OPCODES IMPLEMENTED IN MICROCODE BY MACHINE

Jan Pedersen
23 June 1986

Key: '09 = 12K Dandetiger
'08 = 4K Dandelion
'00 = Dolphin
'32 = Dorado (as reported by Gwan)
'32L = Dorado (as reported by Larry)
'86-4 = 4K Daybreak
'86-8 = 8K Daybreak
X = Has microcode
P = Prolog microcode set
- = Doesn't have microcode
? = Don't know

Opcodes listed by entry in UFN table

op	'09	'08	'00	'32	'32L	'86-4	'86-8	Name
000	X	X	X	X	-	X	X	-X-
001	X	X	X	X	X	X	X	CAR
002	X	X	X	X	X	X	X	CDR
003	X	X	X	X	X	X	X	LISTP
004	X	X	X	X	X	X	X	NTYPX
005	X	X	X	X	X	X	X	TYPEP
006	X	X	X	X	X	X	X	DTEST {new COERCE}
007	-	-	-	-	-	-	-	CDDR {unused}
010	X	X	X	X	X	X	X	FN0
...	X	X	X	X	X	X	X	...
015	X	X	X	X	X	X	X	FNX
016	X	X	X	X	X	X	X	APPLYFN
017	-	-	-	-	X	-	-	CHECKAPPLY{?}
020	X	X	X	X	X	X	X	RETURN
021	X	X	X	X	X	X	X	BIND
022	X	X	X	X	X	X	X	UNBIND
023	X	X	X	X	X	X	X	DUNBIND
024	X	X	X	X	X	X	X	RPLPTR.N
025	X	X	X	X	X	X	X	GCREF
026	X	-	-	-	-	-	-	ASSOC
027	X	X	X	X	X	X	X	GVAR←
030	X	-	X	X	X	X	X	RPLACA
031	X	-	X	X	X	X	X	RPLACD
032	X	X	X	X	X	X	X	CONS
033	-	-	-	-	-	-	-	{unused}{will be GETPROP}
034	X	-	-	-	-	-	-	FMEMB
035	-	-	-	-	-	-	-	{unused}{will be GETHASH}
036	-	-	-	-	-	-	-	{unused}{will be PUTHASH}
037	X	-	X	X	X	X	X	CREATECELL
040	X	-	X	X	X	X	X	BIN
041	-	-	-	-	-	-	-	BOUT {unused}
042	P	-	-	-	-	-	-	{Prolog}OPFETCHPLUSOPDISP
043	-	-	-	-	-	-	-	{unused}{will be LIST1}
044	-	-	-	-	-	-	-	DOCOLLECT {unused}
045	-	-	-	-	-	-	-	ENDCOLLECT {unused}
046	X	-	X	-	-	X	X	RPLCONS
047	X	-	-	-	-	-	-	LISTGET
050	-	-	-	-	-	-	-	ELT
051	-	-	-	-	-	-	-	NTHCHC
052	-	-	-	-	-	-	-	SETA
053	-	-	-	-	-	-	-	RPLCHARCODE {unused}
054	X	X	X	X	X	X	X	EVAL
055	-	-	-	-	-	-	-	{unused}EVALV
056	X	X	-	-	X	X	X	TYPECHECK
057	X	X	X	?	X	X	X	STKSCAN
060	X	-	-	-	-	-	-	BUSBLT
061	X	-	-	-	-	-	-	MISC8{IBLT1 and IBLT2}
062	X	-	-	-	-	-	-	POLY {Poly; Mat. Multiply}
063	X	X	-	-	X	X	X	TYPEMASK.N
064	P	-	-	-	-	-	-	{Prolog}PROLOGREADPTR
065	P	-	-	-	-	-	-	{Prolog}PROLOGREADTAG
066	P	-	-	-	-	-	-	{Prolog}PROLOGWRITETAGPTR
067	P	-	-	-	-	-	-	{Prolog}PROLOGWRITE0PTR

```
070    X      -      -      -      -      -      -      PSEUDOCOLOR
071    -      -      -      -      -      X      X      DOVEMISC
072    X      X      -      -      X      -      X      EQL
073    X      -      -      -      -      -      X      DRAWLINE
074    X      X      ?      ?      X      X      X      STOREN
075    X      X      -      -      X      X      X      COPYN
076    X      X      X      X      -      X      X      RAID
077    -      -      -      -      -      -      -      {unused}RETURN FOR LLBREAK

100    X      X      X      X      X      X      X      IVAR0
...    X      X      X      X      X      X      X      ...
107    X      X      X      X      X      X      X      IVARX

110    X      X      X      X      X      X      X      PVAR0
...    X      X      X      X      X      X      X      ...
117    X      X      X      X      X      X      X      PVARX

120    X      X      X      X      X      X      X      FVAR0
...    X      X      X      X      X      X      X      ...
127    X      X      X      X      X      X      X      FVARX

130    X      X      X      X      X      X      X      PVAR0←
...    X      X      X      X      X      X      X      ...
137    X      X      X      X      X      X      X      PVARX←

140    X      X      X      X      X      X      X      GVAR
141    X      X      -      -      X      X      X      ARG0
142    X      X      X      X      X      X      X      IVARX←
143    X      X      X      X      X      X      X      FVARX←
144    X      X      X      X      X      X      X      COPY
145    -      -      -      X      X      -      -      MYARGCOUNT {unused}
146    X      X      X      X      X      X      X      MYALINK
147    X      X      X      X      X      X      X      ACONST

150    X      X      X      X      X      X      X      'NIL
151    X      X      X      X      X      X      X      'T
152    X      X      X      X      X      X      X      '0
153    X      X      X      X      X      X      X      '1
154    X      X      X      X      X      X      X      SIC
155    X      X      X      X      X      X      X      SNIC
156    X      X      X      X      X      X      X      SICX
157    X      X      X      X      X      X      X      GCONST

160    X      X      X      X      X      X      X      ATOMNUMBER
161    X      X      X      X      X      X      X      READFLAGS
162    X      X      X      X      X      X      X      READRP
163    X      X      X      ?      -      X      X      WRITEMAP
164    X      -      X      ?      X      -      -      READPRINTERPORT
165    X      -      X      ?      X      -      -      WRITEPRINTERPORT
166    X      X      X      X      X      X      X      PILOTBITBLT
167    X      X      X      X      X      X      X      RCLK

170    X      X      X      X      X      X      X      MISC1
171    X      X      X      X      -      X      X      MISC2
172    X      X      X      X      -      X      X      RECLAIMCELL
173    X      X      X      X      X      X      X      GCSCAN1
174    X      X      X      X      X      X      X      GCSCAN2
175    X      X      X      X      X      X      X      SUBRCALL
176    X      X      X      X      X      X      X      CONTEXT
177    -      -      ?      -      -      -      -      {unused}AUDIO

200    X      X      X      X      X      X      X      JUMP00
...    X      X      X      X      X      X      X      ...
207    X      X      X      X      X      X      X      JUMP07

210    X      X      X      X      X      X      X      JUMP10
...    X      X      X      X      X      X      X      ....
217    X      X      X      X      X      X      X      JUMP17

220    X      X      X      X      X      X      X      FJUMP00
...    X      X      X      X      X      X      X      ...
227    X      X      X      X      X      X      X      FJUMP07

230    X      X      X      X      X      X      X      FJUMP10←
...    X      X      X      X      X      X      X      ...
237    X      X      X      X      X      X      X      FJUMP17←

240    X      X      X      X      X      X      X      TJUMP00
...    X      X      X      X      X      X      X      ...
```

247	X	X	X	X	X	X	X	TJUMP07
250	X	X	X	X	X	X	X	TJUMP10
...	X	X	X	X	X	X	X	...
257	X	X	X	X	X	X	X	TJUMP17
260	X	X	X	X	X	X	X	JUMPX
261	X	X	X	X	X	X	X	JUMPXX
262	X	X	X	X	X	X	X	FJUMPX
263	X	X	X	X	X	X	X	TJUMPX
264	X	X	X	X	X	X	X	NFJUMPX
265	X	X	X	X	X	X	X	NTJUMPX
266	X	-	-	-	-	-	-	ARRAYINDEX1
267	X	-	-	-	-	-	-	ARRAYINDEX2
270	X	X	X	X	X	X	X	PVAR0←
...	X	X	X	X	X	X	X	...
276	X	X	X	X	X	X	X	PVAR6←
277	X	X	X	X	X	X	X	POP
300	X	X	-	-	-	X	X	POP.N
301	X	X	-	-	-	X	X	ATOMCELL.N
302	X	X	X	X	X	X	X	GETBASEBYTE
303	-	-	-	-	-	-	-	{unused}
304	X	X	X	X	X	X	X	BLT
305	X	-	-	-	-	-	-	PIXELBLT
306	-	-	-	-	-	-	-	{unused}
307	X	X	X	X	X	X	X	PUTBASEBYTE
310	X	X	X	X	X	X	X	GETBASE.N
311	X	X	X	X	X	X	X	GETBASEPTR.N
312	X	X	X	X	X	X	X	GETBITS.N.FD
313	-	-	-	-	-	-	-	{unused}{new GETBASEFIXP}
314	-	-	-	-	-	-	-	{unused}{new PUTBASEFIXP}
315	X	X	X	X	X	X	X	PUTBASE.N
316	X	X	X	X	X	X	X	PUTBASEPTR.N
317	X	X	X	X	X	X	X	PUTBITS.N.FD
320	X	X	X	X	X	X	X	ADDBASE
321	X	X	X	X	X	X	X	VAG2
322	X	X	X	X	X	X	X	HILOC
323	X	X	X	X	X	X	X	LOLOC
324	X	X	X	X	X	X	X	PLUS2{see notes}
325	X	X	X	X	X	X	X	DIFFERENCE{see notes}
326	X	X	X	X	X	X	X	TIMES2{see notes}
327	X	X	X	X	X	X	X	QUOTIENT{see notes}
330	X	X	X	X	X	X	X	IPLUS2{see notes}
331	X	X	X	X	X	X	X	IDIFFERENCE{see notes}
332	X	X	X	X	X	X	X	ITIMES2{see notes}
333	X	X	X	X	X	X	X	IQUOTIENT{see notes}
334	X	X	X	X	X	X	X	IREMAINDER{see notes}
335	-	-	-	-	-	X	X	{unused}{IPLUS.N}
336	-	-	-	-	-	X	X	{unused}{IDIFFERENCE.N}
337	-	-	-	-	-	-	-	{unused}
340	X	X	X	X	X	X	X	LLSH1{see notes}
341	X	X	X	X	X	X	X	LLSH8{see notes}
342	X	X	X	X	X	X	X	LRSH1{see notes}
343	X	X	X	X	X	X	X	LRSH8{see notes}
344	X	X	X	X	X	X	X	LOGOR2{see notes}
345	X	X	X	X	X	X	X	LOGAND2{see notes}
346	X	X	X	X	X	X	X	LOGXOR2{see notes}
347	-	-	-	-	-	-	-	{unused}{new ALSH}
350	X	-	X	X	X	-	X	FPLUS2
351	X	-	X	X	X	-	X	FDIFFERENCE
352	X	-	X	X	X	-	X	FTIMES2
353	X	-	X	X	X	-	X	FQUOTIENT
354	X	-	-	-	-	-	-	UBFLOAT2 {UFADD, UFSUB, UFISUB, UFMULT, UFDIV, UGREAT, UMAX, UMIN, UREM}
355	X	-	-	-	X	-	-	UBFLOAT1 {UTOB, BTOU, UABS, UNEG, UFIX}
356	X	-	-	-	-	-	-	ARRAYREAD{GENERAL,UNBOXED}
357	X	-	-	-	-	-	-	ARRAYWRITE{GENERAL,UNBOXED}
360	X	X	X	X	X	X	X	EQ
361	X	X	X	X	X	X	X	IGREATERP
362	X	-	X	X	X	-	X	FGREATERP

363	X	X	X	X	X	X	X	GREATERP
364	X	X	?	?	X	-	X	EQUAL
365	X	-	X	X	X	-	X	MAKENUMBER
366	X	-	X	X	X	-	-	BOXIPLUS
367	X	-	X	X	X	-	-	BOXIDIFFERENCE
370	-	-	-	-	-	-	-	MISC5
371	X	-	-	-	-	-	-	FFTSTEP
372	X	-	-	-	-	-	-	MISC3 {Floating Point Array ops: EXP, MAG, FLOAT, COMPLEX, BLKMAX, BLKMIN, BLKABSMAX, BLKABSMIN, FLOATTOBYTE}
373	X	-	-	-	-	-	-	MISC4 {Floating Point Array ops: TIMES, PERM, PLUS, DIFFERENCE, MAGIC, BITMAPBIT}
374	-	-	?	-	X	-	-	{reserved for DOLPHIN}
375	X	X	X	X	X	X	X	SWAP
376	X	X	X	X	X	X	X	NOP
377	-	-	-	-	-	-	-	{unused}

notes:

4K microcode:

PLUS2, DIFFERENCE, TIMES2, QUOTIENT will ufn if args not INTEGERS

IPLUS2, IDIFFERENCE will accept FIXP's as arguments, but will ufn if result is not a smallp or smallneg

ITIMES2, IQUOTIENT, IREMAINDER will ufn if both args are not smallp

12K microcode:

PLUS2, DIFFERENCE, TIMES2, QUOTIENT will try floating point if args not INTEGERS

IPLUS2, IDIFFERENCE will accept FIXP's as arguments, and box the result if it is not a smallp or smallneg

ITIMES2, IQUOTIENT, IREMAINDER will ufn if both args are not smallp