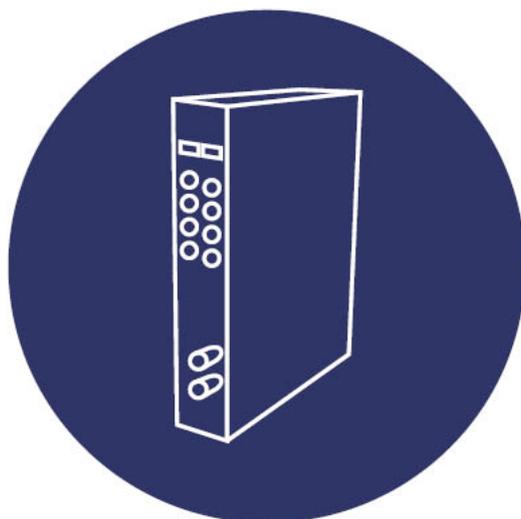


CM 3S-TC

082016

Triple Transmodulator

8PSK-COFDM/QAM



User manual



EKSELANS BY ITS

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USER MANUAL – CM 3S-TC

1. Accessories

The packaging of the module contains all necessary accessories for its installation:

Image and quantity		Description
	1	Metallic plate for Wall mounting that allows the mounting in rack or wall. Mounting in upper side.
	2	Short fast bridge to connect the outputs of tuner (A) with (B) and (B) with (C).
	1	Long bridge to make the mixing of the output together with other modules.
	1	Voltage feeding and data cable to connect to the PSU or adjacent module or CM PR programming device.

2. General Description

The CM 3S-TC module is part of the CM series headend family and its function is to transmodulate the DVB-S/S2 signal into DVB-T/C. It has 3 independent input tuners and up to 3 MUX (in COFM) / 4 MUX (in QAM) with high output and quality levels. Check technical data.

It is presented in modular way offering scalability in order to expand or repair installations. Its aluminium made housing contributes positively to heat dissipation.

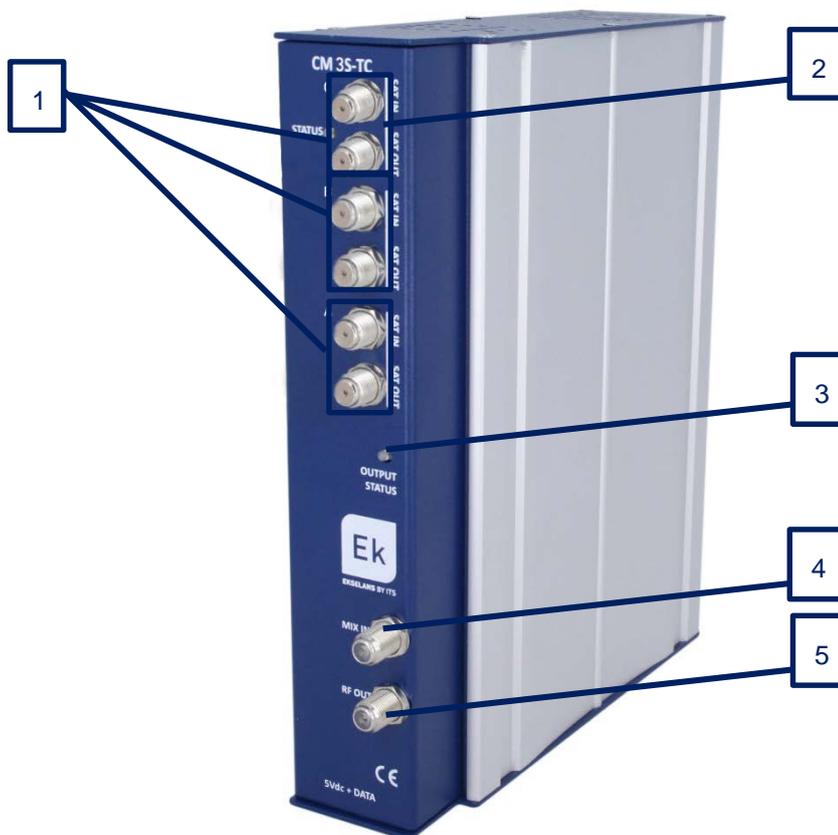


Figure 1. Front indicators and connections

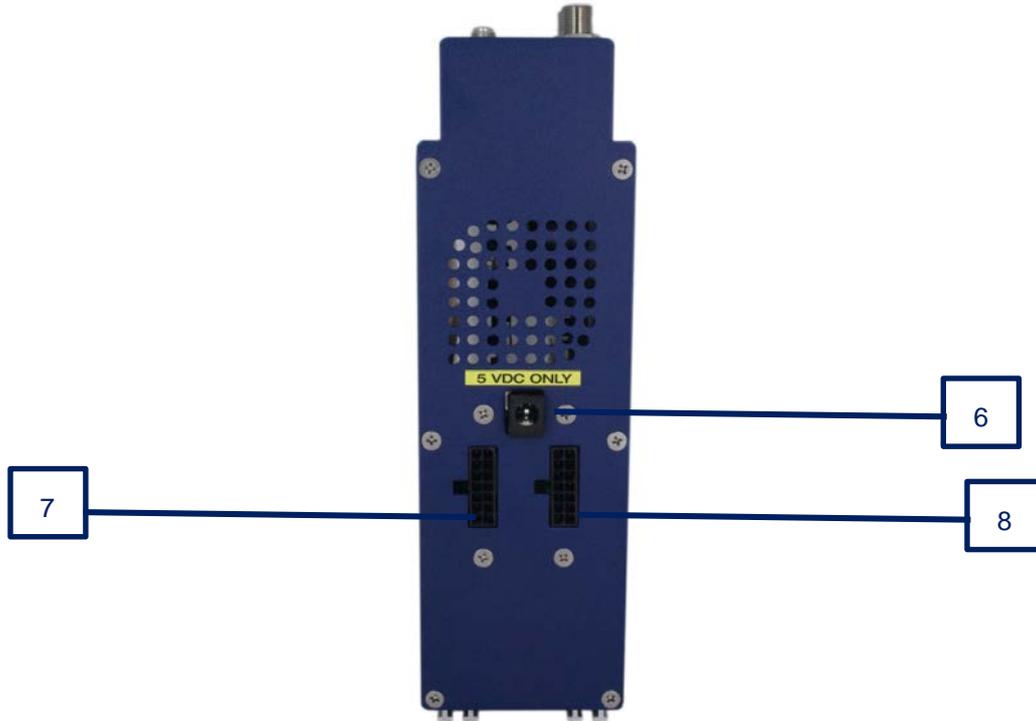


Figure 2. Bottom connections.

Number	Description
1	3 input tuners with their output loop. It is possible to bridge them with the provided short bridges.
2	Input Status LED. It informs about the status of the input tuners. The LED blinks in sequences of 3, indicating each, the status of each tuner. When green, signal is locked.
3	Output status LED.
4	RF MIX Connector.
5	RF OUT connector. At this output there will be the RF signals created by the module, together with the ones, coming from connector 4.
6	Voltage feeding connector. Used in case of using a single module together with FA 55 PSU .
7	Voltage feeding and data input port.
8	Voltage feeding and data output port.

3. Installing and connections

3.1. Installing and general connections

1. In case of installing several modules (complete headend) or just installing one module, fix the module into a Wall frame (CHM TR) or rack frame (CHR TR). In this case, mount in the upper side the metallic provided plate as indicated in figure 3.



Figure 3. Metallic plate support detail (Wall or rack installation)



Important note: In case of a headend with several modules, place always the power supply unit (PSU) at the left of the modules to be installed.

2. Connect the **FA 524** PSU to the module or to the previous module with the feeding provided cable. It can be also connected to **FA 55** PSU to feed a single module.



Figure 4. Module connection to FA 55 and to CM PR.

Connect the LNB(s) to the inputs of the transmodulators. For professional installations it is recommended to use Quattro LNBs (**DRO 44G**).



Important note: In case of using short bridges at the inputs, these will have to be tuned to the same band and polarity.

3. Install “**CM Management**” software on the PC or “**EK Pro**” where it is also included. Both can be downloaded from the www.ekselansbyits.com website.

4. In order to make the programming, set any of these connections:

a. Programming with PC – FA 524 with USB cable.

Connect the **FA 524** to a PC by using a USB (A) – USB (B) cable as follows:

Connect this side to the PSU
(USB – B Type)



Connect this side to the
computer (USB – A type)

b. Programming with PC – FA 524 through internet

Connect the PSU into with an Ethernet cable to the LAN with internet connection.
The module has DHCP enabled. Make the programming from a computer on that LAN.

c. Programming with computer – CM PR via USB

Connect the module to the **CM PR** programming device with the supplied voltage and data cable. Connect the computer to **CM PR** with USB cable



5. Execute the “**CM Management**” software on the computer



Important note: Connect the **FA 524** or the programming device **CM PR** and **FA 55** before executing the software on the PC.

3.2. Installation of a headend with several modules.

If it is desired to install the module into an already existing **CM Headend** with several modules, it is important to follow these instructions:

- Connect the different modules in series through the feeding cable and to the power supply, which must remain on the left of the headend.
- Verify the modules consumption. Generally, it is possible to connect up to 6 modules with a **FA 524** PSU. Anyhow, we recommend to verify the consumption of the modules

to be installed and connected to the PSU.

- It is possible to use a long bridge to make the RF signal reach the adjacent modules.
- Adjust the attenuation at the output to be able to compensate the attenuation at high frequency.

4. “CM Management” Programming software

The programming software “CM Management” allows to configure and manage all the modules of the headend. The program is available for Windows in its versions XP, 7 and above.

Once downloaded from www.ekselansbyits.com execute it having connected previously FA 524 or FA 55 + CM PR. In this way the computer will detect the drivers.

4.1. Main screen

This is the main screen of “CM Management” software:

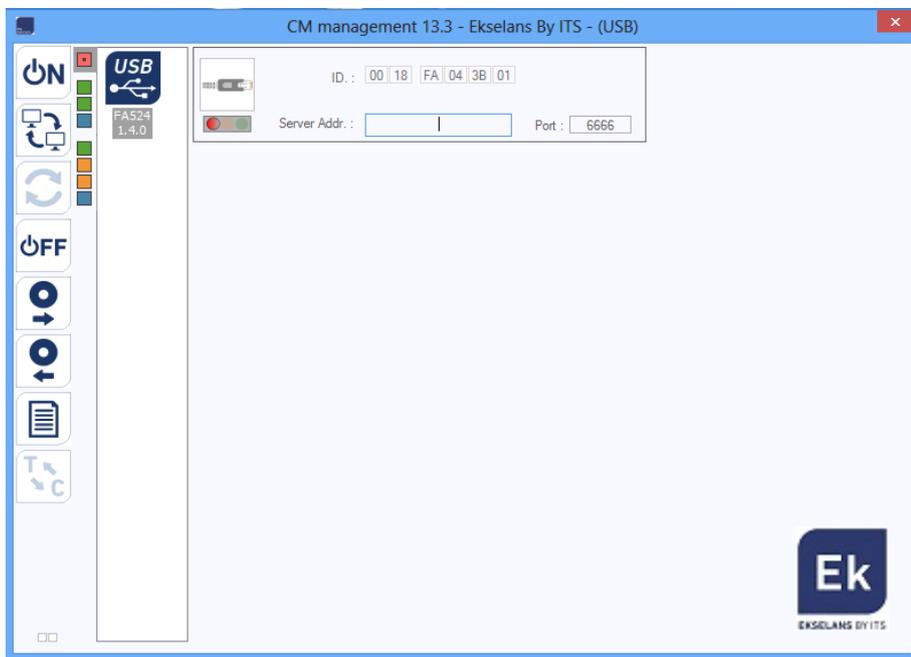


Figure 5. Appearance of the main screen of “CM Management” connected to the PSU

“CM Management” software allows the programming and configuration of CM modules connected to the power supply FA, 524. Here are explained the lateral options of the software:

Button	Function
	Once connected to the PSU via a USB cable, when pressing this button, the software will connect to the headend identifying the modules.
	Once connected to the power supply and acquired CM Key reference, it is possible to establish remote connection through internet. Please read further on regards to this function.
	Firmware of the modules upgrade. If the button is in blue, it means there are modules that can be upgraded. After pressing, when it is finished, it requires reboot, by switching OFF / ON the module. Latest firmware versions are inside the latest version of CM Management software. We recommend you keep your CM Management software upgraded.
	Press this button to disconnect the PSU FA 524 from the programming software. If there is no connection, the icon will be in white background.
	This option allows loading a configuration of programming previously stored on the PC (clone) to a module or several modules connected (exactly same physical configuration). This file has .drc extension.
	This option allows storing into a PC a configuration of one or several modules connected. In the future will be possible to clone this configuration if the modules connected to the PSU are the same and in the same sorting.
	Allows switching the output of the modules from DVB-T (COFDM) to DVB-C (QAM).
	Data logger. Allows storing the current configuration of the different modules of the headend into a single .html file for appropriate visualization.

The screen of "**CM Management**" allows identifying the different modules connected to the PSU FA 524 or CM PR, as displayed:

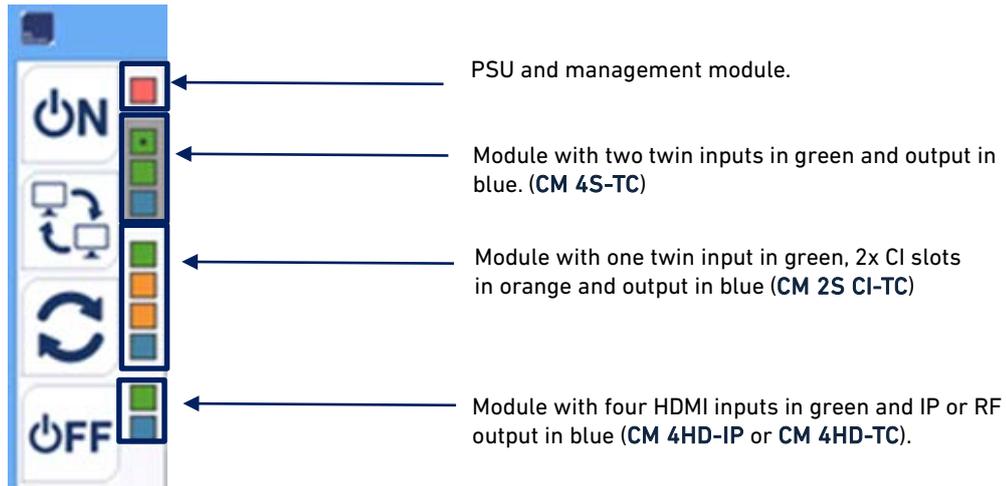


Figure 6. Detail for the identification of three modules connected to the power supply.

Each module of the **CM Headend** series is identified by several squares of different colours grouped. Depending on the module, it will be represented by 2, 3 or 4 squares where the green ones identify the inputs, the orange ones, CI slots and the blue ones the outputs. In case that there is more than one module connected to the power supply, these will be appearing in the same sorting as connected to the PSU. It is the case of figure 6, where there is a total of four modules, 3 different and 1 power supply.

4.2. Programming of CM 3S-TC module

4.2.1. Tuning of DVB-S / DVB-S2 transponders

Once the **CM 3S-TC** module is connected to the **FA 524** and this to the computer (or the **CM 3S-TC** connected to the **CM PR** (and this connected to the computer) and to the **FA 55**), start the “**CM Management**” software. On top, it will be possible to see:



Figure 7. Identification of **CM 3S-TC** modules

When pressing any of two squares above it will appear a screen like figure 8.

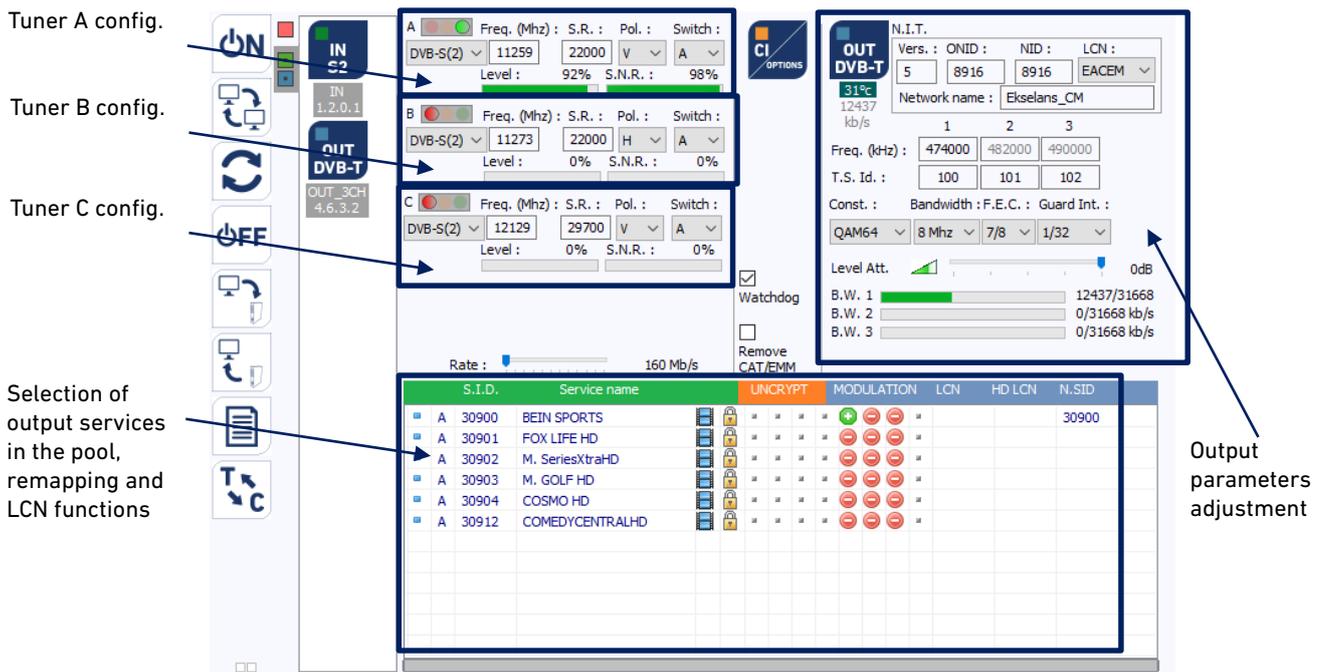


Figure 8. View of the configuration screen of a module **CM 3S-TC** connected to **FA-524**.

For the programming start tuning the desired transponders for each tuner, identifying the frequency, symbol rate, polarity and DiSEqC switch position A, B, C or D. At this point the transponder will be tuned and the light will remain in green. Also in a qualitative way it will be indicated its power and quality. At the bottom the found services of that transponder will appear in the pool.



Important notice: The level and quality offered in measurement of input tuners is only qualitative and do not express a professional measurement. For this purpose it is necessary to measure with a Field Meter like for example TSF 1, from Ekselans.

At the bottom of the window, there will appear the services related to the tuned transponders. Also it is possible to see if these are Free to Air (🔓) or scrambled (🔒) and if are radio (📻) or TV (📺) programs.

S.I.D.	Nombre Servicio	DECODIFIC.	ACTIVACIÓN
A 12061	RTLNITRO		
A 12080	CBC01		
A 12090	n-tv		
B 17500	SAT. 1		
B 17501	ProSieben		
B 17502	kabel eins		
B 17503	N24		
B 17504	SAT. 1 Gold		
B 17505	ProSieben MAXX		
B 17506	kabel eins classics		
B 17507	SAT. 1 Bayern		
B 17508	SAT. 1 NRW		

Figure 9. Activation of different services in the output pool.

4.2.2. Modulation of services to the 3 output COFDM MUXs

In order to select the services for these transponders, select the desired ones by double click on each of them above the negative symbol () so that this remains in positive (). Each column identifies one of the 3 RF output channels, being the first one, the first channel

S.I.D.	Service name	UNCRYPT	MODULATION	LCN	N.SID
B 10301	Das Erste HD				10301
B 10302	arte HD				10302
B 10303	SWR BW HD				10303
B 10304	SWR RP HD				

Figure 10. Activation of three services in three different adjacent MUX

In order to modify the frequency it is necessary to change some of the DVB-T parameters:

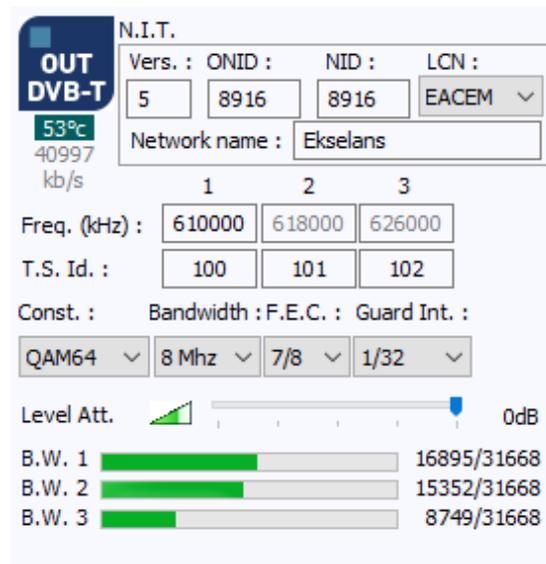


Figure 11. DVB-T parameters adjustment

- **Vers:** NIT version
- **ONID:** Identifies the operator network (original network ID), different from each county.
- **NID:** Identifies the local network
- **LCN:** Type of LCN (EACEM for Europe, ITC for UK, Nordig for Scandinavian countries)
- **Network Name:** Identifies the name of the local network
- **Freq.:** Place here the frequency (in KHz) of first output MUX. The following ones will be automatically calculated. Note that these will be adjacent.
- **TS Id.** Place here the identifier of the Transport Streams that will be transmitted on this frequency.
- **Const:** Modulation scheme to be used (64QAM, 16QAM, QPSK)
- **Bandwidth:** The bandwidth of each output channel 7 MHz or 8 MHz
- **FEC:** Selection of different values of redundancy to protect against errors. Higher rates will prevent from errors but note that will decrease the useful bandwidth for data.
- **Guard I:** Selection of different values of time between symbols transmission. Higher rates will prevent from echoes but note that will decrease the useful bandwidth for data.
- **Level Att.** It is possible to attenuate the output level up to -20dB. Remember that output level of **CM 3S-TC** module is 95 dB μ V.

Also, on this side, it is possible to see the output bit rate of each output MUX:

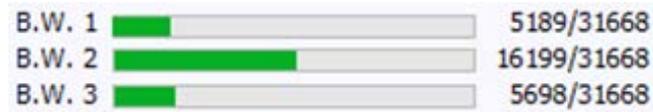


Figure 12. Detail of the output bit rate and capacity per each RF output

In figure 12 it is shown the bit rate of each output MUX. The maximum capacity of DVB-T configuration is 31668 Kbps / 31,6 Mbps. As more services are transmitted in one channel, the occupancy will increase in real time.

It is recommended to occupy maximum 80% of the total capacity in order to avoid overflow problems.



Important notice: In case of not selecting any service for one output MUX, there will not be carrier at that RF frequency, being the spectrum available.

4.2.3. Modulation of services to the 4 output QAM MUXs.

In order to obtain the output modulated in QAM, the steps are the same as in previous point having in consideration the aspects related to DVB-C: Constellation, Band y SR (Symbol Rate).

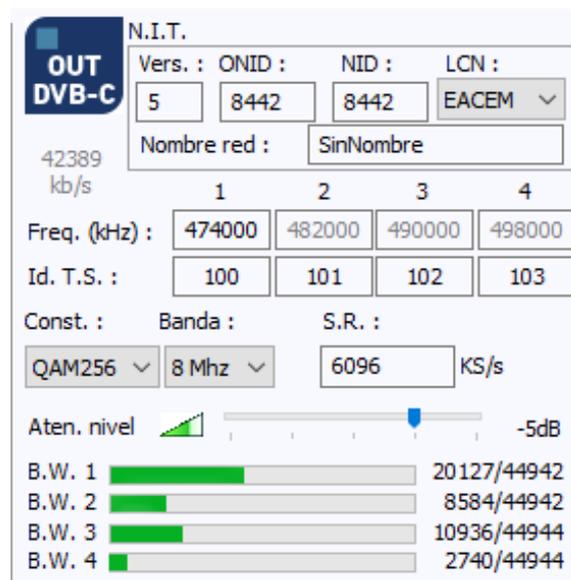


Figure 13. Detail of modulation parameters of DVB-C

4.2.4. Change in the output modulation

The CM 3S-TC module, allows choosing the output standard modulation between COFDM (by default) and QAM. To do so, just press  button on “CM Management” software.

This operation may last up to 4 minutes. Once the change is done the output modulation will be switched into COFDM/QAM.

After the change it is necessary to restart the “CM Management” software.

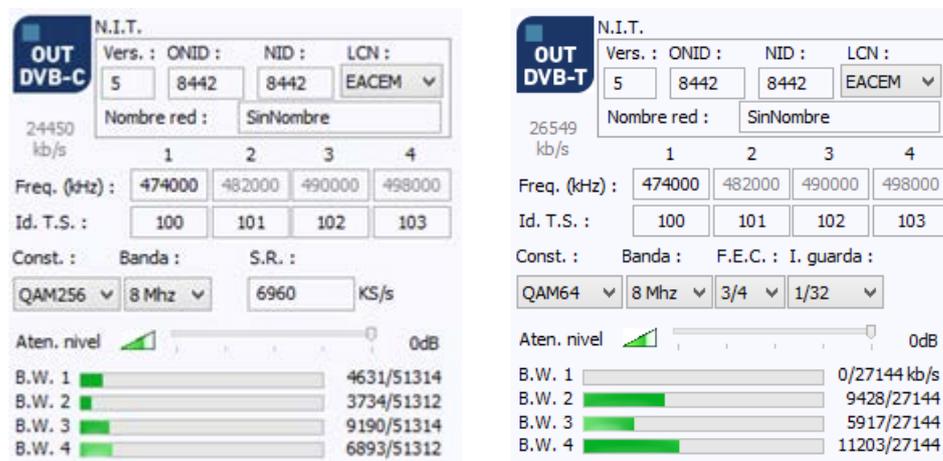


Figure 14. Configuration parameters on different output modulations

4.2.4.1. COFDM vs QAM modulations

With all probability the use of one output modulation will be determined by the rest of existing elements in one installation. It is important to understand that the bandwidth transmitting capacity (services) of the modules is tied to the configured parameters of the output modulation. These should be adjusted to the requirements of the installation in front of noise, reflections and interferences.

In the following table we see a relation of all the output bandwidth (Bit Rate) depending on all configurable parameters:

Useful net data rate (Mbps) on DVB-T for 8MHz bandwidth					
Modulation	FEC	Guard Interval			
		1/4	1/8	1/16	1/32
QPSK	1/2	4,98	5,53	5,85	6,03
	2/3	6,64	7,37	7,81	8,04
	3/4	7,46	8,29	8,78	9,05
	5/6	8,29	9,22	9,76	10,05
	7/8	8,71	9,68	10,25	10,56
16 QAM	1/2	9,95	11,06	11,71	12,06
	2/3	13,27	14,75	15,61	16,09
	3/4	14,93	16,59	17,56	18,10
	5/6	16,59	18,43	19,52	20,11
	7/8	17,42	19,35	20,49	21,11
64 QAM	1/2	14,93	16,59	17,56	18,10
	2/3	19,91	22,12	23,42	24,13
	3/4	22,39	24,88	26,35	27,14
	5/6	24,88	27,65	29,27	30,16
	7/8	26,13	29,03	30,74	31,67

Figure 15. Useful Data Rate for DVB-T in several configurations

Useful net data rate (Mbps) on DVB-C for 8MHz bandwidth					
Modulation	RS	Symbol Rate (KSps)			
		4000	5000	6000	6960
16 QAM	188/204	14,75	18,43	22,12	25,66
32 QAM	188/205	18,43	23,04	27,65	32,07
64 QAM	188/206	22,12	27,65	33,18	38,48
128 QAM	188/207	25,80	32,25	38,71	44,90
256 QAM	188/208	29,49	36,86	44,24	51,31

Figure 16. Useful Data Rate for DVB-C in several configurations

Comparatively, for a same modulation, we observe that the DVB-T standard offers less output bit rate due to it requires greater protections to minimize the potential transmission errors. As benefit, it is a more robust standard against errors.

Remember that the input bit rate flow is variable depending on the image, audio and data transmitted at any moment. For this reason, it is recommended not to use the 100% of the total bit rate capacity per channel. It is recommended to occupy approximately 80% of the total output capacity.

4.2.5. Advanced configurations

4.2.5.1. LCN Function (“Logical Channel Numbering”)

The transmodulator allows tagging the Transport Streams of information so that the TV programs appear specifically sorted on the TV / STBs with LCN function enabled.

Although this function avoids sorting one by one all the devices, it is required to tune them. The function is especially useful when there are many TVs / STBs in one installation.

To realize this, it is necessary to place the desired position number on the LCN column of the POOL.

S.I.D.	Service name	UNCRYPT	MODULATION	LCN	N.SID
B 4033	CSC TEST				
B 4002	SBS6			6	4002
B 4011	NPO1			1	4011
B 4012	NPO2			2	4012
B 4013	NPO3			3	4013
B 4016	CD/TVV info&nieuws			7	4016
B 4044	RTL4			4	4044
B 4045	RTL5			5	4045

Figure 17. LCN sorting of selected programs

4.2.5.2. HD LCN Function (“HD Logical Channel Numbering”)

In case of willing to transmit simultaneously SD and HD programs (simulcast) (The same program) this function will allow to prioritize the SD or HD in front of the HD or SD ones.

In this way, for example, it will be possible to sort the programs as follows:

Program Name	SD / HD	LCN	HD LCN	Sorting
TV 1 HD	HD	1	11	1
TV 2 HD	HD	2	12	2
TV 3 HD	HD	3	13	3
TV 4	HD	4		4
TV 5	HD	5		5
TV 1 SD	SD	11	1	11
TV 2 SD	SD	12	2	12
TV 3 SD	SD	13	3	13

Figure 18. LCN and HD LCN fields configuration

To do so, it is fundamental to have all transmitted programs with “LCN” column filled in. And, in

the case of transmitting the same content in HD place in the “HD LCN” column its equivalent position. In this way, for example, we can have the SD or HD channels in lower or greater positions of the program list of the TVs /STBs.

4.2.5.3. SID & NSID parameters configuration

The transmodulators allow SID fields remapping. This functionality is useful for changing the content (video) of a service placing it in the same output channel of the headend without need to tune again the TVs/STBs.

For this it is necessary to transmit the new program of the NSID where the former one was being transmitted. To do so, just make double click on the column NSID of the new program to transmit and apply a number of a program that was already transmitted.

4.2.5.4. CAT/EMM Tables suppression

Additionally, the “CM Management” program also allows the suppression of CAT/EMM tables. This option allows the transparent pass or the suppression of the Conditional Access Tables (CAT) and Entitlement Management Messages (EMM).

This possibility allows using the module for decoding on the headend (if module has CI slot) or the transparent passing of the tables for decoding on the user side.



4.2.6. Store and load a configuration

The “CM Management” software allows storing a configuration of a CM module (or several) to the computer and clone that configuration to other modules. To do so, it is necessary to use following commands:



Store into PC a configuration to be used in the future. The extension file is *.dtc*



Loads a configuration *.dtc* into a module (or several modules).



Important note: In case of willing to clone a complete headend with more than one module, it is necessary that modules are the same and placed in the same order as the original configuration to clone.

4.2.7. Input bandwidth visualization

The “CM Management” software allows knowing intuitively, further than the bit rate used at each output MUX, the input bandwidth per selected service to transmit.

On figure 19, 12 tuned services can be seen from which 8 are activated to be modulated at the output.

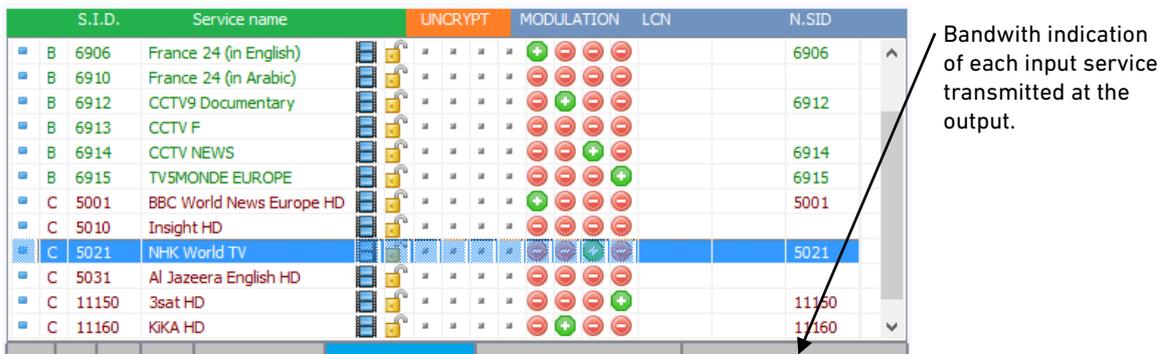


Figure 19. Input bandwidth of transmitted services comparison.

At the bottom of the image of figure 19, there is a bar divided into several columns. In this case, there are 8 columns (of different widths) that correspond in the same order to the programs that are being transmitted.

At the same time, the blue selected program (“NHK World TV”) corresponds to the bar also in blue colour. In addition, it can be observed that programs “3sat HD” y “KiKa HD” are the ones that comparatively occupy most bandwidth.

This tool is useful to visualize which are the channels that occupy most and being able to sort them in the POOL to take the maximum advantage of the module.

4.2.8. Output bandwidth visualization

The “CM Management” software allows checking the output bit rate per each output MUX and for the complete module. Adding these all together we will obtain the first one:

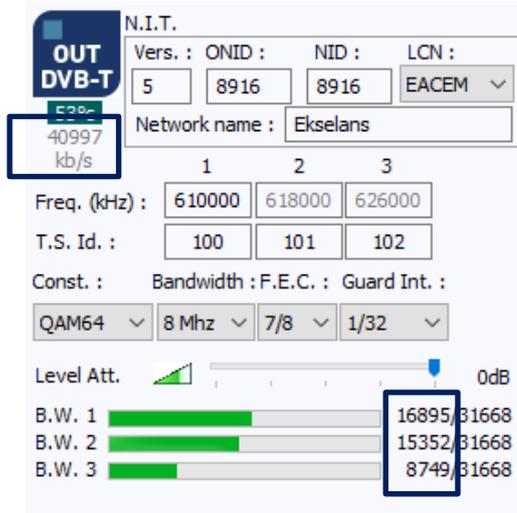


Figure 20. Visualization of each output bandwidth per MUX and its totality.

4.2.9. Data-logger

The “CM Management” software, it has the option to store in a file, all the configuration of the modules connected to the power supply. It is useful for the future, to understand and read the programming.

To do so, make click on icon and indicate the name of the file. It will be created a file with .html extension that can be opened with the navigator, normally as follows:

CM management 14.6 - Ekselans By ITS - (cm.ekselansbyits.com/ [redacted] Calle Laurel, 2) [9.14%] 09/08/16 12:15:13							
FA524 V1.5							
ID	IP address	Identification			server		
0018-FA524B01	192.168.0.70				cm.ekselansbyits.com 6668		
IN V11.6							
Configuration							
FREQ.	S.R.	F.E.C.	SWITCH	LEVEL	S.N.R.	STATUS	
A 11305 MHz	22000	H	A	16%	98%	OK	
Configuration							
FREQ.	S.R.	F.E.C.	SWITCH	LEVEL	S.N.R.	STATUS	
B 1149+ MHz	22000	H	A	-8%	98%	OK	
RATE				100 Mb/s			
Multiplexes Content							
SID	NAME	Type	Crypted	Used			
A 4911	ORF1 HD	TV	X	X			
A 4912	ORF2 HD	TV	X	X			
A 4913	ServisTV HD Österreich	TV	X				
A 4914	ServisTV HD Deutschland	TV					
A 4916	ORF2 HD	TV	X				
B 10391	Das Erste HD	TV		X			
B 10392	arte HD	TV					
B 10393	S/12 B/1 HD	TV					
B 10394	S/12 B/2 HD	TV					
CI_V1.1							
CI_V25.5							
OUT_3CH V4.6							

Figure 21. Detail of .html data file

4.3. Remote management of the headend

The **CM Headend** can be remotely managed. This function is integrated into the **FA 524** power supply and each module of the headend.

4.3.1. Access and remote management of CM 3S-TC

The **CM Headend** series allow the remote management via internet by the PSU **FA 524**. This one has to be connected to the LAN /Internet via de RJ 45 on its front. It is necessary to have the “**CM Management**” software installed on a computer. It can be downloaded from: <http://www.ekselansbyits.com/>.

Due to security reasons, each installer / installer company requires an identifier and password. These will be used to manage all the headends they install and are obtained without any cost. At the same time, it is necessary a **CM KEY** that will be linked to the identifier of the power supply:



Figure 22. Detail of the identifier of the power supply and connection to server



Important note: In order to obtain the remote management it is necessary to obtain a **CM Key** reference to the Ekselans distributor and provide to it the identifier of the power supply.

4.3.1.1. Connection to the server

The configuration data is stored on a server available 24h a day: **cm.ekselansbyits.com, 6666 port**. The possible connection states to the server are

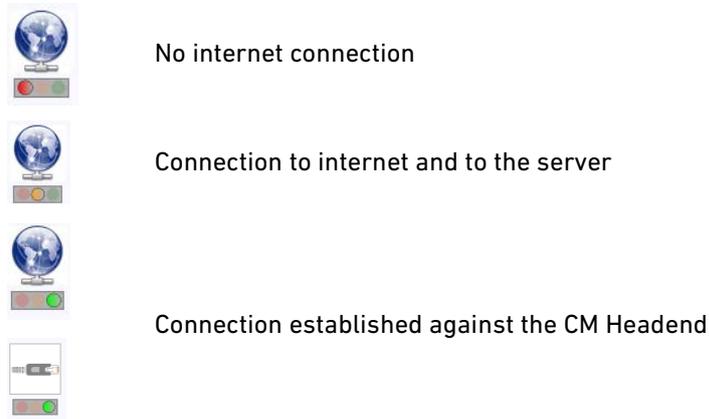


Figure 23. Different states of the connection to the server

4.3.1.2. Management and remote access

To access to a remote **CM Headend**, open **CM Management** software and press  icon. Then it will appear this window.

As each installer company may have different **CM Headends** working, it is possible to view all of them and access individually, via the linked PSU ID and **CM Key**.

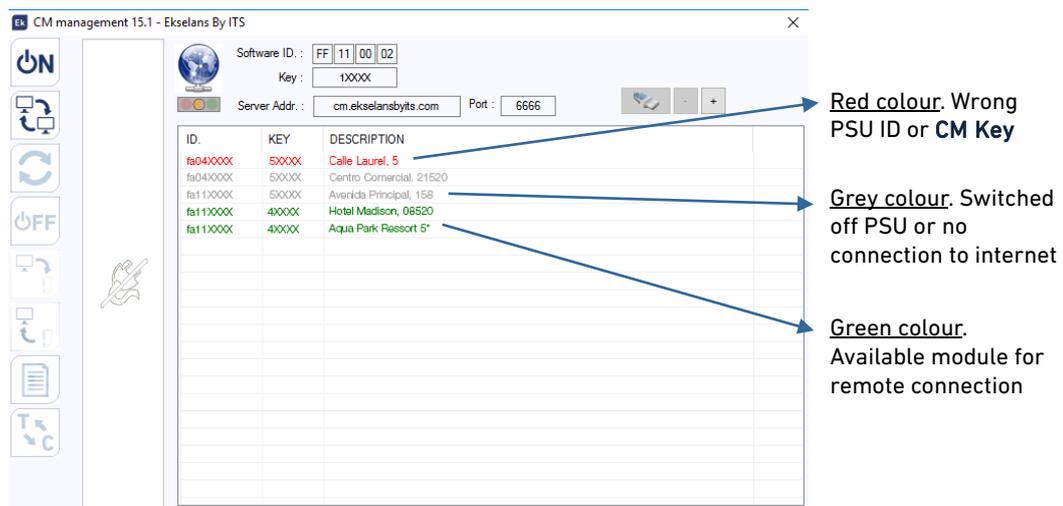


Figure 24. Detail of control remote with two remote headends listed.

In the first connection it will be necessary to place the “Software ID” and “llave”. These are personal for each installer company. In order to obtain it, please contact your **Ekselans** distributor.

If all parameters are correct, the connection will be established with the server without need to open a specific port.

In the same window is it possible to add the different **CM Headends** installed and will be possible to see the status of each of them. We remind that each power supply **FA 524** includes a control module that allows, the remote management. This PSU identifies a **CM Headend**.

With the following commands, we can interact with the **CM Headends** associated to our Software ID:

-  Removes a PSU (and **CM Headend**) from the list
-  Connection to a Headend of the list. It requires first to have selected a PSU (remains in blue when selected).
-  Adds a PSU (and **CM Headend**) to the list.

If all data is correct, it will be established the connection to the server and to the related headend. From this moment, it will be possible to manage the headend as if were working in front of it.

4.3.1.3. Adding a new CM Headend

In order to add a new CM Headend to the list, it is necessary to follow these steps and be sure that the **FA 524** (PSU) is connected to a LAN with internet output.

1. Add the new module (PSU) by pressing the  button.
2. **ID.** Place the ID of the PSU in the mentioned field.
3. **KEY.** Insert the obtained **CM Key** code. It is offered by your **EK Distributor**.
4. **DESCRIPTION.** Optionally (very recommendable), add a description of the installation, for example its postal address.

In the moment when it appears in green color, it is possible to connect to it remotely as if USB connection was established. So, select the PSU and press: 

5. Technical data

Reference	CM 3S-TC
Code	082016
Inputs	
Number of inputs	3 (A, B, C)
Input frequency	950 – 2150 MHz
Input level	43 – 83 dB μ V
Bandwith	36 MHz
Type of modulation	QPSK – 8PSK
LNB feeding	13V / 18 V / 22 KHz / DiSEqC (A/B/C/D)
Outputs	
Number of outputs	1 + loop-through (-1,5 dB)
Maximum output level	95 dB μ V
Output regulation	20 dB (By software)
Output frequency	45 – 862 MHz
Output MUXs	3 COFDM o 4 QAM (adjacent)
Output bandwidth	7 MHz (VHF) / 8 MHz (UHF)
COFDM modulation mode	2K
COFDM constellation	QPSK / 16QAM / 64QAM
QAM constellation	16, 32, 64, 128, 256 QAM
FEC	1/2, 2/3, 3/4, 5/6, 7/8
Guard Interval	1/4, 1/8, 1/16, 1/32
MER	> 35dB
Other	
Programming	Via “CM Management” software connected by USB/LAN to FA 524 or CM PR + FA 55.
Feeding	5 Vdc
Consumption	2,2 A + LNB
Temperature range	0 – 40°

6. Related Products

	FA 524	Power supply for headend modules feeding. Rack or wall mounting. Centralized module for programming. 120W (5V / 24A)
	CM PR	Programming device for a single CM module via USB.
	FA 55	Power Supply for a single CM module. 25W (5V / 5A)
	CHM TR	Metalic support for wall mounting. Supports a total of 7 CM modules.
	CH 3 TR	Metalic support for wall mounting. Supports a total of 3 CM modules.
	CHR TR	Metalic support for 19" rack mounting. Supports a total of 7 CM modules.
	CM KEY	License (Key) for the remote management of the headend via "CM Management" sw.
	CM 4S-TC	Quad DVB S/S2 to COFDM/QAM transmodulator. Output Level 95 dBμV. MER >35dB. Services remux. 4 adjacent output MUXs at output. 13/18V, 22 KHz y DiSEqC. USB player.
	CM 2SCI-TC	Twin DVB S/S2 to COFDM/QAM transmodulator. Output Level 95 dBμV. MER >35dB. Double CI slot. Services remux. 3-4 adjacent output MUXs at output. 13/18V, 22 KHz y DiSEqC. USB player.

	<p>CM 2STC-TC</p>	<p>Twin DVB T/T2/C/S/S2 to COFDM/QAM transmodulator. Output Level 95 dBμV. MER >35dB. Services remux. 3-4 adjacent output MUXs at output. 13/18V, 22 KHz y DiSEqC. USB player.</p>
	<p>CM 4STC-TC</p>	<p>Quad DVB T/T2/C/S/S2 to COFDM/QAM transmodulator. Output Level 95 dBμV. MER >35dB. Services remux. 4 adjacent output MUXs at output. 13/18V, 22 KHz y DiSEqC. USB player.</p>
	<p>CM 2STC CI-TC</p>	<p>Twin DVB T/T2/C/S/S2 to COFDM/QAM transmodulator. Output Level 95 dBμV. MER >35dB. Services remux. Double CI slot. 3-4 adjacent output MUXs at output. 13/18V, 22 KHz y DiSEqC. USB player.</p>
	<p>CM 4AV-TC</p>	<p>4 x AV to COFDM/QAM. Output Level 95 dBμV. MER >35dB. 4 independent inputs mixed into a single RF COFDM/QAM mux.</p>
	<p>CM 4HD-TC</p>	<p>4 x HDMI to COFDM/QAM. Output Level 95 dBμV. MER >35dB. 4 independent digital inputs mixed into a two RF COFDM/QAM mux.</p>

7. Technical support

In order to solve any question related do not hesitate to contact your EK distributor or EK technical service.

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