

The eSOM/2586 MAX-Linux Features

This document describes the main features of the user installable MAX-Linux system for the embedded system-on-module eSOM/2586. 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 rootfs without the need of initial RAM disk.

The MAX-Linux root filesystem uses an extended ext3 partition of the eSOM/2586 NAND flash memory and offers complete user access (non-volatile R/W access). All features of the kernel and hardware specific modules for the Vortex86DX 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)
- X server for VGA LCD and 4-wire resistive touch screen interface

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 partitoning tool
- mkfs.ext2, mkfs.ext3, mkfs.vfat, mkfs.msos formatting 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
- webservice lighttpd
- socat
- SSV IP-by-Net (special IP address assignment)

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)
- SSV watch dog driver (DNP/2486 WDT)
- SSV PIO driver (ssvpio2486)
- SSV RS485 driver
- SSV LCD brightness control for BB6eSOM
- SSV CAN driver for SJA1000

7. Serial Comsole Boot Messages

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SYSLINUX 3.63 2008-04-10 EBIOS Copyright (C) 1994-2008 H. Peter Anvin
[03;00H Loading bzImage.....ready.
[04;00H
[05;00H
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
CPU: Vendor unknown, using generic init.
CPU: Your system may be unstable.
BIOS-provided physical RAM map:
  BIOS-e820: 0000000000000000 - 000000000009fc00 (usable)
  BIOS-e820: 000000000009fc00 - 00000000000a0000 (reserved)
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BIOS-e820: 00000000000e0000 - 0000000000100000 (reserved)
BIOS-e820: 0000000000100000 - 0000000008000000 (usable)
BIOS-e820: 00000000ff000000 - 0000000100000000 (reserved)
128MB LOWMEM available.
DMI not present or invalid.
Allocating PCI resources starting at 10000000 (gap: 08000000:f7000000)
Detected 800.048 MHz processor.
Built 1 zonelists. Total pages: 32768
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: 1024 (order: 10, 4096 bytes)
Console: colour VGA+ 80x25
Dentry cache hash table entries: 16384 (order: 4, 65536 bytes)
Inode-cache hash table entries: 8192 (order: 3, 32768 bytes)
Memory: 126348k/131072k available (1838k kernel code, ...
... 4328k reserved, 713k data, 264k init, 0k highmem)
Checking if this processor honours the WP bit even in supervisor mode... Ok.
Calibrating delay using timer specific routine.. 1602.11 BogoMIPS (lpj=3204229)
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: Vortex86 SoC 05/02 stepping 02
Checking 'hlt' instruction... OK.
NET: Registered protocol family 16
EISA bus registered
PCI: PCI BIOS revision 3.00 entry at 0xf0031, last bus=0
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: 1024 (order: 0, 4096 bytes)
TCP established hash table entries: 4096 (order: 2, 16384 bytes)
TCP bind hash table entries: 2048 (order: 1, 8192 bytes)
TCP: Hash tables configured (established 4096 bind 2048)
TCP reno registered
audit: initializing netlink socket (disabled)
audit(1218608514.488:1): initialized
VFS: Disk quotas dquot_6.5.1
Dquot-cache hash table entries: 1024 (order 0, 4096 bytes)
Initializing Cryptographic API
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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 0x000e3000
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 0x000e1000
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 15, io mem 0x000e2000
usb 1-1: new high speed USB device using ehci_hcd and address 2
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 0x000e0000
usb 1-1: configuration #1 chosen from 1 choice
usb usb4: configuration #1 chosen from 1 choice
hub 4-0:1.0: USB hub found
hub 4-0:1.0: 2 ports detected
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
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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: tsc 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.
EXT3-fs: recovery complete.
kjournald starting. Commit interval 5 seconds
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, (13Apr2007) ...
r6040: RDC R6040 RX NAPI net driver, version 0.17 (13Apr2007)
dnp2486_wdt: timeout 60 sec.
ssvpio2486: version 20090326, using major 65
rs485: module license 'LGPL' taints kernel.
rs485: version 20090320, using major 121, io 0x3e8
lcd-brightness: version 20090420, using major 66
ISA-PeliCAN-indexed port I/O CAN Driver 3.4.6-4_DNP2486 (c) May 13 2009
  H.J. Oertel (oe@port.de), H. Nestler (info at ssv-embedded.de)
done.
/etc/ssvconfig/sbin/ipbynet: create child with pid 375
Setting kernel variables...done.
Mounting local filesystems...done.
Activating swapfile swap...done.
Setting up networking....
Configuring network interfaces...done.
Starting web server: lighttpdNET: 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.
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Starting...  
> eSOM/2586 SSV (SJA1000) at indexed port I/O
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INIT: Entering runlevel: 9
```

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Debian GNU/Linux 4.0 emblinux ttyS0
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emblinux login:
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After that the eSOM/2586 MAX-Linux allows a user login with the user name *root*. This user name needs the password *root*.

Please note: The MAX-Linux for the embedded system-on-module eSOM/2586 contains some parts of the DIL/NetPC DNP/2486 MAX-Linux.