RouterBOARD 750/GL

User's Manual

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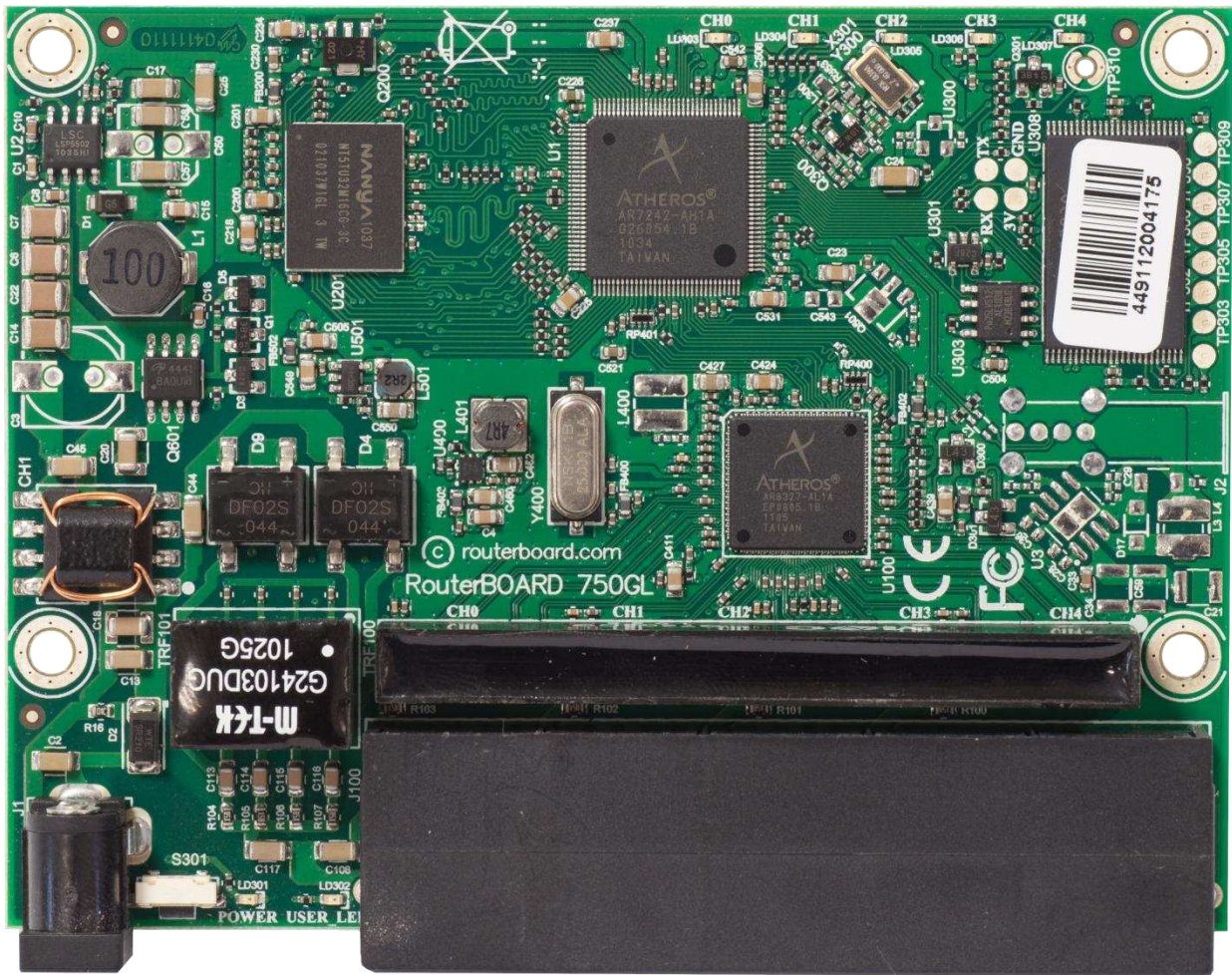
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RMA Instructions are located on our webpage here: **http://rma.mikrotik.com**

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System Board View and Layout

You can download the board dimensions and case design files (PDF and DXF) from www.routerboard.com

Specifications

CPU	RB750: AR7240 400MHz RB750GL: AR7242 400MHz
Memory	RB750: 32MB DDR SDRAM onboard RB750GL: 64MB SDRAM onboard
Boot loader	RouterBOOT
Data storage	64MB onboard NAND memory chip
Ethernet	RB750: Five 10/100 Mbit/s Ethernet ports with Auto-MDI/X RB750GL: Five 10/100/1000 Gigabit Ethernet ports with Auto-MDI/X
LEDs	Power, NAND activity, 5 Ethernet and 1 wireless LEDs
Power at the device	**DC power jack** (5.5mm outside and 2mm inside diameter, female, pin positive plug) accepts **8-30V DC**
Power over Ethernet	Ether 1 requires 8-30V DC (non 802.3af), to compensate for losses, it's recommended to use 12V or more
Power consumption	Up to 6W
Dimensions	113x89x28mm. Weight without packaging and cables: 129g
Temperature	Indoor device. Operational temperature: -20°C to +50°C
Humidity	Operational: up to 70% relative humidity (non-condensing)
RouterOS	RouterOS v5, Level4 license

Hardware Guide

Memory and Storage Devices

Memory

The RB750 has 32MB of built-in memory, RB750GL has 64MB. There are no memory upgrade options.

Input/Output Ports

Ethernet ports

There are five individual Ethernet ports. Ports 2-5 are connected to a switch and can be switched together by an option in the RouterOS software.

All cables made to EIA/TIA 568A/B cable specifications will work correctly (see **Connector Index** for pinout). Note that this port supports automatic cross/straight cable correction (Auto MDI/X), so you can use either straight or cross-over cable for connecting to other network devices.

LEDs

Ethernet LED lights up when a cable is connected, these LEDs don't show ethernet activity, just connectivity. Power LED indicates that the device receives power. ACT LED shows NAND activity and can be programmed to show other things via RouterOS LED menu.

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Powering

The device accepts powering from the power jack or from the first Ethernet port (Passive PoE):

- DC power jack (5.5mm outside and 2mm inside diameter, female, pin positive plug) accepts 8-30V DC
- The first Ethernet port accepts passive Power over Ethernet accepts 8-30V DC

Under maximum load, the power consumption of this device is 6W

Booting options

RouterOS is the operating system of all RouterBOARD routers. Please see detailed configuration guide here

http://wiki.mikrotik.com/wiki/Category:Manual

Initial configuration includes the following:

> Ports Ether2-Ether5 are connected together as a switch. This switch has a DHCP server runni ng, so you can connect to the devide using the Web based „**Webfig**" interface from Ether2-Ether5 or from the wireless interface. Open **http://192.168.88.1** in your browser, in the page that opens, select „**Webfig**" and log in with username „admin" and no password. The Ether1 port has a firewall on it, and a DHCP client, so it's configured to be connected to your ISP.

See this table for specific default config info on all our products:
http://wiki.mikrotik.com/wiki/Manual:Default_Configurations

An alternative configuration option is the **MikroTik Winbox utility** (Windows only). Winbox can be used to connect to the default IP address of 192.168.88.1 with the username **admin** and no password.

In case you wish to boot the device from network, for example to use MikroTik Netinstall, hold the RESET button of the device when starting it until the LED light turns off, and the device will start to look for Netinstall servers. In case IP connection is not available, Winbox can also be used to connect to the MAC address of the device. More information here: http://wiki.mikrotik.com/wiki/First_time_startup

Onboard NAND Storage Device

The RouterBOARD may be started from the onboard NAND storage chip. As there is no partition table on the device, the boot loader assumes the first 4MiB form a YAFFS filesystem, and executes the file called "kernel" stored in the root directory on that partition. It is possible to partition the rest of the medium by patching the kernel source.

Booting from network

You can boot the RouterBOARD device from Network with the NETINSTALL software, if your RouterOS software needs to be reinstalled or reset. Hold the Reset button, power on the device, and release until the LED light stops flashing. See „Buttons and Jumpers" below for details. The Netinstall program can be downloaded from www.mikrotik.com download section.

Network boot works similarly to PXE or EtherBoot protocol, and allows you to the device from an executable image stored on a TFTP server. It uses BOOTP or DHCP (configurable in boot loader) protocol to get a valid IP address, and TFTP protocol to download an executable (ELF) kernel image combined with the initial RAM disk (inserted as an ELF section) to boot from (the TFTP server's IP address and the image name must be sent by the BOOTP/DHCP server).

To boot the RouterBOARD computer from Ethernet network you need the following:

- *An ELF kernel image for the loader to boot from (you can embed the kernel parameters and initrd image as ELF sections called kernparm and initrd respectively)*
- *A TFTP server which to download the image from*
- *A BOOTP/DHCP server (may be installed on the same machine as the TFTP server) to give an IP address, TFTP server address and boot image name*

Operating System Support

MikroTik RouterOS starting from version v5 is fully compatible with the device. If your device is preinstalled with an earlier RouterOS release, please upgrade RouterOS to v5.8 or newer.

Buttons and Jumpers

- RouterOS reset jumper hole (on the **bottom** of case) – resets RouterOS software to defaults. Must short circuit the metallic sides of the hole with a screwdriver and boot the device. Hold screwdriver in place until RouterOS configuration is cleared.
- RouterBOOT reset button (**RES**, front panel) has two functions:
  - Hold this button during boot time until LED light starts flashing, release the button to reset RouterOS configuration (same result as with RouterOS reset hole)

o Hold this button during boot time longer, until LED turns off, then release it to make the RouterBOARD look for Netinstall servers.

RouterBOOT

The RouterBOOT firmware (also referred as Bootloader here) provides the basic functionality to boot an Operating System. It supports serial console via the onboard serial port at the boot time. The loader supports booting from the onboard NAND device and from a network server (see the respective section for details on this protocol).

Boot Loader Configuration

This device doesn't come fitted with a serial port connector, so all Bootloader specific settings must be done in RouterOS. See „*RouterOS functions"*

Boot Loader Upgrading

The boot loader is needed to initialize all the hardware and boot the system up.

The boot loader upgrading is possible from MikroTik RouterOS, from within the "/system routerboard" menu. Updates are included with each RouterOS update. The procedure is described in the MikroTik RouterOS manual: http://wiki.mikrotik.com/wiki/Manual:Bootloader_upgrade

RouterOS functions

The default OS of RouterBOARD devices is RouterOS, when the *routerboard.npk* package is installed, RouterOS can configure some RouterBOARD hardware settings

Firmware information

This menu displays RouterBOARD model number, serial number, the current boot loader version and the version available in the current software packages installed.

```
[admin@MikroTik] > system routerboard print
       routerboard: yes
             model: "rb750"
     serial-number: "154201C1DD3C"
  current-firmware: "2.26"
  upgrade-firmware: "2.27"
[admin@MikroTik] >
```

The firmware version can be upgraded from **RouterOS** by using "**/system routerboard upgrade**" command.

Firmware Settings

Boot loader settings are also accessible through this menu.

```
[admin@MikroTik] > system routerboard settings print
          boot-delay: 2s
         boot-device: nand-if-fail-then-ethernet
       boot-protocol: bootp
  enable-jumper-reset: yes
[admin@MikroTik] >
```

- **Boot-device**: *use this to enable Netinstall*
- **Boot protocol:** *for Netinstall use Bootp, for installing other operating systems, you need to use DHCP*
- **Enable-jumper-reset**: *Disable this to avoid accidental setting reset via the onboard jumper*

The Software Reset jumper , which resets both boot loader settings and RouterOS settings by default, can be disabled in this menu (it will still reset the boot loader settings).

Appendix

Connector Index

Ether1-5	RJ45 (Gigabit for RB750GL) Fast Ethernet 100Base-T ports, Ether1 accepts passive PoE power
Power	Power Jack (8-30V DC)

Button Index

RES	Software Reset 1 button. (see "Buttons and Jumpers")
RESET (unlabeled)	Software Reset 2 jumper hole. Resets RouterOS settings (see „Buttons and Jumpers")

Ethernet Cables

RJ45 Pin	Color	Function (100Mbit)	Function (1Gbit)	RJ45 pin for Straight cable (MDI, EIA/TIA568A)	RJ45 pin for Crossover cable (MDI-X, EIA/TIA568B)
1	Green	TX+ Data	Data A+	1	3
2	Green/White	TX- Data	Data A-	2	6
3	Orange	RX+ Data	Data B+	3	1
4	Blue	-	Data C+	4	4
5	Blue/White	-	Data C-	5	5
6	Orange/White	RX- Data	Data B-	6	2
7	Brown	-	Data D+	7	7
8	Brown/White	-	Data D-	8	8