

# **DSP851C Operation Manual**

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# 1. INFORMATION

Model DSP851C

A. Standard package:

- |   |               |
|---|---------------|
| <b>1. Display main unit</b>                 | <b>1 pc</b>   |
| <b>2. Power plug cable for power source</b> | <b>1 pack</b> |
| <b>3. Mounting screws pack</b>              | <b>1 pack</b> |

B. Optional accessories:

- 1. Power supply adaptor DC 12V/120VAC**
- 2. Power supply adaptor DC 12V/230VAC**
- 3. Side wall mounting bracket**
- 4. Y-cable for serial printer connection(WAS-1471)**

C. Model Classification

**DSP851C** - **00** **C**  
①                      ②      ③

- ① **Model number: DSP851C**
- ② **Type: 00 → standard type**
- ③ **Interface: C → DB9P(female)**

<p>This device complies with Part 15 of the FCC . Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.</p>
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# 2. INTRODUCTION

DSP851C Customer Display is an artistic design POS system peripheral device. It is for use with ECR, POS system to display the purchased prices and the amount of change to customers. Also it is capable to display the advertising message.

The major features of DSP851C are:

- A. Displays up to 40 characters (20 columns x 2 lines).**
- B. Large font (9 x 5.25mm) is easy to read.**
- C. The vacuum fluorescent display (VFD) provides a wide viewing angle, long life, high reliability and high display quality.**
- D. The blue-green display color is gentle to the eyes.**
- E. The display panel is adjustable to provide the best viewing angle up to 30 degrees.**
- F. The support pole is adjustable to provide the best system installation. (Height adjusted from 380mm to 550mm)**
- G. Provides good general utilities:**
  - User-defined message can be downloaded.**
  - International character sets.**
  - Advertising message running.**
- H. Provides an interface based on RS-232C with baud rate selectable from 300 to 19200 BPS.**

### 3. INSTALLATION

A. If you could get the power source DC 12V from the computer(POS system), you might use the enclosed “Power Plug Cable” pack.

1. Turn off the power of the computer(POS system).
2. Connect the power plug cable with the power source(DC 12V) inside the computer(POS system) and secure the RCA jack bracket on the rear panel of the computer(POS system).
3. Connect the RCA jack with the DC power jack on the DSP851C receptacle by using the RCA plug--DC plug adaptor cable.
4. Connect the DB9(female) connector with “Interface cable for computer” to the computer(POS system).
5. Turn on the power of the computer(POS system). The display will be ON.

B. If you are using the external power-supply adaptor DC 12V(Option).

1. Turn off the power of the computer(POS system).
2. Connect the D-sub 9 pin connector with “Interface cable for computer” to the computer(POS system).
3. Connect the power supply unit with the DC power jack on the DSP851C receptacle.
4. Turn on the computer(POS system) and the power supply unit. The display will be ON.

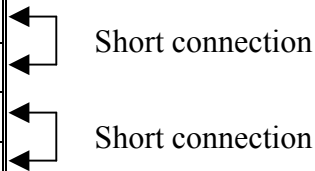
### 4. PIN ASSIGNMENT

A. DB-9(female) pin

B. DC power jack

Pin#	Signal
3	TXD
2	RXD
5	GROUND
8	CTS
7	RTS
4	DTR
6	DSR

Pin#	Signal
Center	+12VDC
Outer	GROUND



# 5. CHARACTER TABLES

International character code tables  
Table 1(U.S.A.)

Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	1	Sp	0	@	P	0	p	€	E	À	■	L	⌞	€	≡
1	1	17	i	1	A	Q	1	q	Û	Æ	Í	■	⌋	≡	£	±
2	2	18	"	2	B	R	2	r	ä	Œ	Ó	■	⌈	≡	£	≥
3	3	19	#	3	C	S	3	s	å	Œ	Ô	ı	⌋	≡	£	≤
4	4	20	\$	4	D	T	4	t	æ	Œ	Õ	ı	⌋	≡	£	ƒ
5	5	21	%	5	E	U	5	u	à	Œ	Ö	ı	⌋	≡	£	ƒ
6	6	22	&	6	F	V	6	v	á	Œ	Ù	ı	⌋	≡	£	÷
7	7	23	'	7	G	W	7	w	â	Œ	Ú	ı	⌋	≡	£	÷
8	8	24	(	8	H	X	8	x	ã	Œ	Û	ı	⌋	≡	£	÷
9	9	25	)	9	I	Y	9	y	ä	Œ	Ü	ı	⌋	≡	£	÷
A	10	26	*	10	J	Z	10	z	å	Œ	Û	ı	⌋	≡	£	÷
B	11	27	+	11	K	[	11	{	ä	Œ	Ü	ı	⌋	≡	£	÷
C	12	28	,	12	L	\	12		å	Œ	ı	ı	⌋	≡	£	÷
D	13	29	-	13	M	]	13	}	ä	Œ	ı	ı	⌋	≡	£	÷
E	14	30	.	14	N	^	14	~	ä	Œ	ı	ı	⌋	≡	£	÷
F	15	31	/	15	O	_	15	Δ	ä	Œ	ı	ı	⌋	≡	£	÷

Note: € is at position 80H(ASCII 128) and D5H(ASCII 213)

Table 2 International character difference among countries, others are as the same as Table 1.

	Country name	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A.	#	\$	@	[	\	]	^	`	{		}	~
1	France	#	\$	à	°	ç	§	^	`	é	ù	è	”
2	Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	U.K.	£	\$	@	[	\	]	^	`	{		}	~
4	Denmark I	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy <sup>o</sup>	#	\$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain	₧	\$	@	ı	Ñ	ı	^	`	”	ñ	}	~
8	Japan	#	\$	@	[	¥	]	^	`	{		}	—
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü

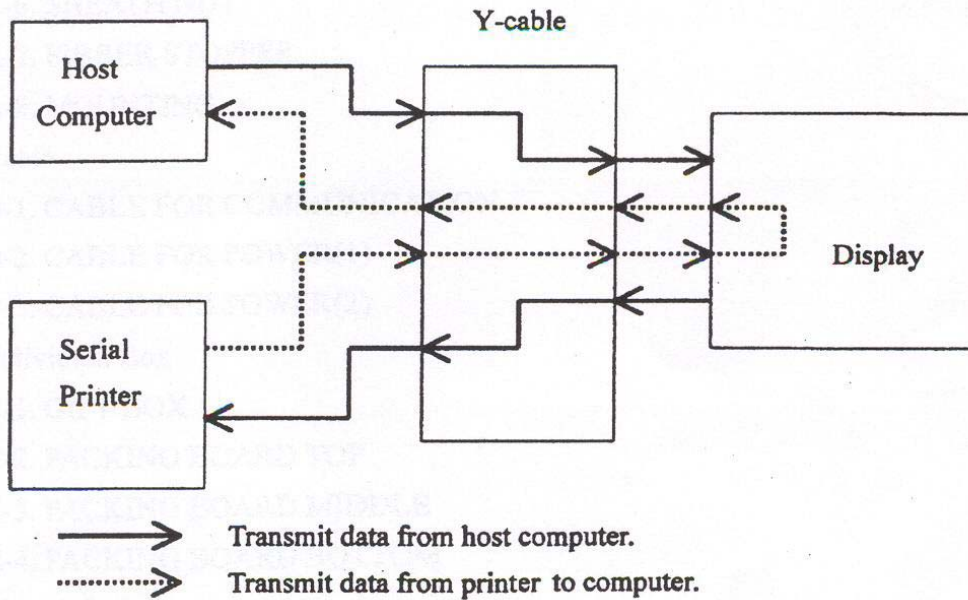
Table 3(Japanese)

Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	16	Sp	0	@	P	96	p	Sp	144	Sp	176	タ	≡	1	┘
1	1	17	i	1	A	Q	97	q	129	145	161	フ	チ	△	┘	┘
2	2	18	"	2	B	R	98	r	130	146	162	イ	ツ	×	┘	┘
3	3	19	#	3	C	S	99	s	131	147	163	ウ	フ	モ	┘	┘
4	4	20	\$	4	D	T	100	t	132	148	164	エ	ト	ヤ	┘	┘
5	5	21	%	5	E	U	101	u	133	149	165	オ	チ	ユ	┘	┘
6	6	22	&	6	F	V	102	v	134	150	166	カ	ニ	ヨ	┘	┘
7	7	23	'	7	G	W	103	w	135	151	167	キ	ヌ	ラ	┘	┘
8	8	24	(	8	H	X	104	x	136	152	168	ク	ネ	リ	┘	┘
9	9	25	)	9	I	Y	105	y	137	153	169	ケ	ノ	ル	┘	┘
A	10	26	*	:	J	Z	106	z	138	154	170	コ	ハ	レ	┘	┘
B	11	27	+	:	K	[	107	{	139	155	171	サ	ヒ	ロ	┘	┘
C	12	28	,	<	L	¥	108		140	156	172	シ	フ	ワ	┘	┘
D	13	29	-	=	M	]	109	)	141	157	173	ス	ヘ	ヅ	┘	┘
E	14	30	.	>	N	^	110	-	142	158	174	セ	ホ	ヅ	┘	┘
F	15	31	/	?	O	_	111	┘	143	159	175	ソ	マ	ヅ	┘	┘

## 6. PRINTER CONNECTION TO DISPLAY (Option)

Connect the DISPLAY in between the Computer (POS. system) and the Printer via the Y-cable following the marking on the connectors. If necessary, use the Connector adapter DB-9 to DB-25 to connect the Y-cable to the Host computer.

Figure 6-1 Data transmission through Y-cable



Note:

All the data transmitted from the host computer will be received by the display. If this data is for the display, the data will be processed, and if it is for the printer, it will be transmitted to the printer.

Whether the data is for the display or the printer can be switched using the Drive feature mode selection command, which is described in paragraph 7-B.

Table 6-1 is an example of Y-cable connection for serial printer.

To Computer(DB9 Female)	To DSP(DB9 male)	To Printer(DB25 male)
Pin2:RXD(in)	Pin2:TXD(out)	N.C.
Pin3:TXD(out)	Pin3:RXD(in)	N.C.
Pin5:SGND	Pin5:SGND	Pin7:SGND
N.C.	Pin9:TXD(out)	Pin3:RXD(in)
N.C.	Pin1:RXD(in)	Pin2:TXD(out)

## 7. PROTOCOL COMMAND GROUP

Command symbols definitions are as below:

**EOT** 04H  
**SOH** 01H  
**ETB** 17H  
**ACK** 06H  
**NACK** 15H

### A. Package Command Format

<b>EOT</b>	<b>SOH</b>	<b>COMMAND</b>	<b>ETB</b>
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Command List

Command	Hexadecimal	Description
<b>B</b>	42H	Set baud rate and parity
<b>I</b>	49H	Select international character set
<b>S</b>	53H	Save the current view message
<b>P</b>	50H	Set cursor position
<b>C</b>	43H	Clear display message
<b>D</b>	44H	Display the saved DEMO message
<b>T</b>	54H	Transmit the current view message to computer
<b>V</b>	56H	Query the version of firmware

**Note:** DSP851C will reply, after receive these commands.

### B. ESC Command Format

<b>ESC</b>	<b>COMMAND</b>
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Command List

Command	Hexadecimal	Description
<b>G</b>	47H	Enable AUX-DEVICE (Printer)
<b>S</b>	53H	Disable AUX-DEVICE (Printer)



### A-1. Set Communication Baud-Rate & Parity

ASCII	EOT	SOH	B	baudrate	parity	ETB
HEX	04H	01H	42H	n	p	17H

[Description]

You can set communication parameter by this command.

[Parameter]

baudrate	300	600	1200	2400	4800	9600	19200
n	36H	35H	34H	33H	32H	31H	30H

p='N'(ASCII, 4EH) means "non-parity, 8 data bits, 1 stop bit"

p='O'(ASCII, 4FH) means "odd-parity, 7 data bits, 1 stop bit"

p='E'(ASCII, 45H) means "even-parity, 7 data its, 1 stop bit"

[Reply] DSP851C reply **ACK**(06H) when correct or **NACK**(15H) when failed.

[Default] **baudrate**=9600, **non**-parity, **8** data bits, **1** stop bit.

### A-2. Select international code table

ASCII	EOT	SOH	I	country	ETB
HEX	04H	01H	49H	n	17H

[Description]

You can set one of international code table as character table for displaying. The same position in different international code table may be different. So, please refer **5. CHARACTER TABLES** to select correct code table.

[Parameters]

country	U.S.A.	France	Germany	U.K.	Denmark I	Sweden	Italy	Spain
n	30H	31H	32H	33H	34H	35H	36H	37H
country	Japan	Norway	Denmark II					
n	38H	39H	3AH					

[Reply] DSP851C reply **ACK**(06H) when correct or **NACK**(15H) when failed.

[Default] **country**=U.S.A.

### A-3. Save the current view-message as advertising message

ASCII	EOT	SOH	S	layer	ETB
HEX	04H	01H	53H	31H ≤ n ≤ 33H	17H

[Description]

DSP851C is capable to save 3 layers of advertising messages. Each layer can have 40 characters. This commands save the current view-message as one of 3 layers. DSP851C demonstrate these layer-messages when execute **A-6** command.

[Parameters]

n=31H, means the current view-message saved to layer1 advertising message

n=32H, means the current view-message saved to layer2 advertising message

n=33H, means the current view-message saved to layer3 advertising message

[Reply] DSP851C reply **ACK**(06H) when correct or **NACK**(15H) when failed.

#### A-4. Set cursor position

ASCII	EOT	SOH	P	position	ETB
HEX	04H	01H	50H	$31H \leq p \leq 58H$	17H

[Description]

You can locate cursor by this command. The position is regarded as linear.

[Parameters] The cursor can be set to the position from 1 to 40.

Position 1(p=31H) means the upper-left corner position.

Position 20(p=44H) means the upper-right corner position.

Position 21(p=45H) means the lower-left corner position.

Position 40(p=58H) means the lower-right corner position.

[Reply] DSP851C reply **ACK**(06H) when correct or **NACK**(15H) when failed.

#### A-5. Clear specific display area

ASCII	EOT	SOH	C	start position	end position	ETB
HEX	04H	01H	43H	$31H \leq p1 \leq 58H$	$31H \leq p2 \leq 58H$	17H

[Description]

Specific part of the current view messages can be cleared by this command.

[Parameters] **p1** and **p2** range same as **A-4 Parameters**.

[Reply] DSP851C reply **ACK**(06H) when correct or **NACK**(15H) when failed.

#### A-6. DEMO the saved advertising message

ASCII	EOT	SOH	D	layer	mode	ETB
HEX	04H	01H	44H	$31H \leq l \leq 37H$	$31H \leq m \leq 37H$	17H

[Description]

1. There are three layers of saved advertising messages as described on **A-3**.
2. There are three modes of display.  
mode1 is running the saved messages from right to left, which is a horizontal scroll mode.  
mode2 is running the saved messages from the lower line to the upper line, which is a vertical scroll mode.  
mode3 is displaying the saved messages with blinking.
3. For display layers,  
l=31 H means display the message saved on layer1.  
l=32H means display the message saved on layer2.  
l=33H means display the message saved on layer3.

l=34H means display the two messages saved on layer1 + layer2.  
 l=35H means display the two messages saved on layer1 + layer3.  
 l=36H means display the two messages saved on layer2 + layer3.  
 l=37H means display all the three messages saved on layer1+layer2+ layer3.

4. For display modes,

m=31 H means display the message with mode1. (horizontal scroll mode)

m=32H means display the message with mode2. (vertical scroll mode)

m=33H means display the message with mode3. (blinking mode).

m=34H means display the message with both mode1 + mode2.

m=35H means display the message with both mode1 + mode3.

m=36H means display the message with both mode2 + mode3.

m=37H means display the message with all modes, mode1+mode2+mode3. For this Demo display function, you must have saved the messages by “save the current view message” previously. For example, l=37H for displaying layers and m=34H for displaying modes, DSP851C would display all the three messages saved on layer1 + layer2 + layer3 with both mode1 + mode2 displaying modes.

5. Any new message from the computer would stop this Demo display function and DSP851C would display that new message from the computer.

[Reply] DSP851C reply **ACK**(06H) when correct or **NACK**(15H) when failed.

#### A-7. Transmit the current view message to computer

<b>ASCII</b>	<b>EOT</b>	<b>SOH</b>	<b>T</b>	<b>ETB</b>
<b>HEX</b>	04H	01H	54H	17H

[Description]

You can get the current view message (40 characters) from DSP851C.

[Reply] The DSP851C reply current view message by following format

<b>ASCII</b>	<b>SOH</b>	<b>current view message</b>	<b>ETB</b>
<b>HEX</b>	01H	XXXX(40 characters)	17H

or **NACK**(15H) when fail.

#### A-8. Query the version of firmware

<b>ASCII</b>	<b>EOT</b>	<b>SOH</b>	<b>V</b>	<b>ETB</b>
<b>HEX</b>	04H	01H	56H	17H

[Description] You can get the version of firmware.

[Reply] The DSP851C reply current version of firmware by ASCII(ROMxxxx).

### **B-1. Enable AUX-DEVICE (printer)**

<b>ASCII</b>	<b>ESC</b>	<b>G</b>
<b>HEX</b>	1BH	47H

[Description]

You can enable the aux-device (printer). After execute this command, all messages will pass through aux-device, and DSP851C doesn't care it.

### **B-2. Disable AUX-DEVICE (printer)**

<b>ASCII</b>	<b>ESC</b>	<b>S</b>
<b>HEX</b>	1BH	53H

[Description]

You can disable the aux-device (printer). After execute this command, all messages will not pass through aux-device

## 8. SPECIFICATIONS

### A. Display

- Vacuum fluorescent display (VFD).
- Number of characters: 40 (20 columns x 2 lines).
- Display color: Blue-green.
- Character font: 5 x 7 dot matrix.
- Character size: H9 x W5.25 mm.
- Character type: Alpha numeric: 95  
Graphic characters: 128
- Power consumption: 400mA Max. 12VDC

### B. Dimension

- Display unit: **H85 \* W230 \* D55mm**.
- Support pole: Telescopic pole from 270mm to 440mm with diameter 38mm.
- Base: 12mm with 80mm diameter.
- Tilt angle: 30 degree **MAX**.
- Horizontal rotation: 360 degree.
- Weight: Approx. 850 grams.

### C. Interface

- Display interface: RS-232C.
- Data transmission method: Serial.
- Default: 9600,N,8,1

### C. Reliability: MTBF 20,000 hours (power on hour)

### D. Operating environment

- Temperature: 5 to 45 degree C.
- Humidity: 10 to 85% relative

### E. Storage environment

- Temperature: -10 to 50 degree C.
- Humidity: 10 to 90% relative.