

JUKO

NEST N3

XT MOTHERBOARD

USER'S MANUAL

JUKO Electronics Industrial Co., Ltd.

P/N 208-300001-00

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NOTE: Specifications are subject to change without
further notice.

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1. Introduction

NEST N3 is a IBM PC/XT compatible mainboard built to run all relevant softwares. Besides the standard architecture, it incorporates many enhanced features to make itself out-perform other XT compatibles. For example, NEST N3 is able to run at a much higher CPU clock speed, which the I/O bus speed is running at a safe 4.77MHz so that most expansion cards will function properly. In addition to the 640K conventional memory, NEST N3 can make use of the 384K memory as either extended memory (Virtual Disk) or expanded memory in EMS 4.0 standard. Therefore, the user can run a large program without adding a RAM expansion card.

Specifications :

- 8 bit high speed CPU either 8086 or V30
- 8KB NEST BIOS
- 3 CPU Speed selectable
- support 8087 coprocessor
- Dynamic Bus Speed control
- 8 I/O slots
- 8 interrupt channels
- 3 DMA channels
- Parity check enable/ disable by jumper selection

2. Feature of NEST N3

2.1 General Features

- 10MHz 0 wait state memory access
- Memory Configuration :
256K x 4 DRAM (1M/640K/512K on board)
- Parity check selectable
- Speed : 4.77/ 7.16/ 10MHz hardware/ software selectable

2.2 Enhanced Features

- EMS 4.0 support (384KB on board can be configured either extended memory as RAMDISK or expanded memory as EMS)
- HARD DISK CACHE, RAMDISK and EMS software utilities support
- Peripherals (printer port, display card etc) Auto Detect BIOS routine
- Super fast screen routine with flicker free scrolling on CGA
- Dynamic bus speed control for high compatibility of peripheral cards

3. Software Utility

3.1 NEST BIOS

The NEST BIOS is newly developed by us to make the life of use easier. Here are the highlights of features.

1. Fastest screen routine with flicker free scrolling on most CGA CARD.
2. Automatic equipment determination eases the procedure of equipment installation. No more switch setting pain.
3. Build in keyclick generator with 8 levels of loudness control.
4. Dynamic speed control for floppy disk drive and other I/O operation to ensure compatibility with PC/XT.
5. Fast RAM TEST can be skipped if desired.

3.2 Software support for NEST N3

Utility Disk, included in the package of NEST N3, provides the software control of the system as follows :

3.2.1 CONTROL.COM (CPU CONTROL PANEL)

CONTROL.COM is the program that enables user to set the speed of CPU and the level of keyclick. It can be run in three different modes.

(a) Menu Driven Mode

To access the software, just type CONTROL <CR>

```
----- NEST N3 Control Panel -----
CPU Speed      4.77MHz
Key Click Off

Use <-- --> to set Speed + - to set Keyclick
Press ESC when finished

----- Version 1.0 -----
```

The above menu will be displayed on screen, use the <--&--> to set the desirable speed, and use KEYPAD + - to set the level of keyclick.

Having finished, just PRESS "ESC" to return to the system.

(b) Command Line Mode

Type CONTROL [OPTION] <CR>

Available options are :

/r	Stay resident
/s0-2	Speed Control (0=4.77MHz 1=7.16MHz 2=10MHz)
/k0-7	Keyclick level (0=Off 7=Highest)

(c) Resident Mode

Type CONTROL / R <CR>

After that, control will stay resident and you can then select CPU speed directly with control keys :

Ctrl-Alt 0 = 4.77MHz
Ctrl-Alt 1 = 7.16MHz
Ctrl-Alt 2 = 10MHz

NOTE : Resident Mode needed to be run only once. Running Resident Mode more than once will cause no harm but will eat up some of your system memory.

3.2.2 EMS.SYS

EMS.SYS is a EMS driver that will turn the Extra Memory on the system board into LIM 4.0 EMS Memory (320K in 1M system). In case of using EMS.SYS, just include the following line in the CONFIG.SYS file of your boot disk.

DEVICE = EMS.SYS

Any program that can utilize LIM EMS memory can work with the driver.

NOTE : DO NOT USE EMS.SYS TOGETHER WITH OTHER EMS BOARD SINCE THE DRIVER ONLY EMULATES LIM MEMORY AND THERE MAY BE CHANCE OF CONFLICT, IN THAT CASE, REMOVE THE DRIVER AND INSTALL A EMS BOARD.

3.2.3 CACHE.SYS

CACHE.SYS is a hard disk speed up program that enables your hard disk to run 10 times faster.

To use CACHE.SYS, include the following command in the CONFIG.SYS file of your boot disk.

DEVICE = CACHE.SYS

3.2.4 RDISK.SYS

RDISK.SYS is a super fast RAMDISK program utilizing the extra RAM in your system. To install the disk, include the command below in the CONFIG.SYS file.

```
DEVICE = RDISK.SYS
```

The DISK will be installed automatically.

IMPORTANT: SINCE EMS.SYS, CACHE.SYS & RDISK.SYS TRY TO OCCUPY ALL EXTRA RAM FOUND IN THE SYSTEM, THEY CAN'T BE USED TOGETHER. INSTALL ONLY ONE OF THESE DRIVERS AT A TIME.

4. System Configuration

This section provides information for preparation of using NEST N3. The user should understand all the information contained in this section before beginning to configure the system.

4.1 System Configuration Setup

The NEST N3 has an eight way DIP switch SWA to set the system configuration. The switch settings are listed as followings :-

SWA - System Configuration DIP Switches



- SW1 - Reserved, ON/OFF does not matter
- SW2 - Presence of Maths Co-Processor
- SW3, SW4 - Amount of Memory on System Board
- SW5, SW6 - Type(s) of Display Adapter(s)
- SW7, SW8 - Number of 5 1/4 inch Diskette Drivers Installed

NOTE : SW3 to SW8 are autodetected by NEST BIOS, they are needed to be set if use other BIOS without autodetection routine.

SW2

Switch		Function
SW2	On	no 8087
	Off	with 8087

SW3, SW4

SW3	SW4	Memory Size
On	On	0 KB
Off	On	512 KB
On	Off	640 KB
Off	Off	1 MB

SW5, SW6

SW5	SW6	Display Adapter
On	On	Enhanced Graphics Adapter
Off	On	Color Graphics Adapter (40x25)
On	Off	Color Graphics Adapter (80x25)
Off	Off	Monochrome Display Adapter

SW7, SW8

SW7	SW8	Diskette Drives
On	On	1 Drive
Off	On	2 Drives
On	Off	3 Drives
Off	Off	4 Drives

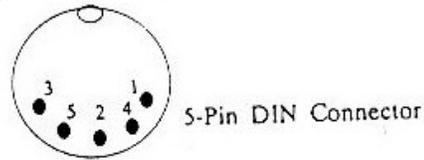
4.2 Switch Settings and Connector Descriptions

The NEST N3 provides the following connectors for your control panel, keyboard and power supply :

- Keyboard connector
- Power supply connector
- Co-processor
- Reset switch
- Speaker connector
- Keylock
- Turbo light
- Turbo switch
- Parity check
- Power Light

a) Keyboard Connector

The pin out of keyboard connector are as follows:



Pin	Description
1	Keyboard Clock
2	Keyboard Data
3	Keyboard Reset
4	Keyboard Ground
5	+5V DC

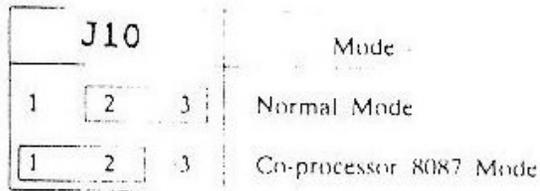
b) Power Supply Connector

Power supply connector is a single plastic connector. The pin assignments for the power supply connector are as follows :

Pin	Description
1	Not connected
2	Not connected
3	+12V DC
4	-12V DC
5	Ground
6	Ground
7	Ground
8	Ground
9	-5V DC
10	+5V DC
11	+5V DC
12	+5V DC

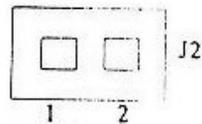
(c) Co-processor (J10)

In order to let the co-processor 8087 (when inserted in U3) operate with all software, J10 is recommended to be short



d) Reset Switch (J2)

With a switch is connected to J2, the computer will operate normally while the switch is open. If you press and release the switch once, it will cause the system to reset. The switch setting and pinout are as follows :



J2	Function
Open	Executing
Close	Reset CPU

Pin	Description
1	Reset in
2	Ground

e) Speaker Connector (J3)

To use the speaker function, connecting a speaker to J3 on the mainboard. The pinout assignment is shown below :



Pin	Description
1	+ Anode
2	Speaker data

f) Keylock (J4)

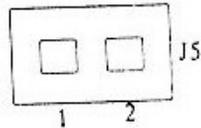
The keylock connector is located at J4 on the mainboard. The keyboard is locked while J4 is open. When the J4 is closed, the keyboard is unlocked. For the switch settings and pinout of keylock connector, refer to the following table :



J4	Function
Close	Enable Keyboard
Open	Lock Keyboard

g) Turbo Light (J5)

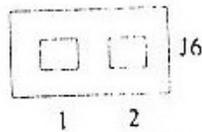
The Turbo LED indicates operation in Super Turbo mode. The Turbo Light Connector is located at J5 on the mainboard. The pinouts for the connector at J5 are as follows :



Pin	Description
1	- Cathode
2	+ Anode

h) Turbo Switch (J6)

The operation of the system can be switched between Super Turbo and Normal mode. The connector of the switch is located at J6 on the mainboard. The Super Turbo mode is on while the J6 jumper is shorted. When the jumper is open, the system is in Normal mode. The pinout assignment and switch setting of Turbo Switch is shown below :

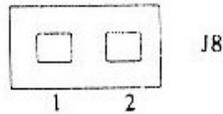


J6	CPU Speed
Open	4.77 MHz
Close	10 MHz

Pin	Description
1	Ground
2	Turbo Switch

(i) Parity Check (J8)

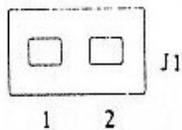
The parity check can be enabled or disabled by J8. However, parity DRAM chips should be inserted when parity check is enabled. Otherwise, parity check error occurs during the start-up.



J8	Parity Check
Open	Disable
Short	Enable

(j) Power Light (J1)

The power light connector is located at J1. If the LED is connected to J1, it will be ON while the power is switched on. The pinout description is shown below :



Pin	Description
1	+ Anode
2	- Cathode

5. Memory Configuration

Different RAM chips are used in different memory configuration of the NEST N3. Note that the switch setting of SWA has to be set in the proper position. (Please refer to section 4.1)

5.1 RAM Configuration

(a) 1MB Configuration

DRAM chips	Sockets
44256 x 8	U7 - U14
41256 x 4 (parity)	U15 - U18

(b) 640KB Configuration

DRAM chips	Sockets
44256 x 4	U8, U10, U12, U14
4464 x 4	U1, U2, U4, U5
41256 x 2 (parity)	U17, U18
4164 x 2 (parity)	U3, U6

(c) 512KB Configuration

DRAM chips	Sockets
44256 x 4	U8, U10, U12, U14
41256 x 2 (parity)	U17, U18

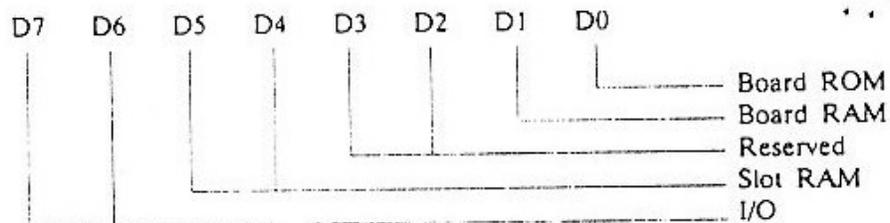
5.2 RAM Speed

Normally, RAM speed of 150ns or faster can be used on our NEST N3.

APPENDIX A Wait State Programming

Program Options :-

Wait State Register 070H (I/O) is a 8 bits (Read/Write) register.



Board ROM

D0	Wait state
0	0
1	1

Board RAM

D1	Wait state
0	0
1	1

Slot RAM

D5	D4	Wait State
0	0	0
0	1	1
1	0	2
1	1	3

I/O

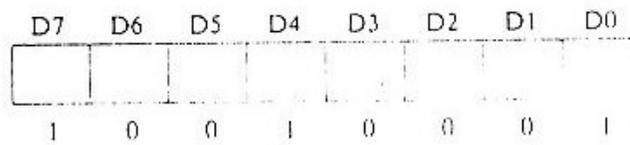
D7	D6	Wait State
0	0	0
0	1	1
1	0	2
1	1	3

To program the following example :

I/O as 2 wait states
Slot RAM as 1 wait state
Board RAM as 0 wait state
Board ROM as 1 wait state

You have to set the value of Wait State Register as 91H

Wait State Register 070H :



Programing Sequence :-

```
CLI
IN      AL, 70H
MOV     AL, #MODE      (#MODE = 91H)
OUT     70H, AL
STI
STI
```

Where #MODE is the desirable wait state setting for the Wait State Register.

APPENDIX B Error Message of BIOS

1. 'PARITY ERROR'

Occurs on system parity error or I/O channel NMI error. The system will halt.

2. 'KEYBOARD ERROR OR LOCKED'

During the system boot up, if the keyboard is not connected or, the keyboard is hardware locked, or the keyboard is bad, the error message will be displayed on the screen.

APPENDIX C General Information on Trouble-Shooting.

Symptoms

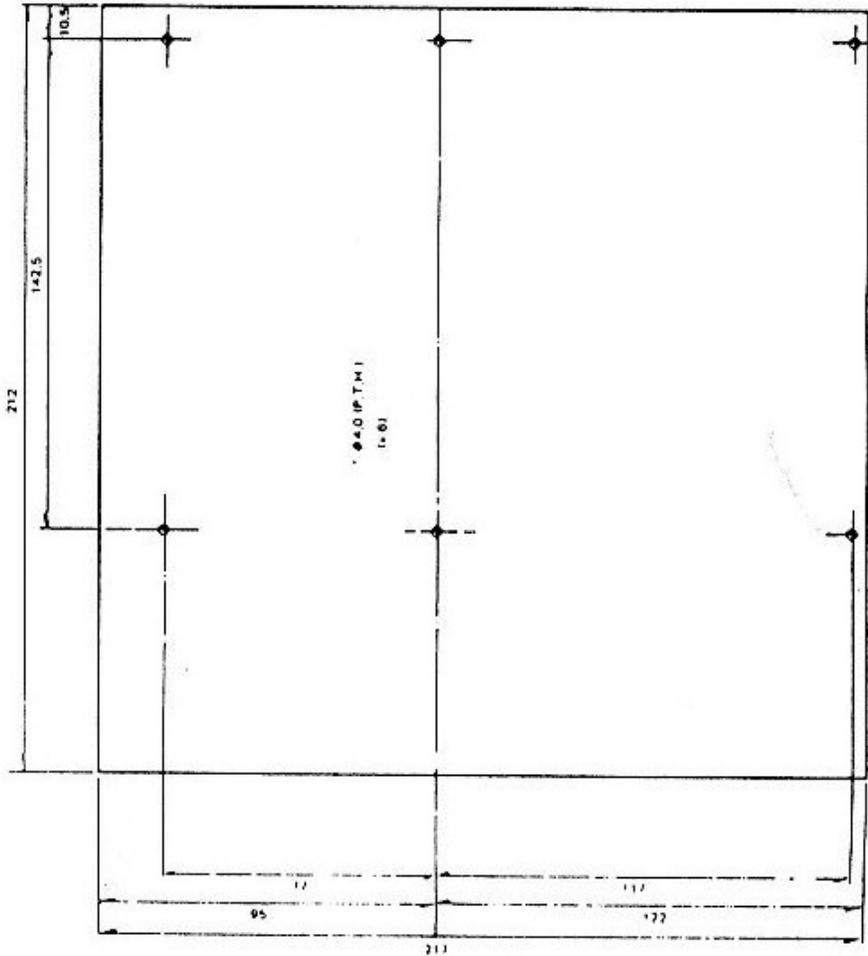
1. No video display and no power light during the power up.
 - a) Problem:
Power Cord is not connected.
Solution:
Check power cord is properly installed.
 - b) Problem:
Power supply does not work.
Solution:
Replace another power supply.

2. No video display and 1 beep is heard, but the floppy disk does work.
 - a) Problem:
Video plug is not connected.
Solution:
Connect the video plug to display adapter.

3. 1 long 2 short beeps are heard with no video display, but the floppy disk drive does work.
 - a) Problem:
Some dirt or bad contact between the card-edge signal tabs of the display card and the I/O slots.
Solution:
Clean the card-edge signal tabs with contact cleaner or insert the display adapter to another slot on the NEST N3 mainboard.

4. Video display and NEST N3 mainboard work properly, but the Keyboard is malfunction.
 - a) Problem:
Keylock is locked.
Solution:
Unlocked the keylock.
 - b) Problem:
Keyboard is not connected to the NEST N3 mainboard.
Solution:
Connect the Keyboard Connector Properly

APPENDIX D Dimension of NEST N3 Mainboard



- NOTE
- 1. All Dimensions are in MM
 - 2. Material 1.6MM THK FR4

APPENDIX E Layout of NEST N3 Mainboard

