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620 IFN=-1ANDK1#="A"THENCP=11:GOTO710 :REM * ACCUMULATOR *
630 IFK2#=""ANDN=-1THENCP=13 :GOTO710 :REM * IMPLIED *
640 NN=LEN(N#)
650 IFN<256ANDLEFT$(CM$(CN),1)="J"THENJM=1:CP=5:GOTO710 :REM * JSR/JMP *
660 IFLEFT$(CM$(CN),1)="B"AND(CM$(CN)<>"BRK")THENCP=12:GOTO710:REM * RELATIVE *
670 IF(N>255ANDK2#="" )THENCP=5:GOTO710 :REM * ABSOLUTE *
680 IFN<256ANDK2#=""THENCP=3:GOTO710 :REM * ZERO PAGE *
690 :
700 EN=2:GOTO1900 :REM * ERROR *
710 HI=-1:REM PRINT"CP=";CP
720 IFCP=12THENGOSUB3870:REM * RELATIVE *
730 REM * MODE O.K.? *
740 IFCM$(CN)="BRK"THENNM=0:GOTO800
750 K4#=MID$(MD$(CN),CP,1)
760 IFK4#="0"ORCP=1THENEN=2:GOTO1900 :REM * ERROR *
770 IFLEFT$(MD$(CN),1)="1"THEN790:REM * NOT A SPECIAL CASE *
780 N7=N:N#=#OP$(CN):GOSUB4800:NM=PS(CP)+N:N=N7:GOTO800
790 N7=N:N#=#OP$(CN):GOSUB4800:NM=OS(CP)+N:N=N7
800 IFNM=-1THENSTOP
810 IFJM=1THENHI=0:LO=N:GOTO850
820 IFN<256THENHI=-1:LO=N:GOTO850
830 HI=INT(N/256):LO=N-HI*256
840 :
850 POKES, NM:S=S+1
860 IFN<0THEN930
870 POKES, LO:S=S+1
880 IFHI<>-1THENPOKES, HI:S=S+1
890 :
900 GOSUB3960
910 IFEL<>1THENEN=1:GOTO1900:REM * ERROR *
920 IFZ0=1THENRETURN
930 GOTO270
940 :
950 REM * SEARCH FOR START *
960 :
970 SYS630
980 P=FNA(828)
990 LN=FNA(P-2) : REM LINE NUMBER
1000 NI=FNA(P-4) : REM NEXT LINE START
1010 N2=FNA(NI+2): REM NEXT LINE NUMBER
1020 IFLN<>0THEN1040
1030 PRINT"START NOT FOUND!":GOTO2060
1040 PRINT"START FOUND AT LINE:";LN
1050 PRINT"PASS ONE:"
1060 PRINT"/LN":RETURN
1070 :
1080 REM * DEFINE A LABEL *
1090 :
1100 GS#=""
1110 GW#=LEFT$(G#,1)
1120 IFGW#<>"":THENEN=1:GOTO1900:REM * ERROR *
1130 KZ=-1:FORI=2TOLEN(G#):GW#=MID$(G#,I,1)
1140 IFGW#=""THENKZ=I:I=LEN(G#):GOTO1160:REM * END OF LABEL NAME *
1150 GS#=GS#+GW#
1160 NEXT:IFKZ=-1THENLB=LB+1:LB$(LB)=GS#:LB(LB)=S:RETURN
1170 I=KZ
1180 FORKK=0TO9:VB$(KK)="" :NEXT
1190 WA=1:J=I+1:FORI=JTOLEN(G#):GW#=MID$(G#,I,1)
1200 IFGW#="+ "ORGW#="- "THENWA=WA+1:REM * PLUS OR MINUS *
1210 VB$(WA)=VB$(WA)+GW#
1220 NEXT
1230 FORI=1TOLB:IFGS#=LB$(I)THENEN=5:GOTO1900 : REM * ERROR *
1240 NEXT
1250 LB=LB+1 :REM * # OF CURRENT LABELS *
1260 LB$(LB)=GS#:LB(LB)=0
1270 FORI=1TOWA:GW#=LEFT$(VB$(I),1)
1280 LV=0:FORJ=1TOLEN(VB$(I)):GD#=MID$(VB$(I),J,1)
1290 IFGD#="#"ORGD#="%"OR(GD#)="0"ANDGD#="9"ORGD#="" THENJ=LEN(VB$(I)):GOTO132

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1300 IFGD#="+"ORGD#="-"THEN1320
1310 LV=1:J=LEN(VB$(I))
1320 NEXTJ
1330 IFLV=0THEN1450
1340 GW=0:IFGW#="+"ORGW#="-"THENVB$(I)=MID$(VB$(I),2):GOTO1380
1350 IFGW#="#"ORGW#="%"ORGW#="'"THEN1380
1360 IFGW#>="0"ORGW#<="9"THEN1380
1370 GW=-1
1380 KZ=-1:FORJ=1TO(LB-1)
1390 IFVB$(I)=LB$(J)THENKZ=J:J=(LB-1)
1400 NEXTJ:IFKZ=-1THENEN=6:GOTO1900:REM * ERROR *
1410 J=KZ:VB$(I)=STR$(LB$(J)):VB$(I)=MID$(VB$(I),2)
1420:
1430 REM * NOW DO SUMS *
1440:
1450 N# = VB$(I):NN# = LEFT$(N#,1)
1460 IFNN#="+"ORNN#="-"THENN# = MID$(N#,2)
1470 IFGW=-1THENN# = MID$(VB$(I),2)
1480 GL=1:GOSUB4000:GL=0
1490 VB$(I) = GW# + STR$(N)
1500 IFGW#="-"THENLB(LB) = LB(LB) - N:GOTO1530:REM * MINUS *
1510 IFGW#="+"THENLB(LB) = LB(LB) + N:GOTO1530:REM * PLUS *
1520 LB(LB) = LB(LB) + N
1530 IFLB(LB) > 65535 THEN EN = 7:GOTO1900:REM * ERROR *
1540 IFLB(LB) < 0 THEN EN = 8:GOTO1900:REM * ERROR *
1550 NEXTI
1560 RETURN
1570:
1580 REM * GET A WORD *
1590:
1600 G# = "":GG# = "":EZ = -1
1610 IFP = (N1 - 1) THEN PRINTG#:EL = 1:RETURN:REM * NEW LINE *
1620 PP = PEEK(P):PP# = CHR$(PP)
1630 IFEZ = -1 AND PP = 32 THEN P = P + 1:PRINTG#" ";:RETURN
1640 IFEZ = -1 AND PP# = "/" THEN EZ = 1
1650 IFPP# = ":" THEN LL = 1
1660 IFEZ = -1 AND PP# = "." THEN EZ = 2
1670 IFASC(PP#) > 127 THEN PP# = KW$(ASC(PP#) AND 127)
1680 G# = G# + PP#:P = P + 1
1690 GZ = ASC(" " + G#) + LEN(G#)
1700 GOTO1610
1710:
1720 REM * NEW LINE *
1730:
1740 EL = 0:REM * NEW LINE *
1750 P = N1 + 4: N1 = FNA(P - 4): L1 = LN
1760 N2 = FNA(N1 + 2)
1770 LN = FNA(P - 2)
1780 PRINT
1790 IFN1 = 0 THEN EN = 4:GOTO1900:REM * NO END ERROR *
1800 RETURN
1810:
1820 REM * CHECK COMMAND *
1830 CN = -1:FORIQ = 1 TO CM:IFCM$(IQ) = G# THEN CN = IQ:IQ = CM
1840 NEXT
1850 IFCN = -1 THEN EN = 1:GOTO1900:REM * ERROR *
1860 RETURN
1870:
1880 REM * HANDLE ERRORS *
1890:
1900 PRINT:PRINT"ERROR":ONEN GOTO1920,1930,1940,1950,1990,2000,2010,2020,2030
1910 STOP
1920 PRINT"SYNTAX ":GOTO2050
1930 PRINT"MODE ":GOTO2050
1940 PRINT"NO START ERROR":GOTO2060
1950 PRINT"NO END COMMAND ERROR":PRINT"SHALL I CONTINUE ASSEMBLING (Y/N)?"
1960 GETAA#:IFAA#<>"N"ANDAA#<>"Y"THEN1960
1970 IFAA#="Y"THENPRINT"CONTINUING":GOTO2100
1980 GOTO2060

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1990 PRINT*LABEL ALREADY DEFINED *):GOTO2050
2000 PRINT*NO SUCH LABEL *):GOTO2050
2010 PRINT*OVERFLOW *):GOTO2050
2020 PRINT*UNDERFLOW *):GOTO2050
2030 PRINT*BRANCH OUT OF RANGE *):GOTO2050
2040 :
2050 PRINT*ERROR IN:)/LN
2060 PRINT*ASSEMBLY ABORTED!*:END
2070 :
2080 REM * END OF PASS 1 *
2090 :
2100 IFUL=0THEN2370:REM * NO LABELS *
2110 EL=1:PRINT:GOSUB4520:PRINT:PRINT*PASS TWO:
2120 PRINT:PRINT*LINE NUMBER:
2130 FORIH=1TOUL:JH=0:J1#="":J2#="":QS=-1:QD=-1
2140 PRINT* ", " /LN(IH)
2150 JH=JH+1:JH#=MID$(UL$(IH),JH,1)
2160 IFJH#="("ORJH#="#"THEN2210
2170 IFJH#="'"THENQS=1:GOTO2220
2180 IFJH#="<"THENQS=2:GOTO2220
2190 IFJH#=">"THENQS=3:GOTO2220
2200 IFQD<>1THENGOSUB2420:GOTO2220
2210 J1#=J1#+JH#
2220 IFJH<=LEN(UL$(IH))THEN2150
2230 KZ=-1:FORIG=1TOLB
2240 IFLB$(IG)=J2#THENKZ=IG:IG=LB
2250 NEXTIG:IFKZ=-1THENLN=LN(IH):EN=6:GOTO1900:REM * ERROR *
2260 N=LB(KZ):REM * N=DECIMAL VALUE *
2270 IFQS=1THENN#=STR$(N):N=ASC(MID$(N#,2)):J1#=LEFT$(J1#,1)
2280 IFQS=2THENN#N-256*INT(N/256):J1#=LEFT$(J1#,1)
2290 IFQS=3THENN#INT(N/256):J1#=LEFT$(J1#,1)
2300 IFQS=4ANDAD#="+"THENN=N+A1
2310 IFQS=4ANDAD#="-"THENN=N-A1
2320 CN=CN(IH):K1#=STR$(N):K2#=J1#
2330 S=UP$(IH):REM * POSITION *
2340 LN=LN(IH):REM * LINE NUMBER *
2350 ZG=1:GOSUB530:ZG=0
2360 NEXT
2370 PRINT:PRINT*ASSEMBLY COMPLETED!*:PRINT
2380 PRINT*START ADDRESS:)/SA
2390 PRINT* END ADDRESS:)/SS
2400 PRINT:PRINT:END
2410 REM * DEAL WITH SPECIAL CASE *
2420 QD=1:JH#=MID$(UL$(IH),JH,1)
2430 IFJH#="+"ORJH#="-"THENGOSUB2520
2440 IFJH#="'"ORJH#="<"THENJ1#=J1#+JH#:RETURN
2450 IFJH>LEN(UL$(IH))THENRETURN
2460 J2#=J2#+JH#:JH=JH+1
2470 IFJH<=LEN(UL$(IH))THEN2420
2480 RETURN
2490 :
2500 REM * LABEL + OR - A VALUE *
2510 :
2520 A1#="":QS=4:AD#=JH#
2530 JH=JH+1:JH#=MID$(UL$(IH),JH,1)
2540 A1#=A1#+JH#
2550 IFJH#("<)"ANDJH#(">)"ANDJH<=LEN(UL$(IH))THEN2530
2560 N#=A1#:GOSUB4800:A1=N:RETURN
2570 :
2580 REM * READ IN DATA AND SET UP *
2590 :
2600 PRINT*SETTING UP - PLEASE WAIT*:CM=56:LB=0
2610 NL=50:REM * # OF POSSIBLE LABELS *
2620 DIMCM$(CM),OP$(CM),MD$(CM),OS(14),PS(14),LB$(NL),LB(NL),KW$(75)
2630 DIMUL$(100),UP(100),LN(100),CN(100),TP$(15)
2640 FORI=830TO920:READA:POKEI,A:NEXT
2650 FORII=1TOCM:READCM$(II),OP$(II),MD$(II):NEXT
2660 OS(1)=-1:OS(2)=8:OS(3)=4
2670 OS(4)=20:OS(5)=12:OS(6)=20

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2680 OS(7)=24:OS(8)=0:OS(9)=16
2690 OS(10)=20:OS(11)=8:OS(12)=1
2700 OS(13)=2:OS(14)=44
2710 :
2720 PS(1)=-1:PS(2)=0:PS(3)=4
2730 PS(4)=20:PS(5)=12:PS(6)=20
2740 PS(7)=28:PS(8)=-1:PS(9)=-1
2750 PS(10)=20:PS(11)=-1:PS(12)=-1
2760 PS(13)=-1:PS(14)=-1
2770 :
2780 I=41117:FORU=0T075
2790 I=I+1:KW#(U)=KW#(U)+CHR#(PEEK(I)AND127)
2800 IFPEEK(I)<128THEN2790
2810 NEXT
2820 :
2830 FORI=1TO14:READTP#(I):NEXT
2840 FORI=1TOCM:MD#(I)=TP#(VAL(MD#(I))):NEXT
2850 PRINT"#####" *I RETURN
2860 :
2870 REM * SAVE UNKNOWN LABEL *
2880 :
2890 UL=UL+1:UL#(UL)=G#:UP(UL)=S:LN(UL)=LN:CN(UL)=CN
2900 IFLEFT#(UL#(UL),1)=":"THENUL#(UL)=MID#(UL#(UL),2)
2910 RETURN
2920 :
2930 REM * DATA FOR SEARCH SUBROUTINE *
2940 DATA165,043,133,247,165,044
2950 DATA133,248,160,000,177,247
2960 DATA141,154,003,200,177,247
2970 DATA141,155,003,240,041,200
2980 DATA177,247,141,156,003,200
2990 DATA177,247,141,157,003,200
3000 DATA177,247,201,091,240,022
3010 DATA201,000,240,003,076,097
3020 DATA003,160,000,173,154,003
3030 DATA133,247,173,155,003,133
3040 DATA248,076,072,003,140,158
3050 DATA003,024,165,247,109,158
3060 DATA003,133,247,165,248,105
3070 DATA000,133,248,165,247,141
3080 DATA060,003,165,248,141,061
3090 DATA003,096,000,000,000,000
3100 DATA000,000,000
3110 :
3120 REM * KEYWORDS *
3130 DATA "ADC",#61,1
3140 DATA "AND",#21,1
3150 DATA "ASL",#02,2
3160 DATA "BCC",#0F,3
3170 DATA "BCS",#0F,3
3180 DATA "BEQ",#EF,3
3190 DATA "BIT",#20,4
3200 DATA "BMI",#2F,3
3210 DATA "BNE",#CF,3
3220 DATA "BPL",#0F,3
3230 DATA "BRK",#44,5
3240 DATA "BVC",#4F,3
3250 DATA "BVS",#6F,3
3260 DATA "CLC",#16,5
3270 DATA "CLO",#06,5
3280 DATA "CLI",#56,5
3290 DATA "CLV",#86,5
3300 DATA "CMP",#C1,1
3310 DATA "CPX",#E0,6
3320 DATA "CPY",#C0,6
3330 DATA "DEC",#C2,7
3340 DATA "DEX",#C8,5
3350 DATA "DEY",#86,5
3360 DATA "EOR",#41,1

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3370 DATA "INC",#E2,7
3380 DATA "INX",#E6,5
3390 DATA "INY",#C6,5
3400 DATA "JMP",#40,8
3410 DATA "JSR",#14,9
3420 DATA "LDA",#A1,1
3430 DATA "LDX",#A2,10
3440 DATA "LDY",#A0,11
3450 DATA "LSR",#42,2
3460 DATA "NOP",#E8,5
3470 DATA "ORA",#01,1
3480 DATA "PHA",#46,5
3490 DATA "PHP",#06,5
3500 DATA "PLA",#66,5
3510 DATA "PLP",#28,5
3520 DATA "ROL",#22,2
3530 DATA "ROR",#62,2
3540 DATA "RTI",#3E,5
3550 DATA "RTS",#5E,5
3560 DATA "SBC",#E1,1
3570 DATA "SEC",#36,5
3580 DATA "SED",#F6,5
3590 DATA "SEI",#76,5
3600 DATA "STA",#81,12
3610 DATA "STX",#82,13
3620 DATA "STY",#80,14
3630 DATA "TAX",#A8,5
3640 DATA "TAY",#A6,5
3650 DATA "TSX",#88,5
3660 DATA "TXA",#88,5
3670 DATA "TXS",#98,5
3680 DATA "TYA",#96,5
3690 DATA "11111111100000"
3700 DATA "10111100001000"
3710 DATA "10000000000100"
3720 DATA "10101000000000"
3730 DATA "10000000000010"
3740 DATA "01101000000000"
3750 DATA "10111100000000"
3760 DATA "10001000000001"
3770 DATA "10001000000000"
3780 DATA "01101010010000"
3790 DATA "01111100000000"
3800 DATA "10111111100000"
3810 DATA "00101000010000"
3820 DATA "00111000000000"
3830 :
3840 :
3850 REM * RELATIVE MODE *
3860 :
3870 IFS-N>128THENEN=9:GOTO1900:REM * ERROR * BRANCH BACKWARDS *
3880 IFN-S>127THENEN=9:GOTO1900:REM * ERROR * BRANCH FORWARDS *
3890 IFABS(S-N)=(S-N)THENN=126-ABS(S-N):N=NOR128:GOTO3910
3900 N=ABS(S-N)-2
3910 IFN>255THENEN=2:GOTO1900:REM * ERROR *
3920 RETURN
3930 :
3940 REM * GET LABEL VALUE FROM EOL *
3950 :
3960 IFEL=1THENRETURN
3970 GOSUB1600
3980 GS#=LEFT$(G#,1)
3990 IFGS#=";" THENEL=1:RETURN
4000 GW#=MID$(G#,2)
4010 FORI=1TO LB
4020 IFLB$(I)=GW#THENEN=5:GOTO1900:REM * ERROR *
4030 NEXT
4040 LB=LB+1
4050 LB$(LB)=GW#:LB(LB)=SS

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4060 GOTO3960
4070 :
4080 REM * DEAL WITH PSEUDO OPS *
4090 :
4100 GS#=LEFT$(G#,4):JH=6
4110 IFGS#=".TXT"THEN#100
4120 IFGS#=".WOR"THEN#320
4130 IFGS#=".BYT"THEN#430
4140 EN=1:GOTO1900:REM * ERROR *
4150 :
4160 REM * .TXT *
4170 :
4180 JH#=MID$(G#,JH,1)
4190 IFJH#(<)CHR$(34)THENEN=1:GOTO1900:REM * ERROR *
4200 JH=JH+1
4210 JH#=MID$(G#,JH,1)
4220 IFJH#=CHR$(34)THEN#260
4230 N=ASC(JH#):POKES,N:S=S+1
4240 GOTO4200
4250 :
4260 JH=JH+2
4270 IFJH<LEN(G#)THENEL=1:G#=MID$(G#,JH):GOSUB3980:RETURN
4280 EL=1:RETURN
4290 :
4300 REM * .WOR *
4310 :
4320 N#=""
4330 GW#=MID$(G#,JH,1)
4340 IFGW#(">") * "ANDJH<=LEN(G#)THENN#=#+GW#:JH=JH+1:GOTO4330
4350 GOSUB4800
4360 N5=INT(N/256):N6=N-256*N5
4370 POKES,N6:S=S+1
4380 POKES,N5:S=S+1
4390 JH=JH-1:GOTO4260
4400 :
4410 REM * .BYT *
4420 :
4430 N#=""
4440 GW#=MID$(G#,JH,1)
4450 IFGW#(">") * "ANDJH<=LEN(G#)THENN#=#+GW#:JH=JH+1:GOTO4440
4460 GOSUB4800
4470 IFN>255THENEN=0:GOTO1900:REM * ERROR *
4480 POKES,N:S=S+1
4490 JH=JH-1:GOTO4260
4500 :
4510 REM * PRINT OUT LABEL INFO. *
4520 PRINT"LABELS:"FORI=1TOLB:PRINTLB$(I),LB(I):NEXT
4530 PRINT
4540 RETURN
4550 :
4560 REM * CONVERT N# (HEX) INTO N (DEC) *
4570 :
4580 N=0:FORII=1TOLEN(N#)
4590 IJ=ASC(MID$(N#,1+LEN(N#)-II,1))
4600 IF(IJ>64)AND(IJ<72)THENIJ=IJ-55
4610 IF(IJ>47)AND(IJ<58)THENIJ=IJ-48
4620 N=N+IJ*(16^(II-1))
4630 NEXT
4640 RETURN:REM * DEC IN N *
4650 :
4660 REM * CONVERT N# (BIN) INTO N (DEC) *
4670 N=0:FORII=1TOLEN(N#)
4680 IJ=VAL(MID$(N#,1+LEN(N#)-II,1))
4690 N=N+IJ*(2^(II-1))
4700 NEXT
4710 RETURN:REM * BIN IN N *
4720 :
4730 REM * DO ASCII CHARACTER *
4740 NN#=MID$(N#,2)

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4750 IFLEN(NN#)<>1THENEN=1:GOTO1900 :REM * ERROR *
4760 N=ASC(NN#)
4770 RETURN :REM * ASCII IN N *
4780 :
4790 REM * SORT OUT NUMBER *
4800 ZW=0:B1=0
4810 ZX#="":N=-1:W#=#LEFT$(N#,1):WS#=#MID$(N#,2)
4820 IFW#=#"ORW#=#" *ORW#=#"A"THENRETURN :REM * ACCUMULATOR MODE *
4830 IFW#=#"%"ORW#=#"%"ORW#=#"%"OR(W#>=#"0"ANDW#<=#"9")THEN4880
4840 :
4850 IFGL=0ANDW#=#" : "THENG#=#" : " :GW#=#W# :GOSUB1130:N=-1:RETURN
4860 :
4870 WS#=#MID$(N#,2):W#=#LEFT$(N#,1)
4880 IFW#=#"%"THENN#=#WS# :GOTO4670 :REM * BINARY *
4890 IFW#=#"%"THENN#=#WS# :GOTO4500 :REM * HEX *
4900 IFW#=#"'"THEN4740 :REM * ASCII *
4910 IFW#>=#"0"ANDW#<=#"9"THENN=#VAL(W#+WS#):RETURN
4920 IFW#=#"/"THENRETURN:REM * COMMENT *
4930 GOSUB2090:NM=255:N=60130:RETURN
4940 :
4950 REM * PLACE SOURCE FROM HERE *
4960 REM * ONWARDS *
4970 :
4980 :-----:
4990 :
5000 [ #C000
5010 /
5020 /DEMONSTRATION
5030 /
5040 / (C) A.R.BENNETT 1985
5050 /
5060 /TYPE "SYS49152"(RETURN)
5070 /TO USE.
5080 /
5090 /DEFINE LABELS
5100 :SCREEN=#0400
5110 :COLSCREEN=#0800
5120 :YELLOW=#07
5130 /
5140 /START OF PROGRAM
5150 LDY #000 /ZERO Y INDEX
5160 LDA TEXT,Y /LOOP /GET A CHARACTER
5170 STA SCREEN,Y /PLACE ON SCREEN
5180 LDA #YELLOW
5190 STA COLSCREEN,Y /DO COLOUR
5200 INY
5210 CPY #00FCHARS
5220 BNE LOOP
5230 RTS
5240 /
5250 .BYT 23 :#00FCHARS
5260 .TXT "ASSEMBLER DEMONSTRATION" :TEXT
5270 END

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The Complete Commodore Machine Code Programming Course

Andrew Bennett and Surya

Chapman and Hall/Methuen

ISBN 0 412 27250 4

Possible errors and changes made N.A. Hoijtink 2021/02/17

240 53246 changed into 53248

430 K3\$<>"N" chnaged into K3\$<>"#"

540 K2\$="N" changed into K2\$="#"

1040 String is different, left it

1200 WA+1 changed into WA+I

1230 IF G\$ changed into IF GS\$

2160-2190 Unclear difference between (and < or (and <

3680 \$AB or \$A8? probably \$AB, tested, =A8

3890 AB\$(S-N) changed into ABS(S-N)

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