IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DTSMA-B-D

PRODUCT NAME: M.P.G. SUMMARY MANUAL

DATE: OCTOBER 1978

MAINTAINED BY: DIAGNOSTIC ENGINEERING

AUTHOR: A. W. LEIGH

Table of Contents

M.P.G. SUMMARY MANUAL

1.0 INTRODUCTION

This manual contains a summary of the operating information for the Maintenance Program Generator (MPG) program. This information has been extracted from the MPG users' manual and is intended for persons who are familiar with MPG and would like a check-list of the information used in operation of MPG.

Persons not familiar with MPG should refer to the M.P.G. USERS' MANUAL (MAINDEC-11-DTUMA-x-D).

2.0 LOADING INFORMATION

This section contains information for loading MPG into memory.

2.1 TC11 DECTAPE

2.1.1 Hardware Bootstrap

BA	Bootstrap Type
773100	BM792-YB (SR = 777344)
773120	MR11-DB
773030	BM873-YA
773070	BM873-YB

2.1.2 Software Bootstrap

BA	Machine Instruction
010000	012700
010002	177344
010004	012710
010006	177400
010010	012740
010012	004002
010014	005710
010016	100376
010020	012710
010022	000003
010024	105710
010026	100376
010030	012710
010032	000005
010034	105710
010036	100376
010040	005007

2.2 RK11 DECPACK DISK

2.2.1 Hardware Bootstrap

BA	Bootstrap Type
773100	BM792-YB (SR = 777406)
773110	MR11-DB
773010	BM873-YA
773030	BM873-YB

2.2.2 Software Bootstrap

BA	Machine Instruction
010000	012700
010002	177406
010004	012710
010006	177400
010010	012740
010012	000005
010014	105710
010016	100376
010020	005007

2.3 TM11 MAGTAPE

2.3.1 Hardware Bootstrap

BA	Bootstrap Type
773136	MR11-DB
773050	BM873-YA
773110	BM873-YB

2.3.2 Software Bootstrap

BA	Machine Instruction
010000	012700
010002	172524
010004	005310
010006	012740
010010	060011
010012	105710
010014	100376
010016	005710
010020	100767
010022	012710
010024	060003
010026	105710
010030	100376
010032	005710
010034	100777
010036	005007

2.4 TM02 MAGTAPE

2.4.1 Hardware Bootstrap

BA	Bootstrap Type
773150	BM873-YB

2.4.2 Software Bootstrap

BA	Machine Instruction
010000	012700
010002	172440
010004	012760
010006	001300
010010	000032
010012	012760
010014	177777
010016	000006
010020	012710
010022	000031
010024	005760
010026	000012
010030	100375
010032	012760
010034	177400
010036	000002
010040	012710
010042	000071
010044	105710
010046	100376
010050	005710
010052	100777
010054	005007

2.5 RX11 FLOPPY DISK

2.5.1 Hardware Bootstrap

BA	Bootstrap Type
173400	BM792-YL

2.5.2 Software Bootstrap

BA	Machine Instruction
010000	005000
010002	012701
010004	177170
010006	105711
010010	001776
010012	012711
010014	000003
010016	005711
010020	001776
010022	100406
010024	105711
010026	100003
010030	116120
010032	000002
010034	000770
010036	005007
010040	000000
010042	000776

2.6 RP04 DISK

2.6.1 Hardware Bootstrap

BA	Bootstrap Type
773320	BM873-YB

2.6.2 Software Bootstrap

BA	Machine Instruction
010000	012700
010002	176700
010004	012710
010006	000023
010010	005060
010012	000034
010014	005060
010016	000006
010020	012760
010022	177400
010024	000002
010026	012710
010030	000071
010032	105710
010034	100376
010036	005007

3.0 MPG COMMANDS

The following commands can be used to give instructions to the MPG executive control program:

```
ENTER p
ENTER p AS name
RUN
RUN p
RUN p AT ln
STOP p
CONT p
KILL p
ASSIGN mdl TO p
ASSIGN mdl,u,u,u TO p
ASSIGN mdl,u TO LIST                (also SAVE and FETCH)
DELETE p
REPORT p
REPORT p COUNTS                     (also STATUS)
OPSW oooo
OPSWp oooo
SHIFT p TO bbbb                     (Memory Mgmnt only)
UBMAP p                             (Memory Mgmnt only)
FILL BFnn WITH *aaa...a
FILL BFnn WITH oooo,oooo,etc
FILL BFnn WITH #aaa...a
FILL BUF WITH *aaa...a
FILL BUF WITH PATn
FILL COMn WITH oooo
FILL COM WITH *aaa...a
MODIFY p
DISPLAY p
DISPLAY p CODE
/SAVE p
/SAVE p AS name
/FETCH name AS p
/DELETE name
/LIST
/LIST ALL
/ZERO
/BOOT
MM
MM p.p.p                            (Memory Mgmnt only)
FM
```

(continued on next page)

```
RDM bbbb,cccc
WRM bbbb,oooo
BOC bbbb,cccc
ADD ooɔo,oooo
SUB oooo,oooo
CBD ooɔo
CDB dddd
*
aaaa     = ASCII characters
bbb,ccc  = absolute memory addresses
dddd     = Decimal number
ln       = Line Number
mdl      = Model number
name     = program NAME
oooo     = Octal number
p        = Program number
u        = Unit number
```

4.0 USER PROGRAM STATEMENTS

The following statements can be used in programs written by persons using MPG:

```
LOAD   a  WITH v
INCR   a
INCR   a  BY v
DECR   a
DECR   a  BY v
MOVE                                (NBR,SRC,DST)
MOVE   a  TO a
MOVE   b  AT a TO a
ADD    a  TO a
ADD    b  AT a TO a
SUB    a  FROM a
SUB    b  AT a FROM a
NEGATE a
SET    a  BIT n
SET    a  BIT n THRU n AND n        (-,&)
CLEAR  a  BIT n
CLEAR  a  BIT n AND n THRU n        (-,&)
IF     a  BIT n SET GO TO ln        (SET,CLEAR)
IF     a  BIT n&n-n CLEAR GO TO ln  (CLEAR,SET)
IF     a  = a GO TO ln              (=,>,<,=>,<=,<>)
IF     b  AT a = a GO TO ln         (=,<>)
GO TO  ln
LINK   ln
RETURN
PRINT  *  ascii text
PRINT  #  ascii text
PRINT  a  IN BINARY                 (BINARY,OCTAL,DECIMAL,ASCII)
PRINT  b  AT a IN ASCII             (ASCII,OCTAL,DECIMAL,BINARY)
FILL   a  WITH RANDOM               (RANDOM,ASCII,variable,PATn)
FILL   b  AT a WITH ASCII           (ASCII,RANDOM,variable,PATn)
ROTATE b
ROTATE b  AT a
PAUSE
DELAY  v
VERIFY a  WITH a
VERIFY b  AT a WITH a
VECTOR a  TO ln                     (N/A for Memory Mgmnt)
letgo
entry
```

(continued on next page)

```
EXIT
RESET                              (N/A for Memory Mgmnt)
word    v
end
done
*
a  = bus Address of location
b  = number of Bytes
ln = Line Number
n  = bit Number
v  = octal or decimal Value or address if a symbolic name
```

5.0 USER PROGRAM EXCLUSIVE STORAGE AREAS

The following one-word storage areas are available to each user program:

TM00	TM04	TM08	TM12
TM01	TM05	TM09	TM13
TM02	TM06	TM10	TM14
TM03	TM07	TM11	TM15

The following I/O buffers are available to each user program.

RDIO WRIO

The following storage areas are used with the indirect MOVE statement:

NBR SRC DST

The operator switch word is:

OPSW

6.0 USER PROGRAM COMMON STORAGE AREAS

The following one-word storage areas are shared by all user programs:

COM0	COM5
COM1	COM6
COM2	COM7
COM3	COM8
COM4	COM9

The following 16 byte storage areas are shared by all user programs:

BUF/BF00	BF04	BF08	BF12
BF01	BF05	BF09	BF13
BF02	BF06	BF10	BF14
BF03	BF07	BF11	BF15

The I/O area which is shared by all user programs is called:

FREE

The center of this area is called:

MIDL

An area which contains the ASCII code for a carriage return and a line feed is:

CRLF

7.0 PRE-DEFINED DATA PATTERNS

The following pre-defined data patterns are available to user programs.

PAT0	100000	WALKING ONES
	040000	
	020000	
	010000	
	etc	
PAT1	077777	WALKING ZEROES
	137777	
	157777	
	167777	
	etc	
PAT2	100000	EXPANDING ONES
	140000	
	160000	
	170000	
	etc	
PAT3	077777	EXPANDING ZEROES
	037777	
	017777	
	007777	
	etc	
PAT4	125252	ALTERNATE ONES (HORIZ.)
	125252	
	125252	
	125252	
	etc	
PAT5	052525	ALTERNATE ZEROES (HORIZ.)
	052525	
	052525	
	052525	
	etc	
PAT6	177777	ALTERNATE ONES (VERT.)
	000000	
	177777	
	000000	
	etc	

```
PAT7    000000      ALTERNATE ZEROES (VERT)
        177777
        000000
        177777
          etc

PAT8    070707      OCTAL CHECKERBOARD
        107070
        070707
        107070
          etc

PAT9    125252      BINARY CHECKERBOARD
        052525
        125252
        052525
          etc

PATA    000000      COUNT WORDS
        000001
        000002
        000003
          etc

PATB    165555      RP04 SERIAL DATA
        133333
        165555
        133333
          etc
```

8.0 MINIMUM SUPPORT DEVICES

The devices listed below have symbolic names defined for their registers.

DEVICE	NAME	DISPL	DESCRIPTION
CD11	CDST	+0	Card Status
	CDCC	+2	Column Count
	CDBA	+4	Current Address
	CDDB	+6	Card Data
CR11	CRS	+0	Card Status
CM11	CRB1	+2	Card Data
	CRB2	+4	Card Data Compressed
DC11	RCSR	+0	Receiver Status
	RBUF	+2	Receiver Data Buffer
	TSCR	+4	Transmitter Status
	TBUF	+6	Transmitter Data Buffer
DN11	ACU	+0	Auto Call Unit
KW11	KWSC	+0	R.T. Clock Status
	KWBR	+2	R.T. Clock Buffer
	KWCR	+4	R.T. Clock Counter
	LKS	+5006	Line Time Clock Status
RC11	RCLA	+0	Look Ahead
	RCDA	+2	Disk Address
	RCER	+4	Error Status
	RCCS	+6	Disk Status
	RCWC	+10	Word Count
	RCCA	+12	Current Address
	RCMN	+14	Maintenance
	RCDB	+16	Disk Data
RF11	DCS	+0	Disk Status
	WC	+2	Word Count
	CMA	+4	Current Mem Adrs
	DAR	+6	Disk Address
	DAE	+10	Adrs Ext Error
	DBR	+12	Disk Data
	MA	+14	Maintenance
	ADS	+16	Look Ahead
RX11	RXCS	+0	Command and Status
RX01	RXDB	+2	Data Buffer
	RXTA	+2	Track Address
	RXSA	+2	Sector Address
	RXES	+2	Error and Status

TA11	TACS	+0	Cassette Status
	TADB	+2	Cassette Data
TM02	MTC1	+0	Control and Status 1
TU16	MTWC	+2	Word Count
	MTBA	+4	Unibus Address
	MTFC	+6	Frame Count
	MTC2	+10	Control and Status 2
	MTDS	+12	Drive Status
	MTER	+14	Error
	MTAS	+16	Attention Summary
	MTCC	+20	Character Check
	MTDB	+22	Data Buffer
	MTMR	+24	Maintenance
	MTDT	+26	Drive Type
	MTSN	+30	Serial Number
	MTTC	+32	Tape Control

9.0 DEVICE ROUTINES

9.1 DJ11 16 LINE-ASYNCHRONOUS SERIAL LINE MULTIPLEXER

9.1.1 Register Names

CSR RBUF TCR BCR TBUF

9.1.2 Storage Locations

SIZE ERR

9.1.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
READ   b INTO a FROM u
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
WRITE  b FROM a TO u
BREAK  ct
BREAK  ct ON u
CRESET
NOWAIT
WAIT
FDUPLX
HDUPLX
STATUS
COUNTS
```

*

a = bus Address of location
b = number of Bytes
ct = number of Character Times
u = Unit number

9.1.4 OPSW Bit

Bit 7 of OPSW = Enable maintenance mode (bit 2 of CSR)

9.2 DL11 SINGLE ASYNCHRONOUS SERIAL LINE INTERFACE

9.2.1 Register Names

RCSR RBUF TCSR TBUF

9.2.2 Storage Locations

SIZE ERR

9.2.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
BREAK  ct
CRESET
NOWAIT
WAIT
CALL
LISTEN
ANSWER
HANGUP
SEND
RECV
RDRON
RDROFF
STATUS
COUNTS
```

*

a = bus Address of location
b = number of Bytes
ct = number of Character Times

9.2.4 OPSW Bit

Bit 7 of OPSW = Enable maintenance mode (bit 2 of XCSR)

9.3 DQ11 NPR SYNCHRONOUS LINE INTERFACE

9.3.1 Register Names Accepted By All Instructions

RCSR TCSR RERR REG

9.3.2 Additional Register Names Accepted By SELREG Instruction

RBAP	RBAS	CDET	SEQ
RCCP	RCCS	SYNC	RBCC
TBAP	TBAS	MISC	TBCC
TCPP	TCCS	TBUF	POLY

9.3.3 Storage Locations

SIZE ERR

9.3.4 User Program Statements

```
SELREG r
SELSEQ r
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
CRESET
NOWAIT
WAIT
NOIDLE
IDLE
CALL
LISTEN
ANSWER
HANGUP
SEND
RECV
FDUPLX
HDUPLX
STATUS
COUNTS
```

*

a = bus Address of location
b = number of Bytes
r = symbolic name of Register

9.3.5 OPSW Bit

Bit 7 of OPSW = Enable maintenance mode (bit 3 of MISC)

9.4 RK11 DISK

9.4.1 Register Names

RKDS RKER RKCS RKWC RKBA RKDA RKDB

9.4.2 Storage Locations

CYL HEAD SECT SIZE ERR

9.4.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
SEEK
WRLOCK
RDFMT  b INTO a
WRFMT  b FROM a
RDCK
WRCK   b AT a
CRESET
DRESET
NOWAIT
WAIT
STEPUP s
STEPDN s
STATUS
COUNTS
```

*

a = bus Address of location
b = number of Bytes
s = number of Sectors

9.4.4 OPSW Bit

Bit 7 of OPSW = Set Inhibit Increment bit in RKCS

9.5 TC11 DECTAPE

9.5.1 Register Names

TCST TCCM TCWC TCBA TCDT

9.5.2 Storage Locations

BLK SIZE ERR

9.5.3 User Program Statements

```
FWD
REV
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
RDNUM  b INTO a
RDALL  b INTO a
WRALL  b FROM a
WRTM   b FROM a
STOP
STPALL
NOWAIT
WAIT
STATUS
COUNTS
```

*

a = bus Address of location
b = number of Bytes

9.6 TM11 MAGTAPE

9.6.1 Register Names

MTS MTC MBRC MCMA MTD MTRD

9.6.2 Storage Locations

RDRB WRRB EOF EOT SIZE ERR

9.6.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
WREIRG b FROM a
WREOF
SPFWD  n
SPREV  n
REWIND
OFFLIN
CRESET
BPI    bi
EVEN
ODD
NOWAIT
WAIT
STATUS
COUNTS
```

*

a = bus Address of location
b = number of Bytes
bi = code for Bits per Inch
n = Number of records

9.7 LP11/LS11/LV11 PRINTERS

9.7.1 Register Names

LPS LPB LPCS LPDB LSCS LSDB LVCS LVDB

9.7.2 Storage Locations

SIZE ERR

9.7.3 User Program Statements

```
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
SPACE  n
TOF
EOT
BUFCLR
PLOT
NOPLOT
NOWAIT
WAIT
STATUS
COUNTS
```

*

a = bus Address of location
b = number of Bytes
n = Number of lines

9.7.4 OPSW Bit

Bit 7 of OPSW = Inhibit automatic CR/LF or Line Terminate during WRITE statement in NOPLOT or PLOT mode

9.8 DH11 PROGRAMMABLE ASYNCHRONOUS 16-LINE MULTIPLEXER

9.8.1 Register Names

SCR NRC LPR CAR BYCR BAR BCR SSR

9.8.2 Storage Locations

SIZE ERR

9.8.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
READ   b INTO a FROM u
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
WRITE  b FROM a TO u
BREAK  ct
BREAK  ct ON u
CRESET
NOWAIT
WAIT
STATUS
COUNTS
ALARM  sal
SETUP  lv
RBAUD  s
TBAUD  s
BAUD   s
EVEN
ODD
NOPAR
ONESTP
TWOSTP
BITS   bc
ECHO
NOECHO
PRESET
```

*

```
a   = bus Address of location
b   = number of Bytes
bc  = Bits per Character
ct  = number of Character Times
lv  = Line Value
s   = baud Speed (see 9.8.4)
sal = Silo Alarm Level
u   = Unit number
```

(continued on next page)

9.8.4 Baud Rate Selection

s	Rate	s	Rate	s	Rate	s	Rate
0	0	4	134.5	D8	600	D12	4800
1	50	5	150	D9	1200	D13	9600
2	75	6	200	D10	1800	D14	EXT A
3	110	7	300	D11	2400	D15	EXT B

9.8.5 OPSW Bit

Bit 7 of OPSW = Enable maintenance mode (bit 9 of SCR)

9.9 PC11/PR11 HIGH SPEED PAPER TAPE READER/PUNCH

9.9.1 Register Names

PRS PRB PPS PPB

9.9.2 Storage Locations

SIZE ERR

9.9.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
LEADER i
NOWAIT
WAIT
STATUS
COUNTS
```

*

a = bus Address of location
b = number of Bytes
i = number of Inches

9.10 RP04/RP05/RP06 DISK

9.10.1 Register Names

RPC1	RPWC	RPBA	RPDA	RPC2	RPDS	RPE1	RPAS
RPLA	RPDB	RPMR	RPDT	RPSN	RPOF	RPDC	RPCC
RPE2	RPE3	RPPO	RPPA	RPAE	RPC3		

9.10.2 Storage Locations

CYL	HEAD	SECT	RTRY	SIZE	ERR

9.10.3 User Program Statements

```
READ    (D256 INTO RDIO)
READ    b (INTO RDIO)
READ    b INTO a
WRITE   (D256 FROM WRIO)
WRITE   b (FROM WRIO)
WRITE   b FROM a
RDHD    b INTO a
WRHD    b FROM a
WRCK    b AT a
WRCKHD  b AT a
SEEK
SEARCH
OFFSET  ov
RETCTR
UNLOAD
RECAL
CRESET
DRESET
PAKACK
RDPSET
REL
STEPUP  s
STEPDN  s
WAIT                        ECION
NOWAIT                      ECIOFF
STATUS                      HCION
COUNTS                      HCIOFF
APORT                       BAION
BPORT                       BAIOFF
FMT22                       CORON
FMT20                       COROFF
ODD                         VVON
EVEN                        VVOFF
*
a  = bus Address of location
b  = number of Bytes
s  = number of Sectors
ov = Offset Value
```

9.11 DU11 SYNCHRONOUS LINE INTERFACE

9.11.1 Register Names

RCSR RBUF PCSR TCSR TBUF

9.11.2 Storage Locations

SYNC SCNT SIZE ERR

9.11.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
BREAK  b
CALL
LISTEN
ANSWER
READY
SEND                          FDUPLX
RECV                          HDUPLX
HANGUP                        NORMAL
CRESET                        SYSTST
MODE   ms                     PRESET
BITS   wl                     GENPAR b AT a
EVEN                          CVSYNC b AT a
ODD                           WAIT
NOPAR                         NOWAIT
STRIP                         STATUS
NSTRIP                        COUNTS
```

*

a = bus Address of location
b = number of Bytes
ms = Mode Select code
wl = Word Length select code

9.11.4 MODE SELECT CODES

ms	Mode
0	Isochronous
2	External Synchronous
3	Internal Synchronous

(continued on next page)

9.11.5 WORD LENGTH SELECT CODES

wl	Nr Bits
5	5
6	6
7	7
10	8
D8	8

9.12 RK06 DISK

9.12.1 Register Names

RKC1	RKWC	RKBA	RKDA	RKC2	RKDS	RKER	RKAS
RKDC	NOTU	RKDB	RKM1	RKPO	RKPA	RKM2	RKM3

9.12.2 Storage Locations

CYL	HEAD	SECT	RTRY	SIZE	ERR

9.12.3 User Program Statements

```
READ    (D256 INTO RDIO)
READ    b (INTO RDIO)
READ    b INTO a
WRITE   (D256 FROM WRIO)
WRITE   b (FROM WRIO)
WRITE   b FROM a
RDHD    s INTO a
WRHD    a
WRCK    b AT a
SEEK
OFFSET  ov
SELDRI  n
UNLOAD
SPIN
RECAL
CRESET
DRESET
SRESET
PAKACK
REL
STEPUP  s
STEPDN  s
WAIT
NOWAIT
STATUS
COUNTS                      BAION
FMT22                       BAIOFF
FMT20                       CORON
ODD                         COROFF
EVEN                        BADSEC
*
        a  = bus Address of location
        b  = number of Bytes
        n  = Number of message returned by drive
        s  = number of Sectors
        ov = Offset Value
```

9.13 RP02/RP03 DISK

9.13.1 Register Names

RPDS	RPER	RPCS	RPWC	RPBA	RPCA
RPDA	RPM1	RPM2	RPM3	SUCA	SILO

9.13.2 Storage Locations

CYL	HEAD	SECT	RTRY	SIZE	ERR

9.13.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
RDNOSK b INTO a
WRNOSK b INTO a
WRCK   b AT a
SEEK
HOMESK
RECAL
IDLE
CRESET
STEPUP s
STEPDN s
WAIT
NOWAIT
STATUS
COUNTS
MODE11
MODE10
HDRON
HDROFF
*
        a  = bus Address of location
        b  = number of Bytes
        s  = number of Sectors
```

9.14 RS03/RS04 DISK

9.14.1 Register Names

RSC1	RSWC	RSBA	RSDA	RSC2	RSDS	RSER
RSAS	RSLA	RSDB	RSMR	RSDT	RSAE	RSC3

9.14.2 Storage Locations

TRAK or HEAD	SECT	RTRY	SIZE	ERR

9.14.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
WRCK   b AT a
SEARCH
CRESET
DRESET
STEPUP s
STEPDN s
WAIT
NOWAIT
STATUS
COUNTS
APORT
BPORT
ODD
EVEN
BAION
BAIOFF
```

*

a = bus Address of location
b = number of Bytes
s = number of Sectors

9.15 RL01 DISK

9.15.1 Register Names

```
RLCS   RLBA   RLDA   RLMP
RLSC   RLSD   RLSS   RLCA   RLSE   RLSB   RLDC   RLSX
```

9.15.2 Storage Locations

```
CYL    SECT   RTRY   SIZE   ERR
```

9.15.3 User Program Statements

```
READ   (D256 INTO RDIO)
READ   b (INTO RDIO)
READ   b INTO a
WRITE  (D256 FROM WRIO)
WRITE  b (FROM WRIO)
WRITE  b FROM a
RDHDR  b INTO a
SEEK
CRESET
DRESET
STEPUP s
STEPDN s
WAIT
NOWAIT
STATUS
COUNTS
SEEKRD b INTO a
SEEKWR b INTO a
ISEEK  c
OSEEK  c
RDNOHC b INTO a
VCON
VCOFF
*
a  = bus Address of location
b  = number of Bytes
s  = number of Sectors
c  = number of Cylinders
```