```
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: C8            2281 :CLOOP     INY
                    2282
1EF3: B1 FE         2283            LDA    (ZPTR),Y
                    2284
1EF5: F0 08         2285            BEQ    :FIN
                    2286
1EF7: 09 80         2287            ORA    #$80
                    2288
1EF9: 20 ED FD      2289            JSR    COUT
                    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
```