PRELIMINARY **PROM** (and **PNEW**) MANUAL (February 13, 1980 7:19 PM)

There are two programs available to fuse proms', one called **PROM** which drives the Alto Prom Blower (Blue Box), and the other called **PNEW** which derives PROLOG-92. **PROM** (as well as **PNEW**--- only **PROM** is mentioned thereafter, unless otherwise noted) combines the features of APROM, PROMDIAG, and LOGICPROM. . **PROM** runs in three modes, "MB File" mode which corresponds fairly closely to APROM, "MB File" mode which corresponds fairly closely to PROMDIAG, and "MB File" mode which corresponds fairly closely to LOGICPROM. Another promgram BINLIST is available for listing MB-files.

PROM COMMAND LINE

GLOBAL SWITCHES

none	Select "MB File" mode.
/E	Select "Prom Editor" mode
/D	Select "Prom Blower Diagnostic" mode
/S	Call Swat (debug use only)

LOCAL SWITCHES (valid in "MB File" mode only)

string/P	Permute memory address (Default ...,2,1,0)(use comma between pin numbers)
string/Q	Permute memory data (Default ...,2,1,0)(use comma between pin numbers)
string/R	Reverse prom's address and/or output data (string: A and/or D)
name/F	Read micro binary from file "name"
name/D	Write differences on file "name"
name/M	Use memory "name"
number/T*	prom ID number (see Table 2 for ID's, "0" for WHATEVER)
[addressA,]value/W**	value written into addressed locations, and checksum updated
0/I	Invert the output data
number/N	"number" exclusive or with the address
number/C	Chip starting address equals "number"
number/B	Set chip starting bit equal to "number"
number/A	Set memory starting address to "number"
number/S	Set memory starting bit to "number" blow the prom.

***** *needed only in PNEW to identify prom type,* if the prom is not in the list use "0". However, be awared that Command line using non-zero ID may be different from that of using zero ID due to differences in prom's pin-assignments between the manufactures and ours (see Tables 3 and 4). For instance, the two slightly different command lines to fuse Intel 2708 are:

PNEW file/F memory/M 4/T proma/C promb/B mema/A memb/S

*PNEW file/F memory/M 0/T **D/R** proma/C promb/B mema/A memb/S*

****** *available only in PNEW, very special application. Address* is a 16-bits address, *value* is a 32-bits numbers (*address* **must** followed by A and **separated** by a common from the *value*, octals are indicated by "R8" following the number or numbers, only one "R8" is needed). PNEW first slices *value* into four bytes (add leading zeroes if necessary) and write into four consective locations, from *(address-5)* to *(address-2)*, of the *memory*, then modifies the checksum at the location *address* of the *memory* by adding four 8-bits numbers of the *value* onto it. Default address is #3777 if *address*A is not supplied.

PROM EDITOR COMMANDS

COMMAND	ACTION
Q	Quit
Z	Zero prom
I	Invert prom
S	Set prom to all ones
C	Change prom (alters bits pointed to by mouse; red sets bit, yellow resets bit, blue returns control to keyboard input)
R	Reverse bit (data bits are numbered with bit zero starting from the left)
E	Equation ("or" the equation into the bit selected. Address bits are numbered with bit zero on the right. "+" means "or". An "N" before a number negates the it.)
G	Get a file
P	Put a file
B	Blow prom
M	Memorize prom
V	Verify prom
L	List prom
N	New prom (test prom for virginity)
F	Format selection (only format 4 which selects 4x256 format and format 8 which selects 8x32 format are currently implemented)
D	Diagnostic (call Prom Blower Diagnostic)
A	Address permutation (Default permutation is 9,8,7,6,5,4,3,2,1,0. All input is right justified. An "N" before a number negates the bit.)
H or ?	Help (list all commands)

PROM DIAGNOSTIC COMMANDS

COMMAND	ACTION
Q	Quit
S	Sweep registers
C	Copy (write memorized data into a prom)
W	Write test
R	Read loop test
T	Type prom (display prom type)
M	Memorize (read a prom into a core buffer for use later)
V	Verify (check that the memorized data agree with the prom)
L	List (generate a listing of the memorized data)
I	Is prom virgin (test prom for virginity)
E	Edit (call Prom Editor)
?	Help (list all commands)

A command line of PROM is looking like this:

PROM *file*/F *memory*/M *diffile*/D *promaddr*/C *prombit*/B *memaddr*/A *membit*/S

where *file* is a file in micro-binary format (see appendix A of D0ASSEM, *D0 Microprogram Assembler*, by E. Fiala, for details on this format), *memory* is the name of a memory in that file, *promaddr* is the lowest address of this prom to be programmed (normally 0), *prombit* is the high-order bit of this prom to be programmed (normally 0), *memaddr* if the lowest address in memory to be programmed in this prom (frequently 0), and *memibt* is the highest-order bit of memory to be programmed in this prom (frequently 0). The idea is that bit *membit* of word *memword* of *memory* will be programmed into bit *prombit* of word *promword* of the prom, and so on, increasing in word number until running out of *memory* length or prom length. Words unspecified by the file are left unchanged.

If *fifile* is specified, then instead of being programmed, the prom will be checked against the appropriate part of *memory*. All differences will be written on *diffile*. PNEW requires prom-type to be supplied so that the prom's characteristics will be varified with that of the Personal-card, the switch is "IDnumber/T". If the prom to be programming is not in the list (see Table 2), use "0/T", in which case the varification is bypassed. For other switches, please see Local Switches List above.

PROM reads its command line from left to right. All other switches but S simply set internal variables in PROM; whenever PROM encounters the S switch it attemp_ts to program a prom according to the most recent settings of its internal variables. For historical reasons PROM expects numbers to be decimal; octal numbers must be followed by "R8". The compare swich is (set by /D) retained once set, (so are I, N, R switches) hence no prom-programming after a prom-checking in the same command line. To compare a sequence of proms against a sequence of segments of a *memory* and concatenate all results onto one differences file, the name of the difference file should be specified with the first /D and omitted from each succeeding /D.

For example, if we had a file *X13.MB* with a memory called *MicroCode* declared to be 16 bits wide, and we wanted to put the low-order 4 bits of the second 256 words into a 256x4 prom, we might say

PROM *X13.MB*/F *MicroCode*/M *0*/C *0*/B *400R8*/A *12*/S

To program a set of 8 proms to hold the first 512 words of *MicroCode*, we might execute the following command:

PROM *X13.MB*/F *MicroCode*/M 0/C 0/B 0/A 0/S 4/S 8/S 12/S
256/A 0/S 4/S 8/S 12/S

The first prom generated by the above command would contain the high-order four bits (0-3) of locations 0-255 of *MicroCode*, the next would contain bits 4-7 of locations 0-255, and so on.

Talbes 3 and 4 show the pins assignments for the address and data-output lines. Please check them throughly. In case they do not match yours there are two ways to confirm your need, switch /R for reversing pin assignments, and switches /P (or /Q) for permuting address (data) pin assignments.

BINLIST is for listing MB-files:

BINLIST *file*/F *memory*/M *identification*/H *Listfile*/L

where *Listfile* is the name of listing output file. Other switches are *Q*, *P*, *I*, *N* (works same as in **PROM**), and A*number/*R (only for reversing address, *number* is the number of address lines to be reversed).

Table 1 Current Prom-types available on Blue Box

Type	*#wds*	*#bits/wd*	*Features*
Intel 3601	256	4	TTL (Open collector)
Intel 2708	1024	8	NMOS (eraseable)
MMI6300 or MIL 6300	256	4	TTL (Open collector)
Motorola 10149	256	4	ECL
Signetics 10139	32	8	ECL
Signetics 8223	32	8	TTL (Open collector)

Table 2 List of Prom-types in PNEW

Type	*#wds*	*#bits/wd*	*ID*	*Features*
F93427	256	4	9	TTL (Tri-states)
F93453	1024	4	13	TTL (Tri-states)
HM7603	256	4	7	TTL (Tri-states)
HM7610	256	4	16	TTL (Open collector)
HM7620	512	4	17	TTL (Open collector)
Intel 1702A	256	8	14	NMOS (eraseable)
Intel 2708	1024	8	4	NMOS (eraseable)
Intel 2716	2048	8	15	NMOS (eraseable)
Intel 2758	1024	8	18	NMOS (eraseable)
Intel 3601	256	4	3	TTL (Open collector)
Intel 8748	1024	8	20	NMOS (eraseable)
MMI6300 or MIL 6300	256	4	10	TTL (Open collector)
MIL 6305	512	4	11	TTL (Open collector)
Motorola 10149	256	4	5	ECL
Signetics 10139	32	8	6	ECL
Signetics 82S23	32	8	2	TTL (Open collector)
Signetics 82S27	256	4	8	TTL (Open collector)
Signetics 82S126	256	8	21	TTL (Open collector)
Signetics 82S136	1024	8	12	TTL (Open collector)
Signetics 82S147	512	8	22	TTL (Tri-states)
TMS2532	4096	8	19	NMOS (eraseable)

Table 3 Proms' pin assignments for Address lines

(A0 refers to the high-order address bit)

	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
F93427	5	6	7	4	3	2	1	15	-	-	-	-
F93453	5	6	7	4	3	2	1	17	16	15	-	-
HM7603*	14	13	12	11	10	-	-	-	-	-	-	-
HM7610	5	6	7	4	3	2	1	15	-	-	-	-
HM7620	5	6	7	4	3	2	1	15	14	-	-	-
I1702A	17	18	19	20	21	1	2	3	-	-	-	-
I2708	22	23	1	2	3	4	5	6	7	8	-	-
I2716	19	22	23	1	2	3	4	5	6	7	8	-
I2758	22	23	1	2	3	4	5	6	7	8	-	-
I3601	5	6	7	4	3	2	1	15	-	-	-	-
I8748	23	22	21	19	18	17	16	15	14	13	12	-
MMI6300	5	6	7	4	3	2	1	15	-	-	-	-
MIL 6305	5	6	7	4	3	2	1	15	14	-	-	-
M10149	4	2	3	9	10	6	5	7	-	-	-	-
S10139	14	13	12	11	10	-	-	-	-	-	-	-
S82S23	14	13	12	11	10	-	-	-	-	-	-	-
S82S27	5	6	7	4	3	2	1	15	-	-	-	-
S82S126	5	6	7	4	3	2	1	15	-	-	-	-
S82S136	5	6	7	4	3	2	1	17	16	15	-	-
S82S147	1	2	3	4	5	16	17	18	19	-	-	-
TMS2532	18	19	22	23	1	2	3	4	5	6	7	8

***** Please be aware that these assignments are different (reversed) from those indicated in TTLDataSheets.dm, hence add switch "A/R" in program/check command line.

Table 4 Proms' pin assignments for Data Output lines

(D0 refers to the high-order Data bit)

	D0	D1	D2	D3	D4	D5	D6	D7
F93427	12	11	10	9	-	-	-	-
F93453	14	13	12	11	-	-	-	-
HM7603	1	2	3	4	5	6	7	9
HM7610	12	11	10	9	-	-	-	-
HM7620	12	11	10	9	-	-	-	-
I1702A	11	10	9	8	7	6	5	4
I2708	9	10	11	13	14	15	16	17
I2716	9	10	11	13	14	15	16	17
I2758	9	10	11	13	14	15	16	17
I3601	12	11	10	9	-	-	-	-
I8748	19	18	17	16	15	14	13	12
MMI6300	12	11	10	9	-	-	-	-
MIL 6305	12	11	10	9	-	-	-	-
M10149	15	14	13	12	-	-	-	-
S10139	1	2	3	4	5	6	7	9
S82S23	1	2	3	4	5	6	7	9
S82S27	12	11	10	9	-	-	-	-
S82S126	12	11	10	9	-	-	-	-
S82S136	14	13	12	11	-	-	-	-
S82S147	6	7	8	9	11	12	13	14
TMS2532	9	10	11	13	14	15	16	17