

Call Recorder APRESA & Call Recorder APRESA Compact

Installation Manual V 2.9 (VC1988)



vidicode

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Care and Maintenance

	Keep the APRESA dry. If it gets wet, wipe it dry immediately with a soft, clean cloth. Liquids might contain minerals that corrode the electronic circuits.
	Use and store the APRESA only in temperature conditions between 0 and 40 degrees Celsius. Temperature extremes can shorten the life of electronic devices and distort or melt plastic parts.
	Keep the APRESA away from excessive dust and dirt.
	Do not use aggressive chemicals, cleaning solvents or strong detergents to clean the APRESA.
LICENSES = €	Store your APRESA licenses in a safe place as you may need these in the future.

**THIS EQUIPMENT MUST BE EARTHED FOR
SAFETY REASONS**

This manual was written to support and guide customers in the installation process of the hardware and software of the:

CALL RECORDER APRESA & CALL RECORDER APRESA-Compact



A product of VIDICODE

How to use this manual

You may want to install a complete "VIDICODE made" APRESA server while others want to install the APRESA software-only on their alternative hardware.

Also the expansion of existing APRESA systems may need some guidance. Expanding an APRESA system involves adding recording channels, increasing storage capacity or adding/ changing a RAID volume.

Connecting the APRESA to the telecommunication infrastructure (signal tapping) will be an issue that most users will have to deal with.

The purpose of this manual is to support you in an effective way. The document starts by presenting a road map that will guide you to the applicable sections for your situation. You will easily find the chapters that are relevant for your situation by using the flowchart.

For a list of VIDICODE APRESA Article codes refer to chapter 10.

THIS MANUAL IS FREQUENTLY UPDATED WITHOUT ANY NOTIFICATION AND YOU ARE STRONGLY ADVISED TO DOWNLOAD THE NEWEST RELEASE OF THE MANUAL FROM THE WEBSITE

www.vidicode.com .

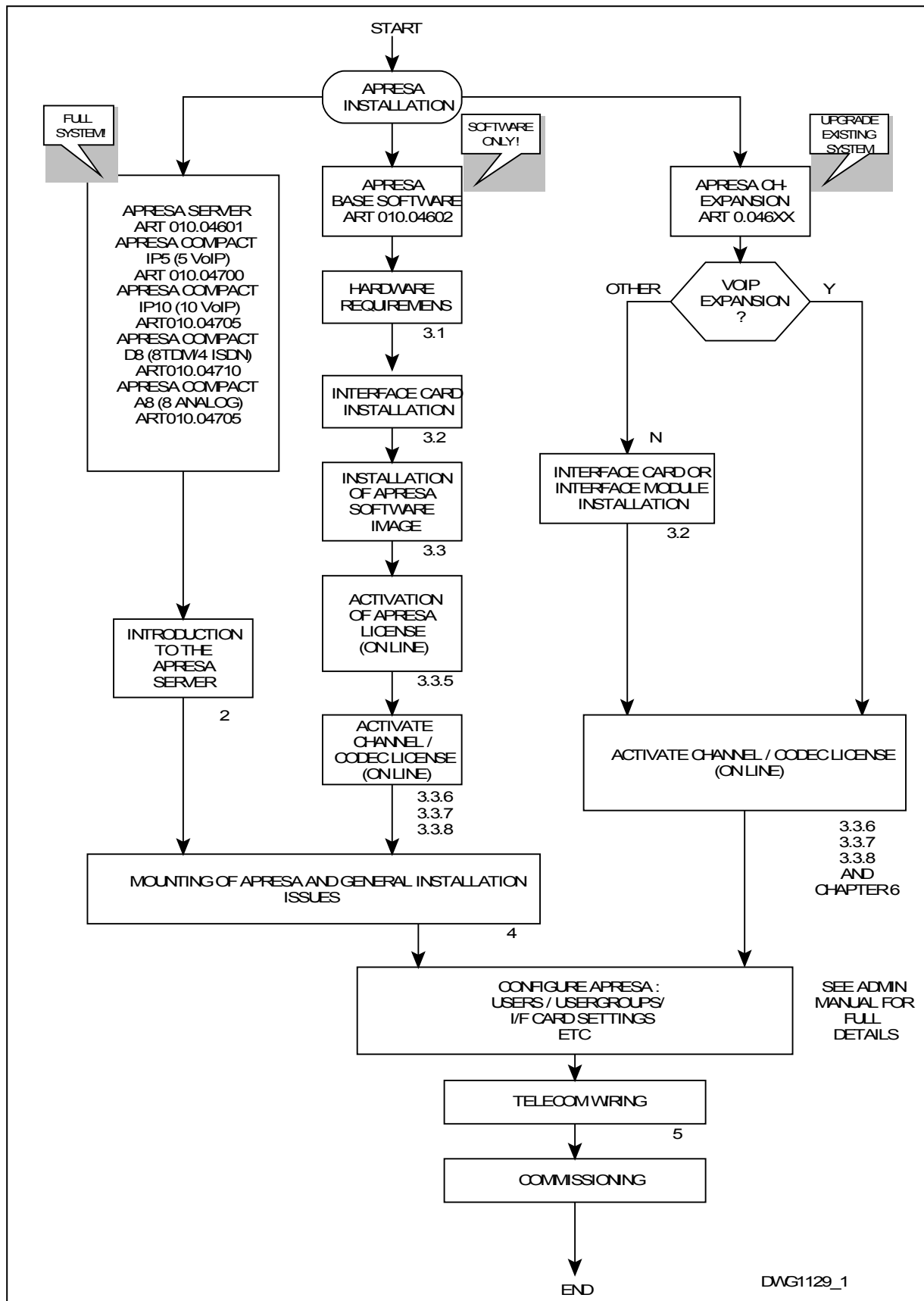
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ROAD MAP



1. INSTALLATION START

Generally we distinguish 3 different situations of use of this document. You are advised to follow the relevant path for your particular situation as indicated by the roadmap. The numbers in the roadmap link to the chapters of interest, avoiding unnecessary reading of irrelevant chapters.

At the end of this chapter you find a list of required materials and tooling to do the job right.

1.1.Situations

1.1.1. The "made by VIDICODE" APRESA Server / APRESA Compact.

The APRESA is available on the market as a turn key product, either a 19" rack or a desktop version. You will find the APRESA software already installed and running on the product. Channel licenses are activated and interface cards will be installed according to your purchase order by VIDICODE. You are advised to read the introduction and the go directly to the mounting, software configuration, telecom wiring, and commissioning sections.

1.1.2. Software only

You prefer to use your own choice of hardware for a variety of reasons. In other words you have the liberty to select your preferred server manufacturer like HP, Dell, etc. or use a virtual machine. As a guide, we have listed the (minimum) hardware requirements of such a system. Refer to the chapter "Hardware requirements". To install the APRESA software image and do the channel licensing one is advised to follow the directions as described in the chapter "Software installation". For the installation of interface cards in your hardware you must follow the directions of the manufacturer or vendor of that machine. Finally process the software configuration, telecom wire tapping and commissioning section.

1.1.3. Upgrading an existing APRESA

If you want to upgrade an existing APRESA system with additional channels or interface card(s) you can go to the "Upgrade existing installations" chapter.

Existing APRESA systems need channel upgrade when customer business expands after time and more and more phones needs to be recorded. Adding and configuration of new channels in software is easy, the main effort here is hardware installation

Note that the APRESA Compact supports standard (NORAIID) hard drive only, and is limited to max. 10 channel VoIP or 8 channel TDM or 8 ch Analog (POTS/audio).

1.2.Package contents, materials and Tooling

1.2.1. Package contents

Open the package carefully, and make sure that none of the items that are listed below are missing.

This product has a very high level of flexibility and inherently there is no standard package content. To help you in checking the delivery read the following:

Package = "VIDICODE APRESA server"

1x	APRESA SERVER	
2x	KEY (FOR DOOR LOCK)	
1x	POWER CORD	2x with optional redundant power supply
1x	QUICK GUIDE FOR INSTALLATION	
1x	GUARANTEE / REGISTRATION FORM	
1x	VIDICODE APPLICATION CD	ONLY for the manuals
1x	APRESA BASE SW INSTALLATION CD	
1x	APRESA BASE SOFTWARE LICENSE	
1x	APRESA CLIENT SOFTWARE LICENSE	
?x	CHANNEL / CODEC LICENSE	Acc. to the channels/codecs ordered.
1x	PATCHBOX RJ11/RJ21	For every ATP / DST interface card installed
1x	RJ21/RJ21 CABLE , LENGTH=1M	For every ATP / DST interface card installed

Package = "VIDICODE APRESA-Compact server"

1x	APRESA-COMPACT SERVER	
1x	POWER CORD	
1x	QUICK GUIDE FOR INSTALLATION	
1x	GUARANTEE / REGISTRATION FORM	
1x	VIDICODE APPLICATION CD	ONLY for the manuals
1x	APRESA BASE SW INSTALLATION CD	
1x	APRESA BASE SOFTWARE LICENSE	
1x	APRESA CLIENT SOFTWARE LICENSE	
1x	CHANNEL / CODEC LICENSE	Acc. to the channels/codecs ordered.
1x	PATCHBOX RJ11/RJ21	Only if a ATP / DST interface card is installed
1x	RJ21/RJ21 CABLE , LENGTH=1M	Only if a ATP / DST interface card is installed

Package = "Software Only" (e-mail or postal package)

1x	QUICK GUIDE FOR INSTALLATION	Image from Vidicode WEB-site
1x	VIDICODE LICENCING TERMS	
1x	GUARANTEE / REGISTRATION FORM	
1x	APRESA BASE SOFTWARE LICENSE	
1x	APRESA CLIENT SOFTWARE LICENSE	
?x	CHANNEL / CODEC LICENSE	Acc. to the channels/codec ordered.
?x	INTERFACE CARD ATP/DST/DTP	Depends on the channels ordered.
1x	PATCHBOX RJ11/RJ21	For every ATP / DST interface card ordered
1x	RJ21/RJ21 CABLE , LENGTH=1M	For every ATP / DST interface card ordered

Note that the last 3 items may be drop shipped directly from a third party.

Package = "Upgrade"

?x	CHANNEL LICENSE	Depends on the channels ordered.
?x	INTERFACE CARD ATP/DST/DTP	Depends on the channels ordered.
1x	PATCHBOX RJ11/RJ21	For every ATP / DST interface card installed
1x	RJ21/RJ21 CABLE , LENGTH=1M	For every ATP / DST interface card installed

Note that the last 3 items may be drop shipped directly from a third party.

If any item is missing or damaged, please contact your local reseller for replacement or other service.

1.2.2. Advised Materials

We advise you to check the following list of materials before you start installing the system.

19" Rack screws and cage nuts	Modular wire 4P/6P/8P
Modular plugs	RJ45 T-splitter(s)
RJ12 T-Splitter(s)	RJ21 cable(s) 3,5 or 10m length
RJ45 patch panel	RJ48C to BNC adapter
Coaxial T-Splitter(s)	

1.2.3. Advised tooling

We advise you to check the following list of tooling of before you start installing the system:

- Standard installers tooling kit;
- RJ modular connector crimp tool

2. INTRODUCTION TO THE APRESA SERVER

The APRESA server is available on the market in 3 types of housing:

1. The "BLACK" or the "BLUE" 19" RACK-MOUNT HOUSING, the standard APRESA.



These versions are based on industrial PC server components. Both are fully compatible with 19 inch server racks and will take 4U height space in the rack. All basic controls, indicators and the DVD drive are safely placed behind a lockable door. Please note that the lock-keys are universal (e.g. identical between different APRESA units). The sole purpose of the DVD is to accommodate software installation. Because the software is pre-installed by VIDICODE, the DVD has no immediate function. The DVD is used when software must be re-installed in the future for whatever reason.

2. The DESKTOP housing , the APRESA-Compact



This version is based on standard quality PC components build in a desktop housing. It is intended to be a small scale- and low cost recording solution. The unit has no DVD drive so when reinstalling the software, the user must attach a USB-DVD drive.

All APRESA-options ordered are pre-installed by VIDICODE:

You will find APRESA license, CHANNEL licenses, CODEC licenses, etc and the APRESA software on CD in the delivery. **These are just for your safekeeping only.** You need these items only when you want to re-install the software.

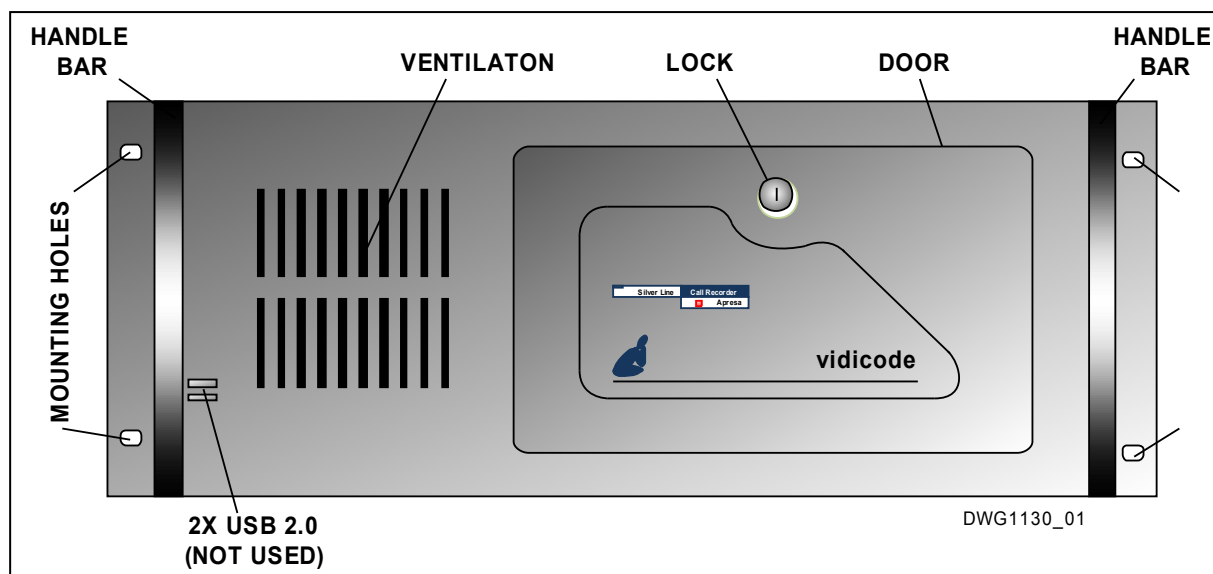
Interface card(s) that are ordered for this machine will be pre-installed.

The following sub-sections describe the 3 types of housing in functional and specifications detail.

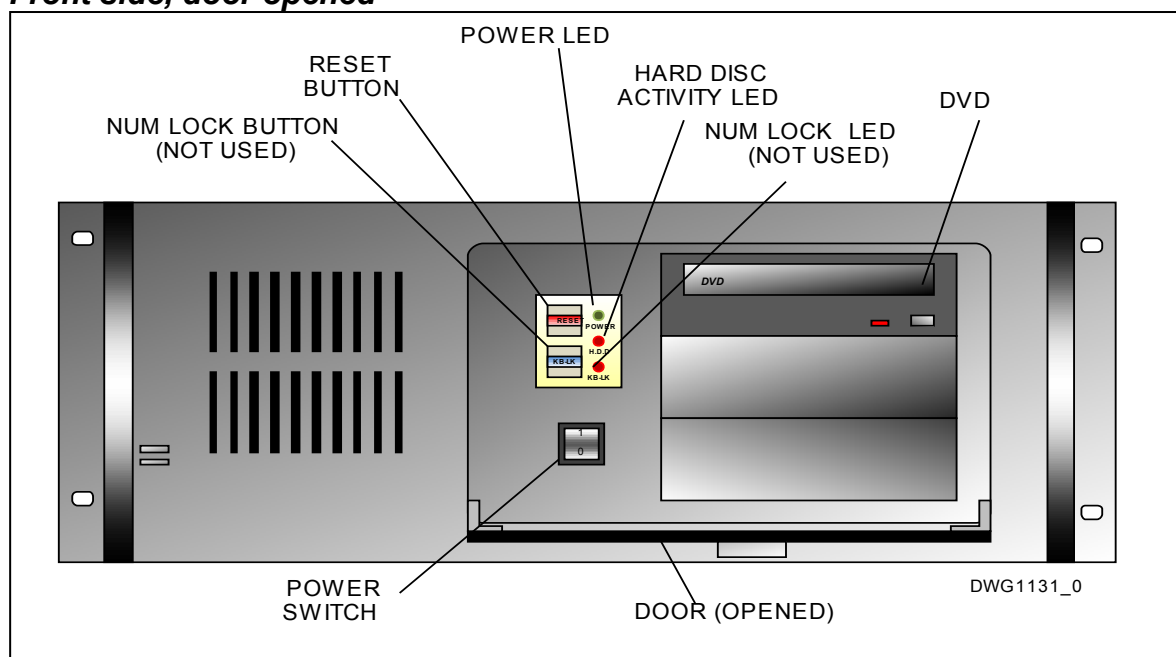
2.1. The BLACK 19" housing



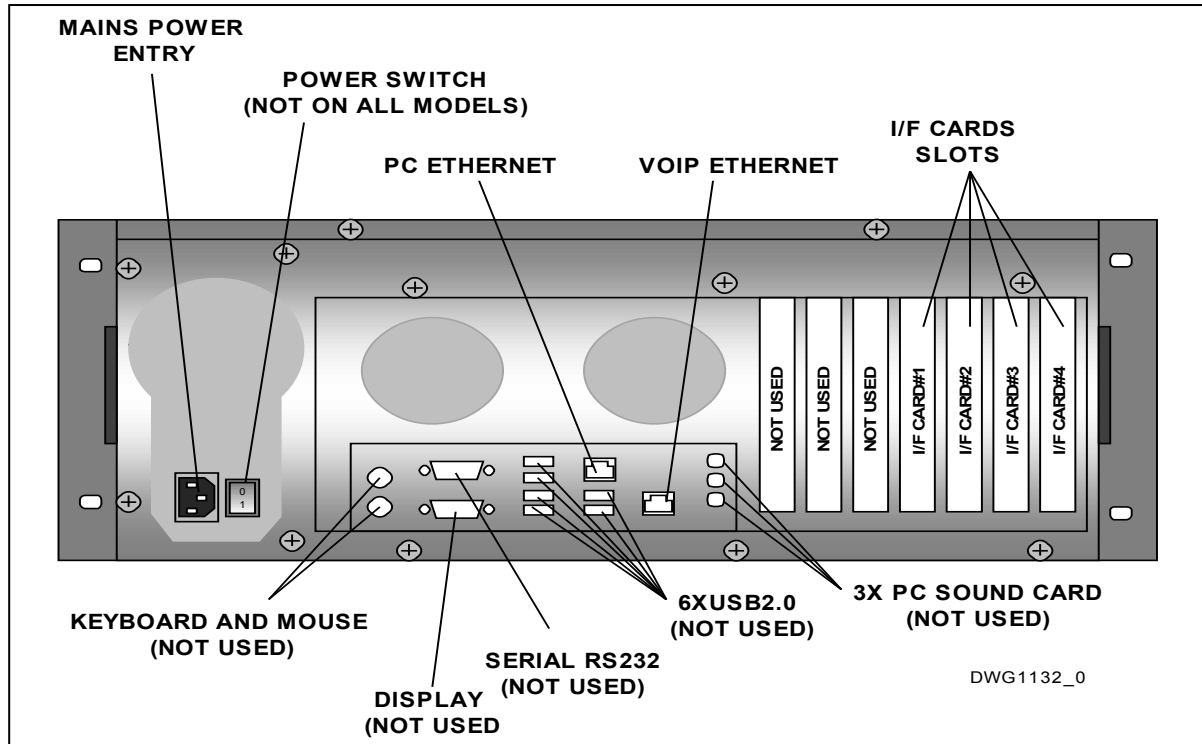
Front side, door closed



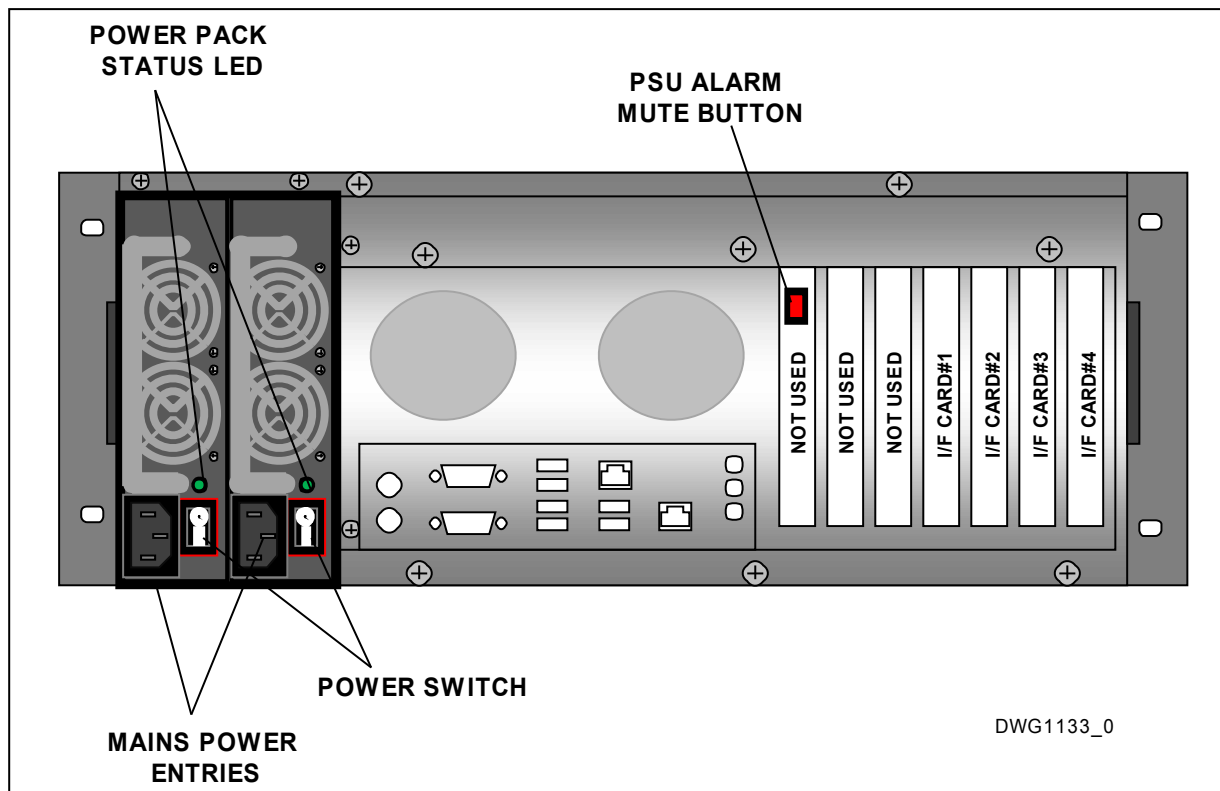
Front side, door opened



Back side, C2SBC-Q motherboard, standard PSU



Back side, C2SBC-Q motherboard redundant PSU



- This housing also accommodates the X9-SCM motherboard. Refer to the next section for information.
- The PSU alarm mute button location may be located elsewhere on your unit.

2.2. Specifications of the "BLACK" APRESA server

2.2.1. Enclosure

TYPE	: KI-N407
COLOR	: Black (Textured)
WEIGHT	: 15 Kg (approximately, varies with different models)
DIMENSIONS	
-Height	: 177 mm (4U)
-Width	: 482 mm (19" RACK mounting brackets standard) 440 mm (desktop, 19" brackets removed)
-Depth	: 510 mm (Including handle bars, exclusive cables)
SLIDING RAIL	: Optionally available
# 3.5" DRIVES	: 5 INTERNAL
# 5.25" DRIVES	: 3 EXTERNAL
# USB	: 2pcs on front / 6pcs at the back (Not used)
COOLING	: Front 120mm chassis FAN 1600 RPM
ACCESS CTRL	: Controls / indicators are placed behind a lockable door
CONTROLS	: -RESET Button -ON/OFF Switch -NUMLOCK Switch (Not used) -PSU Alarm mute button (models with redundant PSU only)
INDICATORS	: -Power -Hard drive ACTIVITY -NUMLOCK SWITCH INDICATOR (not used)

2.2.2. Motherboard / CPU / RAM / PSU

!!!! if the X9-SCM motherboard is mounted skip to the next section !!!!

MOTHERBOARD	: SUPER MICRO C2SBC-Q-O (Socket 775) (for all specifications : www.supermicro.com)
CPU	: INTEL PENTIUM E6600/2CORE/FSB1066/2MB Cache or INTEL PENTIUM E5700/2CORE/FSB 800/2MB Cache or equivalent (for all specifications: www.intel.com)
RAM	: DDR2 4GBYTE @ 800MHZ Standard DDR2 8GBYTE @ 800MHZ Max.
PSU	: 300W Standard 500W Optional (for all specifications: www.supermicro.com) Optional: 1+1 redundant power supply
PCI	: 4 slots
PCI-e	: 2 slots

2.2.3. Hard drive (various configurations possible)

INTERFACE	: SATA 3GBIT/SEC
SIZE	: 3.5 INCH
RPM	: 7200
CACHE	: 16MByte
QUALITY GRADE	: 24/7
CAPACITY	: 1TBYTE (standard configuration) Optional 1or 2 TBYTE
RAID VOLUMES	: Optional, RAID1 or RAID5 (Software RAID)

2.2.4. DVD r/w

INTERFACE	: SATA 3GBit/SEC
SIZE	: 5.25"
SPEED	: 22X
MANUFACTURER	: LG (or equivalent)

2.2.5. Supported PCI interface card

All cards below are designed for the standard PCI card slot.

ANALOG	: SYNWAY TYPE ATP- 24A/PCI+/2.0	: 8CH / 16CH or 24CH
	SYNWAY TYPE ATP- 24A/PCI+/3.0	: 8CH / 16CH or 24CH
TDM	: SYNWAY TYPE DST- 24B/PCI+/2.0	: 8CH / 16CH or 24CH
ISDN E1/T1	: SYNWAY TYPE DTP- 30C/PCI+/2.0	: 30CH / 1TRUNK
ISDN60 (E1)	: SYNWAY TYPE DTP- 60C/PCI+/2.0	: 60CH / 2TRUNK
ISDN120(E1)	: SYNWAY TYPE DTP-120C/PCI+/2.0	: 120CH / 4TRUNK

2.2.6. Supported PCIe interface card

All cards below are designed for the PCIe X1 card slot.

note : These interface cards will work also in PCIe X4/X8/X16/X32 slots.

ANALOG	: SYNWAY TYPE ATP- 24A/PCIe+/2.0	: 8CH / 16CH or 24CH
	SYNWAY TYPE ATP- 24A/PCIe+/3.0	: 8CH / 16CH or 24CH
TDM	: SYNWAY TYPE DST- 24B/PCIe+/2.0	: 8CH / 16CH or 24CH
ISDN E1/T1	: SYNWAY TYPE DTP- 30C/PCIe+/2.0	: 30CH / 1TRUNK
ISDN60 (E1)	: SYNWAY TYPE DTP- 60C/PCIe+/2.0	: 60CH / 2TRUNK
ISDN120(E1)	: SYNWAY TYPE DTP-120C/PCIe+/2.0	: 120CH / 4TRUNK

2.2.7. Environmental specification

TEMPERATURE RANGE:	+10....+35 °C (Operating) or - 10 - + 65 °C (Storage)
HUMIDITY	: 8%-90% No condensing, operating and storage.

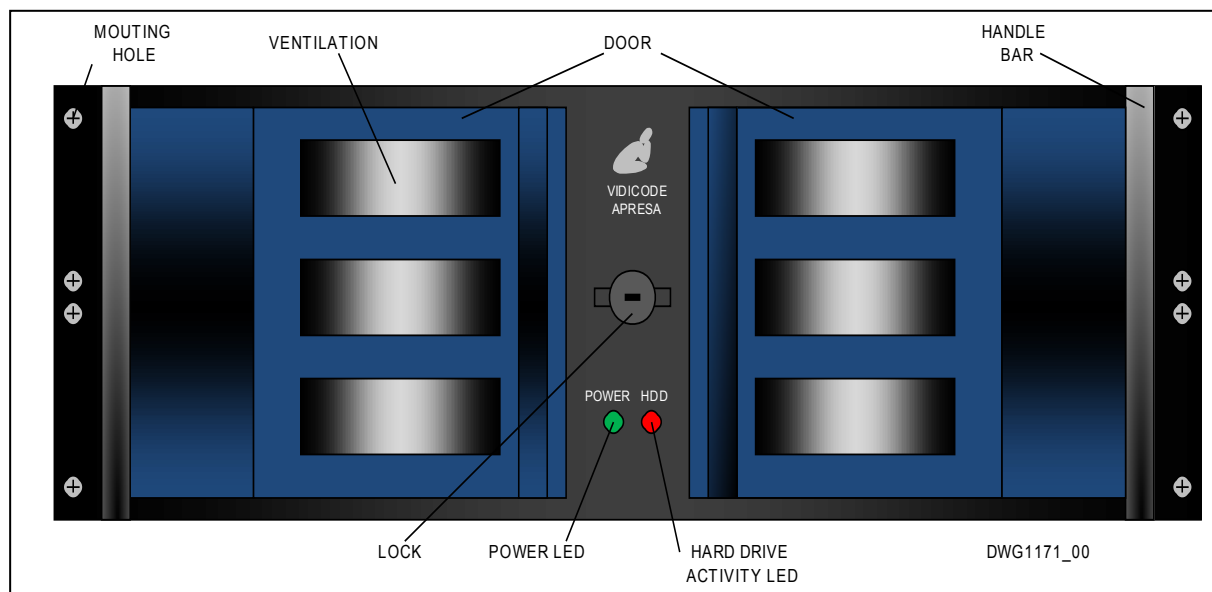
2.2.8. Approvals

EMC APPROVAL	: EN55022 / EN55024 / FCC15
SAFETY	: EN60950

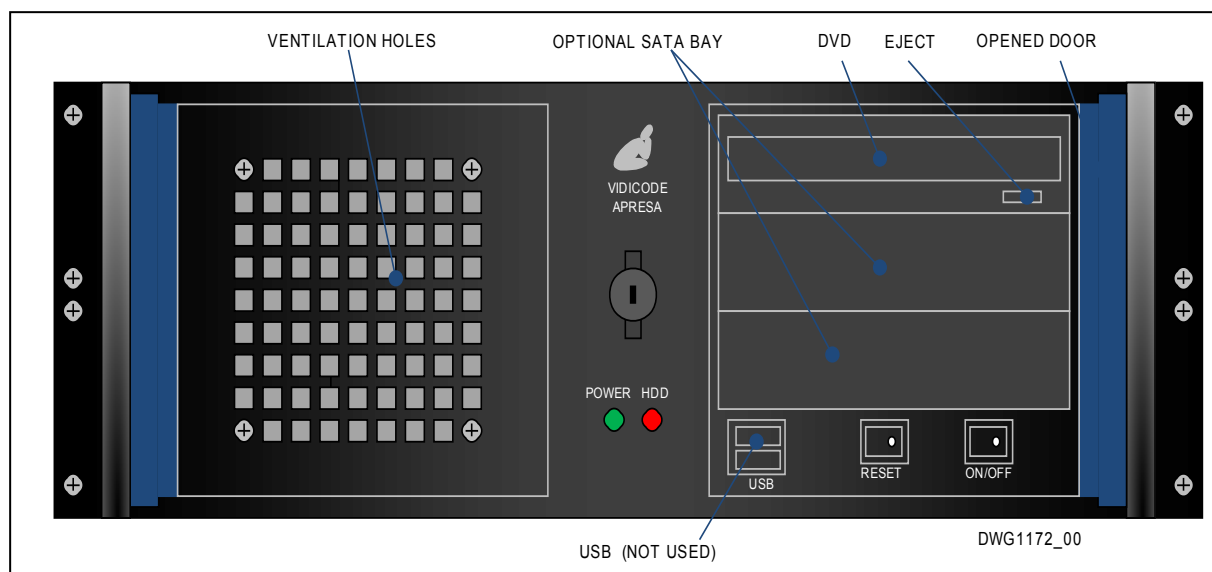
2.3.THE BLUE 19" HOUSING



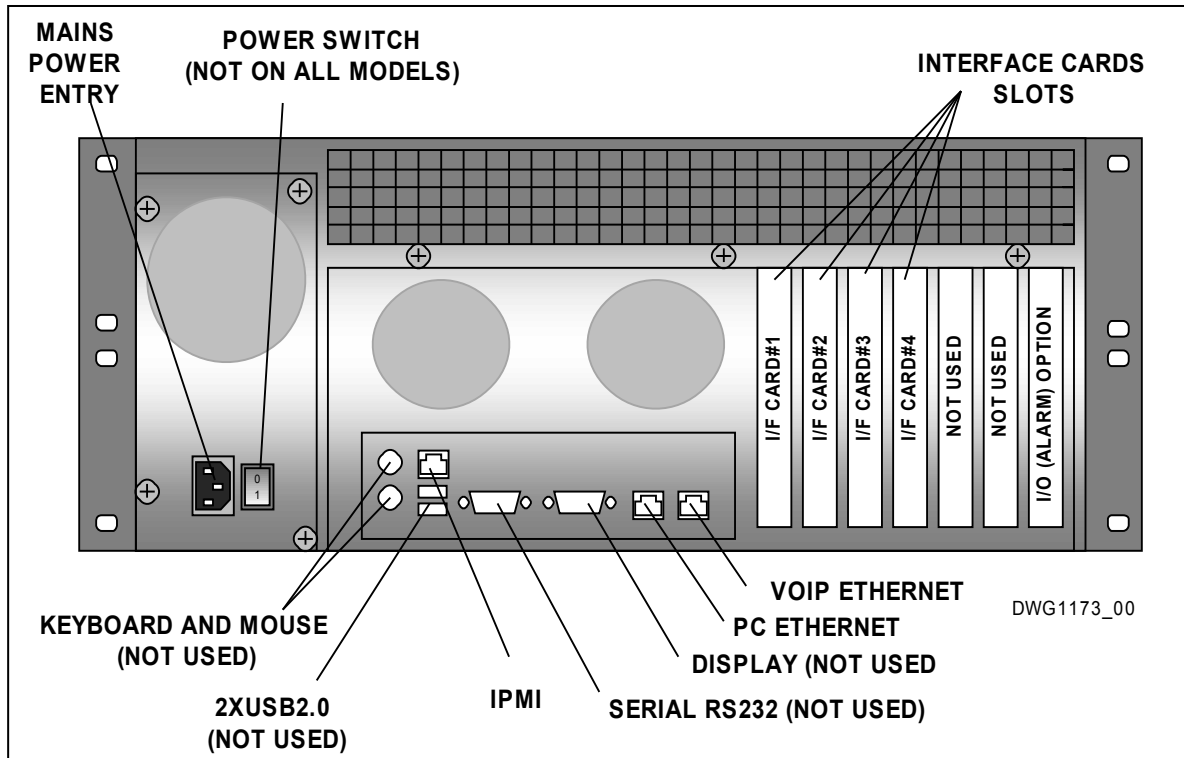
Front side, door closed



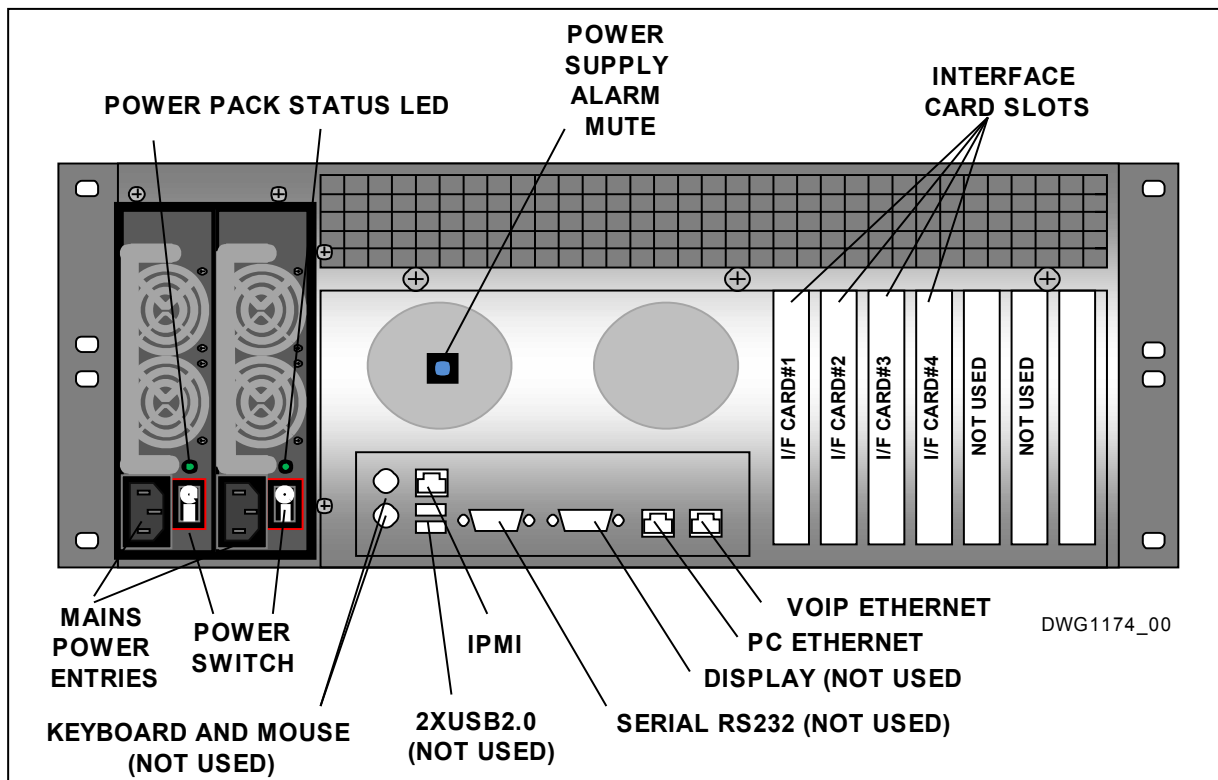
Front side, door opened



Back side, X9-SMB motherboard, standard PSU



Back side, X9-SCM motherboard redundant PSU



- The PSU alarm mute button location may be different.

2.4. Specifications of the "BLUE" APRESA server

2.4.1. Enclosure

TYPE	: KI-N4058BLUE
COLOR	: Blue doors, Black sheet metal (Textured)
WEIGHT	: 15 Kg (approximately, varies with different models)
DIMENSIONS	
-Height	: 177 mm (4U)
-Width	: 482 mm (19" RACK mounting brackets standard) 440 mm (desktop, 19" brackets removed)
-Depth	: 510 mm (Including handle bars, exclusive cables)
SLIDING RAIL	: Optionally available
# 3.5" DRIVES	: 5 INTERNAL
# 5.25" DRIVES	: 3 EXTERNAL
# USB	: 2pcs On front / 6pcs at the back (Not used)
COOLING	: Front 120mm chassis FAN 1600 RPM
ACCESS CTRL	: Controls / indicators are placed behind a lockable door
CONTROLS	: -RESET Button -ON/OFF Switch -NUMLOCK Switch (Not used) -PSU Alarm mute button (models with redundant PSU only)
INDICATORS	: -Power -Hard drive ACTIVITY -NUMLOCK SWITCH INDICATOR (not used)

2.4.2. Motherboard / CPU / RAM / PSU

MOTHERBOARD	: SUPER MICRO X9-SCM (Socket 1155) (for all specifications : www.supermicro.com)
CPU	: INTEL PENTIUM BX80637G2020 2.9 GHz 3MB cache INTEL PENTIUM BX80623G860 3GHz 3MB cache (older systems) (for all specifications: www.intel.com)
RAM	: DDR3 4 GBYTE @ 1300 MHZ , ECC, Standard DDR3 32GBYTE @ 1600MHZ ECC, Max.
PSU	: 300W Standard 500W Optional (for all specifications: www.supermicro.com) Optional: 1+1 redundant power supply
PCI	: 0 slots
PCI-e	: 4 slots

2.4.3. Hard drive (various configurations possible)

INTERFACE	: SATA 3GBIT/SEC
SIZE	: 3.5 INCH
RPM	: 7200
CACHE	: 16MByte
QUALITY GRADE	: 24/7
CAPACITY	: 1TBYTE (standard configuration) Optional 1or 2 TBYTE
RAID VOLUMES	: Optional, RAID1 or RAID5 (Software RAID)

2.4.4. DVD r/w

INTERFACE	: SATA 3GBit/SEC
SIZE	: 5.25"
SPEED	: 22X
MANUFACTURER	: LG (or equivalent)

2.4.5. Supported PCI interface card

This model has NO support for legacy PCI interface cards.

2.4.6. Supported PCIe interface card

All cards below are designed for the PCIe X1 card slot.

note : These interface cards will work also in PCIe X4/X8/X16/X32 slots.

ANALOG	: SYNWAY TYPE ATP- 24A/PCIe+/2.0 : 8CH / 16CH or 24CH
	SYNWAY TYPE ATP- 24A/PCIe+/3.0 : 8CH / 16CH or 24CH
TDM	: SYNWAY TYPE DST- 24B/PCIe+/2.0 : 8CH / 16CH or 24CH
ISDN E1/T1	: SYNWAY TYPE DTP- 30C/PCIe+/2.0 : 30CH / 1TRUNK
ISDN60 (E1)	: SYNWAY TYPE DTP- 60C/PCIe+/2.0 : 60CH / 2TRUNK
ISDN120(E1)	: SYNWAY TYPE DTP-120C/PCIe+/2.0 : 120CH / 4TRUNK

2.4.7. Environmental specification

TEMPERATURE RANGE:	+10 - +35 °C (Operating) or - 10 - + 65 °C (Storage)
HUMIDITY	: 8%-90% No condensing, operating and storage.

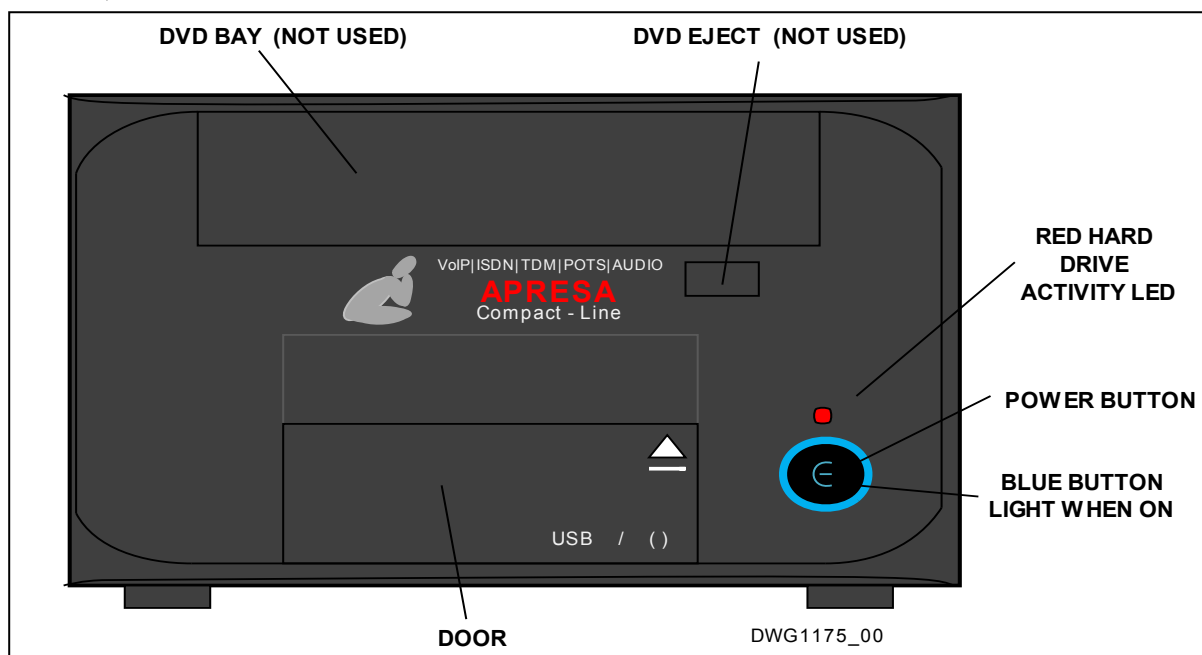
2.4.8. Approvals

EMC APPROVAL	: EN55022 / EN55024 / FCC15
SAFETY	: EN60950

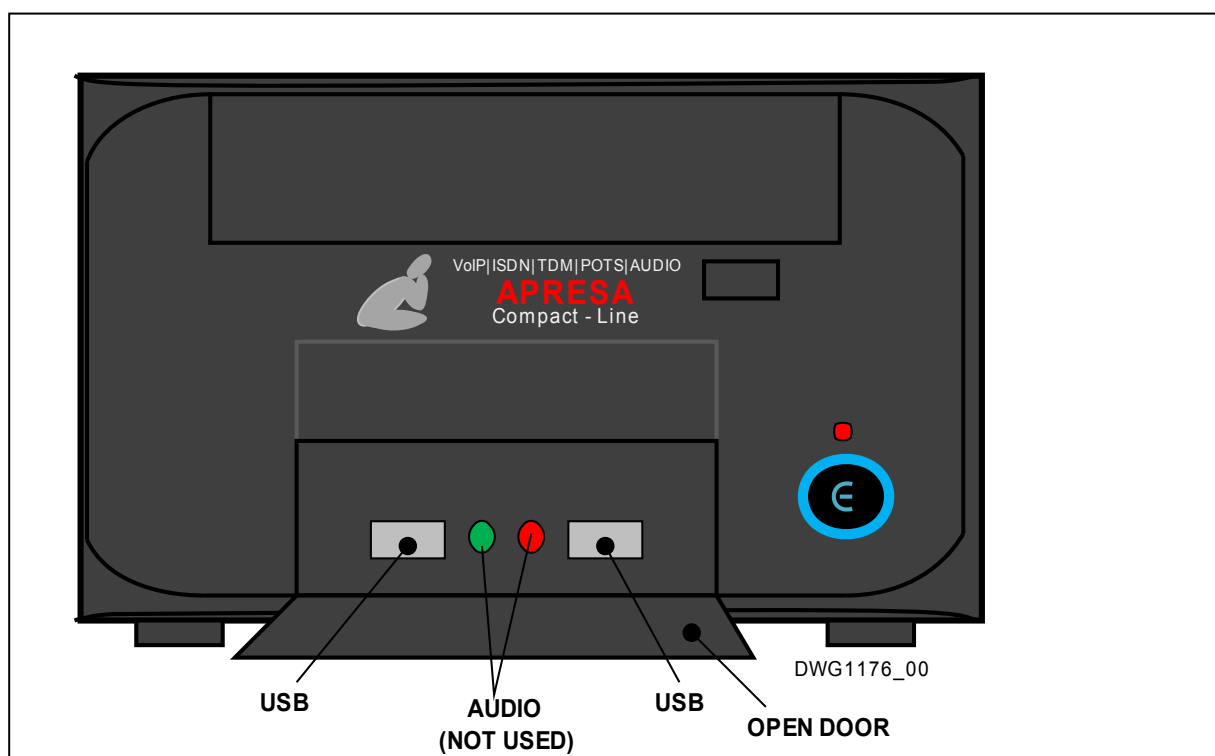
2.5.THE APRESA-COMPACT



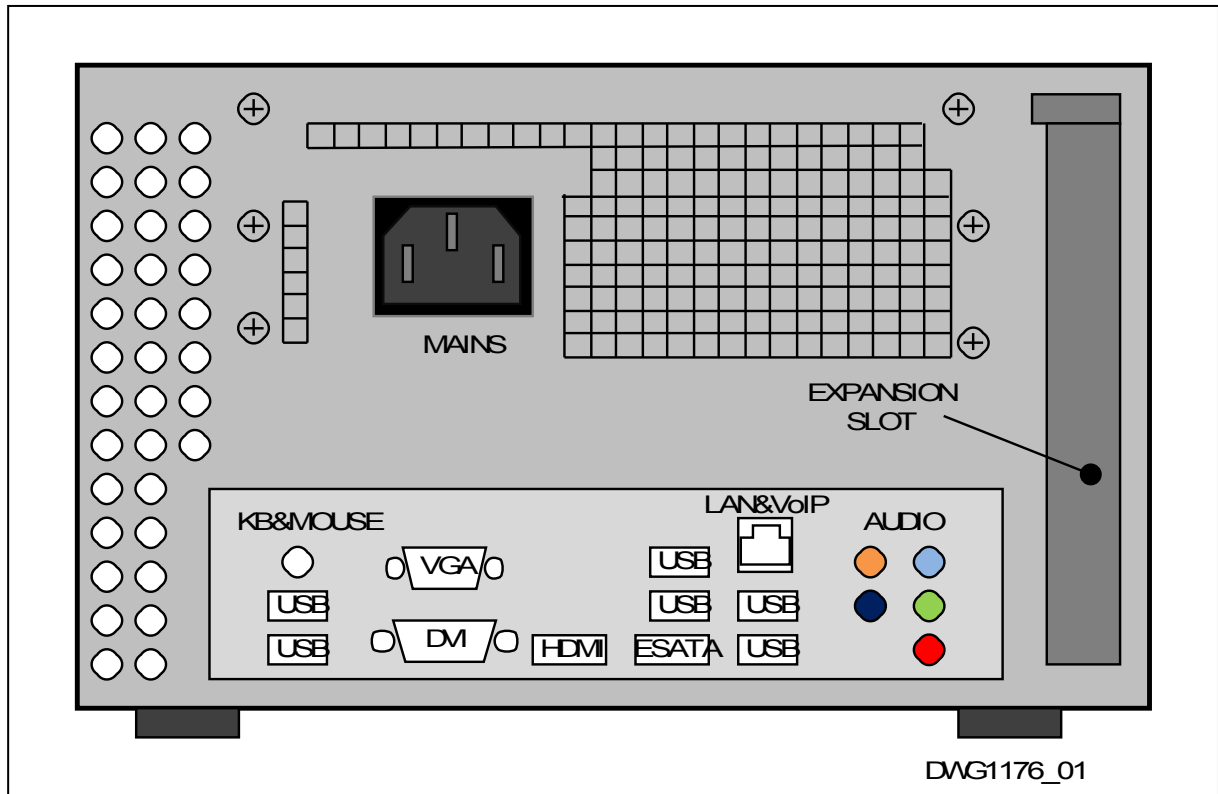
Front side, door closed



Front side, door opened



Back side



note : The KeyBoard & Mouse MiniDin connector is **not** supported under APRESA.

-> **Use a separate USB KeyBoard and USB Mouse**

Remarks about the use of the expansion slot :

- The "APRESA-Compact IP5" and the "APRESA-Compact IP10" with a blind plate over the expansion slot interfaces over a single network port (marked 'Ethernet' in the figure above) for **BOTH** VoIP and all other LAN traffic.
- The "APRESA-Compact IP5" and the "APRESA-Compact IP10" with an extra network port option (VIDICODE art .no 010.05570) installed (in the expansion slot) interfaces to the VoIP over LAN port marked 'Ethernet' in the figure above. The normal LAN traffic is connected to the LAN card in the expansion slot.
- The APRESA-Compact D8 and the APRESA-Compact A8 have a line interface card installed (ATP or DST) capable to capture 8 recording channels.

2.6. Specifications of the APRESA-Compact server

2.6.1. Enclosure

TYPE	: SPIRE SPM210B-300W-PFC, PSU included (or equivalent)
COLOR	: Piano BLACK
WEIGHT	: 3.5 Kg (approximately, varies with different models)
DIMENSIONS	
-Height	: 135 mm
-Width	: 220 mm
-Depth	: 345 mm (excluding cables)
# 3.5" DRIVES	: 1 INTERNAL
# 5.25" DRIVES	: 1 EXTERNAL, not used
# USB	: 2pcs On front / 6pcs at the back
COOLING	: Fan in the PSU , no chassis FAN.
CONTROLS	: -ON/OFF Switch
INDICATORS	: -Power (blue LED) -Hard drive ACTIVITY (red LED)

2.6.2. Motherboard / CPU / RAM / PSU

MOTHERBOARD	: ASROCK E1350M1 (or equivalent) (for all specifications : www.asrock.com)
CPU	: AMD E350, 64bit, dual core 1.6GHz 1MB cache (for all specifications: www.amd.com)
RAM	: DDR3, 2 GBYTE @ 800/1066MHz std. DDR3, 16GBYTE @ 800/1600MHz max.
PSU	: 300W Standard
PCI-e	: 1 slot (for optional line Interface card or GLAN card)

2.6.3. Hard drive

INTERFACE	: SATA 3GBIT/SEC
SIZE	: 3.5 INCH
RPM	: 7200
CACHE	: 16MByte
QUALITY GRADE	: 24/7
CAPACITY	: 1TBYTE

2.6.4. Supported PCIe interface cards

ANALOG	: SYNWAY TYPE ATP- 24A/PCIe+/2.0 : 8CH max. SYNWAY TYPE ATP- 24A/PCIe+/3.0 : 8CH max.
TDM	: SYNWAY TYPE DST- 24B/PCIe+/2.0 : 8CH max.

2.6.5. Environmental specification

TEMPERATURE RANGE: +10 - +35 °C (Operating) or - 10 - + 65 °C (Storage)
HUMIDITY : 8%-90% No condensing, operating and storage.

2.6.6. Approvals

EMC APPROVAL : EN55022 / EN55024 / FCC15
SAFETY : EN60950

3. APRESA BASE SOFTWARE

This chapter describes the complete procedure for installing the APRESA software from a CD.

Pre-requisites:

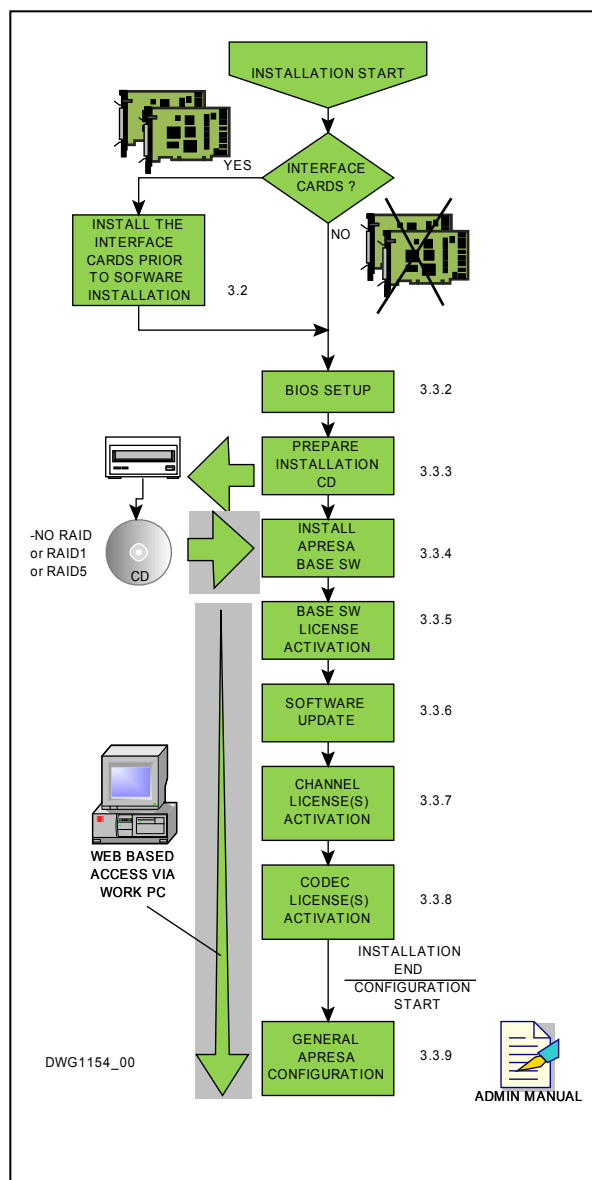
- MONITOR + KEYBOARD + ETHERNET (Aprisa compact: USB-DVD drive)
- APRESA license, Channel license, G.729 license etc.
- WORK-PC (processing the licenses / WEB configuration APRESA)
- Interface cards as applicable.

If you have purchased the complete "VIDICODE made" APRESA server can skip this chapter. Your product will be delivered with software installed and all purchased channel licenses nicely activated. This procedure will also be use full to re-install the APRESA software for whatever reason.

Typically, this procedure is typically written to support you if you have purchased the APRESA Base Software license (inherently without server hardware). This chapter contains all the supporting information that is needed to implement the APRESA software package on the server hardware of your choice.

The APRESA software runs under the LINUX Debian operating system and needs X86/PC compatible environment. (Note : 64Bit only)

Because APRESA offers great flexibility in number of recording channels, digital taps, analog taps etc., the hardware requirements depend mainly on the scale of the recording system to build. Also, the spare capacity issue for future expansion must be taken in consideration.



An APRESA that records only VoIP channels is a truly "Software only" solution. Recording POTS, ISDN, TDM etc. however require interface card(s) built in your target machine.

3.1. Hardware requirements

To support customers in the selection of the server hardware we present a guiding list below.



Note that APRESA requires a 64bit hardware platform.

Systems built according to the basic hardware requirements should perform well. When the system is large in terms of the amount of network traffic anticipated or the number of channels implemented/ simultaneous calls that have to be recorded please ask VIDICODE for advice.

CPU	: INTEL PENTIUM 64 BIT; (3 GHz, dual core, 4M cache, 800 or 1066 MHz FSB)
RAM	: 4 GBYTE 800 MHz DDR2 or better;
ETHERNET	: 1x standard (+ one extra when using a separate VOIP LAN)
HARD DRIVE	: 1 (Or more with RAID1 or RAID5) 1000 GBYTE or larger; NO hardware RAID controller required as the system uses software RAID.
DVD DRIVE	: 22X speed
PCI/SLOTS	: 1 PCI (or 1 PCIe X1) slot for every interface card to be installed.
PSU	: 300W
Note	1: No special requirements regarding peripheral interfaces like USB, COM, LPT etc. 2: The display adapter is used for text-only and is only used during software installation. There are no special requirements.



We advice you to connect the DVD drive to the highest numbered SATA interface on the mother board. The hard drive(s) must be connected from SATA-0 and up.

3.2. Interface card installation procedure

(Skip this chapter if you are working on a VoIP-only system inherently without interface cards)

The interface cards are all PCI (PCI-e) based PC expansion cards.



BEFORE INSTALLATION OF THE INTERFACE CARD(S) ALWAYS:

- SHUT DOWN THE SYSTEM
- REMOVE MAIN CORD (-s)
- DISCONNECT ALL PERIPHERALS
- WORK IN AN ESD SAFE ENVIRONMENT

Procedure in detail :

- Shutdown the APRESA by using the WEB page(LOGON,->TOOL->SYSTEM->SHUTDOWN (The shutdown may take some time so wait patiently until the red power LED turns off).
- After this controlled power down, disconnect the mains power plug (note : in case the APRESA is equipped with redundant power facility, remove BOTH mains power plugs)
- Open the chassis by removing the 2 screws of the top cover plate to gain excess to the PCI(PCIe) expansion slots. (only for VIDICODE, other vendors hardware may be opened differently, refer to the documentation supplied by your typical hardware vendor)
- Locate a free PCI or PCI-e slot to accommodate the interface card you want to install.
- Unscrew the blind plate bracket that corresponds with the PCI expansion slot to use.
- Mark the type of card (like POTS, TDM etc.) for future reference.
- Carefully insert the interface card accurately in the PCI (PCIe) expansion slot and lock the card-bracket using the screw. In case the interface card has a RJ21 type connector check both its bail locks to move freely outside the housing prior to fixation.
- Optionally you can add the top-bracket to secure the interface card firmly in the PCI socket. Doing this is important with the (older) long interface cards. All new interface cards are quite short and will be mechanically fixed stable enough by only the card-bracket screw.
- Reposition the top cover and fixate the screws.

APRESA can take a number of interface cards depending on the specifications of the motherboard and the chassis.

F.i. Supermicro C2-SBC-Q : 4 slots PCI and 2 slots PCI+ makes totals to 6 cards.

F.i. Supermicro X9-SCM : 4 slots PCI+ so totally max 4 cards

F.i. ASROCK E1350M1 : 1 slots PCI+ so totally max 1 ATP or DST card & limited to max 8ch

3.3. Software installation procedure from the CD



THE IMAGE CD USED BY THIS INSTALLATION PROCEDURE
CONTAINS THE LINUX 64BIT OPERATING SYSTEM *AND* THE
PROPRIETARY APRESA APPLICATION SOFTWARE



IF THE SYSTEM USES **ONE** OR MORE INTERFACE CARDS ALWAYS INSTALL
THESE CARDS
PRIOR TO SOFTWARE INSTALLATION

FIX :

If the APRESA base software is already installed without interface cards for whatever reason, run from the WEB-interface: Tools->System->Install Driver.

3.3.1. Attach monitor & keyboard

Always attach a monitor & keyboard to follow the progress of the software installation and to:

- Change BIOS settings;
- Give a confirmation to overwrite current hard drive content if the hard drive you want to use is not empty;
- Type the pass phrase, if the hard drive is to be encrypted during installation and at each reboot;

3.3.2. BIOS setup

(Note : Controls used below refer to Phoenix BIOS, other BIOS manufacturers may be different)
Enter the BIOS configuration menu by pushing **[DEL]** repeatedly, directly after power on. This can take up to 1 minute.

Select: "**GENERAL SETTINGS**" :

- SET: DATE & TIME;
- SET: HARD DRIVE Pre-Delay to 6 seconds.

Select : "**BOOT SETTINGS**" :

- SET : boot-sequence to: ① DVD , ② IDE0, and if more HD-s ③ IDE1 and further. .



When installing the RAID1 or RAID5 version of APRESA you must set the BIOS-
setting for RAID to
NO RAID
(RAID is handled by software)

Select : "**SAVE & EXIT**" (enter : **[F10]** & **[Y]**)

3.3.3. Prepare an installation CD

The quick guide lists the links to the 5 different APRESA images. Ask VIDICODE sales for a quick guide if you don't have one at hand. The various images support different hard drive configurations and the encryption feature. According to your requirements, select one of the images for download, burn it to a CD and to start the installation as described further in this chapter.

Use any CD writer software to burn the image to create an APRESA installation CD.
(a nice freeware CD-burner-tool can be downloaded from <http://www.imgburn.com>)

Note if you are installing a RAID image (only NORAIID with the APRESA Compact):

HARD DRIVE CONFIGURATION	NO OF HARD DRIVE REQUIRED
NO RAID	1
RAID 1	2
RAID 5	3

3.3.4. Installation from CD

Insert the APRESA installation CD into the APRESA and restart the system. The installation process should start automatically. If installation does not start, make sure the CD drive is in the bootable devices list. (Check in the BIOS). When asked for, select a hard drive for installation and confirm the partitioning of that hard drive. From this point on the installation should proceed automatically without further user interaction. The installation process usually takes less than 30 minutes. The end of the installation is signaled by the ejection of the installation CD and the 'System Halted' message.

Initial start-up

Connect the APRESA system to Ethernet. On the VIDICODE-made APRESA hardware, this slot is marked with "PC". Remove the installation CD, and restart the APRESA system by pushing the 'RESET' button. The system should now boot the newly installed APRESA application. If the system uses RAID, the hard drives synchronizing process will start. Depending on the size and speed of the hard drives, synchronization may take several hours to complete. Allow the hard drive synchronization to finish without power interruption. The system can be accessed during synchronization.

Accessing APRESA for the first time

The complete control over the APRESA is by WEB interface only. The next section helps you in setting up the web connection with the APRESA by the use of web browser on your work PC.



APRESA IS ACCESSED BY WEB INTERFACE

The WEB interface is for normal use and configuration. Only under special circumstances the user may need access to the system shell. This is achieved by connecting a monitor & keyboard directly to the APRESA.

After the software installation the APRESA has a STATIC IP address:

IP (STATIC) = 192.168. 55. 55
SUBNET MASK = 255.255.255. 0

Static settings make it easy to find the APRESA on Ethernet but note:

TO ACCESS THE WEB-INTERFACE OF THE APRESA YOUR PC MUST HAVE AN IP-ADDRESS IN THE SAME IP-SUBNET AS THE APRESA

Define the APRESA IP on the work PC

To access the APRESA web interface, you need to configure your work PC to have an IP address in the same subnet as the APRESA system. This means that your work PC should have an IP address in the range from 192.168.55.0 to 192.168.55.255, for example 192.168.55.10. This can be done as follows:

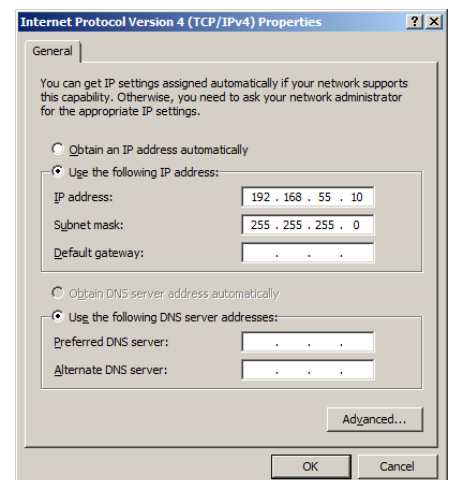
- Open the list of Network Connections (Windows Control Panel)
- Select your network connection, right-click and select Properties
- Select "Internet Protocol Version 4 (TCP/IPv4)", and click "Properties".

You should see something like the screen displayed on the right.

A. If "Obtain an IP address automatically" is enabled, then it is necessary to switch temporarily to a static IP address, as follows:

- Enable "Use the following IP address"
- As IP address, fill in: 192.168.55.10.
- As Subnet mask, fill in: 255.255.255.0

B. If the PC was already set to a static IP address, but in another subnet, then it is possible to add an extra IP address to the PC configuration.



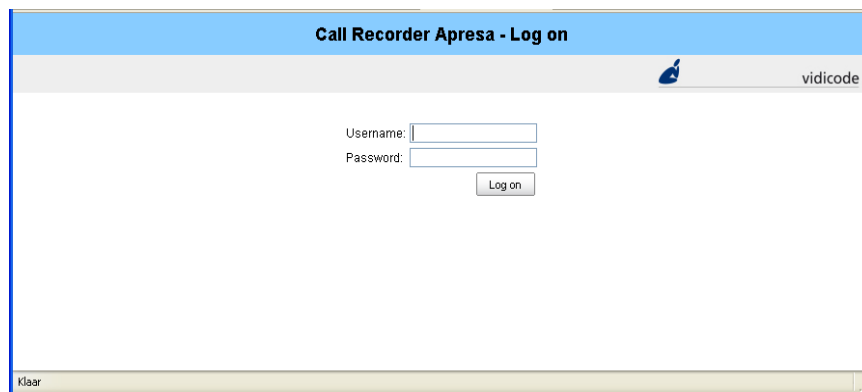
- Click "Advanced..."
- Click "Add..." in the IP address box (not the gateways)
- As IP address, fill in: 192.168.55.10.
- As Subnet mask, fill in: 255.255.255.0

After this adjustment, it should be possible to access the APRESA web interface from the PC. Test this by sending a ping 192.168.55.55, you should get a response .

APRESA Login

To access the web interface, start the web browser, and browse to <http://192.168.55.55>

The Log on screen of the APRESA web interface opens:



The primary account username is "admin".

The password to this account by default is "admin".

The account 'admin' is the primary account for system administration.

First time APRESA network configuration

It is important to change the default assigned static IP network address of the APRESA system either to another static IP or use a dynamic IP.

The MAC address, if needed for DHCP configuration, can be found as follows:

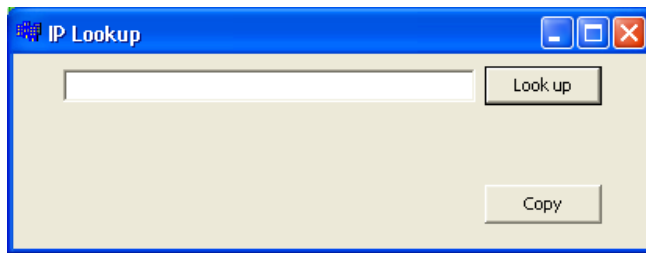
- In the **Tools** menu, choose **System**
- Click **System Information**

The MAC address relevant to the web interface is displayed after eth0.

The Apresa network configuration can be changed as follows:

- In the **Options** menu, select **System Settings**
- Move to the **Network** tab
- Adjust the network configuration to match that of the PC network in your organization.
- Click **Apply** and let the network restart

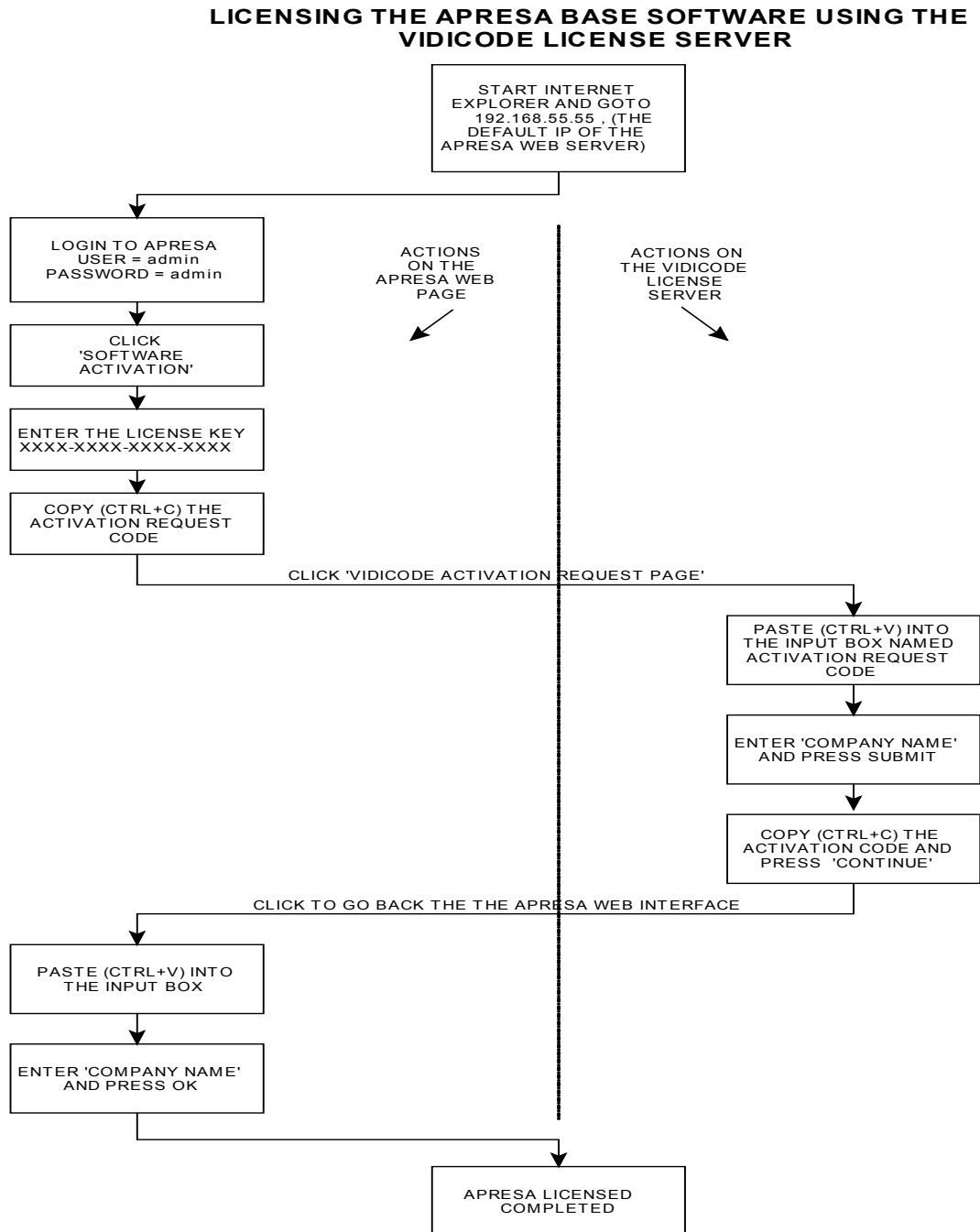
If after the restart, the new IP address of the Apresa is not known for some reason, the program Apresa IP Lookup can be used.



If this program cannot find the IP address, then the current IP address of the Apresa will be displayed on the monitor.
After this is completed, the network configuration adjustment for the PC that was discussed can be reversed.

3.3.5. APRESA BASE SOFTWARE License Activation

The diagram below shows the procedure to follow for the activation of the base license of the APRESA



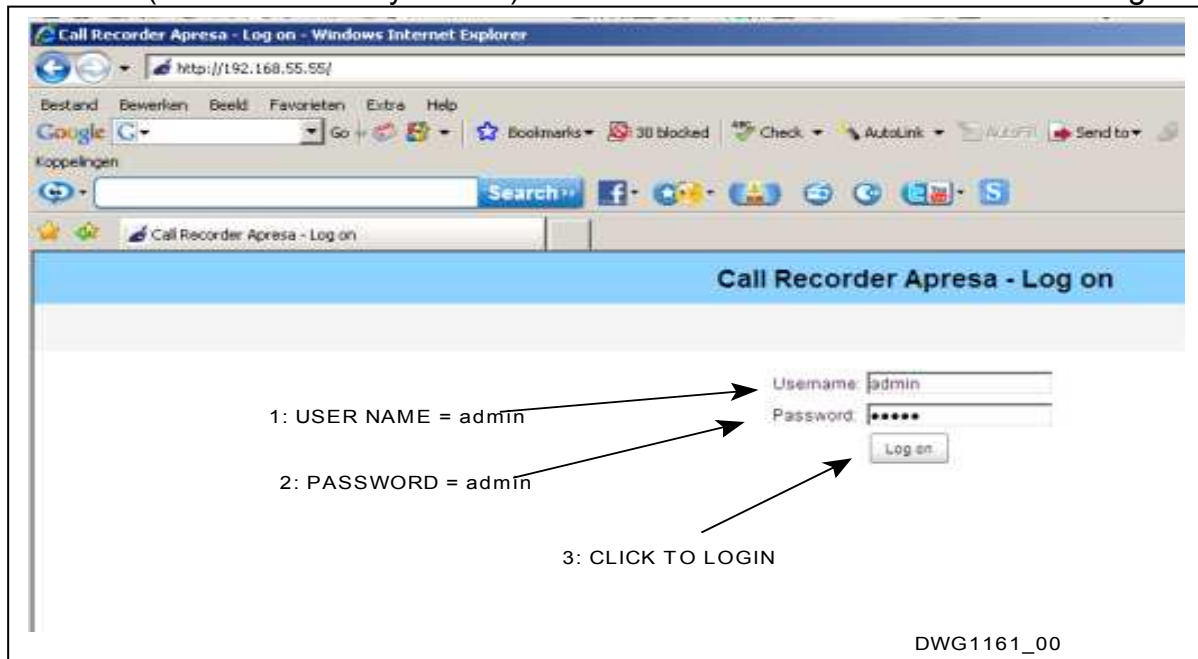
DWG1158_00

NOTE :

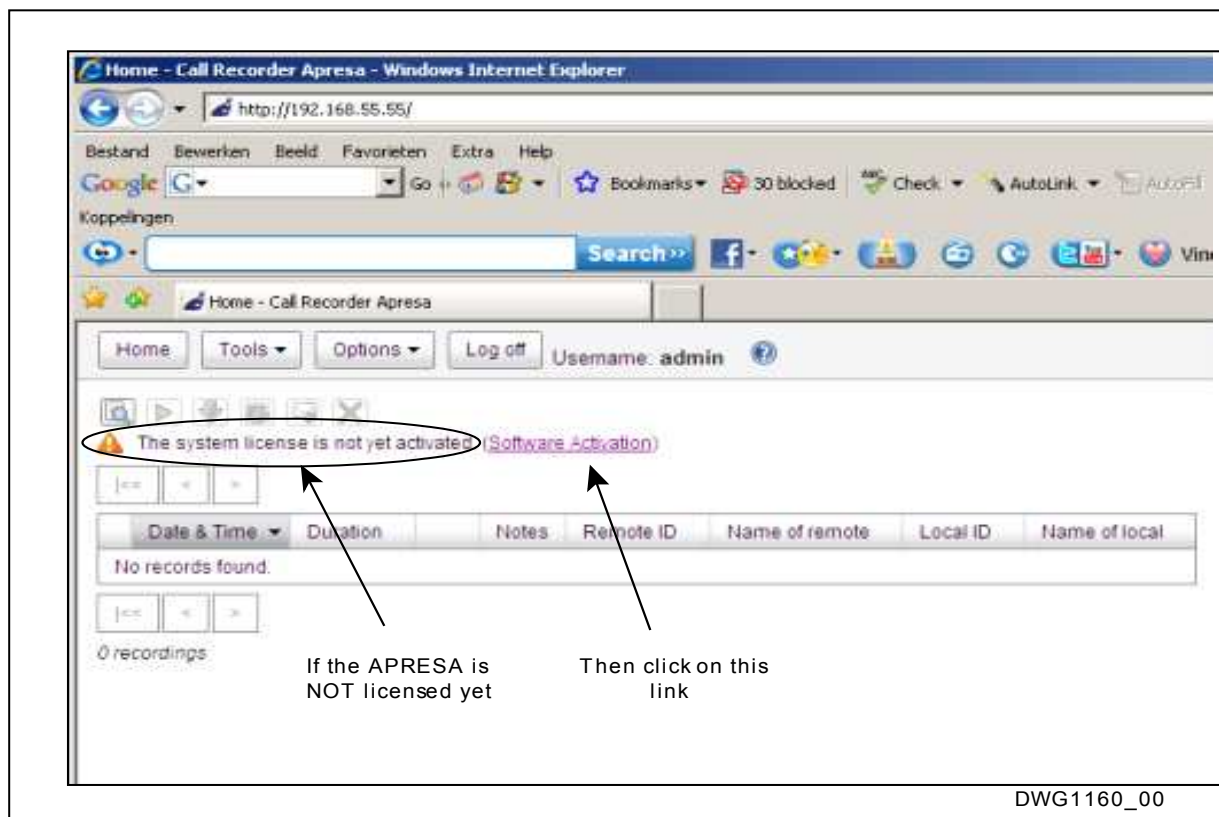
If you can't "click" on the APRESA web page to reach the VIDICODE license server go to : <http://www.vidicode.com/activation>

in detail :

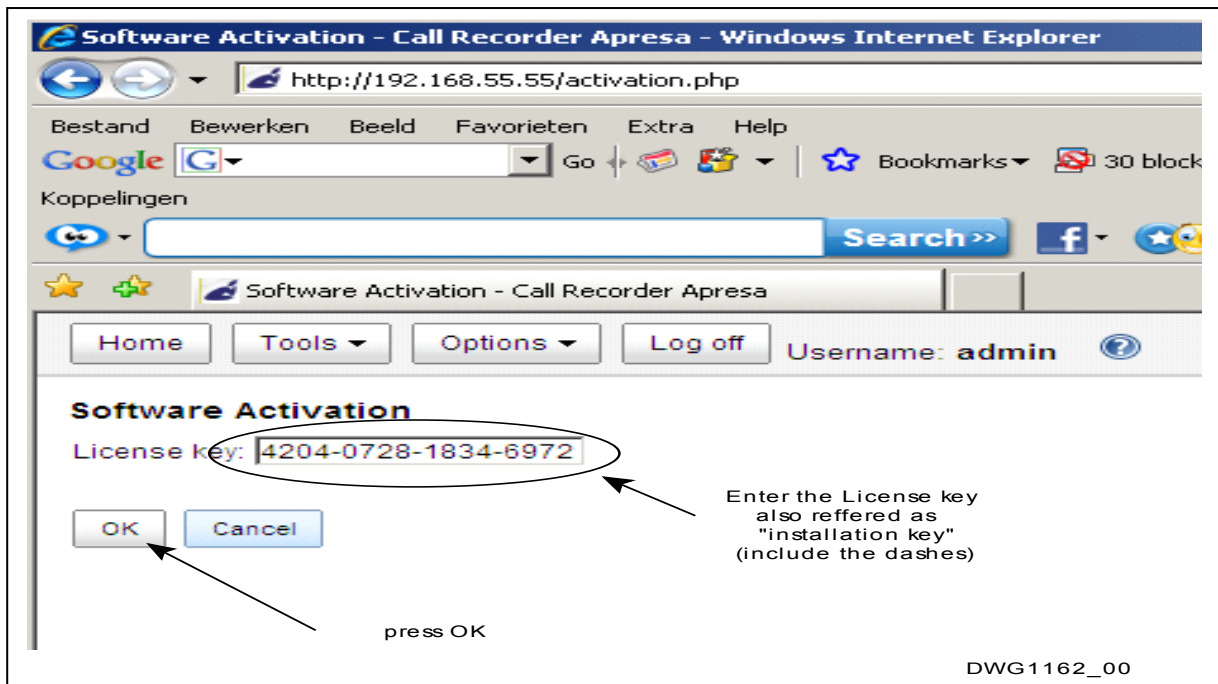
Start your web browser (e.g. Internet Explorer) and go to the IP address of the APRESA (192.168.55.55 by default). Enter Username & Password and click Log On.



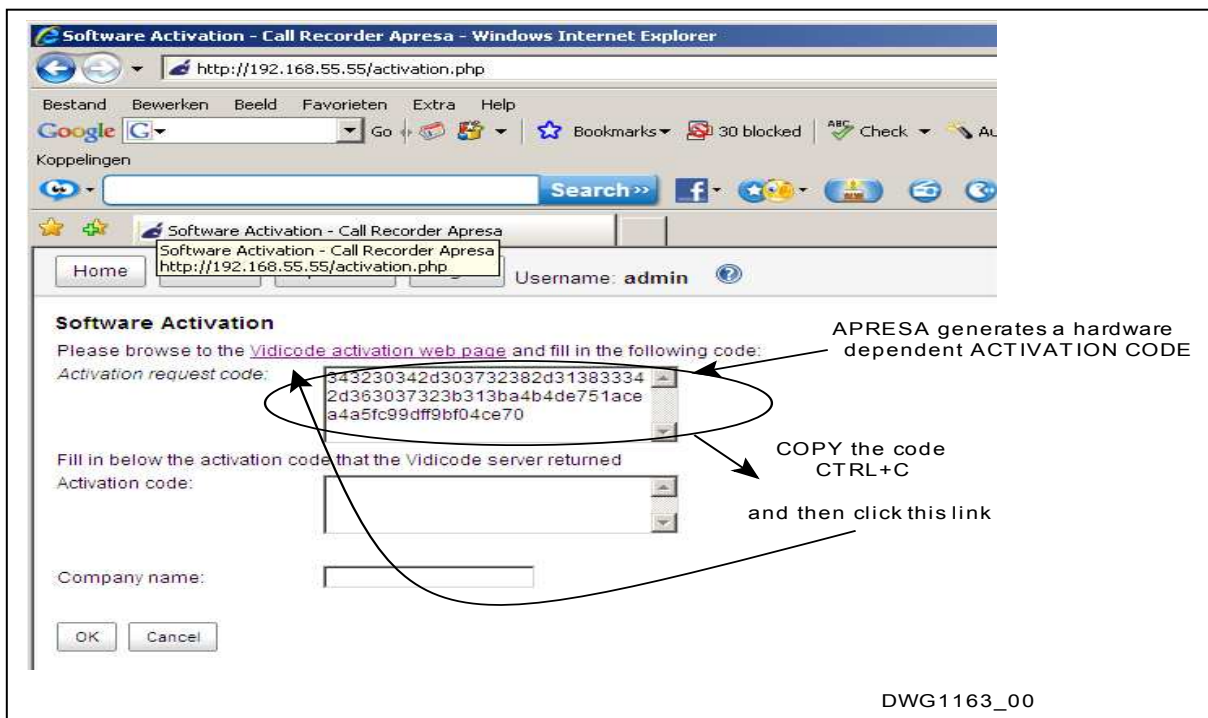
The 'Home' page will be displayed, see below. The page will notify that no license is activated yet. APRESA will ONLY record calls after proper licensing. Click on the link 'Software activation' to start the licensing procedure.



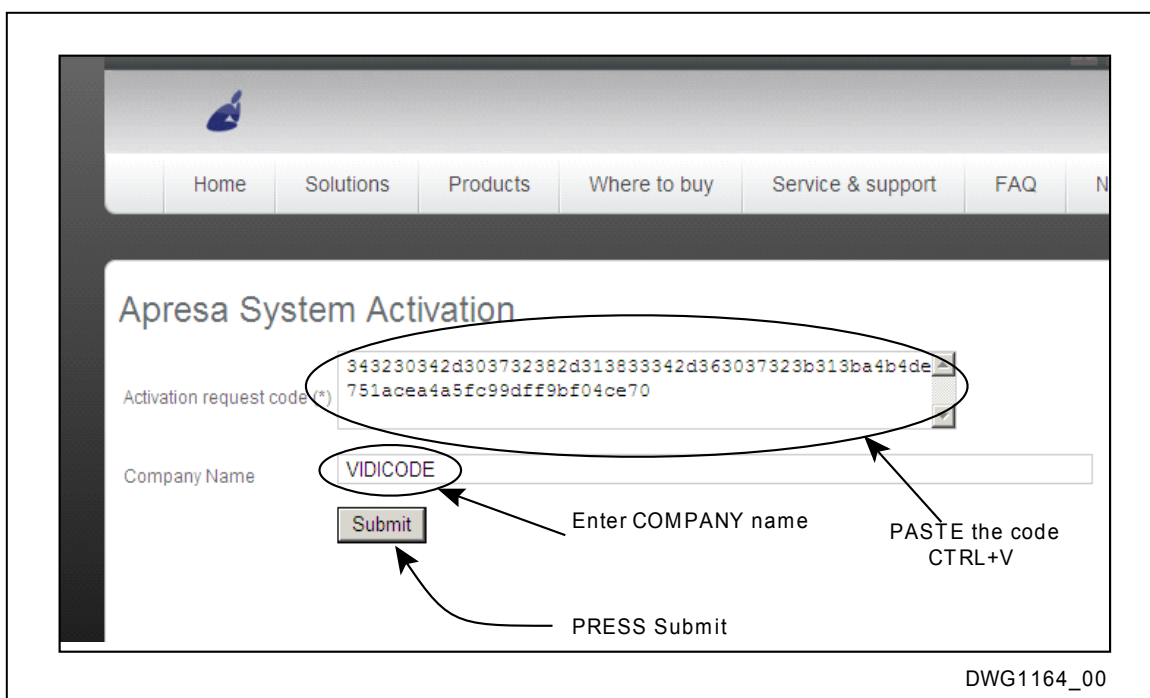
On the screen below, enter the license key and press ok



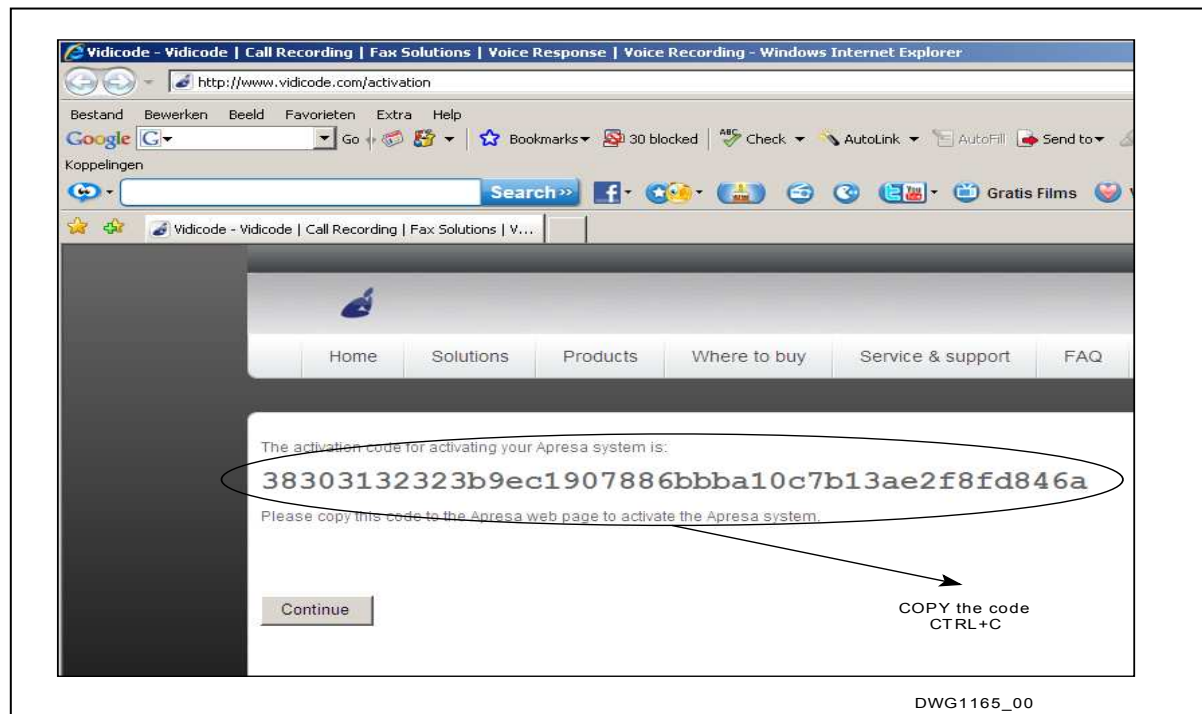
Next :



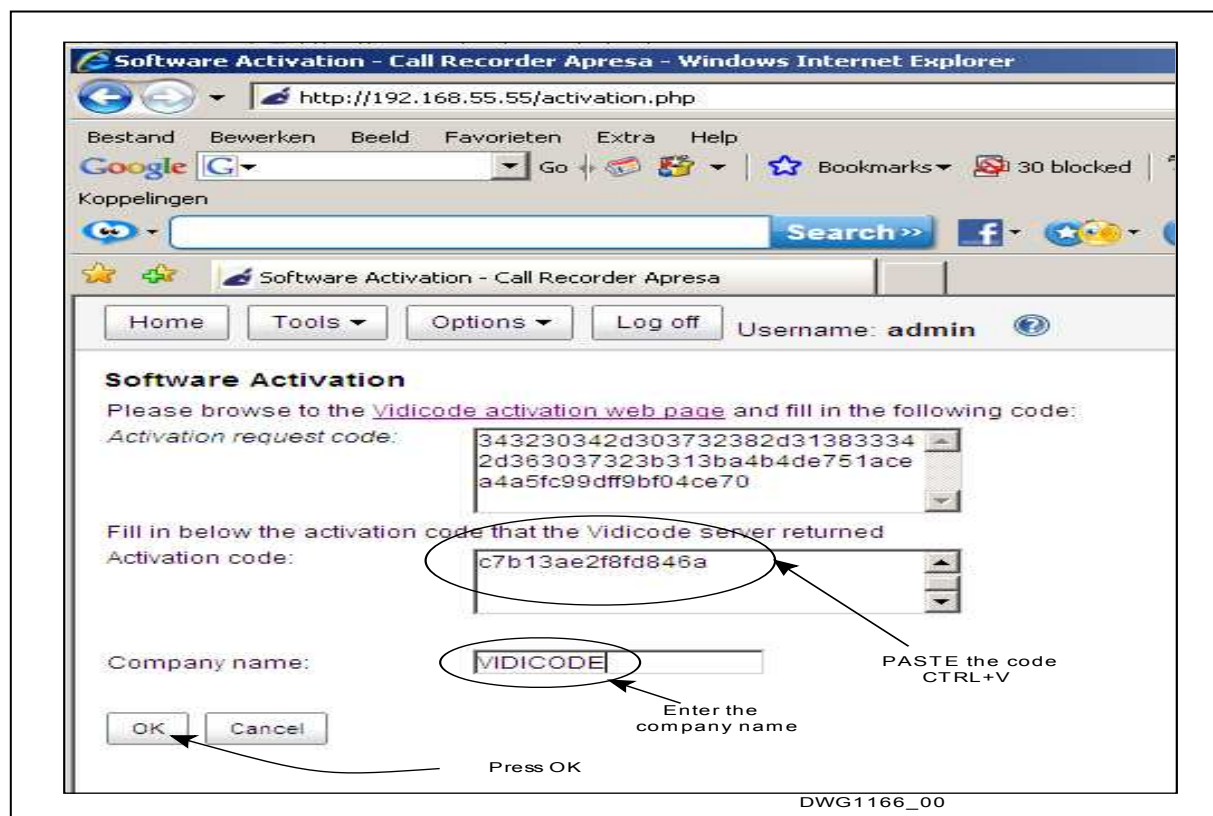
By clicking the link you will be connected to the VIDICODE license server WEB page.



On the screen below copy the activation code (select then CTRL+C)



Now go back to the WEB page of the APRESA and paste (CTRL+V) the activation code. Enter the Company name, followed by ok.



Now the activation is finalized.

To check the success of the activation, select from the APRESA main page:

Tools -> System -> System Information.

If the software serial number a realistic value (not 0 but a number larger then 80000) then the license is activated. Note that you need the software serial number to install recording channels on your APRESA. See the section "channel license activation".

3.3.6. Base Software Update

1. Log in as administrator (admin) in the web interface
2. Open the **Tools** menu, select **System**
3. Click the **Software update** button
- 4.

4-A. *When Apresa has internet connection*, click **Check for Update**. Then click **Download**. It will display a warning if calls are active now. Click **OK** if it is not a problem that these currently active calls will not be recorded. Depending on the speed of the internet connection, it might take a while to download the update.

Or...

4-B. *When Apresa has no internet connection*, download the update file from <http://www.vidicode.com/softwupd/apresa-update.tgz> to your PC. In the Apresa web interface, select this file on your PC, and click **Upload**.

After the file uploaded, or after Apresa has downloaded the update itself, Apresa displays that it is updating the system. When finished, Apresa displays the message that the update is installed.

5. To check the currently installed version, open the **Tools** menu, and select **System**.

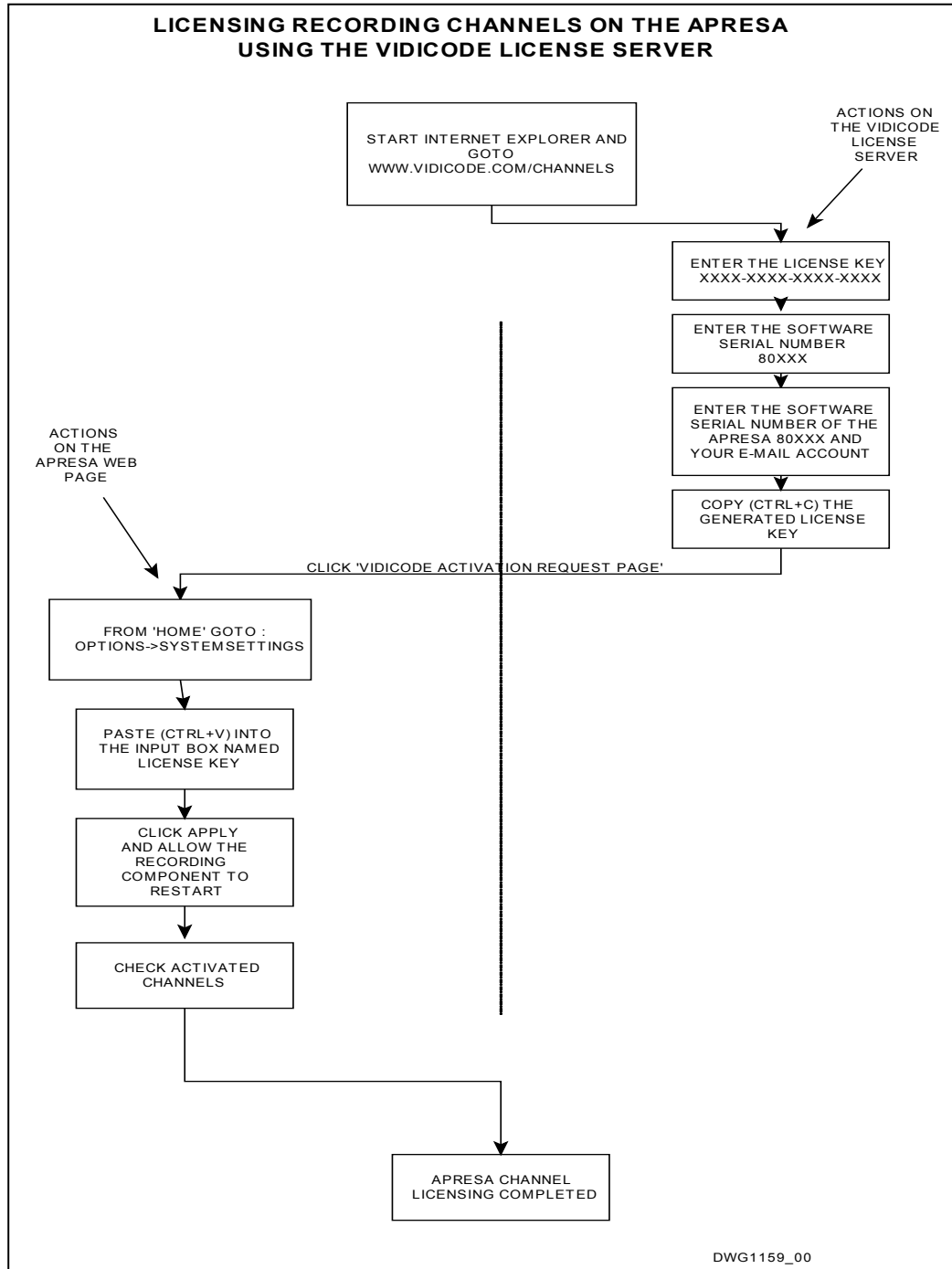
Note :

- 1- The update file works for the hard drive configurations : NORaid, RAID1 and RAID5
- 2- The update file works for the hard drive sizes : 500GB / 1T / 2T / 3T

3.3.7. Channel License Activation

The diagram below shows the path to follow for the activation of channel licenses on your APRESA :

(Channels can only be installed AFTER the installation of APRESA base software)



NOTE :

If you can't "click" on the APRESA web page to reach the VIDICODE license server go to : <http://www.vidicode.com/channels>

After the system license is activated, it is possible to activate the channel licenses that you have purchased. The system will not record until one or more channel licenses are installed.

- Go to the APRESA WEB-homepage, click : **Tools -> System -> System information** and copy (CTRL+C) the "Software serial number" that is displayed;
- Click **Options -> System settings > Activate new channel license**. This will open the VIDICODE channel license server on the internet;
- Enter the license key of the channel license (including the dashes);
- Paste (CTRL+V) the serial number of the machine;
- Optionally enter an e-mail address to send the generated license key;
- Click **Submit**
- Copy (CTRL+C) the generated license key that is displayed
- Move back to the APRESA web interface, and paste (CTRL+V) the key into the License key input box
- Press **Apply** and let the recording component restart.

On success, the number of channels should be updated and displayed in the APRESA web interface. (click : **Tools -> System -> System information**)

The APRESA system is now ready for recording the new channel(s).



NOTE

The software and channel installation need no special attention regarding software drivers for the interface cards. All the interface card drivers are installed automatically and completely without user concern. So, for instance, if you change from SIEMENS to AVAYA TDM you don't have to install different interface card drivers. All you have to do is to change the setting to AVAYA. All PBX that are listed in the compatibility list can be selected without the need to change software drivers.

3.3.8. Codec License Activation (optional)

After the system license and recording channels are activated, it is possible to activate the codec licenses that you have purchased.

- Go to the APRESA WEB-homepage, click : **Tools -> System -> System information** and copy (CTRL+C) the "Software serial number" that is displayed;
- Click **Options -> System settings > Activate new channel license**. This will open the VIDICODE channel license server on the internet;
- Enter the license key of the codec license (including the dashes);
- Paste (CTRL+V) the serial number of the machine;
- Optionally enter an e-mail address to send the generated license key;
- Click **Submit**
- Copy (CTRL+C) the generated license key that is displayed
- Move back to the APRESA web interface, and paste (CTRL+V) the key into the License key input box
- Press **Apply** and let the recording component restart.

On success, the number of codec's should be updated and displayed in the APRESA web interface. (click : **Tools -> System -> System information**)

The APRESA system is now ready for recording using these codec(s).

3.3.9. General APRESA configuration

The next step is to configure the APRESA to meet the specific needs of the owner or organization. This is typically done by the assigned administrator employee. Please refer to the Admin manual for further instructions. The Admin manual can be found on the Application CD and on www.vidicode.com and www.callrecorderapresa.com

3.4. APRESA and Virtual Machines

For installation under "VM-WARE"

- Check the correct ISO-file for installation
- Select a LINUX DEBIAN 64 Bit environment to run APRESA.
- Turn on the BIOS setting "virtual machine". (under device configuration or system security)

4. MOUNTING

This chapter describes the mounting of the “made by VIDICODE” version of the APRESA server. If you use another brand of server then things may be different in your situation.

A full APRESA installation involves the following steps:

- Choosing the location to install the unit;
- Fixing the unit on the selected location;
- Apply power;
- Telecom or network wiring.

4.1. Location considerations

The environmental requirements for reliable and safe operation of an APRESA server are in general quite standard for systems based on PC technology:

- Clean office environment / server room;
- Protection from direct sun light;
- Restricted access;
- Temperature 0-40 °C;
- No vibration;
- FLAT surface when used as desk top.

As the best location, we advise to install the APRESA server in your computer server room. Always install the APRESA server in close proximity of the PBX and phone patch panel as there are maximum cable length restrictions to deal with.

The APRESA call recorder is capable of recording various telephone systems:

- VoIP telephony;
- POTS telephony;
- TDM telephony ;
- ISDN-2 telephony;
- ISDN-E1 or ISDN-T1 telephony;
- Or a combination of the systems above.

When an APRESA server is required to interface to various different telephone systems (e.g. VoIP and POTS combined) it may sometimes be difficult to meet all maximum cable length restrictions required by the various telephone systems. When you have to make trade-offs in cable planning realize that some systems are more forgiving / tolerant than others:

Less critical system in terms of wiring →

AUDIO	POTS	ISDN2	TDM	ISDN-E1/T1	TETRA / VOIP
-------	------	-------	-----	------------	--------------

4.2. Mounting APRESA into a 19 inch rack

The APRESA server is designed to fit in standardized 19-inch server racks and will take 4U in height. Depending on the telecommunication system to be tapped up to 4 patch panels (each 1U in height) may be involved in the total installation and need to be considered when planning cabinet space.

The required depth in the rack is 45cm for the APRESA unit. For proper cabling you must reserve an extra 10cm wire space minimal.

The power consumption of the unit is low enough not to affect the thermal balance of the neighbor-equipment placed above and below. You must always check not to block the airflow on adjacent equipment. To be safe, just have 1U space unused on both sides of the APRESA.

For easy access after installation we advise to use the optional available sliders (ART 090.04090).

Use 4 sets of standard screws & cage nuts to fixate the APRESA in the 19" -RACK (not supplied).

4.3. Apply power to the APRESA.

THIS EQUIPMENT MUST BE EARTHED FOR SAFETY REASONS

The APRESA can be powered from any (EARTED!) 90-260Vac mains outlet.

The power consumption of the APRESA is labeled on the housing and is in the range of 80-120W, depending on interface cards- and storage (hard drive) options.

If the tapped communication system is powered by a UPS you may consider to feed the APRESA also from the UPS enabling recordings to continue during power interruptions. Note that tapped telecommunication lines will not be influenced by a power down of the APRESA.

Critical applications may use a redundant power supply. This option is easily identified by 2 IEC mains power inlets at the back of the APRESA. Both inlets must be individually connected to mains, preferably on different main groups in the electrical installation or different PSU-s. Refer to chapter 11 for more information on redundant power supplies.

The APRESA chassis should (and must) be grounded for safety reasons, according to standard industry requirements. A simple way to comply is using the third pin on the APRESA-PSU power inlet. Using a good quality standard (earthed) mains cable and insert it to an EARTHED mains source. No or improper grounding may cause instability in operation as well as unsafe situations.

5. TELECOM WIRING

5.1.Introduction

The APRESA can be used to record from a wide variety of different signal sources spanning from simple audio lines to the more complex ones like ISDN and VoIP networks.

In the table below you find the various source characteristics listed

OVERVIEW OF WIRING CHARACTERISTICS							
REF	AUDIO	ANALOG (POTS)	TDM (PBX<->TEL)	ISDN2 (BASIC RATE)	ISDN E1/T1 (PRIMARY RATE)	TETRA	VOIP
GROUP	NOT NETWORK BASED	TRADITIONAL TELEPHONE NETWORKS				ETHERNET-BASED TELEPHONE NETWORKS	
INTERFACE CARD	ATP		DST		DTP	N/A	
WIRING	?	UTP (CAT3 or better)				100/1000 ETHERNET (CAT5)	
2/4 WIRE	2	2	2 OR 4	4	4	N/A	
CARD CONNECTOR	RJ21				1,2 or 4 x RJ45	RJ45	
RJ11 PATCH	YES				NO		
RJ45 PATCH	NO	YES			NO		
EXTRACTION	HIGH IMPEDANCE PASSIVE TAPPING					RTP MIRRORING	

Interface card

This parameter specifies the type of the interface card capable of capture the specific signal. The call recorder APRESA supports 3 types of interface cards:

ATP-type – Interface Cards:

-Interfaces to ANALOG signals. One card supports 8,16,or 24 channels.

DST-type - Interface Cards:

-Interfaces to DIGITAL (TDM or ISDN2) signals. One card supports 8,16,or 24 channels.

DTP-type – Interface Cards:

-Interfaces to DIGITAL signals. One card supports 1,2 or 4 trunk lines
= 30 channels E1 / trunk line or 24 channels for T1 / trunk line

Depending on the requirements of your implementation of APRESA, interface cards may be a necessary part of your system. APRESA can hold up to 6 interface cards (4PCI+2PCIe) as absolute maximum. A special chapter is dedicated to the specification of the interface cards. For TETRA and VOIP recording NO special interface card is needed. These networks are Ethernet based and both use the designated Ethernet port located on the PC motherboard.

WIRING

Type of wiring used. Note that for 'AUDIO' you have to make a technical choice depending on the situation at hand.

2 / 4 wire

This number specifies the number of wires to tap in order to record both/all participants in a conversation. Basically this is the number of wires that is used to establish the communication link. A 2-wire link is normally an unshielded twisted pair (UTP). A 4-wire link is normally built with 2 UTP-s, one for the UP-link and one for the DOWN-link.

Pay attention when tapping TDM, either 2 - or 4 wire links are used by the different PBX manufacturers.

When interfacing 'AUDIO' you normally deal with a 2 wire connection with ONE source.

CARD CONNECTOR

This line lists the connector type on the APRESA server.

In case of RJ21 you can connect (soldering) directly your signals to this connector. Also a patch box is available to avoid soldering.

The RJ45 connectors on the DTP interface cards must be connected in parallel using a so called 'T' splitter

EXTRACTION

All interface cards mentioned extract the signals to be recorded based on 'high impedance tapping' meaning that the original signal is extracted with minimal electric disturbance. Depending on the type of PBX, the cable length between the APRESA recorder and the TAP- point (the "stub length") can be up to 6 to 20 meter.

For 'Audio' recording 'high impedance tapping' is not always wanted. Depending on the situation some kind of line-termination may be necessary.

When recording VoIP or TETRA, the 'Ethernet' based networks, you must configure port mirroring switches in order to feed the RTP packets to the APRESA VoIP Ethernet port.

RJ11 PATCH

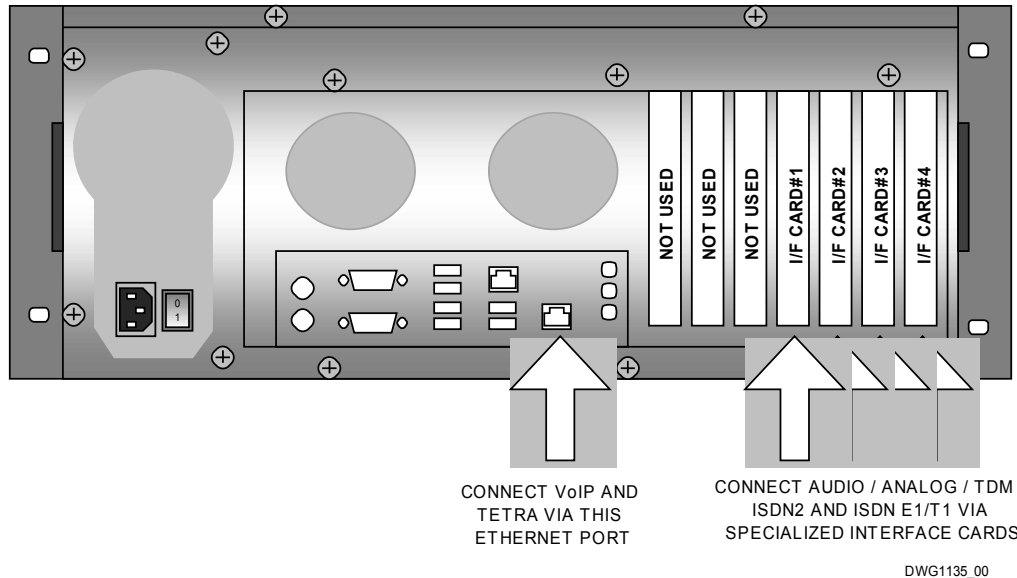
-Indicates the compatibility with the simple 24 channel RJ11 patch panel.

RJ45 PATCH

-Indicates the compatibility with the splitting 24 channel RJ45 patch panel.

5.2. Connector locations

The connectors involved with the telecom signals can all be found on the back side as shown in the example below:



The VoIP and TETRA connections are of CAT5 / CAT6 Ethernet type. Thanks to the world wide standardization, no serious wiring issues are expected. The focus with these networks is on the configuration of the network elements like switches and routers.

All other (old school) telecom infrastructure is interfaced via (optional) specialized interface cards. Depending on the existing wiring of telephone installation that must be tapped you can follow different paths to do the job right. The focus here is tracing the wires that carry the desired signal and how to make an easy TAP to feed the signal to the APRESA.

In the next sections you find the general remarks

5.3. General remarks about wiring

APRESA channels that use interface cards never deals with any line termination.

APRESA is generally installed to tap **existing** telecom networks where we have to deal with all kind of wiring systems, modern and old.

APRESA monitors the communication line to be recorded electrically "in parallel". As a result we will have to make "T" junctions. For the RJ modular connection system one can use readily on the market available "T" splitters (RJ12 or RJ45)

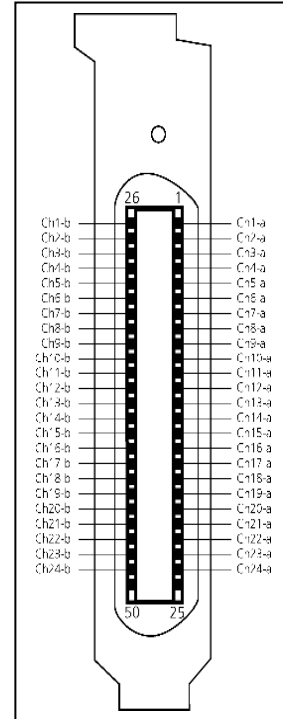
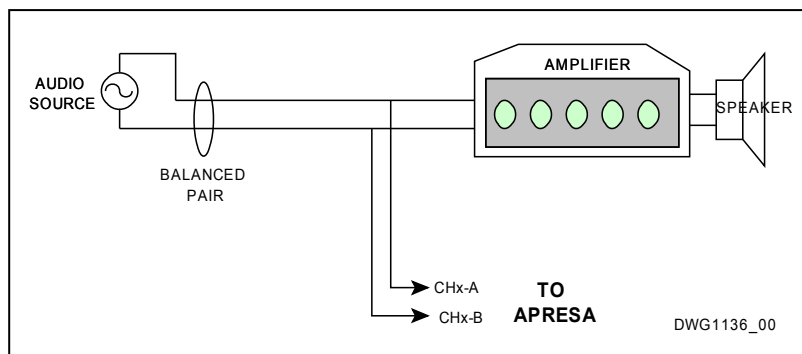
5.4. Wiring audio TAPs

The interface-card that is used to make AUDIO taps is the ATP-card. See chapter 13.1 for the specification and the connections of this type of interface card. This is also the wiring method for (mobile) communication transceivers used by police etc. These radios must have an audio output for the mixed microphone/speaker signal.

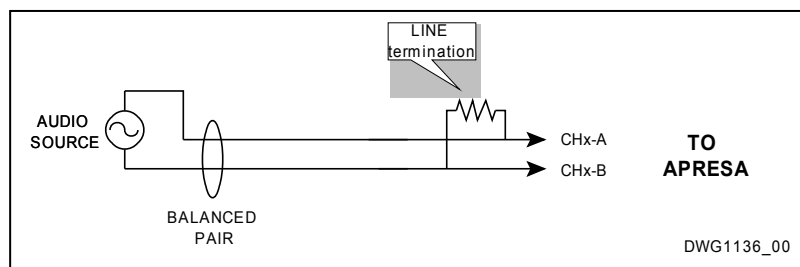
For the pin assignment of the RJ21 connector **on the interface card** see the figure on the right. Every channel needs 2 wires CHx-A and CH-x-B.

5.4.1. Balanced signals

It is preferred to feed balanced pairs to the interface card. This will give the best results in terms of hum and other distortion. Every analog input of the APRESA is build with individual line transformers and DC blocking capacitors, in a truly balanced configuration.

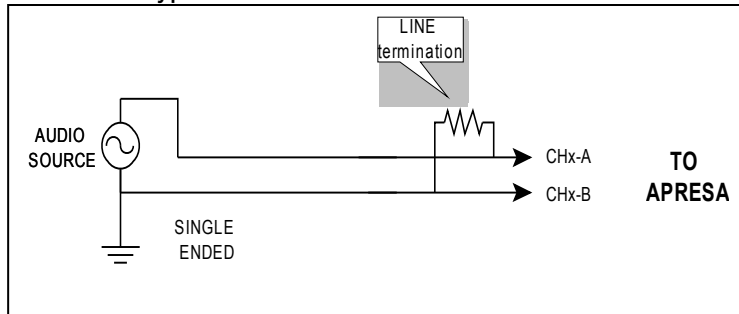


The interface card will not provide any realistic line termination, so if the audio line is not terminated by other equipment (typically an amplifier) you probably want to add a line terminator in some situations. If you want, f.i. 600 ohms line termination you have to provide the 600 ohm termination resistor externally.



5.4.2. Un-balance signals

Unbalanced signals (also called "single ended" signals) also have 2 wires, the signal wire and the ground wire. Because the channels on the analog interface card are isolated in respect to all other channels and to ground, connecting unbalanced signals is no different than the balanced connection type.



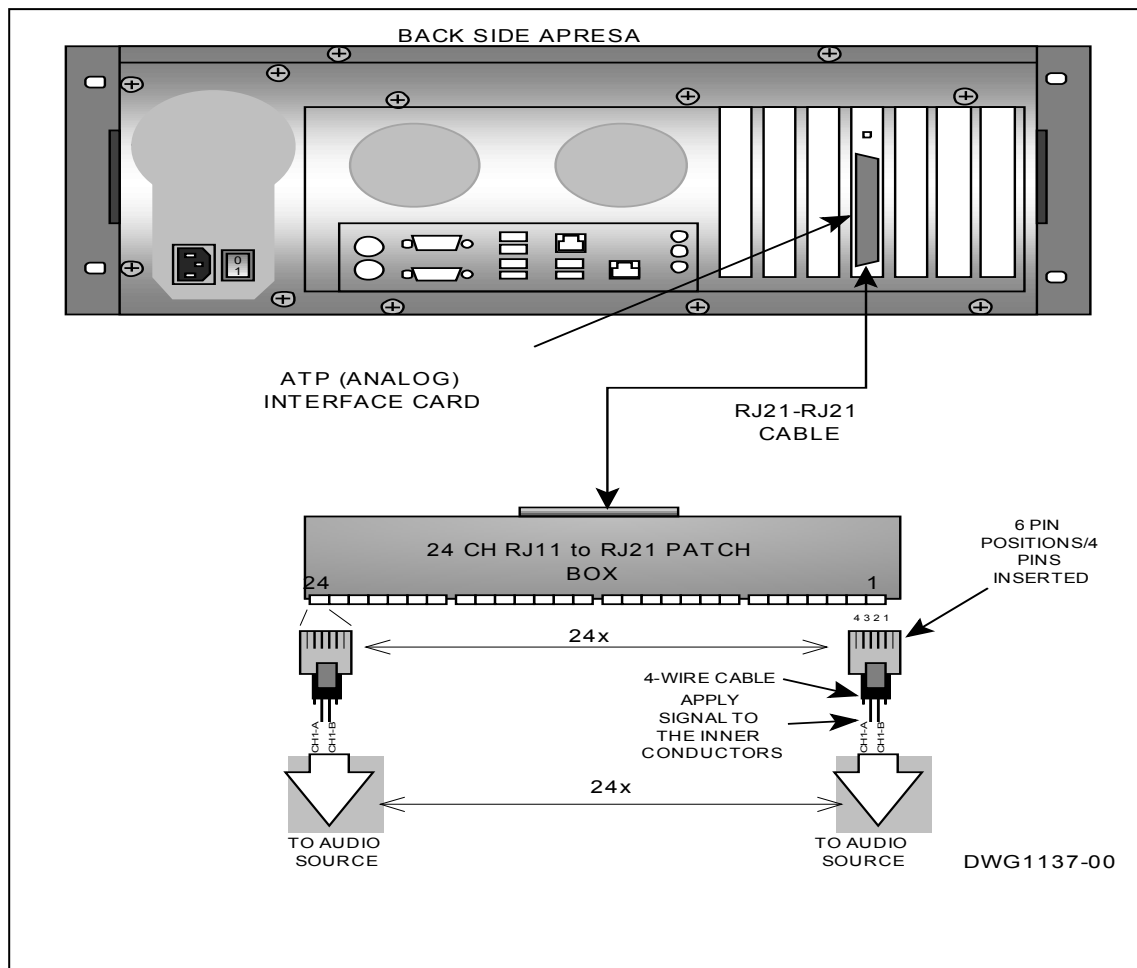
When dealing with an unbalanced signal we advise only to use the best quality of shielded cable that is kept as short as possible.

5.4.3. Wiring using the RJ11 Patch Box

To ease the wiring job, all analog interface boards are supplied with a RJ11 patch box and a RJ21/RJ21 cable 1meter in length. (Optionally lengths of 3,5 and 10m are available)



Connect the Patch Box to the APRESA:



The RJ11 Patch Box supports 24 channels. Each channel on the Patch Box has its own RJ11 inlet connector. Note that the RJ11 modular connector has 6 pin positions of which only 4 are in fact having contacts. RJ11 is also referred as a 6P4C modular connector.

5.4.4. Direct wiring (NOT using the RJ11 Patch Box)

Following this way of installation, possible with ATP- or DST-cards, the supplied cable will only have one RJ21 connector and an open end. After stripping the outer sleeve of the open cable end one will have access to 25 colored twisted pairs. Only 24 twisted pairs represent the recording channels, the 25th twisted pair has no function and can be ignored.



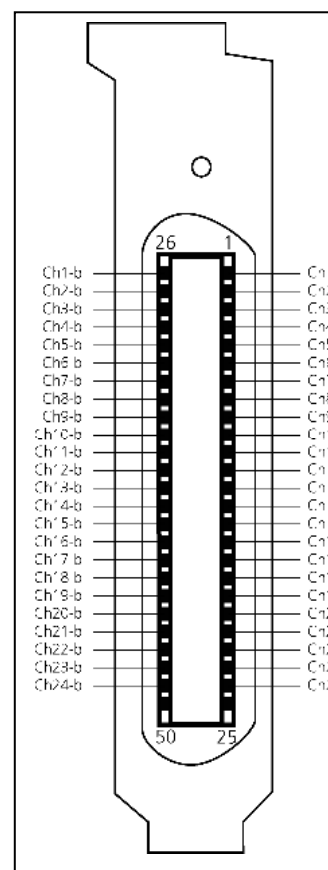
2 DIFFERENT COLORING SCHEMES ARE USED
SIMPLE OHMIC MEASUREMENT BY YOU IS NEEDED TO FIND OUT THE COLORING SCHEME TO FOLLOW

Follow the CORRECT table below to find a particular channel twisted pair.

For instance when locating the wires associated with **channel 9**, look for the colors of **PAIR # 9** in the !! CORRECT !! table below, and find the wires (SCHEME #1) identified by a **RED** wire & **BROWN** wire !! AND !! twisted together.

PAIR #	COLORING #1 :	
1	WHITE	BLUE
2	WHITE	ORANGE
3	WHITE	GREEN
4	WHITE	BROWN
5	WHITE	GREY
6	RED	BLUE
7	RED	ORANGE
8	RED	GREEN
9	RED	BROWN
10	RED	GREY
11	BLACK	BLUE
12	BLACK	ORANGE
13	BLACK	GREEN
14	BLACK	BROWN
15	BLACK	GREY
16	YELLOW	BLUE
17	YELLOW	ORANGE
18	YELLOW	GREEN
19	YELLOW	BROWN
20	YELLOW	GREY
21	PURPLE	BLUE
22	PURPLE	ORANGE
23	PURPLE	GREEN
24	PURPLE	BROWN
25*	PURPLE*	GREY*

PAIR#	COLORING #2 :	
1	BLACK	GREY
2	BLACK	BROWN
3	BLACK	ORANGE
4	BLACK	GREEN
5	BLACK	BLUE
6	RED	GREY
7	RED	BROWN
8	RED	ORANGE
9	RED	GREEN
10	RED	BLUE
11	YELLOW	GREY
12	YELLOW	BROWN
13	YELLOW	ORANGE
14	YELLOW	GREEN
15	YELLOW	BLUE
16	PURPLE	GREY
17	PURPLE	BROWN
18	PURPLE	ORANGE
19	PURPLE	GREEN
20	PURPLE	BLUE
21	WHITE	GREY
22	WHITE	BROWN
23	WHITE	ORANGE
24	WHITE	GREEN
25*	WHITE*	BLUE*



*) = This pair is not used / not connected.

NOTES:

- THIS IS SUPPORTING INFORMATION ONLY AND WE ADVISE YOU TO CAREFULLY CHECK THE CABLE YOU HAVE, AS ITS COLORING SCHEME MAY EVEN BE DIFFERENT FROM THE 2 SCHEMES LISTED ABOVE.
- THE CONNECTOR SHOWN AT THE RIGHT IS THE ONE ON THE INTERFACE CARD (ON THE PC BRACKET) AND THE NUMBERS 1/26 AND 25/50 ARE SWAPPED IN COMPAPRISON WITH THE NUMBERING PRINTED ON THE CONNECTOR BY THE CONNECTOR MANUFACTURER. WE USE THE SWAPPED NUMBERING TO KEEP COMPLIANCE WITH DOCUMENTATION OF THE INTERFACE CARD MANUFACTURER.

5.5. Wiring ANALOG TELEPHONY (POTS) TAPS

GOOD EARTHING OF THE APRESA IS IMPORTANT FOR THE CORRECT OPERATION OF THE ATP ANALOG INTERFACE CARDS. GOOD EARTHING IS MADE BY USING AN EARTHED WALL SOCKET FOR THE MAINS SUPPLY.

The interface card that is used to make POTS taps is the ATP-card. See chapter 13.1 for the specification and the connections of this type of interface card.

Wire taps of POTS-type telecom lines always involves *two* active wires per tapped telephone. For the APRESA the polarity of the signal is irrelevant and can be ignored during wiring. The wiring-type used to install the analog telephone system can very different as we see in the field:

- *Old fashioned twisted pair;*
Normally there are even 2 twisted pairs in the cable. The primary telephone is on the RED/GREEN pair and the secondary telephone (if any) is on the BLACK/YELLOW pair.
- *4 wire modular cable with RJ11 modular plugs (RJ11=6P4C);*
The inner 2 wires carry the signal of the primary telephone, while the outer two are used for the secondary telephone (if any).
- *8 wire modular cable (CAT5) with RJ45 modular plugs and the possible use of (standard) patch panels.*
This cable type is preferred for all new installations because of low cross talk figures. The cable contains 4 twisted pairs. Each twisted pair can connect a telephone. We see 1 or 2 telephones on these cables in the field. Technically however this cable can connect 4 individual telephones.

The installation needed is straight forward as all POTS extensions that must be recorded must be connected (by 2 wires) to an individual recording channel of the ATP interface card of the APRESA.

The analog/POTS wiring taps can be realized in 3 ways:

1. Direct wiring of the RJ21 connector of the interface card (pinning see above)
2. With the RJ11 patch box
3. With the RJ45 patch box

5.6. Wiring TDM Telephony TAPS

The interface card that is used to make TDM taps is the DST-card. See chapter 13.2 for the specification and the connections of this type of interface card.

Almost all enterprise class PBX systems use proprietary protocols to communicate with the attached telephones.

These telephones are not standard types and can only communicate with the PBX of the same manufacturer.

The wiring of TDM telephone taps is a little complex. The complexity is not the number of wires to connect, but in the non standardized pinning of the connectors used by the various PBX manufacturers. Another complicating factor is that besides the familiar 2-wire communication some manufactures deploy a 4-wire scheme for communication between the PBX and the telephones.

5.6.1. 2-Wire Vs. 4-Wire

In case of a *2-Wire* connection the communication between telephone and PBX is bi-directional. The PBX use a ping/pong-type protocol for the voice exchange from telephone to PBX and vice versa (=half duplex). With the *4-wire* connection one pair carries voice information from telephone to PBX while the other pair does the same, but from PBX to telephone (=full duplex). Note that there is no separate path for voice and signaling!

The 2-Wire connection uses *one* recording channel on the APRESA while the 4-Wire connection uses *two* recording channels.

This makes the 4-wire connection scheme in terms of channel costs twice as expensive as the 2-Wire variant, but there is nothing practical that you can do about this.

5.6.2. Wiring schemes

The whole issue of wiring TDM telephony TAPS is simply just to identify the wire-pair (or wire pairs) that carry the voice data and to connect these wires to recording channel(s) on the APRESA. The first step is to find out the name of the manufacturer and the model number of the PBX and Telephones.

The TDM wiring taps can be realized in 3 ways:

1. Direct wiring of the RJ21 connector of the interface card (pinning see above)
2. With the RJ11 patch box
3. With the RJ45 patch box

- TDM with direct wiring on the RJ21 plug

Identify the wire-pair(s) that carries the signal and hook these to the recording channels on the RJ21 plug by soldering or whatever means you prefer. Note that the 4-wire connection must be on adjacent recording channels (f.i. CH1+CH2, NOT CH2+CH3)

- TDM with the RJ11 patch box

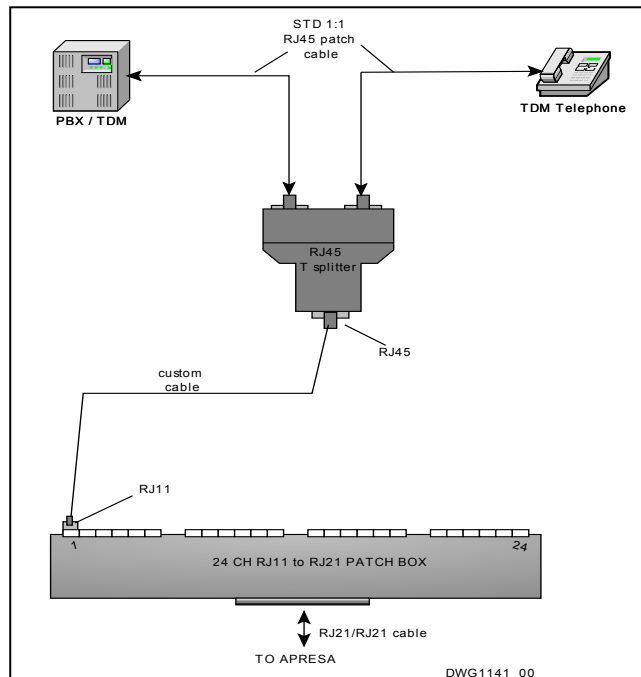
Use a RJ45 'T'-splitter and make a custom (DIY) cable to adapt for the various PBX manufacturers.

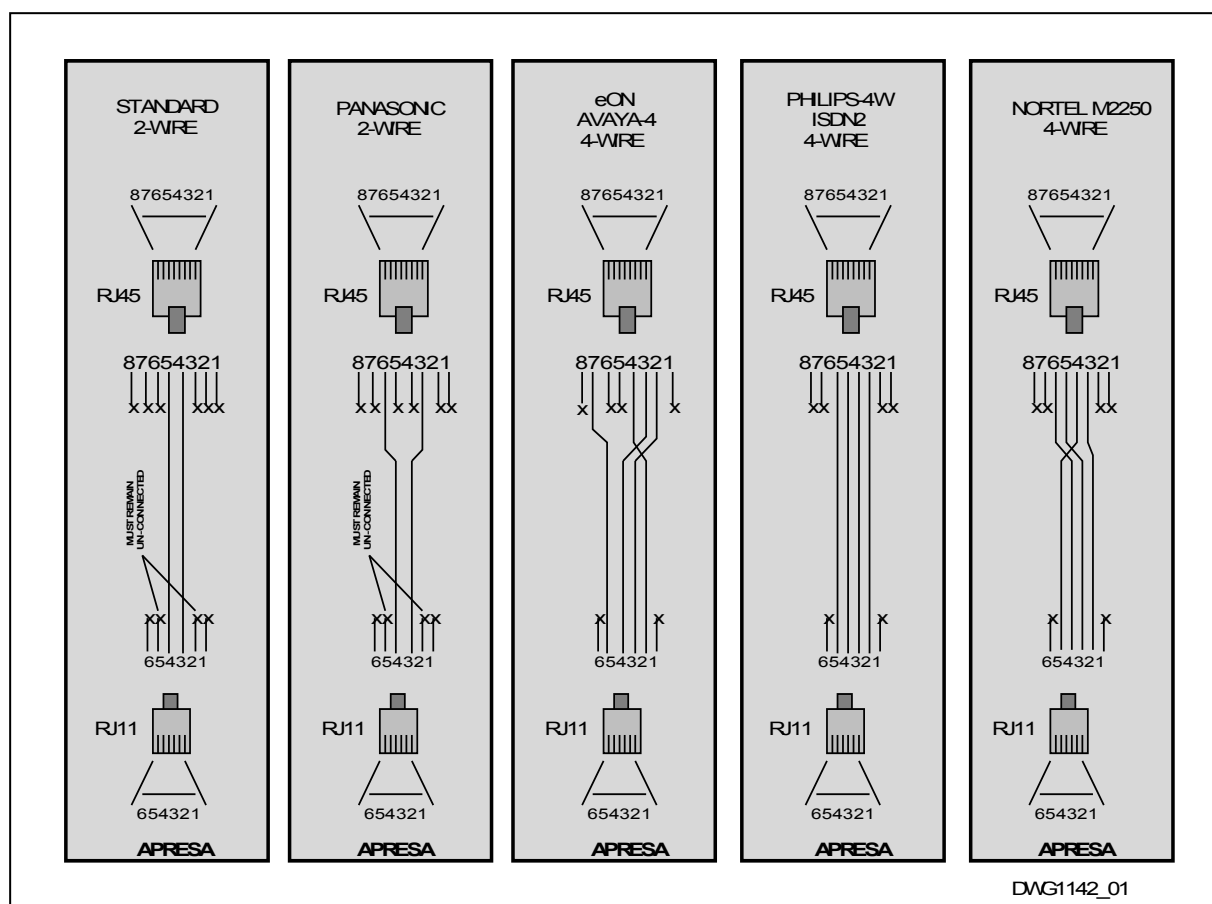
You need to make a custom cable for every telephone to tap.

The custom cables are built with standard modular cable.

One end has a RJ11 (6P4C) modular jack and the other end has a RJ45 (8P8C) attached. There are different wiring schemes to follow for the various PBX brands.

Always test **ONE** custom cable first to avoid time and material loss.





IMPORTANT NOTES ON USING THE RJ11 PATCH BOX



WITH **2-WIRE** CONNECTION YOU CAN USE **ALL 24** OUTLETS OF THE RJ11 PATCH BOX

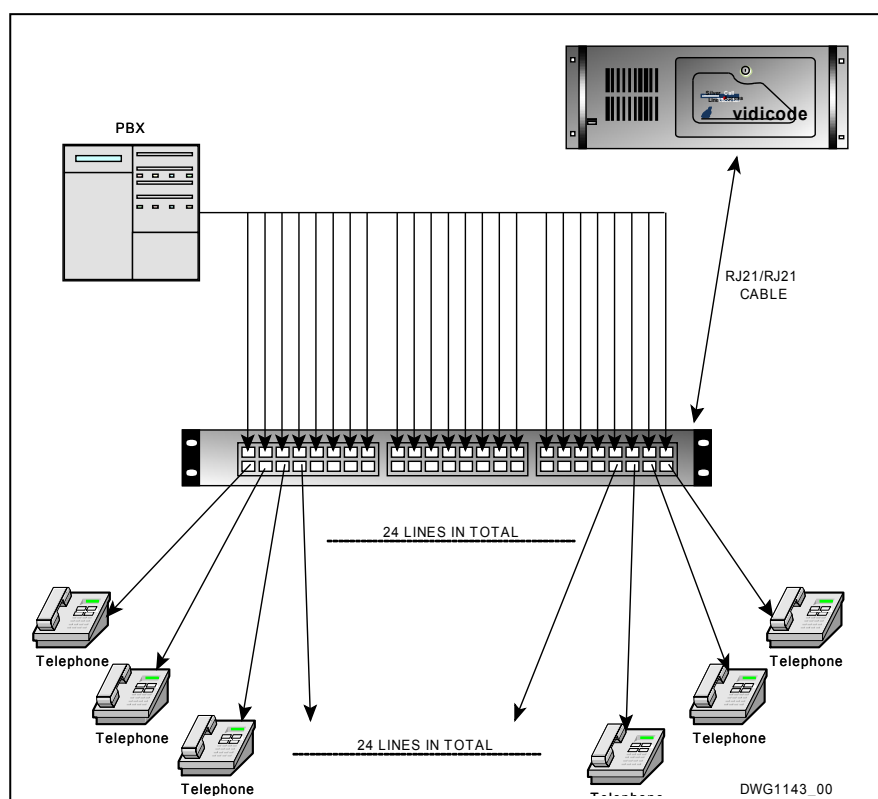


WITH **4-WIRE** CONNECTION YOU CAN **ONLY** USE THE **ODD** NUMBERED OUTLETS OF THE RJ11 PATCH BOX

- TDM with the RJ45 patch box

The use of the RJ45 patch box brings you several advantages:

- 19" RACK mountable
- NO 'T'-splitters needed .
- NO custom cables needed.



Further information can be found in the chapter that describes the RJ45 patch box

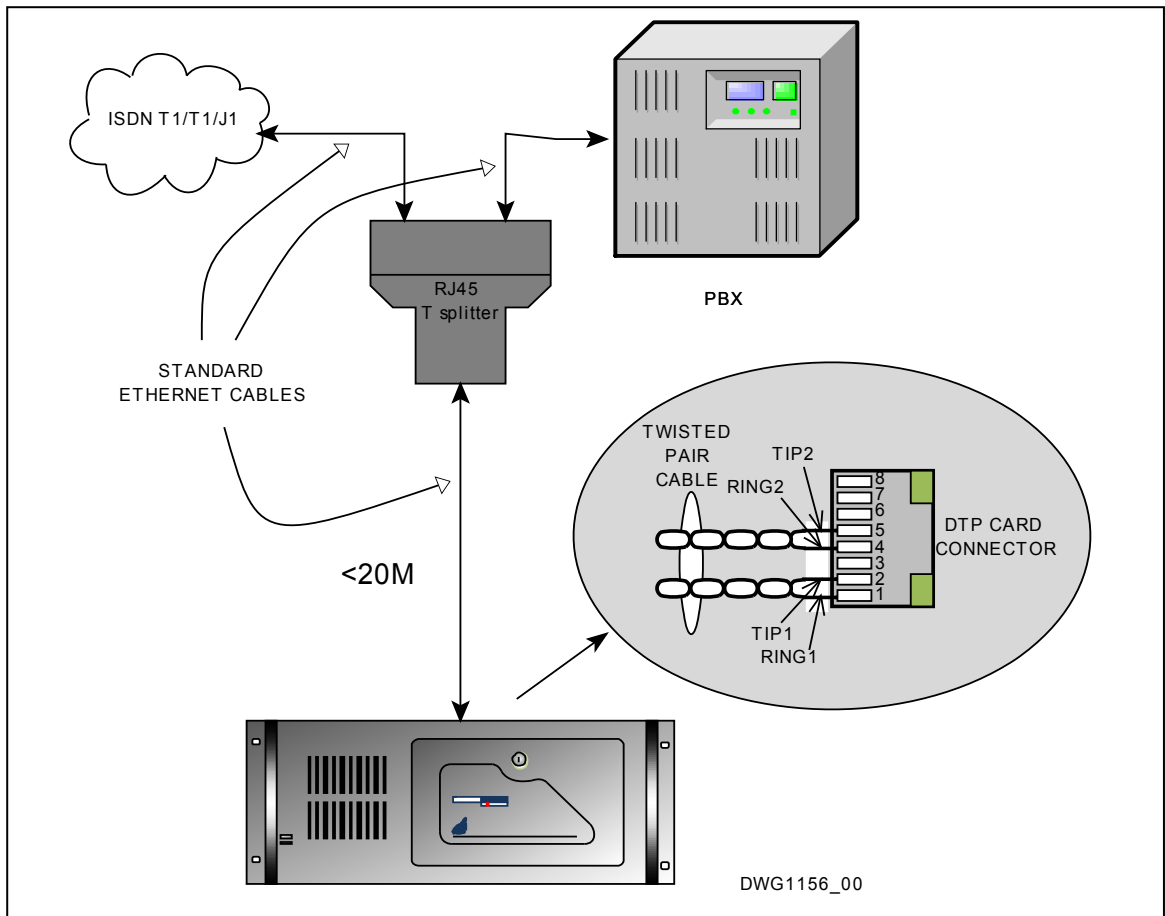
5.7. Wiring ISDN2 Telephony TAPS (Basic rate ISDN)

ISDN2 or ISDN-basic rate is from a wiring point of view pretty much identical the 4-wire TDM installation. Refer to the previous chapter.

5.8. Wiring ISDN E1/T1 Telephony TAPS

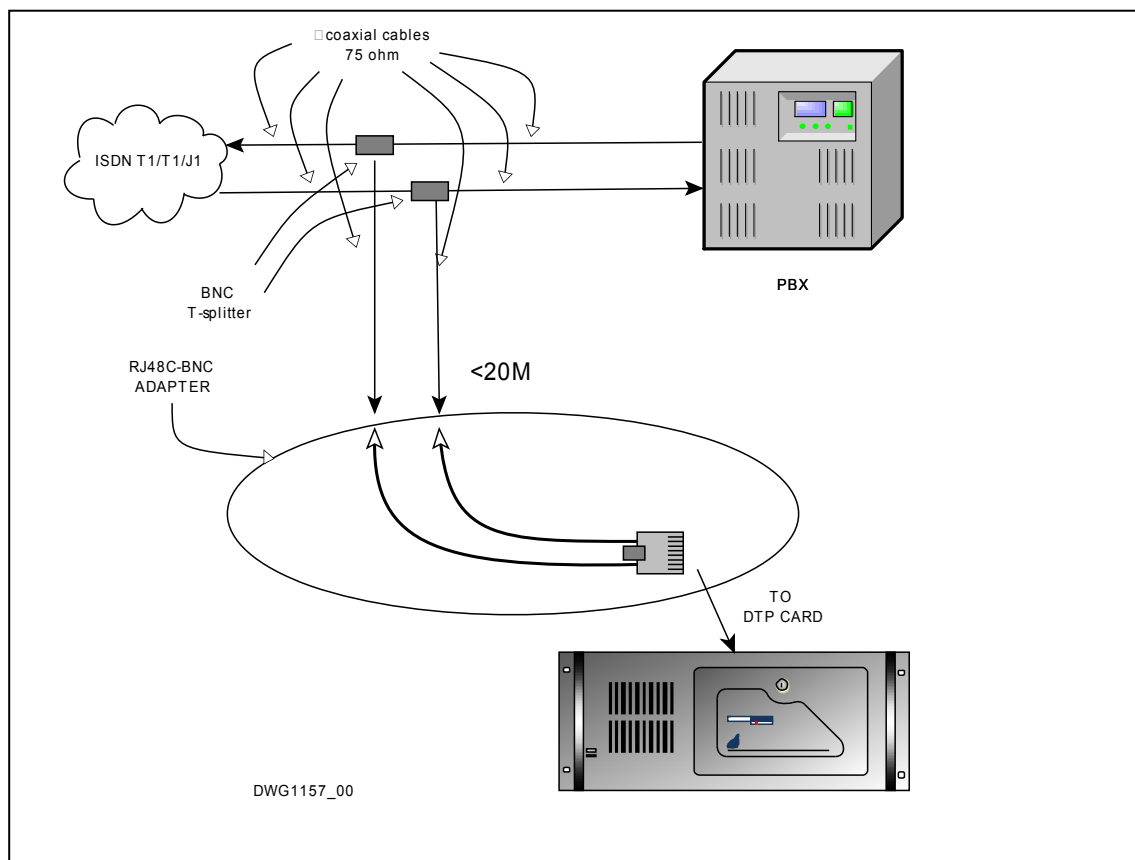
The interface card that is used to make E1/T1/J1 taps is the DTP-card. See chapter 13.3 for the specification and the connections of this type of interface-card.

There are 2 different wiring approaches: the twisted pair type (RJ48C) and the coaxial type. The twisted pair type of wiring is the commonly used wiring type. The diagram below shows the TAP installation. By the RJ45 splitter both receive and the transmit pairs are fed to the DTP card.



All cables used are twisted pair cables. Refer to the pinning of the DTP connector in the drawing for signal reference. The cable between the RJ45 splitter and the APRESA should be less than 20 meter in length. This cable should be twisted pair and explicit **NOT** parallel pair cables that are commonly used for ISDN basic rate installations.

If you must TAP an ISDN E1/T1/J1 installation that deploys *coaxial*/wiring type you must use the diagram below:

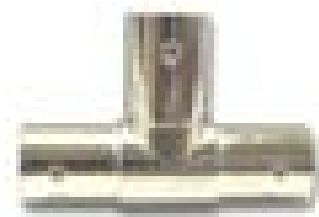


There are in fact 2 coax cables to tap. The actual tap is made by using a "BNC" T-connector, one in each coax cable. The coaxial cables used are of 75 ohm characteristic impedance. The cable between the BNC T-splitter and the APRESA should be less than 20 meter in length.

A Photo of the RJ48C BNC adapter



A photo of a BNC T-Splitter



5.9. Configuration of VOIP telephony recording

In all the telecom networks described so far, the TAP connections are all based on the same principle of "high impedance signal tapping". With modern telephony based on Ethernet, like VoIP, the actual tapping job is not on the hardware level, but on the TCP/IP packet level. The "packet tapping" is performed by a port-mirroring switch.

Port mirroring functionality is supported by almost all enterprise-class network switches, also called managed switches. On Cisco switches, the port-mirroring functionality is referred as 'SPAN or RSPAN'.

A VoIP network that requires call recording must always deploy at least one port-mirroring switch. This switch must be configured to copy packets from one or more (source) ports to one (destination) port. The destination port is normally connected to the recorder system and the destination port of the switch actually forms a single or multiple-TAP.

Another important issue to consider regarding the switch selection is the internal bandwidth of this device. This is an issue that requires the assistance of the network manager at the customer premises, especially with topologies where data and VoIP are sharing the Ethernet. The switch that we supply has an internal bandwidth of 32 Gbps.

With VoIP telephony, all information is sent over the network by (RTP / SIP etc.) packets. The basic issue of the whole configuration job of VoIP telephony recording is to setup the network components in such a way that the APRESA 'see' these RTP packets on its recording NIC (NIC, Network Interface Card).

Apresa uses RTP data to record the audio of VoIP calls. The VoIP PBX should be configured to use only G.711, G.722, G.729, GSM 6.10, or iLBC. These Codecs are supported in Apresa. Apresa will not record audio in other Codecs. Some VoIP telephones can also be configured for Codecs.

For every APRESA recording channel that uses the G.729 codec an additional G.729 license must be purchased besides the channel license.

It is also required by the APRESA that the encryption on the VoIP PBX is switched off.

Depending on the customers recording requirements we distinguish 2 fundamental different solutions 1) *Trunk Side Recording* and 2) *Station Side Recording*

5.9.1. Trunk Side Recording

This method will record inbound and outbound calls. The internal (or local) calls however are **NOT** recorded. With trunk side recording, only one port-mirroring switch is needed to facilitate a single tap on the VoIP PBX. The simple switches (without port-mirroring) that may be used in the existing VoIP network need not to be replaced.

5.9.2. Station Side Recording

This method will record the calls from all phones on the network (inbound-, outbound- and local-calls). If the RTP packets between the internal phones run via the PBX and the switches in the existing VoIP network have no port-mirroring facilities, they must be replaced.

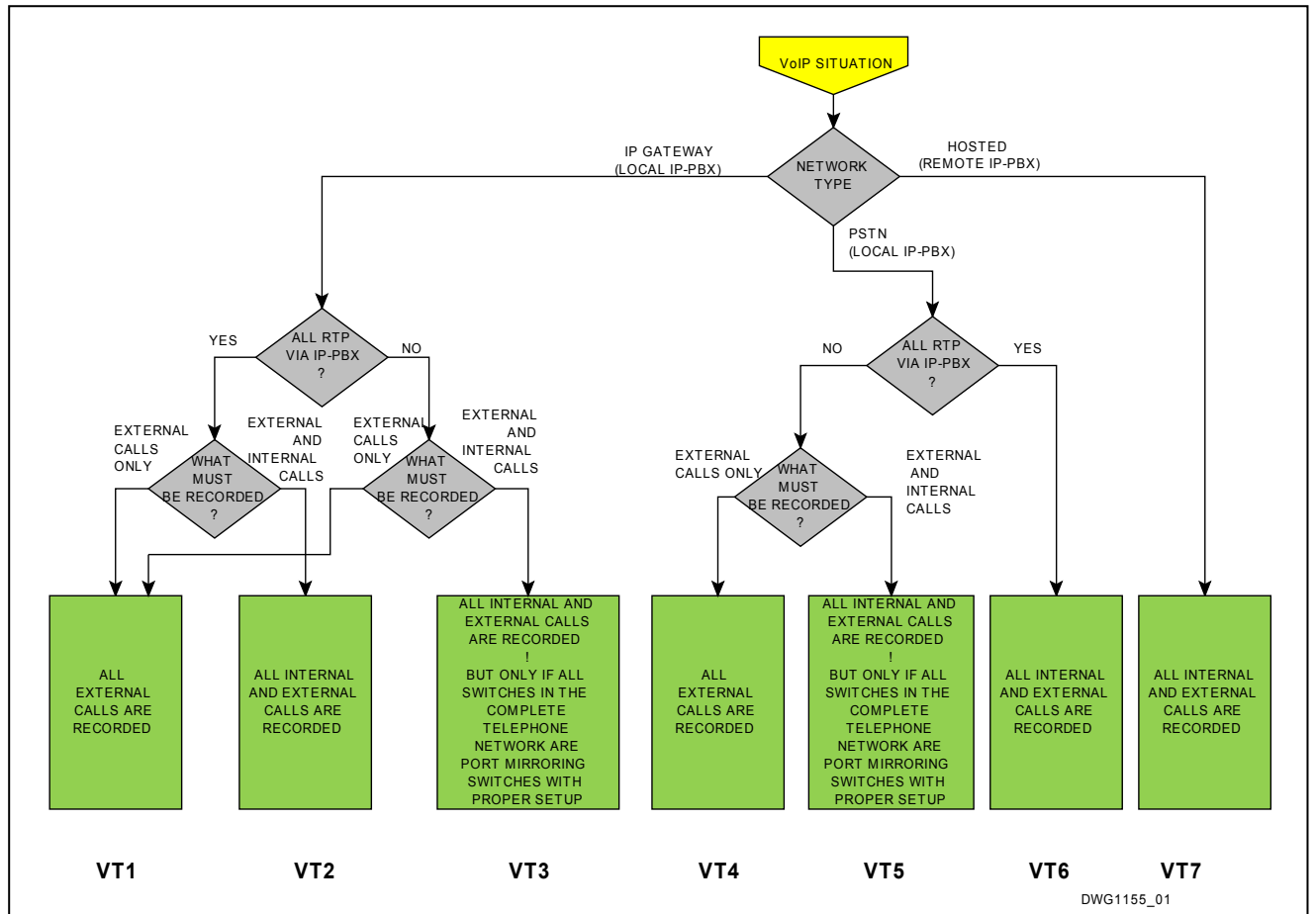
There are VoIP implementations where VoIP data is traveling together with other network data over the company's Ethernet and we see separate Ethernet networks for VoIP. When VoIP is traveling together with the regular network data on the same network, the VoIP packets (=real time!) must have priority over the normal network packets. This is achieved by setting the QoS (quality of service) in favor of the VoIP packets. So far this is standard configuration practice for VoIP telephony. A switch overruns when the maximum supported internal bandwidth is exceeded. A network switch that operates close to its bandwidth limit may fail in its port-mirroring function especially in situations where there are many source ports to mirror. This is one of the reasons of the very wide pricing range of network switches we see in the market. Choose the network switch wisely, because VoIP recording totally relies on the port-mirroring function of the switch you select.

Obviously the installer of a VoIP recorder has to work closely together with the network manager as this manual cannot cover all topics relevant to VoIP environment and installation.

The next section presents several VOIP topology examples. All examples are based on enabling the APRESA to 'see' the data to be recorded. To find the valid example that applies to your VoIP-situation, just get the answer to the 3 questions below:

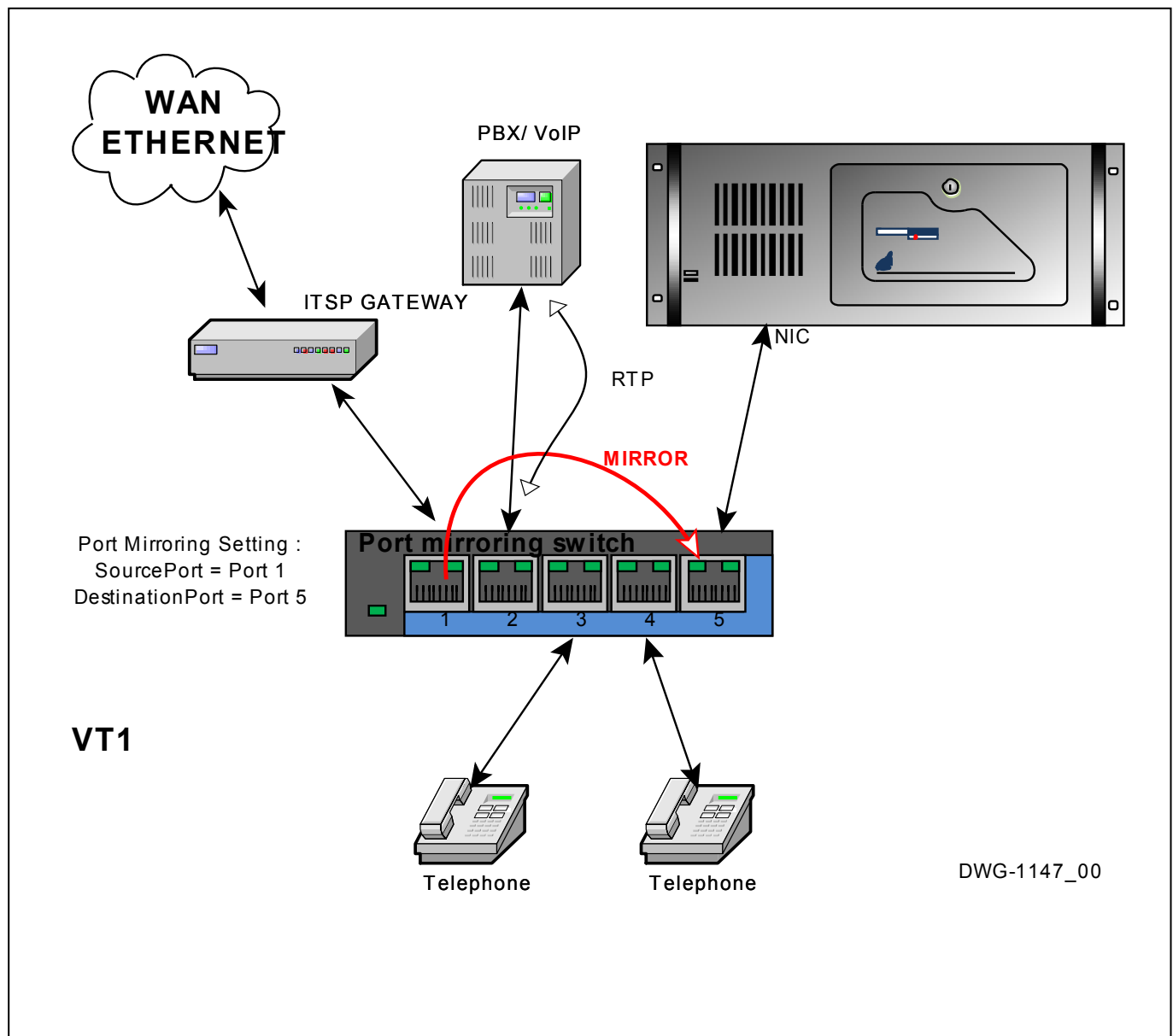
- Find out the Network type
- Find out the routing of the RTP packets
- Find out : record ALL calls or only in&out bound calls

The flowchart below will lead you to the applicable diagram.



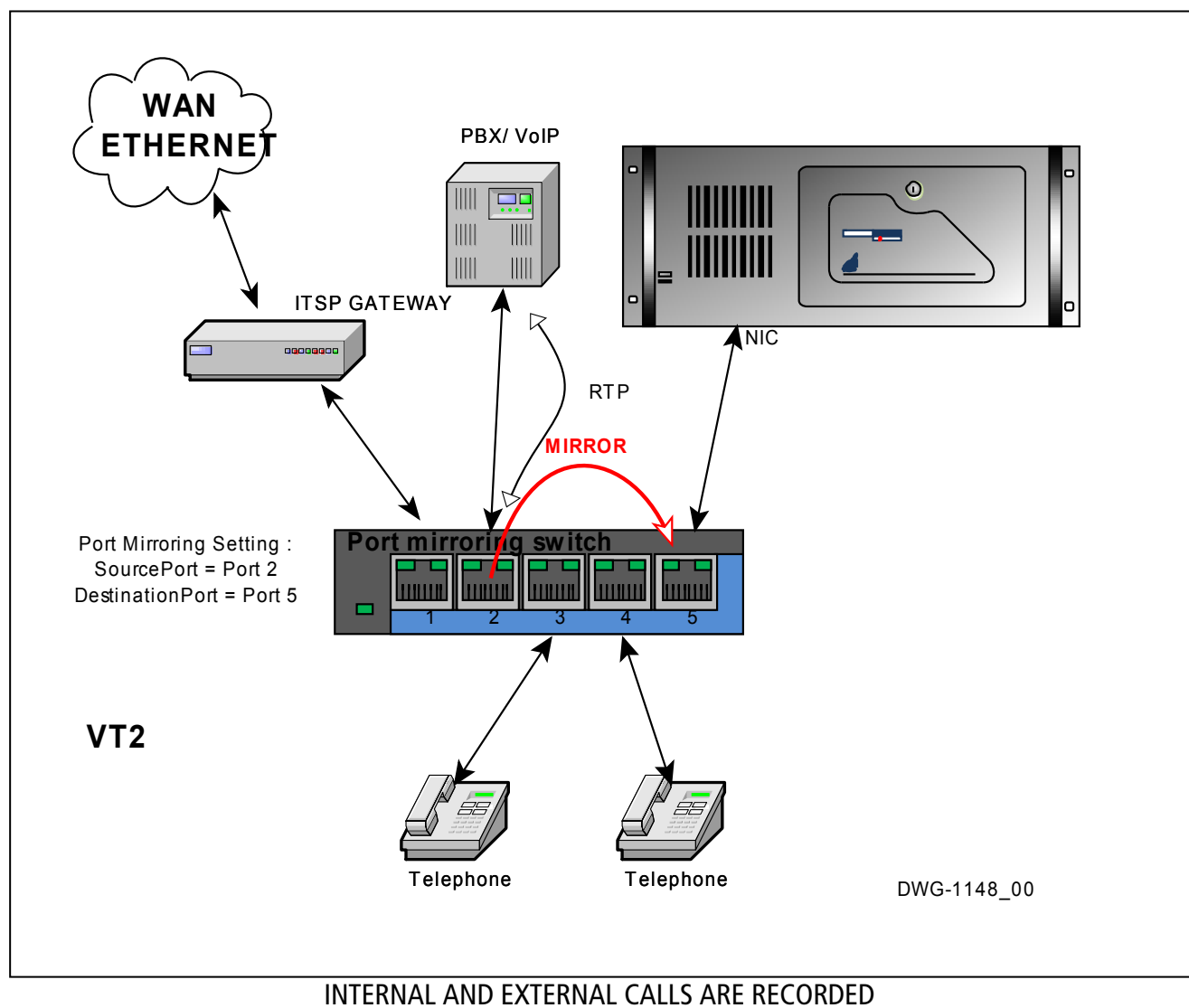
VT1 VT7 on the bottom refers to on of the 7 diagrams that follow below:
(for compact drawing a 5-port switch is used)

5.9.3. VoIP topology 1

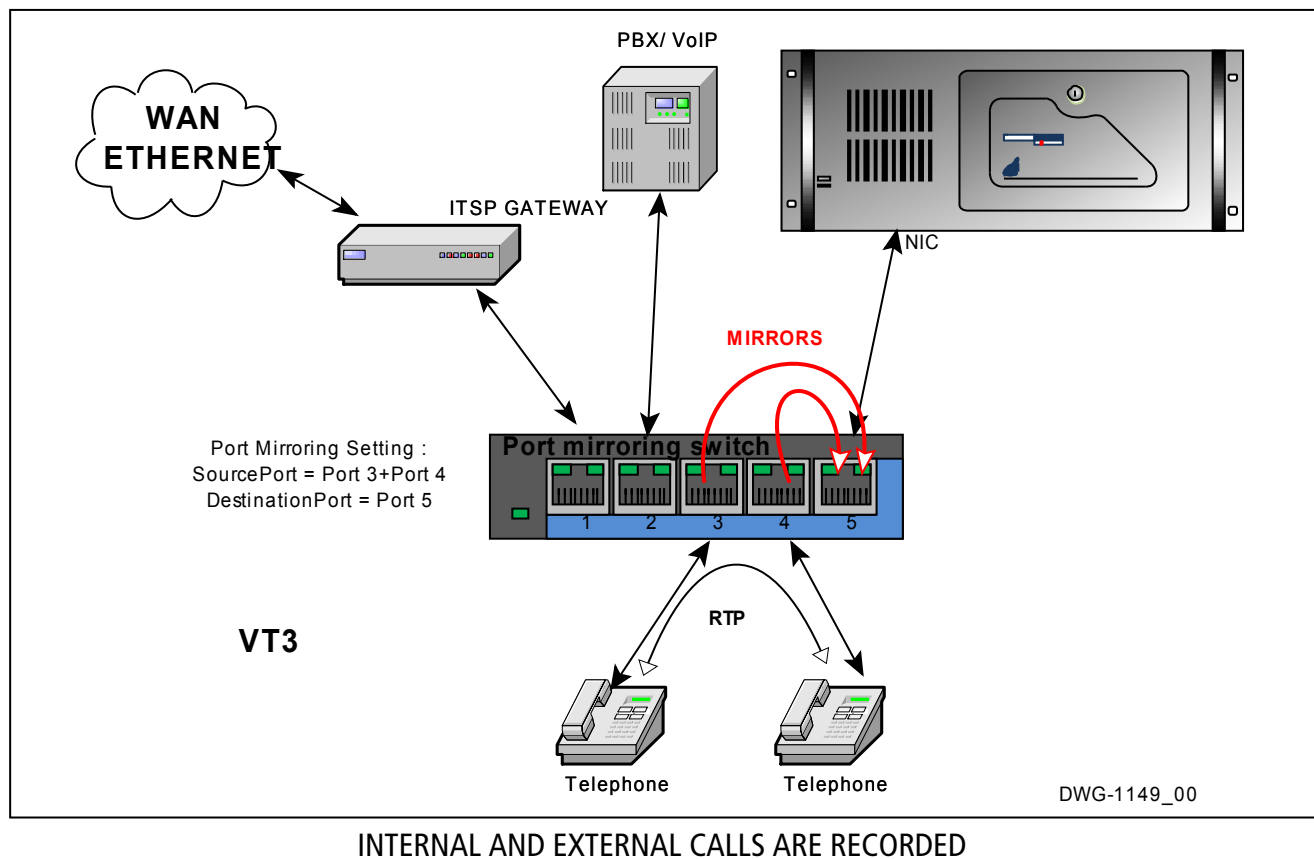


ONLY EXTERNAL CALLS ARE RECORDED

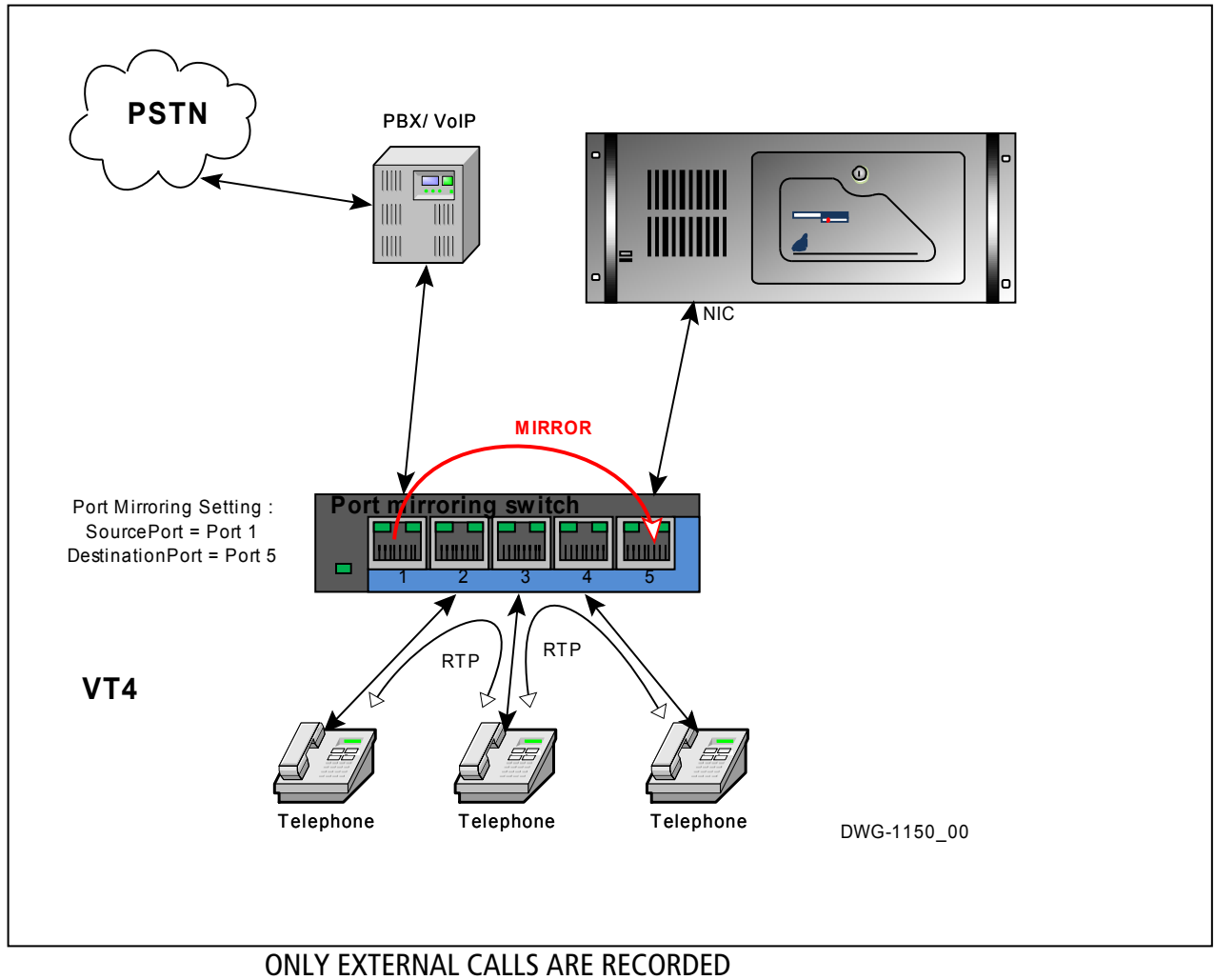
5.9.4. VoIP topology 2



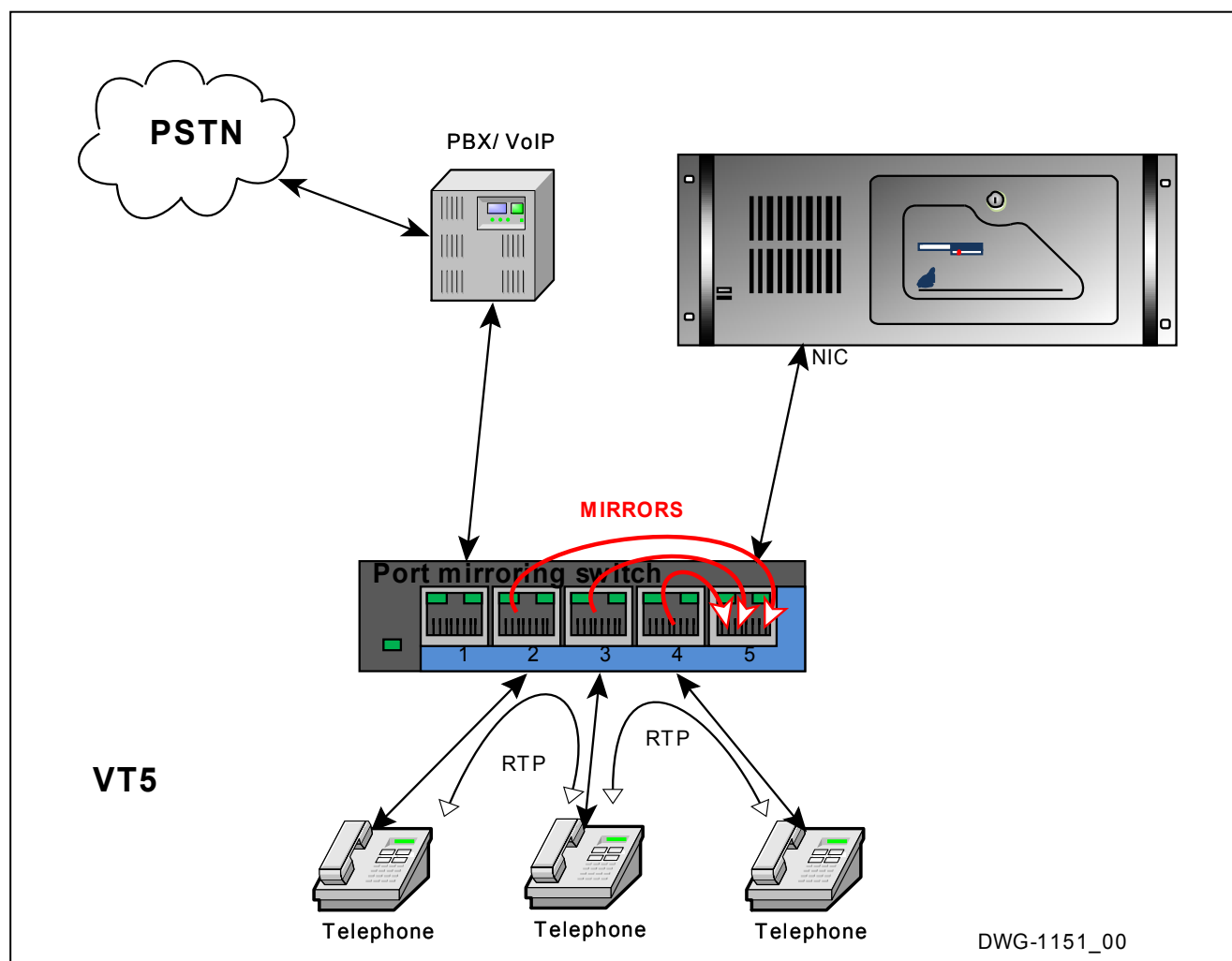
5.9.5. VoIP topology 3



5.9.6. VoIP topology 4

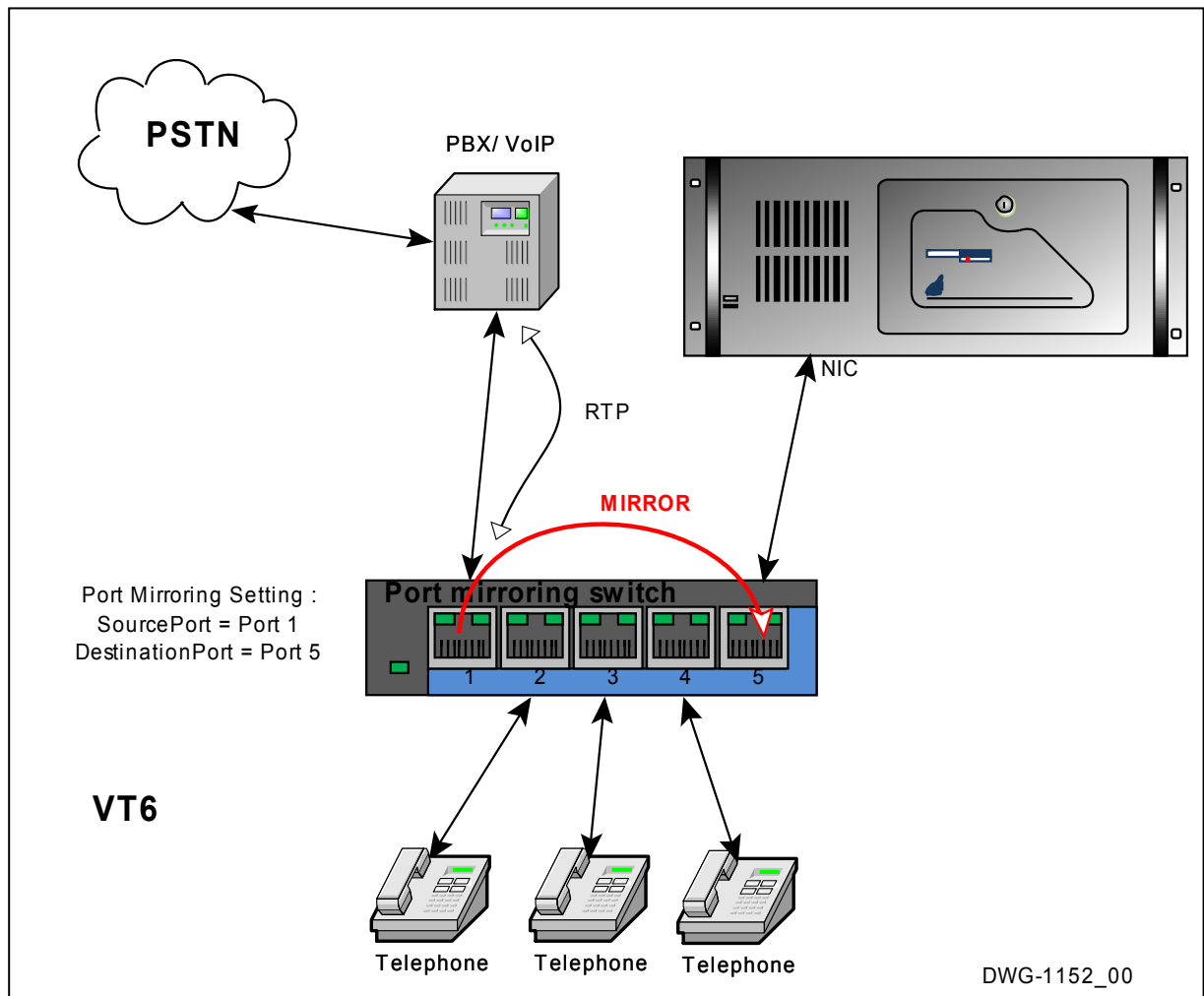


5.9.7. VoIP topology 5



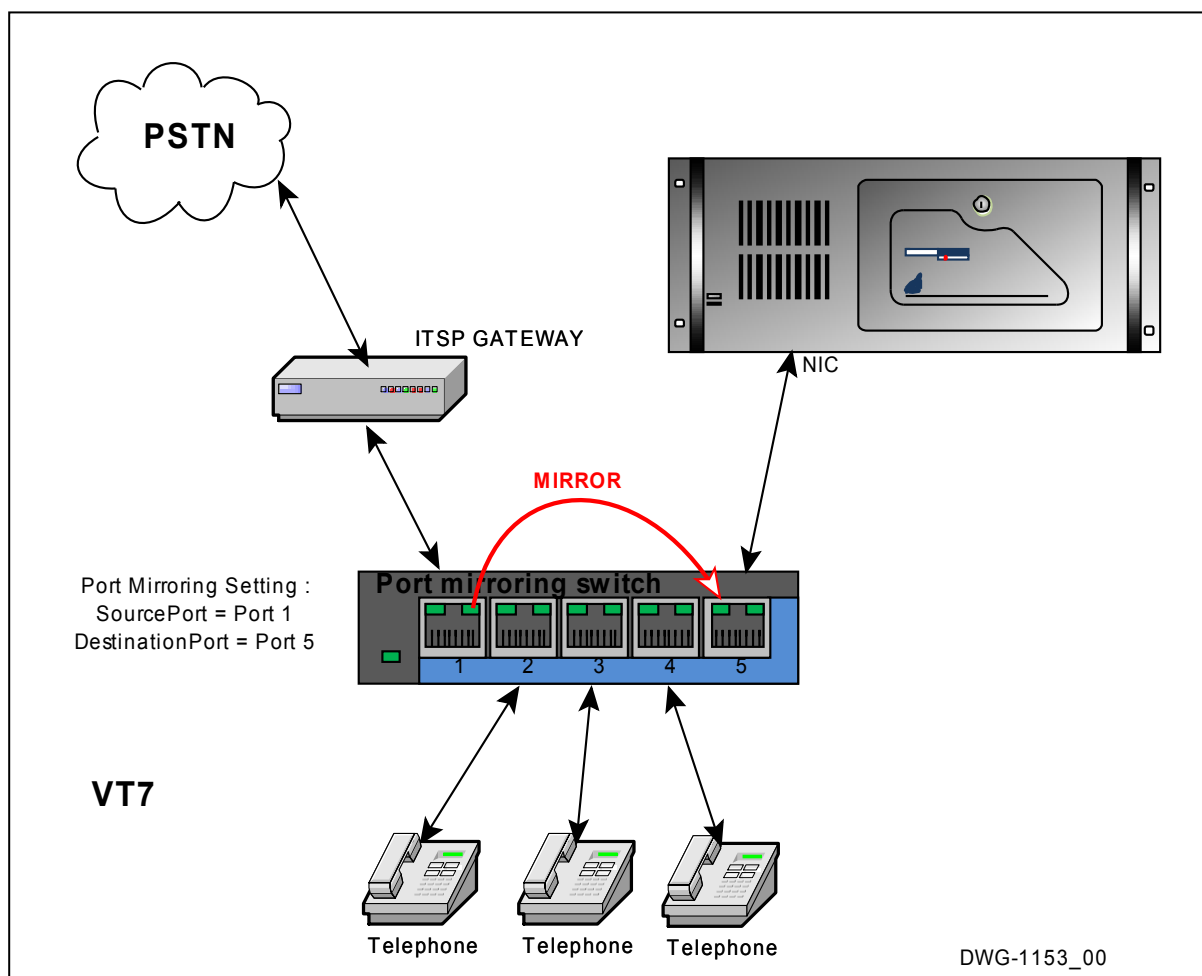
INTERNAL AND EXTERNAL CALLS ARE RECORDED

5.9.8. VoIP topology 6



INTERNAL AND EXTERNAL CALLS ARE RECORDED

5.9.9. VoIP topology 7



INTERNAL AND EXTERNAL CALLS ARE RECORDED

5.10. *Configuration of TETRA communication recording*

NOT YET SUPPORTED

5.11. *Patch panels*

Patch panels are used to ease the telecom wiring.

For VoIP, TETRA installation the standard Ethernet patch panels are applicable. Also, for connection to the DTP (ISDN-E1 / ISDN T1) the standard Ethernet patch panels are applicable, but you need a RJ45 "T" splitter for every trunk to tap.

For connection to the ATP and the DST cards (AUDIO/POTS/TDM/ISDN2) we offer 2 different patch panels,

- The RJ12 patch panel and
- The RJ45 patch panel.

These patch panels use RJ-type connectors. Find everything in detail for RJ cables in Wikipedia.

The RJ12 patch panel is included for every purchased ATP or DST interface card and it is suitable for the smaller installations, up to 8 – 16 channels. This type of patch panel may need special made cabling and external RJ12 "T" - splitters

The RJ45 patch panel is optionally available and works with standard Ethernet cables and has a build-in "T" splitter. This is the smoothest way to install obviously.

Patch panels have powerless operation.

5.11.1. RJ11 Patch panel

This type of patch panel is in the standard scope of delivery. For every ATP- and DST-interface card one RJ11 patch panel is standard supplied.

This type of patch panel is capable of interfacing 2-wire and 4-wire telephone systems. The unit is not 19" rack mountable. Also this wiring solution may need external 'T' splitter (RJ12 or RJ45) and custom cabling between the splitter and this patch panel.

5.11.2. RJ45 Patch panel

Purpose :

The tapping of signal cables in digital (TDM) telephone systems in order to feed the voice data simple and reliable to the APRESA.

The APRESA is compatible with all major brands (Siemens, Philips, etc) in the field of digital PBX.

The APRESA TDM patch panel supports the passive tapping of up to 24 telephones lines.

Telephone line inputs are numbered 1,2,3....24 on the front of the patch panel. Each numbered telephone line input consists of a set of 2 RJ45-type connectors, 1:1 wired for all 8 pins, effectively eliminating the need for external "T"-splitters.

Every telephone line that needs recording must be routed over the RJ45 patch panel. This means that the telephone line coming from the PBX must be plugged in the patch panel and that the other outlet for that channel must connect the telephone. When this is done all connected telephones should be able to make calls as the tapping is fully passive .

The building wiring in modern offices for TDM telephony is just like the Ethernet wiring. This wiring scheme is very well standardized, all connectors are RJ45 (=8-pin) and carry 4 balanced signal pairs on PIN1/2, PIN3/6, PIN4/5 and PIN7/8.

When the telephone uses 2-wire connection this means that it will use *one* balanced pair (=2-wires) to establish the link with the PBX. Used pair is on the PIN4/5 and this is the pair has the passive TAP to feed the APRESA recording channels. The remaining 3 balanced pairs (3x2-wires) are of no concern for the data communication (and for the APRESA).

There is only *one* RJ21:RJ21 cable between the Patch Box and the APRESA.

When the telephone uses 4-wire connection (like Basic rate ISDN) this means that it will use *two* balanced pairs (=2x2-wires) to establish the link with the PBX. Used pairs are on the PIN4/5 & PIN3/6 and these are the pairs having the passive TAPS to feed the APRESA recording channels. The remaining 2 balanced pairs (3x2-wires) are of no concern for the data communication (and for the APRESA).

There are *two* RJ21:RJ21 cables between the Patch Box and the APRESA. Per telephone one need 2 APRESA recording channels.

> NOTE THAT THERE ARE 2 DIFFERENT RJ45 PATCH PANELS <
2-WIRE SYSTEM and 4-WIRE SYSTEM
ORDER THE CORRECT TYPE FOR YOUR INSTALLATION

A wiring diagram can be found in the chapter "Wiring TDM Telephony TAPS".

6. EXPANDING APRESA

> Before changing a commissioned APRESA installation <
MAKE A BACKUP OF ALL RECORDINGS AND SETTINGS
Refer to chapter 7

Expanding an APRESA system means:

- Adding recording channels ;
- Increasing the storage capacity ;
- Building or changing a RAID volume.

6.1.Adding recording channels

The first thing that you need to know is that adding recording channels takes a 2 step approach:

- Adding hardware interface card(s) or interface module(s).
- Activating recording channel licenses;

6.1.1. Channel license upgrade

For every recording channel expansion you must handle as follows:

- Buy channel license(s) from your dealer or from directly VIDICODE;
- Link the license to your machine (www.vidicode.com/channels);
- Enter the response license code in your machine.

Refer to chapter 3 for more details.

6.1.2. Installation of interface cards

If you are expanding the number of VoIP or TETRA channels in your system you never need extra interface cards, just skip this section and go to the telecom wiring chapter.

Upgrading VoIP channels or TETRA channels never requires extra interface cards to be installed because VoIP telephony and TETRA runs over Ethernet.

For AUDIO / POTS / TDM / ISDN2 / ISDN E1/T1

The interface cards that are already present in your machine may have unused channels left that can be used now. If there are a sufficient number of channels spare, just skip this section and go to the telecom wiring chapter.

You need to know that the ATP-interface card and the DST-interface card can support 8-, 16- or 24 channels. Basically these cards are 8 channel cards that can hold up to 2 optional 8 channel interface modules. Adding hardware channels *may* only involve adding 8-channel interface modules in situations where a vacant expansion module position is available on the right type of interface card.

For the hardware installation of interface cards refer to chapter 4

6.1.3. Installation of interface modules

(This section applies only to ATP- and DST interface Cards)

The ATP- and the DST interface cards have 24 channels but may in fact be populated with only 16 or even only 8 channels installed. Channel upgrades are possible by the installation of 8 channel interface modules on the base card:

Base card only = 8 channels.
Base card +1 interface module = 16 channels.
Base card +2 interface module = 24 channels.

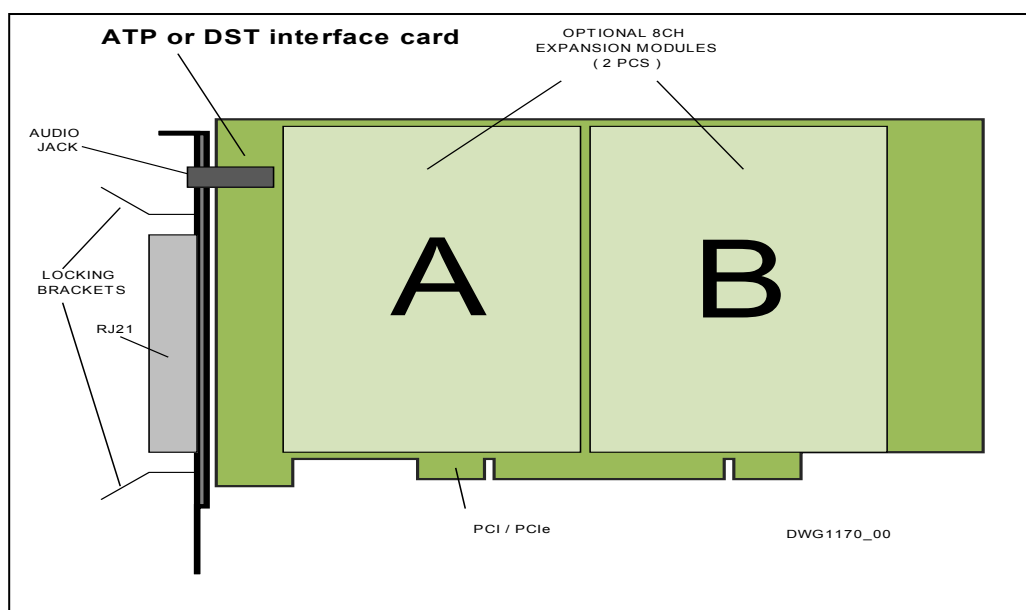
NOTE : ATP and DST expansion modules are NOT identical

Use MOD_24A on ATP Cards and use MOD_24DB on DST Cards

The installation handling for mounting the upgrade card involves the following steps:

1. Remove the interface card that will accept the expansion module, and put it on the table with the PCI (PCIe) connector faced down;
2. The insert location on the interface card for the expansion is listed in the position table below;
3. Note the white text "↑↑UP" on the expansion module.
4. Attach the interface module on to the interface card by checking the correct alignment of all the pins of both connectors involved. Handle CAREFULLY because the connector pins are NOT very tolerant when being bend.
5. Use the 2 screws supplied for final mechanical fixation.
6. Place the interface card back into the PCI (PCIe) slot.
7. No jumpers to set. No reprogramming. Just configure and wire the newly available channels.

INTERFACE CARD PART NUMBER	CH1-CH8	MODULE LOCATION CH9-CH16	MODULE LOCATION CH17-CH24
ATP-24A/PCI+	ON BASE BOARD	B	A
ATP-24A/PCIe+	ON BASE BOARD	B	A
ATP-24A/PCI+(2.0)	ON BASE BOARD	<u>A</u>	<u>B</u>
ATP-24A/PCIe+(2.0)	ON BASE BOARD	B	A
ATP-24A/PCIe+(3.0)	ON BASE BOARD	B	A
DST-24B/PCI+	ON BASE BOARD	B	A
DST-24B/PCIe+(2.0)	ON BASE BOARD	B	A



6.2. Increasing the storage capacity

Increase of storage capacity is possible by installing a larger hard drive(s). Backup the APRESA and bring it up on the newly installed larger drive(s).

6.3. Building or changing a RAID volume

Changing from NoRAID to RAID1/5 or from RAID1 to RAID5 or vice versa require:

- Backup all the recordings;
- Reinstallation of the software in the required hard drive configuration;
- Restore of the recordings;
- This could involve extra license cost.

7. BACKUP AND RESTORE BACKUP

Systems can fail for many reasons. Therefore most APRESA customers demand a reliable and periodic backup of all recordings and system settings stored over time. Network based backup & restore is a standard feature of the APRESA.

For backup click on the WEB interface: **Tools -> System -> Backup**

Specify the network location to store the backup data, the start and end date (backup period) etc and enable backup.

For restore backup click on the WEB interface: **Tools -> System -> Restore backup**

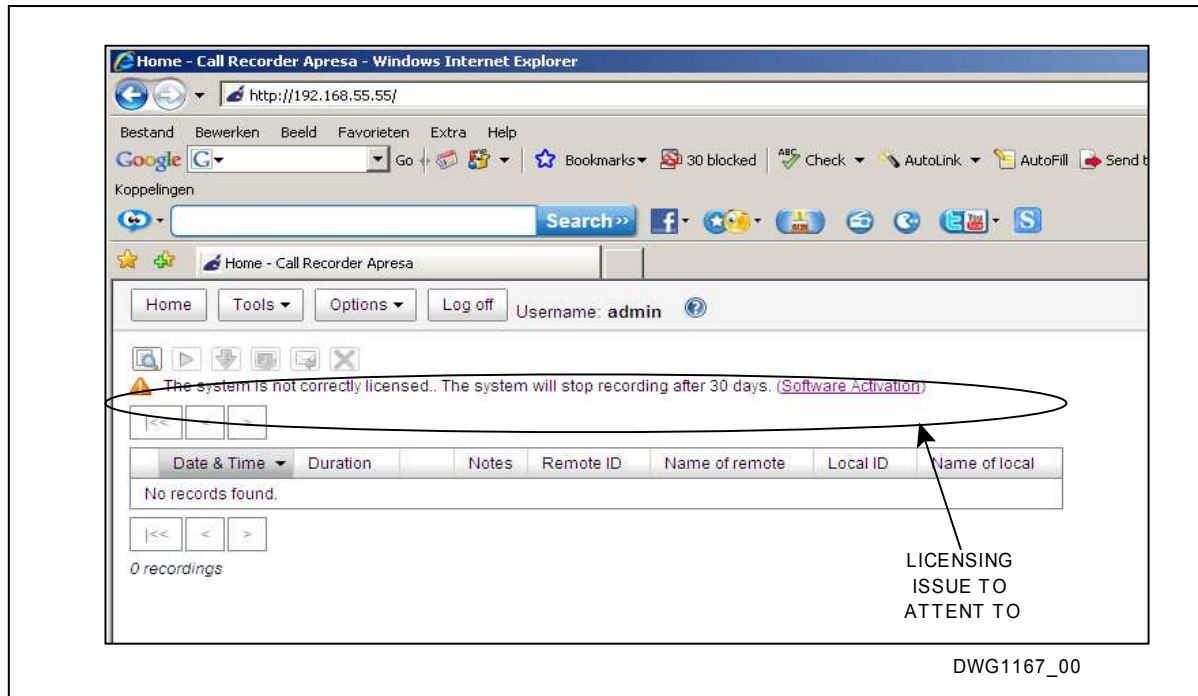
See the ADMIN manual or the on line help pages for more information.



REPLACEMENT OF HARDWARE MAY HAVE LICENSING ISSUES

The APRESA software is protected against illegal copying. This protection is based on the linkage of the software license and the hardware signature of the system that was used at first installation. In case of failing hardware you must (obviously) locate and replace the failing hardware parts.

- Replacing the power supply or the DVD never involves software re-installation or licensing issues.
- Replacing the hard drive involves new software installation & licensing. Simply re-use the base software license you have. Then perform a restore backup operation to restore all settings and recordings on the APRESA. No licensing issues will occur.
- Replacing the motherboard **WILL** cause a licensing issue. Because the APRESA software license is based on the hardware signature of several unique properties that are located on the motherboard APRESA will detect a licensing issue. On the WEB (home) page this issue will be displayed as shown below :



Contact VIDICODE sales to obtain a valid license. Note that APRESA with invalid license will record only for a period of 30 days after installation.

8. MAINTENANCE

Only basic server maintenance is needed. No special things worth mentioning.

9. APPLICABLE VIDICODE ARTICLE CODES

19" SERVER

-010.04601 APRESA 19" server, base software, 1TB Hard Drive, no channel license

Channel licences (010.= license installed by VIDICODE / 090.= license to be installed by customer)

-010/090.04608 **VoIP** Apresa 1 ch. license

- 090.04609 **VoIP** Apresa 5 ch. license

-010/090.04610 **VoIP** Apresa 10 ch. license

-010/090.04670 **VoIP** G.729 Codec, 1 Ch.license

-010/090.04613 **Analog** Apresa 1 ch. license

-010/090.04615 **Analog** Apresa 8 ch. license

-010/090.04618 **TDM**, Apresa 1 ch. license

-010/090.04620 **TDM**, Apresa 8 ch. license

-010/090.04625 **ISDN E1/T1** 6 ch. license

Interface cards (010.= card installed by VIDICODE / 090.= card to be installed by customer)

-010/090.05512 **Analog** PCIe card with 8 ch.

-010/090.05514 **Analog** PCIe card with 16 ch.

-010/090.05516 **Analog** PCIe card with 24 ch.

-010/090.05502 **Digital (TDM)** PCIe card with 8 ch.

-010/090.05504 **Digital (TDM)** PCIe card with 16 ch.

-010/090.05506 **Digital (TDM)** PCIe card with 24 ch.

-010/090.05523 **ISDN E1/T1** PCIe card with 30E1/24T1 ch.

-010/090.05526 **ISDN E1/T1** PCIe card with 30E1/24T1 ch.

Misc hardware options 19" server

-010.04682 Raid 1 redundancy option (2 hard drive, 150.000 hours)

-010.04684 Raid 5 redundancy option (3 hard drive, 300.000 hours)

-010.04660 Server quality redundant power supply 2x420W

-010.04662 Hot Swappable hard drive option ,150.000 hours

-090.04090 Sliding Rail set for 19" Chassis

Software only

-070.04602 APRESA Base software only

-070.04603 APRESA Base software +5 VoIP ch.

-070.04604 APRESA Base software +10 VoIP ch.

APRESA Compact

010.04700 APRESA Compact IP5 for 5 ch VoIP

010.04705 APRESA Compact IP10 for 10 ch VoIP

010.04710 APRESA D8 for 8 ch TDM / 4 lines ISDN-BRI (also 8 channels)

010.04715 APRESA A8 for 8 ch analog POTS or plain audio

010.05570 EXTRA NETWORK PORT GLAN FOR APRESA COMPACT

Cables

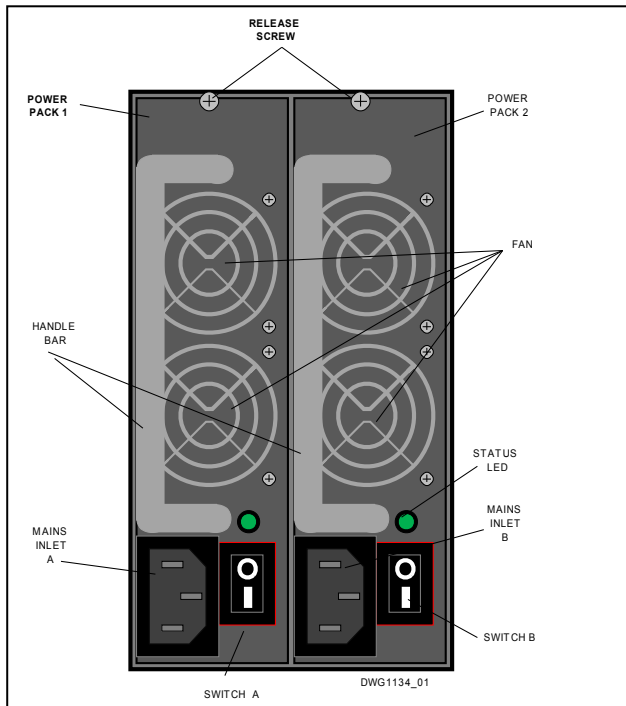
090.05580 cable option RJ21 to open end, L=3m.

090.05582 cable option RJ21 to open end, L=5m.

090.05584 cable option RJ21 to open end, L=10m.

10. REDUNDANT POWER SUPPLY

The APRESA (19" RACK version only) is optionally equipped with a redundant power supply unit (RPSU). The RPSU is located at the back of the housing. The figure below points the items of interest (your model RPSU may be different in detail due to different models used by Vidicode):



The RPSU is built with 2 removable power packs to obtain 1+1 redundancy. In normal situations both power packs supply the power together based on a load balance mechanism. In the status page of the APRESA (Tools/System/System Information) the health of the RPSU is displayed.

In the event that one power pack fails, the other power pack will take over completely by delivering the desired power standing alone. The APRESA system:

1. Sends an warning E-mail to a configurable administrator/manager client;
(note: **ONLY** when configured properly)
2. The health indicator on the system information page will display this error;
3. A loud beep is emitted by the APRESA

Audio alarm is RESET by pressing the RED button on the back of the APRESA.

A failing power pack must be replaced because the actual redundancy function is lost. Note that the remaining power pack is capable to cover the power needs of the APRESA system completely without any time-limits allowing the replacement to be planned at convenience. There is no need to bring the APRESA system down to swap a power pack as the power packs are 'Hot Swappable'.

It is easy to replace a failing power pack.

First step is to locate the failing power pack. The failing one is identified by an off (not burning) green LED on the power pack housing. This LED is on when a power pack is functioning fine so the one with the LED off is the failing one that must be replaced. Remove the mains power cord from the failing power pack and then use the pull-out handle bar and release the locking (or screw) slide to take the failing power pack out. Note that the failing power pack may have a hot surface, so please be care full.

Insert (and mechanically lock) the new power pack and turn the power switch of this unit to 'O' (off). Then insert the mains power cord to the new power pack. Turn the power switch of the new power pack to 'I' (on). The green LED should turn on and the whole RPSU is in restored to the safe redundant state.

Tip :

To take the full advantage of the RPSU, connect the 2 mains power cables to different fused mains power groups. By doing this the APRESA system remains stable and powered when a fuse is blown in the building and one power group is going down.

11. RAID VOLUMES

The APRESA software can handle 3 hard drive configurations:

- No Raid
- RAID1
- RAID5

11.1. *NO RAID*

This is the very basic configuration and it works with only ONE hard drive. Due to the fact that there is no redundancy, a failing hard drive will cause the system to crash.

11.2. *RAID1*

A RAID 1 array deploys always TWO hard drives. This mechanism is also known as the 'Mirroring RAID' because the hard drives are continuously kept to their mutual image. One failing hard drive will have no effect on the system functionality. An e-mail report is sent to notify the failure to the administrator (only if setup properly).

The capacity of a RAID1 volume equals the capacity of the smallest volume member.

The failure rate of a RAID1 volume equals twice the failure rate of a NO RAID solution. The system will continue to work during the failure of one hard drive, but it is still classified as a failure.

We advise you to build a RAID 1 array with *identical* hard drives only.

11.3. *RAID5*

A RAID 5 array deploys always THREE or more hard drives. One failing hard drive will have no effect on the system functionality. An e-mail report is sent to notify the failure to the administrator (only if setup properly).

The capacity of a RAID5 volume equals the capacity of N-1 GBYTE, where N=the number of hard drives in the RAID5 volume.

The failure rate of a RAID5 volume equals N times the failure rate of a NO RAID solution. The system will continue to work during the failure of one hard drive, but it is still classified as a failure.

We advise you to build a RAID 5 array with *identical* hard drives only.

11.4. *How to replace a failing hard drive in a RAID array*

Log on to the Apresa system shell:

User name: vidi

Password: -- For default password, see official manual --

The system shell can be reached remotely, with SSH (PuTTY), if "Enable remote shell" is enabled in the system settings, or it can be done locally by connecting a monitor and keyboard to the Apresa machine, and rebooting.

To find out which drive has failed, open the web interface, and log on as administrator. Open the Tools menu, choose System, click the System Information button, and look for the hard disk marked with an error. Alternatively, it can also be found out from the command line, as follows:

cat /proc/mdstat

For RAID-1:

If you see [UU] then both drives are OK.
If you see [_U] then the first drive (SATA0) has failed.
If you see [U_] then the second drive (SATA1) has failed.
For RAID-5:

If you see [UUU] then all three drives are OK.
If you see [_UU] then the first drive (SATA0) has failed.
If you see [U_U] then the second drive (SATA1) has failed.
If you see [UU_] then the third drive (SATA2) has failed.

If you are replacing the first hard drive, then make sure the second hard disk is bootable, by issuing the following command: (this is only needed for installations that were shipped before Apresa version 1.7.2)

sudo grub-install /dev/sdb

When prompted for a password, use the same password as previously.

Shutdown the system, as follows, in the web interface: Tools menu=>System=>Shutdown system. Or alternatively, from the command line:

sudo halt

Then, replace the failed hard disk, with a new empty one with the same size, reboot, and log on in the system shell (command prompt).

We need to prepare and then add the replaced drive to the RAID array. The commands that we need to issue, depends on which drive we have replaced.

If the first drive (SATA0) was replaced, then type the following commands:

The next command should display no partitions.

sudo sfdisk -d /dev/sda

The next command should display a list of partitions.

sudo sfdisk -d /dev/sdb

If this is so, then proceed to the following command. Be very careful to write this command correctly.

sudo sfdisk -d /dev/sdb | sudo sfdisk --force /dev/sda

sudo mdadm -a /dev/md0 /dev/sda1

sudo mdadm -a /dev/md1 /dev/sda2

sudo mdadm -a /dev/md2 /dev/sda3

If the second drive (SATA1) was replaced, then type:

The next command should display no partitions.

sudo sfdisk -d /dev/sdb

The next command should display a list of partitions.

sudo sfdisk -d /dev/sda

If this is so, then proceed to the following command. Be very careful to write this command correctly.

sudo sfdisk -d /dev/sda | sudo sfdisk --force /dev/sdb

sudo mdadm -a /dev/md0 /dev/sdb1

sudo mdadm -a /dev/md1 /dev/sdb2

sudo mdadm -a /dev/md2 /dev/sdb3

If the third drive (SATA2) was replaced, then type:

The next command should display no partitions.

sudo sfdisk -d /dev/sdc

The next command should display a list of partitions.

sudo sfdisk -d /dev/sda

If this is so, then proceed to the following command. Be very careful to write this command correctly.

sudo sfdisk -d /dev/sda | sudo sfdisk --force /dev/sdc

sudo mdadm -a /dev/md0 /dev/sdc1

```
sudo mdadm -a /dev/md1 /dev/sdc2  
sudo mdadm -a /dev/md2 /dev/sdc3
```

After these commands, synchronization will proceed automatically. It takes more than three hours for 1 GB hard disks. You can see the progress in the web interface (Tools=>System=>System Information). Or alternatively, the progress can be queried from the command line, as follows:

```
cat /proc/mdstat
```

After completion, make the new drive bootable, as follows: (from the command line)

If the first drive (SATA0) was replaced, then type the following command:

```
sudo grub-install /dev/sda
```

If the second drive (SATA1) was replaced, then type the following command:

```
sudo grub-install /dev/sdb
```

If the third drive (SATA2) was replaced, then type the following command:

```
sudo grub-install /dev/sdc
```


12. INTERFACE CARD SPECIFICATIONS

To establish a technical correct tap on the various types of communication links the installer must have some basic information about the interface cards deployed inside the APRESA recorder.

Common characteristics for all interface cards:

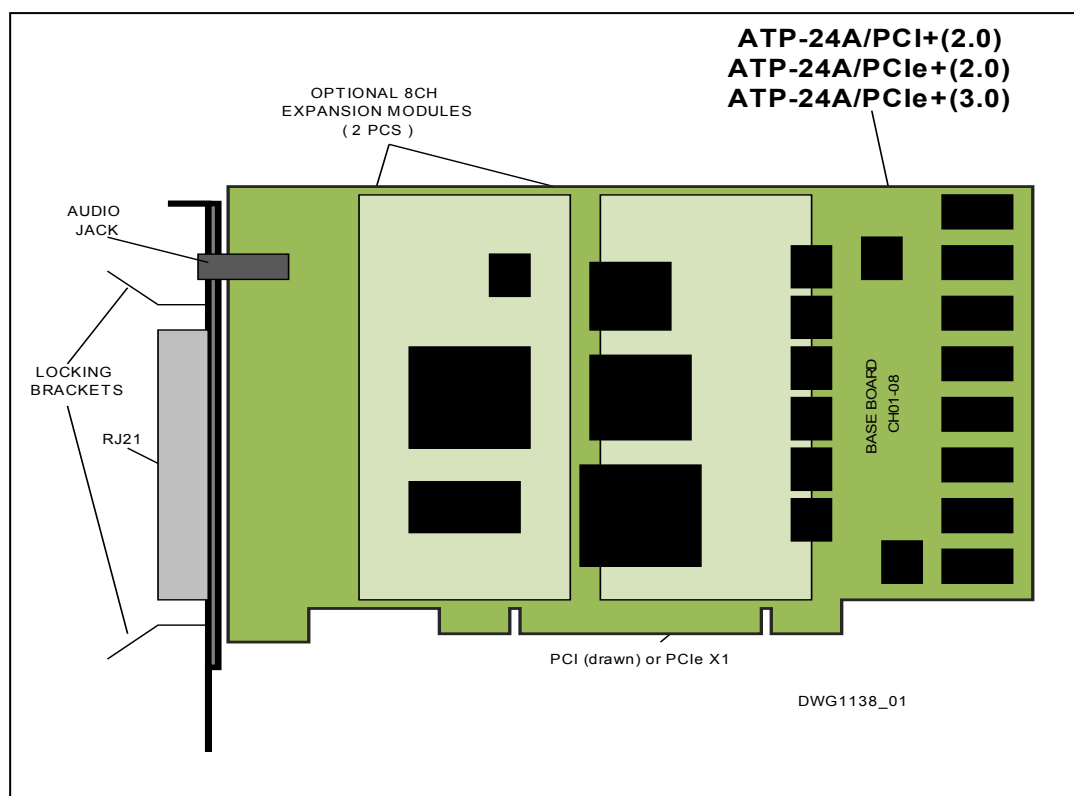
- All are basically PC PCI (or PCIe) expansion cards;
- All PCI are V2.2, 133 MB/sec , PNP (plug and play),Compatible with 3V3 and 5V PCI bus;
- All PCIe X1 that will fit also into X4/X8/X16x32 PCleslots;
- NO jumpers;
- All line interfaces are based on " PASSIVE TAPPING ";
- On-board DSP(s) for effective VOICE compression;
- No line termination possible.

12.1. ATP-24A/PCI+/2.0 / ATP-24A/PCle+/2.0 / ATP-24A/PCle+/3.0

This type of interface card is typically used for the recording of:

- Analog subscriber lines (POTS)
- Plain AUDIO signals.

The base-board supports 8 ANALOG channels but is expandable to 16 or 24 channels in total by the application of 1 or 2 expansion boards.



Key specifications overview:

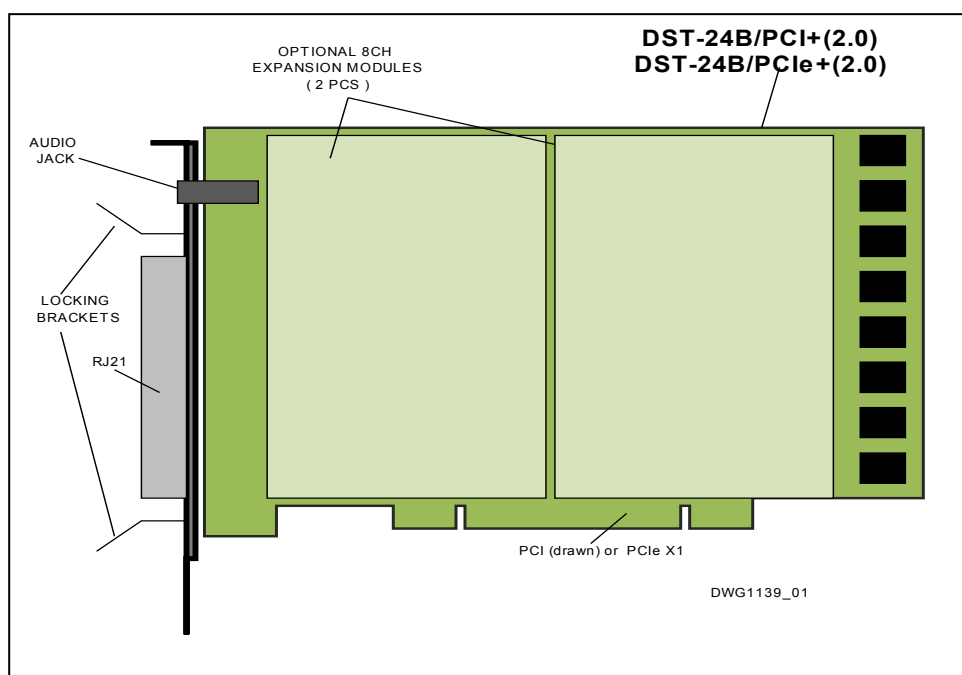
# channels	8, 16 or 24
Size	160x111 mm (excl bracket)
Impedance	10KOHM AC / > 1MOHM DC /
Sensitivity	8mV 750mV , by 16 steps.
Input connector	RJ21 (50 pin)
TAP type	Hi-Impedance passive monitoring by parallel connection
Isolation	500 VDC
Power dissipation	<8 W (3V3@900mA / 5V@200mA / 12V@100mA)
Sample rate	8 KHz
Frequency response	300-3400 Hz (± 3 dB)
Signal to Noise ratio	>34 dB

12.2. *DST-24B/PCI+/2.0 / DST-24B/PCIe+/2.0*

This type of interface card is typically used for the recording of:

- TDM
- ISDN2

The base-board supports 8 DIGITAL channels but is expandable to 16 or 24 channels in total by the application of 1 or 2 expansion boards.



Key specifications overview:

# channels	8, 16 or 24
Size	160x111 mm (excl bracket)
Impedance	1000 OHM AC / > 20MOHM DC /
Input connector	RJ21 (50 pin)
TAP type	Hi-Impedance passive monitoring by parallel connection
Isolation	500VDC
Power dissipation	< 9 W (3V3@1300mA / 5V@50mA / 12V@300mA)
Sample rate	8 KHz
Frequency response	300-3400 Hz (± 3 dB)
Signal to Noise ratio	>34 dB

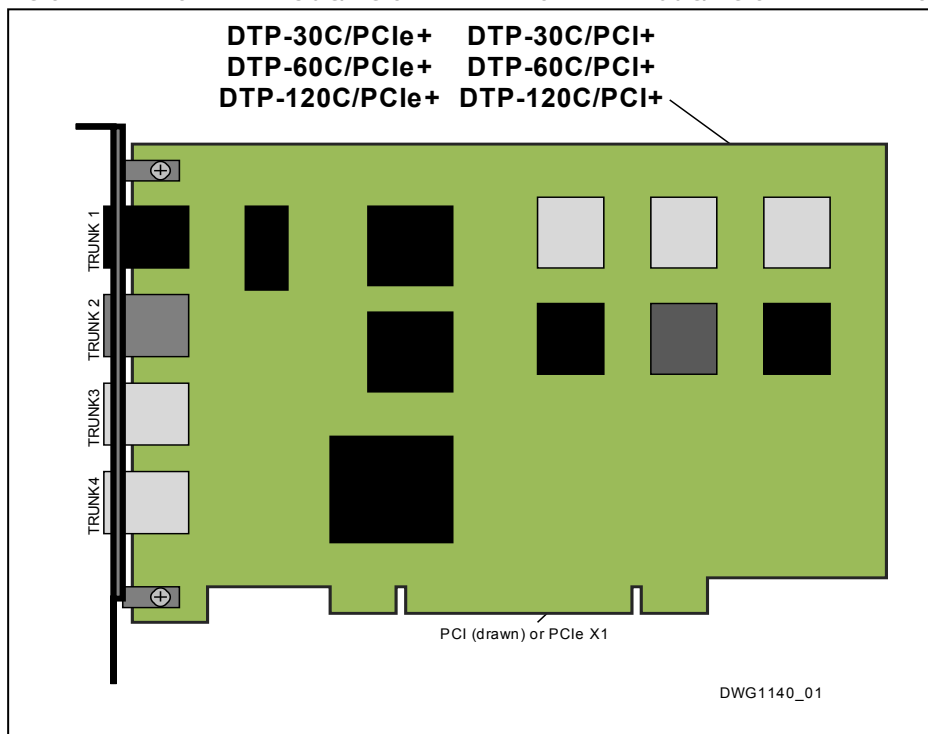
12.3. DTP-X0C/PCI+ / DTP-X0C/PCle+

This type of interface card is typically used for the recording of:

- ISDN-E1 (European type ISDN 'primary' rate, 30 recording channels)
- ISDN-T1 (USA type ISDN 'primary' rate, 24 recording channels)

There are 3 version supporting 1, 2 or 4 trunk lines.

PCI : 1-TRUNK:DTP-30C/PCI+ 2-TRUNK:DTP-60C/PCI+ 4-TRUNK:DTP-120C/PCI+
 PCle : 1-TRUNK:DTP-30C/PCle+ 2-TRUNK:DTP-60C/PCle+ 4-TRUNK:DTP-120C/PCle+



Key specifications overview:

#Trunks	1, 2 or 4
# channels T1 (USA)	24, 48, 96
# channels E1	30, 60, 120
Size	160x112 mm (excl bracket)
Impedance T1	75 OHM unbalanced / 120 OHM balanced
Impedance E1	100-110 OHM balanced
Input interface imp.	1KOHM
Input connector	RJ45 (8 pin modular)
TAP type	Hi-Impedance passive monitoring by parallel connection
Isolation	500VDC
Power dissipation	< 5 W (3V3@1500mA)
Sample rate	8 KHz
Frequency response	300-3400 Hz (±3dB)
Signal to Noise ratio	>34 dB
Signaling systems	SS1 / SS7 / DSSS1

13. GNU General Public License.

Some portions of the device software are covered by the GNU General Public License. The source code of these portions will be provided upon request for a charge of no more than the cost of physically performing the source distribution under the terms of Sections 1 and 2 of the GPL License *) on a medium customarily used for software interchange;.

If you want to receive the source code, contact VIDICODE:

VIDICODE
Blauw-roodlaan 140
2718 SK Zoetermeer
The Netherlands
Tel: +31 793617181
Fax: +31 793618092
E-mail info@vidicode.com

The GPL License can be found on the Application CD in your CR APRESA package under the directory **Licenses**.

14. TERMINOLOGY EXPLAINED

COMMISSIONING=

A procedure using predefined performance criteria to check a system for acceptance by the end user.

HIGH IMPEDANCE TAPPING=

A method used to extract data from a communication line with minimal electric disturbance.

INBOUND CALL=

An external phone makes a call to a local phone

INTERNAL CALL=

A call between 2 local phones, also called a local call

ITSP=

Internet telephony service provider

JBOD=

An acronym for Just a Bunch Of Disks. A group of hard drives in a RAID controller are not set up as any type of RAID configuration. All drives are available to the operating system as an individual disk. JBOD does not provide data redundancy. JBOD is not supported by APRESA

LOCAL CALL=

A call between 2 local phones, also called a internal call

OUTBOUND CALL=

A local phone makes a call to an external phone

RAID=

Is an acronym for "Redundant Array of Independent Drives". Refers to an array of multiple independent hard drive drives that provides high performance and fault tolerance. The APRESA supports Single Disk, RAID1 and RAID5

RAID0=

RAID 0, also referred to as "striping", writes stripes of data across multiple disk drives instead of just one disk drive. RAID 0 does not provide any data redundancy, but does offer the best high-speed data throughput. RAID 0 breaks up data into smaller blocks and then writes a block to each drive in the array. Disk striping enhances performance because multiple drives are accessed simultaneously; the reliability of RAID Level 0 is less because the entire array will fail if any one disk drive fails, due to a lack of redundancy, the reliability of RAID Level 0 is less because the entire array will fail if any one disk drive fails.

RAID1=

RAID 1 is also known as "disk mirroring"; data written on one disk drive is simultaneously written to another disk drive. Read performance will be enhanced if the array controller can, parallel,

access both members of a mirrored pair. During writes, there will be a minor performance penalty when compared to writing to a single disk. If one drive fails, all data (and software applications) are preserved on the other drive. RAID 1 offers extremely high data reliability, at the cost of doubling the required data storage capacity.

RAID 5=

RAID 5 is sometimes called striping with parity at byte level. In RAID 5, the parity information is written to all of the drives in the controllers rather than being concentrated on a dedicated parity disk. If one drive in the system fails, the parity information can be used to reconstruct the data from that drive. All drives in the array system can be used for seek operations at the same time, greatly increasing the read performance of the RAID system.

SNMP=

Simple Network Management Protocol. Is an IP-based protocol to obtain the status of SNMP-client network devices. The SNMP management platform is called the SNMP manager, and the managed devices have the SNMP agent loaded.

SOFTWARE CONFIGURATION=

The setup of installed software to meet the requirements of the user(s)

SOFTWARE INSTALLATION=

This is the process of installing of a software package on a computer. This is normally followed by the software configuration.

STATION SIDE RECORDING=

Recording the calls between local phones

STUB LENGTH=

The length of an un-terminated segment of a transmission line. Applies to the length of the cable between the tap and the APRESA recorder. The maximum length allowed varies with the brand of the PBX. Exceeding the maximum stub length will degrade the quality of the voice link.

TRUNK SIDE RECORDING=

Recording the calls to the external phone network, the outbound and the inbound calls.

U=

Unit to specify the height of 19 inch rack devices 1U = 44.5mm

VOIP=

VOICE OVER INTERNET PROTOCOL

POTS=

An acronym for Plain old telephone system. Commonly called analog telephony.

ISDN2=

An acronym for Integrated Services Digital Network 2 channels. Also called basic rate ISDN

ISDN-E1=

An acronym for Integrated Services Digital Network 30 channels. Also called primary rate ISDN. Used everywhere except in the USA and Japan.

ISDN-T1=

An acronym for Integrated Services Digital Network 24 channels. Also called primary rate ISDN. Used in the USA.

ISDN-J1=

An acronym for Integrated Services Digital Network 30 channels. Also called primary rate ISDN. Used in Japan only.

MIRRORING SWITCH=

Ethernet switch capable of copying the network traffic on one or more (source) ports to a destination port. Managed switches offer port mirroring.

REDUNDANT POWER SUPPLY=

Power supply used in high availability installation. Build with two power packs and allows one power pack to fail without interruption of the processing.

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FCC STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.