A MINI-SIZED BULLETIN BOARD SYSTEM
POSSIBLE STANDARD FOR PACKET RADIO

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ABSTRACT:

AUTO connect/disconnect mode for unattended operation is available with the Vancouver Area Digital Communications Group% terminal node controller (TNC), the Tucson Amateur Packet Radio TNC, and 'Synchronous Packet Radio Using The Software Approach - AX.25 Protocol' software TNC.

A logical expansion of the auto mode's capabilities would be to allow the station to which your station is connected in the AUTO mode to have full access to one or more of your disk drives. Minimum functions would include: LIST the disk directory, SEND a given disk file, SAVE a given file on disk, and send a set of operating instructions upon receiving the HELP command.

It is obvious that a disk I/O system subroutine such as this in the AUTO mode, is indeed in essence a mini-sized version of a computer bulletin board system. By the term 'Possible Standard* in this paper's title, we are suggesting that it would be a 'nice to have feature' incorporated in all packet stations regardless of the protocol or TNC used.

This paper describes the subroutines used by the author to provide these functions on a Model I TRS-80 with the packet radio software approach using the Vancouver protocol.

GENERAL:

These subroutines were written and tested during the summer of 1983. Why did they use the Vancouver protocol? Quite simply because at that time in the western New York and southern Ontario regions there were no AX.25 stations (other than the author's software approach) on the 2 meter band. Southern Ontario (in the vicinities of Hamilton and Toronto) had about 50 active packeteers, all using the Vancouver TNC with Vancouver protocol, and the Buffalo, NY area 65 miles northeast of our QTH had Gil Boelke - W2EUP, using the Vancouver protocol with the GLB PK-1 software approach.

W2EUP convinced us of the value of implementing disk I/O in the AUTO mode with a number of demonstrations, so we wrote the following subroutines. They are designed to work only with the following Model I TRS-80 disk operating systems: TRSDOS 2.3, NEWDOS + and NEWDOS 1.0.

Figure 1 is the commented source code for this subroutine. The comments are largely self explanatory. The equates (EQU) at the beginning of the program serve to link these AUTO mode subroutines to the main software program used in Volume 3 of 'Synchronous Packet Radio Using The Software Approach - Advanced Vancouver Protocol.'

Though only the SEND, SAVE, LIST, and HELP commands are used in this mini-subroutine it is a relatively simple matter to expand the commands to include FLAGS xxx to set the program's number of opening flags transmitted, DELETE file name to do just that, and to include the disk drive number with the file name so any number of disk drives from 1 to 4 may be accessed.

Depending upon how far you wish to go, this fundamental program may be expanded up to and including all of the features of a full sized computer bulletin board system.

Originally, the AUTO disk I/O subroutines required a carriage return and line feed immediately after each command to eliminate the possibility of having the program confuse an info field in a frame that began with SEND, SAVE, LIST or HELP as a command rather than part of the message. Since the commands must be in capital letters, this has not occurred during the past 9 months of operation so the mandatory carriage return and line feed requirements were removed to further simplify operation. By all means put them back in if you wish.

W2EUP's and K2IMF's AUTO mode disk I/O programs require that each command begin with the / character; i.e., /SEND, /SAVE, /LIST, and /HELP to avoid possible confusion. This is yet another approach you might consider.

Figure 2 is the HELP message the program sends in the AUTO mode upon receiving the HELP command in a single frame packet after the connection is established. The capital M's represent ASCII 13 carriage returns and the capital

3% represent ASCII 10 line feeds. They are included, as some of the dumb terminals now used with some packet TNCs do not have the automatic scrolling feature.

CONCLUSION:

Expanding the auto connnect mode's capability to include disk I/O has proven extremely useful. We are grateful to W2EUP for the concept and for continued encouragement.

Volume 3 of @Synchronous Packet Radio Using The Software Approach - Advanced Vancouver Protocol' has not been published and probably never will be published.

WHY?

Quite simply the brilliant AX.25 protocol is taking the world by storm. Its growth capabilites and myriad other advantages over the older Vancouver protocol have just about buried the old timer once and for all except in the immediate Toronto, Vancouver, and Melbourne environs.

The other reason 'Advanced Vancouver Protocol' may never be published is simply the costs involved. It takes a minimum of 200 sales per volume just to break even and with the greatest stretch of our wildest imagination we cannot forsee 200 knowledgeable radio amateurs springing for yet another Vancouver protocol book.

If you feel you must have a copy of the uncommented source and object code for Volume 3, available only for the Model I TRS-80, on a single, DOUBLE sided, 35 track disk, with no instructions or assistance whatsoever other than a short single page telling you how to install your own call letters and node number in the program, then send Richcraft a check for $29 and the disk will be mailed to you first class.

Richcraft Engineering Ltd.
#1 Wahmeda Industrial Park
Chautauqua, New York 14722

NOTE:

The main and shift menus of the Volume 3 program are similar to the menus illustrated in Figure 2 of the Ax.25 Protocol paper by the same author that is presented elsewhere in these proceedings.

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VOLUME 3 MAIN MENU;

                     ENTER OPTION DESIRED 3 _

CHANGE ADDRESSEE CALL        = A   W2EUP CONNECT REQUEST CQ = B
NOT CONNECTED TOGGLE         = C   W2EUP DISCONNECT REQUEST = D
SEND PACKETS FROM LO-MEM     = E   W2EUP CONNECT ACKNOWLEDGE = F
INPUT FRAMES/PACKET LO-MEM   = G   THIS IS VANCOUVER PROTOCOL = H
BACKOFF DELAY TOGGLE OFF     = I   AUTO CONNECT TOGGLE OFF    = J
NOW IN UPPER CASE MODIFY     = K   W2EUP - GIL BOELKE MESSAGE = L
DISPLAY/EDIT MEMORY PAGE     = M   SET INFO FIELD LOMEM PACKS = N
NOT FORMAT VIDEO TOGGLE      = O   QUICK BROWN FOX MESSAGE    = P
TRANSMIT EXTERNALLY ONLY     = Q   SET OPENING FLAG LENGTH    = R
TRANSMIT TO III-MEM ONLY     = S   INPUT/XMIT NORMAL INFO = V & T
CLEAR NON-PGM MEM 17K-62K    = U   INPUT/XMIT ALL STATION = V 6 W
ABORT LOW-MEY PAK SEQUENCE   = X   SET RF-TRY IN CONNECT MODE = Y
SHIFT MENU                   = 1   MOVE HI-MEM TO LOW-MEM     = 2
SEND WAIT REQUEST (RNR)      = 3   SEND CLEAR WAIT (RR)       = 4
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VOLUME 3 SHIFT MENU:

                     SHIFT MENU ? _

XMIT 40960 UP CONTINUOUSLY = A   BOOT DOS READY              = B
LOAD HI-MEM ASCII UUUUUUU  = C   LOAD HI-MEM LOGIC 1111111   = D
EDIT/MODIFY INSTRUCTIONS   = E   CHANGE RECEIVE DPLL BASE #  = F
LOG ON VE3MHZ REPEATER     = G   LOG OFF VE3MHZ REPEATER     = H
SEND MORSE I.D.            = I   SEND SEQUENTIAL ACKS        = J
CAUTION ** RESTORE DOS **  = K   DISPLAY LOW MEMORY @ 17408  = L
DISPLAY RCCV PACKS @ 53248 = M   RESTORE PROGRAM POINTERS    = N
DISPLAY CALL/ADDRESS LIST  = O   MOVE PROGRAM TO LOW MEMORY  = P
SAVE HI-MEM ON DISK        = Q   LOAD DISK FILE TO HI-MEM    = R
TRANSMIT BAUD RATE SELECT  = S   SEND DISK :1 DIRECTORY      = T
CLEAR HI-MEMORY 53248 +    = U   RECEIVE VANCOUVER PROTOCOL  = V
RECEIVE AX.25 NOT CONNECT  = W   SEND MORSE FROM KEYBOARD    = X
NORMAL DISPLAY - NOT DPLL  = Y   DISPLAY DPLL LAST QUADRANT  = Z
      NOTE: SPACE BAR IN RECEIVE MODE = RESEND LAST PACK
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VOLUME 3 CALL & ADDRESS LIST (SUMMER '83):

                 - CALL AND ADDRESS LIST -

VE7APU = 196    VE3ATI =  51    VE2BAR = 215    VE3BKB = 220
 (DOUG)          (BERNIE)       (MIKE)          (JON)
VE3DNM =  98    VE3DSP =  97    VE3DVV = 115    VE3DRZ = 239
(MAX)           (GLEN)          (JOHN)          (ROB)
VE3EC  = 236    VE3EHL = 117    W2EUP  = 119    VE3FAO = 250
 (BILL)          (ED)            (GIL)          (FRANK)
VE3FGK = 218    VE3FMG = 120    VE3GBC = 216    VE3IAC = 238
 (DAVE)          (MIKE)          (BRUCE)         (PAUL)
VE3IUV = 116    VE3LNY = 181    VE3MWM = 185    VE3NEC = 210
(RON)            (JACK)         (STU)           (JOHN)
VE3PKT = 186    WA2RYT = 129    VE3SP  = 118    VE3UR  = 221
 (MAIL BOX)     (RAY)            (RON)          (RAY)
K2IMF  =  41    WB2VEU =  65    W4UMF  =  28    W2CIX  =  30
 (DON)           (ANDY)         (TOM)            (BILL)
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POTENTIAL OSCAR 10 PACKETEERS (SUMMER '83):

U.S.A.   :   - POTENTIAL OSCAR 10 PACKET LIST AS OF 8/15/83 -
KA1GD  ANDY     KA1HTV UNK      WA1LOU STAN     W2EUP  GIL
K2IMF  DON      WA2 LQQ GRUM    WB2VEU ANDY     W3IWI  TOM
K4BRK  CARL     K4CAV  CHAS     WB4JFI TERRY    W4RI   PAUL
W4UCH  BOB      W4UMF  TOM      WA6JPR WALT     NK6K   HAL
KA6M   HANK     W6OVP  DAVE     W6TNS  DON      WA7GXD LYLE
W8KOX  TOM      W9BD   FRED     WB9FLW PETE     K9NG   STEVE
KA9NZI GARY     KA9Q   PHIL     NOCCZ  ANDY     KROU   TIM
OVERSEAS:
OK2SPS PETER    SM5HEV JENS     VK2BOA TONY     ZL1AOX IAN
CANADA  :
VE2BAR MIKE     VE2BPD JEAN     VE3ATI BERNIE   VE3BKB JON
VE3DNM MAX      VE 3DRZ ROB     VE3DSP GLEN     VE3DVV JOHN
VE3EC  BILL     VE3EHL ED       VE3FAO FRANK    VE3FGK DAVE
VE3FMG MIKE     VE3GBC BRUCE    VE3IAC PAUL     VE3IUV RON
VE3LNY JACK     VE3MWM STU      VE3NEC JOHN     VE3SP  RON
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00100 ; AUTO DISK I/O SUBROUTINES FOR VOLUME 3       FIGURE 1
00110
00120 ; SYNCHRONOUS PACKET RADIO USING THE SOFTWARE APPROACH
00130
00140 ; FOR TRSDOS 2.3 - NEWDOS PLUS - NEWDOS80 1.0
00150
00160 ; SOURCE - AUTO 1                  OBJECT - AUTO 2
00170
00180 ; COPYRIGHT (C) 1984 BY RICHCRAFT ENGINEERING LTD.
00190
00200 SETUP   EQU     29760           ;INITIALIZE PGM POINTERS
00210 LENGTH  EQU     75FBH           ;INFO FIELD LENGTH/FRAME
00220 AUTSAV  EQU     75FDH           ;AUTO SAVE DISK POINTER
00230 CONREQ  EQU     75FEH           ;SABM POINTER
00240 BEFORE  EQU     7601H           ;END RCVD INFO III-MEMORY
00250 SEGNUM  EQU     7603H           ;VERY LONG FILE SEGMENTS
00260 CLRHY   EQU     7604H           ;CLEAR HI-MEMORY
00270 SEND3Z  EQU     7607H           ;XMIT MESSAGE ADDRESS
00280 PACK    EQU     760AH           ;XMIT MULTI-FRAME ADDRESS
00290 FRAMES  EQU     7611H           ;NUMBER OF FRAMES/PACK
00300 MOVDN   EQU     761FH           ;RESTORE DOS FM MID-MEM
00310 SIGN9   EQU     762FH           ;TYPE FUNCTION AUTO PTR
00320 MENU    EQU     7630H           ;DISPLAY MAIN MENU
00330         ORG     49632           ;DISK FILE CONTROL BLOCK
00340 FCB     DEFS    32              ;SAVE 32 BYTES FOR FCB
00350 BUFFER  DEFS    256             ;DISK I/O WORKING SPACE
00360 CHEKIT  INC     HL              ;TEST
00370         LD      A,(HL)          ;THE
00380         CP      'L'             ;AUTO
00390         JP      Z,TESTL         ;FUNCTION
00400         CP      'H'             ;DESIRED
00410         JP      Z,TESTH         ;BY
00420         CP      'S'             ;THE
00430         JP      Z,TESTS         ;STATION
00440         RET                     ;WHO
00450 TESTL   INC     HL              ;CONNECTED
00460         LD      A,(HL)          ;TO
00470         CP      'I'             ;YOUR
00480         RET     NZ              ;STATION
00490         INC     HL              ;WHICH
00500         LD      A,(HL)          ;IS
00510         CP      'S'             ; NOW
00520         RET     NZ              ;IN
00530         INC     HL              ;THE
00540         LD      A,(HL)          ;AUTO
00550         CP      'T'             ;MODE.
00560         RET     NZ              ;GOT A 'LIST' COMMAND ?
00570         LD      A,8             ;IF SO,
00580         LD      (SIGN9),A       ;THEN SET SIGN9 FOR LIST
00590         RET                     ;RETURN WHENCE U CAME +I
00600 TESTH   INC     HL              ;LAST LETTER WAS AN 'H'
00610         LD      A,(HL)          ;SO
00620         CP      'E'             ;TEST
00630         RET     NZ              ;FOR
00640         INC     HL              ;THE
00650         LD      A,(HL)          ;'H'
00660         CP      'L'             ;'E'
00670         RET     NZ              ;'L'
00680         INC     HL              ;'P'
00690         LD      A,(HL)          ;COMMAND
00700         CP      'P'             ;WAS IT 'HELP' ?
00710         RET     NZ              ;IF NOT, IGNORE IT
00720         LD      A,2             ;IF SO,
00730         LD      (SIGN9),A       ;THEN SET SIGN9 FOR HELP
00740         RET                     ;RETURN WHENCE U CAME +1
00750 TESTS   INC     HL              ;LAST LETTER WAS AN 'S'
00760         LD      A,(HL)          ;TEST FOR
00770         CP      'A'             ;'A' AS IN SAVE
00780         JP      Z,TESTA         ;IF SO, TEST FOR 'V'
00790         CP      'E'             ;ELSE TEST FOR 'E' AS IN
00800         JP      Z,TESTE         ;SEND. IF SO, TEST 'N'
00810         RET                     ;RETURN WHENCE U CAME +1
00820 TESTA   INC     HL              ;GOT AN 'S' AND 'A'
00830         LD      A,(HL)          ; NOW
00840         CP      'V'             ;TEST
00850         RET     NZ              ;FOR
00860         INC     HL              ;A 'V'
00870         LD      A,(HL)          ;AND
00880         CP      'E'             ;'E'
00890         RET     NZ              ;IF SO,
00900         INC     HL              ;ALSO TEST
00910         LD      A,(HL)          ;FOR A
00920         CP      ' '             ;SPACE AFTER SAVE
00930         RET     NZ              ;IF NOT,
00940         INC     HL              ;THEN IGNORE IT
00950         LD      A,6             ;ELSE
00960         LD      (SIGN9),A       ;SET SIGN9 FOR 'SAVE'
00970         LD      (SAVEIT),HL     ;AND SAVE MEM LOCATION
00980         RET                     ;FOR 'SAVE' FILE NAME
00990 TESTE   INC     HL              ;GOT AN 'S' AND 'E'
01000         LD      A,(HL)          ;SO
01010         CP      'N'             ;TEST
01020         RET     NZ              ;FOR
01030         INC     HL              ;'N'
01040         LD      A,(HL)          ;AND
01050         CP      'D'             ;A
01060         RET     NZ              ;'D' ?
01070         INC     HL              ;AND
01080         LD      A,(HL)          ;A
01090         CP      ' '             ;SPACE ?
01100         RET     NZ              ;IF
01110         INC     HL              ;SO ?
01120         LD      A,4             ;THEN SET
01130         LD      (SIGN9),A       ;SIGN9 FOR A 'SEND'
01140         LD      (SAVEIT),HL     ;AND SAVE MEM LOCATION
01150         RET                     ;FOR SEND FILE NAME
01160 DIZ     LD      A,(HL)          ;DISPLAY
01170         CP      0               ;A MESSAGE
01180         JP      Z,FINISH        ;ON VIDEO
01190         CALL    033H            ;AT CURSOR
01200         INC     HL              ;LOCATION WITH
01210         JP      DIZ             ;ZERO DELIMITER
01220 DZ      CALL    0A9AH           ;MOVE HL TO ACCUM
01230         CALL    OFBDH           ;CONVERT ACCUM TO STRING
01240         CALL    DIZ             ;DISPLAY IT ON VIDEO
01250         RET                     ;RETURN WHENCE U CAME +1
01260 FINISH  RET                     ;RETURN WHENCE U CAME +1
01270 CLS     LD      HL,15360        ;C L E A R   V I D E O
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01280          LD      (16416),HL      ;RESET VIDEO CURSOR
01290          LD      DE,15361        ;CLEAR THE
01300          LD      BC,1023         ;1024 BYTE
01310          LD      (HL),32         ;VIDEO DISPLAY
01320          LDIR                    ;WITH
01330          RET                     ;SPACES
01340  ERR     DEFM    'SP ERROR '     ;STACK POINTER
01350          DEFB    0               ;ERROR MESSAGE
01360  TESTSP  LD      HL,0            ;THE OPTIONAL
01370          ADD     HL,SP           ;STACK
01380          LD      DE,29756        ;POINTER
01390          RST     18H             ;TEST
01400          RET     z               ; IS INCLUDED
01410          PUSH    HL              ;FOR TROUBLE
01420          CALL    CLS             ;SHOOTING
01430          LD      HL,ERR          ;YOUR
01440          CALL    DIZ             ;PROGRAM
01450          POP     HL              ;MODIFICATIONS
01460          CALL    DZ              ;SHOULD
01470          CALL    049H            ;YOU
01480          LD      SP,29758        ;WISH
01490          JP      MENU            ;TO USE IT.
01500  INPNAM  CALL    CLS             ;NOT USED BY AUTO MODE
01510          LD      HL,NAM1         ;ONLY FOR KEYBOARD INPUT
01520          CALL    DIZ             ;REMEMBER DELIMITERS MSG?
01530          CALL    049H            ;AWAIT KEYBOARD INPUT
01540          CP      1               ;BREAK KEY PRESSED ?
01550          JP      Z,ESCAPE        ;IF SO, GOT0 MAIN MENU
01560          CALL    CLS             ;C L E A R   V I D E O
01570          LD      HL,NAM1A        ;BEGIN ADDRESS MESSAGE ?
01580          CALL    DIZ             ;ON VIDEO
01590          CALL    1BB3H           ;INPUT BEGIN ADDRESS
01600          RST     10H             ;SCAN STRING SET 'C' FLAG
01610          CALL    1E5AH           ;CONVERT UNSIGNED INTEGER
01620          EX      DE,HL           ;SWAP INTO HL REGISTER
01630          LD      (DUMP+1),HL     ;LOAD BEGIN INTO DUMP
01640          LD      (HOWFAR+1),HL   ;AND BEGIN INTO HOWFAR
01650  INNAME  CALL    CLS             ;C L EA R   V I D E O
01660          LD      HL,NAM2         ;INPUT FILE NAME MESSAGE?
01670          CALL    DIZ             ;ON VIDEO
01680          CALL    1BB3H           ;INPUT FILE NAME
01690          LD      HL,41E8H        ;WHERE STASHED IN MEMORY
01700          LD      A,(HL)          ;TEST FOR NOTHING INPUT
01710          CP      0               ;IF SO,
01720          JP      Z,ESCAPE        ;GOTO MAIN MENU
01730          CALL    LONG            ;HOW MANY BYTES IN NAME?
01740          LD      HL,41E8H        ;NAME LOCATION IN MEMORY
01750          LD      DE,FCB          ;SO MOVE THEM TO
01760          LDIR                    ;FILE CONTROL BLOCK
01770          CALL    DRIVE           ;AND DRIVE NUMBER TOO
01780          RET                     ;RETURN WHENCE U CAME +1
01790  ESCAPE  POP     AF              ;ADJUST STACK FOR CALL
01800          LD      HL,53248        ;RESET TO NORMAL
01810          LD      (DUMP+1),HL     ;DUMP AND
01820          LD      (HOWFAR+1),HL   ;HOWFAR
01830          JP      MENU            ;GOTO MAIN TIP MENU
01840  LONG    LD      BC,0            ;HOW LONG IS FILE NAME ?
01850  LON1    LD      A,(HL)          ;BYTE FROM NAME STRING
01860          CP      0               ;ZERO DELIMITER
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01870          RET     Z               ;RETURN WITH BYTE COUNT
01880          INC     C               ;1 MORE BYTE
01890          INC     HL              ;NEXT MEM LOCATION
01900          JP      LON1            ;GO COUNT IT
01910          ORG     0C440H          ;LIST SUBROUTINE LOCATION
01920  LIST1   XOR     A               ;ZERO OUT LIST POINTER
01930          LD      (SIGN9),A       ;AT BEGIN RECEIVE MODE
01940          LD      A,195           ;RESTORE JUMP
01950          LD      (400CH),A       ;IN LOW MEMORY
01960          CALL    MOVDN           ;RESTORE DOS
01970          LD      HL,GGON         ;COMPOSITE DIRECTORY SUB-
01980          LD      (4468H),HL      ;ROUTINE SEARCH ADDRESS
01990          CALL    CLS             ;FOR TRSDOS 2.3 AND
02000          LD      HL,MS1A         ;NEWDOS + AND
02010          CALL    DIZ             ;NEWDOS 1.0
02020          LD      HL,MS1A         ;COMPATIBILITY
02030          JP      4405H           ;DISPLAY DIRECTORY VIDEO
02040  GOON    PUSH    HL              ;SINCE
02050  GOON1   LD      A,(HL)          ;TRSDOS 2.3
02060          CP      3               ;AND
02070          JR      Z,DUN           ;NEWDOS +
02080          CP      'D'             ;AND
02090          JP      Z,TESDOS        ;NEWDOS 1.0
02100  GOON2   CALL    033H            ;USE
02110          INC     HL              ;SOMEWHAT
02120          CP      13              ;DIFFERENT
02130          JR      NZ,GOON1        ;LIST THE
02140  DUN     POP     HL              ;DIRECTORY
02150          RET                     ;SUBROUTINES,
02160  TESDOS  PUSH    HL              ;THIS
02170          LD      (HOLE),A        ;SIMPLE
02180          INC     HL              ;PROGRAM
02190          LD      A,(HL)          ;FINESSES
02200          CP      '0'             ;THE
02210          JP      NZ,DUN1         ;PROBLEM
02220          INC     HL              ;BY
02230          LD      A,(HL)          ;FIRST
02240          CP      'S'             ;DISPLAYING
02250          JP      NZ,DUN1         ;THE
02260          POP     HL              ;DIRECTORY
02270          POP     DE              ;ON
02280          POP     BC              ;VIDEO.
02290          JP      DUN2            ;THEN,
02300  HOLE    DEFB    0               ;THE
02310  DUN1    LD      A,(HOLE)        ;LENGTH
02320          POP     HL              ;OF
02330          JP      GOON2           ;THE
02340  DUN2    LD      HL,(16416)      ;DIRECTORY
02350          DEC     HL              ; ON
02360          DEC     HL              ;THE
02370          DEC     HL              ;VIDEO
02380  GOBAK   LD      A,(HL)          ;DISPLAY
02390          CP      47              ;IS
02400          JP      P,ONWARD        ;CALCULATED
02410          DEC     HL              ;USING
02420          JP      GOBAK           ;THE
02430  ONWARD  INC     HL              ;* DOS
02440          INC     HL              ;READY
02450          EX      DE,HL           ;MESSAGE,
02460          LD      HL,15360        ;AND
02470          CALL    0BC7H           ;THE
02480          LD      (LBYTES),HL     ;DISK
02490          PUSH    HL              ;DIRECTORY
02500          LD      BC,32000        ;MOVED
02510          CALL    060H            ;FROM VIDEO
02520          POP     BC              ;TO
02530          LD      HL,15360        ;HI-MEMORY
02540          LD      DE,53248        ;RIGHT
02550          LDIR                    ;HERE.
02560          LD      SP,29758        ;RESET STACK POINTER
02570          CALL    SETUP           ;INITIALIZE PGM POINTERS
02580          CALL    CLS             ;CLEAR VIDEO
02590          CALL    CLRLO           ;CLEAR OUT DOS LO-MEM
02600          CALL    MOVHI1          ;MOVE FROM HI TO LO-MEM
02610          CALL    CALFRM          ;CALCULATE FRAMES/PACK
02620          JP      PACK            ;AND GO SEND THEM.
02630 LBYTES   DEFW    0               ;NUMBER BYTES READ STASH
02640 CLRLO    LD      HL,16872        ;CLEAR OUT DOS
02650          LD      DE,16873        ;FROM
02660          LD      BC,12878        ;LOW MEMORY
02670          LD      (HL),0          ;AND REPLACE
02690          LDIR                    ;WITH
02690          RET                     ;ZEROS.
02700 NUMB     DEFB    0               ;BYTES PER LINE STASH
02710 MOVHI1   LD      A,62            ;USE 62 PER LINE
02720          LD      (NUMB),A        ;AND SET NUMB
02730          LD      HL,53248        ;BEGIN HI-MEMORY
02740          LD      DE,17408        ;BEGIN MULTI-FRAME XMIT
02750          LD      BC,(LBYTES)     ;NUMBER BYTES TO MOVE
02760 MOV1     LD      A,(HL)          ;BYTE FROM HI-MEM
02770          LD      (DE),A          ;MOVE TO LO-MEM
02780          INC     HL              ;NEXT HI-MEM LOCATION
02790          INC     DE              ;NEXT LO-MEM LOCATION
02800          LD      A,(NUMB)        ;BYTES PER LINE
02810          DEC     A               ;MINUS ONE
02820          LD      (NUMB),A        ;AND SAVE IT
02830          CALL    Z,LFEED         ;ZERO DO CARRET/LINEFEED
02840          DEC     BC              ;BYTES TO MOVE COUNTER
02850          LD      A,B             ;TEST
02860          OR      C               ;FOR ZERO ?
02870          JP      Z,STORDE        ;SAVE END LOCATION LO-MEM
02880          JP      MOV1            ;ELSE MOVE NEXT ONE
02890 STORDE   CALL    READY           ;<READY> MSG ON THE END
02900          LD      (THEND),DE      ;SAVE END LO-MEM LOCATION
02910          RET                     ;RETURN WHENCE U CAME +1
02920 THEND    DCFW    0               ;END LOCATION STASH
02930 LFEED    LD      A,62            ;BYTES PER LINE
02940          LD      (NUMB),A        ;RESET COUNTER
02950          LD      A,13            ;CARRIAGE RETURN
02960          LD      (DE),A          ;STUFF INTO LO-MEM
02970          INC     DE              ;NEXT LO-MEM LOCATION
02980          LD      A,10            ;LINE FEED
02990          LD      (DE),A          ;STUFF INTO LO-MEM
03000          INC     DE              ;NEXT LO-MEM LOCATION
03010          RET                     ;RETURN WHENCE U CAME +1
03020 NUM2     DEFB    0               ;NUMBER FRAMES COUNTER
03030 CALFRM   LD      DE,(THEND)      ;LO-MEM END MSG LOCATION
03040          LD      HL,17408        ;BEGIN MULTI-FRAME ADRESS
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03050          CALL    0BC7H           ;SUBTRACT HL FROM DE
03060          LD      DE,250          ;250 BYTES ?
03070          CALL    1C90H           ;COMPARE HL - DE
03080          JP      C,SET1          ;< 250 SO SET 1 FRAME
03090          XOR     A               ;ELSE
03100          LD      (NUM2),A        ;RESET COUNTER
03110 NUM1     LD      DE,(LENGTH)     ;INFO FIELD LENGTH/PACK
03120          OR      A               ;CLEAR CARRY FLAG
03130          SBC     HL,DE           ;SUBTRACT DE FROM HL
03140          LD      A,(NUM2)        ;FRAME COUNTER
03150          INC     A               ;PLUS ONE
03160          LD      (NUM2),A        ;AND SAVE IT
03170          JP      Z,FIN           ;IF ZERO ALL DONE
03180          JP      C,FIN           ;IF CARRY ALL DONE
03190          JP      NUM1            ;ELSE DO NEXT ONE
03200 FIN      LD      A,(NUM2)        ;FRAMES COUNT
03210          CP      7               ;7 FRAMES ?
03220          JP      P,SET7          ;MORE THAN 7, SET AT 7
03230          LD      (FRAMES),A      ;ELSE SET AT NUMBER
03240          RET                     ;RETURN WHENCE U CAME +1
03250 SET7     LD      A,7             ;FRAMES/PACK = 7
03260          LD      (FRAMES),A      ;SET FRAME COUNTER
03270          RET                     ;RETURN WHENCE U CAME +1
03280 SET1     LD      A,1             ;FRAMES/PACK = 1
03290          LD      (FRAMES),A      ;SET FRAME COUNTER
03300          RET                     ;RETURN WHENCE U CAME +1
03310          ORG     0C580H          ;HELP MESSAGE SUBROUTINE
03320 HELP1    XOR     A               ;ZERO OUT HELP POINTER
03330          LD      (SIGN9),A       ;AT BEGIN RECEIVE MODE
03340          LD      A,195           ;RESTORE JUMP
03350          LD      (400CH),A       ;IN LOW MEMORY
03360          CALL    MOVDN           ;RESTORE DOS LO-MEM
03370          LD      HL,HELP1A       ;HELP:1 DISK FILE NAME
03380          LD      DE,FCB          ;FILE CONTROL BLOCK
03390          LD      BC,7            ;FILE NAME + DELIMITER
03400          LDIR                    ;MOVE TO FCB
03410          CALL    OPEN1           ;OPEN AN EXISTING FILE
03420          CALL    MULPLY          ;CALCULATE BYTES IN FILE
03430          CALL    READ            ;READ THEM FROM DISK
03440          CALL    CLOSE           ;CLOSE THE DISK FILE
03450          LD      SP,29758        ;RESET STACK POINTER
03460          CALL    SETUP           ;INITIALIZE PGM POINTERS
03470          CALL    CLRLO           ;CLEAROUT DOS FROM LO-MEM
03480          CALL    MOVHI2          ;MOVE FILE HI TO LO-MEM
03490          CALL    CALFRM          ;CALCULATE FRAMES/PACK
03500          CALL    CLRHY           ;CLEAR OUT HI-MEM
03510          JP      PACK            ;SEND MULTI-FRAME PACKS
03520 HELP1A   DEFM    'HELP: 1'       ;HELP FILE NAME AND DRIVE
03530          DEFB    13              ;FCB DELIMITER
03540 OPEN1    LD      DE,FCB          ;OPEN AN EXISTING FILE
03550          LD      HL,BUFFER       ;DISK I/O BUFFER ADDRESS
03560          LD      B,0             ;BYTES PER SECTOR
03570          CALL    4424H           ;DOS OPEN IT SUBROUTINE
03580          JR      NZ,ERROR        ;Z FLAG SET IF ERROR
03590          RET                     ;RETURN WHENCE U CAME +1
03600 MULPLY   LD      A,(FCB+12)      ;NUMBER RECCRDS IN FILE
03610          CP      47              ;MORE THAN 47 ?
03620          JP      P, VYLONG       ;IF SO, GOT0 VERY LONG
03630 MULO     LD      HL,0            ;BYTES IN FILE COUNTER
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03640 MUL1     LD       DE,256           ;BYTES PER SECTOR IN FILE
03650          ADD      HL,DE            ;ADD TO BYTE COUNTER
03660          DEC      A                ;MINUS ONE RECORD
03670          JP       Z,MUL2           ;IF ZERO, DO LAST ONE
03680          JP       MUL1             ;ADD UP NEXT ONE
03690 MUL2     LD       A,(FCB+8)        ;BYTES IN LAST SECTOR
03700          LD       E,A              ;SWAP IN TO 'E'
03710          LD       D,0              ;ZERO OUT 'D'
03720          ADD      HL,DE            ;ADD TO TOTAL BYTES
03730 MuL3     LD       (LBYTES) ,HL     ;AND SAVE THEM HERE
03740          LD       DE,53248         ;BEGIN HI-MEM LOCATION
03750          ADD      HL,DE            ;HL+DE IN END LOCATION
03760          LD       (LONG1+1),HL     ;AND SAVE THEM HERE
03770          RET                       ;RETURN WHENCE U CAME +1
03780 READ     LD       HL,53248         ;WHERE TO PUT FILE IN MEM
03790          LD       DE,FCB           ;FILE CTRL BLOCK ADDRESS
03800 LG       PUSH     HL               ;SAVE MEM LOCATION STACK
03810          CALL     13H              ;READ BYTE FROM DISK FILE
03820          POP      HL               ;RESTORE MEM LOCATION
03830          LD       (HL),A           ;DISK BYTE INTO MEMORY
03840          INC      HL               ;NEXT MEM LOCATION
03850          PUSH     HL               ;SAVE IT ON STACK
03860          PUSH     DE               ;SAVE FCB POINTER
03870 LONG1    LD       DE,65535         ;MEM END ADDRESS OF FILE
03880          OR       A                ;CLEAR CARRY FLAG
03890          SBC      HL,DE            ;SUBTRACT DE FROM HL
03900          POP      DE               ;RESTORE FCB POINTER
03910          POP      HL               ;RESTORE MEM LOCATION
03920          RET      2                ;RETURN IF ALL DONE
03930          JP       LG               ;READ NEXT DISK FILE BYTE
03940 CLOSE    LD       DE,FCB           ;FCB MEM LOCATION
03950          CALL     4428H            ;CLOSE FILE SUBROUTINE
03960          PUSH     AF               ;SAVE FLAG ON STACK
03970          LD       HL,53248         ;BEGIN HI-MEM ADDRESS
039 80         LD       (DUMP+1),HL      ;RESET DUMP
03990          LD       (HOWFAR+1),HL    ;RESET HOWFAR
04000          POP      AF               ;RESTORE FLAG
04010          RET      2                ;RETURN UNLESS ERROR
04020          POP      HL               ;ADJUST STACK FOR CALL
04030 ERROR    LD       H,0              ;ZERO OUT 'H'
04040          LD       L,A              ;ERROR NUMBER TO 'L'
04050          CALL     0A9AH            ;MOVE HL INTO ACCUM
04060          CALL     0A7FH            ;MAKE SURE AN INTEGER
04070          CALL     OFBDH            ;CONVERT ACCUM TO STRING
04080          LD       DE,MS2A          ;ERROR MESSAGE IN MEM
04090 ER1      LD       A,(HL)           ;FIRST ERROR NUMBER
04100          CP       0                ;ZERO DELIMITER
04110          JP       Z,ER2            ;ALL DONE ? GOT0 ER2
04120          LD       (DE),A           ;ERROR NUMBER TO MESSAGE
04130          INC      HL               ;NEXT ERROR # LOCATION
04140          INC      DE               ;NEXT MESSAGE LOCATION
04150          JP       ER1              ;GO MOVE NEXT ONE
04160 ER2      CALL     CLS              ;CLEAR   VIDEO
04170          POP      AF               ;ADJUST STACK FOR CALL
04380          CALL     SETUP            ;INITIALIZE PGM POINTERS
04190          CALL     CLRLO            ;CLEAR OUT DOS LO-MEM
04200          CALL     CLRHY            ;CLEAR OUT HI-MEM
04210          LD       IY,MS2C          ;ERROR # MESSAGE
04220          JP       SEND32           ;TRANSMIT ERROR # MESSAGE
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04230 MOVH12   LD       HL,53248         ;MOVE HI-MEM TO LO-MEM
04240          LD       DE,17408         ;WITHOUT CARRET/LINEFEEDS
04250          LD       BC,(LBYTES)      ;NUMBER OF BYTES TO MOVE
04260          LDIR                      ;DO IT
04270          LD       A,128            ;MULTI-FRAME
04280          LD       (DE),A           ;TRANSMIT
04290          INC      DE               ;SUBROUTINE
04300          LD       (DE),A           ;USES
04310          INC      DE               ;THREE
04320          LD       (DE),A           ;EACH 128
04330          INC      DE               ;DELIMTERS
04340          LD       (THEND),DE       ;IN A ROW
04350          RET                       ;RETURN WHENCE U CAME +1
04360          ORG      0C680H           ;AUTO SEND FILE ROUTINE
04370 SEND1    XOR      A                ;ZERO OUT SEND POINTER
04380          LD       (SIGN9),A        ;AT BEGIN RECEIVE MODE
04390          LD       HL,(SAVEIT)      ;FILE NAME MEM LOCATION
04400          LD       DE,FCB           ;FILE CTRL BLOCK ADDRESS
04410          LD       BC,0             ;ZERO OUT 'BC'
04420 SEN1     LD       A,(HL)           ;MOVE FILE NAME TO FCB
04430          CP       13               ;CARRIAGE RETURN DELIMTER
04440          JP       2,SEN2           ;GOTO SEN2 IF DONE
04450          LD       (DE),A           ;LOAD NAME INTO FCB
04460          INC      HL               ;NEXT MEM LOCATION
04470          INC      DE               ;NEXT FCB LOCATION
04480          JP       SEN1             ;GO MOVE NEXT ONE
04490 SEN2     CALL     DRIVE            ;STUFF DRIVE # IN FCB
04500          CALL     CLRHY            ;CLEAR OUT HI-MEM
04510          LD       A,195            ;RESET JUMP
04520          LD       (400CH),A        ;IN LO-MEM
04530          CALL     MOVDN            ;RESTORE DOS TO LO-ME!?
04540          CALL     OPEN1            ;OPEN AN EXISTING FILE
04550          CALL     MULPLY           ;CALCULATE # FILE BYTES
04560          CALL     READ             ;READ THEM FROM DISK
04570          CALL     CLOSE            ;THEN CLOSE THE FILE
04580          LD       SP,29758         ;RESET STACK POINTER
04590          CALL     SETUP            ;INITIALIZE PGM POINTERS
04600          CALL     CLRLO            ;CLEAR OUT DOS LO-MEM
04610          CALL     MOVHI2           ;MOVE FILE HI TO LO-MEM
04620          CALL     CALFRM           ;CALCULATE FRAMES/PACK
04630          CALL     CLRHY            ;CLEAR OUT HI-MEM
04640          CALL     CLS              ;CLEAR   VIDEO
04650          JP       PACK             ;SEND MULTI-FRAME/PACKS
04660 DRIVE    LD       A,':'            ;DRIVE # SEPARATOR
04670          LD       (DE),A           ;STUFF INTO FCB
04680          LD       (BC),A           ;NOT USED NOW
04690          INC      DE               ;NEXT FCB LOCATION
04700          INC      BC               ;NOT USED NOW
04710          LD       A,'1'            ;DISK NUMBER
04720          LD       (DE),A           ;STUFF INTO FCB
04730          LD       (BC),A           ;NOT USED NOW
04740          INC      DE               ;NEXT FCB LOCATION
04750          INC      BC               ;NOT USED NOW
04760          LD       A,13             ;FILE NAME DELIMITER
04770          LD       (DE),A           ;STUFF INTO FCB
04780          LD       (BC),A           ;NOT USED NOW
04790          RET                       ;RETURN WHENCE U CAME +1
04800 SAVEIT   DEFW     0                ;FILE NAME BEGIN STASH
04810 NAM%     DEFM     'INPUT FILE NAME '
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04820         DEFB    0              ;DELIMITER
04830         ORG     0C700H         ;AUTO SAVE DISK FILE
04840 SAVE1   XOR     A              ;ZERO OUT SAVE POINTER
04850         LD      (SIGN9),A      ;AT BEGIN RECEIVE MODE
04860         CALL    CLS            ;C L E A R   V I D E O
04870         LD      A.195          ;RESTORE JUMP
04880         LD      (400CH),A      ;TO LOW-MEM
04890         CALL    MOVDN          ;RESTORE DOS TO LO-MEM
04900         LD      HL,(SAVEIT)    ;BEGIN FILE NAME LOCATION
04910         LD      DE,FCB         ;FILE CTRL BLOCK ADDRESS
04920         LD      BC,NAME1       ;FILE NAME TEMP. STASH
04930 SAV1    LD      A,(HL)         ;FILE NAME BYTE
04940         CP      13             ;FILE NAME DELIMITER
04950         JP      Z,SAV2         ;GOTO SAV2 IF DONE
04960         LD      (DE),A         ;NAME BYTE TO FCB
04970         LD      (BC),A         ;TEMPORARY STASH
04980         INC     HL             ;NEXT NAME BYTE LOCATION
04990         INC     DE             ;NEXT FCB LOCATION
05000         INC     BC             ;NEXT STASH LOCATION
05010         JP      SAV1           ;CONTINUE MOVING NAME
05020 SAV2    CALL    DRIVE          ;LOAD DISK DRIVE NUMBER
05030         CALL    OPEN2          ;OPEN NEW FILE ONLY
05040         LD      SP,29758       ; RESET STACK POINTER
05050         CALL    SETUP          ;INITIALIZE PGM POINTERS
05060         CALL    CLRLO          ;CLEAR OUT DOS LO-MEM
05070         JP      SENDIT         ;SEND 'GO AHEAD' MESSAGE
05080 OPEN2   LD      HL,BUFFER      ;DISK I/O WORKING AREA
05090         LD      DE,FCB         ;FILE CTRL BLOCK ADDRESS
05100         LD      B,0            ;256 BYTES PER RECORD
05110         LD      C,10H          ;FILE TYPE DOUBTFUL
05120         CALL    4424H          ;OPEN AN EXISTING FILE
05130         JP      NZ,OPEN4       ;NZ = IT DOES NOT EXIST
05140         LD      SP,29758       ;NO DUPLICATION ALLOWED
05150         CALL    SETUP          ;SO RESET SP & INTXALIZE
05160         LD      IY,MS2B        ;NAME ALREADY USED MSG
05170         JP      SEND3Z         ;SEND 'TRY ANOTHER' MSG
05180 OPEN3   LD      HL,BUFFER      ;DISK I/O WORKING AREA
05190         LD      DE,FC%         ;FILE CTRL BLOCK ADDDRESS
05200         LD      B,0            ;256 BYTES PER RECORD
05210         LD      C,10H          ;FILE TYPE DOUBTFUL
05220 OPEN4   CALL    4420H          ;OPEN A NEW DISK FILE
05230         RET                    ;RETURN WHENCE U CAME +1
05240 SENDIT  CALL    CLRHY          ;CLEAR HI-MEM
05250         LD      A,1            ;SET
05260         LD      (AUTSAV),A     ;AUTO SAVE FILE POINTER
05270         LD      IY,MS3A        ;'GO AHEAD' MESSAGE
05280         JP      SEND3Z         ;SENT VIA SEND3
05290         ORG     0C780H         ;AUTO SAVE HI-MEM ONLY
05300 SAV3    LD      A,195          ;FOR FILES > 12K BYTES
05310         LD      (400CH),A      ;LENGTH 'IF' A DISCONNECT
05320         CALL    MOVDN          ,= ALL DONE IS RECEIVED.
05330         CALL    SETEND         ;STUFF 3 128 DELIMITERS
05340         CALL    SETFCB         ;MOVE FILE NAME INTO FCB
05350         CALL    OPEN1          ;OPEN AN EXISTING FILE
05360         CALL    4448H          ;POSITION END OF FILE
05370         CALL    DUMP           ;WRITE MEM TO DISK
05380         CALL    CLOSE          ;CLOSE THE DISK FILE
05390         LD      SP,29758       ; RESET STACK POINTER
05400         CALL    SETUP          ;INITIALIZE PGM POINTERS
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05410         CALL    CLRLO          ;CLEAR OUT DOS LO-MEM
05420         CALL    CLRHY          ;CLEAR HI-MEM
05430         JP      CONREQ         ;RE-CONNECT TO STATION
05440 SETEND  LD      HL,(BEFORE)    ;END HI-MEM INFO FIELDS
05450         LD      A,128          ;STUFF
05460         LD      (HL),A         ;3 EACH
05470         INC     HL             ;END OF MESSAGE
05480         LD      (HL),A         ;DELIMITERS
05490         INC     HL             ;AT
05500         LD      (HL),A         ;THE
05510         INC     HL             ;VERY END.
05520         LD      (SOFAR+1),HL   ;SAVE END MEM LOCATION
05530         RET                    ;RETURN WHENCE U CAME +1
05540 HOWFAR  LD      HL,53248       ;CALCULATE BYTES TO SAVE
05550 FAR1    INC     HL             ;TO DISK FILE
05560         LD      A,(HL)         ;LOOK
05570         CP      128            ;FOR
05580         JP      NZ,FAR1        ;THREE
05590         INC     HL             ;EACH
05600         LD      A,(HL)         ;DECIMAL
05610         CP      128            ;128
05620         JP      NZ,FAR1        ;END
05630         INC     HL             ;OF
05640         LD      A,(HL)         ;MESSAGE
05650         CP      128            ;DELIMITERS
05660         JP      NZ,FAR1        ;IN A
05670         INC     HL             ;ROW.
05680         LD      (SOFAR+1),HL   ;SAVE LOCATION IN SOFAR
05690         RET                    ;RETURN WHENCE U CAME +1
05700 DUMP    LD      HL,53248       ;BEGIN HI-MEM INFO FIELDS
05710         LD      DE,FCB         ;FILE CTRL BLOCK ADDRESS
05720 DUM1    LD      A,(HL)         ;BYTE TO SAVE ON DISK
05730         PUSH    HL             ;SAVE BYTE MEM LOCATION
05740         CALL    1BH            ;WRITE BYTE TO DISK
05750         POP     HL             ;RESTORE BYTE LOCATION
05760         JP      NZ,ERROR       ;Z FLAG SET IF ERROR
05770         INC     HL             ;NEXT BYTE MEM LOCATION
05780         PUSH    HL             ;SAVE IT IN STACK
05790         PUSH    DE             ;SAVE FCB POINTER
05800 SOFAR   LD      DE,65535       ;LAST MEM BYTE LOCATION
05810         OR      A              ;CLEAR CARRY FLAG
05820         SBC     HL,DE          ;SUBTRACT DE FROM HL
05830         POP     DE             ;RESTORE FCB POINTER
05840         POP     HL             ;AND NEXT MEM LOCATION
05850         RET     Z              ;RETURN IF ALL DONE
05860         JP      DUM1           ;GO DUMP NEXT ONE TO DISK
05870 NAM1    DEFM    'REMEMBER 128 DELIMITERS ? HIT BREAK TO ES
CAPE ELSE <ENTER>'
05880         DEFB    0              ;DELIMITER
05890 SETFCB  LD      HL,NAME1       ;FILE NAME TEMP. STASH
05900         LD      DE,FCB         ;FILE CTRL BLOCK ADDRESS
05910 ST1     LD      A,(HL)         ;MOVE FILE NAME+DELIMITER
05920         LD      (DE),A         ;TO FILE CTRL BLOCK
05930         CP      13             ;DELIMITER ?
05940         RET     Z              ;IF SO, ALL DONE
05950         INC     HL             ;NEXT NAME LOCATION
05960         INC     DE             ;NEXT FCB LOCATION
05970         JP      ST1            ;MOVE NEXT ONE
05980         ORG     0C840H         ;MANUAL SAVE DISK FILE
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05990 SVFILE CALL   INPNAM          ;REMINDER+INPUT FILE NAME
06000        CALL   HOWFAR          ;CALCULATE BYTES TO SAVE
06010        LD     A,195           ;RESTORE JUMP
06020        LD     (400CH),A       ;TO LO-MEM
06030        CALL   MOVDN           ;RESTORE DOS TO LO-MEM
06040        CALL   OPEN3           ;OPEN A NEW FILE
06050        CALL   DUMP            ;DUMP HI-MEM TO DISK
06060        CALL   CLOSE           ;CLOSE THE DISK FILE
06070        LD     SP,29758        ;RESET STACK POINTER
06080        CALL   SETUP           ;INITIALIZE PGM POINTERS
06090        CALL   CLRLO           ;CLEAR DOS OUT LO-MEM
06100        JP     MENU            ;MAIN MENU FOR INSTRUCTS
06110 MS2C   DEFB   13              ;CARRIAGE RETURN
06120        DEFB   10              ;LINE FEED
06130        DEFM   'ERROR # '      ;ERROR MESSAGE
06140 MS2A   DEFM   '     <READY> ' ;ERROR # + <READY> MSG
06150        DEFB   13              ;CARRIAGE RETURN
06160        DEFB   10              ;LINE FEED
06170        DEFB   128             ;ONLY 2 DELIMITERS NEEDED
06180        DEFB   128             ;FOR SEND3 PROCESSING
06190        ORG    0C880H          ;MANUAL LOAD FILE TO MEM
06200 LDFILE CALL   INNAME          ;INPUT FILE NAME
06210        CALL   CLRHY           ;CLEAR HI-MEM
06220        LD     A,195           ;RESTORE JUMP
06230        LD     (400CH),A       ;TO LO-MEM
06240        CALL   MOVDN           ;RESTORE DOS LO-MEM
06250        CALL   OPEN1           ;OPEN EXISTING DISK FILE
06260        CALL   MULPLY          ;CALCULATE FILE LENGTH
06270        CALL   READ            ;LOAD FILE TO HI-MEM
06280        LD     (HIHL),HL       ;SAVE HI-MEM END LOCATION
06290        CALL   CLOSE           ;CLOSE DISK FILE
06300        LD     SP,29758        ;RESET STACK POINTER
06310        CALL   SETUP           ;INITIALIZE PGM POINTERS
06320        CALL   CLRLO           ;CLEAR OUT DOS LO-MEM
06330        CALL   BAKUP           ;CHECK TOO LONG LOADED ?
06340        JP     MENU            ;MENU FOR INSTRUCTIONS
06350 HIHL   DEFW   0               ;END HI-MEM FILE LOCATION
06360 BAKUP  LD     HL,(HIHL)       ;IF THE FILE LENGTH JUST
06370 BAK1   DEC    HL              ;LOADED
06380        LD     A,(HL)          ;HAD RECORDS
06390        CP     28              ;LESS THAN
06400        JP     Z,BAK1          ; 256 BYTES
06410        CP     128             ;LONG,
06420        JP     Z,TESAGN        ;THEN
06430        INC    HL              ;OBVIOUSLY
06440        LD     (BEFORE),HL     ;THIS
06450        RET                    ;SIMPLE
06460 TESAGN DEC    HL              ;SUBROUTINE
06470        LD     A,(HL)          ;WILL
06480        CP     128             ;LOAD
06490        JP     NZ,BAK1         ;FAR
06500        DEC    HL              ;TOO
06510        LD     A,(HL)          ;MANY
06520        CP     128             ;BYTES FROM DISK TO MEM.
06530        JP     NZ,BAK1         ;BAKUP'S JOB IS TO TRY &
06540        LD     (BEFORE),HL     ;CORRECT THIS SITUATION.
06550        RET                    ;RETURN WHENCE U CAME +1
06560        ORG    0C900H          ;AFTER SAVE IN AUTO MODE
06570 SAVMSG XOR    A               ;ZERO OUT
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06580        LD     (AUTSAV),A      ;AUTO SAVE POINTER
06590        LD     IY,MS4A         ;HAS BEEN SAVED MESSAGE
06600        JP     SEND3Z          ;TRANSMIT VIA SEND3
06610 MS4A   DEFB   13              ;CARRIAGE RETURN
06620        DEFB   10              ;LINE FEED
06630        DEFM   'YOUR FILE HAS BEEN AUTOMATICALLY SAVED ON
 DISK.  IF YOU WISH'
06640        DEFB   13              ;CARRIAGE RETURN
06650        DEFB   10              ;LINE FEED
06660        DEFM   'TO TEST IT TRY THE SEND (FILE NAME) COMMA
ND.   <READY> '
06670        DEFB   13              ;CARRIAGE RETURN
06680        DEFB   10              ;LINE FEED
06690        DEFB   128             ;SEND 3 ONLY REQUIRES TWO
06700        DEFB   128             ;128 DELIMITERS
06710 READY  LD     HL,MS5A         ;<READY> MESSAGE
06720        LD     BC,14           ;BYTES TO MOVE
06730        LDIR                   ;MOVE IT INTO 'DE'
06740        RET                    ;RETURN WHENCE U CAME +1
06750 MS5A   DEFB   13              ;CARRIAGE RETURN
06760        DEFB   10              ;LINE FEED
06770        DEFM   '<READY>'       ;MESSAGE
06780        DEFB   13              ;CARRIAGE RETURN
06790        DEFB   10              ;LINE FEED
06800        DEFB   128             ;3 DELIMITERS
06810        DEFB   128             ;ARE NEEDED
06820        DEFB   128             ;BY THE MULTI-FRAME
06830        RET                    ;XMIT LO-MEM SUBROUTINE
06840 MS1A   DEFM   'DIR :1'        ;DISK DRIVE NUMBER USED
06850        DEFB   13              ;USED.  CHANGE TO SUIT
06860        DEFB   10              ;YOUR FANCY.
06870 MS2B   DEFB   13              ;CARRIAGE RETURN
06880        DEFB   10              ;LINE FEED
06890        DEFM   'FILE NAME EXTANT - TRY ANOTHER ONE. '
06900        DEFB   13              ;CARRIAGE RETURN
06910        DEFB   10              ;LINE FEED
06920        DEFB   128             ;DELIMITER
06930        DEFB   128             ;DELIMITER
06940 NAME1  DEFS   13              ;13 BYTE FILE NAME STASH
06950 MS3A   DEFB   73              ;CARRIAGE RETURN
06960        DEFB   10              ;LINE FEED
06970        DEFM   'SEND DISK FILE & WHEN DONE A DISCONNECT T
O CLOSE FILE. '
06980        DEFB   13              ;CARRIAGE RETURN
06990        DEFB   10              ;LINE FEED
07000        DEFB   128             ;DELIMITER
07010        DEFB   128             ;DELIMITER
07020        ORG    0CA40H          ;SAVE VERY LONG FILES
07030 SAV4   LD     A,195           ;AFTER A 'WAIT' RNR HAS
07040        LD     (400CH),A       ;HAS BEEN TRANSMITTED.
07050        CALL   MOVDN           ;RESTORE DOS TO LO-MEM
07060        LD     HL,(BEFORE)     ;END HI-MEM INFO FIELDS
07070        LD     (SOFAR+1),HL    ;LOAD INTO SOFAR
07080        CALL   SETFCB          ;SET FILE CTRL BLOCK
07090        CALL   OPEN1           ;OPEN AN EXISTING FILE
07100        CALL   4448H           ;POSITION TO END OF FILE
07110        CALL   DUMP            ;AND DUMP DATA TO DISK
07120        CALL   CLOSE           ;CLOSE DISK FILE
07130        LD     SP,29758        ;RESET STACK POINTER
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07140        CALL   SETUP            ;INITIALIZE PGM POINTERS
07150        CALL   CLRHY            ;CLEAR HI-MEM
07160        LD     IY,MS6A          ;WAIT/RNR CLEARED MSG
07170        JP     SEND3Z           ;CONTINUE SENDING MESSAGE
07180 MS6A   DEFB   13               ;CARRIAGE RETURN
07190        DEFB   10               ;LINE FEED
07200        DEFM   '<RNR CLEARED - CONTINUE SENDING>'
07210        DEFB   13               ;CARRIAGE RETURN
07220        DEFB   10               ;LINE FEED
07230        DEFB   128              ;DELIMITER
07240        DEFB   128              ;DELIMITER
07250 VYLONG LD     (NUMSEC),A       ;LOAD # OF' DISK SECTORS
07260        LD     DE,0             ;ZERO OUT COUNTER
07270        LD     B,47             ;MAX SECTORS IN HI-MEM
07280 VY1    SUB    B                ;SUBTRACT FROM TOTAL
07290        JP     Z,DON2           ;Z FLAG SET = ALL DONE
07300        JP     C,DON1           ;C FLAG SET = ALL DONE
07310        INC    D                ;SEGMENT COUNTER
07320        JP     VY1              ;TRY AGAIN
07330 DON1   INC    D                ;INCREMENT SEGMENT COUNT
07340 DON2   LD     A,D              ;SWAP I'JTO 'A'
07350        LD     (SEGNUM),A       ;SAVE IN NUMBER SEGMENTS
07360        DEC    A                ;DECREMENT SEGMENT COUNT
07370        LD     E,A              ;SWAP INTO 'E'
07380        XOR    A                ;ZERO OUT 'A'
07390        LD     B,47             ;MAX RECORDS PER SEGMENT
07400 DON3   ADD    A,B              ;ADD 'EM UP AGAIN
07410        DEC    E                ;MINUS ONE FROM COUIJTER
07420        JP     NZ,DON3          ;NZ THEN DO IT AGAIN
07430        LD     B,A              ;THEN SWAP INTO 'B'
07440        LD     A,(NUMSEC)       ;NUMBER SECTORS REMAINING
07450        SUB    B                ;SUBTRACT COUNTER
07460        DEC    A                ;MINUS ONE
07470        LD     (NUMSEC),A       ;SAVE IT IN NUMBER SECTOR
07480        LD     A,1              ;ONLY 1
07490        LD     (SECTOR),A       ;SAVE IT IN SECTOR
07500        LD     HL,12032         ;MAX SEGMENT LENGTH
07510        JP     MUL3             ;AND GO SET LBYTCS TO MAX
07520 NUMSEC DEFB   0                ;NUMBER SECTORS STASH
07530 SECTOR DEFB   0                ;SINGLE SECTOR STASH
07540 NAM1A  DEFM   'INPUT BEGINNING MEM ADDRESS (53248 NOMINA
L) '
07550        DEFB   0                ;DELIMITER
07560        ORG    OCBOOH           ;ONLY USED FOR SENDING
07570 SEND2  CALL   CLRHY            ;DISK FILES GREATER THAN
07580        LD     A,195            ;12K BYTES - 65K MAXIMUM.
07590        LD     (400CH) ,A       ;USED AFTER 1ST 12K SENT.
07600        CALL   MOVDN            ;RESTORE DOS TO LO-MEM
07610        CALL   OPEN1            ;OPEN AN EXISTING FILE
07620        CALL   ANYMOR           ;CALCULATE MORE TO SEND
07630        CALL   READ             ;READ FROM DISK TO HI-MEM
07640        CALL   CLOSE            ;CLOSE DISK FILE
07650        LD     SP,29758         ;RESET STACK POINTER
07660        CALL   SETUP            ;INITIALIZE PGM POINTERS
07670        CALL   CLRLO            ;CLEAR OUT DOS LO-MEM
07680        CALL   MOVHI2           ;MOVE HI-MEM TO LO-MEM
07690        CALL   CALFRM           ;CALCULATE FRAMES TO SEND
07700        CALL   CLRHY            ;CLEAR HI-MEM
07710        JP     PACK             ;SEND MULTI-FRAME PACKS
```

```
07720 ANYMOR LD     A,(SECTOR)       ;SECTOR REMAINING
07730        LD     B,47             ;MAX SECTORS FOR MEM
07740        ADD    A,B              ;AJD 'EM UP
07750        LD     (SECTOR),A       ;AND SAVE IN SECTOR
07760        LD     A,(SEGNUM)       ;NUMBER OF SEGMENTS
07770        CP     1                ;LAST ONE ?
07780        JP     Z,MUL4           ;THEN CALCULATE LENGTH
07790        LD     HL,12032         ;MAX BYTES PER SEGMENT
07800        CALL   MUL3             ;SET LBYTES LENGTH
07810        LD     DE,FCB           ;FILE CTRL BLOCK ADDRESS
07820        LD     A,(SECTOR)       ;NUMBER OF DISK SECTORS
07830        LD     B,0              ;256 BYTES PER RECORD
07840        LD     C,A              ; SlJAP SECTORS INTO 'C'
07850        CALL   444211           ;POSITION TO DISK SECTOR
07860        RET                     ;RETURN WHENCE U CAME +1
07870 MUL4   LD     DE,FCB           ;ONLY LAST FILE SEGMENT
07880        LD     A,(SECTOR)       ;LAST FILE SECTOR READ
07890        LD     B,0              ;256 BYTES PER RECORD
07900        LD     C,A              ; SWAP SECTORS INTO 'C'
07910        CALL   4442H            ;POSITION TO DISK SECTOR
07920        LD     A, (NUMSEC)      ;NUMBER SECTORS REMAINING
07930        CALL   MULO             ;CALCULATE BYTES TO READ
07940        RET                     ;RETURN WHENCE U CAME +1
07950 ; - - - - - - - - - - - - - - - - - - - - - - - - - - - -
07960 ; END OF DISK I/O FOR AUTO MODE
```

- Figure 2 -

HELP Message Transmitted in Auto Mode

```
MJTHIS IS W4UCH CHAUTAUQUA LAKE, NY IN AUTOMATIC DISK I/O MODEMJ
   THERE ARE FOUR FUNDAMENTAL INSTRUCTIONS THAT THIS MODE WILLMJ
   AUTOMATICALLY RECOGNIZE AFTER YOU ARE CONNECTED. THEY ARE: MJ
1. A SINGLE INFO PACKET CONSISTING OF HELP TO CALL THIS       MJ
   PRESENT  SUBROUTINE.                                       MJ
2. A SINGLE INFO PACKET CONSISTING OF LIST TO CALL THE DISK   MJ
   DIRECTORY SUBROUTINE.                                      MJ
3. A SINGLE INFO PACKET CONSISTING OF SEND - SPACE - NAME OF MJ
   DISK PROGRAM, AND CARRIAGE RETURN TO READ THE DISK PROGRAM.MJ
4. A SINGLE INFO PACKET CONSISTING OF SAVE - SPACE - NAME OF MJ
   DISK PROGRAM, AND CARRIAGE RETURN TO WRITE DISK PROGRAM.   MJ
   THE PROGRAM WILL THEN OPEN A DISK FILE AND RESPOND WITH THEMJ
   MESSAGE, 'SEND FILE.' GO AHEAD AND SEND THE FILE.  IF THE MJ
   FILE IS LONGER THAN 10K OR SO BYTES IN LENGTH, THE PROGRAM MJ
   WILL SEND A 'WAIT' RNR WHILE IT SAVES THE DATA ON DISK, ANDMJ
   WHEN SAVED, WILL SEND AN AUTOMATIC 'CLEAR WAIT' RR WHEN    MJ
   READY FOR YOU TO RESUME SENDING THE FILE. THE MODEL 1 TRS80MJ
   DISK CAPACITY IS ABOUT 85K BYTES AND THE MODEL 3TRS80 DISKMJ
   CAPACITY IS ABOUT 170K BYTES.                              MJ
                                                              MJ
   SINGLE FRAME PACKETS MAY BE UP TO 2000 BYTES IN LENGTH AND MJ
   7 FRAME PACKETS MAY HAVE INFO FIELDS OF UP TO 256 BYTES.   MJ
   JUST HOLD TOTAL PACKET LENGTH TO 2000 BYTES OR LESS.       MJ
                                                              MJ
   WHEN YOU HAVE FINISHED SENDING THE DATA YOU WISH SAVED ON MJ
   DISK, SEND A DISCONNECT.  THIS TELLS THE PROGRAM TO FINISH MJ
   SAVING YOUR DATA ON DISK AND 'CLOSE' THE FILE. WHEN THIS ISMJ
   DONE, THE PROGRAM WILL SEND AN AUTOMATIC CONNECT REQUEST   MJ
   AND UPON RECEIVING THE CONNECT REQUEST ACKNOWLEDGE WILL    MJ
   TELL YOU THAT THE DATA WAS SAVED. SHOULD YOU WISH TO CHECK MJ
   IT, GO AHEAD AND DO SO WITH THE SEND - SPACE - FILE NAME - MJ
   COMMAND.                                                   MJ
                                                              MJ
SUGGEST YOU USE THE FOLLOWING CONVENTION FOR FILE NAMES:      MJ
A. FILE NAMES MAY BE UP TO 8 UPPERCASE ALPHANUMERIC CHARACTERSMJ
   AND 'MUST' BEGIN WITH AN ALPHABETIC CHARACTER.             MJ
B. OBJECT CODE FILES SHOULD END WITH A NUMERAL 1 OR /CMD.     MJ
C. SOURCE CODE FILES SHOULD END WITH A NUMERAL 2.             MJ
D. BASIC PROGRAM FILES SHOULD END WITH A NUMERAL 4.           MJ
E. PLAIN VANILLA ASCII FILES/MESSAGES SHOULD BE ALL CAPITALS. MJ
F. ELECTRIC PENCIL FILES SHOULD END WITH /PCL.                MJ
                                                              MJ
THERE ARE 'NO' PROTECTED FILES ON THE DISKFILE DISK. THIS IS MJ
INTENTIONAL. YOU MAY 'READ' ANY EXISTING FILE ON THE DISK.    MJ
WHEN ATTEMPTING TO TO WRITE TO AN EXISTING FILE YOU WILL      MJ
RECEIVE THE MESSAGE 'FILE ALREADY EXTANT - TRY ANOTHER ONE.' MJ
IN THIS CASE, JUST GIVE THE FILE YOU WISH SAVED ANOTHER NAME MJ
AND TRY AGAIN.                                                MJ
                                                              MJ
SHOULD YOU INADVERTENTLY BUGGER-UP SENDING A GIVEN FILE, FIRSTMJ
CLOSE THE FILE BY SENDING A DISCONNECT. THE PROGRAM WILL AUTO-MJ
MATICALLY RECONNECT TO YOU. NOW RENAME THE FILE AND TRY AGAIN.MJ
DO NOT FORGET THE DISCONNECT TO CLOSE THE FILE. IF SO, IT MAY MJ
BUGGER-UP THE PROGRAM FOR YOUR FELLOW AMATEURS WHO MAY WISH TOMJ
USE THE AUTO MODE LATER.                                      MJ
                                                              MJ
REMINDER: CAPITAL LETTERS ARE REQUIRED FOR ALL COMMANDS AND   MJ
FILE NAMES AS SOME USERS MAY NOT HAVE THE LOWERCASE CAPABILITYMJ
AND WOULD NOT BE ABLE TO READ THE FILE NAMES.        MJ<READY>MJ
```

Note:

The capital M = ASCII 13 carriage return and the capital
J = ASCII 10 line feed.