magnetic tape having 8 data levels. (This will accommodate an 8-level code such as ASCII. Presently available options do not facilitate lesser code levels.) The magnetic tape is provided in a cartridge with a 150,000-character capacity. The magnetic tape set is not code sensitive, that is, the particular coding scheme used to represent data may be arbitrarily chosen by the user with the exception of four built-in control codes – see paragraph 2.7.

The 4200 Series Magnetic Tape Sets may be used in attended or unattended applications. The unattended applications are primarily limited to high-speed, on-line data transmission in conjunction with a 200 Series data set, but other possibilities exist.

1.2 Physical and Electrical Characteristics

	Magnetic Tape Set	
Feature	M33/M35/M37 Styling	DATASPEED KSR Styling
Size (Cabinet Dimensions)	12" Wide 29-30" High (adjustable) 23" Deep	12" Wide 32" High 24" Deep
Weight (Less Data Set)	97 pounds	
Mounting	Floor	
Data Storage Medium	1/2" Magnetic Tape Computer Grade 3" x 3" x 1" Cartridge 150,000-Character Capacity (100 feet)	
Tape Handling	In-line threading; automatic unload	
Temperature (Operating)	+40°F to 100°F	
Average AC Power Consumption – Less Data Sets	180 Watts	
Voltage	117 Volts, AC ± 10%	
Frequency	60 ± 0.5 Hz	

Feature	Magnetic Tape Set	
	M33/M35/M37 Styling	DATASPEED KSR Styling
Power Cord	Three-wire grounded type, 8 feet length	
Start Current	11 amps	
Run Current	2-1/2 amps	
Teletypewriter Signal Interface	M33/35, 20 mA @ +20VDC M37, RS232B	
200 Series Data Set Interface	RS232B	
Maximum Acceptable Receiving Distortion (Serial Data)	40%	
Maximum Sending Distortion (Serial Data)	5%	

1.3 Magnetic Tape Set Description

The 4200 Series Magnetic Tape Sets are available in two floor-mounted cabinets. One cabinet (see Fig. 3) is intended only for magnetic tape set adjuncts to DATASPEED KSR set applications. Note that this cabinet provides no data set mounting facilities, and the related control panel is special for this application. The deleted control functions are provided by the DATASPEED KSR set controls. Styling of the other cabinet (see Figs. 1 and 2) is suitable for use in stand-alone and adjunct to Model 33, 35, and 37 teletypewriter set applications. Three front panels are optionally available for this cabinet – blank, cutout for a Data Auxiliary Set 804 or equivalent, and cutout for a Data Set 202C or equivalent.

The magnetic tape sets indicated in Fig. 4 are basically similar but not identical. In each case the proper interface circuit cards and cables must be provided, and proper plug-in crystals are required to determine speed. Also, the cabinet variations indicated above and color to match associated equipment should be considered.

1.4 Magnetic Tape Set Components

The components of the 4200 Series Magnetic Tape Sets have been developed as interchangeable modular elements to provide the specific variable features required for operation in their various applications. The 4200 Series Magnetic Tape Sets consist of the following basic elements:

(1) Tape Transport – The transport contains all of the mechanics associated with tape movement including the motor, gearshift assemblies, three-digit counter, capstan and pinch roller, tape take-up reel, tape tensioning and guiding apparatus, and the nine-channel read/write head. It also includes the tape position photo sensors and motor control circuitry.

(2) Electronics Module – The electronics module contains the power supply, connector board and circuit cards (up to 14 circuit cards) including all logic circuitry.

(3) Control Panel – The control panel includes all switches and lamps for operator control of the set. It is provided with a cable which connects to the cabinet service cable assembly.

(4) Internal Cables – Two internal cable assemblies are required for cabinet service and head service.

(5) Interface Cables – Depending on the application, cables are provided for interfacing the set to a 200 Series data set; Model 33, 35, or 37 set; or DATASPEED KSR set.

(6) Cabinet – Two floor-mounting cabinet styles are provided depending upon application. The

cabinets provide mounting facilities for all of the above componets. The tape transport and control panel mount in the top portion of the cabinet and a compartment is provided in the bottom of the cabinet for the electronics module. A shelf is provided in the center of one of the cabinets for a Data Set 202D with a Data Auxiliary Set 804A or a Data Set 202C. In applications where a Data Set 201 with a Data Auxiliary Set 804A is used, there is sufficient room in the cabinet only for the Data Auxiliary Set 804A. The Data Set 201 must be installed at a convenient location outside of the cabinet. The cable provided will allow the Data Set 201 to be located approximately 3 feet from the magnetic tape set's cabinet. If an extension cable is added, the data set should not be installed more than 15 feet from the cabinet. Note that the cabinets provided are not essential to set operation, and the magnetic tape set's components could be housed relatively easily in specially engineered cabinetry for applications where this is more suitable.

1.5 Station Arrangements

Numerous station arrangements (see Fig. 4) are possible using either DATA-PHONE® service or 2-wire, half-duplex, point-to-point private line service. The appropriate Bell System Technical Reference should be consulted for information on specific data sets. The magnetic tape terminal will provide low- or high-speed, send or receive operation on a half-duplex basis. Transmission or reception may be under manual control of the operator or unattended in some applications. Data communication systems may be arranged for point-to-point local or remote data gathering or for data distribution. Magnetic tape terminals may also be used at outlying points exchanging data with a central data processing terminal such as a computer.

1.5.1 The 4200 Series Magnetic Tape Set when interfaced to a 200 Series data set becomes a self-contained, stand-alone magnetic tape terminal capable of high-speed, on-line data transmission. Transmission speed is 1050 or 1200 wpm using a Data Set 202C6 or 202D4 and 2000 or 2400 wpm using a Data Set 201A3 or 201B. (A Data Auxiliary Set 804 is required where the Data Sets 201A3, 201B, or 202D4 are used.)

1.5.2 A 4200 Series Magnetic Tape Set has the capability of operating at two speeds (i.e., 150 and 1050 wpm). The high-speed, stand-alone terminal described above may also be interfaced to a Model 33, 35, or 37 teletypewriter terminal. Then, in addition to the high-speed transmission capabilities, the 4200 Series Magnetic Tape Set provides 100 or 150 wpm data transmission. With the 4200 Series Magnetic Tape Set as an adjunct to the Model 33, 35, or 37 terminal, it is capable of transmitting data to or receiving data from the Model 33, 35, or 37 terminal apparatus (page printer, keyboard, or paper tape reader) or on the low-speed line at 100 or 150 wpm via the low-speed terminal on-line interface, if present. If the 200 Series data set is deleted from this equipment arrangement, the magnetic tape set may be utilized strictly as a low-speed accessory to the low-speed terminal in local and on-line operation.

1.5.3 The 4200 Series Magnetic Tape Set may also be interfaced to a DATASPEED KSR set. As an adjunct to the DATASPEED KSR set, the 4200 Series Magnetic Tape Set employs input/output circuitry that meets Teletype's high-speed parallel device interface to send data to or receive data from the local DATASPEED KSR set or on-line via the DATASPEED KSR set's interface at speeds up to 1200 wpm.

1.6 Terminal Capabilities

The following capabilities are provided by the 4200 Series Magnetic Tape Sets: (Refer to Fig. 4.)

1.6.1 Magnetic Tape Set with 200 Series Data Set

(1) Data from a magnetic tape cartridge may be transmitted on-line at 1050, 1200, 2000, or 2400 wpm.

(2) Data may be received on-line and recorded on a magnetic tape cartridge at 1050, 1200, 2000, or 2400 wpm.

(3) Attended calls may be initiated or received by the magnetic tape terminal in either the send or receive mode.

(4) Unattended calls may be received by the magnetic tape terminal by selecting the on-line/auto mode and preselecting either the send or receive mode. The magnetic tape must be pre-positioned such that the message to be transmitted or the area which is to be recorded is at the read/write head. If an unattended message concluded with the ASCII control character EOT is transmitted, the magnetic tape set will stop transmitting

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after the EOT character and switch from the send to the receive mode. Answer or return data will be recorded by the magnetic tape set, or the call can be terminated by the calling station.

(5) Auto Disconnect.

1.6.2 Magnetic Tape Set Associated with a Model 33, 35, or 37 Teletypewriter Set

(1) Data may be transmitted from a magnetic tape cartridge to the receiving apparatus in the local teletypewriter set at 100 or 150 wpm. Page printer copy of the transmitted data is provided by the local teletypewriter.

(2) Data may be received and recorded on a magnetic tape cartridge from the transmitting apparatus (keyboard or paper tape reader) in the local teletypewriter set. Page printer copy of the recorded data is provided by the local teletypewriter.

1.6.3 Magnetic Tape Set Associated with a Model 33, 35, or 37 Teletypewriter Set with a 100 Series Data Set

(1) All capabilities indicated above in paragraph 1.6.2 are provided.

(2) Data may be transmitted or received by the magnetic tape set on-line via the local teletypewriter on-line interface at 100 or 150 wpm.

1.6.4 Magnetic Tape Set with a 200 Series Data Set Associated with a Model 33, 35, or 37 Teletypewriter Set

(1) All capabilities indicated above in paragraphs 1.6.1 and 1.6.2 are provided.

1.6.5 Magnetic Tape Set with a 200 Series Data Set Associated with a Model 33, 35, or 37 Teletypewriter Set with a 100 Series Data Set

(1) All capabilities indicated above in paragraphs 1.6.1, 1.6.2, and 1.6.3 are provided.

1.6.6 Magnetic Tape Set Associated with a DATASPEED KSR Set with a 200 Series Data Set

(1) Data may be transmitted from a magnetic tape cartridge to the page printer in the local teletypewriter set or on-line via the DATASPEED KSR set's on-line interface at speeds up to 1200 wpm.

(2) Data may be received and recorded on a magnetic tape cartridge from the local KSR keyboard or on-line interface at speeds up to 1200 wpm.

2. OPERATOR CONTROLS

The operator controls provided on the 4200 Series Magnetic Tape Sets are an array of indicating lamps and control switches (see Figs. 5a and 5b) located at the top of the magnetic tape cabinet which monitor and control various set functions. The uses of the lamps and switches are listed below:

*2.1 Mode Selector Switch

A rotary selector switch places the magnetic tape set into one of three operating modes:

(1) Local – Enables the terminal for low-speed send or receive operation in conjunction with the supporting teletypewriter station (Model 33, 35, or 37 Set). Provides either local operation or on-line operation via the supporting station data set and terminal control.

(2) Manual – On-Line – Provides attended send or receive operation at high speed through a 200 Series data set.

(3) Auto – On-Line – Provides unattended send or receive operation at high speed through a 200 Series data set.

*2.2 Send Switch

Momentary depression of the send switch will enable the magnetic tape set to send in the mode selected. The send switch is lighted when the function has been selected.

*2.3 Receive Switch

Momentary depression of the receive switch will condition the magnetic tape set to receive data in the mode selected. The receive switch is lighted when the function has been selected.

2.4 Stop Switch

Momentary depression of the stop switch will remove the magnetic tape set from any electrically latched function: i.e., send, receive, search forward, or search reverse. The light associated with the stop switch is normally lighted when no function has been selected, and "blinks" when a function is in process.

2.5 Search Forward Switch

Momentary depression initiates an internal read operation in the forward direction at approximately 400 characters/second. This function will continue and the switch will remain lighted until the character selected on the search selector switch (paragraph 2.7) is read on the tape, or manually stopped (paragraph 2.4), or until end of tape (paragraph 2.11) is reached.

2.6 Search Reverse Switch

Momentary depression initiates an internal read operation in the reverse direction at approximately 400 characters/second. Search will continue and the switch will remain lighted until the character selected on the search selector switch is read on the tape, or manually stopped, or until beginning of tape is reached.

2.7 Search and General Function Selector Switch

A rotary selector switch provides selection of three functions:

(1) Character Search – Four positions are programmed for one of four ASCII control characters (FS, GS, LF, and EOT). An additional three positions are available for special character programming in conjunction with an optional circuit card which provides three additional search characters.

(2) Unload – When the selector switch is placed in the extreme clockwise position, the tape will rewind at 30 inches/second into the cartridge.

(3) Record Clock Track – When the selected switch is placed in the extreme counterclockwise position, and tape is positioned to beginning of tape, the clock track will be recorded on the tape. Approximately 6-1/2 minutes are required to completely prepare a tape.

*2.8 Error Switch

The error switch will light at any time an odd parity character is read on the tape. Parity will be monitored when the functions send, search, or single step are selected. Momentary depression of the error switch will turn the light off.

2.9 Forward/Reverse Single Step Switch

Each depression of the switch will result in one character movement of the tape in the desired direction. When forward single step is selected, the character will be transmitted to the local teletypewriter or on-line. Reverse Step is accomplished without readout of the character. The single step function can be utilized while in an idle mode or the receive mode. The switch must be held depressed until the function is completed as indicated by flashing send and stop lights.

2.10 Forward/Reverse Fast Access Switch

Operating this switch will provide high-speed tape movement (approximately 33 inches/second) in the direction selected. Tape movement will continue only while the switch is activated. A resettable three-digit counter is associated with this switch to provide an approximate reference number when accessing messages within the tape.

2.11 Alarm Indicators

Three tape positions will provide an illuminated alarm on the control panel and will cause certain inhibit functions to be activated.

(1) Beginning of Tape – All reverse tape motion (search, fast access, single step) other than the unload function will be inhibited.

(2) Low Tape (approximately 9,000 characters from end of tape) – The receive mode cannot be initiated, but the set will continue to receive if already selected in the receive mode.

(3) End of Tape – All forward tape motion (send, search, fast access, single step) will be inhibited.

* Controls not provided on the magnetic tape sets associated with with DATASPEED KSR set. These functions are selected through control switches on the DATASPEED KSR control panel.

3. SYSTEM OPERATION

Basically, the 4200 Series Magnetic Tape Sets in systems applications operate in the following manner: the magnetic tape set can be used as a sending or a receiving device. As a sender, the magnetic tape set reads data recorded in parallel in eight channels on the magnetic tape. (A ninth channel on the tape is used for a clock track.) The eight signals read are amplified and distributed either serially or in parallel according to the requirements of the particular interface being used. As a receiver, the magnetic tape set receives data at its interface in either serial or

parallel form, converts to parallel signals if necessary, and records the signals in eight parallel channels on the magnetic tape as gaged, character for character, by the pulses recorded in the clock track. Tape movement for both send and receive modes is incremental.

3.1 Tape Handling

The tape handling facilities provide simple in-line threading for loading a tape cartridge on the tape deck and automatic unloading. The magnetic tape itself is never handled by an operator. The rapid access feature enables the operator to move the tape in the forward or reverse direction to the desired location. A resettable counter is provided to give a reference number which the operator uses in conjunction with the rapid access feature to position the tape. To locate a specific message after rapid accessing to the approximate area of the tape, the search feature is used to move the tape to control codes which are recorded on the tape. The single step feature is used to move the tape one character at a time. The character is transmitted in the forward single step function (only). The single step feature is provided in the receive mode to simplify the editing and correction procedure.

3.2 Record Clock Track

A new tape cartridge is loaded onto the tape deck of the magnetic tape set. The rotary function selector switch is placed in the record clock track position. Timed pulses are generated within the set to be recorded on the magnetic tape in one of the nine channels designated "clock track." The clock track will be recorded until end of tape is sensed, where the function will automatically stop. Once the clock track has been recorded on the tape, data can be recorded over and over, and the clock track normally need not be recorded again.

3.3 Mode Selection

Mode selection in the magnetic tape set is not difficult. The three positions on the rotary mode selector switch are used to determine which of the two interfaces (low-speed or high-speed) shall be used. Two of the positions, designated On-Line, Manual or Auto, are used to select the high-speed, on-line interface to a 200 Series data set and to select whether operation will be attended (Manual) or unattended (Auto). The third position, Local, is used to select the low-speed local interface to equipment such as a Model 33, 35, or 37 set. In station arrangements where one or the other of the On-Line or Local positions does not apply because that particular interface is not provided, the position is not used. For the arrangement where the magnetic tape set is adjunct to a DATASPEED KSR set, only the high-speed parallel interface to the KSR set is provided and a special control panel without a rotary mode selector switch is used.

Once the desired interface (and indirectly the related data communication speed) has been selected, and the tape handling facilities have been used to position the tape to the desired location, the operator may select either the send or receive mode by depressing the respective control switch. In the manual modes (Manual, On-Line, and Local), transmission from the magnetic tape will commence when the send switch is depressed. Similarly, the magnetic tape set is conditioned to receive data when the receive button is depressed. In the receive mode there is no tape movement unless data is actually being recorded because of the incremental tape movement employed. Selection of the send or receive switch in the Auto, On-Line mode for automatic answer and unattended operation is used to predetermine the magnetic tape set mode. The special control panel provided on magnetic tape sets used as adjuncts to DATASPEED KSR sets does not include a send or receive switch since these functions are controlled by the KSR set.

3.4 Attended and Unattended Operation

There are no provisions for unattended send operation over low-speed lines, however, teletypewriter stunt box call-in of a magnetic tape set preselected as a sender is possible on a locally engineered wiring basis. If the magnetic tape set is preselected as a receiver in the Local mode, all low-speed data received by an unattended terminal which is interfaced to the magnetic tape set will be recorded on the tape until end of tape is reached.

High-speed on-line operation of the magnetic tape set (Figs. 6 and 7) is possible via an associated 200 Series data set. When attended, the operator can elect to auto-answer incoming calls in the same manner as an unattended station (see below), or establish voice contact prior to proceeding to the data mode. The Manual, On-Line position of the mode selector switch can be used in conjunction with the send and receive switches for either incoming or outgoing calls. After a data connection has been established, the operator can select the message to be transmitted or the portion of tape to be utilized for receiving data by use of the Search or Fast Access controls. In addition, the Local mode can be selected for keyboard preparation of additional data or

readout of previously received traffic without loss of the on-line data connection. To terminate a call, the operator must return to the Talk mode on the data set and place the handset on-hook. The magnetic tape set control will not provide automatic disconnect in the Manual, On-Line mode.

Unattended operation (Figs. 8 and 9) is accomplished by selection of the Auto, On-Line position on the mode selector switch, and selection of send or receive by depressing the appropriate switch. If neither receive or send switches are selected, the terminal will not auto-answer incoming calls. When the terminal is preselected as a sender, an incoming call will initiate transmission of a single message. Transmission will continue until EOT is recognized in the send text. When EOT is transmitted, the magnetic tape set will stop sending and automatically revert to the receive mode. Disconnect will be initiated by an unattended magnetic tape set if data is not received or transmitted for any two-minute interval. The magnetic tape set, when conditioned as a receiver, will record each incoming message on the tape in the order received until low tape is reached. If low tape occurs during a transmission, data will continue to be recorded until the message has been completed or end of tape is reached.

When the magnetic tape set is associated with a DATASPEED KSR terminal, terminal control is performed by the KSR set, and unattended operation will vary from the above procedure as follows: When the magnetic tape set is preselected as a sender, on-line transmission will commence and continue until an EOT character is transmitted. The DATASPEED printer will then be available to receive incoming data. (The magnetic tape set thus remains selected as a sender and cannot be utilized to record incoming data.) When a second incoming EOT character is recognized, transmission will begin at the second message "block" from the magnetic tape set. When the two-character sequence DLE-EOT is transmitted, the terminal will initiate disconnect.

3.5 Record Interlock

Data may be recorded on a tape and read as often as desired. New data may be recorded over old without a separate erasing function. Individual characters may be corrected by recording the proper characters over those being corrected. To protect against accidental recording over or erasing of data, a small plug is provided with the tape cartridge to be inserted in a hole in either the top or bottom side of the cartridge. In the bottom position the plug operates a record interlock switch on the tape deck which inhibits the receive mode. The record interlock plug must be removed from the bottom position for all record functions (clock track and data). The plug in the top position is visible to the operator as the tape cartridge is loaded onto the tape deck and indicates that data can be recorded on the tape.

4. INTERFACE INFORMATION

Facilities for local and on-line interfaces are provided in the 4200 Series Magnetic Tape Sets. (Refer to Fig. 4.)

High-speed serial interface facilities are provided for applications where the magnetic tape set is to be interfaced to equipment such as a 200 Series data set for direct on-line communication or to a DATASPEED KSR set. Data to be recorded on the magnetic tape can be received locally from the Model 33, 35, or 37 transmitting apparatus, or the DATASPEED KSR keyboard, or on-line directly through a 200 Series data set, or through the on-line interfaces of the Model 33, 35, 37 set or DATASPEED KSR set. Data from the magnetic tape set can be transmitted locally through the interface provided to the local receiving apparatus in the Model 33, 35, or 37 set or DATASPEED KSR set, and on-line if the associated set is in an on-line mode or on-line through the associated 200 Series data set. The information provided below covers the 200 Series data set interface to the 4200 Series Magnetic Tape Set.

4.1 Data Set Interface

Interface of a magnetic tape set to a Data Set 202C6, or 202D4, or 201A3, or 201B3, or equivalent, is provided.

The following leads are provided at the connector which connects to the data set (EIA RS232 Standard):

Pin No.	Function	Abbreviation	Circuit
1	Protective Ground	PG	AA
2	Transmitted Data	TD	BA
3	Received Data	RD	BB
4	Request to Send	RTS	CA
5	Clear to Send	CTS	CB
6	Data Set Ready	DSR	CC
7	Signal Ground	SG	AB
8	Data Carrier Detector	RLSD	CF
11#	Supervisory Trans. Data	SRTS	SCA
12#	Supervisory Rec. Data	SDCD	SCF
15*	Serial Clock – Transmit	SCT	
17*	Serial Clock – Receive	SCR	
20	Data Terminal Ready	DTR	CD
22	Ring Indicator	RI	CE

Standard EIA voltages are used at the magnetic tape set for data and control functions. These functions are as follows:

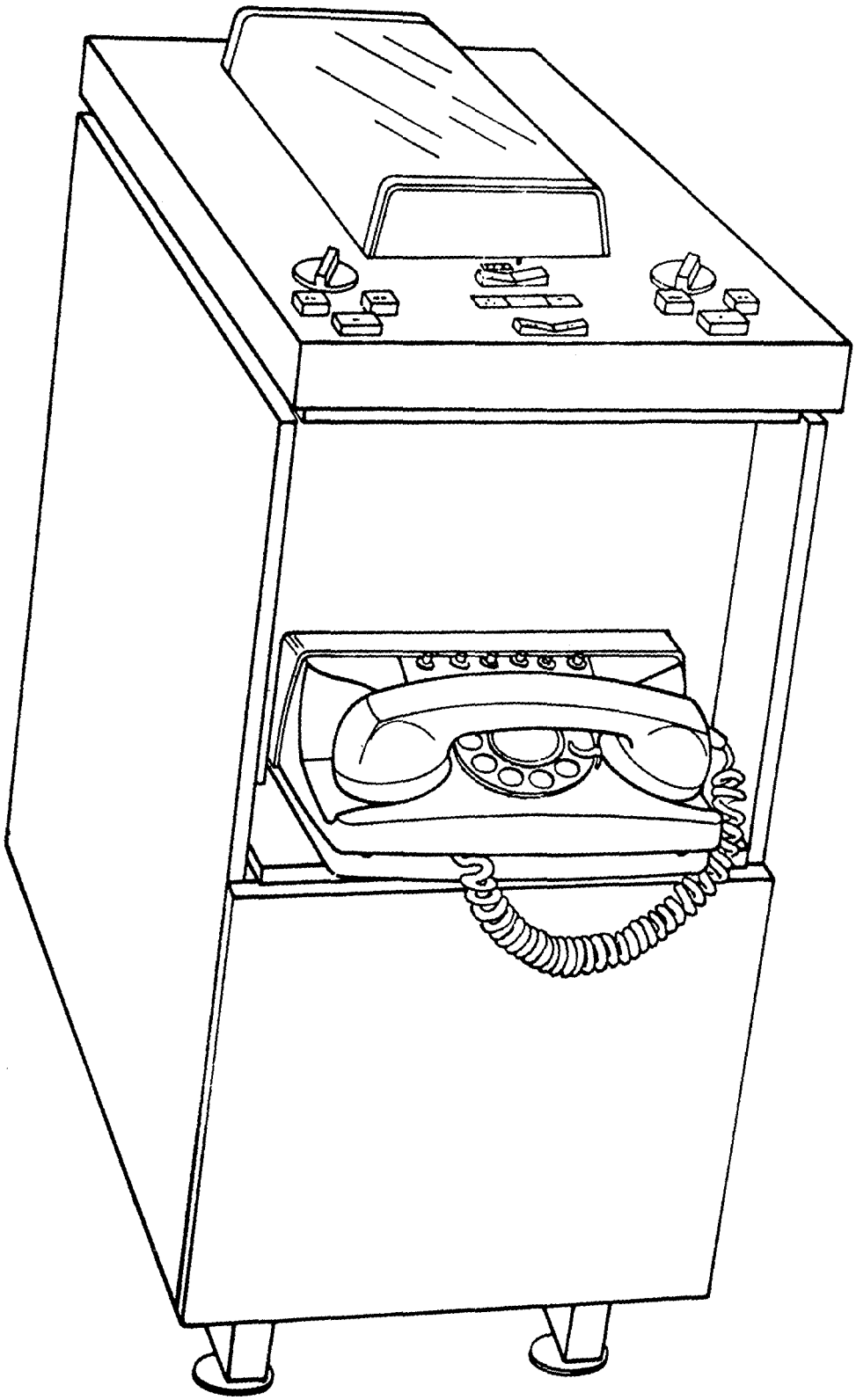
Binary State	One	Zero
Signal Condition	Marking	Spacing
Control Function	OFF	ON
EIA Voltage	-3 to -25V	+3 to +25V
Normal Signal Voltage	O V	+5V

Reverse channel is transmitted over the supervisory data channel. When selected as a receiver, the magnetic tape set applies the reverse channel signal (ON or OFF) to the Supervisory Transmitted data lead and it is received by a DATASPEED sender (including a 4200 Series Magnetic Tape Set) on the Supervisory Received data lead.

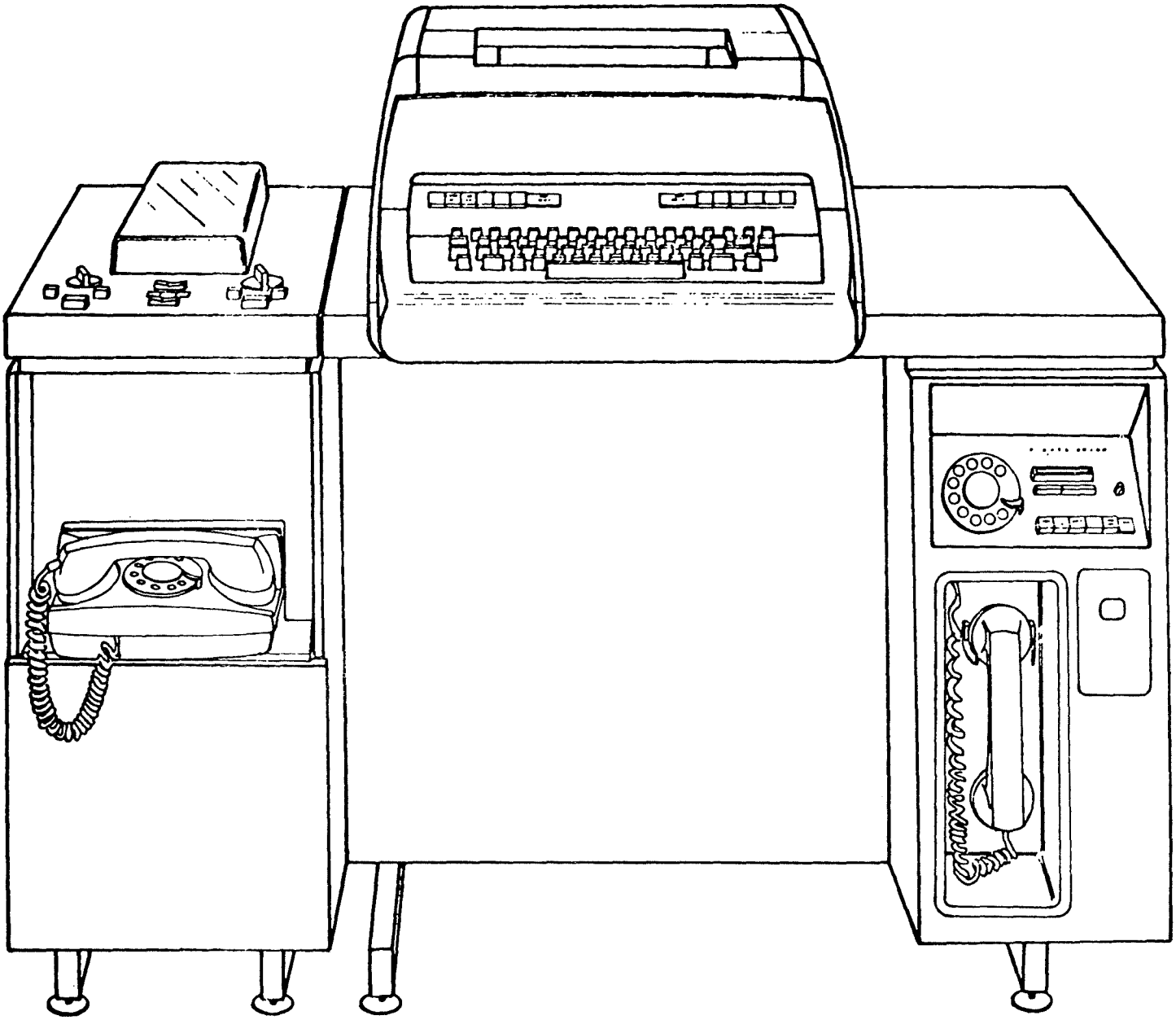
When selected as a sender at 1050 or 1200 wpm, the magnetic tape set utilizes its own internal clock; and if selected as a receiver, operates start-stop directly from the Received Data signal. After standard data set procedures for establishing a call have been completed, the sender must normally receive reverse channel before it will begin transmission. As a wiring option, the reverse channel input may be ignored, allowing transmission to begin when Clear to Send is recognized. As a receiver, the terminal is ready to receive when carrier is detected.

Not used with 201A3 or 201B3 Data Sets.

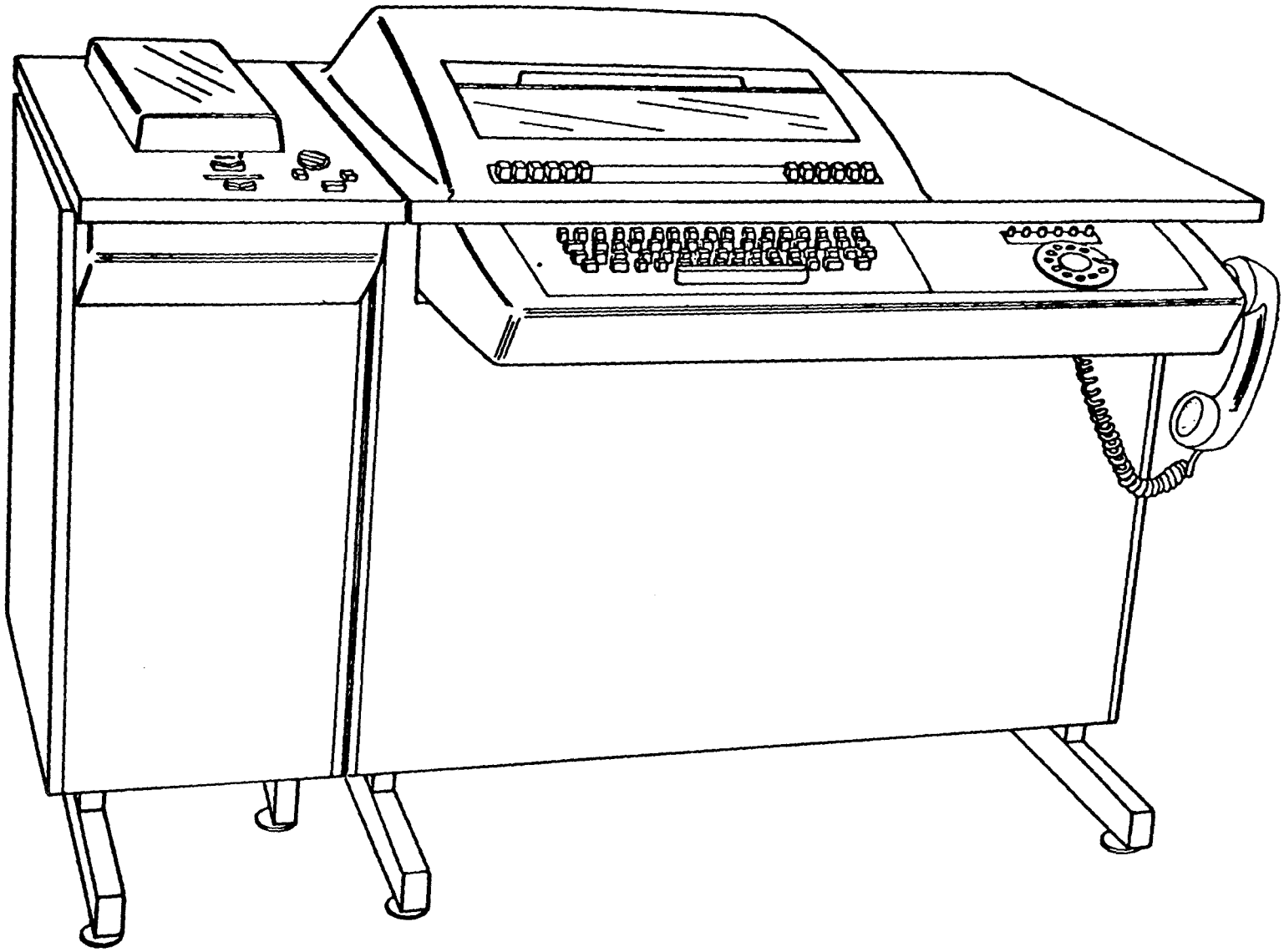
* Not used with 202C6 or 202D4 Data Sets.



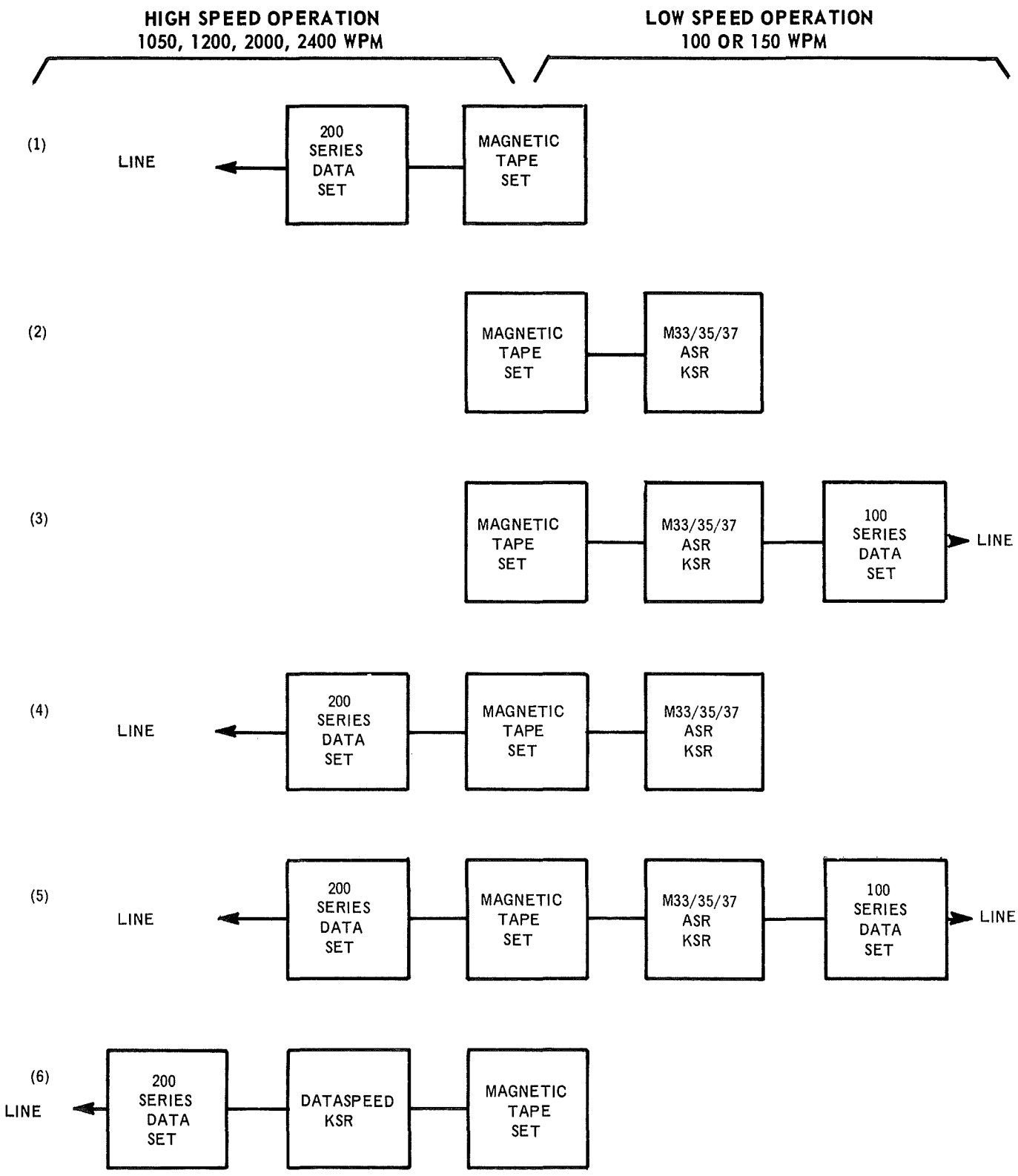
4200 SERIES MAGNETIC TAPE WITH A 200 SERIES DATA SET
Figure 1



4200 SERIES MAGNETIC TAPE SET WITH A 200 SERIES DATA SET
ASSOCIATED WITH A MODEL 37 KSR SET
Figure 2



4200 SERIES MAGNETIC TAPE SET ASSOCIATED WITH A DATASPEED KSR SET.
Figure 3



TYPICAL MAGNETIC TAPE STATION ARRANGEMENTS
Figure 4

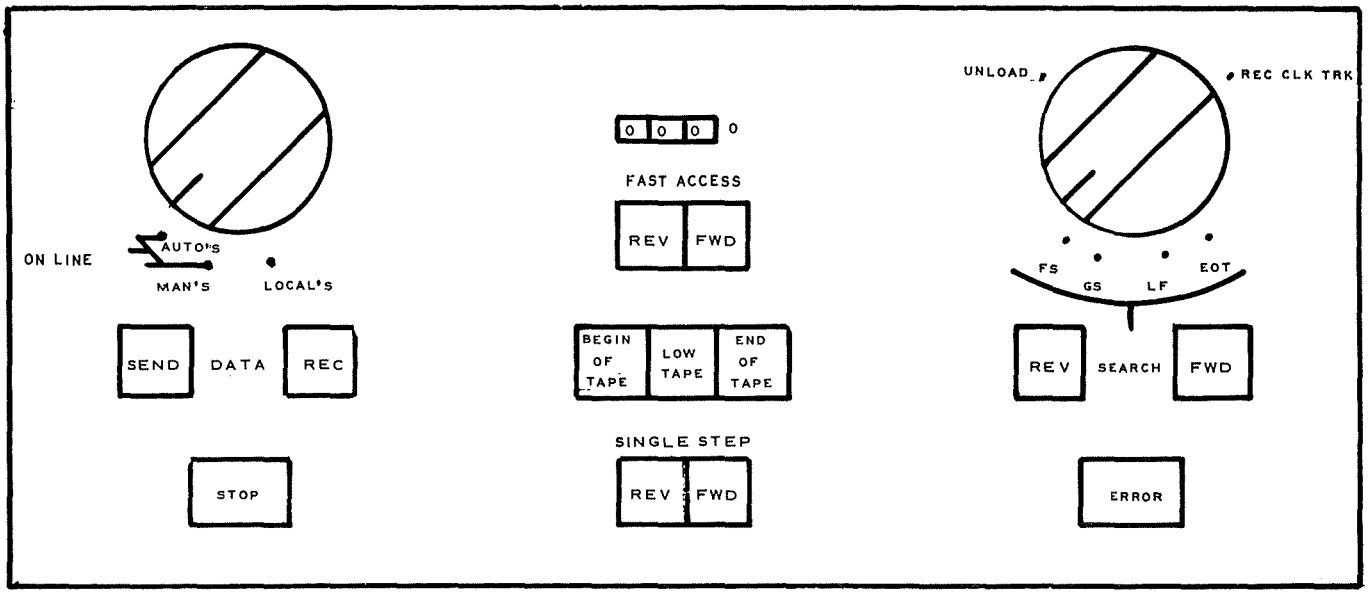
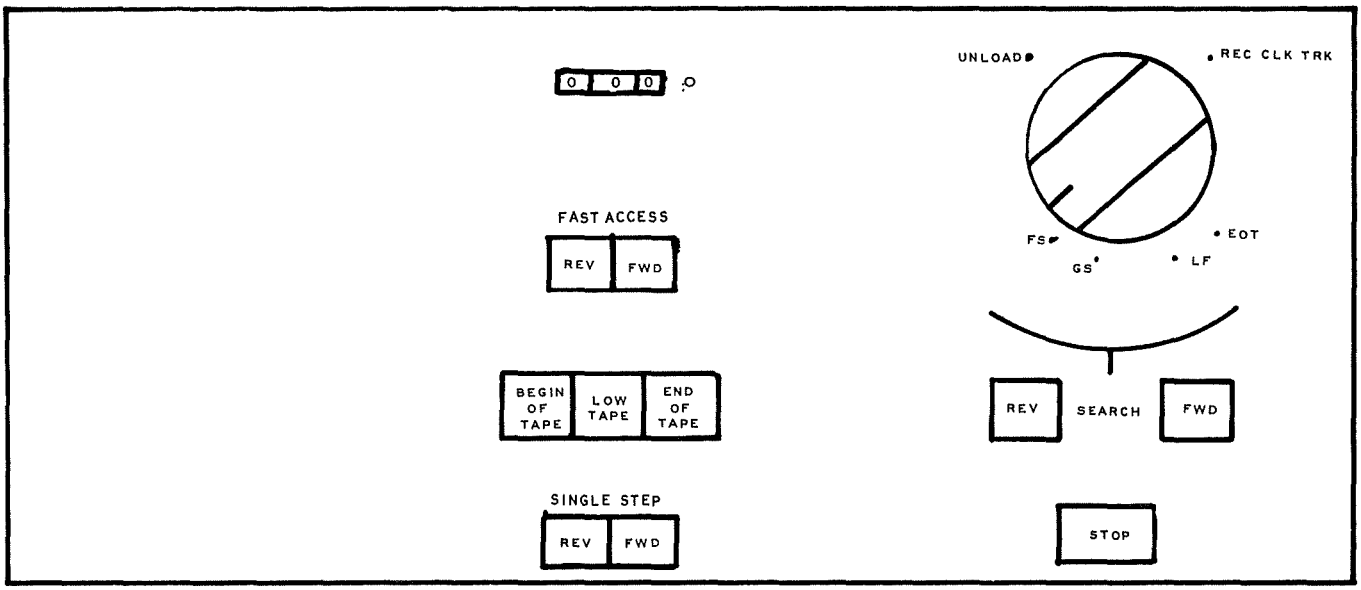
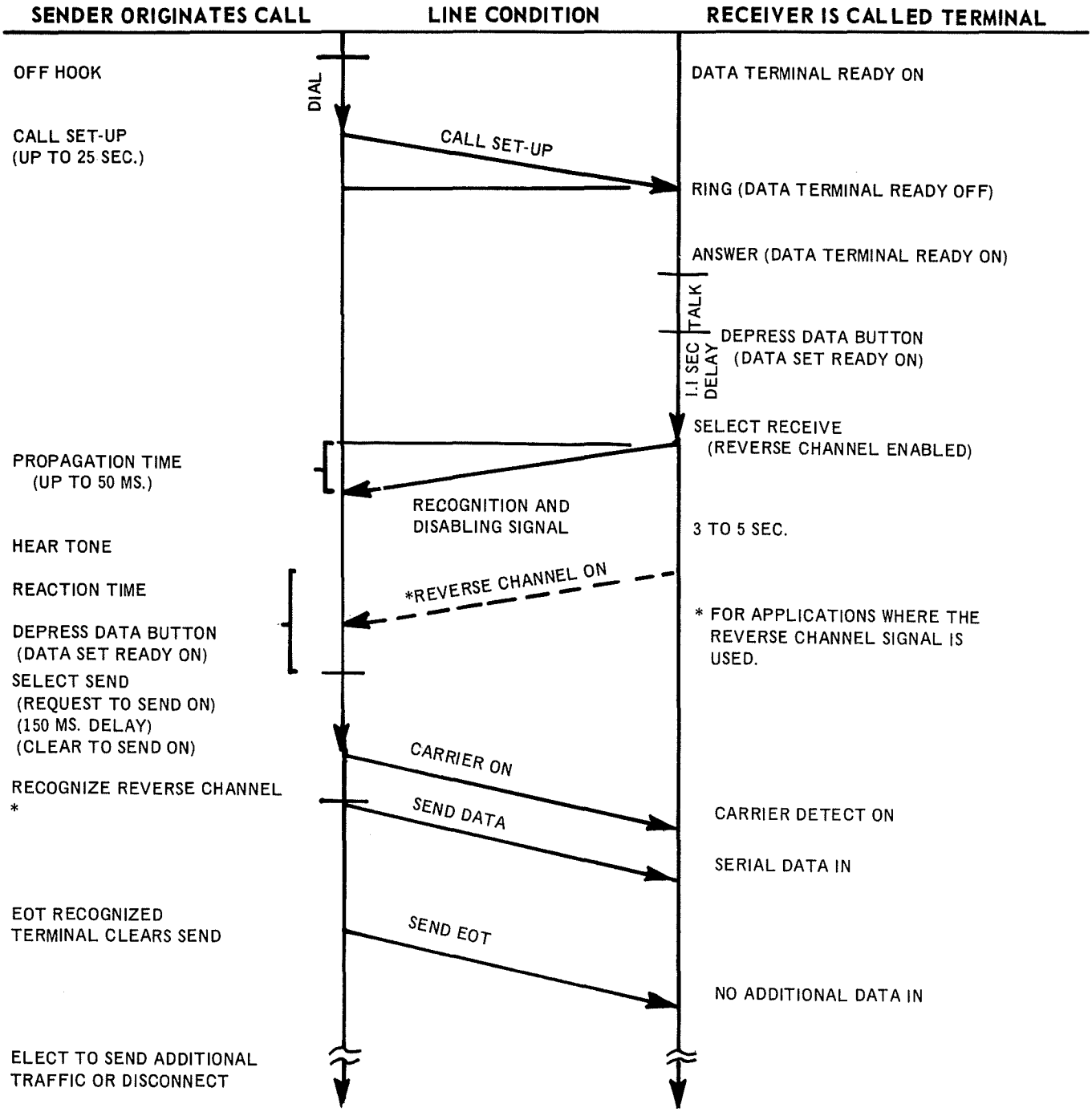


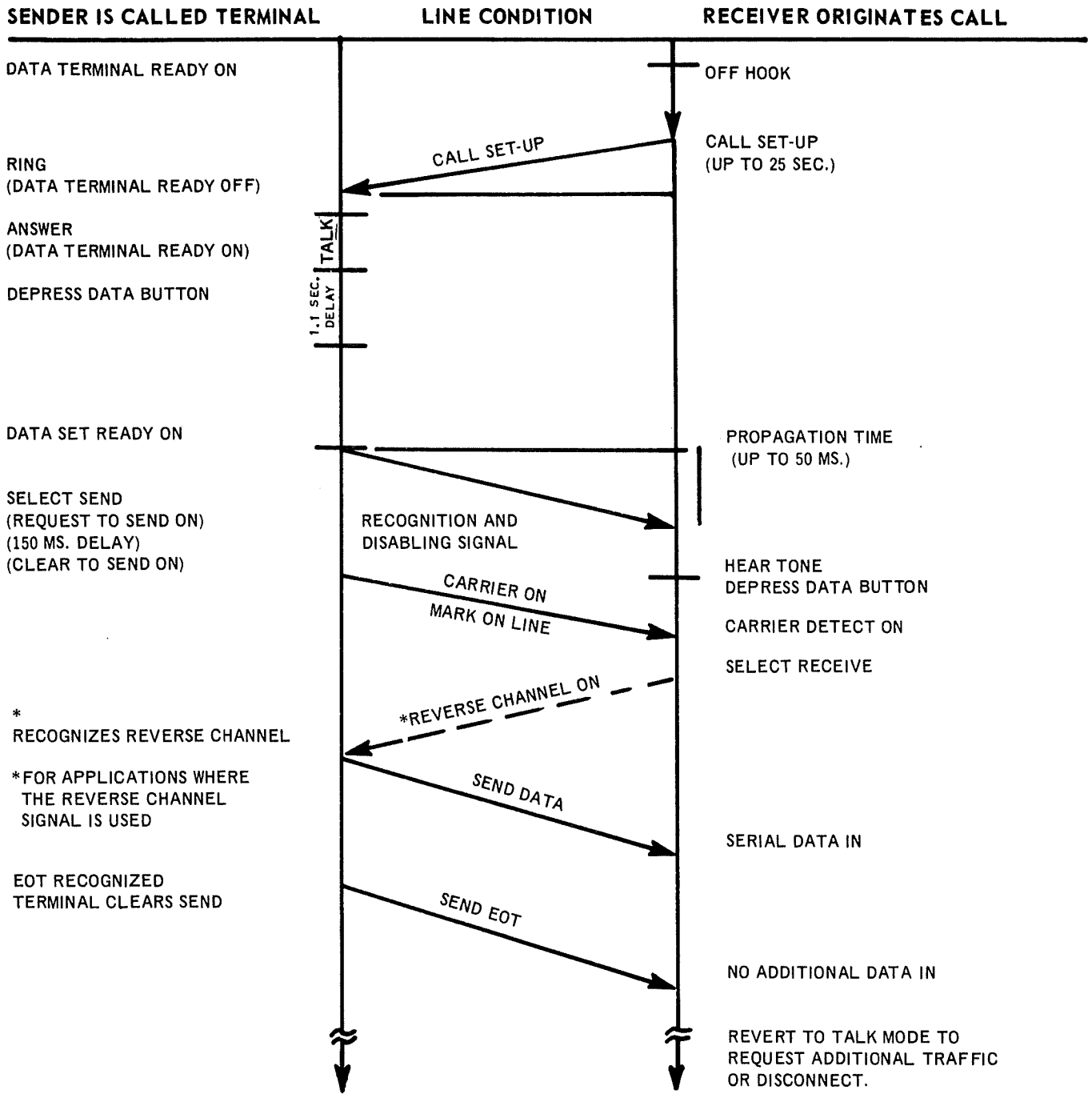
Figure 5a.
BASIC CONTROL PANEL FOR 4200 SERIES MAGNETIC TAPE SET



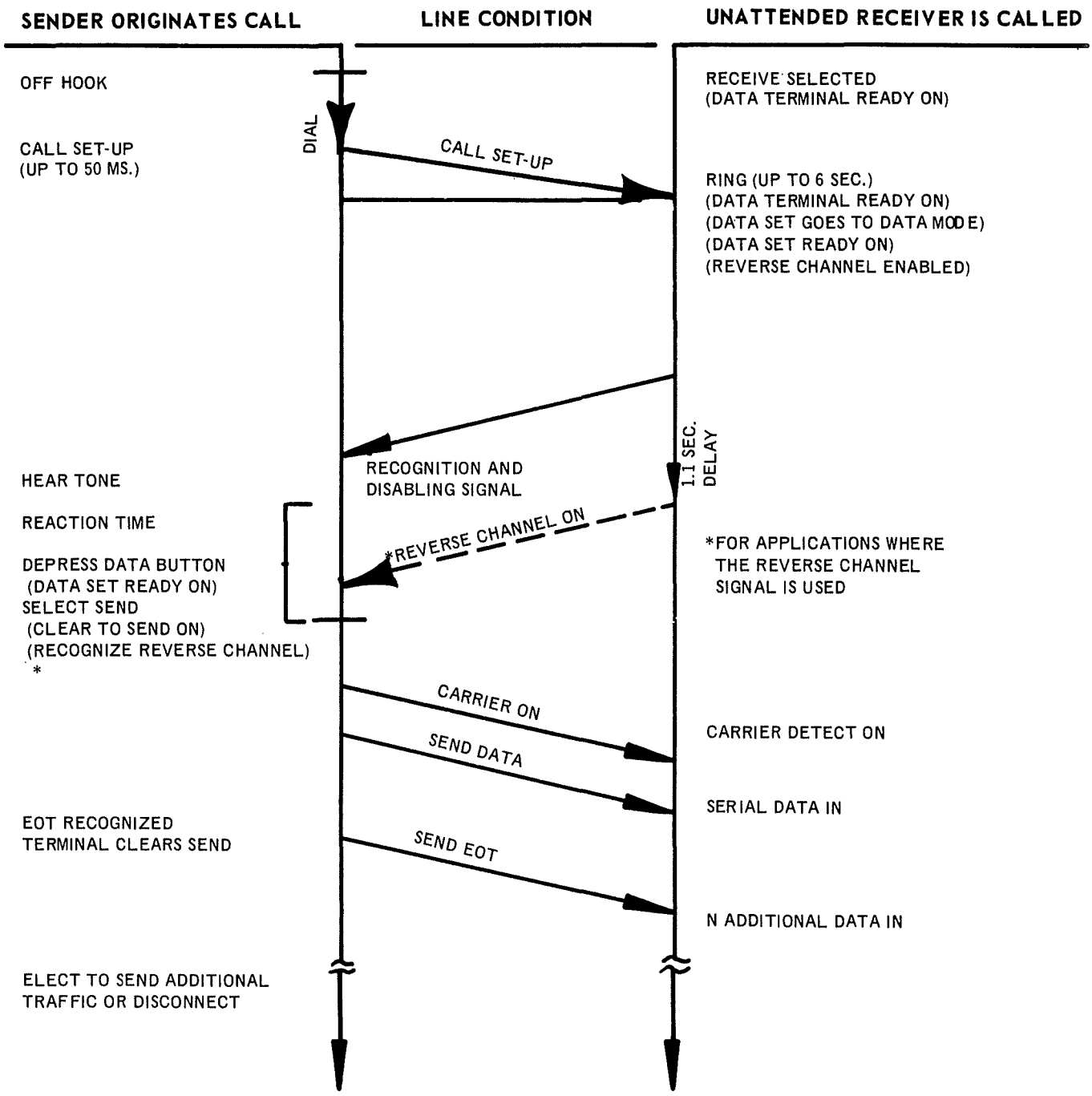
CONTROL PANEL FOR 4200 SERIES MAGNETIC TAPE SET
ASSOCIATED WITH DATASPEED KSR SET
Figure 5b.



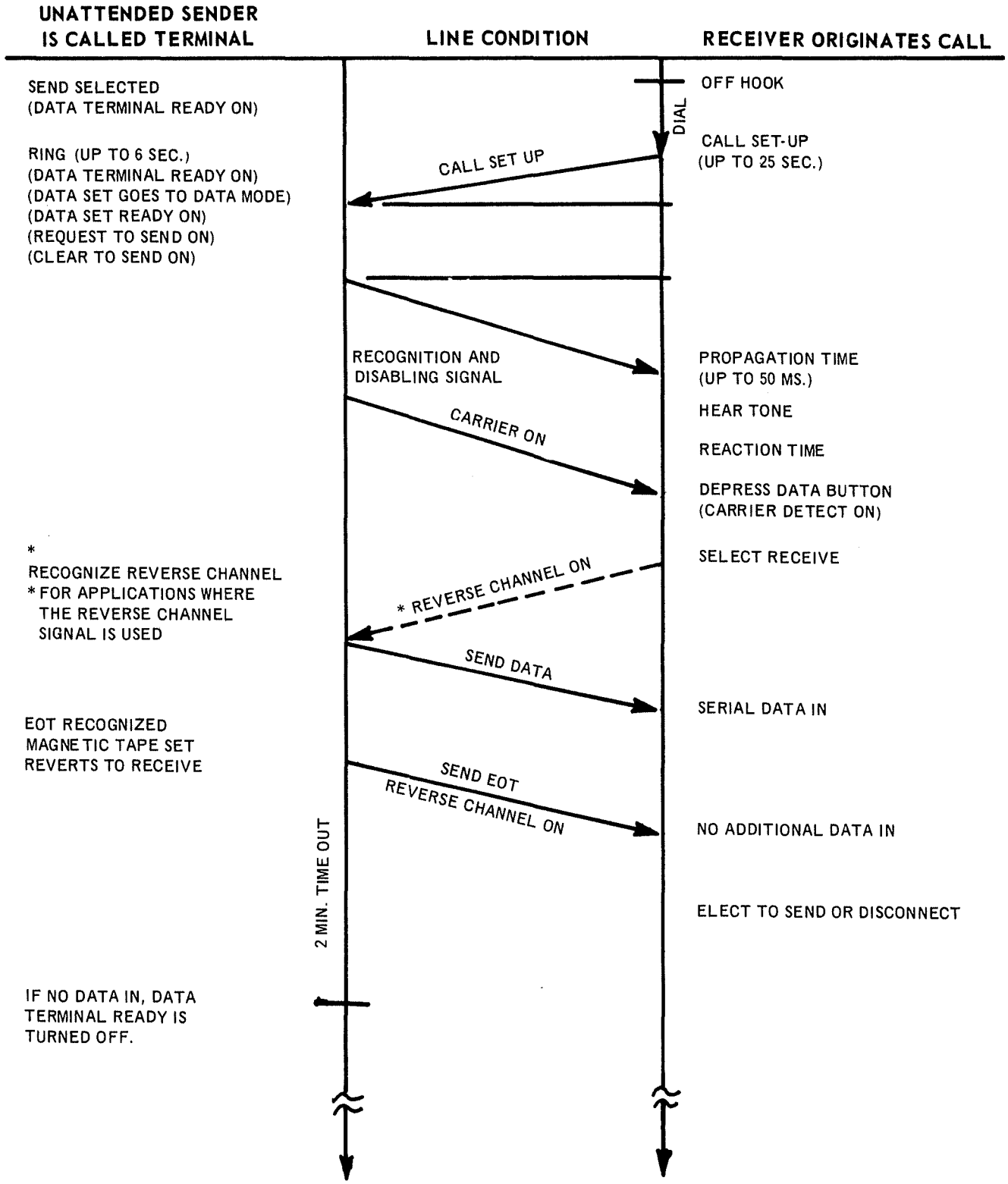
ATTENDED OPERATION – ON-LINE VIA 200 SERIES DATA SET
SENDER ORIGINATES CALL
Figure 6



ATTENDED OPERATION – ON-LINE VIA 200 SERIES DATA SET
RECEIVER ORIGINATES CALL
Figure 7



UNATTENDED RECEIVER OPERATION – ON-LINE VIA 200 SERIES DATA SET
SENDER ORIGINATES CALL
Figure 8



UNATTENDED SENDER OPERATION – ON-LINE VIA 200 SERIES DATA SET
RECEIVER ORIGINATES CALL
Figure 9