

BlueCat Linux Target Support Guide

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For MIPS Malta Boards

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This Target Support Guide (TSG) provides information about the BlueCat Linux Target Support Package (TSP) for MIPS Malta boards.

Throughout this Target Support Guide (TSG), the TSP is referred to as the “malta,” and the board as the “MIPS Malta” or simply as the “target board.”

- **Chapter 1** is an overview of this TSG’s individual chapters.
- **Chapter 2** describes BlueCat Linux download and boot procedures for the MIPS Malta boards.
- **Chapter 3** provides information about the malta TSP’s default BlueCat Linux kernel. It also provides information about kernel reconfiguration parameters and their options.
- **Chapter 4** summarizes demo systems supported by the BlueCat Linux malta TSP.
- **Chapter 5** provides a list of malta TSP-supported device drivers, with important information about each of these.
- **Chapter 6** describes the BlueCat Linux Application Interface specific to the MIPS Malta board.

Downloading and Booting BlueCat Linux on the Target

This chapter provides instructions for downloading a BlueCat Linux system from a cross development host into the MIPS Malta flash memory or RAM, and then booting the BlueCat Linux system on the target board.

Prerequisites

This document is a guide to downloading and booting BlueCat Linux systems on the user's target board. Scenarios that use demo systems included in the BlueCat Linux distribution are presented. As such, the user is assumed to be familiar with the target board hardware and the manufacturer's documentation for it. The user must also have an understanding of system administration for the particular cross development host before BlueCat Linux and the malta Target Support Package (TSP) are installed.

Before installing and booting BlueCat Linux on a MIPS Malta target board, it is assumed that the user has installed the default BlueCat Linux configuration and the malta TSP on the cross development host, as follows:

1. Install the BlueCat Linux MIPS core on the cross-development host, as detailed in the "Installing the Default BlueCat Linux Configuration" section in Chapter 1, "Installation" of the *BlueCat Linux User's Guide*.
2. Install the malta TSP onto the cross development host as detailed in the "Installing Support for Target Boards" section of Chapter 1, "Installation" in the *BlueCat Linux User's Guide*.
3. Activate support for the malta TSP as detailed in the "Activating Support for a Target Board" section of Chapter 1, "Installation" in the *BlueCat Linux User's Guide*.

Hardware Setup

The target board is connected via a null modem serial cable to a terminal emulator on the host COM port. On the target, the serial port is located on the left connector (tty0) of J6. Ethernet is connected from the target J5 connector to a hub. The hub, in turn, is connected to the cross development host.

NOTE: *The baud rate and parity settings for terminal emulator should be set to 38,400 bps, 8 bits/char, no parity, 1 stopbit, and RTS/CTS hardware flow control.*

Downloading and Booting Overview

The standard procedure for installing and booting a BlueCat Linux system on MIPS Malta target boards consists of the following main steps:

- Downloading a BlueCat Linux embedded system into the MIPS Malta flash memory or RAM using the YAMON firmware
- Booting the BlueCat Linux system programmed into target flash memory or RAM in one of the following ways:
 - Manually, using the `go` command
 - Automatically, in “headless” mode.

Downloading BlueCat Linux into Flash via Network

This section provides examples of downloading the `showcase` demo system supported in the malta TSP into the target flash memory or RAM using the YAMON firmware.

Downloading showcase into Target Flash Memory

Use the following procedure to download the `showcase` demo system. into target flash memory:

1. The `showcase.flash.srec` and the `showcase.srec` files are the `showcase.kdi` file (Kernel Downloadable Image) converted to the S-records format. For the `showcase` demo system, these conversions are performed automatically when building the demo system image from the BlueCat Linux environment on the cross development host.

To convert a custom demo system to the S-records format for downloading into target flash memory, use the following command:

```
BlueCat:$ mips-lynx-linux-bluecat\
-objcopy -I binary -O srec \
--change-address=0x9e100000 \
KDI_image S-records_image
```

To convert a custom demo system to the S-records format, for the booting via network use the following command:

```
BlueCat:$ mips-lynx-linux-bluecat\
-objcopy -I binary -O srec \
--change-address=0xa1000000 \
KDI_image S-records_image
```

where *KDI_image* and *S-records_image* correspond to the demo system files in the KDI and S-records formats respectively.

2. Configure the host as a TFTP server:

- For example, to configure the TFTP daemon on a Linux server, uncomment the following line in the `/etc/inetd.conf` configuration file:

```
tftp dgram udp wait root /usr/sbin/tcpd \
in.tftpd /tftplib
```

- Send the SIGHUP signal to force the `inetd` process to re-read the configuration file:

```
BlueCat:# kill -HUP inetd_pid
```

where *inetd_pid* is the process identification number of the *inetd* process.

3. Copy the `showcase.flash.srec` or the `showcase.srec` file from the `$BLUECAT_PREFIX/demo/showcase` directory to the TFTP host.
4. Power up the target board by connecting the target's power supply to an outlet. Hit the **RESET** switch on the board. At this point, the `YAMON>` prompt will appear on the host terminal emulator.
5. Type the following commands at the `YAMON>` prompt to install BlueCat Linux into target flash memory. (Type `help` at the `YAMON>` prompt for a list of available commands. Typing `help` followed by a specific command name will bring up a synopsis the command.)

```

YAMON> setenv ipaddr target_ip
YAMON> setenv gateway gateway_ip
YAMON> setenv subnetmask netmask
YAMON> erase 0x1e100000 0x002e0000
The following area will be erased:
Start address = 0x1e100000
Size          = 0x002e0000
Confirm ? (y/n) y
Erasing...Done
YAMON> load \
tftp://server_ip/showcase.flash.srec
About to load
tftp://172.17.0.1/showcase.flash.srec
Press Ctrl-C to break
.....
.....
.....
.....
.....
.....
.....
.....
.....
Start = 0x9e100000, range =
(0x9e100000,0x9e30f7ff), format = SREC
    
```

Booting BlueCat Linux from Flash

The BlueCat Linux system programmed into target flash memory can be booted in one of the following ways:

- Manually, using the `go` command
- Automatically, in “headless” mode upon board power-up

Starting showcase Using the `go` Command

Use the following command at the `YAMON>` prompt to start the demo system programmed into Flash:

```
YAMON> go 0x9e100000
```

This command transfers control from the YAMON firmware to the starting address of the demo system.

Starting showcase Using “Headless” Mode

The sections “Activating Headless Boot” and “Deactivating Headless Boot” below describe how to activate/deactivate a “headless” boot of a BlueCat Linux system programmed into target flash memory.

Headless booting is configuring the target board to automatically launch the demo system programmed into flash memory upon board power-up.

Activating Headless Boot

Type the following command at the `YAMON>` prompt to make the BlueCat Linux system programmed into Flash start in headless mode:

```
YAMON> unsetenv bootfile  
YAMON> setenv start "go 0x9e100000"
```

Upon successful completion of this command, the BlueCat Linux system programmed into target flash memory will automatically start on every board power-up/reset.

Kernel Configuration Parameters

The malta Target Support Package (TSP) comes with a default BlueCat Linux kernel. The kernel has a number of configuration parameters. These parameters are detailed in the tables listed in Table 3-1 below. Each parameter and its options are listed in the rest of the tables in this chapter.

Table 3-1: Kernel Configuration Options

Parameters	Table Number and Page
Code Maturity Level Options	Table 3-2 on page 10
Machine Selection	Table 3-3 on page 10
CPU Selection	Table 3-4 on page 11
Floating Point Options	Table 3-5 on page 11
General Setup	Table 3-6 on page 11
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Kernel Hacking	Table 3-27 on page 21

Table 3-2: Code Maturity Level Options

Option	Value	Description
CONFIG_EXPERIMENTAL	Y	Prompt for development and/or incomplete code/drivers

Table 3-3: Machine Selection

Option	Value	Description
CONFIG_ACER_PICA_61	N	Support for Acer PICA 1 chipset
CONFIG_ALGOR_P4032	N	Support for Algorithmics P4032
CONFIG_ALGOR_P5064	N	Support for Algorithmics P5064
CONFIG_MIPS_ATLAS	N	Support for MIPS Atlas board
CONFIG_MIPS_MALTA	Y	Support for MIPS Malta board
CONFIG_BAGET_MIPS	N	Support for BAGET MIPS series
CONFIG_DECSTATION	N	Support for DEC stations
CONFIG_MIPS_MAGNUM_4000	N	Support for Mips Magnum 4000

Table 3-3: Machine Selection (Continued)

Option	Value	Description
CONFIG_OLIVETTI_M700	N	Support for Olivetti M700-10
CONFIG_SGI	N	Support for SGI workstations
CONFIG_SNI_RM200_PCI	N	Support for SNI RM200 PCI
CONFIG_PCI	Y	PCI support

Table 3-4: CPU Selection

Option	Value	Description
CONFIG_CPU_MIPS32	MIPS32	CPU type

Table 3-5: Floating Point Options

Option	Value	Description
CONFIG_MIPS_FPU_EMULATOR	Y	Kernel floating point instruction emulation

Table 3-6: General Setup

Option	Value	Description
CONFIG_PCI_QUIRKS	N	PCI quirks
CONFIG_PCI_OLD_PROC	N	Backward compatible <code>/proc/pci</code>
CONFIG_CPU_LITTLE_ENDIAN	Y	Generate little endian code
CONFIG_BLUECAT_LOADER	N	BlueCat Linux OS loader
CONFIG_BLUECAT_IGNORE_PRINTK	N	BlueCat Linux ignore printk
CONFIG_BLUECAT_SMALL_FOOTPRINT	N	BlueCat Linux small memory footprint
CONFIG_BLUECAT_MEMSIZE	N	Memory sizing benchmark
CONFIG_BIN_FMT_AOUT	N	Kernel support for <code>a.out</code> binaries
CONFIG_BLUECAT_MALTA_ASCII_LED	Y	BlueCat Linux Malta ASCII LED control

Table 3-6: General Setup (Continued)

Option	Value	Description
CONFIG_BINFMT_ELF	Y	Kernel support for ELF binaries
CONFIG_BINFMT_MISC	N	Kernel support for MISC binaries
CONFIG_BINFMT_JAVA	N	Kernel support for JAVA binaries (Obsolete)
CONFIG_NET	Y	Networking support
CONFIG_SYSVIPC	Y	System V IPC
CONFIG_BSD_PROCESS_ACCT	N	BSD process accounting
CONFIG_SYSCTL	Y	Sysctl support
CONFIG_PARPORT	N	Parallel port support

Table 3-7: Loadable Module Support

Option	Value	Description
CONFIG_MODULES	Y	Enable loadable module support
CONFIG_MODVERSIONS	Y	Set version information on all symbols for modules
CONFIG_KMOD	Y	Kernel module loader support
CONFIG_FB	N	Support for frame buffer devices (Experimental)

Table 3-8: Block Devices

Option	Value	Description
CONFIG_BLK_DEV_FD	N	Normal PC floppy disk support
CONFIG_BLK_DEV_IDE	Y	Enhanced IDE/MFM/RLL disk/ CD-ROM/tape/floppy support
CONFIG_BLK_DEV_HD_ONLY	N	Old hard disk (MFM/RLL/IDE) driver
CONFIG_BLK_DEV_IDEDISK	Y	Include IDE/ATA-2 DISK support
CONFIG_BLK_DEV_IDEPCI	Y	Generic PCI IDE chipset support
CONFIG_BLK_DEV_LOOP	N	Loopback device support

Table 3-8: Block Devices (Continued)

Option	Value	Description
CONFIG_BLK_DEV_NBD	N	Network block device support
CONFIG_BLK_DEV_MD	N	Multiple device driver support
CONFIG_BLK_DEV_RAM	Y	RAM disk support
CONFIG_BLK_DEV_INITRD	N	Initial RAM disk (<code>initrd</code>) support
CONFIG_BLUECAT_RFS	Y	BlueCat Linux RFS support
CONFIG_BLK_DEV_GENERIC_FLASH_DOC	N	M-Systems DiskOnChip
CONFIG_BLK_DEV_XD	N	XT hard disk support
CONFIG_BLK_DEV_DAC960	N	Mylex DAC960/DAC1100 PCI RAID controller support
CONFIG_PARIDE_PARPORT	Y	Parallel port IDE device support
CONFIG_BLK_CPQ_DA	N	Compaq SMART2 support
CONFIG_BLK_DEV_HD	N	Old hard disk support

Table 3-9: Networking Options

Option	Value	Description
CONFIG_PACKET	Y	Packet socket
CONFIG_NETLINK	Y	Kernel/User netlink socket
CONFIG_RTNETLINK	Y	Routing messages
CONFIG_NETLINK_DEV	Y	Netlink device support
CONFIG_FIREWALL	N	Network firewalls
CONFIG_FILTER	Y	Socket filtering
CONFIG_UNIX	Y	UNIX domain sockets
CONFIG_INET	Y	TCP/IP networking
CONFIG_IP_MULTICAST	Y	IP: Multicasting
CONFIG_IP_ADVANCED_ROUTER	N	IP: Advanced router
CONFIG_IP_PNP	N	IP: Kernel-level autoconfiguration

Table 3-9: Networking Options (Continued)

Option	Value	Description
CONFIG_IP_ROUTER	N	IP: Optimize as router not host
CONFIG_NET_IPIP	N	IP: Tunneling
CONFIG_NET_IPGRE	N	IP: GRE tunnels over IP
CONFIG_IP_MROUTE	N	IP: Multicast routing
CONFIG_IP_ALIAS	N	IP: Aliasing support
CONFIG_ARPD	N	IP: ARP daemon support (Experimental)
CONFIG_SYN_COOKIES	N	IP: TCP syncookie support (Not enabled per default)
CONFIG_INET_RARP	N	IP: Reverse ARP
CONFIG_SKB_LARGE	N	IP: Allow large windows (Not recommended if <16 MB of memory)
CONFIG_IPV6	N	The IPv6 protocol (Experimental)
CONFIG_IPX	N	The IPX protocol
CONFIG_ATALK	N	Appletalk DDP
CONFIG_X25	N	The X25 protocol
CONFIG_LAPB	N	LAPB Data Link Driver (Experimental)
CONFIG_BRIDGE	N	Bridging (Experimental)
CONFIG_LLC	N	802.2 LLC (Experimental)
CONFIG_ECONET	N	Acorn Econet /AUN protocols (Experimental)
CONFIG_WAN_ROUTER	N	WAN router
CONFIG_NET_FASTROUTE	N	Fast switching
CONFIG_NET_HW_FLOWCONTROL	N	Forwarding between high speed interfaces
CONFIG_CPU_IS_SLOW	N	CPU is too slow to handle full bandwidth

Table 3-10: QoS and/or Fair Queuing

Option	Value	Description
CONFIG_NET_SCHED	N	IrDA subsystem support

Table 3-11: SCSI Support

Option	Value	Description
CONFIG_SCSI	N	SCSI support

Table 3-12: Network Device Support

Option	Value	Description
CONFIG_NETDEVICES	Y	Network device support
CONFIG_FDDI	N	FDDI driver support
CONFIG_HIPPI	N	HIPPI driver support (Experimental)
CONFIG_PPP	N	PPP (point-to-point) support
CONFIG_SLIP	N	SLIP (serial line) support
CONFIG_NET_RADIO	N	Wireless LAN (non-ham radio)
CONFIG_NET_FC	N	Fibre Channel driver support
CONFIG_RCPCI	N	Red Greek Hardware VPN (Experimental)
CONFIG_SHAPER	N	Traffic Shaper (Experimental)
CONFIG_SBNI	N	SBNI 12-xx support

Table 3-13: ARCnet Devices

Option	Value	Description
CONFIG_ARCNET	N	ARCnet support
CONFIG_DUMMY	N	Dummy net driver support
CONFIG_EQUALIZER	N	EQL (serial line load balancing) support
CONFIG_ETHERTAP	N	Ethertap network tap
CONFIG_NET_SB1000	N	General Instrument Surfboard 1000

Table 3-14: Ethernet (10 or 100 Mbit)

Option	Value	Description
CONFIG_NET_ETHERNET	Y	Ethernet (10 or 100 Mbit)
CONFIG_NET_VENDOR_3COM	N	3COM cards
CONFIG_LANCE	N	AMD LANCE and PCnet (AT 1500 and NE2100) support
CONFIG_NET_VENDOR_SMC	N	Western Digital/SMC cards
CONFIG_NET_VENDOR_RACAL	N	Racal-Interlan (micom) NI cards
CONFIG_RTL8139	N	RealTek 8129/8139 (not 8019/8029!) support
CONFIG_SIS900	N	Sis 900 PCI Fast Ethernet Adapter support
CONFIG_YELLOWFIN	N	Packet Engines Yellowfin Gigabit-NIC support
CONFIG_NET_ISA	N	Other ISA cards
CONFIG_NET_EISA	Y	EISA, VLB, PCI and on board controllers
CONFIG_PCNET32	Y	AMD PCnet32 (VLB and PCI) support
CONFIG_ACENIC	N	Alteon AceNIC/3Com 3C985/NetGear GA620 Gigabit support
CONFIG_AC3200	N	Ansel Communications EIA 3200 support (Experimental)
CONFIG_APRICOT	N	Apricot Xen-II on board Ethernet
CONFIG_CS89x0	N	CS89x0 support
CONFIG_DM9102	N	DM9102 PCI Fast Ethernet Adapter support (Experimental)
CONFIG_DE4X5	N	Generic DECchip & DIGITAL EtherWORKS PCI/EISA
CONFIG_DEC_ELCP	N	DECchip Tulip (dc21x4x) PCI support
CONFIG_DGRS	N	Digi Intl. RightSwitch SE-X support
CONFIG_EEXPRESS_PRO100	N	Ether ExpressPro/100 support
CONFIG_LNE390	N	Mylex EISA LNE390A/B support (Experimental)
CONFIG_NE3210	N	Novell/Eagle/Microdyne NE3210 EISA support (Experimental)

Table 3-14: Ethernet (10 or 100 Mbit) (Continued)

Option	Value	Description
CONFIG_NE2K_PCI	N	PCI NE2000 support
CONFIG_TLAN	N	TI ThunderLAN support
CONFIG_VIA_RHINE	N	VIA Rhine support
CONFIG_ES3210	N	Racal-Interlan EISA ES3210 support (Experimental)
CONFIG_EPIC100	N	SMC EtherPower II (Experimental)
CONFIG_ZNET	N	Zenith-Note support (Experimental)
CONFIG_NET_POCKET	N	Pocket and portable adaptors

Table 3-15: Token Ring Devices

Option	Value	Description
CONFIG_TR	N	Token Ring driver support

Table 3-16: WAN Interfaces

Option	Value	Description
CONFIG_HOSTESS_SV11	N	Control Hostess SV-11 support
CONFIG_COSA	N	COSA/SRP sync serial boards support
CONFIG_SEALEVEL_4021	N	Sealevel Systems 4021 support
CONFIG_DLCI	N	Frame relay DLCI support

Table 3-17: AX.25 Network Device Drivers

Option	Value	Description
CONFIG_MKISS	N	Serial port KISS driver
CONFIG_6PACK	N	Serial port 6PACK driver

Table 3-17: AX.25 Network Device Drivers (Continued)

Option	Value	Description
CONFIG_BPQETHER	N	BPQ Ethernet driver
CONFIG_DMASCC	N	High-speed (DMA) SCC driver for AX.25
CONFIG_SCC	N	Z8530 SCC driver
CONFIG_BAYCOM_SER_FDX	N	BAYCOM ser12 full duplex driver for AX.25
CONFIG_BAYCOM_SER_HDX	N	BAYCOM ser12 half duplex driver for AX.25
CONFIG_BAYCOM_PAR	N	BAYCOM picpar and par96 driver for AX.25
CONFIG_BAYCOM_EPP	N	BAYCOM epp driver for AX.25
CONFIG_SOUNDMODEM	N	Soundcard modem driver
CONFIG_YAM	N	YAM driver for AX.25

Table 3-18: ISDN Subsystem

Option	Value	Description
CONFIG_ISDN	N	ISDN support

Table 3-19: Character Devices

Option	Value	Description
CONFIG_VT	N	Virtual terminal
CONFIG_SERIAL	Y	Standard/generic (dumb) serial support
CONFIG_SERIAL_CONSOLE	Y	Support for console on serial port
CONFIG_SERIAL_EXTENDED	N	Extended dumb serial driver options
CONFIG_SERIAL_NONSTANDARD	N	Non-standard serial port support
CONFIG_UNIX98_PTYS	N	UNIX98 PTY support
CONFIG_MOUSE	N	Mouse support (Not serial mice)
CONFIG_QIC02_TAPE	N	QIC-02 tape support
CONFIG_WATCHDOG	N	Watchdog Timer support

Table 3-19: Character Devices (Continued)

Option	Value	Description
CONFIG_NVRAM	N	/dev/nvram support
CONFIG_RTC	N	Enhanced Real Time Clock support
CONFIG_DTLK	N	Double Talk PC internal speech card support

Table 3-20: Video for Linux

Option	Value	Description
CONFIG_VIDEO_DEV	N	Video for Linux

Table 3-21: Joystick Support

Option	Value	Description
CONFIG_JOYSTICK	N	Joystick support

Table 3-22: Ftape, the Floppy Tape Device Driver

Option	Value	Description
CONFIG_FTAPE	N	Ftape (QIC-80/Travan) support

Table 3-23: FileSystems

Option	Value	Description
CONFIG_QUOTA	N	Quota support
CONFIG_AUTOFS_FS	N	Kernel automounter support
CONFIG_ADFS_FS	N	ADFS filesystem support (Read only) (Experimental)
CONFIG_AFFS_FS	N	Amiga FFS filesystem support

Table 3-23: FileSystems (Continued)

Option	Value	Description
CONFIG_HFS_FS	N	Apple Macintosh filesystem support (Experimental)
CONFIG_FAT_FS	N	FAT filesystem support
CONFIG_MSDOS_FS	N	MS-DOS filesystem support
CONFIG_UMSDOS_FS	N	UMS-DOS: UNIX-like filesystem on top of standard MS-DOS filesystem
CONFIG_VFAT_F	N	VFAT (Windows-95) filesystem support
CONFIG_ISO9660_FS	N	ISO 9660 CD-ROM filesystem support
CONFIG_JOLIET	N	Microsoft Joliet CD-ROM extensions
CONFIG_MINIX_FS	Y	Minix filesystems support
CONFIG_NTFS_FS	N	Windows NT NTFS support (Read only)
CONFIG_HPFS_FS	N	OS/2 HPFS filesystem support (Read only)
CONFIG_PROC_FS	Y	/proc filesystem support
CONFIG_QNX4FS_FS	N	QNX filesystem support (Experimental)
CONFIG_ROMFS_FS	N	ROM filesystem support
CONFIG_EXT2_FS	Y	Second extended filesystem support
CONFIG_SYSV_FS	N	System V, Version 7 and Coherent filesystem support
CONFIG_UFS_FS	N	UFS filesystem support
CONFIG_BLUECAT_FFS	N	BlueCat Linux Flash File System support
CONFIG_EFS_FFS	N	SGI EFS filesystem support (Read only) (Experimental)

Table 3-24: Network File Systems

Option	Value	Description
CONFIG_CODA_FS	N	Coda filesystem support (Advanced network filesystem)
CONFIG_NFS_FS	N	NFS filesystem support

Table 3-24: Network File Systems (Continued)

Option	Value	Description
CONFIG_NFSD	N	NFS server support
CONFIG_LOCKD	N	lockd support
CONFIG_SMB_FS	N	SMB filesystem support (to mount WfW shares, etc.)
CONFIG_NCP_FS	N	NCP filesystem support (to mount NetWare volumes)

Table 3-25: Partition Types

Option	Value	Description
CONFIG_BSD_DISKLABEL	N	BSD disklabel (BSD partition tables) support
CONFIG_MAC_PARTITION	N	Macintosh partition map support
CONFIG_SMD_DISKLABEL	N	SMD disklabel (Sun partition tables) support
CONFIG_SOLARIS_X86_PARTITION	N	Solaris (x86) partition table support
CONFIG_UNIXWARE_DISKLABEL	N	Unixware slices support (Experimental)
CONFIG_NLS	N	Native language support

Table 3-26: Sound

Option	Value	Description
CONFIG_SOUND	N	Sound support

Table 3-27: Kernel Hacking

Option	Value	Description
CONFIG_CROSSCOMPILE	N	Are you using a cross compiler?
CONFIG_MIPS_FPE_MODULE	N	Build fp exception handler module
CONFIG_REMOTE_DEBUG	N	Remote GDB kernel debugging

Table 3-27: Kernel Hacking (Continued)

Option	Value	Description
CONFIG_MAGIC_SYSRQ	N	Magic SysRq key
CONFIG_BLUECAT_KDBG	N	Include <code>kdbg</code> kernel debugger

Supported Demo Systems

This chapter provides information about BlueCat Linux demo system supported by the malta Target Support Package (TSP).

Demo Systems

Table 4-1 shows the sample system supported in the malta TSP standard distribution, boot devices supported by the sample system, and its RAM and ROM requirements:

Table 4-1: Demo Systems Supported in the malta TSP

Demo	Boot Devices Supported by Default	ROM Requirements	RAM Requirements
showcase	Flash Network using firmware	1939 KB	12288 KB
developer	Network using firmware	3050 KB	15 MB

showcase Demo System

This section provides information on the `showcase` demo system.

DEMO

An Apache Web Server demonstration.
An ASCII LED display demonstration

SYNOPSIS

This demo configures the Apache HTTP daemon turning the target board into a Web server. It also scrolls a text message,

“BlueCat by LinuxWorks” on the ASCII-LED display on the board (U42).

REQUIREMENTS

Storage	Medium
RAM	Medium
Network	Yes
Disk	None
Kernel Option	<code>ramdisk_size=32768</code>

DESCRIPTION

The system boots up in single-user mode. `init` starts `bash` without a login prompt. `bash` automatically runs the `/.bashrc` script file, which executes commands to bring up the network interface and set up the kernel routing table. The network configuration is displayed on the terminal connected to the serial line.

`.bashrc` starts the `httpd` daemon.

Also, the demo system starts simple application that scrolls “BlueCat by LinuxWorks” across the ASCII Led display.

After the demo system is booted, the Apache server is accessible from any networked machine using the IP address entered by the user and serves the `index.html` page located in the `showcase` subtree in the `demo` directory.

The user can enter the default IP address (216.100.252.144) to access the Apache web server, or change the default address as described in “Modifying Target IP and Gateway Addresses” below.

Modifying Target IP and Gateway Addresses

This `showcase` demo includes Apache Web server features. The Apache Web server is “a robust, commercial-grade, featureful, and freely-available source code implementation of an HTTP (web) server.” See <http://www.apache.org> for further information.

Before beginning the BlueCat Linux `showcase` demo system installation, users who wish to take advantage of the demo system’s Apache Web server

feature may wish to define their own target IP address, rather than use the default address (216.100.252.144) defined in the `showcase` demo system's `.bashrc.malta` file.

To change the `showcase` default IP address for the Apache Web server BlueCat Linux Web pages, open the demo system's `.bashrc.malta` file with any text editor (such as `vi`), and perform the following steps:

1. Change the `showcase` default IP address (216.100.252.144) to a new user-selected target IP address by entering a new address at the following line:

```
TARGET_IP=target_IP
```

2. Set a gateway IP address by entering a value at the following line:

```
GATE_IP=gateway_IP
```

3. Rebuild the `showcase` demo system by entering the following command under the `$BLUECAT_PREFIX/demo/showcase` directory:

```
BlueCat:$ touch showcase.spec
```

```
BlueCat:$ make rootfs
```

```
BlueCat:$ make kdi
```

These commands rebuild the demo system image. As the result, the `showcase` demo system will use the new target IP and gateway addresses as the default.

developer Demo System

The `developer` demo is a package consisting of the functionalities of the `shell`, `ftp`, `ping`, `gdb`, and `vl_demo` systems. Refer to Chapter 4 of the *BlueCat Linux User's Guide* for descriptions of `developer` and its component demo systems.

Table 5-1 shows the device drivers supported by the malta Target Support Package (TSP), and details important information about them:

Table 5-1: Device Drivers Supported by the malta TSP

Hardware Device	Device Drivers	Location in Source Tree	Kernel Configuration Options	Notes
UART 16550-compatible	serial.c	drivers/char	CONFIG_SERIAL CONFIG_SERIAL_CONSOLE	
Real Time Clock	rtc.c mcl46818rtc.h mcl46818rtc.h	drivers/char include/linux include/ asm-mips	CONFIG_RTC	
ASCII LED display	malta_ascii_led.c malta_ascii_led.h	drivers/char include/ asm-mips	CONFIG_BLUECAT_MALTA_ASCII_LED	
IDE Controller	Generic IDE drivers	drivers/block/ ide-*.c	CONFIG_BLK_DEV_IDE CONFIG_BLK_DEV_IDEDISK CONFIG_BLK_DEV_IDEPCI	
Ethernet Controller AMD Am79C973	pcnet32.c	drivers/net	CONFIG_PCNET32	
NOR Flash Intel FlashFile	malta.c cfi_probe.c cfi_cmdset_001.c	drivers/mtd drivers/mtd drivers/mtd	CONFIG_MTD_MALTA CONFIG_MTD_MALTA_PART CONFIG_MTD_CFI CONFIG_MTD_CFI_PROBE CONFIG_MTD_CFI_INTELEXT	Supported via BlueCat Linux FFS and Flash Management

This chapter describes the BlueCat Linux Application Interface specific to the MIPS Malta board.

ASCII LED Display Control

BlueCat Linux for the MIPS Malta board has a device driver for the on-board ASCII LED display. The driver is configured by the `CONFIG_BLUECAT_MALT_ASCII_LED` kernel configuration option. This option is located in the **General Setup** submenu of the `make xconfig` user interface. The driver provides an `ioctl()` interface for the user-space applications, and defined in the `$BLUECAT_PREFIX/include/asm/malta_ascii_led.h` file.

The driver is accompanied by the `$BLUECAT_PREFIX/sbin/malta_led` utility to provide control of the ASCII LED display from the shell command line or shell scripts. The utility is included in the `showcase` package and its sources are in the `$BLUECAT_PREFIX/demo/showcase/src.malta` directory.

The utility syntax is as follows:

```
malta_led string
```

where *string* is an array of 8 symbols to be displayed on the ASCII LED display.

For example:

```
# malta_led Hello!  
# malta_led 01234567
```

The ASCII LED driver automatically creates special device file

(`/dev/asciiled`) in the root filesystem. The major number of this device is 233.