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LABEL PRINTER

Detailed description of the invention

Field of the invention

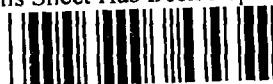
The present invention relates to an improved label printer.

Description of the Prior Art

Figure 67 shows the arrangement of a conventional label printer 1 for printing data such as price and the like on a label in the form of a bar code. As shown, the label printer 1 comprises a label strip 3 in the form of a roll that is mounted in a printer system unit 2, from which the label strip 3 is transported between a thermal print head 4 and a platen roller 5 to print prices, bar codes and other such data on labels 6.

In the above conventional configuration, the printer system unit 2 is provided with a keyboard 7 as the means of entering print data into the label printer 1. To confirm the print data thus input via the keyboard 7,

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the printer system unit 2 is provided with a liquid-crystal display (LCD) 8 on which data entered via the keyboard 7 is displayed.

Prices, product codes and other such print data entered into the label printer 1 via the keyboard 7, are keyed in as an integral combination of media parameters comprised of print data setting information that specifies the required contents of the print data, and print data editing information such as positional data indicating where the print data is to be printed on the label, the size of the print, rotation direction, whether it is printed in bar code form or as ordinary characters (human-readable characters).

However, a drawback of the above conventional label printer 1 is that the operation screens used for entering the media parameters are always displayed in a set sequence. This has an adverse affect on print data input efficiency, since there are many media parameters to be set, and the setting procedure is complex.

An object of the present invention is therefore to provide a label printer in which print setting information specifying the required contents of label print data, and editing information for printing the above print data in a required format on the label, can be entered using operating screens displayed on a touch screen device in the form of a sequential hierarchical structure, wherein the hierarchical structure whereby the operating screens are displayed on the touch-screen is arranged so that any desired level in the hierarchy can be displayed and print setting information input from that level.

In accordance with the present invention, the above object is attained by a label printer, in which print setting information specifying the required contents of label print data, and editing information for printing the above print data in a required format on the label, can be



entered using operating screens displayed on a touch screen device in the form of a sequential hierarchical structure, wherein the hierarchical structure whereby the operating screens are displayed on the touch-screen is arranged so that any desired level in the hierarchy can be displayed and print setting information input from that level.

In the hierarchical structure used to display operating screens on the touch-screen, a desired level in the hierarchy is displayed and print setting information is input from that level.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

An embodiment of the present invention will now be described with reference to the drawings.

Figure 1 is a perspective view showing the exterior of one embodiment of a label printer 10 according to this invention. The label printer 10 comprises a label printer system unit 11 and a touch-screen unit 13 connected with the printer system unit 11 by an interface cable 12.

Figure 2 shows the printer system unit 11 with its cover 14 open. Inside the printer system unit 11 are a thermal print head 15 and a platen roller 16, which operate together to effect printing.

Reference numeral 17 denotes a roll of label strip 17 rotatably mounted toward the rear of the printer system unit 11. The label strip 17 comprises thermosensitive labels 19 detachably attached along a backing strip 18. The label strip 17 is fed between the thermal print head 15 and the platen roller 16, where the prescribed printing of the label 19 is effected by heat supplied from the thermal print head 15.

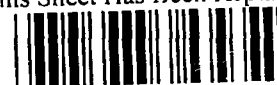
As shown in Figure 3, the touch-screen unit 13 has an LCD 20 for displaying operating screens, and a transparent touch-panel 21 set in close contact with the surface of the LCD 20. When an operator uses a finger to touch a point on the touch-panel 21, the location of the point thus



As shown in Figure 5, DRAM 26 has an operation work area 26a and the MS-DOS operation work area 26b, with the operation work area 26a consisting of program space 33 and operation memory space 34. Program space 33 is used for processing data read into operation memory space 34 by a prescribed program, and for holding the code for a jump table 35 described below. More specifically, the operation memory space 34 consists of a print data buffer space 36, an image editing parameter preparation space 37 and an image editing space 38. The print data buffer space 36 is used for holding the initial values of print data parameters (described below) held in SRAM 25, as set in the initial data value parameter setting space 39; these parameters are converted into print data form for this storage in the buffer space 36. Print data contained in the buffer space 36 and print data editing parameters held in SRAM 25 are read into image editing parameter preparation space 37, where the print data is developed in accordance with conditions specified by the print data editing parameters to produce image editing parameters. Image editing parameters produced in the image editing parameter preparation space 37 are read into image editing space 38, where print image data is produced in accordance with these image editing parameters. The above print image data is the same as the price, product code and other such specific print data to be printed on labels 19, developed into image form.

The MS-DOS program stored in the ROM 24 is read into operation work area 26b, where a data field parameter file 40, described below, is produced.

Under the control of the CPU 22, operation screen data stored in ROM 24 is developed into operation screen image data in VRAM 27. Via the touch-screen control section 29, this image data is displayed on the LCD 20 of the touch-screen unit 13 as sequences of operation screens.



Central Processing Unit(hereinafter referred to as CPU 22)
touched is detected by a ~~CPU 22 (described below)~~ in the form of X and Y coordinates.

Figure 4 is a block diagram of the electrical circuit of the label printer 10. A bus 23 is used to connect a read-only memory (hereinafter referred to as "ROM 24"), a first memory constituted by a static random-access memory (hereinafter referred to as "SRAM 25"), a second memory constituted by a dynamic random-access memory (hereinafter referred to as "DRAM 26"), a video RAM (hereinafter referred to as "VRAM 27") and a printer section 28 to a ^{"C P U 22"}~~central processing unit (hereinafter referred to as "CPU 22")~~. A touch-screen control section 29 is connected to the VRAM 27, and the interface cable 12 connects the touch-screen control section 29 to the touch-screen unit 13.

The printer section 28 is comprised of a head control circuit 30 connected to the bus 23, the thermal print head 15, which is connected to the head control circuit 30, a stepping motor drive circuit 31 connected to the bus 23, a stepping motor 32 connected to the stepping motor drive circuit 31, and the platen roller 16, which is connected to the stepping motor 32.

The ROM 24 contains an MS-DOS (registered trademark) operating system, a program that provides overall control of the label printer 10 by controlling the touch-screen unit 13, the SRAM 25, the DRAM 26, and so forth, and the various operating screen data hierarchically displayed on the LCD 20 of the touch-screen unit 13.

The SRAM 25 is used for storing various data, such as print data, print data parameters, print data editing parameters and the like.

Most of the DRAM 26 is taken up by an operation work area 26b. Label 19 print data and the like supplied to the thermal print head 15 is developed in the form of a dot image under the control of the CPU 22.



As shown in Figure 5, DRAM 26 has an operation work area 26a and the MS-DOS operation work area 26b, with the operation work area 26a consisting of program space 33 and operation memory space 34. Program space 33 is used for processing data read into operation memory space 34 by a prescribed program, and for holding the code for a jump table 35 described below. More specifically, the operation memory space 34 consists of a print data buffer space 36, an image editing parameter preparation space 37 and an image editing space 38. The print data buffer space 36 is used for holding the initial values of print data parameters (described below) held in SRAM 25, as set in the initial data value parameter setting space 39; these parameters are converted into print data form for this storage in the buffer space 36. Print data contained in the buffer space 36 and print data editing parameters held in SRAM 25 are read into image editing parameter preparation space 37, where the print data is developed in accordance with conditions specified by the print data editing parameters to produce image editing parameters. Image editing parameters produced in the image editing parameter preparation space 37 are read into image editing space 38, where print image data is produced in accordance with these image editing parameters. The above print image data is the same as the price, product code and other such specific print data to be printed on labels 19, developed into image form.

The MS-DOS program stored in the ROM 24 is read into operation work area 26b, where a data field parameter file 40, described below, is produced.

Under the control of the CPU 22, operation screen data stored in ROM 24 is developed into operation screen image data in VRAM 27. Via the touch-screen control section 29, this image data is displayed on the LCD 20 of the touch-screen unit 13 as sequences of operation screens.



Under the control of CPU 22, print data stored in SRAM 25 is moved to DRAM 26, and is also supplied to thermal print head 15 via the head control circuit 30.

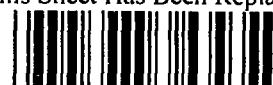
The CPU 22 also controls the supply of the above print data to the thermal print head 15, and operates the stepping motor 32 via the stepping motor drive circuit 31 to thereby turn the platen roller 16 and print the data on labels 19 transported between the platen roller 16 and the thermal print head 15.

Figure 6 shows the layout of the data field parameter file 40, which constitutes an essential part of this invention. The data field parameter file 40 has a print data parameter space 41 for setting print data information in the form of print data parameters, a destination number setting space 42 for setting the destination number N that designates the hierarchical level of the operation screen displayed when the next print data is input from the touch-screen unit 13, and a print field parameter space 43 for setting print data editing information in the form of print data field parameters.

The data field parameter file 40 is stored in the SRAM 25 with an MS-DOS file name FMxx.DAT (where xx has a valid value of 01 - 99). Format number FM01 data field parameter file 40 designates a data field parameter file 40 named FM01.DAT.

This format number FM01 makes it possible to differentiate one data field parameter file 40 (FM01.DAT) comprised of a print data parameter, a corresponding print field parameter and a destination number N from other data field parameter files 40 (FM02.DAT - FM99.DAT).

In this embodiment data field parameter files 40 FM01.DAT to FM99.DAT are formed having format numbers FM01 to FM99, Figure 6 shows only the file having the format number FM01; since the



composition of each of the data field parameter files 40 having format numbers FM02 to FM99 is the same as that of file format number FM01, description of the other files is omitted.

The print data parameter space 41 has sub data parameter spaces 44 designated by data numbers 01 to 30. Each of these sub data parameter spaces 44 has the same composition, being comprised of a data parameter setting space 45 for a prescribed byte for setting a parameter designating print data properties and the like, a name parameter setting space 46 for a prescribed byte for setting a name parameter designating an entry indicating print data content, and the initial data value parameter setting space 39 for a prescribed byte for setting an initial print data value parameter that sets the initial print data value (the default value).

Figure 7 shows details of the sub data parameter space 44 of data number 01.

Thus, as described above, each sub data parameter space 44 consists of a data parameter setting space 45, a name parameter setting space 46 and an initial data value parameter setting space 39. Data parameter setting space 45 is further divided into an attribute field 47, a number of digits field 48, a type field 49, a processing condition field 50 and a status field 51.

When labels 19 are being printed out, the attribute field 47 is used for setting a parameter that determines whether a change mode is to be used because new print data has been entered via the touch-screen unit 13, or a fixed mode to again use the print data just used. Either of these modes can be selected by setting a prescribed numerical value in the attribute field 47.

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The number of digits field 48 is for setting a parameter determining the maximum number of digits of the initial data value parameter set in the initial data value parameter setting space 39.

The type field 49 is for setting a parameter that determines whether the parameter set in the initial data value parameter setting space 39 is a number, ANK, symbol or kanji.

The processing condition field 50 is for setting a mode parameter that, when the initial data value parameter is a bar code, determines whether the value of a check digit input from the touch-screen unit 13 is positive or negative is to be judged automatically or not, and when judgement is automatic, determines the type of bar code, for example JAN 8 or JAN 13.

The status field 51 is for setting a parameter that, when a label 19 is printed out, determines whether the print data of that label 19 is to be kept as the print data for the next label 19, or whether that print data is to be cleared and the print data used for the label immediately preceding the printed out label 19 is to be used for the next label 19.

The name parameter setting space 46 is for setting the parameter designating the entry that indicates the content of the data to be printed, such as for example date of manufacture, product category name, manufacturer, product code, and the like. This is displayed when the operator is using the touch-screen unit 13 to enter the print data, and is for making it easier to understand what to enter to produce the requisite print data.

The initial data value parameter setting space 39 is for setting an initial value (default value) parameter for the data to be printed on a label 19, which may be a date of manufacture such as 10 October 1994, product name, such as chocolate or the like, and the vendor, such as the



ABC Store, for example. The contents may be set as desired within the maximum number of digits setting in the number of digits field 48.

Figure 8 shows the sub data parameter space 44 of the final data number n ($n = 1 - 30$) of the print data parameter space 41. The destination number setting space 42 is formed below the sub data parameter space 44. The destination number N set in the destination number setting space 42 may be any sub data parameter space 44 data number from 01 to 30. In the label printing operation described below, which operation screen is to be displayed on the touch-screen unit 13 with initial data entry values from which to start data entry can be designated by these data numbers 01 to 30, following which the subsequent display of the operation screens proceeds from that point in the hierarchy, thereby enabling entry of the print data to proceed from that point.

Figure 9 shows the settings used in the print data parameter space 41 to produce the data printed on the label 19 shown in Figure 10. The label 19 shown in Figure 10 has spaces (hereinafter referred to as "print fields") 01, 02 and 03 in which to print data in the form of numbers, characters, and bar codes. In this example, "chocolate" (in katakana) ^{in Japanese} is printed in print field 01, a bar code 52 is printed in print field 02, and explanatory characters in print field 03. The "chocolate" represents the name of the product, and the explanatory characters are comprised of a flag manufacturer code 4912345, a product code 67890, and a check digit 4.

In Figure 9, "chocolate" is the initial print data parameter set in the initial data value parameter setting space 39 of the sub data parameter space 44 designated by data number 01. The name parameter is set to product name, data attribute to entry mode, number of print data digits to 6 digits, and data type to kanji. (in Japanese)



The bar code data of bar code 52 is comprised of flag manufacturer code, product code, and check digit. The setting of this bar code data is divided between data numbers 02 and 03 in the sub data parameter space 44. That is, the flag manufacturer code 4912345 is set as the parameter in the initial data value parameter setting space 39 of sub data parameter space 44 data number 02, flag manufacturer is the name parameter set in the name parameter setting space 46, in the attribute field 47 the parameter is set to fixed, in the number of digits field 48 the parameter is seven digits, and in the data type field 49 the parameter is numbers.

With reference to the explanatory characters 4912345678904 constituting the print data in the print field 03 below the bar code 52 on the label 19 shown in Figure 10, a print field copy function, described below, is set so that this print data 4912345678904 is data copied from print field 02. Thus, there is no parameter setting in the sub data parameter space 44 shown in Figure 9 that specifies the explanatory character print data itself.

The destination number in the destination number setting space 42 is set to 3. As a result, after a label has been printed out, the initial data input screen used for again printing out a label will be the screen for entering the manufacturer code, that is, 67890, that being the print data indicated by the data number 03 in sub data parameter space 44.

Reverting to Figure 6, the print field parameter space 43 of the data field parameter file 40 will now be described, with reference to print data editing information set therein.

Editing information relating to the format of data printed on a label 19 is determined in the form of parameter settings in the print field parameter space 43.

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The print field parameter space 43 is divided into thirty sub print field parameter spaces 53, designated by field numbers 01 to 30. These field numbers 01 to 30 correspond to the spaces on each label 19 in which product name, price, manufacturer and other such data is to be printed.

Thus, the sub print field parameter space 53 designated by print field 01 contains a parameter relating to the print format in print field 01 of the label 19.

Details of the sub print field parameter spaces 53 are shown in Figures 11 and 12. The sub print field parameter space 53 shown in Figure 11 relates to the printing of character data in a character field of the label 19, while the sub print field parameter space 53 shown in Figure 12 relates to the printing of data in a bar code field of the label 19.

First, the sub print field parameter space 53 for a character field of Figure 11 will be explained. This sub print field parameter space 53 is composed of a print data type field 54, a print position field 57 comprised of a vertical position field 55 and a horizontal position field 56, a number of digits field 58, a pitch field 59, a scale factor field 62 comprised of a vertical scale factor field 60 and a horizontal scale factor field 61, a direction field 63, a numbering function setting field 71 comprised of a function field 64, a consecutive number field 65, a starting digit field 66, a consecutive digit field 67, an increment/decrement field 68, a minimum range field 69 and a maximum range field 70, a processing condition setting field 74 comprised of a processing field 72 and a processing condition field 73, and a print data specification field 75.

The print data specification field 75 is comprised of a data specification field 76 and blocks 1, 2, 3, and 4. Each of these blocks 1



to 4 is comprised of a data number field 77, starting position field 78 and number of digits field 79.

The print data type field 54 is used to set the sub print field parameter space 53 to a character field or to a bar code field. In the case of a character field, field 54 is also used to set character type to S, M, OB (OCR-B font), WL, U, kanji 16, or kanji 24.

The print position field 57 is for setting the position at which printing starts on the label 19, in terms of X and Y coordinates from a datum point, as shown in Figure 13. The number of digits field 58 is for setting the maximum number of print data digits. The pitch field 59 is for setting the spacing between characters. The scale factor field 62 is used to set the factor by which characters are enlarged vertically and horizontally. The direction field 63 is for setting the direction in which characters are printed, and to forward mode, or to modes for rotating characters by 90, 180, or 270 degrees.

The numbering function setting field 71 is for setting whether or not to print consecutive numbers according to function field 64. When consecutive numbers are to be printed, consecutive number field 65 is used to set whether the numbers are printed incrementally or decrementally. The position at which the printing of consecutive numbers starts is set by starting digit field 66, the number of consecutive number digits by consecutive digit field 67, whether the numbers run incrementally or decrementally by increment/decrement field 68, the minimum range of the consecutive numbering by minimum range field 69, and the maximum range of the consecutive numbering by maximum range field 70.

Processing condition setting field 74 is used to set whether or not symbols are to be supplemented according to processing field 72, and, in



accordance with processing condition field 73, sets ¥, supplement, ¥ supplement, or bar supplement.

Print data specification field 75 is for designating data to be printed in the print fields 01 to 30 as indicated by print field numbers 01 to 30.

Data specification field 76 is for setting a mode whereby the data to be printed is designated by sub data parameter space 44 data numbers 01 to 30, or a mode whereby designated print data already set in a sub print field parameter space 53 is copied.

When data specification field 76 is set to the mode whereby the data to be printed is designated by sub data parameter space 44 data numbers 01 to 30, and block 1 is specified, the data to be printed in the print field concerned can be designated by setting the data number of the print data stored in data number field 77, the print data starting column in starting position field 78, and the number of print data columns in the number of digits field 79 of the block 1.

When data specification field 76 is set to the mode whereby designated print data already set in a sub print field parameter space 53 is to be copied, and block 1 is specified, the data to be printed in the print field concerned can be designated by setting the field number of the print data stored in data number field 77, the print data starting column in starting position field 78, and the number of print data columns in the number of digits field 79 of the block 1.

Since the functions of the data number field, starting position field and number of digits field of blocks 2, 3 and 4 are the same as those of block 1, further explanation thereof is omitted.

The sub print field parameter space 53 of the bar code field will now be explained, with reference to Figure 12. As the composition of this sub print field parameter space 53 is substantially the same as the sub



print field parameter space 53 of the character field described above, the explanation thereof will be limited to the differences. Fields of the other portion that are the same as in the case of the character field are shown with the same names, and explanation thereof is omitted.

Whether a sub print field parameter space 53 relates to a character field or a bar code field is set using print data type field 54, which, when set to bar code field, also sets whether the type of bar code printed is JAN 8 digit, JAN 13 digit, UPC-E, NW-7, compressed NW7, CODE 39, ITF, or CODE 128.

The vertical length of the bar code is set by bar code vertical field 80. The ratio of thick and thin bars is set by bar ratio field 81. The bar code scale factor is set by scale factor field 82.

Processing condition setting field 83 is used to set whether the check digit is automatically calculated or not, in accordance with processing field 84, and also whether JAN 8 digit, JAN 13 digit, Price C/D or Modulus 43 is set by processing condition field 85.

Next, Figure 14 shows the arrangement of the print field parameter space 43 in the print fields 01, 02 and 03 of the label 19 of Figure 10.

The data to be printed in print field 01 of the label 19 shown in Figure 10 is "chocolate" (in katakana). The data specification field 76 in the print data specification field 75 of the sub print field parameter space 53 shown in Figure 14 is set to a data mode whereby the data to be printed is designated by sub data parameter space 44 data number 01.

Next, as block 1, the print data "chocolate" designated by data number 01 in the sub data parameter space 44 shown in Figure 9 is designated as sub print field parameter space 53 print data of six digits, starting from starting position 01.

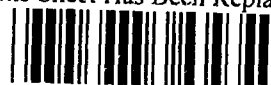


Blocks 2, 3 and 4 are not set, so print data is specified only by block 1.

For the data to be printed in print field 01 as specified by field number 01, the print data type field 54 parameter is set for print type kanji 24, the print position field 57 parameter is set for vertical print position 0272 and horizontal print position 224, the number of digits field 58 is set for six digits, the pitch field 59 parameter is set for a pitch of two, the scale factor field 62 is set for a vertical scale factor of one and a horizontal scale factor of one, and the direction field 63 is set for zero degrees.

The data to be printed in the print field 02 shown in Figure 10 is a JAN 13 digit bar code 52, so the data specification field 76 of sub print field parameter space 53 field number 02, shown in Figure 14, is set to data print mode.

As block 1 in the print data specification field 75, the print data specified by the sub data parameter space 44 data number 02 (flag manufacturer code 4912345) is specified as print data of sub print field parameter space 53 field number 02 having seven digits, counting from starting position 01. As block 2, the print data specified by the sub data parameter space 44 data number 03 (product code 67890) is specified as print data of sub print field parameter space 53 field number 02 having five digits, counting from starting position 01. No print data is specified in block 3 or block 4. Thus, the field 1 print data is the 491234567890 designated by blocks 1 and 2. For the print data specified for field number 02, the print data type field 54 parameter is set for JAN 13 digit, the print position field 57 parameter is set for vertical print position 0336 and horizontal print position 228, the number of digits field 58 is set for thirteen digits, the scale factor field 62 is set for a scale factor of two, the



direction field 63 is set for zero degrees, the bar ratio field 81 is set for a bar ratio of one, the bar code vertical field 80 is set to 072, and the processing condition setting field 83 is set for JAN 13 and automatic check digit generation.

Next, the data to be printed in print field 03 of the label 19 shown in Figure 10 is the explanatory characters 4912345678904, which are constituted of the same code as the print field 02 data (bar code 52).

With reference to Figure 14, the print field copy mode is set by data specification field 76 of the print data specification field 75, and field number 02, as block 1, specifies that the print data is thirteen digits, starting from position 01. As a result, the data printed in print field 03 is the same code, 4912345678904, printed in print field 02. For the print data specified for field number 03, the print data type field 54 parameter is set for M character, the print position field 57 parameter is set for vertical print position 0424 and horizontal print position 232, the number of digits field 58 is set for thirteen digit data, the pitch field 59 parameter is set for a pitch of one, the scale factor field 62 is set for a vertical scale factor of one and a horizontal scale factor of one, and the direction field 63 is set for zero degrees.

Figure 15 is a general illustration of the storage of print data initial values in the print data buffer space 36 of DRAM 26.

The print data buffer space 36 is used to store data numbers 01 to 30, and the initial print data values designated by the data numbers 01 to 30. That is, initial print data values are developed from the initial print data value parameters set in the initial data value parameter setting space 39 of the sub data parameter spaces 44 in the print data parameter space 41 that are stored in the SRAM 25, in accordance with the parameter settings in each attribute field 47, number of digits field 48, type field 49,



processing condition field 50 and status field 51, and are stored in the print data buffer space 36 together with the corresponding data numbers 01 to 30.

It is arranged so that when the initial print data value parameters in the sub data parameter spaces 44 of the SRAM 25 are developed into initial print data values in the print data buffer space 36 of DRAM 26, the destination number N set in the destination number setting space 42 of the data field parameter file 40 is also stored in the print data buffer space 36.

Figure 16 shows the initial print data value parameters of the print data parameter space 41 shown in Figure 9 developed and stored in the DRAM 26 print data buffer space 36 as initial print data values.

In accordance with the data parameters set in the print data parameter space 41, the initial print data value corresponding to data number 01 is developed and stored in the print data buffer space 36 as "chocolate", the initial print data value corresponding to data number 02 as flag manufacturer code 4912345, and the initial print data value corresponding to data number 03 as product code 67890. "3" is stored as the destination number N.

Figure 17 shows the storage status of changed initial print data values in the print data buffer space 36, that is, after the print data has been changed, following the printing of the label 19 of Figure 10, in order to print out label 19A of Figure 18. Specifically, for printing out label 19A, the initial value 67890 of the product code constituting the print data of data number 03 in the print data buffer space 36 has been changed to 67670.

Figure 19 shows the arrangement of what is an essential part of the present invention, the jump table 35 stored in the program space 33 of the DRAM 26. The jump table 35 is arranged so that when the print data



parameter space 41 parameters in the data field parameter file 40 in the SRAM 25 are read into DRAM 26 print data buffer space 36 by the CPU 22, the format number FM in the data field parameter file 40 together with the process addresses LCD01 - LCD32 corresponding to the operation screens, are stored in the program space 33 of the DRAM 26. A prescribed program is stored whereby prescribed operation screens at specific addresses in ROM 24 specified by LCD01 - LCD32 are displayed on the touch-screen unit 13 in a prescribed order.

Thus, after printing a label 19 according to the initial print data values, the CPU 22 reads out the destination number N in the print data buffer space 36, then reads out the process address LCD02 - LCD31 corresponding to the data number 01 - 30 specified by the destination number N. The ROM 24 program designated by the process address LCD02 - LCD31 is executed, causing the data entry screen specified by a data number 01 - 30 in the print data buffer space 36 designated by the destination number N to be displayed on the touch-screen unit 13, followed by prescribed operation screens displayed in sequence.

Figure 20 shows the correspondence between the status of the jump table 35 produced in the program space 33 of the DRAM 26 when the print data parameter space 41 parameters are read into the print data buffer space 36 of DRAM 26, and the data entry screen displayed on the touch-screen unit 13 when the ROM 24 program specified by a jump table 35 process address LCD01 - LCD05 is executed.

The label printing operation of the label printer 10 thus configured will now be described.

First, the label printing operation will be described in outline, with reference to the flow chart of Figure 21.



In step 1, a power switch is (not shown) closed while pressing a feed key (not shown), resulting in step 2 in the display of a utility mode screen on the touch-screen unit 13. Touching prescribed areas displayed on this utility mode screen brings up a data parameter setting screen, in step 3. This data parameter setting screen is used to set prescribed parameters such as data number, name, data attributes, number of data digits, data type, and so forth.

Next, in step 4, the destination number of the operation screen following the printing of the label is entered.

In step 5 the process shifts to the field parameter setting screen for setting prescribed print field parameters such as field number, print position, number of data digits, pitch, scale factor, direction, bar ratio, bar height, processing, functions, data specifications and the like.

In step 6 the electric power is switched off and back on, resulting in step 7 in a print mode screen being displayed on the touch-screen unit 13.

When a prescribed display area of the print mode screen is touched to select manual mode, followed in step 8 by the entry of format number, input data and the number of copies to be printed, in step 9 the prescribed number of labels 19 are printed out in the prescribed format.

In step 10 the prescribed screen to which the process has jumped is displayed. After input of the data and the number of copies to be printed, resulting in step 11 in the printing of labels 19 based on the data thus entered.

Details of the operation of printing out the label 19 shown in Figure 10, using the label printer 10 having the above-described configuration, will now be described with reference to Figures 22 to 65.



First, the operation of setting print data parameters and print field parameters will be described with reference to Figures 22 to 57.

To set print data parameters, first, when ~~the feed key is pressed~~ ^{the power is switched on} while ~~the power is switched on~~, under the control of the CPU 22 the program in the ROM 24 moves the utility mode screen data stored in the ROM 24 into the VRAM 27, and the touch-screen control section 29 displays the utility mode screen, indicated as screen 1, on the LCD 20 of the touch-screen unit 13 (Figure 22).

When the operator touches a print data parameter setting area of the touch-panel 21, the location of the touch is detected by the CPU 22, and in accordance with a program stored beforehand in the ROM 24, the data of the next operation screen is read out of ROM 24 to the VRAM 27, to display print data parameter setting screen as screen 2 on the touch-screen unit 13 (Figure 23).

Next, when the operator touches the Parameter Setting area of screen 2, the next operation screen data is read out of ROM 24 by the CPU 22 and displayed on the touch-screen unit 13 as parameter setting screen, indicated as screen 3 (Figure 24).

When the Data Parameter Setting area of screen 3 is touched, the next operation screen data is read out of ROM 24 by the CPU 22 and displayed on the touch-screen unit 13 as format number entry screen, screen 4 (Figure 25).

Entering format number 01 via the format number entry screen results in the CPU 22 displaying on the touch-screen unit 13, as screen 5, the data number entry screen (Figure 26). Entering data number 01 via the data number entry screen 5 and touching the Enter area causes the CPU 22 to display, as screen 6, the name entry screen (Figure 27).



After touching the prescribed Code Designation, Select and Word areas of name entry screen 6 and entering the product name, touching the Enter area causes the CPU 22 to display data attribute entry screen, screen 9 (Figure 28).

When the Entry area of screen 7 is touched, then the Enter area, the CPU 22 displays as screen 8 the number of data digits entry screen (Figure 29). When this screen 8 is used to enter 06 as the number of data digits, and the Enter area is touched, the CPU 22 displays the data type entry screen as screen 9 (Figure 30).

Selecting the Kanji area in screen 9 followed by the Enter area brings up a display of the print data initial value entry screen as screen 10 (Figure 31).

After the Select area of the print data initial value entry screen 10 is touched and the select print data entry screen 11 is used to input "chocolate" as the initial print data value (Figure 32), touching the Enter area redisplayes print data initial value entry screen 10. When the Enter area of screen 10 is touched, the display shifts to screen 12, the data clear option screen (Figure 33). The No area of screen 12 is touched, followed by the Enter area, completing the setting of the print data parameters designated by sub data parameter space 44 data number 01 shown in Figure 9. Touching the Enter area of the data clear option screen 12 brings up a display of screen 13, the data parameter end field confirmation screen (Figure 34), so the No area is touched, to revert to the display of the data number entry screen 5 (Figure 26). The above operations are used to set each of the print data parameters designated by sub data parameter space 44 data numbers 02 and 03 shown in Figure 9.

Since the operation used to set each of the print data parameters designated by sub data parameter space 44 data numbers 02 and 03 can



be readily understood from the above explanation of the operation relating to data number 01, separate explanations relating to data numbers 02 and 03 are omitted.

After the operation of setting the print data parameters of sub data parameter space 44 data number 03 has been completed, touching the Yes area of the data parameter end field confirmation screen 13 brings up the destination number setting screen 14 shown in Figure 35. Destination number "3" is entered via this screen 14, and the Enter area is then touched, redisplaying the format number entry screen 4 (Figure 25). In the same way as described above, this format number entry screen 4 is used to set print data parameters for the required number of format numbers 02 - 99. For the sake of simplicity, the explanation made with respect to the label 19 of Figure 10 has been limited to print data parameters relating to format number 01.

After all the print data parameters have been set for format numbers 01 - 99, the Previous Screen area of format number entry screen 4 is touched to redisplay screen 3, the parameter setting screen (Figure 24).

When the Field Parameter Setting area of screen 3 is touched, the display shifts to field parameter setting screen 15 to start the setting of the print field parameters (Figure 36).

Format number 01 is input via screen 15 and the Enter area is touched, bringing field number setting screen 16 to the display (Figure 37). When field number 01 has been entered via this screen 16, the Enter area is touched to display the initial field parameter setting screen 17 (Figure 38).

Touching the Print Type: No Print area of the initial field parameter setting screen 17 brings up a display of the character field setting screen 18 (Figure 39). Touching the Character area of screen 18, followed by



the Enter area, moves the process to character type selection screen 19 (Figure 40).

When the Kanji 24 area of the character type selection screen 19 is touched followed by the Enter area, character field setting screen 18 is displayed (Figure 39). When the Print Position area of the screen 18 is touched, the display changes to print position entry screen 20, whereby vertical position 0272 and horizontal position 224 are entered (Figure 41).

Similarly, touching the Number of Digits area of the character field setting screen 18 shifts the display to the number of print data digits screen 21, which is used to enter 06 as the number of digits (Figure 42). Touching the Pitch area of screen 18 changes the display to the pitch entry screen 22, which is used to enter a character pitch of 2 (Figure 43).

The Scale Factor area of the character field setting screen 18 is touched to enter a vertical scale factor of 1 and a horizontal scale factor of 1 via character scale factor entry screen 23 (Figure 44).

Next, the Forward area of character field setting screen 18 is touched to set printing direction to forward via print direction entry screen 24 (Figure 45).

The Data Specification area of screen 18 is then touched, moving the display to data specification selection screen 25 (Figure 46). Touching the Data area of this screen 25, followed by the Enter area, brings up the display of data block setting screen 26 (Figure 47). When block 1 is selected in this screen 26, the display shifts to initial data value setting screen 27 (Figure 48).

After the data number 01, starting digit 01 and number of digits 06 are entered via the initial data value setting screen 27 and the Enter area is touched, specifying "chocolate" as the initial print data value parameter, the display reverts to data block setting screen 26 (Figure 47).

When the End area of the data block setting screen 26 is touched, data specification selection screen 25 is displayed (Figure 46), and when the Enter area is touched, the display returns to field number setting screen 16 (Figure 37).

After using field number setting screen 16 to enter field number 02, touching the Enter area shifts the display to character field setting screen 18 (Figure 39). When the Print Type: Character area in screen 18 is touched, print data type selection screen 28 is displayed (Figure 49), and when the Bar Code area is touched, the display shifts to bar code type selection screen 29 (Figure 50).

When JAN 13 Digit is selected in bar code type selection screen 29, the display moves to bar code field setting screen 30 (Figure 51). The Print Position area of screen 30 is touched to display print position entry screen 20, which is used to enter vertical position 0336 and horizontal position 228 (Figure 41).

In the same way, touching the Number of Digits area of the bar code field setting screen 30 brings number of print data digits entry screen 21 to the display, which is used to enter 13 digits (Figure 42); touching the Bar Scale Factor area of screen 30 brings up bar code scale factor screen 31, into which a bar scale factor of 2 is entered (Figure 52); the Ratio area of screen 30 is touched to display bar code ratio screen 32 to enter 1 as the ratio (Figure 53); the Direction area of screen 30 is touched to display print direction entry screen 24, which is used to select Forward (Figure 45); and the Bar Vertical area of screen 30 is touched to display bar code vertical screen 33, which is used to enter a value of 072 (Figure 54).

The Processing Setting area of screen 30 is touched to display processing condition setting screen 34, in which the C/D Calculation area



is selected (Figure 55), then when the Generate JAN 13 area of check digit selection screen 35 is touched, the display reverts to the bar code field setting screen 30 (Figures 56 and 51).

The display moves to data specification selection screen 25 when the Data Specification area of bar code field setting screen 30 is touched (Figure 46). When the Data area of screen 25 is touched, data block setting screen 26 is displayed (Figure 47). When the Block 1 area of screen 26 is touched, the display shifts to initial data value setting screen 27 (Figure 48). After using screen 27 to enter data number 02, starting digit 01 and number of data digits 07, the Enter area is used to redisplay screen 26 (Figure 47).

Selecting the Block 2 area in the data block setting screen 26 redispays the initial data value setting screen 27 (Figure 48). After using this screen 27 to enter data number 03, number of data digits 05 and starting digit 01, touching the Enter area causes the display to revert to screen 26 (Figure 47). When the End area of the data block setting screen 26 is touched, the display shifts to the bar code field setting screen 30 (Figure 51). When the Enter area of screen 30 is touched, the display reverts back to field number setting screen 16 (Figure 37).

After using field number setting screen 16 to enter field number 03, touching the Enter area shifts the display to bar code field setting screen 30 (Figure 51). When the Print Type: Bar area of screen 30 is touched, print data type selection screen 28 is displayed (Figure 49), and when the Character area is touched, the display shifts to character type selection screen 19 (Figure 40). Selecting M Character in screen 19 causes the display to shift to character field setting screen 18 (Figure 39).

The Print Position area of the screen 18 is touched to display the print position entry screen 20, which is used to set a vertical position of

0424 and a horizontal position of 232 (Figure 41). The Number of Digits area of the character field setting screen 18 is touched to change the display to the number of print data digits screen 21, which is used to enter 13 as the number of digits (Figure 42), the Pitch area of screen 18 is touched to change the display to the pitch entry screen 22, in which a character pitch of 1 is entered (Figure 43); the Scale Factor area of the character field setting screen 18 is touched and a vertical scale factor of 1 and a horizontal scale factor of 1 are entered via character scale factor entry screen 23 (Figure 44), and the Forward area of character field setting screen 18 is touched to set the printing direction to forward via the print direction entry screen 24 (Figure 47).

When the Data Specification area of screen 18 is selected, the display changes to the data specification selection screen 25, on which the Copy area is touched followed by the Enter area, to display copy block setting screen 36 (Figure 57). When block 1 is selected in this screen 36, the display moves to initial data value setting screen 27 (Figure 48).

After field number 02, starting digit 01 and number of digits 13 have been entered via the initial data value setting screen 27 and the Enter area is touched, designating 491234567890 as the print data specified by field number 02, the display reverts to the copy block setting screen 36 (Figure 57). When the End area of the copy block setting screen 36 is touched, the character field setting screen 18 is displayed, and when the Enter area is touched, the display returns to the field number setting screen 16 (Figure 37).

By selecting Format Number in the character field setting screen 18, the above print data parameters, destination number N and print field parameters are stored in a prescribed address in the SRAM 25 as a format number FM01 data field parameter file 40 named FM01.DAT.



At the same time, the data parameters and destination number N are placed in the print data buffer space 36 of DRAM 26, as shown in Figure 16.

The operation of the label printer 10 to print out the label 19 shown in Figure 10 based on the print parameters thus set will now be described with reference to Figures 58 to 65.

When the printer system unit 11 power is switched on, print mode selection screen 37 is displayed on the touch-screen unit 13 under the control of the CPU 22 (Figure 58). Selecting the Print area of the screen 37 displays print selection screen 38 (Figure 59). When the Manual Entry Printing area is touched, the display shifts to manual entry printing screen 39 (Figure 60).

When format number 01 is entered via the manual entry printing screen 39, the CPU 22 determines whether the data attribute of the data parameter number 01 in the data field parameter file 40 of format number 01 is an entry attribute or a fixed attribute. In this case it is set to entry, as shown in Figure 9, so next the data type is determined.

If the CPU 22 determines that the data type is Kanji, prescribed operation screen data stored in the ROM 24 is input to the touch-screen unit 13 to display initial data value display screen 40 (Figure 61).

In the initial data value display screen 40, Product Name is displayed as the name and "chocolate" as the initial print data value.

To change the initial print data value, the Name Selection area of the initial data value display screen 40 is touched, whereby the display changes to name selection screen 41 and the prescribed entry operation is implemented (Figure 62). When the initial print data value "chocolate" is changed to "milk choco" (in katakana), for example, the initial print data value "chocolate" of the data number 01 in print data buffer space

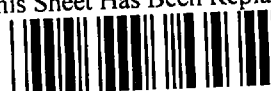


36 of DRAM 26 is changed to "milk choco", making this "milk choco" the print data.

When the Enter area of the initial data value display screen 40 is touched when it is not necessary to change the initial print data value, the CPU 22 determines whether the data attribute of the data parameter number 02 in the data field parameter file 40 of format number 01 is an entry attribute or a fixed attribute. In this case it is set to fixed, as shown in Figure 9, so the CPU 22 next determines whether the data attribute of the data parameter number 03 in the data field parameter file 40 of format number 01 is an entry attribute or a fixed attribute. As shown in Figure 9, in this case it is set to Entry, so next the data type is determined.

If the CPU 22 determines that the data type is Number, prescribed operation screen data stored in the ROM 24 is output to the touch-screen unit 13 to display initial data value display screen 42 (Figure 63), in which Product Code is displayed as the name and 67890 as the initial data value.

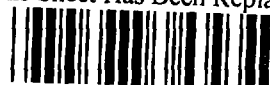
This initial print data value 67890 can be changed by touching the screen 42 to input the required numerical values. The initial print data value thus changed becomes the print data stored in the data number 03 print data buffer space 36 of DRAM 26. When the Enter area of the initial data value display screen 42 is touched when it is not necessary to alter the initial print data value 67890, the CPU 22 determines whether the above data number 03 is the final number. In this case it is the final number in the data parameter of Figure 9, so the next operation screen is displayed, which is manual entry printing screen 43 (Figure 64), which is used to input 1 as the number of labels 19 to be printed. When the Enter area is then touched, the CPU 22 displays printout confirmation screen 44 (Figure 65).



When the Enter area of printout confirmation screen 44 is touched, the CPU 22 develops the print data of print numbers 01 to 03 stored in the print data buffer space 36 of the DRAM 26 in the image editing parameter preparation space 37 of the DRAM 26 to generate image editing parameters in a pattern specified by the field parameters set in print field parameter space 43 of the format number 01 data field parameter file 40 stored in the SRAM 25. The CPU 22 then develops these image editing parameters in the image editing space 38 of DRAM 26 to produce print image data. The CPU 22 also supplies this print image data to the thermal print head 15 in the printer section 28 and operates the stepping motor 32 to turn the platen roller 16, resulting in the print out of one Figure 10 label 19.

The operation to print out the label 19A shown in Figure 18 after printing out the label 19 of Figure 10 will now be explained. The operation to print out label 19A is performed using the operation screen jump table function that is a principal constituent of the present invention.

After label 19 has been printed out, the CPU 22 functions to read out destination number N in the print data buffer space 36 of DRAM 26. At this point, as shown in Figure 16, the destination number N is 3, so the CPU 22 reads out the process address LCD04 corresponding to data number 03 in the jump table 35 generated in the program space 33 of DRAM 26 (Figure 20). Along with reading out the address LCD04, the program stored in ROM 24 address LCD04 is executed, displaying the initial data value display screen 42 shown in Figure 63 on the touch-screen unit 13. Since the screen 42 displays the product code 67890 that is the initial print data value of the label 19, by entering the product code of the label 19A which, as shown in Figure 66, is 67670, and touching



the Enter key, the initial print data value of print data buffer space 36 data number 03 is changed to 67670, as shown in Figure 17.

When the label 19 is printed out the initial print data values of the print data numbers 01 and 02, "chocolate" and 4912345, are maintained in print data buffer space 36. At the same time, when the Enter key of the initial data value display screen 42 is touched, the CPU 22 determines whether the data number 03 is the final number. In the print data buffer space 36 of Figure 17, it is the final number, so the next operation screen is displayed, which is manual entry printing screen 43 (Figure 64), which is used to input 1 as the number of labels 19A to be printed. When the Enter area is then touched, the CPU 22 displays printout confirmation screen 44 (Figure 65).

When the Enter area of the printout confirmation screen 44 is touched, the CPU 22 develops the print data of print numbers 01 to 03 stored in the print data buffer space 36 of the DRAM 26 in the image editing parameter preparation space 37 of the DRAM 26 to generate image editing parameters in a pattern specified by the field parameters set in print field parameter space 43 of the format number 01 data field parameter file 40 stored in the SRAM 25. The CPU 22 then develops these image editing parameters in the image editing space 38 of DRAM 26 to produce print image data. The CPU 22 also supplies this print image data to the thermal print head 15 in the printer section 28 and operates the stepping motor 32 to turn the platen roller 16, resulting in the print out of one Figure 18 label 19A.

With the label printer 10 arranged according to the above configuration, with respect to the entering of print data parameters via the touch-screen unit 13, when a label has been printed out and another label or labels are to be printed out having the same kind of print data, by



entering the destination number N beforehand it is not necessary to display all the operation screens in order starting from the first. Instead, the process jumps to the display of the operation screen for the print data specified by the destination number N, allowing the entering of the print data to proceed from that screen, thereby eliminating having to repeatedly enter the print data items, and thus markedly improving the efficiency of the print data entry operation. Jumping to a required operation screen is also simplified, requiring only entering the destination number N via the touch-screen unit 13.

Although in the embodiment described in the foregoing the printer system unit 11 and the touch-screen unit 13 are separate units connected by the interface cable 12, it is to be understood that this invention is not limited to that arrangement, and that the touch-screen unit 13 and printer system unit 11 can be provided as a single integrated unit.

Also, although the above embodiment is described with reference to the use of 3 as the destination number N following the printing out of a label, to jump to the display of the product code entry screen, this is not limitative. Instead, any destination number may be used. Thus, by setting a value of 03 or above as the data number in the print data parameter space 41 and specifying this value as destination number N, it is possible to jump to a prescribed entry screen designated by this destination number N. The present invention is also not limited to setting the product code 67890 as the initial print data value parameter in the initial data value parameter setting space 39 of data number 03. Instead, anything may be set as the parameter, such as product price, for example, with the arrangement being such that after a label is printed out, the display jumps to this product price entry screen, and any other changes



may be made to the configuration as long as such changes are not of an extent that changes the gist of the invention.

Effect of the invention

As described in the foregoing, in accordance with this invention, a label printer is provided that enables print data information for setting the desired content of data printed on a label, and print data editing information for printing the label data at a prescribed position and in a prescribed format, to be entered via operation screens displayed hierarchically on a touch-screen device provided on the label printer. The print data can be entered starting from any desired operation screen, thereby eliminating the need to repeat the entry of data starting from the first screen, when printing out labels in which some data is repeated.

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Brief Description of the Drawings

Figure 1 is an external perspective view of the label printer of the invention.

Figure 2 is a perspective view of the label printer of the invention with the cover open, showing the main parts.

Figure 3 is a cross-sectional view of the touch-screen unit of the invention.

Figure 4 is a block diagram of the electrical circuit of the invention.

Figure 5 shows the arrangement of the DRAM of the invention.

Figure 6 shows the layout of the data field parameter file of the invention.

Figure 7 shows the arrangement of the sub data parameter spaces of the invention.

Figure 8 shows the arrangement of the sub data parameter space having the final data number, according to the invention.

Figure 9 shows the arrangement of the print data parameters of the label of the invention shown in Figure 10.

Figure 10 is a front view of a label printed based on the initial print data values according to the invention.

Figure 11 shows the arrangement of the print field parameter space of the invention in the case of a character field.

Figure 12 shows the arrangement of the print field parameter space of the invention in the case of a bar code field.

Figure 13 is a front view of a label of the invention, showing the print position image.

Figure 14 shows the arrangement of the print field parameter space of the label according to the invention shown in Figure 10.

Figure 15 shows the arrangement of the print data buffer space of the invention.

Figure 16 shows the arrangement of the print data buffer space when printing the label of the invention shown in Figure 10.

Figure 17 shows the arrangement of the print data buffer space when printing the label of the invention shown in Figure 18.

Figure 18 is a front view of a label printed based on the jump function of the invention.

Figure 19 shows the arrangement of the jump table of the invention.

Figure 20 shows the arrangement of the jump table when printing the label of Figure 18.

Figure 21 is a flow chart of the label printing operation of the label printer of the invention.

Figure 22 shows a utility mode screen on the touch-screen unit of this invention.

Figure 23 shows a print parameter setting screen on the touch-screen unit of the invention.

Figure 24 shows a parameter setting screen on the touch-screen unit of the invention.

Figure 25 shows a format number entry screen on the touch-screen unit of the invention.

Figure 26 shows a data number entry screen on the touch-screen unit of the invention.

Figure 27 shows a name entry screen on the touch-screen unit of the invention.

Figure 28 shows a data attribute entry screen on the touch-screen unit of the invention.



Figure 29 shows a number of digits entry screen on the touch-screen unit of the invention.

Figure 30 shows a data type entry screen on the touch-screen unit of the invention.

Figure 31 shows an initial print data value entry screen on the touch-screen unit of the invention.

Figure 32 shows a select print data entry screen on the touch-screen unit of the invention.

Figure 33 shows a post-print data clear option screen on the touch-screen unit of the invention.

Figure 34 shows an end field confirmation screen on the touch-screen unit of the invention.

Figure 35 shows a destination number setting screen on the touch-screen unit of the invention.

Figure 36 shows a field parameter setting screen on the touch-screen unit of the invention.

Figure 37 shows a field number setting screen on the touch-screen unit of the invention.

Figure 38 shows a field parameter setting screen on the touch-screen unit of the invention.

Figure 39 shows a character field setting screen on the touch-screen unit of the invention.

Figure 40 shows a character type selection screen on the touch-screen unit of the invention.

Figure 41 shows a print position entry screen on the touch-screen unit of the invention.

Figure 42 shows a number of print data digits entry screen on the touch-screen unit of the invention.



Figure 43 shows a pitch entry screen on the touch-screen unit of the invention.

Figure 44 shows a character scale factor entry screen on the touch-screen unit of the invention.

Figure 45 shows a print direction entry screen on the touch-screen unit of the invention.

Figure 46 shows a data specification selection screen on the touch-screen unit of the invention.

Figure 47 shows a data block setting screen on the touch-screen unit of the invention.

Figure 48 shows an initial data value setting screen on the touch-screen unit of the invention.

Figure 49 shows a print data type selection screen on the touch-screen unit of the invention.

Figure 50 shows a bar code type selection screen on the touch-screen unit of the invention.

Figure 51 shows a bar code field setting screen on the touch-screen unit of the invention.

Figure 52 shows a bar code scale factor screen on the touch-screen unit of the invention.

Figure 53 shows a bar code ratio screen on the touch-screen unit of the invention.

Figure 54 shows a bar code vertical screen on the touch-screen unit of the invention.

Figure 55 shows a processing condition setting screen on the touch-screen unit of the invention.

Figure 56 shows a check digit screen on the touch-screen unit of the invention.



Figure 57 shows a copy block setting screen on the touch-screen unit of the invention.

Figure 58 shows a print mode selection screen on the touch-screen unit of the invention.

Figure 59 shows a print selection screen on the touch-screen unit of the invention.

Figure 60 shows a manual entry screen on the touch-screen unit of the invention.

Figure 61 shows an initial data value display screen on the touch-screen unit of the invention.

Figure 62 shows a name selection screen on the touch-screen unit of the invention.

Figure 63 shows an initial data value display screen on the touch-screen unit of the invention.

Figure 64 shows a manual entry printing screen on the touch-screen unit of the invention.

Figure 65 shows a printout confirmation screen on the touch-screen unit of the invention.

Figure 66 shows an initial data value display screen on the touch-screen unit of the invention.

Figure 67 is a partially cutaway external perspective view of a conventional label printer.



Key to drawings:

Figure 1

- 10 Label printer
- 11 Printer system unit
- 12 Interface cable
- 13 Touch-screen unit
- 14 Cover
- 21 Touch-panel

Figure 2

- 11 Printer system unit
- 14 Cover
- 15 Thermal print head
- 16 Platen roller
- 17 Label strip
- 18 Backing strip
- 19 Label

Figure 3

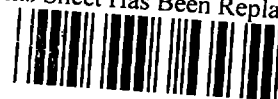
- 12 Interface cable
- 13 Touch-screen unit
- 20 LCD
- 21 Touch-panel

Figure 4

- 13 Touch-screen unit
- 15 Thermal print head
- 16 Platen roller
- 21 Touch-panel
- 28 Printer section
- 29 Touch-screen control section
- Bus
- 30 Head control circuit
- 31 Stepping motor drive circuit
- 32 Stepping motor

Figure 5

- 26a Work area
- 26b MS-DOS work area
- 33 Program space



- 34 Operation memory space
- 36 Print data buffer space
- 37 Image editing parameter preparation space
- 38 Image editing space

Figure 6

AT TOP INSIDE

- 39 Layout of data field parameter file

File name: FM01.DAT

Format number: FM01

- 40 Data field parameter file
- 41 Print data parameter space
- Data 01
- Data 02

Sub data parameter space

Data 30

- 42 Destination number setting space
- 43 Print field parameter space
- Field 01 Field parameter
- Field 02 Field parameter

Field 30 Field parameter

- 44 Sub data parameter space
- 45 Data parameter setting space
- 46 Name parameter setting space
- 53 Sub print field parameter space

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Figure 7

- 39 Initial data value parameter setting space
- 44 Sub data parameter space
- 45 Data parameter setting space
- 46 Name parameter setting space
- 47 Attribute field
- 48 Number of digits field
- 49 Type field
- 50 Processing condition field
- 51 Status field

BELOW FIGURE

Composition of print data parameter space 41

1) Attribute:

- 0 = Initial value
- 1 = Input
- 2 = Fixed

2) Number of digits:

- 00 = Initial value
- 01 - 32 = Range

3) Type:

- 0 = Initial value
- 1 = Number
- 2 = ANK
- 3 = Symbol
- 4 = Kanji

4) Processing conditions:

- 0 = Initial value (no C/D)
- 1 = Reference JAN 8
- 2 = Reference JAN 13

5) Data clear status:

- 1 = Yes
- 2 = No



Figure 8

- 39 Initial data value parameter setting space
- 42 Destination number setting space
- 44 Sub data parameter space
- 45 Data parameter setting space
- 46 Name parameter setting space
- 48 Number of digits field
- 49 Type field
- 50 Processing condition field
- 51 Status field

Figure 9

- 39 Initial data value parameter setting space
- 41 Print data parameter space
- 42 Destination number setting space

- 44 Sub data parameter space
- 01 Product name Input 06 Kanji chocolate
- 02 Flag manufacturer Fixed 07 Number
- 03 Product code Input 05 Number

- 46 Name parameter setting space
- 47 Attribute field
- 48 Number of digits field
- 49 Type field

Figure 10

CLOCKWISE, FROM TOP RIGHT

- Print field 01
- Print field 02
- Print field 03
- Product code
- Flag manufacturer
- 52 Bar code



Figure 11

- 53 Sub print field parameter space
- 54 Print data type field
- 55 Vertical position field
- 56 Horizontal position field
- 57 Print position field
- 58 Number of digits field
- 59 Pitch field
- 60 Vertical scale factor field
- 61 Horizontal scale factor field
- 62 Scale factor field
- 63 Direction field
- 64 Function field
- 65 Consecutive number field
- 66 Starting digit field
- 67 Consecutive digit field
- 68 Increment/decrement field
- 69 Minimum range field
- 70 Maximum range field
- 71 Numbering function setting field
- 72 Processing field
- 73 Processing condition field
- 74 Processing condition setting field
- 75 Print data specification field
- 76 Data specification field
- 77 Data number field
- 78 Starting position field
- 79 Number of digits field

Figure 12

- 53 Sub print field parameter space
- 54 Print data type field
- 57 Print position field
- 58 Number of digits field
- 63 Direction field
- 71 Numbering function setting field
- 76 Data specification field
- 77 Data number field
- 78 Starting position field
- 79 Number of digits field



- 80 Bar code vertical field
- 81 Bar ratio field
- 82 Scale factor field
- 83 Processing condition setting field
- 84 Processing field
- 85 Processing condition field

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Figure 13

AT TOP

Vertical and horizontal reference point

Horizontal dot position

AT LEFT

Datum point

AT RIGHT

Vertical dot position

Field direction

Figure 14

43 Print field parameter space

53 Sub print field parameter space

01 Product name Kanji 24

02 Bar code

03 Explanatory characters M characters

54 Print data type field

57 Print position field

58 Number of digits field

59 Pitch field

62 Scale factor field

63 Direction field

75 Print data specification field

76 Data specification field

80 Bar code vertical field

81 Bar ratio field

83 Processing condition setting field

AT BOTTOM, FROM LEFT

(Data -- Block 1): Data number 01

Start position 01

Number of digits 6

(Data -- Block 1): Data number 02

Start position 01

Number of digits 7

This Sheet Has Been Replaced



(Copy -- Block 1) Field number 02
Start position 01
Number of digits 13

(Data -- Block 1) Data number 03
Start position 01
Number of digits 5

Figure 15

36 Print data buffer space

Data Number 01 Initial data value of data number 01

Data Number 02 Initial data value of data number 02

Data Number 30 Initial data value of data number 30

N: Destination Number

42 Destination number setting space

Figure 16

36 Print data buffer space

Data number 01 chocolate

Data number 02

Data number 03

Destination number

Figure 17

36 Print data buffer space

Data number 01 chocolate

Data number 02

Data number 03

Destination number

This Sheet Has Been Replaced



Figure 18
CLOCK WISE, FROM TOP RIGHT
Print field 01
Print field 02
Print field 03
Product code
Flag manufacturer code
52A Bar code

Figure 19
33 Program space
Number of copies to be printed
Data number 30
...
Data number 01
Format number
35 Jump table

Figure 20
33 Program space
35 Jump table
Number of copies to be printed
Data number 03
...
Data number 01
Format number
35 Jump table

LCD01 Manual entry printout
Format number: 01

Enter Cancel

LCD02 Product name

LCD03 Flag manufacturer code

LCD04 Product code

LCD 05 Number of copies to be printed



Figure 21

- Step 1 Switch on power while pressing feed key down
- Step 2 Shift to utility mode screen
Press "Print parameter setting".
Press "Parameter setting".
Press Data parameter setting.
- Step 3 Set data parameters
Data number, name, data attribute, number of data digits, data type,
data
- Step 4 Set destination number

Press Field parameter setting
- Step 5 Set field parameters
Field number, printing position, number of data digits, pitch, scale
factor, direction, bar ratio, vertical bar, processing conditions,
function setting, data specification
Press Format number
- Step 6 Switch power off and back on
- Step 7 Shift to print mode screen
Press "Print"
Press "Manual printout"
- Step 8 Manual printout

Format number, data input, number of copies to be printed
- Step 9 Print out label
- Step 10 Input data and number of copies to be printed, using jump
operation screen
- Step 11 Print out of label



Figure 22
FROM TOP
Screen 1 Utility mode screen
Utility mode
Set date/time
Set operating conditions
Set print parameters
Turn over page

Figure 23
FROM TOP
Screen 2 Print parameter setting screen
1. Set parameters
2. Upload parameters
3. Download parameters
End

Figure 24
FROM TOP
Screen 3 Parameter setting screen
Set parameters
1. Set data parameters
2. Set field parameters
3. Clear format number
End

Figure 25
FROM TOP
Screen 4 Format number entry screen
Set data parameters
Format number: 01

Enter Previous screen

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Figure 26
FROM TOP
Screen 5 Data number entry screen
Set data parameters
Data number: 01

Enter Cancel

Figure 27
FROM TOP
Screen 6 Name entry screen
Name
1. Code designation
2. Select
3. Word
Enter Cancel Previous screen

Figure 28
FROM TOP
Screen 7 Data attribute input screen
Name
Data attribute:
1. Entry
2. Fixed

Enter Cancel Previous screen

Figure 29
FROM TOP
Screen 8 Number of data digits entry screen
Name

Enter Cancel Previous screen

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Figure 30

Screen 9 Data type entry screen

Name

Data type:

1. Number
2. ANK
3. Symbol
4. Kanji

Enter Cancel Previous screen

Figure 31

FROM TOP

Screen 10 Initial print data value entry screen

Print data

1. Code designation
2. Select
3. Word

Enter Cancel Previous screen

Figure 32

FROM TOP

Screen 11 Select print data entry screen

Print data

"chocolate"

..... Symbols

..... Hiragana

..... Katakana

Enter Cancel Previous screen



Figure 33

FROM TOP

Screen 12 Post-print data clear option screen

Name

Clear data after printing?

1. Yes
2. No

Enter Cancel Previous screen

Figure 34

FROM TOP

Screen 13 Final field confirmation screen

Set data parameter

Is this the final data field?

Yes No

Figure 35

FROM TOP

Screen 14 Destination number setting screen

Set destination number

Destination number after printout:

Enter

Figure 36

FROM TOP

Screen 15 Field parameter setting screen

Set field parameter

Format number:

Enter Previous screen

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Figure 37
FROM TOP
Screen 16 Field number setting screen
Set field parameter
Field number:

Enter

Figure 38
Screen 17 Initial field parameter setting screen
Field number:
Print type: No print Print position
Number of digits:
Scale factor: Pitch Forward
Vertical 1
Horizontal 1
Processing conditions
Function setting (no setting)
Data specification (invalid field)

Enter Format number

Figure 39
Screen 18 Character field setting screen
Field number:
Print type: Character Print position
Number of digits:
Scale factor: Pitch Forward
Vertical 1
Horizontal 1
Processing conditions
Function setting (no setting)
Data specification (invalid field)

Enter Format number



Figure 40

Screen 19 Character type selection screen

Field number:

Character type:

1. S character
2. M character
3. OB character
4. WL character
5. U character
6. Kanji 16
7. Kanji 24

Enter

Figure 41

FROM TOP

Screen 20 Print position entry screen

Field number:

Vertical position

Horizontal position

Enter

Figure 42

FROM TOP

Screen 21 Number of print data digits entry screen

Field number

Number of print data digits:

Enter

Figure 43

FROM TOP

Screen 22 Pitch entry screen

Field number:

Pitch:

Enter



Figure 44

FROM TOP

Screen 23 Character scale factor entry screen

Field number:

Vertical scale factor:

Horizontal scale factor

Enter

Figure 45

FROM TOP

Screen 24 Print direction entry screen

Field number:

Print direction:

- 0. Forward
- 1. 90 degrees
- 2. 180 degrees
- 3. 270 degrees

Enter

Figure 46

Screen 25 Data specification selection screen

Field number:

Data specification selection:

- 1. Data
- 2. Copy

Enter



Figure 47

FROM TOP

Screen 26 Data block setting screen

Field number:

Data block number

1. Block 1
2. Block 2
3. Block 3
4. Block 4

Enter

End

Figure 48

FROM TOP

Screen 27 Initial data value setting screen

Field number:

Number:

Starting digit:

Number of digits:

Enter

Figure 49

FROM TOP

Screen 28 Print data type selection screen

Field number:

Print data type:

0. No printing
1. Characters
2. Bar code
3. Lines

Enter

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Figure 50

FROM TOP

Screen 29 Bar code type selection screen

Field number:

Bar code type:

0. JAN 8
1. JAN 13
2. UPC-E
3. NW-7
4. Compressed NW7
5. C 39
6. ITF
7. C 128

Enter

Figure 51

FROM TOP

Screen 30 Bar code field setting screen

Field number:

Print type: Bar Print position

Number of digits:

Bar scale factor: Ratio Forward

Processing conditions Bar vertical:

Function setting (no setting)

Data specification (invalid field)

Enter

Format number

Figure 52

FROM TOP

Screen 31 Bar code scale factor screen

Field number:

Bar code scale factor

Enter



Figure 53

FROM TOP

Screen 32 Bar code ratio screen

Field screen:

Bar code ratio:

Enter

Figure 54

FROM TOP

Screen 33 Bar code vertical screen

Field number:

Bar code vertical:

Enter

Figure 55

Screen 34 Processing condition setting screen

Field number:

Processing conditions setting:

0. Not set

1. C/D calculation

2. Symbol supplementation

Enter

Figure 56

Screen 35 Check digit screen

Field number:

C/D calculation:

1. Generate JAN 8

2. Generate JAN 13

3. Price CD

4. Modulus 43

Enter

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Figure 57

Screen 36 Copy block setting screen

Field number:

Copy block number:

1. Block 1
2. Block 2
3. Block 3
4. Block 4

Enter

End

Figure 58

Screen 37 Print mode selection screen

Print mode

Print

Print data preparation

Figure 59

Screen 38 Print selection screen

Print selection

1. Manual entry printout
2. Retrieve file and print
3. File reservation printing

End

Figure 60

Screen 39 Manual entry screen

Manual entry printout

Format number:

Enter

Cancel



Figure 61

Screen 40 Initial data value display screen

Product name Manual input

"chocolate"

1. Code designation
2. Select
3. Word

Enter Cancel Previous screen

Figure 62

Screen 41 Name selection screen

Product name New

"chocolate"

..... Symbols

..... Hiragana

.....Katakana

Enter Previous screen

Figure 63

Screen 42 Initial data value display screen

Product code Manual input

Enter Word Cancel Previous screen

Figure 64 Screen 43 Manual entry printout screen

Manual entry printout

Number of copies

Enter Cancel



Figure 65

Screen 44 Printout confirmation screen

Manual input printout

Format: 01: 1 label

Printout?

Enter Cancel Previous screen

Figure 66

Screen 42 Initial data value display screen

Product code Manual input

Enter Word Cancel Previous screen

Figure 67

1. Label printer
2. Printer system unit
3. Roll of labels
4. Thermal print head
5. Platen roller
6. Label
7. Keyboard
8. LCD

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Claim

1. A label printer in which print data such as a price is printed on a label in a label printer system unit, and print data setting information for setting prescribed content of label print data and print data editing information for printing the print data on the label in a prescribed format are entered via operating screens hierarchically displayed on a touch-screen provided on the label printer system unit,

wherein an operation screen at any level in the hierarchical structure can be displayed on the touch-screen and print data setting information input from that level.

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