Monotech PCs
NuXT Rev1.2
DIY Kit Instructions

These instructions are provided to help with this kit, but they do not show you how to make a good solder joint, or other electronics skills. If unsure, Google it, or ask. As with any DIY kit, warranty cannot be provided.

There are four surface mount components in this kit, with 1.27mm and 0.65mm pitch. Make sure you have good flux and are practiced in SMD soldering.

For troubleshooting, you should have a multimeter at the least; preferably an oscilloscope too.

Parts list:

ICs	Package	Quantity	Markings/details	Needed for
FE2010A XT Chipset	LCC-84	1	FE2010A*	
Trident TVGA9000i VGA Chipset	QFP-160	1	TVGA9000i-*	Onboard VGA
8088 or NEC V20 10MHz+ CPU	DIP-40	1	*8088-1 or NEC D70108*-10	
39SF010 128KiB 8-bit Flash (programmed)	DIP-32	1	SST39SF010* (Micro 8088 BIOS + XT-IDE CF)	
PIC12F629 Microcontroller (programmed)	DIP-8	1	12F629* (AT2XT Keyboard Converter)	PS/2 keyboard support
27C256 32KiB EPROM (programmed)	DIP-28-W	1	*27C256* (TVGA9000i BIOS D4.01E)	Onboard VGA
128KiB 4-bit 70ns DRAM	DIP-20	2 or 4	*4C4256*70 or *514256*70	Onboard VGA
512KiB 8-bit Parallel SRAM	SOP-32 450mil	2	AS6C4008-*SIN or HM628512*LFP*	
PC8477 Floppy Controller	LCC-68	1	PC8477* or 82077AA*	Onboard floppy controller
16550 UART	LCC-44	1	*16*50*	Onboard serial port
75185 RS232 Transceiver	DIP-20	1	*75*185* or GD75232*	Onboard serial port
74LS688 Identity Comparator	DIP-20	2	*74*T688* or *74*S688* or *74F521*	Onboard XT-CF and ROM socket
74F573 Octal Latch	DIP-20	3	*74F573*	
74F245 Octal Transceiver	DIP-20	2	*74F245*	
74F244 Octal Buffer	DIP-20	2	*74F244*	
74F138 3-to-8 Decoder	DIP-16	1	*74F138*	
74LS138 3-to-8 Decoder	DIP-16	2	*74*T138* or *74*S138* or *74F138*	Onboard floppy and serial
74LS74 Dual D Flip-flop	DIP-14	1	*74*T74* or *74*S74* or *74F74*	
74F32 Quad OR Gate	DIP-14	1	*74F32*	
74LS14 Schmitt Hex Inverter	DIP-14	1	*74*T14* or *74*S14* or *74F14*	
74F11 Triple 3-input AND Gate	DIP-14	2	*74F11*	
74HCT04 Hex Inverter	DIP-14	1	*74*T04*	
7905 Negative 5V Linear Regulator	TO-220	1	*7905	-5V rail at ISA slots

Crystals	Package	Quantity	Markings/details	Needed for
1.8432MHz Crystal	HC49*	1	Or a 5V DIP-14 Oscillator instead	Onboard serial port
24MHz Crystal	HC49*	1		Onboard floppy controller
28.63636MHz Crystal	HC49*	1		
40MHz Crystal	HC49*	1		Onboard VGA

Connectors	Package	Quantity	Markings/details	Needed for
2x31-way 2.54mm Through-hole edge connector		4		ISA slots
3M CompactFlash connector		1	3M N7E50-7516TS0884	Onboard XT-CF
DE-9 Male right-angle connector		1	Supports centred between both pin rows	Onboard serial port
DE-15 Female right-angle connector		1	Supports in-line with middle pin row	Onboard VGA
6-pin Mini-DIN right-angle female connector		1	Preferably purple	PS/2 keyboard support
4-way right-angle pin header	P=2.54mm	1	Speaker header	External speaker support
2x5-way right-angle pin header	P=2.54mm	1	Front panel header	
2x8-way vertical pin header	P=2.54mm	1	Serial port jumper block	Onboard serial port
2x10-way right-angle male connector	P=4.2mm	1	ATX power connector	
2x17-way vertical shrouded pin header	P=2.54mm	1	Floppy connector	Onboard floppy controller
DIP-8 Socket		1		
DIP-20 Socket		4		Onboard VGA
DIP-28 Socket		2		Onboard VGA and ROM Socket
DIP-32 Socket		1		
DIP-40 Socket		2		
LCC-44 Through-hole Socket		1		Onboard serial port
LCC-68 Through-hole Socket		1		Onboard floppy controller
LCC-84 Through-hole Socket		1		

Monotech PCs
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DIY Kit Instructions

Switches	Package	Quantity	Markings/details	Needed for
4-way DIP Switch	DIP-8	1	ROM Socket Address	Onboard ROM socket
6-way DIP Switch	DIP-12	1	UMB Config	UMB support
10-way DIP Switch	DIP-20	1	System Config	
MS-22D18G2 DPDT Switch		1	U35 ROM Size	Onboard ROM socket
Standard Tactile Switch		2		Onboard Power / Reset button

Resistors	Package	Quantity	Markings/details	Needed for
33 Resistor	P=7.5mm	3	Org-Org-Blk or Org-Org-Blk-Gld	
47 Resistor	P=7.5mm	2	Yel-Vil-Blk or Yel-Vil-Blk-Gld	
100 Resistor	P=7.5mm	1	Brn-Blk-Brn or Brn-Blk-Blk-Blk	Onboard VGA
150 Resistor	P=7.5mm	4	Brn-Grn-Brn or Brn-Grn-Blk-Blk	Onboard VGA
470 Resistor	P=7.5mm	2	Yel-Vil-Brn or Yel-Vil-Blk-Blk	
1K Resistor	P=7.5mm	8	Brn-Blk-Red or Brn-Blk-Blk-Brn	
1.5K Resistor	P=7.5mm	1	Brn-Grn-Red or Brn-Grn-Blk-Brn	Onboard serial port
4.7K Resistor	P=7.5mm	4	Yel-Vil-Red or Yel-Vil-Blk-Brn	
5.6K Resistor	P=7.5mm	1	Grn-Blu-Red or Grn-Blu-Blk-Brn	Onboard XT-CF
10K Resistor	P=7.5mm	5	Brn-Blk-Org or Brn-Blk-Blk-Red	
1M Resistor	P=7.5mm	2	Brn-Blk-Grn or Brn-Blk-Blk-Yel	
1K Bussed Resistor Array (5 resistors)	SIP-6	1	*102*	Onboard floppy controller
4.7K Bussed Resistor Array (4 resistors)	SIP-5	3	*472*	
4.7K Bussed Resistor Array (7 resistors)	SIP-8	1	*472*	
10K Bussed Resistor Array (8 resistors)	SIP-9	5	*103*	

Capacitors	Package	Quantity	Markings/details	Needed for
22pF Ceramic Capacitor	P=5mm	4	22	
47pF Ceramic Capacitor	P=5mm	10	47	
100pF Ceramic Capacitor	P=5mm	1	101	Onboard VGA
470pF Ceramic Capacitor	P=5mm	1	471	Onboard VGA
1nF Ceramic Capacitor	P=5mm	1	102	Onboard VGA
10nF Ceramic Capacitor	P=5mm	1	103	Speaker support
100nF Ceramic Capacitor	P=5mm	47	104	
1uF Ceramic Capacitor	P=5mm	1	105	
10uF Ceramic Capacitor	P=5mm	21	106	

Misc parts	Package	Quantity	Markings/details	Needed for
NuXT Rev1.2 PCB		1		
2N2907 PNP Transistor	TO-92	1	With EBC pinout (install backwards if CBE)	Speaker support
Magnetic speaker (not piezo)	D=12mm, P=6.5mm	1		Onboard speaker
3mm LED	P=2.54mm	6	Preferably Red,Red,Yel,Blu,Grn,Wht	CF activity and power rail LEDs
3mm 2-pin bipolar LED	P=2.54mm	1	Red/Green	Bus Activity indicator
1N4148 Diode	DO-34	3	1N4148	
1.1A Resettable Fuse	P=5mm	1		PS/2 keyboard support
Ferrite Bead	P-7.5mm	6		Onboard VGA
2.7uH Inductor	P=7.5mm	1	Red-Vil-Gold	Onboard VGA
5.6uH Inductor	P=7.5mm	2	Grn-Blu-Gold	Onboard VGA

- If using 1.8432MHz 5V DIP-14 Oscillator instead of 1.8432MHz Crystal, you can omit:
  - 1 x 47pF Ceramic Capacitor
  - 1 x 22pF Ceramic Capacitor
  - 1 x 1.5K Resistor
  - 1 x 1M Resistor
- If using an Intel 82077 Floppy Controller instead of the recommended PC8477, a 4.7nF Ceramic Capacitor is also needed.
- The markings in the parts list can contain asterisks as wildcards. For example, some compatible ICs:
  - *74*T32* or *74*S32*: “SN74AHCT32N”
  - HM628512*LFP*: “HM628512BLFP-7”
  - *16*50*: “PC16550DV” or “TL16C550CFNR”
  - *75*185*: “SN75C185N”
- Some 74-series logic can be substituted. 74LS can be substituted for 74F. 74F can usually be substituted for 74ACT.

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Notes:

- For bussed resistor arrays, they only need to be long enough to fill all holes without a cross through them. Holes with a cross are unused, but are there to accommodate larger SIP resistor arrays. Trim legs off of oversized resistor arrays.
- To install long-leaded parts, you may bend the legs before turning the PCB over. But I prefer to leave the legs straight, put a flat soft object like a rigid mousepad on top of the parts, then turn the PCB over. The flat object keeps the parts from falling out, and you have nice straight legs to solder. *Works great for ICs especially.* Solder one pin of parts first and check they are flush on the other side, adjusting if necessary, before soldering the rest of the pins. Especially important for ICs, DIP switches, and ISA slots.
- For the 7905 regulator, you can bolt the tab down, or solder the tab down. I prefer to solder, but it takes some heat first.
- Ensure polarity is correct for applicable parts.
    - Parts where orientation matters:
        - ICs and IC sockets (notch or line on IC must match notch or line on PCB outline)
        - LCC IC Sockets (flat corner must match flat corner on PCB outline)
        - Bussed resistor arrays (end of resistor array with dot lines up with pin in square on PCB outline)
        - Transistor (Flat side of transistor lines up with flat side on PCB, for EBC transistors. Reverse for CBE transistors)
        - Diodes
        - DIP Switches (switch 1 lines up with square pad on PCB)
        - Voltage regulator (tab lies flat on PCB)
        - LEDs (flat side faces square pad [negative])
    - Parts where orientation does not matter:
        - Single resistors
        - Inductors and ferrite beads
        - Ceramic capacitors
        - Crystals
        - Speaker
        - Pin headers
        - DPDT switch and tactile switches
        - ISA slots
- The 74HCT04 IC is preferably a 74*T04, to reduce the power-off glow of the bus activity LED. This will be improved in next version, to prevent the bus activity LED from being lit while powered off (due to stray current from the 5VSB circuit). Using 74LS04 or 74F04 will result in a much more brightly lit activity LED when system is powered off, compared to CMOS parts, which is undesirable. This IC is marked “74F04” on Rev1.2 PCBs.

Procedure:

1) **Read the notes above.**
2) For the Front Panel and Speaker headers, remove the pin that is marked with a cross on the associated PCB pad.
3) Install the parts in the correct order so you don’t block yourself from installing the rest of the parts. The order would be:
    a. Resistors, inductors, diodes, short crystals, speaker header.
    b. VGA IC
    c. SRAM ICs
    d. DIP ICs and 7905 regulator
    e. DIP IC Sockets, Bussed Resistor Arrays, and LEDs
    f. CompactFlash Connector
    g. Capacitors and SW4 (U35 ROM Size)
    h. DIP Switches and Front Panel header
    i. LCC sockets, Speaker, Transistor, vertical headers
    j. Connectors
    k. Tall crystal
    l. ISA slots
4) Inspect everything carefully, especially for SMD bridges and unsoldered pins.
5) (optional) Clean the flux off. Then dry the PCB, especially under ICs.
6) Insert the socketed ICs.
7) Set DIP switches to default, as detailed on the silkscreen.
8) Test, and check for display output and RAM test. There should be a power-on jingle as soon as the power button is pressed.