

RM94 - RM94CI2 - RM98 - RM98CI2 – RM98CI4

Configuration settings page

The RM9x series modules enable reception of satellite signals from up to 8 multiplexes, decryption of scrambled channels using DVB-CI CAMs, and modulation of up to 64 services into 4 (RM94) or 8 (RM98) DVB-T or DVB-C multiplexes.

For this purpose, various settings can be configured on the page below, which can be accessed by clicking the module from the module list ❶.

S. Id.	Name	CI	OUTPUT (3/64)	LCN	N. S. Id.
A 401	TF1				401
A 403	M6				
A 404	ARTE				
A 417	LCI				
A 419	FRANCE 5				
A 421	W9				
A 422	6TER				
A 423	TMC				
A 424	TFX				
A 425	LCP				
A 426	VIAVOSGES				426
A 427	KTO				427
A 4133	NOUVELLE AQUITAINE				

This page is divided into three sections: the tab buttons ❷, the controls associated with the selected tab ❸, and the services list ❹.

The module temperature is also displayed in ❸, allowing verification that the module is operating within a compliant environment (e.g., adequate ventilation).

First, click one of the five tab buttons in ❷ to configure the required parameters:

Inputs: Allows modification of the LNB settings for the four available inputs (polarity, band, DiSEqC configuration, and selection between Legacy LNB mode or dCSS mode).

Demodulators: Allows configuration of up to eight multiplexes from which services are to be received (selected input, frequency, symbol rate, etc.).

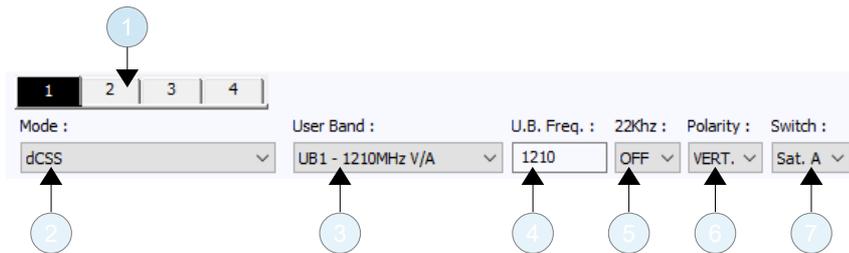
CAM: Provides access to the CAM module menu, if a module is used.

Outputs: Used to configure up to eight DVB-T or DVB-C output multiplexes.

Status: Displays a summary of the input and output status.

Once all input and output parameters have been configured, the services list ❹ can be used to select and configure the services to be modulated.

1) Inputs



Up to four LNBs may be connected to the module. Each LNB can operate either in Legacy mode or in dCSS/SatCR mode.

Prior to configuring an LNB, select the corresponding input to which it is connected by clicking one of the four input buttons on ❶.

Once the input has been selected, set the operating mode ❷.

a) Legacy mode

In Legacy mode, user band selection and frequency are not available. Only the following parameters must be configured:

- ❸ The band (Low / High, corresponding respectively to 22 kHz OFF / ON),
- ❹ The polarity (Vertical / Horizontal),
- ❺ If the LNB is connected via a DiSEqC switch, the corresponding switch port (A, B, C, or D).

b) dCSS/SatCR mode

Refer to your LNB documentation and select either dCSS mode (EN 50607) or SatCR mode (EN 50494), as appropriate.

N.B. : If SatCR mode is selected and user bands greater than 4 are used, the module will automatically operate in EN 50607 for those user bands.

Once the mode has been selected, first click ❷ and choose one of the 24 user bands. The subsequent settings — user band frequency ❸, 22 kHz ❹, polarity ❺, and switch ❻ — will then apply to the selected user band.

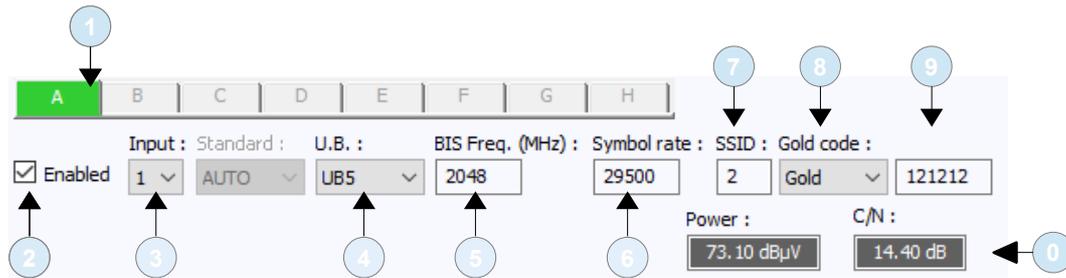
Refer to the LNB documentation to correctly specify the user band frequency. This information will subsequently be used by the module to calculate the frequency offset to be applied.

The selected user band settings will automatically be reflected in the user band selection field ❸, allowing you to verify which user bands have been defined and which settings are applied to each.

If a user band has been selected in error, click ❸ and delete the corresponding frequency.

All associated information in the user band selection field ❸ will be cleared, and the user band will no longer be used.

2) Demodulators



The module can demodulate up to eight multiplexes (A to H), each of which may be received from any of the four inputs.

Each of the eight demodulators can also be used to extract a stream from a multistream DVB-S2 signal.

To configure a demodulator, first select it by clicking ❶, then enable it by clicking ❷. If a demodulator is not used, ensure that it is disabled to minimize power consumption.

Then configure the multiplex by selecting the input from which the signal is received ❸ and, in the case of a dCSS/SatCR LNB, the user band ❹.

Finally, set the BIS frequency ❺ and the symbol rate ❻.

N.B. : If a RF frequency is entered in field ❻ (for example, 12648 MHz) instead of the IF frequency, the module will automatically calculate and display in ❺ the BIS frequency using the standard local oscillator frequencies (9750/10600 MHz).

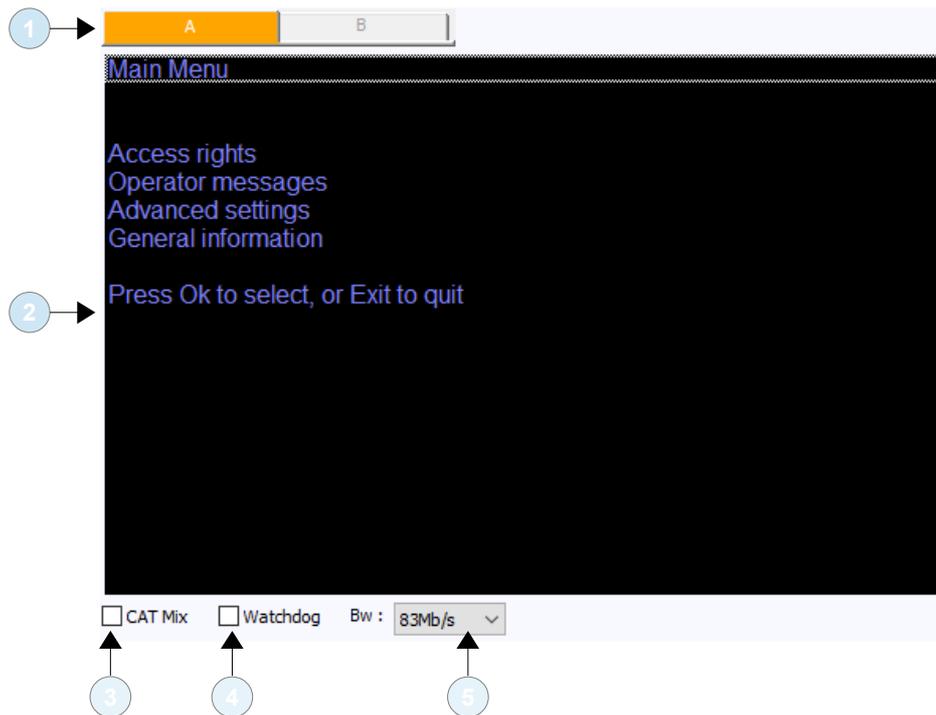
If the multiplex carries multistreams, set the stream ID in ❼ and the PLS information in ❽ and ❾. If you wish to receive another stream from the same multistream DVB-S2 signal, configure another demodulator in the same manner but using a different SSID.

Once all parameters are configured, the TAB control background color reflects the demodulator status:

- **Grey**: demodulator not enabled
- **Red**: demodulator enabled but not locked
- **Orange**: signal locked but data is unstable or being acquired
- **Green**: multiplex correctly acquired (the service list is automatically updated based on the multiplex data).

Signal acquisition status information, including power strength and carrier-to-noise ratio, is displayed in ❿.

3) CAM



IMPORTANT: Before accessing the CAM menu through this dialog, at least one service must be selected for decryption so that the CAM can be detected. If the background color of the CAM tab ❶ is not orange, the CAM is not accessible. Please refer to the service list section for more information on activating service decryption.

To navigate within the CAM menu ❷, ensure that the correct CAM is selected in ❶, that the CAM is accessible (orange state), and wait for the CAM menu to be displayed in ❷. Once the CAM menu is properly shown, use the keyboard arrow keys to navigate, the **Enter** key to access a sub-menu, and the **Esc** key to exit a sub-menu.

Three additional settings are available on this page.

❸ **CAT Mix** : If this option is enabled, a new CAT table, composed of all CAT tables encountered in the multiplexes containing services to be decrypted, will be generated and sent to the CAMs.

When using multiple service providers for decryption, it is generally recommended to enable this option so that the CAM receives all EMMs present across all multiplexes, and not only those present in the first multiplex containing services to be decrypted. However, some CAMs may not properly handle very large CAT tables, so this option should be used with caution.

❹ **Watchdog** : When activated, the module will monitor all decrypted services and, if a service is no longer decrypted, it will reset the CAM and restart the decryption process.

❺ **Bandwidth** : With this setting, you can select the clock used by the module to transmit the stream to the CAM. This clock rate may be increased if the CAM needs to decrypt a large number of services. However, 100 Mb/s is generally considered a safe value.

4) Outputs

The RM98 series can modulate up to eight channels, while the RM94 series can modulate up to four channels.

Each channel shares the same network configuration parameters and is set using the controls below.

The screenshot shows a configuration interface for DVB-T. At the top, there are seven numbered callouts (1-7) pointing to specific fields. Callout 1 points to the 'DVB-T' mode button. Callout 2 points to the 'Version' field (0). Callout 3 points to the 'Network ID' field (8442). Callout 4 points to the 'Network name' field (NoName). Callout 5 points to the 'Orig net. ID' field (8442). Callout 6 points to the 'L.C.N. ID' dropdown menu (NORDIG). Callout 7 points to the 'CAT/EMM Rem.' checkbox. Below these fields is a row of eight tabs labeled 1 through 8, with tab 1 selected. Underneath the tabs are several parameter fields: 'TS ID' (100), 'Freq. (KHz)' (74000), 'B.W.' (8MHz), 'Const.' (QAM 64), 'F.E.C.' (7/8), and 'Guard. int.' (1/32). At the bottom, there are two sliders: 'Level (Att. 0dB)' and 'Bitrate (9.77 / 31.67 Mb/s)'.



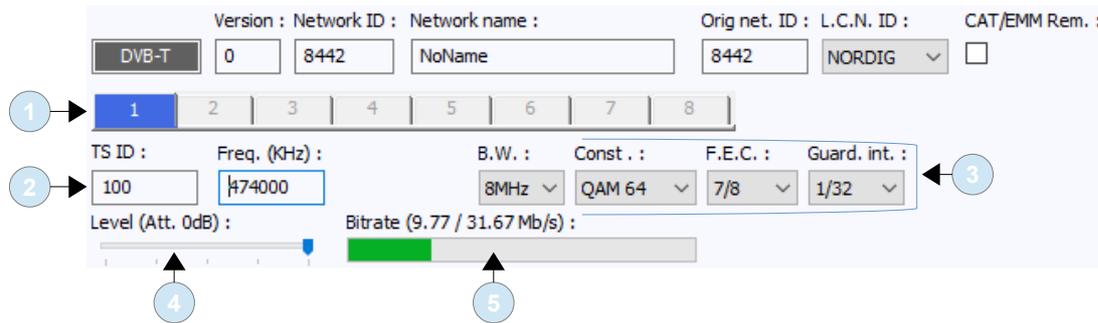
First ensure that the module is operating in the required DVB mode (terrestrial or cable) by checking field ❶. If the module is not in the correct mode, click the button to switch the mode (from DVB-T to DVB-C or from DVB-C to DVB-T). This will restart the entire rack.

Once the correct mode is selected, you can define the network information using fields ❸, ❹, ❺, and ❻. Please ensure that the network IDs and LCN ID correspond to the country in which the system is operating, so that televisions can correctly use the LCN information to organize services with the appropriate channel numbers.

All this information will be reported in the DVB NIT table. Once the modulation parameters for each output multiplex have been configured (refer to the relevant section below in this chapter), you may modify the NIT version number ❷ to indicate to television sets that the table has been updated, allowing them to refresh the network information previously scanned.

Finally, you may choose to completely remove the CAT and EMM information from the stream by enabling ❼ so that televisions correctly process services that were previously decrypted by the CAMs.

After that, you can define the modulation parameters for each of the four or eight DVB-T or DVB-C output multiplexes using the controls below.



Select the output channel you want to set the parameters by clicking the tab control ❶.

Please note that the color of the tabs in this control changes depending on whether at least one service from the service list is assigned to the corresponding multiplex (see the output selection in the Service List section).

Once a service is assigned to a multiplex (blue color), the multiplex is automatically enabled and modulation begins. If no services are assigned to a given multiplex (grey color), no modulation will occur.

Transport stream ID can be defined for each multiplex in ❷.

Regarding the modulation parameters in ❸ and also the level attenuation ❹, since the modulators used in the RM9x series are adjacent modulators, only the first channel of each group of four (1–4 and 5–8) needs to be configured. The frequencies of the remaining channels will be automatically calculated based on the defined bandwidth, and the same modulation parameters will be applied to them.

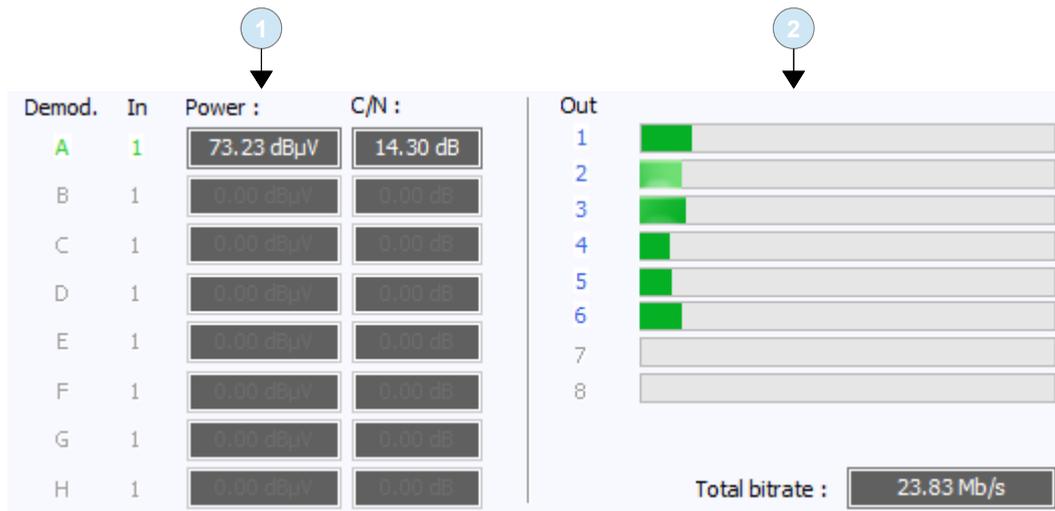
So modulation parameters have to be defined for multiplex 1 and 5 for RM98 and only for multiplex 1 in RM94 module.

In DVB-T mode, setting in ❸ that have to be set are respectively : frequency, bandwidth, constellation, F.E.C. and guard interval.

In DVB-C mode, those settings are : frequency, symbol rate, bandwidth and constellation. The symbol rate must be expressed in ksym/s. Please ensure that its value is correct for the selected bandwidth (it should not exceed 6950 ksym/s in an 8 MHz band, 6080 ksym/s in a 7 MHz band, and 5210 ksym/s in a 6 MHz band).

Bitrate information is displayed in ❺. This field provides a graphical representation of the bitrate used by the selected services relative to the total available bitrate of the selected multiplex. Those information are also available in Mb/s in the field just above. Available bitrate is automatically updated whenever any modulation parameter is modified. Please ensure that the used bitrate does not exceed the available bitrate minus a margin of approximately 10–20%, especially if the used bitrate is subject to fluctuations.

5) Status



The overall system activity status can be found on this screen, for both inputs ❶ and outputs ❷.

The status is displayed in grey whenever an input is not locked, not enabled, or when an output is not used.

All input levels and carrier-to-noise ratios, as well as the bitrate usage on all outputs, are displayed so that any abnormal situation or configuration can be easily detected.

6) Services List

Once at least one demodulator has been correctly configured, the services list is updated with all services found in each demodulator and displayed in the table below.

1	2	3	4	5	6
S. Id.	Name	CI	OUTPUT (17/64)	LCN	N. S. Id.
A 401	TF1		+ - - - - - - -		401
A 403	M6		- + - - - - - -		403
A 404	ARTE		+ - - - - - - -		404
A 417	LCI		+ - - - - - - -		417
A 419	FRANCE 5		- + - - - - - -		419
A 421	W9		- + - - - - - -		421
A 422	6TER		- + - - - - - -		422
A 423	TMC		+ - - - - - - -		423
A 424	TFX		+ - - - - - - -		424
A 425	LCP		+ - - - - - - -		425
A 426	VIAVOSGES		- - - - - - - -		
A 427	KTO		- - - - - - - -		
A 4133	NOUVELLE AQUITAINE		- - - - - - - -		
B 3000	TF1 SERIES FILMS		- - - - - - - -		3000
B 3001	L'EQUIPE		- - - - - - - -		3001
B 3003	RMC STORY		- - - - - - - -		3003
B 3004	RMC DECOUVERTE		- - - - - - - -		3004
B 3005	RMC LIFE		- - - - - - - -		3005
B 3010	NOVO 19		- - - - - - - -		3010
B 3011	CNEWS		- - - - - - - -		3011

This table consists of six main columns:

- ❶ **Service source:** Indicates the demodulator number from which the service is received, followed by its ID.
- ❷ **Service name and audio/video information:** Displays the original service name or the assigned name if it has been modified (preceded by the → symbol if a new name has been assigned). This column also indicates whether an audio PID filter is applied and whether the service is a TV or radio service.
- ❸ **Decryption:** Indicates whether the service is encrypted and, if so, which CAM is used to decrypt it. This column can also be used to specify if a service must be decrypted using BISS or if it contains an encapsulated stream (such as T2-MI or other protocols), and how it should be expanded.
- ❹ **Output:** Indicates in which multiplex the service is to be transmitted (if applicable).
- ❺ **LCN:** Displays the Logical Channel Number used by televisions to organize services.
- ❻ **New Service ID:** Allows the user to assign a new service ID within the transport stream for a service.

This table can be sorted according to any of the six columns. To do so, simply click on the column header. The software will automatically sort the services list according to the selected column, in either ascending or descending order, using the ▲ and ▼ symbols displayed on the left side of the column header.

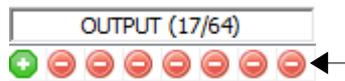
This feature allows services to be sorted by output multiplex, decryption CAM, logical channel number, or other available criteria.

Important: A service that has been previously configured but is currently not present at the inputs (due to signal absence at the input) will be displayed in grey in the list.

Always verify these absent services and ensure that their absence is only temporary, as the modulator will wait for a few seconds for their return before starting modulation. In rare cases, this may prevent the modulator from starting if it waits indefinitely for a service displayed in grey (for example, an RM98 module may wait for services from a previous DTVHD4 configuration if those services are scheduled for modulation). Therefore, ensure that services displayed in grey are expected and represent a normal condition. If not, remove it from the output.

The service output configuration is done in the following way.

a) Selection of the output multiplex.

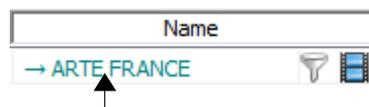


Before modifying the service name, selecting the CAM, or applying any other configuration, the service must first be assigned to an output modulator (1–8 for RM98 or 1-4 for RM94). To do so, simply double-click on the available modulator indicated by the – symbol. To remove a service from a modulator, double-click on the + symbol.

Multiple Selection : The Ctrl key can be used to select or deselect output modulators for multiple services. To do this, first select a service by clicking anywhere on its row. Then, while holding the Ctrl key, click on other services you want to configure. Finally, still holding the Ctrl key, double-click the + or – symbol of the modulator to which you want to assign or remove the selected services. The selection or deselection will be applied to all selected services.

Similarly, the Shift key can be used to select a continuous range of services by clicking on the first service and then double-clicking on the last service of the desired range while holding the Shift key.

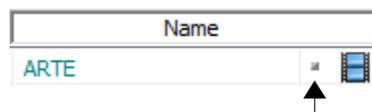
b) Service name change



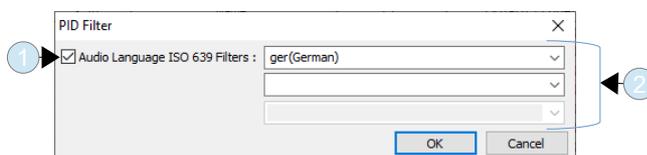
When required, the service name can be changed. To do so, double-click the service name, enter the new name, and press the **Enter** key. The modulator will use the name you have entered. Modified names are displayed in the list preceded by the → symbol.

To remove this modification, double-click the service name, delete the entire text, and press **Enter**. The list will then be updated and display the original service name.

c) Audio PID filtering



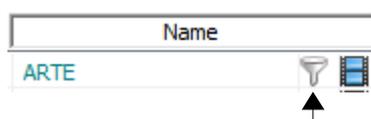
A service may contain multiple audio PIDs for different languages. In some cases, it may be useful to allow only certain languages to be present in the output stream. This can be achieved by double-clicking the field indicated by the arrow and then selecting up to three allowed languages in the dialog box that appears.



Enable or disable the audio filter by clicking ❶ and add up to three allowed languages in ❷. Once the filter is applied, the module will scan the PMT table in the source stream and check for the presence of audio languages associated with the concerned service. Whenever a PID matching one of the selected languages is found, it will be passed through and the PMT will be updated to include only the allowed audio PIDs.

However, if no audio PID matching the selected languages is found, all audio PIDs will be passed through to avoid producing a service without audio.

The presence of audio-filtered services in the service list is indicated by the funnel symbol in front of concerned services :



d) BISS decryption

BISS scrambled services can be descrambled on RM9x modules without the help of CAMs using biss keys that can be entered using the following method.

S. Id.	Name	CI	OUTPUT (0/64)	LCN	N. S. Id.
A 3	SIPSI In-band configura...	010	[-] [-] [-] [-] [-] [-] [-] [-]		
A 50	Fat CSI	010	[-] [-] [-] [-] [-] [-] [-] [-]		
A 4164	BBC ONE	010	[-] [-] [-] [-] [-] [-] [-] [-]		

In the services list window, double-click the padlock icon in front of the service you wish to descramble. For example, in the screen above, to enter a BISS key for the BBC ONE service, double-click the padlock located in front of BBC ONE (see arrow above).

Note: When the same BISS key is used for multiple services, you can select those services in the list using the multiple selection method described earlier (see section a. of this chapter)

The following window is displayed, allowing you to enter the required keys :

BISS Key

Even :

Odd :

PID Encapsulation

Stream over pid extraction

T2MI PLP ID :

OK Cancel

You can now enter a BISS key (16 characters) in either the even or odd key list by typing it in the corresponding dropdown box or selecting it from the list if the key has already been entered.

If the same key is used for both even and odd streams, please enter the same key in both selection boxes.

If the service is not encapsulated, please ensure that both stream encapsulation method options remain unchecked.

Once the keys have been entered and validated, click the **OK** button.

After a few seconds, the services list will be refreshed and will display the actual service type (video or audio) if the PMT was scrambled. A modified padlock icon  will also be displayed to indicate that BISS descrambling is active for the selected service.

S. Id.	Name	CI	OUTPUT (1/64)	LCN	N. S. Id.
A 3	SIPSI In-band configura...	010	[-] [-] [-] [-] [-] [-] [-] [-]		
A 50	Fat CSI	010	[-] [-] [-] [-] [-] [-] [-] [-]		
A 4164	BBC ONE		[+] [-] [-] [-] [-] [-] [-] [-]		4164
A 4220	BBC ONE Scot	010	[-] [-] [-] [-] [-] [-] [-] [-]		
A 4221	BBC ONE NI	010	[-] [-] [-] [-] [-] [-] [-] [-]		

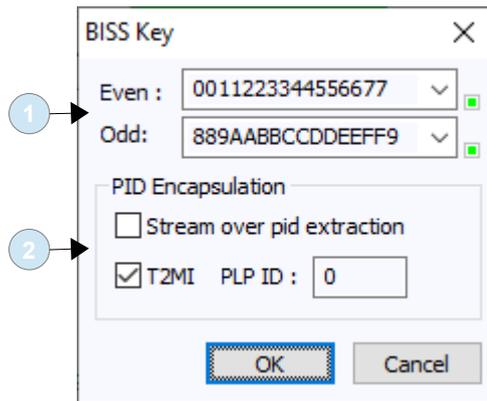
e) Service de-encapsulation (T2Mi...)

RM9x modules are capable of de-encapsulating T2-MI streams as well as streams using other encapsulation methods.

Before de-encapsulation, these streams must be identified and configured so that they can be expanded into a new demodulation channel, allowing the user to select the programs contained within them.

Furthermore, if these streams are encrypted using BISS, they can be decrypted prior to de-encapsulation.

Proceed in the same manner as when configuring BISS keys (see previous section) to configure these encapsulated streams. Specify whether the stream is T2-MI or encapsulated within a PID using another method. In the latter case, the system will attempt to synchronize the data by detecting the sync byte within the data PID that composes the stream.



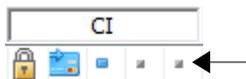
First enter the BISS keys in ❶, if required. Then select the encapsulation method in ❷ and specify the PLP ID (for T2-MI only). Finally, click on OK.

The module will then attempt to extract the stream from the specified service and will automatically create a new input channel in which the extracted stream will be displayed. After a few seconds, the services list will be updated. The output information column for this service will indicate the demodulation channel number to which the stream has been extracted, and the newly extracted services will be displayed under it.

S. Id.	Name	CI	OUTPUT
A 1001	Prg1001	010	[-] [-] [-] [-] [-] [-] [-] [-]
A 1002	Prg1002	010	P P P P P P P P
A 1003	Prg1003	010	[-] [-] [-] [-] [-] [-] [-] [-]
A 65534	Prg65534	010	[-] [-] [-] [-] [-] [-] [-] [-]
P 40001	Clan HD		[-] [-] [-] [-] [-] [-] [-] [-]
P 40002	tdp		[-] [-] [-] [-] [-] [-] [-] [-]
P 40003	tdp HD		[-] [-] [-] [-] [-] [-] [-] [-]
P 40004	Clan		[-] [-] [-] [-] [-] [-] [-] [-]
P 40005	Radio Clasica ...		[-] [-] [-] [-] [-] [-] [-] [-]
P 40006	Radio3 HQ RNE		[-] [-] [-] [-] [-] [-] [-] [-]
P 40007	Radio Exterior...		[-] [-] [-] [-] [-] [-] [-] [-]
P 41001	DKISS		[-] [-] [-] [-] [-] [-] [-] [-]
P 41002	Kiss FM		[-] [-] [-] [-] [-] [-] [-] [-]
P 41003	HTT FM		[-] [-] [-] [-] [-] [-] [-] [-]

The user can now select the services to be modulated from the extracted stream in the usual manner.

f) CAM activation



Each modulated service may be decrypted using an appropriate CAM prior to modulation.

RM98CI2 modules are equipped with two CI slots, while RM9xCI4 modules provide four CI slots, allowing each module to accommodate up to two and four CAMs respectively.

A **blue** square indicates an available slot, while a **grey** square indicates the absence of a slot. When a service is assigned to a CAM for decryption, the **blue** square is replaced by a smartcard icon.

Decryption for a service can be enabled by double-clicking one of the four **blue** squares (depending on the CAM you wish to use), or disabled by double-clicking the smartcard icon.

The multiple selection method described in section a (output multiplex selection) can also be applied when selecting CAMs.

Once a CAM is used for service decryption, it is activated and its menu becomes accessible through the CAM tab controls.

g) Logical Channel attribution



The LCN (Logical Channel Number) is used to define how television services are displayed and organized in the receiver's channel list. It allows televisions to automatically sort channels according to predefined numbers. The LCN does not affect the transmission of the service itself.

To assign a specific number to a channel, double-click the corresponding LCN field, edit the number, and press **Enter**.

To remove this assignment, double-click the LCN field, delete the entire text, and press **Enter**. The list will then be updated and the LCN removed.

Once all LCNs have been defined, it is good practice to update the NIT version number so that televisions are informed that a change has occurred.

Do not forget to verify in the output control panel that the network ID and LCN ID are defined according to the country in which the headend is located.

h) Service ID modification



In order to harmonize identifiers before redistribution, each service can be assigned a new ID. This can be done by double-clicking the N.S.ID column and entering the required SID

To remove this modification, double-click the new ID, delete the entire text, and press **Enter**. The list will then be updated and display the original ID.