

EPSON OPOS ADK MANUAL

APPLICATION DEVELOPMENT GUIDE

POSPrinter (TM-L90)

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Section 1. Introduction

This manual describes the method of use and related items, as well as machine-specific precautions, when the EPSON TM-L90 Series POS Printers are used with the EPSON OPOS ADK program.

This manual applies to the following devices.

Device List

Serial	Parallel	USB	Ethernet
TM-L90	TM-L90P	TM-L90U	TM-L90E
TM-L90M	TM-L90PM	TM-L90MU	TM-L90ME

Before reading the manual, see the following explanation about the characteristic of the TM-L90 models.

- Station: Receipt (Line Thermal 203 dpi X 203 dpi)
- Label Printing / Ticket Printing
- High-speed Printing
- Peeler function

Throughout the manual, the various model names will be referred to as TM-L90.

Compatibility mode

The compatibility mode for upward compatibility was added in OPOS Ver2.60.

For the details of the compatibility mode, please refer to “EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE Compatibility Mode”.

Section 2. Details on Settings

This section describes connection configurations and how to make the settings for the TM-L90 printers.

2.1 References of Firmware Versions

Refer to the release notes (Relnote.txt).

2.2 DIP Switches Settings

Confirm that the following settings have been made correctly.

1) Serial port

DIP-SW1

No.	Setting	
1	OFF	Settable
2	ON	Settable
3	OFF	Fixed at OFF
4	OFF	Fixed at OFF
5	OFF	Settable
6	OFF	Settable
7	ON	Settable
8	OFF	Settable

Set DIP-SW1-1 (Power button function).

If this DIP Switch is ON, the power button is disabled.

Set DIP-SW1-2 (Interface condition selection).

If this DIP Switch is ON, communications settings are set via DIP Switches. If the DIP Switch is OFF, Memory Switches are used.

Set DIP-SW1-3 (Handshake) to DTR/DSR.

Set DIP-SW1-4 (Bit length) to 8 bits.

Set DIP-SW1-5 to DIP-SW1-8 accordance with the port information.

The described set values are the default values. For the details, refer to the product manual of the POSPrinter. Also, if these settings are changed, make sure to change the port information using the SetupPOS utility.

2) Parallel Port

DIP-SW1

No.	Setting	
1	OFF	Settable
2	OFF	Fixed at OFF
3	OFF	Fixed at OFF
4	OFF	Fixed at OFF
5	OFF	Fixed at OFF
6	OFF	Fixed at OFF
7	OFF	Fixed at OFF
8	OFF	Fixed at OFF

Set DIP-SW1-1 (Power button function).

If this DIP Switch is ON, the power button is disabled.

Make other settings in accordance with the settings described above.

3) USB Port

DIP-SW1

No.	Setting	
1	OFF	Settable
2	OFF	Fixed at OFF
3	OFF	Fixed at OFF
4	OFF	Fixed at OFF
5	OFF	Fixed at OFF
6	OFF	Fixed at OFF
7	OFF	Fixed at OFF
8	OFF	Fixed at OFF

Set DIP-SW1-1 (Power button function).

If this DIP Switch is ON, the power button is disabled.

Make other settings in accordance with the settings described above.

4) Ethernet Port

DIP-SW1

No.	Setting	
1	OFF	Settable
2	OFF	Fixed at OFF
3	OFF	Fixed at OFF
4	OFF	Fixed at OFF
5	OFF	Fixed at OFF
6	OFF	Fixed at OFF
7	OFF	Fixed at OFF
8	OFF	Fixed at OFF

Set DIP-SW1-1 (Power button function).

If this DIP Switch is ON, the power button is disabled.

Make other settings in accordance with the settings described above.

2.3 Port Information

1) Port information when serial port is used

The port information that can be set with the SetupPOS utility is as follows.

Item	Setting range
Baud rate [bps]	2400,4800,9600,19200,38400 ^{*1} , 57600 ^{*1} ,115200 ^{*1}
Bit length [bit]	8
Parity	NONE, ODD, EVEN
Stop bit [bit]	1
Handshake	DTR/DSR
Output buffer length [byte]	32 to 1024
Output interval time [ms]	0 to 9999

^{*1} These Baud rate require setting via Memory Switch.

The default settings are as shown in the following table.

Item	Setting range
Baud rate [bps]	19200
Bit length [bit]	8
Parity	NONE
Stop bit [bit]	1
Handshake	DTR/DSR
Output buffer length [byte]	1024
Output interval time [ms]	2500

2) Port information when using parallel port

The port information that can be set with the SetupPOS utility is as follows.

Item	Setting range
Output buffer length [byte]	32 to 1024
Output interval time [ms]	0 to 9999

The default settings are as shown in the following table.

Item	Setting range
Output buffer length [byte]	1024
Output interval time [ms]	2500

3) Port information when using USB port

The port information that can be set with the SetupPOS utility is as follows.

Item	Setting range
Output interval time [ms]	0 to 9999

The default setting is as shown in the following table.

Item	Setting range
Output interval time [ms]	2500

4) Port information when using Ethernet port

The port information that can be set with the SetupPOS utility is as follows.

Item	Setting range
Output buffer length [byte]	32 to 1024
Output interval time [ms]	0 to 9999

The default settings are as shown in the following table.

Item	Setting range
Output buffer length [byte]	1024
Output interval time [ms]	2500

2.4 Device Settings

The following explanation is about the settings for TM-L90.

2.4.1 Usable Device Specific Settings

For the TM-L90, the following device specific settings are settable by the SetupPOS utility. For the detail, please refer to the Section 2 of “EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE POSPrinter (TM Series)”.

Tab	Settings
General	Disable panel buttons
	Assume print complete when data output finishes
	Homogenize Error Codes ^{*1}
	Ignore firmware version check
	Output complete timeout
Bitmap	TMFlogo...
Color Bitmap	Halftone: Method
	Halftone: Brightness
	Color: Primary
Status Log	ERROR
	OFFLINE
	Log file name (include full path)
	Maximum file size [KB]
Paper	Paper Type
	Paper Width [mm]
Default Value	Multilingual font ^{*2}
	Receipt paper layout type
	Peeler installation
Printing Properties	Receipt Characters per Line
	Receipt Line Spacing [dots]
	CharacterSet [CodePage Number]

^{*1} The settings can be changed when using a connection other than serial.

^{*2} Available only for the Multilingual character model.

2.4.2 Paper Width Setting

The TM-L90 models support the following paper width. After adding the TM-L90 by the SetupPOS utility, open the “Device Specific Settings” dialog box. In the “Paper” tab the paper width could be selected.

The settable paper widths are as follows:

- From 38 to 80 [mm]

The default paper width is set to 80mm.

Section 3. Function Details

This section describes the functions of the TM-L90 printers in details. Supplementary explanation of the parts not described in detail in the "UPOS" is also given here.

3.1 Property Set Values and Default Values

The following explanation is about the property set values and the default values.

3.1.1 Capability Set Values

The following values are the Capability set values.

Capability Name	Set Value
CapTransaction	TRUE
CapCoverSensor	TRUE
CapConcurrentRecSlp	FALSE
CapConcurrentJrnSlp	FALSE
CapConcurrentJrnRec	FALSE
CapConcurrentPageMode	FALSE
CapCharacterSet	PTR_CCS_UNICODE *1
CapMapCharacterSet	TRUE *3
CapJrnUnderline	FALSE
CapJrnNearEndSensor	FALSE
CapJrnItalic	FALSE
CapJrnEmptySensor	FALSE
CapJrnDwideDhigh	FALSE
CapJrnDwide	FALSE
CapJrnDhigh	FALSE
CapJrnColor	0
CapJrnCartridgeSensor	0
CapJrnBold	FALSE
CapJrn2Color	FALSE
CapJrnPresent	FALSE
CapRecPageMode	TRUE
CapRecUnderline	TRUE
CapRecStamp	FALSE
CapRecRotate180	TRUE
CapRecRight90	TRUE
CapRecPapercut	TRUE FALSE (TM-L90 with Peeler)

CapRecNearEndSensor	TRUE
CapRecMarkFeed ^{*2}	PTR_MF_TO_TAKEUP PTR_MF_TO_NEXT_TOF PTR_MF_TO_CURRENT_TOF PTR_MF_TO_CUTTER
CapRecLeft90	TRUE
CapRecItalic	FALSE
CapRecEmptySensor	TRUE
CapRecDwideDhigh	TRUE
CapRecDwide	TRUE
CapRecDhigh	TRUE
CapRecColor	PTR_COLOR_PRIMARY
CapRecCartridgeSensor	0
CapRecBold	TRUE
CapRecBitmap	TRUE
CapRecBarCode	TRUE
CapRec2Color	FALSE
CapRecPresent	TRUE
CapRecRuledLine	FALSE
CapSlpUnderline	FALSE
CapSlpRotate180	FALSE
CapSlpRight90	FALSE
CapSlpNearEndSensor	FALSE
CapSlpLeft90	FALSE
CapSlpItalic	FALSE
CapSlpEmptySensor	FALSE
CapSlpDwideDhigh	FALSE
CapSlpDwide	FALSE
CapSlpDhigh	FALSE
CapSlpColor	0
CapSlpCartridgeSensor	0
CapSlpBothSidesPrint	FALSE
CapSlpBold	FALSE
CapSlpBitmap	FALSE
CapSlpBarCode	FALSE
CapSlp2Color	FALSE
CapSlpFullslip	FALSE
CapSlpPresent	FALSE
CapSlpPageMode	FALSE
CapSlpRuledLine	FALSE

^{*1} If Multilingual character model, "PTR_CCS_KANJI" is set.

^{*2} The setting values of CapRecMarkFeed differ depending on the device state and the paper type in the case of the "TM-L90 with Peeler" model.

Please refer to "3.16.1 MarkFeed function of TM-L90 with Peeler" of this manual for details.

*3 If Multilingual character model, "FALSE" is set.

3.1.2 List Properties

The List Properties are explained in the following.

List Property	Settings
CharacterSetList	(TM-L90, TM-L90M *1*3) "120, 121, 126, 130, 131, 150, 151, 152, 153, 154, 155, 255, 437, 720, 737, 775, 850, 851, 852, 853, 855, 857, 858, 860, 861, 862, 863, 864, 865, 866, 869, 998, 999, 1098, 1125, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258"
JrnLineCharsList	"65"
RecLineCharsList (When 80mm is set)	"48,64" *2
SlpLineCharsList	"65"
RecBarCodeRotationList	"0,R90, L90, 180"
RecBitmapRotationList	"0,R90, L90, 180"
SlpBarCodeRotationList	"65"
SlpBitmapRotationList	"65"
FontTypefaceList	"65"

*1 If Multilingual character model, "936" or "950" is added to the list.

*2 The value differs by the settings of the paper width or the layout of the label.

*3 When the CapCharacterSet property is set to "PTR_CCS_UNICODE," "997" is added to the list. When CharacterSet is set to "997," all characters loaded in the device are allocated to Unicode for printing. However, the BinaryConversion property should be set to "OPOS_BC_NONE" when printing with Unicode.

3.1.3 Width and Height Properties

The width and height properties are explained in the following.

Property	Settings		
	Default Value	Maximum value [dot]	Minimum value [dot]
RecLineSpacing	30	127	24 ^{*1}
JrnLineSpacing	X	X	X
SlpLineSpacing	X	X	X
SlpLineHeight [dot]	X		
RecLineHeight [dot]	24,17		
JrnLineHeight [dot]	X		
SlpLineWidth [dot]	X		
RecLineWidth [dot] (When 80mm is set)	576 ^{*5}		
JrnLineWidth [dot]	X		
RecSidewaysMaxLines	19 ^{*3}		
RecSidewaysMaxChars (When Font A is selected)	123 ^{*4}		
RecSidewaysMaxChars (When Font B is selected)	164 ^{*4}		
RecLinesToPaperCut	6 ^{*2}		
SlpSidewaysMaxLines	X		
SlpSidewaysMaxChars	X		
SlpMaxLines	X		

X: No settings

^{*1} In the case of a line thermal station, the Line Spacing setting is identical with the height of the characters which means that it can be set at up to 17 when Font B is selected.

^{*2} It can be changed by the settings of the RecLineSpacing or the character height.

^{*3} It can be changed by the settings of the XxxLineSpacing or the XxxLineHeight.
The value differs accordance with the selected paper width.

^{*4} It can be changed by the settings of the font width, or the selected paper type.

^{*5} The value differs by the settings of the paper width or the layout of the label.

3.1.4 Common Property Strings

The Device information properties are described below.

I/F	DeviceName	DeviceDescription
S	TM-L90	EPSON TM-L90 POS Printer
	TM-L90M	EPSON TM-L90M POS Printer
P	TM-L90P	EPSON TM-L90P POS Printer
	TM-L90PM	EPSON TM-L90PM POS Printer
U	TM-L90U	EPSON TM-L90U POS Printer
	TM-L90MU	EPSON TM-L90MU POS Printer
E	TM-L90E	EPSON TM-L90E POS Printer
	TM-L90ME	EPSON TM-L90ME POS Printer

I/F indicate the connected interface.

The following is the list of the four connecting interfaces.

S: Serial

P: Parallel

U: USB

E: Ethernet

3.1.5 PageMode Print Properties

The Device information properties are described below.

- TM-L90 (Roll paper)

Property	Station ^{*2}		
	Journal	Receipt	Slip
PageModeArea	-	"256~576" ^{*3} , "738"	-
PageModeDescriptor ^{*1}	-	BM/BC/BMR/BCR	-

- TM-L90 (Label paper)

Property	Station ^{*2}		
	Journal	Receipt	Slip
PageModeArea	-	"224~560" ^{*3} , "738"	-
PageModeDescriptor ^{*1}	-	BM/BC/BMR/BCR	-

^{*1} Following setting values are used for the PageModeDescriptor property.

BM : Bitmap printing is available.

BC : Barcode printing is available.

BMR : Rotated printing of bitmap is available.

BCR : Rotated printing of barcode is available.

^{*2} If the Station's CapRecPageMode and/or CapSlpPageMode property values are FALSE, the PageModeArea property shall have "" and the PageModeDescriptor property shall have "0" respectively as a setting value.

^{*3} The width of PageMode property is calculated as follows.

Roll paper paper width of 78-to-80 mm : 576 (Fixation)

 paper width of 38-to-77 mm : 256 + (paper width - 38) · 8

Label paper 224 + (paper width - 38) · 8

3.2 Methods

The following explanation is about supported/unsupported Methods, and the detailed information.

Method	Supported/Unsupported	Compatibility with the PageMode printing
PrintNormal	O	O
PrintTwoNormal	X	X
PrintImmediate	O	O ^{*3}
PrintBarCode	O	O ^{*4}
PrintBitmap	O	O ^{*5}
PrintMemoryBitmap	O	O ^{*5}
CutPaper	O (1~100: One point remains uncut / Full cut ^{*1}) X (TM-L90 with Peeler)	X
MarkFeed	O ^{*2}	O
ChangePrintSide	X	X
ValidateData	O	O
TransactionPrint	O	O
SetLogo	O	O
SetBitmap	O	O
RotatePrint	O	X
EndRemoval	X	X
BeginRemoval	X	X
EndInsertion	X	X
BeginInsertion	X	X
ClearPrintArea	O	O
PageModePrint	O	O
DrawRuledLine	X	X

O: Supported

X : Unsupported

^{*1} Full cut (completely cut) is possible as a dealer option.

^{*2} When selected paper is Normal Paper, the method is unsupported (X).

^{*3} If the specified Station is ready to print, the printing data shall not be stored in the PageMode printing buffer but, instead, go straight to printing. If the Station is not ready to print, an error is returned.

^{*4} If other than "LEFT" is specified for the printing position of barcode, the printing shall be done, regardless of the PageModeHorizontalPosition property setting, based on the PageModePrintArea property setting in the horizontal direction.

^{*5} If other than "LEFT" is specified for the printing position of bitmap, the printing shall be done, regardless of the PageModeHorizontalPosition property setting, based on the PageModePrintArea property setting in the horizontal direction.

3.3 Escape Sequences

The following figure is about supported/unsupported Escape Sequences.

Escape Sequence	Receipt	Compatibility with the PageMode printing
#P	0~100 X (L90 with Peeler)	X
#fP	0~100 X (L90 with Peeler)	X
#sP	X	X
sL	X	X
#B	O	O
tL	O	O
bL	O	O
[*]#R	O	O
#IF	0~9999	O
#uF	0~ approx. 50 cm	O
#rF Maximum [inch]	X	X
[*]#E	0~65535	X
#fT	X	X
bC	O	O
!bC	O	O
#uC	1~2	O
iC	X	X
!iC	X	X
#rC	1	O
rvC	O	O
!rvC	O	O
#sC	X	X
#fC	X	X
tbC	X	X
!tbC	X	X
tpC	X	X
!tpC	X	X
1C	O	O
2C	O	O
3C	O	O
4C	O	O
#hC	1~8	O
#vC	1~8	O
cA	O	O ^{*2}
rA	O	O ^{*2}
lA	O	O
#stC	1	1
!stC	O	O
*#dL	X	X
N	O	O

O: Supported

X : Unsupported

Numbers: Settable range

*1 Regardless of the PageModeHorizontalPosition property setting, center or right adjust what is to be printed based on the PageModePrintArea property setting in the horizontal direction.

3.4 Printable Barcode Type

The TM-L90 models allow the following barcode types.

- Code 128
- Code 128 Parsed
- Code 93
- Codabar
- ITF
- Code 39
- JAN 13 (EAN 13)
- JAN 8 (EAN 8)
- UPC-E
- UPC-A
- PDF417
- MAXI CODE
- QR CODE
- Micro QR CODE
- GS1-Data
- GS1-Data Expanded
- GS1-128
- GS1-Data Truncated
- GS1-Data Limited
- GS1-Data Stacked
- GS1-Data Stacked Omnidirectional
- GS1-Data Expanded Stacked
- Composite
- Datamatrix

3.5 MAXI CODE Printing

3.5.1 Symbology Parameter

When printing MAXI CODE, set the Symbology parameter to one of the following values.

PTR_BCS_MAXICODE : Print using MAXI mode 2.

PTR_BCS_OTHER + 0 : Print using MAXI mode 3.

PTR_BCS_OTHER + 1 : Print using MAXI mode 4 or 5. The mode is set to 4 or 5 automatically depending on the length of the Data parameter. (If the data is long, then the data correction level is lowered for printing.)

PTR_BCS_OTHER + 2 : Print using MAXI mode 6.

3.5.2 Printing Size

Because the size of MAXI CODE is fixed, printing is done at a fixed size that is unaffected by the Width and Height parameters. An error occurs only when the Width and Height parameters fall below zero. If the two dimensional barcode cannot fit into the print area (depending on the paper width, layout settings, etc.) then OPOS_E_ILLEGAL is returned and at this moment ResultCodeExtended becomes zero.

3.5.3 Printing Position

Like the one dimensional barcode, the print position of the two dimensional barcode is the specified position.

3.5.4 Data Format

3.5.4.1 Mode 2

In the case of mode 2, because the format of header + primary message + secondary message is fixed, data for the Data parameter must follow this format.

The header part contains the following data, which can be omitted.

"[> RS 01 GS yy" (In hexadecimal: 0x5B 0x29 0x3E 0x1E 0x30 0x31 0x1D 0x.. 0x..)

yy is '0' to '9' (0x30 to 0x39)

The primary message part contains the following data.

"Postal Code" GS "ISO Country Code" GS "Service Class Code" GS

Field	Length (byte)	Type
Postal Code	1 to 9	Number (0x30 to 0x39)
ISO Country Code	1 to 3	Number (0x30 to 0x39)
Service Class Code	1 to 3	Number (0x30 to 0x39)

For the secondary message, you can freely specify any data from 0x01 to 0xFF, and the data can be omitted. Since the length of the encoded data is not known, the data length cannot be correctly verified. For this reason, if the printer determines, after examining the original data length, that the data can more or less be printed, it tries to print the data; if the length is more than that, then an error occurs. (For the secondary message, an error occurs if the data length is more than 70 bytes.)

3.5.4.2 Mode 3

In the case of mode 3, except for the format of the primary message, it is same as mode 2. The primary message of mode 3 has the following type of data.

"Postal Code" GS "ISO Country Code" GS "Service Class Code" GS

Field	Length (byte)	Type
Postal Code	1 to 6	Number (0x30 to 0x39) A-Z space "\$%&'()*+,-./
ISO Country Code	1 to 3	Number (0x30 to 0x39)
Service Class Code	1 to 3	Number (0x30 to 0x39)

3.5.4.3 Modes 4 and 5

0x01 to 0xFF can be specified to the Data parameter, and there is no restriction on the format. Since the length of the encoded data is not known, the data length cannot be correctly verified. For this reason, if the printer determines, after examining the original data length, that the data can more or less be printed, it tries to print the data; if the length is more than that, then an error occurs. (An error occurs if Data is zero byte or more than 80 bytes.)

Mode 4 differs from mode 5 in the error correction level. As much as possible, OPOS uses the higher error correction level. Therefore, if the data amount is small (less than 50 bytes), OPOS uses mode 5 (the one with a higher error

correction level).

3.5.4.4 Mode 6

0x01 to 0xFF can be specified to the Data parameter, and there is no restriction on the format. Since the length of the encoded data is not known, the data length cannot be correctly verified. For this reason, if the printer determines, after examining the original data length, that the data can more or less be printed, it tries to print the data; if the length is more than that, then an error occurs. (An error occurs if Data is zero byte or more than 80 bytes.)

3.6 QR CODE Printing

3.6.1 QR CODE Printing

When printing QR CODE, set the Symbology parameter to one of the following value

PTR_BCS_QRCODE : Print using QR CODE model 2.

PTR_BCS_OTHER + 3 : Print using QR CODE model 1 (old specification, used for maintaining compatibility).

PTR_BCS_OTHER + 4 : Print using QR CODE model 2.

PTR_BCS_UQRCODE : Print using Micro QR CODE.

3.6.2 Printing Size

Because the width and length of QR CODE are the same, printing is done to the inner part at a size closest to it by using the value specified by the Width parameter. Therefore, the height of print is not affected by the Height parameter. If the Height parameter is less than 0, an error occurs.

The print size is determined by the version of QR and the size of the module. Because the version of QR is determined by the data length and type, you can use the size of the module to adjust the print size. If the two dimensional barcode cannot fit into the print area (depending on the paper width, layout settings, etc.) then OPOS_E_ILLEGAL is returned and at this moment ResultCodeExtended becomes zero.

For QR, it differs from other two dimensional barcodes; if the encoded data result is not known, then the print width cannot be obtained. If the print width cannot be obtained, the page mode range for 90-degree rotated printing cannot be specified.

Therefore, within OPOS it calculates the number of code words of the encoded data. Because of this reason, data amount can be correctly verified.

3.6.3 Error Correction Level

Error correction level is fixed at 7%.

3.6.4 Printing Position

Like the one dimensional barcode, the print position of the two dimensional barcode is the specified position.

3.7 GS1 Printing (two dimension)

3.7.1 Symbology Parameter

When printing GS1, set the Symbology parameter to one of the following value.

PTR_BCS_GS1DATABAR_S :Print using GS1 DataBar Stacked Omnidirectional

PTR_BCS_GS1DATABAR_E_S: Print using GS1 DataBar Expanded Stacked

PTR_BCS_OTHER + 7 : Print using GS1 DataBar Stacked.

PTR_BCS_OTHER + 8 : Print using GS1 DataBar Stacked Omnidirectional.

PTR_BCS_OTHER + 9 : Print using GS1 DataBar Expanded Stacked.

3.7.2 Printing Size

Printing is done to the inner part at a size closest to it by using the value specified by the Width parameter. Therefore, the height of print is not affected by the Height parameter. If the Width and Height parameters are less than 0, an error occurs. Because the printing size is determined by the data length ^{*1} and barcode type, you can use the size of the module to adjust the print size.

If the two dimensional barcode cannot fit into the print area (depending on the paper width, layout settings, etc.) then OPOS_E_ILLEGAL is returned and at this moment ResultCodeExtended becomes 0.

^{*1} Available only for the GS1 DataBar Expanded Stacked.

3.7.3 Printing Position

Like the one dimensional barcode, the print position of the two dimensional barcode is the specified position.

3.7.4 Data Format

[Setting range of data]

Symbology	Length (byte)	Characters that can be specified
GS1 DataBar Stacked	13	0x30-0x39
GS1 DataBar Stacked Omnidirectional	13	0x30-0x39 (The first character is limited to 0x30 or 0x31.)
GS1 DataBar Expanded Stacked	2 to 255	0x20-0x22, 0x25-0x3f, 0x41-0x5a, 0x5F, 0x61-0x7a (The first two characters are limited to 0x30-0x39. Or if the first character is 0x28, the second and the third characters are limited to 0x30-0x39.)

[Special characters of GS1 DataBar 128]

Special characters	ASCII
FNC1	{1
'('	{{
')'	}

3.8 COMPOSITE Printing

3.8.1 Symbology Parameter

When printing COMPOSITE, set the Symbology parameter to the following value.

HIWORD : The constant value of PDF417

LOWORD : The constant value of the barcode that will combine the value of PDF417.

3.8.1.1 Combinable Barcode

The settable barcode in the ROWORD is as follows.

- UPC-A
- UPC-E (Compressed format)
- UPC-E
- EAN 8
- EAN 13
- GS1 DataBar
- GS1 DataBar Truncated
- GS1 DataBar Stacked
- GS1 DataBar Stacked Omnidirectional
- GS1 DataBar Limited
- GS1 DataBar Expanded
- GS1 DataBar Expanded Stacked
- GS1 DataBar 128

3.8.2 Printing Size

Printing is done to the inner part at a size closest to it by using the value specified by the Width parameter.

Therefore, the height of print is not affected by the Height parameter. If the Width and Height parameters are less than 0, an error occurs.

Because the printing size is determined by the data length and composite barcode type, you can use the size of the module to adjust the print size.

If the two dimensional barcode cannot fit into the print area (depending on the paper width, layout settings, etc.) then OPOS_E_ILLEGAL is returned and at this moment ResultCodeExtended becomes 0.

3.8.3 Printing Position

Like the one dimensional barcode, the print position of the two dimensional barcode is the specified position.

3.8.4 Data Format

The range designation of the HIWORD data is as follows.

Symbology	Length (byte)	Characters that can be specified
PDF417	3 to 2361	0x20-0x22, 0x25-0x3f, 0x41-0x5a, 0x5f, 0x61-0x7a

The range designation of the ROWORD data is as follows.

Symbology	Length (byte)	Characters that can be specified
UPC-A	11	0x30-0x39
UPC-E (Compressed format)	6	0x30-0x39
UPC-E	11	0x30-0x39 (The first character is limited to 0x30.)
EAN 8	7	0x30-0x39
EAN 13	12	0x30-0x39
GS1 DataBar	13	0x30-0x39
GS1 DataBar Truncated	13	0x30-0x39
GS1 DataBar Stacked	13	0x30-0x39
GS1 DataBar Stacked Omnidirectional	13	0x30-0x39 (The first character is limited to 0x30 or 0x31.)
GS1 DataBar Limited	13	0x30-0x39 (The first character is limited to 0x30 or 0x31.)
GS1 DataBar Expanded	2 to 255	0x20-0x22, 0x25-0x3f, 0x41-0x5a, 0x5f, 0x61-0x7a (The first two characters are limited to 0x30-0x39. Or if the first character is 0x28, the second and the third characters are limited to 0x30-0x39.)
GS1 DataBar Expanded Stacked	2 to 255	0x20-0x22, 0x25-0x3f, 0x41-0x5a, 0x5f, 0x61-0x7a (The first two characters are limited to 0x30-0x39. Or if the first character is 0x28, the second and the third characters are limited to 0x30-0x39.)
GS1 DataBar 128	3 to 255	0x00-0x7f

[Special characters of Barcodes (GS1 DataBar 128, GS1 DataBar Expanded and GS1 DataBar Expanded Stacked)]

Special characters	ASCII
FNC1	{1
FNC3	{3
{'	{{
{('	{{(
{')'	{})
{*}	{*

3.9 Power Condition Reports

The TM-L90 models support Power Condition Report as follows.

Powered on reporting: Supported.

Powered off reporting: Supported.

3.10 Synchronous Processing

The TM-L90 models support the Process ID for the Synchronous Processing.

3.11 Printing Position

The TM-L90 models support the function for setting printing position.

Function	Receipt
Left margin	O
Print position	O

O: Supported

X : Unsupported

When the left margin setting function is supported, it is possible to specify the horizontal printing position of the bitmap or barcode by dots unit.

When the printing position settings are supported, it is possible to specify the horizontal printing position of the text, bitmap, or the barcode to the left, center, or the right side of the paper.

3.12 Electronic Logo Function (NVRAM)

The TM-L90 models feature a function for electronic logo. To use the electronic logo function (NVRAM), start “TMFlogo utility” from the “Device Specific Settings” of SetupPOS utility, and register image files (BMP style) at the function in advance. For the details of the registration, please refer to the “Help” of “TMFlogo utility” and/or “EPSON OPOS ADK MANUAL User’s Manual TMFlogo Utility”

To print the registered image file, please use the following DirectIO.

PTR_DI_FLASH_BITMAP

PTR_DI_FLASH_BITMAP2

For the details of the printing, please refer to Section 4 of “EPSON OPOS ADK APPLICATION DEVELOPMENT GUIDE POSPrinter (TM Series)”. The available NVRAM size for the TM-L90 is 393216 bytes.

3.13 Printable Bitmap Types and Sizes

The TM-L90 models support the following bitmap commands. For the detail, please refer to the Section 3 of “EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE POSPrinter (TM Series)”. The allowance ranges for bitmaps are as follows.

Bitmap command type	Allowance range		
	x (x x 8 dots)	y (y x 8 dots)	xy
Download bitmap	1~2040	1~384	Receipt: ≤ 98304
	1~1024	1~831	
Raster bitmap	1~1024	1~831	

- Even if meet with the limitation described above, a bitmap that extend the paper width cannot be printed.
- When a height of the raster bitmap expands the value described above, the SO (Service Object) will automatically separate the bitmap data into multiple bitmaps, then print the multiple bitmaps data as one connected bitmap.

3.14 Maintenance Counter

The TM-L90 models feature a maintenance counter function for retaining an operation log of the printer. The following chart shows the available maintenance counters for the TM-L90.

Counter number Hexadecimal	Counter	Unit	Max. Value	Counter Type
14	Paper feed in number of lines: Roll paper	Lines	143,165,576	Resettable
15	Number of times head timing pulse: Roll paper	Times	4,294,967,295	Resettable
32	Number of auto-cutter operations	Times	4,294,967,295	Resettable
46	Uptime of product	Hours	71,582,788	Resettable
94	Number of paper feed lines: Roll paper	Lines	143,165,576	Cumulative
95	Number of times head timing pulse: Roll paper	Times	4,294,967,295	Cumulative
B2	Number of auto-cutter operations	Times	4,294,967,295	Cumulative
C6	Uptime of product	Hours	71,582,788	Cumulative

3.15 Automatic Recovery Function

The TM-L90 models feature a function for automatic recovery when the power is turned on again after an interruption of power. Recovery processing is performed automatically when the printer's power is turned on again after an interruption. The recovery processing restores the printer to the condition it was in before the power was turned off.

3.16 Output without Flow Control on the USB/Ethernet Interfaces

The TM-L90 models support outputting without flow control on the USB/Ethernet interfaces.

3.17 MarkFeed Function

The TM-L90 models support the MarkFeed function.

The OPOS_E_ILLEGAL / OPOS_EX_INVALIDMODE is returned at the execution of the PTR_MF_TO_CURRENT_TOF under the condition that the label is at the peel-off position or the position other than cut position in the case of the "TM-L 90 with Peeler" model.

However, the OutputCompleteEvent is fired upon the processing of the transferred command during the asynchronous print since the label position cannot be comprehended.

The label peeling detector may not be able to detect paper if the TM-L90 with Peeler is installed in a place where the printer is exposed to direct sunlight or other strong light.

If PTR_MF_TO_TAKEUP is executed, the label is fed to the peeling position and OPOS_E_OFFLINE/OPOS_EPTR_REMOVE_BUTTON is returned.

In this case, remove the label and then press the FEED button of the printer.

MarkFeed function of TM-L90 with Peeler Model

The operations of the CapRecMarkFeed and the MarkFeed method in the case of the "TM-L90 with Peeler" model are as follows.

Device Mode	Paper Type	CapRecMarkFeed
Peel-off Issuance Mode	Role Paper (No BlackMark)	0
	BlackMark Paper	*1
	Label Paper	PTR_MF_TO_TAKEUP PTR_MF_TO_CURRENT_TOF
Serial Issuance Mode	Role Paper (No BlackMark)	0
	BlackMark Paper	PTR_MF_TO_TAKEUP PTR_MF_TO_NEXT_TOF PTR_MF_TO_CURRENT_TOF
	Label Paper	PTR_MF_TO_TAKEUP PTR_MF_TO_NEXT_TOF PTR_MF_TO_CURRENT_TOF

*1 BlackMark paper cannot be used in the peel-off issuance mode.

3.18 Label Receipt DirectIO

The TM-L90 models support the following DirectIO commands. For usage information, please refer to the Section 4 of "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE POSPrinter (TM Series)".

PTR_DI_LABEL_REMOVE
 PTR_DI_LABEL_SET_PRINT_MODE
 PTR_DI_LABEL_SET_COUNT_MODE
 PTR_DI_LABEL_PRINT_COUNT
 PTR_DI_LABEL_SET_COUNT_VALUE

3.19 Label Receipt Usage

- Please specify the paper with the Memory Switch. To use the function related to the label, the paper should be label paper or black mark paper.
- When using label receipt paper, the Escape Sequence ESC|#IF feeds the receipt the specified length, or to the head of the next label.

3.20 Paper Cutting and Head Pulling Out Function

The TM-L90 models have a function to continuously cut paper and pull out its head. First, the printer feeds the paper to the cutting position when this function is used. Next, it cuts the paper using the specified cutting rate. Finally, it pulls out the head of the paper and the operation ends. Because the printer pulls out the head of paper after cutting it, the blank on the paper at the upper side can be reduced. This function can be used only if the receipt paper is set to the paper setting. This function can be used by the PTR_DI_CUT_AND_FEED_TOF command of DirectIO. Though the cutting rate can be specified using the *pData* parameter of DirectIO, for the TM-L90, the cutting rate does not change according to the value of *pData*, because the cutting rate depends on the installed position of the auto cutter unit. However, when values other than 0 to 100 are specified for *pData*, OPOS_E_ILLEGAL (OPOS_EX_BADPARAM + 2) is returned.

Section 4. Warnings

This section describes precautions in use of TM-L90.

- When a parallel I/F is used please set Busy Condition of Memory SW1-3 to ON (Buffer full).