Erfolgloser Versuch einer Debian Installation auf einem Wyse 3125SE Thin Client

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Inhaltsverzeichnis

1 Vorwort

Dies sollte ein Anleitung sein wie man Linux auf einem Wyse 3125SE Thin Client installiert.
Doch leider ist mir dies nicht gelungen!
Dennoch soll diese Anleitung einen Einblick geben wie man an die Sache herangeht und vielleicht kann jemand anders die Aufgabe lösen.
Der interne Mini-IDE Port wirkt verlockend scheint aber mangels eines ordentlichen BIOS nicht ansprechbar zu sein. Es ist mir nicht klar wie viel das Systems vom Arbeitsspeicher dem Grafikspeicher zuweist. Dies konnte auch mit dem original Windows CE nicht eindeutig ermittelt werden. Der Bootscreen (Framebuffer Mode) wurde nur bei einer der vielen versuchten Kombinationen (Kernel, Boot Parameter) wirklich angezeigt, leider ist mir nicht mehr bekannt bei welcher Kombination. Darum habe ich den Bootvorgang mit einem seriellen Kabel überwacht (Software HTerm - http://www.der-hammer.info/terminal/).
Ich habe viele verschiedene Kernel und Patches getestet deshalb sind hier auch mehrere dokumentiert. Schlussendlich konnte ich den USB-Port aber nicht dazu bringen meinen Stick zu erkennen und einzubinden. Somit gab es keine root System.
Da diese Projekt gescheitert ist, möchte ich darauf hinweisen, dass die Anleitung fehlerhaft, irreführend und unvollständig sein kann!
Weiters möchte ich darauf hinweisen das ein Wyse 3150 die weit aus unkompliziertere und leistungsfähigere Hardware ist.
Ich vermute, dass ein Wyse 5125 die gleiche Hardware nur mit einem anderen „linuxkompatiblen“ BIOS ist. Die vermutlich sinnvollste Lösung wäre es das BIOS zu tauschen. Leider steht mir so ein BIOS nicht zur Verfügung und deshalb kann ich diese Vermutung nicht verifizieren.

Nützliche Links:
http://thunderlord.net.pl/evo/
http://www.parkytowers.me.uk/thin/Wyse3125SE/

2 Hardware

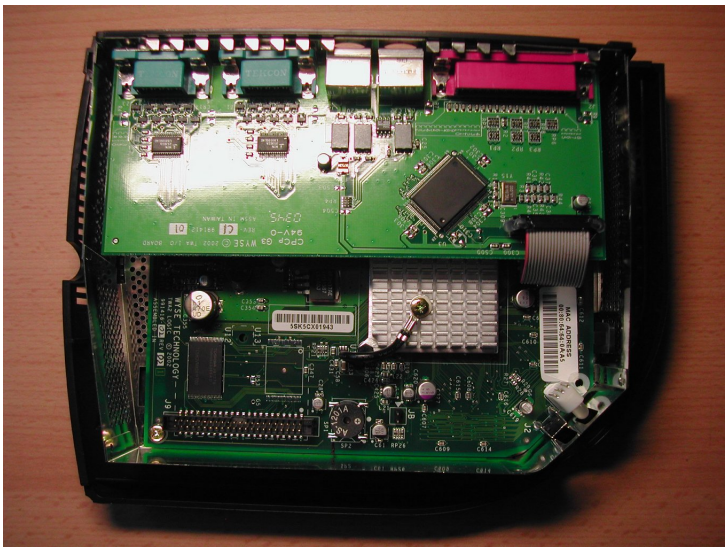

Abbildung 1: Wyse 3125 - Intern

2.1 Intern

CPU/Chipsatz AMD/NSC SC2200 266 MHz
Die CPU in dem SoC ist ein AMD/NSC Geode GX1

Sound Im Chipsatz integriert

Speicher 64 MB

I/O National Semiconductor PC87360 (Hardwaremonitoring?)

USB 1.0 Im Chipsatz integriert

Netzwerk Im Chipsatz integriert,NSC DP8381

Fash 32 MB

BIOS SST SST39VF020 (PLCC)

2.2 Schnittstellen

2x seriell - RS-232, 9-polig
1x parallel - IEEE 1284 (EPP/ECP) - D-Sub (DB-25), 25-polig
3x USB - USB Typ A, 4-polig
1x Netzwerk - Ethernet 10Base-T/100Base-TX - RJ-45

1x Kopfhörer - Ausgabe - Mini-Phone Stereo 3.5 mm
1x Tastatur - generisch - Mini-DIN (PS/2-Typ), 6-polig
1x Maus - generisch - Mini-DIN (PS/2-Typ), 6-polig
1x Display / Video - VGA - HD D-Sub (HD-15), 15-polig

2.3 Abmessungen

Höhe: 21 cm
Breite: 16 cm
Tiefe: 5.7 cm

2.4 Netzteil

Ausgang: 12 VDC, 5 A [-]-(o-[+]

3 Installation Betriebssystem

Für die Installation benötigt man ein Linux System.
Das Betriebssystem für den Thin Client wird auf einem USB-Stick installiert.

3.1 USB-Stick partitionieren und formatieren

fdisk -l
fdisk /dev/sda
d
n
p
Partition number: 1
First cylinder:
Last cylinder:
w
mkfs.ext3 /dev/sda1

3.2 Debian Installation

apt-get install debootstrap
mkdir /mnt/buildroot
mount -t ext3 /dev/sda1 /mnt/buildroot
debootstrap --arch i386 etch /mnt/buildroot http://ftp.debian.org/debian/

chroot /mnt/buildroot /bin/su -

/etc/fstab [-rw-r--r-- root root]

```
# /etc/fstab: static file system information.
#
# <file system> <mount point>   <type>      <options>          <dump>  <pass>
/dev/sda1       /               ext3        defaults,noatime   0       1
none            /proc           proc        defaults           0       1
```

mount -a

/etc/hostname [-rw-r--r-- root root]

```
wyse3125
```

/etc/hosts [-rw-r--r-- root root]

```
127.0.0.1 localhost
127.0.1.1 wyse3125
```

/etc/apt/sources.list [-rw-r--r-- root root]

```
deb http://ftp.tu-graz.ac.at/mirror/debian/ etch main
#deb-src http://ftp.tu-graz.ac.at/mirror/debian/ etch main

deb http://security.debian.org/ etch/updates main
#deb-src http://security.debian.org/ etch/updates main
```

apt-get update
apt-get clean
adduser <Benutzer>

apt-get install locales
dpkg-reconfigure locales

apt-get install console-data
dpkg-reconfigure console-data

3.3 Network

/etc/network/interfaces [-rw-r--r-- root root]

```
auto eth0
iface eth0 inet static
```

```
        address 192.168.0.250
        netmask 255.255.255.0
        network 192.168.0.0
        broadcast 192.168.0.255
        gateway 192.168.0.1
        # dns-* options are implemented by the resolvconf package, if installed
        #dns-nameservers 192.168.0.10
```

3.4 TFTP-Server

apt-get install tftpd-hpa Should the server be started by inetd? Nein
/etc/default/tftpd-hpa.conf [-rw-r--r-- root root]

```
#Defaults for tftpd-hpa
RUN_DAEMON="yes"
OPTIONS="-v -l -s /var/lib/tftpboot"
```

3.5 DHCP-Server

apt-get install dhcp
/etc/dhcpd.conf [-rw-r--r-- root root]

```
subnet 192.168.0.0 netmask 255.255.255.0 {
  range 192.168.0.180 192.168.0.198;
  option broadcast-address 192.168.0.255;
  option routers 192.168.0.1;
}


host ThinClient3125 {
        hardware ethernet 00:80:64:41:FF:A5;
        fixed-address 192.168.0.199;
        filename "bootp.bin";
        next-server 192.168.0.250;
}
```

/etc/init.d/dhcp [-rwxr-xr-x root root]

```
   echo -n "Starting DHCP server: "
   start-stop-daemon --start --quiet --pidfile $DHCPDPID \
   --exec /usr/sbin/dhcpd -- -q $INTERFACES -p 10067
   sleep 2
```

/etc/init.d/dhcp restart

3.6 Debian 2.4 sarge

apt-get install build-essential libncurses-dev kernel-package bzip2 modutils

/etc/apt/sources.list [-rw-r--r-- root root]

```
deb http://security.debian.org/ sarge/updates main
deb http://backports.debian.or.at/backports.org/ sarge-backports main contrib non-free
```

apt-get update

4 Firmware

4.1 Kernel 2.4.17

wget http://www.kernel.org/pub/linux/kernel/v2.4/linux-2.4.17.tar.bz2
mv linux linux-2.4.17
cd linux-2.4.17
mkdir patch
cd patch
wget http://www.amd.com/files/connectivitysolutions/geode/geode_gx/15_-_Graphics_LinuxFramebuffer_SCx200_2.7.7_src.tar.gz
7z x 15_-_Graphics_LinuxFramebuffer_SCx200_2.7.7_src.tar.gz
cd Graphics/LinuxFramebuffer/SCx200/2.7.7/
chmod +x install
./Install
/usr/src/linux-2.4.17
Do you want to continue (y/n)? y
cd /usr/src/linux-2.4.17/patch/

wget http://www.amd.com/files/connectivitysolutions/geode/geode_gx/10_-_Patches_Linux_2.4.24_1.00.tar.gz
7z x 10_-_Patches_Linux_2.4.24_1.00.tar.gz

cd /usr/src/linux-2.4.17
patch -p1 < patch/Patches_Linux_2.4.24_1.00/linux-2.4.24-geode.patch

make oldconfig
National Geode display support y
TV Support y
FlatPanel Support y
DDC Support y
GAL Support y

make menuconfig

```
Processor type and features
Procesor family
586 <select>
Block Devices
(16384) Default RAM disk size
ATA/ATAPI/MFM/RLL
IDE, ATA and ATAPI Block divices
Cyrix CS5530 MediaGX chipset support <*>
SCx200 chipset support <*>
SCSI Device Support
SCSI device support <*>
Network Device Support
Ethernet (10 or 100Mbit)
EISA, VLB, PCI and on board controllers
National Semiconductor DP8381x series PCI Ethernet support <*>
Console drivers
National Geode display support <*>
TV Support <*>
FlatPanel Support <*>
DDC Support <*>
GAL Support <*>
USB support
  Support for Host-side USB<*>
OHCI HCD support <*>
USB Mass Storage support <*>
ISD-200 USB/ATA Bridge support <n>
Bus options (PCI etc.)
NatSemi SCx200 support <*>
NatSemi SCx200 27MHz High-Resolution Timer Support <*>
```

apt-get install gcc-2.95
Makefile

```
HOSTCC          = gcc-2.95

AS              = $(CROSS_COMPILE)as
LD              = $(CROSS_COMPILE)ld
CC              = $(CROSS_COMPILE)gcc-2.95
CPP             = $(CC) -E
```

4.2 Kernel 2.4.24

cd /usr/src
wget http://www.kernel.org/pub/linux/kernel/v2.4/linux-2.4.24.tar.gz
tar xzvf linux-2.4.24.tar.gz

ls -s linux-2.4.24.tar.gz linux
mkdir patch
cd patch
wget http://www.kernel.org/pub/linux/devel/binutils/linux-2.4-seg-4.patch
wget http://www.amd.com/files/connectivitysolutions/geode/geode_gx/10_-_Patches_Linux_2.4.24_1.00.tar.gz
7z x 10_-_Patches_Linux_2.4.24_1.00.tar.gz
wget http://www.amd.com/files/connectivitysolutions/geode/geode_gx/15_-_Graphics_LinuxFramebuffer_SCx200_2.7.7_src.tar.gz
7z x 15_-_Graphics_LinuxFramebuffer_SCx200_2.7.7_src.tar.gz
cd Graphics/LinuxFramebuffer/SCx200/2.7.7/
chmod +x install
./Install
/usr/src/linux
Do you want to continue (y/n)? y
cd /usr/src/linux
cat ../patch/Patches_Linux_2.4.24_1.00/linux-2.4.24-geode.patch | patch -p1
cp ../patch/Patches_Linux_2.4.24_1.00/sc1200_2.4.24.config .config
cat ../patch/linux-2.4-seg-4.patch | patch -p1
ln -s /sbin/depmod /sbin/depmod.modutils

make menuconfig

```
Processor type and features
Procesor family
Geode-GX1/SC1200 <select>
Block Devices
(16384) Default RAM disk size
ATA/ATAPI/MFM/RLL
IDE, ATA and ATAPI Block divices
Cyrix CS5530 MediaGX chipset support <*>
SCx200 chipset support <*>
SCSI Device Support <*>
SCSI device support <*>
SCSI disk support <*>
Network Device Support
Ethernet (10 or 100Mbit)
EISA, VLB, PCI and on board controllers
National Semiconductor DP8381x series PCI Ethernet support <*>
Character devices
Watchdog Cards
NatSemi SCx200 GPIO Support <*>
Console drivers
National Geode display support <*>
TV Support <*>
```

```
FlatPanel Support <*>
DDC Support <*>
GAL Support <*>
Sound
Sound card support <*>
Support for USB
  Preliminary USB device filesystem <*>
UHCI Alternate Driver support <*>
OHCI HCD support <*>
USB Mass Storage support <*>
ISD-200 USB/ATA Bridge support <n>
```

apt-get install gcc-2.95
Makefile

```
HOSTCC          = gcc-2.95

AS              = $(CROSS_COMPILE)as
LD              = $(CROSS_COMPILE)ld
CC              = $(CROSS_COMPILE)gcc-2.95
CPP             = $(CC) -E
```

make-kpkg clean

ln -s /sbin/depmod /sbin/depmod.modutils
time make dep && make clean && make bzImage && make modules && make modules_install
cp arch/i386/boot/bzImage ../bzImage-2.4.24.wyse3125
mkinitrd -o ../initrd.img-2.4.24.wyse3125 2.4.24-geode-1-0-6
initrd.img-2.4.24.wyse3125
bzImage-2.4.24.wyse3125

4.3 Kernel 2.4.31

wget http://www.kernel.org/pub/linux/kernel/v2.4/linux-2.4.31.tar.bz2
tar xjvf linux-2.4.31.tar.bz2
ln -s linux-2.4.31 linux
mkdir patch
cd patch
wget http://www.kernel.org/pub/linux/devel/binutils/linux-2.4-seg-4.patch
wget http://winterm.gaast.net/downloads/linux-2.4.31-geodefb.patch.gz
gzip -d linux-2.4.31-geodefb.patch.gz
cd ../linux
cat ../patch/linux-2.4-seg-4.patch | patch -p1
cat ../patch/linux-2.4.31-geodefb.patch | patch -p1

wget http://winterm.gaast.net/downloads/config-2.4.31
cp config-2.4.31 .config
make menuconfig

```
ATA/ATAPI/MFM/RLL support --->
<*> ATA/ATAPI/MFM/RLL support
IDE, ATA and ATAPI Block devices --->
<*> Enhanced IDE/MFM/RLL disk/cdrom/tape/floppy support
  <*> SCSI emulation support
[*] PCI IDE chipset support
<*> SCx200 chipset support
<*> Cyrix CS5530 MediaGX chipset support
SCSI Support --->
<*> SCSI support
<*> SCSI disk support
Network Device Support --->
Ethernet (10 or 100Mbit) --->
[*] Ethernet (10 or 100Mbit)
[*] EISA, VLB, PCI and on board controllers
<*> National Semiconductor DP8381x series PCI Ethernet support
Console drivers --->
[ ] VGA text console
[*] Video mode selection support
Frame-buffer support --->
[*] Support for frame buffer devices
<*> National Geode display support
[ ] TV Support
[*] FlatPanel Support
[*] DDC Support
[*] GAL Support
USB support --->
  <*> Support for USB
   [*] Preliminary USB device filesystem
<*> OHCI support
<*>USB Mass Storage support
```

make-kpkg clean
time make-kpkg –initrd –append-to-version=.wyse3125 kernel_image kernel_headers
cd..
dpkg –install linux-image-2.4.31.wyse3125_2.4.31.wyse3125-10.00.Custom_i386.deb
cd /bootp
rm nk.bin
./make-nk -k /boot/vmlinuz-2.4.31.wyse3125 -i /boot/initrd.img-2.4.31.wyse3125
rm linux.img bootp.bin

../fw_builder/bundle-tools/fwpack linux.img frl_code.ce k nk.bin poweron.bmp frl_code.bin
cat netxfer > bootp.bin && cat linux.img >> bootp.bin
../fw_builder/bundle-tools/fwextract bootp.bin list
cp bootp.bin /var/lib/tftpboot
in.tftpd -a 192.168.0.250:10069 -l -v -s /var/lib/tftpboot/

4.4 Kernel 2.4.36.8

apt-get install build-essential libncurses-dev kernel-package bzip2 modutils
cd /usr/src
wget http://www.kernel.org/pub/linux/kernel/v2.4/linux-2.4.36.8.tar.bz2
tar xjvf linux-2.4.36.8.tar.bz2
ln -s linux-2.4.36.8 linux
mkdir patch
cd patch
wget http://www.amd.com/files/connectivitysolutions/geode/geode_gx/10_-_Patches_Linux_2.4.24_1.00.tar.gz
7z x 10_-_Patches_Linux_2.4.24_1.00.tar.gz
wget http://www.zen49396.zen.co.uk/T1500/2.4-kernel/linux-2.4.31-geodefb.patch
cd /usr/src/linux
cat ../patch/linux-2.4.24-geode.patch | patch -p1
cat ../patch/linux-2.4.31-geodefb.patch | patch -p1
cp /boot/config-2.4.27-3-386 .
make menuconfig

```
Processor type and features
Procesor family
Geode-GX1/SC1200 <select>
Block Devices
RAM Disk support <*>
(8192) Default RAM disk size
Initial RAM disk (inirtd) support <*>
ATA/ATAPI/MFM/RLL <*>
IDE, ATA and ATAPI Block devices
Cyrix CS5530 MediaGX chipset support <*>
SCx200 chipset support <*>
SCSI emulation support <*>
SCSI Support
SCSI support <*>
SCSI disk support <*>
Network Device Support
Ethernet (10 or 100Mbit)
EISA, VLB, PCI and on board controllers
```

```
National Semiconductor DP8381x series PCI Ethernet support <*>
Character devices
Watchdog Cars
NatSemi SCx200 Support <M>
NatSemi SCx200 GPIO Support <M>
Console drivers
VGA text console <*>
Frame-buffer support
Support for frame buffer devices <*>
National Geode display support <*>
TV Support <n>
FlatPanel Support <*>
DDC Support <*>
GAL Support <*>
Video mode selection support <*>
File systems
Ext3 journalling file system support <*>
Compressed ROM file system support <*>
ROM file system suppport <*>

USB support
  Support for USB<*>
   UGCI Alternate Driver support <*>
OHCI support <*>
USB Mass Storage support <*>
Freecom USB/ATAPI Bridge support <*>
ISD-200 USB/ATA Bridge support < >
```

apt-get install gcc-2.95
Makefile

```
HOSTCC          = gcc-2.95

AS              = $(CROSS_COMPILE)as
LD              = $(CROSS_COMPILE)ld
CC              = $(CROSS_COMPILE)gcc-2.95
CPP             = $(CC) -E
```

make dep
make clean
make bzImage
make modules
ln -s /sbin/depmod /sbin/depmod.modutils
make modules_install
cp arch/i386/boot/bzImage ../bzImage-2.4.36.8.wyse3125

mkinitrd -o ../initrd.img-2.4.36.8.wyse3125 2.4.36.8

4.5 Kernel 2.6

apt-get install build-essential libncurses-dev kernel-package bzip2
apt-get install linux-source
bzw.
apt-get install linux-source-2.6.24

cd /usr/src
tar xjvf linux-source-2.6.24.bz2
ln -s linux-source-2.6.24 linux
cd linux
make mrproper
cp /boot/config-2.6.24-etchnhalf.1-486 /usr/src/linux/.config
make menuconfig

```
Processor type and features
Procesor family
GeodeGX1 <select>
High memory Support <off>
Paravirtualized guest support
Xen <off>
VMI <off>
Lguest <off>

Power management options
ACPI Support <off>
APM Support <off>
CPU Frequency scaling
Default CPUFreq governor (performance)
'powersave' governor <M>
'userspace' governor <M>
'ondemand' governor <M>
'conservative' governor <M>
Cyrix MediaGX/NatSemi Geode Suspend Modulation <*>

Bus options (PCI etc.)
NatSemi SCx200 support <*>
NatSemi SCx200 27MHz High-Resolution Timer Support <*>

Device Drivers
Block Devices
```

```
(16384) Default RAM disk size
ATA/ATAPI/MFM/RLL <*>
Enhanced IDE/MFM/RLL support <*>
Cyrix/National Semiconductor CS5530 MediaGX chipset support <*>
SCSI Device Support
SCSI device support <*>
SCSI disk support <*>
Network Device Support
Ethernet (10 or 100Mbit)
EISA, VLB, PCI and on board controllers
National Semiconductor DP8381x series PCI Ethernet support <*>
Ethernet (1000 Mbit) <off>
Ethernet (10000 Mbit) <off>
USB support
  Support for Host-side USB<*>
OHCI HCD support <*>
UHCI HCD support <*>
USB Mass Storage support <*>
Watchdog Timer Support
National Semiconductor PC87307/PC97307 <*>
National Semiconductor SCx200 <*>
Hardware Monitoring support
Graphics support
Support for frame buffer devices
AMD Geode family framebuffer support (EXPERIMENTAL) <*>
AMD Geode LX framebuffer support (EXPERIMENTAL) <M>
AMD Geode GX framebuffer support (EXPERIMENTAL) <M>
Manually specify the Geode GX frambuffer size [ ]
AMD Geode GX1 framebuffer support (EXPERIMENTAL) <*>
Sound card support <M>
Advanced Linux Sound Architecture <M>
PCI devices <*>
CS5530 Audio <M>
CS5535/CS5536 Audio <M>
File systems
Second extended fs support <*>
Ext3 journalling file system support <*>
Miscellaneous filesystems
Compressed ROM file system support (cramfs) <*>
ROM file system  support <*>
```

make-kpkg clean
time make-kpkg --initrd --append-to-version=.wyse3125 kernel_image kernel_headers

rm /boot/*wyse3125*
dpkg --install linux-image-2.6.24.wyse3125_2.6.24.wyse3125-10.00.Custom_i386.deb

4.6 Kernel 2.6.27.5

cp arch/i386/boot/bzImage ../bzImage-2.6.27.5.wyse3125
mkinitrd -o ../initrd.img-2.6.27.5.wyse3125 2.6.27.5
rootbzImage-2.6.27.5.wyse3125

4.7 Kernel 2.6.30

cd /usr/src
wget linux-source-2.6.30.bz2
tar xjvf linux-source-2.6.30.bz2
ln -s linux-source-2.6.30 linux
cd linux
make mrproper
cp /boot/config-2.6.24-etchnhalf.1-486 /usr/src/linux/.config
make menuconfig

```
Processor type and features
Procesor family
GeodeGX1 <select>
High memory Support (off)
[*] Memtest
[ ] Paravirtualized guest support

Power management options
[*] ACPI (Advanced Configuration and Power Interface) Support
<M> APM (Advanced Power Management) BIOS support
[*] CPU Frequency scaling
Default CPUFreq governor (performance)
<M> 'powersave' governor
<M> 'userspace' governor
<M> 'ondemand' governor
<M> 'conservative' governor
<*> Cyrix MediaGX/NatSemi Geode Suspend Modulation

Bus options (PCI etc.)
[ ] PCI Express support
<*> NatSemi SCx200 support
<*>NatSemi SCx200 27MHz High-Resolution Timer Support
< > PCCard (PCMCIA/CardBus) support
```

```
Device Drivers

[*] Block devices
(16384) Default RAM disk size
<*> ATA/ATAPI/MFM/RLL support
Enhanced IDE/MFM/RLL support <*>
<*>National SCx200 chipset support
SCSI device support
{*} SCSI device support
<*> SCSI disk support
<*> Serial ATA (prod) and Parallel ATA (experimental) drivers
 <*>     CS5530 PATA support
[*] Network device support
[*] Ethernet (10 or 100Mbit)
[*]   EISA, VLB, PCI and on board controllers
 <*> National Semiconductor DP8381x series PCI Ethernet support
[ ] Ethernet (1000 Mbit)
[ ] Ethernet (10000 Mbit)

        [*] Watchdog Timer Support
 <*> National Semiconductor SCx200 Watchdog

Graphics support
{*} Support for frame buffer devices
 [*] AMD Geode family framebuffer support (EXPERIMENTAL)
 <*> AMD Geode LX framebuffer support (EXPERIMENTAL)
 <*> AMD Geode GX framebuffer support (EXPERIMENTAL)
 <*> AMD Geode GX1 framebuffer support (EXPERIMENTAL)
[*] USB support
{*} Support for Host-side USB
[*]     USB verbose debug messages
<*>     OHCI HCD support
<*>   USB Mass Storage support
[*]     USB Mass Storage verbose debug

 File systems
<*> Second extended fs support
<*> Ext3 journalling file system support
< > The Extended 4 (ext4) filesystem
DOS/FAT/NT Filesystems
<*> MSDOS fs support
<*> VFAT (Windows-95) fs support
<*> NTFS file system support
```

```
Pseudo filesystems
<*>   Compressed ROM file system support (cramfs)
<*>   ROM file system support
```

make-kpkg clean
time make-kpkg --initrd --append-to-version=.wyse3125 kernel_image kernel_headers

rm /boot/*wyse3125*
dpkg --install linux-image-2.6.24.wyse3125_2.6.24.wyse3125-10.00.Custom_i386.deb

4.8 Original Firmware entpacken

mkdir ~/wyse3125/
mkdir ~/wyse3125/firmware
cd ~/wyse3125/firmware/
wget http://www.wyse.com/supportdownload/3series/541Wye34_3125_FTP.exe
apt-get install p7zip-full
7z e 541Wye34_3125_FTP.exe
dd if=F541_Wye34.bin of=netxfer bs=512 count=577

cd ~/wyse3125/
wget http://thunderlord.net.pl/evo/files/fw_builder.tar.gz
tar xzvf fw_builder.tar.gz
cd fw_builder
cd bundle-tools
cp ~/wyse3125/firmware/F541_Wye34.bin .
make clean
make

cd ~/wyse3125/firmware
mkdir files
cd files
~/wyse3125/fw_builder/bundle-tools/fwextract /wyse3125/firmware/F541_Wye34.bin extract

4.9 Bootimage erstellen

cd ~/wyse3125/
mkdir bootp
cd bootp

dd if=../firmware/F541_Wye34.bin of=netxfer bs=512 count=577
cp ../firmware/files/frl_code.ce .
cp ../firmware/files/frl_code.bin .

cp ../firmware/files/poweron.bmp .
cp ../firmware/files/k .

apt-get install bin86

cd ~/wyse3125/fw_builder/make-nk

boot.S:

```
kernelparam:    .ascii  "console=tty0"
;               .ascii  " root=/dev/ram0 rw "
                .ascii  " console=ttyS0,38400n8"
;                .ascii  " root=/dev/sda1 lang=us"
                .ascii  " root=/dev/sda1 lang=de"
                .ascii  " video=gx1fb:mode:800x600-16@60 vga=0x314"
;               .ascii  " video=nscfb:vmode:1024x768-16,vfreq:75 vga=0x317"
;               .ascii  " video=gx1fb:mode:800x600-16@60 vga=0x314"
;               .ascii  " video=nscfb:vmode:800x600-16,vfreq:60 vga=0x314"
;               .ascii  " idle=poll"
;                .ascii  " pnpbios=off"
;                .ascii  " acpi=off"
;                .ascii  " apm=off"
;                .ascii  " apic=off"
;                .ascii  " pci=nobios"
;               .ascii  " pci=bios"
;               .ascii  " pci=biosirq"
;                .ascii  " pci=noacpi"
;               .ascii  " pci=routeirq"
;               .ascii  " pci=nosort"
                .ascii  " reboot=bios"
                .byte   0x0
```

make clean
make
cp boot make-nk ~/wyse3125/bootp
cd ~/wyse3125/bootp
rm nk.bin
./make-nk -k /usr/src/bzImage-2.4.36.8.wyse3125 -i /usr/src/initrd-2.4.36.8.wyse3125

4.10 Neue Firmware erstellen

cd ~/3125/bootp
rm linux.img bootp.bin

../fw_builder/bundle-tools/fwpack linux.img frl_code.ce k nk.bin poweron.bmp frl_code.bin

```
fwpack - Generate WYSE Winterm firmware bundles

Checking all files and building index..... Done!
Building for machine type: 06 02 01 01
Calculating file offsets...
Expected image size: 6823860
Now creating image headers and index... Done!
Writing the files...
  frl_code.ce
  k
  frl_code.bin
  poweron.bmp
  nk.bin
End checksum of file is 0, good!
```

cat netxfer > bootp.bin && cat linux.img >> bootp.bin
ls -l bootp.bin linux.img nk.bin
bzImage-2.3.36.8:

```
-rw-r--r-- 1 root root 2164736 Nov  8 11:36 bootp.bin
-rw-r--r-- 1 root root 1869312 Nov  8 11:36 linux.img
-rw-r--r-- 1 root root 1305918 Nov  8 11:35 nk.bin
```

vmlinuz-2.6.24:

```
-rw-r--r-- 1 root root 7119288 Nov  2 17:36 bootp.bin
-rw-r--r-- 1 root root 6823864 Nov  2 17:36 linux.img
-rw-r--r-- 1 root root 6260470 Nov  2 17:10 nk.bin
```

4.11 Sicherheitcheck

~/wyse3125/fw_builder/bundle-tools/fwextract ~/wyse3125/firmware/F541_Wye34.bin list | head -n 7

```
This seems to be a NetXfer image, skipping the NetXfer bootstrap.
Offset    Size      Checksum  SysFlg  BiosFlag  Time      Filename
00005dd3  00040000  ceb26146  010000  00010000  43336e39  frl_code.ce
00045dd3  00000014  fdfc0bf5  010000  00020000  43336e39  k
00045de7  007fdb7f  f960821b  010000  00020000  43336e39  nk.bin
00843967  000097a0  248ba8c2  010000  00020000  43336e39  poweron.bmp
0084d107  00040000  179a7ed8  010000  00020000  43336e39  frl_code.bin
```

../fw_builder/bundle-tools/fwextract bootp.bin list

```
This seems to be a NetXfer image, skipping the NetXfer bootstrap.
Offset    Size      Checksum  SysFlg  BiosFlag  Time      Filename
00000106  00040000  ceb26146  010000  00010000  490dcdce  frl_code.ce
00040106  00000014  fdfc0bf5  010000  00020000  490dd3b0  k
0004011a  005f86f6  4cc5b3a8  010000  00020000  490dd0fb  nk.bin
00638812  000097a0  248ba8c2  010000  00020000  490dd1ad  poweron.bmp
00641fb2  00040000  179a7ed8  010000  00020000  490dcde0  frl_code.bin
```

4.12 Firmware aktualisieren

cp bootp.bin /var/lib/tftpboot/
in.tftpd -a 192.168.0.250:10069 -l -v -s /var/lib/tftpboot/

Wyse 3125 mit mit Spannung versorgen mit gedrückter P-Taste.
Am Bildschrim erscheint NETXFER.
Manchmal wird das Image zwei mal übertragen das sollte man abwarten.

5 Boot Ausgabe

5.1 Kernel 2.4.36.8

```
WILLO
Linux 2.4.36.8
Kernel parameters: console=tty0 console=ttyS0,38400n8 root=/dev/sda1 lang=us vid
eo=nscfb:vmode:800x600-16,vfreq:60 vga=0x317 reboot=bios
Counting memory... 03700000

Starting Linux...
Linux version 2.4.36.8 (root@vb-etch) (gcc version 2.95.4 20011002 (Debian prere
lease)) #2 Sam Nov 8 11:08:17 CET 2008
BIOS-provided physical RAM map:
 BIOS-e801: 0000000000000000 - 000000000009f000 (usable)
 BIOS-e801: 0000000000100000 - 0000000003700000 (usable)
55MB LOWMEM available.
On node 0 totalpages: 14080
zone(0): 4096 pages.
zone(1): 9984 pages.
zone(2): 0 pages.
DMI not present.
Kernel command line: console=tty0 console=ttyS0,38400n8 root=/dev/sda1 lang=us v
ideo=nscfb:vmode:800x600-16,vfreq:60 vga=0x317 reboot=bios
Initializing CPU#0
Detected 266.650 MHz processor.
Console: colour dummy device 80x25
Calibrating delay loop... 532.48 BogoMIPS
Memory: 52280k/56320k available (1953k kernel code, 3652k reserved, 690k data, 1
08k init, 0k highmem)
Checking if this processor honours the WP bit even in supervisor mode... Ok.
Dentry cache hash table entries: 8192 (order: 4, 65536 bytes)
```

```
Inode cache hash table entries: 4096 (order: 3, 32768 bytes)
Mount cache hash table entries: 512 (order: 0, 4096 bytes)
Buffer cache hash table entries: 1024 (order: 0, 4096 bytes)
Page-cache hash table entries: 16384 (order: 4, 65536 bytes)
CPU: NSC Geode(TM) Integrated Processor by National Semi stepping 00
Checking 'hlt' instruction... OK.
POSIX conformance testing by UNIFIX
PCI: Using configuration type 1
PCI: Probing PCI hardware
PCI: Probing PCI hardware (bus 00)
PCI: Fixup for MediaGX/Geode Slave Disconnect Boundary (0x41=0x94)
isapnp: Scanning for PnP cards...
isapnp: No Plug & Play device found
Linux NET4.0 for Linux 2.4
Based upon Swansea University Computer Society NET3.039
Initializing RT netlink socket
Starting kswapd
Journalled Block Device driver loaded
Installing knfsd (copyright (C) 1996 okir@monad.swb.de).
SGI XFS with realtime, tracing, debug enabled
SGI XFS Quota Management subsystem
pty: 256 Unix98 ptys configured
keyboard: Timeout - AT keyboard not present?(ed)
Serial driver version 5.05c (2001-07-08) with MANY_PORTS SHARE_IRQ SERIAL_PCI IS
APNP enabled
ttyS00 at 0x03f8 (irq = 4) is a 16550A
ttyS01 at 0x02f8 (irq = 3) is a 16550A
scx200: NatSemi SCx200 Driver
scx200: GPIO base 0x1300
Floppy drive(s): fd1 is 720k
floppy0: no floppy controllers found
RAMDISK driver initialized: 16 RAM disks of 16384K size 1024 blocksize
natsemi dp8381x driver, version 1.07+LK1.0.17, Sep 27, 2002
  originally by Donald Becker <becker@scyld.com>
  http://www.scyld.com/network/natsemi.html
  2.4.x kernel port by Jeff Garzik, Tjeerd Mulder
PCI: No IRQ known for interrupt pin A of device 00:0f.0. Please try using pci=bi
osirq.
eth0: NatSemi DP8381[56] at 0xc41c7000, 00:80:64:41:ff:a5, IRQ 0.
Uniform Multi-Platform E-IDE driver Revision: 7.00beta4-2.4
ide: Assuming 33MHz system bus speed for PIO modes; override with idebus=xx
SC1200: IDE controller at PCI slot 00:12.2
PCI: Enabling device 00:12.2 (0000 -> 0001)
SC1200: chipset revision 1
SC1200: not 100% native mode: will probe irqs later
    ide0: BM-DMA at 0x5000-0x5007, BIOS settings: hda:pio, hdb:pio
    ide1: BM-DMA at 0x5008-0x500f, BIOS settings: hdc:pio, hdd:pio
hda: C/H/S=0/0/0 from BIOS ignored
hdb: C/H/S=0/0/0 from BIOS ignored
SCSI subsystem driver Revision: 1.00
kmod: failed to exec /sbin/modprobe -s -k scsi_hostadapter, errno = 2
usb.c: registered new driver usbdevfs
usb.c: registered new driver hub
host/uhci.c: USB Universal Host Controller Interface driver v1.1
host/usb-ohci.c: USB OHCI at membase 0xc00cc000, IRQ 10
host/usb-ohci.c: usb-00:13.0, Compaq Computer Corporation ZFMicro Chipset USB
usb.c: new USB bus registered, assigned bus number 1
hub.c: USB hub found
hub.c: 3 ports detected
usb.c: registered new driver hid
hid-core.c: v1.8.1 Andreas Gal, Vojtech Pavlik <vojtech@suse.cz>
hid-core.c: USB HID support drivers
```

```
Initializing USB Mass Storage driver...
usb.c: registered new driver usb-storage
USB Mass Storage support registered.
NET4: Linux TCP/IP 1.0 for NET4.0
IP Protocols: ICMP, UDP, TCP, IGMP
IP: routing cache hash table of 512 buckets, 4Kbytes
TCP: Hash tables configured (established 4096 bind 4096)
NET4: Unix domain sockets 1.0/SMP for Linux NET4.0.
kmod: failed to exec /sbin/modprobe -s -k block-major-8, errno = 2
VFS: Cannot open root device "sda1" or 08:01
Please append a correct "root=" boot option
Kernel panic: VFS: Unable to mount root fs on 08:01
```

5.2 Kernel 2.6.24

```
WILLO
Linux 2.6.24.wyse3125
Kernel parameters: console=tty0 console=ttyS0,38400n8 root=/dev/sda1 lang=us vid
eo=nscfb:vmode:1024x768-16,vfreq:75 vga=0x317 reboot=bios

Starting Linux...
Linux version 2.6.24.wyse3125 (2.6.24-6~etchnhalf.5) (root@wyse3125) (gcc versio
n 4.1.2 20061115 (prerelease) (Debian 4.1.1-21)) #2 Tue Nov 4 23:17:21 CET 2008
BIOS-provided physical RAM map:
 BIOS-e801: 0000000000000000 - 000000000009f000 (usable)
 BIOS-e801: 0000000000100000 - 0000000003c00000 (usable)
60MB LOWMEM available.
Zone PFN ranges:
  DMA             0 ->     4096
  Normal       4096 ->    15360
Movable zone start PFN for each node
early_node_map[1] active PFN ranges
    0:        0 ->    15360
DMI not present or invalid.
Allocating PCI resources starting at 10000000 (gap: 03c00000:fc400000)
swsusp: Registered nosave memory region: 000000000009f000 - 0000000000100000
Built 1 zonelists in Zone order, mobility grouping on.  Total pages: 15240
Kernel command line: console=tty0 console=ttyS0,38400n8 root=/dev/sda1 lang=us v
ideo=nscfb:vmode:1024x768-16,vfreq:75 vga=0x317 reboot=bios
No local APIC present or hardware disabled
Initializing CPU#0
PID hash table entries: 256 (order: 8, 1024 bytes)
Detected 266.607 MHz processor.
Console: colour dummy device 80x25
console [tty0] enabled
console [ttyS0] enabled
Dentry cache hash table entries: 8192 (order: 3, 32768 bytes)
Inode-cache hash table entries: 4096 (order: 2, 16384 bytes)
Memory: 53268k/61440k available (1759k kernel code, 7764k reserved, 748k data, 2
60k init, 0k highmem)
virtual kernel memory layout:
    fixmap  : 0xfffba000 - 0xfffff000   ( 276 kB)
    vmalloc : 0xc4800000 - 0xfffb8000   ( 951 MB)
    lowmem  : 0xc0000000 - 0xc3c00000   (  60 MB)
      .init : 0xc0376000 - 0xc03b7000   ( 260 kB)
      .data : 0xc02b7c54 - 0xc0372da4   ( 748 kB)
      .text : 0xc0100000 - 0xc02b7c54   (1759 kB)
Checking if this processor honours the WP bit even in supervisor mode... Ok.
Calibrating delay using timer specific routine.. 534.58 BogoMIPS (lpj=1069172)
Security Framework initialized
SELinux:  Disabled at boot.
```

```
Capability LSM initialized
Mount-cache hash table entries: 512
Initializing cgroup subsys ns
Initializing cgroup subsys cpuacct
Compat vDSO mapped to ffffe000.
CPU: NSC Unknown stepping 01
Checking 'hlt' instruction... OK.
Freeing SMP alternatives: 0k freed
net_namespace: 64 bytes
NET: Registered protocol family 16
EISA bus registered
PCI: Using configuration type 1
Setting up standard PCI resources
Linux Plug and Play Support v0.97 (c) Adam Belay
PnPBIOS: Scanning system for PnP BIOS support...
PnPBIOS: Found PnP BIOS installation structure at 0xc00fb9b0
PnPBIOS: PnP BIOS version 1.0, entry 0xf0000:0xb9ac, dseg 0x0
PnPBIOS: get_dev_node: unexpected status 0x1
PnPBIOS: 0 nodes reported by PnP BIOS; 0 recorded by driver
SCSI subsystem initialized
usbcore: registered new interface driver usbfs
usbcore: registered new interface driver hub
usbcore: registered new device driver usb
PCI: Probing PCI hardware
NET: Registered protocol family 8
NET: Registered protocol family 20
Time: tsc clocksource has been installed.
NET: Registered protocol family 2
IP route cache hash table entries: 1024 (order: 0, 4096 bytes)
TCP established hash table entries: 2048 (order: 2, 16384 bytes)
TCP bind hash table entries: 2048 (order: 1, 8192 bytes)
TCP: Hash tables configured (established 2048 bind 2048)
TCP reno registered
checking if image is initramfs...it isn't (junk in compressed archive); looks li
ke an initrd
Freeing initrd memory: 4158k freed
apm: BIOS not found.
scx200: NatSemi SCx200 Driver
scx200: GPIO base 0x1300
scx200: Configuration Block base 0x9000
audit: initializing netlink socket (disabled)
audit(954550895.797:1): initialized
Total HugeTLB memory allocated, 0
VFS: Disk quotas dquot_6.5.1
Dquot-cache hash table entries: 1024 (order 0, 4096 bytes)
io scheduler noop registered
io scheduler anticipatory registered
io scheduler deadline registered
io scheduler cfq registered (default)
PCI: Fixup for MediaGX/Geode Slave Disconnect Boundary (0x41=0x94)
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 NS16550A
serial8250: ttyS1 at I/O 0x2f8 (irq = 3) is a NS16550A
Clocksource tsc unstable (delta = 124099772 ns)
Time: pit clocksource has been installed.
RAMDISK driver initialized: 16 RAM disks of 16384K size 1024 blocksize
natsemi dp8381x driver, version 2.1, Sept 11, 2006
  originally by Donald Becker <becker@scyld.com>
  2.4.x kernel port by Jeff Garzik, Tjeerd Mulder
PCI: No IRQ known for interrupt pin A of device 0000:00:0f.0. Please try using p
```

```
ci=biosirq.
natsemi eth0: NatSemi DP8381[56] at 0x10010000 (0000:00:0f.0), 00:80:64:41:ff:a5
, IRQ 0, port TP.
ohci_hcd 0000:00:13.0: OHCI Host Controller
ohci_hcd 0000:00:13.0: new USB bus registered, assigned bus number 1
ohci_hcd 0000:00:13.0: irq 10, io mem 0x000cc000
ohci_hcd 0000:00:13.0: USB HC reset timed out!
ohci_hcd 0000:00:13.0: can't start
ohci_hcd 0000:00:13.0: startup error -1
ohci_hcd 0000:00:13.0: USB bus 1 deregistered
ohci_hcd 0000:00:13.0: init 0000:00:13.0 fail, -1
ohci_hcd: probe of 0000:00:13.0 failed with error -1
USB Universal Host Controller Interface driver v3.0
Initializing USB Mass Storage driver...
usbcore: registered new interface driver usb-storage
USB Mass Storage support registered.
PNP: No PS/2 controller found. Probing ports directly.
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
Cannot allocate resource for EISA slot 3
EISA: Detected 0 cards.
cpuidle: using governor ladder
cpuidle: using governor menu
enabling scx200 high-res timer (1 MHz +0 ppm)
TCP bic registered
Time: scx200_hrt clocksource has been installed.
NET: Registered protocol family 1
NET: Registered protocol family 17
Using IPI Shortcut mode
registered taskstats version 1
RAMDISK: Compressed image found at block 0
invalid compressed format (err=1)
VFS: Cannot open root device "sda1" or unknown-block(0,0)
Please append a correct "root=" boot option; here are the available partitions:
Kernel panic - not syncing: VFS: Unable to mount root fs on unknown-block(0,0)
```