

**PLC-508**  
**HMC86508**  
**Flat Panel Control Board**

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## Introduction

Welcome to the PLC-508 Series. The PLC-508 is a ISA bus flat panel graphic acceleration card. This card uses HM86508 LCD/CRT Controller Chips to support high resolution LCD/CRT display panel. It is made for the SBCs that are not equipped with LCD/CRT interface from the factory and is the best solution for internal flat panel connection.

**PLC-508** has one 44-pin LCD connector (TTL Signal). This model is for internal flat panel connection application, for example: for connection with LCD-Kit01, WS-842CD, MPC-6020..etc.

**PLC-508L1** provides One-Channel LVDS interface on board which supports 18/24-bit LCD panel display with 44-pin D-sub connector on the iron plate for one channel LVDS signal.

## 1.1 Specifications :

**Bus** : ISA bus

**LCD/CRT Interface** : HM86508 Chipset with 1MB Video DRAM

Resolution: up to 1024 x 768, 256 colors for CRT  
800 x 600, 64K colors for LCD

**Output +/-40V VEE** bias voltage for flat panel need

**Output Connector** :

LCD : 44-pin D-sub female LVDS Interface connector (CN1)  
2x22 pin header LCD Interface connector (CN4)  
CRT : 15-pin D-sub female connector (CN2)  
2x5 box header/2.54mm connector for internal CRT  
connection

**LCD Voltage** : 3.3 V or 5 V (selectable from JP5)

**Support LCD Type** :

Prime View	P64CV1	640 x 480 TFT	6.4" (BIOS 5081.HMC)
Toshiba	LTM10C209A	640 x 480 TFT	10.4" (BIOS 5081.HMC)
Toshiba	LTM10C273A	800 x 600 TFT	10.4" (BIOS 5082.HMC)
Toshiba	LTM12C275A	800 x 600 TFT	12.1" (BIOS 5082.HMC)
NEC	NL8060AC33-13	640 x 480 TFT	10.4" (BIOS 5081.HMC)
NEC	NL8060AC26-04	800 x 600 TFT	10.4" (BIOS 5082.HMC)
NEC	NL8060BC31-09	800 x 600 TFT	12.1" (BIOS 5082.HMC)
Hitachi	LMG9211XUCC	640 x 480 DSTN	9.4" (BIOS 5081/2.HMC)
Chunghwa	CLX-8102S-C3X	640 x 480 DSTN	9.4" (BIOS 5081/2.HMC)
Kyocera	KCB104VG2BA-A01640X480	DSTN	10.4" (BIOS 5081/2.HMC)

**Simultaneous VGA and LCD display**

Provide **on-board Keyboard and RS-232** connection to external 44-pin LVDS Connector. It is very useful for remote LCD display with touch screen and keyboard function through one cable connection.

**Flash Disk**: support M-Systems Disk On Chip®

**Operating Temperature**: 0-60°C

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## Installation

This chapter describes how to install the PLC-508. The layout of PLC-508 is shown on the next page and the Unpacking Precautions that you should be careful with are described on the following page. Also included is the jumpers and connectors description for this PLC-508. The default setting of PLC-508 is for TFT type LCD panel.

### Hardware Installation :

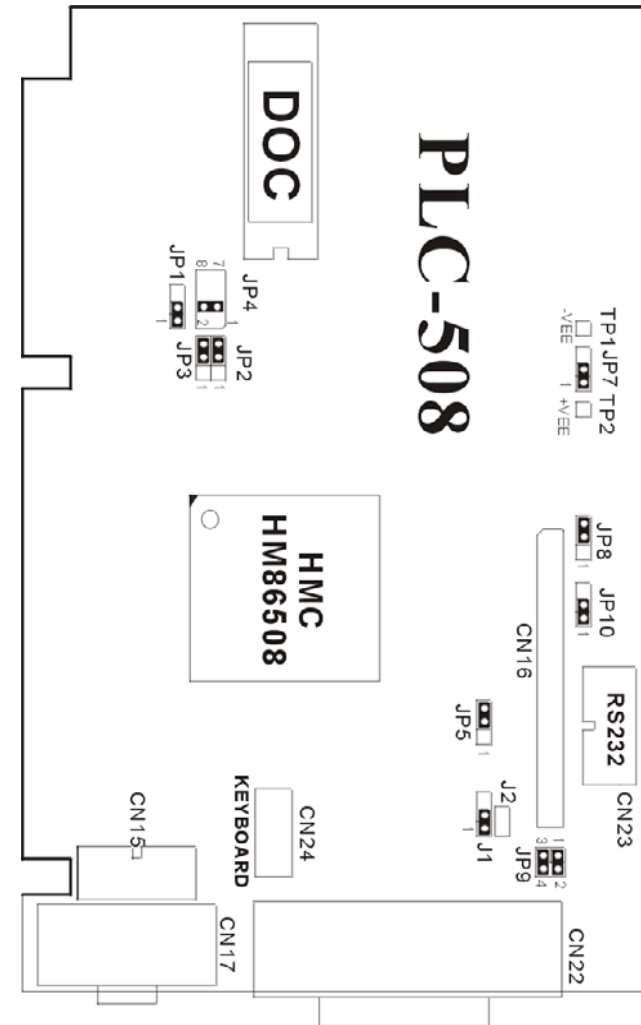
1. Please read the Unpacking Precautions first before you install the PLC-508 (see page 6).
2. Check the type of your LCD panel (TFT or DSTN) and select the type on J1, J2.
3. If your LCD panel is TFT type then skip JP7 and JP8 (default setting of JP8 is for TFT type LCD panel)
4. If your LCD panel is MONO or DSTN type, JP7 must be set according to the data sheet of the LCD panel (+VEE or – VEE) then adjust the output of VEE through R19 (Variable Resistor). **Caution:** don't make connection to your LCD panel while you adjust the output of VEE, it may damage your LCD panel. Measure the voltage with a voltage meter.
5. **Caution:** Don't set the JP8 to VEE if your LCD panel is TFT type. It will cause fatal damage to your LCD panel.
6. The next step is to set the LCD Voltage Setting. Please consult the data sheet of your LCD panel for correct voltage setting.
7. Select the correct BIOS type for your LCD panel on JP5.
8. Connect your LCD panel cable to CN16 (or to CN22 for LVDS) and CRT monitor to CN17 or CN15.

**Software (driver) Installation :**

If this is the first time you install Windows, please plug the PLC-508 into the ISA slot (in POWER OFF condition) then start to install the Windows. After the installation complete, press the  button > Settings > Control Panel. Select the *Display* Icon and then press *Settings* Menu and press the *Advanced* button. Press *Adapter* Menu and then press the *Change* button. Windows will go into *Update Device Driver Wizard*, press *Next* button and then check on: *Display a list of all the drivers in a specific location, so you can select the driver you want*. Then press *Have Disk* button and browse or select the correct driver from the diskette. Choose the HM86508 driver from the disk under the NT40, WIN31 or WIN95 directory, depending on the Windows version that you install.

For harddisk, which has been installed by another VGA driver before, to update the driver: under *Control Panel*, select *System* icon then press *Device Manager* Menu. *Remove* the old display adapters and then install the new driver using *Add New Hardware* wizard under the *Control Panel*. Consult the **Microsoft Windows User Manual** for the driver installation.

**2.1 PLC-508's Layout**



## 2.2 Unpacking Precautions

- ✓ Some components on PLC-508 are very sensitive to static electric charges and can be damaged by a sudden rush of power. Ground yourself to remove any static charge before touching your PLC-508. You can do it by using a grounded wrist strap at all times or by frequently touching any conducting materials that is connected to the ground.
- ✓ Disconnect power supply before handling and doing connection on PLC-508. Do not plug any connector or jumper while the power is on. It will cause fatal damage to your LCD panel.
- ✓ Make sure that every connector is connected in correct direction. Any incorrect connection may cause smoke or burn of electrical parts or fatal damage of your LCD panel.

## 2.3 JUMPER SETTING

### • JP1 JP2 JP3 JP4: Disk On Chip Memory Address

FUNCTION	JP1	JP2	JP3	JP4
CE000H	1-2	2-3	2-3	3-4
D6000H	1-2	2-3	2-3	5-6
DE000H	1-2	2-3	2-3	7-8

### • JP5 : SELECT BIOS

The Flash ROM used on PLC-508 is 64K Flash ROM. It is divided into two segment, 32K each, BIOS 1 and BIOS 2.

JP5	DESCRIPTION
1-2	BIOS 1
2-3	BIOS 2

**Note:** PLC-508 is equipped with one BIOS diskette which contains the following files:

File Name	BIOS 1	BIOS 2
5081.HMC	640 x 480 TFT	640 x 480 DSTN
5082.HMC	800 x 600 TFT	640 x 480 DSTN

PLC-508 is initially installed with 5081.HMC. The BIOS can be programmed or updated with the other \*.HMC files by using an EPROM programmer.

### • JP7 : VEE SELECTION (for LCD type DSTN/MONO)

FUNCTION	JP7
+VEE	1-2
-VEE	2-3

+VEE = +5V ~ +40V

-VEE = -0V ~ -40V

User must read the specification of the LCD panel to know the polarity and bias voltage of the LCD panel. The bias voltage can be set from R19.

• **JP8 : CN16 Pin7 VEE or FPVEE SELECTION**

FUNCTION	JP8
VEE	1-2
<b>FPVEE</b>	<b>2-3</b>

FPVEE = LCD control signal

VEE = +/- 40V output (adjustable through R19) for MONO or DSTN type of LCD panel.

**Caution:** don't set JP8 to VEE for TFT type of LCD panel, it will cause fatal damage!

• **JP9 : LCD VOLTAGE SETTING**

VOLTAGE	1-2, 3-4
3.3 V	OFF
<b>5.0 V</b>	<b>ON</b>

See the specification of the LCD panel to know the right voltage.

• **JP10 : CN22 Pin40 Inverter ON/OFF Control Signal**

PIN NO.	DESCRIPTION
1-2	FPVEE
2-3	ENBKL

• **J1 , J2 : TFT or DSTN SELECTION**

J1	DESCRIPTION
1-2	TFT
2-3	DSTN

J2	DESCRIPTION
OFF	TFT
ON	DSTN

**2.4 PLC-508'S CONNECTOR**

• **CN22: Dsub-44pin LVDS-LCD Connector (PLC-508L1 only)**

PIN NO	FUNCTION	PIN NO	FUNCTION
1	+12V	2	+12V
3	GND	4	GND
5	VCC	6	VCC
7	KBVCC	8	GND
9	SOUT	10	SIN
11	RTS	12	TX0-
13	TX0+	14	TX1-
15	TX1+	16	N/C
17	N/C	18	N/C
19	N/C	20	N/C
21	N/C	22	N/C
23	N/C	24	N/C
25	N/C	26	TX2-
27	TX2+	28	TXC-
29	TXC+	30	N/C
31	N/C	32	DSR
33	CTS	34	DTR
35	N/C	36	N/C
37	N/C	38	N/C
39	GND	40	FPVEE
41	KBDAT	42	KBCLK
43	TX3+	44	TX3-

• **CN17: DSub-15pin CRT Connector (connect to CRT Panel)**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	HS
5	VS	6	NC
7	NC	8	GND
9	GND	10	GND
11	NC	12	NC
13	NC	14	NC
15	NC		

• **CN15: 5X2 header CRT Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	6	NC
2	GREEN	7	NC
3	BLUE	8	GND
4	HS	9	GND
5	VS	10	GND

• **CN16: 22X2 header LCD Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+12V	2	+12V
3	GND	4	GND
5	VCC	6	VCC
7	FPVEE/VEE	8	GND
9	P0	10	P1
11	P2	12	P3
13	P4	14	P5
15	P6	16	P7
17	P8	18	P9
19	P10	20	P11
21	P12	22	P13
23	P14	24	P15
25	P16	26	P17
27	P18	28	P19
29	P20	30	P21
31	P22	32	P23
33	GND	34	GND
35	SHFCLK	36	FLM
37	M	38	LP
39	GND	40	ENBKL
41	GND	42	N/C
43	VCC	44	VCC

Note: \* pin 7 of CN16 can be set as FPVEE or VEE from JP8

\* the range of VEE is +5V ~ +40V and 0V ~ -40V,  
tunable from R19

• **CN24 : Keyboard Connector** (connect to CPU card)

PIN NO.	DESCRIPTION
1	KB-CLK
2	KB-DAT
3	N/C
4	GND
5	+5V

• **CN23 : 5X2 header RS-232 Connector** (connect to CPU card)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NC	6	DSR
2	SIN	7	RTS
3	SOUT	8	CTS
4	DTR	9	N/C
5	GND	10	N/C