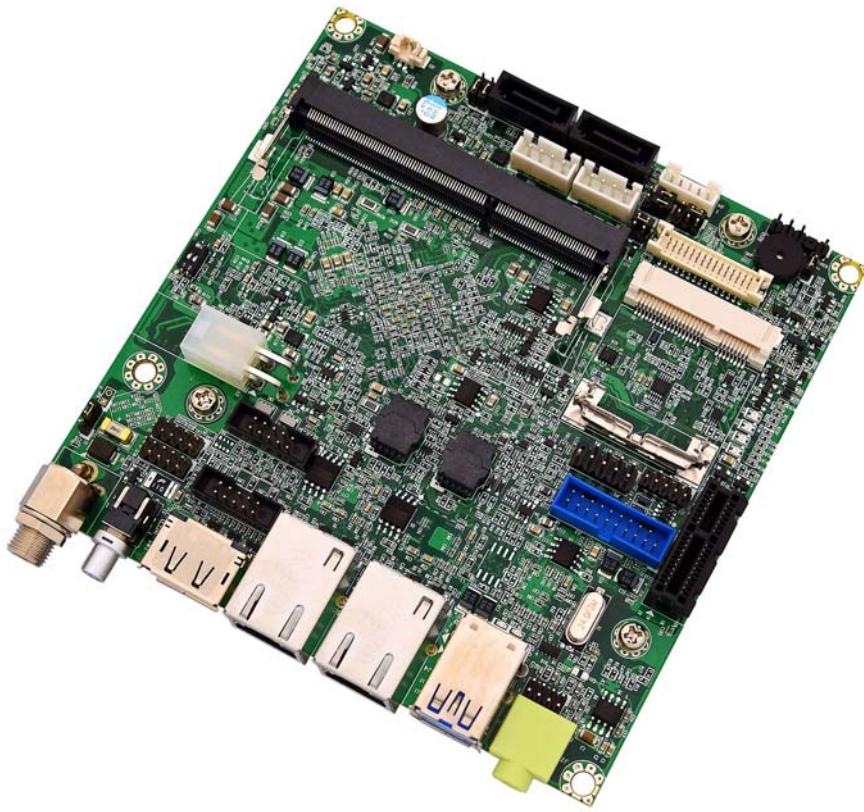




# ITX-N-3800

Industrial Intel Atom® E3800 Series  
NANO-ITX Single Board Computer (SBC)

Product Manual



## Revision History

Document Version	Last Updated Date	Brief Description of Change
v1.0	8/2017	Initial release
v1.1	12/2025	Updated Conformal Coating, added Warranty link, updated all links

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# 1. Before You Begin

Review the warnings (in this section) and the best practice recommendations (see “Best Practices” on page 44) when using and handling the WinSystems ITX-N-3800. Adherence to these recommendations provides an optimal user experience and prevents damage. Read through this document and become familiar with the ITX-N-3800 before proceeding.



APPLYING CONFORMAL COATING AFTER PURCHASE WILL VOID YOUR WARRANTY.  
FAILING TO COMPLY WITH THESE BEST PRACTICES MAY DAMAGE THE ITX-N-3800 AND VOID YOUR WARRANTY.

## 1.1 Warnings

Only qualified personnel should configure and install the ITX-N-3800. While observing the best practices, pay particular attention to the following:



### Avoid Electrostatic Discharge (ESD)

Only handle the circuit board and other bare electronics when electrostatic discharge (ESD) protection is in place. Having a wrist strap and a fully grounded workstation is the minimum ESD protection required before the ESD seal on the product bag is broken.



### Warning

Do not reverse the positive and negative terminals when you connect power to the unit. This will void the warranty and damage the board.

# 2. Introduction

This manual provides configuration and usage information for the ITX-N-3800. If you still have questions, contact Technical Support at (817) 274-7553, Monday through Friday, between 8 AM and 5 PM Central Standard Time (CST).

Refer to the WinSystems website for other accessories (including cable drawings and pinouts) that can be used with your ITX-N-3800.

## 3. Functionality

The ITX-N-3800 is an industrial embedded single board computer (SBC). Its compact design and low power dissipation board is ideal for Digital Signage, Digital Security Surveillance (DSS), Medical, and Industrial IoT applications. The processor for the unit is an Intel® E3800 series Atom™, integrated into the ITX-N-3800. The low-profile thermal solution provides a rugged platform base that protects the PCB assembly and offers convenient mounting. Information to configure and operate the ITX-N-3800 for most applications is included in this Product Manual or on our website at [www.winsystems.com](http://www.winsystems.com).

**NOTE** WinSystems can provide custom configurations for Original Equipment Manufacturer (OEM) clients. For details, please contact an Application Engineer through Technical Support (see contact information in the Introduction section on page 1).

## 4. Features

This section describes the features of the ITX-N-3800.

### Package Contents

- One ITX-N-3800 NANO-ITX Main Board
- One passive Heatsink
- One SATA cable

### Embedded Single Board Computer (SBC)

- Intel E3800 series Atom processor:

	ITX-N-3815-1-0	ITX-N-3827-2-0	ITX-N-3845-2-0
Processor	Intel Atom E3815	Intel Atom E3827	Intel Atom E3845
Core Speed	1.46 GHz	1.75 GHz	1.91 GHz
Number of Cores	1	2	4
L2 Cache	512 KB	1 MB	2 MB

### Operating Systems (compatibility)

The ITX-N-3800 uses the Intel® BayTrail-I SOC. An older operating system might not be able to recognize this chip. For compatibility issues with older Windows Operating Systems such as Windows 8, please install the BayTrail-I SOC chipset component driver (INF) before any other driver.

- Microsoft Windows
- Linux
- Other x86-compatible systems

**Memory**

- Up to 8 GB DDR3L SDRAM (one 204-pin SODIMM)

**BIOS**

- Phoenix® uEFI BIOS

**Video Interfaces**

- Supports multiple displays
- DP (rear I/O)
- VGA (on-board connector)
- LVDS (dual-channel 24-bit)

**Ethernet**

- Supports Wake on LAN function
- Intel® I210 Gigabit Ethernet (1 gigabit per second, GbE) controllers
- ITX-N-3827 and ITX-N-3845: Supports two GbE
- ITX-N-3815: Supports one GbE

**Storage (Bootable)**

- Two SATA (2.0) ports

**Serial Interface**

- One serial port (RS-232/422/485, BIOS configurable)
- Supports six USB (Universal Serial Bus) ports:
  - USB 3.0: Four ports, two on rear I/O and two on the board (header)
  - USB 2.0 ports: Two ports on the board (header)

**General Purpose Input-Output (GPIO)**

- On-board programmable 8-bit General Purpose Input Output I/O interface

**System Monitoring Feature**

- System temperature and major power sources monitors

**SD Interface**

- One micro SD socket

**Bus Expansion**

- One PCIe x 1 slot (PCI Express)

## Audio

- Line Out Audio Jack on rear I/O
- On board pin header for Line Out, Line In, Microphone

## Power

DC 12 V connector and 4-pin power connector cannot be used at the same time.

- DC 12 V input (rear I/O)
- 4-pin +12 V DC power connector on board
- Model specific power specifications:
  - ITX-N-3815: +12 V DC input (5 W typical)
  - ITX-N-3827: +12 V DC input (8 W typical)
  - ITX-N-3845: +12 V DC input (10 W typical)

## Additional Features

- Watchdog timer (WDT). Supports WDT function through software programming for enable/disable and interval setting, and a general system reset.

## Temperature

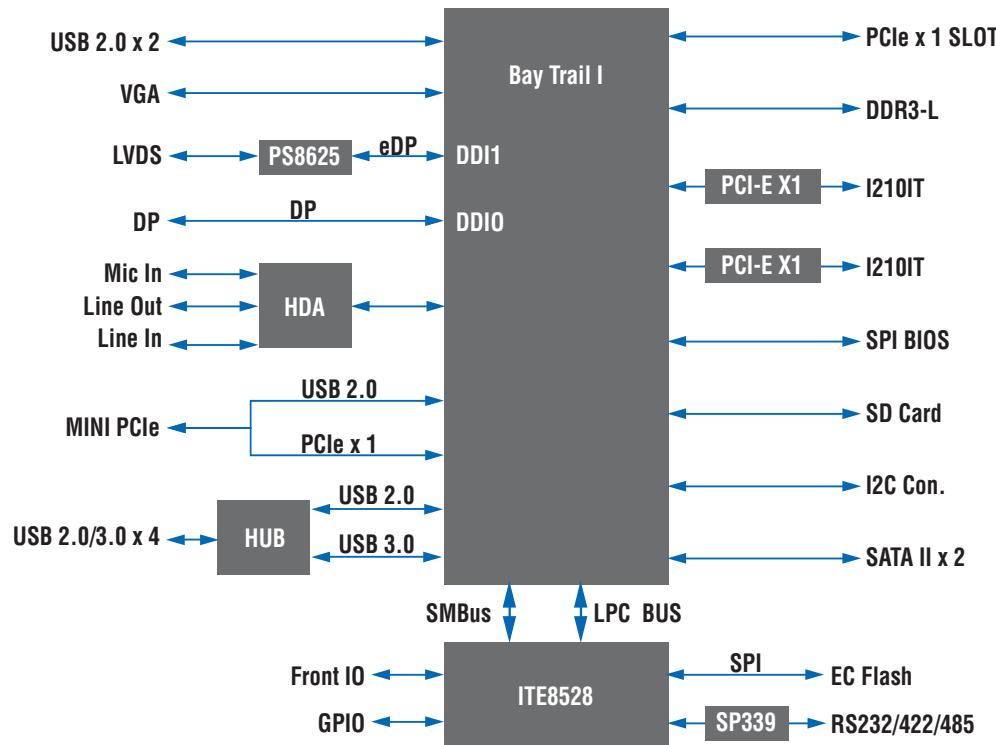
- Operating temperature: -40 °C to +80 °C (-40 °F to +176 °F)
- Storage temperature: -40 °C to +80 °C (-40 °F to +176 °F)

## 5. General Operation

### 5.1 System Block Diagram

The ITX-N-3800 is an embedded single board computer (SBC). It is a full-featured embedded system with a variety of on-board I/O options. The following figure is a simplified system block of the ITX-N-3800:

**Figure 5-1:** Simplified Block Diagram



## 6. Specifications

The ITX-N-3800 system adheres to the following specifications and requirements.

Electrical	
V <sub>CC</sub>	12 V DC ±5%, 15 Watts (maximum)
MTBF	14.5 Years
Battery: CR-2032	Chemical System: Li/MnO <sub>2</sub> Nominal Voltage: 3 V Rated Capacity: 225 mAh
Mechanical	
Mechanical Dimensions	4.72 x 4.72 inches (120 x 120 mm)
Weight	2.65 lbs (1.20 kg)
Environmental	
Temperature	-40 °C to +80 °C (-40 °F to +176 °F)
Humidity (RH)	5% to 95% non-condensing
RoHS Compliant	Yes
Operating Systems	
Runs 32/64-bit Windows, Linux, and other x86-compatible operating systems.	
Chipsets and Drivers	
CPU Type	<b>Intel® Atom™ CPU</b> <b>E3845</b> : 1.91 GHz L2 Cache 2048 KB <b>E3827</b> : 1.75 GHz L2 Cache 1024 KB <b>E3815</b> : 1.46 GHz L2 Cache 512 KB
SBC BIOS	Phoenix BIOS ITX-N-3800
EC	Version: R00.E00
Memory	DDR3L SO-DIMM 1333 1.35 V/4 GB
VGA Card	On-board Intel® HD Graphics
LAN Card	On-board Intel® I210 Gigabit Network Connection
LAN Card	On-board Intel® I210 Gigabit Network Connection #2
Audio Card	On-board Realtek ALC892 High Definition Audio

# 7. Setup

Use the information in this section to install the ITX-N-3800. Refer to “Configuration” on page 12 to locate and identify the connectors outlined in this section.

## 7.1 Installation and Connections

1. Connect a compatible monitor to the VGA output (J8), the Display Port (J3), or the LVDS Connector (J18) and Backlight connector (J24), depending on your preference and capabilities.

**NOTE** If you are using a flat panel display, make sure the jumper for Backlight Power at JP6 is installed as required. See “Backlight Power (JP6)” on page 26 for specific requirements.

**NOTE** If you are using a flat panel display, configure LVDS configuration “LVDS Link Selection (JP3)” on page 25 and “Panel Voltage Selection (JP5)” on page 25, and “LVDS Color Depth and Data Mapping (JP10)” on page 26. For more information on the connector, see “LVDS Connector (J18)” on page 22.

2. Connect a USB keyboard to any of the USB ports at J6 or J13.
3. Plug in the boot media of your preference. The options are:
  - SATA (J21/J22)
  - USB (J6 or J13)
4. If using a battery, connect the battery to J23.
5. Connect an Ethernet cable to a port at J4/J5 (as available).

## 7.2 Power Up

Plug in a compatible +12 V DC power source at J1 or J12. The first time power is applied, the ITX-N-3800 will boot automatically bypassing the power button (SW1). After initial startup, briefly press the power button to turn the ITX-N-3800 on and off or press and hold it to reset.

## 7.3 Driver Installation

The information in this section helps you to configure an operating system’s driver for use with the on-board PCI devices of the ITX-N-3800. Drivers and documentation are available on the WinSystems website at [www.winsystems.com](http://www.winsystems.com) or by contacting a Application Engineer at +1-817-274-7553.

### 7.3.1 Chipset Component Driver

The ITX-N-3800 uses the Intel® BayTrail-I SOC. An older operating system might not be able to recognize this chip. For compatibility issues with older Windows Operating Systems such as Windows 8, make sure to install the BayTrail-I SOC chipset component driver (INF) before any other driver.

### 7.3.2 Intel HD Graphics 4600

The ITX-N-3800 has an integrated Intel® HD Graphics 4600 that supports DirectX 11 and OpenGL 4.0. This design provides outstanding graphic performance and supports VGA, DP, dual-channel 24-bit LVDS.

### 7.3.3 Intel LAN I210IT Gigabit Ethernet Controller

The LAN controller is an Intel I210 Gigabit Ethernet (1 gigabit per second, GbE) controller and provides connection on the rear I/O panel:

- Supports Wake on LAN function
- E3827/ E3845 (only): Dual Intel I210IT Gigabit Ethernet controller and two RJ45 connectors
- E3815: Single Intel I210IT Gigabit Ethernet controller and one RJ45 connector

### 7.3.4 Realtek ALC892 HD Audio Controller

- Uses Realtek ALC892 HD Audio driver

## 7.4 Watchdog Timer (WDT)

The ITX-N-3800 features an advanced watchdog timer (WDT) that can be used to guard against software lockups. The timer is programmable from 1 second to 255 minutes (15,300 seconds).

**NOTE** Use a long timeout if the watchdog timer is enabled and booting to an operating system.

Use the following example as a guide to programming the WDT.

### 7.4.1 Example Code for WDT

The ITX-N-3800 features a programmable watchdog timer (WDT). The following watchdog timer code example is written in C++. Use this example as a guide to program the WDT.

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#include <dos.h>

#define EC_DATA 0x62
#define EC_CMD 0x66
#define EC_CMD_READ 0x80
#define EC_CMD_WRITE 0x81

#define WDT_MODE 0x06 // WDT Select mode.
#define WDT_MIN 0x07 // Minute mode counter
#define WDT_SEC 0x08 // Second mode counter

// Use port 62 and port 66 to access EC command / data.
static int IBF_Check()
{
    unsigned char IBF_status;
    do
    {
        pw_udelay (20); // delay 20 us
        IBF_status = inportb (EC_CMD);
    } while (IBF_status & 0x02);
    return 1;
}

static int OBF_Check ()
{
    unsigned char OBF_status;
    do
    {
        pw_udelay (20); // delay 20 us
        OBF_status = inportb (EC_CMD);
    } while (!(OBF_status & 0x01));
    return 1;
}

static void Write_EC (unsigned char index, unsigned char data)
{
    IBF_Check ();
    outportb (EC_CMD, EC_CMD_WRITE);
    IBF_Check ();
    outportb (EC_DATA, index);
    IBF_Check ();
    outportb (EC_DATA, data);
}

static unsigned char Read_EC (unsigned char address)
{
    unsigned char data;
    IBF_Check ();
    outportb (EC_CMD, EC_CMD_READ);
    IBF_Check ();
    outportb (EC_DATA, address);
    OBF_Check ();
    data = inportb (EC_DATA);
    return data;
}
```

```

void EC_WDT_Trigger ()
{
    /* WDT Counter */
    Write_EC (WDT_SEC, 0x05);
    /* if use minute mode */
    /* Write_EC (WDT_MIN, 0x05); */

    /* 0x01 is second mode */
    /* 0x03 is minute mode */
    Write_EC (WDT_MODE, 0x01);

    Write_EC ((b->wdt.ec.count_m_addr & 0xFF), b->wdt.ec.timeout);
    Write_EC ((b->wdt.ec.cfg_addr & 0xFF), 0x03); // WDTCFG[1:0]=11

    int main ()
    {
        int i;
        EC_WDT_Trigger ();
        for (i = 0; i < 5; i++)
        {
            printf ("Reset counter .....%d\n", 5 - i);
            delay (1000);
        }
        return 0;
    }
}

```

## 7.5 General Purpose Input-Output (GPIO)

The ITX-N-3800 features a programmable General Purpose Input-Output (GPIO). The following GPIO code example is written in C++. Use the following example as a guide to program the GPIO.

```

#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#include <dos.h>

#define EC_DATA      0x62
#define EC_CMD       0x66
#define EC_CMD_READ  0x80
#define EC_CMD_WRITE 0x81

#define GPIO_DIR     0x2B
#define GPIO_DATA    0x2C

static void Write_EC (unsigned char index, unsigned char data)
{
    delay(100);
    outportb (EC_CMD, EC_CMD_WRITE);
    delay(100);
    outportb (EC_DATA, index);
    delay(100);
    outportb (EC_DATA, data);
}

static unsigned char Read_EC (unsigned char address)
{
    unsigned char data;
    delay(100);
    outportb (EC_CMD, EC_CMD_READ);
    delay(100);
    outportb (EC_DATA, address);
    delay(100);
    data = inportb (EC_DATA);
    return data;
}

```

```

int main ()
{
    unsigned char d2;
    printf("\n\n");
    printf("ITX-N-3800 GPIO TEST Program v1.0\n");
    printf("Please short the following pins with 2.0mm-pitched jumper on J10\n");
    printf("PIN 1,3,5,7 is input ; PIN 2,4,6,8 is output\n");
    printf("GPIO1 ---- GPIO5\n");
    printf("GPIO2 ---- GPIO6\n");
    printf("GPIO3 ---- GPIO7\n");
    printf("GPIO4 ---- GPIO8\n");
    printf("GND xxxx Vcc <==PWR/GND pins, DO NOT short them!\n\n");
    printf("Test Begins...\n");

    /* Set GPIO Port In/Out mode */
    /* Port 1 ~ 4 In mode, 5 ~ 8 Out mode*/
    Write_EC (GPIO_DIR, 0x0F);

    /* Set Port 5 ~ 8 Low */
    Write_EC (GPIO_DATA, 0x0F);
    sleep(1);

    d2 = Read_EC (GPIO_DATA);

    printf("GPIO_DATA = %x\n", d2);
    if ((d2 & 0x01) == 0)
        printf ("GPIO70->GPIO74 test ok !! (pull low)\n");
    else
        printf ("GPIO70->GPIO74 test fail (pull high) \n");

    if ((d2 & 0x02) == 0)
        printf ("GPIO71->GPIO75 test ok !! (pull low)\n");
    else
        printf ("GPIO71->GPIO75 test fail (pull high)\n");

    if ((d2 & 0x04) == 0)
        printf ("GPIO72->GPIO76 test ok !! (pull low)\n");
    else
        printf ("GPIO72->GPIO76 test fail (pull high)\n");

    if ((d2 & 0x08) == 0)
        printf ("GPIO73->GPIO77 test ok !! (pull low)\n");
    else
        printf ("GPIO73->GPIO77 test fail (pull high)\n");
    return 0;
}

```

## 7.6 Reset CMOS BIOS Configuration

Jumpers can be used to reset the BIOS CMOS settings to the factory default. Enable/disable the Clear CMOS Function hardware circuit, by placing or removing the jumper from JP7 or JP8 as needed. See “Reset CMOS BIOS Configuration” on page 41 for usage.

## 8. Configuration

This section describes the ITX-N-3800 components and configuration.

## 8.1 Component Layout

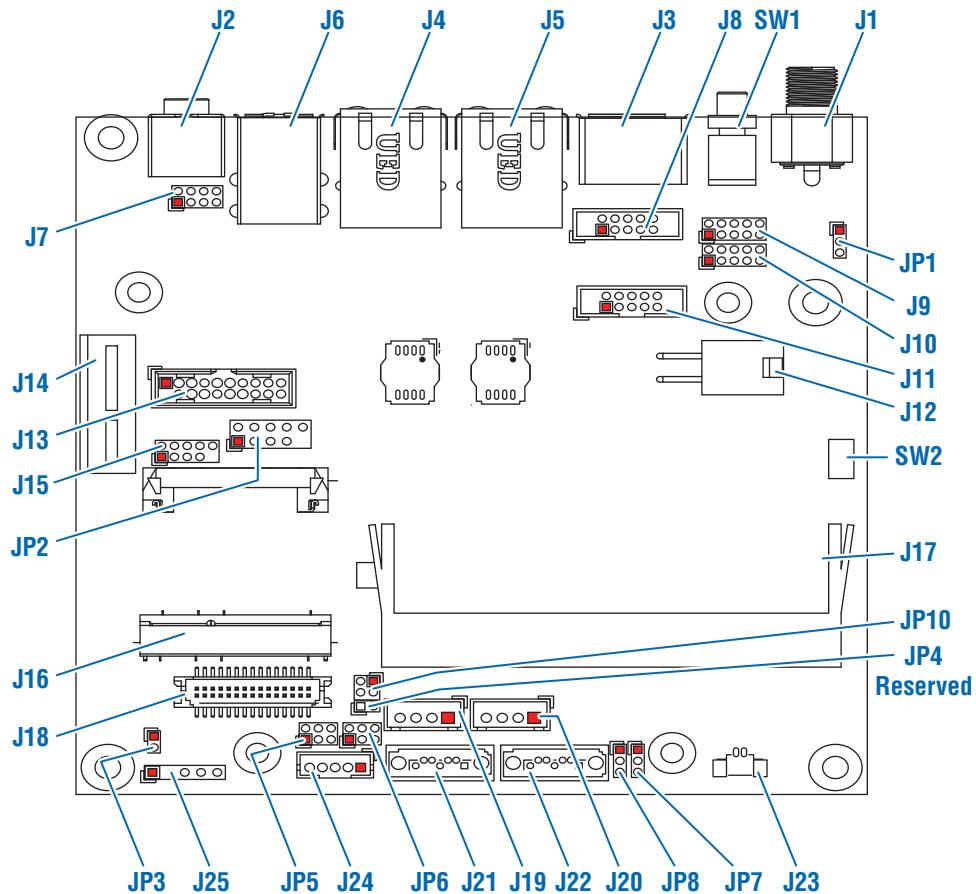
The ITX-N-3800 provides components on the edge and top of the board. Edge connections provide common external connections.

### 8.1.1 Top View Components

The following figure illustrates the location of each connector, jumper, and switch on the top of the ITX-N-3800.

Pin 1 of each connector or jumper is indicated by a red square in the figure.

**Figure 8–1:** Components



## Connectors

The following table provides connector descriptions and references for the figure on page 12 (“Top View Components”).

Item	Description	Reference
J1	DC Jack	page 14
J2	Audio Jack (Line_out)	page 14
J3	DisplayPort	page 15
J4/J5	RJ45 Connector	page 15
J6	USB3 Connector	page 16
J7	External Audio Pin Header	page 16
J8	VGA Pin Header	page 17
J9	Front Panel Pin Header	page 17
J10	General Purpose I/O Pin Header	page 18
J11	RS232/422/485 Pin Header	page 18
J12	ATX 4 Pin Connector	page 19
J13	External USB3 Connector	page 19
J14	PCIe x 1 Slot	page 20
J15	External USB2 Connector	page 20
J16	Mini PCIe Connector	page 21
J17	DDR3 SO-DIMM Socket	page 21
J18	LVDS Connector	page 22
J19/J20	SATA Power Connector	page 22
J21/J22	SATA GEN2 Connector	page 23
J23	Battery Connector	page 23
J24	Backlight Connector	page 24
J25	SMBUS Connector	page 24

## Jumpers

The following table provides jumper descriptions and references for the figure on page 12 (“Top View Components”).

Item	Description	Reference
JP1	GPIO4 through GPIO7 Voltage Level Selection (JP1)	page 25
JP2	Reserved	-
JP3	LVDS Link Selection (JP3)	page 25
JP4	Reserved	-
JP5	Panel Voltage Selection (JP5)	page 25
JP6	Backlight Power (JP6)	page 26
JP7/JP8	CMOS Clear (JP7/JP8)	page 26
JP10	LVDS Color Depth and Data Mapping (JP10)	page 26

## Switches

The following table provides switch descriptions and references for the figure on page 12 (“Top View Components”).

Item	Description	Reference
SW1	Power Switch	page 27
SW2	Power on / BIOS Recovery selection	page 27

## 8.2 Power

The main power supply to the board is +12 V DC. The ITX-N-3800 draws power through the J1 connector or the J12 connector. See “DC Jack (J1)” on page 14 and “ATX 4 Pin Connector (J12)” on page 19.

## 8.3 Connectors

### 8.3.1 DC Jack (J1)

This connector provides for a +12 V DC input from a power adapter.



#### Caution

Either connect a power supply to this connector (J1) or to the ATX 4-pin connector (J12), but not both. Applying power to both power connectors may result in damage to the single board computer.

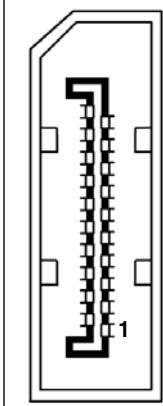
### 8.3.2 Audio Jack (Line\_out) (J2)

This connector provides an audio line out (Line\_out) signal.

### 8.3.3 DisplayPort (J3)

The Display Port 1.1 connector supplies both video and high definition (HD) audio. See the “Audio Jack (Line\_out) (J2)” on page 14 and the “External Audio Pin Header (J7)” on page 16 for other audio options.

#### Layout and Pin Reference:

	Pin	Name	Description	Pin	Name	Description
	1	ML_Lane 0 (p)	Lane 0 (positive)	2	GND	Ground
	3	ML_Lane 0 (n)	Lane 0 (negative)	4	ML_Lane 1 (p)	Lane 1 (positive)
	5	GND	Ground	6	ML_Lane 1 (n)	Lane 1 (negative)
	7	ML_Lane 2 (p)	Lane 2 (positive)	8	GND	Ground
	9	ML_Lane 2 (n)	Lane 2 (negative)	10	ML_Lane 3 (p)	Lane 3 (positive)
	11	GND	Ground	12	ML_Lane 3 (n)	Lane 3 (negative)
	13	CONFIG1	CONFIG1	14	CONFIG2	CONFIG2
	15	AUX_CH (p)	Auxiliary Channel (positive)	16	GND	Ground
	17	AUX_CH (n)	Auxiliary Channel (negative)	18	Hot Plug	Hot Plug Detect
	19	RETURN	Return for Power	20	DP_PWR	Power for connector (3.3 V 500 mA)

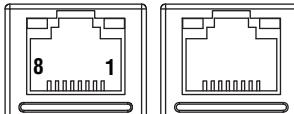
### 8.3.4 RJ45 Connector (J4/J5)

Two Intel I210 Gigabit Ethernet controllers provide standard IEEE 1588 and 802.1AS protocol timestamping. Each Ethernet interface includes 10/100/1000 MP/s multispeed, full, and half-duplex operation.

The pinout below describes the standard RJ45 Ethernet connectors.

**NOTE** Model 3815 ITX-N-3800S has one interface and one RJ45 connector (J4 only).

#### Layout and Pin Reference:

		
Pin	Function	Description
1	TX_D1+	Transceive Data+
2	TX_D1-	Transceive Data-
3	RX_D2+	Receive Data+
4	BI_D3+	Bi-Directional Data+
5	BI_D3-	Bi-Directional Data-
6	RX_D2-	Receive Data-
7	BI_D4+	Bi-Directional Data+
8	BI_D4-	Bi-Directional Data-

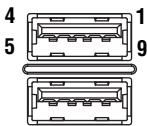
On-board Ethernet activity LEDs are built into the connectors at J4 & J5. There is one green LED (left) and one bi-color green/yellow LED (right).

LED	Activity	Ethernet Status
Left	Off	No Link
	Flashing (green)	Linked
Right	Off	No Link
	Off	Linked at 10 MB
	On (yellow)	Linked at 100 MB
	On (green)	Linked at 1 GB

### 8.3.5 USB3 Connector (J6)

J6 provides two USB 3.0 connectors.

#### Pin Reference:

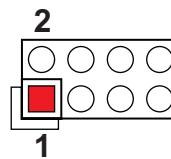


Pin	USB 3.0
1	USBVCC
2	D-
3	D+
4	GND
5	RX-
6	RX+
7	GND
8	TX-
9	TX+

### 8.3.6 External Audio Pin Header (J7)

This 4x2-pin header provides pins for Mic + Line\_in + Line\_out.

#### Layout and Pin Reference:

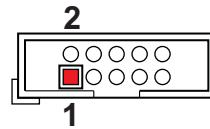


Pin	Name	Pin	Name
1	MIC_L	2	Line_in_L
3	Ground	4	Line_in_R
5	Line_out_L	6	Ground
7	Line_out_R	8	MIC_R

### 8.3.7 VGA Pin Header (J8)

This 5x2-pin header provides pins for VGA connections.

**Layout and Pin Reference:**

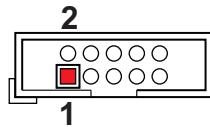


Pin	Name	Pin	Name
1	RED	2	SCL
3	GREEN	4	GND (Ground)
5	BLUE	6	SDA
7	VSYNC	8	GND (Ground)
9	HSYNC	10	+5 V

### 8.3.8 Front Panel Pin Header (J9)

This 5x2-pin header provides pins for front panel connections.

**Layout and Pin Reference:**

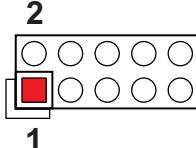


Pin	Name	Pin	Name
1	Ground	2	N/C
3	+5 V	4	N/C
5	HDD_LED (+)	6	HDD_LED (-)
7	Reset (+)	8	Power On (-)
9	Reset (-)	10	Power On (+)

### 8.3.9 General Purpose I/O Pin Header (J10)

This 5x2-pin header provides access to eight ITX-N-3800 GPIO connections (GPIO0 through GPIO7).

#### Layout and Pin Reference:

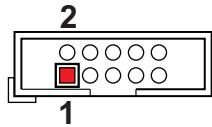


Pin	Name	Pin	Name
1	GPIO0	2	GPIO4 (Output Only)
3	GPIO1	4	GPIO5 (Output Only)
5	GPIO2	6	GPIO6 (Output Only)
7	GPIO3	8	GPIO7 (Output Only)
9	Ground	10	+5 V

### 8.3.10 RS232/422/485 Pin Header (J11)

This 5x2-pin header provides access to the ITX-N-3800 serial port (RS-232/422/485) at J11.

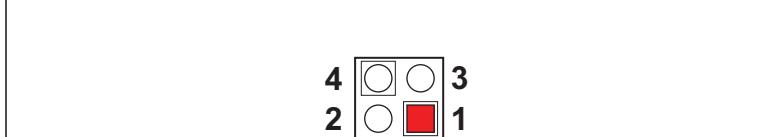
#### Layout and Pin Reference:



Pin	RS-232	RS-422	RS-485
1	DCD#	T-	RX/TX-
2	RXD#	T+	RX/TX+
3	TXD#	R+	N/A
4	DTR#	R-	N/A
5	GND	GND	GND
6	DSR#	N/A	N/A
7	RTS#	N/A	N/A
8	CTS#	N/A	N/A
9	RI#	N/A	N/A
10	N/C	N/C	N/C

### 8.3.11 ATX 4 Pin Connector (J12)

Also see “DC Jack (J1)” on page 14 and “Power On / BIOS Recovery selection (SW2)” on page 27.



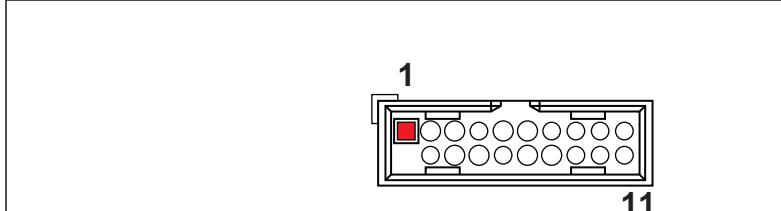
Pin	Name
1	COM (Black)
2	COM (Black)
3	+12 V DC (Yellow)
4	+12 V DC (Yellow)

This connector (right-angle receptacle) is a Molex 39-29-104 with a Molex 39-01-2040 mating connector.

### 8.3.12 External USB3 Connector (J13)

Voltage (5 V DC) through pin 1 and pin 19 is always available. It is supplied by the 5 V  $V_{CC}$  power source (in normal operation mode) or by the 5 V standby power source (in standby mode).

#### Layout and Pin Reference:



Pin	Name	Pin	Name
1	5 V	11	USB2_DP_#3
2	USB3_RXM_#1	12	USB_DM_#3
3	USB3_RXP_#1	13	Ground
4	Ground	14	USB3_TXP_#3
5	USB3_TXM_#1	15	USB3_TXM_#3
6	USB3_TXP_#1	16	Ground
7	Ground	17	USB3_RXP_#3
8	USB2_DM_#1	18	USB3_RXM_#3
9	USB2_DP_#1	19	5 V
10	Ground	20	Key (no pin)

### 8.3.13 PCIe x1 Slot (J14)

This PCI-Express bus supports 1x (2.5 Gbps) bus width (transmits and receive pair).

**Layout and Pin Reference:**

Pin	Side B Connector		Side A Connector	
	Name	Description	Name	Description
1	+12 V	+12 volt power	PRSNT#1	Hot plug presence detect
2	+12 V	+12 volt power	+12 V	+12 volt power
3	RSVD	Reserved	+12 V	+12 volt power
4	GND	Ground	GND	Ground
5	SMCLK	SMBus clock	JTAG2	TCK
6	SMDAT	SMBus data	JTAG3	TDI
7	GND	Ground	JTAG4	TDO
8	+3.3 V	+3.3 volt power	JTAG5	TMS
9	JTAG1	+TRST#	+3.3 V	+3.3 volt power
10	3.3 V aux	3.3v volt power	+3.3 V	+3.3 volt power
11	WAKE#	Link Reactivation	PWRGD	Power Good
Mechanical Key				
12	RSVD	Reserved	GND	Ground
13	GND	Ground	REFCLK +	Reference Clock
14	HSOp(0)	Transmitter Lane 0, Differential pair	REFCLK -	Differential pair
15	HSOn(0)		GND	Ground
16	GND	Ground	HSIp(0)	Receiver Lane 0, Differential pair
17	PRSNT#2	Hotplug detect	HSIn(0)	
18	GND	Ground	GND	Ground

### 8.3.14 External USB2 Connector (J15)

Voltage (5 V DC) through pin 1 and pin 2 is always available. It is supplied by the 5 V  $V_{CC}$  power source (in normal operation mode) or by the 5 V standby power source (in standby mode).

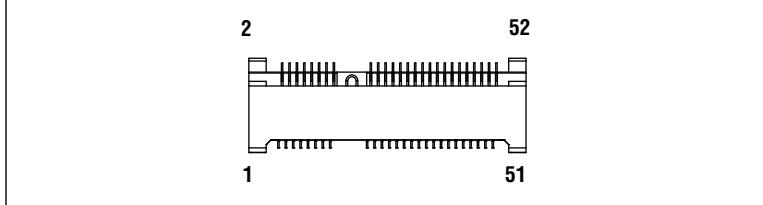
**Layout and Pin Reference:**

Pin	Name	Pin	Name
1	5 V	2	5 V
3	USB-	4	USB-
5	USB+	6	USB+
7	Ground	8	Ground
9	Key (no pin)	10	N/C

### 8.3.15 Mini PCIe Connector (J16)

The ITX-N-3800 includes a MiniPCIe socket at J8.

#### Layout and Pin Reference:



Pin	Name	Pin	Name
1	WAKE#	2	3.3 Vaux
3	NC	4	GND
5	NC	6	1.5 V
7	CLKREQ#	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
<b>Mechanical Key</b>			
17	NC	18	GND
19	NC	20	W_DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3 Vaux
25	PERp0	26	GND
27	GND	28	+1.5 V
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3 Vaux	40	GND
41	+3.3 Vaux	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	NC	46	LED_WPAN#
47	NC	48	+1.5 V
49	NC	50	GND
51	NC	52	+3.3 Vaux
NC = Not Connected			

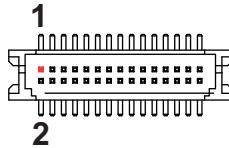
### 8.3.16 DDR3 SO-DIMM Socket (J17)

The ITX-N-3800 supports DDR3 SRAM system memory, 1066 MHz or 1333 MHz, through this on-board SODIMM socket (204-pin).

### 8.3.17 LVDS Connector (J18)

The ITX-N-3800 supports LVDS flat panel displays.

**Layout and Pin Reference:**

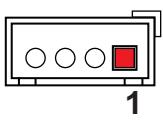


Pin	Name	Pin	Name
1	VDD_LVDS	2	VDD_LVDS
3	LVDSA_DATA0	4	LVDSA_DATA#0
5	LVDSA_DATA1	6	LVDSA_DATA#1
7	LVDSA_DATA2	8	LVDSA_DATA#2
9	LVDSA_DATA3	10	LVDSA_DATA#3
11	LVDSA_CLKP	12	LVDSA_CLKN
13	DDC_SCL	14	DDC_SDA
15	Ground	16	Ground
17	LVDSB_DATA0	18	LVDSB_DATA#0
19	LVDSB_DATA1	20	LVDSB_DATA#1
21	LVDSB_DATA2	22	LVDSB_DATA#2
23	LVDSB_DATA3	24	LVDSB_DATA#3
25	LVDSB_CLKP	26	LVDSB_CLKN
27	N/C	28	N/C
29	Ground	30	Ground

### 8.3.18 SATA Power Connector (J19/J20)

Power is supplied to the SATA device via the connector at J19/J20.

**Layout and Pin Reference:**



Pin	Name
1	+12 V
2	Ground
3	Ground
4	+5 V

### 8.3.19 SATA GEN2 Connector (J21/J22)

The bootable SATA (2.0) interface is located at J21/J22. WinSystems offers CBL-SATA-701-20 for this connector.

#### Layout and Pin Reference:

	Pin	Name
7	1	
	2	GND
	3	RX1+
	4	RX1-
	5	GND
	6	TX1-
	7	TX1+
	7	GND

### 8.3.20 Battery Connector (J23)

An optional external battery, connected to BAT, supplies the ITX-N-3800 board with standby power for the real-time clock and CMOS setup RAM.

A power supervisory circuit contains the voltage sensing circuit and an internal power switch to route the battery or standby voltage to the circuits selected for backup. The battery automatically switches on when the  $V_{CC}$  of the systems drops below the battery voltage and off when  $V_{CC}$  returns to normal.

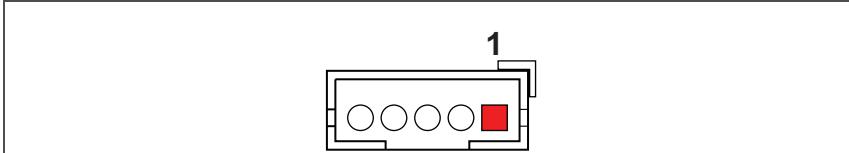
#### Layout and Pin Reference:

Pin	Name
1	Battery Voltage
2	Ground

### 8.3.21 Backlight Connector (J24)

Power and control is supplied through the Backlight connector at J24.

**Layout and Pin Reference:**

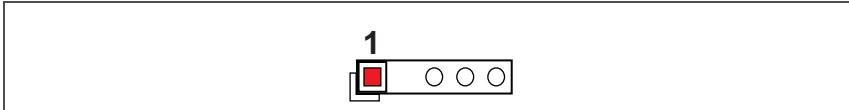


Pin	Name
1	+5 V
2	BL_CTRL
3	+12 V
4	Ground
5	BL_Enable

### 8.3.22 SMBUS Connector (J25)

System Management Bus connections are made through the connector at J25.

**Layout and Pin Reference:**

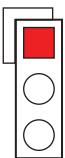


Pin	Name
1	SMB_CLK
2	Key (no pin)
3	Ground
4	SMB_DATA
5	+5 V

## 8.4 Jumpers and Switches

### 8.4.1 GPIO4 through GPIO7 Voltage Level Selection (JP1)

This jumper configures the on-board programmable 8-bit Digital I/O interface.



JP1	Function
1-2 Short	5 V
2-3 Short	3.3 V (Default)

### 8.4.2 LVDS Link Selection (JP3)

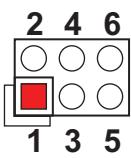
Select the appropriate LVDS link setting using this jumper (JP3).



JP3	Function
Short	Dual Channel (Default)
Open	Single Channel

### 8.4.3 Panel Voltage Selection (JP5)

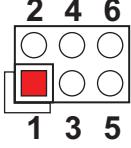
Select the appropriate  $V_{CC}$  setting using this jumper (JP5).



JP5	Function
1-3 Short	$V_{CC}$ 3.3 V (Default)
3-5 Short	$V_{CC}$ 5 V
3-4 Short	+12 V

#### 8.4.4 Backlight Power (JP6)

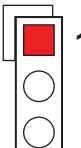
Select the appropriate backlight enable and power settings for the backlight using this jumper (JP6).



Pin Number	Signal Description
1-3	Backlight Enable: Active High (Default)
3-5	Backlight Enable: Active Low
2-4	Backlight Power: +5 VDC (Default)
4-6	Backlight Power: +12 VDC

#### 8.4.5 CMOS Clear (JP7/JP8)

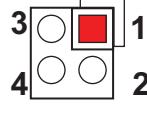
Clear CMOS using this jumper (JP7/JP8). See “Reset CMOS BIOS Configuration” on page 41 for usage of this jumper.



JP7/JP8	Function
1-2 Short	Normal Operation (Default)
2-3 Short	Clear CMOS Contents

#### 8.4.6 LVDS Color Depth and Data Mapping (JP10)

Select the appropriate LVDS color depth and data mapping setting using this jumper (JP10).



JP10	Function
2-4 Short	8-bit LVDS, VESA mapping (Default)
1-3, 2-4 Short	8-bit LVDS, JEIDA mapping
1-3 Short	6-bit LVDS, VESA and JEIDA mapping

#### 8.4.7 Power Button (SW1)

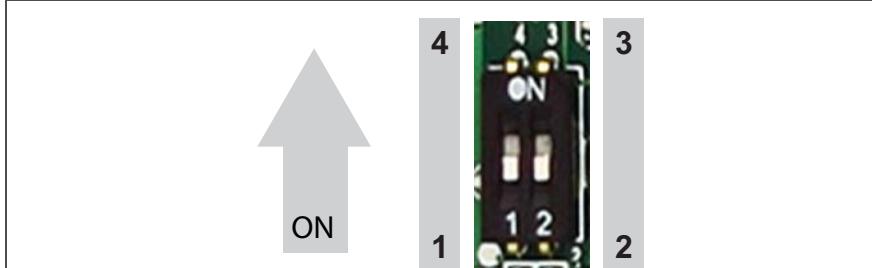
The Power Button (SW1), located on the lower right edge of the board, controls power to the ITX-N-3800. The first time you connect power to J1 or J12, the power button is bypassed and the board powers up automatically.

After the initial power up, press SW1 briefly to power the unit on or off, depending on the present state.

If the unit accidentally locks up and is unresponsive, press and hold SW1 for four (4) seconds to perform a hard restart.

#### 8.4.8 Power On / BIOS Recovery selection (SW2)

Select the appropriate Power On / BIOS Recovery setting using these switches (SW2).



SW2	Function
1-4 OFF	ATX (Default)
1-4 ON	AT
2-3 OFF	Recovery Disable (Default)
2-3 ON	Recovery Enable

# 9. BIOS Settings

## 9.1 General Information

The ITX-N-3800 includes a uEFI BIOS from Phoenix Technologies stored in Flash ROM. Access setup information through the BIOS setup utility to modify basic system configuration. The configuration is stored in CMOS RAM (it is retained during power-off). When power is applied to the system, the ITX-N-3800 communicates with peripheral devices and checks hardware resources against the configuration information stored in the CMOS memory. If during startup an error is detected or the CMOS parameters need to be initially defined, the diagnostic program prompts the user to enter the SETUP program. Some errors are significant enough to cause the startup to fail.

## 9.2 Entering Setup

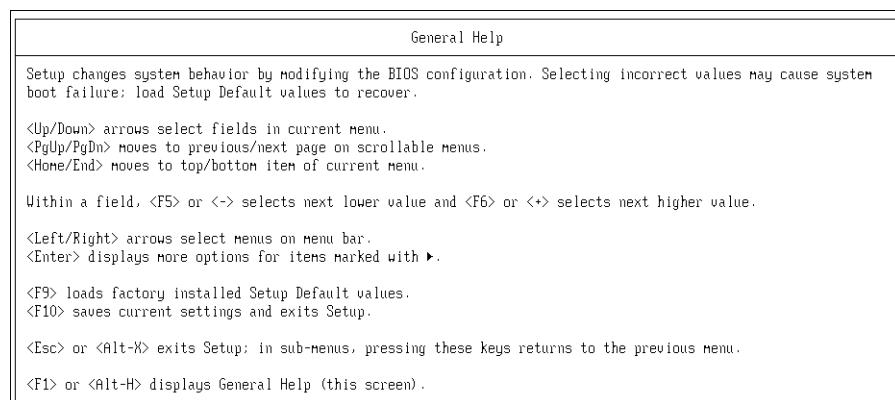
To enter setup, apply power to the computer and then press **F2**. This key (**F2**) must be pressed when either the splash screen is displayed (during the system power-on self test, POST) or when the **Press F2 for Setup** message is displayed. It may take a few seconds before the main setup menu screen is displayed.

### Press F2 to enter SETUP

If the message disappears before responding and you still wish to enter Setup, restart the system by pressing the RESET button. It can be also restarted by pressing the **Ctrl**, **Alt**, and **Delete** keys on the keyboard simultaneously.

### Press <F1> to Run General Help or Resume

The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing **F1**. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press **Esc** to exit the Help screen.



## 9.3 Navigation of the Menus

Use the up and down arrow keys to move among the selections and press **Enter** when a selection is highlighted to enter a sub-menu or to see a list of choices. See “BIOS Screens” on page 29 for available options.

## 9.4 BIOS Screens

The following BIOS screens contain the options and sample settings for the ITX-N-3800. Your actual configuration may differ from the screens shown here.

**NOTE** Use care when modifying BIOS settings.

### Main Menu



### System Date

Displays the current date in MM/DD/YYYY format. To set or change the date, highlight the row using the up/down arrow keys, then highlight the month, day, or year by pressing the Enter key until the desired value is highlighted with a square block. Use the +/- keys to change the highlighted value, or enter the time using the number keys.

## System Time

Displays the current time in HH/MM/SS format. To set or change the time, highlight the row using the up/down arrow keys, then highlight the hour, minute, or second by pressing the Enter key until the desired value is highlighted with a square block. Use the +/- keys to change the highlighted value.

## System Information

System Information parameters provide information and vary with BIOS version and the specific modules used. The typical format of the information is provided instead of the actual Default Setting or Value.

### BIOS Version

Value format: yymmdd

### BIOS Build Date

Value format: mm/dd/yyyy

### EC Version

Value format: ymmddTXX

### EC Build Date

Value format: mm/dd/yyyy

### Processor Type

Value: Intel® Atom™ CPU E3800 series

### System Memory Speed

Value: 1066 MHz or 1333 MHz

### L2 Cache Speed

Value: 512 KB per Core

### Total Memory

Value: Up to 8192 MB

### SODIMM Information

- [1] Value: 1024 MB to 8192 MB (DDR3- 1333) @ DIMM0
- [2] Value: 0 MB

## Boot Features

### **NumLock**

Selects the default state for NumLock during power up.

Default Setting/Value: On

### **Timeout**

Number of seconds that Power On Self Test (POST) will wait for user input before booting.

Default Setting/Value: 0

### **Quick Boot**

Enables/disables quick boot.

Default Setting/Value: Disable

### **Diagnostic Splash Screen**

Enables/disables the diagnostic splash screen during boot.

Default Setting/Value: Disable

### **Diagnostic Summary Screen**

Displays the Diagnostic Summary screen during boot.

Default Setting/Value: Disable

### **BIOS Level USB**

Enables/disables all BIOS support for USB (boot time is reduced if USB support is not needed and disabled).

**NOTE** This will prevent using a USB keyboard in Setup or a USB biometric scanner such as a finger print reader to control access to setup, but does not prevent the operating system from supporting such hardware.

Default Setting/Value: Enable

### **Console Redirection**

Enables/disables Universal Console Redirection

Default Setting/Value: Disable

### **Allow Hotkey in S4 Resume**

Enables/disables hotkey detection when the system resumes from the Hibernate state.

Default Setting/Value: Enable

## UEFI Boot

Enables the Unified Extensible Firmware Interface (UEFI). The UEFI interfaces between the OS and firmware.

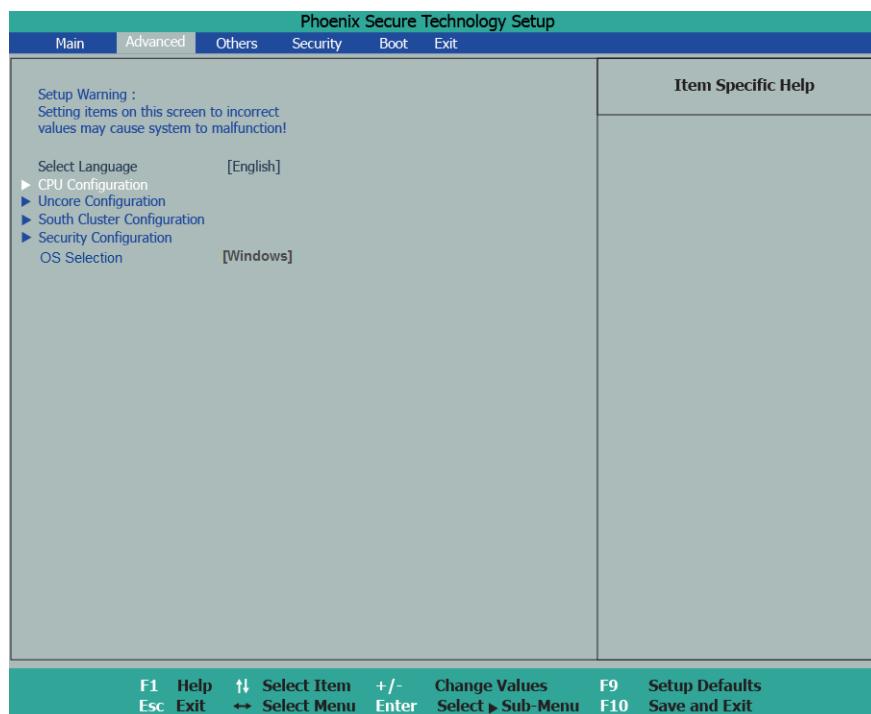
Default Setting/Value: Enable

## Error Manager

Error Manager log information. From this screen you can:

- View Error Manager Log
- Clear Error Manager Log

## Advanced Menu



The **Advanced** menu contains a variety of complex items and sub-menus for CPU and other types of configuration.



### Warning

Assigning incorrect values to items on the following screen menus may cause system malfunction.

## CPU Configuration

### Active Processor Cores

Number of cores to enable in each processor package. Choices: All, 1.

Default Setting/Value: All

### Execute Disable Bit

Prevents certain classes of malicious buffer overflow attacks when combined with a supporting Operating System (OS). Choices: Disable, Enable.

Default Setting/Value: Enable

### Limit CPUID Maximum

Disabled for Windows XP. Choices: Disable, Enable.

Default Setting/Value: Disable

### Bi-directional PROCHOT#

When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor. Choices: Disable, Enable.

Default Setting/Value: Enable

### VTX-2

Enables or disables the VTX-2 Mode support.

Default Setting/Value: Enable

### TM1

Enables or disables TM1, which is a thermal monitor based on clock throttling.

Default Setting/Value: Enable

### DTS

Enables or disables the digital thermal sensor, which protects the processor from overheating.

Default Setting/Value: Enable

### CPU Power Management

This subset of the CPU Configuration menu provides CPU power management options.

- Intel® SpeedStep™: Enables or disables the processor's performance states (P-States). Default Setting/Value: Enable

- Boot Performance Mode: Selects the performance state that the BIOS will set before OS handoff. Choices: Max Performance, Max Battery. Default Setting/Value: Max Performance
- Intel Turbo Boost Technology: Enable to allow processor cores to run faster than the base operating frequency if it is operating below power, current, and temperature specification limits. Default Setting/Value: Enable
- C-States: Enables or disables C-States Default Setting/Value: Disable
- Enhanced C-States: Enables or disables C1E, C2E and C4E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
- Max C State: This option controls the Max C State that the processor will support Choices: C7, C6, C4, C1.

## Uncore Configuration

### **GOP Configuration (Read Only): GOP Driver**

Enable or disable the GOP Driver. Enabling will unload VBIOS; Disabling will load VBIOS. Default Setting/Value: Enable

### **IGD:Configuration**

Integrated Graphics Device (Read Only): Enables or disables the Integrated Graphics Device (IGD). Enables the Integrated Graphics Device (IGD) when selected as the Primary Video Adapter. Default Setting/Value: Enable

Primary Display (Read Only): Selects which of the IGD/PCI Graphics devices should be the primary display, or select SG for Switchable/Hybrid GFX. Default Setting/Value: Auto

RC6 (Render Standby)(Read Only): Enables or disables render standby support. Default Setting/Value: Enable

PAVC (Read Only): Enables or disables protected audio/video control. Default Setting/Value: Lite Mode

GTT Size (Read Only): Selects the GTT size. Default Setting/Value: 2 MB

Aperture Size (Read Only): Selects the aperture size. Default Setting/Value: 256 MB

DVMT Pre-Allocated (Read Only): Selects the DVMT 5.0 pre-allocated (Fixed) graphics memory size used by the internal graphics device. Default Setting/Value: 64 MB

Spread Spectrum Clock (Read Only): Enables or disables the clock chip spread spectrum feature. Default Setting/Value: Disable

### **IGD - LCD Control**

IGD Turbo: Selects the IGD Turbo feature, if Auto is selected. IGD Turbo will only be enabled when SOC stepping is 80 or above. Default Setting/Value: Auto

Force Lid Status: For test: forces lid status to on or off. Default Setting/Value: ON

BIA: When Auto is selected, GMCH uses the VBIOS default. When Level n is selected, GMCH is enabled with the selected Aggressiveness Level. Default Setting/Value: Auto

LCD Panel type: Choices: 640 x 480, 800 x 600, 1025 x 768, 1280 x 1024, 1400 x 1050, 1600 x 1200, 1360 x 768, 1680 x 1050, and so on.

IGD Boot Type: Selects preference for Integrated Graphics Device (IGD) display interface used upon system boot. Choices: Auto, VGA Port, DP, LVDS. Default Setting/Value: Auto

Panel Scaling: Selects the LCD panel scaling option used by the internal graphics device. Choices: Auto, Centering, Stretching. Default Setting/Value: Auto

## System Component

### PMIC Configuration: PNP Setting

Select PNP setting mode, Disable, Performance, Power or Power & Performance mode.

## South Cluster Configuration

### PCI Express Configuration

This subset of the South Cluster Configuration menu provides PCI Express configuration options.

- PCI Express Root Port 1: Controls the PCI Express Root Port 1  
Default Setting/Value: Enable
- PCI Express Root Port 2: Controls the PCI Express Root Port 2  
Default Setting/Value: Enable
- PCI Express Root Port 3: Controls the PCI Express Root Port 3  
Default Setting/Value: Enable
- PCI Express Root Port 4: Controls the PCI Express Root Port 4  
Default Setting/Value: Enable

### USB Configuration

This subset of the South Cluster Configuration menu provides USB configuration options.

- XHCI Mode: Controls mode of operation of XHCI controller. Choices: Smart Auto, Auto, Enable, Disable.
- XHCI Link Power Management: Enables or disables XHCI link power management (USB 3.0).  
Default Setting/Value: Enable
- USB OTG Support  
Enable/Disable USB OTG Support Choices: Disable, PCI Mode, ACPI Mode.
- EHCI Controller (Show only)  
Control each of the USB ports (port 0 through port 9) disabling Choices: Enable, Disable.

- USB Per-Port Disable Control  
Control each of the USB ports (0~3) disabling Choices: Disable, Enable.
- USB Per-Port #0 through Port #3 Disable  
Disable USB port Choices: Disable, Enable.

### Audio Configuration

This subset of the South Cluster Configuration menu provides audio configuration options.

LPE Audio Support. Choices: Disabled, LPE Audio ACPI mode, or LPE Audio APCI mode. Default Setting/Value: Disable

Audio Controller: Controls detection of the Azalia device. When disabled, Azalia is unconditionally disabled; when enabled, Azalia is unconditionally enabled. Default Setting/Value: Enable

### SATA Drives

This subset of the South Cluster Configuration menu provides SATA drive options.

- Chipset SATA: Enables or disables the chipset SATA controller. The chipset SATA controller supports both internal SATA ports (up to 3Gb/s supported per channel). Default Setting/Value: Enable
- SATA Test Mode: Enables or disables test mode. Default Setting/Value: Disable
- Chipset SATA Mode: When IDE is selected, compatibility mode disables AHCI. When AHCI is selected, advanced SATA features such as Native Command Queuing are supported. Default Setting/Value: AHCI



#### Warning

The operating system (OS) may not boot if this setting is changed after the OS is installed.

- Serial Port 0/1 Hot Plug Capability: Enables or disables the Hot Plug Capability. If enabled, SATA port 0/1 will be reported as Hot Plug capable.

### LPSS & SCC Configuration

OS Selection: Selects Windows or Android as the operating system.

LPSS & SCC Devices Mode: Selects ACPI Mode or PCI Mode as the LPSS & SCC Devices Mode.

SCC SD Card Support Choices: Enables or disables the SCC SD Card support.

### Miscellaneous Configuration

- State After G3: Specifies in which state to begin when power is re-applied after a power failure (G3 state) as S0 State or S5. Default Setting/Value: S0 State
- SMM Lock: Enables or disables the SMM Lock feature. This locks the SMRAM and disables the SMM driver. Default Setting/Value: Enable

- PCI MMIO Size: Sets the PCIO MMIO size as 2 GB, 1.5 GB, 1.25 GB, or 1 GB.  
Default Setting/Value: 1 GB

## Others



## SIO Configuration

### Serial Port:

- Serial Port 1: Disables or configures Serial Port 1 as 3F8/IRQ4.

### COM1 Configuration

- Configures COM1 as RS-232, RS-422, or RS-285.

### Watch Dog Timer

- Disables, or enables and configures the watch dog timer as 15 seconds, 30 seconds, 1 minute, 2 minutes, or 3 minutes.

## Hardware Monitor

**CPU TEMP:** Displays the CPU temperature in Celsius.

**SYS\_TEMP:** Displays the system temperature in Celsius.

**VCORE:** Displays the CPU CORE voltage.

**3.3V:** Displays the 3.3 V rail voltage.

**5.0V:** Displays the 5 V rail voltage.

**12.0V:** Displays the 12 V rail voltage.

**1.35V:** Displays the 1.35 V rail voltage.

## APM Configuration

**Power On By RTC Alarm:** If enabled, allows the ITX-N-3800 to be powered on by an RTC alarm. Default Setting/Value: Disable

**Wake On LAN1:** If enabled, allows the ITX-N-3800 to be awakened by LAN1. Default Setting/Value: Enable

**Wake up by Ring:** If enabled, allows the ITX-N-3800 to be awakened by a ring. Default Setting/Value: Disable

## Security

Phoenix Secure Technology Setup					
Main	Advanced	Others	Security	Boot	Exit
<p>Supervisor Password is: Cleared  User Password is: Cleared</p> <p><b>Set Supervisor Password</b> [Enter]  <b>Supervisor Hint String</b> [ ]</p> <p><b>Set User Password</b> [Enter]  <b>User Hint String</b> [ ]</p> <p><b>Min. password length</b> [ 1 ]</p> <p>Authenticate User on Boot [Disable]</p> <p><b>HDD Security Status</b>  No HDD detected</p> <p><b>Trusted Platform Module (TPM)</b>  TPM not detected</p>					Item Specific Help
					Set or clear the Supervisor account's password.
F1 Help Esc Exit	↑ Select Item → Select Menu	+/- Enter	Change Values Select ▶ Sub-Menu	F9 F10	Setup Defaults Save and Exit

**Supervisor Password is (Read Only):** Default Setting/Value: Cleared

**User Password is (Read Only):** Default Setting/Value: Cleared

**Set Supervisor Password:** Press **Enter** to set or clear the supervisor account's password. Press **Esc** to exit without making changes.

**Supervisor Hint String:** Press **Enter** to type a hint for the Supervisor password. If you forget your password, the hint may help you remember the password.

**Set User Password:** Press **Enter** to set or clear the user password. Press **Esc** to exit without making changes.

**User Hint String:** Press **Enter** to type a hint for the User password. If you forget your password, the hint may help you remember the password.

**Min. password length:** Sets the minimum number of characters for your password (1-20). Default Setting/Value: 1

**Authenticate User on Boot (Read only):** Enables or disables user authentication prompt on boot. Default Setting/Value: Disable

**HDD Security Status (Read only):** If no hard disk drive is detected, this is blank.

**No HDD Detected (Read only):** This is displayed when no hard disk drive is detected.

**Trusted Platform Module (TPM) (Read only):** This is the name of the next variable.

**TPM Not Detected (Read only):** This is the TPM variable current state.

## Boot



## Boot Priority Order

Once selected, use the + or – key to change the order in which the selected device boots. Press the up and down arrow keys to select (highlight) a device. The + and - keys move a selected device up or down. Pressing **Shift + 1** enables or disables a device (toggles its state). Pressing the **Del** key deletes an unprotected selected device.

## Exit



**Exit Saving Changes:** Saves all changes, exits setup, and restarts the system (this is the same functionality as F10).

**Exit Discarding Changes:** Exits setup without changes (this is the same functionality as ESC).

**Load Setup Defaults:** Loads standard default values (this is the same functionality as F9).

**Discard Changes:** Loads the original values of this boot time, not the default setup values.

**Save Changes:** Saves all changes on all menus, but does not restart the system.

# 10. Troubleshooting

This section provides useful tips to get the ITX-N-3800 operating. For basic hardware installation and configuration, refer to “Installation and Connections” on page 7. This section addresses system integration issues in terms of BIOS setting and OS diagnostics.

## 10.1 BIOS settings

This section assumes that you have correctly selected and connected all the devices with the required cables before applying power. If this is in question, inspect the connection and application of each of the following components: 204-pin DDR3 Memory, keyboard, mouse, SATA hard disk, VGA connector, power cable of the device, and all ATX accessories. Failure of any of these components can cause system failure.

It is recommended that you press **F2** and enter the BIOS setup menu during the initial boot-up sequence to configure a stable BIOS configuration that can be woken.

### 10.1.1 Loading the Default Optimal Setting

**NOTE** If the system appears to be unstable during its startup, you can try loading the default BIOS configuration to see if this solves the issues.

When prompted in the main setup menu, load setup defaults:

1. Apply power to an installed ITX-N-3800 and press **F2** to enter the BIOS setup menu.
2. Select the **Exit** menu and then scroll to **Load Setup Defaults**.
3. Press **Enter**.
4. To load the default optimal BIOS setup, select **Yes**. This forces the BIOS setting back to the initial factory configuration.

### 10.1.2 Reset CMOS BIOS Configuration

Jumpers can be used to reset the BIOS CMOS settings to the factory default. Enable/disable the Clear CMOS Function hardware circuit, by placing or removing the jumper from JP7 or JP8 as needed. See “CMOS Clear (JP7/JP8)” on page 26.

To reset the BIOS CMOS configuration to the factory default settings:

1. Remove power from the ITX-N-3800.
2. Find JP7/JP8.
3. Remove jumpers from pins 1-2.
4. Install jumpers on pins 2-3 and wait five seconds.
5. Replace jumpers back on pins 1-2.

### 10.1.3 Update BIOS

1. Obtain the ROM file and flash utility. See “Cables and Software Drivers” on page 43.
2. Extract the files from the zip archive to the root directory of a bootable USB flash drive. The three required files are: Shell Flash 32.efi, temp.bin, and Update.nsh.
3. Insert the USB flash drive in USB port of the ITX-N-3800 and apply power to the board.
4. Boot to EFI-Shell mode.
5. At the prompt, enter the command **fs0:** to change to the root directory of the USB drive.
6. At the root directory of the USB drive, enter the command **update** to start the updating the BIOS.
7. When the update has completed, there will be a 5-second pause and then the computer automatically restarts.
8. Press **F2** to open the BIOS setup menu and select **Load Setup Defaults**.
9. To finish the update, select the **Exit Saving Changes** option.

### 10.1.4 Install USB 3.0 Windows 7 Driver

The ITX-N-3800 uses the Bay Trail platform. This platform requires the following configuration to be able to use the USB 3.0 driver needed for the Windows 7 Operating System (OS). Perform this procedure before installing Windows 7.

**NOTE** Windows 8 can use the USB 3.0 driver directly; this procedure is for Windows 7.

1. Restart the computer and then press the **F2** key to open the BIOS setup menu.
2. From the Advanced tab on the USB Configuration screen:
  - Set XCHCI Mode to **[Disable]**
  - Set EHCI Controller to **[Enable]**
3. After completing the installation of Windows 7, from the **Advanced** tab on the USB Configuration screen:
  - Set XCHCI Mode to **[Smart Auto]**
  - Leave EHCI Controller at **[Enable]**
4. Restart the computer and allow Windows 7 to complete startup.
5. Install the USB 3.0 driver.
6. Restart the computer and then press the **F2** key to open the BIOS setup menu.
7. From the **Advanced** tab on the USB Configuration screen:
  - Set XCHCI Mode to **[Enable]**
  - Set EHCI Controller to **[Disable]**
8. To complete the installation, restart the computer and allow Windows 7 to complete startup.

## 11. Cables and Software Drivers

Go to [www.winsystems.com](http://www.winsystems.com) for cable information and software drivers.

# Appendix A. Best Practices

This section outlines the best practices for operating the ITX-N-3800 in a safe and effective manner that does not damage the board. Please read this section carefully.

**Avoid Electrostatic Discharge (ESD)**—Only handle the circuit board and other bare electronics when electrostatic discharge (ESD) protection is in place. Having a wrist strap and a fully grounded workstation is the minimum ESD protection required before the ESD seal on the product bag is broken.

## Power Supply

### Power Supply Budget

Evaluate your power supply budget. It is usually good practice to budget twice the typical power requirement for all of your devices.

### Zero-Load Power Supply

Use a zero-load power supply whenever possible. A zero-load power supply does not require a minimum power load to regulate. If a zero-load power supply is not appropriate for your application, then verify that the single board computer's typical load is not lower than the power supply's minimum load. If the single board computer does not draw enough power to meet the power supply's minimum load, then the power supply will not regulate properly and can cause damage to the ITX-N-3800.

**Use Proper Power Connections (Voltage)**—When verifying the voltage, measure it at the power connector on the ITX-N-3800. Measuring it at the power supply does not account for voltage drop through the wire and connectors.

Power the ITX-N-3800 using J1 (+12 V DC) or J12 (ATX 4-pin connector). Verify the power connections. Incorrect voltages can cause catastrophic damage.

### Power Harness

Minimize the length of the power harness. This will reduce the amount of voltage drop between the power supply and the ITX-N-3800.

### Gauge Wire

Use the largest gauge wire available for your application and connector. Most connector manufacturers have a maximum gauge wire they recommend for their pins.

### Contact Points

For maximum reliability, WinSystems boards typically use connectors with gold finish contacts. It is critical that the contact material in the mating connectors is matched properly (gold to gold and tin to tin). Contact areas made with dissimilar metals can cause oxidation/corrosion, resulting in unreliable connections.

## Power Down

Make sure that power has been removed from the system before making or breaking any connections.



**Power Supply OFF**—The power supply should always be off before it is connected to the I/O Module. Do not hot-plug the ITX-N-3800 on a host platform that is already powered.

**I/O Connections OFF**—I/O Connections should also be off before connecting them to the embedded computer modules or any I/O cards. Connecting hot signals can cause damage whether the embedded system is powered or not.

## Conformal Coating

Conformal coating by any source other than WINSYSTEMS voids the product warranty and will not be accepted for repair by WINSYSTEMS. If such a product is sent to WINSYSTEMS for repair, it will be returned at customer expense and no service will be performed. A WINSYSTEMS product conformally coated by WINSYSTEMS will be subject to regular WINSYSTEMS warranty terms and conditions.

## Operations/Product Manuals

Every single board computer has an Operations manual or Product manual.

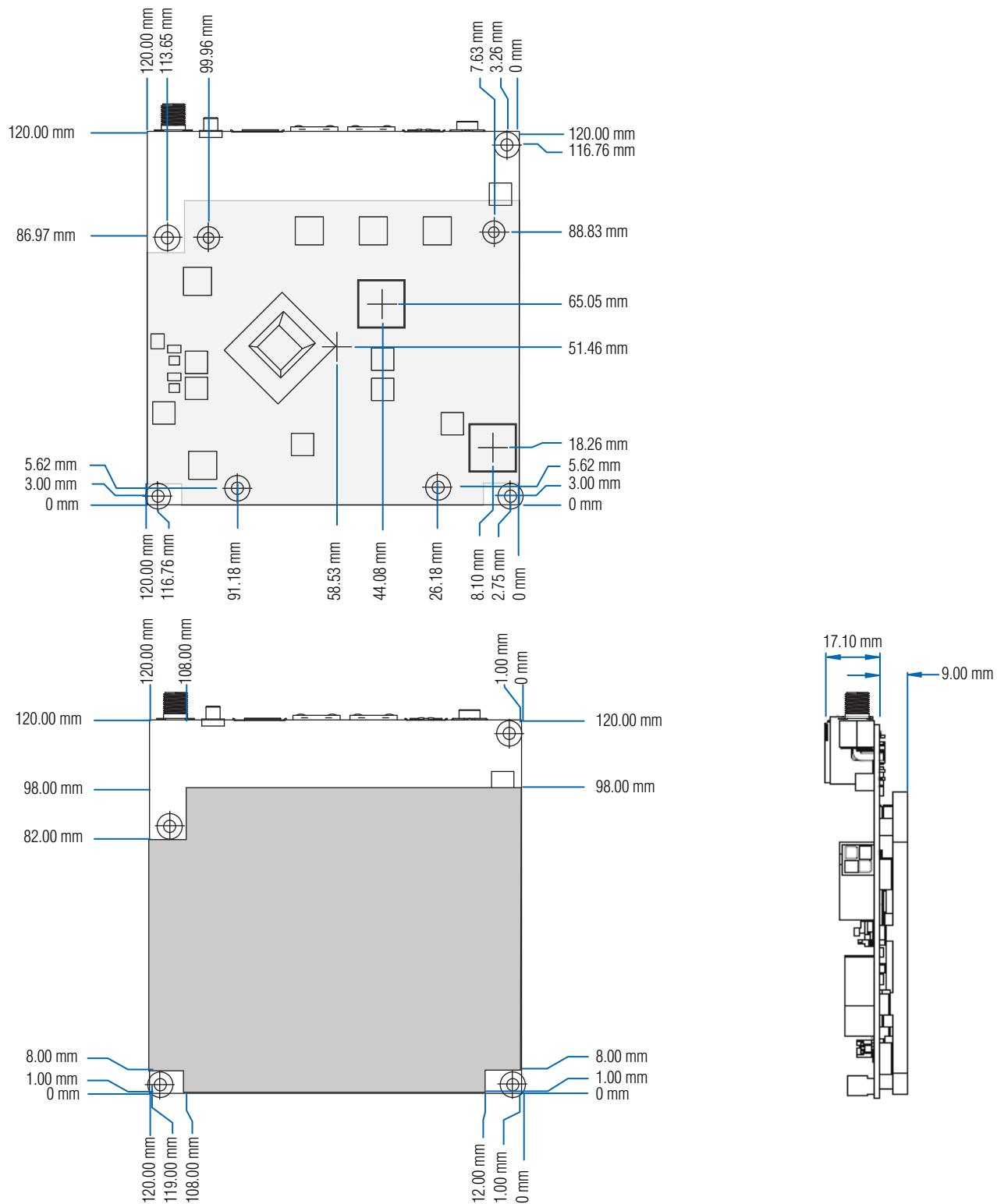
**Periodic Updates**—Operations/Product manuals are updated often. Periodically check the WinSystems website (<https://www.winsystems.com>) for revisions.

**Check Pinouts**—Always check the pinout and connector locations in the manual before plugging in a cable. Many I/O modules will have identical headers for different functions and plugging a cable into the wrong header can have disastrous results.

**Contact an Applications Engineer**—If a diagram or chart in a manual does not seem to match your board, or if you have additional questions, contact a WinSystems Applications Engineer at: +1-817-274-7553.

# Appendix B. Mechanical Drawing

Figure B-1: ITX-N-3800 Dimensions



## Appendix C. Warranty Information

Full warranty information can be found at <https://winsystems.com/company-policies/warranty/>.