

***Technotrend S2-4100 DVB-S Receiver
EUMETCast C-Band Africa & Americas LINUX
Setup Guide***

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1 INTRODUCTION

1.1 Purpose

The purpose of this manual is to guide a user through the minimum necessary to allow the reception of EUMETCast data (**only DVB-S C-Band Africa/Americas**) on the Technotrend S2-4100 DVB-S2 receiver. The base operating system used for this procedure is Linux 64bit (Centos 6.6 and Ubuntu 14.04.05).

Important Note: This device is not compatible with the EUMETCast DVB-S2 Ku-Band Service!!!



More details about the device can be found at:

http://engl.technotrend.eu/2959/PC_Products.html

1.2 Prerequisites

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

- A PC with a PCIe slot port is available for connecting the receiver;
- Operating System is compliant. The tested Linux distribution in this manual is Centos 6.6 Final (64 bit) and UBUNTU LTS 14.04 (64 bit);
- Firefox 35 and higher or any other compatible browser;
- Root access to the reception host system;
- Internet access
- The EUMETCast antenna pointing has been performed correctly to EUTELSAT 5 West A (5 W) for C-Band Africa DVB-S reception and SES-6 (40.5 W) for C-Band Americas DVB-S reception;
- An EKU has been obtained from the EUMETSAT user help desk;
- The reception host has the latest EUMETCast reception software installed;

1.3 Document Structure

Section 1 General information (this section).

Section 2 Centos 6.6 (64bit) Installation

Section 3 Ubuntu 14.04 (64bit) Installation

2 CENTOS INSTALLATION

The Centos OS used was Centos 6.6 (kernel 2.6.32). The original Linux drivers have been downloaded from the technotrend official ftp site:

http://engl.technotrend.eu/2959/PC_Products.html

```
# cat /etc/issue
CentOS release 6.6 (Final) 64 bit

# uname -r
2.6.32-504.el6.x86_64
```

2.1 Drivers Compilation

- a. Download the latest driver. Make sure you're "root" user.

```
# wget http://www.tt-downloads.de/tt_s2_4100_drv_lnx.tar.bz2
# cp tt_s2_4100_drv_lnx.tar.bz2 /root
# cd /root
# tar xjvf tt_s2_4100_drv_lnx.tar.bz2
```

- b. Modification of compat.h header file is needed :

Edit ~/tt_s2_4100_drv_lnx/v41/compat.h file & comment out the following lines:

```
/*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);
*}*/
```

```
# cd tt_s2_4100_drv_lnx
# ./tt_install_lnx26_x64.sh
# reboot ( you will be asked, just say "yes")
```

c. Status after compilation:

```
# dmesg |grep DVB
DVB: registering new adapter (SAA716x dvb adapter)
DVB: registering adapter 0 frontend 0 (Technotrend TT-budget S2-4100 DVB-S/S2)...
```

2.2 DVB-APPS – SMCROUTE Installation

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/
```

Install Linux dvb applications package:

```
# rpm -ivh linuxtv-dvb-apps-1.1.1-2_20070420.e16.x86_64.rpm
```

Note : For 32 bit systems use:

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

Install Static Multicast Router daemon:

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

```
# femon
using '/dev/dvb/adapater0/frontend0'
FE: Technotrend TT-budget S2-4100 DVB-S/S2 (SAT)
status 1f | signal cadb | snr ae13 | ber 00000000 | unc 00000000 |
status 1f | signal cabb | snr ac5e | ber 00000000 | unc 00000000 |
status 1f | signal cadb | snr ac5e | ber 00000000 | unc 00000000 |
```

2.3 DVB-S / C-Band Africa/Americas Antenna EUMETCast Tune

a. Tuning using szap-s2

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.x86_64.rpm
```

Notes:

For 32bit systems use # rpm -ivh dvb-eumetcast-1.0-11.i386.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)
```

```
/etc/channels.conf
```

```
/etc/dvb-eumetcast.cfg
```

```
/etc/eumetcast-channels.cfg
```

```
/etc/init.d/dvb-eumetcast
```

```
/usr/bin/szap-s2 ← (precompiled version)
```

Add dummy module to kernel

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

```
# chmod +x /etc/rc.modules
```

```
# reboot
```

Select transponder and DVB interface address

Do that by editing the following file:

```
$ vi /etc/dvb-eumetcast.cfg
```

and select the relevant EUMETCAST_SERVICE_IDENTIFIER for your setup - default is "Ku-BAND-EUR"

Possible EUMETCAST_SERVICE_IDENTIFIERS:

"Ku-BAND-EUR" for KU-Band Europe

"C-BAND-AFR" for C-Band Africa

"C-BAND-SAM" for C-Band South America

Then select the name of the DVB_INTERFACE_NAME of your setup - default is for "dvb0"

Start dvb-service

```
# service dvb-eumetcast start (to start the dvb-service)
```

Status after Tuning


```
# femon
using '/dev/dvb/adapter0/frontend0'
FE: Technotrend TT-budget S2-4100 DVB-S/S2 (SAT)
status 1f | signal cafb | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK
status 1f | signal cb0b | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK
status 1f | signal cafb | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK
status 1f | signal caeb | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK
status 1f | signal cafb | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK
status 1f | signal cb1b | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK
status 1f | signal cafb | snr ae13 | ber 00000000 | unc 00000000 | FE_HAS_LOCK
status 1f | signal cb0b | snr ae13 | ber 00000000 | unc 00000000 | FE_HAS_LOCK
status 1f | signal cb0b | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK
```

b. TCPDUMP TEST

```
# tcpdump -nni dvb0_0

tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on dvb0_0, link-type EN10MB (Ethernet), capture size 65535 bytes
12:14:23.257837 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.293446 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.293457 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 447
12:14:23.329052 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 263
12:14:23.329070 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.329071 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 106
12:14:23.364718 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.364754 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.400265 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.400287 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.435898 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.471464 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.471472 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
```

2.4 ECU drivers Installation

- a. Install compatibility libraries :

```
# yum install glibc.i686
```

Check if everything is OK ::

```
# rpm -qa | grep compat-libstdc++
```

```
compat-libstdc++-296-2.96-144.el6.i686 ← (OK)
compat-libstdc++-33-3.2.3-69.el6.x86_64
```

- b. Check pcsc

Check & **uninstall** all existing pcsc versions:

```
# rpm -qa |grep pcsc
pcsc-lite-libs-1.5.2-14.el6.x86_64
pcsc-lite-1.5.2-14.el6.x86_64

# yum remove pcsc-lite-libs-1.5.2-14.el6.x86_64
# yum remove pcsc-lite-1.5.2-14.el6.x86_64
```

Install the pcsc-lite rpm that is available on EUMETSAT CD and it is compatible with the used version of the aksrte etoken software.

```
# yum install pcsc-lite-1.2.0-3.i386.rpm
```

c. Install the etoken software:

```
# yum install aksrte-3-15.84p3.i386.rpm
```

d. Insert the ECU and restart the computer

2.5 Tellicast Installation

Install Tellicast V2.12.1 pre-release.

This version is available via EUMETCast in the subdirectory "tellicast-client-pre-release" of the "Info-Channel-1" target directory.

For the installation please check the linux README files.

Set IP address in /etc/cast-client_bas.ini to

```
interface_address=192.168.238.238
```

Set the target directory for logs in /etc/cast-client_bas.ini and the target directory for data in /etc/cast-client-channels_bas.ini.

2.6 Firewall

Make sure the firewall allows traffic from the interface address in 2.5!

2.7 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.

3 UBUNTU INSTALLATION

The Ubuntu OS used was Ubuntu 12.04.05 x86_64 (kernel 3.13.0.32). The original Linux drivers have been downloaded from the technotrend official ftp site:

http://engl.technotrend.eu/2959/PC_Products.html

```
# cat /etc/issue  
Ubuntu 12.04.5 LTS \n \l
```

```
Kernel Used : 2.6.32  
# uname -r  
3.13.0-32-generic
```

3.1 Drivers Compilation

a. Compile by running :

```
# ./tt_install_lnx3x_x64.sh  
# reboot
```

```
Compilation Errors : 0  
Compilation Warnings :0
```

b. Status after compilation (**FAULT**):

```
# dmesg |grep dvb  
[ 6.082325] saa716x_core: disagrees about version of symbol dvb_dmxdev_init  
[ 6.082330] saa716x_core: Unknown symbol dvb_dmxdev_init (err -22)  
[ 6.082377] saa716x_core: disagrees about version of symbol dvb_register_adapter  
[ 6.082379] saa716x_core: Unknown symbol dvb_register_adapter (err -22)  
[ 6.082389] saa716x_core: disagrees about version of symbol dvb_dmx_release  
[ 6.082391] saa716x_core: Unknown symbol dvb_dmx_release (err -22)  
[ 6.082399] saa716x_core: disagrees about version of symbol dvb_net_init  
[ 6.082401] saa716x_core: Unknown symbol dvb_net_init (err -22)  
[ 6.082407] saa716x_core: disagrees about version of symbol dvb_dmxdev_release  
[ 6.082408] saa716x_core: Unknown symbol dvb_dmxdev_release (err -22)  
[ 6.082415] saa716x_core: disagrees about version of symbol dvb_frontend_detach  
[ 6.082417] saa716x_core: Unknown symbol dvb_frontend_detach (err -22)  
[ 6.082421] saa716x_core: disagrees about version of symbol dvb_net_release  
[ 6.082422] saa716x_core: Unknown symbol dvb_net_release (err -22)  
[ 6.082427] saa716x_core: disagrees about version of symbol dvb_unregister_frontend  
[ 6.082429] saa716x_core: Unknown symbol dvb_unregister_frontend (err -22)  
[ 6.082435] saa716x_core: disagrees about version of symbol dvb_register_frontend  
[ 6.082436] saa716x_core: Unknown symbol dvb_register_frontend (err -22)  
[ 6.082442] saa716x_core: disagrees about version of symbol dvb_unregister_adapter  
[ 6.082444] saa716x_core: Unknown symbol dvb_unregister_adapter (err -22)  
[ 6.082447] saa716x_core: disagrees about version of symbol dvb_dmx_init  
[ 6.082448] saa716x_core: Unknown symbol dvb_dmx_init (err -22)
```

To resolve it :

```
# 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/
```

& recompile the drivers:

```
# ./tt_install_lnx3x_x64.sh
# reboot
```

Status after second compilation: Success

```
# dmesg |grep dvb
[  6.166584] dvb_core: module verification failed: signature and/or required key missing
- tainting kernel
[  6.712316] DVB: registering new adapter (SAA716x dvb adapter)

# dmesg |grep front
[  7.266935] DVB: registering adapter 0 frontend 0 (Technotrend TT-budget S2-4100 DVB-
S/S2)...
```

3.2 DVB-APPS – SMCROUTE Installation

```
# apt-get install dvb-apps
```

```
# apt-get install smcroute
```

```
# femon
```

```
FE: Technotrend TT-budget S2-4100 DVB-S/S2 (DVBS)
status SCVYL | signal c9eb | snr a06c | ber 00000000 | unc 00000000 |
status SCVYL | signal c9eb | snr a06c | ber 00000000 | unc 00000000 |
status SCVYL | signal c9ab | snr 9eb7 | ber 00000000 | unc 00000000 |
status SCVYL | signal c9bb | snr 9eb7 | ber 00000000 | unc 00000000 |
status SCVYL | signal c9ab | snr 9eb7 | ber 00000000 | unc 00000000 |
status SCVYL | signal c9cb | snr 9eb7 | ber 00000000 | unc 00000000 |
status SCVYL | signal c9db | snr a06c | ber 00000000 | unc 00000000 |
```

3.3 DVB-S / C-Band Africa/Ameicas Antenna EUMETCast Tune

a. Tuning using szap-s2

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/Linu
x/DVB_devices/Common_Apps/deb_binary_packages/
```

and give the following command :

```
# dpkg -i dvb-eumetcast-1.0-11.x86_64.deb
```

Notes:

- For 32bit systems use # dpkg -i dvb-eumetcast-1.0-11.i386.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)  
  
/etc/channels.conf  
/etc/dvb-eumetcast.cfg  
/etc/eumetcast-channels.cfg  
/etc/init.d/dvb-eumetcast  
/usr/bin/szap-s2 ← (precompiled version)
```

Include dummy module in the /etc/modules

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

Select transponder and DVB interface address

Do that by editing the following file:

```
$ vi /etc/dvb-eumetcast.cfg
```

and select the relevant EUMETCAST_SERVICE_IDENTIFIER for your setup - default is "Ku-BAND-EUR"

Possible EUMETCAST_SERVICE_IDENTIFIERS:

- "Ku-BAND-EUR" for KU-Band Europe
- "C-BAND-AFR" for C-Band Africa
- "C-BAND-SAM" for C-Band South America

Then select the name of the DVB_INTERFACE_NAME of your setup - default is for "dvb0"

Start dvb-service

```
# service dvb-eumetcast start (to start the dvb-service)
```

Status after Tuning

```
# femon  
using '/dev/dvb/adapter0/frontend0'  
FE: Technotrend TT-budget S2-4100 DVB-S/S2 (SAT)  
status 1f | signal cafb | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK  
status 1f | signal cb0b | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK  
status 1f | signal cafb | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK  
status 1f | signal caeb | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK  
status 1f | signal cafb | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK  
status 1f | signal cb1b | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK  
status 1f | signal cafb | snr ae13 | ber 00000000 | unc 00000000 | FE_HAS_LOCK  
status 1f | signal cb0b | snr ae13 | ber 00000000 | unc 00000000 | FE_HAS_LOCK  
status 1f | signal cb0b | snr ac5e | ber 00000000 | unc 00000000 | FE_HAS_LOCK
```

b. TCPDUMP TEST

```
# tcpdump -nni dvb0_0
```

```
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode  
listening on dvb0_0, link-type EN10MB (Ethernet), capture size 65535 bytes  
12:14:23.257837 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
```

```
12:14:23.293446 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.293457 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 447
12:14:23.329052 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 263
12:14:23.329070 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.329071 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 106
12:14:23.364718 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.364754 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.400265 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
12:14:23.400287 IP 192.168.1.1.40405 > 224.223.222.223.4711: UDP, length 1442
```

3.4 EKU drivers Installation

Install EKU software in the following order:

EKU software is available from the EUMETCast CD or here at:

```
ftp://ftp.eumetsat.int/pub/ops/out/user/EUMETCast_Support/EUMETCast_Licence_cd/Linux/EKU_software/
```

```
# apt-get install libusb-0.1-4:i386

# dpkg -i libstdc++2.10-glibc2.2_2.95.4-22_i386.deb
# dpkg -i pcsc-lite_1.2.0-3_i386.deb
# dpkg -i --force-all aksrte_3-15.84p6_i386.deb
```

then plug in the EKU and restart the computer

3.5 Tellicast Installation

Install Tellicast V2.12.1 pre-release.

This version is available via EUMETCast in the subdirectory "tellicast-client-pre-release" of the "Info-Channel-1" target directory.

For the installation please check the linux README files.

Set IP address in /etc/cast-client_bas.ini to

```
interface_address=192.168.238.238
```

Set the target directory for logs in /etc/cast-client_bas.ini and the target directory for data in /etc/cast-client-channels_bas.ini.

3.6 Firewall

Make sure the firewall allows traffic from the interface address in 3.5!

3.7 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.