

TBS DVB-S2 Receivers EUMETCast LINUX Setup Guide

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Document Change Record

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v1	12 January 2015		First release
v1A	16 April 2015		Links Updated , New drivers used, Appendix for Centos 6.6 added
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v2	15 March 2016		Document title updated New TBS-6903 device added (§1, p5) Prerequisites Updated (§2, p7) New Linux drivers used (§3.2, p11)

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1 INTRODUCTION



Figure 1 TBS-5925 Receiver



Figure 2 TBS-6925 Receiver



Figure 3 TBS-6983 Receiver

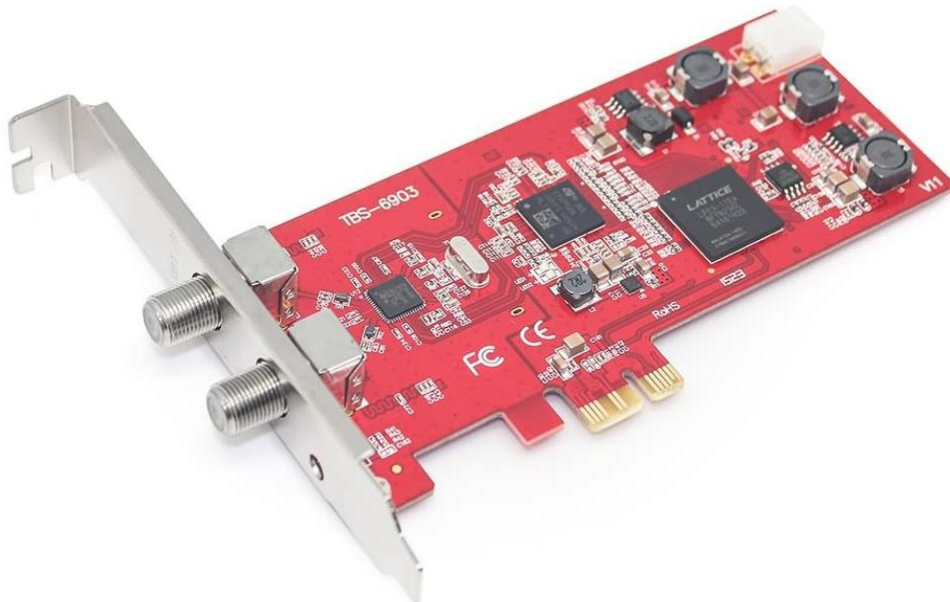


Figure 4 TBS-6903 Receiver

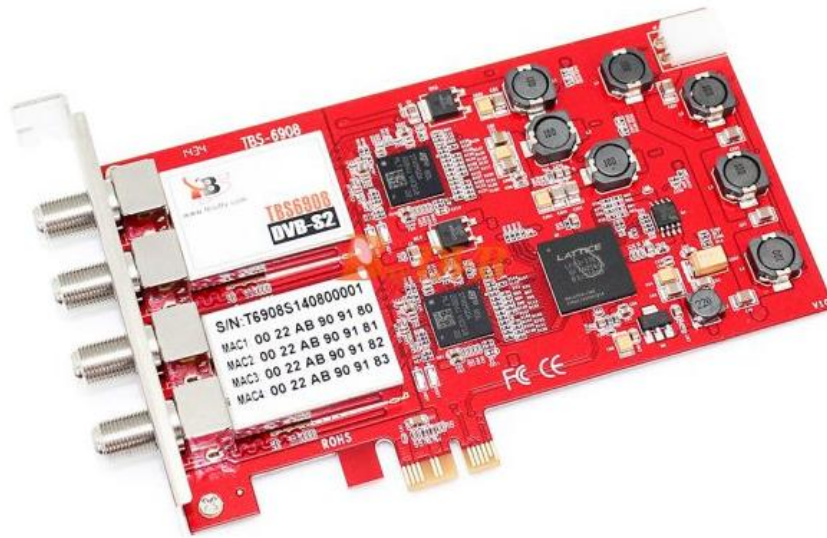


Figure 5 TBS-6908 Receiver

The purpose of this manual is to guide a user through the minimum necessary steps to allow the reception of EUMETCast data (DVB-S2) on the TBS-5925 / TBS-6925 / TBS-6983/ TBS-6903/TBS-6908 **satellite receivers**.

2 PREREQUISITES

Before performing the configuration please ensure the following steps have been addressed:

- A PC that covers the recommended technical specifications (see TD15: EUMETCastReception Station Requirements – PC Hardware Specifications). If the HVS is enabled PC RAM should be > 4 Gb;
- A USB 2.0 port is available for connecting the TBS-5925 receiver;
- A PCIe slot is available for connecting the TBS-6925 / TBS-6983 / TBS-6903/TBS-6908 receiver;
- Operating System is compliant. The tested Linux distribution in this manual is UBUNTU LTS 14.04.02 (32 bit) and Centos 6.6 Final (32 bit). The 64 bit version of these distributions can also be used by installing the 32bit compatibility drivers;
- Firefox 35 and higher or any other compatible browser;
- Root access to the reception host system;
- The EUMETCast antenna pointing has been performed correctly to EUTELSAT10A for DVB-S2 reception. (For DVB-S2 reception the antenna pointing and LNB quality are crucial);
- An EKU has been obtained from the EUMETSAT user help desk;

3 INSTALLATION & CONFIGURATION

3.1 Physical Connections



Figure 6 TBS-5925 Connectors

The connectors used in the TBS-5925 device configuration are described in the following table:

Number	Connector
1	Power Supply
2	RF In
3	USB 2.0 Connector

- Connect the power adaptor to connector 1 on the TBS-5925;
- Connect the antenna cable to the connector 2 ;
- Connect the device using the connector 3 to the PC using a usb cable ;

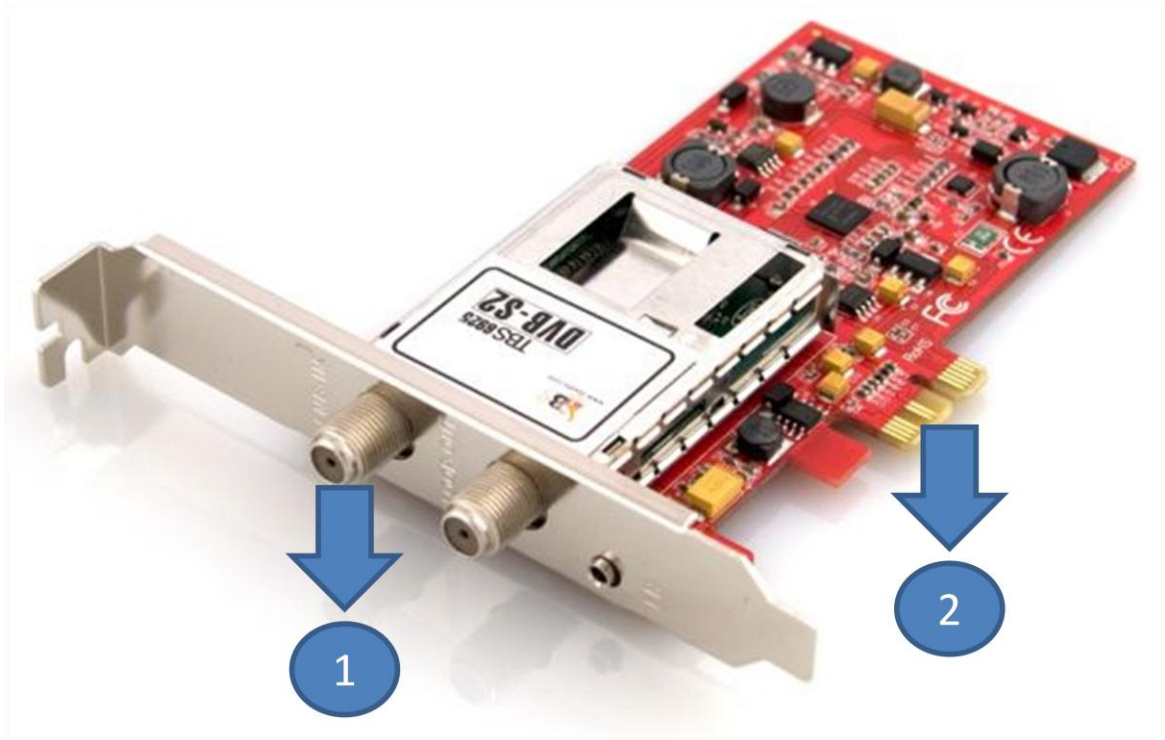


Figure 7 TBS-6925/TBS-6983 Connectors

The connectors used in the TBS-6925 / TBS-6983 device configuration are described in the following table:

Number	Connector
1	RF In
2	PCIe 1.x Connector

- Connect the antenna cable to the connector 1;
- Plug-in the connector 2 to a free PCIe slot of your PC ;

Note: On TBS-6983 to get adapter 0 use the lower plug (on TBS-6925 upper plug, lower is loop)

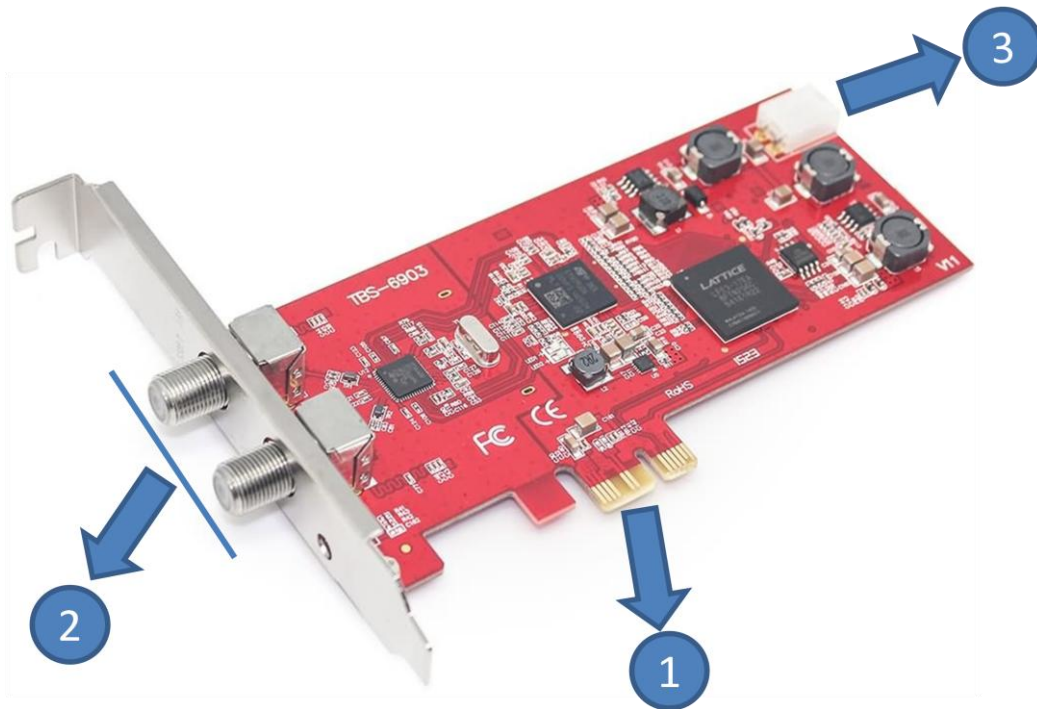


Figure 8 TBS-6903 Connectors

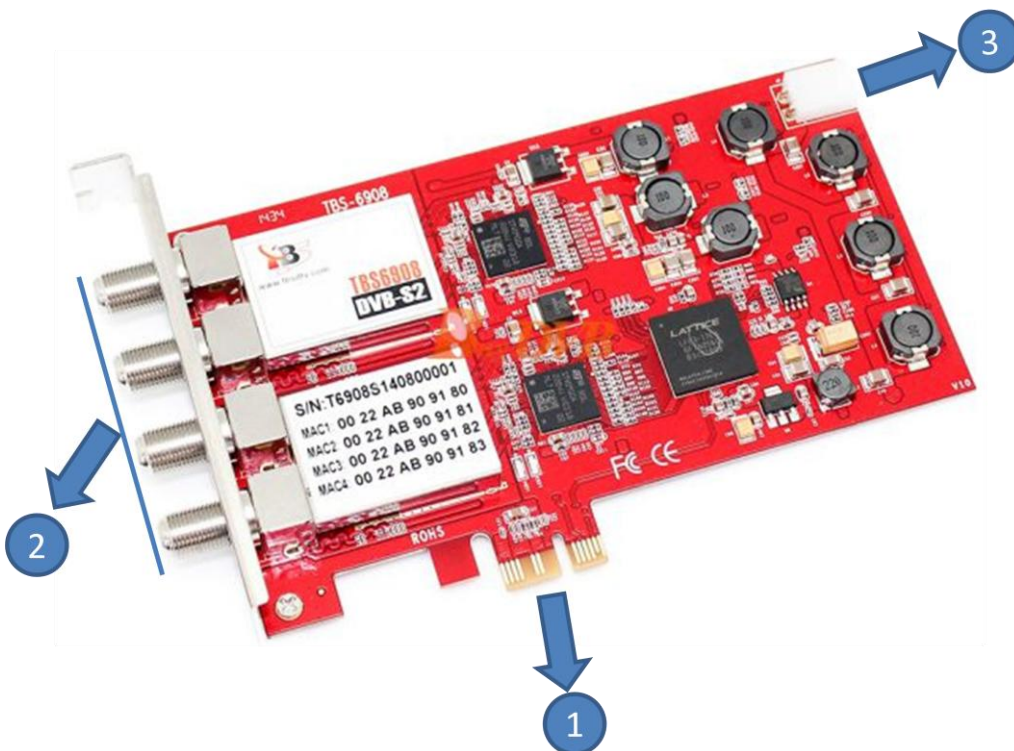


Figure 9 TBS-6908 Connectors



Figure 10 TBS-6903/6908 Power Cable

The connectors used in the TBS-6903/6908 devices configuration are described in the following table:

Number	Connector
1	PCIe 1.x Connector
2	RF In
3	Power Cable Connector

Notes:

- i. On TBS-6903/6908 to get adapter 0 use the lower plug.
- ii. The external power plug is optional. It needs to be used in very rare cases when there is no enough power from PCIe slot. (The LNB Input on TBS cards can provide 450mA. If the user has only LNB connected on the coaxial cable, then the external power is not needed as one LNB is on average 100mA. If there are things like motor, DiSEqC devices on the same coaxial cable, then the power consumption can go up and external power be needed).

3.2 Linux Drivers

- 1) Precompiled drivers are not yet available
- 2) You can find the latest windows driver at tbsdtv web site :

<http://www.tbsdtv.com/download/>

- 3) The version used for EUMETSAT testing was v160219

- 4) The installation instructions for various specific linux distributions are listed in the Appendixes.
- 5) After the driver installation reboot the EUMETCast W/S in order to load the newly installed drivers.

```
# shutdown -r now
```

- 6) After reboot check that the newly installed driver is loaded correctly:

```
# dmesg | grep TBS
```

- 7) If everything is OK, the output from the above command should be similar to:

if everything is OK, the output from the above command should be similar to:

e.g.

- a. for the TBS-5925 USB device (UBUNTU) :

```
# dmesg |grep TBS
```

```
[ 1.468829] usb 1-6: Product: TBS-5925
[ 1.468832] usb 1-6: Manufacturer: TBS-Tech
[ 13.960367] dvb-usb: found a 'TBS 5925 DVB-S2 USB2.0' in cold state, will try to load a firmware
[ 14.079021] tbs5925: start downloading TBS5925 firmware
[ 14.196012] dvb-usb: found a 'TBS 5925 DVB-S2 USB2.0' in warm state.
[ 14.196206] DVB: registering new adapter (TBS 5925 DVB-S2 USB2.0)
[ 14.484325] tbs5925: TBS 5925 FE Attached.
[ 14.486426] dvb-usb: TBS 5925 DVB-S2 USB2.0 successfully initialized and connected.
```

- b. for the TBS-5925 USB device (CENTOS) :

```
# dmesg |grep TBS
```

```
usb 2-1.6: Product: TBS-5925
usb 2-1.6: Manufacturer: TBS-Tech
dvb-usb: found a 'TBS 5925 DVB-S2 USB2.0' in cold state, will try to load a firmware
tbs5925: start downloading TBS5925 firmware
dvb-usb: found a 'TBS 5925 DVB-S2 USB2.0' in warm state.
DVB: registering new adapter (TBS 5925 DVB-S2 USB2.0)
tbs5925: TBS 5925 FE Attached.
dvb-usb: TBS 5925 DVB-S2 USB2.0 successfully initialized and connected.
[root@sadca-pc1 ~]# dmesg |grep TBS
usb 2-1.6: Product: TBS-5925
usb 2-1.6: Manufacturer: TBS-Tech
dvb-usb: found a 'TBS 5925 DVB-S2 USB2.0' in cold state, will try to load a firmware
tbs5925: start downloading TBS5925 firmware
dvb-usb: found a 'TBS 5925 DVB-S2 USB2.0' in warm state.
DVB: registering new adapter (TBS 5925 DVB-S2 USB2.0)
tbs5925: TBS 5925 FE Attached.
dvb-usb: TBS 5925 DVB-S2 USB2.0 successfully initialized and connected.
```

3.3 Channel Tuning

Szap-s2 software is used for the channel tuning. A precompiled version of this software is included in the dvb-eumetcast rpm/deb/tar.gz file.

3.4 Verify Lock & Reception

The signal lock and quality can be easily tested using femon command:

```
# femon -H (femon -h for centos)

FE: TurboSight TBS 6908 DVBS/S2 frontend (DVBS)
status SCVYL | signal 85% | snr 86% | ber 0 | unc 0 | FE_HAS_LOCK
status SCVYL | signal 85% | snr 85% | ber 0 | unc 0 | FE_HAS_LOCK
status SCVYL | signal 85% | snr 85% | ber 0 | unc 0 | FE_HAS_LOCK
status SCVYL | signal 85% | snr 86% | ber 0 | unc 0 | FE_HAS_LOCK
status SCVYL | signal 85% | snr 85% | ber 0 | unc 0 | FE_HAS_LOCK
status SCVYL | signal 85% | snr 85% | ber 0 | unc 0 | FE_HAS_LOCK
status SCVYL | signal 85% | snr 84% | ber 0 | unc 0 | FE_HAS_LOCK
```

After the whole installation is completed and the dvb-eumetcast service is running, the data reception can be tested using tcpdump command

```
# tcpdump -nni dummy0

06:58:48.255090 IP 192.168.1.1.51728 > 224.223.222.240.7022: UDP, length 1242
06:58:48.255103 IP 192.168.1.1.42048 > 224.223.222.27.7004: rx type 242 (1242)
06:58:48.255109 IP 192.168.1.1.51728 > 224.223.222.240.7022: UDP, length 1242
06:58:48.255112 IP 192.168.1.1.51728 > 224.223.222.240.7022: UDP, length 1242
06:58:48.255116 IP 192.168.1.1.38955 > 224.223.222.83.8002: UDP, length 1242
06:58:48.255122 IP 192.168.1.1.53211 > 224.223.222.23.6004: UDP, length 1242
06:58:48.255125 IP 192.168.1.1.53211 > 224.223.222.23.6004: UDP, length 1242
06:58:48.255129 IP 192.168.1.1.42048 > 224.223.222.27.7004: rx type 242 (1242)
06:58:48.255132 IP 192.168.1.1.51728 > 224.223.222.240.7022: UDP, length 1242
06:58:48.255135 IP 192.168.1.1.51728 > 224.223.222.240.7022: UDP, length 1242
06:58:48.255138 IP 192.168.1.1.42048 > 224.223.222.27.7004: rx type 242 (1242)
06:58:48.255141 IP 192.168.1.1.51728 > 224.223.222.240.7022: UDP, length 1242
06:58:48.255144 IP 192.168.1.1.51728 > 224.223.222.240.7022: UDP, length 1242
06:58:48.255148 IP 192.168.1.1.51629 > 224.223.222.1.7003: rx type 240 (1242)
06:58:48.255152 IP 192.168.1.1.51728 > 224.223.222.240.7022: UDP, length 1242
```

4 TELICAST AND SYSTEM CONFIGURATION SETUP

4.1 Tellicast Setup

After the steps above have been completed, the Tellicast application must be given the fixed IP from which the data can be taken:

Into the configuration file `cast-client_xxx.ini` the “*interface_address*” must be set to the reception host local IP Address:

```
interface_address=192.168.238.238
```

N-B: The `interface_address` parameter can be commented or deleted from `cast-client_xxx.ini` and the Tellicast application will search the multicast data on all the interfaces available on the host; that is not recommended when the reception host is used to receive another data flow, the Tellicast client application is not able to distinguish between the flows a priori!

4.2 Firewall

Make sure the firewall allows traffic from the interface address in 4.1!

4.3 System Configuration Setup

In order to allow unrestricted multicast from network interfaces under **Linux reception host**, login as **root** and update (if needed) the `sysctl` parameters as follow:

```
# vi /etc/sysctl.conf

net.ipv4.conf.default.rp_filter = 0
net.ipv4.conf.all.rp_filter = 0
net.ipv4.ip_forward = 1
net.core.rmem_max = 5500000
net.core.wmem_max = 5500000
```

```
Then run :
# sysctl -p /etc/sysctl.conf
```

to refresh with the new configuration.

Appendix A UBUNTU 14.04.02 (32 BIT)

- 1) Login in your “eumetcast” account and switch to root :

```
account@eumetcast:~$ sudo su -  
[sudo] password for account:  
root@eumetcast:~#
```

- 2) Download the TBS linux drivers at /home/user/Downloads/tbs directory

- 3) Unzip the file

```
# unzip tbs-linux-drivers_v160219.zip
```

- 4) Give the following commands

```
# apt-get update  
# apt-get install dvb-apps (installs the LINUX dvb applications package)  
# apt-get install smcroute (installs static multicast router daemon)  
# cp dvb-usb-tbsqbox-id5925.fw /lib/firmware/ (installs the needed firmware for the  
TBS-5925 USB Device)  
# tar xjvf linux-tbs-drivers.tar.bz2
```

- 5) Go to driver package directory:

```
# cd linux-tbs-drivers
```

- 6) Depending on your kernel version and if the kernel is x86 or x86_64 (check output of 'uname -a') do:

- for x86 kernel 3.x (x86 32 bit installations of kernel 3.x):

```
# ./v41/tbs-x86_r3.sh (for our kernel here we used this)
```

- for x86 kernel 2.6.x (x86 32 bit installations of kernel 2.6.x):

```
# ./v41/tbs-x86.sh
```

- for any x86_64 kernel (x86 64 bit installations of Linux):

```
# ./v41/tbs-x86_64.sh
```

- 7) Build and install the driver:

```
# make
# make install
Reboot in order to load the newly installed driver:

# shutdown -r now
```

If everything is OK you should see the messages described in paragraph 3.2 (7).

Trouble shooting:

If after driver installation the device is not working and you are getting an error about "Unknown symbol" in dmesg :

```
[ 7.407126] dvb_usb: disagrees about version of symbol rc_register_device
[ 7.407129] dvb_usb: Unknown symbol rc_register_device (err -22)
[ 7.407137] dvb_usb: disagrees about version of symbol rc_free_device
[ 7.407138] dvb_usb: Unknown symbol rc_free_device (err -22)
[ 7.407143] dvb_usb: disagrees about version of symbol rc_allocate_device
[ 7.407144] dvb_usb: Unknown symbol rc_allocate_device (err -22)
[ 7.407152] dvb_usb: disagrees about version of symbol rc_unregister_device
[ 7.407153] dvb_usb: Unknown symbol rc_unregister_device (err -22)
```

Do the following:

```
# ll /lib/modules

total 12
drwxr-xr-x 3 root root 4096 Jul 22 2014 ./
drwxr-xr-x 23 root root 4096 Feb 23 11:41 ../
drwxr-xr-x 5 root root 4096 Feb 23 13:57 3.13.0-32-generic/
```

then :

```
# rm -R /lib/modules/3.13.0-32-generic/kernel/drivers/media/

# cd /home/user/Downloads/tbs/linux-tbs-drivers/

# make distclean
# ./v4l/tbs-x86_r3.sh
# make
# make install
```

Reboot in order to load the newly installed driver:

```
# shutdown -r now
```

If everything is OK you should see the messages described in paragraph 3.2 (7).

8) Include dummy module in the /etc/modules

```
# echo dummy >> /etc/modules (and reboot)
```

9) Login again and download the dvb-eumetcast-1.0-11.i386.deb file from EUMETSAT ftp site :

```
ftp://ftp.eumetsat.int/pub/OPS/out/user/EUMETCast_Support/EUMETCast_Licence_cd/Linux/DVB_devices/Common_Apps/deb_binary_packages/
```

and give the following command :

```
# dpkg -i dvb-eumetcast-1.0-11.i386.deb
```

Notes:

- For 64bit systems use # dpkg -i dvb-eumetcast-1.0-11.x86_64.deb

- Alternative you can use the tar.gz file on the root folder and extract :

```
# cd /
```

```
# tar --absolute-names -zxf dvb-eumetcast-1.0-11.i386.tar.gz (32bit systems) or
```

```
# tar --absolute-names -zxf dvb-eumetcast-1.0-11.x86_64.tar.gz (64bit systems)
```

10) Start the dvb-eumetcast service

```
# service dvb-eumetcast start
```

Appendix B CENTOS 6.6 (32BIT)

- 1) Login in your “eumetcast” account and switch to root :

```
~$ su -  
password :  
~#
```

- 2) Download the dvb-apps & smcroute rpm from :

ftp://ftp.eumetsat.int/pub/OPS/out/user/EUMETCast_Support/EUMETCast_Licence_cd/Linux/DVB_devices/Common_Apps/rpm_binary_packages/

- 3) Install Linux dvb applications package:

```
# rpm -ivh linuxtv-dvb-apps-1.1.1-2_20070420.e16.i686.rpm
```

Note: For 64bit systems use #rpm -ivh linuxtv-dvb-apps-1.1.1-2_20070420.e16.x86_64.rpm

- 4) Install Static Multicast Router daemon :

```
# rpm -ivh smcroute-0.92-2.i386.rpm
```

- 5) Download the TBS linux drivers at /home/user/Downloads/tbs directory

- 6) Unzip the file

```
# unzip tbs-linux-drivers_v160219.zip
```

- 7) If you are using TBS-5925 device, install the needed firmware

```
# cp dvb-usb-tbsqbox-id5925.fw /lib/firmware/
```

- 8) Extract the linux drivers

```
# tar xjvf linux-tbs-drivers.tar.bz2
```

- 9) Go to driver package directory:

```
# cd linux-tbs-drivers
```

- 10) Depending on your kernel version and if the kernel is x86 or x86_64 (check output of 'uname -a') do:

- for x86 kernel 3.x (x86 32 bit installations of kernel 3.x):

```
# ./v41/tbs-x86_r3.sh (for our Kernel here we used this)
```

- for x86 kernel 2.6.x (x86 32 bit installations of kernel 2.6.x):

```
# ./v41/tbs-x86.sh
```

- for any x86_64 kernel (x86 64 bit installations of Linux):

```
# ./v41/tbs-x86_64.sh
```

11) Build and install the driver:

```
# make
# make install
Reboot in order to load the newly installed driver:

# shutdown -r now
```

If everything is OK you should see the messages described in paragraph 3.2 (7).

Trouble shooting:

If you are getting an error during compilation about "conflicting types ":

```
make[2]: Leaving directory `/home/eumetman/Downloads/tbs/linux-tbs-
drivers/v41/firmware'
Kernel build directory is /lib/modules/2.6.32-504.12.2.el6.centos.plus.i686/build
make -C /lib/modules/2.6.32-504.12.2.el6.centos.plus.i686/build
SUBDIRS=/home/eumetman/Downloads/tbs/linux-tbs-drivers/v41 modules
make[2]: Entering directory `/usr/src/kernels/2.6.32-
504.12.2.el6.centos.plus.i686'
  CC [M] /home/eumetman/Downloads/tbs/linux-tbs-drivers/v41/au0828-core.o
In file included from <command-line>:0:
/home/eumetman/Downloads/tbs/linux-tbs-drivers/v41/compat.h:26: error: conflicting
types for 'find_next_zero_bit'
include/linux/bitops.h:243: note: previous declaration of 'find_next_zero_bit' was
here
/home/eumetman/Downloads/tbs/linux-tbs-drivers/v41/compat.h:32: error: conflicting
types for 'find_next_bit'
include/linux/bitops.h:233: note: previous declaration of 'find_next_bit' was here
make[3]: *** [/home/eumetman/Downloads/tbs/linux-tbs-drivers/v41/au0828-core.o]
Error 1
make[2]: *** [_module_/home/eumetman/Downloads/tbs/linux-tbs-drivers/v41] Error 2
make[2]: Leaving directory `/usr/src/kernels/2.6.32-504.12.2.el6.centos.plus.i686'
make[1]: *** [default] Error 2
make[1]: Leaving directory `/home/eumetman/Downloads/tbs/linux-tbs-drivers/v41'
make: *** [all] Error 2
```

What has happened is that Red Hat has now back-ported more 'advanced' code into its own kernels. So you are witnessing the conflict of having two declarations, in two separate places, for two parameters.

To resolve those errors you will need to edit the `/usr/src/tbsdrivers/linux-tbs-drivers/v4l/compat.h` file and:

- (1) Comment out the declaration for 'find_next_zero_bit' which begins at line 26
- (2) Comment out the declaration for 'find_next_bit' which begins at line 32

See below:

```
/* static inline unsigned long find_next_zero_bit_le(const void *addr,
*          unsigned long size, unsigned long offset)
* {
*   return find_next_zero_bit(addr, size, offset);
* }
*
* static inline unsigned long find_next_bit_le(const void *addr,
*          unsigned long size, unsigned long offset)
* {
*   return find_next_bit(addr, size, offset);
* } */
#endif
```

Then rebuild and install the driver:

```
# make
# make install
```

Reboot in order to load the newly installed driver:

```
# shutdown -r now
```

If everything is OK you should see the messages described in paragraph 3.2 (7).

12) Include dummy module in the `/etc/modules`

```
# echo 'modprobe dummy' >> /etc/rc.modules
# chmod +x /etc/rc.modules
```

and reboot

11) Login again and download the `dvb-eumetcast-1.0-11.i386.rpm` file from EUMETSAT ftp site :

```
ftp://ftp.eumetsat.int/pub/OPS/out/user/EUMETCast_Support/EUMETCast_Licence_cd/Linux/DVB_devices/Common_Apps/rpm_binary_packages/
```

and give the following command :

```
# rpm -ivh dvb-eumetcast-1.0-11.i386.rpm
```

Notes:

- For 64bit systems use `# rpm -ivh dvb-eumetcast-1.0-11.x86_64.rpm`
- Alternative you can use the tar.gz file on the root folder and extract :

```
# cd /
```

```
# tar --absolute-names -zxf dvb-eumetcast-1.0-11.i386.tar.gz (32bit systems) or
```

```
# tar --absolute-names -zxf dvb-eumetcast-1.0-11.x86_64.tar.gz (64bit systems)
```

13) Start the dvb-eumetcast service

```
# service dvb-eumetcast start
```