INTELLEC® SERIES III MICROCOMPUTER DEVELOPMENT SYSTEM POCKET REFERENCE

Order No. 121610-002

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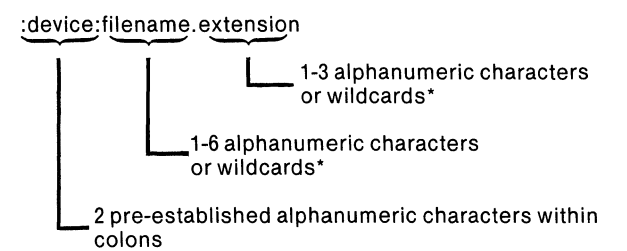
CONVENTIONS:

UPPERCASE—must be entered as shown
lower case—variable information
[ ]—indicate optional field
...—field may be repeated
{}—one and only one entry must be selected
{}...—at least one entry must be selected

DEVICE FILENAME FORMAT



*wildcards:
An asterisk (*) matches any sequence of characters.
A question mark (?) matches any single character.

System Designated Device Names:

:F0: thru :F9: Directory on the disk in drive 0...9
(shown as :Fn: in command syntax)
:TI: Teletypewriter keyboard
:TO: Teletypewriter printer
:TP: Teletypewriter punch
:TR: Teletypewriter reader
:VI: Video terminal keyboard
:VO: Video terminal screen
:HP: High-speed paper tape punch
:HR: High-speed paper tape reader
:LP: Line printer
:CI: Console input
:CO: Console output
:BB: Byte bucket

CONTROL CHARACTERS

RUBOUT	Deletes preceding character
CNTL-C	Terminates 8086 program execution and enters RUN or ISIS-II
CNTL-D	Interrupts 8086 program execution and enters DEBUG-86
CNTL-E	In a SUBMIT file, switches the console input from the command sequence file to the initial system console
CNTL-P	Allows literal entry of control characters (including itself)
CNTL-Q	Resumes console display
CNTL-R	Redisplays current input line as modified
CNTL-S	Suspends console display
CNTL-X	Deletes all characters since last carriage return
CNTL-Z	Enters end-of-file

ISIS-II CONSOLE COMMANDS

Disk Maintenance

FORMAT—format a new disk and copy files

FORMAT :Fn:*label* [*switches*] <cr>

where *label* = name of disk

switches = A—copy all files
S—copy files with system attribute set
FROM n—identifies disk containing files needed for formatting

IDISK—format a new disk as a basic system or non-system disk

IDISK :Fn:*label* [*switches*] <cr>

where *label* = name of disk

switches = S—copy files needed for basic system disk
P—specifies single drive mode
FROM n—identifies disk containing files needed for formatting

FIXMAP—map bad sectors on a hard disk

FIXMAP *drive* <cr>

where *drive* = number of hard disk unit 0-1

Subcommands are:

MARK *disk-address* <cr>	Change the known state of a sector from good to bad.
FREE *disk-address* <cr>	Change the known state of a sector from bad to good.
LIST [*filename*] <cr>	List all known bad sectors.
COUNT <cr>	List the number of known bad sectors.
RECORD <cr>	Record changes specified by MARK and FREE.
QUIT <cr>	Exit to ISIS-II without recording changes.
EXIT <cr>	Record changes and exit to ISIS-II.

where *disk-address* is given as:
track sector [T]
track = 0-199 *sector* = 1-144
T = process 36 sectors at once

File Control

ATTRIB—change and/or display the attributes of a disk file
ATTRIB [:Fn:]*filename* [*attriblist*] [Q] <cr>
where *attriblist* is: I0 or I1—invisible
W0 or W1—write protect
F0 or F1—format
S0 or S1—system

COPY—copy a file from one device to another
COPY [:Fn:]*infile* [,...] TO { [:Fn:][*outfile*] / :device: } [*switches*] <cr>
where *switches* are:
S = system—copy only files with S attribute
N = nonsystem—copy only files without F or S attribute
P = pause—single drive mode
Q = query—query before each copy
C = attribute—create *outfile* with same attributes as *infile*
B = brief—delete, then recreate *outfile* with new data
U = update—open *outfile* for update. Length changes only if *outfile* is extended

HDCOPY—copy the contents of one hard disk to another
HDCOPY { *indrive* TO *outdrive* / BACKUP } <cr>
indrive specifies the source disk. *outdrive* specifies the destination disk. The BACKUP option lets you backup a removable hard disk platter.

DELETE—remove references to a file from the directory
DELETE [:Fn:]*filename* [Q] [,...[Q]] [P] <cr>
where Q = query—query before each deletion
P = pause—single drive mode

DIR—output the names of and information about the files listed within the disk directory
DIR [FOR *filename*][TO *listfile*] [*switches*] <cr>
where *switches* are:

0-9	—indicates drive number
I	—invisible—list invisible files
F	—fast—list only name.ext of files
P	—pause—single drive mode
O	—single column display
Z	—show number of sectors in use

RENAME—change the name of a disk file
RENAME [:Fn:]*oldname* TO [:Fn:] *newname* <cr>
Note—:Fn: must be the same in oldname and newname.

VERS—display ISIS utility version numbers
VERS [:Fn:] *filename*<cr>
where *filename* is the name of the ISIS file on :Fn: whose version number is to be displayed.

8080/8085 Program Execution

filename—execute the named program
filename [*parameters*] <cr>
where *filename* is the name of an 8080/8085 absolute object module to be executed.
parameters are parameters needed by *filename*

DEBUG—load an 8080/8085 program and give control to the Monitor
DEBUG [[:Fn:] *filename*[*parameters*]] <cr>
where *filename* is the name of the absolute object module to be debugged.
parameters are parameters needed by *filename*

SUBMIT—enter a file that contains commands to be executed
SUBMIT [:Fn:] *filename* [(parameter [,...])9] <cr>
where *filename* is the name of the file containing the command sequence definition. If extension is omitted, SUBMIT looks for the default extension .CSD.
parameter specifies real values that replace formal parameters in the command sequence definition.

8086 Program Execution

RUN—activate the 8086 execution mode
RUN [[:Fn:] *filename* [*parameters*][; *comments*]] <cr>
where *filename* is the name of an executable 8086 program. If you enter no extension, the system assumes a default extension of .86. If you enter an extension (or a period and no extension, as in MYPROG.), the default extension is not assumed.

parameters are parameters needed by *filename*.

WORK—change/display workfile default drive
[RUN] WORK [:Fn:] <cr>
where :Fn: specifies the drive n to be set as the default drive for temporary workfiles. Initial system default is :F1:. If :Fn: is not specified the current default is displayed.

DATE—change/display system date
[RUN] DATE [nn/nn/nn] <cr>
where nn = 00-99 specifying the date desired. If date is not specified, the last date entered is displayed.

EXIT—transfer control from RUN to ISIS-II
EXIT <cr>

DEBUG-86 COMMANDS

Utility Commands

DEBUG—Transfer Control to DEBUG-86

[:Fn:]RUN DEBUG [[:Fn:]*filename* [*parameters*]] <cr>

where *filename* is the name (including extension) of a program that is a valid absolute, PIC, or LTL 8086 object module. If an extension (or name plus period) is not specified, default extension of .86 is assumed.

parameters are ASCII characters (separated by commas or spaces) representing variable data required by your program.

EXIT—Exit DEBUG-86

EXIT <cr>

LOAD—Load 8086 Object Code

LOAD [:Fn:]*filename* [{NOSYMBOL / NOLINE} ...]<cr>

where *filename* is the complete name of a valid absolute, PIC or LTL 8086 object module. No default extension is assumed.

NOSYMBOL prevents program symbol table from being loaded.

NOLINE prevents program line number table from being loaded.

Execution Commands

GO—Execute 8086 Instructions

GO [FROM *addr*]
{ [FOREVER] / [TILL *break-addr* [OR *break-addr*]] / [TILL *break-reg* [OR *break-reg*]] } <cr>

where FROM *addr* specifies the address of the first instruction to be executed. If it is omitted, the CS:IP address is used. Use the form nnnn:nnnn, as in 800:0 (leading zeros need not be entered).

break-addr is an integer expression entered as a pointer that references a 20- bit execution address.

break-reg is BR0 or BR1.

GR Command

Display form:

GR<cr>

Change form:

GR =
{ FOREVER / TILL *break-addr* [OR *break-addr*] / TILL *break-reg* [OR *break-reg*] } <cr>

where *break-addr* is an integer expression entered as a pointer that references a 20- bit execution address.

break-reg is BR0 or BR1 (or BR for both breakpoint registers).

STEP—Execute a Single Instruction

STEP [FROM *address*] <cr>

where FROM *address* is the address where single step execution is to begin. If it is omitted, the CS:IP address is used. Use the form nnnn:nnnn, as in 800:0 (leading zeros need not be entered).

Change Commands

Change Register—Change Content of a Register

register = *change-exp* <cr>

where *register* is RAL, RAH, RBL, RBH, RCL, RCH, RDL, RDH, RAX, RBX, RCX, RDX, SP, BP, SI, DI, SS, CS, DS, ES, IP, RF, CFL, PFL, AFL, ZFL, SFL, TFL, IFL, DFL, or OFL.

change-exp is the new contents of *register*.

Change Memory—Change Contents of Memory Locations

memory-type addr { [TO *end-addr*] / [LENGTH n] } =
change-exp [,...]19<cr>

where *memory-type* is BYTE, WORD, SINTEGER, INTEGER, or POINTER.

addr is a memory location entered as a pointer value containing a base and a displacement.

TO *end-addr* specifies the upper limit of a range of memory.

LENGTH n specifies a number of bytes, words, or pointers (depending on *memory-type*).

change-exp is the new contents of the specified memory location and is a pointer value if *memory-type* = pointer; otherwise, it is an integer value.

Change Port—Change Contents of I/O Ports

port-type addr { [TO *end-addr*] / [LENGTH n] } =
change-exp [,...]19<cr>

where *port-type* is one of the following: PORT, WPORT.

addr is the address of an 8086 port and is an integer value between 0 and 65,535.

TO *end-addr* specifies the upper limit of a range of port addresses and is an integer value between 0 and 65,535.

LENGTH n specifies an integer value giving the number of port or word port addresses.

change-exp is the new contents of the specified port.

Display Commands

Display Register—Display Contents of 8086 Registers

{ *register* [, ...]19 / REGISTER / FLAG }<cr>

Up to 19 register keywords can be listed (see Change Memory Command.)

REGISTER displays all 16-bit 8086 registers.

FLAG displays all 1-bit status flags.

Display Memory—Display 8086 Memory

memory-type address { [TO *end-address*] / [LENGTH n] } <cr>

where *memory-type* is BYTE, WORD, SINTEGER, INTEGER, or POINTER.

address is a memory location entered as a pointer value containing a base and a displacement.

TO *end-address* specifies the upper limit of a range of memory.

LENGTH n specifies a number of bytes, words, or pointers (depending on *memory-type*).

Display Memory—Display 8086 Memory in ASM Form

ASM address { [TO *end-address*] / [LENGTH n] } <cr>

where *memory-type* is BYTE, WORD, SINTEGER, INTEGER, or POINTER.

address is a memory location entered as a pointer value containing a base and a displacement.

TO *end-address* specifies the upper limit of a range of memory.

LENGTH n specifies a number of bytes, words, or pointers (depending on *memory-type*).

Display Port—Display I/O Port Contents

port-type address { [TO *end-address*] / [LENGTH n] } <cr>

where *port-type* is either PORT or WPORT.
address is the address of an 8086 port and is an integer value between 0 and 65,535.

TO *end-address* specifies the upper limit of a range of port addresses and is an integer value between 0 and 65,535.

LENGTH n specifies an integer value giving the number of port or word port addresses.

Display Boolean—Display Boolean Value

BOOL *expression* <cr>

where *expression* is evaluated to a boolean value. If the least significant bit of the result equals 1, the boolean value is TRUE; otherwise the boolean value is FALSE.

Display Stack—Display User Stack Contents

STACK *expression*<cr>

where *expression* defines the number of words on the user stack to be displayed.

EVALUATE—Display Integers in Five Bases

EVALUATE *expression* [SYMBOLICALLY] <cr>

where *expression* is an integer expression.

SYMBOLICALLY displays each numeric value output by the command as a symbol or a source statement, plus a remainder.

Symbol Manipulation Commands

Define Symbol—Enter New Symbol

DEFINE [*..module*].*symbol* = *change-exp* [OF *memory-type*] <*cr*>

where module is the name of an existing program module in which *symbol* is to be located.

symbol is a user-defined symbol to be entered into the symbol table.

change-exp is the address of statement labels or variables, or the value of a constant.

OF *memory-type* specifies any of the following: BYTE, WORD, SINTEGER, INTEGER, or POINTER.

Display Symbols—Display One or More Symbols

$$\left\{ \begin{array}{c} \text{SYMBOL} \\ [..module].symbol\ [.symbol] \ldots \end{array} \right\} \text{<cr>}$$

where SYMBOL causes the entire DEBUG-86 symbol table to be displayed.

symbol is the name of an existing symbol.

Display Lines—Display Statement Numbers

$$\left\{ \begin{array}{c} \text{LINE} \\ [..module]\#statement\text{-}number \end{array} \right\} <cr>$$

where LINE displays all statement numbers in the current domain.

statement-number is the source statement number having a default decimal suffix.

Display Modules—Display Module Names

MODULE<cr>

Change Symbols—Change Value of a Symbol

[..*module*].*symbol*[.*symbol* ...] ... =
change-exp [OF *memory-type*]<cr>

Remove Symbols Command

$$\text{REMOVE} \left\{ \begin{array}{l} [..module].symbol \quad [.symbol...]19 \quad ,... \\ \text{SYMBOL} \\ \text{MODULE } ..module \ [,..module]... \end{array} \right\} <cr>$$

where up to 19 modules and 19 symbols can be listed.

SYMBOL deletes entire current DEBUG-86 symbol table.

MODULE deletes all symbols and lines of the named module from the symbol and statement number tables.

Set Domain Command

DOMAIN ..*module* <cr>

where DOMAIN establishes a default module for source statement number references.

module is the name of an existing program module.

Compound Commands

REPEAT Command

REPEAT<cr>
[*command*<cr>
| WHILE *boolean-expression*<cr>
| UNTIL *boolean-expression*<cr>] ...
END<cr>

COUNT Command

COUNT *arithmetic-expression*<cr>
[*command*<cr>
| WHILE *boolean-expression*<cr>
| UNTIL *boolean-expression*<cr>] ...
END<cr>

IF Command

IF *boolean-expression* [THEN]<cr>
  [*command*<cr>] ...
[ORIF *boolean-expression* [THEN]<cr>
  [*command*<cr>] ...] ...
[ELSE<cr>
  [*command*<cr>] ...]
END<cr>

MONITOR COMMANDS

Monitor I/O Configuration Command

A—Assign Command

A *logical-device = physical-device* <cr>
Possible values of logical and physical device are:

Logical Device	Physical Device
C or Console	T or TTY
	C or CRT
	B or BATCH
	1 (reserved)

R or Reader	T or TTY P or PTR 1 or 2 (reserved)
P or Punch	T or TTY P or PTP 1 or 2 (reserved)
L or List	T or TTY C or CRT L or LPT 1 (reserved)

Q—Query Command
Q <cr>

Memory Control Commands

D—Display Memory
D *start-address*, *end-address* <cr>

F—Fill Memory
F *start-address*, *end-address*, *constant* <cr>

M—Move Memory
M*start-address*,*end-address*,*destination-address* <cr>

S—Substitute Memory
S *address*, [*data-byte*][,[*data-byte*]][...] <cr>

Register Commands

X—Register Command
Display Form: X <cr>
Modify Form:
X*register*,[*data*][,[*data*]][,...] <cr>

Paper Tape I/O Commands

R—Read
R*bias* <cr>

W—Write
W*start-address*, *end-address* <cr>

E—End of File
E*entry-point* <cr>

N—Null
N <cr>

Execute Command

G—Execute Command
G[*start-address*][,*breakpoint 1*[,*breakpoint 2*]] <cr>

Utility Command

H—Hexadecimal add and subtract
H*number 1*, *number 2* <cr>

ISIS-II ERROR MESSAGES

1. Fatal error. Too few buffers were allocated.
2. Illegal active file table number.
3. Fatal error. Active file table is full.
4. Incorrectly specified filename.
5. Unrecognized device name.
6. Attempt to write to input device.
7. Fatal error. The disk is full.
8. Attempt to read from output device.
9. Disk directory is full.
10. Pathname is not on same disk.
11. File already exists.
12. File is already open.
13. No such file.
14. Write-protected file encountered.
15. Fatal error. ISIS overwrite.
16. Fatal error. Bad load format.
17. Not a disk file.
18. Illegal ISIS commands.
19. Attempted seek on non-disk file.
20. Attempted back seek too far.
21. Can't rescan.
22. Illegal access mode to open.
23. Missing filename.
24. Fatal error. Disk input/output hardware error. See note below.
25. Illegal echo file.
26. Illegal attribute identifier.
27. Illegal seek command.
28. Missing extension.
29. Fatal error. Premature EOF.
30. Fatal error. Drive not ready.
31. Can't seek on write only file.
32. Can't delete open file.
33. Fatal error. Illegal system call parameter.
34. Fatal error. Invalid return switch in a LOAD system call.
35. Seek past EOF.

When error 24 occurs, an additional message is displayed:

```
STATUS=00nn
D=x T=yyy S=zzz
```

where x represents the drive number, yyy the track address, zzz the sector address, and where nn has the following meanings:

For flexible disks:

01	Deleted record
02	Data field CRC error
03	Invalid address mark

04	Seek error
08	Address error
0A	ID field CRC error
0E	No address mark
0F	Incorrect data address mark
10	Data overrun or data underrun
20	Attempt to write on Write Protect
40	Drive has indicated a Write error
80	Drive not ready

For hard disks:

01	ID field miscompare
02	Data field CRC error
04	Seek error
08	Bad sector address
0A	ID field CRC error
0B	Protocol violations
0C	Bad track address
0E	No ID address mark or sector not found
0F	Bad data field address mark
10	Format error
20	Attempt to write on write-protected drive
40	Drive has indicated a write error
80	Drive not ready

RUN PROGRAM ERROR MESSAGES

101. HARDWARE NOT RESPONDING (fatal error)
102. INVALID SYNTAX
103. COMMAND LINE TOO LONG
104. INSUFFICIENT MEMORY TO LOAD
105. MISMATCHED SOFTWARE/FIRMWARE
106. ERROR 106 USER PC mmmm
107. ILLEGAL LOAD ADDRESS
108. INVALID OBJECT FILE
117. UNRESOLVED SYMBOLS (warning)
118. RAM FAILURE (warning)
119. ROM CHECKSUM ERROR (warning)

DEBUG-86 ERROR MESSAGES

120. Syntax error
121. Invalid token
122. No such line
123. Inappropriate number
124. Partition bounds error
125. Symbol already exists
126. Symbol does not exist
127. Memory failure

133. Null string error
134. Memory overflow
135. Stack overflow
136. Command too complex
137. Module does not exist
139. Excessive data
141. Unsuitable execute file
142. Line too long
143. Too many partitions
147. Pointer value required
148. Integer value required
149. Differing bases

CONSOLE COMMAND INTERFACE ERRORS

201. Unrecognized switch
202. Unrecognized delimiter
203. Invalid syntax
206. Illegal disk label
208. Checksum error
209. Relo file sequence error
210. Insufficient memory
211. Record too long
212. Illegal relo type
213. Fixup bounds error
214. Illegal SUBMIT parameter
215. Argument too long
216. Too many parameters
217. Object record too short
218. Illegal record format
219. Phase error
220. No EOF record in object module file
221. Segment overflow during LINK operation
222. Unrecognized record in object module file
223. Fixup record pointer is incorrect
224. Illegal record sequence in object module file in LINK
225. Illegal module name specified
226. Module name exceeds 31 characters
227. Command syntax requires left parenthesis
228. Command syntax requires right parenthesis
229. Unrecognized control specified in command
230. Duplicate symbol found
231. File already exists
232. Unrecognized command
233. Command syntax requires a TO clause
234. Filename illegally duplicated in command
235. File specified in command is not a library file
236. More than 249 common segments in input files
237. Specified common segment not found in object file
238. Illegal stack content record in object file
239. No module header in input object file
240. Program exceeds 64K bytes

HEXADECIMAL-DECIMAL CONVERSION

BYTE				BYTE			
HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC
0	0	0	0	0	0	0	0
1	4,096	1	256	1	16	1	1
2	8,192	2	512	2	32	2	2
3	12,288	3	768	3	48	3	3
4	16,384	4	1,024	4	64	4	4
5	20,480	5	1,280	5	80	5	5
6	24,576	6	1,536	6	96	6	6
7	28,672	7	1,792	7	112	7	7
8	32,768	8	2,048	8	128	8	8
9	36,864	9	2,304	9	144	9	9
A	40,960	A	2,560	A	160	A	10
B	45,056	B	2,816	B	176	B	11
C	49,152	C	3,072	C	192	C	12
D	53,248	D	3,328	D	208	D	13
E	57,344	E	3,548	E	224	E	14
F	61,440	F	3,840	F	240	F	15

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