MICROCOM CORPORATION

LABEL DESIGN SOFTWARE

FOR MODELS

1100, 1400, 2000
2150, M450, M460
M650

LDS100/140/200/250/450/460/650

REV 2.2

NOVEMBER 11, 1988

1. INTRODUCTION

The Label Design Software (LDS) is a powerful and easy to use package that allows the user to create his own label formats. LDS supports printing multiple copies, serial numbering, and logos. It can be driven from a dumb terminal, PC, or mainframe computer.

A large number of predefined label formats can be stored in EPROM memory. The maximum amount limited only by the amount of available memory. The same is true for user defined label formats.

A large variety of character generators are supported which are used to create the size and style of text desired.

All the popular barcodes are supported. Special or proprietary codes can be accommodated.

2. CONTROLLING THE PRINTER

2.1 CONTROL CHARACTERS TO THE PRINTER

The following characters control special functions. All other control characters are ignored.

SOH ^A   Enter accumulator mode.

STX ^B   Begin text string entry mode.

ETX ^C   Start print cycle mode.

EOT ^D   Enter command mode.

ENQ ^E   Enquiry mode.

ESC ^[Instructs the printer to leave its current mode
           of operation. Only used in special cases.
           Also used to implement Epson printer graphic
           commands.

CR   ^M   Terminates a text or data string.

DEL   Deletes the last printable character entered.
           Cannot delete the effect of a control code.

CAN ^X   Deletes all printable characters previously
           entered up to the last control code.
           Cannot delete the effect of a control code.

```
BS   ^H   Same as DEL but has another special function.

LF   ^J   No effect.

VT   ^K   Print a test  label.

FF   ^L   Print a blank label.

DC3  ^S   Instructs the printer to stop sending data.

DC1  ^Q   Instructs the printer to continue sending data.
```

2.2   ^A ACCUMULATOR MODE

The accumulator mode is used in conjunction with the command mode to load data or control numbers into the printer. See the section on command mode.

2.3 ^B TEXT ENTRY MODE

The text entry mode is used to load the information to be printed on the label. Data is sent in strings of printable ASCII characters separated by carriage returns. The first string entered is text string one the next is two and so on. Each label format field specifies a text string number to retrieve the data from.

2.31 PROTECTED TEXT

A text entry starting position can be specified with the ^An^D61 control sequence (Where n is the text string number). This allows text entry mode to start at a specific text string number. This feature is useful in protecting fixed text on a label.

2.32 PRE-PADDED TEXT

Text can also be fixed at the beginning of each text string. The text that is to be fixed is loaded into the text strings by entering text mode. Then the ^D62 control sequence will start at the current starting text position and fix the data at the beginning of the text strings. If no data is entered in a text string before the ^D62 control sequence is executed then no data will be fixed in that string.

2.4 ^C PRINT MODE

The print mode instructs the print to start the print cycle.
If the printer has not been instructed to print multiple copies then
only one label will be printed.

2.5 ^D COMMAND MODE

The command mode is used for sending the printer set-up and control
information. Command mode is begun by entering a control-D code
(^D). Then a command number is entered followed by a carriage return
or another control code. Some commands load data or control numbers
into the machine. The accumulator mode is used to send the data,
then a control-D command can use the data in the accumulator.

Example: ^A3^D75^C This sequence will print three labels.

The following is a list of command codes:


```
 1   Enter accumulator mode        (Same as ^A)
 2   Begin text string entry mode  (Same as ^B)
 3   Start print cycle             (Same as ^C)
 5   Send printer status           (Same as ^E)
11   Print a test  label           (Same as ^K)
12   Print a blank label           (Same as ^L)
32   Clear machine state (same as power up)
40   Clear 41-53
41   Load number of fields in layout
42   Load label width  (X direction)
43   Load label height (Y direction)
44   Load web size (X direction)
45   Load gap size (Y direction)
46   Load stepper speed
47   Load label control byte
48   Load number of steps to activate gap detector
49   Load number of steps past gap
50   Load X direction offset
51   Load Y direction offset
52   Load vertical step count
53   Load print head width
55   Load EPROM layout
56   Load  RAM  layout
57   Enter label format mode
58   Execute EEPROM commands
59   Load EEPROM
60   Clear 61-62
61   Load text starting position
62   Generate text offsets
```

```
63   Load text mode control byte
        0  Disable auto text mode entry and clear text control
        1  Enable auto text mode entry (^B is optional)
        2  Enable clear all text on entry to text mode
        3  Enable both

64   Load auto-print string count
65   Load Label Centering and Low Density control byte
        0  Disable Label Centering and Low Density Compatible Mode
        1  Enable Label Centering
        2  Enable Low Density Compatible Mode
        3  Enable Both

        Note: Low Density Compatible Mode is for the M450 only

66   Load Clear EEPROM function
          66   Clear EEPROM formats

69   Load Skip Speed

70   Clear 71-76
71   Disable repeat/copies function
72   Enable  repeat/copies function
73   Load copies count
75   Load label count
76   Load inner label delay

(The next commands will only function with a single field)
80   Clear 86, 88, 89
81   Disable serial number function
84   Load text string number
85   Load step value
86   Load inc or dec status
        0  Disable increment and decrement
        1  Enable increment
        2  Enable decrement

(The next commands will function on more than one field)
87   Load field number to clear increment or decrement
88   Load field number to increment
89   Load field number to decrement

93   Load control codes recognition status

        0  Enable control code recognition
        1  Disable control code recognition
```

```
96   Load keypad queuing number
         0  Disable keypad queuing
         1  Print first label then queue for remainder
         2
         3  Disable keypad pause
         4  Queue for first label only
         5  Queue for all labels
         6
         7  Queue for first label and disable keypad pause

98   Load labels taken sensor and external print switch control
         LTS = Labels Taken Sensor
         EPS = External Print Switch
          0     Disable LTS   Disable EPS
          1     Enable  LTS   Disable EPS
          2     Disable LTS   Enable  EPS
          3     Enable  LTS   Enable  EPS
```

2.6   ^E   ENQUIRY MODE

The printer can be polled to acquire the state of the machine. When
an enquiry character (^E) is sent to the printer it will respond with
one of the following control characters:

SUB   ^Z   >RESTARTED<
           Response to the first ENQ after power-up. This informs
           the controlling unit that the printer has just powered
           up and any previous set-ups are lost.

NAK   ^U   >DATA ERROR<
           A data error has occurred (e.g. parity or barcode
           error). This error condition is cleared when a print
           cycle is started or when STX is received.

EM   ^Y   >LOW STOCK<
           End of label stock. This error blocks the printing,
           but a blank label may be feed out with the FF control
           character. The error flag is cleared when a label has
           been successfully fed out.

SYN   ^V   >TAKE LABEL<
           Previous label not taken. This can only occur on
           printers equipped with the label sensor option.

ACK   ^F   >READY<
           Ready or no errors.

These control codes are listed in order of priority. The SUB
character can only happen on the first poll after power up. Also the
SUB character can be suppressed by a dip switch setting. See the
section on dip switches.

3. LABEL FORMATTING

A label format consists of a header record and field records. These
records describe how the label is to be printed. The starting record
(record zero) is the header. The header contains information about
the label height, width, print speed, etc. The records following the
header are the field records. A field record contains information on
where the field starts on the label, type of characters or barcode to
use, etc.

EXAMPLE FORMAT:

```
^A1^D57
4
1,100, 40,10, ,4
2,100, 38,10, ,4,1
3,100,100, 6, ,4,2
4, 98,100, 6, ,4,3
^A1^D56
^D2
NORMAL
UPSIDEDOWN
RIGHT
LEFT
^C
```

The character sequence `^A1^D57' puts the printer into format mode
with ram layout `1' selected.

The next line is the header information for ram format `1'. It
specifies that four fields are defined.

The next four lines is layout information for each field in the
format.

The character sequence `^A1^D56' selects ram format `1'.

The character sequence `^D2' puts the printer into text string entry
mode.

The next four lines are data for each text string.

The character sequence control-C (^C) starts the print cycle.

3.1 HEADER DESCRIPTION

A header is broken down into thirteen different elements. These
elements contain information about the label. It is not necessary to
enter data for all of the header elements. If an element is left
blank, then a default value will be used.

The following is a list of the header element mnemonics and their
default values:

Mnemonic	HFM	LSX	LSY	WEB	GAP	DPS	LCB	AGD	SPG	OFX	OFY	VSC	PHX
Default value MODEL													
1100	0,	231,	154,	5,	10,	31,	0,	1,	154,	0,	0,	2,	300
1400	0,	231,	154,	5,	10,	31,	0,	1,	154,	0,	0,	2,	300
2000	0,	432,	308,	5,	10,	31,	0,	1,	154,	0,	0,	2,	600
2150	0,	462,	308,	5,	10,	--,	0,	10,	160,	0,	0,	2,	448
M450	0,	231,	155,	5,	10,	31,	0,	1,	70,	0,	0,	2,	300
M460	0,	462,	310,	10,	20,	31,	0,	2,	140,	0,	0,	2,	640
M650	0,	231,	155,	5,	10,	31,	0,	1,	70,	0,	0,	2,	448

The header elements are:

HFM NUMBER OF FIELDS IN LAYOUT
     This element is used to specify how many fields are in the
     layout. The printer will then reserve RAM memory space for the
     layout. If more fields than what are specifed for HFM are sent
     to the printer, they will be ignored.

LSX LABEL SIZE X DIRECTION
     This element specifies the width of the label.

LSY LABEL SIZE Y DIRECTION
     This element specifies the height of the label.

WEB WEB SIZE X DIRECTION
     This element specifies the size of the web on the edges of the
     label.

GAP GAP SIZE Y DIRECTION
     This element specifies the size of the gap between labels.

DPS DEFAULT PRINT SPEED
     This element selects the speed of the labels through the
     printer. If too fast of a speed is selected, then the fields on
     the label will become garbled.

LCB LABEL CONTROL BYTE
     This element has several purposes.   If it is set to a value of
     one, then the gap detector is sensed on the trailing edge of the

label instead of the leading edge. If it is set to a value of
two, then the printer will not wait on the gap detector. Instead,
it prints all fields and then moves the extra distance as
specified in the SPG header element.

AGD   NUMBER OF STEPS TO ACTIVATE GAP DETECTOR
      This element determines how many slices (steps) before the gap
      detector circuit is activated. This will aid in printing on
      multiple labels with one label layout.

SPG   NUMBER OF STEPS PAST GAP DETECTOR
      This element determines how many slices (steps) to move the
      label after detection of a label gap. This facilitates using
      very small labels.

OFX   X DIRECTION OFFSET
      This element allows the user to move all the fields in the X
      direction. If the printer contains a print head with a
      multi-plate design, then you must be considerate of any
      barcodes that might cross the gap between plates.

OFY   Y DIRECTION OFFSET
      This element allows the user to move all the fields in the Y
      direction.

VSC   VERTICAL STEP COUNT
      This element allows the user to change the vertical ratio of
      all the fields on the label.

PHX   PRINT HEAD WIDTH
      This element specifies the width of the print head in dots.
      This allows the label layout to be used on all printers with
      LDS software.

3.2   FIELD DESCRIPTION

A field is broken down into forteen different elements. These
elements contain the information nessessary to produce a field on a
label. It is not nessessary to enter data for all of the field
elements. If an element is left blank, then a default value will be
used.

The following is a list of the field element mnemonics and their
default values:

```
Mnemonic        TSN,XB, YB, CC,TCI,CGN,FO,FJ,CMX,CMY, CS,TSP,CLX,CLY
Default value    0, 0,  0, *1,  1, *2, 0, 0,  1,  1, *1,  1, *1, *1
```

*1   The default for these elements depends on the character
     generator used (CGN).

*2   The default for this element depends on the text conversion
     identifier used (TCI).

The field elements are:

TSN   TEXT STRING NUMBER
      This element determines which text string to get the data from.
      This allows more than one field to use the same text string.

XB   X BEGINNING COORDINATE
      The X coordinate of the field is measured in dots. The X
      coordinate is specified from the right edge of the field as
      viewed from the front of the printer. The X coordinate
      increases in size from left to right as viewed from the front
      of the printer.

YB   Y BEGINNING COORDINATE
      The Y coordinate of the field is measured in dots. The Y
      coordinate is specified from the leading edge of the field as
      viewed from the front of the printer. The Y coordinate
      increases in size as the label feeds from the printer.

CC   CHARACTER COUNT
      This element determines how many characters will be used in the
      field. If the number of characters in the selected text string
      is less than the amount used by CC then the remainder of the
      field is padded with blanks.

 TCI TEXT CONVERSION IDENTIFIER
      This element determines how the selected text string number
      (TSN) will be printed on the label.

              1   Text
              2   Text with asteriks
              3   Text with checksum
              7   Logo
             12   UPCA barcode
             13   UPCE barcode
             15   Interleaved two of five barcode
             16   Code three of nine barcode
             17   Code 39 left
             18   Code 39 middle
             19   Code 39 right
             20   EAN13 barcode
             21   EAN8 barcode
             24   MSI 1 (Plessey)

```
         25    MSI 2
         26    MSI 3
         28    MSI Human readable type 1
         29    MSI Human readable type 2
         32    UPCA human readable w/extended bars
         33    UPCA human readable w/extended bars, no checksum
         40    Code 128
         42    Codabar
```

CGN   CHARACTER GENERATOR NUMBER
      This element determines which character generator to use.
      Barcode and text character generators are stored in EPROM
      memory. The number of character generators that can be stored
      in the printers memory is limited by the size of the
      generators.

FO   FIELD ORIENTATION
      This element determines the orientation of each field on the
      label.
```
         0     Horizontal normal orientation
         1     Horizontal upsidedown orientation
         2     Vertical right orientation
         3     Vertical left orientation
         4     Fixed width horizontal normal orientation
         5     Fixed width horizontal upsidedown orientation
         8     Fast fixed width horizontal normal orientation
         9     Fast fixed width horizontal upsidedown orientation
```

FJ   FIELD JUSTIFICATION
      This element determines the justification of each field on the
      label. Each field is justified relative to its orientation.
```
         0     Left justified above base line
         1     Right justified above base line
         2     Left justified below base line
         3     Right justified below base line
         4     Centered above base line
         5     Centered below base line
```

CMX   CHARACTER MULTIPLIER X DIRECTION
      This element multiplies each character in the Y direction. If
      this element is not used, the default value of one will be
      used. This element is only used by the M450 printer, all
      others should use the default value.

CMY   CHARACTER MULTIPLIER Y DIRECTION
      This element multiplies each character in the Y direction. If
      this element is not used, the default value of one will be
      used.

CS   CHARACTER SPACING
      This element determines the spacing between each character. If
      this element is not used, then the default value for the
      selected character generator (CGN) is selected.

TSP TEXT STARTING POSITION
      This element determines where to start using data in the
      selected text string (TSN). If this element is not used, then
      it will be set to a value of one.

CLX CHARACTER CELL LENGTH X DIRECTION
      This element will override the width of the characters in the
      selected character generator (CGN). If this element is not
      used, the default value for the selected character generator
      (CGN) is selected. This element is used only for special cases.

CLY CHARACTER CELL LENGTH Y DIRECTION
      This element will override the height of the characters in the
      selected character generator (CGN). If this element is not
      used, the default value for the selected character generator is
      selected. This element is used only for special cases.

4.1 INTERFACE

Models 1100, 1400, 2000, M450, and M460 printers contain an RS-232C
compatible asynchronous communications port. This port is configured
as Data Communications Equipment (DCE). This allows a `One For One'
connection with a dumb terminal.

The following is the pin-out for the 25 pin RS-232C connector:

        PIN 2   HOST DATA   (To printer from terminal or host)
        PIN 3   PRINTER DATA   (From printer to terminal or host)
        PIN 5   CLEAR TO SEND (From printer to terminal or host)
        PIN 7   SIGNAL GROUND

The baud rate can be set by changing the jumper configuration. The
jumper can be found on the control board for the M450 and M460
printers. For the 1100, 1400, and 2000 they are on the serial I/O
board.

Other serial port functions can be set via the dip switch setting.
See the section on DIP SWITCHES.

4.2 DIP SWITCH SETTINGS

The dip switches on the memory expansion board inside the printer
allow the user to change communication parameters.

Switch Bank One (Top set of switches)

```
1    |Response to enquiry ------------> 1 2
2    |                                  ------------------------
3    Always zero                        0 0  Control codes
4    Odd/Even parity                    1 0   Text equivalent
5    Disable/Enable parity              1 1   Up arrow equivalent
6    Enable echo
7    8/7 Bit data
8    Enable/Disable Xon-Xoff
```

Switch Bank Two (Bottom set of switches)

```
1    Enable Clear Text Function
2    Special response to first poll
3    Always zero
4    Enable print repetition
5    Format type select 0=EPROM 1=EEPROM
6    |
7    |Power up format select           6 7 8
8    |
                                       0 0 0   Not Used *
                                       0 0 1   Format 1
                                       0 1 0   Format 2
                                       0 1 1   Format 3
                                       1 0 0   Format 4
                                       1 0 1   Format 5
                                       1 1 0   Format 6
                                       1 1 1   Format 7
```

```
          * Same as Format 1 except the text is cleared.
            (Text is cleared only for EPROM type).
```

Switch Bank Three (For 2150, M450, and M460 only)

```
1    |
2    |Baud rate select (For 2150 only)
3    |
4    Enable Label centering
5    Enable Low Density Compatible Mode (For M460)
6    Always zero
7    Always zero
8    Enable tag stock sensing (For M450 and M460 only)
```

```
                          'SCG1DO'
                 FOR PRINTER WITH LDS SOFTWARE
                         88.06.18


The following letters (NURL) indicate which character generators
are available in this character generator set.


N = NORMAL HORIZONTAL          U = UPSIDE DOWN HORIZONTAL
R = RIGHT ORIENTED VERTICAL    L = LEFT ORIENTED VERTICAL


TEXT GENERATORS


GEN     NURL  HEIGHT   WIDTH    SPACING   DECENDER LENGTH
NO.
1       NURL   05      03        1         0
2       NURL   05      05        1         0
3       NURL   06      05        1         0
4       NURL   07      05        1         0
5       NURL   07      07        1         0
6       NURL   07      07        1         0              Bold
7       NURL   08      05        1         0
8       NURL   09      05        1         0
9       NURL   09      07        1         0
10      NURL   12      08        2         0
11      NURL   15      12        2         0
12      NURL   18      10        2         0
13      NURL   40      15        3         0
14      NU     40      20        3         0
15      NU     09      40        4         0
16      NURL   18      21        2         0              Numeric
```

BARCODE GENERATORS

CODE NO.	NURL	CODE	RATIO	SPACING
1		C39		
2	NU	C39	2/1	1
3	NU	C39	3/1	1
4		C39		
5		C39	5/2	2
1		I25		
2	NU	I25	2/1	-
3	NU	I25	3/1	-
4		I25		
5	NU	I25	5/2	-
1	NU	UPC	100%	-
2		UPC		
3		UPC		
1	NU	UPCH	100%	-
1		C128		-
1		Codabar		
2		Codabar	2/1	1
3		Codabar	3/1	1

LOGO GENERATORS

GEN NO.	NURL	HEIGHT	WIDTH	SPACING	DECENDER	LENGTH
1	N	2	255	0	0	LINE
2	N	40	41	0	0	DLTAIN