Original ACTION! System Runtime Source#

```
MODULE ; SYS.ACT

DEFINE EOL="$9B"
DEFINE OpenBuf = "$0500"
DEFINE OpenBufL = "$00"
DEFINE OpenBufH = "$05"

BYTE ARRAY copy_right(0) =
"(c)  by A.C.S/OSS"

; Primitive IO routines
PROC Clos=*(BYTE d)[$FFA2$A686$CA0$AD0]

PROC Outputq=*(BYTE d,BYTE ARRAY s)
[$A684$BA0$4D0]

PROC In=*(BYTE d,BYTE ARRAY s)
[$A684$5A0$A586$A2$0$A386]

PROC XIOstr=*(BYTE d,x,c,a1,a2,BYTE ARRAY s)
[$A0A$A0A$98AA$9D$342$A3A5$AF0$9D$34A$A4A5$9D$34B$A9$0$9DA8$349
$A5B1$9D$348$12F0$18$A5A5$169$9D$344$A6A5$69$0$9D$345$4C$E456$60]

PROC Opn=*(BYTE d,BYTE ARRAY s,BYTE m,o)
[$A586$A684$3A0$4CXIOstr]

PROC Prt=*(BYTE d,BYTE ARRAY s)
[$A586$A684$A2$0$A386$9A0$20XIOstr$AD0$BA9$9D$342$9BA9$4C$E456$60]

PROC Error(BYTE err)[$6C$A$0$1113$8301]

PROC Break=*()
[$BA$8E$4C1$80A0$98$4C Error]


; math library routines
PROC LShift=*()
[$84A4$AF0$8586$A$8526$88$FAD0$85A6$60]

PROC RShift=*()
[$84A4$AF0$8586$8546$6A$88$FAD0$85A6$60]

PROC SetSign=*()[$D3A4$1010]
PROC SS1=*()
[$8685$8786$38$A9$0$86E5$A8$A9$0$87E5$AA$98$60]

PROC SMOps=*()
[$D386$E0$0$310$20SS1$8285$8386$85A5$E10$AA$D345$D385
$84A5$20SS1$8485$8586$A9$0$8785$60]

PROC MultB=*()
[$1BF0$CA$C786$AA$15F0$C686$A9$0$8A2$A$C606$290$C765$CA$F6D0
$18$8765$8785$86A5$87A6$60]

PROC MultI=*()
[$20SMOps$82A6$1BF0$C686$84A6$15F0$CA$C786
$8A2$A$8726$C606$690$C765$290$87E6$CA$F0D0
```

```
$8685$82A5$85A6$20MultB$83A5$84A6$20MultB$4CSetSign]

PROC DivI=*()
[$20SMOps$85A5$27F0
$8A2$8226$8326$8726$38$83A5$84E5$A8$87A5$85E5$490
$8785$8384$CA$E7D0$82A5$2A$A2$0$83A4$8684$4CSetSign
$10A2$8226$8326$2A$4B0$84C5$390$84E5$38$CA$EFD0
$8226$8326$8685$82A5$83A6$4CSetSign]

PROC RemI=*()[$20 DivI$86A5$87A6$60]

PROC SArgs=*()
[$A085$A186$A284$18$68$8485$369$A8$68$8585$69$0$48$98$48$1A0
$84B1$8285$C8$84B1$8385$C8$84B1
$A8$B9$A0$0$8291$88$F810$11A5$FD0$11E6$4C Break$6308$1109$1819$2113$3323$60]

SET $4E4=LShift
SET $4E6=RShift
SET $4E8=MultI
SET $4EA=DivI
SET $4EC=RemI
SET $4EE=SArgs

PROC ChkErr=*(BYTE r,b,eC)
[$1610$88C0$8F0
;$98$80C0$11F0 original code
 $98$80C0$12F0 ; corrected as shown in Bugsheet#3
$4C Error$8A$4A4A$4A4A$98AA$9D EOF$60]

PROC Break1=*(BYTE err)
[$1A2$1186$48$20 Break$68$A8$60]

PROC Open=*(BYTE d,BYTE ARRAY f,BYTE m,a2)
[$48$A186$A284$A8$A9$0$99 EOF$A8$A1B1$8D OpenBuf $A8$C8$9BA9$2D0$A1B1$99 OpenBuf $88$F
$68$A2 OpenBufL $A0 OpenBufH $20Opn$4C ChkErr]

PROC PrintE=*(BYTE ARRAY s)[$A186$AA$A1A4$A5device]
PROC PrintDE=*(BYTE d,BYTE ARRAY s)
[$20 Prt$4C ChkErr]

PROC Close=*(BYTE d)[$20 Clos$4C ChkErr]

PROC Print=*(BYTE ARRAY s)[$A186$AA$A1A4$A5device]
PROC PrintD=*(BYTE d,BYTE ARRAY s)
[$20Outputq$4C ChkErr]

PROC InS=*()
[$20In$A084$BD$348$3F0$38$1E9$A0$0$A591$A0A4$60]

PROC InputS=*(BYTE ARRAY s)[$A286$AA$A2A4$A5device]
PROC InputSD=*(BYTE d,BYTE ARRAY s)[$48$FFA9$A385$68]
PROC InputMD=*(BYTE d,BYTE ARRAY s,BYTE m)
[$48$A186$A284$A0$0$A3A5$A191$68$A2A4]
PROC InputD=*(BYTE d,BYTE ARRAY s)[$20InS$4C ChkErr]

BYTE FUNC GetD=*(BYTE d)[$7A2]
PROC CCIO=*()
;[$A486$A0A$A0A$AA$A4A5$9D$342$A9$0$9D$348$9D$349     original code
[$A386$A0A$A0A$AA$A3A5$9D$342$A9$0$9D$348$9D$349 ; corrected as shown in Bugsheet#3
```

```
$98$20$E456$A085$4C ChkErr]

PROC PutE=*()[$A9$9B]
PROC Put=*(BYTE c)[$AA$A5device]
PROC PutD=*(BYTE d,BYTE c)[$A186$A1A4]
PROC PutD1=*()[$BA2$4C CCIO]

PROC PutDE=*(BYTE dev)[$A0$9B$F7D0]

PROC XIO=*(BYTE d,f,c,a1,a2,BYTE ARRAY s)
[$20XIOstr$4C ChkErr]

PROC CToStr=*()
[$D485$D586$20$D9AA$20$D8E6$FFA0$A2$0$C8$E8
$F3B1$9D$550$F710$8049$9D$550$8E$550$60]

PROC PrintB=*(BYTE n)[$A2$0]
PROC PrintC=*(CARD n)[$20 CToStr$A5device]
PROC PNum=*()[$50A2$5A0$20 Outputq$4C ChkErr]

PROC PrintBE=*(BYTE n)[$A2$0]
PROC PrintCE=*(CARD n)[$20PrintC$4CPutE]

PROC PrintBD=*(BYTE d, n)[$A0$0]
PROC PrintCD=*(BYTE d, CARD n)
[$A085$8A$A284$A2A6$20 CToStr$A0A5$4CPNum]

;PROC PrintBDE=*(BYTE n)[$A0$0] original code
PROC PrintBDE =*(BYTE d,n)[$A0$0] ; corrected as shown in bugsheet #3
PROC PrintCDE=*(BYTE d,CARD n)
[$20PrintCD$A0A5$4CPutDE]

PROC PrintI=*(INT n)[$A286$AA$A2A4$A5device]
PROC PrintID=*(BYTE d,INT n)[$C0$0$1610$48$A186$A284$2DA0
$20PutD1$38$A9$0$A1E5$AA$A9$0$A2E5$A8$68$4CPrintCD]

PROC PrintIE=*(INT n)[$20PrintI$4CPutE]

PROC PrintIDE=*(BYTE d,INT n)
[$20PrintID$A0A5$4CPutDE]

PROC StrB=*(BYTE n, BYTE ARRAY s)[$A286$A384$A2$0$A2A4]
PROC StrC=*(CARD n, BYTE ARRAY s)[$A284$20 CToStr$C8$B9$550$A291$88$F810$60]
PROC StrI=*(INT n, BYTE ARRAY s)[$E0$0$ED10$A085$A186$A284
$38$A9$0$A0E5$A8$A9$0$A1E5$AA$98$20 CToStr$E8$8A
$A8$B9$54F$A291$88$F8D0$8A$A291$C8$2DA9$A291$60]

BYTE FUNC InputB=*()
CARD FUNC InputC=*()
INT FUNC InputI=*()
[$A5 device]
BYTE FUNC InputBD=*(BYTE d)
CARD FUNC InputCD=*(BYTE d)
INT FUNC InputID=*(BYTE d)
[$13A2$8E$550$50A2$5A0$20InputD$50A9$5A2]
BYTE FUNC ValB=*(BYTE ARRAY s)
CARD FUNC ValC=*(BYTE ARRAY s)
INT FUNC ValI=*(BYTE ARRAY s)
[$A485$A586$A0$0$A084$A184$A284$A4B1$A385$A3E6
```

```
$20A9$C8$A4D1$5D0$C8$A3C4$F730$A4B1$2DC9$3D0$A285$C8$A3C4$3610
$A4B1$30C9$3030$3AC9$2C10$38$30E9$AA
$A1A5$48$A0A5$A$A126$A$A126$18$A065$A085$68$A165$A185$A006$A126
$18$8A$A065$A085$290$A1E6$C8$A3C4$CA30
$A2A5$DF0$38$A9$0$A0E5$A085$A9$0$A1E5$A185$60]

PROC PrintH=*(CARD n)
[$A485$A586$4A9$A685$24A9$20Put
$A9$0$4A2$A406$A526$2A$CA$F8D0
$3069$3AC9$230$669$20Put$A6C6$E5D0$60]

PROC PrintF=*(BYTE ARRAY f, CARD a1,a2,a3,a4,a5)
[$C085$C186$8C$5F0$A0$0$C0B1$C285$C2E6$DA2$A2B5$9D$5F0$CA$F8D0$8B86$8A86]
PROC PF2=*()
[$8AE6$8AA4$C2C4$DAB0$C0B1$25C9$FD0$8AE6$C8$C0B1$25C9$6F0$45C9$8D0$9BA9$20Put$4CPF2
$8BA4$8BE6$8BE6$A085$B9$5F0$BE$5F1$A0A4$43C0$E6F0$53C0$6D0$20Print$4CPF2
$49C0$6D0$20PrintI$4CPF2
$48C0$6D0$20PrintH$4CPF2
$20PrintC$4CPF2]

PROC Note=*(BYTE d,CARD POINTER s,BYTE POINTER o)
[$A186$A284$A0A$A0A$AA$26A9$9D$342$20$E456$20 ChkErr$A0$0
$BD$34E$A391$BD$34C$A191$BD$34D$C8$A191$60]

PROC Point=*(BYTE d,CARD s,BYTE o)
[$A186$A0A$A0A$98AA$9D$34D$A1A5$9D$34C$A3A5
$9D$34E$25A9$9D$342$20$E456$4C ChkErr]


MODULE ; GRAPHIC ROUTINES

BYTE ARRAY dev_S="S:", dev_E="E:"

PROC Graphics=*(BYTE m)
[$48$A9$0$20 Close$CA9$A385$A9$0$AEdev_E$ACdev_E+1$20Open
$6A9$20 Close$68$A485$3029$1C49$A385$6A9$AEdev_S$ACdev_S+1$4COpen]

PROC Position=*(CARD c,BYTE r)[$5B85$5C86$5A84]
PROC Pos1=*()[$5585$5686$5484$60]

PROC GrIO=*()
[$20Pos1$AD$2FD$8D$2FB$ADdev_S$A585$ADdev_S+1$A685$A9$0$A385$A485$6A9$60]

PROC DrawTo=*(CARD c,BYTE r)
[$20GrIO$11A0$4CXIO]

BYTE FUNC Locate=*(CARD c,BYTE r)
[$20Position$6A9$4CGetD]

PROC Plot=*(CARD c,BYTE r)
[$20Pos1$6A9$AE$2FD$4CPutD]

PROC SetColor=*(BYTE reg,hue,lum)
[$5C9$1610$A085$98$F29$A285$8A$A0A$A0A$A205$A0A6$9D$2C4$9D$D016$60]

PROC Fill=*(CARD c,BYTE r)
[$20GrIO$12A0$4CXIO]
```

```
BYTE FUNC Rand=*(BYTE r)
[$AE$D20A$C9$0$9F0$8486$A2$0$8586$20MultI$A086$60]

PROC Sound=*(BYTE v, p, d, vol)[$A$A284$A8$7C9$530
$64A0$20 Error$998A$D200$A2A5$A0A$A0A$A305$99$D201$60]

PROC SndRst=*()[$AD$232$EF29$8D$232$8D$D20F$A9$0$8A2$9D$D200$CA$FA10$60]

BYTE FUNC Paddle=*(BYTE p)[$BDAA$270$A085$60]

BYTE FUNC PTrig=*(BYTE p)[$A2$0$4C9$330$E8
$329$A8$BD$D300$39*+5$A085$60$804$8040]

BYTE FUNC Stick=*(BYTE p)[$A2$0$2C9$330$E8$129
$BDA8$D300$88$4D0$4A4A$4A4A$F29$A085$60]

BYTE FUNC STrig=*(BYTE p)[$BDAA$D010$A085$60]

BYTE FUNC Peek=*(CARD a)
CARD FUNC PeekC=*(CARD a)
[$A285$A386$A0$0$A2B1$A085$C8$A2B1$A185$60]

PROC Poke=*(CARD a,BYTE v)[$A085$A186$A098$9100$60A0]

PROC PokeC=*(CARD a,v)[$20Poke$A5C8$91A3$60A0]

PROC Zero=*(BYTE POINTER a,CARD s)[$48$A9$0$A485$68]
PROC SetBlock=*(BYTE POINTER a,CARD s,BYTE v)
[$A085$A186$A284$A0$0$A4A5$A3A6$10F0$A091$C8$FBD0$A1E6$A3C6$F5D0
$3F0$A091$C8$A2C4$F9D0$60]

PROC MoveBlock=*(BYTE POINTER d,s,CARD sz)
[$A085$A186$A284$A0$0$A5A5$16F0
$A2B1$A091$C8$F9D0
$A1E6$A3E6$A5C6$F1D0$5F0
$A2B1$A091$C8$A4C4$F7D0$60]


INT FUNC SCompare=*(BYTE ARRAY a,b)
[$A485$A586$A284$A0$0$A084$A184$A4B1$A2D1$3F0$20*+21
$C9$0$1D0$60$A685$C8$A4B1$A2D1$5D0$A6C4
$F590$60$FFA2$A086$390$A2B1$E8$A186$60]

PROC SCopy=*(BYTE ARRAY d,s)
[$A085$A186$A284$A0$0$A2B1$A091$8F0$A8$A2B1$A091$88$F9D0$60]

PROC SCopyS=*(BYTE ARRAY d,s,BYTE b,e)
[$A085$A186$A284$A0$0$A2B1$A5C5$2B0$A585$A4C6$18$A2A5
$A465$A285$290$A3E6$38$A5A5$A4E5$2B0$A9$0$4CSCopy+10]

PROC SAssign=*(BYTE ARRAY d,s,BYTE b,e)
[$A085$A186$A284$A0$0$A2B1$DF0$A685$A4C6$38$A5A5$A4E5$2F0
$1B0$AA60$A6C5$890$18$A6A5$AA$A465$A585
$A5A5$A0D1$390$A091$18$A0A5$A465$A085$290
$A1E6$4C8ASCopy+14]
```