PCM-3540T/R LVDS Transmitter/Receiver Module

Introduction

Traditional LCD configurations are limited in range from 30 to 50 cm. The PCM-3540T/R is an ingenious solution to extend the range of LCD panel monitors. By employing LVDS technology with transmitting and receiving units, LCDs can now be placed up to 12 m away from the computer. The cable connecting the transmitter to the receiver comes in various lengths: 2 m, 3 m, 5 m, 10 and 12 m.

Some of the advantages to using Advantech's PCM-3540T/R are: potential 12 m increase in range of your LCD display, Advantech's transmitter-cable-receiver combinations exceed CE and FCC Class A, EMI standards. Furthermore using the PCM-3540T with an Advantech CPU card/board, equipped with C&T65550 chips, now supports 36-bit XGA TFT LCD. Please refer to the Jumper Settings section for detailed information.

Notes: Advantech has tests show that the LCD signal can be transmitted up to 12 m successfully only if using the PCM-3540T, PCM-3540R and PCM-10354 (LVDS cable) combinations. For better image quality be sure the LCD is grounded firmly.

Specifications

- Standard PC/104 form factor for PCM-3540T
- Supports 18-bit, 24-bit, and 36-bit resolutions up to 1024 × 768 TFT LCD
- On-board 44-pin and 16-pin LCD interface
- Transmission distance options: 2 m, 3 m, 5 m, 10 m, 12 m
- On board 4-pin power supply connector for PCM-3540R
- Total power consumption for the PCM-3540T/R: 400 mA@+5V

Initial Inspection

In addition to this user's manual, your shipping box should contain the following items, please note that each package is sold separately:

For the PCM-3540T

- 1 PCM-3540T LVDS Transmitter Module
- 1 44-pin LCD Cable (from CPU card/board to PCM3540T)
- 1 PC/104 Support package

For the PCM-3540R

- 1 PCM-3540R LVDS Receiver Module
- 1 PC/104 Support Package

For the PCM-10354

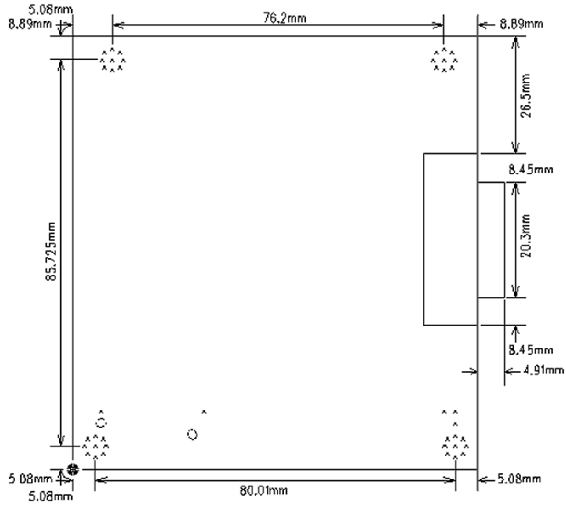
- 1 LVDS Cable
- No Manual

WARNING!

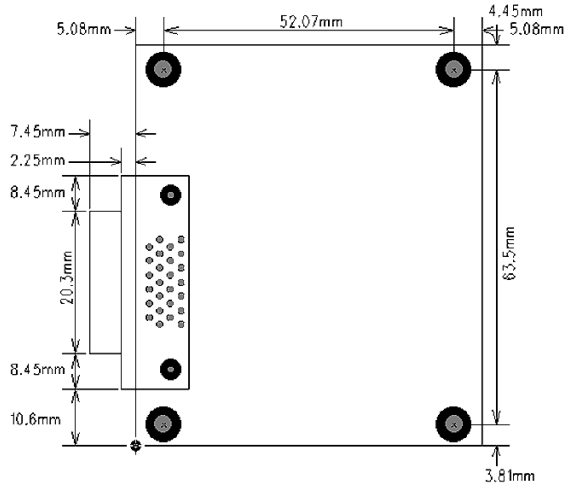
Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl, and styrofoam. The board should be handled only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors.

Part no. 2006354001 2nd Edition Printed in Taiwan October 1998

PCM-3540T Component Layout

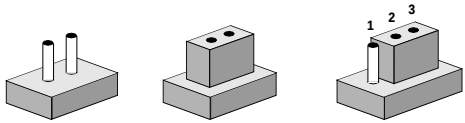


PCM-3540R Component



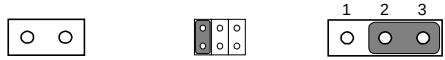
Setting Jumpers

You configure the board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip. To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



Open/Off Open/Off Open/Off

The ju mper settings are schematically depicted in this manual as follows:



Open/Off Open/Off Open/Off

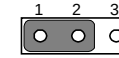
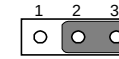
A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

Generally, you simply need a standard cable to make most connections.

PCM-3540T jumper settings

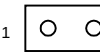
JP1: Reserved. For Lattice PLD programming only.
JP2: Power source setting: You can set the PCM-3540T power source form the PC/104 connector or the LCD cable by the following settings:

Jumper	Setting
JP2: Power from PC/104 connector	
JP2: Power from LCD cable*	

***default**

Input mode setting: JP3, pin1-2

Please check the LCD signal (18-bit, 24-bit, or 36-bit) form the CPU board first, then set the proper input mode by the following settings:

JP3, Pin 1-2	Setting
24/36-bit input	
18-bit input*	

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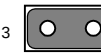
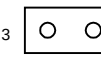
Output mode settings: JP3, pin 3-4

The output mode setting should be the same as the input mode setting. If you set the input mode as 18-bit, the output mode should be set at 18-bit. Advantech CPU board/cards equipped with C&T65550 chips, can be set with the output mode as 36-bit to support 36-bit TFT LCDs even if the input mode is set as 18-bit. However you may need to modify the CPU board/card BIOS. Please contact Advantech's customer service department to light your LCD panel if needed.

JP3, Pin 3-4	Setting
24/36-bit input	
18-bit input*	

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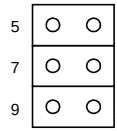
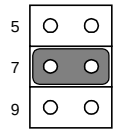
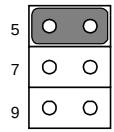
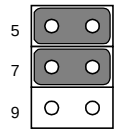
Panel type select: JP3, pin 5-10

To support STN LCD, you should provide the signal (25MHz clock) from the 102nd pin of the C&T65550 on the CPU card/board to the 42nd pin of the CN2 on the PCM-3540T. In the future, the LCD connector on most of Advantech's CPU cards/boards will provide this signal at the 42nd pin.

JP3, Pin 5-10	Setting
TFT LCD*	
Reserved	
Reserved (for STN)	
Reserved	

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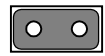
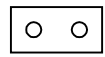
Cable power enable/disable: JP4

This function allows the PCM-3540T to provide power (+5V DC) to the PCM-3540R via the LVDS cable. If you set JP4 as "enable", you should also set JP1 on PCM-3540R as "Power from LVDS cable". It's not recommended to set JP4 as "enable" if the LVDS cable is equal to or longer that 5 meters.

JP4	Setting
Enable	
Disable*	

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Power source select: JP1

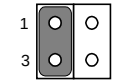
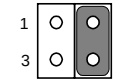
This function allows the PCM-3540R to get the power (+5V DC) from the PCM-3540T via the LVDS cable or an external power supply.

JP1	Setting
Power from LVDS cable	
Power from external power connector (CN1)*	

***default**

LCD voltage selection: JP2

To avoid damaging the LCD, check the LCD voltage carefully then set the LCD voltage with the following setting:

JP2	Setting
5V*	
3.3V	

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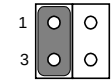
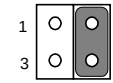
Panel type selection: JP3 Pin 1-4

Set the LCD type you will use by the following settings:

JP3	Setting
Reserved for STN LCD	
TFT LCD*	

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PCM-3540T/R LVDS Cable Connector Pin Assignments

PCM-3540T, CN1	Function	PCM-3540R, CN2
25	L1 -	15
26	L1 +	14
24	FG	16
13	L2 -	1
12	L2 +	2
23	FG	17
11	L3 -	3
10	L3 +	4
22	FG	18
9	L4 -	5
8	L4 +	6
21	FG	19
7	+ 5V	7
20	+ 5V	20
19	FG	21
5	L5 -	9
6	L5 +	8
18	FG	22
3	L6 -	11
4	L6 +	10
17	FG	23
1	L7 -	13
2	L7 +	12
16	FG	24
15	L8 -	25
14	L8 +	26

PCM-3540R external power connector pin assignments(CN1)

Pin No.	Function
1	+12 V
2	GND
3	GND
4	+5 V

PCM-3540T/R LCD Pin Assignments

The following pin assignments apply for 18-bit LCD signal input from the CPU board and 18-bit LCD signal output to the panel

Pin No.	PCM-3540T CN 2	PCM-3540T CN 4	PCM-3540R CN 3	PCM-3540R CN 6
1	12V	-	12V	-
2	12V	-	12V	-
3	GND	-	GND	-
4	GND	-	GND	-
5	VDDX(+5V)	-	VDDX(+5V)	-
6	VDDX(+5V)	-	VDDX(+5V)	-
7	VSAFE	-	VSAFE	-
8	GND	-	GND	-
9	-	-	-	-
10	-	-	-	-
11	B2	-	B2	-
12	B3	-	B3	-
13	B4	-	B4	-
14	B5	-	B5	-
15	B6	-	B6	-
16	B7	-	B7	-
17	-		-	
18	-		-	
19	G2		G2	
20	G3		G3	
21	G4		G4	
22	G5		G5	
23	G6		G6	
24	G7		G7	
25	-		-	
26	-		-	
27	R2		R2	
28	R3		R3	
29	R4		R4	
30	R5		R5	
31	R6		R6	
32	R7		R7	
33	GND		GND	
34	GND		GND	
35	SHFCLK		SHFCLK	
36	FLM		FLM	
37	ACDCLK/M		ACDCLK/M	
38	LP		LP	
39	GND		GND	
40	BNK-		BNK-	
41	GND		GND	
42	STN SHFCLK(25 MHz)		NC	
43	ENVDD		ENVDD	
44	VDDX		VDDX	

PCM-3540T/R LCD Pin Assignments

The following pin assignments apply for 36-bit LCD signal input from the CPU board and 36-bit LCD signal output to the panel

Pin No.	PCM-3540T CN 2	PCM-3540T CN 4	PCM-3540R CN 3	PCM-3540R CN 6
1	12V	VDDX(+5V)	12V	VDDX(+5V)
2	12V	VDDX(+5V)	12V	VDDX(+5V)
3	GND	FR0	GND	FR0
4	GND	FR1	GND	FR1
5	VDDX(+5V)	FR2	VDDX(+5V)	FR2
6	VDDX(+5V)	FR3	VDDX(+5V)	FR3
7	VSAFE	FR4	VSAFE	FR4
8	GND	FR5	GND	FR5
9	FB0	SR0	FB0	SR0
10	FB1	SR1	FB1	SR1
11	FB2	SR2	FB2	SR2
12	FB3	SR3	FB3	SR3
13	FB4	SR4	FB4	SR4
14	FB5	SR5	FB5	SR5
15	SB0	GND	SB0	GND
16	SB1	GND	SB1	GND
17	SB2		SB2	
18	SB3		SB3	
19	SB4		SB4	
20	SB5		SB5	
21	FG0		FG0	
22	FG1		FG1	
23	FG2		FG2	
24	FG3		FG3	
25	FG4		FG4	
26	FG5		FG5	
27	SG0		SG0	
28	SG1		SG1	
29	SG2		SG2	
30	SG3		SG3	
31	SG4		SG4	
32	SG5		SG5	
33	GND		GND	
34	GND		GND	
35	SHFCHK		SHFCHK	
36	FLM		FLM	
37	ACDCLK/M		ACDCLK/M	
38	LP		LP	
39	GND		GND	
40	BNK-		BNK-	
41	GND		GND	
42	STN SHFCLK(25 MHz)		NC	
43	ENVDD		ENVDD	
44	VDDX		VDDX	

PCM-3540T/R LCD Pin Assignments

The following pin assignments apply for 18-bit LCD signal input from the CPU board and 36-bit LCD signal output to the panel

Pin No.	PCM-3540T CN 2	PCM-3540T CN 4	PCM-3540R CN 3	PCM-3540R CN 6
1	12V	VDDX(+5V)	12V	VDDX(+5V)
2	12V	VDDX(+5V)	12V	VDDX(+5V)
3	GND	-	GND	FR0
4	GND	-	GND	FR1
5	VDDX(+5V)	-	VDDX(+5V)	FR2
6	VDDX(+5V)	-	VDDX(+5V)	FR3
7	VSAFE	-	VSAFE	FR4
8	GND	-	GND	FR5
9	-	-	FB0	SR0
10	-	-	FB1	SR1
11	B2	-	FB2	SR2
12	B3	-	FB3	SR3
13	B4	-	FB4	SR4
14	B5	-	FB5	SR5
15	B6	GND	SB0	GND
16	B7	GND	SB1	GND
17	-		SB2	
18	-		SB3	
19	G2		SB4	
20	G3		SB5	
21	G4		FG0	
22	G5		FG1	
23	G6		FG2	
24	G7		FG3	
25	-		FG4	
26	-		FG5	
27	R2		SG0	
28	R3		SG1	
29	R4		SG2	
30	R5		SG3	
31	R6		SG4	
32	R7		SG5	
33	GND		GND	
34	GND		GND	
35	SHFCLK		SHFCLK	
36	FLM		FLM	
37	ACDCLK/M		ACDCLK/M	
38	LP		LP	
39	GND		GND	
40	BNK-		BNK-	
41	GND		GND	
42	STN SHFCLK(25 MHz)		NC	
43	ENVDD		ENVDD	
44	VDDX		VDDX	

PCM-3540T/R LCD Pin Assignments

The following pin assignments apply for 24-bit LCD signal input from the CPU board and 24-bit LCD signal output to the panel

Pin No.	PCM-3540T CN 2	PCM-3540T CN 4	PCM-3540R CN 3	PCM-3540R CN 6
1	12V	-	12V	-
2	12V	-	12V	-
3	GND	-	GND	-
4	GND	-	GND	-
5	VDDX(+5V)	-	VDDX(+5V)	-
6	VDDX(+5V)	-	VDDX(+5V)	-
7	VSAFE	-	VSAFE	-
8	GND	-	GND	-
9	B0	-	B0	-
10	B1	-	B1	-
11	B2	-	B2	-
12	B3	-	B3	-
13	B4	-	B4	-
14	B5	-	B5	-
15	B6	-	B6	-
16	B7	-	B7	-
17	G0		G0	
18	G1		G1	
19	G2		G2	
20	G3		G3	
21	G4		G4	
22	G5		G5	
23	G6		G6	
24	G7		G7	
25	R0		R0	
26	R1		R1	
27	R2		R2	
28	R3		R3	
29	R4		R4	
30	R5		R5	
31	R6		R6	
32	R7		R7	
33	GND		GND	
34	GND		GND	
35	SHFCLK		SHFCLK	
36	FLM		FLM	
37	ACDCLK/M		ACDCLK/M	
38	LP		LP	
39	GND		GND	
40	BNK-		BNK-	
41	GND		GND	
42	STN SHFCLK(25 MHz)		NC	
43	ENVDD		ENVDD	
44	VDDX		VDDX	

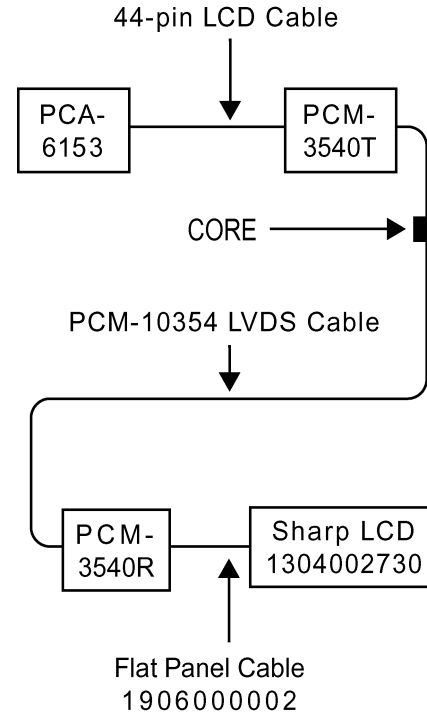
Appendix A

The following configuration is a real world example of Advantech's CPU cards/boards equipped with the C&T 65550 chipsets operating 36-bit XGA TFT LCD.

Advantech CPU boards/cards:
PCA-6153-02A2 Half size Pentium CPU card with 2 MB video RAM
LVDS module
Transmitter: PCM-3540T-00A1
Receiver: PCM-3540R-00A1
Cable (12 meter): PCM-10354-1200

Flat Panel Cable (from PCM-3540R to LCD):
FPC for Sharp LQ14X03E Rev.A101-1
(Item No.:1906000002)
LCD:
36-bit XGA TFT LCD, Sharp LQ14X03E
(Item No.:1304002730)

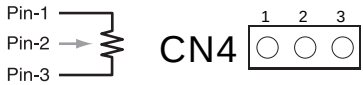
You may need to modify your CPU BIOS to operate the Sharp LQ14X03E LCD. Please contact Advantech's Customer Service Dept. for the modified BIOS.



Appendix B

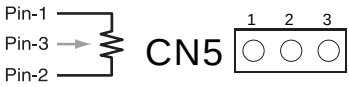
For STN panel contrast and back-light control, the PCM-3540R's CN4 and CN5 connectors must be used in conjunction with a Variable Resistor.

PCM-3540 Contrast Control (CN4):
A VR (Variable Resistor) is needed to contrast control. Please refer to the VR connection diagram below for details.



PCM-3540R Contrast control (CN4)	
Pin No.	Function
1	ZNVEE
2	Contrast ADJ (VSAFE)
3	GND

PCM-3540 Back-Light Control (CN5):
A VR (Variable Resistor) is needed to Back-Light control. Please refer to the VR connection diagram below for details.



PCM-3540R Back-Light control (CN5)	
Pin No.	Function
1	+12 V
2	GND
3	Back-Light ADJ (BNK)