

**Main routine**

|    |       |        |        |                      |          |
|----|-------|--------|--------|----------------------|----------|
| 1  | 00000 | COPY   | START  | 0                    |          |
| 2  |       |        | EXTDEF | BUFFER, BUFFEND      |          |
| 3  |       |        | EXTREF | RDREC, WRREC, LENGTH |          |
| 4  | 00000 | FIRST  | STL    | RETADR               | 172029   |
| 5  | 00003 | CLOOP  | +JSUB  | RDREC                | 4B100000 |
| 6  | 00007 |        | +LDA   | LENGTH               | 03100000 |
| 7  | 0000B |        | COMP   | #0                   | 290000   |
| 8  | 0000E |        | JEQ    | ENDFIL               | 332007   |
| 9  | 00011 |        | +JSUB  | WRREC                | 4B100000 |
| 10 | 00015 |        | J      | CLOOP                | 3F2FEB   |
| 11 | 00018 | ENDFIL | LDA    | EOF                  | 032014   |
| 12 | 0001B |        | STA    | BUFFER               | 0F2014   |
| 13 | 0001E |        | LDA    | #3                   | 010003   |
| 14 | 00021 |        | +STA   | LENGTH               | 0F100000 |
| 15 | 00025 |        | +JSUB  | WRREC                | 4B100000 |
| 16 | 00029 |        | J      | @RETADR              | 3E2000   |
| 17 | 0002C | RETADR | RESW   | 1                    |          |
| 18 | 0002F | EOF    | BYTE   | C'EOF'               | 454F46   |
| 19 | 00032 | BUFFER | RESB   | 4096                 |          |
| 20 | 01032 | BUFEND | EQU    | *                    |          |
| 21 | 01000 | MAXLEN | EQU    | BUFEND-BUFFER        |          |
| 22 |       |        | END    | FIRST                |          |

**RDREC Subroutine to read a record into buffer**

|    |       |        |        |                |          |
|----|-------|--------|--------|----------------|----------|
| 1  | 00000 | RDREC  | START  | 0              |          |
| 2  |       |        | EXTDEF | LENGTH         |          |
| 3  |       |        | EXTREF | BUFFER, BUFEND |          |
| 4  | 00000 |        | CLEAR  | X              | B410     |
| 5  | 00002 |        | CLEAR  | A              | B400     |
| 6  | 00004 |        | CLEAR  | S              | B440     |
| 7  | 00006 |        | LDT    | MAXLEN         | 77201E   |
| 8  | 00009 | RLOOP  | TD     | INPUT          | E3201A   |
| 9  | 0000C |        | JEQ    | RLOOP          | 332FFA   |
| 10 | 0000F |        | RD     | INPUT          | DB2014   |
| 11 | 00012 |        | COMPR  | A, S           | A004     |
| 12 | 00014 |        | JEQ    | EXIT           | 332009   |
| 13 | 00017 |        | +STCH  | BUFFER, X      | 57900000 |
| 14 | 0001B |        | TIXR   | T              | B850     |
| 15 | 0001D |        | JLT    | RLOOP          | 3B2FE9   |
| 16 | 00020 | EXIT   | STX    | LENGTH         | 132007   |
| 17 | 00023 |        | RSUB   |                | 4F0000   |
| 18 | 00026 | INPUT  | BYTE   | X'F1'          | F1       |
| 19 | 00027 | MAXLEN | WORD   | BUFEND-BUFFER  | 000000   |
| 20 | 0002A | LENGTH | RESW   | 1              |          |
| 21 |       |        | END    |                |          |

**WRREC Subroutine to write a record from buffer**

|    |       |        |       |                |          |
|----|-------|--------|-------|----------------|----------|
| 1  | 00000 | WRREC  | START | 0              |          |
| 2  |       |        | EXREF | LENGTH, BUFFER |          |
| 3  | 00000 |        | CLEAR | X              | B410     |
| 4  | 00002 |        | +LDT  | LENGTH         | 77100000 |
| 5  | 00006 | WLOOP  | TD    | OUTPUT         | E32012   |
| 6  | 00009 |        | JEQ   | WLOOP          | 332FFA   |
| 7  | 0000C |        | +LDCH | BUFFER, X      | 53900000 |
| 8  | 00010 |        | WD    | OUTPUT         | DF2008   |
| 9  | 00013 |        | TIXR  | T              | B850     |
| 10 | 00015 |        | JLT   | WLOOP          | 3B2FEE   |
| 11 | 00018 |        | RSUB  |                | 4F0000   |
| 12 | 0001B | OUTPUT | BYTE  | X'05'          | 05       |
| 13 |       |        | END   |                |          |

## Object programs:

```
HCOPY 00000001032
DBUFFER000032BUFEND001032
RRDREC WRREC LENGTH
T0000001E1720294B100000031000002900003320074B1000003F2FEB0320140F2014
T00001E0E0100030F1000004B1000003E2000
T00002F03454F46
M00000405+RDREC
M00000805+LENGTH
M00001205+WRREC
M00002205+LENGTH
M00002605+WRREC
E000000
```

```
HRDREC 0000000002D
DLENGTH00002A
RBUFFERBUFEND
T00000001DB410B400B44077201EE3201A332FFADB2014A00433200957900000B850
T00001D0D3B2FE91320074F0000F1000000
M00001805+BUFFER
M00002706+BUFEND-BUFFER
E
```

```
HWRREC 0000000001C
RLENGTHBUFFER
T00000001CB41077100000E32012332FFA53900000DF2008B8503B2FEE4F000005
M00000305+LENGTH
M00000D05+BUFFER
E
```

## ESTAB (external symbol table)

| name   | address | CS length |
|--------|---------|-----------|
| COPY   | 02000   | 1032      |
| BUFFER | 02032   |           |
| BUFEND | 03032   |           |
| RDREC  | 03032   | 002D      |
| LENGTH | 0305C   |           |
| WRREC  | 0305F   | 001C      |

## Loaded Program (with the load address 02000h)

*(if not modified as indicated by M-records)*

|       | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | A  | B  | C  | D  | E  | F  |
|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 00000 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 01FF0 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 02000 | 17 | 20 | 29 | 4B | 10 | 00 | 00 | 03 | 10 | 00 | 00 | 29 | 00 | 00 | 33 | 20 |
| 02010 | 07 | 4B | 10 | 00 | 00 | 3F | 2F | EB | 03 | 20 | 14 | 0F | 20 | 14 | 01 | 00 |
| 02020 | 03 | 0F | 10 | 00 | 00 | 4B | 10 | 00 | 00 | 3E | 20 | 00 | ?? | ?? | ?? | 45 |
| 02030 | 4F | 46 | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? |
| 02040 | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 03030 | ?? | ?? | B4 | 10 | B4 | 00 | B4 | 40 | 77 | 20 | 1E | E3 | 20 | 1A | 33 | 2F |
| 03040 | FA | DB | 20 | 14 | A0 | 04 | 33 | 20 | 09 | 57 | 90 | 00 | 00 | B8 | 50 | 3B |
| 03050 | 2F | E9 | 13 | 20 | 07 | 4F | 00 | 00 | F1 | 00 | 00 | 00 | ?? | ?? | ?? | B4 |
| 03060 | 10 | 77 | 10 | 00 | 00 | E3 | 20 | 12 | 33 | 2F | FA | 53 | 90 | 00 | 00 | DF |
| 03070 | 20 | 08 | B8 | 50 | 3B | 2F | EE | 4F | 00 | 00 | 05 |    |    |    |    |    |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

*(modified as indicated by M-records)*

|       | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | A  | B  | C  | D  | E  | F  |
|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 00000 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 01FF0 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 02000 | 17 | 20 | 29 | 4B | 10 | 30 | 32 | 03 | 10 | 30 | 5C | 29 | 00 | 00 | 33 | 20 |
| 02010 | 07 | 4B | 10 | 30 | 5F | 3F | 2F | EB | 03 | 20 | 14 | 0F | 20 | 14 | 01 | 00 |
| 02020 | 03 | 0F | 10 | 30 | 5C | 4B | 10 | 30 | 5F | 3E | 20 | 00 | ?? | ?? | ?? | 45 |
| 02030 | 4F | 46 | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? |
| 02040 | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? | ?? |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 03030 | ?? | ?? | B4 | 10 | B4 | 00 | B4 | 40 | 77 | 20 | 1E | E3 | 20 | 1A | 33 | 2F |
| 03040 | FA | DB | 20 | 14 | A0 | 04 | 33 | 20 | 09 | 57 | 90 | 20 | 32 | B8 | 50 | 3B |
| 03050 | 2F | E9 | 13 | 20 | 07 | 4F | 00 | 00 | F1 | 00 | 10 | 00 | ?? | ?? | ?? | B4 |
| 03060 | 10 | 77 | 10 | 30 | 5C | E3 | 20 | 12 | 33 | 2F | FA | 53 | 90 | 20 | 32 | DF |
| 03070 | 20 | 08 | B8 | 50 | 3B | 2F | EE | 4F | 00 | 00 | 05 |    |    |    |    |    |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ..... |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |