CONVENTIONS

REFERENCE CARD CONVENTIONS

CAPITAL LETTERS and special characters must be typed as shown.

Words in **lower-case** describe what to type.

{Entries in braces are required.}

[Entries in brackets are optional.]

Entries in vertical list (i.e. on off) mean pick one.

. . . means you may repeat the previous entry.

COMMAND CONVENTIONS

Blanks are not allowed.

Commands other than those initiated by the special keys ↑ ↓ ← → INS DEL STEP CAN are terminated by a RETURN .

Typing the CAN (cancel) key will clear the line currently being entered and allow you to start over.

Some system functions require acknowledgement. Typing Y means yes. Typing N or RETURN means no or continue.

POWER UP SEQUENCE

Switch on circuit breaker on back panel of AMDS.
Turn on disk.
Insert system diskette into drive 0.
Initiate desired program

POWER DOWN SEQUENCE

Remove diskettes.
Turn off disk.
Switch off circuit breaker on back panel of AMDS.

FILENAME CONVENTIONS

[N:][drive-number:] {name}

N: specifies that the file is to be created.

If **drive-number:** is omitted, it defaults to **0**.

name may be up to 10 ASCII characters long. No blanks are allowed.

INITIATING A PROGRAM

J {system-character}

There are currently up to 8 Futuredata supplied programs:

CONVENTIONS

M — Manager
E — Editor
A — Assembler
L — Linker
D — Debugger
U — Utility
B — Basic Interpreter
C — Basic Compiler

COMMAND FILES

INITIATE COMMAND FILE

J ∧{filename} [,parm]. . .

RETURN TO KEYBOARD INDEFINITELY

[prompt] ∧ K . . .

prompt is a string which may be input. The processor switches to keyboard until user types **∧**.

RETURN TO KEYBOARD FOR ONE LINE

[prompt] ∧ L

prompt is a string which may be input. The processor switches to keyboard until RETURN is typed.

ABORT COMMAND FILE

SHIFT BREAK

PARAMETER SUBSTITUTION

∧{n}

n is a digit from **1** to **9.**

When this sequence occurs in a command file, it causes the substitution of the numbered parameter.

MANAGER

INITIALIZE DISKETTE

I[drive-number]

If **drive-number** is omitted, it defaults to **1**.

MANAGER

DISPLAY DISKETTE DIRECTORY

D[drive-number][P]

If **drive-number** is omitted, it defaults to **0**.

If **P** is appended, the directory will be printed.

CREATE FILE

C{filename}[,tracks [,extension-size]]

If **,tracks** is omitted, it defaults to **1**.

If **,extension-size** is omitted, it defaults to **1**.

SCRATCH FILE

S{filename}

The manager will request verification. Type **Y** or **N**.

COPY FILE

M{from-filename} , {to-filename}

RENAME FILE

R {current-filename} , {new-filename}

EXCHANGE FILENAMES

E {filename-one} , {filename-two}

COPY DISKETTE

X{from-drive-number}, {to-drive-number} [,type]

type may be one of the following characters:

A — copy all files
S — copy only system files (files with Z attribute)

If **,type** is omitted, only non-system files will be copied.

SPECIFY FILE ATTRIBUTES

A{filename} [,attribute [attribute]. . .]

attribute may be one of the following characters:

S — Source file (text)
C — Command file (text)
R — Relocatable object file (binary)
O — Absolute object file (binary)
P — Permanent file (non-scratchable)
W — Write protected file
Z — System file

MANAGER

DISPLAY DISKETTE DIRECTORY

D[drive-number][P]

If **drive-number** is omitted, it defaults to **0**.
If **P** is appended, the directory will be printed.

CREATE FILE

C{filename}[,tracks[,extension-size]]

If **,tracks** is omitted, it defaults to **1**.
If **,extension-size** is omitted, it defaults to **1**.

SCRATCH FILE

S{filename}

The manager will request verification. Type **Y** or **N**.

COPY FILE

M{from-filename},{to-filename}

RENAME FILE

R {current-filename},{new-filename}

EXCHANGE FILENAMES

E{filename-one},{filename-two}

COPY DISKETTE

X{from-drive-number},{to-drive-number} [,type]

type may be one of the following characters:

- **A** — copy all files
- **S** — copy only system files (files with Z attribute)

If **,type** is omitted, only non-system files will be copied.

SPECIFY FILE ATTRIBUTES

A{filename}[,attribute [attribute]...]

attribute may be one of the following characters:

- **S** — Source file (text)
- **C** — Command file (text)
- **R** — Relocatable object file (binary)
- **O** — Absolute object file (binary)
- **P** — Permanent file (non-scratchable)
- **W** — Write protected file
- **Z** — System file

MANAGER

- **B** — Blind file

FREE UNUSED SPACE IN FILE

F {filename}

EDITOR

LOAD EDITOR WORKSPACE

L[filename]

If **filename** is omitted, additional data will be loaded from the previously specified filename.

WRITE EDITOR WORKSPACE

W [$] [*] [filename]

If **filename** is not specified, additional data will be appended to the previously specified file.
If **$** is specified, only the top part of the workspace (down to but not including the edit line) will be written.
If * is specified, the written data will not be removed from the editor's workspace.

WRITE THEN LOAD

N

Both filenames must have been previously specified.

END OUTPUT FILE

E

ADVANCE EDIT LINE

↑

$\mathbf{A}\begin{bmatrix}\$\\ n\end{bmatrix}$

A$ advances the edit line to the end of the editor workspace.

BACKUP EDIT LINE

↓

$\mathbf{B}\begin{bmatrix}\$\\ n\end{bmatrix}$

B$ backs up the edit line to the beginning of the editor workspace.

EDITOR

DELETE LINES

DEL[n]

If **n** is not specified, the default is 1 line.

FIND [AND REPLACE] A STRING

F [{delim} {string} {delim} [{rstring} {delim} [A] [V]]]

delim is a character occuring in neither **string** nor **rstring**.
The command scans for **string** from the line following the current edit line to the end of the workspace.
If **rstring** is specified, the command scans for **string** from the current edit line to the end of the workspace. If **string** is found, it is replaced by **rstring**. If **V** is specified, verification is requested before replacement.
If **A** is specified, the command will repeat until the end of workspace is reached.

GET [AND REPLACE] A STRING

G [{delim} {string} {delim} [{rstring} {delim} [A] [V]]]

delim is a character occuring in neither **string** nor **rstring**.
The command scans for **string** from the line following the current edit line to the end of the file. (If the string is not found in the editor workspace, the workspace will be written and more lines will be read from the file until either **string** is found or the end of the file is reached.)
If **rstring** is specified, the command scans for **string** from the current edit line to the end of the file. If **string** is found, it is replaced by **rstring**. If **V** is specified, verification is requested before replacement. If **A** is specified, the command will repeat until the end of the file is reached.

CLEAR EDITOR WORKSPACE

CLR

SET TABS

T[column][,column]...

SET UPPER CASE MODE

SU

EDITOR

SET LOWER/UPPER CASE MODE

SL

INSERT LINES

I

Lines will be inserted above current edit line.
Entry of an empty line will end insert.

ENTER LINE EDITING MODE

X

Line editing sub-commands:

TAB	— position cursor at next tab stop
SPACE	— space forward (destructive)
→	— space forward (non-destructive
BACKSPACE	— space backward (destructive)
←	— space backward (non-destructive)
INS	— enter or leave character insert mode
DEL	— delete character
↑	— go forward in editor workspace
↓	— go backward in editor workspace
RETURN	— leave line editing mode

ASSEMBLER

ASSEMBLER OPTIONS

M	— Use macro library
L	— List on CRT
T	— Truncated list
E	— List errors only
P	— List on printer
B [speed] [delay]	— List on serial port
O	— Write relocatable object file
S	— Append symbol table to object file

DATA DEFINITION PSEUDO-OPS

EQUATE
label EQU expression

DEFINE CONSTANT
label DC {expression} [,expression]. . .

RESERVE STORAGE
label DS expression

ASSEMBLER

RELOCATION PSEUDO-OPS

DEFINE ORIGIN
ORG expression

BEGIN ABSOLUTE SEGMENT
ASEG

BEGIN RELOCATABLE SEGMENT
RSEG name

DEFINE GLOBAL SYMBOL
GLBL {symbol} [,symbol]. . .

MACRO DEFINITION PSEUDO—OPS

DEFINE MACRO
macro-name MACRO
[parameter-name] [,parameter-name] . . .

END MACRO DEFINITION
ENDM

CONDITIONAL ASSEMBLY PSEUDO-OPS

DEFINE GLOBAL SET SYMBOL.

$$\textbf{set-symbol-name DEFG}\begin{Bmatrix}\textbf{expression}\\ \textbf{'string'}\end{Bmatrix}$$

DEFINE LOCAL SET SYMBOL

$$\textbf{set-symbol-name DEFL}\begin{Bmatrix}\textbf{expression}\\ \textbf{'string'}\end{Bmatrix}$$

BEGIN IF BLOCK
[if-block-name] IF expression

BEGIN ALTERNATIVE CONDITION IN IF BLOCK
ELSEIF expression

BEGIN LAST ALTERNATIVE CONDITION IN IF BLOCK
ELSE

END IF BLOCK
ENDIF

EXIT FROM IF BLOCK
EXITIF [if-block-name]

BEGIN DO (REPEAT) BLOCK
[do-block-name] DO expression

END DO BLOCK
ENDDO

EXIT DO BLOCK
EXITDO [do-block-name]

ASSEMBLER

BEGIN NEXT ITERATION OF DO BLOCK
NEXTDO [do-block-name]

END ASSEMBLY
END [entry-point]

LIST CONTROL PSEUDO-OPS

EXPANSION CONTROL

$$\textbf{PRINT}\begin{Bmatrix}\textbf{OFF}\\ \textbf{ON}\\ \textbf{GEN}\\ \textbf{ALL}\end{Bmatrix}$$

OFF halts listing of assembled lines.

ON enables listing of lines except for conditional pseudo-ops, lines skipped due to conditional pseudo-ops, and lines resulting from macro expansions.

GEN enables listing of lines, including lines resulting from macro expansions. Lines which are conditional pseudo-ops or lines skipped due to conditional pseudo-ops are not listed.

ALL enables listing of all lines including lines resulting from macro expansions, conditional pseudo-ops, and lines skipped due to conditional pseudo-ops.

INSERT SPACE IN LISTING
SPC

EJECT TO NEXT PAGE
EJE

LINKAGE EDITOR

LINKAGE EDITOR OPTIONS

L	— List on CRT
P	— List on printer
B [speed] [delay]	— List on serial port
D	— Delete unspecified RSEGs
O	— Write absolute object file
S	— Append symbol table to object file

LINKAGE EDITOR INPUT

The Linkage Editor will prompt **SPECIFY INPUT FILE**. Enter the filename. This request will be repeated until you type RETURN instead of a filename. Then the Linkage Editor will prompt **ENTER OUTPUT FILE**. Type the absolute object filename. The Linkage Editor will then prompt **LINKER INPUT**. Enter the RSEG's and then locations in memory in the following format:

#ORG absolute-address
{rseg} [,rseg]. . .
#ORG absolute-address
{rseg} [,rseg]. . .
.
.
.
#END

DEBUGGER

DEBUGGER EXPRESSIONS

Many debugger commands accept an expression consisting of the following operands:

{digit}[digit] — hexadecimal constant
'char' — ASCII constant
# [filename:] [symbol] — symbolic address

Combined with the following post-unary operators:

***** — treat previous expression as an indirect address
% — treat previous expression as a relative address

and the following binary operators:

+ — addition
− — subtraction

SWAP CURSOR

The debugger display is formatted into two logically separate halves: the disassembled half and the hexadecimal half. Commands operate on each half independently. In order to switch which half commands affect, hit the TAB key.

DISPLAY MEMORY

$\mathbf{D}\begin{Bmatrix}\$\\ \textbf{expression}\end{Bmatrix}$

If **$** is specified, memory around the previously displayed address is again displayed.

ADVANCE DISPLAY 1 LINE

↑

JMP 'A700'

BACKUP DISPLAY 1 LINE

↓

ADVANCE DISPLAY 1 BYTE

→

BACKUP DISPLAY 1 BYTE

←

STORE DATA IN MEMORY

S {constant} [,constant]. . .

STORE DATA IN REGISTER

Z {reg = constant} [,reg = constant]. . .

reg may be any register shown at the top of the display.

S: Stack Pointer

FIND DATA IN MEMORY

F {constant} [,constant]. . .

EXECUTE

$\mathbf{E}\begin{bmatrix}\$\\ \textbf{expression}\end{bmatrix}$

If the parameter is omitted, the cursor address will be used. If **$** is specified, the address in the PC will be used.

SINGLE STEP

STEP

SET BREAKPOINT

BS {n}

Sets breakpoint at cursor address. **n** may be between **0** and 4. If **n** = **0** the hardware breakpoint will be used.

DISPLAY BREAKPOINT

BD {n}

RESET BREAKPOINT

BR

CLEAR ALL BREAKPOINTS

BC

LOAD PROGRAM

L {filename} [, [offset] [,symbol-table-address]]

filename is the name of the absolute object file.

offset is an expression specifying how much the program is to be offset from its specified load address. No relocation is performed. Used in programming PROMs.

symbol-table-address is an expression which specifies the beginning address of where the program's symbol table is to be loaded. On completion of the command the debugger will display the length of the symbol table. If the message PARTLY LOADED is displayed, there was not enough memory to load the complete table.

WRITE PROGRAM

W {filename} {,start-addr ,end-addr} [,start-addr,end-addr]. . .[,entry-addr]

The specified memory locations will be written in absolute object format.

If **entry-addr** is omitted, the first **start-addr** will be used as the entry point address.

PROTECT/UNPROTECT MEMORY

X

Switches protection for the 1K block in which the cursor address is located.

TRACE EXECUTION

$\mathbf{T}\begin{bmatrix}\$\\ \textbf{expression}\end{bmatrix}$

If the parameter is omitted, the cursor address will be used. If **$** is specified, the address in the PC will be used.

DISPLAY TRACE DATA

TR

MAP USER MEMORY*

U {addr} [,mask]

addr is an expression which defines the beginning of a 2K region.

mask is a he
256 byte bl

SELECT EN

M [code] [c

The following

C — User c
D — Enable
I — User c
M — Enable
(accor
P — Protec
E — Full en
R — Disabl

If no paramet
mode.

* — User mus
to function.

CHECK FO

C [type] [,l

type is the PR
2704
2708
2758
2716

If **type** is omit
length is the r
If **length** is om

PROGRAM

P [type] [,l

PROM will be
current curs

type is the PR
2704
2708
2758
2716

If **type** is omit
length is the r
If **length** is on

INPUT DA

I [type] [,l

rent cursor

e PROM.

in memory

e PROM.

SET BREAKPOINT PARAMETERS

$$B\{n\}\left[,C=\{\text{dec}\}\right]\left[,A=\begin{bmatrix}>\\<\end{bmatrix}\begin{Bmatrix}\text{expression}\\\text{hex6}\end{Bmatrix}\right]\left[,D=\begin{Bmatrix}\text{expression}\\\text{hex4}\end{Bmatrix}\right]$$

$$\left[,R=\begin{Bmatrix}R\\W\\X\end{Bmatrix}\right]\left[,I=\begin{Bmatrix}I\\M\\X\end{Bmatrix}\right]\left[,M1=\begin{Bmatrix}0\\1\\X\end{Bmatrix}\right]\left[,DMA=\begin{Bmatrix}0\\1\\X\end{Bmatrix}\right]$$

$$\left[,E=\{\text{binary4}\}\right]$$

n — specifies breakpoint **0**, **1**, or **2**

If no parameters are specified, the breakpoint is reset.

C — specifies a repetition count
A — specifies the breakpoint address
D — specifies the data value
R — specifies a read or write bus cycle
I — specifies an I/O port or memory access cycle
M1 — specifies an opcode fetch cycle
DMA — specifies a DMA cycle
E — specifies the value of the 4 external lines
DLY — specifies the number of bus cycles to be delayed after the last breakpoint is reached before data collection is terminated

Omitted parameters are unchanged.

SET TRACE QUALIFIER PARAMETERS

$$Q\left[,A=\begin{bmatrix}>\\<\end{bmatrix}\begin{Bmatrix}\text{expression}\\\text{hex6}\end{Bmatrix}\right]\left[,D=\begin{Bmatrix}\text{expression}\\\text{hex4}\end{Bmatrix}\right]$$

$$\left[,R=\begin{Bmatrix}R\\W\\X\end{Bmatrix}\right]\left[,I=\begin{Bmatrix}I\\M\\X\end{Bmatrix}\right]\left[,M1=\begin{Bmatrix}0\\1\\X\end{Bmatrix}\right]\left[,DMA=\begin{Bmatrix}0\\1\\X\end{Bmatrix}\right]$$

$$\left[,E=\{\text{binary4}\}\right]$$

If no parameters are specified, all cycles will be recorded.

A — specifies an address
D — specifies a data value
R — specifies a read or write bus cycle
I — specifies an I/O port or memory access cycle
M1 — specifies an opcode fetch cycle
DMA — specifies a DMA cycle
E — specifies the value of the 4 external lines

Omitted parameters are unchanged.

SET TIMER INCREMENT

$$T\begin{Bmatrix}N\\U\\B\end{Bmatrix}$$

N — specifies 100 nanosecond increments
U — specifies microsecond increments
B — specifies bus cycles

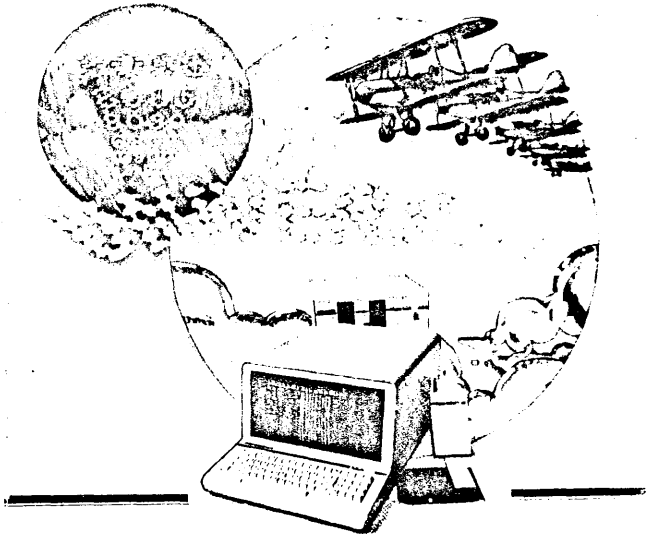
TO ACCESS OTHER DRIVE

N:/: ____

PRINTED IN U.S.A

12-78 15K

AMDS Reference Card



futuredata

μP μP and away in universal development systems.