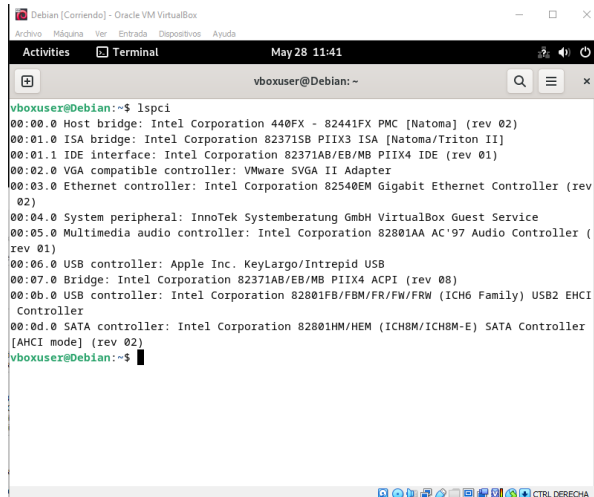


Taller 5

Nombre: Juan Jiménez

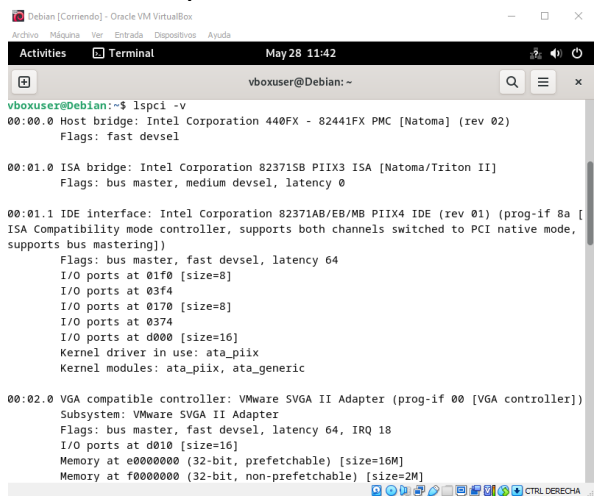
Fecha: 28/05/2024

1. Información de Hardware lspci y lsusb:



```
vboxuser@Debian:~$ lspci
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01)
00:02.0 VGA compatible controller: VMware SVGA II Adapter
00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Controller (rev 02)
00:04.0 System peripheral: InnoTek Systemberatung GmbH VirtualBox Guest Service
00:05.0 Multimedia audio controller: Intel Corporation 82801AA AC'97 Audio Controller (rev 01)
00:06.0 USB controller: Apple Inc. KeyLargo/Intrepid USB
00:07.0 Bridge: Intel Corporation 82371AB/EB/MB PIIX4 ACPI (rev 08)
00:0b.0 USB controller: Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI Controller
00:0d.0 SATA controller: Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller [AHCI mode] (rev 02)
vboxuser@Debian:~$
```

El comando “lspci” nos sirve para visualizar la información de los conectores pci

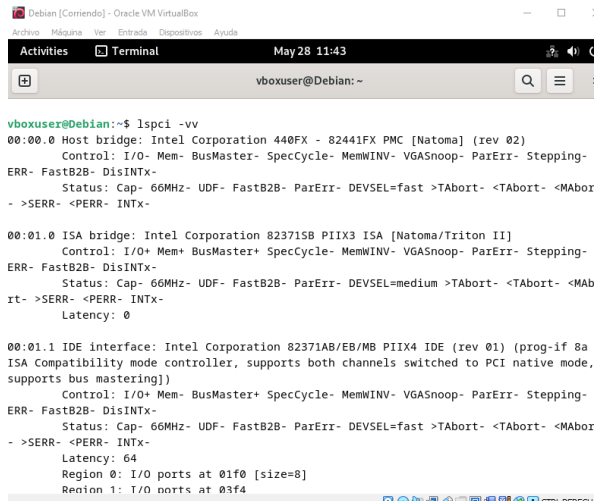


```
vboxuser@Debian:~$ lspci -v
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
    Flags: fast devsel

00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
    Flags: bus master, medium devsel, latency 0

00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01) (prog-if 8a [
ISA Compatibility mode controller, supports both channels switched to PCI native mode,
supports bus mastering])
    Flags: bus master, fast devsel, latency 64
    I/O ports at 01f0 [size=8]
    I/O ports at 03f4
    I/O ports at 0170 [size=8]
    I/O ports at 0374
    I/O ports at d000 [size=16]
    Kernel driver in use: ata_piix
    Kernel modules: ata_piix, ata_generic

00:02.0 VGA compatible controller: VMware SVGA II Adapter (prog-if 00 [VGA controller])
    Subsystem: VMware SVGA II Adapter
    Flags: bus master, fast devsel, latency 64, IRQ 18
    I/O ports at d010 [size=16]
    Memory at e0000000 (32-bit, prefetchable) [size=16M]
    Memory at f0000000 (32-bit, non-prefetchable) [size=2M]
```

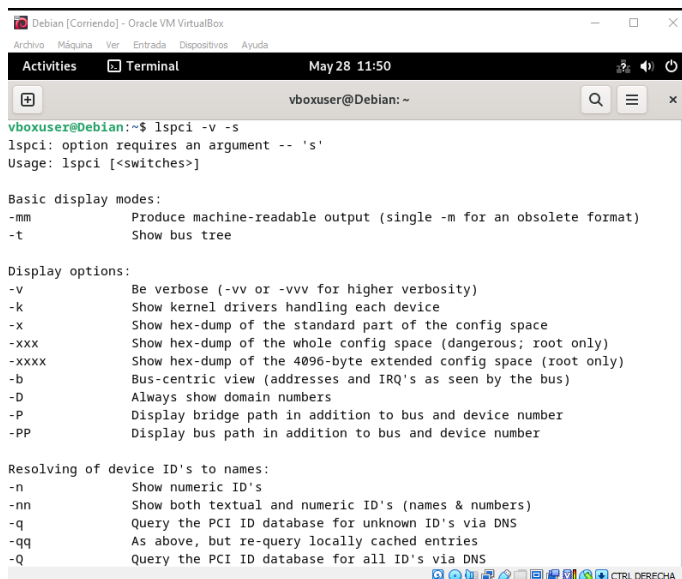


```
vboxuser@Debian:~$ lspci -vv
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
    Control: I/O- Mem- BusMaster- SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- S
ERR- FastB2B- DisINTx-
    Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort
- >SERR- <PERR- INTx-

00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- S
ERR- FastB2B- DisINTx-
    Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=medium >TAbort- <TAbort- <MAbo
rt- >SERR- <PERR- INTx-
    Latency: 0

00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01) (prog-if 8a [
ISA Compatibility mode controller, supports both channels switched to PCI native mode,
supports bus mastering])
    Control: I/O+ Mem- BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- S
ERR- FastB2B- DisINTx-
    Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort
- >SERR- <PERR- INTx-
    Latency: 64
    Region 0: I/O ports at 01f0 [size=8]
    Region 1: I/O ports at 03f4
```

los comandos “lspci -v y lspci -vv” nos permiten visualizar con más información sobre los puertos pci del equipo.



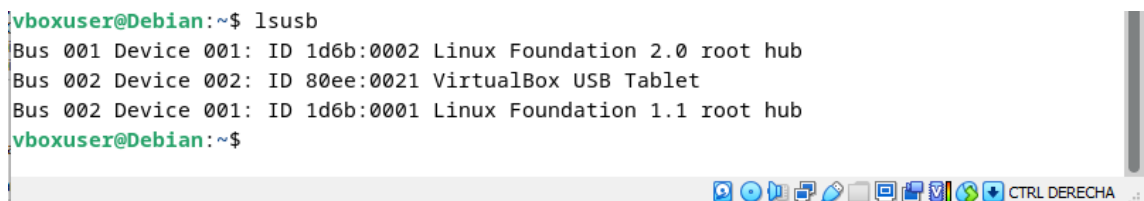
```
Debian [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal May 28 11:50
vboxuser@Debian: ~
vboxuser@Debian:~$ lspci -v -s
lspci: option requires an argument -- 's'
Usage: lspci [<switches>]

Basic display modes:
-mm          Produce machine-readable output (single -m for an obsolete format)
-t          Show bus tree

Display options:
-v          Be verbose (-vv or -vvv for higher verbosity)
-k          Show kernel drivers handling each device
-x          Show hex-dump of the standard part of the config space
-xxx       Show hex-dump of the whole config space (dangerous; root only)
-xxxx      Show hex-dump of the 4096-byte extended config space (root only)
-b          Bus-centric view (addresses and IRQ's as seen by the bus)
-D          Always show domain numbers
-P          Display bridge path in addition to bus and device number
-PP         Display bus path in addition to bus and device number

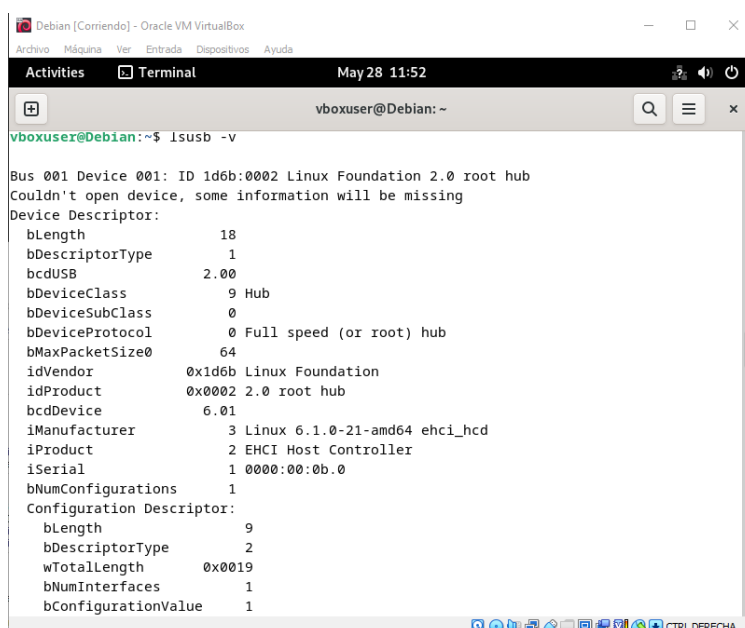
Resolving of device ID's to names:
-n          Show numeric ID's
-nn         Show both textual and numeric ID's (names & numbers)
-q          Query the PCI ID database for unknown ID's via DNS
-qq         As above, but re-query locally cached entries
-Q          Query the PCI ID database for all ID's via DNS
```

El comando “lspci -v -s” nos muestra un slot que especifiquemos.



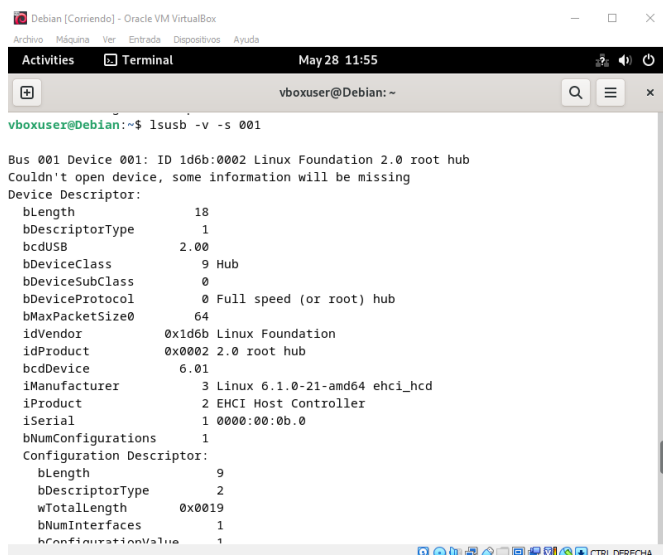
```
vboxuser@Debian:~$ lsusb
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 002: ID 80ee:0021 VirtualBox USB Tablet
Bus 002 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
vboxuser@Debian:~$
```

El comando “lsusb” nos muestra los conectores usb del equipo que estén conectados



```
Debian [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal May 28 11:52
vboxuser@Debian: ~
vboxuser@Debian:~$ lsusb -v
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Couldn't open device, some information will be missing
Device Descriptor:
  bLength                18
  bDescriptorType         1
  bcdUSB                  2.00
  bDeviceClass             9 Hub
  bDeviceSubClass          0
  bDeviceProtocol          0 Full speed (or root) hub
  bMaxPacketSize0         64
  idVendor                0x1d6b Linux Foundation
  idProduct               0x0002 2.0 root hub
  bcdDevice                6.01
  iManufacturer           3 Linux 6.1.0-21-amd64 ehci_hcd
  iProduct                2 EHCI Host Controller
  iSerial                 1 0000:00:0b.0
  bNumConfigurations       1
Configuration Descriptor:
  bLength                 9
  bDescriptorType         2
  wTotalLength             0x0019
  bNumInterfaces           1
  bConfigurationValue      1
```

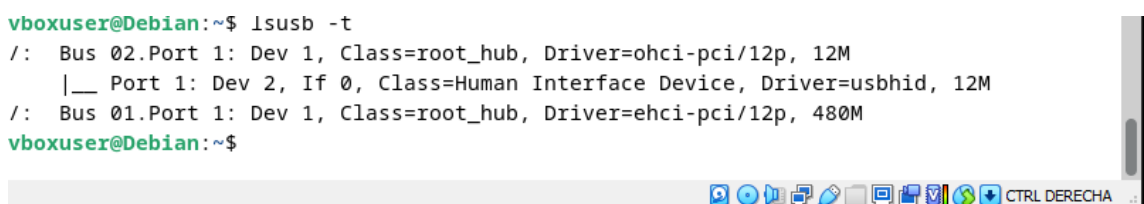
El comando “lsusb -v” nos muestra más especificaciones de los conectores usb que están en el equipo.



```
vboxuser@Debian:~$ lsusb -v -s 001

Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Couldn't open device, some information will be missing
Device Descriptor:
  bLength                18
  bDescriptorType         1
  bcdUSB                  2.00
  bDeviceClass             9 Hub
  bDeviceSubClass          0
  bDeviceProtocol          0 Full speed (or root) hub
  bMaxPacketSize0         64
  idVendor                 0x1d6b Linux Foundation
  idProduct                0x0002 2.0 root hub
  bcdDevice                6.01
  iManufacturer           3 Linux 6.1.0-21-amd64 ehci_hcd
  iProduct                 2 EHCI Host Controller
  iSerial                  1 0000:00:0b.0
  bNumConfigurations       1
Configuration Descriptor:
  bLength                  9
  bDescriptorType          2
  wTotalLength             0x0019
  bNumInterfaces           1
  bConfigurationValue      1
```

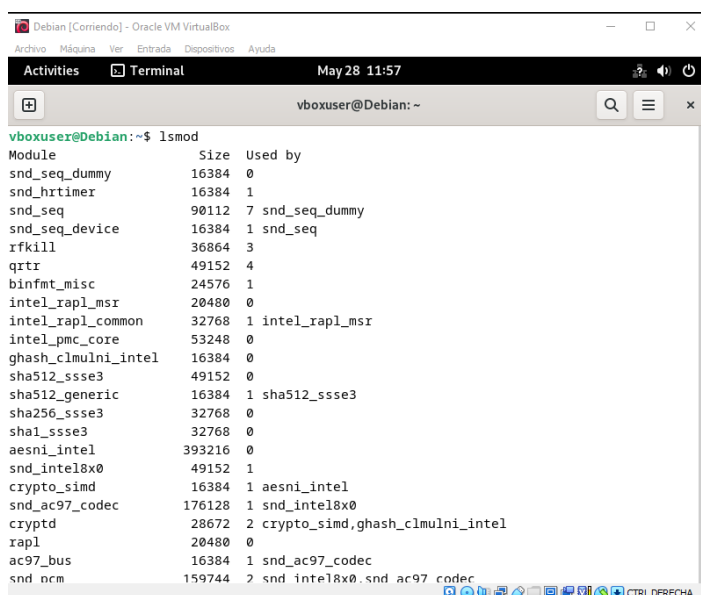
El comando “lsusb -v -s 001” nos permite ver los datos específicos de un bus que seleccionamos en este caso el 001.



```
vboxuser@Debian:~$ lsusb -t
/: Bus 02.Port 1: Dev 1, Class=root_hub, Driver=ohci-pci/12p, 12M
   |__ Port 1: Dev 2, If 0, Class=Human Interface Device, Driver=usbhid, 12M
/: Bus 01.Port 1: Dev 1, Class=root_hub, Driver=ehci-pci/12p, 480M
vboxuser@Debian:~$
```

El comando “lsusb -t” nos muestra la velocidad del usb.

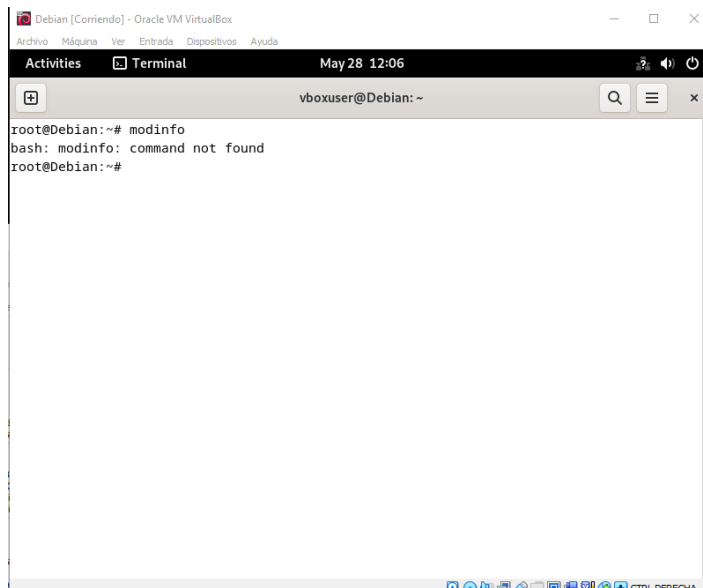
2. Modulos de kernel de Linux:



```
vboxuser@Debian:~$ lsmod

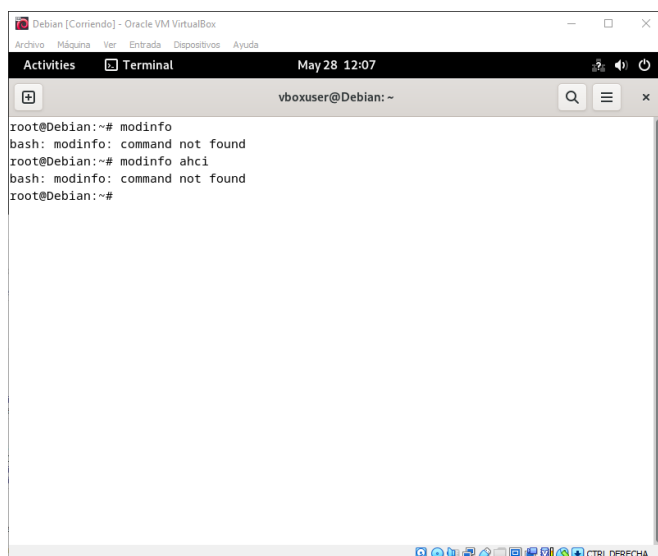
Module                  Size  Used by
snd_seq_dummy           16384  0
snd_hrtimer             16384  1
snd_seq                 90112  7 snd_seq_dummy
snd_seq_device          16384  1 snd_seq
rfkill                  36864  3
qrtr                    49152  4
binfmt_misc            24576  1
intel_rapl_msr          20480  0
intel_rapl_common       32768  1 intel_rapl_msr
intel_pmc_core          53248  0
ghash_clmulni_intel     16384  0
sha512_ssse3            49152  0
sha512_generic          16384  1 sha512_ssse3
sha256_ssse3            32768  0
sha1_ssse3              32768  0
aesni_intel            393216  0
snd_intel8x0            49152  1
crypto_simd             16384  1 aesni_intel
snd_ac97_codec          176128  1 snd_intel8x0
cryptd                  28672  2 crypto_simd,ghash_clmulni_intel
rapl                    20480  0
ac97_bus                16384  1 snd_ac97_codec
snd_pcm                 159744  2 snd_intel8x0,snd_ac97_codec
```

El comando “lsmod” nos permite ver los módulos que se encuentra en el equipo



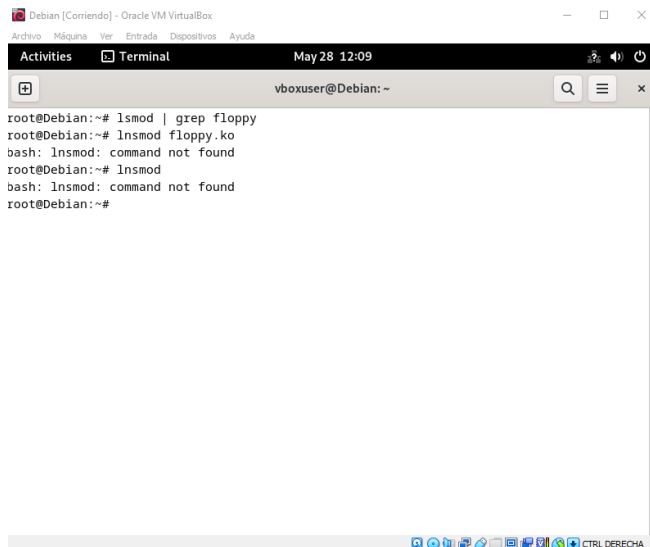
```
root@Debian:~# modinfo
bash: modinfo: command not found
root@Debian:~#
```

“modinfo” sirve para ver la información de los módulos del kernel de Debian



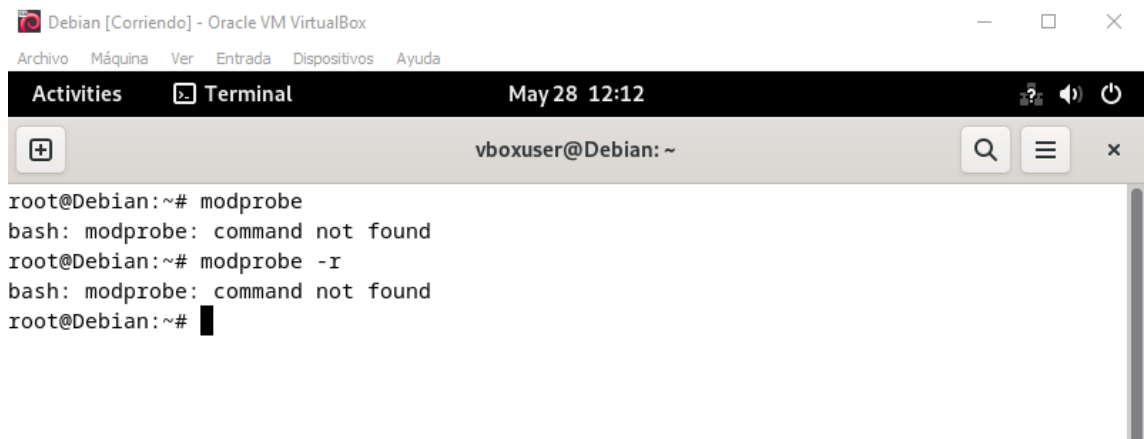
```
root@Debian:~# modinfo
bash: modinfo: command not found
root@Debian:~# modinfo ahci
bash: modinfo: command not found
root@Debian:~#
```

El comando “modinfo ahci” sirve para ver la información única del módulo que deseamos visualizar en este caso ahci.



```
Debian [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal May 28 12:09
vboxuser@Debian: ~
root@Debian:~# lsmod | grep floppy
root@Debian:~# insmod floppy.ko
bash: insmod: command not found
root@Debian:~# insmod
bash: insmod: command not found
root@Debian:~#
```

El comando “`Insmod | grep floppy`” nos permite cargar un fichero de tipo `.ko` al sistema.



```
Debian [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal May 28 12:12
vboxuser@Debian: ~
root@Debian:~# modprobe
bash: modprobe: command not found
root@Debian:~# modprobe -r
bash: modprobe: command not found
root@Debian:~#
```

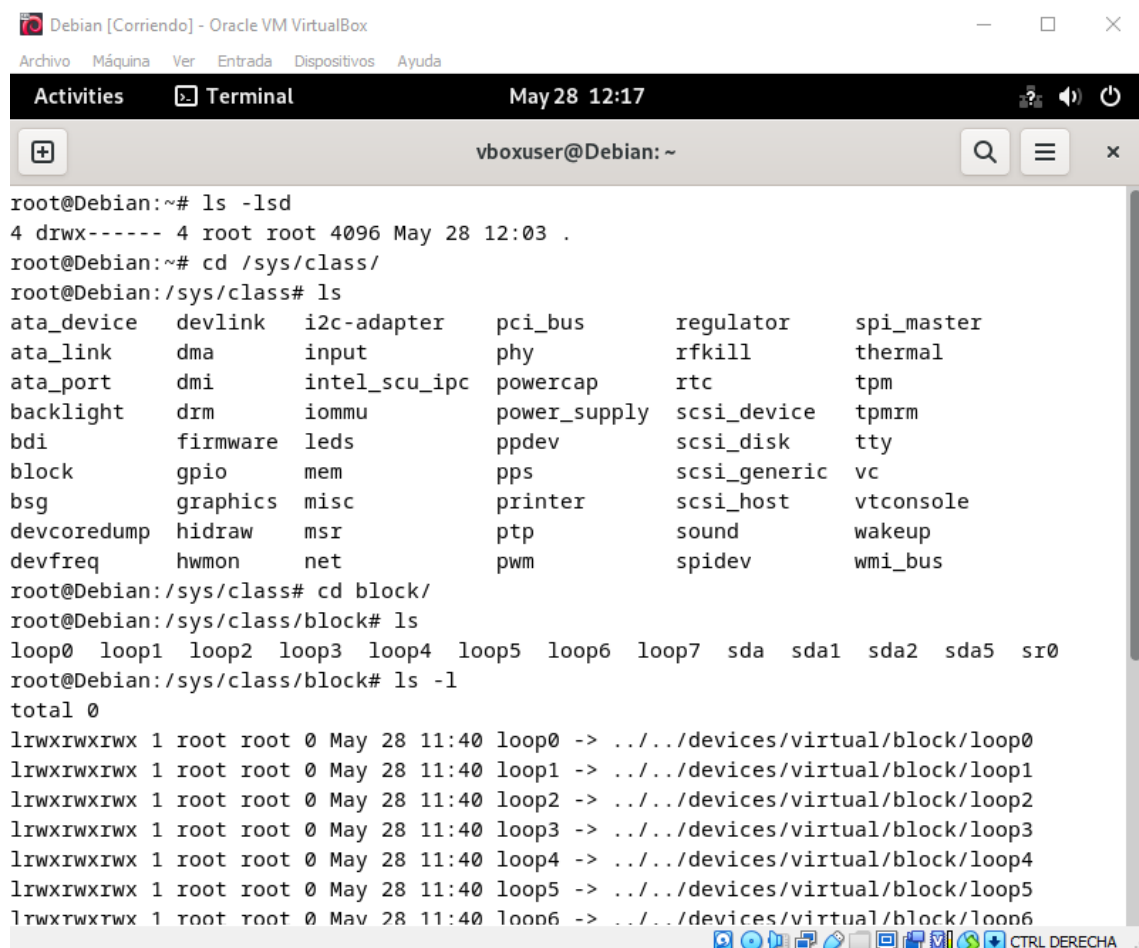
Los comandos “`modprobe`” y “`modprobe -r`” sirven para cargar y borrar módulos.

3. Pendrive USB:



```
Debian [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal May 28 12:16
vboxuser@Debian: ~
root@Debian:~# ls -lsd
4 drwx----- 4 root root 4096 May 28 12:03 .
root@Debian:~#
```

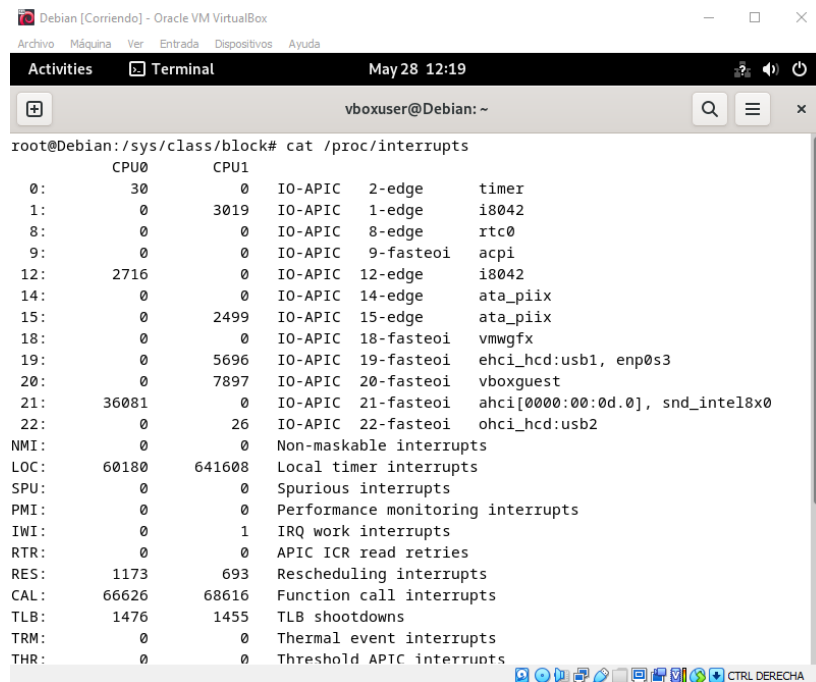
El comando “ls -l sd” nos permite ver los discos duros y sus particiones.



```
Debian [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal May 28 12:17
vboxuser@Debian: ~
root@Debian:~# ls -lsd
4 drwx----- 4 root root 4096 May 28 12:03 .
root@Debian:~# cd /sys/class/
root@Debian:/sys/class# ls
ata_device  devlink  i2c-adapter  pci_bus      regulator  spi_master
ata_link    dma      input        phy          rfkill     thermal
ata_port    dmi      intel_scu_ipc powercap     rtc        tpm
backlight   drm      iommu        power_supply scsi_device tpmrm
bdi          firmware leds         ppdev        scsi_disk   tty
block       gpio     mem          pps          scsi_generic vc
bsg          graphics misc         printer      scsi_host   vtconsole
devcoredump hidraw   msr          ptp          sound       wakeup
devfreq     hwmon   net          pwm          spidev     wmi_bus
root@Debian:/sys/class# cd block/
root@Debian:/sys/class/block# ls
loop0 loop1 loop2 loop3 loop4 loop5 loop6 loop7 sda sda1 sda2 sda5 sr0
root@Debian:/sys/class/block# ls -l
total 0
lrwxrwxrwx 1 root root 0 May 28 11:40 loop0 -> ../../devices/virtual/block/loop0
lrwxrwxrwx 1 root root 0 May 28 11:40 loop1 -> ../../devices/virtual/block/loop1
lrwxrwxrwx 1 root root 0 May 28 11:40 loop2 -> ../../devices/virtual/block/loop2
lrwxrwxrwx 1 root root 0 May 28 11:40 loop3 -> ../../devices/virtual/block/loop3
lrwxrwxrwx 1 root root 0 May 28 11:40 loop4 -> ../../devices/virtual/block/loop4
lrwxrwxrwx 1 root root 0 May 28 11:40 loop5 -> ../../devices/virtual/block/loop5
lrwxrwxrwx 1 root root 0 May 28 11:40 loop6 -> ../../devices/virtual/block/loop6
```

los comandos usados en la imagen presente es otra forma para visualizarlos con más pasos.

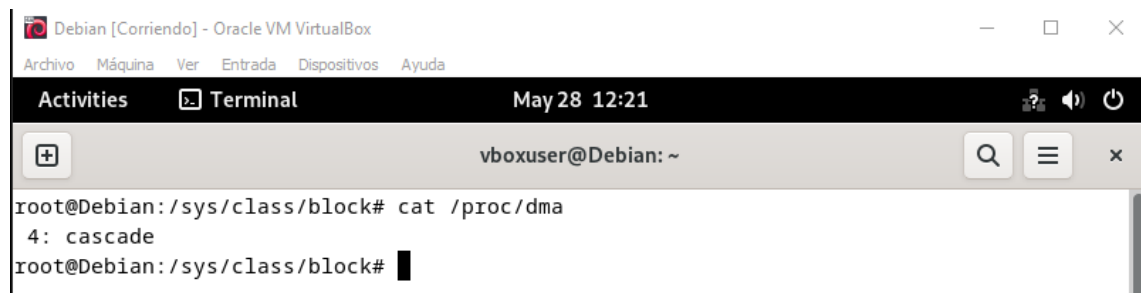
4. Sistema real:



The screenshot shows a terminal window titled "Debian [Corriendo] - Oracle VM VirtualBox". The terminal prompt is "root@Debian:/sys/class/block#". The command executed is "cat /proc/interrupts". The output displays a table of interrupts for CPU0 and CPU1, including various IO-APIC interrupts, timer interrupts, and other system events.

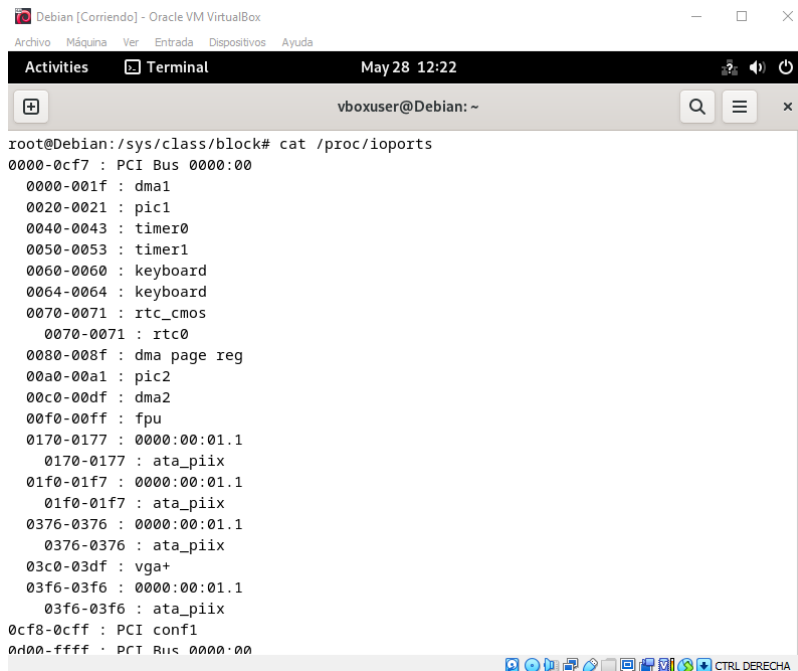
	CPU0	CPU1	
0:	30	0	IO-APIC 2-edge timer
1:	0	3019	IO-APIC 1-edge i8042
8:	0	0	IO-APIC 8-edge rtc0
9:	0	0	IO-APIC 9-fasteoi acpi
12:	2716	0	IO-APIC 12-edge i8042
14:	0	0	IO-APIC 14-edge ata_piix
15:	0	2499	IO-APIC 15-edge ata_piix
18:	0	0	IO-APIC 18-fasteoi vmwgfx
19:	0	5696	IO-APIC 19-fasteoi ehci_hcd:usb1, enp0s3
20:	0	7897	IO-APIC 20-fasteoi vboxguest
21:	36081	0	IO-APIC 21-fasteoi ahci[0000:00:0d.0], snd_intel8x0
22:	0	26	IO-APIC 22-fasteoi ohci_hcd:usb2
NMI:	0	0	Non-maskable interrupts
LOC:	60180	641608	Local timer interrupts
SPU:	0	0	Spurious interrupts
PMI:	0	0	Performance monitoring interrupts
IWI:	0	1	IRQ work interrupts
RTR:	0	0	APIC ICR read retries
RES:	1173	693	Rescheduling interrupts
CAL:	66626	68616	Function call interrupts
TLB:	1476	1455	TLB shootdowns
TRM:	0	0	Thermal event interrupts
THR:	0	0	Threshold APIC interrupts

El comando “cat /proc/interrupts” nos permite ver las interrupciones asociadas.



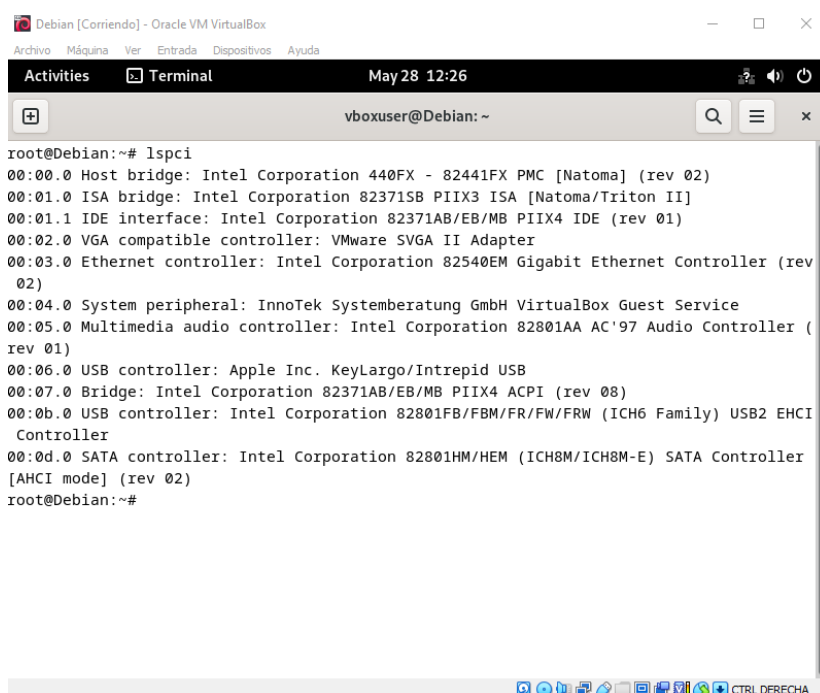
The screenshot shows a terminal window titled "Debian [Corriendo] - Oracle VM VirtualBox". The terminal prompt is "root@Debian:/sys/class/block#". The command executed is "cat /proc/dma". The output shows "4: cascade".

Este comando nos permite ver las cascadas que tiene el equipo



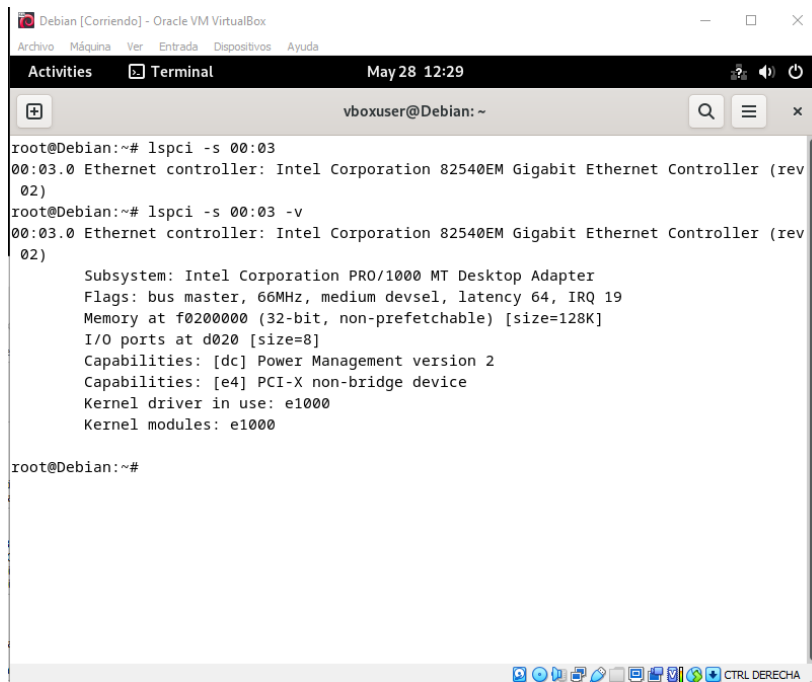
```
root@Debian:/sys/class/block# cat /proc/ioproports
0000-0cf7 : PCI Bus 0000:00
0000-001f : dma1
0020-0021 : pic1
0040-0043 : timer0
0050-0053 : timer1
0060-0060 : keyboard
0064-0064 : keyboard
0070-0071 : rtc_cmos
0070-0071 : rtc0
0080-008f : dma_page reg
00a0-00a1 : pic2
00c0-00df : dma2
00f0-00ff : fpu
0170-0177 : 0000:00:01.1
0170-0177 : ata_piix
01f0-01f7 : 0000:00:01.1
01f0-01f7 : ata_piix
0376-0376 : 0000:00:01.1
0376-0376 : ata_piix
03c0-03df : vga+
03f6-03f6 : 0000:00:01.1
03f6-03f6 : ata_piix
0cf8-0cff : PCI conf1
0d00-ffff : PCI Bus 0000:00
```

Muestra los dispositivos del equipo como por ejemplo el teclado “cat /proc/ioproports”



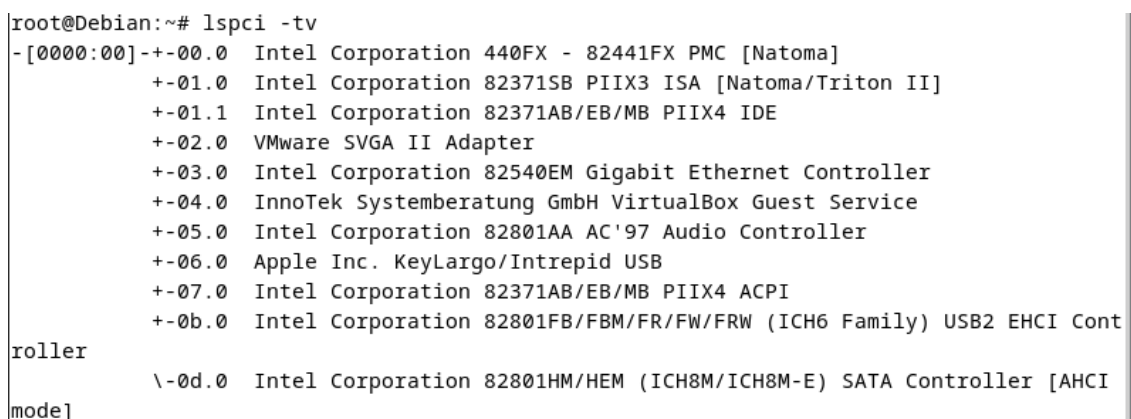
```
root@Debian:~# lspci
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01)
00:02.0 VGA compatible controller: VMware SVGA II Adapter
00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Controller (rev 02)
00:04.0 System peripheral: InnoTek Systemberatung GmbH VirtualBox Guest Service
00:05.0 Multimedia audio controller: Intel Corporation 82801AA AC'97 Audio Controller (rev 01)
00:06.0 USB controller: Apple Inc. KeyLargo/Intrepid USB
00:07.0 Bridge: Intel Corporation 82371AB/EB/MB PIIX4 ACPI (rev 08)
00:0b.0 USB controller: Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI Controller
00:0d.0 SATA controller: Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller [AHCI mode] (rev 02)
root@Debian:~#
```

El comando “lspci” nos muestra todos los dispositivos conectados en el equipo



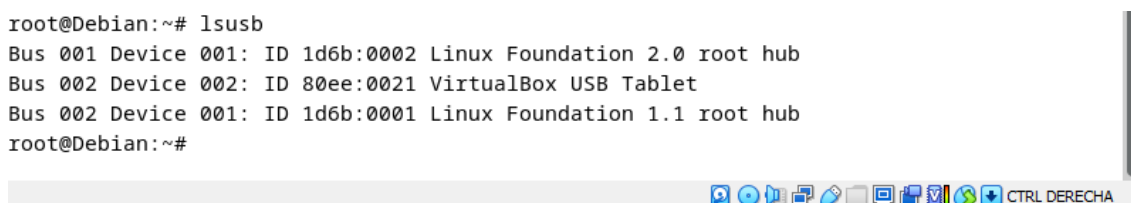
```
Debian [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
Activities Terminal May 28 12:29
vboxuser@Debian: ~
root@Debian:~# lspci -s 00:03
00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Controller (rev 02)
root@Debian:~# lspci -s 00:03 -v
00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Controller (rev 02)
Subsystem: Intel Corporation PRO/1000 MT Desktop Adapter
Flags: bus master, 66MHz, medium devsel, latency 64, IRQ 19
Memory at f0200000 (32-bit, non-prefetchable) [size=128K]
I/O ports at d020 [size=8]
Capabilities: [dc] Power Management version 2
Capabilities: [e4] PCI-X non-bridge device
Kernel driver in use: e1000
Kernel modules: e1000
root@Debian:~#
```

El comando “lspci –s 00:03 –v” nos permite ver más detallado sobre el dispositivo pci que deseemos en este caso el 00:003.



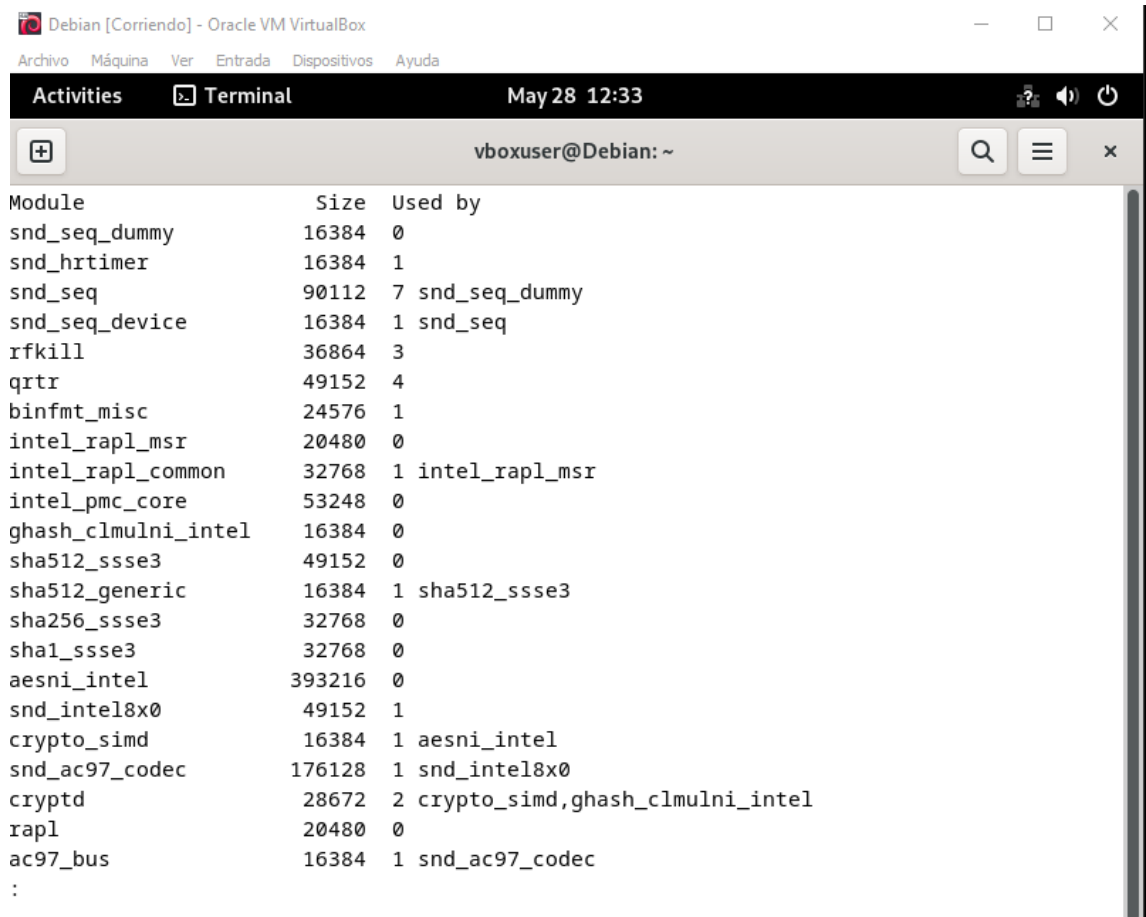
```
root@Debian:~# lspci -tv
-[0000:00]-+-00.0 Intel Corporation 440FX - 82441FX PMC [Natoma]
+-01.0 Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
+-01.1 Intel Corporation 82371AB/EB/MB PIIX4 IDE
+-02.0 VMware SVGA II Adapter
+-03.0 Intel Corporation 82540EM Gigabit Ethernet Controller
+-04.0 InnoTek Systemberatung GmbH VirtualBox Guest Service
+-05.0 Intel Corporation 82801AA AC'97 Audio Controller
+-06.0 Apple Inc. KeyLargo/Intrepid USB
+-07.0 Intel Corporation 82371AB/EB/MB PIIX4 ACPI
+-0b.0 Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI Controller
+-0d.0 Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller [AHCI mode]
```

el comando “lspci –tv” sirve para mostrar el árbol de los dispositivos.



```
root@Debian:~# lsusb
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 002: ID 80ee:0021 VirtualBox USB Tablet
Bus 002 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
root@Debian:~#
```

El comando “lsusb” sirve para mostrar la información de los buses y dispositivos conectados.



```
Module              Size  Used by
snd_seq_dummy       16384  0
snd_hrtimer          16384  1
snd_seq              90112  7 snd_seq_dummy
snd_seq_device       16384  1 snd_seq
rfkill               36864  3
qrtr                  49152  4
binfmt_misc          24576  1
intel_rapl_msr        20480  0
intel_rapl_common    32768  1 intel_rapl_msr
intel_pmc_core        53248  0
ghash_clmulni_intel  16384  0
sha512_ssse3         49152  0
sha512_generic       16384  1 sha512_ssse3
sha256_ssse3         32768  0
sha1_ssse3           32768  0
aesni_intel          393216  0
snd_intel8x0          49152  1
crypto_simd           16384  1 aesni_intel
snd_ac97_codec        176128  1 snd_intel8x0
cryptd                28672  2 crypto_simd,ghash_clmulni_intel
rapl                  20480  0
ac97_bus              16384  1 snd_ac97_codec
:
```

Lsmod | less nos permite visualizar los modulos que están en el equipo.