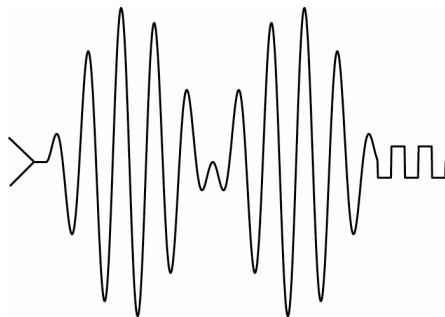


APPLICATION NOTE

Flat Panel Displays Supported by the CM110 and CM112



RTD Embedded Technologies, Inc.

"Accessing the Analog World"®

SWM- 640020006
Rev. A

APPLICATION NOTE

Flat Panel Displays Supported by the CM110 and CM112



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Introduction

The CM110 and CM112 video modules produced by RTD Embedded Technologies feature a flat panel interface. Support for a particular flat panel depends on the VGA BIOS and wiring scheme. This application note lists all flat panels that are known to work with the CM110/112.

The VGA BIOS files shipped with the CM110/112 support several common panels. Additional panels can be supported by modifying the VGA BIOS. The CM110/112 Companion CD (SWC-720010026) includes these BIOS files, the programming utility, and the tools to make a custom VGA BIOS.

If you have used a panel that is not on this list, and you have found that it works the CM110/112, please contact RTD so that it can be added to the list. Please provide the panel manufacturer, model number, the BIOS file (if applicable), wiring diagram, and bias voltage.

Common Flat Panels

The following displays are supported by the CM110 and CM112 with the included VGA BIOSes. Many similar panels will also work with the modules without BIOS changes. Connections for these panels are listed in the Chips and Technologies 65545 VGA controller datasheet. The datasheet can be downloaded from the Asilant Technologies web site (www.asilant.com).

Active Color (TFT)

- Hitachi TM26D50VC2AA 640x480
- Sharp LQ9D011 640x480
- Sharp LQ10D311 640x480
- Sharp LQ10DX01 1024x768
- Toshiba LTM-09C015-1 640x480

Passive Color (STN)

- Sanyo LM-CK53-22NEZ 640x480
- Sanyo LCM5327-24NAK 640x480
- Sanyo LCM5331-22NTK 640x480
- Sharp LM64C031 640x480
- Sharp LM64C08P 640x480
- Kyocera KCL6448 640x480
- Hitachi LMG9720XUFC 640x480
- Hitachi LMG9721XUFC 640x480
- Toshiba TLX-8062S-C3X 640x480
- Optrex DMF-50351NC-FW 640x480

Monochrome

- Epson EG-9005F-LS 640x480
- Epson ECM-A9071 1024x768

- Citizen G6481L-FF 640x480
- Sharp LM64P80 640x480
- Sanyo LCM-6494-24NTK 640x480
- Sanyo LCM-5491-24NAK 1024x768
- Hitachi LMG5364XUFC 640x480

Plasma

- Matsushita S804 640x480

Electroluminescent (EL)

- Sharp LJ64ZU50 640x480

Other Supported Panels

The following displays have been added to those already supported by the CM110 and CM112.

- Planar EL640.480-AA1 Multi-Color Electroluminescent (EL) panel, 10.4"
- Planar EL640.480-AF1 ICEBrite Electroluminescent (EL) panel, 6.4", dual scan, 4-bit
- Planar EL320.240.36 ICEBrite Electroluminescent (EL) panel, 5.6", 4 bit
- Sharp LQ9D021, LQ94D021 and LQ9P021, 640x480, Color 9-bit TFT
- Sharp LQ9D031, LQ9P031, LQ9D151, LQ9D161, LQ9D167, LQ10D131, LQ64D141, LQ64D142 and LQ64D167 640x480, Color 12-bit TFT
- Sharp LQ10D321, LQ10D361 and LQ64P311, 640x480, Color 18-bit TFT
- Sharp LQ10D341, LQ10D344, LQ10D345 and LQ10D346, 640x480, Color 18-bit TFT
- Sharp LQ10D367, 640x480, Color 18-bit TFT
- Sharp LM64P722, 640x480, Mono DD
- Optrex DMF50081, 320x200 Quarter VGA, Color
- Sharp LM64P70, 640x480, Mono

Wiring and BIOS Information for Supported Panels

The following pages provide wiring tables and BIOS information for the flat panels listed in the previous section. Some panels listed below require a custom VGA BIOS installed on the board. Custom VGA BIOS files can be found in the "VGA_BIOS_Custom" directory of the CM110/112 Companion CD (SWC-720010026).

Planar EL640.480-AA1

Manufacturer	Planar
Model	EL640.480-AA1
Type	Multi-Color (8 shades)
Technology	ICEBrite Electroluminescent (EL)
Resolution	640 x 480

Style	VGA, 10.4"
Scan	DS
Interface	4 bits
BIOS file	"EL640AA1.BIN"

Flat Panel Connections			CM110/112 Connections		
Signal	Pin		Pin	Signal	Comments
Vsync	24	<>	11	Vsync	-
Hsync	22	<>	10	Hsync	-
VCLK	18	<>	13	SHFCLK	-
_Blank	20	<>	8	Blank*/DE	See note.
VMODE	29	<>		GND	
VDD		<>		VDDSW	
GND	1,3,5,15,17,19,21	<>	6,9,12,14,31,40	GND	Grounds as needed.
D0	2	<>	19	PNL4	LSB
D1	4	<>	25	PNL10	-
D2	6	<>	30	PNL15	-
D3	8	<>	29	PNL14	MSB

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.
- Place JP7 so M signal is connected to Blank*/DE pin (position 1-2).
- EL640AA1.BIN is a custom VGA BIOS.

Planar EL640.480-AF1

Manufacturer	Planar
Model	EL640.480-AF1
Type	Monochrome
Technology	ICEBrite Electroluminescent (EL)
Resolution	640 x 480
Style	VGA, 6.4"
Scan	DS
Interface	4 bits
BIOS file	"ICEBRSM.BIN"

Flat Panel Connections			CM110/112 Connections		
Signal	Pin		Pin	Signal	Comments
S	13	<>	11	Vsync	-

CP1	11	<>	10	Hsync	-
CP2	9	<>	13	SHFCLK	-
VL	17, 18	<>	1	VDDSW	+5Vdc
GND	10,12,14,15,16	<>	6,9,12,14,31,40	GND	Grounds as needed.
VH	19, 20	<>		+12Vdc	
UD0	2	<>	18	PNL3	-
UD1	1	<>	17	PNL2	-
UD2	4	<>	16	PNL1	-
UD3	3	<>	15	PNL0	-
LD0	6	<>	22	PNL7	-
LD1	5	<>	21	PNL6	-
LD2	8	<>	20	PNL5	-
LD3	7	<>	19	PNL4	-

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.
- ICEBRSM.BIN is a custom VGA BIOS.

Planar EL320.240.36

Manufacturer	Planar
Model	EL320.240.36
Type	Monochrome
Technology	ICEBrite Electroluminescent (EL)
Resolution	320 x 240
Style	Quarter VGA, 5.6"
Scan	SS
Interface	4 bits
BIOS file	"ICEBRSM.BIN"

Flat Panel Connections			CM110/112 Connections		
Signal	Pin		Pin	Signal	Comments
VS	7	<>	11	Vsync	-
HS	9	<>	10	Hsync	-
VCLK	11	<>	13	SHFCLK	-
VL	5	<>	1	VDDSW	+5Vdc
VH	1,2	<>		+12Vdc	-
GND	6,8,10,12,14,16,18,20	<>	6,9,12,14,31,40	GND	Grounds as needed.
VID0	13	<>	18	PNL3	-

VID1	15	<>	17	PNL2	-
VID2	17	<>	16	PNL1	-
VID3	19	<>	15	PNL0	-
Self Test	3	<>		GND	Disables Self Test
TOUCH	4	<>		NC	Do not connect

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.
- ICEBRSM.BIN is a custom VGA BIOS.

Sharp LQ9D021, LQ94D021 and LQ9P021

Manufacturer	Sharp
Models	LQ9D021, LQ94D021 and LQ9P021
Type	Color
Technology	LCD-TFT
Resolution	640 x 480
Style	VGA
Scan	SS
Interface	9 bit
BIOS file	"18BTFT.DAT"

Flat Panel Connections			CM110/112 Connections		
Signal	Pin		Pin	Signal	Comments
FLM	4	<>	11	FLM	-
LP	6	<>	10	LP	-
SHFCLK	10	<>	13	SHFCLK	-
ENAB	28	<>	8	Blank*/DE	See note.
Vdd	22	<>	1	Vddsw	-
Vdd	24	<>	1	Vddsw	-
Vss	2	<>	6	GND	-
Vss	8	<>	9	GND	-
Vss	9	<>	12	GND	-
Vss	12	<>	14	GND	-
Vss	15	<>	31	GND	-
Vss	20	<>	40	GND	-
Vss	21	<>	6	GND	-
Vss	27	<>	9	GND	-
Vss	30	<>	12	GND	-

BLUE2	31	<>	19	PNL4	-
BLUE1	29	<>	18	PNL3	-
BLUE0	25	<>	17	PNL2	-
GREEN2	19	<>	27	PNL12	-
GREEN1	17	<>	26	PNL11	-
GREEN0	13	<>	25	PNL10	-
RED2	7	<>	36	PNL20	-
RED1	5	<>	35	PNL19	-
RED0	3	<>	34	PNL18	-
-	-	<>	-	-	-
Vdd	?	<>	2	Vbklsw	Vdd to backlight inverter
EN	?	<>	5	enabkl	Enable to backlight inverter

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.
- Place JP7 so M signal is connected to Blank*/DE pin (position 1-2).

Sharp LQ9D031, LQ9P031, LQ9D151, LQ9D161, LQ9D167, LQ10D131, LQ64D141, LQ64D142 and LQ64D167

Manufacturer	Sharp
Models	LQ9D031, LQ9P031, LQ9D151, LQ9D167, LQ10D131, LQ64D141, LQ64D142 and LQ64D167
Type	Color
Technology	LCD-TFT
Resolution	640 x 480
Style	VGA
Scan	SS
Interface	12 bit
BIOS file	"18BTFT.DAT"

Flat Panel Connections			CM110/112 Connections		
Signal	Pin		Pin	Signal	Comments
FLM	4	<>	11	FLM	-
LP	6	<>	10	LP	-
SHFCLK	10	<>	13	SHFCLK	-
ENAB	28	<>	8	Blank*/DE	See note.
Vdd	22	<>	1	Vddsw	-
Vdd	24	<>	1	Vddsw	-

Vss	2	<>	6	GND	-
Vss	8	<>	9	GND	-
Vss	9	<>	12	GND	-
Vss	12	<>	14	GND	-
Vss	15	<>	31	GND	-
Vss	20	<>	40	GND	-
Vss	21	<>	6	GND	-
Vss	27	<>	9	GND	-
Vss	30	<>	12	GND	-
BLUE3	31	<>	20	PNL5	-
BLUE2	29	<>	19	PNL4	-
BLUE1	25	<>	18	PNL3	-
BLUE0	23	<>	17	PNL2	-
GREEN3	19	<>	28	PNL13	-
GREEN2	17	<>	27	PNL12	-
GREEN1	13	<>	26	PNL11	-
GREEN0	11	<>	25	PNL10	-
RED3	7	<>	37	PNL21	-
RED2	5	<>	36	PNL20	-
RED1	3	<>	35	PNL19	-
RED0	1	<>	34	PNL18	-
-	-	<>	-	-	-
Vdd	?	<>	2	Vbklsw	Vdd to backlight inverter
EN	?	<>	5	enabkl	Enable to backlight inverter

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.
- Place JP7 so M signal is connected to Blank*/DE pin (position 1-2).

Sharp LQ10D321, LQ10D361 and LQ64P311

Manufacturer	Sharp
Model	LQ10D321, LQ10D361 and LQ64P311
Type	Color
Technology	LCD-TFT
Resolution	640 x 480
Style	VGA
Scan	SS
Interface	18 bits

BIOS file	"18BTFT.DAT"
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Flat Panel Connections			CM110/112 Connections		
Signal	Pin		Pin	Signal	Comments
Vsync	4	<>	11	FLM	-
Hsync	3	<>	10	LP	-
CK	2	<>	13	SHFCLK	-
ENAB	27	<>	8	Blank*/DE	See note.
Vdd	28	<>	1	Vddsw	-
Vdd	29	<>	1	Vddsw	-
Vss	1	<>	6	GND	-
Vss	5	<>	9	GND	-
Vss	12	<>	12	GND	-
Vss	19	<>	14	GND	-
Vss	26	<>	31	GND	-
BLUE5	25	<>	22	PNL7	-
BLUE4	24	<>	21	PNL6	-
BLUE3	23	<>	20	PNL5	-
BLUE2	22	<>	19	PNL4	-
BLUE1	21	<>	18	PNL3	-
BLUE0	20	<>	17	PNL2	-
GREEN5	18	<>	30	PNL15	-
GREEN4	17	<>	29	PNL14	-
GREEN3	16	<>	28	PNL13	-
GREEN2	15	<>	27	PNL12	-
GREEN1	14	<>	26	PNL11	-
GREEN0	13	<>	25	PNL10	-
RED5	11	<>	39	PNL23	-
RED4	10	<>	38	PNL22	-
RED3	9	<>	37	PNL21	-
RED2	8	<>	36	PNL20	-
RED1	7	<>	35	PNL19	-
RED0	6	<>	34	PNL18	-
TST	30	<>	-	No Connect	-
TST	31	<>	-	No Connect	-

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.

- Place JP7 so M signal is connected to Blank*/DE pin (position 1-2).

Sharp LQ10D341, LQ10D344, LQ10D345 and LQ10D346

Manufacturer	Sharp
Model	LQ10D341, LQ10D344, LQ10D345 and LQ10D346
Type	Color
Technology	LCD-TFT
Resolution	640 x 480
Style	VGA
Scan	SS
Interface	18 bits
BIOS file	"18BTFT.DAT"

Flat Panel Connections			CM110/112 Connections		
Signal	Pin		Pin	Signal	Comments
Vsync	4	<>	11	FLM	-
Hsync	3	<>	10	LP	-
CK	2	<>	13	SHFCLK	-
ENAB	27	<>	8	Blank*/DE	See note.
Vdd	28	<>	1	Vddsw	-
Vdd	29	<>	1	Vddsw	-
Vss	1	<>	6	GND	-
Vss	5	<>	9	GND	-
Vss	12	<>	12	GND	-
Vss	19	<>	14	GND	-
Vss	26	<>	31	GND	-
BLUE5	25	<>	22	PNL7	-
BLUE4	24	<>	21	PNL6	-
BLUE3	23	<>	20	PNL5	-
BLUE2	22	<>	19	PNL4	-
BLUE1	21	<>	18	PNL3	-
BLUE0	20	<>	17	PNL2	-
GREEN5	18	<>	30	PNL15	-
GREEN4	17	<>	29	PNL14	-
GREEN3	16	<>	28	PNL13	-
GREEN2	15	<>	27	PNL12	-
GREEN1	14	<>	26	PNL11	-
GREEN0	13	<>	25	PNL10	-

RED5	11	<>	39	PNL23	-
RED4	10	<>	38	PNL22	-
RED3	9	<>	37	PNL21	-
RED2	8	<>	36	PNL20	-
RED1	7	<>	35	PNL19	-
RED0	6	<>	34	PNL18	-
R/L	30	<>	-	??	-
U/P	31	<>	-	??	-

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.
- Place JP7 so M signal is connected to Blank*/DE pin (position 1-2).

Sharp LQ10D367

Manufacturer	Sharp
Model	LQ10D367
Type	Color
Technology	LCD-TFT
Resolution	640 x 480
Style	VGA, 10.4"
Scan	SS
Interface	18 bits
BIOS file	"18BTFT.DAT"

Flat Panel Connections			CM110/112 Connections		
Signal	Pin		Pin	Signal	Comments
Vsync	4	<>	11	FLM	-
Hsync	3	<>	10	LP	-
CK	2	<>	13	SHFCLK	-
ENAB	27	<>	8	Blank*/DE	See note.
Vdd	28	<>	1	Vddsw	-
Vdd	29	<>	1	Vddsw	-
Vss	1,5,12,19,26	<>	6	GND	Grounds as needed.
BLUE5	25	<>	22	PNL7	-
BLUE4	24	<>	21	PNL6	-
BLUE3	23	<>	20	PNL5	-
BLUE2	22	<>	19	PNL4	-
BLUE1	21	<>	18	PNL3	-

BLUE0	20	<>	17	PNL2	-
GREEN5	18	<>	30	PNL15	-
GREEN4	17	<>	29	PNL14	-
GREEN3	16	<>	28	PNL13	-
GREEN2	15	<>	27	PNL12	-
GREEN1	14	<>	26	PNL11	-
GREEN0	13	<>	25	PNL10	-
RED5	11	<>	39	PNL23	-
RED4	10	<>	38	PNL22	-
RED3	9	<>	37	PNL21	-
RED2	8	<>	36	PNL20	-
RED1	7	<>	35	PNL19	-
RED0	6	<>	34	PNL18	-

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.
- Place JP7 so M signal is connected to Blank*/DE pin (position 1-2).

Sharp LM64P722

Manufacturer	Sharp
Model	LM64P722
Type	Monochrome
Technology	LCD
Resolution	640 x 480
Style	VGA
Scan	DD
Interface	8 bits
BIOS file	"MONODDEX.DAT" or "MONODDNA.DAT"

Flat Panel Connections		CM110/112 Connections			
Signal	Pin		Pin	Signal	Comments
S	1	<>	11	FLM	-
CP1	2	<>	10	LP	-
CP2	3	<>	13	SHFCLK	-
Vdd	4	<>	1	Vddsw	-
Vss	5	<>	6	GND	
Vee	6	<>	4	Vee-	-
Vss	7	<>	9	GND	-

DU0	8	<>	18	PNL3	Data bits are in reverse order.
DU1	9	<>	17	PNL2	-
DU2	10	<>	16	PNL1	-
DU3	11	<>	15	PNL0	-
DL0	12	<>	22	PNL7	-
DL1	13	<>	21	PNL6	-
DL2	14	<>	20	PNL5	-
DL3	15	<>	19	PNL4	-

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.

Optrex DMF50081

Manufacturer	Optrex
Model	DMF 50081
Type	Monochrome
Technology	LCD
Resolution	320 x 240
Style	Quarter VGA
Scan	SS
Interface	4 bits
BIOS file	"DMF50081.bin"

Flat Panel Connections			CM110/112 Connections		
Signal	Pin		Pin	Signal	Comments
FLM	1	<>	11	FLM	-
LP	2	<>	10	LP	-
CP	3	<>	13	SHFCLK	-
M	4	<>	7	M	-
Vadj	5	<>	-	-	To wiper of 10k-20k pot between Vcc & Vee (see Optrex data). Try setting at -21.0V.
Vcc	6	<>	1	VDDsafe	-
Vss	7	<>	6	GND	-
Vee	8	<>	4	Vee(-)	Try setting at -22.0V.
D0	9	<>	18	P3	Data bits are in reverse order.
D1	10	<>	17	P2	-
D2	11	<>	16	P1	-

D3	12	<>	15	P0	-
Disp Off*	13	<>	-	-	Not used. Internal pullup.
14	-	<>	-	-	-

Notes:

- All pins of CM110/112 are on connector CN5 unless otherwise noted.
- Presently does not support simultaneous CRT/FP operation.
- DMF50081.BIN is a custom VGA BIOS.

Sharp LM64P70

Manufacturer	Sharp
Model	LM64P70
Type	Monochrome
Technology	LCD
Resolution	640 x 480
Style	VGA
Scan	DD
Interface	8 bits
BIOS file	"MONODDEX.DAT"

Notes:

- Use BIOS and wiring for LM64P80 shown in 65545 datasheet.

Latest Information

This list of supported flat panels is subject to change. RTD continually tests and improves its products. Please visit the RTD Embedded technologies web site (www.rtd.com) for the latest list of supported panels, board utilities, and VGA BIOS files.