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MTRB9 - HB9 MONITOR *09:01:00. Zenith Data Systems UNIX HB/HB9 Cross Assembler PA
BE 22
MTR - MAIN EXECUTIVE LOOP. 15:27:30 28-MAY-80

835 *** ERROR - COMMAND ERROR.
836 *
837 * ERROR IS CALLED AS A 'RAIL-OUT' ROUTINE.
838 *
839 * IT RESETS THE OPERATIONAL MODE, AND RESTORES THE STACK POINTER.
840 *
841 * ENTRY NONE
842 * EXIT TO MTR LOOP
843 * CTLFLG SET
844 * MFLAG CLEARED
845 *
846 *
847 * IF .RAM.
848 * ELSE
849 * ERRNZ *-322A
850 * ENDIF

851 *
852 * EQU *
853 * LXI H, MFLAG
854 * MOV A, H
855 * ANI 3770-UD,DDU-UD,NFR (A) = .MFLAG RE-ENABLE DISPLAYS
856 * MOV M, A REPLACE
857 * INX H
858 * MVI M, CB.SSI+CB.MTL+CB.CLI+CB.SPK RESTORE *CTLFLG*
859 * ERRNZ CTLFLG, MFLAG-1
860 * EI
861 * LHL REGPTR
862 * SPHL
863 * CALL ALARM RESTORE STACK POINTER TO EMPTY STATE
864 * ALARM FOR 200 MS

865 ** MTR - MONITOR LOOP.
866 *
867 *
868 * IF .RAM.
869 * ELSE
870 * ERRNZ *-344A
871 * ENDIF

872 *
873 * EQU *
874 * EI

875 *
876 * MTR1
877 * LXI H, MTR1
878 * PUSH H
879 * JMP CKAUTO SET 'MTR1' AS RETURN ADDRESS
880 * MTR.15 CALL TYPMSS CHECK AUTO BOOT, IF NOT CONTROL BACK TO NEXT
881 *
882 * MTR.2 CALL RCC READ A CONSOLE CHARACTER
883 * ANI 01011111B MAKE SURE ITS UPPER CASE TO MATCH TABLE
884 * LXI H, MTRAL LOOK UP CHARACTER IN *MTRAL*
885 * MVI B, MTRAL (B) = LENGTH OF TABLE
886 * CMF M SEE IF CHARACTER FROM CONSOLE = TABLE ENTRY
887 * JZ MTR.4 IF EQUAL

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MTRB9 - H89 MONITOR *09.01.00.
 GE 23 Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 MTR - MAIN EXECUTIVE LOOP. 15:27:31 28-MAY-80

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888      000.375 043      INX H      POINT TO NEXT TABLE ENTRY
889      000.376 043      INX H
890      000.377 043      INX H
891      001.000 005      ICR B      SEE IF FAST END OF TABLE
892      001.001 302 371 000      JNZ MTR.3    IF NOT FAST
893      001.004 076 007      MVI A,A,BEL      ELSE, DING ERROR
894      001.006 315 302 003      CALL WCC      TRY AGAIN
895      001.011 303 357 000      JMP MTR.2
896      001.014 315 302 003      CALL WCC      WRITE CHARACTER BACK TO CONSOLE
897      001.017 043      INX H      GET ROUTINE ADDRESS LSR
898      001.020 176      MOV A,M      GET MSR
899      001.021 043      INX H
900      001.022 146      MOV H,M      (H,L) = ROUTINE ADDRESS
901      001.023 157      MOV L,A      GO TO ROUTINE
902      001.024 351      PCHL
903      007
904      008
905      009 MTR      EQU *      JUMP TABLE
906      010      SET *254      ALL ROUTINES MUST START IN THIS PAGE
907      011      DB 'G'      GO TO USER ROUTINE
908      012      DW 0088
909      013
910      014      DB 'S'      SUBSTITUTE MEMORY MODE
911      015      DW SUBM
912      016
913      017      DB 'P'      PROGRAM COUNTER ALTER MODE
914      018      DW PCA
915      019
916      020      DB 'E'      ROOT H-17 OR Z-47 DRIVE
917      021      DW BOOT
918      022
919      000.004      EQU *      NUMBER OF TABLE ENTRIES /JMT 790507/
920      001.041 040 123 104      RMSG IB 'SD',0    'SECONDARY DEVICE'
921      001.045 077 000      ERMSG IB '7',0    ERROR MESSAGE

```

MSG. ERR 15:27:31 28-MAY-80

```
001.047.....ORG.....1047A.....
931 ** MSG.ERR - ERROR MESSAGE FOR RAM TEST
932 *
933 *
934 * *ERROR @ *
935
001.047 015 012 012 MSG.ERR DB A.CR,A.LF,A.LF
001.052 105 122 122 DB 'ERROR,@'
001.062 000 DB 0
```

[illegible]

MTK89 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 BE 25
 MTR - MAIN EXECUTIVE LOOP.

15:27:31 28-MAY-80

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941 **      SAE = STORE ABUSS AND EXIT.
942 *
943 *      ENTRY (HL) = ABUSS VALUE
944 *      EXIT TO (RET)
945 *      USES NONE
946
947      IF ... RAM.
948      ELSE
949      ERNZ *=-1063A
950      ENDIF
951
952 SAE      SHLD ABUSS
953 RET

```

```

955 **      PIN = PORT IN
956 *
957 *      PIN INPUTS A BYTE FROM DISK
958 *
959 *      ENTRY: NONE
960 *
961 *      EXIT: (A) = INPUT BYTE FROM Z47
962 *
963 *      USE: AF
964
965 PIN      EQU *
966 CALL IN.
967 ANI S.PTR
968 JR Z,PIN
969 CALL IN1
970 RET

```

GET STATUS
 CHECK FOR DATA TERMINAL REQUEST
 IF READY, WAIT
 INPUT A BYTE FROM PORT

```

001.067 315 170 006
001.067 315 170 006
001.072 346 200
001.074 050 371
001.076 315 156 006
001.101 311

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NRB9 - HB9 MONITOR #09:01:00. Zenith Data Systems UNIX HB/HB9 Cross Assembler PA
 RE 26
 MONITOR TASK SUBROUTINES. 15:27:32 28-MAY-80

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001.103      ORG 1103A
              PCA - PROGRAM COUNTER ALTER
773 **      PCA INPUTS AND/OR DISPLAYS THE CURRENT USER PROGRAM VALUE AND ALLOWS
774 **      A NEW VALUE TO BE ENTERED OR RETAINS THE CURRENT VALUE IF
775 *      A CR IS TYPED
776 **
777 *      ENTRY NONE
778 *      EXIT NONE
779 *      USES A,D,E,H,L,F
780 *
781 *
782 *
783
784
001.103      LXI H,MSG,PC      COMPLETE PC MESSAGE
001.106      CALL TYPMSG
001.111      MVI A,10      GET LOCATION OF USER PC
001.113      CALL LRA
001.116      MOV E,M      (D,E) = USER PC VALUE
001.117      INX H
001.120      MOV D,M      (H,L) = USER PC VALUE
001.121      XCHG
001.122      CALL IROC
001.125      JC PCA1      INPUT NEXT CHARACTER
                          IF FIRST CHARACTER WAS OCTAL, INPUT NEW PC
001.130      CALL IOA      ELSE, OUTPUT CURRENT VALUE
001.133      CALL IROC      SEE IF USER WANTS TO CHANGE IT NOW
001.136      RNC          IF NO CHANGE, EXIT
1000
1001 *      ENTER NEW USER PC VALUE
1002
001.137      XCHG      (H,L) = ADDRESS OF USER PC VALUE
001.140      MVI D,A,CR  END BYTE WITH A RETURN
001.142      CALL IOA      INPUT NEW ADDRESS
001.145      RET
1006

001.146      LXI H,MSG,GO      COMPLETE GO MESSAGE
001.151      CALL TYPMSG
001.154      CALL IROC      INPUT A RETURN OR AN OCTAL CHARACTER
001.157      JNC GO88.1      IF RETURN, GO TO CURRENT USER PC
1014
001.162      PUSH PSW      ELSE, SAVE OCTAL CHARACTER AND FLAGS
001.163      MVI A,10      GET ADDRESS OF USER PC
001.165      CALL LRA
001.170      INX H      POINT TO MSB
001.171      POP PSW      GET FIRST CHARACTER BACK
001.172      MVI D,A,CR  END ADDRESS WITH A RETURN
1025
1008 **      GO88 - GO TO USER ROUTINE FROM HB8 MONITOR
1009 *
1010 *
1011 *      GO88 WAITS FOR A CARRIAGE RETURN OR A NEW ADDRESS TERMINATED WITH
1012 *      A CARRIAGE RETURN. IF NO ADDRESS IS ENTERED, GO88 TRANSFERS
1013 *      CONTROL TO THE ADDRESS SPECIFIED BY THE USER PC VALUE
1014
001.146      LXI H,MSG,GO      COMPLETE GO MESSAGE
001.151      CALL TYPMSG
001.154      CALL IROC      INPUT A RETURN OR AN OCTAL CHARACTER
001.157      JNC GO88.1      IF RETURN, GO TO CURRENT USER PC
1019
001.162      PUSH PSW      ELSE, SAVE OCTAL CHARACTER AND FLAGS
001.163      MVI A,10      GET ADDRESS OF USER PC
001.165      CALL LRA
001.170      INX H      POINT TO MSB
001.171      POP PSW      GET FIRST CHARACTER BACK
001.172      MVI D,A,CR  END ADDRESS WITH A RETURN
1025

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MTK89 - H89 MONITOR $09.01.00.
GE 27 Zenith Data Systems UNIX H8/H89 Cross Assembler PA
MONITOR TASK SUBROUTINES. G088 15:27:32 28-MAY-80

001.174 315 062 003 1026 CALL IOA INPUT NEW GO ADDRESS.
001.177 315 302 003 1027 G088.1 ECHO RETURN
001.202 076 012 1028 MVI A,A,LF LINE FEED.
001.204 315 302 003 1029 CALL WCC
001.207 303 222 001 1030 JMP GO EXECUTE USER ROUTINE.

1032 ** AUTOBO - AUTO BOOT
1033 *
1034 * ENTRY: NONE
1035 *
1036 * EXIT: (SEE 'DEVICE' ROUTINE)
1037 *
1038 * USE: ALL
1039 *
001.212 257 301 002 1040 AUTOBO XRA A SET TO PRIMARY FLAG
001.213 315 301 002 1041 CALL DEVICE CHECK DEVICE INFORMATION.
001.216 303 336 001 1042 JMP BOOTO GOTO BOOT IT

1044 ORG 1222A
1045 ** GO - RETURN TO USER MODE
1046 *
1047 * ENTRY NONE
1048 *
1049 IF .RAM.
1050 ELSE
1051 ERRNZ *-1222A
1052 ENAIF
1053
001.222 303 063 000 1054 JMP GO.

1056 ** SSTEP - SINGLE STEP INSTRUCTION.
1057 *
1058 * ENTRY NONE
1059 *
1060 IF .RAM.
1061 ELSE
1062 ERRNZ *-1225A
1063 ENAIF
1064
001.225 363 072 011 040 1065 SSTEP EQU * SINGLE STEP
001.225 363 072 011 040 1066 PI DISABLE INTERRUPTS UNTIL THE RIGHT TIME
001.226 072 011 040 1067 LDA CTLFLG
001.231 356 030 1068 XRI CB,SSI CLEAR SINGLE STEP INHIBIT
001.233 323 330 1069 OUT OP,CTL PRIME SINGLE STEP INTERRUPT
001.235 062 011 040 1070 SSTEP STA CTLFLG SET NEW FLAG VALUES
001.240 341 1071 POP H CLEAN STACK
001.241 303 172 000 1072 JMP INTXIT RETURN TO USER ROUTINE FOR STEP.

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MT889 - H89 MONITOR *09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 28
 MONITOR TASK SUBROUTINES. 15:27:33 28-MAY-80

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1074 ** STPRN - SINGLE STEP RETURN
1075
1076 IF .RAM.
1077 ELSE
1078 ERNZ *1244A
1079 ENDIF
1080
1081 STPRN EQU *
1082 ORI CR.SSI          DISABLE SINGLE STEP INTERRUPTION
1083 OUT OP.CTL          TURN OFF SINGLE STEP ENABLE
1084 SET CILFLG
1085 STAX D
1086 ANI CR.MTL          SEE IF IN MONITOR MODE
1087 JNZ MTR
1088 JMF UIVECT3         TRANSFER TO USER'S ROUTINE

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MTR89 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
GE 29
NORMAL BOOT 15:27:33 28-MAY-80

1091. ** NBOOT - NORMAL BOOT
1092. *
1093. * NBOOT IS ENTERED WHEN USER TYPE 'BOOT' COMMAND FROM MONITOR,
1094. * IT WILL ACCEPT THE BOOT DEVICE AS WELL AS THE UNIT NUMBER FROM
1095. * CONSOLE AND GO TO THE BOOT CODE.
1096. *
1097. * ENTRY: NONE
1098. *
1099. * EXIT: (AIO,UNI) = UNIT NUMBER TO BOOT
1100. * (PRIM) = PORT ADDRESS OF THE BOOT DEVICE
1101. * (TMFG) = DEVICE TYPE, =1 IS Z47, =0 IS H17
1102. *
1103. * USED: ALL
1104.
001.261 257 XRA A
001.262 315 301 002 NBOOT
001.263 315 262 003 CALL DEVICE
001.270 376 015 START1 ACC
001.272 050 042 CPI A,CR
001.274 376 060 JR Z,ROOTO
001.276 070 007 CPI '0'
001.300 270 007 JR C,WRONG
001.301 070 036 CMP B
001.303 010 113 JR C,ROOT5
001.304 050 010 DB MI,EXAF
001.306 010 115 JR Z,NB7
001.307 076 007 EQU *
001.307 076 007 MVI A,A,BEL
001.311 315 302 003 CALL WCC
001.314 030 347 JR START1
001.316 010 1121 NB7
001.317 346 137 DB MI,EXAF
001.321 376 123 ANI 0101111B
001.323 040 362 JR NZ,WRONG
001.325 041 041 001 1126 * USER WISHES TO BOOT FROM SECONDARY DEVICE.
001.325 041 001 1127 *
001.330 315 100 006 1128 PSEC
001.333 074 1132 CALL H,BSMSG
001.334 030 324 INR A
001.335 1133 JR NROOTO
001.336 257 1136 * SAVE THE AIO,UNI, CHECK IF THERE IS THE BOOT DEVICE AND GO!
001.337 030 012 1137 EOOT0
001.341 315 302 003 1138 XRA A
001.346 107 1139 JR BOOT6
001.347 315 003 006 1140 BOOT5
001.352 170 1141 SUI '0'
001.353 062 061 041 1142 MOV B,A
001.356 174 1143 CALL WCR
001.357 062 061 041 1144 MOV A,B
001.358 062 061 041 1145 EOOT6
001.359 062 061 041 1146 STA AIO,UNI
001.360 062 061 041 1147 MOV A,H
001.361 062 061 041 1148 CHECK IF NO DEVICE AT ADDR, PORT
001.362 062 061 041 1149
001.363 062 061 041 1150
001.364 062 061 041 1151
001.365 062 061 041 1152
001.366 062 061 041 1153
001.367 062 061 041 1154
001.368 062 061 041 1155
001.369 062 061 041 1156
001.370 062 061 041 1157
001.371 062 061 041 1158
001.372 062 061 041 1159
001.373 062 061 041 1160
001.374 062 061 041 1161
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001.414 062 061 041 1201
001.415 062 061 041 1202
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001.641 062 061 041 1428
001.642 062 061 041 1429
001.643 062 061 041 1430
001.644 062 061 041 1431
001.645 062 061 041 1432
001.646 062 061 041 1433
001.647 062 061 041 1434
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001.649 062 061 041 1436
001.650 062 061 041 1437
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001.652 062 061 041 1439
001.653 062 061 041 1440
001.654 062 061 041 1441
001.655 062 061 041 1442
001.656 062 061 041 1443
001.657 062 061 041 1444
001.658 062 061 041 1445
001.659 062 061 041 1446
001.660 062 061 041 1447
001.661 062 061 041 1448
001.662 062 061 041 1449
001.663 062 061 041 1450
001.664 062 061 041 1451
001.665 062 061 041 1452
001.666 062 061 041 1453
001.667 062 061 041 1454
001.668 062 061 041 1455
001.669 062 061 041 1456
001.670 062 061 041 1457
001.671 062 061 041 1458
001.672 062 061 041 1459
001.673 062 061 041 1460
001.674 062 061 041 1461
001.675 062 061 041 1462
001.676 062 061 041 1463
001.677 062 061 041 1464
001.678 062 061 041 1465
001.679 062 061 041 1466
001.680 062 061 041 1467
001.681 062 061 041 1468
001.682 062 061 041 1469
001.683 062 061 041 1470
001.684 062 061 041 1471
001.685 062 061 041 1472
001.686 062 061 041 1473
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001.688 062 061 041 1475
001.689 062 061 041 1476
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001.692 062 061 041 1479
001.693 062 061 041 1480
001.694 062 061 041 1481
001.695 062 061 041 1482
001.696 062 061 041 1483
001.697 062 061 041 1484
001.698 062 061 041 1485
001.699 062 061 041 1486
001.700 062 061 041 1487
001.701 062 061 041 1488
001.702 062 061 041 1489
001.703 062 061 041 1490
001.704 062 061 041 1491
001.705 062 061 041 1492
001.706 062 061 041 1493
001.707 062 061 041 1494
001.708 062 061 041 1495
001.709 062 061 041 1496
001.710 062 061 041 1497
001.711 062 061 041 1498
001.712 062 061 041 1499
001.713 062 061 041 1500
001.714 062 061 041 1501
001.715 062 061 041 1502
001.716 062 061 041 1503
001.717 062 061 041 1504
001.718 062 061 041 1505
001.719 062 061 041 1506
001.720 062 061 041 1507
001.721 062 061 041 1508
001.722 062 061 041 1509
001.723 062 061 041 1510
001.724 062 061 041 1511
001.725 062 061 041 1512
001.726 062 061 041 1513
001.727 062 061 041 1514
001.728 062 061 041 1515
001.729 062 061 041 1516
001.730 062 061 041 1517
001.731 062 061 041 1518
001.732 062 061 041 1519
001.733 062 061 041 1520
001.734 062 061 041 1521
001.735 062 061 041 1522
001.736 062 061 041 1523
001.737 062 061 041 1524
001.738 062 061 041 1525
001.739 062 061 041 1526
001.740 062 061 041 1527
001.741 062 061 041 1528
001.742 062 061 041 1529
001.743 062 061 041 1530
001.744 062 061 041 1531
001.745 062 061 041 1532
001.746 062 061 041 1533
001.747 062 061 041 1534
001.748 062 061 041 1535
001.749 062 061 041 1536
001.750 062 061 041 1537
001.751 062 061 041 1538
001.752 062 061 041 1539
001.753 062 061 041 1540
001.754 062 061 041 1541
001.755 062 061 041 1542
001.756 062 061 041 1543
001.757 062 061 041 1544
001.758 062 061 041 1545
001.759 062 061 041 1546
001.760 062 061 041 1547
001.761 062 061 041 1548
001.762 062 061 041 1549
001.763 062 061 041 1550
001.764 062 061 041 1551
001.765 062 061 041 1552
001.766 062 061 041 1553
001.767 062 061 041 1554
001.768 062 061 041 1555
001.769 062 061 041 1556
001.770 062 061 041 1557
001.771 062 061 041 1558
001.772 062 061 041 1559
001.773 062 061 041 1560
001.774 062 061 041 1561
001.775 062 061 041 1562
001.776 062 061 041 1563
001.777 062 061 041 1564
001.778 062 061 041 1565
001.779 062 061 041 1566
001.780 062 061 041 1567
001.781 062 061 041 1568
001.782 062 061 041 1569
001.783 062 061 041 1570
001.784 062 061 041 1571
001.785 062 061 041 1572
001.786 062 061 041 1573
001.787 062 061 041 1574
001.788 062 061 041 1575
001.789 062 061 041 1576
001.790 062 061 041 1577
001.791 062 061 041 1578
001.792 062 061 041 1579
001.793 062 061 041 1580
001.794 062 061 041 1581
001.795 062 061 041 1582
001.796 062 061 041 1583
001.797 062 061 041 1584
001.798 062 061 041 1585
001.799 062 061 041 1586
001.800 062 061 041 1587
001.801 062 061 041 1588
001.802 062 061 041 1589
001.803 062 061 041 1590
001.804 062 061 041 1591
001.805 062 061 041 1592
001.806 062 061 041 1593
001.807 062 
```

NTR89 - HB9 MONITOR 09.01.00. Zenith Data Systems UNIX HB/H89 Cross Assembler PA
GE 30
NORMAL BOOT 15:27:34 28-MAY-80

001.357	247	1147	ANA	A	NO DEVICE
001.360	312 171 002	1148	JZ	NODEV	JMP TO THE EXECUTION ROUTINE
001.363	351	1149	PCHL		

MTR89 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 9E...31. 15:27:35 28-MAY-80
 BOOT Z-47 DISK DRIVE

```

1152 **      Z47      -      BOOT FROM Z47 DISK DRIVE
1153 *
1154 *      Z47 WILL LOAD DATA FROM DISK TRACK 0 SECTOR 1 AND 2 TO
1155 *      USER FIRST AVAILABLE RAM LOCATION. IF THE BOOT IS SUCCED,
1156 *      CONTROL PASS TO THAT LOCATION.
1157 *
1158 *      ENTRY: (AIO,UNI) = UNIT NUMBER TO BOOT
1159 *
1160 *      EXIT:  NONE
1161 *
1162 *      USE:    ALL
1163 *
001.364      EQU     Z47      *
1164 *      LD      (STK),SP      SAVE STACK POINTER FOR RE-BOOT
1165 *
001.364      DB      355Q,163Q
1166 *
001.366      DW      STK
1167 *
1168 *
001.370      EQU     Z47A     *
1169 *
001.370      EI
1170 *      LDA     AIO,UNI      LET THE TIMER FLY
1171 *      RLC
1172 *      RLC      GET UNIT NUMBER
1173 *      RLC      SET TO SIDE/UNIT/SECTOR.FORMAT
1174 *      RLC
1175 *      RLC
1176 *      INR     A
1177 *      MOV     C,A          SET TO SECTOR 1
1178 *      MOV     A,W,RES      SAVE SIDE/UNIT/SECTOR (SIDE=0)
1179 *      RESET
1180 *      CALL    OUT         RESET Z47
1181 *
1182 * DETERMINE THE DISK IS SINGLE OR DOUBLE DENSITY
1183 *
002.010      MOV     A,DC,RAS SEND READ AUX. STATUS COMMAND
1184 *      CALL    COM
1185 *      MOV     A,C
1186 *      CALL    DAT          GET SIDE/UNIT/SECTOR
1187 *      CALL    DAT          SEND SECOND COMMAND BYTE
1188 *      CALL    FIN          GET AUX. STATUS
1189 *      ANI     AS,ODD       CHECK IT IS SINGLE OR DOUBLE DENSITY
1190 *      RLC
1191 *      XRI     10000000B     REVERSE THEN 7TH BIT, MAKE THE SECTOR
1192 *      MOV     R,A          # TO 138 OR 256(R=0).BYTES
1193 *
1194 *      READ BOOT CODE FROM Z47
1195 *
002.032      LXI     H,USERFWA ROOT DESTINATION
1196 *      PUSH    B            SAVE SECTOR SIZE & SIDE/UNIT/SECTOR
002.035      CALL    RDBLCK  READ A SECTOR FROM DISK
1197 *      CALL    B
1198 *      POP     B            GET SECTOR SIZE & SUS BACK
1199 *      INR     C
1200 *      CALL    RDBLCK      SET TO NEXT SECTOR
1201 *      CALL    RDBLCK      READ ANOTHER SECTOR
1202 *
1203 *      CHECK ANY ERROR DURING BOOT
1204 *
002.046      CALL    IN,     GET INTERFACE STATUS
1205 *      ANI     S,ERR       IS THERE ANY ERROR WHEN BOOT
1206 *      JR      NZ,NODEV    THEN ABORT
1207 *

```

MTR89 - H89 MONITOR #09:01:00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 32
 BOOT Z-47 DISK DRIVE 15:27:35 28-MAY-80

002.055 062 010 040 1208 STA MFLAG STOP TIMER
 002.060 303 200 042 1209 JMP USERFMA

1211 ** RETRY - RE-BOOT Z47
 1212 *
 1213 * RETRY IS ENTERED WHEN 3.5 SECONDS TIME OUT & BOOT Z47
 1214 * STILL NOT SUCCEED, IT RESTORE STACK & JUMP TO BOOT Z47 ROUTINE
 1215 *
 1216 * ENTRY: NONE
 1217 *
 1218 * EXIT: (HL) = (SP)
 1219 *
 1220 * USE: HL, SP
 1221
 002.063 052 124 041 1222 RETRY LHLD STK GET OLD STACK ADDRESS
 002.066 371 1223 SPHL SET IQ STACK POINTER
 002.067 030 277 1224 JR Z47A RE-BOOT

MT889 - H89 MONITOR #09:01:00, Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 33, 15:27:35 28-MAY-80
 SUPPORT ROUTINES

```

1227 **      R,SDP      - SET DEVICE PARAMETER, ALLOW TO SET DRIVE 0, 1, AND 2,
1228 *      (MORE INFORMATION CAN BE FOUND IN H17 ROM CODE 36062A)
1229
1230 R,SDP      EQU      *
1231 MVI      A,ERTCNT
1232 STA      D,DECNT
1233 LDA      AIO,UNI
1234 PUSH     PSW
1235 CPI      2
1236 JR      C,R,SDP1
1237 MVI      A,3
1238 R,SDP1    JMP      SDP3
  
```

SET MAX ERROR COUNT FOR OPERATION
 LOAD DRIVE NUMBER
 SAVE IT
 IS IT DRIVE 2?
 IF NOT JMP TO H17 ROM ROUTINE

```

1240 **      CKAUTO      - CHECK IF IT IS AUTO BOOT
1241 *
1242 *      CKAUTO IS ENTERED FROM MONITOR LOOP, IT WILL CHECK IF AUTO BOOT
1243 *      CONDITION IS TRUE, IF NOT, BACK TO MONITOR LOOP
1244 *      IF AUTO BOOT, JUMP TO BOOT DEVICE ROUTINE
1245 *
1246 *      ENTRY: NONE
1247 *
1248 *      EXIT: NONE
1249 *
1250 *      USE: ALL
1251
1252 CKAUTO      EQU      *
1253 IN      H88,SW
1254 ANI      H88,AT
1255 JR      Z,CHAT2
1256 LXI      H,AUTOR
1257 CMP      M
1258 JNZ      ATR
1259 CHAT2      LXI      H,MSG,PR
1260 JMP      MTR,15
  
```

GET SWITCH DATA
 CHECK AUTO BOOT SWITCH BIT SET
 NOT SET
 SET AUTO BOOT FLAG ADDR,
 CHECK AUTO BOOT BEFORE?
 YES, AUTO BOOT
 LOAD 'H:' ADDR,
 BACK TO MONITOR LOOP

MYR89 - HB9 MONITOR \$09.01.00. Zenith Data Systems UNIX HB/HB9 Cross Assembler PA
 GE 34
 MAKE NOISE ROUTINES 15:27:36 28-MAY-80

```

002.136. 1263 ORG 2136A
1264 ** HORN - MAKE NOISE.
1265 *
1266 * ENTRY (A) = (MILLISECOND COUNT)/2
1267 * EXIT NONE
1268 * USES A,F
1269
1270 IF .RAM.
1271 ELSE
1272 ERNZ *-2136A
1273 ENDF
1274
000.001 1275 ALARM EQU *
000.000 1276 JR ALARMB BRANCH TO A JUMP TO NOISE TO DING BELL
1277 IF .RAM.
1278 ELSE
1279 ERNZ *-2140A
1280 ENDF
1281
002.140 1282 HORN PUSH PSW
002.141 1283 MVI A,CB.SPK TURN ON SPEAKER
1284
002.143 1285 HRNO XTHL
002.144 1286 PUSH D SAVE (HL), (H) = COUNT
002.145 1287 XCHG SAVE (DE)
002.146 1288 LXI H,CTLFLG (D) = LOOP COUNT
002.151 1289 XRA M
002.152 1290 MOV E,M (E) = OLD CTLFLG VALUE
002.153 1291 MOV M,A TURN ON HORN
002.154 1292 MVI L,#TICCNT
1293
002.156 1294 MOV A,D (A) = CYCLE COUNT
002.157 1295 ADD M
002.160 1296 HRN2 CMP M WAIT REQUIRED TICCOUNTS
002.161 1297 JR NZ,HRN2
1298
002.163 1299 JMP HRNX JUMP TO AN EXTENSION OF HORN SO ROOM
1300 CAN BE MADE FOR A JUMP TO NOISE
1301 *
1302
002.166 1303 ALARMB JMP NOISE SEND A BELL TO THE CONSOLE
1304

```

MTR89 - H89 MONITOR *09.01.00.
 GE 35
 NO DEVICE INSTALLED

Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 15:27:37 28-MAY-80

```

1307 **      NODEV - NO DEVICE AT THE UNIT USER INDICATE
1308 *
1309 *      NODEV IS ENTERED WHEN: 1. 15 SECONDS TIME OUT
1310 *      OR 2. NO DEVICE IS INDICATED ON SWITCH
1311 *      OR 3. USER HIT <DELETE> TO ABORT BOOT
1312 *      OR 4. BOOT ERROR
1313 *      IT WILL EXIT TO 'ERROR' ROUTINE AND MONITOR LOOP
1314 *
1315 *      ENTRY: NONE
1316 *
1317 *      EXIT: (A) = 0
1318 *
1319 *      USE: AF, HL
1320 *
1321 *      NODEV
1322 *      LXI H,ERRMSG PRINT ERROR MESSAGE
1323 *      CALL TYPMSG
1324 *      STA .MFLAG STOP TIMER
1325 *      OUT DF,DC OFF DISK
1326 *      JMP ERROR BACK TO MONITOR LOOP

```

```

HTR89 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
GE...36
BOOT H-17 DISK DRIVE 15:27:37 28-MAY-80

```

1329	**	H17	ROOT FROM H17, RISK SYSTEM (THIS IS THE MODIFICATION OF THE H17 BOOT ROUTINE, MORE INFORMATION CAN BE FOUND ON H17 BOOT ROM 30000A).
1330	*		
1331	*		
1332	*		
1333	*		
1334	*		
1335	*		
1336	*		
1337	*		
1338	*		
002,207	H17		
002,207		EQU *	
002,207		LXI B,BOOTAL	SET THE COUNT TO MOVE IN CONSTANTS AND VECTORS
002,212		LXI D,BOOTAL	SET THE SOURCE ADDRESS
002,215		LXI H,D,CON	SET THE DESTINATION ADDRESS
002,220		CALL \$MOVE	MOVE IT
1344			
1345	**		
1346	*		
1347			
002,223		LXI H,R,SDF	SET THIS ROM ROUTINE ADDRESS
002,226		SHLD D,SDF	SET INTO RAM JUMP VECTOR
002,231		EI	RESTORE INTERRUPT
1351			
1352	*		
1353	*		
1354			
002,232		MVI B,10	LOOK FOR SOME HOLE AND NO HOLE
002,234		CALL R,SDF	SELECT UNIT & MOTOR ON
002,237		CALL WNH	WAIT FOR NO HOLE
002,242		CALL WHD	WAIT FOR HOLE
002,245		DJNZ H17A	
1360			
1361	*		
1362			
002,247		CALL R,ABORT	RESET DISK DRIVE
002,252		LXI D,USERFMA	SET THE LOAD LOCATION
002,255		LXI R,R*256	LOAD 2 SECTORS
002,260		LXI H,0	LOAD FROM TRACK 0 SECTOR 1
002,263		CALL R,READ	READ DISK BOOT CODE
002,266		JR C,NODEV	ERROR ON BOOT, BACK TO 'H1'
1369			
1370	**		
1371			
002,270		LXI H,CLOCK17	LOAD CLOCK ROUTINE ADDRESS
002,273		SHLD JUIVECH1	SET IT INTO VECTOR LOCATION
002,276		JMP USERFMA	GOTO BOOT CODE

MYR89 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 37
 DETERMINE BOOT DEVICE 15:27:38 28-MAY-80

```

1377 ***      DEVICE -      DETERMINE BOOT WHICH DEVICE AT WHICH PORT
1378 *
1379 *      ENTRY: Z FLAG ( Z=1 FOR PRIMARY, Z=0 FOR SECONDARY)
1380 *
1381 *      EXIT: HL = DEVICE BOOT EXECUTION ADDRESS
1382 *            IF H=0 THEN NO DEVICE THERE
1383 *            (I.E. THE EXEC. ADDR. MUST RESIDENT > 1000A)
1384 *      REG B = PRIMARY MAXI. DRIVE NUMBER
1385 *            IF Z47, #='4'; IF H17, #='3'
1386 *      (PRIM) = PRIMARY DEVICE PORT ADDRESS
1387 *      IF Z47 THEN THE PORT IS EITHER 1700 OR 1740
1388 *      IF H17 THEN DON'T CARE (H17 BOOT ROM TAKE CARE IT)
1389 *      (TMFG) = 1 IF BOOT FROM Z47, = 0 IF FROM H17
1390 *
1391 *      USE: ALL
1392 *
1393 *      DEVICE EQU *
1394 *      DB MI,EXAF      SAVE Z FLAG
1395 *
1396 *      INITIAL VARIABLES
1397 *
1398 *      DI      NO INTERRUPT
1399 *      LXI      H,D,RAM      CLEAR H17 WORK RAM AREA
1400 *      MVI      B,D,RAHL      LENGTH TO CLEAR
1401 *      CALL      $ZERO
1402 *      OUT      DP,DC      OFF DISK
1403 *      STA      TICONT      0 TIMER COUNTER
1404 *      STA      MYCNT      0.5 SECOND TIMER = 0
1405 *
1406 *      INR      A      (A)=1
1407 *      STA      TMFG      SET TIMER TO Z47 FLAG
1408 *      ERRNZ      UD,CLK-1      TIMER INTERRUPT MUST = 1
1409 *      STA      MFLAG      ALLOW TIMER INTERRUPT
1410 *      LXI      H,UIVEC      SET ALL VECTOR TO EI/RET PROCESS
1411 *      MVI      M,M1,JMP
1412 *      INX      H
1413 *      MVI      M,REIXIT      STORE LS BYTE
1414 *      INX      H
1415 *      MVI      M,REIXIT/256      STORE MS BYTE
1416 *      INX      H
1417 *      ADD      A
1418 *      JF      BOOT2
1419 *
1420 *      LXI      H,TMOUT      SET TIMER INTERRUPT VECTOR
1421 *      SHLD      UIVEC+1
1422 *
1423 *      MVI      A,D,STA      ASSUME ALL DEVICE ARE Z47 & BOOT AT 1700
1424 *      STA      PRIM      SINCE H17 BOOT ROM WILL TAKE CARE OF ITS MATTER
1425 *      LXI      H,Z47      SET Z47 BOOT ADDR.
1426 *      MVI      B,'4'      SET MAX. UNIT TO 4
1427 *
1428 *      DETERMINE BOOT DEVICE AND ITS INFORMATION
1429 *
1430 *      IN      H88,SW      READ SWITCH DATA
1431 *      PUSH      PSW      SAVE IN STACK
1432 *      ANI      H88S.DIV      CHECK PRIMARY DEVICE ADDRESS

```

MTRB9 - H89 MONITOR *09.01.00.
 38
 DETERMINE BOOT DEVICE

Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 15:27:39 28-MAY-80

002,377	010	1433	DB	MI,EXAF	SAVE Z FLAG & SET Z' FOR PRIM. SEC. FLAG
003,000	040 005	1434	JR	NZ,SECOND	IT SECONDARY
003,002	010	1435	DB	MI,EXAF	
003,003	040 033	1436	JR	NZ,B170	
003,005	030 003	1437	JR	B174	
003,007	010	1438	DB	MI,EXAF	BOOT PRIMARY AT 1700
003,010	050 026	1439	JR	Z,B170	PRIMARY DEVICE IS AT 1740
003,012	076 174	1440	MVI	A,UP,DP	
003,014	062 120 041	1441	STA	PRM	GET SWITCH DATA BACK
003,017	361	1442	POP	PSW	CHECK THIS IS Z47 OR H17
003,020	346 003	1443	ANI	H885.4	IT H17
003,022	050 004	1444	JR	Z,BH17	
003,024	075	1445	DCR	A	IT IS Z47
003,025	310	1446	RZ		NO DEVICE THERE, Z47 LOCATION MUST ON 1***A
003,026	045	1447	DCR	H	
003,027	311	1448	RET		
000,000		1449	ERRNZ	Z47/256-1	
		1450			
		1451	*	PRIMARY DEVICE IS H17	
		1452			
003,030	041 207 002	1453	LXI	H,H17	SET TO H17 EXECUTION LOCATION
003,033	005	1454	DCR	B	SET TO MAX 3 DRIVE
003,034	062 121 041	1455	STA	TMFG	SET TIMER INTERRUPT = 0 FOR H17
003,037	311	1456	RET		
		1457			
		1458	**	PRIMARY DEVICE IS AT PORT 1700	
		1459			
003,040	361	1460	EQV	*	GET SWITCH DATA
003,040	346 014	1461	POF	PSW	CHECK ANY DEVICE IN 1700
003,041	376 004	1462	ANI	H885.0	
003,043	030 356	1463	CPI	00000100R	CHECK IF IT IS Z47
003,045		1464	JR	DEV2	

MTR89 - H89 MONITOR \$09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 39 15:27:39 28-MAY-80
 SUPPORT ROUTINES

```

003.047 1467 ** ORG 3047A
1468 ** LRA - LOCATE REGISTER ADDRESS.
1469 *
1470 * ENTRY NONE
1471 * EXIT (A) = REGISTER INDEX
1472 * (H,L) = STORAGE ADDRESS
1473 * (D,E) = (O,A)
1474 * USES A,D,E,H,L,F
1475
1476
000.001 1477 IF .RAM
1478 ELSE
1479 ERNZ *-3047A
1480 ENDIF

003.047 1481 LRA LDA REGI
003.052 1482 LRA MOV EIA
003.053 1483 MVI D:0
003.055 1484 LHL REGPTR
003.060 1485 DAD D (DE) = (REGPTR)+(REGI)
003.061 1486 RET
1487

1489 ** IOA - INPUT OCTAL ADDRESS.
1490 *
1491 * ENTRY (H,L) = ADDRESS OF RECEPTION DOUBLE BYTE.
1492 * (D) = TERMINATING CHARACTER
1493 * EXIT NONE
1494 * USES A,D,E,H,L,F
1495
1496
000.001 1496 IF .RAM
1497 ELSE
1498 ERNZ *-3062A
1499 ENDIF

003.062 1500 JMP IOA1
003.065 1501 RETAIN H8 ORG
1502
1503

1505 ** IOB - INPUT OCTAL BYTE.
1506 *
1507 * READ ONE OCTAL BYTE FROM THE KEYSER.
1508 *
1509 * ENTRY (H,L) = ADDRESS OF BYTE TO HOLD VALUE
1510 * (C) SET IF FIRST DIGIT IN (A)
1511 * EXIT NONE
1512 * USES A,D,E,H,L,F
1513
1514
000.001 1514 IF .RAM
1515 ELSE
1516

```

```

MTR89 - H89 MONITOR *09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
GE 40
SUPPORT ROUTINES
1517 000.000 ERRNZ *-3066A
1518 ENDF
1519
1520 003.066 066 000 M+0 ZERO OUT OLD VALUE
1521 003.070 324 262 003 CMC RCC READ CONSOLE CHARACTER
1522
1523 * SEE IF CHARACTER IS A VALID OCTAL VALUE
1524 *
1525 003.073 374 060 CPI '0' LESS THAN ZERO?
1526 003.075 332 135 003 JC IOB2 IF (A) < 0, SEE IF A TERMINATING CHARACTER
1527 003.100 374 070 CPI '8' GREATER THAN 7?
1528 003.102 322 070 003 JNC IOB1 IF TOO LARGE, TRY AGAIN
1529
1530 * HAVE AN OCTAL DIGIT
1531 *
1532 003.105 315 302 003 CALL WCC ECHO CHARACTER
1533 003.110 344 007 ANI 0000011B MASK FOR BINARY VALUE
1534 003.112 137 MOV E+A (E) = VALUE
1535 003.113 174 MOV A+M GET OLD VALUE
1536 003.114 007 RLC SHIFT 3
1537 003.115 007 RLC
1538 003.116 007 RLC
1539 003.117 303 126 003 JMP IOB1.5 JUMP AROUND AN H88/H89 TO H8 FANE ROUTINE
1540
1541 ** FANE OUT ROUTINE FOR CALLERS OF *IOB* FROM THE H8 FRONT PANEL
1542
1543 000.001 IF .RAM.
1544
1545 ELSE
1546 000.000 ERRNZ *-3122A
1547 ENDF
1548
1549 003.122 043 INX H
1550 003.123 043 INX H
1551 003.124 043 INX H
1552 003.125 311 RET
1553
1554
1555 * CONTINUE
1556
1557 003.126 346 370 IOB1.5 ANI 11111000B Toss OLD LSB DIGIT
1558 003.130 263 ORA E REPLACE WITH NEW VALUE
1559 003.131 167 MOV M+A
1560 003.132 303 070 003 JMP IOB1 INPUT ANOTHER CHARACTER
1561
1562 * CHECK FOR A CARRIAGE RETURN TO TERMINATE BYTE
1563 *
1564 003.135 376 015 IOB2 CPI A+CR CARRIAGE RETURN?
1565 003.137 310 RZ RETURN IF CARRIAGE RETURN /JMT 790507/
1566 003.140 257 XRA A CLEAR CARRY /JMT 790507/
1567 003.141 030 325 JR IOB1 GET A NEW CHARACTER /JMT 790507/

```

NTRB9 - HB9 MONITOR \$09.01.00. Zenith Data Systems UNIX HB/HB9 Cross Assembler PA
GE 41
RAM TEST ROUTINES 15:27:41 28-MAY-80

```

1570 **      DYASC - DYNAMIC RAM ASCII OUTPUT TO CONSOLE
1571 *
1572 *      ENTRY (A) = CHARACTER TO OUTPUT
1573 *      (IX) = RETURN ADDRESS
1574 *      EXIT TO (IX)
1575 *      USES A,C,F
1576
1577 DYASC EQU *
1578 *      AF,AF'      SAVE CHARACTER TO OUTPUT
1579 *      MI,EXAF
1580 DYASC1 IN SC,ACERUR,LSR READ LINE STATUS REGISTER
1581 ANI UC,THE
1582 JZ DYASC1 WAIT IF UART CAN'T HOLD ANOTHER CHARACTER
1583
1584 *      EX AF,AF'      GET CHARACTER TO OUTPUT
1585 *      DB MI,EXAF
1586 OUT SC,ACERUR,THR OUTPUT TO UART
1587 *      JP (IX)      RETURN TO CALLER
1588 *      DB MI,JIYA,MI,JIYB
1589
1590 **      DYBYT - DYNAMIC RAM BYTE OUTPUT
1591 *
1592 *      ENTRY (A) = BYTE TO OUTPUT AS OCTAL
1593 *      (IX) = RETURN ADDRESS
1594 *      EXIT TO (IX)
1595 *      USES A,C,IY,F
1596
1597 DYBYT MOV C,A      SAVE CHARACTER
1598 ANI 11000000B      OUTPUT FIRST CHARACTER OF OCTAL VALUE
1599 RRC
1600 RRC
1601 RRC
1602 RRC
1603 RRC
1604 RRC
1605 ORI 00110000B      MAKE INTO ASCII
1606
1607 *      LD IY,DYBYT.2
1608 *      DB MI,LDYA,MI,LDYB
1609 *      DW DYBYT.2
1610
1611 JMP DYASC
1612
1613 DYBYT.2 MOV A,C      OUTPUT SECOND CHARACTER
1614 ANI 00111000B
1615 RRC
1616 RRC
1617 RRC
1618 ORI 00110000B      MAKE INTO ASCII
1619
1620 *      LD IY,DYBYT.4      RETURN ADDRESS
1621 *      DB MI,LDYA,MI,LDYB
1622 *      DW DYBYT.4
1623

```

```

NTR69 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
GE 42
RAM TEST ROUTINES
DYBYT 15:27:41 28-MAY-80

003.216 303.143 003.1624 JMP DYASC
1625
003.221 171 1626 DYBYT.4 MOV A:C OUTPUT LAST CHARACTER
003.222 346 007 1627 ANI 0000011B
003.224 366 060 1628 ORI 00110000B MAKE ASCII
1629
003.226 375 041 1630 * LD DYBYT.6 RETURN ADDRESS
1631 DB MI.LDYA,MI.LDYB
003.230 235 003 1632 DW DYBYT.6
1633
003.232 303.143 003.1634 JMP DYASC
1635
003.235 1636 DYBYT.6 EQU *
1637 * JP (IX) RETURN TO CALLER
003.235 335.351 1638 DB MI,JIXA,MI,JIXB

1640 ** MSG.PAS - PASS MESSAGE FOR DYNAMIC RAM TEST
1641 *
1642
003.237 015 012 1643 MSG.PAS DB A,C,R'A,L,F
003.241 040 040 040 1644 DB ' Pass = '
003.257 000 1645 DB 0

```

NTR89 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 43
 RCK - READ CONSOLE KEYPAD 15:27:42 28-MAY-80

```

003,260 1648 ..... 3260A
1649 ** RCK - READ CONSOLE KEYPAD
1650 *
1651 * RCK IS CALLED TO READ A KEYSTROKE FROM THE CONSOLE FRONT PANEL KEYPAD.
1652 * SINCE THE H88/89 DOES NOT HAVE A FRONT PANEL, THIS ROUTINE IS PROVIDED
1653 * ONLY TO MAINTAIN COMPATIBILITY WITH PAM-8.
1654 * RCK WILL IMMEDIATELY RETURN WITH A VALUE OF 0 (ZERO) IN THE ACCUMULATOR.
1655 *
1656 * ENTRY... NONE
1657 * EXIT (A) = 0
1658 * USES... AIF
1659
000,000 1660 * RCK MUST HAVE SAME ENTRY AS RCK IN PAM-8
1661 ERRNZ *-3260A
1662
003,260 1663 RCK EQU *
1664
003,260 1665 XRA A
003,261 1666 RET
1667

```

```

MTR89 - H89 MONITOR #09.01.00.
GE.....44
CONSOLE CHARACTER ROUTINES.
                                Zenith Data Systems UNIX H8/H89 Cross Assembler ..... FA
                                15:27:42 28-MAY-80

```

1671	**	RCC	-- READ CONSOLE CHARACTER.
1672	*		
1673	*	RCC	IS CALLED TO READ A KEYSTROKE FROM THE CONSOLE.
1674	*		IF A RUBOUT/DELETE IS RECEIVED, EXIT IS TO *ERROR*.
1675	*		
1676	*	ENTRY	NONE
1677	*	EXIT	TO ERROR -- IF A DELETE OR RUBOUT IS ENCOUNTERED
1678	*		TO CALLER -- WHEN A KEY IS HIT
1679	*		(A) = ASCII KEY VALUE
1680	*	USES	A,F
1681			
1682			
1683			
1684	RCC	EQU	*
003,262			
1685			
003,262	333 355	IN	SC,ACE+UR,LSR INPUT ACE LINE STATUS REGISTER
1686			
003,264	346 001	ANI	UC,US SEE IF THERE IS A DATA READY
1687			
003,266	050 372	JR	Z,RCC1
1688			
1689			
003,270	333 350	IN	SC,ACE+UR,RBR ELSE, INPUT CHARACTER
1690			
003,272	346 177	ANI	Q111111R TOS\$, ANY PARITY
1691			
003,274	376 177	CPI	A,DEL
1692			
003,276	312 322 000	JZ	ERROR IF RUBOUT, EXIT TO ERROR
1693			
1694			
003,301	311	RET	ELSE, EXIT TO CALLER
1695			

1697	**	WCC - WRITE CONSOLE CHARACTER	
1698	*		
1699	*	WRITE A CHARACTER TO THE CONSOLE UART PORT	
1700	*		
1701	*	ENTRY (A) = ASCII CHARACTER TO OUTPUT	
1702	*	EXIT NONE	
1703	*	USES NONE	
1704			
1705			
1706	WCC	FUSH FSW	SAVE CHARACTER
1707	WCC1	IN SC.ACE+UR.LSR	INPUT ACE STATUS
1708		ANI UC.THE	SEE IF TRANSMITTER HOLDING REGISTER IS EMPTY
1709		JR Z,WCC1	
1710			
1711		POF FSW	GET CHARACTER
1712		OUT SC.ACE+UR.THR	OUTPUT TO CONSOLE
1713		RET	
003.302	365		
003.303	333 355		
003.305	346 040		
003.307	050 372		
003.311	361		
003.312	323 350		
003.314	311		

```

MTR89 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
05 45 15:27:42 28-MAY-80
CONSOLE CHARACTER ROUTINES.

```

```

1715 ** THE FOLLOWING IS ONLY A PORTION OF THE DYNAMIC RAM TEST!!!
1716 *
003.315 353 XCHG
003.316 174 MOV A,H OUTPUT MSR
1719
1720 * LD IX,DY9.4 RETURN ADDRESS
003.317 335 041 DB MI,LDXA,MI,LDXB
003.321 326 003 DW DY9.4
1723
003.323 303 160 003 JMP DYBYT
1725
003.326 175 MOV DY9.4 A,L OUTPUT LSB
1727
1728 * LD IX,DY9.5 RETURN ADDRESS
003.327 335 041 DB MI,LDXA,MI,LDXB
003.331 335 003 DW DY9.5
1731
003.333 030 223 JR DYBYT
1733
003.335 353 XCHG
003.336 041 362 007 LXI H,MSG,EQ SAVE ERROR ADDRESS
1736 OUTPUT = *
1737 * LD IX,DY9.8 RETURN ADDRESS
003.341 335 041 DB MI,LDXA,MI,LDXB
003.343 350 003 DW DY9.8
1740
003.345 303 306 007 JMP DYMSG OUTPUT STRING
1741
003.350 032 MOV DY9.8 D OUTPUT RAM CONTENTS
1742
1744 * LD IX,DYMEM10 RETURN ADDRESS
003.351 335 041 DB MI,LDXA,MI,LDXB
003.353 360 003 DW DYMEM10
1748
003.355 303 160 003 JMP DYBYT
1749
003.360 076 007 MOV DYMEM10 MVI A,A,BEL PING BELL
1750
1751 * LD IX,DY10.5 RETURN ADDRESS
003.362 375 041 DB MI,LDYA,MI,LDYB
003.364 265 007 DW DY10.5
1756
003.366 303 143 003 JMP DYASC
1757

```

```

NTRB9 - H89 MONITOR #09.01.00.
GE 46
CONSOLE CHARACTER ROUTINES.

PRSRM
15:27:43 28-MAY-80

1760 ** IO ROUTINES TO BE COPIED INTO AND USED IN RAM.
1761 *
1762 * MUST CONTINUE TO 3777A FOR PROPER COPY.
1763 * THE TABLE MUST ALSO BE BACKWARDS TO THE FINAL RAM
1764
1765 IF .RAM.
1766 ELSE
1767 ERNZ 4000A-7-*
1768
1769 ENDF
1770
1771 PRSRM EQU *
1772 DB 1 REFIN
1773 DB 0 CTFLG
1774 DB 0 .MELAG
1775 DB 0 DSPMOD
1776 DB 0 DSPROT
1777 DB 10 REGI
1778 DB MI.RET
1779
1780 IF .RAM.
1781 ELSE
1782 ERNZ *-4000A
1783
1784 ENDF
1785
000.001
000.000
003.371
003.371 001
003.372 000
003.373 000
003.374 000
003.375 000
003.376 012
003.377 311
000.001
000.000

```

MTK89 - H89 MONITOR #09.01.00, Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 47
 H88/H89 ADDITIONAL ROUTINES 15:27:44 28-MAY-80

```

1788 *** INITOX EXTENSION OF INITO TO SUPPORT H88
1789
004,000 076 002 INITOX MVI A,H88B,CK ENABLE CLOCK
004,002 323 362 OUT H88,CTL
1792 * SET UP ACE FOR CONSOLE COMMUNICATIONS
1793 *
1794 *
004,004 076 200 MVI A,UC,DILA SET DIVISOR LATCH ACCESS BIT
004,006 323 353 OUT SC,ACE+UR,LCR
004,010 041 101 004 LXI H,BRTAB (H,L) = BEGINNING OF BAUD RATE TABLE
004,013 333 362 IN H88,SW INPUT SWITCHES FOR DESIRED BAUD RATE
004,015 346 100 ANI H88S,ER MASK FOR BAUD RATE SWITCHES ONLY
004,017 017 RRC SHIFT FOR A *2 FOR TABLE
004,020 017 RRC
004,021 017 RRC
004,022 017 RRC
004,023 017 RRC
004,024 205 ADD L ADD DISPLACEMENT FROM BEGINNING OF TABLE
004,025 157 MOV L,A
004,026 176 MOV A,M GET MSB OF DIVISOR
004,027 323 351 OUT SC,ACE+UR,DLM GET LSB
004,031 043 INX H
004,032 176 MOV A,M
004,033 323 350 OUT SC,ACE+UR,DLL
004,035 076 003 MVI A,UC,8BW SET 8 BITS, 1 STOP BIT, NO PARITY
004,037 323 353 OUT SC,ACE+UR,LCR
004,041 076 000 MVI A,0 SET NO INTERRUPTS
004,043 323 351 OUT SC,ACE+UR,IER
1816
1817 * WAIT A WHILE TO ALLOW THE CONSOLE RESET TO FINISH SO IT CAN
1818 * ACCEPT THE FIRST PROMPT
1819 *
004,045 001 000 065 LXI R,65000A APPROX. 100 MS
004,050 015 C
004,051 040 375 JR NZ,INITOX1
1823
004,053 020 373 DJNZ INITOX1
1825
1826 * INPUT SWITCH TO SEE IF TO BEGIN OPERATION OR MEMORY TEST
1827 *
004,055 333 362 IN H88,SW GET SWITCHES
004,057 346 040 ANI H88S,M MASK FOR MEMORY TEST ONLY
004,061 312 116 007 JZ DYNEM IF TO PERFORM MEMORY TESTS
1831
1832 * REPLACE WHAT WAS ORIGINALLY AT THE JUMP WHICH GOT US HERE
1833 *
004,064 021 371 003 LXI D,FRSR0M (DE) = ROM COPY OF FRS CODE
004,067 257 XRA A
004,070 062 123 041 STA AUTOR INITIAL AUTO BOOT FLAG
004,073 062 066 040 STA DATA INITIAL 362G PORT DATA SAVE BYTE
004,076 303 003 000 JMP INITO,0 RETURN TO ORIGINAL CODE

```

MTR89 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 48
 H88/H89 ADDITIONAL ROUTINES BRTAB 15:27:44 28-MAY-80

1840 ** BRTAB - BAUD RATE DIVISOR TABLE

1841 *
 004.101 BRTAB EQU *
 1843
 004.101 000 014 1844 BR96 DB 0.12 9600 BAUD
 004.103 000 006 1845 BR19.2 DB 0.6 19,200 BAUD
 1846 *BR38.4 DB 0.3 38,400 BAUD
 1847 *BR56.0 DB 0.2 56,000 BAUD

1848
 000.004 SET #256

000.000 ERRNZ BRTAB/256-1. TABLE MUST BE IN ONE PAGE

1852 *** SAVALLX - SAVALL EXTENSION TO MAKE ROOM FOR A JUMP TO THE NMI HANDLER

1853
 004.105 SAVALLX EQU * REPLACE OLD CODE
 004.105 345 1854 SAVALLX EQU *
 004.106 325 1855 PUSH H SET ON STACK AS 'REGISTER'
 004.107 021 011 040 1856 PUSH D SET RETURN ADDRESS
 004.112 032 1857 LXI D,CTFLG
 004.113 303 151 000 1858 LDAX D
 1859 JMP SAVALLR RETURN TO OLD CODE

NR89 - H89 MONITOR \$09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 49
 H88/H89 NON MASKABLE INTERRUPT 15:27:45 28-MAY-80

```

1862 **** NMI - NON MASKABLE INTERRUPT
1863 *
1864 * NMI IS USED AS THE TRAP FOR ALL ILLEGAL PORT REQUESTS
1865 *
1866 * PORT ADDRESSES TRAPPED ARE:
1867 *
1868 *     IN 3600 FRONT PANEL KEYBOARD INPUT
1869 *     OUT 3600 FRONT PANEL CONTROL
1870 *     OUT 3610 FRONT PANEL DISPLAY CONTROL
1871 *     IN/OUT 3720 CONSOLE DATA FOR AN 8251A
1872 *     OUT 3730 CONSOLE CONTROL FOR AN 8251A
1873 *
1874 *
1875 *
1876 * THESE PORT REQUESTS ARE RESPONDED TO AS FOLLOWS:
1877 *
1878 *     IN 3600 RETURNS WITH (A) = 3770 TO SHOW THAT
1879 *     NO FRONT PANEL SWITCHES ARE PRESSED
1880 *
1881 *     OUT 3600 MOVES BIT 6 (CR.CLI) TO BIT 1, AND
1882 *     BIT 4 (CR.SSI) INVERTED, TO BIT 0, AND
1883 *     OUTPUTS THESE BITS TO PORT 3620 TO
1884 *     CONTROL THE CLOCK AND SINGLE STEP INTERRUPTS
1885 *
1886 *     OUTPUTS TO 3610, 3720, AND 3730 JUST RETURN
1887 *
1888 *     INPUTS FROM 3610, 3720, AND 3730 RETURN WITH (A) = 0
1889 *     TO INDICATE AN EMPTY BUSS
1890 *
1891 * ENTRY NONE
1892 *
1893 * EXIT NONE
1894 *
1895 * USES (A) ONLY IF 'FAKING' AN INPUT
1896 *
1897 *
1898 * NMI
1899 *
1900 *     GET RETURN ADDRESS FROM STACK
1901 *     SAVE FOR LATER USE
1902 *     PUT RETURN ADDRESS BACK ON STACK
1903 *
1904 *     SAVE REGISTERS
1905 *
1906 *     SAVE (A) PRIOR TO I/O
1907 *     GET RETURN ADDRESS
1908 *     BACK UP TO PORT # WHICH GOT US HERE
1909 *     GET PORT #
1910 *
1911 *     PORT 3600
1912 *     IF PORT WAS 3600
1913 *
1914 *     PORT REFERENCED WAS 3610, 3720, OR 3730
1915 *
1916 *     CPI 3610 MAKE SURE PORT IS LEGAL
1917 *     JR Z,NMIO.5 IF LEGAL

```

MT889 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 SE 50
 H88/H89 NON MASKABLE INTERRUPT 15:27:45 28-MAY-80

```

004.144 376 372 1918 CPI 3720
004.146 050 004 1919 JR Z,NM10.5
004.150 376 373 1920
004.152 040 062 1921 CPI 3730
004.154 053 1922 JR NZ,NM12.5 IF NONE OF THE ABOVE, EXIT
004.155 176 1923
004.156 376 323 1924 NM10.5 DCX H
004.160 050 054 1925 MOV A,M POINT TO IN/OUT INSTRUCTION
004.162 376 333 1926 CPI MI,OUT SEE IF INPUT OR OUTPUT
004.164 040 050 1927 JR Z,NM12.5 IF OUTPUT, JUST EXIT
004.166 361 1928
004.167 076 000 1929 CPI MI,IN
004.171 030 044 1930 JR NZ,NM12.5 IF NOT INPUT EITHER, ILLEGAL SO EXIT
004.173 053 1931
004.174 176 1932 POP PSW RESTORE FLAGS
004.175 376 333 1933 MVI A,0 ELSE, RETURN LIKE AN EMPTY BUSS
004.177 040 005 1934 JR NM13 EXIT
004.201 361 1935
004.202 076 377 1936 NM11 DCX H
004.204 030 031 1937 MOV A,M POINT TO IN/OUT INSTRUCTION
004.206 376 323 1938 CPI MI,IN GET I/O INSTRUCTION
004.210 040 024 1939 JR NZ,NM11.5 IF NOT 'IN'
004.212 170 1940
004.213 346 120 1941 POP PSW RESTORE FLAGS
004.215 017 1942 MVI A,11111111B SHOW 'NO KEYS PRESSED'
004.216 017 1943 JR NM13 EXIT
004.217 017 1944
004.220 017 1945 NM11.5 CPI MI,OUT MAKE SURE INTRUCTION IS AN 'OUT'
004.221 017 1946 JR NZ,NM12.5 IF NOT
004.222 070 001 1947
004.224 074 1948 NM12 MOV A,B GET OUTPUT DATA AGAIN
004.225 041 066 040 1949 ANI CB,CLI+CR,SSI MOVE CLOCK INFO TO BIT 1
004.230 266 1950 RRC
004.231 323 362 1951 RRC
004.233 346 374 1952 RRC
004.235 167 1953 RRC
004.236 361 1954 RRC
004.237 301 1955 JR C,NM12.2
004.240 341 1956 INR A
004.241 355 105 1957 NM12.2 LXI H,DATA OR WITH THE BYTE IN RAM
004.242 167 1958 ORA M BEFORE OUTPUT IT
004.243 167 1959 OUT H88,CTL SET IN HARDWARE
004.244 167 1960 ANI 1111100B
004.245 167 1961 MOV M,A
004.246 167 1962
004.247 167 1963 NM12.5 POP PSW RESTORE (A,F)
004.248 167 1964
004.249 167 1965 NM13 POP B
004.250 167 1966 POP H
004.251 167 1967 RETN Z80 RETURN FROM NMI
004.252 167 1968 DB 3550,1050

```

MTR89 - H89 MONITOR \$09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 51
 SUPPORT ROUTINES & BOOT DEVICE ROUTINE 15:27:46 28-MAY-80

```

1971 ** ATB - AUTO BOOT ROUTINE CONTINUE
1972
004.243 167 012 M,A, SET AUTO BOOT FLAG
004.244 076 012 MVI A,10 SET TO AUTO BOOT ROUTINE
004.246 315 052 003 CALL LRA,
004.251 021 212 001 LXI D,AUTOBO SET AUTO BOOT ROUTINE
004.254 030 016 JR BOOTX
1977

1979 ORG 4256A
1980 ** BOOT H-17 OR Z47 ENTRY POINT FOR H89
1981 *
1982 * ENTRY NONE
1983 *
1984 * EXIT (DE) = NORMAL BOOT ROUTINE ADDRESS
1985 *
1986 * USES ALL
1987

004.256 041 234 006 LXI H,MSG,RT COMPLETE BOOT MESSAGE
004.261 315 100 006 CALL TYPMSG
004.264 076 012 MVI A,10
004.266 315 052 003 CALL LRA, GET LOCATION OF USER PC
004.271 021 261 001 LXI D,NBOOT SET ITS VALUE TO THE NORMAL BOOT ROUTINE
004.274 163 000 JR BOOTX
004.275 043 INX H
004.276 162 MOV M,D
1994
1995
1996
004.277 303 063 000 JMP GO, DO IT
1997

```

MT889 - H89 MONITOR \$09.01.00, Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 52
 TIME OUT FOR BOOT 15:27:47 28-MAY-80

```

2000 **      TMOUT - ROOT CODE TIME OUT ROUTINE
2001 *
2002 *      TMOUT IS ENTERED FROM TIMER INTERRUPT EVER 100 MS. AND IT WILL
2003 *      EXIT: IF BOOT SUCCESS THEN TIMER OFF.
2004 *      IF 15 SECONDS TIME OUT AND BOOT IS NOT SUCCESS YES.
2005 *      THEN ABORT BOOT Z47 & TO MONITOR LOOP
2006 *      IF < 15S & 3.5S THEN RE-BOOT
2007 *
2008 *      ENTRY: (TMFG) = 1 IF THE TIME OUT IS FOR Z47
2009 *      = 0 IF THE TIME OUT IS FOR H17
2010 *      EXIT: NONE
2011 *
2012 *      USE: ALL (WHEN RETURN, ALL REGISTERS ARE RESTORED)
2013 *
2014 TMOUT EQU *
2015 IN SC,ACE+UR,LSR INPUT ACE LINE STATUS REGISTER
2016 ANI UC,DR SEE IF THERE IS A DATA READY
2017 JR Z,TMOUT4 CHECK IF IT IS <DELETE>
2018
2019 IN SC,ACE+UR,RBR INPUT DATA FROM KB
2020 ANI 0111111B IS IT <DEL>?
2021 CPI A,DEL
2022 JZ NODEV IF IT, ABORT THE BOOT
2023 * ELSE IGNORE THE INPUT
2024 TMOUT4 LXI H,TMFG
2025 MOV A,M
2026 ANA A
2027 DB MI,EXAF
2028 LIA IICNT GET IIC.
2029 ANA A SET ZERO FLAG
2030 JR NZ,TMOUT2 NOT IN 0.5 SECOND
2031 INX H SET TO MYCNT
2032 ERRCNZ MYCNT MUST FOLLOW TMFG
2033 INR M INCREASE THE COUNT FOR 0.5 SECOND
2034 MOV A,M
2035 CPI 30 CHECK IF MORE THAN 15 SECONDS
2036 JNC NODEV NO DEVICE ?
2037 TMOUT1 SBI 7 IS IT 3.5 SECONDS?
2038 JR C,TMOUT2 IF NOT, WAIT
2039 JR NZ,TMOUT1 CHECK MORE
2040 DB MI,EXAF
2041 JNZ RETRY IF IT IS Z47, THEN RE-BOOT
2042 JR TMOUT3 IT IS H-17, CONTINUE IT CLOCK ROUTINE
2043 TMOUT2 DB MI,EXAF CHECK IT IS Z47 OR H17
2044 RNZ Z47, THEN RETURN
2045 TMOUT3 JMP CLOCK17 CONTINUE H17 CLOCK ROUTINE

```

MT889 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 53
 SUBSTITUTE MEMORY 15:27:48 28-MAY-80

```

004.370      2048      ORG      4370A
0049 **      2049      SUBM - SUBSTITUTE MEMORY
0050 *      2050      *
0051 *      2051      * SUBM INPUTS A MEMORY ADDRESS FROM THE CONSOLE AND THEN DISPLAYS
0052 *      2052      * THAT ADDRESS AND ITS CONTENTS. IF A CARRIAGE RETURN IS THEN TYPED,
0053 *      2053      * CONTROL RETURNS TO THE MONITOR. IF A SPACE IS TYPED, THE NEXT
0054 *      2054      * MEMORY LOCATION AND CONTENTS ARE DISPLAYED. IF A MINUS SIGN IS
0055 *      2055      * TYPED, THE PREVIOUS MEMORY LOCATION AND CONTENTS ARE DISPLAYED.
0056 *      2056      * IF AN OCTAL CHARACTER IS TYPED, A BYTE IS ENTERED AND PLACED AT THE
0057 *      2057      * CURRENT MEMORY LOCATION.
0058 *      2058      *
0059 *      2059      * ENTRY NONE
0060 *      2060      * EXIT NONE
0061 *      2061      *
0062 *      2062      * USES A,E,H,L,F
0063      2063      *
004.370      2064      SUBM      COMPLETE SUBSTITUTE MESSAGE
004.373      2065      LXI      H,MSG.SUB
004.376      2066      CALL    TYPMSG
004.376      2067      CALL    IROC
005.001      2068      RNC
005.001      2069      *
005.002      2070      LXI      H,IOWRK+1
005.005      2071      MVI      D,A.CR
005.007      2072      CALL    IOA
005.012      2073      XCHG
005.013      2074      *
005.013      2075      SUBM1
005.016      2076      CALL    TOA
005.017      2077      MOV      A,M
005.022      2078      CALL    TOB
005.024      2079      MVI      A,' '
005.024      2080      CALL    WCC
005.027      2081      SUBM2
005.032      2082      CALL    IOC
005.032      2083      JNC      SUBM7
005.035      2084      CPI      ' '
005.037      2085      JNZ      SUBM4
005.042      2086      INX      H
005.043      2087      JMP      SUBM1
005.043      2088      *
005.046      2089      SUBM4
005.050      2090      CPI      '-'
005.050      2091      JNZ      SUBM6
005.053      2092      SUBM5
005.056      2093      CALL    WCC
005.056      2094      DCX      H
005.057      2095      JMP      SUBM1
005.062      2096      SUBM6
005.064      2097      CPI      A.CR
005.064      2098      RZ
005.065      2099      *
005.065      2100      MVI      A,A.BEL
005.067      2101      CALL    WCC
005.072      2102      JMP      SUBM2
005.072      2103      *

```

MT889 - H89 MONITOR #09.01.00. Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 54
 SUBSTITUTE MEMORY 15:27:49 28-MAY-80

```

005.075 066 000 2104 SUBM7 MVI M,0 ZERO BYTE TO BE BUILT
2105
005.077 315 302 003 2106 SUBM8 CALL WCC ECHO OCTAL CHARACTER
005.102 346 007 2107 ANI 00000111R GET BINARY VALUE
005.104 137 2108 MOV E,A SAVE PARTIAL
005.105 176 2109 MOV A,M GET CURRENT
005.106 007 2110 RLC MAKE ROOM FOR NEW CHARACTER
005.107 007 2111 RLC
005.110 007 2112 RLC TOSS PREVIOUS LSB
005.111 346 370 2113 ANI 11111000B ADD NEW
005.113 263 2114 ORA E SAVE NEW TOTAL
005.114 167 2115 MOV M,A INPUT NEXT CHARACTER
005.115 315 301 005 2116 SUBM9 CALL IOC IF OCTAL
005.120 322 077 005 2117 JNC SUBM8
2118
005.123 376 040 2119 CFI SPACE?
005.125 312 042 005 2120 JZ SUBM3 IF SPACE, DISPLAY NEXT BYTE
2121
005.130 376 055 2122 CFI MINUS?
005.132 312 053 005 2123 JZ SUBM5 IF MINUS, DISPLAY PREVIOUS
2124
005.135 376 015 2125 CFI A,CR RETURN?
005.137 310 2126 RZ IF RETURN, EXIT
2127
005.140 076 007 2128 MVI A,A,BELL ELSE, RING BELL
005.142 315 302 003 2129 CALL WCC
005.145 303 115 005 2130 JMP SUBM9 TRY AGAIN
2131
2133 ** IROC - INPUT A RETURN OR AN OCTAL CHARACTER
2134 *
2135 * IROC INPUTS A CHARACTER FROM THE CONSOLE AND WAITS UNTIL IT
2136 * RECEIVES EITHER A VALID OCTAL CHARACTER OR A CARRIAGE RETURN
2137 *
2138 * ENTRY NONE
2139 * EXIT (A) = INPUT CHARACTER
2140 * 'C' = SET IF CHARACTER IS OCTAL
2141 * USES A,F
2142
2143
005.150 315 262 003 2144 IROC CALL RCC INPUT CHARACTER
005.153 376 015 2145 CFI A,CR RETURN?
005.155 310 2146 RZ IF A,CR
2147
005.156 376 060 2148 CFI '0' < 0?
005.160 332 166 005 2149 JC IROC1 IF < OCTAL
2150
005.163 376 070 2151 CFI '8' > 8?
005.165 330 2152 RC IF OCTAL
2153
005.166 076 007 2154 IROC1 MVI A,A,BELL ELSE, RING BELL
005.170 315 302 003 2155 CALL WCC
005.173 303 150 005 2156 JMP IROC TRY AGAIN

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MTR89 - H89 MONITOR *09.01.00, Zenith Data Systems UNIX H8/H89 Cross Assembler PA
 GE 55
 SUPPORT ROUTINES IOA1 15:27:50 28-MAY-80

```

2158 ** IOA1 - INPUT OCTAL ADDRESS
2159 *
2160 * IOA1 IS A CONTINUATION OF *IOA* AND INPUTS A SPLIT OCTAL ADDRESS.
2161 * WITHOUT REQUIRING LEADING ZEROS
2162 *
2163 * ENTRY (H,L) = ADDRESS + 1 WHERE INPUT ADDRESS IS TO BE PLACED
2164 * (A) = FIRST OCTAL CHARACTER IF 'C' IS SET
2165 * (D,E) = INPUT ADDRESS
2166 * (A) = LAST INPUT CHARACTER
2167 * USES A,B,E,H,L,F
2168
005.176 305 IOA1 PUSH B SAVE (B,C)
005.177 102 MOV B,D (B) = TERMINATION CHARACTER
005.200 345 PUSH H SAVE ADDRESS WHERE INPUT IS TO BE PLACED
005.201 041 000 000 LXI H,0 SET NEW VALUE TO ZERO
005.204 324 262 003 CMC RCC IF CARRY SET, FIRST CHARACTER IS IN ACC
005.207 376 060 CPI '0' MAKE SURE CHARACTER IS OCTAL
005.211 332 242 005 JC IOA3 IF < OCTAL
2177
005.214 376 070 CPI 'B'
005.216 322 242 005 JNC IOA3 IF > OCTAL
2180
005.221 315 302 003 CALL WCC ECHO OCTAL CHARACTER
005.224 346 007 ANI 00000111B GET BINARY VALUE
005.226 365 PUSH PSW SAVE NEW CHARACTER VALUE
005.227 051 DAD H SHIFT THREE TO MAKE ROOM FOR NEW CHARACTER
005.230 051 DAD H
005.231 051 DAD H
005.232 365 PUSH PSW SAVE CARRY FROM DAD
005.233 321 POP D SAVE FLAG RESULT IN E
005.234 361 POP PSW RETURN NEW CHARACTER VALUE TO (A)
005.235 205 ADD L
005.236 157 MOV L,A
005.237 303 204 005 JMP IOA2 SEE IF MORE CHARACTERS
2193
005.242 270 CMP B TERMINATING CHARACTER?
005.243 312 260 005 JZ IOA4 IF EQUAL
2196
005.246 076 007 MVI A,A,BEL ELSE, DING BELL
005.250 315 302 003 CALL WCC
005.253 067 STC TRY AGAIN
005.254 077 CMC
005.255 303 204 005 JMP IOA2
2202
2203 * END OF INPUT, PUT VALUE IN MEMORY AND EXIT
2204
005.260 315 302 003 CALL WCC ECHO CHARACTER TO D
005.263 127 MOV D,A LAST CHARACTER TO D
005.264 335 PUSH D
005.265 361 POP PSW (PSW) = RESULT OF DAD
005.266 174 MOV A,H MAKE (H) INTO SPLIT OCTAL
005.267 037 RAR
005.270 147 MOV H,A
005.271 172 MOV A,D RESTORE LAST INPUT CHARACTER
005.272 353 XCHG (D,E) = INPUT ADDRESS

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MTR89 - H89 MONITOR  #09.01.00.
GE 56
SUPPORT ROUTINES

IOA1 15:27:50 28-MAY-80

005.273 341 2214 POP H
005.274 162 2215 MOV M,D
005.275 053 2216 DCX H
005.276 163 2217 MOV M,E
005.277 301 2218 POP B
005.300 311 2219 RET

(H,L) = LOCATION TO PLACE THIS ADDRESS
RESTORE (B,C)

** IOC - INPUT OCTAL CHARACTER
2221 **
2222 *
2223 *
2224 *
2225 * ENTRY NONE
2226 * EXIT (A) = INPUT CHARACTER
2227 * 'C' = SET IF CHARACTER NOT OCTAL
2228 * USES A,F
2229 *
2230 IOC
2231 CALL RCC
2232 CPI '0'
2233 RC
2234 CPI '8'
2235 CMC
2236 RET
IF CHARACTER < OCTAL
CHARACTER > OCTAL?
'C' IF GREATER THAN

IOA - TYPE OCTAL ADDRESS
2238 **
2239 *
2240 * TOA OUTPUTS TO THE CONSOLE A CRLF, THE SPECIFIED ADDRESS AND A SPACE
2241 *
2242 * ENTRY (H,L) = ADDRESS TO BE DISPLAYED
2243 * EXIT NONE
2244 * USES A,B,C,F
2245 *
2246 TOA
2247 MVI A,A,CR
2248 CALL WCC
2249 MVI A,A,LF
2250 CALL WCC
2251 TOA
2252 MOV A,H
2253 CALL TOR
2254 MOV A,L
2255 CALL TOR
2256 MVI A,' '
2257 CALL WCC
2258 RET
SPACE

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NTR89 - HB9 MONITOR #09:01:00. Zenith Data Systems UNIX HB/HB9 Cross Assembler PA
 GE 57
 SUPPORT ROUTINES

TOB 15:27:51 28-MAY-80

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2261 **      TOB - TYPE OCTAL BYTE
2262 *
2263 *      TOB OUTPUTS TO THE CONSOLE IN OCTAL, THE BYTE IN A
2264 *
2265 *      ENTRY (A) = BYTE TO BE OUTPUT
2266 *      EXIT NONE
2267 *      USES A,F
2268
2269
2270 TOB      PUSH      B
2271          MVI        B,2      NUMBER OF CHARACTERS - 1
2272          MOV        C,A      SAVE ORIGINAL BYTE
2273          ORA        A      ASSURE 'C' = ZERO
2274          RAR
2275          RAR          SHIFT TOP BYTE TO LSB
2276          RAR          SHIFT MIDDLE BYTE TO LSB
2277          RAR          SHIFT MIDDLE BYTE TO LSB
2278          RAR
2279          RAR
2280          ANI        00000111B  MASK FOR HALF ASCII
2281          ORI        00110000B  MAKE WHOLE ASCII
2282          CALL       WCC          OUTPUT TO CONSOLE
2283          MOV        A,C      GET ORIGINAL BYTE
2284          DCR        B
2285          JNZ        TOB1      IF SECOND BYTE STILL NEEDS TO BE OUTPUT
2286
2287          ANI        00000111B  ELSE, OUTPUT LAST CHARACTER
2288          ORI        00110000B
2289          CALL       WCC
2290          POP        B
2291          RET
2292
2293 **      WCR - WAIT FOR A CARRIAGE RETURN
2294 *
2295 *      WCR INPUTS CHARACTERS FROM THE CONSOLE UNTIL A CARRIAGE RETURN
2296 *      IS RECEIVED AND THEN ECHOS A CR LF
2297 *
2298 *
2299 *      ENTRY NONE
2300 *      EXIT NONE
2301 *      USES A,F
2302
2303
2304 WCR      CALL       RCC          INPUT CHARACTER
2305          CPI        A,CR      IF NOT A CR
2306          JZ         WCR
2307
2308          CALL       WCC          ELSE, ECHO CR
2309          MVI        A,A,LF    LINE FEED
2310          CALL       WCC
2311          RET
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