SPECIFICATION MANUAL
LARGE DISC ADAPTER

REV A

ZA-4036
F/N: 217304
REV. A

LARGE DISK ADAPTER
Specifications

ZA-4036
F/N 217304

GENERAL

The Large Disk Adapter (LDA) allows the attachment of up to eight
disk drives to a CHI central processor. The LDA is an integral
part of the processor I/O. The standard LDA supports up to eight
CHI 2330 model 2 disk drives.

The CHI 2330 model 2 disk drive with 79.3 megaword capacity has
nineteen recording surfaces. Each recording surface has 815 data
tracks with 16 sectors per track. Each sector has a capacity of
320 16 bit words. Cylinders 807 through 814 are reserved leaving
78.6 megaword user capacity. This drive is often referred to as
a 200 megabyte drive which describes its raw unformatted capacity.

The CHI LDA is not format compatible with other disk controllers.
Disk packs may only be interchanged between CHI systems equipped
with the LDA.

The LDA incorporates a special form of cyclical redundancy check
for data error detection and limited error correction. The error
correction procedure requires a significant amount of time;
therefore, operation retries will normally be done first under
automatic control of the LDA.

The sectors as recorded on the disk pack will always contain 320
data words, not counting the sector address. A larger or smaller
number of words, however, may be transferred with the LDA
accessing additional sectors or making up the difference.
When it is desired to transfer more than a single sector's worth
of data, it is only necessary to provide the sector address for
the beginning sector and the total word count desired. The LDA
will compute successive sector addresses and will cause new head
selects and seeks to occur when necessary.

The LDA incorporates a significantly different I/O protocol which
requires programming concepts new to the 2130 system. There is
only one XIO command. That command is a function control which
provides a memory address to the LDA. The LDA then begins cycle
stealing command words from successive memory locations beginning
at that address. Completion of the operation specified by the
command word will be flagged by an interrupt. All operations,
including transfer of status information, will be terminated in
this fashion. There are several special cases of the single XIO
that do not result in cycle stealing command words. These special
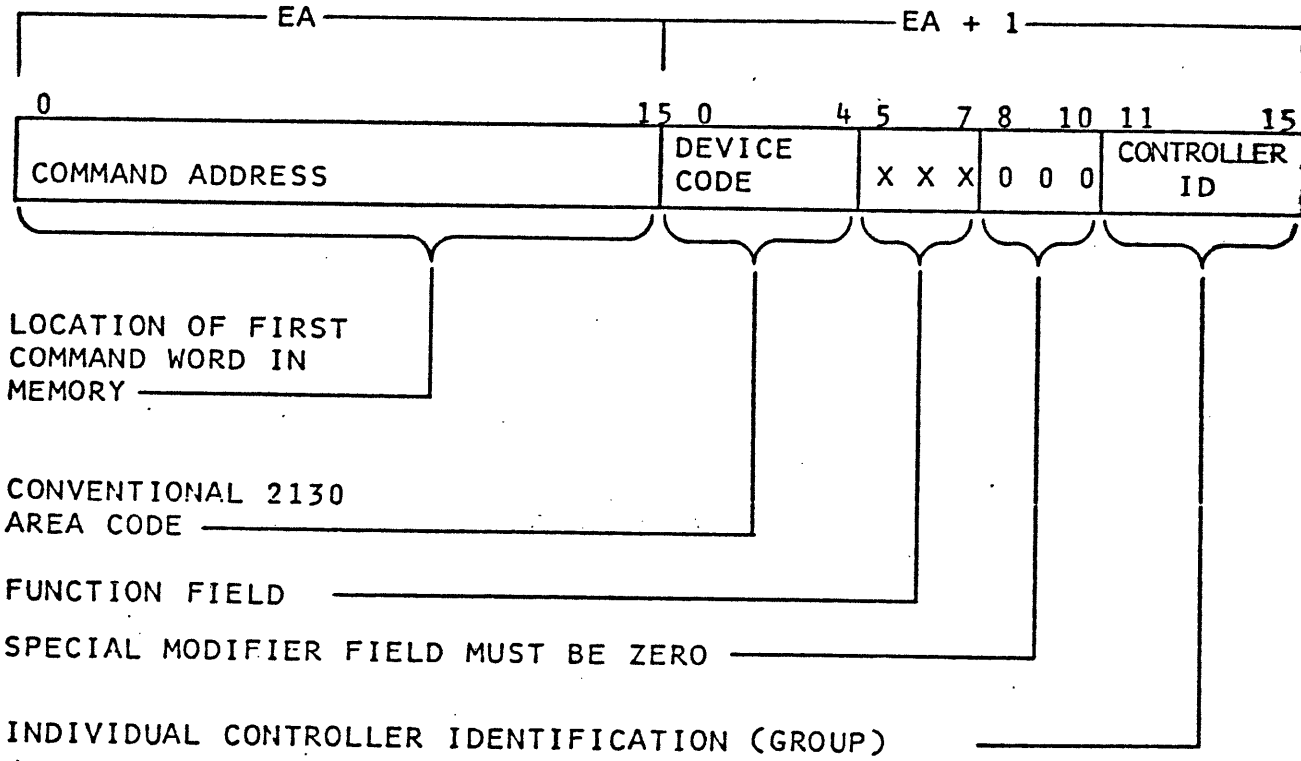cases are flagged by modifier bits in the XIO.

These modifier bits are involved with the following immediate operations: unmask interrupt; mask interrupt; reset interrupt; and halt controller.

A sequence of operations may be begun with a single XIO and there will be only one interrupt at the end of the last operation as long as each operation in the sequence completes normally. This is done by chaining command words. When command words are chained, an interrupt will not occur at the end of the operation specified by each command word, but instead the LDA will go to the next command word in the command buffer. Multiple non-contiguous command word buffers may be used by linking between buffers with the 'alternate command buffer' command word. If any operation associated with chain commands does not complete in a normal manner, then the rest of the command chain will not be executed but an interrupt will be presented.

X10 START

EA		EA + 1			
0 15	0 4	5 7	8 10	11 15
COMMAND ADDRESS	DEVICE CODE	X X X	0 0 0	CONTROLLER ID

LOCATION OF FIRST
COMMAND WORD IN
MEMORY

CONVENTIONAL 2130
AREA CODE

FUNCTION FIELD

SPECIAL MODIFIER FIELD MUST BE ZERO

INDIVIDUAL CONTROLLER IDENTIFICATION (GROUP)

X10 SENSE ILSW

```
|--------------- EA ---------------|------------------ EA + 1 ------------------|
 0                              15  0          4 5      7 8     10 11            15
|==================================|  0 0 0 0 0 | 0 1 1 | 0 0 0 | R R R R R |
```
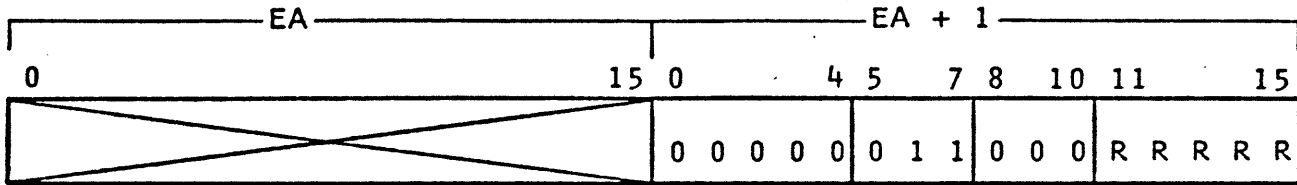
RESERVED FOR SECONDARY
ILSW, MUST BE ZERO

THERE ARE TWO ILSW BITS WHICH ARE INDIVIDUALLY ASSIGNABLE
TO ANY POSITION. ONE IS FOR THE OP END INTERRUPT THE OTHER
IS FOR THE PROGRAMMED INTERRUPT.

THE ADAPTER IS ASSIGNABLE TO ANY INTERRUPT LEVEL FROM 1 TO 5.

X10 IMMEDIATE

EA		EA + 1				
0 · · · · · · · · · · 15	0 · · · 4	5 · 7	8 · 10	11 · · · 15		

	DEVICE CODE	X X X	M M M	CONTROLLER ID

	M	M	M
UNMASK INTERRUPT	0	0	1
MASK INTERRUPT	0	1	0
RESET OP END INTERRUPT	0	1	1
RESET PROGRAMMED INTERRUPT	1	0	0
RESERVED	1	0	1
RESERVED	1	1	0
HALT CONTROLLER	1	1	1

SPECIAL MODIFIER FIELD

GENERAL COMMAND WORD FORMAT

COMMAND ADDRESS CONTENTS ———— COMMAND ADDRESS + 1 ————

0	7	8		11	12	15	0	15

COMMAND CODE	ST	CC	R	PI	RESERVED	ADDRESS OR OPERATION VALUE
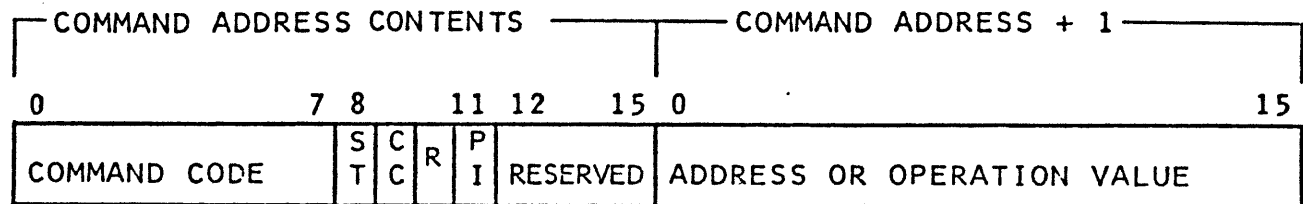
SEE INDIVIDUAL
COMMANDS FOR EXPLANATIONS

RESERVED FOR SPECIAL
DIAGNOSTIC FUNCTIONS

STANDARD OPERATION FLAGS

PROGRAMMED INTERRUPT

RESERVED, MUST BE ZERO

CHAIN COMMAND

SUPPRESS TRANSFER

X	X	X	X	0	0	0	0	INVALID
M	M	M	M	M	M	0	1	WRITE
M	M	M	M	M	M	1	0	READ
M	M	M	M	M	M	1	1	CONTROL
M	M	M	M	0	1	0	0	SENSE
M	M	M	M	1	0	0	0	ALTERNATE COMMAND BUFFER
M	M	M	M	1	1	0	0	RESERVED

X= DONT CARE
M= MODIFIER (SEE SPECIFIC COMMANDS)

COMMAND CODE

WRITE COMMAND


```
        ┌────────────── CW ──────────────┐┌─CW + 1─┬─CW + 2─┬─CW + 3─┬─CW + 4─┐
        0              78     12     150  cyl 150 HD sctr 150    150     15
       ┌──┬──┬─┬─┬─┬──┬──┬─┬─┬─┬──┬─┬─┬─┬─┬────────┬────────┬────────┬────────┐
       │R │  │I│S│D│  │S │C│ │P│S│S│S│S│ SECTOR │ SECTOR │ WORD   │ BUFFER │
       │C │R.R│D│R│W│0 1│T │C│O│1│ │ │ │ │ADDRESS │ADDRESS │COUNT   │ADDRESS │
       └──┴──┴─┴─┴─┴──┴──┴─┴─┴─┴──┴─┴─┴─┴─┴────────┴────────┴────────┴────────┘
```

|0|0|0|0| NORMAL OPERATION

SPECIAL DIAGNOSTIC FUNCTION

STANDARD OPERATION FLAGS

WRITE COMMAND CODE

DIAGNOSTIC WRITE

SUPPRESS AUTO ERROR RETRY

INITIALIZE SECTOR ID FIELD (NOTE)

RESERVED, MUST BE ZERO

PERFORM AUTOMATIC READ CHECK
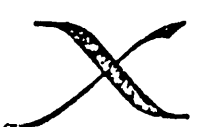
NOTE:
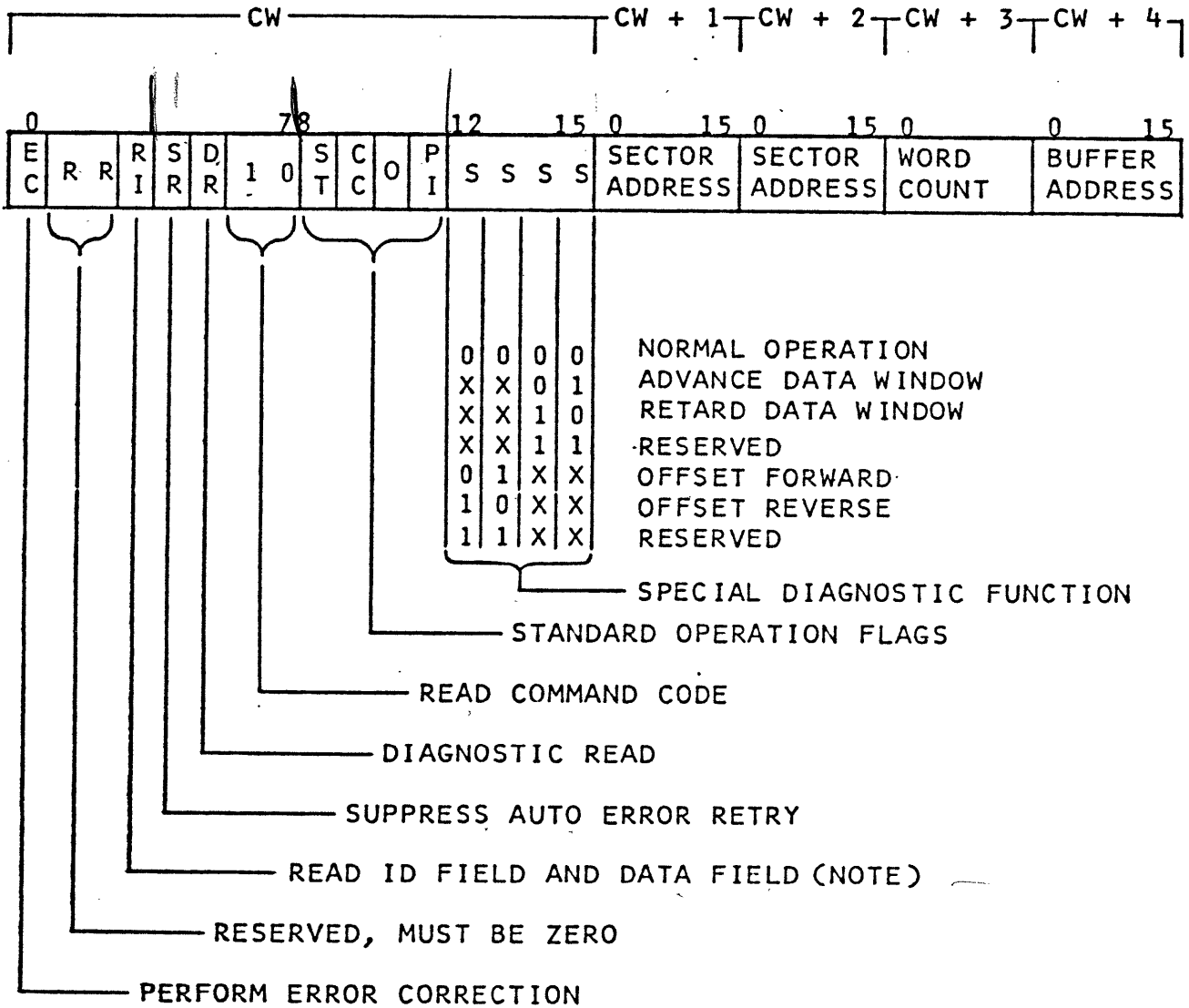CAUTION "INITIALIZE SECTOR ID FIELD" SHOULD ONLY BE DONE WHEN
THE CAPABILITY TO FLAG DEFECTIVE TRACKS AND ASSIGN ALTERNATE
TRACKS IS AVAILABLE.

READ COMMAND

					CW							CW + 1	CW + 2	CW + 3	CW + 4
0			R I	S R	D R	7 1	8 0	S T	C C	O	P I	12 S S S S 15	0 SECTOR ADDRESS 15	0 SECTOR ADDRESS 15	0 WORD COUNT 15	0 BUFFER ADDRESS 15
E C	R R															

0	0	0	0	NORMAL OPERATION
X	X	0	1	ADVANCE DATA WINDOW
X	X	1	0	RETARD DATA WINDOW
X	X	1	1	RESERVED
0	1	X	X	OFFSET FORWARD
1	0	X	X	OFFSET REVERSE
1	1	X	X	RESERVED

——— SPECIAL DIAGNOSTIC FUNCTION

——— STANDARD OPERATION FLAGS

——— READ COMMAND CODE

——— DIAGNOSTIC READ

——— SUPPRESS AUTO ERROR RETRY

——— READ ID FIELD AND DATA FIELD (NOTE)

——— RESERVED, MUST BE ZERO
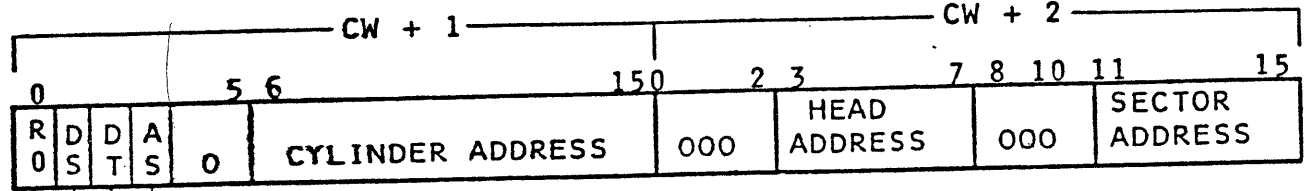
——— PERFORM ERROR CORRECTION

NOTE:

WHEN A READ ID AND DATA FIELD IS SPECIFIED WITH A WORD COUNT OF
2, ONLY THE ID FIELD WILL BE READ (AND ERROR CHECKED).

READ OR WRITE COMMAND

SECTOR ADDRESS FORMAT

CW + 1						CW + 2			
0		5 6		15	0	2 3	7	8 10 11	15
R 0	D S	D T	A S	0	CYLINDER ADDRESS	000	HEAD ADDRESS	000	SECTOR ADDRESS

ALTERNATE SECTOR FLAG

DEFECTIVE TRACK FLAG

DEFECTIVE SECTOR FLAG

READ ONLY FLAG

THESE BITS MAY ONLY BE ON WITH AND ARE USED IN CON- JUNCTION WITH THE INITIALIZE ID FLAG (BIT 3) OF THE WRITE COMMAND.
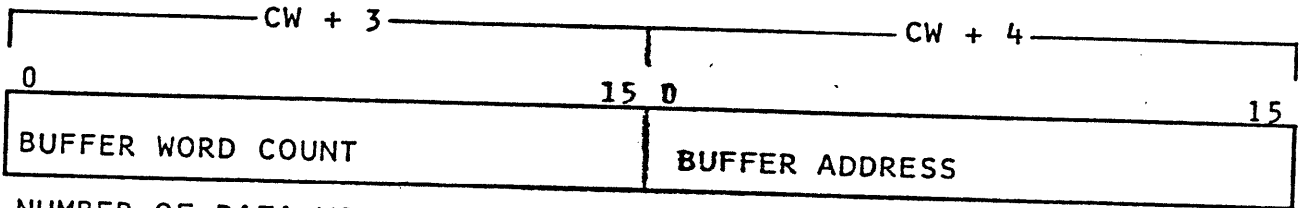
SECTOR ADDRESS IS FOR THE FIRST SECTOR. WHEN THE WORD COUNT EXCEEDS THE CAPACITY OF A SINGLE SECTOR, THE CONTROLLER WILL CALCULATE SUCCESSIVE SECTOR ADDRESSES IN A CYLINDER FORMAT.

RANGE OF DECIMAL VALUES

	29 MEGAWORD DRIVE	79 MEGAWORD DRIVE
CYLINDER ADDRESS	0-821	0-814
HEAD ADDRESS	0-4	0-18
SECTOR ADDRESS	0-23	0-15

READ OR WRITE COMMAND

```
        ┌──────────── CW + 3 ────────────┬──────────── CW + 4 ────────────┐
        0                              15 0                              15
        ┌────────────────────────────────┬────────────────────────────────┐
        │ BUFFER WORD COUNT              │ BUFFER ADDRESS                  │
        └────────────────────────────────┴────────────────────────────────┘
        NUMBER OF DATA WORDS             LOCATION OF FIRST DATA WORD
        IN MEMORY                        IN MEMORY
```
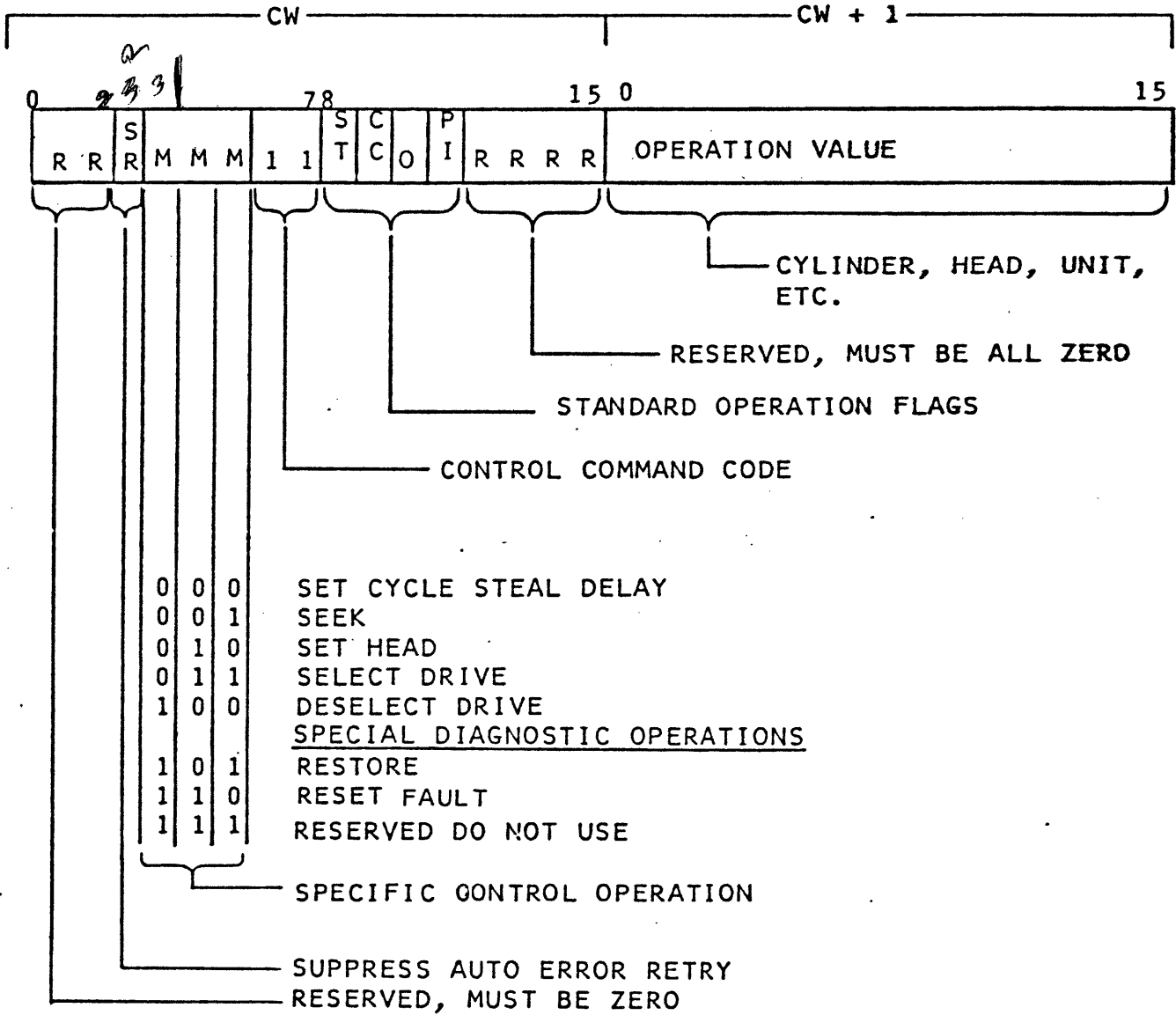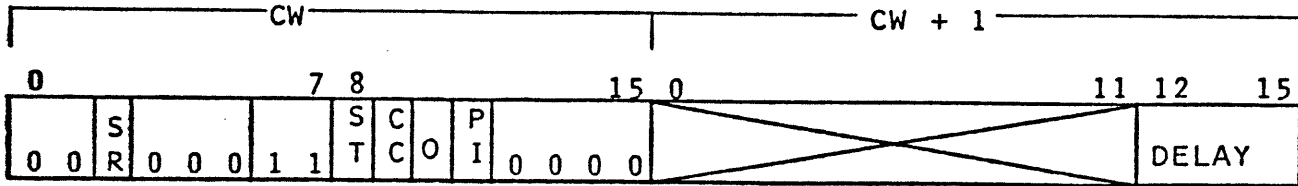
THE WORD COUNT MAY BE ANY VALUE BETWEEN 1 AND 65,535. THE
ADAPTER · WILL AUTOMATICALLY ACCESS SUCCESSIVE SECTORS IN A
CYLINDER FORMAT.

CONTROL COMMAND

| | | CW | | | | | | | CW + 1 | |

```
    0    2 3 3        7 8              15 0                        15
   ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──────────────────┐
   │  │  │S │  │  │  │  │  │S │C │  │P │  │  │  │  │                │
   │R │R │R │M │M │M │1 │1 │T │C │O │I │R │R │R │R │ OPERATION VALUE│
   └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──────────────────┘
```

CYLINDER, HEAD, UNIT, ETC.

RESERVED, MUST BE ALL ZERO

STANDARD OPERATION FLAGS

CONTROL COMMAND CODE

0	0	0	SET CYCLE STEAL DELAY
0	0	1	SEEK
0	1	0	SET HEAD
0	1	1	SELECT DRIVE
1	0	0	DESELECT DRIVE
			SPECIAL DIAGNOSTIC OPERATIONS
1	0	1	RESTORE
1	1	0	RESET FAULT
1	1	1	RESERVED DO NOT USE

SPECIFIC CONTROL OPERATION

SUPPRESS AUTO ERROR RETRY

RESERVED, MUST BE ZERO

SET CYCLE STEAL DELAY.

	CW								CW + 1		

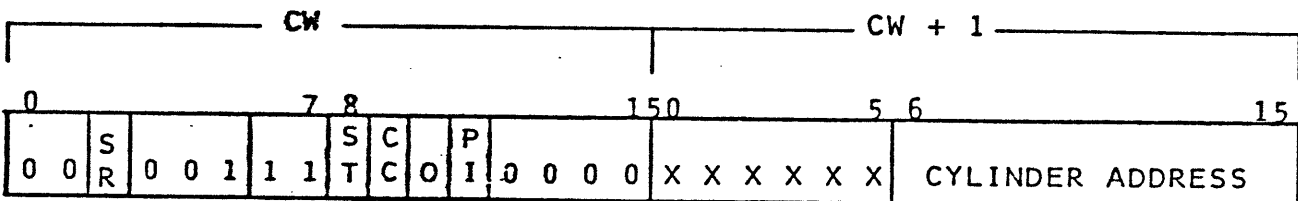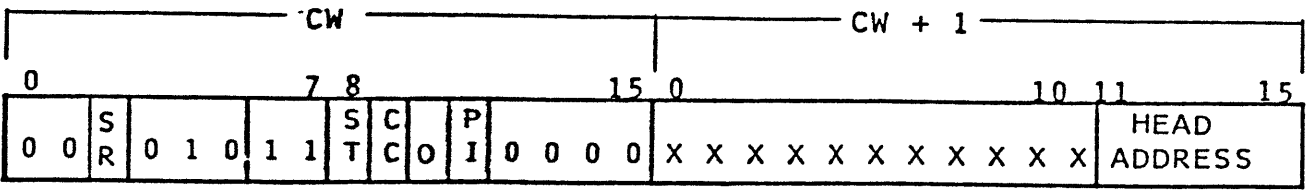| 0 | | S R | 0 0 0 | 1 1 | S T | C C | O | P I | 0 0 0 0 | | DELAY |

DELAY IS BINARILY ENCODED IN INCREMENTS OF .66 MICROSECONDS
FROM 0 TO 10 MICROSECONDS. THE DEFAULT CONDITION IS ZERO
DELAY.

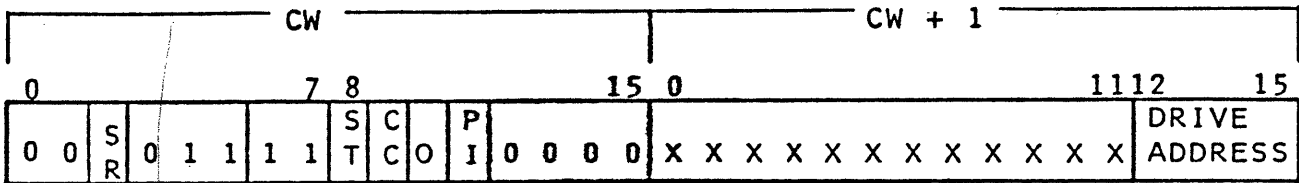## SEEK CONTROL COMMAND
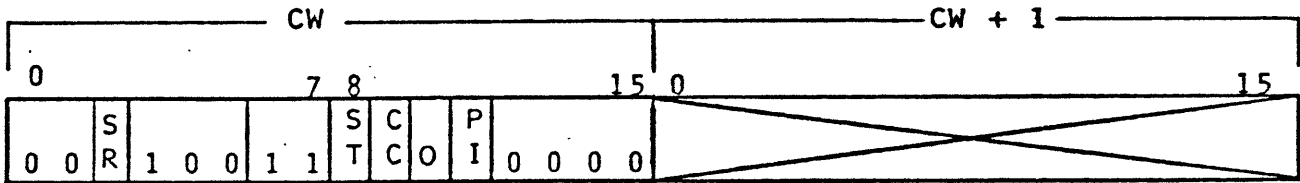
| 0 0 | S R | 0 0 1 | 1 1 | S T | C C | O | P I | 0 0 0 0 | X X X X X X | CYLINDER ADDRESS |

SET HEAD CONTROL COMMAND

| 0 0 | S R | 0 1 0 | 1 1 | S T | C C | O | P I | 0 0 0 0 | X X X X X X X X X X | HEAD ADDRESS |

SELECT DRIVE CONTROL COMMAND

CW																CW + 1															

0	0	S R	0	1	1	1	1	1	S T	C C	O	P I	0	0	0	0	X X X X X X X X X X X X	DRIVE ADDRESS

Positions: 0 ... 7 8 ... 15 | 0 ... 11 12 ... 15

DESELECT DRIVE CONTROL COMMAND

CW																CW + 1	

0	0	S R	1	0	0	1	1	S T	C C	O	P I	0	0	0	0	

Positions: 0 ... 7 8 ... 15 | 0 ... 15
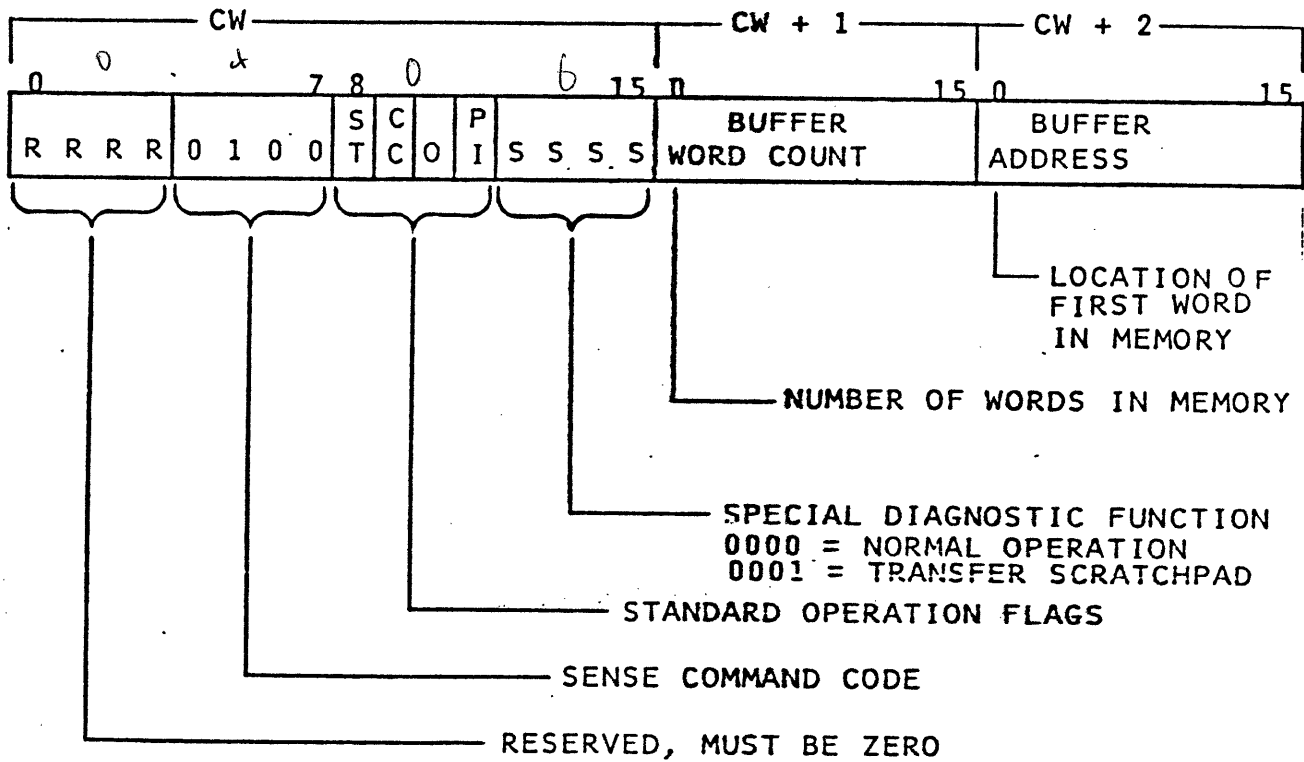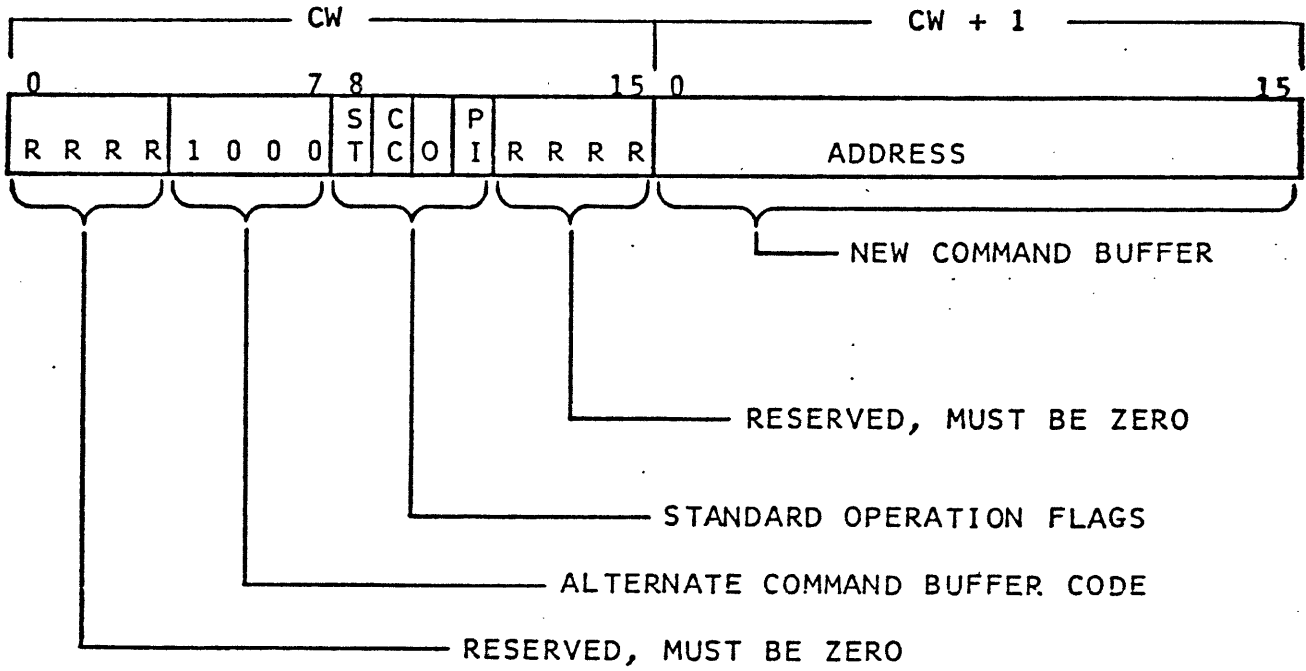
THIS COMMAND IS ONLY REQUIRED BY SYSTEMS UTILIZING DUAL PORT DISK DRIVES. NORMALLY A NEW DRIVE SELECT CONTROL COMMAND WILL OVERLAY THE OLD.

CHI

SENSE COMMAND

CW				CW + 1	CW + 2
0 7	8		15	0 15	0 15
R R R R 0 1 0 0	S T	C C	O	P I	S S S S	BUFFER WORD COUNT	BUFFER ADDRESS

LOCATION OF FIRST WORD IN MEMORY

NUMBER OF WORDS IN MEMORY

SPECIAL DIAGNOSTIC FUNCTION
0000 = NORMAL OPERATION
0001 = TRANSFER SCRATCHPAD

STANDARD OPERATION FLAGS

SENSE COMMAND CODE

RESERVED, MUST BE ZERO

ALTERNATE COMMAND BUFFER COMMAND

```
        ──── CW ────────────────           ──── CW + 1 ────────────
    0              7 8          15 0                              15
   ┌────────┬────────┬─┬─┬─┬─┬────────┬──────────────────────────────┐
   │        │        │S│C│ │P│        │                              │
   │R R R R │1 0 0 0 │T│C│O│I│R R R R │          ADDRESS             │
   └────────┴────────┴─┴─┴─┴─┴────────┴──────────────────────────────┘
```

NEW COMMAND BUFFER

RESERVED, MUST BE ZERO

STANDARD OPERATION FLAGS

ALTERNATE COMMAND BUFFER CODE

RESERVED, MUST BE ZERO

LDA STATUS WORDS

WORD ONE
BIT

0	OPERATION ERROR ABORT
1	SUCCESSFUL OPERATION END
2	NOT READY
3	INVALID COMMAND
4	NINETEEN SURFACE ID
5	DATA ERROR
6	NON CORRECTABLE DATA ERROR
7	DRIVE SEEK ERROR
8	WRITE PROTECTED
9	UNAVAILABLE CYLINDER ADDRESS
10	UNAVAILABLE HEAD ADDRESS
11	UNAVAILABLE SECTOR ADDRESS
12	DRIVE FAULT
13	INVALID COMMAND SEQUENCE
14	TRANSFER LOCKOUT
15	TWENTY-FOUR SECTOR TRACKS

OPERATION ERROR ABORT (WORD 1 BIT 0)

This bit is the logical "or" of all abnormal conditions.

If this bit is on, one or more of the following conditions will also be flagged.

DATA ERROR
NON CORRECTABLE DATA ERROR
WRITE PROTECTED ERROR
DRIVE SEEK ERROR
UNAVAILABLE CYLINDER ADDRESS
UNAVAILABLE HEAD ADDRESS
UNAVAILABLE SECTOR ADDRESS
READ/WRITE FAULT
UNAVAILABLE DRIVE
DRIVE RESERVED

The memory address of the command for which the error bit was set is provided in an additional status word.

If an error is still indicated at the end of the automatic error retry then the LDA will look for a sense command at the end of a command chain. The sense command will be executed if found and then an interrupt will be generated. If there is no sense command then the interrupt will be generated immediately.

,SUCCESSFUL OPERATION END (WORD 1 BIT 1)

Indicates that all commands fetched as a result of the last START XIO were executed without any abnormal conditions occurring.

NOT READY (WORD 1 BIT 2)

Attached drive cannot be accessed.

WRITE PROTECTED   (WORD 1   BIT 8)

Drive cannot be written to.   Is turned on with error when
read only sector is attempted to be written

NINETEEN SURFACE DR.   (WORD 1   BIT 4)

Indicates selected drive has 19 surfaces instead of 5.

LDA STATUS WORDS

WORD TWO
BIT

BIT		
0	UNAVAILABLE DRIVE	
1	MULTIPLE DRIVES SELECTED	
2	DRIVE RESERVED	
3	NO DRIVE SELECT ENABLED	
4	MSB	
5		
6	CURRENTLY SELECTED DRIVE	
7	LSB	
8		
9	RESERVED	
10		
11	MSB	
12		
13	NEXT AVAILABLE SECTOR	
14		
15	LSB	

LDA STATUS WORDS

WORD THREE

Memory address of last command fetched that was not a sense or transfer command buffer command.

If there was no error the address will be that of a read, write, or control command.

If there was an error the address will be that of the command for which the error occurred.

Will be all ones following DC reset

WORD FOUR

Will provide adapter control program version number in bits 0 thru 7, and modification number in bits 8 thru 15. Example: first controller will be version 1 mod 0 or /0100

WORD FIVE

WORD FIVE and beyond will be used for diagnostic status.

LDA STATUS WORDS

WORD FIVE   DIAGNOSTIC STATUS

Bit
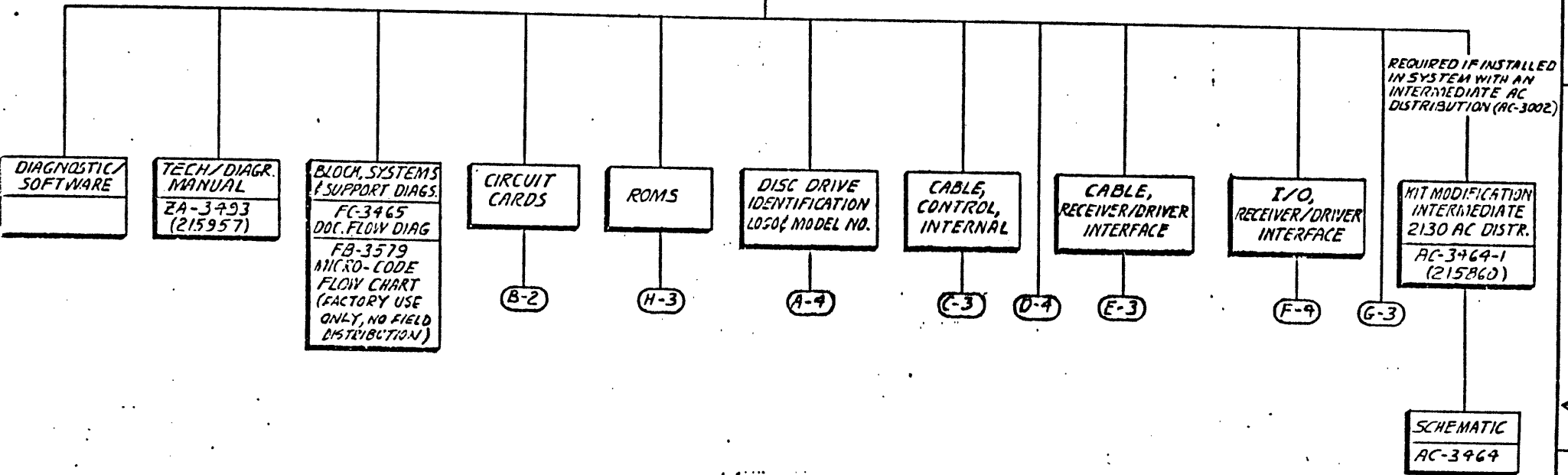| Bit	
0	Drive Fault
1	No Sync
2	ECC Error
3	Data Compare Error'
4	Offset Reverse
5	Offset Forward
6	Retard Data Window
7	Advance Data Window
8	Sector Overrun
9	Data Overrun
10	Defective Sector
11	Defective Track
12	Sector ID OK
13	Primary Sector ID Bad
14	Re Zero
15	Offset Error

LDA STATUS WORDS

WORD SEVEN

Host memory Address of First Word in Error

WORD EIGHT

Bit Mask to Correct Error (if error burst crossed word boundary then bit mask is folded around into a single word).

```
┌─────────────────────────────────────────────┐
│ LARGE DISC ADAPTER, LDAQI (MRX) 150 MB        │
│                                               │
│              AC-3483-1                         │
│              (215911)                          │
│                                               │
│ REFER TO SHEET 5 FOR I/O RECEIVER/DRIVER       │
│ INTERFACE DRIVE SELECT PLUG, AND SIGNAL        │
│ TERMINATION WIRING REQUIREMENTS.               │
└─────────────────────────────────────────────┘
```
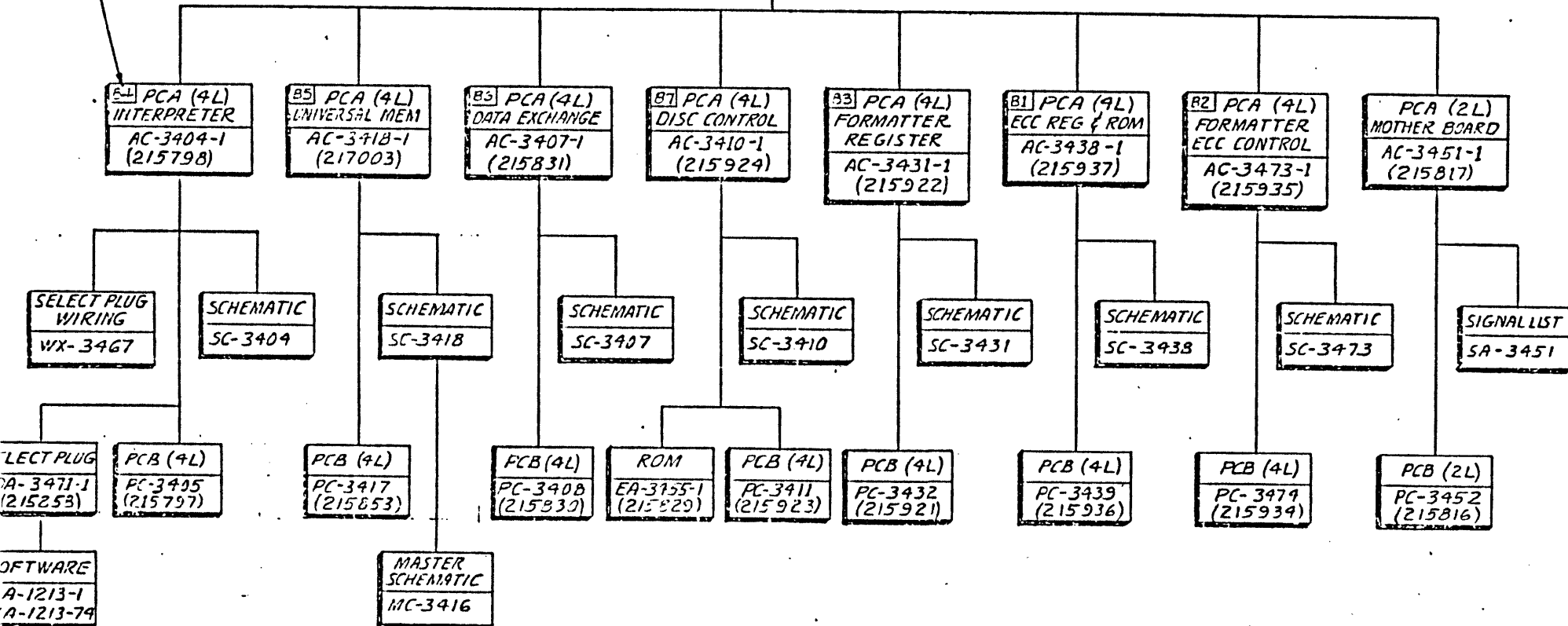
REQUIRED IF INSTALLED IN SYSTEM WITH AN INTERMEDIATE AC DISTRIBUTION (AC-3002)

| DIAGNOSTIC/ SOFTWARE | TECH/DIAGR. MANUAL ZA-3493 (215957) | BLOCK, SYSTEMS & SUPPORT DIAGS. FC-3465 DOC. FLOW DIAG FB-3579 MICRO-CODE FLOW CHART (FACTORY USE ONLY, NO FIELD DISTRIBUTION) | CIRCUIT CARDS | ROMS | DISC DRIVE IDENTIFICATION LOGO & MODEL NO. | CABLE, CONTROL, INTERNAL | CABLE, RECEIVER/DRIVER INTERFACE | I/O, RECEIVER/DRIVER INTERFACE | KIT MODIFICATION INTERMEDIATE 2130 AC DISTR. AC-3464-1 (215860) |

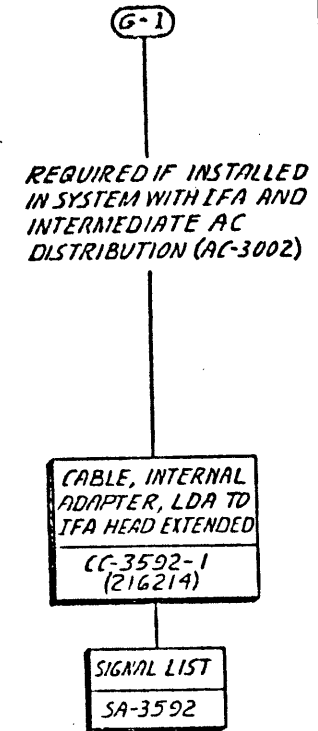B-2   H-3   A-4   C-3 D-4 E-3   F-9 G-3

SCHEMATIC
AC-3464

REFER TO
SHEET 1

(B)

| CIRCUIT
CARDS |

MOTHERBOARD POSITION
(REFERENCE ONLY)

| E1 PCA (4L)
INTERPRETER
AC-3404-1
(215798) | | B5 PCA (4L)
UNIVERSAL MEM
AC-3418-1
(217003) | | B3 PCA (4L)
DATA EXCHANGE
AC-3407-1
(215831) | | B7 PCA (4L)
DISC CONTROL
AC-3410-1
(215924) | | B3 PCA (4L)
FORMATTER
REGISTER
AC-3431-1
(215922) | | B1 PCA (4L)
ECC REG & ROM
AC-3438-1
(215937) | | B2 PCA (4L)
FORMATTER
ECC CONTROL
AC-3473-1
(215935) | | PCA (2L)
MOTHER BOARD
AC-3451-1
(215817) |

| SELECT PLUG
WIRING
WX-3467 | | SCHEMATIC
SC-3404 | | SCHEMATIC
SC-3418 | | SCHEMATIC
SC-3407 | | SCHEMATIC
SC-3410 | | SCHEMATIC
SC-3431 | | SCHEMATIC
SC-3438 | | SCHEMATIC
SC-3473 | | SIGNAL LIST
SA-3451 |

| ELECT PLUG
A-3471-1
(215253) | | PCB (4L)
PC-3405
(215797) | | PCB (4L)
PC-3417
(215853) | | PCB (4L)
PC-3408
(215830) | | ROM
EA-3155-1
(215529) | | PCB (4L)
PC-3411
(215923) | | PCB (4L)
PC-3432
(215921) | | PCB (4L)
PC-3439
(215936) | | PCB (4L)
PC-3479
(215934) | | PCB (2L)
PC-3452
(215816) |

| OFTWARE
A-1213-1
A-1213-79 | | MASTER
SCHEMATIC
MC-3416 |

X COMPUTER HARDWARE INC

| AC | 3483 | A1 |

C-1

CABLE, CONTROL, INTERNAL

CABLE VERSION DETERMINED BY CPU TYPE

2130 BUCKET

CABLE, CONTROL, INTERNAL
CC-3461-1 (215842)

SIGNAL LIST
SA-3461

BASIC PARTS
DC-3458-1 (215839)
DC-3459-1 (215841)

2130/2120 RACK MOUNT

CABLE, CONTROL, INTERNAL
CC-3461-3 (215843)

SIGNAL LIST
SA-3461

BASIC PARTS
DC-3458-3 (215840)
DC-3459-1 (215841)

32/30 RACK MOUNT

CABLE, CONTROL, INTERNAL
CC-3461-5 (215844)

SIGNAL LIST
SA-3461

BASIC PARTS
DC-3458-3 (215840)
DC-3459-1 (215841)

H-1

ROMS

MICROCODE PROGRAM LISTING
RA-3646-1 (216512)
(FACTORY USE ONLY, NO FIELD DISTRIBUTION)

ROMS	QTY
EA-3823-1 (217004)	1
EA-3824-1 (217005)	1
EA-3825-1 (217006)	1
EA-3826-1 (211007)	1
EA-3827-1 (217008)	1
EA-3828-1 (217009)	1
EA-3829-1 (217010)	1
EA-3830-1 (217011)	1
EA-3831-1 (217012)	1
EA-3832-1 (217013)	1
EA-3833-1 (217014)	1
EA-3834-1 (217015)	1

E-1

CABLE, RECEIVER/DRIVER INTERFACE

CABLE VERSION DETERMINED BY CPU TYPE

2100 SERIES

CABLE, RECEIVER/DRIVER INTERFACE
CC-3462-1 (215850)

32/30

CABLE, RECEIVER/DRIVER INTERFACE
CC-3462-3 (215851)

G-1

REQUIRED IF INSTALLED IN SYSTEM WITH IFA AND INTERMEDIATE AC DISTRIBUTION (AC-3002)

CABLE, INTERNAL ADAPTER, LDA TO IFA HEAD EXTENDED
CC-3592-1 (216214)

SIGNAL LIST
SA-3592

COMPUTER HARDWARE INC

AC 3483 A1
3 - 7

A

DISC DRIVE IDENTIFICATION (LOGO & MODEL NO.)

...E REQUIRED FOR EACH
...RIVE USED IN SYSTEM
...PLY OVER EXISTING LOGO

DISC DRIVE IDENTIFICATION (LOGO & MODEL NO)

DA-3593-1 (216215)

ARTWORK

HA-3593

F

I/O, RECEIVER / DRIVER INTERFACE

I/O VERSION DETERMINED BY CPU TYPE

2130 BUCKET

I/O, RECEIVER / DRIVER INTERFACE
AC-3454-1 (215814)

PCA (4L) RCVR/DRIVER ✱
AC-3413-1 (215855)

SIGNAL LIST
SA-3454

SCHEMATIC
SC-3413

PCB (4L)
PC-3414 (215852)

BASIC PARTS
DC-3448-1 (215811)
DA-3449-1 (215813)

2130/2120 RACK MOUNT

I/O, RECEIVER / DRIVER INTERFACE
AC-3454-3 (215815)

PCA (4L) RCVR/DRIVER ✱
AC-3413-1 (215855)

SIGNAL LIST
SA-3454

SCHEMATIC
SC-3413

PCB (4L)
PC-3414 (215852)

BASIC PARTS
DC-3448-3 (215812)
DA-3449-1 (215813)

32/30 RACK MOUNT

I/O, RECEIVER / DRIVER INTERFACE
AC-3454-5 (215857)

PCA (4L) RCVR/DRIVER ✱
AC-3413-3 (215856)

SIGNAL LIST
SA-3454

SCHEMATIC
SC-3413

PCB (4L)
PC-3414 (215852)

BASIC PARTS
DC-3448-3 215812
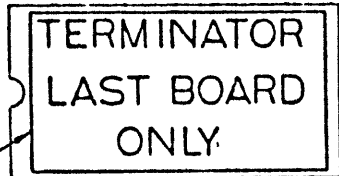DA-3449-1 (215813)

D

SUPPORT, RIBBON CABLE
DC-3539 (216217)

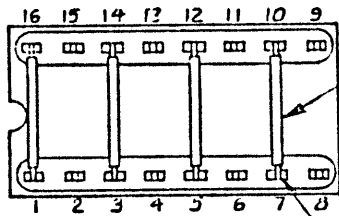✱REFER TO SHEET 5 FOR UNIQUE DRIVE SELECT PLUG TERMINATION & WIRING

AC 3483

X COMPUTER HARDWARE INC

AC 3483 4.7 A1

DETAIL B (IC POSITION "7")

RECEIVER/DRIVER TERMINATOR PLUG WIRING
ONE REQUIRED PER LDA

TERMINATOR
LAST BOARD
ONLY

LABEL
DA-3498-1
P/N 215965

16 15 14 13 12 11 10 9

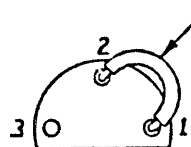30 AWG WIRE
DD-1002-59
P/N 211493
4 PLACES

1 2 3 4 5 6 7 8

ALL CONNECTIONS MUST
BE REFLOW SOLDERED.
(TIN BOTH PIN AND WIRE.
THEN HOLD WIRE ON PIN
AND APPLY JUST ENOUGH
HEAT TO MELT SOLDER.
PLUG MUST BE FREE
STANDING WHEN THIS IS
DONE.)

HEADER & COVER
2049 JER
211762

NOTE: TERMINATOR PLUG TO BE USED ONLY ON LAST
CARD IN RECEIVER/DRIVER CHAIN. USE
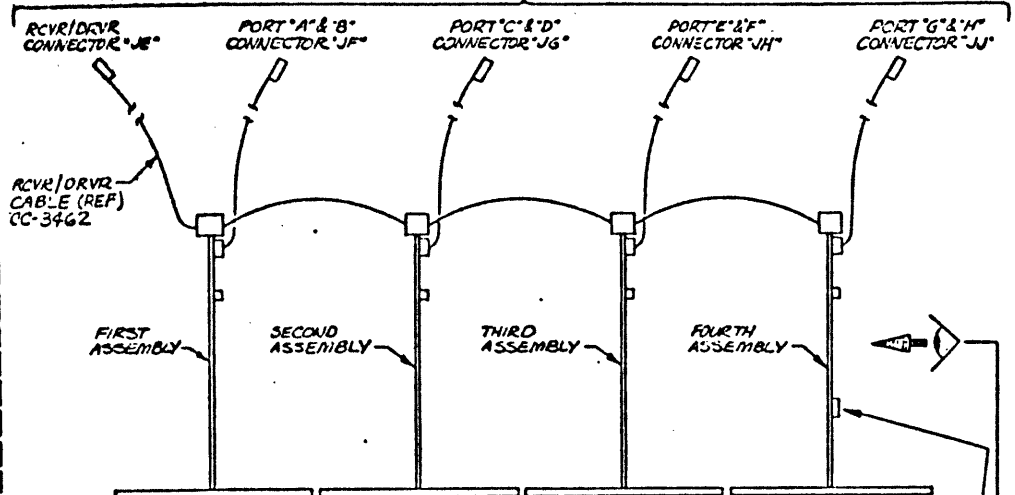LABEL DA-3498-1 SHOWN ABOVE.

DETAIL A

JUMPER WIRE CONFIGURATION

26 AWG WIRE
DO NOT SOLDER

2

3   1

USED IN 3 PLACES
(POSITIONS A, B, & C)
ON EACH RECEIVER/DRIVER CARD.

ALL CONNECTORS ATTACH DIRECTLY TO DISC
CONTROL PCA, CARD "7" (AC-3410)

RCVR/DRVR
CONNECTOR "JE"   PORT "A" & "B"
CONNECTOR "JF"   PORT "C" & "D"
CONNECTOR "JG"   PORT "E" & "F"
CONNECTOR "JH"   PORT "G" & "H"
CONNECTOR "JJ"

RCVR/DRVR
CABLE (REF)
CC-3462

FIRST
ASSEMBLY   SECOND
ASSEMBLY   THIRD
ASSEMBLY   FOURTH
ASSEMBLY

"LDA" RCVR/DRVR & I/O CONNECTOR INSTALLATION (TOP VIEW)
MAXIMUM (8 DRIVES) CONFIGURATION SHOWN

FIRST RCVR/DRVR INTERFACE I/O ASSEMBLY (AC-3454). ONE
ASSEMBLY WILL SUPPORT "2" DRIVES, EACH CIRCUIT CARD
REQUIRES JUMPERS TO BE ADDED (3 PLACES) REFER TO DETAIL "A"

THE LAST ASSEMBLY (IN SEQUENCE) CIRCUIT CARD ALSO REQUIRES
A SIGNAL TERMINATION PLUG IN IC POSITION "7"
REFER TO DETAIL "B"

X COMPUTER HARDWARE INC

AC   3483   A1
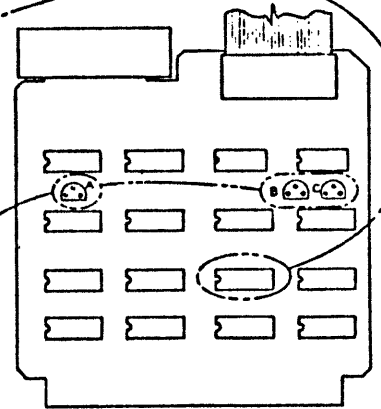
LDA MEMORY FUNCTION (REFERENCE)

CHI 2100 OR 32/30 SERIES CPU I/O CAGE
(REFERENCE)

POSITION "5" MEMORY AC-3418-1 (217003) REFERENCE

POSITIONS RELATIVE TO EACH OTHER.

1 2 3 4   6 7

5

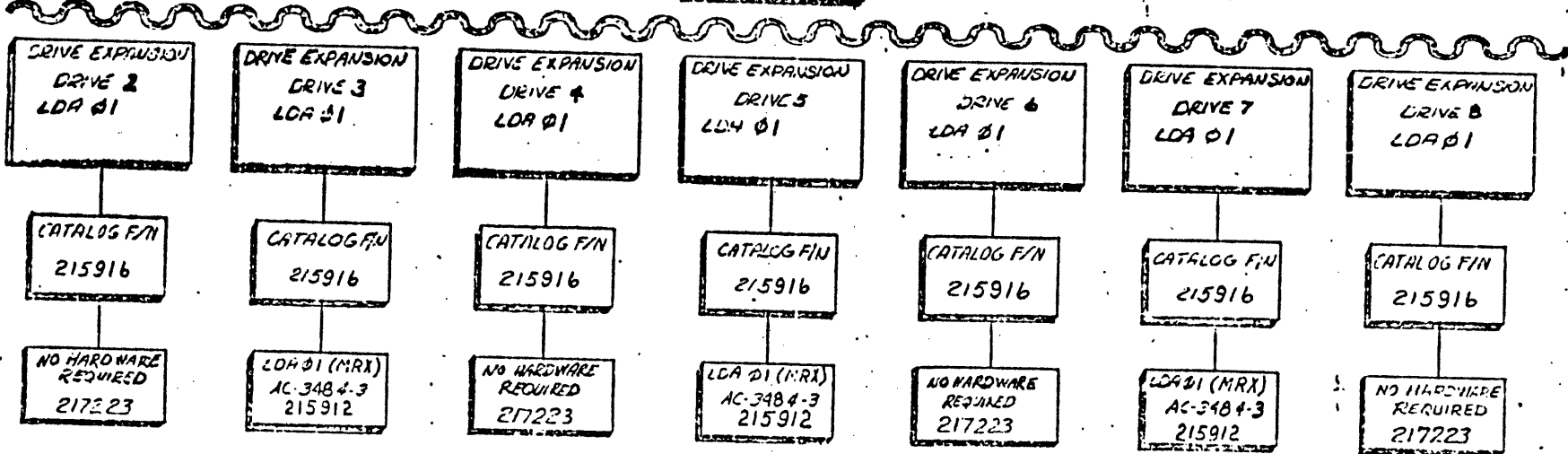LARGE DISC ADAPTER
7 CIRCUIT CARDS

25

29

33 XA-3333-1

37 XA-3331-1

41 XA-3577-1

45 XA-3625-1

49 XA-3625-1

53 XA-3233-1

26

30

34 XA-3557-1

38 XA-3327-1

42 XA-3623-1

46 XA-3630-1

50 XA-3626-1

54 XA-3624-1
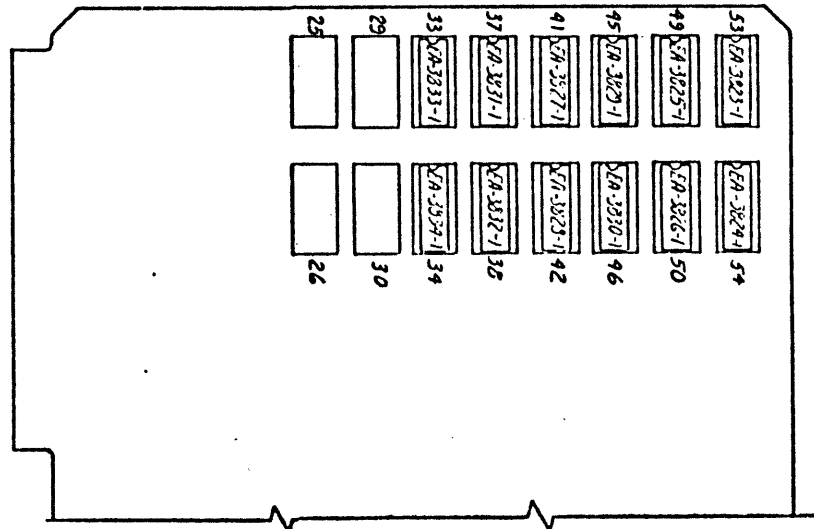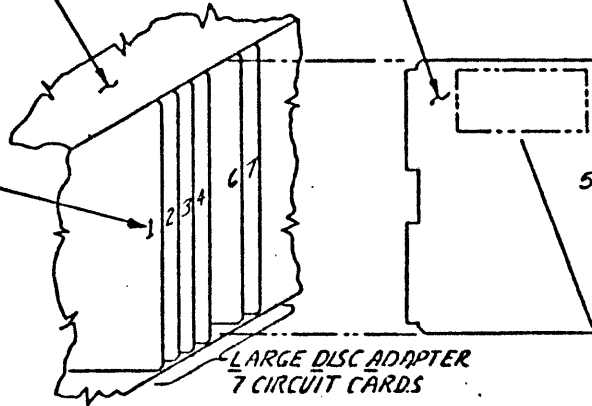
AC 3483

AC | 3483 | A1
6 of 7

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┌─────────────────────────────────────────────────────────────────┐
│ LARGE DISC ADAPTER :  WILL SUPPORT USER FORMATTED 150            │
│        LDA Ø1          MEGABYTE (79 MEGA WORD) DRIVES            │
│  (FEATURE NUMBER)      (200 MEGABYTE RAW UNFORMATTED CAP)        │
└─────────────────────────────────────────────────────────────────┘
                              │
                    ┌──────────────────┐
                    │  CATALOG F/N     │
                    │    215915        │
                    └──────────────────┘
                              │
                    ┌──────────────────┐
                    │ DRIVE EXPANSION  │
                    │    DRIVE 1       │
                    │  LDA Ø1 (MRX)    │
                    │  AC-3483-1       │
                    │    215911        │
                    └──────────────────┘
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DRIVE EXPANSION DRIVE 2 LDA Ø1	DRIVE EXPANSION DRIVE 3 LDA Ø1	DRIVE EXPANSION DRIVE 4 LDA Ø1	DRIVE EXPANSION DRIVE 5 LDA Ø1	DRIVE EXPANSION DRIVE 6 LDA Ø1	DRIVE EXPANSION DRIVE 7 LDA Ø1	DRIVE EXPANSION DRIVE 8 LDA Ø1
CATALOG F/N 215916	CATALOG F/N 215916	CATALOG F/N 215916	CATALOG F/N 215916	CATALOG F/N 215916	CATALOG F/N 215916	CATALOG F/N 215916
NO HARDWARE REQUIRED 217223	LDA Ø1 (MRX) AC-3484-3 215912	NO HARDWARE REQUIRED 217223	LDA Ø1 (MRX) AC-3484-3 215912	NO HARDWARE REQUIRED 217223	LDA Ø1 (MRX) AC-3484-3 215912	NO HARDWARE REQUIRED 217223

NOTE: SALES ORDER MUST SPECIFY THE DISC DRIVE NUMBER WHEN ORDERING A DRIVE EXPANSION.

LARGE DISK ADAPTER

GENERAL BLOCK DIAGRAM

HOST
PROCESSOR
I/O BAY

LOW SPEED DATA AND PROGRAM CONTROL

HIGH SPEED DATA

INTERPRETER
(MICRO
PROCESSOR)

MEMORY
(CONTROL
STORAGE)

DISK CONTROL
(RCVR/DRVR)

CONTROL AND STATUS

LOW SPEED DATA BUS

ECC
REGISTERS
(R/W CLK MPX)

DISC
DRIVE

DATA
EXCHANGE
(FIFO BUFFER)

FORMATTER
CONTROL

FORMATTER
REGISTERS
(SER-DES)

READ/WRITE DATA

HIGH SPEED DATA BUS