PC8106-2
Display Controller Card

The PC8106 display controller supports a wide variety of Flat Panel Displays ranging from 320x200 up to 640x480. Simple installation requires one 16 bit ISA bus slot.

Basic Features:

- *Monochrome Panels:Colors are converted to 64 gray shades.*
  Color Panels: Displays 4096 colors.
- *Hardware VGA compatible.*
- *Vertical centering.*
- *512K display memory.*
- *All display voltages generated onboard.*
- *Single or dual panel interface.*
- *Small size: 6.3" x 3.5"*
- *Low power: 180ma from 5 volt supply*

Ordering Information

Currently Apollo Display offers two versions of the PC8106 display controller, PC8106N-2 and PC8106P-2. The difference between the two display cards is that the PC8106N develops a **negative** voltage for LCD drive whereas the PC8106P-2 develops a **positive** voltage for LCD drive. The majority of the OPTREX displays requires a negative LCD voltage.

Board	*Display*	*Cable*	*Comments*
PC8106N-2-50174	DMF50174	CBL-50174/081	320x240 ¼ VGA Mono
PC8106N-2-50081	DMF50081	CBL-50174/081	320x240 ¼ VGA Mono
PC8106N-2-50840	DMF50840	ADP50840	320X240 ¼ VGA Mono
PC8106N-2-50531	DMF50531	CON-50531	320x240 ¼ VGA Mono
PC8106P-2-50944	DMF50944	ADP50944	320x240 ¼ VGA Color
PC8106N-2-651	DMF651	CBL-651/036	640x200 CGA Mono
PC8106N-2-50036	DMF50036	CBL-651/036	640x200 CGA Mono
PC8106N-2-50383	DMF50383	CBL-50260/383	640x480 Mini-VGA Mono
PC8106N-2-50260	DMF50260	CBL-50260/383	640x480 VGA Mono
PC8106P-2-50961	DMF50961	CBL-50961	640x480 VGA Mon
PC8106P-2-50766	DMF50766	CBL-50757	640x480 VGA Color
PC8106N-2-*	*	CBL-*	Display specified by
PC8106P-2-*	*	CBL-*	Customer

*** Display part number**

R-B127

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Installation ...

Configure the PC8106-2 for the display by setting the jumpers on J5 using the configuration chart below. Construct the cable to interface the LCD Module to the PC8106-2, the cable should not exceed 24 inches.

Turn off your computer and remove the cover. Locate one empty 16 bit slot, remove the protective rear plate. Insert the card pressing straight down with even pressure being sure the card is fully seated. Secure the PC8106-2 using the screw you removed when taking out the protective rear plate. Also at this time be sure that there is no other display card installed.

PC8106-2 Configuration

To configure the PC8106 for the type of panel you are using, install the appropriate jumpers.

Display Resolution	Display Mode		J5-5	4	3	2	1
Monochrome Displays							
320x240	Single	4	IN	IN	OUT	IN	OUT
OPTREX DMF50174, DMF50081, DMF50531							
320x256	Single	4	IN	OUT	OUT	IN	OUT
480x320	Dual	8	OUT	IN	IN	OUT	OUT
640x200	Single	4	IN	OUT	IN	OUT	OUT
Optrex DMF50036, DMF651, DMF50357							
640x400	Single	8	IN	IN	OUT	OUT	OUT
640x400	Dual	8	OUT	IN	OUT	OUT	OUT
640x480	Single	8	IN	OUT	OUT	OUT	OUT
640x480	Dual	8	OUT	OUT	OUT	OUT	OUT
OPTREX DMF50260, DMF50383, DMF50753, DMF50961							
Color Displays							
320x240	Single	8	IN	IN	IN	OUT	IN
OPTREX DMF50944							
640x480	Single	8	IN	OUT	OUT	OUT	IN
640x480	Dual	8	OUT	IN	OUT	OUT	IN
640x480	Single	16	IN	IN	OUT	OUT	IN
640x480	Dual	16	OUT	IN	OUT	OUT	IN
OPTREX DMF50414, DMF50757, DMF50766							

Bias voltage (VEE) ...

The PC8106-2 is available in two configurations, PC8106N and PC8106P. The differences are the PC8106N-2 generates a negative (-14 to -24)voltage, 0 to +3 volts for LCD bias. The PC8106P-2 generates a positive(24 to 35 volts) voltage for LCD bias. The 0 to +3 volts on the PC8106N-2 is for Kyocera displays only.

These voltages are factory set to a specific LCD module when the module is specified with the order. However, when this is not specified users must check their modules required bias voltage prior to use since these values do vary from model to model.

The bias voltage is switched on only when all the registers are set and the clock to the LCD is running. This protects the display from damage which could occur if this voltage were applied before the controller was initialized and running.

The negative bias voltage range is -14 to -24 volts controlled by R28 and the positive bias voltage range is +24 to +34 volts controlled by R23.

This potentiometer is adjusted for proper contrast on the display. If needed this potentiometer may be remoted off the board. To do this remove R23 or R28 depending on which version you have and connect the external potentiometer to connector J6 as follows:

PC8106P-2, 10K	PC8106N-2, 100K(R28) 5K(R23)
J6.1, CW	J6.2, CW
J6.3, Wiper	J6.4, Wiper
J6.5, CCW	J6.6, CCW

Pin 1 of J6 is identified with a square pad.

Display Interface ...

Connection to the display is made through a 34 position connector J1 located in the center right side of the board. A contrast potentiometer comes installed from the factory. This potentiometer may be located externally if desired.

J1-

Pin#			
1.	UD0	2.	UD1
3.	UD2	4.	UD3
5.	UD4	6.	UD5
7.	UD6	8.	UD7
9.	LD0	10.	LD1
11.	LD2	12.	LD3
13.	LD4	14.	LD5
15.	LD6	16.	LD7
17.	WF (M)	18.	LP
19.	XSCL (CP)	20.	YD (FLM)
21.	Polarizer	22.	+12 Volts
23.	XSCL2	24.	NC
25.	+5	26.	GROUND
27.	Disp off	28.	GROUND
29.	VEE SELECT +	30.	VEE
31.	VEE SELECT COMMON	32.	VEE
33.	VEE SELECT -	34.	GROUND

External contrast adjustment

Remove existing contrast pot and connect to:

PC8106P-2, 10K	PC8106N-2, 100K
J6.1, CW	J6.2, CW
J6.3, Wiper	J6.4, Wiper
J6.5, CCW	J6.6, CCW

Note:

Do not use the 5 volt or 12 volt pins for backlighting voltage. We suggest using a spare disk drive power connector or other source.

For displays requiring a positive contrast voltage, J1 pins 29 and 31 must be shorted together.

For displays requiring a negative contrast voltage, J1 pins 31 and 33 must be shorted together.

These jumpers help protect the display from the wrong voltage being applied if you were trying to use the wrong version display card.

Certain Kyocera displays require a +3 volt vee voltage. These displays will use the PC8106N-2 Rev E or higher. ***DO NOT*** use PC8106P or any earlier version of the PC8106N board. Contrast on these displays are adjusted with R23, 5K potentiometer.

Windows 3.1 Driver Installation ...

The Windows 3.1 driver is for CDS PC8106, VGA104 256 color driver board only. To check if you have a 256 color version the part number on the LCD controller should read: "***SPC8106FOC***".

To install driver:

1. Locate your original Windows 3.1 disks, you will need them to load the required fonts.

2. Go to your Windows subdirectory: "***CD WINDOWS***".

3. Run Windows setup program: "***SETUP***".

4. Select "***Display***" and press enter.

5. Scroll down to the end of the list and select:
   "***Other (Requires disk provided by hardware manufacturer)***".

6. Insert the driver disk and press enter.

7. Follow instructions to finish installation.

8. After the driver has loaded select "***Accept configuration shown above***" and press enter.

9. Follow the instructions, it will ask you to insert several of your original Windows 3.1 disks and close.

NOTES:

A. For color displays you must install this driver for the ***256 color mode***. If the 16 color mode is acceptable for your application you do not have to install this driver, select the Windows 3.1 standard VGA or VGA 3.0 driver.

B. For monochrome displays there is no need to load the 256 color driver. Select Windows 3.1 standard VGA or VGA 3.0 driver.

C. For Windows 95 applications please consult the sales office.

Display Interface Guide

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Monochrome Displays

OPTREX DMF50081
OPTREX DMF50174
320x240

Fitting controller: PC8106N-2
Cable: CBL-50174/081
Backlight Inverter: CXAL10L

```
DMF50081
DMF50174  1  2  3  4  5  6  7  8  9  10  11  12  13  14
          |  |  |  |  |  |  |  |  |  |   |   |   |
     J1-  20 18 19 17 32 25 26 30 1  2   3   4   25  NC
```

Jumper J1 pins 31 and 33
Note: On the DMF50174 pin 1 is located towards the center of the display board. Please refer to "CN2" markings on the PWB just below CN1.

OPTREX DMF50531
320x240

Fitting controller: PC8106N-2
Cable: CON-50531
Backlight Inverter: CXAL10L

```
DMF50531  1  2  3  4  5  6  7  8  9  10  11  12
          |  |  |  |  |  |  |  |  |  |   |   |
     J1-  32 30 4  3  2  1  25 26 25 18  19  20
```

Jumper J1 pins 31 and 33

OPTREX DMF50036
640x200

Fitting controller: PC8106N-2
Cable: CBL-651/036
Backlight Inverter: CXAM10L-L

```
DMF50036  1  2  3  4  5  6  7  8  9  10  11  12
          |  |  |  |  |  |  |  |  |  |   |   |
     J1-  20 18 19 17 32 25 26 30 1  2   3   4
```

Jumper J1 pins 31 and 33

OPTREX DMF50260, DMF50383
OPTREX DMF50753, DMF50961

640x480

Fitting controller: PC8106N-2
Cable: CBL-50260/383
Backlight Inverter: DMF50260, Elevam S-12562-6M
DMF50383 DMF50753, Elevam S-12562-5M

DMF50260	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
J1-	20	18	19	25	25	26	32	1	2	3	4	9	10	11	12

Jumper J1 pins 31 and 33

Color Displays

OPTREX DMF50268
320X240

Fitting controller: PC8106N-2
Cable: CBL-50268
Backlight Inverter: CXAM10L-L

DMF50268	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
J1-	20	18	19	17	32	25	26	30	1	2	3	4	5	6	7	8	25

Jumper J1 pins 31 and 33

OPTREX DMF50414
640x480

Fitting controller: PC8106P-2
Cable: CBL-50414
Backlight Inverter: Elevam S-12549

CN1-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
J1-	20	18	19	25	25	26	32	1	2	3	4	5	6	7	8

CN2-	1	2	3	4	5	6	7	8	9	10
	|	|	|	|	|	|	|	|	|	|
J1-	28	9	10	11	12	13	14	15	16	28

Jumper J1 pins 29 and 31

OPTREX DMF50757, DMF50766
640x480

Fitting controller: PC8106P-2
Cable: CBL-50757
Backlight Inverter: Elevam S-12565-6M

CN1-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
J1-	20	17	25	18	26	19	26	1	2	3	4	5	6	7	8

CN2-	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	|	|	|	|	|	|	|	|	|	|	|	|	|	|
J1-	9	10	11	12	13	14	15	16	25	28	28	32	32	32

Jumper J1 pins 29 and 31

Kyocera
KCB104VG-1BA-A01 KCB104VGB-2B-A01
640x480

Fitting controller: ***PC8106N-2*** **Rev: E or higher**
Cable:
Backlight Inverter:

CN1-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
J1-	20	NC	27	18	26	19	26	1	2	3	4	5	6	7	8

CN2-	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	|	|	|	|	|	|	|	|	|	|	|	|	|	|
J1-	9	10	11	12	13	14	15	16	25	28	28	32	32	32

Jumper J1 pins 29 and 31

Specifications subject to change without notice.

Specifications

W4444444444444444444444444444444444444444444444444444444444444444U
Board Size: 6.3"x3.2"
Operating temperature: 0 to +70° C
Interface: 16 Bit ISA Bus
Display Memory: 512K
Display Memory Address: A000H to BFFFH
Simultaneously display 256 colors from a palette 0f 4096 colors
64 gray shades by FRM and dithering
Vertical Centering
5 volt supply current: 175ma
12 volt supply current: PC8106P- 110ma, PC8106N- Not required
LCD drive voltages:
PC8106N: -15 to -24 volts, PC8106P: +25 to +34 volts

R-10/19/98