User Manual

Version 2.0 January 2013

Breeze

Hardware System

Manual Version 2.0
Part Number:

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Safety

IMPORTANT SAFETY INSTRUCTIONS

1. To disconnect the machine from the electrical Power Supply, turn off the power switch and remove the power cord plug from the wall socket. The wall socket must be easily accessible and in close proximity to the machine.
2. Read these instructions carefully. Save these instructions for future reference.
3. Follow all warnings and instructions marked on the product.
4. Do not use this product near water.
5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided.
7. This product should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
8. Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord.
9. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

CE MARK

CE

This device complies with the requirements of the EEC directive 2004/108/EC with regard to “Electromagnetic compatibility” and 2006/95/EC “Low Voltage Directive”.

FCC

FC

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.

(2) This device must accept any interference received, including interference that may cause undesired operation

CAUTION ON LITHIUM BATTERIES

There is a danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Battery Caution

Risk of explosion if battery is replaced by an incorrectly type.
Dispose of used battery according to the local disposal instructions.

Safety Caution

Note: To comply with IEC60950-1 Clause 2.5 (limited power sources, L.P.S) related legislation, peripherals shall be 4.7.3.2 "Materials for fire enclosure" compliant.

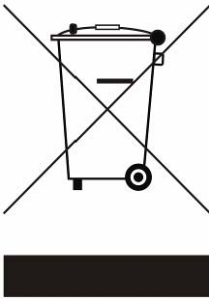
4.7.3.2 Materials for fire enclosures

For MOVABLE EQUIPMENT having a total mass not exceeding 18kg.the material of a FIRE ENCLOSURE, in the thinnest significant wall thickness used, shall be of V-1 CLASS MATERIAL or shall pass the test of Clause A.2.

For MOVABLE EQUIPMENT having a total mass exceeding 18kg and for all STATIONARY EQUIPMENT, the material of a FIRE ENCLOSURE, in the thinnest significant wall thickness used, shall be of 5VB CLASS MATERIAL or shall pass the test of Clause A.1

LEGISLATION AND WEEE SYMBOL

2012/19/EU Waste Electrical and Electronic Equipment Directive on the treatment, collection, recycling and disposal of electric and electronic devices and their components.



The crossed dustbin symbol on the device means that it should not be disposed of with other household wastes at the end of its working life. Instead, the device should be taken to the waste collection centers for activation of the treatment, collection, recycling and disposal procedure.
To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take this item for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract.

This product should not be mixed with other commercial wastes for disposal.

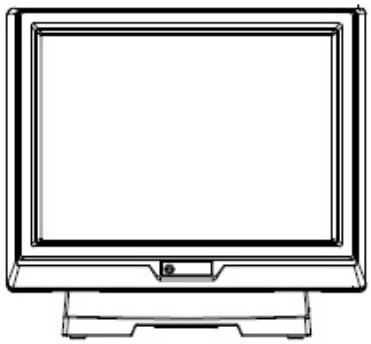
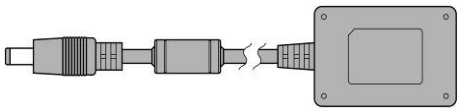
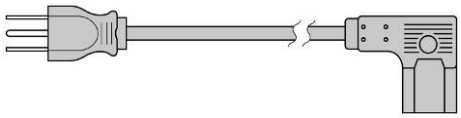
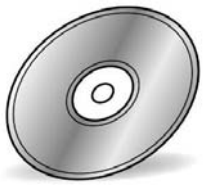
Revision History

Version	Date	Description
1.0	July 2008	• Initial release
1.1	February 2009	• B78 M/B Upgraded from v2.1 to v2.2 • B98 V1.0 M/B information added • Second display installation added • 2nd FAN of B98 MB added • Drivers list and installation upgraded • Jumper setting upgraded • VGA version upgraded • Specification upgraded • 2-in-1 MSR + iButton / Fingerprint module installation added
1.2	November 2009	• 17" TFT LCD added • Drivers installation removed • BIOS setup removed • B68 motherboard version added
1.3	June 2010	• C48 motherboard version added • New system stand phased in • B68, B78 Jumper updated
1.4	January 2011	• C48 motherboard updated to v2.1 • B78 motherboard updated to v2.4 • B98 motherboard updated to v1.1 • 8.4" 2nd display phased in • SSD module added • OSD functions for 2nd display added
2.0	January 2013	• C78 motherboard removed • C98 motherboard removed • C58 motherboard added

Table of Contents

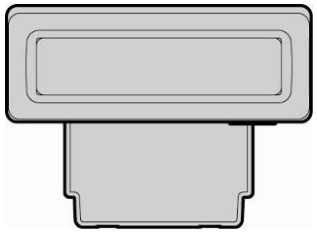
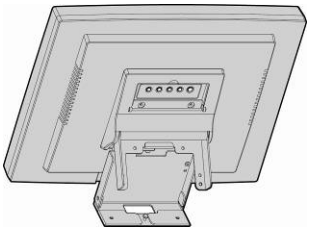
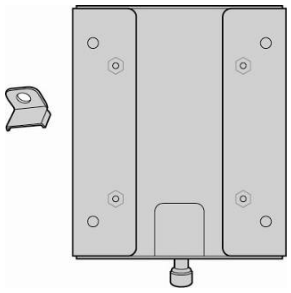
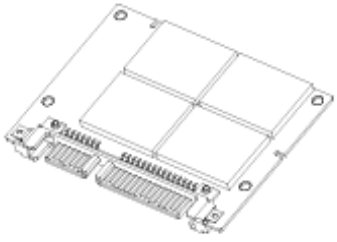
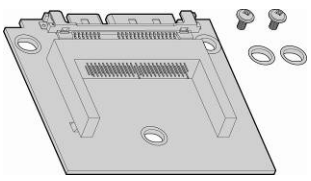
1 Item Checklist

1-1 Standard Item

	
a. System	b. Power adapter
	
c. Power cord	d. RJ45-DB9 cable (x2)
	
e. Driver CD	

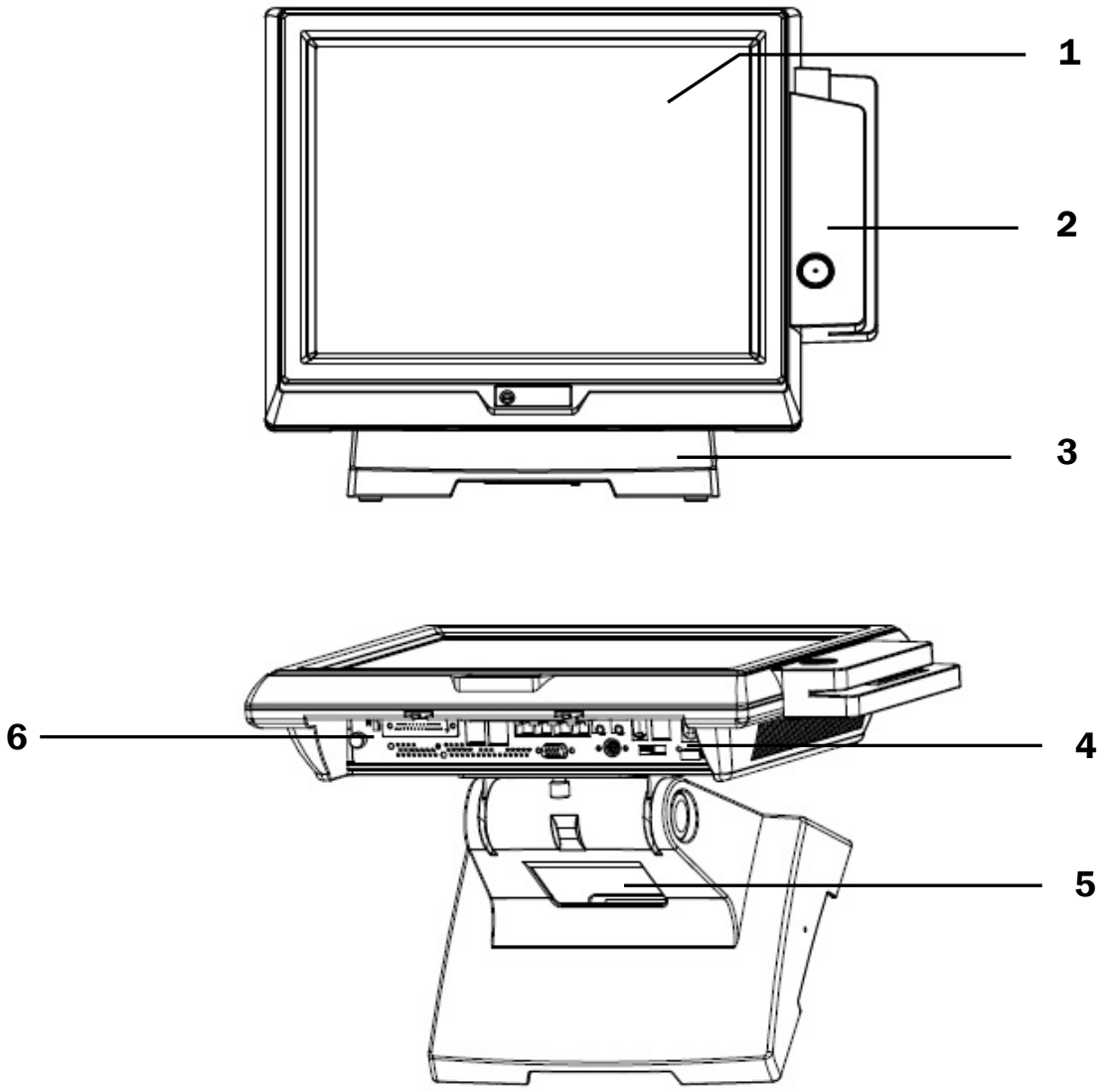
1-2 Optional Item

The touch terminal device provides various peripheral options for your selection. Please refer to your local sales representative or distributor for further information.

	
a. MSR module	b. MSR + iButton module
	
c. MSR + Fingerprint module	d. VFD customer display (with RJ45 cable)
	
e. Second display with touch	f. Wall mount kit
	
g. SSD module	h. CF card adapter board

2 System View

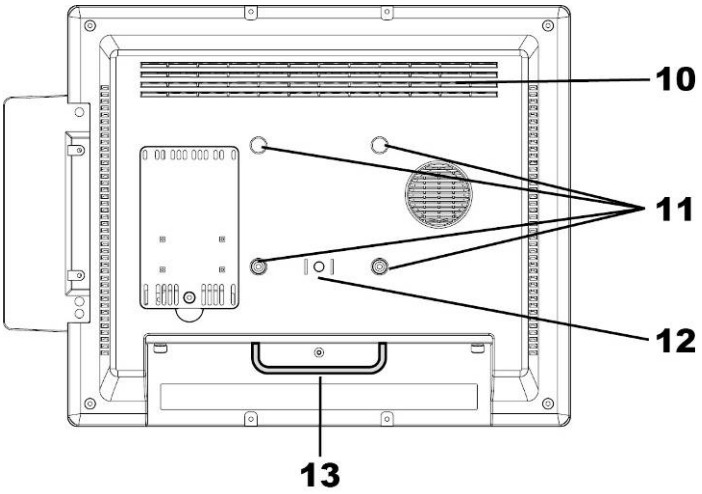
2-1 Front View



No.	Description
1	Touch
2	MSR (optional)
3	Stand (with power brick and cable management)
4	I/O Ports
5	Stand hole for cables outlet
6	Second power button

2-2 Rear View with stand

2-3 Rear View without stand

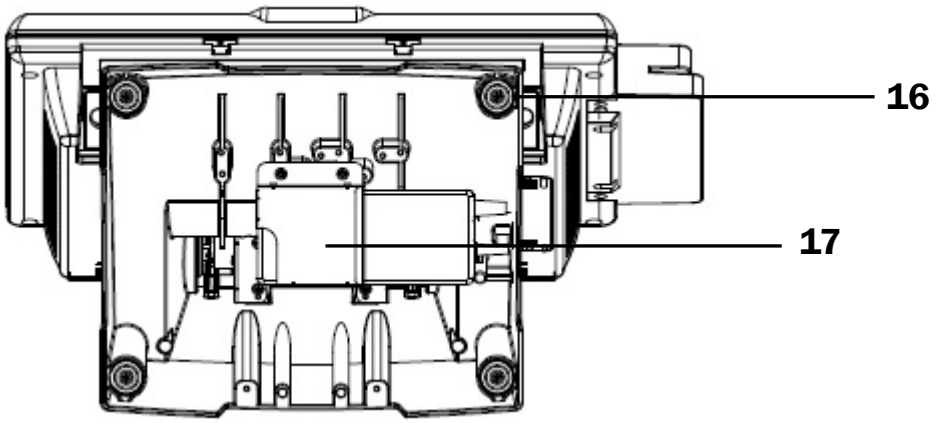


No.	Description
6	2nd Display (optional)
7	Ventilation holes
8	HDD door
9	VFD dummy cover
10	Ventilation holes
11	VESA holes (100x100mm)
12	Thumbscrew hole for stand / wall-mount bracket
13	Handle of motherboard

2-4 Side View

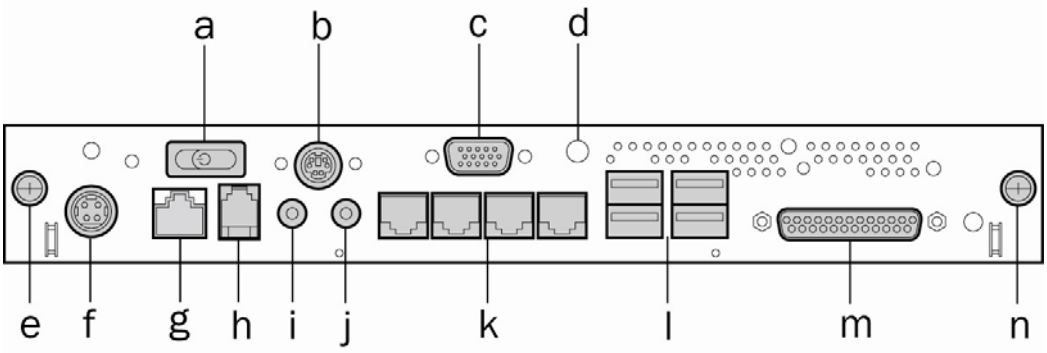
No.	Description
14	Speaker outlet
15	Stand hinge cover (at both sides)

2-5 Bottom View



No.	Description
16	Rubber foot
17	Holder bracket for power brick

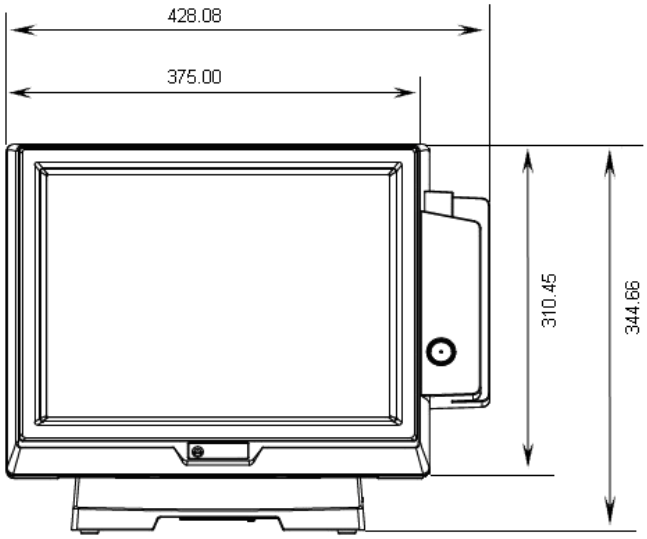
2-6 I/O View

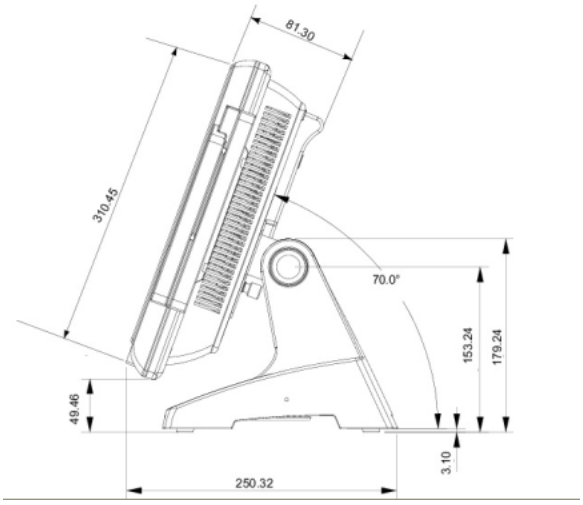


No.	Description
a	Power switch
b	PS/2
c	2nd VGA
d	Antenna hole(blind hole)
e / n	Thumbscrews for fixing the motherboard
f	DC-IN (19V)
g	LAN
h	Cash drawer
i	MIC-in
J	Line-out
k	COM 1, 2, 3, 4
l	USB (x4)
m	Parallel

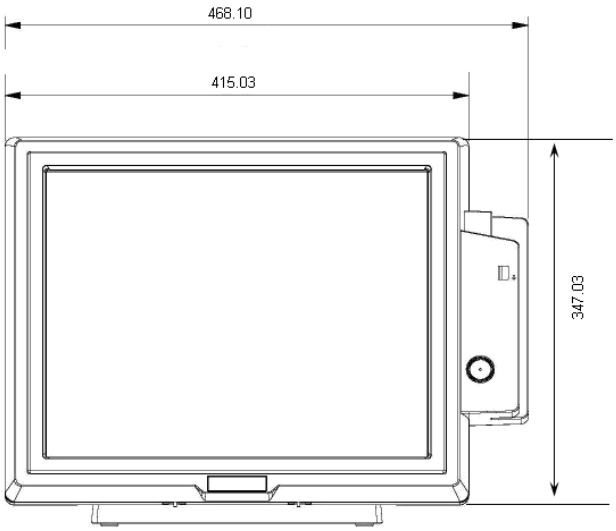
3 System Dimensions

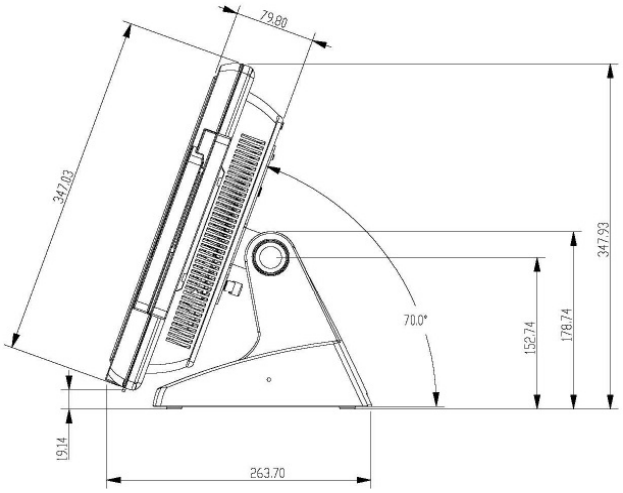
3-1 15” System Dimensions





3-2 17” System Dimensions





4 Peripheral Installation

4-1 VFD Installation

The VFD requires 12V power and must be connected to a powered COM port (COM3 or COM4). Please refer to chapter 7-1-3 (B78 motherboard, jumper JP3), chapter 7-2-3 (B98 motherboard, jumper JP5), Chapter 7- 3-3 (B68 motherboard, jumper JP3), and Chapter 7-4-3 (C48 motherboard, jumper JP7) for correct jumper setting.

■ VFD Module View

■ VFD Installation Procedure

1. Slide the VFD module to the VESA bracket on the stand and tighten it with thumb screw.
2. Connect the VFD cable to the COM port on the system.

4-2 Second Display Installation

4-2-1 8.4" Second Display Installation

- **Accessories:**

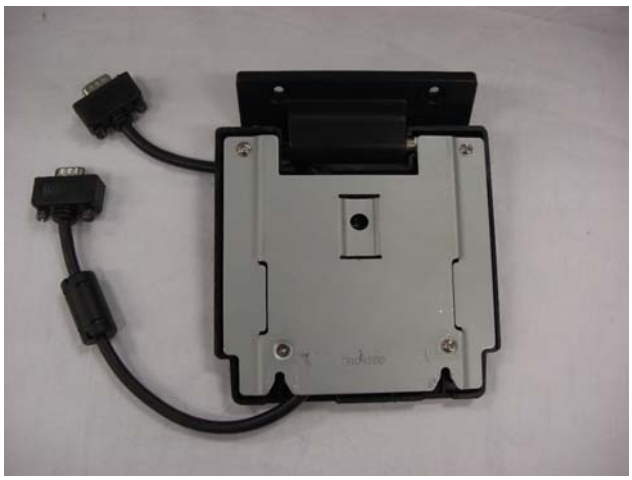
System Stand

8.4” 2nd Display

VGA Cable x 1

Screw x 6

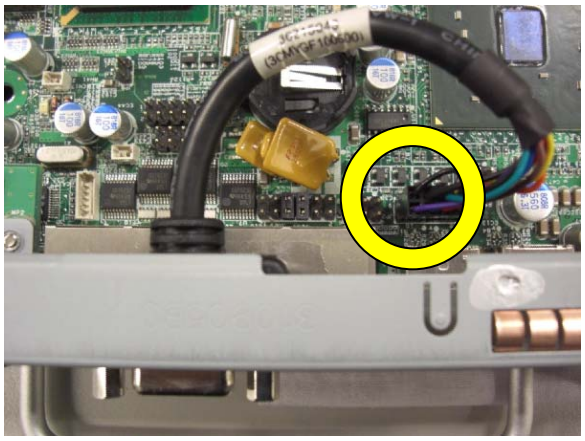
2nd Display Bracket



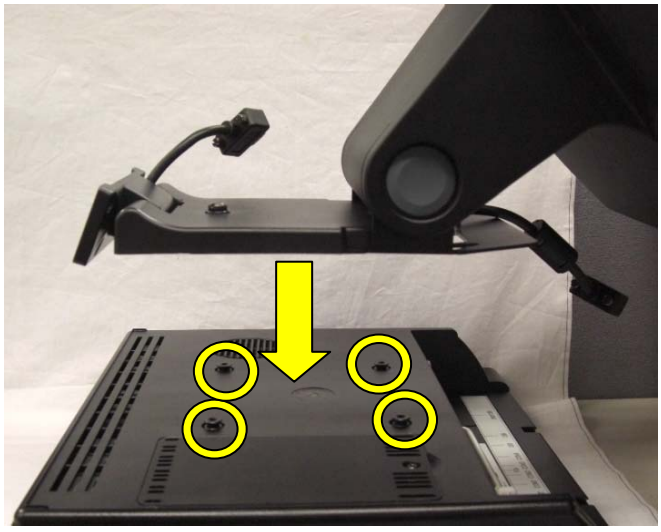
■ **Installation Procedure:**

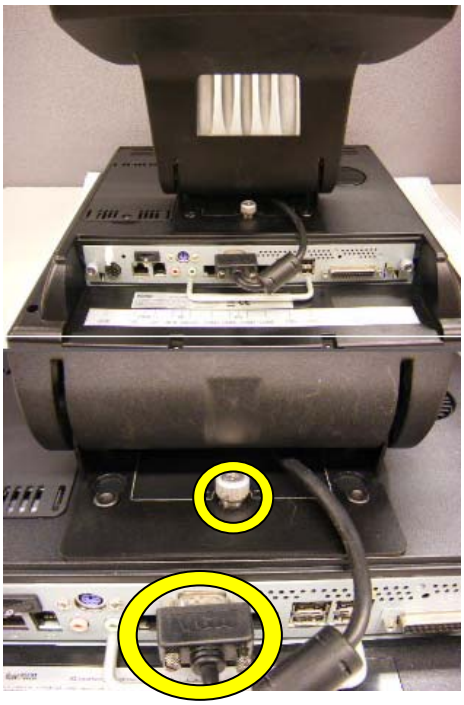
1. Attach the 2nd display bracket to the stand system and fasten the thumb screw (x1).

2. Loosen the thumb screw (x2) and the screw (x2) of the female VGA cable.
3. Pull the I/O panel towards you by the handle



4. Replace the VGA cable to male type.
5. Connect the other end of VGA cable to the jumper on the motherboard.
   The locations of VGA power jumper are as following:
   B78: JP1 and JP2
   B98: JP9 and JP13
   B68: JP4
   C48: JP18
   Please see chapter 7 for different motherboards.





6. Attach the stand with 2nd display bracket to the LCD touch panel. Fix the stand with 2nd display bracket on the VESA holes (x4) until it snaps in place.
7. Fasten the thumb screw (x1) and connect the VGA cable to the LCD touch panel.

8. Attached the 2nd display and connect the other end of cable to the system port.

4-2-2 10.4" / 12.1" Second Display Installation

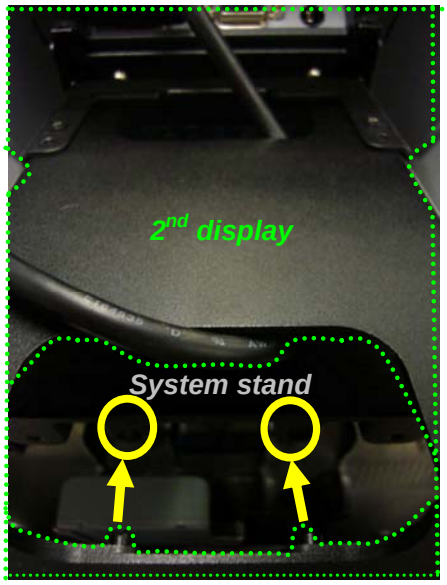
- **Accessories:**

2nd display

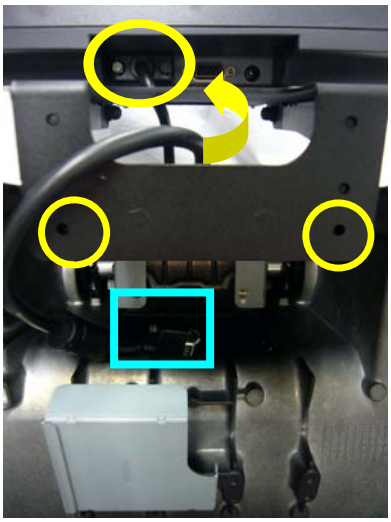
VGA Cable x 1

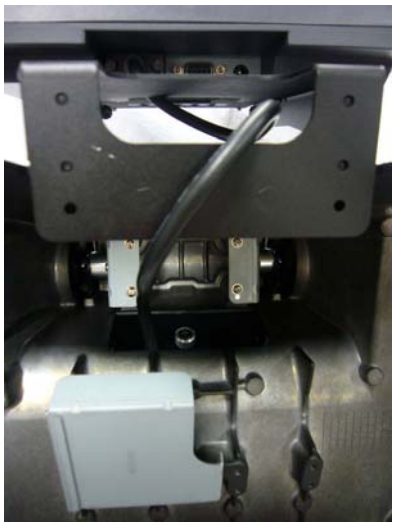
Screw x 2

■ **Installation Procedure:**

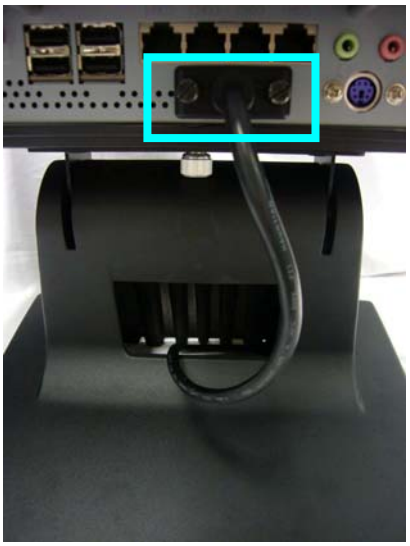


1. Thread two ends of the cable respectively through the upper and the lower gap on the 2nd display on the bracket.
2. Align the boss on 2nd display to the holes on the bottom of the system stand. Attach 2nd display to the stand.





3. Fasten the 2nd display stand with the screws (x2), and connect cable to 2nd display.



4. Route VGA cable through stand gap and connect the other end of the cable to the system port.

4-3 Power Cord Installation

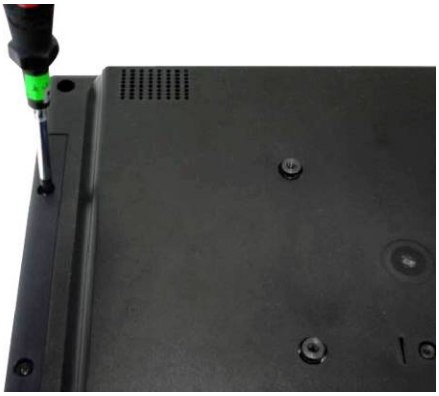
1. Connect the Power cord to the power adapter.
2. Route through the base gap for cable management.

4-4 MSR / 2-in-1 MSR Installation

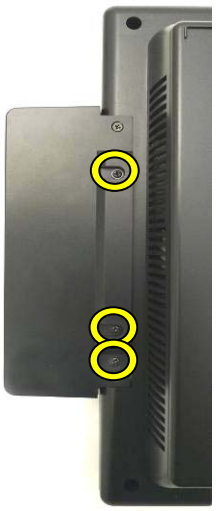
There are 3 kinds of MSR and 2-in-1 MSR modules available at your request. You may request for further information in your local distributor or sales representative.
The 3 MSR modules are:

1. MSR Reader
2. MSR, 2-in-1 MSR with iButton Reader
3. 2-in-1 MSR with fingerprint reader.

The installing methods for the 3 kinds of MSR are similar to the instructions below.



1. Loosen the screws (x2) on the MSR dummy cover.

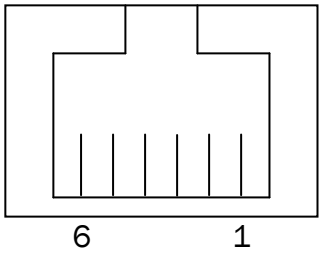


2. Connect the respective connectors for each MSR or 2-in-1 MSR module.
3. Fasten the screws (x3) to fix the MSR or 2-in-1 MSR module.

4-5 Cash Drawer Installation

You can install a cash drawer through the cash drawer port. Please verify the pin assignment before installation.

Cash Drawer Pin Assignment



Pin	Signal
1	GND
2	DOUT bit0
3	DIN bit0
4	12V / 19V
5	DOUT bit1
6	GND

Cash Drawer Controller Register

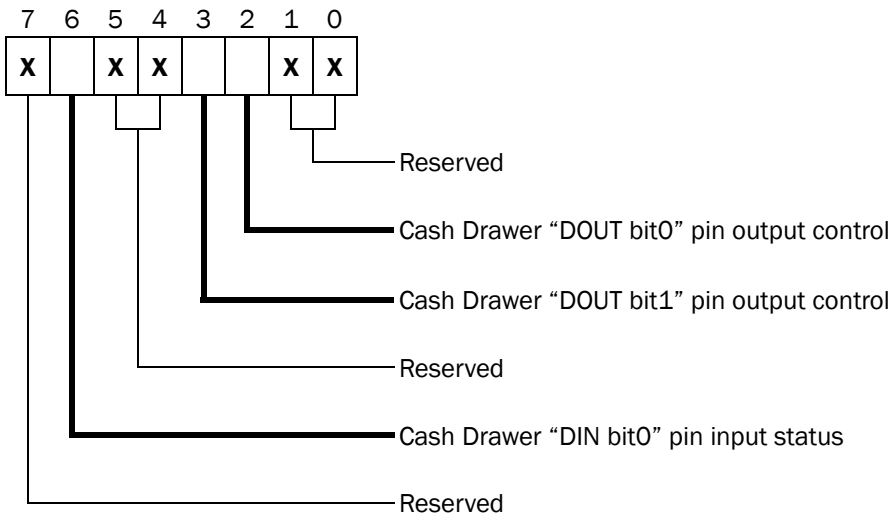
The Cash Drawer Controller use one I/O addresses to control the Cash Drawer.

Register Location: 48Ch

Attribute: Read / Write

Size: 8bit

BIT	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Attribute	Reserved	Read	Reserved		Write		Reserved	



Bit 7: Reserved

Bit 6: Cash Drawer “DIN bit0” pin input status.

= 1: the Cash Drawer closed or no Cash Drawer

= 0: the Cash Drawer opened

Bit 5: Reserved

Bit 4: Reserved

Bit 3: Cash Drawer “DOUT bit1” pin output control.

= 1: Opening the Cash Drawer

= 0: Allow close the Cash Drawer

Bit 2: Cash Drawer “DOUT bit0” pin output control.

= 1: Opening the Cash Drawer

= 0: Allow close the Cash Drawer

Bit 1: Reserved

Bit 0: Reserved

Note: Please follow the Cash Drawer control signal design to control the Cash Drawer.

Cash Drawer Control Command Example

Use Debug.EXE program under DOS or Windows98

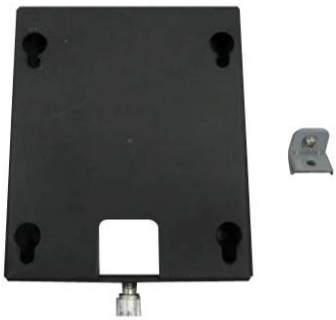
Command	**Cash Drawer**
O 48C 04	Opening
O 48C 00	Allow to close
➢ Set the I/O address 48Ch bit2 =1 for opening Cash Drawer by “DOUT bit0” pin control. ➢ Set the I/O address 48Ch bit2 = 0 for allow close Cash Drawer.	

Command	**Cash Drawer**
I 48C	Check status
➢ The I/O address 48Ch bit6 =1 mean the Cash Drawer is opened or not exist. ➢ The I/O address 48Ch bit6 =0 mean the Cash Drawer is closed.	

4-6 VESA Wall-Mount Kit Installation

If you want to mount the POS terminal on the wall, please order the wall mount kit from you distributor and follow the steps below for the installation.

■ Wall-mount kit accessory:



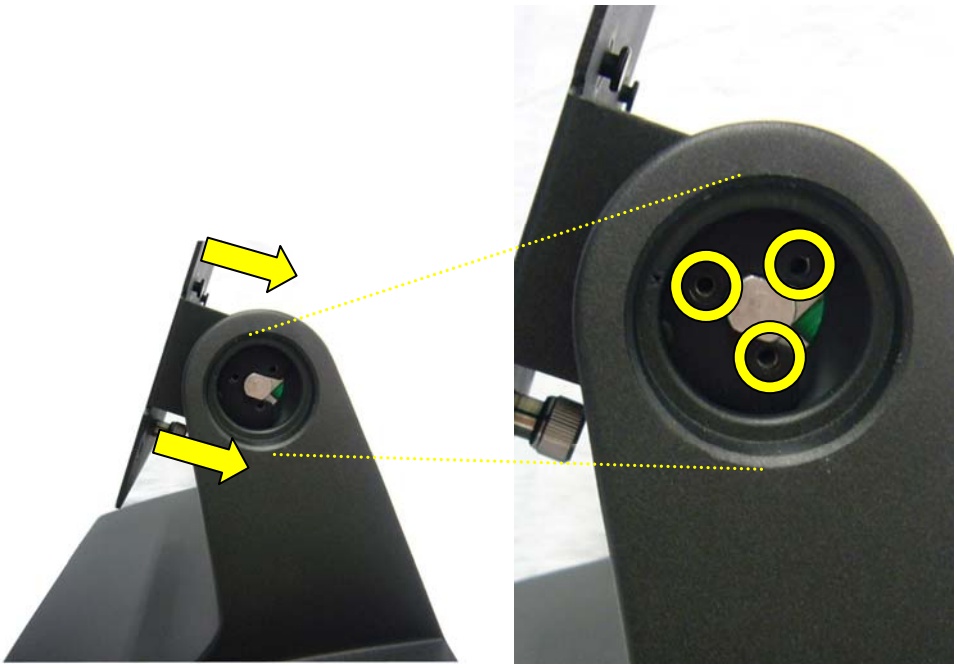
■ Installation procedure:

1. Remove the stand by loosening the thumb screw (x1).
2. Place the wall mount bracket on the rear cover and tighten the screw (x1).

3. Attach the wall mount bracket and tighten with thumbscrew (x1)

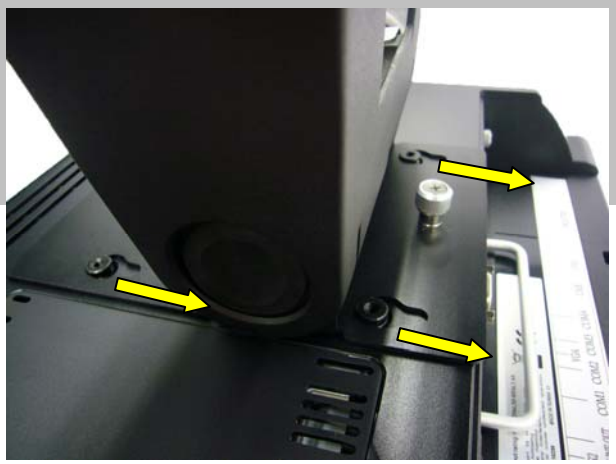
4-7 Stand Assembly & Disassembly

Stand Assembly



1. Slide the VESA hinge bracket into the metal hinge shaft on the stand.
2. Fasten the screws (x6) (3 on both sides) to fix the VESA hinge bracket onto the stand.

3. Use rubber hinge cover to plug the holes on both sides.



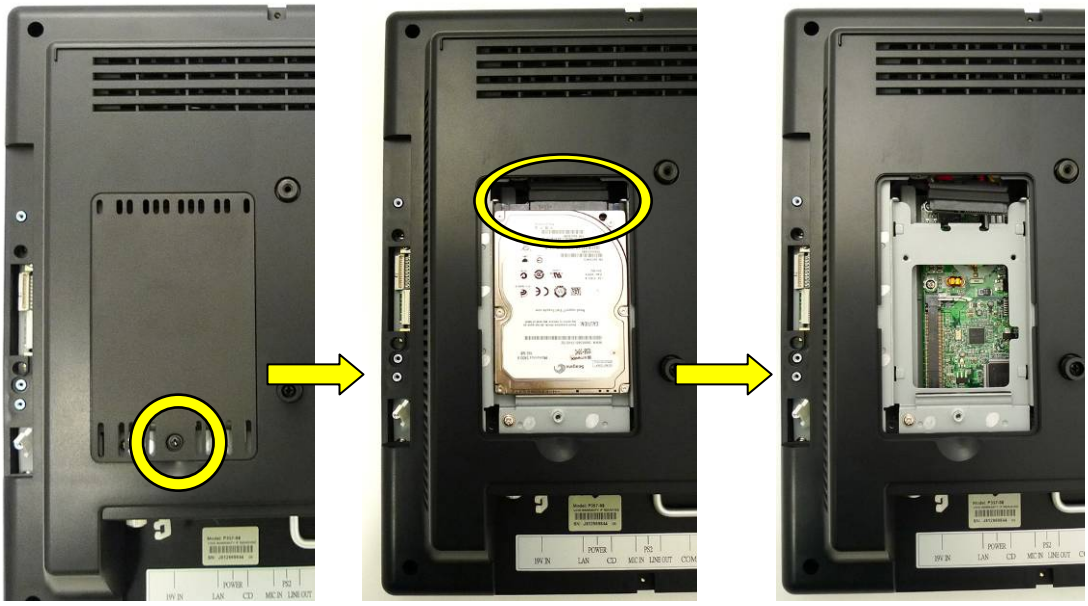
4. Align larger end of the teardrop mounting holes on the VESA hinge bracket with fixing screws (x4) on the rear cover of the system. Slide to narrow end of the mounting holes, and stick the bracket to the system.
5. Push and fasten the thumb screw to fix it to the system.

Stand Disassembly

1. Loosen the thumb screw.
2. Slide the system upward to separate from the stand.

5 System Assembly & Disassembly

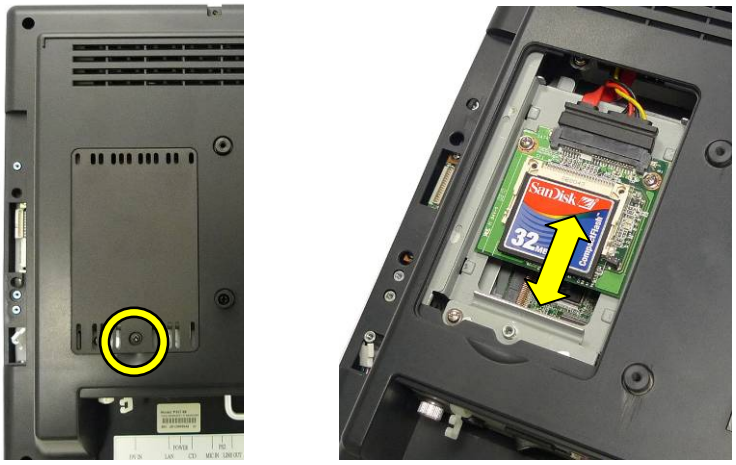
5-1 HDD Replacement



1. Remove the screw (x1) to open the HDD door.
2. Disconnect the HDD cable (x1).
3. Replace the HDD.

5-2 Compact Flash Card Replacement

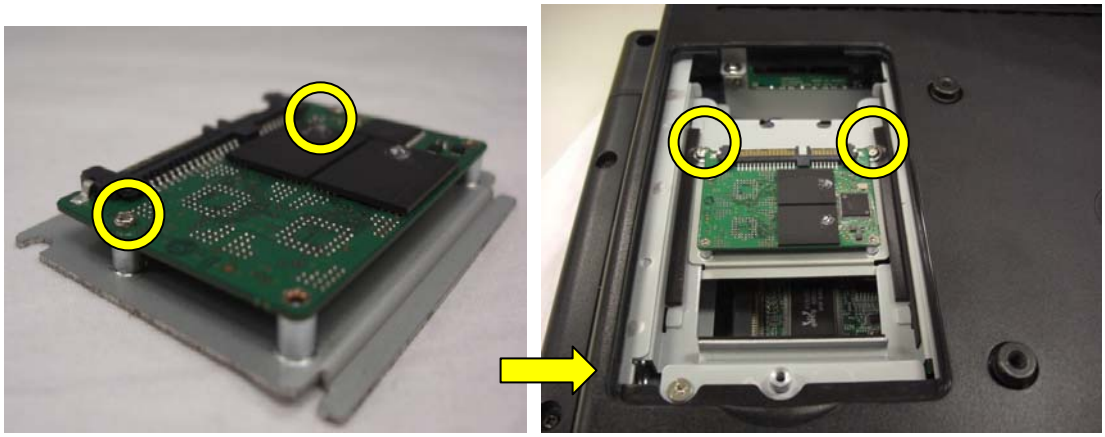
If the system is equipped with CF (Compact Flash) slot as storage device, please follow the following steps to replace CF card.



1. Loosen the screw (x1) to open the HDD door, and replace the CF card.

5-3 SSD Card Replacement

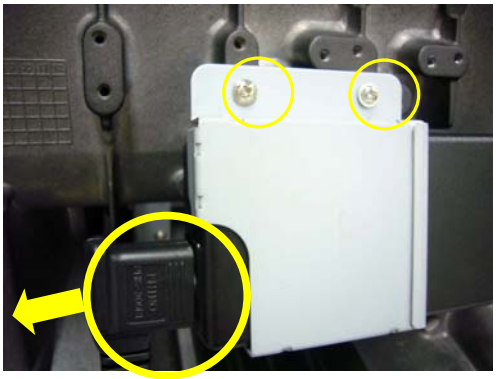
If the system is equipped with SSD card as storage device, please follow the following steps to replace SSD card.



1. Loosen the screw (x1) to open the HDD door.(see 5-1 step1)
2. Fasten the screw (x2) to fix the SSD card on the SSD holder bracket.
3. Fit the SSD holder bracket into the slot and fasten the screw (x2).

5-4 Power Adapter Replacement

1. Route the adapter cable from the hole of cable management of the stand.



2. Disconnect the power cord from the adapter.
3. Loosen the screws (x2) to disassemble the power adapter holding bracket and the adapter.

6 Specification

Motherboard	B68	C48	C58
CPU Supports	Intel Atom N270 processors 1.6G (BGA)	Intel Pineview D525 dual core 1.8G (BGA)	Intel CedarView D2550 dual core 1.86GHz, L2 1M, 10W
Chipset	Intel 945GSE + ICH7M, FSB 533MHz	CPU with Graphic built-in + ICH 8M, FSB 800MHz	Intel NM10 Express Chipset
System Memory	2 x DDR2 DIMM up to 2GB, FSB 533 MHz	2 x DDR3 DIMM up to 4GB, FSB 800MHz	1x DDR3 DIMM up to 4GB 1067MHz
Graphic Memory	Share system memory up to 224MB	Intel GMA 3150, share system memory up to 256MB	DX9, Graphic core speed at 640MHz
LCD Panel			
LCD Size	15”		
Brightness (cd/m²)	250nits		
Maximal Resolution	1024 x 768		
Touch Screen Type	Resistive		
Tilt Angle (Degree)	0~70°		
Storage			
HDD	one slim HDD bay support SATA HDD		
Flash Memory	by optional compact SSD (without HDD)		
Expansion			
Mini-PCI-E Slot	1		
External I/O Ports			
USB	4 ports (V2.0)		
PS/2	1		
Serial / COM	4 x RJ-45 COM connector (COM1 & COM2 standard RS-232; COM3 & COM4 pin10 with 5V /12V power by jumper)	4 x RJ-45 COM connector (COM1/COM2 standard RS-232 without power, COM3 /COM4 powered COM with power enable /disable by BIOS setting and +5V/+12V by MB setting. COM3 default +5V/ COM4 default +12V)	4 x RJ45 COM connector (COM1 w/o power; COM2/COM3/COM4 powered COM with power enable /disable by BIOS setting; COM2 is 0V/5V; COM3 is 0V/5V/12V; COM4 is 0V/5V/12V; COM2 voltage 0V/5V by jumper; COM3/COM4 voltage 5V/12V by jumper; default BIOS setting 0V)

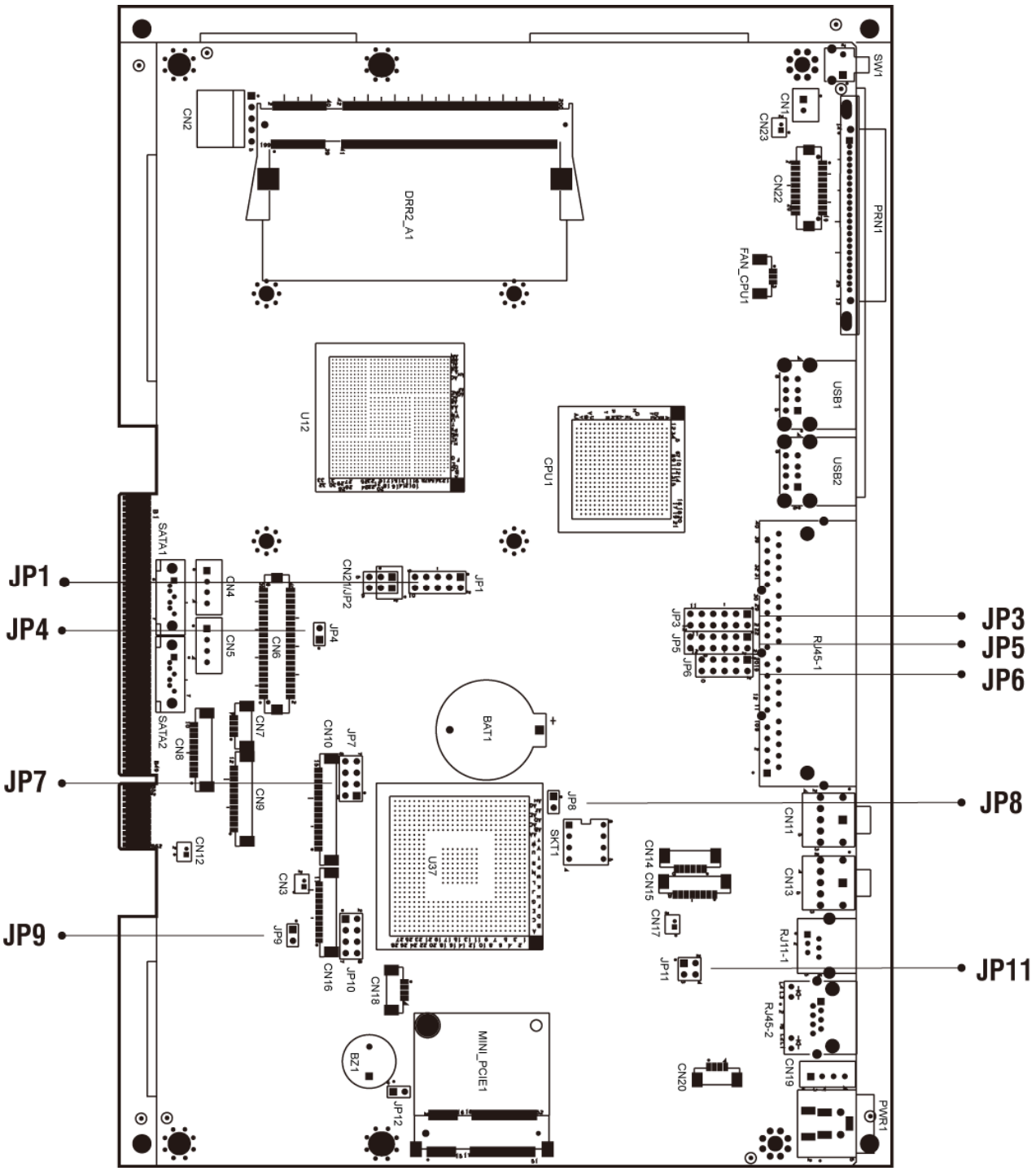
Motherboard	**B68**	**C48**	**C58**
Parallel	1		
LAN (10 /100 / 1000)	1 x RJ-45		
DC Jack	1		
2nd VGA	1 (Female)		
Cash Drawer Port	1 x RJ-11 (for +24V Cash Drawer)		
Audio Jack	1 x Line-out, 1 x MIC-in		
Audio			
Built in Speaker	2 x 2W speakers		
Power			
Power Adapter	19V/65W		
Control / Indicator			
Power Button	2		
Indicator LED	1		
Peripheral			
MSR	3 Tracks MSR (PS/2, USB)		
2-in-1 MSR	MSR (PS/2, USB) + Fingerprint (USB) / MSR (PS/2, USB) + iButton (PS/2)		
Second Display	8.4" / 10.4" / 12.1" / 15" 2nd display (optional touch)		
Customer Display	Flush mount VFD display 2 x 20 characters (COM)		
Communication			
Wireless LAN	802.11 b/g/n wireless LAN card & antenna		
Environment			
EMC & Safety	FCC, Class A, CE, LVD		
Operating Temperature	0°C ~ 35°C (32°F~ 95°F)		
Storage Temperature	-20°C ~ 60°C (4°F ~ 140°F)		
Humidity	20% ~ 80% RH non condensing		
Dust & Water Proof	IP 54 (Front bezel)		
Dimension(W x D x H)	15”: 8.1kgs / 9.1kgs		
Mounting	100mm x100mm VESA Standard holes		
OS Support	Windows XP Professional, Windows Embedded POSReady 2009, Windows XP Embedded, Windows XP Professional for Embedded, Windows 7, Linux		

* This specification is subject to change without prior notice.

7 Jumper Settings

7-1 B68 Motherboard

7-1-1 Motherboard Layout



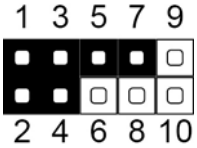
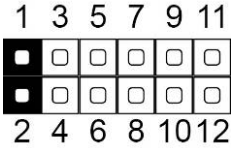
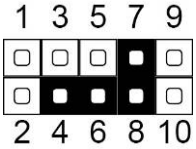
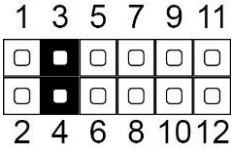
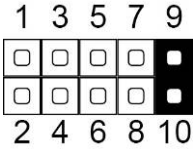
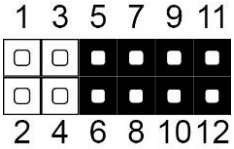
B68v 1.0

7-1-2 Connector and Function

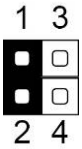
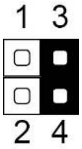
Connector	Function
BAT1	CMOS Battery Base (Use CR2023)
CN1	Power On Button
CN2	Touch Sensor
CN3	Power LED
CN4	SATA1 HDD Power Connector
CN5	SATA2 HDD Power Connector
CN6	LCD Interface Connector
CN7	IrDA Connector
CN8	For External Touch Connector
CN9	Inverter Connector
CN10	Card Reader Connector
CN11	Line Out
CN12	LED Power
CN13	MIC In
CN14	Speaker & MIC CONN
CN15	CD-IN CONN
CN17	LAN LED
CN18	USB5
CN19	DC-Jack
CN20	PS2 KEYBOARD
DDR2_A1	DDR2 SO-DIMM1
DDR2_A2	DDR2 SO-DIMM2
PRN1	Parallel Port
PWR1	+19V Power Adaptor
RJ11_1	Cash Drawer Connector
RJ45_1	COM1, COM2, COM3, COM4
RJ45_2	LAN (on Board)
SATA1	SATA Connector
SATA2	SATA Connector
SKT1	SPI ROM
USB1	USB1, USB2
USB2	USB3, USB4
SW1	Power On Bottom
JP1	CRT Connector
JP3	COM3/COM4 Power Setting
JP4	VGA Power Setting
JP5 / 6	COM2 RS232/485/422 Setting
JP7	LCD ID Setting
JP8	RTC Reset
JP9	Power Mode Setting
JP11	Cash Drawer Power Setting

7-1-3 Jumper Setting

COM2 RS232/485/422 Setting

Function	JP6 (1-2, 3-4, 4-6, 5-6, 7-8, 9-10)	JP5 (1-2, 3-4, 5-6, 7-8, 9-10, 11-12)
▲RS232		
RS485		
RS422		

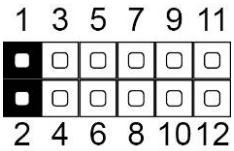
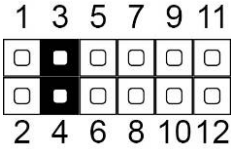
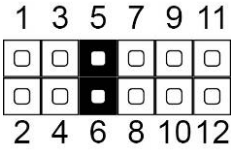
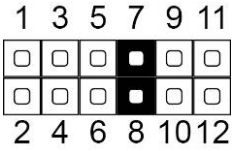
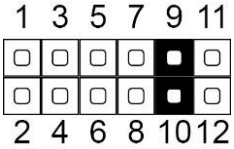
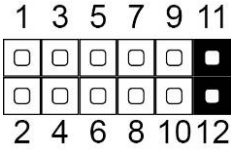
Cash Drawer Power Setting

Function	JP11 (1-2, 3-4)
+12V	
▲+19V (for +24V Cash Drawer)	

Power Mode Setting

Function	JP9 (1-2)
▲ATX Power	
AT Power	

COM3 & COM4 Power Setting

Function		JP3 (1-2, 3-4, 5-6, 7-8, 9-10,11-12)
COM3 Pin30	▲RI	
	+5V	
	+12V	
COM4 Pin40	▲RI	
	+5V	
	+12V	

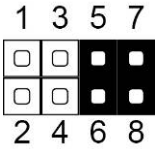
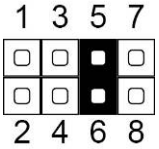
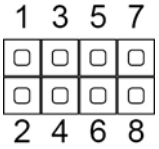
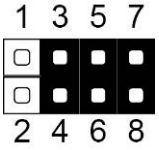
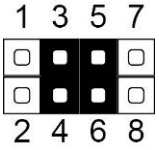
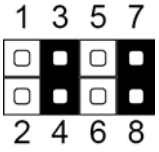
CMOS Operation Mode

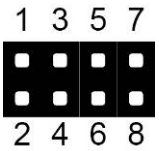
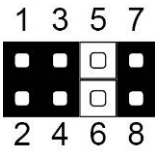
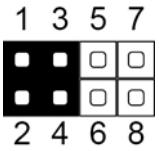
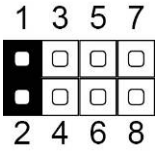
Function	JP8 (1-2)
▲CMOS Normal	
CMOS Reset	

VGA Power Setting

Function	JP4 (1-2)
▲No Power	
+12V	

LCD ID Setting

Panel #	Resolution	LVDS		Output Interface	JP7 (1-2) (3-4) (5-6) (7-8)
		Bits	Channel		
1	1366 x 768	24	Single	LVDS	
2	1440 x 900	24	Dual	LVDS	
4	1920 x 1080	24	Dual	LVDS	
5	1024 x 768	24	Single	LVDS	
6	1280 x 1024	24	Dual	LVDS	
7	800 x 600	24	Single	LVDS	

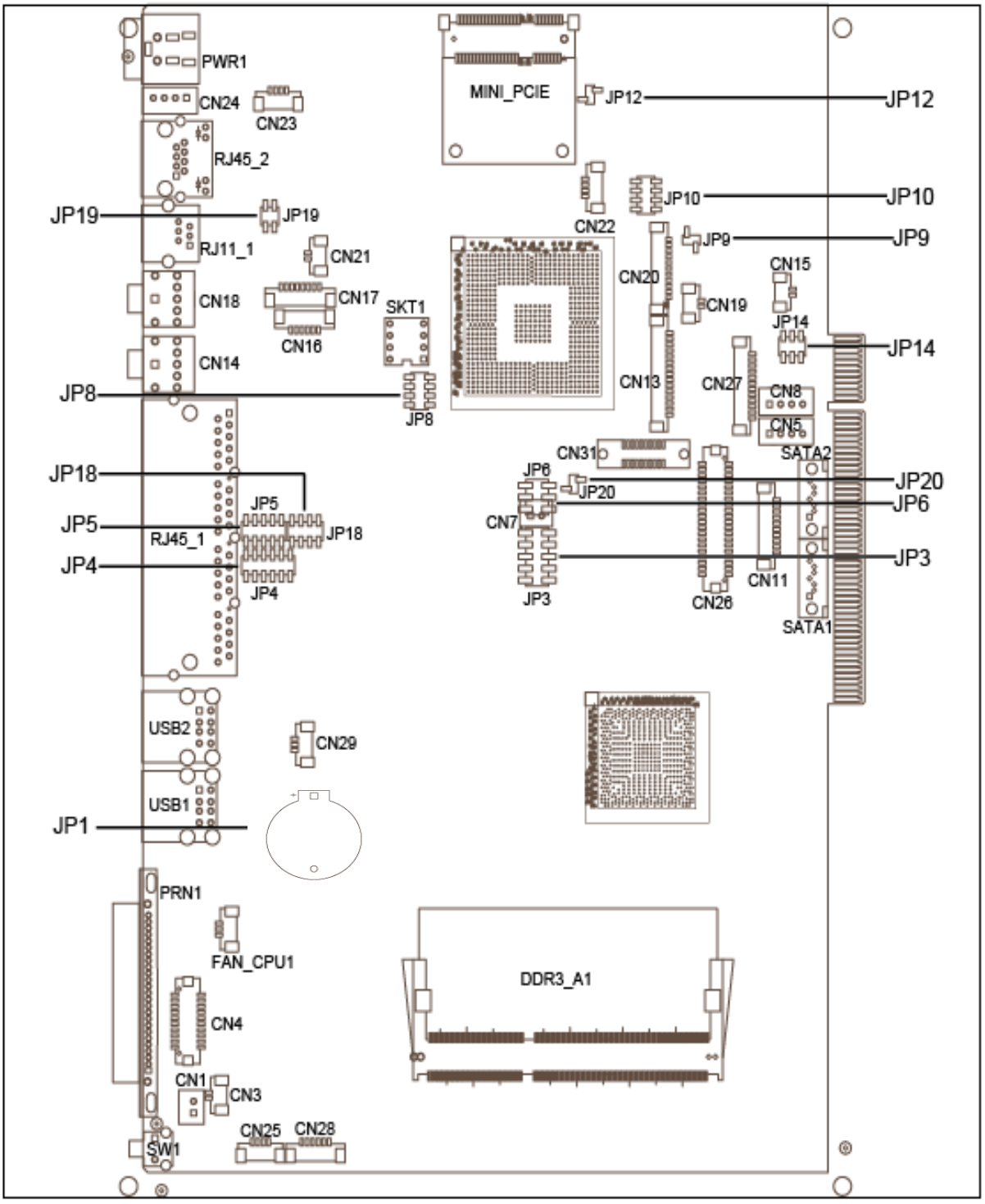
Panel #	Resolution	LVDS		Output Interface	JP7 (1-2) (3-4) (5-6) (7-8)
		Bits	Channel		
9	1024 x 768	18	Single	LVDS	
11	800 x 600	18	Single	LVDS	
12	800 x 600	18	Single	LVDS	
				CRT	

*Panel ID #12 is only applied for Sharp 12" LQ121S1LG41 / LQ121S1LG42 panel.

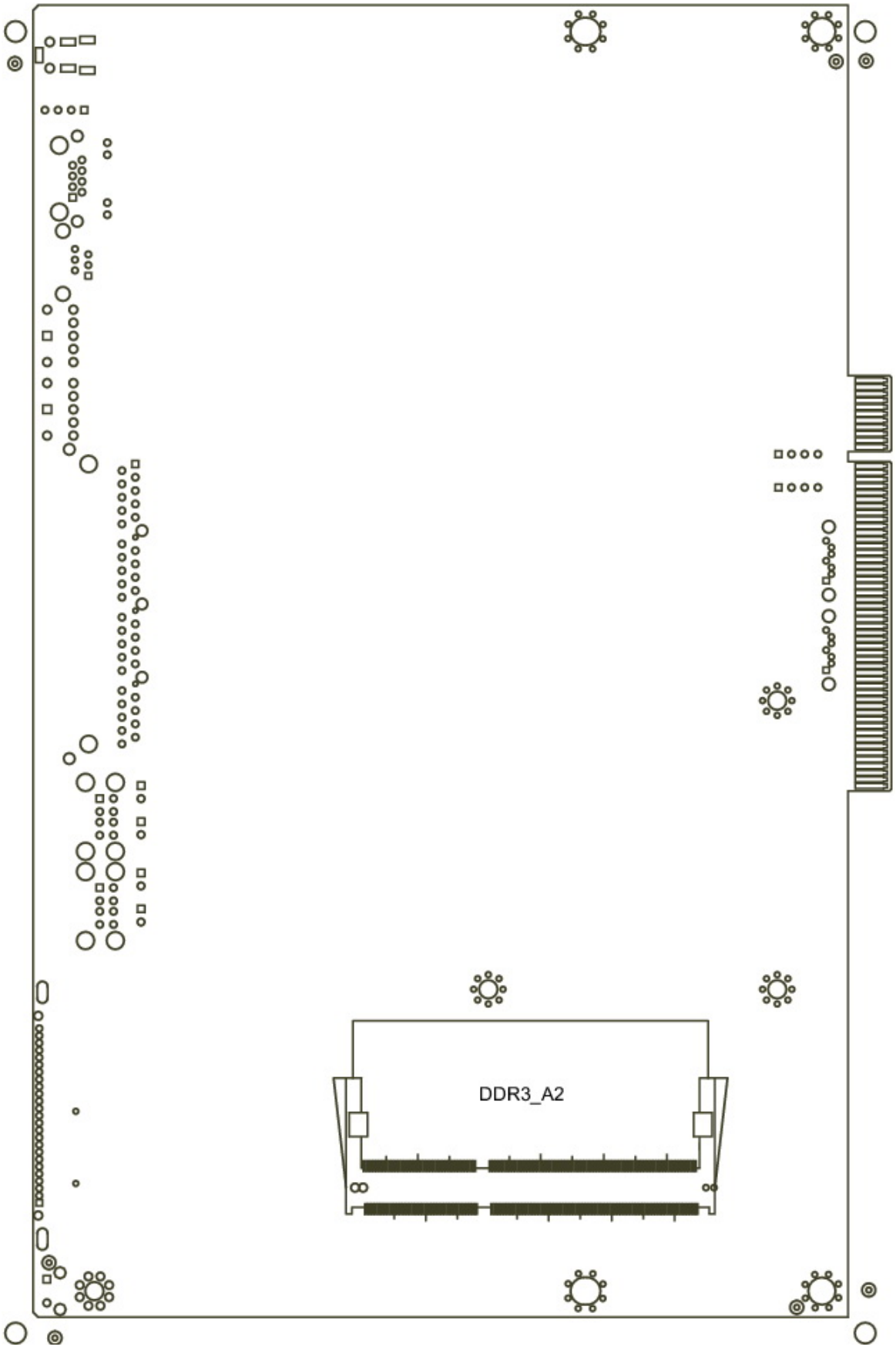
▲ = Manufacturer Default Setting  OPEN  SHORT

7-2 C48 Motherboard

7-2-1 C48 Motherboard Layout



C48 V2.1 TOP LAYER



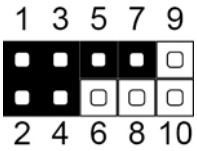
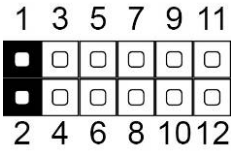
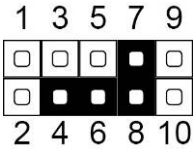
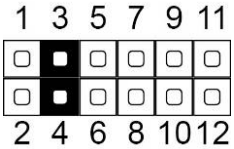
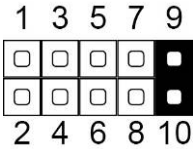
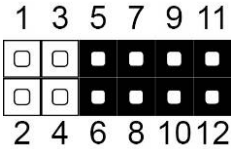
C48 V2.1 BOTTOM LAYER

7-2-2 Connector and Function

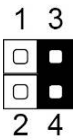
Connector	Connector
CN1	Power Button Connector
CN3	Printer Port Reset
CN4	Printer Port
CN5/8	HDD Power
CN11	COM5 For Touch
CN13	Card Reader Connector
CN14	Line out
CN15	HDD LED
CN16	Speaker & MIC
CN18	MIC IN
CN20/JP10	System Indicator
CN22	USB Port
CN23	PS2 KEYBOARD
CN26	LVDS
CN27	Inverter Connector
CN29	System Fan
DDR3_A1	DDR3 SO-DIMM1
DDR3_A2	DDR3 SO-DIMM2
PRN1	Parallel Port
PWR1	+19V DC Jack
RJ11_1	Cash Drawer Connector
RJ45_1	COM1, COM2, COM3, COM4
RJ45_2	LAN
SATA1	SATA Connector
SATA2	SATA Connector
USB1	USB1, USB2
USB2	USB3, USB4
SW1	Power Button
JP1	CMOS Operation Mode
JP3/6	VGA Port
JP4/5	COM2 RS232/485/422 Setting
JP8	LCD ID Setting
JP9	Power Mode Setting
JP12	System Reset
JP14	Inverter Selection
JP18	COM3/4 Power Setting
JP19	Cash Drawer Power Setting

7-2-3 Jumper Setting

COM2 RS232/485/422 Setting

Function	JP5 (1-2, 3-4, 4-6, 5-6, 7-8, 9-10)	JP4 (1-2, 3-4, 5-6, 7-8, 9-10, 11-12)
▲RS232		
RS485		
RS422		

Cash Drawer Power Setting

Function	JP19 (1-2, 3-4)
+12V	
▲+19V (for +24V Cash Drawer)	

Power Mode Setting

Function	JP9 (1-2)
▲ATX Power	
AT Power	

System Reset

Function	JP12 (1-2)
▲System Normal	
System Reset	

Inverter Selection

Function	JP14 (1-2)
CCFL	
▲LED	

CMOS Operation Mode

CMOS Reset

To clear the CMOS,

1. Remove the power cable from the system.
2. Open the system, and set the 'CMOS Operation jumper' from 'CMOS Normal' to 'CMOS Reset'. (refer to the jumper shown below)
3. Connect the power cable to the system, and **power on the system:**
   in ATX mode: press the power button and it will fail power on
   in AT mode: turn on system power
4. Remove the power cable from the system.
5. Return the "CMOS Operation mode" jumper setting from "CMOS Reset" to "CMOS normal".
6. Connect the power cable and power on the system.

CMOS Operation Mode

Function	JP1 (1-2)
▲CMOS Normal	
CMOS Reset	

COM3 & COM4 Power Setting

COM3 and COM4 can be set to provide power to your serial device.

The voltage can be set to +5V or 12V by setting jumper JP18 on the motherboard.

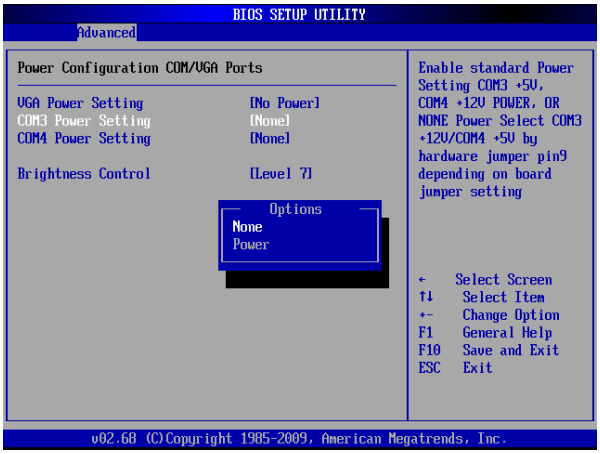
When enabled, the power is available on pin 10 of the RJ45 serial connector.

If you use the serial RJ45 to DB9 adapter cable, the power is on pin 9 of the DB9 connector. By default, the power option is **disabled** in the BIOS.

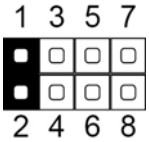
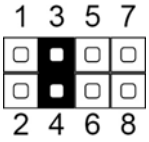
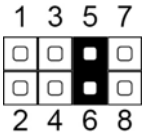
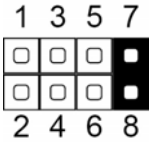
Enable COM3/COM4 power in BIOS

1. Power on the system, and press the <DEL> key when the system is booting up to enter the BIOS Setup utility.
2. Select the Advanced tab
3. Select **Power Configuration COM/VGA** Ports and press <Enter> to go to display the available options.

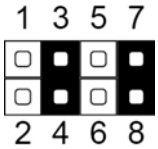
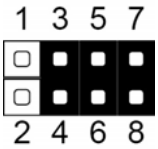
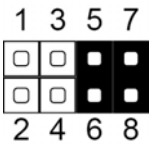
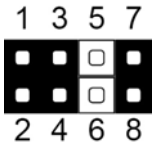
4. To enable the power, select **COM3 Power Setting or COM4 Power setting** and press <Enter>. Select **Power** and press <Enter>.
   Save the change by pressing F10

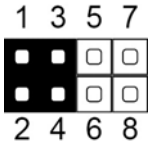
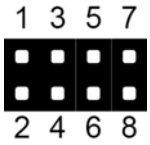
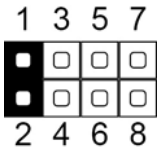


COM3 & COM4 Power Setting

Function		JP18 (1-2, 3-4, 5-6, 7-8)
COM3	+5V	
	▲+12V	
COM4 Pin40	+5V	
	▲+12V	

LCD ID Setting

Resolution	LVDS		Output Interface	JP8 (1-2, 3-4, 5-6, 7-8)
	Bits	Channel		
800 x 600	24	Single	1st: LCD Panel 2nd: VGA Port	
▲1024 x 768	24	Single		
1366 x 768	24	Single		
800 x 600	18	Single		

800 x 600	18	Single		
1024 x 768	18	Single		
1280 x 1024	24	Dual	1st: LCD Panel	

* specialized for Sharp 12.1" LQ121S1LG41/LQ121S1LG42 panel.

▲ = Manufacturer Default Setting  OPEN  SHORT

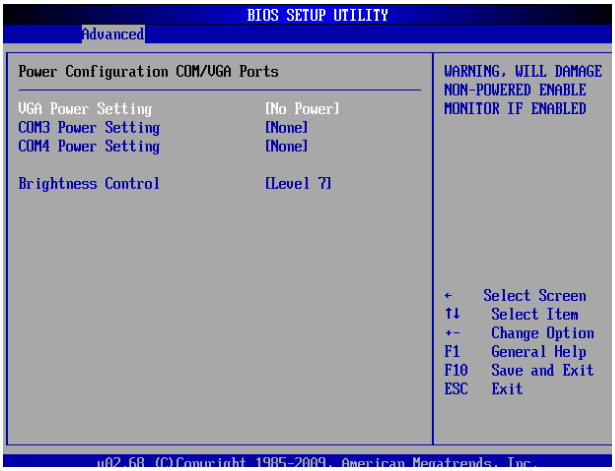
2nd VGA Power Setting

VGA port power must be on through BIOS/Utility for default is "No Power"

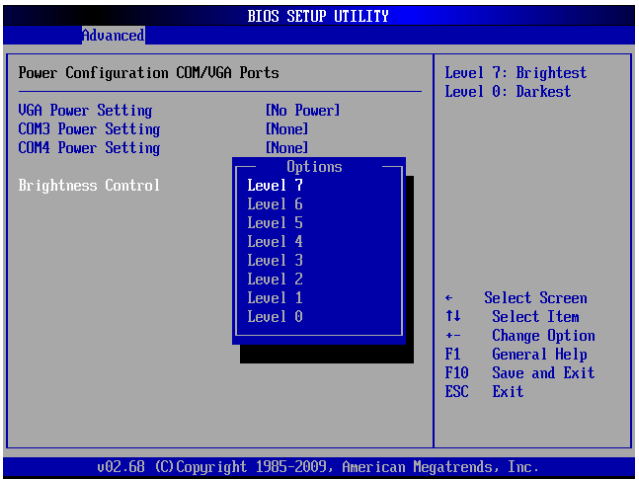
Enable 2nd VGA Power in BIOS

1. Power on the system, and press the <DEL> key when the system is booting up to enter the BIOS Setup utility.
2. Select the Advanced tab
3. Select "Power Configuration COM/VGA Ports" and press <Enter> to go to display the available options.

4. To switch on the power, select "+12V" press <Enter>. Please Save the change by pressing F10

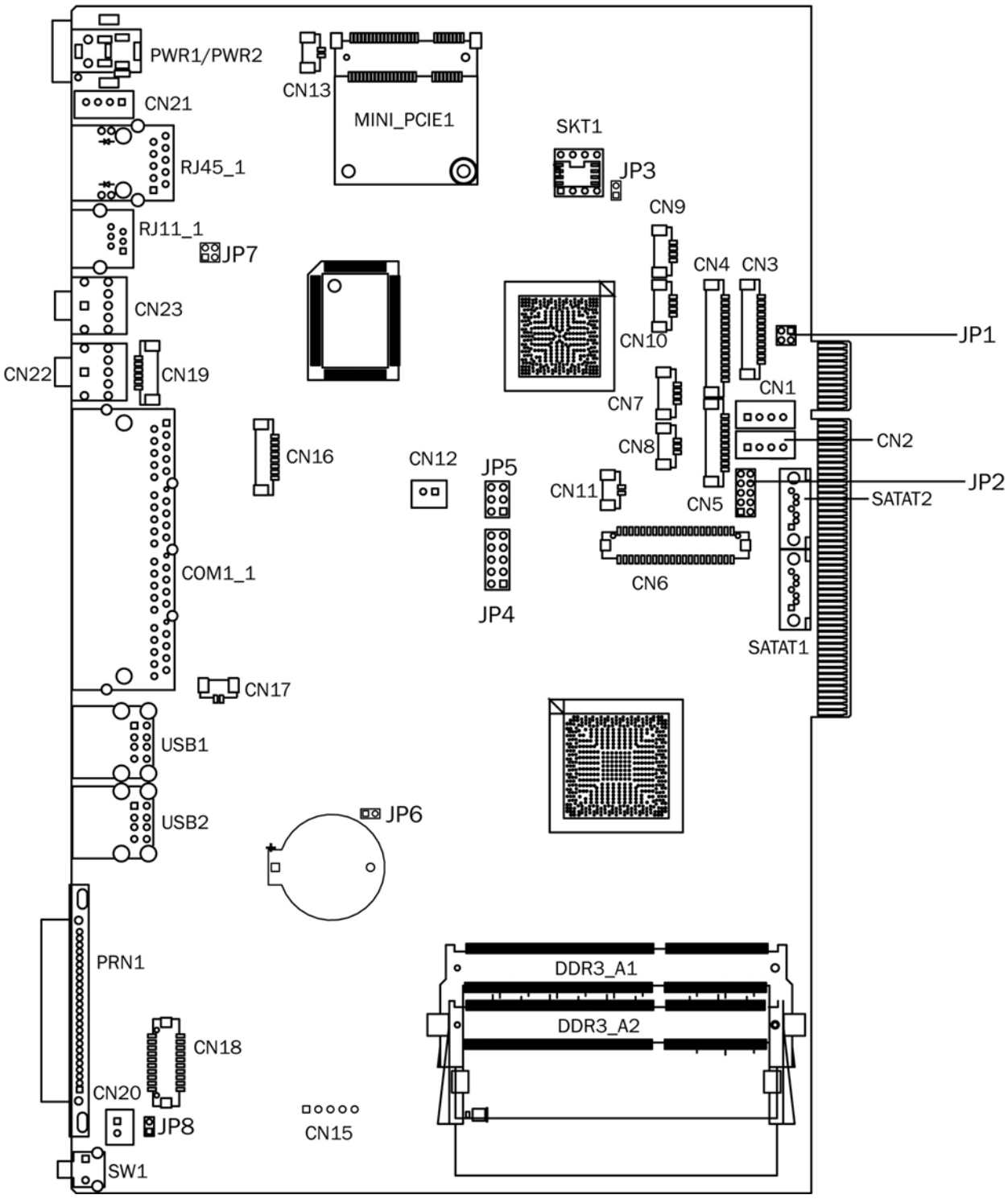


5. To switch brightness level, select brightness control and choose level. Please save the change before exiting BIOS to avoid data lost.



7-3 C58 Motherboard

7-3-1 Motherboard Layout



C58 V1.0

7-3-2 Connector and Function

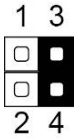
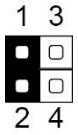
Connector	Connector
CN1/2	SATA Power CONN
CN3	Inverter Selection
CN4	Card Reader
CN5	COM5 Touch
CN6	LVDS
CN7	PS2 K/B
CN9/10	USB
CN11	STAT LED
CN15	Touch Sensor
CN17	Power LED
CN19	Speaker & MIC-IN
CN20	Power Button
CN22	Power Adaptor CONN
CN22	Line-out
CN23	Mic-in
BAT1	CMOS battery
COM1_1	COM1~4
PRN1	Printer Port
PWR2	Adaptor
RJ11_1	Cash Drawer
RJ45_1	LAN
SATA1/SATA2	SATA CONN
USB1/USB2	USB
JP1	Inverter Selection
JP2	LCD ID Setting
JP4/JP5	CRT
JP7	Cash Drawer Power Setting

7-3-3 Jumper Setting

Inverter Selection

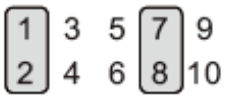
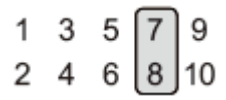
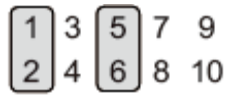
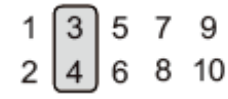
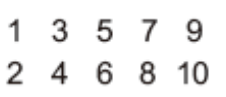
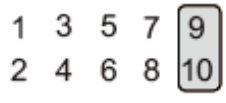
Function	JP1 (1-2)
CCFL	
▲LED	

Cash Drawer Power Setting

Function	JP7 (1-2, 3-4)
+12V	
▲+19V (for +24V Cash Drawer)	

LCD ID Setting

Panel #	Resolution	LVDS		Output Interface	JP2 (1-2) (3-4) (5-6) (7-8)(9-10)
		Bits	Channel		
1	800 x 600	18	Single	LVDS	
2	800 x 600	18	Single	LVDS	
3	800 x 600	24	Single	LVDS	

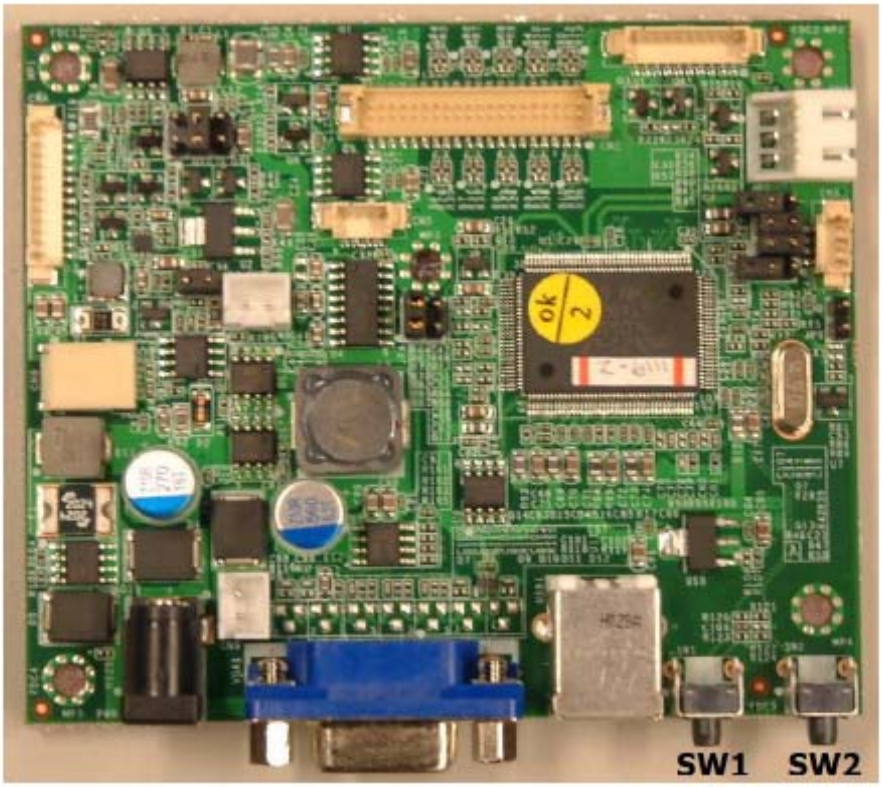
Panel #	Resolution	LVDS		Output Interface	JP2 (1-2) (3-4) (5-6) (7-8)(9-10)
		Bits	Channel		
6	800 x 600	24	Single	LVDS	
4	1024 x 600	18	Single	LVDS	
5	1024 x 768	18	Single	LVDS	
7	1024 x 768	24	Single	LVDS	
9	1280 x 1024	24	Dual	LVDS	
10	1366 x 768	18	Single	LVDS	
11	1366 x 768	24	Single	LVDS	
13	1440 x 900	24	Dual	LVDS	
15	1920 x 1080	24	Dual	LVDS	
				CRT	

▲ = Manufacturer Default Setting  OPEN  SHORT

Appendix A: Drivers Installation

The shipping package includes a Driver CD in which you can find every individual driver and utility that enables you to install the drivers on the system.
Please insert the Driver CD into the drive and double click on the “index.htm” to select the models. You can refer to the drivers installation guide for each driver in the “Driver/Manual List”.

Appendix B: OSD Functions for 2nd Display

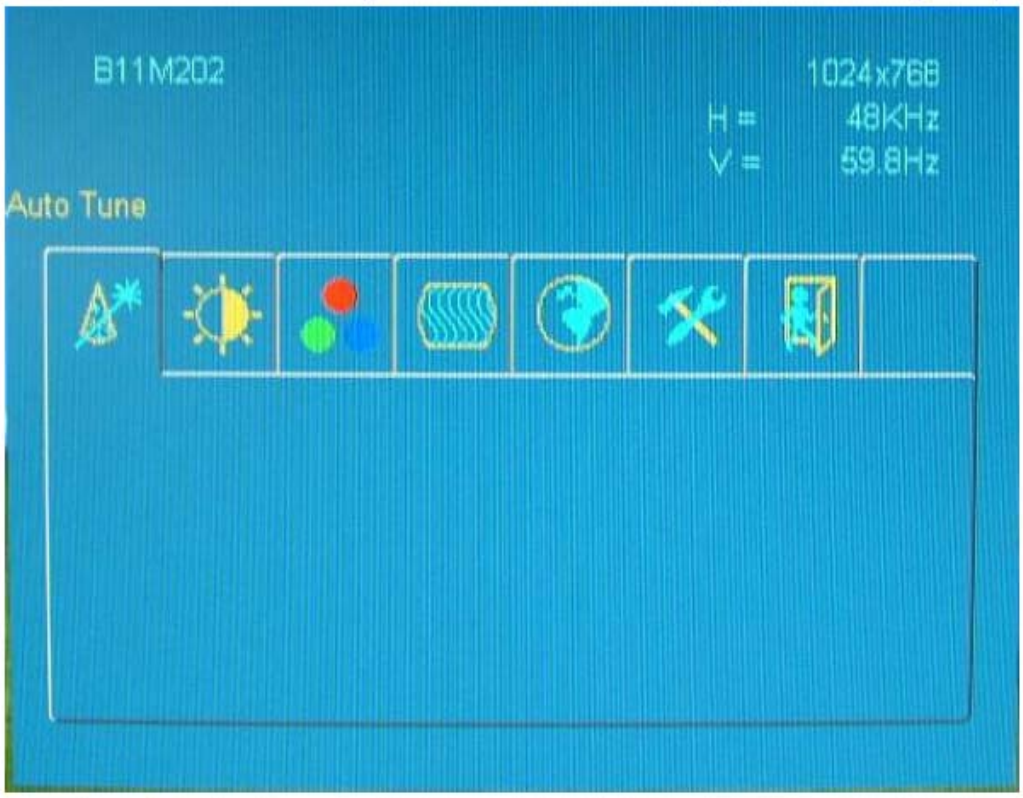


Condition	SW1	SW2	SW1+SW2
Normal Mode (Signal Input Mode)	Power	Auto Tune	Menu Mode (SW1 + SW2 keep press 3 seconds)
Menu Mode	Right	Select	No Function

PS: 2 Key OSD only shifts to right when press SW1 key in menu mode.

(Ex: Brightness Value: 1→10→1)

1. In the signal input mode, keep pressing the SW1 + SW2 key 3 seconds at the same time.



2. Press the SW1 key to select video icon then press the SW2 key to enter brightness adjustment.

3. Press the SW1 key to adjust brightness value.

(Brightness value: 1→2→3→4.....10→1→2.....)

4. Menu mode window will automatically close when there is no command for 10 seconds.

Appendix C: VFD Customer Display

1. Specification

NO	Item	Description
1	Display method	Vacuum fluorescent display
2	Number of character	40 characters (20 columns x 2 lines)
3	Character font	5 x 7 Dot matrix
4	Display color	Blue green
5	Brightness	700 cd /m2
6	Character type	96 alphanumeric 25 kinds of international character set 1 user define character
7	Character size	9.0mm x 5.25mm
8	Power supply	12 ~ 24VDC Manufacture offer +12V power adapter
9	Power consumption	3 ~ 6 W
10	MTBF	25000 hours (power on time)
11	Panel dimensions	224 (W) x 93 (H) x 50(D) mm
12	Support dimensions	Long support : 22 cm Short support : 9 cm
13	Base dimensions	190(w)x55(h)x96(d)mm
14	Viewing angle	-5 ~ 60 degrees
15	Rotation angle	Maximum 270 degrees
16	Weight	1.25 Kg

17	Operating temperature	5 ~ 45°C
18	Operating Humidity	30% ~ 85%
19	Storage Temperature	-10 ~ 55 °C
20	Storage Humidity	10% ~ 85%

2. Interface

Data transmission	Serial
Synchronization	Asynchronous
Signal level	MARK = -3 to –15 V (logic “1”) SPACE = +3 to +15 V (logic “0”)
Baud rates	4800, 9600, 19200, 38400 bps
Parity	None, even
Bit length	8 bits
Stop bits	1 bit

3. Dip Switch and Software Setting

1.1. Command Type Selection

SW1	SW2	SW3	Command Type	Demo Mode Support	Default
ON	ON	ON	PS7300	No	
OFF	ON	ON	EPSON ESC/POS	Yes	*
ON	OFF	ON	ADM 787/ ADM 788	No	
OFF	OFF	ON	DSP800	Yes	
ON	ON	OFF	AEDEX/ EMAX	No	
OFF	ON	OFF	UTC/P	No	
ON	OFF	OFF	UTC/S	No	
OFF	OFF	OFF	CD5220	Yes	

1.2. Baud Rate Selection

SW8	SW9	Baud Rate (bps)	Default
ON	ON	4800	
OFF	ON	9600	*
ON	OFF	19200	
OFF	OFF	38400	

1.3. Parity Check Selection

SW10	Parity Check	Default
ON	None-parity	*
OFF	Even-parity	

1.4. Command Control

SW12	Function
ON	Depends on SW1~SW11 setting
OFF	Bypass SW1~SW11 setting, fixed at: ➢ Command type: POS7300, ➢ Baud rate: 9600 ➢ Parity check: None-parity ➢ Demo mode: Disable

1.5. International Character Set

ID	SW 4	SW 5	SW 6	SW 7	SW 11	Character Set (20h – 7Fh)	Code Table (80H-FFH)	Default	Note
0	ON	ON	ON	ON	OFF	U.S.A.	CP-437 (USA, Standard Europe)	*	
1	OFF	ON	ON	ON	OFF	FRANCE	CP-858 (Multilingual + Euro Symbol)		
2	ON	OFF	ON	ON	OFF	GERMANY			
3	OFF	OFF	ON	ON	OFF	U.K.			
4	ON	ON	OFF	ON	OFF	DENMARK I			
5	OFF	ON	OFF	ON	OFF	SWEDEN			
6	ON	OFF	OFF	ON	OFF	ITALY			
7	OFF	OFF	OFF	ON	OFF	SPAIN			
8	ON	ON	ON	OFF	OFF	JAPAN	Katakana		
9	OFF	ON	ON	OFF	OFF	NORWAY	CP-858 (Multilingual + Euro Symbol)		
10	ON	OFF	ON	OFF	OFF	DENMARK II			
11	OFF	OFF	ON	OFF	OFF	Slawie			
12	ON	ON	OFF	OFF	OFF	RUSSIA			
13	OFF	ON	OFF	OFF	OFF	U.S.A.	CP-860 (Portuguese)		
14	ON	OFF	OFF	OFF	OFF	U.K.	Greek		
15	OFF	OFF	OFF	OFF	OFF	U.S.A.	CP-852 (Hungary)		
16	ON	ON	ON	ON	ON	U.S.A.	CP-862 (Hebrew)		
17	OFF	ON	ON	ON	ON	U.S.A.	CP-863 (Canadian-French)		
18	ON	OFF	ON	ON	ON	U.S.A.	CP-865 (Nordic)		
19	OFF	OFF	ON	ON	ON	U.S.A.	CP-866 (Cyrillic)		
20	ON	ON	OFF	ON	ON	U.S.A.	Windows-1251 (Cyrillic)		
21	OFF	ON	OFF	ON	ON	U.S.A.	Windows-1252 (West European Latin)		
22	ON	OFF	OFF	ON	ON	U.S.A.	Windows-1255 (Hebrew)		
23	OFF	OFF	OFF	ON	ON	U.S.A.	Windows-1257 (Baltic)		
24	ON	ON	ON	OFF	ON	U.S.A.	Windows-1253 (Greek)		
25	OFF	ON	ON	OFF	ON	U.S.A.	Windows-1250 (East European Latin)		

4. Software Status Setting Commands

When the system is powered on, the VFD will read the DIP switches to set the **Command Type**, **Baud Rate**, **Parity**, and **International Character set**. The user can change the settings as follows:

1.6. Baud Rate Setting Command

STX 05 B n ETX	/Change the baud rate setting/
ASCII Format	STX 05 B **n** ETX
Dec. Format	[02] [05] [66] **n** [03]
Hex. Format	[02h][05h][42h] **n** 30h≦**n**≦33h [0 3 h]
Description	Change the display communication baud rate. The baud rate setting can be selected from 4800 to 38400.

n	Baud rate
30h	4800
31h	9600
32h	19200
33h	38400

1.7. Parity Check Setting Command

STX 05 P n ETX	/Change the Parity check setting/
ASCII Format	STX 05 P **n** ETX
Dec. Format	[02] [05] [80] **n** [0 3]
Hex. Format	[02h][05h][50h] **n** **n**=30h, 31h [0 3 h]
Description	Change the display communication parity. Set 8 data bit and the parity set for even or non-parity.

n	Parity check
30h	None-parity
31h	Even-parity

1.8. International Character Set Setting Command

STX 05 S n /Change the international character set/
ETX

ASCII Format STX 05 S **n** ETX

Dec. Format [02] [05] [83] **n** [03]

Hex. Format [02h][05h][53h] **n** 30h≦ **n** ≦4Fh

[0 3 h]

Description Change the display international character font.

n	Character Set (20h – 7Fh)	Code Table (80H-FFH)	Note
30h	U.S.A.	CP-437 (USA, Standard Europe)	
31h	FRANCE	CP-858 (Multilingual + Euro Symbol)	
32h	GERMANY		
33h	U.K.		
34h	DENMARK I		
35h	SWEDEN		
36h	ITALY		
37h	SPAIN		
38h	JAPAN	Katakana	
39h	NORWAY	CP-858 (Multilingual+ Euro Symbol)	
3Ah	DENMARK II		
3Bh	Slawie		
3Ch	RUSSIA		
3Dh	U.S.A.	CP-860 (Portuguese)	
3Eh	U.K.	Greek	
3Fh	U.S.A.	CP-852 (Hungary)	
40h	U.S.A.	CP-862 (Hebrew)	
41h	U.S.A.	CP-863 (Canadian-French)	
42h	U.S.A.	CP-865 (Nordic)	
43h	U.S.A.	CP-866 (Cyrillic)	
44h	U.S.A.	Windows-1251 (Cyrillic)	
45h	U.S.A.	Windows-1252 (West European Latin)	
46h	U.S.A.	Windows-1255 (Hebrew)	
47h	U.S.A.	Windows-1257 (Baltic)	
48h	U.S.A.	Windows-1253 (Greek)	
49h	U.S.A.	Windows-1250 (East European Latin)	

1.9. Command Type Setting Command

STX 05 C n ETX /Change the command type setting/

ASCII Format STX 05 C **n** ETX

Dec. Format [02] [05] [67] **n** [03]

Hex. Format [02h][05h][43h] **n** 30h≦ **n** ≦37h

[0 3 h]

Description This command will change the command type and initialize the display.

The display emulation mode is based on DSP800/ ESC/ ADM 787/ POS7300/ AEDEX/ UTC/ CD5220 mode.

n	Command Type	n	Command Type
30h	POS7300	34h	AEDEX
31h	ESC/POS	35h	UTC/P
32h	ADM 787	36h	UTC/S
33h	DSP800	37h	CD5220

1.10. Run Demo message

STX 05 D 08 ETX /Run demo message/

ASCII Format STX 05 D 08 ETX

Dec. Format [02][05][68][08][03]

Hex. Format [02h][05h][44h][08h][03h]

Description Run demo message for the display.

The display emulation mode is based on DSP800, EPSON ESC/POS, CD5220 command type.

1.11. Show Firmware Version

STX 05 V 01 ETX /Show Firmware Version/

ASCII Format STX 05 V 01 ETX

Dec. Format [02][05][86][01][03]

Hex. Format [02h][05h][56h][01h][03h]

Description Show firmware version.

5. Command List Table

Command List Table – 1

	POS7300	CD5220	EPSON D101	UTC/S	UTC/P	AEDEX	ADM788	DSP800
Move cursor right	O	O	O					
Move cursor left	O	O	O					
Move cursor up	O	O	O					
Move cursor down	O	O	O					
Move cursor to right-most position	O	O	O					
Move cursor to left-most position	O	O	O					
Move cursor to home position	O	O	O					
Move cursor to bottom position		O	O					
Move cursor to specified position	O	O	O					O
Clear display screen	O	O	O	O			O	
Clear cursor line	O	O	O					
Brightness adjustment		O	O					O
Blink display screen	O	O	O					O
Initialize display	O	O	O					O
Select character code table		O	O					
Select international character set		O	O					O
Select/cancel reverse character			O					
Overwrite mode	O	O	O	O				
Vertical scroll mode	O	O	O	O				
Horizontal scroll mode	O	O	O					
Set/cancel the window range		O	O					
Select peripheral device		O	O					O
Set starting/ending position of macro definition			O					
Execute and quit macro			O					
Execute self-test		O	O					O
Display time			O		O	O		
Display time continuously			O					
Display position				O				

	POS7300	CD5220	EPSON D101	UTC/S	UTC/P	AEDEX	ADM788	DSP800
Cursor on/off	O	O	O	O				
Change to UTC enhanced mode				O				
Change to UTC standard mode					O			
Write string to upper line	O	O			O	O		

Command List Table – 2

	POS7300	CD5220	EPSON D101	UTC/S	UTC/P	AEDEX	ADM788	DSP800
Upper line message continuous scroll	O	O			O	O		
Bottom line message scroll continuously	O							
Message vertical down scroll continuously	O							
Message vertical upper scroll continuously	O							
Carriage return	O			O			O	
Line feed	O			O				
Back space	O			O				
Horizontal tab	O			O				
Command type select		O	O					O
Upper line message scroll once pass					O	O		
Change attention code					O	O		
Two line display					O	O		
Clear upper line and move cursor to upper left-end position							O	
Clear bottom line and move cursor to bottom left-end position							O	
Set period to upper line, last n position							O	
Set line blinking, upper line	O						O	
Clear line blinking, upper line	O						O	

	POS7300	CD5220	EPSON D101	UTC/S	UTC/P	AEDEX	ADM788	DSP800
Clear field 1 and move cursor to field 1, first position							O	
Clear field 2 and move cursor to field 2,first position							O	
Clear display range from n position to m position and move cursor to n position								O
Save the current displaying data to n layer for demo display								O
Turn annunciator on/off			O					
Specify period			O					
Specify comma			O					
Specify semicolon (period + comma)			O					

6. Command Details

6.1. POS7300 Series Command List

POS7300 Standard Mode Command List-1

Command	Code (hex)	Function Description
ESC F A **[DATA]** CR	1B 46 41 **[DATA]** 0D	Write string to upper line ➢ Maximal **[DATA]** length is 40
ESC F B **[DATA]** CR	1B 46 42 **[DATA]** 0D	Write string to lower line ➢ Maximal **[DATA]** length is 40
ESC F D **[DATA]** CR	1B 46 44 **[DATA]** 0D	Upper line message scroll continuously ➢ Maximal **[DATA]** length is 40
ESC F O **[DATA]** CR	1B 46 4F **[DATA]** 0D	Bottom line message scroll continuously ➢ Maximal **[DATA]** length is 40
ESC P **x y**	1B 50 **x y**	Move cursor to specified position ➢ **x** = 1 ~ 14h, for columns location. ➢ **y** = 1 ~ 2, for lines location.
ESC _ **n**	1B 5F **n**	Set cursor on/off ➢ **n** = 00 ~ 01
ESC DC1	1B 11	Overwrite mode
ESC DC2	1B 12	Vertical scroll mode
ESC DC3	1B 13	Horizontal scroll mode
ESC @	1B 40	Initialize display
US MD1 **n**	1F 01 **n**	Message vertical upper scroll continuously ➢ **n** = 01 ~ 0Ch
US MD2 **n**	1F 02 **n**	Message vertical down scroll continuously ➢ **n** = 01 ~ 0Ch
US DC1 **n**	1F 11 **n**	Set line blinking ➢ **n** = ’1’ ~ ’2’ ■ **n** = ’1’ up line ■ **n** = ’2’ low line
US DC2 **n**	1F 12 **n**	Clear line blinking ➢ **n** = ’1’ ~ ’2’ ■ **n** = ’1’ up line ■ **n** = ’2’ low line
US E **n**	1F 45 **n**	Blink display screen ➢ **n** = 00h ~ FFh ■ **n** = 0 for no blink

Command	Code (hex)	Function Description
NULL H	0 48	Move cursor up
NULL K	0 4B	Move cursor left
NULL M	0 4D	Move cursor right
NULL P	0 50	Move cursor down
NULL G	0 47	Move cursor to left-most position
NULL O	0 4F	Move cursor to right-most position

POS7300 Standard Mode Command List-2

Command	Code (hex)	Function Description
BS	08	Back space
HT	09	Horizontal tab
LF	0A	Line feed
HOM	0B	Move cursor to home position
CLR	0C	Clear display screen
CLR	12	Clear display screen
CR	0D	Carriage return
CAN	18	Clear cursor line, and clear string mode
DLE **n**	10 **n**	Display position ➢ **n** = 0 ~ 27h, for location.
ESC = **n**	1B 3D **n**	Select peripheral device, display or printer ➢ **n** = 1~3 ■ **n** = '1': enable printer only ■ **n** = '2': enable display only ■ **n** = '3': enable both of printer and display

6.2. CD5220 Standard Mode Command List

CD5220 Standard Mode Command List-1

Command	Code (hex)	Function Description
ESC DC1	1B 11	Overwrite mode
US SOH	1F 01	
ESC DC2	1B 12	Vertical scroll mode
US STX	1F 02	
ESC DC3	1B 13	Horizontal scroll mode
US ETX	1F 03	
ESC Q A **[DATA]** CR	1B 51 41 **[DATA]** 0D	Set the string display mode, write string to upper line. *1 ➢ Maximal **[DATA]** length is 20
ESC Q B **[DATA]** CR	1B 51 42 **[DATA]** 0D	Set the string display mode, write string to lower line. *1 ➢ Maximal **[DATA]** length is 20
ESC Q D **[DATA]** CR	1B 51 44 **[DATA]** 0D	Upper line message scroll continuously. *1 *2 ➢ Maximal **[DATA]** length is 40
ESD [D	1B 5B 44	Move cursor left
BS	08	
ESC [C	1B 5B 43	Move cursor right
HT	09	
ESC [A	1B 5B 41	Move cursor up
US LF	1F 0A	
ESC [B	1B 5B 42	Move cursor down
LF	0A	
ESC [H	1B 5B 48	Move cursor to home position
HOM	0B	
ESC [L	1B 5B 4C	Move cursor to left-most position
CR	0D	
ESC [R	1B 5B 52	Move cursor to right-most position
US CR	1F 0D	
ESC [K	1B 5B 4B	Move cursor to bottom position
US B	1F 42	
ESC # **n**	1B 23 **n**	Command type select ➢ **n** = 30h ~ 37h
US @	1F 40	Execute self test
US E **n**	1F 45 **n**	Blink display screen

Command	Code (hex)	Function Description
		➢ **n** = 00h ~ FFh ■ **n** = 0 for no blink
ESC l **x y**	1B 6C **x y**	Move cursor to specified position ➢ **x** = 1 ~ 14h, for columns location. ➢ **y** = 1,2, for lines location.
US $ **x y**	1F 24 **x y**	
ESC @	1B 40	Initialize display

CD5220 Standard Mode Command List-2

Command	Code (hex)	Function Description
ESC W **s x1 x2 y**	1B 57 **s x1 x2 y**	Set or cancel the window range at horizontal scroll mode ➢ 1 ≦ **x1** ≦ **x2** ≦ 14h, for columns location. ➢ **y** = 1~2, for lines location. ➢ **s** = 0: cancel **s** = 1: set
CLR	0C	Clear display screen, and clear string mode
CAN	18	Clear cursor line, and clear string mode
ESC * **n**	1B 2A **n**	Brightness adjustment ➢ **n** = 1 ~ 4, **n** = 4 for highest brightness
US X **n**	1F 58 **n**	
ESC _ **n**	1B 5F **n**	Set cursor on/off ➢ **n** = 1: cursor on **n** = 0: cursor off
ESC f **n**	1B 66 **n**	Select international fonts ➢ About **n**, refer. *3
ESC c **n**	1B 63 **n**	Select fonts, ASCII code or JIS code, ➢ About **n**, refer. *4
ESC = **n**	1B 3D **n**	Select peripheral device, display or printer ➢ **n**='1': enable printer only **n**='2': enable display only **n**='3': enable both of printer and display

Note:

1. While using command “ESC Q A” or “ESC Q B”, other commands cannot be used except when using command “CLR” or “CAN” to change operating mode.
2. When using command “ESC Q D”, the upper line message will scroll continuously until a new command is received, it will then clear the upper line and move the cursor to the upper left-end position.
3. Select the international Character set (20h – 7Fh) by command “ESC f **n**”.

Parameter “n”		International Character Set	Parameter “n”		International Character Set
Character	Hex		Character	Hex	
‘A’	41h	U.S.A.	‘W’	57h	Sweden
‘G’	47h	Germany	‘D’	44h	Denmark I
’I’	49h	Italy	‘E’	45h	Denmark II
‘J’	4Ah	Japan	‘L’	4Ch	Slavonic
‘U’	55h	U.K.	‘R’	52h	Russia
‘F’	46h	France			
‘S’	53h	Spain			
‘N’	4Eh	Norway			

4. Select character code table (80H-FFH) by command “ESC c **n**”.

Parameter “n”		character Code Table
Character	Hex	
‘A’	41h	Compliance with ASCII code (CP-437)
‘J’	4Ah	Compliance with JIS code (Katakana)
‘L’	4Ch	Compliance with Slawie code
‘R’	52h	Compliance with RUSSIA code
‘M’	4Dh	CP-850 (Multilingual)
‘P’	50h	CP-858 (Multilingual+ Euro Symbol)
‘p’	70h	CP-860 (Portuguese)
‘F’	46h	CP-863 (Canadian-French)
‘N’	4Eh	CP-865 (Nordic)
‘u’	75h	CP-852 (Hungary)
‘H’	48h	CP-862 (Hebrew)
‘C’	43h	CP-866 (Cyrillic)
‘G’	47h	Greek
‘c’	63h	Windows-1251 (Cyrillic)
‘W’	57h	Windows-1252 (West European Latin)
‘h’	68h	Windows-1255 (Hebrew)
‘B’	42h	Windows-1257 (Baltic)
‘g’	67h	Windows-1253 (Greek)

Parameter “n”		character Code Table
Character	Hex	
‘E’	45h	Windows-1250 (East European Latin)

6.3. UTC Standard Mode Command List

Command	Code (hex)	Function Description
BS	08	Back space
HT	09	Horizontal tab
LF	0A	Line feed
CR	0D	Carriage return
DLE **n**	10 **n**	Display position ➢ **n** = 0 ~ 27h, for location.
DC1	11	Over write display mode
DC2	12	Vertical scroll mode
DC3	13	Cursor on
DC4	14	Cursor off
US	1F	Clear display
ESC d	1B 64	Change to UTC enhanced mode

6.4. UTC Enhanced Mode Command List

Command	Code (hex)	Function Description
ESC u A **[DATA]** CR	1B 75 41 **[DATA]** 0D	Upper line display ➢ Maximal **[DATA]** length is 20
ESC u B **[DATA]** CR	1B 75 42 **[DATA]** 0D	Bottom line display ➢ Maximal **[DATA]** length is 20
ESC u D **[DATA]** CR	1B 75 44 **[DATA]** 0D	Upper line message scroll continuously ➢ Maximal **[DATA]** length is 40
ESC u E **h h** : **m m** CR	1B 75 45 **h h** ':' **m m** 0D	Display time ➢ **h**, **m** = '0' ~ '9'
ESC u F **[DATA]** CR	1B 75 46 **[DATA]** 0D	Upper line message scroll Once pass ➢ Maximal **[DATA]** length is 40
ESC u H **n m** CR	1B 75 48 **n m** 0D	Change attention code ➢ **n** = 1 ~ 20h ➢ **m** = 1 ~ 20h
ESC u I **[DATA]** CR	1B 75 49 **[DATA]** 0D	Two line display ➢ Maximal **[DATA]** length is 40
ESC RS CR	1B 0F 0D	Change to UTC standard mode

6.5. AEDEX/EMAX Mode Command List

Command	Code (hex)	Function Description
! # 4 **[DATA]** CR	21 23 34 **[DATA]** 0D	Upper line message scroll ➢ Maximal **[DATA]** length is 40
! # 5 **h h** : **m m** CR	21 23 35 **h h** ':' **m m** 0D	Display time ➢ **h**, **m** = '0' ~ '9'
! # 8 **n m** CR	21 23 38 **n m** 0D	Change attention code ➢ **n**, **m** = 1 ~ 20
! # 9 **[DATA]** CR	21 23 39 **[DATA]** 0D	Two line display ➢ Maximal **[DATA]** length is 40
! # 6 **[DATA]** CR	21 23 36 **[DATA]** 0D	Upper line message scroll once pass ➢ Maximal **[DATA]** length is 40

6.6. ADM787/788 mode command list

Command	Code (hex)	Function Description
CLR	0C	Clear display
CR	0D	Carriage return
SLE1	0E	Clear upper line and move cursor to upper left-end position
SLE2	0F	Clear bottom line and move, Cursor to bottom left-end position
DC0 **n**	10 **n**	Set period to upper line last n position ➢ **n** = 31H ~ 37H
DC1 **n**	11 **n**	Set line blinking, upper line ➢ **n** = '1' ~ '2' ■ **n** = '1': up line ■ **n** = '2': low line
DC2 **n**	12 **n**	Clear line blinking, upper line ➢ **n** = '1' ~ '2' ■ **n** = '1': up line ■ **n** = '2': low line
SF1	1E	Clear field 1 and move cursor to field 1, first position
SF2	1F	Clear field 2 and move cursor to field 2, first position

6.7. DSP800 Mode Command List

Command	Code (hex)	Function Description
EOT SOH I **n** ETB	04 01 49 **n** 17	Select international character set ➢ **n** = 00 ~ 0Fh or 30 ~ 3Fh
EOT SOH P **n** ETB	04 01 50 **n** 17	Move cursor to specified position ➢ **n** = 31h ~ 58h
EOT SOH C **n m** ETB	04 01 43 **n m** 17	Clear display range from n position to m position and move cursor to n position ➢ 31h ≦ **n** ≦ **m** ≦ 58h
EOT SOH S **n** ETB	04 01 53 **n** 17	Save current view message to n layer for demo view data ➢ **n** = 31h ~ 35h
EOT SOH D **n m** ETB	04 01 44 **n m** 17	Display the saved demo message ➢ **n** = 31h ~ 4Fh ➢ **m** = 31h ~ 33h
EOT SOH A **n** ETB	04 01 41 **n** 17 **n** =31h-34h	Brightness adjustment
EOT SOH F **n** ETB	04 01 46 **n** 17 00h≦**n**≦FFh	Blink display Screen ➢ **n** = 00h ~ FFh, **n** = 0 for no blink
EOT SOH # **n** ETB	04 01 23 **n** 17 **n** =30~37h	Command type select
EOT SOH % ETB	04 01 25 17	Initialize display
EOT SOH @ ETB	04 01 40 17	Execute self-test
EOT SOH = **n** ETB	04 01 3D **n** 17	Select peripheral device, display or printer ➢ **n** = '1': enable printer only **n** = '2': enable display only **n** = '3': enable both of printer and display

6.8. EPSON ESC/POS Command List

EPSON ESC/POS Command List-1

Command	Code (hex)	Function Description
US r **n**	1F 72 **n**	Select/cancel reverse character. ➢ **n** = 00,01
US MD1	1F 01	Specify overwrite mode.
US MD2	1F 02	Specify vertical scroll mode.
US MD3	1F 03	Specify horizontal scroll mode.
CAN	18	Clear cursor line
ESC # **n**	1B 23 **n**	Command type select ➢ **n** = 30h ~ 37h
US # **n x**	1F 23 **n x**	Turn annunciator on/off. ➢ **n** = 0 for annunciator off **n** = 1 for annunciator on ➢ **x** = 1 ~ 14h, for columns location.
US C **n**	1F 43 **n**	Set cursor on/off ➢ **n** = 00, 01
BS	08	Move cursor left
HT	09	Move cursor right
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**	Move cursor to specified position ➢ **x** = 1 ~ 14h, for columns location. ➢ **y** = 1 ~ 2, for lines location.
CLR	0C	Clear display screen
US E **n**	1F 45 **n**	Blink display screen ➢ **n** = 00h ~ FFh **n** = 0 for no blink
ESC @	1B 40	Initialize display
US . **n**	1F 2E **n**	Specify period ➢ **n** = a displayable character code
US , **n**	1F 2C **n**	Specify comma ➢ **n** = a displayable character code
US ; **n**	1F 3B **n**	Specify semicolon (period + comma)

Command	Code (hex)	Function Description
		➢ **n** = a displayable character code
US :	1F 3A	Set starting/ending position of macro definition. Ex.: 1F 3A … (macro string) … 1F 3A
US @	1F 40	Execute self - test
US T h m	1F 54 h m	Display time ➢ 0 ≦ h ≦ 17h, for hours setting. ➢ 0 ≦ m ≦ 3Bh, for minutes setting.

EPSON ESC/POS Command List-2

Command	Code (hex)	Function Description
US ^ **n m**	1F 5E **n m**	Execute and quit macro. It's an interval of n between the two words. It's an interval of m between the two strings. ➢ 00 ≦ (**n**, **m**) ≦ FFh ■ **n** = Word time ■ **m** = show string time
US U	1F 55	Display time continuously
US X **n**	1F 58 **n**	Brightness adjustment ➢ **n** = 1 ~ 4
ESC W **n s x1 y1 x2 y2**	1B 57 **n s x1 y1 x2 y2**	Set or cancel the window range ➢ **n** = 1 ~ 4, for window number ➢ **s** = 0: cancel **s** = 1: set ➢ 1 ≦ **x1** ≦ **x2** ≦ 14h, for columns location. ➢ 1 ≦ **y1** ≦ **y2** ≦ 2, for lines location.
ESC R **n**	1B 52 **n**	Select international character set (20H~7Fh). ➢ **n** = 00 ~ 0Fh. See note *1
ESC t **n**	1B 74 **n**	Select character code table (80H~FFh). ➢ **n** = 00 ~ 1Fh. See note *2
ESC = **n**	1B 3D **n**	Select peripheral device, display or printer ➢ **n** = '1': enable printer only **n** = '2': enable display only **n** = '3': enable both of printer and display

Note:

1. Select international character set (20H~7Fh) by command "ESC R **n**"

n	International character set	n	International character set	n	International character set
0h	U.S.A.	**6h**	ITALY	**Ch**	RUSSIA
1h	FRANCE	**7h**	SPAIN	**Dh**	Not used
2h	GERMANY	**8h**	JAPAN	**Eh**	Not used
3h	U.K.	**9h**	NORWAY	**Fh**	Not used
4h	DENMARK I	**Ah**	DENMARK II		
5h	SWEDEN	**Bh**	SLAVONIC		

2. Select character code table (80H~FFh) by command “ESC t **n**”

n	Character code table	n	Character code table	n	Character code table
0h	CP-437 (USA, Standard Europe)	**7h**	Russia	**Fh**	Windows-1257 (Baltic)
1h	Katakana (for Japan)	**8h**	Greek	**10h**	Windows-1252 (West European Latin)
2h	CP-850 (Multilingual)	**9h**	CP-852 (Hungary)	**11h**	Windows-1253 (Greek)
3h	CP-860 (Portuguese)	**Ah**	CP-862 (Hebrew)	**12h**	Windows-1250 (East European Latin)
4h	CP-863 (Canadian-French)	**Bh**	CP-866 (Cyrillic)	**13h**	CP-858 (Multilingual+ Euro Symbol)
5h	CP-865 (Nordic)	**Ch**	Windows-1251 (Cyrillic)		
6h	Slawie	**Eh**	Windows-1255 (Hebrew)		

7. Character Set

7.1. Character Code 20H – 7FH

7.1.1. International Character Sets

Character Code Number												
Country \ Hex	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
Country \ Dec	35	36	64	91	92	93	94	96	123	124	125	126
U.S.A	#	$	@	[	\	]	^	`	{	¦	}	~
France	#	$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	β
U.K	£	$	@	[	\	]	^	`	{	¦	}	~
Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
Spain	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
Japan	#	$	@	[	¥	]	^	`	{	¦	}	~
Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Slavonic	#	$	@	[	\	]	^	`	{	¦	}	~
Russia	#	$	@	[	\	]	^	`	{	¦	}	~

7.1.2. USA, Standard Character Sets

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
20h		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30h	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40h	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50h	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60h	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70h	p	q	r	s	t	u	v	w	x	y	Z	{	¦	}	~	

7.2. Character Code 80H – FFH

7.2.1. CP-437 (USA, Standard Europe)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90h	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	¢	£	¥	Pt	*ƒ*
A0h	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	«	»
B0h	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0h	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0h	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	▉	▄	▌	▐	▀
E0h	α	ß	Γ	π	Σ	σ	µ	τ	Φ	θ	Ω	δ	∞	ø	ε	∩
F0h	≡	±	≥	≤	⌠	⌡	÷	≈	°	•	·	√	ⁿ	²	■	

7.2.2. CP-850 (Multilingual)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90h	É	æ	Æ	ô	ö	ò	û	ù	ÿ	ö	Ü	ø	£	Ø	×	ƒ
A0h	á	í	ó	ú	ñ	Ñ	a	o	¿	®	¬	½	¼	¡	«	»
B0h	░	▒	▓	│	┤	Á	Â	À	©	╣	║	╗	╝	¢	¥	┐
C0h	└	┴	┬	├	─	┼	ã	Ã	╚	╔	╩	╦	╠	═	╬	¤
D0h	ð	Ð	Ê	Ë	È	ı	Í	Î	Ï	┘	┌	█	▄	¦	Ì	▀
E0h	ó	ß	ô	ò	õ	Õ	µ	þ	Þ	Ú	Û	Ù	ý	Ý	¯	´
F0h		±	=	¾	¶	§	÷	¸	°	¨	·	1	3	2	■	

7.2.3. CP-858 (Multilingual + Euro Symbol)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90h	É	æ	Æ	ô	ö	ò	û	ù	ÿ	ö	Ü	ø	£	Ø	×	ƒ
A0h	á	í	ó	ú	ñ	Ñ	a	o	¿	®	¬	½	¼	¡	«	»
B0h	░	▒	▓	│	┤	Á	Â	À	©	╣	║	╗	╝	¢	¥	┐
C0h	└	┴	┬	├	─	┼	ã	Ã	╚	╔	╩	╦	╠	═	╬	¤
D0h	ð	Ð	Ê	Ë	È	€	Í	Î	Ï	┘	┌	█	▄	¦	Ì	▀
E0h	ó	ß	ô	ò	õ	Õ	µ	þ	Þ	Ú	Û	Ù	ý	Ý	¯	´
F0h		±	=	¾	¶	§	÷	¸	°	¨	·	1	3	2	■	

7.2.4. Katakana for Japan

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	α	β	γ	⊿	ϵ	η	θ	λ	μ	π	ρ	σ	τ	Φ	Ω	∑
90h	£	§	IE	IR	∫	x̄	Ā	-1	2	3	x	½	1/	√	±	■
A0h		◦	「	」	、	•	ヲ	フ	イ	ウ	エ	オ	ヤ	ュ	ヨ	ッ
B0h	ー	ア	イ	ウ	エ	オ	カ	キ	ク	ケ	コ	サ	シ	ス	セ	ソ
C0h	タ	チ	ツ	テ	ト	ナ	ニ	ヌ	ネ	ノ	ハ	ヒ	フ	ヘ	ホ	マ
D0h	ミ	ム	メ	モ	ヤ	ュ	ヨ	ラ	リ	ル	レ	ロ	ワ	ン	"	◦
E0h	↑	↓	←	→	↵	↳	↦	↰	⇤	⇥	”	“	«	»	∴	∵
F0h	≤	≥	≠	≒	‖	|	⊥	∞	α	∼	~	≡	∓	⍰	⊕	Θ

7.2.5. Slawie

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	Ç	ü	é	â	ä	ů	ć	ç	ļ	ë	õ	õ	î	ź	ä	ć
90h	é	Ĺ	í	ô	ö	Ľ	ĭ	ś	ś	Ö	Ü	ť	ť	ł	x	č
A0h	á	í	ó	ú	ą	ą	ž	ž	ę	ę		ź	č	ş	«	»
B0h	▒	▒	▓	|	┤	á	â	ě	ş					ŧ	ŧ	
C0h					─	┼	ă	ă						═		¤
D0h	đ	đ	ď	ë	ď	ň	í	î	ě			▉	▄	ţ	ů	■
E0h	ó	β	ô	ń	ń	ň	š	š	ŕ	ú	ŕ	ũ	ý	ý	ţ	´
F0h	–	˜	¸	˝	˘	§	÷	˛	°	¨	·	ũ	ř	ř	■	

7.2.6. Russia

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	А	Б	В	Г	Д	Е	Ж	З	и	Й	К	Л	М	Н	О	П
90h	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
A0h	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
B0h																
C0h																
D0h																
E0h	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	Э	ю	я
F0h	∂	Ғ	Қ	Ң	θ	Ұ	Ү	Һ	∂	ғ	қ	ң	θ	ұ	Ү	

7.2.7. CP-860 (Portuguese)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	Ç	ü	é	â	ã	à	Á	ç	ê	Ê	è	Í	Ô	ì	Ã	Â
90h	É	À	È	ô	õ	ò	Ú	ù	Ì	Õ	Ü	¢	£	Ù	Pts	Ó
A0h	á	í	ó	ú	ñ	Ñ	a̲	o	¿	Ò	¬	½	¼	¡	«	»
B0h	▒	▒	▓	│	┤	╡	╢	╖	╕	╣	‖	╗	╝	╜	╛	┐
C0h	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0h	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	└	▉	▄	▌	▐	▀
E0h	α	β	Γ	π	Σ	σ	μ	τ	Φ	θ	Ω	δ	∞	ø	є	∩
F0h	≡	±	≥	≤	⌠	⌡	÷	≈	°	•	·	√	n	2	■	

7.2.8. Greek

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	A	B	Γ	Δ	E	Z	**H**	Θ	I	K	Λ	M	N	Ξ	O	Π
90h	P	Σ	T	Y	Φ	X	Ψ	Ω	α	β	γ	δ	ε	ζ	η	θ
A0h	ι	κ	λ	μ	ν	ξ	ο	π	ρ	σ	ς	τ	υ	φ	χ	ψ
B0h																
C0h																
D0h																
E0h	ω															
F0h										£				-		

7.2.9. CP-852 (Hungary)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	Ç	ü	é	â	ä	ů	ć	ç	ł	ë	Ő	ő	î	Ź	Ä	Ć
90h	É	Ĺ	Í	ô	ö	Ľ	ľ	Ś	ś	Ö	Ü	Ť	ť	Ł	x	č
A0h	á	í	Ó	ú	Ą	ą	Ž	ž	Ę	ę	¬	ź	Č	ş	«	»
B0h	░	▒	▓	│	┤	Á	Â	Ě	Ş	╣	║	╗	╝	ż	ż	┐
C0h	└	┴	┬	├	─	┼	Ă	ă	╚	╔	╩	╦	╠	═	╬	¤
D0h	đ	Đ	Ď	Ë	ď	Ň	Í	Î	ě	┘	┌	█	▄	Ţ	Ů	▀
E0h	Ó	ß	Ô	Ń	ń	ň	Š	š	Ŕ	Ú	ŕ	Ű	ý	Ý	ţ	´
F0h	─	˜	˛	ˇ	˘	§	÷	¸	°	¨	˙	ũ	Ř	ř	■	

7.2.10. CP-862 (Hebrew)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	א	ב	ג	ד	ה	ו	ז	ח	ט	י	ך	כ	ל	ם	מ	ן
90h	נ	ס	ע	ף	פ	ץ	צ	ק	ר	ש	ת	¢	£	¥	Pts	*ƒ*
A0h	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	«	»
B0h	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0h	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0h	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	▀
E0h	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0h	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	

7.2.11. CP-863 (Canadian- French)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	Ç	ü	é	â	Â	à	¶	ç	ê	ë	è	ï	î	=	Ä	§
90h	É	È	Ê	ô	Ë	Ï	û	ù	¤	Ô	Ü	¢	£	Ù	Û	*ƒ*
A0h	¦	í	‘	ó	ú	¨	˷	¯	Î	⌐	¬	½	¼	¾	«	»
B0h	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0h	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0h	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	▀
E0h	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0h	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	

7.2.12. CP-865 (Nordic)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90h	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	Pt	*ƒ*
A0h	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	«	¤
B0h	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0h	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0h	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	▀
E0h	α	ß	Γ	π	Σ	σ	µ	τ	Φ	θ	Ω	δ	∞	ø	ε	∩
F0h	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	

7.2.13. CP-866 (Cyrillic)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
90h	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
A0h	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
B0h	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0h	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0h	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	▀
E0h	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я
F0h	Ё	ё	Є	є	Ї	ї	Ў	ў	°	∙	·	√	№	¤	■	

7.2.14. Windows-1250

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	€		‚		„	…	†	‡		‰	Š	‹	Ś	Ť	Ž	Ź
90h		‘	’	“	”	•	–	—		™	š	›	ś	ť	ž	ź
A0h		ˇ	˘	Ł	¤	Ą	¦	§	¨	©	Ş	«	¬		®	Ż
B0h	°	±	˛	ł	´	µ	¶	·	¸	ą	ş	»	Ľ	˝	ľ	ż
C0h	Ŕ	Á	Â	Ă	Ä	Ĺ	Ć	Ç	Č	É	Ę	Ë	Ě	Í	Î	Ď
D0h	Đ	Ń	Ň	Ó	Ô	Ő	Ö	×	Ř	Ů	Ú	Ű	Ü	Ý	Ţ	ß
E0h	ŕ	á	â	ă	ä	ĺ	ć	ç	č	é	ę	ë	ě	í	î	ď
F0h	đ	ń	ň	ó	ô	ő	ö	÷	ř	ů	ú	ű	ü	ý	ţ	˙

7.2.15. Windows-1251 (Cyrillic)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	Ђ	Ѓ	‚	ѓ	„	…	†	‡	€	‰	Љ	‹	Њ	Ќ	Ћ	Џ
90h	ђ	‘	’	“	”	•	–	—		™	љ	›	њ	ќ	ћ	џ
A0h		Ў	ў	Ј	¤	Ґ	¦	§	Ё	©	Є	«	¬		®	Ї
B0h	°	±	І	і	ґ	µ	¶	·	ё	№	є	»	ј	Ѕ	ѕ	ї
C0h	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
D0h	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
E0h	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
F0h	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я

7.2.16. Windows-1252 (West European Latin)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	€		‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹	Œ		Ž	
90h		‘	’	“	”	•	–	—	˜	™	š	›	œ		ž	Ÿ
A0h		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯
B0h	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0h	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0h	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E0h	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0h	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

7.2.17. Windows-1253 (Greek)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	€		‚	ƒ	„	…	†	‡		‰		‹				
90h		‘	’	“	”	•	–	—		™		›				
A0h		΅	Ά	£	¤	¥	¦	§	¨	©		«	¬	–	®	―
B0h	°	±	²	³	΄	µ	¶	·	Έ	Ή	Ί	»	Ό	½	Ύ	Ώ
C0h	ΐ	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ	Ν	Ξ	Ο
D0h	Π	Ρ		Σ	Τ	Υ	Φ	Χ	Ψ	Ω	Ϊ	Ϋ	ά	έ	ή	ί
E0h	ΰ	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο
F0h	π	ρ	ς	σ	τ	υ	φ	χ	ψ	ω	ϊ	ϋ	ό	ύ	ώ	

7.2.18. Windows-1255 (Hebrew)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	€		‚	ƒ	„	…	†	‡	ˆ	‰		‹				
90h		‘	’	“	”	•	–	—	˜	™		›				
A0h		¡	¢	£	₪	¥	¦	§	¨	©	×	«	¬	–	®	¯
B0h	°	±	²	³	´	µ	¶	·	¸	¹	÷	»	¼	½	¾	¿
C0h	ְ	ֱ	ֲ	ֳ	ִ	ֵ	ֶ	ַ	ָ	ֹ		ֻ	ּ	ֽ	־	ֿ
D0h	׀	ׁ	ׂ	׃	ׄ	ׅ	׆	ׇ	׈	׉	׊	׋	׌	׍	׎	׏
E0h	א	ב	ג	ד	ה	ו	ז	ח	ט	י	ך	כ	ל	ם	מ	ן
F0h	נ	ס	ע	ף	פ	ץ	צ	ק	ר	ש	ת					

7.2.19. Windows-1257 (Baltic)

	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
80h	€		‚		„	…	†	‡		‰		‹		¨	ˇ	¸
90h		‘	’	“	”	•	–	—		™		›		¯	˛	
A0h			¢	£	¤		¦	§	Ø	©	Ŗ	«	¬	–	®	Æ
B0h	°	±	²	³	´	µ	¶	·	ø	¹	ŗ	»	¼	½	¾	æ
C0h	Ą	Į	Ā	Ć	Ä	Å	Ę	Ē	Č	É	Ź	Ė	Ģ	Ķ	Ī	Ļ
D0h	Š	Ń	Ņ	Ó	Ō	Õ	Ö	×	Ų	Ł	Ś	Ū	Ü	Ż	Ž	ß
E0h	ą	į	ā	ć	ä	å	ę	ē	č	é	ź	ė	ģ	ķ	ī	ļ
F0h	š	ń	ņ	ó	ō	õ	ö	÷	ų	ł	ś	ū	ü	ż	ž	˙

8. Command Details

A.1. Overwrite mode

In this mode, the cursor will move towards the right and begin from the upper left position. When the cursor has reached the end of the upper line, the cursor will move down to the bottom left position to continue. When the cursor has reached the end of the bottom line, it will move to up the upper left position and overwrite the previous characters.

A.2. Vertical scroll mode

In this mode, the cursor will move towards the right. The cursor will begin from the upper left position until it has reached the end of the upper line. The cursor will then move down to the bottom left position to continue until it has reached the end of the bottom line.

A.3. Horizontal scroll mode

In this mode, the extent of the cursor activity is bound by a predefined range, limited to the upper line. (Please refer to Set or cancel window command), where the default window is the whole upper line. The cursor will begin from the left-end of the range and move rightward until it reached the end of the range, to continue, the characters that comes thereafter will start pushing the previous characters leftward from the right-end, scrolling the characters to the left.

A.4. Set the string display mode and write string to display

Set the string display mode, write to upper or lower line d1 d2 d3 … dn {1≦n≦20}. ‘A’ stands for the upper line, ‘B’ stands for the lower line. The string display mode will be cancelled and the display will return to the previous mode after receiving CLR or CAN.

A.5. Upper line message continuous scroll

The message (previously defined) will scroll continuously in the horizontal direction until a new command is received.

A.6. Move cursor left

When the current cursor is at the left-end position, this command operates differently depending on the display mode.

- **Overwrite mode:** When the cursor reached the left-end of the lower line, it will continue to the right-end of the upper line, overwrite previous characters. When it reached the left end of the upper line, it will continue to the right-end of the lower line.
- **Vertical scroll mode:** When the cursor reached the left-end of the lower line, the lower line will scroll up and replace the previous upper line, the lower line will be cleared and the cursor will continue to the right end of the lower line.
- **Horizontal scroll mode:** The cursor will remain stationary.

A.7. Move cursor right

Move the cursor to the right. When the cursor has reached the right-end, this command operates differently depending on the display mode.

- **Overwrite mode:** When the cursor has reached the right-end of the lower line, it will continue to the left-end of the upper line and overwrite previous characters. When it has reached the right-end of the upper line, it will continue to the right-end of the lower line.

- **Vertical scroll mode:** When the cursor has reached the right-end of the lower line, the lower line will scroll up to replace the upper line, the lower line is cleared and ready to continue characters thereafter.
- **Horizontal scroll mode:** The cursor will remain stationary.

A.8. Move cursor up

Move the cursor up one line. When the cursor is on the upper line, this command operates differently depending on the display mode.

- **Overwrite mode:** The cursor is moved to the same column the lower line.
- **Vertical scroll mode:** The characters displayed on the upper line is scrolled to the lower line, and the upper line is cleared. The cursor will remain at the same position.
- **Horizontal scroll mode:** The cursor will remain stationary.

A.9. Move cursor down

Move the cursor down one line. When the cursor is on the lower line, this command operates differently depending on the display mode.

- **Overwrite mode:** The cursor is moved to the same column on the upper line.
- **Vertical scroll mode:** The characters displayed on the lower line are scrolled to the upper line, and the lower line is cleared. The cursor will remain at the same position.
- **Horizontal scroll mode:** The cursor will remain stationary.

A.10. Move cursor to home position

The cursor will move to the left-end position of the upper line.

A.11. Move cursor to left-most position

The cursor will be moved to the left-end position of the current line.

A.12. Move cursor to right-most position

The cursor will be moved to the right-end position of the current line.

A.13. Move cursor to bottom position

The cursor will be moved to the right-end position on the lower line.

A.14. Move cursor to specified position

The cursor will be moved to column x on line y.

A.15. Initialize display

The data in the input buffer will be cleared and reset from default.

A.16. Reset the window

Reset the window on the display.
When s=0, the window is cancelled (values: x1, x2, and y are not required.)
When s=1, the window will be reset (values: x1, x2, and y are required.)
The x1 and x2 set the position of the left column and right column, respectively, of the window.
The y sets the upper line or the lower line of the window.
This function is valid within the horizontal mode.

A.17. Clear display screen and clear string mode

All the display characters will be cleared, and the string mode will be cancelled.

A.18. Clear current line and cancel string mode

The current line is cleared, and the string mode is cancelled.

A.19. Brightness adjustment

Adjust the brightness of the vacuum fluorescent display.
When n=3, brightness=70%
When n=4, brightness=100%

A.20. Set cursor ON or OFF

When n=0, cursor is OFF
When n=1, cursor is ON

9. Control Code Set

HEX	CODE	HEX	CODE
00H	NULL	10H	DLE
01H	SOH, MD1	11H	DC1
02H	STX, MD2	12H	DC2
03H	ETX, MD3	13H	DC3
04H	EOT, MD4	14H	DC4
05H	ENQ, MD5	15H	NAK
06H	ACK, MD6	16H	SYN
07H	BEL, MD7	17H	ETB
08H	BS, MD8	18H	CAN
09H	HT	19H	EM
0AH	LF	1AH	SUB
0BH	VT, HOM	1BH	ESC
0CH	FF, CLR	1CH	FS
0DH	CR	1DH	GS
0EH	SO, SLE1	1EH	RS, SF1
0FH	SI, SLE2	1FH	US, SF2