

# LA210 Letterprinter

## Emulation Modes Reference Guide

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**EMULATION MODULE 3  
IBM GRAPHICS PRINTER**

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This guide summarizes the information on printer emulation modes found in your *LA213 Letterprinter Programmer Reference Manual*. For information on general operating and programming features, see your *LA213 Letterprinter Operator and Programmer Reference Guide*.

## EMULATION MODE 1 IBM/EPSON MX80

This mode uses the LA10X-1 8-megabyte cartridge (Part ID 187). Install it in either slot 2 or 4. The other slot can hold any other hard cartridge.

### SWITCH-SELECTABLE FEATURES

#### Switch A

| Switch | Setting    | Function                                                                                   |
|--------|------------|--------------------------------------------------------------------------------------------|
| A1, A2 | Up or down | Not used.                                                                                  |
| A3     | Up         | When line buffer is full, printer prints line and advances to next line.                   |
|        | Down       | When line buffer is full, printer drops characters.                                        |
| A4     | Up         | Cancel (CAN) character clears line buffer.                                                 |
|        | Down       | CAN character is ignored.                                                                  |
| A5     | Up         | Delete (DEL) character clears line buffer.                                                 |
|        | Down       | DEL character is ignored.                                                                  |
| A6     | Up         | Printer performs an automatic line feed when it receives a carriage return (CR) character. |
|        | Down       | The printer only performs a carriage return.                                               |
| A7     | Up         | When printer receives BEL character, error bell sounds.                                    |
|        | Down       | BELL character is ignored.                                                                 |
| A8     | Up         | Selects standard 8-inch paper width at power up.                                           |
|        | Down       | Selects 15-inch paper width.                                                               |

**Switch B**

| Switch   | Setting    | Function                  |
|----------|------------|---------------------------|
| B1 to B4 | All up     | Enables emulation mode.   |
| B5       | Up         | Selects emulation mode 1. |
| B6       | Down       | Selects emulation mode 1. |
| B7       | Up or down | Not used.                 |
| B8       | Up         | Enables 2K buffer.        |
|          | Down       | Enables 0.13K buffer.     |



|      |      |        |      |      |      |      |      |      |      | 13   | 14   | 15 |
|------|------|--------|------|------|------|------|------|------|------|------|------|----|
| M    | H    | 10     | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   |    |
| 001  | 002  | 003    | 004  | 005  | 006  | 007  | 008  | 009  | 010  | 011  | 012  |    |
| 013  | 014  | 015    | 016  | 017  | 018  | 019  | 020  | 021  | 022  | 023  | 024  |    |
| 025  | 026  | 027    | 028  | 029  | 030  | 031  | 032  | 033  | 034  | 035  | 036  |    |
| 037  | 038  | 039    | 040  | 041  | 042  | 043  | 044  | 045  | 046  | 047  | 048  |    |
| 049  | 050  | 051    | 052  | 053  | 054  | 055  | 056  | 057  | 058  | 059  | 060  |    |
| 061  | 062  | 063    | 064  | 065  | 066  | 067  | 068  | 069  | 070  | 071  | 072  |    |
| 073  | 074  | 075    | 076  | 077  | 078  | 079  | 080  | 081  | 082  | 083  | 084  |    |
| 085  | 086  | 087    | 088  | 089  | 090  | 091  | 092  | 093  | 094  | 095  | 096  |    |
| 097  | 098  | 099    | 100  | 101  | 102  | 103  | 104  | 105  | 106  | 107  | 108  |    |
| 109  | 110  | 111    | 112  | 113  | 114  | 115  | 116  | 117  | 118  | 119  | 120  |    |
| 121  | 122  | 123    | 124  | 125  | 126  | 127  | 128  | 129  | 130  | 131  | 132  |    |
| 133  | 134  | 135    | 136  | 137  | 138  | 139  | 140  | 141  | 142  | 143  | 144  |    |
| 145  | 146  | 147    | 148  | 149  | 150  | 151  | 152  | 153  | 154  | 155  | 156  |    |
| 157  | 158  | 159    | 160  | 161  | 162  | 163  | 164  | 165  | 166  | 167  | 168  |    |
| 169  | 170  | 171    | 172  | 173  | 174  | 175  | 176  | 177  | 178  | 179  | 180  |    |
| 181  | 182  | 183    | 184  | 185  | 186  | 187  | 188  | 189  | 190  | 191  | 192  |    |
| 193  | 194  | 195    | 196  | 197  | 198  | 199  | 200  | 201  | 202  | 203  | 204  |    |
| 205  | 206  | 207    | 208  | 209  | 210  | 211  | 212  | 213  | 214  | 215  | 216  |    |
| 217  | 218  | 219    | 220  | 221  | 222  | 223  | 224  | 225  | 226  | 227  | 228  |    |
| 229  | 230  | 231    | 232  | 233  | 234  | 235  | 236  | 237  | 238  | 239  | 240  |    |
| 241  | 242  | 243    | 244  | 245  | 246  | 247  | 248  | 249  | 250  | 251  | 252  |    |
| 253  | 254  | 255    | 256  | 257  | 258  | 259  | 260  | 261  | 262  | 263  | 264  |    |
| 265  | 266  | 267    | 268  | 269  | 270  | 271  | 272  | 273  | 274  | 275  | 276  |    |
| 277  | 278  | 279    | 280  | 281  | 282  | 283  | 284  | 285  | 286  | 287  | 288  |    |
| 289  | 290  | 291    | 292  | 293  | 294  | 295  | 296  | 297  | 298  | 299  | 300  |    |
| 301  | 302  | 303    | 304  | 305  | 306  | 307  | 308  | 309  | 310  | 311  | 312  |    |
| 313  | 314  | 315    | 316  | 317  | 318  | 319  | 320  | 321  | 322  | 323  | 324  |    |
| 325  | 326  | 327    | 328  | 329  | 330  | 331  | 332  | 333  | 334  | 335  | 336  |    |
| 337  | 338  | 339    | 340  | 341  | 342  | 343  | 344  | 345  | 346  | 347  | 348  |    |
| 349  | 350  | 351    | 352  | 353  | 354  | 355  | 356  | 357  | 358  | 359  | 360  |    |
| 361  | 362  | 363    | 364  | 365  | 366  | 367  | 368  | 369  | 370  | 371  | 372  |    |
| 373  | 374  | 375    | 376  | 377  | 378  | 379  | 380  | 381  | 382  | 383  | 384  |    |
| 385  | 386  | 387    | 388  | 389  | 390  | 391  | 392  | 393  | 394  | 395  | 396  |    |
| 397  | 398  | 399    | 400  | 401  | 402  | 403  | 404  | 405  | 406  | 407  | 408  |    |
| 409  | 410  | 411    | 412  | 413  | 414  | 415  | 416  | 417  | 418  | 419  | 420  |    |
| 421  | 422  | 423    | 424  | 425  | 426  | 427  | 428  | 429  | 430  | 431  | 432  |    |
| 433  | 434  | 435    | 436  | 437  | 438  | 439  | 440  | 441  | 442  | 443  | 444  |    |
| 445  | 446  | 447    | 448  | 449  | 450  | 451  | 452  | 453  | 454  | 455  | 456  |    |
| 457  | 458  | 459    | 460  | 461  | 462  | 463  | 464  | 465  | 466  | 467  | 468  |    |
| 469  | 470  | 471    | 472  | 473  | 474  | 475  | 476  | 477  | 478  | 479  | 480  |    |
| 481  | 482  | 483    | 484  | 485  | 486  | 487  | 488  | 489  | 490  | 491  | 492  |    |
| 493  | 494  | 495    | 496  | 497  | 498  | 499  | 500  | 501  | 502  | 503  | 504  |    |
| 505  | 506  | 507    | 508  | 509  | 510  | 511  | 512  | 513  | 514  | 515  | 516  |    |
| 517  | 518  | 519    | 520  | 521  | 522  | 523  | 524  | 525  | 526  | 527  | 528  |    |
| 529  | 530  | 531    | 532  | 533  | 534  | 535  | 536  | 537  | 538  | 539  | 540  |    |
| 541  | 542  | 543    | 544  | 545  | 546  | 547  | 548  | 549  | 550  | 551  | 552  |    |
| 553  | 554  | 555    | 556  | 557  | 558  | 559  | 560  | 561  | 562  | 563  | 564  |    |
| 565  | 566  | 567    | 568  | 569  | 570  | 571  | 572  | 573  | 574  | 575  | 576  |    |
| 577  | 578  | 579    | 580  | 581  | 582  | 583  | 584  | 585  | 586  | 587  | 588  |    |
| 589  | 590  | 591    | 592  | 593  | 594  | 595  | 596  | 597  | 598  | 599  | 600  |    |
| 601  | 602  | 603    | 604  | 605  | 606  | 607  | 608  | 609  | 610  | 611  | 612  |    |
| 613  | 614  | 615    | 616  | 617  | 618  | 619  | 620  | 621  | 622  | 623  | 624  |    |
| 625  | 626  | 627    | 628  | 629  | 630  | 631  | 632  | 633  | 634  | 635  | 636  |    |
| 637  | 638  | 639    | 640  | 641  | 642  | 643  | 644  | 645  | 646  | 647  | 648  |    |
| 649  | 650  | 651    | 652  | 653  | 654  | 655  | 656  | 657  | 658  | 659  | 660  |    |
| 661  | 662  | 663    | 664  | 665  | 666  | 667  | 668  | 669  | 670  | 671  | 672  |    |
| 673  | 674  | 675    | 676  | 677  | 678  | 679  | 680  | 681  | 682  | 683  | 684  |    |
| 685  | 686  | 687    | 688  | 689  | 690  | 691  | 692  | 693  | 694  | 695  | 696  |    |
| 697  | 698  | 699    | 700  | 701  | 702  | 703  | 704  | 705  | 706  | 707  | 708  |    |
| 709  | 710  | 711    | 712  | 713  | 714  | 715  | 716  | 717  | 718  | 719  | 720  |    |
| 721  | 722  | 723    | 724  | 725  | 726  | 727  | 728  | 729  | 730  | 731  | 732  |    |
| 733  | 734  | 735    | 736  | 737  | 738  | 739  | 740  | 741  | 742  | 743  | 744  |    |
| 745  | 746  | 747    | 748  | 749  | 750  | 751  | 752  | 753  | 754  | 755  | 756  |    |
| 757  | 758  | 759    | 760  | 761  | 762  | 763  | 764  | 765  | 766  | 767  | 768  |    |
| 769  | 770  | 771    | 772  | 773  | 774  | 775  | 776  | 777  | 778  | 779  | 780  |    |
| 781  | 782  | 783    | 784  | 785  | 786  | 787  | 788  | 789  | 790  | 791  | 792  |    |
| 793  | 794  | 795    | 796  | 797  | 798  | 799  | 800  | 801  | 802  | 803  | 804  |    |
| 805  | 806  | 807    | 808  | 809  | 810  | 811  | 812  | 813  | 814  | 815  | 816  |    |
| 817  | 818  | 819    | 820  | 821  | 822  | 823  | 824  | 825  | 826  | 827  | 828  |    |
| 829  | 830  | 831    | 832  | 833  | 834  | 835  | 836  | 837  | 838  | 839  | 840  |    |
| 841  | 842  | 843    | 844  | 845  | 846  | 847  | 848  | 849  | 850  | 851  | 852  |    |
| 853  | 854  | 855    | 856  | 857  | 858  | 859  | 860  | 861  | 862  | 863  | 864  |    |
| 865  | 866  | 867    | 868  | 869  | 870  | 871  | 872  | 873  | 874  | 875  | 876  |    |
| 877  | 878  | 879    | 880  | 881  | 882  | 883  | 884  | 885  | 886  | 887  | 888  |    |
| 889  | 890  | 891    | 892  | 893  | 894  | 895  | 896  | 897  | 898  | 899  | 900  |    |
| 901  | 902  | 903    | 904  | 905  | 906  | 907  | 908  | 909  | 910  | 911  | 912  |    |
| 913  | 914  | 915    | 916  | 917  | 918  | 919  | 920  | 921  | 922  | 923  | 924  |    |
| 925  | 926  | 927    | 928  | 929  | 930  | 931  | 932  | 933  | 934  | 935  | 936  |    |
| 937  | 938  | 939    | 940  | 941  | 942  | 943  | 944  | 945  | 946  | 947  | 948  |    |
| 949  | 950  | 951    | 952  | 953  | 954  | 955  | 956  | 957  | 958  | 959  | 960  |    |
| 961  | 962  | 963    | 964  | 965  | 966  | 967  | 968  | 969  | 970  | 971  | 972  |    |
| 973  | 974  | 975    | 976  | 977  | 978  | 979  | 980  | 981  | 982  | 983  | 984  |    |
| 985  | 986  | 987    | 988  | 989  | 990  | 991  | 992  | 993  | 994  | 995  | 996  |    |
| 997  | 998  | 999    | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 | 1007 | 1008 |    |
| 1009 | 1010 | 1011   | 1012 | 1013 | 1014 | 1015 | 1016 | 1017 | 1018 | 1019 | 1020 |    |
| 1021 | 1022 | 1023   | 1024 | 1025 | 1026 | 1027 | 1028 | 1029 | 1030 | 1031 | 1032 |    |
| 1033 | 1034 | 1035   | 1036 | 1037 | 1038 | 1039 | 1040 | 1041 | 1042 | 1043 | 1044 |    |
| 1045 | 1046 | 1047   | 1048 | 1049 | 1050 | 1051 | 1052 | 1053 | 1054 | 1055 | 1056 |    |
| 1057 | 1058 | 1059   | 1060 | 1061 | 1062 | 1063 | 1064 | 1065 | 1066 | 1067 | 1068 |    |
| 1069 | 1070 | 1071   | 1072 | 1073 | 1074 | 1075 | 1076 | 1077 | 1078 | 1079 | 1080 |    |
| 1081 | 1082 | 1083   | 1084 | 1085 | 1086 | 1087 | 1088 | 1089 | 1090 | 1091 | 1092 |    |
| 1093 | 1094 | 1095   | 1096 | 1097 | 1098 | 1099 | 1100 | 1101 | 1102 | 1103 | 1104 |    |
| 1105 | 1106 | 1107   | 1108 | 1109 | 1110 | 1111 | 1112 | 1113 | 1114 | 1115 | 1116 |    |
| 1117 | 1118 | 1119   | 1120 | 1121 | 1122 | 1123 | 1124 | 1125 | 1126 | 1127 | 1128 |    |
| 1129 | 1130 | 1131   | 1132 | 1133 | 1134 | 1135 | 1136 | 1137 | 1138 | 1139 | 1140 |    |
| 1141 | 1142 | 1143   | 1144 | 1145 | 1146 | 1147 | 1148 | 1149 | 1150 | 1151 | 1152 |    |
| 1153 | 1154 | 1155   | 1156 | 1157 | 1158 | 1159 | 1160 | 1161 | 1162 | 1163 | 1164 |    |
| 1165 | 1166 | 1167   | 1168 | 1169 | 1170 | 1171 | 1172 | 1173 | 1174 | 1175 | 1176 |    |
| 1177 | 1178 | 1179   | 1180 | 1181 | 1182 | 1183 | 1184 | 1185 | 1186 | 1187 | 1188 |    |
| 1189 | 1190 | 1191   | 1192 | 1193 | 1194 | 1195 | 1196 | 1197 | 1198 | 1199 | 1200 |    |
| 1201 | 1202 | 1203   | 1204 | 1205 | 1206 | 1207 | 1208 | 1209 | 1210 | 1211 | 1212 |    |
| 1213 | 1214 | 1215   | 1216 | 1217 | 1218 | 1219 | 1220 | 1221 | 1222 | 1223 | 1224 |    |
| 1225 | 1226 | 1227   | 1228 | 1229 | 1230 | 1231 | 1232 | 1233 | 1234 | 1235 | 1236 |    |
| 1237 | 1238 | 1239   | 1240 | 1241 | 1242 | 1243 | 1244 | 1245 | 1246 | 1247 | 1248 |    |
| 1249 | 1250 | 1251</ |      |      |      |      |      |      |      |      |      |    |

UNIT 1  
SUPPLEMENTAL CHARACTER SET

## CONTROL CHARACTERS

### CO and C1 Control Characters

| Name            | Mnemonic | Octal Code |     | Function                                                                                                                            |
|-----------------|----------|------------|-----|-------------------------------------------------------------------------------------------------------------------------------------|
|                 |          | CO         | C1  |                                                                                                                                     |
| Null            | NUL      | 00         | 200 | Used in escape sequences.                                                                                                           |
| Bell            | RFI      | 07         | 207 | Sounds bell if enabled by switch A2.                                                                                                |
| Horizontal tab  | HT       | 11         | 211 | Advances to next horizontal tab if any. Otherwise, takes no action.                                                                 |
| Line feed       | LF       | 12         | 212 | Prints buffer's contents, then advances paper by current line-spacing.                                                              |
| Vertical tab    | VT       | 13         | 213 | Prints buffer's contents, then moves to next vertical tab, if any. Otherwise, performs line feed.                                   |
| Form feed       | FF       | 14         | 214 | Advances to next line of form.                                                                                                      |
| Carriage return | CR       | 16         | 216 | Prints buffer's contents, then performs a carriage return. Also performs a line feed if line feed/new line is enabled by switch A5. |
| Shift out       | SO       | 18         | 218 | Sets double width for all following characters, until the next line terminator or D04 is received.                                  |
| Shift in        | SI       | 17         | 217 | Sets compressed pitch for current line and following lines, until D02 is received.                                                  |

---

**DC and DY Control Characters (Cont)**

| Name             | Mnemonic | Catal Code |     | Function                                                                          |
|------------------|----------|------------|-----|-----------------------------------------------------------------------------------|
|                  |          | DC         | DY  |                                                                                   |
| Device control 1 | DC1      | 21         | 221 | Enables the printer and clears print buffer.                                      |
| Device control 2 | DC2      | 22         | 222 | Sets standard pitch for current line, and following lines, until til is received. |
| Device control 3 | DC3      | 23         | 223 | Disables the printer until DC1 is received.                                       |
| Device control 4 | DC4      | 24         | 224 | Sets single width for all following characters, until DC is received.             |
| Cancel           | QAN      | 30         | 230 | Clears the print buffer if enabled by switch #4.                                  |
| Escape           | LSC      | 33         | 233 | Starts escape sequence.                                                           |

## ESCAPE SEQUENCES

### Vertical Form Handling

| Name<br>(Mnemonic)               | Sequence                | Function                                                                                             |
|----------------------------------|-------------------------|------------------------------------------------------------------------------------------------------|
| Set vertical<br>pitch<br>(LEULP) | ESC 0<br>033 060        | Set vertical<br>pitch to 8 lines<br>per inch                                                         |
| (LEULP)                          | ESC 1<br>033 061        | Set vertical<br>pitch to 10.33 lines<br>per inch (72/7)                                              |
| (ERNUZ)                          | ESC 2<br>033 062        | Set vertical<br>pitch to the<br>setting specified<br>in a previous<br>ESC A sequence                 |
| (EDNLF)                          | ESC A Pn<br>033 101 *** | Set vertical<br>pitch to 1/2/Pn<br>lines per inch.<br>Does not take<br>effect until ESC B<br>& A are |
| Set form<br>length<br>(FDRFL)    | ESC C Pn<br>033 103 *** | Set the form<br>length to the<br>number of inches<br>that equal Pn x<br>current pitch                |

### Vertical Tabs

| Name<br>(Mnemonic)             | Sequence                        | Function                                                                                                                                                                                                                                                                                            |
|--------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set vertical<br>tabs<br>(LEVT) | ESC B Pn1 Pn2 Pn<br>033 102 *** | Clears vertical<br>tabs, then sets<br>tabs at Pn1,<br>Pn2, and other<br>designated stops.<br>Pn is a character<br>representing the<br>line numbers in<br>ascending order.<br>For example, the<br>character 100<br>sets a tab at<br>line 10. You can<br>specify up to 10<br>tabs in one<br>sequence. |

## Horizontal Tabs

| Name<br>(Mnemonic)              | Sequence                                   | Function                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set horizontal tabs<br>(CHS-IT) | ESC B Pn1 Pn2 Pn NUL<br>033 104 *** ** 000 | Clears horizontal tabs, then loads at Pn1, Pn2, and other designated stops. Pn is a character representing the column number of the desired tab; for example, the character DC2 sets a tab at column 18. You can specify up to 16 tabs. |

## Paper Fault Handling

| Name<br>(Mnemonic)           | Sequence         | Function                     |
|------------------------------|------------------|------------------------------|
| Disable paper out<br>(ERDPO) | ESC B<br>033 056 | Disables paper-out handling. |
| Enable paper out<br>(EREPO)  | ESC @<br>033 057 | Enables paper-out handling.  |

## Printing Modes

| Name<br>(Mnemonic)              | Sequence         | Function                                              |
|---------------------------------|------------------|-------------------------------------------------------|
| Enable bold<br>(EREBL)          | ESC E<br>033 105 | Sets bold printing for all following characters.      |
| Disable bold<br>(ERDDI)         | ESC F<br>033 06  | Turns off bold printing for all following characters. |
| Set high resolution<br>(ERH-IR) | ESC G<br>033 107 | Enters high resolution mode.                          |
| Set low resolution<br>(ERD-IR)  | ESC H<br>033 108 | Enters low resolution mode.                           |

## EMULATION MODE 2 IBM/EPSON MX80 PLUS GRAFTRAX

This mode uses two cartridges, the LA100X-EPitalic™ 9 (primary font, ID 011) and LA100X-LC Graftrax (font ID 143). Install the Italic cartridge in slot 2 and Graftrax cartridge in slot 4. If another style is desired, install the alternate primary font cartridge in slot 2.

### SWITCH-SELECTABLE FEATURES

#### Switch A

| Switch | Setting | Function                                                                                   |
|--------|---------|--------------------------------------------------------------------------------------------|
| A1     | Down    | Printer is set to standard horizontal pitch at power-up.                                   |
|        | Up      | Printer operates at compressed horizontal pitch.                                           |
| A2     | Up      | Sets bottom margin to 1 inch at power-up.                                                  |
| A3     | Up      | Enables bold printing at power-up.                                                         |
| A4     | Up      | Enables italic printing at power-up.                                                       |
| A5     | Up      | Enables slashed zero (0) printing at power-up.                                             |
| A6     | Up      | Printer performs an automatic line feed when it receives a carriage return (CR) character. |
|        | Down    | Printer only performs a carriage return.                                                   |
| A7     | Up      | When printer receives BEL character, emitted sounds.                                       |
|        | Down    | BEL character is ignored.                                                                  |
| A8     | Up      | Selects standard 8 1/2 inch paper width at power-up.                                       |
|        | Down    | Selects 13 inch paper width.                                                               |

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**Switch 5**

| Switch   | Setting    | Function                  |
|----------|------------|---------------------------|
| B1 to B4 | All up     | Enables emulation mode.   |
| B5       | Down       | Selects emulation mode 3. |
| B6       | Up         | Selects emulation mode 2. |
| B7       | Up or down | Not used.                 |
| D0       | Up         | Enables 2K buffer.        |
|          | Down       | Enables 0.12K buffer.     |

MODE 2 CHARACTER SET

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |

**KEY**

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| A  |    | B  |    | C  |    | D  |    | E  |    | F  |    | G  |    | H  |    | I  |    | J  |    | K  |    | L  |    | M  |    | N  |    | O  |    | P  |    | Q  |    | R  |    | S  |    | T  |    | U  |    | V  |    | W  |    | X  |    | Y  |    | Z  |    | AA |    | AB |    | AC |    | AD |    | AE |    | AF |    | AG |    | AH |    | AI |    | AJ |    | AK |    | AL |    | AM |    | AN |    | AO |    | AP |    | AQ |    | AR |    | AS |    | AT |    | AU |    | AV |    | AW |    | AX |    | AY |  | AZ |  | BA |  | BB |  | BC |  | BD |  | BE |  | BF |  | BG |  | BH |  | BI |  | BJ |  | BK |  | BL |  | BM |  | BN |  | BO |  | BP |  | BQ |  | BR |  | BS |  | BT |  | BU |  | BV |  | BW |  | BX |  | BY |  | BZ |  | CA |  | CB |  | CC |  | CD |  | CE |  | CF |  | CG |  | CH |  | CI |  | CJ |  | CK |  | CL |  | CM |  | CN |  | CO |  | CP |  | CQ |  | CR |  | CS |  | CT |  | CU |  | CV |  | CW |  | CX |  | CY |  | CZ |  | DA |  | DB |  | DC |  | DD |  | DE |  | DF |  | DG |  | DH |  | DI |  | DJ |  | DK |  | DL |  | DM |  | DN |  | DO |  | DP |  | DQ |  | DR |  | DS |  | DT |  | DU |  | DV |  | DW |  | DX |  | DY |  | DZ |  | EA |  | EB |  | EC |  | ED |  | EE |  | EF |  | EG |  | EH |  | EI |  | EJ |  | EK |  | EL |  | EM |  | EN |  | EO |  | EP |  | EQ |  | ER |  | ES |  | ET |  | EU |  | EV |  | EW |  | EX |  | EY |  | EZ |  | FA |  | FB |  | FC |  | FD |  | FE |  | FF |  | FG |  | FH |  | FI |  | FJ |  | FK |  | FL |  | FM |  | FN |  | FO |  | FP |  | FQ |  | FR |  | FS |  | FT |  | FU |  | FV |  | FW |  | FX |  | FY |  | FZ |  | GA |  | GB |  | GC |  | GD |  | GE |  | GF |  | GG |  | GH |  | GI |  | GJ |  | GK |  | GL |  | GM |  | GN |  | GO |  | GP |  | GQ |  | GR |  | GS |  | GT |  | GU |  | GV |  | GW |  | GX |  | GY |  | GZ |  | HA |  | HB |  | HC |  | HD |  | HE |  | HF |  | HG |  | HH |  | HI |  | HJ |  | HK |  | HL |  | HM |  | HN |  | HO |  | HP |  | HQ |  | HR |  | HS |  | HT |  | HU |  | HV |  | HW |  | HX |  | HY |  | HZ |  | IA |  | IB |  | IC |  | ID |  | IE |  | IF |  | IG |  | IH |  | II |  | IJ |  | IK |  | IL |  | IM |  | IN |  | IO |  | IP |  | IQ |  | IR |  | IS |  | IT |  | IU |  | IV |  | IW |  | IX |  | IY |  | IZ |  | JA |  | JB |  | JC |  | JD |  | JE |  | JF |  | JG |  | JH |  | JI |  | JJ |  | JK |  | JL |  | JM |  | JN |  | JO |  | JP |  | JQ |  | JR |  | JS |  | JT |  | JU |  | JV |  | JW |  | JX |  | JY |  | JZ |  | KA |  | KB |  | KC |  | KD |  | KE |  | KF |  | KG |  | KH |  | KI |  | KJ |  | KK |  | KL |  | KM |  | KN |  | KO |  | KP |  | KQ |  | KR |  | KS |  | KT |  | KU |  | KV |  | KW |  | KX |  | KY |  | KZ |  | LA |  | LB |  | LC |  | LD |  | LE |  | LF |  | LG |  | LH |  | LI |  | LJ |  | LK |  | LM |  | LN |  | LO |  | LP |  | LQ |  | LR |  | LS |  | LT |  | LU |  | LV |  | LW |  | LX |  | LY |  | LZ |  | MA |  | MB |  | MC |  | MD |  | ME |  | MF |  | MG |  | MH |  | MI |  | MJ |  | MK |  | ML |  | MN |  | MO |  | MP |  | MQ |  | MR |  | MS |  | MT |  | MU |  | MV |  | MW |  | MX |  | MY |  | MZ |  | NA |  | NB |  | NC |  | ND |  | NE |  | NF |  | NG |  | NH |  | NI |  | NJ |  | NK |  | NL |  | NM |  | NN |  | NO |  | NP |  | NQ |  | NR |  | NS |  | NT |  | NU |  | NV |  | NW |  | NX |  | NY |  | NZ |  | OA |  | OB |  | OC |  | OD |  | OE |  | OF |  | OG |  | OH |  | OI |  | OJ |  | OK |  | OL |  | OM |  | ON |  | OO |  | OP |  | OQ |  | OR |  | OS |  | OT |  | OU |  | OV |  | OW |  | OX |  | OY |  | OZ |  | PA |  | PB |  | PC |  | PD |  | PE |  | PF |  | PG |  | PH |  | PI |  | PJ |  | PK |  | PL |  | PM |  | PN |  | PO |  | PP |  | PQ |  | PR |  | PS |  | PT |  | PU |  | PV |  | PW |  | PX |  | PY |  | PZ |  | QA |  | QB |  | QC |  | QD |  | QE |  | QF |  | QG |  | QH |  | QI |  | QJ |  | QK |  | QL |  | QM |  | QN |  | QO |  | QP |  | QQ |  | QR |  | QS |  | QT |  | QU |  | QV |  | QW |  | QX |  | QY |  | QZ |  | RA |  | RB |  | RC |  | RD |  | RE |  | RF |  | RG |  | RH |  | RI |  | RJ |  | RK |  | RL |  | RM |  | RN |  | RO |  | RP |  | RQ |  | RR |  | RS |  | RT |  | RU |  | RV |  | RW |  | RX |  | RY |  | RZ |  | SA |  | SB |  | SC |  | SD |  | SE |  | SF |  | SG |  | SH |  | SI |  | SJ |  | SK |  | SL |  | SM |  | SN |  | SO |  | SP |  | SQ |  | SR |  | SS |  | ST |  | SU |  | SV |  | SW |  | SX |  | SY |  | SZ |  | TA |  | TB |  | TC |  | TD |  | TE |  | TF |  | TG |  | TH |  | TI |  | TJ |  | TK |  | TL |  | TM |  | TN |  | TO |  | TP |  | TQ |  | TR |  | TS |  | TT |  | TU |  | TV |  | TW |  | TX |  | TY |  | TZ |  | UA |  | UB |  | UC |  | UD |  | UE |  | UF |  | UG |  | UH |  | UI |  | UJ |  | UK |  | UL |  | UM |  | UN |  | UO |  | UP |  | UQ |  | UR |  | US |  | UT |  | UU |  | UV |  | UW |  | UX |  | UY |  | UZ |  | VA |  | VB |  | VC |  | VD |  | VE |  | VF |  | VG |  | VH |  | VI |  | VJ |  | VK |  | VL |  | VM |  | VN |  | VO |  | VP |  | VQ |  | VR |  | VS |  | VT |  | VU |  | VV |  | VW |  | VX |  | VY |  | VZ |  | WA |  | WB |  | WC |  | WD |  | WE |  | WF |  | WG |  | WH |  | WI |  | WJ |  | WK |  | WL |  | WM |  | WN |  | WO |  | WP |  | WQ |  | WR |  | WS |  | WT |  | WU |  | WV |  | WW |  | WX |  | WY |  | WZ |  | XA |  | XB |  | XC |  | XD |  | XE |  | XF |  | XG |  | XH |  | XI |  | XJ |  | XK |  | XL |  | XM |  | XN |  | XO |  | XP |  | XQ |  | XR |  | XS |  | XT |  | XU |  | XV |  | XW |  | XX |  | XY |  | XZ |  | YA |  | YB |  | YC |  | YD |  | YE |  | YF |  | YG |  | YH |  | YI |  | YJ |  | YK |  | YL |  | YM |  | YN |  | YO |  | YP |  | YQ |  | YR |  | YS |  | YT |  | YU |  | YV |  | YW |  | YX |  | YZ |  | ZA |  | ZB |  | ZC |  | ZD |  | ZE |  | ZF |  | ZG |  | ZH |  | ZI |  | ZJ |  | ZK |  | ZL |  | ZM |  | ZN |  | ZO |  | ZP |  | ZQ |  | ZR |  | ZS |  | ZT |  | ZU |  | ZV |  | ZW |  | ZX |  | ZY |  | ZZ |  |
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|  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    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| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 00 |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    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|  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    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|  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    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| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 00 |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    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|  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    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|  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 00 |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 00 |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 00 |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    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| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 00 |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    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| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 4  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    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## CONTROL CHARACTERS

### CO Control Characters

| Name            | Mnemonic | Octal Code | Function                                                                                                                  |
|-----------------|----------|------------|---------------------------------------------------------------------------------------------------------------------------|
| Null            | NUL      | 00         | Used in escape sequences.                                                                                                 |
| Bell            | BEL      | 07         | Sounds bell if enabled by switch A7.                                                                                      |
| Backspace       | BS       | 10         | Prints buffer's contents, then moves back one character cell. Moves back two cells if this is first time in double width. |
| Horizontal tab  | HT       | 11         | Moves to next horizontal tab, if any. Otherwise, takes no action.                                                         |
| Line feed       | LF       | 12         | Prints buffer's contents, then advances paper by current line spacing.                                                    |
| Vertical tab    | VT       | 13         | Prints buffer's contents, then performs a line feed.                                                                      |
| Form feed       | FF       | 14         | Advances to next top of form.                                                                                             |
| Carriage return | CR       | 15         | Prints buffer's contents, then returns to left margin. Performs line-as-fit enabled by switch A6.                         |

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**D0 Control Characters (Cont)**

| <b>Name</b>      | <b>Mnemonic</b> | <b>Octal Code</b> | <b>Function</b>                                                                                    |
|------------------|-----------------|-------------------|----------------------------------------------------------------------------------------------------|
| Shift out        | SO              | 16                | Sets double width for all following characters, until the next line terminator or DC4 is received. |
| Shift In         | SI              | 17                | Sets compressed pitch for current line and following lines, until DC2 is received.                 |
| Device control 2 | DC2             | 22                | Sets standard horizontal pitch for current line and following lines, until SI is received.         |
| Device control 4 | DC4             | 24                | Sets single width for all following characters, until SO is received.                              |
| Escape           | ESC             | 33                | Starts escape sequence.                                                                            |

---

## C1 Control Characters

| Name                 | Mnemonic | Octal Code | Function                                                                                           |
|----------------------|----------|------------|----------------------------------------------------------------------------------------------------|
| Null                 | NUL      | 200        | Used in escape sequences.                                                                          |
| Return sign          | -        | 201        | *                                                                                                  |
| Unibyte              | -        | 202        | *                                                                                                  |
| Opening single quote | -        | 203        | *                                                                                                  |
| Closing single quote | -        | 204        | *                                                                                                  |
| Paragraph            | -        | 205        | *                                                                                                  |
| Top level corner     | -        | 206        | *                                                                                                  |
| Re                   | BLL      | 207        | Releases ball tone if enabled by switch A7.                                                        |
| Backspace            | BS       | 210        | Prints buffer's contents, then moves back one character cell.                                      |
| Horizontal tab       | HT       | 211        | Advances to next horizontal line stop, if any. Otherwise, takes no action.                         |
| Line feed            | LF       | 212        | Prints buffer's contents, then advances paper by one or two spaces.                                |
| Vertical tab         | VT       | 213        | Prints buffer's contents, then performs a line feed.                                               |
| Form feed            | FF       | 214        | Advances to next top of form.                                                                      |
| Carriage return      | CR       | 215        | Prints buffer's contents, then returns to left margin. Performs line feed if enabled by switch A5. |

## C1 Control Characters (Cont)

| Name                | Mnemonic | Data Code | Function                                                                                       |
|---------------------|----------|-----------|------------------------------------------------------------------------------------------------|
| Shift out           | SO       | 216       | Sets double width for all following characters, until next line terminator or DC4 is received. |
| Shift In            | SI       | 217       | Res compressed horizontal pitch for current line and following lines, until DC2 is received.   |
| Device control 2    | DC2      | 222       | Sets standard horizontal pitch for current line and following lines, until SI is received.     |
| Device control 4    | DC4      | 224       | Sets single width for all following characters, until SO is received.                          |
| Top right corner    |          | 225       | *                                                                                              |
| Right T             |          | 228       | *                                                                                              |
| Left i              |          | 227       | *                                                                                              |
| Top T               |          | 230       | *                                                                                              |
| Bottom left corner  |          | 231       | *                                                                                              |
| Bottom right corner |          | 232       | *                                                                                              |
| Escape              | ESC      | 235       | Starts escape sequence.                                                                        |
| Vertical line       |          | 238       | *                                                                                              |
| Horizontal line     |          | 235       | *                                                                                              |
| Bottom T            |          | 236       | *                                                                                              |
| Center cross        |          | 237       | *                                                                                              |

\* Indicates a printable character. See the Mode 2 Character Set for examples of these characters.

## ESCAPE SEQUENCES

### Vertical Form Handling

| Name<br>(Mnemonic)                   | Sequence                        | Function                                                                                                               |
|--------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Set vertical<br>pitch<br>(LHSL1)     | ESC 0<br>(33 080)               | Sets vertical<br>pitch to 8 lines<br>per inch.                                                                         |
| (EH101)                              | ESC 1<br>(33 081)               | Sets vertical<br>pitch to 10/3<br>(72/7) lines per<br>inch.                                                            |
| (LHSL2)                              | ESC 2<br>(33 082)               | Sets vertical<br>pitch to 6 lines<br>per inch.                                                                         |
| (FVNL3)                              | ESC 3 Pn<br>(33 083 **)         | Sets vertical<br>pitch to 216/Pn<br>lines per inch.                                                                    |
| (LHNL3)                              | ESC A Pn<br>(33 101 **)         | Sets vertical<br>pitch to 72/Pn<br>lines per inch.                                                                     |
| (FVNL4)                              | ESC J Pn<br>(33 112 **)         | Prints author's<br>contents, then<br>sets vertical<br>pitch to 216/Pn<br>lines per inch for<br>next line feed<br>only. |
| Set form<br>length<br>(FRSL1)        | ESC C Pn<br>(33 102 **)         | Sets the form<br>length to the<br>number of inches<br>that equal Pn X<br>current pitch.                                |
| (ENSL1)                              | ESC C NUL Pn<br>(33 103 000 **) | Sets the form<br>length to Pn<br>inches.                                                                               |
| Set bottom<br>margin<br>(FRSLM)      | ESC N Pn<br>(33 113 **)         | Sets the bottom<br>margin to Pn<br>lines from the<br>bottom of the<br>page.                                            |
| Clear<br>bottom<br>margin<br>(ERCLM) | ESC O<br>(33 117)               | Clears the<br>bottom margin.<br>Overrides any<br>margin set by<br>escape A2.                                           |

## Horizontal Form Handling

| Name<br>(Mnemonic)                     | Sequence                 | Function                                                                                                                                 |
|----------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Set right margin<br>(CRSRM)            | ESC Q Pn<br>053 121 **   | Sets right margin to Pn (column number in octal).                                                                                        |
| Set double-width characters<br>(ERDLW) | ESC W DO<br>052 127 ***  | Sets double-width characters for current line and following lines. Any non-zero character as the third character completes the sequence. |
| Set single-width characters<br>(ERODW) | ESC W NUL<br>055 127 000 | Sets single-width characters for current line and following lines.                                                                       |

## Horizontal Tabs

| Name<br>(Mnemonic)              | Sequence                                                                                        | Function                                                                                                                                                                                                                        |
|---------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set horizontal tabs<br>(LASHIT) | ESC D Pn1 Pn2 Pn NUL<br>003 104 ** ** 000<br>or<br>ESC G Pn1 Pn2 Pn BOH<br>008 104 ** ** ** 200 | Sets horizontal tab stops at Pn1, Pn2, and other designated stops. Pn is a character representing the column number of the desired stop. For example, the character 002 sets a tab at column 15. You can specify up to 16 tabs. |

**Paper Fault Handling**

| <b>Name<br/>(Mnemonic)</b>      | <b>Sequence</b>  | <b>Function</b>                  |
|---------------------------------|------------------|----------------------------------|
| Disable<br>paper-out<br>(EPDPO) | ESC 8<br>033 060 | Disables paper-<br>out handling. |
| Enable<br>paper-out<br>(EHPPO)  | ESC 9<br>033 061 | Enables paper-<br>out handling.  |

**Unidirectional/Bidirectional Control**

| <b>Name<br/>(Mnemonic)</b>                            | <b>Sequence</b>           | <b>Function</b>                                                                                                                |
|-------------------------------------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Set one-line<br>unidirectional<br>printing<br>(EHLUD) | ESC 0<br>033 074          | Prints current<br>line from left to<br>right.                                                                                  |
| Set bidirectional<br>printing<br>(EHDUD)              | ESC 11 MUL<br>033 074 000 | Prints lines in<br>bidirectional<br>mode.                                                                                      |
| Set unidirectional<br>printing<br>(EHLUD)             | ESC 11 >0<br>033 074 "    | Prints lines from<br>left to right only.<br>Any non-zero<br>character as the<br>third character<br>completes this<br>sequence. |

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## Character Set Mapping

When you install a primary cartridge other than the italic cartridge in slot 2, all references to the italic set in the following table apply to the character set of the installed primary cartridge.

| Switch A4 Setting | Escape Sequence | C0 | GL           | C1 | GR           |
|-------------------|-----------------|----|--------------|----|--------------|
| Down (normal)     | None            | CO | ASCII        | C1 | Italic ASCII |
| Up (italic)       | None            | CO | Italic ASCII | C1 | Italic ASCII |
| Down (normal)     | ESC E           | C1 | Italic ASCII | C1 | Italic ASCII |
| Down (normal)     | ESC F           | CO | ASCII        | CO | ASCII        |
| Up (italic)       | ESC G           | C1 | Italic ASCII | C1 | Italic ASCII |
| Up (italic)       | ESC H           | CO | Italic ASCII | CO | Italic ASCII |

| Name<br>(Mnemonic)          | Sequence         | Function                                                                                        |
|-----------------------------|------------------|-------------------------------------------------------------------------------------------------|
| Set eighth bit<br>(PR8B0)   | ESC @<br>053 043 | Set as 8th bit unchanged. Use current character set.                                            |
| Clear eighth bit<br>(ER8B0) | ESC _<br>053 073 | Clears 8th bit (sets to 0).<br>Maps the default GL and CO character set to the C1 and GR range. |
| Set eighth bit<br>(CR8B0)   | ESC ><br>053 073 | Set 8th bit.<br>Maps the default C1 and GR character set to the CO and GL range.                |

## Printing Modes

| Name<br>(Mnemonic)      | Sequence         | Function                                              |
|-------------------------|------------------|-------------------------------------------------------|
| Enable bold<br>(FR8B0)  | ESC E<br>053 105 | Set bold printing for all following characters.       |
| Disable bold<br>(FR8B0) | ESC F<br>053 105 | Turns off bold printing for all following characters. |

## Printing Modes (Cont)

| Name<br>(Mnemonic)                                 | Sequence                 | Function                                                                                                                                           |
|----------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Set high<br>resolution<br>(EN=HR)                  | ESC C<br>033 107         | Enters high<br>resolution mode                                                                                                                     |
| Set low<br>resolution<br>(EN=LH)                   | ESC H<br>033 108         | Enters low<br>resolution mode,<br>and resets the<br>set of settings                                                                                |
| Set<br>underline<br>(PR=UL)                        | ESC - >0<br>033 146 ***  | Underlines all<br>following charac-<br>ters. Any nonzero<br>character as the<br>third character<br>completes this<br>sequence                      |
| Reset<br>underline<br>(LRDU)                       | ESC - NUL<br>033 045 000 | Turns off under-<br>lining for all<br>following<br>characters                                                                                      |
| Select italic<br>(EN=I)                            | ESC 4<br>033 084         | Selects italic<br>ASCII set as GL                                                                                                                  |
| Select<br>normal<br>(PR=NL)                        | ESC 5<br>033 045         | Selects normal<br>ASCII set as GL                                                                                                                  |
| Enable<br>superscript<br>(=RLSCF)                  | ESC 8 NUL<br>033 128 000 | Prints all<br>following charac-<br>ters in super-<br>script mode                                                                                   |
| Enable<br>subscript<br>(LRSCF)                     | ESC 9 >0<br>033 129 ***  | Prints all<br>following charac-<br>ters in subscript<br>mode. Any non-<br>zero character as<br>the third charac-<br>ter completes<br>this sequence |
| Reset script<br>and direct<br>printing<br>(LRDSCF) | ESC 7<br>033 127         | Resets script<br>setting to no<br>script and resets<br>printing mode to<br>direct mode                                                             |

## Graphics Mode

| Name<br>(Minicomid)             | Sequence                    | Function                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 60 DPI<br>graphics<br>(EXGH0)   | ESC K Pn1 Pn2<br>053 13 *** | <p>Enter 60 dots per inch for the next 1 bytes. Pn1 and Pn2 together specify the number of bytes according to the formula:</p> $n = (256 \times Pn2) + Pn1$ <p>The total must be less than the remainder of bytes in the line buffer. If the buffer is empty, the total must be less than 460 (8-inch paper selected) or less than 430 (10-inch paper selected).</p>   |
| 100 DPI<br>graphics<br>(EXGH-2) | ESC L Pn1 Pn2<br>053 14 *** | <p>Enter 100 dots per inch for the next 1 bytes. Pn1 and Pn2 together specify the number of bytes according to the formula:</p> $n = (256 \times Pn2) + Pn1$ <p>The total must be less than the remainder of bytes in the line buffer. If the buffer is empty, the total must be less than 860 (8-inch paper selected) or less than 1740 (10-inch paper selected).</p> |

**Reset**

| <b>Name<br/>(Mnemonic)</b> | <b>Sequence</b>  | <b>Function</b>                                                                             |
|----------------------------|------------------|---------------------------------------------------------------------------------------------|
| Reset<br>(ERRIS)           | ESC *<br>033 100 | Resets all features (previously set by escape sequences) to their initial default settings. |

**Mode 2 Default Settings (Restored by Reset)**

| <b>Feature</b>   | <b>Setting</b>                                                                         |
|------------------|----------------------------------------------------------------------------------------|
| GL character set | Set to current setting of switch A4. (GL is not italic if A4 is set to down position.) |
| 8 bit operations | Leave 8th bit unchanged.                                                               |
| Print direction  | Set to b direction.                                                                    |
| Script           | Set to no superscript or subscript.                                                    |
| Character width  | Set to single width.                                                                   |
| Underline        | Set to no underlining.                                                                 |
| Paper fault      | Enabled.                                                                               |
| Vertical tab     | Set to every line.                                                                     |
| Horizontal tab   | Set every eight columns (1, 3, 5, 7, ...).                                             |
| Form length      | Set to 11 inches.                                                                      |
| Bottom margin    | Set to current setting of switch A2 (either no bottom margin or 1-inch margin).        |
| Vertical pitch   | Set to 8 lines per inch.                                                               |
| Paper width      | Set to current setting of switch A8 (either 8 inches or 10 inches).                    |
| Right margin     | Set to the current paper width selected by switch A8.                                  |
| Resolution       | Set to low resolution.                                                                 |
| Rate             | Set to current setting of switch A3.                                                   |
| Horizontal pitch | Set to current setting of switch A1 (either standard or compressed).                   |

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## EMULATION MODE 3 IBM GRAPHICS PRINTER

This mode uses two cartridges, the LA10X-LA line drawing (font ID 130) and LA10X-LD foreign style (font ID 141). You can select these cartridges in slot 7 or 8.

### SWITCH-SELECTABLE FEATURES

#### Switch A

| Switch | Setting    | Function                                                                                   |
|--------|------------|--------------------------------------------------------------------------------------------|
| A1, A2 | Up or down | Not used.                                                                                  |
| A3     | Up         | When line buffer is full, printer prints line and advances to next line.                   |
|        | Down       | When line buffer is full, printer does characters.                                         |
| A4     | Up         | Cancel (CAN) character clears line buffer.                                                 |
|        | Down       | CAN character is ignored.                                                                  |
| A5     | Up         | Delete (DEL) character clears line buffer.                                                 |
|        | Down       | DEL character is ignored.                                                                  |
| A6     | Up         | Printer performs an automatic line load when it receives a carriage return (CR) character. |
|        | Down       | Printer only performs a carriage return.                                                   |
| A7     | Up         | When printer receives BELL character, error bell sounds.                                   |
|        | Down       | BELL character is ignored.                                                                 |
| A8     | Up         | Selects standard 8 inch paper width at power on.                                           |
|        | Down       | Selects 10 inch paper width.                                                               |

#### Switch B

| Switch   | Setting    | Function                  |
|----------|------------|---------------------------|
| B1 to B4 | All up     | Enables emulation mode.   |
| B5, B6   | Up         | Selects emulation mode 3. |
| B7       | Up or down | Not used.                 |
| B8       | Up         | Enables 2K buffer.        |
|          | Down       | Enables 0.13K buffer.     |

## MODE 3 CHARACTER SET 1

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 | 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 | 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 | 1007 | 1008 | 1009 | 1010 | 1011 | 1012 | 1013 | 1014 | 1015 | 1016 | 1017 | 1018 | 1019 | 1020 | 1021 | 1022 | 1023 | 1024 | 1025 | 1026 | 1027 | 1028 | 1029 | 1030 | 1031 | 1032 | 1033 | 1034 | 1035 | 1036 | 1037 | 1038 | 1039 | 1040 | 1041 | 1042 | 1043 | 1044 | 1045 | 1046 | 1047 | 1048 | 1049 | 1050 | 1051 | 1052 | 1053 | 1054 | 1055 | 1056 | 1057 | 1058 | 1059 | 1060 | 1061 | 1062 | 1063 | 1064 | 1065 | 1066 | 1067 | 1068 | 1069 | 1070 | 1071 | 1072 | 1073 | 1074 | 1075 | 1076 | 1077 | 1078 | 1079 | 1080 | 1081 | 1082 | 1083 | 1084 | 1085 | 1086 | 1087 | 1088 | 1089 | 1090 | 1091 | 1092 | 1093 | 1094 | 1095 | 1096 | 1097 | 1098 | 1099 | 1100 | 1101 | 1102 | 1103 | 1104 | 1105 | 1106 | 1107 | 1108 | 1109 | 1110 | 1111 | 1112 | 1113 | 1114 | 1115 | 1116 | 1117 | 1118 | 1119 | 1120 | 1121 | 1122 | 1123 | 1124 | 1125 | 1126 | 1127 | 1128 | 1129 | 1130 | 1131 | 1132 | 1133 | 1134 | 1135 | 1136 | 1137 | 1138 | 1139 | 1140 | 1141 | 1142 | 1143 | 1144 | 1145 | 1146 | 1147 | 1148 | 1149 | 1150 | 1151 | 1152 | 1153 | 1154 | 1155 | 1156 | 1157 | 1158 | 1159 | 1160 | 1161 | 1162 | 1163 | 1164 | 1165 | 1166 | 1167 | 1168 | 1169 | 1170 | 1171 | 1172 | 1173 | 1174 | 1175 | 1176 | 1177 | 1178 | 1179 | 1180 | 1181 | 1182 | 1183 | 1184 | 1185 | 1186 | 1187 | 1188 | 1189 | 1190 | 1191 | 1192 | 1193 | 1194 | 1195 | 1196 | 1197 | 1198 | 1199 | 1200 | 1201 | 1202 | 1203 | 1204 | 1205 | 1206 | 1207 | 1208 | 1209 | 1210 | 1211 | 1212 | 1213 | 1214 | 1215 | 1216 | 1217 | 1218 | 1219 | 1220 | 1221 | 1222 | 1223 | 1224 | 1225 | 1226 | 1227 | 1228 | 1229 | 1230 | 1231 | 1232 | 1233 | 1234 | 1235 | 1236 | 1237 | 1238 | 1239 | 1240 | 1241 | 1242 | 1243 | 1244 | 1245 | 1246 | 1247 | 1248 | 1249 | 1250 | 1251 | 1252 | 1253 | 1254 | 1255 | 1256 | 1257 | 1258 | 1259 | 1260 | 1261 | 1262 | 1263 | 1264 | 1265 | 1266 | 1267 | 1268 | 1269 | 1270 | 1271 | 1272 | 1273 | 1274 | 1275 | 1276 | 1277 | 1278 | 1279 | 1280 | 1281 | 1282 | 1283 | 1284 | 1285 | 1286 | 1287 | 1288 | 1289 | 1290 | 1291 | 1292 | 1293 | 1294 | 1295 | 1296 | 1297 | 1298 | 1299 | 1300 | 1301 | 1302 | 1303 | 1304 | 1305 | 1306 | 1307 | 1308 | 1309 | 1310 | 1311 | 1312 | 1313 | 1314 | 1315 | 1316 | 1317 | 1318 | 1319 | 1320 | 1321 | 1322 | 1323 | 1324 | 1325 | 1326 | 1327 | 1328 | 1329 | 1330 | 1331 | 1332 | 1333 | 1334 | 1335 | 1336 | 1337 | 1338 | 1339 | 1340 | 1341 | 1342 | 1343 | 1344 | 1345 | 1346 | 1347 | 1348 | 1349 | 1350 | 1351 | 1352 | 1353 | 1354 | 1355 | 1356 | 1357 | 1358 | 1359 | 1360 | 1361 | 1362 | 1363 | 1364 | 1365 | 1366 | 1367 | 1368 | 1369 | 1370 | 1371 | 1372 | 1373 | 1374 | 1375 | 1376 | 1377 | 1378 | 1379 | 1380 | 1381 | 1382 | 1383 | 1384 | 1385 | 1386 | 1387 | 1388 | 1389 | 1390 | 1391 | 1392 | 1393 | 1394 | 1395 | 1396 | 1397 | 1398 | 1399 | 1400 | 1401 | 1402 | 1403 | 1404 | 1405 | 1406 | 1407 | 1408 | 1409 | 1410 | 1411 | 1412 | 1413 | 1414 | 1415 | 1416 | 1417 | 1418 | 1419 | 1420 | 1421 | 1422 | 1423 | 1424 | 1425 | 1426 | 1427 | 1428 | 1429 | 1430 | 1431 | 1432 | 1433 | 1434 | 1435 | 1436 | 1437 | 1438 | 1439 | 1440 | 1441 | 1442 | 1443 | 1444 | 1445 | 1446 | 1447 | 1448 | 1449 | 1450 | 1451 | 1452 | 1453 | 1454 | 1455 | 1456 | 1457 | 1458 | 1459 | 1460 | 1461 | 1462 | 1463 | 1464 | 1465 | 1466 | 1467 | 1468 | 1469 | 1470 | 1471 | 1472 | 1473 | 1474 | 1475 | 1476 | 1477 | 1478 | 1479 | 1480 | 1481 | 1482 | 1483 | 1484 | 1485 | 1486 | 1487 | 1488</ |
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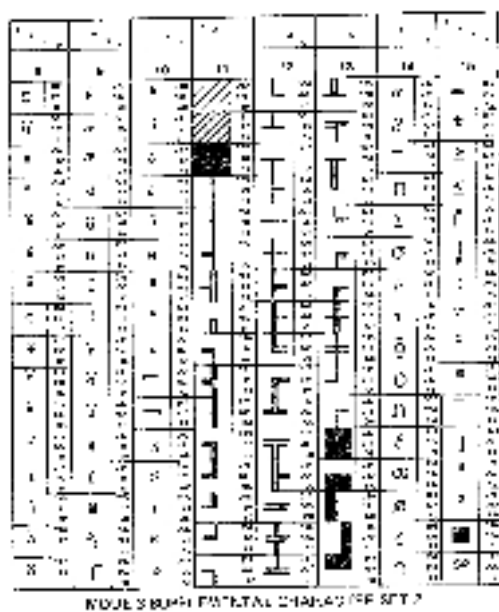
## MODE 3 CHARACTER SET 2

[illegible]

**KEY**

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|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
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| 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | 2101 | 2102 | 2103 | 2104 | 2105 | 2106 | 2107 | 2108 | 2109 | 2110 | 2111 | 2112 | 2113 | 2114 | 2115 | 2116 | 2117 | 2118 | 2119 | 2120 | 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 | 2128 | 2129 | 2130 | 2131 | 2132 | 2133 | 2134 | 2135 | 2136 | 2137 | 2138 | 2139 | 2140 | 2141 | 2142 | 2143 | 2144 | 2145 | 2146 | 2147 | 2148 | 2149 | 2150 | 2151 | 2152 | 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 | 2160 | 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 | 2169 | 2170 | 2171 | 2172 | 2173 | 2174 | 2175 | 2176 | 2177 | 2178 | 2179 | 2180 | 2181 | 2182 | 2183 | 2184 | 2185 | 2186 | 2187 | 2188 | 2189 | 2190 | 2191 | 2192 | 2193 | 2194 | 2195 | 2196 | 2197 | 2198 | 2199 | 2200 | 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2207 | 2208 | 2209 | 2210 | 2211 | 2212 | 2213 | 2214 | 2215 | 2216 | 2217 | 2218 | 2219 | 2220 | 2221 | 2222 | 2223 | 2224 | 2225 | 2226 | 2227 | 2228 | 2229 | 2230 | 2231 | 2232 | 2233 | 2234 | 2235 | 2236 | 2237 | 2238 | 2239 | 2240 | 2241 | 2242 | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 | 2249 | 2250 | 2251 | 2252 | 2253 | 2254 | 2255 | 2256 | 2257 | 2258 | 2259 | 2260 | 2261 | 2262 | 2263 | 2264 | 2265 | 2266 | 2267 | 2268 | 2269 | 2270 | 2271 | 2272 | 2273 | 2274 | 2275 | 2276 | 2277 | 2278 | 2279 | 2280 | 2281 | 2282 | 2283 | 2284 | 2285 | 2286 | 2287 | 2288 | 2289 | 2290 | 2291 | 2292 | 2293 | 2294 | 2295 | 2296 | 2297 | 2298 | 2299 | 2300 | 2301 | 2302 | 2303 | 2304 | 2305 | 2306 | 2307 | 2308 | 2309 | 2310 | 2311 | 2312 | 2313 | 2314 | 2315 | 2316 | 2317 | 2318 | 2319 | 2320 | 2321 | 2322 | 2323 | 2324 | 2325 | 2326 | 2327 | 2328 | 2329 | 2330 | 2331 | 2332 | 2333 | 2334 | 2335 | 2336 | 2337 | 2338 | 2339 | 2340 | 2341 | 2342 | 2343 | 2344 | 2345 | 2346 | 2347 | 2348 | 2349 | 2350 | 2351 | 2352 | 2353 | 2354 | 2355 | 2356 | 2357 | 2358 | 2359 | 2360 | 2361 | 2362 | 2363 | 2364 | 2365 | 2366 | 2367 | 2368 | 2369 | 2370 | 2371 | 2372 | 2373 | 2374 | 2375 | 2376 | 2377 | 2378 | 2379 | 2380 | 2381 | 2382 | 2383 | 2384 | 2385 | 2386 | 2387 | 2388 | 2389 | 2390 | 2391 | 2392 | 2393 | 2394 | 2395 | 2396 | 2397 | 2398 | 2399 | 2400 | 2401 | 2402 | 2403 | 2404 | 2405 | 2406 | 2407 | 2408 | 2409 | 2410 | 2411 | 2412 | 2413 | 2414 | 2415 | 2416 | 2417 | 2418 | 2419 | 2420 | 2421 | 2422 | 2423 | 2424 | 2425 | 2426 | 2427 | 2428 | 2429 | 2430 | 2431 | 2432 | 2433 | 2434 | 2435 | 2436 | 2437 | 2438 | 2439 | 2440 | 2441 | 2442 | 2443 | 2444 | 2445 | 2446 | 2447 | 2448 | 2449 | 2450 | 2451 | 2452 | 2453 | 2454 | 2455 | 2456 | 2457 | 2458 | 2459 | 2460 | 2461 | 2462 | 2463 | 2464 | 2465 | 2466 | 2467 | 2468 | 2469 | 2470 | 2471 | 2472 | 2473 | 2474 | 2475 | 2476 | 2477 | 2478 | 2479 | 2480 | 2481 | 2482 | 2483 | 2484 | 2485 | 2486 | 2487 | 2488 | 2489 | 2490 | 2491 | 2492 | 2493 | 2494 | 2495 | 2496 | 2497 | 2498 | 2499 | 2500 | 2501 | 2502 | 2503 | 2504 | 2505 | 2506 | 2507 | 2508 | 2509 | 2510 | 2511 | 2512 | 2513 | 2514 | 2515 | 2516 | 2517 | 2518 | 2519 | 2520 | 2521 | 2522 | 2523 | 2524 | 2525 | 2526 | 2527 | 2528 | 2529 | 2530 | 2531 | 2532 | 2533 | 2534 | 2535 | 2536 | 2537 | 2538 | 2539 | 2540 | 2541 | 2542 | 2543 | 2544 | 2545 | 2546 | 2547 | 2548 | 2549 | 2550 | 2551 | 2552 | 2553 | 2554 | 2555 | 2556 | 2557 | 2558 | 2559 | 2560 | 2561 | 2562 | 2563 | 2564 | 2565 | 2566 | 2567 | 2568 | 2569 | 2570 | 2571 | 2572 | 2573 | 2574 | 2575 | 2576 | 2577 | 2578 | 2579 | 2580 | 2581 | 2582 | 2583 | 2584 | 2585 | 2586 | 2587 | 2588 | 2589 | 2590 | 2591 | 2592 | 2593 | 2594 | 2595 | 2596 | 2597 | 2598 | 2599 | 2600 | 2601 | 2602 | 2603 | 2604 | 2605 | 2606 | 2607 | 2608 | 2609 | 2610 | 2611 | 2612 | 2613 | 2614 | 2615 | 2616 | 2617 | 2618 | 2619 | 2620 | 2621 | 2622 | 2623 | 2624 | 2625 | 2626 | 2627 | 2628 | 2629 | 2630 | 2631 | 2632 | 2633 | 2634 | 2635 | 2636 | 2637 | 2638 | 2639 | 2640 | 2641 | 2642 | 2643 | 2644 | 2645 | 2646 | 2647 | 2648 | 2649 | 2650 | 2651 | 2652 | 2653 | 2654 | 2655 | 2656 | 2657 | 2658 | 2659 | 2660 | 2661 | 2662 | 2663 | 2664 | 2665 | 2666 | 2667 | 2668 | 2669 | 2670 | 2671 | 2672 | 2673 | 2674 | 2675 | 2676 | 2677 | 2678 | 2679 | 2680 | 2681 | 2682 | 2683 | 2684 | 2685 | 2686 | 2687 | 2688 | 2689 | 2690 | 2691 | 2692 | 2693 | 2694 | 2695 | 2696 | 2697 | 2698 | 2699 | 2700 | 2701 | 2702 | 2703 | 2704 | 2705 | 2706 | 2707 | 2708 | 2709 | 2710 | 2711 | 2712 | 2713 | 2714 | 2715 | 2716 | 2717 | 2718 | 2719 | 2720 | 2721 | 2722 | 2723 | 2724 | 2725 | 2726 | 2727 | 2728 | 2729 | 2730 | 2731 | 2732 | 2733 | 2734 | 2735 | 2736 | 2737 | 2738 | 2739 | 2740 | 2741 | 2742 | 2743 | 2744 | 2745 | 2746 | 2747 | 2748 | 2749 | 2750 | 2751 | 2752 | 2753 | 2754 | 2755 | 2756 | 2757 | 2758 | 2759 | 2760 | 2761 | 2762 | 2763 | 2764 | 2765 | 2766 | 2767 | 2768 | 2769 | 2770 | 2771 | 2772 | 2773 | 2774 | 2775 | 2776 | 2777 | 2778 | 2779 | 2780 | 2781 | 2782 | 2783 | 2784 | 2785 | 2786 | 2787 | 2788 | 2789 | 2790 | 2791 | 2792 | 2793 | 2794 | 2795 | 2796 | 2797 | 2798 | 2799 | 2800 | 2801 | 2802 | 2803 | 2804 | 2805 | 2806 | 2807 | 2808 | 2809 | 2810 | 2811 | 2812 | 2813 | 2814 | 2815 | 2816 | 2817 | 2818 | 2819 | 2820 | 2821 | 2822 | 2823 | 2824 | 2825 | 2826 | 2827 | 2828 | 2829 | 2830 | 2831 | 2832 | 2833 | 2834 | 2835 | 2836 | 2837 | 2838 | 2839 | 2840 | 2841 | 2842 | 2843 | 2844 | 2845 | 2846 | 2847 | 2848 | 2849 | 2850 | 2851 | 2852 | 2853 | 2854 | 2855 | 2856 | 2857 | 2858 | 2859 | 2860 | 2861 | 2862 | 2863 | 2864 | 2865 | 2866 | 2867 | 2868 | 2869 | 2870 | 2871 | 2872 | 2873 | 2874 | 2875 | 2876 | 2877 | 2878 | 2879 | 2880 | 2881 | 2882 | 2883 | 2884 | 2885 | 2886 | 2887 | 2888 | 2889 | 2890 | 2891 | 2892 | 2893 | 2894 | 2895 | 2896 | 2897 | 2898 | 2899 | 2900 | 2901 | 2902 | 2903 | 2904 | 2905 | 2906 | 2907 | 2908 | 2909 | 2910 | 2911 | 2912 | 2913 | 2914 | 2915 | 2916 | 2917 | 2918 | 2919 | 2920 | 2921 | 2922 | 2923 | 2924 | 2925 | 2926 | 2927 | 2928 | 2929 | 2930 | 2931 | 2932 | 2933 | 2934 | 2935 | 2936 | 2937 | 2938 | 2939 | 2940 | 2941 | 2942 | 2943 | 2944 | 2945 | 2946 | 2947 | 2948 | 2949 | 2950 | 2951 | 2952 | 2953 | 2954 | 2955 | 2956 | 2957 | 2958 | 2959 | 2960 | 2961 | 2962 | 2963 | 2964 | 2965 | 2966 | 2967 | 2968 | 2969 | 2970 | 2971 | 2972 | 2973 | 2974 | 2975 | 2976 | 2977 | 2978 | 2979 | 2980 | 2981 | 2982 | 2983 | 2984 | 2985 | 2986 | 2987 | 2988 | 2989 | 2990 | 2991 | 2992 | 2993 | 2994 | 2995 | 2996 | 2997 | 2998 | 2999 | 3000 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-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**E. J. O'Neil**



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## CONTROL CHARACTERS

### C0 and C1 Control Characters (Set 1)

| Name             | Mnemonic | Octal Code |     | Function                                                                                          |
|------------------|----------|------------|-----|---------------------------------------------------------------------------------------------------|
|                  |          | C0         | C1  |                                                                                                   |
| Nul              | NUL      | 00         | 200 | Used in escape sequences.                                                                         |
| Bell             | BLL      | 07         | 207 | Sounds bell (tone if enabled by switch A7).                                                       |
| Horizontal tab   | HT       | 11         | 211 | Advances to next horizontal tab stop. If none, otherwise, takes no action.                        |
| Line feed        | LF       | 12         | 212 | Prints buffer's contents, then advances paper by current line spacing.                            |
| Vertical tab     | VT       | 13         | 213 | Prints buffer's contents, then performs line feed.                                                |
| Form feed        | FF       | 14         | 214 | Advances to end of page of form.                                                                  |
| Carriage return  | CR       | 15         | 215 | Prints buffer's contents, returns to left margin, and performs line feed if enabled by switch A5. |
| Shift out        | SO       | 16         | 216 | Sets double width for all following characters, until next terminator or DCM is received.         |
| Shift in         | SI       | 17         | 217 | Sets compressed horizontal pitch for current line and following lines, until EX2 is received.     |
| Device control 2 | DC2      | 22         | 222 | Sets standard horizontal pitch for current line and following lines, until SI is received.        |

## CO and C1 Control Characters (Set 1) (Cont)

| Name             | Mnemonic | Octal Code |     | Function                                                              |
|------------------|----------|------------|-----|-----------------------------------------------------------------------|
|                  |          | C0         | C1  |                                                                       |
| Device control 4 | DC4      | 24         | 224 | Sets single width for all following characters, until EO is received. |
| Cancel           | CAN      | 30         | 232 | Clears print buffer if enabled by switch A4.                          |
| Escape           | ESC      | 32         | 236 | Starts escape sequences.                                              |

## C0 Control Characters (Set 2)

| Name           | Mnemonic | Octal Code | Function                                                               |
|----------------|----------|------------|------------------------------------------------------------------------|
| Null           | NUL      | 00         | Used to separate sequences.                                            |
| Left           | -        | 03         | Prints a heart symbol.                                                 |
| Diamond        | -        | 04         | Prints a diamond symbol.                                               |
| Globe          | -        | 05         | Prints a globe symbol.                                                 |
| Space          | -        | 06         | Prints a space symbol.                                                 |
| Bell           | BLL      | 07         | Sounds bell tone if enabled by switch A7.                              |
| Horizontal tab | HT       | 11         | Advances to next horizontal tab, if any. Otherwise, takes no action.   |
| Line feed      | LF       | 12         | Prints buffer's contents, then advances paper by current line spacing. |
| Vertical tab   | VT       | 13         | Prints buffer's contents, then performs a vertical feed.               |
| Form feed      | FF       | 14         | Advances to next line of form.                                         |

## 00 Control Characters (Set 2) (Cont)

| Name             | Heximate | Octal Code | Function                                                                                           |
|------------------|----------|------------|----------------------------------------------------------------------------------------------------|
| Carrage return   | CR       | 15         | Prints buffer's contents, then returns to left margin. Performs line feed if enabled by switch A6. |
| Shift out        | SO       | 16         | Sets double width for all following characters, until the next line terminator or DC4 is received. |
| Shift in         | SI       | 17         | Sets compressed horizontal pitch for current line and following lines, until DC2 is received.      |
| Device control 2 | DC2      | 22         | Sets standard horizontal pitch for current line and following lines, until SI is received.         |
| Device control 4 | DC4      | 24         | Sets single width for all following characters, until SO is received.                              |
| Paragraph        | -        | 25         | Prints paragraph symbol.                                                                           |
| Cancel           | CAN      | 30         | Clears printer buffer if enabled by switch A4.                                                     |
| Escape           | LSC      | 32         | Starts escape sequences.                                                                           |

## ESCAPE SEQUENCES

### Vertical Form Handling

| Name<br>(Mnemonic)               | Sequence                        | Function                                                                                                                                                    |
|----------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set vertical<br>pitch<br>(ER301) | ESC 0<br>0B0 0B0                | Sets vertical<br>pitch to 6 lines<br>per inch                                                                                                               |
| (ER101)                          | ESC 1<br>0B3 0B1                | Sets vertical<br>pitch to 10.3 lines<br>per inch (72/7)                                                                                                     |
| (FRNL2)                          | ESC 2<br>0B0 0B2                | Sets vertical<br>pitch to the<br>setting specified<br>in a previously<br>issued LSC A<br>sequence. If none<br>was set, sets<br>pitch to 8 lines<br>per inch |
| (FRNL1)                          | ESC A Pn<br>0B8 101 ***         | Sets vertical<br>pitch to 72/Pn<br>lines per inch.<br>Does not take<br>effect until ESC 2<br>is sent.                                                       |
| (FRNL8)                          | ESC B Pn<br>0B3 0B0 ***         | Sets vertical<br>pitch to 216/Pn<br>lines per inch.                                                                                                         |
| (FRNL4)                          | ESC J Pn<br>0B2 112 ***         | Prints headers<br>contents and sets<br>vertical pitch to<br>216/Pn lines per<br>inch for text, line<br>feed only                                            |
| Set form<br>length<br>(ER312)    | ESC C Pn<br>0B8 103 ***         | Sets the form<br>length to the<br>number of inches<br>that equals Pn X<br>current pitch                                                                     |
| (LF5FI)                          | ESC C PnL Pn<br>0B3 108 200 *** | Sets the form<br>length to Pn<br>inches.                                                                                                                    |

### Vertical Form Handling (Cont)

| Name<br>(Mnemonic)                   | Sequence               | Function                                                                    |
|--------------------------------------|------------------------|-----------------------------------------------------------------------------|
| Set bottom<br>margin<br>(ERSBM)      | ESC N Pn<br>033 118 "" | Sets the bottom<br>margin to Pn<br>lines from the<br>bottom of the<br>page. |
| Clear<br>bottom<br>margin<br>(ERCBM) | ESC O<br>033 117       | Clears the<br>bottom margin.                                                |

### Horizontal Form Handling

| Name<br>(Mnemonic)                            | Sequence                 | Function                                                                                                                                                             |
|-----------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set<br>double-width<br>characters<br>(CRDWC)  | ESC W >0<br>033 127 ""   | Sets double-<br>width characters<br>for current line<br>and following<br>lines. Any non-<br>zero character as<br>the line charac-<br>ter completes<br>this sequence. |
| Set<br>single-width<br>characters<br>(CRSDWC) | ESC W NUL<br>033 127 000 | Sets single-width<br>characters for<br>current line and<br>following lines.                                                                                          |
| Carriage<br>return<br>(RCR)                   | ESC <<br>033 074         | Performs car-<br>riage return<br>without perform-<br>ing line feed<br>regardless of<br>current switch<br>setting.                                                    |

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## Horizontal Tabs

| Name<br>(Mnemonic)            | Sequence                                   | Function                                                                                                                                                                                                                        |
|-------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Set horizontal tabs<br>(LHST) | ESC D Pn1 Pn2 Pn NUL<br>033 034 ... .. 000 | Sets horizontal tab stops at Pn1, Pn2, and other design Atn1 stops. Pn is a character representing the column number of the desired stop. For example, the character D25 sets a tab at column 25. You can specify 1 to 16 tabs. |

## Paper Fault Handling

| Name<br>(Mnemonic)          | Sequence         | Function                     |
|-----------------------------|------------------|------------------------------|
| Disable paper out<br>(LHPO) | ESC 8<br>033 036 | Disables paper-out handling. |
| Enable paper out<br>(EHPO)  | ESC 9<br>033 037 | Enables paper-out handling.  |

## Unidirectional/Bidirectional Control

| Name<br>(Mnemonic)                     | Sequence                 | Function                                                                                                   |
|----------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------|
| Set bidirectional printing<br>(EBUD)   | ESC U NUL<br>033 071 000 | Prints lines in bidirectional mode.                                                                        |
| Set unidirectional printing<br>(EFLUD) | ESC U >0<br>033 074 ...  | Prints lines from left to right only. Any nonzero character as the third character completes the sequence. |

**Alternate Character Set Mapping**

| <b>Name<br/>(Mnemonic)</b> | <b>Sequence</b>                  | <b>Function</b>                                                                                                      |
|----------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Select<br>set 2<br>(FRC02) | <b>ESC</b> <b>G</b><br>038   066 | Selects the<br>alternate char-<br>acter set (set 2).                                                                 |
| Select<br>set 1<br>(ERC01) | <b>ESC</b> <b>F</b><br>038   067 | Selects charac-<br>ter set 1.<br>(This character<br>set is the default<br>set when the<br>printer is<br>powered on.) |

**Printing Modes**

| <b>Name<br/>(Mnemonic)</b>        | <b>Sequence</b>                                    | <b>Function</b>                                                                                                                |
|-----------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Enable bold<br>(LELBD)            | <b>ESC</b> <b>E</b><br>033   105                   | Sets bold<br>printing for<br>all following<br>characters.                                                                      |
| Disable bold<br>(LELDD)           | <b>ESC</b> <b>F</b><br>033   106                   | Turns off bold<br>printing for<br>all following<br>characters.                                                                 |
| Set high<br>resolution<br>(EREHR) | <b>ESC</b> <b>G</b><br>033   107                   | Enters high<br>resolution mode.                                                                                                |
| Set low<br>resolution<br>(LELDR)  | <b>ESC</b> <b>H</b><br>033   108                   | Enters low<br>resolution mode.                                                                                                 |
| Set underline<br>(EREUL)          | <b>ESC</b> <b>~</b> <b>&gt;0</b><br>033   045   44 | Underlines all<br>following charac-<br>ters. Any nonzero<br>character as the<br>third character<br>completes this<br>sequence. |
| Reset<br>underline<br>(ERDUL)     | <b>ESC</b> <b>~</b> <b>NUL</b><br>033   045   000  | Turns off under-<br>lining for all<br>following<br>characters.                                                                 |

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## Printing Modes (Cont)

| Name<br>(Mnemonic)                                       | Sequence                 | Function                                                                                                                                     |
|----------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Enable<br>super-script<br>(ERESCH)                       | ESC S NUL<br>033 123 000 | Prints all<br>following characters in super-<br>script mode                                                                                  |
| Enable<br>sub-script<br>(RESOR)                          | ESC S 00<br>033 123 000  | Prints all<br>following characters in sub-script<br>mode. Any non-<br>zero character as<br>the third character<br>completes<br>this sequence |
| Reset script<br>and times<br>horizontalizing<br>(EROSCR) | ESC 1<br>033 124         | Resets script<br>setting to no-<br>script and restarts<br>printing mode to<br>Left-aligned.                                                  |

## Graphics Mode

| Name<br>(Mnemonic)            | Sequence                         | Function                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UD DPI<br>graphics<br>(UDGDB) | ESC K Pn1 Pn2<br>033 113 000 000 | Enter 60 dots per<br>inch for the next<br>n bytes. Pn1 and<br>Pn2 together<br>specify the<br>number of bytes<br>according to the<br>formula<br>$n = 256 \times Pn2 + Pn1$<br>The total must be<br>less than the<br>remainder of<br>bytes in the line<br>buffer. If the<br>buffer is empty,<br>the total must be<br>less than 100<br>(8-inch paper<br>selected) or 444<br>then 730 (13-inch<br>paper selected). |

## Graphics Mode (Cont)

| Name<br>(Mnemonic)              | Sequence                        | Function                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 132 DPI<br>graphics<br>(LHGH12) | ESC L Pn1 Pn2<br>03h 11h ... .. | <p>Enter 132 dots per inch for the next n bytes. Pn1 and Pn2 together specify the number of bytes according to the formula:</p> $n = (256 \times Pn2) + Pn1$ <p>The total must be less than the remainder of bytes in the line buffer. If the buffer is empty, the total must be less than 960 (8-inch paper scaled) or less than 1740 (13-inch paper scaled).</p> |
| 132 DPI<br>graphics<br>(ERGH12) | ESC Y Pn1 Pn2<br>03h 13h ... .. | <p>Enter 132 dots per inch for the next n bytes. Pn1 and Pn2 together specify the number of bytes according to the formula:</p> $n = (256 \times Pn2) + Pn1$ <p>The total must be less than the remainder of bytes in the line buffer. If the buffer is empty, the total must be less than 260 (8-inch paper scaled) or less than 1740 (13-inch paper</p>          |

## Graphics Mode (Cont.)

| Name<br>(Mnemonic)              | Sequence                        | Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 220 DPI<br>graphics<br>(ERGD24) | ESC Z Pn1 Pn2<br>033 132 *** ** | <p>selected. ESC Y prints every other col.</p> <p>Enter 220 dots per inch for the next n bytes. Pn1 and Pn2 together specify the number of bytes according to the formula</p> $n = (256 \times Pn2) - Pn1$ <p>The total must be less than the remainder of bytes in the line buffer. If the buffer is empty, the total must be less than 1920 (8-inch paper selected) or less than 2880 (13-inch paper selected). ESC Z prints one dot in any three consecutive positions.</p> |

