

Toshiba TX System RISC TX7901/AVM79R
uLinux Universal Edition
(SAMPLE CODE FOR AVM79R)

Installation Guide

OVERVIEW

uLinux INCLUDED FEATURES

- Little-endian, 32-bit kernel based on Linux 2.4.18
- MMU, timer, interrupt and exception processing support
- On-board DRAM support
- On-board RTC support
- On-CPU Serial port support (2ch)
- On-CPU Ethernet MAC support (mac0, mac1)
- On-CPU PCI driver (PCI0, PCI1)
- TC86C001 (Goku-S) ATA/ATAPI host support
 - IDE/ATA-2 disk support
 - ATAPI CD-ROM support
- TC86C001 (Goku-S) USB host (OHCI) support (2port)
 - USB Human Interface driver support
- EtherExpressPro/100 support
- RealTeck RTL-8139 PCI Fast Ether Adapter support
- File System
 - ext2, minix, ISO9660, proc, devfs, root file system on NFS
- Loadable module support
- Packages

bash-2.05b	tinylogin-1.4
busybox-0.60.5	util-linux-2.11y-4
clacklib-2.7	dhcp-3.0p11
devfsd-1.3.25	ftp-0.17
e2fsprogs-1.32	iproute-2.4.7
gawk-3.11	libcap-1.10
glibc-2.3.1	portmap-4.0
hdparm-5.2	procps-2.0.11
libtermcap-2.0.8	psmisc-21.2
minigetty-1.00	readline-4.3
ncurses-5.3	tcp_wrappers-7.6
pam-0.75	telnet-0.17
popt-1.6.3	vsftpd-1.1.3
slang-1.4.5	xinetd-2.3.7
SysVinit-2.84.7	

CD-ROM CONTENTS

This CD-ROM contains the directories below.

- kernel (kernel image)
- rootfs (root file system)
- etc.sample (Host PC network configuration sample)

SYSTEM REQUIREMENTS

The following is required to get the *uLinux* to work properly on the AVM79R.

Host PC:

RedHat 8.0
CD-ROM drive
COM port
Ethernet card

AVM79R:

mon79 Version 1.67 or later Little-endian

BOOTING

INTRODUCTION

Because mon79 uses bootp and tftp of Ethernet to load the kernel, and the kernel contained in this CD is configured based on the root file system on NFS, it is necessary that dhcpd, tftpd, and nfsd are installed previously on Host PC. Also, terminal software (minicom and such) is required on Host PC to use mon79 and serial console of the kernel.

CONNECTING HOST PC AND AVM79R

Connect COM port (Host PC) and UART1 (AVM79R) by crossing cable. Then network Host PC and MAC1 (AVM79R).

CONNECTING TO THE TARGET CONSOLE

Launch terminal software on Host PC. Set serial as 115200 baud, 8bit, non-parity, 1 stop bit, and no flow handshaking. As turning on the power of AVM79R, mon79 message as below appears on terminal software:

```
Booting mon79 1.67 (little endian).
Initializing SDRAM... done.
Testing SDRAM... done.
Loading mon79 (1/3)... done.
Loading mon79 (2/3)... done.
```

```

Loading mon79 (3/3)... done.
DIMM0 window: 00000000-03ffffff (64MB)
DIMM2 window: fff00000-f00fffff
DIMM1 window: fff00000-f00fffff
DIMM3 window: fff00000-f00fffff
Detected TX7901 #2.
MAC0: 00:01:01:01:55:00
MAC1: 00:01:01:01:55:01
mon79 1.67>

```

Check out connection and terminal software settings if the message doesn't come up.

NETWORK SETTING ON PC

Set `/etc/dhcpd.conf` to use bootp service with dhcp.

The MAC address of the Target can be confirmed on the booting message of mon79.

The following is an example when Target IP is 192.168.0.10 and MAC address is 00:01:01:01:55:01.

```

option subnet-mask 255.255.255.0;
option broadcast-address 192.168.0.255;
option domain-name-servers 192.168.0.253;

option domain-name "lineo.co.jp";
allow bootp;
ddns-update-style ad-hoc;

shared-network BOGUS {
    subnet 192.168.0.0 netmask 255.255.255.0 {
    }
}

host AVM79R {
    hardware ethernet 00:01:01:01:55:01;
    fixed-address 192.168.0.10;
    filename "vmlinux";
}

```

In order to use tftp service, change "disable" in `/etc/xinetd.d/tftp` as "no" and restart xinetd.

Set `/etc/exports` to use nfs mount from Target and restart nfs.

The following is a `/etc/exports` setting example when Target IP is 192.168.0.10.

```

/tftpboot/192.168.0.10 192.168.0.10(rw,no_root_squash)

```

KERNEL/ROOT FILE SYSTEM PREPARATION

Copy kernel and root file system from this CD.

The following is an example when Target IP is 192.168.0.10.

```

mount /dev/cdrom
cd /tftpboot
cp /mnt/cdrom/kernel/vmlinux.*1
tar -xvzf /mnt/cdrom/rootfs/rootfs.tar.gz
mv rootfs 192.168.0.10

```

- *1 RTC driver for AVM79R version 1.10
Please use the kernel below.
cp /mnt/cdrom/kernel/vmlinux-rev1.0 vmlinux
(Board version is shown on the lower-left of the AVM79R.)

BOOTING VIA ETHERNET

Enter b command from mon79 prompt.

The following is an example when Target IP is 192.168.0.10 and IP of Host PC is 192.168.0.1.

```
b vmlinux ip=192.168.0.10:192.168.0.1:::mac1
```

However, Rev 1.0 of AVM79R requires avm79=1 parameter in addition to the commands above. (Board version is shown on the lower-left of the AVM79R.)

```
b vmlinux ip=192.168.0.10:192.168.0.1:::mac1 avm79=1
```

Kernel boot example)

```
mon79 1.67> b vmlinux ip=192.168.192.210:192.168.192.45:::mac1 avm79=1
BOOTP => IP address: 192.168.192.210
BOOTP => Host IP address: 192.168.192.45
BOOTP => Filename: /vmlinux
ARP => Host HW address: 00:10:5a:76:0d:4d
Downloading 'vmlinux'..
section 1 .text: 80002000-801cd910: Loading...
section 2 .fixup: 801cd910-801ced64: Loading...
section 3 .kstrtab: 801ced64-801d4150: Loading...
section 4 __ex_table: 801d4150-801d5a50: Loading...
section 5 __dbe_table: 801d5a50-801d5a58: Loading...
section 6 __ksymtab: 801d5a58-801d80b0: Loading...
section 7 .data.init_task: 801da000-801dc000: Loading...
section 8 .text.init: 801dc000-801f3a34: Loading...
section 9 .data.init: 801f3a34-80218620: Loading...
section 10 .setup.init: 80218620-80218730: Loading...
section 11 .initcall.init: 80218730-802187f0: Loading...
section 12 .data.cacheline aligned: 80219000-8021b340: Loading...
section 13 .reginfo: 8021b340-8021b358: Ignored.
section 14 .data: 8021c000-80238000: Loading...
section 15 .bss: 80238000-80265a10: Ignored.
section 16 .comment: 80265a10-80267630: Loading...
section 17 .pdr: 00000000-0002b360: Ignored.
section 18 .mdebug.abi32: 00000000-00000000: Ignored.
section 19 .shstrtab: 00000000-000000db: Ignored.
section 20 .symtab: 00000000-00040700: Ignored.
section 21 .strtab: 00000000-0004638d: Ignored.
Jumping to 8000246c.
CPU revision is: 00003801
FPU revision is: 00003801
loading r5900 mmu
  Branch Prediction : on
  Double Issue      : off
Primary instruction cache 32kb, linesize 64 bytes
Primary data cache 32kb, linesize 64 bytes
setting r5900 vec0
f4031403 30031403
f4031403 30031403
Linux version 2.4.18 (root@lineo45.lineo.co.jp) (gcc version 3.2.1) #1
3Determined physical RAM map:
memory: 08000000 @ 00000000 (usable)
```

```

User-defined physical RAM map:
  memory: 03000000 @ 00000000 (usable)
On node 0 totalpages: 12288
zone(0): 12288 pages.
zone(1): 0 pages.
zone(2): 0 pages.
Kernel command line: ip=192.168.192.210:192.168.192.45:::mac1 avm79=1
consoleMsetting vec3 handler
setting mips_counter_frequency to 200000000
Console: colour dummy device 80x25
Calibrating delay loop... 209.30 BogoMIPS
Memory: 45964k/49152k available (1880k kernel code, 3188k reserved, 112k
data,)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: 1024 (order: 1, 8192 bytes)
Buffer-cache hash table entries: 1024 (order: 0, 4096 bytes)
Page-cache hash table entries: 16384 (order: 4, 65536 bytes)
Checking for 'wait' instruction... unavailable.
POSIX conformance testing by UNIFIX
Autoconfig PCI channel 0x80236f90
Scanning bus 00, I/O 0x00001000:0x00100000, Mem 0x60000000:0x70000000
00:13.0 Class 0400: 16f4:8000
      Mem at 0x60000000 [size=0x20000]
      Mem at 0x60020000 [size=0x1000]
      Mem at 0x60021000 [size=0x1000]
00:14.0 Class 0501: 102f:0042 (rev 01)
      I/O at 0x00001000 [size=0x200]
Autoconfig PCI channel 0x80236fa4
Scanning bus 01, I/O 0x00100000:0x00200000, Mem 0x70000000:0x80000000
01:14.0 Class 0101: 102f:0105 (rev 01)
      I/O at 0x00100000 [size=0x8]
      I/O at 0x00100008 [size=0x4]
      I/O at 0x00100010 [size=0x10]
      I/O at 0x00100020 [size=0x10]
01:14.1 Class 0c03: 102f:0106 (rev 01)
      Mem at 0x70000000 [size=0x1000]
01:14.2 Class 0c03: 102f:0107 (rev 01)
      Mem at 0x70001000 [size=0x1000]
01:14.3 Class 0780: 102f:0108 (rev 01)
      I/O at 0x00100400 [size=0x400]
      I/O at 0x00100800 [size=0x400]
      I/O at 0x00100c00 [size=0x400]
      I/O at 0x00101000 [size=0x400]
PCI: 01:a0 INTSEL 01
PCI: 01:a2 INTSEL 01
PCI: 01:a3 INTSEL 02
pcibios_fixup_irqs: fixing up irq for AVM79R board
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TC86C001 mode 0x00000005
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
devfs: v1.10 (20020120) Richard Gooch (rgooch@atnf.csiro.au)
devfs: boot_options: 0x1
initialize_kbd: Keyboard failed self test
pty: 256 Unix98 ptys configured
keyboard: Timeout - AT keyboard not present?(ed)
keyboard: Timeout - AT keyboard not present?(f4)
Serial driver version 5.05c (2001-07-08) with MANY_PORTS SHARE_IRQ

```

```

SERIAL_PCI
ttyS00 at 0xbe007000 (irq = 9) is a 16550A
ttyS01 at 0xbe008000 (irq = 10) is a 16550A
Generic MIPS RTC Driver v1.0
block: 128 slots per queue, batch=32
RAMDISK driver initialized: 16 RAM disks of 4096K size 1024 blocksize
Uniform Multi-Platform E-IDE driver Revision: 6.31
ide: Assuming 33MHz system bus speed for PIO modes; override with idebus=xx
TC86C001: IDE controller on PCI bus 01 dev a0
TC86C001: chipset revision 1
TC86C001: 100% native mode on irq 18
    ide0: BM-DMA at 0x100010-0x100017, BIOS settings: hda:pio, hdb:pio
loop: loaded (max 8 devices)
PPP generic driver version 2.4.1
usb.c: registered new driver hub
usb-ohci.c: USB OHCI at membase 0xc0000000, IRQ 18
usb-ohci.c: usb-01:14.1, Toshiba America TC86C001 USB Host
usb.c: new USB bus registered, assigned bus number 1
hub.c: USB hub found
hub.c: 2 ports detected
usb.c: registered new driver hid
hid-core.c: v1.8 Andreas Gal, Vojtech Pavlik <vojtech@suse.cz>
hid-core.c: USB HID support drivers
NET4: Linux TCP/IP 1.0 for NET4.0
IP Protocols: ICMP, UDP, TCP
IP: routing cache hash table of 512 buckets, 4Kbytes
TCP: Hash tables configured (established 4096 bind 8192)
IP-Config: Guessing netmask 255.255.255.0
IP-Config: Complete:
    device=macl, addr=192.168.192.210, mask=255.255.255.0,
gw=255.255.255.25, host=192.168.192.210, domain=,
nis-domain=(none),
    bootserver=192.168.192.45, rootserver=192.168.192.45, rootpath=
ip_tables: (C) 2000-2002 Netfilter core team
NET4: Unix domain sockets 1.0/SMP for Linux NET4.0.
ttc: TX7901 Programmable timer driver (C) Embedix 2002
Looking up port of RPC 100003/2 on 192.168.192.45
Looking up port of RPC 100005/1 on 192.168.192.45
VFS: Mounted root (nfs filesystem).
Mounted devfs on /dev
Freeing unused kernel memory: 244k freed
INIT: version 2.84 booting
Started device management daemon v1.3.25 for /dev
Mounting proc filesystem: [ OK ]
Configuring kernel parameters: [ OK ]
Setting clock (localtime): Sat May 17 22:41:19 UTC 2003 [ OK ]
Setting hostname lineo: [ OK ]
Remounting root filesystem in read-write mode: [ OK ]
Activating swap partitions: [ OK ]
Setting hostname lineo: [ OK ]
Remounting root filesystem in read-write mode: [ OK ]
Activating swap partitions: [ OK ]
Checking filesystems
Checking all file systems.
[ OK ]
Mounting local filesystems: [ OK ]
INIT: Entering runlevel: 3
Setting network parameters: [ OK ]
Bringing up loopback interface: [ OK ]
Bringing up interface mac0: [ OK ]
Starting portmapper: [ OK ]
Initializing random number generator: [ OK ]
Mounting other filesystems: [ OK ]
Starting xinetd: [ OK ]

```

```
Lineo Linux
Kernel 2.4.18 on an mips
lineo login:
```

KERNEL SOURCE CODE

If you wish to obtain kernel source code, please contact: support@lineo.co.jp

Lineo uSolutions provides BSP (Board Support Package) for AVM79R as well.

This BSP can be plugged-in and used with ELITE (Embedded Linux Integration Tools & Environment), Lineo's integrated cross-development environment.

For further information of BSP and ELITE, please mail to: support@lineo.co.jp