# 1 <br> CIIR1. Id disswheel 6100 

## Operation Manual for

 Model 6100 Daisywheel Printer
## NOTICE:

* All rights reserved. Reproduction of any part of this manual in any form whatsoever without Juki express written permission is forbidden.
* The contents of this manual are subject to change without notice.

All efforts have been made to ensure the accuracy of the contents of this manual. D $\quad$ ver, should

|  | e n |
| :---: | :---: |
| E | 1110 |
| th |  | notwithstanding, JUKI can assume no responsibility for any errors in this 110 their consequences.

© Copyright 1983 by TOKYO JUKI INDUSTRIAL CO., LTD. Tokyo, Japan

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.
Introduction ..... 1

1. General Description ..... 1
2. Specifications ..... 1
Installation of the Printer ..... 2
3. Unpacking ..... 2
1.1 Unpacking procedure ..... 2
1.2 Repacking the printer ..... 2
4. Checking the Printer Parts ..... 2
5. Installing the Printer ..... 3
3.1 Installing location ..... 3
3.2 Removing the paper table protection sheet ..... 3
3.3. Removing the fixer ..... 4
6. Setting a Cartridge Ribbon ..... 6
7. Attaching a Daisy Wheel to the Printer ..... 7
8. Setting Paper on the Printer ..... 8
6.1 Loading a paper on the printer ..... 8
6.2 Fine adjustment 6 the printing position ..... $\frac{8}{9} 4$
Operation ..... 10
9. 'Switches and Indicators ..... 10
1.1 Switches ..... 10
1.2 Indicators ..... 12
1.3 Loading a form by the bail switch ..... 12
10. Self-test ..... 13
11. Setting of DIP Switches ..... 13
3.1 Setting ..... 14
3.2 International character set ..... 16
12. Control Codes ..... 17
4.1 Control codes ..... 17
4.2 Special control codes (Escape code sequences) ..... 20
4.2.1 Standard functions ..... 21
4.2.2 Word processing function ..... 28
13. Character Level ..... 30
14. Parallel Interfàce ..... 31
15. Optional ..... 34
7.1 Serial Interface ..... 34
7.220 mA Current Loop Interface ..... 35
16. Code Table ..... 37

## INTRODÚCTION

## 1. General Description

This is a daisy wheel printer controlled by a micro processor unit. The printer, which is a result of the state-of-the-art engineering combined with superior manufacturing techniques, provides superior performance and many advantages such as the easy drop-in type daisy wheel replacement, use of IBM cartridge ribbons, moderate price, low power consumption and long service life. In addition, the printer head driven by a linear motor permits simpler mechanism and higher accuracy of printing position at the same time.

## 2. Specifications

| Print speed | : Max. 18 cps |
| :---: | :---: |
|  | 17 cps (Shannon text, $10 \mathrm{ch} / \mathrm{inch}$ ) |
| Print wheel | : 100 characters/wheel (Triumph-Adler compatible) |
| Print wheel life | : 10 million characters/wheel 0 |
| Number of characters per line | : 110 characters (10 pitch) |
|  | 132 characters (12 pitch) |
|  | 165 characters ( 15 pitch) |
| $\cdots$ | 82 to 220 characters (Proportional spacing ${ }^{\text {d }}$ |
| Max. paper width | : 13" |
| Carriage motion | : Bi-directional, incremental motion: 1/120 inch |
| Carriage return time | : Max. 1,000 ms |
| Paper feed | : Bi-directional, Friction feed |
| Min. feed | : $1 / 48$ inch |
| Ribbon | : Cartridge Type: IBM Typewriter ribbon |
|  | Single strike ribbón |
| - | Multi strike ribbon |
| Interface | Parallel (Centronics compatible) <br> (Option: RS232C serial) |
| Temperature | : $41^{\circ} \mathrm{F} \sim 95^{\circ} \mathrm{F}$ ( $5^{\circ} \mathrm{C}$ to $35^{\circ} \mathrm{C}$ ) (Operating) |
| Relative Humidity | : 30\% to 85\% (Operating, Non-condensation) |
| Power | $\begin{aligned} & \text { AC } 100 \mathrm{~V}, 120 \mathrm{~V}, 220 \mathrm{~V}, 240 \mathrm{~V}, 50 \& 60 \mathrm{~Hz} \\ & \text { Max. } 50 \mathrm{~W} \end{aligned}$ |
| Dimension | : $20.5^{\prime \prime} \mathrm{W} \times 5.9^{\prime \prime} \mathrm{H} \times 14.2^{\prime \prime} \mathrm{D}$ |
|  | ( $520 \mathrm{~mm} \times 151 \mathrm{~mm} \times 360 \mathrm{~mm}$ ). |
| Weight | 27.5 lbs approx. |
|  | (12.5 kgs. approx.) |

## 1. Unpacking

Before unpacking the printer, carefully check the exterior of the carton containing the printer. If any damaged incurred during transportation has been found, immediately contact the shop you bought the machine.

### 1.1 Unpacking procedure

Unpack the printer in accordance with the following steps:
Step 1: Open the carton.
Step 2: Pull out straight the printer together with its shock-absorbing materials.
Step 3: Place the printer along with the shock-absorbing materials on a table or other plain spot.
Step 4: Remove the shock-absorbing materials from the printer.
Step 5: Take the vinyl cover off the printer.

### 1.2 Repacking the printer

Repack the printer in reverse order from unpacking procedure.
Repack the printer when storing it or sending it for repair.
Caution It is advisable to keep the packing materials for possible reshipment of the printer.

## 2. Checking the Printer Parts

The printer is furnished with the standard accessories shown below. If any missed or damaged parts have been found out, contact the source of your purchase.

2. Daisy Wheel

3. Single-strike Ribbon

4. Power Code

5. Operation Manual

| No. | Name | Q'ty |
| :---: | :--- | :---: |
| 1. | Daisy wheel printer | 1 |
| 2. | Daisy wheel | 1 |
| 3. | Single-strike ribbon | 1 |
| 4. | Power cord | 1 |
| 5. | Operation Manual | 1 |

### 3.1 Installing location

Install the printer with attention paid to the following.
(1) Mount the printer on a level and tough table of stand. At this time, place the printer so that its rubber feet all rest on the table or stand evenly.
(2) Do not install the printer at a place exposed to direct sunlight, or hot or contaminated air.
(3) Do not connect the printer to a receptacle used also for a large motor, cooler or other equipment which produce electrical noise.
(4) Always keep the ambient temperature at 40 degree F ( 5 degree C ) through 95 degree F ( 35 degree C ) while operating the printer.
Be careful not to subject the printer to shocks or a sudden temperature change.

### 3.2 Removing the paper table protection sheet

The paper table and platen are wrapped with a sheet to protect the paper table from shocks or vibration during transportation. Before using the printer, take off this sheet.

Remember to set this protection sheet on the paper table as it was originally set when reshipping the printer.


If it is difficult to remove the sheet, open or take off the soundproofing cover to take the sheet out in the following way:
Step 1: Open the soundproofing cover towards you till upright position.
Step 2: Pull up and remove the soundproofing cover.


### 3.3 Removing the fixers

The carriage is fixed with two buffers which protect the carriage from shocks or vibration during transportation.
Keep these carriage fixers for possible reshipment in the future.
Step 1: Hold the printer cover as shown below and lift it.
Step 2: When the cover lock on your side has been disengaged, draw off the cover towards you.


Step 3: Remove the right carriage fixer.
Step 4: Move the carriage to the right and remove the left carriage fixer. AC cord and ribbon can be taken out.

The daisy motor is fixed not to slip out during transportation.
Step 1: Cut the motor band and remove it from the carriage.
Step 2: Remove the lever fixer from the carriage.
The platen is fixed with two materials which protect the platen from shocks or vibration during transportation.
Step 1: Remove the platen fixer from both side of the platen.

Caution It is recommended that the original packing material be retained for reshipment or other transporting purposes.


## 4. Setting a Cartridge Ribbon

Either a single strike ribbon or multi strike ribbon can be used. When a cartridge ribbon has been set on the printer, the printer will automatically set itself for a feed amount suited to that ribbon.

Step 1: Pull the ribbon load lever toward you.
Step 2: Pass the lead tape of the ribbon through the three guides.
Step 3: Push down the cartridge until it is held by the clip spring.


Step 4: Turn the cartridge knob counter-clockwise direction until the inked part of the ribbon reaches the printing part.
Step 5: Return the ribbon load lever to its original position.


Supplement: Replacing a cartridge ribbon
When the ribbon is seen to be almost running out through the cartridge slit, replace the ribbon in the following procedure.
Step 1: Pull the ribbon load lever toward you.
Step 2: Pull up the cartridge off the printer.

Caution (1) Do not forcibly pull up the cartridge without pulling the ribbon load lever toward you.

(2) When the end zone of ribbon reaches to the print position, printed characters could not be recognized clearly.
(3) Periodically clean the ribbon path and remove paper dust and ink flake from interior.

## 5. Attaching a Daisy Wheel to the Printer

The drop-in design of the daisy wheel permits easy setting and replacement of the daisy wheel.

Step 1: Draw the daisy setting lever toward you.
Step 2: Drop the daisy wheel into the daisy case of the printer.

Caution The type surface of the daisy wheel should face to the platen.
Step 3: Push the daisy setting lever to the front.


Supplement: Removing the daisy wheel.
Step 1: Pull the daisy setting lever toward you.
Step 2: Held and pull up the daisy wheel.


## 6. Setting a Paper on the Printer

Paper of up to 13 inch width can be set on the printer.

### 6.1 Loading a paper on the printer

Step 1: Pull the paper bail lever toward you.
Step 2: Confirm that the release lever is set away from you.
Step 3: Place paper between the paper table and the rear of the platen.
Step 4: Turn the feed knob until the form reaches the printing position.
Step 5: Push the bail lever back.


### 6.2 Fine adjustment of the printing position

First pull that the release lever, then turn the right feed knob back and forth while pushing it to perform fine adjustment of the printing position.


### 6.3 Correcting the position of a paper

If paper set on the printer is crooked, correct it in accordance with the following procedure.
Step 1: Pull the release lever toward you.
Step 2: Open the soundproofing cover toward you.
Step 3: Align the side edges of paper as shown below and then push back the release lever.

Step 4: Close the acoustic cover and push the bail lever.


## OPERATION

## 1. Switches and Indicators

The power switch is located at the left on the back of the printer case, and the operation panel is located at the right on the front. The operation panel has three membrane switches, one 4-Step selector slide switch and three indicators.


### 1.1 Switches

## Power SW:

Controls the primary AC power supplied to the printer.
When it is turned on the initial state of the printer is:
(1) LSI (Line Spacing Index) follows to Dip SW.
(2) CSI (Column Spacing Index) follows to the switches on the operation panel.
(3) Left Margin is set at 1 st column.
(4) Right Margin is set at the final column.
(5) Horizontal Tab and Vertical Tab are not set.
(6) Top Margin is set at the top of the paper.
(7) Bottom Margin is set at the end of the paper.
(8-1) The printer is set in the on-line state, and READY lamp lights.
(8-2) If no error is present, CHECK lamp goes out.
(9) Auto Backward Print Mode.
(10) The paper length is set at 11 inches or 12 .
(11) Carriage is positioned at 1 st column.
(12) The Print Wheel is positioned at the home position.
(13) The Ribbon is set at the home position.
(14) The Power Indication Lamp lights up.
(15) Ready Lamp lights up.
(16) Remote Mode.

Caution Before turning on the power switch, make sure that paper has been set on the printer.

It is important to set paper correctly on the printer to obtain the best printing result.
Do not use any other AC cord than the 3-core cable furnished with the printer.

## Form Feed SW:

By depressing this switch, form feed can be performed in the Pause condition and paper in fed to as far as the first line or the top margin of the next page.

## Pause SW:

Used to interrupt the operation of the printer without erasing the data.
When the pause switch is depressed, the check lamp will light.
The pause is released by depressing the reset switch.

## Reset SW:

Used to release the pause, check or error status.
The check or error status is released by depressing the reset switch after eliminating the cause.

## Spacing SW:

A 4-step selector slide switch which provides selection of PS (Proportional Spacing), $15 \mathrm{cpi}, 12 \mathrm{cpi}$ and 10 cpi . Set this switch at a desired spacing before powering up the printer. Change of the spacing pitch setting of this switch after powering up the printer can be made by the ESC function of the host computer.

### 1.2 Indicators

## Power:

This green LED indicator will light up when the power switch of the printer is turned on.

## Ready:

This is a green LED indicator which will light up when the printer is ready to transfer data. It blinks if errors related to data transfer (buffer over flow, parity error, flamming error, over run error) happen. According to operator's judgement, data stored in the print buffer can be printed by depressing Reset switch.

## Check:

This indicator lamp lights up in the check status and blinks in the error status.
Check status: The ribbon or paper has run out.
Error status: Error which can not warrant the adequate printing happens. Data stored in the print buffer can be printed by depressing Reset switch after removing the cause of error.

### 1.3 Loading a form by the bail switch

By operating the bail switch, you can automatically set paper at the 1 inch position from the top end of the paper. This can be done when the printer has been powered up and when the printer is not in Error mode and when the printer is in Pause mode.
Step 1: Make sure that the release lever has been push back.
Step 2: Place paper between the paper table and the rear of the platen.
Step 3: Pull the bail lever toward you.
Step 4: Draw the bail lever once toward you.
Step 5: When paper has been fed enough and stopped, return the bail lever to its original position.
The printing operation begins at one inch from the top end of the paper.

Top end of the paper


The self-test feature checks the following:
(1) Buffer RAM
(2) Operation of the printer mechanism
(3) Print quality

Note: If the printer is equipped with a serial I/F (option), the self-test feature also checks whether the connection is made adequately.

Turn on the power switch while depressing the Form Feed switch and then release the Form Feed switch. This will start the self-test. To stop the self-test, turn off the power switch.

Self-test
RAM OK
Serial OK

Caution (1) Turn off the power switch to stop the self-test before the form runs out.
(2) If "RAM BAD" is printed instead of "RAM OK", the printer will do no further operation. In this case, the printer must be sent for repair.
(3) "Serial OK" is not printed at parallel I/F. "Serial OK" or "Serial BAD" is printed only at serial I/F.
(4) If "Serial BAD" is printed instead of "Serial OK", check the connection of the serial I/F connector. Continue the self-test.

## 3. Setting of DIP Switches

The mode can be changed by the DIP switches on the back of the operation panel in accordance with customer's requirement.

Open the printer cover and set the DIP switches as shown below. The DIP switches will be turned on when they are set towards the front of the printer and turned off when set towards the back of the printer.



### 3.1 Setting

The DIP switch pins are numbered from 1 to 10, the 10th pin being not in use. The following table shows the function of each DIP switch pin and their factory-set conditions.

| DIP SW <br> Pin No. | Function | OFF | ON | Factory-set <br> condition |  |
| :---: | :--- | :---: | :---: | :---: | :---: |
| 1 | Auto line feed | Not fixed | Fixed | OFF |  |
| 2 | Impression level | Low | Hight | OFF |  |
| 3 | Buffer's data processing <br> mode selection | Series | Line | OFF |  |
| 4 | International character set |  |  |  |  |
| 5 | International character set | See Table (page 16) |  |  |  |
| 6 | International character set |  |  |  |  |
| 7 | Paper | Continuous <br> Paper | Cut <br> Sheet | OFF |  |
| 8 | Form length | $11^{\prime \prime}$ | $12^{\prime \prime}$ | OFF |  |
| 9 | Line spacing | $1 / 6^{\prime \prime}$ | $1 / 8^{\prime \prime}$ | OFF |  |
| 10 | Un-used | Invalid | Invalid | OFF |  |

Caution Do not turn on the power switch until the setting of these DIP switch pins has been completed.
If the setting of these switch pins is changed with the power switch turned on, the previous functions will remain effective unless the printer is remote-reset or initialize.
(1) DIP SW pin No. 1: AUTO Line feed

When this switch pin is set to "ON", the printer will feed the line only by CR code.

(2) DIP SW pin No. 2: IMPRESSION CONTROL

When this switch is set to ON, the impact of printing will be increased.
(3) DIP SW pin No. 3: BUFFER'S DATA PROCESSING MODE SELECTION

OFF: Data sent from CPU are processed in series. If the buffer is full of data, printer does not receive data from CPU. When data in the buffer decrease to 220 BYTE, data are sent from CPU till next buffer full.
Data sent from host computer are printed out immediately after receiving one character.
ON: Data are sent from CPU to printer buffer until buffer becomes full and if the control code (CR, LF, FF, VT) in the buffer is executed, CPU will send data till next control code.
Data are processed by one line unit. (When IBP PC interface is applied, SW No. 3 has to be set to ON.)
(4) DIP SW pin Nos. 4, 5 and 6: INTERNATIONAL CHARACTER SET

Various character sets of the countries shown in Table will be provided through combinations of these three pins.
(5) DIP SW pin No. 7: PAPERS

Setting this switch pin to ON will put the printer in Cut Sheet mode in which the printer is set for Paper End status and stops printing when print on one page is completed.
Set another paper on the printer and then depress the reset switch. This will cause the printer to start printing again.
(6) DIP SW pin No. 8: PAPER LENGTH

Set this switch pin to OFF for a $11^{\prime \prime}$ paper and set it to ON for $12^{\prime \prime}$ paper.
(7) DIP SW pin No. 9: LINE SPACING

When this switch pin is set to ON, the line space will be $1 / 8$ inch instead of $1 / 6$ inch.
(8) DIP SW pin No. 10 Although this switch pin is not in use, set it to OFF.

### 3.2 International character set

Combinations of DIP switch pin Nos. 4,5 and 6 will give the characters of countries shown in Table below. The character arrays are as shown in Table. The character codes are shown in Appendix.

Note: Use a daisy wheel specified in Appendix for each language.

| DIP SW pin No. 6 | DIP SW pin No. 5 | DIP SW pin No. 4 | Language |
| :---: | :---: | :---: | :--- |
| OFF | OFF | OFF | AMERICAN |
| OFF | OFF | ON | FRENCH |
| OFF | ON | OFF | GERMAN |
| OFF | ON | ON | ENGLISH |
| ON | OFF | OFF | DANISH/ <br> NORNEGIAN <br> ON OFF |
| ON | ON | ON | SWEDISH/ <br> FINNISH |
| ON | ON | ITALIAN |  |


| code <br> Language | ก | N | en | m | ㅇ | $\cdots$ | U | in | 出 | 8 | $\sim$ | V | $\hat{\sim}$ | 싿 | $\begin{aligned} & \text { I } \\ & 0 \\ & \end{aligned}$ | - | $\begin{aligned} & \mathbf{0} \\ & \mathbf{M} \end{aligned}$ | $\begin{aligned} & x \\ & 0 \\ & \hline \end{aligned}$ | $\begin{aligned} & \lambda \\ & u \\ & \text { un } \end{aligned}$ | N U |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| AMERICAN | \# | , | $<$ | > | @ | [ | 1 | ] | ^ | , | \{ | 1 | \} | $\sim$ | § | £ | .. | ç | $\zeta$ | $\neg$ |
| FRENCH | £ | , | 2 | 3 | à | - | Ç | § | - | $\frac{1}{2}$ | é | ù | è | . | § | $£$ | 3 | ^ | \% | $\mu$ |
| GERMAN | \# | 1 | $<$ | $>$ | § | A | O' | U | ^ | - | ä | ö | ü | B | § | £ | , | ^ | 2 | $\mu$ |
| ENGLISH | Ł | , | $<$ | > | @ | [ | 1 | ] | $\wedge$ | , | \{ | $\dagger$ | \} | $\sim$ | § | E | . | ¢̧ | $\zeta$ | $\neg$ |
| $\begin{array}{\|l\|} \hline \text { DANISH/ } \\ \text { NORNEGIAN } \end{array}$ | \# | 1 | < | > | . | F | $\emptyset$ | A | - | - | æ | $\emptyset$ | å | , | § | £ | , | $\sim$ | 2 | 1 |
| SWEDISH/ <br> FINNISH | 非 | 1 | $<$ | > | $\square$ | A | O' | A | ^ | - | ä | ö | å | Ü | § | £ | - | ^ | $\bigcirc$ | $\mu$ |
| ITALIAN | £ | 1 | 2 | 3 | § | 0 | ¢̧ | é | ^ | ù | à | ò | è | İ | § | £ | 3 | ^ | \% | $\mu$ |
| SPANISH | £ | , | 2 | 3 | § | i | $\widetilde{\mathrm{N}}$ | i | $\wedge$ | - | - | ก̃ | ¢̧ | ~ | § | $\pm$ | ${ }^{3}$ | $\wedge$ | $\underline{\text { a }}$ | 1 |

## 4. Control Codes

Various software controls can be done by using the control codes. Please carefully read the description of these control codes in order to take full advantage of the printer.
The control codes come in special control codes based on escape codes and those control codes shown in ASCII code table.

### 4.1 Control codes

The following shows the control codes given ty 7 bits ASCII code table.

| Column Row | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | NUL | DLE | ( $\downarrow$ ) | 0 | @ | P | , | p |
| 1 | SOH | DC 1 | ! | 1 | A | Q | a | q |
| 2 | STX | DC 2 | " | 2 | B | R | b | r |
| 3 | ETX | DC 3 | \# | 3 | C | S | c | S |
| 4 | EOT | DC 4 | \$ | 4 | D | T | d | t |
| 5 | ENQ | NAK | \% | 5 | E | U | e | u |
| 6 | ACK | SYN | \& | 6 | F | V | f | v |
| 7 | BEL | ETB | , | 7 | G | W | g | w |
| 8 | BS | CAN | 1 | 8 | H | X | h | x |
| 9 | HT | EM | ) | 9 | I | Y | i | y |
| A | LF | SUB | * | : | J | Z | j | z |
| B | VT | ESC | + | ; | K | [ | k |  |
| C | FF | FS | , | $<$ | L | $\backslash$ | 1 | 1 |
| D | CR | GS | - | $=$ | M | ] | m |  |
| E | SO | RS | . | > | N | - | n | $\sim$ |
| F | SI | US | 1 | ? | O | - | 0 | ( 7 ) |
| Note: The parenthesized characters can be specified by ESC code. |  |  |  |  |  |  |  | (§) |
|  |  |  |  |  |  |  |  | ( £) |
|  |  |  |  |  |  |  |  | ( ${ }^{\prime}$ ) |
|  |  |  |  |  |  |  |  | ( ç) |

(1) ACK (Acknowledge)

ACK is transmitted to the host computer over the communications link when a ETX (End of Text) code is encountered in the print buffer, i.e., when the signal reaches the ETX code after the data inside of the print buffer is printed. Valid for serial interface.
(2) BEL (Bell)

BEL sounds the audible alarm (buzzer) for 0.5 second when this signal is encountered in the print buffer.
(e.g.) When $A B C--X Y Z B E_{L}{ }^{\text {\& }}{ }^{C} R$ are transmitted, the buzzer sounds after printing A B C $--\mathrm{X}_{\mathrm{Y}} \mathrm{Z}$ characters.
(3) BS (Backspace)

BS backspaces the carriage one print position in Normal mode, or $1 / 60$ inch in Graphics mode. The previous data can not be erased.
(e.g.) When $G$ ra ${ }^{B} S^{\wedge} \mathrm{ce}^{\mathrm{C}} \mathrm{R}$ are transmitted, Grâce is printed.
(4) CR (Carriage Return)

CR causes a carriage return. When the left margin is set, the carriage returns to the left margin position. If AUTO LF Switch is on, also CR causes line feed operation.
(5) DC1 (Device Control 1)

When in the parallel interface, this signal is transmitted from the host computer, the printer is set in the select condition and the data can be transmitted. When, in the Serial interface, the protocol of DC1/DC3 is selected, when the number of data inside of the printer buffer after printing becomes less than 220 byte, DCl is transmitted to the host computer. DCl is possible to be transmitted only by means of DC3. That is to say, DC1 can be transmitted after being transmitted DC3 and being made the printing operation.
(6) DC3 (Device Control 3)

When in the parallel interface, this signal is transmitted, the printer is put on the diselect condition, and the data can not be transmitted. Moreover, when, in the Serial interface, the remaining number of data which can be received becomes less than 64 byte, DC3 is transmitted to the host computer.
(7) DEL (Delete)

This signal is normally ignored by the printer.
(8) ETX (End of Text)

It is effective in the Serial interface. This signal is transmitted to the printer at the end of a data string. This signal is taken together with the data in the printer buffer. Upon finding the ETX in the buffer, the printer will immediately transmit an ACK signal to notify the host computer to send another data string.
(e.g.) When A B C - X Y Z $^{B} E_{L}{ }^{\mathrm{E}} \mathrm{T}_{\mathrm{X}}$ are transmitted, A B C $-\mathrm{X}^{\text {X Y Z }}$ are printed, and ACK signal is transmitted after ringing the buzzer.
(9) ECS (Escape)

Various controls can be made by means of the entry of ESC code and its following code.
(10) FF (Form Feed)

FF initiates form feed to the top of the next page (form), or to the top margin on the next form or page when it is set.
(11) HT (Horizontal Tab)

HT initiates movement of the carriage to the next previously set Horizontal Tab Stop.
(12) LF (Line Feed)

LF initiates movement of the paper up one line. Movement changes to $1 / 48$ inch per command in the Graphics mode.
(13) NUL (Null)

This signal is ignored by the printer in all modes. It can be used as a spare code for dummy use.
(14) SP (Space)

SP initiates movement of the carriage one print position in normal mode, or 1/60 inch in Graphic mode.
(15) VT (Vertical Tab)

VT initiates movement of the paper up to the next previously set Vertical Tab Stop.

### 4.2 Special control codes (Escape code sequences)

A variety of special functions can be executed by entering ESC code and numerals, alphabets or symbols which follow the ESC code.
Standard function

| Control code |  |
| :--- | :--- |
| ESC 1 | Set HT stop at the present position |
| ESC 2 | Clears all HTs and VTs |
| ESC 3 | Sets Graphic mode to ON (Clears by CR) |
| ESC 4 | Sets Graphic mode to OFF |
| ESC 5 | Sets Forward print mode to ON |
| ESC 6 | Sets Backward print mode to ON (Cleared by CR) |
| ESC 7 | Sets Print suppress to ON (Cleared by CR) |
| ESC 8 | Clears the present HT stop |
| ESC 9 | Sets the left margin at the present position |
| ESC 0 | Sets the right margin at the present position |
| ESC HT(n) | Absolute HT to (n) colum |
| ESC LF | Set lines per page to (n) |
| ESC VT(n) | Absolute VT to (n) line |
| ESC FF(n) | Set lines per page to (n) |
| ESC - | Sets VT stop at the present position |
| ESC CR P | Executes remote reset |
| ESC RS(n) | Sets LSI to (n-1) |
| ESC US(n) | Sets CSI to (n-1) |
| ESC C | Clears top/bottom margins |
| ESC D | Executes $1 / 2$ line feed in the opposite direction |
| ESC U | Executes $1 / 2$ line feed |
| ESC L | Sets bottom margin at the present position |
| ESC T | Sets top margin at the present position |
| ESC Y | Prints symbol " 9 " |
| ESC Z | Prints symbol "7" |
| ESC | Prints symbol " " |


| Control code |  |
| :--- | :--- |
| ESC I | Prints symbol " f "" |
| ESC J | Prints symbol """ |
| ESC K | Prints symbol " $¢ "$ |
| ESC / | Enable Automatic backward print |
| ESC $\backslash$ | Disable Automatic backward print |
| ESC S | Sets CSI at a valued set by Spacing SW |
| ESC SUB R | Remote error reset |
| ESC SUB I | Initialize the printer |
| ESC SUB 1 | Status Request (only Serial I/F mode) |

## Word Processing Functions

| Control code |  |
| :--- | :--- |
| ESC P | Sets proportional space to ON (Cleared by ESC S) |
| ESC Q | Sets proportional space to OFF |
| ESC DC1(n) | Offset selection (Cleared by CR) |
| ESC E | Sets automatic underscore to ON |
| ESC R | Sets automatic underscore to OFF |
| ESC O | Sets bold print to ON (Cleared by CR) |
| ESC W | Sets shadow print to ON (Cleared by CR) |
| ESC \& | Sets bold/shadow print to OFF |
| ESC \% | Sets carriage settling time |
| ESC N | Clears carriage settling time |
| ESC BS | $1 / 120^{\prime \prime}$ back space |
| ESC X | Cancels all word processing modes except PS |

### 4.2.1 Standard functions

(1) ESC 1

A code used to specify a Horizontal Tab Stop position. When the printer receives ESC 1 code, the Tab stop is set at the present location of the carriage.
(2) ESC 2

When ESC 2 code is received, any preset HT Stop or VT stop will be cleared.
(3) ESC 3

When ESC 3 code is received, the printer is set for graphic mode. The graphic mode will provide the following action.
(a) When the printer receives print data, it will print the characters without moving its carriage.
(b) The carriage can be moved $1 / 60^{\prime \prime}$ either to the right or left by SP or BS code.
(c) The form can be fed $1 / 48^{\prime \prime}$ up or down by LF or ESC LF code.


Note: SP stands for Space code (HEX. 20). represents a period (HEX. 2E).
(4) ESC 4

Entry of ESC 4 code clears the graphic mode.
Note: The graphic mode can be cleared also by CR code.
(5) ESC 5

Used to clear the backward print mode.
Note: The backward print mode can be cleared also by CR code.
(6)

ESC 6
Entry of ESC 6 code place the printer in the backward print mode, provided that the last print line has been terminated by LF, ESC LF or CR code before receiving ESC 6, or else the printer may not be able to do further data processing.
When the printer is set for the backward print mode, the carriage moves to the left to proceed with printing.
In the backward print mode, the spacing and backspacing are reversed, while the operation of the tab, carriage return and paper feed remain unhanged.
[DATA] ABCD LF ESC 6 SP 4321
[PRINT] ABCD
1234
[DATA] SP SP SP ESC 9

$$
\text { A B C D CR ESC6 SP }) 1(
$$

[PRINT] (1)ABCD
(7) ESC 7

Entry of ESC 7 code will set the printer for print suppres status. The print suppress can be cleared by CR code.
DATA CITY; $\begin{array}{lllllllll}\text { ESC 7 } & \mathrm{N} \cdot \mathrm{Y} \cdot \mathbf{C R} & \mathbf{S P} & \mathbf{S P} & \mathbf{S P} & \mathbf{S P} & \mathbf{S P} & \text { LX }\end{array}$
PRINT CITY; LX
(8) ESC 8

If the printer receives ESC 8 code when HT stop has been set at the present carriage position, that HT stop will be cleared. Other HT stops specified in advance will remain effective.
(9) ESC 9

If the printer receives ESC 9 code, the left margin will be set at the present carriage position, and left margin previously set at any other point will be cleared. The printer will start printing at that newly set left margin after a carriage return.

DATA ABC ESC 9 DEFG CR LF HIJKL CR LF
PRINT ABCDEFG
HIJKL
(10) ESC 0

If the printer receives ESC 0 code, the right margin will be set at the present carriage position, and right margin previously set at any other point will be cleared.
(11) ESC HT (n)

By using this code, you can made the carriage move directly from the 1st to 126 th columns without the need for specifying HT stop. The (n) represents any one of decimal 1 to 126 , however it must be specified by an ASCII code. NUL code and DEL code cannot be used.

DATA ABC ESC HT LF DEF DATA ABC ESC HT A DEF
PRINT $123456789101112 \leftarrow$ columns
ABC DEF
123456...... $6364656667 \longleftarrow$ columns

ABC D E F
(12) ESC LF

When the printer receives ESC LF code, it will feed the form by one line in the opposite direction. In the graphic mode, the printer will feed the form by $1 / 48^{\prime \prime}$ in the opposite direction.
Caution ESC LF shall not be used when the print position is within 2.7 inch from the end edge of the paper.
(13) ESC VT (n)

By using this code, you can make the printer feed the form directly from 1st to 126 th lines without specifying VT stop in advance. The ( n ) represents decimal 1 to 126 , however, it must be specified by an ASCII code. NUL code and DEL code can not be used.
(14) ESC FF (n)

By using this code, you can specify the length of a page on a line basis. The $(\mathrm{n})$ represents any one of decimal 1 to 126 , however, it must be specified by an ASCII code. NUL code and DEL code can not be used. To set one page for 66 lines, for example, enter ESC FF B code, or enter ESC FF H to set it for 72 lines.
(15) ESC -

Used to specify Vertical Tab Stop. Whenever the printer has received this code, the vertical tab stop will be specified at the present line.

## (16) ESC CR P

This is a code for remote reset. When the printer receives this code, the printer will be placed in the busy status. This code is stored into a data buffer of the printer before the instruction is executed, so that if any other data has already been in the data buffer before this code is entered, the printer will be put into power on condition by this code only after the processing of that data has been completed.
(17) ESC RS (n)

This code sets the value of LSI (Line Spacing Index) to ( $n-1$ ). The ( $n$ ) represents any one of decimal 1 to 126 , but it must be specified by an ASCII code. NUL code and DEL code cannot be used. The paper feed amount per line depends on the value of LSI. When LSI=1, the amount of paper feed per line will be $1 / 48^{\prime \prime}$, in other words you can specify the amount of paper feed per line on a $1 / 48^{\prime \prime}$ basis.
$3 \mathrm{LPI}=1 / 3$ inch per line
$1 / 3$ inch $=16 \times 1 / 48$ inch $=(17-1) \times 1 / 48$ inch
$=(n-1) \times 1 / 48$ inch
Since ( n ) is 17 in the decimal notation, use ESC RS DC1 code to specify the feed amount.
(18) ESC US (n)

Used to set the value of CSI (Character Spacing Index) to ( $\mathrm{n}-1$ ). The ( n ) represents any one of decimal 1 to 126 , but it must be specified by an ASCII code. NUL code and DEL code cannot be used. The character pitch per column depends on the value of CSI. When CSI $=1$, the character pitch will be $1 / 120^{\prime \prime}$, in other words you can specify the character pitch on a $1 / 120^{\prime \prime}$ basis.
$10 \mathrm{CPI}=$ Character pitch $1 / 10$ inch
$1 / 10$ inch $=12 \times 1 / 120$ inch $=(13-1) \times 1 / 120$ inch
$=(\mathrm{n}-1) \times 1 / 120$ inch
Since ( $n$ ) will be 13 in the decimal notation, use ESC US CR to specify the character pitch.
(19) ESC C

This code is used to clear preset top and bottom margins to restore the margins which have been set at the time when the printer was powered up.
(20) ESC D

When the printer receives ESC D code, it will feed paper by $1 / 2$ line in the opposite direction.
DATA $4=2$ ESC D 2 PRINT $4=2^{2}$
(Print based on 6LPI)
(21) ESC U

When the printer receives ESC $U$ code, it will feed paper by $1 / 2$ line in the forward direction.

| DATA | CO | ESC U | 2 | ESC D, H | $\mathrm{ESC} U$ | 2 | ESC D | O | $\boxed{C R}$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| PRINT | $\mathrm{CO}_{2}, \mathrm{H}_{2} \mathrm{O}$ |  | LF |  |  |  |  |  |  |

(22) ESC T

When the printer receives ESC T code, it will set the top margin at the present line, and any top margin previously set will be cleared. When FF code is entered in the printer, the printer will feed paper to the newly specified line to begin printing with this line.
(23) ESC L

When the printer has accepted ESC L code, it will set the bottom margin at the present line, and any bottom margin previously set will be cleared. Immediately upon completion of print of the specified bottom margin line, the paper will be automatically fed to the specified line on the top margin.
(24) ESC Y, ESC Z, ESC H, ESC I, ESC J and ESC K

When any one of these codes is entered into the printer, the printer will print a symbol " $\ddagger$ ", " $\urcorner$ ", "§", " $£ ", " . "$ or " $¢ "$. These symbols will be printed when the DIP switches on the operation panel circuit board are set for U.S.A.
DATA ABC ESC Y ESC Z ESC H ESC I ESC J ESC K DEF CR LF

## 

(25) ESC /

This code is used to restore the automatic backward print mode when this mode has been cleared. The printer is set for the automatic backward print when it is powered up. In the automatic backward print mode, the printer will print in the right and left directions and take the shortest possible route to move its carriage for printing. In the automatic backward mode, the carriage will return to the left print starting point for printing each time one line of print is completed unless the printer is in any one of the following status:
(a) The automatic backward print mode is not cleared.
(b) The printer has a line of printed data terminated by CR code.
(c) A line of printed data does not include a control code.
(26) ESC $\backslash$

This is a code to clear the automatic backward print mode. Whenever ESC $\backslash$ code is accepted by the printer, the subsequent line print will begin from the left. In other words, the printer will print characters only from the left to right.
(27) ESC S

Used to set CSI (Character Spacing Index) value at a character pitch specified by the spacing switch on the operation panel.
(28) ESC SUB R

This is a remote error reset code, and provides the same function as that obtained when the reset switch on the operation panel is depressed.
(29) ESC SUB I

This is a code to initialize the printer. When ESC SUB I code is accepted by the printer, the printer initialized as same as POWER ON condition. If this code is accepted by the printer, every data in the data buffer are cleared unconditionaly.
Therefor customer should be take care used this code.
(30) ESC SUB 1

This code effective only serial interface mode. ESC SUB 1 code is accepted by the printer, the printer sended STX code and status to a host computer. Status Bit as follow.

## Bit Status

0 End of ribbon
$1 \quad 10$ pitch
2 Paper out
3 Auto LF enable
4 Carriage open
5 Buffer full
6 Printer in check
7 *Parity Bit*
Note: Parity Bit is set by selection switch on the Serial I/F board.

### 4.2.2 Word Precessing function

(1) ESC P

This is a code to specify PS (Proportional Space). The proportional space has a PS value for each character, and the pitch of each character does not depend on a CSI value but depends on the PS value table located in the printer memory except for space. The character pitch will not restore its value specified by the spacing switch unless power off/on ESC SUB I, ESC-CR-P or ESC $S$ code is entered into the printer.
(2) ESC Q

This is a code used to clear the proportional space mode. If the printer receives ESC Q code, the PS mode will be cleared but CSI value is the same as one before receiving ESC P.
(3) ESC DC1 (n)

The character pitch is usually changed by changing the CSI value, however, individual characters have different pitches which are stored in the memory table. This code is used to increase or decrease the table values. When a table value has been specified by ESC DC1 ( n ) code, it will remain unchanged until a new value is specified by another ESC DC1 (n) code. These offsets are cleared by entering CR code or ESC X code.

The byte of $(\mathrm{n})$ is specified as follows:
Bits $0-5=$ Size of offset.(63 units max. $----1 / 120$ per unit)
Bit $6=$ Sign of offset $(1=$ negative $)$
To decrease the character pitch, set it for negative offset. Namely, the carriage will not move when the character pitch is set for 0 or less and the bit 6 for 1 .
(4) ESC E

When the printer has received ESC E code, it will then print underscore until it receives ESC R code.

(5) ESC R

Used to clear the underscore. Refer to the description of ESC E code.
(6) ESC O

This is a code for bold printing. If the printer receives this ESC O code, it will print the same character over a printed character and continue this double printing until it receives CR code or ESC \& code.

```
DATA ABC ESC O DEF ESC & GHI ESC O JKL CR LF MNO
    CR LF
PRINT ABCDEFGHIJKL
    MNO
```

(7) ESC W

This is a shadow print code which is entered to make the printer print the same characters, shifting them by $1 / 120^{\prime \prime}$ thereby printing shadowy characters as shown below. This will be continued until CR code or ESC \& code is issued.

DATA ABC ESC W DEF ESC \& GHI ESC W JKL CR LF MNO CR LF

PRINT ABCDEFGHIJKL MNO
(8) ESC \&

This is a code to clear the bold print mode or shadow print mode.
(9) ESC \%

When the printer receives ESC \% code, it will make the carriage settling time longer to print. Therefore the printing will be done at a lower speed but with even character pitch.
(10) ESC N

This code is used to clear the carriage settling time.
(11) ESC BS

Entry of ESC BS code will cause the printer to provide $1 / 120^{\prime \prime}$ back space.
(12) ESC X

When the printer receives ESC $X$ code, all the word processing functions except the proportional space will be cleared.

## 5. Character Level (DAISY Wheel)



## 6. Parallel Interface

This printer is equipped with a parallel interface as a standard unit.
(1) Specifications
(a) Data transfer speed: 500 cps (max.)
(b) Synchronization: By STROBE pulses supplied from outside.
(c) Handshaking: By ACKNLG or BUSY signals.
(d) Logic level: All input data and interface control signals are of TTL level.
(2) Connector

Plug: AMPHENOL 57-30360.
The length of the cable should be 2 m or less.
(3) Input connector

| $\begin{gathered} \text { Signal } \\ \text { pin } \\ \text { No. } \end{gathered}$ | Return pin No. | Direction | Signal | Signal pin No. | Return pin No. | Direction | Signal |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 19 | In | $\overline{\text { STROBE }}$ | 14 |  |  | GND |
| 2 | 20 | In | DATA 1 | 15 |  |  | NC |
| 3 | 21 | In | DATA 2 | 16 |  |  | GND |
| 4 | 22 | In | DATA 3 | 17 |  |  | CHASSIS GND |
| 5 | 23 | In | DATA 4 | 18 |  |  | $+5 \mathrm{~V}$ |
| 6 | 24 | In | DATA 5 | 19~30 |  |  | GND |
| 7 | 25 | In | DATA 6 | 31 | 30 | In | $\overline{\text { PRIME }}$ |
| 8 | 26 | In | DATA 7 | 32 |  | Out | $\overline{\text { ERROR }}$ |
| 9 | 27 | In | DATA 8 | 33 |  |  | GND |
| 10 | 28 | Out | $\overline{\text { ACKNLG }}$ | 34 |  |  | NC |
| 11 | 29 | Out | BUSY | 35 |  |  | NC |
| 12 |  | Out | PE | 36 |  |  | NC |
| 13 |  | Out | SLCT |  |  |  |  |

(4) Description of signals
(a) STROBE

This is a pulse to read data. The pulse width must be $0.5 \mu$ s or more at the receiving the host computer. It is normally kept at HIGH, and when it is shifted from HIGH to LOW, data is latched.
(b) DATA $1 \sim 8$

These signals provide information of the 1st to 8 th bit of parallel data, and stay HIGH if data is 1 while stay LOW if data is 0 . Each bit must rise $0.5 \mu \mathrm{~s}$ earlier than the falling edge of a STROBE signal and must be secured $0.5 \mu \mathrm{~s}$ later than the rising edge. The DATA 8 is ignored since they are usually used for 7 bit ASCII codes.
(c) ACKNLG

This is an acknowledging pulse having approx. $7 \mu \mathrm{~s}$ pulse width, which is produced at the end of data input. When this pulse is produced, another data can be transferred.
(d) BUSY

This is a DC level signal to indicate whether the printer is ready to accept data entry or not. Data entry can be made while this signal stays LOW, provided that data entry can be made for DC 1 even when the signal is HIGH.
(e) PRIME

If this signal is set to LOW, the printer control unit will stop its operation. Accordingly, if this LOW signal is received during printing or while any function is in operation, such operation can not be guaranteed. If this signal is set to HIGH again, the printer will be initialized to restore its original status obtained when it is first powered up. Normally, the signal is set to HIGH.
(f) SLCT

This is a DC level signal which shows that the printer is operative.
(g) PE

This is a DC level signal which tells that paper has run out. It becomes HIGH in the absence of form and becomes LOW in the presence of form.
(h) ERROR

This is a DC level signal which indicates that the printer is in error status. It becomes LOW in error status while it becomes HIGH in normal status.
(5) Data transfer sequence


## 7. Optional

### 7.1 Serial interface

RS232C
(1) Specifications

Method . . . . . . . . . . . . . . . . . . . . Asynchronous system
Data transmitting speed . . . . . . . . . 300, 600, 1200, 2400 BPS
(change-over by means of Dip SW of serial I/F Board)

Start bit
1 bit
Data bit
7 bit
Parity check . . . . . . . . . . . . . . . . . . ODD, EVEN or MARK or SPACE (change-over by Dip SW)

Stop bit . . . . . . . . . . . . . . . . . . . . . One or two (change-over by Dip SW)
Mark $=\operatorname{logic} 1(-5 \mathrm{~V}$ to $-15 \mathrm{~V})$
Space $=\operatorname{logic} 0(+5 \mathrm{~V}$ to $+15 \mathrm{~V})$
Protocol
DC1/DC3 protocol
Printer ready protocol ETX/ACK protocol
(2) Connector

EIA standard 25 pin Canon type

| Data terminal ready (DTR) |  | Protective ground |
| :---: | :---: | :---: |
|  | -14 | Transmitted data (TD) |
|  | -15 | Received data (RD) |
|  | -16 | Request to send (RTS) |
|  | -17 | Clear to send (CTS) |
|  | -18 | Data set ready (DSR) |
|  | -19 | Signal ground (SG) |
|  | $\bigcirc 20$ | Received line signal detector (CD) |
| or (PRDY) | -21 80 ${ }^{\circ}$ |  |
|  | - $222310^{\circ}$ | Printer Ready (PRDY) |
|  | - $2411^{\circ}$ |  |

## $7.2 \mathbf{2 0 m A}$ current loop interface

(1) Specifieations

Signal polarity . . . . . . . . . . . Mark $=\operatorname{logic} 1$ (Current ON) Space $=$ logic $0($ Current OFF)
Other specifications are the same as those of RS232C.
(2) Connector


| Pin No. | Name of signal | Direction | Function |
| :---: | :--- | :--- | :--- |
| 7 | XMIT SINK | Printer |  |
| 10 | +RECEIVE DATA | $\longleftrightarrow$ | GND |
| 13 | RECEIVED SINK | $\longleftrightarrow$ | Positive received data |
| 17 | XMIT SOURCE | $\longrightarrow$ | GND |
| 18 | +XMIT DATA | $\longleftrightarrow$ | Transmitting power supply |
| 19 | - XMIT DATA | $\longrightarrow$ | Positive transmitted data |
| 21 | - RECEIVED DATA | $\longrightarrow$ | Negative transmitted data (RTN) |
| 23 | RECEIVE SOURCE | $\longrightarrow$ | Negative received data (RTN) |
| 24 | -XMIT DATA | $\longrightarrow$ | Receiving power supply |
| 25 | + RECEIVED DATA | $\longleftrightarrow$ | Negative transmitted data (RTN) |



Receiving Circuit

8. Code Table

ASCII CODE TABLE

|  | Hex. No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Hex. No. | Binary No. | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 |
| 0 | 0000 | $\begin{aligned} & \text { NUL } \\ & \qquad \begin{array}{l} 0 \end{array} \end{aligned}$ | DEL $\begin{array}{\|l\|} \hline 16 \\ \hline \end{array}$ | SP $32$ | $48$ | $64$ | P <br> 80 | $96$ | p <br> 112 |
| 1 | 0001 | SOH <br> 1 | DC1 $17$ | $33$ | 1 <br> 49 | A <br> 65 | 81 | 97 | $\begin{aligned} & 9 \\ & 113 \end{aligned}$ |
| 2 | 0010 | $\begin{aligned} & \text { STX } \\ & \sqrt{2} \end{aligned}$ | $\begin{aligned} & \text { DC2 } \\ & \quad 18 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2 \\ & 50 \\ & \hline \end{aligned}$ | B $66$ |  | b <br> 98 | $114$ |
| 3 | 0011 | $\begin{aligned} & \text { ETX } \\ & \qquad \begin{array}{\|c} \mathbf{3} \\ \hline \end{array} \end{aligned}$ | $\begin{aligned} & \text { DC3 } \\ & \quad 19 \end{aligned}$ | $35$ | $3$ <br> 51 | $67$ | S <br> 83 |  | 115 |
| 4 | 0100 | EOT | $\begin{aligned} & \text { DC4 } \\ & \quad 20 \end{aligned}$ | $36$ | 4 $52$ | D <br> 68 | T <br> 84 | d $100$ | 116 |
| 5 | 0101 | $\begin{aligned} & \text { ENQ } \\ & \boxed{5} \end{aligned}$ | NAK $21$ | \% $37$ | 5 <br> 53 | E <br> 69 |  | 101 | $u$ <br> 117 |
| 6 | 0110 | $\begin{aligned} & \text { ACK } \\ & \sqrt{6} \end{aligned}$ | $\begin{aligned} & \text { SYN } \\ & \quad 22 \end{aligned}$ | 38 | 6 <br> 54 | F <br> 70 | v <br> 86 | 102 | v $118$ |
| 7 | 0111 | BEL 7 | ETB <br> 23 | 39 | 7 <br> 55 | G $71$ | W <br> 87 | B <br> 103 | $\begin{aligned} & w \\ & 119 \end{aligned}$ |
| 8 | 1000 | BS $\begin{array}{\|l\|} \hline 8 \\ \hline \end{array}$ | CAN $24$ | ( $40$ | 8 <br> 56 | H $72$ |  | h <br> 104 | $x$ <br> 120 |
| 9 | 1001 | $$ | $\begin{aligned} & \text { EM } \\ & 25 \end{aligned}$ | ) $41$ | 9 <br> 57 | I <br> 73 |  |  | y <br> 121 |
| A | 1010 | $\begin{gathered} \text { LF } \\ 10 \end{gathered}$ | $\begin{aligned} & \text { SUB } \\ & \quad 26 \\ & \hline \end{aligned}$ | 42 | $58$ | J <br> 74 |  | j <br> 106 | $122$ |
| B | 1011 | $\begin{aligned} & \mathrm{VT} \\ & \hline 11 \\ & \hline \end{aligned}$ | ESC $27$ |  | $59$ | K $75$ |  | $107$ | $\{$ <br> 123 |
| C | 1100 | FF <br> 12 | $\begin{aligned} & \text { FS } \\ & \qquad 28 \end{aligned}$ | $44$ | $\begin{aligned} & < \\ & 60 \end{aligned}$ | L <br> 76 |  | 1 <br> 108 | $124$ |
| D | 1101 | CR <br> 13 | GS $29$ | $45$ | 61 | M $77$ | J $93$ | m <br> 109 | \} $125$ |
| E | 1110 | so <br> 14 | RS $30$ | $46$ | $62$ | N <br> 78 | 94 | n <br> 110 | $126$ |
| F | 1111 | SI $15$ | US $\begin{array}{\|l\|} \hline 31 \\ \hline \end{array}$ | 1 <br> 47 | 63 |  | $95$ | $111$ | DEL <br> 127 |

FRANCE CODE TABLE

|  | Hex. No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Hex. No. | Binary No. | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 |
| 0 | 0000 | $\begin{aligned} & \text { NUL } \\ & \qquad 0 \end{aligned}$ | DEL <br> 16 | SP <br> 32 | 48 | à $64$ | P <br> 80 | $\frac{1}{2}$ <br> 96 | $112$ |
| 1 | 0001 | $\mathrm{SOH}$ | $\begin{aligned} & \text { DCI } \\ & 17 \end{aligned}$ | $33$ | 1 <br> 49 | A 65 | Q $81$ | a $97$ | 9 $113$ |
| 2 | 0010 | $\begin{aligned} & \text { STX } \\ & 2 \end{aligned}$ | $\begin{aligned} & \text { DC2 } \\ & 18 \end{aligned}$ | 34 | 2 <br> 50 | B <br> 66 | R <br> 82 | b <br> 98 | 114 |
| 3 | 0011 | ETX $3$ | DC3 $19$ | £ <br> 35 | $3$ <br> 51 | C <br> 67 |  | C <br> 99 | 115 |
| 4 | 0100 | EOT $4$ | DC4 <br> 20 | 36 | 4 <br> 52 | D <br> 68 | T <br> 84 | d <br> 100 | t <br> 116 |
| 5 | 0101 | ENQ $5$ | NAK $21$ | \% <br> 37 | 5 <br> 53 | E <br> 69 | U <br> 85 | 101 | 117 |
| 6 | 0110 | $\begin{gathered} \mathrm{ACK} \\ 6 \end{gathered}$ | SYN <br> 22 | \& $38$ | 6 <br> 54 | F <br> 70 | V <br> 86 | f <br> 102 | v <br> 118 |
| 7 | 0111 | BEL 7 | ETB <br> 23 | $39$ | 7 <br> 55 | G <br> 71 | w 87 | g <br> 103 | w <br> 119 |
| 8 | 1000 | BS <br> 8 | CAN <br> 24 | 40 | 8 <br> 56 | 72 | $\mathrm{x}$ | h <br> 104 | x <br> 120 |
| 9 | 1001 | HT $9$ | EM <br> 25 | .) <br> 41 | 9 <br> 57 | I <br> 73 | $\mathrm{Y}$ <br> 89 | i $\square$ <br> 105 | y <br> 121 |
| A | 1010 | LF $10$ | SUB $26$ | 42 | 58 | J <br> 74 | Z <br> 90 | j | $z$ <br> 122 |
| B | 1011 | VT <br> 11 | ESC $27$ | 43 | 59 | K <br> 75 | 0 <br> 91 | $\begin{aligned} & k \\ & 107 \end{aligned}$ | $123$ |
| C | 1100 | FF <br> 12 | FS <br> 28 | 44 | 60 | L <br> 76 | $92$ | $1$ <br> 108 | ù $124$ |
| D | 1101 | CR $13$ | GS <br> 29 | 45 | $=$ <br> 61 | M <br> 77 | § $93$ | m 109 | $125$ |
| E | 1110 | SO <br> 14 | RS 30 | 46 | 62 | $78$ | 94 | n <br> 110 | /. 126 |
| F | 1111 | SI $\qquad$ | US $\qquad$ <br> 31 | / <br> 47 | $63$ | 0 <br> 79 | 95 | o <br> 111 | DEL $127$ |


|  | Hex. No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Hex. No. | $\begin{aligned} & \text { Binary } \\ & \text { No. } \end{aligned}$ | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 |
| 0 | 0000 | NUL $0$ | DEL <br> 16 | SP <br> 32 | 48 |  |  | 96 | p $112$ |
| 1 | 0001 | $\begin{aligned} & \mathrm{SOH} \\ & 1 \end{aligned}$ | $\begin{aligned} & \text { DC1 } \\ & 17 \end{aligned}$ | 33 | 1 <br> 49 | A $65$ | Q 81 | $97$ | q <br> 113 |
| 2 | 0010 | $\begin{aligned} & \text { STX } \\ & 2 \end{aligned}$ | $\begin{aligned} & \text { DC2 } \\ & 18 \end{aligned}$ | " 34 | $\begin{aligned} & 2 \\ & 50 \end{aligned}$ | $\stackrel{\text { B }}{ }{ }^{66}$ | R ${ }^{\text {R }}$ | b $98$ | $114$ |
| 3 | 0011 | ETX $3$ | $\begin{aligned} & \text { DC3 } \\ & 19 \end{aligned}$ | \# <br> 35 | 3 $51$ | c <br> 67 |  | C <br> 99 | 115 |
| 4 | 0100 | $\begin{aligned} & \text { EOT } \\ & \boxed{4} \end{aligned}$ | $\begin{aligned} & \text { DC4 } \\ & \quad 20 \end{aligned}$ | \$ <br> 36 | 4 $52$ | D <br> 68 | T <br> 84 | d <br> 100 | $t$ <br> 116 |
| 5 | 0101 | $\begin{aligned} & \text { ENQ } \\ & \boxed{5} \end{aligned}$ | NAK <br> 21 | \% $37$ | 5 <br> 53 | E <br> 69 | $85$ | $101$ | u <br> 117 |
| 6 | 0110 | $\begin{aligned} & \mathrm{ACK} \\ & 6 \end{aligned}$ | SYN $22$ | \& | 6 <br> 54 | F $70$ | v <br> 86 | f <br> 102 | v <br> 118 |
| 7 | 0111 | $\begin{gathered} \text { BEL } \\ 7 \end{gathered}$ | $\begin{aligned} & \text { ETB } \\ & 23 \end{aligned}$ | $39$ | $7$ <br> 55 | G $71$ |  | g $103$ | w <br> 119 |
| 8 | 1000 | BS $8$ | CAN $24$ | 40 | 8 <br> 56 | H <br> 72 |  | h <br> 104 | x <br> 120 |
| 9 | 1001 | $\begin{aligned} & \text { HT } \\ & \boxed{9} \end{aligned}$ | EM <br> 25 | ) <br> 41 | 9 $57$ | I $73$ |  | i <br> 105 | y <br> ${ }^{\mathrm{y}}$ <br> 121 |
| A | 1010 | LF <br> 10 | $\begin{aligned} & \text { SUB } \\ & 26 \end{aligned}$ | 42 | 58 | $\mathrm{J}$ $74$ |  | j <br> 106 | $z$ <br> 122 |
| B | 1011 | vT <br> 11 | ESC $27$ | 43 | $59$ | K <br> 75 | A $91$ | k <br> 107 | $123$ |
| C | 1100 | FF <br> 12 | FS <br> 28 | 44 | $\begin{aligned} & < \\ & 60 \end{aligned}$ | L <br> 76 | 0 $92$ | 1 <br> 108 | o <br> 124 |
| D | 1101 | CR <br> 13 | GS | 45 | $\begin{aligned} & = \\ & 61 \end{aligned}$ | M $77$ | 0 $93$ | m <br> 109 | ü <br> 125 |
| E | 1110 | so <br> 14 | RS $30$ | $46$ | $62$ | N <br> 78 | 94 | n <br> 110 | B <br> 126 |
| F | 1111 | SI <br> 15 | US $31$ | 1 <br> 47 | $63$ | 0 $\begin{array}{\|l\|} \hline 79 \\ \hline \end{array}$ |  | 0 <br> 111 | DEL $127$ |

ENGLAND CODE TABLE

|  | Hex. No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Hex. No. | Binary No. | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 |
| 0 | 0000 | $\begin{aligned} & \text { NUL } \\ & \qquad \begin{array}{\|l} 0 \end{array} \end{aligned}$ | DEL $16$ | SP <br> 32 | $48$ | 64 | $80$ | 96 | p <br> 112 |
| 1 | 0001 | $\begin{aligned} & \text { SOH } \\ & \boxed{1} \end{aligned}$ | $\begin{aligned} & \text { DC1 } \\ & 17 \end{aligned}$ | $33$ | 1 <br> 49 | A $65$ | Q <br> 81 | a <br> 97 | $\begin{aligned} & \text { q } \\ & 113 \end{aligned}$ |
| 2 | 0010 | $\begin{aligned} & \text { STX } \\ & \sqrt{2} \end{aligned}$ | $\begin{aligned} & \text { DC2 } \\ & \quad 18 \end{aligned}$ | $34$ | 2 <br> 50 | B <br> 66 | R <br> 82 | b $98$ | r $114$ |
| 3 | 0011 | $\begin{aligned} & \text { ETX } \\ & \boxed{3} \end{aligned}$ | $\begin{aligned} & \text { DC3 } \\ & 19 \end{aligned}$ | £ <br> 35 | 3 $51$ | C $67$ | S <br> 83 | C <br> 99 | $s$ $115$ |
| 4 | 0100 | $\begin{aligned} & \text { EOT } \\ & 4 \end{aligned}$ | $\begin{aligned} & \text { DC4 } \\ & 20 \end{aligned}$ | $\$$ <br> 36 | 4 <br> 52 | D <br> 68 | T <br> 84 | d $100$ | $116$ |
| 5 | 0101 | $\begin{aligned} & \mathrm{ENQ} \\ & { }_{5} \end{aligned}$ | NAK <br> 21 | $\%$ <br> 37 | 5 <br> 53 | E <br> 69 | $\stackrel{U}{85}^{8}$ | e $101$ | u $117$ |
| 6 | 0110 | $\frac{\mathrm{ACK}}{6}$ | SYN <br> 22 | \& $38$ | 6 <br> 54 | F <br> 70 | v <br> 86 | f <br> 102 | $\stackrel{\mathrm{v}}{ }$ |
| 7 | 0111 | $\begin{aligned} & \text { BEL } \\ & \hline 7 \end{aligned}$ | $\begin{aligned} & \text { ETB } \\ & 23 \end{aligned}$ | 39 | 7 <br> 55 | G <br> 71 | W ${ }^{\text {W7 }}$ |  | w <br>  <br> 119 |
| 8 | 1000 | BS <br> 8 | CAN $24$ | 40 | 8 <br> 56 | H <br> 72 |  | h <br> 104 | x <br> 120 |
| 9 | 1001 | $\begin{aligned} & \text { HT } \\ & \hline 9 \end{aligned}$ | $\begin{aligned} & \text { EM } \\ & 25 \end{aligned}$ | $41$ | 9 $57$ | I $73$ |  | i $105$ | y <br> 121 |
| A | 1010 | LF <br> 10 | $\begin{aligned} & \text { SUB } \\ & \qquad 26 \end{aligned}$ | 42 | 58 | J $74$ |  | j <br> 106 | z <br> 122 |
| B | 1011 | vT <br> 11 | ESC $27$ | 43 | 59 | K <br> 75 | 1 $91$ | k <br> 107 | \{ <br> 123 |
| C | 1100 | FF <br> 12 | FS <br> 28 | 44 | $\begin{aligned} & < \\ & 60 \end{aligned}$ | L <br> 76 |  | 1 <br> 108 | 1 124 |
| D | 1101 | CR <br> 13 | GS $29$ | 45 | 61 | M <br> 77 | ] <br> 93 | m <br> 109 | \} <br> 125 |
| E | 1110 | so <br> 14 | $\begin{aligned} & \text { RS } \\ & \quad 30 \end{aligned}$ | 46 | $62$ | N <br> 78 | 94 | $n^{n}$ | 126 |
| F | 1111 | SI <br> 15 | US 31 | 47 | 63 | 0 <br> 79 |  | o <br> 111 | DEL $127$ |

## DENMARK/NORSELAND CODE TABLE

|  | Hex. No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Hex. No. | $\begin{aligned} & \text { Binary } \\ & \text { No. } \end{aligned}$ | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 |
| 0 | 0000 | NUL $0$ | DEL | SP <br> 32 | 48 | 64 | $80$ | $96$ | P <br> 112 |
| 1 | 0001 | SOH <br> 1 | $\begin{aligned} & \text { DC1 } \\ & 17 \end{aligned}$ | 33 | 1 <br> 49 | A <br> 65 | $81$ | a <br> 97 | $\begin{aligned} & q \\ & 113 \end{aligned}$ |
| 2 | 0010 | $\begin{aligned} & \text { STX } \\ & \sqrt{2} \end{aligned}$ | $\begin{aligned} & \text { DC2 } \\ & 18 \end{aligned}$ | $34$ | $2$ <br> 50 | B <br> 66 | R <br> 82 | b <br> 98 | 1 <br> 114 |
| 3 | 0011 | $\begin{aligned} & \text { ETX } \\ & \boxed{3} \end{aligned}$ | $\begin{aligned} & \text { DC3 } \\ & 19 \end{aligned}$ | \# <br> 35 | 3 <br> 51 | C <br> 67 | S <br> 83 | $99$ | $\mathrm{s}^{\mathrm{s}} 115$ |
| 4 | 0100 | $\begin{aligned} & \text { EOT } \\ & \sqrt{4} \end{aligned}$ | $\begin{aligned} & \text { DC4 } \\ & \quad 20 \end{aligned}$ | $\$$ <br> 36 | 4 <br> 52 | D <br> 68 | T <br> 84 | d $100$ | 116 |
| 5 | 0101 | $\begin{aligned} & \text { ENQ } \\ & 5 \end{aligned}$ | NAK <br> 21 | $\%$ <br> 37 | 5 $53$ | E <br> 69 | $85$ | $101$ | 116 <br> 117 |
| 6 | 0110 | $\begin{aligned} & \text { ACK } \\ & 6 \end{aligned}$ | SYN $22$ |  <br> 38 | 6 <br> 54 | F $70$ | $\mathrm{v}$ $86$ | f <br> 102 |  <br> 118 |
| 7 | 0111 | BEL <br> 7 | ETB $23$ | $39$ | $\begin{aligned} & 7 \\ & 55 \end{aligned}$ | G <br> 71 | W <br> 87 | B <br> 103 | w 1119 |
| 8 | 1000 | BS <br> 8 | CAN $24$ |  | 8 $56$ | H <br> 72 | $88$ | h <br> 104 | $120$ |
| 9 | 1001 | HT <br> 9 | EM $25$ | $41$ | 9 <br> 57 | $73$ |  | i $105$ | y $121$ |
| A | 1010 | LF $10$ | SUB $26$ | 42 | 58 | J <br> 74 |  | j <br> 106 | $z$ <br> 122 |
| B | 1011 | $\begin{aligned} & \text { VT } \\ & \quad 11 \end{aligned}$ | $\begin{aligned} & \text { ESC } \\ & \qquad 27 \end{aligned}$ | 43 | 59 | K $75$ |  | k $107$ | 123 |
| C | 1100 | FF $12$ | FS $28$ | $44$ | $\begin{aligned} & < \\ & 60 \end{aligned}$ | L <br> 76 |  | $\begin{aligned} & 1 \\ & 108 \end{aligned}$ | $\phi$ $124$ |
| D | 1101 | CR <br> 13 | $\begin{aligned} & \text { GS } \\ & 29 \end{aligned}$ | 45 | 61 | M $77$ |  | m | $125$ |
| E | 1110 | so <br> 14 | RS <br> 30 | $46$ | $>$ $62$ | N $78$ | 94 | n <br> 110 | 126 |
| F | 1111 | Si <br> 15 | US <br> 31 | 47 |  | 10 79 | - 9 | 111 | DEL <br> 127 |


|  | Hex. No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Hex. No. | $\begin{aligned} & \text { Binary } \\ & \text { No. } \end{aligned}$ | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 |
| 0 | 0000 | $\begin{aligned} & \text { NUL } \\ & \quad 0 \end{aligned}$ | DEL $16$ | SP <br> 32 |  | $\begin{aligned} & \infty \\ & 64 \end{aligned}$ | $80$ | 96 | p <br> 112 |
| 1 | 0001 | SOH $1$ | $\mathrm{DC1}$ $17$ | 33 | 1 <br> 49 |  | Q <br> 81 |  | q <br> 113 |
| 2 | 0010 | $\begin{aligned} & \text { STX } \\ & 2 \end{aligned}$ | $\begin{aligned} & \text { DC2 } \\ & \quad 18 \end{aligned}$ | 34 | $\begin{aligned} & 2 \\ & 50 \end{aligned}$ | B <br> 66 | R <br> 82 | b | $114$ |
| 3 | 0011 | $\begin{aligned} & \text { ETX } \\ & \qquad \begin{array}{\|l} 3 \end{array} \end{aligned}$ | $\begin{aligned} & \text { DC3 } \\ & \quad 19 \end{aligned}$ | \# <br> 35 | 3 <br> 51 | C <br> 67 | S <br> 83 | C <br> 99 | $115$ |
| 4 | 0100 | EOT $4$ | $\begin{aligned} & \text { DC4 } \\ & \quad 20 \end{aligned}$ | $36$ | 4 $52$ | D <br> 68 | T <br> 84 | d <br> 100 | $116$ |
| 5 | 0101 | ENQ <br> 5 | NAK $21$ | $37$ | 5 <br> 53 | E <br> 69 | U <br> 85 | $101$ | u <br> 117 |
| 6 | 0110 | $\begin{aligned} & \mathrm{ACK} \\ & \boxed{6} \end{aligned}$ | $\begin{aligned} & \text { SYN } \\ & \quad 22 \end{aligned}$ | \& | 6 <br> 54 | F $70$ | v <br> 86 | $f$ $102$ | $118$ |
| 7 | 0111 | $\begin{aligned} & \text { BEL } \\ & \begin{array}{\|c\|} 7 \\ \hline \end{array} \end{aligned}$ | $\begin{aligned} & \text { ETB } \\ & \quad 23 \\ & \hline \end{aligned}$ |  | 7 <br> 55 | G $\begin{array}{\|l\|} \hline 71 \\ \hline \end{array}$ | w <br> 87 | 8 <br> 103 | $119$ |
| 8 | 1000 | BS $\begin{array}{\|l\|} \hline 8 \\ \hline \end{array}$ | CAN $\begin{array}{\|l\|} \hline 24 \\ \hline \end{array}$ | ( $40$ | 8 $56$ |  | X <br> 88 | h <br> 104 | $\mathbf{x}$ $120$ |
| 9 | 1001 | HT <br> 9 | EM $25$ | ) | $9$ $57$ | 1 $73$ |  | i <br> 105 | y <br> 121 |
| A | 1010 | LF <br> 10 | $\begin{aligned} & \text { SUB } \\ & 26 \end{aligned}$ | $42$ | $58$ |  | Z $90$ | j <br> 106 | 2 <br> 122 |
| B | 1011 | vT $11$ | ESC $27$ | 43 | $59$ |  | A <br> 91 | $\mathrm{k}$ $107$ | $123$ |
| C | 1100 | FF <br> 12 | FS <br> 28 | $44$ | $\begin{aligned} & < \\ & 60 \end{aligned}$ | L <br> 76 | $92$ | 1 <br> 108 | ö <br> 124 |
| D | 1101 | CR <br> 13 | GS <br> 29 | 45 | $=$ <br> 61 | M $77$ | $\AA$ $93$ | m <br> 109 |  <br> 125 |
| E | 1110 | So <br> 14 | RS $30$ | 46 | $\begin{aligned} & > \\ & 62 \end{aligned}$ | N $78$ | $94$ | n <br> 110 | ü <br> 126 |
| F | 1111 | SI <br> 15 | US <br> 31 | 47 | 63 | 10 <br>  <br> 9 | $95$ | $111$ | DEL $127$ |

ITALY CODE TABLE

|  | Hex. No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Hex. No. | Binary No. | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 |
| 0 | 0000 | NUL $0$ | DEL $16$ | SP <br> 32 | $48$ | § <br> 64 | $80$ | ù <br> 96 | p <br> 112 |
| 1 | 0001 | SOH <br> 1 | $\mathrm{DC1}$ | $33$ | 1 <br> 49 | A $65$ | $81$ | $97$ | q <br> 113 |
| 2 | 0010 | $\begin{aligned} & \text { STX } \\ & \sqrt{2} \end{aligned}$ | $\begin{aligned} & \text { DC2 } \\ & 18 \end{aligned}$ | $34$ | $50$ | B $66$ | R $82$ | b $98$ | $114$ |
| 3 | 0011 | $\begin{aligned} & \text { ETX } \\ & \boxed{3} \end{aligned}$ | $\begin{aligned} & \text { DC3 } \\ & \hline 19 \end{aligned}$ | £ $35$ | 3 $51$ | C <br> 67 | S $83$ | C <br> 99 | s $115$ |
| 4 | 0100 | $\begin{aligned} & \text { EOT } \\ & \qquad 4 \end{aligned}$ | $\begin{aligned} & \text { DC4 } \\ & 20 \end{aligned}$ | $\$$ <br> 36 | 4 $52$ | D <br> 68 | T <br> 84 | d <br> 100 | t <br> 116 |
| 5 | 0101 | $\begin{gathered} \mathrm{ENQ} \\ 5 \end{gathered}$ | NAK $21$ | \% <br> 37 | 5 <br> 53 | E <br> 69 | U <br> 85 | $101$ | $117$ |
| 6 | 0110 | $\begin{aligned} & \mathrm{ACK} \\ & \boxed{6} \end{aligned}$ | $\begin{aligned} & \text { SYN } \\ & 22 \end{aligned}$ |  <br> 38 | 6 <br> 54 | F <br> 70 |  | $\mathrm{f}$ <br> 102 | $\mathrm{v}$ <br> 118 |
| 7 | 0111 | BEL 7 | ETB <br> 23 | 39 | 55 | G $71$ | W <br> 87 | g <br> 103 | w $119$ |
| 8 | 1000 | BS <br> 8 | CAN <br> 24 |  | 8 $56$ | H <br> 72 | X | h $104$ | $120$ |
| 9 | 1001 | HT $9$ | EM <br> 25 | ) <br> 41 | 9 <br> 57 | I $73$ |  | i | y $121$ |
| A | 1010 | LF <br> 10 | SUB $26$ | 42 | 58 | J $74$ |  | j <br> 106 | $z$ <br> 122 |
| B | 1011 | VT <br> 11 | ESC $27$ | 43 | 59 | K $75$ |  | k <br> 107 | à $123$ |
| C | 1100 | FF $12$ | FS | 44 | $60$ | L $76$ |  | 1 <br> 108 | 124 <br> 1 |
| D | 1101 | CR <br> 13 | GS $29$ | 45 | $61$ | $\mathrm{M}$ $77$ |  | m $109$ | $125$ |
| E | 1110 | so <br> 14 | RS <br> 30 | $46$ | $62$ | N $78$ | 94 | n $110$ | $\mathrm{i}^{1}$ |
| F | 1111 | $\begin{aligned} & \text { SI } \\ & 15 \end{aligned}$ | $\begin{aligned} & \text { US } \\ & \begin{array}{\|l} 31 \\ \hline \end{array} \end{aligned}$ | $1$ | $63$ | $\begin{aligned} & 0 \\ & 79 \end{aligned}$ | $95$ | o <br> 111 | DEL <br> 127 |

## SPAIN CODE TABLE

|  | Hex. No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Hex. No. | Binary No. | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 |
| 0 | 0000 | NUL $\begin{array}{\|l\|} \hline 0 \end{array}$ | DEL $16$ | SP <br> 32 | 0 <br> 48 | § <br> 64 | P <br> 80 | 96 | p <br> 112 |
| 1 | 0001 | $\mathrm{SOH}$ | $\begin{aligned} & \text { DC1 } \\ & 17 \end{aligned}$ | $33$ | 1 <br> 49 | A <br> 65 | Q $81$ | $97$ | q $113$ |
| 2 | 0010 | STX $2$ | $\begin{aligned} & \text { DC2 } \\ & 18 \end{aligned}$ | 34 | 2 <br> 50 | B $66$ |  | b <br> 98 | r <br> 114 |
| 3 | 0011 | ETX $3$ | $\begin{gathered} \text { DC3 } \\ \hline 19 \end{gathered}$ | 35 | 51 | C <br> 67 |  | C <br> 99 | $s$ <br> 115 |
| 4 | 0100 | EOT $4$ | DC4 $20$ | 36 | $4$ <br> 52 | D <br> 68 | T <br> 84 | d <br> 100 | 116 |
| 5 | 0101 | ENQ $5$ | NAK 21 | \% <br> 37 | 53 | E $69$ | U <br> 85 | 101 | $117$ |
| 6 | 0110 | $\begin{aligned} & \text { ACK } \\ & \qquad 6 \end{aligned}$ | $\begin{aligned} & \text { SYN } \\ & 22 \end{aligned}$ | \& | 6 <br> 54 | F <br> 70 | v <br> 86 | f <br> 102 | $118$ |
| 7 | 0111 | BEL <br> 7 | ETB 23 | 39 | $7$ <br> 55 | G <br> 71 | 87 | 8 <br> 103 | $119$ |
| 8 | 1000 | BS <br> 8 | CAN <br> 24 | 40 | 8 $\square$ <br> 56 | H <br> 72 | $\mathbf{x}$ | h <br> 104 |  |
| 9 | 1001 | HT $\square$ $9$ | EM <br> 25 | ) <br> 41 | 9 <br> 57 | I <br> 73 | Y <br> 89 | $\begin{aligned} & \text { i } \\ & 105 \end{aligned}$ | y <br> 121 |
| A | 1010 | LF $10$ | SUB 26 | 42 | 58 | J <br> 74 | Z <br> 90 | j | $z$ <br> 122 |
| B | 1011 | VT <br> 11 | ESC 27 | 43 | $59$ | K <br> 75 | i <br> 91 | k <br> 107 | o <br> 123 |
| C | 1100 | FF <br> 12 | FS <br> 28 | 44 | 60 | L $\square$ <br> 76 | ก <br> 92 | $1$ <br> 108 | ก <br> 124 |
| D | 1101 | CR <br> 13 | GS | $45$ | $=$ <br> 61 | M <br> 77 | i $93$ | m <br> 109 | f <br> 125 |
| E | 1110 | SO <br> 14 | RS <br> 30 | 46 | 62 | N | 94 | n $110$ | 126 |
| F | 1111 | SI $15$ | US $31$ | 1 <br> 47 | 63 | 0 <br> 79 | 95 | 0 | DEL 127 |



