

Timesys Embedded Linux Demo Application for GizmoSphere Gizmo 2

User Guide

LinuxLink
by timesys®

Introduction

Goal

This guide is designed to help you deploy a Timesys LinuxLink assembled Linux demonstration image onto your GizmoSphere Gizmo 2 board.

Pre-requisites

This guide is intended for use with either Linux based or Microsoft® Windows® based hosts.

You will need the following for the exercises in this tutorial:

GizmoSphere Gizmo 2 board	Hardware platform to run Linux demo
Demo image	Located on microSD card received with Gizmo 2 board
microSD Card* <i>(required only if making a backup copy of demo)</i>	Minimum 4GB

Additional Information / Assumptions

The demonstration image that you received with your Gizmo 2 board (provided on the included microSD card) contains a pre-installed Linux operating system and Timesys-powered embedded Linux demo application. The demo includes all necessary files to boot and run Linux and the various graphical demo applications on the applicable kit, below:

- GizmoSphere Gizmo 2 board

Booting the Board from the microSD Card

1. Follow all the instructions for setting up the board, including inserting the 3V coin battery, power supply and applicable cables.
2. Insert the microSD card into your Gizmo 2 board, and power up the board by pressing the power button.
3. The board will then boot from the microSD card.
4. After the boot prompt, you should see kernel booting and then switching to a better console resolution.
5. Shortly after, the Xfce desktop will start and enter straight into the Timesys Application Launcher demo application (Figure 1).

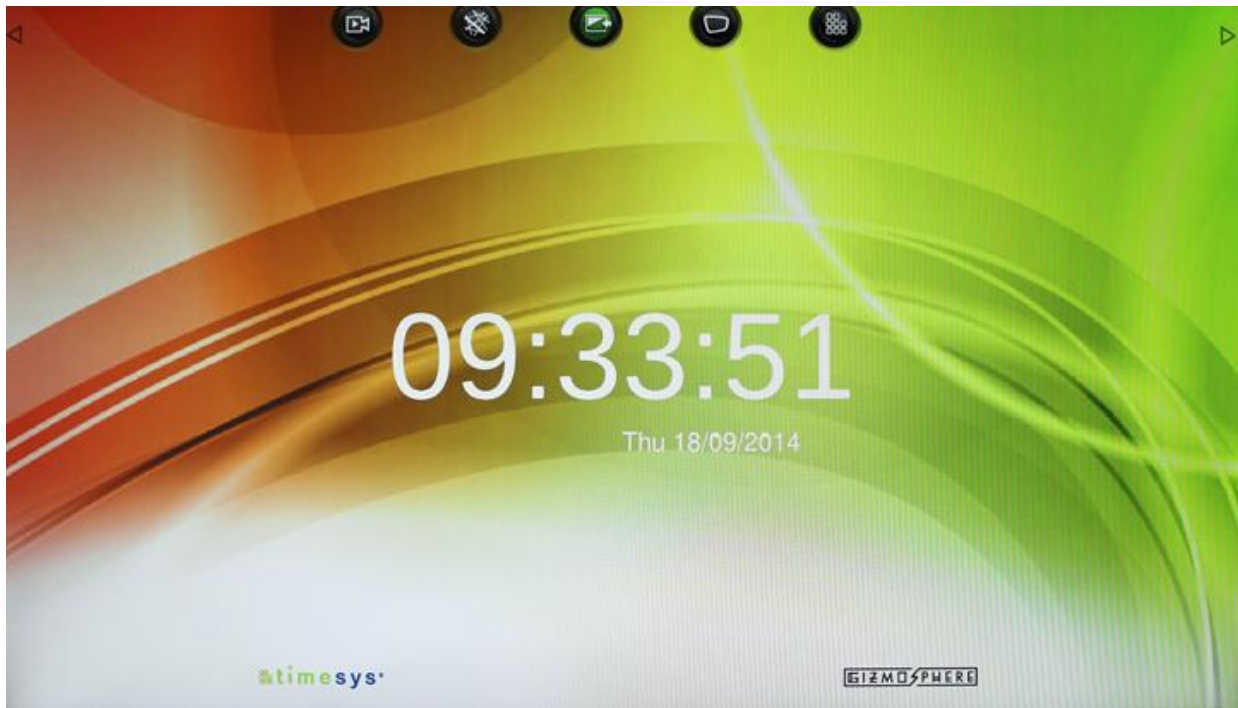


Figure 1: Timesys Application Launcher

Timesys Application Launcher

The Timesys Application Launcher is a full screen Qt5 application containing information and embedded Linux demos for the Gizmo 2 board.

Included Embedded Linux Demo Applications

The Timesys Application Launcher demo applications and their icons are:



Video Player

Launching the Video Player will play the included “Big Buck Bunny” movie — a 1080p video (H.264 format) — using MPlayer in accelerated fullscreen mode.

“Big Buck Bunny” is the Peach Open Movie Project / Blender Foundation / www.bigbuckbunny.org



About GizmoSphere

If you have Internet connectivity, launching About GizmoSphere will open a browser and take you to gizmosphere.org, an online community where you can find additional resources and learn more about your Gizmo 2 board. If you do not have an Internet connection, the browser will load information from local pages.



Exit to Desktop

Launching Exit to Desktop will take you out of the application launcher and to the Xfce desktop where you can access tools for developing and running native C/C++ and Python applications. At any time, you can restart the Application Launcher through the Xfce desktop drop-down Applications menu (under the “Other” sub-menu).



XBMC

Launching XBMC opens an award-winning free and open source (GPL) software media player and entertainment hub.



About Timesys

If you have Internet connectivity, launching About Timesys will open a browser and take you to timesys.com/gizmo (Timesys’ embedded Linux Development Center for GizmoSphere Gizmo boards) where you can find additional embedded Linux development resources and [register for a LinuxLink FREE Edition account](#) that will enable you to build a custom image for your board. If you do not have an Internet connection, the browser will load information from local pages.

Highlighting / Selecting a Demo Application

From the Timesys Application Launcher, you can access the included demo applications via the icons appearing in the icon bar at the top of the Launcher screen (Figure 2).



Figure 2: Timesys Application Launcher demo application icon bar

By default, the demo app icon appearing in the “horizontal” center of the application launcher window becomes the “highlighted/selected” application, as indicated by its green background (shown, above).

The “row of application icons” will move horizontally left or right as a unit. To move the icons horizontally to the left or right so as to “center” the application you want to highlight:

1. Click the left or right arrow located in the icon bar.
- OR
2. Click and drag the icon bar to the left or right.

Highlighted / Selected Demo Application Information Window

Once an application is “highlighted / selected” an information window opens (Figure 3).



Figure 3: Application Information Window

- The application window displays information about the demo application as well as a green “Launch App” button, located in the lower, left side of the window.
- To exit the information window, highlight another demo app icon at the top of the app launcher screen. **Note:** By default, the information window will automatically close after 15 seconds of inactivity.

Launching an application

- To launch an application and begin using it, simply click the “Launch App” button, located in the lower, left side of the window (Figure 3).
- After an app has finished running, exiting it will return you to the Timesys Application Launcher.

Xfce Desktop

Xfce is a desktop environment where you can run applications (like the Qt 5 Timesys Launcher app), browse the web, do native development in C/C++ and Python, or open a Terminal to execute Linux shell commands.

Leafpad Text Editor

Xfce includes Leafpad, a simple, lightweight text editor. It can be launched from the leaf-shaped icon on the panel at the bottom of the desktop, or from the Applications Menu under "Accessories."

Basic Linux Shell Commands

All of the following can be done from a Terminal (Xfce Applications Menu -> Terminal Emulator).

- **Connecting to the Internet:**
 - Command line: `# udhcpc -i eth0`
 - Or to make this happen automatically, you can add "ip=dhcp" to end of last line of text in `syslinux.cfg` on the boot partition of the microSD card (e.g. `/media/mmcblk0p1/syslinux.cfg`). If you aren't connected to a network, this may increase the boot time.
- **Setting the time/date:** If you are connected to a network at boot time, NTP (network time protocol) will attempt to set the time and date. If you want to set it manually, use the `date` command, and sync the time to the hardware clock to save it and keep accurate time for the next boot. **Note:** *If you omit the `hwclock` command, but properly shutdown, it will save the time during shutdown. In case you cannot shut down properly, we suggest issuing the `hwclock sync` explicitly.*
 - The default format for date is `MMDDhhmm[[CC]YY]`. You may also use a string with a flexible format instead. The following are equivalent:
`# date 080115302014`
- or -
`# date -s "Aug 1 3:30PM 2014"`
 - Then to sync the system time to the RTC:
`# hwclock --systohc`
- **Accessing USB drives:** When a USB media device is connected, it will be automatically mounted under its device name in the `/media` folder. For example, `/media/<device>`. Before removing the drive, be sure to unmount it with the 'umount' command:
 - `# umount /media/<device>`
- **Shutting down and rebooting:** To shut down or restart gracefully via command line, use the applicable command:
 - `poweroff`
 - `reboot`
- **glxinfo:** Use this tool to verify that the cutting edge open source Radeon driver is in use with hardware acceleration enabled:
 - `# glxinfo | grep render`

- Expected output:
 direct rendering: Yes
 OpenGL Renderer string: Gallium 0.4 on AMD KABINI
- **glxgears:** To see the 3D rendering in action, try: `# vblank_mode=0 glxgears`
- **mplayer:** MPlayer uses hardware acceleration to smoothly play HD video. Note that some choppiness, especially at the start, may be the result of playing the file from slower media. The cache parameter in this example may help with that to some degree. Using a USB3.0 source is recommended, but there is a 1080p H.264 video included in `/opt/videos`.
 - `# mplayer -vo vdpau -vc ffmpeg12vdpau,ffh264vdpau,ffodivxvdpau,ffwmv3vdpau,ffvc1vdpau -fullscreen -cache 8192 /opt/videos/big_buck_bunny_1080p_h264.mov`
 - The arguments in this example specify that we want to use the VDPAU accelerated output, limit the codec detection to VDPAU codecs, launch in fullscreen mode, and specify a cache.

Preparing the microSD Card (if flashing demo image to a new microSD card)

To install the Timesys LinuxLink image to a microSD card for booting on the Gizmo 2 board:

Linux Users

In the following, replace `<device>` with the correct device node. For example, with a built in microSD card reader it might be `/dev/mmcblk0`, and with an SD-to-USB adapter it might be `/dev/sdb`.

- `# dmesg | tail` is often useful to see what node was assigned to a device you just plugged in.
- Make sure any file systems on the device are unmounted.
- `# dd if=filename.img of=/dev/<device> bs=4M`



IMPORTANT NOTE: Incorrect selection of your microSD card could result in corruption of other data devices attached to your computer.

- `# sync`
- Unmount any partitions which may have auto-mounted, and remove the device.

Windows Users

Download the microSD card image installer (*Win32DiskImager*) via the download link on the Timesys website at <http://www.timesys.com/gizmo>, and extract the .zip file.



IMPORTANT NOTE: Be sure to **back up any files on your microSD Card before running Win32DiskImager** as it replaces everything on the microSD Card.

Using Windows Explorer, determine the drive mapped to the microSD card. Typically, the microSD card will appear as a Removable Disk with a specific drive letter (i.e., H:).

Using Start->Run or by double-clicking on “Win32DiskImager.exe,” run the Win32DiskImager application from the location where you unzipped it (Figure 4).



Figure 4. Running Win32DiskImager with Windows© XP

Note: If you are running Windows Vista or newer, you should right-click on Win32DiskImager, and “Run as administrator” (Figure 5).

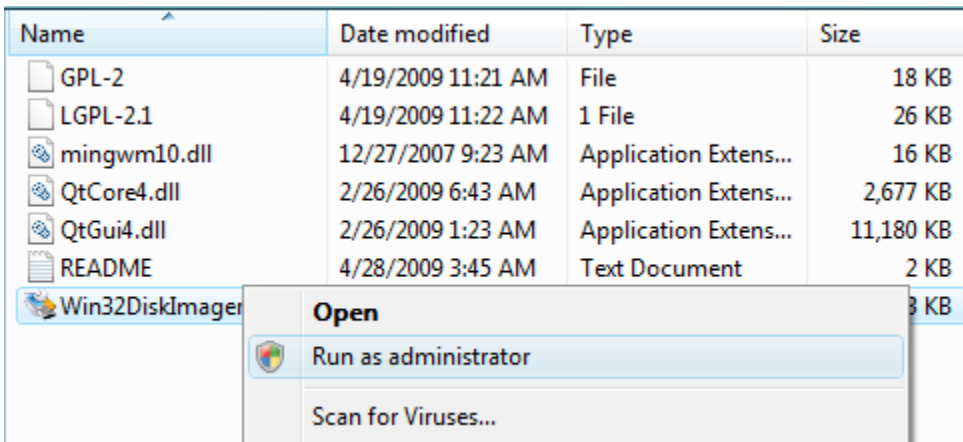


Figure 5. Starting Win32DiskImager with admin privileges (Vista and newer)

Once Win32DiskImager runs, set the Image File location to point to the demo image file that you have downloaded. Pick the appropriate device drive id for the microSD card (Figure 6). Note that

the location of your image file as well as the location of your microSD card will differ from that shown in the example on the next page.

Demo Image File

SD Card

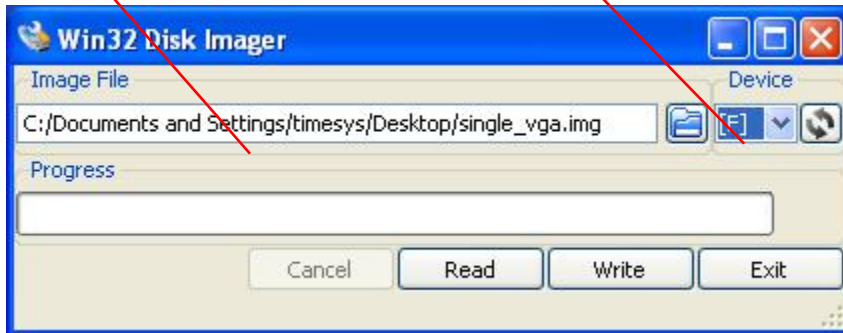



Figure 6. Flashing .img file on a microSD card

Click “Write.” The process should take just few seconds to complete.



IMPORTANT NOTE: Incorrect selection of your microSD card could result in corruption of other data devices attached to your computer.

Safely remove the microSD card from your Windows host. There should be a “Safely Remove” icon in the system tray near the clock. Click on this icon, and select your microSD card.

Access Additional Development Resources

To access additional embedded Linux development resources from Timesys including code snippets, “How To” docs and more, visit the Timesys Development Center for GizmoSphere Gizmo Boards at <http://www.timesys.com/gizmo>

Build Custom Images

You can build custom images for your Gizmo 2 board with a Timesys LinuxLink FREE Edition account.

To register for a LinuxLink FREE Edition account:

1. Visit <http://www.timesys.com/gizmo>
2. Click on the “Use LinuxLink FREE” button located in the upper right corner of the page (or click on any “Register for a Free LinuxLink account” link within the text of the page).
3. From the registration page, select “GizmoSphere Gizmo 2” from the drop down list located to the right of “Board you want to assemble Linux for *”

To build a custom image for your Gizmo 2 board:

1. Log into LinuxLink (<https://linuxlink.timesys.com/login/>)
2. Click on “Build BSP / SDK” located in the top navigation menu.
3. Our cloud-based UI will walk you through the steps of building your custom BSP / SDK.