the digital group
po box 6528 denver, colorado 80206 (303) 777-7133

In Maxi-64, the printer routine starts at 006014 and ends at 010377.

The Digital Group Printer routine is used as a sub-routine.

The Character to be printed should be loaded in the accumulator, and the print sub-routine called.

The routine saves all registers.

If you wish to use this routine with other software, its location is 006000 - 010377

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FILE  060000  122017
READY
ASSM :

006014                  0100        ST   006014 :
006014                  0110 *-----------------------------------------
006014                  0120 *
006014                  0130 * THE DIGITAL GROUP PRINTER DRIVER PROGRAM
006014                  0140 *      2-80  SHORT VERSION
006014                  0150 *-----------------------------------------
006014                  0160 *
006014                  0170 *
006014                  0180 INPORT EQU  03H :
006014                  0190 OTPORT EQU  03H
006014                  0200 BUFSIZ EQU  140    TEXT BUFFER SIZE :
006014                  0210 *
006014                  0220 * DRIVER SECTION STORES LINE IN BUFFER,IGNORING
006014                  0230 * ASCII OUTSIDE GIVEN LIMITS
006014                  0240 * ON C/R, VECTORS TO PRINTOUT ROUTINE
006014                  0250 *
006014 345              0260 DRIVER PUSH HL    SAVE ALL REGISTERS :
006015 325              0270        PUSH DE
006016 305              0280        PUSH BC :
006017 365              0290        PUSH AF
006020 346 177          0300        AND  177 :
006022 376 015          0310        CP   015   IF CHAR IS C/R THEN PRINT LINE
006024 050 050          0320        JR   Z,LINE
006026                  0330 *
006026 326 040          0340        SUB  040    IF NOT, THEN CALCULATE OFFSET
006030 070 037          0350 AA     JR   C,EXIT  AND CHECK ASCII LIMITS
006032 306 300          0360        ADD  300 :
006034 060 007          0370        JR   NC,MAYBE   PLACE IN BUFFER IF LEGAL
006036 306 345          0380        ADD  345
006040 070 027          0390        JR   C,EXIT      IGNORE IF NOT LEGAL
006042 326 275          0400        SUB  275    BIAS DOWN TO OFFSET
006044 107              0410        LD   B,A    SET UP OFFSET IN B :
006045 326 270          0420 MAYBE  SUB  270 :
006047 107              0430        LD   B,A
006050 070 017          0440        JR   C,EXIT :
006052 072 134 007      0450        LD   A,(STOLN)
006055 117              0460        LD   C,A :
006056 257              0470        XOR  A
006057 052 135 007      0480 OK     LD   HL,(TXTPT)
006062 160              0490        LD   M,B      PUT OFFET IN TEXT BUFFER
006063 043              0500        INC  HL
006064 042 135 007      0510        LD   (TXTPT),HL RESTORE POINTER :
006067 257              0520        XOR  A
006070 167              0530        LD   (HL),A :
006071                  0540 *
006071 361              0550 EXIT   POP  AF       RESTORE ALL REGISTERS
006072 301              0560        POP  BC
006073 321              0570        POP  DE
006074 341              0580        POP  HL :
006075 311              0590        RET
006076                  0600 *
006076                  0610 *  SET UP PRINTER FOR ONE LINE OF PRINT AND
006076                  0620 *  TAKE CARE OF HOUSEKEEPING (PRINT HEAD
006076                  0630 *  RETURN, BUFFER CLEAN-UP AND RIBBON ADVANCE)
006076                  0640 *
006076 363              0650 LINE   DI
006077 315 067 007      0660        CALL HOME    HEAD MUST BE IN POSITION
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006102 315 060 007      0670        CALL CSETUP  PREPARE TO MOVE HEAD
006105 315 047 007      0680        CALL ACSYNC  WAIT FOR A LINE 0 :
006110 076 006          0690        LD   A,06 PRINT FWD
006112 323 003          0700        OUT  OTPORT  START HEAD
006114 333 003          0710 LOOP1  IN   INPORT
006116 313 147          0720        BIT  4,A     PRINT FIELD BIT :
006120 040 372          0730        JR   NZ,LOOP1 WAIT FOR PRINT FIELD :
006122 315 231 006      0740        CALL PRINTR  PRINT TEXT BUFFER :
006125 315 060 007      0750        CALL CSETUP  LISTEN UP MOTORS :
006130 257              0760        XOR  A       ALL STOP
006131 323 003          0770        OUT  OTPORT :
006133 041 000 005      0780        LD   HL,005000 DELAY FOR MOTOR TO RESPOND
006136 315 041 007      0790        CALL WASTE :
006141 315 067 007      0800        CALL HOME    RETURN THE HEAD :
006144 006 140          0810        LD   B,BUFSIZ
006146 041 236 010      0820 CLEAN  LD   HL,TXTSZ :
006151 076 010          0830        LD   A,010   010 EQU ASCII SPACE OFFSET
006153 167              0840 LOOP2  LD   M,A :
006154 043              0850        INC  HL
006155 020 374          0860        DJNZ LOOP2    LOAD BUFFER WITH SPACES AFTER PRINT
006157 041 236 010      0870        LD   HL,TXTSZ :
006162 257              0880        XOR  A
006163 167              0890        LD   M,A :
006164 042 135 007      0900        LD   (TXTPT),HL :
006167 373              0910        EI
006170 315 060 007      0920        CALL CSETUP :
006173 257              0930        XOR  A
006174 323 003          0940        OUT  OTPORT :
006176 315 060 007      0950        CALL CSETUP :
006201 076 020          0960        LD   A,020 :
006203 323 003          0970        OUT  OTPORT   MOVE TYPE RIBBON ON PRINTER
006205 041 017 020      0980        LD   HL,020017 :
006210 315 041 007      0990        CALL WASTE :
006213 315 060 007      1000        CALL CSETUP :
006216 257              1010        XOR  A    STOP MOVING TYPE RIBBON :
006217 323 003          1020        OUT  OTPORT :
006221 041 141 121      1030        LD   HL,121141
006224 315 041 007      1040        CALL WASTE :
006227 030 240          1050        JR   EXIT :
006231                  1060 * :
006231                  1070 *  SET UP EACH CHAR FOR OUTPUT
006231                  1080 * :
006231 335 041 236 010  1090 PRINTR LD   IX,TXTSZ PUT TXT BUF START ADR IN INDEX REG
006235                  1100 * :
006235                  1110 *                    IX CONTAINS ADDRESS OF LETTER
006235                  1120 *                    IY CONTAINS ADDRESS OF FONT POINTER :
006235                  1130 * :
006235 072 134 007      1140 TXTFCH LD   A,(STOLN) :
006240 117              1150        LD   C,A :
006241 335 156 000      1160        LD   L,(IX+0)   FONT TABLE OFFSET IN L
006244 076 177          1170        LD   A,177 :
006246 245              1180        AND  L        MASK
006247 157              1190        LD   L,A      WIPE OUT MSB OF FONT TABLE OFFSET
006250 257              1200        XOR  A
006251 147              1210        LD   H,A
006252 265              1220        OR   L        TABLE DISPLACEMENT = 0 ?
006253 310              1230        RET  Z        (END OF TEXT BUFFER) :
006254 006 007          1240        LD   B,7
006256 053              1250        DEC  HL
006257 020 375          1260        DJNZ $-1
006261 375 041 134 007  1270        LD   IY,FNTSZ :
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006265 325              1280        PUSH DE
006266 124              1290        LD   D,H :
006267 135              1300        LD   E,L
006270 051              1310        ADD  HL,HL  TIMES 5 = ACTUAL ADD OF FONT OF CHAR
006271 051              1320        ADD  HL,HL
006272 031              1330        ADD  HL,DE :
006273 321              1340        POP  DE
006274 353              1350        EX   DE,HL :
006275 375 031          1360        ADD  IY,DE   FONT DISP IN IY
006277 355 133 137 007  1370        LD   DE,(DOTIME) :
006303 325              1380        PUSH DE
006304 353              1390 GAPCP  EX   DE,HL  SET UP FOR GAP BETWEEN CHARS
006305 051              1400        ADD  HL,HL
006306 021 357 377      1410        LD   DE,377357 :
006311 031              1420        ADD  HL,DE :
006312 042 132 007      1430        LD   (TEMP),HL :
006315 076 360          1440 ONCP   LD   A,360  CALCULATE SOLENOID ON TIME
006317 241              1450        AND  C       A HAS INTENSITY
006320 313 077          1460        SRL  A
006322 313 077          1470        SRL  A
006324 041 036 000      1480        LD   HL,000036
006327 117              1490        LD   C,A
006330 006 000          1500        LD   B,0
006332 011              1510        ADD  HL,BC
006333 321              1520        POP  DE
006334 345              1530        PUSH HL
006335 257              1540 OFFCP  XOR  A       CALCULATE SOLENOID OFF TIME
006336 353              1550        EX   DE,HL
006337 355 122          1560        SBC  HL,DE
006341 321              1570        POP  DE      DE HAS SOLENOID ON TIME :
006342 345              1580        PUSH HL
006343 052 132 007      1590        LD   HL,(TEMP)
006346 053              1600 LOOP3  DEC  HL       KILL A LITTLE MORE TIME :
006347 175              1610        LD   A,L
006350 264              1620        OR   H
006351 040 373          1630        JR   NZ,LOOP3
006353 341              1640        POP  HL
006354 016 005          1650        LD   C,5
006356 375 106 000      1660 FNTFCH LD   B,(IY+00H)  SET TO PRINT A CHAR :
006361 072 131 007      1670        LD   A,(DOUBLE)  IS DOUBLE PRINT ENABLED?
006364 346 200          1680        AND  200          IF BIT 7 HIGH - YES :
006366 304 005 007      1690        CALL NZ,FONTOT    PRINT IT!
006371 315 005 007      1700        CALL FONTOT       PRINT IT!
006374 375 043          1710        INC  IY      NEXT FONT IN TABLE
006376 015              1720        DEC  C     ALL FONTS OUT?
006377 040 355          1730        JR   NZ,FNTFCH  NO - GET NEXT FONT
007001 335 043          1740 NXTCHR INC  IX      POINT TO NEXT CHAR. IN BUFFER
007003 030 230          1750        JR   TXTFCH      DONE - GET NEXT CHAR :
007005                  1760 *
007005                  1770 *  SOLENOID DRIVE ROUTINE
007005                  1780 * :
007005 325              1790 FONTOT PUSH DE      SAVE ON COUNT
007006 345              1800        PUSH HL      SAVE OFF COUNT
007007 076 006          1810        LD   A,006   MOTOR RUN
007011 323 003          1820        OUT  OTPORT
007013 076 200          1830        LD   A,200   SET UP STROBE
007015 260              1840        OR   B
007016 323 003          1850        OUT  OTPORT
007020 033              1860 FNTLP1 DEC  DE
007021 172              1870        LD   A,D
007022 263              1880        OR   E
```

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007023 040 373      1890         JR   NZ,FNTLP1 WASTE ON TIME
007025 076 200      1900         LD   A,200
007027 323 003      1910         OUT  OTPORT
007031 053          1920 FNTLP2  DEC  HL
007032 174          1930         LD   A,H
007033 265          1940         OR   L
007034 040 373      1950         JR   NZ,FNTLP2 WASTE OFF TIME
007036 341          1960         POP  HL
007037 321          1970         POP  DE
007040 311          1980         RET
007041              1990 *
007041              2000 * THIS LOOP WASTES 9.6 X HL + 4 MICROSECONDS :
007041              2010 *
007041 053          2020 WASTE   DEC  HL
007042 175          2030         LD   A,L
007043 264          2040         OR   H
007044 040 373      2050         JR   NZ,WASTE
007046 311          2060         RET
007047 365          2070 ACSYNC  PUSH AF      RETURNS CONTROL AS A.C. LINE
007050 333 003      2080         IN   INPORT  GOES THRU ZERO.
007052 313 137      2090         BIT  3,A
007054 050 372      2100         JR   Z,ACSYNC+1 :
007056 361          2110         POP  AF
007057 311          2120         RET
007060              2130 *
007060              2140 * :
007060              2150 * SETS UP PRINTER TO ACCEPT A FUNCT. COMMAND :
007060              2160 *
007060 365          2170 CSETUP  PUSH AF   ENABLE PRINT MOVE COMMANDS :
007061 076 200      2180         LD   A,200      10000000
007063 323 003      2190         OUT  OTPORT
007065 361          2200         POP  AF
007066 311          2210         RET
007067 333 003      2220 HOME    IN   INPORT :
007071 313 147      2230         BIT  4,A     IN PRINT FIELD?
007073 300          2240         RET  NZ      IF NOT, MUST BE HOME
007074 315 060 007  2250         CALL CSETUP  TALK TO MOTORS
007077 076 005      2260         LD   A,005   REVERSE COMMAND
007101 315 047 007  2270         CALL ACSYNC  WAIT FOR AC LINE=0
007104 323 003      2280         OUT  OTPORT
007106 333 003      2290 HOMELP  IN   INPORT
007110 313 147      2300         BIT  4,A     HOME YET?
007112 050 372      2310         JR   Z,HOMELP WAIT FOR HEAD TO COME
007114 041 025 006  2320         LD   HL,006025 T.O. FOR HOME OVERUN
007117 315 041 007  2330         CALL WASTE
007122 315 060 007  2340 HALT    CALL CSETUP  PREPARE FOR A STOP
007125 257          2350         XOR  A
007126 323 003      2360         OUT  OTPORT   ALL STOP
007130 311          2370         RET
007131              2380 *
007131              2390 *  BUFFER AREA
007131              2400 DOUBLE DC   0    BIT 7 HIGH FOR DOUBLE PRINT :
  000
007132              2410 TEMP    DC   0,0
  000   000   :
007134              2420 * :
007134              2430 *  FONT TABLE STARTS HERE - AS OFFSET=0 REFERS TO C/R
                    2440 *  THE FIRST 5 BYTES CAN BE USED FOR BUFFER AREA :
                    2450 *
                    2460 FNTSZ   DC   076
```

```
007135                  2470 STOLN  EQU  FNTSZ
007135                  2480 TXTPT  DW   TXTSZ   ADDR EQU END OF FONT TABLE :
  236 010
007137                  2490 DOTIME DW   000147  PRINT LENGTH BYTE (L S BYTE) :
  147 000
007141                  2500        DC   200,200,200,200 :
  200   200   200   200
007145                  2510        DC   200
  200
007146                  2520        DC   200,200,375,200 :
  200   200   375   200
007152                  2530        DC   200
  200
007153                  2540        DC   200,360,200,360 :
  200   360   200   360
007157                  2550        DC   200
  200
007160                  2560        DC   224,377,224,377 :
  224   377   224   377
007164                  2570        DC   224
  224
007165                  2580        DC   222,252,377,252 :
  222   252   377   252
007171                  2590        DC   244
  244
007172                  2600        DC   342,344,210,223 :
  342   344   210   223
007176                  2610        DC   243
  243
007177                  2620        DC   266,311,265,202 :
  266   311   265   202
007203                  2630        DC   205
  205
007204                  2640        DC   200,200,360,200 :
  200   200   360   200
007210                  2650        DC   200
  200
007211                  2660        DC   234,242,301,200 :
  234   242   301   200
007215                  2670        DC   200
  200
007216                  2680        DC   200,200,301,242 :
  200   200   301   242
007222                  2690        DC   234
  234
007223                  2700 * * :
007223                  2710        DC   242,224,377,224 :
  242   224   377   224
007227                  2720        DC   242
  242
007230                  2730 * + :
007230                  2740        DC   210,210,276,210 :
  210   210   276   210
007234                  2750        DC   200
  200
007235                  2760 *      :
007235                  2770        DC   200,201,206,200 :
  200   201   206   200
007241                  2780        DC   200
  200
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007242                  2790 * -
007242                  2800        DC   210,210,210,210 :
  210   210   210   210
007246                  2810        DC   210
  210
007247                  2820 * . :
007247                  2830        DC   200,200,201,200 :
  200   200   201   200
007253                  2840        DC   200
  200
007254                  2850 * / :
007254                  2860        DC   202,204,210,220 :
  202   204   210   220
007260                  2870        DC   240
  240
007261                  2880 * 0
007261                  2890        DC   276,305,311,321 :
  276   305   311   321
007265                  2900        DC   276
  276
007266                  2910 * 1 :
007266                  2920        DC   200,241,377,201 :
  200   241   377   201
007272                  2930        DC   201
  201
007273                  2940 * 2 :
007273                  2950        DC   243,305,311,311 :
  243   305   311   311
007277                  2960        DC   261
  261
007300                  2970 * 3 :
007300                  2980        DC   302,301,311,331 :
  302   301   311   331
007304                  2990        DC   346
  346
007305                  3000 * 4
007305                  3010        DC   214,224,244,377 :
  214   224   244   377
007311                  3020        DC   204
  204
007312                  3030 * 5  :
007312                  3040        DC   362,321,321,321 :
  362   321   321   321
007316                  3050        DC   316
  316
007317                  3060 * 6 :
007317                  3070        DC   236,251,311,311 :
  236   251   311   311
007323                  3080        DC   307
  307
007324                  3090 * 7  :
007324                  3100        DC   300,307,310,320 :
  300   307   310   320
007330                  3110        DC   340
  340
007331                  3120 * 8  :
007331                  3130        DC   266,311,311,311 :
  266   311   311   311
007335                  3140        DC   266
  266
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007336                          3150 * 9
007336                          3160        DC   261.311,311,312 :
  261   311   311   312
007342                          3170        DC   274
  274
007343                          3180 * : :
007343                          3190        DC   200,200,224,200 :
  200   200   224   200
007347                          3200        DC   200
  200
007350                          3210 * ; :
007350                          3220        DC   200,201,226,200 :
  200   201   226   200
007354                          3230        DC   200
  200
007355                          3240 * <
007355                          3250        DC   210,224,242,301 :
  210   224   242   301
007361                          3260        DC   200
  200
007362                          3270 * = :
007362                          3280        DC   224,224,224,224 :
  224   224   224   224
007366                          3290        DC   224
  224
007367                          3300 * >
007367                          3310        DC   200,301,242,224 :
  200   301   242   224
007373                          3320        DC   210
  210
007374                          3330 * ?
007374                          3340        DC   240,300,315,320 :
  240   300   315   320
010000                          3350        DC   240
  240
010001                          3360 * @
010001                          3370        DC   276,301,335,315 :
  276   301   335   315
010005                          3380        DC   237
  237
010006                          3390 * A
010006                          3400        DC   237,244,304,244 :
  237   244   304   244
010012                          3410        DC   237
  237
010013                          3420 * B :
010013                          3430        DC   377,311,311,311 :
  377   311   311   311
010017                          3440        DC   266
  266
010020                          3450 * C :
010020                          3460        DC   276,301,301,201 :
  276   301   301   201
010024                          3470        DC   343
  343
010025                          3480 * D :
010025                          3490        DC   377,301,301,301 :
  377   301   301   301
010031                          3500        DC   276
  276
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010032                      3510 * E :
010032                      3520        DC   377,311,311,311 :
  377   311   311   311
010036                      3530        DC   301
  301
010037                      3540 * F :
010037                      3550        DC   377,310,310,310 :
  377   310   310   310
010043                      3560        DC   300
  300
010044                      3570 * G
010044                      3580        DC   276,301,301,305
  276   301   301   305
010050                      3590        DC   307
  307
010051                      3600 * H :
010051                      3610        DC   377,210,210,210 :
  377   210   210   210
010055                      3620        DC   377
  377
010056                      3630 * I
010056                      3640        DC   200,301,377,301 :
  200   301   377   301
010062                      3650        DC   200
  200
010063                      3660 * J :
010063                      3670        DC   202,201,201,201 :
  202   201   201   201
010067                      3680        DC   376
  376
010070                      3690 * K
010070                      3700        DC   377,210,224,242
  377   210   224   242
010074                      3710        DC   301
  301
010075                      3720 * L
010075                      3730        DC   377,201,201,201
  377   201   201   201
010101                      3740        DC   201
  201
010102                      3750 * M
010102                      3760        DC   377,240,230,240 :
  377   240   230   240
010106                      3770        DC   377
  377
010107                      3780 * N :
010107                      3790        DC   377,220,210,204 :
  377   220   210   204
010113                      3800        DC   377
  377
010114                      3810 * O
010114                      3820        DC   276,301,301,301 :
  276   301   301   301
010120                      3830        DC   276
  276
010121                      3840 * P
010121                      3850        DC   377,310,310,310 :
  377   310   310   310
010125                      3860        DC   260
  260
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010126                      3870 * 0 :
010126                      3880        DC   276,301,305,302 :
  276   301   305   302
010132                      3890        DC   275
  275
010133                      3900 * R
010133                      3910        DC   377,310,314,312 :
  377   310   314   312
010137                      3920        DC   261
  261
010140                      3930 * S
010140                      3940        DC   262,311,311,301
  262   311   311   301
010144                      3950        DC   246
  246
010145                      3960 * T
010145                      3970        DC   300,300,377,300
  300   300   377   300
010151                      3980        DC   300
  300
010152                      3990 * U :
010152                      4000        DC   376,201,201,201 :
  376   201   201   201
010156                      4010        DC   376
  376
010157                      4020 * V
010157                      4030        DC   374,202,201,202 :
  374   202   201   202
010163                      4040        DC   374
  374
010164                      4050 * W
010164                      4060        DC   377,202,214,202
  377   202   214   202
010170                      4070        DC   377
  377
010171                      4080 * X
010171                      4090        DC   343,224,210,224
  343   224   210   224
010175                      4100        DC   343
  343
010176                      4110 * Y
010176                      4120        DC   340,220,217,220
  340   220   217   220
010202                      4130        DC   340
  340
010203                      4140 * Z
010203                      4150        DC   303,305,311,321
  303   305   311   321
010207                      4160        DC   341
  341
010210                      4170 *
010210                      4180        DC   377,377,301,301 :
  377   377   301   301
010214                      4190        DC   301
  301
010215                      4200 *
010215                      4210        DC   240,220,210,204 :
  240   220   210   204
010221                      4220        DC   202
  202
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010222                  4230 *
010222                  4240        DC * 301,301,301,377
  301   301   301   377
010226                  4250        DC   377
  377
010227                  4260 *
010227                  4270        DC   220 240 377,240
  220
010230                  4280        DC   220
  220
010231                  4290 *
010231                  4300        DC   210,234,210,210 :
  210   234   210   210
010235                  4310        DC   210
  210
010236                  4320 TXTSZ  DS   140
010376 000              4330 ZZZZZ  NOP

NO ERRORS FOUND :

FILE  060000  122017
READY
LTABL
AA     006030   ACSYNC 007047   BUFSIZ 000140   CLEAN  006146
CSETUP 007060   DOTIME 007137   DOUBLE 007131   DRIVER 006014
EXIT   006071   FNTFCH 006356   FNTLP1 007020   FNTLP2 007031
FNTSZ  007134   FONTOT 007005   GAPCP  006304   HALT   007122
HOME   007067   HOMELP 007106   INPORT 000003   LINE   006076
LOOP1  006114   LOOP2  006153   LOOP3  006346   MAYBE  006045
NXTCHR 007001   OFFCP  006335   OK     006057   ONCP   006315
OTPORT 000003   PRINTR 006231   STDLN  007134   TEMP   007132
TXTFCH 006235   TXTPT  007135   TXTSZ  010236   WASTE  007041
ZZZZZ  010376     :
FILE  060000  122017
READY
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