```
1    * REALM MAP INTERPRETER
2
3
4
5            ORG   $163E      ; ALLOWS BUFFER AT $1F00
6
7
8
9    * ZERO PAGE USAGE
10
11
12
13   FAC1     EQU   $06        ; FACTOR IN MULBB
14
15   FAC2     EQU   $07        ; FACTOR IN MULBB
16
17   PROD     EQU   $08        ; PRODUCT IN MULBB $08,$09
18
19   YEND     EQU   $1E
20
21   SPTR     EQU   $CE        ; BACKING SUBMAP $CE,$CF
22
23   IDX      EQU   $D7        ; OUTER LOOP INDEX 1
24
25   IDY      EQU   $E3        ; OUTER LOOP INDEX 2
26
27   SCRPTR   EQU   $EB        ; SCREEN POINTER $EB,$EC
28
29   DX       EQU   $ED
30
31   DY       EQU   $EE
32
33   TEMP     EQU   $EF
34
35   MPTR     EQU   $FA        ; INPLACE SUBMAP $FA,$FB
36
37   SROW1    EQU   $FC        ; ROW IN SPRITE
38
39   SROW2    EQU   $FD        ; ROW IN SPRITE
40
41   ZPTR     EQU   $FE        ; DENIZEN SUBMAP, GENERAL USE
42
43
44
45   * VARIABLES
46
47
48
49   STAB     EQU   $1FC0      ; TABLE OF SPRITE PTRS
50
51   DOFF     EQU   $1FEE      ; OFFSET TO DENIZEN MAP
52
53   ROWS     EQU   $1FF0      ; MAP ROWS
54
55   COLS     EQU   $1FF1      ; MAP COLUMNS
56
57   YPIX     EQU   $1FF2
58
59   XPIX7    EQU   $1FF3
```

```
                        60
                        61   SPAN     EQU   $1FF4      ; 2*RNG+1
                        62
                        63   RNG      EQU   $1FF5      ; MAP VISIBLE RANGE
                        64
                        65   OFFSET   EQU   $1FF6      ; TILE OFFSETS, 2 NIBBLES
                        66
                        67   SADDR    EQU   $1FF7      ; PTR TO SPRITE TABLE
                        68
                        69   MAPTYP   EQU   $1FF9      ; $00,$01,$02
                        70
                        71   HOSTILE  EQU   $1FFA
                        72
                        73   TRAVEL   EQU   $1FFB      ; $00,$10,$20
                        74
                        75   MAP0     EQU   $1FFC      ; MAP POINTER
                        76
                        77   X0       EQU   $1FFE
                        78
                        79   Y0       EQU   $1FFF
                        80
                        81
                        82
                        83   SCREEN0  EQU   $2000      ; SCREEN ADDRESS
                        84
                        85   BUFFER   EQU   $1F00      ; SUBMAP BUFFER
                        86
                        87
                        88
                        89   * OFFSETS TO ALL SPRITES
                        90
                        91
                        92
163E: 00 00 18          93   SOFFSET  HEX   0000,1800,3000,4800
1641: 00 30 00 48
1645: 00
                        94
1646: 60 00 78          95            HEX   6000,7800,9000,A800
1649: 00 90 00 A8
164D: 00
                        96
164E: C0 00 D8          97            HEX   C000,D800,F000,0801
1651: 00 F0 00 08
1655: 01
                        98
1656: 20 01 38          99            HEX   2001,3801,5001,6801
1659: 01 50 01 68
165D: 01
                       100
165E: 80 01 98         101            HEX   8001,9801,B001,C801
1661: 01 B0 01 C8
1665: 01
                       102
1666: E0 01 F8         103            HEX   E001,F801,1002,2802
1669: 01 10 02 28
166D: 02
                       104
```

```
166E: 40 02 58  105           HEX   4002,5802,7002,8802
1671: 02 70 02 88
1675: 02
                106
1676: A0 02 B8  107           HEX   A002,B802,D002,E802
1679: 02 D0 02 E8
167D: 02
                108
167E: 00 03 18  109           HEX   0003,1803,3003,4803
1681: 03 30 03 48
1685: 03
                110
                111
                112
                113  * OFFSETS TO PARTY SPRITES (PADDED)
                114
                115  * ADDR = WALKING + MAPTYP*2 + TRAVEL/2
                116
1686: 98 01 80  117  WALKING  HEX   9801,8001,9801,0000
1689: 01 98 01 00
168D: 00
                118
168E: 08 01 08  119  SAILING  HEX   0801,0801,0801,0000
1691: 01 08 01 00
1695: 00
                120
1696: 80 01 80  121  FLYING   HEX   8001,8001,8001,0000
1699: 01 80 01 00
169D: 00
                122
                123
                124
                125  * ARRAYS OF FORBIDDEN TERRAIN CODES
                126
                127  * ADDR = FRBOUT + MAPTYP*24 + TRAVEL/2
                128
                129  * FIRST BYTE OF EACH ROW IS ARRAY SIZE
                130
                131  * NEGATIVE FIRST BYTE FLIPS TO ALLOWED
                132
                133  * NB ORDER CAN MATTER TO BASIC PROGS
                134
169E: 06 02 04  135  FRBOUT   HEX   06,02,04,06,08,09,05,00
16A1: 06 08 09 05
16A5: 00
                136
16A6: FD 04 07  137           HEX   FD,04,07,0E,00,00,00,00
16A9: 0E 00 00 00
16AD: 00
                138
16AE: 02 05 02  139           HEX   02,05,02,00,00,00,00,00
16B1: 00 00 00 00
16B5: 00
                140
16B6: 04 04 05  141  FRBTWN   HEX   04,04,05,06,0A,00,00,00
16B9: 06 0A 00 00
16BD: 00
```

```
                       142
16BE: FF 04 00         143           HEX   FF,04,00,00,00,00,00,00
16C1: 00 00 00 00
16C5: 00
                       144
16C6: 00 00 00         145           HEX   00,00,00,00,00,00,00,00
16C9: 00 00 00 00
16CD: 00
                       146
16CE: 05 02 04         147  FRBDNG   HEX   05,02,04,05,06,08,00,00
16D1: 05 06 08 00
16D5: 00
                       148
16D6: FF 04 00         149           HEX   FF,04,00,00,00,00,00,00
16D9: 00 00 00 00
16DD: 00
                       150
16DE: 00 00 00         151           HEX   00,00,00,00,00,00,00,00
16E1: 00 00 00 00
16E5: 00
                       152
16E6: 06 04 05         153  FRBGRD   HEX   06,04,05,06,0A,0B,0C,00
16E9: 06 0A 0B 0C
16ED: 00
                       154
                       155
                       156
                       157  * MOBILE DENIZEN CODES
                       158
                       159  * ACCESS AS MOBILE,X OR MOBILE+3,X WHERE X = MAPTYP
                       160
16EE: FF 11 0F         161  MOBILE   HEX   FF,11,0F,FF,19,0F
16F1: FF 19 0F
                       162
                       163  * ACESS AS DERASE,X WHERE X = MAPTYP
                       164
16F4: 00 0F 07         165  DERASE   HEX   00,0F,07
                       166
                       167
                       168
                       169  * DENIZENS FOR AN ORDERED COUNT
                       170
                       171  * FIRST BYTE IS ARRAY SIZE
                       172
16F7: 06 09 0A         173  TWNCOUNT HEX   06,09,0A,0B,0C,0D,0E
16FA: 0B 0C 0D 0E
                       174
16FE: 02 03 0D         175  DNGCOUNT HEX   02,03,0D
                       176
                       177
                       178
                       179  * ROM ROUTINES
                       180
                       181
                       182
                       183  COUT     EQU   $FDED
                       184
```

```
185
186
187
188
189  * MACROS ****************************
190
191
192
193           DO    0
194
195
196
197  * SIMPLE MATH
198
199
200
201  INC16     MAC
202
203           INC   ]1
204
205           BNE   CONT
206
207           INC   ]1+1
208
209  CONT
210
211           <<<
212
213
214
215  DEC16     MAC
216
217           SEC
218
219           LDA   ]1
220
221           SBC   #$01
222
223           STA   ]1
224
225           LDA   ]1+1
226
227           SBC   #$00
228
229           STA   ]1+1
230
231           <<<
232
233
234
235  NEGB      MAC
236
237           LDA   ]1
238
239           EOR   #$FF
240
241           STA   ]1
```

```
242
243           INC   ]1
244
245           <<<
246
247
248
249  NEGW     MAC
250
251           LDA   ]1
252
253           EOR   #$FF
254
255           STA   ]1
256
257           LDA   ]1+1
258
259           EOR   #$FF
260
261           STA   ]1+1
262
263           INC16 ]1
264
265           <<<
266
267
268
269  DIV64    MAC
270
271           LSR
272
273           LSR
274
275           LSR
276
277           LSR
278
279           LSR
280
281           LSR
282
283           <<<
284
285
286
287  MOD64    MAC
288
289           AND   #$3F
290
291           <<<
292
293
294
295  DIV8     MAC
296
297           LSR
298
```

```
299           LSR
300
301           LSR
302
303           <<<
304
305
306
307  MOD8     MAC
308
309           AND   #$07
310
311           <<<
312
313
314
315  MUL      MAC              ; PROD = V1 * V2
316
317           LDA   ]1
318
319           STA   FAC1
320
321           LDA   ]2
322
323           STA   FAC2
324
325           JSR   MULBB
326
327           <<<
328
329
330
331  MULA     MAC              ; PROD = V1 * A
332
333           STA   FAC1
334
335           LDA   ]1
336
337           STA   FAC2
338
339           JSR   MULBB
340
341           <<<
342
343
344
345  MUL24    MAC              ; ONLY FOR 8 BITS
346
347           ASL
348
349           ASL
350
351           ASL
352
353           STA   FAC1
354
355           ASL
```

```
356
357           CLC
358
359           ADC   FAC1
360
361           <<<
362
363
364
365  MUL40    MAC             ; ONLY FOR 8 BITS
366
367           STA   FAC1
368
369           ASL
370
371           ASL
372
373           ASL
374
375           ASL
376
377           ASL
378
379           STA   FAC2        ; FAC2=A*32
380
381           LDA   FAC1
382
383           ASL
384
385           ASL
386
387           ASL               ; A=A*8
388
389           CLC
390
391           ADC   FAC2
392
393           <<<
394
395
396
397  MUL128   MAC
398
399           STA   PROD
400
401           LDA   #$00
402
403           STA   PROD+1
404
405           ASL   PROD
406
407           ROL   PROD+1
408
409           ASL   PROD
410
411           ROL   PROD+1
412
```

```
413           ASL   PROD
414
415           ROL   PROD+1
416
417           ASL   PROD
418
419           ROL   PROD+1
420
421           ASL   PROD
422
423           ROL   PROD+1
424
425           ASL   PROD
426
427           ROL   PROD+1
428
429           ASL   PROD
430
431           ROL   PROD+1
432
433           <<<
434
435
436
437  ADDAW    MAC             ; ADD A TO WORD1
438
439           CLC
440
441           ADC   ]1
442
443           STA   ]1
444
445           LDA   #$00
446
447           ADC   ]1+1
448
449           STA   ]1+1
450
451           <<<
452
453
454
455  ADDBW    MAC             ; ADD BYTE1 TO WORD2
456
457           CLC
458
459           LDA   ]1
460
461           ADC   ]2
462
463           STA   ]2
464
465           LDA   #$00
466
467           ADC   ]2+1
468
469           STA   ]2+1
```

```
470
471           <<<
472
473
474
475  SUBBW    MAC              ; SUB BYTE1 FROM WORD2
476
477           SEC
478
479           LDA   ]2
480
481           SBC   ]1
482
483           STA   ]2
484
485           LDA   ]2+1
486
487           SBC   #$00
488
489           STA   ]2+1
490
491           <<<
492
493
494
495  ADDWW    MAC              ; ADD WORD1 TO WORD2
496
497           CLC
498
499           LDA   ]1
500
501           ADC   ]2
502
503           STA   ]2
504
505           LDA   ]1+1
506
507           ADC   ]2+1
508
509           STA   ]2+1
510
511           <<<
512
513
514
515  SUBWW    MAC              ; SUB WORD1 FROM WORD2
516
517           SEC
518
519           LDA   ]2
520
521           SBC   ]1
522
523           STA   ]2
524
525           LDA   ]2+1
526
```

```
527           SBC   ]1+1
528
529           STA   ]2+1
530
531           <<<
532
533
534
535   * MEMORY MANIPULATIONS
536
537
538
539   COPYW     MAC
540
541           LDA   ]1
542
543           STA   ]2
544
545           LDA   ]1+1
546
547           STA   ]2+1
548
549           <<<
550
551
552
553   PHX       MAC
554
555           TXA
556
557           PHA
558
559           <<<
560
561
562
563   PHY       MAC
564
565           TYA
566
567           PHA
568
569           <<<
570
571
572
573   PLX       MAC
574
575           PLA
576
577           TAX
578
579           <<<
580
581
582
583   PLY       MAC
```

```
584
585           PLA
586
587           TAY
588
589           <<<
590
591
592
593   LONIB   MAC
594
595           AND   #$0F
596
597           <<<
598
599
600
601   HINIB   MAC
602
603           AND   #$F0
604
605           LSR
606
607           LSR
608
609           LSR
610
611           LSR
612
613           <<<
614
615
616
617   SELNIB  MAC                 ; X SELECTS NIBBLE
618
619           STA   PROD+1
620
621           LONIB
622
623           STA   PROD
624
625           LDA   PROD+1
626
627           HINIB
628
629           STA   PROD+1
630
631           LDA   PROD,X
632
633           <<<
634
635
636
637   * PARAMETER MANIPULATIONS
638
639
640
```

```
641  INITXY   MAC
642
643           SEC
644
645           LDA   X0
646
647           SBC   RNG
648
649           STA   X0
650
651           SEC
652
653           LDA   Y0
654
655           SBC   RNG
656
657           STA   Y0
658
659           LDA   RNG
660
661           ASL
662
663           STA   SPAN
664
665           INC   SPAN
666
667           <<<
668
669
670
671  RESETXY  MAC
672
673           CLC
674
675           LDA   X0
676
677           ADC   RNG
678
679           STA   X0
680
681           CLC
682
683           LDA   Y0
684
685           ADC   RNG
686
687           STA   Y0
688
689           <<<
690
691
692
693  ADVMROW  MAC
694
695           ADDBW SPAN;SPTR
696
697           LDA   COLS
```

```
                        698
                        699           LSR
                        700
                        701           ADDAW MPTR
                        702
                        703           LDA   COLS
                        704
                        705           LSR
                        706
                        707           ADDAW ZPTR
                        708
                        709           <<<
                        710
                        711
                        712
                        713           DO    1
                        714
                        715
                        716
                        717
                        718
                        719  * SUBROUTINES ************************
                        720
                        721
                        722
                        723
                        724
                        725  * MULTIPLY TWO BYTES TO FORM A WORD
                        726
                        727
                        728
1701: A9 00             729  MULBB    LDA   #$00       ; MULTIPLY 8 BIT FACTORS
                        730
1703: 85 08             731           STA   PROD
                        732
1705: 85 09             733           STA   PROD+1
                        734
                        735           PHX
                        735
1707: 8A                735           TXA
                        735
1708: 48                735           PHA
                        735
                        735           <<<
                        736
1709: A2 08             737           LDX   #$08       ; 8 BITS PER BYTE
                        738
170B: 46 06             739  :START   LSR   FAC1
                        740
170D: 90 07             741           BCC   :CLEAR
                        742
170F: 18                743           CLC
                        744
1710: A5 09             745           LDA   PROD+1
                        746
1712: 65 07             747           ADC   FAC2
                        748
```

```
1714: 85 09     749           STA   PROD+1
                750
1716: 66 09     751  :CLEAR   ROR   PROD+1
                752
1718: 66 08     753           ROR   PROD
                754
171A: CA        755           DEX
                756
171B: D0 EE     757           BNE   :START
                758
                759           PLX
                759
171D: 68        759           PLA
                759
171E: AA        759           TAX
                759
                759           <<<
                760
171F: 60        761           RTS
                762
                763
                764
                765  * GET SCREEN ADDRESS OF ANY 7 PIXEL SEGMENT
                766
                767  * IN: YPIX = PIXEL ROW, XPIX7 = PIXEL COLUMN / 7
                768
                769  * RETURN: SCRPTR = POINTER TO 7 PIXEL SEGMENT
                770
                771  * ADDR = 8192 + 1024 * (Y%8) + 128 * (Y%64)/8 + 40 * Y/64
                772
                773  * NOTE: 128*(Y%64)/8 IS NOT 16*(Y%64) DUE TO TRUNCATION
                774
                775
                776
1720: A9 00     777  GETSCR   LDA   #SCREEN0
                778
1722: 85 EB     779           STA   SCRPTR
                780
1724: A9 20     781           LDA   #>SCREEN0
                782
1726: 85 EC     783           STA   SCRPTR+1
                784
1728: AD F2 1F  785           LDA   YPIX
                786
                787           DIV64
                787
172B: 4A        787           LSR
                787
172C: 4A        787           LSR
                787
172D: 4A        787           LSR
                787
172E: 4A        787           LSR
                787
172F: 4A        787           LSR
                787
1730: 4A        787           LSR
```

```
                787
                787             <<<
                788
                789             MUL40               ; EXPECT 8 BITS
                789
1731: 85 06     789             STA   FAC1
                789
1733: 0A        789             ASL
                789
1734: 0A        789             ASL
                789
1735: 0A        789             ASL
                789
1736: 0A        789             ASL
                789
1737: 0A        789             ASL
                789
1738: 85 07     789             STA   FAC2          ; FAC2=A*32
                789
173A: A5 06     789             LDA   FAC1
                789
173C: 0A        789             ASL
                789
173D: 0A        789             ASL
                789
173E: 0A        789             ASL                 ; A=A*8
                789
173F: 18        789             CLC
                789
1740: 65 07     789             ADC   FAC2
                789
                789             <<<
                790
1742: 85 08     791             STA   PROD
                792
1744: A9 00     793             LDA   #$00
                794
1746: 85 09     795             STA   PROD+1
                796
                797             ADDWW PROD;SCRPTR ; ADD 40*Y/64
                797
1748: 18        797             CLC
                797
1749: A5 08     797             LDA   PROD
                797
174B: 65 EB     797             ADC   SCRPTR
                797
174D: 85 EB     797             STA   SCRPTR
                797
174F: A5 09     797             LDA   PROD+1
                797
1751: 65 EC     797             ADC   SCRPTR+1
                797
1753: 85 EC     797             STA   SCRPTR+1
                797
                797             <<<
                798
```

```
1755: AD F2 1F  799           LDA   YPIX
                800
                801           MOD64
                801
1758: 29 3F     801           AND   #$3F
                801
                801           <<<
                802
                803           DIV8
                803
175A: 4A        803           LSR
                803
175B: 4A        803           LSR
                803
175C: 4A        803           LSR
                803
                803           <<<
                804
                805           MUL128
                805
175D: 85 08     805           STA   PROD
                805
175F: A9 00     805           LDA   #$00
                805
1761: 85 09     805           STA   PROD+1
                805
1763: 06 08     805           ASL   PROD
                805
1765: 26 09     805           ROL   PROD+1
                805
1767: 06 08     805           ASL   PROD
                805
1769: 26 09     805           ROL   PROD+1
                805
176B: 06 08     805           ASL   PROD
                805
176D: 26 09     805           ROL   PROD+1
                805
176F: 06 08     805           ASL   PROD
                805
1771: 26 09     805           ROL   PROD+1
                805
1773: 06 08     805           ASL   PROD
                805
1775: 26 09     805           ROL   PROD+1
                805
1777: 06 08     805           ASL   PROD
                805
1779: 26 09     805           ROL   PROD+1
                805
177B: 06 08     805           ASL   PROD
                805
177D: 26 09     805           ROL   PROD+1
                805
                805           <<<
                806
                807           ADDWW PROD;SCRPTR ; ADD 128*(Y%64)/8
```

```
                        807
177F: 18                807            CLC
                        807
1780: A5 08             807            LDA   PROD
                        807
1782: 65 EB             807            ADC   SCRPTR
                        807
1784: 85 EB             807            STA   SCRPTR
                        807
1786: A5 09             807            LDA   PROD+1
                        807
1788: 65 EC             807            ADC   SCRPTR+1
                        807
178A: 85 EC             807            STA   SCRPTR+1
                        807
                        807            <<<
                        808
178C: AD F2 1F          809            LDA   YPIX
                        810
                        811            MOD8
                        811
178F: 29 07             811            AND   #$07
                        811
                        811            <<<
                        812
1791: 85 09             813            STA   PROD+1     ; EFFECTIVE ASL*8
                        814
1793: A9 00             815            LDA   #$00
                        816
1795: 85 08             817            STA   PROD
                        818
1797: 06 09             819            ASL   PROD+1
                        820
1799: 06 09             821            ASL   PROD+1
                        822
                        823            ADDWW PROD;SCRPTR ; ADD 1024*Y%8
                        823
179B: 18                823            CLC
                        823
179C: A5 08             823            LDA   PROD
                        823
179E: 65 EB             823            ADC   SCRPTR
                        823
17A0: 85 EB             823            STA   SCRPTR
                        823
17A2: A5 09             823            LDA   PROD+1
                        823
17A4: 65 EC             823            ADC   SCRPTR+1
                        823
17A6: 85 EC             823            STA   SCRPTR+1
                        823
                        823            <<<
                        824
                        825            ADDBW XPIX7;SCRPTR
                        825
17A8: 18                825            CLC
                        825
```

```
17A9: AD F3 1F  825           LDA   XPIX7
                825
17AC: 65 EB     825           ADC   SCRPTR
                825
17AE: 85 EB     825           STA   SCRPTR
                825
17B0: A9 00     825           LDA   #$00
                825
17B2: 65 EC     825           ADC   SCRPTR+1
                825
17B4: 85 EC     825           STA   SCRPTR+1
                825
                825           <<<
                826
17B6: 60        827           RTS              ; ADDRESS IS IN SCRPTR
                828
                829
                830
                831  * ADVANCE PIXEL ROW
                832
                833  * BEATS DIRECT GETSCR CALL 7 OUT OF 8 TIMES
                834
                835
                836
17B7: EE F2 1F  837  ADVPROW  INC   YPIX
                838
17BA: 18        839           CLC
                840
17BB: A5 EC     841           LDA   SCRPTR+1
                842
17BD: 69 04     843           ADC   #$04
                844
17BF: 85 EC     845           STA   SCRPTR+1
                846
17C1: C9 40     847           CMP   #$40
                848
17C3: 10 01     849           BPL   :RECALC
                850
17C5: 60        851           RTS
                852
17C6: 20 20 17  853  :RECALC  JSR   GETSCR
                854
17C9: 60        855           RTS
                856
                857
                858
                859  * PREVENT MOVING OFF MAP IN X
                860
                861  * IN: IDX, DX, COLS
                862
                863  * RETURN: A
                864
                865
                866
17CA: 18        867  XPREVENT CLC
                868
17CB: A5 D7     869           LDA   IDX
```

```
                        870
17CD: 65 ED             871           ADC   DX
                        872
17CF: 30 08             873           BMI   :NEG
                        874
17D1: CD F1 1F          875           CMP   COLS
                        876
17D4: 10 06             877           BPL   :POS
                        878
17D6: A9 00             879           LDA   #$00
                        880
17D8: 60                881           RTS
                        882
17D9: A9 FF             883  :NEG      LDA   #$FF
                        884
17DB: 60                885           RTS
                        886
17DC: A9 01             887  :POS      LDA   #$01
                        888
17DE: 60                889           RTS
                        890
                        891
                        892
                        893  * PREVENT MOVING OFF MAP IN Y
                        894
                        895  * IN: IDY, DY, ROWS
                        896
                        897  * RETURN: A
                        898
                        899  * NB DUNGEONS CANNOT RELY ON N FLAG
                        900
                        901
                        902
17DF: 18                903  YPREVENT CLC
                        904
17E0: A5 E3             905           LDA   IDY
                        906
17E2: 65 EE             907           ADC   DY
                        908
17E4: C9 FF             909           CMP   #$FF
                        910
17E6: F0 08             911           BEQ   :NEG
                        912
17E8: CD F0 1F          913           CMP   ROWS
                        914
17EB: F0 06             915           BEQ   :POS
                        916
17ED: A9 00             917           LDA   #$00
                        918
17EF: 60                919           RTS
                        920
17F0: A9 FF             921  :NEG      LDA   #$FF
                        922
17F2: 60                923           RTS
                        924
17F3: A9 01             925  :POS      LDA   #$01
                        926
```

```
17F5: 60        927           RTS
                928
                929
                930
                931  * CHECK Y BOUNDS
                932
                933  * IN: IDY
                934
                935  * RETURN: A
                936
                937  * NB DUNGEONS CANNOT RELY ON N FLAG
                938
                939  * THEREFORE MUST CHECK EACH CASE
                940
                941
                942
17F6: A2 FF     943  YBOUNDS  LDX   #$FF
                944
17F8: E4 E3     945  :NLOOP   CPX   IDY
                946
17FA: F0 1A     947           BEQ   :NEG
                948
17FC: CA        949           DEX
                950
17FD: E0 F9     951           CPX   #$F9
                952
17FF: D0 F7     953           BNE   :NLOOP
                954
                955
                956
1801: AE F0 1F  957           LDX   ROWS
                958
1804: 8A        959           TXA
                960
1805: 18        961           CLC
                962
1806: 69 06     963           ADC   #$06
                964
1808: 85 06     965           STA   FAC1
                966
180A: E4 E3     967  :PLOOP   CPX   IDY
                968
180C: F0 0B     969           BEQ   :POS
                970
180E: E8        971           INX
                972
180F: E4 06     973           CPX   FAC1
                974
1811: D0 F7     975           BNE   :PLOOP
                976
                977
                978
1813: A9 00     979           LDA   #$00
                980
1815: 60        981           RTS
                982
1816: A9 FF     983  :NEG     LDA   #$FF
```

```
                        984
1818: 60                985             RTS
                        986
1819: A9 01             987  :POS       LDA   #$01
                        988
181B: 60                989             RTS
                        990
                        991
                        992
                        993  * INITIALIZE MAP ROW POINTERS
                        994
                        995  * IN: Y0, MAP0, DOFF, COLS
                        996
                        997
                        998
181C: AD FF 1F          999  INIMPTR    LDA   Y0
                        1000
181F: 85 E3             1001            STA   IDY
                        1002
1821: 20 F6 17          1003            JSR   YBOUNDS
                        1004
1824: C9 FF             1005            CMP   #$FF
                        1006
1826: F0 2B             1007            BEQ   :NEG
                        1008
                        1009
                        1010
1828: AD FF 1F          1011 :POS       LDA   Y0
                        1012
                        1013            MULA  COLS
                        1013
182B: 85 06             1013            STA   FAC1
                        1013
182D: AD F1 1F          1013            LDA   COLS
                        1013
1830: 85 07             1013            STA   FAC2
                        1013
1832: 20 01 17          1013            JSR   MULBB
                        1013
                        1013            <<<
                        1014
                        1015            COPYW PROD;MPTR
                        1015
1835: A5 08             1015            LDA   PROD
                        1015
1837: 85 FA             1015            STA   MPTR
                        1015
1839: A5 09             1015            LDA   PROD+1
                        1015
183B: 85 FB             1015            STA   MPTR+1
                        1015
                        1015            <<<
                        1016
183D: 46 FB             1017            LSR   MPTR+1
                        1018
183F: 66 FA             1019            ROR   MPTR
                        1020
```

```
                        1021          ADDWW MAP0;MPTR  ; MPTR = TERRAIN SUBMAP
                        1021
1841: 18                1021          CLC
                        1021
1842: AD FC 1F          1021          LDA   MAP0
                        1021
1845: 65 FA             1021          ADC   MPTR
                        1021
1847: 85 FA             1021          STA   MPTR
                        1021
1849: AD FD 1F          1021          LDA   MAP0+1
                        1021
184C: 65 FB             1021          ADC   MPTR+1
                        1021
184E: 85 FB             1021          STA   MPTR+1
                        1021
                        1021          <<<
                        1022
1850: 4C 99 18          1023          JMP   :DEN
                        1024
                        1025
                        1026
                        1027 :NEG     NEGB  Y0
                        1027
1853: AD FF 1F          1027          LDA   Y0
                        1027
1856: 49 FF             1027          EOR   #$FF
                        1027
1858: 8D FF 1F          1027          STA   Y0
                        1027
185B: EE FF 1F          1027          INC   Y0
                        1027
                        1027          <<<
                        1028
                        1029          MUL   Y0;COLS
                        1029
185E: AD FF 1F          1029          LDA   Y0
                        1029
1861: 85 06             1029          STA   FAC1
                        1029
1863: AD F1 1F          1029          LDA   COLS
                        1029
1866: 85 07             1029          STA   FAC2
                        1029
1868: 20 01 17          1029          JSR   MULBB
                        1029
                        1029          <<<
                        1030
                        1031          COPYW PROD;ZPTR
                        1031
186B: A5 08             1031          LDA   PROD
                        1031
186D: 85 FE             1031          STA   ZPTR
                        1031
186F: A5 09             1031          LDA   PROD+1
                        1031
1871: 85 FF             1031          STA   ZPTR+1
```

```
                        1031
                        1031          <<<
                        1032
1873: 46 FF             1033          LSR   ZPTR+1
                        1034
1875: 66 FE             1035          ROR   ZPTR
                        1036
                        1037          COPYW MAP0;MPTR
                        1037
1877: AD FC 1F          1037          LDA   MAP0
                        1037
187A: 85 FA             1037          STA   MPTR
                        1037
187C: AD FD 1F          1037          LDA   MAP0+1
                        1037
187F: 85 FB             1037          STA   MPTR+1
                        1037
                        1037          <<<
                        1038
                        1039          SUBWW ZPTR;MPTR
                        1039
1881: 38                1039          SEC
                        1039
1882: A5 FA             1039          LDA   MPTR
                        1039
1884: E5 FE             1039          SBC   ZPTR
                        1039
1886: 85 FA             1039          STA   MPTR
                        1039
1888: A5 FB             1039          LDA   MPTR+1
                        1039
188A: E5 FF             1039          SBC   ZPTR+1
                        1039
188C: 85 FB             1039          STA   MPTR+1
                        1039
                        1039          <<<
                        1040
                        1041          NEGB  Y0
                        1041
188E: AD FF 1F          1041          LDA   Y0
                        1041
1891: 49 FF             1041          EOR   #$FF
                        1041
1893: 8D FF 1F          1041          STA   Y0
                        1041
1896: EE FF 1F          1041          INC   Y0
                        1041
                        1041          <<<
                        1042
                        1043
                        1044
                        1045 :DEN     COPYW MPTR;ZPTR
                        1045
1899: A5 FA             1045          LDA   MPTR
                        1045
189B: 85 FE             1045          STA   ZPTR
                        1045
```

```
189D: A5 FB     1045          LDA   MPTR+1
                1045
189F: 85 FF     1045          STA   ZPTR+1
                1045
                1045          <<<
                1046
                1047          ADDWW DOFF;ZPTR  ; ZPTR = DENIZEN SUBMAP
                1047
18A1: 18        1047          CLC
                1047
18A2: AD EE 1F  1047          LDA   DOFF
                1047
18A5: 65 FE     1047          ADC   ZPTR
                1047
18A7: 85 FE     1047          STA   ZPTR
                1047
18A9: AD EF 1F  1047          LDA   DOFF+1
                1047
18AC: 65 FF     1047          ADC   ZPTR+1
                1047
18AE: 85 FF     1047          STA   ZPTR+1
                1047
                1047          <<<
                1048
18B0: 60        1049          RTS
                1050
                1051
                1052
                1053 * LOAD SUBMAP BUFFER
                1054
                1055 * IN: MPTR, ZPTR, X0, Y0, SPAN
                1056
                1057
                1058
18B1: A9 00     1059 LDSUB    LDA   #BUFFER
                1060
18B3: 85 CE     1061          STA   SPTR
                1062
18B5: A9 1F     1063          LDA   #>BUFFER
                1064
18B7: 85 CF     1065          STA   SPTR+1
                1066
18B9: AD FF 1F  1067          LDA   Y0
                1068
18BC: 85 E3     1069          STA   IDY
                1070
18BE: AC F4 1F  1071          LDY   SPAN
                1072
18C1: 88        1073          DEY
                1074
                1075 :YLOOP   PHY
                1075
18C2: 98        1075          TYA
                1075
18C3: 48        1075          PHA
                1075
                1075          <<<
```

```
                        1076
18C4: 20 F6 17          1077          JSR   YBOUNDS
                        1078
18C7: 85 EF             1079          STA   TEMP
                        1080
18C9: AE F4 1F          1081          LDX   SPAN
                        1082
18CC: CA                1083          DEX
                        1084
                        1085 :XLOOP   PHX
                        1085
18CD: 8A                1085          TXA
                        1085
18CE: 48                1085          PHA
                        1085
                        1085          <<<
                        1086
18CF: 8A                1087          TXA
                        1088
18D0: 18                1089          CLC
                        1090
18D1: 6D FE 1F          1091          ADC   X0
                        1092
18D4: 85 D7             1093          STA   IDX
                        1094
18D6: 4A                1095          LSR
                        1096
18D7: A8                1097          TAY
                        1098
18D8: A5 EF             1099          LDA   TEMP
                        1100
18DA: D0 4C             1101          BNE   :OUT
                        1102
18DC: A5 D7             1103          LDA   IDX
                        1104
18DE: 30 48             1105          BMI   :OUT
                        1106
18E0: CD F1 1F          1107          CMP   COLS
                        1108
18E3: 10 43             1109          BPL   :OUT
                        1110
18E5: A5 D7             1111          LDA   IDX
                        1112
18E7: 29 01             1113          AND   #$01
                        1114
18E9: AA                1115          TAX               ; X = PARITY
                        1116
18EA: B1 FA             1117          LDA   (MPTR),Y
                        1118
                        1119          SELNIB
                        1119
18EC: 85 09             1119          STA   PROD+1
                        1119
                        1119          LONIB
                        1119
18EE: 29 0F             1119          AND   #$0F
                        1119
```

```
                        1119          <<<
                        1119
18F0: 85 08             1119          STA   PROD
                        1119
18F2: A5 09             1119          LDA   PROD+1
                        1119
                        1119          HINIB
                        1119
18F4: 29 F0             1119          AND   #$F0
                        1119
18F6: 4A                1119          LSR
                        1119
18F7: 4A                1119          LSR
                        1119
18F8: 4A                1119          LSR
                        1119
18F9: 4A                1119          LSR
                        1119
                        1119          <<<
                        1119
18FA: 85 09             1119          STA   PROD+1
                        1119
18FC: B5 08             1119          LDA   PROD,X
                        1119
                        1119          <<<
                        1120
18FE: 85 06             1121          STA   FAC1
                        1122
1900: AD EF 1F          1123          LDA   DOFF+1     ; IF 0 NO DENIZENS
                        1124
1903: 08                1125          PHP
                        1126
1904: A5 06             1127          LDA   FAC1
                        1128
1906: 28                1129          PLP
                        1130
1907: F0 31             1131          BEQ   :SAVE
                        1132
1909: B1 FE             1133          LDA   (ZPTR),Y
                        1134
                        1135          SELNIB
                        1135
190B: 85 09             1135          STA   PROD+1
                        1135
                        1135          LONIB
                        1135
190D: 29 0F             1135          AND   #$0F
                        1135
                        1135          <<<
                        1135
190F: 85 08             1135          STA   PROD
                        1135
1911: A5 09             1135          LDA   PROD+1
                        1135
                        1135          HINIB
                        1135
1913: 29 F0             1135          AND   #$F0
```

```
                        1135
1915: 4A                1135            LSR
                        1135
1916: 4A                1135            LSR
                        1135
1917: 4A                1135            LSR
                        1135
1918: 4A                1135            LSR
                        1135
                        1135            <<<
                        1135
1919: 85 09             1135            STA   PROD+1
                        1135
191B: B5 08             1135            LDA   PROD,X
                        1135
                        1135            <<<
                        1136
191D: 69 11             1137            ADC   #$11
                        1138
191F: C9 1F             1139            CMP   #$1F
                        1140
1921: 10 17             1141            BPL   :SAVE
                        1142
1923: 85 06             1143            STA   FAC1
                        1144
1925: 4C 3A 19          1145            JMP   :SAVE
                        1146
                        1147 :OUT       COPYW MAP0;PROD
                        1147
1928: AD FC 1F          1147            LDA   MAP0
                        1147
192B: 85 08             1147            STA   PROD
                        1147
192D: AD FD 1F          1147            LDA   MAP0+1
                        1147
1930: 85 09             1147            STA   PROD+1
                        1147
                        1147            <<<
                        1148
1932: A0 00             1149            LDY   #$00
                        1150
1934: B1 08             1151            LDA   (PROD),Y
                        1152
                        1153            LONIB
                        1153
1936: 29 0F             1153            AND   #$0F
                        1153
                        1153            <<<
                        1154
1938: 85 06             1155            STA   FAC1
                        1156
                        1157 :SAVE      PLX
                        1157
193A: 68                1157            PLA
                        1157
193B: AA                1157            TAX
                        1157
```

```
                        1157          <<<
                        1158
193C: 8A                1159          TXA
                        1160
193D: A8                1161          TAY
                        1162
193E: A5 06             1163          LDA   FAC1
                        1164
1940: 91 CE             1165          STA   (SPTR),Y
                        1166
1942: CA                1167          DEX
                        1168
1943: 10 88             1169          BPL   :XLOOP
                        1170
1945: E6 E3             1171          INC   IDY
                        1172
                        1173          ADVMROW
                        1173
                        1173          ADDBW SPAN;SPTR
                        1173
1947: 18                1173          CLC
                        1173
1948: AD F4 1F          1173          LDA   SPAN
                        1173
194B: 65 CE             1173          ADC   SPTR
                        1173
194D: 85 CE             1173          STA   SPTR
                        1173
194F: A9 00             1173          LDA   #$00
                        1173
1951: 65 CF             1173          ADC   SPTR+1
                        1173
1953: 85 CF             1173          STA   SPTR+1
                        1173
                        1173          <<<
                        1173
1955: AD F1 1F          1173          LDA   COLS
                        1173
1958: 4A                1173          LSR
                        1173
                        1173          ADDAW MPTR
                        1173
1959: 18                1173          CLC
                        1173
195A: 65 FA             1173          ADC   MPTR
                        1173
195C: 85 FA             1173          STA   MPTR
                        1173
195E: A9 00             1173          LDA   #$00
                        1173
1960: 65 FB             1173          ADC   MPTR+1
                        1173
1962: 85 FB             1173          STA   MPTR+1
                        1173
                        1173          <<<
                        1173
1964: AD F1 1F          1173          LDA   COLS
```

```
                        1173
1967: 4A                1173            LSR
                        1173
                        1173            ADDAW ZPTR
                        1173
1968: 18                1173            CLC
                        1173
1969: 65 FE             1173            ADC   ZPTR
                        1173
196B: 85 FE             1173            STA   ZPTR
                        1173
196D: A9 00             1173            LDA   #$00
                        1173
196F: 65 FF             1173            ADC   ZPTR+1
                        1173
1971: 85 FF             1173            STA   ZPTR+1
                        1173
                        1173            <<<
                        1173
                        1173            <<<
                        1174
                        1175            PLY
                        1175
1973: 68                1175            PLA
                        1175
1974: A8                1175            TAY
                        1175
                        1175            <<<
                        1176
1975: 88                1177            DEY
                        1178
1976: 30 03             1179            BMI   :FIN
                        1180
1978: 4C C2 18          1181            JMP   :YLOOP
                        1182
197B: A9 00             1183 :FIN       LDA   #BUFFER    ; RESET SPTR
                        1184
197D: 85 CE             1185            STA   SPTR
                        1186
197F: A9 1F             1187            LDA   #>BUFFER
                        1188
1981: 85 CF             1189            STA   SPTR+1
                        1190
1983: 60                1191            RTS
                        1192
                        1193
                        1194
                        1195 * IS TILE FORBIDDEN TO PARTY
                        1196
                        1197 * IN: FAC1,FAC2
                        1198
                        1199
                        1200
1984: A9 9E             1201 CHKTIL     LDA   #FRBOUT
                        1202
1986: 85 08             1203            STA   PROD
                        1204
```

```
1988: A9 16     1205          LDA   #>FRBOUT
                1206
198A: 85 09     1207          STA   PROD+1
                1208
198C: AD FB 1F  1209          LDA   TRAVEL
                1210
198F: 4A        1211          LSR
                1212
                1213          ADDAW PROD
                1213
1990: 18        1213          CLC
                1213
1991: 65 08     1213          ADC   PROD
                1213
1993: 85 08     1213          STA   PROD
                1213
1995: A9 00     1213          LDA   #$00
                1213
1997: 65 09     1213          ADC   PROD+1
                1213
1999: 85 09     1213          STA   PROD+1
                1213
                1213          <<<
                1214
199B: A5 06     1215          LDA   FAC1
                1216
199D: 48        1217          PHA
                1218
199E: AD F9 1F  1219          LDA   MAPTYP
                1220
                1221          MUL24
                1221
19A1: 0A        1221          ASL
                1221
19A2: 0A        1221          ASL
                1221
19A3: 0A        1221          ASL
                1221
19A4: 85 06     1221          STA   FAC1
                1221
19A6: 0A        1221          ASL
                1221
19A7: 18        1221          CLC
                1221
19A8: 65 06     1221          ADC   FAC1
                1221
                1221          <<<
                1222
                1223          ADDAW PROD
                1223
19AA: 18        1223          CLC
                1223
19AB: 65 08     1223          ADC   PROD
                1223
19AD: 85 08     1223          STA   PROD
                1223
19AF: A9 00     1223          LDA   #$00
```

```
                        1223
19B1: 65 09     1223            ADC   PROD+1
                        1223
19B3: 85 09     1223            STA   PROD+1
                        1223
                        1223            <<<
                        1224
19B5: 68        1225            PLA
                        1226
19B6: 85 06     1227            STA   FAC1
                        1228
19B8: A0 00     1229            LDY   #$00
                        1230
19BA: B1 08     1231            LDA   (PROD),Y   ; COUNT
                        1232
19BC: 30 21     1233            BMI   :FLIP      ; NEG COUNT FLIPS MEANING
                        1234
19BE: A8        1235            TAY
                        1236
19BF: F0 0A     1237 :TLOOP     BEQ   :TERROK
                        1238
19C1: B1 08     1239            LDA   (PROD),Y
                        1240
19C3: C5 06     1241            CMP   FAC1
                        1242
19C5: F0 15     1243            BEQ   :FORBID
                        1244
19C7: 88        1245            DEY
                        1246
19C8: 4C BF 19  1247            JMP   :TLOOP
                        1248
19CB: AD EF 1F  1249 :TERROK    LDA   DOFF+1
                        1250
19CE: F0 09     1251            BEQ   :ALLOW
                        1252
19D0: AD FA 1F  1253            LDA   HOSTILE
                        1254
19D3: D0 04     1255            BNE   :ALLOW
                        1256
19D5: A5 07     1257            LDA   FAC2
                        1258
19D7: F0 03     1259            BEQ   :FORBID
                        1260
19D9: A9 00     1261 :ALLOW     LDA   #$00
                        1262
19DB: 60        1263            RTS
                        1264
19DC: A9 01     1265 :FORBID    LDA   #$01
                        1266
19DE: 60        1267            RTS
                        1268
19DF: 49 FF     1269 :FLIP      EOR   #$FF
                        1270
19E1: A8        1271            TAY
                        1272
19E2: C8        1273            INY
                        1274
```

```
19E3: F0 F7     1275 :ALOOP   BEQ   :FORBID
                1276
19E5: B1 08     1277          LDA   (PROD),Y
                1278
19E7: C5 06     1279          CMP   FAC1
                1280
19E9: F0 E0     1281          BEQ   :TERROK
                1282
19EB: 88        1283          DEY
                1284
19EC: 4C E3 19  1285          JMP   :ALOOP
                1286
                1287
                1288
                1289 * IS TILE FORBIDDEN TO DENIZENS
                1290
                1291 * IN: FAC1,FAC2
                1292
                1293
                1294
19EF: AD F9 1F  1295 CHKDEN   LDA   MAPTYP
                1296
19F2: C9 02     1297          CMP   #$02
                1298
19F4: F0 1C     1299          BEQ   :DNGN
                1300
19F6: AE E6 16  1301          LDX   FRBGRD     ; COUNT
                1302
19F9: F0 0B     1303 :TLOOP   BEQ   :TERROK
                1304
19FB: BD E6 16  1305          LDA   FRBGRD,X
                1306
19FE: C5 06     1307          CMP   FAC1
                1308
1A00: F0 0D     1309          BEQ   :FORBID
                1310
1A02: CA        1311          DEX
                1312
1A03: 4C F9 19  1313          JMP   :TLOOP
                1314
1A06: A5 07     1315 :TERROK  LDA   FAC2
                1316
1A08: C9 0E     1317          CMP   #$0E
                1318
1A0A: 30 03     1319          BMI   :FORBID
                1320
1A0C: A9 00     1321          LDA   #$00
                1322
1A0E: 60        1323          RTS
                1324
1A0F: A9 01     1325 :FORBID  LDA   #$01
                1326
1A11: 60        1327          RTS
                1328
1A12: A9 07     1329 :DNGN    LDA   #$07
                1330
1A14: C5 06     1331          CMP   FAC1
```

```
                     1332
1A16: D0 F7          1333          BNE   :FORBID
                     1334
1A18: A9 00          1335          LDA   #$00
                     1336
1A1A: 60             1337          RTS
                     1338
                     1339
                     1340
                     1341 * GET TERRAIN AND DENIZEN
                     1342
                     1343 * IN: MPTR, ZPTR, IDX, DX, DY
                     1344
                     1345 * DY MUST BE ONE OF (-1,0,1)
                     1346
                     1347
                     1348
1A1B: AD F1 1F       1349 GETTILE  LDA   COLS
                     1350
1A1E: 4A             1351          LSR
                     1352
1A1F: 85 08          1353          STA   PROD
                     1354
1A21: A9 00          1355          LDA   #$00
                     1356
1A23: 85 09          1357          STA   PROD+1     ; PROD IS ROW OFFSET
                     1358
1A25: A5 EE          1359          LDA   DY
                     1360
1A27: F0 05          1361          BEQ   :NONE
                     1362
1A29: 30 0A          1363          BMI   :DECY
                     1364
1A2B: 4C 47 1A       1365          JMP   :CONT
                     1366
1A2E: A9 00          1367 :NONE    LDA   #$00
                     1368
1A30: 85 08          1369          STA   PROD
                     1370
1A32: 4C 47 1A       1371          JMP   :CONT
                     1372
                     1373 :DECY    NEGW  PROD
                     1373
1A35: A5 08          1373          LDA   PROD
                     1373
1A37: 49 FF          1373          EOR   #$FF
                     1373
1A39: 85 08          1373          STA   PROD
                     1373
1A3B: A5 09          1373          LDA   PROD+1
                     1373
1A3D: 49 FF          1373          EOR   #$FF
                     1373
1A3F: 85 09          1373          STA   PROD+1
                     1373
                     1373          INC16 PROD
                     1373
```

```
1A41: E6 08     1373          INC   PROD
                1373
1A43: D0 02     1373          BNE   CONT
                1373
1A45: E6 09     1373          INC   PROD+1
                1373
                1373 CONT
                1373
                1373          <<<
                1373
                1373          <<<
                1374
                1375 :CONT    ADDWW PROD;MPTR  ; SIGNED ADD
                1375
1A47: 18        1375          CLC
                1375
1A48: A5 08     1375          LDA   PROD
                1375
1A4A: 65 FA     1375          ADC   MPTR
                1375
1A4C: 85 FA     1375          STA   MPTR
                1375
1A4E: A5 09     1375          LDA   PROD+1
                1375
1A50: 65 FB     1375          ADC   MPTR+1
                1375
1A52: 85 FB     1375          STA   MPTR+1
                1375
                1375          <<<
                1376
                1377          ADDWW PROD;ZPTR
                1377
1A54: 18        1377          CLC
                1377
1A55: A5 08     1377          LDA   PROD
                1377
1A57: 65 FE     1377          ADC   ZPTR
                1377
1A59: 85 FE     1377          STA   ZPTR
                1377
1A5B: A5 09     1377          LDA   PROD+1
                1377
1A5D: 65 FF     1377          ADC   ZPTR+1
                1377
1A5F: 85 FF     1377          STA   ZPTR+1
                1377
                1377          <<<
                1378
1A61: A5 D7     1379          LDA   IDX
                1380
1A63: 18        1381          CLC
                1382
1A64: 65 ED     1383          ADC   DX
                1384
1A66: 48        1385          PHA
                1386
1A67: 4A        1387          LSR
```

```
                        1388
1A68: A8                1389            TAY
                        1390
1A69: B1 FA             1391            LDA   (MPTR),Y
                        1392
1A6B: 85 06             1393            STA   FAC1
                        1394
1A6D: B1 FE             1395            LDA   (ZPTR),Y
                        1396
1A6F: 85 07             1397            STA   FAC2
                        1398
                        1399            SUBWW PROD;MPTR  ; SIGNED SUB
                        1399
1A71: 38                1399            SEC
                        1399
1A72: A5 FA             1399            LDA   MPTR
                        1399
1A74: E5 08             1399            SBC   PROD
                        1399
1A76: 85 FA             1399            STA   MPTR
                        1399
1A78: A5 FB             1399            LDA   MPTR+1
                        1399
1A7A: E5 09             1399            SBC   PROD+1
                        1399
1A7C: 85 FB             1399            STA   MPTR+1
                        1399
                        1399            <<<
                        1400
                        1401            SUBWW PROD;ZPTR
                        1401
1A7E: 38                1401            SEC
                        1401
1A7F: A5 FE             1401            LDA   ZPTR
                        1401
1A81: E5 08             1401            SBC   PROD
                        1401
1A83: 85 FE             1401            STA   ZPTR
                        1401
1A85: A5 FF             1401            LDA   ZPTR+1
                        1401
1A87: E5 09             1401            SBC   PROD+1
                        1401
1A89: 85 FF             1401            STA   ZPTR+1
                        1401
                        1401            <<<
                        1402
1A8B: 68                1403            PLA
                        1404
1A8C: 29 01             1405            AND   #$01
                        1406
1A8E: AA                1407            TAX             ; X = PARITY
                        1408
1A8F: A5 06             1409            LDA   FAC1
                        1410
                        1411            SELNIB          ; NB SPOILS PROD
                        1411
```

```
1A91: 85 09     1411          STA   PROD+1
                1411
                1411          LONIB
                1411
1A93: 29 0F     1411          AND   #$0F
                1411
                1411          <<<
                1411
1A95: 85 08     1411          STA   PROD
                1411
1A97: A5 09     1411          LDA   PROD+1
                1411
                1411          HINIB
                1411
1A99: 29 F0     1411          AND   #$F0
                1411
1A9B: 4A        1411          LSR
                1411
1A9C: 4A        1411          LSR
                1411
1A9D: 4A        1411          LSR
                1411
1A9E: 4A        1411          LSR
                1411
                1411          <<<
                1411
1A9F: 85 09     1411          STA   PROD+1
                1411
1AA1: B5 08     1411          LDA   PROD,X
                1411
                1411          <<<
                1412
1AA3: 85 06     1413          STA   FAC1
                1414
1AA5: A5 07     1415          LDA   FAC2
                1416
                1417          SELNIB
                1417
1AA7: 85 09     1417          STA   PROD+1
                1417
                1417          LONIB
                1417
1AA9: 29 0F     1417          AND   #$0F
                1417
                1417          <<<
                1417
1AAB: 85 08     1417          STA   PROD
                1417
1AAD: A5 09     1417          LDA   PROD+1
                1417
                1417          HINIB
                1417
1AAF: 29 F0     1417          AND   #$F0
                1417
1AB1: 4A        1417          LSR
                1417
1AB2: 4A        1417          LSR
```

```
                        1417
1AB3: 4A                1417            LSR
                        1417
1AB4: 4A                1417            LSR
                        1417
                        1417            <<<
                        1417
1AB5: 85 09             1417            STA   PROD+1
                        1417
1AB7: B5 08             1417            LDA   PROD,X
                        1417
                        1417            <<<
                        1418
1AB9: 85 07             1419            STA   FAC2
                        1420
1ABB: 60                1421            RTS
                        1422
                        1423
                        1424
                        1425 * SET ANY MAP TILE
                        1426
                        1427 * IN: A, ZPTR, IDX, DX, DY
                        1428
                        1429 * DY MUST BE ONE OF (-1,0,1)
                        1430
                        1431
                        1432
1ABC: 85 EF             1433 SETTILE    STA   TEMP
                        1434
1ABE: AD F1 1F          1435            LDA   COLS
                        1436
1AC1: 4A                1437            LSR
                        1438
1AC2: 85 08             1439            STA   PROD
                        1440
1AC4: A9 00             1441            LDA   #$00
                        1442
1AC6: 85 09             1443            STA   PROD+1     ; PROD IS ROW OFFSET
                        1444
1AC8: A5 EE             1445            LDA   DY
                        1446
1ACA: F0 05             1447            BEQ   :NONE
                        1448
1ACC: 30 0A             1449            BMI   :DECY
                        1450
1ACE: 4C EA 1A          1451            JMP   :CONT
                        1452
1AD1: A9 00             1453 :NONE      LDA   #$00
                        1454
1AD3: 85 08             1455            STA   PROD
                        1456
1AD5: 4C EA 1A          1457            JMP   :CONT
                        1458
                        1459 :DECY      NEGW  PROD
                        1459
1AD8: A5 08             1459            LDA   PROD
                        1459
```

```
1ADA: 49 FF     1459            EOR   #$FF
                1459
1ADC: 85 08     1459            STA   PROD
                1459
1ADE: A5 09     1459            LDA   PROD+1
                1459
1AE0: 49 FF     1459            EOR   #$FF
                1459
1AE2: 85 09     1459            STA   PROD+1
                1459
                1459            INC16 PROD
                1459
1AE4: E6 08     1459            INC   PROD
                1459
1AE6: D0 02     1459            BNE   CONT
                1459
1AE8: E6 09     1459            INC   PROD+1
                1459
                1459 CONT
                1459
                1459            <<<
                1459
                1459            <<<
                1460
                1461 :CONT      ADDWW PROD;ZPTR  ; SIGNED ADD
                1461
1AEA: 18        1461            CLC
                1461
1AEB: A5 08     1461            LDA   PROD
                1461
1AED: 65 FE     1461            ADC   ZPTR
                1461
1AEF: 85 FE     1461            STA   ZPTR
                1461
1AF1: A5 09     1461            LDA   PROD+1
                1461
1AF3: 65 FF     1461            ADC   ZPTR+1
                1461
1AF5: 85 FF     1461            STA   ZPTR+1
                1461
                1461            <<<
                1462
1AF7: A5 D7     1463            LDA   IDX
                1464
1AF9: 18        1465            CLC
                1466
1AFA: 65 ED     1467            ADC   DX
                1468
1AFC: 48        1469            PHA
                1470
1AFD: 4A        1471            LSR
                1472
1AFE: A8        1473            TAY
                1474
1AFF: 68        1475            PLA
                1476
1B00: 29 01     1477            AND   #$01
```

```
                        1478
1B02: D0 0B             1479            BNE   :ODD
                        1480
1B04: B1 FE             1481            LDA   (ZPTR),Y
                        1482
1B06: 29 F0             1483            AND   #$F0
                        1484
1B08: 05 EF             1485            ORA   TEMP
                        1486
1B0A: 91 FE             1487            STA   (ZPTR),Y
                        1488
1B0C: 4C 1F 1B          1489            JMP   :FIN
                        1490
1B0F: 06 EF             1491 :ODD       ASL   TEMP
                        1492
1B11: 06 EF             1493            ASL   TEMP
                        1494
1B13: 06 EF             1495            ASL   TEMP
                        1496
1B15: 06 EF             1497            ASL   TEMP
                        1498
1B17: B1 FE             1499            LDA   (ZPTR),Y
                        1500
1B19: 29 0F             1501            AND   #$0F
                        1502
1B1B: 05 EF             1503            ORA   TEMP
                        1504
1B1D: 91 FE             1505            STA   (ZPTR),Y
                        1506
                        1507 :FIN       SUBWW PROD;ZPTR  ; SIGNED SUB
                        1507
1B1F: 38                1507            SEC
                        1507
1B20: A5 FE             1507            LDA   ZPTR
                        1507
1B22: E5 08             1507            SBC   PROD
                        1507
1B24: 85 FE             1507            STA   ZPTR
                        1507
1B26: A5 FF             1507            LDA   ZPTR+1
                        1507
1B28: E5 09             1507            SBC   PROD+1
                        1507
1B2A: 85 FF             1507            STA   ZPTR+1
                        1507
                        1507            <<<
                        1508
1B2C: 60                1509            RTS
                        1510
                        1511
                        1512
                        1513 * ARTIFICIAL UNINTELLIGENCE (AU)
                        1514
                        1515 * IN: RNG, A = THE RELATIVE TILE INDEX
                        1516
                        1517 * IN: HOSTILE = $01,$FF (AGGRESSIVE,FEARFUL)
                        1518
```

```
                        1519 * RETURN: A = TILES TO MOVE (SIGNED BYTE)
                        1520
                        1521
                        1522
1B2D: 38                1523 DELTA    SEC
                        1524
1B2E: ED F5 1F          1525          SBC   RNG
                        1526
1B31: 08                1527          PHP
                        1528
1B32: F0 10             1529          BEQ   :TEST
                        1530
1B34: 28                1531 :GO      PLP
                        1532
1B35: 30 09             1533          BMI   :GOPL
                        1534
1B37: AD FA 1F          1535          LDA   HOSTILE
                        1536
1B3A: 49 FF             1537          EOR   #$FF
                        1538
1B3C: 18                1539          CLC
                        1540
1B3D: 69 01             1541          ADC   #$01
                        1542
1B3F: 60                1543          RTS
                        1544
1B40: AD FA 1F          1545 :GOPL    LDA   HOSTILE
                        1546
1B43: 60                1547          RTS
                        1548
1B44: AD FA 1F          1549 :TEST    LDA   HOSTILE
                        1550
1B47: C9 01             1551          CMP   #$01
                        1552
1B49: F0 03             1553          BEQ   :NOGO
                        1554
1B4B: 4C 34 1B          1555          JMP   :GO
                        1556
1B4E: 28                1557 :NOGO    PLP
                        1558
1B4F: A9 00             1559          LDA   #$00
                        1560
1B51: 60                1561          RTS
                        1562
                        1563
                        1564
                        1565 * DENIZEN MOVEMENT (TOWN OR DUNGEON)
                        1566
                        1567 * IN: MPTR, ZPTR, X0, Y0, RNG, SPAN, HOSTILE
                        1568
                        1569 * DENIZENS MUST MOVE IN SEQUENCE ALONG X THEN Y
                        1570
                        1571 * THIS GIVES THE PLAYER AN ADVANTAGE
                        1572
                        1573
                        1574
1B52: A9 00             1575 DMOVE    LDA   #BUFFER
```

```
                        1576
1B54: 85 CE             1577            STA   SPTR
                        1578
1B56: A9 1F             1579            LDA   #>BUFFER
                        1580
1B58: 85 CF             1581            STA   SPTR+1
                        1582
1B5A: AD FF 1F          1583            LDA   Y0
                        1584
1B5D: 85 E3             1585            STA   IDY
                        1586
1B5F: 18                1587            CLC
                        1588
1B60: 6D F4 1F          1589            ADC   SPAN
                        1590
1B63: 85 1E             1591            STA   YEND
                        1592
1B65: AE F4 1F          1593 :YLOOP     LDX   SPAN
                        1594
1B68: CA                1595            DEX
                        1596
                        1597 :XLOOP     PHX
                        1597
1B69: 8A                1597            TXA
                        1597
1B6A: 48                1597            PHA
                        1597
                        1597            <<<
                        1598
1B6B: 8A                1599            TXA
                        1600
1B6C: 18                1601            CLC
                        1602
1B6D: 6D FE 1F          1603            ADC   X0
                        1604
1B70: 85 D7             1605            STA   IDX
                        1606
1B72: 8A                1607            TXA
                        1608
1B73: A8                1609            TAY
                        1610
1B74: B1 CE             1611            LDA   (SPTR),Y
                        1612
1B76: AC F9 1F          1613            LDY   MAPTYP
                        1614
1B79: D9 EE 16          1615            CMP   MOBILE,Y
                        1616
1B7C: F0 0D             1617            BEQ   :MOVEX
                        1618
1B7E: D9 F1 16          1619            CMP   MOBILE+3,Y
                        1620
1B81: F0 08             1621            BEQ   :MOVEX
                        1622
                        1623 :NEXTX     PLX
                        1623
1B83: 68                1623            PLA
                        1623
```

```
1B84: AA        1623          TAX
                1623
                1623          <<<
                1624
1B85: CA        1625          DEX
                1626
1B86: 10 E1     1627          BPL   :XLOOP
                1628
1B88: 4C FE 1B  1629          JMP   :NEXTY
                1630
1B8B: A9 00     1631 :MOVEX   LDA   #$00
                1632
1B8D: 85 EE     1633          STA   DY
                1634
1B8F: 8A        1635          TXA
                1636
1B90: 20 2D 1B  1637          JSR   DELTA
                1638
1B93: 85 ED     1639          STA   DX
                1640
1B95: F0 2F     1641          BEQ   :MOVEY
                1642
1B97: 20 CA 17  1643 :DX      JSR   XPREVENT
                1644
1B9A: D0 26     1645          BNE   :NOGOX
                1646
1B9C: 20 1B 1A  1647          JSR   GETTILE
                1648
1B9F: 20 EF 19  1649          JSR   CHKDEN
                1650
1BA2: D0 1E     1651          BNE   :NOGOX
                1652
1BA4: A5 ED     1653          LDA   DX
                1654
1BA6: 48        1655          PHA
                1656
1BA7: A9 00     1657          LDA   #$00
                1658
1BA9: 85 ED     1659          STA   DX
                1660
1BAB: 20 1B 1A  1661          JSR   GETTILE
                1662
1BAE: AC F9 1F  1663          LDY   MAPTYP
                1664
1BB1: B9 F4 16  1665          LDA   DERASE,Y
                1666
1BB4: 20 BC 1A  1667          JSR   SETTILE
                1668
1BB7: 68        1669          PLA
                1670
1BB8: 85 ED     1671          STA   DX
                1672
1BBA: A5 07     1673          LDA   FAC2
                1674
1BBC: 20 BC 1A  1675          JSR   SETTILE
                1676
1BBF: 4C C6 1B  1677          JMP   :MOVEY
```

```
                    1678
1BC2: A9 00         1679 :NOGOX   LDA   #$00
                    1680
1BC4: 85 ED         1681          STA   DX
                    1682
1BC6: 38            1683 :MOVEY   SEC
                    1684
1BC7: A5 E3         1685          LDA   IDY
                    1686
1BC9: ED FF 1F      1687          SBC   Y0
                    1688
1BCC: 20 2D 1B      1689          JSR   DELTA
                    1690
1BCF: 85 EE         1691          STA   DY
                    1692
1BD1: F0 B0         1693          BEQ   :NEXTX
                    1694
1BD3: 20 DF 17      1695 :DY      JSR   YPREVENT
                    1696
1BD6: D0 AB         1697          BNE   :NEXTX
                    1698
1BD8: 20 1B 1A      1699          JSR   GETTILE
                    1700
1BDB: 20 EF 19      1701          JSR   CHKDEN
                    1702
1BDE: D0 A3         1703          BNE   :NEXTX
                    1704
1BE0: A5 EE         1705          LDA   DY
                    1706
1BE2: 48            1707          PHA
                    1708
1BE3: A9 00         1709          LDA   #$00
                    1710
1BE5: 85 EE         1711          STA   DY
                    1712
1BE7: 20 1B 1A      1713          JSR   GETTILE
                    1714
1BEA: AC F9 1F      1715          LDY   MAPTYP
                    1716
1BED: B9 F4 16      1717          LDA   DERASE,Y
                    1718
1BF0: 20 BC 1A      1719          JSR   SETTILE
                    1720
1BF3: 68            1721          PLA
                    1722
1BF4: 85 EE         1723          STA   DY
                    1724
1BF6: A5 07         1725          LDA   FAC2
                    1726
1BF8: 20 BC 1A      1727          JSR   SETTILE
                    1728
1BFB: 4C 83 1B      1729          JMP   :NEXTX
                    1730
                    1731 :NEXTY   ADVMROW
                    1731
                    1731          ADDBW SPAN;SPTR
                    1731
```

```
1BFE: 18        1731          CLC
                1731
1BFF: AD F4 1F  1731          LDA   SPAN
                1731
1C02: 65 CE     1731          ADC   SPTR
                1731
1C04: 85 CE     1731          STA   SPTR
                1731
1C06: A9 00     1731          LDA   #$00
                1731
1C08: 65 CF     1731          ADC   SPTR+1
                1731
1C0A: 85 CF     1731          STA   SPTR+1
                1731
                1731          <<<
                1731
1C0C: AD F1 1F  1731          LDA   COLS
                1731
1C0F: 4A        1731          LSR
                1731
                1731          ADDAW MPTR
                1731
1C10: 18        1731          CLC
                1731
1C11: 65 FA     1731          ADC   MPTR
                1731
1C13: 85 FA     1731          STA   MPTR
                1731
1C15: A9 00     1731          LDA   #$00
                1731
1C17: 65 FB     1731          ADC   MPTR+1
                1731
1C19: 85 FB     1731          STA   MPTR+1
                1731
                1731          <<<
                1731
1C1B: AD F1 1F  1731          LDA   COLS
                1731
1C1E: 4A        1731          LSR
                1731
                1731          ADDAW ZPTR
                1731
1C1F: 18        1731          CLC
                1731
1C20: 65 FE     1731          ADC   ZPTR
                1731
1C22: 85 FE     1731          STA   ZPTR
                1731
1C24: A9 00     1731          LDA   #$00
                1731
1C26: 65 FF     1731          ADC   ZPTR+1
                1731
1C28: 85 FF     1731          STA   ZPTR+1
                1731
                1731          <<<
                1731
                1731          <<<
```

```
                     1732
1C2A: E6 E3          1733          INC   IDY
                     1734
1C2C: A5 E3          1735          LDA   IDY
                     1736
1C2E: C5 1E          1737          CMP   YEND
                     1738
1C30: F0 03          1739          BEQ   :FIN
                     1740
1C32: 4C 65 1B       1741          JMP   :YLOOP
                     1742
1C35: A9 00          1743 :FIN     LDA   #BUFFER    ; RESET SPTR
                     1744
1C37: 85 CE          1745          STA   SPTR
                     1746
1C39: A9 1F          1747          LDA   #>BUFFER
                     1748
1C3B: 85 CF          1749          STA   SPTR+1
                     1750
1C3D: 60             1751          RTS
                     1752
                     1753
                     1754
                     1755 * LOAD CURRENT ROW OF SPRITE PTRS INTO STAB
                     1756
                     1757 * IN: SPAN, SPTR=CURRENT SUBMAP ROW
                     1758
                     1759
                     1760
                     1761 LDSTAB   PHX
                     1761
1C3E: 8A             1761          TXA
                     1761
1C3F: 48             1761          PHA
                     1761
                     1761          <<<
                     1762
                     1763          PHY
                     1763
1C40: 98             1763          TYA
                     1763
1C41: 48             1763          PHA
                     1763
                     1763          <<<
                     1764
1C42: AC F4 1F       1765          LDY   SPAN
                     1766
1C45: 88             1767          DEY
                     1768
1C46: B1 CE          1769 :LOOP    LDA   (SPTR),Y
                     1770
1C48: 0A             1771          ASL
                     1772
1C49: AA             1773          TAX
                     1774
1C4A: BD 3E 16       1775          LDA   SOFFSET,X
                     1776
```

```
1C4D: 85 FE     1777          STA   ZPTR
                1778
1C4F: BD 3F 16  1779          LDA   SOFFSET+1,X
                1780
1C52: 85 FF     1781          STA   ZPTR+1
                1782
                1783          ADDWW SADDR;ZPTR ; ZPTR HAS ADDR OF SPRITE
                1783
1C54: 18        1783          CLC
                1783
1C55: AD F7 1F  1783          LDA   SADDR
                1783
1C58: 65 FE     1783          ADC   ZPTR
                1783
1C5A: 85 FE     1783          STA   ZPTR
                1783
1C5C: AD F8 1F  1783          LDA   SADDR+1
                1783
1C5F: 65 FF     1783          ADC   ZPTR+1
                1783
1C61: 85 FF     1783          STA   ZPTR+1
                1783
                1783          <<<
                1784
1C63: 98        1785          TYA
                1786
1C64: 0A        1787          ASL
                1788
1C65: AA        1789          TAX
                1790
1C66: A5 FE     1791          LDA   ZPTR
                1792
1C68: 9D C0 1F  1793          STA   STAB,X
                1794
1C6B: A5 FF     1795          LDA   ZPTR+1
                1796
1C6D: 9D C1 1F  1797          STA   STAB+1,X
                1798
1C70: 88        1799          DEY
                1800
1C71: 10 D3     1801          BPL   :LOOP
                1802
                1803          PLY
                1803
1C73: 68        1803          PLA
                1803
1C74: A8        1803          TAY
                1803
                1803          <<<
                1804
1C75: CC F5 1F  1805          CPY   RNG
                1806
1C78: F0 03     1807          BEQ   :PARTY
                1808
                1809          PLX
                1809
1C7A: 68        1809          PLA
```

```
                        1809
1C7B: AA                1809            TAX
                        1809
                        1809            <<<
                        1810
1C7C: 60                1811            RTS
                        1812
                        1813 :PARTY     PHY
                        1813
1C7D: 98                1813            TYA
                        1813
1C7E: 48                1813            PHA
                        1813
                        1813            <<<
                        1814
1C7F: AD F9 1F          1815            LDA   MAPTYP
                        1816
1C82: 0A                1817            ASL
                        1818
1C83: 85 EF             1819            STA   TEMP
                        1820
1C85: AD FB 1F          1821            LDA   TRAVEL
                        1822
1C88: 4A                1823            LSR
                        1824
1C89: 18                1825            CLC
                        1826
1C8A: 65 EF             1827            ADC   TEMP
                        1828
1C8C: A8                1829            TAY
                        1830
1C8D: B9 86 16          1831            LDA   WALKING,Y
                        1832
1C90: 85 FE             1833            STA   ZPTR
                        1834
1C92: B9 87 16          1835            LDA   WALKING+1,Y
                        1836
1C95: 85 FF             1837            STA   ZPTR+1
                        1838
                        1839            ADDWW SADDR;ZPTR
                        1839
1C97: 18                1839            CLC
                        1839
1C98: AD F7 1F          1839            LDA   SADDR
                        1839
1C9B: 65 FE             1839            ADC   ZPTR
                        1839
1C9D: 85 FE             1839            STA   ZPTR
                        1839
1C9F: AD F8 1F          1839            LDA   SADDR+1
                        1839
1CA2: 65 FF             1839            ADC   ZPTR+1
                        1839
1CA4: 85 FF             1839            STA   ZPTR+1
                        1839
                        1839            <<<
                        1840
```

```
1CA6: AD F5 1F  1841          LDA   RNG
                1842
1CA9: 0A        1843          ASL
                1844
1CAA: AA        1845          TAX
                1846
1CAB: A5 FE     1847          LDA   ZPTR
                1848
1CAD: 9D C0 1F  1849          STA   STAB,X
                1850
1CB0: A5 FF     1851          LDA   ZPTR+1
                1852
1CB2: 9D C1 1F  1853          STA   STAB+1,X
                1854
                1855          PLY
                1855
1CB5: 68        1855          PLA
                1855
1CB6: A8        1855          TAY
                1855
                1855          <<<
                1856
                1857          PLX
                1857
1CB7: 68        1857          PLA
                1857
1CB8: AA        1857          TAX
                1857
                1857          <<<
                1858
1CB9: 60        1859          RTS
                1860
                1861
                1862
                1863 * MAIN PAINT ROUTINE
                1864
                1865 * ASSUMES X0,Y0 ALREADY OFFSET
                1866
                1867
                1868
1CBA: 20 1C 18  1869 PAINT    JSR   INIMPTR
                1870
1CBD: 20 B1 18  1871          JSR   LDSUB
                1872
1CC0: AD F6 1F  1873 :PAINT   LDA   OFFSET
                1874
                1875          LONIB           ; TILE ROWS
                1875
1CC3: 29 0F     1875          AND   #$0F
                1875
                1875          <<<
                1876
                1877          MULA  #$0C
                1877
1CC5: 85 06     1877          STA   FAC1
                1877
1CC7: A9 0C     1877          LDA   #$0C
```

```
                        1877
1CC9: 85 07             1877            STA   FAC2
                        1877
1CCB: 20 01 17          1877            JSR   MULBB
                        1877
                        1877            <<<
                        1878
1CCE: A5 08             1879            LDA   PROD        ; EXPECT 8 BITS
                        1880
1CD0: 8D F2 1F          1881            STA   YPIX        ; STARTING PIX ROW
                        1882
1CD3: AD F6 1F          1883            LDA   OFFSET
                        1884
                        1885            HINIB             ; TWICE TILE COLS
                        1885
1CD6: 29 F0             1885            AND   #$F0
                        1885
1CD8: 4A                1885            LSR
                        1885
1CD9: 4A                1885            LSR
                        1885
1CDA: 4A                1885            LSR
                        1885
1CDB: 4A                1885            LSR
                        1885
                        1885            <<<
                        1886
1CDC: 8D F3 1F          1887            STA   XPIX7
                        1888
1CDF: 20 20 17          1889            JSR   GETSCR      ; INIT SCRPTR PTR
                        1890
                        1891
                        1892
1CE2: AC F4 1F          1893            LDY   SPAN
                        1894
1CE5: 88                1895            DEY
                        1896
                        1897
                        1898
                        1899 :YLOOP     PHY               ; LOOP OVER ROWS
                        1899
1CE6: 98                1899            TYA
                        1899
1CE7: 48                1899            PHA
                        1899
                        1899            <<<
                        1900
1CE8: 20 3E 1C          1901            JSR   LDSTAB      ; LOAD SPRITE PTRS
                        1902
1CEB: A9 00             1903            LDA   #$00
                        1904
1CED: 85 FC             1905            STA   SROW1
                        1906
1CEF: A9 0C             1907            LDA   #$0C
                        1908
1CF1: 85 FD             1909            STA   SROW2
                        1910
```

```
                      1911
                      1912
1CF3: AD F4 1F        1913 :PLOOP   LDA   SPAN       ; LOOP OVER PIXEL ROWS
                      1914
1CF6: 0A              1915          ASL
                      1916
1CF7: AA              1917          TAX
                      1918
                      1919
                      1920
1CF8: BD BE 1F        1921 :XLOOP   LDA   STAB-2,X     ; LOOP OVER COLUMNS
                      1922
1CFB: 85 FE           1923          STA   ZPTR
                      1924
1CFD: BD BF 1F        1925          LDA   STAB-1,X
                      1926
1D00: 85 FF           1927          STA   ZPTR+1
                      1928
                      1929
                      1930
1D02: A4 FC           1931          LDY   SROW1
                      1932
1D04: B1 FE           1933          LDA   (ZPTR),Y
                      1934
1D06: 85 06           1935          STA   FAC1
                      1936
1D08: A4 FD           1937          LDY   SROW2
                      1938
1D0A: B1 FE           1939          LDA   (ZPTR),Y
                      1940
1D0C: 85 07           1941          STA   FAC2
                      1942
                      1943
                      1944
1D0E: 8A              1945          TXA
                      1946
1D0F: A8              1947          TAY
                      1948
1D10: A5 06           1949          LDA   FAC1
                      1950
1D12: 91 EB           1951          STA   (SCRPTR),Y ; PAINT LEFT SEGMENT
                      1952
1D14: C8              1953          INY
                      1954
1D15: A5 07           1955          LDA   FAC2
                      1956
1D17: 91 EB           1957          STA   (SCRPTR),Y ; PAINT RIGHT SEGMENT
                      1958
                      1959
                      1960
1D19: CA              1961          DEX
                      1962
1D1A: CA              1963          DEX
                      1964
1D1B: D0 DB           1965          BNE   :XLOOP
                      1966
                      1967
```

```
                1968
1D1D: 20 B7 17  1969          JSR   ADVPROW    ; ADV SCRPTR 1 ROW
                1970
1D20: E6 FC     1971          INC   SROW1
                1972
1D22: E6 FD     1973          INC   SROW2
                1974
                1975
                1976
1D24: A5 FC     1977          LDA   SROW1
                1978
1D26: C9 0C     1979          CMP   #$0C
                1980
1D28: D0 C9     1981          BNE   :PLOOP
                1982
                1983
                1984
                1985          ADDBW SPAN;SPTR  ; ADV SUBMAP PTR 1 ROW
                1985
1D2A: 18        1985          CLC
                1985
1D2B: AD F4 1F  1985          LDA   SPAN
                1985
1D2E: 65 CE     1985          ADC   SPTR
                1985
1D30: 85 CE     1985          STA   SPTR
                1985
1D32: A9 00     1985          LDA   #$00
                1985
1D34: 65 CF     1985          ADC   SPTR+1
                1985
1D36: 85 CF     1985          STA   SPTR+1
                1985
                1985          <<<
                1986
                1987          PLY
                1987
1D38: 68        1987          PLA
                1987
1D39: A8        1987          TAY
                1987
                1987          <<<
                1988
1D3A: 88        1989          DEY
                1990
1D3B: 10 A9     1991          BPL   :YLOOP
                1992
1D3D: 60        1993          RTS
                1994
                1995
                1996
                1997 * GET TILE INFORMATION (NOT FOR INNER LOOPS)
                1998
                1999 * IN: X0, Y0, MAP0, DOFF, COLS
                2000
                2001 * RETURN: TERRAIN IN FAC1, DENIZEN IN FAC2
                2002
```

```
                        2003
                        2004
1D3E: 20 1C 18  2005 GET      JSR   INIMPTR
                        2006
1D41: AD FE 1F  2007          LDA   X0
                        2008
1D44: 85 D7     2009          STA   IDX
                        2010
1D46: A9 00     2011          LDA   #$00
                        2012
1D48: 85 ED     2013          STA   DX
                        2014
1D4A: 85 EE     2015          STA   DY
                        2016
1D4C: 20 1B 1A  2017          JSR   GETTILE
                        2018
1D4F: 60        2019          RTS
                        2020
                        2021
                        2022
                        2023 * SET TILE INFORMATION (NOT FOR INNER LOOPS)
                        2024
                        2025 * IN: X0, Y0, MAP0, DOFF, COLS, FAC1, FAC2
                        2026
                        2027 * NEGATIVE CODES ARE NOT WRITTEN
                        2028
                        2029
                        2030
1D50: A5 06     2031 SET      LDA   FAC1
                        2032
1D52: 48        2033          PHA
                        2034
1D53: A5 07     2035          LDA   FAC2
                        2036
1D55: 48        2037          PHA
                        2038
1D56: 20 1C 18  2039          JSR   INIMPTR
                        2040
1D59: AD FE 1F  2041          LDA   X0
                        2042
1D5C: 85 D7     2043          STA   IDX
                        2044
1D5E: A9 00     2045          LDA   #$00
                        2046
1D60: 85 ED     2047          STA   DX
                        2048
1D62: 85 EE     2049          STA   DY
                        2050
1D64: 68        2051          PLA
                        2052
1D65: 30 03     2053          BMI   :TERR
                        2054
1D67: 20 BC 1A  2055          JSR   SETTILE
                        2056
                        2057 :TERR    COPYW MPTR;ZPTR
                        2057
1D6A: A5 FA     2057          LDA   MPTR
```

```
                        2057
1D6C: 85 FE     2057            STA   ZPTR
                        2057
1D6E: A5 FB     2057            LDA   MPTR+1
                        2057
1D70: 85 FF     2057            STA   ZPTR+1
                        2057
                        2057            <<<
                        2058
1D72: 68        2059            PLA
                        2060
1D73: 30 03     2061            BMI   :FIN
                        2062
1D75: 20 BC 1A  2063            JSR   SETTILE
                        2064
1D78: 60        2065 :FIN       RTS
                        2066
                        2067
                        2068
                        2069 * PARTY MOVEMENT (MAIN ROUTINE)
                        2070
                        2071
                        2072
1D79: 20 3E 1D  2073 PMOVE      JSR   GET
                        2074
1D7C: 20 84 19  2075            JSR   CHKTIL
                        2076
1D7F: D0 4B     2077            BNE   :FORBID
                        2078
                        2079            INITXY
                        2079
1D81: 38        2079            SEC
                        2079
1D82: AD FE 1F  2079            LDA   X0
                        2079
1D85: ED F5 1F  2079            SBC   RNG
                        2079
1D88: 8D FE 1F  2079            STA   X0
                        2079
1D8B: 38        2079            SEC
                        2079
1D8C: AD FF 1F  2079            LDA   Y0
                        2079
1D8F: ED F5 1F  2079            SBC   RNG
                        2079
1D92: 8D FF 1F  2079            STA   Y0
                        2079
1D95: AD F5 1F  2079            LDA   RNG
                        2079
1D98: 0A        2079            ASL
                        2079
1D99: 8D F4 1F  2079            STA   SPAN
                        2079
1D9C: EE F4 1F  2079            INC   SPAN
                        2079
                        2079            <<<
                        2080
```

```
1D9F: AD FA 1F  2081          LDA   HOSTILE
                2082
1DA2: F0 0C     2083          BEQ   :PAINT
                2084
1DA4: 20 1C 18  2085          JSR   INIMPTR
                2086
1DA7: 20 B1 18  2087          JSR   LDSUB
                2088
1DAA: 20 1C 18  2089          JSR   INIMPTR
                2090
1DAD: 20 52 1B  2091          JSR   DMOVE
                2092
1DB0: 20 BA 1C  2093 :PAINT   JSR   PAINT
                2094
                2095          RESETXY
                2095
1DB3: 18        2095          CLC
                2095
1DB4: AD FE 1F  2095          LDA   X0
                2095
1DB7: 6D F5 1F  2095          ADC   RNG
                2095
1DBA: 8D FE 1F  2095          STA   X0
                2095
1DBD: 18        2095          CLC
                2095
1DBE: AD FF 1F  2095          LDA   Y0
                2095
1DC1: 6D F5 1F  2095          ADC   RNG
                2095
1DC4: 8D FF 1F  2095          STA   Y0
                2095
                2095          <<<
                2096
1DC7: A9 00     2097          LDA   #$00
                2098
1DC9: 85 06     2099          STA   FAC1
                2100
1DCB: 60        2101          RTS
                2102
1DCC: A9 FF     2103 :FORBID  LDA   #$FF
                2104
1DCE: 85 06     2105          STA   FAC1
                2106
1DD0: 60        2107          RTS
                2108
                2109
                2110
                2111 * COUNT DENIZENS UP TO POSITION
                2112
                2113 * IN: X0,Y0,ROWS,COLS,MAP0,SCRPTR
                2114
                2115 * SCRPTR = PTR TO ARRAY OF COUNTABLE CODES
                2116
                2117 * RETURN: YEND HAS THE COUNT
                2118
                2119
```

```
                        2120
                        2121 CNTDEN   COPYW MAP0;MPTR
                        2121
1DD1: AD FC 1F          2121          LDA   MAP0
                        2121
1DD4: 85 FA             2121          STA   MPTR
                        2121
1DD6: AD FD 1F          2121          LDA   MAP0+1
                        2121
1DD9: 85 FB             2121          STA   MPTR+1
                        2121
                        2121          <<<
                        2122
                        2123          COPYW MAP0;ZPTR
                        2123
1DDB: AD FC 1F          2123          LDA   MAP0
                        2123
1DDE: 85 FE             2123          STA   ZPTR
                        2123
1DE0: AD FD 1F          2123          LDA   MAP0+1
                        2123
1DE3: 85 FF             2123          STA   ZPTR+1
                        2123
                        2123          <<<
                        2124
                        2125          ADDWW DOFF;ZPTR
                        2125
1DE5: 18                2125          CLC
                        2125
1DE6: AD EE 1F          2125          LDA   DOFF
                        2125
1DE9: 65 FE             2125          ADC   ZPTR
                        2125
1DEB: 85 FE             2125          STA   ZPTR
                        2125
1DED: AD EF 1F          2125          LDA   DOFF+1
                        2125
1DF0: 65 FF             2125          ADC   ZPTR+1
                        2125
1DF2: 85 FF             2125          STA   ZPTR+1
                        2125
                        2125          <<<
                        2126
1DF4: A9 00             2127          LDA   #$00
                        2128
1DF6: 85 ED             2129          STA   DX
                        2130
1DF8: 85 EE             2131          STA   DY
                        2132
1DFA: 85 1E             2133          STA   YEND       ; COUNTER
                        2134
                        2135
                        2136
1DFC: A9 00             2137          LDA   #$00
                        2138
1DFE: 85 E3             2139          STA   IDY
                        2140
```

```
1E00: A9 00     2141 :YLOOP   LDA   #$00
                2142
1E02: 85 D7     2143          STA   IDX
                2144
1E04: A5 D7     2145 :XLOOP   LDA   IDX
                2146
1E06: CD FE 1F  2147          CMP   X0
                2148
1E09: D0 07     2149          BNE   :READ
                2150
1E0B: A5 E3     2151          LDA   IDY
                2152
1E0D: CD FF 1F  2153          CMP   Y0
                2154
1E10: F0 54     2155          BEQ   :STOP
                2156
1E12: 20 1B 1A  2157 :READ    JSR   GETTILE
                2158
1E15: A0 00     2159          LDY   #$00
                2160
1E17: B1 EB     2161          LDA   (SCRPTR),Y
                2162
1E19: A8        2163          TAY
                2164
1E1A: F0 0C     2165 :CLOOP   BEQ   :CONT
                2166
1E1C: B1 EB     2167          LDA   (SCRPTR),Y
                2168
1E1E: C5 07     2169          CMP   FAC2
                2170
1E20: F0 04     2171          BEQ   :COUNT
                2172
1E22: 88        2173          DEY
                2174
1E23: 4C 1A 1E  2175          JMP   :CLOOP
                2176
1E26: E6 1E     2177 :COUNT   INC   YEND
                2178
1E28: E6 D7     2179 :CONT    INC   IDX
                2180
1E2A: A5 D7     2181          LDA   IDX
                2182
1E2C: CD F1 1F  2183          CMP   COLS
                2184
1E2F: D0 D3     2185          BNE   :XLOOP
                2186
                2187          ADVMROW
                2187
                2187          ADDBW SPAN;SPTR
                2187
1E31: 18        2187          CLC
                2187
1E32: AD F4 1F  2187          LDA   SPAN
                2187
1E35: 65 CE     2187          ADC   SPTR
                2187
1E37: 85 CE     2187          STA   SPTR
```

```
                        2187
1E39: A9 00             2187            LDA   #$00
                        2187
1E3B: 65 CF             2187            ADC   SPTR+1
                        2187
1E3D: 85 CF             2187            STA   SPTR+1
                        2187
                        2187            <<<
                        2187
1E3F: AD F1 1F          2187            LDA   COLS
                        2187
1E42: 4A                2187            LSR
                        2187
                        2187            ADDAW MPTR
                        2187
1E43: 18                2187            CLC
                        2187
1E44: 65 FA             2187            ADC   MPTR
                        2187
1E46: 85 FA             2187            STA   MPTR
                        2187
1E48: A9 00             2187            LDA   #$00
                        2187
1E4A: 65 FB             2187            ADC   MPTR+1
                        2187
1E4C: 85 FB             2187            STA   MPTR+1
                        2187
                        2187            <<<
                        2187
1E4E: AD F1 1F          2187            LDA   COLS
                        2187
1E51: 4A                2187            LSR
                        2187
                        2187            ADDAW ZPTR
                        2187
1E52: 18                2187            CLC
                        2187
1E53: 65 FE             2187            ADC   ZPTR
                        2187
1E55: 85 FE             2187            STA   ZPTR
                        2187
1E57: A9 00             2187            LDA   #$00
                        2187
1E59: 65 FF             2187            ADC   ZPTR+1
                        2187
1E5B: 85 FF             2187            STA   ZPTR+1
                        2187
                        2187            <<<
                        2187
                        2187            <<<
                        2188
1E5D: E6 E3             2189            INC   IDY
                        2190
1E5F: A5 E3             2191            LDA   IDY
                        2192
1E61: CD F0 1F          2193            CMP   ROWS
                        2194
```

```
1E64: D0 9A     2195          BNE   :YLOOP
                2196
1E66: 60        2197 :STOP    RTS
                2198
                2199
                2200
                2201
                2202
                2203 * FIND TREASURE TROVE ADDRESS
                2204
                2205 * IN: X0,Y0,ROWS,COLS,MAP0
                2206
                2207 * RETURN: ZPTR HAS ADDRESS, YEND HAS INDEX
                2208
                2209
                2210
1E67: A9 FE     2211 TROVE    LDA   #DNGCOUNT
                2212
1E69: 85 EB     2213          STA   SCRPTR
                2214
1E6B: A9 16     2215          LDA   #>DNGCOUNT
                2216
1E6D: 85 EC     2217          STA   SCRPTR+1
                2218
1E6F: 20 D1 1D  2219          JSR   CNTDEN
                2220
                2221          COPYW MAP0;ZPTR
                2221
1E72: AD FC 1F  2221          LDA   MAP0
                2221
1E75: 85 FE     2221          STA   ZPTR
                2221
1E77: AD FD 1F  2221          LDA   MAP0+1
                2221
1E7A: 85 FF     2221          STA   ZPTR+1
                2221
                2221          <<<
                2222
1E7C: A9 40     2223          LDA   #$40
                2224
1E7E: 85 08     2225          STA   PROD
                2226
1E80: A9 06     2227          LDA   #$06
                2228
1E82: 85 09     2229          STA   PROD+1
                2230
                2231          ADDWW PROD;ZPTR  ; ADD 1600
                2231
1E84: 18        2231          CLC
                2231
1E85: A5 08     2231          LDA   PROD
                2231
1E87: 65 FE     2231          ADC   ZPTR
                2231
1E89: 85 FE     2231          STA   ZPTR
                2231
1E8B: A5 09     2231          LDA   PROD+1
```

```
                        2231
1E8D: 65 FF             2231            ADC   ZPTR+1
                        2231
1E8F: 85 FF             2231            STA   ZPTR+1
                        2231
                        2231            <<<
                        2232
                        2233            MUL   YEND;#$32
                        2233
1E91: A5 1E             2233            LDA   YEND
                        2233
1E93: 85 06             2233            STA   FAC1
                        2233
1E95: A9 32             2233            LDA   #$32
                        2233
1E97: 85 07             2233            STA   FAC2
                        2233
1E99: 20 01 17          2233            JSR   MULBB
                        2233
                        2233            <<<
                        2234
                        2235            ADDWW PROD;ZPTR  ; ADD 50*INDEX
                        2235
1E9C: 18                2235            CLC
                        2235
1E9D: A5 08             2235            LDA   PROD
                        2235
1E9F: 65 FE             2235            ADC   ZPTR
                        2235
1EA1: 85 FE             2235            STA   ZPTR
                        2235
1EA3: A5 09             2235            LDA   PROD+1
                        2235
1EA5: 65 FF             2235            ADC   ZPTR+1
                        2235
1EA7: 85 FF             2235            STA   ZPTR+1
                        2235
                        2235            <<<
                        2236
1EA9: 60                2237            RTS
                        2238
                        2239
                        2240
                        2241 * FIND AND DISPLAY MONOLOGUE
                        2242
                        2243 * IN: X0,Y0,ROWS,COLS,MAP0
                        2244
                        2245 * RETURN: YEND HAS FIRST CHAR
                        2246
                        2247
                        2248
1EAA: A9 F7             2249 MONO       LDA   #TWNCOUNT
                        2250
1EAC: 85 EB             2251            STA   SCRPTR
                        2252
1EAE: A9 16             2253            LDA   #>TWNCOUNT
                        2254
```

```
1EB0: 85 EC     2255          STA   SCRPTR+1
                2256
1EB2: 20 D1 1D  2257          JSR   CNTDEN
                2258
                2259          COPYW MAP0;ZPTR
                2259
1EB5: AD FC 1F  2259          LDA   MAP0
                2259
1EB8: 85 FE     2259          STA   ZPTR
                2259
1EBA: AD FD 1F  2259          LDA   MAP0+1
                2259
1EBD: 85 FF     2259          STA   ZPTR+1
                2259
                2259          <<<
                2260
1EBF: A9 72     2261          LDA   #$72
                2262
1EC1: 85 08     2263          STA   PROD
                2264
1EC3: A9 06     2265          LDA   #$06
                2266
1EC5: 85 09     2267          STA   PROD+1
                2268
                2269          ADDWW PROD;ZPTR  ; ADD 1650
                2269
1EC7: 18        2269          CLC
                2269
1EC8: A5 08     2269          LDA   PROD
                2269
1ECA: 65 FE     2269          ADC   ZPTR
                2269
1ECC: 85 FE     2269          STA   ZPTR
                2269
1ECE: A5 09     2269          LDA   PROD+1
                2269
1ED0: 65 FF     2269          ADC   ZPTR+1
                2269
1ED2: 85 FF     2269          STA   ZPTR+1
                2269
                2269          <<<
                2270
                2271          MUL   YEND;#$78
                2271
1ED4: A5 1E     2271          LDA   YEND
                2271
1ED6: 85 06     2271          STA   FAC1
                2271
1ED8: A9 78     2271          LDA   #$78
                2271
1EDA: 85 07     2271          STA   FAC2
                2271
1EDC: 20 01 17  2271          JSR   MULBB
                2271
                2271          <<<
                2272
                2273          ADDWW PROD;ZPTR  ; ADD 120*INDEX
```

```
                2273
1EDF: 18        2273            CLC
                2273
1EE0: A5 08     2273            LDA   PROD
                2273
1EE2: 65 FE     2273            ADC   ZPTR
                2273
1EE4: 85 FE     2273            STA   ZPTR
                2273
1EE6: A5 09     2273            LDA   PROD+1
                2273
1EE8: 65 FF     2273            ADC   ZPTR+1
                2273
1EEA: 85 FF     2273            STA   ZPTR+1
                2273
                2273            <<<
                2274
1EEC: A0 00     2275            LDY   #$00
                2276
1EEE: B1 FE     2277            LDA   (ZPTR),Y
                2278
1EF0: 85 1E     2279            STA   YEND       ; RETURN FIRST CHARACTER
                2280
1EF2: B1 FE     2281 :CLOOP     LDA   (ZPTR),Y
                2282
1EF4: F0 09     2283            BEQ   :FIN
                2284
1EF6: 09 80     2285            ORA   #$80
                2286
1EF8: 20 ED FD  2287            JSR   COUT
                2288
1EFB: C8        2289            INY
                2290
1EFC: 4C F2 1E  2291            JMP   :CLOOP
                2292
1EFF: 60        2293 :FIN       RTS


--End assembly, 2242 bytes, Errors: 0


Symbol table - alphabetical order:

MD ADDAW   =$8000   MD ADDBW   =$8000   MD ADDWW   =$8000   MD ADVMROW =$8000
   ADVPROW =$17B7      BUFFER  =$1F00      CHKDEN  =$19EF      CHKTIL  =$1984
   CNTDEN  =$1DD1      COLS    =$1FF1   M  CONT    =$1AEA   MD COPYW   =$8000
   COUT    =$FDED   MD?DEC16   =$8000      DELTA   =$1B2D      DERASE  =$16F4
MD DIV64   =$8000   MD DIV8    =$8000      DMOVE   =$1B52      DNGCOUNT=$16FE
   DOFF    =$1FEE      DX      =$ED        DY      =$EE        FAC1    =$06
   FAC2    =$07     ?  FLYING  =$1696   ?  FRBDNG  =$16CE      FRBGRD  =$16E6
   FRBOUT  =$169E   ?  FRBTWN  =$16B6      GET     =$1D3E      GETSCR  =$1720
   GETTILE =$1A1B   MD HINIB   =$8000      HOSTILE =$1FFA      IDX     =$D7
   IDY     =$E3     MD INC16   =$8000      INIMPTR =$181C   MD INITXY  =$8000
   LDSTAB  =$1C3E      LDSUB   =$18B1   MD LONIB   =$8000      MAP0    =$1FFC
   MAPTYP  =$1FF9      MOBILE  =$16EE   MD MOD64   =$8000   MD MOD8    =$8000
?  MONO    =$1EAA      MPTR    =$FA     MD MUL     =$8000   MD MUL128  =$8000
MD MUL24   =$8000   MD MUL40   =$8000   MD MULA    =$8000      MULBB   =$1701
```

```
MD NEGB    =$8000   MD NEGW    =$8000      OFFSET  =$1FF6      PAINT   =$1CBA
MD PHX     =$8000   MD PHY     =$8000   MD PLX     =$8000   MD PLY     =$8000
?  PMOVE   =$1D79      PROD    =$08     MD RESETXY =$8000      RNG     =$1FF5
   ROWS    =$1FF0      SADDR   =$1FF7   ?  SAILING =$168E      SCREEN0 =$2000
   SCRPTR  =$EB     MD SELNIB  =$8000   ?  SET     =$1D50      SETTILE =$1ABC
   SOFFSET =$163E      SPAN    =$1FF4      SPTR    =$CE        SROW1   =$FC
   SROW2   =$FD        STAB    =$1FC0   MD?SUBBW   =$8000   MD SUBWW   =$8000
   TEMP    =$EF        TRAVEL  =$1FFB   ?  TROVE   =$1E67      TWNCOUNT=$16F7
   WALKING =$1686      X0      =$1FFE      XPIX7   =$1FF3      XPREVENT=$17CA
   Y0      =$1FFF      YBOUNDS =$17F6      YEND    =$1E        YPIX    =$1FF2
   YPREVENT=$17DF      ZPTR    =$FE
```

Symbol table - numerical order:

```
   FAC1    =$06        FAC2    =$07        PROD    =$08        YEND    =$1E
   SPTR    =$CE        IDX     =$D7        IDY     =$E3        SCRPTR  =$EB
   DX      =$ED        DY      =$EE        TEMP    =$EF        MPTR    =$FA
   SROW1   =$FC        SROW2   =$FD        ZPTR    =$FE        SOFFSET =$163E
   WALKING =$1686   ?  SAILING =$168E   ?  FLYING  =$1696      FRBOUT  =$169E
?  FRBTWN  =$16B6   ?  FRBDNG  =$16CE      FRBGRD  =$16E6      MOBILE  =$16EE
   DERASE  =$16F4      TWNCOUNT=$16F7      DNGCOUNT=$16FE      MULBB   =$1701
   GETSCR  =$1720      ADVPROW =$17B7      XPREVENT=$17CA      YPREVENT=$17DF
   YBOUNDS =$17F6      INIMPTR =$181C      LDSUB   =$18B1      CHKTIL  =$1984
   CHKDEN  =$19EF      GETTILE =$1A1B      SETTILE =$1ABC   M  CONT    =$1AEA
   DELTA   =$1B2D      DMOVE   =$1B52      LDSTAB  =$1C3E      PAINT   =$1CBA
   GET     =$1D3E   ?  SET     =$1D50   ?  PMOVE   =$1D79      CNTDEN  =$1DD1
?  TROVE   =$1E67   ?  MONO    =$1EAA      BUFFER  =$1F00      STAB    =$1FC0
   DOFF    =$1FEE      ROWS    =$1FF0      COLS    =$1FF1      YPIX    =$1FF2
   XPIX7   =$1FF3      SPAN    =$1FF4      RNG     =$1FF5      OFFSET  =$1FF6
   SADDR   =$1FF7      MAPTYP  =$1FF9      HOSTILE =$1FFA      TRAVEL  =$1FFB
   MAP0    =$1FFC      X0      =$1FFE      Y0      =$1FFF      SCREEN0 =$2000
MD INC16   =$8000   MD?DEC16   =$8000   MD NEGB    =$8000   MD NEGW    =$8000
MD DIV64   =$8000   MD MOD64   =$8000   MD DIV8    =$8000   MD MOD8    =$8000
MD MUL     =$8000   MD MULA    =$8000   MD MUL24   =$8000   MD MUL40   =$8000
MD MUL128  =$8000   MD ADDAW   =$8000   MD ADDBW   =$8000   MD?SUBBW   =$8000
MD ADDWW   =$8000   MD SUBWW   =$8000   MD COPYW   =$8000   MD PHX     =$8000
MD PHY     =$8000   MD PLX     =$8000   MD PLY     =$8000   MD LONIB   =$8000
MD HINIB   =$8000   MD SELNIB  =$8000   MD INITXY  =$8000   MD RESETXY =$8000
MD ADVMROW =$8000      COUT    =$FDED
```