User's Manual

BD-202 Series

VFD Customer Display

Contents

1. Information

1.1 Standard Package

- Display unit (RS-232 or USB interface)
- Support CD
- Power kit (for RS-232 interface)
  to retrieve power DC 12V from switching power supply inside the computer.

1.2 Optional Accessories

- Switch-Mode Power Supply
  Input: AC 100V~240V, 50Hz~60Hz
  Output: DC 9 V, 1A
- Power adapter
  Input: AC 110V, 60Hz
  Output: DC 9 V, 1A
- Power adapter
  Input: AC 230V, 60Hz
  Output: DC 9 V, 1A

1.3 Specifications

A. Tube Display

Customer Display	Vacuum Fluorescent Display
Display Pattern	5 x 7 dot matrix
Brightness	500 cd/m^2
Character Type	96 alphanumeric & 13 international characters
Character Set	9 different command sets
Character Size	3.75W x 4.75H mm
Character Number	2 x 20

B. Electrical

Power Source	DC 9V~12V (RS-232) or DC 5V (USB)
Power Consumption	2.5 Watts (RS-232) or 2.3Watts (USB)
Central Control Unit	CPU 8031BH ROM 64K flash ROM 32K SRAM
Speed	29MHz

C. Physical

Dimensions (Panel)	165W x 39D x 67H mm
Dimensions (Support)	72mm
Dimensions (Base)	187W x 84D x 25H mm
Tilt Angle	Max. 53°
Rotation Angle	Max. 360°
Weight	0.56Kg
Interface	RS-232 or USB
Color	Black or beige

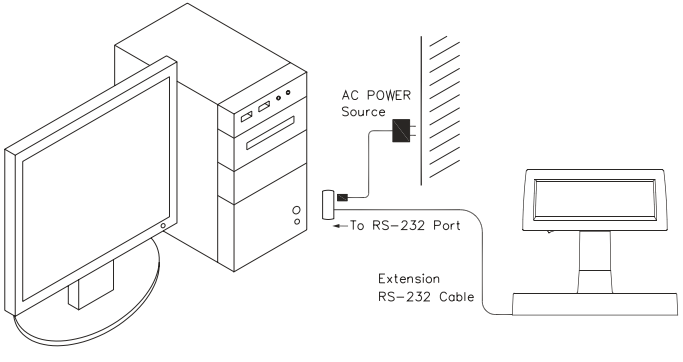
D. Environmental

Operating Temperature	0℃~40℃ (32°F~104°F)
Storage Temperature	-10℃~50℃ (14°F~122°F)
Relative Humidity	0%~90% RH

2. Installation

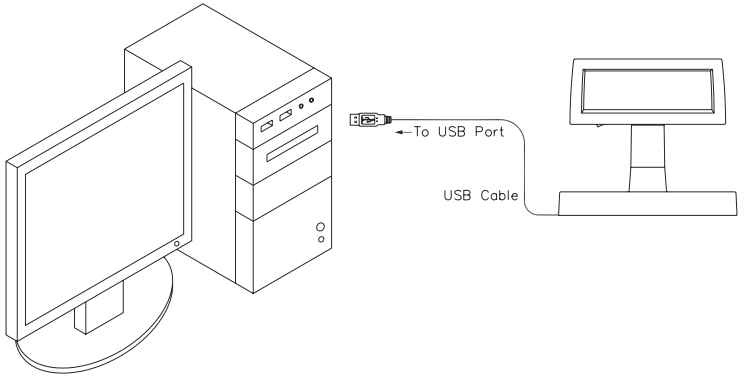
2.1 RS-232 Connection

Step 1: Turn off the computer.
Step 2: Connect the display cable to the RS-232 port of the computer.
Step 3: Set the connection between the bundled power kit and the switch power supply inside the computer or connecting the DC power source by the appropriate DC power adapter.
Step 4: Turn on the computer. The display will be on and ready for receiving data.



2.2 USB Connection

Step1: Connect the USB cable of the display to the USB port of the computer.
Step 2: Insert the bundled CD and install the USB driver through Utilities\BD-202\CP2102_USBdriver\Check USB_Port.exe



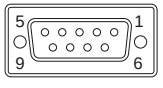
3. Cable Connections

3.1 RS-232 Interface

A. Cable-end

DSUB-9 Pin Female Connector

2	TX
3	RX
5	GND
7	CTS
8	RTS
9	VCC
1 — **4** — **6**	Short Connection



B. DC Power Jack

GND —(•— +9~12VDC/500~1000mA

C. Interface of Display Panel Side

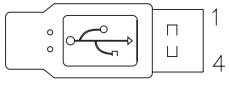
Interface connector (display panel side)
6 pin Male-Header
Pin assignments:

1	TXD
	DSR
	RXD
	DTR
	GND
6	VCC

3.2 USB Interface

A. Cable-end

USB
1 +5V
2 – Data
3 +Data
4 GND



B. Interface of Display Panel Side

4 pin Male-Header
Pin assignments:

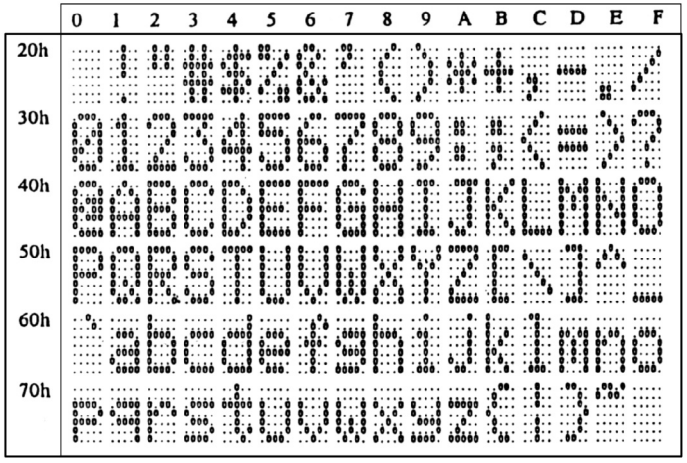
1 VCC
2 D-
3 D+
4 GND

4. Character Font Table

A. Control code set

HEX	CODE	HEX	CODE
00H	NULL	10H	DLE
01H	MD1	11H	DC1
02H	MD2	12H	DC2
03H	MD3	13H	DC3
04H	MD4	14H	DC4
05H	MD5	15H	
06H	MD6	16H	
07H	MD7	17H	
08H	BS, Md8	18H	CAN
09H	HT	19H	
0AH	LF	1AH	
0BH	HOM	1BH	ESC
0CH	CLR	1CH	
0DH	CR	1DH	
0EH	SLE1	1EH	SF1
0FH	RS,SLE2	1FH	US, SF2

B. U.S.A. font set

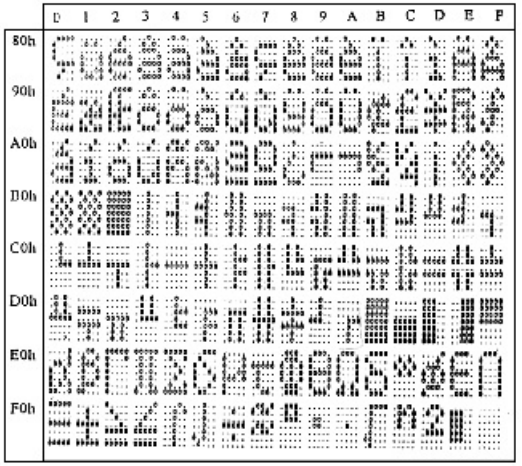


C. International character selection

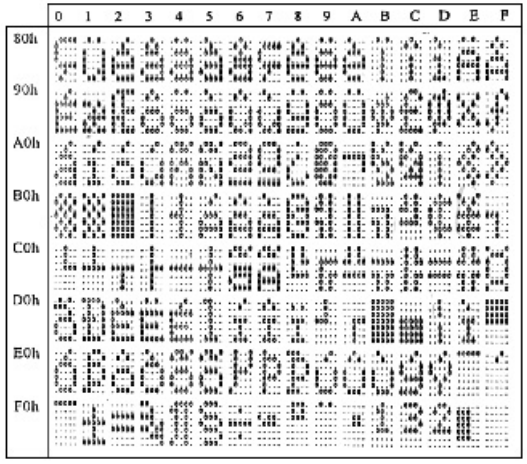
ASCII CODE

Hex. Value	International	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
30H	USA	#	$	@	[	\	]	^	`	{	|	}	~
31H	FRANCE	#	$	à	°	ç	§	^	`	é	ù	è	¨
32H	GERMANY	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
33H	U.K.	£	$	@	[	\	]	^	`	{	|	}	~
34H	DENMARK I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
35H	SWEDEN	#	¤	@	Ä	Ö	Å	Ü	é	ä	ö	å	ü
36H	ITALY	#	$	@	°	ç	é	^	ù	à	ò	è	ì
37H	SPAIN	#	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
38H	JAPAN	#	$	@	[	¥	]	^	`	{	|	}	~
39H	NORWAY	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
3AH	DENMARK II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
3BH	SLAVONIC	#	$	@	[	\	]	^	`	{	|	}	~
3CH	RUSSIA	#	$	@	[	\	]	^	`	{	|	}	~

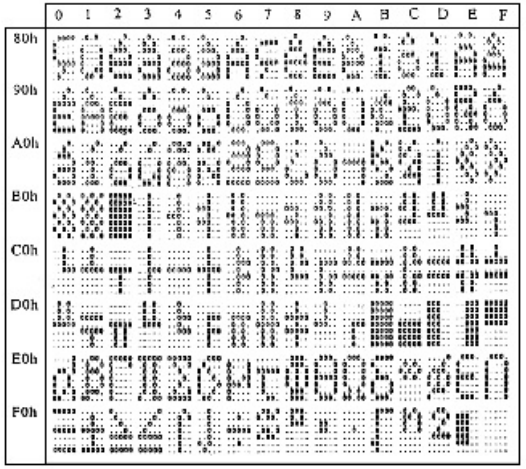
3DH: Standard Europe international font set



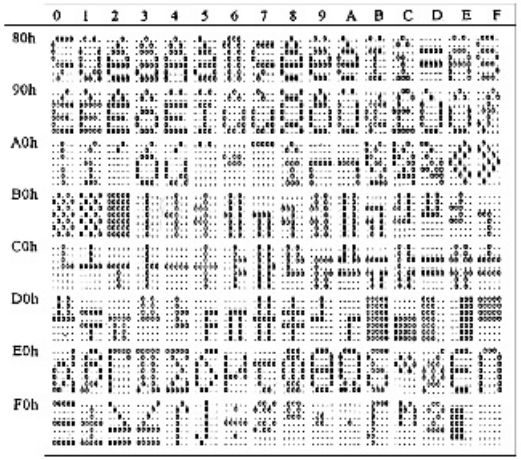
3EH: Multingual international font set



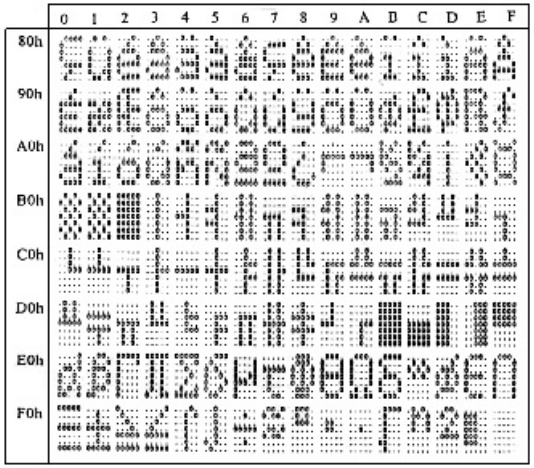
3FH: Portuguese international font set



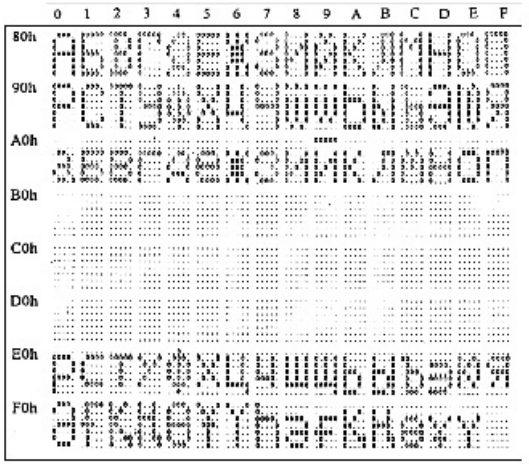
40H: Canadian French international font set



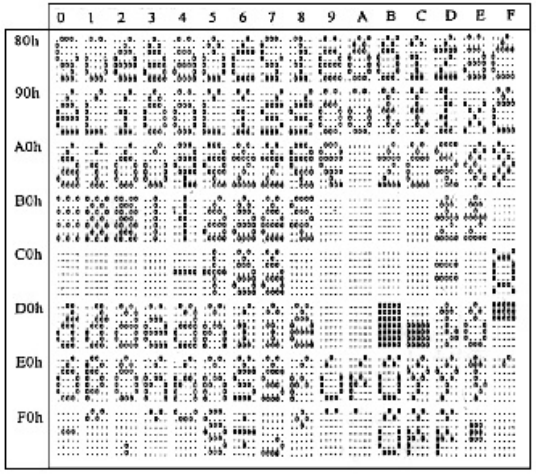
41H: NORDIC internatinal font set



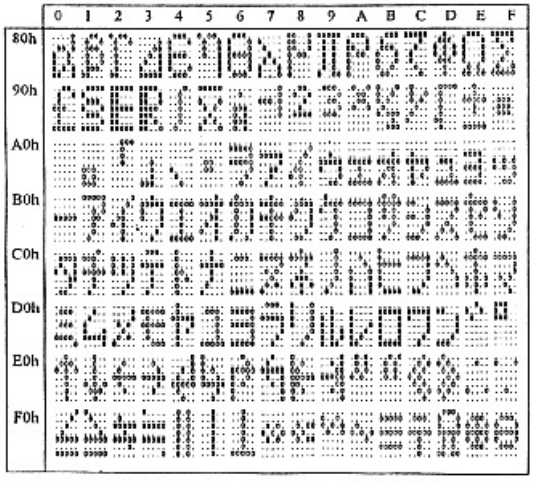
42H: RUSSIA font set



43H: SLAVONIC Font set

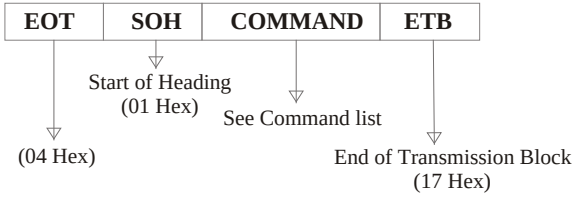


44H: Katakana font set



5. System Commands

5.1 Command Format



5.2 Command List

A. Set Baud Rate

COMMAND: B

COMPUTER:	EOT	SOH	'B'	'BAUD RATE'	'N'	ETB
ASCII	(04H)	(01H)	(42H)	(31H~37H)	(4EH)	(17H)
Byte	1	1	1	1	1	1

DISPLAY:	ACK	(or NACK if failed)
ASCII	(06H)	(15H)
Byte	1	1

Note: Baud rates
31H: 9600
32H: 4800
33H: 2400
34H: 1200
35H: 600
36H: 300
37H:19200

B. Select international code table

COMMAND: I
COMPUTER:EOT SOH 'I' 'CHAR' ETB
ASCII(04H)(01H)(49H)(30H~44H)(17H)
Byte 1 1 1 1 1
DISPLAY: ACK (or NACK if failed)
ASCII (06H) (15H)
Byte 1 1

Note : International Character Code

30H : U. S. A.	3BH : Slavonic
31H : France	3CH : Russia
32H : Germany	3DH : Standard Europe International font set
33H : U. K.	3EH : Multingual International font set
34H : Denmark I	3FH : Portuguese International font set
35H : Sweden	40H : Canadian French International font set
36H : Italian	41H : Nordic International font set
37H : Spain	42H : Russia font set
38H : Japan	43H : Slavonic font set
39H : Norway	44H : Katakana font set
3AH : Denmark II	

C. Save the current view message

(Save Demo view data)

COMMAND: S
COMPUTER:EOT SOH 'S' 'Layer' ETB
ASCII(04H)(01H)(53H)(31H~33H)(17H)
Byte 1 1 1 1 1
DISPLAY: ACK (or NACK if failed)
ASCII (06H) (15H)
Byte 1 1

Note : 31H: Layer 1 / 32H: Layer 2 / 33H: Layer 3

D. Set cursor position

COMMAND: P
COMPUTER: EOT SOH 'P' 'Position' ETB
ASCII (04H) (01H) (50H) (31H~58H) (17H)
Byte 1 1 1 1 1
DISPLAY: ACK (or NACK if failed)
ASCII (06H) (15H)
Byte 1 1

Note: The cursor can be set to the position from 1 to 40
Position 1 means the upper left corner position.
Position 20 means the upper right corner position.
Position 21 means the lower left corner position.
Position 40 means the lower right corner position.

E. Clear display range

COMMAND: C

COMPUTER:						
	EOT	SOH	'C'	'START'	'END'	ETB
ASCII	(04H)	(01H)	(43H)	(31H~58H)	(31H~58H)	(17H)
Byte	1	1	1	1	1	1

DISPLAY:		
	ACK	(or NACK if failed)
ASCII	(06H)	(15H)
Byte	1	1

Note: Some part of the current view messages can be cleared by this COMMAND. It can start clearing between position 1 and position 40.

F. Display the saved DEMO message

COMMAND: D

COMPUTER:						
	EOT	SOH	'D'	'Layer'	'Mode'	ETB
ASCII	(04H)	(01H)	(44H)	(31H~37H)	(31H~33H)	(17H)
Byte	1	1	1	1	1	1

DISPLAY:		
	ACK	(or NACK if failed)
ASCII	(06H)	(15H)
Byte	1	1

Note:

a) There are three layers of saved view messages as described on COMMAND "S"
b) There are two modes of display:
Mode 1 is running the saved messages from right to left, which is a horizontal scroll mode.
Mode 2 is running the saved messages from the lower line to the upper line, which is a vertical scroll mode.
c) For display layers:
select 31H means display the message saved on layer 1.
select 32H means display the message saved on layer 2.
select 33H means display the message saved on layer 1+ layer 2.
select 34H means display the message saved on layer 3.
select 35H means display the two messages saved on layer 1 + layer 3.
select 36H means display the two messages saved on layer 2 + layer 3.
select 37H means display all the messages saved on layer 1 + layer 2 + layer 3.
d) For display modes,
select 31H means display the message with Mode 1.
select 32H means display the message with Mode 2.
select 33H means display the message with Mode 1+Mode 2.
For this Demo display function, you must have saved the message by COMMAND "S" previously, For example, select 37H for displaying layers and select 33H for displaying modes, DSP would display all the three messages saved on layer 1+ layer 2 + layer 3 with both Mode 1 + Mode 2 displaying modes.
e) Any new message from the computer would stop this Demo display function and DSP would display that new message from the computer.

G. Select the Command Mode

COMMAND: M						
COMPUTER:	EOT	SOH	'M'	'Mode'		ETB
ASCII	(04H)	(01H)	(4DH)	(30H~38H)		(17H)
Byte	1	1	1	1		1
DISPLAY:	ACK			(or NACK if failed)		
ASCII	(06H)			(15H)		
Byte	1			1		

Note: Command Modes Selection

H. Set all default

COMMAND: X				
COMPUTER:	EOT	SOH	'X'	ETB
ASCII	(04H)	(01H)	(58H)	(17H)
Byte	1	1	1	1

5.3 Transmission method

Each ASCII character is transmitted with

1 start bit
8 data bits
1 stop bit
No parity

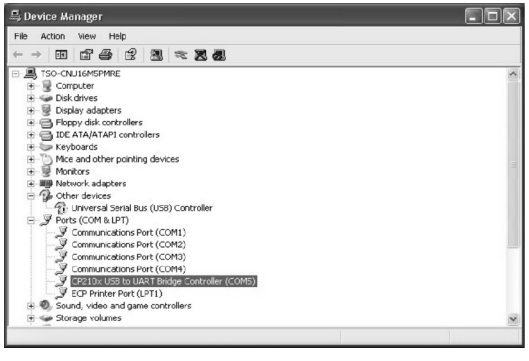
Note: You may generate your own application software to run the display according to the standard RS-232C communication protocols and the SOFTWARE CONTROL information listed on this chapter.

6. Demo Software

Connect the display to COM 1 or the USB port of the computer.
The default communication parameters are:

COM port:	COM 1
Baud rate:	9600
Parity:	None
Data bits:	8
Stop bit:	1

Note: Identify the USB port
USB interface customer display assigns a virtual serial port for communications. Execute Start\Control Panel\System\Hardware\Device Manager\Ports (Com & LPT) to identify the port number.



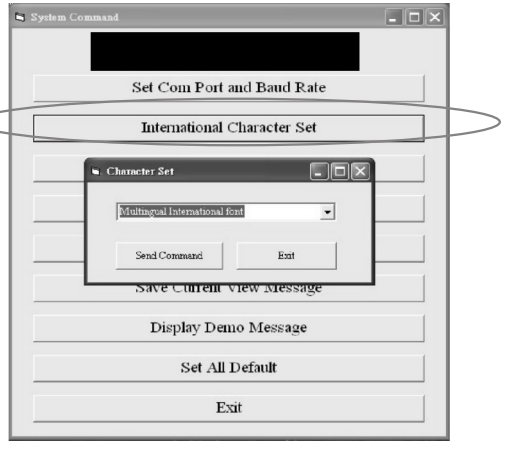
Follow the steps below to install the demo software.

- Make sure the display is powered on and connected properly to the computer.
- Insert the bundled CD and install the demo software through Utilities\BD-202\setup.exe

- Run the demo software through Start\Programs\BDConfig.
- Test the software commands, such as Cursor Position, Screen Display, and Display Mode, by each index.
- Close the configuration utility to complete the setup process.

Note: Set the symbol of the Euro (€)

- Run the demo software of BD-202.
- Click "International Character Set" and select "Multingual international font". Press the "Send Command" bottom on the Character Set window.



- The position of the Euro (€) is Font: E, D5 (Hex).

7. Command Modes

The command modes can be selected with the Demo Software.

Mode 0: BD-202 (Default)
Mode 1: EPSON Esc/POS

Mode 0: BD-202 mode

Command	Hexadecimal Codes	Function
B	42H	Set baud rate and parity
I	49H	Select international character set
S	53H	Save the current view message
P	50H	Set cursor position
C	43H	Clear display message
D	44H	Display the saved DEMO message
ESC G ESC S	IBH 47H IBH 53H	Print ON command Print OFF command
M	4DH	Select command mode
X	58H	Set all default

Mode 1: EPSON Esc/POS mode

Command	Code Description (hex)	Function
HT	09	Move cursor right
BS	08	Move cursor left
US LF	1F 0A	Move cursor up
LF	0A	Move cursor down
US CR	1F 0D	Move cursor to right-most position
CR	0D	Move cursor to left-most position
HOM	0B	Move cursor to home position
US B	1F 42	Move cursor to bottom position
US $ x y	1F 24 x y X=1-20 y=01,02	Move cursor to specified position
CLR	0C	Clear display screen
CAN	18	Clear cursor line
US E n	1F 45 n n=00-ff	Blink display screen
ESC @	1B 40	Initialize display
ESC R n	1B 52 n n=0~15	Select international character set
US MD1	1F 01	Specify overwrite mode
US MD2	1F 02	Specify vertical scroll mode
US MD3	1F 03	Specify horizontal scroll mode
ESC W n s x1 y1 x2 y2	1B 57 n s x1 y1 x2 y2 n=1,2,3,4 s=0, 1	Specify/cancel the window range 1<=x1<=x2<=20 1<=y1<=y2<=2
US:	1F 3A	Set starting/ending position of macro definition
US ^ n m	1F 5E n m 00<=(n,m)<=ff	Execute and quit macro