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IPC Solution

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FB-1602 PC/104 VGA/LCD
Display Module User's Manual

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If you have problems or difficulties in using the system board, or setting up the relevant devices, and software that are not explained in this manual, please contact our service engineer for service, or send email to support@fabiatech.com.

Returning Your Board For Service & Technical Support

If your board requires servicing, contact the dealer from whom you purchased the product for service information. You can help assure efficient servicing of your product by following these guidelines:

❑ A list of your name, address, telephone, facsimile number, or email address where you may be reached during the day

❑ Description of you peripheral attachments

❑ Description of you software (operating system, version, application software, etc.) and BIOS configuration

❑ Description of the symptoms (Extract wording any message)

For updated BIOS, drivers, manuals, or product information, please visit us at www.fabiatech.com

Table of Content

Chapter 1 Introducing the FB1602 System Board

Overview

The FB1602 is a PC/104 VGA/LCD module. This user's manual provides information on the physical features and installation of the FB1602.

The FB1602 is supports CRT color monitor, STN, Dual-Scan, TFT, monochrome and color panels. It can be connected to create a compact video solution for the industrial environment. 512 K/1MB of RAM on-boarded allows a maximum CRT resolution of 1280X1024 and a LCD resolution of 640X480 with 64K colors.

For different VGA display modes, your monitor must possess certain characteristics for display the mode you want. There is the table to list the standard VGA display modes for the module and monitor information, which supports them.

| Model# (Hex)	Display Mode	Colors	Text Display	Font Size	Pixel Resolution	Dot Clock (MHz)	Horizontal Freq. (KHz)	Vertical Freq. (Hz)
0+, 1+	Text	16	40x25	9x16	360x400	50/28.322	31.5	70
0+, 1+	Text	16	40x25	8x14	320x350	56/25.175	31.5	70
0+, 1+	Text	16	40x25	8x8	320x200	56/25.175	31.5	70
2+, 3+	Text	16	80x25	9x16	720x400	56/28.322	31.5	70
2+, 3+	Text	16	80x25	8x14	640x350	56/25.175	31.5	70
2+, 3+	Text	16	80x25	8x8	640x200	56/25.175	31.5	70
4	Graphics	4	40x25	8x8	320x200	56/25.175	31.5	70
5	Graphics	4	40x25	8x8	320x350	56/25.175	31.5	70
6	Graphics	2	80x25	8x8	640x200	56/25.175	31.5	70
7+	Text	Mono	80x25	9x16	720x400	56/25.322	31.5	70
7+	Text	Mono	80x25	9x14	720x350	56/25.322	31.5	70
7+	Text	Mono	80x25	9x8	720x350	56/25.322	31.5	70
13	Graphics	256	40x25	8x8	320x200	56/25.175	31.5	70

Supported Video Modes – VGA Standard

Model # (Hex)	Display Mode	Colors	Text Display	Font Size	Pixel Resolution	Dot Clock (MHz)	Horizontal Freq. (KHz)	Vertical Freq. (Hz)
20	4 Bit Linear	16	80x30	8x16	640x480	56/25.175	31.5	60
22	4 Bit Linear	16	100x37	8x16	800x600	56/40.000	37.5	60
24	4 Bit Linear	16	128x48	8x16	1024x768	65/65.000	48.5	60
24I	4 Bit Linear	16	128x48	8x16	1024x768	65/44.900	35.5	43
30	8 Bit Linear	256	80x30	8x16	640x480	56/25.175	31.5	60
32	8 Bit Linear	256	100x37	8x16	800x600	56/40.000	37.5	60
34	8 Bit Linear	256	128x48	8x16	1024x768	65/65.000	48.5	60
34I	8 Bit Linear	256	128x48	8x16	1024x768	64/44.900	35.5	43
40	15 Bit Linear	32K	80x30	8x16	640x480	65/50.350	31.5	60
41	16 Bit Linear	64K	80x30	8x16	640x480	65/50.350	31.5	60
50	24 Bit Linear	16	80x30	8x16	640x480	65/65.000	27.1	51.6
60	Text	16	132x35	8x16	1056x400	65/40.000	30.5	68
61	Text	16	132x50	8x16	1056x400	65/40.000	30.5	68
71,75I						65/44.900	35.5	43
78	Packed Pixel	16	80x25	8x16	640x400	56/25.175	31.5	70
79	Packed Pixel	256	80x30	8x16	640x480	56/25.175	31.5	60

Note: The "I" in the mode #Column indicates "Interlaced"

Supported Video Modes – Extended Resolution

Layout
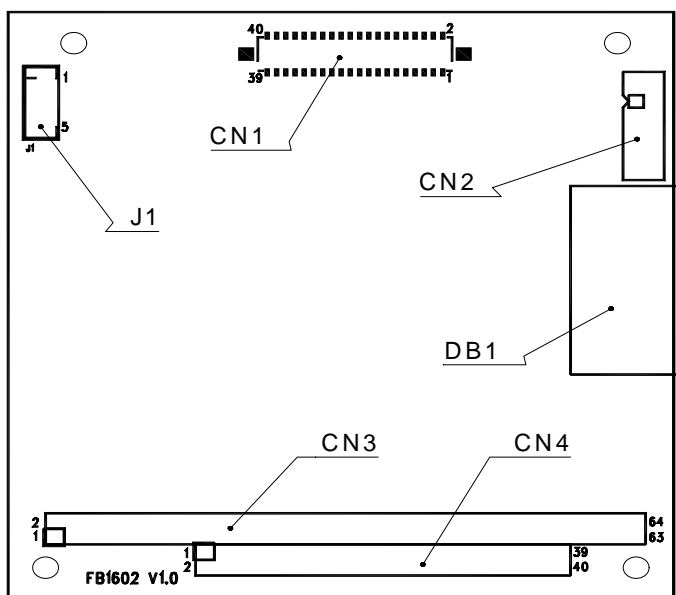
Specifications

- IBM-VGA hardware compatible

- Supports CRT color monitors and STN, TFT, Dual-Scan STN, monochrome and color panels.

- CRT resolution up to 1280x1024x16 colors.

- LCD resolution up to 640x480x64K colors.

- Chips and Technology F65545 Chipset.

- Simultaneous CRT and LCD operation.

- Operating temperature 0 degree C to 60 degree C

- Up to 95% Humidity non-condensing.

- Power Req.: +5v only 0.3A maximum.

- PC/104 form-factor (92x97mm/3.6"x3.8").

Packing List

Upon receiving the package, verify the following things. Should any of the mentioned happens, contact us for immediate service.

- Unpack and inspect the FB1602 package for possible damage that may occur during the delivery process.

- Verify the accessories in the package according to the packing list and see if there is anything missing or incorrect package is included.

- If the cable(s) you use to install the FB1602 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FB1602 system board.

> **Note:** after you install the FB1602, it is recommended that you keep the diskette or CD that contains drivers and document files, document copies, and unused cables in the cartoon for future use.

The following lists the accessories that may be included in your FB1602 package. Some accessories are optional items that are only shipped upon order.
- One FB1602 PC/104 VGA /LCD display board
- One compact disc containing manual file in PDF format and necessary   drivers and utilities

Chapter 2 Hardware Installation

This chapter introduces the FB1602 board connectors and then guides you to apply them for field application.

Before Installation

Before you install the PC/104 VGA/LCD board, make sure you follow the following descriptions.

1. Before removing the board from its anti-static bag, wear an anti-static strap to prevent the generation of Electricity Static Discharge (ESD). The ESD may be created from human body that touches the board. It may do damage to the board circuit.

2. Once you have installed the VGA card into the CPU's PC/104 bus, you can start connect internal cables. The internal cables are wire leads with plastic female connector that attached to the card's connectors. The VGA card's connectors have many numbers of pins and are the points of contact between the CPU card and other parts of the computer.

3. When you connect the LCD connectors, be careful with the pin orientations.

Hardware Features

The following lists the connectors and jumpers to install the FB1602.

| Item	Description
CN1	DF12 40–PIN LCD interface connector
CN2	10-pin header for VGA monitor
CN3	64 pin PC/104 connector bus A & B
CN4	40 pin PC/104 connector bus C & D
J1	5-pin external header for inverter board
DB1	CRT connector

CN1 & J1: LCD Connector and inverter board connector

CN1 is 24-bit LCD interface connector and J1 is for inverter board connector.

PIN	Signal
1	+12 V
2	GND
3	ENABLK
4	N.C
5	+5 V
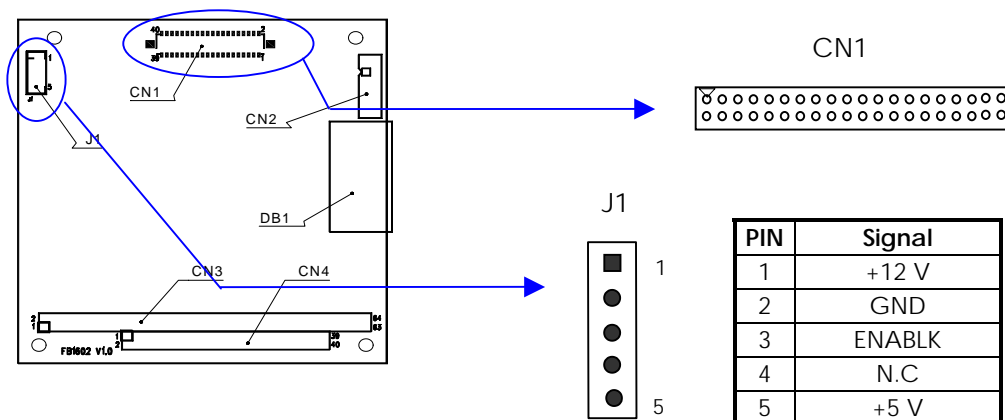
Pin	CN1	Pin	CN1
1	+5V	2	+5V
3	Ground	4	Ground
5	-	6	-
7	NC	8	Ground
9	FP0	10	FP1
11	FP2	12	FP3
13	FP4	14	FP5
15	FP6	16	FP7
17	FP8	18	FP9
19	FP10	20	FP11
21	FP12	22	FP13
23	FP14	24	FP15
25	FP16	26	FP17
27	FP18	28	FP19
29	FP20	30	FP21
31	FP22	32	FP23
33	Ground	34	Ground
35	SHFCLK	36	FP
37	DE	38	LP
39	ENABLK	40	ENAVEE

DB1& CN2: CRT connector

The CRT is use to a standard CRT connector (DB1).
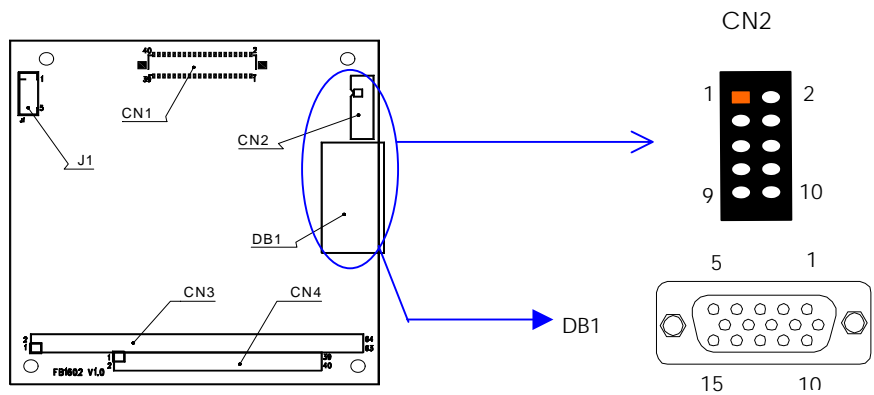
CN2

DB1

DB1	Signal	CN2	DB1	Signal	CN2
1	RED	1	6,7,8	Analog Ground	6
2	GREEN	3	13	HSYNC	9
3	BLUE	5	14	VSYNC	7
5,10	Digital Ground	4	Case	Case Ground	6

CN3, CN4: PC/104 Connector

Locate the PC/104 bus connector on the FB1602 VGA module and its counterpart on the CPU card or board.

CN3 – BUS A & B

CN4 – BUS C & D
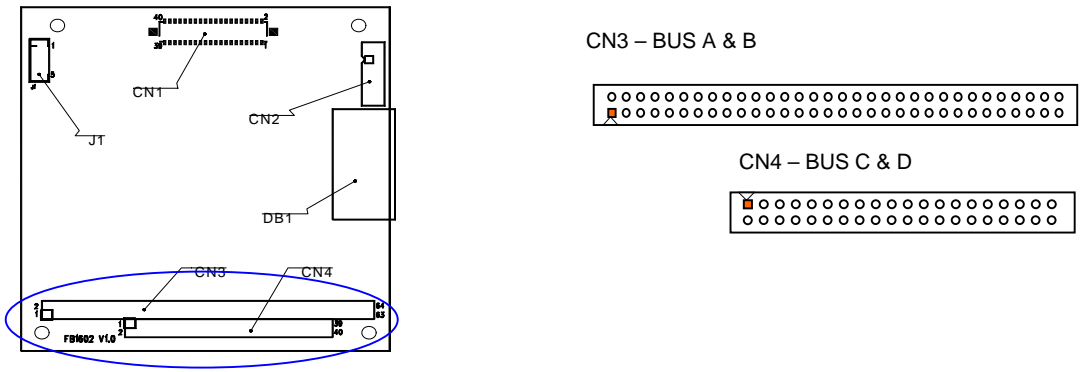
PC/104 A&B Pin

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	-IOCHK	A17	SA14	B1	Ground	B17	-DACK1
A2	SD7	A18	SA13	B2	RSTDRV	B18	DRQ1
A3	SD6	A19	SA12	B3	+5V	B19	-REFSH
A4	SD5	A20	SA11	B4	IRQ9	B20	BUSCLK
A5	SD4	A21	SA10	B5	-5V (*1)	B21	IRQ7
A6	SD3	A22	SA9	B6	DRQ2	B22	IRQ6
A7	SD2	A23	SA8	B7	-12V (*1)	B23	IRQ5
A8	SD1	A24	SA7	B8	-ZWS	B24	IRQ4
A9	SD0	A25	SA6	B9	+12V	B25	IRQ3
A10	IORDY	A26	SA5	B10	Key1	B26	-DACK2
A11	AEN	A27	SA4	B11	-MEMW	B27	TC
A12	SA19	A28	SA3	B12	-MEMR	B28	ALE
A13	SA18	A29	SA2	B13	-IOW	B29	+5V
A14	SA17	A30	SA1	B14	-IOR	B30	OSC
A15	SA16	A31	SA0	B15	-DACK3	B31	Ground
A16	SA15	A32	Ground	B16	DRQ3	B32	Ground

PC/104 C& D Pin

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
C1	GND	C11	MEMW#	D1	Ground	D11	-DACK#5
C2	SBHE	C12	SD8	D2	MEMCS16#	D12	DREQ5
C3	LA23	C13	SD9	D3	IOCS16#	D13	DACK#6
C4	LA22	C24	SD10	D4	IRQ10	D14	DREQ6
C5	LA21	C25	SD11	D5	IRQ11	D15	DACK#7
C6	LA20	C26	SD12	D6	IRQ12	D16	DREQ7
C7	LA19	C27	SD13	D7	IRQ15	D17	VCC
C8	LA18	C28	SD14	D8	IRQ14	D18	MASTER#
C9	LA17	C29	SD15	D9	DACK#0	D19	GND
C10	MEMR#	C20	KEY	D10	DREQ0	D20	GND

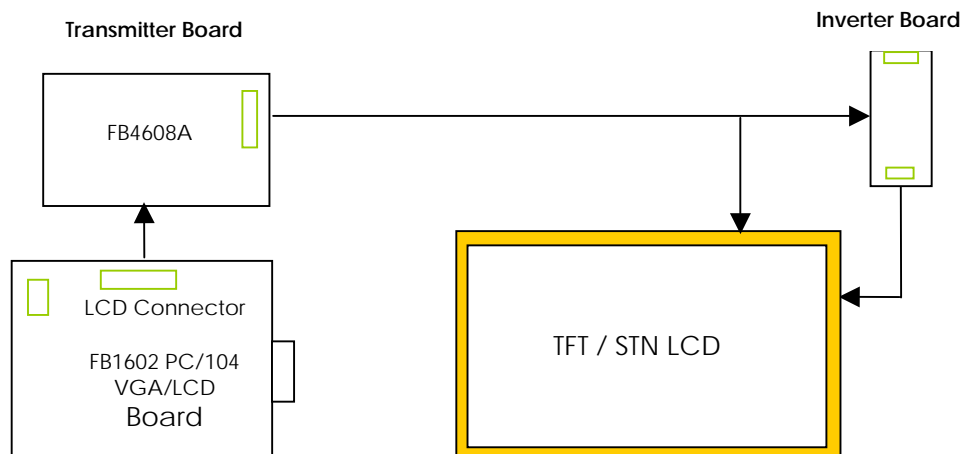# Chapter 2 Installing CRT and LCD Monitors

This chapter describes the configuration and installation procedure of LCD and CRT displays. Both CRT and LCD displays may be used at the same time. However, each type of LCD requires different BIOS. This section describes the configuration and   installation procedure using LCD display. Skip this section if you are using CRT monitor only.

- LCD Flat Panel Display
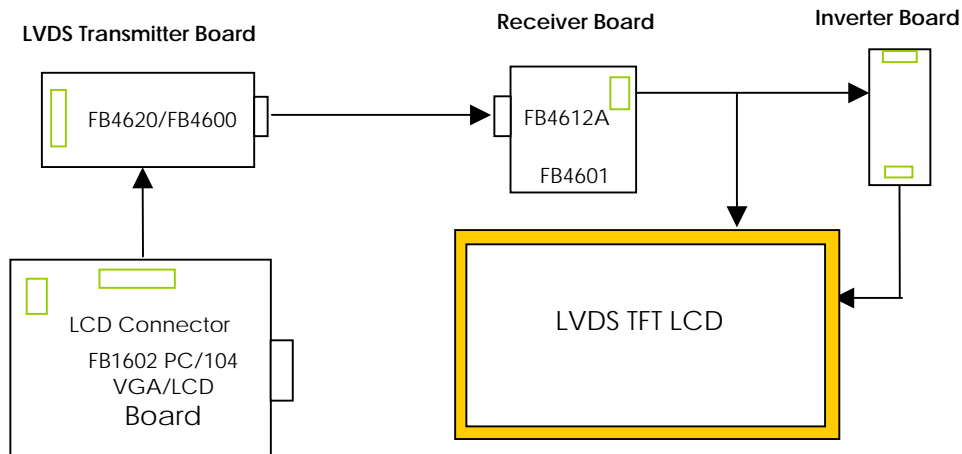- CRT & LCD Display

LCD FLAT PANEL DISPLAY

The BIOS default for NEC NL6448AC33-13 LCD panel. And then set your system properly and BIOS module for the right LCD panel you are using. Each model of LCD requires different BIOS in order to work properly.   If the BIOS you need is not on our website www.fabiatech.com, then you can contact fabia   send us a sample of the panel you will be using and we will send it back to you with the new BIOS.

The following shows the block diagram of using FB1602 for LCD display.

Transmitter Board

Inverter Board

FB4608A

LCD Connector

FB1602 PC/104
VGA/LCD
Board

TFT / STN LCD

LCD Panel Block Diagram

LVDS Link Diagram

The block diagram shows that FB1602 till needs components to be used with a LCD panel. The transfer board (FB4608A) provides the control for the brightness and the contrast of the LCD panel while inverter board is the one that supplies the high voltage to drive the LCD panel. The FB4608A, FB4600/01 and FB4620/21 are available from FabIATech with all the necessary cables.


NOTE: Be careful with the pin orientation when installing connectors and the cables. A wrong connection can easily destroy your LCD panel. The pin 1 of the cable connectors is indicated with a sticker and the pin1 of the ribbon cable usually has a different color.

CRT & LCD DISPLAY

The FB1602 supports a CRT colored monitor and a LCD. It can be connected to create a compact video solution for the industrial environment. 512KB /1MB(Optional) of RAM on-boarded allows a maximum CRT resolution of 1024X768 with 256 colors and a LCD resolution of 640X480 with 64K colors.
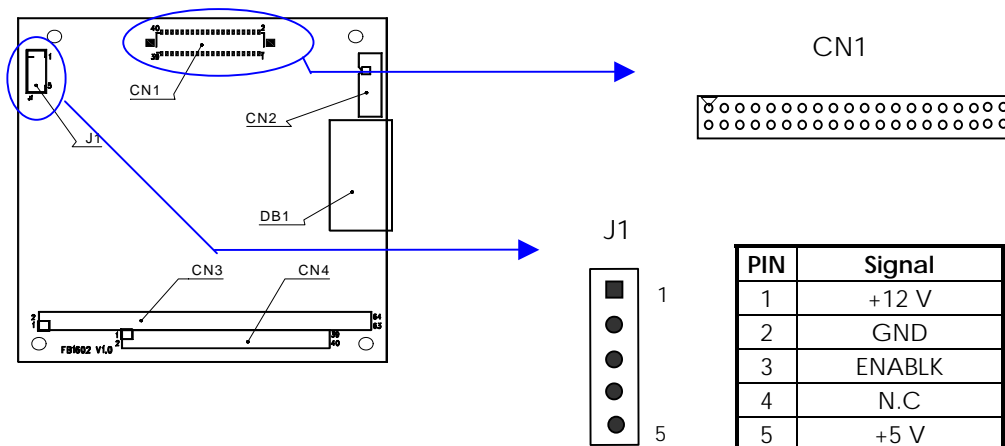
DB1: CRT connector

The CRT is use to a standard CRT connector (DB1).
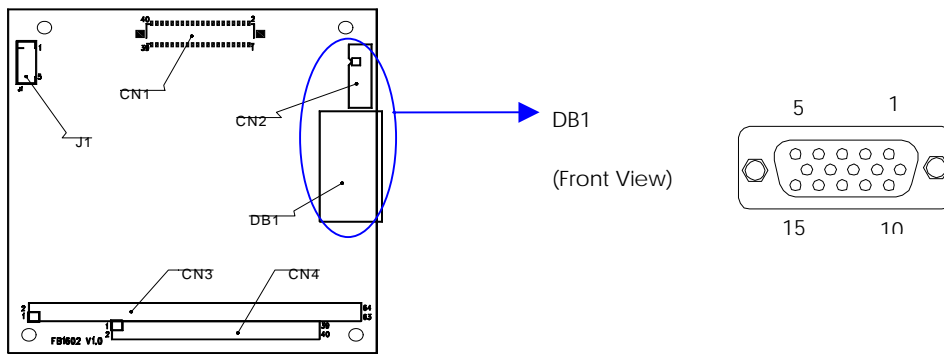
DB1	Signal	CN2	DB1	Signal	CN2
1	RED	1	6,7,8	Analog Ground	6
2	GREEN	3	13	HSYNC	9
3	BLUE	5	14	VSYNC	7
5,10	Digital Ground	4	Case	Case Ground	6

CN1 & J1: LCD Connector and inverter board connector

CN1 is 24-bit LCD interface connector and J1 is for inverter board connector.

CN1

J1

PIN	Signal
1	+12 V
2	GND
3	ENABLK
4	N.C
5	+5 V

Pin	CN2	Pin	CN2
1	+5V	2	+5V
3	Ground	4	Ground
5	-	6	-
7	NC	8	Ground
9	FP0	10	FP1
11	FP2	12	FP3
13	FP4	14	FP5
15	FP6	16	FP7
17	FP8	18	FP9
19	FP10	20	FP11
21	FP12	22	FP13
23	FP14	24	FP15
25	FP16	26	FP17
27	FP18	28	FP19
29	FP20	30	FP21
31	FP22	32	FP23
33	Ground	34	Ground
35	SHFCLK	36	FP
37	DE	38	LP
39	ENABLK	40	ENAVEE

Chapter 3 Driver and Utility

The FB1602 provides a CD ROM includes the manual files (a complete manual file) and the required utility files.

VGA Driver for Win 31

Step 1: To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>VGA>Ct65545>. If your system is not equipped with a CD ROM device, copy the VGA driver from the CD ROM to a 1.44″ diskette.

Step 2: Execute setup.exe file.

Step 3: The screen shows the chip type. Press any key to enter the main menu.

Step 4: There are some items for choice to setup. Please choose the <Windows Version 3.1> item notice the function key defined. Press [ENTER] selected the <All Resolutions>, when this line appears [*] symbol, which means this item is selected. Pressing [End] starts to install.

Step 5: The screen will show the dialog box, demanding the user to type the WIN31′s path. The default is C:\WINDOWS.

Step 6: As the setup is completed, the system will generate the message as follows.

Installation is done!

Change to your Windows directory and type SETUP to run the Windows Setup program. Choose one of the new drivers marked by an *. Please refer to the User′s Guide to complete the installation.

Step 7:   Press the [Esc] key to return to the main menu, and re-press the [Esc] key to return to the DOS mode.

Step 8:   In the WIN31, you can find the <Chips CPL> icon located in the {CONTROL PANEL} group.

Step 9:   Adjust the <Refresh Rate>, <Cursor Animation>, <Font size>, <Resolution>, and <Big Cursor>.

Utility Program

The utility allows you to select the display type from the following:

- CT.COM: CRT only
- FP.COM: LCD (Flat Panel) only
- SM.COM: Both CRT and LCD (Flat Panel)

Chapter 4 Technical Reference

This section outlines the errors that may occur when you operate the system, and also gives you the suggestions on solving the problems.

Topic include:

● Trouble Shooting for Error Beep Code

Trouble Shooting for Error Messages

The following information informs the error beep code and troubleshooting. Please adjust your systems according to the messages below. Make sure all the components and connectors are in proper position and firmly attached. If the errors still exist, please contact with your distributor for maintenance.

❑ **Error Beep Code**

There are three possible beep codes produced by the BIOS during POST listed below:

Beep Code	Error Condition
1 long followed by 2 short beeps	CMGA card failure
1 long followed by 3 short beeps	RAM test failure
1 long followed by 4 short beeps	DAC test failure
1 long followed by 8 short beeps	VGA initialized failure

❑ **Troubleshooting**

If you have problems after installation, check the following to determine the cause.

● Ensure that all cable are properly connected, all plugs are firmly seated in their sockets. Check to see if the VGA and LCD are firmly seated in its bus PC/104. Be sure it is not making contact with any other cards in the system.

● Ensure that the display monitor is properly connected to computer. Be sure the display monitor and your system's power supply is operating properly (i.e. FAN operates, system power light come on). Power OFF the computer system and all other connector devices before checking the following:

- Ensure that no other switch setting on the CPU card has been accidentally changed. Refer to the documentation provided with you computer to determine the corrector switch settings

- Ensure the LCD panel's VEE and BACKLIGHT voltage

If checking these items does not locate the problem, there may be a malfunction of the computer system, display monitor or the VGA and LCD board. Consult you computer dealer for assistance in locating the problem

Appendix

Dimension
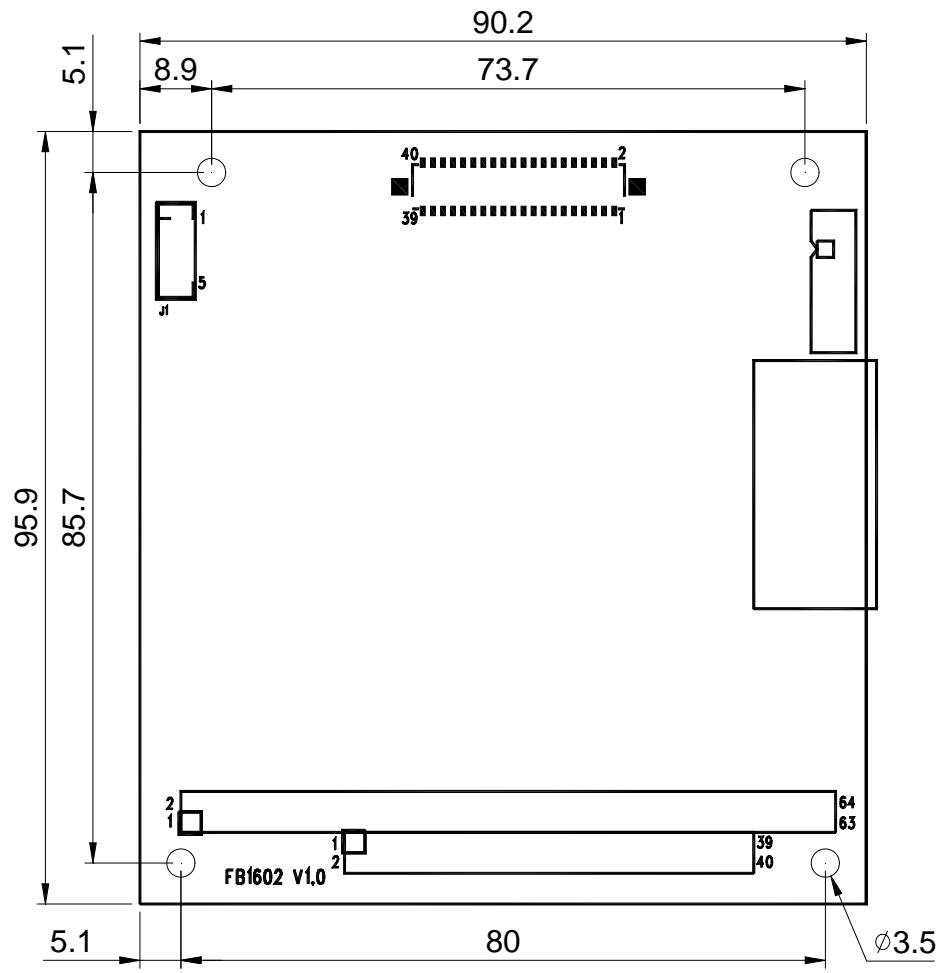
Unit: mm

SUPPORTED LCD PANEL

This VGA board can provide the total solution with inverter board for the following list of standard LCD panel using the PC/104 VGA module. Consult your FabIATech representative for new developments, when using other models of standard LCD panels in the market.

NO.	Manufacture	Model No.	Description
1	NEC	NL-6448AC30-10	TFT 9.4"
2	NEC	NL-6448AC32-10	TFT 10.2"
3	NEC	NL-6448AC33-10	TFT 10.4"
4	TOSHIBA	LTM10C209	TFT 10.4"