CONTROL DATA
CORPORATION

CONTROL DATA®
3121-A/B MAGNETIC TAPE CONTROLLERS

REFERENCE MANUAL

REVISION RECORD

REVISION	DESCRIPTION
A	Manual released; this publication obsoletes the 3121-A/B Magnetic Tape Controllers section of the
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Address comments concerning this manual to:

Control Data Corporation
Technical Publications Department
4201 North Lexington Avenue
Arden Hills, Minnesota 55112

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PREFACE

This publication contains reference information for CONTROL DATA® 3121-A/B Magnetic Tape Controllers which may be used in conjunction with standard Control Data 3000 series data channels. The reader should be familiar with characteristics of the 3000 series data channels.

CONTENTS

FIGURES

TABLES

3121-A/B MAGNETIC TAPE CONTROLLERS

The CONTROL DATA® 3121 Magnetic Tape Controller controls one or two CDC® 609 Magnetic Tape Transports and communicates with any CDC® 3000 Series Data Channel. The 3121 is mounted in a separate cabinet. The 3121-A uses a 60-hertz power supply and the 3121-B uses a 50-hertz power supply. The controllers are otherwise identical.

FUNCTIONAL DESCRIPTION

The controller synchronizes the character mode transmission of 8-bit words between the data channel and the tape units. No BCD conversion is used and the controller allows forward reading only. As the data passes through the controller, an odd parity bit is generated and passed along with the data frame to the tape unit to be written. The frequency of data recording is 800 bpi. As each frame passes through the controller, a cyclic redundancy character (CRC) is developed; the final version of which is recorded at the end of the data. A longitudinal check character is written following the CRC. During a Read operation, the entire 9 bits (8 data bits plus 1 parity) is transferred to the data channel. The CRC can also be read by the data channel to allow the computer to perform error correction. Longitudinal parity is also checked during Read and Write operations.

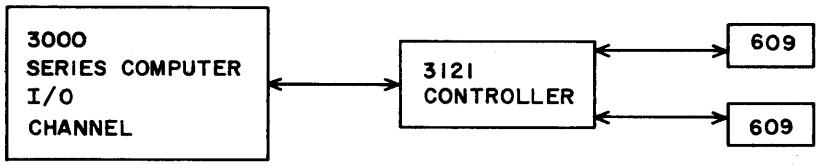

Figure 1. Typical Configuration

TAPE UNIT DESIGNATION

Located on the tape unit is a unit select switch which is used to select the unique numerical designation of 0 or 1. When the numerical designation of a tape unit is changed, any existing connection is cleared.

DATA TRANSMISSION

Record/File Formats

The data written on tape as the result of a single output instruction constitutes a record. If 3100/3300 character output instructions are used, a record gap followed by a single character may be attained. Each record is followed by a three-frame gap, the cyclic redundancy character, another three-frame gap, and the longitudinal check character. No CRC character is written for a tape mark. The longitudinal check character is written 8 character times after the tape mark. Adjacent records are separated by a 0.6-inch record gap.

The length of a file consisting of one or more records is determined by the programmer. Adjacent files are separated by a tape mark written in response to the Write Tape Mark function code.

An End of Record signal is sent to the data channel during a Read operation when a tape unit detects a record gap. This signal may be used to terminate a Read. The Read operation also terminates when the specified number of words or characters has been read.

Transfer Rates

Read or Write operations are performed with 609 Tape Transports at a fixed density of 800 characters per inch, 33 microseconds per frame.

CODES

All connections and operations are controlled by 12-bit Connect and Function codes in conjunction with the appropriate Connect or Select/Function instruction. (See Table 1.) Status codes are constantly available while the equipment is connected. In all discussions of codes, bit "0" is in the rightmost position.

TABLE 1. CONNECT, FUNCTION, AND STATUS CODES

Connect	
Connect	N00U*
Function	
Release	0000
Clear	0005
Rewind	0010
Rewind Unload	0011
Backspace	0012
Write Tape Mark	0015
Select Interrupt on Ready and Not Busy	0020
Release Interrupt on Ready and Not Busy	0021
Select Interrupt on End of Operation	0022
Release Interrupt on End of Operation	0023
Select Interrupt on Abnormal End of Operation	0024
Release Interrupt on Abnormal End of Operation	0025
Status	
Ready	XXX1
Channel and/or Read/Write Control and/or Unit Busy	XXX2
Write Enable	XXX4
Tape Mark	XX1X
Load Point	XX2X
End of Tape	XX4X
Density**	X2XX
Lost Data	X4XX
End of Operation	1XXX
Vertical Parity Error, Longitudinal Parity Error, or CRC Error During Read	2XXX

*N = Equipment number (controller) U = Tape unit
**("1" in bit 7 indicates 800 bpi)

CONNECT CODE

A controller must be connected to the data channel before it can respond to either a Select/Function instruction or an I/O instruction. The connection is accomplished by the Connect instruction; the Connect code (N00U) being the lower 12 bits of this instruction.

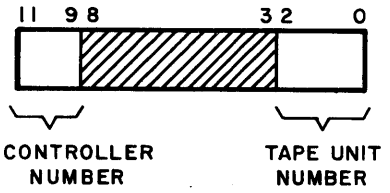

Figure 2. Connect Code Format

The controller examines every connect code transmitted by the data channel and returns a Reply signal* indicating a connect if all of the following conditions are met.

1. The requested unit (U) is not Busy.
2. The N portion of the Connect code matches the setting of the Equipment Number switch on the controller.
3. The U portion of the Connect code matches the setting of the Unit Select switch on the tape unit.
4. A transmission parity error is not detected.

If the requested tape unit is Busy, a Reject signal which tells the central processor to read the next instruction at the reject jump address is returned to the data channel. Equipment status is available to that data channel to determine the cause of the Reject.

If the N portion of the Connect code does not match the setting of the Equipment Number switch, neither a Reject nor a Reply is returned to the data channel. Equipment status is not made available and the controller automatically disconnects. If a Reply or Reject is not returned to the data channel from any of the attached equipments within 100 microseconds, the central processor generates an internal Reject

If a transmission parity error is detected in a Connect code, the device does not connect and neither a Reject nor a Reply is returned to the data channel. Instead, the controller XMSN PE (parity error) indicator lights. The Error condition may be cleared by either a Channel Clear or a Master Clear. Transmission Parity Error condition is cleared automatically at the beginning of each Connect attempt.

*A Reply signal tells the central processor to process the next instruction.

Bits 0-2 (U)

The U portion of the code designates a specific tape unit.

Bits 2-8

Unused

Bits 9-11 (N)

The N portion of the code contains the equipment number of the controller. The number designating the controller is either 0 or 1 and is changed by the Equipment Number switch located in the controller cabinet.

FUNCTION CODES

Function codes are used to prepare a connected controller and tape unit for an I/O operation and have no effect on non-connected controllers or tape units. The codes are located in the lower 12 bits of a Select/Function instruction and are transmitted to the controller on 12 data lines. (See Table 1 for a complete list of function codes.)

The three classifications of codes are operating, non-operating, and interrupt. Operating codes Rewind, Rewind Unload, Backspace, Read, Write, and Write Tape Mark, cause tape motion and also cause the controller to become Busy. Non-operating codes include Format Selection, Clear, and Release.

The controller accepts operating codes only when the tape is motionless. Thus, operating codes are not accepted during a Read or a Write operation, or while another operating code is being executed. Likewise, a new Read or Write operation cannot be initiated while an operating code is being executed.

Non-operating codes are accepted prior to a Read or Write operation, following the conclusion of a Write, and following the receipt of an End of Record signal during a Read. Thus, they are accepted even though an operating code is being executed.

Interrupt codes can be selected at any time. The controller examines one code at a time, checking first for parity errors. If none are found, it returns a Reply if the requested function can be performed* or a Reject if it cannot be performed. Interrupt codes always cause a Reply to be returned to the data channel.

If a parity error is detected, the requested function will not be performed, a Parity Error signal is returned to the data channel, and the XMSN Parity Error indicator lights. Since a Reply or a Reject is not returned to the data channel, the central processor generates an internal reject after a wait of 100 microseconds.

The Parity Error condition may be cleared by a Master Clear. The equipment must then be reconnected before a new function code will be examined by the controller. A reconnect attempt will automatically clear the previous Transmission Parity Error indication.

Release (0000)

This code clears the unit connection.

Clear (0005)

This code clears all tape units.

Rewind (0010)

This code rewinds the tape to load point. It has no effect when the tape is at load point.

Rewind Unload (0011)

This code rewinds the tape to load point and the tape unit Ready condition drops. All further operations with this tape unit require placing the tape unit in a Ready condition manually.

Backspace (0012)

This code backspaces the tape one record or until load point is detected. If the tape is at load point with fewer than two records preceding the load point, the tape will unload.

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*Certain illegal function codes will cause a Reply to be returned. However, in these cases no action will follow.

Write Tape Mark (0015)

This code advances the tape at least 6 inches and then writes a 23_8 tape mark followed by a 23_8 check character.

Select Interrupt on Ready and Not Busy (0020)

This code causes the controller to send an Interrupt signal to the processor when the tape unit is in a Ready and Not Busy condition, that is, when power is applied, the unit is under computer control and all tape motion has ceased. Once up, the Interrupt signal can be cleared by selecting Release Interrupt on Ready and Not Busy or by clearing the controller.

Release Interrupt on Ready and Not Busy (0021)

This code clears an Interrupt on Ready and Not Busy selection and the Interrupt signal if it is up.

Select Interrupt on End of Operation (0022)

This code causes the controller to send an Interrupt signal to the processor approximately 200 microseconds after the last data character is read by a tape unit, or load point has been detected during a rewind operation. Once up, the Interrupt signal can be cleared by selecting any interrupt, any release, or the Master Clear.

During a chaining operation (3600/3800 Systems only), an interrupt does not occur until the data channel is Not Busy, that is, until the last record has been written or read in the chaining operation.

Release Interrupt on End of Operation (0023)

This code clears an Interrupt on End of Operation selection and the Interrupt signal if it is up.

Select Interrupt on Abnormal End of Operation (0024)

This code causes the controller to send an Interrupt signal to the processor after an abnormal condition occurs. These abnormal conditions are End of Tape, Tape Mark*,

*Common to Interrupt on End of Operation and Interrupt on Abnormal End of Operation.

Load Point*, Vertical Parity Error, Longitudinal Parity Error, Lost Data, and the connected tape unit becoming Not Ready.

In the case of interrupt on the connected tape unit becoming Not Ready, the interrupt occurs immediately when the connected tape unit goes from a Ready to a Not Ready condition, that is, if the power is turned off on the tape unit). This interrupt does not occur during a Connect operation, or when a Release code (0000) is executed. In all other abnormal conditions listed, the interrupt occurs when one or more of the conditions is encountered and when an End of Operation is detected.

A new Read or Write operation cannot start until the Interrupt signal is cleared. Once up, the Interrupt signal can be cleared by reselecting any interrupt or selecting any release, or a Master Clear.

Release Interrupt on Abnormal End of Operation (0025)

This code clears an Interrupt on Abnormal End of Operation selection and the Interrupt signal if it is up.

STATUS CODES

Status codes permit the monitoring of several controller and tape unit operating conditions. These codes are made available to the data channel on 12 status lines following a connect or a rejected connect attempt. Sense Status and Copy Status instructions make these codes available to the central processor.

See Table 1 for a complete list of these codes. If two or more status conditions exist simultaneously, the Status Response is the sum of the individual codes.

Ready (XXX1)

Bit 0 is set when the tape unit is in a Ready condition, that is, power is applied and the READY indicator lights. (The controller can operate the tape unit.) Bit 0 is not set when manual control of the unit is possible.

*Common to Interrupt on End of Operation and Interrupt on Abnormal End of Operation.

Channel and/or Read/Write Control and/or Unit Busy (XXX2)

If the tape unit is Ready, bit 1 is set when the channel is transmitting or receiving data during an I/O operation. It is also set if the unit is ready and tape motion is initiated by an operating function code. In these two cases it will remain set until 5 milliseconds after tape motion stops. Bit 1 is cleared approximately 5 milliseconds after either detection of Lost Data or an Abnormal End of Operation Interrupt signal occurs and it cannot be reset until these conditions cease to exist. Bit 1 cannot be set if the tape is not ready (bit 0 is clear).

Write Enable (XXX4)

Bit 2 is set when the file protection ring is on the tape reel. It is possible to read from or write on the tape when the ring is present. Without the ring it is possible to read from but not to write on the tape.

Tape Mark (XX1X)

Bit 3 is set whenever a tape mark is read, including readback during a Write.

Load Point (XX2X)

Bit 4 is set when the tape is set at load point. It is cleared when the tape moves off load point.

End of Tape (XX4X)

Bit 5 is set when the End of Tape marker is detected. It is cleared when a reverse is initiated, the Ready drops, or the tape unit is otherwise deselected.

Density (X2XX)

This code is not applicable for the 609 Tape Transport because it operates only at a density of 800 bpi. However, the controller may be selected at 200 bpi with a 0 in bit 7 instead of 1. If this is done, parity errors will occur.

Lost Data (X4XX)

Bit 8 is set when the controller determines that data may have been lost in transmission. Tape motion stops when bit 8 is set and cannot be restarted until this bit has been cleared by a new Connect or function code.

When operating from a 160/160-A Computer via a CONTROL DATA® 3681 Data Channel converter, lost data is also detected if the Read or Write selects in the 3681 are not cleared immediately after a Read or Write operation is completed. As long as a Write signal is present and the Data signal is not present at the required time, the controller assumes that a data transmission loss has occurred and a Lost Data signal is sent. If the Read signal is present, but data is not being accepted by the channel, a Lost Data status also occurs. The Read or Write select in the 3681 must be cleared immediately after a Read or Write operation is completed to prevent the Lost Data signal from being sent abnormally. If the Lost Data signal is present, it must be cleared if Read or Write operations are to continue.

End of Operation (1XXX)

Bit 9 is set approximately 5 milliseconds after the completion of an operating function or when an End of Record signal is generated. It is cleared by initiating a new operating function, Read/Write operation, or a Master Clear.

Vertical or Longitudinal Parity Error , or CRC Error During Read (2XXX)

Bit 10 is set following detection of either a Vertical or Longitudinal Parity Error, or detection of a CRC Error During Read. It is cleared by initiating a new Read, Write, or a Master Clear. If this bit is set during a chaining operation (on 3600/3800 Systems only) due to detection of a Vertical or Longitudinal Parity Error, it cannot be cleared until the chaining operation terminates.

INTERRUPTS

Interrupts provide a method of attaining optimum utilization of a system's capabilities. Basically, the system halts the main program and initiates an interrupt processing program when an Interrupt signal is detected by the processor. (See the system reference manual for additional information on processing interrupts.)

The controller can be programmed to send an Interrupt signal to the processor when any one of the conditions specified by the three interrupts occurs.*

Select/Interrupt codes permit the controller to consider as a group the operating conditions which may occur in an attached unit. If a specific interrupt has been selected and at least one of the conditions specified by it occurs in the connected unit, the controller sends an Interrupt signal to the processor. If the interrupt system in the processor has been enabled to recognize the interrupt, the main program is interrupted and control is transferred to a specific program address. Status sensing and follow-up operations may follow. If desired, control may be returned to the main program by a jump instruction located at the end of the interrupt processing program.

If the processor's interrupt system has not been enabled, it is still possible to sense for these conditions via sense status and copy status instructions written into the main program.

Regardless of which of the preceding actions is followed, the Interrupt signal will remain up until cleared by reselecting any interrupt or selecting a Clear Interrupt or a Master Clear. The Interrupt signal is transmitted on the equipment interrupt line via the data channel currently connected to the equipment, whether or not the channel is currently servicing the equipment.

*See description of function codes.

The setting of the Equipment Number switch determines the number of the line that transmits Interrupt signals. For example, if the Equipment Number switch is set to 5, all Interrupt signals coming from this controller are transmitted on interrupt line 5. Since each equipment attached to a data channel has a unique equipment number, each uses a different interrupt line. A Channel Product Register Jump instruction* or a Copy Status instruction** can identify the equipment sending the Interrupt signal by inspection of the interrupt lines.

PARITY CHECKING

Transmission Parity Checking

Connect codes, function codes, and data are transmitted between the data channel and the controller in odd parity, that is, the number of "1" bits transmitted must be odd. If the number of "1" bits in a data byte is even, a "1" is transmitted on the parity line*. If the number of "1" bits in the data byte is odd, the "1" is not transmitted on the parity line.

A Transmission Parity Error exists if the total number of "1" bits transmitted on the 12 data lines plus the parity line is even, indicating that a bit has been lost or picked up in error. The various types of transmission parity errors are listed below:

1. Parity Error in a Connect Code: If a parity error is detected in a Connect code, the device does not connect** and a Reject or a Reply is not returned to the data channel. Instead, the error lights the XMSN Parity Error indicator. These Parity Error conditions may be cleared by either a Channel Clear or a Master Clear. A new connect attempt will also clear a previous Transmission Parity Error indication.
2. Parity Error in a Function Code: If a parity error is detected, the requested functions will not be performed. A parity error signal is returned to the data channel and the XMSN Parity Error indicator lights. Since a Reject or a Reply is not returned to the data channel the central processor generates an internal Reject after a wait of 100 microseconds. The Parity Error condition may be

*3600/3800 Systems
**3100/3300 Systems

cleared by a Master Clear*. The equipment must then be reconnected before a new function code can be examined by the controller. A reconnect will automatically clear the transmission parity error indication.

3. Parity Error in Output Data: If a transmission parity error is detected during a Write operation the XMSN Parity Error indicator lights. Both a Reply and a Parity Error signal are sent to the data channel and the data will be written on tape. The validity of the data received from this point until the conditions are cleared by a Channel Clear or Master Clear is questionable. All operations will continue unless appropriate programming steps have been taken to clear the parity error and rewrite the data. The equipment must then be reconnected and the appropriate functions reselected prior to the new output.

4. Parity Errors in Input Data: Transmission parity errors may be detected by the data channel on data received from the equipment. If a parity error is detected, a parity error bit in the data channel is set and a parity error indicator on either the channel or the console lights. The faulty data will be entered into either storage or the 'A' register. The validity of the data received from this point until the indicators are cleared is questionable. All operations will continue unless appropriate programming steps have been taken to clear the parity error and reread the data. These parity error conditions are cleared by a Channel Clear or a Master Clear issued by any 3000 Series System.

5. Input/Output Parity Error Bit in the Data Channel: The input/output parity error bit is set whenever a transmission parity error is detected. If the error is detected by the external equipment the bit is set by the parity error signal.

   If the interrupt system is active, in 3600/3800 Systems, an interrupt signal is generated when this bit sets. If the interrupt system has not been enabled to detect this bit, the bit may be sensed to detect parity error conditions.

   In 3100/3300 Systems the bit must be sensed if transmission parity error conditions are to be detected by the central processor.

   Refer to the appropriate system reference manual for more information on the input/output parity error bit.

*Though operations may continue normally, the validity of a new function code and/or data prior to a Master Clear, Channel Clear, or reconnect is questionable.

Equipment Parity Error Checking

Each character transmitted between the controller and the tape unit is checked for correct parity. During a Write operation the controller adds the correct parity bit to each character and relays it to the tape unit. Approximately 4 or 5 milliseconds after writing, a vertical parity error check is made. This time interval is used to check-read the tape and transmit the data back to the controller. At the conclusion of a record, a record check character is written following the CRC character. This character is used for longitudinal parity checking. During a Read or Write, vertical and longitudinal parity checks are made by the controller.

Both Vertical and Longitudinal Parity Errors are considered equipment parity errors.

1. Vertical Parity Error Checking: A Vertical (Transverse) Parity Error exists when the number of "1" bits on the six data lines plus the parity line is not odd.

   If a Vertical Parity Error is detected, the TAPE Parity Error indicator on the controller lights and a Parity Error signal is placed on the appropriate status line. The parity error condition may be cleared by a new Read, Write, Channel Clear, or a Master Clear. If selected, this condition will cause an Abnormal End of Operation Interrupt.

2. Longitudinal Parity Error Checking: The tape is divided into nine longitudinal (lengthwise) tracks. Eight of the tracks are used to store data while the ninth holds the vertical parity bits. When a record is read from tape, the total number of "1's" in each track must be even. If the number of "1" bits in any track of a record is odd, a "1" will be written in that track as a part of the record check character. During a Read operation, Longitudinal Parity Error exists if the record check character is not as anticipated.

   If a Longitudinal Parity Error is detected, the TAPE Parity Error indicator remains on and a Parity Error signal is placed on the appropriate status line. This parity error condition may be cleared by a new Read, Write, Channel Clear, or a Master Clear. If selected, this condition will cause an Interrupt on Abnormal End of Operation.

SWITCHES AND INDICATORS

Equipment Number Switch

The setting of the two-position Equipment Number switch designates the controller and corresponds to the N portion of the Connect code. The switch setting also determines the interrupt transmission line number used by the equipment.

INTERRUPT Indicator

This indicator lights when an interrupt occurs and remains on until the Interrupt signal drops.

CONNECT Indicator

This indicator lights when the controller is connected.

XMSN/TAPE PE Indicator

If a Transmission Parity Error is detected during a Connect, Select/Function, Read, or Write operation, the XMSN portion of this indicator lights.

The indicator remains on until the parity error is cleared by a Channel Clear, a Master Clear, or a reconnect. The TAPE portion of this indicator lights if a Vertical or Longitudinal Parity Error is detected. The indicator remains on until a Channel Clear or Master Clear is selected or a new motion function is initiated.

CLEARING THE CONTROLLER

Prior to the initial use of the controller, the system should be cleared. There are five possible ways of clearing the controller:

1. Clear Channel*

   a. This signal (100 microseconds)clears all activity in the data channel.
   b. Clears the present connection the controller may have with a tape unit.
   c. Performs a Master Clear on the controller Read, Write, and function logic.

   No status signals are available to the data channel after execution of this instruction.

2. Clear (0005)

   This function code clears the present connection the controller may have with a tape unit. The Clear is 2 microseconds. The controller remains connected in the sense that status signals are still available for the data channel.

3. Release (0000)

   This function code clears the connection for the connected tape unit.

4. Power On Master Clear

   When power is applied to the controller, all tape units connected are cleared. Logic in the controller is also cleared. No status signals are available to the data channel after power is applied, until appropriate connect is made.

5. External Master Clear

   This clears all tape units connected. It also clears the logic in the controller. No status signals are available to the data channel after executing this operation.

   The Clear and Release codes can only be used after a controller is connected to a tape unit.

*See the individual processor instructions.

SUPPLEMENTARY INFORMATION
MAGNETIC TAPE EQUIPMENT

A

The section contains information common to several Control Data magnetic tape units. It includes:

1) Tape format.
2) Operating instructions for CONTROL DATA 603, 604, 606, and 607 Tape Units.
3) Manual controls for 603, 604, 606, and 607 Tape Units.

TAPE RECORDING CHARACTERISTICS

TAPE FORMAT

Magnetic tape provides a high-speed, nonvolatile storage medium for recording information. The tape has a plastic base, coated on one side with a magnetic oxide which consists of minute particles of iron oxide mixed with a binding agent.

Information is read (detected) or written (stored) by passing oxide side of the tape over read/write heads. Information is written on or read from independent tracks on the tape by seven recording heads placed vertically across the tape.

A nonreturn-to-zero (change-on-ones) recording scheme is used. In this system, magnetic particles on the tape are aligned in either the positive or negative direction. A binary "1" is recorded by reversing the alignment (polarity); no polarity reversal results in recording a "0". Thus, each track of the tape is fully magnetized, and the polarity is reversed as each "1" bit is recorded.

A line of tape data consists of a 6-bit character and a parity (check) bit. Tracks 0 through 5 specify the character; track 6 holds the parity bit (Figure A-1).

In Control Data systems, data is recorded in binary or binary coded decimal (BCD) format. Tape is binary if data is recorded as it is represented in core storage. In BCD format, digits, characters, and special symbols are represented in core storage by 6-bit binary numbers.

The formats also differ in selection of parity bits. In binary format, the parity bit is chosen so that the total number of "1" bits in any line is odd. In BCD format, the total number of "1" bits is even. The format is selected by the controller.

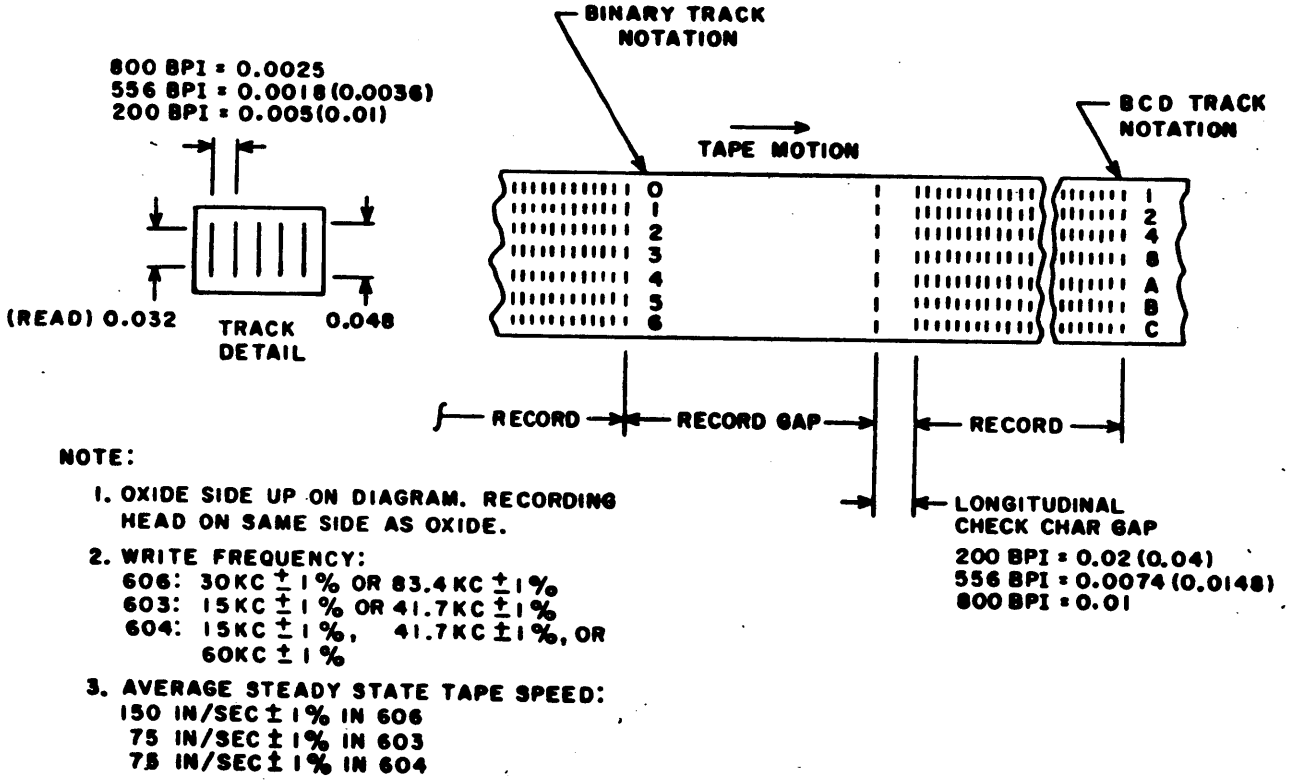

Figure A-1. Bit Assignments on Tape

Recorded data on the tape is arranged in groups called records and files. A minimum of one line of information constitutes a record. Adjacent records are separated by a 3/4-inch unrecorded area (record gap). A longitudinal parity bit is recorded in coded* format at the end of each record; the number of "1's" in each record track is made even.

A file consists of a group of records. Adjacent files are separated by recording an end of file mark 6 inches from the last record in the file. The file mark consists of an octal 17 (BCD) and its check character.

REFLECTIVE SPOTS

Reflective spots are placed on the tape to determine the beginning and end of the usable portion of the magnetic tape. The reflective spots are plastic, one inch long by 3/16 inch wide, coated on one side with adhesive strips and on the other with vaporized aluminum. They are placed on the base or uncoated side of the tape and detected by photosensing circuits.

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* The word "coded" is often used instead of BCD.

The load point marker must be placed at least 10 feet from the beginning of the tape on the supply reel (Figure A-2). This marker is placed with its one-inch dimension parallel to and not more than 1/32 inch from the edge of the tape nearest the operator when the file reel is mounted.

The end of tape marker should be placed not less than 18 feet from the end of the tape attached to the takeup reel hub. The marker is placed with its one-inch dimension parallel to and not more than 1/32 inch from the edge of the tape nearest the tape unit (when reel is mounted).

Markers are applied while the reel is removed from the tape unit and must be properly aligned and firmly attached to the tape. Use care to avoid dust accumulation on the tape while attaching markers.

FILE PROTECTION RINGS

The back of the file reel has a slot near the hub which accepts a plastic file protection ring (Figure A-3). Writing on a tape is possible only when the reel contains this ring, but the tape may be read with or without the ring. Presence of a ring on a reel of tape is signaled by the overhead lights which turn on immediately after the tape load procedure is executed. The lights remain on until the ring is removed or the tape unit is placed in the unload status. The ring should be removed from the file reel after writing to avoid loss of records through accidental rewriting.

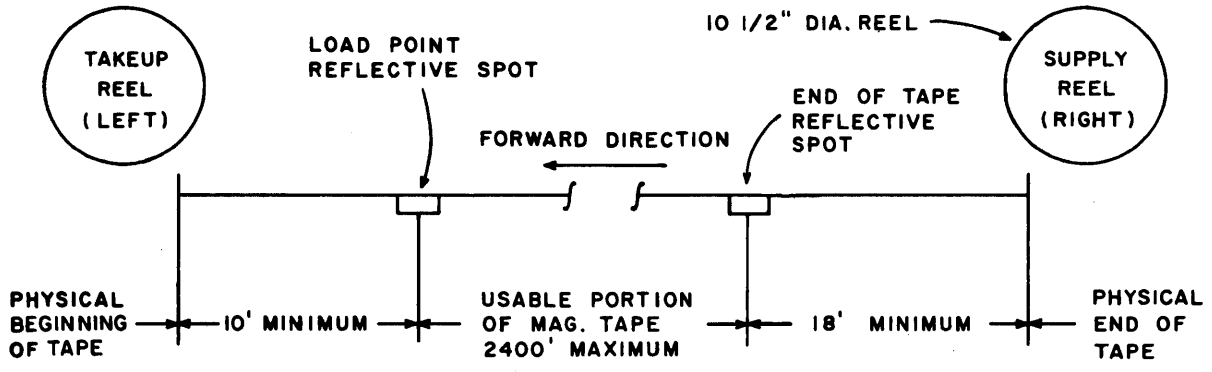

Figure A-2. Physical Layout of Tape

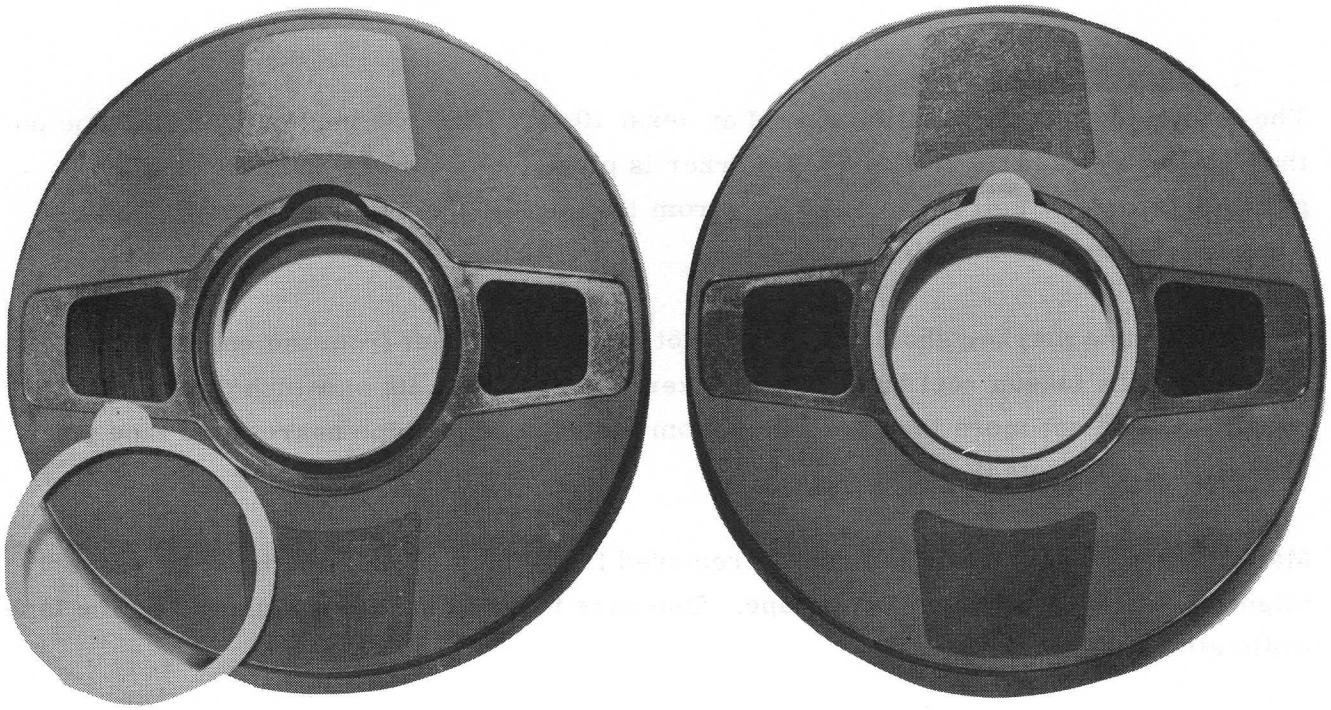

Figure A-3. File Protection Ring

603/604/606/607 OPERATING INSTRUCTIONS

APPLICATION OF POWER

To initially energize the tape unit:

1) Open doors at back of cabinet.
2) Push the two-line circuit breakers (on power supply) to the up position. The neon indicator should light.
3) Push the two-reel power circuit breakers (on power supply) to the up position.
4) Hold the Power On switch on the maintenance panel for about 2 seconds. The pump motor should start.
5) The POWER indicator on the operator's control panel should light. If not, repeat the procedure.
6) Close the back doors.

The POWER switch on the operator's control panel is used only to remove power from the unit. Once this switch is pushed, the above procedure must be repeated in order to apply power to the unit.

TAPE LOAD PROCEDURE

1) Slide front door down to lowest position (Figure A-4).

2) Check that supply reel has been file-protected as necessary.

3) Mount reel on supply reel hub and tighten hub knob.

4) Make sure that tape load arms are in up position.

5) Pull tape from supply reel to reach takeup reel. Thread tape on the outside of the supply tape load arm, over the head assembly, around the outside of the takeup load arm, and over the top of the takeup reel. Release tape and spin the takeup reel hub two or three times.

6) Slide tape under head assembly.

7) Snap tape load arms down.

8) Set Unit Select switch (0-7 or STANDBY) to desired program selection number.

9) Press CLEAR switch.

10) Press LOAD switch. Tape drops in columns, moves forward, and stops on load point marker. LOAD indicator lights. If tape continues moving forward for more than 3 or 4 seconds, either no load point marker was placed on the tape or the operator manually wound the marker onto the takeup reel during step 5.

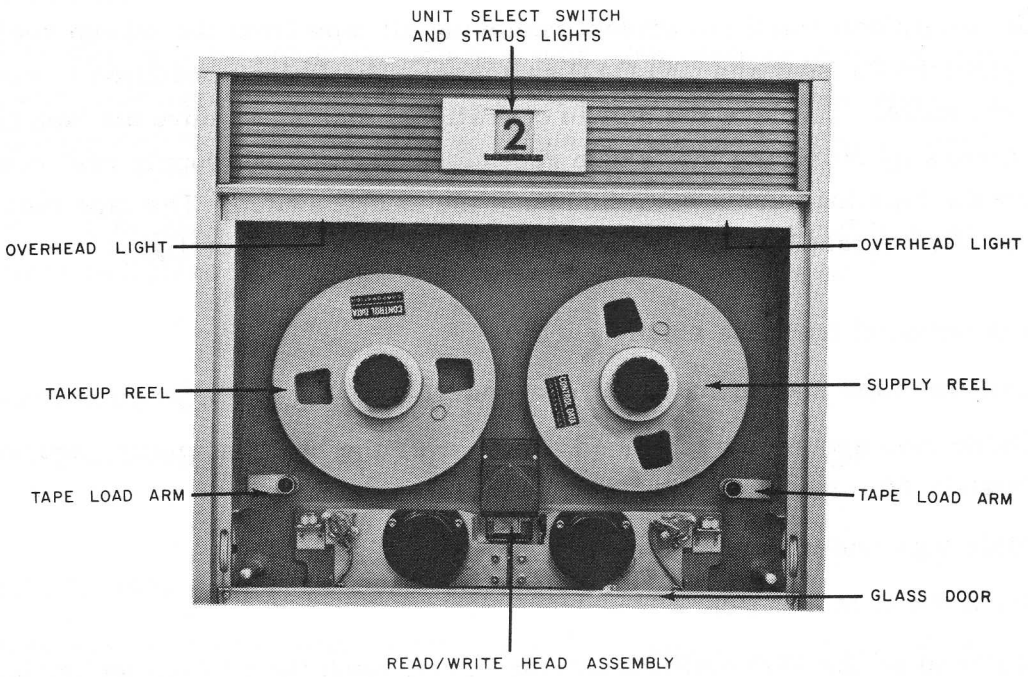

Figure A-4. Tape Load and Unload Mechanics

11) If the unit is to be controlled by the controller, press the READY switch. If it is to be namually operated and the READY switch has been pushed, push the CLEAR switch.

12) Push up door.

If the supply reel contains a file protection ring, the overhead lights should be on, indicating that a Write operation may be performed.

TAPE UNLOAD PROCEDURE

1) Press CLEAR switch.

2) Press UNLOAD switch. All tape is automatically drawn from the takeup reel and wound on the supply reel. The UNLOAD indicator lights.

3) Slide down front door.

4) Loosen supply reel hub knob and remove supply reel.

5) Check if reel needs to be file-protected and if it is labeled adequately prior to storage.

SPECIAL INSTRUCTIONS

To simulate an Unload condition without removing all tape from the takeup reel, simultaneously push the CLEAR and UNLOAD switches. The Unload condition is simulated, but tape does not move. To place the unit in operational status, remove all tape from the vacuum columns by revolving the takeup reel clockwise and the supply reel counterclockwise. Snap the tape load arms down and push the LOAD switch. The tape moves forward and stops on the nearest load point marker. The LOAD indicator lights.

If all tape is unwound from the supply reel:

1) Snap the tape load arms up, if necessary.

2) Guide tape around the tape load arms, over the head assembly, and wrap approximately 10 turns around the supply reel.

3) Slide tape under head assembly.

4) Push the LOAD switch.

5) As soon as the FORWARD indicator lights, push the CLEAR switch and then the REVERSE switch. Tape will rewind on the nearest load point marker.

The following information is applicable when a number of load point or end of tape markers are used on a single tape:

To move forward from a reflective marker and stop at nearest end of tape marker, push the FORWARD switch.

To move forward off a reflective marker and stop at nearest load point or end of tape marker, push the FORWARD and then the LOAD switch. The LOAD indicator lights if motion stops at load point marker.

To reverse from a reflective marker and stop at nearest load point marker, push the UNLOAD, CLEAR, and REVERSE switches in that order.

Tape motion may be stopped at any time by pushing the CLEAR switch. An Unload operation may be performed by pushing the UNLOAD switch.

MANUAL CONTROLS

The manual controls (Figures A-5 and A-6) are effective when the CLEAR switch is lighted. The indicators, however, reflect both manual- and processor-imposed operating conditions.

UNIT SELECT SWITCH

A 10-position switch is mounted on each tape unit. The setting of this switch (0-7 or STANDBY) either designates the control or places it in a Standby condition. Units in a Standby condition cannot be connected to and, hence, used by the processor.

A white indicator in this switch is lighted while the unit is connected to a data channel. A red indicator is lighted while the unit is reserved by a data channel.

POWER SWITCH/INDICATOR

This switch turns off tape unit power. It is lighted when power is on.

FORWARD SWITCH/INDICATOR

This switch moves the tape forward. Motion stops when the end of tape marker is sensed or the CLEAR switch is pushed. It is lighted during this operation.

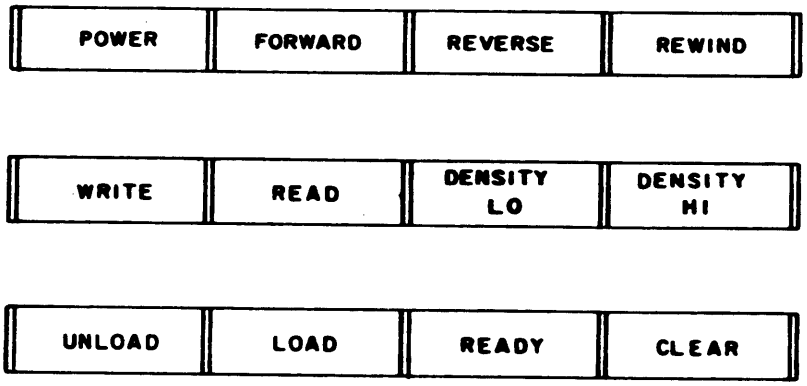

Figure A-5. 603/606 Operator's Control Panel

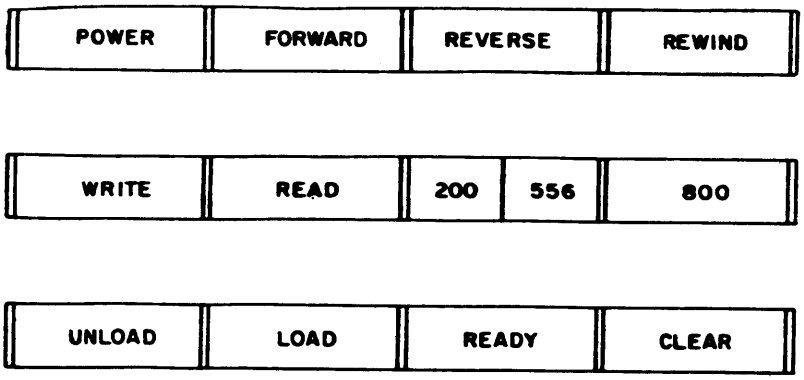

Figure A-6. 604/607 Operator's Control Panel

REVERSE SWITCH/INDICATOR

This switch rewinds the tape. Motion stops when the load point marker is sensed or the CLEAR switch is pushed. It is lighted during this operation.

REWIND SWITCH/INDICATOR

This switch rewinds the tape to load point. It is lighted during this operation.

WRITE INDICATOR

This indicator is lighted during a Write or Write File Mark operation.

READ INDICATOR

This indicator is lighted during a Read operation.

DENSITY LO* SWITCH/INDICATOR

This switch selects low density. It is lighted if low density is selected.

DENSITY HI* SWITCH/INDICATOR

This switch selects high density. It is lighted if high density is selected.

200/556** SWITCH/INDICATOR

This alternate-action switch selects either 200 or 556 bits per inch density. The selected side is lighted.

800** SWITCH/INDICATOR

This switch selects 800 bits per inch density. It is lighted if 800 bits per inch is selected.

UNLOAD SWITCH/INDICATOR

This switch moves all the tape to the supply reel. It is lighted when the tape unit is in unload status.

LOAD SWITCH/INDICATOR

This switch moves tape forward to load point. It is lighted when the tape is at load point.

READY SWITCH/INDICATOR

This switch places the unit under processor control. It is lighted while the unit is under processor control.

CLEAR SWITCH/INDICATOR

This switch master clears the tape unit. It places the unit under manual control. It is lighted when the unit is under manual control.

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* 603/606 Tape units

** 604/607 Tape units

COMMENT SHEET

MANUAL TITLE 3121-A/B MAGNETIC TAPE CONTROLLERS

Reference Manual

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