TEXAS INSTRUMENTS

Improving Man's Effectiveness Through Electronics

Model 960/980 Computer
Model DS44 Disc Controller
Maintenance Manual

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PREFACE

This manual provides maintenance instructions for the Texas Instruments Model DS44 Moving Head Disc Controller. The manual also provides the theory of operation for the controller. The information in the manual is divided into the following sections:

I Introduction – Provides a general introduction to the Model DS44 Moving Head Disc Controller.

II Moving Head Disc Controller – Provides a description of the organization and functions of the controller.

III Theory of Operation – Provides the detailed theory of operation for the Moving Head Disc Controller.

IV Maintenance – Provides the information necessary to troubleshoot the controller.

V Documentation – Describes the computer-generated documentation, including the Pin List and Load List for the controller.

VI Drawings – Contains the drawings pertinent to the maintenance of the controller.

Additional information concerning the Model DS44 Moving Head Disc Controller may be found in the following:

Title	Part Number
960/980 DMAP Expander Manual	216759-9701
Maintenance Manual for Model DS44 Disc Drive	973792-9701
Model 980A Maintenance Manual System Description	960699-9701
Model 980B Maintenance Manual System Description	943012-9701
Model 960A Maintenance Manual System Description	226750-9701
Model 960B Maintenance Manual System Description	942773-9701
Block Transfer Controller Maintenance Manual	240802-9701

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SECTION I

INTRODUCTION

1.1 SCOPE

This manual contains the maintenance documentation and theory of operation for the Model DS44 Moving Head Disc Controller, which interfaces the Direct Memory Access Channel of the Model 960 or Model 980 Computer. This document discusses only the controller and its interface to the moving head disc unit.

1.2 DISC CHARACTERISTICS

The controller is designed for the Model DS44 Moving Head Disc Drive. Each Disc Drive contains one fixed and one removable disc with one read/write head per surface. Each disc surface has 408 tracks, 88 data sectors/track (an 89th sector is used for head switching), 32 data words/sector, for a total of 1,148,928 words/surface. The maximum data transfer rate is 156.25K words/second.

The controller accommodates up to four Model DS44 disc units. Additional information on the disc drives may be obtained from the maintenance manuals or specifications.

1.3 INSTALLATION

The Moving Head Disc Controller can be included in several combinations of peripheral controllers. The connector plate wiring for all combinations is documented in the DMAC Expander Maintenance Manual. Refer to the appropriate section to determine the correct board locations of the controller.

SECTION II

MOVING HEAD DISC CONTROLLER

2.1 GENERAL

The controller for the Model DS44 disc drive, combined with a Block Transfer Controller (BTC), provides an interface to the Direct Memory Access Port of the Model 960 or 980 computers through the Direct Memory Access Channel (DMAC) Expander. Refer to figure 2-1 for a block diagram relationship of the disc controller and disc drive to the 960 or 980 computer.

2.2 DISC CONTROLLER ORGANIZATION

The Moving Head Disc Controller consists of two major logic sections: the Block Transfer Controller (BTC), and the Disc Control Logic (DCL). The BTC provides the interface for the DMAC Expander and the DCL provides the interface for the disc drive. The BTC and DCL are discussed in detail in Section III - Theory of Operation. Figure 2-2 illustrates the disc controller organization.

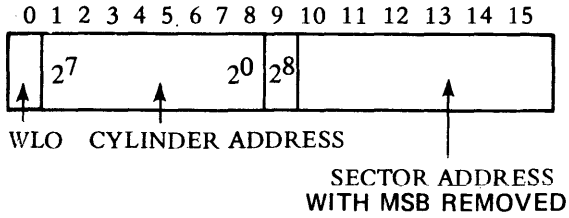
2.3 DISC SECTOR ORGANIZATION

The minimum addressable block of data on the disc is a sector. Each sector consists of a 16-bit preamble word, an identification (I.D.) word, 32 data words, and a data check word.

SECTOR FORMAT

The controller generates the preamble, I.D., and check words. The preamble word is used to activate the disc drive read/write logic. The I.D. word identifies the associated sector. The check word is used to determine if the data was read from the disc correctly.

2.4 IDENTIFICATION WORD



Bit 0	Write Lockout Bit. A logic ZERO indicates that the data in the associated sector is not protected and can be written over. A logic ONE indicates that the data in the associated sector is protected and can be written over only with a Write I.D. command or a Write Data command with Lockout Override. This bit is specified by the Write I.D. Command.
Bits 1 through 9	Cylinder Address Field. These bits indicate the cylinder address on which the associated sector may be found.
Bits 10 through 15	Sector Address Field with MSB Removed. These bits indicate the address of the next sector which will come under the read/write head.

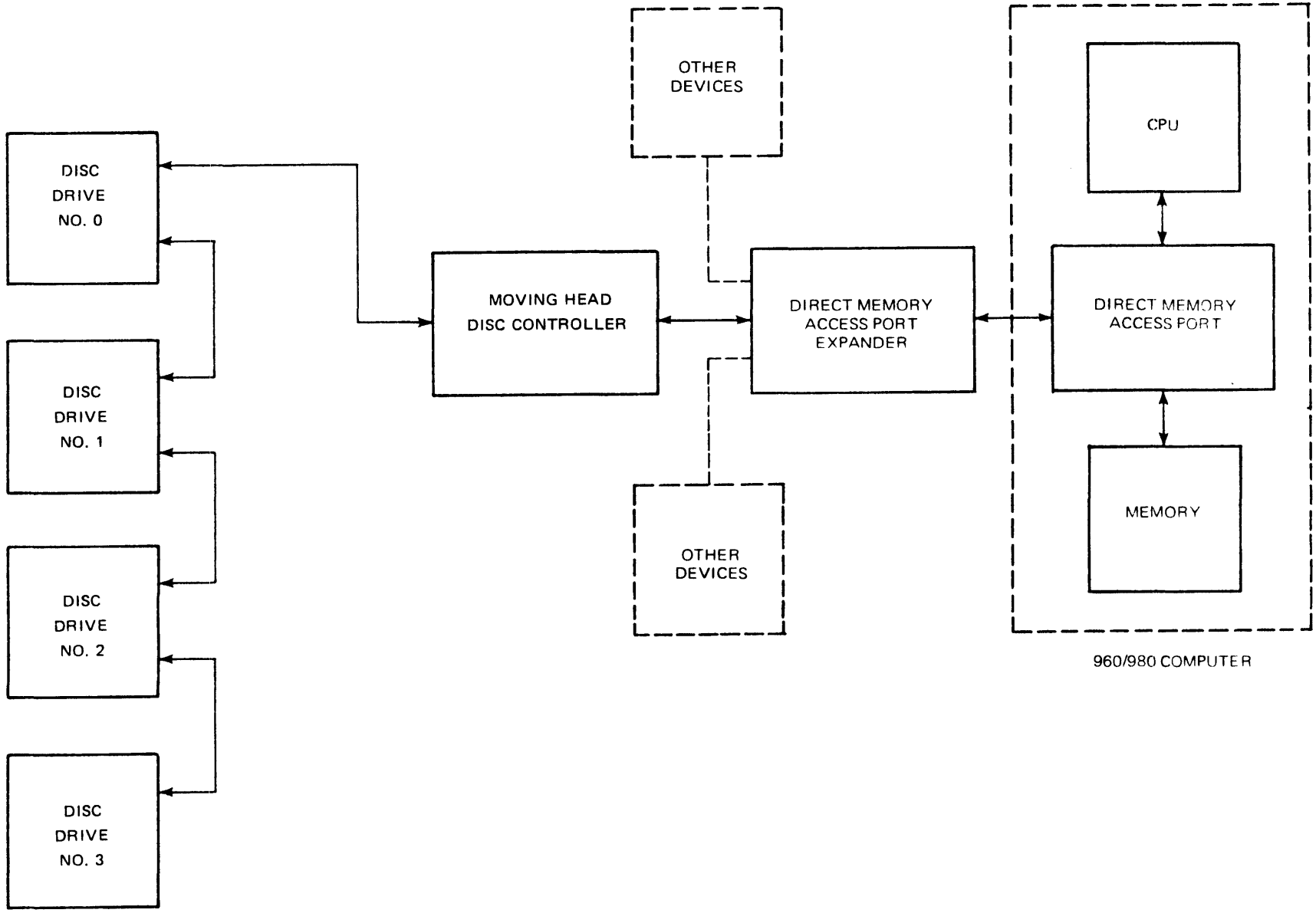


Figure 2-1. Disc Drive, Disc Controller and Computer Block Diagram Relationship

(A)134193

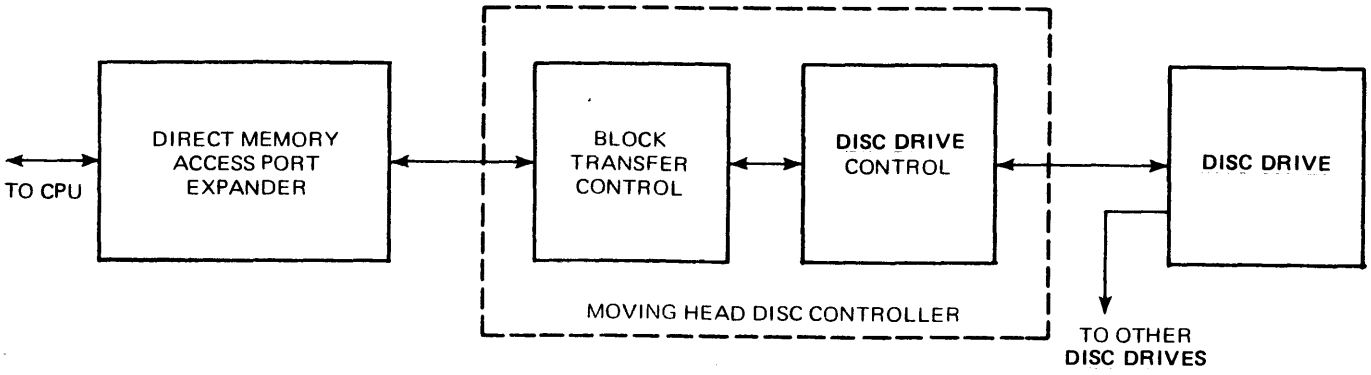


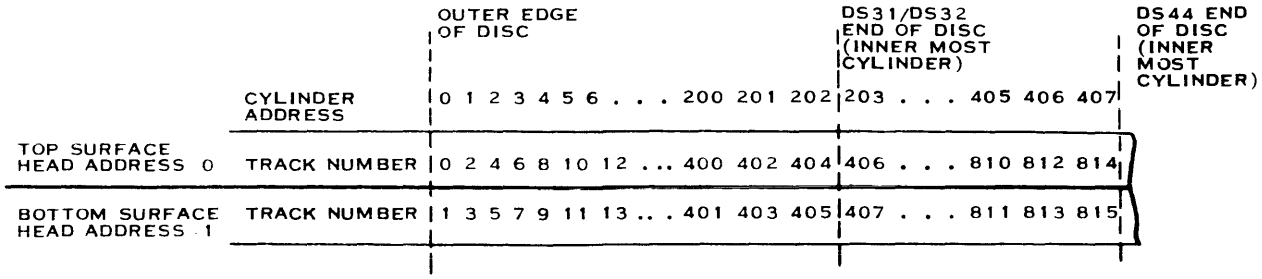
Figure 2-2. Disc Controller Organization Block Diagram

2.5 DISC CONTROLLER FUNCTIONS

The controller is capable of performing several types and combinations of read, write, and seek operations. While executing certain read/write commands, the controller performs several automatic functions such as data checking, head switching, and data address verification. The automatic functions are explained in the following paragraphs, and should be remembered when using this controller.

2.5.1 **AUTOMATIC SEEKING.** Upon receipt of a Read, Write, or Compare command, the controller always causes the disc to seek to the cylinder address given in List Word 3. Therefore, it is not mandatory that a Data Transfer command be preceded by an Independent Seek command.

2.5.2 **AUTOMATIC TRACK INCREMENT.** If the end of a track is encountered during a data transfer operation and all the data has not yet been transferred, the controller will seek to the next cylinder and/or switch heads (refer to figure 2-3). If only the head was switched, data transfer will be interrupted for only one sector time (about 280 microseconds). If the cylinder was incremented, thereby causing an automatic seek, data transfer will be interrupted for about 12.5 milliseconds.



THE COMBINATION OF HEAD ADDRESS AND CYLINDER ADDRESS DEFINE A TRACK ADDRESS.

IF AN OPERATION IS BEING PERFORMED ON AN EVEN NUMBERED TRACK, i.e., 0, 2, 4, 6 ··· 404, UPON REACHING THE END OF THE TRACK, IF THE SECTOR COUNT IS NOT ZERO, THE HEAD WILL BE SWITCHED TO THE BOTTOM SURFACE AND PROCESSING WILL RESUME WITH SECTOR ZERO, SAME CYLINDER, BOTTOM SURFACE.

IF AN OPERATION IS BEING PERFORMED ON AN ODD NUMBERED TRACK, i.e., 1, 3, 5, 7 ··· 405, UPON REACHING THE END OF THE TRACK IF THE SECTOR COUNT IS NOT ZERO, THE HEAD WILL BE SWITCHED TO THE TOP SURFACE AND THE CYLINDER WILL BE INCREMENTED. AFTER THE DISC HAS SEEKED TO THE NEXT CYLINDER, THE I.D. WILL BE VERIFIED, AND PROCESSING WILL RESUME WITH SECTOR ZERO.

(A)133414

Figure 2-3. Automatic Track Incrementing

2.5.3 **AUTOMATIC I.D. VERIFICATION.** The controller automatically checks the I.D. word for proper cylinder address during a read data, write data, or compare data operation under the following conditions:

NOTE

A track address is defined by a head address and a cylinder address. Refer to figure 2-3.

1. After acquiring an initialization list, the controller checks the I.D. word on the starting track address before executing the list.

2. After an automatic cylinder increment and after the disc reaches the new cylinder, the controller checks the I.D. word on the new cylinder before continuing with the list. The I.D. word is not checked if only the head is switched (refer to figure 2-3). Therefore, a Write I.D. with Lockout Enabled should be performed on a cylinder basis.

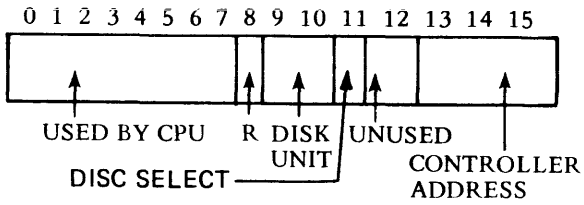
2.5.4 **WRITE PROTECTED DATA.** Since automatic I.D. verification is performed on a first sector encountered basis, the minimum amount of data that can be write-protected is 88 sectors (one track). Any track on the top surface of the disc (Head Address = 0) which is write protected can only be changed by a Write I.D. command or a Write Data with Lockout Override command. If data is to be write-protected on a track on the bottom surface, the whole cylinder (top track and bottom track) should be protected.

2.5.5 **STATUS STORAGE.** Every time status is stored, the Status Register in the controller is cleared. Any time the controller is addressed by an Automatic Transfer Instruction (ATI) while it is executing a previous list, a Busy status will be stored. Therefore, any nonabortive status that had accumulated to that point is stored with the Busy status and is not reported again when the current list is completed. Note that Operation Complete status may be accompanied by Busy, Parity Error, I.D. Compare Error status, and/or Seek Complete Unit XX status.

2.6 INSTRUCTION FORMAT

The Automatic Transfer Instruction (ATI) in the 980 computer and the Activate Direct Access Channel (ADAC) command in the 960 computer are each two-word instructions by which a device on the Direct Memory Access Channel is activated. Execution of an ATI or ADAC command causes a strobe to be generated with each of the two words. Each strobe indicates that the corresponding word is stable on the memory read data lines and may be accepted by the controller. The format for each of the two words is given in the following paragraphs.

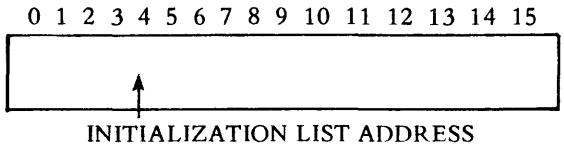
2.6.1 FIRST ACTIVATE WORD



When the first word from the CPU is stable on the read data lines (indicated by the first strobe), the BTC decodes the address bits (12 through 15) to determine if it is being addressed. If addressed, the BRC presents bits 8 through 11 to the DCL.

Bit 8	Reset/Acquire List Bit. A logic ZERO indicates the controller is is to acquire an initialization list. A logic ONE resets the BTC and DCL (equivalent to depressing the Master Reset button on the front panel of the computer).
Bits 9 and 10	These bits determine the disc unit on which reading/writing will occur. 00 selects Disc Drive No. 0 01 selects Disc Drive No. 1 10 selects Disc Drive No. 2 11 selects Disc Drive No. 3
Bit 11	Disc Select 0 selects Fixed Disc 1 selects Removable Disc (can be reversed with plug-in jumper)

2.6.2 SECOND ACTIVATE WORD

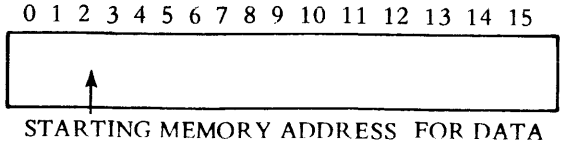


The second word of the ATI or ADAC command is the memory address from which the BTC fetches the initialization list. The controller does not need any further commands from the CPU until the specified list operation is completed or aborted. The second word is accepted by the BTC only if it was addressed by the first word and the controller was not still processing a previous list.

2.7 INITIALIZATION LIST

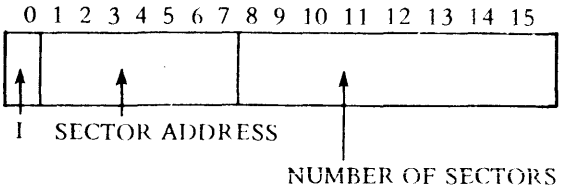
The initialization list is stored in memory prior to the issuance of an ATI or ADAC command. The list consists of four words located in consecutive memory locations, with the address of the first list word being defined in the second word of the ATI or ADAC command. The format for the list words is given in the following paragraphs.

2.7.1 LIST WORD 1



List Word 1 specifies the starting memory address where the first data word will be fetched/ stored. Sucessive data words will be fetched/stored at consecutively higher memory locations.

2.7.2 LIST WORD 2

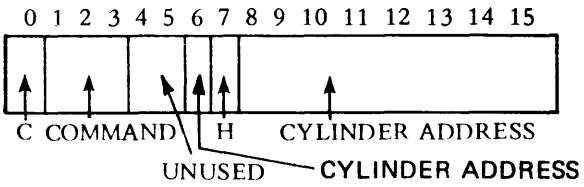


Bit 0 — Interrupt Bit. A logic ZERO enables the controller to store status without issuing an interrupt. A logic ONE causes the controller to issue an interrupt and wait for interrupt recognition before storing status.

Bits 1 through 7 — Sector Address Bits. These bits determine the sector at which the controller begins data transfer. The minimum allowable number in this field is 00_{16}. The maximum allowable number is 57_{16}. A number greater than 57_{16} results in a Program Error status.

Bits 8 through 15 — Sector Count Field. This field determines the number of sectors to be transferred. When performing ANY operation on the disc, this field must be nonzero. If not, a Program Error status will result. The maximum allowable value in this field is FF_{16}.

2.7.3 LIST WORD 3



Bit 0 — Chain Bit. A logic ZERO indicates the controller is to terminate processing after completing the operation specified in the current list. A logic ONE indicates the controller is to acquire another initialization list (from the memory address specified by List Word 4) after completing the operation specified in the current list.

Bits 1 through 3 — Command Field. This field determines the type of operation the controller is to perform.

000 Read data
001 Read Identification word
010 Compare data
011 Independent seek
100 Write data
101 Write I.D., Lockout disabled
110 Write I.D., Lockout enabled
111 Write data, Override lockout

Bits 4 and 5 — Not used.

Bit 6 and Bits 8 through 15	Cylinder Address. This field specifies the cylinder address at which the data transfer will begin. Bit 6 is the most significant bit, and bits 8 through 15 must be between 0 and 197_{16}.
Bit 7	Head Select. This bit selects the head which is to be used in the the transfer operation. Together with the cylinder address, this bit specifies a unique track on the disc. The head selection is: 0 - Upper head (top surface) 1 - Lower head (bottom surface)

2.7.3.1 **Read Data.** The controller reads data from the disc and stores it in CPU memory until the number of sectors specified in List Word 2 have been transferred. Automatic track incrementing applies. See figure 2-3.

2.7.3.2 **Read I.D.** The next identification word that comes under the read head will be transferred to the memory location specified in List Word 1.

2.7.3.3 **Compare Data.** The controller compares the data in memory (starting at the address specified in List Word 1) to the data on the disc (starting at the sector and cylinder specified in List Words 2 and 3, respectively).

2.7.3.4 **Independent Seek.** This operation causes the controller to move the head to the cylinder address specified in List Word 3. After the disc accepts the Seek command, the controller stores Operation Complete status (this occurs 20 microseconds to 50 microseconds after receipt of List Word 4). The controller is then ready to accept a command to perform an operation on another unit. When the disc completes the seek, the controller stores Seek Complete status for that unit whether or not the controller is busy processing a list on another unit.

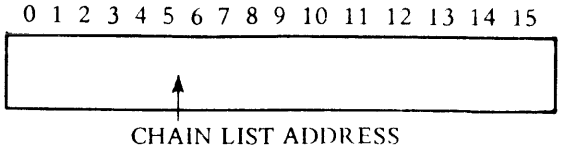
2.7.3.5 **Write Data.** The controller writes data on the disc until the number of sectors specified in List Word 2 have been written. If the lockout bit (Bit 0 of the I.D. word) is set, no data is written and the controller stores Write Lockout status and terminate.

2.7.3.6 **Write I.D., Lockout Disabled.** The I.D. word is written on the number of sectors specified in List Word 2. The data portion of each sector consists of the data word in the specified memory address of List Word 1.

2.7.3.7 **Write I.D., Lockout Enabled.** This operation is the same as write I.D., lockout disabled, except that the write lockout bit (bit 0 of I.D. word) is written as a logic ONE. Therefore, a Write Data Override Lockout command is required to write data on these sectors.

2.7.3.8 **Write Data, Override Lockout.** The number of sectors specified in List Word 2 is written on the disc, whether or not the write lockout bits (bit 0 of the I.D. word) is on. The write lockout bit condition of the I.D. word is not altered by this operation.

2.7.4 LIST WORD 4



List Word 4 specifies the starting memory address of the next Initialization List to be acquired if chaining is indicated by bit 0 of List Word 3. If chaining is not indicated, this list word is ignored. Chaining allows the controller to read/write from different areas of memory and/or execute more than FF_{16} sectors with the CPU issuing only one ATI or ADAC command.

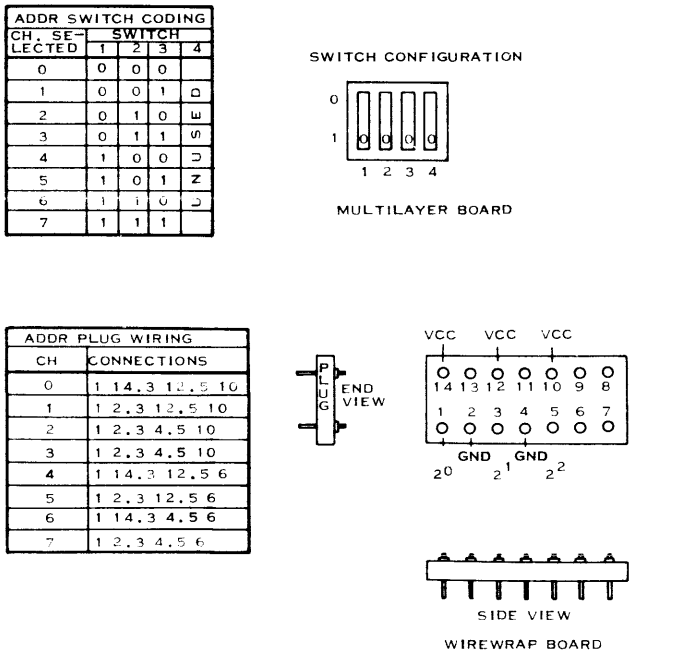
2.8 CHANNEL ADDRESSING

The controller may be assigned any channel (DMAP) address form channel 0 through channel 7. Circuitry within the BTC section of the disc controller uses the assigned (hardwired) address to determine when to respond to an ATI or ADAC command. This circuitry also determines which request lines to drive and which acknowledge lines to monitor as explained in the following paragraphs. Refer to the BTC manual for detailed information.

2.8.1 ADDRESS SELECTION. The channel addressing scheme utilized permits assignment of any channel address and enables the address to be changed if required. The assigned channel address is wired on an address select plug as shown in figure 2-4. The decoding and comparison of the assigned address to the address in ATI1 or ADAC1 is shown functionally in figure 2-5.

2.8.2 ADDRESS MODIFICATION. In order that the channel address may be changed without altering the controller logic or connector plate wiring, the BTC section of the Disc controller picks up seven sets of channel control lines. However, only one line from each group, the one corresponding to the assigned channel, is utilized.

The circuitry for driving the appropriate memory access line and interrupt request line is shown in figure 2-6. The circuitry for monitoring the memory access grant line and interrupt acknowledge line is shown in figure 2-7. Using this channel addressing scheme makes address modification a simple matter of altering the address select plug wiring.



NOTES: 1. THE CHANNEL ADDRESS SWITCH IS LOCATED ON THE BTC 1 MULTILAYER BOARD IN LOCATION 505 (ROW 5, COLUMN 5) ON THE BT 1 WIREWRAP BOARD IN LOCATION B00 (ROW B, COLUMN 00).

2. ONLY ONE SWITCH FOR EACH CONTROLLER.

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Figure 2-4. Channel Address Decoding

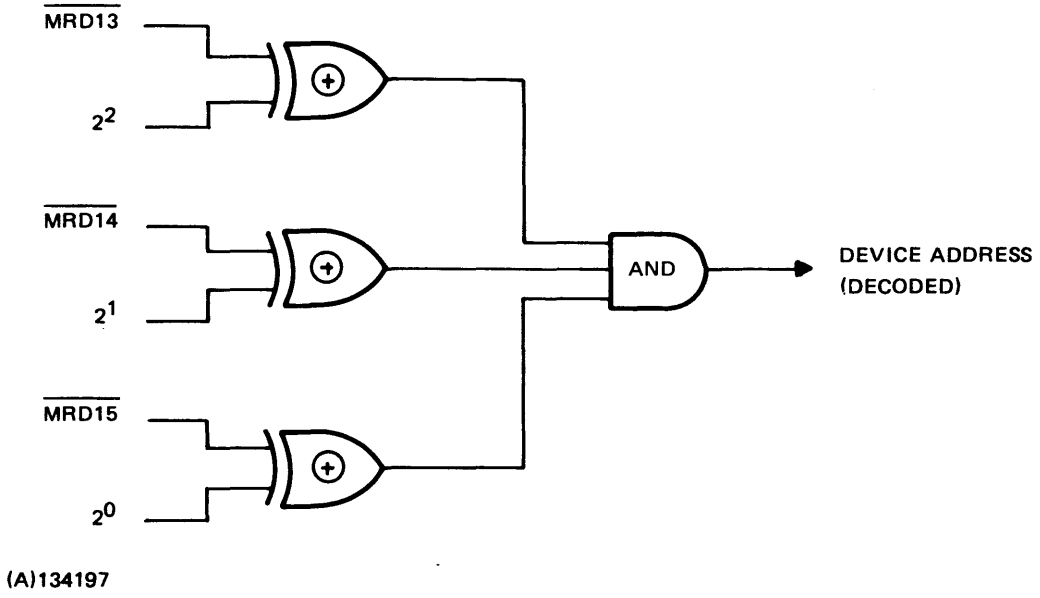


Figure 2-5. Channel Address Decoding Logic

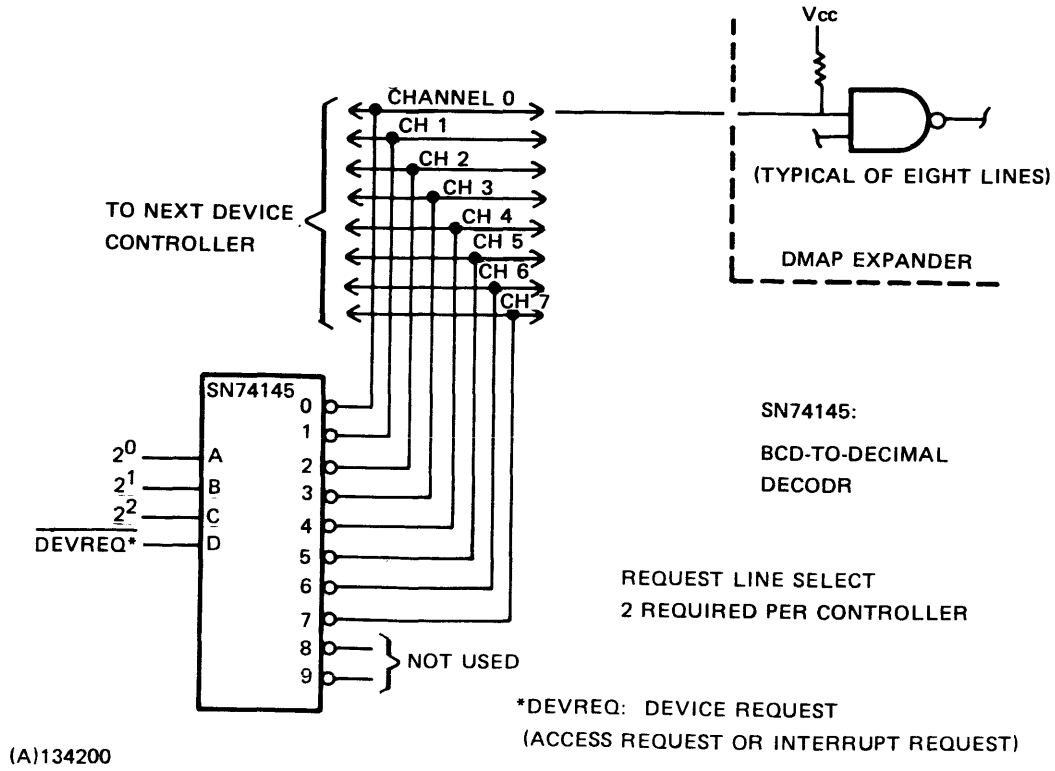


Figure 2-6. Request Line Select

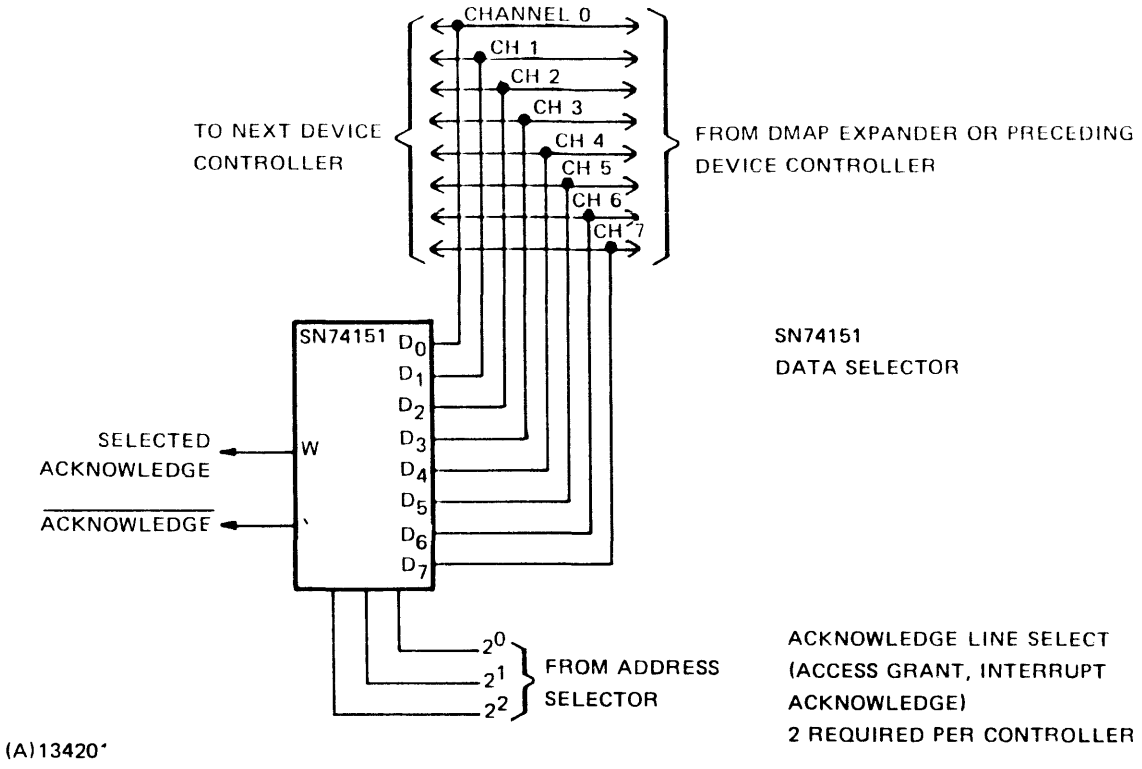


Figure 2-7. Acknowledge Line Select

2.9 MEMORY ACCESS

In executing a memory cycle, the controller issues a request for memory access and then waits until a memory access grant is received before proceeding. The time elapsing between a request and receiving access is dependent on CPU activity, the Expander, other device controllers, and the channel address assigned to this controller (priority). The BTC section of the disc controller contains the circuitry for executing memory cycles. For detailed information refer to the BTC manual. The generalized timing chart of figure 2-8 gives the relationship between signals at the controller/expander interface.

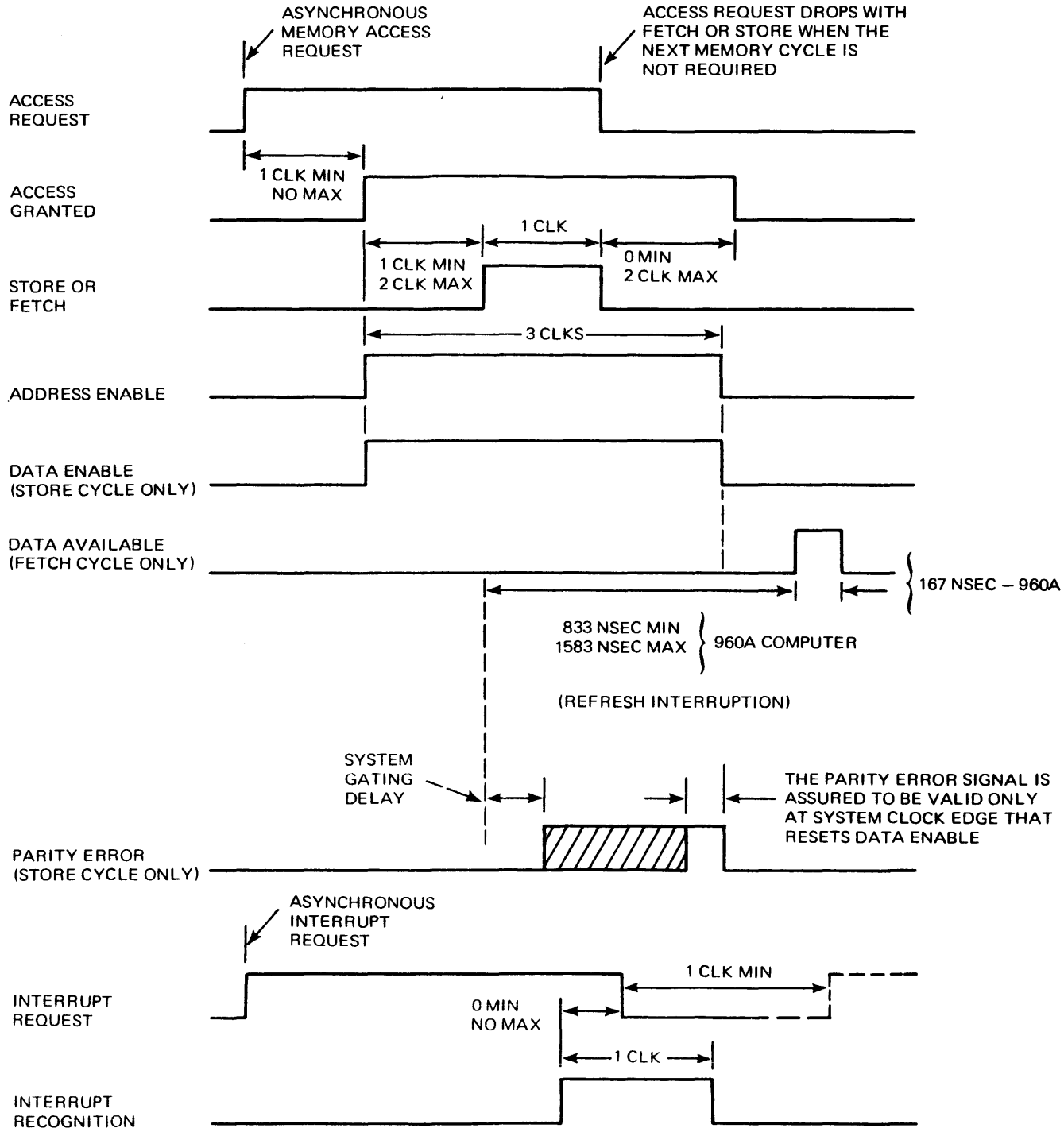
2.10 INTERRUPTS/STATUS

The controller may interrupt the program being executed by the CPU and cause the controller status to be processed.

When the specified operation is completed, the controller issues an interrupt request (if interrupts were enabled by bit 0 of the last List Word 2 that was received) indicating that status is ready to be stored in memory and processed by the CPU. The controller must then wait until an interrupt recognition is received before taking further action (to receive an interrupt recognition, the DMAC interrupt bit in the CPU Status Register must be set).

When an interrupt recognition is received, the controller proceeds with status storage through the memory access request sequence.

2.10.1 STATUS STORAGE LOCATIONS. The controller stores two status words each time it stores status. The locations in memory where status is stored are a function of the channel that the controller is "on". Refer to figure 2-4.



NOTES:

1. SIGNALS ARE SHOWN IN THE TRUE SENSE.
2. DEVICE CONTROLLER INTERFACE IS ASYNCHRONOUS TO THE COMPUTER.
3. SYSTEM CLOCK IS 3 MHz (333 NSEC) FOR THE 960 COMPUTER AND 4 MHz (250 NSEC) FOR THE 980 COMPUTER

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Figure 2-8. Controller Interface Signal Relationship

2.10.2 STATUS WORD 1.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
O.C.	W.P.E.	O.L.	D.T.E.	E.O.D.	P.E.	C.E.	P.A.R.	I.D.E.	B.S.Y.	CH.I.TKN.	W.I..ON	S.C. 11_2	S.C. 10_2	S.C. 01_2	S.C. 00_2

Bit 0 Operation Complete. Status is stored upon successful completion of a nonchained list, where the operation called for is a read, compare, read I.D., write I.D., or the disc unit accepts an Independent Seek command.

Bit 1 Write Protect Enabled. Status is stored if an attempt is made to write on a disc while its write protect switch is "on". The controller is reset to its idle state when the status is stored.

Bit 2 Offline. Status is stored if an attempt is made to perform an operation on the disc and it is not ready, i.e., power is not "on", disc is not at proper speed, disc cartridge is not in position, unit does not exist, and after a restore operation following a disc malfunction during a seek. The controller then returns to its idle state.

Bit 3 Data Transfer Error. Status is stored if a data word was not available from the CPU at the time required (write operation) or if the controller could not store a data word in the CPU in the time required (read operation). The word transfer rate between the controller and the CPU is approximately 156.25 KHz, (one word every 6.4 microseconds). Upon detection of a data transfer error, reading or writing is discontinued and the controller resets to its idle condition after storing status. This status will also occur if an attempt is made to transfer data to/from a disc cartridge that has never been initialized by a write I.D. operation (i.e., a new cartridge or a cartridge with a bad surface on it).

Bit 4 End of Disc. If an attempt is made to read or write beyond cylinder address 407, the controller restores the disc to cylinder 00_{16}. After the disc is restored, an End of Disc status will be stored. The controller then resets to its idle condition.

Bit 5 Program Error. Status will ALWAYS be stored if List Word 2 has an invalid starting sector address or List Word 2 contains a sector count of zero. The controller then resets to its idle state.

Bit 6 Compare Error. Status is set during a compare operation if the data read from the disc does not match the data pulled from the specified CPU memory buffer. Status is stored after the current sector has been compared. The controller then returns to its idle state. Chaining is ignored.

Bit 7 — Parity Error. Status is set during a read operation or a compare operation if the parity read from the disc does not match the parity generated by the controller. Status is stored after all sectors in the list have been read. If the list is chained, the controller acquires the new list and continues.

Bit 8 — I.D. Compare Error. Before executing a data transfer to or from the disc for a read, compare or write operation, the I.D. word is checked against the cylinder, head, and sector address registers of the controller.

For a write data operation, the I.D. word of the first sector encountered of the selected track is checked. If a match does not occur with controller registers, the I.D. Compare Error status is set and the write operation terminates before writing begins on the disc. The controller returns to its idle state after the status has been stored. For a read or compare operation, an I.D. Compare Error status does not terminate the operation.

Bit 9 — Device Busy. Status is set when the controller receives an ATI command while it is processing another list. Status is stored immediately. The controller then continues processing its list and the status register is reset.

Bit 10 — Chain List Taken. Upon successful completion of a list whose chain bit is "on" (List Word 3, bit 0), the controller does not store status, but acquires the new list. The controller then stores the Chain List Taken status and continues by processing the new list. If a list whose chain bit is "on" is not successfully completed, the new list is not acquired and processing will be discontinued.

NOTE

On a parity error, processing and chaining will continue.

Bit 11 — Write Lockout On. Status is stored if an attempt is made to write on a track whose write lockout bit (bit 0 of the I.D. word) is "on". Refer to the Write Protected Data paragraph for exceptions.

Bit 12 — Seek Complete Unit 11_2. Status is stored when the unit indicates it has reached the proper cylinder address. The sequence of events for a seek operation is as follows (assuming the controller is idle, not busy):

1. The controller becomes busy upon receipt of a Seek command.

2. The disc unit accepts the Seek command.

3. The controller stores Operation Complete status and returns to its idle condition (ready for another ATI command).

4. From 8 to 70 milliseconds later, depending on how far the disc had to seek, the disc completes its seek and the controller stores Seek Complete status for that unit. This status is stored as soon as it is encountered whether or not the controller is in the process of executing another list on a different disc unit. An interrupt precedes this status only if interrupts were enabled by the last List Word 2 received by the controller.

Bit 13 Seek Complete Unit 10_2. See description for bit 12.

Bit 14 Seek Complete Unit 01_2. See description for bit 12.

Bit 15 Seek Complete Unit 00_2. See description for bit 12.

2.10.3 **STATUS WORD 2.** The second status word is not utilized.

2.11 DATA TRANSFER RATE

Data transfer between the controller and the CPU is in 16-bit parallel form. Data transfer between the controller and the disc is in bit serial form with the least significant bit being transferred first and the most significant bit being transferred last. The bit transfer rate between the controller and the disc is 2.5 MHz. The maximum word transfer rate between the controller and the CPU memory is 156.25 KHz. The actual rate is goverened by the activity of other DMAC controllers.

2.12 CONTROLLER INTERFACE SIGNALS

Signal levels are compatible with Texas Instruments Series 74 TTL (transistor-transistor logic) intergrated circuits and are defined as follow:

Logic ONE	+5 volts (maximum) +2.4 volts (minimum)
Logic ZERO	+0.8 volt (maximum) +0.0 volt (minimum)

Three interfaces will be described: CPU/Block Transfer Controller Logic (BTCL), BTCL/Disc Controller Logic (DCL), and DCL/Disc.

2.12.1 **SIGNALS FROM THE CPU.** Signals from the CPU that are buffered and/or processed by the Expander and routed to the BTC are listed in table 2-1. Data lines are provided in the logically true sense and all other lines are provided in the logically false sense.

2.12.2 **SIGNALS TO THE CPU.** Signals from the BTC that are buffered and/or processed by the Expander and routed to the CPU are listed in table 2-2. Data and address lines are provided in the logically true sense and all other lines are provided in the logically false sense.

Table 2-1. Signals from CPU to BTC

Signal	Remarks
DEVMRD(N)	Memory Read Data. N = 00-16. Bit 0 is MSB. Bit 15 is LSB.
AG,(N)–	Memory Access Granted. N = 0-7. Indicates that channel (N) has the next memory cycle
DEVATI1–	Channel Activate Strobe. Accompanies first ATI or ADAC word
DEVATI2–	Channel Activate Strobe. Accompanies first ATI or ADAC word
IRECOG(N)–	Interrupt Acknowledge. N = 0-7. Indicates that channel (N) may proceed with a status (store) cycle
DATAV–	Data Available. Indicates that the memory read data lines are stable on a fetch cycle
CLOCK–	System Clock. 3MHz for 960 computer and 4MHz for 980 computer
RESET–	Master Reset. For initialization when required.

Table 2-2. Signals to CPU from BTC

Signal	Remarks
DEVMWD,(N)	Memory Write Data. N = 00-16. Bit 0 is MSB. Bit 15 is LSB.
DEVADD,(N)	Memory Address. N = 00-15. Bit 0 is MSB. Bit 15 is LSB.
ARDEV,(N)–	Memory Access Request. N = 0-7. Channel (N) request for memory access
INTDEV,(N)–	Interrupt Request. N = 0-7. Channel (N) request for an interrupt cycle (status store cycle)
DEVSTORE–	Store cycle initiate
DEVFETCH	Fetch cycle initiate

2.12.3 **DISC CONTROLLER TO BTC INTERFACE.** The controller/BTC interface is designed so that the controller and the BTC must be located in the same motherboard and mounted within one standard enclosure.

Signal levels are determined by the signature of the signal. The signals suffixed with a bar(-) are referred to as false or inverted logic (at the low-voltage level, the logical function of the signal is true; at the high-voltage level, the logical function of the signal is false.)

All signals at the BTC/controller interface are synchronized with the trailing edge of the CPU system clock (SCLOCK).

The signal definitions in this section apply only when the BTC is used with the disc controller. For a more detailed description, refer to the BTC specification.

2.12.3.1 **BTC to Controller Signals.** The signals from the BTC to the controller are given in table 2-3.

2.12.3.2 **Controller to BTC Signals.** The signals from the controller to the BTC are given in table 2-4. These signals are generated by cut-collector IC devices with enables.

2.12.4 **CONTROLLER/DISC INTERFACE.** The logic levels for the controller/disc interface signals are TTL compatible.

Logic ONE	+2.4 to +5.0 Vdc
Logic ZERO	0 to 0.8 Vdc

All interface connections are made with one cable to disc unit 0. This cable connects to a top edge connector of one disc controller board.

Tables 2-5 and 2-6 define the signals between the controller and the disc.

For a more detailed description, refer to the applicable disc specification.

Table 2-3. BTC to Controller Signals

Signal	Remarks
ATI1	This one clock time signal occurs every time the CPU addresses the disc controller with an ATI or ADAC command.
ATI2	This one clock time signal indicates that the second word of the ATI or ADAC command is available. This signal will not occur if the ATI1 was received while the disc controller was busy (processing a previous initialization list).
MRD(N)	N = 08 to 11. These lines are monitored only during the ATI1 pulse. At this time they indicate the contents of bits 8, 9, 10 and 11 of the first ATI word.
LIST(N)	N = 1, 2, 3, or 4. These one clock time signals indicate that List Word N is available during this clock time only.
RFOUT(N)–	N = 00 to 15. These signals represent a bidirectional data bus. All data transfers between the controller and the BTC are made through these 16 lines.
READY	This signal indicates the BTC is ready to transfer a word from/to the controller.
STATBUSY	This signal indicates the BTC is ready to begin a status store operation.
ZERO8	This signal indicates that all the sector(s) in the initialization list have been read or written.
MREST	This signal indicates that the CPU Master Reset switch or the power clear has been actuated. A high on this line causes the controller to be immediately reset to its idle condition.
SCLOCK	This is the CPU system clock.

Table 2-4. Controller to BTC Signals

Signal	Remarks
LISTEN–	This one clock time signal causes the BTC to fetch four list words.
RF4EN	This signal indicates which Register File Register in the BTC contains the address of the first list word.
MEMEN–	This one clock time signal activates the BTC data transfer controllers. Upon activation, these controllers begin transferring data to/from CPU memory.
DEVREAD	This signal indicates whether data is being transferred to or from CPU memory.
ACK–	This signal indicates that the disc controller is ready to transfer a word to the BTC (if reading from the disc) or that the disc controller has taken a data word from the BTC (if writing on the disc).
COUNT	This signal will be disabled so that the second status word stored will be the list address.
DECOUNT–	This one clock time signal decrements the sector counter in the BTC.
STATEN–	This signal activates the BTC status controller.
INTEN–	This signal indicates that status will be stored via interrupts.
TWOSC	This signal indicates that two status words will be stored.
BUSY–	This signal indicates the disc controller is busy.
BTCLR–	This signal resets all active controllers and flip-flops in the BTC and resets the disc controller.

Table 2-5. Controller to Disc Signals

Signal	Description
ADDS(N)–	Cylinder Address. N = 0-7, and 0, A. Nine lines which establish the 9-bit parallel address that defines a track on each disc surface by defining the position of the heads. Logic ZERO for true
RESTORE–	Restore. One line which signals the disc to retract the heads to the home position, cylinder address $(000)_8$. In response to this signal, the Address Register in the disc is also set to $(000)_8$ and an address acknowledge (ADSACK–) is issued by the disc. Logic ZERO for true
ADDSST–	Cylinder Address Strobe. This signal is used by the disc for sampling the cylinder address lines and the restore line. This signal is held until either the address acknowledge signal or the attention signal is issued by the disc. Logic ZERO for true
HS–	Head Select. This signal selects one of the two heads for the purpose of reading or writing. Logic ZERO selects upper head. Logic ONE selects lower head.
WG–	Write Gate. This signal controls the current for the write coil. Logic ZERO for current on. Logic ONE for current off.
EG–	Erase Gate. This signal controls the current for the erase coil. Logic ZERO for current on. Logic ONE for current off.
DS–	This signal selects either the fixed or the removable disc. A logic "0" selects the removable disc and a logic 1 selects the fixed disc.
WDNCLK–	Write Data and Clock. This line carries the multiplexed data and clock pulses for double frequency type recording on the disc, one complete pulse for each recorded flux reversal. The pulses should have a minimum width of 100 nanoseconds and the leading edge transition time at the disc should be less than 50 nanoseconds, negative going leading edge.
SELU(N)	Select Lines. N - 0-3. These lines select and control the input/output lines of an individual disc unit in a daisy-chain system configuration. Up to four direct select lines are provided. Logic ZERO on a line selects the disc unit associated with that line.

Table 2-6. Disc to Controller Signals

Signal	Description
FRY–	File Ready. A signal on this line indicates the disc drive is in the following condition. Proper power is supplied. Disc cartridge is loaded. Door is closed. Disc is rotating at operating speed and heads are in flying position. It is not in the write check condition. Logic ZERO for true
RTS/R/W–	Ready to Seek/Read/Write. A signal on this line indicates the disc is in the file ready condition and it is not in the process of executing a seek operation. Logic ZERO for true
ADSACK–	Address Acknowledge. A signal on this line notifies the controller that a command to move the heads to a specified address has been accepted, and execution of the command has begun. Pulsewidth is 1 μsec. Logic ZERO for true
SKIC–	Seek Incomplete. This signal indicates that, due to some malfunction, a seek operation was not completed by the disc. This signal, once it becomes true, is held until a Restore command is received by the disc. Logic ZERO for true
RCLK–	Read Clock. This line carries pulses representing clock signals that have been separated from data signals during read operation of the disc. Pulsewidth is 50 nanoseconds to 150 nanoseconds (100 nanoseconds nominal). The leading edge should be used as reference. Logic ZERO for true
RD–	Read Data. This line carries pulses representing data signals which have been separated from clock signals during read operation of the disc. Pulsewidth is 50 nanoseconds to 150 nanoseconds (100 nanoseconds nominal). The leading edge should be used as reference. Logic ZERO for true

Table 2-6. Controller to Disc Signals (Continued)

Signal	Description
SECTORM–	Sector Marks. This line supplies one pulse for each of the sector slots as they pass by the sector transducer of the disc drive. The leading edge of these pulses should be used as reference. There will be 24 sector marks per revolution of the disc pack. Logic ZERO for true
INDEXM–	Index Marks. This line supplies one pulse per disc revolution to ensure proper sector identification. It signifies that the next sector mark following this pulse is the sector mark ofr the first disc sector on the track. The leading edge of these pulses should be used as reference. Logic ZERO for true
WCHK–	Write Check. This signal notifies the controller of the following: Due to some malfunction, the disc may not be able to perform adequate write function. Temporary voltage fluctuation has occurred without interrupting operation. The controller generates an offline status if writing is attempted during this condition. Logic ZERO for true.
WPS–	Write Protect Status. When true, this signal indicates to the controller that the disc is under write protect condition. The controller generates a Write Protect status if writing is attempted when this signal is true. Logic ZERO for true
ATTNX–	Attention Line Unit X. X = 0-3. There is one attention line for each disc unit on the controller. The attention line of each unit is active even though that unit may not have been selected by the last ATI Word 1. Refer to Figure 3-11 for use of attention lines.

SECTION III

THEORY OF OPERATION

3.1 GENERAL

The Moving Head Disc Controller may be assigned any channel address on the Direct Memory Access Port. The controller decodes the two-word ATI or ADAC command and, if properly addressed and in a ready condition, acquires the list words from the specified location (if required).

The controller transfers data to or from CPU memory as 16-bit words with a maximum rate of 156.2K words/second. Data transfer between the controller and the disc is in bit-serial form at a rate of 2.5M bits/second.

List operations may be chained so that the controller performs many operations with only one ATI or ADAC command issued from the CPU. The interrupt capability may be enabled or disabled in any or all of the lists. When the operation is completed (or aborted) the appropriate status of the controller and/or disc unit is stored in the memory location assigned to the channel address of the controller.

Figure 3-1 is a generalized flowchart of the controller. This flowchart shows the major logic paths followed by the control logic when executing a disc operation.

3.2 LOGIC ORGANIZATION

The Moving Head Disc Controller is divided into two major logic sections: the Block Transfer Control (BTC), and the Disc Control Logic (DCL). The reason for this division is that the BTC provides the basic interface circuitry for interfacing to the Direct Memory Access Port Expander and is available as an aid to controller design. The BTC is fully documented in the Block Transfer Controller Maintenance Manual. Therefore, only the basic operation is mentioned here.

The DCL provides the necessary read/write and seek control necessary for completing the interface of the disc to the DMAP Expander. Figure 3-2 is a block diagram of the DCL logic areas, the BTC registers, and gating pertinent to the disc controller.

3.3 BLOCK TRANSFER CONTROL

The Block Transfer Control logic section provides the circuitry required to interface to the DMAP Expander. This logic includes capabilities to perform the following functions:

1. Decode the device (channel) address bits of an ATI or ADAC Word 1 and determine whether the disc controller is being addressed.

2. Accept the Activate Word 2 if addressed by Word 1 (and the controller is not busy), and store this word in the register file.

3. Acquire the initialization list from the address specified by Activate Word 2 and save the four list words as appropriate.

4. Execute memory cycles to either fetch or store data as required by the Disc Control Logic.

5. Decrement the sector counter as indicated by the DCL, and notify the DCL when counter reaches zero.

The Block Transfer Control executes the above functions as described in the following paragraphs. Refer to the BTC Maintenance Manual for detailed information.

3.3.1 **ACTIVATE WORD MONITORING.** The first activate word is accepted by the BTC if the address bits (13 through 15) indicate that the disc controller is being addressed and if the DCL is not busy. If both of these conditions are true, the word is stored in Register File 1 (RF1) and bits 8, 9, 10 and 11 are presented to the DCL along with a strobe indicating the presence of a (buffered) ATI or ADAC word. If the DCL is busy, the BTC presents the first word as above, but it is not stored in the register file. In either case, the DCL decodes bits 8, 9, 10 and 11 to take the appropriate action as described in later sections.

If properly addressed by Activate Word 1, and the DCL is not busy, Activate Word 2 is accepted and stored in Register File 3(RF3). This word is presented to the DCL along with a strobe indicating its presence. The DCL does not use this word, though the strobe is utilized by the DCL Activation Control logic. This word will be stored in RF3 until required for list acquisition.

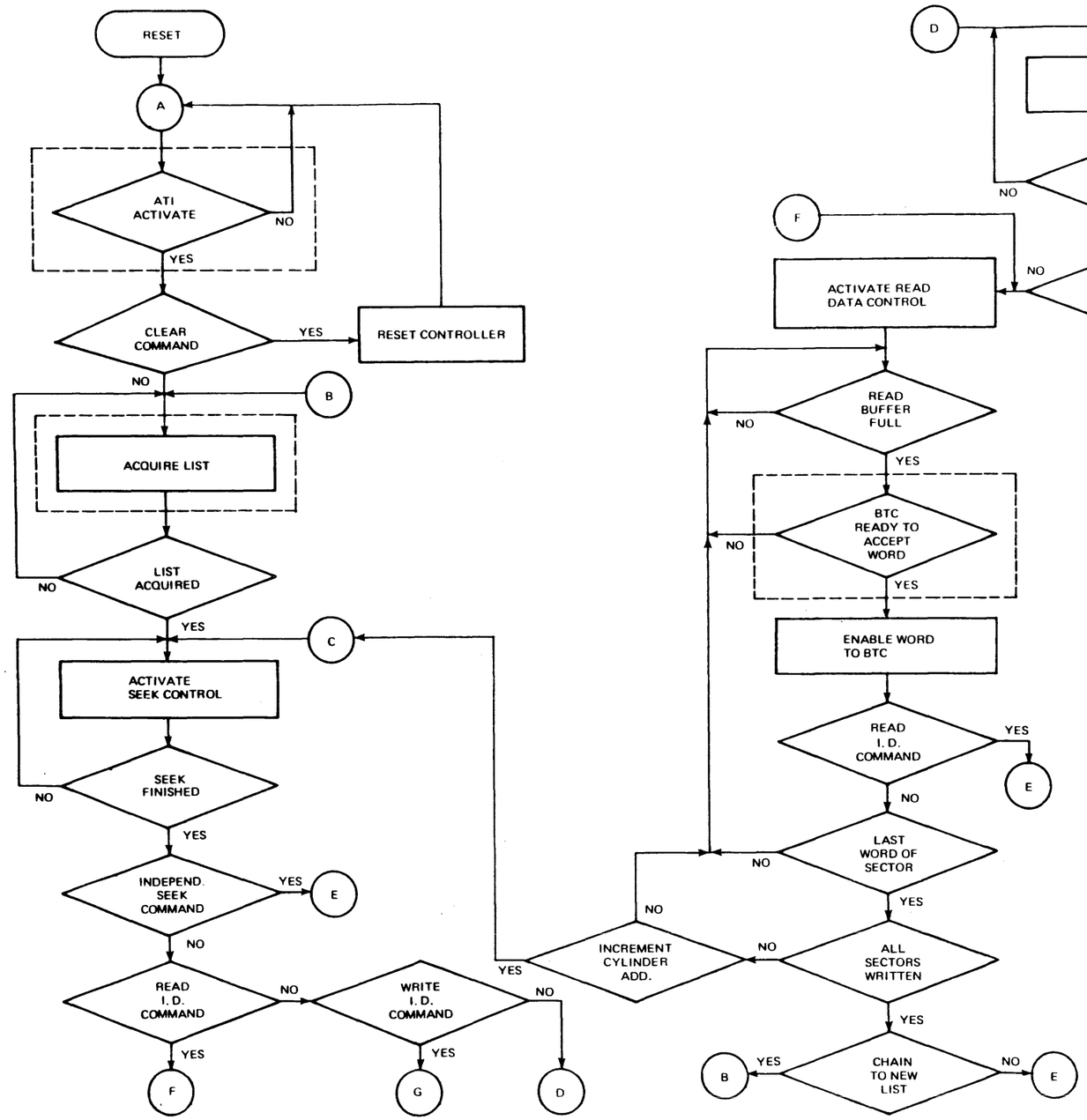
3.3.2 **LIST ACQUISITION.** The disc controller acquires the initialization list through activation of the BTC by the DCL. When the DCL issues a list enable (LISTEN), the BTC checks the RF4EN signal to determine where the list address is stored. RF4EN equal to a logic ZERO indicates that the list address is stored in Register File 3 (RF3). RF4EN equal to a logic ONE indicates that Register File 4 (RF4) contains the list address. RF4EN is reset to logic ZERO each time a list acquisition is initiated following an Activate 2 strobe. Thereafter, RF4EN is toggled after each list acquisition when chaining. The contents of the various registers in the BTC are outlined in table 3-1.

3.3.3 **MEMORY CYCLE EXECUTION.** The Disc Control Logic (DCL) indicates to the BTC whether a Read or Write command is to be executed, and whether data is to be acquired from memory or stored in memory. The appropriate memory cycle execution begins when the DCL issues a memory enable (MEMEN) to the BTC.

For a disc write operation, the BTC begins acquiring data from the starting data address (indicated by List Word 1). The BTC presents the data to the DCL as required. Register Files RF1 and RF2 are utilized as buffer storage until the DCL requests a new data word, so the BTC is normally two words ahead of the DCL. This means that two extra words are acquired by the BTC during a write operation, but this is of no consequence since they are not requested by the DCL.

For a disc read operation, the BTC begins storing data when the DCL indicates that a data word is ready to be transferred. The BTC has the capability of buffering two words from the DCL while the DCL is acquiring a third word, but normally the BTC will have stored a data word before the next word is acquired by the DCL.

3.3.4 **STATUS STORAGE.** A status cycle is initiated by the BTC when the DCL issues a status enable (STATEN). The status storage is preceded by an interrupt if the interrupt enable signal (INTEN) from the DCL so indicates. The DCL also indicates that two status words are to be stored (TWOSC). The first status word is supplied by the DCL, which is requested to do so by the BTC after a status cycle has been initiated. The second word, the address of the initialization list, is supplied by the BTC. Status storage memory cycles and data transfer memory cycles may be executed (interleaved) as required.



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NOTE
AREAS WITHIN DASHED LINES ARE BTC FUNCTIONS. OTHER AREAS ARE DCL FUNCTIONS.

Figure 3-1. Disc Controller General Flowchart

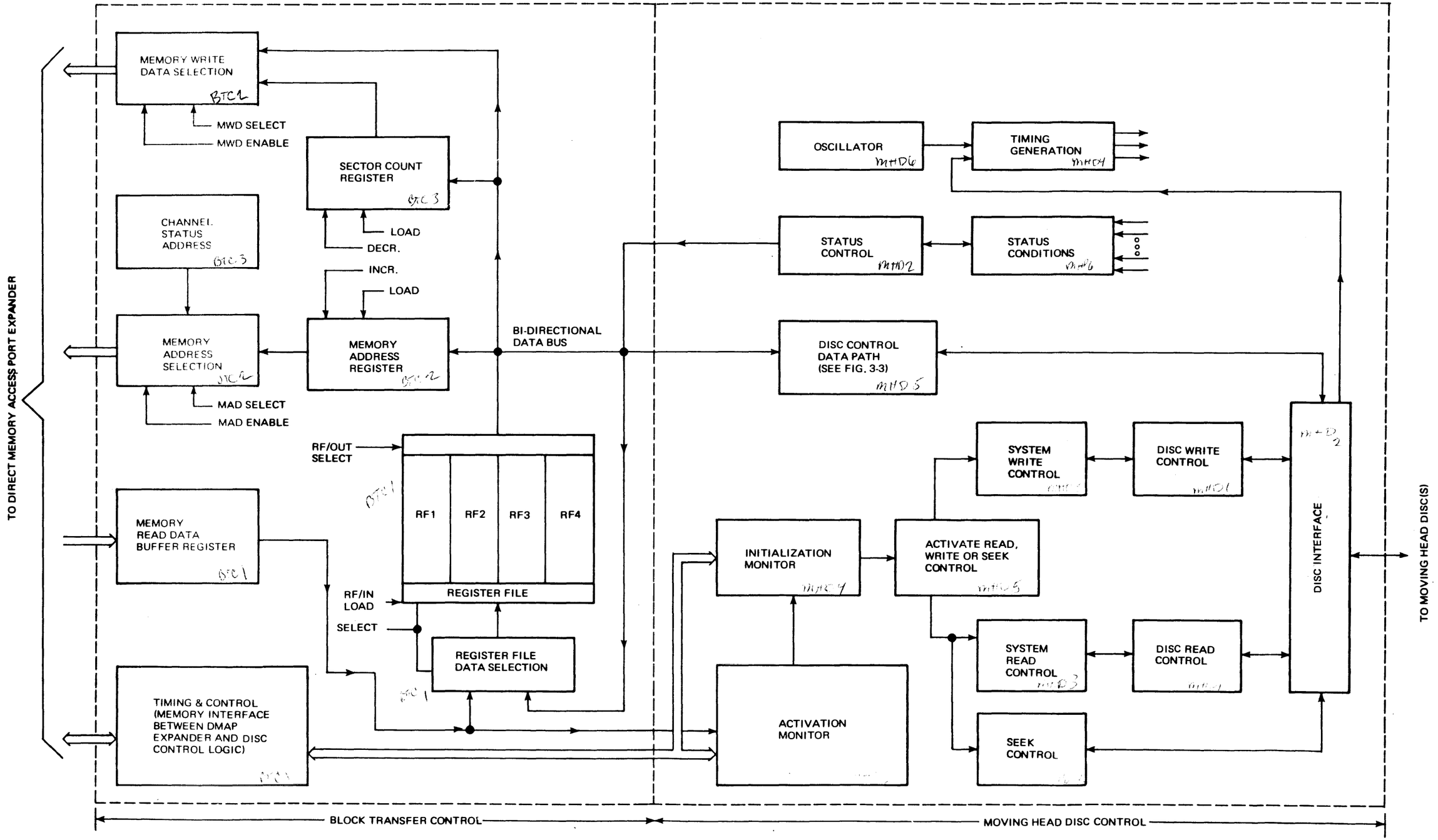

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Figure 3-2. Disc Controller Block Diagram

Table 3-1. BTC Register Content

	STROBE OR ENABLE (SEE NOTE 1)	RF4EN (SEE NOTE 2)	BTC REGISTER CONTENT							
			REGISTER FILE 1 (RF1)	REGISTER FILE 2 (RF2)	REGISTER FILE 3 (RF3)	REGISTER FILE 4 (RF4)	MEMORY ADDRESS REGISTER	SECTOR COUNT REGISTER		
	ACTIVATE 1	———	ACTIVATE WORD 1	———	———	———	———	———		
	ACTIVATE 2	———	ACTIVATE WORD 1	———	ACTIVATE WORD 2 (LIST ADDRESS)	———	———	———		
INITIAL LIST ACQUISITION	LISTEN (TO ACQUIRE INITIAL LIST)	0	ACTIVATE WORD 1	———	LIST ADDRESS	———	LIST ADDRESS	———		
	LW1	0	ACTIVATE WORD 1	STARTING DATA ADDRESS	LIST ADDRESS	———	LIST ADDRESS + 1	———		
	LW2	0	SECTOR COUNT	STARTING DATA ADDRESS	LIST ADDRESS	———	LIST ADDRESS + 2	———		
	LW3	0	DCL COMMAND WORD	STARTING DATA ADDRESS	LIST ADDRESS	———	LIST ADDRESS + 3	SECTOR COUNT		
	LW4	0	DCL COMMAND WORD	STARTING DATA ADDRESS	LIST ADDRESS (CURRENT)	CHAIN (LIST) ADDRESS	STARTING DATA ADDRESS	SECTOR COUNT		
	MEMEN	1	———	———	LIST ADDRESS (CURRENT)	CHAIN (LIST) ADDRESS	STARTING DATA ADDRESS	SECTOR COUNT		
CHAIN LIST ACQUISITION	LISTEN (TO ACQUIRE CHAIN LIST)	1	———	———	LIST ADDRESS (PREVIOUS)	CHAIN (LIST) ADDRESS	(CHAIN) LIST ADDRESS	———		
	LW1	1	———	(NEW) STARTING DATA ADDRESS	LIST ADDRESS (PREVIOUS)	LIST ADDRESS (CURRENT)	LIST ADDRESS + 1	———		
	LW2	1	SECTOR COUNT (NEW)	STARTING DATA ADDRESS	LIST ADDRESS (PREVIOUS)	LIST ADDRESS (CURRENT)	LIST ADDRESS + 2	———		
	LW3	1	DCL COMMAND WORD (NEW)	STARTING DATA ADDRESS	LIST ADDRESS (PREVIOUS)	LIST ADDRESS (CURRENT)	LIST ADDRESS + 3	SECTOR COUNT (NEW)		
	LW4	1	DCL COMMAND WORD	STARTING DATA ADDRESS	CHAIN (LIST) ADDRESS	LIST ADDRESS (CURRENT)	(NEW) STARTING DATA ADDRESS	SECTOR COUNT		
	MEMEN	0	———	———	CHAIN (LIST) ADDRESS	LIST ADDRESS (CURRENT)	(NEW) STARTING DATA ADDRESS	SECTOR COUNT		

NOTES:
1. REGISTER CONTENT TRUE AT STROBE TIME OR AS A RESULT OF AN ENABLE FROM THE DCL.
2. RF4EN (REGISTER FILE 4 ENABLE) TO THE BTC IS TOGGLED UPON COMPLETION OF EACH LIST ACQUISITION; INITIALLY RESET TO LOGIC ZERO WITH EACH ACTIVATE 2 STROBE.

3.4 DISC CONTROL LOGIC (DCL)

The Disc Control Logic (DCL) provides the necessary circuitry to control the disc and execute the commands previously described. The flowchart and block diagram shown in figures 3-1 and 3-2, respectively, illustrate the general operation and organization of the DCL and the BTC. The following paragraphs describe the DCL in detail.

The DCL is comprised of eleven major subsections as follows:

Registers

Timing Generation

Activation Monitor

Initialization List Monitor

Seek Control

Identification Control

System Write Control

Disc Write Control

System Read Control

Disc Read Control

Status Control

3.5 DCL REGISTERS

The DCL Registers are used to assemble/disassemble data, contain command information, and contain addressing information. Table 3-2 lists and describes the DCL Registers. Figure 3-3 shows the registers in the DCL path and figure 3-4 shows the registers associated with command and addressing.

Table 3-2. DCL Registers

Register	Function
Input Data Buffer Register (MRDXX/MHD XX=00-15)	Accepts data from the BTC and provides sufficient drive for all controller register inputs to which data may be routed. Data is loaded into the appropriate register by selective clocking.
Data Buffer Register (MWDXX/MHD XX=00-15)	Provides a one-word buffer which allows the BTC to have two-word times in which to perform a data transfer between the DCL and the BTC.
Shift Register (SHXX XX=00-15)	Provides the parallel to serial conversion when writing on the disc. Provides the serial to parallel conversion when reading from the disc.
Parity Register (CRCXX XX=00-15)	Generates the parity on information being transferred to/from the disc.
Status Register (STATXX XX=00-15)	Contains the status of the controller and/or disc. The content of this register is the first status word stored.

Table 3-2. DCL Registers (Continued)

Register	Function
Command Register (chain, commx X=1-3)	Loaded with bits 0 through 3 of List Word 3. This register determines what type of operation the controller will perform. (Read, Write, Seek, etc.)
Head Address Register (UPHD/Q)	Loaded with bit 7 of List Word 3. This register determines which surface of the disc the controller will read/write.
Cylinder Address Register (CYLADX X=0-7 and 0, A)	Loaded with bits 6, and 8 through 15 of List Word 3. This register determines which cylinder of this disc the controller will read/write/seek. This register is incremented at the occurrence of an automatic cylinder increment. (See figure 2-3.)
Unit Number Register (LIUNX X=0-1)	Loaded with bits 9 and 10 of ATI or ADAC Word 1. Selects the disc unit which will be read/written/ seeked.
Disc Select Register (SELCAR)	Loaded with bit 11 of ATI or ADAC Word 1. Selects the disc (fixed or removable) which will be read/written/seeked.
Sector Address Register (SECADX X=0-6)	Loaded initially with bits 1 through 7 of List Word 2. Contains the sector address at which reading/ writing will begin. This register is reset to zero during an automatic track increment. (See figure 2-3.)
Write Lockout Register (WLKOUT/Q)	Loaded with bit 3 of List Word 3 for a Write I.D. command. Loaded with bit 0 of the I.D. word for a Read or Write Data command. Determines whether or not data is write protected.
Next Sector Address Register (even cylinders) (NXSEADEVX X=0-6)	Contains the address of the next sector which will come under the read/write head on the disc. Used for even numbered cylinders. (See figure 2-3.)
Next Sector Address Register (odd cylinders) (NXSEADODX X=0-6)	Contains the address of the next sector which will come under the read/write head on the disc. Used for odd numbered cylinders. (See Figure 2-3.) This register runs 180°out of phase with the N.S.A. Register for even cylinders. When the N.S.A. Register for even cylinders contains 00_{10}, this register contains 44_{10}.
Independent Seek in Progress Register (SKNGX/Q X=0-3)	This 4-bit register (1-bit for each disc unit) indicates which disc unit(s) are performing an independent seek.

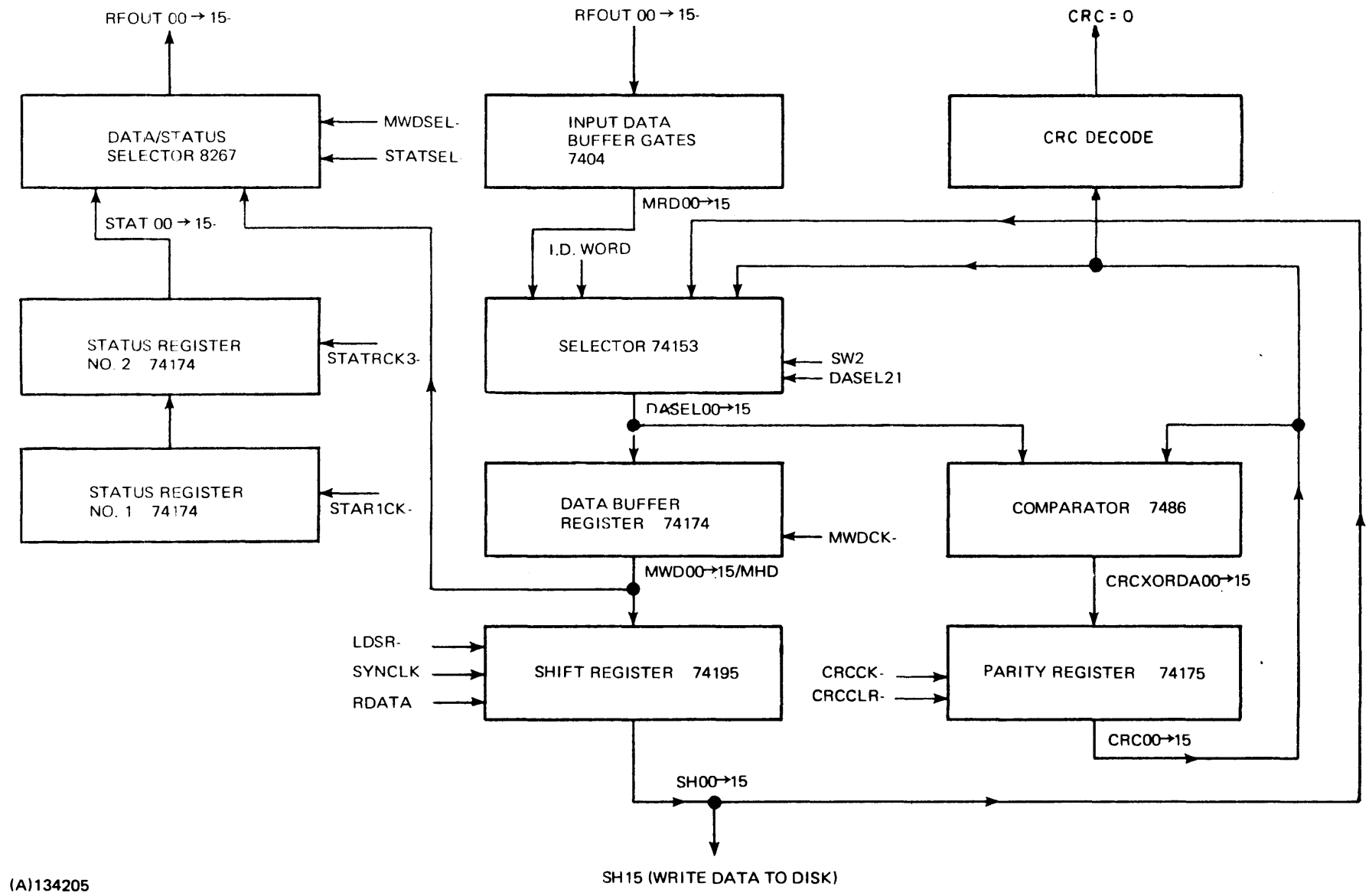


Figure 3-3. DCL Registers, Data Path

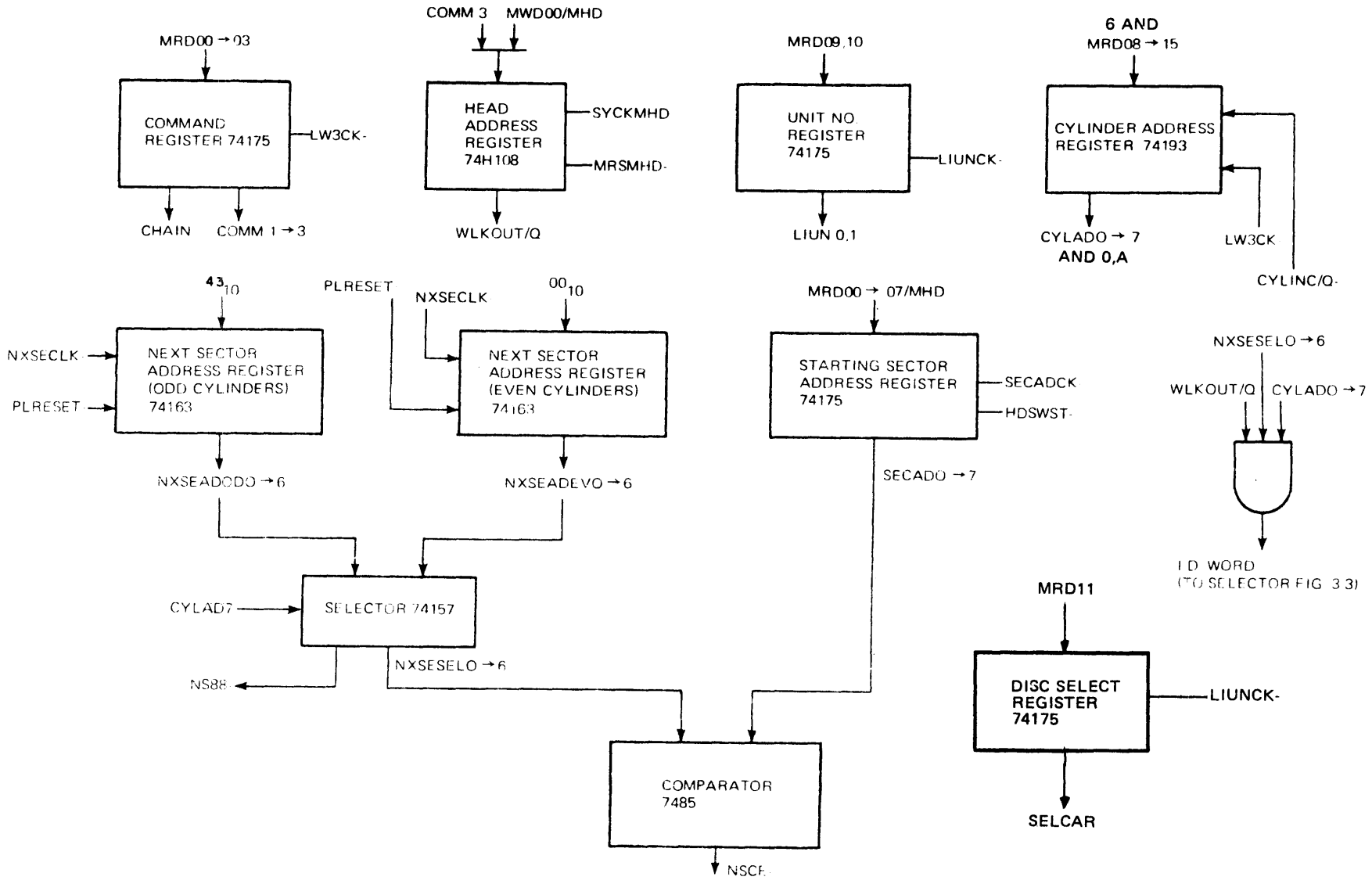


Figure 3-4. Command and Sector Addressing Registers Block Diagram

3.6 TIMING GENERATION

The sector pulses which segment the disc surface into 89 sectors are provided by the Sector Pulse Generator (SPG). The SPG consists of a phase-locked loop (PLL) which generates a high-frequency signal of approximately 1.5 MHz synchronized to the disc speed and a counter which divides the high frequency down to the sector pulse frequency. Figure 3-5 is a block diagram of the SPG.

3.6.1 PHASE-LOCKED LOOP. The phase-locked loop (PLL) is a frequency feedback system comprised of a phase comparator, a filter, and voltage-controlled oscillator (VCO). In addition, a frequency divider may be inserted in the feedback path for frequency multiplication application such as is required in the SPG.

The PLL basic principle of operation is briefly explained as follows. With no signal input applied to the system, the error voltage at the input of the VCO (PLVC) is essentially zero and the VCO operates at its free-running frequency. If an input is applied to the system, the phase detector compares the phase and frequency of the input (SECTORM–) with the frequency (PLV1) of the feedback path (the VCO frequency divided by the feedback counter). It then generates an error voltage which is related to the phase and frequency difference between the two signals.

This error voltage (PLF) is then filtered, amplified, and applied to the control input of the VCO. The phase detector is designed so that the error voltage causes the VCO to move in a direction which decreases the phase and frequency difference at the phase detector. When the input frequency is sufficiently close to the feedback frequency, the PLL locks or synchronizes to the input frequency and continues to track the input for small frequency or phase deviations. The lock-on and transient characteristics of the PLL are determined by the phase detector, filter, and VCO characteristics.

3.6.2 SECTOR PULSE GENERATOR DETAILS. The moving head disc drive, TI Part Number 973780-0008, provides 24 sector pulses and 1 index pulse per revolution from the disc hub. The speed of the disc is 2400 rpm ±2%. Additionally, there is a ±29 microsecond variation in the sector pulses from the disc due to manufacturing tolerances. The purpose of the SPG is to utilize the sector and index pulses from the disc to derive 89 sector pulses per disc revolution with less than a ±10 microsecond variation from actual physical disc locations.

The PLL components of the SPG consist of an MC4044P phase detector and amplifier integrated circuit, and an MC4024P VCO integrated circuit. The PLL circuit and counters are shown in figure 3-5. The blocks labeled 'Phase Det.' and 'Charge Pump' form the complete PLL phase detector. The output of this section, A, is a signal (PLF) that is normally between 2 and 3 volts with 0.7 volt (0 to 10 microseconds wide) positive and negative pulses superimposed. These pulses are the error-correction pulses produced by the phase detector due to a phase or frequency error at its inputs. The active filter formed by R1, C1, R2, T1, and the amplifier in the MC4044 amplify and filter this signal to provide a nominal 4.0-volt control voltage, B, for the VCO (MC4024). This control voltage also has superimposed error pulses. When viewed on an oscilloscope, these pulses occur immediately before or after the negative transistion of the input signal at the phase detector. The component values in the active filter are chosen to allow the PLL to lock and settle to less than 5 percent in approximately 8 milliseconds with less than 15 percent overshoot. The loop bandwidth in this configuration is 1 KHz.

Figure 3-6 shows the typical timing relationship of the SPG signals. The SPG logic is designed to ensure synchronization and validity of logical sector pulses and sector addresses during startup and disc drive unit switching.

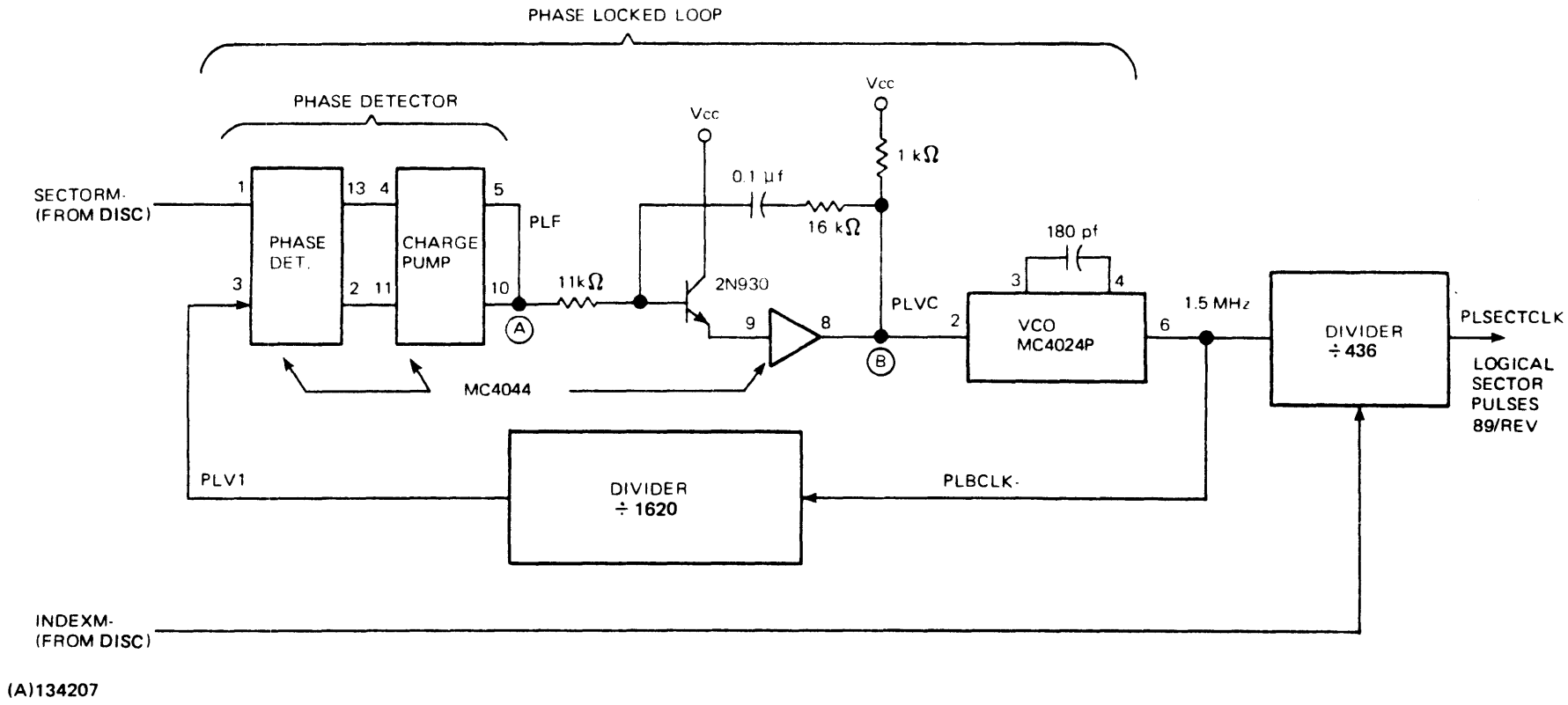
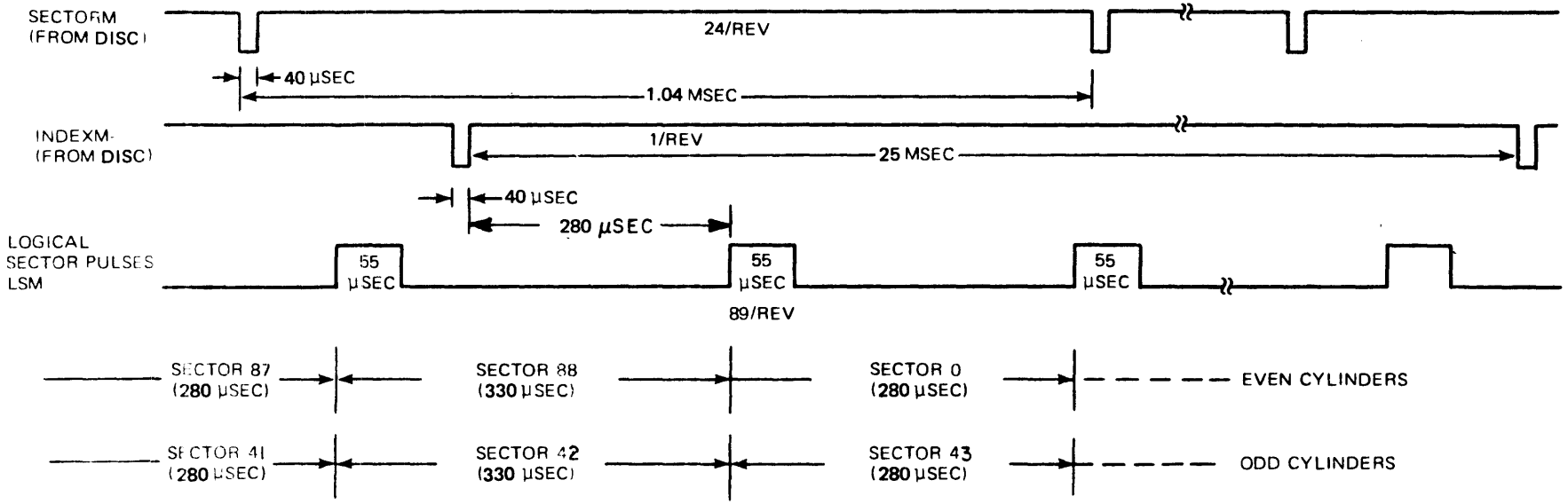


Figure 3-5. Sector Pulse Generator Block Diagram



NOTES:
1. SECTOR 88 CONTAINS NO DATA AND IS USED FOR HEAD SWITCHING.
2. ALL OTHER SECTORS CONTAIN 32 DATA WORDS, 1 PREAMBLE WORD, AND 1 PARITY WORD.
3. ABOVE TIMING IS NORMAL CASE; HOWEVER, DURING FIRST REVOLUTION AFTER ADDRESSING A DIFFERENT DISC UNIT (INDEXM-) MAY OCCUR RANDOMLY.
4. ALL SECTORS ARE NOMINALLY 280µSEC EXCEPT SECTOR 88 ON EVEN CYLINDERS AND SECTOR 43 ON ODD CYLINDERS WHICH ARE 320µSEC
5. ABOVE TIMING IS NOT TO SCALE AND IS FOR REFERENCE ONLY. INDICATED DELAYS MAY VARY DUE TO DISC SPEED AND COMPONENT VARIATIONS.

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Figure 3-6. Sector Pulse Generator Timing Diagram

3.7 ACTIVATION MONITOR

Refer to figure 3-7. The function of the Activation Monitor is to take appropriate action when an activate strobe is received from the BTC. When an Activate Word (ATI1) strobe is received, the DCL decodes bits 8, 9, 10 and 11 of the word. If the activate word is not a Clear command, and the controller is not busy, bits 9, 10 and 11 are loaded into the Unit Number Register (LIUNO&1) and the Disc Select Register (SELCAR).

The BTC will not send an Activate Word 2 (ATI2) strobe if the DCL is busy processing another list. When an Activate Word 2 strobe is received by the DCL, it activates the list acquisition control logic in the BTC (LISTEN–) and selects Register File 3 for the list address by setting RF4EN to a logic ZERO.

3.8 INITIALIZATION LIST MONITOR

Refer to figures 3-8 and 3-9. List word strobes will not be sent by the BTC if the DCL is already processing another list.

List Word 1 (List 1) strobe is not monitored by the DCL since it is the starting data address and is saved in a BTC register.

Only the first 8 bits of List Word 2 are saved by the DCL (the interrupt bit and the starting sector address field). The least significant 8 bits (sector count) are saved in a register in the BTC. That register is decremented by the DCL, and the BTC notifies the DCL when it has decremented to zero.

When List Word 3 (LIST 3) strobe occurs, the DCL loads bits 0 through 3 into the Command Register, bit 7 into the Head Address Register, and bits 8 through 15 into the Cylinder Address Register.

Assuming there is no program error in List Word 2, List Word 4 (LIST 4) strobe activates the BTC data control logic (MEMEN). Also, at this time the Chain List Taken status is set (if applicable) and the Command Register activates the DCL Read, Write, and/or Seek Control Logic.

3.9 SEEK CONTROL

Refer to figure 3-10. The purpose of the Seek Control Logic is to initiate and complete seek operations on the disc (i.e., move the head to the desired cylinder). If there is no error in List Word 2, List Word 4 strobe activates the Seek Control Logic.

3.9.1 SEEK STATE 0 (SK0). SK0 determines whether to initiate a seek on the disc by monitoring several control signals from the disc. If the seek cannot be performed, appropriate status bits are set, status is stored, and the controller resets to its idle condition. If the seek can be performed, SK0 determines if it is to be an ordinary seek or a restore (return the head to cylinder zero). A restore is caused by an invalid cylinder address or a malfunction during a seek.

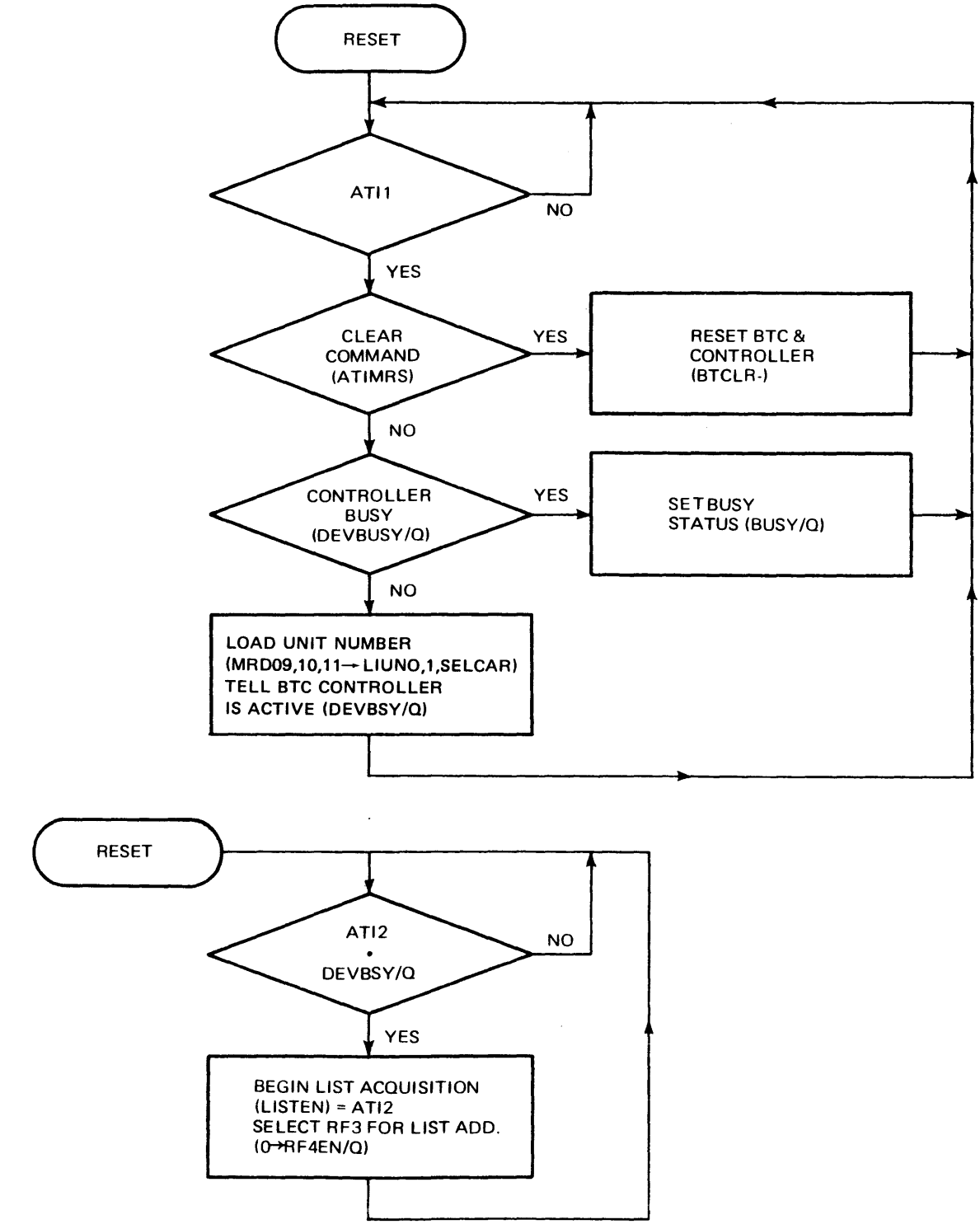

Figure 3-7. Activation Monitor

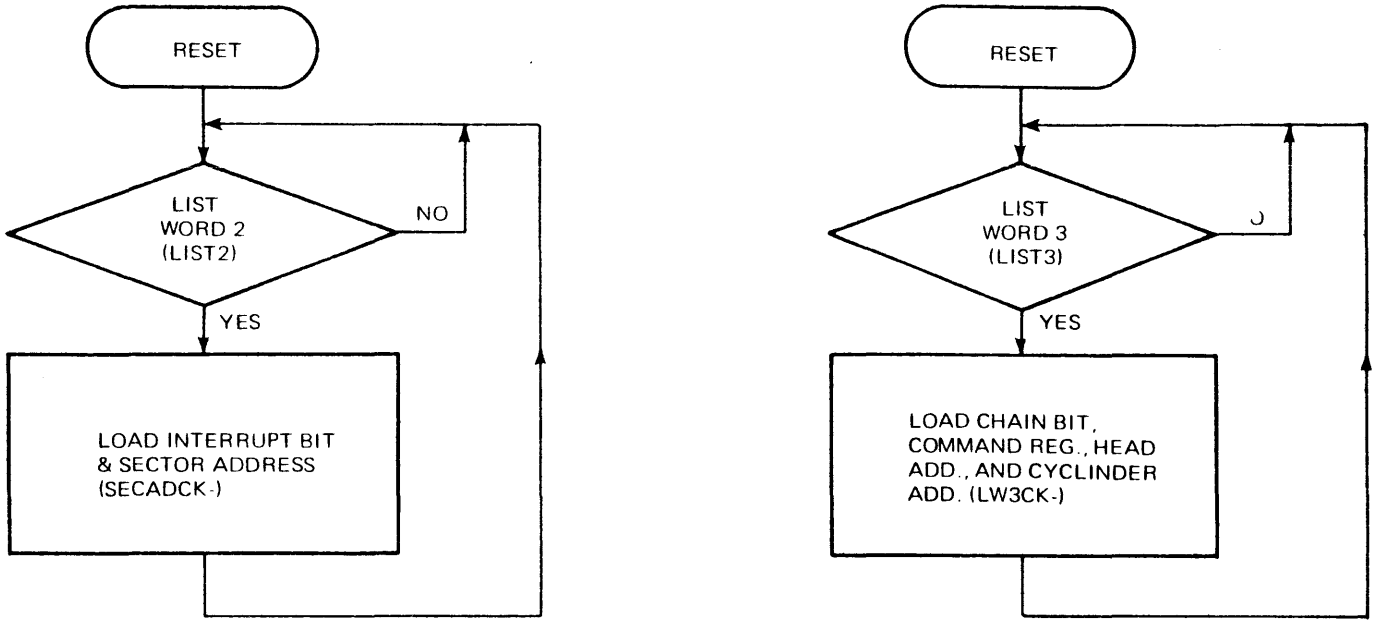

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Figure 3-8. Initialization List Monitor (List Word 2, List Word 3)

3.9.2 **SEEK STATE 1 (SK1/Q).** During SK1, an address strobe (ADSST) is sent to the disc telling it to take the cylinder address which is on the lines. One of the following occurs while in SK1 (refer to figure 3-11):

1. The disc accepts the cylinder address and returns an address acknowledge (ADSACK/Q).

2. The disc does not accept the cylinder address (invalid address) and issues a pulse on the attention line (ATTN) causing a logical address interlock (LAIL).

3. The head is at the desired cylinder and the disc issues a pulse on both the address acknowledge line and the attention line.

3.9.3 **SEEK STATE 2 (SK2/Q).** The function of SK2 is to initiate a restore operation if a LAIL occurred in SK1, activate the independent seek monitor if the command was an Independent Seek, or synchronize the Disc Read Control Logic to the disc by waiting for the trailing edge of a logical sector mark before turning off the Seek Control Logic.

3.9.4 **SEEK STATE 3 (SK3/Q).** The function of SK3/Q is to determine when a restore operation has been completed by the disc. If the restore operation was due to a LAIL, the End of Disc status is set. Otherwise, the restore was initiated due to a malfunction by the disc during a previous seek and the OFF Line status is set.

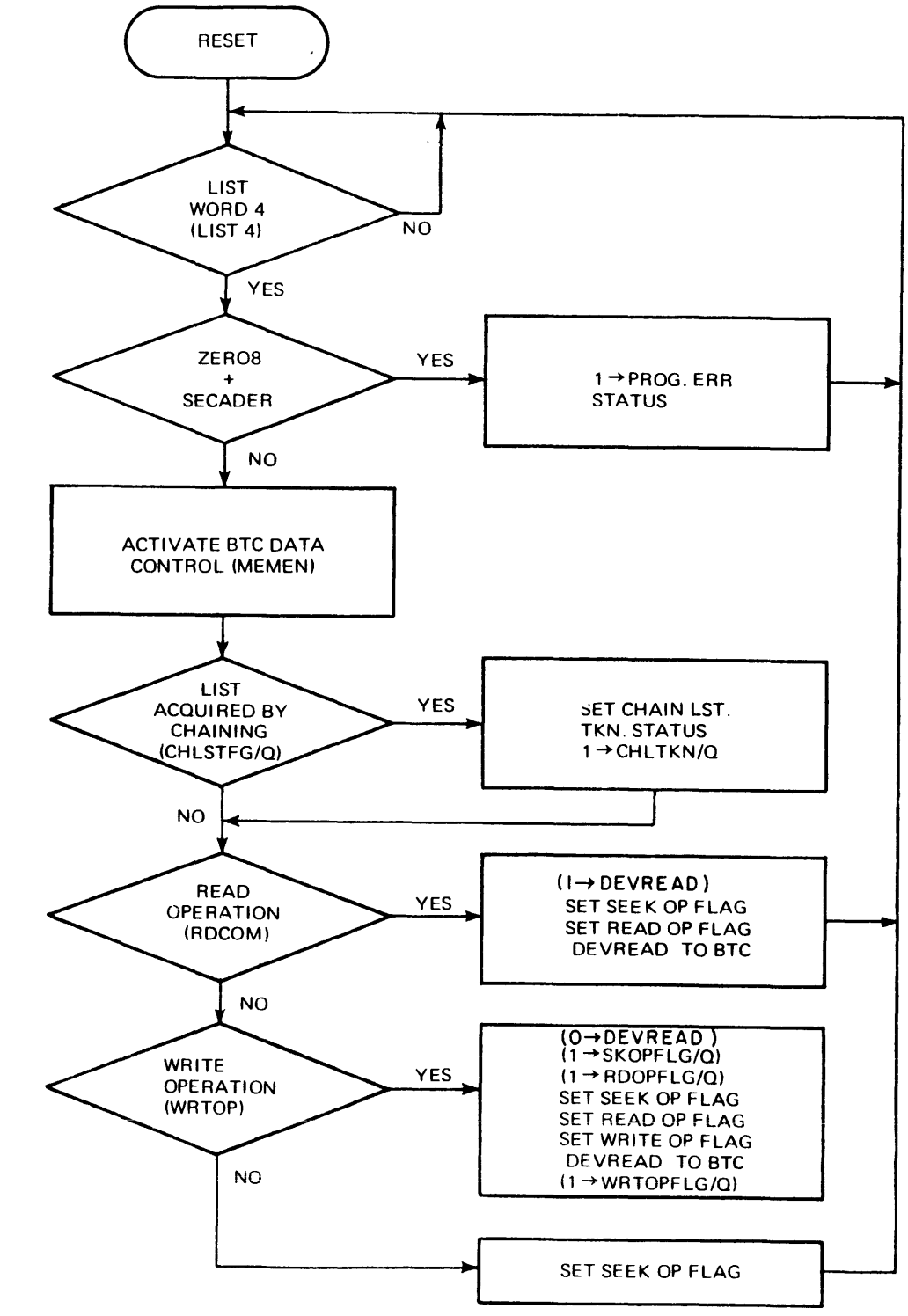

Figure 3-9. Initialization List Monitor (List Word 4)

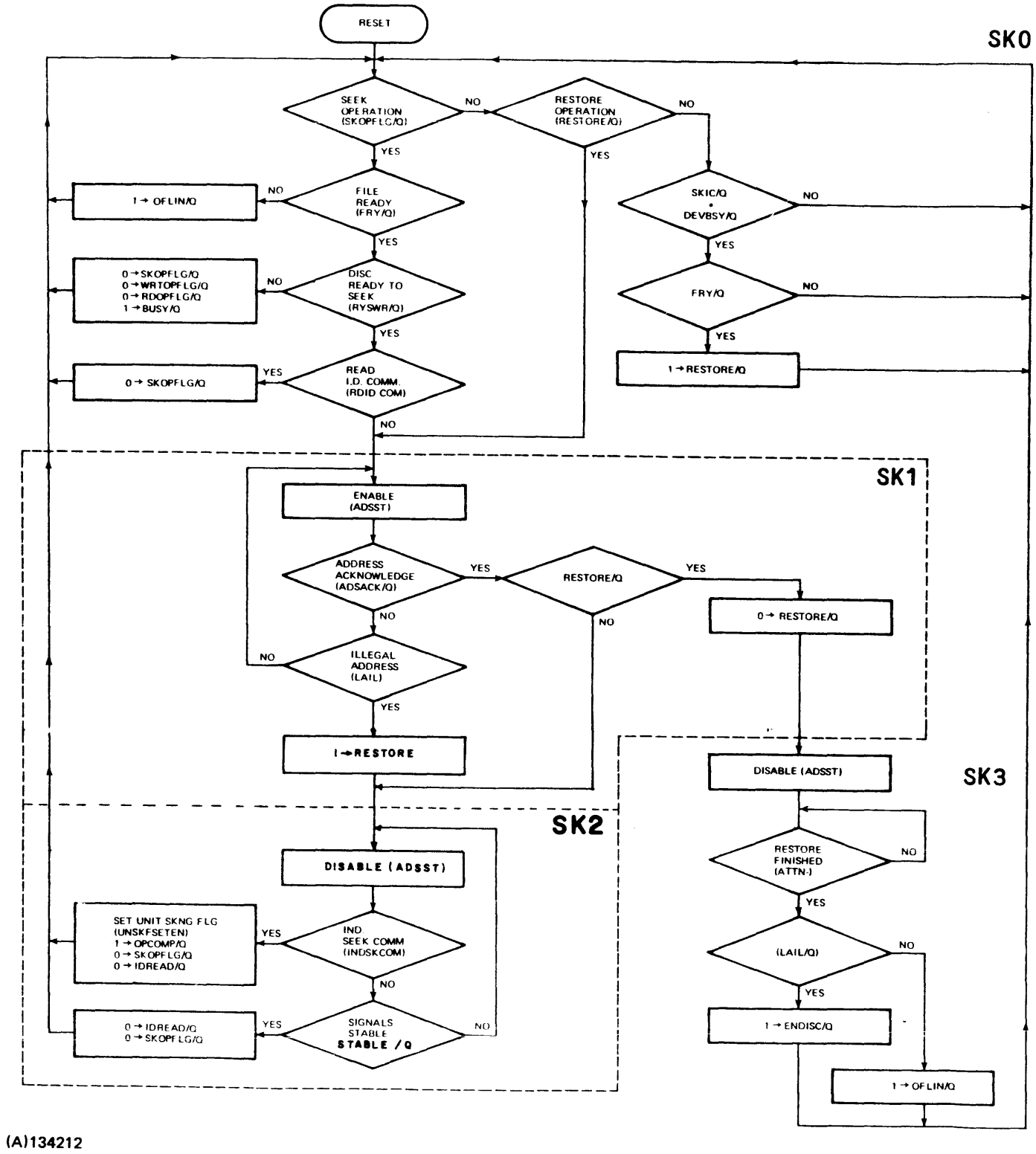

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Figure 3-10. Seek Control

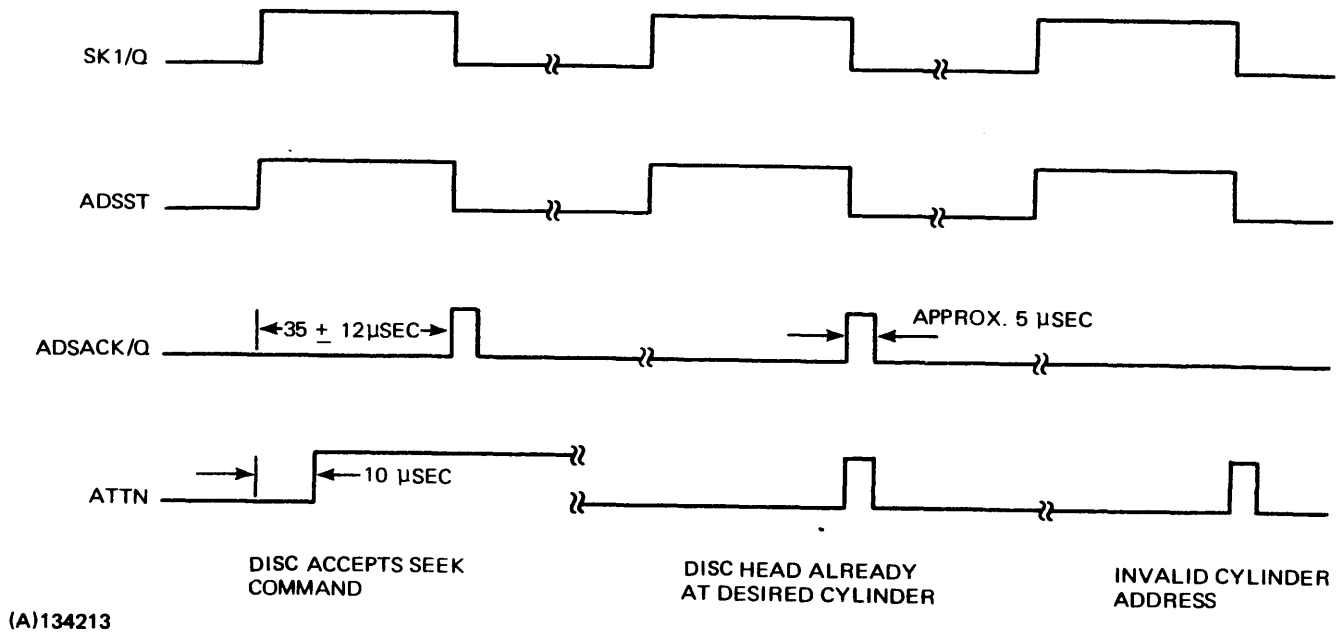

Figure 3-11. Disc Response to Seek Command

3.9.5 **INDEPENDENT SEEK MONITOR (ISM).** Refer to figure 3-12. If a valid Independent seek is initiated in SK1, SK2 sets the independent seek in progress bit (SKNGX/Q, X=0→3) of that unit. When a disc completes an Independent Seek, the ISM sets the Independent Seek Finished status for that unit (SKFINX/Q, X=0→3). The occurrence of an Independent Seek Finished status causes an immediate status storage cycle whether or not the controller is active. An Interrupt precedes the status storage only if interrupts were enabled by the last List Word 2 that was received by the controller. It is possible for more than one disc unit to be seeking while a data transfer is occurring on another unit.

3.10 IDENTIFICATION WORD VERIFICATION

The I.D. word verifies that the disc has seeked to the correct cylinder. The controller performs an I.D. check prior to every read or write operation and if an automatic cylinder increment occurs while reading or writing. The I.D. check logic is included in the System Read and Disc Read Control Logic.

3.10.1 **SYSTEM READ STATE 0 (SR0).** List Word 4 (LIST 4) strobe activates the System Read Controller if a read or write operation is going to be performed. Once activated, SR0 monitors the Seek Controller. When the Seek Controller has finished and the Command Register indicates a read data or write data operation and the I.D. word has not been checked, SR0 initiates an I.D. check cycle by sending a start signal (DRSRTF/Q) to the Disc Read Control Logic. When the Disc Read Controller reaches State 2 (DR2), the desired I.D. word (Cylinder Address Register, Head Address Register, next Sector Address Register) is loaded into the Parity (CRC) Register. (Refer to figure 3-22.)

3.10.2 **SYSTEM READ STATE 1 (SR1/Q).** SR1 waits for the I.D. word to be read and loaded into the Data Buffer Register and the Parity Register. (Refer to figure 3-13.) When the buffer contains a word, indicated by BUFFUL/Q, the next system clock turns off SR1/Q.

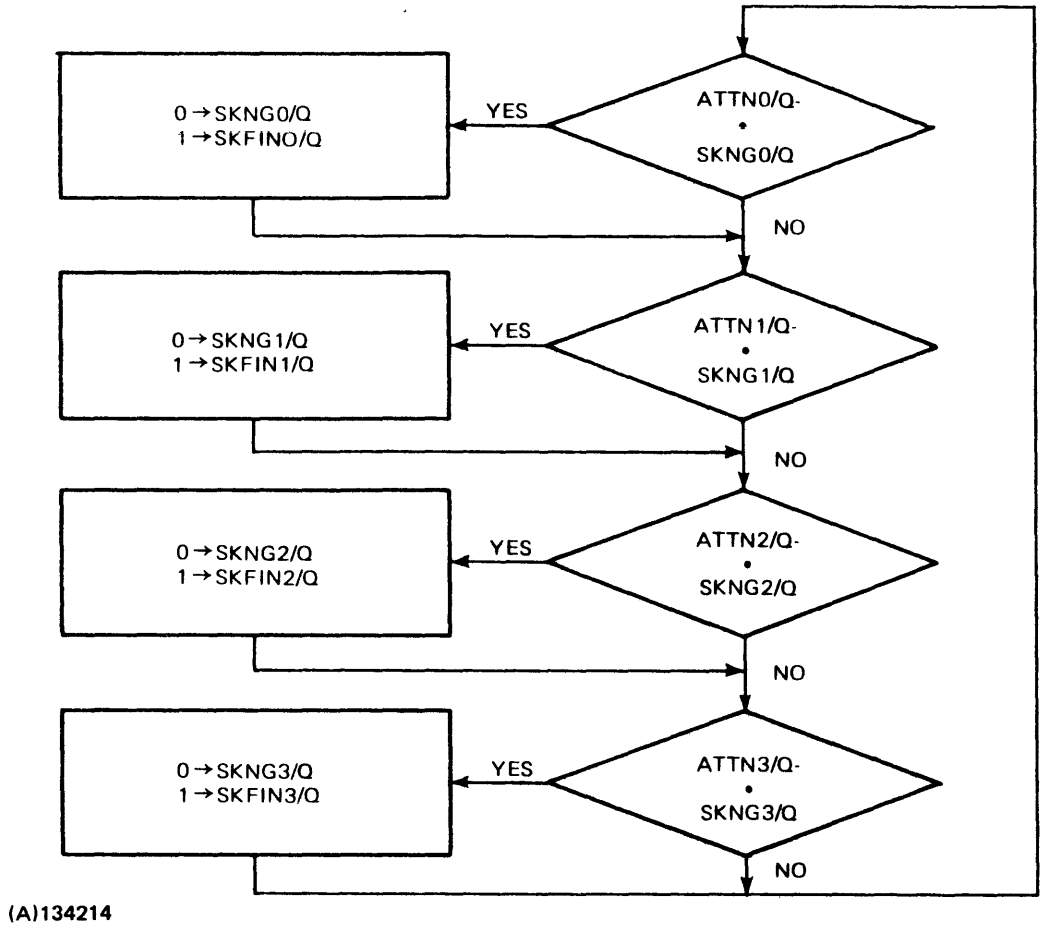

Figure 3-12. Independent Seek Status Monitor

3.10.3 SYSTEM READ STATE 2 (SR2/Q). SR2 waits for the word mark to go away before continuing. This is to ensure that the system control stays in synchronization with the disc control. The content of the Parity Register is then examined. If it is zero, the I.D. word read from the disc was correct. However, if the Parity Register is nonzero, the I.D. Compare Error status is set. An I.D. Compare Error status only terminates a write data operation. Otherwise, processing continues. (Refer to figure 3-24, sheets 1 and 3.)

3.11 SYSTEM WRITE CONTROL

The System Write Control Logic is activated during List Word 4 strobe if the command is a Write or Compare command. Once activated, System Write State 0 (SW0) monitors the System Read Control to determine when to start the write operation. The Read Controller remains active until the disc has completed a seek operation and the I.D. has been verified. The I.D. will be checked if the command is a Write Data or Compare Data but not if it is a Write I.D.

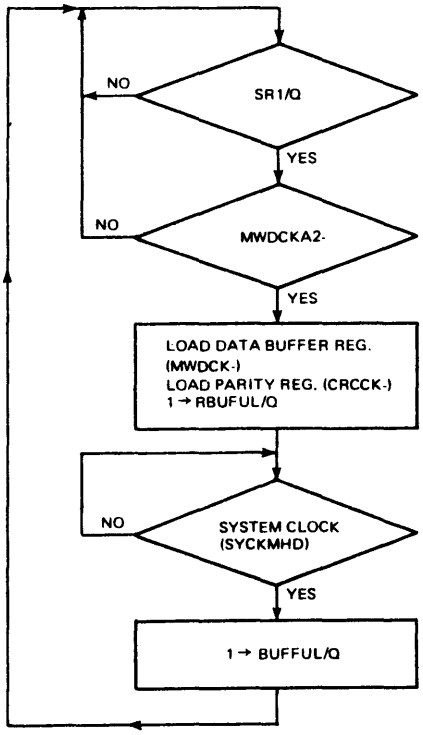

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Figure 3-13. General Flowchart, Data Buffer Register and Parity Register Loading When Reading

3.11.1 **SYSTEM WRITE STATE 0 (SW0).** Refer to figure 3-14. When the Read Controller turns off and if the disc is ready, the sector counter in the BTC is decremented. The Parity Register and the word counter are cleared. The I.D. word/Q flip-flop inhibits incrementing the word counter when the I.D. word is written. Refer to the timing chart in figure 3-15.

3.11.2 **SYSTEM WRITE STATE 1 (SW1/Q).** During SW1, a start signal is sent to the Disc Write Controller (if writing on the disc) or to the Disc Read Controller (if reading from the disc). The I.D. word to be written (or compared) is loaded into the Data Buffer Register. The word mark received indicates that the Disc Write Controller (DRC if comparing) has taken the I.D. word from the Data Buffer Register and loaded it in the Shift Register. (Refer to figure 3-14.)

3.11.3 **SYSTEM WRITE STATE 2 (SW2/Q).** Refer to figure 3-16. The System Write Controller remains in SW2 until all the data words and the parity word for that sector have been written. WS2 obtains the data words from the BTC and holds them in the Data Buffer Register until the disc controller loads the word into its Shift Register. Each time a word mark (WOMKSR/Q) is received from the disc controller, a word has been taken from the Data Buffer Register and loaded into the Shift Register. The next data word is then fetched from the BTC. This process continues until the parity word has been loaded into the Shift Register. At this point, the System Write Controller steps to System Write State 3 (SW3/Q). If a word is not available from the BTC by the time the disc controller is ready for it, a Data Transfer Error status will be set.

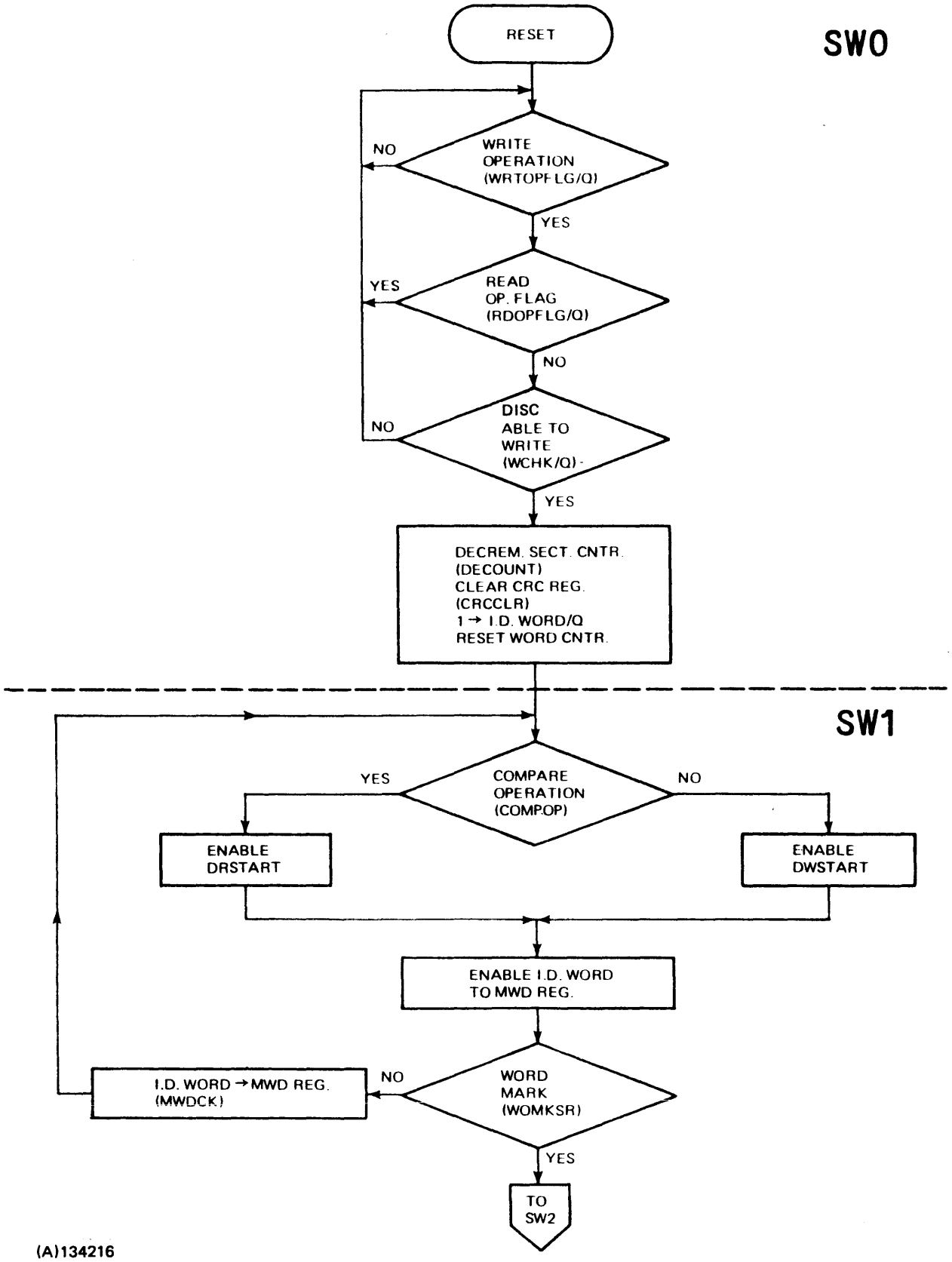

Figure 3-14. System Write Control, States 0 and 1

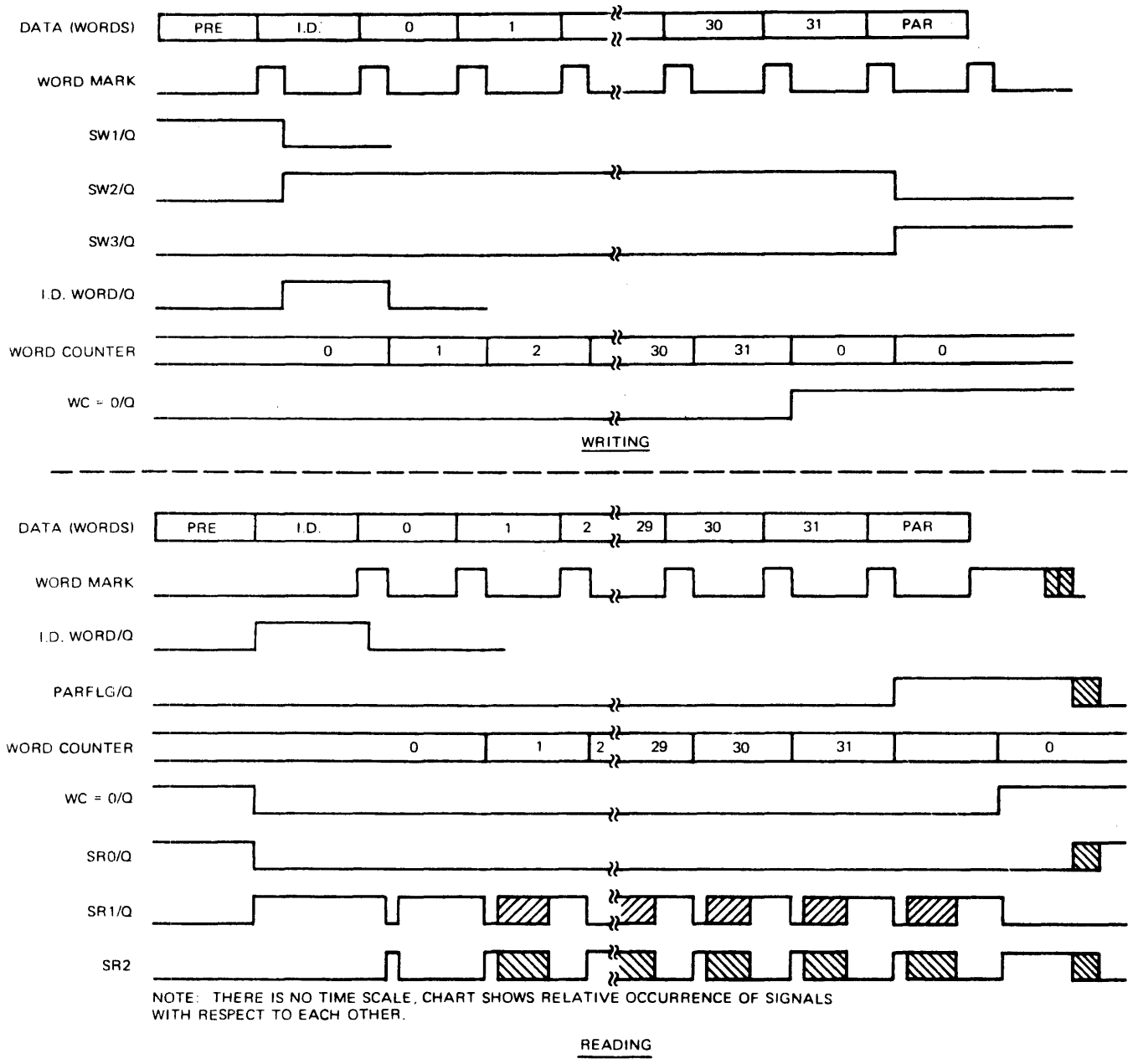

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Figure 3-15. Timing Chart, System Read and Write Controller

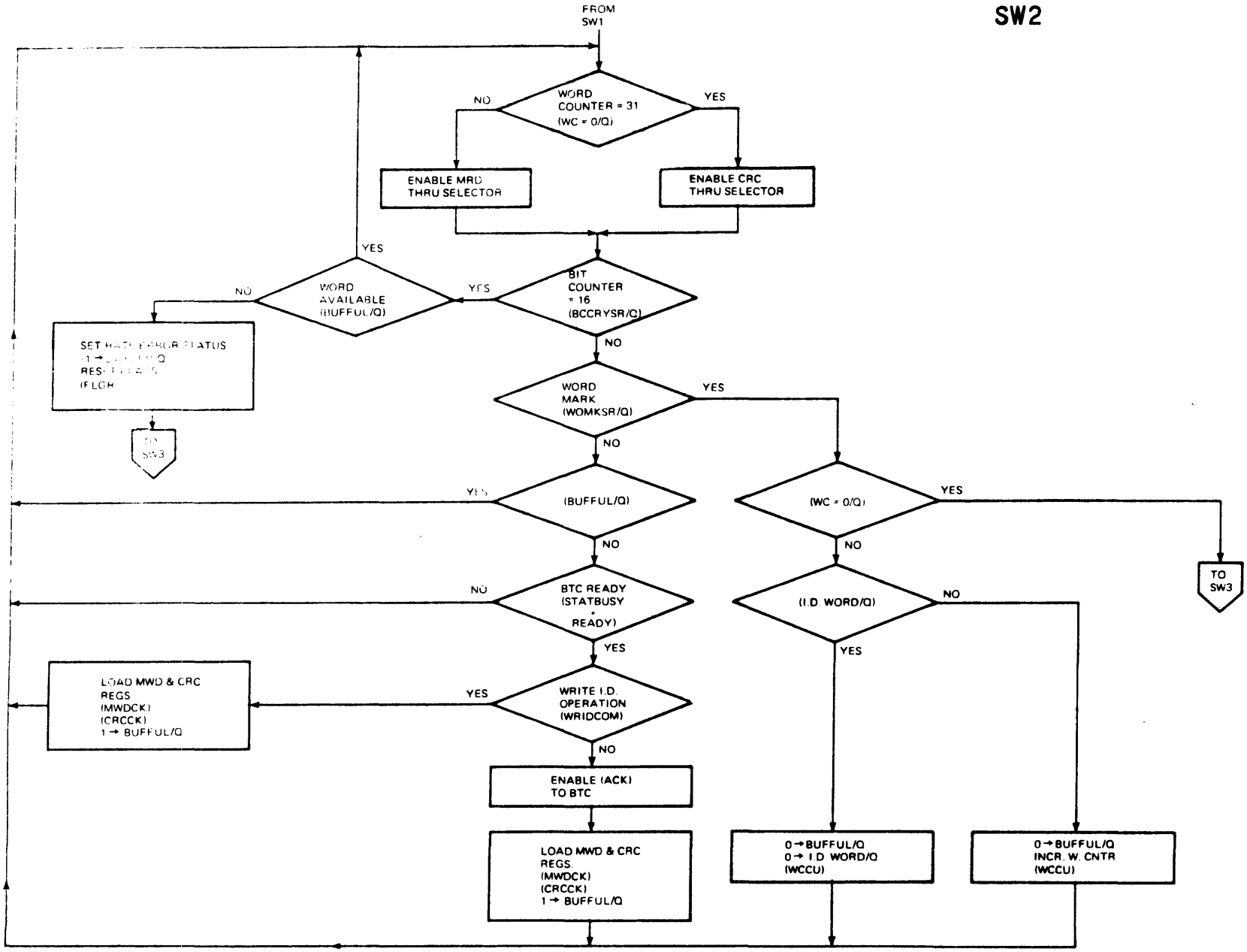

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Figure 3-16. System Write Control, State 2

3.11.4 **SYSTEM WRITE STATE 3 (SW3/Q).** Refer to figure 3-17. SW3 determines if the operation is to be aborted (due to data transfer error or compare error), continued (ZERO8 or CHAIN), or is complete (ZERO8 and CHAIN). If the operation is to be continued (or is finished), SW3 waits for the disc controller to return to its initial state (DR0 and SW0) before continuing. This is to ensure that the system controller stays in synchronization with the disc controller. If all the sectors have not been written (or compared), the system returns to SW0 and the process is repeated. Once all the sectors have been written (compared), the controller chains to a new list (if required) or sets Operation Complete status.

3.12 DISC WRITE CONTROL

The Disc Write Controller provides the necessary circuitry to control the disc when writing. It depends on the System Write Control to furnish data at the proper time and to activate and stop it. Wheras all System Control Logic is synchronized to the CPU (system) clock, all Disc Read and Write Control Logic is synchronized to a clock generated by a crystal oscillator in the controller. The oscillator clock is a square wave signal with a 400-nanosecond period (BITCK).

3.12.1 **DISC WRITE STATE 0 (DW0/Q).** Refer to figure 3-18. Once a start signal (DWSRTF/Q) is received from the system controller, DW0 waits for a logical sector mark. After the LSMF/Q is seen, DW0 must determine if it should write that sector. EQUAL/Q means that at least one sector has been written, but the BTC sector counter is not zero. NSCE means that the next sector is the starting sector at which writing begins. EQUAL/Q, the Write Gate and the Erase Gate Delay are turned on when exiting DW0. The Erase Gate Delay ensures that the Erase Gate and Write Gate are turned on at the same physical point on the disc. Refer to the Diablo Maintenance Manual for details.

3.12.2 **DISC WRITE STATE 1 (DW1/Q).** Refer to figure 3-19. When the Erase Gate Delay times out (20 ±5 milliseconds), the Erase Gate turns on the disc until the logical sector mark signal disappears (LSMF/Q will be 55 milliseconds). When LSMF/Q drops, the Disc Write Control steps to DW2/Q.

3.12.3 **DISC WRITE STATE 2 (DW2/Q).** Refer to figure 3-20. All the words in the sector (preamble, I.D., data, and parity) are written while in DW2. The preamble word is 15 zeros followed by a 1. When writing the I.D., data, and parity words, the least significant bit is written first. The controller multiplexes the data and the data clock (both data and clock are written on the disc). See figure 3-20. After each word is written, DW2 checks if the System Write Control is still in SW2. If the Sytem Write Control has gone to SW3, the sector has been written. DW2 then writes one more clock pulse (this is required when reading) and steps to DW3.

3.12.4 **DISC WRITE STATE 3 (DW3/Q).** Refer to figure 3-21. If all sectors have not been written and the end of the track is not imminent, the Disc Write Controller returns to DW0 and continues. If the end of the track is encountered or all the sectors have been written, DW3 waits for the next sector mark. When the sector mark occurs, the Disc Write Controller steps to DW4 and stops writing on the disc.

The time between the parity word and the next sector mark is about 50 microseconds.

3.12.5 **DISC WRITE STATE 4 (DW4/Q).** When the sector mark (LSMF/Q) turns off (the Erase Gate turns off during the sector mark), DW4 determines if processing is to continue. If all the sectors have been written (ZERO8), the Disc Write Controller returns to DW0 and waits for another start signal from the system controller. If processing is to continue, the disc read/write head is switched and the cylinder address is incremented (if applicable). Refer to figure 2-3, Automatic Track Incrementing.

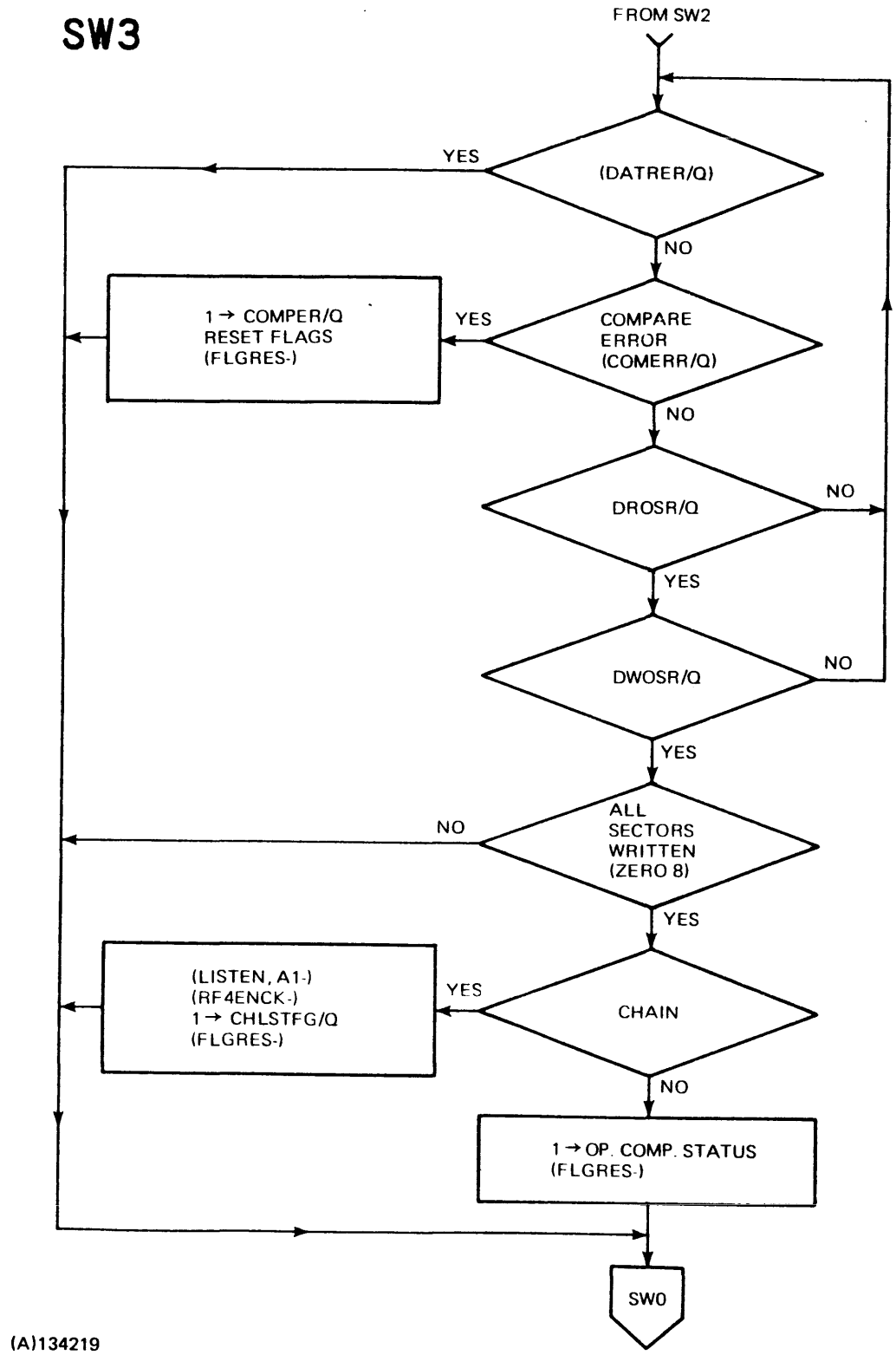

Figure 3-17. System Write Control, State 3

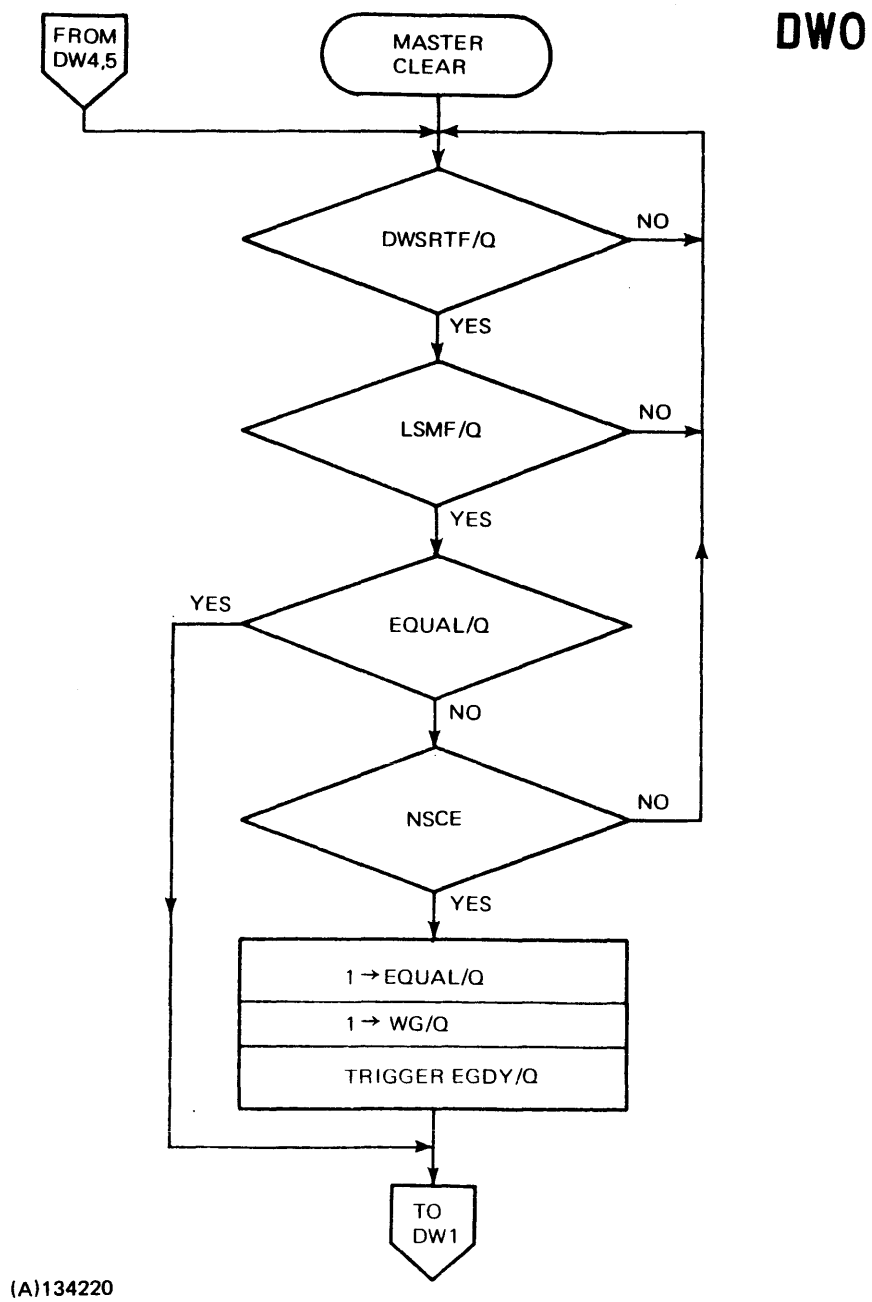

Figure 3-18. Disc Write Control, State 0

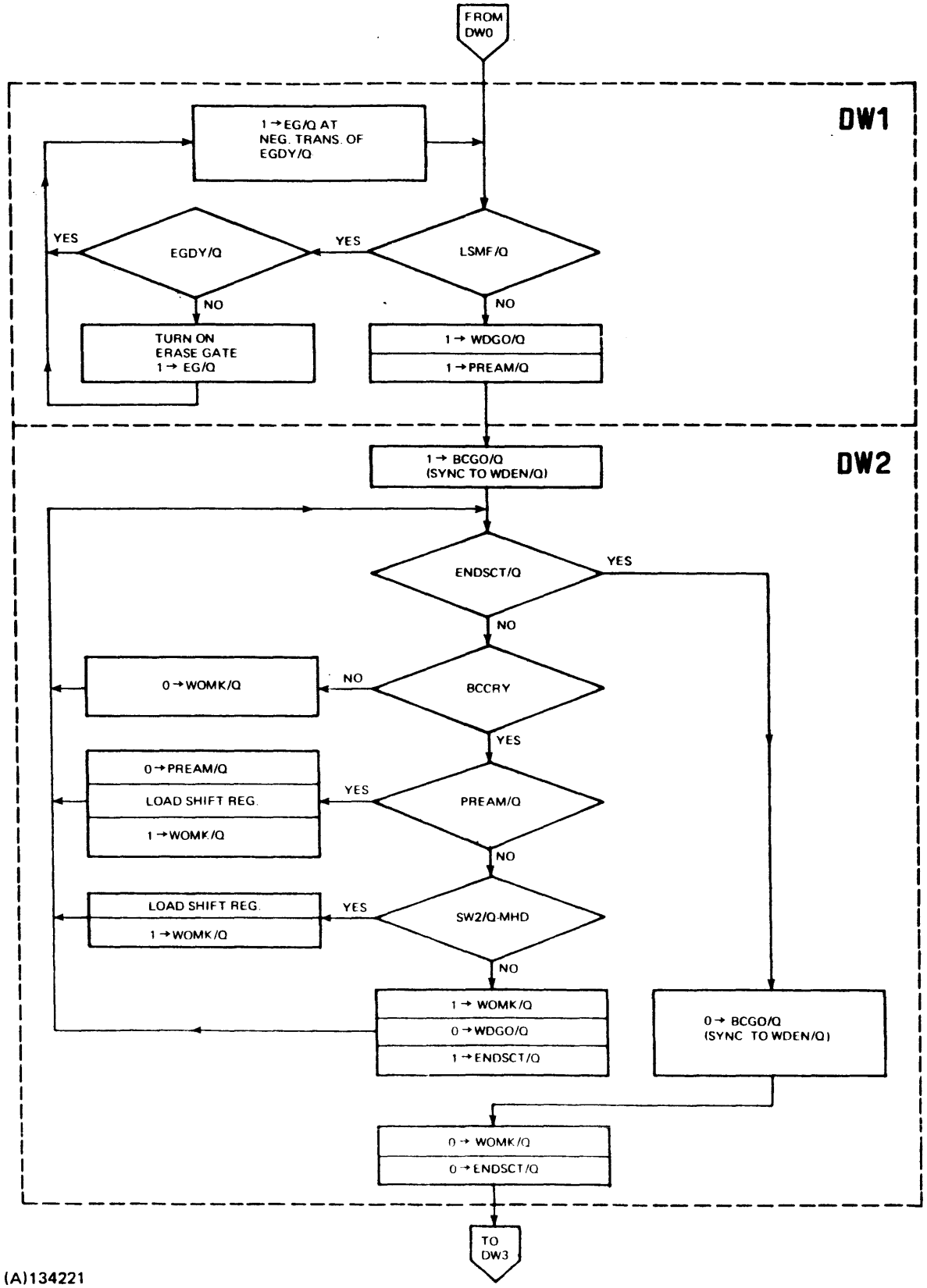

Figure 3-19. Disc Write Control, States 1 and 2

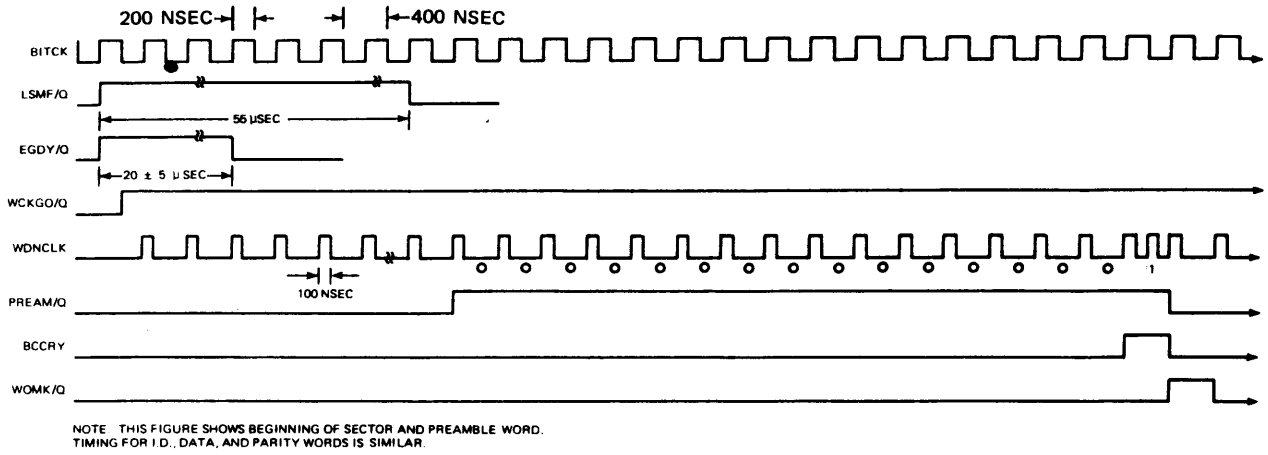

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Figure 3-20. Timing Chart, Disc Write Control

3.13 SYSTEM READ CONTROL

The System Read Controller is activated by the List Word 4 strobe for all Read and Write commands. The System Read Control performs I.D. verification prior to data transfer (not applicable for a Read I.D. or Write I.D. command) and prevents writing on the disc if an I.D. error is encountered. Other functions of the System Read Controller are to accept data from the Disc Read Controller and transfer it to CPU memory via the BTC, and to monitor the BTC and Disc Read Controller in order to set status bits and abort or terminate the list operation. The System Read Controller is synchronized to the CPU (system) clock.

3.13.1 **SYSTEM READ STATE 0 (SR0/Q).** Refer to figure 3-22. The I.D. check operation is detailed in the Identification Word Verification paragraph and will not be discussed in this section. The primary function of SR0 is to determine when to initiate a read or write operation on the disc. It does this by monitoring the Seek Controller to see when the disc has finished seeking. For a Read I.D. command, a start signal is given to the Disc Read Controller. When the DRC reaches its State 2 (DR2/Q), the System Read Controller steps to State 1 (SR1/Q). For a Read Data command and if the I.D. word has been read (whether or not it was correct), a start signal is issued to the Disc Read Controller. When the DRC reaches State 2 (DR2/Q), the Parity Register, Word Counter, and word count equal 0 flip-flops are reset. The sector counter in the BTC is decremented, and the IDWORD/Q flip-flop (used to inhibit the Word Counter) is set.

3.13.2 **SYSTEM READ STATE 1 (SR1/Q).** Refer to figure 3-23. SR1 determines when a word has been read from the disc (refer to figure 3-13) and when to increment the Word Counter. When a word has been loaded into the Data Buffer Register, the System Read Controller steps to SR2/Q.

3.13.3 **SYSTEM READ STATE 2 (SR2/Q).** Refer to figure 3-24 (sheets 1 through 3). To keep the System Read Controller in synchronization with the Disc Read Controller, SR2 waits for the word mark to fall before proceeding. If the I.D. word/Q flip-flop is "on", System Read steps back to SR1 to wait for the first data word. If the WC=0/Q flip-flop is "on", the word just read was the parity word. Once the parity word is read (refer to figure 3-24, sheet 2), SR2 must decide whether to continue with the next sector, terminate, or chain to a new list, and it must check the parity word.

If it is not an I.D. check operation, the data word is transferred to the BTC. Operation Complete status will be set if the command was a Read I.D., otherwise, the System Read Controller Steps back to SR1 and waits for the next word.

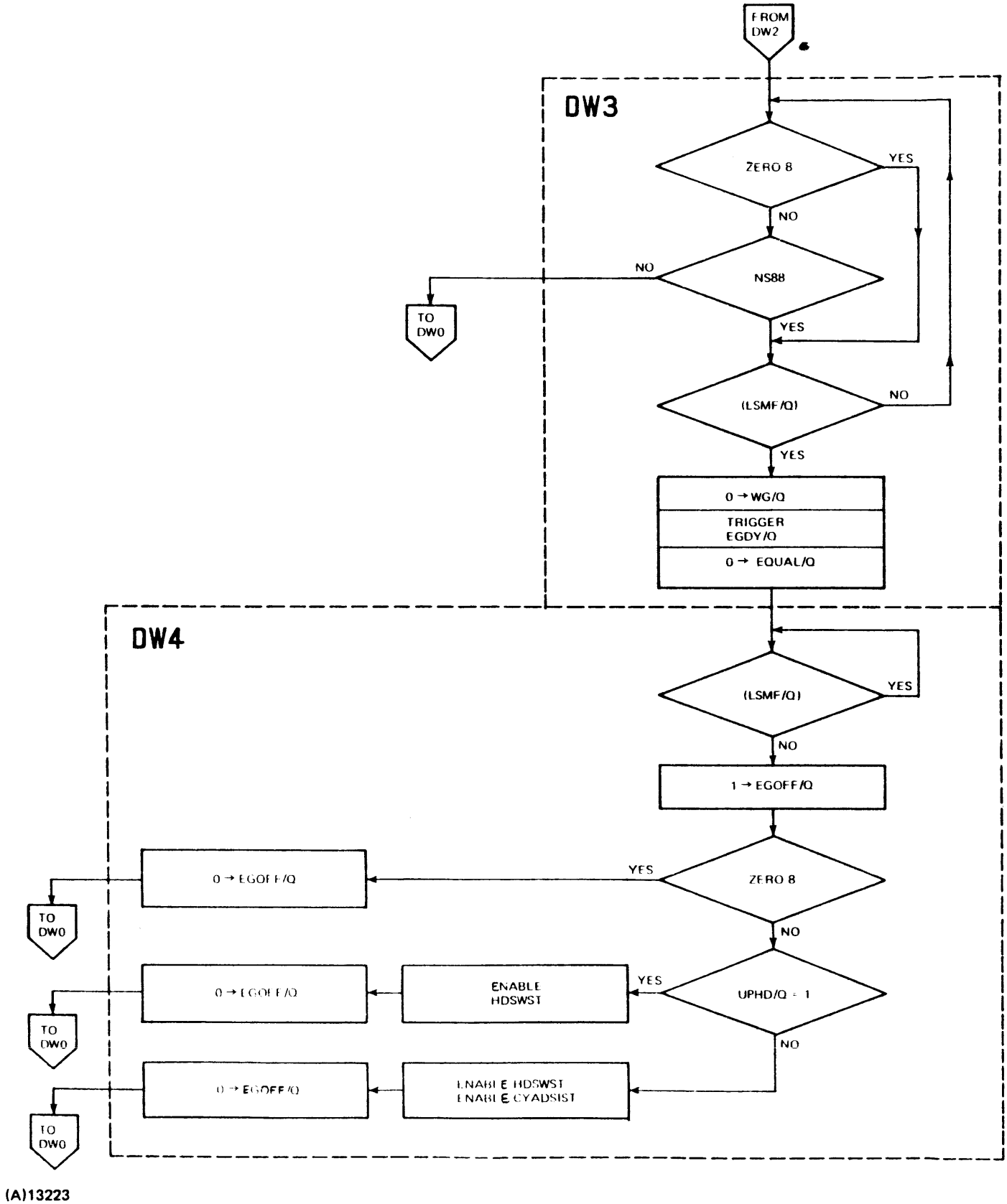

Figure 3-21. Disc Write Control, States 3 and 4

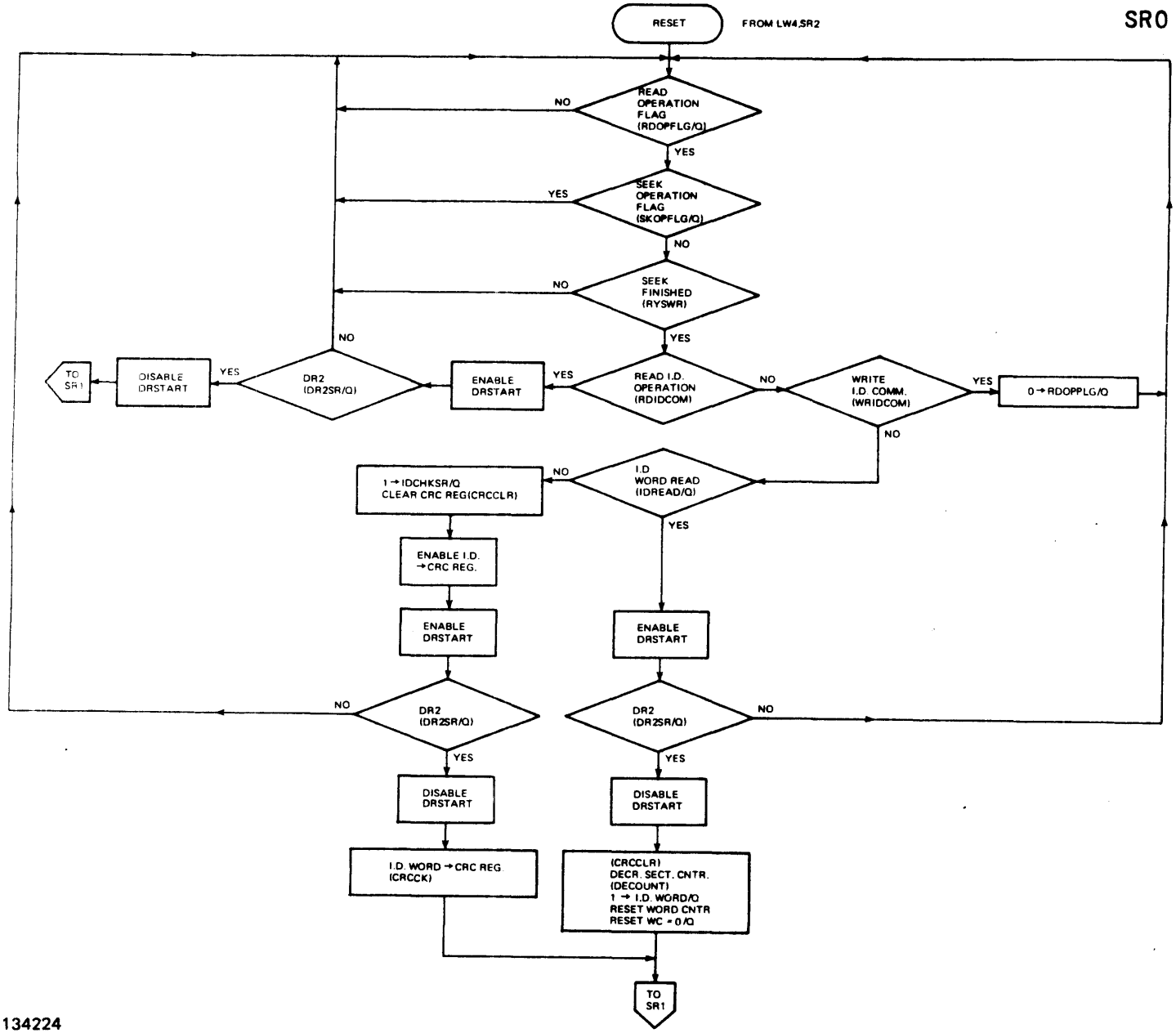

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Figure 3-22. System Read Control, State 0

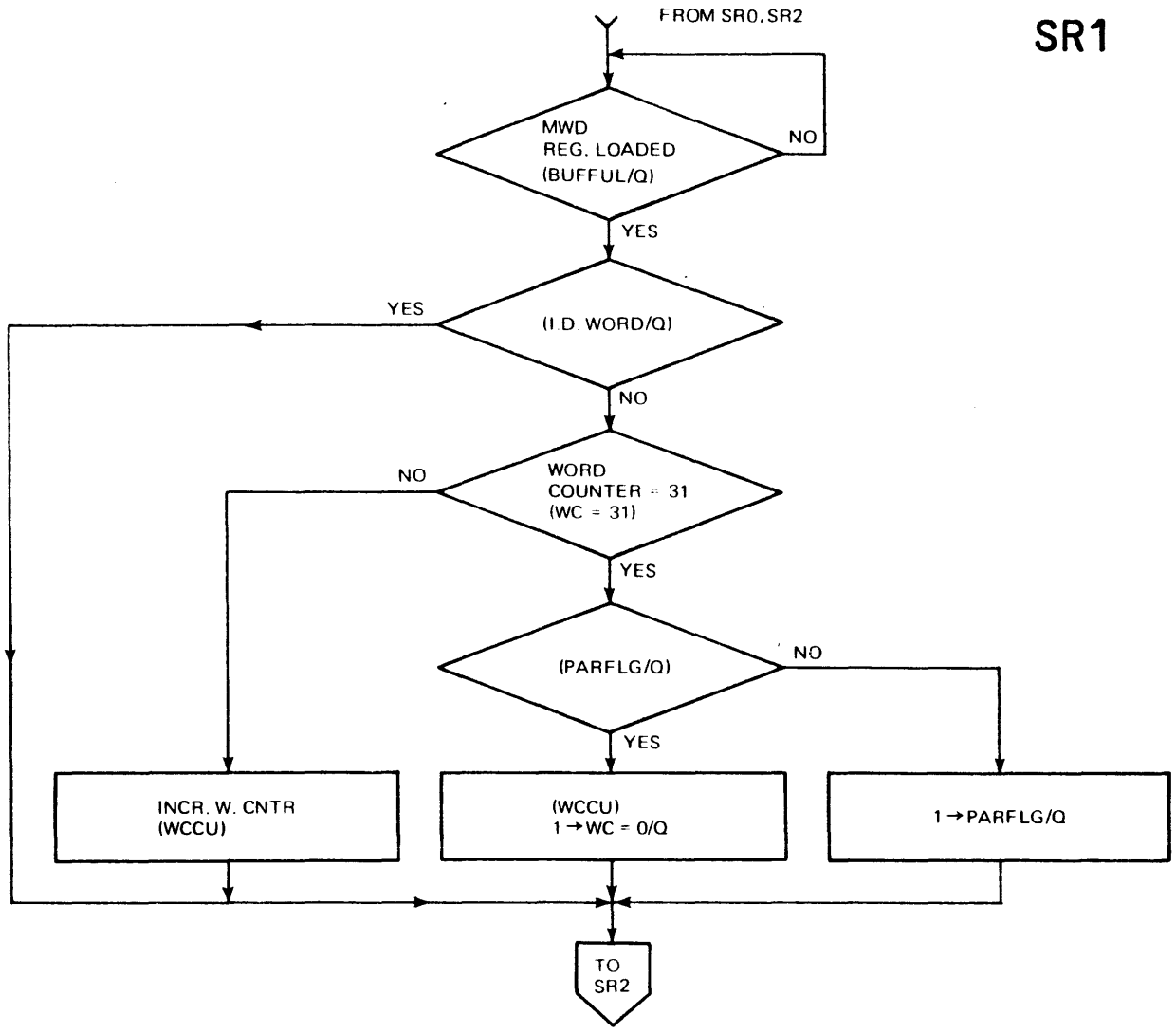


Figure 3-23. System Read Control, State 1

3.14 DISC READ CONTROL

The primary function of the Disc Read Controller (DRC) is to provide the necessary circuitry to retrieve data from the disc and present the information to the system controller. The system control is synchronized to the CPU (system) clock. The DRC is synchronized to the disc via the crystal/and generated clock (BITCK).

3.14.1 **DISC READ STATE 0 (DR0).** Refer to figure 3-25. The DR0 initiates the read operation on the proper sector. The system controller sends a start signal (DRSFTF/Q) when it is ready. Reading commences with the next sector encountered if that sector is not the 89th (switching) sector and if the operation is an I.D. check or Read I.D. command. The EQUAL/Q flag means that at least one sector has been read, the BTC sector counter is not zero (ZERO8) and to continue reading. NSCE (next sector compare equal) means that the next sector is the starting sector at which reading begins.

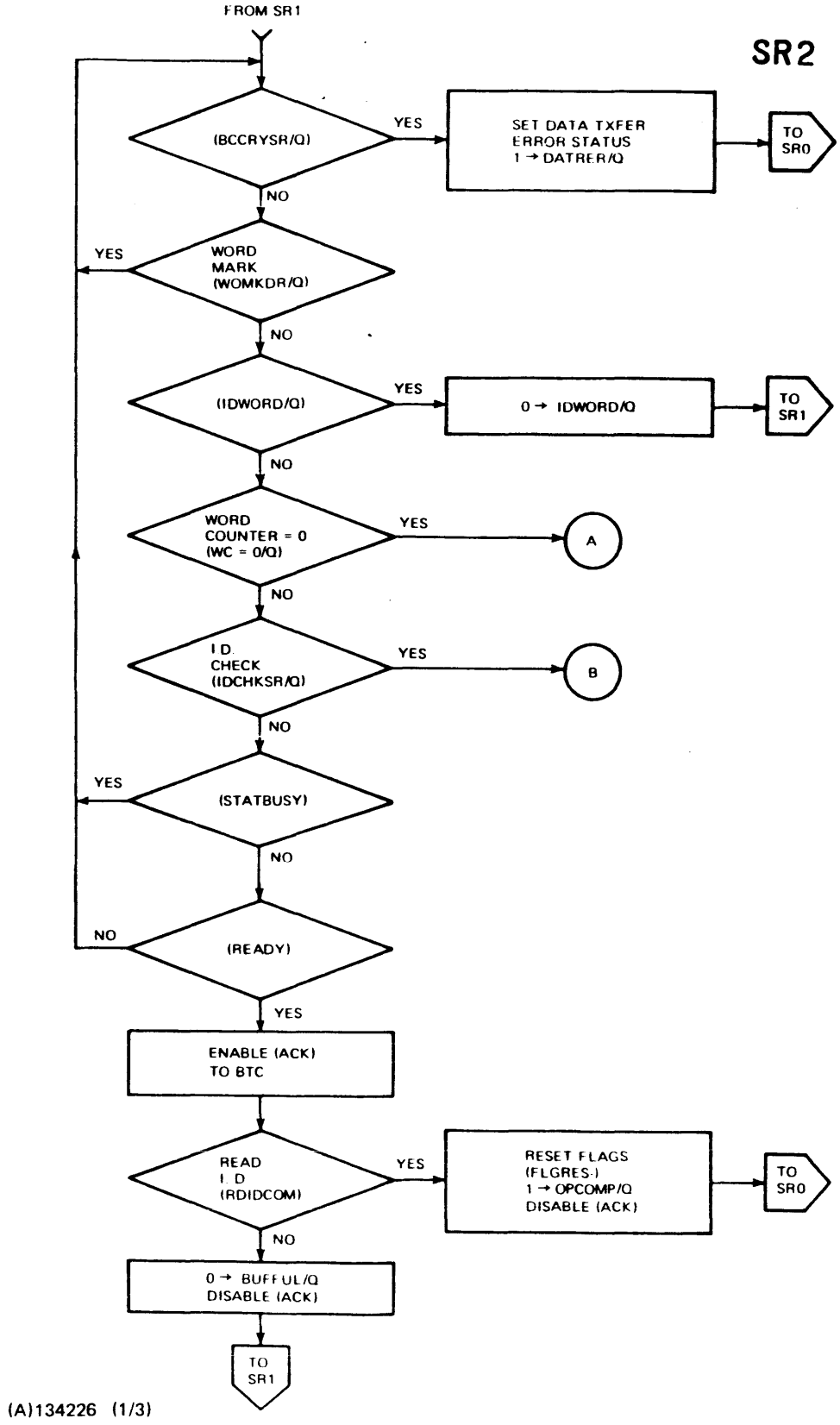


Figure 3-24. System Read Control, State 2 (Sheet 1 of 3)

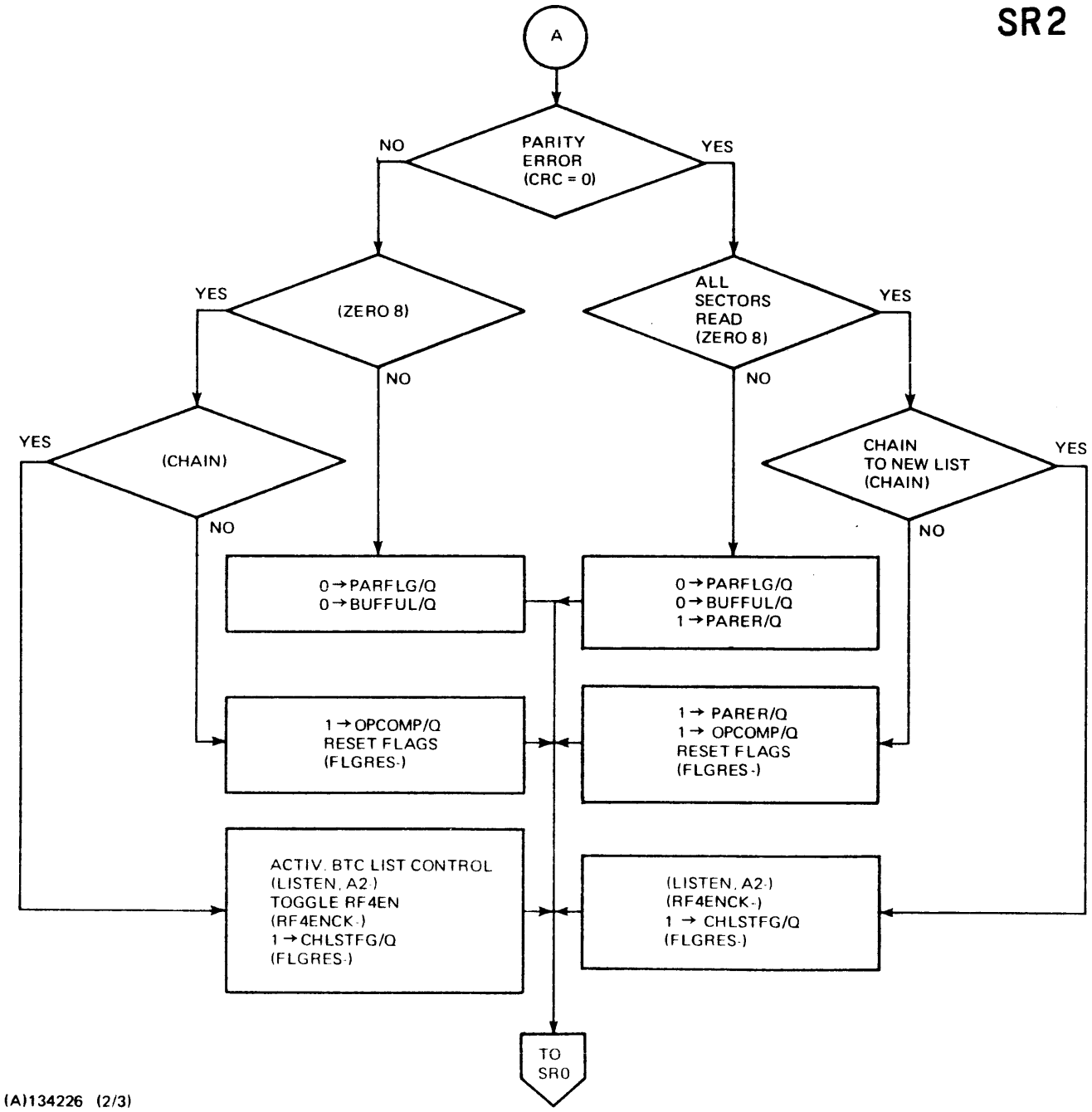
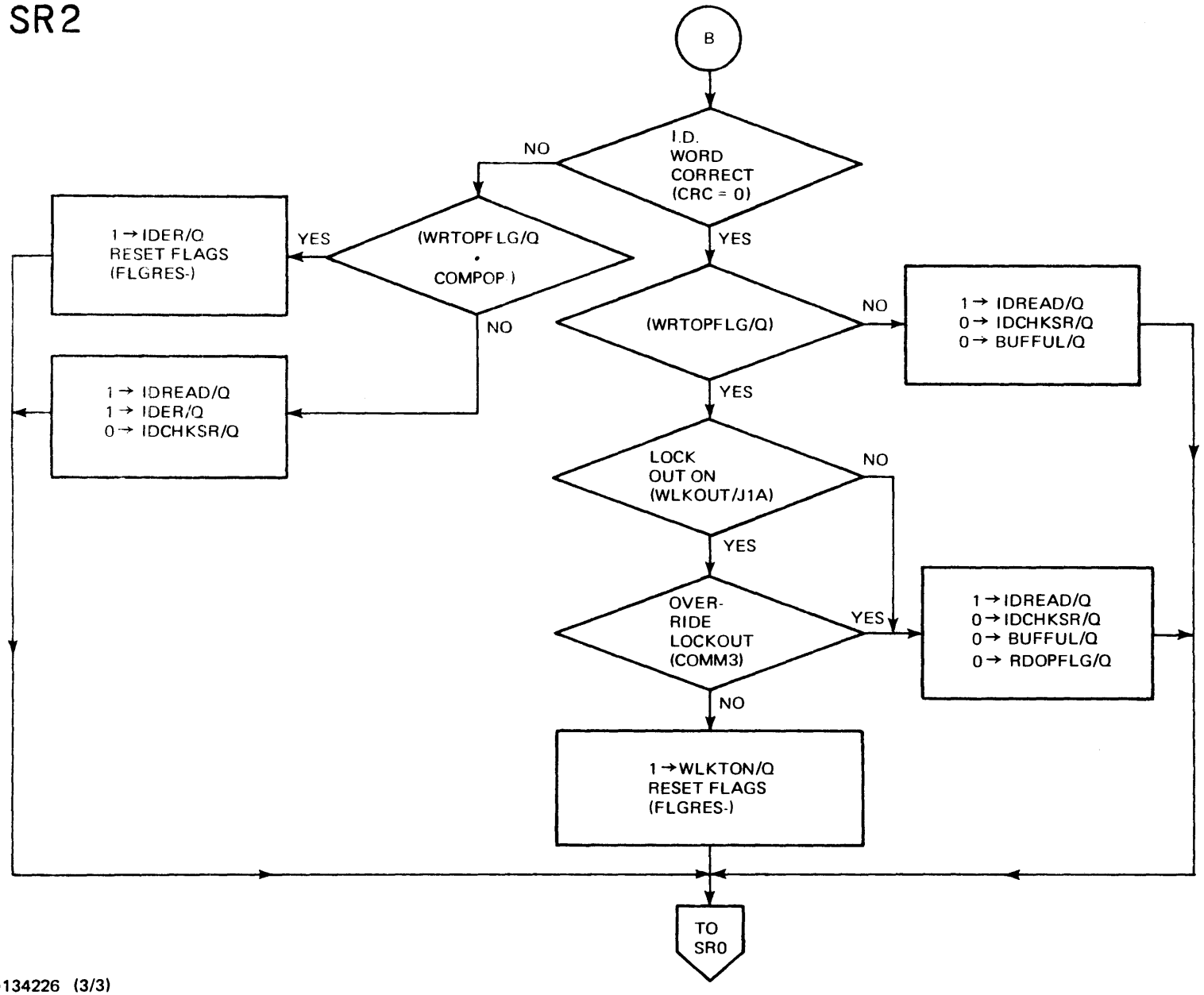


Figure 3-24. System Read Control, State 2 (Sheet 2 of 3)



(A)134226 (3/3)

Figure 3-24. System Read Control, State 2 (Sheet 3 of 3)

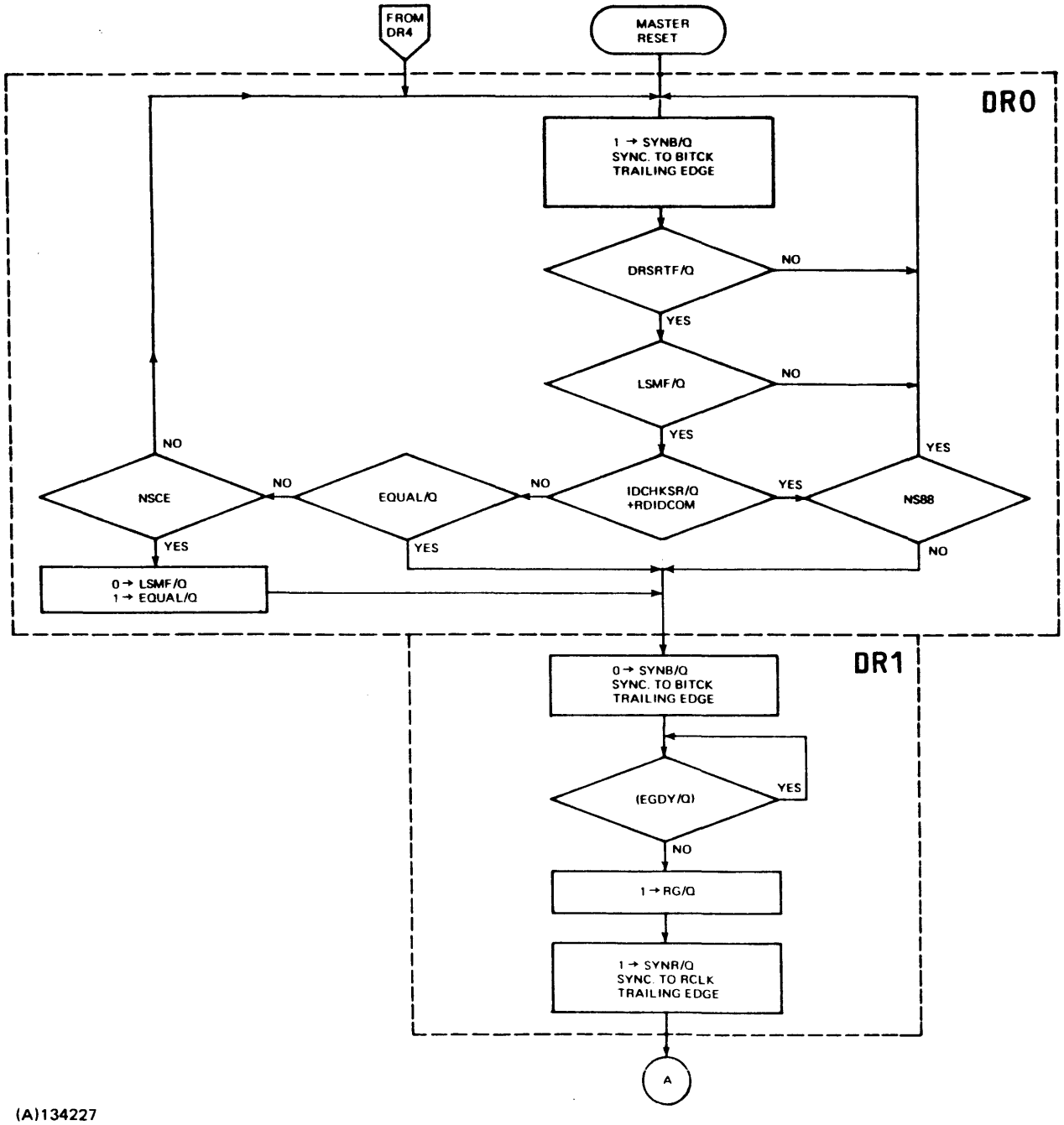


Figure 3-25. Disc Read Control, States 0 and 1

3.14.2 **DISC READ STATE 1 (DR1).** Refer to figure 3-25. The first portion of DR1 switches the DRC from the crystal oscillator clock (BITCK) to the clock being read from the disc (RCLK). After clock switching has been effected, DR1 reads the preamble word (15 zeros followed by a one). A word mark is generated before existing DR1 if this is a compare operation and the I.D. has been checked. For a compare operation the Disc Read Controller and the System Write Controller are active.

3.14.3 **DISC READ STATE 2 (DR2).** Refer to figure 3-26. The I.D. word, data words, and parity word are read during DR2. When the System Write Controller leaves SW2 (if a compare operation) or the System Read Controller sets PARFLG/Q or IDCHKSR/Q, the DRC steps to Disc Read State 3.

3.14.4 **DISC READ STATE 3 (DR3).** Refer to figure 3-26. During DR3, the parity word is loaded into the Data Buffer Register and the Parity Register (CRCCK–). (Refer to figure 3-23.) The clock to which the DRC is synchronized is switched back from the clock being read from the disc (RDCLK) to the crystal oscillator clock (BITCK).

3.14.5 **DISC READ STATE 4 (DR4).** Refer to figure 3-27. DR4 determines if the read operation has been completed (ZERO8), or if reading is to continue. If reading is to continue, DR4 performs a head switch and/or cylinder increment, if necessary.

3.15 STATUS CONTROL

The Status Controller determines when status should be stored. It stores status and determines whether processing is to continue after status has been stored. The Status Controller is a system controller, and is synchronized to the CPU (system) clock.

3.15.1 **STATUS CONTROL STATE 0 (ST0).** Refer to figure 3-28. ST0 determines when status should be stored (ST1/JA1). If the status to be stored is a terminal type status, meaning that processing is to be stopped, a reset signal (FLGRES) is generated which resets the System Read, Write, and Seek Controllers to their idle state. The BTC Status Controller is then activated by a signal from ST0 (STATEN) and the status word to be stored is transferred from Status Register 1 to Status Register 2.

3.15.2 **STATUS CONTROL STATE 1 (ST1).** Refer to figure 3-29. ST1 waits for the BTC Status Controller to obtain memory access granted from the CPU and take the status word. When the BTC takes the status word, the Status Controller steps to State 2.

3.15.3 **STATUS CONTROL STATE 2 (ST2).** Refer to figure 3-29. ST2 is primarily a wait state for waiting until the BTC has stored both status words. If the status stored was a terminal type status, indicated by STRESEN/Q, a reset signal is generated (STATMRS) which resets the entire Moving Head Disc Controller (the BTC logic and the DCL). The Moving Head Disc Controller is now ready for another Activate command from the CPU.

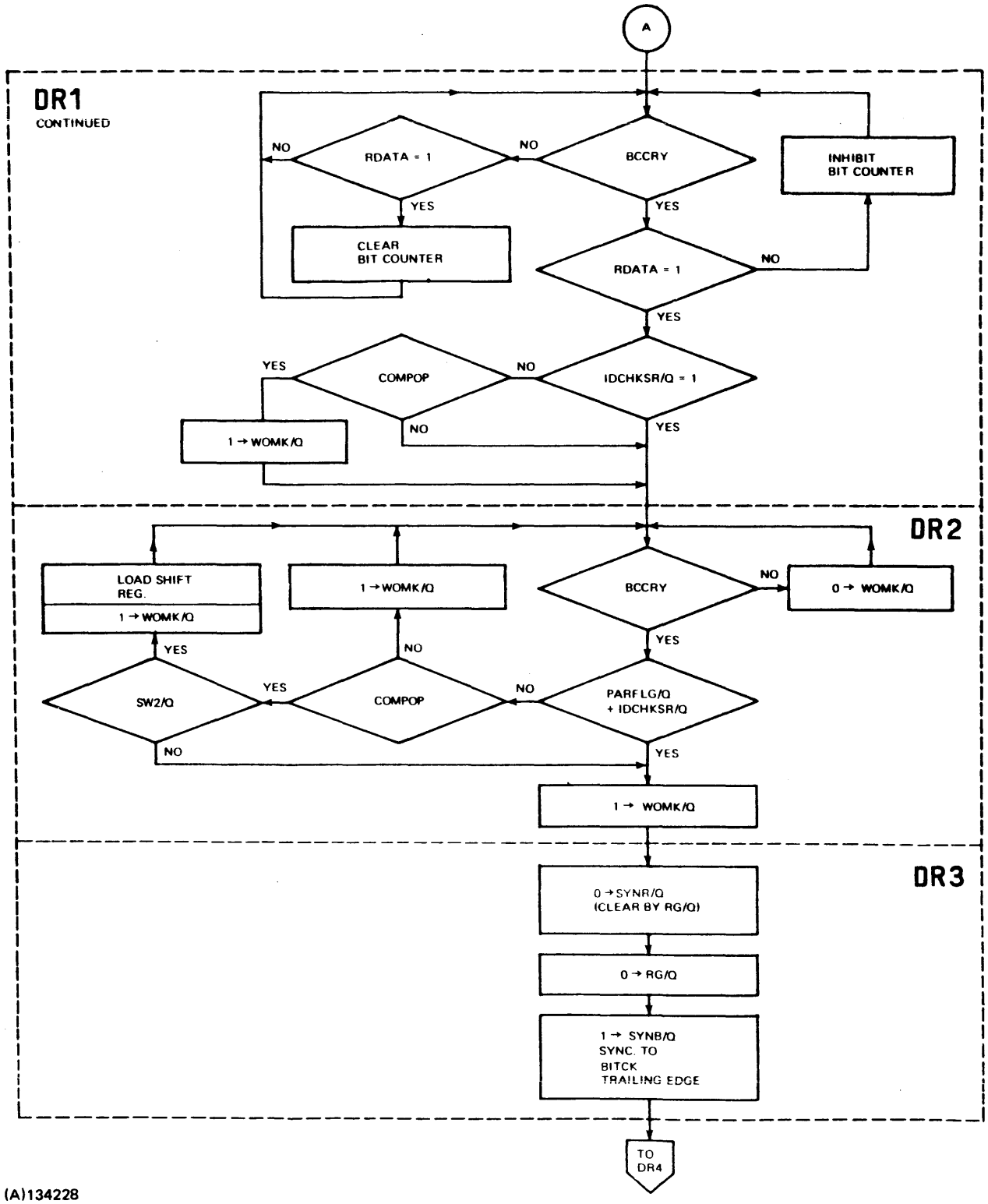


Figure 3-26. Disc Read Control, States 1, 2, and 3

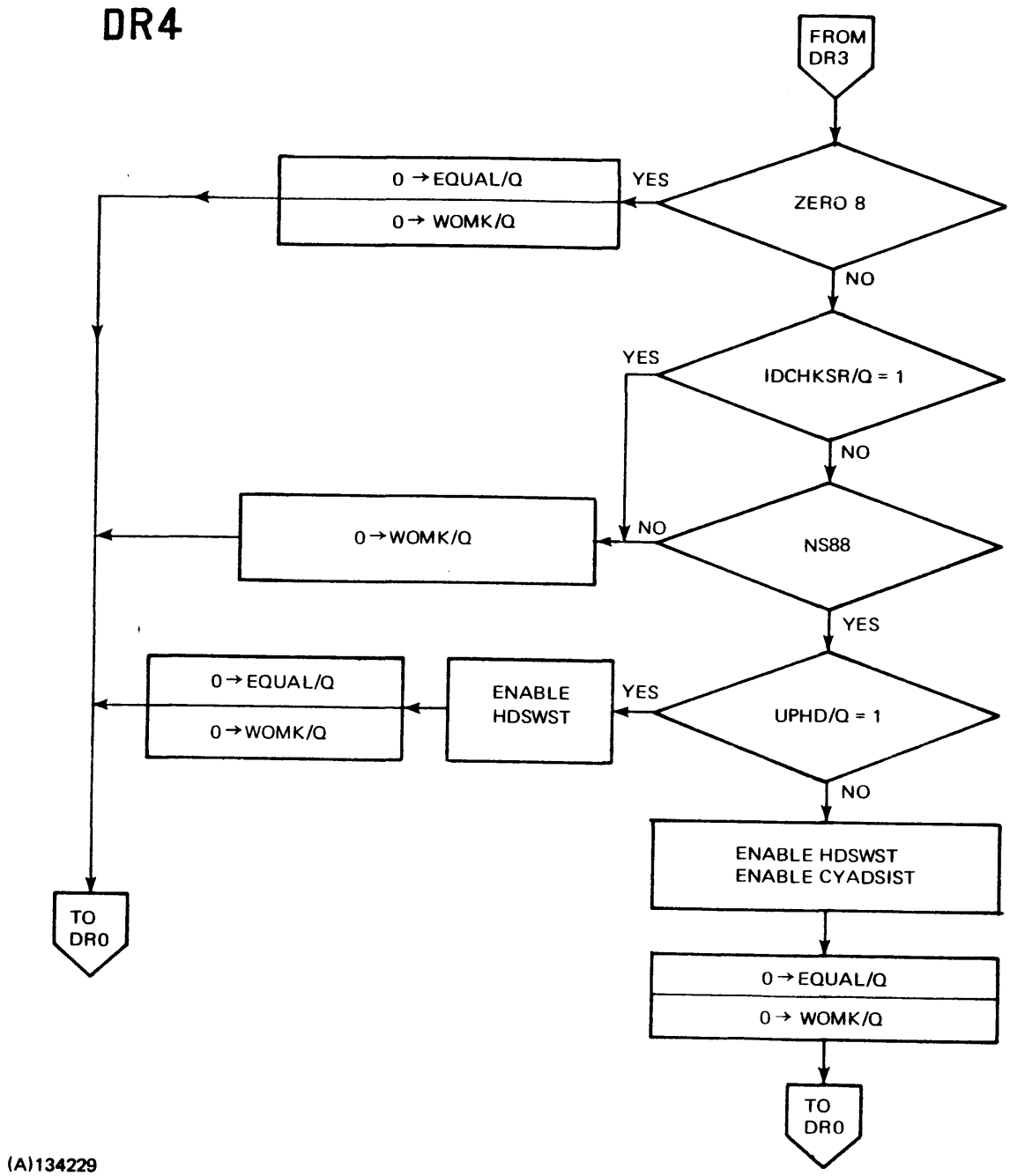


Figure 3-27. Disc Read Control, State 4

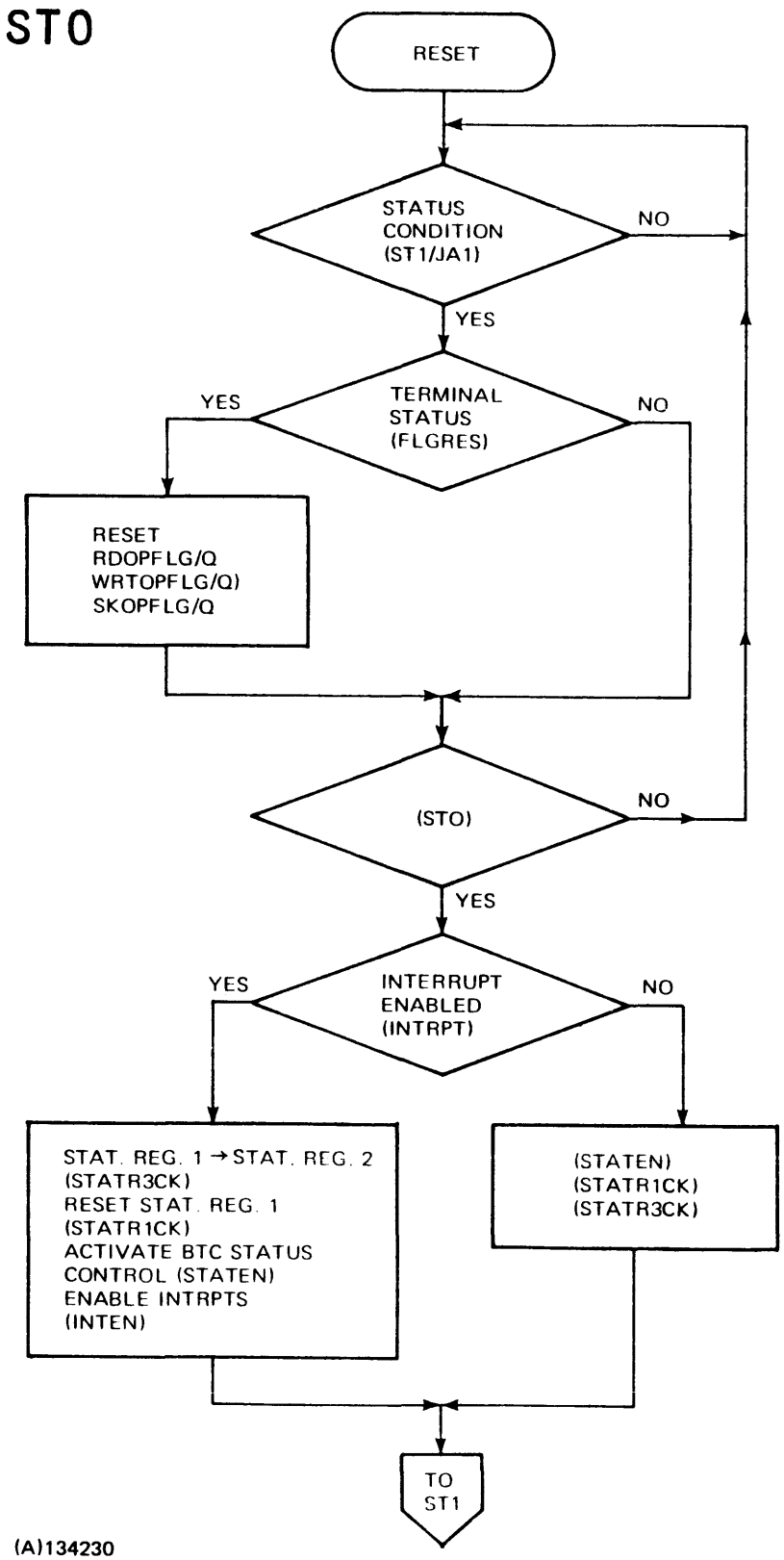


Figure 3-28. Status Control, State 0

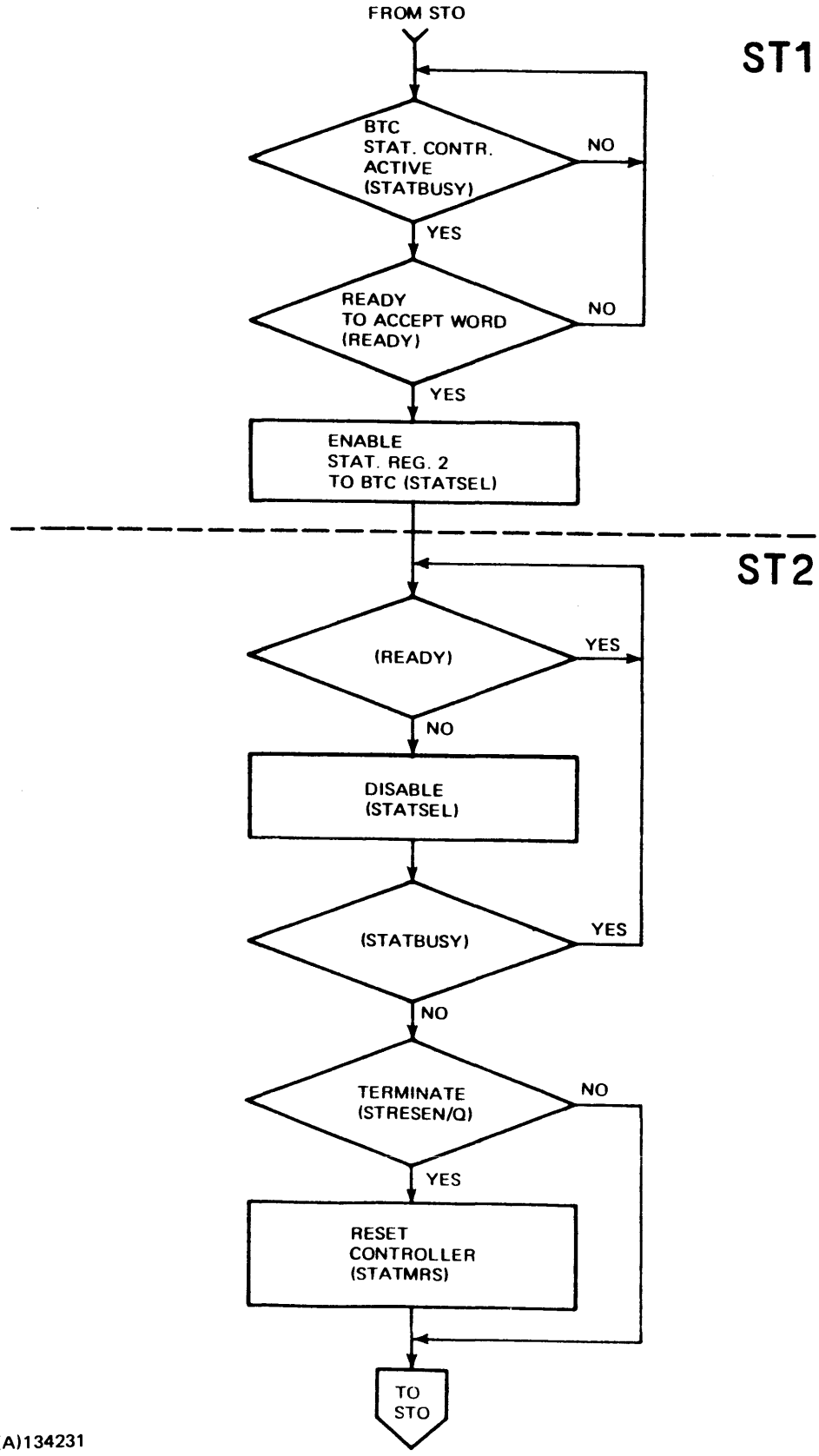


Figure 3-29. Status Control, States 1 and 2

SECTION IV

MAINTENANCE

4.1 GENERAL

This section, combined with Sections V and VI, provides the information required to trouble-shoot the controller circuitry. These sections include the connector pin numbering, circuit board network location designations, listing of the signals within the controller and those signals interconnecting the circuit boards, and logic diagrams.

4.2 PREVENTIVE MAINTENANCE

Maintenance is not required for the controller. However, proper preventive maintenance of the disc unit is essential and reference should be made to the maintenance manual for the appropriate maintenance.

4.3 CIRCUIT BOARDS

The circuit boards used are provided with individual network pin sockets which are designed for wire-wrap interconnections. The network location designations are those utilized in the circuit documentation. The single connector board is illustrated in figure 4-1 and the double connector circuit board is illustrated in figure 4-2. The circuit boards are always installed with the component side toward the front of the I/O Expansion Unit.

The bottom edge connector is designated as location M, and the top edge connector is designated as location N. Figure 4-3 shows the top edge pin assignment which corresponds to the cable connector used.

4.4 CONTROLLER/DISC CABLING

The controller and disc(s) are connected via cabling consisting of twisted pair lines. Figure 4-4 illustrates the controller/disc connections.

4.5 DIAGNOSTICS

The following diagnostics are pertinent to the 980A and 980B computers.

Program Description	985137-9901
Assembly Listing	985137-9902
Paper Tape Object	985137-1101

The following diagnostics are pertinent to the 960A and 960B computers.

Program Description	985136-9901
Assembly Listing	985136-9902
Paper Tape Object	985136-1101

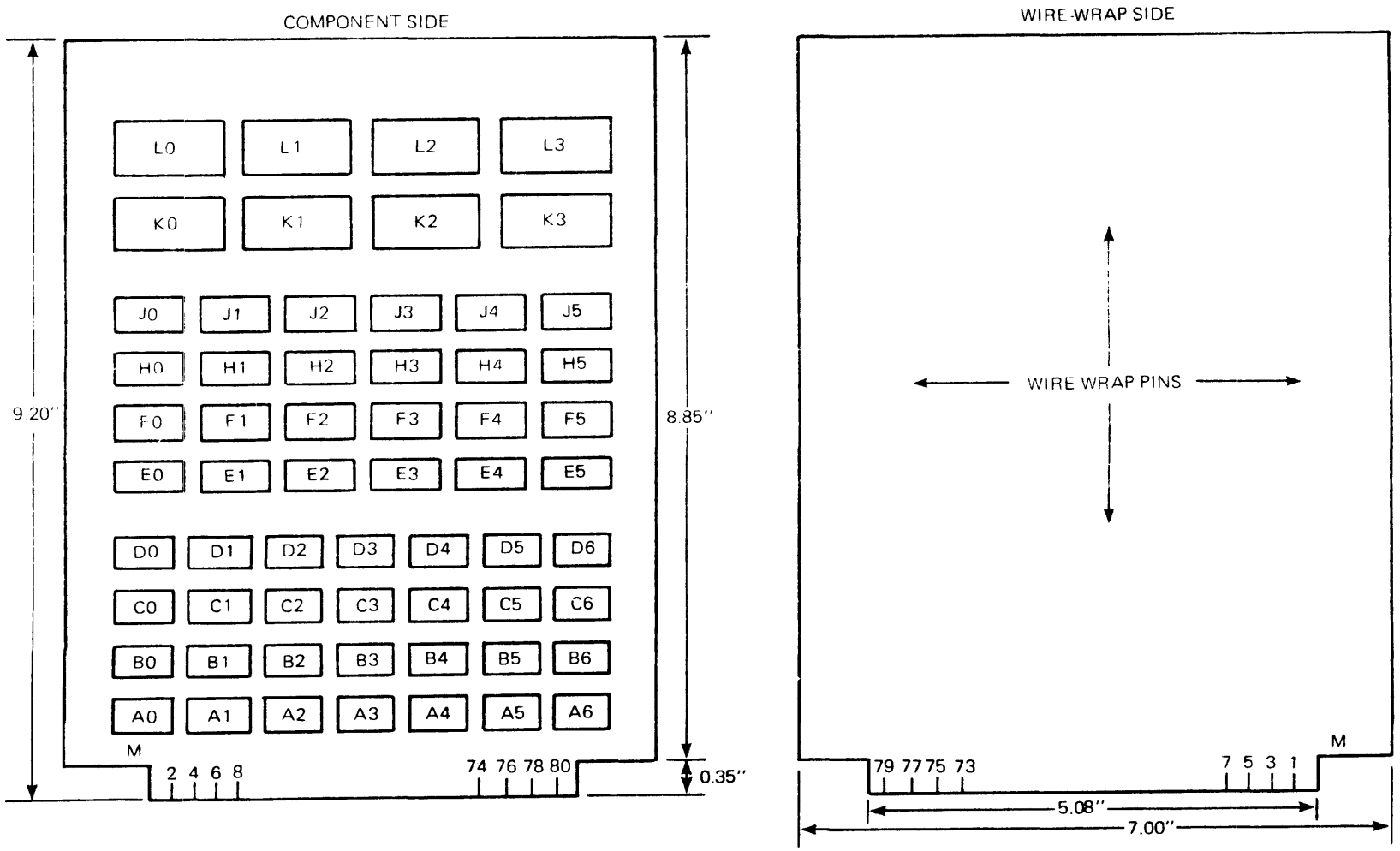


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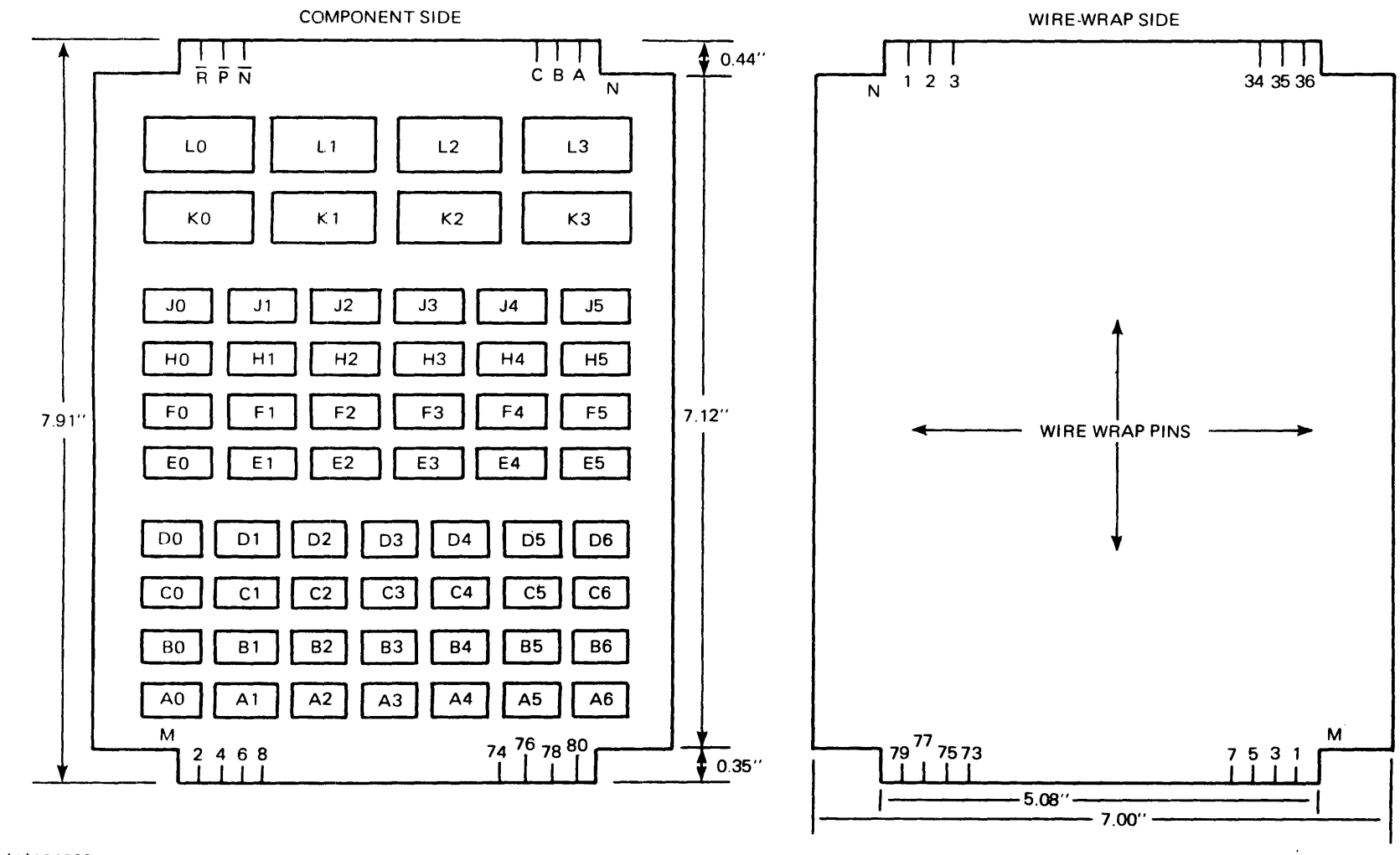
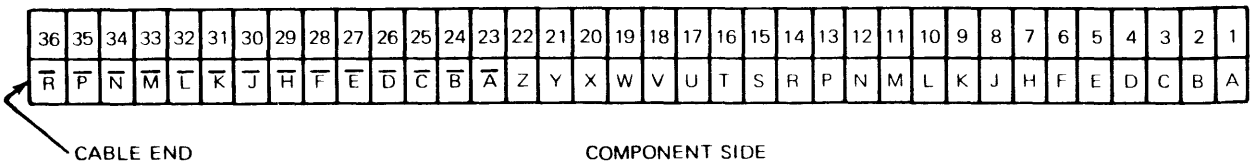
Figure 4-1. Single Connector Circuit Board, Outline Dimensions and Circuit Location Designations



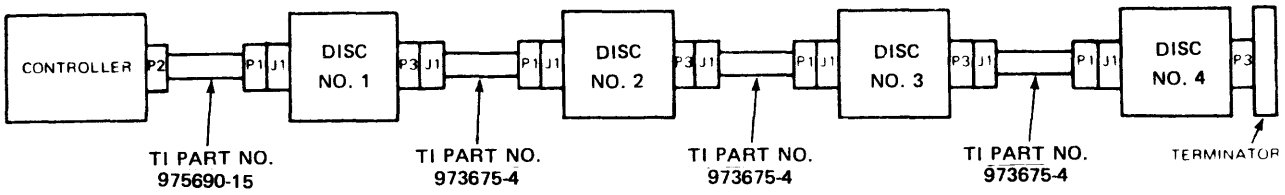
(A)134233

Figure 4-2. Double Connector Circuit Board, Outline Dimensions and Circuit Location Designations



(A)134234

Figure 4-3. Top Edge Connector Pin Assignment



(A)134235

Figure 4-4. Controller/Disc Cabling

SECTION V

DOCUMENTATION

5.1 GENERAL

This section describes the optional, computer-generated documentation including the signature load list, and the location pin list.

5.2 CONTROLLER LOAD LIST, PART NUMBER 961711-9920

The signature load list is an alphanumerical listing of all signal names utilized in the controller circuitry. Each listing indicates every point to which a signal connects. The load list reference information is given in table 5-1. The load list is as follows.

5.3 CONTROLLER PIN LIST, PART NUMBER 961771-9921

The location pin list is a listing of the signal on each pin every network, component, and connector of the controller circuit boards. The pin listing for each location includes the information defined in table 5-2. The pin list is as follows.

5.4 CONNECTOR PLATE WIRING

The connector plate wiring for any configuration which includes the Moving Head Disc Controller is documented in the appropriate appendix of the DMAP Expander Maintenance Manual, Part Number 216759-9701.

If connector plate wiring information is required concerning the BTC and/or the DMAP Expander and/or other controllers of a given configuration, refer to the manual listed above.

LOAD LIST

Drawing No. 967711-9920

Table 5-1. Load List Reference Information

Item	Description
Signature	Signal name
Circuit type	Type of circuit providing a load or source
Location name	Indicates the location of the load or source Network or component locations are listed as X Y0Z, where: X indicates the (module) board no., i.e., 1 indicates Circuit Board N. 1, etc. Y0Z indicates the row/column location as indicated in figures 4-1 and 4-2, i.e., row Y column 0Z. Connector locations are indicated as either X M0X (bottom connector) or X N0X (top connector). Again, X indicates the (module) board no.
Pin name	Indicates the pin number associated with corresponding location name.
Pun function	An asterisk (*) indicates a signal source. If no signal source is indicated, the source enters through a connector pin from an external point.
Block number Device name Sequence no. N + Load Branch vector Wiring comment	Not used in maintenance/troubleshooting

PIN SIGNATURE		CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD	BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
ACK-	X	CB	BTCCB3X	3		CN		0	1	/910 3	CONN	.00
ACK-	X	CB	CB003MHD	7		CN		0	1	/902 7	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
AG	X	CB	BTCCB3X	4		CN		0	1	/910 4	CONN	.00
AG	X	CB	BTCCB2X	3		CN		0	1	/908 3	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
AGDEV-		CB	BTCCB0X	21		CN		0	1	/912 21	CONN	.00
AGDEV-		CB	BTCCB3X	5		CN		0	1	/910 5	CONN	.00
AGDEV-		CB	BTCCB3X	6		CN		0	1	/910 6	CONN	.00
AGDEV-		CB	BTCCB3X	7		CN		0	1	/910 7	CONN	.00
AGDEV-		CB	BTCCB3X	8		CN		0	1	/910 8	CONN	.00
AGDEV-		CB	BTCCB3X	9		CN		0	1	/910 9	CONN	.00
AGDEV-		CB	BTCCB3X	10		CN		0	1	/910 10	CONN	.00
AGDEV-		CB	BTCCB3X	11		CN		0	1	/910 11	CONN	.00
AGDEV-		CB	BTCCB3X	12		CN		0	1	/910 12	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
ARDEV-		CB	BTCCB0X	67		CN		0	1	/912 67	CONN	.00
ARDEV-		CB	BTCCB3X	14		CN		0	1	/910 14	CONN	.00
ARDEV-		CB	BTCCB3X	15		CN		0	1	/910 15	CONN	.00
ARDEV-		CB	BTCCB3X	16		CN		0	1	/910 16	CONN	.00
ARDEV-		CB	BTCCB3X	17		CN		0	1	/910 17	CONN	.00
ARDEV-		CB	BTCCB3X	18		CN		0	1	/910 18	CONN	.00
ARDEV-		CB	BTCCB3X	19		CN		0	1	/910 19	CONN	.00
ARDEV-		CB	BTCCB3X	20		CN		0	1	/910 20	CONN	.00
ARDEV-		CB	BTCCB3X	21		CN		0	1	/910 21	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
ATI1	X	CB	BTCCB1X	4		CN		0	1	/907 4	CONN	.00
ATI1	X	CB	CB002MHD	8		CN		0	1	/901 8	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
ATI2	X	CB	BTCCB3X	74		CN		0	1	/910 74	CONN	.00
ATI2	X	CB	BTCCB1X	5		CN		0	1	/907 5	CONN	.00
ATI2	X	CB	CB003MHD	9		CN		0	1	/902 9	CONN	.00
ATI2	X	CB	CB002MHD	76		CN		0	1	/901 76	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BCCRY	XA	CB	CB001MHD	36		CN		0	1	/903 36	CONN	.00
BCCRY	XA	CB	CB003MHD	44		CN		0	1	/902 44	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BCCRY-	XA	CB	CB001MHD	46		CN		0	1	/903 46	CONN	.00
BCCRY-	XA	CB	CB003MHD	58		CN		0	1	/902 58	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BITOSC	XA	CB	CB006MHD	21		CN		0	1	/904 21	CONN	.00
BITOSC	XA	CB	CB001MHD	66		CN		0	1	/903 66	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BTCLR	XA	CB	CB001MHD	17		CN		0	1	/903 17	CONN	.00
BTCLR	XA	CB	CB002MHD	17		CN		0	1	/901 17	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BTCLR-	X	CB	BTCCB1X	6		CN		0	1	/907 6	CONN	.00
BTCLR-	X	CB	CB004MHD	9		CN		0	1	/906 9	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BUFFUL/Q	XA	CB	CB001MHD	52		CN		0	1	/903 52	CONN	.00
BUFFUL/Q	XA	CB	CB003MHD	64		CN		0	1	/902 64	CONN	.00
BUFFUL/Q	XA	CB	CB002MHD	62		CN		0	1	/901 62	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BUSY-	X	CB	BTCCB1X	7		CN		0	1	/907 7	CONN	.00
BUSY-	X	CB	CB002MHD	5		CN		0	1	/901 5	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BUSY/D-	XA	CB	CB006MHD	36		CN		0	1	/904 36	CONN	.00
BUSY/D-	XA	CB	CB002MHD	57		CN		0	1	/901 57	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BUSY/DB2-	XA	CB	CB003MHD	11		CN		0	1	/902 11	CONN	.00
BUSY/DB2-	XA	CB	CB002MHD	15		CN		0	1	/901 15	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
BUSY/Q-	XA	CB	CB005MHD	75		CN		0	1	/905 75	CONN	.00
BUSY/Q-	XA	CB	CB006MHD	29		CN		0	1	/904 29	CONN	.00
BUSY/Q-	XA	CB	CB002MHD	35		CN		0	1	/901 35	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CHAIN	XA	CB	CB004MHD	29		CN		0	1	/906 29	CONN	.00
CHAIN	XA	CB	CB003MHD	12		CN		0	1	/902 12	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CHAIN-	XA	CB	CB004MHD	30		CN		0	1	/906 30	CONN	.00
CHAIN-	XA	CB	CB003MHD	13		CN		0	1	/902 13	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CHLTKN/D-	XA	CB	CB006MHD	39		CN		0	1	/904 39	CONN	.00
CHLTKN/D-	XA	CB	CB003MHD	62		CN		0	1	/902 62	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CHLTKN/Q-	XA	CB	CB006MHD	28		CN		0	1	/904 28	CONN	.00
CHLTKN/Q-	XA	CB	CB002MHD	34		CN		0	1	/901 34	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CLOCK-		CB	BTCCB0X	33		CN		0	1	/912 33	CONN	.00
CLOCK-		CB	BTCCB1X	8		CN		0	1	/907 8	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CNTUP-	X	CB	BTCCB3X	22		CN		0	1	/910 22	CONN	.00
CNTUP-	X	CB	BTCCB2X	4		CN		0	1	/908 4	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
COMERR/Q	XA	CB	CB001MHD	43		CN		0	1	/903 43	CONN	.00
COMERR/Q	XA	CB	CB003MHD	54		CN		0	1	/902 54	CONN	.00

PIN SIGNATURE		CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD	BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
								0 NET LOADS *EXTERNAL SOURCE*				
COMM1-	XA	CB	CB004MHD	31		CN		0	1	/906 31	CONN	.00
COMM1-	XA	CB	CB001MHD	11		CN		0	1	/903 11	CONN	.00
COMM1-	XA	CB	CB003MHD	14		CN		0	1	/902 14	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
COMM2	XA	CB	CB004MHD	32		CN		0	1	/906 32	CONN	.00
COMM2	XA	CB	CB001MHD	12		CN		0	1	/903 12	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
COMM3-	XA	CB	CB004MHD	33		CN		0	1	/906 33	CONN	.00
COMM3-	XA	CB	CB001MHD	13		CN		0	1	/903 13	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
COMPER/D-	XA	CB	CB006MHD	44		CN		0	1	/904 44	CONN	.00
COMPER/D-	XA	CB	CB003MHD	72		CN		0	1	/902 72	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
COMPOP-	XA	CB	CB004MHD	76		CN		0	1	/906 76	CONN	.00
COMPOP-	XA	CB	CB006MHD	32		CN		0	1	/904 32	CONN	.00
COMPOP-	XA	CB	CB001MHD	33		CN		0	1	/903 33	CONN	.00
COMPOP-	XA	CB	CB003MHD	35		CN		0	1	/902 35	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
COUNT	X	CB	BTCCB2X	5		CN		0	1	/938 5	CONN	.00
COUNT	X	CB	CB001MHD	4		CN		0	1	/903 4	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CRC=0	XA	CB	CB004MHD	69		CN		0	1	/906 69	CONN	.00
CRC=0	XA	CB	CB005MHD	72		CN		0	1	/905 72	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CRC=0-	XA	CB	CB004MHD	72		CN		0	1	/906 72	CONN	.00
CRC=0-	XA	CB	CB006MHD	43		CN		0	1	/904 43	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CRCCK-	XA	CB	CB005MHD	27		CN		0	1	/905 27	CONN	.00
CRCCK-	XA	CB	CB003MHD	16		CN		0	1	/902 16	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CRCCLR-	XA	CB	CB005MHD	26		CN		0	1	/905 26	CONN	.00
CRCCLR-	XA	CB	CB003MHD	15		CN		0	1	/902 15	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLADCRY		CB	CB004MHD	75		CN		0	1	/906 75	CONN	.00
CYLADCRY		CB	CB005MHD	76		CN		0	1	/905 76	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLAD0	XA	CB	CB005MHD	44		CN		0	1	/905 44	CONN	.00
CYLAD0	XA	CB	CB002MHD	24		CN		0	1	/901 24	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLAD1	XA	CB	CB005MHD	43		CN		0	1	/905 43	CONN	.00
CYLAD1	XA	CB	CB002MHD	23		CN		0	1	/901 23	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLAD2	XA	CB	CB005MHD	42		CN		0	1	/905 42	CONN	.00
CYLAD2	XA	CB	CB002MHD	22		CN		0	1	/901 22	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLAD3	XA	CB	CB005MHD	41		CN		0	1	/905 41	CONN	.00
CYLAD3	XA	CB	CB002MHD	21		CN		0	1	/901 21	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLAD4	XA	CB	CB005MHD	48		CN		0	1	/905 48	CONN	.00
CYLAD4	XA	CB	CB002MHD	27		CN		0	1	/901 27	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLAD5	XA	CB	CB005MHD	47		CN		0	1	/905 47	CONN	.00
CYLAD5	XA	CB	CB002MHD	26		CN		0	1	/901 26	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLAD6	XA	CB	CB005MHD	46		CN		0	1	/905 46	CONN	.00
CYLAD6	XA	CB	CB002MHD	25		CN		0	1	/901 25	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLAD7	XA	CB	CB004MHD	36		CN		0	1	/906 36	CONN	.00
CYLAD7	XA	CB	CB005MHD	33		CN		0	1	/905 33	CONN	.00
CYLAD7	XA	CB	CB002MHD	16		CN		0	1	/901 16	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
CYLINC/Q-	XA	CB	CB004MHD	48		CN		0	1	/906 48	CONN	.00
CYLINC/Q-	XA	CB	CB005MHD	45		CN		0	1	/905 45	CONN	.00
CYLINC/Q-	XA	CB	CB001MHD	20		CN		0	1	/903 20	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
DATAV-		CB	BTCCB0X	27		CN		0	1	/912 27	CONN	.00
DATAV-		CB	BTCCB1X	9		CN		0	1	/907 9	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
DATAVL	X	CB	BTCCB3X	23		CN		0	1	/910 23	CONN	.00
DATAVL	X	CB	BTCCB1X	10		CN		0	1	/907 10	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
DATEN-	X	CB	BTCCB3X	69		CN		0	1	/910 69	CONN	.00
DATEN-	X	CB	BTCCB2X	70		CN		0	1	/908 70	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
DATREF/D-	XA	CB	CB006MHD	47		CN		0	1	/904 47	CONN	.00
DATREF/D-	XA	CB	CB003MHD	73		CN		0	1	/902 73	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
DATREF/Q-	XA	CB	CB006MHD	27		CN		0	1	/904 27	CONN	.00
DATREF/Q-	XA	CB	CB003MHD	23		CN		0	1	/902 23	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
DD2/Q-	X	CB	BTCCB3X	25		CN		0	1	/910 25	CONN	.00

PIN SIGNATURE		CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N* LOAD		BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
DD2/Q-	X	CB	BTCCB1X	11		CN		0		1	/907 11	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DECOUNT-	X	CB	BTCCB3X	26		CN		0		1	/910 26	CONN	.00
DECOUNT-	X	CB	CB003MHD	4		CN		0		1	/902 4	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,00		CB	BTCCB0X	34		CN		0		1	/912 34	CONN	.00
DEVADD,00		CB	BTCCB2X	7		CN		0		1	/908 7	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,01		CB	BTCCB0X	35		CN		0		1	/912 35	CONN	.00
DEVADD,01		CB	BTCCB2X	8		CN		0		1	/908 8	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,02		CB	BTCCB0X	36		CN		0		1	/912 36	CONN	.00
DEVADD,02		CB	BTCCB2X	9		CN		0		1	/908 9	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,03		CB	BTCCB0X	37		CN		0		1	/912 37	CONN	.00
DEVADD,03		CB	BTCCB2X	10		CN		0		1	/908 10	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,04		CB	BTCCB0X	38		CN		0		1	/912 38	CONN	.00
DEVADD,04		CB	BTCCB2X	11		CN		0		1	/908 11	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,05		CB	BTCCB0X	39		CN		0		1	/912 39	CONN	.00
DEVADD,05		CB	BTCCB2X	12		CN		0		1	/908 12	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,06		CB	BTCCB0X	40		CN		0		1	/912 40	CONN	.00
DEVADD,06		CB	BTCCB2X	13		CN		0		1	/908 13	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,07		CB	BTCCB0X	41		CN		0		1	/912 41	CONN	.00
DEVADD,07		CB	BTCCB2X	14		CN		0		1	/908 14	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,08		CB	BTCCB0X	42		CN		0		1	/912 42	CONN	.00
DEVADD,08		CB	BTCCB2X	15		CN		0		1	/908 15	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,09		CB	BTCCB0X	43		CN		0		1	/912 43	CONN	.00
DEVADD,09		CB	BTCCB2X	16		CN		0		1	/908 16	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,10		CB	BTCCB0X	45		CN		0		1	/912 45	CONN	.00
DEVADD,10		CB	BTCCB2X	17		CN		0		1	/908 17	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,11		CB	BTCCB0X	44		CN		0		1	/912 44	CONN	.00
DEVADD,11		CB	BTCCB2X	18		CN		0		1	/908 18	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,12		CB	BTCCB0X	46		CN		0		1	/912 46	CONN	.00
DEVADD,12		CB	BTCCB2X	19		CN		0		1	/908 19	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,13		CB	BTCCB0X	47		CN		0		1	/912 47	CONN	.00
DEVADD,13		CB	BTCCB2X	20		CN		0		1	/908 20	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,14		CB	BTCCB0X	48		CN		0		1	/912 48	CONN	.00
DEVADD,14		CB	BTCCB2X	21		CN		0		1	/908 21	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADD,15		CB	BTCCB0X	49		CN		0		1	/912 49	CONN	.00
DEVADD,15		CB	BTCCB2X	22		CN		0		1	/908 22	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADSEL0	X	CB	BTCCB3X	27		CN		0		1	/910 27	CONN	.00
DEVADSEL0	X	CB	BTCCB1X	12		CN		0		1	/907 12	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADSEL1	X	CB	BTCCB3X	28		CN		0		1	/910 28	CONN	.00
DEVADSEL1	X	CB	BTCCB2X	23		CN		0		1	/908 23	CONN	.00
DEVADSEL1	X	CB	BTCCB1X	13		CN		0		1	/907 13	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVADSEL2	X	CB	BTCCB3X	29		CN		0		1	/910 29	CONN	.00
DEVADSEL2	X	CB	BTCCB2X	24		CN		0		1	/908 24	CONN	.00
DEVADSEL2	X	CB	BTCCB1X	14		CN		0		1	/907 14	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVATI1-		CB	BTCCB0X	25		CN		0		1	/912 25	CONN	.00
DEVATI1-		CB	BTCCB1X	15		CN		0		1	/907 15	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVATI2-		CB	BTCCB0X	23		CN		0		1	/912 23	CONN	.00
DEVATI2-		CB	BTCCB1X	16		CN		0		1	/907 16	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVBSY/Q	XA	CB	CB003MHD	75		CN		0		1	/902 75	CONN	.00
DEVBSY/Q	XA	CB	CB002MHD	10		CN		0		1	/901 10	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVEETCH-		CB	BTCCB0X	73		CN		0		1	/912 73	CONN	.00
DEVEETCH-		CB	BTCCB2X	25		CN		0		1	/908 25	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD00		CB	BTCCB0X	4		CN		0		1	/912 4	CONN	.00
DEVMRD00		CB	BTCCB1X	17		CN		0		1	/907 17	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD01		CB	BTCCB0X	3		CN		0		1	/912 3	CONN	.00
DEVMRD01		CB	BTCCB1X	18		CN		0		1	/907 18	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				

PIN SIGNATURE	CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD		BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
DEVMRD02	CB	BTCCB0X	6		CN		0		1	/912 6	CONN	.00
DEVMRD02	CB	BTCCB1X	19		CN		0		1	/907 19	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD03	CB	BTCCB0X	5		CN		0		1	/912 5	CONN	.00
DEVMRD03	CB	BTCCB1X	20		CN		0		1	/907 20	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD04	CB	BTCCB0X	8		CN		0		1	/912 8	CONN	.00
DEVMRD04	CB	BTCCB1X	21		CN		0		1	/907 21	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD05	CB	BTCCB0X	7		CN		0		1	/912 7	CONN	.00
DEVMRD05	CB	BTCCB1X	22		CN		0		1	/907 22	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD06	CB	BTCCB0X	10		CN		0		1	/912 10	CONN	.00
DEVMRD06	CB	BTCCB1X	23		CN		0		1	/907 23	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD07	CB	BTCCB0X	9		CN		0		1	/912 9	CONN	.00
DEVMRD07	CB	BTCCB1X	24		CN		0		1	/907 24	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD08	CB	BTCCB0X	12		CN		0		1	/912 12	CONN	.00
DEVMRD08	CB	BTCCB1X	25		CN		0		1	/907 25	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD09	CB	BTCCB0X	11		CN		0		1	/912 11	CONN	.00
DEVMRD09	CB	BTCCB1X	26		CN		0		1	/907 26	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD10	CB	BTCCB0X	14		CN		0		1	/912 14	CONN	.00
DEVMRD10	CB	BTCCB1X	27		CN		0		1	/907 27	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD11	CB	BTCCB0X	13		CN		0		1	/912 13	CONN	.00
DEVMRD11	CB	BTCCB1X	28		CN		0		1	/907 28	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD12	CB	BTCCB0X	16		CN		0		1	/912 16	CONN	.00
DEVMRD12	CB	BTCCB1X	29		CN		0		1	/907 29	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD13	CB	BTCCB0X	15		CN		0		1	/912 15	CONN	.00
DEVMRD13	CB	BTCCB1X	30		CN		0		1	/907 30	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD14	CB	BTCCB0X	18		CN		0		1	/912 18	CONN	.00
DEVMRD14	CB	BTCCB1X	31		CN		0		1	/907 31	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD15	CB	BTCCB0X	17		CN		0		1	/912 17	CONN	.00
DEVMRD15	CB	BTCCB1X	32		CN		0		1	/907 32	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMRD16	CB	BTCCB0X	19		CN		0		1	/912 19	CONN	.00
DEVMRD16	CB	BTCCB1X	33		CN		0		1	/907 33	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,00	CB	BTCCB0X	50		CN		0		1	/912 50	CONN	.00
DEVMWD,00	CB	BTCCB2X	26		CN		0		1	/908 26	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,01	CB	BTCCB0X	51		CN		0		1	/912 51	CONN	.00
DEVMWD,01	CB	BTCCB2X	27		CN		0		1	/908 27	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,02	CB	BTCCB0X	52		CN		0		1	/912 52	CONN	.00
DEVMWD,02	CB	BTCCB2X	28		CN		0		1	/908 28	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,03	CB	BTCCB0X	53		CN		0		1	/912 53	CONN	.00
DEVMWD,03	CB	BTCCB2X	29		CN		0		1	/908 29	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,04	CB	BTCCB0X	54		CN		0		1	/912 54	CONN	.00
DEVMWD,04	CB	BTCCB2X	30		CN		0		1	/908 30	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,05	CB	BTCCB0X	55		CN		0		1	/912 55	CONN	.00
DEVMWD,05	CB	BTCCB2X	31		CN		0		1	/908 31	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,06	CB	BTCCB0X	56		CN		0		1	/912 56	CONN	.00
DEVMWD,06	CB	BTCCB2X	32		CN		0		1	/908 32	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,07	CB	BTCCB0X	57		CN		0		1	/912 57	CONN	.00
DEVMWD,07	CB	BTCCB2X	33		CN		0		1	/908 33	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,08	CB	BTCCB0X	58		CN		0		1	/912 58	CONN	.00
DEVMWD,08	CB	BTCCB2X	34		CN		0		1	/908 34	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,09	CB	BTCCB0X	59		CN		0		1	/912 59	CONN	.00
DEVMWD,09	CB	BTCCB2X	35		CN		0		1	/908 35	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,10	CB	BTCCB0X	60		CN		0		1	/912 60	CONN	.00
DEVMWD,10	CB	BTCCB2X	36		CN		0		1	/908 36	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,11	CB	BTCCB0X	61		CN		0		1	/912 61	CONN	.00
DEVMWD,11	CB	BTCCB2X	37		CN		0		1	/908 37	CONN	.00
							0	NET LOADS *EXTERNAL SOURCE*				

PIN SIGNATURE		CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD		BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
DEVMWD,12		CB	BTCCB0X	62		CN		0		1	/912 62	CONN	.00
DEVMWD,12		CB	BTCCB2X	38		CN		0		1	/908 38	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,13		CB	BTCCB0X	63		CN		0		1	/912 63	CONN	.00
DEVMWD,13		CB	BTCCB2X	39		CN		0		1	/908 39	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,14		CB	BTCCB0X	64		CN		0		1	/912 64	CONN	.00
DEVMWD,14		CB	BTCCB2X	40		CN		0		1	/908 40	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,15		CB	BTCCB0X	65		CN		0		1	/912 65	CONN	.00
DEVMWD,15		CB	BTCCB2X	41		CN		0		1	/908 41	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVMWD,16		CB	BTCCB0X	66		CN		0		1	/912 66	CONN	.00
DEVMWD,16		CB	BTCCB2X	42		CN		0		1	/908 42	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVREAD	X	CB	BTCCB3X	30		CN		0		1	/910 30	CONN	.00
DEVREAD	X	CB	CB004MHD	13		CN		0		1	/906 13	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVSELO-	X	CB	BTCCB2X	43		CN		0		1	/908 43	CONN	.00
DEVSELO-	X	CB	BTCCB1X	34		CN		0		1	/907 34	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DEVSTORE-		CB	BTCCB0X	69		CN		0		1	/912 69	CONN	.00
DEVSTORE-		CB	BTCCB2X	44		CN		0		1	/908 44	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DRSTARTB1	XA	CB	CB001MHD	29		CN		0		1	/903 29	CONN	.00
DRSTARTB1	XA	CB	CB003MHD	31		CN		0		1	/902 31	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DROMHD/Q	XA	CB	CB004MHD	58		CN		0		1	/906 58	CONN	.00
DROMHD/Q	XA	CB	CB001MHD	44		CN		0		1	/903 44	CONN	.00
DROMHD/Q	XA	CB	CB003MHD	55		CN		0		1	/902 55	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
DWO	XA	CB	CB001MHD	47		CN		0		1	/903 47	CONN	.00
DWO	XA	CB	CB003MHD	59		CN		0		1	/902 59	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
EGDY/Q-	XA	CB	CB001MHD	62		CN		0		1	/903 62	CONN	.00
EGDY/Q-	XA	CB	CB002MHD	71		CN		0		1	/901 71	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
ENDISC/D-	XA	CB	CB006MHD	46		CN		0		1	/904 46	CONN	.00
ENDISC/D-	XA	CB	CB002MHD	75		CN		0		1	/901 75	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
ENDISC/Q-	XA	CB	CB006MHD	26		CN		0		1	/904 26	CONN	.00
ENDISC/Q-	XA	CB	CB002MHD	33		CN		0		1	/901 33	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
ENREWB-	X	CB	BTCCB3X	31		CN		0		1	/910 31	CONN	.00
ENREWB-	X	CB	BTCCB1X	35		CN		0		1	/907 35	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
HDSWST-	XA	CB	CB004MHD	34		CN		0		1	/906 34	CONN	.00
HDSWST-	XA	CB	CB001MHD	14		CN		0		1	/903 14	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
IDCHKSR/Q	XA	CB	CB001MHD	35		CN		0		1	/903 35	CONN	.00
IDCHKSR/Q	XA	CB	CB003MHD	39		CN		0		1	/902 39	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
IDCHKSR/Q-XA		CB	CB005MHD	68		CN		0		1	/905 68	CONN	.00
IDCHKSR/Q-XA		CB	CB001MHD	34		CN		0		1	/903 34	CONN	.00
IDCHKSR/Q-XA		CB	CB003MHD	38		CN		0		1	/902 38	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
IDREAD/J	XA	CB	CB004MHD	71		CN		0		1	/906 71	CONN	.00
IDREAD/J	XA	CB	CB006MHD	42		CN		0		1	/904 42	CONN	.00
IDREAD/J	XA	CB	CB003MHD	71		CN		0		1	/902 71	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
IDREAD/Q-	XA	CB	CB001MHD	28		CN		0		1	/903 28	CONN	.00
IDREAD/Q-	XA	CB	CB003MHD	30		CN		0		1	/902 30	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
IDWORD/Q	XA	CB	CB001MHD	41		CN		0		1	/903 41	CONN	.00
IDWORD/Q	XA	CB	CB003MHD	49		CN		0		1	/902 49	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
INDEXM	XA	CB	CB004MHD	20		CN		0		1	/906 20	CONN	.00
INDEXM	XA	CB	CB003MHD	76		CN		0		1	/902 76	CONN	.00
INDEXM	XA	CB	CB002MHD	14		CN		0		1	/901 14	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
INTDEV-		CB	BTCCB0X	71		CN		0		1	/912 71	CONN	.00
INTDEV-		CB	BTCCB3X	32		CN		0		1	/910 32	CONN	.00
INTDEV-		CB	BTCCB3X	33		CN		0		1	/910 33	CONN	.00
INTDEV-		CB	BTCCB3X	34		CN		0		1	/910 34	CONN	.00
INTDEV-		CB	BTCCB3X	35		CN		0		1	/910 35	CONN	.00
INTDEV-		CB	BTCCB3X	36		CN		0		1	/910 36	CONN	.00
INTDEV-		CB	BTCCB3X	37		CN		0		1	/910 37	CONN	.00
INTDEV-		CB	BTCCB3X	38		CN		0		1	/910 38	CONN	.00
INTDEV-		CB	BTCCB3X	39		CN		0		1	/910 39	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
INTEN-	X	CB	BTCCB3X	40		CN		0		1	/910 40	CONN	.00
INTEN-	X	CB	CB004MHD	3		CN		0		1	/906 3	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
IRECOGDEV-		CB	BTCCB0X	29		CN		0		1	/912 29	CONN	.00

PIN SIGNATURE		CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD		BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
IRECOGDEV-		CB	BTCCB3X	41		CN		0		1	/910 41	CONN	.00
IRECOGDEV-		CB	BTCCB3X	42		CN		0		1	/910 42	CONN	.00
IRECOGDEV-		CB	BTCCB3X	43		CN		0		1	/910 43	CONN	.00
IRECOGDEV-		CB	BTCCB3X	44		CN		0		1	/910 44	CONN	.00
IRECOGDEV-		CB	BTCCB3X	45		CN		0		1	/910 45	CONN	.00
IRECOGDEV-		CB	BTCCB3X	46		CN		0		1	/910 46	CONN	.00
IRECOGDEV-		CB	BTCCB3X	47		CN		0		1	/910 47	CONN	.00
IRECOGDEV-		CB	BTCCB3X	48		CN		0		1	/910 48	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LAIL	XA	CB	CB004MHD	55		CN		0		1	/906 55	CONN	.00
LAIL	XA	CB	CB005MHD	58		CN		0		1	/905 58	CONN	.00
LAIL	XA	CB	CB002MHD	55		CN		0		1	/901 55	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LC2/Q-	X	CB	BTCCB3X	49		CN		0		1	/910 49	CONN	.00
LC2/Q-	X	CB	BTCCB2X	45		CN		0		1	/908 45	CONN	.00
LC2/Q-	X	CB	BTCCB1X	36		CN		0		1	/907 36	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LC3+LCNT4	X	CB	BTCCB3X	50		CN		0		1	/910 50	CONN	.00
LC3+LCNT4	X	CB	BTCCB2X	75		CN		0		1	/908 75	CONN	.00
LC3+LCNT4	X	CB	BTCCB1X	37		CN		0		1	/907 37	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LDSP-	XA	CB	CB005MHD	73		CN		0		1	/905 73	CONN	.00
LDSR-	XA	CB	CB001MHD	64		CN		0		1	/903 64	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LISTEN-	X	CB	BTCCB3X	51		CN		0		1	/910 51	CONN	.00
LISTEN-	X	CB	CB003MHD	8		CN		0		1	/902 8	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LIST1	X	CB	BTCCB3X	52		CN		0		1	/910 52	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LIST2	X	CB	BTCCB3X	53		CN		0		1	/910 53	CONN	.00
LIST2	X	CB	BTCCB2X	46		CN		0		1	/908 46	CONN	.00
LIST2	X	CB	CB004MHD	12		CN		0		1	/906 12	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LIST3	X	CB	BTCCB3X	54		CN		0		1	/910 54	CONN	.00
LIST3	X	CB	CB001MHD	7		CN		0		1	/903 7	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LIST4	X	CB	BTCCB3X	55		CN		0		1	/910 55	CONN	.00
LIST4	X	CB	BTCCB1X	38		CN		0		1	/907 38	CONN	.00
LIST4	X	CB	CB004MHD	6		CN		0		1	/906 6	CONN	.00
LIST4	X	CB	CB003MHD	5		CN		0		1	/902 5	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LSMF/Q	XA	CB	CB004MHD	65		CN		0		1	/906 65	CONN	.00
LSMF/Q	XA	CB	CB001MHD	50		CN		0		1	/903 50	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LSMF/Q-	XA	CB	CB004MHD	64		CN		0		1	/906 64	CONN	.00
LSMF/Q-	XA	CB	CB001MHD	49		CN		0		1	/903 49	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
LW3CK-	XA	CB	CB004MHD	17		CN		0		1	/906 17	CONN	.00
LW3CK-	XA	CB	CB005MHD	17		CN		0		1	/905 17	CONN	.00
LW3CK-	XA	CB	CB001MHD	8		CN		0		1	/903 8	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MC-	XA	CB	CB001MHD	63		CN		0		1	/903 63	CONN	.00
MC-	XA	CB	CB002MHD	72		CN		0		1	/901 72	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MCOMP	X	CB	BTCCB3X	56		CN		0		1	/910 56	CONN	.00
MCOMP	X	CB	BTCCB2X	47		CN		0		1	/908 47	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MCO-	X	CB	BTCCB3X	57		CN		0		1	/910 57	CONN	.00
MCO-	X	CB	BTCCB2X	48		CN		0		1	/908 48	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MC2/Q	X	CB	BTCCB2X	76		CN		0		1	/908 76	CONN	.00
MC2/Q	X	CB	BTCCB1X	74		CN		0		1	/907 74	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MC5+MC7-	X	CB	BTCCB2X	49		CN		0		1	/908 49	CONN	.00
MC5+MC7-	X	CB	BTCCB1X	40		CN		0		1	/907 40	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MEMEN-	X	CB	BTCCB3X	58		CN		0		1	/910 58	CONN	.00
MEMEN-	X	CB	CB004MHD	15		CN		0		1	/906 15	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MEMRD-	X	CB	BTCCB3X	75		CN		0		1	/910 75	CONN	.00
MEMRD-	X	CB	BTCCB2X	6		CN		0		1	/908 6	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MEMREAD	X	CB	BTCCB3X	59		CN		0		1	/910 59	CONN	.00
MEMREAD	X	CB	BTCCB2X	50		CN		0		1	/908 50	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MPRESET-		CB	BTCCB0X	68		CN		0		1	/912 68	CONN	.00
MPRESET-		CB	CB002MHD	3		CN		0		1	/901 3	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MRD00/MHD	XA	CB	CB004MHD	21		CN		0		1	/906 21	CONN	.00
MRD00/MHD	XA	CB	CB005MHD	18		CN		0		1	/905 18	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
MRD01/MHD	XA	CB	CB004MHD	22		CN		0		1	/906 22	CONN	.00
MRD01/MHD	XA	CB	CB005MHD	19		CN		0		1	/905 19	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				

PIN SIGNATURE	CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	#N# LOAD		BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
MRD02/MHD XA	CB	CB004MHD	23		CN		0		1	/906 23	CONN	.00
MRD02/MHD XA	CB	CB005MHD	20		CN		0		1	/905 20	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD03/MHD XA	CB	CB004MHD	24		CN		0		1	/906 24	CONN	.00
MRD03/MHD XA	CB	CB005MHD	21		CN		0		1	/905 21	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD04/MHD XA	CB	CB004MHD	25		CN		0		1	/906 25	CONN	.00
MRD04/MHD XA	CB	CB005MHD	22		CN		0		1	/905 22	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD05/MHD XA	CB	CB004MHD	26		CN		0		1	/906 26	CONN	.00
MRD05/MHD XA	CB	CB005MHD	23		CN		0		1	/905 23	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD06/MHD XA	CB	CB004MHD	27		CN		0		1	/906 27	CONN	.00
MRD06/MHD XA	CB	CB005MHD	24		CN		0		1	/905 24	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD07/MHD XA	CB	CB004MHD	28		CN		0		1	/906 28	CONN	.00
MRD07/MHD XA	CB	CB005MHD	25		CN		0		1	/905 25	CONN	.00
MRD07/MHD XA	CB	CB001MHD	10		CN		0		1	/903 10	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD08 X	CB	BTCCB1X	41		CN		0		1	/907 41	CONN	.00
MRD08 X	CB	CB002MHD	4		CN		0		1	/901 4	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD09 X	CB	BTCCB1X	42		CN		0		1	/907 42	CONN	.00
MRD09 X	CB	CB002MHD	7		CN		0		1	/901 7	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD10 X	CB	BTCCB1X	43		CN		0		1	/907 43	CONN	.00
MRD10 X	CB	CB002MHD	9		CN		0		1	/901 9	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD11 X	CB	BTCCB1X	44		CN		0		1	/907 44	CONN	.00
MRD11 X	CB	CB001MHD	67		CN		0		1	/903 67	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRD12 X	CB	BTCCB1X	45		CN		0		1	/907 45	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MREST X	CB	BTCCB1X	76		CN		0		1	/907 76	CONN	.00
MREST X	CB	CB006MHD	8		CN		0		1	/904 8	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MREST- XA	CB	CB006MHD	40		CN		0		1	/904 40	CONN	.00
MREST- XA	CB	CB003MHD	70		CN		0		1	/902 70	CONN	.00
MREST- XA	CB	CB002MHD	67		CN		0		1	/901 67	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRSMHD XA	CB	CB004MHD	67		CN		0		1	/906 67	CONN	.00
MRSMHD XA	CB	CB005MHD	74		CN		0		1	/905 74	CONN	.00
MRSMHD XA	CB	CB001MHD	54		CN		0		1	/903 54	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MRSMHD- XA	CB	CB004MHD	46		CN		0		1	/906 46	CONN	.00
MRSMHD- XA	CB	CB006MHD	13		CN		0		1	/904 13	CONN	.00
MRSMHD- XA	CB	CB001MHD	18		CN		0		1	/903 18	CONN	.00
MRSMHD- XA	CB	CB003MHD	18		CN		0		1	/902 18	CONN	.00
MRSMHD- XA	CB	CB002MHD	18		CN		0		1	/901 18	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MWDCK- XA	CB	CB005MHD	28		CN		0		1	/905 28	CONN	.00
MWDCK- XA	CB	CB003MHD	17		CN		0		1	/902 17	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MWDCKA2- XA	CB	CB001MHD	39		CN		0		1	/903 39	CONN	.00
MWDCKA2- XA	CB	CB003MHD	47		CN		0		1	/902 47	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MWDSEL- XA	CB	CB005MHD	53		CN		0		1	/905 53	CONN	.00
MWDSEL- XA	CB	CB006MHD	16		CN		0		1	/904 16	CONN	.00
MWDSEL- XA	CB	CB003MHD	22		CN		0		1	/902 22	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MWD00/MHD XA	CB	CB004MHD	35		CN		0		1	/906 35	CONN	.00
MWD00/MHD XA	CB	CB005MHD	31		CN		0		1	/905 31	CONN	.00
MWD00/MHD XA	CB	CB006MHD	11		CN		0		1	/904 11	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MWD01/MHD XA	CB	CB005MHD	30		CN		0		1	/905 30	CONN	.00
MWD01/MHD XA	CB	CB006MHD	10		CN		0		1	/904 10	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MWD02/MHD XA	CB	CB005MHD	29		CN		0		1	/905 29	CONN	.00
MWD02/MHD XA	CB	CB006MHD	9		CN		0		1	/904 9	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
MWD03/MHD XA	CB	CB005MHD	32		CN		0		1	/905 32	CONN	.00
MWD03/MHD XA	CB	CB006MHD	12		CN		0		1	/904 12	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
NSCE XA	CB	CB004MHD	45		CN		0		1	/906 45	CONN	.00
NSCE XA	CB	CB001MHD	16		CN		0		1	/903 16	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
NSR8- XA	CB	CB004MHD	43		CN		0		1	/906 43	CONN	.00
NSR8- XA	CB	CB001MHD	15		CN		0		1	/903 15	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
NXSESEL1 XA	CB	CB004MHD	38		CN		0		1	/906 38	CONN	.00
NXSESEL1 XA	CB	CB005MHD	35		CN		0		1	/905 35	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*					
NXSESEL2 XA	CB	CB004MHD	40		CN		0		1	/906 40	CONN	.00

PIN SIGNATURE		CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD		BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
NXSESEL2	XA	CB	CB005MHD	37		CN		0		1	/905 37	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
NXSESEL3	XA	CB	CB004MHD	37		CN		0		1	/906 37	CONN	.00
NXSESEL3	XA	CB	CB005MHD	34		CN		0		1	/905 34	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
NXSESEL4	XA	CB	CB004MHD	42		CN		0		1	/906 42	CONN	.00
NXSESEL4	XA	CB	CB005MHD	39		CN		0		1	/905 39	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
NXSESEL5	XA	CB	CB004MHD	44		CN		0		1	/906 44	CONN	.00
NXSESEL5	XA	CB	CB005MHD	40		CN		0		1	/905 40	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
NXSESEL6	XA	CB	CB004MHD	41		CN		0		1	/906 41	CONN	.00
NXSESEL6	XA	CB	CB005MHD	38		CN		0		1	/905 38	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
OFLIN/D-	XA	CB	CB006MHD	48		CN		0		1	/904 48	CONN	.00
OFLIN/D-	XA	CB	CB002MHD	73		CN		0		1	/901 73	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
OPCOMP/D-	XA	CB	CB006MHD	50		CN		0		1	/904 50	CONN	.00
OPCOMP/D-	XA	CB	CB003MHD	74		CN		0		1	/902 74	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
PARER	X	CB	BTCCB1X	46		CN		0		1	/907 46	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
PARERR-		CB	BTCCBOX	75		CN		0		1	/912 75	CONN	.00
PARERR-		CB	BTCCB1X	47		CN		0		1	/907 47	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
PARFLG/Q	XA	CB	CB001MHD	58		CN		0		1	/903 58	CONN	.00
PARFLG/Q	XA	CB	CB003MHD	69		CN		0		1	/902 69	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
PARFLG/Q-	XA	CB	CB001MHD	57		CN		0		1	/903 57	CONN	.00
PARFLG/Q-	XA	CB	CB003MHD	68		CN		0		1	/902 68	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
PLR1	XA	CB	CB004MHD	19		CN		0		1	/906 19	CONN	.00
PLR1	XA	CB	CB002MHD	13		CN		0		1	/901 13	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
PROGER/D-	XA	CB	CB004MHD	73		CN		0		1	/906 73	CONN	.00
PROGER/D-	XA	CB	CB006MHD	45		CN		0		1	/904 45	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
PROGER/DA-	XA	CB	CB004MHD	59		CN		0		1	/906 59	CONN	.00
PROGER/DA-	XA	CB	CB003MHD	56		CN		0		1	/902 56	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RBUFUL/Q-	XA	CB	CB001MHD	38		CN		0		1	/903 38	CONN	.00
RBUFUL/Q-	XA	CB	CB003MHD	46		CN		0		1	/902 46	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RDATA	XA	CB	CB005MHD	71		CN		0		1	/905 71	CONN	.00
RDATA	XA	CB	CB001MHD	53		CN		0		1	/903 53	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RDATAP	XA	CB	CB001MHD	60		CN		0		1	/903 60	CONN	.00
RDATAP	XA	CB	CB002MHD	69		CN		0		1	/901 69	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RDCK-	XA	CB	CB001MHD	24		CN		0		1	/903 24	CONN	.00
RDCK-	XA	CB	CB002MHD	36		CN		0		1	/901 36	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RDIDCOM	XA	CB	CB004MHD	66		CN		0		1	/906 66	CONN	.00
RDIDCOM	XA	CB	CB001MHD	51		CN		0		1	/903 51	CONN	.00
RDIDCOM	XA	CB	CB003MHD	61		CN		0		1	/902 61	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RDIDCOM-	XA	CB	CB001MHD	27		CN		0		1	/903 27	CONN	.00
RDIDCOM-	XA	CB	CB003MHD	29		CN		0		1	/902 29	CONN	.00
RDIDCOM-	XA	CB	CB002MHD	42		CN		0		1	/901 42	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RDOPFLG/J	XA	CB	CB004MHD	53		CN		0		1	/906 53	CONN	.00
RDOPFLG/J	XA	CB	CB003MHD	36		CN		0		1	/902 36	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
READY	X	CB	BTCCB3X	60		CN		0		1	/910 60	CONN	.00
READY	X	CB	CB005MHD	10		CN		0		1	/905 10	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
READYMHD	XA	CB	CB005MHD	69		CN		0		1	/905 69	CONN	.00
READYMHD	XA	CB	CB003MHD	41		CN		0		1	/902 41	CONN	.00
READYMHD	XA	CB	CB002MHD	46		CN		0		1	/901 46	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RESET-		CB	BTCCBOX	31		CN		0		1	/912 31	CONN	.00
RESET-		CB	BTCCB1X	48		CN		0		1	/907 48	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RESETA-	X	CB	BTCCB3X	61		CN		0		1	/910 61	CONN	.00
RESETA-	X	CB	BTCCB2X	51		CN		0		1	/908 51	CONN	.00
RESETA-	X	CB	BTCCB1X	49		CN		0		1	/907 49	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT00-	X	CB	BTCCB2X	52		CN		0		1	/908 52	CONN	.00
RFOUT00-	X	CB	BTCCB1X	50		CN		0		1	/907 50	CONN	.00
RFOUT00-	X	CB	CB004MHD	8		CN		0		1	/906 8	CONN	.00
RFOUT00-	X	CB	CB006MHD	3		CN		0		1	/904 3	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				

PIN SIGNATURE		CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD		BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
RFOUT01-	X	CB	BTCCB2X	53		CN		0		1	/908 53	CONN	.00
RFOUT01-	X	CB	BTCCB1X	51		CN		0		1	/907 51	CONN	.00
RFOUT01-	X	CB	CB004MHD	11		CN		0		1	/906 11	CONN	.00
RFOUT01-	X	CB	CB006MHD	4		CN		0		1	/904 4	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT02-	X	CB	BTCCB2X	54		CN		0		1	/908 54	CONN	.00
RFOUT02-	X	CB	BTCCB1X	52		CN		0		1	/907 52	CONN	.00
RFOUT02-	X	CB	CB004MHD	16		CN		0		1	/906 16	CONN	.00
RFOUT02-	X	CB	CB006MHD	7		CN		0		1	/904 7	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT03-	X	CB	BTCCB2X	55		CN		0		1	/908 55	CONN	.00
RFOUT03-	X	CB	BTCCB1X	53		CN		0		1	/907 53	CONN	.00
RFOUT03-	X	CB	CB004MHD	14		CN		0		1	/906 14	CONN	.00
RFOUT03-	X	CB	CB006MHD	5		CN		0		1	/904 5	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT04-	X	CB	BTCCB2X	56		CN		0		1	/908 56	CONN	.00
RFOUT04-	X	CB	BTCCB1X	54		CN		0		1	/907 54	CONN	.00
RFOUT04-	X	CB	CB004MHD	5		CN		0		1	/906 5	CONN	.00
RFOUT04-	X	CB	CB005MHD	6		CN		0		1	/905 6	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT05-	X	CB	BTCCB2X	57		CN		0		1	/908 57	CONN	.00
RFOUT05-	X	CB	BTCCB1X	55		CN		0		1	/907 55	CONN	.00
RFOUT05-	X	CB	CB004MHD	10		CN		0		1	/906 10	CONN	.00
RFOUT05-	X	CB	CB005MHD	9		CN		0		1	/905 9	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT06-	X	CB	BTCCB2X	58		CN		0		1	/908 58	CONN	.00
RFOUT06-	X	CB	BTCCB1X	56		CN		0		1	/907 56	CONN	.00
RFOUT06-	X	CB	CB004MHD	4		CN		0		1	/906 4	CONN	.00
RFOUT06-	X	CB	CB005MHD	5		CN		0		1	/905 5	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT07-	X	CB	BTCCB2X	59		CN		0		1	/908 59	CONN	.00
RFOUT07-	X	CB	BTCCB1X	57		CN		0		1	/907 57	CONN	.00
RFOUT07-	X	CB	CB005MHD	13		CN		0		1	/905 13	CONN	.00
RFOUT07-	X	CB	CB001MHD	6		CN		0		1	/903 6	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT08-	X	CB	BTCCB2X	60		CN		0		1	/908 60	CONN	.00
RFOUT08-	X	CB	BTCCB1X	58		CN		0		1	/907 58	CONN	.00
RFOUT08-	X	CB	CB005MHD	14		CN		0		1	/905 14	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT09-	X	CB	BTCCB2X	61		CN		0		1	/908 61	CONN	.00
RFOUT09-	X	CB	BTCCB1X	59		CN		0		1	/907 59	CONN	.00
RFOUT09-	X	CB	CB005MHD	4		CN		0		1	/905 4	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT10-	X	CB	BTCCB2X	62		CN		0		1	/908 62	CONN	.00
RFOUT10-	X	CB	BTCCB1X	60		CN		0		1	/907 60	CONN	.00
RFOUT10-	X	CB	CB005MHD	15		CN		0		1	/905 15	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT11-	X	CB	BTCCB2X	63		CN		0		1	/908 63	CONN	.00
RFOUT11-	X	CB	BTCCB1X	61		CN		0		1	/907 61	CONN	.00
RFOUT11-	X	CB	CB005MHD	8		CN		0		1	/905 8	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT12-	X	CB	BTCCB2X	64		CN		0		1	/908 64	CONN	.00
RFOUT12-	X	CB	BTCCB1X	62		CN		0		1	/907 62	CONN	.00
RFOUT12-	X	CB	CB005MHD	12		CN		0		1	/905 12	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT13-	X	CB	BTCCB2X	65		CN		0		1	/908 65	CONN	.00
RFOUT13-	X	CB	BTCCB1X	63		CN		0		1	/907 63	CONN	.00
RFOUT13-	X	CB	CB005MHD	7		CN		0		1	/905 7	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT14-	X	CB	BTCCB2X	66		CN		0		1	/908 66	CONN	.00
RFOUT14-	X	CB	BTCCB1X	64		CN		0		1	/907 64	CONN	.00
RFOUT14-	X	CB	CB005MHD	3		CN		0		1	/905 3	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFOUT15-	X	CB	BTCCB2X	67		CN		0		1	/908 67	CONN	.00
RFOUT15-	X	CB	BTCCB1X	65		CN		0		1	/907 65	CONN	.00
RFOUT15-	X	CB	CB005MHD	16		CN		0		1	/905 16	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFPADD1	X	CB	BTCCB3X	62		CN		0		1	/910 62	CONN	.00
RFPADD1	X	CB	BTCCB1X	66		CN		0		1	/907 66	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RFWADD1	X	CB	BTCCB3X	64		CN		0		1	/910 64	CONN	.00
RFWADD1	X	CB	BTCCB1X	68		CN		0		1	/907 68	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RF4EN	X	CB	BTCCB3X	65		CN		0		1	/910 65	CONN	.00
RF4EN	X	CB	CB003MHD	3		CN		0		1	/902 3	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
RG/Q	XA	CB	CB001MHD	56		CN		0		1	/903 56	CONN	.00
RG/Q	XA	CB	CB002MHD	64		CN		0		1	/901 64	CONN	.30
								0	NET LOADS *EXTERNAL SOURCE*				
RG/Q-	XA	CB	CB001MHD	55		CN		0		1	/903 55	CONN	.00
RG/Q-	XA	CB	CB002MHD	63		CN		0		1	/901 63	CONN	.30
								0	NET LOADS *EXTERNAL SOURCE*				
RTS/R/W	XA	CB	CB003MHD	48		CN		0		1	/902 48	CONN	.00
RTS/R/W	XA	CB	CB002MHD	51		CN		0		1	/901 51	CONN	.30
								0	NET LOADS *EXTERNAL SOURCE*				
RYSWP/Q	XA	CB	CB003MHD	37		CN		0		1	/902 37	CONN	.00
RYSWP/Q	XA	CB	CB002MHD	45		CN		0		1	/901 45	CONN	.00

PIN SIGNATURE		CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD	BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
								0 NET LOADS *EXTERNAL SOURCE*				
RYSWR/Q-	XA	CB	CB003MHD	65		CN		0	1	/902 65	CONN	.00
RYSWR/Q-	XA	CB	CB002MHD	65		CN		0	1	/901 65	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SCLOCK	X	CB	BTCCB1X	69		CN		0	1	/907 69	CONN	.00
SCLOCK	X	CB	CB002MHD	11		CN		0	1	/901 11	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SC4/Q-	X	CB	BTCCB3X	66		CN		0	1	/910 66	CONN	.00
SC4/Q-	X	CB	BTCCB1X	70		CN		0	1	/907 70	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SC4,5-	X	CB	BTCCB3X	67		CN		0	1	/910 67	CONN	.00
SC4,5-	X	CB	BTCCB2X	68		CN		0	1	/908 68	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SC5/Q	X	CB	BTCCB3X	68		CN		0	1	/910 68	CONN	.00
SC5/Q	X	CB	BTCCB2X	69		CN		0	1	/908 69	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SC5/Q-	X	CB	BTCCB3X	63		CN		0	1	/910 63	CONN	.00
SC5/Q-	X	CB	BTCCB1X	67		CN		0	1	/907 67	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SH15	XA	CB	CB005MHD	51		CN		0	1	/905 51	CONN	.00
SH15	XA	CB	CB001MHD	21		CN		0	1	/903 21	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SIGSTA/Q-	XA	CB	CB004MHD	52		CN		0	1	/906 52	CONN	.00
SIGSTA/Q-	XA	CB	CB001MHD	30		CN		0	1	/903 30	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SIGSTAB/Q	XA	CB	CB004MHD	60		CN		0	1	/906 60	CONN	.00
SIGSTAB/Q	XA	CB	CB001MHD	45		CN		0	1	/903 45	CONN	.00
SIGSTAB/Q	XA	CB	CB003MHD	57		CN		0	1	/902 57	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SIGSTA1/Q	XA	CB	CB004MHD	61		CN		0	1	/906 61	CONN	.00
SIGSTA1/Q	XA	CB	CB002MHD	59		CN		0	1	/901 59	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SKOPFLG/J	XA	CB	CB004MHD	68		CN		0	1	/906 68	CONN	.00
SKOPFLG/J	XA	CB	CB003MHD	66		CN		0	1	/902 66	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SKOPFLG/K	XA	CB	CB003MHD	67		CN		0	1	/902 67	CONN	.00
SKOPFLG/K	XA	CB	CB002MHD	66		CN		0	1	/901 66	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SKOPFLG/Q	XA	CB	CB003MHD	51		CN		0	1	/902 51	CONN	.00
SKOPFLG/Q	XA	CB	CB002MHD	54		CN		0	1	/901 54	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SKOPFLG/Q-	XA	CB	CB003MHD	43		CN		0	1	/902 43	CONN	.00
SKOPFLG/Q-	XA	CB	CB002MHD	48		CN		0	1	/901 48	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SK1/Q-	XA	CB	CB001MHD	25		CN		0	1	/903 25	CONN	.00
SK1/Q-	XA	CB	CB002MHD	38		CN		0	1	/901 38	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SK2/J	XA	CB	CB004MHD	56		CN		0	1	/906 56	CONN	.00
SK2/J	XA	CB	CB002MHD	56		CN		0	1	/901 56	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SK2/K	XA	CB	CB004MHD	51		CN		0	1	/906 51	CONN	.00
SK2/K	XA	CB	CB003MHD	27		CN		0	1	/902 27	CONN	.00
SK2/K	XA	CB	CB002MHD	40		CN		0	1	/901 40	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SK2/Q-	XA	CB	CB004MHD	50		CN		0	1	/906 50	CONN	.00
SK2/Q-	XA	CB	CB001MHD	26		CN		0	1	/903 26	CONN	.00
SK2/Q-	XA	CB	CB002MHD	39		CN		0	1	/901 39	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SR0/J	XA	CB	CB006MHD	33		CN		0	1	/904 33	CONN	.00
SR0/J	XA	CB	CB003MHD	40		CN		0	1	/902 40	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SR0/K	XA	CB	CB001MHD	32		CN		0	1	/903 32	CONN	.00
SR0/K	XA	CB	CB003MHD	34		CN		0	1	/902 34	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SR1/J	XA	CB	CB003MHD	32		CN		0	1	/902 32	CONN	.00
SR1/J	XA	CB	CB002MHD	44		CN		0	1	/901 44	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SR1/Q	XA	CB	CB001MHD	65		CN		0	1	/903 65	CONN	.00
SR1/Q	XA	CB	CB003MHD	63		CN		0	1	/902 63	CONN	.00
SR1/Q	XA	CB	CB002MHD	61		CN		0	1	/901 61	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
SR1/Q-	XA	CB	CB005MHD	67		CN		0	1	/905 67	CONN	.00
SR1/Q-	XA	CB	CB002MHD	43		CN		0	1	/901 43	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
STATRUSY	X	CB	BTCCB3X	70		CN		0	1	/910 70	CONN	.00
STATRUSY	X	CB	BTCCB2X	71		CN		0	1	/908 71	CONN	.00
STATRUSY	X	CB	CB005MHD	11		CN		0	1	/905 11	CONN	.00
STATRUSY	X	CB	CB002MHD	6		CN		0	1	/901 6	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				
STATRUSY-	XA	CB	CB003MHD	28		CN		0	1	/902 28	CONN	.00
STATRUSY-	XA	CB	CB002MHD	41		CN		0	1	/901 41	CONN	.00
								0 NET LOADS *EXTERNAL SOURCE*				

PIN SIGNATURE		CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD		BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
STATEN-	X	CB	BTCCB3X	71		CN		0		1	/910 71	CONN	.00
STATEN-	X	CB	BTCCB1X	71		CN		0		1	/907 71	CONN	.00
STATEN-	X	CB	CB006MHD	6		CN		0		1	/904 6	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STATR1CK-	XA	CB	CB006MHD	49		CN		0		1	/904 49	CONN	.00
STATR1CK-	XA	CB	CB002MHD	74		CN		0		1	/901 74	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STATR3CK-	XA	CB	CB006MHD	25		CN		0		1	/904 25	CONN	.00
STATR3CK-	XA	CB	CB002MHD	32		CN		0		1	/901 32	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STATSEL-	XA	CB	CB005MHD	52		CN		0		1	/905 52	CONN	.00
STATSEL-	XA	CB	CB006MHD	15		CN		0		1	/904 15	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT04-	XA	CB	CB005MHD	55		CN		0		1	/905 55	CONN	.00
STAT04-	XA	CB	CB006MHD	18		CN		0		1	/904 18	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT05-	XA	CB	CB005MHD	54		CN		0		1	/905 54	CONN	.00
STAT05-	XA	CB	CB006MHD	17		CN		0		1	/904 17	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT06-	XA	CB	CB005MHD	57		CN		0		1	/905 57	CONN	.00
STAT06-	XA	CB	CB006MHD	20		CN		0		1	/904 20	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT07-	XA	CB	CB005MHD	56		CN		0		1	/905 56	CONN	.00
STAT07-	XA	CB	CB006MHD	19		CN		0		1	/904 19	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT08-	XA	CB	CB005MHD	59		CN		0		1	/905 59	CONN	.00
STAT08-	XA	CB	CB006MHD	22		CN		0		1	/904 22	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT10-	XA	CB	CB005MHD	61		CN		0		1	/905 61	CONN	.00
STAT10-	XA	CB	CB006MHD	24		CN		0		1	/904 24	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT11-	XA	CB	CB005MHD	60		CN		0		1	/905 60	CONN	.00
STAT11-	XA	CB	CB006MHD	23		CN		0		1	/904 23	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT12-	XA	CB	CB005MHD	63		CN		0		1	/905 63	CONN	.00
STAT12-	XA	CB	CB002MHD	29		CN		0		1	/901 29	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT13-	XA	CB	CB005MHD	62		CN		0		1	/905 62	CONN	.00
STAT13-	XA	CB	CB002MHD	28		CN		0		1	/901 28	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT14-	XA	CB	CB005MHD	65		CN		0		1	/905 65	CONN	.00
STAT14-	XA	CB	CB002MHD	31		CN		0		1	/901 31	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
STAT15-	XA	CB	CB005MHD	64		CN		0		1	/905 64	CONN	.00
STAT15-	XA	CB	CB002MHD	30		CN		0		1	/901 30	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
ST1/J	XA	CB	CB006MHD	37		CN		0		1	/904 37	CONN	.00
ST1/J	XA	CB	CB002MHD	58		CN		0		1	/901 58	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
ST1/J-	XA	CB	CB006MHD	30		CN		0		1	/904 30	CONN	.00
ST1/J-	XA	CB	CB002MHD	37		CN		0		1	/901 37	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
SW1/Q	XA	CB	CB001MHD	42		CN		0		1	/903 42	CONN	.00
SW1/Q	XA	CB	CB003MHD	52		CN		0		1	/902 52	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
SW2	XA	CB	CB005MHD	50		CN		0		1	/905 50	CONN	.00
SW2	XA	CB	CB003MHD	21		CN		0		1	/902 21	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
SW2/Q-	XA	CB	CB001MHD	31		CN		0		1	/903 31	CONN	.00
SW2/Q-	XA	CB	CB003MHD	33		CN		0		1	/902 33	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
SYCKMHD	XA	CB	CB004MHD	18		CN		0		1	/906 18	CONN	.00
SYCKMHD	XA	CB	CB001MHD	9		CN		0		1	/903 9	CONN	.00
SYCKMHD	XA	CB	CB003MHD	10		CN		0		1	/902 10	CONN	.00
SYCKMHD	XA	CB	CB002MHD	12		CN		0		1	/901 12	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
SYCKMHD-	XA	CB	CB004MHD	74		CN		0		1	/906 74	CONN	.00
SYCKMHD-	XA	CB	CB006MHD	14		CN		0		1	/904 14	CONN	.00
SYCKMHD-	XA	CB	CB001MHD	19		CN		0		1	/903 19	CONN	.00
SYCKMHD-	XA	CB	CB003MHD	19		CN		0		1	/902 19	CONN	.00
SYCKMHD-	XA	CB	CB002MHD	19		CN		0		1	/901 19	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
SYCKMHDJ	XA	CB	CB004MHD	47		CN		0		1	/906 47	CONN	.00
SYCKMHDJ	XA	CB	CB003MHD	20		CN		0		1	/902 20	CONN	.00
SYCKMHDJ	XA	CB	CB002MHD	20		CN		0		1	/901 20	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
SYCL-	X	CB	BTCCB3X	72		CN		0		1	/910 72	CONN	.00
SYCL-	X	CB	BTCCB2X	72		CN		0		1	/908 72	CONN	.00
SYCL-	X	CB	BTCCB1X	73		CN		0		1	/907 73	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				
SYNCLK	XA	CB	CB004MHD	63		CN		0		1	/906 63	CONN	.00
SYNCLK	XA	CB	CB005MHD	70		CN		0		1	/905 70	CONN	.00
SYNCLK	XA	CB	CB001MHD	48		CN		0		1	/903 48	CONN	.00
								0	NET LOADS *EXTERNAL SOURCE*				

PIN SIGNATURE	CIRCUIT TYPE	DEVICE NAME	PIN NAME	WIRE CODE	PIN FUNC	CKT FREQ.	N+ LOAD	BLOCK NUMBER	LOCATION NAME PIN	WIRING COMMENT	WIRE LENGTH
SYNR/Q- XA	CB	CB001MHD	40		CN		0	1	/903 40	CONN	.00
SYNR/Q- XA	CB	CB002MHD	52		CN		0	1	/901 52	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
TERM- XA	CB	CB006MHD	34		CN		0	1	/904 34	CONN	.00
TERM- XA	CB	CB003MHD	42		CN		0	1	/902 42	CONN	.00
TERM- XA	CB	CB002MHD	47		CN		0	1	/901 47	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
TWOSC X	CB	BTCCB3X	73		CN		0	1	/910 73	CONN	.00
TWOSC X	CB	CB001MHD	3		CN		0	1	/903 3	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
UNSKFSETEN XA	CB	CB004MHD	54		CN		0	1	/906 54	CONN	.00
UNSKFSETEN XA	CB	CB003MHD	50		CN		0	1	/902 50	CONN	.00
UNSKFSETEN XA	CB	CB002MHD	53		CN		0	1	/901 53	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
UPHD/Q XA	CB	CB001MHD	37		CN		0	1	/903 37	CONN	.00
UPHD/Q XA	CB	CB002MHD	50		CN		0	1	/901 50	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WC=0/Q XA	CB	CB005MHD	66		CN		0	1	/905 66	CONN	.00
WC=0/Q XA	CB	CB006MHD	31		CN		0	1	/904 31	CONN	.00
WC=0/Q XA	CB	CB003MHD	26		CN		0	1	/902 26	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WCHK/Q- XA	CB	CB003MHD	45		CN		0	1	/902 45	CONN	.00
WCHK/Q- XA	CB	CB002MHD	49		CN		0	1	/901 49	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WDNCK XA	CB	CB001MHD	59		CN		0	1	/903 59	CONN	.00
WDNCK XA	CB	CB002MHD	68		CN		0	1	/901 68	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WG/Q XA	CB	CB001MHD	61		CN		0	1	/903 61	CONN	.00
WG/Q XA	CB	CB002MHD	70		CN		0	1	/901 70	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WLKOUT/Q XA	CB	CB004MHD	49		CN		0	1	/906 49	CONN	.00
WLKOUT/Q XA	CB	CB005MHD	49		CN		0	1	/905 49	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WLKTON/D- XA	CB	CB004MHD	70		CN		0	1	/906 70	CONN	.00
WLKTON/D- XA	CB	CB006MHD	41		CN		0	1	/904 41	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WOMKDR/Q- XA	CB	CB001MHD	23		CN		0	1	/903 23	CONN	.00
WOMKDR/Q- XA	CB	CB003MHD	25		CN		0	1	/902 25	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WOMKSR XA	CB	CB001MHD	22		CN		0	1	/903 22	CONN	.00
WOMKSR XA	CB	CB003MHD	24		CN		0	1	/902 24	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WPS XA	CB	CB006MHD	38		CN		0	1	/904 38	CONN	.00
WPS XA	CB	CB002MHD	60		CN		0	1	/901 60	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WRIDCOM XA	CB	CB004MHD	62		CN		0	1	/906 62	CONN	.00
WRIDCOM XA	CB	CB003MHD	60		CN		0	1	/902 60	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
WRTOPFLG/QXA	CB	CB004MHD	57		CN		0	1	/906 57	CONN	.00
WRTOPFLG/QXA	CB	CB006MHD	35		CN		0	1	/904 35	CONN	.00
WRTOPFLG/QXA	CB	CB003MHD	53		CN		0	1	/902 53	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
ZERO16 X	CB	BTCCB2X	73		CN		0	1	/908 73	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
ZERO8 X	CB	BTCCB2X	74		CN		0	1	/908 74	CONN	.00
ZERO8 X	CB	CB004MHD	7		CN		0	1	/906 7	CONN	.00
ZERO8 X	CB	CB001MHD	5		CN		0	1	/903 5	CONN	.00
ZERO8 X	CB	CB003MHD	6		CN		0	1	/902 6	CONN	.00
							0 NET LOADS *EXTERNAL SOURCE*				
31/44SIGNAL	CB	CB004MHD	39		CN		0	1	/906 39	CONN	.00
31/44SIGNAL	CB	CB005MHD	36		CN		0	1	/905 36	CONN	.00
31/44SIGNAL	CB	CB001MHD	68		CN		0	1	/903 68	CONN	.00

PIN LIST

Drawing No. 961711-9921

LOCATION /901

1				CONN	2				CONN	3	MPRESET-		CB002MHD	CONN
4	MRD08	X	CB002MHD	CONN	5	BUSY-	X	CB002MHD	CONN	6	STATBUSY	X	CB002MHD	CONN
7	MRD09	X	CB002MHD	CONN	8	ATI1	X	CB002MHD	CONN	9	MRD10	X	CB002MHD	CONN
10	DEVBSY/Q	XA	CB002MHD	CONN	11	SCLOCK	X	CB002MHD	CONN	12	SYCKMHD	XA	CB002MHD	CONN
13	PLR1	XA	CB002MHD	CONN	14	INDEXM	XA	CB002MHD	CONN	15	BUSY/DB2-	XA	CB002MHD	CONN
16	CYLAD7	XA	CB002MHD	CONN	17	BTCLR	XA	CB002MHD	CONN	18	MRSMHD-	XA	CB002MHD	CONN
19	SYCKMHD-	XA	CB002MHD	CONN	20	SYCKMHDJ	XA	CB002MHD	CONN	21	CYLAD3	XA	CB002MHD	CONN
22	CYLAD2	XA	CB002MHD	CONN	23	CYLAD1	XA	CB002MHD	CONN	24	CYLAD0	XA	CB002MHD	CONN
25	CYLAD6	XA	CB002MHD	CONN	26	CYLAD5	XA	CB002MHD	CONN	27	CYLAD4	XA	CB002MHD	CONN
28	STAT13-	XA	CB002MHD	CONN	29	STAT12-	XA	CB002MHD	CONN	30	STAT15-	XA	CB002MHD	CONN
31	STAT14-	XA	CB002MHD	CONN	32	STATR3CK-	XA	CB002MHD	CONN	33	ENDISC/Q-	XA	CB002MHD	CONN
34	CHLTKN/Q-	XA	CB002MHD	CONN	35	BUSY/Q-	XA	CB002MHD	CONN	36	RDCK-	XA	CB002MHD	CONN
37	ST1/J-	XA	CB002MHD	CONN	38	SK1/Q-	XA	CB002MHD	CONN	39	SK2/Q-	XA	CB002MHD	CONN
40	SK2/K	XA	CB002MHD	CONN	41	STATBUSY-	XA	CB002MHD	CONN	42	RDIDCOM-	XA	CB002MHD	CONN
43	SR1/Q-	XA	CB002MHD	CONN	44	SR1/J	XA	CB002MHD	CONN	45	RYSWR/Q	XA	CB002MHD	CONN
46	READYMHD	XA	CB002MHD	CONN	47	TERM-	XA	CB002MHD	CONN	48	SKOPFLG/Q-	XA	CB002MHD	CONN
49	WCHK/Q-	XA	CB002MHD	CONN	50	UPHD/Q	XA	CB002MHD	CONN	51	RTS/R/W	XA	CB002MHD	CONN
52	SYNR/Q-	XA	CB002MHD	CONN	53	UNSKFSETEN	XA	CB002MHD	CONN	54	SKOPFLG/Q	XA	CB002MHD	CONN
55	LATL	XA	CB002MHD	CONN	56	SK2/J	XA	CB002MHD	CONN	57	BUSY/D-	XA	CB002MHD	CONN
58	ST1/J	XA	CB002MHD	CONN	59	SIGSTA1/Q	XA	CB002MHD	CONN	60	WPS	XA	CB002MHD	CONN
61	SR1/Q	XA	CB002MHD	CONN	62	BUFFUL/Q	XA	CB002MHD	CONN	63	RG/Q-	XA	CB002MHD	CONN
64	RG/Q	XA	CB002MHD	CONN	65	RYSWR/Q-	XA	CB002MHD	CONN	66	SKOPFLG/K	XA	CB002MHD	CONN
67	MREST-	XA	CB002MHD	CONN	68	WDNCK	XA	CB002MHD	CONN	69	RDATAP	XA	CB002MHD	CONN
70	WG/Q	XA	CB002MHD	CONN	71	EGDY/Q-	XA	CB002MHD	CONN	72	MC-	XA	CB002MHD	CONN
73	OFLIN/D-	XA	CB002MHD	CONN	74	STATP1CK-	XA	CB002MHD	CONN	75	ENDISC/D-	XA	CB002MHD	CONN
76	ATI2	X	CB002MHD	CONN	77				CONN	78				CONN
79				CONN	80				CONN					

LOCATION /902

1				CONN	2				CONN	3	RF4EN	X	CB003MHD	CONN
4	DECOUNT-	X	CB003MHD	CONN	5	LIST4	X	CB003MHD	CONN	6	ZERO8	X	CB003MHD	CONN
7	ACK-	X	CB003MHD	CONN	8	LISTEN-	X	CB003MHD	CONN	9	ATI2	X	CB003MHD	CONN
10	SYCKMHD	XA	CB003MHD	CONN	11	BUSY/DB2-	XA	CB003MHD	CONN	12	CHAIN	XA	CB003MHD	CONN
13	CHAIN-	XA	CB003MHD	CONN	14	COMM1-	XA	CB003MHD	CONN	15	CRCCLR-	XA	CB003MHD	CONN
16	CRCCK-	XA	CB003MHD	CONN	17	MWDCK-	XA	CB003MHD	CONN	18	MRSMHD-	XA	CB003MHD	CONN
19	SYCKMHD-	XA	CB003MHD	CONN	20	SYCKMHDJ	XA	CB003MHD	CONN	21	SW2	XA	CB003MHD	CONN
22	MWDSEL-	XA	CB003MHD	CONN	23	DATRER/Q-	XA	CB003MHD	CONN	24	WDMKSR	XA	CB003MHD	CONN
25	WDMKDR/Q-	XA	CB003MHD	CONN	26	WC=0/Q	XA	CB003MHD	CONN	27	SK2/K	XA	CB003MHD	CONN
28	STATBUSY-	XA	CB003MHD	CONN	29	RDIDCOM-	XA	CB003MHD	CONN	30	IDREAD/Q-	XA	CB003MHD	CONN
31	DRSTARTB1	XA	CB003MHD	CONN	32	SR1/J	XA	CB003MHD	CONN	33	SW2/Q-	XA	CB003MHD	CONN
34	SR0/K	XA	CB003MHD	CONN	35	COMPOP-	XA	CB003MHD	CONN	36	RDOPFLG/J	XA	CB003MHD	CONN
37	RYSWR/Q	XA	CB003MHD	CONN	38	IDCHKSR/Q-	XA	CB003MHD	CONN	39	IDCHKSR/Q	XA	CB003MHD	CONN
40	SR0/J	XA	CB003MHD	CONN	41	READYMHD	XA	CB003MHD	CONN	42	TERM-	XA	CB003MHD	CONN
43	SKOPFLG/Q-	XA	CB003MHD	CONN	44	BCCRY	XA	CB003MHD	CONN	45	WCHK/Q-	XA	CB003MHD	CONN
46	RBUFUL/Q-	XA	CB003MHD	CONN	47	MWDCKA2-	XA	CB003MHD	CONN	48	RTS/R/W	XA	CB003MHD	CONN
49	IDWORD/Q	XA	CB003MHD	CONN	50	UNSKFSETEN	XA	CB003MHD	CONN	51	SKOPFLG/Q	XA	CB003MHD	CONN
52	SW1/Q	XA	CB003MHD	CONN	53	WRTOPFLG/Q	XA	CB003MHD	CONN	54	COMERR/Q	XA	CB003MHD	CONN
55	DROMHD/Q	XA	CB003MHD	CONN	56	PROGER/DA-	XA	CB003MHD	CONN	57	SIGSTAB/Q	XA	CB003MHD	CONN
58	BCCRY-	XA	CB003MHD	CONN	59	DWO	XA	CB003MHD	CONN	60	WRIDCOM	XA	CB003MHD	CONN
61	RDIDCOM	XA	CB003MHD	CONN	62	CHLTKN/D-	XA	CB003MHD	CONN	63	SR1/Q	XA	CB003MHD	CONN
64	BUFFUL/Q	XA	CB003MHD	CONN	65	RYSWR/Q-	XA	CB003MHD	CONN	66	SKOPFLG/J	XA	CB003MHD	CONN
67	SKOPFLG/K	XA	CB003MHD	CONN	68	PARFLG/Q-	XA	CB003MHD	CONN	69	PARFLG/Q	XA	CB003MHD	CONN
70	MREST-	XA	CB003MHD	CONN	71	IDREAD/J	XA	CB003MHD	CONN	72	COMPER/D-	XA	CB003MHD	CONN
73	DATRER/D-	XA	CB003MHD	CONN	74	OPCOMP/D-	XA	CB003MHD	CONN	75	DEVBSY/Q	XA	CB003MHD	CONN
76	INDEXM	XA	CB003MHD	CONN	77				CONN	78				CONN
79				CONN	80				CONN					

LOCATION /903

1				CONN	2				CONN	3	TWOSC	X	CB001MHD	CONN
4	COUNT	X	CB001MHD	CONN	5	ZERO8	X	CB001MHD	CONN	6	RFOUT07-	X	CB001MHD	CONN
7	LIST3	X	CB001MHD	CONN	8	LW3CK-	XA	CB001MHD	CONN	9	SYCKMHD	XA	CB001MHD	CONN
10	MRD07/MHD	XA	CB001MHD	CONN	11	COMM1-	XA	CB001MHD	CONN	12	COMM2	XA	CB001MHD	CONN
13	COMM3-	XA	CB001MHD	CONN	14	HDSWST-	XA	CB001MHD	CONN	15	NSB8-	XA	CB001MHD	CONN
16	NSCE	XA	CB001MHD	CONN	17	BTCLR	XA	CB001MHD	CONN	18	MRSMHD-	XA	CB001MHD	CONN
19	SYCKMHD-	XA	CB001MHD	CONN	20	CYLINC/Q-	XA	CB001MHD	CONN	21	SH15	XA	CB001MHD	CONN
22	WDMKSR	XA	CB001MHD	CONN	23	WDMKDR/Q-	XA	CB001MHD	CONN	24	RDCK-	XA	CB001MHD	CONN
25	SK1/Q-	XA	CB001MHD	CONN	26	SK2/Q-	XA	CB001MHD	CONN	27	RDIDCOM-	XA	CB001MHD	CONN
28	IDREAD/Q-	XA	CB001MHD	CONN	29	DRSTARTB1	XA	CB001MHD	CONN	30	SIGSTA/Q-	XA	CB001MHD	CONN
31	SW2/Q-	XA	CB001MHD	CONN	32	SR0/K	XA	CB001MHD	CONN	33	COMPOP-	XA	CB001MHD	CONN
34	IDCHKSR/Q-	XA	CB001MHD	CONN	35	IDCHKSR/Q	XA	CB001MHD	CONN	36	BCCRY	XA	CB001MHD	CONN
37	UPHD/Q	XA	CB001MHD	CONN	38	RBUFUL/Q-	XA	CB001MHD	CONN	39	MWDCKA2-	XA	CB001MHD	CONN
40	SYNR/Q-	XA	CB001MHD	CONN	41	IDWORD/Q	XA	CB001MHD	CONN	42	SW1/Q	XA	CB001MHD	CONN
43	COMERR/Q	XA	CB001MHD	CONN	44	DROMHD/Q	XA	CB001MHD	CONN	45	SIGSTAB/Q	XA	CB001MHD	CONN
46	BCCRY-	XA	CB001MHD	CONN	47	DWO	XA	CB001MHD	CONN	48	SYNCLK	XA	CB001MHD	CONN
49	LSMF/Q-	XA	CB001MHD	CONN	50	LSMF/Q	XA	CB001MHD	CONN	51	RDIDCOM	XA	CB001MHD	CONN
52	BUFFUL/Q	XA	CB001MHD	CONN	53	RDATA	XA	CB001MHD	CONN	54	MRSMHD	XA	CB001MHD	CONN
55	RG/Q-	XA	CB001MHD	CONN	56	RG/Q	XA	CB001MHD	CONN	57	PARFLG/Q-	XA	CB001MHD	CONN
58	PARFLG/Q	XA	CB001MHD	CONN	59	WDNCK	XA	CB001MHD	CONN	60	RDATAP	XA	CB001MHD	CONN
61	WG/Q	XA	CB001MHD	CONN	62	EGDY/Q-	XA	CB001MHD	CONN	63	MC-	XA	CB001MHD	CONN
64	LPSR-	XA	CB001MHD	CONN	65	SR1/Q	XA	CB001MHD	CONN	66	BITOSC	XA	CB001MHD	CONN
67	MRD11	X	CB001MHD	CONN	68	31/44SIGNAL		CB001MHD	CONN	69				CONN
70				CONN	71				CONN	72				CONN
73				CONN	74				CONN	75				CONN
76				CONN	77				CONN	78				CONN
79				CONN	80				CONN					

LOCATION /904

1				CONN	2				CONN	3	RFOUT00-	X	CB006MHD	CONN
4	RFOUT01-	X	CB006MHD	CONN	5	RFOUT03-	X	CB006MHD	CONN	6	STATEN-	X	CB006MHD	CONN
7	RFOUT02-	X	CB006MHD	CONN	8	MREST	X	CB006MHD	CONN	9	MWD02/MHD	XA	CB006MHD	CONN
10	MWD01/MHD	XA	CB006MHD	CONN	11	MWD00/MHD	XA	CB006MHD	CONN	12	MWD03/MHD	XA	CB006MHD	CONN
13	MRSMHD-	XA	CB006MHD	CONN	14	SYCKMHD-	XA	CB006MHD	CONN	15	STATSEL-	XA	CB006MHD	CONN
16	MWDSEL-	XA	CB006MHD	CONN	17	STAT05-	XA	CB006MHD	CONN	18	STAT04-	XA	CB006MHD	CONN
19	STAT07-	XA	CB006MHD	CONN	20	STAT06-	XA	CB006MHD	CONN	21	BITOSC	XA	CB006MHD	CONN
22	STAT08-	XA	CB006MHD	CONN	23	STAT11-	XA	CB006MHD	CONN	24	STAT10-	XA	CB006MHD	CONN
25	STATR3CK-	XA	CB006MHD	CONN	26	ENDISC/Q-	XA	CB006MHD	CONN	27	DATRER/Q-	XA	CB006MHD	CONN

28	CHLTKN/Q-	XA	CB006MHD	CONN	29	BUSY/Q-	XA	CB006MHD	CONN	30	ST1/J-	XA	CB006MHD	CONN
31	WC=0/Q	XA	CB006MHD	CONN	32	COMPOP-	XA	CB006MHD	CONN	33	SR0/J	XA	CB006MHD	CONN
34	TERM-	XA	CB006MHD	CONN	35	WRTOPFLG/Q	XA	CB006MHD	CONN	36	BUSY/D-	XA	CB006MHD	CONN
37	ST1/J	XA	CB006MHD	CONN	38	WPS	XA	CB006MHD	CONN	39	CHLTKN/D-	XA	CB006MHD	CONN
40	MREST-	XA	CB006MHD	CONN	41	WLKTON/D-	XA	CB006MHD	CONN	42	IDREAD/J	XA	CB006MHD	CONN
43	CRC=0-	XA	CB006MHD	CONN	44	COMPER/D-	XA	CB006MHD	CONN	45	PROGER/D-	XA	CB006MHD	CONN
46	ENDISC/D-	XA	CB006MHD	CONN	47	DATRER/D-	XA	CB006MHD	CONN	48	OFLIN/D-	XA	CB006MHD	CONN
49	STATRICK-	XA	CB006MHD	CONN	50	OPCOMP/D-	XA	CB006MHD	CONN	51				CONN
52				CONN	53				CONN	54				CONN
55				CONN	56				CONN	57				CONN
58				CONN	59				CONN	60				CONN
61				CONN	62				CONN	63				CONN
64				CONN	65				CONN	66				CONN
67				CONN	68				CONN	69				CONN
70				CONN	71				CONN	72				CONN
73				CONN	74				CONN	75				CONN
76				CONN	77				CONN	78				CONN
79				CONN	80				CONN					

LOCATION /905 CIRCUIT TYPE CB BLOCK 1 GATE

1				CONN	2				CONN	3	RFOUT14-	X	CB005MHD	CONN
4	RFOUT09-	X	CB005MHD	CONN	5	RFOUT06-	X	CB005MHD	CONN	6	RFOUT04-	X	CB005MHD	CONN
7	RFOUT13-	X	CB005MHD	CONN	8	RFOUT11-	X	CB005MHD	CONN	9	RFOUT05-	X	CB005MHD	CONN
10	READY	X	CB005MHD	CONN	11	STATBUSY	X	CB005MHD	CONN	12	RFOUT12-	X	CB005MHD	CONN
13	RFOUT07-	X	CB005MHD	CONN	14	RFOUT08-	X	CB005MHD	CONN	15	RFOUT10-	X	CB005MHD	CONN
16	RFOUT15-	X	CB005MHD	CONN	17	LW3CK-	XA	CB005MHD	CONN	18	MRD00/MHD	XA	CB005MHD	CONN
19	MRD01/MHD	XA	CB005MHD	CONN	20	MRD02/MHD	XA	CB005MHD	CONN	21	MRD03/MHD	XA	CB005MHD	CONN
22	MRD04/MHD	XA	CB005MHD	CONN	23	MRD05/MHD	XA	CB005MHD	CONN	24	MRD06/MHD	XA	CB005MHD	CONN
25	MRD07/MHD	XA	CB005MHD	CONN	26	CRCCLR-	XA	CB005MHD	CONN	27	CRCCK-	XA	CB005MHD	CONN
28	MWDCK-	XA	CB005MHD	CONN	29	MWD02/MHD	XA	CB005MHD	CONN	30	MWD01/MHD	XA	CB005MHD	CONN
31	MWD00/MHD	XA	CB005MHD	CONN	32	MWD03/MHD	XA	CB005MHD	CONN	33	CYLAD7	XA	CB005MHD	CONN
34	NXSESEL3	XA	CB005MHD	CONN	35	NXSESEL1	XA	CB005MHD	CONN	36	31/44SIGNAL		CB005MHD	CONN
37	NXSESEL2	XA	CB005MHD	CONN	38	NXSESEL6	XA	CB005MHD	CONN	39	NXSESEL4	XA	CB005MHD	CONN
40	NXSESEL5	XA	CB005MHD	CONN	41	CYLAD3	XA	CB005MHD	CONN	42	CYLAD2	XA	CB005MHD	CONN
43	CYLAD1	XA	CB005MHD	CONN	44	CYLAD0	XA	CB005MHD	CONN	45	CYLINC/Q-	XA	CB005MHD	CONN
46	CYLAD6	XA	CB005MHD	CONN	47	CYLAD5	XA	CB005MHD	CONN	48	CYLAD4	XA	CB005MHD	CONN
49	WLKOUT/Q	XA	CB005MHD	CONN	50	SW2	XA	CB005MHD	CONN	51	SH15	XA	CB005MHD	CONN
52	STATSEL-	XA	CB005MHD	CONN	53	MWDSEL-	XA	CB005MHD	CONN	54	STAT05-	XA	CB005MHD	CONN
55	STAT04-	XA	CB005MHD	CONN	56	STAT07-	XA	CB005MHD	CONN	57	STAT06-	XA	CB005MHD	CONN
58	LAIL	XA	CB005MHD	CONN	59	STAT08-	XA	CB005MHD	CONN	60	STAT11-	XA	CB005MHD	CONN
61	STAT10-	XA	CB005MHD	CONN	62	STAT13-	XA	CB005MHD	CONN	63	STAT12-	XA	CB005MHD	CONN
64	STAT15-	XA	CB005MHD	CONN	65	STAT14-	XA	CB005MHD	CONN	66	WC=0/Q	XA	CB005MHD	CONN
67	SP1/Q-	XA	CB005MHD	CONN	68	IDCHKSP/Q-	XA	CB005MHD	CONN	69	READYMHD	XA	CB005MHD	CONN
70	SYNCLK	XA	CB005MHD	CONN	71	RDATA	XA	CB005MHD	CONN	72	CRC=0	XA	CB005MHD	CONN
73	LDSR-	XA	CB005MHD	CONN	74	MRSMHD	XA	CB005MHD	CONN	75	BUSY/Q-	XA	CB005MHD	CONN
76	CYLADCRY		CB005MHD	CONN	77				CONN	78				CONN
79				CONN	80				CONN					

LOCATION /906 CIRCUIT TYPE CB BLOCK 1 GATE

1				CONN	2				CONN	3	INTEN-	X	CB004MHD	CONN
4	RFOUT06-	X	CB004MHD	CONN	5	RFOUT04-	X	CB004MHD	CONN	6	LIST4	X	CB004MHD	CONN
7	ZERO8	X	CB004MHD	CONN	8	RFOUT00-	X	CB004MHD	CONN	9	BTCLR-	X	CB004MHD	CONN
10	RFOUT05-	X	CB004MHD	CONN	11	RFOUT01-	X	CB004MHD	CONN	12	LIST2	X	CB004MHD	CONN
13	DEVREAD	X	CB004MHD	CONN	14	RFOUT03-	X	CB004MHD	CONN	15	MEMEN-	X	CB004MHD	CONN
16	RFOUT02-	X	CB004MHD	CONN	17	LW3CK-	XA	CB004MHD	CONN	18	SYCKMHD	XA	CB004MHD	CONN
19	PLR1	XA	CB004MHD	CONN	20	INDEXM	XA	CB004MHD	CONN	21	MRD00/MHD	XA	CB004MHD	CONN
22	MRD01/MHD	XA	CB004MHD	CONN	23	MRD02/MHD	XA	CB004MHD	CONN	24	MRD03/MHD	XA	CB004MHD	CONN
25	MRD04/MHD	XA	CB004MHD	CONN	26	MRD05/MHD	XA	CB004MHD	CONN	27	MRD06/MHD	XA	CB004MHD	CONN
28	MRD07/MHD	XA	CB004MHD	CONN	29	CHAIN	XA	CB004MHD	CONN	30	CHAIN-	XA	CB004MHD	CONN
31	COMM1-	XA	CB004MHD	CONN	32	COMM2	XA	CB004MHD	CONN	33	COMM3-	XA	CB004MHD	CONN
34	HDSWST-	XA	CB004MHD	CONN	35	MWD00/MHD	XA	CB004MHD	CONN	36	CYLAD7	XA	CB004MHD	CONN
37	NXSESEL3	XA	CB004MHD	CONN	38	NXSESEL1	XA	CB004MHD	CONN	39	31/44SIGNAL		CB004MHD	CONN
40	NXSESEL2	XA	CB004MHD	CONN	41	NXSESEL6	XA	CB004MHD	CONN	42	NXSESEL4	XA	CB004MHD	CONN
43	NS88-	XA	CB004MHD	CONN	44	NXSESEL5	XA	CB004MHD	CONN	45	NSCE	XA	CB004MHD	CONN
46	MRSMHD-	XA	CB004MHD	CONN	47	SYCKMHDJ	XA	CB004MHD	CONN	48	CYLINC/Q-	XA	CB004MHD	CONN
49	WLKOUT/Q	XA	CB004MHD	CONN	50	SK2/Q-	XA	CB004MHD	CONN	51	SK2/K	XA	CB004MHD	CONN
52	SIGSTA/Q-	XA	CB004MHD	CONN	53	RDOPFLG/J	XA	CB004MHD	CONN	54	UNSKESETEN	XA	CB004MHD	CONN
55	LAIL	XA	CB004MHD	CONN	56	SK2/J	XA	CB004MHD	CONN	57	WRTOPFLG/Q	XA	CB004MHD	CONN
58	DROMHD/Q	XA	CB004MHD	CONN	59	PROGER/DA-	XA	CB004MHD	CONN	60	SIGSTAE/Q	XA	CB004MHD	CONN
61	SIGSTA1/Q	XA	CB004MHD	CONN	62	WRIDCOM	XA	CB004MHD	CONN	63	SYNCLK	XA	CB004MHD	CONN
64	LSMF/Q-	XA	CB004MHD	CONN	65	LSMF/Q	XA	CB004MHD	CONN	66	RDIDCOM	XA	CB004MHD	CONN
67	MRSMHD	XA	CB004MHD	CONN	68	SKOPFLG/J	XA	CB004MHD	CONN	69	CRC=0	XA	CB004MHD	CONN
70	WLKTON/D-	XA	CB004MHD	CONN	71	IDREAD/J	XA	CB004MHD	CONN	72	CRC=0-	XA	CB004MHD	CONN
73	PROGER/D-	XA	CB004MHD	CONN	74	SYCKMHD-	XA	CB004MHD	CONN	75	CYLADCRY		CB004MHD	CONN
76	COMPOP-	XA	CB004MHD	CONN	77				CONN	78				CONN
79				CONN	80				CONN					

LOCATION /907 CIRCUIT TYPE CB BLOCK 1 GATE

1				CONN	2				CONN	3				CONN
4	ATI1	X	BTCCB1X	CONN	5	ATI2	X	BTCCB1X	CONN	6	BTCLR-	X	BTCCB1X	CONN
7	BUSY-	X	BTCCB1X	CONN	8	CLOCK-		BTCCB1X	CONN	9	DATAV-		BTCCB1X	CONN
10	DATAVL	X	BTCCB1X	CONN	11	DD2/Q-	X	BTCCB1X	CONN	12	DEVADSEL0	X	BTCCB1X	CONN
13	DEVADSEL1	X	BTCCB1X	CONN	14	DEVADSEL2	X	BTCCB1X	CONN	15	DEVATI1-		BTCCB1X	CONN
16	DEVATI2-		BTCCB1X	CONN	17	DEVMRD00		BTCCB1X	CONN	18	DEVMRD01		BTCCB1X	CONN
19	DEVMRD02		BTCCB1X	CONN	20	DEVMRD03		BTCCB1X	CONN	21	DEVMRD04		BTCCB1X	CONN
22	DEVMRD05		BTCCB1X	CONN	23	DEVMRD06		BTCCB1X	CONN	24	DEVMRD07		BTCCB1X	CONN
25	DEVMRD08		BTCCB1X	CONN	26	DEVMRD09		BTCCB1X	CONN	27	DEVMRD10		BTCCB1X	CONN
28	DEVMRD11		BTCCB1X	CONN	29	DEVMRD12		BTCCB1X	CONN	30	DEVMRD13		BTCCB1X	CONN
31	DEVMRD14		BTCCB1X	CONN	32	DEVMRD15		BTCCB1X	CONN	33	DEVMRD16		BTCCB1X	CONN
34	DEVSELO-	X	BTCCB1X	CONN	35	ENRFWR-	X	BTCCB1X	CONN	36	LC2/Q-	X	BTCCB1X	CONN
37	LC3+LCNT4	X	BTCCB1X	CONN	38	LIST4	X	BTCCB1X	CONN	39				CONN
40	MC5+MC7-	X	BTCCB1X	CONN	41	MRD08	X	BTCCB1X	CONN	42	MRD09	X	BTCCB1X	CONN
43	MRD10	X	BTCCB1X	CONN	44	MRD11	X	BTCCB1X	CONN	45	MRD12	X	BTCCB1X	CONN
46	PAPER	X	BTCCB1X	CONN	47	PARERR-		BTCCB1X	CONN	48	RESET-		BTCCB1X	CONN
49	RESETA-	X	BTCCB1X	CONN	50	RFOUT00-	X	BTCCB1X	CONN	51	RFOUT01-	X	BTCCB1X	CONN
52	RFOUT02-	X	BTCCB1X	CONN	53	RFOUT03-	X	BTCCB1X	CONN	54	RFOUT04-	X	BTCCB1X	CONN
55	RFOUT05-	X	BTCCB1X	CONN	56	RFOUT06-	X	BTCCB1X	CONN	57	RFOUT07-	X	BTCCB1X	CONN
58	RFOUT08-	X	BTCCB1X	CONN	59	RFOUT09-	X	BTCCB1X	CONN	60	RFOUT10-	X	BTCCB1X	CONN
61	RFOUT11-	X	BTCCB1X	CONN	62	RFOUT12-	X	BTCCB1X	CONN	63	RFOUT13-	X	BTCCB1X	CONN
64	RFOUT14-	X	BTCCB1X	CONN	65	RFOUT15-	X	BTCCB1X	CONN	66	RFPADD1	X	BTCCB1X	CONN
67	SC5/Q-	X	BTCCB1X	CONN	68	RFWADD1	X	BTCCB1X	CONN	69	SCLOCK	X	BTCCB1X	CONN

70	SC4/Q-	X	BTCCB1X	CONN	71	STATEN-	X	BTCCB1X	CONN	72					CONN
73	SYCL-	X	BTCCB1X	CONN	74	MC2/Q	X	BTCCB1X	CONN	75					CONN
76	MREST	X	BTCCB1X	CONN	77				CONN	78					CONN
79				CONN	80				CONN						

LOCATION /908 CIRCUIT TYPE CB BLOCK 1 GATE

1				CONN	2				CONN	3	AG	X	BTCCB2X	CONN
4	CNTUP-	X	BTCCB2X	CONN	5	COUNT	X	BTCCB2X	CONN	6	MEMRD-	X	BTCCB2X	CONN
7	DEVADD,00		BTCCB2X	CONN	8	DEVADD,01		BTCCB2X	CONN	9	DEVADD,02		BTCCB2X	CONN
10	DEVADD,03		BTCCB2X	CONN	11	DEVADD,04		BTCCB2X	CONN	12	DEVADD,05		BTCCB2X	CONN
13	DEVADD,06		BTCCB2X	CONN	14	DEVADD,07		BTCCB2X	CONN	15	DEVADD,08		BTCCB2X	CONN
16	DEVADD,09		BTCCB2X	CONN	17	DEVADD,10		BTCCB2X	CONN	18	DEVADD,11		BTCCB2X	CONN
19	DEVADD,12		BTCCB2X	CONN	20	DEVADD,13		BTCCB2X	CONN	21	DEVADD,14		BTCCB2X	CONN
22	DEVADD,15		BTCCB2X	CONN	23	DEVADSEL1	X	BTCCB2X	CONN	24	DEVADSEL2	X	BTCCB2X	CONN
25	DEVFETCH-		BTCCB2X	CONN	26	DEVMWD,00		BTCCB2X	CONN	27	DEVMWD,01		BTCCB2X	CONN
28	DEVMWD,02		BTCCB2X	CONN	29	DEVMWD,03		BTCCB2X	CONN	30	DEVMWD,04		BTCCB2X	CONN
31	DEVMWD,05		BTCCB2X	CONN	32	DEVMWD,06		BTCCB2X	CONN	33	DEVMWD,07		BTCCB2X	CONN
34	DEVMWD,08		BTCCB2X	CONN	35	DEVMWD,09		BTCCB2X	CONN	36	DEVMWD,10		BTCCB2X	CONN
37	DEVMWD,11		BTCCB2X	CONN	38	DEVMWD,12		BTCCB2X	CONN	39	DEVMWD,13		BTCCB2X	CONN
40	DEVMWD,14		BTCCB2X	CONN	41	DEVMWD,15		BTCCB2X	CONN	42	DEVMWD,16		BTCCB2X	CONN
43	DEVSEL0-	X	BTCCB2X	CONN	44	DEVSTORE-		BTCCB2X	CONN	45	LC2/Q-	X	BTCCB2X	CONN
46	LIST2	X	BTCCB2X	CONN	47	MCOMP	X	BTCCB2X	CONN	48	MC0-	X	BTCCB2X	CONN
49	MC5+MC7-	X	BTCCB2X	CONN	50	MEMREAD	X	BTCCB2X	CONN	51	RESETA-	X	BTCCB2X	CONN
52	RFOUT00-	X	BTCCB2X	CONN	53	RFOUT01-	X	BTCCB2X	CONN	54	RFOUT02-	X	BTCCB2X	CONN
55	RFOUT03-	X	BTCCB2X	CONN	56	RFOUT04-	X	BTCCB2X	CONN	57	RFOUT05-	X	BTCCB2X	CONN
58	RFOUT06-	X	BTCCB2X	CONN	59	RFOUT07-	X	BTCCB2X	CONN	60	RFOUT08-	X	BTCCB2X	CONN
61	RFOUT09-	X	BTCCB2X	CONN	62	RFOUT10-	X	BTCCB2X	CONN	63	RFOUT11-	X	BTCCB2X	CONN
64	RFOUT12-	X	BTCCB2X	CONN	65	RFOUT13-	X	BTCCB2X	CONN	66	RFOUT14-	X	BTCCB2X	CONN
67	RFOUT15-	X	BTCCB2X	CONN	68	SC4,5-	X	BTCCB2X	CONN	69	SC5/Q	X	BTCCB2X	CONN
70	DATEN-	X	BTCCB2X	CONN	71	STATBUSY	X	BTCCB2X	CONN	72	SYCL-	X	BTCCB2X	CONN
73	ZERO16	X	BTCCB2X	CONN	74	ZERO8	X	BTCCB2X	CONN	75	LC3+LCNT4	X	BTCCB2X	CONN
76	MC2/Q	X	BTCCB2X	CONN	77				CONN	78				CONN
79				CONN	80				CONN					

LOCATION /910 CIRCUIT TYPE CB BLOCK 1 GATE

1				CONN	2				CONN	3	ACK-	X	BTCCB3X	CONN
4	AG	X	BTCCB3X	CONN	5	AGDEV-		BTCCB3X	CONN	6	AGDEV-		BTCCB3X	CONN
7	AGDEV-		BTCCB3X	CONN	8	AGDEV-		BTCCB3X	CONN	9	AGDEV-		BTCCB3X	CONN
10	AGDEV-		BTCCB3X	CONN	11	AGDEV-		BTCCB3X	CONN	12	AGDEV-		BTCCB3X	CONN
13				CONN	14	ARDEV-		BTCCB3X	CONN	15	ARDEV-		BTCCB3X	CONN
16	ARDEV-		BTCCB3X	CONN	17	ARDEV-		BTCCB3X	CONN	18	ARDEV-		BTCCB3X	CONN
19	ARDEV-		BTCCB3X	CONN	20	ARDEV-		BTCCB3X	CONN	21	ARDEV-		BTCCB3X	CONN
22	CNTUP-	X	BTCCB3X	CONN	23	DATAVL	X	BTCCB3X	CONN	24				CONN
25	DD2/Q-	X	BTCCB3X	CONN	26	DECOUNT-	X	BTCCB3X	CONN	27	DEVADSEL0	X	BTCCB3X	CONN
28	DEVADSEL1	X	BTCCB3X	CONN	29	DEVADSEL2	X	BTCCB3X	CONN	30	DEVREAD	X	BTCCB3X	CONN
31	ENRFWR-	X	BTCCB3X	CONN	32	INTDEV-		BTCCB3X	CONN	33	INTDEV-		BTCCB3X	CONN
34	INTDEV-		BTCCB3X	CONN	35	INTDEV-		BTCCB3X	CONN	36	INTDEV-		BTCCB3X	CONN
37	INTDEV-		BTCCB3X	CONN	38	INTDEV-		BTCCB3X	CONN	39	INTDEV-		BTCCB3X	CONN
40	INTEN-	X	BTCCB3X	CONN	41	IRECOGDEV-		BTCCB3X	CONN	42	IRECOGDEV-		BTCCB3X	CONN
43	IRECOGDEV-		BTCCB3X	CONN	44	IRECOGDEV-		BTCCB3X	CONN	45	IRECOGDEV-		BTCCB3X	CONN
46	IRECOGDEV-		BTCCB3X	CONN	47	IRECOGDEV-		BTCCB3X	CONN	48	IRECOGDEV-		BTCCB3X	CONN
49	LC2/Q-	X	BTCCB3X	CONN	50	LC3+LCNT4	X	BTCCB3X	CONN	51	LISTEN-	X	BTCCB3X	CONN
52	LIST1	X	BTCCB3X	CONN	53	LIST2	X	BTCCB3X	CONN	54	LIST3	X	BTCCB3X	CONN
55	LIST4	X	BTCCB3X	CONN	56	MCOMP	X	BTCCB3X	CONN	57	MC0-	X	BTCCB3X	CONN
58	MEMEN-	X	BTCCB3X	CONN	59	MEMREAD	X	BTCCB3X	CONN	60	READY	X	BTCCB3X	CONN
61	RESETA-	X	BTCCB3X	CONN	62	RFRADD1	X	BTCCB3X	CONN	63	SC5/Q-	X	BTCCB3X	CONN
64	RFWADD1	X	BTCCB3X	CONN	65	RF4EN	X	BTCCB3X	CONN	66	SC4/Q-	X	BTCCB3X	CONN
67	SC4,5-	X	BTCCB3X	CONN	68	SC5/Q	X	BTCCB3X	CONN	69	DATEN-	X	BTCCB3X	CONN
70	STATBUSY	X	BTCCB3X	CONN	71	STATEN-	X	BTCCB3X	CONN	72	SYCL-	X	BTCCB3X	CONN
73	TWOSC	X	BTCCB3X	CONN	74	ATI2	X	BTCCB3X	CONN	75	MEMRD-	X	BTCCB3X	CONN
76				CONN	77				CONN	78				CONN
79				CONN	80				CONN					

LOCATION /912 CIRCUIT TYPE CB BLOCK 1 GATE

1				CONN	2				CONN	3	DEVMRD01		BTCCB0X	CONN
4	DEVMRD00		BTCCB0X	CONN	5	DEVMRD03		BTCCB0X	CONN	6	DEVMRD02		BTCCB0X	CONN
7	DEVMRD05		BTCCB0X	CONN	8	DEVMRD04		BTCCB0X	CONN	9	DEVMRD07		BTCCB0X	CONN
10	DEVMRD06		BTCCB0X	CONN	11	DEVMRD09		BTCCB0X	CONN	12	DEVMRD08		BTCCB0X	CONN
13	DEVMRD11		BTCCB0X	CONN	14	DEVMRD10		BTCCB0X	CONN	15	DEVMRD13		BTCCB0X	CONN
16	DEVMRD12		BTCCB0X	CONN	17	DEVMRD15		BTCCB0X	CONN	18	DEVMRD14		BTCCB0X	CONN
19	DEVMRD16		BTCCB0X	CONN	20				CONN	21	AGDEV-		BTCCB0X	CONN
22				CONN	23	DEVATI2-		BTCCB0X	CONN	24				CONN
25	DEVATI1-		BTCCB0X	CONN	26				CONN	27	DATAV-		BTCCB0X	CONN
28				CONN	29	IRECOGDEV-		BTCCB0X	CONN	30				CONN
31	RESET-		BTCCB0X	CONN	32				CONN	33	CLOCK-		BTCCB0X	CONN
34	DEVADD,00		BTCCB0X	CONN	35	DEVADD,01		BTCCB0X	CONN	36	DEVADD,02		BTCCB0X	CONN
37	DEVADD,03		BTCCB0X	CONN	38	DEVADD,04		BTCCB0X	CONN	39	DEVADD,05		BTCCB0X	CONN
40	DEVADD,06		BTCCB0X	CONN	41	DEVADD,07		BTCCB0X	CONN	42	DEVADD,08		BTCCB0X	CONN
43	DEVADD,09		BTCCB0X	CONN	44	DEVADD,11		BTCCB0X	CONN	45	DEVADD,10		BTCCB0X	CONN
46	DEVADD,12		BTCCB0X	CONN	47	DEVADD,13		BTCCB0X	CONN	48	DEVADD,14		BTCCB0X	CONN
49	DEVADD,15		BTCCB0X	CONN	50	DEVMWD,00		BTCCB0X	CONN	51	DEVMWD,01		BTCCB0X	CONN
52	DEVMWD,02		BTCCB0X	CONN	53	DEVMWD,03		BTCCB0X	CONN	54	DEVMWD,04		BTCCB0X	CONN
55	DEVMWD,05		BTCCB0X	CONN	56	DEVMWD,06		BTCCB0X	CONN	57	DEVMWD,07		BTCCB0X	CONN
58	DEVMWD,08		BTCCB0X	CONN	59	DEVMWD,09		BTCCB0X	CONN	60	DEVMWD,10		BTCCB0X	CONN
61	DEVMWD,11		BTCCB0X	CONN	62	DEVMWD,12		BTCCB0X	CONN	63	DEVMWD,13		BTCCB0X	CONN
64	DEVMWD,14		BTCCB0X	CONN	65	DEVMWD,15		BTCCB0X	CONN	66	DEVMWD,16		BTCCB0X	CONN
67	ARDEV-		BTCCB0X	CONN	68	MPRESET-		BTCCB0X	CONN	69	DEVSTORE-		BTCCB0X	CONN
70				CONN	71	INTDEV-		BTCCB0X	CONN	72				CONN
73	DEVFETCH-		BTCCB0X	CONN	74				CONN	75	PARERR-		BTCCB0X	CONN
76				CONN	77				CONN	78				CONN
79				CONN	80				CONN					

SECTION VI

DRAWINGS

This section includes drawings that are pertinent to maintenance of the Moving Head Disc Controller (Disc Control Logic) as follows:

Title	Drawing Number	Page Number
MHD No. 1 Assembly	973721	6-3
MHD No. 1 Logic	973722	6-9
MHD No. 2 Assembly	973678	6-21
MHD No. 2 Logic	973679	6-27
MHD No. 3 Assembly	961630	6-37
MHD No. 3 Logic	973755	6-41
MHD No. 4 Assembly	973683	6-55
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MHD No. 6 Assembly	973784	6-81
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Cable Assembly, Disc Controller	973690	6-89
Wire List	973691	6-92
Cable Assembly, Daisy Chain	973675	6-95
Wire List	973787	6-99

NOTES: UNLESS OTHERWISE SPECIFIED
1. NETWORKS ARE SN74_ SERIES
2. CAPACITORS C4 THRU C17 TO BE INSTALLED PRIOR TO WIRE WRAP

REVISIONS			
LTR	DESCRIPTION	DATE	APPD
A	CN407334 (C) O'Rourke (1) LM, ADDED ITEM 29 (2) UPDATED REV LEVEL BLOCK	5/10/76	
B	CN406888 (B) O'Rourke (1) LM, ITEM 29 WAS 535997-0053 (2) UPDATED REV LEVEL BLK	6-4-76	
C	CN412181 (D) T Barker (1) ADDED Z LM AND REVISED REV LEVEL BLOCK	8/25/76	
D	CN417432 (B) R. Shaw (1) LM ADD -10 WAS 163312 (2) CN -0001 & -0002 LM ITEM 13 WAS -7163 (3) UPDATED REV LEVEL BLOCK	9-27-76	
E	CN 420791 (C) D Campbell (1) UPDATED REV LEVEL BLK & ADDED TEST PROC (2) ZONE B3 DELETED TITLE ADD (-1 ONLY) TO MARKING NOTE (3) ZONE B3 ADDED 30" LEADER TO J4 LOCATION (4) ZONE A1 ADDED MARKING NOTE (5) ZONE B3 ADDED MARK TITLE (6) ON LM -0001 & -0002 ADDED ITEM 30	11/24/76	
F	CN420824 (C) C. Shaw (1) -1 LM, DELETED ITEM 30 (2) -2 LM, ITEM 30 WAS 172312-2 (3) ADDED (-2 ONLY) TO BALLOON 30 (4) UPDATED REV LEVEL BLOCK	2-4-77	
G	CN421977 (E) D. Waddell (1) UPDATED REV LEVEL BLOCK	2-9-77	
H	CN420992 (C) J. Mallard (1) ITEM 30 WAS POINTING TO J4 (2) ADDED X TO J3 AND CUT-LINED SOCKET (3) ADDED ITEM 30 A (4) UPDATED REV LEV BLK	5-18-77	

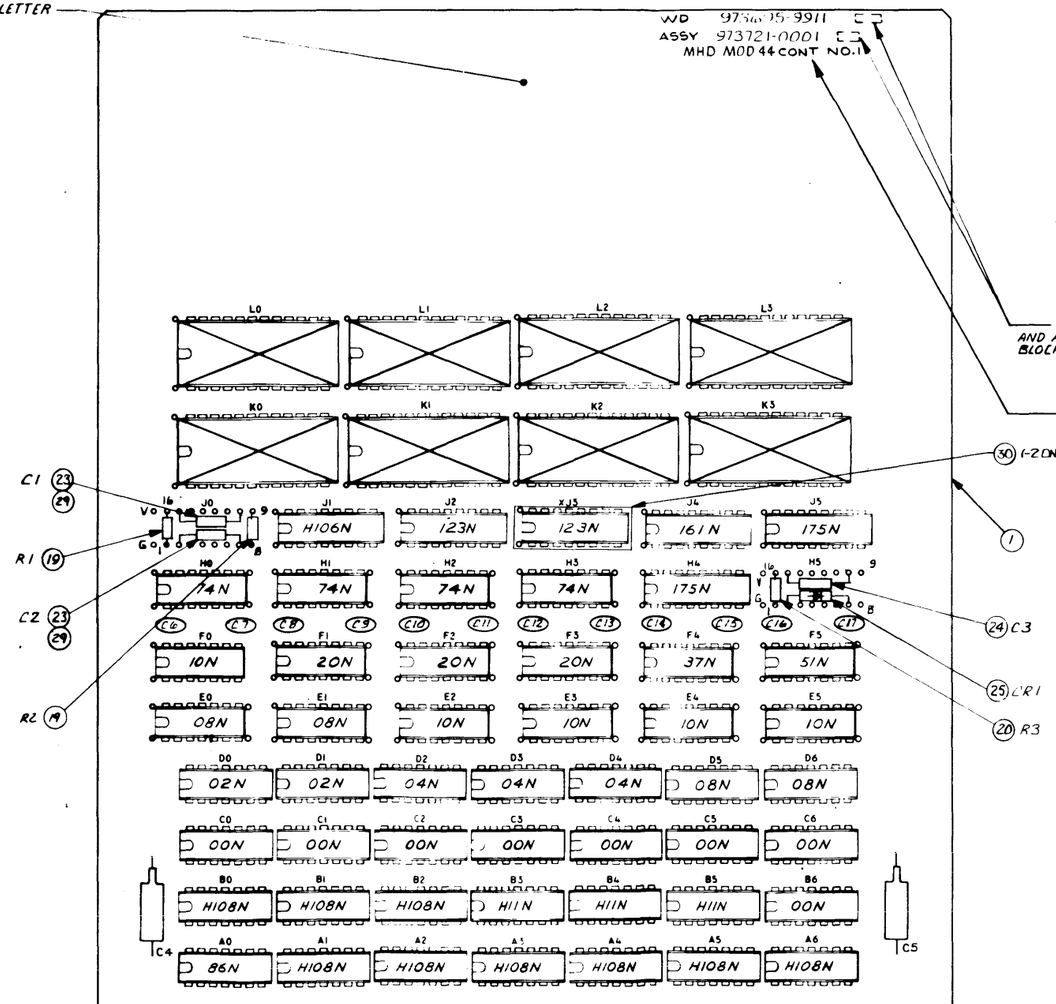
MARK ASSY REV LETTER (-2 ONLY)

WD 973605-9911 C3
ASSY 973721-0001 C3
MHD MOD 44 CONT NO.1

MARK ASSY PART NO, WIRE DECK NO AND APPROPRIATE REV LETTER PER REV LEVEL BLOCK, APPROXIMATELY AS SHOWN (-1 ONLY)

MARK TITLE

(30) (-2 ONLY)



973721-0002	MHD NO1, MODEL 44 W/W
973721-0001	MHD NO1, MODEL 44 W/W
PART NO	DESCRIPTION

TEST PROC 973723-9901					*	*	*	*
MULTI-WIRE BD 944040-0001				*	*	A	A	B	B
WIRE WRAP BD 217862-0001				-	G	G	H	H	H
LOGIC 973722-9901	*	*	A	A	A	A	A	A	A
WIRE DECK 973695-9911	A	A	D	D	D	D	D	D	D
ASSEMBLY	*	A	B	B	D	E	F	G	H

UNLESS OTHERWISE SPECIFIED
DECIMAL XX ± .02 XXX ± .010
FRACTIONAL ± ANGULAR ± 1°
CONCENTRICITY MACHINED DIAMETERS .004 TIR
ALL DIMENSIONS TO BE MET BEFORE PLATING
REMOVE ALL BURRS AND SHARP EDGES
DO NOT SCALE THIS DRAWING
ALL DIMENSIONS IN INCHES
SURFACES MARKED √ TO HAVE
DRILLED HOLE TOLERANCES
.013 TO 136 ± .003
136 TO 250 ± .005
250 AND ABOVE ± .006

PROCESSES
1) MARK PER F-100, METHOD II, CLASS I, HEIGHT .09, COLOR BLK
2) SOLDER PER F-127 METHOD I AND/OR F-124

LIST OF MATERIALS

ITEM NO	QTY	PART NUMBER	DESCRIPTION
8100		973674	

TEXAS INSTRUMENTS INCORPORATED
DALLAS, TEXAS
MHD NO1, MODEL 44
MHD MOD 44 CONT NO 1
973721

32 H9

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INCORPORATED

DATE 05/09/77 — **LIST OF MATERIAL** — PAGE 1 of

PART NUMBER LM0973721-0001 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		0217862-0002	LOGIC BOARD-SINGLE ENDED WIRE WRAP	
0002	REF	EA		0973695-9911	WIRE DECK, MHD MODEL 44	
0003	00009.000	EA		0222222-7400	NETWORK SN7400N	-SN7400N
0003*					C0 C1 C2 C3 C4 C5 C6 B6	
0004	00002.000	EA		0222222-7402	NETWORK SN7402N	TI- -SN7402N
0004*					D0 D1	
0005	00003.000	EA		0222222-7404	NETWORK SN7404N	
0005*					D2 D3 D4	
0006	00004.000	EA		0222222-7408	NETWORK-SN7408N	
0006*					E0 E1 D5 D6	
0007	00005.000	EA		0222222-7410	NETWORK SN7410N	-SN7410N
0007*					E0 E2 E3 E4 E5	
0008	00007.000	EA		0222222-7420	NETWORK SN7420N	-SN7420N
0008*					E1 E2 E3	
0009	00001.000	EA		0222222-7437	NETWORK SN7437N	
0009*					E4	
0010	00001.000	EA		0222222-7451	NETWORK SN7451N	-SN7451N
0010*					E5	
0011	00004.000	EA		0222222-7474	NETWORK SN7474N	-SN7474N
0011*					H0 H1 H2 H3	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
		J. Rood	5-11-77			4HD,NO.1,MODEL 44
APPD-MFG	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO. 8100

PART NUMBER LM0973721-0001 REV H

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INCORPORATED

DATE 05/09/77 **LIST OF MATERIAL** PAGE 2 of

PART NUMBER LM0973721-0001 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0012	00002.000	EA		0222222-7123	NETWORK SN74123N	
0012A					J2 J3	
0013	00001.000	EA		0222222-7161	NETWORK SN74161N	-SN74161N
0013A					J4	
0014	00002.000	EA		0222222-7175	NETWORK SN74175N	
0014A					J5 H4	
0015	00001.000	EA		0240000-7106	NETWORK SN74H106N	
0015A					J1	
0016	00009.000	EA		0240000-7108	NETWORK SN74H108N	
0016A					B0 B1 B2 A1 A2 A3 A4 A5 A6	
0017	00003.000	EA		0240000-7411	NETWORK-SN74H11N	
0017A					B3 B4 B5	
0018	00001.000	EA		0222222-7486	NETWORK-SN7486N	
0018A					A0	
0019	00002.000	EA		0972975-0065	RES FIX COMP 4.7 K OHMS 5% 1/8 WATT	QPL - RC05G472JS
0019A					R1 R2	
0020	00001.000	EA		0539370-0473	RES FIX FILM 8.25K OHM 1% .25 WATT	COR - NA55
0020A					R3	
0021	00013.000	EA		0230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	ERI -5635-000-Y5F05
0021A					C6 THRU C17	

DRAFTSMAN DATE	CKD DRAFTSMAN DATE	DESIGN ENGINEER DATE	TITLE
			MHD, NO. 1, MODEL 44

APPD MFG DATE	APPD PROJECT ENGINEER DATE	RELEASED DATE	PROJECT NO.		PART NUMBER	REV
					LM0973721-0001	H

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TEXAS INSTRUMENTS
INCORPORATED

DATE 05/09/77 **LIST OF MATERIAL** PAGE 3 of

PART NUMBER LM0973721-0001 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0025	00002.000	EA		0972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL -M39003/1-2271
0026					C4 C5	
0027	00002.000	EA		0972926-0016	CAP FIX MICA 500V 36.0 PF 5 %	QPL -CM04E360J03
0028					C1 C2	
0029	00001.000	EA		0058023-0008	CAP FIX .010 MFD 5 % 100V MYLAR FOIL	TRW - 663UW
0030					C3	
0035	00001.000	EA		0972932-0001	DIODE,1N914B SWITCHING 75V PIV 75MA 4NS	TI - IN9148
0032					CR1	
0036	AR	FT		0535978-0058	WIRE ELEC.,SOLID,"KYNAR" INSUL #30 AWG	
0037	REF	EA		0973722-9901	LOGIC DIAGRAM,MHD,NO.1,MODEL 44	
0038	REF	EA		0973722-9901	TEST PROCEDURE,MHD,NO.1,MODEL 44	
0039	AR	FT		0416499-0006	INSULATION SLEEVING,TEFLON #22 NATURAL	QPL -81349

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE MHD,NO.1,MODEL 44		
APPD.-MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.		PART NUMBER LM0973721-0001 REV H

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TEXAS INSTRUMENTS
INCORPORATED

DATE 05/09/77 **LIST of MATERIAL** PAGE 2 of

PART NUMBER LM0973721-0002 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0013	00001.000	EA		0222222-7161	J2 J3 NETWORK SN74161N	-SN74161N
0013A					J4	
0014	00002.000	EA		0222222-7175	NETWORK SN74175N	
0014A					J5 H4	
0015	00001.000	EA		0240000-7106	NETWORK SN74H106N	
0015A					J1	
0016	00009.000	EA		0240000-7108	NETWORK SN74H108N	
0016A					B0 B1 B2 A1 A2 A3 A4 A5 A6	
0017	00002.000	EA		0240000-7411	NETWORK-SN74H11N	
0017A					B3 B4 B5	
0018	00001.000	EA		0222222-7486	NETWORK-SN7486N	
0018A					A0	
0019	00002.000	EA		0972975-0065	RES FIX COMP 4.7 K OHMS 5% 1/8 WATT	QPL - RC05C472JS
0019A					R1 R2	
0020	00001.000	EA		0539370-0473	RES FIX FILM 8.25K OHM 1% .25 WATT	CDR - NA55
0020A					R3	
0021	00013.000	EA		0230590-0000	CAP .05 MF 12 V 20. % CER TRANSCAP	SRI -5635-000-Y5FC5
0021A					C6 THRU C17	
0022	00002.000	EA		0972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL -M39003/1-2271

DRAFTSMAN DATE	CKD. DRAFTSMAN DATE	DESIGN ENGINEER DATE	TITLE MHD, NO.1, MODEL 44	
APPD.-MFG DATE	APPD. PROJECT ENGINEER DATE	RELEASED DATE	PROJECT NO.	PART NUMBER LM0973721-0002 REV H

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INCORPORATED

DATE 05/09/77 **LIST OF MATERIAL** PAGE 3 of

PART NUMBER LM0973721-0002 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	BOARD SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0022*					C4 C5	
0023	00002.000	EA		0972926-0016	CAP FIX MICA 500V 36.0 PF 5 %	QPL -CM04E360J0D
0023A					C1 C2	
0024	00001.000	EA		0058023-0008	CAP FIX .01C MFD 5 % 100V MYLAR FOIL	TRW - 663UW
0024A					C3	
0025	00001.000	EA		0972932-0001	DIODE,1N914B SWITCHING 75V PIV 75MA 4NS	TI - 1N914B
0026	AR	FT		0535978-0058	WIRE ELEC.,SOLID,"KYNAR" INSUL #30 AWG	
0027	REF	EA		0973722-9901	LOGIC DIAGRAM,MHD,NO.1,MODEL 44	
0028	REF	EA		0973723-9901	TEST PROCEDURE,MHD,NO.1,MODEL 44	
0029	AR	FT		0410459-0006	INSULATION SLEEVING,TEFLON #22 NATURAL	QPL -81349
0030	00001.000	EA		0539544-0002	SOCKET,16PIN IC LOW PROFILE SOLDER TAIL	TI -C93-16-02
0030A					XU3	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE MHD, NO.1, MODEL 44		
APPD. MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.		PART NUMBER LM0973721-0002 REV H

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INCORPORATED

DATE 05/09/77 **LIST OF MATERIAL** PAGE 1 of

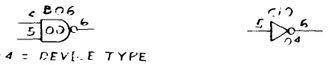
PART NUMBER LM0973721-0002 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		0944040-0001	MWB,MOVING HEAD DISC 44 CONTROLLER NO 1	
0002	00008.000	EA		0222222-7400	NETWORK SN7400N	-SN7400N
00021					C0 C1 C2 C3 C4 C5 C6 B6	
0003	00002.000	EA		0222222-7402	NETWORK SN7402N	TI- -SN7402N
00041					D0 D1	
0005	00003.000	EA		0222222-7404	NETWORK SN7404N	
00056					D2 D3 D4	
0006	00004.000	EA		0222222-7408	NETWORK-SN7408N	
00061					E0 E1 D5 D6	
0007	00005.000	EA		0222222-7410	NETWORK SN7410N	-SN7410N
00071					E0 E2 E3 E4 E5	
0008	00002.000	EA		0222222-7420	NETWORK SN7420N	-SN7420N
00081					E1 E2 E3	
0009	00001.000	EA		0222222-7437	NETWORK SN7437N	
00091					E4	
0010	00001.000	EA		0222222-7451	NETWORK SN7451N	-SN7451N
00101					E5	
0011	00004.000	EA		0222222-7474	NETWORK SN7474N	-SN7474N
00111					H0 H1 H2 H3	
0012	00002.000	EA		0222222-7123	NETWORK SN74123N	

DRAFTSMAN	DATE	CKD DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE MHD, NO.1, MODEL 44		
APPD MFG.	DATE	APPD PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.		PART NUMBER LM0973721-0002 REV H

TI 13849

NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL DEVICE TYPES ARE PREFIXED WITH SN74
2. GROUND IS APPLIED TO PIN 7 OF ALL 14-PIN IC'S AND PIN 8 OF ALL 16-PIN IC'S
3. VCC IS APPLIED TO PIN 14 OF ALL 14-PIN IC'S AND PIN 16 OF ALL 16-PIN IC'S
4. DEVICE TYPE / PIN NUMBER AND LOCATION OF IC IS SHOWN AS FOLLOWS:



00 AND 04 = DEVICE TYPE
4, 5 AND 6 = PIN NUMBERS
B06 AND C10 LOCATION; FIRST LETTER DENOTES ROW SE AND AND THIRD DIGIT IS DENOTE COLUMN IC IS LOCATED AT THE INTERSECTION OF ROW AND COLUMN
5. ALL PIN NUMBERS ARE SOCKET NUMBERS

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A3	A	SN74 7432 = X CHANGE JUMPER 6 TO 4		

973722 D

REV STATUS OF SHEETS	REV	A					- A
	SHEET	1	2	3	4	5	6

-2 QTY REQD	-1 QTY REQD	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100

HOLE TOLERANCE

.013 THRU 126 +.004 −.001	126 THRU 250 +.005 −.001	251 THRU 500 +.006 −.001
501 THRU 780 +.008 −.001	781 THRU 1.000 +.010 −.001	1.001 THRU 2.000 +.012 −.001

973721	B101
973721	B100
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES ANGLES ±1°
  3 PLACE DECIMALS ±.010
  2 PLACE DECIMALS ±.02

		DATE
DWN	R Ruiz	5/21/76
CHK	N. Keller	7-26-76
ENGR	[illegible]	7-26-76
QA	[illegible]	7/30/76
APVD	[illegible]	7/30/76
CONTR NO		
DESIGN ACTIVITY RELEASE	[illegible]	8/5/76

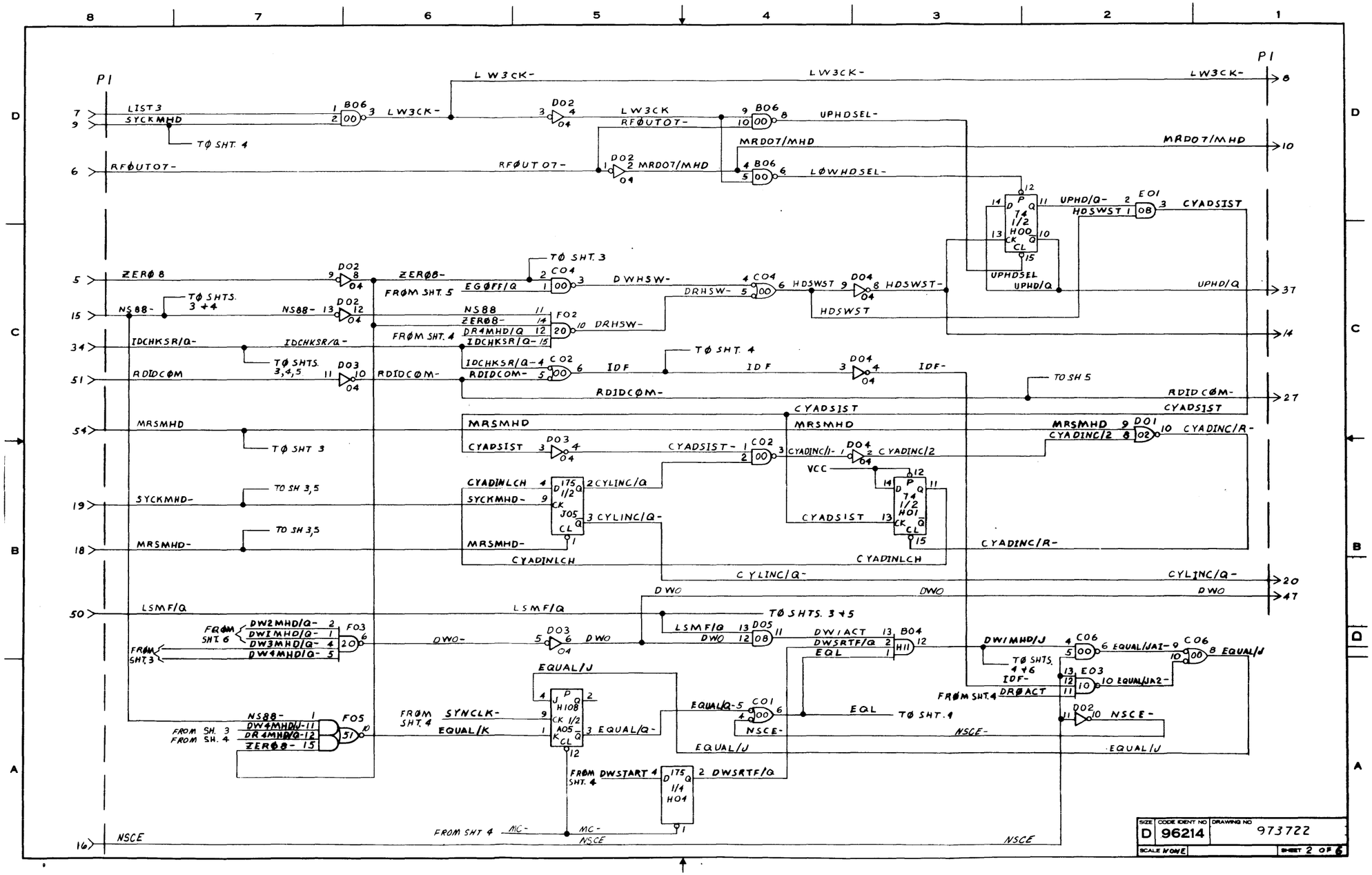
TEXAS INSTRUMENTS INCORPORATED Equipment Group Dallas, Texas

DIAGRAM, LOGIC, DETAILED, MOVING HEAD CONTROLLER 44 NO 1

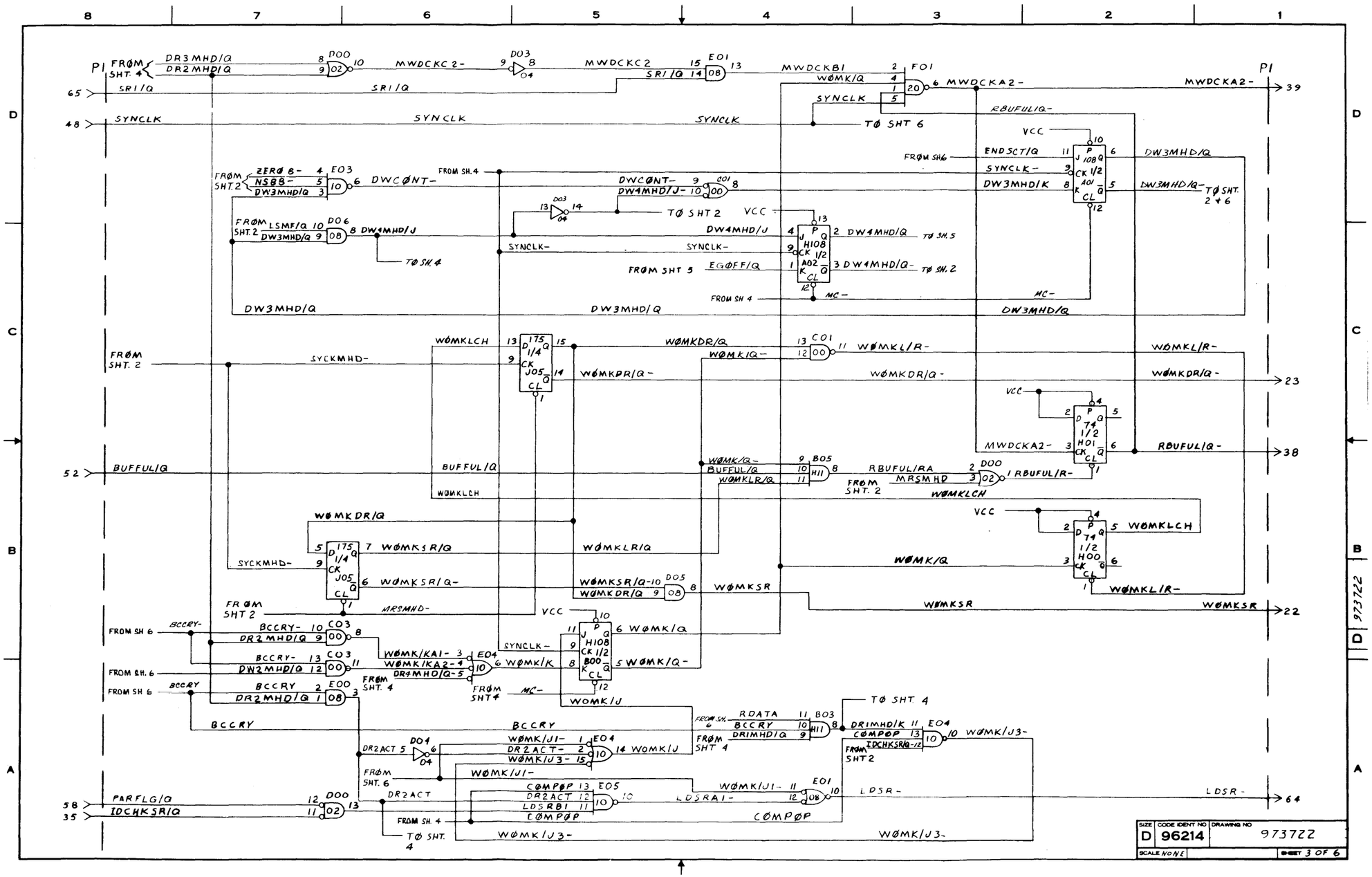
SIZE	CODE IDENT NO	DRAWING NO
D	96214	973722

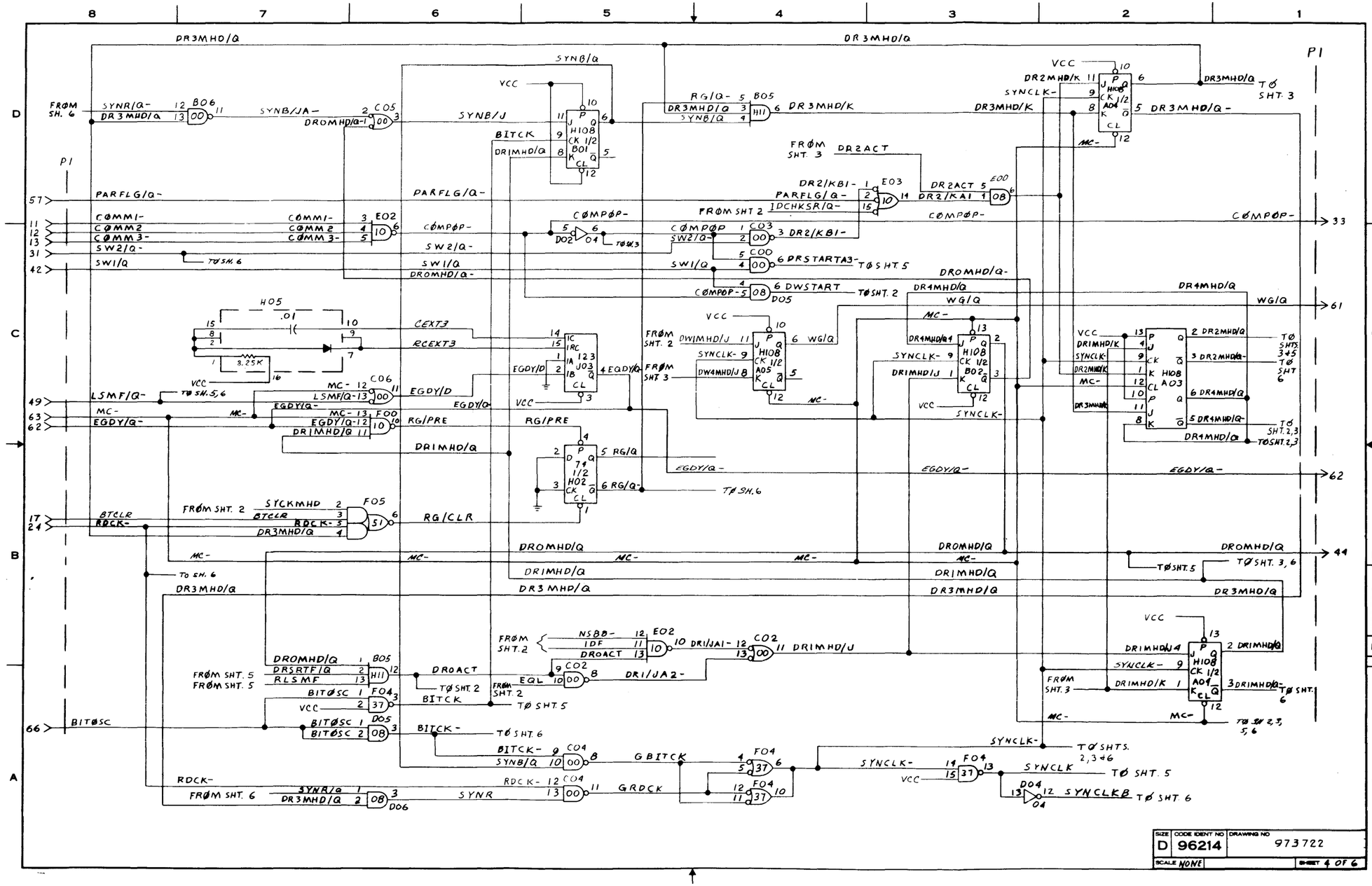
SCALE NONE SHEET 1 OF 6

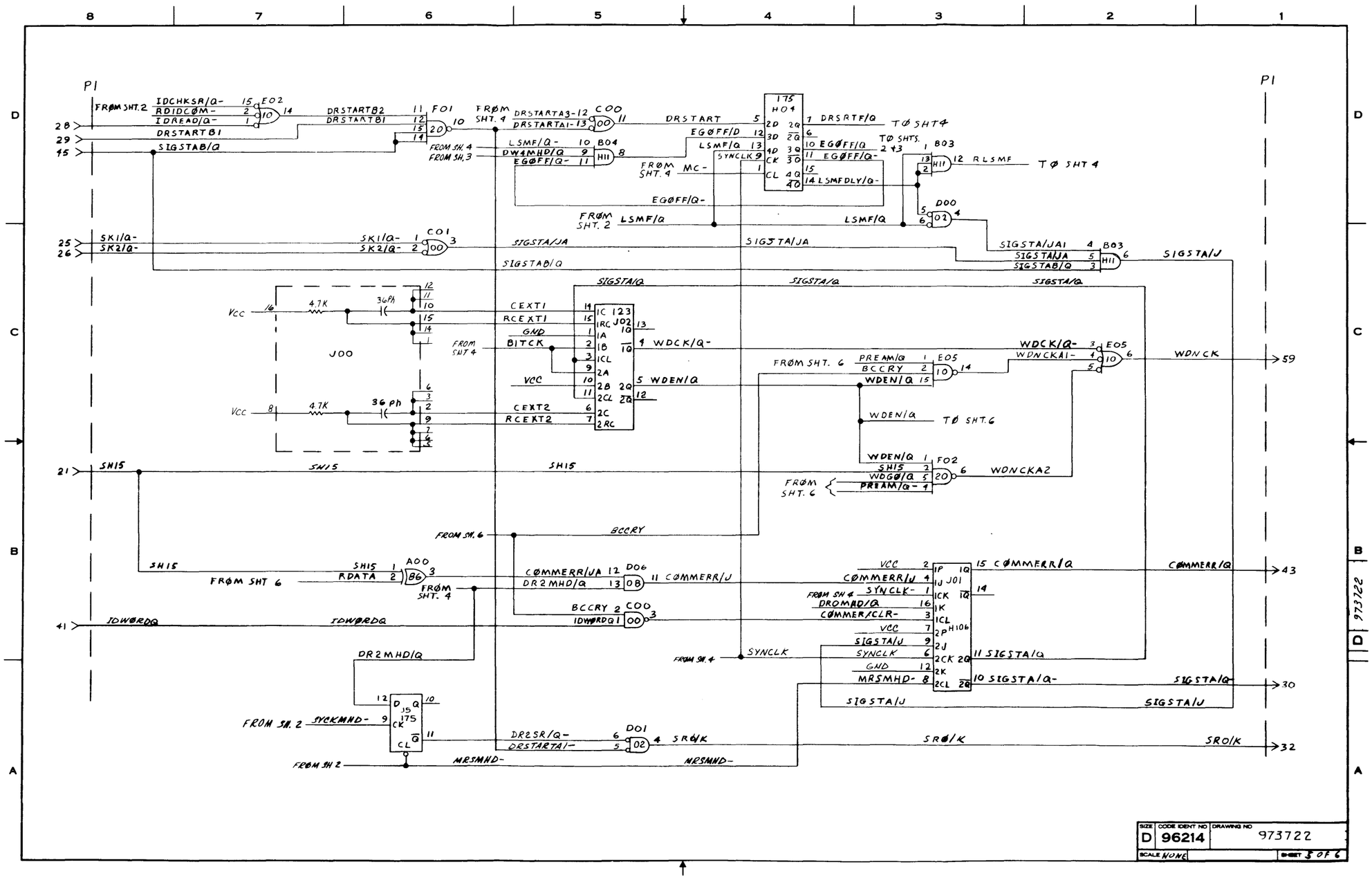
42

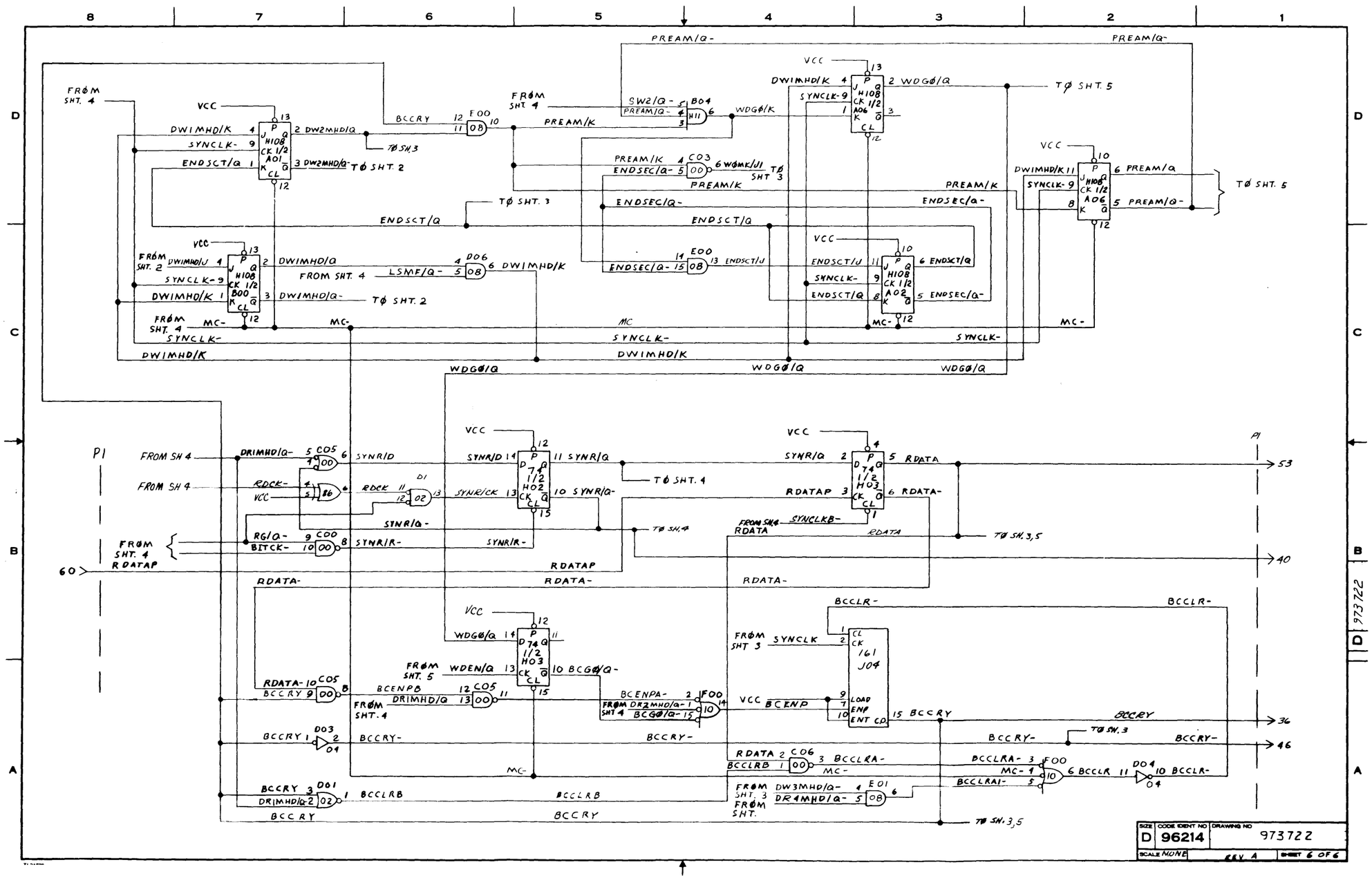


SIZE	CODE IDENT NO	DRAWING NO
D	96214	973722
SCALE NONE		SHEET 2 OF 6


P1
FROM SHT. 4
DR3MHD/Q
DR2MHD/Q
MWDCKC2-
MWDCKC2
SR1/Q
SYNCLK
MWDCKB1
WØMK/Q
MWDCKA2-
RBUFUL/Q-
TØ SHT 6
VCC
ENDSCT/Q
FROM SH6
SYNCLK-
DW3MHD/K
DW3MHD/Q
TØ SHT. 2 + 6
ZERØ 8-
NSBB-
DW3MHD/Q
FROM SH.4
DWCØNT-
DW4MHD/J-
TØ SHT 2
FROM SHT.2
LSMF/Q
DW4MHD/J
TØ SH.4
SYNCLK-
FROM SHT 5
EGØFF/Q
DW4MHD/Q
TØ SH. 5
TØ SH. 2
NC-
FROM SH 4
DW3MHD/Q
WØMKLCH
WØMKDR/Q
WØMKL/R-
WØMKDR/Q-
FROM SHT. 2
SYCKMHD-
WØMK/Q-
BUFFUL/Q
WØMKLR/Q
RBUFUL/RA
MRSMHD
FROM SHT. 2
/ RBUFUL/R-
WØMKSR/Q
WØMKSR
WØMKLR/Q
WØMKSR
BCCRY-
FROM SH 6
BCCRY-
DR2MHD/Q
WØMK/KA1-
WØMK/KA2-
DR3MHD/Q-
FROM SHT 4
MC-
WØMK/J
TØ SHT 4
RDATA
BCCRY
DRIMHD/Q
DRIMHD/K
COMPØP
IDCHKSR/Q-12
WØMK/J3-
FROM SHT 2
DR2ACT
WØMK/J1-
WØMK/J3-
FROM SHT. 6
COMPØP
DR2ACT
LDSRB1
LDSRA1-
LDSR-
PARFLG/Q
IDCHKSR/Q
FROM SH. 4
TØ SHT. 4
SIZE D
CODE IDENT NO 96214
DRAWING NO 973722
SCALE NONE
SHEET 3 OF 6


DR3MHD/Q
SYNB/Q
PARFLG/Q-
COMMI-
COMM2
COMM3-
SW2/Q-
SW1/Q
DROMHD/Q-
BITCK
DR1MHD/Q
CEXT3
RCEXT3
EGDY/D
EGDY/Q-
LSMF/Q-
MC-
RG/PRE
RG/CLR
BTCLR
RDCK-
SYNR/Q
SYNR
DR3MHD/K
DR2MHD/K
SYNCLK-
DR2ACT
COMPØP-
DR1MHD/Q
WG/Q
DR4MHD/Q
DR2MHD/Q
DROACT
EQL
BITØSC
BITCK-
GBITCK
GRDCK
SYNCLK
SYNCLKB
DR1/JA2-
DR1MHD/J
DR3MHD/Q-
DR4MHD/Q-
DR2MHD/Q-
DR1MHD/K
DR2/KB1-
DR2/KA1
DR2MHD/J
DR2MHD/K
DR4MHD/J
DR4MHD/K
DR1MHD/J
DR1MHD/K
DR3MHD/K
DRSTART A3-
DWSTART
DRIMHD/J
DRIMHD/K
DR1/JA1-
DR2/KB1-
DR2ACT
DR3MHD/Q
DR4MHD/Q
DR2MHD/Q
DR1MHD/Q
DROMHD/Q
DR3MHD/K
DR2MHD/K
DR4MHD/K
DR1MHD/K
DR3MHD/J
DR2MHD/J
DR4MHD/J
DR1MHD/J
DRIMHD/J
DRIMHD/K
DR1/JA2-
DR1/JA1-
DR2/KB1-
DR2/KA1
DR2ACT
DR3MHD/Q
DR4MHD/Q
DR2MHD/Q
DR1MHD/Q
DROMHD/Q
DR3MHD/K
DR2MHD/K
DR4MHD/K
DR1MHD/K
DR3MHD/J
DR2MHD/J
DR4MHD/J
DR1MHD/J
DRIMHD/J
DRIMHD/K
SIZE
CODE IDENT NO
DRAWING NO
D
96214
973722
SCALE NONE
SHEET 4 OF 6

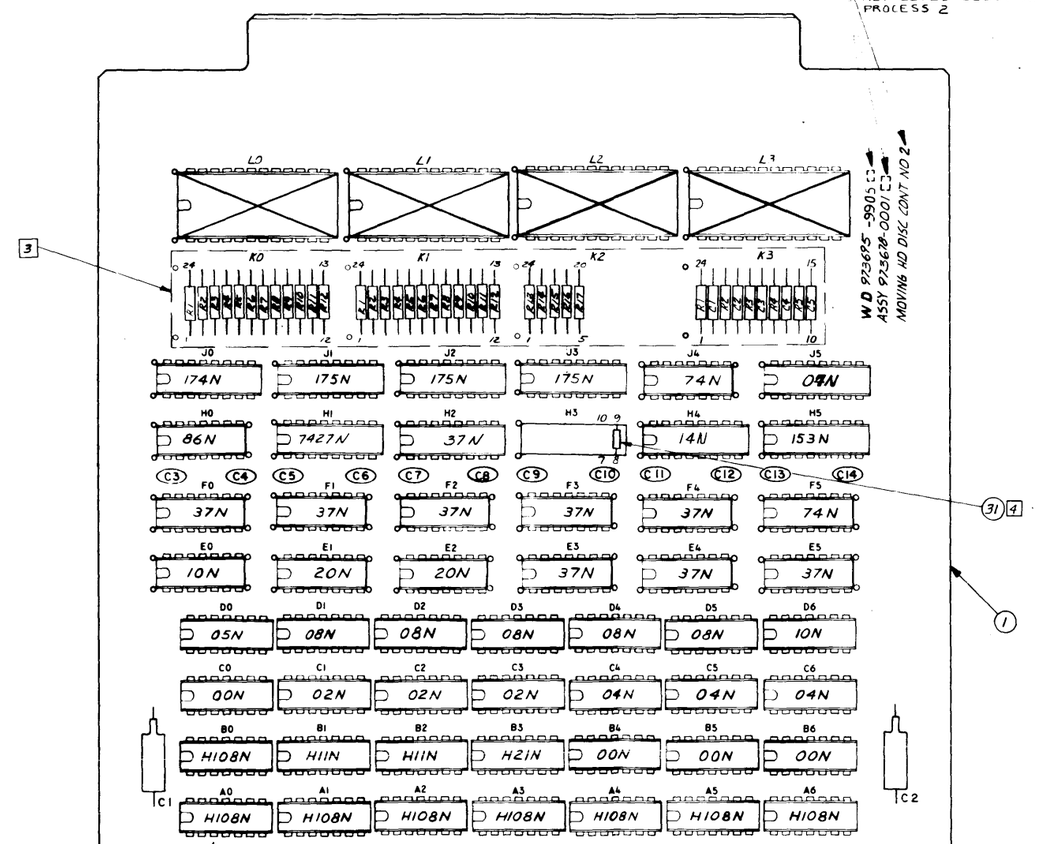

P1
FROM SHT. 2
IDCHKSR/Q-
ADIDCOM-
IDREAD/Q-
DRSTARTB1
SIGSTAB/Q
DRSTARTB2
DRSTARTB1
FROM SHT. 4
DRSTARTA3-12
DRSTARTA1-13
DRSTART
EGOFF/D
LSMF/Q
SYNCLK
FROM SHT. 4 MC-
EGOFF/Q-
FROM SHT. 2 LSMF/Q
LSMF/Q
DRSTRTF/Q
TO SHT 4
EGOFF/Q
EGOFF/Q-
LSMFDLY/Q-
TO SHTS. 2 & 3
RLSMF
SK1/Q-
SK2/Q-
SIGSTA/JA
SIGSTAB/Q
SIGSTA/JA1
SIGSTA/J
SIGSTA/Q
VCC
4.7K
36PH
CEXT1
RCEXT1
GND
BITCK
FROM SHT 4
WDCK/Q-
WDEN/Q
J00
J02
CEXT2
RCEXT2
FROM SHT. 6
PREAM/Q
BCCRY
WDCK/Q-
WDNCKA1-
WDNCK
59
WDEN/Q
TO SHT.6
WDEN/Q
SH15
WDGG0/Q
PREAM/Q-
WDNCKA2
FROM SHT. 6
FROM SH. 6
BCCRY
SH15
FROM SHT 6
RDATA
FROM SHT. 4
IOWRDQ
DR2MHD/Q
FROM SH. 2
SYCKMHD-
DR2SR/Q-
DRSTARTA1-
MRSMHD-
COMMERR/JA
DR2MHD/Q
COMMERR/J
BCCRY
IOWRDQ1
COMMERR/Q
COMMERR/W
SYNCLK-
DROMHD/Q
COMMERR/CLR-
SIGSTA/J
SYNCLK
GND
MRSMHD-
FROM SH 4
SYNCLK
SIGSTA/Q
SIGSTA/Q-
SIGSTA/J
SR0/K
SR0/K
SR0/K
32
30
43
973722
SIZE D
CODE IDENT NO 96214
DRAWING NO 973722
SCALE NONE
SHEET 5 OF 6


8
7
6
5
4
3
2
1
D
C
B
A
PREAM/Q-
VCC
FROM SHT. 4
DWIMHD/K
SYNCLK-
ENDSCT/Q
DW2MHD/Q
TØ SH.3
TØ SHT. 2
BCCRY
F00
PREAM/K
SW2/Q-
PREAM/Q-
B04
H11
WDGØ/K
WDGØ/Q
TØ SHT. 5
SYNCLK-9
CO3
ENDSEC/Q-
TØ SHT 3
ENDSEC/Q-
ENDSCT/Q
TØ SHT. 3
DWIMHD/J
DWIMHD/Q
D06
LSMF/Q-
DWIMHD/K
DWIMHD/Q-
MC-
MC
SYNCLK
WDGØ/Q
E00
ENDSCT/J
ENDSCT/Q
E02
ENDSEC/Q-
P1
FROM SH 4
DRIMHD/Q-
C05
SYNRID
RDCK-
RDCK
D1
02
SYNRICK
SYNRIQ-
SYNRIR-
RG/Q-
BITCK-
C00
RDATAP
RDATA-
SYNRIQ
SYNRIR
T0 SH.4
RDATA
SYNCLKB-
TØ SH.3,5
53
40
WDEN/Q
BCENPB
BCENPA-
BCENP
BCCRY-
D03
D01
BCCLRB
DRIMHD/Q-
D04
BCCLR-
SYNCLK
DW3MHD/Q-
DR4MHD/Q-
E01
TØ SH.3
36
46
SIZE D
CODE IDENT NO 96214
DRAWING NO 973722
SCALE NONE
REV A
SHEET 6 OF 6
973722

NOTES: UNLESS OTHERWISE SPECIFIED
1. NETWORKS ARE SN74 SERIES
~~2. CLINCH LEADS OF CAPACITORS C1 THRU C14 PRIOR TO WIRE WRAP AND PROCESS 1~~
3. HAND SOLDER COMPONENTS PER PROCESS 1
4. INSTALL JUMPER PLUG (ITEM 31) BETWEEN PINS 8 AND 9 OF H3. WITH THE JUMPER INSTALLED IN THIS POSITION MOD 11=0 SELECTS THE FIXED DISC. FOR MODMO TO SELECT THE REMOVABLE DISC INSTALL THE JUMPER BETWEEN PINS 7 AND 10 OF H3

LTR	REVISIONS DESCRIPTION	DATE	APPD
A	CN411152(C) (1) ADDED LABEL DWG TO REV LEVEL BLOCK, WIRE DECK WAS -9906 IN REV LEVEL BLOCK & ON SD (2) ON LM AND OF ITEM 2 WAS -9906 (3) UPDATED REV LEVEL BLOCK	11/3/75	
B	CN409931 (C) (1) UPDATED REV LEVEL (2) DELETED NOTE 2.	11/10/75	
C	CN407266 (B) (1) REVISED PER ECI TO ENSURE ENGR CHANGES INCORPORATED REV LEVEL BLOCK	2/17/76	
D	CN407237 (C) (1) ADDED ITEM 31 TO LM & FID (2) ADDED NOTE 4 (3) UPDATED REV LEVEL BLOCK	3/8/76	
E	CN406765 (B) (1) ADDED ITEM 32 (2) QTY OF ITEM 27 WAS 6 (3) DELETED REF TO R3 R1 THRU R3R5 (3) RELOCATED RESISTOR AT LOCATION A3 WAS AT PIN 7 TO 10 (4) REVISED NOTE 4 (5) UPDATED REV LEVEL BLOCK	5/14/76	
F	CN406890 (B) (1) UPDATED REV LEVEL BLOCK	5/14/76	
G	CN412182 (D) (1) ADDED -2 LM AND REVISED REV STATUS BLOCK	8/26/76	
H	CN414996 (C) (1) UPDATED REV LEVEL BLOCK	8/26/76	

MARK TITLE, ASSY PART NUMBER, WIRE DECK NUMBER AND APPROPRIATE REV LETTERS IN REV LEVEL BLOCK APPROX WHERE SHOWN PER PROCESS 2



PART NO	DESCRIPTION
973678-0002	MOVING HEAD DISC 44 CONTROLLER NO 2 M/W
973678-0001	MOVING HEAD DISC 44 CONTROLLER NO 2 W/W

REVISION LEVEL											
MULTI-WIRE BD (9)96058-0001	-	A	A	B	C	D	D	*	D		
LOGIC DIAGRAM 973679-9901	-	A	A	B	B	C	D	D	D		
WIRE WRAP BOARD 217863-0001	D	G	G	G	G	G	G	G	G		
WIRE DECK (973695-9905)	*	A	A	B	B	C	D	D	F		
ASSEMBLY	*	A	B	C	D	F	G	H			

UNLESS OTHERWISE SPECIFIED
DECIMAL: XX ± .02 XXX ± .010
FRACTIONAL: ± 1/64 ANGULAR ± 1°
CONCENTRICITY: MACHINED DIAMETERS .004 TIR
ALL DIMENSIONS TO BE MET BEFORE PLATING
REMOVE ALL BURRS AND SHARP EDGES
DO NOT SCALE THIS DRAWING
ALL DIMENSIONS IN INCHES
SURFACES MARKED ✓ TO HAVE
DRILLED HOLE TOLERANCES
.013 TO .136 +.003 -.002 .136 TO .250 +.005 -.002
.250 AND ABOVE ± .005

LIST OF MATERIALS

QTY REQD	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
	PROCESSES		
	1. SOLDER PER F-127, METHOD I AND/OR F-124		
	2. MARK PER F-100, METHOD II, CLASS 1, HEIGHT .09, COLOR BLACK		

PROJ NO	SIZE	NEXT ASSY DWG NO
8980	A	973674
8980	A	
8980	A	
7502		973674
7503		

TEXAS INSTRUMENTS INCORPORATED INDUSTRIAL PRODUCTS DIVISION HOUSTON, TEXAS

MOVING HEAD DISC 44 CONTROLLER NO 2
MHD CONTROLLER
COMPUTER
SIZE D | 973678 | REV
SHEET 2/11

M LM

TEXAS INSTRUMENTS
INCORPORATED

DATE 08/24/76 **LIST OF MATERIAL** PAGE 1 of

PART NUMBER 973678-0001 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		217863-0001	LOGIC BCARD-CBL ENDED WIRE WRAP	
0002	REF	EA		973655-5905	WIRE DECK, MHD MODEL 44	
0003	00004.000	EA		222222-7400	NETWORK SN7400N	-SN7400N
C003A					C0 B4 B5 E6	
0004	00003.000	EA		222222-7402	NETWORK SN7402N	TI--SN7402N
0004A					C1 C2 C3	
C005	00003.000	EA		222222-7404	NETWORK SN7404N	
C005A					C4 C5 C6	
C006	00001.000	EA		222222-7405	NETWORK SN7405N	
0006A					D0	
C007	00005.000	EA		222222-7408	NETWORK-SN7408N	
0007A					C1 C2 D3 C4 D5	
C008	00002.000	EA		222222-7410	NETWORK SN7410N	-SN7410N
C008A					E0 C6	
C009	00002.000	EA		222222-7420	NETWORK SN7420N	-SN7420N
C009A					E1 E2	
0010	00009.000	EA		222222-7437	NETWORK SN7437N	
0010A					F0 F1 F2 F3 F4 E3 E4 E5	
0010B					H2	
0011	00002.000	EA		222222-7474	NETWORK SN7474N	-SN7474N

DRAFTSMAN DATE | CKD DRAFTSMAN DATE 8/25/76 | DESIGN ENGINEER DATE | TITLE MOVING HEAD DISC 44 CONTROLLER NO.2

APPD MFG DATE | APPD PROJECT ENGINEER DATE | RELEASED DATE | PROJECT NO

PART NUMBER 973678-0001 REV H

TI 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 08/24/76 **LIST OF MATERIAL** PAGE 2 of

PART NUMBER 973678-0001 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0011A					J4 F5	
0012	00001.000	EA		222222-7486	NETWORK-SN7486N	
0012A					H0	
0013	00001.000	EA		222222-7153	NETWORK SN74153N	-SN74153N
0013A					H5	
0014	00001.000	EA		222222-7174	NETWORK SN74174N	
0014A					J0	
0015	00003.000	EA		222222-7175	NETWORK SN74175N	
0015A					J1 J2 J3	
0016	00002.000	EA		240000-7411	NETWORK-SN74H11N	
C016A					B1 P2	
0017	00001.000	EA		240000-7421	NETWORK-SN74H21N	
C017A					B3	
0018	00008.000	EA		240000-7108	NETWORK SN74H108N	
C018A					B0 A0 A1 A2 A3 A4 A5 A6	
0019	00012.000	EA		230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	FRI-5635-000-Y5F0503M
C019A					C3 THRU C14	
0020	00002.000	EA		972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT QPL-M39003/1-2271	
0020A					C1 C2	
0021	AR	FT		535578-0058	WIRE ELEC.,SOLID,"KYNAR" INSUL #30 AWG	

DRAFTSMAN DATE | CKD DRAFTSMAN DATE | DESIGN ENGINEER DATE | TITLE MOVING HEAD DISC 44 CONTROLLER NO.2

APPD MFG DATE | APPD PROJECT ENGINEER DATE | RELEASED DATE | PROJECT NO

PART NUMBER 973678-0001 REV H

TI 13849

TEXAS INSTRUMENTS
INCORPORATED

LIST OF MATERIAL

PAGE 3 of

LM 973678-0001 H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
C022	EFF	EA		973679-0001	DIAGRAM,MFF 44 NO.2	
C023	EFF	EA		973680-0001	UNIT TEST PROG,MFD 44 NO.2	
0024	00001.000	EA		222222-7427	NETWORK SN7427N	TI--SN7427N
C024A					H1	
0025	00014.000	EA		972946-0043	RES FIX 120 OHM 5 % .25 W CARBON FILM	ROH- R-25
0025A					K0R2 K0R4 K0R6 K0R8 K2R10	
0025B					K0R12 K1R2 K1R4 K1R6 K1R8	
C025C					K1R10 K1R12 K2R14 K2R16	
0026	00014.000	EA		972946-0052	RES FIX 300 OHM 5 % .25 W CARBON FILM	ROH- R-25
C026A					K0R1 K0R3 K0R5 K0R7 K0R9	
C026B					K0R11 K1R1 K1R3 K1R5 K1R7	
C026C					K1R9 K1R11 K2R13 K2R15	
0027	00001.000	EA		972946-0065	RES FIX 1.0K OHM 5 % .25 W CARBON FILM	ROH- R-25
C027A					K2R17	
0028	00005.000	EA		972929-0397	CAP FIX CERAMIC .001 UF 10% 200V	OPL-M39014/01-1397
0028A					K3C1 THRU K3C5	
0029	00001.000	EA		222222-7414	NETWORK SN7414N	
C029A					H4	
0030	00001.000	EA		222222-7407	NETWORK-SN7407N	TI--SN7407N
C030A					J5	

DRAFTSMAN DATE | CKD DRAFTSMAN DATE | DESIGN ENGINEER DATE | TITLE: MOVING HEAD DISC 44 CONTROLLER NO.2

APPD MFG DATE | APPD PROJECT ENGINEER DATE | RELEASED DATE | PROJECT NO | LM PART NUMBER 973678-0001 REV H

TI 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 08/24/76

LIST OF MATERIAL

PAGE 4 of

LM PART NUMBER 973678-0001 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0031	00001.000	EA		972713-C001	PLUG, JUMPER, I.C., 0.300 INCH	
C031A					H3	
0032	00005.000	EA		972946-C082	RES FIX 5.1K OHM 5 % .25 W CARBON FILM	ROH- R-25
0032A					K3R1 THRU K3R5	

DRAFTSMAN DATE | CKD DRAFTSMAN DATE | DESIGN ENGINEER DATE | TITLE: MOVING HEAD DISC 44 CONTROLLER NO.2

APPD MFG DATE | APPD PROJECT ENGINEER DATE | RELEASED DATE | PROJECT NO | LM PART NUMBER 973678-0001 REV H

TI 13849

TEXAS INSTRUMENTS INCORPORATED — DATE 08/24/76 — **LIST OF MATERIAL** — PAGE 1 of — LM PART NUMBER 973678-0002 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
C001	00001.000	EA		944038-0001	MWA,MOVING HEAD DISC 44 CONTROLLER NO 2	
0003	00004.000	EA		222222-7400	NETWORK SN7400N	-SN7400N
0003A					C0 B4 B5 B6	
C004	00003.000	EA		222222-7402	NETWORK SN7402N	TI--SN7402N
0004A					C1 C2 C3	
0005	00003.000	EA		222222-7404	NETWORK SN7404N	
C005A					C4 C5 C6	
0006	00001.000	EA		222222-7405	NETWORK SN7405N	
C006A					C0	
C007	00005.000	EA		222222-7408	NETWORK-SN7408N	
0007A					D1 C2 D3 C4 D5	
C008	00002.000	EA		222222-7410	NETWORK SN7410N	-SN7410N
C008A					E0 C6	
0009	00002.000	EA		222222-7420	NETWORK SN7420N	-SN7420N
C009A					E1 F2	
0010	C0009.000	EA		222222-7437	NETWORK SN7437N	
0010A					F0 F1 F2 F3 F4 E3 E4 E5 H2	
0011	00002.000	EA		222222-7474	NETWORK SN7474N	-SN7474N
C011A					J4 F5	
0012	00001.000	EA		222222-7486	NETWORK-SN7486N	

DRAFTSMAN — DATE — CKD DRAFTSMAN — DATE — DESIGN ENGINEER — DATE — TITLE: MOVING HEAD DISC 44 CONTROLLER NO.2

APPD MFG — DATE — APPD PROJECT ENGINEER — DATE — RELEASED — DATE — PROJECT NO — LM PART NUMBER 973678-0002 REV H

TI 13849

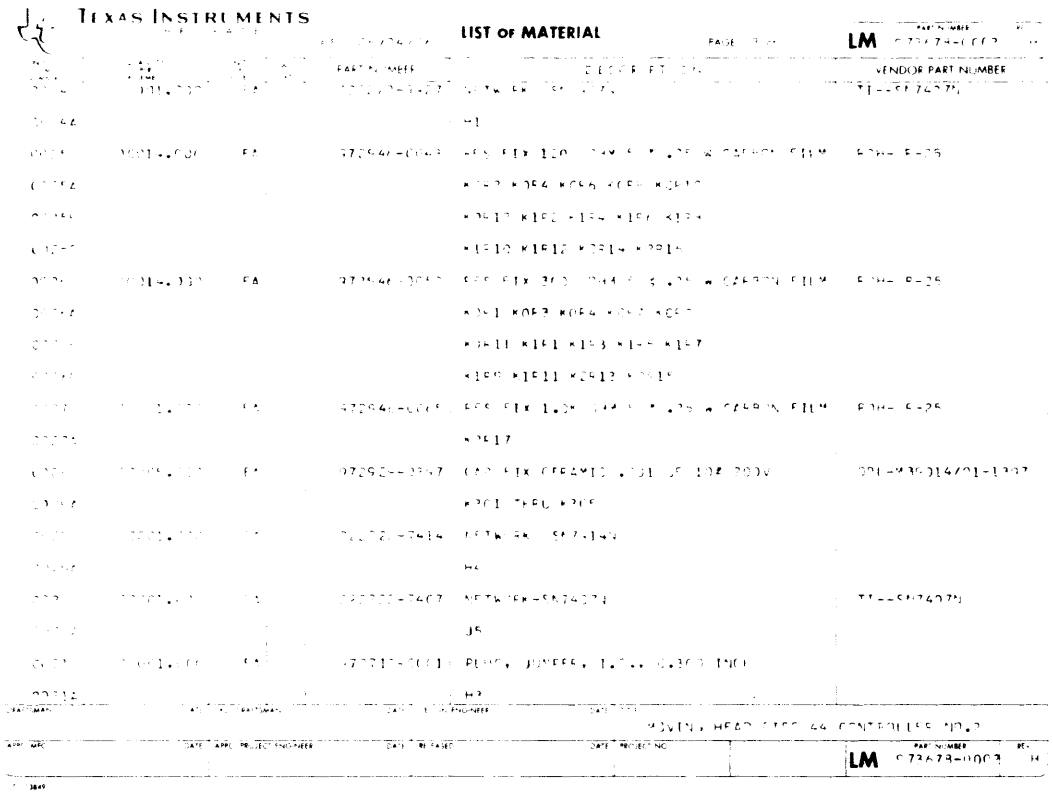
TEXAS INSTRUMENTS INCORPORATED — DATE 08/24/76 — **LIST OF MATERIAL** — PAGE 2 of — LM PART NUMBER 973678-0002 REV H

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0012A					H0	
0013	00001.000	EA		222222-7153	NETWORK SN74153N	-SN74153N
C013A					H5	
0014	00001.000	EA		222222-7174	NETWORK SN74174N	
0014A					J0	
0015	00003.000	EA		222222-7175	NETWORK SN74175N	
C015A					J1 J2 J3	
0016	00002.000	EA		240000-7411	NETWORK-SN74H11N	
0016A					B1 B2	
0017	00001.000	EA		240000-7421	NETWORK-SN74H21N	
C017A					B3	
0018	00008.000	EA		240000-7108	NETWORK SN74H108N	
C018A					B0 A0 A1 A2 A3 A4 A5 A6	
0019	00012.000	EA		230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	ERI-5635-000-Y5E0503M
0019A					C3 THRU C14	
0020	00002.000	EA		972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	OPL-M39003/1-2271
C020A					C1 C2	
0021	AR	FT		535978-0058	WIRE ELEC.,SOLID,"KYNAR" INSUL #30 AWG	
0022	REF	EA		973679-9901	DIAGRAM,MFD 44 NO 2	
C023	REF	EA		973680-9901	UNIT TEST PROC,MFD 44 NO 2	

DRAFTSMAN — DATE — CKD DRAFTSMAN — DATE — DESIGN ENGINEER — DATE — TITLE: MOVING HEAD DISC 44 CONTROLLER NO.2

APPD MFG — DATE — APPD PROJECT ENGINEER — DATE — RELEASED — DATE — PROJECT NO — LM PART NUMBER 973678-0002 REV H

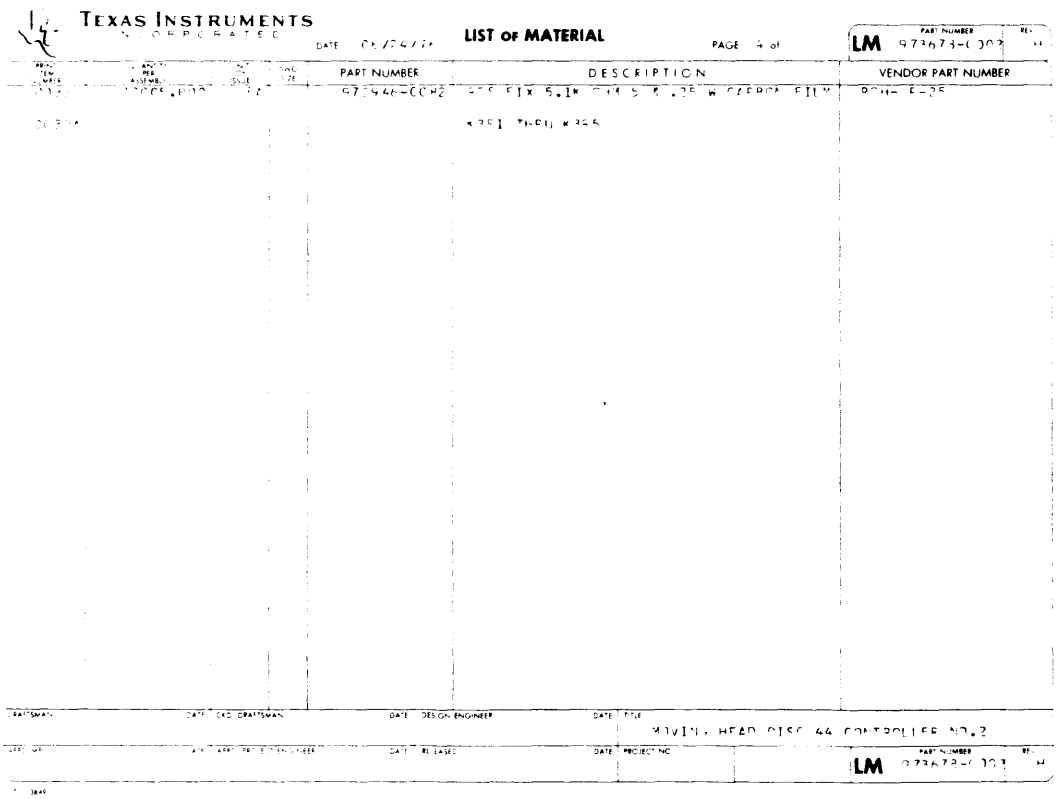
TI 13849



TEXAS INSTRUMENTS

LIST OF MATERIAL

LM 973673-0003



TEXAS INSTRUMENTS INCORPORATED

DATE 05/24/77

LIST OF MATERIAL

PAGE 4 of

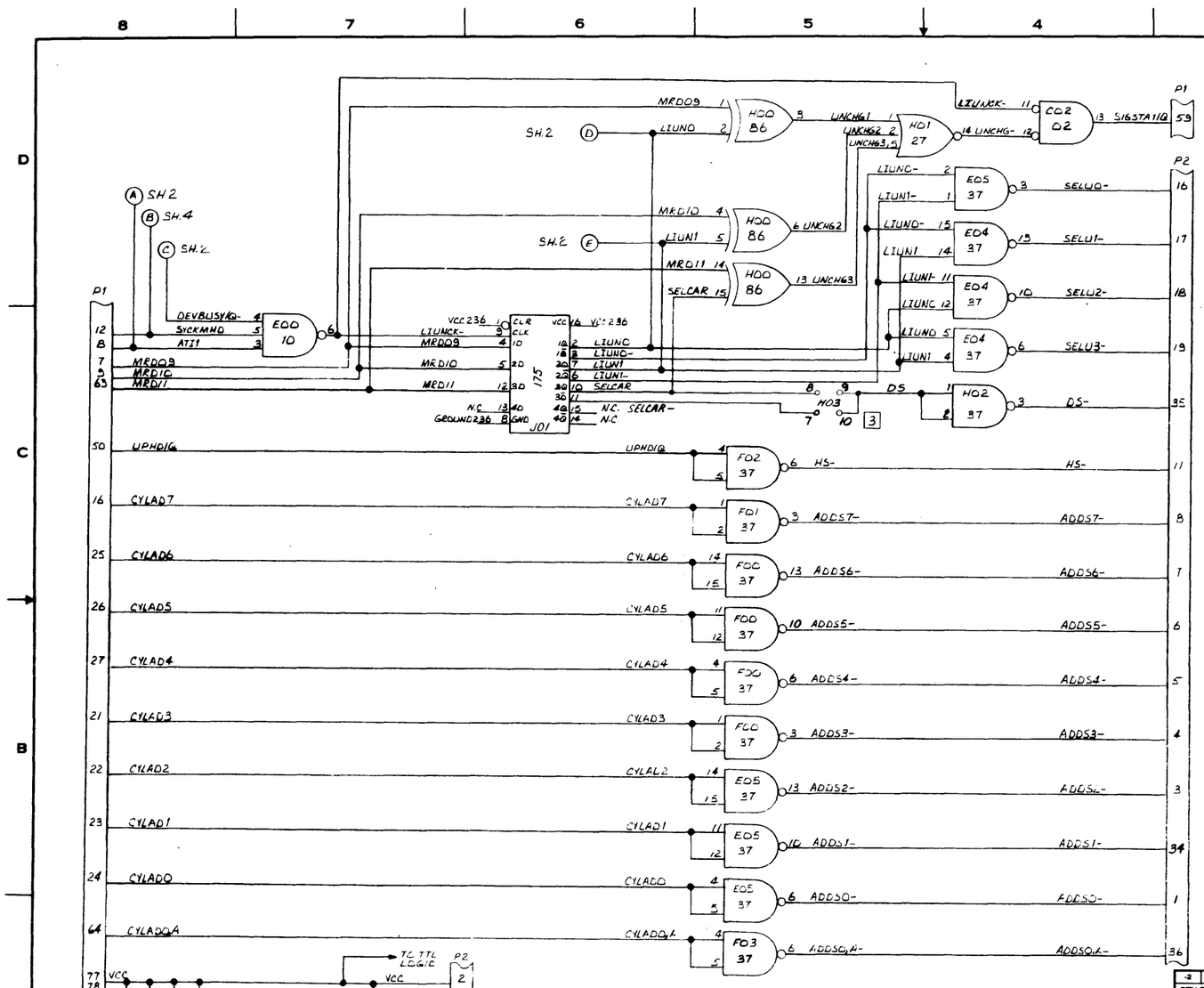
LM PART NUMBER 973673-0003

PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
973946-0002	RES FIX 6.1K OHM 5% .25W W/FEDRL FILM	RCM- E-25
	R351 THRU R355	

DRAFTSMAN DATE CKD DRAFTSMAN DATE DESIGN ENGINEER DATE TITLE

MAIN, HEAD DISC 44 CONTROLLER NO.2

APP'D MFG DATE APPD PROJECT ENGINEER DATE RELEASED DATE PROJECT NO. LM PART NUMBER 973673-0003



NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL CAPACITOR VALUES ARE .05 MICROFARADS.
2. ALL INTEGRATED CIRCUITS ARE SN 74 XXX SERIES.
3. INSTALL JUMPER PLUG BETWEEN PINS 8 AND 9 OF HO3 FOR MRDI1=0 TO SELECT THE FIXED DISC. INSTALL JUMPER BETWEEN PINS 7 AND 10 OF HO3 FOR MRDI1=0 TO SELECT THE REMOVABLE DISC.

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CN 411175 (C)	4/29/75	
	B	CN 407236 (C) MADDRD SH5	4/19/76	
	C	CN 406763 (C)	5/29/76	
	D	CN 406809 (C)	6-7-76	

REV STATUS	REV	D	D	D	D	D
OF SHEETS	SH	1	2	3	4	5

-2 QTY REQD	-1	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100

HOLE TOLERANCE

.013 THRU .125 +.004 −.001	.126 THRU 250 +.005 −.001	.251 THRU 500 +.008 −.001
.501 THRU 750 +.008 −.001	.751 THRU 1.000 +.010 −.001	1.001 THRU 2.000 +.012 −.001

5367 A	R101
5736 B	R100
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES ANGLES ±1°
  3 PLACE DECIMALS ±.010
  2 PLACE DECIMALS ±.02

MATERIAL:

		DATE
DWN	[illegible] 2	5/29/74
CHK	[illegible] B	10/29/74
ENGR	[illegible]	5/29/74
QA		
APPD		
CONTR		
DESIGN ACTIVITY RELEASE		11-4-74

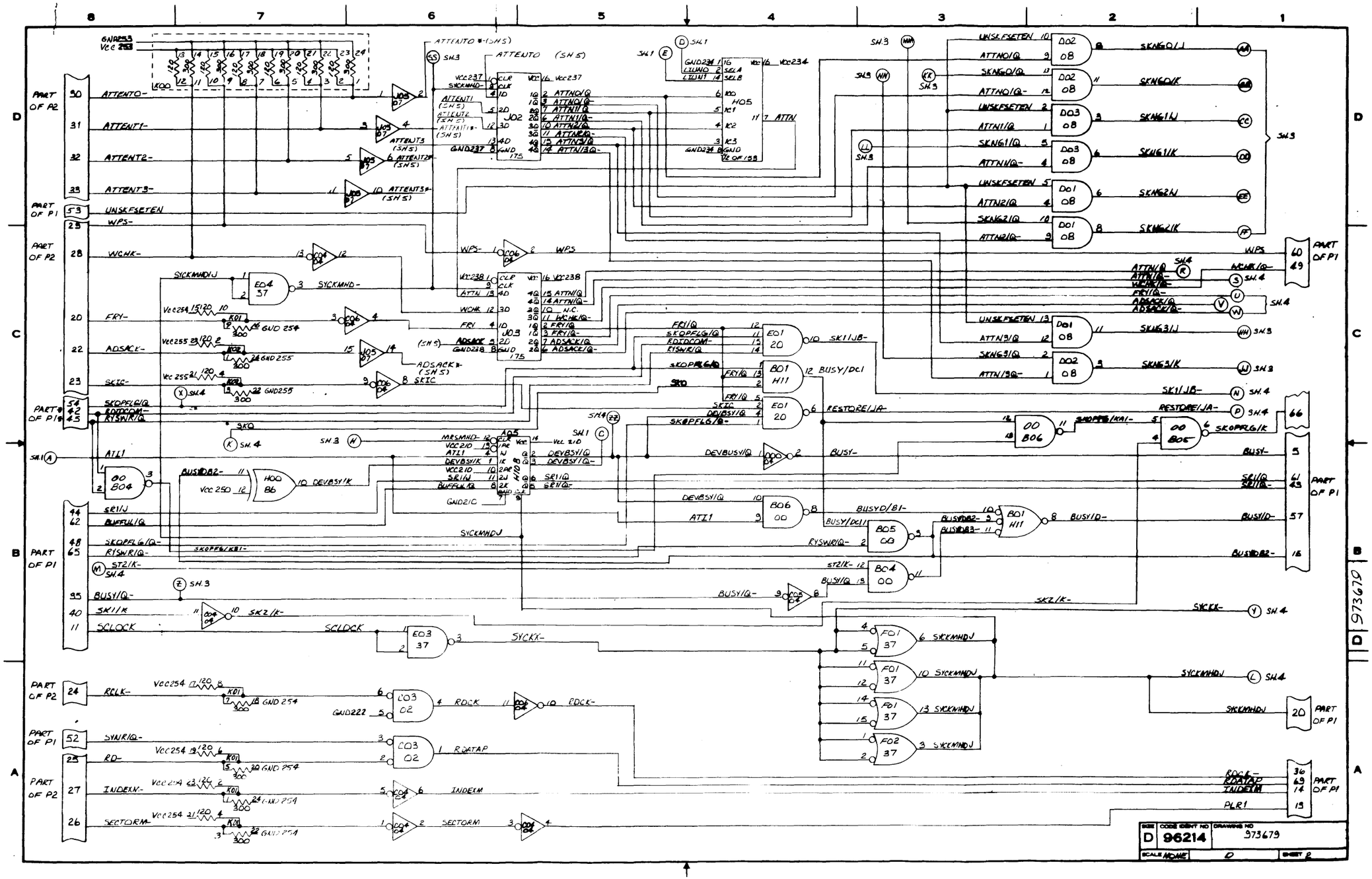
TEXAS INSTRUMENTS INCORPORATED Equipment Group Austin, Texas

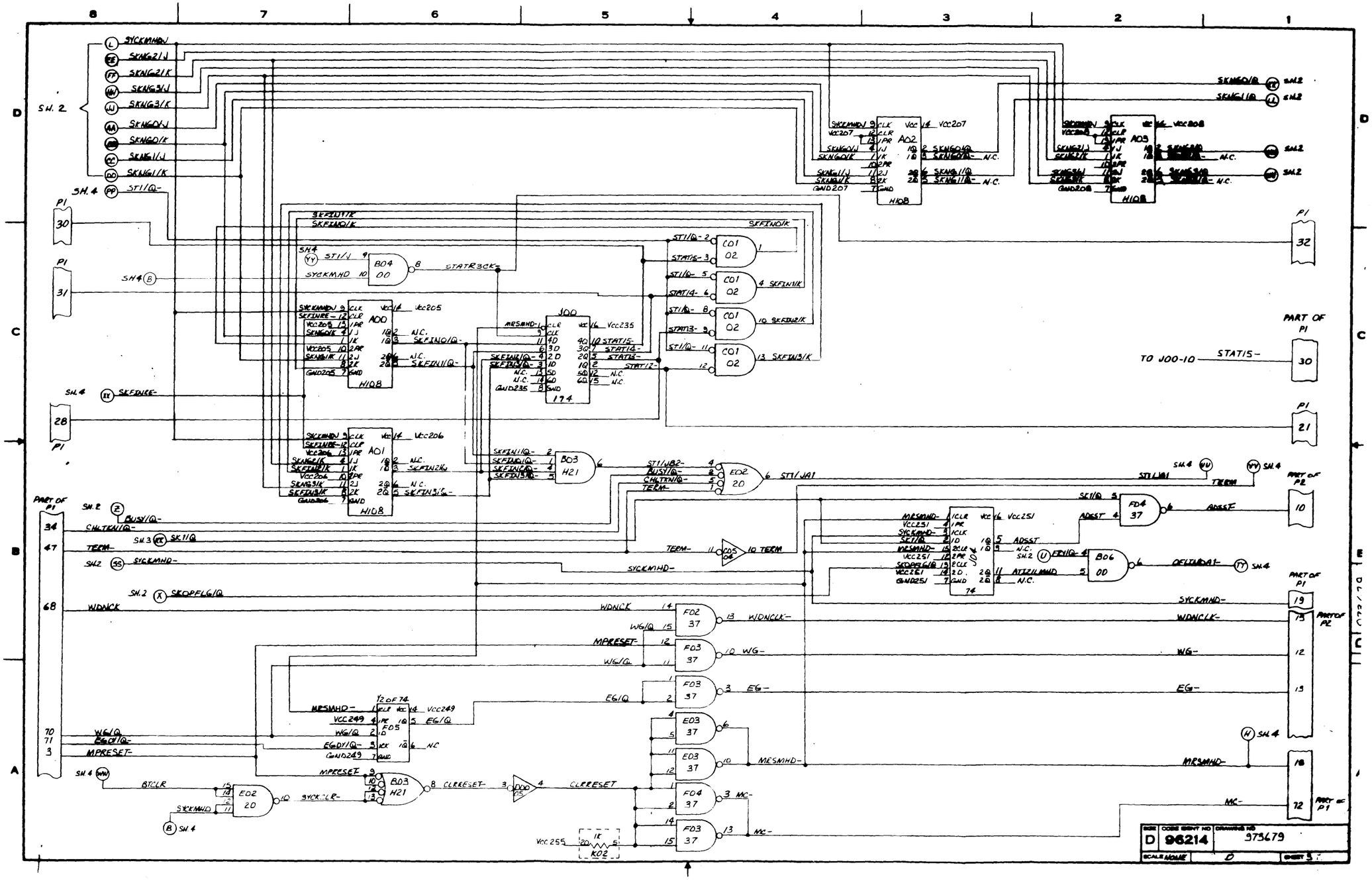
DIAGRAM, LOGIC, DETAILED
MOVING HEAD DISK CONTROLLER 44
ND 2

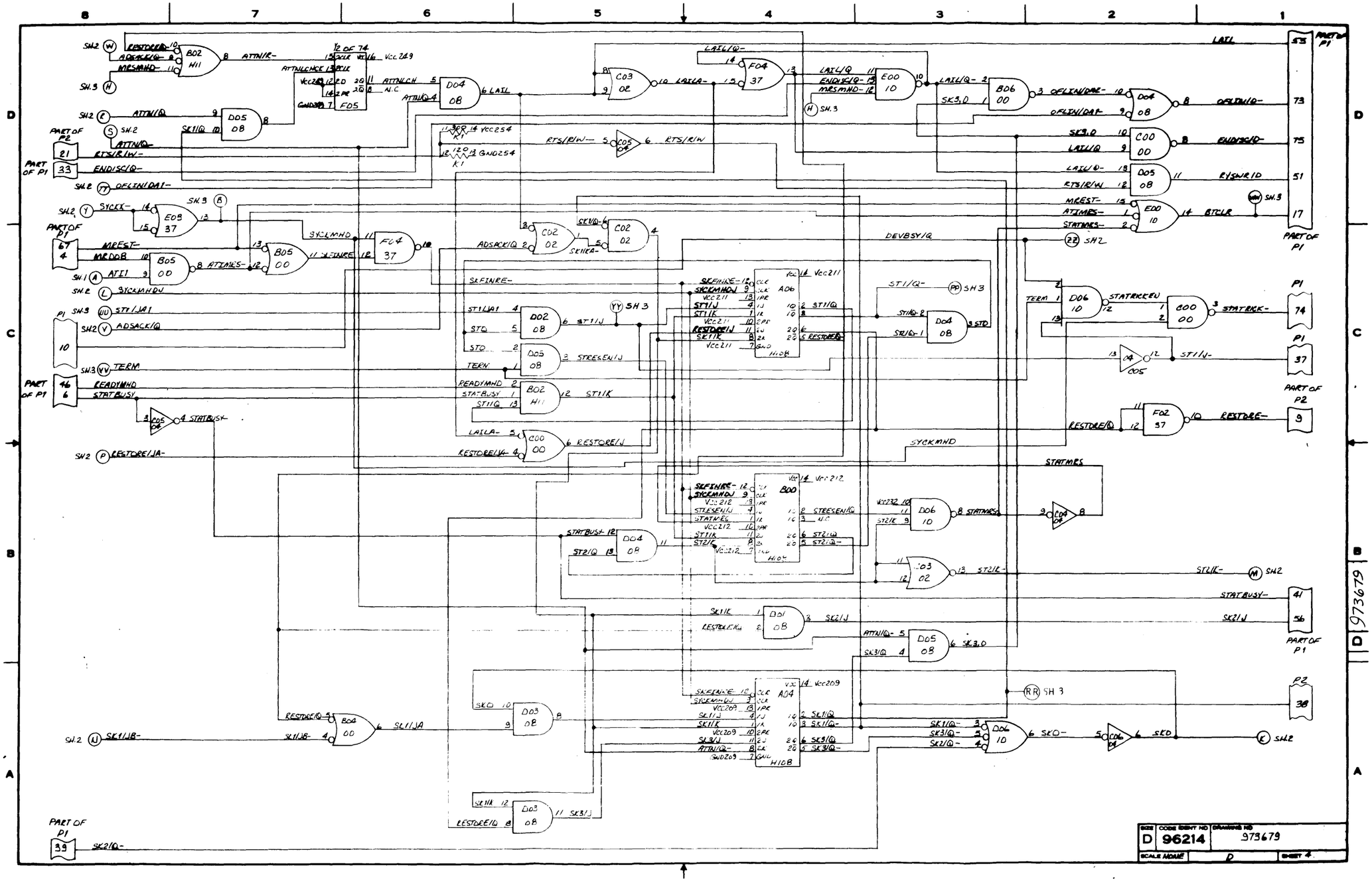
SIZE	CODE IDENT NO	DRAWING NO
D	96214	973679

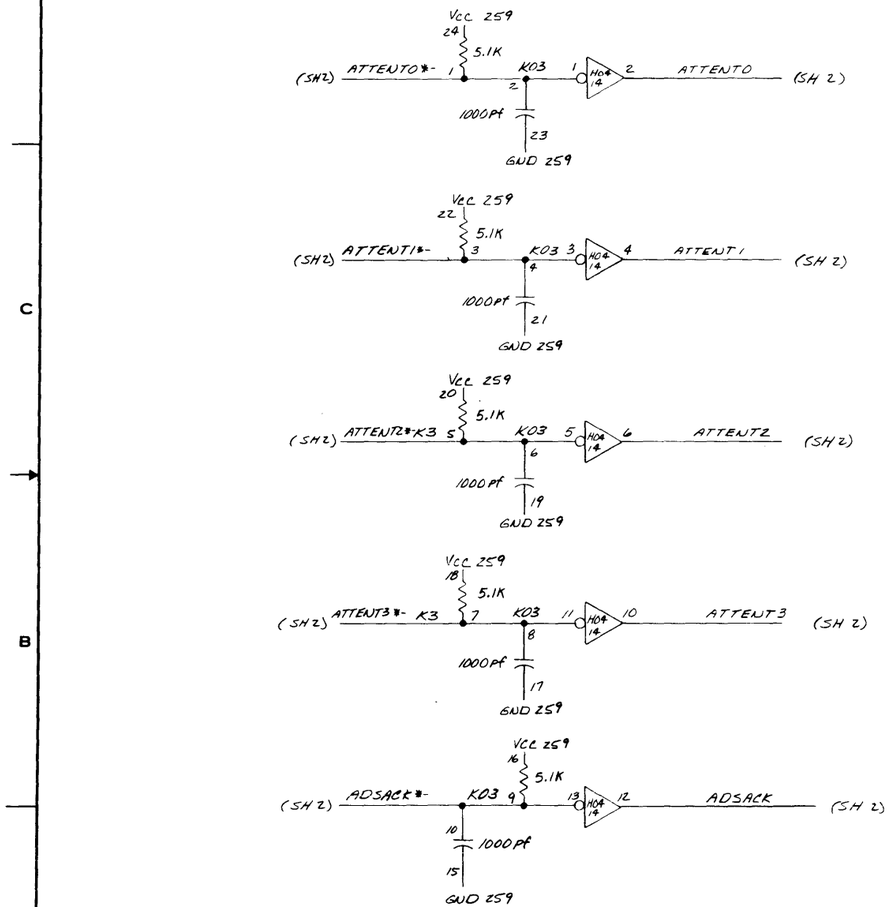
SCALE NONE | SHEET 1 OF 5

973679 D

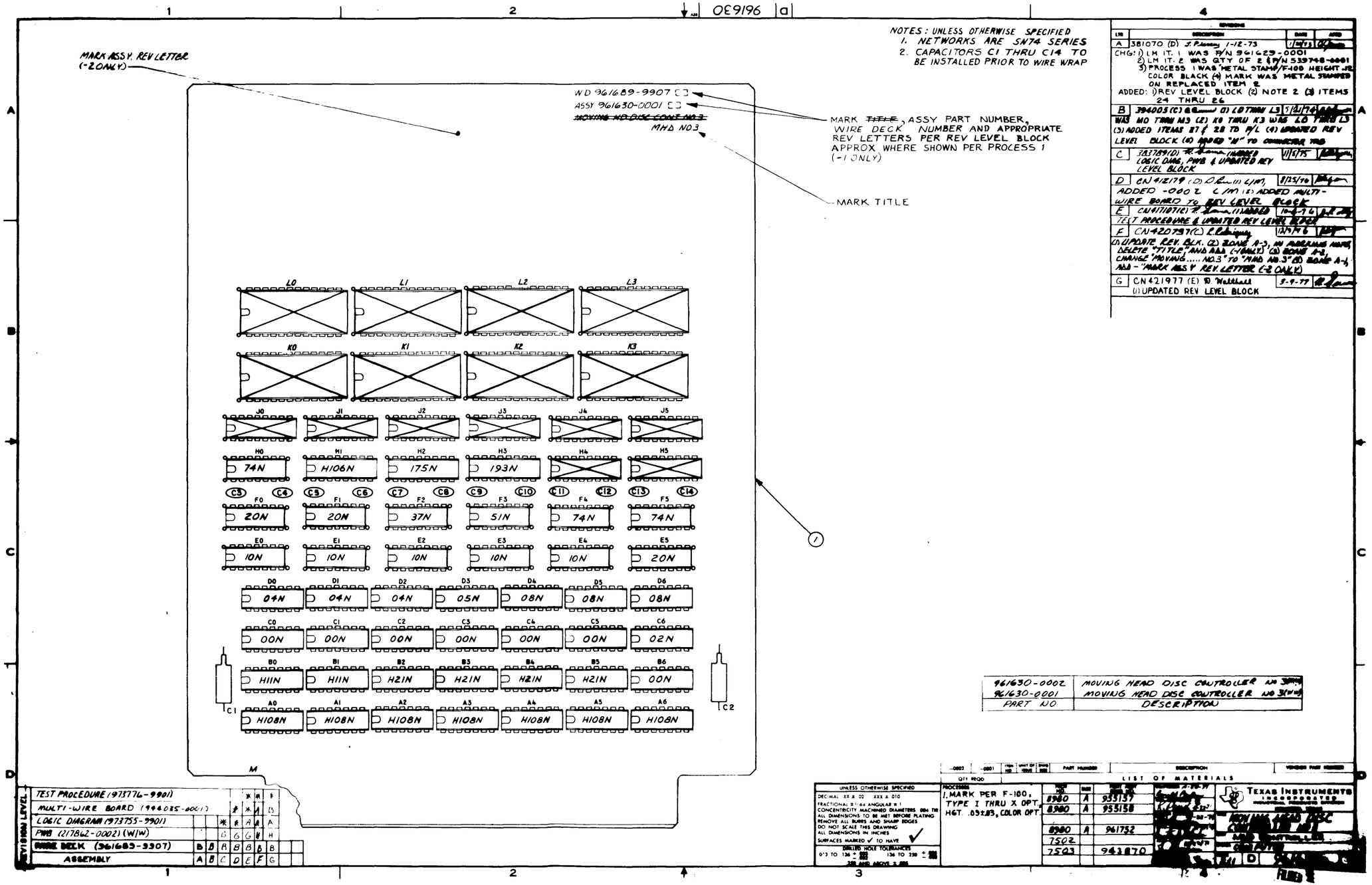

ATTEN0- ATTEN1- ATTEN2- ATTEN3-
UNSKFSETEN
WPS-
WCHK-
FRY-
ADSACK-
SKIC-
SKOPFLG/Q
RDTDCOM-
RYSWR/Q
ATL1
SR1/J
BUFFUL/Q
SKOPFLG/Q-
RYSWR/Q-
ST2/K-
BUSY/Q-
SK1/K
SCLOCK
SK2/K-
RCLK-
SYNR/Q-
RD-
INDEXN-
SECTORM-
SYCKMHDJ
SYCKK-
SKQ
BUSYDB2-
DEVBSY/K
SKOPFLG/K
BUSY-
DEVBUSY/Q
BUSYD/B1-
BUSY/DC1
BUSYD-
SK1/JB-
RESTORE/JA-
SKOPFLG/K
SKZ/K-
RDCK-
RDATAP
INDEXM
SECTORM
PLR1
PART OF P2
PART OF P1
SH.1
SH.2
SH.3
SH.4
SH.5
SH.9
SIZE D
CODE IDENT NO 96214
DRAWING NO 973679
SCALE NONE
SHEET 8


SYCKMHD/J
SKNG2/J
SKNG2/K
SKNG3/J
SKNG3/K
SKNG0/J
SKNG0/K
SKNG1/J
SKNG1/K
ST1/Q-
SH. 2
SH. 4
P1
30
31
28
32
21
SKFIJJ/K
SKFIMO/K
SKFINO/K
ST1/Q- 2
STAT15- 3
ST1/Q- 5
STAT14- 6
ST1/Q- 8
STAT13- 9
ST1/Q- 11
12
C01
02
1
4 SKFIN1/K
10 SKFIN2/K
13 SKFIN3/K
SH4 (YY) ST1/J
SYCKMHD 10
B04
00
8
STATR3CK-
SKFINE- 12
VCC205 13
SKNG0/K 1
VCC205 10
SKNG1/K 11
GND205 7
A00
H108
N.C.
SKFIN0/Q-
SKFIN1/Q-
MRSMHD- 1
9
6
SKFIN2/Q- 4
SKFIN1/Q- 3
N.C. 13
N.C. 14
GND235 8
J00
174
VCC235
STAT15-
STAT14-
STAT13-
STAT12-
N.C.
SH4 (KK) SKFINEE-
SKFINE- 12
VCC206 13
SKNG2/K 1
VCC206 10
SKNG3/K 11
GND206 7
A01
SKFIN2/Q-
SKFIN1/Q-
SKFIN3/Q-
B03
H21
6
ST1/JA2-
BUSY/Q-
CHLTRN/Q-
TERM-
EO2
20
6 ST1/JA1
SKNG0/K 1
SKNG1/J 4
SKNG1/K 5
GND207 7
A02
SKNG0/Q
SKNG1/Q
N.C.
SKNG0/R (TT) SH.2
SKNG1/R (LL) SH.2
VCC208 16
SKNG2/J 4
SKNG2/K 1
SKNG3/J 4
SKNG3/K 1
GND208 7
A03
SKNG2/Q
SKNG3/Q
SKNG2/R (RR) SH.2
SKNG3/R (SS) SH.2
PART OF P1
TO J00-10 STAT15-
PART OF P2
SH.2 (Z) BUSY/Q-
CHLTRN/Q-
SH.3 (KK) SK1/Q
TERM-
SH.2 (SS) SYCKMHD-
SH.2 (X) SKOPFLG/Q
WDNCK
34
47
68
70
71
3
WG/Q
EGDY/Q-
MPRESET-
SH.4 (WW)
BTCLR
SYCKMHD
(B) SH.4
EO2
20
10 SYCKCLR-
B03
H21
8 CLRRESET-
CLRRESET
Vcc255
1K
RO2
SK1/Q 5
ADSST 4
FD4
37
6 ADSST
10
SH.4 (UU) ST1/JA1
(VV) SH.4 TERM
MRSMHD- 1
Vcc251 4
SYCKMHD- 9
SK1/Q 2
MRSMHD- 15
Vcc251 12
SKOPFLG/Q 13
Vcc251 14
GND251 7
J04
74
N.C.
SH.2 (U) FR1/Q- 4
ATT2/LMMD 11
N.C. 8
B06
00
6 OFLTMDAT-
(TT) SH.4
SH.4 (H)
MRSMHD-
MC-
18
72
FD2
37
WDNCK 14
WG/Q 15
13 WDNCLK-
FD3
37
MPRESET- 12
WG/Q 11
10 WG-
1
2
3 EG-
EG/Q
4
5
6
11
12
10 MRSMHD-
1
2
3 MC-
14
15
13 MC-
Y2 OF 74
MRSMHD- 1
Vcc249 4
WG/Q 2
EGDY/Q- 9
GND249 7
F05
Vcc249
EG/Q
NC
MPRESET
SYCKMHD-
WDNCLK-
WG-
EG-
MRSMHD-
MC-
SIZE D
CODE IDENT NO 96214
DRAWING NO 973679
SCALE NONE
SHEET 5


8
7
6
5
4
3
2
1
D
C
B
A
SH2 (W) RESTORE/I- 10
ADSACK/Q- 8
MRESMND- 11
B02 H11
ATTN/R-
SH.3 (H)
1/2 OF 74
VCC249
ATTN/LCH 5
N.C
D04 08
LAIL
SH2 (E) ATTN/Q 9
(S) SH.2 ATTN/Q-
D05 08
SK1/Q 10
PART OF P2 21 RTS/R/W-
PART OF P1 33 END/SC/Q-
SH.2 (TT) OFLIN/DAT-
R1 14 VCC254
R2 13 GND254
RTS/R/W- 5
C05 04
6 RTS/R/W
SH2 (Y) SYCLK- 14
E08 37
SH.3 (A)
PART OF P1 67 4 MREST-
MRDDB 10
B05 00
8 ATTMES-
SW.1 (A) ATT1 9
SW.2 (L) SYCKMHD
SYCKMHD 11
F04 37
SKFINRE- 12
P1 10
SW.3 (UU) STT/JA1
SW2 (V) ADSACK/Q
SW3 (VV) TERM
PART OF P1 46 6 READYMHD
STATBUSY
C05 04
4 STATBUSK
SW2 (P) RESTORE/JA-
C03 02
LAIL/Q-
F04 37
LAIL/Q 11
END/SC/Q- 13
MRESMND- 12
E00 10
SH.3
LAIL/Q- 2
SK3.0 1
B06 00
3 OFLIN/DAE-
OFLIN/DAT- 9
D04 08
SK3.0 10
LAIL/Q 9
C00 00
LAIL/Q- 13
RTS/R/W 12
D05 08
MRESET- 13
ATTMES- 1
STATMES- 2
E00 10
(22) SH2
LAIL
PART OF P1 55
OFLIN/IQ- 73
END/SC/Q- 75
R/S/WR/D 51
BTCLR 17
C02 02
ADSACK/Q 2
SKVQ- 6
SKIKA- 5
DEVBSY/Q
SKFINRE-
ST1LVA1 4
ST1Q 5
ST1Q 2
TERM 1
READYMHD 2
STATBUSY 1
ST1IQ 13
D02 08
(YY) SH 3
ST1/J 6
STRESEN/J 3
ST1/K 12
LAILA- 5
RESTORE/JA- 4
C00 00
RESTORE/J 6
SKFINRE- 12
SYCKMHD 9
VCC211 13
ST1/J 4
ST1/K 1
VCC211 10
RESTORE/J 11
SK1/K 8
VCC211 7
H108
ST1/Q 2
ST1/Q- 1
D04 08
3 STD
(PP) SH3
SYCKMHD
STATMES
TERM 1
D06 10
STATRCKEN 12
B00 00
3 STATRCK-
P1 74
13
C04 C05
12 ST1/J-
P1 37
PART OF P2
RESTORE/Q 12
F02 37
10 RESTORE-
P2 9
SKFINRE- 12
SYCKMHD 9
VCC212 13
STRESEN/J 4
STATMES 1
VCC212 16
ST1/K 11
ST2/K 8
VCC212 7
B00
H108
STRESEN/Q 2
ST2/Q 6
ST2/Q- 5
VCC232 10
D06 10
8 STATMES
ST2/K 9
9
C04 08
8
STATBUSY- 12
D04 08
11
ST2/Q 13
C03 02
13 ST2/K-
(M) SH2
ST2/K-
STATBUSY-
SK2/J
PART OF P1 41 56
SK1/K 1
RESTORE/Q 2
D01 08
3 SK2/J
ATTN/Q- 5
SK3/Q 4
D05 08
6 SK3.0
SKFINRE- 12
SYCKMHD 9
VCC209 13
SK1/J 4
SK1/K 1
VCC209 10
SK3/J 11
ATTN/Q- 8
SWD209 7
A04
H108
(RR) SH 3
P2 38
SK1/Q- 3
SK3/Q- 5
SK2/Q- 4
D06 10
6 SKO-
C06 04
6 SKO
(K) SH2
SW.2 (J) SK1/JB-
RESTORE/Q 5
SK1/JB- 4
B04 00
6 SK1/JA
SKO 10
D03 08
9
8
SK1IA 12
RESTORE/Q 8
D03 08
11 SK3/J
PART OF P1 39 SK2/Q-
SIZE D
CODE IDENT NO 96214
DRAWING NO 973679
SCALE NONE
D
SHEET 4
973679



SIZE	CODE IDENT NO	DRAWING NO
D	96214	973679
SCALE NONE	D	SHEET 5



LTR	DESCRIPTION	DATE	APPD
A	381070 (D) J. Flaherty 1-12-73	1/16/73	
	CHG: 1) LM IT. 1 WAS P/N 961629-0001 2) LM IT. 2 WAS QTY OF 2 & P/N 539748-0001 3) PROCESS 1 WAS METAL STAMP/F-100 HEIGHT .12 COLOR BLACK (4) MARK WAS METAL STAMPED ON REPLACED ITEM 2. ADDED: 1) REV LEVEL BLOCK (2) NOTE 2 (3) ITEMS 24 THRU 26		
B	394005 (C) A.G. (D) (1) LO THRU L3 WAS NO THRU N3 (2) K0 THRU K3 WAS LO THRU L3 (3) ADDED ITEMS 27 & 28 TO P/L (4) UPDATED REV LEVEL BLOCK (5) ADDED "N" TO CONNECTOR TAB	5/24/74	
C	383789 (D) ~~R. Lewis~~ (MANUAL LOGIC DIAG, PWB & UPDATED REV LEVEL BLOCK	11/6/75	
D	CN 412179 (D) D. Lewis (1) L/M, ADDED -0002 L/M (2) ADDED MULTI-WIRE BOARD TO REV LEVEL BLOCK	8/25/76	
E	CN 417107 (C) R. Lewis (1) ADDED TEST PROCEDURE & UPDATED REV LEVEL BLOCK	10-29-76	
E	CN 420797 (C) R. Robinson (1) UPDATE REV BLK. (2) ZONE A-3, IN ADDING NOTE, DELETE "TITLE" AND ADD (-1 ONLY) (3) ZONE A-2, CHANGE "DRWG..... NO.3" TO "AND NO.3" (4) ZONE A-4, ADD - "MARK ASS'Y REV. LETTER (-2 ONLY)	12/7/76	
G	CN 421977 (E) D. Wohlhaus (1) UPDATED REV LEVEL BLOCK	5-9-77	

PART NO	DESCRIPTION
961630-0002	MOVING HEAD DISC CONTROLLER NO 3
961630-0001	MOVING HEAD DISC CONTROLLER NO 3

QTY REQD -0002	QTY REQD -0001	ITEM NO	UNIT OF ISSUE	SHORT DESC	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
		8980	A		955157		
		8980	A		955158		
		8980	A		961752		
		7502					
		7503			943870		

LIST OF MATERIALS

DIVISION LEVEL									
TEST PROCEDURE (973776-9901)					*	R	F		
MULTI-WIRE BOARD (996085-0001)				F	*	A	B		
LOGIC DIAGRAM (973755-9901)			*	R	A	A	A		
PWB (2178662-0002) (W/W)			G	G	H	H	H		
WIRE DECK (961689-9907)	B	B	B	B	B	B	B		
ASSEMBLY	A	B	C	D	E	F	G		

UNLESS OTHERWISE SPECIFIED
DECIMAL XX ± .02 XXX ± .010
FRACTIONAL ± 1/64 ANGULAR ± 1°
CONCENTRICITY MACHINED DIAMETERS .004 TIR
ALL DIMENSIONS TO BE MET BEFORE PLATING
REMOVE ALL BURRS AND SHARP EDGES
DO NOT SCALE THIS DRAWING
ALL DIMENSIONS IN INCHES
SURFACES MARKED √ TO HAVE
DRILLED HOLE TOLERANCES
0 TO 136 ± .003 136 TO 250 ± .006
251 AND ABOVE ± .004

PROCESS
1. MARK PER F-100, TYPE I THRU X OPT. HGT. .093±.015, COLOR OPT.

TEXAS INSTRUMENTS INCORPORATED
MOVING HEAD DISC CONTROLLER NO 3
SIZE D
REV G

TEXAS INSTRUMENTS
INCORPORATED

DATE 08/23/76

LIST OF MATERIAL

PAGE 1 of

LM PART NUMBER 961630-0001 REV G D

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		217862-0002	LOGIC BOARD-SINGLE ENDED WIRE WRAP	
0002	REF	EA		961689-9907	WIRE DECK,MHD 3, BLOCK 3	
0003	00007.000	EA		222222-7400	NETWORK SN7400N	-SN7400N
0004	00001.000	EA		222222-7402	NETWORK SN7402N	TI--SN7402N
0005	00003.000	EA		222222-7404	NETWORK SN7404N	
0006	00001.000	EA		222222-7405	NETWORK SN7405N	
0007	00003.000	EA		222222-7408	NETWORK-SN7408N	
0008	00005.000	EA		222222-7410	NETWORK SN7410N	-SN7410N
0009	00001.000	EA		222222-7437	NETWORK SN7437N	
0010	00001.000	EA		222222-7451	NETWORK SN7451N	-SN7451N
0011	00003.000	EA		222222-7474	NETWORK SN7474N	-SN7474N
0012	00001.000	EA		222222-7175	NETWORK SN74175N	
0013	00001.000	EA		222222-7193	NETWORK SN74193N	-SN74193N
0014	00002.000	EA		240000-7411	NETWORK-SN74H11N	
0015	00004.000	EA		240000-7421	NETWORK-SN74H21N	
0016	00001.000	EA		240000-7106	NETWORK SN74H106N	
0017	00007.000	EA		240000-7108	NETWORK SN74H108N	
0018	00003.000	EA		222222-7420	NETWORK SN7420N	-SN7420N
0024	00012.000	EA		230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	ERI-5635-000-Y5F0503M
0024A					C3 THRU C14	

DRAFTSMAN DATE | CKD. DRAFTSMAN 8/24/76 DATE | DESIGN ENGINEER DATE | TITLE MOVING HEAD DISC CONTROLLER NO 3

APPD.-MFG. DATE | APPD. PROJECT ENGINEER DATE | RELEASED DATE | PROJECT NO. 8100/8101

LM PART NUMBER 961630-0001 REV G D

T.I. 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 08/23/76

LIST OF MATERIAL

PAGE 1 of

LM PART NUMBER 961630-0002 REV G

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		944035-0001	MWB,MOVING HEAD DISC CONTROLLER NO 3	
0003	00007.000	EA		222222-7400	NETWORK SN7400N	-SN7400N
0004	00001.000	EA		222222-7402	NETWORK SN7402N	TI--SN7402N
0005	00003.000	EA		222222-7404	NETWORK SN7404N	
0006	00001.000	EA		222222-7405	NETWORK SN7405N	
0007	00003.000	EA		222222-7408	NETWORK-SN74C8N	
0008	00005.000	EA		222222-7410	NETWORK SN7410N	-SN7410N
0009	00001.000	EA		222222-7437	NETWORK SN7437N	
0010	00001.000	EA		222222-7451	NETWORK SN7451N	-SN7451N
0011	00003.000	EA		222222-7474	NETWORK SN7474N	-SN7474N
0012	00001.000	EA		222222-7175	NETWORK SN74175N	
0013	00001.000	EA		222222-7193	NETWORK SN74193N	-SN74193N
0014	00002.000	EA		240000-7411	NETWORK-SN74H11N	
0015	00004.000	EA		240000-7421	NETWORK-SN74H21N	
0016	00001.000	EA		240000-7106	NETWORK SN74H106N	
0017	00007.000	EA		240000-7108	NETWORK SN74H108N	
0018	00003.000	EA		222222-7420	NETWORK SN7420N	-SN7420N
0024	00012.000	EA		230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	ERI-5635-000-Y5F0503A
0024A					C3 THRU C14	
0025	00002.000	EA		972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL-M39003/1-2271

DRAFTSMAN / DATE	CKD DRAFTSMAN / DATE	DESIGN ENGINEER / DATE	TITLE
			MOVING HEAD DISC CONTROLLER NO 3
APPD MFG. / DATE	APPD. PROJECT ENGINEER / DATE	RELEASED / DATE	PROJECT NO.

LM PART NUMBER 961630-0002 REV G

T.I. 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 08/23/76

LIST OF MATERIAL

LM PART NUMBER 961630-0002 REV G

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0025A					C1 C2	
0026	AR	FT		535978-0058	WIRE ELEC.,SOLID,"KYNAR" INSUL #30 AWG	
0027	REF	EA		973755-9901	LOGIC DIAGRAM,MHD #3	
0028	REF	EA		973776-9901	TEST PROCEDURE,MHD #3	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
						MOVING HEAD DISC CONTROLLER NO 3
APPD.-MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.

LM PART NUMBER 961630-0002 REV G

T.I. 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 08/23/76

LIST OF MATERIAL

PAGE 2 of

LM PART NUMBER 961630-0001 REV G D

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0025	00002.000	EA		972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL-M39003/1-2271
0025A					C1 C2	
0026	AR	FT		535978-0058	WIRE ELEC.,SOLID,"KYNAR" INSUL #30 AWG	
0027	REF	EA		973755-9901	LOGIC DIAGRAM,MHD #3	
0028	REF	EA		973776-9901	TEST PROCEDURE,MHD #3	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
						MOVING HEAD DISC CONTROLLER NO 3
APPD.-MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.
						LM PART NUMBER 961630-0001 REV G D

T.I. 13849

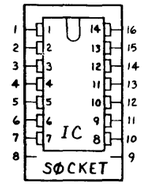
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CN41997(C) R. Lane (MAR) PAGES REV * WITH CHANGE(2) DWG WAS 2 SH	9-28-76	

NOTES: UNLESS ØTHERWISE SPECIFIED;

1. ALL DEVICE TYPES ARE PREFIXED WITH SN 74.
2. GRØUND IS APPLIED TØ PIN 7 ØF ALL 14-PIN IC'S AND PIN 8 ØF ALL 16-PIN IC'S.
3. VCC IS APPLIED TØ PIN 14 ØF ALL 14-PIN IC'S AND PIN 16 ØF ALL 16-PIN IC'S.
4. DEVICE TYPE, PIN NUMBERS AND LØCATIØN ØF IC IS SHOWN AS FOLLOWS:

00 AND 04 = DEVICE TYPE
4, 5 AND 6 = PIN NUMBERS
B06 AND C10 = LØCATIØN - FIRST DIGIT DENØTES RØW, SECOND AND THIRD DIGITS DENØTE CØLUMN - IC IS LØCATED AT INTERSECTIØN ØF RØW AND COLUMN.

5. ALL RESISTØRS 1/4 WATT, 5 %
6. WHEN A 14-PIN IC IS USED IN A 16-PIN SØCKET, THE IC PIN NUMBER SHØWN ØN THE LØGIC DIAGRAM IS THE SAME AS THE SØCKET PIN NUMBER. THEREFØRE; IC PIN 8 IS LABELED PIN 10, IC PIN 9 IS LABELED PIN 11, ETC.



REV STATUS	REV	A	A	A	A	A	A
OF SHEETS	SHEET	1	2	3	4	5	6	7

-2 QTY REQD	-1 QTY REQD	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION
				PARTS LIST		

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100

HOLE TOLERANCE		
.013 THRU .125	+.004 −.001	
.126 THRU .250	+.005 −.001	
.251 THRU .500	+.008 −.001	
.501 THRU .750	+.008 −.001	
.751 THRU 1.000	+.010 −.001	
1.001 THRU 2.000	+.012 −.001	

NEXT ASSY	USED ON
961630	8101
961630	8101
APPLICATION	

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES ANGLES ±1°
  3 PLACE DECIMALS ±.010
  2 PLACE DECIMALS ±.02

		DATE
DWN	M. HALEY	7-28-76
CHK	C. KEELER	8-3-76
ENGR		
QA		8/9/76
APP		8/9/76
MFR.		8/9/76
DESIGN ACTIVITY RELEASE		8/9/76

TEXAS INSTRUMENTS INCORPORATED
Equipment Group Dallas, Texas

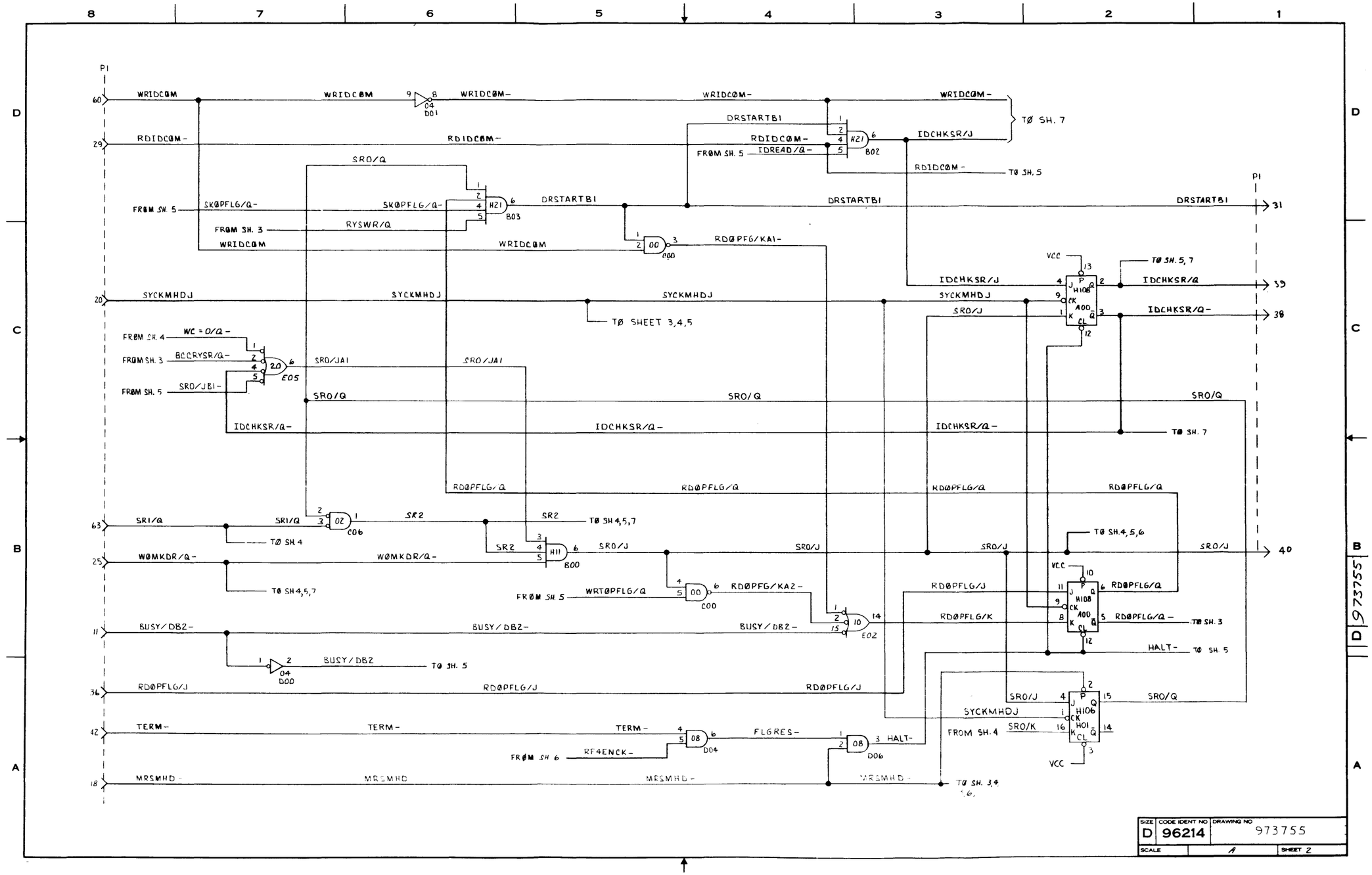
LOGIC DIAGRAM
MOVING HEAD DISC CONTROLLER
3

SIZE	CODE IDENT NO	DRAWING NO
D	96214	973755

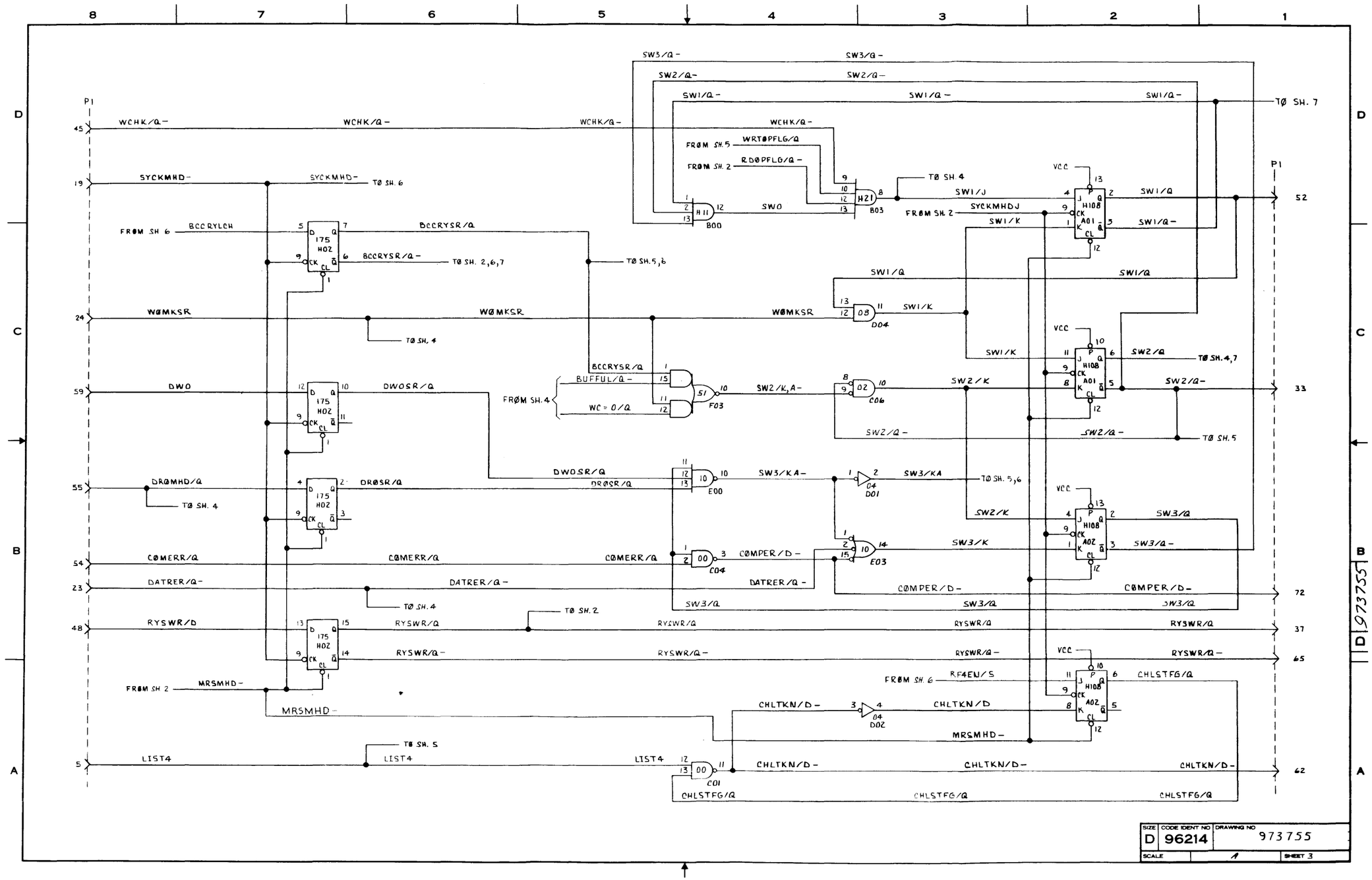
SCALE NONE SHEET 1 ØF 7

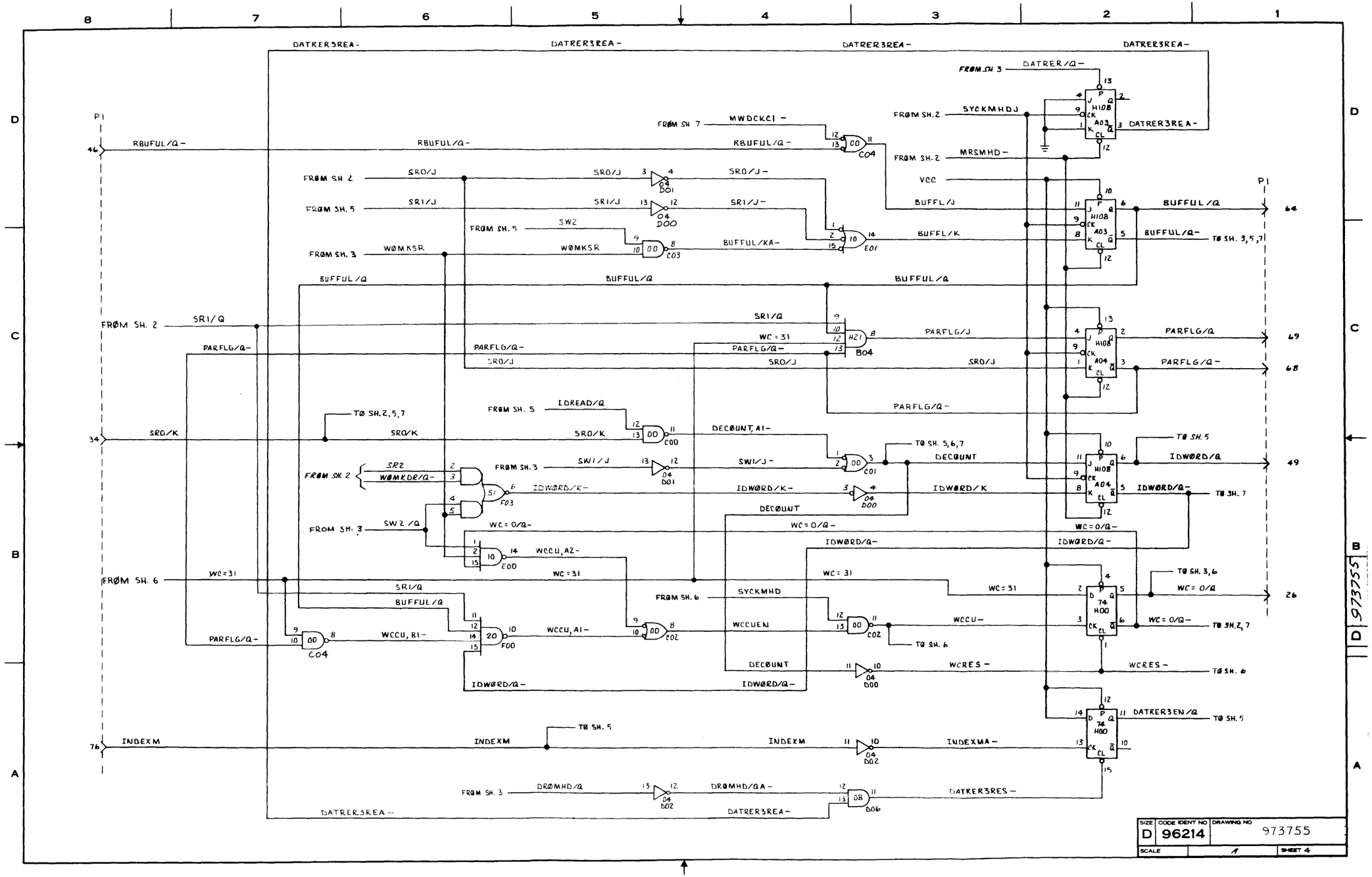
D973755

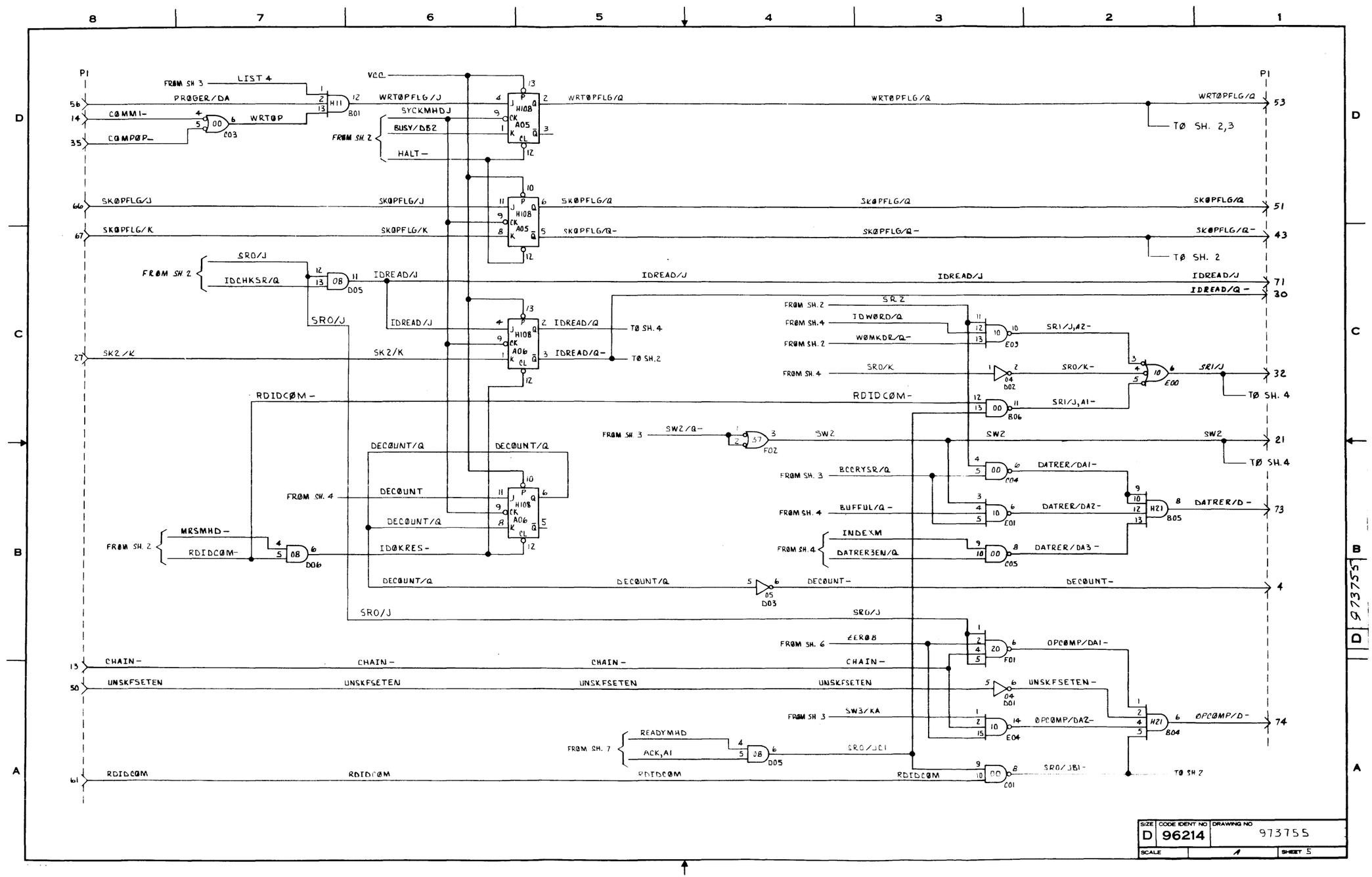
43



SIZE	CODE IDENT NO	DRAWING NO
D	96214	973755
SCALE		SHEET 2


8
7
6
5
4
3
2
1
D
C
B
A
P1
WCHK/Q-
SYCKMHD-
TØ SH. 6
FRØM SH 6
BCCRYLCH
BCCRYSR/Q
BCCRYSR/Q-
TØ SH. 2,6,7
TØ SH.5,6
WØMKSR
TØ SH. 4
DWO
DWOSR/Q
FRØM SH.4
BUFFUL/Q-
WC = 0/Q
SW2/K,A-
DRØMHD/Q
DRØSR/Q
SW3/KA-
SW3/KA
TØ SH. 5,6
COMERR/Q
COMPER/D-
DATRER/Q-
RYSWR/Q
RYSWR/Q-
FRØM SH 2
MRSMHD-
LIST4
TØ SH. 5
CHLSTFG/Q
CHLTKN/D-
CHLTKN/D
FRØM SH. 6
REFENJ/S
SW3/Q-
SW2/Q-
SW1/Q-
FRØM SH. 5
WRTØPFLG/Q
FRØM SH. 2
RDØPFLG/Q-
TØ SH. 4
SW1/J
SW1/K
SW1/Q
SYCKMHDJ
SW0
SW2/K
SW3/K
SW3/Q
SW3/Q-
TØ SH. 7
TØ SH.4,7
TØ SH. 5
52
33
72
37
65
62
B00
B03
C06
F03
E00
D01
E03
C04
C01
D04
D02
E04
VCC
H11
H21
H108
A01
A02
D
96214
973755
SIZE
CODE IDENT NO
DRAWING NO
SCALE
SHEET 3

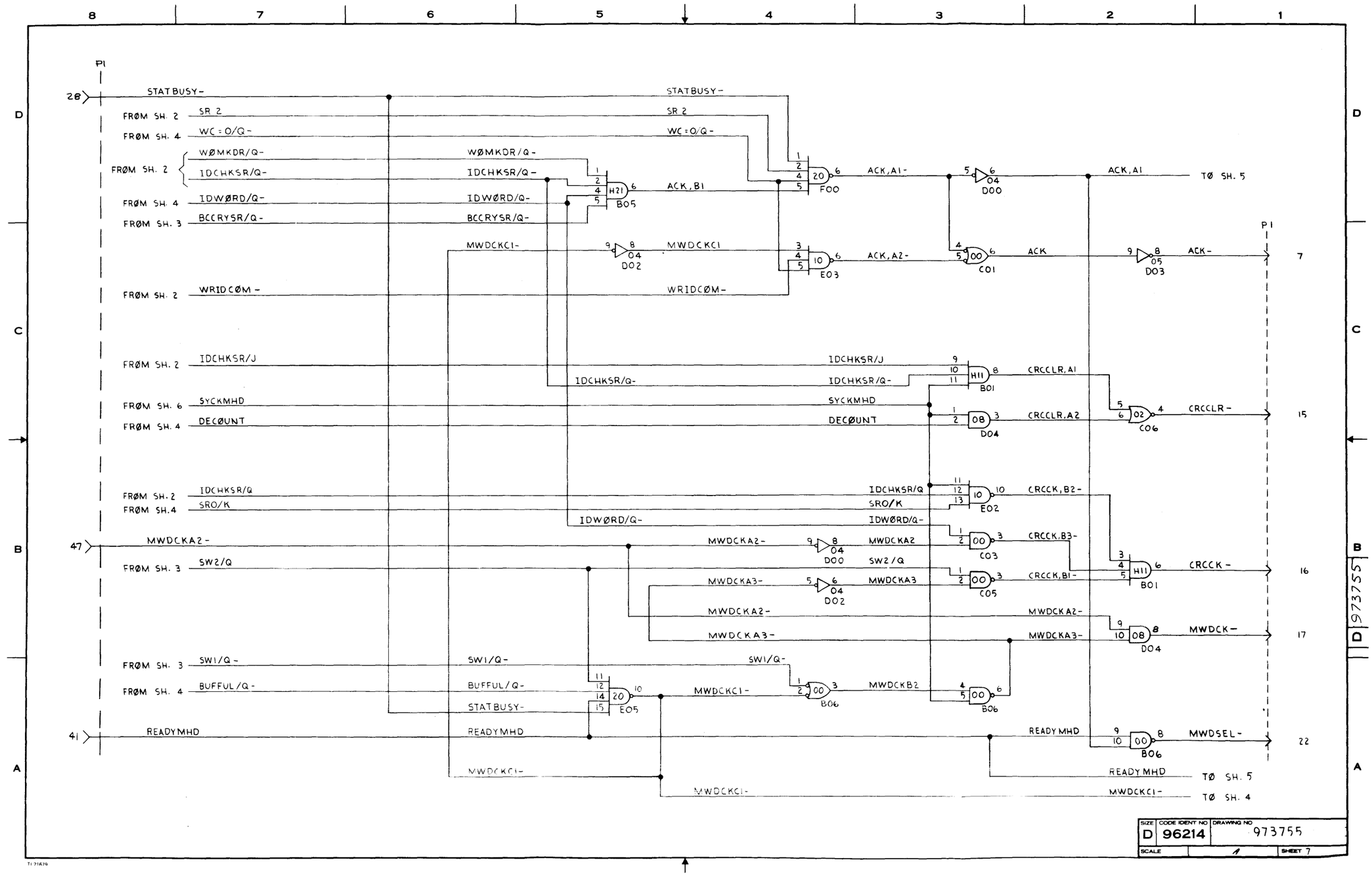

DATRER3REA-
FROM SH 3
DATRER/Q-
FROM SH.2
SYCKMHDJ
MWDCKC1-
FROM SH 7
RBUFUL/Q-
MRSMHD-
VCC
BUFFL/J
BUFFL/K
BUFFUL/Q
BUFFUL/Q-
TO SH. 3,5,7
SRO/J
SRI/J
SW2
WOMKSR
BUFFUL/KA-
SRI/Q
WC=31
PARFLG/J
PARFLG/Q
PARFLG/Q-
IDREAD/Q
SRO/K
DECOUNT,A1-
TO SH.2,5,7
TO SH. 5,6,7
DECOUNT
SW1/J
SW1/J-
SR2
WOMKDR/Q-
IDWORD/K-
IDWORD/K
SW2/Q
WC=0/Q-
WCCU,A2-
WCCU,A1-
WCCU,B1-
WCCUEN
WCCU-
IDWORD/Q-
SYCKMHD
WC=0/Q
WCRES-
TO SH. 6
INDEXM
INDEXMA-
DRQMHD/QA-
DRQMHD/Q
DATRER3RES-
DATRER3EN/Q
DATRER3REA--
P1
64
49
68
26
76
34
46
A
B
C
D
8
7
6
5
4
3
2
1
SIZE D
CODE IDENT NO 96214
DRAWING NO 973755
SCALE
SHEET 4


8
7
6
5
4
3
2
1
D
C
B
A
P1
FROM SH 3
LIST 4
PROGER/DA
COMMI-
COMPOP-
56
14
35
H11
B01
00
C03
WRTOP
VCC
WRTOPFLG/J
SYCKMHDJ
BUSY/DB2
FROM SH. 2
HALT-
H108
A05
WRTOPFLG/Q
TO SH. 2,3
53
SKOPFLG/J
SKOPFLG/K
66
67
SKOPFLG/Q
SKOPFLG/Q-
51
43
TO SH. 2
SRO/J
IDCHKSR/Q
08
D05
IDREAD/J
IDREAD/Q
IDREAD/Q-
TO SH. 4
TO SH.2
71
30
SK2/K
27
A06
SR2
FROM SH.2
IDWORD/Q
FROM SH.4
WOMKDR/Q-
FROM SH.2
SRO/K
FROM SH.4
04
D02
E03
E00
SRI/J,A2-
SRO/K-
SRI/J
32
TO SH. 4
RDIDCOM-
SRI/J,A1-
B06
SW2/Q-
FROM SH. 3
37
F02
SW2
21
TO SH.4
DECOUNT/Q
DECOUNT
FROM SH. 4
DECOUNT-
4
05
D03
BCCRYSR/Q
DATRER/DA1-
C04
BUFFUL/Q-
DATRER/DA2-
E01
H21
B05
DATRER/D-
73
INDEXM
DATRER3EN/Q
DATRER/DA3-
C05
MRSMHD-
RDIDCOM-
FROM SH. 2
ID0KRES-
D06
SRO/J
CHAIN-
13
UNSKFSETEN
50
ERR08
FROM SH. 6
OPCOMP/DA1-
F01
04
D01
UNSKFSETEN-
SW3/KA
FROM SH 3
OPCOMP/DA2-
E04
OPCOMP/D-
74
READYMHD
ACK,A1
FROM SH. 7
J8
D05
SRO/JC1
SRO/JB1-
TO SH 7
RDIDCOM
61
C01
SIZE
CODE IDENT NO
DRAWING NO
D
96214
973755
SCALE
A
SHEET 5
D 973755

P1
44 BCCRY
58 BCCRY-
FRØM SH. 3 BCCRYSR/Q
10 SYCKMHD — TØ SH. 4,7
9 ATI2
75 DEVBSY/Q
FRØM SH. 3 SW3/KA
12 CHAIN
6 ZERØ B
FRØM SH. 3 BCCRYSR/Q -
FRØM SH. 4 WC = 0/Q
FRØM SH. 2 SRO/J
FRØM SH. 3 SYCKMHD-
FRØM SH. 2 MRSMHD-
FRØM SH. 4 WCCU-
FROM SH. 4 DECØUNT
FRØM SH. 4 WCRES-

VCC
BCCRY
BCCRY-
BCCRYSR/Q
BCCRYL/R-
BCCRYLCH — TØ SH. 3
LISTEN, A1-
LISTEN, A2-
RF4EN/S — TØ SH. 3
SYCKMHD
RF4ENCK- — TØ SH. 2
RF4EN/Q-
RF4EN
ATI2
ATI2-
DEVBSY/Q
LISTEN, A3-
SW3/KA
CHAIN
ZERØ B
LISTEN, B
WC = 0/Q
SRO/J
LISTEN, A1-
LISTEN, A2-
LISTEN/D
LISTEN/Q
LISTEN-
SYCKMHD-
MRSMHD-
WCCRY-
WC4
WC3
WC2
WC1
WC=31, A
WC=31
WCO
WCO-
WCRES-
TØ SH. 4

CO2 CO3 CO5 C00 B00 B02 E01 E02 D01 D03 D04 D05

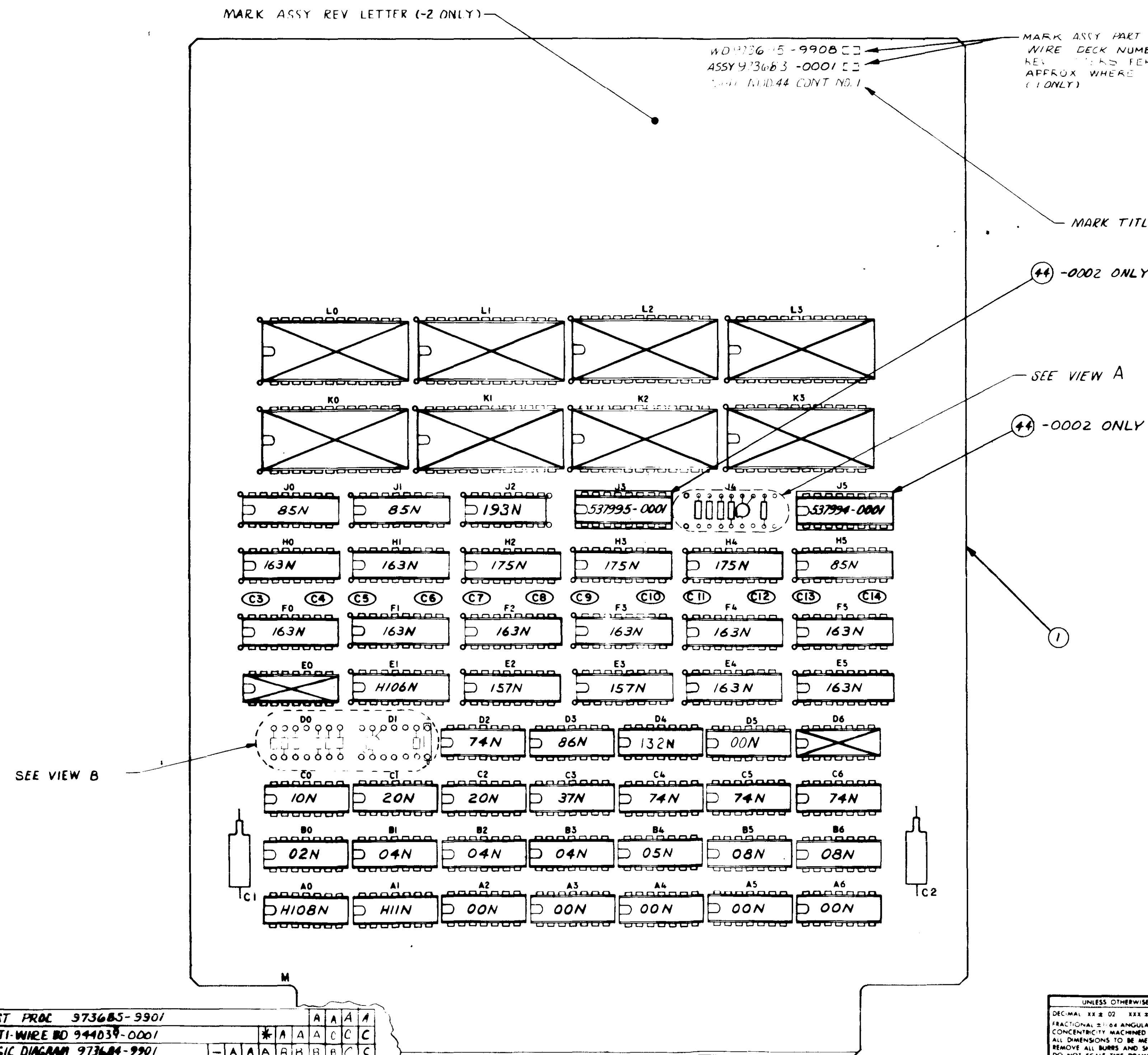

P1
28
STATBUSY-
FRØM SH. 2
SR 2
FRØM SH. 4
WC=0/Q-
FRØM SH. 2
WØMKDR/Q-
IDCHKSR/Q-
FRØM SH. 4
IDWØRD/Q-
FRØM SH. 3
BCCRYSR/Q-
FRØM SH. 2
WRIDCØM-
FRØM SH. 2
IDCHKSR/J
FRØM SH. 6
SYCKMHD
FRØM SH. 4
DECØUNT
FRØM SH. 2
IDCHKSR/Q
FRØM SH. 4
SRO/K
47
MWDCKA2-
FRØM SH. 3
SW2/Q
FRØM SH. 3
SW1/Q-
FRØM SH. 4
BUFFUL/Q-
STATBUSY-
41
READYMHD
MWDCKC1-
H21
B05
O4
D02
O4
D00
20
F00
ACK,A1-
O4
D00
ACK,A1
TØ SH. 5
ACK,B1
MWDCKC1
ACK,A2-
00
C01
ACK
O5
D03
ACK-
7
P1
WRIDCØM-
10
E03
H11
B01
CRCCLR,A1
O2
C06
CRCCLR-
15
O8
D04
CRCCLR,A2
IDCHKSR/Q
SRO/K
10
E02
CRCCK,B2-
IDWØRD/Q-
MWDCKA2-
O4
D00
MWDCKA2
00
C03
CRCCK,B3-
SW2/Q
MWDCKA3-
O4
D02
MWDCKA3
00
C05
CRCCK,B1-
H11
B01
CRCCK-
16
MWDCKA2-
MWDCKA3-
O8
D04
MWDCKA2-
MWDCKA3-
MWDCK-
17
SW1/Q-
BUFFUL/Q-
STATBUSY-
20
E05
MWDCKC1-
00
B06
MWDCKB2
00
B06
READYMHD
00
B06
MWDSEL-
22
READYMHD
TØ SH. 5
MWDCKC1-
TØ SH. 4
SIZE
D
CODE IDENT NO
96214
DRAWING NO
973755
SCALE
SHEET 7
973755
D

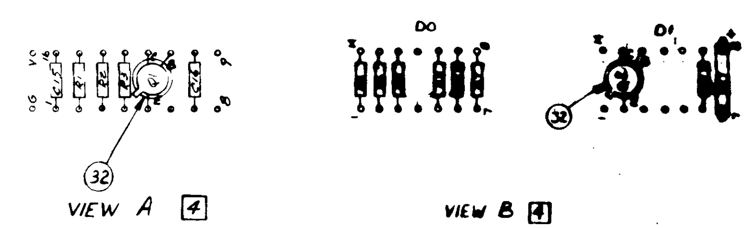
D 973683

NOTES: UNLESS OTHERWISE SPECIFIED
1. NETWORKS ARE SN74 SERIES
2. ~~CLINCH LEADS OF CAPACITORS C1 THRU C14 PRIOR TO WIRE WRAP AND PROCESS 1~~
3. MAXIMUM COMPONENT HEIGHT FROM BOARD IS .35 INCHES.

[4] HAND SOLDER COMPONENTS PER PROCESS 1

LTR	DESCRIPTION	DATE	APPD
A	CN411149 (C) (1) ADDED LOGIC DIAG TO REV LEVEL BLOCK (2) IN FD D5 WAS 02N (3) ON LM ITEM 4 QTY WAS 2, DELETED D5 IN ITEM 4A, ITEM 3 WAS QTY 5, ADDED D05 TO ITEM 3A (4) UPDATED REV LEVEL BLOCK	1/3/75	
B	CN409332 (C) (1) DELETED NOTE 2 (2) UPDATED REV LVL BLK	11/10/75	
C	CN412115 (D) (1) ADDED -2 LM AND UPDATED REV LEVEL BLOCK	8/25/76	
D	CN 421268 (A) A. JARAMILLO (1) ZNC-1 ADDED DISCRETE COMPONENT LOCATIONS D0 & D1 (2) LCN D4 CHANGED (3) ADDED VIEW B (4) L/M REVISIED (5) UPDATED REV. LEV. BLK	11-8-76	
E	CN422641 (D) (1) ON -1 & -2 LM: ITEM 40 WAS 418767-0117 (2) UPDATED REV LEVEL BLK	12/22/76	
F	CN420793 (C) (1) UPDATED REV LEV BLK (2) ADDED TEST PROC TO REV LEV BLK (3) REV MARKING CALL-OUTS	12/22/76	
G	CN421977 (E) D. Walthall (1) UPDATED REV LEVEL BLOCK	3-9-77	
H	CN420298 (B) (1) UPDATED REVISION LEVEL BLOCK	4-6-77	
J	CN392214 (C) (1) ADDED TO LM -0002 IT. 44 (2) UPDATED REVISION LEVEL BLOCK	5-18-77	





PART NO	DESCRIPTION
973683-0002	MOVING HEAD DISC 44 CONTROLLER NO 4 W/W
973683-0001	MOVING HEAD DISC 44 CONTROLLER NO 4 W/W

REVISION LEVEL										
TEST PROC 973685-9901							A	A	A	A
MULTI-WIRE BD 944039-0001			*	A	A	A	C	C	C	
LOGIC DIAGRAM 973684-9901	–	A	A	A	B	B	B	B	C	C
WIRE WRAP [illegible] 217862-0002		G	G	G	H	H	H	H	H	H
WIRE DECK (973695-9908)	*	A	A	A	G	G	G	G	H	H
ASSEMBLY	*	A	B	C	D	E	F	G	H	J

UNLESS OTHERWISE SPECIFIED
DECIMAL XX ± .02 XXX ± .010
FRACTIONAL ± 1/64 ANGULAR ± 1°
CONCENTRICITY MACHINED DIAMETERS .004 TIR
ALL DIMENSIONS TO BE MET BEFORE PLATING
REMOVE ALL BURRS AND SHARP EDGES
DO NOT SCALE THIS DRAWING
ALL DIMENSIONS IN INCHES
SURFACES MARKED ✓ TO HAVE ✓
DRILLED HOLE TOLERANCES
.013 TO .136 +.003 −.002 .136 TO .250 ±.004 .250 AND ABOVE ±.005

PROCESSES
1. SOLDER PER F-127 METHOD I AND/OR F-124
2. MARK PER F-100, METHOD II CLASS I, HEIGHT .09, COLOR BLACK

-0002	-0001	ITEM NO	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
QTY REQD					LIST OF MATERIALS		

8980	A	973674
8980	A	
8980	A	
8100/8101		973674
7502		973674
7503		

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MOVING HEAD DISC 44 CONTROLLER NO 4

980 COMPUTER

D 973683

32 H3

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INCORPORATED

DATE 05/09/77

LIST OF MATERIAL

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PART NUMBER LM0973683-0001 REV J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		0217862-0002	LOGIC BOARD-SINGLE ENDED WIRE WRAP	
0002	REF	EA		0973695-9308	MASTER FILE TAPE MODEL 44 MHD CONTR NO4	
0003	00006.000	EA		0222222-7400	NETWORK SN7400N	-SN7400N
00031					A2 A3 A4 A5 A6 D5	
0004	00001.000	EA		0222222-7402	NETWORK SN7402N	TI- -SN7402N
00041					B0	
0005	00003.000	EA		0222222-7404	NETWORK SN7404N	
00051					B1 B2 B3	
0006	00001.000	EA		0222222-7405	NETWORK SN7405N	
00061					B4	
0007	00002.000	EA		0222222-7408	NETWORK-SN7408N	
00071					B5 B6	
0008	00001.000	EA		0222222-7410	NETWORK SN7410N	-SN7410N
00081					C0	
0009	00002.000	EA		0222222-7420	NETWORK SN7420N	-SN7420N
00091					C1 C2	
0010	00001.000	EA		0222222-7437	NETWORK SN7437N	
00101					C3	
0011	00004.000	EA		0222222-7474	NETWORK SN7474N	-SN7474N
00111					D2 C4 C5 C6	

DRAFTSMAN DATE	CKD. DRAFTSMAN DATE	DESIGN ENGINEER DATE	TITLE
	J. Rowe 5-11-77		MOVING HEAD DISC 44 CONTROLLER NO.4
APPD.-MFG DATE	APPD. PROJECT ENGINEER DATE	RELEASED DATE	PROJECT NO. 8980

PART NUMBER LM0973683-0001 REV J

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DATE 05/09/77 **LIST OF MATERIAL** PAGE 2 of

PART NUMBER LM0973683-0001 REV J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0012	00003.000	EA		0222222-7485	NETWORK,SN7485N	
0012A					J0 J1 H5	
0013	00001.000	EA		0222222-7486	NETWORK-SN7486N	
0013A					D3	
0014	00002.000	EA		0222222-7157	NETWORK SN74157N	
0014A					E2 E3	
0015	00010.000	EA		0222222-7163	NETWORK SN74163N	
0015A					H0 H1 E0 E1 E2 E3 E4 E5	
0015B					E4 E5	
0016	00003.000	EA		0222222-7175	NETWORK SN74175N	
0016A					H2 H3 H4	
0017	00001.000	EA		0222222-7193	NETWORK SN74193N	-SN74193N
0017A					J2	
0018	00001.000	EA		0240000-7411	NETWORK-SN74H11N	
0018A					A1	
0019	00001.000	EA		0240000-7106	NETWORK SN74H106N	
0019A					E1	
0020	00001.000	EA		0240000-7108	NETWORK SN74H108N	
0020A					A0	
0021	00001.000	EA		0537995-0001	NETWORK MC4044P	MOT -MC4044P

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
						MOVING HEAD DISC 44 CONTROLLER NO.4
APPD. MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO

PART NUMBER LM0973683-0001 REV J

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PART NUMBER LM0973683-0001 REV J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0021A					J3	
0022	00001.000	EA		0537994-0001	NETWORK MC4024P	MOT -MC4024P
0022A					J5	
0023	00012.000	EA		0230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	ERI -5635-000-Y5F05
0023A					C3 THRU C14	
0024	00012.000	EA		0972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL -M39003/1-2271
0024A					C1 C2	
0025	AR	FT		0535978-0058	WIRE ELEC.,SOLID,"KYNAR" INSUL #30 AWG	
0026	00001.000	EA		0972957-0001	TRANSISTOR,2N930A NPN LOW CUR AMP,TO-5	MOT - 2N930A
0026A					Q1	
0027	00001.000	EA		0972927-0033	CAP FIX MICA 500V 180 PF 5%	QPL -CM05F181JCD
0027A					C16	
0028	00001.000	EA		0230618-0008	CAP .10000 MF 100V 10. %	ERI -8131-M100-W5F1
0028A					C15	
0029	00001.000	EA		0972975-0049	RES FIX COMP 1.0 K OHMS 5% 1/8 WATT	QPL - RC05G102JS
0029A					R3	
0030	00001.000	EA		0530466-0074	RESISTOR,FIXED,COMPOSITION-STYLE RC05	
0030A					R1	
0031	00001.000	EA		0530466-0078	RESISTOR,FIXED,COMPOSITION-STYLE RC05	
0031A					R2	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE MOVING HEAD DISC 44 CONTROLLER NO.4		
APPD.-MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.		PART NUMBER LM0973683-0001 REV J

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DATE 05/09/77 **LIST OF MATERIAL** PAGE 5 of

PART NUMBER LM0973683-0001 REV J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0044					C17	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE	MOVING HEAD DISC 44 CONTROLLER NO.4
APPD.-MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.	PART NUMBER LM0973683-0001 REV J

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INCORPORATED

DATE 05/18/77

LIST OF MATERIAL

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PART NUMBER LM 0573683-0002 REV J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		0944039-0001	MWB,MOVING HEAD DISC 44 CONTROLLER NO 4	
0003	00006.000	EA		0222222-7400	NETWORK SN7400N	-SN7400N
0003A					A2 A3 A4 A5 A6 D5	
0004	00001.000	EA		0222222-7402	NETWORK SN7402N	TI- -SN7402N
0004A					B0	
0005	00003.000	EA		0222222-7404	NETWORK SN7404N	
0005A					B1 B2 B3	
0006	00001.000	EA		0222222-7405	NETWORK SN7405N	
0006A					B4	
0007	00002.000	EA		0222222-7408	NETWORK-SN7408N	
0007A					B5 B6	
0008	00001.000	EA		0222222-7410	NETWORK SN7410N	-SN7410N
0008A					C0	
0009	00002.000	EA		0222222-7420	NETWORK SN7420N	-SN7420N
0009A					C1 C2	
0010	00001.000	EA		0222222-7437	NETWORK SN7437N	
0010A					C3	
0011	00004.000	EA		0222222-7474	NETWORK SN7474N	-SN7474N
0011A					D2 C4 C5 C6	
0012	00003.000	EA		0222222-7485	NETWORK,SN7485N	

DRAFTSMAN	DATE	CKD DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
						MOVING HEAD DISC 44 CONTROLLER NO. 4

APPD MFG	DATE	APPD PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO		PART NUMBER	REV
								LM 0573683-0002	J

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PART NUMBER LM 0973683-0002 REV J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0012A					J0 J1 H5	
0013	00001.000	EA		0222222-7486	NETWORK-SN7486N	
0013A					D3	
0014	00002.000	EA		0222222-7157	NETWORK SN74157N	
0014A					E2 E3	
0015	00010.000	EA		0222222-7163	NETWORK SN74163N	
0015A					H0 H1 F0 F1 F2 F3 F4 F5	
0015B					E4 E5	
0016	00003.000	EA		0222222-7175	NETWORK SN74175N	
0016A					H2 H3 H4	
0017	00001.000	EA		0222222-7193	NETWORK SN74193N	-SN74193N
0017A					J2	
0018	00001.000	EA		0240000-7411	NETWORK-SN74H11N	
0018A					A1	
0019	00001.000	EA		0240000-7106	NETWORK SN74H106N	
0019A					E1	
0020	00001.000	EA		0240000-7108	NETWORK SN74H108N	
0020A					A0	
0021	00001.000	EA		0537995-0001	NETWORK MC4044P	MOT -MC4044P
0021A					J3	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE MOVING HEAD DISC 44 CONTROLLER NO. 4		
APPD.-MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.		PART NUMBER LM 0973683-0002 REV J

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PART NUMBER LM 0973083-0002 REV J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0022	00001.000	EA		0537994-0001	NETWORK MC4024P	MOT -MC4024P
0022A					J5	
0023	00012.000	EA		0230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	ERI -5635-000-Y5F05
0023A					C3 THRU C14	
0024	00002.000	EA		0972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	UPL -M39003/1-2271
0024A					C1 C2	
0025	AR	FT		0535978-0058	WIRE ELEC.,SOLID,"KYNAR" INSUL #30 AWG	
0026	00001.000	EA		0972957-0001	TRANSISTOR,2N930A NPN LOW CUR AMP,TO-5	MOT - 2N930A
0026A					Q1	
0027	00001.000	EA		0972927-0033	CAP FIX MICA 500V 180 PF 5%	UPL -CM05E181J03
0027A					C16	
0028	00001.000	EA		0230618-0008	CAP .10000 MF 100V 10. %	ERI -8131-M100-W5R1
0028A					C15	
0029	00001.000	EA		0972975-0049	RES FIX COMP 1.0 K OHMS 5% 1/8 WATT	UPL - RC05G102JS
0029A					R3	
0030	00001.000	EA		0530466-0074	RESISTOR,FIXED,COMPOSITION-STYLE RC05	
0030A					R1	
0031	00001.000	EA		0530466-0078	RESISTOR,FIXED,COMPOSITION-STYLE RC05	
0031A					R2	
0032	00002.000	EA		0185113-0001	X SPACER XST TO-18 CASE	* -

DRAFTSMAN DATE	CKD DRAFTSMAN DATE	DESIGN ENGINEER DATE	TITLE
			MOVING HEAD DISC 44 CONTROLLER NO. 4

APPD MFG. DATE	APPD PROJECT ENGINEER DATE	RELEASED DATE	PROJECT NO		PART NUMBER	REV
					LM 0973083-0002	J

T.I. 13849

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INCORPORATED

DATE 05/18/77 **LIST OF MATERIAL** PAGE 4 of

PART NUMBER LM 0973683-0002 REV J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0033	REF	EA		0973684-9901	DIAG, LOGIC, MHD 44 CONTROLLER NO.4	
0034	REF	EA		0973685-9901	UNIT TEST PROC, MHD 44 CONTROLLER NO.4	
0035	00001.000	EA		0222222-7132	NETWORK SN74132N	
0035A					U4	
0036	00002.000	EA		0538130-0019	RESISTOR, 56.00 OHM 1/8W 5%	
0036A					R4,R6	
0037	00001.000	EA		0972975-0025	RES FIX COMP 100 OHMS 5% 1/8 WATT	QPL - RC05G101JS
0037A					R5	
0038	00001.000	EA		0972975-0033	RES FIX COMP 220 OHMS 5 % 1/8 WATT	QPL - RC05G221JS
0038A					R7	
0039	00001.000	EA		0972958-0002	TRANSISTOR,2N2907A PNP GEN PURP SW TO-18	TI - 2N2907A
0039A					Q2	
0040	00001.000	EA		0972975-0079	RES FIX COMP 18K 5% 1/8 WATT	81349 -
0040A					R8	
0041	00001.000	EA		0972934-0001	DIODE,1N746A 3.3 V 5% SIL VOLT REG	QPL - 1N746A
0041A					CR2	
0042	00001.000	EA		0153733-0001	DIODE GTD-132 / CGD-949	
0042A					CR1	
0043	00001.000	EA		0972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL -M39003/1-2271
0043A					C17	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE MOVING HEAD DISC 44 CONTROLLER NO. 4	
APPD. MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.	PART NUMBER LM 0973683-0002 REV J

T.I. 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 05/18/77 **LIST OF MATERIAL** PAGE 5 of

PART NUMBER	REV
LM 0973683-0002	J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0044	00002.000	EA		0539544-0002	SOCKET,16PIN IC LOW PROFILE SOLDER TAIL	TI -C93-16-02
0044A					XJ3 XJ5	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
						MOVING HEAD DISC 44 CONTROLLER NO. 4

APPD. MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.		PART NUMBER	REV
								LM 0973683-0002	J

T.I. 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 05/09/77 **LIST OF MATERIAL** PAGE 4 of

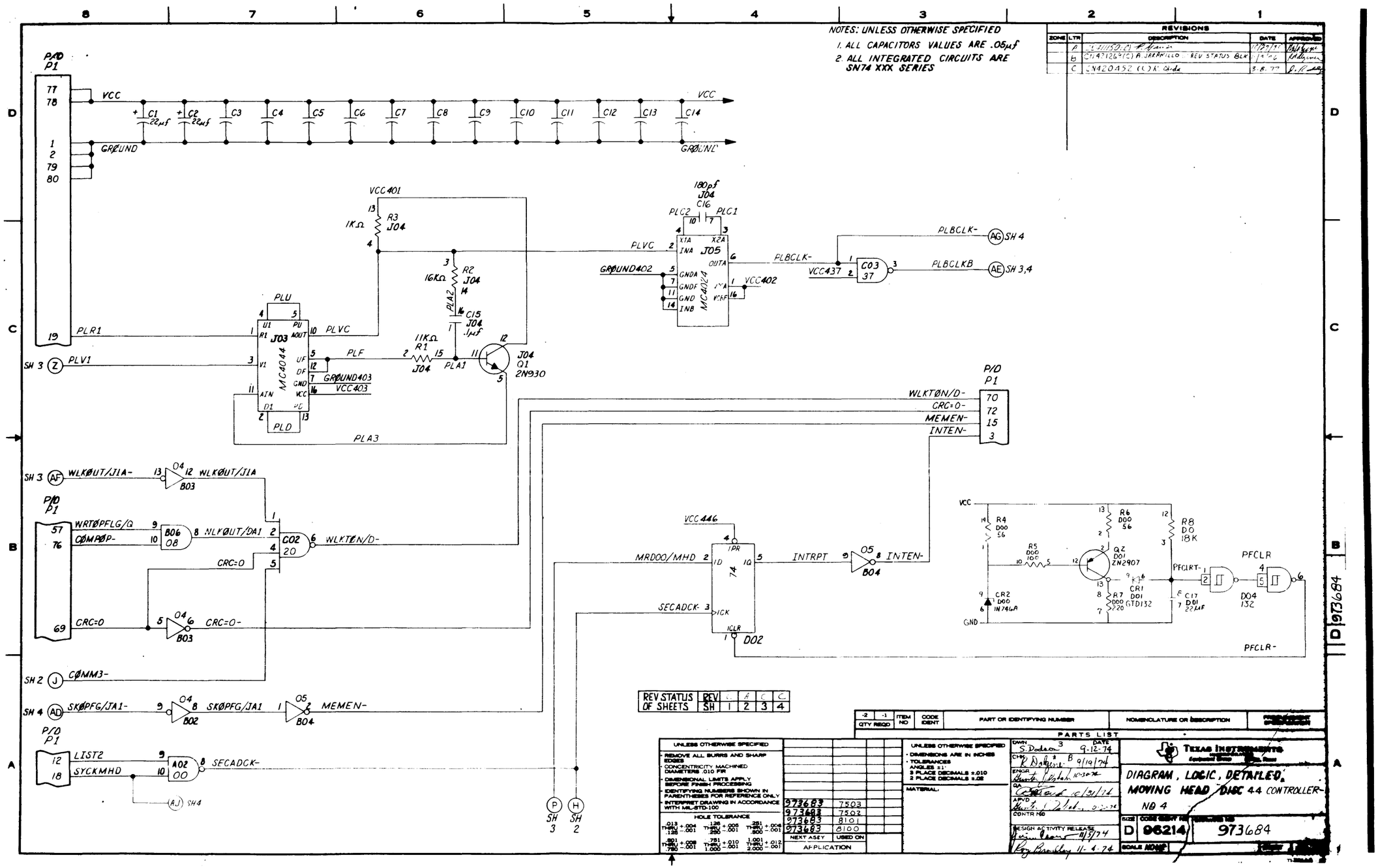
PART NUMBER LM0973683-0001 REV J

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0032	00002.000	EA		0185113-0301	X SPACER XSY TO-18 CASE	* -
0033	REF	EA		0973684-9901	DIAG, LOGIC, MHD 44 CONTROLLER NO.4	
0034	REF	EA		0973685-9901	UNIT TEST PROC, MHD 44 CONTROLLER NO.4	
0035	00001.000	EA		0222222-7132	NETWORK SN74132N	
00351					D4	
0036	00002.000	EA		0538130-0019	RESISTOR, 56.00 OHM 1/8W 5%	
00361					R4,R6	
0037	00001.000	EA		0972975-0025	RES FIX COMP 100 OHMS 5% 1/8 WATT	JPL - RC05G101JS
00371					R5	
0038	00001.000	EA		0972975-0033	RES FIX COMP 220 OHMS 5 % 1/8 WATT	QPL - RC05G221JS
00381					R7	
0039	00001.000	EA		0972958-0002	TRANSISTOR,2N2907A PNP GEN PURP SW TO-18	TI - 2N2907A
00391					Q2	
0040	00001.000	EA		0972975-0079	RES FIX COMP 18K 5% 1/8 WATT	81349 -
00401					R8	
0041	00001.000	EA		0972934-0001	DIODE,1N746A 3.3 V 5% SIL VOLT REG	QPL - 1N746A
00411					CR2	
0042	00001.000	EA		0153733-0001	DIODE GTD-132 / CGD-949	
00421					CR1	
0043	00001.000	EA		0972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL -M39003/1-2271

DRAFTSMAN DATE	CKD. DRAFTSMAN DATE	DESIGN ENGINEER DATE	TITLE
			MOVING HEAD DISC 44 CONTROLLER NO.4

APPD. MFG. DATE	APPD. PROJECT ENGINEER DATE	RELEASED DATE	PROJECT NO.		PART NUMBER LM0973683-0001	REV J

T.I. 13849


NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL CAPACITORS VALUES ARE .05µf
2. ALL INTEGRATED CIRCUITS ARE SN74 XXX SERIES
REVISIONS
ZONE LTR DESCRIPTION DATE APPROVED
A 2111502-01 E. Hamm 10/27/71
B CN1472647(2) A. JARAMILLO REV STATUS BLK 1-9-76
C CN1420452 (1) K. Clyde 3-8-77
P/O P1
77 78 1 2 79 80 19
VCC
GROUND
C1 22µf C2 22µf C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14
VCC401
R3 J04 1KΩ
R2 J04 16KΩ
PLA2
C15 J04 .1µf
R1 J04 11KΩ
PLA1
PLU
MC4044 J03
U1 R1 V1 AIN D1 PU AOUT UF DF GND VCC PD
PLR1
PLV1
SH 3 (Z)
PLVC
PLF
GROUND403
VCC403
PLD
PLA3
180pf J04 C16
PLC2 PLC1
MC4024 J05
XTA XTB INA OUTA GNDA GNDF GND INB VCC
PLVC
GROUND402
VCC402
PLBCLK-
SH 4 (AG)
C03 37
VCC437
PLBCLKB
SH 3,4 (AE)
P/O P1
WLKTØN/D-
CRC=0-
MEMEN-
INTEN-
70 72 15 3
SH 3 (AF) WLKØUT/J1A- B03 WLKØUT/J1A
P/O P1
57 76 69
WRTØPFLG/Q
CØMPØP-
B06 08
WLKØUT/DA1
C02 20
WLKTEN/D-
CRC=0
CRC=0-
B03
SH 2 (J) CØMM3-
SH 4 (AD) SKØPFG/JA1- B02 SKØPFG/JA1 B04 MEMEN-
P/O P1
12 18
LIST2
SYCKMHD
A02 00
SECADCK-
(AJ) SH4
VCC446
74 1PR 1D 1CK 1CLR 1Q
MRDOO/MHD
SECADCK- 3
INTRPT
O5 B04
INTEN-
D02
R4 D00 56
R5 D00 100
R6 D00 56
R8 D0 18K
Q2 D01 ZN2907
CR1 D01 GTD132
CR2 D00 1N746A
R7 D00 220
C17 D01 22µF
PFCLR
PFCLRT-
D04 132
PFCLR-
GND
P (SH 3) H (SH 2)
REV STATUS OF SHEETS
REV A C C
SH 1 2 3 4
-2 QTY REQD -1 ITEM NO CODE IDENT PART OR IDENTIFYING NUMBER NOMENCLATURE OR DESCRIPTION
PARTS LIST
973683 7503
973683 7502
973683 8101
973683 8100
NEXT ASSY USED ON
APPLICATION
UNLESS OTHERWISE SPECIFIED
• REMOVE ALL BURRS AND SHARP EDGES
• CONCENTRICITY, MACHINED DIAMETERS .010 FIR
• DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
• IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
• INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100
HOLE TOLERANCE
.013 +.004 -.001 THRU .125 +.005 -.001
126 THRU 250 +.006 -.001
251 THRU 500 +.008 -.001
501 THRU 780 +.008 -.001
781 THRU 1.000 +.010 -.001
1.001 THRU 2.000 +.012 -.001
UNLESS OTHERWISE SPECIFIED
• DIMENSIONS ARE IN INCHES
• TOLERANCES
ANGLES ±1°
3 PLACE DECIMALS ±.010
2 PLACE DECIMALS ±.02
MATERIAL:
DRAWN S. Dodson DATE 9-12-74
CHKD B 9/19/74
ENGR 10-30-74
QA 10/31/74
APVD
CONTR NO
DESIGN ACTIVITY RELEASE 11/7/74
TEXAS INSTRUMENTS
DIAGRAM, LOGIC, DETAILED, MOVING HEAD DISC 4.4 CONTROLLER-NO 4
SIZE D
CODE IDENT NO 06214
DRAWING NO 973684
SCALE NONE
973684

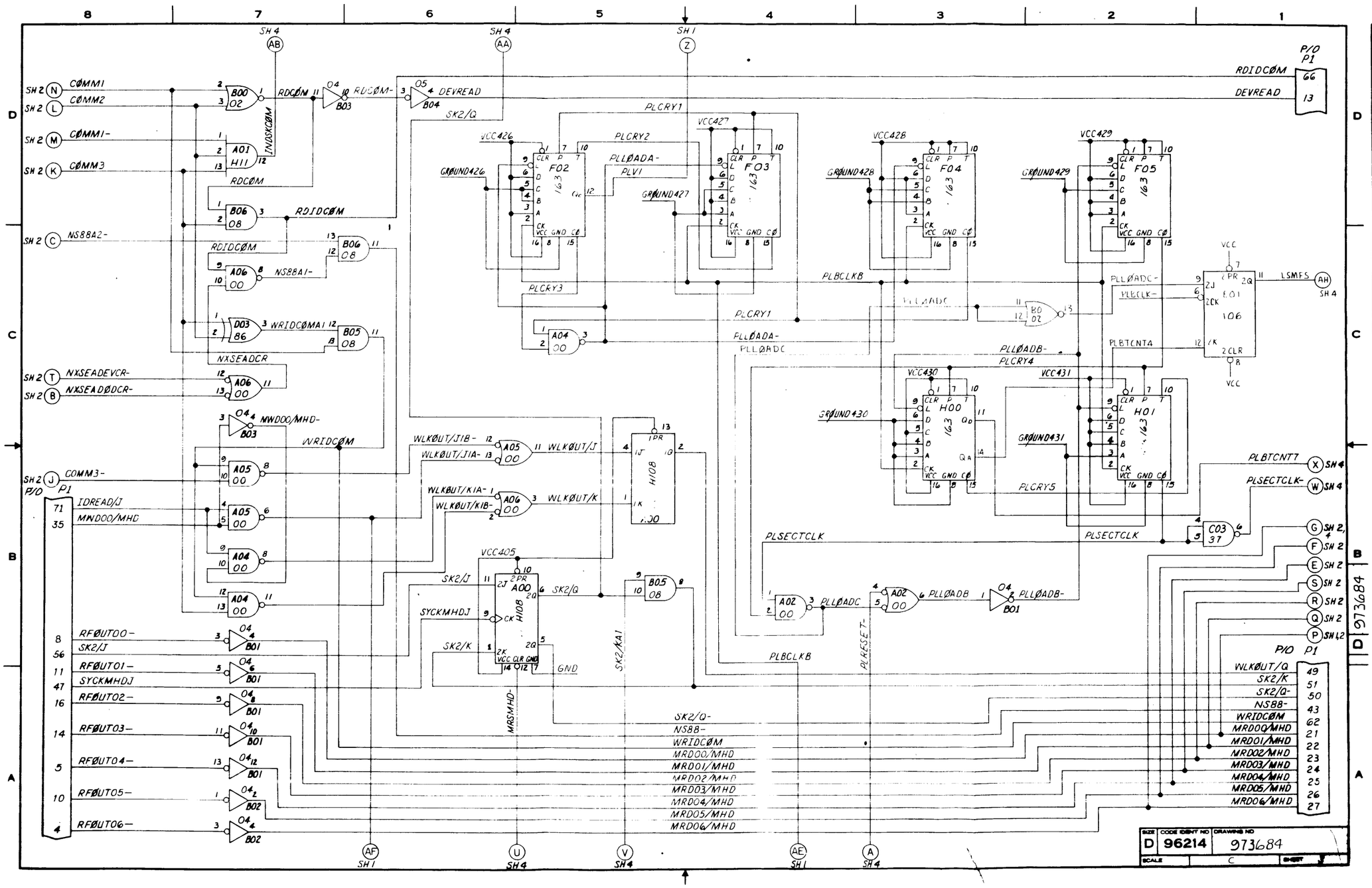
REVISIONS

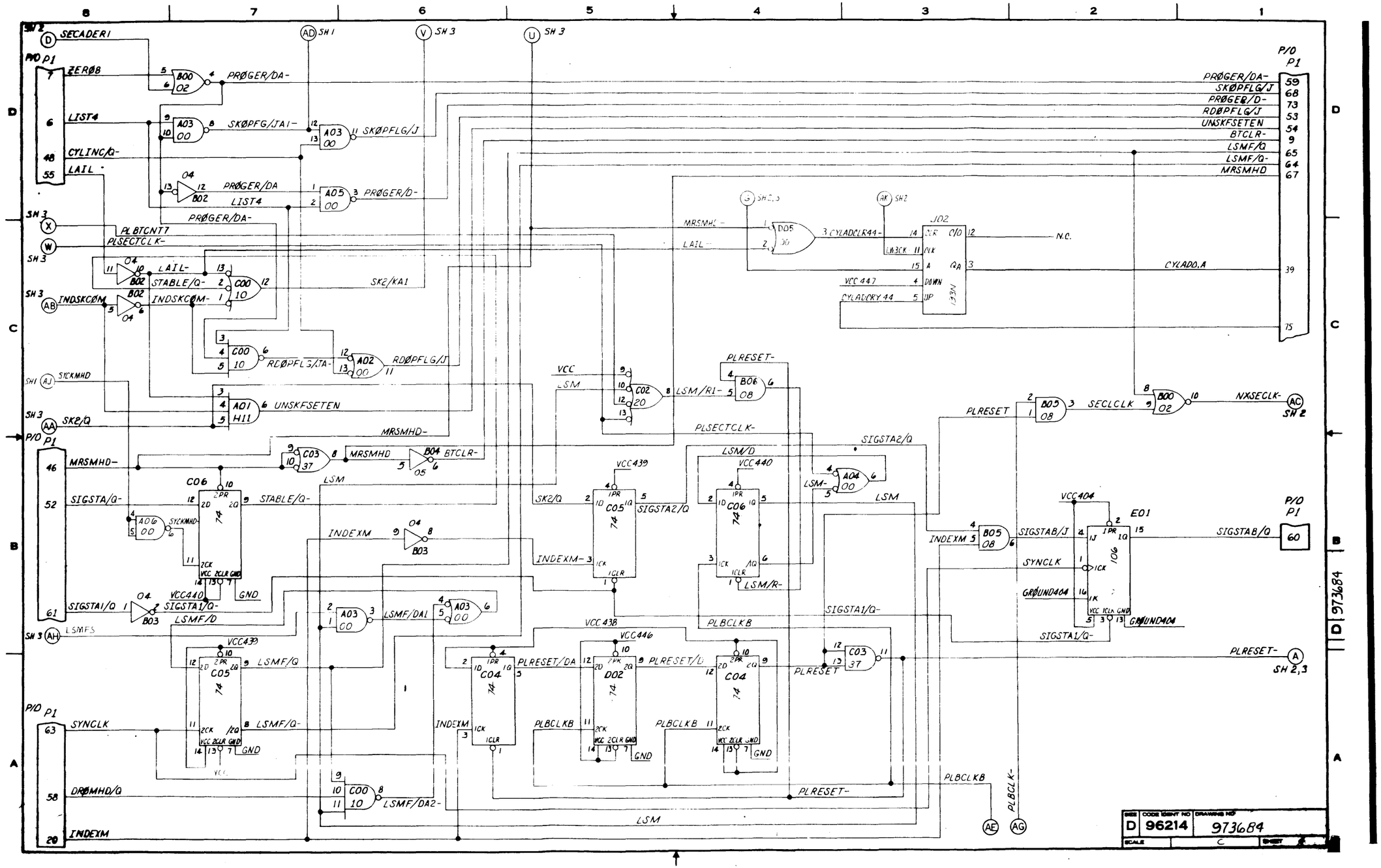
ZONE	LTR	DESCRIPTION	DATE	APPROVED

NXSEADEVCR-
SH 3 (T) NXSEADEVCR-
VCC 422
GROUND422
PLRESET-
E04 163
NXSEADEV3
NXSEADEV4
NXSEADEV5
NXSEADEV6
NXSEEVCRY
NXSEADEVO
P/O P1 36 CYLAD7
VCC 423
GROUND423
E05 163
NXSEADEVCR-
NXSEADEV1
NXSEADEV2
VCC 424
GROUND424
F00 163
NXSEADØDCR-
NXSEADØD3
NXSEADØD4
NXSEADØD5
NXSEADØD6
NXSEADØCRY
VCC 425
GROUND425
SH 4 (A) PLRESET-
SH 4 (AC) NXSECLK-
F01 163
NXSEADØDCR-
NXSEADØDO
NXSEADØD1
NXSEADØD2
SH4 (AK)
P/O P1 17 LW3CK-
28 MRDO7/MHD
34 HDSWST-
C01 20
CYLAD7
GROUND420
VCC420
E02 157
NXSEADØDO
NXSEADØD1
NXSEADEVO
NSB8A2-
GROUND421
VCC421
E03 157
NXSEADEVO
NXSELO
NXSEL1
NXSEL2
NXSEL3
NXSEL4
NXSEL5
NXSEL6
SECAD2
SECAD1
SECADO
SEGTNX
SEEGNX
SELTNX
GROUND442
VCC442
J00 85
GROUND441
VCC441
H05 95
SECAD3
SECAD4
SECAD5
SECAD6
GROUND443
VCC443
J01 85
SECADER1
MRDO3/MHD
MRDO2/MHD
MRDO1/MHD
MRDOO/MHD
SH 3 (S) (R) (Q) (P)
LW3CK-
P/O P1 40 NXSESEL2
39 NXSESEL1
38 NSCE
45
29 CHAIN
30 CHAIN-
31 CØMM1-
32 CØMM2
33 CØMM3-
H02 175
CØMM1
CØMM3
VCC432
GROUND442
(N) SH 3
(M) SH 3
(L) SH 3
(K) SH 3
(J) SH 1,3
H03 175
VCC433
GROUND433
HDSWST-
SECADCK-
SECAD6
SECAD5
SECAD4
SECAD3
H04 175
MRDO4/MHD
MRDO5/MHD
MRDO6/MHD
MRDO7/MHD
P/O P1 37 NXSESEL3
42 NXSESEL4
41 NXSESEL6
44 NXSESEL5
GROUND434
VCC434
(H) SH1
(B) SH3
(C) SH3
(D) SH4
(E) SH3
(F) SH3
(G) SH3,4

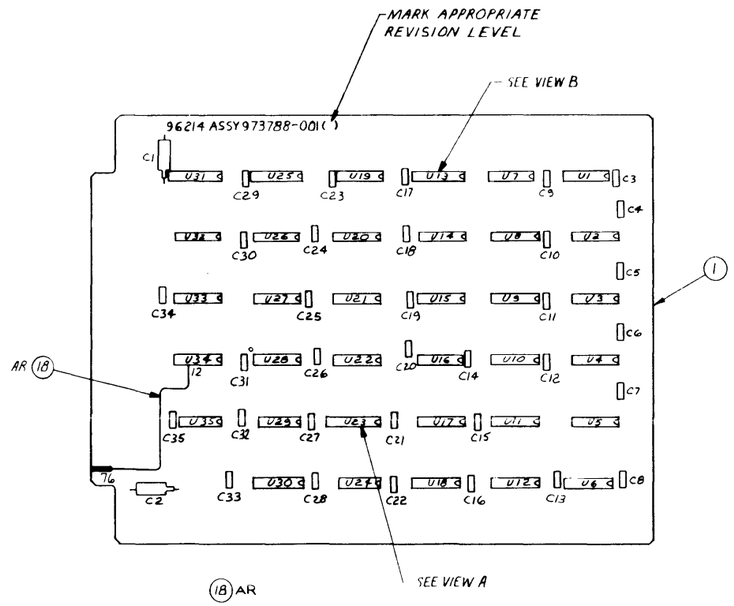
SIZE	CODE IDENT NO	DRAWING NO
D	96214	973684
SCALE	A	SHEET

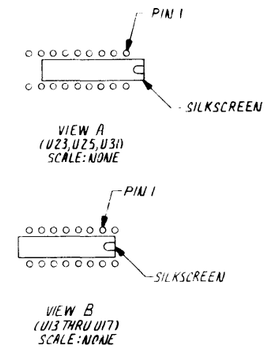
D 973684


8
7
6
5
4
3
2
1
SH4 AB
SH4 AA
SH1 Z
P/O P1
RDIDCØM 66
DEVREAD 13
SH2 N COMM1
SH2 L COMM2
SH2 M COMM1-
SH2 K COMM3
B00 02
A01 H11
INDSKCØM
RDCØM
RDCØM 11
O4 10 RUSØM-
B03
O5 4 DEVREAD
B04
SK2/Q
PLCRY1
VCC426
VCC427
VCC428
VCC429
PLCRY2
PLLØADA-
PLV1
GROUND426
GROUND427
GROUND428
GROUND429
F02
F03
F04
F05
163
CLR P T
L D C B A CK
VCC GND CØ
B06 08
RDIDCØM
SH2 C NS88A2-
A06 00
NS88A1-
D03 86
WRIDCØMA1 12
B05 08
NXSEADCR
SH2 T NXSEADEVCR-
SH2 B NXSEADØDCR-
A06 00
O4 3 MWD00/MHD-
B03
WRIDCØM
A05 00
SH2 J COMM3-
P/O P1
71 IDREAD/J
35 MWD00/MHD
A04 00
WLKØUT/J1B- 12
WLKØUT/J1A- 13
A05 00
WLKØUT/J
WLKØUT/K1A- 1
WLKØUT/K1B- 2
A06 00
WLKØUT/K
H108
VCC405
SK2/J
SK2/K
SYCKMHDJ
A00
2PR 2J 2CK 2K 2CLR 2Q
CK H108
VCC CLR GND
SK2/Q 6
B05 08
GND
MRSMHD-
SK2/KA1
PLBCLKB
PLKESET-
A02 00
PLLØADC
PLLØADB
PLLØADB-
B01
PLLØADC-
PLBCLK-
PLBTCNT4
PLSECTCLK-
PLSECTCLK
PLCRY4
PLCRY5
GROUND430
GROUND431
H00
H01
Q0 QA
C03 37
LSMFS
AH SH4
VCC
B0 02
A02 00
B01
106
2PR 2J 2CK 2K 2CLR 2Q
RFØUTO0- 8
SK2/J 56
RFØUTO1- 11
SYCKMHDJ 47
RFØUTO2- 16
RFØUTO3- 14
RFØUTO4- 5
RFØUTO5- 10
RFØUTO6- 4
O4 B01
O4 B02
P/O P1
WLKØUT/Q 49
SK2/K 51
SK2/Q- 50
NS88- 43
WRIDCØM 62
MRD00/MHD 21
MRD01/MHD 22
MRD02/MHD 23
MRD03/MHD 24
MRD04/MHD 25
MRD05/MHD 26
MRD06/MHD 27
SK2/Q-
NS88-
WRIDCØM
MRD00/MHD
MRD01/MHD
MRD02/MHD
MRD03/MHD
MRD04/MHD
MRD05/MHD
MRD06/MHD
PLBCLKB
PLKESET-
SK2/KA1
MRSMHD-
GND
AF SH1
U SH4
V SH4
AE SH1
A SH4
SH 2, 4
SH 2
SH 4
SH 1
SH 4
SIZE D
CODE IDENT NO 96214
DRAWING NO 973684
SCALE
C
SHEET
973684


SECADER1
ZERØB
LIST4
CYLINC/Q-
LAIL
PRØGER/DA-
PRØGER/DA
LIST4
PRØGER/D-
SKØPFG/JA1-
SKØPFLG/J
PLBTCNT7
PLSECTCLK-
LAIL-
STABLE/Q-
SK2/KA1
INDSKCØM
INDSKCØM-
RDØPFLG/JA-
RDØPFLG/J
SYCKMHD
UNSKFSETEN
SK2/Q
MRSMHD-
MRSMHD
BTCLR-
SIGSTA/Q-
STABLE/Q-
SIGSTA1/Q
SIGSTA1/Q-
LSMF/D
LSMFS
LSMF/DA1
LSMF/Q
LSMF/Q-
LSMF/DA2-
SYNCLK
DRØMHD/Q
INDEXM
VCC
LSM
LSM/R1-
PLRESET-
PLSECTCLK-
SIGSTA2/Q
LSM/D
LSM-
LSM/R-
SK2/Q
INDEXM-3
VCC438
PLBCLKB
PLRESET/DA
PLRESET/L
PLRESET
INDEXM
PLBCLKB
PLBCLK-
MRSMHD-
LAIL-
CYLADCLR44-
CYLADCRY44
CYLADO.A
N.C.
VCC447
SECLCLK
NXSECLK-
SIGSTAB/J
SIGSTAB/Q
SYNCLK
GROUND404
VCC404
P/O P1
SH 1
SH 2
SH 3
SH 2,3

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CN#110790(C) SD date (1) UPDATED REV LVL BLOCK	10/20/75	
	B	CN#111062(C) K. Garner (1) ADDED ITEM 18 TO LM & FD (2) ADDED VIEWS A&B (3) UPDATED REV LEVEL BLOCK	3/12/76	
	C	CN#117068(B) K. Garner (1) RELOCATED ITEM 18 FROM FEEDTHROUGH TO U34-12 (2) UPDATED REV LEVEL BLOCK	3/17/76	
	D	CN 117150 (E) P. Lopez (1) ADDED TEST PROC & UPDATED REV LEVEL BLOCK	11-29-76	





PROCESSES:
1. SOLDER PER F-127, METHOD I AND/OR F-124
2. MARK PER F-100, TYPE II, CLASS 1, HEIGHT .12, COLOR BLACK

REV LEVEL						
TEST PROC 973778						*
LOGIC DIAGRAM 973786-9901	*	A	A	B	B	C
PRINTED WIRING BOARD 973787-0001	*	A	B	B	C	D
ASSEMBLY	*	A	B	C	D	

-2 QTY REQD	-1 QTY REQD	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION
				PARTS LIST		

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100

HOLE TOLERANCE

.013 THRU .128 +.004 -.001	.126 THRU .250 +.006 -.001	.250 THRU .500 +.008 -.001	
.501 THRU .780 +.008 -.001	.780 THRU 1.000 +.010 -.001	1.001 THRU 2.000 +.012 -.001	

NEXT ASSY	USED ON
955157	8101
961752	8100
APPLICATION	

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES ANGLES ±1° 3 PLACE DECIMALS ±.010 2 PLACE DECIMALS ±.02

MATERIAL:

DWN 3 DATE 7-25-74
ENGR 1/30/74
QA 7/30/74
APVD 7/30/74
CONFIG NO
DESIGN ACTIVITY RELEASE 8/1/74

TEXAS INSTRUMENTS INCORPORATED Equipment Group Dallas, Texas

MOVING HEAD DISC CONTROLLER #5

SIZE	CODE IDENT NO	DRAWING NO
D	96214	973788

SCALE 1/1 SHEET

D 973788

TEXAS INSTRUMENTS
INCORPORATED

DATE 03/09/76

LIST OF MATERIAL

PAGE 1 of

PART NUMBER LM 973788-0001 REV D 00

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		973787-0001	PWB, MHC, CONTROLLER #5	
0002	00001.000	EA		222222-7400	NETWORK SN7400N	-SN7400N
0002A					U1	
0003	00001.000	EA		222222-7402	NETWORK SN7402N	TI--SN7402N
C003A					U35	
0004	00002.000	EA		222222-7404	NETWORK SN7404N	
C004A					U7,U24	
0005	00001.000	EA		222222-7408	NETWORK-SN74C8N	
C005A					U25	
0006	00002.000	EA		222222-7430	NETWORK SN7430N	-SN7430N
C006A					U19,U29	
0007	00004.000	EA		222222-7486	NETWORK-SN7486N	
C007A					U14,U15,U16,U17	
0008	00008.000	EA		222222-7153	NETWORK SN74153N	-SN74153N
C008A					U2,U3,U4,U5,U8,U9,U10,U11	
0009	00003.000	EA		222222-7174	NETWORK SN74174N	
C009A					U6,U26,U27	
0010	00004.000	EA		222222-7175	NETWORK SN74175N	
0010A					U20,U21,U22,U23	
0011	00002.000	EA		222222-7193	NETWORK SN74193N	-SN74193N

DRAFTSMAN	DATE	CKD DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
		R Delgrosso	3/10/76			MOVING HEAD DISC CONTROLLER #5
APPD MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO. 8980

PART NUMBER LM 973788-0001 REV D 00

TI 13849

TEXAS INSTRUMENTS
INCORPORATED

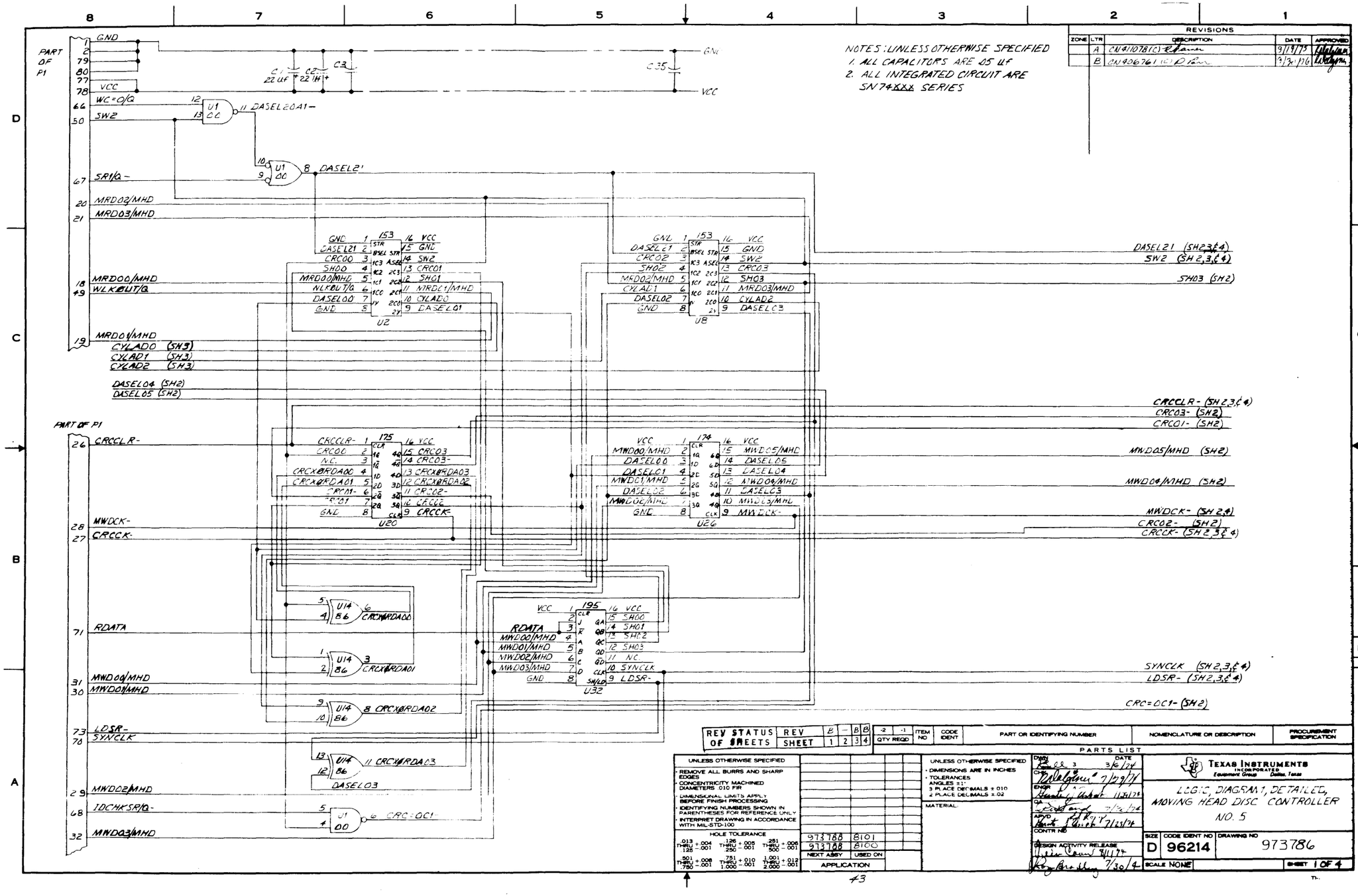
DATE 03/09/76 **LIST OF MATERIAL** PAGE 2 of

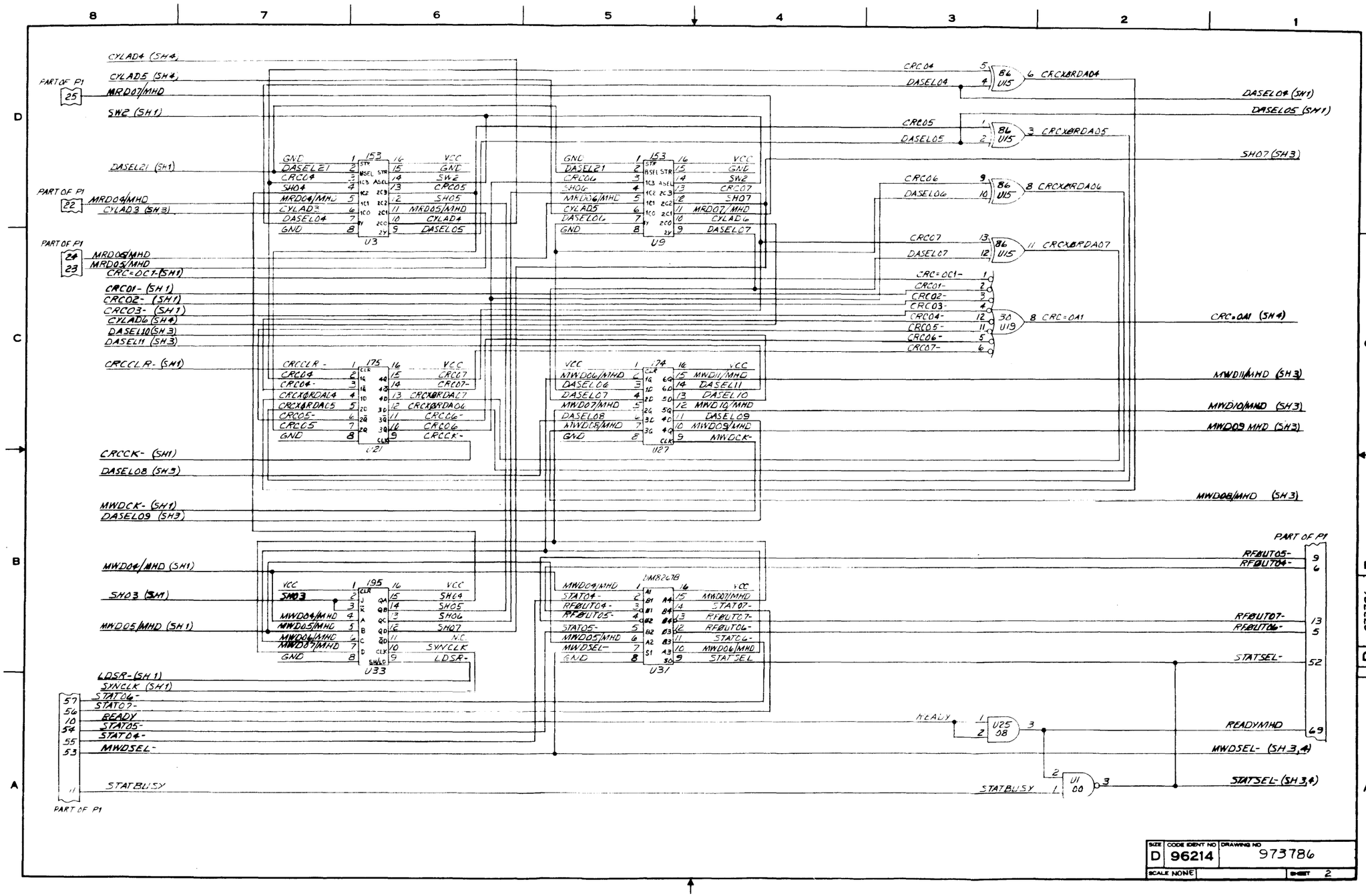
PART NUMBER LM 973788-0001 REV D BE

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0011A					U30,U34	
0012	00004.000	EA		222222-7195	NETWORK SN74195N	
0012A					U12,U28,U32,U33	
0013	00003.000	EA		244712-8267	NETWORK,DM8267B	
0013A					U13,U18,U31	
0014	00033.000	EA		230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	ERI-5635-000-Y5F0503M
0014A					C3 THRU C35	
0015	00002.000	EA		972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL-M39003/1-2271
0015A					C1,C2	
0016	REF	EA		973786-9901	DIAGRAM, LOGIC, MHD CONTROLLER #5	
0017	REF	EA		973778-9901	TEST PROCEDURE,MHD #5	
0018	AR	FT		538347-1999	WIRE HOOK UP B-26 AWG 19 STR WHITE	JUD- HH0109

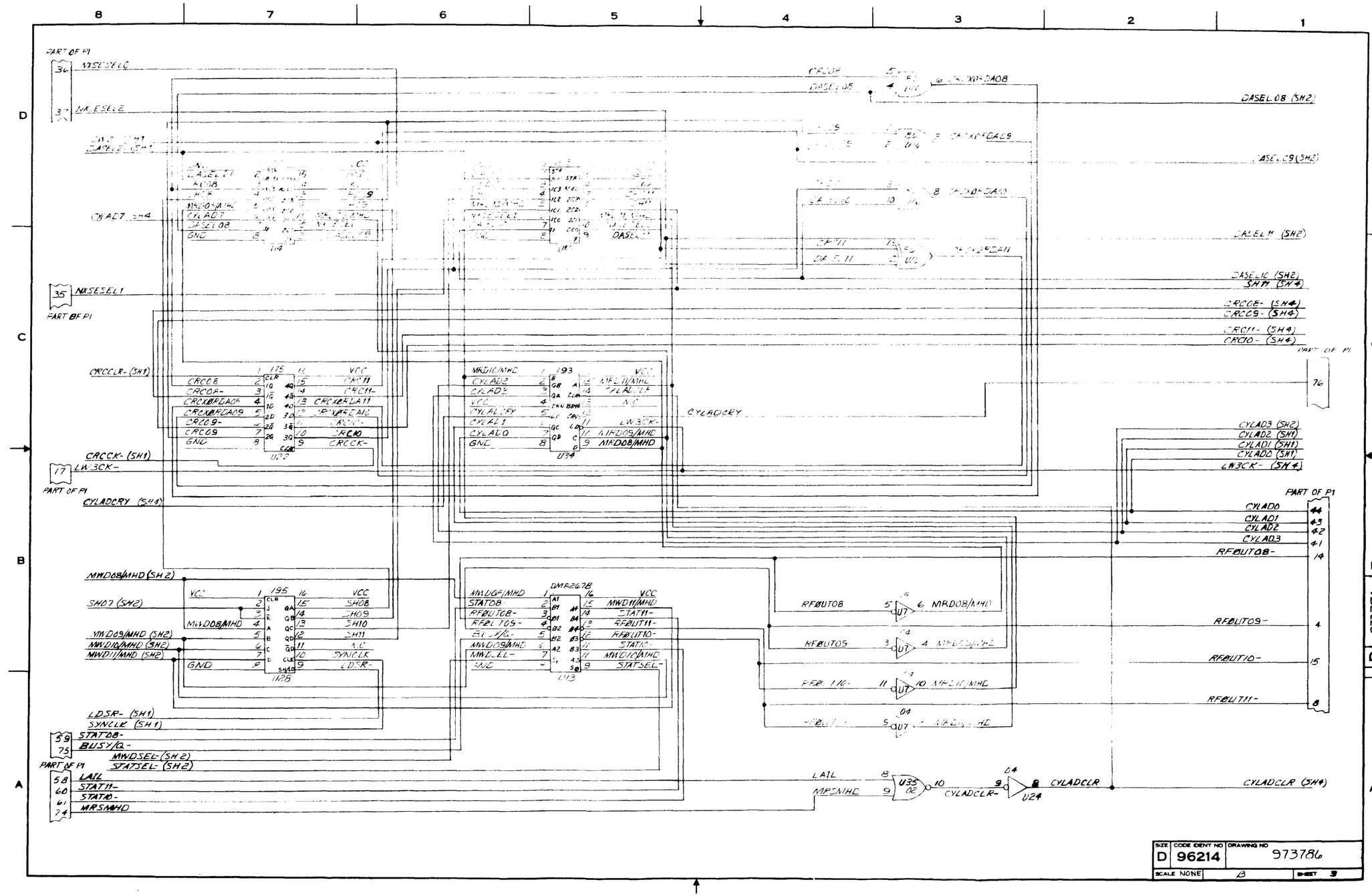
DRAFTSMAN DATE	CKD. DRAFTSMAN DATE	DESIGN ENGINEER DATE	TITLE
			MOVING HEAD DISC CONTROLLER #5

APPD. MFG. DATE	APPD. PROJECT ENGINEER DATE	RELEASED DATE	PROJECT NO.		PART NUMBER / REV
					LM 973788-0001 D BE

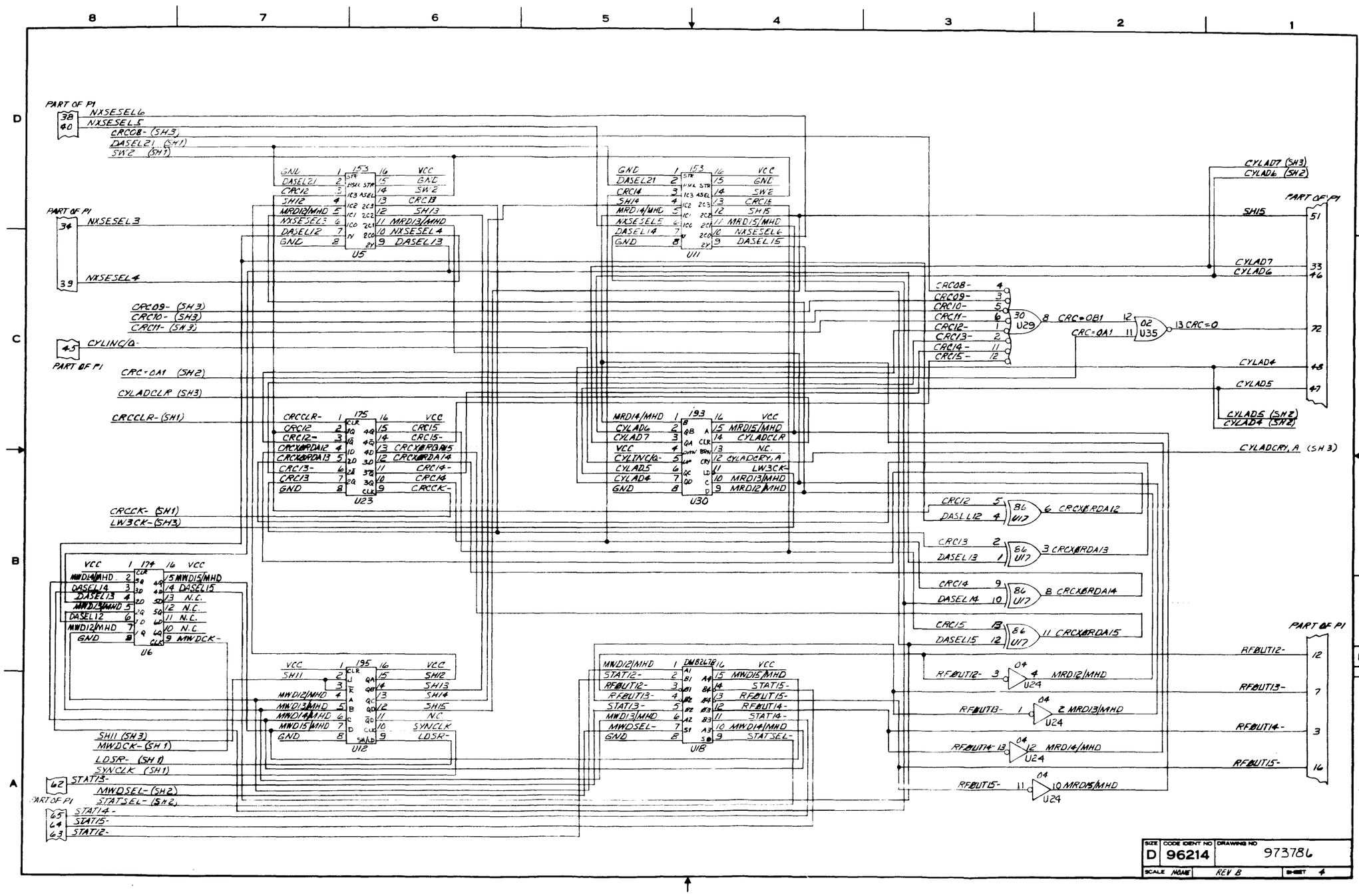

NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL CAPACITORS ARE .05 Uf
2. ALL INTEGRATED CIRCUIT ARE SN74XXX SERIES
REVISIONS
ZONE LTR DESCRIPTION DATE APPROVED
A CN#41078(C) 9/19/73
B CN#43676(C) 3/31/76
PART OF P1
GND
VCC
C1 22 uf
C2 22 uf
C3
C35
WC=O/Q
SW2
SR1/Q-
MRD02/MHD
MRD03/MHD
MRD00/MHD
WLKBUT/Q
MRD01/MHD
CYLAD0 (SH3)
CYLAD1 (SH3)
CYLAD2 (SH3)
DASEL04 (SH2)
DASEL05 (SH2)
CRCCLR-
MWDCK-
CRCCK-
RDATA
MWD00/MHD
MWD01/MHD
LDSR-
SYNCLK
MWD02/MHD
IDCHKSR/Q-
MWD03/MHD
DASEL20A1-
DASEL21
CRC00
SH00
NLKBUT/Q
DASEL00
CRCX0RDA00
CRCX0RDA01
CRC02-
CRC01
CRCCC
CRCCK-
CRC03-
CRCX0RDA03
CRCX0RDA02
DASEL03
CRC=OC1-
DASEL01
CYLAD0
CYLAD1
MRD01/MHD
DASEL02
MWD00/MHD
MWD01/MHD
MWD02/MHD
MWD03/MHD
SYNCLK
DASEL21 (SH2,3,4)
SW2 (SH 2,3,4)
SH03 (SH2)
CRCCLR- (SH 2,3,4)
CRC03- (SH2)
CRC01- (SH2)
MWD05/MHD (SH2)
MWD04/MHD (SH2)
MWDCK- (SH 2,4)
CRC02- (SH2)
CRCCK- (SH 2,3,4)
SYNCLK (SH 2,3,4)
LDSR- (SH 2,3,4)
CRC=OC1- (SH2)
U1
U2
U8
U14
U20
U26
U32
153
175
174
195
REV STATUS OF SHEETS
PARTS LIST
UNLESS OTHERWISE SPECIFIED
HOLE TOLERANCE
973788 8101
973788 8100
NEXT ASSY USED ON
APPLICATION
MATERIAL
TEXAS INSTRUMENTS INCORPORATED Equipment Group Dallas, Texas
LOGIC, DIAGRAM, DETAILED, MOVING HEAD DISC CONTROLLER NO. 5
SIZE D
CODE IDENT NO 96214
DRAWING NO 973786
SCALE NONE
SHEET 1 OF 4
973786
43



SIZE	CODE IDENT NO	DRAWING NO
D	96214	973786
SCALE NONE		SHEET 2



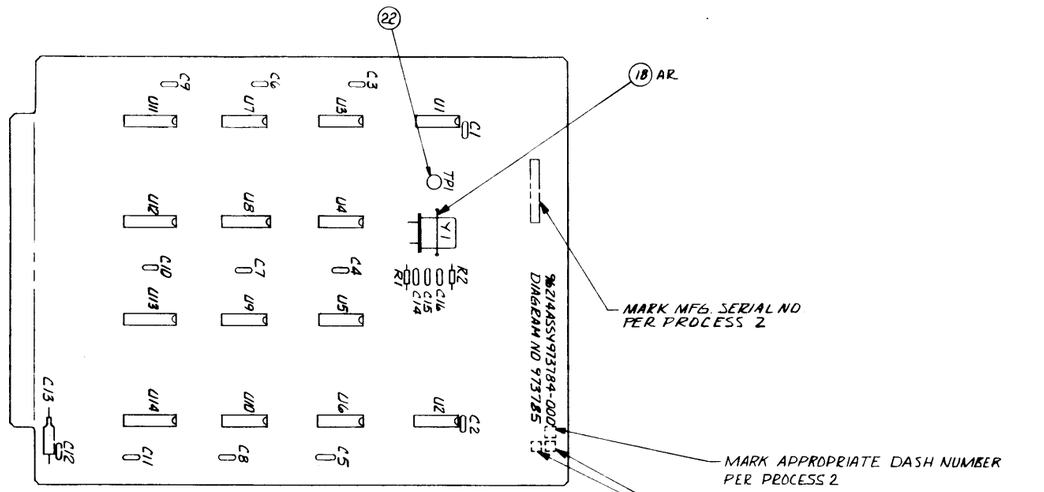
SIZE	CODE IDENT NO	DRAWING NO
D	96214	973786
SCALE NONE	B	SHEET 3


8
7
6
5
4
3
2
1
PART OF P1
NXSESEL6
NXSESEL5
CRC08- (SH3)
DASEL21 (SH1)
SW2 (SH1)
NXSESEL3
NXSESEL4
CRC09- (SH3)
CRC10- (SH3)
CRC11- (SH3)
CYLINC/Q-
CRC=0A1 (SH2)
CYLADCLR (SH3)
CRCCLR- (SH1)
CRCCK- (SH1)
LW3CK- (SH3)
SH11 (SH3)
MWDCK- (SH1)
LDSR- (SH1)
SYNCLK (SH1)
STAT13-
MWDSEL- (SH2)
STATSEL- (SH2)
STAT14-
STAT15-
STAT12-
U5
U11
U23
U30
U6
U12
U18
U29
U35
U17
U24
CYLAD7 (SH3)
CYLAD6 (SH2)
SH15
CYLAD5 (SH2)
CYLAD4 (SH2)
CYLADCRY, A (SH3)
CRC=0
RFBUT12-
RFBUT13-
RFBUT14-
RFBUT15-
SIZE D
CODE IDENT NO 96214
DRAWING NO 973786
SCALE NONE
REV B
SHEET 4

NOTES
1. MAXIMUM COMPONENT HEIGHT FROM COMPONENT SIDE OF BOARD IS .31
2. MAXIMUM LEAD LENGTH FROM CONDUCTOR SIDE OF BOARD IS .075
3. TO PREVENT SOLDER FROM WICKING DOWN CONNECTOR FINGERS WHEN SOLDERING, MASK ALL CONNECTOR FINGERS ON BOTH SIDES OF BOARD

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	392367(C2) D Parsons (1) UPDATED REV LEV BLK	9/23/74	
	B	377172(B) E Hansen (1) UPDATED REV LEVEL BLOCK	7/22/74	
	C	388981(E)15 Dodson (1) ADDED DASH 2 TO L/M (2) UPDATED REV STATUS BLOCK.	10/2/74	
	D	411085(C) R Hansen (1) N/A REV LEVEL BLOCK LOGIC WAS 973785 (2) UPDATED REV LEVEL BLOCK	10/27/75	
	E	407123(C) D Parsons (1) REVISED REV LEVEL BLOCK	2/18/76	
	F	CN 414145 (C) A Jones 11/6 (1) ADDED ITEM 22 TO L/M & BALLOON 22 TO F/D (2) ADDED TEST PROC & UPDATED REV. LEV BLK	11/30/76	
	G	CN 417150 (E) M Jones 11/6 U1 UPDATED REV LEV BLK	11/24/76	



PROCESSES:
1. SOLDER PER F-124 AND OR F-127
2. MARK PER F-100, TYPE II, CLASS I HEIGHT .12, COLOR BLACK

REV LEVEL										
TEST PROC 993779 9901								A	A
PRINTED WIRING BD. 973783-1	*	A	B	B	C	D	E	F
LOGIC DIAGRAM DET. MHDC NO 6 FOR 973782	*	*	*	*	A	A	A	A
ASSEMBLY 973784	*	A	B	C	D	E	F	G

-2 QTY REQD	-1 QTY REQD	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100

HOLE TOLERANCE

.013 THRU .125 +.004 -.001	.126 THRU .250 +.005 -.001	.251 THRU .500 +.006 -.001
.501 THRU .780 +.008 -.001	.781 THRU 1.000 +.010 -.001	1.001 THRU 2.000 +.012 -.001

NEXT ASSY	USED ON
973674	8101
973674	9100
943870	7603
933129	7503
955157	8101
961752	8100

APPLICATION

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES ANGLES ±1° 3 PLACE DECIMALS ±.010 2 PLACE DECIMALS ±.02

MATERIAL:

		DATE
DWN	J Hansen	3/1/74
CHK	R Hansen	3/4/74
ENGR	J Dodson	3/5/74
QA		3/5/74
APVD		3/5/74
CONTR NO		
DESIGN ACTIVITY RELEASE		3/5/74

TEXAS INSTRUMENTS INCORPORATED Equipment Group Dallas, Texas

MOVING HEAD DISK CONTROLLER NO 6

SIZE	CODE IDENT NO	DRAWING NO
D	96214	973784

SCALE 1/1 SHEET

TI-79146 PR

973784 D

TEXAS INSTRUMENTS
INCORPORATED

DATE 11/10/76

LIST OF MATERIAL

PAGE 1 of

PART NUMBER LM0973784-0001 REV G

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		0222222-7400	NETWORK SN7400N	-SN7400N
0001A					U5	
0002	00001.000	EA		0222222-7402	NETWORK SN7402N	TI- -SN7402N
C002A					U10	
0003	00001.000	EA		0222222-7404	NETWORK SN7404N	
0003A					U6	
0004	00001.000	EA		0222222-7405	NETWORK SN7405N	
0004A					U1	
0005	00001.000	EA		0222222-7408	NETWORK-SN7408N	
0005A					U2	
0006	00001.000	EA		0222222-7410	NETWORK SN7410N	-SN7410N
0006A					U9	
0007	00001.000	EA		0222222-7430	NETWORK SN7430N	-SN7430N
C007A					U4	
0008	00001.000	EA		0222222-7437	NETWORK SN7437N	
0008A					U3	
0009	00001.000	EA		0222222-7474	NETWORK SN7474N	-SN7474N
C009A					U7	
0010	00004.000	EA		0222222-7174	NETWORK SN74174N	
0010A					U8 L13 L14 U12	

DRAFTSMAN DATE	CKD. DRAFTSMAN DATE	DESIGN ENGINEER DATE	TITLE
	J. Rockley 11-11-76		PWB ASSY, MOVING HEAD DISK CONT NO.6
APPD.-MFG. DATE	APPD. PROJECT ENGINEER DATE	RELEASED DATE	PROJECT NO. 7502

PART NUMBER LM0973784-0001 REV G

T.I. 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 11/10/76

LIST OF MATERIAL

PAGE 1 of

PART NUMBER LM0973784-0002 REV G #

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		0222222-7400	NETWORK SN7400N	-SN7400N
0001A					U5	
0002	00001.000	EA		0222222-7402	NETWORK SN7402N	TI- -SN7402N
0002A					U10	
0003	00001.000	EA		0222222-7404	NETWORK SN7404N	
0003A					U6	
C004	00001.000	EA		0222222-7405	NETWORK SN7405N	
C004A					U1	
0005	00001.000	EA		0222222-7408	NETWORK-SN7408N	
0005A					U2	
C006	00001.000	EA		0222222-7410	NETWORK SN7410N	-SN7410N
C006A					U9	
0007	00001.000	EA		0222222-7430	NETWORK SN7430N	-SN7430N
0007A					U4	
0008	00001.000	EA		0222222-7437	NETWORK SN7437N	
0008A					U3	
0009	00001.000	EA		0222222-7474	NETWORK SN7474N	-SN7474N
C009A					U7	
0010	00004.000	EA		0222222-7174	NETWORK SN74174N	
001CA					U8 U13 U14 U12	

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
						PWB ASSY, MHD CONTROLLER NO. 6
APPD.-MFG.	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.

PART NUMBER LM0973784-0002 REV G #

T.I. 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 11/10/76 **LIST OF MATERIAL** PAGE 2 of

PART NUMBER LM0973784-0002 REV G

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0011	00001.000	EA		0244712-8267	NETWORK,DM82678	
0011A					U11	
0012	00001.000	EA		0418801-0007	CRYSTAL,QUARTZ 5.000 MHZ HC-18/U	QPL - CR-64/U
0012A					Y1	
0013	00002.000	EA		0972975-0041	RES FIX COMP 470 OHMS 5 % 1/8 WATT	QPL - RC05G471JS
0013A					R1 R2	
0014	00012.000	EA		0230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	ERI -5635-000-Y5F05
0014A					C1 THRU C12	
0015	00001.000	EA		0972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL -M39003/1-2271
0015A					C13	
0016	00002.000	EA		0972926-0020	CAP FIX MICA 500V 51.0 PF 5 %	QPL -CM04E510J00
0016A					C14 C16	
0017	00001.000	EA		0972929-0391	CAP FIX CERAMIC 470 PF 10 % 200 V	QPL -M39014/01-1391
0017A					C15	
0018	AR	FT		0538347-1999	WIRE HOOK UP B-26 AWG 19 STR WHITE	JUD - HH0109
0019	00001.000	EA		0973783-0001	PWB,MOVING HEAD DISC CONTROLLER NO.6	
0020	REF	EA		0973782-9901	LOGIC DIAGRAM, DETAILED MHD CONT. NO. 6	
0021	REF	EA		0973779-9901	TEST PROCEDURE, MDH NO. 6	
0022	00001.000	EA		0083694-0003	TERMINAL TURRET TYPE	USE - 20108

DRAFTSMAN	DATE	CKD. DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
						PWB ASSY, MHD CONTROLLER NO. 6

APPD. MFG	DATE	APPD. PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO.		PART NUMBER	REV
								LM0973784-0002	G

T.I. 13849

TEXAS INSTRUMENTS
INCORPORATED

DATE 11/10/76 **LIST of MATERIAL** PAGE 2 of

PART NUMBER LM 0973784-0001 REV G

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0011	00001.000	EA		0244712-8267	NETWORK,DM82678	
0011A					U11	
0012	00001.000	EA		0418801-0005	CRYSTAL,QUARTZ 3.124 MHZ HC-18/U	QPL - CR-64/U
0012A					Y1	
0013	00002.000	EA		0972975-0041	RES FIX COMP 470 OHMS 5 % 1/8 WATT	QPL - RC05G471JS
0013A					R1 R2	
0014	00012.000	EA		0230590-9000	CAP .05 MF 12 V 20. % CER TRANSCAP	ERI -5635-000-Y5F05
0014A					C1 C2 C3 C4 C5 C6 C7 C8 C9	
0014B					C10 C11 C12	
0015	00001.000	EA		0972924-0010	CAP FIX TANT SOLID 22 MFD 10 % 15 VOLT	QPL -M39003/1-2271
0015A					C13	
0016	00002.000	EA		0972926-0020	CAP FIX MICA 500V 51.0 PF 5 %	QPL -CM04E510J0D
0016A					C14 C16	
0017	00001.000	EA		0972929-0391	CAP FIX CERAMIC 470 PF 10 % 200 V	QPL -M39014/01-1391
0017A					C15	
0018	AR	FT		0538347-1999	WIRE HOOK UP 3-26 AWG 19 STR WHITE	JUD - HH0109
0019	00001.000	EA		0973783-0001	PWB,MOVING HEAD DISC CONTROLLER NO.6	
0020	REF	EA		0973782-9901	LOGIC DIAGRAM, DETAILED MHD CONT. NO. 6	
0021	REF	EA		0973779-9901	TEST PROCEDURE, MDH NO. 6	
0022	00001.000	EA		0083694-0003	TERMINAL TURRET TYPE	USE - 2010B

DRAFTSMAN / DATE	CKD. DRAFTSMAN / DATE	DESIGN ENGINEER / DATE	TITLE
			PWB ASSY,MOVING HEAD DISK CONT NO.6
APPD.-MFG. / DATE	APPD. PROJECT ENGINEER / DATE	RELEASED / DATE	PROJECT NO. / PART NUMBER / REV
			LM 0973784-0001 G

T.I. 13849

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CN#11084(C) R. Lane	8/27/75	[illegible]

NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL CAPACITORS ARE .05 UF
2. ALL INTEGRATED CIRCUIT ARE SN74___ SERIES

PART OF P1

MWD03/MHD
MWD00/MHD
MWD01/MHD
MWDSEL-
STATSEL-
MWD02/MHD
COMPER/D-
BUSY/D-
CHLTKN/D-
WLKTØN/D-
STATRICK-
ØFLIN/D-
ØPCØMP/D-
PRØGER/D-
ENDISC/D-
DATRER/D-
MRSMHD-
STATR3CK-
IOREAD/J
CRC=0-
ST1/J-
SR0/J
WC=0/Q
WPS
ST1/J
WRITØPFLG/Q
COMPØP-

U11 74174: STATOL-, RFØUT03-, RFØUT01-, STAT04-, GND; VCC, STAT03-, RFØUT03-, RFØUT02-, STAT02-
DMB2673
U13 74174: VCC U10, CHLTKN/Q-, GND; VCC, BUSY/Q-, WLKTØN/Q-, IDER/D-, IDER/Q-, PARER/D-, PARER/Q-
LZ4
U14 74174: VCC609, PRØGER/Q-, ENDISC/Q-, DATPER/Q-, GND; VCC, ØPCØMP/Q-, WRPEN/D-, WRPEN/Q-, ØFLIN/Q-
U12 74174: COMPER/Q-, PARER/Q-, IDER/Q-, STAT08-, GND; VCC, STAT11-, WLKTØN/Q-, CHLTKN/Q-, STAT10-, STATR3CK-
U6B 04: IDER/Q, HØLDSTAT
U5B 00: 6 IDER/DA2-
U2A 08: 3 IDER/D-
U5C 00: 8 IDER/DA1-
U9A 10: 12 PARER/DA1-
U1 05: 2 STATEN-
U6C 04: PARER/Q-, 6 PARER/Q
U2C 08: MREST-, STI/J-, 8 HØLDSTAT
U5D 00: 12 COMPER/Q-
U2B 08: 6 PARER/D-

ØPCØMP/Q-
WRPEN/Q-
ØFLIN/Q-
DATRER/Q-
ENDISC/Q-
PRØGER/Q-
TERM,C/Q-
U4 30: 8
U6A 04: COMPER/Q-, 2 COMPER/Q
U10 02: TERM,A1, 1 TERM-

MRSMHD-
STAT00-
ØPCØMP/Q-
WRPEN/Q-
STAT01-
ØFLIN/Q-
STAT02-
GND
U8 74174: VCC, STAT05-, PRØGER/Q-, ENDISC/Q-, STAT04-, DATRER/Q-, STAT03-, STATR3CK-
WPS
WRITØPFLG/Q
U5A 00: 3 WRPEN/D-
IDER/Q
COMPØP-
U9B 10: 6 TERM,C-
U5D 00: 11 PARER/C-
U2B 08: 6 PARER/D-

PART OF P1
TERM- 34
CHLTKN/Q 28
RFØUT03- 5
RFØUT02- 7
RFØUT01- 4
RFØUT00- 3
DATRER/Q- 27
ENDISC/Q- 26
STAT08- 22
STAT07- 19
STAT06- 20
BUSY/Q- 29
STAT11- 23
STAT10- 24
STATEN- 6
STAT05- 17
STAT04- 18
(SH2,B-8) TERM,C-
(SH2,B8) MRSMHD-
(SH2,B-8) TERM,C/Q-
(SH2,B-8) MREST-

REV STATUS OF SHEETS	REV	A	A
	SHEET	1	2

-2 QTY REQD	-1	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPL. BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100

HOLE TOLERANCE

.013 THRU .125	± .004 ± .001	.126 THRU 250	± .005 − .001	.251 THRU .500	± .006 − .001
.501 THRU .750	± .008 − .001	.751 THRU 1.000	± .010 − .001	1.001 THRU 2.000	± .012 − .001

973764	7503	
973764	7502	
973784	8101	
973784	8100	
NEXT ASSY	USED ON	
APPLICATION		

43

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES ANGLES ±1° 3 PLACE DECIMALS ± .010 2 PLACE DECIMALS ± .02

MATERIAL

		DATE
DWN	[illegible]	2/8/74
CHK	[illegible]	2/19/74
ENGR	[illegible]	3/5/74
QA	[illegible]	[illegible]
APVD	[illegible]	[illegible]
CONTR NO		
DESIGN ACTIVITY RELEASE		

TEXAS INSTRUMENTS INCORPORATED Equipment Group Dallas, Texas

LOGIC, DIAGRAM, DETAILED, MOVING HEAD DISC CONTROLLER NO. 6

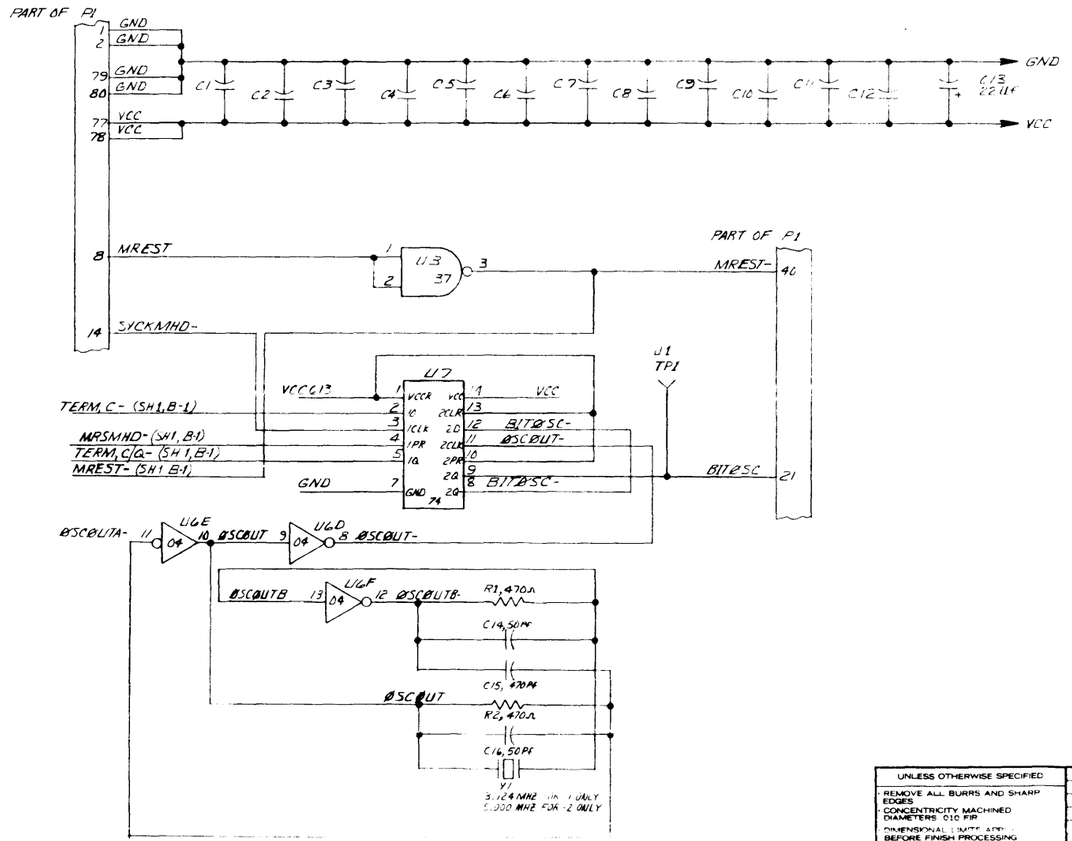
SIZE	CODE IDENT NO	DRAWING NO
D	96214	973782

SCALE NONE — SHEET 1 OF 2

973782

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED



2 QTY REQD	1 QTY REQD	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD 100

HOLE TOLERANCE

.013 THRU .125 +.004 -.001	126 THRU 250 +.005 -.001	251 THRU 500 +.006 -.001
.501 THRU 750 +.008 -.001	751 THRU 1.000 +.010 -.001	1.001 THRU 2.000 +.012 -.001

NEXT ASSY	USED ON
973784	B10
973787	B100

APPLICATION

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES
  ANGLES ±1°
  3 PLACE DECIMALS ± .010
  2 PLACE DECIMALS ± .030

MATERIAL

DWN	DATE
CHK	
ENGR	
QA	
APVD	
CONTR NO	
DESIGN ACTIVITY RELEASE	

TEXAS INSTRUMENTS INCORPORATED Equipment Group Dallas, Texas

LOGIC DIAGRAM DETAILED MOVING HEAD DISC CONTROLLER NO6

SIZE	CODE IDENT NO	DRAWING NO
D	96214	973782

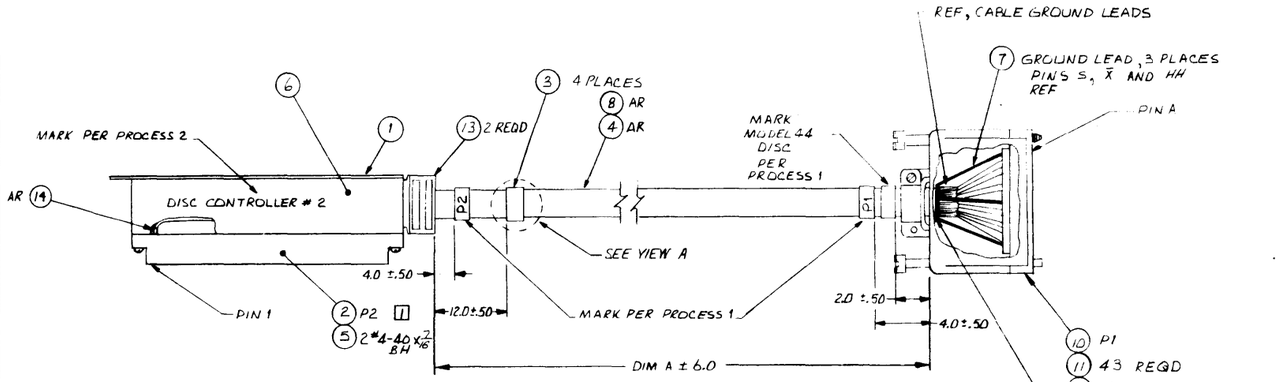
SCALE NONE | REV A | SHEET 2

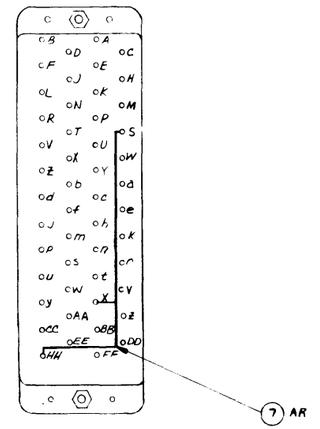
TI-7914 E

973782

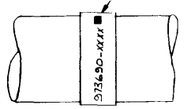
NOTES:
1. BUS PINS J THRU J̄ ON P2 (LETTER SIDE ONLY) USING ITEM 7
2. JUMPER PINS A AND R̄ ON P2 TO J THRU J̄ BUS ON P2 USING ITEM 7.
3. THIS CABLE SHALL BE TESTED BY MEANS OF POINT-TO-POINT USING THE WIRE LIST (973691) AS A REFERENCE.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CN 13032 (1) P.R. 111 6/M, ITEM 4, 8, 10 WAS 236303-1000, 230255-3060, 973697-0001 (2) UPDATED REV LEVEL BLOCK	7-15-74	JHM





CONTACT ARRANGEMENT
CABLE ENTRY SIDE



VIEW A

973690— XXXX
BASIC PART NUMBER
DIM A IN FEET

PROCESSES:
1. MARK PER F-100 METHOD VII, CLASS 12, COLOR BLACK
2. MARK PER F-100 METHOD II, CLASS 1, HEIGHT .12, COLOR BLACK, TYPE 3
3. SOLDER PER F-127, METHOD I

-2 QTY REQD	-1 QTY REQD	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION
				PARTS LIST		
				WIRE LIST FOR -0001 ASSEMBLY 973691	*	*
				ASSEMBLY 973690	*	A

REVISION LEVEL

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100

HOLE TOLERANCE

.013 THRU .125 +.004 -.001	126 THRU 250 +.005 -.001	251 THRU 500 +.006 -.001
501 THRU 750 +.008 -.001	751 THRU 1.000 +.010 -.001	1.001 THRU 2.000 +.012 -.003

973674	B/DI
973674	R/DC
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES ANGLES ±1°
  3 PLACE DECIMALS ± .010
  2 PLACE DECIMALS ± .02

MATERIAL:

DWN	J DATE 11/30/74
CHK	DATE 11/10/74
ENGR	DATE
QA	DATE 11/21/74
APVD	DATE
CONTR NO	
DESIGN ACTIVITY RELEASE	DATE 11/21/74

TEXAS INSTRUMENTS INCORPORATED
Equipment Group Dallas, Texas

CABLE ASSEMBLY, MOVING HEAD DISC MODEL 44 TO CONTROLLER

SIZE	CODE IDENT NO	DRAWING NO
D	96214	973690

SCALE NONE SHEET 1/1

LM

TI-7914E 75

973690 D

TEXAS INSTRUMENTS
INCORPORATED

DATE 07/02/76 **LIST OF MATERIAL** PAGE 1 of

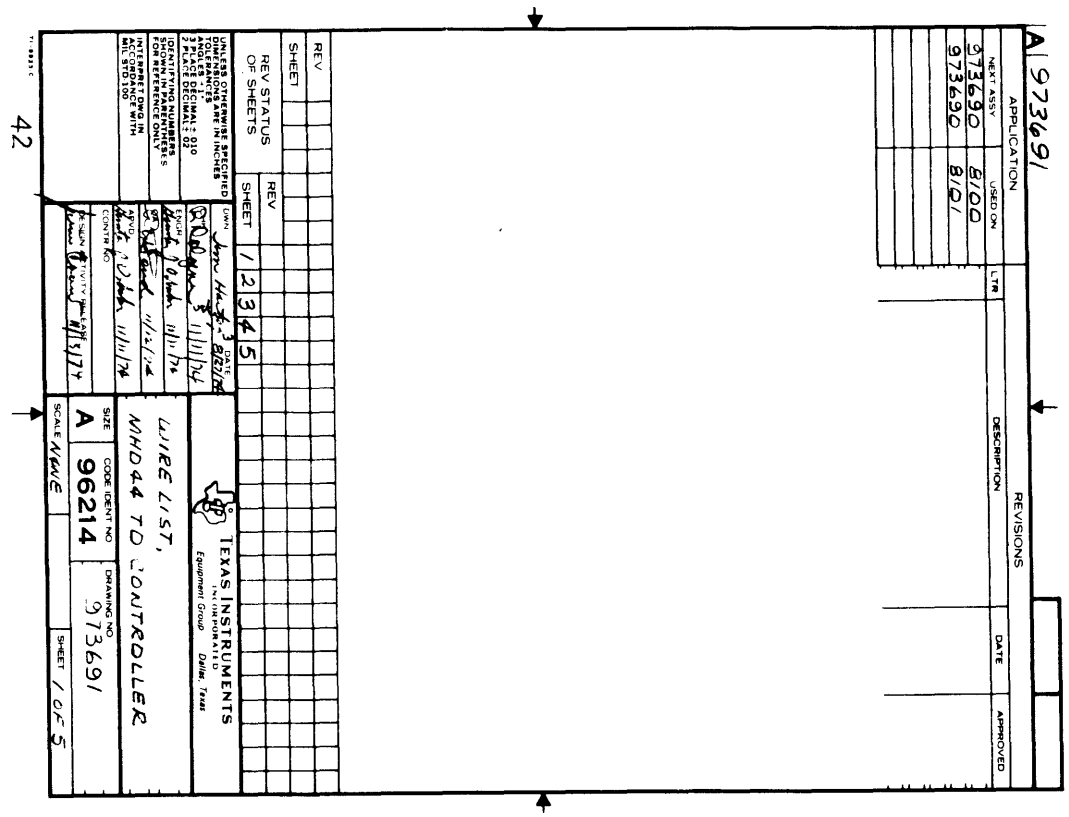
PART NUMBER LM 973690-0015 REV A

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		216136-C001	HOOD,CONNECTOR	
0002	00001.000	EA		231447-0800	CONNECTOR PC 36 PIN	VIK-2VH-36/1CN-5
C002A					P2	
0003	00004.000	EA		418201-0001	STRAP,MARKER,ADJUSTABLE,PLASTIC	QPL- MS3368-1-9
0004	00015.000	FT		972435-0007	INSUL SLEEVING,1.0" ID ZIPPER TUBE PVC	ZIP- ZTR-1000-63-20-1
0005	00002.000	EA		972988-0016	SCREW 4-40 X .438 PAN HEAD CRES	
0006	00001.000	EA		216138-C001	COVER,CONNECTOR	
0007	00001.000	FT		411400-0016	WIRE, 16AWG, SOLID, UNINSULATED	
0008	00108.000	FT		772570-CC05	CABLE, ELEC, FLAT (ST-1426-19B-XL)	
C0C9	REF	EA		973691-9901	WIRE LIST, MHD44 TO CONTROLLER	
0010	00001.000	EA		973657-0003	CONNECTOR,RECTANGULAR,ELECTRICAL	
0010A					P1	
0011	00043.000	EA		411378-0004	CONTACT ELECTRICAL FEMALE	WIN-100-1026S
0012	00003.000	EA		231554-0085	CONTACT SOCKET 100-1016S	WIN-100-1016S
0013	00002.000	EA		418212-0040	STRAP,TIECOWN,ADJUSTABLE,PLASTIC	QPL- MS3367-4-9
0014	AR	FT		411634-0710	SLEEVE,PVC, .066 DIA. CLEAR	QPL- MIL-1-631

DRAFTSMAN	DATE	CKD DRAFTSMAN	DATE	DESIGN ENGINEER	DATE	TITLE
		[signature]	7/6/76			CABLE ASSY, MHD44 TO CONTROLLER
APPD MFG	DATE	APPD PROJECT ENGINEER	DATE	RELEASED	DATE	PROJECT NO 8100

PART NUMBER LM 973690-0015 REV A

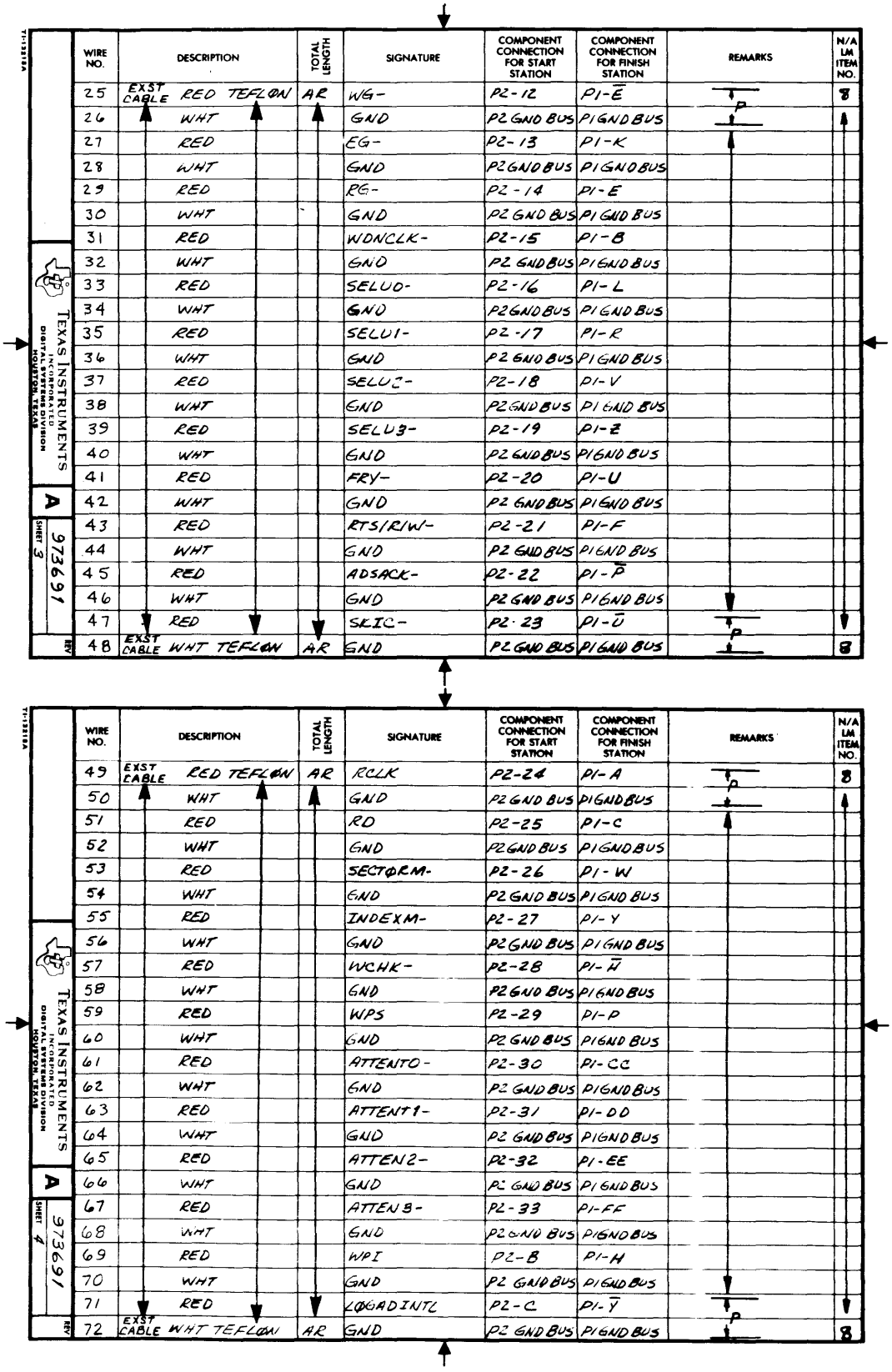
34



42

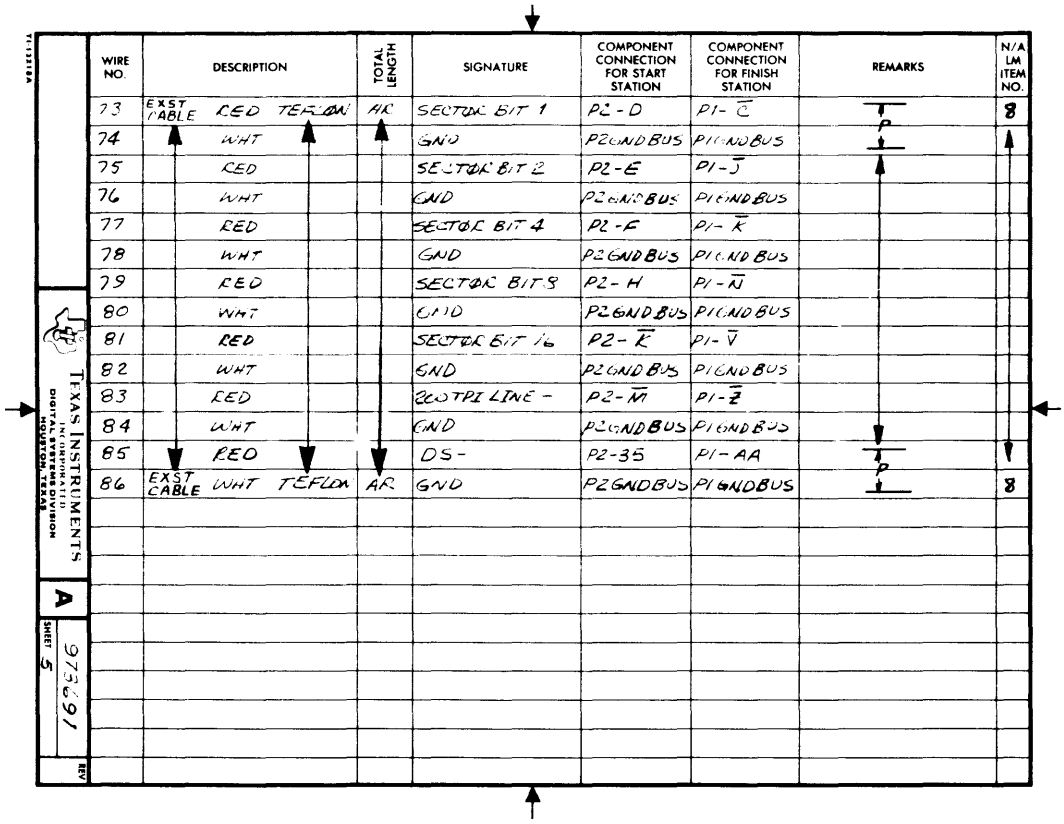
WIRE NO.	DESCRIPTION	TOTAL LENGTH	SIGNATURE	COMPONENT CONNECTION FOR START STATION	COMPONENT CONNECTION FOR FINISH STATION	REMARKS	N/A LM ITEM NO.
1	EXST CABLE RED TEFLON	AR	ADDS0-	P2- 36	P1- $\overline{M}$	P	8
2	WHT		GND	P2-GND BUS	P1GND BUS	P	
3	RED		ADDS1-	P2- 1	P1-$\overline{BB}$		
4	WHT		GND	P2-GND BUS	P1GND BUS		
5	RED		ADDS2-	P2- 34	P1-$\overline{B}$		
6	WHT		GND	P2 GND BUS	P1 GND BUS		
7	RED		ADDS3-	P2- 3	P1- T		
8	WHT		GND	P2 GND BUS	P1 GND BUS		
9	RED		ADDS4-	P2- 4	P1-$\overline{F}$		
10	WHT		GND	P2 GND BUS	P1 GND BUS		
11	RED		ADDS5-	P2- 5	P1- X		
12	WHT		GND	P2 GND BUS	P1 GND BUS		
13	RED		ADDS6-	P2- 6	P1- J		
14	WHT		GND	P2 GND BUS	P1 GND BUS		
15	RED		ADDS7-	P2- 7	P1- $\overline{S}$		
16	WHT		GND	P2 GND BUS	P1 GND BUS		
17	RED		ADDS8-	P2- 8	P1- N		
18	WHT		GND	P2 GND BUS	P1 GND BUS		
19	RED		RESTORE-	P2-9	P1- $\overline{W}$		
20	WHT		GND	P2 GND BUS	P1GND BUS		
21	RED		ADDSST-	P2-10	P1-$\overline{T}$		
22	WHT		GND	P2 GND BUS	P1 GND BUS		
23	RED		HS-	P2-11	P1- $\overline{A}$	P	
24	EXST CABLE WHT TEFLON	AR	GND	P2 GND BUS	P1 GND BUS	P	8

TEXAS INSTRUMENTS INCORPORATED DIGITAL SYSTEMS DIVISION HOUSTON, TEXAS
A 973691 SHEET 2 REV



WIRE NO.	DESCRIPTION	TOTAL LENGTH	SIGNATURE	COMPONENT CONNECTION FOR START STATION	COMPONENT CONNECTION FOR FINISH STATION	REMARKS	N/A LM ITEM NO.
25	EXST CABLE RED TEFLON	AR	WG-	P2-12	P1-$\bar{E}$	P	8
26	WHT		GND	P2 GND BUS	P1 GND BUS		
27	RED		EG-	P2-13	P1-K		
28	WHT		GND	P2 GND BUS	P1 GND BUS		
29	RED		RG-	P2-14	P1-E		
30	WHT		GND	P2 GND BUS	P1 GND BUS		
31	RED		WDNCLK-	P2-15	P1-B		
32	WHT		GND	P2 GND BUS	P1 GND BUS		
33	RED		SELU0-	P2-16	P1-L		
34	WHT		GND	P2 GND BUS	P1 GND BUS		
35	RED		SELU1-	P2-17	P1-R		
36	WHT		GND	P2 GND BUS	P1 GND BUS		
37	RED		SELU2-	P2-18	P1-V		
38	WHT		GND	P2 GND BUS	P1 GND BUS		
39	RED		SELU3-	P2-19	P1-Z		
40	WHT		GND	P2 GND BUS	P1 GND BUS		
41	RED		FRY-	P2-20	P1-U		
42	WHT		GND	P2 GND BUS	P1 GND BUS		
43	RED		RTS/RW-	P2-21	P1-F		
44	WHT		GND	P2 GND BUS	P1 GND BUS		
45	RED		ADSACK-	P2-22	P1-$\bar{P}$		
46	WHT		GND	P2 GND BUS	P1 GND BUS		
47	RED		SKIC-	P2-23	P1-$\bar{U}$	P	
48	EXST CABLE WHT TEFLON	AR	GND	P2 GND BUS	P1 GND BUS	P	8

WIRE NO.	DESCRIPTION	TOTAL LENGTH	SIGNATURE	COMPONENT CONNECTION FOR START STATION	COMPONENT CONNECTION FOR FINISH STATION	REMARKS	N/A LM ITEM NO.
49	EXST CABLE RED TEFLON	AR	RCLK	P2-24	P1-A	P	8
50	WHT		GND	P2 GND BUS	P1 GND BUS		
51	RED		RD	P2-25	P1-C		
52	WHT		GND	P2 GND BUS	P1 GND BUS		
53	RED		SECTORM-	P2-26	P1-W		
54	WHT		GND	P2 GND BUS	P1 GND BUS		
55	RED		INDEXM-	P2-27	P1-Y		
56	WHT		GND	P2 GND BUS	P1 GND BUS		
57	RED		WCHK-	P2-28	P1-$\bar{W}$		
58	WHT		GND	P2 GND BUS	P1 GND BUS		
59	RED		WPS	P2-29	P1-P		
60	WHT		GND	P2 GND BUS	P1 GND BUS		
61	RED		ATTENT0-	P2-30	P1-CC		
62	WHT		GND	P2 GND BUS	P1 GND BUS		
63	RED		ATTENT1-	P2-31	P1-DD		
64	WHT		GND	P2 GND BUS	P1 GND BUS		
65	RED		ATTEN2-	P2-32	P1-EE		
66	WHT		GND	P2 GND BUS	P1 GND BUS		
67	RED		ATTEN3-	P2-33	P1-FF		
68	WHT		GND	P2 GND BUS	P1 GND BUS		
69	RED		WPI	P2-B	P1-H		
70	WHT		GND	P2 GND BUS	P1 GND BUS		
71	RED		LOGADINTL	P2-C	P1-$\bar{Y}$	P	
72	EXST CABLE WHT TEFLON	AR	GND	P2 GND BUS	P1 GND BUS	P	8



WIRE NO.	DESCRIPTION	TOTAL LENGTH	SIGNATURE	COMPONENT CONNECTION FOR START STATION	COMPONENT CONNECTION FOR FINISH STATION	REMARKS	N/A LM ITEM NO.
73	EXST CABLE RED TEFLON	AR	SECTOR BIT 1	P2-D	P1-$\overline{C}$	P	8
74	WHT		GND	P2 GND BUS	P1 GND BUS	P	
75	RED		SECTOR BIT 2	P2-E	P1-$\overline{J}$		
76	WHT		GND	P2 GND BUS	P1 GND BUS		
77	RED		SECTOR BIT 4	P2-F	P1-$\overline{K}$		
78	WHT		GND	P2 GND BUS	P1 GND BUS		
79	RED		SECTOR BIT 8	P2-H	P1-$\overline{N}$		
80	WHT		GND	P2 GND BUS	P1 GND BUS		
81	RED		SECTOR BIT 16	P2-$\overline{K}$	P1-$\overline{V}$		
82	WHT		GND	P2 GND BUS	P1 GND BUS		
83	RED		200 TPI LINE -	P2-$\overline{M}$	P1-$\overline{Z}$		
84	WHT		GND	P2 GND BUS	P1 GND BUS		
85	RED		DS-	P2-35	P1-AA	P	
86	EXST CABLE WHT TEFLON	AR	GND	P2 GND BUS	P1 GND BUS	P	8

TEXAS INSTRUMENTS INCORPORATED DIGITAL SYSTEMS DIVISION HOUSTON, TEXAS

A

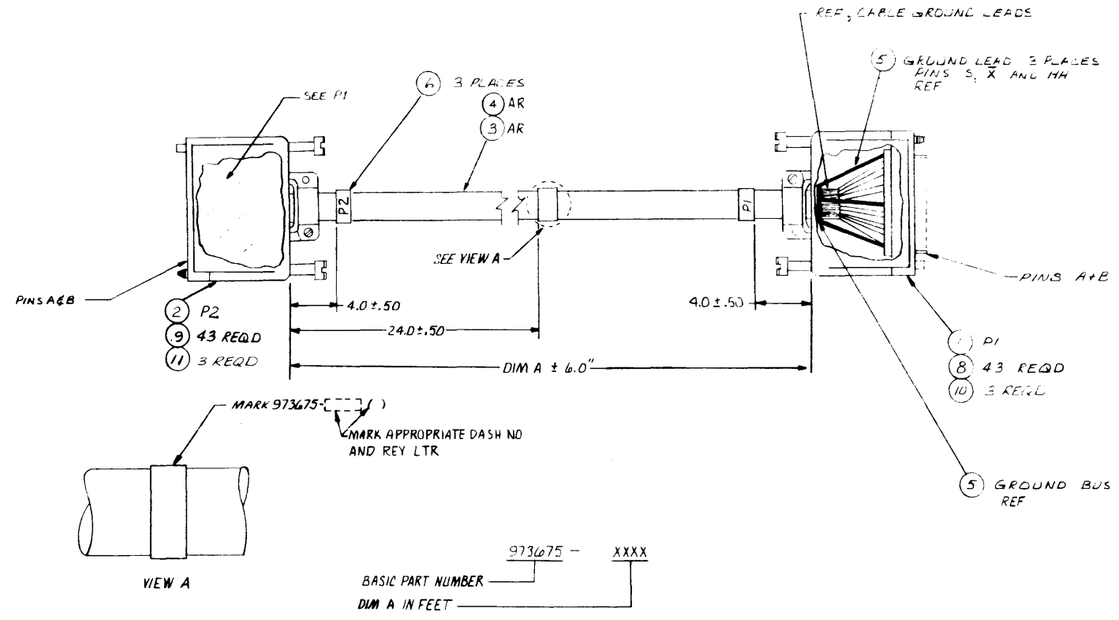
SHEET 5

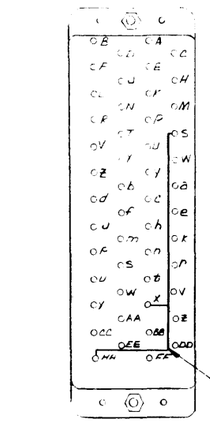
973691

REV

NOTES:
1. THIS CABLE SHALL BE TESTED BY MEANS OF POINT-TO-POINT USING THE WIRE LIST (973692) AS A REFERENCE.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CN 407295 (E) J. Valleje (1) CHANGED -0004 ALLEN ITEMS 10 TO 3 BALLOON 8 WAS 46 REQD REDRAWN LAY-OUT FOR PINS A+B 3 BALLOON 9 WAS 46 REQD & UPDATED REV LEVEL BLOCK	5-13-76	
	B	CN 4 3560 (E) J. Vallejo (1) CHANGED ITEM 4 PN WAS 230255-3060, ITEM 3 PN WAS 234303-1000 (2) UPDATED REV LEVEL BLOCK	7-15-76	
	C	CN 420055 (E) J. Moore (1) CHANGED ITEM 11 WAS 0231554-0085 (2) UPDATED REV LEVEL BLOCK	8-5-77	
	D	CN 420058 (E) J. Moore (1) CHANGED ITEM 8 WAS 0231554-0116 (2) UPDATED REV LEVEL BLOCK	8/15/77	





PROCESSES:
1. MARK PER F100, METHOD VII, CLASS 12, COLOR BLACK TYPE 3
2. SOLDER PER F-127, METHOD I

WIRE LIST FOR -0001 ASSEMBLY	973692	*	*	*	*		
ASSEMBLY	973675	A	B	C	D		

-2 QTY REQD	-1 QTY REQD	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION
				PARTS LIST		

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100

HOLE TOLERANCE

.013 THRU .125	+.004 −.001	.126 THRU .250	+.005 −.001	.251 THRU .500	+.006 −.001
.501 THRU .750	+.008 −.001	.751 THRU 1.000	+.010 −.001	1.001 THRU 2.000	+.012 −.001

973674	RIDT
973678	B/OO
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES
  - ANGLES ±1°
  - 3 PLACE DECIMALS ±.010
  - 2 PLACE DECIMALS ±.02

MATERIAL:

	DATE
DWN Jim Hanley	8/22/74
CHK D Nelson	11/21/74
ENGR	
QA	11/21/74
APVD	
CONTR NO	
DESIGN ACTIVITY RELEASE	11/21/74

TEXAS INSTRUMENTS INCORPORATED Equipment Group Dallas, Texas

CABLE ASSEMBLY, MOVING HEAD DISC MODEL 44 DAISY CHAIN

SIZE	CODE IDENT NO	DRAWING NO
D	96214	973675

SCALE NONE SHEET

REVISION LEVEL

24 LM TI-7914E

973675 D

Change 1

6-97/6-98

Digital Systems Division

TEXAS INSTRUMENTS
INCORPORATED

DATE 03/10/77

LIST of MATERIAL

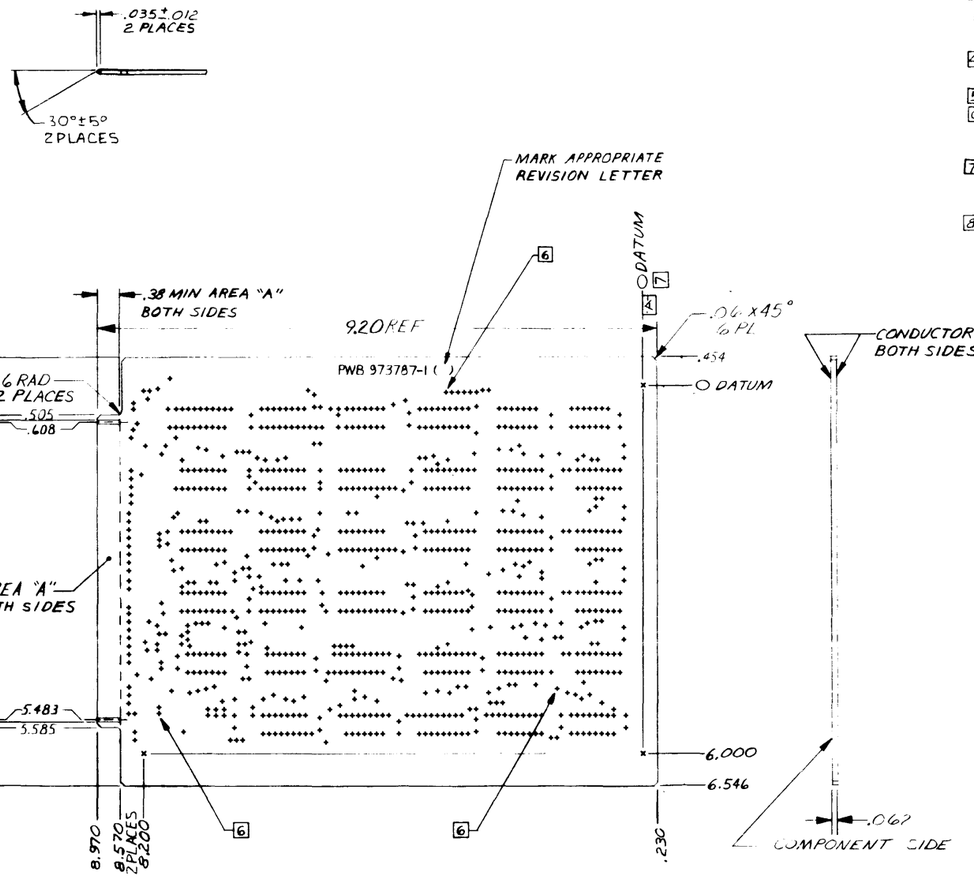
PAGE 1 of

PART NUMBER LM 0973675-0004 REV D

PRINT ITEM NUMBER	QUANTITY PER ASSEMBLY	UNIT OF ISSUE	DWG. SIZE	PART NUMBER	DESCRIPTION	VENDOR PART NUMBER
0001	00001.000	EA		0973667-0002	CONNECTOR, PLUG, 50 PIN	
0001A					P1	
0002	00001.000	EA		0973667-0001	CONNECTOR, SOCKET, 50 PIN	
0002A					P2	
0003	00004.000	FT		0972435-0007	INSUL SLEEVING,1.0" ID ZIPPER TUBE PVC	ZIP - ZTR-1000-63-2
0004	00030.000	FT		0772570-0005	CABLE, ELEC, FLAT (ST-1426-198-XL)	
0005	00001.000	FT		0411400-0016	WIRE, 16AWG, SOLID, UNINSULATED	
0006	00003.000	EA		0418201-0060	STRAP,MARKER,ADJUSTABLE,PLASTIC	QPL-MS-3368-1-98
0007	REF	EA		0973692-9901	WIRE LIST, MHD44 DAISY CHAIN CABLE ASSY	
0008	00043.000	EA		0411377-0006	CONTACT #24-28 ELECTRICAL MALE	1-00-1024P
0009	00043.000	EA		0411378-0004	CONTACT ELECT FEMALE	GE -11637
0010	00003.000	EA		0418722-0002	CONTACT PIN,CRIMP,REMOVABLE SIZE 16 & 20	MIL -MS17803-16-16
0011	00003.000	EA		0972739-0002	CONTACT #16 13 AMP SOCKET,CONNECTOR	006779-100-1016S

DRAFTSMAN DATE	CKD. DRAFTSMAN DATE	DESIGN ENGINEER DATE	TITLE
	3-11-77		CABLE ASSY, DAISY CHAIN, MHD44
APPD.-MFG. DATE	APPD. PROJECT ENGINEER DATE	RELEASED DATE	PROJECT NO. 5101 / PART NUMBER LM 0973675-0004 REV D

T.I. 13849



ASSEMBLY NOTES: UNLESS OTHERWISE SPECIFIED
1. ENTIRE ASSY. CONFORM TO TI SPECIFICATION S-105
2. MINIMUM PLATED THROUGH WALL THICKNESS .001
3. DESIGN MEETS TI STANDARD S-105
4. APPLY PROCESS 2 AND 3 TO AREA A BOTH SIDES
5. MARK USING ITEM 2
6. REGISTRATION MARKS ON ITEM 2 TO BE USED FOR POSITIONING MARKING AT HOLES SHOWN
7. ALL HOLES DRILLED ARE TO BE WITHIN .014 TRUE POSITION OF O-O DATUM WHEN PINNED TO PLANE A
8. FINISHED PWB SHALL MEET UL94V-2 FLAMMABILITY RATING AND BE MARKED WITH THE REQUIRED UL CODE NUMBER

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CN 409218 (C) R. [illegible] (1) ADDED 1 HOLE 93875G-2062 .062 THK PLATED (2) ADDED NOTE 8 (3) UPDATED REV LEVEL CONTROL BLOCK (4) CONDUCTOR & HOLE PATTERN NOT AFFECTED	10/28/75	[illegible]
	B	CN 383788 (C) R. [illegible] (1) DIM .505 WAS .480, .454 WAS .470 (2) ADDED DIM .608, 5.483, 5.585 & 39 SPACES ... +4.875 (3) CONDUCTOR PATTERN AFFECTED. HOLE PATTERN NOT AFFECTED (4) UPDATED REV LEVEL CONTROL BLOCK	12/11/75	[illegible]
	C	CN 422526 (E) A. [illegible] CONDUCTOR GROUP PATTERN NOT AFFECTED	11/23/76	[illegible]

HOLE SCHEDULE

SYM	FINISHED HOLE DIAMETER	REMARKS
+	.039 +.006 -.002	PLATED THRU [2]
X	.094 +.007 -.005	PLATED THRU [2]

[5] [8]	REF AR	2 1		MP973787-9801 (973787MP) 802778-17	MASTER PATTERN (ARTWORK) PLASTIC SHEET, UL APPROVED	
-2 QTY REQD	-1	ITEM NO	CODE IDENT	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	PROCUREMENT SPECIFICATION

PARTS LIST

PRINTED WIRING BOARD	*	A	B	C
MARKING AW	*	*	*	*
DRILL DECK	*	*	*	*
LAYER 1 COMPONENT SIDE	*	*	B	B
LAYER 2 CONDUCTOR SIDE	*	*	*	*
REVISION STATUS				

PROCESSES:
1. TIN-LEAD PLATE .000" THICKNESS MINIMUM PER F-10
4 2. NICKEL PLATE F-42, CLASS 1, TYPE II, .0003 THICKNESS MINIMUM
4 3. GOLD PLATE F-39, TYPE II CLASS 1, GRADE C, .00005 THICKNESS MINIMUM
4. MARK PER F-100, TYPE II CLASS 1, HEIGHT .12, COLOR BLACK
5 5. MARK PER F-100, TYPE I, COLOR BLACK

UNLESS OTHERWISE SPECIFIED
- REMOVE ALL BURRS AND SHARP EDGES
- CONCENTRICITY MACHINED DIAMETERS .010 FIR
- DIMENSIONAL LIMITS APPLY BEFORE FINISH PROCESSING
- IDENTIFYING NUMBERS SHOWN IN PARENTHESES FOR REFERENCE ONLY
- INTERPRET DRAWING IN ACCORDANCE WITH MIL-STD-100

HOLE TOLERANCE
.013 THRU .125 +.004 -.001; .126 THRU .250 +.005 -.001; .251 THRU .500 +.006 -.001
.501 THRU .750 +.008 -.001; .751 THRU 1.000 +.010 -.001; 1.001 THRU 2.000 +.012 -.001

973787	8101	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN INCHES
- TOLERANCES ANGLES ±1° 3 PLACE DECIMALS ±.010 2 PLACE DECIMALS ±.02

MATERIAL:

DWN	[illegible] DATE 7-10-74
CHK	[illegible] 7-10-74
ENGR	[illegible] 7-30-74
QA	[illegible] 8/1/74
APVD	[illegible] 7-30-74
CONTR NO	
DESIGN ACTIVITY RELEASE	[illegible] 8/1/74

TEXAS INSTRUMENTS INCORPORATED Equipment Group Dallas, Texas

PRINTED WIRING BOARD, MOVING HEAD DISC CONTROLLER #5

SIZE	CODE IDENT NO	DRAWING NO
D	96214	973787

SCALE 1/1 SHEET

973787 B

ALPHABETICAL INDEX

ALPHABETICAL INDEX

INTRODUCTION

The following index lists key words and concepts from the subject material of the manual together with the area(s) in the manual that supply major coverage of the listed concept. The numbers along the right side of the listing reference the following manual areas:

- Sections - References to Sections of the manual appear as "Section x" with the symbol x representing any numeric quantity.
- Appendixes - References to Appendixes of the manual appear as "Appendix y" with the symbol y representing any capital letter.
- Paragraphs - References to paragraphs of the manual appear as a series of alphanumeric or numeric characters punctuated with decimal points. Only the first character of the string may be a letter; all subsequent characters are numbers. The first character refers to the section or appendix of the manual in which the paragraph is found.
- Tables - References to tables in the manual are represented by the capital letter T followed immediately by another alphanumeric character (representing the section or appendix of the manual containing the table). The second character is followed by a dash (-) and a number:

  Tx-yy

- Figures - References to figures in the manual are represented by the capital letter F followed immediately by another alphanumeric character (representing the section or appendix of the manual containing the figure). The second character is followed by a dash (-) and a number:

  Fx-yy

- Other entries in the Index - References to other entries in the index are preceded by the word "See" followed by the referenced entry.

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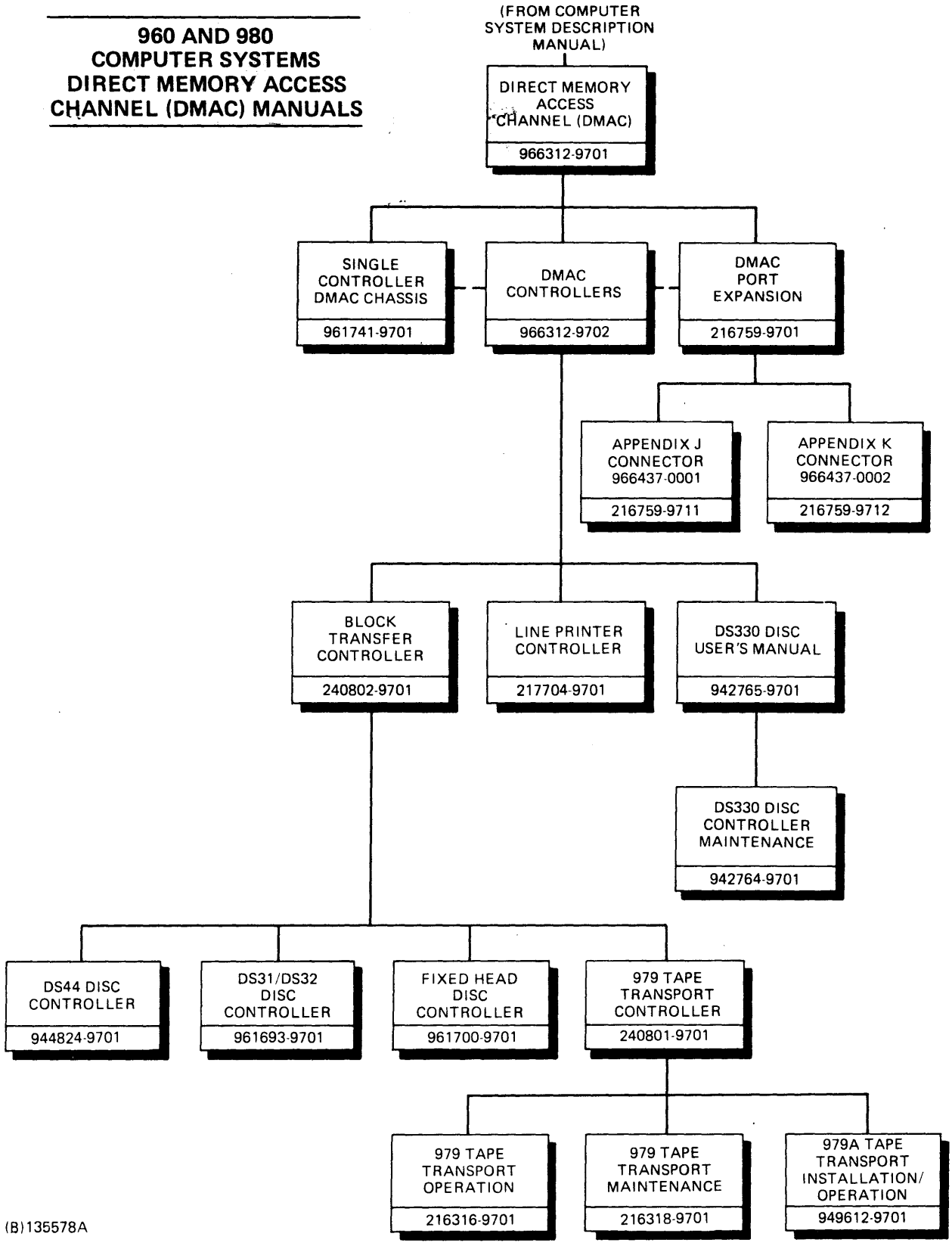

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