COM Express

nanoX Starter Kit

Quick Start Guide



Manual Revision: 2.01
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Part Number: 50-1J032-1010

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Revision History

Revision	Date	Changes
2.00	2010/11/25	Initial Release
2.01	2012/07/11	Add support for Type 10 modules (PCB rev. A2)

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Preface

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Environmental Responsibility (RoHS & WEEE)

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Electrostatic Sensitive Device (ESD)



Always ground yourself to remove any static charge before touching the module or carrier board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not installed in a chassis.

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Conventions

Take note of the following conventions used throughout this manual to make sure that tasks and instructions are performed properly.



NOTE:

Additional information, aids, and tips that help perform specific tasks.



CAUTION:

Critical information that users MUST know and instructions that users MUST perform to complete a task.



WARNING:

Information to prevent physical injury, data loss, component damage, program corruption, etc. when trying to complete a specific task.

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1 Introduction

1.1 Overview

The nanoX Starter Kit is intended for testing and verification of COM Express systems based on Type 1 and Type 10 modules and complies with the PICMG® COM.0 R1.0 and R2.0 specification. It includes everything customers need to begin their own design and development.

The nanoX Starter Kit includes the nanoX-BASE standard ATX size COM Express reference carrier board, a Mini size COM Express module of your choice, and additional items such as cabling, power supply and thermal solution. The complete kit allows customers to quickly emulate the functionality of their end product for software development and hardware verification. Drivers, BSPs, design files (including schematics, mechanical drawings and BOM), certificates and test reports are included to assist customers in designing their own custom carrier board. The nanoX Starter Kit also includes additional development tools including a verified 10.1" LVDS flat panel display, an LVDS-to-TTL conversion board, and ADD2 DVI card.

1.2 How to order the nanoX Starter Kit



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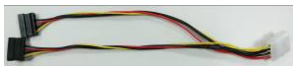
1.3 What's included in the nanoX Starter Kit?

Standard Items

No.	Photo	ADLINK P/N	Item Description
1		91-77102-0010	nanoX-BASE Reference Carrier Board
2		29-90100-F000	10.1” LVDS flat panel display (1024 x 600) HSD100IFW1-A00
3		91-79203-0010	Flat Panel Transfer Board for LVDS to TTL signal conversion
4		92-94046-0010	ADD2 DVI Adapter card (FI-CH7307)
5		29-024L0-0010.	USB flash drive
6		31-32210-1000	Power supply

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Standard Cabling

Photo	Part No.	Item Description
	30-20243-2000	LVDS panel cable
	30-20449-0000	FPTB LVDS-to-LVDS cable
	30-30012-0000	SDVO flat cable
	30-10057-5010	7P SATA cable
	30-20171-1000	4-pin Molex to 2x SATA Power cable
	30-01068-0000	USB 2.0 Type A to mini-B cable 2m
	30-10014-3000	LPT Flat cable IDC to DB25, L=215mm
	30-20027-3000	PSU converter cable for AT mode using ATX power supply (no 5Vsb)
	30-00001-0030	US Power Cord 10A,125V
	30-00002-0010	EU Power Cord 220V

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Optional Items

Type 1 Modules		
Photo	Part No.	Item Description
	91-72301-1030	**nanoX-ML-53-512(G)** Mini size COM Express Type 1 Module with Intel Atom Processor Z530 at 1.6GHz, 512 MB memory
	91-72301-1130	**nanoX-ML-53-512/4G(G)** Mini size COM Express Type 1 Module with Intel Atom Processor Z530 at 1.6GHz, 512 MB memory and 4 GB SSD
	91-72301-3130	**nanoX-ML-51-512/4G(G)** Mini size COM Express Type 1 Module with Intel Atom Processor Z510 at 1.1GHz, 512 MB memory and 4 GB SSD
	91-72301-4030	**nanoX-ML-53P-512/4G(G)** Mini size COM Express Type 1 Module with Intel Atom Processor Z530 at 1.6GHz, 512 MB memory, 4 GB SSD and 2 PCIe x1
	91-95041-1010	**THS-nML-B** Low profile heatsink for nanoX-ML with threaded standoffs
	91-95041-0010	**HTS-nML-B** Heatspreader for nanoX-ML with threaded standoffs

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Type 10 Modules		
Photo	Part No.	Item Description
	91-72302-2010	**nanoX-TC-E680-1G** Mini size COM Express Type 10 Module with Intel Atom Processor E680 processor at 1.6GHz and PCH EG20T
	91-72302-3010	**nanoX-TC-E660-1G** Mini size COM Express Type 10 Module with Intel Atom Processor E660 processor at 1.3GHz and PCH EG20T
	91-72302-6010	**nanoX-TC-E640-1G** Mini size COM Express Type 10 Module with Intel Atom Processor E640 processor at 1.1GHz and PCH EG20T
	91-72302-7010	**nanoX-TC-E620-1G** Mini size COM Express Type 10 Module with Intel Atom Processor E620 processor at 600 MHz and PCH EG20T
	91-95085-1010	**THS-nXTC-B** Multidirectional Heatsink for nanoX-TC with threaded standoffs for bottom mounting
	91-95085-0010	**HTS-nXTC-B** Heatspreader for nanoX-TC with threaded standoffs for bottom mounting
	91-95085-0210	**HTS-nXTC-BT** Heatspreader for nanoX-TC with threaded standoffs for top mounting

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2 Getting Started

2.1 Unpacking

Check that the EPE foam layers contain the items shown below:



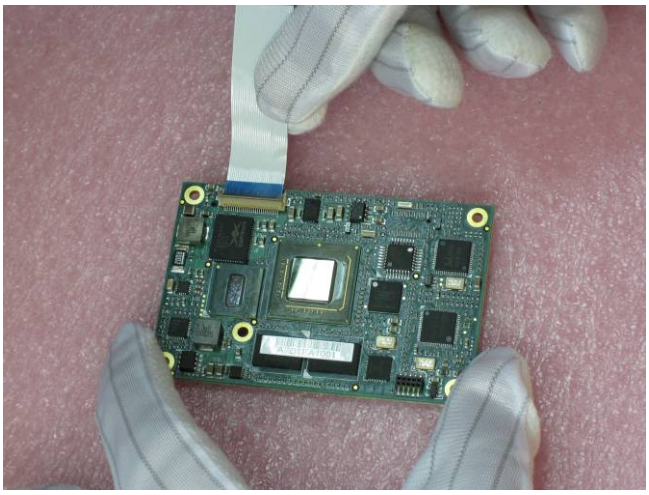
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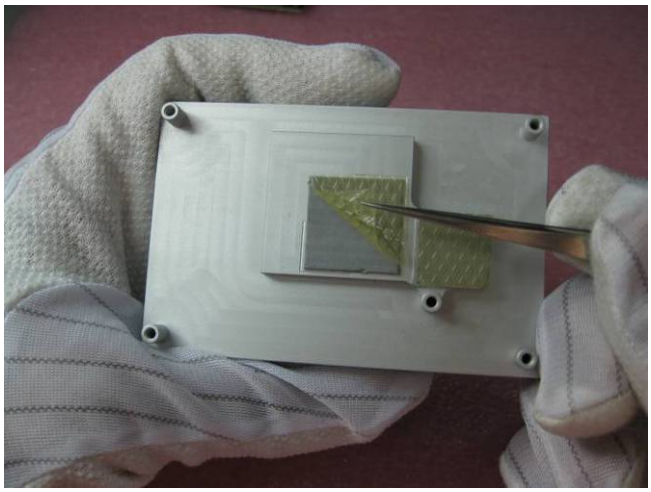
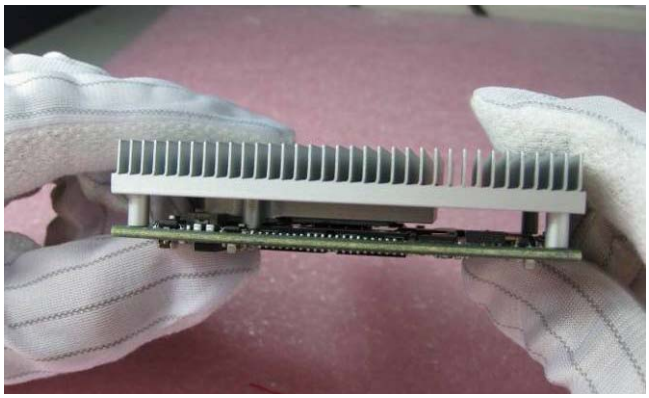
Remove the EPE foam layers and check accessory boxes contain the items below:

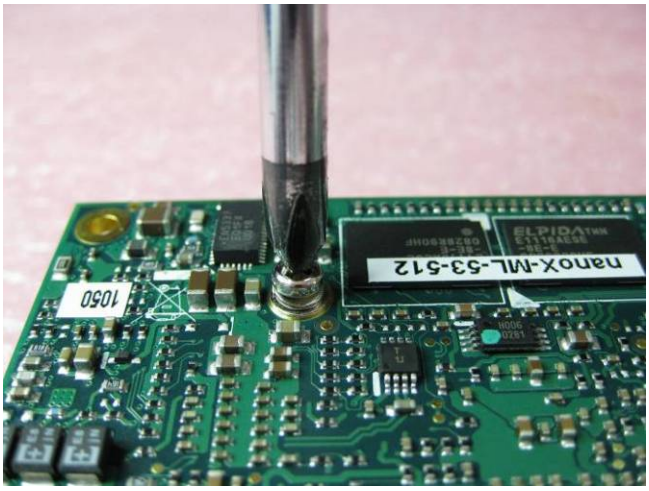
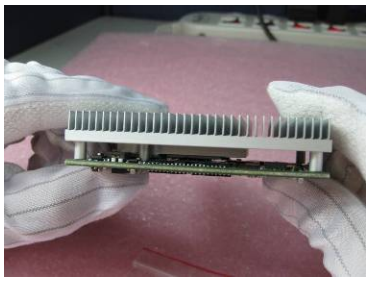


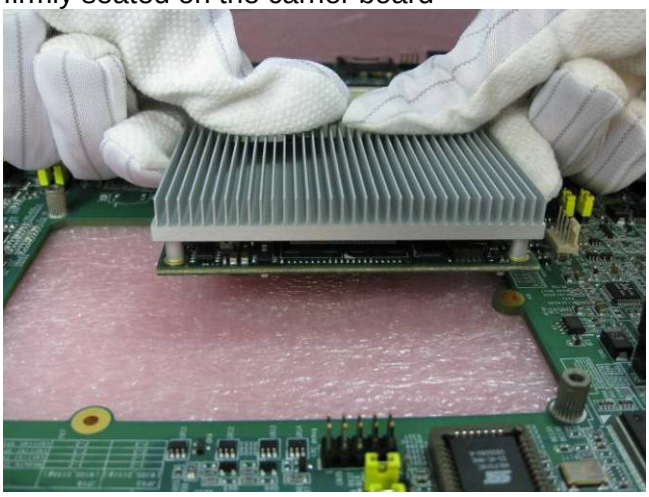
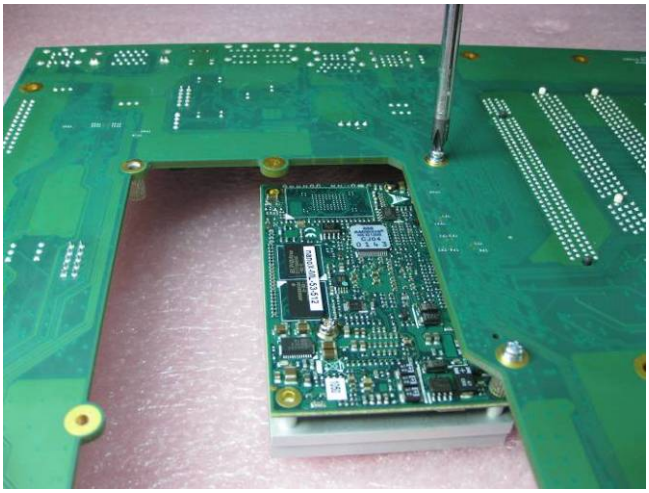
2.2 Type 1 Module Installation

If you intend to use a DVI monitor with the ADD2 DVI card, first install the SDVO flat cable onto the nanoX-ML module. Otherwise, skip ahead to Step 3.

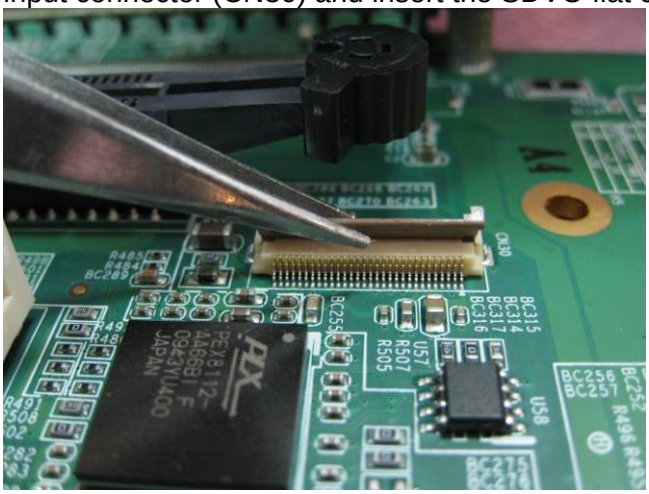
Install SDVO flat cable onto nanoX-ML (if required)	**Required items**
Step 1 Lift the locking mechanism on the nanoX-ML SDVO signal connector and insert the SDVO flat cable. 	 
Step 2 Press down on the lock on the SDVO connector to secure the flat cable. 	

Install heatsink onto nanoX-ML module	Required items
Step 3 Removed protective membranes from thermal pads 	
Step 4 Assemble heatsink onto nanoX-ML module  	 **or** 

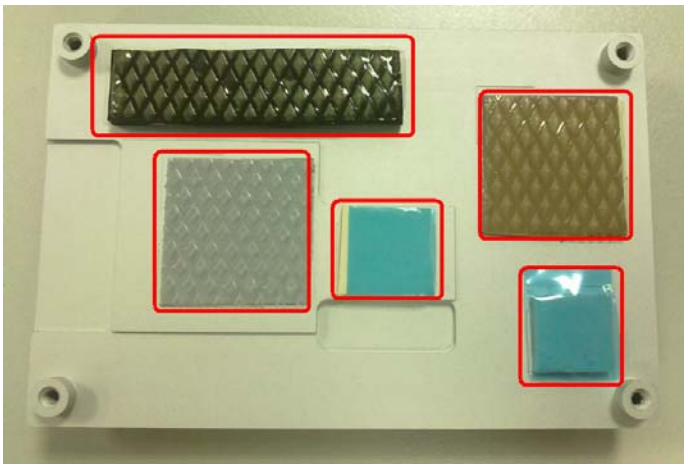
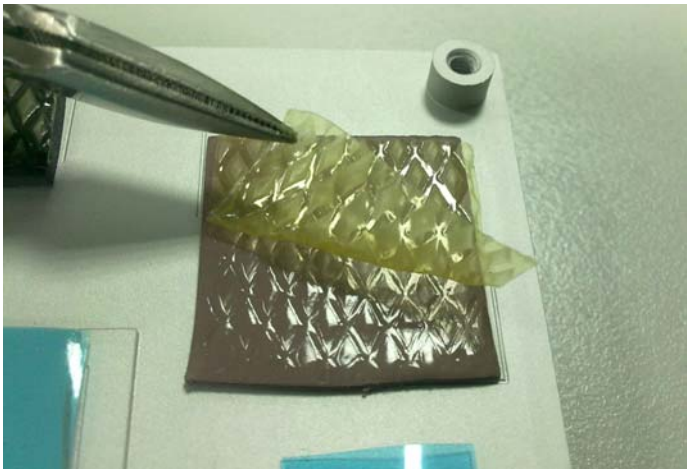
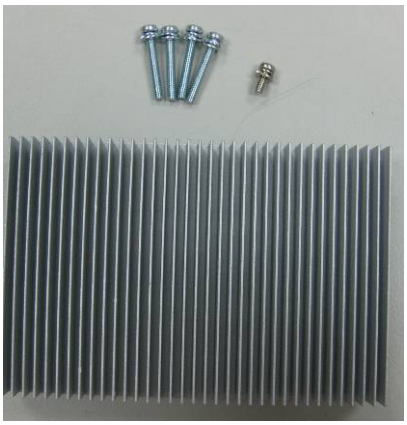
Install heatsink onto nanoX-ML module (cont'd)	**Required items**
Step 5 Use one M2.5, L:6mm screw provided to fasten the heatsink to the nanoX-ML module 	
Install nanoX-ML module onto carrier board	**Required items**
Step 6 Place the nanoX-ML module with heatsink onto the AB connector on the carrier board as shown  (continued below)	 

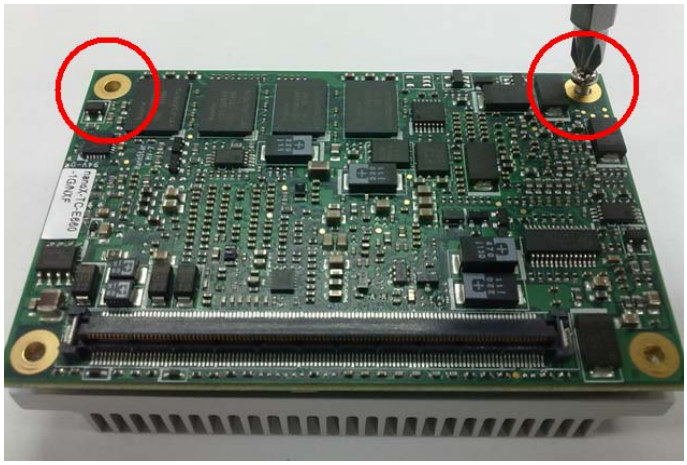
Install nanoX-ML module onto carrier board (cont'd)	**Required items**
Press down on the connector side of the module until it is firmly seated on the carrier board 	
Step 7 Use two M2.5, L:16mm screws provided to secure the nanoX-ML to the carrier board (2 extra screws are provided for use with a custom carrier board with 4 mounting standoffs) 	

If you are not using a DVI monitor with the ADD2 DVI card, skip ahead to **Section 2.4, DVI Display Interface Installation**.

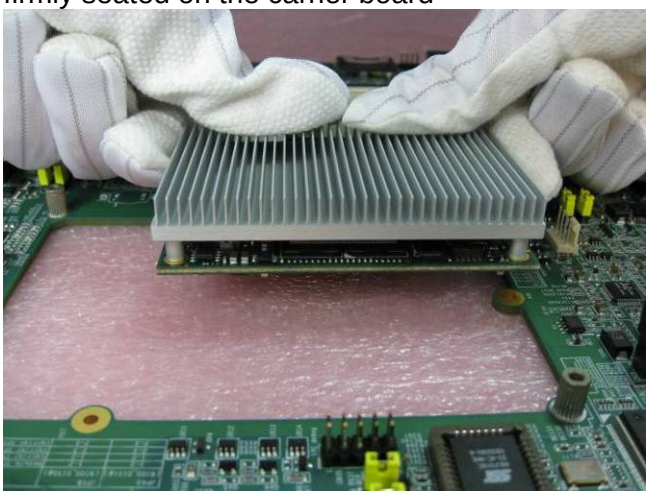
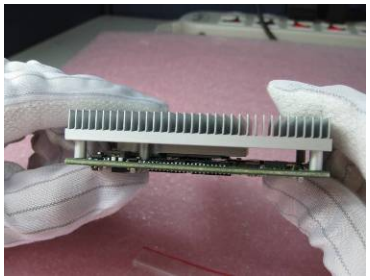
Install SDVO flat cable onto carrier board (if necessary)	**Required items**
Step 8 Lift the locking mechanism on the nanoX-BASE SDVO input connector (CN30) and insert the SDVO flat cable.  Insert the SDVO flat cable into nanoX-BASE SDVO input connector and press down on the locking mechanism 	

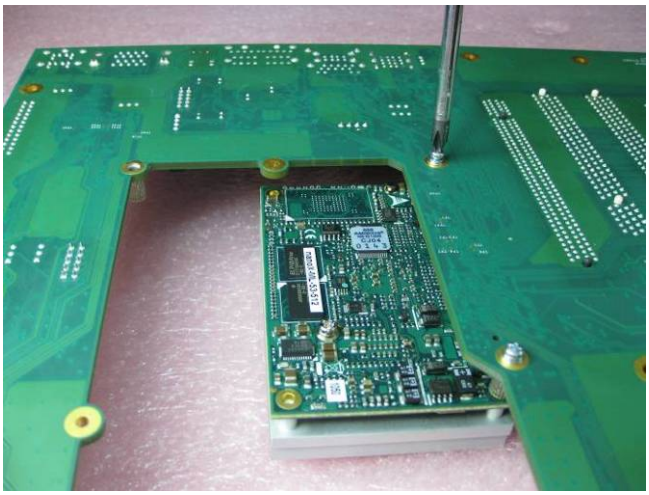
2.3 Type 10 Module Installation

Install heatsink onto nanoX-TC module	Required items
Step 1 Removed protective membranes from thermal pads  	

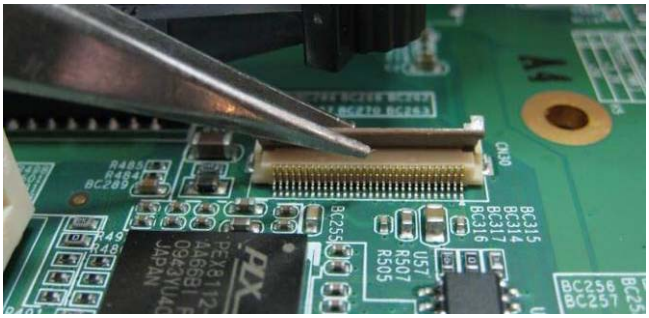
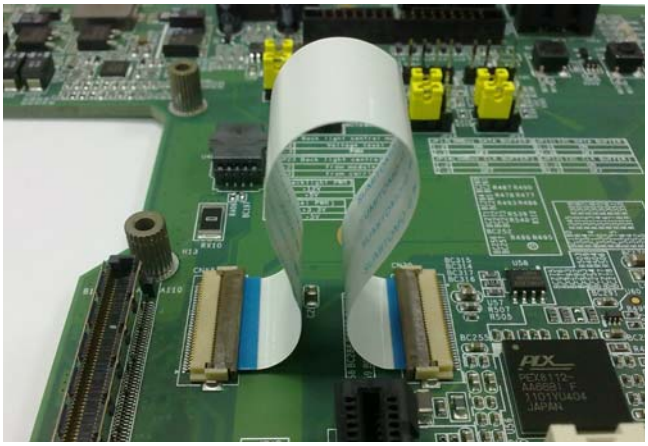
Install heatsink onto nanoX-TC module (con'td)	**Required items**
Step 2 Assemble heatsink onto nanoX-TC module  	 
Step 3 Use two M2.5, L:8mm screws provided to fasten the heatsink to the nanoX-TC module 	

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Install nanoX-TC module onto carrier board	Required items
Step 4 Place the nanoX-TC module with heatsink onto the AB connector on the carrier board as shown  Press down on the connector side of the module until it is firmly seated on the carrier board 	 

Install nanoX-TC module onto carrier board (cont'd)	**Required items**
Step 5 Use two M2.5, L:18mm screws provided to secure the nanoX-TC to the carrier board (2 extra screws are provided for use with a custom carrier board with 4 mounting standoffs) 	

If you not using a DVI monitor with the ADD2 DVI card, skip ahead to **Section 2.5, LVDS Output using HannStar Flat Panel Display**.

Install SDVO flat cable onto carrier board (if required)	**Required items**
Step 6 Lift the locking mechanism on the nanoX-BASE SDVO input connector (CN30) and insert the SDVO flat cable.  Insert the SDVO flat cable into nanoX-BASE SDVO input connector and press down on the locking mechanism Repeat for the SDVO output connector (CNX5). 	 

2.4 DVI Display Interface Installation

DVI Display using ADD2 DVI Adapter Card

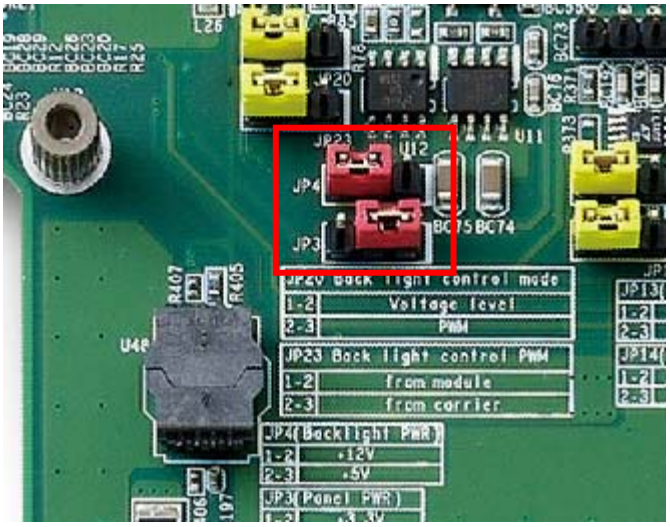
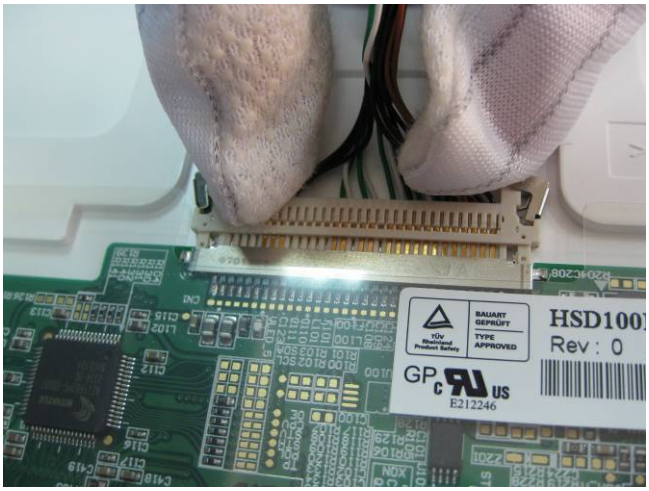
If you intend to use a DVI monitor with the ADD2 DVI Adapter Card, be sure to first install the SDVO flat cable as described above.

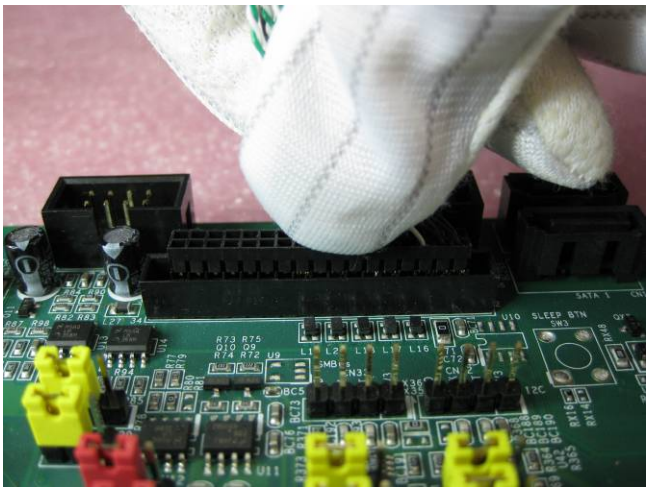
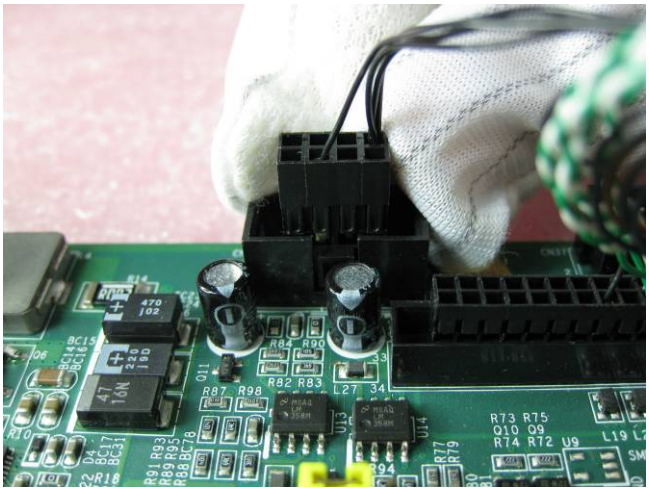
Install ADD2 DVI Adapter Card	Required items
Step 1 Plug the ADD2 DVI Adapter Card into the SDVO slot 	
Step 2 Plug the DVI display connector into the ADD2 DVI Adapter Card 	

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2.5 LVDS Output using HannStar Flat Panel Display

To use the HannStar 10.1” LVDS flat panel display included with the nanoX-BASE Starter Kit, follow the instructions below.

Install Flat Panel Display	Required items
Step 1 Set the nanoX-BASE **Panel Power Jumper** (JP3) is set to *+3.3V* (short 1-2) and the **Backlight Power Jumper** (JP4) is set to *+5V* (short 2-3) as shown below 	
Step 2 Connect the JAE FI-Series end of the LVDS panel cable (P/N: 30-20243-2000) to the LVDS flat panel display as shown 	  

Install Flat Panel Display (cont'd)	**Required items**
Step 3 Connect the 34-pin female box header of the LVDS panel cable to CN6 of the nanoX-BASE (LVDS Output Connector) 	 
Step 9 Connect the 8-pin female box header of the LVDS panel cable to CN7 of the nanoX-BASE (Backlight Control Connector) 	

Using the Flat Panel Transfer Board

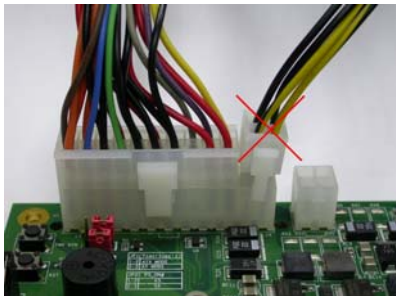
Included with the nanoX Starter Kit is the Flat Panel Transfer Board (FPTB) which is intended for prototyping and verification of LVDS and TTL flat panel displays with COM Express systems. The FPTB is equipped with an LVDS-to-TTL converter to allow users to implement TTL displays with COM Express systems that support LVDS only. Onboard PWM circuitry supports backlight control for LVDS and TTL displays.

For detailed instructions on how to connect a TTL flat panel display to the nanoX-BASE using the FPTB, see Chapter 3 on page 33.

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2.6 Power and I/O Connections

Connect the Power Supply	Required items
Plug the ATX connector of the power supply into CN1 of the nanoX-BASE  Plug the ATX 12V 4-pin connector of the power supply into the nanoX-BASE 	



CAUTION:

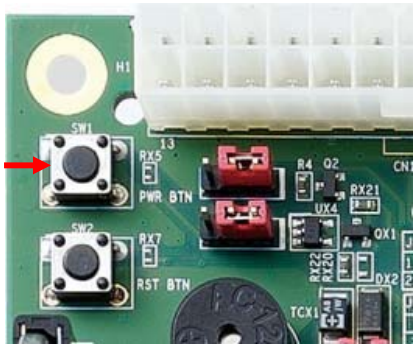
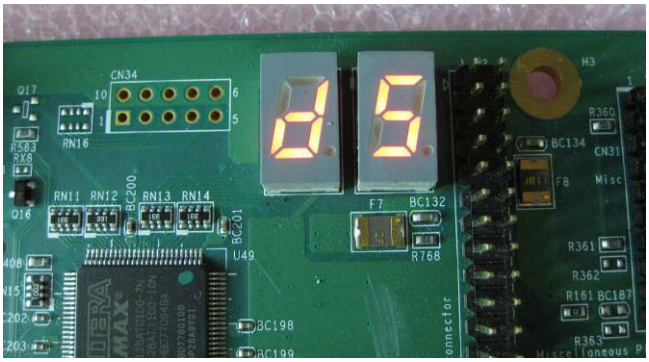
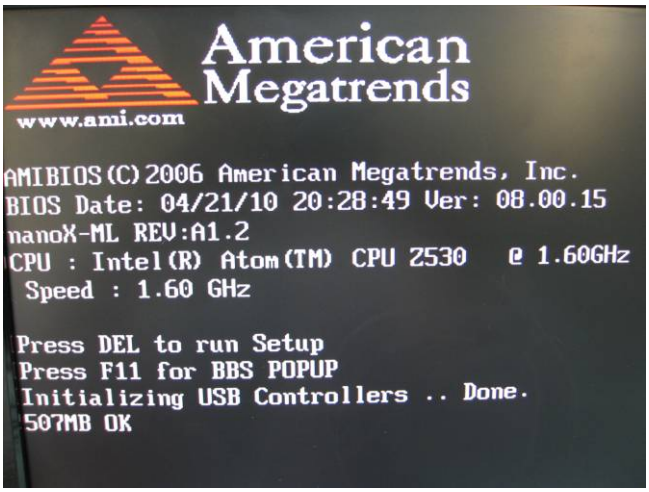
DO NOT plug the ATX 12V 4-pin connector of the power supply into the ATX 24-pin power connector on the nanoX-BASE

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Connect the Power Supply (cont'd)	**Required items**
Plug power cord into the power supply 	
Connect the Keyboard and Mouse	
Plug keyboard and mouse connector into nanoX-BASE 	

2.7 Powering Up the nanoX-BASE System

To power up the nanoX-BASE system, follow the steps below.

Powering Up the nanoX-BASE System	Required items
Press the Power Button SW1.  The POST LEDs on the nanoX-BASE will display the bootup status – "d5" indicates a successful boot  The monitor will display the BIOS boot screen  	

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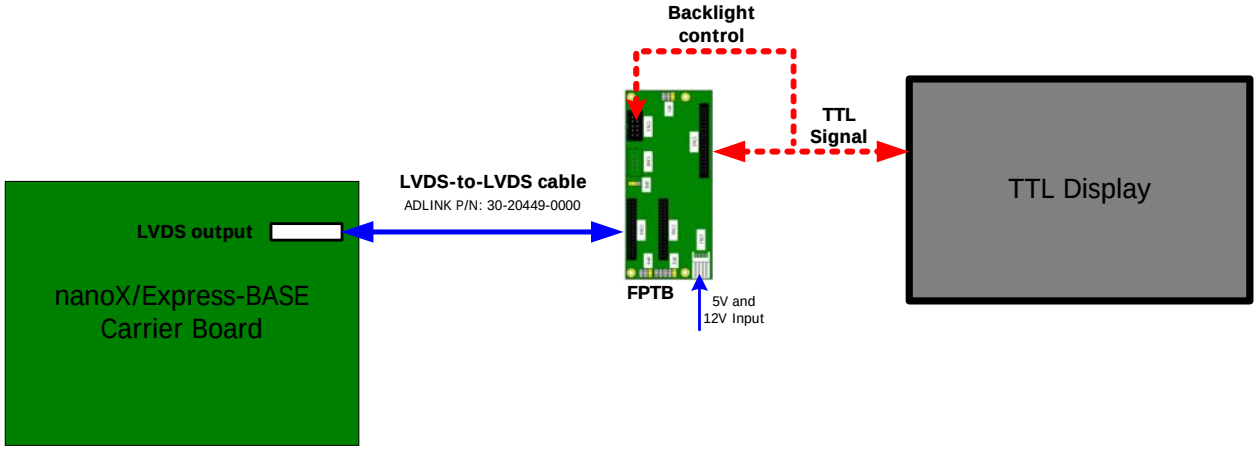
3 Using a TTL Flat Panel Display

Included with the nanoX Starter Kit is the Flat Panel Transfer Board (FPTB) which is intended for prototyping and verification of LVDS and TTL flat panel displays with COM Express systems. The FPTB is equipped with an LVDS-to-TTL converter to allow users to implement TTL displays with COM Express systems that support LVDS only. Onboard PWM circuitry supports backlight control for LVDS and TTL displays. For a complete description of the FPTB and its applications, refer to the *Flat Panel Transfer Board User's Manual*.

Instructions on how to connect a TTL flat panel display to the nanoX-BASE using the FPTB are provided below.

3.1 Overview

The FPTB provides LVDS-to-TTL conversion and backlight control for use with an ADLINK reference carrier board and TTL display. The user must provide the cable connection from the FPTB's TTL output and backlight control connectors to the TTL panel inputs.

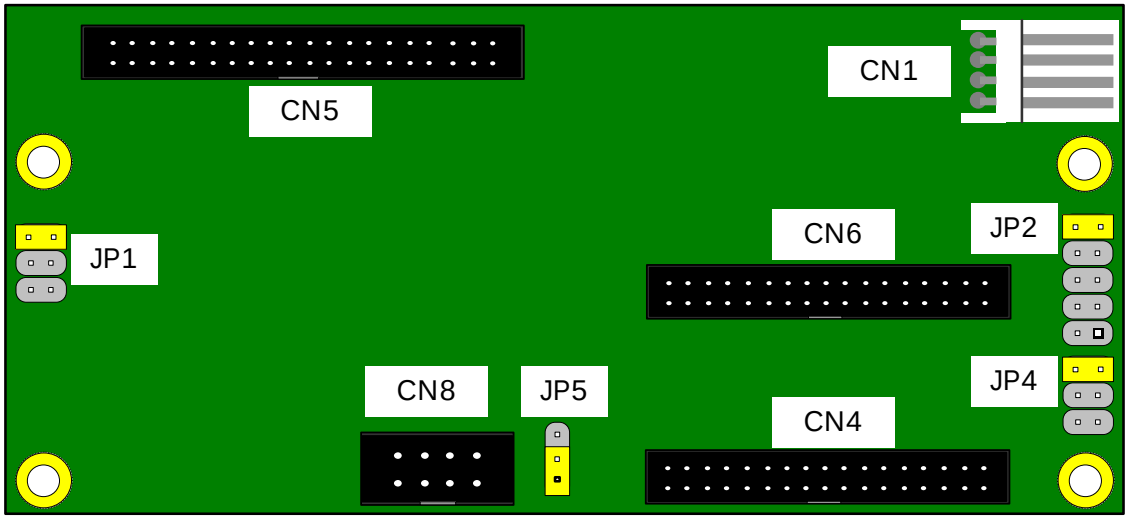


nanoX/Express-BASE → FPTB → TTL Display:

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3.2 Connectors and Jumpers

Board Layout



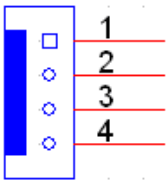
FPTB (Flat Panel Transfer Board) Connector and Jumper Locations

Connector	Description
CN1	Power Connector
CN4	LVDS Input Connector
CN5	TTL Output Connector
CN6	LVDS Output Connector
CN8	Backlight Control Connector
JP1	Backlight Voltage Jumper
JP2	Panel Voltage Jumper
JP4	LVDS/TTL Mode Selector Jumper
JP5	Backlight Control Mode Jumper

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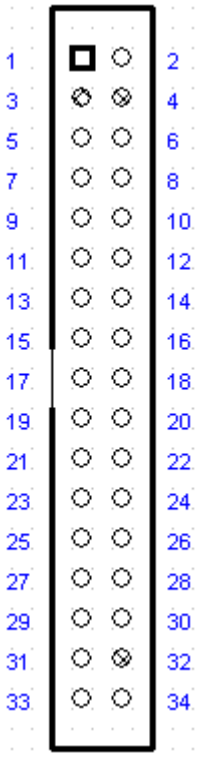
Connector Pin Definitions

CN1: Power Connector *(Floppy power connector)*



Pin	Signal
1	+5V
2	GND
3	GND
4	+12V

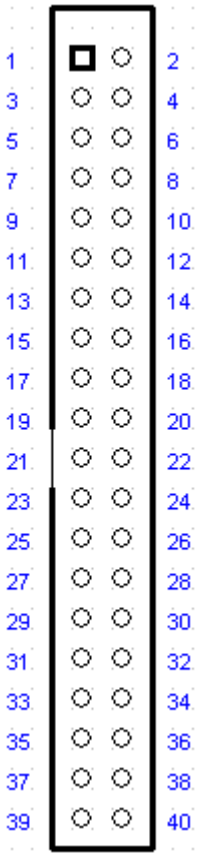
CN4: LVDS Input Connector *(2x17 box header, 2.00 mm pitch)*



Pin	Signal	Pin	Signal
1	LVDS_CLK_A	2	LVDS_DTA_A
3	PNL_PWR	4	PNL_PWR
5	GND	6	LVDS_A-N0
7	LVDS_A-P0	8	VDD_EN
9	LVDS_A-N1	10	LVDS_A-P1
11	BL_EN_2	12	LVDS_A-P2
13	LVDS_A-N2	14	N.C
15	LVDS_ACLK _ N	16	LVDS_ACLK _ P
17	PNL_PWR	18	LVDS_A-P3
19	LVDS_A-N3	20	GND
21	LVDS_B-N0	22	LVDS_B-P0
23	GND	24	LVDS_B-N1
25	LVDS_B-P1	26	GND
27	LVDS_B-N2	28	LVDS_B-P2
29	GND	30	LVDS_BCLK _ P
31	LVDS_BCLK _ N	32	N.C
33	LVDS_B-P3	34	LVDS_B-N3

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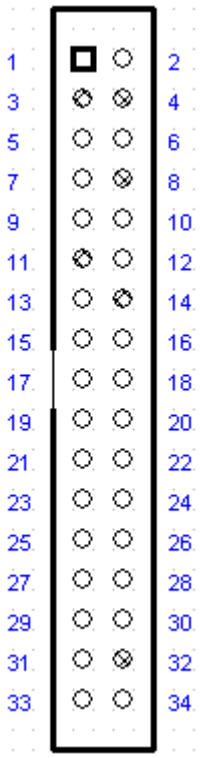
CN5: TTL Output Connector *(2x20 box header, 2.00 mm pitch)*



Pin	Signal	Pin	Signal
1	GND	2	FCLK
3	GND	4	FR0
5	FR1	6	FR2
7	GND	8	FR3
9	FR4	10	FR5
11	GND	12	FR6
13	FR7	14	FG0
15	GND	16	FG1
17	FG2	18	FG3
19	GND	20	FG4
21	FG5	22	GND
23	FG6	24	FG7
25	FB0	26	GND
27	FB1	28	FB2
29	FB3	30	GND
31	FB4	32	FB5
33	FB6	34	GND
35	FB7	36	HS (HSYNC)
37	VS (VSYNC)	38	GND
39	DE (DATA ENBLE)	40	GND

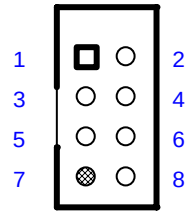
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CN6: LVDS Output Connector *(2x17 box header, 2.00 mm pitch)*



Pin	Signal	Pin	Signal
1	LVDS_CLK_A	2	LVDS_DTA_A
3	PNL_PWR	4	PNL_PWR
5	GND	6	LVDS_A-N0
7	LVDS_A-P0	8	VDD_EN
9	LVDS_A-N1	10	LVDS_A-P1
11	BL_EN_2	12	LVDS_A-P2
13	LVDS_A-N2	14	N.C
15	LVDS_ACLK _ N	16	LVDS_ACLK _ P
17	PNL_PWR	18	LVDS_A-P3
19	LVDS_A-N3	20	GND
21	LVDS_B-N0	22	LVDS_B-P0
23	GND	24	LVDS_B-N1
25	LVDS_B-P1	26	GND
27	LVDS_B-N2	28	LVDS_B-P2
29	GND	30	LVDS_BCLK _ P
31	LVDS_BCLK _ N	32	N.C
33	LVDS_B-P3	34	LVDS_B-N3

CN8: Backlight Control Connector *(2x4 box header, 2.54 mm pitch)*

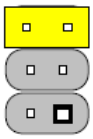


Pin	Signal	Pin	Signal
1	GND	2	PNL_PWR
3	BL_CTRL	4	GND
5	LVDS_BL_EN	6	GND
7	N.C.	8	BLK_PWR

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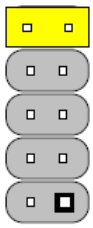
Jumper Settings

JP1: Backlight Voltage



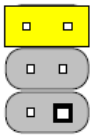
Jumper	Status
1 - 2	+12V
3 – 4	Reserved
5 – 6	+5V*

JP2: Panel Voltage



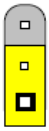
Jumper	Status
1 - 2	+12V
3 – 4	Reserved
5 – 6	+5V
7 - 8	Reserved
9 - 10	+3.3V*

JP4: LVDS/TTL Mode



Jumper	Status
1 - 2	TTL Output Active
3 - 4	Reserved
5 - 6	LVDS Output Active*

JP5: Backlight Control Mode



Jumper	Status
1 - 2	BLCTRL_PWM *
2 - 3	BLCTRL_VTL

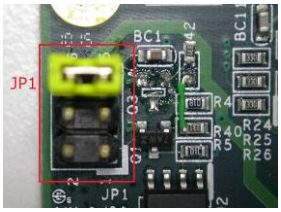
Note: * indicates default setting

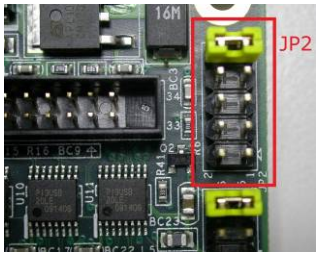
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3.3 Installation

Jumper Settings

Make sure the **Backlight Voltage jumper** (JP1) and **Panel Voltage jumper** (JP2) are correct for the display panel you are using.



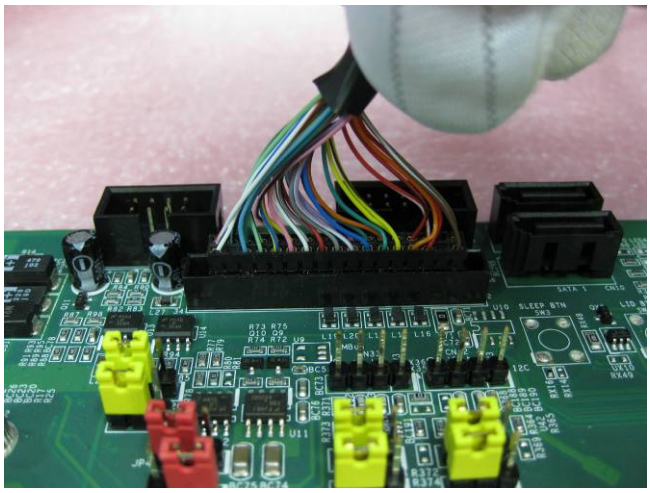
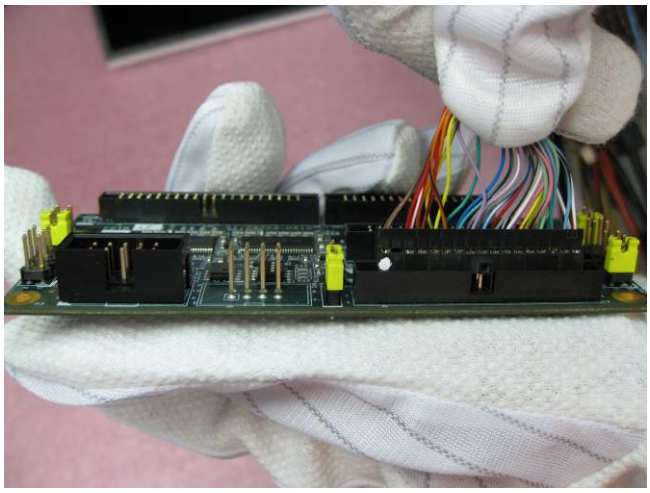


Set the **LVDS/TTL Mode jumper** (JP4) to *TTL Output Active* (short pins 1-2).Set the **Backlight Control Mode jumper** (JP5) to *PWM* or *Voltage Level* as appropriate for your display.

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Connecting LVDS Input to FPTB

Use the FPTB LVDS-to-LVDS cable (P/N 30-20449-0000) to connect the LVDS output connector on the nanoX-BASE (CN6) to the LVDS input connector on the FPTB (CN4).

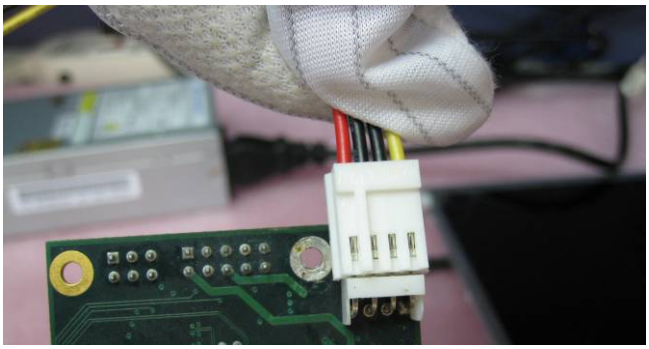
Connecting LVDS Input to FPTB	**Required items**
Plug the LVDS-to-LVDS cable into nanoX-BASE CN6 	 LVDS-to-LVDS cable
Plug the LVDS-to-LVDS cable connector into FPTB CN4 	

TTL Output to Display Panel

Make the appropriate cable to connect the TTL Output Connector (CN5) and Backlight Control Connector (CN8) on the FPTB to the target TTL display panel.

FPTB Power Connector

Connect the Floppy Drive power connector of your power supply to the FPTB Power Connector (CN1).



Power Up the System

Assemble the rest of your system as required and power it on. An example nanoX-BASE system with FPTB connected to a TTL display panel is shown below.



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