DiSEqC COMMANDS

A3.1 DiSEqC introduction

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.

A3.2 To begin: The Universal LNB

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:

'Standard'	'TWIN'	'QUAD'*	'OCTO'
1 satellite only 1 receiver	1 satellite only 2 receivers	1 satellite only 4 receivers	1 satellite only 8 receivers

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 *HD* RANGER *2*, the band and the polarisation selection can be done from different menus (all the different ways indicate dare equivalent):

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

A3.3 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.

A3.4 In the individual facilities

A3.4.1 Tone-burst switcher (2 inputs – 1 output)

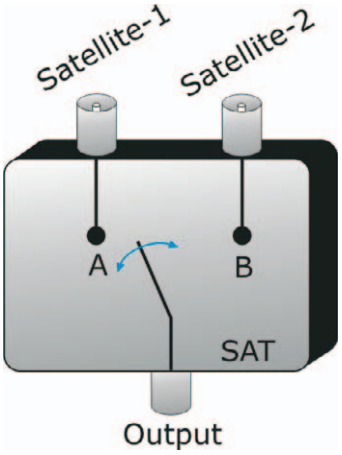

Figure A3. 1.

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.

A3.4.2 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.

Figure A3. 2.

A3.4.3 DiSEqC™ Switcher with 4 inputs and 1 output

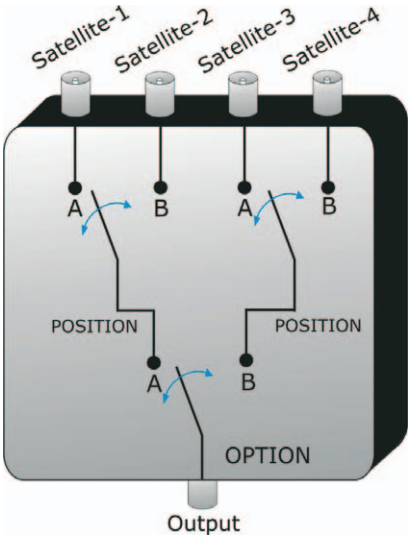

Figure A3. 3.

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 *HD* RANGER *2*, it is very easy to use this type of switcher, because it incorporates a specific «OPT / POS»command:

HD RANGER *2* 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

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).

A3.5 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-LNBis 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 signal scan then be distributed in the building through multiswitches.

Figure A3. 4.

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.

Figure A3. 5.

► **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.

A3.5.1 Multiswitch (1 satellite)

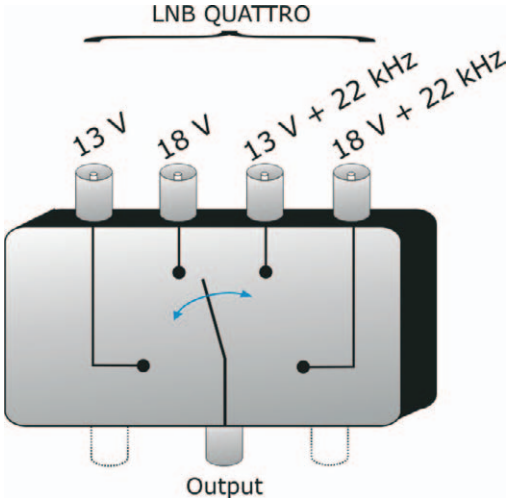

Figure A3. 6.

In the **DiSEqC™** menu of the *HD* RANGER *2*, 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.

A3.5.2 Multiswitch (2 Satellites)

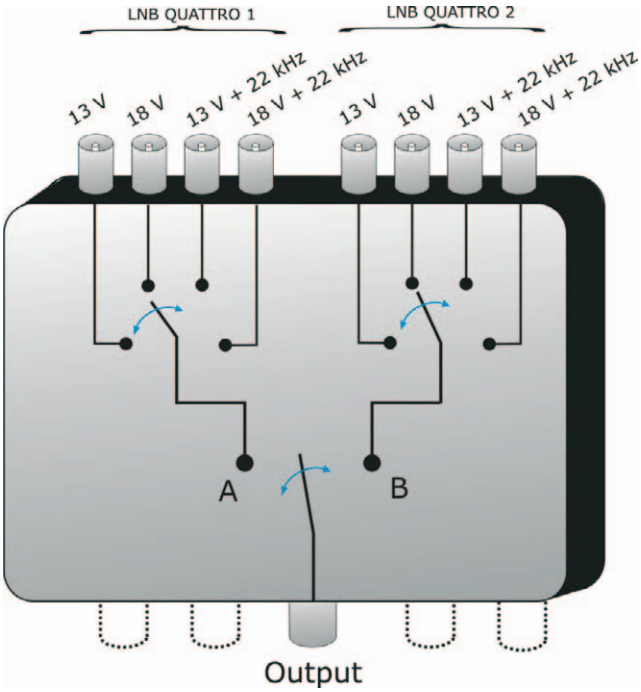

Figure A3. 7.

This type of multiswitch is used usually to switch the Astra 19º and Hotbird 13º 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

A3.5.3 Multiswitch (4 Satellites)

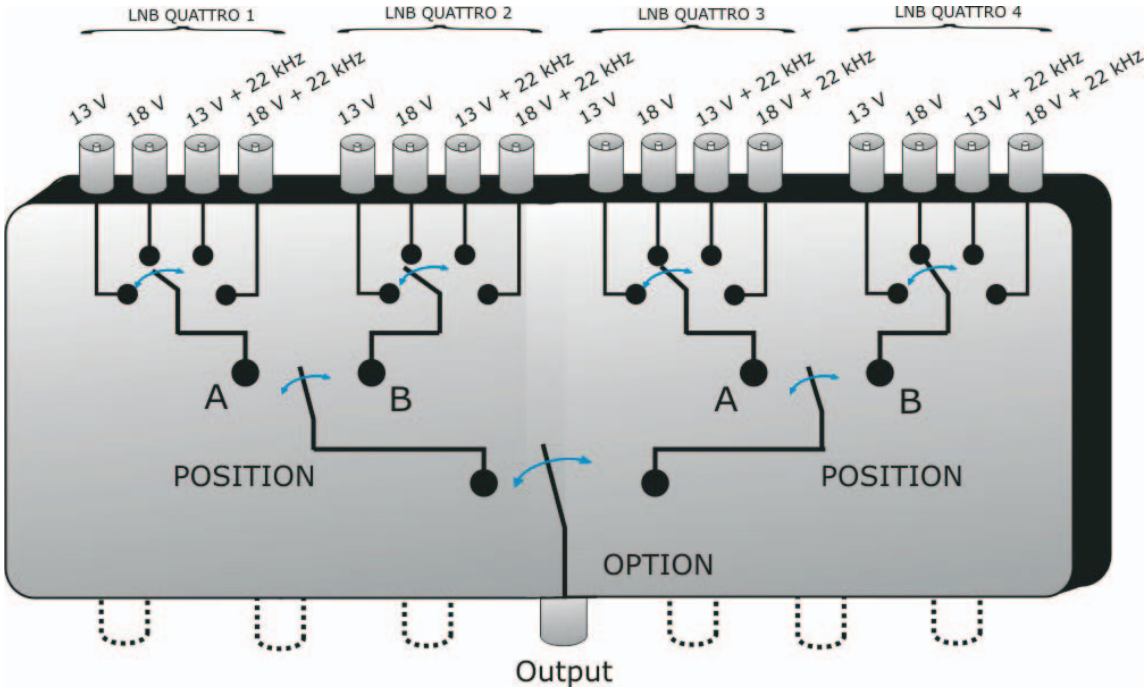

Figure A3. 8.

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 equipment 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 itis 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

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

A3.6 DiSEqC programs and commands in the *HD* RANGER *2*

► Commands

The **Commands** option allows executing any of the following commands:

COMMAND
SAT AB-A
SAT AB-B
SWITCH OPTION AB-A
SWITCH OPTION AB-B
DISABLE LIMITS
LIMIT EAST
LIMIT WEST
DRIVE ROTOR
GOTO
HALT
STORE
RECALCULATE
SWITCH 1A
SWITCH 1B
SWITCH 2A
SWITCH 2B
SWITCH 3A
SWITCH 3B
SWITCH 4A
SWITCH 4B
POWER
RESET
STANDBY

► Programs

There are eight predefined programs that execute basic functions to control an universal switch with two or four inputs. It also has more programs that control installations with 8 or 16 satellite antennas using SPAUN devices or switches Commited/Uncommited. Whenever a **DiSEqC™** program is sent, the commands that correspond to the equipment status in relation to the Horizontal or Vertical polarization and High or Low frequency band are also sent. This allows assuring that the installation status is the one indicated by the equipment.

DiSEqC Programs
16x1 LNB01 U1A2A/OpA_PoA
16x1 LNB02 U1A2A/OpA_PoB
16x1 LNB03 U1A2A/OpB_PoA
16x1 LNB04 U1A2A/OpB_PoB
16x1 LNB05 U1B2A/OpA_PoA
16x1 LNB06 U1B2A/OpA_PoB
16x1 LNB07 U1B2A/OpB_PoA
16x1 LNB08 U1B2A/OpB_PoB
16x1 LNB09 U1A2B/OpA_PoA
16x1 LNB10 U1A2B/OpA_PoB
16x1 LNB11 U1A2B/OpB_PoA
16x1 LNB12 U1A2B/OpB_PoB
16x1 LNB13 U1B2B/OpA_PoA
16x1 LNB14 U1B2B/OpA_PoB
16x1 LNB15 U1B2B/OpB_PoA
16x1 LNB16 U1B2B/OpB_PoB
8x1 LNB1 U1A/OptA_PosA
8x1 LNB2 U1A/OptA_PosB
8x1 LNB3 U1A/OptB_PosA
8x1 LNB4 U1A/OptB_PosB
8x1 LNB5 U1B/OptA_PosA
8x1 LNB6 U1B/OptA_PosB
8x1 LNB7 U1B/OptB_PosA
8x1 LNB8 U1B/OptB_PosB
LNB4 (Sw1A-OptB-PosB)
LNB8 (Sw1B-OptB-PosB)
Position AB-A
Position AB-A
Sat A (Toneburst)
Sat B (Toneburst)
Switch Uncom.1/AA
Switch Uncom.1/AB
Switch Uncom.1/BA
Switch Uncom.1/BB
Switch Uncom.2/AA
Switch Uncom.2/AB
Switch Uncom.2/BA
Switch Uncom.2/BB