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;                                   RCSL: 44 - RT 584
;                                   AUTHOR: JENS MICHAELSEN
;                                   EDITED:  730527
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;                   SCC 702
;                TESTPROGRAM
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; BINARY TAPE: RCSL 44 - RT 585
; ASCII  TAPE: RCSL 44 - RT 586
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; ABSTRACT:  THIS PROGRAM DESCRIBES HOW TO
;            TEST THE HARDWARE IN THE COMMU-
;            NICATIONSCONTROLLER, THE SCC 702.
;            IT DO NOT CONTAIN DIAGNOSTIC OR
;            RELIABILITY ROUTINES.
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        000100          .LOC 100

00100 002121            JMP @ A ; TEST RECEIVER LOOP A
00101 002122            JMP @ B ; TEST RECEIVER LOOP B
00102 002123            JMP @ C ; TEST RECEIVER LOOP C
00103 002124            JMP @ D ; TEST RECEIVER LOOP D
00104 002125            JMP @ E ; TEST RECEIVER LOOP E
00105 002126            JMP @ C7 ; TEST: 7 BIT CHARACTERS
00106 002127            JMP @ C6 ; TEST: 6 BIT CHARACTERS
00107 002130            JMP @ ODT ; TEST: ODD BIT STATUS
00110 002131            JMP @ CLT ; TEST: CLASS REGISTER
00111 002132            JMP @ K ; TEST: DATACHANNEL LATE
00112 002133            JMP @ L ; TEST: CALLING SIGNAL
00113 002134            JMP @ M ; TEST: READY FOR SENDING
00114 002135            JMP @ N ; TEST: DATASET NOT READY
00115 002136            JMP @ O ; TEST: DATASET NOT READY WHILE RUNNING
00116 002137            JMP @ P ; TEST: DATASET NOT READY AUTOMATICALLY
00117 002140            JMP @ Q ; TEST: CARRIER OFF
00120 002141            JMP @ R ; TEST: SAVE LEFT BYTE
00121 000152  A         : LOOPA
00122 000173  B         : LOOPB
00123 000242  C         : LOOPC
00124 000311  D         : LOOPD
00125 000355  E         : LOOPE
00126 000422  C7        : CHL7
00127 000465  C6        : CHL6
00130 000530  ODT       : ODDT
00131 000571  CLT       : CLTST
00132 000652  K         : LOOPK
00133 000723  L         : LOOPL
00134 000745  M         : LOOPM
00135 001003  N         : LOOPN
00136 001024  O         : LOOPO
00137 001076  P         : LOOPP
00140 001141  Q         : LOOPQ
00141 001200  R         : SAVEB

        000040  REC = 40
        000041  XMT = 41



00142 177777  CM1       : -1
00143 177776  CM2       : -2
00144 177775  CM3       : -3
00145 177774  CM4       : -4
00146 177773  CM5       : -5
00147 177772  CM6       : -6
00150 177771  CM7       : -7
00151 000040  MASKD     : 40     ; CLASS 1 MASK
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                ; START IN 100
                        ; SET SWITCHES ON TESTBOX AS FOLLOWING:
                        ; DATASET READY TO ON.
                        ; READY FOR SENDING TO ON.
                        ; CALLING SIGNAL TO OFF.
                        ; RECEIVER CARRIER TO ON.
                        ; CLOCK FREQUENCY AS NEEDED.

                        ; LOOP A: RUNNING THROUGH STATES:
                        ; 0 - 1 - 0 - 1 - 0 ETC.
                        ; CHARACTERS: SYN,?
                        ; CONTROLWORD: 8 BIT + SYN


00152 020172  LOOPA:  LDA 0, CWA       ; LOAD CONTROLWORD
00153 061040          DOA 0, REC       ; TO THE RECEIVER.
00154 020166          LDA 0,CHXA       ; LOAD ADDRESS TO
00155 024167          LDA 1,CHRA       ; COUNTERS.
00156 030142          LDA 2,CM1        ; LOAD WORD NUMBER.
00157 062041  AGA:    DOB 0,XMT        ; START THE
00160 066240          DOBC 1,REC       ; CONTROLLER AND
00161 073140          DOCS 2,REC       ; WAIT THAT THE
00162 073141          DOCS 2,XMT       ; TRANSMITTER
00163 063641          SKPDN,XMT        ; WORD COUNTER OVERFLOWS;
00164 000163          JMP .-1          ; THEN START AGAIN.
00165 000157          JMP AGA          ; HALT THE ROUTINE BY
                                       ; PRESSING STOP.

00166 000170  CHXA:    CHAXA  ; XMT ADDRESS
00167 000171  CHRA:    CHARA  ; REC ADDRESS
00170 013077  CHAXA:   013077 ; SYN,?
00171 000000  CHARA:   0      ; CONTENTS= 0 AFTER RUN
00172 101426  CWA:     101426 ; CONTROLWORD
```

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                ; START IN 101
                        ; LOOP B: RUNNING THROUGH STATES:
                        ; 0 - 1 - 2 - 4 - 5 - 6 - 0 - 1 - 2 - ETC:
                        ; CHARACTERS: SYN,SYN,STX,$,?
                        ; ASCII VALUES : 026 - 026 - 002 - 044 - 077
                        ; STX IS DEFINED AS CLASS 1
                        ; RECEIVE MODE IS 1
                        ; CONTROLWORD :  MODE 1 + 8 BIT + SYN


00173 020226  LOOPB:  LDA 0, ADR      ; THIS LOOP INITIATES
00174 061040          DOA  0,REC      ; THE PROGRAM BY
00175 014226          DSZ ADR         ; CLEARING THE CLASS
00176 000173          JMP LOOPB       ; REGISTER.
00177 061040          DOA 0, REC
00200 020227          LDA 0, CL       ; LOAD THE CLASS
00201 061040          DOA 0, REC      ; REGISTER.
00202 020230          LDA 0, CWB      ; LOAD THE NEW
00203 061040          DOA 0, REC      ; CONTROLWORD.
00204 030145          LDA 2, CM4      ; LOAD THE WORD
00205 024232  AGB:    LDA 1, CHRB     ; COUNTER, AND
00206 020231          LDA 0, CHXB     ; THE APPROPIATE
00207 062041          DOB 0, XMT      ; ADDRESS COUNTERS.
00210 066040          DOB 1, REC      ; THEN START THE
00211 073140          DOCS 2, REC     ; CONTROLLER AND
00212 073141          DOCS 2, XMT     ; WAIT FOR THE
00213 063641          SKPDN, XMT      ; TRANSMITTER WORD
00214 000213          JMP .-1         ; COUNT OVERFLOW.
00215 060640          DIAC 0, REC     ; READ RECEIVER STATUS
00216 024151          LDA 1, MASKD    ; MASK STATUSWORD
00217 123400          AND 1,0         ; AND TEST FOR CLASS 1
00220 122404          SUB 1,0,SZR
00221 063077          HALT            ; CLASS 1 NOT DETECTED
00222 020225          LDA 0, REST     ; RESTORE
00223 040226          STA 0, ADR      ; CLASSWORD
00224 000205          JMP AGB         ; CLASS 1 RECEIVED, LOOP AGAIN


00225 000377  REST:   000377
00226 000377  ADR:    000377  ;
00227 000402  CL :    000402  ; CLASS 1
00230 103426  CWB:    103426  ; CONTROLWORD
00231 000233  CHXB:   CHAXB   ; XMT ADDRESS
00232 000237  CHRB:   CHARB   ; REC ADDRESS
00233 013026  CHAXB:  013026  ; SYN,SYN
00234 001044  TXB1:   001044  ; STX,$
00235 037400  TXB2:   037400  ; ?, NONE
00236 177777  TXB3:   177777  ; TEST THE FOLLOWING AFTER RUN:
00237 000000  CHARB:  0       ; 001044
00240 000000  TRB1:   0       ; 037400
00241 000000  TRB2:   0
```

```
                ; START IN 102
                        ; LOOP C: RUNNING THROUGH STATES:
                        ; 0 - 1 - 2 - 4 - 5 - 3 - 3 - 3 - 3 - 4 - 5 - 3 - ETC.
                        ; CHARACTERS: SYN,SYN,STX,X,Y,Z,SYN,?,STX,X,Y,Z,
                        ; ASCII: 026-026-002-130-131-132-026-077-002-130-131
                        ; STX IS DEFINED AS CLASS 1
                        ; MODE IS 0
                        ; CONTROLWORD: MODE 0 + 8 BIT + SYN

00242 020271  LOOPC:  LDA 0, CWC        ; LOAD RECEIVER
00243 061040          DOA 0,REC         ; WITH THE CONTROLWORD.
00244 030150          LDA 2,CM7         ; LOAD THE WORD AND
00245 024273  AGC:    LDA 1,CHRC        ; ADDRESS COUNTERS IN
00246 020272          LDA 0,CHXC        ; THE CONTROLLER.
00247 062041          DOB 0,XMT         ; START THE RECEIVER
00250 066240          DOBC 1,REC        ; AND THE TRANSMITTER
00251 073140          DOCS 2, REC       ; WAIT FOR THE RECEIVER
00252 073141          DOCS 2, XMT       ; DONE FLOP ( CLASS 1)
00253 063640          SKPDN, REC        ; TO BE ONE AND THEN
00254 000253          JMP .-1           ; WAIT FOR THE NORMAL
00255 063641          SKPDN, XMT        ; TRANSMITTER TERMINATION
00256 000255          JMP .-1           ; WORD COUNT OVERFLOW.
00257 060440          DIA 0, REC        ; READ RECEIVER STATUS
00260 024151          LDA 1, MASKD      ; AND TEST THE
00261 123400          AND 1,0           ; STATUSWORD.
00262 122404          SUB 1,0,SZR
00263 063077          HALT              ; CLASS 1 NOT DETECTED,.
00264 020277          LDA 0, TXC3
00265 024305          LDA 1, TRC2       ; TEST THAT THE SYN CHARACTER.
00266 106414          SUB# 0,1,SZR      ; IS NOT DELETED
00267 063077          HALT              ; IT WAS DELETED, EXAMIN AC 1
00270 000245          JMP AGC           ; RUN ANOTHER TIME

00271 101426  CWC     :101426 ; CONTROLWORD
00272 000274  CHXC    :CHAXC  ; TRANSMITTER ADDRESS
00273 000303  CHRC    :CHARC  ; RECEIVER ADDRESS
00274 013026  CHAXC   :013026 ; SYN,SYN
00275 001130  TXC1    :001130 ; STX,X
00276 054532  TXC2    :054532 ; Y,Z
00277 013077  TXC3    :013077 ; SYN, ?
00300 001130  TXC4    :001130 ; STX, X
00301 054532  TXC5    :054532 ; Y,Z
00302 177777  TXC6    :177777           ; TEST THE CONTENTS OF
                                        ; THE FOLLOWING CELLS
                                        ; AFTER THE RUNNING
00303 000000  CHARC   : 0               ; 001130
00304 000000  TRC1    : 0               ; 054532
00305 000000  TRC2    : 0               ; 013077, WHERE 013 IS THE SYN
00306 000000  TRC3    : 0               ; 001130
00307 000000  TRC4    : 0               ; 054532
00310 000000  TRC5    : 0
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                ; START IN 103
                        ; LOOP D: THIS LOOP IS RUNNING THROUGH STATES:
                        ; 0 - 1 - 2 - 3 - 3 - 3 - 3 - 4 - 5 - 0 - 1 - 2 - ETC.
                        ; CHARACTERS: SYN, SYN, X, Y, SYN, Z, STX , ?
                        ; THE MIDDLEPLACED SYN-CHARACTER IS TO BE DELETED
                        ; STX IS DEFINED AS CLASS 1
                        ; RECEIVEMODE IS 1
                        ; CONTROLWORD: MODE 1 + 8 BIT + SYN


00311 020340  LOOPD:  LDA 0, CWD        ; LOAD CONTROLWORD REGISTER
00312 061040          DOA 0, REC        ; IN THE RECEIVER.
00313 030146          LDA 2, CM5        ; LOAD THE WORD
00314 024342  AGD:    LDA 1, CHRD       ; COUNTERS AND THE
00315 020341          LDA 0, CHXD       ; ADDRESS COUNTERS
00316 062041          DOB 0, XMT        ; IN THE RECEIVER
00317 066240          DOBC 1, REC       ; AND IN THE
00320 073140          DOCS 2,REC        ; TRANSMITTER.
00321 073141          DOCS 2,XMT        ; START THE CONTROLLER
00322 063640          SKPDN, REC        ; AND WAIT THE RECEIVER DONE.
00323 000322          JMP .-1           ; THIS MEANS CLASS 1 RECEIVED.
00324 063641          SKPDN, XMT        ; THEN WAIT FOR TRANSMITTER
00325 000324          JMP .-1           ; WORD COUNTER OVERFLOW.
00326 060440          DIA 0, REC        ; READ RECEIVER STATUSWORD.
00327 024151          LDA 1, MASKD      ; TEST THE STATUS.
00330 123400          AND 1,0           ; WAS IT CLASS 1 RECEIVED ?
00331 122404          SUB 1,0,SZR
00332 063077          HALT              ; NO, I'M SORRY
00333 020351          LDA 0, TRD1       ; TEST THAT THE SYN CHARACTER
00334 024354          LDA 1, TWD        ; REALLY WAS DELETED IN THE
00335 106404          SUB 0,1, SZR      ; RECEIVED TEXT.
00336 063077          HALT              ; OH, WHAT A PITY, IT WASN'T..
00337 000314          JMP AGD           ; NO ERRORS; RUN AGAIN

00340 103426          CWD:    103426    ; CONTROLWORD
00341 000343          CHXD:   CHAXD     ; XMT ADDRESS
00342 000350          CHRD:   CHARD     ; REC ADDRESS
00343 013026          CHAXD:  013026    ; SYN,SYN
00344 054131          TXD1:   054131    ; X,Y
00345 013132          TXD2:   013132    ; SYN,Z
00346 001077          TXD3:   001077    ; STX,?
00347 177777          TXD4:   177777
00350 000000          CHARD:  0         ; 054131 AFTER RUN
00351 000000          TRD1:   0         ; 055002
00352 000000          TRD2:   0         ; 037777
00353 000000          TRD3:   0
00354 055002          TWD:    055002    ; Z,STX.(RECEIVED WORD)
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```
; START IN 104
        ; LOOP E. THIS LOOP RUNS THROUGH STATES:
        ; 0 - 1 - 2 - 3 - 3 -  3 - 3 - 4 - 5 - 3 - 3 - ETC.
        ; CHARACTERS: SYN, SYN, X, Y, SYN, Z, STX, ?, X, Y,
        ; ASCII: 026,026,130,131,026,032,002,077,130,131
        ; STX IS DEFINED AS CLASS 1
        ; MODE IS 0
        ; CONTROLWORD: MODE 0 + 8 BIT + SYN


00355 020427  LOOPE:  LDA 0,CWE       ; LOAD THE CONTROLWORD
00356 061040          DOA 0, REC      ; TO THE RECEIVER.
00357 030147          LDA 2,CM6       ; LOAD THE WORD
00360 024425  AGE:    LDA 1, CHRE     ; COUNTER AND THE
00361 020425          LDA 0, CHXE     ; ADDRESS COUNTER
00362 062041          DOB 0, XMT      ; IN THE RECEIVER
00363 066240          DOBC 1, REC     ; AND IN THE
00364 073140          DOCS 2, REC     ; TRANSMITTER.
00365 073141          DOCS 2, XMT     ; START THE CONTROLLER.
00366 063640          SKPDN, REC      ; WAIT FOR THE RECEIVER
00367 000366          JMP .-1         ; DONE FLAG.
00370 063641          SKPDN, XMT      ; WAIT TRANSMITTER
00371 000370          JMP .-1         ; DONE FLIP-FLOP.
00372 060440          DIA 0, REC      ; READ RECEIVER STATUSWORD.
00373 024151          LDA 1, MASKD    ; TEST IF IT WAS A CLASS 1
00374 123400          AND 1,0         ; CHARACTER?
00375 122404          SUB 1,0,SZR
00376 063077          HALT            ; IT FAILED!
00377 020412          LDA 0, TXE2     ; TEST THAT THE SYN-
00400 024416          LDA 1, TRE1     ; CHARACTER WAS NOT
00401 106404          SUB 0,1, SZR    ; DELETED
00402 063077          HALT            ; GOOD GRIEF, IT WAS.
00403 000360          JMP AGE         ; IT'S OK; RUN ONE MORE TIME


00404 101426  CWE:    101426          ; CONTROLWORD
00405 000415  CHRE:   CHARE           ; RECEIVER ADDRESS
00406 000407  CHXE:   CHAXE           ; TRANSMITTER ADDRESS
00407 013026  CHAXE:  013026          ; SYN,SYN
00410 054131  TXE1:   054131          ; X,Y
00411 013032  TXE2:   013032          ; SYN,Z
00412 001077  TXE3:   001077          ; STX,?
00413 054131  TXE4:   054131          ; X,Y
00414 177777  TXE5:   177777

                                      ; TEST THE CONTENTS IN THESE
                                      ; CELLS AFTER RUNNING:
00415 000000  CHARE:  0               ;054131
00416 000000  TRE1:   0               ;013032
00417 000000  TRE2:   0               ;001077
00420 000000  TRE3:   0               ;054131
00421 000000  TRE4:   0
```

```
                ; START IN 105
                        ; 7 BIT CHARACTERSET TEST.
                        ; THIS TEST USES 7 BIT CHARACTERS.
                        ; THE RECEIVER AND THE TRANSMITTER IS
                        ; SET UP TO A 7 BIT CHARACTERSET.


00422 020433  CHL7:   LDA 0, CW7        ; LOAD THE RECEIVER
00423 061040          DOA 0, REC        ; WITH THE CONTROLWORD.
00424 020432          LDA 0, CL7        ; LOAD THE RECEIVER
00425 061040          DOA 0, REC        ; CLASS REGISTER.
00426 030145          LDA 2, CM4        ; LOAD THE WORD
00427 024421  AGF:    LDA 1, CHX7       ; COUNTERS AND THE
00430 020427          LDA 0, CHR7       ; ADDRESS COUNTERS.
00431 066041          DOB 1, XMT        ;
00432 062240          DOBC 0, REC       ;
00433 073140          DOCS 2, REC       ; START THE
00434 073141          DOCS 2, XMT       ; CONTROLLER.
00435 063641          SKPDN, XMT        ; WAIT FOR THE TRANSMITTER
00436 000777          JMP .-1           ; WORD COUNT OVERFLOW.
00437 020421          LDA 0, CHRR7      ; TEST THE RECEIVED
00440 024423          LDA 1, MA7        ; CHARACTERS NOT
00441 107414          AND# 0,1,SZR      ; CONTAINS BIT (8).
00442 063077          HALT              ; IT DID IN THIS WORD.
00443 020416          LDA 0, TRA7       ; TRY THE OTHER WORD
00444 024420          LDA 1, MB7        ; IN THE SAME MANNER.
00445 107414          AND# 0,1,SZR      ;
00446 063077          HALT              ; IT FAILED TOO, ERROR.
00447 000760          JMP AGF           ; OK, TRY AGAIN



00450 000451  CHX7:   CHXR7            ; TRANSMITTER ADDRESS
00451 125252  CHXR7:  125252           ; SYN, SYN
00452 125653  TXA7:   125653           ; ANY, ANY
00453 152725  TXB7:   152725           ; CLASS 1, CLASS 1
00454 177777  TXC7:   177777
00455 102452  CW7:    102452           ; CONTROLWORD
00456 000525  CL7:    000525           ; CLASS
00457 000460  CHR7:   CHRR7            ; RECEIVER ADDRESS
00460 000000  CHRR7:  0                ; 025453 AFTER RUN
00461 000000  TRA7:   0                ; 052525 AFTER RUN
00462 000000  TRB7:   0
00463 152324  MA7:    152324           ; 1ST WORD MASK
00464 125252  MB7:    125252           ; 2ND WORD MASK
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                ; START IN 106
                        ; 6 BIT CHARACTERSET TEST.
                        ; THE TRANSMITTER IS LOADED WITH 8 BIT
                        ; CHARACTERS AND THESE CHARACTERS IS TESTED
                        ; WHEN THE RECEIVER HAS STORED THEM AT THE
                        ; APPROPIATE ADDRESSES.


00465 020433    CHL6:   LDA 0, CW6          ; THE COMMENTS TO THIS
00466 061040            DOA 0, REC          ; ROUTINE IS EXACTLY
00467 020432            LDA 0, CL6          ; THE SAME AS FOR THE
00470 061040            DOA 0, REC          ; 6 BIT CHARACTERSET
00471 030145            LDA 2, CM4          ; TEST.
00472 024421    AGG:    LDA 1, CHX6
00473 020427            LDA 0, CHR6
00474 066041            DOB 1, XMT
00475 062240            DOBC 0, REC
00476 073140            DOCS 2, REC
00477 073141            DOCS 2, XMT
00500 063641            SKPDN, XMT
00501 000777            JMP .-1
00502 020421            LDA 0, CHRR6
00503 024423            LDA 1, MA6
00504 107414            AND# 0,1,SZR
00505 063077            HALT                ; IT FAILED THE 1ST WORD
00506 020416            LDA 0, TRA6
00507 024420            LDA 1, MB6
00510 107414            AND# 0,1,SZR
00511 063077            HALT                ; 2ND WORD FAILED TOO
00512 000760            JMP AGG             ; LOOP AGAIN



00513 000514    CHX6    :       CHXR6
00514 152725    CHXR6   :       152725      ; SYN, SYN
00515 153727    TXA6    :       153727      ; ANY, ANY
00516 165352    TXB6    :       165352      ; CLASS 1, CLASS 1
00517 177777    TXD6    :       177777
00520 103025    CW6     :       103025      ; CONTROLWORD
00521 000452    CL6     :       000452      ; CLASSWORD
00522 000523    CHR6    :       CHRR6
00523 000000    CHRR6   :       0           ; 013427 AFTER RUN
00524 000000    TRA6    :       0           ; 025052 AFTER RUN
00525 000000    TRB6    :       0
00526 164350    MA6     :       164350
00527 152725    MB6     :       152725
```

```
; START IN 107
        ; ODD BIT TEST:
        ; THIS LOOP CHECKS THE ODD BIT STATUS.
        ; THE RECEIVER IS OPERATED IN MODE 1.
        ; I.E. WHEN IT RECEIVES A CLASS 1 CHARACTER,
        ; IT STORES TWO CHARS MORE AND THEN IT SETS
        ; DONE AND CLEARS BUSY. THE CLASS 1 CHARACTER
        ; IS STORED AS LEFT BYTE, AND THE ODD BIT IS SET.



00530 020226  ODDT:   LDA 0, ADR      ; CLEAR CLASS REGISTER.
00531 061040          DOA 0, REC
00532 014226          DSZ ADR
00533 000775          JMP ODDT
00534 061040          DOA 0, REC
00535 020227          LDA 0, CL       ; LOAD CLASS REGISTER
00536 061040          DOA 0, REC
00537 020230          LDA 0, CWB      ; LOAD CONTROLWORD
00540 061040          DOA 0, REC
00541 030144          LDA 2, CM3
00542 024232  AGH:    LDA 1, CHRB
00543 020231          LDA 0, CHXB
00544 062041          DOB 0, XMT      ; LOAD ADDRESS
00545 066040          DOB 1, REC
00546 073140          DOCS 2, REC     ; LOAD WORD COUNT
00547 073141          DOCS 2, XMT     ; AND START CONTROLLER
00550 063640          SKPDN, REC      ; WAIT FOR REC DONE
00551 000777          JMP .-1
00552 063641          SKPDN, XMT      ; WAIT WD CNT OVFLO
00553 000777          JMP .-1
00554 064440          DIA 1, REC      ; READ STATUS
00555 060441          DIA 0, XMT
00556 101203          MOVR 0,0,SNC    ; TEST BIT (15)
00557 063077          HALT            ; WD CNT NOT OVFLO, EXAMIN AC 0
00560 125300          MOVS 1,1
00561 125100          MOVL 1,1
00562 125103          MOVL 1,1,SNC    ; TEST BIT (9)
00563 063077          HALT            ; ODD BIT NOT SET
00564 125103          MOVL 1,1,SNC    ; TEST CLASS 1; BIT (10)
00565 063077          HALT            ; CLASS 1 NOT RECEIVED
00566 020225          LDA 0, REST
00567 040226          STA 0, ADR      ; RESTORE HIGHEST CLASSWORD
00570 000752          JMP AGH         ; OK, RUN AGAIN
```

```
; START IN 110
        ; CLASS REGISTER TEST.
        ; THE WHOLE CLASS REGISTER EXEPT THE TWO
        ; LOWEST ADDRESSES IS DEFINED AS CLASS 1.
        ; ALL ONES IS THE SYN-CHARACTER AND THE
        ; FOLLOWING LOWER ADDRESS IS A CHARACTER
        ; CALLED "ANY".
        ; THE CHARACTERS FROM THE TRANSMITTER IS
        ; CHANGED FROM ALL ZEROS TO THE HIGHEST
        ; USABLE NUMBER:
        ; EACH TIME THE TRANSMITTER TERMINATES
        ; WITH WORD COUNT OVERFLOW, THE CLASS
        ; CHARACTER IS INCREMENTED AND A NEW
        ; CYCLE IS SET UP.
        ; THE RECEIVER IS TESTED THAT THE STATUS
        ; IS CLASS 1 RECEIVED. STATUSBIT (10).



00571 020460  CLTST:  LDA 0, CWCL      ; LOAD CONTROLWORD
00572 061040          DOA 0, REC       ; TO THE RECEIVER.
00573 020441          LDA 0, ADRE      ; LOAD LOWEST CLASS
00574 061040  CLLD:   DOA 0, REC       ; ADDRESS WITH CLASS 1.
00575 101400          INC 0,0          ; COUNT THIS ADDRESS UP.
00576 024435          LDA 1, ADRB      ; COMPARE TO END ADDRESS
00577 106414          SUB# 0,1, SZR    ; END ADDRESS REACHED?
00600 000774          JMP CLLD         ; NO, CONTINUE CYCLE.
00601 020434  AGJ:    LDA 0, STAD      ; LOAD WORD AND
00602 024440          LDA 1, RCAD      ; ADDRESS COUNTERS
00603 030145          LDA 2, CM4       ; WITH THE SPECIFIED
00604 062041          DOB 0, XMT       ; NUMBERS AND START
00605 066040          DOB 1, REC       ; THE CONTROLLER.
00606 073140          DOCS 2, REC
00607 073141          DOCS 2, XMT      ; WAIT FOR THE
00610 063641          SKPDN, XMT       ; TRANSMITTER WORD
00611 000777          JMP .-1          ; COUNT OVERFLOW.
00612 060640          DIAC 0, REC      ; READ RECEIVER STATUS-
00613 024151          LDA 1, MASKD     ; WORD AND CHECK IT.
00614 106414          SUB# 0,1,SZR     ; STATUSERROR?
00615 063077          HALT             ; YES, EXAMIN AC 0.
00616 024431          LDA 1, TSTCL     ; CHECK THAT IT
00617 106414          SUB# 0,1,SZR     ; IS CLASS 1 , THAT IS
00620 063077          HALT             ; RECEIVED. NO, IT SHOULD.
00621 030416          LDA 2, CLWD      ; YES, IT IS FINE.
00622 151400          INC 2,2          ; COUNT CLASSWORD UP.
00623 024425          LDA 1, CLWDE     ; IS THE HIGHEST
00624 050413          STA 2, CLWD      ; ADDRESS REACHED?
00625 146414          SUB# 2,1,SZR     ;
00626 000753          JMP AGJ          ; NO, CYCLE AGAIN.
00627 020417          LDA 0, RECYC     ; RESTORE CLASSWORD
00630 040407          STA 0, CLWD      ; FOR MORE CYCLES.
00631 063077          HALT             ; PASSED ONCE.
00632 000737          JMP CLTST        ; PERFORM A NEW RUN.
```

```
00633 000776  ADRB:   776
00634 000400  ADRE:   400
00635 000636  STAD:   STWD            ; XMT ADDRESS
00636 177376  STWD:   177376          ; SYN, SYN
00637 177000  CLWD:   177000          ; SYN, CLASS 1
00640 177777  ANY:    177777          ; ANY, ANY
00641 177777  ANYB:   177777
00642 000643  RCAD:   SRAD            ; REC ADDRESS
00643 000000  SRAD:   0
00644 000000  DNCA:   0
00645 000000  TOM:    0
00646 177000  RECYC:  177000
00647 000040  TSTCL:  40              ; STATUS BIT (10)
00650 177376  CLWDE:  177376          ; CLASSWORD END
00651 101776  CWCL:   101776          ; CONTROLWORD
```

```
                ; START IN 111
                        ; DATACHANNEL LATE TEST.
                        ; THE CONTROLLER IS SET UP AND STARTED.
                        ; WHEN THE 5TH WORD IS RECEIVED, THE
                        ; PROGRAM HALTS.
                        ; THEN PRESS CONTINUE, AND YOU'LL HALT
                        ; AGAIN WITH RECEIVER STATUS IN AC 0,
                        ; AND TRANSMITTER STATUS IN AC 1.
                        ; STATUSBIT (14) MUST BE SET IN EITHER CASE.

00652 020225  LOOPK:  LDA 0, REST
00653 040226          STA 0, ADR
00654 020226  CLEAR:  LDA 0, ADR      ; THIS LITTLE LOOP
00655 061040          DOA 0, REC      ; CLEARS THE CLASS-
00656 014226          DSZ ADR         ; REGISTER.
00657 000775          JMP CLEAR
00660 020423          LDA 0, CWK      ; LOAD CONTROLWORD.
00661 061040          DOA 0, REC      ;
00662 030150  AGK:    LDA 2 , CM7     ; LOAD WORD COUNTERS
00663 024421          LDA 1, CHRK     ; AND ADDRESS
00664 020421          LDA 0, CHXK     ; COUNTERS WITH THE
00665 062041          DOB 0, XMT      ; SPECIFIED NUMBERS.
00666 066040          DOB 1, REC      ; START THEN THE
00667 073140          DOCS 2 , REC    ; CONTROLLER.
00670 073141          DOCS 2, XMT     ; WAIT  FOR THE
00671 020430          LDA 0, TRK4     ; 5TH RECEIVED
00672 101005          MOV 0,0, SNR    ; WORD TO BE STORED.
00673 000776          JMP .-2         ; NOT YET, RELAX
00674 063077          HALT            ; YES, PRESS CONTINUE.
00675 060640          DIAC 0, REC     ; READ RECEIVER STATUS.
00676 064641          DIAC 1, XMT     ; READ TRANSMITTER STATUS.
00677 063077          HALT            ; EXAMIN AC'S.
00700 102400          SUB 0,0         ; CLEAR RECEIVER
00701 040420          STA 0, TRK4     ; WORD ADDRESS
00702 000760          JMP AGK         ; PERFORM NEW CYCLE.


00703 101426  CWK:    101426          ; CONTROLWORD
00704 000715  CHRK:   CHARK           ; RECEIVER ADDRESS
00705 000706  CHXK:   CHAXK           ; TRANSMITTER ADDRESS
00706 013026  CHAXK:  013026
00707 013430  TXK1:   013430
00710 014432  TXK2:   014432
00711 015434  TXK3:   015434
00712 016436  TXK4:   016436
00713 017440  TXK5:   017440
00714 020442  TXK6:   020442
00715 000000  CHARK:  0
00716 000000  TRK1:   0
00717 000000  TRK2:   0
00720 000000  TRK3:   0
00721 000000  TRK4:   0
00722 000000  TRK5:   0
```

```
                ;
                ; START IN 112
                        ; CALLING SIGNAL TEST.
                        ; PRESS START.
                        ; SET CALLING SIGNAL ON AND WAIT FOR HALT.
                        ; EXAMIN AC0 FOR A 1 IN BIT (13)
                        ; SET CALLING SIGNAL TO AUTO AND
                        ; PRESS CONTINUE.
                        ; WAIT FOR THE COMPUTER TO HALT AND THEN
                        ; EXAMIN AC 0 FOR A 1 IN BIT (13)
                        ; FOR FURTHER RUNS, PRESS CONTINUE.

00723 102620    LOOPL:  SUBZR 0,0
00724 063040            DOC 0, REC
00725 063640            SKPDN, REC      ; WAIT FOR CALLING SIGNAL.
00726 000777            JMP .-1
00727 060640            DIAC 0, REC     ; READ STATUS AND CLEAR STATUS
00730 063077            HALT            ; EXAMIN AC 0 FOR A 1 IN (13)
00731 102520    AGL:    SUBZL 0,0       ; PUT DATATERMINAL READY ON
00732 061041            DOA 0, XMT
00733 063640            SKPDN, REC      ; WAIT FOR CALLING SIGNAL
00734 000777            JMP .-1
00735 060440            DIA 0, REC      ; READ RECEIVER STATUS
00736 101005            MOV 0,0,SNR     ; STATUSWORD ZERO ?
00737 000772            JMP AGL         ; YES, TRY AGAIN
00740 060640            DIAC 0, REC     ; NO, BUT IS IT THE RIGHT BIT?
00741 063077            HALT            ; EXAMIN AC 0 FOR A 1 IN
00742 102400            SUB 0,0         ; BIT (13). PRESS CONTINUE
00743 061041            DOA 0,XMT       ; FOR ANOTHER PASS
00744 000757            JMP LOOPL
```

```
; START IN 113
        ; TEST THAT THE TRANSMITTER WILL NOT
        ; TERMINATE IF THE MODEM CONTROL SIGNAL
        ; "READY FOR SENDING" GOES OFF, BUT THAT
        ; IT WILL GO IDLE.
        ; SET "READY FOR SENDING" TO OFF
        ; START PROGRAM.
        ; WHEN REQUEST TO SEND GOES ON - THEN
        ; SWITCH READY FOR SENDING ON.
        ; WAIT A FEW SECONDS, THEN SWITCH
        ; READY FOR SENDING OFF.
        ; THE LAMP: "DATATERMINAL READY" MUST NOT
        ; GO ON.



00745 020424  LOOPM:  LDA 0, CWM       ; LOAD THE CONTROLWORD
00746 061040          DOA 0, REC       ; TO THE RECEIVER.
00747 030145  AGM:    LDA 2, CM4       ; LOAD THE RECEIVER
00750 024427          LDA 1, CHRM      ; AND THE TRANSMITTER
00751 020421          LDA 0, CHXM      ; WORD AND ADDRESS
00752 062041          DOB 0, XMT       ; COUNTERS WITH
00753 066040          DOB 1, REC       ; THE SPECIFIED NUMBERS
00754 073140          DOCS 2, REC      ; AND WAIT FOR DONE
00755 073141          DOCS 2, XMT      ; IN THE TRANSMITTER.
00756 063641          SKPDN, XMT
00757 000777          JMP .-1
00760 060441          DIA 0, XMT       ; TEST WHAT SORT OF TER-
00761 101212          MOVR# 0,0,SZC    ; MINATION IT WAS.
00762 000765          JMP AGM          ; IT WAS OVERFLOW, AGAIN.
00763 102520          SUBZL 0,0        ; READY FOR SENDING OFF
00764 061041          DOA 0, XMT       ; HAS TERMINATED.
00765 063077          HALT             ; THERE MUST BE AN ERROR.
00766 102400          SUB 0,0          ; PUT DATATERMINAL READY
00767 061041          DOA 0, XMT       ; LAMP OFF AND PERFORM
00770 000757          JMP AGM          ; A NEW CYCLE.

00771 101426  CWM:    101426  ; CONTROLWORD
00772 000773  CHXM:   CHAXM
00773 013026  CHAXM:  013026
00774 144276  TXM1:   144276
00775 163403  TXM2:   163403
00776 052504  TXM3:   052504
00777 001000  CHRM:   CHARM
01000 000000  CHARM:  0
01001 000000  TRM1:   0
01002 000000  TRM2:   0
```

```
; START IN 114
        ; TEST: TRY TO SET STATUS 12 DATASET NOT READY
        ; WITHOUT RECEIVER AND TRANSMITTER BUSY.
        ; SET "DATASET READY" TO AUTO



01003 102520  LOOPN:  SUBZL 0,0          ; PUT DATATERMINAL
01004 061041          DOA 0, XMT         ; READY ON.
01005 060141          NIOS, XMT          ; START THE TRANSMITTER
01006 060241          NIOC, XMT          ; AND THE RECEIVER.
01007 060140          NIOS, REC
01010 060240          NIOC, REC          ; CLEAR THEM AGAIN.
01011 102400          SUB 0,0            ; PUT DATATERMINAL
01012 061041          DOA 0, XMT         ; READY OFF.
01013 064441          DIA 1, XMT         ; READ STATUS
01014 060440          DIA 0, REC
01015 030406          LDA 2, MAN         ; MASK TRANSMITTER STATUS
01016 113415          AND# 0,2,SNR       ; AND CHECK IT
01017 063077          HALT               ; IT DID NOT SET!
01020 133415          AND# 1,2,SNR       ; TRY THE RECEIVER
01021 063077          HALT               ; IT FAILED TOO
01022 000761          JMP LOOPN          ; THANKS GOD; TRY AGAIN


01023 000010  MAN:    10
```

```
; START IN 115
        ; TEST: TRY TO SET STATUS 12 DATASET NOT READY
        ; WHILE RUNNING IN NORMAL MODE.
        ; START PROGRAM
        ; WAIT A FEW SECONDS, THEN PUT DATASET READY OFF.
        ; IF THE PROGRAM ANSWERS WITH A DATATERMINAL
        ; READY, THE TEST WAS POSITIVE.


01024 020434  LOOPO:  LDA 0, CWO       ; LOAD CONTROLWORD.
01025 061040          DOA 0, REC
01026 030146          LDA 2, CM5       ; LOAD THE WORD
01027 024433          LDA 1, CHRO      ; AND ADDRESS
01030 020431          LDA 0, CHXO      ; COUNTERS WITH
01031 062041          DOB 0, XMT       ; THE SPECIFIED
01032 066040          DOB 1, REC       ; NUMBERS.
01033 073140          DOCS 2, REC
01034 073141          DOCS 2, XMT      ; START THE CONTROLLER.
01035 063641          SKPDN, XMT       ; WAIT FOR THE TRANSMITTER
01036 000777          JMP .-1          ; WORD COUNT OVERFLOW.
01037 060441          DIA 0, XMT       ; READ TRANSMITTER STATUS.
01040 024434          LDA 1, MAO       ; MASK IT.
01041 107414          AND# 0,1,SZR     ; WAS IT OVERFLOW?
01042 000402          JMP .+2          ; NO. ANOTHER STATUS?
01043 000761          JMP LOOPO        ; YES, LOAD AGAIN.
01044 024431          LDA 1, MASO      ; MAYBE IT WAS
01045 107414          AND# 0,1,SZR     ; STATUSBIT (12)?
01046 063077          HALT             ; ERROR, EXAMIN AC 0.
01047 060440          DIA 0, REC       ; READ RECEIVER STATUS.
01050 107414          AND# 0,1,SZR     ; WAS IT BIT (12)?
01051 063077          HALT             ; REC. ERROR, EXAMIN AC 0.
01052 102520          SUBZL 0,0        ; THE TEST WAS OK,
01053 061041          DOA 0, XMT       ; PUT DATATERMINAL READY ON.
01054 063077          HALT             ; ANOTHER RUN?
01055 102400          SUB 0,0          ; YES, THEN PRESS CONTINUE.
01056 061041          DOA 0, XMT       ; PUT DATATERMINAL READY OFF.
01057 000745          JMP LOOPO        ; AND PERFORM ANOTHER RUN.

01060 101426  CWO:    101426           ; CONTROLWORD
01061 001063  CHXO:   CHAXO
01062 001070  CHRO:   CHARO
01063 013026  CHAXO:  013026
01064 054131  TXO1:   054131
01065 013132  TXO2:   013132
01066 001077  TXO3:   001077
01067 054131  TXO4:   054131
01070 000000  CHARO:  0
01071 000000  TRO1:   0
01072 000000  TRO2:   0
01073 000000  TRO3:   0
01074 177776  MAO:    177776
01075 177766  MASO:   177766
```

```
; START IN 116
                        ; TEST: TRY TO SET STATUS 12 AUTOMATICALLY
                        ; WHILE RUNNING IN NORMAL MODE (BUSY)
                        ; SET "DATASET READY" TO AUTO



01076 102400  LOOPP:  SUB 0,0           ; CLEAR TRO 2
01077 040773          STA 0, TRO2
01100 020436          LDA 0, CWP        ; LOAD THE CONTROLWORD
01101 061040          DOA 0, REC        ; TO THE RECEIVER.
01102 102520          SUBZL 0,0         ; PUT DATATERMINAL READY ON
01103 061041          DOA 0, XMT
01104 030146          LDA 2, CM5        ; LOAD WORD AND ADDRESS
01105 024432          LDA 1, CHRP       ; COUNTERS.
01106 020432          LDA 0, CHXP
01107 062041          DOB 0, XMT
01110 066040          DOB 1, REC
01111 073140          DOCS 2, REC       ; START THE CONTROLLER
01112 073141          DOCS 2, XMT       ; AND WAIT FOR
01113 020757          LDA 0, TRO2       ; NONZERO CONTENTS IN
01114 103405          AND 0,0,SNR       ; THE RECEIVER ADDRESS
01115 000776          JMP .-2           ; TRO2.
01116 102400          SUB 0,0           ; THEN PUT DATATERMINAL
01117 061041          DOA 0, XMT        ; READY OFF AGAIN.
01120 063641          SKPDN, XMT        ; WAIT FOR XMT DONE.
01121 000777          JMP .-1
01122 060441          DIA 0, XMT        ; READ TRANSMITTER STATUS.
01123 024412          LDA 1, MASP       ; MASK STATUS.
01124 107415          AND# 0,1, SNR     ; IS IT BIT (12)?
01125 063077          HALT              ; NO, THERE IS STATUSERROR.
01126 063640          SKPDN, REC        ; TEST NOW RECEIVER STATUS.
01127 063077          HALT              ; REC STILL BUSY?
01130 060440          DIA 0, REC        ; READ STATUS
01131 024404          LDA 1, MASP
01132 107415          AND# 0,1,SNR
01133 063077          HALT              ; IT FAILED;
01134 000742          JMP LOOPP         ; TRY AGAIN

01135 000010  MASP:   000010
01136 101426  CWP:    101426            ; CONTROLWORD
01137 001070  CHRP:   CHARO
01140 001063  CHXP:   CHAXO

                      ; ALL OTHER CONSTANTS FROM THE PREVIOUS LOOP.
```

```
                ; START IN 117
                        ; TEST: TRY TO SET STATUS (11) CARRIER OFF
                        ; WHILE RUNNING IN NORMAL MODE.
                        ; START THE PROGRAM AND WAIT A FEW SECONDS.
                        ; PUT "CARRIER" TO OFF AND WAIT FOR THE
                        ; DATATERMINAL LAMP TO GO ON.
                        ; IF THIS HAPPENS, THE TEST WAS POSITIVE.


01141 062677  LOOPQ:  IORST             ; CLEAR THE CONTROLLER
01142 020432          LDA 0, CWQ        ; LOAD THE CONTROLWORD
01143 061040          DOA 0, REC        ; OUTPUT THE CONTROLWORD
01144 030146          LDA 2, CMS        ; TO THE RECEIVER.
01145 024430          LDA 1, CHRQ       ; THEN LOAD THE WORD
01146 020430          LDA 0, CHXQ       ; AND THE ADDRESS
01147 062041          DOB 0, XMT        ; COUNTERS WITH THE
01150 066040          DOB 1, REC        ; SPECIFIED NUMBERS.
01151 073140          DOCS 2, REC       ; THEN START THE
01152 073141          DOCS 2, XMT       ; CONTROLLER AND
01153 063640  RDO:    SKPDN, REC        ; WAIT FOR DONE FROM
01154 000406          JMP XDO           ; THE RECEIVER, ELSE
01155 060440          DIA 0, REC        ; WAIT XMT DONE.
01156 024421          LDA 1, MAQ1       ; READ RECEIVER STATUS. AND
01157 106414          SUB# 0,1,SZR      ; TEST FOR CARRIER OFF.
01160 000761          JMP LOOPQ         ; NOT CARRIER OFF; RUN AGAIN.
01161 000407          JMP FLAG          ; YES, CONGRATULATIONS!
01162 063641  XDO:    SKPDN, XMT        ; TRANSMITTER CALLING?
01163 000770          JMP RDO           ; NO, RELAX
01164 060441          DIA 0, XMT        ; READ XMT STATUS.
01165 101213          MOVR# 0,0,SNC     ; WAS IT OVERFLOW?
01166 063077          HALT              ; NO, XMT STATUS ERROR
01167 000752          JMP LOOPQ         ; IT WAS OVERFLOW; LOAD AGAIN
01170 102520  FLAG:   SUBZL 0,0        ; PUT DATATERMINAL READY
01171 061041          DOA 0, XMT        ; LAMP ON AND END!
01172 063077          HALT
01173 000746          JMP LOOPQ         ; PRESS CONTINUE
                                        ; FOR ANOTHER PASS

01174 101426  CWQ:    101426            ; CONTROLWORD
01175 001070  CHRQ:   CHARO
01176 001063  CHXQ:   CHAXO
01177 000020  MAQ1:   20                ; CARRIER OFF MASK
```

```
                ;
                ; START IN 120
                        ; SAVE LEFT BYTE TEST:
                        ; SET CARRIER TO AUTO.
                        ; THE PROGRAM WILL SET CARRIER OFF IN THE
                        ; MIDDLE OF THE LAST CHARACTER. THE PREVIOUSLY
                        ; TRANSMITTED CHAR IS LEFT BYTE IN A WORD,
                        ; AND THIS CHARACTER SHOULD BE SAVED AS THE
                        ; CONTROLLER TERMINATES THE TRANSMISSION.
                        ; OBS!!!! ONLY FOR 1200 BITS/SEC


01200 020226  SAVEB:  LDA 0, ADR      ; CLEAR THE CLASS REGISTER
01201 061040          DOA 0, REC
01202 014226          DSZ ADR
01203 000775          JMP SAVEB
01204 061040          DOA 0, REC
01205 020225          LDA 0, REST
01206 040226          STA 0, ADR
01207 102520          SUBZL 0,0
01210 061041          DOA 0, XMT      ; PUT CARRIER ON
01211 020227          LDA 0, CL
01212 061040          DOA 0, REC      ; OUTPUT CLASSWORD
01213 020230          LDA 0, CWB
01214 061040          DOA 0, REC      ; LOAD CONTROLWORD
01215 020441          LDA 0, ADRR
01216 024441          LDA 1, ADRX
01217 030145          LDA 2, CM4
01220 062040          DOB 0, REC      ; LOAD ADDRESS
01221 066041          DOB 1, XMT
01222 073140          DOCS 2, REC     ; LOAD WORDCOUNT
01223 073141          DOCS 2, XMT     ; AND START CONTROLLER
01224 020446          LDA 0, RADR     ; TEST RECEIVED DATA
01225 101005          MOV 0,0,SNR
01226 000776          JMP .-2
01227 014433          DSZ TIMER       ; CLASS 1 IS STORED
01230 000777          JMP .-1
01231 102400          SUB 0,0
01232 061041          DOA 0, XMT      ; PUT CARRIER OFF
01233 014425          DSZ WAIT        ; WAIT 1 CLOCK PERIOD
01234 000777          JMP .-1
01235 020436          LDA 0, RECBY
01236 024425          LDA 1, MASBY
01237 107400          AND 0,1         ; LEFT BYTE ISOLATED
01240 020424          LDA 0, ORGBY
01241 106414          SUB# 0,1,SZR
01242 063077          HALT            ; LEFT BYTE DISAPPEARED
01243 020422          LDA 0, TICNT
01244 040416          STA 0, TIMER    ; RESTORE TIMECOUNT
01245 020414          LDA 0, RWAIT
01246 040412          STA 0, WAIT     ; RESTORE WAIT
01247 062677          IORST
01250 102400          SUB 0,0
01251 040422          STA 0, RECBY    ; CLEAR RECBY
01252 040420          STA 0, RADR     ; CLEAR RADR
01253 063077          HALT            ; PRESS CONTINUE FOR A
01254 000724          JMP SAVEB       ; NEW RUNNING
```

```
01255 103426   CW:      103426
01256 001272   ADRR:    RADR
01257 001266   ADRX:    XADR
01260 000400   WAIT:    400
01261 000400   RWAIT:   400
01262 005670   TIMER:   5670
01263 177400   MASBY:   177400
01264 125000   ORGBY:   125000
01265 005670   TICNT:   5670
01266 013026   XADR:    013026   ; SYN,SYN
01267 037402   X1:      037402   ; ?,STX
01270 125377   X2:      125377   ; 252,PAD
01271 177777   X3:      177777   ; PAD,PAD
01272 000000   RADR:    0
01273 000000   RECBY:   0


               .END
```

A	000121
ADR	000226
ADRB	000633
ADRE	000634
ADRR	001256
ADRX	001257
AGA	000157
AGB	000205
AGC	000245
AGD	000314
AGE	000360
AGF	000427
AGG	000472
AGH	000542
AGJ	000601
AGK	000662
AGL	000731
AGM	000747
ANY	000640
ANYB	000641
B	000122
C	000123
C6	000127
C7	000126
CHARA	000171
CHARB	000237
CHARC	000303
CHARD	000350
CHARE	000415
CHARK	000715
CHARM	001000
CHARO	001070
CHAXA	000170
CHAXB	000233
CHAXC	000274
CHAXD	000343
CHAXE	000407
CHAXK	000706
CHAXM	000773
CHAXO	001063
CHL6	000465
CHL7	000422
CHR6	000522
CHR7	000457
CHRA	000167
CHRB	000232
CHRC	000273
CHRD	000342
CHRE	000405
CHRK	000704
CHRM	000777
CHRO	001062
CHRP	001137
CHRQ	001175
CHRR6	000523
CHRR7	000460
CHX6	000513
CHX7	000450
CHXA	000166
CHXB	000231

```
CHXC     000272
CHXD     000341
CHXE     000406
CHXK     000705
CHXM     000772
CHXO     001061
CHXP     001140
CHXQ     001176
CHXR6    000514
CHXR7    000451
CL       000227
CL6      000521
CL7      000456
CLEAR    000654
CLLD     000574
CLT      000131
CLTST    000571
CLWD     000637
CLWDE    000650
CM1      000142
CM2      000143
CM3      000144
CM4      000145
CM5      000146
CM6      000147
CM7      000150
CW       001255
CW6      000520
CW7      000455
CWA      000172
CWB      000230
CWC      000271
CWCL     000651
CWD      000340
CWE      000404
CWK      000703
CWM      000771
CWO      001060
CWP      001136
CWQ      001174
D        000124
DNCA     000644
E        000125
FLAG     001170
K        000132
L        000133
LOOPA    000152
LOOPB    000173
LOOPC    000242
LOOPD    000311
LOOPE    000355
LOOPK    000652
LOOPL    000723
LOOPM    000745
LOOPN    001003
LOOPO    001024
LOOPP    001076
LOOPQ    001141
M        000134
MA6      000526
```

MA7	000463
MAN	001023
MAO	001074
MAQ1	001177
MASBY	001263
MASKD	000151
MASO	001075
MASP	001135
MB6	000527
MB7	000464
N	000135
O	000136
ODDT	000530
ODT	000130
ORGBY	001264
P	000137
Q	000140
R	000141
RADR	001272
RCAD	000642
RDO	001153
REC	000040
RECBY	001273
RECYC	000646
REST	000225
RWAIT	001261
SAVEB	001200
SRAD	000643
STAD	000635
STWD	000636
TICNT	001265
TIMER	001262
TOM	000645
TRA6	000524
TRA7	000461
TRB1	000240
TRB2	000241
TRB6	000525
TRB7	000462
TRC1	000304
TRC2	000305
TRC3	000306
TRC4	000307
TRC5	000310
TRD1	000351
TRD2	000352
TRD3	000353
TRE1	000416
TRE2	000417
TRE3	000420
TRE4	000421
TRK1	000716
TRK2	000717
TRK3	000720
TRK4	000721
TRK5	000722
TRM1	001001
TRM2	001002
TRO1	001071
TRO2	001072

```
TRO3     001073
TSTCL    000647
TWD      000354
TXA6     000515
TXA7     000452
TXB1     000234
TXB2     000235
TXB3     000236
TXB6     000516
TXB7     000453
TXC1     000275
TXC2     000276
TXC3     000277
TXC4     000300
TXC5     000301
TXC6     000302
TXC7     000454
TXD1     000344
TXD2     000345
TXD3     000346
TXD4     000347
TXD6     000517
TXE1     000410
TXE2     000411
TXE3     000412
TXE4     000413
TXE5     000414
TXK1     000707
TXK2     000710
TXK3     000711
TXK4     000712
TXK5     000713
TXK6     000714
TXM1     000774
TXM2     000775
TXM3     000776
TXO1     001064
TXO2     001065
TXO3     001066
TXO4     001067
WAIT     001260
X1       001267
X2       001270
X3       001271
XADR     001266
XDO      001162
XMT      000041
```