aycan
a PARATUS Medical Imaging Company

aycan xray-print

Installation Guide

for Software version: 3.00.000 and higher
Date: June 2023

Doc.-Number: 43417
Doc.-Version: 3.00

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1 Introduction / Intended Use

The aycan xray-print system provides the economical, high quality printing of radiological images on normal paper. Its normal environment is a private practice, clinic, or hospital radiology department.

One or more modalities may be attached to the xray-print system and use it as a secondary output device.

This manual will guide the system administrator through the installation and configuration of aycan xray-print, and aid in any troubleshooting that may be required.

aycan xray-print is a DICOM printserver embedded into a Debian Linux system which is able to start and run directly from DVD. There is no need to have any other operating system installed.

Intended Use:

Images produced with the aycan xray-print system are not intended for diagnostic, therapeutic, surgical planning or similar purposes.

The images should exclusively be used for documentation and information purposes in connection with final diagnostic results.

2 Installation of aycan xray-print

2.1 Hardware requirements

For aycan xray-print you need a standard PC that fulfills the current industry and safety standards and has the following minimum requirements:

– x86 64 Bit CPU, min. 2 GHz clock speed

– 4GB RAM

– IDE or S-ATA hard disk drive (min. 50 GB for xray-print)

– 1000 Mbit Ethernet network interface card

– Two free USB ports

– bootable DVD drive

– standard graphics card, min. 1024 x 768

– keyboard and mouse

All components have to be brand components supported by the Linux OS.

2.2 Preparing the system

Make sure that the computer system meets the hardware requirements listed above.

In the BIOS setup of the computer, choose the following settings:

Boot device is DVD-drive

USB-Port enabled

USB must have a special IRQ

Start the system and place the aycan xray-print DVD into the bootable DVD drive. The installation program will start automatically and you will get a boot prompt. At this point press F2 to get a help screen with available boot options. If you have an old small display for example, you can reduce the resolution for the graphical environment here. After typing any key on boot prompt, you have to press <Enter> to go on.

2.3 Preparing the hard disk

Although the aycan xray-print system starts directly from the DVD, at least 50 GBytes of nonvolatile storage is (currently[1]) needed for temporary files, print jobs, and to store settings.

xray-print is able to handle Linux partitions only. If all your hard drives are completely used and formatted with Microsoft's NTFS or FAT32 filesystem you have to downsize or delete one ore more of these partitions to get at least 10 GB free space. For downsizing partitions you have to use the included "parted" tool (see chapter 2.3.2.4) or an external partitioning program. For deletion of partitions you can use the setup program of xray-print.

1 Memory size may change in future versions

2.3.1 Choosing a partition

If no installed system can be found on any partition the setup program will be started. First the „Main menu" will be displayed (Figure 1). This menu shows all usable partitions. Usable means that the partition has a Linux filesystem and at least 10 GB free space. This is the minimum but it is recommended to give xray–print a partition with 50 GB or more.

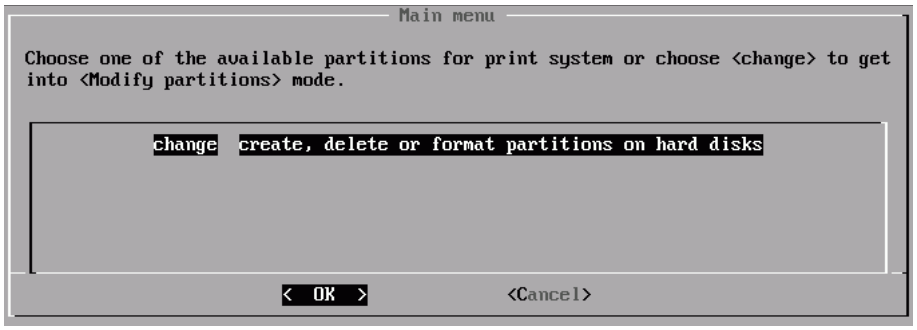


Figure 1 Main menu

In this dialog you can select a partition which shall be used for aycan xray–print, or you can select „change" to go to the „Modify partitions" dialog (Figure 3), where you can do some dialog based partitioning operations. To enter this dialog you have to confirm the warn dialog (Figure 2) by typing „yes" followed by <Enter>.

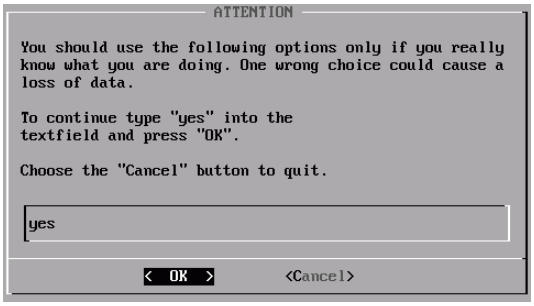


Figure 2

2.3.2 Modifying partitions

Partitioning operations can cause a loss of data. You should know what you are doing when changing your partitions. aycan doesn't take charge of any disk operation performed by users.

In the „Modify partitions" dialog (Figure 3) you have four possibilities to modify partitions:
– Search automatically for free space and create a partition (A)
– Delete an existing partition (D)
– Format an existing partition (F)
– Use parted to create a new partition (P)

Figure 3 Modify Partitions

aycan xray–print has only restricted capabilities in partitioning hard disks but it should be sufficient in normal case. Only primary partitions can be created. Note that every hard disk can contain a maximum of four primary partitions. This means if there are already four primary partitions on the disk, you either have to delete a partition and create a new one, or format one of the existing partitions (Linux partitions only) to get enough space.

Formatting or deleting a partition will destroy all data stored on it. Use this operations only if the partition doesn't contain needed data and if you know exactly what you are doing.

You may create and use an extended partition for xray-print or resize an existing partition with the included parted tool (see chapter 2.3.2.4) or with an external partitioning tool.

2.3.2.1 Searching for free space and creating a partition (A)

This option searchs for free unpartitioned space on all local hard drives. If a block of at least 10 GB free space is found, you can choose the size of the new partition in 10 GB steps in the next dialog (Figure 4).

Note: The bigger the partition the better. If you use the computer only for aycan xray-print, you should create one big partition with the maximum size of the hard disk.

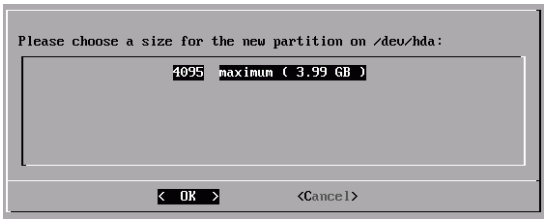


Figure 4 Choose partition size

After choosing the partition size you will be asked whether a bad block check should be performed while formatting the partition or not. You should always choose „Yes" to be sure the hard disk is ok and has no hardware problems.

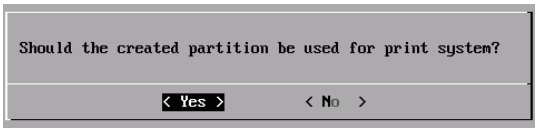


Figure 5

When the partitioning process has finished you can decide whether you want to use this new partition for xray-print (Figure 5). Choosing „Yes" will continue setup, „No" will bring you back to menu.

2.3.2.2 Deleting an existing partition (D)

With this option you can delete every existing partition no matter what filesystem it contains. The next dialog (Figure 6) shows all partitions found. Select the partition you want to delete and confirm the deletion.

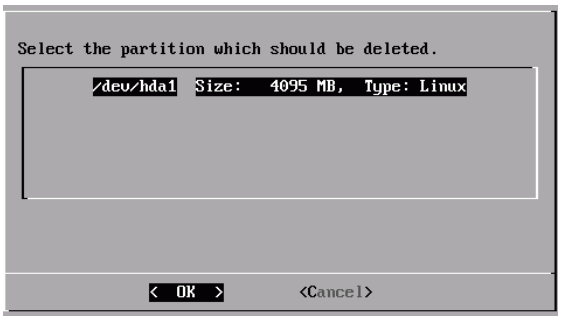


Figure 6

Note: If you delete a partition, all data from this partition will be lost! This operation is irreversible!

2.3.2.3 Formatting an existing partition (F)

If you want to install aycan xray-print on an existing Linux partition, but the partition doesn´t have enough free space, you can format this partition with this option. Select the partition you want to use in the next dialog (Figure 7). After confirming the procedure the partition will be formatted with the XFS filesystem. The following dialog asks for a badblock check (Figure 8). You should always choose „Yes" to make sure your hard disk has no hardware problems.

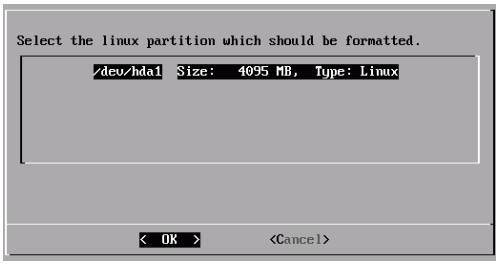


Figure 7 Format partition

Figure 8 Badblock check

If you want to use the newly formatted partition for aycan xray-print, you must leave the „Modify partitions“ dialog now and choose the formatted partition in the „Main menu“.

2.3.2.4 Use parted to create a new partition (P)

"parted" is a disk partitioning and partition resizing program.

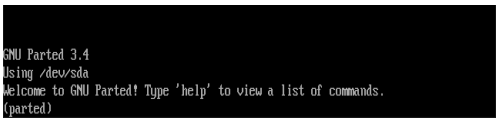


Figure 9 "parted"

Please enter "help" and press enter to see the available commands.

To quit the parted tool enter "quit" and press enter.

2.4 Setting up the operating system

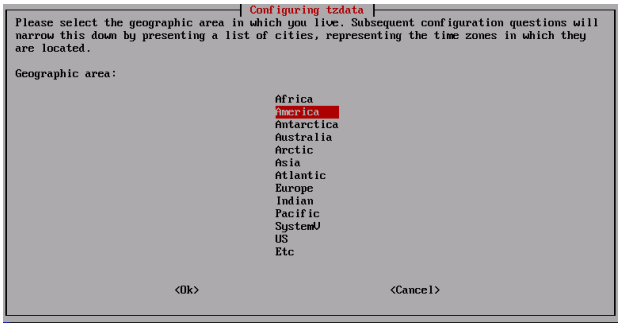
2.4.1 Keyboard configuration

Figure 10 Keyboard layout

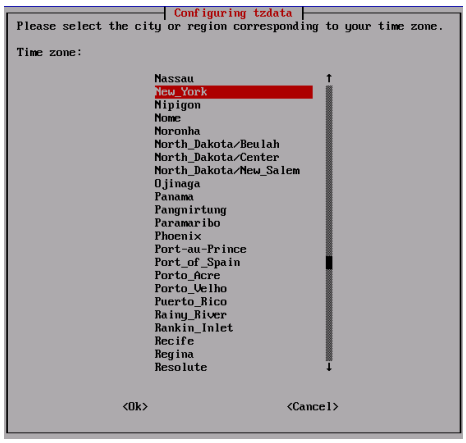
The default system language of aycan xray–print is (american) english, but you can choose different keyboard layouts depending on the keyboard you use. If there is no suitable layout in the list, you should call your service provider to get information what to do.

2.4.2 Geographic area and Time zone configuration

Select the geographic area in which the system should run and click 'Ok'.



Now select the city or region corresponding to your time zone and click 'Ok'.



2.4.3 User configuration

Every Linux system has a superuser called „root" which has no restrictions on the system. For example to change network configuration or to add and delete users you have to become root. Enter and verify the password of this superuser root in the following two dialogs. Make sure that you choose a password you will never forget or write it down and keep it on a secret place. You can´t do any administrative work on the system without this password. You can change this password later in the running system, but you need the old password to set a new one.

Figure 11

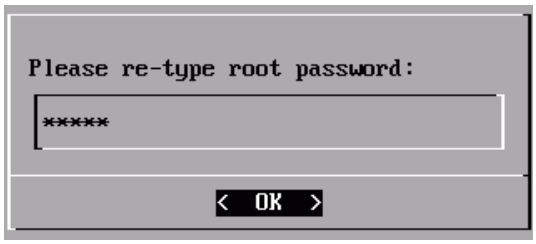


Figure 12

The superuser „root" is only for administrative work. To configure the print system you should never log in as root. An additional user account is created to login at the graphical interface. Enter the name of this standard user in the next dialog (Figure 13).

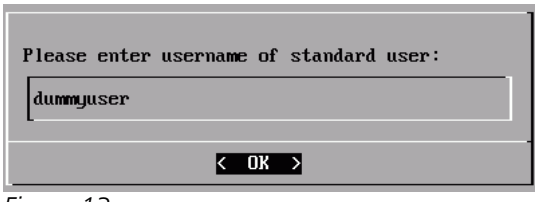


Figure 13

This new user needs a password, too. Make sure that you never forget this password. If you forget this password, you can not log in to the system. You can change this password later in the running system, but you need the root password to set a new one.

Figure 14

Figure 15

If you want to create more new users you can do this later in the running system by using the „User management" tool on desktop (see 2.6.2).

2.4.4 Network configuration

Figure 16

This section explains the network configuration. In the first dialog (Figure 16) you have to enter a name for the printserver. The name has to be one word without spaces. If you are using a nameserver, you have to add this name.

In the next dialog (Figure 17) you must enter the IP address of the aycan xray–print computer. aycan xray–print can only work in a network with fixed IP addresses, because the IP of the printer must be known and the printing modalities must know the IP of the aycan xray–print system. If you don´t know the final IP of the computer yet, you can use the IP of the loopback device (127.0.0.1) during setup. You can change the IP later in the running system using the „Network configuration" tool on desktop (see 2.6.1). Don´t forget to set the real IP before trying to print.

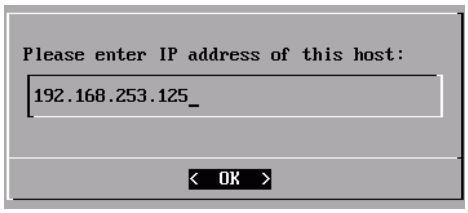


Figure 17

In the next dialog (Figure 18) you must enter the netmask for the subnet the computer is connected to. In most cases this will be 255.255.255.0 .

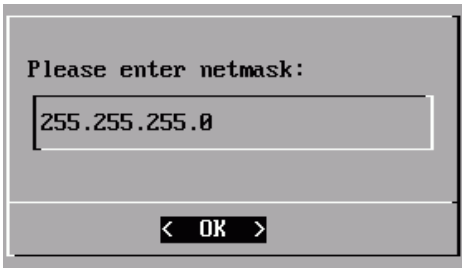


Figure 18

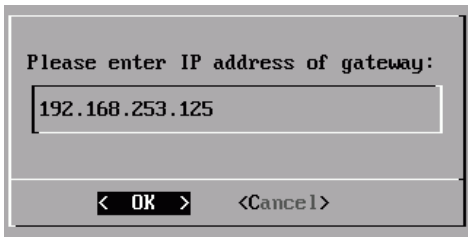


Figure 19

If the printer is in a different subnet as the aycan xray-print server, you must configure a gateway to be able to reach the printer and send printjobs. If not you can choose „Cancel" here.

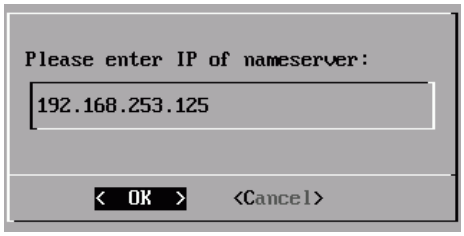


Figure 20

If you have a nameserver in your network, you can use the following two dialogs (Figures 19,20) to configure the IP of the nameserver and the domain the printserver belongs to. It is not necessary to configure a nameserver for the print system. You can select „Cancel" and work with IP addresses only. In this case the domain name dialog will not be displayed.

Figure 21

In the next dialog (Figure 22) you have to enter a short description for the location of the xray-print server. This makes it easier for service personal to indentify a server if there are more than one printservers in one practice.

Figure 22

You can change the network configuration on a running system using the network configuration tool „Network configuration" on desktop. There is no need to restart the system after changing network configuration.

2.5 Graphical login

After a successful setup or after every restart a graphical login screen appears. All additionally created users can be selected with the dropdown menu. Enter the valid password and click "Log In" or press <Enter> to log in.

2.6 Configuration tools

2.6.1 Network configuration

For a belated changing of the network configuration you can use the dialog based configuration tool. Start it with a click on the corresponding icon on desktop. After confirming root password to get administrative rights you will get a summary dialog with the actual network configuration. Click the "OK" button to open the configuration wizard which guides you through the configuration. In the summary dialog at the end click the "OK" button to save and activate new configuration.

2.6.2 User management

You have the possibility to add more users to your xray-print system. Furthermore you can change the password for existing users or delete them. Start the user management tool with the corresponding icon on desktop. After confirming root password you will get a dialog where you can select the operation you want to do. The dialogs will explain what to do.

Note:

- You have to give any user a valid not empty password
- You can not delete the user that is currently logged in

If you want to change the name of your standard user first create a user with the new name, then reboot and log in as the new user. Now you can delete the old user.

2.6.3 Set date and time

To change date and time of your system use the corresponding icon on desktop. After confirming the root password the date dialog will open. Set the correct date and click the „Ok" button. Then use the arrows near the values to set the new time or simply mark the value itself and type in the correct time. Click „Ok" to set and save the new system time and date.

2.6.4 Set Time zone

To change the current time zone of your system use the corresponding icon on desktop. After confirming the root password the time zone dialog will open. Select the correct time zone and the corresponding region and click the „Ok" button to save the changes.

2.7 Installing the aycan xray-print Software

After login, the aycan xray-print ControlCenter will start automatically. If you have closed the window you can start the ControlCenter with its icon on desktop. This program allows a graphical view and change for the configuration of the aycan xray-print software. Please read the aycan xray-print ControlCenter manual for further information.

aycan xray-print must be configured as a new printer at the individual modalities. This will require the network port from aycan xray-print ControlCenter, the IP address of the aycan xray-print computer and the Application Entity (see below).

Please use 'xray–print' and the number of the initial path for the Application Entity.

For an example network setup this might be:

Path-No.	IP-Address	Port-No.	Application-Entity
1	192.168.255.173	5001	xray-print1
2	192.168.255.173	5002	xray-print2
...	...	...	...

After installing the aycan xray-print software, you should print some test documents[2]. If the print quality does not fit your needs, the system has to be optimized with the help of the aycan LUT[3]-Editor.

2 The printer should be calibrated before. See documentation of the printing device.
3 The aycan Look-Up-Table Editor is part of the aycan xray-print Controlcenter. See the aycan xray-print ControlCenter manual.

3. Troubleshooting

Like every complex hardware and software system, problems can occur during installation and operation of the aycan xray-print system.

This chapter will help you locate and correct the causes of these problems.

3.1 Problems during installation

If there are problems during installation, make sure the computer meets the basic hardware requirements listed in chapter 2.1. Verify also that all steps of the installation instructions in chapter 2 have been executed correctly.

3.1.1 Computer won't start from DVD

Check whether booting from DVD is activated in the BIOS and that the DVD disk drive was correctly recognized. If this is the case and the computer still won't boot from DVD, the BIOS or the DVD disk drive probably isn't compatible with the boot system on the aycan xray-print DVD. Check the minimum hardware requirements (chapter 2.1, page 3 of this manual). You may test your system with another bootable DVD (if available). If booting fails again, consult your hardware supplier. Try to boot from aycan xray-print DVD on another computer. If it also won't start from DVD, the aycan xray-print DVD may be damaged. In this case consult the aycan xray-print support.

3.1.2 Computer hangs during installation

This may occur during the hardware recognition. Please switch off and restart the computer to repeat the installation process.

3.2 Problems during operation

3.2.1 Some pictures contain the words 'DICOM Print demo'.

This occurs if the dongle of the aycan xray-print system isn't running or isn't available.

The dongle is working if a red light can be seen inside. If the light is out, the dongle isn't running and the system will go into demo mode. This means that only connections on the first initial path will be allowed and single pictures will be provided with the words 'DICOM Print demo' in them.

To fix this, first reboot the computer. If the dongle light fails to come on after the restart, the USB-Port in the BIOS is probably not activated or doesn't have its own IRQ. Activate the USB-Port and assign a dedicated IRQ to the USB-controller. If the dongle light still doesn't come on after a restart, make sure the USB connections are attached to the mainboard correctly, if they aren't integrated on the mainboard directly.

If this is unsuccessful, the mainboard is probably not compatible with the Linux operating system or, possibly, the dongle is faulty. Plug the dongle into another computer's USB port. Be sure the BIOS settings match the requirements. If the red light fails to come on, the dongle is damaged. In this case consult the aycan xray-print service.

3.2.2 No dongle found. System is in demo mode.

See 3.2.1

3.2.3 Printer doesn't work

Please, first check the manual(s) for your printing device and/or contact the support provider for this printer. If no errors can be found, contact aycan xray-print support.

3.3 Removing aycan xray-print related data

All xray-print related data is inside one directory. To delete this directory you can boot the computer from the xray-print DVD, type **„deletesystem"** on boot screen and press <Enter>. After system initialization there will appear a dialog to confirm system deletion. **Choosing „Yes" will delete your installed xray-print system without any backup of configuration**, so make sure you have backuped your configuration before if you need it any longer.

After deleting the system directory the setup program will start automatically. If you want you can format or delete the xray-print partition here. **Note that this will destroy all data on this partition, so don't format or delete a partition which contains xray-print independent data.**

3.4 Updating hardware of xray-print system

xray-print does a hardware scan on every startup. To move the system to another (faster) computer, you only have to plug the hard drive with the xray-print partition to this new machine and boot this machine from xray-print DVD. Note that the new hardware also has to meet the hardware requirements in 2.1.

Note: Before changing the hardware you should always make a backup of the actual configuration to floppy or USB stick.

4. Appendix

4.1 Protection from dongle theft/loss

Your system will only work proper with the dongle plugged in to the USB-Port of your computer. We recommend that you protect the dongle from theft or loss the way it is mapped in the figure below:

Figure 23 Dongle

4.2 Imprint

Contact:

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Factual errors and technical changes reserved – Date: 06-2023