

The TV EXPLORER and DiSEqC™



The **DiSEqC™** (*Digital Satellite Equipment Control*) is an open protocol created by Eutelsat in 1997 as a communication standard between satellite TV receivers and external peripherals. The DiSEqC™ communications are based on the control commands, which travel combined with power voltage through the coaxial cable that leads the TV signal. The compatible peripherals and receivers detect these commands and react in agreement with such.

A DiSEqC™ command is a digital command represented by a succession of binary messages: "0" and "1" obtained when modulating the 22 kHz signal.

The **DiSEqC™** usually is used in the satellite TV facilities in order to use different types of switchers, through the coaxial cable that leads the TV signal.

To begin: The Universal LNB

'Standard'



1 satellite only
1 receiver

'TWIN'



1 satellite only
2 receivers

'QUAD' *



1 satellite only
4 receivers

'OCTO'



1 satellite only
8 receivers

The Universal LNB is the simplest and most used LNB. This allows the signal reception coming from one single satellite.

TWIN (2 independent outputs), QUAD (4 independent outputs) and OCTO (8 independent outputs) versions exist in the market. Each output is independent from others and can be connected to a different receiver.




An universal LNB is controlled by means of a power voltage and a 22kHz signal, sent through the RF cable, which allows us to switch between the different bands and polarities, according to the following table:

Power	Band	Polarization (linear / circular)
13 V	Low	Vertical / Right
18 V	Low	Horizontal / Left
13 V + 22 kHz	High	Vertical / Right
18 V + 22 kHz	High	Horizontal / Left

(*) · Not to confuse with LNB QUATTRO used in collective facilities.

Note: the LNB accept a very wide range of values for these voltages, usually 10-14.5V (for 13V) and 15.5-20V (for 18V).

In the **TV Explorer**, the band and the polarisation selection can be done from different menus (all the different ways indicated are equivalent):

Key	Menu	Line
	External units power supply	13V, 18V, 13V+22kHz, 18V+22kHz
	Configuration	Band : High / Low Polarization : Vertical / Horizontal
	DiSEqC	Band : High / Low Polarization : Vertical / Horizontal

TV EXPLORER “DiSEqC” menu

The command sending from the **TV Explorer** is carried out by means of the **DiSEqC**.

In order to send a DiSEqC™ command, it is necessary to select the different parameters by means of the rotary selector:

1. Select the polarisation.
2. Select the band.
3. Select the DiSEqC™ command (line “Send”) and validate it, by pressing the rotary selector in order to send the corresponding command (with the associated polarisation parameters and band).

Following, the most usually situations we can be found are described.

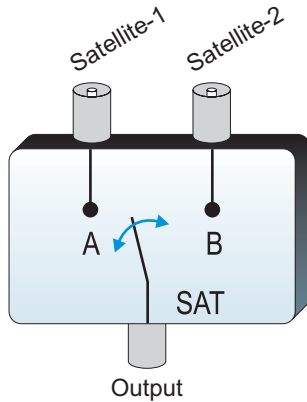


DiSEqC™ around the world

The use of **DiSEqC™** devices requires to know previously which commands are acknowledged by these ones, since it will determine the wiring diagram of the different elements, as well as the way as they can be controlled. This information must be provided by the device manufacturer.

Following appear the **DiSEqC™** devices more usually installed in the individual and collective facilities.

In the individual facilities



Tone-burst switcher (2 inputs – 1 output)

It is the simpler DiSEqC™ switcher. This one uses the « SAT A/B » commands and allows to switch between two different Universal LNB:

Command	Selected input
SAT A	Satellite 1
SAT B	Satellite 2

These switchers are transparent to the LNB's (13V, 18V, 22 kHz) commutation commands. Then, once chosen the satellite with the SAT command, the corresponding LNB can be used in a normal way. (see Universal LNB).

Note: There are switchers of 2 inputs and 1 output in which other DiSEqC commands are used, such as POSITION or OPTION, to allow more complex assemblies. Refer to the manufacturer technical information to make sure which are the commands to use.

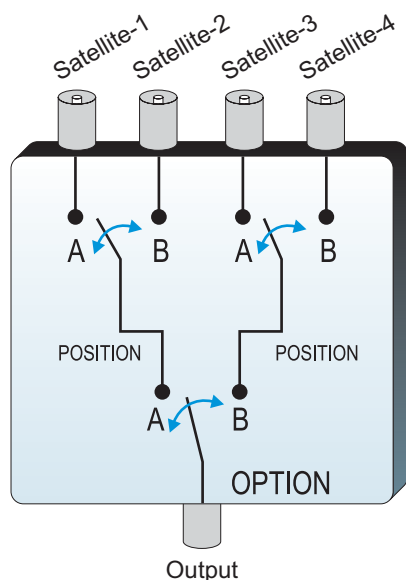
Monobloc LNB

A Monobloc LNB is a module composed by 2 Universal LNB connected by a Tone-burst switcher (2 inputs – 1 output). So, it can be managed in the same way.

Also TWIN (2 independent outputs), QUAD (4 independent outputs) and OCTO versions exist (8 independent outputs). In this case, each output is controlled in a different way from the rest.

Important: If it is desired to use Monobloc LNB with DiSEqC™ switchers, is necessary to make sure that these are compatible.





DiSEqC™ Switcher with 4 inputs and 1 output

This switcher allows the signal reception from four independent Universal LNBs (coming from 4 different satellites) on a single receiver.

As it is possible to observe in the attached scheme, there are "OPTION" and "POSITION" switchers in cascade. In order to switch it, will be necessary to send an OPTION command and later a POSITION command that yields, therefore, a total of 4 possibilities.

Note: the manufacturers usually assure the compatibility with the Tone-burst commands (SAT A/B) so that the second stage can be switched as much using a « POSITION A/B » command as using a « SAT A/B » command. This allows us then to use the switcher like a Tone-burst type with 2 inputs and 1 output.

With the **TV EXPLORER**, it is very easy to use this type of switcher, because it incorporates a specific « OPT / POS » command:

TV EXPLORER Command	Combination of DiSEqC™ commands send	Selected input
OPT/POS A-A	Option A + Position A	Satellite 1
OPT/POS A-B	Option A + Position B	Satellite 2
OPT/POS B-A	Option B + Position A	Satellite 3
OPT/POS B-B	Option B + Position B	Satellite 4

Only, it is necessary to locate the marker on the « SEND » line from DiSEqC menu and to select it by pressing the rotary selector, choose the « OPT/POS » command "OPT/POS" by turning the rotary selector, later validate by pressing again the rotary selector in order to send the command.

These switchers are transparent to the LNB's (13V, 18V, 22 kHz) switching commands. Then, once the satellite is chosen by means of the SAT command, the corresponding LNB can be used in a normal way. (see Universal LNB).



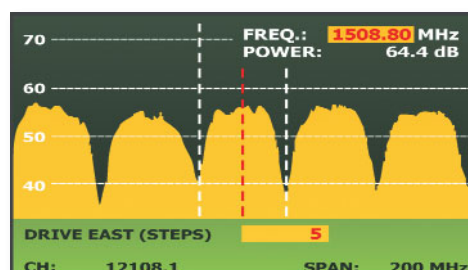
DiSEqC™ Motors

By means of the **TV Explorer** you can control easily and quickly DiSEqC 1.2™ motors. The **COMMANDS** option from DiSEqC™ menu allows to execute any of the following commands.

Electrical limits	
LIMIT EAST	Sets the current position as East limit
LIMIT WEST	Sets the current position as West limit
ENABLE LIMITS	Electronic limits activation
DISABLE LIMITS	Electronic limits desactivation
To drive the motor	
DRIVE EAST (SECONDS)	Turns motor to East (Units: seconds)
DRIVE EAST (STEPS)	Turns motor to East (Units: steps)
DRIVE WEST (SECONDS)	Turns motor to West (Units: seconds)
DRIVE WEST (STEPS)	Turns motor to West (Units: steps)
HALT	Stops the motor motion
Memories	
Store position	Store in memory the current position
Recalculate	Recalculates a satellite position

The motor control process (DRIVE EAST or DRIVE WEST) is more easy to be carried out from the spectrum analyser mode. From the spectrum analyser screen you must select a DRIVE command in the DiSEqC™ commands menu and then the meter will back to the spectrum screen. So, by turning the rotary selector clockwise you will drive to West the motor and by turning counter clockwise you will drive to East (a line at the screen bottom states the seconds or steps done).

In order to exit from this control mode press on DiSEqC™ key.



In the collective facilities

The most frequent satellite signal distribution system in the small collective facilities is the “BIS-switched”. This technology implies to use the “Quattro” type LNBs (not to confuse with the “QUAD” type) and also supports specific multiswitches for this type of facilities.



A **Quattro-LNB** is a LNB with 4 outputs that provides in a separated way the four frequency bands (vertical low, vertical high, horizontal low and horizontal high). These four signals can then be distributed in the building through multiswitches.

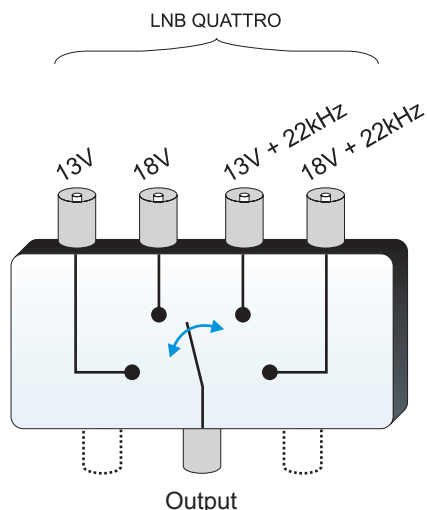


The signal is distributed in the network by means of **multi-outlet multiswitches**. The number of inputs and outputs is variable. The number of inputs depends on the number of satellites (LNB). Usually a multiswitch includes also an input for the TV terrestrial signal. The number of outputs depends on the number of terminals (receivers) that can be connected to the multiswitch. In addition, **multiswitch in cascade** incorporate pass connectors to be able to distribute the signal and thus to connect several multiswitch in cascade mode and therefore to give access to more users.

Examples of multiswitch:

	SAT Inputs	TER Inputs	Satellites	Terminals
Multiswitch 9/4	8	1	2	4
Multiswitch 5/16	4	1	1	16
Multiswitch 17/16	16	1	4	16
...

We will not consider the input of terrestrial TV, since this does not take part in the satellite signal. Also the following indicated examples do not show more than a single output. In the case of several outputs, the own operation scheme is reproduced for each one of them, because they are independent of the others.



Multiswitch (1 satellite)

In the DiSEqC menu of the **TV Explorer**, select the band and the polarisations desired and send the SAT A command, as it is indicated in the following table:

Band	Polarization	Command
Low	Horizontal	SAT A
Low	Vertical	SAT A
High	Horizontal	SAT A
High	Vertical	SAT A

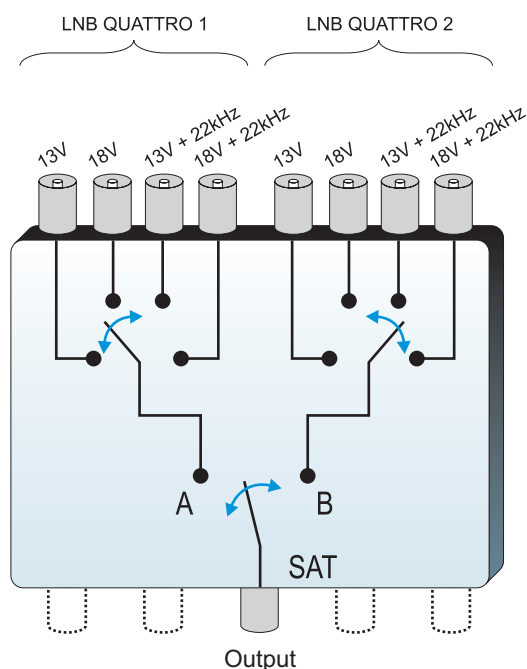
Very important: Whenever you wish to change of band or polarisation, it is necessary to send the SAT A command at the same time, since multiswitch does not respond to the habitual switching commands for a LNB (13V/18V/+22kHz): it is necessary the complete DiSEqC™ sequence to cause the commutation.

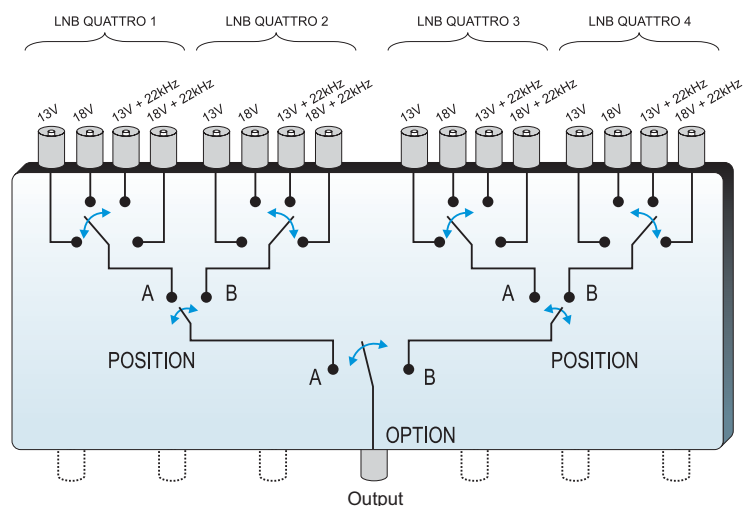
Multiswitch (2 Satellites)

This type of multiswitch is used usually to switch the Astra 19° and Hotbird 13° satellites.

As in the previous case, if for a certain satellite it is desired to change of band or polarisation, it is not sufficient with changing the corresponding parameter, but in addition it is necessary to send the command SAT A/B corresponding to cause the switching (even if one does not change of satellite).

Band	Polarization	Command	Output
Low	Horizontal	SAT A	Satellite-1
Low	Vertical	SAT A	Satellite-1
High	Horizontal	SAT A	Satellite-1
High	Vertical	SAT A	Satellite-1
Low	Horizontal	SAT B	Satellite-2
Low	Vertical	SAT B	Satellite-2
High	Horizontal	SAT B	Satellite-2
High	Vertical	SAT B	Satellite-2





Multiswitch (4 Satellites)

This type of multiswitch allows to distribute the signal coming from 4 different satellites. It uses a combination of OPTION, POSITION, Polarisation and Band commands. The **TV Explorer** allows to use easily this type of multiswitch thanks to the « OPT / POS » command, which sends the OPTION et POSITION commands in the necessary order. Like in the others multiswitch, if it is wanted to change of band or polarisation, if the satellite is even he himself, is necessary to send OPT/POS command to cause the commutation again.

Band	Polarization	Command	Satellite
Low	Horizontal	OPT/POS A-A	Satellite-1
Low	Vertical	OPT/POS A-A	Satellite-1
High	Horizontal	OPT/POS A-A	Satellite-1
High	Vertical	OPT/POS A-A	Satellite-1
Low	Horizontal	OPT/POS A-B	Satellite-2
Low	Vertical	OPT/POS A-B	Satellite-2
High	Horizontal	OPT/POS A-B	Satellite-2
High	Vertical	OPT/POS A-B	Satellite-2
Low	Horizontal	OPT/POS B-A	Satellite-3
High	Vertical	OPT/POS B-A	Satellite-3
High	Horizontal	OPT/POS B-A	Satellite-3
Low	Vertical	OPT/POS B-A	Satellite-3
Low	Horizontal	OPT/POS B-B	Satellite-4
High	Vertical	OPT/POS B-B	Satellite-4
High	Horizontal	OPT/POS B-B	Satellite-4
High	Vertical	OPT/POS B-B	Satellite-4