

Astrocade ROM Assembly Listing

Subroutines, Character Set, et. all
Storage Area (\$0000-\$0E18)
Pages 16-82 (67 pages)

```

642
643 LIST S,X,T,M
644 NLIST I
645 ; *****
646 ; * HVGSYS *
647 ; *****

>0008 649 PFUG EQU 09H ; POT FUDGE FACTOR
>17DE 650 GFSTR EQU 17DEH ; GUN FIGHT START ADDRESS
>1328 651 CMSTR EQU 1328H ; CHECKMATE START ADDRESS
>1020 652 CALCST EQU 1020H ; CALCULATOR START ADDRESS
>0E19 653 SCBST: EQU 0E19H ; SCRIBBLING START ADDRESS

655 ; *****
656 * POWER UP RESTART *
657 ; *****
658 ORG 0
0000 00 659 NOP ; WAIT FOR THINGS TO SETTLE DOW
0001 F3 660 DI
0002 AF 661 XOR A
0003 D308 662 OUT (CON),A ; *** SET CONSUMER MODE ***
0005 C3610C 663 JP PWRUP

665 ORG 8
0008 C30720 666 TRANSFER CONTROL TO RESTART HANDLER
667 JP 2007H ; VECTOR OUT

000B 1C 669 NUMBRS: DEFB 1CH
000C 3C 670 DEFB 3CH
000D 1C 671 DEFB 1CH
000E 20 672 DEFB 20H

674 ORG 16
0010 C30A20 675 JP 200AH ; RESTART 2
0013 06 676 MENUCL: DEFB 06H ; MENU COLORS
0014 FB 677 DEFB 0FBH
0015 07 678 DEFB 07H
0016 52 679 DEFB 52H

681 ORG 24
0018 C30D20 682 JP 200DH ; RESTART 3
  
```

PROPRIETARY INFORMATION

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	684	:	NAME:	PAUSE
	685	:	PURPOSE:	HALT # OF INTERRUPTS
	686	:	INPUT:	B = # OF INTERRUPTS
001B	FB		MPAUSE:	EI
001C	76			HALT
001D	10FD			DJNZ -1
001F	C9			RET

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0020 C31020 692 ORG 32
 693 JP 2010H ; RESTART 4

695 ; NAME: SET WORD
 696 ; (HL)=DE
 0023 73 697 MSETW: LD (HL),E
 0024 23 698 INC HL
 0025 72 699 LD (HL),D
 0026 C9 700 RET

0028 C31320 702 ORG 40
 703 JP 2013H ; RESTART 5

002B 210000 705 CONG LD HL,0 ; ZERO OUT HL
 002E C9 706 RET

0030 C31620 708 ORG 48
 709 JP 2016H ; RESTART 6

0033 00 711 CKSUM DEFB 0 ; CHECKSUM

0034 8B01 713 ITAB DEFW MACTIB ; INTERRUPT TRANSFER
 0036 01 714 DEFB 1 ; ** SYSTEM REVISION LEVEL

716 ORG 56
 717 ; NAME: USER PROGRAM INTERFACE
 718 ; PURPOSE: TRANSFER OF CONTROL FROM USER TO SYSTEM
 719 ; INPUT: ROUTINE # FOLLOWS INLINE AFTER RST INSTR
 720 ; OUTPUT: IN L.O. BIT SET, LOAD ARGUMENTS INLINE F
 721 ; STACK USE: NONE
 722 ; SIDE EFFECTS: 16 BYTES TOTAL, 16 BYTES ON EXIT
 723 ; EXPLANATION: REGISTERS AF, BC, DE, HL, IX, AND OLD IY SAV
 724 ; REGISTERS AF, BC, DE, HL, IX, AND PREVIOUS IY ARE PUSHED
 725 ; THE NUMBER FOLLOWING THE RST 56 INSTRUCTION IS USED TO
 726 ; EXEC A JUMP VECTOR GIVING THE STARTING ADDRESS OF THE
 727 ; SYSTEM ROUTINE OR CALL. IF OBTAINED, INLINE ARGUMENTS
 728 ; ARE COPIED INTO THE CONTEXT AREA. FOR ARGUMENT ORDERIN
 729 ; SEE INTERPRETER DOCUMENTATION AND APPROP. TABLES
 730 ; A DUMMY RETURN IS INSERTED WHICH, WHEN RETURNED TO BY
 731 ; SYSTEM ROUTINE, WILL RESTORE THE REGISTER CONTENTS AND
 732 ; RETURN TO THE USER PROGRAM

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734 ;
735 ;   *** THE UPI HAS BEEN EXTENDED TO SUPPORT USER SUPPLI
736 ;   ROUTINES.  IF THE CALL INDEX PROVIDED IS NEGATIVE
737 ;   THEN THE USERS DISPATCH TABLE POINTER (USERTB) IS US
738 ;   NOTE THAT THE SIGN BIT ISN'T ZAPPED BEFORE BEING
739 ;   USED AS AN INDEX.  THIS MEANS THAT THE USERS DISPATCH
740 ;   TABLE POINTER SHOULD POINT 128 BYTES BEFORE THE FIRS
741 ;   EX (SP),HL ; RETURN ADDRESS TO HL
0039 E3 742 ;   PUSH AF ; CREATE CONTEXT
003A C5 743 ;   PUSH BC
003B D5 744 ;   PUSH DE
003C DDE5 745 ;   PUSH IX
003E FDE5 746 ;   PUSH IY
0040 FD210000 747 ;   LD IY,0 ; POINT IY AT CONTEXT
0044 FD39 748 ;   ADD IY,SP
0046 7E 749 ;   LD A,(HL) ; LOAD OPCODE
0047 23 750 ;   INC HL
0048 117A02 751 ;   LD DE,RETN ; DE = RETURN POINT
004B 1F 752 ;   RRA ; SUCK WANTED?
004C 3836 753 ;   JR C,MINTO-$ ; JUMP IF YES
004E E5 754 ;   INT ; PUSH HL ; SAVE PC
004F D5 755 ;   PUSH DE ; SAVE DUMMY RETURN
0050 21CB00 756 ;   LD HL,SYOPT
0053 07 757 ;   RLCA
0054 5F 758 ;   LD E,A
0055 1600 759 ;   LD D,0
0057 17 760 ;   RLA ; USE TABLE WANTED?
0058 3003 761 ;   JR NC,PUSH1-$
005A 2AFD4F 762 ;   LD HL,(USERTB) ; YES LOAD IT
005D 19 763 ;   PUSH ADD HL,DE
005E 5E 764 ;   LD E,(HL)
005F 23 765 ;   INC HL
0060 56 766 ;   LD D,(HL)
0061 D5 767 ;   PUSH DE
0062 FD660B 768 ;   LD H,(IY+6H)
0065 FD6E0A 769 ;   LD L,(IY+6L)
0068 FD5603 770 ;   REL ; LD D,(IY+6IHX)
006B FD5E02 771 ;   LD E,(IY+6IYL)
006E D5 772 ;   PUSH DE
006F DDE1 773 ;   POP IX
0071 FD7E09 774 ;   LD A,(IY+6A)
0074 FD5605 775 ;   DEL ; LD D,(IY+6BD)
0077 FD5E04 776 ;   LD E,(IY+6BE)
007A C9 777 ;   RET ; CALL VIA RETURN
  
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779 ; NAME:          MACRO INTERPRETER
780 ; PURPOSE:       INTERPRETING SEQUENCES OF SYSTEM CALLS
781 ; INPUT:         ADDRESS OF STRING TO INTERPRET PASSED ON
782 ; STACK USE:     NO INCREASE IN DEPTH
783 ; EXPLANATION:   IF OPTIONED (BIT 0 OF CALL INDEX SET) THE
784 ; ARGUMENT TABLE (MRARGT) IS INDEXED GIVING A MASK WHICH
785 ; SPECIFIES HOW TO TRANSFER INLINE ARGUMENTS INTO THE CO
786 ; BLOCK. THIS MASK IS FORMATED AS FOLLOWS:
787 ;
788 ;
789 ; *****
790 ; * 7 * 6 * 5 * 4 * 3 * 2 * 1 * 0 *
791 ; *****
792 ; * H * L * A * IX * B * C * D * E *
793 ; *****
794 ; ARGUMENTS MUST FOLLOW THE CALL INDEX IN THE FOLLOWING
795 ; (OMITING UNUSED ARGUMENTS, OF COURSE)
796 ; (INDEX), IXL, IXH, E, D, C, B, A, L, H
797 ;
798 ; THE SIMULATED PC IS SAVED AND A DUMMY RETURN IS
799 ; INSERTED ON THE STACK. THE UPI DISPATCHING ROUTINE IS
800 ; THEN ENTERED AT 'INTPE', WHICH EFFECTS A CONTROL TRANS
801 ; TO THE CALLED ROUTINE. WHEN THE CALLED ROUTINE RETURN
802 ; IT WILL COME BACK HERE TO INTERPRET THE NEXT MACRO INS
803 ; NOTE THAT THIS ROUTINE IS RE-ENTRANT, THEREFORE THE CAL
804 ; ROUTINE MAY RETURN BACK THROUGH HERE, IF IT FEELS LIKE IT.
805 ; * THE UPI HAS BEEN EXTENDED TO SUPPORT USER PROVIDED
806 ; SYSTEM ROUTINES. IF A NEGATIVE CALL INDEX IS ENCOUNTER
807 ; BY THE INTERPRETER, AND 'S' IN 'INLINE' IS OPTIONED, THE
808 ; USER MACRO ROUTINE ARGUMENT TABLE IS INDEXED FOR A
809 ; PARAMETER MASK. THE ADDRESS OF THIS TABLE IS ASSUMED
810 ; TO BE IN (UMARGT), (UMARGT+). THIS POINTER SHOULD
811 ; POINT 64 BYTES BEFORE THE FIRST REAL ENTRY.
812 ; I. E. LD HL, USERMT-64 ; WHERE USERMT POINTS AT
813 ; LD (UMARGT), HL
007B D1 814 MINTO: POP DE ; DISCARD DUMMY RETURN FROM UPI
007C 815 RENTER:
007E E1 816 POP HL ; POP OFF PC

818 ; NAME:          NCALL
819 ; PURPOSE:       CALL INTERPRETER SUBROUTINE
820 ; INPUT:         PC = ROUTINE ADDRESS
821 ; NOTES:        ROUTINE MAY BE CALLED FROM MACHINE LANGUAGE
822 ; ANOTHER INTERPRETED SEQUENCE
823 ; STACK DEPTH INCREASED BY 4 BY CALL
007D 7E 824 MNCALL: LD A, (HL) ; GET OPCODE
007E 23 825 INC HL
007F CB3F 826 SRL A
0081 117C00 827 LD DE, RENTER ; LOAD INTERPRETER DUMMY RETURN
0084 D5 828 MINTO: PUSH DE ; SAVE DUMMY RETURN
0085 4F 829 LD C, A ; INDEX TO C
0086 3012 830 JR NC, MINT2-$ ; JUMP IF NO LOAD WANTED
0088 EB 831 EX DE, HL
0089 0600 832 LD B, 0
  
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 Nothing

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008B 214B01 833 LD HL, MRARGT ; LOAD SYSTEM ARG TABLE
008E CB77 834 BIT 6, A ; USE USER TABLE?
0090 2803 835 JR Z, MINT1-$ ; JUMP IF NO
0092 2AFB4F 836 LD HL, (UMARGT)
0095 09 837 MINT1: ADD HL, BC ; INDEX TABLE
0096 46 838 LD B, (HL)
0097 CDA800 839 CALL MSUCK1 ; CALL SUCK ROUTINE
009A D1 840 MINT2: POP DE ; DUMMY RETURN TO DE, HL = PC
009B 79 841 LD A, C ; GET CALL INDEX BACK
009C FD4607 842 LD B, (IY+CBB) ; RESTORE CLOBBERED REGISTERS
009F FD4E06 843 LD C, (IY+CBC)
00A2 18AA 844 JR INTPE-$ ; JOIN NORMAL UPI DISPATCH SEQU

846 ; NAME: SUCK INLINE ARGUMENTS
847 ; PURPOSE: TRANSFER OF INLINE ARGS INTO CONTEXT BLO
848 ; INPUT: B = ARG LOAD MASK (SEE INTERPRETER COMME
849 ; OUTPUT: HL = UPDATED PC
850 ; EXPLANATION: THIS ROUTINE IMPLEMENTS A MACRO LOAD INST
851 ; IT IS USED BY THE INTERPRETER AS WELL. A ONE BIT IN T
852 ; THE LINE LOAD MASK MEANS TRANSFER THE NEXT INLINE BYTE I
853 ; ZERO BIT MEANS 'ADVANCE CONTEXT BLOCK POINTER'
854 ; TWO ENTRY POINTS ARE DEFINED ONE FOR THE SUCK MACRO I
855 ; OTHER FOR THE INTERPRETER TO USE
856 ; SUCK MACRO ENTRY
00A4 E1 857 MSUCK1: POP HL ; RETURN ADDRESS TO HL
00A5 D1 858 POP DE ; POP OFF PC
859 ; ** BYTE SAVING TRICK *** REPLACE WITH LD HL, REENTRY
00A6 23 860 INC HL ; ADVANCE TO REENTRY (MINT0)
00A7 E5 861 PUSH HL
862 ; CALL INTO ...
00A8 CB60 863 MSUCK2: BIT 4, B ; IX BIT WANTED?
00AA 280A 864 JR Z, MSUCK2-$ ; MSUCK2 IF NOT
00AC 1A 865 LD A, (DE)
00AD 13 866 INC DE
00AE FD7702 867 LD (IY+CBXL), A
00B1 1A 868 LD A, (DE)
00B2 13 869 INC DE
00B3 FD7703 870 LD (IY+CBXH), A
00B6 FDE5 871 MSUCK3: PUSH IY ; LET IY = IY
00B8 E1 872 POP HL
00B9 23 873 INC HL ; + 4
00BA 23 874 INC HL
00BB 23 875 INC HL
00BC 23 876 INC HL
00BD CBA0 877 RES 4, B ; KILL IX BIT
878 ; SUCK IN LOOP
00BF CB38 879 MSUCK4: SRL B
00C1 3003 880 JR NC, MSUCK5-$ ; MSUCK5 IF NOT THIS TIME
00C3 1A 881 LD A, (DE) ; GET INLINE BYTE
00C4 13 882 INC DE
00C5 77 883 LD (HL), A ; STUFF INTO CB
00C6 23 884 MSUCK5: INC HL ; BUMP CB POINTER
885 ; ** THIS CODE ASSUMES THAT STATUS OF 'SRL' IS PRESERVE
00C7 20F6 886 JR NZ, MSUCK3-$ ; JUMP BACK IF MORE TO DO
00C9 EB 887 EX DE, HL ; HL = PC
00CA C9 888 RET ; THEN QUIT
  
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      890 ; *****
      891 ; * UPI ROUTINE ADDRESS TABLE *
      892 ; *****
00CB 7E00 893 SYSDPT: DEFW MINTPC
00CD 7902 894 DEFW MXINTC
00CF 3206 895 DEFW MRCALL
00D1 7D00 896 DEFW MMCALL
00D3 730E 897 DEFW MMRET
00D5 C40A 898 DEFW MMJUMP
00D7 A400 899 DEFW MSUCK
00D9 8E01 900 DEFW MACTIN
00DB 7E04 901 DEFW TIMEY
00DD 0805 902 DEFW MUZSET
00DF FC05 903 DEFW MUZSTP
00E1 CF03 904 DEFW MSETUP
00E3 DE01 905 DEFW MCOLOR
00E5 EE0A 906 DEFW Mfill
00E7 B206 907 DEFW MPAINT
00E9 FE06 908 DEFW MVWRIT
00EB 0B07 909 DEFW MWRITR
00ED 1507 910 DEFW MWRITP
00EF 1907 911 DEFW MWRIT
00F1 1C07 912 DEFW MWRIT
00F3 7D07 913 DEFW MVBLAN
00F5 9E07 914 DEFW MBLANK
00F7 B903 915 DEFW MSAVE
00F9 AD07 916 DEFW MREST
00FB 6A02 917 DEFW MSCROL
00FD E107 918 DEFW DISPCH
00FF C407 919 DEFW STRNEW
0101 EB0E 920 DEFW BCDIS
0103 F60A 921 DEFW MRELAR
0105 FB0A 922 DEFW MRELA1 ; RELAR
0107 5606 923 DEFW MVECTC
0109 3306 924 DEFW MVECT
010B C90A 925 DEFW MKCTAS
010D AC01 926 DEFW MENTRY ; SENT
010F 0C06 927 DEFW MDOIT ; DOIT
0111 0B06 928 DEFW MDOITB
0113 BA01 929 DEFW MPIZBK ; PIZBK
0115 970C 930 DEFW MMENU
0117 FB0C 931 DEFW MGETP
0119 310D 932 DEFW MGETA
011B 1E00 933 DEFW MPAUSE ; PAUSE
011D CC0E 934 DEFW MDISTI ; DISPLAY TIME
011F 150C 935 DEFW MINCSC ; INC SCORE
0121 760B 936 DEFW INXNIB ; INDEXN
0123 900E 937 DEFW PUTNIB ; STOREN
0125 AC0B 938 DEFW MINDW ; INDEXW
0127 BDOE 939 DEFW MINDB ; INDEXB
0129 4E0E 940 DEFW MMOVE ; MOVE
012B AA0D 941 DEFW MSHFTU
012D 2103 942 DEFW BCDAD
012F 1F03 943 DEFW BCDSB
0131 DE02 944 DEFW BCDML
0133 8402 945 DEFW BCDDV
  
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0135 6403 946
 0137 4103 947
 0139 6E03 948
 013B 2903 949
 013D 5603 950
 013F 4C03 951
 0141 7F03 952
 0143 410C 953
 0145 6C03 954
 0147 2300 955
 0149 4002 956

DEFW BCDCS
 DEFW BCDNG
 DEFW SDADD
 DEFW SDSMG
 DEFW SDABS
 DEFW SNEGT
 DEFW MRANGE
 DEFW MQUIT
 DEFW MSETB
 DEFW MSETW
 DEFW MMTD.

958 ; MACRO ROUTINES ARGUMENT MASK TABLE
 959 ; *****

960 ; *****
 961 ; * 6 * 5 * 4 * 3 * 2 * 1 * 0 *
 962 ; *****
 963 ; H * L * A * IX * B * C * D * E *
 964 ; *****

965 ; ARGUMENTS MUST FOLLOW THE CALL INDEX IN THE FOLLOWING
 966 ; (LISTING UNUSED ARGUMENTS, OF COURSE)
 967 ; (INDEX), IXL, IXH, D, C, B, A, L,

014B 00 968
 014C 00 969
 014D C0 970
 014E C0 971
 014F 00 972
 0150 C0 973
 0151 08 974
 0152 00 975
 0153 04 976
 0154 F0 977
 0155 00 978
 0156 2A 979
 0157 C0 980
 0158 2F 981
 0159 2F 982
 015A D0 983
 015B E3 984
 015C E3 985
 015D EF 986
 015E EF 987
 015F 13 988
 0160 CB 989
 0161 CF 990
 0162 C3 991
 0163 CF 992
 0164 27 993
 0165 C7 994
 0166 CF 995
 0167 20 996
 0168 20 997
 0169 D4 998

MRANGE DEFB 0 ; INT
 DEFB 0 ; XINT
 DEFB 11000000B ; RCALC
 DEFB 11000000B ; MCALE
 DEFB 0 ; MRE
 DEFB 11000000B ; MJUM
 DEFB 00001000B ; SUC
 DEFB 0 ; ACT
 DEFB 00000100B ; DEC
 DEFB 11110000B ; BMUSIC
 DEFB 0 ; EMUSIC
 DEFB 00101000B ; SET
 DEFB 11000000B ; COL
 DEFB 00101111B ; FIL
 DEFB 00101111B ; RECT
 DEFB 11010000B ; VWRITR
 DEFB 11100001B ; WRITR
 DEFB 11100001B ; WRITR
 DEFB 11100001B ; WRITR
 DEFB 11101111B ; WRITR
 DEFB 00010011B ; VBLANK
 DEFB 11001011B ; BLANK
 DEFB 11001111B ; SAVE
 DEFB 11000011B ; RESTORE
 DEFB 11001111B ; SCROLL
 DEFB 00100111B ; NEW DISCHR
 DEFB 11000111B ; NEW DISSTR
 DEFB 11001111B ; DISNUM
 DEFB 00100000B ; RELABS
 DEFB 00100000B ; RELAB1
 DEFB 11010100B ; VECTC

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016A D0      999      DEFB 11010000B ; VECT
016B 00     1000     DEFB 0           ; KCTASC
016C 03     1001     DEFB 00000011B ; SENTRY
016D C0     1002     DEFB 11000000B ; DOIT
016E C0     1003     DEFB 11000000B ; DOITB
016F 00     1004     DEFB 0           ; PIZBRK
0170 C3     1005     DEFB 11000011B ; MENU
0171 EC     1006     DEFB 11101100B ; GET PARAMETER
0172 CF     1007     DEFB 11001111B ; GET NUMBER
0173 08     1008     DEFB 00001000B ; PAUSE
0174 07     1009     DEFB 00000111B ; DISTIM
0175 C0     1010     DEFB 11000000B ; INCSCR
0176 C0     1011     DEFB 11000000B ; INDEXN
0177 C0     1012     DEFB 11000000B ; STOREN
0178 C0     1013     DEFB 11000000B ; INDEXW
0179 C0     1014     DEFB 11000000B ; INDEXB
017A CF     1015     DEFB 11001111B ; MOVE
017B C8     1016     DEFB 11001000B ; SHIFTU
017C CB     1017     DEFB 11001011B ; BCDADD
017D CB     1018     DEFB 11001011B ; BCDSUB
017E CB     1019     DEFB 11001011B ; BCDMUL
017F CB     1020     DEFB 11001011B ; BCDIV
0180 C8     1021     DEFB 11000000B ; BCDCHS
0181 0B     1022     DEFB 00001011B ; BCDNEG
0182 CB     1023     DEFB 11001011B ; DADD
0183 0B     1024     DEFB 00001011B ; DSUB
0184 0B     1025     DEFB 00001011B ; DADD
0185 C8     1026     DEFB 11000000B ; NET
0186 20     1027     DEFB 00100000B ; RANED
0187 00     1028     DEFB 00000000B ; QU
0188 E0     1029     DEFB 11000000B ; SET BYTE
0189 C3     1030     DEFB 11000011B ; SET WORD
018A C7     1031     DEFB 11000111B ; MAKE TO DELTAS
  
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PROPRIETARY INFORMATION

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1033 ; PAGES 4 60TH SET COUNTERS IN CTO-3
018B F3     1034 ; MAKE SURE INTERRUPT IS DISABL
018C F5     1035 ;
018D C5     1036 ;
018E D5     1037 ;
018F E5     1038 ;
0190 ED5E   1039 ;
0192 3E00   1040 ;
0194 ED47   1041 ;
0196 3EC9   1042 ;
0198 D30F   1043 ;
019A 3E34   1044 ;
019C D30D   1045 ;
019E CDA004 1046 ; UPDATE TIMEOUT, MUSIC AND SECON
01A1 0E0F   1047 ; USE CTO-3
01A3 CD7E04 1048 ; DEC CTO-3
01A6 E1     1049 ;
01A7 D1     1050 ;
01A8 C1     1051 ;
  
```

; PAGES 4 60TH SET COUNTERS IN CTO-3
 ; MAKE SURE INTERRUPT IS DISABL

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01A9 F1      1052      POP  AF
01AA FB      1053      EI
01AB C9      1054      RET

1056 ; ROUTINE: SENTRY
1057 ; PURPOSE: TO WAIT FOR CHANGE OF PROGRAM STATUS
1058 ; IN EITHER THE PORTS OR THE TIMER-COUNTERS.
1059 ; IN ADDITION IT CHECKS TIMEOUT FOR LONG PERIODS OF IN-
1060 ; ACTIVITY.
1061 ; ** IS VECTOR OUT FLAG SET??
01AC 3AFA4F  1062 MENTRY: LD  A, (SENFLG)
01AF FEAA    1063      CP  0AAH
01B1 CA1920  1064      JP  Z, 2019H      ; YES - JUMP OUT
01B4 3AEC4F  1065      LD  A, (TIMOUT)   ; CHECK IF TIME TO BLAKOUT
01B7 B7      1066      OR  A
01B8 202B    1067      JR  NZ, TTEST-*
01BA AF      1068 MPI: XOR  A      ; TIME TO SHUT DOWN
01BB F3      1069      DI
01BC D315    1070      OUT (VOLC), A    ; TURN OFF SOUNDS
01BE D316    1071      OUT (VOLAR), A
01C0 010B08  1072      LD  BC, COLBX+8*256
01C3 ED79    1073      OUT (C), A      ; PAINT IT BLACK
01C5 10FC    1074      DJNZ -2
01C7 111402  1075 PBL: LD  DE, AKES
01CA CDF40C  1076      CALL FINDL3     ; CALL STORE DE INTO CONTEXT RO
01CD CDE501  1077      CALL TTEST      ; WAIT FOR SOMETHING TO HAPPEN
01D0 3C      1078      INC A
01D1 20E7    1079      JR  NZ, MPBKB-*
01D3 FD360900 1080      LD  (IY+DE), 0
01D7 FB      1081      EI
01D8 2AE84F  1082      LD  HL, (COLLST) ; GET SAVED COLORS
01DB 22E84F  1083 MCOLR: LD  (COLL3), HL ; SAVE COLORS FOR FUTURE
01DE 010B08  1084      LD  BC, 800+COLBX
01E1 EDB3    1085      OTIR          ; RESET THE COLORS
01E3 AF      1086      XOR  A
01E4 C9      1087      RET
01E5 CDEC03  1088 TTEST: CALL TRCHK
01E8 FD7709  1089      LD  (IY+CB), A
01EB FD7007  1090      LD  (IY+CB), B
01EE FE13    1091      CP  SKYD
01F0 D8      1092      RET  C
01F1 FE1C    1093      CP  POTO
01F3 D0      1094      RET  NC
01F4 3EFF    1095      LD  A, OFFH
01F6 32EC4F  1096      LD  (TIMOUT), A
01F9 C9      1097      RET
  
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01FA C40D 1099 CALCL: DEFW SCBL
 01FC DD0D 1100 DEFW PNCALC
 01FE 2010 1101 DEFW CALCST ; START OF CALCULATOR

1103 ; SYSTEM ROUTINES JUMP VECTOR
 1104 ORG 200H
 0200 C3A004 1105 JP TIMEZ ; DO TIMER & MUSIC
 0203 C37B04 1106 JP TIMEX ; DECTMR

0206 20 1108 SYSFNT: DEFB 20H
 0207 08 1109 DEFB 8
 0208 08 1110 DEFB 8
 0209 01 1111 DEFB 1
 020A 07 1112 DEFB 7
 020B E408 1113 DEFW LRGCHR

020D A0 1115 SMLCHR: DEFB 0A0H
 020E 04 1116 DEFB 4
 020F 06 1117 DEFB 6
 0210 01 1118 DEFB 1
 0211 05 1119 DEFB 5
 0212 BFOA 1120 DEFW SMLCHR

1122 ; ALL KEYS MASK
 0214 3F 1123 AKEY: DEFB 3FH
 0215 3F 1124 DEFB 3FH
 0216 3F 1125 DEFB 3FH
 0217 3F 1126 DEFB 3FH

1128 ; HEAD OF ONBOARD MENU
 0218 BE0D 1129 GUNLINK: DEFW CML
 021A CA0D 1130 DEFW PNGF
 021C DE17 1131 DEFW GFSTR
 021E 4D415820 1132 DEFM 'MAX SCORE'
 0227 00 1133 DEFB 0
 0228 23204F46 1134 DEFM '# OF PLAYERS'
 0234 00 1135 DEFB 0
 0235 23204F46 1136 DEFM '# OF GAMES'
 023F 00 1137 DEFB 0

PROPRIETARY INFORMATION

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1139 ; NAME: CONVERT MASK TO DELTAS
1140 ; INPUT: B = JOYSTICK MASK
1141 ; C = FLOP STATUS (MR FLOP BIT SET IF FLOP
1142 ; DE = X POSITIVE DELTA
1143 ; HL = Y POSITIVE DELTA
0240 CD5602 1144 MMTD: CALL CONCPL ; HANDLE Y
0243 EB 1145 EX DE, HL
0244 CB71 1146 BIT MRFLOP, C ; FLOP SET?
0246 2907 1147 JR Z, MMTD2-$ ; YES - DO IT
0248 78 1148 LD A, B ; NO - GET MASK
0249 E603 1149 AND 3
024B 2901 1150 JR Z, MMTD1-$
024D 2F 1151 CPL ; INVERT IF NOT ZERO
024E 47 1152 MMTD1: LD B, A
024F CD5602 1153 MMTD2: CALL CONCPL ; PROCESS X
0252 EB 1154 EX DE, HL
0253 C3B80B 1155 JP STHLDE ; STORE HL, DE AND QUIT
  
```

```

1157 ; SUBROUTINE TO CONDITIONALLY COMPLEMENT OR ZERO HL
0256 CB08 1158 CONCPL: RRC B
0258 300A 1159 JR NC, CONC1-$ ; JUMP IF NOT UP
025A 7D 1160 LD A, L
025B 2F 1161 CPL
025C 6F 1162 LD L, A
025D 7C 1163 LD A, H
025E 2F 1164 CPL
025F 67 1165 LD H, A
0260 23 1166 INC HL
0261 CB08 1167 RRC B
0263 C9 1168 RET
0264 CB08 1169 CONC1: RRC B ; DOWN GET?
0266 D8 1170 RET C ; QUIT IF SO
0267 C32B00 1171 JP CONC2 ; JUMP TO ZERO OUT
  
```

```

1173 ; NAME: SCROLL MEMORY BUFFER
1174 ; INPUT: B = NUMBER OF LINES TO SCROLL
1175 ; C = NUMBER OF BYTES ON LINE TO SCROLL
1176 ; DE = LINE INCREMENT
1177 ; HL = FIRST LINE TO SCROLL
026A AF 1178 MSCRL: XOR A
026B C5 1179 MSCRL: PUSH BC ; SAVE COUNTERS
026C D5 1180 PUSH DE
026D 47 1181 LD B, A
026E EB 1182 EX DE, HL
026F 19 1183 ADD HL, DE ; ADD INCREMENT TO LINE
0270 E5 1184 PUSH HL
0271 ED80 1185 LDIR
0273 E1 1186 POP HL
0274 D1 1187 POP DE
0275 C1 1188 POP BC
0276 10F3 1189 DJNZ MSCRL1-$
0278 C9 1190 RET
  
```

PROPRIETARY INFORMATION

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1192 ; NAME: MACRO INTERPRETER EXIT WITH CONTEXT REST
1193 ; PURPOSE: QUIT INTERPRETING AND GO HOME
0279 E1 1194 MXINTC: POP HL ; THROW OUT DUMMY RETURN
1195 ; NAME: RETURN FROM SYSTEM CALL
1196 ; PURPOSE: RETURNING TO USER AND RESTORATION OF REG
027A E1 1197 RETN: POP HL ; RETURN ADDRESS TO HL
027B FDE1 1198 POP IY
027D DDE1 1199 POP IX
027F D1 1200 POP DE
0280 C1 1201 POP BC
0281 F1 1202 POP AF
0282 E3 1203 EX (SP),HL ; STK=RETURN, HL=OLD HL
0283 C9 1204 RET
  
```

```

1206 ; NAME: BCD DIVIDE
1207 ;
0284 CDC002 1208 BCD: CALL GNACC ; GENERATE ACCUMULATOR
0287 E3 1209 EX (SP),HL ; HL = ACC, TOP = ARG2
0288 C5 1210 PUSH BC
0289 0600 1211 LD B,0
028B 79 1212 LD A,C
028C CB39 1213 SRL C
028E 09 1214 ADD HL,BC
028F 4F 1215 LD C,A
0290 EB 1216 EX DE,HL ; HL = ARG1, DE = ACC
0291 ED80 1217 LDIR ; HL = ARG1 FLAG+1
0293 C1 1218 POP BC
0294 D1 1219 POP DE
0295 2B 1220 DEC HL
0296 E3 1221 EX (SP),HL ; HL = ARG2, TOP = ARG1 FLAG
0297 C5 1222 PUSH BC
0298 0600 1223 LD B,0
029A 09 1224 ADD HL,BC ; HL = ACC+SIZE/2
029B C1 1225 POP BC
029C 0D 1226 DEC C ; DECREMENT SIZE
029D EB 1227 EX DE,HL ; HL = ARG2, DE = ACC, TOP = AR
029E 1B 1228 DEC DE
029F 1B 1229 DIV: DEC DE
02A0 AF 1230 XOR A
02A1 1231 SYSTEM NEG ; ARG2 = -ARG2 (10S COMP)
02A1 FF 1231 + RST 56
02A2 74 1231 + DEFB NEG
1231 + IF NEG. EQ. INTPC
1231 + ENDIF
02A3 1232 DIV: SYSTEM DADD ; SUBTRACT UNTIL BORROW
02A3 FF 1232 + RST 56
02A4 6E 1232 + DEFB DADD
1232 + IF DADD. EQ. INTPC
1232 + ENDIF
02A5 380A 1233 JR C, DIV3-$
02A7 3C 1234 INC A ; OR UNTIL LOOP COUNT > 99
02A8 27 1235 DAA
  
```

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```

02A9 20F8      1236      JR    NZ, DIV2-*
02AB E1        1237      POP  HL
02AC 36FF      1238      LD   (HL), OFFH
02AE C1        1239      POP  BC
02AF 186A      1240      JR   MULT6-*
02B1          1241  DIV3:  SYSTEM NEG
02B1 FF        1241 +    RST  56
02B2 74        1241 +    DEFB NEG
                1241 +    IF  NEG. EQ. INTPC
                1241 +    ENDIF
02B3          1242      SYSTEM DADD
02B3 FF        1242 +    RST  56
02B4 6E        1242 +    DEFB DADD
                1242 +    IF  DADD. EQ. INTPC
                1242 +    ENDIF
02B5 E3        1243      EX   (SP), HL      ; HL = ARG1
02B6 2B        1244      DEC  HL
02B7 77        1245      LD   (HL), A      ; SAVE ANSWER IN ARG1
02B8 E3        1246      EX   (SP), HL
02B9 0D        1247      DEC  C
02BA 20E3      1248      JR   NZ, DIV1-*
02BC E1        1249      POP  HL
02BD C1        1250      POP  BC
02BE 1855      1251      JR   DIV4-*
                1252 ; SUBROUTINE TO GENERATE ACCUMULATOR ON THE STACK
02C0 DDE1      1253  GND:   POP  IX
02C2 AF        1254      XOR  A
02C3 4F        1255      LD   C, A
02C4          1256      SYSTEM DABS      ; ARG1=ABS VALUE
02C4 FF        1256 +    RST  56
02C5 72        1256 +    DEFB DABS
                1256 +    IF  DABS. EQ. INTPC
                1256 +    ENDIF
02C6 EB        1257      EX   DE, HL
02C7          1258      SYSTEM DABS      ; ARG2=ABS VALUE
02C7 FF        1258 +    RST  56
02C8 72        1258 +    DEFB DABS
                1258 +    IF  DABS. EQ. INTPC
                1258 +    ENDIF
02C9 EB        1259      EX   DE, HL      ; FLAG IF NEG ANS, ELSE POS
02CA 67        1260      LD   H, A
02CB 6F        1261      LD   L, A
02CC 78        1262      LD   A, B
02CD E5        1263  MUL:   PUSH HL      ; GENERATE ACC ON STACK
02CE 10FD      1264      DJNZ MULT1-*
02D0 47        1265      LD   B, A      ; RESTORE SIZE
02D1 39        1266      ADD  HL, SP
02D2 C5        1267      PUSH BC      ; SAVE SIGN
02D3 E5        1268      PUSH HL      ; SAVE STACK POINTER
02D4 E5        1269      PUSH HL      ; SAVE ACC POINTER
02D5 FD660B    1270      LD   H, (IY+CBH) ; RESTORE ARG2 POINTER
02D8 FD6E0A    1271      LD   L, (IY+CBL)
02DB 48        1272      LD   C, B
02DC DDE9      1273      JP   (IX)
                1274 ; DECIMAL MULTIPLY
                1275 ; GIVEN: DE>ARG1, HL>ARG2, B=SIZE/2
                1276 ; (SIZE/2-1 ASSUMED EVEN)

```

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```

    1277 ; RETURNED: ARG1=ANSWER, C<0 ON OVERFLOW
    1278 ;
    1279 ;
02DE CDC002 1280 BCDML: CALL GNACC ; GENERATE ACCUM
02E1 7E 1281 MULT2 LD A, (HL) ; A=MULT LOOP COUNT
02E2 23 1282 INC HL
02E3 E3 1283 EX (SP), HL ; HL>DEC ACC
02E4 A7 1284 AND A ; IF A=0, SKIP MULT LOOP
02E5 2809 1285 JR Z, MULT4-$
02E7 EB 1286 EX DE, HL
02E8 1287 MULT3: SYSTEM DADD ; ELSE MULTIPLY
02E8 FF 1287 + RST 56
02E9 6E 1287 + DEFB DADD
    1287 + IF DADD. EQ. INTPC
    1287 + ENDIF
02EA A7 1288 AND A ; CLEAR THE CARRY BIT
02EB 3D 1289 DEC A ; DECIMAL DECREMENT
02EC 27 1290 DAA
02ED 20F9 1291 JR NZ, MULT3-$
02EF EB 1292 EX DE, HL
02F0 23 1293 MULT4: INC HL ; INCREMENT DECIMAL ACC
02F1 E3 1294 EX (SP), HL ; HL>DEC2
02F2 0D 1295 DEC C
02F3 20EC 1296 JR NZ, MULT2-$
02F5 E1 1297 POP HL
02F6 E1 1298 POP HL ; RESTORE STACK POINTER
02F7 C1 1299 POP BC ; RESTORE SIGN
02F8 D5 1300 PUSH DE
02F9 C5 1301 PUSH BC
02FA 48 1302 LD C, B
02FB 0600 1303 LD B, 0
02FD CB39 1304 SRL C
02FF 09 1305 ADD HL, BC
0300 CB21 1306 SLA C
0302 EDB0 1307 LDIR
0304 C1 1308 POP BC
0305 C5 1309 PUSH BC ; CHECK FOR OVERFLOW
0306 CB38 1310 SRL B
0308 AF 1311 XOR A
0309 B6 1312 MULT5: OR (HL)
030A 23 1313 INC HL
030B 10FC 1314 DJNZ MULT5-$
030D A7 1315 AND A ; SET FLAGS
030E 2803 1316 JR Z, MULT7-$
0310 3EFF 1317 LD A, OFFH
0312 12 1318 LD (DE), A
0313 C1 1319 MULT6: POP BC ; CHECK SIGN AND
0314 E1 1320 POP HL
0315 CB41 1321 DI BIT 0, C ; NEGATE ARG1 IF NECESSARY
0317 2802 1322 JR Z, MULT6-$
0319 1323 SYSTEM BCDCHS
0319 FF 1323 + RST 56
031A 6A 1323 + DEFB BCDCHS
    1323 + IF BCDCHS. EQ. INTPC
    1323 + ENDIF
031B E1 1324 MULT6: POP HL ; RESTORE ORIGINAL STACK POINTER
031C 10FD 1325 DJNZ MULT6-$
  
```

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```

031E C9      1326      RET
              1327      ; BCD SUBTRACT & ADD
              1328      ;
              1329      ; GIVEN:      DE>ARG1, HL>ARG2
              1330      ;              B=SIZE/2+1
              1331      ; RETURNED: ARG1=ANSWER
031F          1332 BCD5B:  SYSTEM BCDCHS
031F FF      1332 +      RST 56
0320 6A      1332 +      DEFB BCDCHS
              1332 +      IF BCDCHS.EQ.INTPC
              1332 +      ENDIF
0321          1333 BCDAD:  SYSTEM BCDNEG
0321 FF      1333 +      RST 56
0322 6C      1333 +      DEFB BCDNEG
              1333 +      IF BCDNEG.EQ.INTPC
              1333 +      ENDIF
0323 EB      1334      EX DE,HL
0324          1335      SYSTEM BCDNEG
0324 FF      1335 +      RST 56
0325 6C      1335 +      DEFB BCDNEG
              1335 +      IF BCDNEG.EQ.INTPC
              1335 +      ENDIF
0326 EB      1336      EX DE,HL
0327          1337      SYSTEM DADD
0327 FF      1337 +      RST 56
0328 6E      1337 +      DEFB DADD
              1337 +      IF DADD.EQ.INTPC
              1337 +      ENDIF
              1338      ; AND FALL INTO
              1339      ;
              1340      ;
              1341      ; DECIMAL SIGNED MAGNITUDE
              1342      ;
              1343      ; GIVEN:      D>ARG (10'S COMPLEMENT)
              1344      ;              B=SIZE/2+1
              1345      ; RETURNED: ARG (SIGNED MAGNITUDE)
              1346      ;
0329 68      1347 SDSMG:  LD L,B      ; HL>ARG B-1 (SIGN BYTE)
032A 2D      1348      DEC L
032B 2600    1349      LD H,0
032D 19      1350      ADD HL,DE
032E 7E      1351      LD A,(HL)      ; IF POS (SIGN NIBBLE<5)
032F FE50    1352      CP 50H
0331 D8      1353      RET C      ; EXIT
0332 EB      1354      EX DE,HL
0333 3E00    1355 SDSMG:  LD A,0      ; ELSE 10'S COMPLEMENT
0335 9E      1356      SBC A,(HL)
0336 27      1357      DAA
0337 77      1358      LD (HL),A
0338 23      1359      INC HL
0339 10F8    1360      DJNZ SDSMG1-$
033B 2B      1361      DEC HL      ; AND SET SIGN BIT
033C 7E      1362      LD A,(HL)
033D F680    1363      OR 80H
033F 77      1364      LD (HL),A
0340 C9      1365      RET
              1366      ;
  
```

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```

1367 ;
1368 ; BCD NEGATE
1369 ;
1370 ; GIVEN: DE>ARG (SIGNED MAGNITUDE)
1371 ; B=SIZE/2+1
1372 ; RETURNED: ARG (10'S COMPLEMENT)
1373 ;
0341 68 1374 BCDNG: LD L, B ; HL>ARG+B-1 (SIGN BYTE)
0342 2D 1375 DEC L
0343 2600 1376 LD H, 0
0345 19 1377 ADD HL, DE
0346 CB7E 1378 BIT 7, (HL) ; EXIT IF POS
0348 C8 1379 RET Z
0349 3600 1380 LD (HL), 0 ; CLEAR SIGN BYTE
034B EB 1381 EX DE, HL
034C AF 1382 SNEGT: XOR A ; CLEAR CARRY
034D 3E00 1383 BCDNG: LD A, 0 ; ELSE 10'S COMPLEMENT
034F 9E 1384 SBC A, (HL)
0350 27 1385 DAA
0351 77 1386 LD (HL), A
0352 23 1387 INC HL
0353 10F8 1388 DJNZ BCDNG1
0355 C9 1389 RET
1390 ;
1391 ;
1392 ; DECIMAL ABSOLUTE
1393 ;
1394 ; GIVEN: DE>ARG (SIGNED MAGNITUDE)
1395 ; B=SIZE/2+1
1396 ; RETURNED: ARG+1 IF SIGN BIT CLEARED
1397 ;
0356 68 1398 SDAB: LD L, B
0357 2600 1399 LD H, 0
0359 2D 1400 DEC L
035A 19 1401 ADD HL, DE
035B CB7E 1402 BIT 7, (HL)
035D C8 1403 RET Z
035E 3600 1404 LD (HL), 0
0360 FD3406 1405 INC (IY+CB)
0363 C9 1406 RET
1407 ;
1408 ;
1409 ; BCD CHANGE SIGN
1410 ;
1411 ; GIVEN: HL>ARG B=SIZE/2+1
1412 ; (SIGNED MAGNITUDE)
1413 ; RETURNED: ARG SIGN BIT COMPLEMENTED
1414 ;
0364 48 1415 BCDC: LD C, B
0365 0600 1416 LD B, 0
0367 0D 1417 DEC C
0368 09 1418 ADD HL, BC
0369 7E 1419 LD A, (HL)
036A EE80 1420 XOR 80H
1421 ; NAME: SET BYTE
036C 77 1422 MSETB: LD (HL), A
036D C9 1423 RET

```

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1424 ;
1425 ;
1426 ; DECIMAL ADD
1427 ;
1428 ; GIVEN:  DE>ARG1  HL>ARG2 (10'S COMPLEMENT)
1429 ;        B=SIZE/2+1
1430 ; RETURNED: ARG1=ANSWER (10'S COMPLIMENT)
1431 ;
036E AF 1432 SDADD: XOR A
036F 1A 1433 SDADD1: LD A, (DE)
0370 8E 1434 ADC A, (HL)
0371 27 1435 DAA
0372 12 1436 LD (DE), A
0373 13 1437 INC DE
0374 23 1438 INC HL
0375 10F8 1439 DJNZ SDADD1-#
0377 FE99 1440 CP 99H
0379 17 1441 RLA
037A 2F 1442 CPL
037B FD7708 1443 LD (IY+CBFLAG), A ; SEND BACK STATUS FROM DADD
037E C9 1444 RET

1446 ; NAME: RANGED RANDOM NUMBER
1447 ; INPUT: A RANGE
1448 ; OUTPUT: A RANDOM NUMBER (0 TO RANGE-1)
037F F5 1449 MRAN: PUSH AF
0380 2AEF4F 1450 LD HL, (RANSH)
0383 CDAC03 1451 CALL SHIFTR
0386 011700 1452 LD BC, 23
0389 09 1453 ADD HL, BC
038A 8A 1454 ADC A, D
038B 22EF4F 1455 LD (RANSH), HL
038E 2AF14F 1456 LD HL, (RANSH+2)
0391 5F 1457 LD E, A
0392 CDAC03 1458 CALL SHIFTR
0395 19 1459 ADD HL, DE
0396 22F14F 1460 LD (RANSH+2), HL
0399 5A 1461 LD E, D
039A EB 1462 EX DE, HL
039E F1 1463 POP AF
039C A7 1464 AND A
039D 4F 1465 LD C, A
039E 7A 1466 LD A, D
039F 2808 1467 JR Z, R3-#
03A1 AF 1468 XOR A
03A2 19 1469 R1: ADD HL, DE
03A3 3001 1470 JR NC, R2-#
03A5 3C 1471 INC A
03A6 0D 1472 R2: DEC C
03A7 20F9 1473 JR NZ, R1-#
03A9 C3D10A 1474 R3: JP QFROG
03AC 44 1475 SHIFTR: LD B, H
03AD 4D 1476 LD C, L
03AE AF 1477 XOR A
03AF 1607 1478 LD D, 7
  
```

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```

03B1 29      1479 SH1:  ADD HL,HL
03B2 17      1480      RLA
03B3 15      1481      DEC D
03B4 20FB    1482      JR NZ,SH1-$
03B6 09      1483      ADD HL,BC
03B7 8A      1484      ADC A,D
03B8 C9      1485      RET
  
```

```

1487 ; NAME:      SAVE AREA
1488 ; INPUT:     HL = SCREEN ADDRESS
1489 ;           DE = SAVE AREA ADDRESS
1490 ;           BC = Y, X SIZE OF AREA TO SAVE
1491 ; NOTES:    THE SIZES OF THE OBJECT ARE SAVED IN THE
1492 ;           FIRST TWO BYTES OF THE SAVE AREA.
  
```

```

03B9 EB      1493 MSAVE:  EX DE,HL
03BA 71      1494      LD (HL),C      ; SET X SIZE
03BB 23      1495      INC HL
03BC 70      1496      LD (HL),B      ; SET Y SIZE
03BD 23      1497      INC HL
03BE AF      1498      XOR A
03BF EB      1499      EX DE,H
03C0 CBF4    1500      SET 6,H      ; SET NONMAGIC ADDRESS
03C2 C5      1501 MSAV   PUSH BC
03C3 E5      1502      PUSH HL
03C4 47      1503      LD B,A
03C5 EDB0    1504      LDIR
03C7 E1      1505      POP HL
03C8 0E28    1506      LD C,BYTEHL
03CA 09      1507      ADD HL,BC
03CB C1      1508      POP BC
03CC 10F4    1509      DJNZ MSAVE,X$
03CE C9      1510      RET
  
```

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```

1512 ; NAME:  PREGAME OUTPUT PORT SETUP
1513 ; PURPOSE: TO SET ONCOM, VERBL, C
1514 ; INPUTS: B=HORCE, D=VERBL, A=INMOD
03CF 0E09    1515 MSET   LD C,HORCE      ; GET HORSE PORT NUMBER
03D1 ED41    1516      OUT (C),B      ; HORCE
03D3 0C      1517      INC C
03D4 ED51    1518      OUT (C),D      ; VERBL
03D6 D30E    1519      OUT (INMOD),A
03D8 C9      1520      RET
  
```

```

1522 ; NAME:  TEST FOR TRANSITIONS
1523 ; FUNCTION: TO LOOK FOR CHANGES IN THE PORTS &TC.
1524 ; RETURNS : A= 0 NO CHANGE
1525 ; 1-8 COUNTER TIMER#N HIT 0
1526 ; 9-C = POTO-3 CHANGED
1527 ; D = A SECONDS UP
1528 ; E= KEYBOARD CHANGED (B=0-24)
1529 ; F-16 : TRIGO!JOYO - T3!J3
  
```

```

*MODCOMP Z-80 CROSS ASSEMBLER* HOME VIDEO GAME SYSTEM PAGE 35
ADDR OBJECT STMT LABEL OPCODE OPERAND COMMENT

1530 ; RETURNS NEW VALUE IN B
03D9 5E 1531 CTLP LD E, (HL)
03DA 010108 1532 LD BC, 301H
03DD 79 1533 CCTLP LD A, C ; GET MASK
03DE 0F 1534 RRCA
03DF 4F 1535 LD C, A
03E0 A3 1536 AND E ; CHECK IF CT BIT =1
03E1 2003 1537 JR NZ, CCT1-$
03E3 10F8 1538 DJNZ CCTLP-$
03E5 C9 1539 RET
03E6 AB 1540 CCT1: XOR E ; MASK OUT BIT IN QUESTION
03E7 77 1541 LD (HL), A ; PUT BACK THE CTFLAGS OR SEMI4
03E8 78 1542 LD A, B
03E9 82 1543 ADD A, D
03EA E1 1544 POP HL ; OLD RET ADDR
03EB C9 1545 RET
03EC 2825 1546 TRCAT JR Z, TSEX-$ ; SKIP COUNTER-TIMERS AND POTS?
03EE 21DD4F 1547 LD HL, CNT ; GET COUNTER TIMERS STATUS
03F1 1600 1548 LD D, 0
03F3 CDD903 1549 CALL CTLP ; COUNTER TIMERS
03F6 1608 1550 LD D, 8
03F8 23 1551 INC HL
03F9 CDD903 1552 CALL CTLP ; SEMI4
03FC 011C04 1553 LD BC, 400H+POTO
03FF 23 1554 TPLD INC HL ; -> POTO
0400 ED73 1555 IN A, (C)
0402 5E 1556 LD E, (HL) ; GET POTO
0403 93 1557 SUB E
0404 3805 1558 JR C, PHOT-$ ; NEW ONE LESS THAN OLD
0406 D603 1559 SUB PFUG ; FUDGE BOUNCE FACTOR
0408 3806 1560 JR C, EPLQ-$ ; NEW MORE THAN OLD+4
040A 3C 1561 INC A
040B 83 1562 PHOT: ADD A, E
040C 77 1563 LD (HL), A
040D 47 1564 LD B, A
040E 79 1565 LD A, C
040F C9 1566 RET
0410 0C 1567 EPLQF INC C
0411 10EC 1568 DJNZ TPLOP-$
1569 ; NOW TEST SECONDS
0413 21E34F 1570 TSEX LD HL, KEYSEX ; HL = KEYSEX
0416 7E 1571 LD A, (HL)
0417 CB7F 1572 BIT 7, A
0419 2806 1573 JR Z, TKEY3-$
041B CBBF 1574 RES 7, A
041D 77 1575 LD (HL), A
041E 3E11 1576 LD A, SSEC ; SECS
0420 C9 1577 RET
1578 ; NOW TEST KEYBOARD
0421 E5 1579 TKEYS: PUSH HL
0422 CD7400 1580 CALL DELOAD
0425 EB 1581 EX DE, HL
0426 011704 1582 LD BC, 400H+KEY3
0429 1100FF 1583 LD DE, OFFO0H ; SET BIT COUNTER+COLUMNN
042C ED73 1584 MSK1: IN A, (C)
042E A6 1585 AND (HL) ; CHECK AGAINST MASK
042F 200A 1586 JR NZ, MSENK2-$

```

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ADDR	OBJECT	STMT	LABEL	OPCODE	OPERAND	COMMENT
0431	0D	1587		DEC	C	; NEXT PORT
0432	1C	1588		INC	E	; AND COLUMN
0433	23	1589		INC	HL	; AND MASK
0434	10F6	1590		DJNZ	MSK1-\$	
0436	78	1591		LD	A, B	; NOTHING DOWN
0437	1E12	1592		LD	E, SKYU	
0439	180B	1593		JR	MSENKE-\$	
043B	14	1594	MSENK2	INC	D	; BIT COUNTER
043C	0F	1595		RRCA		
043D	30FC	1596		JR	NC, MSENK2-\$	
043F	7A	1597		LD	A, D	
0440	07	1598		RLCA		; KEY=BIT*4
0441	07	1599		RLCA		
0442	83	1600		ADD	A, E	; + COLUMN
0443	3C	1601		INC	A	; PLUS 1
0444	1E13	1602		LD	E, SKYD	
0446	E1	1603	MSENKE	POP	HL	
0447	AE	1604		XOR	(HL)	; KEY=OKEY?
0448	E67F	1605		AND	7FH	
044A	2807	1606		JR	Z, HANDLE-\$	
044C	AE	1607		XOR	(HL)	
044D	77	1608		LD	(HL)	
044E	E67F	1609		AND	07FH	
0450	47	1610		LD	B, A	
0451	7B	1611		LD	A, E	; KEYBOARD RETURN CODE
0452	C9	1612		RET		
		1613				; NO TEST HANDLES
0453	011004	1614	HANDLE:	LD	BC, 40H+SWO	
0456	23	1615	SWLOP	INC	HL	; -> SWO
0457	ED78	1616		IN	A, (C)	
0459	AE	1617		XOR	(HL)	; COMPARE THE 2
045A	2005	1618		JR	NZ, SWBIT-\$	
045C	0C	1619		INC	C	
045D	10F7	1620		DJNZ	SWLOP-\$; NO CHANGE
045F	78	1621		LD	A, B	; RETURN 0
0460	C9	1622		RET		
0461	CB67	1623	SWHI	BIT	4, A	; TEST TRIGGER
0463	280C	1624		JR	Z, JOY-\$; NO TRIG MUST BE JOYSTICK
0465	E610	1625		AND	10H	; FILTER OUT TRIGGER
0467	AE	1626		XOR	(HL)	; UPDATE VALUE
0468	77	1627		LD	(HL)	
0469	E610	1628		AND	10H	
046B	47	1629		LD	B, A	
046C	79	1630		LD	A, C	; GET PORT NUMBER
046D	07	1631		RLCA		; *2
046E	D60C	1632		SUB	OCH	
0470	C9	1633		RET		
0471	AE	1634	JOY	XOR	(HL)	
0472	77	1635		LD	(HL), A	; NO CHANGE IN TRIG SO STORE ST
0473	E60F	1636		AND	0FH	; TAKE OFF TRIGGER
0475	47	1637		LD	B, A	
0476	79	1638		LD	A, C	
0477	07	1639		RLCA		; *2
0478	D60B	1640		SUB	OBH	
047A	C9	1641		RET		

PROPRIETARY INFORMATION
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DO NOT REPRODUCE

```

1643 ; TIMEX
1644 ; INPUTS HL-> TIME BASE IN RAM
1645 ; B=TIME BASE MODULUS
1646 ; C=MASK AS IN DECCTS
1647 ; PURPOSE: TO DECR TIMEBASE AND IF 0 RESET IF AND DECR
1648 ; COUNTER TIMERS
047B 35 1649 TIMEX: DEC (HL) ; DEC TIMEBASE
047C C0 1650 RET NZ
047D 70 1651 LD (HL),B ; RESET TIMEBASE
  
```

```

1653 ; NAME: DECREMENT COUNTER TIMERS
1654 ; INPUTS: C=MASK
1655 ; USED BY ACTINT AND DECCTS TO DECREMENTS CTS UNDER MASK
1656 ; MASK= *76543210*, IF BIT=1 THEN DEC CORESPONDING
1657 ; CT IF BIT=0 LEAVE CT# ALONE
1658 ; NOTE: ALL COUNTERS ARE RUN IN BCD FOR EASY DISPLAY
047E 0608 1659 TIMEX LD B,8 ; NO OF BITS
0480 21D54F 1660 LD HL,CTO ; -> TO COUNTER TIMERS
0483 1600 1661 LD D,0 ; RESULTS
0485 CB39 1662 TIMEX SRL C ; CHANGE THIS TIMER?
0487 300A 1663 JR NC,ETL ;
0489 7E 1664 LD A,(HL) ; GET THE TIMER
048A B7 1665 OR A ; IS ZERO ALREADY?
048B 2906 1666 JR Z,ETL ;
048D 3D 1667 DEC A
048E 27 1668 DAA
048F 2001 1669 JR NZ,+3
0491 37 1670 SCF
0492 77 1671 LD (HL), ; STORE NEW VALUE
0493 23 1672 ETL: INC HL
0494 CB1A 1673 RR D ; ROTATES IN CARRY FLAG
0496 10ED 1674 DJNZ TIMLP
0498 3ADD4F 1675 LD A,(CNT) ; COUNTER UPDATE&NUMBER TRACKER
049B B2 1676 OR D
049C 32DD4F 1677 LD (CNT),A
049F C9 1678 RET
  
```

```

1680 ; NAME: TIMER ROUTINE
1681 ; PURPOSE: TO UPDATE GAME TIME, TIMEOUT AND MUSIC
1682 ; INPUTS OUTPUTS: NONE
1683 ; NOTE: PUSH YOUR REGISTERS (AF, DE, HL)
1684 TIMEX: ; ASSUMES YOU PUSH DA REGS
04A0 21F94F 1685 LD HL,PRIOR ; PRIORITY=TICKS
04A3 CB4E 1686 BIT 1,(HL) ; CHECK IF TICKS OVERRUN
04A5 C0 1687 RET NZ ; RETURN
04A6 CBCE 1688 SET 1,(HL)
04A8 EB 1689 EX DE,HL
1690 ; *SIXTIETH OF A SECOND INTERUPT*
04A9 21EA4F 1691 LD HL,DURAT ; NOTE TIMER
04AC 7E 1692 LD A,(HL) ; =0 SKIP
04AD B7 1693 OR A
  
```

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```

04AE 281C 1694 JR Z,SIXY-$
04B0 35 1695 DEC (HL)
04B1 200B 1696 JR NZ,STAKO-$
04B3 E5 1697 PUSH HL
04B4 DDE5 1698 PUSH IX
04B6 CD1405 1699 CALL MUZCPU ; =0 DO NEXT NOTE
04B9 DDE1 1700 POP IX
04BB E1 1701 POP HL
04BC 180E 1702 JR SIXY-$
04BE EB 1703 STAKO: EX DE,HL
04BF CB7E 1704 BIT 7,(HL)
04C1 EB 1705 EX DE,HL
04C2 2008 1706 JR NZ,SIXY-$
04C4 3D 1707 DEC A
04C5 3D 1708 DEC A ; =1 QUIET NOTE
04C6 2004 1709 JR NZ,SIXY-$
1710 ; A
04C8 D316 1711 OUT (VOLAB),A
04CA D315 1712 OUT (VOLC),A
04CC 23 1713 SIXY: INC HL
04CD 35 1714 DEC (HL) ; IF(--TMR60<0)
04CE F20205 1715 JP P,GOUT ; ELZ FORWARD
04D1 363B 1716 LD (HL),G ; THEN TMR60=59
04D3 23 1717 INC HL ; -> TIMEOUT
04D4 EB 1718 EX DE,HL
04D5 21E34F 1719 LD HL,KEYEX ; SET SECONDS UP
04D8 CBFE 1720 SET 7,(HL)
04DA EB 1721 EX DE,HL
04DB 7E 1722 LD A,(HL) ; CHECK IF ZERO
04DC B7 1723 OR A
04DD 2801 1724 JR Z,GT01-$
04DF 35 1725 DEC (HL) ; DEC TIMEOUT
1726 ; *GAME TIMER ONCE A SECOND ROUTINE*
1727 ; IF (SEC != 0 & MIN !=0)
1728 ; IF (SEC == 0
1729 ; SEC=59; --MIN
1730 ; ELSE --SEC
1731 ; ELSE GAMETIMEUP
04E0 23 1732 GTIMER: INC HL ; ->GTSECS
04E1 7E 1733 LD A,(HL) ; IF (SEC==0
04E2 23 1734 INC HL ; ->GTMINS
04E3 B6 1735 OR (HL) ; & MIN!=0)
04E4 2813 1736 JR Z,GT01-$
04E6 2B 1737 DEC HL ; ->GTSECS AGAIN
04E7 7E 1738 LD A,(HL) ; IF (SEC==0)
04E8 B7 1739 OR A
04E9 2009 1740 JR NZ,GT01-$
04EB 3659 1741 LD (HL),59H ; THEN SEC=59BCD
04ED 23 1742 INC HL ; ->GTMINS AGAIN
04EE 7E 1743 LD A,(HL) ; --MIN
04EF 3D 1744 DEC A
04F0 27 1745 DAA
04F1 77 1746 LD (HL),A
04F2 180E 1747 JR GOUT-$
04F4 3D 1748 GT01: DEC A ; ELSE --SEC
04F5 27 1749 DAA
04F6 77 1750 LD (HL),A

```

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```

04F7 1809      1751      JR      GOUT-#
04F9 21F84F   1752  GT02:  LD      HL,GAMSTB ; ELSE GAMETIMEUP=1
04FC CB46      1753      BIT     GSBTIM,(HL)
04FE 2802      1754      JR      Z,GOUT-#
0500 CBFE      1755      SET     GSBEND,(HL)
0502 21F94F   1756  GOUT   LD      HL,PRIOR
0505 CB8E      1757      RES     1,(HL)
0507 C9        1758      RET

; RETURN TO BACKGND OR LO LEVEL
  
```

PROPRIETARY INFORMATION

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```

1760 ; NAME: START MUZCPU
1761 ; PURPOSE: TO START MUSIC PLAYING (ALSO NOISES)
1762 ; INPUTS: HL -> SCORE
1763 ; A=VOICES
1764 ; NOTE: YOU SHOULD LOAD MUZSP IF YOU DO CALLS
0508 32D44F 1765 MUZSET LD (VOICES),A
050B DD22D04F 1766 LD (MUZSP),IX
050F CDFC05 1767 CALL MUZSTP
0512 1803 1768 JR MUZCP1-$

1769 ; NAME: MUZCPU
1770 ; PURPOSE: PLAYING MUSIC AND NOISES.
1771 ; NOTE: DURAT=0 WHEN CALLED
1772 ; OUTPUT: NONE
1773 ; *MUSIC PROCESSOR*
1774 ; FETCH OPCODE
1775 ; IF (OPCODE < 80H)
1776 ; SET NOTE DURATION ETC
1777 ; ELSE
1778 ; SWITCH (OPCODE & OFOH)
1779 ; CASE 80H:
1780 ; IF (MASK=8) STUFF SNDB,PC=PC+9
1781 ; ELSE OUTI (MASK)=DATA
1782 ; CASE 90H:
1783 ; VOICES=DATA
1784 ; CASE A0H:
1785 ; (--SP)=DATA IN NIBBLE, OP +1
1786 ; CASE B0H:
1787 ; SET VOLUME = DATA, DATA
1788 ; CASE C0H:
1789 ; SWITCH (MASK)
1790 ; CASE D: MPCL=(MSP+); MPCH=(MSP++); BREAK
1791 ; CASE E: (--MSP)=MPCH; (--MSP)=MPCL
1792 ; CASE F: IF --(SP)=MPCH THEN SP++
1793 ; CASE 3: MPC=DATA16
1794 ; CASE D0H: CALL RELATIVE
1795 ; CASE E0: DURAT=DATA
1796 ; CASE F0: VOICES=0, PORTS=0
0514 2ACE4F 1797 MUZCP1 LD HL, (MUZPC) ; LOOK LIKE NORMAL LOOP RETURN
0517 DD2AD04F 1798 MUZCP1 LD IX, (MUZSP) ; FETCH STACK POINTER
051B 7E 1799 OPLD LD A, (HL) ; OPCODE FETCH
051C 23 1800 INC HL ; -> OPERAND, DATA
051D B7 1801 OR A ; TEST FOR 80H OR MORE
051E FA5B05 1802 JP M, MOO
1803 ; NORMAL NOTE OPERATOR
0521 32EA4F 1804 LD (DURAT), A
0524 3AD44F 1805 LD A, (VOICES)
0527 011808 1806 LD BC, 800H+SNDBX
052A CB3F 1807 SRL A ; SET NOISE
052C 3002 1808 JR NC, +4
052E EDA3 1809 OUTI
0530 0605 1810 LD B, 5 ; -> VIBRATO
0532 CB3F 1811 SRL A
0534 3002 1812 JR NC, +4
0536 EDA3 1813 OUTI ; SET VIBRATO
0538 0604 1814 LD B, 4 ; -> NOTE C
053A CB3F 1815 M81: SRL A ; CHECK C, B, A
  
```

PROPRIETARY INFORMATION

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ADDR	OBJECT	STMT	LABEL	OPCD	OPERAND	COMMENT
053C	3009	1816		JR	NC, M82-\$	
053E	EDA3	1817		OUTI		
0540	CB3F	1818	M815	SRL	A	; CHECK IF INC PC WAS ON
0542	3807	1819		JR	C, M83-\$	
0544	2B	1820		DEC	HL	; RESTORE PC
0545	1804	1821		JR	M83-\$	
0547	05	1822	M82	DEC	B	
0548	23	1823		INC	HL	
0549	18F5	1824		JR	M815-\$	
054B	B7	1825	M83	OR	A	
054C	20EC	1826		JR	NZ, M81-\$	
		1827			; PLAY NOTE	
054E	3AD24F	1828		LD	A, (PVOLAB)	
0551	D316	1829		OUT	(VOLAB), A	
0553	3AD34F	1830		LD	A, (PVOLMC)	
0556	D315	1831		OUT	(VOLC), A	
0558	C3F405	1832		JP	MUZ999	
055B	FE90	1833	MOO	CP	90H	
055D	3015	1834		JR	NC, MO1-\$	
		1835			STUFF PORT OR SOUND BLOCK	
055F	CB5F	1836		BIT	3, A	; IF (STUFF SNDBLK)
0561	2808	1837		JR	Z, MOO-\$	
0563	78	1838		LD	A, B	; SAVE (VSN)
0564	011808	1839		LD	BC, 8+256+SNDBX	; B=C=SNDBX
0567	EDB3	1840		OTIR		; HL->NEXT OPCODE WHEN DONE
0569	1380	1841		JR	OPLOOP-\$	
056B	E607	1842	MOO	AND	7	; ISOLATE PORT NUMBER
056D	F610	1843		OR	10H	; PORTS 10H-17H
056F	4F	1844		LD	C, A	; SET PORT REGISTER
0570	EDA3	1845		OUTI		
0572	18A7	1846		JR	OPLOOP-\$	
0574	2007	1847	MO1	JR	NZ, MO-\$	
0576	7E	1848		LD	A, (HL)	; GET NEW VOICES
0577	23	1849		INC	HL	
0578	32D44F	1850		LD	(VOICES), A	
057B	189E	1851		JR	OPLOOP-\$	
057D	FE80	1852	MO2	CP	OBOH	
057F	3006	1853		JR	NC, MO-\$	
0581	E60F	1854		AND	0FH	
0583	5F	1855		LD	E, A	
0584	1C	1856		INC	E	
0585	183E	1857		JR	MO45-\$	
0587	FEC0	1858	MO3	CP	OCON	; SET VOL ETC
0589	3009	1859		JR	NC, M8-\$	
		1860			; LD PVOLS	
058B	11D24F	1861		LD	DE, PVOLAB	
058E	EDA0	1862		LDI		; DONT CARE ABOUT BC
0590	EDA0	1863		LDI		
0592	1387	1864	OPL2	JR	OPLOOP-\$	
0594	200B	1865	MO4	JR	NZ, MO40-\$	
0596	DD3500	1866		DEC	(IX+0)	; DEC STACK TOP
0599	200A	1867		JR	NZ, MO41-\$	
059B	DD23	1868		INC	IX	
059D	23	1869		INC	HL	
059E	23	1870		INC	HL	
059F	18F1	1871		JR	OPLP2-\$	
05A1	FED0	1872	MO40	CP	O00H	; PC SP STUFF

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05A3	3027	1873		JR	NC, M05-\$	
05A5	E60F	1874	M041	AND	OFH	; ISOLATE MASK
05A7	FE09	1875		CP	9	; RETURN
05A9	200C	1876		JR	NZ, M043-\$	
05AB	DD6E00	1877		LD	L, (IX+0)	
05AE	DD23	1878		INC	IX	
05B0	DD6600	1879		LD	H, (IX+0)	
05B3	DD23	1880		INC	IX	
05B5	18DB	1881		JR	OPLP2-\$	
05B7	5E	1882	M043:	LD	E, (HL)	; PCL=
05B8	23	1883		INC	HL	
05B9	56	1884		LD	D, (HL)	; PCH=
05BA	23	1885		INC	HL	
05BB	EB	1886		EX	DE, HL	; SET THE PC
05BC	FE04	1887		CP	4	; IS IT A JMP?
05BE	38D2	1888		JR	C, OPLP2-\$; IT IS
05C0	DD2B	1889	M044	DEC	IX	; ITS A CALL
05C2	DD7200	1890		LD	(IX+0), D	; (--SP)=PCH
05C5	DD2B	1891	M043	DEC	IX	
05C7	DD7300	1892		LD	(IX+0), E	; (--SP)=PCL
05CA	18C6	1893		JR	OPLP2-\$	
05CC	FEE0	1894	M043	CP	0E0H	
05CE	300A	1895		JR	NC, M05-\$	
05D0	E60F	1896		AND	OFH	
05D2	0600	1897		LD	B, 0	
05D4	4F	1898		LD	C, A	
05D5	54	1899		LD	D, H	
05D6	5D	1900		LD	E, L	
05D7	09	1901		ADD	HL, BC	
05D8	18E6	1902		JR	M044	; CALL
05DA	200A	1903	M043	JR	NZ, M041-\$	
05DC	3AF94F	1904		LD	A, (PCH OR)	; LE STA
05DF	EE90	1905		XOR	80H	
05E1	32F94F	1906		LD	(PRIOR), A	
05E4	18AC	1907		JR	OPLP2-\$	
05E6	FEF0	1908	M043	CP	OFOH	; REST VOICE (OR SUSTAIN)
05E8	2812	1909		JR	Z, MUZSTP-\$	
05EA	7E	1910		LD	A, HL	
05EB	32EA4F	1911		LD	(DURAT), A	; SET DURATION OF QUIET
05EE	23	1912		INC	HL	
05EF	AF	1913		XOR	A	
05F0	D316	1914		OUT	(VOLDB), A	
05F2	D315	1915		OUT	(VOLC), A	
		1916			END OF MUZCPU PROCESSOR	
05F4	22CE4F	1917	MUZCPU:	LD	(MUZPC), HL	; SAVE THE PC
05F7	DD22D04F	1918		LD	(MUZSP), IX	; SAVE THE STACK POINTER
05FB	C9	1919		RET		
		1920			NAME MUZSTP	
		1921			PURPOSE: STOP MUZCPU, SET PORTS TO 0	
05FC	AF	1922	MUZSTP:	XOR	A	
05FD	32EA4F	1923		LD	(DURAT), A	
0600	32F94F	1924		LD	(PRIOR), A	
0603	011808	1925		LD	BC, 800H+SNDBX	
0606	ED79	1926		OUT	(C), A	
0608	10FC	1927		DJNZ	-2	
060A	C9	1928		RET		

PROPRIETARY INFORMATION
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1930 ; NAME: DO IT
1931 ; PURPOSE: TRANSFER CONTROL TO USER STATE TRANSITION
1932 ; INPUT: A = RETURN CODE FROM SENTRY ROUTINE
1933 ; HL = DO IT TABLE ADDRESS
1934 ; OUTPUT:
1935 ; DESCRIPTION: THIS ROUTINE IS USED WITH THE SENTRY ROUT
1936 ; IT IS USED FOR DISPATCHING TO A STATE TRANSITION
1937 ; ROUTINE. THE RETURN CODE FROM SENTRY IS USED TO
1938 ; SEARCH THE DOIT TABLE. IF A MATCH IS FOUND, CONT
1939 ; TRANSFERRED. IF NO MATCH IS FOUND, THE ROUTINE RE
1940 ; THE DOIT TABLE IS MADE UP OF THREE BYTE ENTRIES:
1941 ; BYTE 0 BIT 7: IF SET - DO A MCALL TO THIS HANDLER
1942 ; BYTE 0 BIT 6: IF SET - DO A RCALL TO THIS HANDLER
1943 ; BYTE 0 BITS 5-0: RETURN CODE THIS ROUTINE IS TO PR
1944 ; BYTE 1 AND 2: THE ADDRESS TO TRANSFER TO.
1945 ; THE LIST IS TERMINATED BY A BYTE WHICH IS .GE. OC
060B 78 1946 MDOITB LD A,B
060C D5 1947 MDOI PUSH DE
060D 57 1948 LD D,A
060E 7E 1949 MDOI LD A,(HL) ; GET RETURN CODE FOR THIS ENTR
060F 4F 1950 LD C,A ; C = CURRENT ENTRY
0610 FEC0 1951 CP COH ; LIST TERMINATOR?
0612 3802 1952 JR C,MDOI1-* ; NO JUMP
0614 D1 1953 POP DE ; YES RETURN
0615 C9 1954 RET
0616 23 1955 MDOI INC HL
0617 E63F 1956 AND 3FH
0619 BA 1957 CP D ; NORMAL MATCH?
061A 2804 1958 JR Z,MDOI2-* ; JUMP IF SO
061C 23 1959 MDOI INC HL ; NO MATCH - SKIP OVER
061D 23 1960 INC HL ; GO TO ADDRESS
061E 18EE 1961 JR MDOI3
0620 D1 1962 MDOI2: POP DE
0621 5E 1963 MDOI3: LD E,(HL) ; DE = AUTO ADDR
0622 23 1964 INC HL
0623 56 1965 LD D,(HL)
0624 EB 1966 EX DE,HL
0625 CB79 1967 BIT 7,C ; MCALL?
0627 C27D00 1968 JP NZ,MDOI4 ; JUMP IF SO
062A CB71 1969 BIT 6,C ; RCALL?
062C 2004 1970 JR NZ,MRCALL-* ; MUST BE JUMP
062E D1 1971 POP DE
062F F1 1972 POP AF
0630 E5 1973 PUSH HL
0631 EB 1974 EX DE,HL
; RCALL ROUTINE
0632 E9 1975 MRCALL: JP (HL)
1977 ; *****
1978 ; * VECTORIZING ROUTINES *
1979 ; *****
1980 ; NAME: VECTOR X AND Y COORDINATES
1981 ; PURPOSE: UPDATE X,Y COORDINATES AND LIMIT CHECK
1982 ; INPUT: IX = VECTOR PACKET
1983 ; HL = LIMITS TABLE
1984 ; OUTPUT: C = TIME BASE USED
1985 ; NONZERO STATUS SET IF OBJECT MOVED

```

PROPRIETARY INFORMATION

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1986 ; NOTES:
1987 ; THIS ROUTINE WORKS WITH A 'VECTOR PACKET', WHICH LOG
1988 ; *****
1989 ; *BYTE* CONTENTS * NAME *
1990 ; *****
1991 ; * 00 * MAGIC REGISTER * VBMR *
1992 ; *****
1993 ; * 01 * VECTOR STATUS * VBSTAT *
1994 ; *****
1995 ; * 02 * TIME BASE * VBTIMB *
1996 ; *****
1997 ; * 03 * DELTA X * VBDXL *
1998 ; * 04 * * VBDXH *
1999 ; *****
2000 ; * 05 * X COORDINATE * VBXL *
2001 ; * 06 * * VBXH *
2002 ; *****
2003 ; * 07 * X CHECKS MASK * VBXCHK *
2004 ; *****
2005 ; * 08 * DELTA Y * VBDYL *
2006 ; * 09 * * VBDYH *
2007 ; *****
2008 ; * 10 * Y COORDINATE * VBYL *
2009 ; * 11 * * VBYH *
2010 ; *****
2011 ; * 12 * Y CHECKS MASK * VBYCHK *
2012 ; *****
2013 ;
2014 ; OPTIONS BYTE:
2015 ; BIT MEANING
2016 ; -----
2017 ; 7 VECTOR IS ACTIVE
2018 ;
2019 ; CHECKS BYTE:
2020 ; BIT MEANING
2021 ; -----
2022 ; 0 DO LIMIT CHECKS
2023 ; 1 REVERSE COORDINATES ON LIMIT ATTAINMENT
2024 ; 2 TARGET ATTAINED (OUTPUT)
2025 ; 3 IF THE VECTOR IS ACTIVE, AND THE TIME BASE IS NONZER
2026 ; THEN THE UPDATE COORDINATE ROUTINE IS CALLED FOR THE X
2027 ; AND Y PORTIONS OF THE PACKET.
0633 FDCB08F6 2028 MVECB SET PSWZD,(IX+CBFLAG) ; SET ZERO FLAG
0637 DDCB017E 2029 BIT VBSA0D,(IX+VBSTAT) ; IS VECTOR ACTIVE?
063B DD4E02 2030 LD C,(IX+VBTIMB) ; TIME BASE TO C
063E DD360200 2031 LD (IX+VBTIMB),0 ; ZERO TIME BASE
0642 FD7106 2032 LD (IX+CBC),C ; PASS BACK TIME BASE
0645 C8 2033 RET Z
0646 79 2034 LD A,C
0647 A7 2035 AND A ; IS TIME BASE ZERO?
0648 C8 2036 RET Z ; QUIT IF SO
0649 110300 2037 LD DE,VBDXL ; ADVANCE TO FIRST
064C DD19 2038 ADD IX,DE
064E CD5606 2039 CALL MVECTC ; UPDATE FIRST COORDINATE
0651 110500 2040 LD DE,VBDYL-VBDXL ; TO Y
0654 DD19 2041 ADD IX,DE
2042 ; AND FALL INTO ...

```

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2043 ; NAME: VECTOR COORDINATE
2044 ; PURPOSE: UPDATE OF SINGLE COORDINATE
2045 ; INPUT: IX = POINTER TO L. O. DELTA BYTE OF VECTOR
2046 ; C = TIME BASE
2047 ; HL = LIMITS PACKET (IF USED)
2048 ; OUTPUT: NONZERO STATUS SET IF MOTION OCCURED
2049 ; (SHOULD BE SET ON CALL, SINCE IT IS NOT S
2050 ; NOTES:
2051 ; THIS ROUTINE OPERATES ON A SUBSET OF THE VECTOR PACK
2052 ; (BETWEEN L. O. DELTA BYTE AND CHECKS BYTE).
2053 ; THE DELTA IS ADDED TO THE COORDINATE TIME-BASE TIMES
2054 ; IF OPTIONED, LIMIT CHECKING IS DONE. IF THE CHECK FAI
2055 ; THE COORDINATE IS SET TO THE LIMIT.
2056 ; WHEN THIS HAPPENS, THE LIMIT ATTAINED BIT IS SET
0656 E5 2057 MVECTC: PUSH HL
0657 DD5601 2058 LD D, (IX+VBDCH) ; LOAD DELTA
065A DD5E00 2059 LD E, (IX+VBDCL)
065D DD6603 2060 LD H, (IX+VBCH) ; LOAD COORDINATE
0660 DD6E02 2061 LD L, (IX+VBCL)
0663 7C 2062 LD A, H ; SAVE OLD COORDINATE FOR MOTIO
0664 41 2063 LD B, C
0665 19 2064 MVECTA: ADD HL, DE ; ADD DELTA TO COORD
0666 10FD 2065 DJNZ MVECTB ; TIME-BASE TIMES
2066 ; IS MOTION OCCURED?
0668 BC 2067 CP H
0669 2904 2068 JR Z, MVECTA-1 ; JUMP TO SKIP TESTS IF SO
066B FDCB08B6 2069 RES PSWZRC, (IX+CBFLAG) ; SET MOVED STATUS
2070 ; LIMIT CHECK WANTED?
066F DDCB0446 2071 MVECTA: BIT VBCLMT, (IX+VBCCHK)
0673 2931 2072 JR Z, MVECTB-1 ; MVECTB IF NOT
2073 ; PERFORM LIMIT CHECK
0675 7C 2074 LD A, H
0676 E3 2075 EX (SP), H
0677 46 2076 LD B, (HL) ; LIMIT TO B
0678 23 2077 INC HL
2078 ; HANDLE SLIGHTLY LESS THAN ZERO CASE
0679 FECF 2079 CP 207 ; MIDPOINT BETWEEN 160 AND 0
067B 3007 2080 JR NC, MVECT2-1 ; JUMP TO FAIL IF >207
067D B8 2081 CP B ; DO COMPARE
067E 3804 2082 JR C, MVECT2-1 ; JUMP ON FAIL
0680 46 2083 LD B, (HL) ; UPPER LIMIT CHECK
0681 B8 2084 CP B
0682 3820 2085 JR C, MVECT3-1 ; JUMP ON PASS
0684 23 2086 MVECT2: INC HL
2087 ; A LIMIT WAS EXCEEDED - SET COORDINATE AT LIMIT
0685 DD7003 2088 LD (IX+VBCH), B
0688 DD360200 2089 LD (IX+VBCL), 0
068C DDCB04DE 2090 SET VBCLAT, (IX+VBCCHK) ; SET LIMIT ATTAINED
2091 ; IS REVERSE DELTA OPTION SET?
0690 F1 2092 POP AF ; CLEAN UP STACK
0691 DDCB044E 2093 BIT VBCREV, (IX+VBCCHK)
0695 C8 2094 RET Z ; QUIT IF NOT
2095 ; REVERSE THE BIMBO
0696 7A 2096 LD A, D
0697 2F 2097 CPL
0698 57 2098 LD D, A
0699 7B 2099 LD A, E

```

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MODCOMP Z-80	CROSS	ASSEMBLER	HOME VIDEO GAME SYSTEM	PAGE	46	
ADDR	OBJECT	STMT	LABEL	OPCD	OPERAND	COMMENT
069A	2F	2100		CPL		
069B	5F	2101		LD	E, A	
069C	13	2102		INC	DE	
069D	DD7300	2103		LD	(IX+VBDCL), E	; STORE BACK
06A0	DD7201	2104		LD	(IX+VBDCH), D	
06A3	C9	2105		RET		
06A4	23	2106	MVECT3:	INC	HL	; STEP PAST LIMIT
06A5	E3	2107		EX	(SP), HL	; HL = COORDINATE AGAIN
06A6	DD7502	2108	MVECT6:	LD	(IX+VBCL), L	; STORE BACK COORDINATES
06A9	DD7403	2109		LD	(IX+VBCH), H	
06AC	E1	2110		POP	HL	; RESTORE LIMITS POINTER
06AD	DDCB049E	2111		RES	VBCLAT, (IX+VBCCHK)	; CLEAR ATTAINED BIT
06B1	C9	2112		RET		

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2114 ; *****
2115 ; * PAINT RECTANGLE ROUTINE *
2116 ; *****
2117 ; NAME:          PAINT RECTANGLE
2118 ; INPUT:         A = COLOR MASK TO WRITE
2119 ;                B = Y SIZE
2120 ;                C = X SIZE
2121 ;                D = Y COORDINATE
2122 ;                E = X COORDINATE
06B2 AF      2123 MPAINT: XOR   A
06B3 CD4E0B 2124         CALL  RELTA1
06B6 EB      2125         EX    DE, HL
06B7 CBF4    2126         SET   6, H
06B9 D30C    2127         OUT  (MAGIC), A ; UNMAGIC THE ADDRESS
                XOR   A
06BB FD5E09 2129         LD   E, (IY+CBA)
06BE 79      2130         LD   A, C
06BF 0F      2131         RRCA
06C0 0F      2132         RRCA
06C1 E63F    2133         AND  3FH
06C3 3C      2134         INC  A
06C4 57      2135         LD   D, A
06C5 15      2136 MPT1:  DEC  D
06C6 2907    2137         JR   Z, MPT2-4
06C8 3EFF    2138         LD   A, OFFH
06CA CDE206 2139         CALL STRIPE
06CD 18F6    2140         JR   MPT1-4
06CF 79      2141 MPT2:  LD   A, C
06D0 E603    2142         AND  03H
06D2 3C      2143         INC  A
06D3 4F      2144         LD   C, A
06D4 AF      2145         XOR  A
06D5 0D      2146 MPT3:  DEC  C
06D6 2806    2147         JR   Z, MPT4-4
06D8 0F      2148         RRCA
06D9 0F      2149         RRCA
06DA C6C0    2150         ADD  A, 11000000B
06DC 18F7    2151         JR   MPT3-4
06DE CDE206 2152 MPT4:  CALL STRIPE
06E1 AF      2153         XOR  A
2154 ; AND    LL INTO ...
2155 ; STRIP PAINTER
2156 ; HL    ADDRESS OF STRIPE A = DATA B = MASK B = ITERATIONS
2157 ; OUT  L=HL+1 A = COUNTERED
06E2 E3      2158 STRIP: PUSH HL
06E3 C5      2159         PUSH BC
06E4 32FF0F 2160         LD   (WASTE), A
06E7 3AFF4F 2161         LD   A, (WASTE+4000H)
06EA 4F      2162         LD   C, A
06EB 7B      2163 STRP1: LD   A, E
06EC AE      2164         XOR  (HL)
06ED A1      2165         AND  C
06EE AE      2166         XOR  (HL)
06EF 77      2167         LD   (HL), A
06F0 7D      2168         LD   A, L
06F1 C628    2169         ADD  A, BYTEPL
  
```

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06F3	6F	2170		LD	L, A	
06F4	7C	2171		LD	A, H	
06F5	CE00	2172		ADC	A, 0	
06F7	67	2173		LD	H, A	
06F8	10F1	2174		DJNZ	STRP1-*	
06FA	C1	2175		POP	BC	
06FB	E1	2176		POP	HL	
06FC	23	2177		INC	HL	
06FD	C9	2178		RET		

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2180 ; *****
2181 ; * WRITE ROUTINES *
2182 ; *****
2183 ; NOTES: THE GENERAL CALLING SEQUENCE FOR THE WRI
2184 ; INPUT: HL = PATTERN ADDRESS
2185 ; D = Y COORDINATE
2186 ; E = X COORDINATE
2187 ; B = Y SIZE
2188 ; C = X SIZE
2189 ; A = MAGIC REGISTER
2190 ; OUTPUT: DE = SCREEN ADDRESS USED
2191 ; THESE ROUTINES ARE NESTED, FOR EXAMPLE
2192 ; WRITP, WHICH FALLS INTO WRIT, WHICH FALL
2193 ; ENTRY: WRITE FROM VECTOR
2194 ; INPUT: HL = PATTERN ADDRESS
2195 ; IX = VECTOR ADDRESS
2196 ; OUTPUT: DE, A
2197 ; SIDE EFFECTS: BLANK BIT SET IN VECTOR STATUS BYTE
06FE DD7E00 2198 MWRIT: LD A, (IX+VBMR) ; LOAD MR
0701 DD560B 2199 LD D, (IX+VBXH) ; LOAD Y
0704 DD5E06 2200 LD E, (IX+VBXH) ; LOAD X
0707 DDCB01F6 2201 SET VBBLNK, (IX+VBSTAT) ; SET BLANK BIT
2202 ; ENTRY: WRITE RELATIVE
2203 ; PURPOSE: WRITING RELATIVE PATTERNS
2204 ; INPUT: HL, DE, A
2205 ; OUTPUT: DE
2206 ; NOTES: PATTERN IS PRECEDED BY RELATIVE DISPLAC
2207 ; (X FIRST, THEN Y) AND PATTERN SIZE
070B F5 2208 MWRIT: PUSH AF ; SAVE MR
070C 7E 2209 LD A, (HL) ; GET HL X
070D 23 2210 INC HL
070E 83 2211 ADD A, E ; ADD TL SUPERIOR X
070F 5F 2212 LD E, A
0710 7E 2213 LD A, (HL) ; SAME MEMORY FOR Y
0711 23 2214 INC HL
0712 82 2215 ADD A, D
0713 57 2216 LD D, A
0714 F1 2217 POP AF
2218 ; ENTRY: WRITE WITH PATTERN SIZE SCARE-UP
2219 ; PURPOSE: WRITING VARIABLE SIZED PATTERNS
2220 ; INPUT: HL, DE, A
2221 ; OUTPUT: DE
2222 ; NOTES: FIRST TWO BYTES POINTED AT BY HL ARE TAK
2223 ; BE PATTERN SIZES (X SIZE FIRST)
0715 4E 2224 MWRIT: LD C, (HL) ; GET X SIZE
0716 23 2225 INC HL
0717 46 2226 LD B, (HL) ; AND Y
0718 23 2227 INC HL
2228 ; ENTRY: WRITE WITH COORDINATE CONVERSION
2229 ; INPUT: HL, DE, BC, A
2230 ; OUTPUT: DE
0719 CDF60A 2231 MWRIT: CALL MRELAB ; DO CONVERSION
2232 ; ENTRY: WRITE ABSOLUTE
2233 ; INPUT: HL, BC, A AS ABOVE
2234 ; DE = ABSOLUTE SCREEN ADDRESS
071C CB77 2235 MWRIT: BIT MRFLOP, A ; FLOP WRITE WANTED?
  
```

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ADDR	OBJECT	STMT	LABEL	OPCODE	OPERAND	COMMENT
071E	202C	2236		JR	NZ, MWRTFL-\$; MWRTFL IF SO
0720	CB5F	2237		BIT	MRXPND, A	; EXPAND WANTED?
0722	2011	2238		JR	NZ, MWX-\$; JUMP IF SO
		2239			; DO NORMAL? WRITE	
0724	AF	2240		XOR	A	
0725	C5	2241	MWRT:	PUSH	BC	
0726	D5	2242		PUSH	DE	
0727	47	2243		LD	B, A	; ZERO REGISTER B
0728	EDB0	2244		LDIR		; WRITE A LINE
072A	12	2245		LD	(DE), A	; CLEAR THE SHIFTER
072B	D1	2246		POP	DE	
072C	EB	2247		EX	DE, HL	; ADVANCE TO NEXT LINE
072D	0E28	2248		LD	C, BYTEPL	
072F	09	2249		ADD	HL, BC	
0730	EB	2250		EX	DE, HL	
0731	C1	2251		POP	BC	
0732	10F1	2252		DJNZ	MWRT-\$; LOOP IF MORE GOODIES
0734	C9	2253		RET		
		2254			; WRITE EXPANDED	
0735	EB	2255	MWX1	EX	DE, HL	
0736	C5	2256	MWX1	PUSH	BC	
0737	E5	2257		PUSH	HL	
0738	41	2258		LD	B, C	
0739	1A	2259	MWX2	LD	A, (DE)	
073A	13	2260		INC	DE	
073B	77	2261		LD	(HL), A	
073C	23	2262		INC	HL	
073D	77	2263		LD	(HL), A	
073E	23	2264		INC	HL	
073F	10F8	2265		DJNZ	MWX2-\$	
0741	70	2266		LD	(HL), A	
0742	23	2267		INC	HL	
0743	70	2268		LD	(HL), B	
0744	E1	2269		POP	HL	
0745	0E28	2270		LD	C, BYTEPL	
0747	09	2271		ADD	HL, BC	
0748	C1	2272		POP	BC	
0749	10EB	2273		DJNZ	MWX1	
074B	C9	2274		RET		
		2275			; ROUTINE TO HANDLE FLOPPED CAs	
074C	CB5F	2276	MWRT:	BIT	MRXPND, A	; EXPANDED FLOPPED WRITE WANTED
074E	2016	2277		JR	NZ, MWX-\$; JUMP IF YEP
0750	AF	2278		XOR	A	
0751	C5	2279	WRFL1	PUSH	BC	
0752	D5	2280		PUSH	DE	
0753	47	2281		LD	B, A	
0754	EDA0	2282	WRFL1	LDI		
0756	1B	2283		DEC	DE	
0757	1B	2284		DEC	DE	
0758	EA5407	2285		JP	PE, WRFL2	
075B	12	2286		LD	(DE), A	
075C	D1	2287		POP	DE	
075D	EB	2288		EX	DE, HL	; SAME AS NORMAL NOW ON
075E	0E28	2289		LD	C, BYTEPL	
0760	09	2290		ADD	HL, BC	
0761	EB	2291		EX	DE, HL	
0762	C1	2292		POP	BC	

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0763 10EC      2293          DJNZ WRFL1-*
0765 C9       2294          RET
                2295 ; WRITE EXPANDED FLOPPED ROUTINE
0766 EB       2296 MWXF:   EX   DE, HL
0767 C5       2297 MWXF1:  PUSH BC
0768 E5       2298          PUSH HL
0769 41       2299          LD   B, C
076A 1A       2300 MWXF2:  LD   A, (DE)
076B 13       2301          INC  DE
076C 77       2302          LD   (HL), A
076D 2B       2303          DEC  HL
076E 77       2304          LD   (HL), A
076F 2B       2305          DEC  HL
0770 10F8     2306          DJNZ MWXF2-*
0772 70       2307          LD   (HL), B
0773 2B       2308          DEC  HL
0774 70       2309          LD   (HL), B
0775 E1       2310          POP  HL
0776 0E28    2311          LD   C, BYTEPL
0778 09       2312          ADD  HL, BC
0779 C1       2313          POP  BC
077A 10EB    2314          DJNZ MWXF1-*
077C C9       2315          RET
                2316 ; NAME:          BLANK FROM VECTOR
                2317 ; PURPOSE:       BLANK WITH INFO LOAD FROM VECTOR
                2318 ; INPUT:         IX = VECTOR
                2319 ;                 E = X SIZE
                2320 ;                 D = Y SIZE
                2321 ; NOTES:        THIS ROUTINE BLANKS TO 00
                2322 ;                 THIS ROUTINE INTERROGATES THE BLANK BIT
                2323 ;                 AND REFRAINS FROM BLANKING IF NOT SET
                2324 ;                 IF IT WAS SET, IT IS THEN RESET
077D DDCB0176 2325 MVBLAN: BIT  VBBLNK (IX+VBSTAT) ; IS BLANK BIT SET?
0781 C8       2326          RET  Z          ; QUIET IF NOT
0782 DDCB01B6 2327          RES  VBBLNK (IX+VBSTAT) ; KILL BLANK BIT
0786 DD660E   2328          LD   H, (IX+BOAH) ; LOAD BLANK ADDRESS
0789 DD6E0D   2329          LD   L, (IX+BOAL)
078C DDCB0076 2330          BIT  MRFLOR (IX+VBMR) ; IS FLOP SET?
0790 2808     2331          JR   Z, MVBLA1-* ; JUMP IF NOT
0792 7B       2332          LD   A, E          ; X STATE TO A
0793 ED44     2333          NEG          ; TWO'S COMPLEMENT AND ADD 1
0795 3C       2334          INC  A
0796 4F       2335          LD   C, A
0797 06FF     2336          LD   B, OFF
0799 09       2337          ADD  HL, BC          ; USE B BACK UP SCREEN ADDRESS
                2338 ; UMMAGIC THE BLANK ADDRESS
079A         2339 MVBLA1:
079A CBF4     2340          SET  6, H
079C 0600     2341          LD   B, 0          ; ASSUME BLANK TO ZERO
                2342 ; NAME:          BLANK AREA
                2343 ; PURPOSE:       SETTING N X M REGION TO CONSTANT
                2344 ; INPUT:         HL = BLANK ADDRESS
                2345 ;                 E = X SIZE
                2346 ;                 D = Y SIZE
                2347 ;                 B = DATA TO FILL WITH
079E 3E28    2348 MBLANK: LD   A, BYTEPL ; COMPUTE LINE INCREMENT
07A0 93       2349          SUB  E
  
```

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07A1 4F      2350      LD  C, A
07A2 78      2351      LD  A, B           ; A = DATA TO FILL WITH
07A3 43      2352  MBLAN1: LD  B, E
07A4 77      2353  MBLAN2: LD  (HL), A
07A5 23      2354      INC  HL
07A6 10FC    2355      DJNZ MBLAN2-$$
07A8 09      2356      ADD  HL, BC
07A9 15      2357      DEC  D
07AA 20F7    2358      JR   NZ, MBLAN1-$$
07AC C9      2359      RET

2360      ; NAME:          RESTORE AREA
2361      ; INPUT:        HL = SCREEN ADDRESS TO RESTORE TO
2362      ;             DE = SAVE AREA ADDRESS
2363      ; NOTE:       SIZES ARE LOADED FROM THE SAVE AREA
07AD EB      2364  MREST:  EX  DE, HL
07AE 4E      2365      LD  C, (HL)
07AF 23      2366      INC  HL
07B0 46      2367      LD  B, (HL)
07B1 23      2368      INC  HL
07B2 CBF2    2369      SET  6, D           ; MAKE SURE WE ARE NONMAGIC
07B4 AF      2370      XOR  A
07B5 C5      2371  MREST1: PUSH BC
07B6 D5      2372      PUSH DE
07B7 47      2373      LD  B, A
07B8 EDB0    2374      LDIR
07BA EB      2375      EX  DE, HL
07BB E1      2376      POP  HL
07BC 0E28    2377      LD  C, BTEPL
07BE 09      2378      ADD  HL, C
07BF EB      2379      EX  DE, HL
07C0 C1      2380      POP  B
07C1 10F2    2381      DJNZ MREST1-$$
07C3 C9      2382      RET
  
```

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2384 ; *****
2385 ; * CHARACTER DISPLAY ROUTINES *
2386 ; *****
2387 ; NAME:          DISPLAY STRING
2388 ; PURPOSE:       MESSAGE DISPLAY
2389 ; INPUT:         E, D = X, Y COORDINATES
2390 ;               HL = STRING ADDRESS
2391 ;               IX = FONT DESCRIPTOR
2392 ; OUTPUT:        D, E ALTERED AS IN DISPLAY CHARACTER
2393 ; STACK USE:     4 BYTES (EXCLUDING USE BY SYSPCH)
2394 ; EXPLANATION:  AS EACH CHARACTER IS BROUGHT IN, IT
2395 ; IS TESTED FOR BEING A LIST TERMINATOR ( CHAR = 0)
2396 ; IF IT ISN'T, DISPLAY CHARACTER IS CALLED AND THE
2397 ; TEST IS REPEATED FOR THE NEXT CHARACTER.  THUS
2398 ; A NULL STRING IS HANDLED PROPERLY.
07C4 7E 2399 STRNEW: LD  A, (HL) ; GET CHARACTER
07C5 A7 2400 AND  A ; BE IT A TERMINATOR?
07C6 C3 2401 RET  Z ; QUIT IF SO
07C7 FACE07 2402 JP  M, STRD1 ; DISPLAY IF ALT FONT
07CA FE64 2403 CP  64H ; SUCK IN STRING?
07CC 3006 2404 JR  NC, STRD2-# ; JUMP IF YES
07CE CDE107 2405 STRD1: CALL DISPCH ; SHOW CHAR
07D1 23 2406 INC  HL ; ADVANCE TO NEXT CHAR
07D2 18F0 2407 JR  STRNEW-# ; AND LOOP
07D4 E617 2408 STRD2: AND 10111B ; MAKE SUCK MASK
07D6 47 2409 LD  B, A
07D7 23 2410 INC  HL
07D8 EB 2411 EX  DE, HL
07D9 CDA800 2412 CALL MSUCK
07DC CD6800 2413 CALL RELD
07DF 18E3 2414 JR  STRNEW-# ; GO AFTER NEXT CHARACTER
2415 ; *****
2416 ; * CHARACTER DISPLAY ROUTINE *
2417 ; *****
2418 ; INPUT:         A CHARACTER
2419 ;               C OPTIONS
2420 ;               D Y COORDINATE
2421 ;               E X COORDINATE
2422 ;               IX FONT DESCRIPTOR
2423 ; (ONLY IF ALTERNATE FONT USED)
2424 ; OUTPUT:        DE UPDATED TO POINT AT NEXT CHARACTER FROM
2425 ; NOTES:         THE OPTION BYTE IS FORMATTED AS FOLLOWS:
2426 ;               BITS  CONTENTS
2427 ;               ----  -----
2428 ;               0-1   OFF COLOR FOR EXPANSION
2429 ;               2-3   ON COLOR FOR EXPANSION
2430 ;               4     OR OPTION
2431 ;               5     XOR OPTION
2432 ;               6-7   ENLARGEMENT FACTOR (N+1)X
2433 ;
2434 ; CHARACTERS BETWEEN 1 AND 1FH, AND BETWEEN 91H AND 9FH
2435 ; ARE INTERPRETED AS TAB CHARACTERS.  THEY CAUSE THE
2436 ; CURSOR REPRESENTED BY D AND E TO BE SPACED OVER N
2437 ; CHARACTER POSITIONS, WHERE N = CHAR. AND. 7FH
2438 ; CHARACTERS BETWEEN 20H AND 7FH ARE TAKEN AS REFERENCES
2439 ; THE SYSTEM STANDARD 5 X 7 CHARACTER FONT.  CHARACTERS
  
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2440 ; BETWEEN OAOH AND OFFH REFER TO THE USER SUPPLIED ALTERN
2441 ; CHARACTER FONT. THIS FONT IS DESCRIBED BY A FONT
2442 ; DESCRIPTOR TABLE OF THE FOLLOWING FORMAT:
2443 ; *****
2444 ; * 0 * BASE CHARACTER VALUE *
2445 ; *****
2446 ; * 1 * X FRAME SIZE *
2447 ; *****
2448 ; * 2 * Y FRAME SIZE *
2449 ; *****
2450 ; * 3 * X PATTERN SIZE (BYTES) *
2451 ; *****
2452 ; * 4 * Y PATTERN SIZE *
2453 ; *****
2454 ; * 5 * PATTERN TABLE *
2455 ; * 6 * ADDRESS *
2456 ; *****
07E1 C5 2457 DISCH1: PUSH BC
07E2 E5 2458 PUSH HL
07E3 DDE5 2459 PUSH IX
07E5 A7 2460 AND A
07E6 FAED07 2461 JP M,DISCH1 ; JUMP IF YES
07E9 DD210602 2462 LD IX,SP
07ED FE20 2463 DISCH1: CP 20H ; IS CHAR < 20H?
07EF 300D 2464 JR NC,DISCH1B-$ ; JUMP IF NOT
07F1 F5 2465 DISCH1A: PUSH AF ; LOAD TO SPACE OVER
07F2 CD4E08 2466 CALL NXTFRM
07F5 CDF40C 2467 CALL FINDL ; STORE IT BACK
07F8 F1 2468 POP AF
07F9 3D 2469 DEC A
07FA 20F5 2470 JR NZ,DISCH1A-$
07FC 183B 2471 JR DISCH1-$ ; JUMP TO EXIT
07FE DD9600 2472 DISCH1B: SUB (IX+FTBASE) ; SUBTRACT BASE CHAR
0801 5F 2473 LD E,A
0802 1600 2474 LD D,0
0804 210000 2475 LD HL,0
0807 DD4E03 2476 LD C,(IX+FTBYTE) ; MULTIPLY CHARACTER
080A DD4604 2477 DISCH2: LD B,(IX+FTYSIZ) ; BY PATTERN SIZE
080D 19 2478 DISCH2: ADD HL,DE
080E 10FD 2479 DJNZ DISCH3-$
0810 0D 2480 DEC C
0811 20F7 2481 JR NZ,DISCH2-$
0813 DD5606 2482 LD D,(IX+FTPTH) ; ADD TO TABLE START
0816 DD5E05 2483 LD E,(IX+FTPTL)
0819 19 2484 ADD HL,DE
2485 ; COMPUTE POSITION WHERE NEXT CHARACTER WOULD GO
2486 ; AND SAVE
081A CD4E08 2487 CALL NXTFRM ; STEP COORDINATES TO NEXT FRAM
081D D5 2488 PUSH DE ; SAVE
081E DD4604 2489 LD B,(IX+FTYSIZ)
0821 C5 2490 DISCH4: PUSH BC
0822 E5 2491 PUSH HL
0823 CD6C08 2492 CALL WRTLIN
0826 E1 2493 POP HL
0827 DD4E03 2494 LD C,(IX+FTBYTE) ; STEP TO NEXT LINE OF PATTERN
082A 09 2495 ADD HL,BC
082B C1 2496 POP BC
  
```

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082C FD7E05 2497 LD A, (IY+ CBD) ; ADVANCE Y COORDINATE
082F 81 2498 ADD A, C
0830 FD7705 2499 LD (IY+ CBD), A
0833 10EC 2500 DJNZ DISCH4-#
0835 D1 2501 POP DE ; RESTORE NEW POSITION
0836 CDF40C 2502 CALL FINDL3 ; STUFF DE BACK INTO CONTEXT
0839 DDE1 2503 DISCH5: POP IX
083B E1 2504 POP HL
083C C1 2505 POP BC
083D C9 2506 RET
2507 ; SUBROUTINE TO CONVERT ENLARGEMENT FACTOR TO ITERATION C
2508 ; INPUT: MODE BYTE FROM CONTEXT SAVE AREA
2509 ; OUTPUT: B, A = ITERATION COUNT
083E FD7E06 2510 DCLCTB: LD A, (IY+ CBC) ; GET MODE BYTE
0841 07 2511 RLCA
0842 07 2512 RLCA
0843 E603 2513 AND 03 ; ISOLATE ENLARGEMENT FACTOR
0845 3C 2514 INC A
0846 47 2515 LD B, A
0847 AF 2516 XOR A
0848 37 2517 SCF
0849 9F 2518 DCLCTC: ADC A, A
084A 10FD 2519 DJNZ DCLCTB-#
084C 47 2520 LD B, A
084D C9 2521 RET
2522 ; SUBROUTINE TO UPDATE COORDINATES TO POINT AT NEXT CHARA
2523 ; FRAME:
2524 ; INPUT: COORDINATES TAKEN FROM CBD, CBE IN CONTEXT
2525 ; OUTPUT: UPDATED COORDINATES RETURNED IN D AND E
2526 ; C = CLOBBERED C = ENLARGE FACTOR CONVERT
084E CD3E08 2527 NXTFRM: CALL DCLCTB ; GET ITERATION COUNT
0851 48 2528 LD C, B ; SAVE
0852 FD5605 2529 LD D, (IY+ CBD) ; GET X COORD
0855 FD7E04 2530 LD A, (IY+ CBE) ; GET Y COORD
0858 DD8601 2531 NXTFRM: ADD A, (IX+ TFSX) ; ADD X FRAME SIZE
085B 10FB 2532 DJNZ NXTFRM-# ; 2**ENLARGE TIMES
085D FEA0 2533 CP 160 ; PASS RIGHT EDGE OF SCREEN?
085F 3809 2534 JR C, NXTFRM-#
0861 7A 2535 LD A, D
0862 41 2536 LD B, C
0863 DD8602 2537 NXTFRM: ADD A, (IX+ TFSY) ; YEP - ADVANCE VERTICAL
0866 10FB 2538 DJNZ NXTFRM-#
0868 57 2539 LD D, A
0869 AF 2540 XOR A
086A 5F 2541 NXTFRM: LD E, A
086B C9 2542 RET
2543 ; SUBROUTINE TO WRITE ONE LINE OF A PATTERN WITH ENLARGE
2544 ; AND EXPAND
2545 ; ENTRY: HL = SOURCE IX = FONT TABLE
086C DD4E03 2546 WRTLIN: LD C, (IX+ FTBYTE)
086F 0600 2547 LD B, 0
0871 DDE5 2548 PUSH IX ; CAPTURE STACK POINTER
0873 DD210000 2549 LD IX, 0
0877 DD39 2550 ADD IX, SP
0879 DDE5 2551 PUSH IX ; SAVE CAPTURED STACK
087B D1 2552 POP DE ; DE = CAPTURED STACK
087C 3E0C 2553 LD A, 0CH ; SET EXPAND TO 00, 11
  
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ADDR	OBJECT	STMT	LABEL	OPCODE	OPERAND	COMMENT
087E	D319	2554		OUT	(XPAND), A	
0880	3E08	2555		LD	A, 08H	; SET EXPAND BIT
0882	D30C	2556		OUT	(MAGIC), A	
0884	FD7E06	2557		LD	A, (IY+CBC)	; GET CONTROL BYTE
0887	E6C0	2558		AND	0C0H	; ISOLATE ENLARGE AMOUNT
0889	2821	2559		JR	Z, WRTL3-\$; JUMP IF ZERO
088B	07	2560		RLCA		
088C	07	2561		RLCA		
088D	EB	2562	WRTL1:	EX	DE, HL	
088E	A7	2563		AND	A	; CLEAR CARRY BIT
088F	ED42	2564		SBC	HL, BC	; COMPUTE STACK FRAME SIZE
0891	ED42	2565		SBC	HL, BC	
0893	F9	2566		LD	SP, HL	; SEIZE STACK SPACE
0894	CBB4	2567		RES	6, H	; MAGICIFY THE ADDRESS
0896	F5	2568		PUSH	AF	
0897	41	2569		LD	B, C	
0898	1A	2570	WRTL2:	LD	A, (DE)	; GET SOURCE BYTE
0899	13	2571		INC	DE	
089A	77	2572		LD	(HL), A	; EXPAND IT
089B	23	2573		INC	HL	
089C	77	2574		LD	(HL), A	
089D	23	2575		INC	HL	
089E	10F8	2576		DJNZ	WRTL3-\$	
08A0	CB21	2577		SLA	C	
08A2	F1	2578		POP	AF	
08A3	210000	2579		LD	HL, 0	; CAPTURE STACK TOP AGAIN
08A6	39	2580		ADD	HL, SP	
08A7	54	2581		LD	D, H	; SET DE=HL
08A8	5D	2582		LD	E, L	; FOR NEXT DEST COMBO
08A9	3D	2583		DEC	A	
08AA	20E1	2584		JR	NZ, WRTL1-\$	
		2585				; NOW DO WRITE TO SCREEN
08AC	CD3E08	2586	WRTL3:	CALL	DCLCTB	; GET ITERATION COUNTER
08AF	CD7400	2587		CALL	DELOD	
08B2	FD7E06	2588		LD	A, (IY+CBC)	
08B5	D319	2589		OUT	(XPAND), A	
08B7	E630	2590		AND	030H	
08B9	F608	2591		OR	8	
08BB	CD080B	2592		CALL	RELTA	
08BE	EB	2593		EX	DE, HL	
08BF	F5	2594	WRTL4:	PUSH	AF	
08C0	C5	2595		PUSH	BC	
08C1	D5	2596		PUSH	DE	
08C2	E5	2597		PUSH	HL	
08C3	41	2598		LD	B, C	
08C4	1A	2599	WRTL5:	LD	A, (DE)	
08C5	13	2600		INC	DE	
08C6	77	2601		LD	(HL), A	
08C7	23	2602		INC	HL	
08C8	77	2603		LD	(HL), A	
08C9	23	2604		INC	HL	
08CA	10F8	2605		DJNZ	WRTL5-\$	
08CC	FD7E04	2606		LD	A, (IY+CBE)	
08CF	E603	2607		AND	03	
08D1	2801	2608		JR	Z, WRTL6-\$	
08D3	70	2609		LD	(HL), B	
08D4	E1	2610	WRTL6:	POP	HL	; STEP TO NEXT LINE

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08D5 0E28      2611      LD      C, BYTEPL
08D7 09        2612      ADD     HL, BC
08D8 D1        2613      POP     DE
08D9 C1        2614      POP     BC
08DA F1        2615      POP     AF
08DB D30C     2616      OUT    (MAGIC), A
08DD 10E0     2617      DJNZ   WRTL4-*
08DF DDF?     2618      LD      SP, IX      ; RESTORE STACK
08E1 DDE1     2619      POP     IX
08E3 C9        2620      RET
  
```

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2622      ; MACRO TO GENERATE CHARACTER PATTERN TABLE ENTRY
2623 DEFCHR MACR #A, #B, #C, #D, #E, #F, #G
2624      DEFB #A
2625      DEFB #B
2626      DEFB #C
2627      DEFB #D
2628      DEFB #E
2629      DEFB #F
2630      DEFB #G
2631      ENDM
  
```

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2633      ; LARGE CHARACTER SET (8 X 8)
  
```

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08E4      2634      LRG     DEFCHR 000H, 000H, 000H, 000H, 000H, 000H, 000H ; SPACE
08E4 00    2635 +    DEFB 000H
08E5 00    2635 +    DEFB 000H
08E6 00    2635 +    DEFB 000H
08E7 00    2635 +    DEFB 000H
08E8 00    2635 +    DEFB 000H
08E9 00    2635 +    DEFB 000H
08EA 00    2635 +    DEFB 000H
08EB      2636      DEFCHR 020H, 020H, 020H, 020H, 020H, 000H, 020H ; !
08EB 20    2636 +    DEFB 020H
08EC 20    2636 +    DEFB 020H
08ED 20    2636 +    DEFB 020H
08EE 20    2636 +    DEFB 020H
08EF 20    2636 +    DEFB 020H
08F0 00    2636 +    DEFB 000H
08F1 20    2636 +    DEFB 020H
08F2      2637      DEFCHR 050H, 050H, 050H, 000H, 000H, 000H, 000H ; "
08F2 50    2637 +    DEFB 050H
08F3 50    2637 +    DEFB 050H
08F4 50    2637 +    DEFB 050H
08F5 00    2637 +    DEFB 000H
08F6 00    2637 +    DEFB 000H
08F7 00    2637 +    DEFB 000H
08F8 00    2637 +    DEFB 000H
08F9      2638      DEFCHR 048H, 048H, 0FCH, 048H, 0FCH, 048H, 048H ; #
08F9 48    2638 +    DEFB 048H
08FA 48    2638 +    DEFB 048H
08FB FC    2638 +    DEFB 0FCH
08FC 48    2638 +    DEFB 048H
  
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08FD	FC	2638	+	DEFB	0FCH	
08FE	48	2638	+	DEFB	048H	
08FF	48	2638	+	DEFB	048H	
0900		2639		DEFCHR	020H, 078H, 080H, 070H, 008H, 0F0H, 020H ; \$	
0900	20	2639	+	DEFB	020H	
0901	78	2639	+	DEFB	078H	
0902	80	2639	+	DEFB	080H	
0903	70	2639	+	DEFB	070H	
0904	08	2639	+	DEFB	008H	
0905	F0	2639	+	DEFB	0F0H	
0906	20	2639	+	DEFB	020H	
0907		2640		DEFCHR	0C0H, 0C8H, 010H, 020H, 040H, 098H, 018H ; %	
0907	C0	2640	+	DEFB	0C0H	
0908	C8	2640	+	DEFB	0C8H	
0909	10	2640	+	DEFB	010H	
090A	20	2640	+	DEFB	020H	
090B	40	2640	+	DEFB	040H	
090C	98	2640	+	DEFB	098H	
090D	18	2640	+	DEFB	018H	
090E		2641		DEFCHR	060H, 090H, 0A0H, 040H, 0A8H, 090H, 068H ; &	
090E	60	2641	+	DEFB	060H	
090F	90	2641	+	DEFB	090H	
0910	A0	2641	+	DEFB	0A0H	
0911	40	2641	+	DEFB	040H	
0912	A8	2641	+	DEFB	0A8H	
0913	90	2641	+	DEFB	090H	
0914	68	2641	+	DEFB	068H	
0915		2642		DEFCHR	060H, 060H, 060H, 000H, 000H, 000H ;	
0915	60	2642	+	DEFB	060H	
0916	60	2642	+	DEFB	060H	
0917	60	2642	+	DEFB	060H	
0918	00	2642	+	DEFB	000H	
0919	00	2642	+	DEFB	000H	
091A	00	2642	+	DEFB	000H	
091B	00	2642	+	DEFB	000H	
091C		2643		DEFCHR	010H, 020H, 020H, 020H, 020H, 010H ; (
091C	10	2643	+	DEFB	010H	
091D	20	2643	+	DEFB	020H	
091E	20	2643	+	DEFB	020H	
091F	20	2643	+	DEFB	020H	
0920	20	2643	+	DEFB	020H	
0921	20	2643	+	DEFB	020H	
0922	10	2643	+	DEFB	010H	
0923		2644		DEFCHR	040H, 020H, 020H, 020H, 020H, 040H ;)	
0923	40	2644	+	DEFB	040H	
0924	20	2644	+	DEFB	020H	
0925	20	2644	+	DEFB	020H	
0926	20	2644	+	DEFB	020H	
0927	20	2644	+	DEFB	020H	
0928	20	2644	+	DEFB	020H	
0929	40	2644	+	DEFB	040H	
092A		2645		DEFCHR	000H, 0A8H, 070H, 0D8H, 070H, 0A8H, 000H ; *	
092A	00	2645	+	DEFB	000H	
092B	A8	2645	+	DEFB	0A8H	
092C	70	2645	+	DEFB	070H	
092D	D8	2645	+	DEFB	0D8H	
092E	70	2645	+	DEFB	070H	

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ADDR	OBJECT	STMT	LABEL	OPCD	OPERAND	COMMENT
092F	A8	2645	+	DEFB	0A8H	
0930	00	2645	+	DEFB	000H	
0931		2646		DEFCHR	000H, 020H, 020H, 0F8H, 020H, 020H, 000H ;	+
0931	00	2646	+	DEFB	000H	
0932	20	2646	+	DEFB	020H	
0933	20	2646	+	DEFB	020H	
0934	F8	2646	+	DEFB	0F8H	
0935	20	2646	+	DEFB	020H	
0936	20	2646	+	DEFB	020H	
0937	00	2646	+	DEFB	000H	
0938		2647		DEFCHR	000H, 000H, 000H, 060H, 060H, 020H, 040H ;	,
0938	00	2647	+	DEFB	000H	
0939	00	2647	+	DEFB	000H	
093A	00	2647	+	DEFB	000H	
093B	60	2647	+	DEFB	060H	
093C	60	2647	+	DEFB	060H	
093D	20	2647	+	DEFB	020H	
093E	40	2647	+	DEFB	040H	
093F		2648		DEFCHR	000H, 000H, 000H, 0F8H, 000H, 000H, 000H ;	-
093F	00	2648	+	DEFB	000H	
0940	00	2648	+	DEFB	000H	
0941	00	2648	+	DEFB	000H	
0942	F8	2648	+	DEFB	0F8H	
0943	00	2648	+	DEFB	000H	
0944	00	2648	+	DEFB	000H	
0945	00	2648	+	DEFB	000H	
0946		2649		DEFCHR	000H, 000H, 000H, 000H, 060H, 060H ;	
0946	00	2649	+	DEFB	000H	
0947	00	2649	+	DEFB	000H	
0948	00	2649	+	DEFB	000H	
0949	00	2649	+	DEFB	000H	
094A	00	2649	+	DEFB	000H	
094B	60	2649	+	DEFB	060H	
094C	60	2649	+	DEFB	060H	
094D		2650		DEFCHR	000H, 008H, 010H, 020H, 040H, 080H, 000H ;	
094D	00	2650	+	DEFB	000H	
094E	08	2650	+	DEFB	008H	
094F	10	2650	+	DEFB	010H	
0950	20	2650	+	DEFB	020H	
0951	40	2650	+	DEFB	040H	
0952	80	2650	+	DEFB	080H	
0953	00	2650	+	DEFB	000H	
0954		2651		DEFCHR	070H, 088H, 088H, 088H, 088H, 088H, 070H ;	0
0954	70	2651	+	DEFB	070H	
0955	88	2651	+	DEFB	088H	
0956	88	2651	+	DEFB	088H	
0957	88	2651	+	DEFB	088H	
0958	88	2651	+	DEFB	088H	
0959	88	2651	+	DEFB	088H	
095A	70	2651	+	DEFB	070H	
095B		2652		DEFCHR	020H, 060H, 020H, 020H, 020H, 020H, 070H ;	1
095B	20	2652	+	DEFB	020H	
095C	60	2652	+	DEFB	060H	
095D	20	2652	+	DEFB	020H	
095E	20	2652	+	DEFB	020H	
095F	20	2652	+	DEFB	020H	
0960	20	2652	+	DEFB	020H	

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0961	70	2652	+	DEFB	070H	
0962		2653		DEFCHR	070H, 088H, 008H, 070H, 080H, 030H, 0F8H ;	2
0962	70	2653	+	DEFB	070H	
0963	88	2653	+	DEFB	088H	
0964	08	2653	+	DEFB	008H	
0965	70	2653	+	DEFB	070H	
0966	80	2653	+	DEFB	080H	
0967	80	2653	+	DEFB	080H	
0968	F8	2653	+	DEFB	0F8H	
0969		2654		DEFCHR	070H, 088H, 008H, 030H, 008H, 088H, 070H ;	3
0969	70	2654	+	DEFB	070H	
096A	88	2654	+	DEFB	088H	
096B	08	2654	+	DEFB	008H	
096C	30	2654	+	DEFB	030H	
096D	08	2654	+	DEFB	008H	
096E	88	2654	+	DEFB	088H	
096F	70	2654	+	DEFB	070H	
0970		2655		DEFCHR	010H, 030H, 050H, 090H, 0F8H, 010H, 010H ;	4
0970	10	2655	+	DEFB	010H	
0971	30	2655	+	DEFB	030H	
0972	50	2655	+	DEFB	050H	
0973	90	2655	+	DEFB	090H	
0974	F8	2655	+	DEFB	0F8H	
0975	10	2655	+	DEFB	010H	
0976	10	2655	+	DEFB	010H	
0977		2656		DEFCHR	0F8H, 080H, 0F0H, 088H, 008H, 088H, 070H ;	5
0977	F8	2656	+	DEFB	0F8H	
0978	80	2656	+	DEFB	080H	
0979	F0	2656	+	DEFB	0F0H	
097A	08	2656	+	DEFB	008H	
097B	08	2656	+	DEFB	008H	
097C	88	2656	+	DEFB	088H	
097D	70	2656	+	DEFB	070H	
097E		2657		DEFCHR	030H, 040H, 080H, 0F8H, 088H, 088H, 070H ;	6
097E	30	2657	+	DEFB	030H	
097F	40	2657	+	DEFB	040H	
0980	80	2657	+	DEFB	080H	
0981	F0	2657	+	DEFB	0F0H	
0982	88	2657	+	DEFB	088H	
0983	88	2657	+	DEFB	088H	
0984	70	2657	+	DEFB	070H	
0985		2658		DEFCHR	0F8H, 008H, 010H, 020H, 040H, 040H, 040H ;	7
0985	F8	2658	+	DEFB	0F8H	
0986	08	2658	+	DEFB	008H	
0987	10	2658	+	DEFB	010H	
0988	20	2658	+	DEFB	020H	
0989	40	2658	+	DEFB	040H	
098A	40	2658	+	DEFB	040H	
098B	40	2658	+	DEFB	040H	
098C		2659		DEFCHR	070H, 088H, 088H, 070H, 088H, 088H, 070H ;	8
098C	70	2659	+	DEFB	070H	
098D	88	2659	+	DEFB	088H	
098E	88	2659	+	DEFB	088H	
098F	70	2659	+	DEFB	070H	
0990	88	2659	+	DEFB	088H	
0991	88	2659	+	DEFB	088H	
0992	70	2659	+	DEFB	070H	

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ADDR	OBJECT	STMT	LABEL	OPCD	OPERAND	COMMENT
0993		2660		DEFCHR	070H, 088H, 088H, 079H, 008H, 010H, 060H ;	9
0993	70	2660	+	DEFB	070H	
0994	88	2660	+	DEFB	088H	
0995	88	2660	+	DEFB	088H	
0996	78	2660	+	DEFB	078H	
0997	08	2660	+	DEFB	008H	
0998	10	2660	+	DEFB	010H	
0999	60	2660	+	DEFB	060H	
099A		2661		DEFCHR	000H, 060H, 060H, 000H, 060H, 060H, 000H ;	:
099A	00	2661	+	DEFB	000H	
099B	60	2661	+	DEFB	060H	
099C	60	2661	+	DEFB	060H	
099D	00	2661	+	DEFB	000H	
099E	60	2661	+	DEFB	060H	
099F	60	2661	+	DEFB	060H	
09A0	00	2661	+	DEFB	000H	
09A1		2662		DEFCHR	060H, 060H, 000H, 060H, 060H, 020H, 040H ;	:
09A1	60	2662	+	DEFB	060H	
09A2	60	2662	+	DEFB	060H	
09A3	00	2662	+	DEFB	000H	
09A4	60	2662	+	DEFB	060H	
09A5	60	2662	+	DEFB	060H	
09A6	20	2662	+	DEFB	020H	
09A7	40	2662	+	DEFB	040H	
09A8		2663		DEFCHR	010H, 020H, 040H, 080H, 040H, 020H, 010H ;	<
09A8	10	2663	+	DEFB	010H	
09A9	20	2663	+	DEFB	020H	
09AA	40	2663	+	DEFB	040H	
09AB	80	2663	+	DEFB	080H	
09AC	40	2663	+	DEFB	040H	
09AD	20	2663	+	DEFB	020H	
09AE	10	2663	+	DEFB	010H	
09AF		2664		DEFCHR	000H, 000H, 0F8H, 000H, 0F8H, 000H, 000H ;	=
09AF	00	2664	+	DEFB	000H	
09B0	00	2664	+	DEFB	000H	
09B1	F8	2664	+	DEFB	0F8H	
09B2	00	2664	+	DEFB	000H	
09B3	F8	2664	+	DEFB	0F8H	
09B4	00	2664	+	DEFB	000H	
09B5	00	2664	+	DEFB	000H	
09B6		2665		DEFCHR	040H, 020H, 010H, 000H, 010H, 020H, 040H ;	>
09B6	40	2665	+	DEFB	040H	
09B7	20	2665	+	DEFB	020H	
09B8	10	2665	+	DEFB	010H	
09B9	08	2665	+	DEFB	008H	
09BA	10	2665	+	DEFB	010H	
09BB	20	2665	+	DEFB	020H	
09BC	40	2665	+	DEFB	040H	
09BD		2666		DEFCHR	070H, 088H, 008H, 010H, 020H, 000H, 020H ;	?
09BD	70	2666	+	DEFB	070H	
09BE	88	2666	+	DEFB	088H	
09BF	08	2666	+	DEFB	008H	
09C0	10	2666	+	DEFB	010H	
09C1	20	2666	+	DEFB	020H	
09C2	00	2666	+	DEFB	000H	
09C3	20	2666	+	DEFB	020H	
09C4		2667		DEFCHR	070H, 088H, 088H, 0A8H, 0B8H, 080H, 079H ;	@

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ADDR	OBJECT	STMT	LABEL	OPCD	OPERAND	COMMENT
09C4	70	2667	+	DEFB	070H	
09C5	88	2667	+	DEFB	088H	
09C6	B8	2667	+	DEFB	0B8H	
09C7	A8	2667	+	DEFB	0A8H	
09C8	B8	2667	+	DEFB	0B8H	
09C9	80	2667	+	DEFB	080H	
09CA	78	2667	+	DEFB	078H	
09CB		2668		DEFCHR	070H, 088H, 088H, 0F8H, 088H, 088H, 088H ;	A
09CE	70	2668	+	DEFB	070H	
09CC	88	2668	+	DEFB	088H	
09CD	88	2668	+	DEFB	088H	
09CE	F8	2668	+	DEFB	0F8H	
09CF	88	2668	+	DEFB	088H	
09D0	88	2668	+	DEFB	088H	
09D1	88	2668	+	DEFB	088H	
09D2		2669		DEFCHR	0F0H, 088H, 088H, 0F0H, 088H, 088H, 0F0H ;	B
09D2	F0	2669	+	DEFB	0F0H	
09D3	88	2669	+	DEFB	088H	
09D4	88	2669	+	DEFB	088H	
09D5	F0	2669	+	DEFB	0F0H	
09D6	88	2669	+	DEFB	088H	
09D7	88	2669	+	DEFB	088H	
09D8	F0	2669	+	DEFB	0F0H	
09D9		2670		DEFCHR	070H, 088H, 080H, 080H, 080H, 088H, 070H ;	C
09D9	70	2670	+	DEFB	070H	
09DA	88	2670	+	DEFB	088H	
09DB	80	2670	+	DEFB	080H	
09DC	80	2670	+	DEFB	080H	
09DD	80	2670	+	DEFB	080H	
09DE	88	2670	+	DEFB	088H	
09DF	70	2670	+	DEFB	070H	
09E0		2671		DEFCHR	0F0H, 088H, 088H, 088H, 088H, 088H, 0F0H ;	D
09E0	F0	2671	+	DEFB	0F0H	
09E1	88	2671	+	DEFB	088H	
09E2	88	2671	+	DEFB	088H	
09E3	88	2671	+	DEFB	088H	
09E4	88	2671	+	DEFB	088H	
09E5	88	2671	+	DEFB	088H	
09E6	F0	2671	+	DEFB	0F0H	
09E7		2672		DEFCHR	0F8H, 080H, 080H, 0E0H, 080H, 080H, 0F8H ;	E
09E7	F8	2672	+	DEFB	0F8H	
09E8	80	2672	+	DEFB	080H	
09E9	80	2672	+	DEFB	080H	
09EA	E0	2672	+	DEFB	0E0H	
09EB	80	2672	+	DEFB	080H	
09EC	80	2672	+	DEFB	080H	
09ED	F8	2672	+	DEFB	0F8H	
09EE		2673		DEFCHR	0F8H, 080H, 080H, 0E0H, 080H, 080H, 080H ;	F
09EE	F8	2673	+	DEFB	0F8H	
09EF	80	2673	+	DEFB	080H	
09F0	80	2673	+	DEFB	080H	
09F1	E0	2673	+	DEFB	0E0H	
09F2	80	2673	+	DEFB	080H	
09F3	80	2673	+	DEFB	080H	
09F4	80	2673	+	DEFB	080H	
09F5		2674		DEFCHR	070H, 088H, 080H, 080H, 098H, 088H, 078H ;	G
09F5	70	2674	+	DEFB	070H	

PROPRIETARY INFORMATION

Dave Nutting Associates, Inc.

DO NOT REPRODUCE

ADDR	OBJECT	STMT	LABEL	OPCODE	OPERAND	COMMENT
09F6	88	2674	+	DEFB	088H	
09F7	80	2674	+	DEFB	080H	
09F8	80	2674	+	DEFB	080H	
09F9	98	2674	+	DEFB	098H	
09FA	88	2674	+	DEFB	088H	
09FB	78	2674	+	DEFB	078H	
09FC		2675		DEFCHR	088H, 088H, 088H, 0F8H, 088H, 088H, 088H ;	H
09FD	88	2675	+	DEFB	088H	
09FE	88	2675	+	DEFB	088H	
09FF	F8	2675	+	DEFB	0F8H	
0A00	88	2675	+	DEFB	088H	
0A01	88	2675	+	DEFB	088H	
0A02	88	2675	+	DEFB	088H	
0A03		2676		DEFCHR	070H, 020H, 020H, 020H, 020H, 020H, 070H ;	I
0A03	70	2676	+	DEFB	070H	
0A04	20	2676	+	DEFB	020H	
0A05	20	2676	+	DEFB	020H	
0A06	20	2676	+	DEFB	020H	
0A07	20	2676	+	DEFB	020H	
0A08	20	2676	+	DEFB	020H	
0A09	70	2676	+	DEFB	070H	
0A0A		2677		DEFCHR	008H, 008H, 008H, 008H, 088H, 070H ;	J
0A0A	08	2677	+	DEFB	008H	
0A0B	08	2677	+	DEFB	008H	
0A0C	08	2677	+	DEFB	008H	
0A0D	08	2677	+	DEFB	008H	
0A0E	08	2677	+	DEFB	008H	
0A0F	88	2677	+	DEFB	088H	
0A10	70	2677	+	DEFB	070H	
0A11		2678		DEFCHR	088H, 090H, 0A0H, 018H, 0A0H, 090H, 088H ;	K
0A11	88	2678	+	DEFB	088H	
0A12	90	2678	+	DEFB	090H	
0A13	A0	2678	+	DEFB	0A0H	
0A14	C0	2678	+	DEFB	0C0H	
0A15	A0	2678	+	DEFB	0A0H	
0A16	90	2678	+	DEFB	090H	
0A17	88	2678	+	DEFB	088H	
0A18		2679		DEFCHR	080H, 080H, 080H, 080H, 080H, 080H, 0F8H ;	L
0A18	80	2679	+	DEFB	080H	
0A19	80	2679	+	DEFB	080H	
0A1A	80	2679	+	DEFB	080H	
0A1B	80	2679	+	DEFB	080H	
0A1C	80	2679	+	DEFB	080H	
0A1D	80	2679	+	DEFB	080H	
0A1E	F8	2679	+	DEFB	0F8H	
0A1F		2680		DEFCHR	088H, 0D8H, 0A8H, 0A8H, 088H, 088H, 088H ;	M
0A1F	88	2680	+	DEFB	088H	
0A20	D8	2680	+	DEFB	0D8H	
0A21	A8	2680	+	DEFB	0A8H	
0A22	A8	2680	+	DEFB	0A8H	
0A23	88	2680	+	DEFB	088H	
0A24	88	2680	+	DEFB	088H	
0A25	88	2680	+	DEFB	088H	
0A26		2681		DEFCHR	088H, 0C8H, 0A8H, 098H, 088H, 088H, 088H ;	N
0A26	88	2681	+	DEFB	088H	
0A27	C8	2681	+	DEFB	0C8H	

PROPRIETARY INFORMATION

Dave Nutting Associates, Inc

DO NOT REPRODUCE

ADDR	OBJECT	STMT	LABEL	OPCODE	OPERAND	COMMENT
0A28	A8	2681	+	DEFB	0A8H	
0A29	98	2681	+	DEFB	098H	
0A2A	88	2681	+	DEFB	088H	
0A2B	88	2681	+	DEFB	088H	
0A2C	88	2681	+	DEFB	088H	
0A2D		2682		DEFCHR	0F8H, 0E8H, 0D8H, 0C8H, 0B8H, 0A8H, 0F8H ; 0	
0A2D	F8	2682	+	DEFB	0F8H	
0A2E	88	2682	+	DEFB	088H	
0A2F	88	2682	+	DEFB	088H	
0A30	88	2682	+	DEFB	088H	
0A31	88	2682	+	DEFB	088H	
0A32	88	2682	+	DEFB	088H	
0A33	F8	2682	+	DEFB	0F8H	
0A34		2683		DEFCHR	0F0H, 0E8H, 0D8H, 0F0H, 0E0H, 0D0H, 0E0H ; P	
0A34	F0	2683	+	DEFB	0F0H	
0A35	88	2683	+	DEFB	088H	
0A36	88	2683	+	DEFB	088H	
0A37	F0	2683	+	DEFB	0F0H	
0A38	80	2683	+	DEFB	080H	
0A39	80	2683	+	DEFB	080H	
0A3A	80	2683	+	DEFB	080H	
0A3B		2684		DEFCHR	070H, 068H, 058H, 068H, 0A8H, 090H, 068H ; G	
0A3B	70	2684	+	DEFB	070H	
0A3C	88	2684	+	DEFB	088H	
0A3D	88	2684	+	DEFB	088H	
0A3E	88	2684	+	DEFB	088H	
0A3F	A8	2684	+	DEFB	0A8H	
0A40	90	2684	+	DEFB	090H	
0A41	68	2684	+	DEFB	068H	
0A42		2685		DEFCHR	0F0H, 0E8H, 0D8H, 0F0H, 0A0H, 090H, 088H ; R	
0A42	F0	2685	+	DEFB	0F0H	
0A43	88	2685	+	DEFB	088H	
0A44	88	2685	+	DEFB	088H	
0A45	F0	2685	+	DEFB	0F0H	
0A46	A0	2685	+	DEFB	0A0H	
0A47	90	2685	+	DEFB	090H	
0A48	88	2685	+	DEFB	088H	
0A49		2686		DEFCHR	070H, 068H, 060H, 070H, 008H, 088H, 070H ; S	
0A49	70	2686	+	DEFB	070H	
0A4A	88	2686	+	DEFB	088H	
0A4B	80	2686	+	DEFB	080H	
0A4C	70	2686	+	DEFB	070H	
0A4D	08	2686	+	DEFB	008H	
0A4E	88	2686	+	DEFB	088H	
0A4F	70	2686	+	DEFB	070H	
0A50		2687		DEFCHR	0F8H, 020H, 020H, 020H, 020H, 020H, 020H ; T	
0A50	F8	2687	+	DEFB	0F8H	
0A51	20	2687	+	DEFB	020H	
0A52	20	2687	+	DEFB	020H	
0A53	20	2687	+	DEFB	020H	
0A54	20	2687	+	DEFB	020H	
0A55	20	2687	+	DEFB	020H	
0A56	20	2687	+	DEFB	020H	
0A57		2688		DEFCHR	088H, 088H, 088H, 088H, 088H, 088H, 070H ; U	
0A57	88	2688	+	DEFB	088H	
0A58	88	2688	+	DEFB	088H	
0A59	88	2688	+	DEFB	088H	

PROPRIETARY INFORMATION

Dave Nelling Associates, Inc.

DO NOT REPRODUCE

ADDR	OBJECT	STMT	LABEL	OPCODE	OPERAND	COMMENT
0A5A	38	2688	+	DEFB	088H	
0A5B	38	2688	+	DEFB	088H	
0A5C	38	2688	+	DEFB	088H	
0A5D	70	2688	+	DEFB	070H	
0A5E		2689		DEFCHR	088H, 088H, 088H, 050H, 050H, 020H, 020H ;	V
0A5E	38	2689	+	DEFB	088H	
0A5F	38	2689	+	DEFB	088H	
0A60	38	2689	+	DEFB	088H	
0A61	50	2689	+	DEFB	050H	
0A62	50	2689	+	DEFB	050H	
0A63	20	2689	+	DEFB	020H	
0A64	20	2689	+	DEFB	020H	
0A65		2690		DEFCHR	088H, 088H, 088H, 0A8H, 0A8H, 0D8H, 088H ;	W
0A65	38	2690	+	DEFB	088H	
0A66	38	2690	+	DEFB	088H	
0A67	38	2690	+	DEFB	088H	
0A68	A8	2690	+	DEFB	0A8H	
0A69	A8	2690	+	DEFB	0A8H	
0A6A	D8	2690	+	DEFB	0D8H	
0A6B	38	2690	+	DEFB	088H	
0A6C		2691		DEFCHR	088H, 088H, 050H, 020H, 050H, 088H, 088H ;	X
0A6C	38	2691	+	DEFB	088H	
0A6D	38	2691	+	DEFB	088H	
0A6E	50	2691	+	DEFB	050H	
0A6F	20	2691	+	DEFB	020H	
0A70	50	2691	+	DEFB	050H	
0A71	38	2691	+	DEFB	088H	
0A72	38	2691	+	DEFB	088H	
0A73		2692		DEFCHR	088H, 088H, 050H, 020H, 020H, 020H ;	Y
0A73	38	2692	+	DEFB	088H	
0A74	38	2692	+	DEFB	088H	
0A75	50	2692	+	DEFB	050H	
0A76	20	2692	+	DEFB	020H	
0A77	20	2692	+	DEFB	020H	
0A78	20	2692	+	DEFB	020H	
0A79	20	2692	+	DEFB	020H	
0A7A		2693		DEFCHR	0F8H, 008H, 010H, 040H, 040H, 080H, 0F8H ;	Z
0A7A	F8	2693	+	DEFB	0F8H	
0A7B	08	2693	+	DEFB	008H	
0A7C	10	2693	+	DEFB	010H	
0A7D	20	2693	+	DEFB	020H	
0A7E	40	2693	+	DEFB	040H	
0A7F	30	2693	+	DEFB	080H	
0A80	F8	2693	+	DEFB	0F8H	
0A81		2694		DEFCHR	070H, 040H, 040H, 040H, 040H, 040H, 070H ;	[
0A81	70	2694	+	DEFB	070H	
0A82	40	2694	+	DEFB	040H	
0A83	40	2694	+	DEFB	040H	
0A84	40	2694	+	DEFB	040H	
0A85	40	2694	+	DEFB	040H	
0A86	40	2694	+	DEFB	040H	
0A87	70	2694	+	DEFB	070H	
0A88		2695		DEFCHR	000H, 080H, 040H, 020H, 010H, 008H, 000H ;	\
0A88	00	2695	+	DEFB	000H	
0A89	80	2695	+	DEFB	080H	
0A8A	40	2695	+	DEFB	040H	
0A8B	20	2695	+	DEFB	020H	

PROPRIETARY INFORMATION

Dave Nutting Associates, Inc.

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0A8C	10	2695	+	DEFB	010H	
0A8D	08	2695	+	DEFB	008H	
0A8E	00	2695	+	DEFB	000H	
0A8F		2696		DEFCHR	070H, 010H, 010H, 010H, 010H, 010H, 070H ;	J
0A90	70	2696	+	DEFB	070H	
0A91	10	2696	+	DEFB	010H	
0A92	10	2696	+	DEFB	010H	
0A93	10	2696	+	DEFB	010H	
0A94	10	2696	+	DEFB	010H	
0A95	70	2696	+	DEFB	070H	
0A96		2697		DEFCHR	020H, 070H, 0A8H, 020H, 020H, 020H, 020H ;	^
0A97	20	2697	+	DEFB	020H	
0A98	70	2697	+	DEFB	070H	
0A99	A8	2697	+	DEFB	0A8H	
0A9A	20	2697	+	DEFB	020H	
0A9B	20	2697	+	DEFB	020H	
0A9C	20	2697	+	DEFB	020H	
0A9D		2698		DEFCHR	000H, 020H, 040H, 0F8H, 040H, 020H, 000H ;	+
0A9E	00	2698	+	DEFB	000H	
0A9F	20	2698	+	DEFB	020H	
0AA0	40	2698	+	DEFB	040H	
0AA1	F8	2698	+	DEFB	0F8H	
0AA2	40	2698	+	DEFB	040H	
0AA3	20	2698	+	DEFB	020H	
0AA4	00	2698	+	DEFB	000H	
0AA5		2699		DEFCHR	020H, 020H, 020H, 020H, 0A8H, 070H, 020H ;	DOWN
0AA6	20	2699	+	DEFB	020H	
0AA7	20	2699	+	DEFB	020H	
0AA8	20	2699	+	DEFB	020H	
0AA9	A8	2699	+	DEFB	0A8H	
0AAA	70	2699	+	DEFB	070H	
0AAB	20	2699	+	DEFB	020H	
0AAB		2700		DEFCHR	000H, 020H, 010H, 0F8H, 010H, 020H, 000H ;	RIGHT
0AAC	00	2700	+	DEFB	000H	
0AAC	20	2700	+	DEFB	020H	
0AAD	10	2700	+	DEFB	010H	
0AAE	F8	2700	+	DEFB	0F8H	
0AAF	10	2700	+	DEFB	010H	
0AB0	20	2700	+	DEFB	020H	
0AB1	00	2700	+	DEFB	000H	
0AB2		2701		DEFCHR	008H, 088H, 050H, 020H, 050H, 088H, 000H ;	MULTI
0AB3	00	2701	+	DEFB	000H	
0AB4	88	2701	+	DEFB	088H	
0AB5	50	2701	+	DEFB	050H	
0AB6	20	2701	+	DEFB	020H	
0AB7	50	2701	+	DEFB	050H	
0AB8	88	2701	+	DEFB	088H	
0AB9	00	2701	+	DEFB	000H	
0ABA	00	2702		DEFB	0	
0ABA	20	2703		DEFB	20H	
0ABB	00	2704		DEFB	0	
0ABC	F8	2705		DEFB	0F8H	
0ABD	00	2706		DEFB	0	
0ABE	20	2707		DEFB	20H	

PROPRIETARY INFORMATION

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2708 ; ** LAST BYTE OF DIVIDE IS ZERO, WHICH HAPPENS TO BE FIR
2709 ;   BYTE OF ...
2710 ; SMALL CHARACTERS (4 X 6)
OABF 2711 SMLCHR
OABF 2712 DEF5 000H, 000H, 000H, 000H, 000H ; SPACE
OABF 00 2712 + DEF5 000H
OAC0 00 2712 + DEF5 000H
OAC1 00 2712 + DEF5 000H
OAC2 00 2712 + DEF5 000H
OAC3 00 2712 + DEF5 000H

OAC4 DDE1 2714 MMJUMP: POP IX
OAC6 E3 2715 EX (SP), HL
OAC7 DDE9 2716 JP (IX)

2718 ; NAME: CONVERT KEY CODE TO ASCII
2719 ; PURPOSE: SAME
2720 ; INPUT: A=KEY CODE
2721 ; OUTPUT: A=ASCII EQUIVALENT
2722 ; HOW: TABLE LOOKUP
OAC9 2723 MKCTAB:
OAC9 48 2724 LD C, B
OACA 0600 2725 LD B, 0
OACC 21D50A 2726 LD HL, KCCTAB
OACF 09 2727 ADD HL, BC
OAD0 7E 2728 LD A, (HL)
OAD1 FD7709 2729 QFF: LD (IY+CB), A
OAD4 C9 2730 RET

OADS 2732 KCTATB:
OADS 20 2733 DEFB ' ' ; SPACE
OAD6 43 2734 DEFB '·' ; BULLET
OAD7 5E 2735 DEFB '5EH' ; UP ARROW
OADS 5C 2736 DEFB '5CH' ; DOWN ARROW
OAD9 25 2737 DEFB 'X' ;
ODA 52 2738 DEFB 'R' ; RECALL
OADB 53 2739 DEFB 'S' ; STORE
OADC 3B 2740 DEFB ' +' ; PLUS MINUS
OADD 2F 2741 DEFB ' / ' ; DIVIDE
OADE 37 2742 DEFB '7' ;
OADF 38 2743 DEFB '8' ;
OAE0 39 2744 DEFB '9' ;
OAE1 2A 2745 DEFB '*' ; TIMES
OAE2 34 2746 DEFB '4' ;
OAE3 35 2747 DEFB '5' ;
OAE4 36 2748 DEFB '6' ;
OAE5 2D 2749 DEFB '-' ; MINUS
OAE6 31 2750 DEFB '1' ;
OAE7 32 2751 DEFB '2' ;
OAE8 33 2752 DEFB '3' ;
OAE9 2B 2753 DEFB '+' ; PLUS
OAEA 26 2754 DEFB '&' ; CE
  
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PROPRIETARY INFORMATION

Dave Nutting Associates, Inc.

DO NOT REPRODUCE

0AEB 30 2755 DEFB '0'
 0AEC 2E 2756 DEFB '1' ; POINT
 0AED 3D 2757 DEFB '=' ; EQUALS

2759 ; NAME: FILL AREA
 2760 ; PURPOSE: SET REGION OF SCREEN TO CONSTANT VALUE
 2761 ; INPUT: A = DATA TO FILL WITH
 2762 ; BC = NUMBER OF BYTES TO FILL
 2763 ; DE = STARTING ADDRESS OF REGION TO FILL

0AEE EB 2764 MFILL: EX DE, HL
 0AEF 77 2765 MFILL1: LD (HL), A ; STUFF BYTE
 0AF0 EDA1 2766 CPI ; BUMP HL, DEC BC
 0AF2 EAEFOA 2767 JP PE, MFILL1
 0AF3 C9 2768 RET

2770 ; NAME: RELATIVE TO ABSOLUTE
 2771 ; PURPOSE: COORDINATE CONVERSION
 2772 ; INPUT: E = X COORDINATE
 2773 ; D = Y COORDINATE
 2774 ; M = MAGIC REGISTER VALUE TO USE
 2775 ; OUTPUT: A = ABSOLUTE ADDRESS
 2776 ; P = MAGIC REGISTER TO USE

0AF6 CD080B 2777 ; MAGIC ENTRY POINT
 0AF9 1805 2778 MRAB: CALL RELTAB
 2779 JR MREL1--\$
 2780 ; MAGIC ENTRY POINT
 0AFB CD4E0B 2781 MREL1: CALL RELTAB
 0AFE CBF2 2782 SET 6, D ; NOT MAGIC THE ADDRESS
 0B00 FD7304 2783 MREL2: LD (IY+0BE), E ; UPDATE CB DE
 0B03 FD7205 2784 LD (IY+0BD), D
 0B06 18C9 2785 MFROG: JR QFROG--\$
 2786 ; MAGIC ENTRY POINT
 0B08 CD4E0B 2787 RELTAB: CALL RELTAB
 0B0B D30C 2788 OUT (MAGIC), A
 0B0D C9 2789 RET
 0B0E 00 2790 CKSUM2: DEFB 0 ; *** CHECKSUM ***
 0B0F 2791 DEF5 0E0H, 0A0H, 0A0H, 0A0H, 0E0H ; 0
 0B0F E0 2791 + DEFB 0E0H
 0B10 A0 2791 + DEFB 0A0H
 0B11 A0 2791 + DEFB 0A0H
 0B12 A0 2791 + DEFB 0A0H
 0B13 E0 2791 + DEFB 0E0H
 0B14 2792 DEF5 040H, 040H, 040H, 040H, 040H ; 1
 0B14 40 2792 + DEFB 040H
 0B15 40 2792 + DEFB 040H
 0B16 40 2792 + DEFB 040H
 0B17 40 2792 + DEFB 040H
 0B18 40 2792 + DEFB 040H
 0B19 2793 DEF5 0E0H, 020H, 0E0H, 080H, 0E0H ; 2
 0B19 E0 2793 + DEFB 0E0H
 0B1A 20 2793 + DEFB 020H
 0B1B E0 2793 + DEFB 0E0H
 0B1C 80 2793 + DEFB 080H

PROPRIETARY INFORMATION
 Dave Nutting
 Atari

DO NOT REPRODUCE

ADDR	OBJECT	STMT	LABEL	OPCODE	OPERAND	COMMENT
0B1D	EO	2793	+	DEFB	0E0H	
0B1E		2794		DEFB	0E0H, 020H, 060H, 020H, 0E0H ;	3
0B1E	EO	2794	+	DEFB	0E0H	
0B1F	20	2794	+	DEFB	020H	
0B20	60	2794	+	DEFB	060H	
0B21	20	2794	+	DEFB	020H	
0B22	EO	2794	+	DEFB	0E0H	
0B23		2795		DEFB	0A0H, 0A0H, 0E0H, 020H, 020H ;	4
0B23	AO	2795	+	DEFB	0A0H	
0B24	AO	2795	+	DEFB	0A0H	
0B25	EO	2795	+	DEFB	0E0H	
0B26	20	2795	+	DEFB	020H	
0B27	20	2795	+	DEFB	020H	
0B28		2796		DEFB	0E0H, 080H, 0E0H, 020H, 0E0H ;	5
0B28	EO	2796	+	DEFB	0E0H	
0B29	80	2796	+	DEFB	080H	
0B2A	EO	2796	+	DEFB	0E0H	
0B2B	20	2796	+	DEFB	020H	
0B2C	EO	2796	+	DEFB	0E0H	
0B2D		2797		DEFB	0E0H, 080H, 0E0H, 0A0H, 0E0H ;	6
0B2D	EO	2797	+	DEFB	0E0H	
0B2E	80	2797	+	DEFB	080H	
0B2F	EO	2797	+	DEFB	0E0H	
0B30	AO	2797	+	DEFB	0A0H	
0B31	EO	2797	+	DEFB	0E0H	
0B32		2798		DEFB	0E0H, 020H, 020H, 020H, 020H ;	7
0B32	EO	2798	+	DEFB	0E0H	
0B33	20	2798	+	DEFB	020H	
0B34	20	2798	+	DEFB	020H	
0B35	20	2798	+	DEFB	020H	
0B36	20	2798	+	DEFB	020H	
0B37		2799		DEFB	0E0H, 0A0H, 0E0H, 0A0H, 0E0H ;	8
0B37	EO	2799	+	DEFB	0E0H	
0B38	AO	2799	+	DEFB	0A0H	
0B39	EO	2799	+	DEFB	0E0H	
0B3A	AO	2799	+	DEFB	0A0H	
0B3B	EO	2799	+	DEFB	0E0H	
0B3C		2800		DEFB	0E0H, 0A0H, 0E0H, 020H, 0E0H ;	9
0B3C	EO	2800	+	DEFB	0E0H	
0B3D	AO	2800	+	DEFB	0A0H	
0B3E	EO	2800	+	DEFB	0E0H	
0B3F	20	2800	+	DEFB	020H	
0B40	EO	2800	+	DEFB	0E0H	
0B41		2801		DEFB	000H, 040H, 000H, 040H, 000H ;	
0B41	00	2801	+	DEFB	000H	
0B42	40	2801	+	DEFB	040H	
0B43	00	2801	+	DEFB	000H	
0B44	40	2801	+	DEFB	040H	
0B45	00	2801	+	DEFB	000H	
0B46		2802		DEFB	040H, 0E0H, 0E0H, 0E0H, 0E0H ;	BULLET
0B46	40	2802	+	DEFB	040H	
0B47	EO	2802	+	DEFB	0E0H	
0B48	EO	2802	+	DEFB	0E0H	
0B49	EO	2802	+	DEFB	0E0H	
0B4A	EO	2802	+	DEFB	0E0H	

PROPRIETARY INFORMATION

Dave Nutting Associates, Inc.

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```

2804 ; MOVE ROUTINE
OB4B EDB0 2805 MMOVE: LDIR
OB4D C9 2806 RET

2808 ; SYSTEM ENTRY POINT FOR NONMAGIC ADDRESSES
OB4E E5 2809 RELTA1: PUSH HL
OB4F E6FC 2810 AND OFCH ; TOSS OUT SHIFT AMOUNT
OB51 6F 2811 LD L,A ; SAVE
OB52 7B 2812 LD A,E ; GET X
OB53 E603 2813 AND 03H ; ISOLATE SHIFT AMOUNT
OB55 B5 2814 OR L ; COMBINE WITH MR
OB56 F5 2815 RELTA2: PUSH AF
OB57 E640 2816 AND 040H ; IS FLOPPED BIT SET?
OB59 7B 2817 LD A,E
OB5A 2803 2818 JR Z,RELTA3-* ; JUMP IF NOT
OB5C 2F 2819 CPL ; YEP - UNFLOP THE COORDINATE
OB5D C6A0 2820 ADD A,160
OB5F 6A 2821 RELTA3: LD L,D ; HL = Y
OB60 2600 2822 LD H,0
OB62 29 2823 ADD HL,HL ; SET HL = Y * 8
OB63 29 2824 ADD HL,HL
OB64 29 2825 ADD HL,HL
OB65 54 2826 LD D,H
OB66 5D 2827 LD E,L
OB67 29 2828 ADD HL,HL ; SET HL = Y * 32
OB68 29 2829 ADD HL,HL
OB69 19 2830 ADD HL,DE ; SET HL = Y * 40
OB6A CB3F 2831 SRL A ; A = Y / 4
OB6C CB3F 2832 SRL A
OB6E 5F 2833 LD E,A
OB6F 1600 2834 LD D,0
OB71 19 2835 ADD HL,DE ; HL = Y * 40 + X
2836 IF NWHDR=1
2837 ENDIF
OB72 EB 2838 EX DE

2840 ; NAME: RETURN FROM MACRO SUBROUTINE
2841 ; PURPOSE: RETURN CONTROL TO CALLER
2842 ; THIS CODE WAS MOVED FROM RELABS SINCE
2843 ; IT DOES THE STACK CLEANUP THAT MRET DOES
OB73 F1 2844 MMR: POP AF
OB74 E1 2845 POP HL
OB75 C9 2846 RET

2848 ; ENTRY FOR USER
OB76 CD7B0B 2849 INXNIB: CALL XNIB
OB79 188B 2850 JR MFROG-*
  
```

PROPRIETARY INFORMATION
Design Associates, Inc.

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	2852	; NAME:	INDEX NIBBLE	
	2853	; PURPOSE:	LOAD OF SPECIFIED NIBBLE RELATIVE TO BASE	
	2854	; INPUT:	C = NIBBLE NUMBER	
	2855	; OUTPUT:	HL = BASE ADDRESS	
	2856	; DESCRIPTION:	NIBBLE RETURNED RIGHT JUSTIFIED IN A.	
	2857	; BY AN EVEN NIBBLE NUMBER.	BYTE = NIBBLE# 2+BASE	
	2858	; THE LOW ORDER NIBBLE OF A GIVEN BYTE IS ADDRESSED		
0B7B	E5	2860	XNIB: PUSH HL	
0B7C	C5	2861	PUSH BC	
0B7D	0600	2862	LD B,0	
0B7F	CB39	2863	SRL C	
0B81	09	2864	ADD HL,BC	
0B82	7E	2865	LD A,(HL)	
0B83	C1	2866	POP BC	
0B84	CB41	2867	BIT 0,C	
0B86	2804	2868	JR Z,XNIB1-*	
0B88	0F	2869	RRCA	
0B89	0F	2870	RRCA	
0B8A	0F	2871	RRCA	
0B8B	0F	2872	RRCA	
0B8C	E60F	2873	XNIB1: AND 0FH	
0B8E	E1	2874	POP HL	
0B8F	C9	2875	RET	
	2877	; NAME:	STORE NIBBLE	
	2878	; PURPOSE:	NIBBLE STORING (!)	
	2879	; INPUT:	C = NIBBLE TO STORE	
	2880	; OUTPUT:	C = NIBBLE NUMBER (AS IN XNIB)	
	2881	; HL = BASE ADDRESS		
0B90	E5	2882	PLXNIB: PUSH HL	
0B91	C5	2883	PUSH BC	
0B92	0600	2884	LD B,0	
0B94	CB39	2885	SRL C	
0B96	09	2886	ADD HL,BC	
0B97	C1	2887	POP BC	
0B98	CB41	2888	BIT 0,C	
0B9A	2809	2889	JR Z,PLXNIB1-*	
0B9C	07	2890	; L.O. CASE - SHIFT IT	
0B9D	07	2891	RLCA	
0B9E	07	2892	RLCA	
0B9F	07	2893	RLCA	
0BA0	AE	2894	RLCA	
0BA1	E6F0	2895	XOR (HL)	
0BA3	1803	2896	AND 0FH	
0BA5	AE	2897	JR PUTNB2-*	
0BA6	E60F	2898	PUTNB1: XOR (HL)	; L.O. CASE
0BA8	AE	2899	AND 0FH	
0BA9	77	2900	PUTNB2: XOR (HL)	
0BAA	E1	2901	LD (HL),A	
0BAB	C9	2902	POP HL	
		2903	RET	

PROPRIETARY INFORMATION
Dee Nutting Associates, Inc.

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2905 ; NAME : INDEX WORD TABLE (WORD INDEX)
2906 ; PURPOSE: TO INDEX AN ARRAY OF DEFW'S
2907 ; INPUTS: A=INDEX NUMBER (0-255)
2908 ; HL -> TABLE ENTRY 0
2909 ; OUTPUTS: DE = ENTRY LOOKED UP
2910 ; HL = POINTER TO ENTRY IN TABLE
OBAC 5F 2911 MINDW: LD E,A
OBAD 1600 2912 LD D,0
OBAF CB23 2913 SLA E
OBB1 CB12 2914 RL D ; DE*2
OBB3 19 2915 ADD HL,DE
OBB4 5E 2916 LD E,(HL)
OBB5 23 2917 INC HL
OBB6 56 2918 LD D,(HL)
OBB7 2B 2919 DEC HL
OBB8 CDF40C 2920 ST DE: CALL FINDL3
OBBB 1808 2921 JR MINDB1-$ ; JOIN STORE IN INDEX BYTE
  
```

```

2923 ; NAME: INDEX BYTE TABLE
2924 ; PURPOSE: TABLE LOOKUP
2925 ; INPUTS: A = INDEX NUMBER
2926 ; OUTPUT: A = VALUE OF BYTE
2927 ; HL = POINTER TO TABLE ENTRY
OBBD 5F 2928 MINDB: LD E,A
OBBE 1600 2929 LD D,0
OBC0 19 2930 ADD HL,D
OBC1 7E 2931 LD A,(HL)
OBC2 FD7709 2932 LD (IX+2BA),A
OBC5 FD740B 2933 MINDB1: LD (IY+2BH),H
OBC8 FD750A 2934 LD (IY+2BL),L
OBCB C9 2935 RET
  
```

```

2937 ; NAME: DISPLAY TIME
2938 ; PURPOSE: DISPLAY TIME ON SCREEN
2939 ; INPUTS: E = X COORD
2940 ; D = Y COORD
2941 ; C = SAME AS DISCHR OPTIONS EXCEPT BIT 7 = 1
2942 ; TO DISPLAY COLON AND SECONDS
2943 ; OUTPUTS: NONE
OBCC 2944 MINDTI:
OBCC DD210D02 2945 LD IX,SMLFNT
OBDO 0642 2946 LD B,42H
OBD2 21EE4F 2947 LD HL,GTMIN5
OBD5 C5 2948 PUSH BC
OBD6 FDCB06BE 2949 RES 7,(IY+CBC)
OBDA CDEB0B 2950 CALL BCDISP
OBDD C1 2951 POP BC
OBDE CB79 2952 BIT 7,C
OBE0 C8 2953 RET Z
OBE1 3EBA 2954 LD A,80H+3AH
  
```

PROPRIETARY INFORMATION

Data Mining Solutions

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```

OBE3 CDE107 2955          CALL DISPCH
OBE6 0642    2956          LD   B,42H
OBE8 21ED4F 2957          LD   HL,GTSECS
                2958 ; AND FALL INTO

                2960 ; NAME:          DISPLAY BCD NUMBER
                2961 ; INPUT:          B = NUMBER DISPLAY OPTIONS
                2962 ;                   C = CHARACTER DISPLAY OPTIONS
                2963 ;                   DE = Y, X COORDINATES
                2964 ;                   HL = NUMBER ADDRESS (POINTS AT LO BYTE)
                2965 ;                   IX = ALTERNATE FONT (IF USED)
                2966 ; OUTPUT:         DE UPDATED
                2967 ; DESCRIPTION: THIS ROUTINE CONVERTS EACH NIBBLE INTO
                2968 ; ASCII AND DISPLAYS IT. THE NORMALLY ILLEGAL BCD
                2969 ; VALUES ARE DISPLAYED AS CODES 2A THRU 2F RESPECTIVELY.
                2970 ; THE NUMBER DISPLAY OPTIONS BYTE IS FORMATED AS FOLLOWS:
                2971 ; BIT 7-6   SET IF LEADING ZERO SURPRESSION WANTED
                2972 ; BIT 5-4   SET IF USE OF ALTERNATE FONT WANTED
                2973 ; BIT 3-0   NUMBER OF DIGITS TO DISPLAY (NOT NUMBER 0)

OBE8 79      2974 BCDISP: LD   A,B          ; GET OPTIONS
OBEC E63F    2975          AND   3FH          ; ISOLATE NUMBER OF DIGITS
OBEE 3D      2976 BCDOP: DEC  A          ;
OBEF F8      2977          RET  M          ; QUIT IF NULL OR NO MORE
OBF0 4F      2978          LD   C,A          ; SAVE
OBF1 CD7B0B 2979          CALL  XNIB       ; GET NEXT DIGIT
OBF4 2007    2980          JR   NZ,BCDD1-$    ; JUMP IF NONZERO
OBF6 CB78    2981          BIT  7,B          ; IS ZERO SURPRESS ON?
OBF8 2803    2982          JR   Z,BCDD2-$    ; JUMP IF NOT
OBF9 B1      2983          OR   C          ; LAST DIGIT?
OBFB 2014    2984          JR   NZ,BCDD4-$    ; JUMP IF NOT
OBFD CBB8    2985 BCDOP: RES  7,B          ; CLEAR LEADING ZERO FLAG
OBFF C606    2986          ADD  A,6          ;
OC01 E60F    2987          AND  0FH          ;
OC03 C62A    2988          ADD  A,2AH        ;
OC05 CB70    2989 BCDOP: BIT  6,B          ; ALTERNATE FONT?
OC07 2802    2990          JR   Z,BCDD3-$    ; JUMP IF NO
OC09 F680    2991          OR   80H          ; YEA SET THE BIT
OC0B CDE107 2992 BCDOP: CALL  DISPCH     ; DISPLAY THE CHAR
OC0E 79      2993          LD   A,C          ; GET TOP COUNTER IN A
OC0F 18DD    2994          JR   BCDD0-$    ; AND GO FOR NEXT
OC11 3E20    2995 BCDOP: LD   A,' '      ; LEADING ZERO - WRITE A SPACE
OC13 18F0    2996          JR   BCDDA

                2998 ; NAME:          INCREMENT SCORE
                2999 ; PURPOSE:     INCREMENT SCORE AND COMPARE TO END SCORE
3000 ; INPUTS:   HL -> PLAYER SCORE LOW ADDR OF 3 BYTES
3001 ; OUTPUTS:  GSBEND OF GAMSTB SET IF MAX SCORE REACHED

OC15 0603    3002 MINCSC: LD   B,3
OC17 E5      3003          PUSH HL
OC18 7E      3004 INCLOP: LD   A,(HL)
OC19 C601    3005          ADD  A,1
OC1B 27      3006          DAA
OC1C 77      3007          LD   (HL),A
  
```

PROPRIETARY INFORMATION

Pure Mating Associates, Inc.

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0C1D	2003	3008		JR	NZ, CMPIT-\$	
0C1F	23	3009		INC	HL	
0C20	10F6	3010		DJNZ	INCLOP-\$	
0C22	E1	3011	CMPIT:	POP	HL	
0C23	23	3012		INC	HL	
0C24	23	3013		INC	HL	
0C25	3AF84F	3014		LD	A, (GAMSTB)	
0C28	CB4F	3015		BIT	GSBSCR, A	
0C2A	08	3016		RET	Z	
0C2B	11F64F	3017		LD	DE, ENDSCLR+2	
0C2E	0603	3018		LD	B, 3	
0C30	1A	3019	CMPLOP:	LD	A, (DE)	
0C31	BE	3020		CP	(HL)	
0C32	2807	3021		JR	Z, REPEAT-\$; ENDSCLR = SCORE
0C34	D0	3022		RET	NC	; ENDSCLR > SCORE
0C35	21F84F	3023	SETEND:	LD	HL, GAMSTB	; ENDSCLR < SCORE
0C38	CBFE	3024		SET	GSBEND, (HL)	
0C3A	C9	3025		RET		
0C3B	1B	3026	REPEAT:	DEC	DE	
0C3C	2B	3027		DEC	HL	
0C3D	10F1	3028		DJNZ	CMPLOP-\$	
0C3F	18F4	3029		JR	SETEND-\$	
		3031				
		3032				
		3033				
0C41		3034	MQUIT:	SYSSUK	STRDIS	
0C41	FF	3034	+	RST	56	
0C42	35	3034	+	DEFB	STRDIS-1	
		3034	+	IF	STRDIS.EQ. INTPC	
		3034	+	ENDIF		
0C43	30	3035		DEFB	48	
0C44	18	3036		DEFB	24	
0C45	4C	3037		DEFB	01001180B	
0C46	570C	3038		DEFW	GMOVR	
0C48		3039		SYSTEM	ACTINT	; ACTIVATE INTERRUPTS
0C48	FF	3039	+	RST	56	
0C49	0E	3039	+	DEFB	ACTINT	
		3039	+	IF	ACTINT.EQ. INTPC	
		3039	+	ENDIF		
0C4A		3040	MQUIT:	SYSSUK	SENTRY	; WAIT FOR SOMETHING TO HAPPEN
0C4A	FF	3040	+	RST	56	
0C4B	43	3040	+	DEFB	SENTRY-1	
		3040	+	IF	SENTRY.EQ. INTPC	
		3040	+	ENDIF		
0C4C	1402	3041		DEFW	AKEYS	
0C4E	FE14	3042		CP	STO	
0C50	2804	3043		JR	Z, MQUIT2-\$; TRIGGER CHANGE?
0C52	FE13	3044		CP	SKYD	; KEY HIT?
0C54	20F4	3045		JR	NZ, MQUIT1-\$; NO - KEEP GOING
0C56	C7	3046	MQUIT2:	RST	0	; YES - RESET
0C57	47414D45	3047	GMOVR:	DEFM	'GAME'	
0C5B	06	3048		DEFB	6	
0C5C	4F564552	3049		DEFM	'OVER'	
0C60	00	3050		DEFB	0	

PROPRIETARY INFORMATION
Dave Nutting Associates, Inc.

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3052 ; *****
3053 ; * MENU ROUTINES *
3054 ; *****
>0060 3055 NOLINE EQU 96 ; NUMBER OF DISPLAYED LINES
>0000 3056 MNNL EQU 0 ; NEXT FIELD
>0001 3057 MNNH EQU 1
>0002 3058 MNSAL EQU 2 ; STRING ADDRESS
>0003 3059 MNSAH EQU 3
>0004 3060 MNGL EQU 4 ; GO TO ADDRESS
>0005 3061 MNGH EQU 5

3063 ; SYSTEM POWER UP ROUTINE
0C61 3A0020 3064 PWRUP LD A,(FIRSTC) ; GET FIRST CASSETTE LOCATION
0C64 FEC3 3065 CP 0C3H ; IS IT A JUMP??
0C66 CA0020 3066 JP Z,FIRSTC ; JUMP TO IT IF SO
0C69 31CE4F 3067 LD SP,BEGRAM
0C6C 3068 SYSSUK F ; CLEAR SYSTEM RAM
0C6C FF 3068 + RST 56
0C6D 1B 3068 + DEFB FILL+1
3068 + IF FILL EQ INTPC
3068 + ENDIF
0C6E CE4F 3069 DEFW BEGRAM
0C70 3200 3070 DEFW 50
0C72 00 3071 DEFB 0
0C73 32FF0F 3072 LD (WATCH),A ; CLEAR SHIFTER
0C76 3D 3073 DEC A
0C77 32EC4F 3074 LD (TIMEOUT),A ; CLEAR TIMEOUT WATCHDOG
0C7A 3075 SYSTEM INT C
0C7A FF 3075 + RST 56
0C7B 00 3075 + DEFB INTPC
3075 + IF INTPC EQ INTPC
>0001 3075 +INTPC DEFL 1
3075 + ENDIF
0C7C 3076 DO EMUSIO
0C7C 15 3076 + DEFB EMUSIO+1
0C7D 3077 DO SETQL
0C7D 17 3077 + DEFB SETQL+1
0C7E BF 3078 DEFB (NOLINE*2)-1
0C7F 29 3079 DEFB 41
0C80 08 3080 DEFB 8
0C81 3081 DO COLSET
0C81 19 3081 + DEFB COLSET+1
0C82 1300 3082 DEFW MENUCL
0C84 3083 DO ACTINT
0C84 0F 3083 + DEFB ACTINT+1
0C85 3084 EXIT
0C85 02 3084 + DEFB XINTC
>0000 3084 +INTPC DEFL 0
0C86 11F30D 3085 LD DE,GAMSTR ; 'SELECT GAME' AS TITLE
0C89 210020 3086 LD HL,FIRSTC ; ASSUME MENU STARTS IN CASSETT
  
```

PROPRIETARY INFORMATION
Game Nudging Associates, Inc.

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```

0C8C 7E      3087      LD  A, (HL)      ; GET FIRST CASSETTE BYTE
0C8D 23      3088      INC HL
0C8E FE55    3089      CP  55H          ; IS SENTINEL THERE?
0C90 2803    3090      JR  Z,PWRUP1-$   ; YEP - JUMP
0C92 211802  3091      LD  HL,GUNLNK    ; WRONG - USE ONBOARD ONLY
0C95        3092 PWRUP1: SYSTEM MENU ; DISPLAY THE MENU
0C95 FF      3092 +     RST 56
0C96 4A      3092 +     DEFB MENU
                3092 +     IF  MENU.EQ. INTPC
                3092 +     ENDIF
  
```

```

3094 ; NAME:          DISPLAY MENU AND BRANCH ON CHOICE
3095 ; INPUT:         HL = MENU LIST
3096 ;               DE = MENU TITLE
3097 ; OUTPUT:        DE = TITLE OF SELECTION MADE
3098 ; DESCRIPTION:
3099 ; THE MENU LIST IS A LINKED LIST OF THE FOLLOWING F
3100 ; *****
3101 ; * NEXT ENTRY *
3102 ; * *
3103 ; *****
3104 ; * STRING ADDRESS *
3105 ; * *
3106 ; *****
3107 ; * BRANCH TO ADDRESS *
3108 ; * *
3109 ; *****
3110 ; THIS LIST IS TERMINATED BY A NEXT ENTRY FIELD OF ZEROS
3111 ; A MAXIMUM OF EIGHT ENTRIES MAY BE DISPLAYED.
0C97 E5      3112 MMEN  PUSH HL
0C98 E5      3113      PUSH HL
0C99 CD190D  3114      CALL MNCLR      ; CLEAR SCREEN AND THROWUP TITL
0C9C        3115      XYRELL DE, 12
0C9C 11100C  3115 +     LD  DE, RE (12).SHL.8+(16)
0C9F 010901  3116      LD  BC, 10      ; INITIALIZE ENTRY # AND COLOR
0CA2 DDE1    3117 MMENH  POP  IX      ; FIRST ENTRY TO IX
0CA4 78      3118      LD  A,B        ; SELECTION NUMBER TO A
0CA5 C630   3119      ADD A,'0'      ; MAKE IT ASCII
0CA7        3120      SYSTEM CHRDIS ; AND SHOW IT
0CA7 FF      3120 +     RST 56
0CA8 32      3120 +     DEFB CHRDIS
                3120 +     IF  CHRDIS.EQ. INTPC
                3120 +     ENDIF
0CA9 3E2D    3121      LD  A,'-'      ; DISPLAY DASH
0CAB        3122      SYSTEM CHRDIS
0CAB FF      3122 +     RST 56
0CAC 32      3122 +     DEFB CHRDIS
                3122 +     IF  CHRDIS.EQ. INTPC
                3122 +     ENDIF
0CAD DD6603  3123      LD  H,(IX+MNSAH) ; HL = STRING ADDRESS
0CB0 DD6E02  3124      LD  L,(IX+MNSAL)
0CB3        3125      SYSTEM STRDIS ; DISPLAY SELECTION
0CB3 FF      3125 +     RST 56
0CB4 34      3125 +     DEFB STRDIS
                3125 +     IF  STRDIS.EQ. INTPC
  
```

PROPRIETARY INFORMATION
 Dave Nutting Associates, Inc.

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		3125 +	ENDIF		
OCB5	3E08	3126	LD	A, 8	
OCB7	92	3127	ADD	A, D	; TO NEXT LINE
OCB8	57	3128	LD	D, A	
OCB9	1E10	3129	LD	E, 16	
OCBB	04	3130	INC	B	; BUMP ENTRY #
OCBC	DD6601	3131	LD	H, (IX+MNNH)	; HL = NEXT ENTRY ADDR
OCBF	DD6E00	3132	LD	L, (IX+MNNL)	
OCC2	E5	3133	PUSH	HL	
OCC3	7C	3134	LD	A, H	
OCC4	B5	3135	OR	L	
OCC5	20DB	3136	JR	NZ, MMENU1-\$; NO - JUMP BACK
		3137			; AT THIS POINT HL = 0, (SP) = 0
OCC7	39	3138	ADD	HL, SP	; HL = STACK POINTER
OCC8	C5	3139	MMENU3:	PUSH BC	
OCC9	010101	3140	LD	BC, 0101H	
OCCC		3141	XYRELL	DE, 16, 77	; FEEDBACK ADDRESS
OCCC	11104D	3141 +	LD	DE, RES. (77). SHL 8+(16)	
OCCF		3142	SYSTEM	GETNUM	; GET NUMBA
OCCF	FF	3142 +	RST	56	
OCDO	4E	3142 +	DEFB	GETNUM	
		3142 +	IF	GETNUM EQ. INTPC	
		3142 +	ENDIF		
OCD1	C1	3143	POP	BC	
OCD2	7E	3144	LD	A, (HL)	; HOW DOES SHE LOOK?
OCD3	A7	3145	AND	A	; ZERO ENTERED?
OCD4	2803	3146	JR	Z, MMENU5-\$; JUMP IF SO
OCD6	B8	3147	CP	B	; IN RANGE?
OCD7	3806	3148	JR	C, MMENU6-\$; JUMP IF SO
OCD9	3E3F	3149	LD	A, ?	; DUD ENTRY - SHOW ?
OCDB		3150	SYSTEM	CHRDIS	
OCDB	FF	3150 +	RST	56	
OCDC	32	3150 +	DEFB	CHRDIS	
		3150 +	IF	CHRDIS EQ. INTPC	
		3150 +	ENDIF		
OCDD	18E9	3151	JR	MMENU4-\$; GO BACK FOR NEXT TRY
OCDF	E1	3152	MMENU4:	POP HL	; THROW OUT ENTRY AREA
OCE0	D1	3153	POP	DE	; RESTORE HEAD OF MENU LIST
OCE1	47	3154	LD	B, A	; NUMBER ENTERED TO B
OCE2	EB	3155	MMENU7:	EX DE, HL	; HL = ENTRY PTR
OCE3	5E	3156	LD	E, (HL)	; DE = NEXT
OCE4	23	3157	INC	HL	
OCE5	56	3158	LD	D, (HL)	
OCE6	10FA	3159	DJNZ	MMENU4-\$; COUNT DOWN TO ENTRY
OCE8	23	3160	INC	HL	
OCE9	5E	3161	LD	E, (HL)	; STRING TO DE
OCEA	23	3162	INC	HL	
OCEB	56	3163	LD	D, (HL)	
OCEC	23	3164	INC	HL	
OCED	4E	3165	LD	C, (HL)	; GO TO ADDRESS TO BC
OCEE	23	3166	INC	HL	
OCEF	46	3167	LD	B, (HL)	
OCF0	E1	3168	POP	HL	; HL = RETURN TO PLACE
OCF1	F1	3169	POP	AF	; THROW OUT OLD PC
OCF2	C5	3170	PUSH	BC	; PUT NEW PC ON STACK
OCF3	E5	3171	PUSH	HL	; AND PUT BACK DUMMY RETURN
OCF4	FD7304	3172	FINDL3:	LD (IY+CBE), E	; PASS BACK TITLE ADDRESS

PROPRIETARY INFORMATION
David Nutting Associates, Inc.

DO NOT REPRODUCE

```
OCF7 FD7205 3173 LD (IY+CB0),D
OCFA C9 3174 RET ; AND GO BACK
```

```
3176 ; NAME: GET PARAMETER
3177 ; PURPOSE: INPUT OF PROGRAM OPTIONS
3178 ; INPUT: A = NUMBER OF DIGITS
3179 ; BC = PROMPT STRING ADDRESS
3180 ; DE = FRAME TITLE ADDRESS
3181 ; HL = PARAMETER ADDRESS
3182 ; DESCRIPTION:
3183 ; THIS ROUTINE ASKS THE USER TO ENTER A NUMBER
3184 ; FIRST A MENU FRAME IS CREATED, USING THE STRING
3185 ; POINTED AT BY DE AS A TITLE. THE STRING 'ENTER'
3186 ; IS DISPLAYED, FOLLOWED BY THE PROMPT STRING.
3187 ; GETNUM IS THEN CALLED TO INPUT THE NUMBER. FEEDBACK
3188 ; IS PROVIDED IN DOUBLE SIZED CHARACTERS.
3189 ; NOTE: ** THIS ROUTINE USES TWO SYSTEM LEVELS AND THE AL
OCFB F5 3190 MGET: PUSH AF ; SAVE NUMBER OF DIGITS
OCFC E5 3191 PUSH HL
OCFD C5 3192 PUSH BC
OCFE CD190D 3193 CALL MNCLR
OD01 3194 SYSSUK STRDIS ; DISPLAY 'ENTER'
OD01 FF 3194 + RST 56
OD02 35 3194 + DEFB STRDIS+1
3194 + IF STRDIS.EQ. INTPC
3194 + ENDIF
OD03 08 3195 DEFB 8
OD04 20 3196 DEFB 32
OD05 09 3197 DEFB 1001B
OD06 B70D 3198 DEFW ENTST
OD08 E1 3199 POP HL
OD09 3200 SYSTEM STRDIS ; DISPLAY WHAT TO ENTER
OD09 FF 3200 + RST 56
OD0A 34 3200 + DEFB STRDIS
3200 + IF STRDIS.EQ. INTPC
3200 + ENDIF
OD0B E1 3201 POP HL
OD0C F1 3202 POP AF
OD0D 47 3203 LD B,A
OD0E CBF1 3204 SET 6,C ; SET LARGE CHARS
OD10 3205 XYRELL DE,48 ; LOAD FEEDBACK ADDRESS
OD10 113030 3205 + LD DE,48.SHL:8+(48)
OD13 3206 SYSTEM GETNUM ; GET NUMBER
OD13 FF 3206 + RST 56
OD14 4E 3206 + DEFB GETNUM
3206 + IF GETNUM.EQ. INTPC
3206 + ENDIF
OD15 3207 SYSSUK PAWS ; LET USER READ IT
OD15 FF 3207 + RST 56
OD16 51 3207 + DEFB PAWS+1
3207 + IF PAWS.EQ. INTPC
3207 + ENDIF
OD17 0F 3208 DEFB 15
OD18 C9 3209 RET
3210 ; SUBROUTINE TO CLEAR SCREEN FOR MENU AND THROWUP TITLE
```

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0D19	D5	3211	MNCLR:	PUSH DE	
0D1A		3212		SYSSUK FILL	
0D1A	FF	3212	+	RST 56	
0D1B	1B	3212	+	DEFB FILL+1	
		3212	+	IF FILL EQ. INTPC	
		3212	+	ENDIF	
0D1C	0040	3213		DEFW NORMEM	
0D1E	B01	3214		DEFW 11*BYTEPL	
0D20	00	3215		DEFB 0	
0D21		3216		SYSSUK FILL	
0D21	FF	3216	+	RST 56	
0D22	1B	3216	+	DEFB FILL+1	
		3216	+	IF FILL EQ. INTPC	
		3216	+	ENDIF	
0D23	B841	3217		DEFW NORMEM+(11*BYTEPL)	
0D25	480D	3218		DEFW (NOLINE-11)*BYTEPL	
0D27	55	3219		DEFB 55H	
0D28	E1	3220		POP HL	
0D29		3221		XYRELL DE, 24, 0 ; TITLE	
0D29	111800	3221	+	LD DE, RES. (0). SHL 8+(24)	
0D2C	0E04	3222		LD C, 0100B	
0D2E		3223		SYSTEM STRDIS	
0D2E	FF	3223	+	RST 56	
0D2F	34	3223	+	DEFB STRDIS	
		3223	+	IF STRDIS EQ. INTPC	
		3223	+	ENDIF	
0D30	C9	3224		RET	

3226	;	NUM:	GET NUMBER	
3227	;	INPT:	B = DISNUM OPTIONS	
3228	;		C = CHRDIS OPTIONS FOR FEEDBACK	
3229	;		DE = COORDINATES OF FEEDBACK AREA	
3230	;		HL = ADDRESS OF HERE TO STASH NUMBER	
3231	;	DESCRIPTION:	THIS ROUTINE CAN INPUT A NUMBER FROM	
3232	;		EITHER THE KEYBOARD OR THE HAND CONTROL. KEYBOARD	
3233	;		ENTRY PROCEEDS CONVENTIONALLY. GETNUM EXITS	
3234	;		WHEN THE EQUALS KEY IS PRESSED OR THE REQUIRED NU	
3235	;		OF DIGITS IS ENTERED	
3236	;		PLAYER ONE HAND CONTROL MAY ALSO BE USED	
3237	;		ENTER A NUMBER. TO USE THIS OPTION, PULL THE TRI	
3238	;		THEN ROTATE THE POT UNTIL THE NUMBER YOU WISH TO	
3239	;		ENTER IS SHOWN IN THE FEEDBACK AREA. PULL THE TR	
3240	;		AGAIN TO REGISTER THE ENTRY. IF DURING THIS PROC	
3241	;		THE KEYBOARD IS USED - KEYBOARD INPUT WILL OVERRI	
0D31	D9	3242	MGETN:	EXX
0D32	CD990D	3243		CALL CLRNUM ; CLEAR THE NUMBER
0D35	4F	3244		LD C, A ; SET ZERO DIGITS IN - POT ENAB
0D36	FD7E07	3245	MGETN1:	LD A, (IY+CBB) ; ENTRY COMPLETE?
0D39	A9	3246		XOR C
0D3A	E63F	3247		AND 3FH
0D3C	C8	3248		RET Z ; QUIT IF SO
0D3D	21360D	3249		LD HL, MGETN1
0D40	E5	3250		PUSH HL
0D41		3251		SYSTEM RANGED ; RANDOMIZE WHILE WE WAIT
0D41	FF	3251	+	RST 56

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OD42	76	3251 +		DEFB RANGED	
		3251 +		IF RANGED. EQ. INTPC	
		3251 +		ENDIF	
OD43		3252		SYSSUK SENTRY	
OD43	FF	3252 +		RST 56	
OD44	43	3252 +		DEFB SENTRY+1	
		3252 +		IF SENTRY. EQ. INTPC	
		3252 +		ENDIF	
OD45	0B00	3253		DEFW NUMBAS	
OD47		3254		SYSSUK DOIT	
OD47	FF	3254 +		RST 56	
OD48	45	3254 +		DEFB DOIT+1	
		3254 +		IF DOIT. EQ. INTPC	
		3254 +		ENDIF	
OD49	4C0D	3255		DEFW GNUMDO	
OD4B	C9	3256		RET	; NOTHIN - LOOP ON SENTRY
OD4C		3257	GNUMDO	JMP SKYD, MGETN6	
OD4C	13	3257 +		DEFB SKYD	
OD4D	7F0D	3257 +		DEFW MGETN6	
		3257 +		IF 0	
		3257 +		ENDIF	
OD4F		3258		JMP STO, MGETN2	
OD4F	14	3258 +		DEFB STO	
OD50	550D	3258 +		DEFW MGETN2	
		3258 +		IF 0	
		3258 +		ENDIF	
OD52		3259		JMP SPO, MGETN3	
OD52	1C	3259 +		DEFB SPO	
OD53	610D	3259 +		DEFW MGETN3	
		3259 +		IF 0	
		3259 +		ENDIF	
		3260		; TRIGGER ROUTINE	
OD55	CB60	3261	MGETN2:	BIT 4, B	; 0-1 TRANS?
OD57	C8	3262		RET Z	; NO - IGNORE
OD58	79	3263		LD A, C	
OD59	3C	3264		INC A	
OD5A	283A	3265		JR Z, MGETN4-\$; ARE WE ALREADY IN POT MODE?
OD5C	CB79	3266		BIT 7, C	; YEP - JUMP TO EXIT
OD5E	C0	3267		RET NZ	; POT LEGAL?
OD5F	0EFF	3268		LD C, OFFH	; NO - IGNORE
		3269		; SET BIT FLAG	
		3269		; POT ROUTINE	
OD61	79	3270	MGETN3:	LD A, C	; QUIT IF NOT IN POT MODE
OD62	3C	3271		INC A	
OD63	C0	3272		RET NZ	
		3273		; HOW MANY DIGITS?	
OD64	D9	3274		EXX	; TO NORMAL SET
OD65	78	3275		LD A, B	; SNATCH DIGITS
OD66	D9	3276		EXX	
OD67	FE01	3277		CP 1	; 1 PRAY TELL?
OD69	060A	3278		LD B, 10	
OD6B	2802	3279		JR Z, MGETN4-\$; JUMP IF GOOD GUESS
OD6D	0664	3280		LD B, 100	; WRONG!
OD6F	DB1C	3281	MGETN4:	IN A, (POTO)	; GET CURRENT POT VALUE
OD71	57	3282		LD D, A	; RANGE IT
OD72	AF	3283		XOR A	
OD73	5F	3284		LD E, A	
OD74	67	3285		LD H, A	

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0D75 19      3286 MGETN5: ADD HL, DE
0D76 CE00    3287      ADC A, 0      ; ADD EVERY CARRY TO AC
0D78 27      3288      DAA
0D79 10FA    3289      DJNZ MGETN5-*
0D7B D9      3290      EXX      ; BACK TO NORMAL SET
0D7C 77      3291      LD (HL), A
0D7D 1814    3292      JR MGETN8-*
3293      ; KEYBOARD ROUTINE
0D7F 0C      3294 MGETN6: INC C      ; POT MODE?
0D80 2004    3295      JR NZ, MGETN7-* ; JUMP IF NOT
0D82 CD990D  3296      CALL CLRNUM
0D85 0C      3297      INC C      ; SET ONE DIGIT SO FAR
0D86 CBF9    3298 MGETN7: SET 7, C ; SET POT LOCKOUT
0D88         3299      SYSTEM KCTASC
0D88 FF      3299 +      RST 56
0D89 40      3299 +      DEFB KCTASC
3299 +      IF KCTASC.EQ.INTPC
3299 +      ENDIF
0D8A FE3D    3300      CP '='      ; EQUALS TYPED?
0D8C 2808    3301      JR Z, MGETN9-* ; QUIT IF EQUALS
0D8E E60F    3302      AND 0FH
0D90 D9      3303      EXX
0D91         3304      SYSTEM SHIF TU ; SHIF DIGIT UP
0D91 FF      3304 +      RST 56
0D92 60      3304 +      DEFB SHIF
3304 +      IF SHIF.EQ.INTPC
3304 +      ENDIF
0D93 D5      3305 MGETN8: PUSH DE
0D94         3306      SYSTEM DISNUM
0D94 FF      3306 +      RST 56
0D95 36      3306 +      DEFB DISNUM
3306 +      IF DISNUM.EQ.INTPC
3306 +      ENDIF
3307 ; ENTER HERE FOR EQUAL OR TRIGGER EXIT TO THROW OUT RETURN
0D96 D1      3308 MGETN9: POP DE
0D97 D9      3309      EXX      ; BACK TO NORMAL
0D98 C9      3310      RET

3312 ; SUBROUTINE TO CLEAR NUMBER
0D99 C5      3313 CLRNUM: PUSH BC
0D9A D9      3314      EXX      ; TO NORMAL SET
0D9B E5      3315      PUSH HL
0D9C 78      3316      LD A, B
0D9D 3C      3317      INC A
0D9E E63E    3318      AND 3EH
0DA0 1F      3319      RRA
0DA1 D9      3320      EXX      ; BACK TO ALTERNATE SET
0DA2 4F      3321      LD C, A
0DA3 AF      3322      XOR A
0DA4 47      3323      LD B, A
0DA5 D1      3324      POP DE
0DA6         3325      SYSTEM FILL
0DA6 FF      3325 +      RST 56
0DA7 1A      3325 +      DEFB FILL
3325 +      IF FILL.EQ.INTPC
  
```

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3325 +      ENDIF
ODA8 C1    3326      POP BC
ODA9 C9    3327      RET

3329 ; NAME:      SHIFT UP
3330 ; INPUT:     A = DATA TO SHIFT UP
3331 ;           B = SIZE IN DIGITS
3332 ;           HL = AREA TO SHIFT ADDRESS

ODAA F5    3333 MSHFTU: PUSH AF
ODAB 78    3334      LD A, B
ODAC 3C    3335      INC A
ODAD E63E  3336      AND 3EH
ODAF 47    3337      LD B, A
ODB0 F1    3338      POP AF
ODB1 ED6F  3339 SHFTU:  RLD
ODB3 23    3340      INC HL
ODB4 10FB  3341      DJNZ SHFTU1-$
ODB6 C9    3342      RET
  
```

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ODB7 454E5445 3344 ENT9:  DEFM 'ENTER'
ODBD 00        3345      DEFB 0
ODBE FA01     3346 CML:  DEFW CALCL
ODCO D30D    3347      DEFW PNCM
ODC2 2813    3348      DEFW CMSTRT ; CHECK RATE START
ODC4 0000    3349 SCBL:  DEFW 0
ODC6 E80D    3350      DEFW PNCBL
ODC8 190E    3351      DEFW SCBST
ODCA 47554E46 3352 PNGF:  DEFM 'GUNFIGHT'
ODD2 00      3353      DEFB 0
ODD3 43484543 3354 PNCB:  DEFM 'CHECK RATE'
ODDC 00      3355      DEFB 0
ODDD 43414C43 3356 PNCA:  DEFM 'CALCULATOR'
ODE7 00      3357      DEFB 0
ODE8 53435249 3358 PNSB:  DEFM 'SCRIBBLING'
ODF2 00      3359      DEFB 0
ODF3 53454C45 3360 GAMS:  DEFM 'SELECT GAME'
ODFE 67      3361      DEFB 67H
ODFF 08      3362      DEFB 8
OE00 58      3363      DEFB 88
OE01 0D      3364      DEFB 1101B
OE02 28432920 3365      DEFM '(C) BALLY MFG 1977'
OE14 00      3366      DEFB 0
OE15        3367      END
  
```

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