

ASYNCHRONOUS COMMUNICATIONS SUBROUTINES

THE ASYNCHRONOUS COMMUNICATIONS PACKAGE CONTAINS FIVE SUBROUTINES CALLABLE EITHER FROM COBOL PROGRAMS OR FROM FORTRAN PROGRAMS. THESE SUBROUTINES ALLOW THE USER TO INITIALIZE A TTY LINE FOR COMMUNICATIONS WITH ANOTHER COMPUTER, PLACE A CALL OUT ON THAT LINE TO THE OTHER COMPUTER (IF DIAL OUT HARDWARE EXISTS FOR THAT LINE), INITIATE THE COUNTERPART COMMUNICATIONS JOB IN THE OTHER COMPUTER, THEN SEND AND RECEIVE DATA TO AND FROM THE OTHER COMPUTER WITH COMPLETE ERROR DETECTION AND ERROR CORRECTION, AND FINALLY DISCONNECT THE COMMUNICATIONS LINE AT THE TERMINATION OF THE DATA TRANSFER.

THE FOLLOWING IS A DESCRIPTION OF THE FIVE SUBROUTINES, THEIR CALLING SEQUENCE, THEIR ERROR CODES, AND SAMPLE PROGRAMS DEMONSTRATING THE USE OF EACH OF THE SUBROUTINES.

INIT - THE INITIALIZATION SUBROUTINE

FORTRAN CALL:

CALL INITF(IOINDX, IERROR, ITYPE)

COBOL CALL:

ENTER MACRO INITC USING IOINDX, IERROR, ITYPE

WHERE THE ARGUMENTS ARE DEFINED AS:

IOINDX FORTRAN:

IOINDX MUST BE AN INTEGER VARIABLE CONTAINING THE UNIVERSAL I/O INDEX OF THE TTY LINE TO BE USED AS THE COMMUNICATIONS LINE. THIS INDEX IS OCTAL 200000 PLUS THE TTY LINE NUMBER. THE UNIVERSAL I/O INDEX IS DESCRIBED IN THE DECSYSTEM-10 MONITOR CALLS MANUAL.

COBOL:

IOINDX MUST BE A COMPUTATIONAL ITEM WITH A DECIMAL VALUE EQUIVALENT TO OCTAL 200000 PLUS THE TTY NUMBER (EG. THE IOINDX FOR TTY LINE 14 WOULD BE 65,536 + 12 OR 65,548 DECIMAL). IOINDX IS DEFINED AS: IOINDX PIC 9(10) COMP VALUE 65548.

IERROR

FORTRAN:

IERROR IS AN INTEGER VARIABLE WHICH IS SET EITHER TRUE (-1) OR FALSE (0) DEPENDING ON WHETHER THE INITIALIZATION WAS COMPLETED SUCCESSFULLY. IF IERROR IS FALSE, THEN ITYPE CONTAINS THE TYPE OF FAILURE THAT OCCURED.

COBOL:

IERROR IS A COMPUTATIONAL ITEM WHICH IS SET TO EITHER TRUE (-1) OR FALSE (0) AS INDICATED ABOVE FOR THE FORTRAN CALL. IERROR IS DEFINED AS: IERROR PIC 9(10) COMP.

ITYPE

FORTRAN:

ITYPE IS AN INTEGER VARIABLE SET TO THE TYPE OF ERROR ENCOUNTERED BY THE SUBROUTINE. IF IERROR IS FALSE THEN ITYPE IS RETURNED WITH THE FOLLOWING VALUES:

- 1 - TTY LINE IS NOT AVAILABLE
- 2 - TTY NOT ASSIGNED TO THIS JOB
- 3 - NO CHANNELS ARE AVAILABLE

COBOL:

ITYPE IS A COMPUTATIONAL ITEM WHICH

WILL CONTAIN AN ERROR TYPE VALUE AS
INDICATED ABOVE FOR THE FORTRAN
CALL. ITYPE IS DEFINED AS:
ITYPE PIC 9(10) COMP.

THE INIT SUBROUTINE REQUIRES THAT THE COMMUNICATIONS
TTY LINE BE ASSIGNED TO THE JOB IN ORDER TO USE THAT
LINE IN IMAGE MODE. THE INIT SUBROUTINE ALSO
REQUIRES THAT THE CALLING ROUTINE LEAVE I/O CHANNELS
16 AND 17 FREE FOR COMMUNICATING WITH THE
COMMUNICATIONS TTY LINE.

DIAL - THE DIALER SUBROUTINE

FORTRAN CALL:

CALL DIALF(IDIAL, N, IERROR, ITYPE)

COBOL CALL:

ENTER MACRO DIALC USING IDIAL, N, IERROR, ITYPE.

WHERE THE ARGUMENTS ARE DEFINED AS:

IDIAL FORTRAN:

IDIAL IS AN INTEGER ARRAY CONTAINING THE DIGITS TO BE DIALED. THE DIGITS MUST BE IN THE RANGE OF 1 TO 10, STORED ONE DIGIT TO A WORD. THE NUMBER 14 DECIMAL WILL CAUSE A FIVE SECOND PAUSE IN DIALING. THIS IS USEFUL FOR GETTING AN "OUTSIDE LINE" WHERE A SECOND DIAL TONE MUST BE WAITED FOR.

COBOL:

IDIAL IS A GROUP LEVEL ITEM CONTAINING N (DEFINED BELOW) ELEMENTARY ITEMS DEFINED AS:
IDIGIT- PIC 9 COMP VALUE -.
NOTE THAT EACH DIGIT DIALED IS PLACED IN A SEPARATE ITEM (WORD).

N

FORTRAN:

N IS THE NUMBER OF DIGITS IN THE ARRAY TO BE DIALED. (INCLUDING ANY PAUSE REQUESTS) N MUST BE LESS THAN OR EQUAL TO 16 DECIMAL. IF N IS ZERO, THEN NO DIAL TAKES PLACE. TO COMMUNICATE OVER A LEASED OR HARD WIRED LINE, DIAL CAN BE CALLED WITH N=0.

COBOL:

N IS A COMPUTATIONAL ITEM CONTAINING THE NUMBER OF DIGITS TO BE DIALED. N MUST BE LESS THAN OR EQUAL TO 16 DECIMAL. N IS DEFINED AS:
N PIC 99 COMP VALUE -.

IERROR

FORTRAN:

IERROR IS AN INTEGER VARIABLE WHICH IS SET TRUE (-1) IF THE DIAL WAS SUCCESSFUL OR TO FALSE (0) IF THE CALL DID NOT GO THROUGH.

COBOL:

IERROR IS A COMPUTATIONAL ITEM WHICH IS SET TO EITHER TRUE (-1) OR FALSE (0) AS INDICATED ABOVE FOR THE FORTRAN CALL. IERROR IS DEFINED AS:

IERROR PIC 9(10) COMP.

ITYPE

FORTRAN:

ITYPE IS AN INTEGER VARIABLE WHICH IS SET TO THE FOLLOWING VALUES IF IERROR IS FALSE:

- 0 - UNDEFINED ERROR
- 1 - TTY LINE NOT A DATASET LINE
- 2 - CALL DID NOT GO THROUGH
- 3 - MORE THAN 16 DIGITS WERE SPECIFIED IN N

COBOL:

ITYPE IS A COMPUTATIONAL ITEM WHICH WILL CONTAIN AN ERROR TYPE VALUE AS INDICATED ABOVE FOR THE FORTRAN CALL. ITYPE IS DEFINED AS:
ITYPE PIC 9(10) COMP.

AFTER COMPLETING THE CALL (IF ONE WAS SPECIFIED) THE DIAL SUBROUTINE DIRECTLY COUPLES THE JOB'S CONTROLLING TTY WITH THE COMMUNICATIONS TTY LINE. THIS ENABLES THE USER TO LOG ONTO THE OTHER COMPUTER AND TO START UP THE COUNTERPART COMMUNICATIONS PROGRAM ON THE OTHER COMPUTER.

SEND - THE DATA SENDING SUBROUTINE

FORTTRAN CALL:

CALL SENDF(ISEND, N, IERROR, ITYPE)

COBOL CALL:

ENTER MACRO SENDC USING ISEND, N, IERROR, ITYPE

WHERE THE ARGUMENTS ARE DEFINED AS:

ISEND

FORTTRAN:

ISEND IS AN INTEGER ARRAY CONTAINING THE DATA TO BE TRANSMITTED. THE DATA IS REPRESENTED AS 8-BIT CHARACTERS PACKED RIGHT-ADJUSTED ONE PER WORD IN THE ARRAY.

COBOL:

ISEND IS A GROUP LEVEL ITEM CONTAINING N ITEMS DEFINED AS:
02 CHARX PIC X SYNC RIGHT VALUE 'X'.
NOTE THAT EACH CHARACTER SENT REQUIRES A SEPARATE ITEM (WORD) AND IS POSITIONED IN BITS 30 THRU 35. IF "USAGE IS DISPLAY-7" WERE ADDED TO THE DEFINITION, THE CHARACTER APPEARS IN BITS 28 THRU 34 WITH BIT 35 EQUAL TO ZERO.

N

FORTTRAN:

N IS AN INTEGER VARIABLE CONTAINING THE NUMBER OF DATA ELEMENTS TO BE SENT. THERE IS NO SIZE LIMIT FOR N. HOWEVER, THE COMMUNICATIONS PACKAGE WILL TRANSMIT THE ARRAY AS A SERIES OF MESSAGES CONTAINING UP TO 72 DATA ELEMENTS PER MESSAGE. THE SIZE OF THE MESSAGES IS NORMALLY TRANSPARENT TO THE USER, BUT IF THE USER WANTS TO MINIMIZE TRANSMISSION OVERHEAD THEN DATA SHOULD BE PACKED INTO ARRAYS WHICH ARE A MULTIPLE OF 72 WORDS LONG.

COBOL:

N IS A COMPUTATIONAL ITEM CONTAINING THE NUMBER OF CHARACTERS TO BE SENT AS DESCRIBED ABOVE FOR THE FORTTRAN CALL. N IS DEFINED AS:
N PIC 9(10) VALUE -.

IERROR

FORTTRAN:

IERROR IS A INTEGER VARIABLE WHICH IS SET TRUE (-1) IF THE DATA WAS RECEIVED SUCCESSFULLY BY THE OTHER COMPUTER AND FALSE (0) IF THE OTHER

COMPUTER DID NOT GET THE DATA.

COBOL:

IERROR IS A COMPUTATIONAL ITEM WHICH IS SET TO EITHER TRUE (-1) OR FALSE (0) AS INDICATED ABOVE FOR THE FORTRAN CALL. IERROR IS DEFINED AS:
IERROR PIC 9(10) COMP.

ITYPE

FORTRAN:

ITYPE IS AN INTEGER VARIABLE WHICH IS SET TO THE FOLLOWING VALUES IF IERROR IS FALSE:

-1 - IF THE OTHER COMPUTER IS TRYING TO TRANSMIT

DATA CONCURRENTLY WITH THIS PROGRAM.

N - THE NUMBER OF RETRIES BEFORE GIVING UP.

IF IERROR IS TRUE, ITYPE WILL BE SET TO THE NUMBER OF TRIES THAT WERE NECESSARY BEFORE THE DATA WAS SUCCESSFULLY RECEIVED BY THE OTHER COMPUTER.

COBOL:

ITYPE IS A COMPUTATIONAL ITEM WHICH WILL CONTAIN AN ERROR TYPE VALUE AS INDICATED ABOVE FOR THE FORTRAN CALL. ITYPE IS DEFINED AS:
ITYPE PIC 9(10) COMP.

RECV - THE DATA RECEIVER SUBROUTINE

FORTRAN CALL:
CALL RECVF(IRECV, N, IERROR, ITYPE)

COBOL CALL:
ENTER MACRO RECVC USING IRECV, N, IERROR, ITYPE

WHERE THE ARGUMENTS ARE DEFINED AS:

IRECV FORTRAN:
IRECV IS AN INTEGER ARRAY INTO WHICH THE DATA RECEIVED FROM THE OTHER COMPUTER IS PACKED RIGHT ADJUSTED ONE 8-BIT CHARACTER PER WORD.

COBOL:
IRECV IS A GROUP LEVEL ITEM CONTAINING N ELEMENTARY ITEMS INTO WHICH EACH DATA CHARACTER IS RECEIVED. EACH CHARACTER EXPECTED IS DEFINED AS:

02 CHARX PIC X SYNC RIGHT.
NOTE THAT EACH CHARACTER RECEIVED REQUIRES A SEPARATE ITEM (WORD) AND IS POSITIONED IN BITS 30 THRU 35. IF "USAGE IS DISPLAY-7" WERE ADDED TO THE DEFINITION, THE CHARACTER WOULD APPEAR IN BITS 28 THRU 34 WITH BIT 35 EQUAL TO 0.

N FORTRAN:
N IS AN INTEGER VARIABLE CONTAINING THE NUMBER OF DATA ELEMENTS TO BE RECEIVED FROM THE OTHER COMPUTER. N CAN BE ANY SIZE, BUT IT SHOULD AGREE WITH THE NUMBER OF DATA ELEMENTS BEING SENT FROM THE OTHER COMPUTER. IF N IS SMALLER THAN THE NUMBER OF DATA ELEMENTS SENT FROM THE OTHER COMPUTER, THE FIRST N DATA ELEMENTS WILL BE RETURNED IN IRECV AND THE REMAINING ELEMENTS WILL BE LOST.

COBOL:
N IS A COMPUTATIONAL ITEM CONTAINING THE NUMBER OF DATA CHARACTERS TO BE RECEIVED AS INDICATED ABOVE IN THE FORTRAN CALL. N IS DEFINED AS:
N PIC 9(10) VALUE -.

IERROR FORTRAN:
IERROR IS AN INTEGER VARIABLE WHICH IS SET TO TRUE (-1) IF THE DATA IS RECEIVED PROPERLY, AND SET TO FALSE

(0) IF 30 SECONDS PASS BEFORE ANY DATA IS RECEIVED.

COBOL:

IERROR IS A COMPUTATIONAL ITEM WHICH IS SET TO EITHER TRUE (-1) OR FALSE (0) AS INDICATED ABOVE FOR THE FORTRAN CALL. IERROR IS DEFINED AS:
IERROR PIC 9(10) COMP.

ITYPE

FORTRAN:

ITYPE IS AN INTEGER VARIABLE WHICH IS SET TO THE NUMBER OF DATA ELEMENTS SUCCESSFULLY RECEIVED BEFORE RETURNING. IF IERROR IS TRUE, ITYPE WILL EQUAL N.

COBOL:

ITYPE IS A COMPUTATIONAL ITEM WHICH WILL CONTAIN AN ERROR TYPE VALUE AS INDICATED ABOVE FOR THE FORTRAN CALL. ITYPE IS DEFINED AS:
ITYPE PIC 9(10) COMP.

HNGUP - THE DISCONNECT SUBROUTINE

PROTRAN CALL:
CALL HNGUPF

COBOL CALL:
ENTER MACRO HNGUPC

THERE ARE NO ARGUMENTS TO THIS SUBROUTINE. THE HNGUP SUBROUTINE RESTORES THE COMMUNICATIONS TTY LINE TO ITS NORMAL STATE, AND THEN HANGS UP THE MODEM IF THE TTY LINE IS A DATASET. IT IS IMPORTANT TO CALL THIS SUBROUTINE BEFORE EXITING FROM THE COMMUNICATIONS JOB TO LEAVE THE TTY LINE IN A REASONABLE STATE FOR THE NEXT TRANSFER. THIS IS ESPECIALLY IMPORTANT IF THE JOB'S CONTROLLING TTY IS ALSO THE COMMUNICATIONS TTY.

MESSAGES WHICH MIGHT APPEAR ON THE CONTROLLING TTY:

? COMMUNICATIONS TTY LINE NO LONGER ASSIGNED TO JOB

THIS IS A FATAL ERROR MESSAGE WHICH COULD APPEAR IF THE COMMUNICATIONS TTY WAS SOMEHOW LOST BY THE COMMUNICATIONS JOB.

?COMMUNICATIONS TTY LINE NO LONGER AVAILABLE

THIS IS A FATAL ERROR MESSAGE WHICH OCCURS IF THE COMMUNICATIONS JOB CANNOT INIT THE COMMUNICATIONS TTY ANY LONGER. THE REASON IS THE SAME AS ABOVE.

? DSK NOT AVAILABLE TO WRITE DEBUG FILE

THIS MESSAGE AND THE NEXT ONE CAN ONLY APPEAR IF "FTDEBUG" IS TURNED ON IN DIAL.MAC. THE MESSAGE MEANS THAT THE INIT SUBROUTINE COULD NOT INIT THE DISK.

? CANNOT ENTER DEBUG FILE

THIS MESSAGE OCCURS IF THERE WAS AN ERROR WHILE TRYING TO ENTER THE DEBUG FILE (DEBUG.FIL). IT MIGHT OCCUR IF THE DSK WERE FULL, OR DEBUG.FIL CANNOT BE SUPERCEDED.

CONTROLLING TTY IS NOW DIRECTLY CONNECTED TO COMMUNICATIONS LINE. TYPE ↑X TO CONTINUE.

THIS MESSAGE ORIGINATES FROM THE DIAL SUBROUTINE AFTER SUCCESSFULLY CALLING INTO THE OTHER COMPUTER. AT THIS POINT THE COMMUNICATIONS TTY LINE IS CONNECTED TO THE CONTROLLING TTY LINE SUCH THAT ALL CHARACTERS TYPED ON THE CONTROLLING TTY ARE SENT OUT OVER THE COMMUNICATIONS LINE, AND ALL CHARACTERS RECEIVED FROM THE COMMUNICATIONS LINE ARE TYPED ON THE CONTROLLING TTY. THIS ALLOWS THE USER TO LOG ONTO THE OTHER COMPUTER AND START UP A PROGRAM WHICH WILL RECEIVE OR SEND THE DESIRED DATA IN THE CORRECT FORMAT. CONTROL CHARACTERS CAN BE SENT TO THE OTHER COMPUTER BY TYPING AN UP-ARROW (↑) FOLLOWED BY THE DESIRED ASCII CHARACTER. FOR EXAMPLE: ↑C, ↑O, OR ↑Z. TO EXIT FROM THIS MODE AND RETURN TO THE MAIN PROGRAM, THE USER MUST TYPE A CONTROL-X OR ↑X (AN UP-ARROW FOLLOWED BY AN X).

SAMPLE PROGRAMS:

FORTRAN RECEIVER PROGRAM

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      DIMENSION IRECV(100)
      CALL INITF("200043,IERROR,ITYPE)
      IF (.NOT.IERROR)GO TO 1
      CALL RECVF(IRECV,100,IERROR,ITYPE)
      IF (.NOT.IERROR)GO TO 2
      TYPE 100
      CALL HNGUPF
      CALL EXIT
1     TYPE 101
      IF (ITYPE.EQ.1)TYPE 102
      IF (ITYPE.EQ.2)TYPE 103
      CALL HNGUPF
      CALL EXIT
2     TYPE 104,ITYPE
      CALL HNGUPF
      CALL EXIT
100    FORMAT(' SUCCESSFUL TRANSFER')
101    FORMAT(' COMM LINE INITIALIZATION FAILURE')
102    FORMAT(' TTY NOT AVAILABLE')
103    FORMAT(' TTY NOT ASSIGNED')
104    FORMAT(' TIME OUT AFTER RECEIVING 'I3,
X      ' OUT OF 100 WORDS')
      END
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FORTRAN SENDER PROGRAM

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DIMENSION ISEND(100), IDIAL(9)
DATA IDIAL/9,14,8,9,7,5,7,10,2/
CALL INITF("200046", IERROR, ITYPE)
IF (.NOT.IERROR) GO TO 1
CALL DIALF(IDIAL, 9, IERROR, ITYPE)
IF (.NOT.IERROR) GO TO 3
CALL SENDF(ISEND, 100, IERROR, ITYPE)
IF (.NOT.IERROR) GO TO 2
TYPE 100
CALL HNGUPF
CALL EXIT
1 TYPE 101
IF (ITYPE.EQ.1) TYPE 102
IF (ITYPE.EQ.2) TYPE 103
CALL HNGUPF
CALL EXIT
2 TYPE 104, ITYPE
CALL HNGUPF
CALL EXIT
3 TYPE 105
IF (ITYPE.EQ.1) TYPE 106
IF (ITYPE.EQ.2) TYPE 107
CALL HNGUPF
CALL EXIT
100 FORMAT(' SUCCESSFUL TRANSFER')
101 FORMAT(' COMM LINE INITIALIZATION FAILURE')
102 FORMAT(' TTY NOT AVAILABLE')
103 FORMAT(' TTY NOT ASSIGNED')
104 FORMAT(' TIME OUT AFTER RECEIVING 'I3,
X ' OUT OF 100 WORDS')
105 FORMAT(' ERROR IN DIAL')
106 FORMAT(' TTY NOT A DATASET')
107 FORMAT(' CALL DID NOT GO THROUGH')
END

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COBOL EXAMPLE PROGRAM

IDENTIFICATION DIVISION.

PROGRAM-ID. DIAL .

ENVIRONMENT DIVISION.

DATA DIVISION.

WORKING-STORAGE SECTION.

77 IOINDX PIC 9(10) COMP VALUE 65548.

77 IERROR PIC 9(10) COMP.

77 ITYPE PIC 9(10) COMP.

77 N PIC 999 COMP.

01 IDIAL.

02 IDIG1 PIC 99 COMP VALUE 9.

02 IDIG2 PIC 99 COMP VALUE 14.

02 IDIG3 PIC 99 COMP VALUE 8.

02 IDIG4 PIC 99 COMP VALUE 9.

02 IDIG5 PIC 99 COMP VALUE 7.

02 IDIG6 PIC 99 COMP VALUE 5.

02 IDIG7 PIC 99 COMP VALUE 7.

02 IDIG8 PIC 99 COMP VALUE 10.

02 IDIG6 PIC 99 COMP VALUE 2.

01 ISEND.

02 CHAR1 PIC X SYNC RIGHT VALUE 'A'.

02 CHAR2 PIC X SYNC RIGHT VALUE 'B'.

02 CHAR3 PIC X SYNC RIGHT VALUE 'C'.

02 CHAR4 PIC X SYNC RIGHT VALUE 'D'.

02 CHAR5 PIC X SYNC RIGHT VALUE 'E'.

02 CHAR6 PIC X SYNC RIGHT VALUE 'F'.

02 CHAR7 PIC X SYNC RIGHT VALUE 'G'.

02 CHAR8 PIC X SYNC RIGHT VALUE 'H'.

02 CHAR9 PIC X SYNC RIGHT VALUE 'I'.

02 CHAR10 PIC X SYNC RIGHT VALUE 'J'.

01 IRECV.

02 CHARX PIC X SYNC RIGHT OCCURS 10 TIMES.

PROCEDURE DIVISION.

RECEIVER-ROUTINE.

ENTER MACRO INITC USING IOINDX, IERROR, ITYPE.

IF IERROR NOT EQUAL TO 0 GO TO ONE.

MOVE 10 TO N.

ENTER MACRO RECVC USING IRECV, N, IERROR, ITYPE.

IF IERROR NOT EQUAL TO 0 GO TO TWO.

DISPLAY 'SUCCESSFUL TRANSFER'.

ENTER MACRO HNGUPC.

STOP RUN.

ONE.

DISPLAY 'COMMUNICATIONS LINE INITIALIZATION FAILURE'.

IF ITYPE EQUAL TO 1 DISPLAY 'TTY NOT AVAILABLE'.

IF ITYPE EQUAL TO 2 DISPLAY 'TTY NOT ASSIGNED'.

ENTER MACRO HNGUPC.

STOP RUN.

TWO.

DISPLAY 'TIME OUT AFTER RECEIVING ' ITYPE ' WORDS'.

ENTER MACRO HNGUPC.

STOP RUN.

SENDER-SUBROUTINE.

ENTER MACRO INITC USING IOINDX, IERROR, ITYPE.

IF IERROR EQUAL TO 0 GO TO ONES.

MOVE 9 TO N.

ENTER MACRO DIALC USING IDIAL, N, IERROR, ITYPE.

IF IERROR EQUAL TO 0 GO TO THREES.

MOVE 10 TO N.

ENTER MACRO SENDC USING ISEND, N, IERROR, ITYPE.

IF IERROR EQUAL TO 0 GO TO TWOS.

DISPLAY 'SUCCESSFUL TRANSFER'.

ENTER MACRO HNGUPC.

STOP RUN.

ONES.

DISPLAY 'COMMUNICATIONS LINE INITIALIZATION FAILURE'.

IF ITYPE EQUAL TO 1 DISPLAY 'TTY NOT AVAILABLE'.

IF ITYPE EQUAL TO 2 DISPLAY 'TTY NOT ASSIGNED'.

ENTER MACRO HNGUPC.

STOP RUN.

TWOS.

DISPLAY 'TIME OUT AFTER RECEIVING ' ITYPE ' WORDS'.

ENTER MACRO HNGUPC.

STOP RUN.

THREES.

DISPLAY 'ERROR IN DIAL'.

IF ITYPE EQUAL TO 1 DISPLAY 'TTY NOT A DATASET'.

IF ITYPE EQUAL TO 2 DISPLAY 'CALL DID NOT GO THROUGH'.

ENTER MACRO HNGUPC.

STOP RUN.