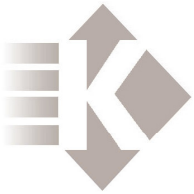
Professional Monitors 14”
BM5314A12 (V.3)/A13

User Manual
BM5314D13

Edition 01

Noviembre de 2002



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SAFETY INFORMATION

WARNING: This product includes critical mechanical and electrical parts which are essential for X-Radiation safety.
For continued safety replace critical components indicated in the service schematic only with exact replacement parts given in the parts list of service Manual.
Operating high voltage for this product is 16 Kv. At minimum brightness. Refer to service manual for measurement procedures and proper service adjustments.

WARNING: Electric shock or fire hazard can be caused if critical components are replaced by non conform components. Refer to parts list of service manual.

CAUTION: High vacuum tube is dangerous to handle refer replacement to qualified personnel.
Replace with a tue of the same type for continued safety

1. INTRODUCTION

1.1. APLICATIONS

The KROMA BM5314 monitors have been designed to use in Broadcast studios for signal evaluation requiring accurate picture reproduction. Also it can be used in post-production..

They incorporate microprocessor based control in all its operations, providing automatic color set-up, thus eliminating the operator´s subjetive factor.

1.1.1. FEATURES

BM5314A12 14”

Basic Video version: CCVS (PAL/NTSC). Three composite video inputs, one of them is configurable as external sync.

Options:

BM5014X01

This module consist of 2 Digital video inputs in passive loop-through, according to (ITU-R BT601) 10 Bits and analog components (RGB/YPrPb).

BM5014X02

This module consist of 2 Digital video inputs in passive loop-through, according to (ITU-R BT601) 10 Bits and analog components (RGB/YPrPb). This SDI module allows the user to extract the embedded audio and then output it in Analog or AES EBU Digital form.

BM5314A13 14”

It can be configured with the following options:

BM5314X01

This module consist of 2 Digital video inputs in passive loop-through, according to (ITU-R BT601)10 Bits

BM5314X02

This module consist of 2 Digital video inputs in passive loop-through, according to (ITU-R BT601) 10 Bits. This SDI module allows the user to extract the embedded audio and then output it in Analog or AES EBU Digital form.

BM5314X03

This module consist of 2 PAL,NTSC,SECAM video input and 2 Digital video inputs in passive loop-through, according to (ITU-R BT601) 10 Bits

BM5314X04

It is the more complete version (module), it has all the options previously mentioned.

1.1.2. PICTURE TUBE

High resolution, in line guns an shadow mask tube, with 0.28 dot pitch and P22 phosphor.

1.1.3. COLOUR STABILITY

Beam current feedback, which allows to correct colour temperature drift caused by CRT variation and environmenttal conditions.

1.1.4. FLEXIBILITY

Modular configuration. It is provided with an analog and digital bus, allowing the exchange of signals between the options installed, making it a system of open architecture for future options.

1.1.5. AUTO SETUP SYSTEM

By use of the KROMA set AK5400X50, composed by a DG5400 test signal generator and an optical probe model SR5400.The generator is able to provide up to 34 patterns designed for monitors alignment.

With this combination, automatic grey scale adjustment can by carried out.

This set also allows transfering automatically the parameter setting of this setup to other monitors.

1.1.6. REMOTE CONTROL

The RS-485 bus included in the BM5314 KROMA monitors. Is able to control up to 128 monitors. These can be in group controlled, individually controlled or all of them can be controlled at the same time by remote control RK5000.

1.1.7. MENU

This help the operation, displaying the operating parameters and the commands to access at several functions.

The adjustment operations to be done by the specialized personnel are protected by numerical password.

1.1.8. NORMAL SIZE, UNDERSCAN AND 16:9

The BM5314 range provides facilities for normal picture size or underscan (95% reduced size) and aspect ratio 4:3 and 16:9 selectable from the front panel by SIZE key.

1.1.9. MEMORIES

The monitor has 5 available memories

- All memories accessible via password (only for data store)
- Four memories for general use.
- One memorie for the system or factory

1.2. TECHNICAL SPECIFICATIONS

1.2.1. SCAN & SYNC

Systems 625/50/2:1 Horizontal frequency 15.625 Hz

525/60/2:1 Horizontal frequency 15734 Hz

Horizontal oscillator lock-in range: ± 750 Hz

Horizontal sync. constant time: Fast: 0.5 mS

Slow: 2.5 mS

1.2.2. PICTURE DISPLAY

Aspect ratio: 4:3 and 16:9

Errors: - Linearity error: ≤ 4 % of picture height

- Geometry error: ≤ 1 % ídem.
- Convergene error:

TUBE	ZONE 1	REST
14”	0.4 mm	0.5 mm

ZONE 1 IS WITHIN A CIRCLE CENTRED ON THE SCREEN WHOSE DIAMETER IS EQUAL TO PICTURE HEIGHT.

1.2.3. CTR

- 14” HR 0.28 dot pitch Phosphor: P22
- Resolution : > 700 TV línes in centre
- Colour temperature: 6500º K ± 200º K (IN ALL MEMORIES)
- Black level: Set to 0.8 Nit (10 % APL WINDOW SIGNAL)
- White level: Set to 105 Nit (100% APL WINDOW SIGNAL)
- Beam current limiting: 180 Nit (FLAT FIELD SIGNAL)

1.3. BM5314A12 MODEL

1.3.1. DECODER PAL / NTSC PERFORMANCE

- Inputs A, B and C
  - Level : 1 V_{pp} +3/-6 dB
  - Impedance : 75 Ω ± 1% or loop-through (selectable)
  - Return losses: 35 dB @ 5 Mhz.
  - Isolation between A, B and C inputs: > 60 dB @ 10 Mhz.
  - Mismatch between A and B inputs: < 1% and < 1º @ 4.43 Mhz
- External sync input
  - Level : 4 V_{PP} +6 dB

    0.3 V_{PP} +6 dB (programable by menu)
  - Impedance : 75 Ω ± 1% or loop-through (selectable)

- ♦ Return losses: > 35 dB @ 5 Mhz

- Auxiliary signal (Front panel)[1]
  - ♦ Format : CCVS similar to A and B
  - ♦ Impedance : 75 Ω ± 1%
  - ♦ Return losses: > 25 dB @ 5 Mhz.

1.3.2. LUMINANCE

- Frequency response:

  Without *notch* filter: 100 Khz - 6 Mhz ± 1 dB

  Notch filter suppresion < - 30 dB @ 4.43 Mhz

- K factor

(APERTURE 0 dB)	WITHOUT FILTER	WITH FILTER
K_{pb}	< 0.5 %	< 1%
K_{2T}	< 0.3 %	< 1.2%

- Non linearity: < 1%
- Noise: (100 Khz - 5 Mhz) < 60 dB

1.3.3. CHROMINANCE

- Pass Band: 1.3 Mhz (Equiband)
- Saturation control: ± 6 dB
- Subcarrier oscillator lock.in range: 300 Hz
- Luminance-chrominance delay: < 50 nS

1.4. BM5314A13 MODEL

1.4.1. SDI FEATURES

Compatible with signal source according to norm ITU-R BT.601 and BT.656 SMPTE/EBU of 270 Mbits per second.

- ♦ Demultiplexed of components and synchyronization according to Rec.601 and Rec.656 of CCIR.
- ♦ S1 and S2 video inputs in loop-through. Impedance 75Ω
- ♦ Return losses: > 21 dB @ 270 Mhz. or loop-through (selectable)
- ♦ Frequency response: 0 – 5,5 Mhz. < 0.5 dB
- ♦ Tilt (V): < 0,5 %
- ♦ K factor: Kp < 0,3 %

[1] During the auto set-up it control the channels R G B in parallel.

Kpb < 0,2 %

- Non lineality: < 1%
- Missmatch between components:

Gain: < 0.1%
Delay: < 3 ns

- Analog audio levels: (Only in BM5314X02 and BM5314X04)

4Vpp @ 0dBFs

Note: The audio outputs are not designed to work with 4 or 8 Ohm loads, it must be connected to inputs with loads >1K Ohm.

1.4.2. DECODER PAL / NTSC / SECAM PERFORMANCE

- **Input A & B**
- Level : 1 V_{pp} +3/-6 dB
- Impedance : 75 Ω ± 1% or loop-through (selectable)
- Return losses: 35 dB @ 5 Mhz.
- Isolation between A, B and C inputs: > 60 dB @ 10 Mhz.
- Mismatch between A and B: < 1% and < 1º @ 4.43 Mhz

- **External sync input**
- Level : 0.3 V_{PP} (Black burst) +6 dB / -28 dB
- Impedance : 75 Ω ± 1% or loop-through (selectable)
- Return losses: > 35 dB @ 5 Mhz

- **Auxiliary Input (Front panel)**[2]
- Format : CCVS similar to A and B
- Impedance : 75 Ω ± 1%
- Return losses: > 25 dB @ 5 Mhz

1.4.3. LUMINANCE

- Filtering: By adaptive “Comb filter” PAL/NTSC of three lines.
- Frequency response: 100 Khz – 5.5 Mhz ± 1 dB
- K factor: K_{pb} < 2%
  K_{2T} < 3.5%
- Differential Gain: 2º
- Differential Phase: 2%

[2] During the auto set-up it control the chanel R G B in parallel.

1.4.4. CHROMINANCE

- Saturacion control: ± 6 dB
- Subcarrier oscillator lock in range: 300 Hz
- Luminance-chrominance delay: < 50 Ns

1.5. GENERAL

Enviromental Characteristics:

- ♦ Warm-up : 20 minutes to meet specifications.
- ♦ Temperature range:

  From 15 to 40 ºC (TO MEET SPECIFICATIONS)

  From 0 to 45 ºC (OPERATING ONLY)
- ♦ Relative humidity: 0 to 90 % non considensing @ 40 ºC
- ♦ Altitude : ≤ 3000 m.
- ♦ X-ray emision: < 0.1 mR/Hr @ 5 cm monitor outside surface.

- Power
  - ♦ Voltage : 110 / 220 V_{AC} ± 20%
  - ♦ Power consumption: 85 W
- Dimensions:

	Height	Width	Depth
Model 14”	256 mm. (6 UR.)	417 mm	470 mm.

- Weight: 19Kg.

1.6. INSTALLATION

1.6.1. Previous Inspection

After having removed the equipment from its original packing material, check for visible signs of damage which may have occurred during shipment. Report any shortage or damage to the freight carrier and ***KROMA*** or its representative inmediately.

Check that you have received the following accessories with the monitor:

- AC power cord, and
- User´s Manual.

If the equipment has to be reshipped to a long distance, it is recommended to use the original packing material in order to avoid damages during transport.

1.6.2. Safety Information

For electric shock protection, it is necessary to connect the chassis to a protective ground; to this purpose, the earth ground terminal of the plug is directly connected to the metal part of the monitor (green-yellow wire). Insert the power plug in a mating outlet with an earth ground contact.

Due to the presence of high voltages inside the equipment, the same can only be open, adjusted or repaired by QUALIFIED PERSONNEL.

1.6.3. Connection to the Main

Before connecting the monitor to the mains, check that the mains voltage corresponds to that indicated in the voltage selector located in the rear panel, next to the mains connector.

If the mains voltage presetting is not the appropriate, carry out the change by removing the fuseholder and turning it until the desired value is shown in the window.
Fuses should be changed in accordance with the mains voltage presetting used, as per the following table:

POWER	FUSE
220 V	3.15 A Slow
110 V	4 A Slow

1.6.4. Location

Due to the CRT´s sensitivity to magnetic fields, avoid installing the monitor near this type of disturbance sources such as: Loudspeakers, electric motors, transformers, etc.

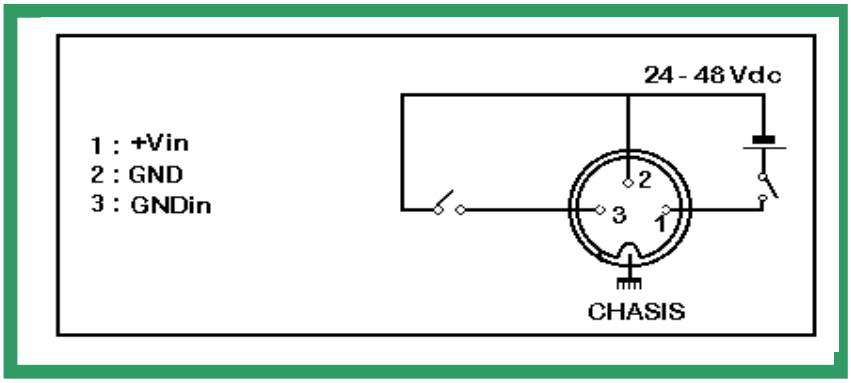
The monitor has a dagaussing device incorporated which operates automatically when the equipment is switched on. It can also be activated manually from the front panel controls.

If the monitor is changed of location, some colour impurities may occur due to the variation of the earth magnetic field. This problem disappears by activating the degaussing circuit with the DEG key.

During the time this operation last, avoid placing near the monitor items which have magnetic information such as: tapes, cassettes, cards, etc.

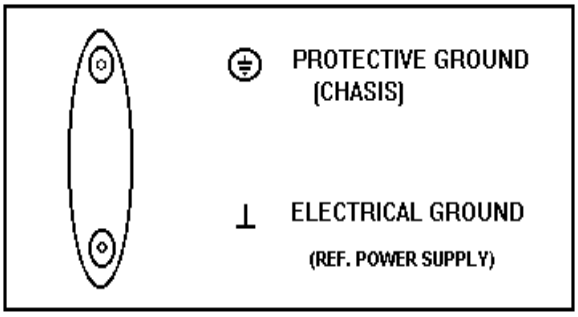
1.6.5. Tally Lamp

This lamp, located on the monitor´s front panel, can be activated with voltages within the range + 24V and + 48 V, or by closing of the contacts 2 and 3 of the connector located in rear panel. (SEE FIGURE).



1.6.6. Ground Terminals

There are two ground terminals: protective ground and electrical earth or ground from the power supply. They are normally connected by means of a metal jumper, but they can be isolated one another by eliminating said jumper, in case it is necessary to avoid hum pickups due to the installation.



1.6.7. Remote Control Connectors (RS-485 Interface)

They are located at the rear of the video unit. The connectors, in loop through configuration, are prepared for connection of the *KROMA* RK-5400 remote control.This connector, are also useful for to update the futures software versions

Configuration

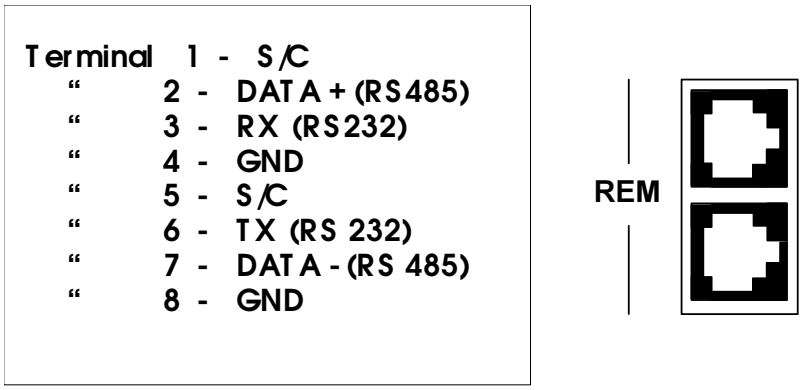
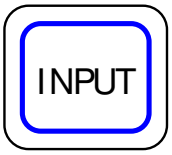


Figure 1

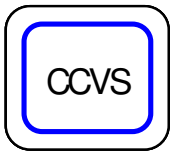
2. INPUTS SELECTION

2.1. INPUT key



This key allows the selection of diferent inputs, by consecutive key presses. The number of states, or possible inputs, it relys on the assignment that it has made. This could change between one and nine inputs.

2.2. CCVS Key



Key for the selection of one of the available composite inputs A , B and C. (C input is only possible if the SYNC key is in the OFF mode).

The first time that is pressed appears the current and in the second time will switch the input at following. The number of states will be 2 or 3, relying on the state of the SYNC key.

This will be only possible if the Decoder CCVS option is installed.

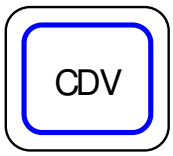
In BM5314A13 monitor there are two input A & B.

When this key has been pressed will appear the message:

INPUT: CCVS X

it will disappear lapsed a few seconds, or pressing ESC key.

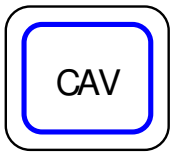
2.3. CDV key



The operation of this key is similar to CCVS key, but in this case it will allows the selecction between digital video input S1 and S2.

To press this key it will appear the message: S1 or S2 that will disappear lapsed a few seconds, or pressing ESC key.

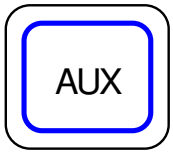
2.4. CAV Key



This key allows the selection between analog component input RGB and YPrPb YPrPb YPrPb. It will disappear lapsed a few seconds, or pressing ESC key.

It is not available in the BM5314A13 model.

2.5. AUX Key

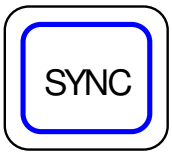


Similar operation to the CCVS key, but in this case it will allow to select between AUX RGB and AUX DEC video (only with installed option Decoder CCVS). When we select AUX RGB the signal to the BNC in the front panel of monitor drives the signal to the three guns (R G B) at the same time and therefore we will see a black and white image.

Afterpressing this key, it will appear the message AUX RGB or AUX DEC, that will disappear lapsed a few seconds, or pressing the ESC key.

3. AUXILIARY FUNCTIONS

3.1. SYNC Key



Key for the selection of internal or external sync. However this function can be enabled by programming of the this option in sub-menu, in this case the input CCVS C could be selected with the key CCVS, as a third analog video input.

After pressing this key, will appear the following messages:

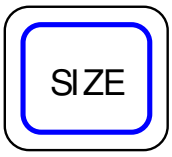
SYNC: INT or SYNC: EXT

Or:

SYNC-KEY OFF

The messages disappear lapsed 4 seconds or pressing ESC key.

3.2. SIZE Key



Key to select between overscan,normal size and underscan reduced size at 95%:

This selection is possible, as much being programed the monitor with an aspect ratio 4:3 or 16:9 (See menu options).

After pressing this key, will appear the following messages:

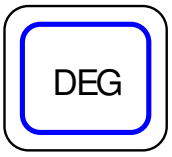
SIZE: NORM 4:3 or SIZE: U/S 4:3

Or:

SIZE: NORM 16:9 or SIZE: U/S 16:9

The message disappears lapsed 4 seconds, or pressing ESC key.

3.3. DEG Key



Key to manually degauss the monitor CTR.

Indirect action by means of relay microprocessor controlled.

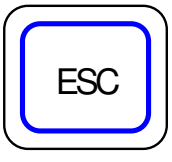
- Time of activation: 4 seg.
- Minimal time for the next activation after the degaussing > 5 min.

After pressing this key, will appear the following message: DEGAUSSING

3.4. STS (STATUS) Key

This key allows the programming of the internal parameters of the monitor through menus. In the Status menu, this key operates in recurrent mode. When pressed, are displayed the configuration parameters or return to the main menu (STS).

3.5. ESC Key

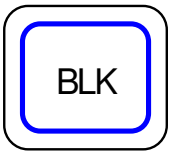


This key will allow us to return to previous menu and interrupt procedures. When you return from the previous menu or shown some

of the controls (BLK, CNT,...), if any parameter has been modified,it will save in static mode in the working memory.

4. COMMAND KEYS FUNCTION

4.1. BLK KEY (BLACK LEVEL/BRIGHT)



By pressing of this key from the normal mode, a message appears in the screen, indicating the current value of the black level, (Brightness) and if the value has been calibrated or not.

BLACK LEVEL 00 CAL or BLACK LEVEL +10 UNCAL

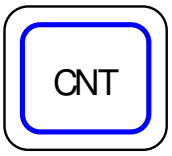
Starting from this instant are entered in the modification mode of this value by means of the ORE[3], increasing in the clockwise and decrease in counterclockwise.

The maximum BLK valor is +20 and the minimum is -20.

If being in this mode of work, the CAL key is pressed , the value of the black level is updated regarding the calibration value (see Appendix A), also is possible to reach the calibration value by means of the ORE(3).

The exit from this mode of control of Level of Black (Brightness), to normal mode (without messages in screen) it is performed: automatically, after 4 seconds without pressing any key or manually by pressing ESC key.

4.2. CNT (CONTRAST)



Similar behavior to the described above, for BLCK but concerning to the gain of the final video amplifier (Contrast).

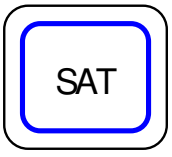
The messages that could appear are:

CONTRAST 030 CAL

or

CONTRAST 030 UNCAL

4.3. SATURATION/COLOUR



Similar behavior to the described above, for CNT but concerning to the gain of the decoder´s chrominance amplifier.

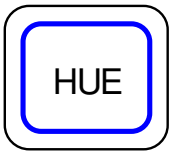
This key acts on two parameters. If the active input signal is NTSC, the system internally will select the saturation of NTSC, modifiying this value. For any other system will adjust the same parameter automatically, the system of the active signal is detected and adjusts the control of saturation.

The messages that could appear are:

SATURATION 030 CAL or SATURATION 030 UNCAL

[3] ORE: Optical Rotary Encoder

4.4. HUE/TINT (NTSC only)



Similar behavior to the described for BLCK concerning to the chrominance phase regarding to the *burst* in the decoder. Because is a parameter of the NTSC system will only be permitted their modification when the active signal corresponds to this system.

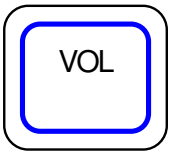
The messages that could appear are:

HUE 030 CAL or HUE 032 UNCAL

Or

NO AVAILABLE If the connecting signal is not NTSC

4.5. VOL (VOLUME)

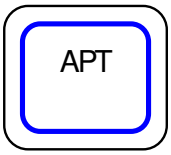


It allows to control the audio volume, when the SDI option is installed. (Only available with composite input PAL or NTSC).

If this key in a monitor not equipped with the SDI option is pulsed will appear the message: NOT AVAILABLE.

However, the operation of this key is programmable and it has associated a specific function configured through menus. The program is volatile, that is to say, it should be activated every time that the monitor is powered..

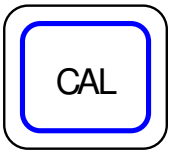
4.6. APT KEY (APERTURE)



It allows to control the transitory response of the luminance channel of the decoder in order to enhance, if it proceed, the "fine"details of the image, or attenuate the possible noise in this band (2.8 Mhz/ NTSC- 4 Mhz/ PAL approximately).

4.7. CAL Key

Two operating modes:



1. When CAL is pressed, being in one of the modes: BLCK, CNTR, APT, HUE or SAT,the behavior is the described already.
2. The monitor utilizes different menus on those that there is diverse active options. With the ORE select the option and with the CAL key executes the selected option.
3. In Calibration of values in SETUP MANUAL.

5. INDICATORS

5.1. UNCAL LED

This LED is kept activated (Red LED lit) if any of the variables:BLK, CNTR, APT, HUE or SAT, has a different value of the calibration.

In order to proceed to the calibration of this variable, see previous paragraph, and the behavior of the CAL key with the modes BLCK , CNTR, APT, HUE or SAT.

6. MENUS OPERATION

The STS key shows the STATUS menu through the which gives up pass to all the sub-menus, which they allow to configure all the parameters and functions from the monitor.

6.1. STATUS MENU

When the STS key is pressed from the normal operation mode, the following menu will appear:

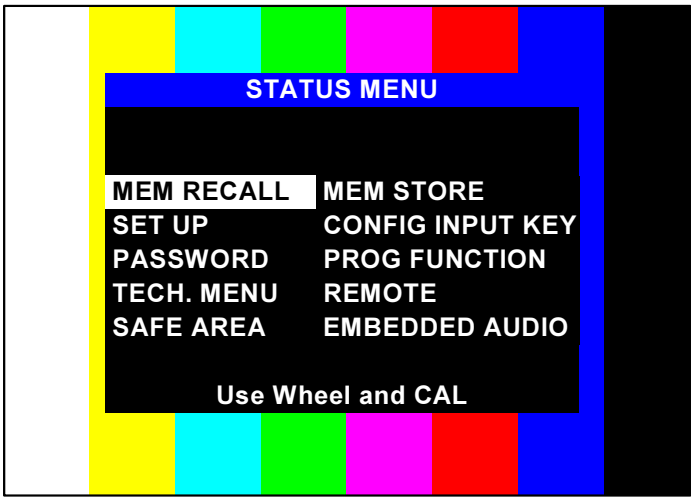


Figure 2

The different options selection is carried out by means of the O.R.E. (Optical Rotary Encoder), and in order to activate the function we will press CAL key.

6.2. MEMORY RECALL MENU

It allows to load in the working memory the content of whatever of the existent memories in the monitor (USER 0, USER 1, USER 2 or USER 3 or SYSTEM).

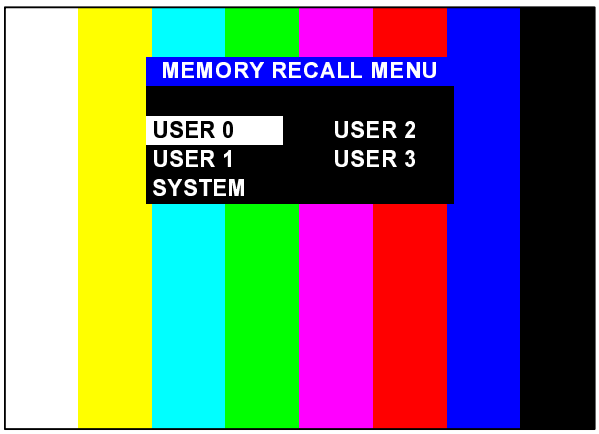


Figure 3

In order to select the memory wanted to recover, we must press CAL in order to transfer the content as active value.

6.3. SET UP MENU

From this menu it could be modified and adjust the parameters of the GRAY SCALE (LL/ HL and intermediate values) and the SET UP values of BLCK, CNTR, SAT, HUE, VOL and APT.

When selecting this menu will appear the following sub-menu:

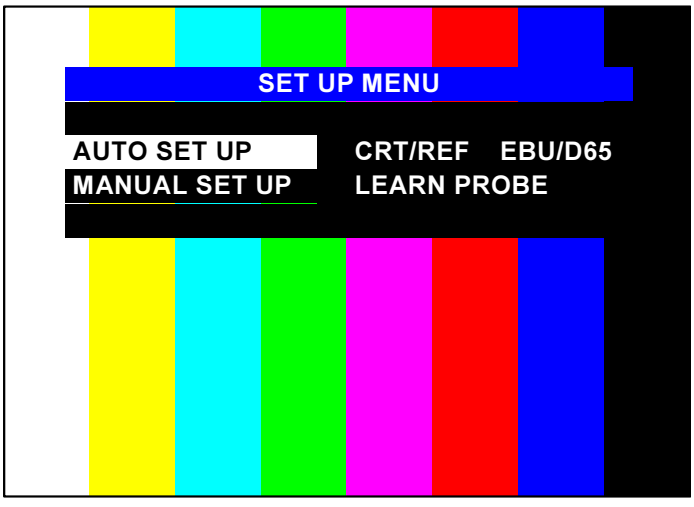


Figure 4

6.3.1. AUTO SET UP option

It can be carried out, by means of the set Generator/ Analizer KROMA DG5400 and probe AK4400X50 especially designed for this use.

When CAL key is pressed, will appear a flashing message in the lower line, requesting the technical password. If the password is correct, the system will permit pass to one of the auxiliary inputs, (AUX RGB or AUX CCVS). In the same menu, will appear the message "SELECT INPUT: AUX CCVS however; you could select any of the available inputs by pressing the keys associated to the inputs (AUX, CCVS, CDV).

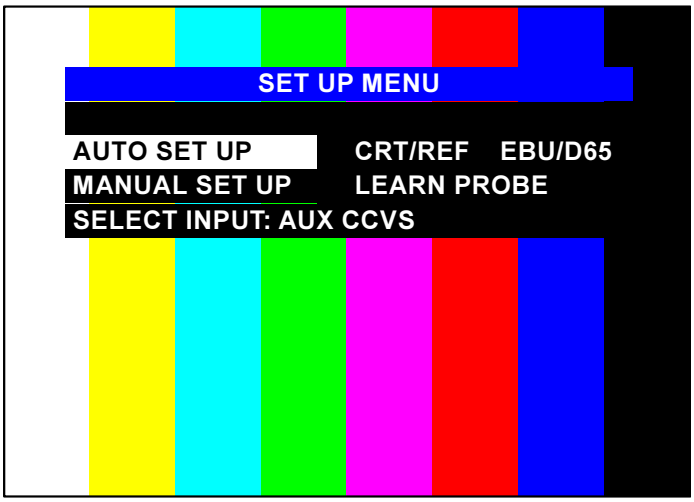


Figure 5

In order to obtain an accurate adjustment, the monitor carries out a different adjustment for the digital inputs. For this purpose select one of the digital inputs (S1 or S2) and the system will carry out an independent adjustment of any another input. In this mode, when you change a digital input, the system will program the values of HLs and the LLs ,corresponding to the digital adjustment. Consequently, will note a better response of the monitor.

Independently of the type of input selected, this should coincide with the DG5400.

Once selected the input signal and the phosphor reference, press the key CAL in order to start the adjustment. If during any step you doubt of any parameter, you could stop the process by pressing ESC.

Next, it appears the message: "PUT PROBE & PRESS CAL.", put on the optical probe on the center of the screen and fix it to the center of the window that it will appear after a short time. Starting from this moment and during the adjustment time, don´t move the probe and not disconnect the A.S.U connector. because it will block the system owing initiate again the monitor. However, their parameters won't be affected.

The adjustment is finished when appears the message: "Ok. AUTO SET UP SUCCESSFULLY"

Once completed with success the adjustment, also there will be exist auto-calibrated in the working memory . If you desire to keep the adjustment you could use one of the four memories (See MEMORY STORE MENU).

The adjustment procedure informs about several events that don´t allow carry out it correctly. The messages are the following:

- "CANNOT CONNECT":
- "UNCOHERENT DATA":
- "Not CONVERGED": it could be originated by different causes, the most common is the input level of the signal. Check the termination switch (HP/75Ω)

The conclusion reached are:

- White D 6500 ± 200 ºK or another optional (see SEL CRT/REF)
- 0.5 NIT for window signal with 10% APL
- 90 NITS for window signal with 100% APL

6.3.2. CRT/REF option

With this option you will select a group of parameters as reference for an Auto Set Up, or to specify the group that will be modified when you select the option LEARN PROBE.

With the CAL key, you will select in cyclical mode, one of the 4 groups of parameters. Three of these are identified with the model of a C.R.T. and one of them has been reserved for the user.

6.3.3. LEARN PROBE option

With this option you will store some characteristics of colorimetry in the meter in order to adjust other monitors in the same conditions. For example, if the conditions of brightness of your study modify the subjective perception of the colour of the monitor, or you prefer a tendency toward a determined colour; then, you modify manually the characteristics of a monitor in order to take it as reference. Next, you utilize one of the four groups of parameters with the option CRT/ REF, with preference, the group of user (USER) and select the option LEARN PROBE with the key CAL.

The operation of this option is similar to AUTO SET UP. You will have connected a DG5400 generator with specific[4] “patterns”, in order to make the learning. Likewise, it will request you a technical password and will also to put the measuring probe on the screen and press the CAL key in order to start the process or ESC in order to stop it. Due to the risk of data loss the operation, this should only be carried out for technical personnel.

This operation is longer than the AUTO SET UP and it is essential don't move the probe during the process.

6.4. Option: MANUAL SET UP

When you select this option MANUAL SET UP from the SET UP menu,you would be able to adjust all the monitor parameters values, as much the current values as the calibration values. ie: CNT, BLK, SAT, VOL, APT and HUE; as well as the parameters LL´S and HL´S or grey scale, and the geometry.

[4]Three windows 100% red, green and blue.

Once selected this option will request the technical password with four digits code.

If correct, we will enter in the following menu:

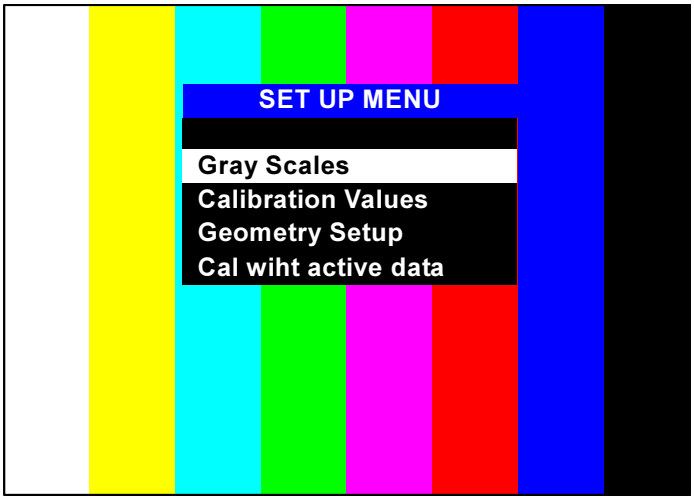


Figure 6

6.4.1. Option: MENU GRAY SCALES

By selecting this option, you may carry out a manually adjustment, of the current biasing levels, of the cathode of the CRT (LLs) and the gain of the RGB video amplifier, (HLs).

The new menu will be the following one:

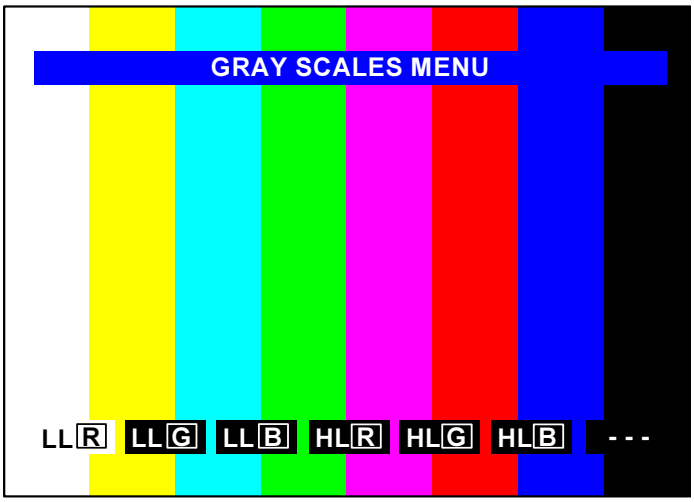


Figure 7

Once selected one of the options the symbols (_ _ _) located in the right hand of the lower part of the screen going to indicate the value of the state of the variable. If the CAL key is pressed again then will be stored the last current value, the dashed lines appear again and one may select another variable.

On the other hand, if ESC key is also pressed, will store the modified value of the variable but it will return to the previous menu.

6.4.2. Option: MENU CALIBRATION VALUES

In this menu we could modify the associate parameters to the primary controls of the monitor.

The menu from wich one we could modify the parameters is the following one:

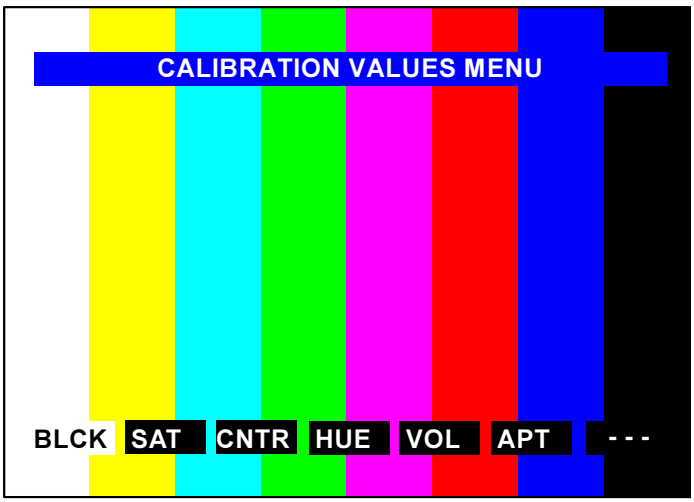


Figure 8

The operation is the same as in the previous case, the dashed lines, of the right hand in lower part of screen, when pressing CAL, they will give the values of the variable. However, there are parameters with some particularities that are kept in mind:

1. **The Saturation (SAT):** The monitor detects if you are viewing a (PAL, NTSC or SECAM) system signal, in whose case will modify the associate parameter to this system. In any other case always the parameters represent the saturation.

2. **The Volume (VOL):** Although functions exist associated to the VOL key, the system of control won't give you access to this variable, except for the monitor carries incorporate the audio digital input option.

3. **The Hue Option**: It will only has access, if the active input signal is NTSC.

4. **The Aperture (APT):** it will only give access to modify their value if the monitor incorporates the option.

6.4.3. Option: GEOMETRY SET UP

By means of this menu could be modified the parameters in relation to the format of the picture, and another with more technical content.

The menu through the one will be able to carry out the change is the following:

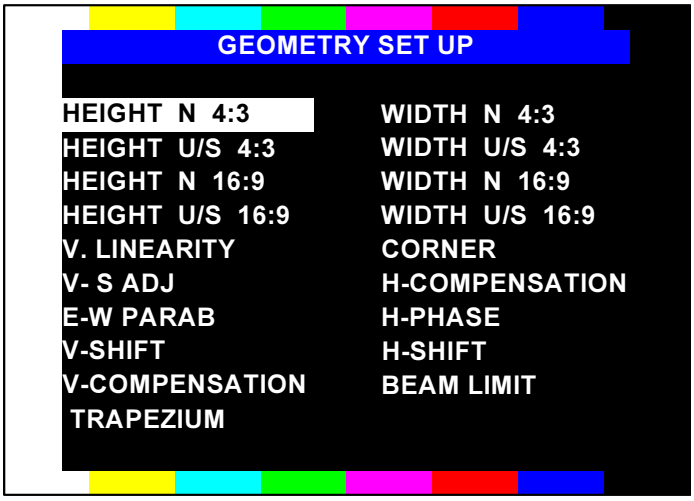


Figure 9

In order to modify a parameter, this will be selected, with the ORE help, and we press CAL key, then will appear in the lower line of the menu: the name and the value of the parameter, at the moment it is updated in the monitor. In the same way that in the previous menu, the operation of both keys CAL and ESC are the same.

This option provides access to the adjustment of all the variables involved with the monitor geometry alignment.

6.4.4. Option: CAL WITH ACTIVE DATA

With this option you could convert all the active parameters values in calibration values, this option is very suitable after carrying out an adjustment and before of saving the data in one of the user memories.

During the calibration process will appear in the 2nd line of the menu, MANUAL SET UP MENU the message: "UPDATING."

6.5. Option: CHANGE PASSWORD MENU

This new option allows us to change the access password for the several menus. When we selected this option, it will request the old access password, by default all the monitors start from the factory with the number: 1 1 1 1

Next step, it will request us the new access password and its confirmation of this one. The password could be selected for each user.

The menu that allow us to change the technical key is:

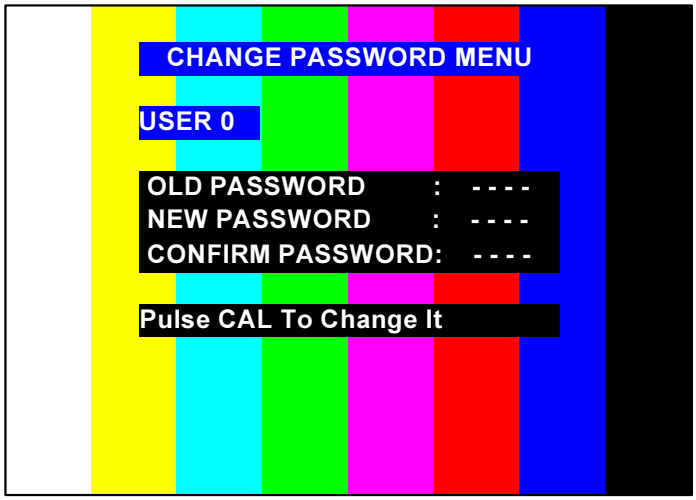


Figure 10

In order to indicate in that phase of the process is, the four dashed lines (- - - -) of the password will be flashing. Also, in proportion as we introduce the characters the scripts they are substituted for asterisks (* * * *).

They are considered forbidden all those password that contain the “0”.

If it has been made correctly, the monitor will show the text "OK," in the last line, if not, it will show "ERROR" and it will return to the main menu.

6.6. Option: TECH. MENU

This menu consist of options reserved to KROMA´s technicians, updatings and specific operations.

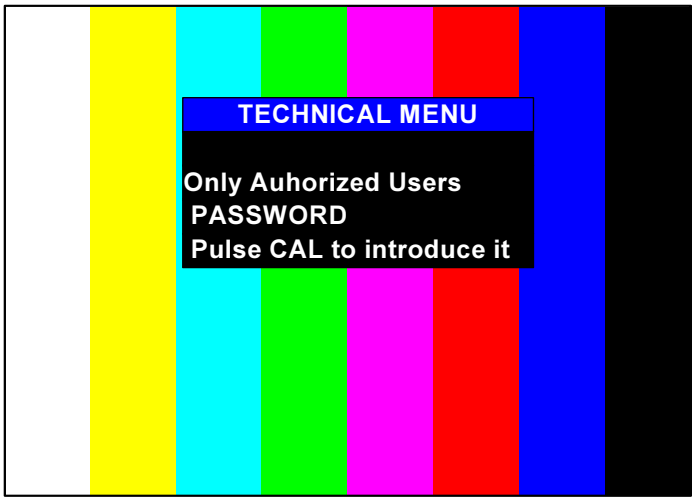


Figure 11

6.7. Option: SAFE AREA MENU

The menu where you will find options in order to configure the "safe area" it is the following:

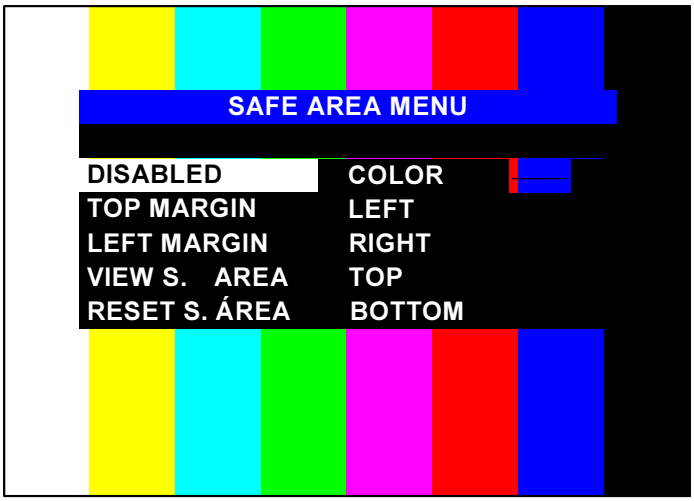


Figure 12

Next they are detailed each one of the menu options.

6.7.1. Option: DISABLED

In alternated mode, you could activate or disable the "Safe Area" by pressing the CAL key.

There are several conditions so that don't appear the "Safe Area":

1. Message "NO SYNC" active.
2. Identification number of monitor activated
3. Any message on the screen.
4. Be modifying menus.
5. Incorrect programming. Use the RESET S.A. option in order to begin the "Safe Area".

When they are activated so much "Grid" as the "Safe Area" it will have priority the "Safe Area".

6.7.2. Option: TOP MARGIN

We understand for "Safe Area" a closed frame that defines an area. The option TOP MARGIN determines the distance between the superior margin of the image and the superior border of the frame (option: TOP). This parameter permits a more precise adjustment of the frame.

With aid of the ORE select TOP MARGIN and after press CAL key, it will appear the "Safe Area" with the last established conditions. Move the ORE clockwise and couterclocwise in order to adjust the frame in the desired position. Once determined their position pulses ESC in order to validate and store returning to the SAFE AREA MENU.

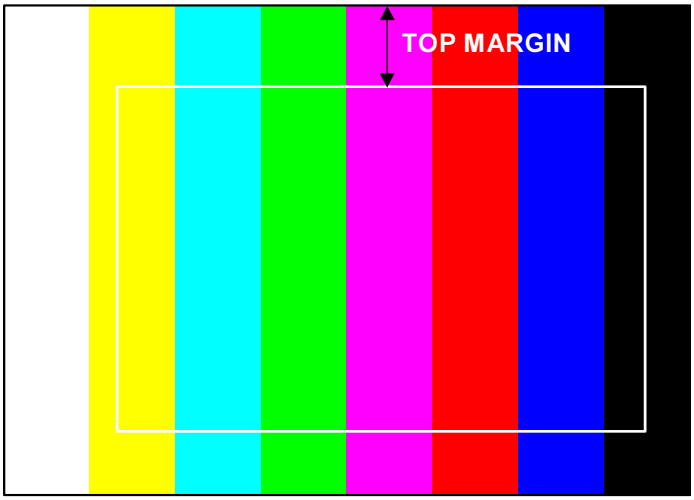


Figure 13

6.7.3. Option: LEFT MARGIN

In the same way as the previous option,it allows to modify a parameter of fine adjustment of the "Safe Area." In this case is the distance between the left limit of the image and the frame.

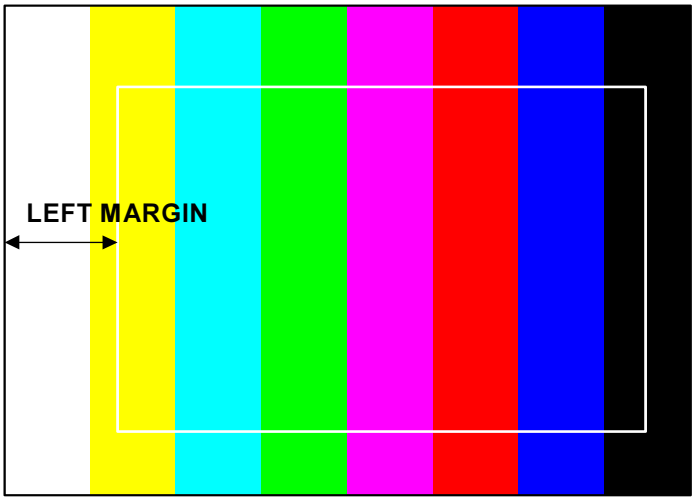


Figure 14

The procedure of adjustment is identical to the one before.

6.7.4. Option: COLOUR

It is possible to modify the "Safe Area" colour for matching the image to the background. Pressing the CAL key, we could choose one of the 8 colours. Associate to the option COLOUR, on the right hand there is a window in order to see the chosen colour.

6.7.5. Option: VIEW

It allows to make a preliminary viewing of the "Safe Area" during some seconds. After returning to the menu: SAFE AREA MENU.

6.7.6. Option: RESET S.A.

If there is any problem with the form of the "Safe Area" or you want to start of some well-known conditions, then you select the option and press CAL so, you will see the "Safe Area" during some seconds and you will memorize the initial conditions. You starting from this instant could modify the parameters in order to adapt the "Safe Area" to your convenience.

6.7.7. Option: LEFT

By selecting this option and pressing the CAL key appears the "Safe Area," with aid of the ORE you could move to left and right, the left side of the frame. When you had selected its position, press the ESC key in order to store ,and return to the menu: SAFE AREA MENU.

6.7.8. Option: RIGHT

With this option you could move the right side of the frame, toward left and right side.

The adjustment procedure is identical to the LEFT option.

6.7.9. Option: TOP

With this option you could move the upper side of the frame towards up or down side.

The procedure of adjustment is identical to the LEFT option.

6.7.10. Option: BOTTOM

With this option you could move the lower side of the frame towards up or down.

The adjustment procedure is identical to the LEFT option.

The adjustment for these last four options is showed in the following figure:

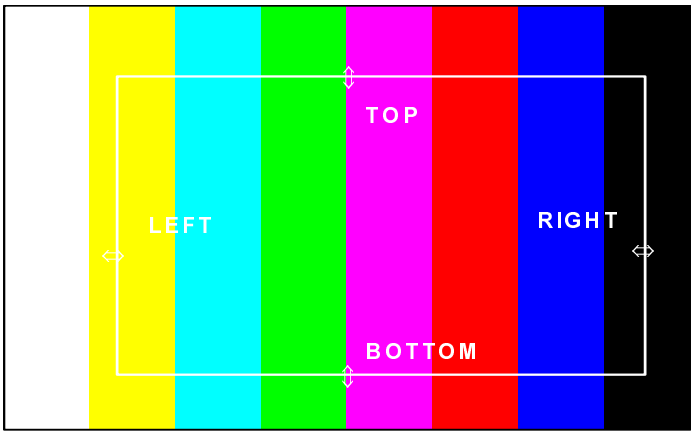


Figure 15

6.8. MEMORY STORE MENU

It allows to store in the working memory, the content of any of of the existent memories in the monitor (USER 0, USER 1, USER 2 , USER 3 and SYSTEM).

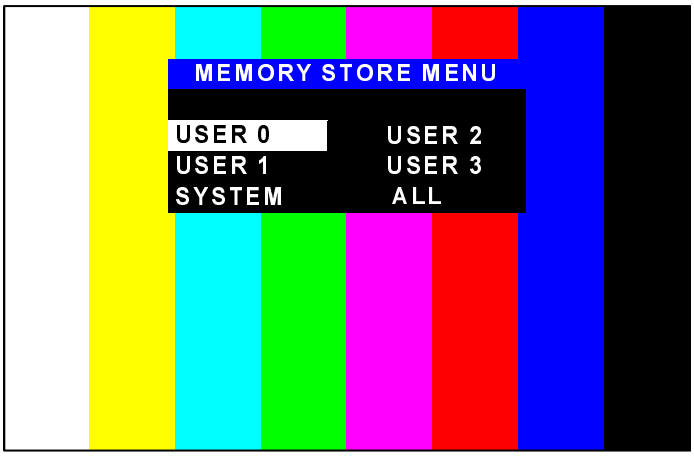


Figure 16

We selec the memory the one we want to store and we press CAL. In all memories it will request us the techical password and while it stores the value will appear the message STORING in mode "Flashing".

The ALL mode will allow to store all the dates in all user memories, in one time.

6.9. Option: MENU CONFIG INPUT KEY

This option allows us to associate to the key "INPUT" a sequence of input change, that later on we could activate on cyclic mode by pressing to this key.

The menu has the following appearance ([1]):

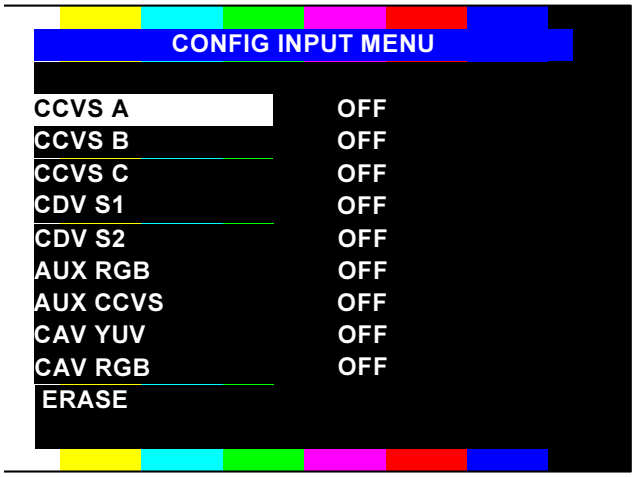


Figure 17

With the CAL key aid and the ORE, we selected the input, that we desire to include in the cyclic sequence. If we press in alternative mode the CAL key on one of the inputs, the ON/OFF message will appear, in order to indicate us if this is included or not.

Example:

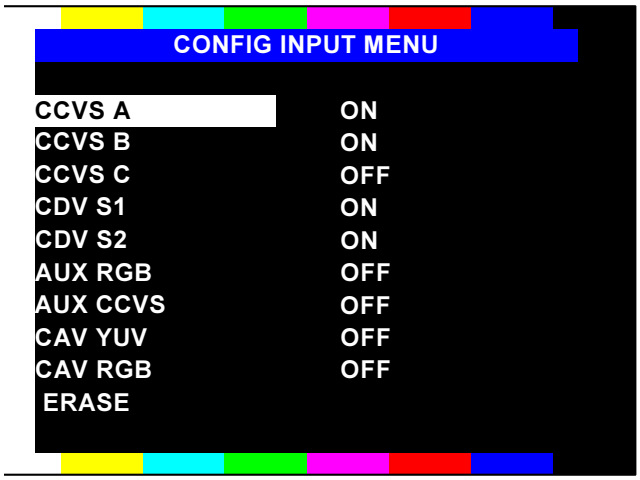


Figure 18

The cyclic sequence of inputs change associated to the INPUT key would be:

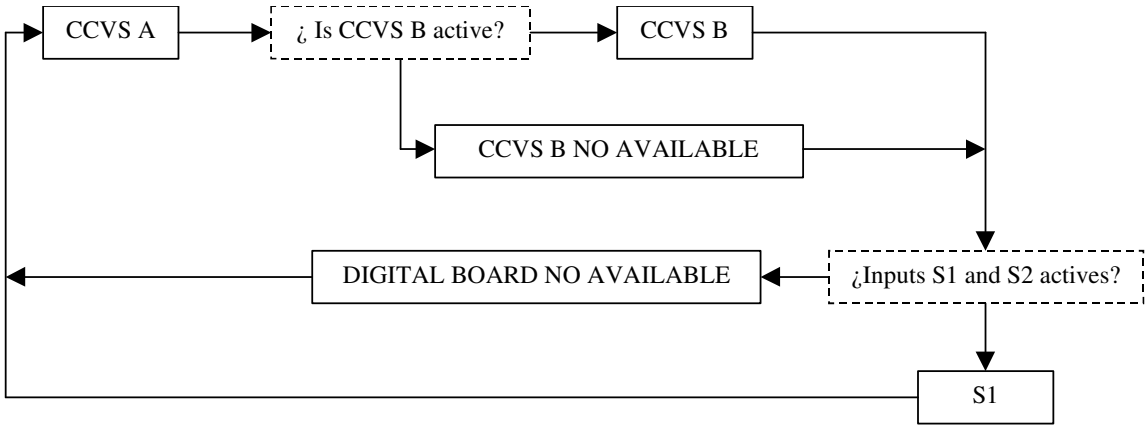


Figure 19

When the ERASE option is pressed, all the inputs are erased from the sequence. Therefore the second time and successives that we pulse the INPUT key will appear the message: "NO CONFIG."

6.10. Option: CONFIGURATION MENU

In this menu some of the monitor actions can be configured. The menu will have the following appearance:

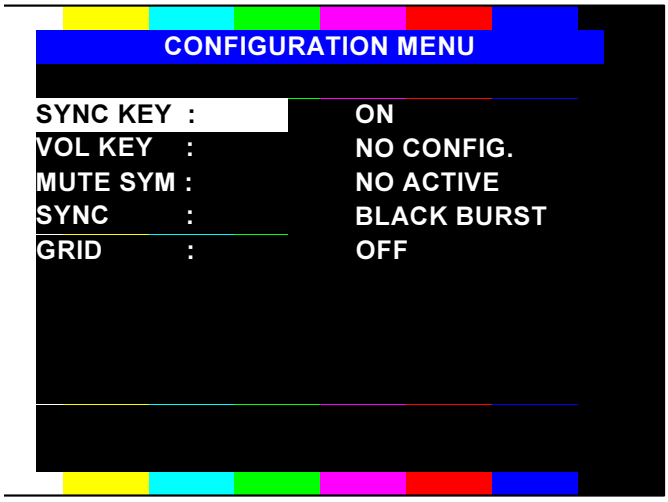


Figure 20

6.10.1. Option: SYNC KEY (Only in BM5314A12 Monitors)

It allows to program the SYNC key in order to switch between internal and external sync or disable it. Thereby, the INPUT and CCVS keys, the BM5314A12 could switch to the CCVSC input, making possible that the external sync input becomes an composite video input.

6.10.2. Option: VOL KEY: VOLUME CONTROL

Pressing CAL we select this option and we are into a new audio parameters menu. This menu shows the different programmings function from the key "VOL".

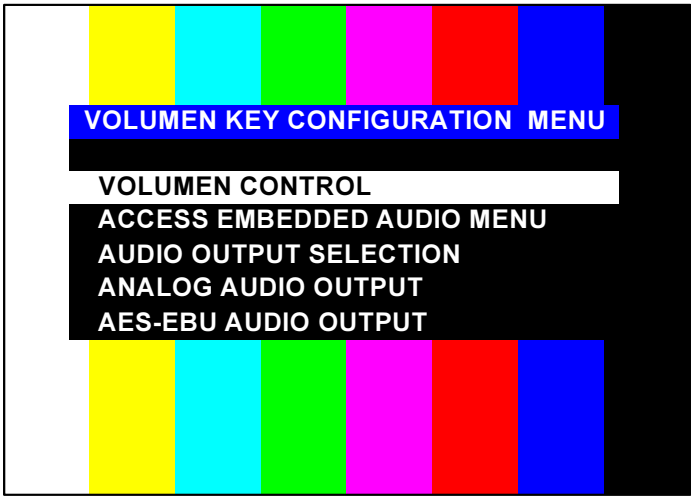


Figure 21

With the first option **"VOLUME CONTROL"**, the"VOL" key and with the "ORE" will become a volume control of the ouput audio.

When we select the second option "AUDIO ACCESS EMBEDED MENU", the "VOL" key will allow us to see the group or groups and channels in each group where there are audio. If the symbol that appear is red color it indicates that the signal of audio present is stereo and if the signal is green is monoaural.

"AUDIO OUTPUT SELECTION" allows to switch a pair of channels, previously selected in “EMBEDDED AUDIO” menu. It affects to the analog and to the digital (AES-EBU) output.

The other two options allow to switch independently the analog and to the digital output.

6.10.3. Option: AFC

It allows to select the time constant of the PLL of the horizontal sync. The options are AFC: FAST and AFC: SLOW.

6.10.4. Optión: SIZE

With this option you will select the aspect ratio of the picture. The two possible options are: "NORM 4: 3" and "NORM 16: 9"

6.10.5. Option:DELAY

It is only on operation when the monitor has inserted the optional SDI video inputs. It allows to to have a delay in Horizonal and Vertical scan of the picture. (“Pulse Cross”). The alternative positions are: NORM and H+V.

6.10.6. Option:MUTE SYM

By means of this option, the “Mute Symbol” can be activated, it must appear in the screen while in the embedded audio option any output is in MUTE position or the volume level is 0.

The possible positions are: NO ACTIVE and ON - OFF

6.10.7. Option: SYNC

This option allows you to select the sync level. You could choose "BLACK BURST" or with a “4 Vpp” standard sync signal.

6.10.8. Option: COLOUR

It selects 3 states that can be switched in cyclic mode with the CAL key:

COLOUR : AUTO

In this situation, the monitor will display colour if the signal has “burst”.

COLOUR : MONO

It displays the image in black and white by suppression of the chrominance signal, maintaining the luminance filter.

COLOUR : FULL BANDWITH

In this case, it will display the image in black and white, but without introducing the luminance filter,so, it will allow to see the image with all the resolution of the signal.

6.10.9. Option: GRID

This option allows to generate a chess of white squares on the picture. Its functionality is an approach in order to hide partially pictures with a reserved content .

You will be allowed that the CAL key can activate this option at the time that it chooses with ORE one of the three sizes of the square (2, 4, 8 or OFF mode), finally this function will be activated pressing CAL key.

This function is conditioned to the "Safe Area," operation, since it is actived under the same conditions. However, the "Safe Area" have more priority and it will block the representation of the "chess" if it is activated.

As difference from other options this can not been configured as static, for this reason it has to be activated every time when you switch on the monitor.

6.11. Option: REMOTE MENU

In this menu appear two options, one of them is common to all the versions later to 1.9. The other option “REMOTE MODE” is associated to particular software versions. When the monitor is selected, it converts in a remote control.

In the normal version, the menu is the following one:

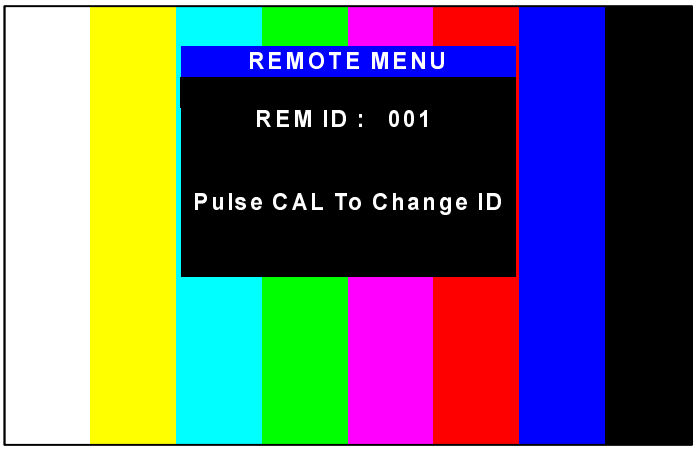


Figure 22

6.11.1. Option: REM ID

It allows to assign to each monitor an identification number that it will be recognized for the remote control, when it is activated.

By pressing the CAL key in this option, it will appear three dashed lines and the identification number of the monitor, the system wait until you introduce the three last numbers of the new identification[5]. If you want to stop the operation, you will press the ESC key.

Once carried out this operation the monitor is identified with this number, for all the remote control functions. When the remote control is activated, the monitor keeps the keyboard functions, but it has preference the remote control. (See remote control RK5000 information/manual).

[5] The possible values go from number 1 to number 128, both inclusively. The INPUT key has associated the value 0.

6.11.2. Option: REMOTE MODE

This option is associated to specific version of "software". When the monitor is selected, it passes to be converted in a remote control. Because of the explanation of this option is associated to a version of "software", it will be included in a separated appendix.

6.12. Option: EMBEDDED AUDIO

This option will be only available when the Digital option BM5014X02 is installed (In monitor BM531A12) or BM5314X02/X04 (In monitor BM5314A13):

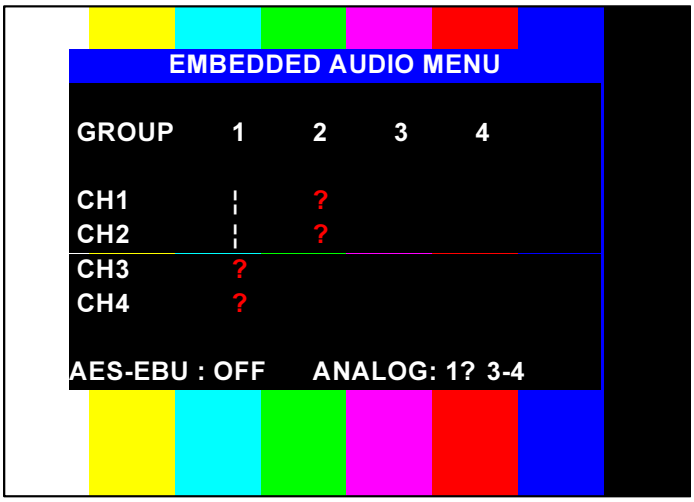


Figure 23

The upper part of the figure indicates the audio signal state, and the lower part is used in order to select the channel to extract.

The columns of this menu indicate the group number of the four possible groups, and in each column can be several marks of reed or green color, that indicate the channels that contain audio and the mode of this one. (Reed→ stereo, Green→ mono).

The AES-EBU & ANALOG output in the lower part, it can be selected with the slider moving the ORE. Pressing "CAL" Key we will be able to select the group and the wished channel.

Pressing ESC it will return to the previous menu and we would able to select another option.

6.13. Option: CONFIG VALUES

This option presents/displays on the screen the calibration parameters values. The appearance of this menu is the following one:

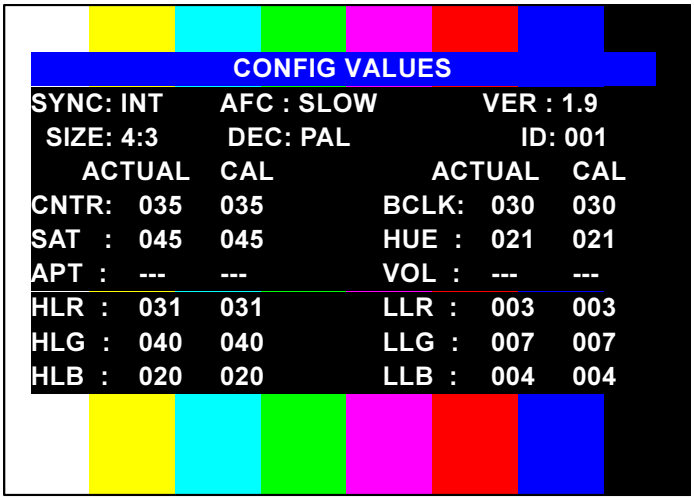


Figure 24

This graphic informs to the user about the monitor parameters values, along with other informative datas.

In order to have access to this menu the STS Key must be pressed twice consecutively.

7. APENDIX

7.1. Apendix A – Memories Structure

In the monitor we have 5 memories of reference:

The SYSTEM Memory can be acceded entering a technical code. And the other four are available to the user disposal, by means of an individualized access code.

In addition, there is a work memory whose data directly control the HW of the monitor and it is modified by the user by means of the front panel, in normal operation.

All the memories have two zones:

1. Technical: It contains LL/HL values of each gun and the BLK LVL, CNTR, SAT, HUE and APT calibration values.
2. Operational: It contains the present value of BLK LVL, CNTR, SAT, HUE and APT, as well as the rest of the front panel control.

The SETUP option from the STATUS menu allows to modify the values for the technical zone in the working memory. By means of MEM STORE option all the content of the working memory is transfered to the choosen memory (0, 1, 2 and 3).

When the user modifies any value from the operational zone, this information remains only in the working memory, it does not happen to memories 0, 1, 2 and 3, unless the MEM STORE option is selected.

In case of POWER OFF the monitor always recovers the state in which it was before the energy loss.

There is a series of recorded data of permanent form and they are not affected by the functions “MEM STORE” and “MEM RECALL” and they are the following ones:

1. Monitor identification number (“REM ID” from the REMOTE MENU)
2. Auto Setup CRT ref.
3. “Software Version” number.

7.2. Apendix B: THE MONITOR AS REMOTE CONTROL

This appendix explains the remote control operation from a monitor.

When you select the REMOTE MODE option in the menu: REMOTE MENU is disabled the input signal and it appear the following control menu:

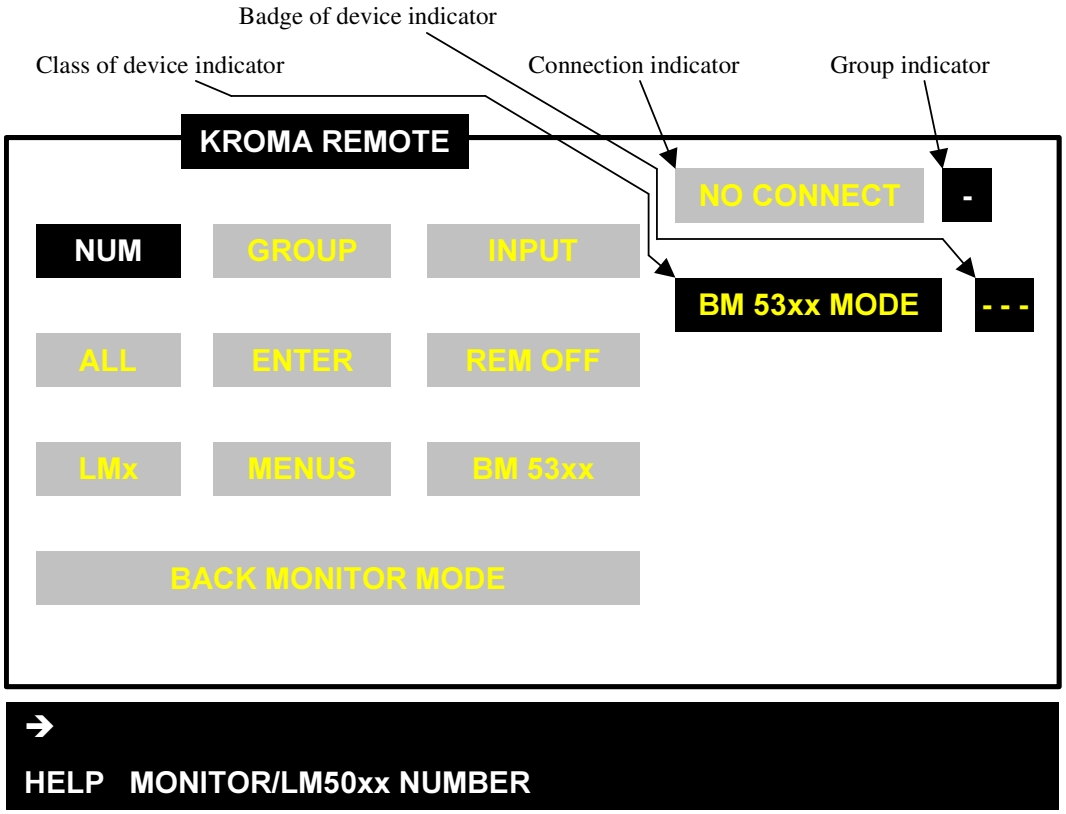


Figura 25

With the ORE aid you could choose one of the nine available options in this menu (NUM, GROUP, INPUT, ALL, ENTER, REM OFF, LMx, MENUS, BM 53xx and BACK MODE MONITOR).

Initially the remote control is programmed in order to connect with monitors BM53xx series. However, it could specify you another type of device (BM44xx, LM5xxx) making use of the options that they will be detailled later on.

In the lower part of the menu, two lines of control appear. In the first one an arrow (➔) appears, in order to indicate that it is the command line. The second line (HELP< message>) is destined to offer an aid message.

7.2.1. Remote Control Indicators

Inside the box and in the upper part of menu there are four windows that will inform us about the remote control state. The purpose of each one of them is as follows:

7.2.1.1. Connection Indicator

When the remote control get to establishing a connection with one or several devices it will inform to the user changing the text "Not CONNECT" for one of the following messages:

1. “CONNECTION” when it refer to an only device. Associate to this message appears in the Badgeof Device[6] Indicator , the identification number of the device with the one we have established connection.
2. "ALL MODE" when the connection settles down with the set whole devices (30 ó 128 according to the device class).
3. "GRP MODE" when is possible to settle down a connection with a group. The group is identified with a number (1~ 9), the one which appears in the Group Indicator[7]

7.2.1.2. Class of Device Indicator

The remote control could work with several types of devices. Each one of these is identified by the remote control with a operation mode. Several modes correspond to each one of the the following messages:

1. Modo: Monitors BM53xx ⇒ The message: BM 53xx MODE.
2. Modo: Monitors BM44xx ⇒The message: BM 44xx MODE.
3. Modo: Monitors LM50xx ⇒ The message: LM50xx MODE.

7.2.2. The Remote Control Options:

7.2.2.1. Option: NUM

When the user wants to control an only device, independently of the series or type that belongs to, and do not exist any connection . Then, pressing the CAL key is requested in the COMMAND line (➔) the identification number[8]. The message will be the following (➔) NUM: - - -

Depending on the device class that the user wants to establish connection, it exists a maximum number of identification. Otherwise, if it is a monitor of the series BM44xx the greater permitted number is 30 (1~ 30) in any other case 128 (1~ 128). If the associates limits to the identification number are not respected, it will be requested again.

In order to introduce a number inferior to 100 you insert first the digit 0 (INPUT Key).

Although you could select with the ORE the options of the menu, while you introduce the identification number these are disabled.

If you want to cancel the operation, introduce a valid number and later execute the REM OFF option.

[6] It is a windows with three scripts on the right top part.
[7] It is a windows on the right of the Connection Indicator.
[8] The 0 has been associated to the INPUT key.

You will observe that upon introducing a valid data, the cursor have been positioned on the ENTER option, press CAL key if you want to establish a connection. When this happen the remote control indicators will be modify at the time that the message of the COMAND line disappears. Also, the options of the remote control will be darkened in order to indicate that you are in Active Control Mode, which ones are detailled later on.

If it is not possible to establish the connection, the program will inform you with a temporal message in the COMAND line. Observe that the cursor remains in the ENTER option and the COMMAND line keeps the identification number that you introduced. It is the moment of revising the connections and check that the identification number in the device coincides with the one you introduced in the COMMAND line (press two times the STS key) Because the cursor is on the ENTER option you could press the CAL key in order to attempt again to establish a connection.

7.2.2.2. Option: GROUP

When the user wants to choose some devices of the same class in order to carry out the same operations on them, the remote control provides the GROUP option (group).

The GROUP option allows to select 1 of the 9 existent groups for each class of device in the remote control.

A group is a numbers list of devices identification. With the MENUS option the user could publish the corresponding list to each group, including or not, each one of the possible identification numbers of in it.

7.2.2.3. Option: INPUT/Func.

When the mode BM44xx is selected, the INPUT option allows to specify to the remote control that the keys associated to the input change of the remote control (INPUT, CCVS, CDV, CAV and AUX), operate of equivalent mode to a keyboard of a monitor BM44xx when in this is wanted to change of input. Because the remote control keyboards and the monitors are not equivalent, the keys of the remote control are recurrent in order to change between the inputs of a same type (Ej: with CAV are changed between RGB and YPrPb).

When the selected option is "Func." The keyboard of the remote control carried out the associated functions at one keyboard of a BM44xx without inputs change.

7.2.2.4. Option: ALL

It is an option that permits a control on all the devices of a same class.

Whenever this option is executed, the remote control will pass automatically to Active Control mode, except if connection of any type already exists.

7.2.2.5. Option: ENTER

This option could carry out two operations:

1. If the remote control is not connected to any device, and an individual device or group has already been selected . Then, upon executing this option, the remote attempt to establish a connection.

2. If the remote control is in one of the states of the Active Control Mode ,this option allows us to change of state. See Active Control Mode.

7.2.2.6. Option: REM OFF (REMOTE OFF)

This option is used in order to disable the connection with any type of device, and also, to locate to the remote control in a well-known state.

7.2.2.7. Option: LMx

It allows to configure to the remote control in order to establish connection with equipments of the LM50xx. series.

7.2.2.8. Option: MENUS

It is an active option whenever a connection doesn't exist.

When the CAL key is pressed it will appear a menu with several operations. In the following figure an example is showed:

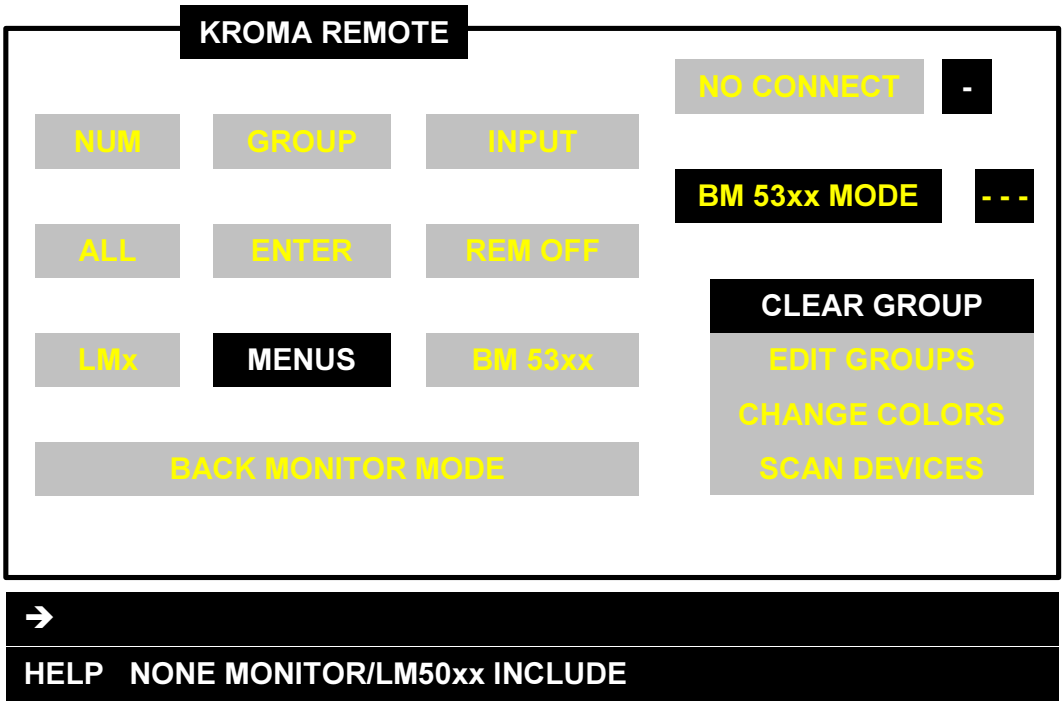


Figure 26

7.2.2.9. Option: CLEAR GROUP

This application request to the user the number (1~ 9) of group in the COMMAND line, later on, it erases statically all the group identification number.

7.2.2.10. Option: EDIT GROUPS

This option permits to the user assign the identification numbers to a determined group. The operations sequence is the following:

1. It requests to the user to introduce a group number.

2. With the ORE and the CAL key aid, the user includes the device identification number in the lists of the choosen group. On the COMMAND line the following messages appear:

```
➔ Group 7 NUM:  001 Included
HELP   EDIT DEVICES OF A GROUP
```

Figure 27

or

```
➔ Group 7 NUM:  001 Not Included
HELP   EDIT DEVICES OF A GROUP
```

Figure 28

3. When you finish editing the group press the ESC key in order to store it statically.

7.2.2.11. Option: CHANGE COLOURS

It allows to the user to change the colors of the Remote Control.

7.2.2.12. Option: SCAN DEVICES

It allow to carry out a scanning by all the devices in order to identify which ones are operative from the remote control.

7.2.2.13. Option: BM53xx / BM44xx

This option allows to indicate to the remote control which class of equipment we want to control.

When we configure the remote control in BM44xx mode, we permit that the INPUT option/ Func, is modified.

7.2.2.14. Option: BACK MONITOR MODE

This option allows us to make that the monitor behaves again as a remote control.

7.2.3. The Active Control Mode.

In this section the operation of the remote control is detailled.

Once Established any connection, it is understood that the remote control is in Active Control Mode.

The Active Control Mode has two states:

1. [State1] When the options menú of the remote control is darkened, then the keyboard of the monitor that behaves as remote control is equal (with the exceptions already well-known refered to the keys) to the keyboard of the equipment that we are connected.
2. [State2] The Active Control Mode has a very similar state that the menu of the remote control, in fact in appearance is the same, except for that the cursor only passes for the options: INPUT, ENTER, REM OFF and BACK MONITOR MODE. And also, in the Connection Indicator the NO CONNECT message doesn't appear.

In order to change between the two states of the Active Control Mode you could use the ESC key. However, the actions carried out upon changing of a state to another they are not the same:

* When you are in [State1] and press the ESC key in order to pass to the[State2], the remote control DOESN´T send any action of ESC to the connected equipment.

* When you are in [State2] and you press the ESC key in order to pass to the[State1], the remote control SEND an action of ESC to the connected equipment.

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