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CORE 15 IOTS (IOTS,53) 9/28/73 BPC/JBL/JGC

SZS=640000

LAT=762200

PTRHNG=650000

CLKHNG=740000

/P POINTERS

BITS=0

BILLTT=6

SUPTD=7

PROGAD=30

USERAC=44

USERPC=45

USERIO=46

USERFG=47

TTNO=76

/IOTS

TYO=IOT 3

LRG=IOT 10

RRO=IOT 17

RCK=IOT 32

CKS=IOT 33

RRI=IOT 37

DSC=IOT 50

ASC=IOT 51

ISB=IOT 52

LSM=IOT 54

ESM=IOT 55

LEM=IOT 74

FBC=IOT 2015

EEM=IOT 4074

XMT=IOT 4340

RPS=IOT 4540

I/ OFFSET DCH

COR=DCH I

/SEQ,BRK, EXITS IN CORE 14

CH4BRK, 0

/CHANNEL 4 DEBREAK

OCTR, 0

/CHANNEL 7 VARIABLE

1MINX, 0

/CHANNEL 10 DEBREAK

PEXIT, 0

/CHANNEL 3 DEBREAK

TELEXIT, 0

/CHANNEL 13 DEBREAK (INTERRUPT FROM PDP-7)

bug on page 11

/DISPATCHER REGISTERS

RSTAT, 0
 MSTAT, 0
 R0, 0
 R1, 0
 R2, 0
 ILGIOT, 0
 DSP1, 0
 HOTFLG, 0
 C16RH, 0
 FSTAT, 0
 BDSTAT, 0
 C16SWF, 0
 C16FERR, 0
 ICORE, 0
 ISTAT, 0
 DELAY, 0

UNTBL;

.UNTBL, 200000 /BITS + USER NUMBER
 =0 /REEL

.UNTBL+2, 200000
 =0

/BIT0=UNUSEABLE, BIT1=FREE, BIT2=IN BACKWARDS POSITION, BIT3=WRITE RING

NETUWT, 0 /NET HANDLER WAITING IF NON ZERO
 NETNI, 0 /NET SERVICE WAITING IF NON ZERO

TME, 0 /MINUTES SINCE MIDNIGHT
 DAT, LCH I, /DAYS SINCE 1848, 130773=OCT 1, 1973

TMADAT, LAC NETHND /FIX UP PDP=1'S NET READY LINE
 SZA
 NETMIU
 SZA I
 NETMID
 IDX TME / 1 MIN. CLOCK
 SAS (60,"T"24,)
 JMP I 1MINX
 IDX DAT /NEW DAY
 DZM TME
 JMP I 1MINX

DGTDI SZF I 6 /DISPATCHER GTD IOT
 JMP DGTDR
 LSM
 LAC DAT
 LIO TME
 ESM
 JMP DGTDI

DGTDR, LAC I (SUPTD)
 LIO I (SUPTD+1)
 DGTDI, DAC I (DCH 70)
 DIO I (DCH 72)
 JMP I R1

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/SOROBAN TYPE=OUT ROUTINE

```
SOT,      DAC SOTX
          CKS
          RIL 2S
          SPI I
          JMP I SOTX
          LAC SOTOUT
          SAD SOTIN
          JMP I SOTX
          SAD (JMP COR SOTBUF SOTLEN=1
          LAW SOTBUF=1
          DAP SOTOUT
          LIF"U"SCF
          LCH I SOTOUT
          LFI
          RCL 6S
          TYO
          JMP I SOTX
SOTX,      0
```

/PUT A CHAR IN THE SOROBAN BUFFER

SOTDCH, 0 /CALL OUT OF S, B, MODE

```
SOTDC1,   DAC SOTDCX
          LAC SOTIN
          IDC
          SAD (LAC COR SOTBUF+SOTLEN
          SUB (SOTLEN
          SAD SOTOUT
          JMP SOTDC3
          DAC SOTIN
          LAC SOTDCH
          DCH SOTIN
SOTDC2,   ISB 1400
          JMP I SOTDCX
SOTDCX,   0
```

```
SOTDC3,   SZS 20
          JMP I SOTDCX
          JSP SOT
          JMP SOTDC1
```

SOTLEN=100

```
SOTBUF,   I+,+SOTLEN/
SOTIN,     COR SOTBUF
SOTOUT,    COR SOTBUF
REPEAT 1IF P,EXPUNGE SOTLEN
```

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/SOROBAN OCTAL PRINT , IO(NUMBER) , AC(=NUMBER OF DIGITS)

SOTOCT, 0
DAC SOTOCX
SOTOC1, CLA
RCL 38
DIO SOTNUM
SZA I
LAW 20
RAR 68
JDA SOTDCH
LIO SOTNUM
ISP SOTOCT
JMP SOTOC1
JDA SOTDCH
JMP I SOTOCX
SOTOCX, 0
SOTNUM, 0

/OCTAL PRINT WITH DELETE LEADING ZERO

SOTPR1, 0
DAC SOTOCX
LAW I 6
DAC SOTOCT
CLL"U"CML
LIO SOTPR1
CLA
RCL 38
SZA
CLL
SZA I
LAW 20
RAR 68
DIO SOTPR1
SZL I
JDA SOTDCH
ISP SOTOCT
JMP SOTPR1
SZL"U"CLL
JMP SOTPR1
JMP I SOTOCX

INTCOT,	000000	000000
000057	550000	335473
212001	020304	050607
101173	007400	720000
616263	646566	677071
414243	444546	475051
222324	252627	303135
563477	560000	

/SOROBAN TYPE=OUT CONCISE/INTERNAL STRING

```

SOTINT, 0
        LIO SOTINT
        DIO SOTXT
        DZM SOTPRT
        SZF 6
        JMP SOTXT9      /INTERNAL
        JMP SOTXT8      /CONCISE

```

/SOROBAN TYPE=OUT STRING

```

SOTXT, 0
SOTXT8, DAC SOTPRT
SOTXT9, DAC SOTOCX
        LAW I 100,      /UP TO ONE HUNDRED CHARACTERS
        DAC SOTOCT
SOTXT1, LCH I SOTXT
        LIO SOTPRT
        SNI I          /INTERNAL OR CONCISE ?
        JMP SOTXT2
        RCL 78
        DIV ,+1
        3
        RAL 28
        RCR 28
        ADD (COR+INTCOT)
        DAC SOTNUM
        LCH I SOTNUM
SOTXT2, SAD (560000)    /OVERBAR
        JMP I SOTOCX
        JDA SOTDCH
        ISP SOTOCT
        JMP SOTXT1
        JMP I SOTOCX

```

/DISPATCHER IOT TO USE SOROBAN

```

SOTT,  LAW I 177+1000"4
        ADD I RSTAT
        SCR 98
        LSM
        JDA SOTOCT
        LIO I (TTNO)
        RIR 68
        LAW I 2
        JDA SOTOCT
        LAC I (DCH 70)
        JDA SOTINT
        LAC I (DCH 72)
        SZF I 1
        JMP SOTT2
        JDA SOTPRT
SOTT3, LAC (347277)
        JDA SOTDCH
        JDA SOTDCH
        JDA SOTDCH
        ESM
        JMP I R1

```

```

SOTT2, SZF 2
        JDA SOTINT
        JMP SOTT3

```

SOT + X1 ← INTERNAL CODE STRING(S)

/SOT + X1 ← AC has string ptr

/SOT + 4X ← IO has number for octal print

/SOT + 2X ← IO has 2nd string ptr

```

C16RET:  LAC I (DCH 71) /LEGAL ONLY FROM CORE 16
          RAL 28
          SMA
          JMP I ILGIOT   /ILLEGAL FROM CORE 0
          LAW C16RTB
          AAI"U"SCF
          DAP C16R1      /SETUP REDISPATCH
          SUB (C16RTT)
          SZM
C16RI,   JMP I ILGIOT   /BEYOND RANGE OF TABLE, ILLEGAL
C16R1,   JMP .
C16RTB,  JMP C16RN      /NORMAL RETURN
          JMP C16RA      /ABNORMAL RETURN
          JMP I C16RH     /HH16 RETURN
          JMP C16HHR     /INITIATE HALT HRR, SOROBAN TYPEOUT
          JMP I C16FIN    /FASTRAND INSWAP
          JMP I C16FOU    /FASTRAND OUTSWAP
          JMP I C16FSW    /FASTRAND SWAP
          JMP I C16SWF    /FASTRAND FINISHED
C16RTT,  JMP I C16FERR   /FASTRAND ERROR
C16RN,   JSP C16RTS     /CALL RETURN ROUTINE
          JMP I R0       /AND GIVE RETURN 0
C16RA,   LAW C16RI      /SETUP EXIT TO ILGIOT
C16RTS,  DAP C16RSX
          LAC I (USERAC)
          DAC I (DCH 70)
          LAC I (USERPC)
          DAC I (DCH 71)
          LIO I (USERIO)
          DIO I (DCH 72)
          LIO I (USERFG)
          DIO I DSP1
          AND (170000)   /CHECK ON DEBREAK PC'S CORE
          SZA I          /ONLY 0 LEGAL
C16RSX,  JMP .          /RETURN
          JMP I ILGIOT

```

/SOROBAN TYPEOUT FOR HALT HORRIBLE

```
C16HHR,  LAC (10000)
          IOR I (BITS)
          DAC I (BITS)
          LAC MSTAT      /GET =STAT IN AC
          ADD I RSTAT
          RCR 9S
          LAW I 3
          LSM
          JDA SOTOCT      /TYPE PROGRAM NUMBER
          LAW I 2
          LIO I (BILLTT)
          RIR 6S
          JDA SOTOCT      /TYPE TT NUMBER
          LAW I 3
          LIO I (PROGAD)
          RIL 9S
          JDA SOTOCT      /TYPE PROGRAM ADDRESS
          LAW I 6
          LIO I (DCH 70)
          JDA SOTOCT      /TYPE TRAP BUFFER
          LAW I 6
          LIO I (DCH 72)
          JDA SOTOCT      /TYPE DRUM ADDRESS
          CLC
          JDA SOTDCH      /TYPE CR (77)
          ESM
          JMP I R1
```

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HLD, SZF 1 /BARE BONES "HOLD" IOT
 JMP I R1
 JMP I R2

/OLD LINE PRINTER STUFF, 2400 BITS PER SECOND
PBRK, JMP I PEXIT /INTERRUPT ON CHANNEL 3
PCHR, JMP I R1 /DISPATCHER IOT+21XX

/OLD PDP=7 STUFF, PDP=1 IOTS TO MAKE DIRECT MEMORY REFERENCE(S)
/ INTO PDP=7 CORE. SOMEDAY THIS STUFF COULD BE USED WITH
/ THE LOCKHEED SUE'S FOR PROGRAM LOADING, ETC.

DTEL, JMP I R1

TELINT, JMP I TELEXIT


```

EXEC,      SZS I 50          /IOT GET EXEC STATUS
           JMP I ILGIOT      /SS 5 PROTECTED
           LAC I (DCH 71)
           IDA
           DAC ,EXEC1
           LAC (EXECRT)      /GIVE USER A HANDLE BACK TO USER MODE
           DAC I (77)
           JMP I ,EXEC1      /SET USER RUNNING ON A CH 16 BRK STARTED

```

```

EXECRT:    DAC I (DCH 71) /JSP HERE WHEN DONE
           JMP I R0

```

```

EXEC1,     0

```

AND (IDA)
 SBA
 JMP I R0
 LAC (577777)
 AND I (DCH 71)
 DAC I (DCH 71)

```

/HARDWARE IOT'S FOR DRIVING NET INTERFACE

```

```

NETSWD=IOT 1043      /SKIP IF [INPUT] WORD DONE
NETINW=IOT 1443      /READ WORD FROM NET
NETSNE=IOT 1243      /SKIP IF NO [INPUT] ERROR
NETCLE=IOT 1643      /CLEAR ERROR
NETSIR=IOT 1143      /SKIP IF IMP READY
NETSFW=IOT 1543      /SKIP IF FINAL [INPUT] WORD
NETAIIS=IOT 1343     /ACTIVATE INPUT INTERRUPT
NETSSE=IOT 0043      /SKIP IF [OUTPUT] SHIFTER EMPTY
NETOUT=IOT 0443      /WRITE WORD TO NET
NETOTF=IOT 0243      /WRITE FINAL WORD
NETM!U=IOT 0643      /BRING UP OUR READY LINE
NETM!D=IOT 0143      /TAKE DOWN OUR READY LINE
NETAOI=IOT 0543      /ACTIVATE OUTPUT INTERRUPT

```

```

/NETWORK INPUT BUFFER

```

```

/BOTH BUFFERS ARE 100 LONG AND MUST BEGIN AT MULTIPLE OF 200

```

```

REPEAT 1 IF P, PRINT "HERE TO NEXT MULTIPLE OF 200 IS PATCH AREA"
I+[,+177]"A"7600/
NETIBF:  I+.,+100/

```

/NETWORK INTERRUPT HANDLER = CHANNEL 11

```

NTINT:  DAC NTINTX
        NETSWD
        JMP NTINT0      /NOT AN INPUT INTERRUPT
        NETSNE
        JMP NTINT1      /ERROR
NTINT7, LAC NETISP ovp
        IDA
        AND (=100)
        SAS NETIUP ovp
        JMP NTINT2
        DAC NETNI      /BUFFER FULL, HAVE CH 16 WAKE US UP
        JMP NTINT0

NTINT1, NETSFW      /AT THE END OF THE DEAD MESSAGE?
        SKP I
        JMP NTINT7      /YES, FEED USER THE ERROR
        NETAII      /OTHERWISE JUST THROW WORD AWAY
        NETINW
        JMP NTINT0

NTINT2, LAC (200000) /BUILD WORD FOR BUFFER
        NETSFW
        CLA
        NETSNE
        IOR (400000)
        NETCLE
        NETAII
        NETINW
        IAI
        DAC I NETISP ovp
        IDX NETISP ovp
        AND (=100)
        DAC NETISP
        LAC NETUWT      /DO WE HAVE TO WAKE UP HANDLER?
        SZA
        JSP NETWAK      /GO DO IT
        ESM
        DZM NETUWT
        JMP NTINT0

NETISP, NETIBF      /INPUT SERVICE POINTER
NETIUP, NETIBF      /INPUT USER POINTER
    
```

NTINT0, NETSSE
 JMP I NTINTX /OUTPUT SIDE NOT AVAILABLE
 LAC NETOSP /WORD TO GO?
 SAS NETOUP
 JMP NTINT5
 DAC NETNI /NOTHING MORE TO SEND
 JMP I NTINTX

NTINT5, LIO I NETOSP
 NETAOI
 SPI
 NETOTF
 SPI I
 NETOUT
 IDX NETOSP
 AND (=100)
 DAC NETOSP
 LAC NETUNT /RESTART HANDLER IF NECESSARY
 SZA
 JSP NETWAK
 DZM NETUNT
 JMP I NTINTX

NETOSP, NETOBF
 NETOUP, NETOBF

REPEAT 1IF P,PRINT "HERE TO NEXT MULTIPLE OF 200 IS PATCH AREA"
 I+[,+177]"A"7600/
 NETOBF: I+.,+100/ /NETWORK OUTPUT BUFFER

NETWAK, LSM /WAKE UP NET HANDLER

DAP NTHAKX
 LAC NETHND
 SZA I
 JMP I /THERE IS NO NET HANDLER

LAW I 7777
 AND I NETHND
 SAS (CLKHNG)
 JMP NTHAK1 /HE'S NOT ASLEEP AT THE MOMENT
 DZM I NETHND /A GOOD, SOLID POKE
 DZM I HOTFLG
 ISB 1700
 JMP NTHAKX

NTHAK1, AND B1
 SZA
 JMP NTHAK2 /HUNG IN SOME STRANGE WAY
 LAW 7777

AND I NETHND
 SUB (100) /RUNNING, USING IOP, WAITING FOR IOP, ETC.
 SPA /IS HE FAIRLY LOW ON THE QUEUE ?

JMP NTHAK2
 LAW 20 /YUP, HELP HIM OUT.
 NTHAK2, DZM NETFLG /REMEMBER THIS NOTABLE EVENT
 JMP NTHAKX

DAP I NETHND

/USER CALL TO ACCESS NETWORK

```

NET,      SZF I 1
          JMP NET01      /RESTRICTED IOT'S
          SZF I 5
          JMP NET02      /GET OR RELEASE
          SZF 6
          JMP NET11
          JSP NETWAK      /IOT "NETPOK"
          ESM
          JMP I R1

NET11,    LAW 7777
          AND NETHND
          SAS I RSTAT
          SZA
          NETSIR          /IOT "NETUP"
          JMP I R1        /R1 => NO
          JMP I R2        /R2 => YES

NET02,    LAW 7777
          AND NETHND
          SAS I RSTAT    /DO SOMETHING IF CALLER IS NET HANDLER...
          SZA            /...OR THERE IS NO NET HANDLER AT ALL
          SKP I
          JMP I R1        /OTHERWISE IOT IS A NOP
          LSM
          LAC NETIUP
          DAC NETISP
          LAC NETOUP
          DAC NETOSP
          LAC LSPPTR
          DAC LSGPTR
          ESM
          LAC I RSTAT    /ALWAYS GRAB NET FIRST
          IOR (DCH)
          DAC NETHND
          NETMIU
          NETAI
          NETINW
          SZF I 6
          JMP I R2        /YOU'VE GOT NETWORK
          NETMID          /REALLY WANTED TO RELEASE IT
          DZM NETHND
          JMP I R1

NETFLG,   =0            /0 IF SOME EXCITING EVENT HAS HAPPENED
NETHND,   0             /STAT PTR TO NET HANDLER
NETADR,   0             /ADDRESS IN USER CORE FOR DATA TRANSFERS
NTINTX,   0             /CORE 14 LINK FOR CH 11 DEBREAK

```

```

NET01,  LAW 7777      /YOU MUST BE NET HANDLER TO GET ANY FARTHER
        AND NETHND
        SAS I RSTAT
        JMP I ILGIOT   /YOU LOSE
        SZF 5
        JMP NET03
        LAW 7777      /SET UP USER DATA ADDRESS
        AND I (DCH 70)
        DAC NETADR
        SZF 6
        JMP NET04
NET13,  LAC NETIUP     /FETCH A WORD FROM NET BUFFER
        LSM
        SAD NETISP
        JMP NET12      /BUFFER EMPTY
        ESM
        LAC I (DCH 72)
        SAS NETADR
        JMP NET15
        SUB (1)        /OVERRUN, DON'T ADVANCE DATA ADDRESS
        DAP NETADR
NET15,  LIO I NETIUP
        LSM
        IDX NETIUP     /STEP USER POINTER
        AND (=100)
        DAC NETIUP
        LAC NETNI      /SERVICE ROUTINES HAVE TO BE WOKEN UP?
        DZM NETNI
        SZA
        ISB 1100
        ESM
        LAC (177777)
        NAI
        DAC I NETADR   /TUCK AWAY THE WORD
        IDX NETADR
        DAP I (DCH 70)
        SPI            /ERROR?
        JMP I R2       /YES
        RIL 18
        SPI I
        JMP NET13      /MORE WORDS TO COME
        IDX I (DCH 71) /END OF GOOD MESSAGE = R3
        JMP I R2
NET12,  DAC NETUWT     /WAIT FOR NEXT WORD
        JMP NETR1

```

```

NET04,  LAC NETOUP      /ROOM IN BUFFER FOR ANOTHER WORD?
        IDA
        AND (=100)
        LSM
        SAD NETOSP
        JMP NET16      /NO
        ESM
        CLI
        LAC I (DCH 72)
        SAD NETADR
        LIO (400000)
        LAC (177777)
        AND I NETADR
        IAI
        DAC I NETOUP
        LSM
        IDX NETOUP
        AND (=100)
        DAC NETOUP
        LAC NETNI
        DZM NETNI
        SZA
        ISB 1100
        IDX NETADR
        DAP I (DCH 70)
        ESM
        SPI I
        JMP NET04      /GET NEXT WORD
        JMP I R2       /DONE WITH MESSAGE

NET16,  DAC NETUWT      /WAIT FOR BUFFER TO EMPTY
NETR1,  ESM
        JMP I R1

NET03,  LSM            /PUT NET HANDLER TO SLEEP
        LAC NETFLG     /ANYTHING OF NOTE HAPPENED RECENTLY?
        SZA
        JMP I DELAY    /NO, BYE BYE
        CLC            /YES, SEND HANDLER ON ITS WAY...
        DAC NETFLG
        ESM
        CLA
        DAP I NETHND   /...QUICKLY
        JMP I R1

```

/NETWORK LIST PAIRS==NETPUT AND NETGET IOTS

```

LSPR,    LAW 7777
        AND NETHND
        SZA I
        JMP I R1      /NO NETHANDLER
        CLF 6
        SAD I RSTAT
        STF 6          /CALLED BY NETHANDLER
        SZF 1
        JMP LSPRG      /GET
        LAW 2
        ADD LSPPTR
        SAD (DCH I LSPBUF+LSPBFL)
        LAC (DCH I LSPBUF)
        SAD LSGPTR
        JMP I R1      /BUFFER IS FULL
        LAC I RSTAT
        RCR 68
        LAC I (DCH 70)
        SZF I 6
        RCL 68
        SZF I 6      /NETHANDLER GETS TO PUT WHOLE AC
        RAR 68
        DAC I LSPPTR
        IDX LSPPTR
        LAC I (DCH 72)
        DAC I LSPPTR
        IDX LSPPTR
        SAD (DCH I LSPBUF+LSPBFL)
        LAW LSPBUF
        DAP LSPPTR
        JSP NETWAK      /DO A NETPOK
        ESM
        JMP I R2

```

```

LSPRG,   SZF I 6
        JMP I ILGIOT  /LOSE IF NOT NETHANDLER
        LAC LSGPTR
        SAD LSPPTR
        JMP I R1      /NOTHING TO GET
        LAC I LSGPTR
        DAC I (DCH 70)
        IDX LSGPTR
        LAC I LSGPTR
        DAC I (DCH 72)
        IDX LSGPTR
        SAD (DCH I LSPBUF+LSPBFL)
        LAW LSPBUF
        DAP LSGPTR
        JMP I R2

```

```

LSPPTR,  DCH I LSPBUF
LSGPTR,  DCH I LSPBUF
LSPBFL=200
LSPBUF,  ,+I+LSPBFL/
START XX=JMP

```