

ANKARO®

HS2CT 100

User's manual (English)





NOTE: This user's guide is adapted to software version 0008/0003 of HS2CT 100 dated 21/09/2010, v.5.116 of MDX 500, v.1.96 of MDX 600, v.1.76 of MDL and v.1.8.22 of HPR 100
For future software updates, you can download the user's guide from the following website:
<http://www.ankaro.com/>

Chapter 1. Installation.

1.1. Safety Measures

- 1.- Never place the device next to hot sources.
- 2.- Never undergo the device to temperatures that exceed its level of operation.
- 3.- Never expose the device to leakings nor splatterings.
- 4.- Never place objects that contain liquids over the device.
- 5.- Respect the ventilation slots of the device, do not cover them with any kind of object.
- 6.- The space around the device must be free of objects, in a MDLmum radius of 40cm.
- 7.- Avoid locations with possibilities of spilling liquids on the inside of the device, and with important changes of temperature.
- 8.- Never open the device by yourself due to electric risk. In case of problems, go always to qualified technicians
- 9.- Never, under no circumstances, open the device when connected to the electrical net.
- 10.- During the handling it is better to disconnect the device from the electrical net.
- 11.- Obey the electricity security rules during the assembling. Use materials that obey the current law.
- 12.- The connecting plug must be accessible in a fast and simple way to have a fast disconnection.
- 13.- Never touch the plug with wet hands. Also, disconnect always the device before handling the connections.
- 14.- Never put any heavy object over the device, since it could get damaged.
- 15.- If the device is going to remain some time without use, it is recommendable to disconnect it from the electrical net.
- 16.- The repairmen and the maintenance of the device must be done by TV and radio specialised technicians.

1.2. Box content



User's guide



2 x Bridge F male – F male



DC Cable



HS2CT 100



Cable 12 cm PIN to PIN RJ45 – RJ45

1.3. Description and connections

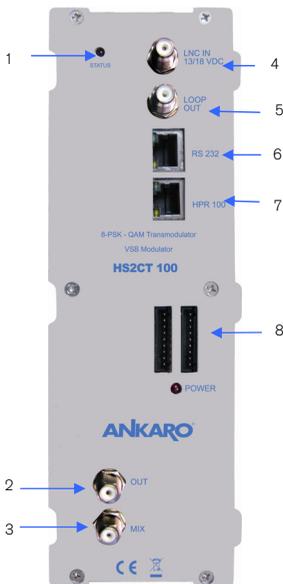
The module HS2CT 100 is used for the reception of free channels that obey the DVB-S / DVB-S2 standards. Each module allows the reception of a complete transponder in DVB-S (QPSK) / DVB-S2 (QPSK/8PSK), and the subsequent modulation in DVB-C (QAM) of it.

A feature of this equipment is its modulator in Vestigial Side Band (or VSB). This modulation can be used to distribute adjacent channels in one distribution without any intermodulation problem.

Each module has one Loop connector to cascade several modules at input and a Mix connector to do same in output channels. The output channel is selectable between C2 and C69.

All parameters are programmed by the means of HPR 100 or the MDX or MDL series of field strength meter, and they are monitored in the display of programmer or in the 5" TFT screen of field strength meter.

HS2CT 100



1. Two-colored led*: It indicates the different states of the device.
2. OUT: This connector supplies the modulated channel according to the selected standard in the module and mixes it with all the signals that it receives through the MIX connector
3. MIX: Input of mixing of the module.
4. LNC IN: To connect to the LNC or to the LOOP OUT output of the previous module
5. LOOP OUT: To connect to the ANT IN input of the next module.
6. RS 232: Ethernet connector to cascade modules with the telecontrol unit with the RJ45/RJ45 cable provided.
7. HPR 100: Ethernet connector to make the programming with the programmer.
8. DC connectors: It has two connectors for input/output.

*States of two-colored leds

1. Initialization mode

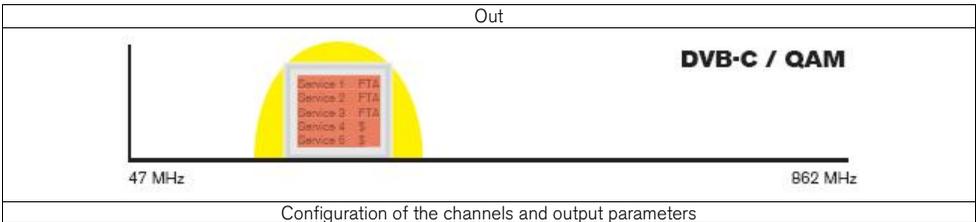
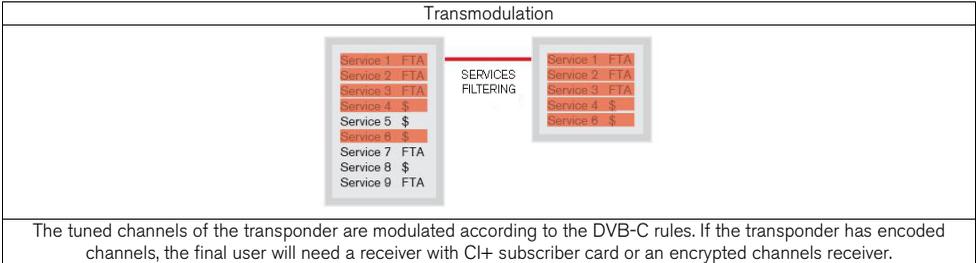
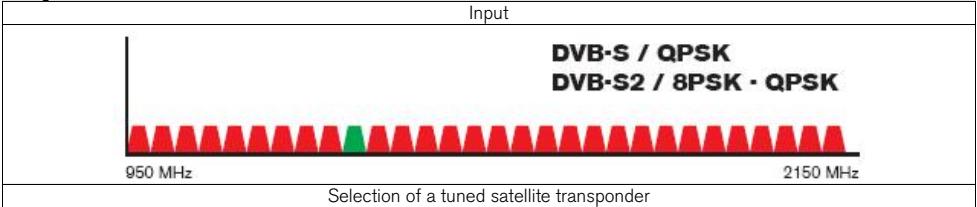
- Green: main application charged.
- Blinking Green: Completing the initial sequence, at the moment when the module gets initialized, the led will turn into one of the states the operating mode.
- Red: Phase of initializing the module.

2. Operative Mode

- Green: The system is working properly.
- Orange: At least one critical event has been recorded in the module. The led will only change into green when the registration of events has been read by the programmer.
- Red: Error or alert detected in the running of the device, the led will be on only as long as the error/alert is present. Once the error or the alert disappears, the led will change into orange because the error/alert is stored in the registration of events.

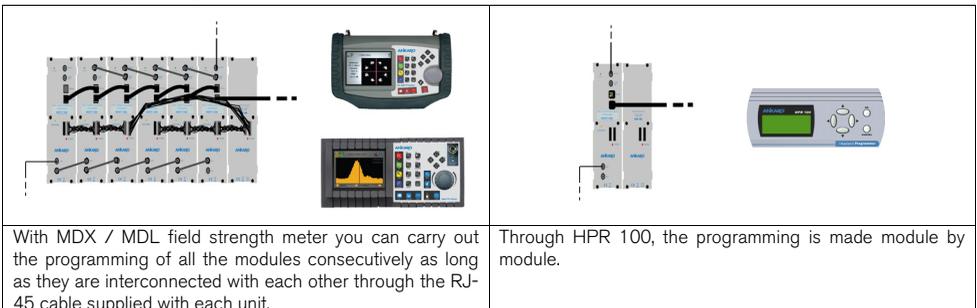
3. Programming mode

- When the module detects an external programmer, the led will blink in the next sequence: green-orange-red.
- Once you leave the programming mode, the led will turn into the corresponding operating mode.

Stages of transmodulator HS2CT 100**1.4. Programming**

HS2CT 100 has two ethernet connectors. In order to make the programming of the module you have to connect the corresponding programmer to HPR 100 connector.

You can make the programming through the HPR 100 programmer and also through the MDX and MDL field strength meter.

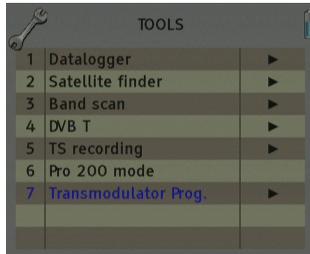
1.4.1. Programming modes

1.4.2. Programming

Below you will find the steps to follow in order to make the programming both from corresponding MDX and MDL field strength meter as well as from HPR 100.

MDX / MDL

In order to start programming the HS2CT 100 transmodulator, you will have to go to "Tools" option through the key 8 of your field strength meter and to select the "Prog Transmodulators" option.



Then, it will proceed to recognize the module and to show the main menu. In the "Prog. Transmodulators" are shown the different configuration options that this tool offers:



1. Module selection

The field strength meter allows carrying out the programming of one or several transmodulators from an only transmodulator.



Without interconnection of modules.
An only module connected



Interconnection of several modules, you can select which modules you wish to program.

2. State of the module

In the option "State of the module" are specified the main parameters of the module at this moment.

- Transmodulator input: It indicates whether the module is hooked or without signal.
- Input bit rate: Transfers of data in the satellite tuner input.
- Output bit rate: Transfer of data in the module output.
- BER before and after Viterbi: It indicates the error rate of bits of the input signal before and after the correction produced by Viterbi algorithm.
- MER: Parameter that indicates the quality of the input modulated digital signal, expressed in dB.
- Noise Margin: It indicates the difference between the value of current C/N and the value of C/N at the point of pixilation of the signal, that is, the quantity of dBs of C/N measure that are needed to lose the input signal.
- Temperature: It indicates the current temperature of the module in °C.

TRANSMODULATOR PROG
HS2CT100-074910170215

Front end : Locked
Unlock at 14/07/2010 09:48
Input bitrate : 49192133 bps
Output bitrate : 50870589 bps
BER (b) < 1.0e-08 (a) < 1.0e-08
MER : 14.1 dB
Noise Margin : 7.1 dB (88%)
Temperature : 34.7°C

3. Input configuration

In this option you will be able to configure the input parameters of the satellite signal:

- Local oscillator: Selection of the local oscillator that you wish to use: FI, KU, C, K9750, K10000, K10600, K10700, K10750, K11250, K11300, K11325.
 - Frequency (MHz): Transponder frequency that you wish to tune.
 - Symbol speed: Symbol speed required by the transponder.
 - Auto symbol rate: You will be able to select if the detection of the Symbol Rate is going to be Automatic (On) or Manual (Off).
 - In Manual mode (Off), the value of the Symbol Rate should be fixed by the user based on the provider's information.
 - In Automatic mode (On), the meter will automatically identify the SR when a Satellite carrier is tuned. This feature is very useful when the provider's information is unknown.
- The SR value found will appear in the field of selection of the SR menu. This value found by the meter could not correspond exactly to the real broadcast SR, but to a very close value.

DVB-S FRONT END
HS2CT100-074910170215

1	Local oscillator	KU
2	Frequency (MHz)	11914.0
3	Symbol rate	27500
4	Auto symbol rate	Off
5	DVB	DVBS2
6	LNB supply	▶

Locked - MER:14.1 dB - NM:7.1 dB
BER(b):< 1.0e-08 - Quality:88%



Note: The Automatic Symbol Rate feature does not work when the carrier quality is very poor or/and with a very low Power Level.

- DVB: This option allows selecting the standard DVB of the transponder that you want to tune. Options: DVB-S1,DVB-S2 and auto
- LNB Feeding: In this option you can set the parameters concerning the LNB:
 - Voltage RF IN: 13V, 18V and Off.
 - Tone 22 kHz: Off, and Auto. In the
 - Switch DiseqC: A, B, C, D and Off.

DVB-S FRONT END SUPPLY
HS2CT100-074910170215

1	RF IN voltage	18 V
2	22 kHz tone	On
3	DISEqC switch	Off

Locked - MER:14.1 dB - NM:7.1 dB
BER(b):< 1.0e-08 - Quality:88%

4. Modulator configuration

This option allows you to configure the DVB-C modulator that the device has.

- Symbol speed: The available symbol speed ranges from 1 to 6.96 MS/s.
In order to estimate the output symbol speed you have to take into account the following parameters: input modulation, input symbol speed, input FEC, output modulation.

For example, for a 8PSK signal with 22000 MS/s and a FEC 2/3, the output symbol speed should be calculated according to the chosen QAM modulation.

$$V_{SYMBOL.OUT} = \frac{V_{SYMBOL.IN} \cdot FEC(n^{bit-symbol}(8PSK))}{n^{bit-symbol}(QAM)} = \frac{22000 \cdot \frac{2}{3}}{n^{bit-symbol}(QAM)}$$

Modulation	QPSK	8PSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Number of bits per symbol	2	3	4	5	6	7	8

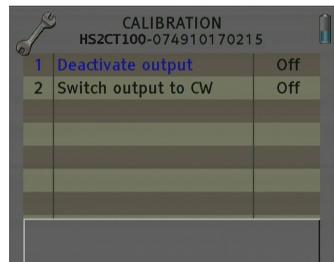
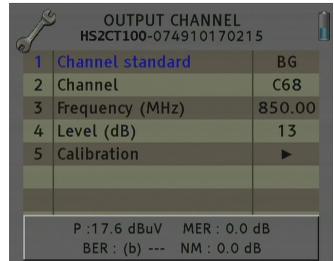
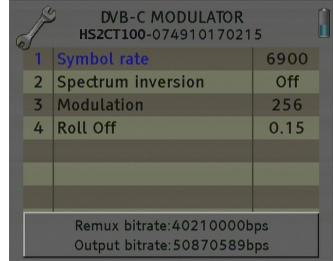
Modulation	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Symbol speed (MS/s)	11000	8800	7333	6286	5500

- Spectrum inversion: Activate or deactivate the spectrum inversion in the modulation.
- Modulation: Modulation Format. Options: 16 QAM, 32 QAM, 64 QAM, 128 QAM, 256 QAM.
- Roll-off factor: Roll-off factor reduces the interference between symbols thanks to the raised cosine filtering, the bigger this value is, the less interference between symbols that will be caused. Typical Value according to rules DVB-C = 15%. Options: 15 %, 13%.

5. Output configuration

In this option you can configure the different parameters of the cable signal.

- Channel standard: It allows you to select the channelling of the cable signal standards. Options: BG, BG, PAL BG IT, 11, M NTSC, PAL M, PAL N, PAL DK, PAL I, BB_AU, DK PAL, L PAL.
- Channel: Output channel of the cable modulation. When you select the output channel, the field "Frequency (MHz)" will be modified automatically, adapting itself to the selected channel. Options: C2-C69.
- Frequency (MHz): Output frequency of cable modulation. When you modify this field, the field "Channel" will be also modified, indicating the channel equivalent to the selected frequency in the case that this frequency corresponds to the frequency of a channel. Options: 47-862 MHz.
- Level: Regulation of the output level of the modulated signal. Options: 0-15dB.
- Calibration: Allows the realization of two tests in order to verify the correct running of the device.
 - Output deactivate: It allows activating or deactivating the output of transmodulator.
 - Pure carries output: It allows activating or deactivating the DVB-C modulation, allowing visualizing the carrier without modulation in the selected frequency.



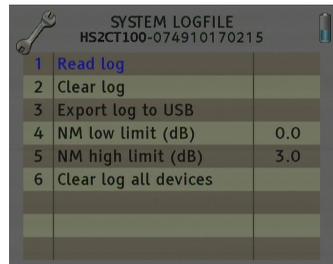
6. System information

This option provides information of the transmodulator.

- Stored events: In this field are indicated the registered events in the module.
 - Saved events reading: It allows reading the registered events in the module.
 - Delete the events: It allows deleting all events stored until this moment.
 - Export the events to USB: It allows you to export all events registered to the connected USB device.
 - NM (dB) low Limit: An event of error will be recorded when the value of Noise Margin is lower than the set value.
 - NM (dB) high limit: Once the event of error is recorded (Noise Margin < Limit Lower NM), this will be Noise Margin value that will have to be exceeded so the module stops being in error.
 - Delete the events of all the modules. It allows deleting the events report of all the interconnected modules.
- Values by default: This option restores the values by default of the transmodulator.
- Modifying the alias: It allows you to assign a name/alias to the module you are programming. Option only available when the Alias Auto option is configured as "none" (manual mode).
- Alias Auto: It allows configuring the name/alias of the modules automatically. Options: Channel, Frequency, None.
- System information: It allows you to visualize the basic information of the module: model, no of series, firmware version, etc.



SYSTEM INFORMATION HS2CT100-074910170215	
1	System logfile
2	Factory default
3	Write alias
4	Auto alias
5	System information
6	
7	
8	
9	
10	

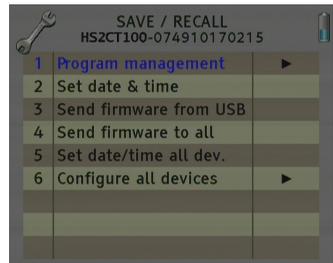


SYSTEM LOGFILE HS2CT100-074910170215	
1	Read log
2	Clear log
3	Export log to USB
4	NM low limit (dB)
5	NM high limit (dB)
6	Clear log all devices
7	
8	
9	
10	

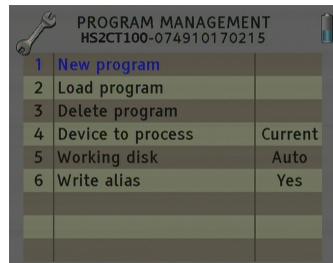
7. Save and recall

This option allows saving and loading the configuration of the module, carrying out firmware update or making an adjustment of the time and date of the module.

- Program management:
 - New program: This option allows creating a program with the current configuration of a module or group of modules.
 - Load program: It allows loading a previously created program on a module or group of modules.
 - Delete program: It allows deleting a program.
 - Device to process:
 - Current: The creation or loading of a program will be applied only in the module that is currently connected.
 - All: The creation or loading of a program will be applied to the whole group of connected modules.
 - Working disk: With this option we have the possibility of choosing if we want to work into the internal disk or in the external storage device USB 2.0.
- Once the option is selected, a dialog box will appear and we will be able to choose among three different options.
 - Auto: The Meter decides where the data will be stored. If there is external memory connected, the Meter will store the data in it. If not, it will use the internal memory.
 - USB: The Meter always will try to use the external memory connected to the USB port. If this memory has not been connected an error message will be shown, reminding that there was an error storing the data and it will be not stored.
 - Internal: Always the internal memory is used to store the data.
- Write Alias: It allows saving the alias of the module in the program. Options: Yes/No
- Set Date and time: Setting of the date and time of transmodulator. It is appropriate to maintain these parameters set in order to have the registration of errors linked to the current time and date.
- Send Firmware from USB: It allows carrying out the firmware update from the USB device.
- Send firmware to all: It allows carrying out the update of all the modules that are interconnected at the same time.

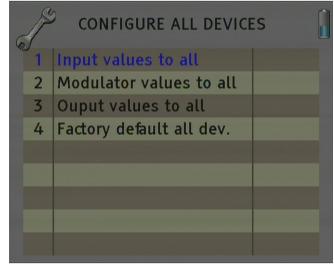


SAVE / RECALL HS2CT100-074910170215	
1	Program management
2	Set date & time
3	Send firmware from USB
4	Send firmware to all
5	Set date/time all dev.
6	Configure all devices
7	
8	
9	
10	



PROGRAM MANAGEMENT HS2CT100-074910170215	
1	New program
2	Load program
3	Delete program
4	Device to process
5	Working disk
6	Write alias
7	
8	
9	
10	

- Set date/time all devices: Loading the current date and time of the module in the rest of interconnected modules.
- Configure all devices:
 - Input values to all devices: It allows copying the current input configuration in all the interconnected modules.
 - Modulator values to all devices: It allows copying the configuration of the current modulator in all the interconnected modules.
 - Output values to all devices: It allows copying the current output configuration in all the interconnected modules.
 - Factory default to all devices: It allows making values by default to all the interconnected modules.

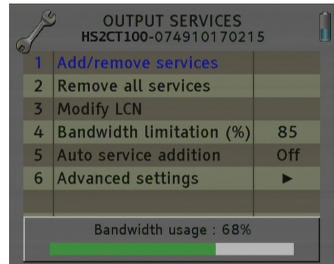


8. Set Output Services

This option allows making the selection of the services that you wish to include in the output multiplex.

- Add/Remove services: It allows adding the services to the multiplex and also removing the ones previously included. The lower bar informs about the available space in the output multiplex. As you add more services, the space available will decrease.

Once you have tuned a transponder in the "Input Set Up" section and you have selected the DVB-C modulator configuration in the "Modulator Set Up" section, you can make the assignment of the services that are going to be included in the output multiplex "Adding/Removing services".



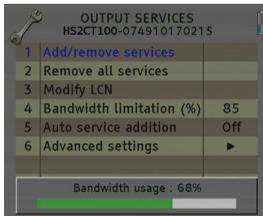
Adding services:



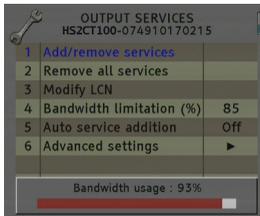
1. Select "Service to add" option
2. Select one of the transponder services you want to add.
3. Once you have chosen the service, select the "Add/Remove" button to include the service in the multiplex.



Note: It is not recommended to exceed the 85% of the maximum capacity of the multiplex due to the possible variability of the bits rate of the inputs services.

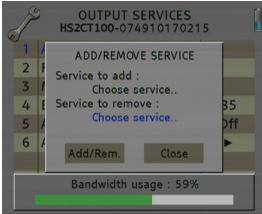


Recomendad capacity
(lower to 85%)

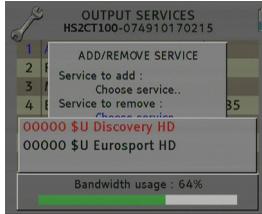


Excessive capacity
It is recommended to remove
services

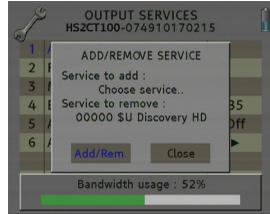
Removing services:



1. Select the "Service to remove" option.



2. Select one of the transponder services you want to remove.



3. Once you have chosen the service, select the "Add/Remove" button to remove the service in the multiplex.

- Remove all services: It allows removing all the services included in the multiplex.
- Modify LCN: The LNC function allows assigning automatically a predetermined position to each one of the services of the multiplex. This function will allow the users who have a receiver with LNC support to make the ordination of channels automatically.



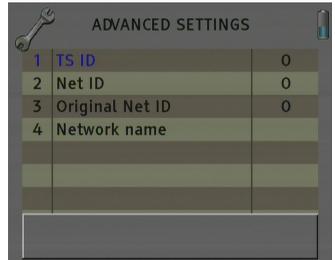
Note: If in the existing installation there are already services that have LNC system, you will have to configure the position of the module services in order to avoid conflicts with other net services.



- Bandwidth limitation: It allows selecting the % of the capacity of the output channel.
- Auto service addition:

- On: It selects the services automatically when an input carrier is tuned and when the list of selected services is empty. The receiver will have this state by default.
- Always: It selects the services automatically every time a new input carrier is tuned. This state is only recommended to be used for making test in the module.
- Off: The automatic mode is deactivated; the services have to be manually selected.

- Advanced settings: It allows making the adjustment of the identification parameters of the multiplex.
 - TS ID: Transport Stream identification value. It is recommended to configure a value different from TS ID for each one of the output multiplex configured.
 - Net ID: Net identification value
 - Original Net ID: Original net identification value
 - Network Name: Name associated with the net.



Next it is attached the identification table (NID/ONID) of the main satellites. You will be able to find more information in the law ETSI TR 101 162 v1.2.1.

Satellite	Net ID	Original Net ID	Description
Hotbird 13°E (Eutelsat 13°E)	318	318	Eutelsat 13°E System
Astra 19,2°E	1	1	Astra Satellite Network 19,2°E
Astra 23°E	3-25	3-25	Astra n (n=1-23)
Astra 28,2°E	2	2	Astra Satellite Network 28,2°E
Nilesat 7°W	2048	2048	Nilesat 101
Hispasat 30°W	33	33	Hispasat Network 1

HPR 100



Note: From HPR 100 programmer you can only carry out the programming of a single module, in order to carry out the programming of several modules at the same time you have to use a MDX or MDL series field strength meter.

When you connect the HPR 100 programmer, it will proceed to recognize the module and to show the main menu. In the main menu are shown the different options for configuring the transmodulator.

```

HS2CT 100
>Manual<      Config
  Auto
    
```



Note: The programming parameters used in the programming through HPR 100 are not detailed, since all these parameters are detailed in the section MDX/MDL.

1. Manual

In this section are specified the different options for setting up the input, output and modulation parameters.

1. This field shows the type of parameter that is selected at the moment. Options: Input Sat, check out cable, TV output.
2. This field shows the parameter that is selected. Click on OK to edit the selected parameter and Right/Left for changing it. Once it is configured press Cancel.

```

HS2CT 100 Input Sat → 1
  RF level:      013
>LO Freq:      LO KU → 2
  Freq:         11509
    
```

Satellite input	Cable output	TV output
<ul style="list-style-type: none"> - L.O. frequency - Input frequency - Input symbol speed - Antenna - DiseqC - Auto symbol rate - DVB mode 	<ul style="list-style-type: none"> - QAM Mode - Investment - Roll Off - Output symbol speed 	<ul style="list-style-type: none"> - RF Channel - RF Level

2. Auto

This option allows saving and loading the configuration of the module in the HPR 100 programmer.

- Module reading: It stores the current configuration of the module in the memory of the programmer.
- Configuration of module: It loads in the module one of the configurations previously saved in the field strength meter.

```

HS2CT 100
> * Module reading *
  * Config. Module *
    
```

3. Config

In "Config" option the information concerning the transmodulator is given.

- Read Log file
- Delete Log file
- Factory Default
- Update firmware
- Output services
 - Add services
 - PID: Select one of the transponder services you want to add
 - Add: Select the "Add" button to include the service in the multiplex.
 - Delete services
 - PID
 - Delete
- Date / Hour
- Software version info
- Global Update

```

HS2CT 100
  SW version info
>Read LOG file
  Delete LOG file
    
```

```

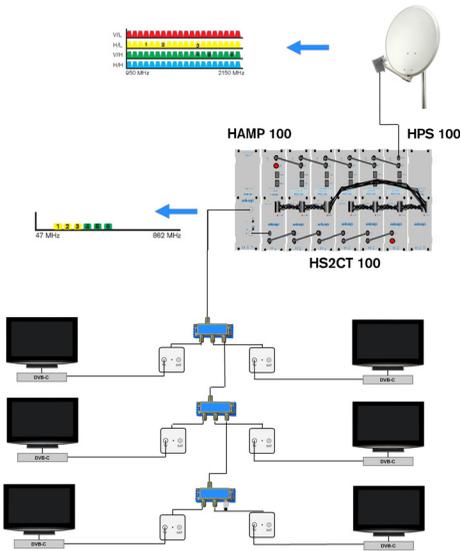
HS2CT 100
  BW usage      000%
  Delete services
>Add services
    
```

```

HS2CT 100
  Input          013%
  PID:01838 CNBC Europ
+Add
    
```

1.5. Accessories and example of installation

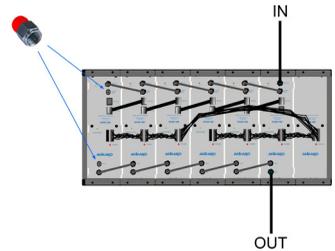
Example of installation



Installation that consist of 6 HS2CT 100 and that will allow tuning channels up to 6 different transponders and to distribute them through a network of modulated cable in DVB-C. The distributed channels need a cable receiver in order to be decoded.



In order to guarantee the right running of the different equipments of the installation, we recommend you to provide the inputs and outputs which are not used with a 75Ω load.



Accessories



Programmer
Mod. HPR 100
Code 20018.11



Field strength meter
Mod. MDX 600
Code 0001006



Field strength meter
Mod. MDL 400
Code 0001003



Wide band amplifier 47-862MHz
Mod. HAMP 100
Code 20042.11



Mixer
Mod. HAM 100
Code 20012.11

Chapter 2. Technical features

Ref.	HS2CT 100
Code	20022.11
Input frequency margin	950-2150 MHz
Input level	-30 a -60 dBm
Input impedance	75Ω
LNB (feeding/conmuration)	13V-18V / 0-22kHz
Input connector	Female F connector
Input LOOP losses	<1 dB
FEC	1/2, 2/3, 3/4, 5/6, 7/8, 8/9, 9/10, 1/4, 1/3, 1/5, 2/5, 3/5, 4/5 DVB, RS 204,188
Input modulation	8PSK, QPSK
Input Symbol Rate	DVB-S:1-45 MS/s / DVB-S2:1-37 MS/s
Modulation Error Ratio (MER)	Typ. 40 / Min. 36
Selectable format of output modulation	16 QAM, 32 QAM, 64 QAM, 128 QAM, 256 QAM
Output symbol Rate	1-6,96 MS/s
Roll-Off Factor	13 %,15%
Output channels	C2-C69
Output connectores	Female F connector
Output Level	80 dBuV
Regulation margin	15 dB
MIX Losses	<1 dB
Band spurious	-60 dBc
Programming Interface	RJ-45
Programmer	HPR 100, MDX and MDL
Operating temperature	0°C-45°C
Consumption 5V (mA)	800
Consumption 12V (mA)	300
Consumption 24V (mA)	15
Consumption 30V (mA)	2
Dimensions	75x265x150 mm
Weight	1,4Kg

Chapter 3. Declaration of conformity



CONFORMITY DECLARATION

"WE , ANKARO, DECLARE THAT THE PRODUCT
HS2CT 100
IS IN CONFORMITY WITH FOLLOWING DIRECTIVES
Low Voltage Directive 2006/95/EC
EMC Directive 2004/108/EC"

If you wish a copy of the conformity declaration, please contact to the company

ANKARO[®]

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