CONTROL DATA®
SPECIAL OPTION 60026
MAGNETIC TAPE CONTROLLER

DESCRIPTION
PROGRAMMING AND
OPERATION
CIRCUIT DIAGRAMS
PARTS LIST

CONTROL DATA
CORPORATION

REFERENCE/CUSTOMER ENGINEERING MANUAL

REVISION RECORD

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PREFACE

The following documents, in addition to this manual, form the complete set of manuals for Special Option 60026.

Publication Number	Description
17772400	Special Option 60026 Magnetic Tape Controller engineering documentation (wire list, equation file, and chassis map)

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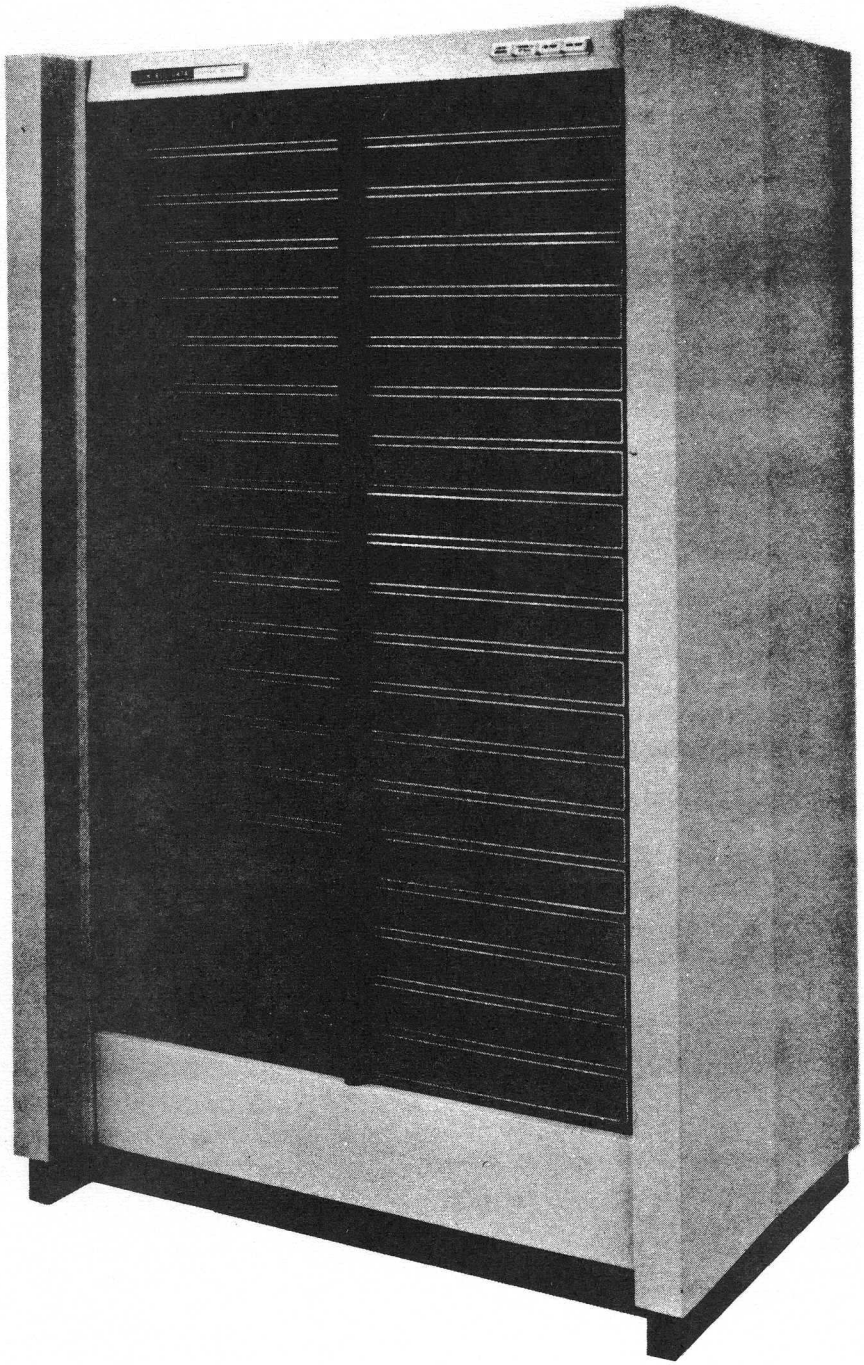


SPECIAL OPTION 60026 MAGNETIC TAPE CONTROLLER

SECTION 1

INTRODUCTION

The CONTROL DATA* Special Option 60026 Magnetic Tape Controller is an intermediate equipment which synchronizes the exchange of information between 24 bit bidirectional data channels and Control Data 627 Magnetic Tape Transports (21-track tape). The controller contains all the logic necessary for connecting the data channel and a tape unit, read and write operations, translating external functions, parity checking and generation, error detection, and status responses.

The 60026 is a single control synchronizer which connects to a 3X07 bidirectional communication channel. It can connect and control up to four transports on a one-at-a-time basis.

Figure 1-1 illustrates the location of the Special Option 60026 in a typical 3000 Series computer system.

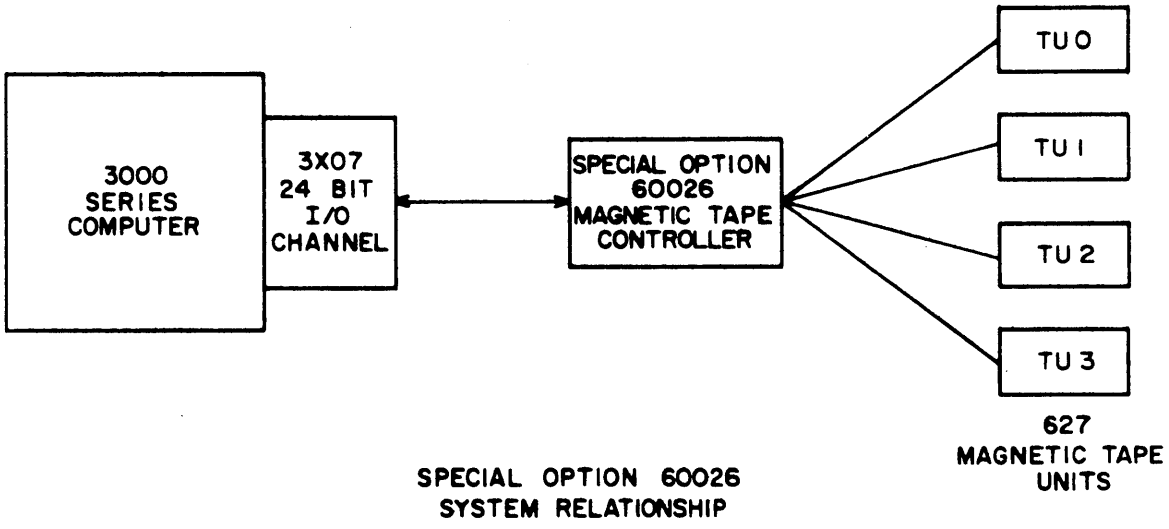


Figure 1-1. Special Option 60026 System Relationship

* Registered trademark of Control Data Corporation.

SECTION 2
DESCRIPTION

PHYSICAL DESCRIPTION

The Special Option 60026 Magnetic Tape Controller is contained in a standard Type C cabinet.

EQUIPMENT DATA

Height	75 inches
Depth	20 1/2 inches
Width	43 3/8 inches
Maximum depth, including all access doors extended	56 inches
Maximum width, including all access doors extended	120 inches
Weight	1200 pounds (approx.)
Cooling Requirements	3000 (approx.) BTU/hr.
Power consumption, 400 cycle, 208 volts, 3 phase	625 watts
Power consumption, 60 cycle, 115 volts, single phase	230 watts
Line Current, 400 cycle, 208 volts, 3 phase	2 amp/phase
Line Current, 60 cycle, 115 volts, single phase	2.4 amp
Cooling method	blower
Distance from signal cable receptacle to floor	8 1/4 inches
Distance from power junction box to floor	2 inches

FUNCTIONAL DESCRIPTION

A program using a tape operation must first select a tape unit and establish a connection. The connection is established by directing the computer to execute an external connect code. This code designates the communications channel number, the controller equipment number, and the tape unit on which the operation is to be performed. After the controller connects a tape unit, any other connection that channel makes automatically clears the previous unit connection.

Once the computer establishes a connect, the program may direct the computer to execute one or more external function instructions or perform a tape operation. During read or write operations, the synchronizer waits for the computer to initiate the operation (Read or Write signal present) and then serves as a timing and buffer wait for directing the flow of data between the tape unit and the data channel.

MAGNETIC TAPE

Information is recorded on one inch magnetic tape in 21-parallel track format (Figure 2-1). Two of these tracks are generated by the controller and used for synchronization timing (bit 9 equals clock bit) and error checking (bit 19 equals parity bit). The remaining nineteen bits represent the four distinct types of words which may be written on tape: 1) start of data (SOD) word, 2) end of data (EOD) word, 3) block word, and 4) data word. The first three words contain a "1" in bit position 18 (block bit) and are further defined by code bits in bit positions 16 and 17. The fourth word contains a "0" in bit position 18 which defines it as a data word. Data words contain a sign bit ("1" negative and "0" positive) in bit position 17 and information data in bits 0 through 16. Table 2-1 describes the four types of tape words.

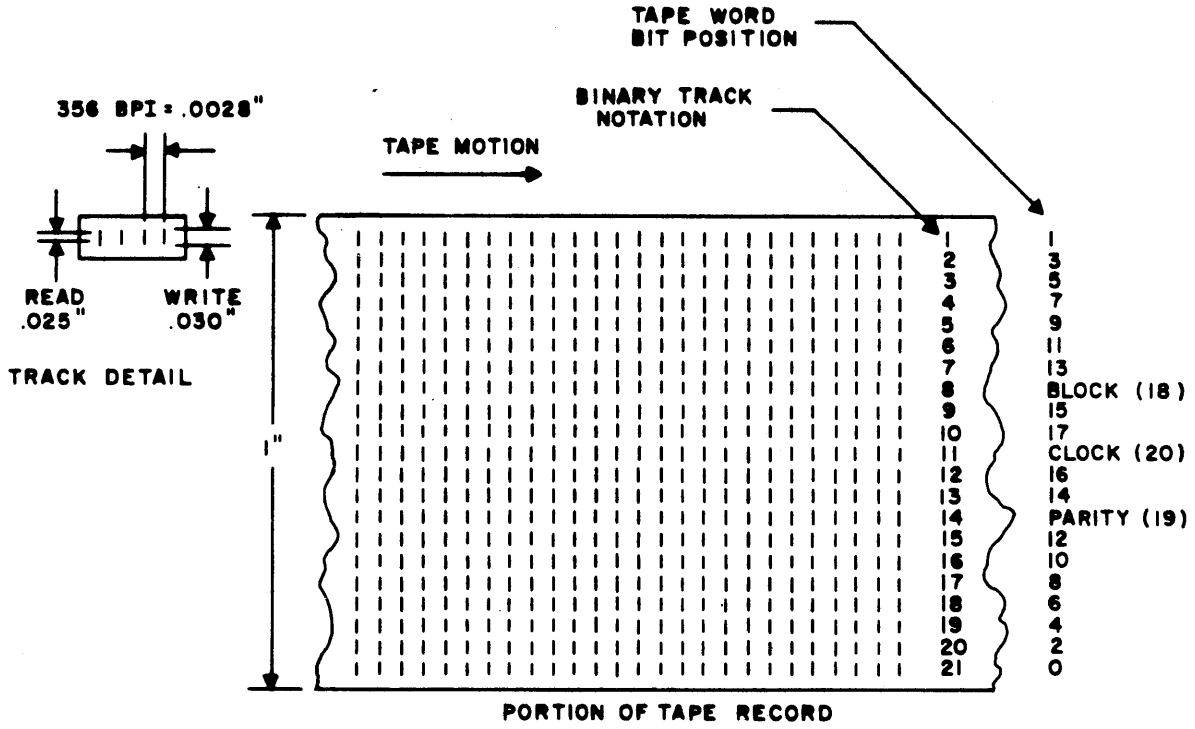


Figure 2-1. Bit Assignments on Tape

TABLE 2-1. TAPE WORD BIT FORMAT

Word Type	Bit Position			
	18	17	16	15 ⟷ 0
SOD Word	1	1	0	Address
EOD Word	1	1	1	All "1's"
Block Word	1	0	0	Address
Data Word	0	S	Information	

The tape arranges recorded data in groups called records. A preceding SOD address word (repeated several times) identifies a record; an EOD word (repeated several times) terminates a record.

The tape arranges data within a record in groups called blocks. Each block consists of a block word address and 31_{10} data words. The block word address identifies the following block of 31_{10} data words.

Figure 2-2 illustrates tape record and block format.

The tape records information continuously without space between blocks at a density of 356 words per inch and at a speed of 112.5 inches per second (25 usec per word). All words record a "1" bit in the clock track. The controller uses this bit for timing purposes during read operations.

The "non-return-to-zero" method is used to record information on tape. During the writing process, a magnetizing current flows through the head at all times, in one direction or the other. The direction of magnetization is not significant. A change in the direction of the magnetic flux represents a "1" bit on the tape. Using this method to record eliminates the necessity of erasing. The write current erases information previously written on tape while the new information is being recorded.

TAPE FORMAT

Each record written on tape consists of three parts: start of data (SOD) address, a block of data words (block word address and 31 data words), and end of data (EOD). The writing of all "1's" across the tape signifies the EOD. Figure 2-2 illustrates a typical record tape format. The SOD is two different lengths depending upon the position of the tape on the transport. If the tape is at the loadpoint (beginning of the reel), the SOD is recorded for 80 ms. All other SOD's on the reel are written for 3 ms.

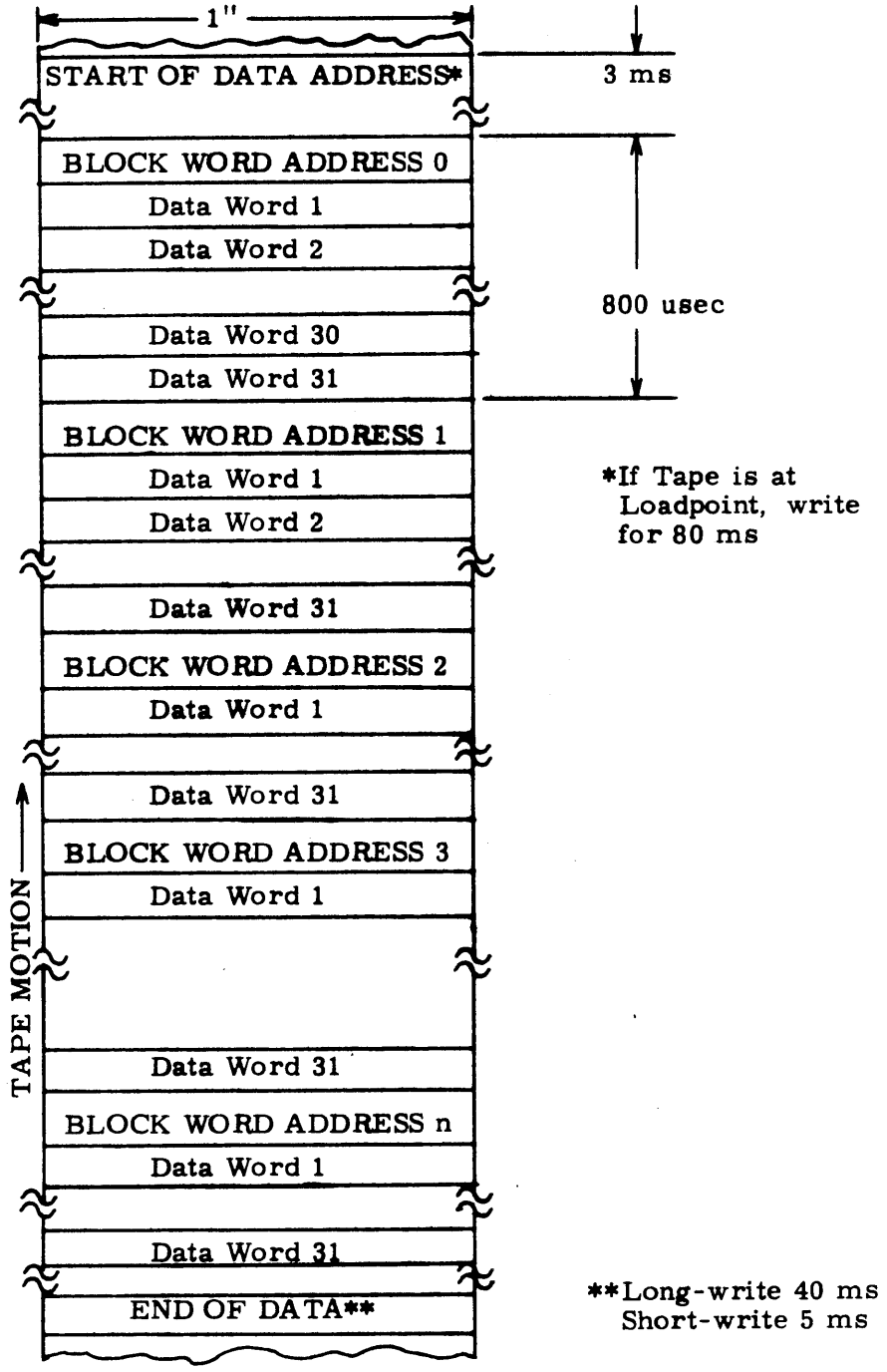


Figure 2-2. Tape Record Format

After the controller writes the SOD, it records blocks of data words in the format previously described.

At the end of each record, the EOD is recorded. The controller can write one of two lengths of EOD if the program executes the appropriate external function code prior to a write operation. Section 3 lists external function codes. If the controller selects the long EOD, it writes all "1's" on tape for 40 ms. If the controller selects the short EOD, it records all "1's" on tape for 5 ms. A Master Clear (MC) signal automatically conditions the controller to write the long EOD.

DATA TRANSMISSIONS AND PARITY

All information transmitted between the controller and the data channel is in the form of 24-bit bytes and two transmission parity bits. The data channel generates a transmission parity bit for every 12-bit byte sent to the controller. Therefore, each 24-bit byte has two transmission parity bits which the controller checks for an odd parity count. Conversely, when information is sent to the data channel, the controller generates two transmission parity bits which the data channel checks.

DATA CHANNEL ↔ TAPE SYNCHRONIZER

The lower 18 bit (0-17) positions contain write data passing from the data channel to the synchronizer. Bit position 20 contains the comparison bit and bit position 18 contains the block bit. The remaining bit positions are not used.

All 24 bits contain the read data passing from the synchronizer to the data channel. Of these 24 bits, the lower 17 bits (0-16) contain information. If the word read is a data word (block bit 18 equals "0") bit 17 (information sign bit) extends through bit 23. If the word read is a block word address (block bit 18 equals "1") bit extension does not occur. In this case, bits 0-18 are transmitted as they appear on tape and bits 19-23 are filled with "0's".

TAPE SYNCHRONIZER ↔ TAPE TRANSPORT

Information transmitted between the controller and the tape unit is in the form of 21-bit words. Bit positions 0 through 18 correspond to their respective positions in the 24-bit byte. Bit position 19 contains the parity bit. Bit position 20 is used for the Clock pulse which the controller generates during write operations. This Clock pulse provides timing which is used to read the recorded information from the tape.

PARITY ERROR INDICATION

Any tape parity errors detected by the synchronizer during a read operation cause the transfer of a special error word (60000000_8) to the data channel in place of the tape word. A manually controlled switch at location 1B058 within the chassis of the synchronizer allows the transfer of the special error word. If the switch is up, the error word is sent; if it is down, the tape word is sent to the data channel.

If a parity error occurs on a word that matches the desired first block word address, the synchronizer ignores this word and searches the remaining block word addresses in the record. Tape stops when an EOD is detected.

Parity errors detected during write operations via the automatic read-after-write error check feature cause tape parity error status (bit 9) to set. This indication is removed when status is read or via a master clear. The status check for write parity errors is valid 2.7 ms after a write is complete. This 2.7 ms delay is a function of the spacing between the write and read heads of the 627 tape transport.

WRITE

The computer can execute a write operation after it establishes the connect. When the controller receives a write signal, it first samples the binary status of the comparison bit (bit 20). This bit informs the controller whether or not the word is to be written on tape. If the comparison bit is a "1", the word is not written on tape but held in the O register as are all following words (if any) during the write operation. The comparison bit is normally set when performing a one-word write of a SOD or block word prior to a search or read operation.

If the comparison bit is a "0", the controller performs a normal write operation.

SEARCH FOR START OF DATA

Assuming the connect is established, the computer may direct the controller to locate a particular record on the tape. Execution of a Search Start of Data (forward or backward) function locates the record. However, prior to initiation of this function, the address for SOD location must be sent to the controller. Execution of a write instruction enters the address as previously explained.

When the Search SOD function is executed, the tape unit starts motion in the direction indicated by the function code. Each word on the tape is then read, placed in a comparison network and discarded by the controller until the word read is identical to the SOD address previously entered. Before a search is satisfied, the controller must read the SOD address eight consecutive times. This assures the controller that the correct SOD address has been found.

READ

Assuming that the tape is in position (at the correct SOD address or between the correct SOD address and the block intended to be read), the computer sends the controller a block word address by another write operation. The computer then sends a read signal which moves the tape forward. Although the tape unit sends all of the data that it is reading to the controller the controller does not transmit any data to the data channel until the block word address is found.

Data is then continuously sent to the computer until the end of data words are read or the computer word count equals zero.

When an EOD is detected, the unit continues to move tape forward for 3 ms and then stops. If the word count equals zero, and no EOD is detected, the computer drops the Read signal to the controller. The controller then signals the tape unit to stop forward tape motion and begins moving the tape backward. The tape moves backward far enough to be in front of the last block read and then stops. At the completion of the operation, the O register contains the address of the last block word read.

The non-stop read is performed if the controller receives the Read signal from the channel within 30 usec from the time the channel drops the Read signal. If the controller does not receive the Read signal within 30 usec tape motion stops and the controller will accept the following read only after the tape unit becomes not busy. Use of the non-stop read saves 5 ms.

READ JIG FEATURE

If the Read signal drops within a record, the controller dictates 5 ms of reverse tape motion. Since the controller contains the block word, as each block is read the jig provides the controller with the ability to resume reading tape at the point in the record where the Read signal dropped. To utilize this feature in reading partial records

the programmer must instruct the controller to read the next block word before dropping the Read signal. The controller then resumes reading at the correct point (Figure 2-3).

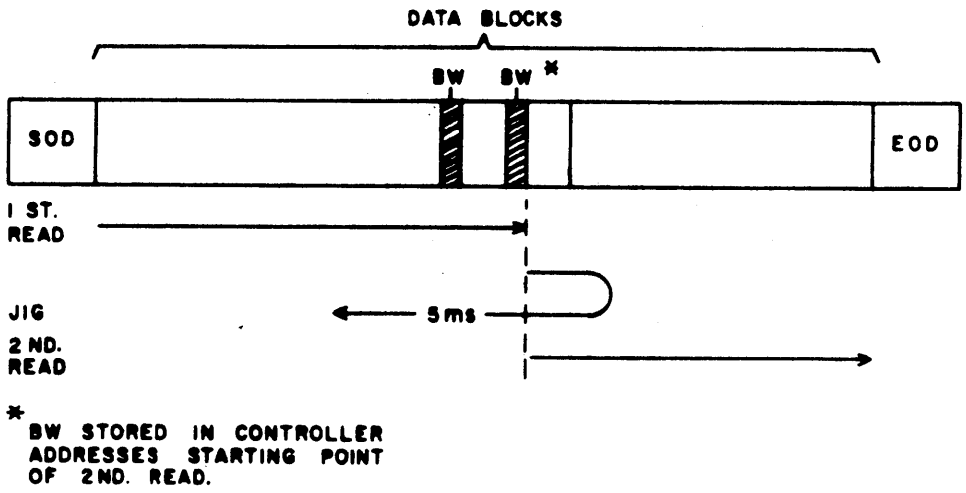


Figure 2-3. Example of Read Jig Feature

SECTION 3

PROGRAMMING AND OPERATION

EXTERNAL FUNCTION CODES

The 60026 Controller does not accept or recognize function codes unless the channel is connected. Function codes should be selected before starting an operation; i. e. before the channel becomes active and the data transmission takes place. This assures that all selections have been made and applicable action will take place during or at the end of the preceding operation (Write, Read or Search). All external function codes applicable to the controller are listed in Table 3-1.

TABLE 3-1. EXTERNAL FUNCTION CODES FOR THE SPECIAL OPTION 60026

MOTION AND FORMAT	
0000	Release
0005	Clear
0010	Rewind
0011	Rewind Unload
0013	Search Start of Data Forward
0014	Search Start of Data Backward
0030	Long End of Data
0031	Short End of Data
INTERRUPTS	
0020	Interrupt on Normal End of Operation
0021	Release Interrupt on Normal End of Operation
0022	Interrupt on Ready and Not Busy
0023	Release Interrupt on Ready and Not Busy
0024	Interrupt on Error
0025	Release Interrupt on Error
0026	Interrupt on Begin Data Transfer
0027	Release Interrupt on Begin Data Transfer

MOTION AND FORMAT CODES

Release (0000)

A Release code clears the existing tape unit connection.

Clear (0005)

Same as Release (0000).

Rewind (0010)

A 0010 code rewinds the tape at high speed (over 320 inches/second) to loadpoint. Any further Rewind instructions when tape is at loadpoint have no effect. A Load-point signal appears on a status line when the operation is complete.

Rewind Unload (0011)

A 0011 code rewinds tape at high speed to tape unload condition and stops. All further operations on this tape are locked out until the tape has been reloaded manually.

Search Start of Data Forward (0013)

Search Start of Data Backward (0014)

If the program contains a search function, the computer must first send the controller a Start of Data address. A Write operation accomplishes this. The search function code (Forward or Backward) 0013/0014 is then initiated to start tape motion. When the controller recognizes the particular Start of Data address, tape motion stops. A Start of Data (SOD) signal appears on a status line when the operation is complete. If no SOD address is detected, tape motion continues until loadpoint or end of tape markers are reached and then terminates.

Long End of Data (0030)

This function code gears the controller to write the End of Data word (all "1's") on the tape for 40 ms.

Short End of Data (0031)

The 0031 code gears the controller to write the End of Data word (all "1's") on the tape for 5 ms.

INTERRUPT CODES

All desired interrupt selections must come before a Read or Write operation, but can occur during any other operation. The eight-position Equipment Designator switch determines on which line the Interrupt signal is transmitted. For example, if the Equipment Designator switch is set to 5, any interrupts are transmitted on

interrupt line 5. Each Release Interrupt code clears its corresponding selection. Any new Interrupt code (either a set or a clear) or a Master Clear clears the Interrupt signal.

NOTE

When the selected condition for interrupt occurs in a tape unit, that unit must be connected. If the tape unit is not connected, the interrupt does not occur. For example, interrupt on Ready and not busy is selected and a Rewind is executed. During rewinding, another tape unit is connected to the controller. This disconnects the unit that is rewinding, and it does not interrupt when the unit becomes Ready and not Busy. If the unit that was rewinding is reconnected, and it is or becomes Ready and not Busy, the interrupt occurs.

Interrupt on Normal End of Operation (0020)

Release Interrupt on Normal End of Operation (0021)

The 0020 code selects the controller to send an Interrupt signal out to the channel when a search SOD function is satisfied or when read or write operations are complete. Release Interrupt on Normal End of Operation (code 0021) clears this condition.

Interrupt on Ready and Not Busy (0022)

Release Interrupt on Ready and Not Busy (0023)

The 0022 code selects the controller to send an Interrupt signal out to the channel when the Ready and Not Busy condition is sensed. Release Interrupt on Ready and Not Busy (code 0023) clears this condition.

Interrupt on Error (0024)

Release Interrupt on Error (0025)

The 0024 code selects Control X to send an Interrupt signal out on the channel when any one of the following conditions occurs:

1) Block Length Error
2) Loadpoint Sensed while searching SOD reverse
3) End of Tape Sensed
4) Lost Data

Release Interrupt on error code (0025) clears this condition.

Interrupt on Begin Data Transfer (0026)

Release Interrupt on Begin Data Transfer (0027)

The 0026 code selects the controller to send an Interrupt signal out on the channel when the addressed block word is read. Release Interrupt on Begin Data Transfer (code 0027) clears this condition.

STATUS RESPONSE

Twelve status conditions for the controller and tape unit are available to the computer after a connect has been established. Table 3-2 lists the Status Responses available to the computer for the controller and the bit position of each status condition in association with the bit sensing instruction.

READY (XXX1)

The Ready status line is activated when the connected tape unit is in a Ready condition. When the tape unit is manually controlled, the Ready signal is not present.

TABLE 3-2. STATUS RESPONSES

	STATUS	BIT POSITION
XXX1	Ready	0
XXX2	Channel/Equipment/Unit Busy	1
XXX4	Write Enable	2
XX1X	Start of Data (Search satisfied)	3
XX2X	End of Data	4
XX4X	Begin Data Transfer	5
X1XX	Normal End of Operation	6
X2XX	End-of-Tape or Loadpoint	7
X4XX	Block Length Error	8
1XXX	Tape Parity Error	9
2XXX	Not Used	10
4XXX	Lost Data	11

CHANNEL, CONTROLLER, OR TAPE UNIT BUSY (XXX2)

The controller activates this status line when it is reading or writing from/on tape. The signal is also present when the connected tape unit is in a Busy condition due to a tape motion function, and when the channel is busy.

WRITE ENABLE (XXX4)

A signal is present on the Write Enable status line only when the file protection ring is on the tape reel. When this signal is absent, it is impossible to write on tape; however, information may be read from tape.

START OF DATA (XX1X)

The controller activates the Start of Data status when a Search (SOD) function is satisfied. The controller removes the signal from the line when a new function or operation is selected.

END OF DATA (XX2X)

The End of Data signal is present when an End of Data word is sensed after a block word has been read.

BEGIN DATA TRANSFER (XX4X)

This line is activated when the addressed block word is read from the tape. The computer must first issue a Write instruction to enter the address of the desired block word. Then a Read instruction is executed. When the desired block word is sensed, the status signal will be present. If the Begin Data Transfer status is not available upon the termination of a read operation, the controller has not transferred data to the data channel.

NORMAL END OF OPERATION (X1XX)

The controller activates this status line when 1) a search is terminated by finding the SOD, 2) the End of Data is read during a read operation, or 3) the channel goes Not Busy.

END OF TAPE OR LOADPOINT (X2XX)

This status signal is present on the line when the metal leader on the end of tape reel is positioned on the tape unit end of tape sensor, or when a loadpoint marker is detected at the tape unit.

BLOCK LENGTH ERROR (X4XX)

This status line is activated whenever the number of data words in a block is not equal to 31_{10}. This bit is set if an error is detected during read or write operations and is cleared when status is read.

PARITY ERROR (1XXX)

This status line is activated whenever a tape parity (vertical) error occurs. The signal is removed when a new read or write operation is executed or by a new connect operation or whenever an external status instruction is performed by the computer.

NOT USED (2XXX)

LOST DATA (4XXX)

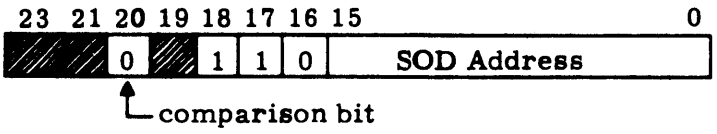
This signal appears during a write operation if the tape controller is ready to accept information, but the Data signal is absent (Write signal present). When the Lost Data signal appears during a write operation, tape motion stops. Further write operations are impossible until a new Function or Connect code clears the Lost Data signal.

The Lost Data signal also appears during a read operation when the tape controller has data ready for output, but the Data signal is absent (Read signal present). If the Lost Data signal appears during a read operation, tape motion stops. Further Read operations are impossible until a new Function or Connect code clears the signal.

INPUT/OUTPUT DATA FORMATS

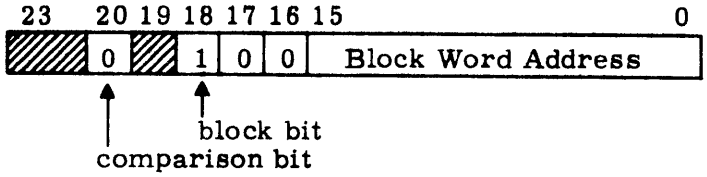
The following word formats illustrate the coding of computer input/output words during write, search, and read operation.

WRITE START OF DATA



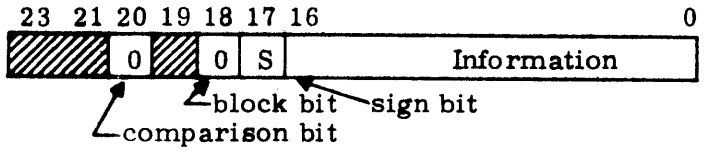
The start of data (SOD) address is in the 16 low order bit positions of the computer output word. The controller decodes bit positions 18, 17, and 16, to indicate that the word received is a SOD address. Bit 20 is zero indicating that this SOD address is to be written on the tape.

WRITE BLOCK WORD



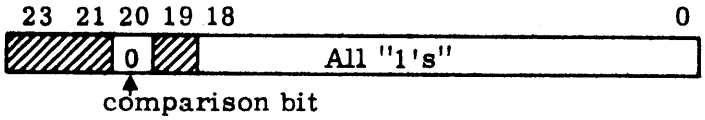
The block word address is in the 16 low order bit positions (0-15) of the computer output word. The controller decodes bit positions 18, 17, and 16 indicating that the word received is a block word address. Bit 20 is a zero indicating the word is written on tape.

WRITE DATA WORDS



Data words are in the lower 17 bits of each computer output data word to the controller. Bit 18 equals 0 indicates to the controller that a data word is contained in bits 0-17. Bit 17 is the sign bit for the data word. Bit 20 is zero indicating the data word is written on tape. Each data block must contain 31_{10} data words.

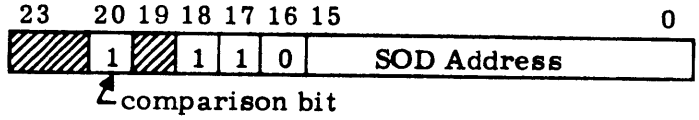
WRITE END OF DATA WORD



When the last data word of a record is written, the end of data word is written. Bit positions 0 through 18 of the output word contain all "1's". Bit 20 is "0" indicating that the output word is written on tape.

SEARCH FORMAT

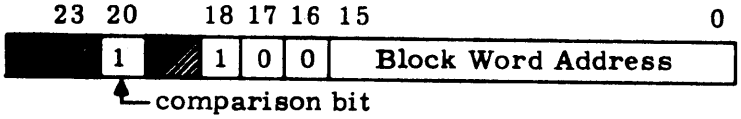
Prior to the initiation of a search SOD function, the SOD address must be transmitted from the computer to the controller via a one word write operation. The format of the output word is shown in the following diagram.



Upon execution of a write instruction, the controller loads the contents of the output word into the O register, but does not start tape motion. Bit 20 set to "1" indicates to the controller that a Search function will follow. The "1" bit in position 20 causes the controller to inhibit the write gates to the tape. The controller decodes bits 18, 17, and 16 of the output word to indicate that the contents of bit positions 0 through 15 contain a SOD address.

READ FORMAT

Prior to the initiation of a read operation, the computer must transmit the starting block word address to the controller via a one word write operation. The format of the output word is shown in the following diagram.



Upon execution of the write instruction, the controller loads the contents of the output word into the O register, but does <u>not</u> start tape motion. Bits 18, 17, and 16 of the output word are decoded at the controller to indicate that bits 0-15 contain a Block word address. Bit 20 is a "1" indicating the output word is <u>not</u> to be written on tape.

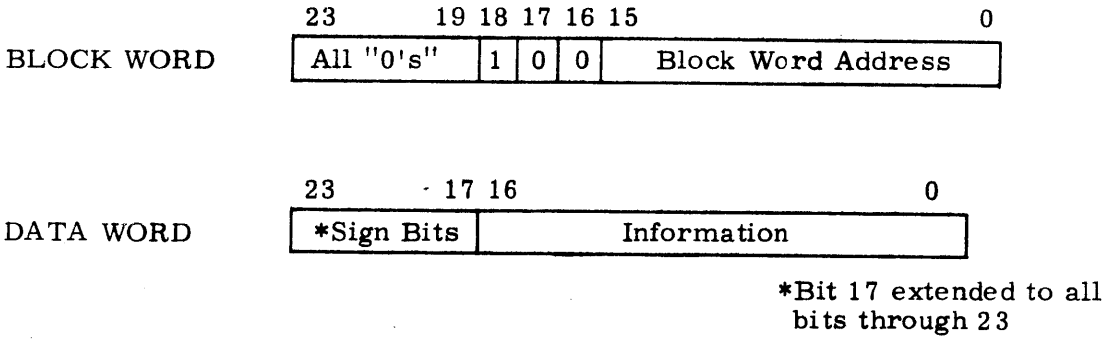
The instruction following this write operation is a read instruction. After the controller executes the read instruction, it initiates forward tape motion. When it detects the desired block word address, it initiates a read data transfer to the computer. The first word transferred to the computer is the correct block word address.

<u>Input Word Format</u>

Input words may be data words or block words as determined by the block bit (bit 18) recorded on tape.

If a parity error occurs on any input word except the first block word in a group of blocks, the word in which the parity error occurred is replaced by a unique input word. This unique word contains "1's" in bit positions 23 and 22 and all other bits are "0's" (60000000_8).

If a parity error occurs on a block word while the controller is looking for the desired block word, the block word is ignored. If the controller does not find the correct block word the tape moves to the EOD, sends a Disconnect signal to the computer, and stops. No data is transferred in this case.



OPERATION

This section contains general information required for operating the 627 Magnetic Tape Transport and includes the functions of the controls and indicators located on the 60026 controller. For a detailed description of the tape unit, refer to the 627 Magnetic Tape Transport/ Reference Manual (Control Data publication number 40807800).

POWER TURN ON

The power to the Special Option Magnetic Tape Controller turns on at the System Power Distribution Panel. To initially energize the 627 tape unit use the following procedure:

1) Open doors at back of cabinet.

2) Push the Main Power circuit breaker (On power supply) to the Up position. A neon indicator located directly below the circuit breaker should light. (If the neon fails to light, notify maintenance).

3) Push the remaining circuit breakers on the power supply to the Up position.

4) Place the Power switch on the maintenance panel in the On (Up) position and hold for about two seconds, then release.

5) The Power indicator on the front control panel should turn on. If the indicator fails to light, turn off all power and repeat the procedure starting with step 2 above. (If the indicator on the front control panel fails to light after repeating the procedure, notify maintenance).

6) Close the back doors.

NOTE

The Power switch on the operator's front control panel is used only to remove power from the unit. Once the switch is pressed, the above procedure must be repeated to apply power to the unit.

TAPE LOADING PROCEDURE

1) Lower the front sliding door to its lowest position.

2) Remove the file reel from the plastic tape container, handling it by the center hole and edges only. Do not squeeze the sides together. Keep the tape container closed at all times to prevent contamination.

3) Check the file protection ring on the back of the supply reel. If the operation to be performed with the tape is a read, the ring is not necessary. If the file is to be written on, make sure the ring is in place.

4) Mount the file reel on the supply reel hub (right side when facing front of transport). For proper reel alignment, push the reel firmly against the hub stop before tightening the hub knob. If the supply reel contains a file protection ring, the overhead lights should be on, indicating that a write operation may be performed. If the lights are not on, notify maintenance.

5) Make sure that the tape load arms are in the Up position.

6) Pull sufficient tape from the supply reel to reach the take-up reel. Thread the tape on the outside of the supply tape load arm and over the head assembly. Take the end of the fifteen foot metal leader attached to the take-up reel and make the (quick-disconnect) connection to the end of the

supply reel tape. To make the connection, slip the two tabs on the end of the supply tape into the two slots provided on the end of the take-up reel tape. Make sure the tape is not twisted and that it is threaded over the outside of the take-up load arm.

CAUTION

During tape loading, be sure to connect the leader on the LEFT side of the Read/ Write heads when facing the unit.

7) Slide the tape under the head assembly.

8) Snap tape load arms down.

9) Place the Equipment Designator switch to one of the ten positions (0 through 7 or one of the standby positions) to assign a logical program selection address.

10) Press the Load switch. The tape drops into the vacuum columns and stops on the loadpoint; the Load indicator turns on. There are three tape sensors located in the vacuum columns. The one in the upper left corner of the left column (facing the front of tape unit) senses the beginning of the tape. The loadpoint sensor is located about five inches down on the right side of the left column, and the end of tape sensor is on the upper right corner of the right column. A fifteen foot metal leader is attached to each end of the reel for the purpose of sensing the beginning and end of the tape. The tape loadpoint is directly behind the two quick-disconnect tabs on the supply reel tape. If the Load indicator does not turn on, notify maintenance.

11) To place the tape unit under computer control, press the Ready pushbutton and the Ready indicator should light.

12) Raise the sliding glass door.

TAPE UNLOADING PROCEDURE

1) Press the Clear switch to remove the computer control of the tape unit.

2) Press the Unload switch. The tape is automatically drawn from the take-up reel until the loadpoint is sensed and stops. The Unload light turns on.

3) Lower the sliding glass door.

4) Rotate the supply reel in a counterclockwise direction until the quick-disconnect is out of the vacuum column. Carefully remove the tabs on the supply reel tape and from the take-up reel end. Manually rotate the supply reel in a counterclockwise direction until all the tape is on the reel. Rotate the take-up reel in a clockwise direction until all of the metal leader is out of the vacuum column.

5) Loosen the supply reel hub knob and remove the reel.

6) Check the reel for proper labeling and place it in the plastic tape container.

GENERAL PRECAUTIONS FOR TAPE OPERATION

1) Do not allow the tape to fall on the floor. The area in which the tape is used should be kept clean. Dust or ashes can damage the tape permanently.

2) Handle the tape reel near the hub. Never rock the reel by grasping the outer edge. If a tape break occurs, divide the reel into two smaller reels. Splicing is not recommended except for emergency data recovery.

3) If it is difficult to remove the reel, break the bond between the reel and the hub by placing palms of hands along the edges of the reel and rotating it.

4) Always keep the sliding glass door shut except while loading or unloading tape.

5) Always keep the plastic tape container closed to prevent contamination from dust and ashes.

MANUAL CONTROLS AND INDICATORS

Table 3-3 describes the manual controls and indicators for operating the 627 Magnetic Tape Transport. The controls and indicators associated with the 60026 Controller are described in Table 3-4.

TABLE 3-3. 627 CONTROLS AND INDICATORS

NAME		FUNCTION
Power	S*	Removes power from all components and power supplies.
	I**	Power is available to components and power supplies.
Forward	S	Moves tape from right to left at 112.5 ips. Motion stops when end of tape marker is sensed.
	I	Tape is moving forward at 112.5 ips.
Reverse	S	Moves tape from left to right at 112.5 ips. Motion stops when loadpoint marker is sensed.
	I	Tape is moving in reverse direction at 112.5 ips.
Rewind	S	Rewinds tape at high speed (over 320 ips average). Motion stops when the loadpoint marker is sensed.
	I	Tape is moving in reverse direction at high speed.
Unload	S	Moves tape at high speed to load position. Pad retracts and vacuum is removed from tape columns.
	I	Tape unit is in unload status.
Load	S	Pulls tape into column, moves tape forward, then searches reverse for loadpoint marker. Motion automatically stops when marker is sensed.
	I	Tape is at loadpoint marker.
Ready	S	Places unit under computer control. Unit is placed under manual control only when master cleared locally or a rewind unload selected by the controller.
	I	Unit is under computer control.
Clear	S	Master clears all previous settings and conditions. Stops (immediately) tape motion. New manual selections are necessary to reselect tape unit and/or operation required.
	I	Unit is cleared.
Equipment Designator	S	Ten-position switch; 0-7 provide input designation while two standby positions disconnect unit from external control.
	I(White)	Unit select status indicator number 1.
	I(Red)	Unit select status indicator number 2.
Overhead Lights	I	File protection ring is on reel (unit can write) and tape unit is not in the unload position.

*Switch
**Indicator

TABLE 3-4. 60026 CONTROLS AND INDICATORS

NAME		FUNCTION
Equipment Designator	S*	Eight-position switch (0 through 7) associated with the controller. The setting designates the equipment number N. Interrupts coming from the controller are transmitted through one of the eight interrupt lines corresponding to the Equipment Selection switch setting.
	I** (White)	Controller connected to a computer channel.
	I (Red)	Transmission parity error occurred.
Interrupt	I	Interrupt occurred after an interrupt function was programmed.
Write	I	Write operation being performed.
Vertical Parity	I	Tape parity (vertical) error occurs.
Block Length Error	I	31_{10} words not present in data block.
Error Word Transfer	S	A manually controlled switch at location 1B058 within the chassis of the synchronizer allows the transfer of the special error word. If the switch is up, the error word is sent; if down, the tape word is sent to the data channel.

*Switch
**Indicator

SECTION 4

CIRCUIT DIAGRAMS

KEY TO LOGIC SYMBOLS

(STANDARD 1604 OR 3600 CARD TYPES)

Logic diagrams represent a symbolic approach to electronic schematics. By using symbols to represent building block circuits, the diagram becomes easy to read if the reader understands the function of the symbols. In Control Data Corporation logic, two signals, a logical 0 ("0") and logical 1 ("1"), are the possible input or output conditions of a circuit. A circuit with an output of "1" is "up" and a circuit with an output of "0" is "down". Detailed descriptions of logic symbols and their associated building block circuit cards are contained in the appropriate printed circuit manual (1604 and 3600 Card Types). Refer to the Literature Distribution Center Catalog for the publication number and latest revision level.

STANDARD LOGIC SYMBOLS

Standard logic diagram symbols for Control Data equipment using 1604- or 3600-type cards are inverters, flip-flops, control delays, capacitive delays, inductive delays, and line drivers and receivers.

Inverters

An inverter is a logic element which provides an output that is an inversion of its input. When more than one input is provided to an inverter, "1's" take precedence over "0's" and drive the output of the inverter to "0". Because any "1" input of several inputs drives the output to a "0", an inverter may be considered an inverting OR (NOR) gate when more than one input is present.

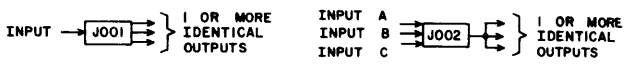


Figure 1. Inverter Symbols

Acceptable conventions for showing multiple OR inputs are given in Figure 2.

Figure 2. OR Circuit Conventions

An AND gate requires that all its inputs be "1's" in order that its output be a "1". If one or more of the inputs to an AND gate are "0", the output is a "0". Figure 3 illustrates conventions for showing AND gates feeding an inverter.

Figure 3. AND Circuit Conventions

Figure 4 illustrates a combination AND/OR input.

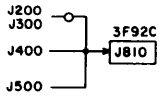


Figure 4. AND/OR Circuit Convention

Flip-Flops (FF)

The flip-flop (FF) is a storage device with two stable states - designated as Set and Clear - and is composed of two or more inverters. The logic symbols (Figure 5) are formed by the combination of inverter symbols. By convention, Set inputs and outputs are shown in the upper part of the symbol and Clear inputs and outputs are shown in the lower part of the symbol.

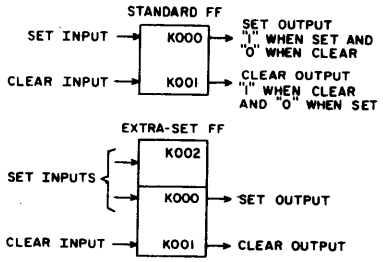


Figure 5. Flip-Flop Symbols

Figure 6 illustrates the interconnection of inverter symbols to form a flip-flop symbol. The term numbers assigned to each flip-flop are the term numbers of the internal inverters as seen by comparing the terms in Figure 5 with those in Figure 6. Notice that the Set output is the output of inverter K001, and the Clear output is the output of inverters K000 and K002.

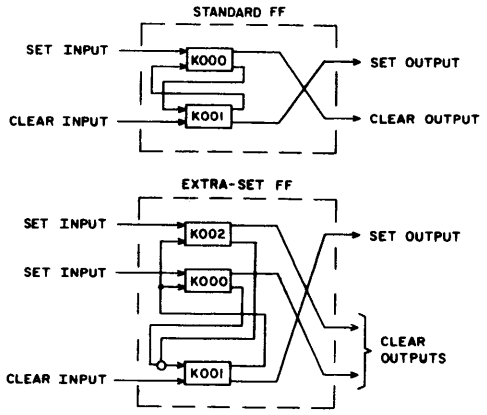


Figure 6. Internal Inverter Connections for a Flip-Flop

Control Delay

A control delay is a timing device consisting of an H term which receives the input and one or more V, Y, or N terms to provide the outputs. The H term is essentially a flip-flop with controlled feedback and occupies an entire printed circuit card. The output term(s) are inverter(s) located elsewhere on the logic chassis. The "1" outputs from a control delay are clocked pulses which are delayed one phase time from the "1" inputs. Clock inputs are not shown on the logic diagrams for any H, V, Y, or N terms; these terms, which control the start and duration of the delayed output pulses, may be found in the Equation Summary. Figure 7 illustrates two representative forms of the control delay symbol, with possible inputs and outputs labelled. Figure 8 shows the electrical connections for the two forms.

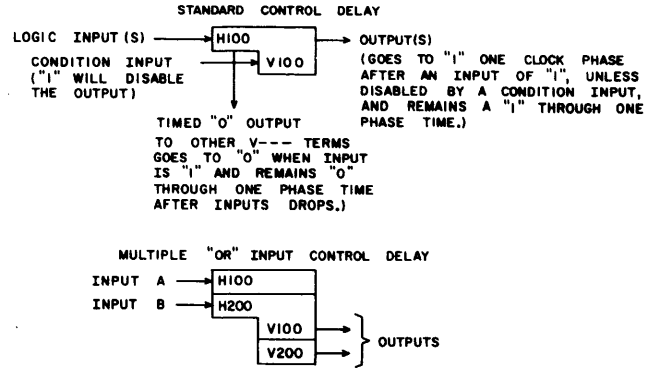


Figure 7. Control Delay Symbols

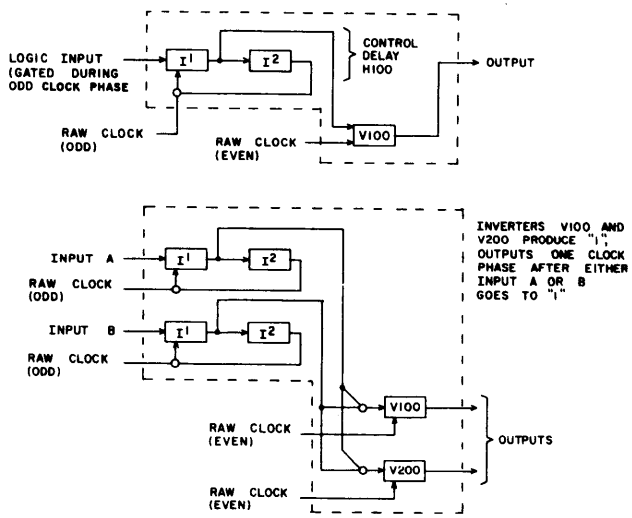


Figure 8. Electrical Connections for Control Delay

Control delays may have multiple inputs and/or multiple outputs. When a control delay has multiple output terms (i.e., more than one V, Y, or N term), each output term may have a separate conditioning input.

Capacitive Delays

A capacitive delay is used to delay the "1" input to a logic element. ("0" inputs are not affected by the delay.) Capacitive delays may be active or passive, depending upon whether or not transistors are used as part of the delaying circuit. Delay periods are checked by using a dual-trace scope connected to the input and output of the delay producing element. The actual connection points for the scope and probes vary for different cards and should be determined by referring to the Printed Circuit Manual.

Active delays may be recognized by the circuit letter always present as part of the card location. Pin numbers are also shown when external wiring is needed to connect the proper capacitance. In Figure 9, the pluggable delay uses this wiring to connect to capacitors on the same card. In the third example, this wiring connects to capacitors located on two separate capacitor cards.

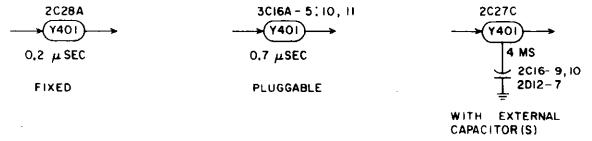


Figure 9. Active Capacitive Delays

All passive capacitive delays (Figure 10) are formed by wiring grounded capacitors, located on one or more capacitor cards, as an AND input to the affected logic element. For this reason, all passive delays show pin numbers to provide this external wiring data.

Figure 10. Passive Capacitive Delays

Capacitive delays may be adjustable or nonadjustable, depending on the card type and/or the external wiring connections on the card. When it is necessary to adjust the delay period in order to obtain specified circuit operation (usually done by varying a potentiometer in the RC network), a diagonal arrow is added to the delay symbol as shown in Figure 11.

Figure 11. Adjustable Capacitive Delays

Inductive Delays

An inductive delay is used to delay either the "1" or "0" input to a logic element or as a tapped delay line for timing of operations. The symbol for this delay is an elongated oval with a double vertical line just within the input end of the oval. When used as a tapped delay line, the inductive delay is terminated in its characteristic impedance. Inductive delays are identified in the same manner as capacitive delays (except for the vertical lines) unless they are used as delay lines. On multi-section cards where no identifying circuit letters are present, pin numbers are shown adjacent to the input and output arrows. Figure 12 shows both kinds of inductive delays.

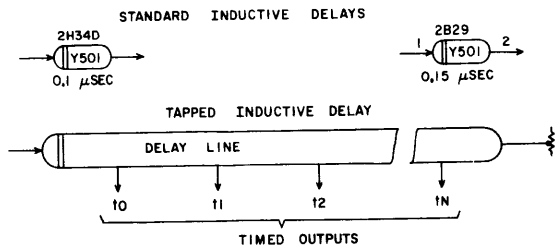


Figure 12. Inductive Delays

Line Drivers/Receivers

Voltage levels used to represent "1's" and "0's" on cables are different from those used for internal logic. The level shift to and from internal logic is made by line drivers and line receivers. These cards may be considered as inverting the signal electrically, but not logically. The letters commonly associated with these cards are L & M (1604) and R & T (3000 Series). A 3000 Series Receiver may also be used to perform a logical inversion by swapping the twisted pair wires. This usage is indicated by a circle on the input side of the symbol. In Figure 13, "1's" and "0's" have been added to clarify the logic states; they are not part of the symbol.

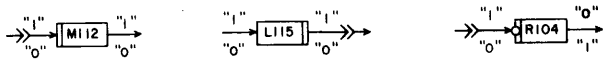


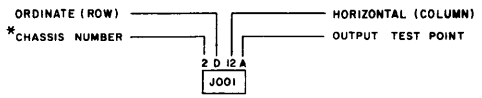
Figure 13. Typical Line Driver/Receiver Symbols

NON-LOGIC CONVENTION

The use of the double vertical bar, as shown in Figure 13, denotes a shift in signal voltage level from that used in internal logic. The double bar appears on the input or output side of the symbol, depending on which side connects to the non-logic-level signal. No particular voltage level is implied by the double bar - only that it is non-logic.

JACK ASSIGNMENTS

Each numbered term in the logic diagrams contains a jack assignment showing the physical location of that hardware element and the test point (circuit section) associated with it. For some card types, the test point letter is replaced by a pin number. For these cases, a card extender must be used in order to test that section of the card. Also, some symbols show no test point. This is because the entire card is used for one purpose (e.g. a single inverter, FF, or control delay). Figure 14 illustrates the inverter J001, with 2D12A representing its jack assignment.



*When most or all jack assignments are located on one chassis, the chassis numbers for that chassis are omitted. All multi-chassis devices include a chassis number as part of each jack assignment.

Figure 14. Jack Assignment Scheme

CABLE IDENTIFICATION

Cable connections are represented by the MIL-STD-15 symbol and identified as to connector location and pins used, as shown in Figure 15.

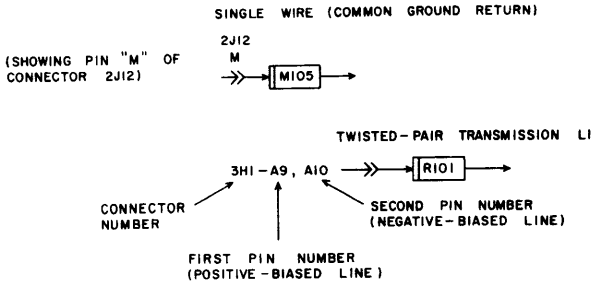


Figure 15. Cable Connections

SPECIAL LOGIC SYMBOLS

Nonstandard elements (special logic and/or non-logic elements) are represented by a special circuit symbol (generally a rectangle as shown in Figure 16). The special circuit symbol always shows the symbol designation, jack location, and the card type. Supplemental information may also be shown such as in the case of special delay cards which indicate the delay period. For detailed information refer to the specific card type in the appropriate Printed Circuit or Logic Module Manual.

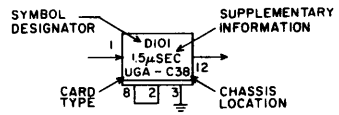


Figure 16. Symbol for Special Circuits

INPUT/OUTPUT DESIGNATIONS

Where several pages of logic are involved, a symbol index and term list (side cars) are incorporated within the manual. Also in certain instances such as special card types or on equipments for which no equation summary exists (as for peripheral devices) input and output pin numbers are indicated on each logic element as are the output destinations of the elements (Figure 17).

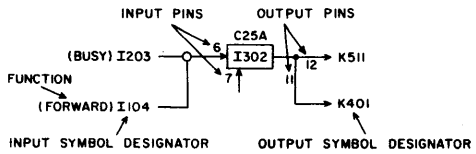


Figure 17. Input/Output Designations

SYMBOL LIST

TERM	SHEET
A000	1
A001	1
A002	1
A003	1
A004	1
A005	1
A006	1
A007	1
A008	1
A009	1
A010	1
A011	1
A012	1
A013	1
A014	1
A015	1
A016	1
A017	1
A018	1
A019	1
A020	1
A021	1
A022	1
A023	1
A024	1
A025	1
A026	1
A028	1
A029	1
A030	1
B000	12
B001	12
B002	12
B003	12
B010	12
B011	12
B012	12
B013	12
B020	12
B021	12
B022	12
B023	12
B030	12
B031	12
B032	12
B033	12
B040	12
B041	12
B042	12
B043	12
C000	10
C001	10
C002	10
C003	10
C004	10
C005	10
C006	10
C007	10
C008	10
C009	10
C010	10
C011	10
C012	10
C013	10
C014	10
C015	10
C016	10
C017	10
C018	10
C019	10
C020	10
C021	10
C022	10
C023	10
C024	10
C025	10
C026	10
C027	10
C028	10
C029	10
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C078	10
C079	10
C080	10
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C082	10
C083	10
C084	10
C085	10
C086	10
C087	10
C088	10
C089	10
D000	5
D001	5
D002	5
D003	5
D004	5
D005	5
D006	3
D007	3
D008	3
D009	3
D010	3
D012	3
D013	5
D014	5
D015	3
D016	3
D017	3
D018	5
D019	5
D020	5
D021	5
D022	5
D023	5
D024	5
D025	5
D026	5
D027	6
D028	5
D029	3
D030	5
D031	8
D032	5
D033	3
D034	8
D035	6
D036	5
D037	5
D038	5
D039	3
D041	7
D042	7
D043	7
D046	7
D047	3
D048	7
D049	6
D050	7
D051	6
D052	7
D053	7
D054	7
D056	7
D058	7
D062	5
D063	5
D064	7
D065	7
D066	7
D067	7
D068	7
D070	7
D072	7
D074	7
D076	7
D077	7
D080	3
D081	2
E000	11
E001	11
E002	11
E003	11
E004	11
E010	11
E011	11
E012	11
E013	11
E037	3
E038	3
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E041	11
E042	11
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E044	11
E045	11
E046	11
E047	11
E050	11
E051	11
E052	11
E053	11
E054	11
E055	11
E056	11
E060	13
E061	13
E062	13
E063	13
E064	13
E065	13
E073	11
E074	11
E087	11
E088	11
E089	11
E090	11
E091	11
E092	11
E093	11
E094	11
F000	8
F001	8
F002	8
F010	8
G080	9
G081	9
G082	9
G083	9
G084	9
G085	9
G090	9
G091	9
H000	13
H001	13
H002	13
H003	13
H004	13
H005	13
H006	13
H007	13
H008	13
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H010	13
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H062	13
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H066	13
H067	13
H068	13
H069	13
I000	3
I001	3
I002	3
I003	3
I004	3
I005	3
I006	3
I009	3
I010	3
I011	3
I012	3
I015	3
I017	3
I018	3
I019	3
I020	5
I021	5
I022	16
I026	16
I030	16
I031	16
I032	16
I033	16
I034	16
I050	16
I051	16
I052	16
I053	16
I122	16
I126	16
I130	16
I131	16
I132	16
I133	16
I134	16
I150	16
I151	16
I152	16
I153	16
I222	16
I226	16
I230	16
I231	16
I232	16
I233	16
I234	16
I250	16
I251	16
I252	16
I253	16
I322	16
I326	16
I330	16
I331	16
I332	16
I333	16
I334	16
I350	16
I351	16
I352	16
I353	16
I800	4
I801	4
I803	4
I804	4
I805	4
I807	4
I810	4
I811	4
I900	21
J000	5
J001	5
J002	5
J003	5
J004	5
J005	5
J006	5
J007	5
J009	5
J010	5
J011	5
J014	5
J015	5
J016	5
J017	5
J018	5
J019	5
J025	6
J026	5
J027	5
J028	6
J029	6
J030	6
J031	6
J032	6
J033	6
J034	6
J035	6
J036	6
J037	6
J038	5
J039	5
K000	3
K001	3
K002	3
K003	3
K004	3
K005	3
K012	3
K013	3

TERM	SHEET	TERM	SHEET	TERM	SHEET	TERM	SHEET	TERM	SHEET	TERM	SHEET	TERM	SHEET	TERM	SHEET
K014	3	L014	20	L205	19	L326	21	M112	17	M229	18	N011	19	N201	19
K015	3	L015	20	L206	19	L327	21	M113	17	M230	18	N012	20	N202	19
K016	2	L016	20	L207	19	L328	21	M114	17	M231	18	N013	20	N203	19
K017	2	L017	20	L208	19	L330	21	M115	17	M232	18	N014	20	N204	19
K020	16	L018	20	L209	19			M116	17	M233	18	N015	20	N205	19
K021	16	L019	20	L210	19	M000	16	M117	17	M300	16	N016	20	N206	19
K040	16	L020	20	L211	19	M001	16	M118	17	M301	16	N017	20	N207	19
K041	16	L021	20	L212	20	M002	16	M119	17	M302	16	N018	20	N208	19
K120	16	L022	20	L213	20	M003	16	M120	17	M303	16	N019	20	N209	19
K121	16	L023	20	L214	20	M004	16	M121	17	M304	16	N020	20	N210	19
K140	16	L024	21	L215	20	M005	16	M122	17	M305	16	N021	20	N211	19
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K241	16	L030	21	L220	20	M010	17	M127	18	M310	17	N026	21	N216	20
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L001	19	L122	20	L313	20	M033	18	M216	17	M333	18	N119	20	N308	19
L002	19	L123	20	L314	20	M100	16	M217	17			N120	20	N309	19
L003	19	L124	21	L315	20	M101	16	M218	17	N000	19	N121	20	N310	19
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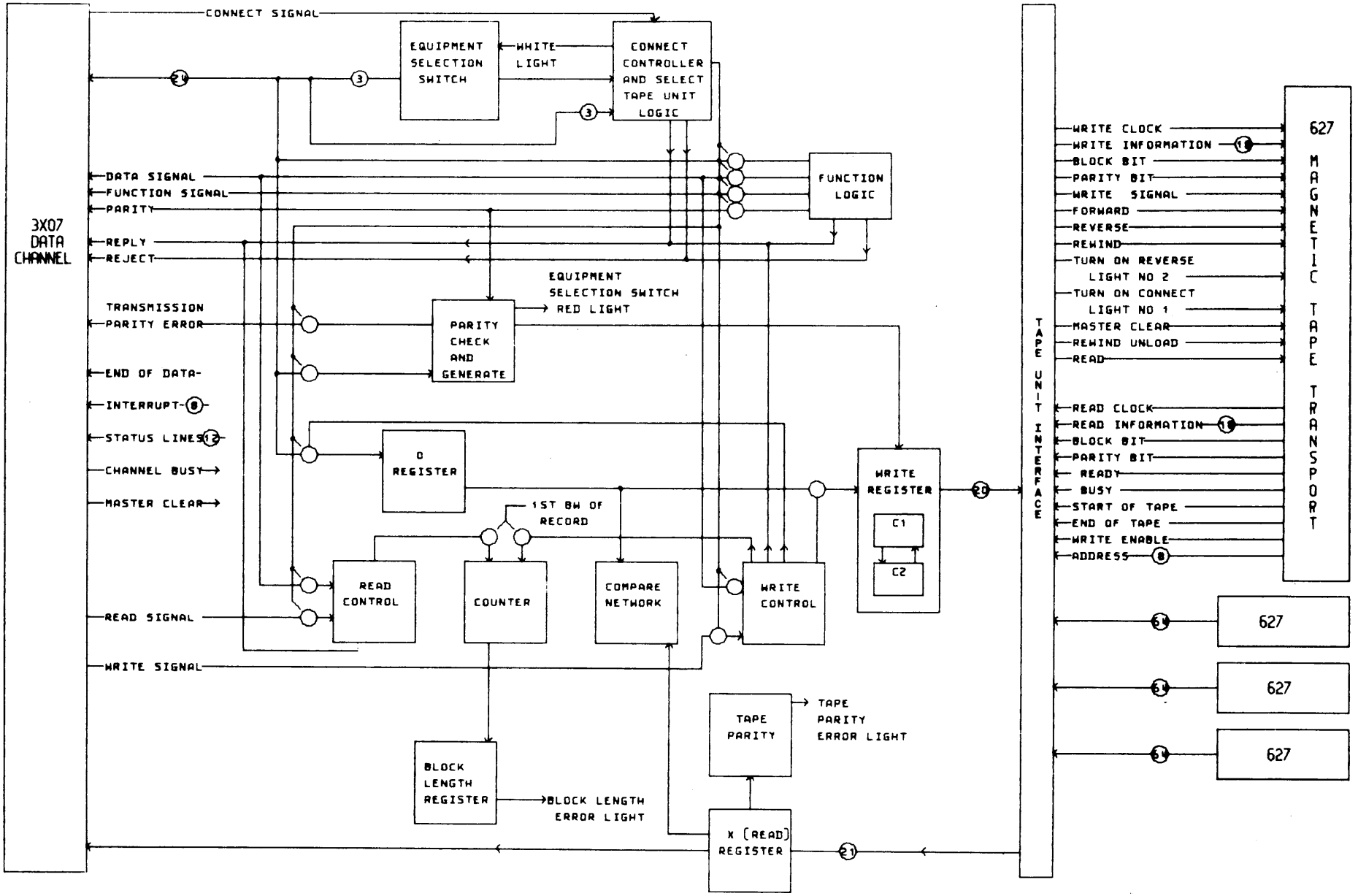


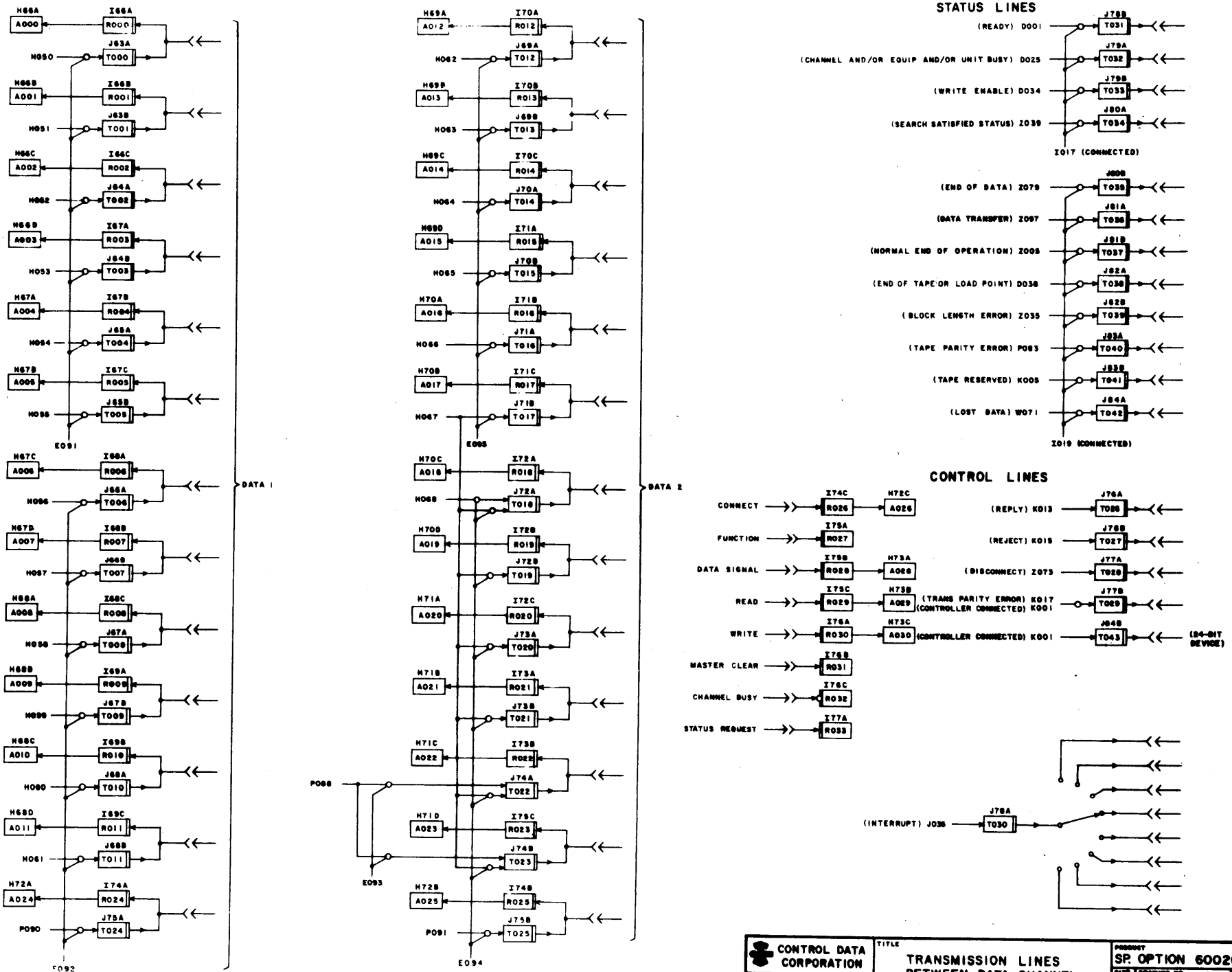
CONTROL DATA CORPORATION	TITLE: MAGNETIC TAPE CONTROLLER BLOCK DIAGRAM	PRODUCT: SP. OPT. 60026	
DEVELOPMENT DIVISION AUTOMATED DRAFTING		DRAWING NO: 38705100	REV
		TAPE NO: 6336	SHEET: 1-1 PAGE: 4-9

TERM	LOC'N	SHEET	DESCRIPTION
D001	C51B	5	
D025	E81B	5	
D034	E60B	8	
D038	I63B	5	
E091	I65A	11	
E092	I65B	11	
E093	I84A	11	
E094	I84B	11	
H050	I78A	13	
H051	I78B	13	
H052	I78C	13	
H053	I78D	13	

TERM	LOC'N	SHEET	DESCRIPTION
H054	I79A	13	
H055	I79B	13	
H056	I79C	13	
H057	I79D	13	
H058	I80A	13	
H059	I80B	13	
H060	I80C	13	
H061	I80D	13	
H062	I81A	13	
H063	I81B	13	
H064	I81C	13	
H065	I81D	13	

TERM	LOC'N	SHEET	DESCRIPTION
H066	I82A	13	
H067	I82B	13	
H068	I82C	13	
I017	B55A	3	
I019	B55B	3	
J035	C65A	6	
K001	B56C	3	
K005	B51C	3	
K013	B69A	3	
K015	B71A	3	
K017	J51C	2	

TERM	LOC'N	SHEET	DESCRIPTION
P083	J85C	14	
P088	I83C	13	
P090	J87C	14	
P091	J87D	14	
W071	E67A	8	
Z005	B61C	6	
Z035	G83A	12	
Z039	H75C	12	
Z073	C85C	11	
Z079	C84C	11	
Z097	C90C	11	



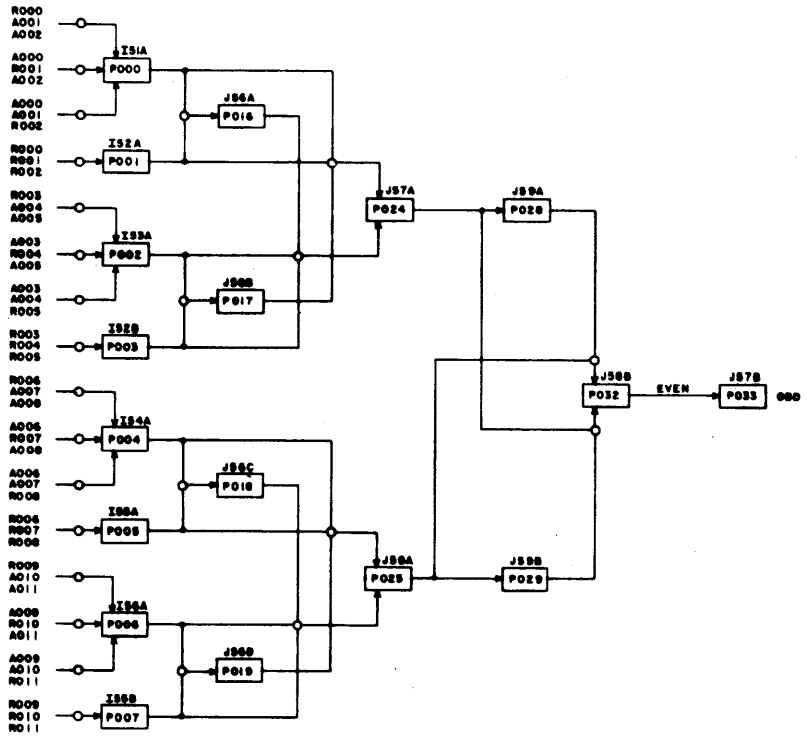
CONTROL DATA CORPORATION	TITLE: TRANSMISSION LINES BETWEEN DATA CHANNEL AND CONTROLLER	PRODUCT: SP. OPTION 60026	
COMPUTER DIVISION		SIZE: C	DRAWING NO.: 38705100
		SHEET: 1	PAGE: 4-11

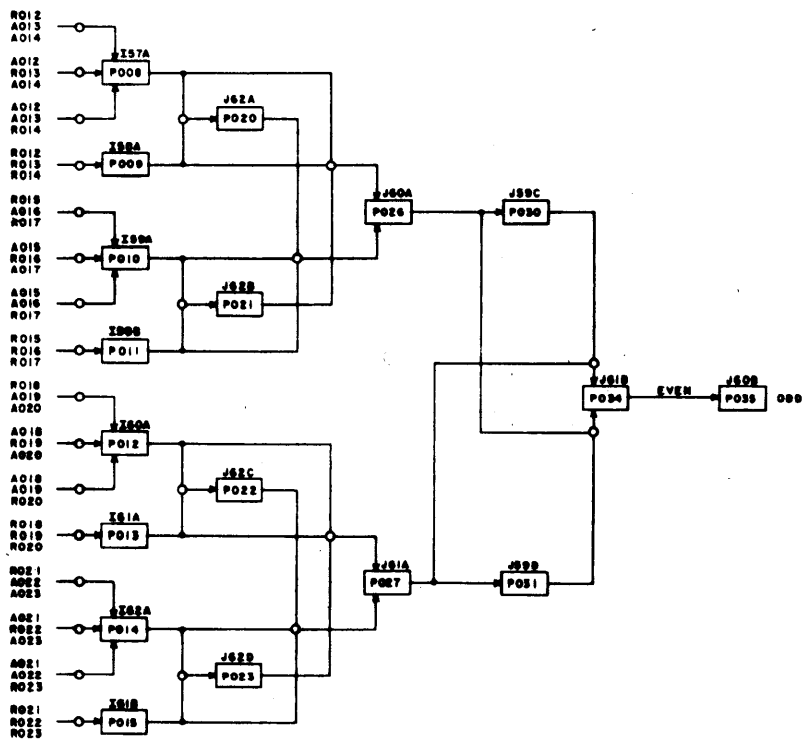
TERM	LOC'N	SHEET	DESCRIPTION
A000	H66A	1	
A001	H66B	1	
A002	H66C	1	
A003	H66D	1	
A004	H67A	1	
A005	H67B	1	
A006	H67C	1	
A007	H67D	1	
A008	H68A	1	
A009	H68B	1	
A010	H68C	1	
A011	H68D	1	
A012	H69A	1	
A013	H69B	1	
A014	H69C	1	

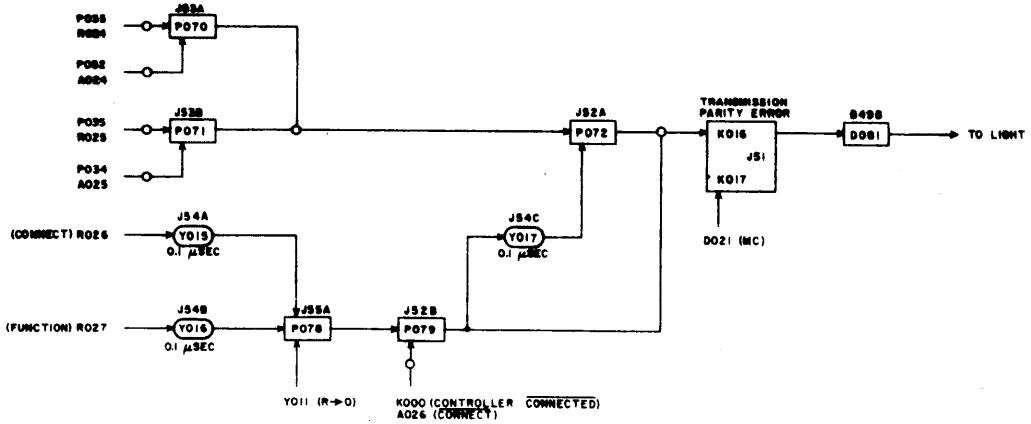
TERM	LOC'N	SHEET	DESCRIPTION
A015	H69D	1	
A016	H70A	1	
A017	H70B	1	
A018	H70C	1	
A019	H70D	1	
A020	H71A	1	
A021	H71B	1	
A022	H71C	1	
A023	H71D	1	
A024	H72A	1	
A025	H72B	1	
A026	H72C	1	
D021	C91A	5	
K000	B56A	3	
R000	I66A	1	

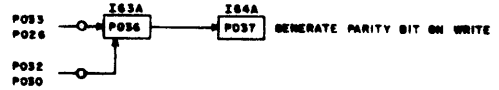
TERM	LOC'N	SHEET	DESCRIPTION
R001	I66B	1	
R002	I66C	1	
R003	I67A	1	
R004	I67B	1	
R005	I67C	1	
R006	I68A	1	
R007	I68B	1	
R008	I68C	1	
R009	I69A	1	
R010	I69B	1	
R011	I69C	1	
R012	I70A	1	
R013	I70B	1	
R014	I70C	1	

TERM	LOC'N	SHEET	DESCRIPTION
R015	I71A	1	
R016	I71B	1	
R017	I71C	1	
R018	I72A	1	
R019	I72B	1	
R020	I72C	1	
R021	I73A	1	
R022	I73B	1	
R023	I73C	1	
R024	I74A	1	
R025	I74B	1	
R026	I74C	1	
R027	I75A	1	
Y011	D68A	8	









CONTROL DATA CORPORATION
COMPUTER DIVISION

TITLE
CHECK TRANSMISSION PARITY, GENERATE WRITE PARITY

PRODUCT
SP. OPTION 60026

SIZE	DRAWING NO.	REV
C	38705100	

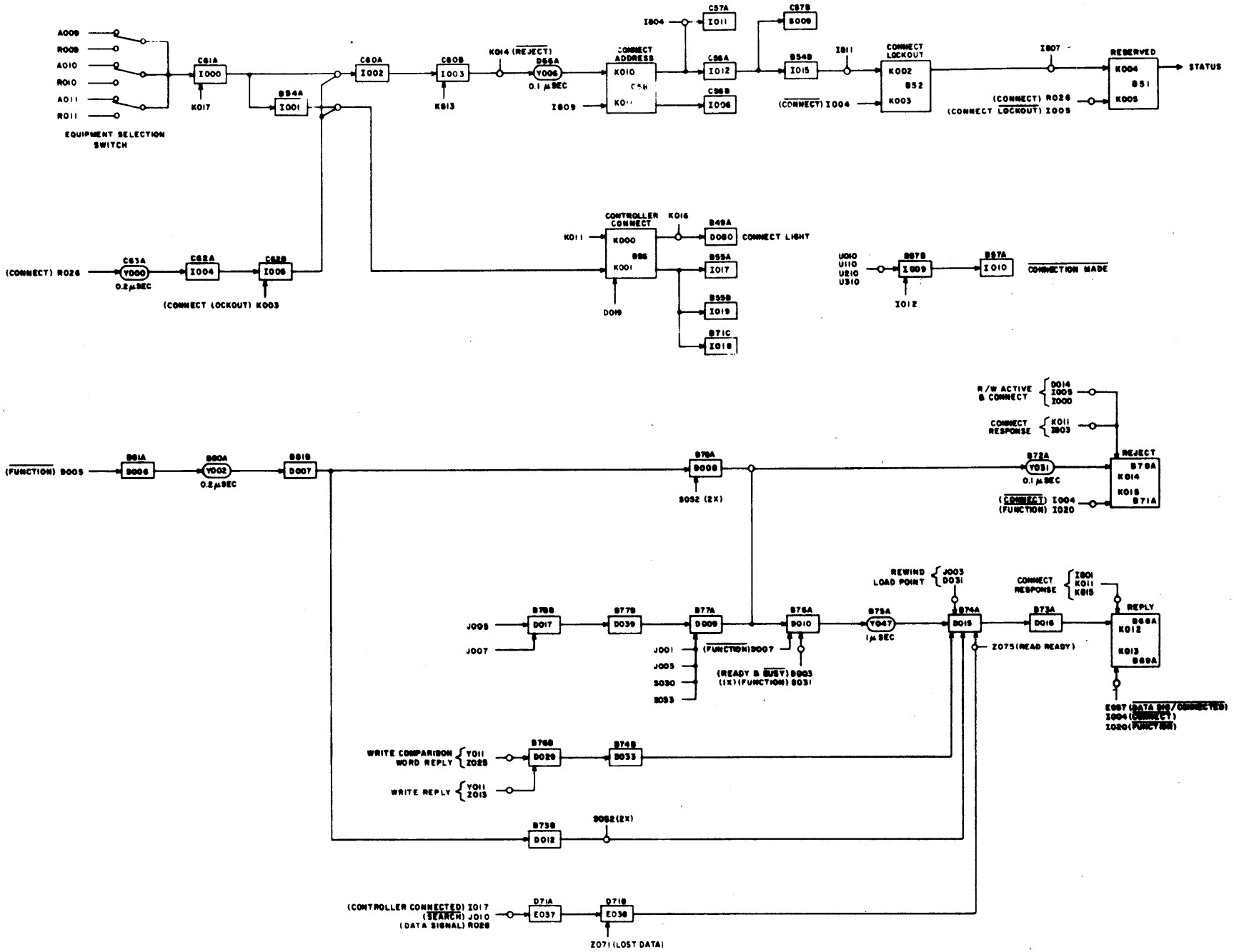
SHEET 2 PAGE 4-13

TERM	LOC'N	SHEET	DESCRIPTION
A009	H68B	1	
A010	H68C	1	
A011	H68D	1	
D003	C52B	5	
D005	D77B	5	
D014	D87B	5	
D019	C91A	5	
D031	C54A	8	
I807	K65A	4	
I811	K74A	4	

TERM	LOC'N	SHEET	DESCRIPTION
I020	D77A	5	
J001	B84C	5	
J003	B85C	5	
J005	B86C	5	
J007	B87C	5	
J010	B90B	5	
K016	J51A	2	
K017	J51C	2	
K813	K77C	4	
K815	K75C	4	

TERM	LOC'N	SHEET	DESCRIPTION
R009	I69A	1	
R010	I69B	1	
R011	I69C	1	
R026	I74C	1	
R028	I75B	1	
S030	G75A	5	
S031	G76A	5	
S033	G75B	5	
S052	H74A	5	

TERM	LOC'N	SHEET	DESCRIPTION
U010	C22B	16	
U110	F22B	16	
U210	I22B	16	
U310	L22B	16	
Y011	D68A	8	
Z013	D67C	8	
Z025	D58C	8	
Z071	E68A	8	
Z075	D90A	11	



CONTROL DATA CORPORATION

COMPUTER DIVISION

TITLE: CONNECT, REPLY & REJECT

PRODUCT: SP OPTION 60026

SIZE: C | DRAWING NO.: 38705100 | REV:

SHEET: 3 | PAGE: 4-15

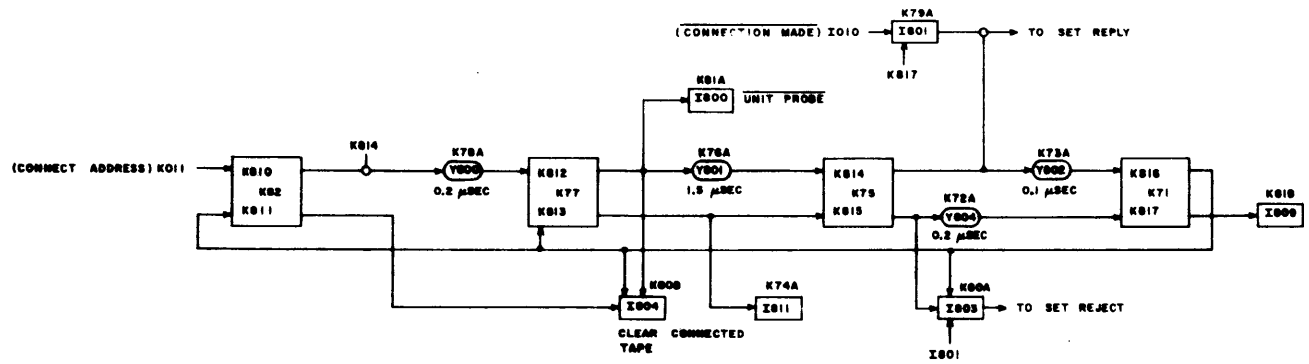
TERM	LOC'N	SHEET	DESCRIPTION
I010	B57A	3	
U020	C21B	16	

TERM	LOC'N	SHEET	DESCRIPTION
U120	F21B	16	
U220	I21B	16	

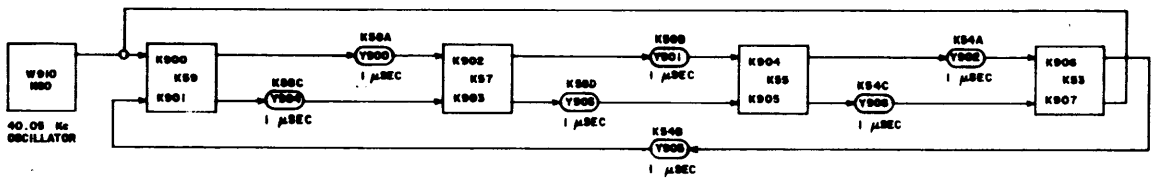
TERM	LOC'N	SHEET	DESCRIPTION
U320	L21B	16	

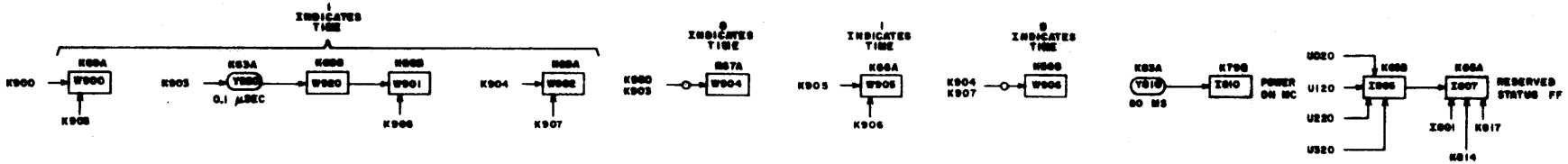
TERM	LOC'N	SHEET	DESCRIPTION
W910	K60A	4	

CONNECT CHAIN



WRITE OSCILLATOR





CONTROL DATA CORPORATION	TITLE: CONNECT CHAIN, WRITE OSCILLATOR, POWER ON MASTER CLEAR	PRODUCT: SP. OPTION 60026	
COMPUTER DIVISION		SIZE: C	DRAWING NO.: 38705100
		SHEET: 4	PAGE: 4-17

TERM	LOC'N	SHEET	DESCRIPTION
A000	H66A	1	
A001	H66B	1	
A002	H66C	1	
A003	H66D	1	
A004	H67A	1	
D007	B81B	3	
I017	B55A	3	
I018	B71C	3	
I810	K79B	4	

TERM	LOC'N	SHEET	DESCRIPTION
J025	D70B	6	
K013	B69A	3	
K015	B71A	3	
K017	J51C	2	
R000	I66A	1	
R001	I66B	1	
R002	I66C	1	
R003	I67A	1	
R004	I67B	1	

TERM	LOC'N	SHEET	DESCRIPTION
R005	I67C	1	
R027	I75A	1	
R031	I76B	1	
R032	I76C	1	
U030	C42A	17	
U032	C41A	17	
U078	J44A	18	
Z006	C55A	8	

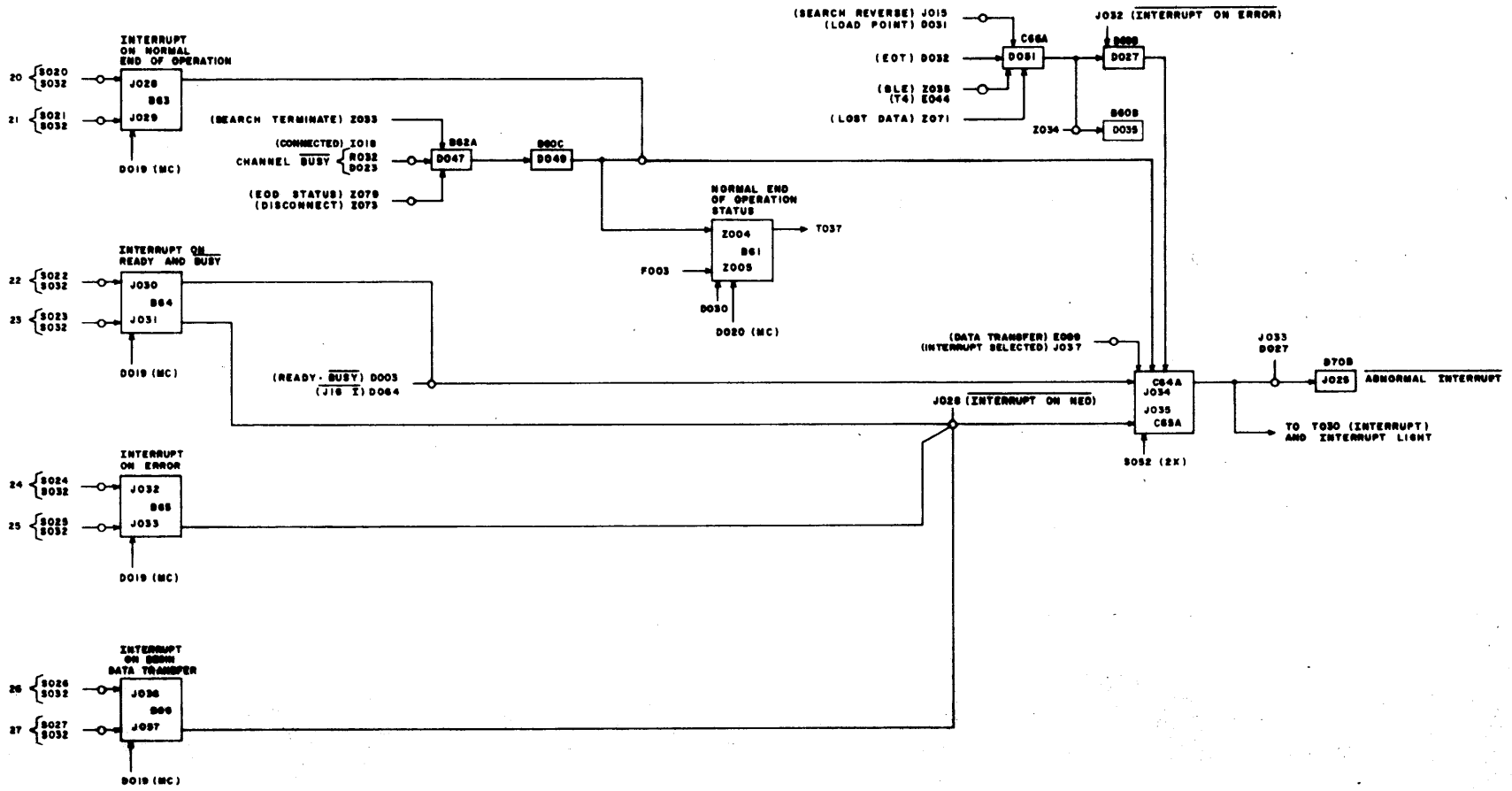
TERM	LOC'N	SHEET	DESCRIPTION
Z021	D56A	8	
Z023	D51C	8	
Z043	D85C	11	
Z044	D82A	11	
Z045	D82C	11	
Z049	E77C	11	
Z065	E75C	11	
Z070	E69A	8	

TERM	LOC'N	SHEET	DESCRIPTION
D003	C52B	5	
D019	C91A	5	
D020	C91B	5	
D023	D87A	5	
D030	C69B	5	
D031	C54A	8	
D032	C54B	5	
D064	C80A	7	

TERM	LOC'N	SHEET	DESCRIPTION
E044	D92A	11	
E089	D74A	11	
F003	D59B	8	
J015	B91C	5	
R032	I76C	1	
S020	G71A	5	
S021	G71B	5	

TERM	LOC'N	SHEET	DESCRIPTION
S022	G72A	5	
S023	G72B	5	
S024	G73A	5	
S025	G73B	5	
S026	G74A	5	
S027	G74B	5	
S032	G76B	5	

TERM	LOC'N	SHEET	DESCRIPTION
S052	H74A	5	
T029	J77B	1	
Z033	F90C	12	
Z035	G83A	12	
Z071	E68A	8	
Z073	C85C	11	
Z079	C84C	11	
Z034	G84A	12	



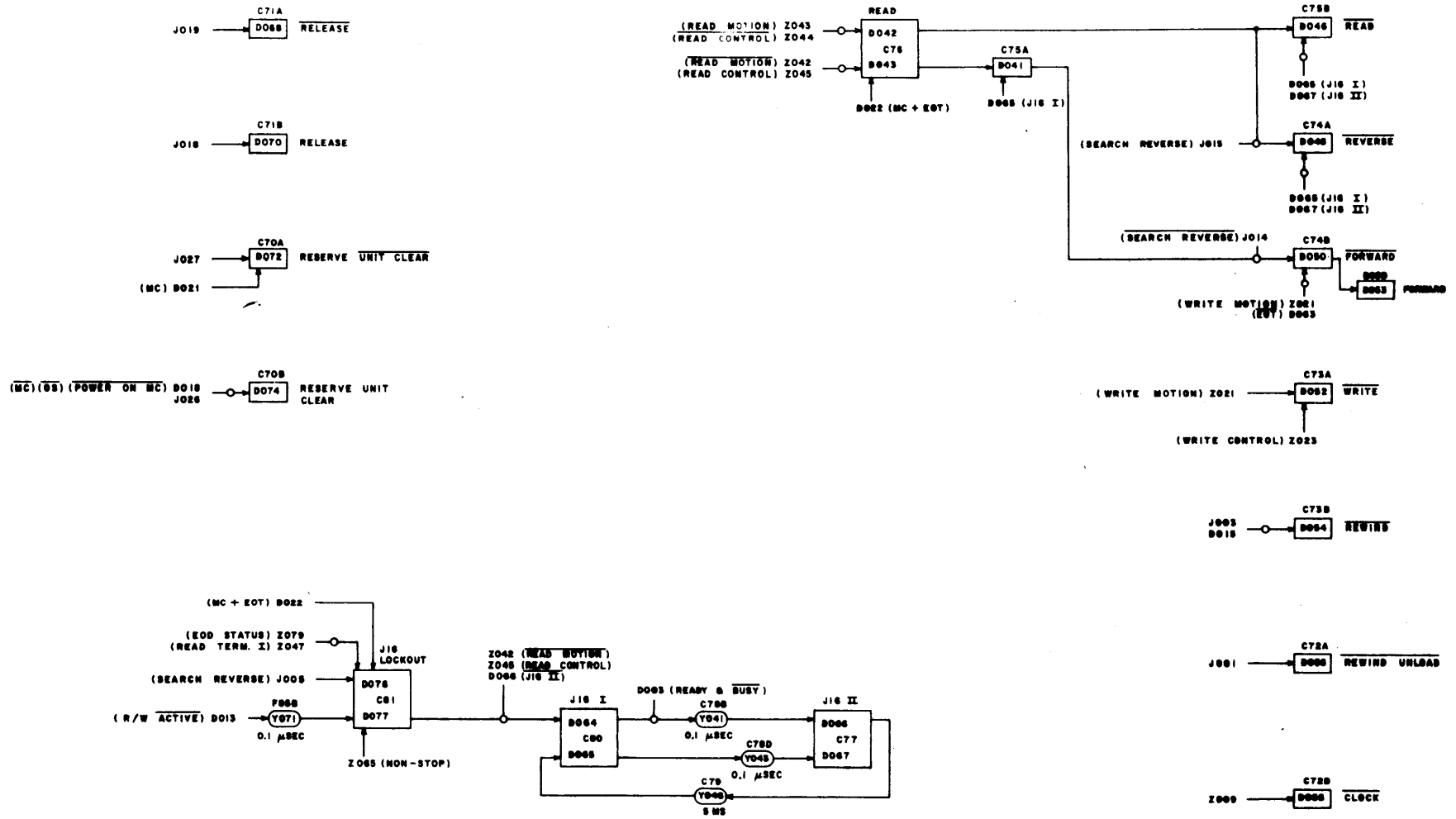
CONTROL DATA CORPORATION	TITLE: INTERRUPTS	PRODUCT: SP. OPTION 60026	
COMPUTER DIVISION		SIZE: C	DRAWING NO.: 38705100 REV: C
			SHEET: 6 PAGE: 4-21

TERM	LOC'N	SHEET	DESCRIPTION
D003	C52B	5	
D013	D76B	5	
D015	B74A	3	
D018	C92A	5	
D021	C91C	5	
D022	C91D	5	
D063	B60A	5	

TERM	LOC'N	SHEET	DESCRIPTION
J001	B84C	5	
J003	B85C	5	
J005	B86C	5	
J014	B91A	5	
J015	B91C	5	
J018	B89A	5	
J019	B89C	5	

TERM	LOC'N	SHEET	DESCRIPTION
J026	B88A	5	
J027	B88C	5	
Z009	D64C	8	
Z021	D56A	8	
Z023	D51C	8	
Z042	D85A	11	

TERM	LOC'N	SHEET	DESCRIPTION
Z043	D85C	11	
Z044	D82A	11	
Z045	D82C	11	
Z047	E80C	11	
Z065	E75C	11	
Z079	C84C	11	



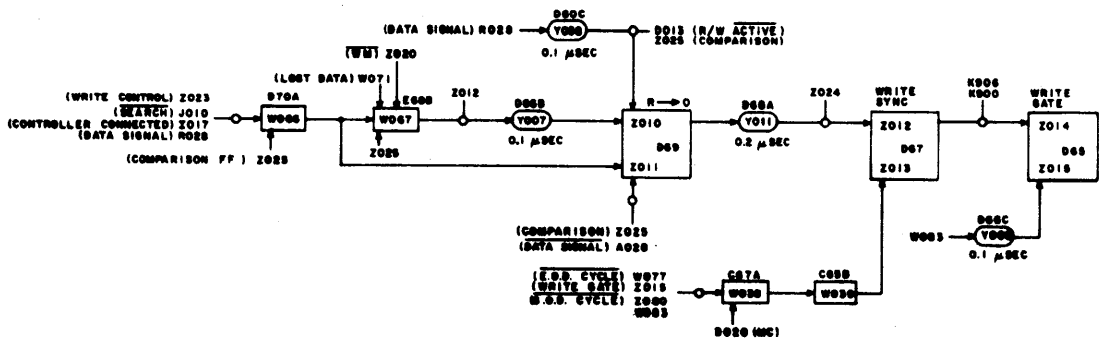
CONTROL DATA CORPORATION COMPUTER DIVISION	TITLE TAPE FUNCTIONS	PRODUCT SP. OPTION 60026	
		SIZE C	DRAWING NO. 38705100 REV
			SHEET 7 PAGE 4-23

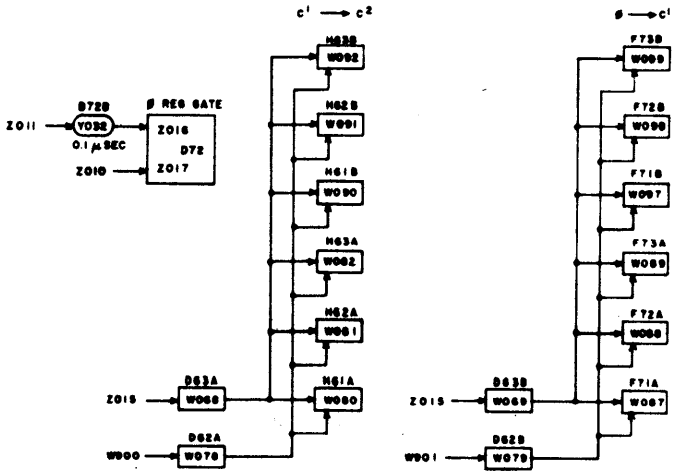
TERM	LOC'N	SHEET	DESCRIPTION
A016	H70A	1	
A017	H70B	1	
A018	H70C	1	
A028	H73A	1	
A030	H73C	1	
C087	H60B	10	
D002	C52A	5	
D013	D76B	5	
D020	C91B	5	
D021	C91C	5	

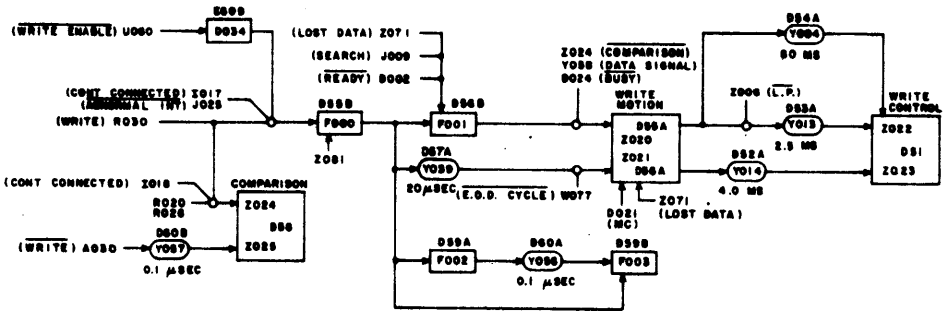
TERM	LOC'N	SHEET	DESCRIPTION
D024	E81A	5	
E000	F84B	11	
I005	C62B	3	
I017	B55A	3	
I018	B71C	3	
I021	D76A	5	
I810	K79B	4	
J009	B90A	5	
J010	B90B	5	
J025	D70B	6	

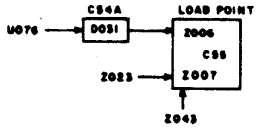
TERM	LOC'N	SHEET	DESCRIPTION
J038	B83A	5	
J039	B83C	5	
K900	K59A	4	
K906	K53A	4	
R016	I71B	1	
R018	I72A	1	
R020	I72C	1	
R028	I75B	1	
U076	I39A	18	
U080	J43A	18	

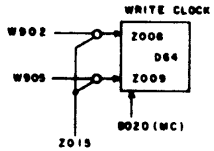
TERM	LOC'N	SHEET	DESCRIPTION
W900	K69A	4	
W901	K69B	4	
W902	K68A	4	
W905	K66A	4	
W906	K66B	4	
Z043	D85C	11	
Z075	D90A	11	
Z077	C83C	11	
Z087	C89A	11	



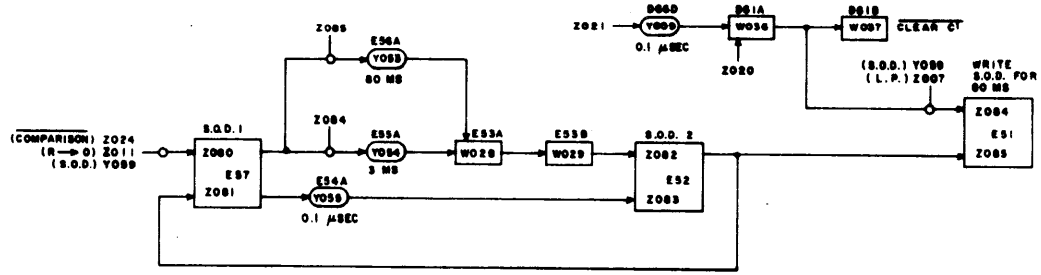




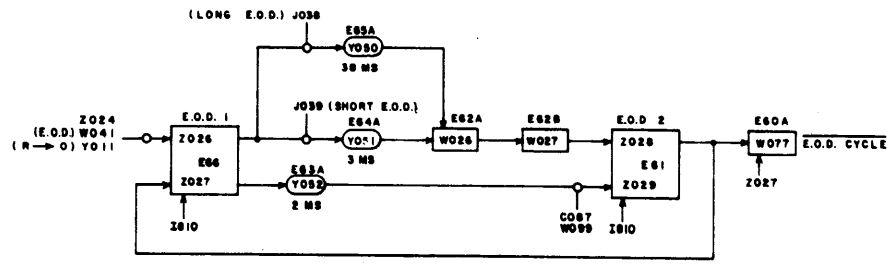




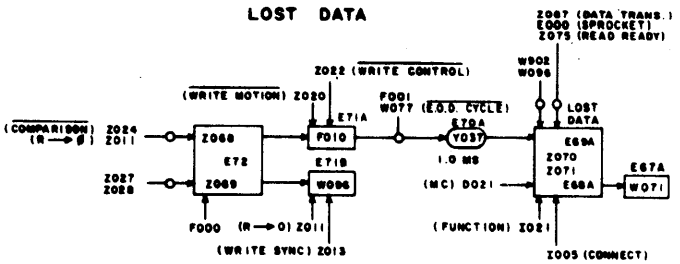
S.O.D.

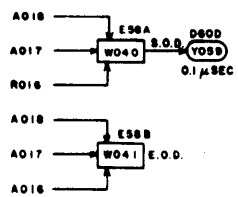


E.O.D.



LOST DATA





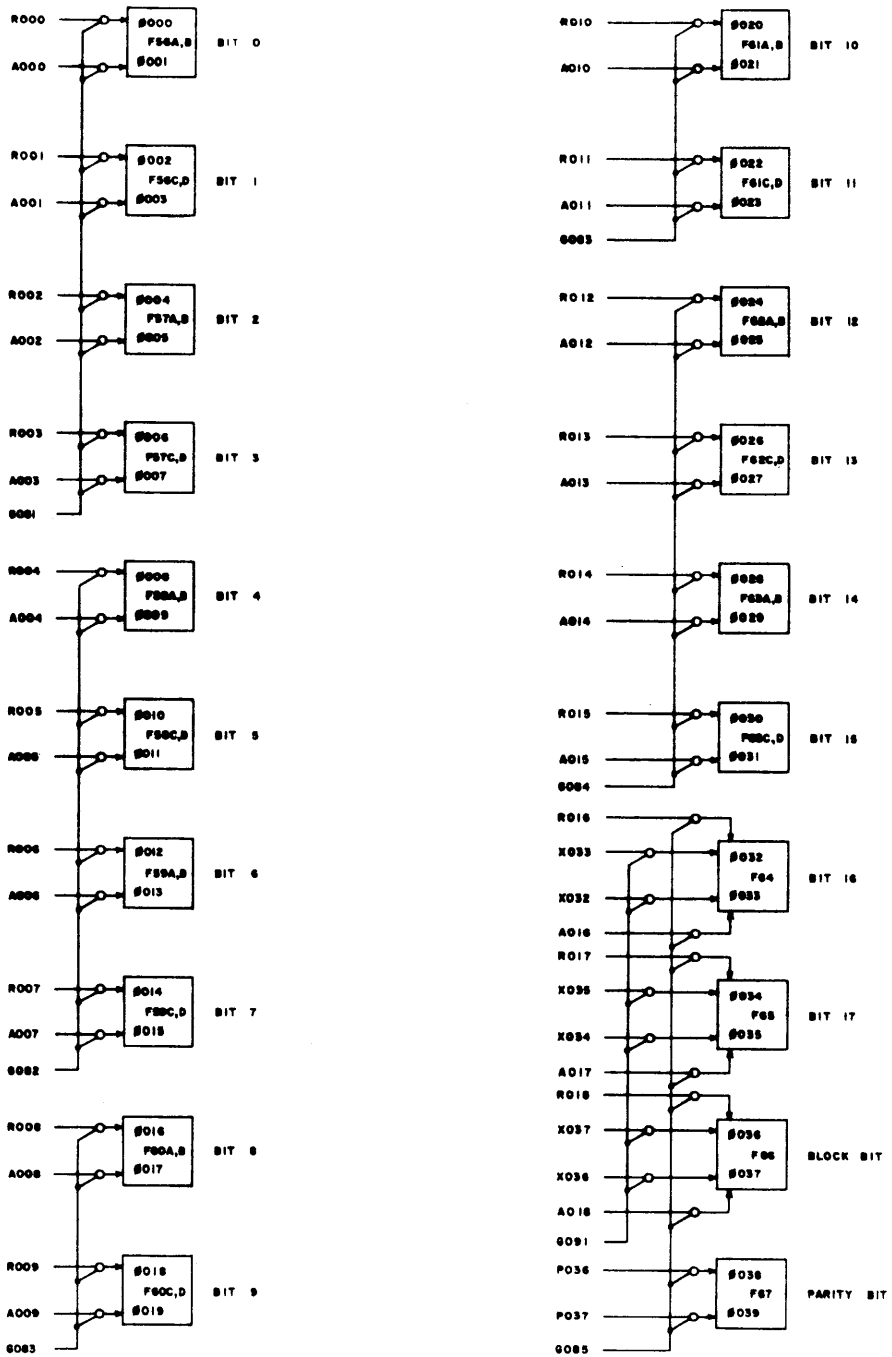
CONTROL DATA CORPORATION COMPUTER DIVISION	TITLE WRITE CONTROL	PRODUCT SP. OPTION 60026	
		SIZE C	DRAWING NO. 38705100
		SHEET 8	PAGE 4-25

TERM	LOC'N	SHEET	DESCRIPTION
A000	H66A	1	
A001	H66B	1	
A002	H66C	1	
A003	H66D	1	
A004	H67A	1	
A005	H67B	1	
A006	H67C	1	
A007	H67D	1	
A008	H68A	1	
A009	H68B	1	
A010	H68C	1	
A011	H68D	1	
A012	H69A	1	
A013	H69B	1	

TERM	LOC'N	SHEET	DESCRIPTION
A014	H69C	1	
A015	H69D	1	
A016	H70A	1	
A017	H70B	1	
A018	H70C	1	
E038	D71B	3	
P036	I63A	2	
P037	I64A	2	
P080	J86A	14	
R000	I66A	1	
R001	I66B	1	
R002	I66C	1	
R003	I67A	1	

TERM	LOC'N	SHEET	DESCRIPTION
R004	I67B	1	
R005	I67C	1	
R006	I68A	1	
R007	I68B	1	
R008	I68C	1	
R009	I69A	1	
R010	I69B	1	
R011	I69C	1	
R012	I70A	1	
R013	I70B	1	
R014	I70C	1	
R015	I71A	1	
R016	I71B	1	

TERM	LOC'N	SHEET	DESCRIPTION
R017	I71C	1	
R018	I72A	1	
W032	H81A	12	
X032	H93A	13	
X033	H93B	13	
X034	H93C	13	
X035	H93D	13	
X036	H94A	13	
X037	H94B	13	
Z011	D69C	8	
Z016	D72A	8	
Z075	D90A	11	
Z087	C89A	11	



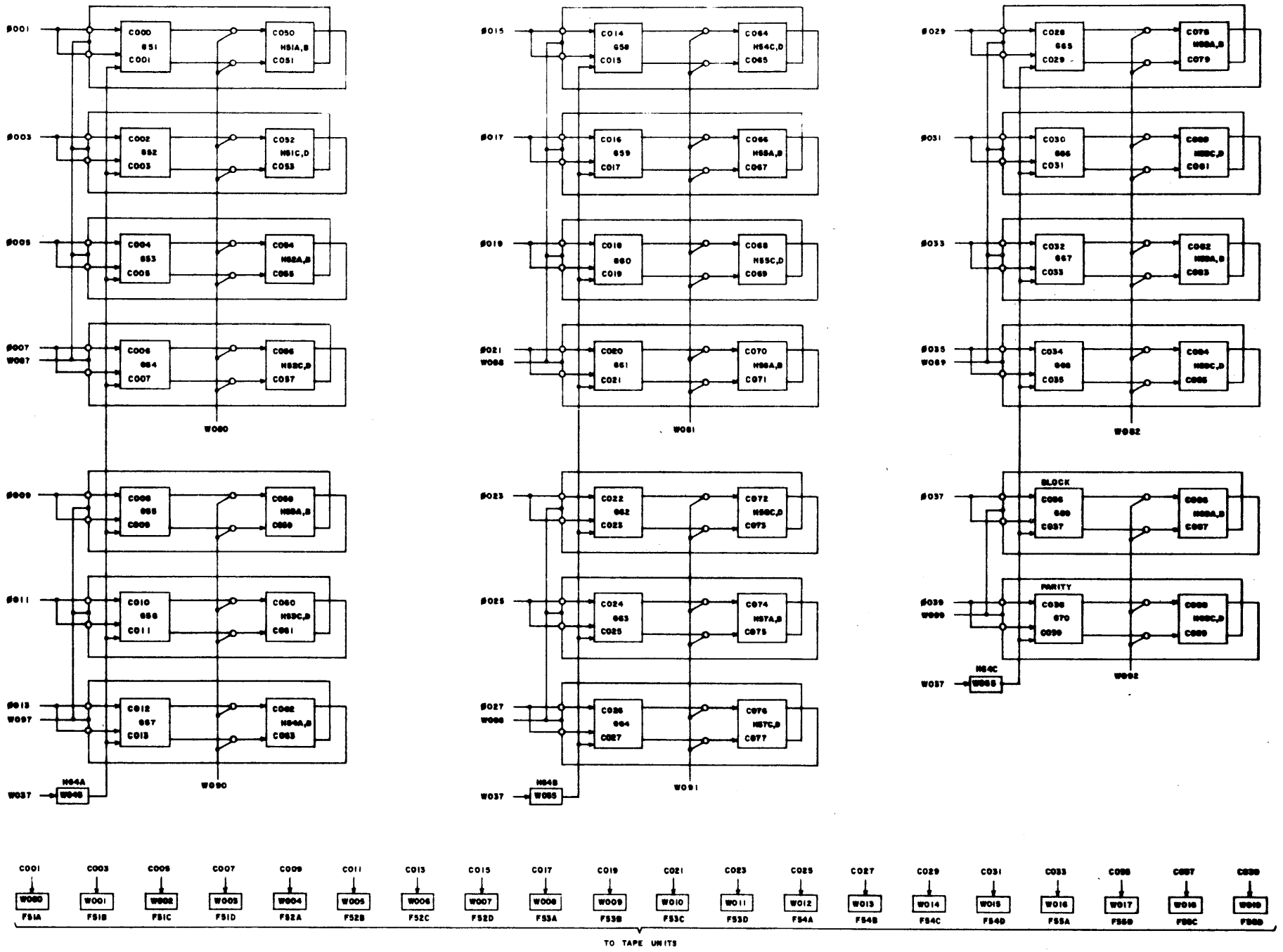
CONTROL DATA CORPORATION	TITLE: Ø REGISTER	PRODUCT: SP. OPTION 60026	
COMPUTER DIVISION		SIZE: C	DRAWING NO.: 38705100
		SHEET: 9	PAGE: 4-27

TERM	LOC'N	SHEET	DESCRIPTION
O001	F56B	9	
O003	F56D	9	
O005	F57B	9	
O007	F57D	9	
O009	F58B	9	
O011	F58D	9	
O013	F59B	9	
O015	F59D	9	
O017	F60B	9	

TERM	LOC'N	SHEET	DESCRIPTION
O019	F60D	9	
O021	F61B	9	
O023	F61D	9	
O025	F62B	9	
O027	F62D	9	
O029	F63B	9	
O031	F63D	9	
O033	F64C	9	

TERM	LOC'N	SHEET	DESCRIPTION
O035	F65C	9	
O037	F66C	9	
O039	F67C	9	
W037	D61B	8	
W080	H61A	8	
W081	H62A	8	
W082	H63A	8	
W087	F71A	8	

TERM	LOC'N	SHEET	DESCRIPTION
W088	F72A	8	
W089	F73A	8	
W090	H61B	8	
W091	H62B	8	
W092	H63B	8	
W097	F71B	8	
W098	F72B	8	
W099	F73B	8	



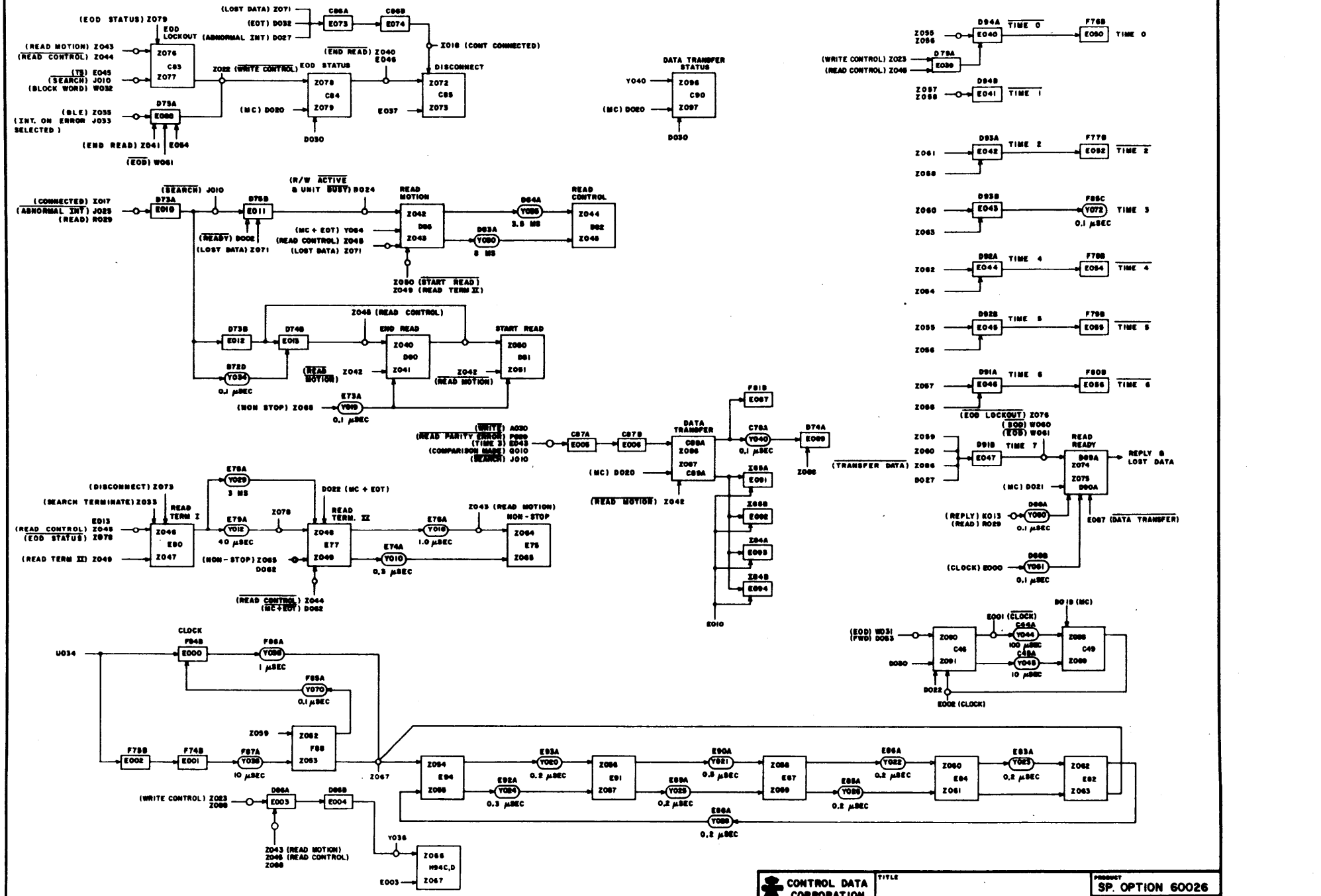
CONTROL DATA CORPORATION	TITLE: WRITE REGISTERS	PRODUCT: SP. OPTION 60026	
COMPUTER DIVISION		SIZE: C	DRAWING NO.: 38705100 REV:
		SHEET: 10	PAGE: 4-29

TERM	LOC'N	SHEET	DESCRIPTION
A030	H73C	1	
D002	C52A	5	
D019	C91A	5	
D020	C91B	5	
D021	C91C	5	
D022	C91D	5	
D024	E81A	5	
D027	C66B	6	

TERM	LOC'N	SHEET	DESCRIPTION
D030	C69B	5	
D032	C54B	5	
D053	B60D	7	
D062	C92B	5	
I017	B55A	3	
I018	B71C	3	
J010	B90B	5	
J025	D70B	6	

TERM	LOC'N	SHEET	DESCRIPTION
J033	B65C	6	
K013	B69A	3	
P089	I83D	13	
Q010	F83B	12	
R029	I75C	1	
U034	C40A	17	
W031	H82B	12	
W032	H81A	12	

TERM	LOC'N	SHEET	DESCRIPTION
W060	H78A	12	
W061	H78B	12	
Y064	C93A	5	
Z022	D51A	8	
Z023	D51C	8	
Z033	F90C	12	
Z035	G83A	12	



CONTROL DATA CORPORATION COMPUTER DIVISION	TITLE READ CONTROL	PRODUCT SP. OPTION 60026	
		SIZE C	DRAWING NO. 38705100
			REV B
		SHEET 11	PAGE 4-31

TERM	LOC'N	SHEET	DESCRIPTION
D019	C91A	5	
D020	C91B	5	
D021	C91C	5	
D030	C69B	5	
E042	D93A	11	
E043	D93B	11	
E044	D92A	11	
E046	D91A	11	
E054	F78B	11	
E055	F79B	11	
J005	B86C	5	
J007	B87C	5	
J009	B90A	5	
J010	B90B	5	
J014	B91A	5	
J015	B91C	5	
J016	B91A	5	
O000	F56A	9	
O001	F56B	9	
O002	F56C	9	
O003	F56D	9	
O004	F57A	9	
O005	F57B	9	
O006	F57C	9	
O007	F57D	9	

TERM	LOC'N	SHEET	DESCRIPTION
O008	F58A	9	
O009	F58B	9	
O010	F58C	9	
O011	F58D	9	
O012	F59A	9	
O013	F59B	9	
O014	F59C	9	
O015	F59D	9	
O016	F60A	9	
O017	F60B	9	
O018	F60C	9	
O019	F60D	9	
O020	F61A	9	
O021	F61B	9	
O022	F61C	9	
O023	F61D	9	
O024	F62A	9	
O025	F62B	9	
O026	F62C	9	
O027	F62D	9	
O028	F63A	9	
O029	F63B	9	
O030	F63C	9	
O031	F63D	9	

TERM	LOC'N	SHEET	DESCRIPTION
O032	F64A	9	
O033	F64C	9	
O034	F65A	9	
O035	F65C	9	
O036	F66A	9	
O037	F66C	9	
R030	I76A	1	
X000	H85A	13	
X001	H85B	13	
X002	H85C	13	
X003	H85D	13	
X004	H86A	13	
X005	H86B	13	
X006	H86C	13	
X007	H86D	13	
X008	H87A	13	
X009	H87B	13	
X010	H87C	13	
X011	H87D	13	
X012	H88A	13	
X013	H88B	13	
X014	H88C	13	
X015	H88D	13	
X016	H89A	13	

P081 J86B 14 →

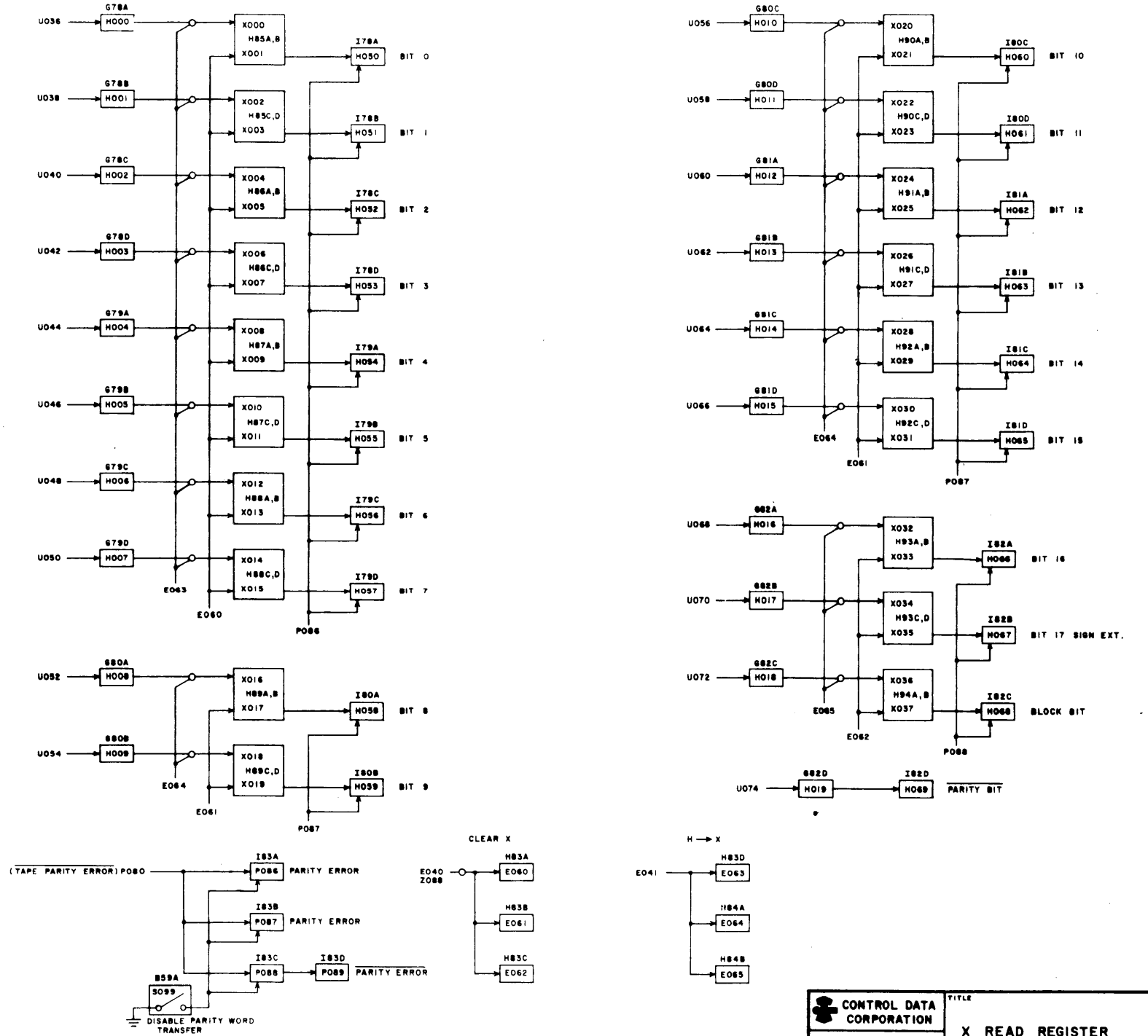
TERM	LOC'N	SHEET	DESCRIPTION
X017	H89B	13	
X018	H89C	13	
X019	H89D	13	
X020	H90A	13	
X021	H90B	13	
X022	H90C	13	
X023	H90D	13	
X024	H91A	13	
X025	H91B	13	
X026	H91C	13	
X027	H91D	13	
X028	H92A	13	
X029	H92B	13	
X030	H92C	13	
X031	H92D	13	
X032	H93A	13	
X033	H93B	13	
X034	H93C	13	
X035	H93D	13	
X036	H94A	13	
X037	H94B	13	
Y072	F85C	11	
Z020	D55A	8	
Z086	C88A	11	

TERM	LOC'N	SHEET	DESCRIPTION
E040	D94A	11	
E041	D94B	11	
P080	J86A	14	
U036	C39A	17	
U038	D42A	17	
U040	D41A	17	

TERM	LOC'N	SHEET	DESCRIPTION
U042	D40A	17	
U044	D39A	17	
U046	E42A	17	
U048	E41A	17	
U050	E40A	17	
U052	E39A	17	

TERM	LOC'N	SHEET	DESCRIPTION
U054	F43A	17	
U056	F42A	17	
U058	F41A	17	
U060	G44A	17	
U062	G43A	18	
U064	H43A	18	

TERM	LOC'N	SHEET	DESCRIPTION
U066	H42A	18	
U068	H41A	18	
U070	I42A	18	
U072	I41A	18	
U074	I40A	18	
Z088	C49A	11	



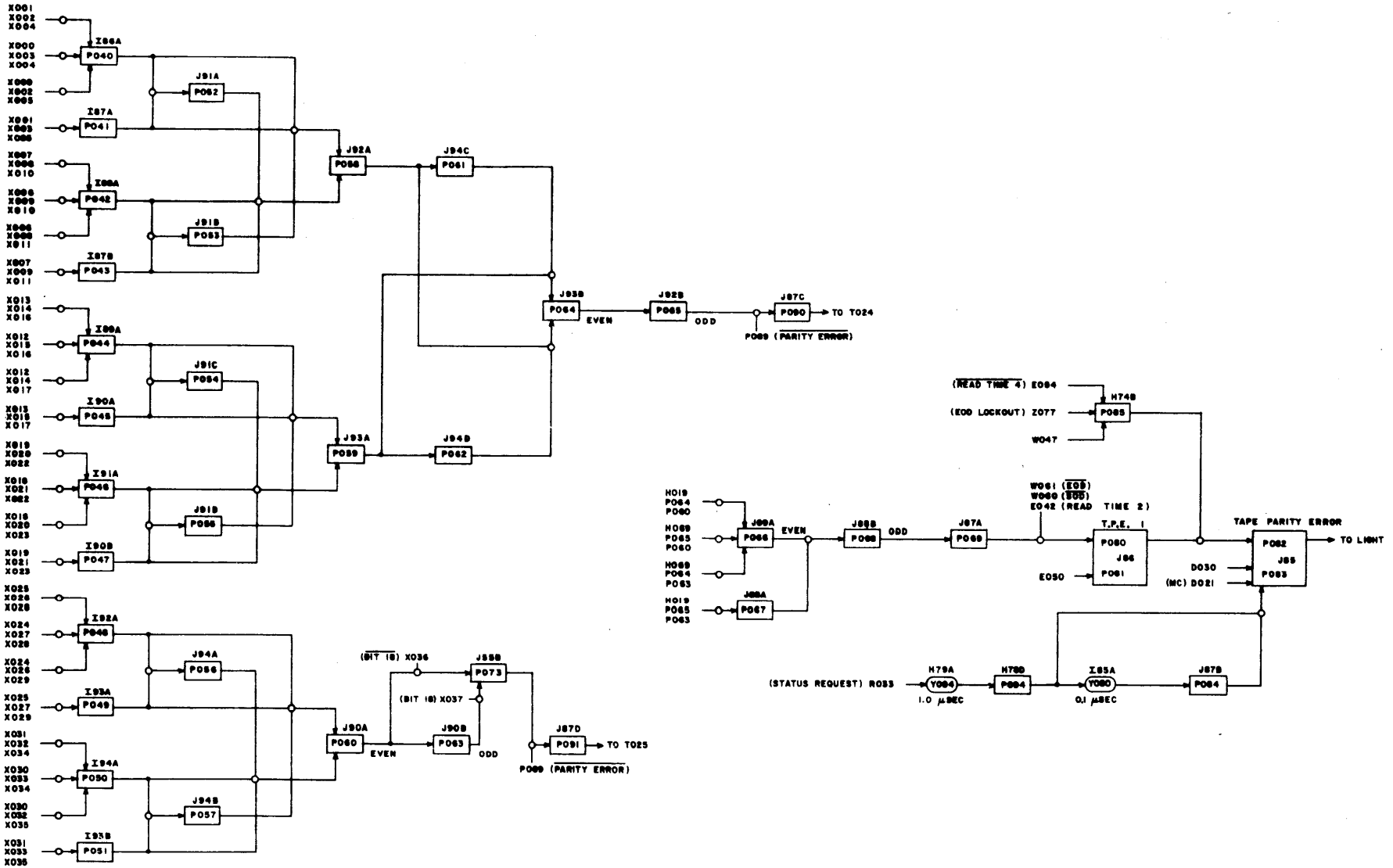
CONTROL DATA CORPORATION	TITLE: X READ REGISTER	PRODUCT: SP OPTION 60026	
COMPUTER DIVISION		SIZE: C	DRAWING NO.: 38705100 REV
		SHEET: 13	PAGE: 4-35

TERM	LOC'N	SHEET	DESCRIPTION
D021	C91C	5	
D030	C69B	5	
E042	D93A	11	
E050	F76B	11	
E054	F78B	11	
H019	G82D	13	
P089	I83D	13	
R033	I77A	1	
W047	C53B	12	
W060	H78A	12	
W061	H78B	12	
X000	H85A	13	
X001	H85B	13	

TERM	LOC'N	SHEET	DESCRIPTION
X002	H85C	13	
X003	H85D	13	
X004	H86A	13	
X005	H86B	13	
X006	H86C	13	
X007	H86D	13	
X008	H87A	13	
X009	H87B	13	
X010	H87C	13	
X011	H87D	13	
X012	H88A	13	
X013	H88B	13	
X014	H88C	13	

TERM	LOC'N	SHEET	DESCRIPTION
X015	H88D	13	
X016	H89A	13	
X017	H89B	13	
X018	H89C	13	
X019	H89D	13	
X020	H90A	13	
X021	H90B	13	
X022	H90C	13	
X023	H90D	13	
X024	H91A	13	
X025	H91B	13	
X026	H91C	13	

TERM	LOC'N	SHEET	DESCRIPTION
X027	H91D	13	
X028	H92A	13	
X029	H92B	13	
X030	H92C	13	
X031	H92D	13	
X032	H93A	13	
X033	H93B	13	
X034	H93C	13	
X035	H93D	13	
X036	H94A	13	
X037	H94B	13	
Z077	C83C	11	

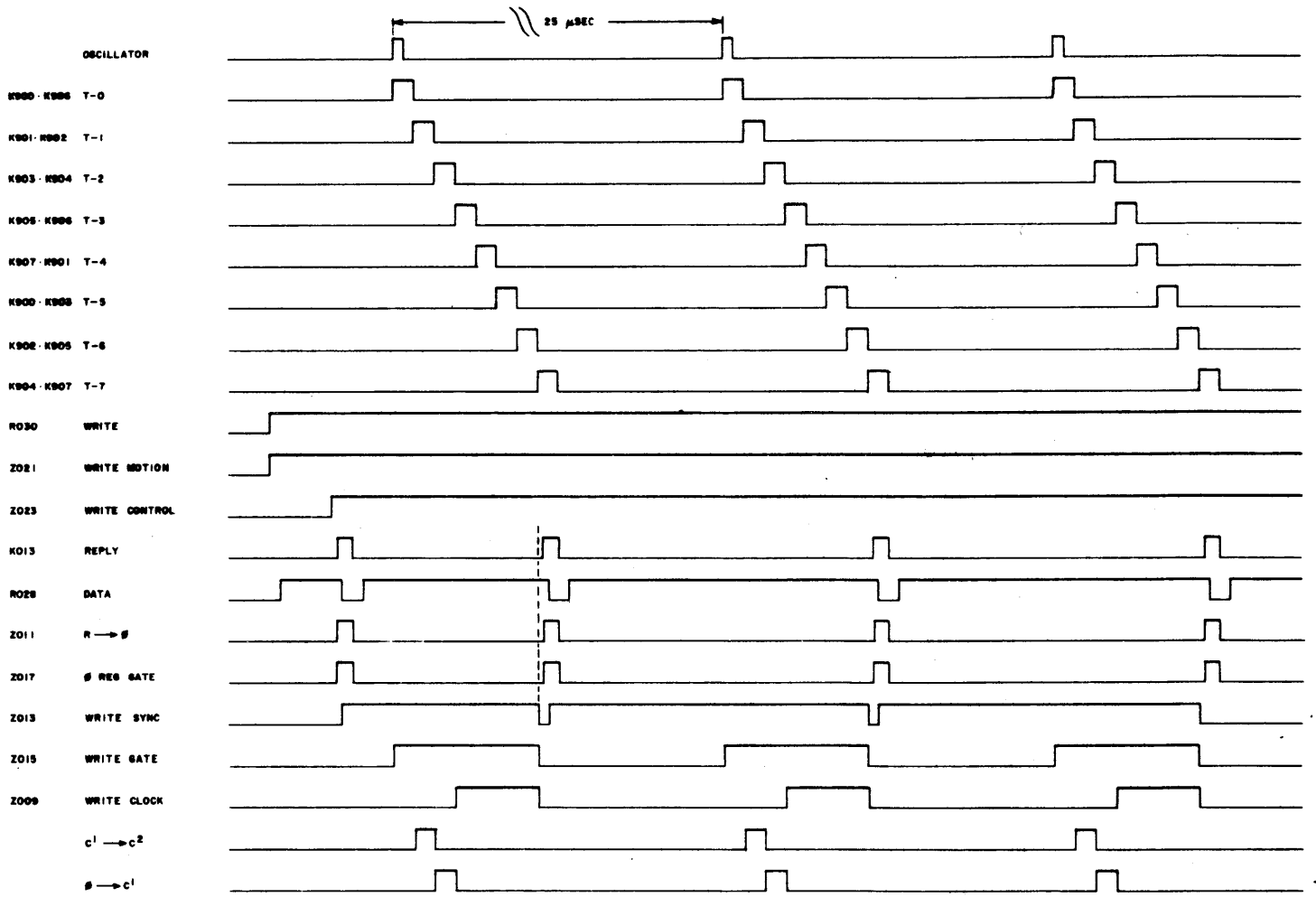


CONTROL DATA CORPORATION COMPUTER DIVISION	TITLE READ PARITY CHECK	PRODUCT SP. OPTION 60026	
		SIZE C	DRAWING NO. 38705100 REV
		SHEET 14	PAGE 4-37

WRITE SEQUENCE

The following sequence of events indicates the primary control signals which are active during a write operation. Write timing is illustrated on page 4-39.

Step	Event	Description
1a.	Write Signal	The Write signal places the connected tape unit in write status and enables write (forward tape) motion.
1b.	Data Signal	The Data signal indicates an output word is on the data channel data lines and is Ready for transfer.
2a.	R → O	The data word entered the O register from the channel. R → O FF enables a Reply signal.
2b.	Reply Signal	The 60026 indicates the receipt of the channel word which causes the channel to drop the Data signal (60026 then drops the Reply signal).
2c.	O Reg Gate	This sets 0.1 usec after the R → O FF sets, locking out further R → O transfer until the O Reg gate clears (at the same time as the R → O).
2d.	Write Sync	The Write Sync FF is enabled by the Data signal and disabled by the timing chain at time 7. R → O transfer cannot take place when the Write Sync sets.
3.	Oscillator	The oscillator sends a timing pulse once every 25 usec to enable the timing chain and subsequent data transfer.
4.	Write Gate	This sets at time 0 and clears at time 7. This enables data transfer to the C registers and to the tape.
5.	$C^1 \rightarrow C^2$	Data word transfers from the C^1 register to the C^2 register during time 1. The C^2 register conditions the C^1 register to write in the non-return to zero method.
6.	$O \rightarrow C^1$	Data transfers from the O register to the C^1 (write) register during time 2.
7.	Write Clock	Write Clock FF sets at time 3 and clears at time 7. The Write clock writes a "1" on the tape with each data word which is used for tape synchronization. If the clock bit is not present on tape, parity error occurs.

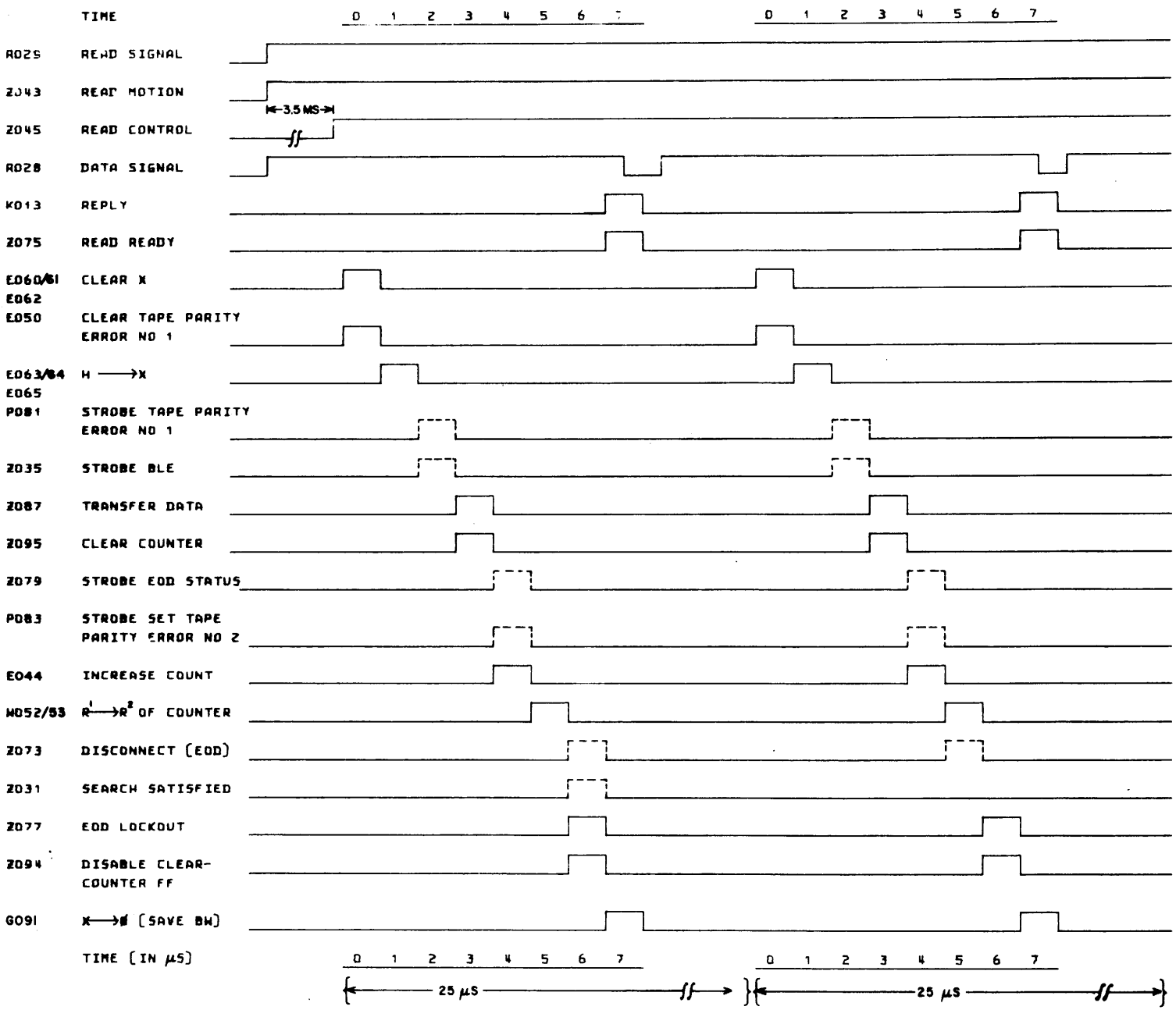


	TITLE: WRITE TIMING	PRODUCT: SPECIAL OPTION 60085	
		SIZE: C · DRAWING NO.: 38705100	REV.
		SHEET	PAGE: 4-39

READ SEQUENCE

The following sequence of events indicates the primary controls active during a read operation. Read timing is illustrated on page 4-41

Step	Event	Description
1a.	Read Signal	The Read signal places the connected tape unit in read status and enables read motion.
1b.	Data Signal	The data channel sends a Data signal to the 60026 requesting a data word from the tape. Upon receipt of a word, the Data signal drops until the channel is ready to receive another word.
1c.	Read Motion	Read tape motion begins when the 60026 receives the Read signal and Data signal from the data channel.
1d.	Clear X Register	Prior to each data word transfer, the timing chain enables the clearing of the 60026 X register.
1e.	Clear Tape Parity 1	Prior to transfer of the first data word, the timing pulse enables clearing of Tape Parity Error FF 1.
2.	H → X	During time 1 in the timing chain, the data word transfers from the tape unit to the X register in the 60026. The X register holds the data word for parity check, word count and comparison.
3a.	Transfer Data	The Transfer Data FF enables data transfer from the tape unit to the T register at time 3. When the Reply is generated at time 7, the data word passes to the channel.
3b.	Clear Counter	During time 3, prior to the transfer of the first data word to the channel, the timing chain enables clearing of the 60026 counter.
4a.	Strobe Tape Parity Error FF 2	If the tape is not at EOD and Tape Parity Error FF 1 is set, Tape Parity Error FF 2 will set at time 4, lighting the Tape Parity Error indicator.
4b.	Increase Count	Each data word increases the counter during time 4 of the timing chain.
5a.	EOD Lockout	The 60026 recognizes the End of Data word but does not transmit the word to the channel. The timing chain enables the lockout at time 6.
5b.	Disable Counter Clear FF	The Clear Counter FF must be disabled during each data word tranfer to continue counting.
6a.	Reply Signal	The 60026 indicates the transmission of the tape data word to the channel which causes the channel to drop the Data signal. (The 60026 then drops the Reply signal.)
6b.	Read Ready	The timing chain enables the Read Ready FF at time 7 if the controller does not detect a SOD word or an EOD word and a data word has been gated to the T register by the Data Transfer FF at time 3. The Read Ready enables the Reply signal to the data channel.
6c.	Save Block Word	During the transfer of each block of data, the block word is transferred from the X register to the O register. The block word is held in the O register as a reference word which may be used in a jig back to the previous block word.



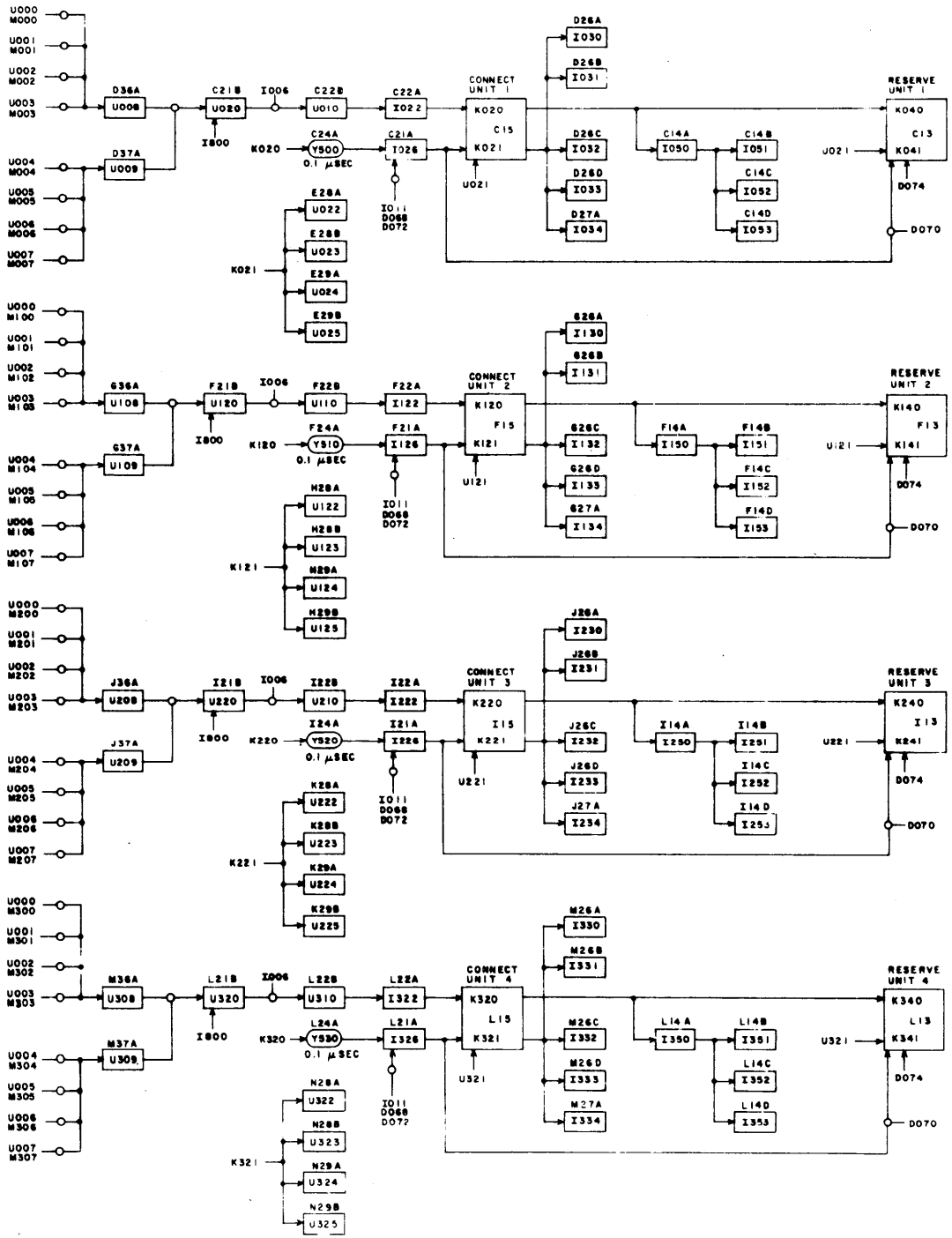
CONTROL DATA CORPORATION COMPUTER DIVISION AUTOMATED DRAFTING	TITLE: READ TIMING DIAGRAM	PRODUCT: SPEC. OPT. 60026 DRAWING NO:	REV:
		TAPE NO: 6362	SHEET: 15 PAGE: 4-41

TERM	LOC'N	SHEET	DESCRIPTION
D068	C71A	7	
D070	C71B	7	
D072	C70A	7	
D074	C70B	7	

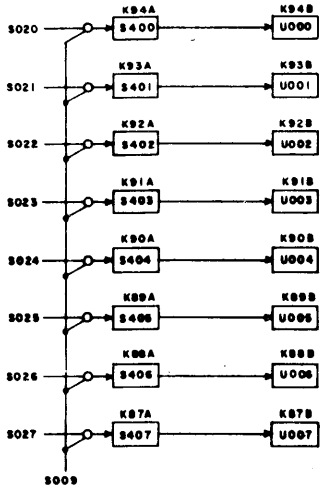
TERM	LOC'N	SHEET	DESCRIPTION
I006	C56B	3	
I011	C57A	3	
I800	K81A	4	
S009	C57B	3	

TERM	LOC'N	SHEET	DESCRIPTION
S020	G71A	5	
S021	G71B	5	
S022	G72A	5	
S023	G72B	5	

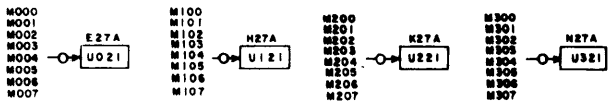
TERM	LOC'N	SHEET	DESCRIPTION
S024	G73A	5	
S025	G73B	5	
S026	G74A	5	
S027	G74B	5	



UNIT CONNECT TRANSLATIONS



UNIT 1	UNIT 2	UNIT 3	UNIT 4
E01A M000	H01A M100	K01A M200	N01A M300
E01B M001	H01B M101	K01B M201	N01B M301
E02A M002	H02A M102	K02A M202	N02A M302
E02B M003	H02B M103	K02B M203	N02B M303
E03A M004	H03A M104	K03A M204	N03A M304
E03B M005	H03B M105	K03B M205	N03B M305
E04A M006	H04A M106	K04A M206	N04A M306
E04B M007	H04B M107	K04B M207	N04B M307



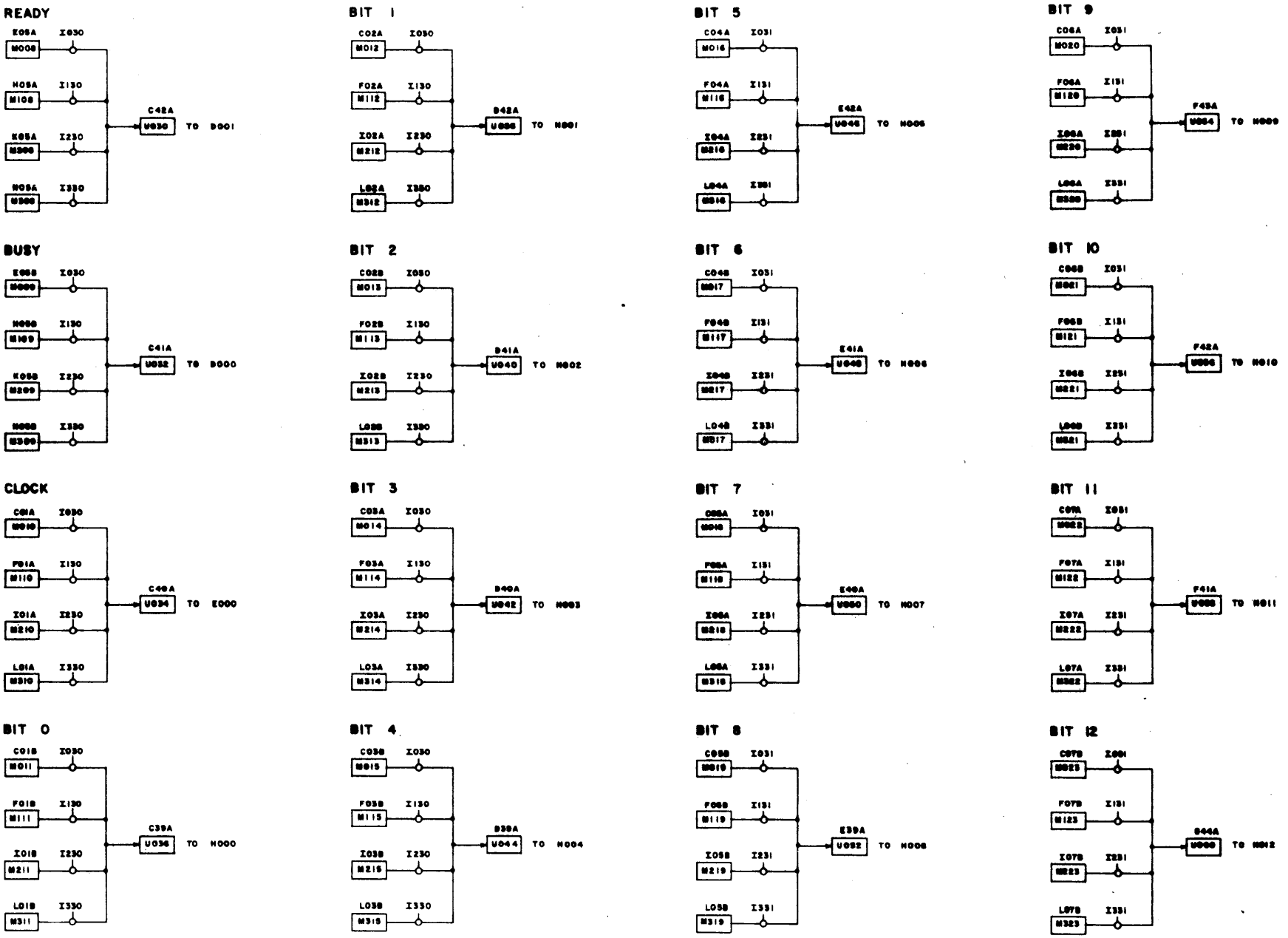
CONTROL DATA CORPORATION	TITLE: TAPE UNIT SELECTION	PRODUCT: SP. OPTION 60026	
COMPUTER DIVISION		SIZE: C	DRAWING NO.: 38705100
		SHEET: 16	PAGE: 4-43

TERM	LOC'N	SHEET	DESCRIPTION
I030	D26A	16	
I031	D26B	16	

TERM	LOC'N	SHEET	DESCRIPTION
I130	G26A	16	
I131	G26B	16	

TERM	LOC'N	SHEET	DESCRIPTION
I230	J26A	16	
I231	J26B	16	

TERM	LOC'N	SHEET	DESCRIPTION
I330	M26A	16	
I331	M26B	16	



CONTROL DATA CORPORATION	TITLE: INPUT FROM TAPE UNITS	PROJECT: SP. OPTION 60026	
COMPUTER DIVISION		SIZE: C	DRAWING NO.: 38705100
		SHEET: 17	PAGE: 4-46

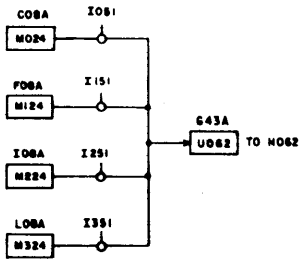
TERM	LOC'N	SHEET	DESCRIPTION
I051	C14B	16	
I052	C14C	16	

TERM	LOC'N	SHEET	DESCRIPTION
I151	F14B	16	
I152	F14C	16	

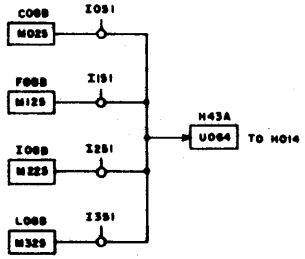
TERM	LOC'N	SHEET	DESCRIPTION
I251	I14B	16	
I252	I14C	16	

TERM	LOC'N	SHEET	DESCRIPTION
I351	L14B	16	
I352	L14C	16	

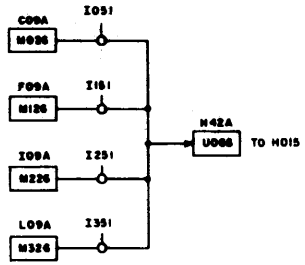
BIT 13



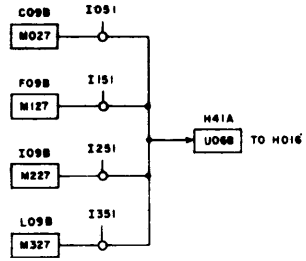
BIT 14



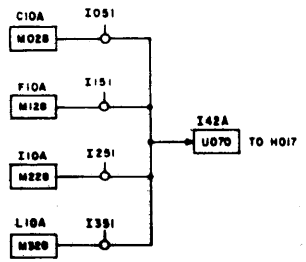
BIT 15



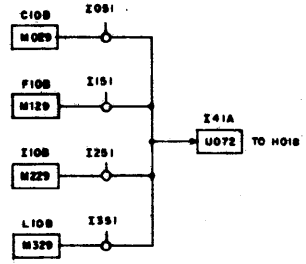
BIT 16



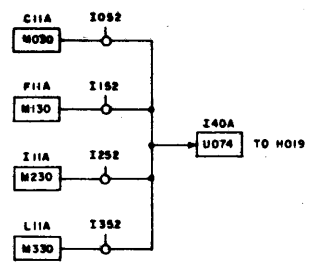
BIT 17



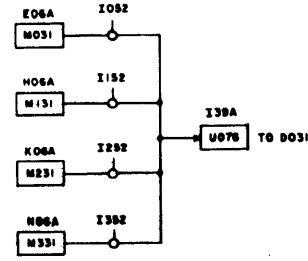
BLOCK



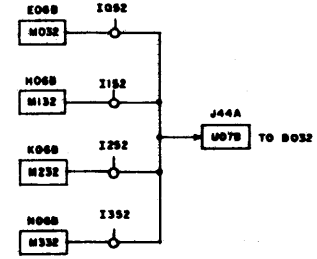
PARITY



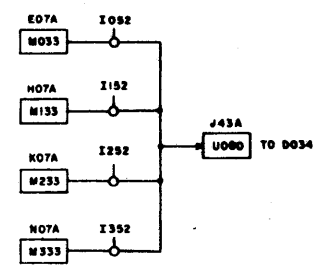
LOAD POINT



END OF TAPE



WRITE ENABLE

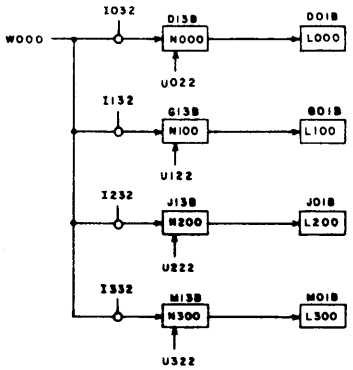


CONTROL DATA CORPORATION	TITLE: INPUT FROM TAPE UNITS	PRODUCT: SP. OPTION 60026	
COMPUTER DIVISION		SIZE: C	DRAWING NO.: 38705100 REV
			SHEET: 18 PAGE: 4-47

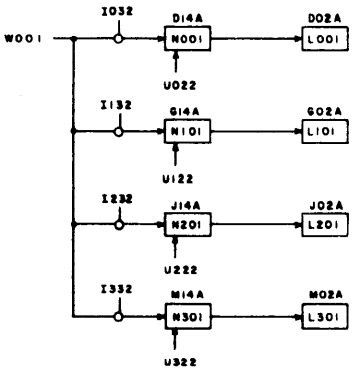
TERM	LOC'N	SHEET	DESCRIPTION		TERM	LOC'N	SHEET	DESCRIPTION
I032	D26C	16			I232	J26C	16	
I033	D26D	16			I233	J26D	16	
I132	G26C	16			I332	M26C	16	
I133	G26D	16			I333	M26D	16	

TERM	LOC'N	SHEET	DESCRIPTION		TERM	LOC'N	SHEET	DESCRIPTION
U022	E28A	16			U222	K28A	16	
U023	E28B	16			U223	K28B	16	
U122	H28A	16			U322	N28A	16	
U123	H28B	16			U323	N28B	16	

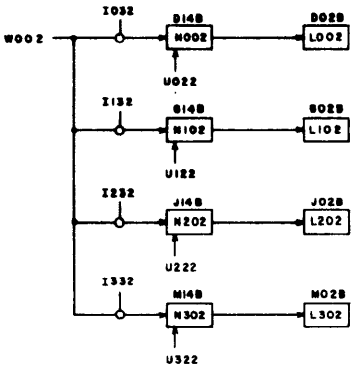
BIT 0



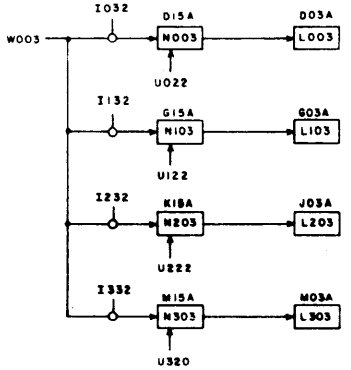
BIT 1



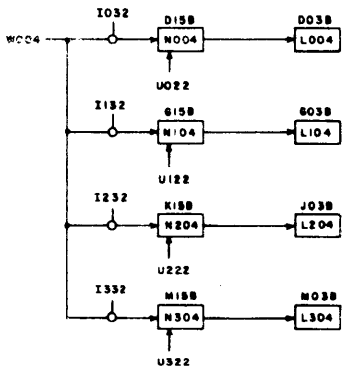
BIT 2



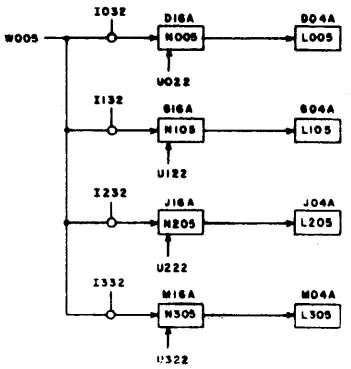
BIT 3



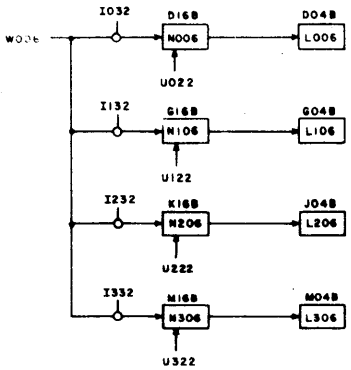
BIT 4



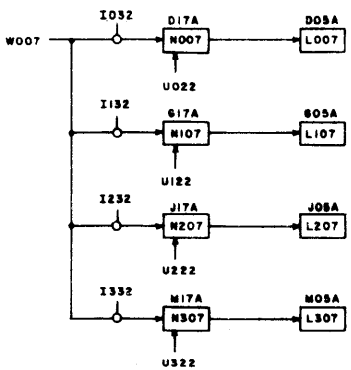
BIT 5



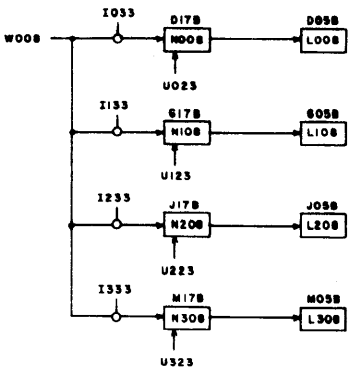
BIT 6



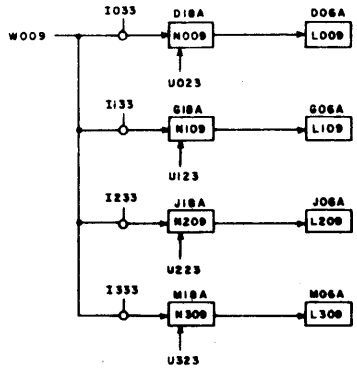
BIT 7



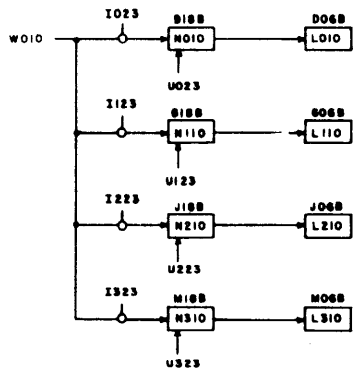
BIT 8



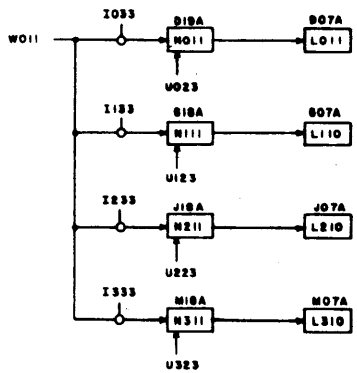
BIT 9



BIT 10



BIT 11



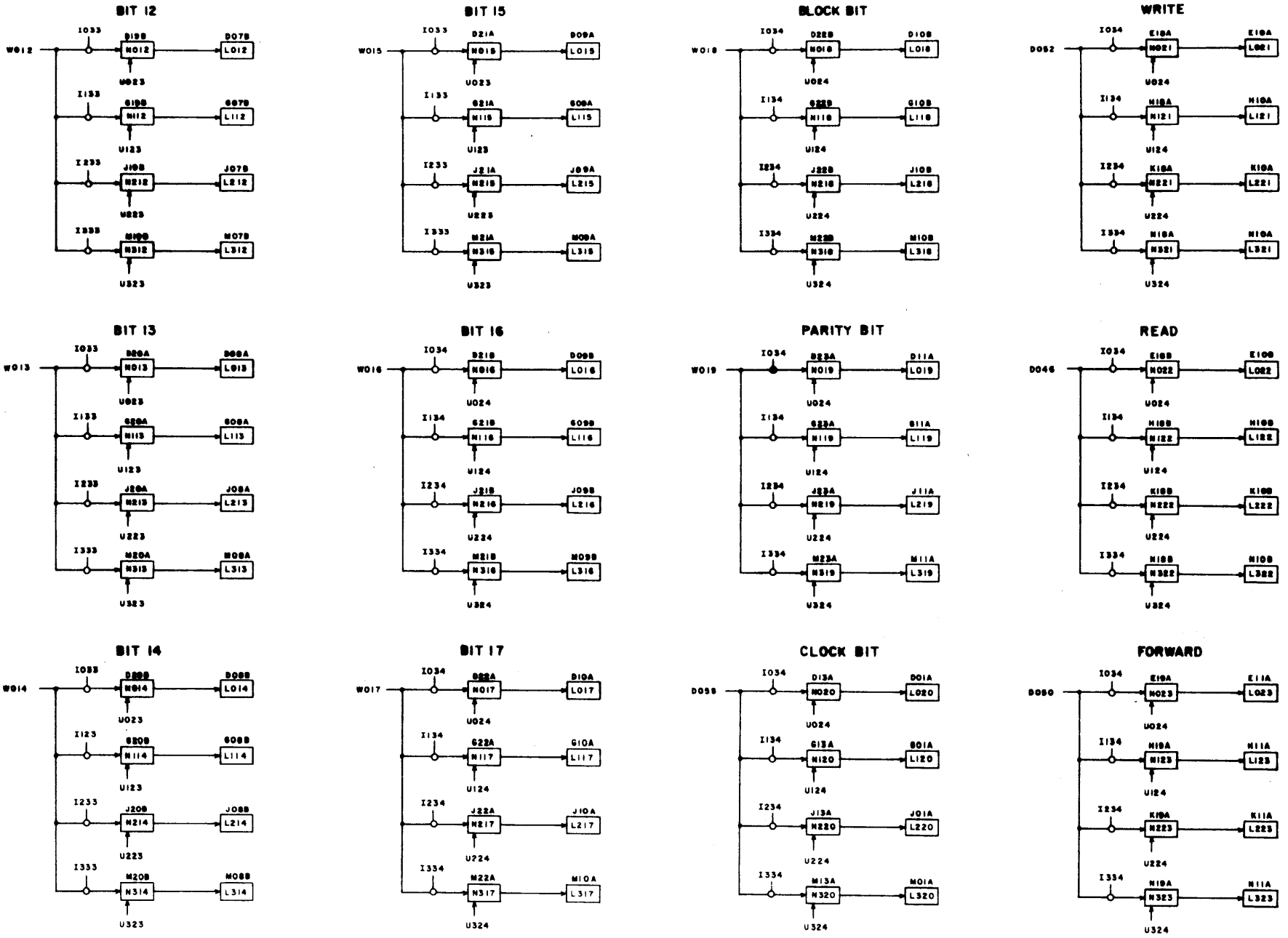
CONTROL DATA CORPORATION COMPUTER DIVISION	TITLE: OUTPUT TO TAPE UNITS	PRODUCT: SP. OPTION 60026	
		SIZE: C	DRAWING NO.: 38705100 REV
			SHEET: 19 PAGE: 4-49

TERM	LOC'N	SHEET	DESCRIPTION
I033	D26D	16	
I034	D27A	16	
I133	G26D	16	
I134	G27A	16	

TERM	LOC'N	SHEET	DESCRIPTION
I233	J26D	16	
I234	J27A	16	
I333	M26D	16	
I334	M27A	16	

TERM	LOC'N	SHEET	DESCRIPTION
U023	E28B	16	
U024	E29A	16	
U123	H28B	16	
U124	H29A	16	

TERM	LOC'N	SHEET	DESCRIPTION
U223	K28B	16	
U224	K29A	16	
U323	N28B	16	
U324	N29A	16	



CONTROL DATA CORPORATION COMPUTER DIVISION	TITLE: OUTPUT TO TAPE UNITS	PRODUCT: SP. OPTION 60026	REV
		SIZE: C · DRAWING NO.: 38705100	
		PROJECT: 20 · PAGE: 4-51	

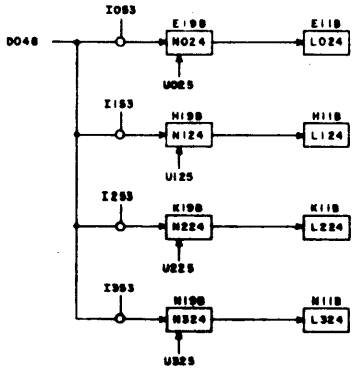
TERM	LOC'N	SHEET	DESCRIPTION
D021	C91C	5	
D048	C74A	7	
D054	C73B	7	
D056	C72A	7	

TERM	LOC'N	SHEET	DESCRIPTION
I053	C14D	16	
I153	F14D	16	
I253	I14D	16	
I353	L14D	16	

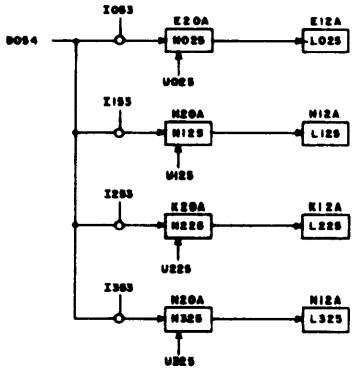
TERM	LOC'N	SHEET	DESCRIPTION
K041	C13C	16	
K141	F13C	16	
K241	I13C	16	
K341	L13C	16	

TERM	LOC'N	SHEET	DESCRIPTION
U025	E29B	16	
U125	H29B	16	
U225	K29B	16	
U325	N29B	16	

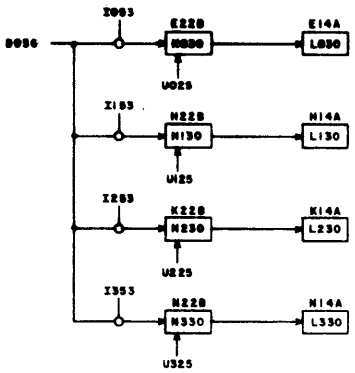
REVERSE



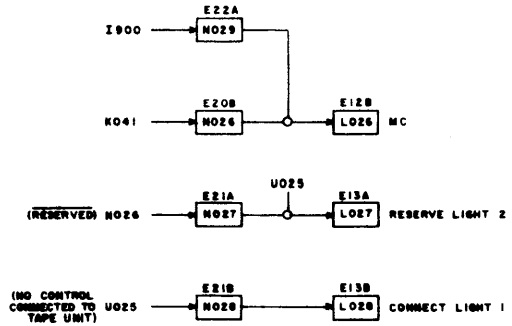
REWIND



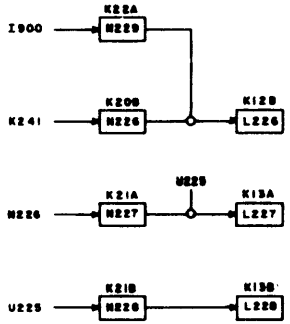
REWIND UNLOAD

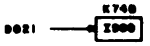


TAPE UNIT 0

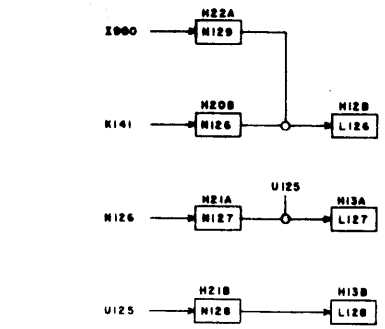


TAPE UNIT 2

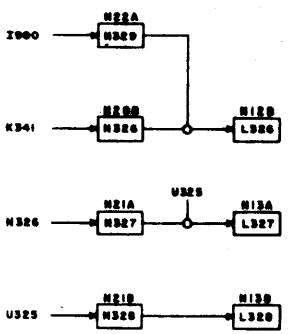




TAPE UNIT 1



TAPE UNIT 3



CONTROL DATA CORPORATION COMPUTER DIVISION	TITLE: OUTPUT TO TAPE UNITS	PRODUCT: SP. OPTION 60026	
		SIZE: C	DRAWING NO.: 38706100
		SHEET: 21	PAGE: 4-53

SECTION 5

PARTS LIST

MAINTENANCE PARTS LIST

The parts list provides the identification and ordering data necessary for the CONTROL DATA Special Option 60026 Magnetic Tape Controller.

Electrical Contents: Chassis assembly items are included except lead wires and bulk wire.

Hardware Contents: Chassis itmes are included except standard hardware such as screws, nuts, bolts, washers and raw material.

The chassis assembly and subassemblies are broken down into individual parts, listed in alphabetical rather than disassembly order.

The following publications contain information on printed circuit assemblies, peripheral cabinets, and power supplies necessary to complete a total parts listing of the equipment.

PUBLICATION	PUBLICATION NUMBER
Printed Circuit Card Assemblies	60040800
CDC Power Supply Manual	60120700
Peripheral Controller Cabinets Customer-Engineering Instruction Manual (includes Power Supply modification)	60097300

ORDERING OF PARTS

When ordering Control Data parts, include the following information: CDC drawing number, description, quantity needed and the equipment on which used. When ordering parts, use the procedure indicated by that vendor.

Special option 60026 Magnetic Tape Controller
CDC Dwg. No. 17772400

PARTS LIST

CHASSIS ASSEMBLY

CDC - DRAWING NUMBER	DESCRIPTION	QUANTITY EACH MACHINE
30006000	Bar, Mounting, Connector	
30507800	Bar, Mounting, Connector 49-94	
30507100	Bar, Mounting, Indicator Panel	
30507200	Bar, Mounting, Switch Panel	
30008700	Bracket, Angle, Chassis Frame	
30505800	Bracket, Mounting, Switch Panel	
30505700	Bracket, Mounting, Indicator Panel	
30600102	Cabinet Assembly, Refer to Publication Number 60097300	
30002201	Capacitor, Fixed, Electrolytic 10-10 UF, 50 WVDC	
17772400	Card Placement	
30000901	Connector, Receptacle, 61 Contacts	
30000100	Connector, Receptacle, 30 Contacts	
24512001	Connector, Receptacle, 24 Socket	
00865004	Grommet, Strained Relief, 61 Wire	
30104800	Hinge, Connector Panel	
17711000	Identification Plate	
00856101	Knob	
30002409	Light Indicator, Incandescent, White	
30503200	Member, Frame, Chassis, Side	
30507902	Member, Frame, Chassis, Side	
30008901	Member, Frame, Chassis, Top or Bottom	
30008902	Member, Frame, Chassis, Top or Bottom	
17772500	Panel, Light	
17772600	Panel, Blank	
17772700	Panel, Blank	
25164804	Plate, Filler, Chassis	
30010102	Plate, Designation, Narrow 49-71	
30013102	Plate, Designation, Narrow 72-94	
30010101	Plate, Designation, Narrow 01-23	
30013101	Plate, Designation, Narrow 24-46	
30008401	Plate, Designation, Wide 01-23	
30012801	Plate, Designation, Wide 24-46	
30008402	Plate, Designation, Wide 49-71	
30012802	Plate, Designation, Wide 72-94	

SPECIAL OPTION 60026 MAGNETIC TAPE CONTROLLER (Cont'd)

PARTS LIST

CDC - DRAWING NUMBER	DESCRIPTION	QUANTITY EACH MACHINE
30104100	Plate, Retaining, Connector, 8 Holes	
25151703	Power Supply Assembly, Refer to Publication Number 60097300	
30004600	Rubber, Special Section, Seal	
30504900	Seal, Strip, Metal	
30116500	Shield, Connector, Receptacle	
30000902	Socket Contact	
30005900	Spacer, Module 01-94	
30507700	Spacer, Module 49-94	
30508200	Spacer, Module 01-46	
30104600	Support, Connector Assembly	
30008102	Support, Retainer-Spacer	
30506300	Stud Extension	
17772400	Wire Tabs	

PARTS LIST

PRINTED CIRCUIT CARD ASSEMBLY DATE: _____

CDC - DRAWING NUMBER	DESCRIPTION	QUANTITY EACH MACHINE
30908201	Printed Circuit Card Assembly; Type CA21	
30912201	Printed Circuit Card Assembly; Type CA31	
30921801	Printed Circuit Card Assembly; Type CA55	
30924601	Printed Circuit Card Assembly; Type CA62	
30929801	Printed Circuit Card Assembly; Type CA75	
30930201	Printed Circuit Card Assembly; Type CA76	
30931801	Printed Circuit Card Assembly; Type CA80	
30932201	Printed Circuit Card Assembly; Type CA81	
30933401	Printed Circuit Card Assembly; Type CA84	
30935401	Printed Circuit Card Assembly; Type CA89	
30938601	Printed Circuit Card Assembly; Type CA97	
30942201	Printed Circuit Card Assembly; Type HA05	
30943001	Printed Circuit Card Assembly; Type HA07	
30943801	Printed Circuit Card Assembly; Type HA09	
30944601	Printed Circuit Card Assembly; Type HA11	
30947801	Printed Circuit Card Assembly; Type HA19	
30952201	Printed Circuit Card Assembly; Type HA30	
30957801	Printed Circuit Card Assembly; Type HA46	
30958201	Printed Circuit Card Assembly; Type HA47	
30958601	Printed Circuit Card Assembly; Type HA48	
31700201	Printed Circuit Card Assembly; Type K11	
31700601	Printed Circuit Card Assembly; Type K12	
31701001	Printed Circuit Card Assembly; Type K13	
31701401	Printed Circuit Card Assembly; Type K14	
31701801	Printed Circuit Card Assembly; Type K16	
31702601	Printed Circuit Card Assembly; Type K22	
31711801	Printed Circuit Card Assembly; Type K23	
31703001	Printed Circuit Card Assembly; Type K24	
31703401	Printed Circuit Card Assembly; Type K25	
31703801	Printed Circuit Card Assembly; Type K26	
31704201	Printed Circuit Card Assembly; Type K27	
31704601	Printed Circuit Card Assembly; Type K29	

PARTS LIST

PRINTED CIRCUIT CARD ASSEMBLY (Cont'd) DATE: _____

CDC - DRAWING NUMBER	DESCRIPTION	QUANTITY EACH MACHINE
31709401	Printed Circuit Card Assembly; Type K31	
31705001	Printed Circuit Card Assembly; Type K32	
31709801	Printed Circuit Card Assembly; Type K33	
31710201	Printed Circuit Card Assembly; Type K35	
31705801	Printed Circuit Card Assembly; Type K36	
31711401	Printed Circuit Card Assembly; Type K38	
31707001	Printed Circuit Card Assembly; Type K58	
31708601	Printed Circuit Card Assembly; Type K67	
31710601	Printed Circuit Card Assembly; Type K68	
31711001	Printed Circuit Card Assembly; Type K69	
31709001	Printed Circuit Card Assembly; Type K71	