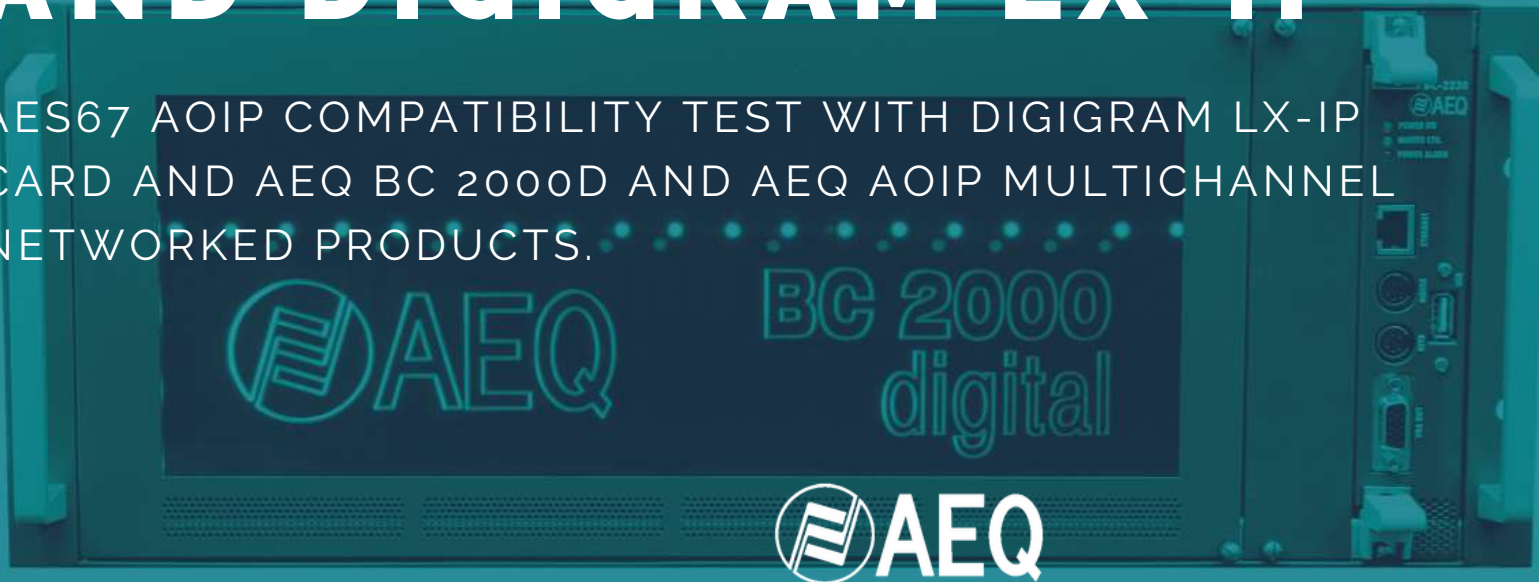




AEQ BC2000 ROUTER AND DIGIGRAM LX-IP

AES67 AOIP COMPATIBILITY TEST WITH DIGIGRAM LX-IP
CARD AND AEQ BC 2000D AND AEQ AOIP MULTICHANNEL
NETWORKED PRODUCTS.



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INTRODUCTION

A series of tests have been accomplished to confirm the AES67 compatibility between AoIP ready AEQ equipment and RAVENNA DIGIGRAM LX-IP SOUND CARD.

This memorandum and quick guide shows how to connect and configure the RAVENNA DIGIGRAM LX-IP SOUND CARD with AEQ's AoIP ready equipment using the Audinate Dante Brooklyn II modules (NETBOX 8/32, CROSSNET, ARENA, B2000D MATRIX, CONEXIA, FORUM, CAPITOL, etc...) using AES-67 AoIP Standard.

For the test was used BC 2000D ROUTER as AEQ test equipment, but all the steps can be extended to any other AEQ AoIP Network connectivity ready equipment using the DANTETM Brooklyn II Modules.

REQUIRED /USED ELEMENTS

HARDWARE ELEMENTS:

PC CONTROL WINDOWS 7 SP1.
DIGIGRAM LX-IP RAVENNA SOUND CARD.
AEQ BC 2000D ROUTER, BC2214 CARD
ETHERNET SWITCH 100/1000 8 puertos.

FIRMWARE & SOFTWARE ELEMENTS:

AEQ FIRMWARE

- BC2214 CARD
- Micro Firmware: 04-10-16. Version 1.30
- BC22X4_MCU_V130.AFU
- FPGA Firmware: 08-11-16. Version 2.17 BC22X4_FPGA_V217.AFU
- AOIP DANTE Firmware: 07-12-16. Version 3.10.1.2 BC22X4_V071216.dnt
-

AEQ SOFTWARE

- MATRIX SETUP 07-03-17. version 1.6.0.28
- MATRIX RTC 07-03-17. version 1.6.0.28

AUDINATE SOFTWARE

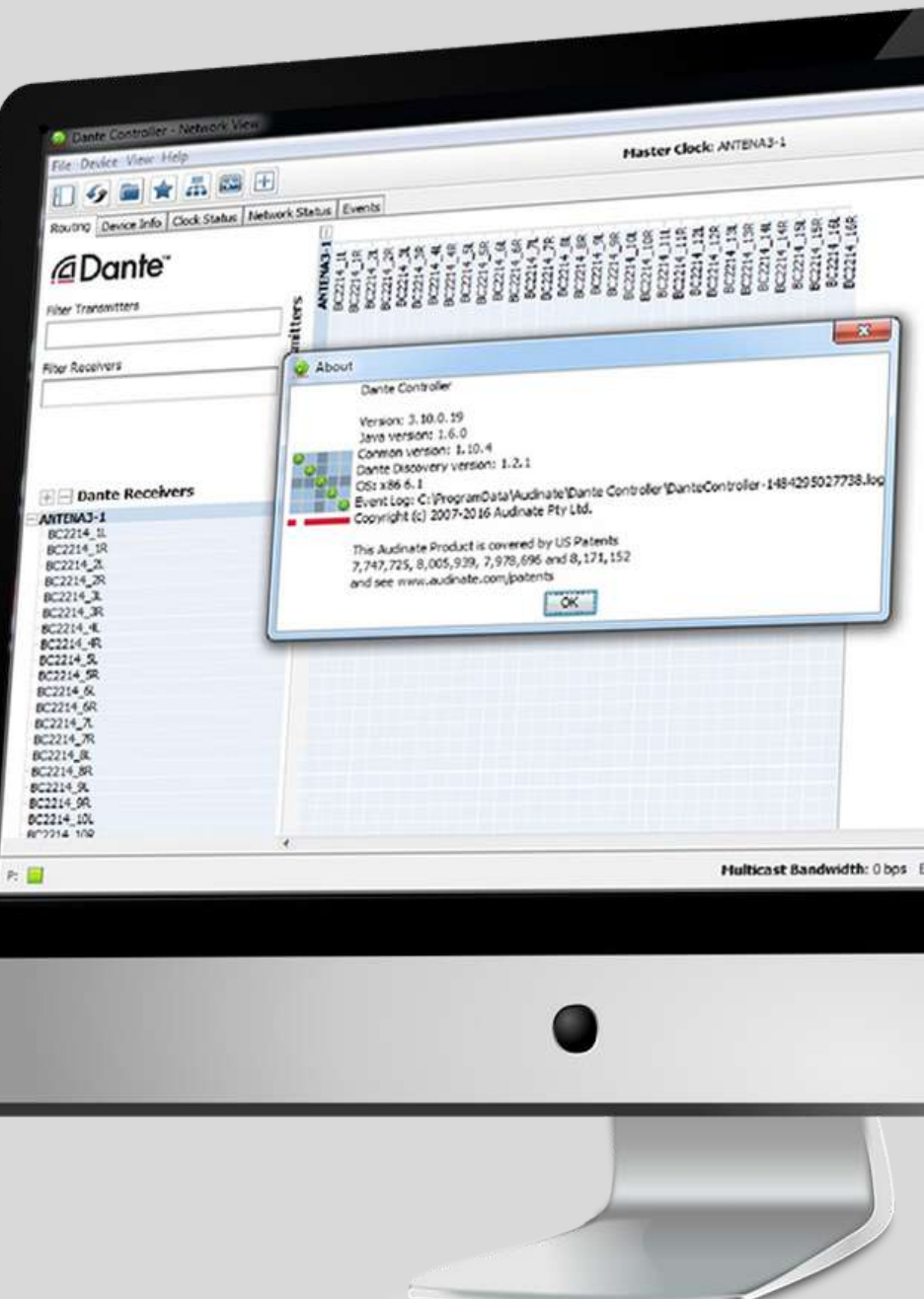
- DANTE CONTROLLER 3.10.0.19
- DANTE FIRMWARE UPDATE 3.10.0.9

RAVENNA SOFTWARE

- RAV2SAP CONVERTER TOOL FREWARE ALCNETWORKX
Version 1.0.0.27

DIGIGRAM SOFTWARE

- LX-IP KIT V.2.0.3



HOW TO CONFIGURE THE SYSTEM, STEP BY STEP:

Obviously all equipment or hardware elements need to be powered.

1.- BC2214 card for BC 2000D router (also called ANTENA 3-1)

Following the user manual, we assign the name of ANTENA 3-1 to the BC2214 card .We configure the BC 2000D as follows; we assume that we have one local network card (NIC) and we configure two address ranges 192.168.x.x for the AoIP network and 192.169.x.x for the BC 2000D control network. For example, we provided the address 192.168.0.1 255.255.255.0 and 192.169.0.1 255.255.255.0 and following the corresponding user manual for the equipment (AEQ Audio Over IP Routing System), we set the following IP addresses for the ANTENA 3-1 card:

CONTROL:

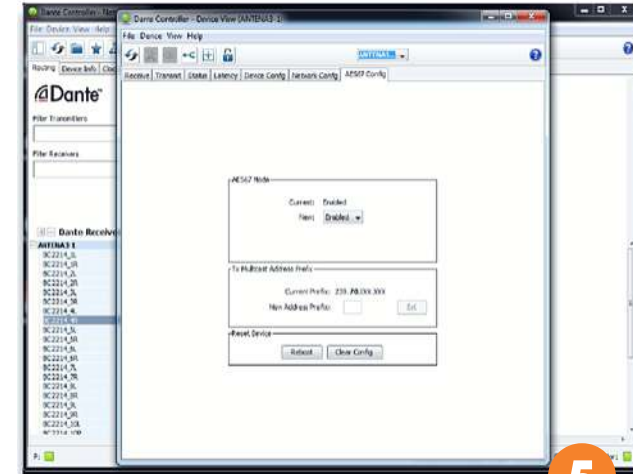
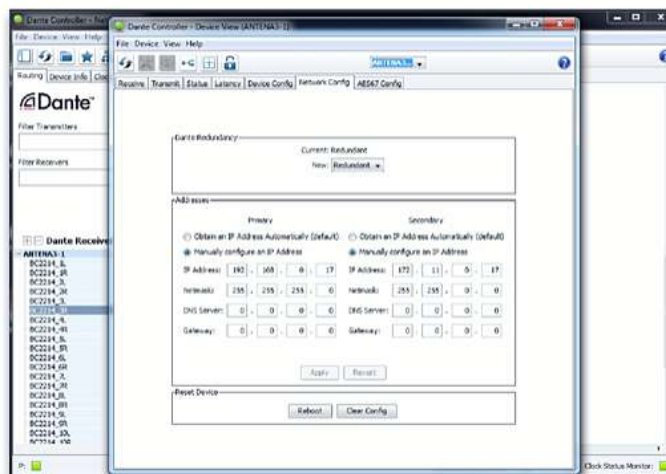
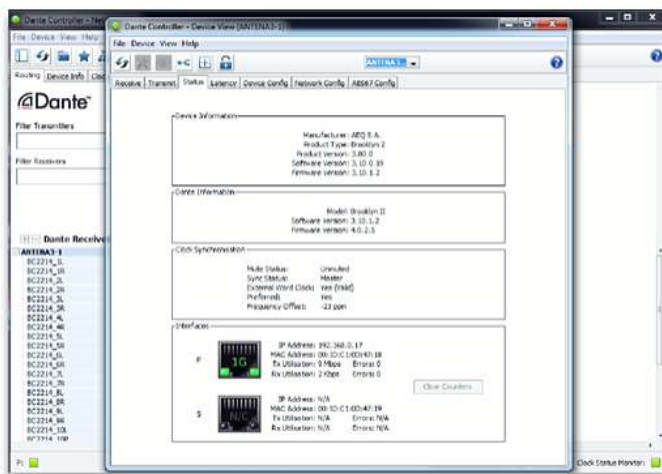
192.168.0.38 255.255.255.0

AOIP:

192.168.0.17 255.255.255.0

1

We execute the DANTE CONTROLLER SW application to register the BC2214 card (ANTENA 3-1) and under the "AES67 Config" tab we select AES67-ENABLED and 239.70.xxx.xxx as a prefix for the TX addresses AES67multicast flows. Once accomplished, we press the reboot key to enable these configurations.

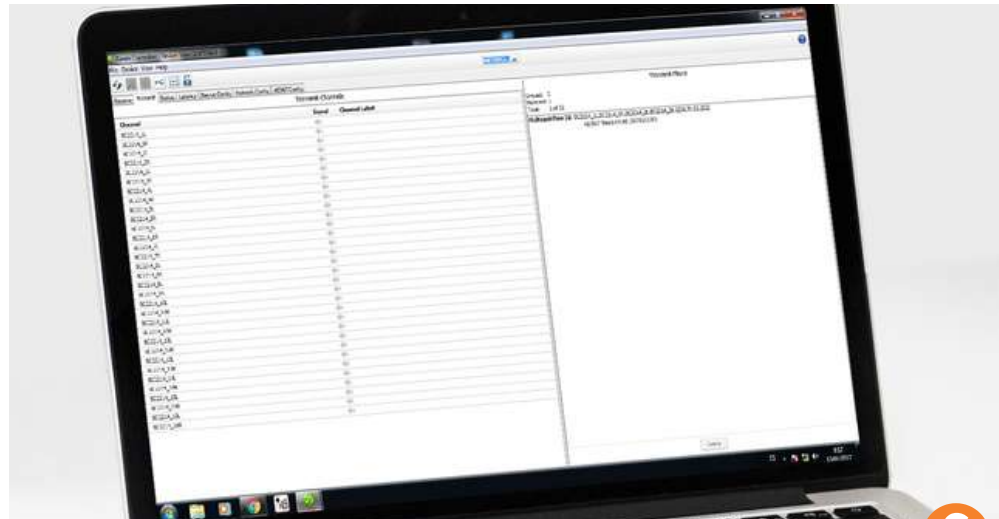
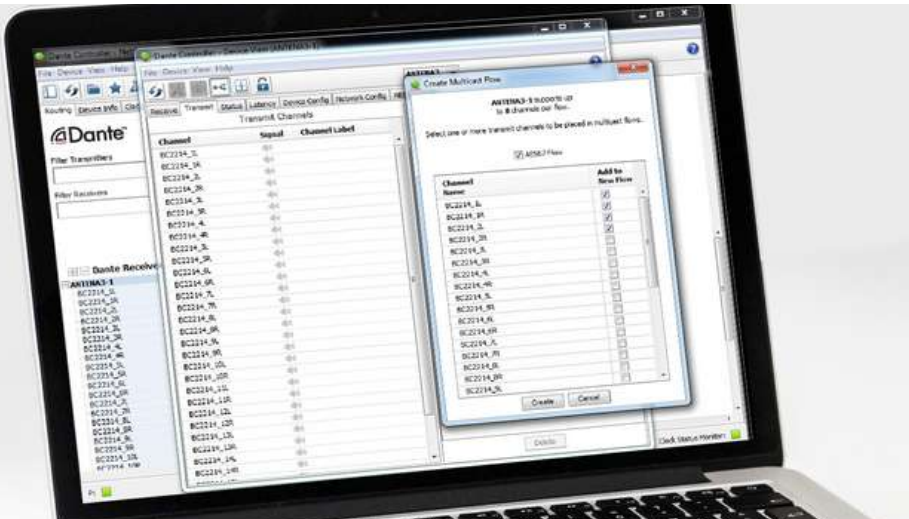


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2 Then we configure the ANTENA 3-1 card as Master PTPV2 under the "Clock Status" tab:

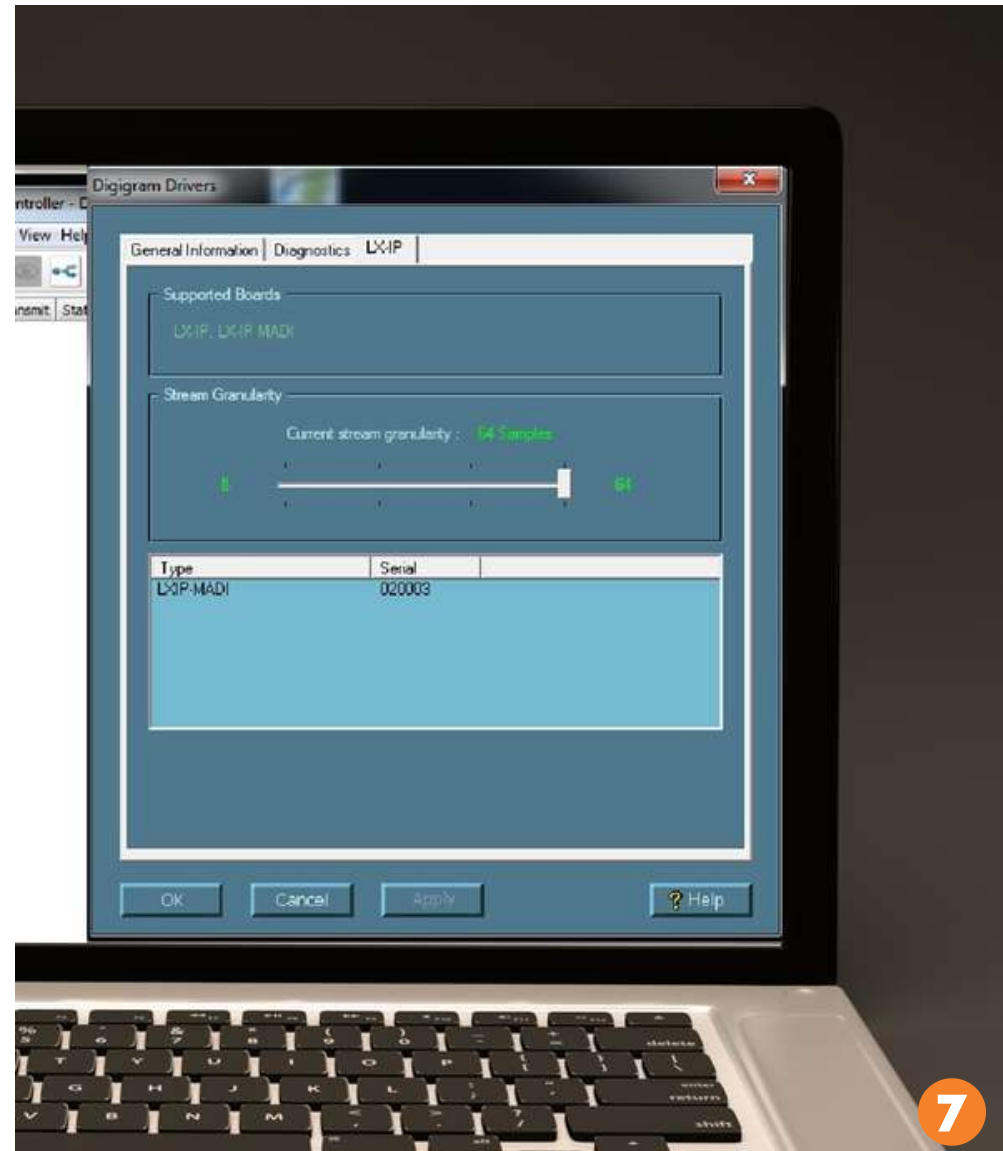


3 We create a Multicast flow using the first 4 Channels of the BC 2214 ANTENA 3-1:



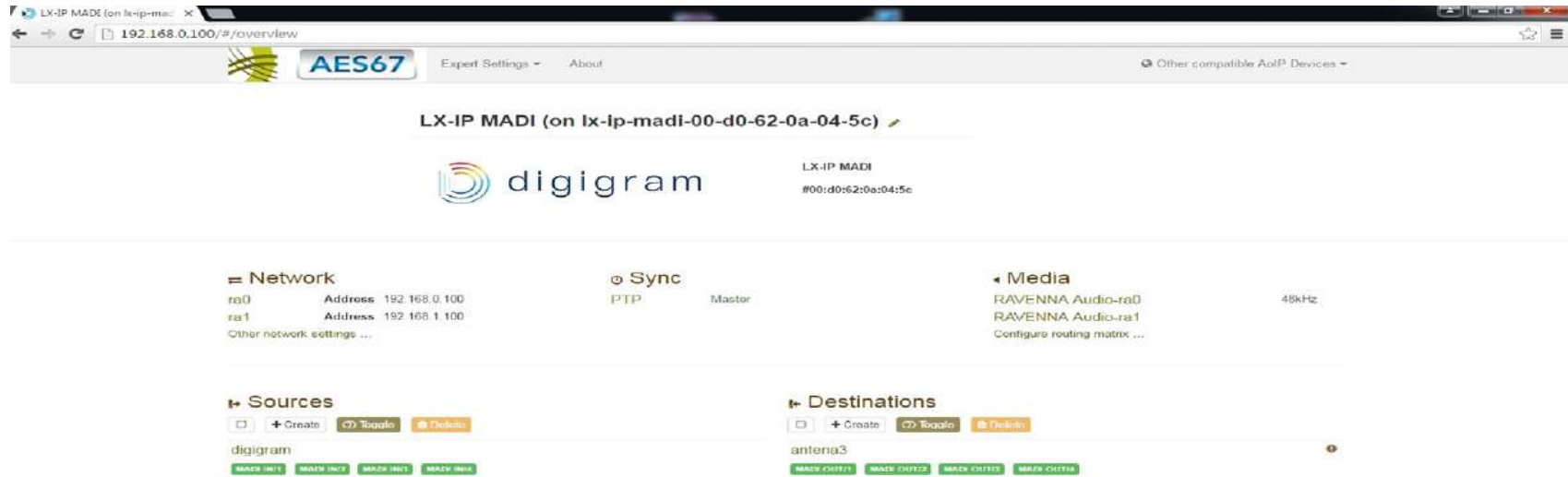
2.- Installation of LX-IP RAVENNA.

Following the steps of the LX-IP RAVENNA MANUAL DIGIGRAM manual we install the sound card on the PC and install the necessary drivers for its operation.



3.- Configuration Ethernet interface of LX-IP RAVENNA.

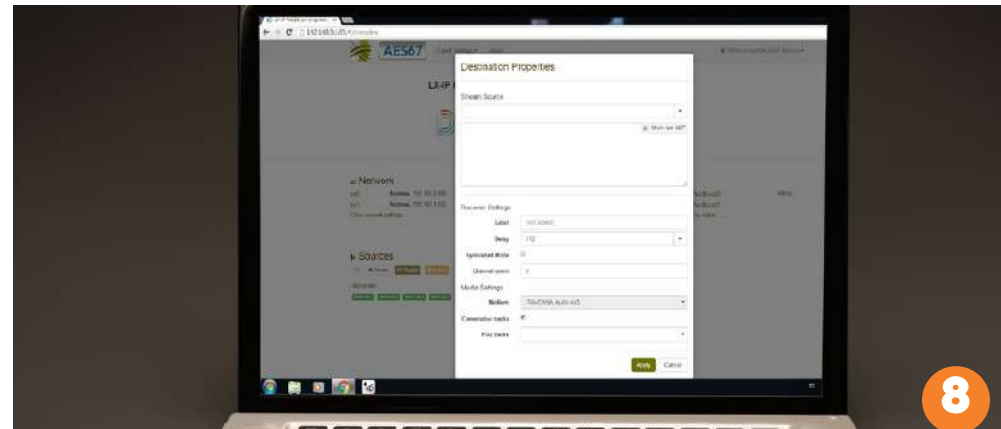
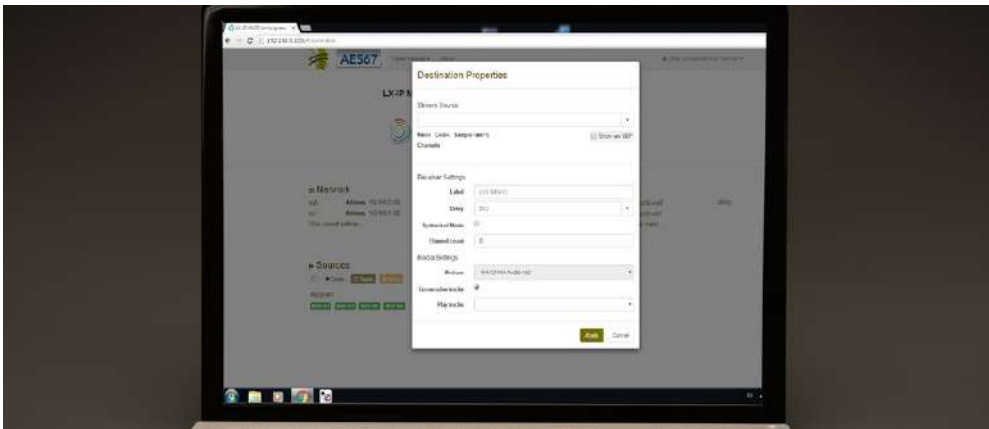
Using the CHROME browser following the instructions in the LX-IP manual we connect to the card and change the ip address of the RA0 ethernet interface which is the one we are going to use and select for example 192.168.0.100.



4.- Configuration of the reception of the LX-IP RAVENNA.

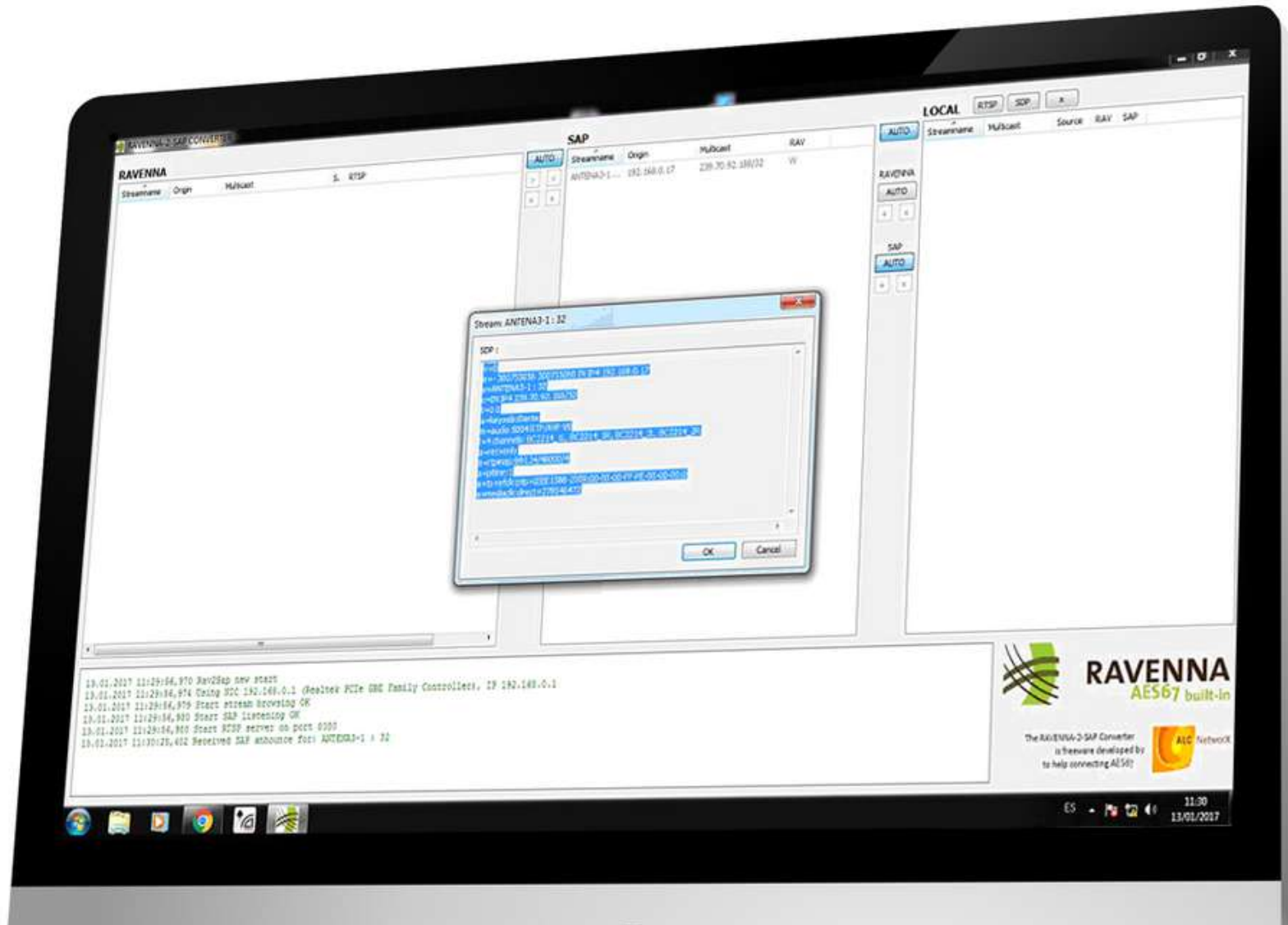
1 We configure the reception of the LX-IP card to manage the AES-67 stream that we have configured in the BC 2214. It is done in the Destinations section by pressing the CREATE key:

2 Then click on the "Show Raw SDP" key and a blank box appears where we have to edit the SDP of the AES-67 stream that we want to receive on the DIGIGRAM LX-IP card.



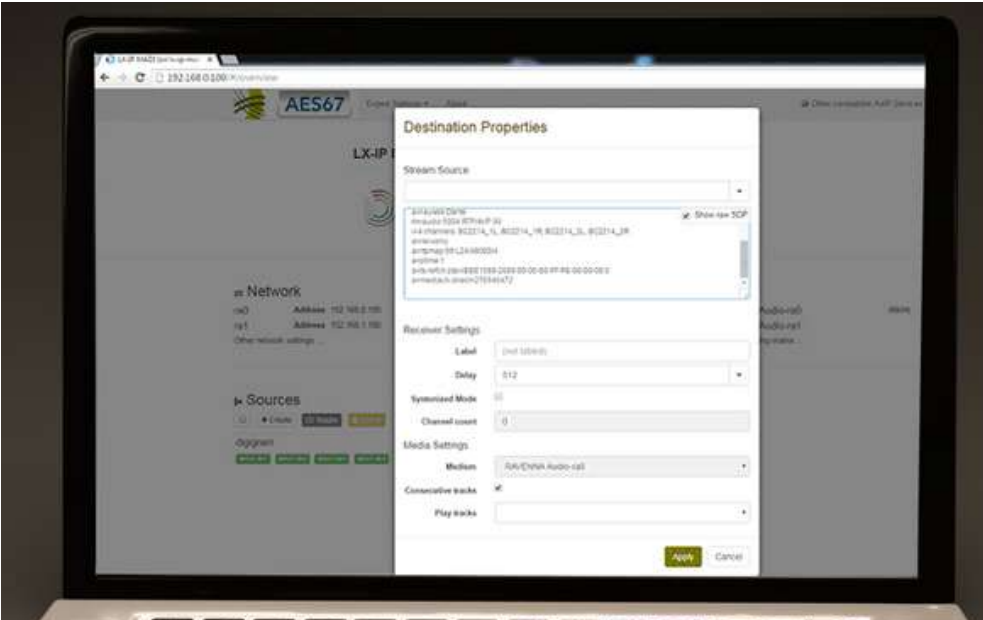
5.- Use of RAV2SAP tool by Ravenna

- 1 We minimize the browser and we run the Ravenna RAV2SAP tool and wait for the AES67 stream we generated on the BC 2214 to appear. Then, when we click on the RAV column and a window with the SDP (Session Description Protocol), items information opens. We "select all" and copy the information to the clipboard.



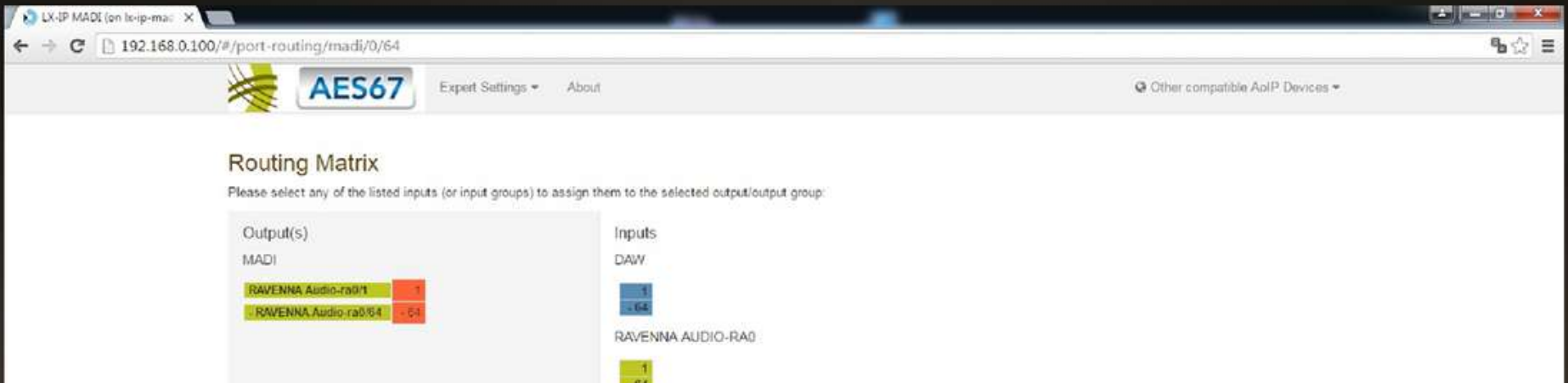
2

Then paste the contents of the clipboard in the blank box inside the "show raw sdp" section of the browser and press the apply Key:



3

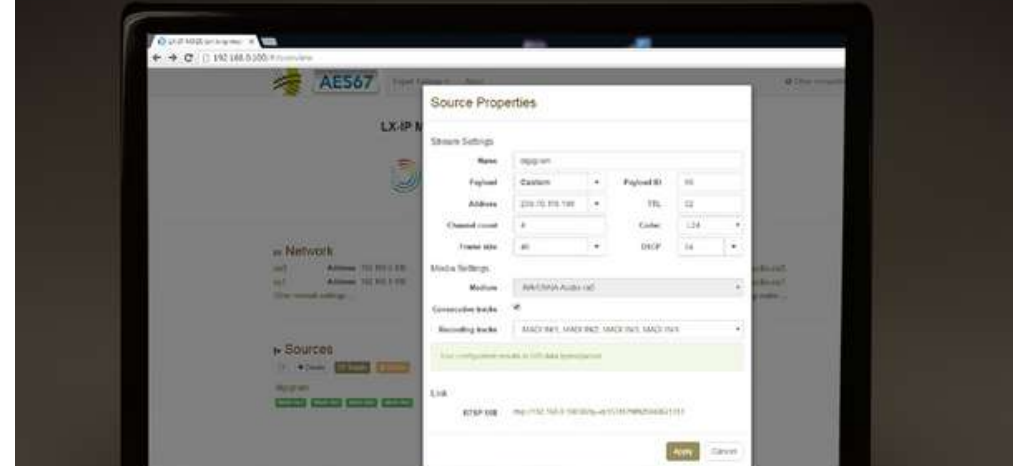
At this point we are already receiving the audio channels of the AES-67 stream generated from the BC 200D. To leave doubts, if we can, enter the "Config Matrix Routing" window and select that the AoIP audio received by the ethernet interface RA0 is routed to the outputs 1,2,3 4 of the MADI for its external check. It could be routed also to the analog outputs of the PC itself (daw0..daw3), but in this test for convenience we use the MADI interface that also has the card, to test the audio later.



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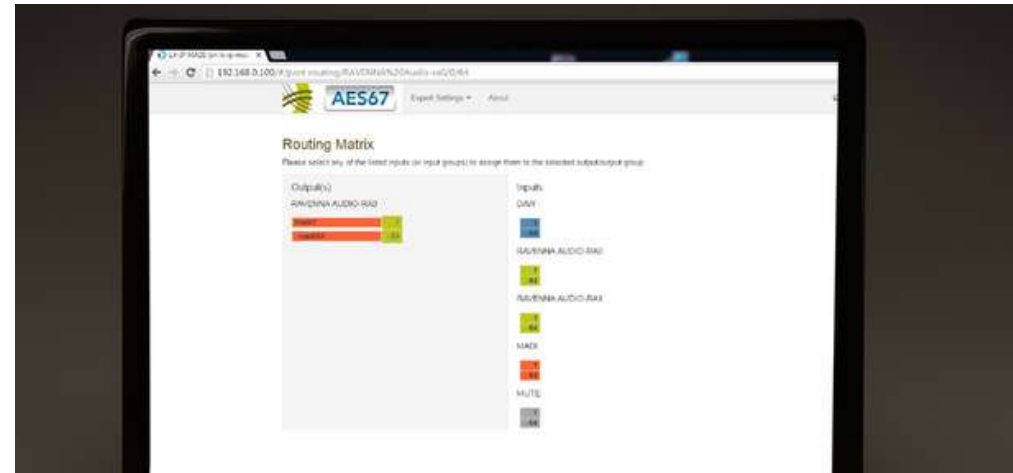
6.- Configuration of the transmission from the LX-IP.

1 We configure the transmission from the LX-IP digigram card that is made in the sources field. An AES-67 stream is created by pressing the CREATE key.



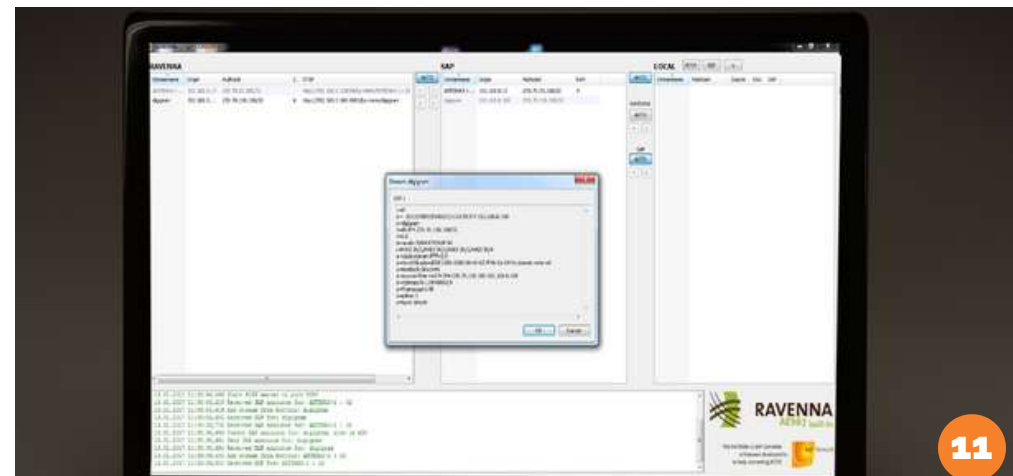
2 We Select the desired number of channels and we ensure that the multicast address is in the same range as the AES-67 stream generated from the netbox.

We configure the internal audio routing of the card so that the inputs of the MAD1 interface are directed to the output AOIP ra0 of the AES-67 stream we just created.



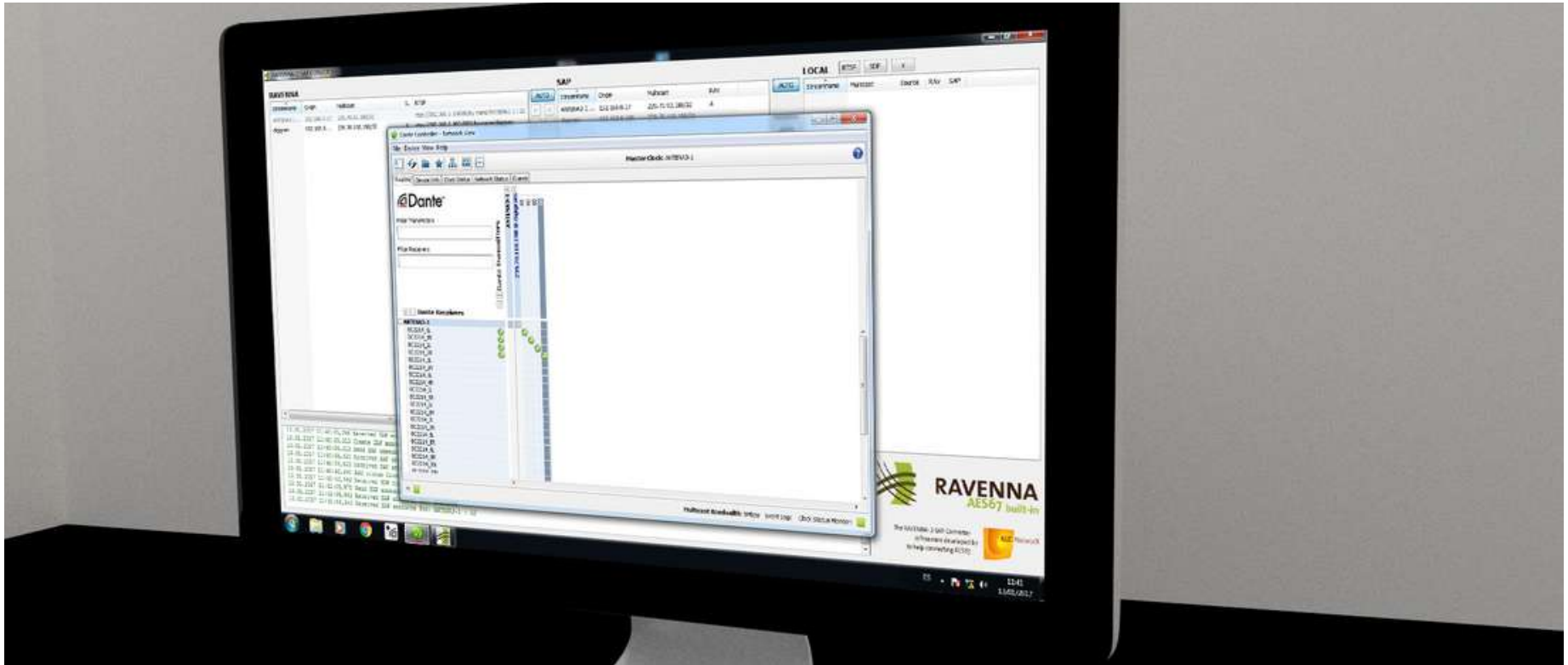
3 At this point we already have the transmitter and receiver of the LX-IP card with four audio channels respectively. The audio received by AoIP through the ethernet interface ra0 is routed to the MAD1 outputs of the LX-IP card and the MAD1 inputs of the card are routed to the AoIP outputs via the ethernet ra0 interface.

Finally, we verify that the AES-67 stream generated by the BC2214 card ANTENA 3-1 and the Digigram LX-IP card are in the RAV2SAP application and that the AES-67 stream generated by the Digigram LX-IP card is properly converted to SAP format so that they can be displayed directly in the routing window of the DANTE CONTROLLER software application.



7.- Audio Test

Finally we perform the audio test. We started the Dante Controller and made the corresponding subscription to receive the 4 channels integrated in the AES-67 stream generated from the Digigram LX-IP card.



We put a loop in the MADI interface of the Ravenna DIGIGRAM LX-IP card to connect the MADI (receiving from BC 2214 by AoIP) outputs to their own MADI inputs (transmission to BC 2214 by AoIP).

Finally we put an audio source in the analog input 1 of the BC 2214 card and we will notice that we receive that audio in the analog output 1. The path of this signal is as follows: analog input 1 is integrated in channel 1 of the generated AES-67 stream from the BC 2214 card, that stream is received by the Digigram card and extracts the channel 1 of said stream by the output 1 of the MADI interface, that in turn enters the input 1 of the MADI interface that is integrated in channel 1 of the stream RAVENNA-AES67 which is transmitted by the LX-IP Digigram card to the BC 2214 which is finally routed through the DANTE CONTROLLER to the receiver Dante 1 and thus to the analog output 1.

The same test can be performed with the analog inputs / outputs 2,3,4. To verify correct operation.

CONCLUSION

This exercise demonstrates the viability of the AES67 AoIP link and its perfection. On the other hand, it is clear that the procedure for configuration is not elementary. To avoid spending a lot of time on this, it is necessary to have access to a configuration guide like this one or to be trained in the configuration processes for all the equipment from different manufacturers to be used. The tools that RAVENNA and DANTE are providing to enable and simplify connectivity and compatibility are effective, but must be used separately and in a coordinated way.

It is expected that over time, these procedures can be simplified and as certainly required by regular users, becoming a more user-friendly configuration.



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