

OS GET/SPLIT/PUT

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| Step | Instruction | Address | Comment                        | Octal  | Step |
|------|-------------|---------|--------------------------------|--------|------|
| 00   | *ENTRY      |         | PUT                            | ← BA → | 00   |
| 01   | LDA         | 0000    |                                |        | 01   |
| 02   | JSBR        | I2 1725 | STA } Save return address      |        | 02   |
| 03   | P=3723-     |         |                                |        | 03   |
| 04   | LDB         | I2 A    | =P1                            |        | 04   |
| 05   | JSBR        | I2 1414 | Reserve Alpha Data 1/10        |        | 05   |
| 06   | JSBR        | I2 1622 | START                          |        | 06   |
| 07   | JUMP        | 0014    | Binary at present              |        | 07   |
| 10   | P JSBR      | I2 1721 | LDA Return Address             |        | 10   |
| 11   | P=3723-     |         |                                |        | 11   |
| 12   | INCA        |         |                                |        | 12   |
| 13   | JUMP        | I2 A    |                                |        | 13   |
| 14   | JSBR        | I2 1625 | SUSPEND                        |        | 14   |
| 15   | JSBR        | I2 1721 | LDA Return Address             |        | 15   |
| 16   | P=3723-     |         |                                |        | 16   |
| 17   | JUMP        | 0004    | Return                         |        | 17   |
| 20   | *ENTRY      |         | RESET ROUTINE for GET/SPLIT    | ← BA → | 20   |
| 21   | JSBR        | I2 1721 | LDA Return Address             |        | 21   |
| 22   | P=3722-     |         |                                |        | 22   |
| 23   | STA         | Z 0161  |                                |        | 23   |
| 24   | LDA         | I2 0161 | → Parameter Block              |        | 24   |
| 25   | JSBR        | Z 1630  | Reserve Offset                 |        | 25   |
| 26   | STA         | Z 0162  | → P1 in parameter block        |        | 26   |
| 27   | LDA         | I2 0162 | = Control Word                 |        | 27   |
| 30   | STA         | Z 0160  |                                |        | 30   |
| 31   | INSZ        | Z 0161  |                                |        | 31   |
| 32   | JUMP        | I 0020  | Return                         |        | 32   |
| 33   | *ENTRY      |         | GET/SPLIT                      | ← BA → | 33   |
| 34   | LDA         | 0033    |                                |        | 34   |
| 35   | JSBR        | I2 1725 | STA } Save return address      |        | 35   |
| 36   | P=3722-     |         |                                |        | 36   |
| 37   | JSBR        | 0020    | Reset *RESTART                 |        | 37   |
| 40   | INSZ        | Z 0162  | → P2                           |        | 40   |
| 41   | LDA         | I2 0162 | = P2 → product word            |        | 41   |
| 42   | STA         | 0044    |                                |        | 42   |
| 43   | JSBR        | I2 1652 | PUT, product                   |        | 43   |
| 44   | P=          |         |                                |        | 44   |
| 45   | JSBR        | 0020    | Reset                          |        | 45   |
| 46   | ANEG        |         | Alpha Mode GET + SPLIT?        |        | 46   |
| 47   | LDA         | Z 0277  | No - set length to 63-bits     |        | 47   |
| 50   | ANDH        | Z 0375  | 000177 (Reserve length)        |        | 50   |
| 51   | IOB         | Z A     |                                |        | 51   |
| 52   | LDA         | Z 0160  | = Control Word                 |        | 52   |
| 53   | ANDH        | 0157    | 210000                         |        | 53   |
| 54   | CMPH        | 0157    | 210000 Alpha without Feedback? |        | 54   |
| 55   | COMPSB      |         | Indicate No Feedback           |        | 55   |
| 56   | JUMP        | 0332    | Yield                          |        | 56   |
| 57   | LDA         | Z 0066  | → Input Buffer                 |        | 57   |
| 60   | STA         | 0063    |                                |        | 60   |
| 61   | JSBR        | I2 1621 | STIV                           |        | 61   |
| 62   | P=          |         | Flags, 5 bits                  |        | 62   |
| 63   | P=          |         | → Buffer                       |        | 63   |
| 64   | JUMP        | 0100    | Cancellation (ETX)             |        | 64   |
| 65   | INSZ        | Z 0162  | Accountant (STX)               |        | 65   |
| 66   | INSZ        | Z 0162  | → P3                           |        | 66   |
| 67   | ANEG        |         | (Control Word)                 |        | 67   |
| 70   | JUMP        | 1002    | Binary or Fetch Mode GET       |        | 70   |
| 71   | AMSB        |         |                                |        | 71   |
| 72   | JUMP        | 0113    | SPLIT                          |        | 72   |
| 73   | ISA/AMSB    |         |                                |        | 73   |
| 74   | JUMP        | 0120    | Convert to Meta-code           |        | 74   |
| 75   | ISA/AMSB    |         |                                |        | 75   |
| 76   | JUMP        | 0137    | Have Read                      |        | 76   |
| 77   | JUMP        | I2 0161 | Return                         |        | 77   |

OS

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| Step | Instruction   | Address | Comment                       | Octal       | Step |
|------|---------------|---------|-------------------------------|-------------|------|
| 00   | ANEQ          |         | * CANCELLATION                |             | 00   |
| 01   | JUMP          | 0037    | Binary & Fetch mode - restart |             | 01   |
| 02   | LDA/INCH/BASE |         |                               |             | 02   |
| 03   | JUMP          | 0037    | Not SPLIT - restart           |             | 03   |
| 04   | LDA           | Z 0045  | = No. of characters input     |             | 04   |
| 05   | A=0           |         |                               |             | 05   |
| 06   | JUMP          | 0037    | Alpha Limit - restart         |             | 06   |
| 07   | JSR           | I2 1652 | PUT "No"                      |             | 07   |
| 10   | P1=711630     |         |                               |             | 10   |
| 11   | JSR           | 0020    | Reset                         |             | 11   |
| 12   | JUMP          | I2 0161 | Return                        |             | 12   |
| 13   | JSR           | I2 1652 | PUT "yes"                     |             | 13   |
| 14   | P1=711632     |         | * SPLIT "YES"                 |             | 14   |
| 15   | JSR           | 0020    | Reset                         |             | 15   |
| 16   | INSZ          | Z 0161  |                               |             | 16   |
| 17   | JUMP          | I2 0161 | Return                        |             | 17   |
| 20   | WOOP          |         |                               |             | 20   |
| 21   | WOOP          |         | * Convert to Motorola         |             | 21   |
| 22   | LDA           | I2 0162 | = P3 -> Target                |             | 22   |
| 23   | STA           | 0132    |                               |             | 23   |
| 24   | LDA           | Z 0160  | = Control Word                |             | 24   |
| 25   | ANDA          | Z 0375  | 000177 (Character length)     |             | 25   |
| 26   | JORA          | Z 0256  | B216                          |             | 26   |
| 27   | STA           | 0133    |                               |             | 27   |
| 30   | JSR           | I2 1637 | Convert to Motorola           |             | 30   |
| 31   | P1=3600-      |         | ASCII (Length 1253)           |             | 31   |
| 32   | P1=           |         | Motorola                      |             | 32   |
| 33   | P2=           |         | 516, length                   |             | 33   |
| 34   | A=0           |         |                               |             | 34   |
| 35   | JUMP          | I2 1641 | Error                         |             | 35   |
| 36   | JUMP          | I2 0161 | Return                        |             | 36   |
| 37   | WOOP          |         |                               |             | 37   |
| 40   | WOOP          |         | * Move & Pad                  |             | 40   |
| 41   | LDA           | I2 0162 | = P2 -> Target                |             | 41   |
| 42   | STA           | 0150    |                               |             | 42   |
| 43   | LDA           | Z 0160  | = Control Word                |             | 43   |
| 44   | ANDA          | Z 0375  | 000177 (Character length)     |             | 44   |
| 45   | STA           | 0151    |                               |             | 45   |
| 46   | JSR           | I2 1741 | Move & Pad                    |             | 46   |
| 47   | P1=3600-      |         | Source                        |             | 47   |
| 50   | P1=           |         | Target                        |             | 50   |
| 51   | P1=           |         | Search                        |             | 51   |
| 52   | JUMP          | I2 0161 | Return                        |             | 52   |
| 53   |               |         |                               |             | 53   |
| 54   |               |         |                               |             | 54   |
| 55   |               |         |                               |             | 55   |
| 56   |               |         | Buffer for Error Handler      |             | 56   |
| 57   |               |         |                               |             | 57   |
| 60   | *ENTRY        |         | DECODE                        | MASK 210000 | 60   |
| 61   | LDB           | I 0160  | = P1                          | ← BIT →     | 61   |
| 62   | STB           | 0173    | Target Pointer                |             | 62   |
| 63   | INSZ          | 0160    |                               |             | 63   |
| 64   | LDB           | I 0176  | Motor                         |             | 64   |
| 65   | CMPB          | Z 0371  | Flag 160377                   |             | 65   |
| 66   | JSR           | I 0177  | Decode                        |             | 66   |
| 67   | LDA           | Z 0316  | 0/0200 -> "No"                |             | 67   |
| 70   | STA           | 0172    |                               |             | 70   |
| 71   | JSR           | I2 1741 | Move & Pad                    |             | 71   |
| 72   | P1=           |         |                               |             | 72   |
| 73   | P1=           |         |                               |             | 73   |
| 74   | P3=12chars    |         |                               |             | 74   |
| 75   | JUMP          | I 0160  | Return                        |             | 75   |
| 76   |               |         | -> Decode Motor               | 10/0144     | 76   |
| 77   |               |         | -> Decode Motor               | 10/0200     | 77   |

OS

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| Step | Instruction              | Address | Comment                                     | Octal  | Step |
|------|--------------------------|---------|---|--------|------|
| 00   | JNSZ                     | Z 0142  | *ERROR HANDLER                              |        | 00   |
| 01   | JUMP                     | 0316    | Addr. to suspend (direct)                   |        | 01   |
| 02   | CHA                      |         | } Check "Command bits in use" flag          |        | 02   |
| 03   | STA                      | IL 1617 | }   |        | 03   |
| 04   | JSBR                     | IL 1652 | PUT "ERROR"                                 |        | 04   |
| 05   | P <sub>1</sub> = 01327   |         |   |        | 05   |
| 06   | JSBR                     | IL 1621 | STIN  |        | 06   |
| 07   | P <sub>1</sub> = 000000  |         | Flags, Parity                               |        | 07   |
| 10   | P <sub>2</sub> = 13/0156 |         | → Buffer                                    |        | 10   |
| 11   | JUMP                     | 0037    | Acknowledged - reset                        |        | 11   |
| 12   | JUMP                     | 0204    | Accepted - re-accept "ERROR"                |        | 12   |
| 13   | LDA                      | Z 0160  | = Control word *ESCAPE                      |        | 13   |
| 14   | ANDA                     | Z 0323  | Bit 9                                       |        | 14   |
| 15   | AND                      |         |   |        | 15   |
| 16   | JUMP                     | 0223    | P <sub>0</sub> not specified                |        | 16   |
| 17   | DESZ                     | Z 0162  | → P <sub>0</sub>                            |        | 17   |
| 20   | LDA                      | IL 0162 | → Escape Point                              |        | 20   |
| 21   | JSBR                     | Z 1630  | Resolve Offset                              |        | 21   |
| 22   | JUMP                     | IL A    | Escape                                      |        | 22   |
| 23   | JSBR                     | IL 1721 | LDA Default Escape Point                    |        | 23   |
| 24   | P <sub>1</sub> = 3764-   |         |   |        | 24   |
| 25   | JUMP                     | IL A    | Escape                                      |        | 25   |
| 26   | *ENTRY                   |         | SUSPEND                                     | ← BA → | 26   |
| 27   | LDA                      | 0226    |   |        | 27   |
| 30   | JUMP                     | 0234    | Flag  |        | 30   |
| 31   | *ENTRY                   |         | SUSPEND2                                    | ← BA → | 31   |
| 32   | LDA                      | I 0231  | = P <sub>1</sub>                            |        | 32   |
| 33   | JSBR                     | Z 1630  | Resolve Offset                              |        | 33   |
| 34   | STA                      | Z 0176  |   |        | 34   |
| 35   | LDA                      | Z 0040  | = Task No.                                  |        | 35   |
| 36   | STA                      | Z 0177  |   |        | 36   |
| 37   | JSBR                     | IL 1616 | STACK                                       |        | 37   |
| 40   | JUMP                     | IL 1624 | to TASK SCHEDULER                           |        | 40   |
| 41   | *ENTRY                   |         | ESTABLISH TASK                              | ← BA → | 41   |
| 42   | STA                      | Z 0040  | = Task No.                                  |        | 42   |
| 43   | ADA                      | Z 0047  | +Task Control Table entry                   |        | 43   |
| 44   | LDA                      | IL A    | → TCA (3720-)                               |        | 44   |
| 45   | SFA                      | Z 0212  | → 3706-                                     |        | 45   |
| 46   | STA                      | 0250    |   |        | 46   |
| 47   | JSBR                     | IL 1707 | Duplicate (Task position)                   |        | 47   |
| 50   | P <sub>1</sub> =         |         |   |        | 50   |
| 51   | P <sub>2</sub> = 0/0065  |         |   |        | 51   |
| 52   | P <sub>3</sub> = 8 words |         |   |        | 52   |
| 53   | LDA                      | Z 0040  |   |        | 53   |
| 54   | JUMP                     | I 0241  | Return                                      |        | 54   |
| 55   | ANDA                     | Z 0277  | (Always Output Device) *TEST OUTPUT Channel |        | 55   |
| 56   | STA                      | Z 1717  | Device Code                                 |        | 56   |
| 57   | JSBR                     | IL 1755 | SKIP I/O                                    |        | 57   |
| 60   | JUMP                     | 1113    | auto next task.                             |        | 60   |
| 61   | LDA                      | 1100    | = Task No.                                  |        | 61   |
| 62   | JSBR                     | IL 1620 | Establish Task                              |        | 62   |
| 63   | LDA                      | IL 0074 | }   |        | 63   |
| 64   | CISA                     |         | } Indicate not in use                       |        | 64   |
| 65   | STA                      | IL 0074 | }   |        | 65   |
| 66   | JSBR                     | IL 1721 | LDA Continuation Address                    |        | 66   |
| 67   | P <sub>1</sub> = 3726-   |         |   |        | 67   |
| 70   | JNSZ                     | IL 0111 |   |        | 70   |
| 71   | BUMP                     | IL A    | Return (from START)                         |        | 71   |
| 72   |                          |         |   |        | 72   |
| 73   |                          |         |   |        | 73   |
| 74   |                          |         |   |        | 74   |
| 75   |                          |         |   |        | 75   |
| 76   |                          |         |   |        | 76   |
| 77   |                          |         |   |        | 77   |

OS

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| Step | Instruction | Address | Comment  | Octal  | Step |
|------|-------------|---------|--|--------|------|
| 00   |             |         |  |        | 00   |
| 01   |             |         |  |        | 01   |
| 02   |             |         |  |        | 02   |
| 03   |             |         |  |        | 03   |
| 04   |             |         |  | 007600 | 04   |
| 05   |             |         |  | 020317 | 05   |
| 06   |             |         |  |        | 06   |
| 07   |             |         |  |        | 07   |
| 10   |             |         |  |        | 10   |
| 11   |             |         |  |        | 11   |
| 12   |             |         |  |        | 12   |
| 13   |             |         |  |        | 13   |
| 14   |             |         |  | 00770  | 14   |
| 15   |             |         |  |        | 15   |
| 16   | JSLA        | Z 1625  | 204000 (Jan 02011)                                 |        | 16   |
| 17   | JUMP        | 0204    |  |        | 17   |
| 20   |             |         |  |        | 20   |
| 21   |             |         |  |        | 21   |
| 22   |             |         |  |        | 22   |
| 23   |             |         |  |        | 23   |
| 24   |             |         |  |        | 24   |
| 25   |             |         |  |        | 25   |
| 26   |             |         |  |        | 26   |
| 27   |             |         |  |        | 27   |
| 30   |             |         |  |        | 30   |
| 31   |             |         |  |        | 31   |
| 32   | LDA         | Z 0160  | = Control Word (Jan 0056)                          | 204000 | 32   |
| 33   | ANDA        | Z 0331  | 204000   |        | 33   |
| 34   | CHPA        | Z 0331  | 204000   |        | 34   |
| 35   | ADB         | Z 0356  | Bot 16 Retain Count Case.                          |        | 35   |
| 36   | STB         | 0062    |  |        | 36   |
| 37   | JUMP        | 0057    |  |        | 37   |
| 40   | JSR         | IL 1721 | LDA * COMMAND                                      |        | 40   |
| 41   | P=3735-     |         |  |        | 41   |
| 42   | A=0         |         |  |        | 42   |
| 43   | JUMP        | 0347    | Bypass - address                                   |        | 43   |
| 44   | LDA         | Z 0161  | GET/SPLIT Refer address                            |        | 44   |
| 45   | SFA         | Z 0202  | CFR (= 350000)                                     |        | 45   |
| 46   | STA         | IL B    | Indicates Command Mode                             |        | 46   |
| 47   | JSR         | IL 1640 | GET "COMMAND" (Bypass to 13/0361)                  |        | 47   |
| 50   | P=13/0375   |         |  |        | 50   |
| 51   | LDA         | IL 1617 | = Command Au. bank address                         |        | 51   |
| 52   | AND         |         |  |        | 52   |
| 53   | JUMP        | 0356    |  |        | 53   |
| 54   | JSR         | IL 1625 | SUSPEND  |        | 54   |
| 55   | JUMP        | 0351    |  |        | 55   |
| 56   | JSR         | IL 1617 | COMMAND MODE                                       |        | 56   |
| 57   | CLA         |         |  |        | 57   |
| 60   | STA         | IL 1617 | Clear "JULIA" indicator                            |        | 60   |
| 61   | JSR         | IL 1652 | PUT 'SI' (Indicates relation) + Binary for Command |        | 61   |
| 62   | P=0/0217    |         |  |        | 62   |
| 63   | JSR         | IL 1721 | LDA  |        | 63   |
| 64   | P=3735-     |         |  |        | 64   |
| 65   | STA         | Z 0177  |  |        | 65   |
| 66   | CLA         |         |  |        | 66   |
| 67   | STA         | IL B    | Clear "Command Mode" Indicator                     |        | 67   |
| 70   | JUMP        | IL 0177 | to operation "GET/SPLIT" code.                     |        | 70   |
| 71   | ANDA        | Z 0375  | 000177 (Jan 0422)                                  |        | 71   |
| 72   | INCA        |         | - length + 1                                       |        | 72   |
| 73   | JUMP        | 0423    |  |        | 73   |
| 74   |             |         | Po 13/0361   |        | 74   |
| 75   |             |         | CFR  | 200577 | 75   |
| 76   |             |         | GET "COMMAND"                                      | 711752 | 76   |
| 77   |             |         |  | 211771 | 77   |

OS - STIN & STOUT

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| Step | Instruction  | Address | Comment                              | Octal  | Step |
|------|--------------|---------|--------------------------------------|--------|------|
| 00   | *ENTRY       |         | STIN                                 | ← BA → | 00   |
| 01   | LDA          | IL 0074 | = Devia Code, etc.                   |        | 01   |
| 02   | AMSB         |         |                                      |        | 02   |
| 03   | JUMP         | 0403    | loop - Target is already in progress |        | 03   |
| 04   | JORA         | Z 0356  | Bit 16                               |        | 04   |
| 05   | STA          | IL 0074 | Invalidate Target in Progress        |        | 05   |
| 06   | SWAPH        |         |                                      |        | 06   |
| 07   | ANDA         | Z 0277  | (Access Target Devia Code)           |        | 07   |
| 10   | STA          | Z 1717  | Devia Code                           |        | 10   |
| 11   | LDA          | IL 0074 | = Devia Code, etc.                   |        | 11   |
| 12   | ANDA         | Z 0277  | (Access Output Devia Code)           |        | 12   |
| 13   | LDB          | I 0400  | = P                                  |        | 13   |
| 14   | BPOS         |         |                                      |        | 14   |
| 15   | C2A          | 01      | No Floorbook                         |        | 15   |
| 16   | BMSB         |         |                                      |        | 16   |
| 17   | CISA/col/PSA |         | Reopen Ground Code                   |        | 17   |
| 20   | STA          | 0443    |                                      |        | 20   |
| 21   | LDA          | Z B     |                                      |        | 21   |
| 22   | JUMP         | 0371    | Patch INDA 177, INCB                 |        | 22   |
| 23   | STA          | 0441    |                                      |        | 23   |
| 24   | JSBR         | IL 1725 | STA length+1                         |        | 24   |
| 25   | P-3736-      |         |                                      |        | 25   |
| 26   | INSZ         | 0400    |                                      |        | 26   |
| 27   | LDA          | I 0400  | = P → Buffer                         |        | 27   |
| 30   | JSBR         | Z 1630  | Random Output                        |        | 30   |
| 31   | STA          | 0442    |                                      |        | 31   |
| 32   | INCB         |         |                                      |        | 32   |
| 33   | STA          | IL B    | 03737- (1st use)                     |        | 33   |
| 34   | LDA          | 0400    |                                      |        | 34   |
| 35   | INCA         |         | → Continuation Address               |        | 35   |
| 36   | INCB         |         |                                      |        | 36   |
| 37   | STA          | IL B    | 03740-                               |        | 37   |
| 40   | JSBR         | IL 1762 | INPUT                                |        | 40   |
| 41   | P=           |         | Length                               |        | 41   |
| 42   | P=           |         | Buffer                               |        | 42   |
| 43   | P=           |         | Floorbook Devia Code                 |        | 43   |
| 44   | JUMP         | IL 1624 | to Test Scheduler                    |        | 44   |
| 45   |              |         |                                      |        | 45   |
| 46   |              |         |                                      |        | 46   |
| 47   |              |         |                                      |        | 47   |
| 50   |              |         |                                      |        | 50   |
| 51   |              |         |                                      |        | 51   |
| 52   |              |         |                                      |        | 52   |
| 53   |              |         |                                      |        | 53   |
| 54   |              |         |                                      |        | 54   |
| 55   |              |         |                                      |        | 55   |
| 56   |              |         |                                      |        | 56   |
| 57   |              | IL      |                                      |        | 57   |
| 60   |              |         |                                      |        | 60   |
| 61   |              |         |                                      |        | 61   |
| 62   |              | IL      |                                      |        | 62   |
| 63   |              |         |                                      |        | 63   |
| 64   |              |         |                                      |        | 64   |
| 65   |              |         |                                      |        | 65   |
| 66   |              |         |                                      |        | 66   |
| 67   |              |         |                                      |        | 67   |
| 70   |              |         |                                      |        | 70   |
| 71   |              |         |                                      |        | 71   |
| 72   |              | IL      |                                      |        | 72   |
| 73   |              | IL      |                                      |        | 73   |
| 74   |              | IL      |                                      |        | 74   |
| 75   |              |         |                                      |        | 75   |
| 76   |              |         |                                      |        | 76   |
| 77   |              |         |                                      |        | 77   |

OS Simulation

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| Step | Instruction | Address | Comment                            | Octal        | Step |
|------|-------------|---------|------------------------------------|--------------|------|
| 00   | *ENTRY      |         | OPEN FILE                          | ← BA →       | 00   |
| 01   | CASA        |         |                                    |              | 01   |
| 02   | STA         | Z 0153  | = Refresh Number                   |              | 02   |
| 03   | LDA         | 0500    | { same pattern address }           |              | 03   |
| 04   | STA         | Z 0155  |                                    |              | 04   |
| 05   | JSBR        | IL 1670 | FETCH Catalogue Entry              |              | 05   |
| 06   | R= 040007   |         | 2 <sup>nd</sup> level              |              | 06   |
| 07   | R= 0/0153   |         |                                    |              | 07   |
| 10   | R= 0        |         | No extraction                      |              | 10   |
| 11   | LDA         | IL 0151 | = 1 <sup>st</sup> word of record   |              | 11   |
| 12   | AND         |         |                                    |              | 12   |
| 13   | JUMP        | 0531    | Not loaded                         |              | 13   |
| 14   | AND         | Z 0277  | Reserve length of FCB              |              | 14   |
| 15   | LDB         | Z 0151  | → Record                           |              | 15   |
| 16   | ADB         | Z 0204  | CF4                                |              | 16   |
| 17   | STB         | 0524    | → Source                           |              | 17   |
| 20   | STA         | 0526    | Length                             |              | 20   |
| 21   | JSBR        | IL 1704 | Get Max                            |              | 21   |
| 22   | STA         | 0525    | → target                           |              | 22   |
| 23   | JSBR        | IL 1707 | Verify FCB                         |              | 23   |
| 24   | R=          |         |                                    |              | 24   |
| 25   | R=          |         |                                    |              | 25   |
| 26   | R=          |         |                                    |              | 26   |
| 27   | LDA         | 0525    | → FCB in Comp area                 |              | 27   |
| 30   | JUMP        | IL 0155 | Return                             |              | 30   |
| 31   | LDA         | Z 0201  | CF1                                | ↓ Not loaded | 31   |
| 32   | LDB         | 0534    |                                    |              | 32   |
| 33   | JUMP        | 0517    | Jump                               |              | 33   |
| 34   |             |         | → Invalid FCB                      | 13/0535      | 34   |
| 35   |             |         | "INVALID" FCB                      | 0/1377       | 35   |
| 36   |             |         |                                    |              | 36   |
| 37   |             |         |                                    |              | 37   |
| 40   | *ENTRY      |         | DIRECT FCB SEARCH Process          | ← BA →       | 40   |
| 41   | LDA         | Z 0164  | → FCB                              |              | 41   |
| 42   | ADA         | Z 0203  |                                    |              | 42   |
| 43   | STA         | Z 0164  | → FCB Number                       |              | 43   |
| 44   | JMP         |         |                                    |              | 44   |
| 45   | STA         | Z 0165  | → Mac Number                       |              | 45   |
| 46   | LDA         | Z 0160  | Comp Word                          |              | 46   |
| 47   | AND         | 1366    | 034000 185 19, 13, 12              |              | 47   |
| 50   | JORA        | 1367    | 040100 Test before limit, Search   |              | 50   |
| 51   | JSBR        | 1300    | Process                            |              | 51   |
| 52   | JUMP        | I 0540  | Return                             |              | 52   |
| 53   | *ENTRY      |         | UNSUPPORTED FILE CF4 FIT 91 format | ← BA →       | 53   |
| 54   | LDA         | Z 0161  | Return                             |              | 54   |
| 55   | JUMP        | Z 1374  | HALT                               |              | 55   |
| 56   |             |         |                                    |              | 56   |
| 57   |             |         |                                    |              | 57   |
| 60   |             |         |                                    |              | 60   |
| 61   |             |         |                                    |              | 61   |
| 62   |             |         |                                    |              | 62   |
| 63   |             |         |                                    |              | 63   |
| 64   |             |         |                                    |              | 64   |
| 65   |             |         |                                    |              | 65   |
| 66   |             |         |                                    |              | 66   |
| 67   |             |         |                                    |              | 67   |
| 70   |             |         |                                    |              | 70   |
| 71   |             |         |                                    |              | 71   |
| 72   |             |         |                                    |              | 72   |
| 73   |             |         |                                    |              | 73   |
| 74   |             |         |                                    |              | 74   |
| 75   |             |         |                                    |              | 75   |
| 76   |             |         |                                    |              | 76   |
| 77   |             |         |                                    |              | 77   |

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| Step | Instruction | Address | Comment                                | Octal        | Step |
|------|-------------|---------|--|--------------|------|
| 00   |             |         |  |              | 00   |
| 01   |             |         |  |              | 01   |
| 02   |             |         |  |              | 02   |
| 03   |             |         |  |              | 03   |
| 04   |             |         |  |              | 04   |
| 05   |             |         |  |              | 05   |
| 06   |             |         |  |              | 06   |
| 07   |             |         |  |              | 07   |
| 10   |             |         |  |              | 10   |
| 11   |             |         |  |              | 11   |
| 12   |             |         |  |              | 12   |
| 13   |             |         |  |              | 13   |
| 14   |             |         |  |              | 14   |
| 15   |             |         |  |              | 15   |
| 16   |             |         |  |              | 16   |
| 17   |             |         |  |              | 17   |
| 20   |             |         |  |              | 20   |
| 21   |             |         |  |              | 21   |
| 22   |             |         |  |              | 22   |
| 23   |             |         |  |              | 23   |
| 24   |             |         |  |              | 24   |
| 25   |             |         |  |              | 25   |
| 26   |             |         |  |              | 26   |
| 27   |             |         |  |              | 27   |
| 30   |             |         |  |              | 30   |
| 31   | *ENTRY      |         | STACK                                  | ← BA →       | 31   |
| 32   | LDA         | Z 0250  | 0/0050 → Index                         |              | 32   |
| 33   | LDB         | I2 A    |  |              | 33   |
| 34   | BNE         |         |  |              | 34   |
| 35   | JUMP        | 0640    | } ends for end of a                    |              | 35   |
| 36   | LDA         | Z B     |  |              | 36   |
| 37   | JUMP        | 0633    |  |              | 37   |
| 40   | LDB         | Z 0056  | → Free Q                               |              | 40   |
| 41   | BNE         |         |  |              | 41   |
| 42   | JUMP        | 0657    | Obtain used element.                   |              | 42   |
| 43   | STB         | I2 A    |  |              | 43   |
| 44   | LDA         | I2 B    | → Next in Free Q                       |              | 44   |
| 45   | STA         | Z 0056  | → Free Q                               |              | 45   |
| 46   | CHA         |         |  | (from 0657)  | 46   |
| 47   | STA         | I2 B    | Indicate End of chain                  |              | 47   |
| 50   | INCB        |         |  |              | 50   |
| 51   | LDA         | Z 0177  | Task No.                               |              | 51   |
| 52   | STA         | I2 B    |  |              | 52   |
| 53   | INCB        |         |  |              | 53   |
| 54   | LDA         | Z 0176  | Coordinate Address                     |              | 54   |
| 55   | STA         | I2 B    |  |              | 55   |
| 56   | JUMP        | I 0631  | Return.                                |              | 56   |
| 57   | STA         | Z 0170  | Save sub-chain address                 |              | 57   |
| 60   | LDA         | Z 0203  | CF3 (No of words in suspended element) |              | 60   |
| 61   | JSBR        | I2 1704 | Get chain                              |              | 61   |
| 62   | LDB         | Z A     | → suspended element                    |              | 62   |
| 63   | STB         | I2 0170 | Link with chain                        |              | 63   |
| 64   | JUMP        | 0646    | Repeat.                                |              | 64   |
| 65   |             |         |  |              | 65   |
| 66   |             |         |  |              | 66   |
| 67   |             |         |  | under 210000 | 67   |
| 70   | *ENTRY      |         | ADDRESS → 0502                         | ← BA →       | 70   |
| 71   | LDB         | I 0670  | = P.                                   |              | 71   |
| 72   | STB         | 0707    | Target pointer.                        |              | 72   |
| 73   | INSZ        | 0670    |  |              | 73   |
| 74   | LDB         | I 0176  | Header                                 |              | 74   |
| 75   | CMPE        | Z 0371  | Flag                                   |              | 75   |
| 76   | JUMP        | 0702    |  |              | 76   |
| 77   | JSBR        | I2 1612 | 0x02 → 0502                            |              | 77   |

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| Step | Instruction              | Address | Comment                                  | Octal               | Step |
|------|--------------------------|---------|--|---------------------|------|
| 00   | P <sub>1</sub> = 13/0713 |         |  |                     | 00   |
| 01   | LDA                      | 0700    |  |                     | 01   |
| 02   | SKIP                     |         |  |                     | 02   |
| 03   | JSR                      | I 0712  | Address → 0712                           |                     | 03   |
| 04   | STA                      | 0706    |  |                     | 04   |
| 05   | JSR                      | I 1741  | Mode & Prod                              |                     | 05   |
| 06   | P <sub>1</sub> = /       |         |  |                     | 06   |
| 07   | P <sub>2</sub> = /       |         |  |                     | 07   |
| 10   | P <sub>3</sub> = 9 choro |         |  |                     | 10   |
| 11   | JUMP                     | I 0670  | Return.                                  |                     | 11   |
| 12   |                          |         | → Address → 0505                         | 10/0216             | 12   |
| 13   |                          |         |  |                     | 13   |
| 14   |                          |         |  |                     | 14   |
| 15   |                          |         |  |                     | 15   |
| 16   |                          |         |  |                     | 16   |
| 17   |                          |         |  |                     | 17   |
| 20   |                          |         |  |                     | 20   |
| 21   |                          |         |  |                     | 21   |
| 22   |                          |         |  |                     | 22   |
| 23   |                          |         |  |                     | 23   |
| 24   |                          |         |  |                     | 24   |
| 25   |                          |         |  |                     | 25   |
| 26   |                          |         |  |                     | 26   |
| 27   |                          |         |  |                     | 27   |
| 30   | STB                      | Z 0164  | → FCB                                    |                     | 30   |
| 31   | CMPA                     | 1371    | 201427 JSR FCB?                          | (from 1013)         | 31   |
| 32   | SKIP                     |         |  |                     | 32   |
| 33   | JUMP                     | 1044    | Yes/No                                   |                     | 33   |
| 34   | LDA                      | Z 0160  | Control Word                             |                     | 34   |
| 35   | ANDA                     |         | 022377                                   |                     | 35   |
| 36   | STA                      | 1061    | Fetch P <sub>1</sub>                     |                     | 36   |
| 37   | LDA                      | 1371    | 201427                                   |                     | 37   |
| 40   | JUMP                     | 1044    | Continue                                 |                     | 40   |
| 41   |                          |         |  |                     | 41   |
| 42   | JSR                      | 0020    | Reset                                    | 022377              | 42   |
| 43   | INSZ                     | Z 0162  | → P <sub>2</sub>                         | * Restart FETCH     | 43   |
| 44   | INSZ                     | Z 0162  | → P <sub>3</sub>                         |                     | 44   |
| 45   | LDA                      | Z 0160  | Control Word                             |                     | 45   |
| 46   | ANDA                     | Z 1752  | File ID                                  |                     | 46   |
| 47   | JORA                     | 1372    | File 16812                               |                     | 47   |
| 50   | LDB                      | Z 0160  | Control Word                             |                     | 50   |
| 51   | LSB/BMSB                 |         |  |                     | 51   |
| 52   | XORA                     | Z 0356  | Bit 16 (Remove "Test" option)            |                     | 52   |
| 53   | STA                      | 1061    |  |                     | 53   |
| 54   | JUMP                     | 1053    | Header                                   |                     | 54   |
| 55   | LDA                      | Z 0142  | Options, ID                              | * HYBRID File Field | 55   |
| 56   | SWAPA                    |         |  |                     | 56   |
| 57   | LRA                      |         |  |                     | 57   |
| 60   | LRA                      |         |  |                     | 60   |
| 61   | ANDA                     | Z 0203  |  |                     | 61   |
| 62   | ADA                      | Z 0160  | FCB Pointer                              |                     | 62   |
| 63   | LDA                      | I 0160  | → File Control Block                     |                     | 63   |
| 64   | STA                      | Z 0160  | FCB Pointer (recessed for sub-file)      |                     | 64   |
| 65   | LDA                      | I 0160  | → FCB Access thru (FCB Word)             |                     | 65   |
| 66   | INSZ                     | Z 0160  | → FCB Word 1                             |                     | 66   |
| 67   | JUMP                     | I 0160  | FILE ACCESS ROUTINE                      |                     | 67   |
| 70   | JSR                      | 0020    | Reset                                    | (from 1064)         | 70   |
| 71   | AMSB                     |         |  |                     | 71   |
| 72   | JUMP                     | 1076    | Point header records - main (not loaded) |                     | 72   |
| 73   | → LCA/MSB                |         |  |                     | 73   |
| 74   | JUMP                     | 1076    | "NOT TEST" after main.                   |                     | 74   |
| 75   | JSR                      | I 1652  | Put "NOT FOUND"                          |                     | 75   |
| 76   | P <sub>1</sub> = 7/1616  |         |  |                     | 76   |
| 77   | JUMP                     | 0037    | Restart                                  |                     | 77   |



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| Step | Instruction   | Address | Comment                     | Octal           | Step |
|------|---------------|---------|-----------------------------|-----------------|------|
| 00   | INSZ          | Z 0162  | →P <sub>2</sub>             |                 | 00   |
| 01   | INSZ          | Z 0162  | →P <sub>2</sub>             |                 | 01   |
| 02   | LDA           | IL 0162 | * Binary & Fetch mode       |                 | 02   |
| 03   | JSBR          | Z 1630  | Local Offset                |                 | 03   |
| 04   | STA           | Z 0162  | → Target                    |                 | 04   |
| 05   | LDA           | Z 0160  | Control Word                |                 | 05   |
| 06   | ANDA          | Z 0232  | Bit 10 (Fetch mode)         |                 | 06   |
| 07   | A=0           |         |                             |                 | 07   |
| 10   | JUMP          |         | Fetch mode                  |                 | 10   |
| 11   | LDA           | Z 0160  | Control Word                | Binary mode     | 11   |
| 12   | ANDA          | Z 0355  | Bit 15 (Control Word limit) |                 | 12   |
| 13   | AND           |         |                             |                 | 13   |
| 14   | JUMP          |         |                             |                 | 14   |
| 15   | INSZ          | Z 0162  | →P <sub>4</sub>             |                 | 15   |
| 16   | LDA           | IL 0162 |                             |                 | 16   |
| 17   | JSBR          | Z 1630  | Local                       |                 | 17   |
| 20   | STA           | Z 0164  | → H <sub>in</sub>           |                 | 20   |
| 21   | INSZ          | Z 0162  | →P <sub>5</sub>             |                 | 21   |
| 22   | LDA           | IL 0162 |                             |                 | 22   |
| 23   | JSBR          | Z 1630  | Return                      |                 | 23   |
| 24   | STA           | Z 0165  | → H <sub>ac</sub>           |                 | 24   |
| 25   | LDA           | Z 0160  | Control Word                |                 | 25   |
| 26   | JSBR          |         | Process Binary              |                 | 26   |
| 27   | LDA           | Z 0042  | Memory Indicator            |                 | 27   |
| 30   | JUMP          | IL 0161 | Return                      |                 | 30   |
| 31   | LDA           | Z 0160  | Control Word                | * Fetch mode    | 31   |
| 32   | ANDA          | Z 4752  | 000377 (Remove Fetch Id)    |                 | 32   |
| 33   | STA           |         | 1042                        |                 | 33   |
| 34   | IORA          |         | 1372                        | Bits 13 & 12    | 34   |
| 35   | LDB           | Z 0160  |                             |                 | 35   |
| 36   | LSR/BSR       |         |                             |                 | 36   |
| 37   | XORA          | Z 0256  | Bit 16 (Remove Test option) |                 | 37   |
| 40   | STA           |         | 1061                        | Fetch P         | 40   |
| 41   | JSBR          | IL 1700 | Return from FCB (Word)      |                 | 41   |
| 42   |               |         |                             |                 | 42   |
| 43   | J40P          | Z 0730  | Return to bit in JSBR       |                 | 43   |
| 44   | JSBR          | IL 1766 | Remove Register             |                 | 44   |
| 45   | DECA          |         |                             |                 | 45   |
| 46   | COMP          |         |                             |                 | 46   |
| 47   | JSBR          | IL A    | to GET/SET processor        |                 | 47   |
| 50   | LDA           | Z 0043  | Algo indicator              |                 | 50   |
| 51   | A=0           |         |                             |                 | 51   |
| 52   | JUMP          | IL 0161 | Return - input was alpha    |                 | 52   |
| 53   | LDA           | IL 0162 | → Target (hex 0754)         |                 | 53   |
| 54   | STA           |         | 1062                        |                 | 54   |
| 55   | INSZ          | Z 0162  | →P <sub>4</sub>             |                 | 55   |
| 56   | LDA           | IL 0162 | → Fetch mode                |                 | 56   |
| 57   | STA           |         | 1063                        |                 | 57   |
| 60   | JSBR          | IL 1670 | FETCH                       |                 | 60   |
| 61   |               |         |                             |                 | 61   |
| 62   |               |         |                             |                 | 62   |
| 63   |               |         |                             |                 | 63   |
| 64   | JUMP          |         | 0770                        |                 | 64   |
| 65   | JSBR          |         | 0020                        | Reset           | 65   |
| 66   | LRA/ENCR/ALAS |         |                             |                 | 66   |
| 67   | JUMP          |         | 1076                        | Return to GET+2 | 67   |
| 70   | JSBR          | IL 1652 | 19T "UNPUSHED"              |                 | 70   |
| 71   | P=71624       |         |                             |                 | 71   |
| 72   | JUMP          | I 0037  | Restart GET                 |                 | 72   |
| 73   |               |         |                             |                 | 73   |
| 74   |               |         |                             |                 | 74   |
| 75   |               |         |                             |                 | 75   |
| 76   | CLA           |         |                             |                 | 76   |
| 77   | JUMP          | IL 0161 | Return                      |                 | 77   |

OS-TASK SCHEDULER

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| Step | Instruction | Address  | Comment                                       | Octal | Step |
|------|-------------|----------|---|-------|------|
| 00   |             |          | TASK NUMBER UNDER INSPECTION                  | /     | 00   |
| 01   |             |          | TASK CONTROL TABLE pointer                    | /     | 01   |
| 02   | NOOP        |          | [JSBR IL 0011] *TASK SCHEDULER                | /     | 02   |
| 03   | CHA         |          |   |       | 03   |
| 04   | STA         | Z 0142   | Clear "lock", "finite permit", etc.           |       | 04   |
| 05   | STA         | 1100     | Task Under Inspection                         |       | 05   |
| 06   | COMPA       |          |   |       | 06   |
| 07   | STA         | Z 0040   | Current Task No. = -1 = Scheduler             |       | 07   |
| 10   | JSBR        | I 1177   | 12/1700 Check Disc                            |       | 10   |
| 11   | LDA         | Z 0047   | → Task Control Table entry                    |       | 11   |
| 12   | STA         | 1101     | Table pointer                                 |       | 12   |
| 13   | LDA         | 1100     | Task No. *NEXT I/O Station                    |       | 13   |
| 14   | COMPA       | Z 0055   | How I/O Station Task No.                      |       | 14   |
| 15   | JUMP        | 1143     | End of I/O Stations                           |       | 15   |
| 16   | → INSZ      | 1100     | Task No.                                      |       | 16   |
| 17   | INSZ        | 1101     | Table pointer                                 |       | 17   |
| 20   | LDB         | I 1101   | → TCA origin (3720-)                          |       | 20   |
| 21   | LDA         | IZ B     | = Decim Code etc.                             |       | 21   |
| 22   | AMSB        |          |   |       | 22   |
| 23   | JUMP        | 1226     | Input is in Progress                          |       | 23   |
| 24   | → APOS      |          |   |       | 24   |
| 25   | JUMP        | 0255     | Output is in Progress                         |       | 25   |
| 26   | → MDOB      | Z 0245   | → 3765-                                       |       | 26   |
| 27   | LDA         | IZ B     | = Flash Permit Word                           |       | 27   |
| 30   | AMSB/CHA    |          | Flash Permiting?                              |       | 30   |
| 31   | JUMP        | 1113     | No. - onto next task                          |       | 31   |
| 32   | → STA       | IZ B     | Redundant Permit Word Returned.               |       | 32   |
| 33   | NOOP        |          |   |       | 33   |
| 34   | → LDA       | 1100     | Task No.                                      |       | 34   |
| 35   | JSBR        | IZ 11620 | ESTABLISH TASK                                |       | 35   |
| 36   | LDB         | 1641     | → Flash Message (Disc Data Byte)              |       | 36   |
| 37   | JSBR        | IZ 1623  | STOUT   |       | 37   |
| 40   | NOOP        |          | (used when in library)                        |       | 40   |
| 41   | JUMP        | IZ 1624  | to Task Scheduler                             |       | 41   |
| 42   |             |          |   |       | 42   |
| 43   | LDA         | Z 0027   | Interrupt flag. *TEST for Interrupt           |       | 43   |
| 44   | AND         |          | Interrupt?                                    |       | 44   |
| 45   | JUMP        | 1154     | No. by user                                   |       | 45   |
| 46   | → JSBR      | IZ 1605  | Address → 1730H                               |       | 46   |
| 47   | P: 13/1672  |          |   |       | 47   |
| 50   | JSBR        | IZ 1653  | FLASH " INTERRUPT AT..."                      |       | 50   |
| 51   | P: 13/1662  |          |   |       | 51   |
| 52   | CHA         |          |   |       | 52   |
| 53   | STA         | Z 0027   | Clear Flag                                    |       | 53   |
| 54   | LDA         | 1100     | Task No. *NEXT PRINTER                        |       | 54   |
| 55   | COMPA       | Z 0051   | Max. Task No.                                 |       | 55   |
| 56   | JUMP        | 1166     | End of Printers                               |       | 56   |
| 57   | → INSZ      | 1100     | Task No.                                      |       | 57   |
| 60   | INSZ        | 1101     | Table pointer                                 |       | 60   |
| 61   | LDB         | I 1101   | → TCA origin (3720-)                          |       | 61   |
| 62   | LDA         | IZ B     | = Decim Code, etc.                            |       | 62   |
| 63   | APOS        |          |   |       | 63   |
| 64   | JUMP        | 1214     | Printing is in Progress                       |       | 64   |
| 65   | → JUMP      | 1154     | onto next Task                                |       | 65   |
| 66   | LDA         | Z 0050   | → First elevation stack *TEST Suspended Stack |       | 66   |
| 67   | A=0         |          |   |       | 67   |
| 70   | JUMP        | 1200     | UNSTACK                                       |       | 70   |
| 71   | → JUMP      | 1103     | no-cycle.                                     |       | 71   |
| 72   |             |          |   |       | 72   |
| 73   |             |          |   |       | 73   |
| 74   | LDB         | I 1101   | → TCA origin (3720-) (from 12.32)             |       | 74   |
| 75   | LDA         | IZ B     | = Decim Code etc.                             |       | 75   |
| 76   | JUMP        | 1124     |   |       | 76   |
| 77   |             |          | → Check Discs etc. 12/1700                    |       | 77   |

OS - TASK SCHEDULER

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| Step | Instruction | Address | Comment                            | Octal                                | Step |
|------|-------------|---------|------------------------------------|--------------------------------------|------|
| 00   | LDB         | I2 A    | → Next Section in Q *UNSTACK       |                                      | 00   |
| 01   | STB         | Z 0050  | → Save stack IZ ady.               |                                      | 01   |
| 02   | LDB         | Z 0056  | → Free Stack Chain                 |                                      | 02   |
| 03   | STA         | Z 0056  | ? Link into Free Chain             |                                      | 03   |
| 04   | STB         | I2 0056 | }                                  |                                      | 04   |
| 05   | INCA        |         |                                    |                                      | 05   |
| 06   | STA         | Z 0177  | Save                               |                                      | 06   |
| 07   | LDA         | I2 A    | = Task No.                         |                                      | 07   |
| 10   | JSBR        | I2 1620 | Establish Task                     |                                      | 10   |
| 11   | INSZ        | Z 0177  |                                    |                                      | 11   |
| 12   | LDA         | I2 0177 | = Continuation Address             |                                      | 12   |
| 13   | JUMP        | I2 A    | Resume Task.                       |                                      | 13   |
| 14   | ANDA        | Z 0277  | (Leaves Device Code) *TEST PRINTER |                                      | 14   |
| 15   | STA         | Z 1717  | Device Code                        |                                      | 15   |
| 16   | JSBR        | I2 1755 | SKIP if OUT                        |                                      | 16   |
| 17   | JUMP        |         | Still Busy - act next Task.        |                                      | 17   |
| 20   | LDA         |         | = Task No.                         |                                      | 20   |
| 21   | JSBR        | I2 1620 | Establish Task                     |                                      | 21   |
| 22   | LDA         | I2 0074 | }                                  |                                      | 22   |
| 23   | CLSA        |         | } Indicate Not Use.                |                                      | 23   |
| 24   | STA         | I2 0074 | }                                  |                                      | 24   |
| 25   | JUMP        | I2 1411 | to continuation Address            |                                      | 25   |
| 26   | Noop        |         | *TEST INPUT Channel                |                                      | 26   |
| 27   | SWAPA       |         |                                    |                                      | 27   |
| 30   | ANDA        | Z 0277  | (Leaves Input Device Code)         |                                      | 30   |
| 31   | STA         | Z 1717  | Device Code                        |                                      | 31   |
| 32   | JSBR        | I2 1755 | SKIP IN                            |                                      | 32   |
| 33   | JUMP        |         |                                    |                                      | 33   |
| 34   | LDA         |         | = Task No.                         |                                      | 34   |
| 35   | JSBR        | I2 1620 | Establish Task                     |                                      | 35   |
| 36   | LDA         | I2 0074 | }                                  |                                      | 36   |
| 37   | XORA        | Z 0356  | Bit 16 } Indicate Not In Use.      |                                      | 37   |
| 40   | STA         | I2 0074 | }                                  |                                      | 40   |
| 41   | LDA         | Z 1720  | BIT-Status / RSC / EOF Status      |                                      | 41   |
| 42   | APOS        |         |                                    |                                      | 42   |
| 43   | JUMP        | I2 1641 | Error - Status Failure on Input.   |                                      | 43   |
| 44   | SWAPA       |         |                                    |                                      | 44   |
| 45   | ANDA        | Z 1752  | (Leaves Remaining of Count)        |                                      | 45   |
| 46   | LDB         | Z 0074  | → TCA origin (3720-)               |                                      | 46   |
| 47   | ADB         | Z 0216  | → 3736-                            | } Calculate No. of characters input. | 47   |
| 50   | LDB         | I2 B    | = length                           |                                      | 50   |
| 51   | SFB         | Z A     |                                    |                                      | 51   |
| 52   | STB         | Z 0045  |                                    |                                      | 52   |
| 53   | LDA         |         | → Input Buffer                     |                                      | 53   |
| 54   | LDB         | Z A     | } Indicate CVR test limits etc.    |                                      | 54   |
| 55   | JSBR        | I2 1703 | Save Registers                     |                                      | 55   |
| 56   | JSBR        |         | RESET "GET" rtn.                   |                                      | 56   |
| 57   | LDB         | Z 0074  | → TCA origin (3720-)               |                                      | 57   |
| 60   | ADB         | Z 0290  | → 3740-                            |                                      | 60   |
| 61   | LDB         | I2 B    | = Continuation Address             |                                      | 61   |
| 62   | LDA         | Z 1720  | RSC/EOF                            |                                      | 62   |
| 63   | ANDA        | Z 0375  | 000177 (Leaves EOF)                |                                      | 63   |
| 64   | CMPA        | Z 0203  | "NUL ETX"                          |                                      | 64   |
| 65   | JUMP        |         | to "Reject" address                |                                      | 65   |
| 66   | CMPA        | Z 0202  | "NUL STX"                          |                                      | 66   |
| 67   | JUMP        |         | to "Reject" address                |                                      | 67   |
| 70   | CMPA        | Z 0233  | "NUL ESC"                          |                                      | 70   |
| 71   | JUMP        |         | to ESCAPE                          |                                      | 71   |
| 72   | CMPA        | Z 0226  | "NUL SYN"                          |                                      | 72   |
| 73   | JUMP        |         | to COMMAND HANDLER                 |                                      | 73   |
| 74   | JUMP        | I2 1641 | Error - would EOF                  |                                      | 74   |
| 75   | INCB        |         |                                    |                                      | 75   |
| 76   | LDA         | Z 0160  | "GET" Control word                 |                                      | 76   |
| 77   | JUMP        | I2 B    | to continuation address            |                                      | 77   |

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| Step | Instruction | Address | Comment                              | Octal               | Step |
|------|-------------|---------|--------------------------------------|---------------------|------|
| 00   | *ENTRY      |         | PROCESS BINARY INPUT                 | ← BA →              | 00   |
| 01   | STA         | Z 0166  | Control Word                         |                     | 01   |
| 02   | ANDA        | 1374    | 000317                               |                     | 02   |
| 03   | STA         | 1405    | B of CVB (Binary Format Word)        |                     | 03   |
| 04   | LDA         |         |                                      |                     | 04   |
| 05   | LDA         |         |                                      |                     | 05   |
| 06   | SWAPA       |         |                                      |                     | 06   |
| 07   | ANDA        | Z 0203  | Bits 1-2 (Reserved word control)     |                     | 07   |
| 10   | STA         | 1332    |                                      |                     | 10   |
| 11   | STA         | 1351    |                                      |                     | 11   |
| 12   | STA         | 1530    |                                      |                     | 12   |
| 13   | STA         | 1531    |                                      |                     | 13   |
| 14   | LDA         | Z 0163  | → Format Word                        |                     | 14   |
| 15   | STA         | 1330    |                                      |                     | 15   |
| 16   | STA         | 1350    |                                      |                     | 16   |
| 17   | LDA         | Z 0166  | Control Word                         | *NULL FEATURE       | 17   |
| 20   | ANDA        | Z 0344  | Bit 12                               |                     | 20   |
| 21   | AND         |         |                                      |                     | 21   |
| 22   | JUMP        | 1400    | Control input                        |                     | 22   |
| 23   | LDA         | Z 0045  | = No. of Characters input            |                     | 23   |
| 24   | A=0         |         |                                      |                     | 24   |
| 25   | JUMP        | 1400    | Control input                        |                     | 25   |
| 26   | STA         | Z 0043  | Indicate Numerical Input             |                     | 26   |
| 27   | JSCR        | I2 1707 | Duplicate Previous Value to Workarea |                     | 27   |
| 30   | P=          |         |                                      |                     | 30   |
| 31   | P= 13/1375  |         | Control place                        |                     | 31   |
| 32   | P=          |         | No. of words                         |                     | 32   |
| 33   | LDA         | Z 0166  | Control Word                         | *REJECT - use       | 33   |
| 34   | ANDA        | Z 0356  | Bit 16                               |                     | 34   |
| 35   | AND         |         |                                      |                     | 35   |
| 36   | JUMP        | 1342    | BYPASS                               |                     | 36   |
| 37   | LDA         | I 1331  | 1st word of Workarea                 |                     | 37   |
| 40   | APOS        |         |                                      |                     | 40   |
| 41   | JUMP        | I2 1841 | Format - numeric input               |                     | 41   |
| 42   | LDA         | Z 0166  | Control Word                         | *TEST BETWEEN WORDS | 42   |
| 43   | ANDA        | Z 0355  | Bit 15                               |                     | 43   |
| 44   | A=0         |         |                                      |                     | 44   |
| 45   | JSCR        | 1500    | Test limits                          |                     | 45   |
| 46   | JSCR        | I2 1707 | Duplicate from Workarea              | *ASSIGN TO REGISTER | 46   |
| 47   | P= 13/1375  |         | Control place                        |                     | 47   |
| 50   | P=          |         |                                      |                     | 50   |
| 51   | P=          |         | No. of words                         |                     | 51   |
| 52   | JUMP        | I 1300  | Return                               |                     | 52   |
| 53   | LDA         | Z 0356  | Bit 16                               | Mask from 1456      | 53   |
| 54   | STA         | Z 0043  |                                      |                     | 54   |
| 55   | JUMP        | 1434    | Treat as actually non-numeric        |                     | 55   |
| 56   | STA         |         |                                      |                     | 56   |
| 57   | LDA         |         |                                      |                     | 57   |
| 60   |             |         |                                      |                     | 60   |
| 61   |             |         |                                      |                     | 61   |
| 62   |             |         |                                      |                     | 62   |
| 63   |             |         |                                      |                     | 63   |
| 64   |             |         |                                      |                     | 64   |
| 65   |             |         |                                      |                     | 65   |
| 66   |             |         | MASK                                 | 034000              | 66   |
| 67   |             |         | MASK                                 | 040100              | 67   |
| 70   |             |         |                                      |                     | 70   |
| 71   |             |         | BAM MASK                             | 201427              | 71   |
| 72   |             |         | MASK                                 | 104000              | 72   |
| 73   |             |         | → Remains of Control of Max CVB      | 1/1546              | 73   |
| 74   |             |         | MASK                                 | 000317              | 74   |
| 75   |             |         |                                      |                     | 75   |
| 76   |             |         | Workarea                             |                     | 76   |
| 77   |             |         |                                      |                     | 77   |

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| Step | Instruction              | Address | Comment                                    | Octal | Step |
|------|--------------------------|---------|--|-------|------|
| 00   | Woop                     |         | Convert binary                             |       | 00   |
| 01   | Woop                     |         |  |       | 01   |
| 02   | JSBR                     | 12 1762 | Convert to binary                          |       | 02   |
| 03   | P <sub>1</sub> = 3600 -  |         | ASCII Error                                |       | 03   |
| 04   | P <sub>2</sub> = 13/1375 |         | Work Area                                  |       | 04   |
| 05   | P <sub>3</sub> =         |         | Work Area                                  |       | 05   |
| 06   | JSBR                     | 12 1703 | Save Registers                             |       | 06   |
| 07   | Woop                     |         |  |       | 07   |
| 10   | APDS                     |         |  |       | 10   |
| 11   | JUMP                     | 12 1641 | Error - too large                          |       | 11   |
| 12   | AND/CLA/COMP             |         |  |       | 12   |
| 13   | JUMP                     | 1441    | Input is outside memory                    |       | 13   |
| 14   | CHPA                     | I 1373  | 1/1546 (Recursion count)                   |       | 14   |
| 15   | JUMP                     | 1434    | Yes - Input begins with a non-numeric char |       | 15   |
| 16   | LDA                      | Z 0166  | Control Word                               |       | 16   |
| 17   | ANDA                     | Z 0352  | Bit 4 (Check Digit)                        |       | 17   |
| 20   | JUMP                     | 1475    | Notch.                                     |       | 20   |
| 21   | LDB                      | 1404    | Work Area                                  |       | 21   |
| 22   | ADA                      | 12 B    |  |       | 22   |
| 23   | INCB                     |         |  |       | 23   |
| 24   | DESZ                     | 1332    | Word Count                                 |       | 24   |
| 25   | JUMP                     | 1422    |  |       | 25   |
| 26   | JSBR                     | 12 1740 | Control Check Digit                        |       | 26   |
| 27   | CHPA                     | Z 0043  | Alpha char CVL                             |       | 27   |
| 30   | CLA/STP                  |         | Control Check digit                        |       | 30   |
| 31   | JUMP                     | 12 1641 | Error - wrong check digit                  |       | 31   |
| 32   | STA                      | Z 0043  | Indicate Numeric Input                     |       | 32   |
| 33   | JUMP                     | 1333    | Merge.                                     |       | 33   |
| 34   | LDA                      | Z 0166  | Control Word                               |       | 34   |
| 35   | ANDA                     | Z 0347  | Bit 12 (Alpha-Function)                    |       | 35   |
| 36   | AND                      |         |  |       | 36   |
| 37   | JUMP                     | 12 1641 | Error - Alpha not allowed.                 |       | 37   |
| 40   | JUMP                     | I 1300  | Return - Alpha allowed                     |       | 40   |
| 41   | LDA                      | Z 0045  | Non-numeric input                          |       | 41   |
| 42   | A=0                      |         |  |       | 42   |
| 43   | JUMP                     | 1453    |  |       | 43   |
| 44   | COMP/A                   |         | (No input)                                 |       | 44   |
| 45   | STA                      | Z 0043  |  |       | 45   |
| 46   | LDA                      | Z 0166  | Control Word                               |       | 46   |
| 47   | ANDA                     | Z 0347  | Bit 13 (Alpha Function)                    |       | 47   |
| 50   | AND                      |         |  |       | 50   |
| 51   | JUMP                     | 1333    | Merge - "Zero" input                       |       | 51   |
| 52   | JUMP                     | I 1300  | Return - "Alpha" input                     |       | 52   |
| 53   | LDA                      | Z 0166  | Control Word                               |       | 53   |
| 54   | ANDA                     | Z 0352  | Bit 4 (Check digit)                        |       | 54   |
| 55   | AND                      |         |  |       | 55   |
| 56   | JUMP                     | 1333    | Merge                                      |       | 56   |
| 57   | JUMP                     | 1353    | Check digit missing                        |       | 57   |
| 60   |                          |         |  |       | 60   |
| 61   |                          |         |  |       | 61   |
| 62   |                          |         |  |       | 62   |
| 63   |                          |         |  |       | 63   |
| 64   |                          |         |  |       | 64   |
| 65   |                          |         |  |       | 65   |
| 66   |                          |         |  |       | 66   |
| 67   |                          |         |  |       | 67   |
| 70   |                          |         |  |       | 70   |
| 71   |                          |         |  |       | 71   |
| 72   |                          |         |  |       | 72   |
| 73   |                          |         |  |       | 73   |
| 74   |                          |         |  |       | 74   |
| 75   | AND/CLA                  |         |  |       | 75   |
| 76   | JUMP                     | 12 1641 | Error (not outside memory)                 |       | 76   |
| 77   | JUMP                     | 1421    |  |       | 77   |

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| Step | Instruction | Address | Comment                              | Octal  | Step |
|------|-------------|---------|--------------------------------------|--------|------|
| 00   | *ENTRY      |         | TEST BITWISE BETWEEN 13/175          | ← 0A → | 00   |
| 01   | LDB         | 1331    | → 13/175                             |        | 01   |
| 02   | LDA         | I2 B    | → 13/175                             |        | 02   |
| 03   | CMPA        | I2 0164 | Compare with Mem.                    |        | 03   |
| 04   | JUMP        | 1516    |                                      |        | 04   |
| 05   | SHGT        |         |                                      |        | 05   |
| 06   | JUMP        | I2 1641 | Error                                |        | 06   |
| 07   | LDB         | 1331    |                                      |        | 07   |
| 10   | LDA         | I2 B    |                                      |        | 10   |
| 11   | CMPA        | I2 0165 | Compare with Mem.                    |        | 11   |
| 12   | JUMP        | 1523    |                                      |        | 12   |
| 13   | SHNGT       |         |                                      |        | 13   |
| 14   | JUMP        | I2 1641 | Error                                |        | 14   |
| 15   | JUMP        | I 1500  | Return - OK.                         |        | 15   |
| 16   | INCB        |         |                                      |        | 16   |
| 17   | INISZ       | Z 0164  |                                      |        | 17   |
| 20   | DESZ        | 1530    | Counter                              |        | 20   |
| 21   | JUMP        | 1502    | Not rest                             |        | 21   |
| 22   | JUMP        | I 1500  | Return - OK (= Mem)                  |        | 22   |
| 23   | INCB        |         |                                      |        | 23   |
| 24   | INISZ       | Z 0165  |                                      |        | 24   |
| 25   | DESZ        | 1531    | Counter                              |        | 25   |
| 26   | JUMP        | 1510    | Not rest                             |        | 26   |
| 27   | JUMP        | I 1500  | Return - OK (= Mem)                  |        | 27   |
| 30   |             |         | Counter                              | -      | 30   |
| 31   |             |         | Counter                              | -      | 31   |
| 32   | *ENTRY      |         | START                                |        | 32   |
| 33   | LDA         | I2 0074 | Flags, Davis Codes                   |        | 33   |
| 34   | APOS        |         | "Output in progress?"                |        | 34   |
| 35   | JUMP        | I 1532  | Yes - wait until done                |        | 35   |
| 36   | CISA/COMPSA |         |                                      |        | 36   |
| 37   | STA         | I2 0074 | Truncate in use                      |        | 37   |
| 40   | STB         | Z 0177  | → Absolute Byte                      |        | 40   |
| 41   | ANDA        | Z 0277  | (Clears output device code)          |        | 41   |
| 42   | STA         | Z 1777  | "Device Code"                        |        | 42   |
| 43   | ADA         | 1612    | 010700                               |        | 43   |
| 44   | STA         | 1571    | "STOP if BUSY"                       |        | 44   |
| 45   | ADA         | 1613    | 003000                               |        | 45   |
| 46   | STA         | 1572    | "STOP if NOT DONE"                   |        | 46   |
| 47   | LDA         | 1532    |                                      |        | 47   |
| 50   | JSBR        | I2 1725 | STA } Save Current Address           |        | 50   |
| 51   | #=3726-     |         |                                      |        | 51   |
| 52   | LDA         | Z 0024  | Device Table origin                  |        | 52   |
| 53   | ADA         | Z 1717  | Device Code                          |        | 53   |
| 54   | LDB         | Z 0074  | 3720 → 77CH                          |        | 54   |
| 55   | ADB         | Z 0240  | → 3760 - (Output device addr.)       |        | 55   |
| 56   | INT OFF     |         |                                      | 000005 | 56   |
| 57   | STB         | I2 A    | Set up device addr. address          |        | 57   |
| 60   | CISA/COMPSA |         |                                      |        | 60   |
| 61   | STA         | Z 0176  | → Service M.                         |        | 61   |
| 62   | CAH         |         |                                      |        | 62   |
| 63   | DECB        |         |                                      |        | 63   |
| 64   | STA         | I2 B    | Clear Special Effects Word           |        | 64   |
| 65   | LDA         | Z 0177  | → Absolute Byte                      |        | 65   |
| 66   | DECB        |         |                                      |        | 66   |
| 67   | STA         | I2 B    | Out X2                               |        | 67   |
| 70   | LDB         | Z 0176  | → Service Mem.                       |        | 70   |
| 71   | BSY         |         |                                      | /      | 71   |
| 72   | NOT DONE    |         |                                      | /      | 72   |
| 73   | SKIP        |         | (don't transmit until block is done) |        | 73   |
| 74   | JSBR        | I2 B    | Service M. (transmit first device)   |        | 74   |
| 75   | INT ON      |         |                                      | 000004 | 75   |
| 76   | JUMP        | I2 1624 | to Test Subroutine                   |        | 76   |
| 77   |             |         |                                      |        | 77   |

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| Step | Instruction | Address | Comment                              | Octal  | Step |
|------|-------------|---------|--------------------------------------|--------|------|
| 00   | *ENTRY      |         | FLASH HAL STATIONS                   | ← BA → | 00   |
| 01   | LDB         | 1600    |                                      |        | 01   |
| 02   | JSBR        | 1632    | Process Parameter                    |        | 02   |
| 03   | LDA         | Z 0055  | Max. I/O Station Task No. (Jan 1647) |        | 03   |
| 04   | STA         | Z 0177  | Control                              |        | 04   |
| 05   | LDA         | Z 0177  | Task No.                             |        | 05   |
| 06   | JSBR        | 1624    | Place Flash Request                  |        | 06   |
| 07   | DESZ        | Z 0177  |                                      |        | 07   |
| 10   | JUMP        | 1605    | auto wait                            |        | 10   |
| 11   | JUMP        | I 1600  | Return                               |        | 11   |
| 12   |             |         | "SHIP IS BUSY"                       | 010700 | 12   |
| 13   |             |         | + "SHIP IS KEYPAD"                   | 003000 | 13   |
| 14   |             |         |                                      |        | 14   |
| 15   |             |         |                                      |        | 15   |
| 16   |             |         |                                      |        | 16   |
| 17   |             |         | INSTALLATION NAME                    |        | 17   |
| 20   |             |         | (ASCII)                              |        | 20   |
| 21   |             |         |                                      |        | 21   |
| 22   |             |         |                                      |        | 22   |
| 23   |             |         |                                      |        | 23   |
| 24   | *ENTRY      |         | PLACE FLASH REQUEST                  | ← BA → | 24   |
| 25   | ADIT        | Z 0047  | TCH table entry                      |        | 25   |
| 26   | LDA         | I2 A    | → TCH                                |        | 26   |
| 27   | ADA         | Z 0245  |                                      |        | 27   |
| 30   | STA         | I2 A    | 3765- 24-310                         |        | 30   |
| 31   | JUMP        | I 1624  | return.                              |        | 31   |
| 32   | *ENTRY      |         | Process Parameter                    | ← BA → | 32   |
| 33   | STB         | 1600    |                                      |        | 33   |
| 34   | LDB         | I2 B    | =P,                                  |        | 34   |
| 35   | JSBR        | I2 1414 | Remove Allocated Byte                |        | 35   |
| 36   | STB         | 1641    | → Message (Byte)                     |        | 36   |
| 37   | INVSZ       | 1600    |                                      |        | 37   |
| 40   | JUMP        | I 1632  | Return.                              |        | 40   |
| 41   |             |         | → Flash Message (Allocated Byte)     |        | 41   |
| 42   | *ENTRY      |         | FLASH SINGLE STATION                 | ← BA → | 42   |
| 43   | LDB         | 1642    |                                      |        | 43   |
| 44   | JSBR        | 1632    | Process Parameter                    |        | 44   |
| 45   | ORSA        |         |                                      |        | 45   |
| 46   | AND         |         |                                      |        | 46   |
| 47   | JUMP        | 1603    |                                      |        | 47   |
| 50   | CHPA        | Z 0055  | Max. I/O Station Task No.            |        | 50   |
| 51   | NOOP        |         |                                      |        | 51   |
| 52   | SKOT        |         |                                      |        | 52   |
| 53   | JSBR        | 1624    | Place Flash Request                  |        | 53   |
| 54   | JUMP        | I 1600  | Return.                              |        | 54   |
| 55   |             |         |                                      |        | 55   |
| 56   |             |         |                                      |        | 56   |
| 57   |             |         |                                      |        | 57   |
| 60   |             |         |                                      |        | 60   |
| 61   |             |         |                                      |        | 61   |
| 62   |             |         | BEH CR                               |        | 62   |
| 63   |             |         | SO O                                 |        | 63   |
| 64   |             |         | S SA                                 |        | 64   |
| 65   |             |         | I M                                  |        | 65   |
| 66   |             |         | T E                                  |        | 66   |
| 67   |             |         | R R                                  |        | 67   |
| 70   |             |         | U P                                  |        | 70   |
| 71   |             |         | T SP                                 |        | 71   |
| 72   |             |         |                                      |        | 72   |
| 73   |             |         |                                      |        | 73   |
| 74   |             |         |                                      |        | 74   |
| 75   |             |         |                                      |        | 75   |
| 76   |             |         | SI                                   |        | 76   |
| 77   |             |         | SP NUL                               |        | 77   |

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| Step | Instruction | Address | Comment | Octal  | Step |
|------|-------------|---------|---------|--------|------|
| 00   |             |         | SP SO   |        | 00   |
| 01   |             |         | NUL P   |        | 01   |
| 02   |             |         | R I     |        | 02   |
| 03   |             |         | N T     |        | 03   |
| 04   |             |         | E R     |        | 04   |
| 05   |             |         | " -     |        | 05   |
| 06   |             |         | SP S    |        | 06   |
| 07   |             |         | U S     |        | 07   |
| 10   |             |         | P E     |        | 10   |
| 11   |             |         | N D     |        | 11   |
| 12   |             |         | E D     |        | 12   |
| 13   |             |         | SI SP   |        | 13   |
| 14   |             |         | NUL BEL |        | 14   |
| 15   |             |         | SP SP   |        | 15   |
| 16   |             |         | I N     |        | 16   |
| 17   |             |         | H I     |        | 17   |
| 20   |             |         | B I     |        | 20   |
| 21   |             |         | T E     |        | 21   |
| 22   |             |         | D !     |        | 22   |
| 23   |             |         | NUL ↓   |        | 23   |
| 24   |             |         | ↓ ↓     |        | 24   |
| 25   |             |         | SP P    |        | 25   |
| 26   |             |         | R I     |        | 26   |
| 27   |             |         | N T     |        | 27   |
| 30   |             |         | SP C    |        | 30   |
| 31   |             |         | A N     |        | 31   |
| 32   |             |         | C E     |        | 32   |
| 33   |             |         | L L     |        | 33   |
| 34   |             |         | E D     |        | 34   |
| 35   |             |         | SP C    |        | 35   |
| 36   |             |         | Y SP    |        | 36   |
| 37   |             |         | O P     |        | 37   |
| 40   |             |         | E R     |        | 40   |
| 41   |             |         | N T     |        | 41   |
| 42   |             |         | O R     |        | 42   |
| 43   |             |         | BEL SP  |        | 43   |
| 44   |             |         | SO      |        | 44   |
| 45   |             |         |         |        | 45   |
| 46   |             |         | SP      |        | 46   |
| 47   |             |         | P R     |        | 47   |
| 50   |             |         | I N     |        | 50   |
| 51   |             |         | T E     |        | 51   |
| 52   |             |         | D SP    |        | 52   |
| 53   |             |         | B Y     |        | 53   |
| 54   |             |         | -       |        | 54   |
| 55   |             |         | SI SP   |        | 55   |
| 56   |             |         | NUL BEL |        | 56   |
| 57   |             |         | CR SO   |        | 57   |
| 60   |             |         | P R     |        | 60   |
| 61   |             |         | I N     |        | 61   |
| 62   |             |         | T E     |        | 62   |
| 63   |             |         | R- SP   |        | 63   |
| 64   |             |         | SP-BEL  | SP     | 64   |
| 65   |             |         | SO-P    | U N    | 65   |
| 66   |             |         | R-I     | R E    | 66   |
| 67   |             |         | N-T     | A D    | 67   |
| 70   |             |         | E-R     | Y SP   | 70   |
| 71   |             |         | -L      |        | 71   |
| 72   |             |         | SP      |        | 72   |
| 73   |             |         | N R     |        | 73   |
| 74   |             |         | EP A    |        | 74   |
| 75   |             |         | D V     | SI NUL | 75   |
| 76   |             |         | SI SP   |        | 76   |
| 77   |             |         | NUL NUL |        | 77   |