The DNP/2486 MIN-Linux Features

The DNP/2486 MIN-Linux system is using a RAM disk image based on the Debian Etch (4.0) distribution. The RAM disk has been built from scratch to support all features of the kernel and hardware specific modules for the Vortex86SX SOC of the DNP/2486.

The RAM disk offers console-based access to the platform, either through serial line or using the telnet protocol over Ethernet.

This minimal system may also be used to upgrade the system to MAX-Linux which offers a complete console based system with all features known from the famous Debian desktop version.

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 module subset)
- MIN-Linux Debian Etch (4.0) based ext2 ramdisk image

2. Busybox

- BusyBox v1.1.3
- Build in commands:

  [, [[, adjtimex, ar, arping, ash, awk, basename, bunzip2, busybox, bzcat, cal, cat, chgrp, chmod, chown, chroot, chvt, clear, cmp, cp, cpio, cut, date, dc, dd, deallocvt, df, dirname, dmesg, dos2unix, du, dumpkmap, dumpleases, echo, egrep, env, expr, false, fgrep, find, fold, free, ftpget, ftpput, getopt, grep, gunzip, gzip, head, hexdump, hostid, hostname, httpd, id, ifconfig, ip, ipaddr, ipcalc, iplink, iproute, iptunnel, kill, killall, klogd, last, length, ln, loadfont, loadkmap, logger, login, logname, logread, losetup, ls, md5sum, mkdir, mkfifo, mknod, mktemp, more, mount, mt, mv, nameif, nc, netstat, nslookup, od, openvt, patch, pidof, ping, ping6, printf, ps, pwd, rdate, readlink, realpath, renice, reset, rm, rmdir, route, rpm, rpm2cpio, run-parts, sed, setkeycodes, sh, sha1sum, sleep, sort, start-stop-daemon, strings, stty, swapoff, swapon, sync, syslogd, tail, tar, tee, telnet, telnetd, test, tftp, time, top, touch, tr, traceroute, true, tty, udhcpc, udhcpd, umount, uname, uncompress, uniq, unix2dos, unzip, uptime, usleep, uudecode, uuencode, vi, watch, watchdog, wc, wget, which, who, whoami, xargs, yes, zcat

3. Filesystem Tools

- vfat, fat, msdos, iso (iso8859) kernel modules for filesystem mount support
- fdisk harddisk partitioning tool
- mkfs.ext2, mkfs.ext3, mkfs.vfat, mkfs.msdos formatting tool
- tune2fs tool
- loop device support

4. Network Feature

- ipv4 and ipv6 kernel modules
- telnet-deamon for network remote login
- ftp-deamon for network file transfer
- tftp client (included in busybox)

5. Kernel Module Support

- lsmod
- depmod
- modprobe
- rmmod

6. Other Features

- login and getty standard utilities for remote login
- passwd password utility (only temporary)
- pivot_root, chroot capabilities
- halt, reboot, shutdown features
- kernel module support for USB HID devices (mouse, keyboard …)

7. Serial Comsole Boot Messages

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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: initrd=initrd.gz root=/dev/ram0 rw console=ttyS0,115200
pnpbios=off acpi=off rootdelay=0 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: 58644k/65536k available (1838k kernel code, 6440k 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
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Mount-cache hash table entries: 512
Compat vDSO mapped to ffffe000.
CPU: 486
Checking 'hlt' instruction... OK.
checking if image is initramfs...it isn't (no cpio magic); looks like an initrd
Freeing initrd memory: 2737k freed
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(1213575308.868:1): 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
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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
Time: pit clocksource has been installed.
RAMDISK: Compressed image found at block 0
VFS: Mounted root (ext2 filesystem).
Freeing unused kernel memory: 264k freed

INIT: version 2.86 booting

  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
Setting hostname to 'emblinux'...done.
Cleaning up ifupdown....
Loading kernel module mii.
Loading kernel module r6040.
r6040: RDC R6040 RX NAPI net driver, version 0.17 (13Apr2007)
r6040: RDC R6040 RX NAPI net driver, version 0.17 (13Apr2007)
Loading kernel module dnp2486_wdt.
dnp2486_wdt: timeout 60 sec.
Loading kernel module ssvpio.
ssvpio2486: version 20080312, using major 65
Will now mount local filesystems:.
Setting up networking....
Configuring network interfaces...done.
Initializing random number generator...done.

INIT: Entering runlevel: 2

Starting internet superserver: inetd.
Running local boot scripts (/etc/rc.local).
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emblinux login:
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After that the DNP/2486 MIN-Linux allows a user login with the user name ***root***. This user name needs no password.