

The DNP/2486 MAX-Linux Features

This document describes the main features of the user installable MAX-Linux system for the DIL/NetPC DNP/2486. MAX-Linux features a typical standard Linux system, based on the Debian Etch (4.0) distribution. MAX-Linux makes use of a complete user defined boot process that uses special kernel parameters to boot into to rootfs without the need of initial RAM disk.

The MAX-Linux root filesystem uses an extended ext3 partition of the DNP/2486 NAND flash memory and offers complete user access (non-volatile R/W access). All features of the kernel and hardware specific modules for the Vortex86SX SOC are integrated, as well as the complete set of applications and tools known from base system of the famous Debian desktop version.

MAX-Linux offers console-based access to the platform, either through serial line or the Ethernet infrastructure and supports telnet or the more secure ssh protocol.

1. Main Features

- Syslinux 3.63 based bootloader system for USB-NAND flash
- Linux-Kernel Version 2.6.18.8-dmp-ssv1 (standard debian kernel modules)
- Debian Etch (4.0) based ext3 rootfs filesystem (non-volatile)
- Java(TM) SE Runtime Environment (build 1.6.0_03-b05)

2. General Tools

- GNU bash (Version 3.1.17)
- Perl interpreter (Version 5.8.8)
- apt-get and aptitude (Software package management)
- packaging tools (tar, gzip, bzip2, zip)
- midnight commander (file manager)
- Rich set of command line applications and tools known from the Debian desktop version

3. Filesystem Tools

- vfat, fat, msdos, iso (iso8859), nfs and many more modules for filesystem mount support
- fdisk harddisk partitioning tool
- mkfs.ext2, mkfs.ext3, mkfs.vfat, mkfs.msdos formating tool
- tune2fs tool
- loop device support

4. Network Feature

- dhcp client
- ipv4 and ipv6 kernel modules

- telnet-daemon for network remote login
- ssh-daemon for secure network remote login
- ftp-daemon for network file transfer
- full featured tftp client
- webservers lighttpd
- socat

5. Kernel Module Support

- lsmod
- depmod
- modprobe
- rmmod

6. Other Features

- minicom
- login and getty standard utilities for remote login
- passwd password utility
- addgroup, adduser, delgroup, deluser (non-volatile user management)
- pivot_root, chroot capabilities
- halt, reboot, shutdown features
- full kernel module support (standard Debian kernel modules for a variety of devices)

7. Serial Console Boot Messages

```
Linux version 2.6.18.8-dmp-ssv1 (mha@hareangle-saturn) SSV20080404 (gcc-Version
4.1.2 20061115 (prerelease) (Debian 4.1.1-21)) #1 PREEMPT Fri Apr 4 10:17:51
CEST 2008
```

```
BIOS-provided physical RAM map:
```

```
BIOS-e820: 0000000000000000 - 000000000009fc00 (usable)
BIOS-e820: 000000000009fc00 - 00000000000a0000 (reserved)
BIOS-e820: 00000000000e0000 - 0000000000100000 (reserved)
BIOS-e820: 0000000000100000 - 0000000004000000 (usable)
BIOS-e820: 00000000ff000000 - 0000000100000000 (reserved)
```

```
64MB LOWMEM available.
```

```
DMI not present or invalid.
```

```
Allocating PCI resources starting at 10000000 (gap: 04000000:fb000000)
```

```
Built 1 zonelists. Total pages: 16384
```

```
Kernel command line: root=/dev/sda5 ro console=ttyS0,115200 pnpbios=off acpi=off
rootdelay=6 ssvinit BOOT_IMAGE=bzImage
```

```
No local APIC present or hardware disabled
```

```
Initializing CPU#0
```

```
PID hash table entries: 512 (order: 9, 2048 bytes)
```

```
Console: colour dummy device 80x25
```

```
Dentry cache hash table entries: 8192 (order: 3, 32768 bytes)
```

```
Inode-cache hash table entries: 4096 (order: 2, 16384 bytes)
```

```
Memory: 61388k/65536k available (1838k kernel code, 3700k reserved, 713k data,
264k init, 0k highmem)
Checking if this processor honours the WP bit even in supervisor mode... Ok.
Security Framework v1.0.0 initialized
SELinux: Disabled at boot.
Capability LSM initialized
Mount-cache hash table entries: 512
Compat vDSO mapped to fffffe000.
CPU: 486
Checking 'hlt' instruction... OK.
NET: Registered protocol family 16
EISA bus registered
PCI: Using configuration type 1
Setting up standard PCI resources
ACPI: Interpreter disabled.
Linux Plug and Play Support v0.97 (c) Adam Belay
pnp: PnP ACPI: disabled
PnPBIOS: Disabled
SCSI subsystem initialized
usbcore: registered new driver usbfs
usbcore: registered new driver hub
PCI: Probing PCI hardware
PCI: Using IRQ router default [17f3/6031] at 0000:00:07.0
NET: Registered protocol family 2
IP route cache hash table entries: 512 (order: -1, 2048 bytes)
TCP established hash table entries: 2048 (order: 1, 8192 bytes)
TCP bind hash table entries: 1024 (order: 0, 4096 bytes)
TCP: Hash tables configured (established 2048 bind 1024)
TCP reno registered
audit: initializing netlink socket (disabled)
audit(1213580399.552:1): initialized
VFS: Disk quotas dquot_6.5.1
Dquot-cache hash table entries: 1024 (order 0, 4096 bytes)
Initializing Cryptographic API
io scheduler noop registered
io scheduler anticipatory registered
io scheduler deadline registered
io scheduler cfq registered (default)
isapnp: Scanning for PnP cards...
isapnp: No Plug & Play device found
Serial: 8250/16550 driver $Revision: 1.90 $ 4 ports, IRQ sharing enabled
serial8250: ttyS0 at I/O 0x3f8 (irq = 4) is a 16550A
serial8250: ttyS1 at I/O 0x2f8 (irq = 3) is a 16550A
serial8250: ttyS2 at I/O 0x3e8 (irq = 4) is a 16550A
serial8250: ttyS3 at I/O 0x2e8 (irq = 3) is a 16550A
RAMDISK driver initialized: 16 RAM disks of 8192K size 1024 blocksize
ehci_hcd 0000:00:0a.1: EHCI Host Controller
ehci_hcd 0000:00:0a.1: new USB bus registered, assigned bus number 1
ehci_hcd 0000:00:0a.1: irq 9, io mem 0x000e2000
ehci_hcd 0000:00:0a.1: USB 2.0 started, EHCI 1.00, driver 10 Dec 2004
usb usb1: configuration #1 chosen from 1 choice
hub 1-0:1.0: USB hub found
```

```
hub 1-0:1.0: 2 ports detected
ehci_hcd 0000:00:0b.1: EHCI Host Controller
ehci_hcd 0000:00:0b.1: new USB bus registered, assigned bus number 2
ehci_hcd 0000:00:0b.1: irq 10, io mem 0x000e2100
ehci_hcd 0000:00:0b.1: USB 2.0 started, EHCI 1.00, driver 10 Dec 2004
usb usb2: configuration #1 chosen from 1 choice
hub 2-0:1.0: USB hub found
hub 2-0:1.0: 2 ports detected
ohci_hcd 0000:00:0a.0: OHCI Host Controller
ohci_hcd 0000:00:0a.0: new USB bus registered, assigned bus number 3
ohci_hcd 0000:00:0a.0: irq 5, io mem 0x000e0000
usb usb3: configuration #1 chosen from 1 choice
hub 3-0:1.0: USB hub found
hub 3-0:1.0: 2 ports detected
ohci_hcd 0000:00:0b.0: OHCI Host Controller
ohci_hcd 0000:00:0b.0: new USB bus registered, assigned bus number 4
ohci_hcd 0000:00:0b.0: irq 11, io mem 0x000e1000
usb 2-1: new high speed USB device using ehci_hcd and address 2
usb usb4: configuration #1 chosen from 1 choice
hub 4-0:1.0: USB hub found
hub 4-0:1.0: 2 ports detected
usb 2-1: configuration #1 chosen from 1 choice
Initializing USB Mass Storage driver...
scsi0 : SCSI emulation for USB Mass Storage devices
usbcore: registered new driver usb-storage
USB Mass Storage support registered.
PNP: No PS/2 controller found. Probing ports directly.
serio: i8042 AUX port at 0x60,0x64 irq 12
serio: i8042 KBD port at 0x60,0x64 irq 1
mice: PS/2 mouse device common for all mice
EISA: Probing bus 0 at eisa.0
EISA: Detected 0 cards.
TCP bic registered
NET: Registered protocol family 1
NET: Registered protocol family 17
NET: Registered protocol family 8
NET: Registered protocol family 20
Using IPI Shortcut mode
Waiting 6sec before mounting root device...
Time: pit clocksource has been installed.
  Vendor: SMI          Model: USB DISK          Rev: 1100
  Type:   Direct-Access          ANSI SCSI revision: 00
SCSI device sda: 1981440 512-byte hdwr sectors (1014 MB)
sda: Write Protect is off
sda: assuming drive cache: write through
SCSI device sda: 1981440 512-byte hdwr sectors (1014 MB)
sda: Write Protect is off
sda: assuming drive cache: write through
  sda: sda1 sda2 < sda5 >
sd 0:0:0:0: Attached scsi disk sda
EXT3-fs: INFO: recovery required on readonly filesystem.
EXT3-fs: write access will be enabled during recovery.
```

```
kjournald starting.  Commit interval 5 seconds
EXT3-fs: recovery complete.
EXT3-fs: mounted filesystem with ordered data mode.
VFS: Mounted root (ext3 filesystem) readonly.
Freeing unused kernel memory: 264k freed

INIT: version 2.86 booting

EXT3 FS on sda5, internal journal
Setting the system clock..
Cleaning up ifupdown....
Loading kernel modules...r6040: RDC R6040 RX NAPI net driver, version 0.17
(13Apr2007)
r6040: RDC R6040 RX NAPI net driver, version 0.17 (13Apr2007)
dnp2486_wdt: timeout 60 sec.
ssvpio2486: version 20080312, using major 65
done.
/etc/ssvconfig/sbin/ipbynet: create child with pid 367
Setting kernel variables...done.
Mounting local filesystems...done.
Activating swapfile swap...done.
Setting up networking....
Configuring network interfaces...done.
Starting web server: lighttpd
NET: Registered protocol family 10
lo: Disabled Privacy Extensions
IPv6 over IPv4 tunneling driver
.
Starting internet superserver: inetd.
Starting OpenBSD Secure Shell server: sshd.
Starting periodic command scheduler: crond.

INIT: Entering runlevel: 9

Debian GNU/Linux 4.0 emblinux ttyS0

emblinux login:
```

After that the DNP/2486 MAX-Linux allows a user login with the user name *root*. This user name needs the password *root*.