digipaX

Version 1.4.8

Administrator's Guide

Installation and Administration

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1 Introduction

1.1 General

> This document is confidential!
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In this document we explain the installation of various components as well as the functions and settings that go beyond the user's documentation. A normal user has particularly limited access possibilities to the system settings. The integration of digipaX software in an overall-system comprising of numerous DICOM and GDT systems can only be made by competent persons the administrators.
For administrators and maintenance personnel special training is needed. Information on trainings can be obtained from the manufacturer.

Using this documentation and the password at the end of this document, administrators will be able to configure digipaX for specific situations in practice.

1.2 Symbols and illustrations

Symbol	Meaning
	Note
	Tip

All digipaX illustrations (screenshots) show the program windows in Classic Style. This allows the images to be clearer in the documentation. The program is normally set to Black Style, which is more suitable for viewing medical images.

1.3 Possible risks

To reduce the risk of electric shock please heed the use of the CE marked hardware and keeping of the safe distance of 1.50 m between the installed hardware components and the patient (see Section 2.2.4 Hardware and safety and 2.2.9 Installation and connection instructions). In addition, galvanic isolation should be used when connecting devices with a data cable.

While using the module for acquisition of radiological images (image acquisition module), the loss of the current image can occur if the instructions are not properly observed after the error has had appeared. Therefore, while executing the activities according to the checklist special attention should be paid to instructing the staff related to the acquisition of images (an explanation of the backup/restore functions).

To prevent loss of the entire image archive, multiple and dispersed storage of the image data must be provided. For this purpose, please read Section 2.2.3 RAID system and backup.

The users of the system should be instructed that the failure to follow the operating manual is associated with the risk. In particular, it is imperative that all safety precautions in the User's Guide are observed.

2 Network and hardware

2.1 Data network

2.1.1 Purpose of connection to data network

Purpose of embedding in the data network is availability of central data stock of DICOM images on several computers and inter-device data exchange by

- sending/receiving DICOM images via DICOM Communication,
- sending/receiving jobs via DICOM Worklist and
- recalling/creating/transferring files as e.g. thumbnails, Worklist files, XML files, license files etc. through enabling Windows in Microsoft networks.

2.1.2 Properties and features required

- Network topology Ethernet
- Star topology
- Min. 100BaseT, but 1000BaseT or more is recommended

2.1.3 Configuration required

- Network protocol TCP/IP
- preferably static IP addresses. If dynamic addresses are used, an accurate name resolution of hostnames in the network is required (usage of DNS or WINS, in exceptions by editing the file „hosts")
- Windows operating systems (see Section 2.2.2.1)
- Windows working groups or domains
- RAID system (RAID1, RAID5 or RAID10) for data

2.1.4 Safety requirements

The PCs and the network must be protected against access of unauthorized persons by necessity of providing username and password. If the network is connected with internet, it must be protected against attacks from internet. Most devices for internet access (DSL router, Fritzbox etc.) already have an internet firewall for network protection. Local firewalls on particular PCs can be additionally activated in order to avoid unwanted communication from inside to outside to internet. However, in this case trouble-free network traffic between stations must not be impeded or completely blocked.

The following services and ports are required:

- image archive port 5678
- image querying at work stations port 104
- automatic capture of images at work stations port 105
- port 2200 on server that provides the Worklist, as well as read and write access to Worklist directory through the network from appropriate stations

- read and write access to further special directories on the server for license, thumb-nails, Presentation States and other data if need be

Furthermore, the systems must be protected against malwares by installation of antivirus softwares. Should the above-mentioned ports already be in use, they can be changed. All free ports from 1024 can be used for this.

2.1.5 Other information on communication flow

- Reading and writing license file (folder-enable)
- Writing job files on server (folder-enable)
- Querying job list (Worklist) from server (DICOM Query – C-FIND)
- Accessing images from server (DICOM Query Retrieve – C-MOVE)
- Sending images to server (DICOM Send – C-STORE)
- Querying information on patients, studies and images from server (DICOM Query)
- Reading and writing thumbnails on server (folder-enable)
- Reading and writing Presentation State files on server (folder-enable)
- Poss. exchanging GDT files with third-party systems (folder-enable)
- Poss. receiving and sending out HL7 messages (HL7 protocol)
- Poss. reading and writing the X-ray journal (folder-enable)
- Poss. reading and writing manually recorded patients list (folder-enable)

2.1.6 Possible risks if requirements are not met

- Time delays in cases of emergency because:
  o software does not start (no access to license file)
  o images cannot be queried or are queried only very slowly
- Other possible limitations that do not impact directly:
  o creating jobs impossible
  o querying job list impossible
  o long waiting times (if network is slow or configured inappropriately)

2.2 Hardware

2.2.1 Conditions for use

This product is designed for use on personal computers in residential and commercial premises. The used hardware must be adapted to the prevailing environment conditions. The user of PC must verify if hardware corresponds to requirements prevailing in location of its installation.

2.2.2 System requirements

2.2.2.1   Supported operating systems

Windows XP, Windows Vista, Windows 7, Windows 8
Windows Server 2003, Windows Server 2008, Windows Server 2012

When using Windows server 2008 it is necessary that the feature „Desktop Experience" of Windows is installed. The installation is to be made in server manager above the switch „Add feature".

2.2.2.2   Server

Recommended system configuration:

Processor	Dual-core processor 2,5 GHz or higher
Main memory	Min. 2 GB RAM
Operating system	Windows 7 Prof.
Graphics card	Minimum 128 MB DVI (dual), 1280 x 1024
Harddisk	System disk min. 60 GB + additional image store (RAID system)
Network	1000BaseT (Gigabit Ethernet)

Minimum system requirements:

Processor	Pentium 4 or similar min. 2,1 GHz
Main memory	Min. 1 GB RAM
Operating system	Windows XP Prof. or higher
Graphics card	On-board graphics, 1280 x 1024
Harddisk	System disk min. 60 GB + additional image store (RAID system)
Network	100BaseT

2.2.2.3   Workstation

Recommended system configuration:

Processor	Dual-core processor 2,5 GHz or higher
Main memory	Min. 2 GB RAM
Operating system	Windows 7 Prof.
Graphics card	Minimum 128 MB DVI (dual), 1280 x 1024
Harddisk	60 GB or more
Network	1000BaseT (Gigabit Ethernet)

Minimum system requirements:

Processor	Pentium 4 or similar min. 2,1 GHz

Main memory	Min. 1 GB RAM
Operating system	Windows XP Prof. or higher
Graphics card	On-board graphics, 1280 x 1024
Harddisk	Min. 60 GB
Network	100BaseT

RAID system size depends on the expected number of images.

2.2.3 RAID system and backup

The data of archivized images are to be saved on a RAID system to minimise the data loss risk. RAID 1 or RAID 5 is recommended.
In addition, the data are to be put on further harddisks by their mirroring or daily backup (see also chapter 22 Archiving).

2.2.4 Hardware and safety

The used hardware must be provided with CE and it must meet requirements provided in Electromagnetic Compatibility Directive and Low Voltage Directive. It is necessary to observe restrictions concerning the use and provisions regarding the maintenance and operation of the installed hardware according to the manufacturer's information and standard EN 60950-1.
It is necessary to ensure proper functioning of the installed hardware components before the software will be installed and taken in use.

2.2.5 Use within urgent care facilities

The equipment used within urgent care facilities, such as ambulance or hospital emergency department must meet specific requirements. In these places, prevention against possible malfunction or breakdown during time-critical medical procedures is needed. Computers must be protected against power blackout by uninterruptible power supply solutions, if the urgent care facility is not already protected by any kind of emergency power supply. Permanent availability of image and patient data as well as server services must be assured. This can be obtained by mirroring of image data or any other cluster solutions. Appropriate measures should also be taken in order to prevent failure of the work stations, which means providing a ready to use substitute station. Networks must meet the requirements of IEC 80001.

2.2.6 Noise level

The installed components, in particular fans of the system should meet the current directives in terms of noise level and keep the required noise limits.

2.2.7 Diagnostic display

The diagnostic workstation requires a special diagnostic display according to quality assurance directives for radiographic equipment. In order to ensure the quality of the display, a

daily visual inspection is necessary. This can be made via software (e.g. "LUXOR DisplayQ") or by using the SMPTE test patterns. The staff must be trained accordingly.

2.2.8 Devices

The following devices can be connected to the digipaX software for data exchange:

Device type	Manufacturer	Unit
CR-Scanner:	iCRco	iCR-Serie
	Orex Computed Radiography Ltd.	Orex
	Kodak (Carestream)	PoC-Serie
	Carestream Health	Vita LE
Detector:	Teleoptic PRA, Ltd.	Alpha 4600
	XCAN AG	XCAN DR-System
Generator:	JOSEF BETSCHART AG	GENESIS 50 RFT
	Provotec	ProVario
Dose-area-product meters:	Wellhöfer	KermaX IDP
Video sources:	video sources from the manufacturer "The Imaging Source" with „WDM Stream Class Driver" and DirectShow supported	
Foot switch:	any USB foot switch with two programmable pedals for key combination Foot switch with a serial connection (RS232), here control cables CTS, DSR, DCD and RI are supported (NO switch)	

While connecting the equipment the instructions of the manufacturers of devices must be followed. In particular it is to ensure galvanic isolation if necessary.
Connection of devices is described in chapter 20 Device connections.

2.2.9 Installation and connection instructions

While installing and connecting the systems the specifications and precautions provided by the manufacturers must be followed.

The installed hardware must be CE marked and meet the requirements of EMC and Low Voltage Directive. The restrictions on application as well as maintenance and use instructions for the installed hardware are to be followed according to the manufacturer's information and DIN EN 60950-1.

It is to ensure that between the installed hardware components and a patient a distance of 1.50 meters will be kept (so that no simultaneous touch of hardware and patient is possible). Moreover, all the hardware must stand safely. Monitors should also stand safely so that they cannot be pulled down accidentally. Cables are to be so installed that loose hanging is avoided.

The hardware shall be located in such a manner to allow for quick and easy disconnection from power supply in emergency situations. The disconnectable power outlet strips with good access may be used as possible alternative.

The keyboard, mouse and monitor shall be located on workplace in such a manner to eliminate their physical impact on environment.

There are no known interactions between computer hardware and X-ray system. Therefore, no special precautions for their installation are given.

2.2.10 Uninterruptible power supply (UPS)

Check if an uninterruptible power supply of a device is necessary to prevent image loss during data transfer from external appliances and to exclude possible dangers for patients. The instructions of the manufacturers relating to this must be followed.

2.2.11 Cleaning with disinfectants

The installed hardware should be cleaned in principle with common disinfectants. The hardware components may not get damaged by using such disinfectants. Inform the staff especially if such cleaning of installed hardware is not acceptable.

2.2.12 Software

The same version of digipaX software is to be installed at all connected stations.

3 Installation guidelines

3.1 Server guidelines

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3.2 Workstation guidelines

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3.4 Installation and interconnection plan

Especially for larger systems in which DICOM router, worklist server, multiple image archives and even third–party system may be integrated, it is recommended to make an interconnection plan for the systems involved. For each computer, enter its name, IP address and systems which are to be installed. For each DICOM system, specify an AE Title and port, where it will be accessible (for servers – Service Class Provider (SCP)) or which will be used by it for image query as Service Class User (SCU).

Example of a simple system structure:

System	AETitle	Port
TurboMed		
digipaX	DIGIPAX1	104

System	AETitle	Port
TurboMed		
digipaX	DIGIPAX2	104
	AUTODIGI2	105

System	AETitle	Port
digipaX	SCANNER	104
Conquest	CONQUEST	5678
WL-Server	WORKLIST	2200
XScan32	XSCAN	2300
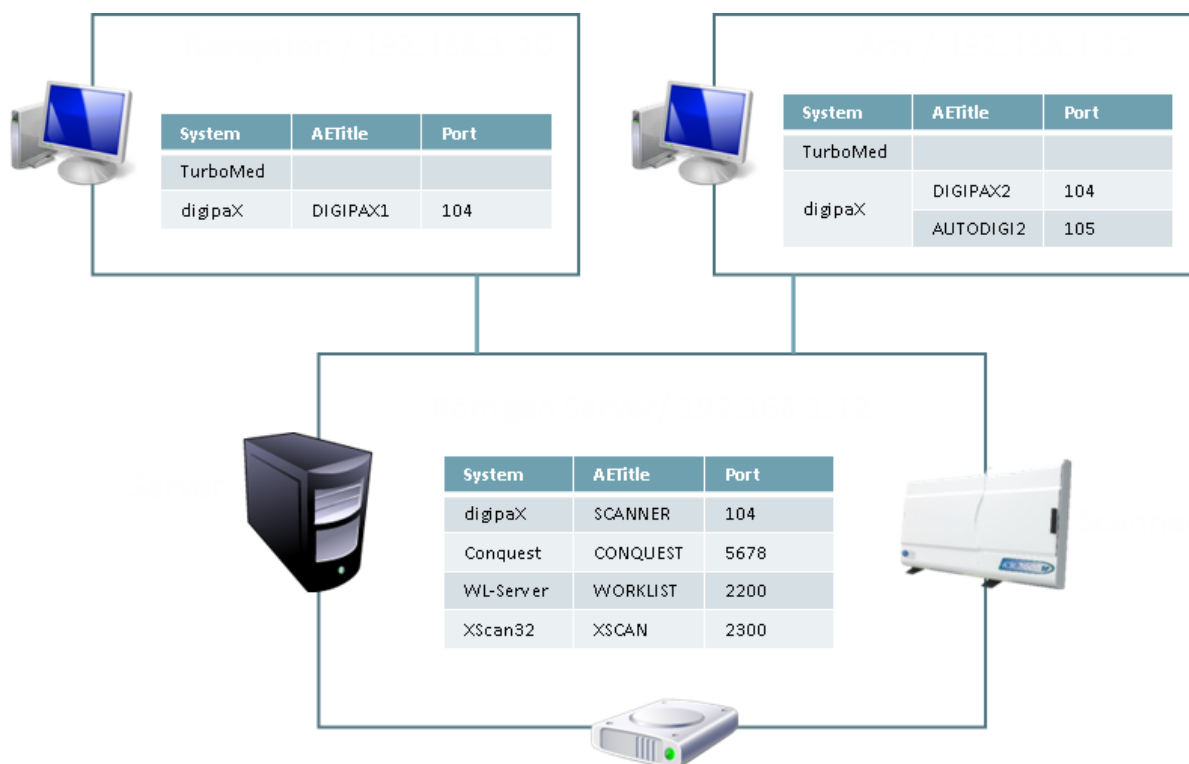
4 Program installations

> For the installation the administrator rights are necessary. User account control as well as use of security software and firewalls may cause problems whilst installing the digipaX software. Settings of such programs may require adjusting (enabling of ports, approval of accession rights to the programs and for the user etc.).

All installation programs are started through the tool Xinstall.
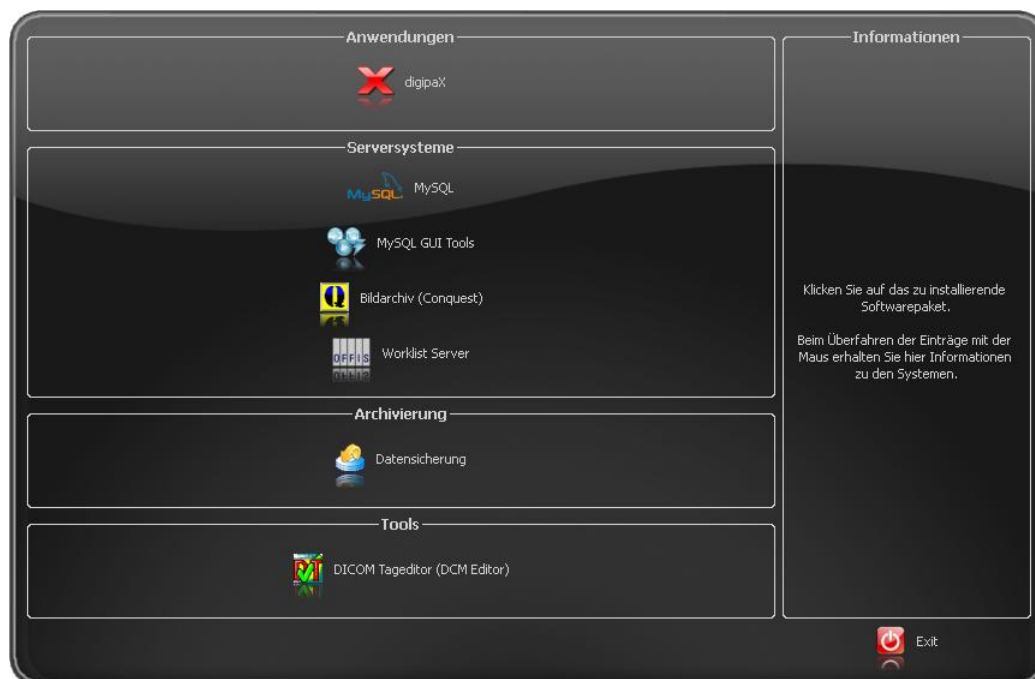
By clicking on the appropriate menu item the setup of this software launches.
Adjusting this installation software Xinstall is possible and is explained in a separate document. Install the required components one by one. The necessary settings are described in the next section.

4.1 digipaX

The installation program installs the digipaX software (typically in directory C:\digipaX\digipaX).

If setting as a veterinary version is needed, then it can be enabled as preset in the setup (see also 16 Veterinary version).

After the installation has been completed, a BodyGenX tool is accessed optionally. With this tool the organ tables for various specialities of human or veterinary medicine can be installed. Also, the Procedure Codes of various devices can be installed. Use of BodyGenX is described in the section 14 Body Generator (BodyGenX).

4.2 MySQL

First install MySQL server on usual way ("Typical").

Just at the end of the setup select "Configure" and do the settings like shown in the following dialogues:
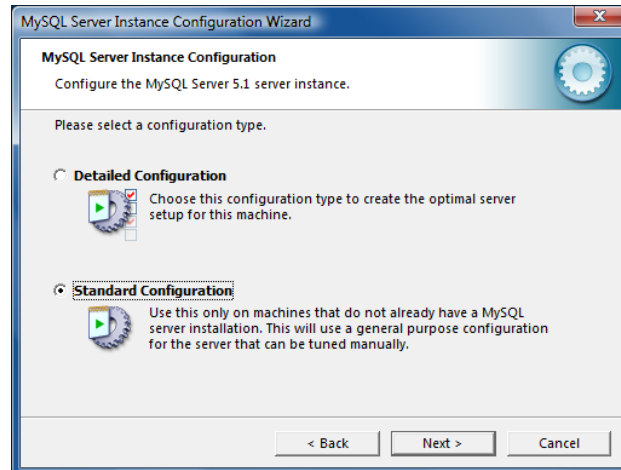
As password, here „root" was used.
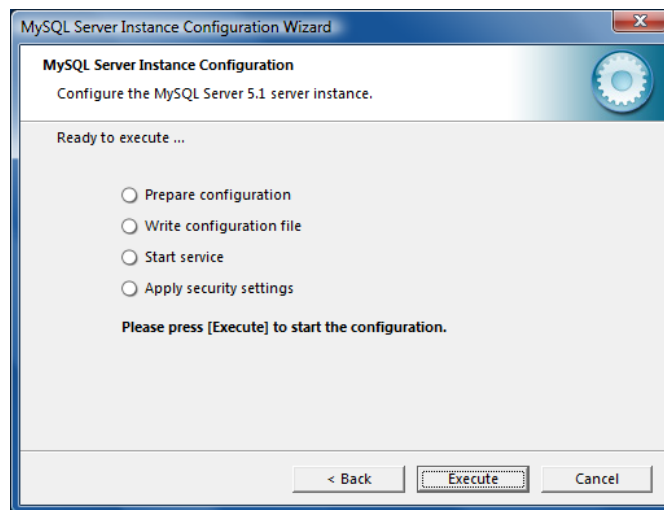
Additionally, the installation of "MySQL Workbench" is recommended. It includes tools for testing and optimizing the database, which could be used immediately when only needed.
The creating of an automatic backup of the MySQL database is described under point 22.2 Securing MySQL database.

If using Windows 7, after installation of MySQL a reboot is required!

4.3 MySQL Workbench

Additionally, the installation of "MySQL Workbench" is recommended. In it, you can establish a database backup (optionally), so that you do not need to recover the database in a slow recovery process from the DICOM images if a system crash occurs. It also includes tools for testing and optimizing the database, which could be used immediately when only needed.

4.4 Conquest

The Conquest (PACS server) is the image archive and absolutely necessary for operating the system.
Install the Conquest files on the target computer (e.g. C:\digipaX\Conquest).

The installation path must not include blank spaces as otherwise you would not be able to log in the Conquest as a service! The Windows program directories usually include a blank space in the path (C:\Program Files) and cannot be used as an installation path. Please keep this in mind at the installation and use the recommended path „C:\digipaX\Conquest" preferably.

4.5 Xadmin

If needed, the tool Xadmin can also be used to support some administrator's tasks. Currently Xadmin supports acquisition of already existing data (DICOM images from previous system), modifications of tags in batch mode and creation of X-ray journals from the tags of the DI-

COM files. The program starts through Xadmin.exe. For more, read the Xadmin user's manual.

Conquest image is based on database system MySQL.

4.6 Worklist server: wlmscpfs

The worklist server is only needed if the worklist component of the digipaX system is intended to be used.

Here at this place only the required components are copied on the PC. You still have to configure the worklist server and install it as a service. This operation is described in section 8.

4.7 Backup

This tool is necessary for creating image files backup on CD / DVD. It requires installation of Nero software.

4.8 DICOM Definition files / DICOM editor

With the DICOM editor, the DICOM tags of image files can be changed. This is necessary if e.g. wrong assignments of images occur.

Before the DICOM Editor can be installed the associated Definition Files must be installed.

4.9 Ghostscript

Ghostscript is required for importing the PDF documents with the import module.

4.10 Remote maintenance

For remote maintenance the Teamviewer is used. At the customer's the Quicksupport module is sufficient.

http://www.digipax.de/downloads/TeamViewer/TeamViewerQS_en.exe

4.11 Nero

Burning of patients' CDs (DVDs) is directly possible in digipaX. For this, an integrated Built-In-Burning engine as well as the Nero software can be used. To use Nero, the Nero software must be installed on the computer. The settings which software is to be used are described under point 18.7 Selection of burning software.

5 Commissioning / general configurations

5.1 digipaX

5.1.1 Configuration of information on practice and physicians

In the configuration on the page "Information on practice and physicians" doctor's name and address are to be put in. If necessary, doctor's or company identification number can be added (for more see Chapter 23 Tips for group medical practices (team practices).

5.1.2 Licensing

From digipaX version 1.2 software activation is required.

The program is installed on base of a standard, full-featured trial license, which expires after 30 days. Within those 30 days a new license file must be installed in the system. The application for new license file is possible just already during configuration of the server and hence the product activation can be done prior to delivery of the system.

5.1.2.1 Product activation flow

1. Launch the digipaX on the server and open the configuration page "License"
2. Click the button "Product activation ..."
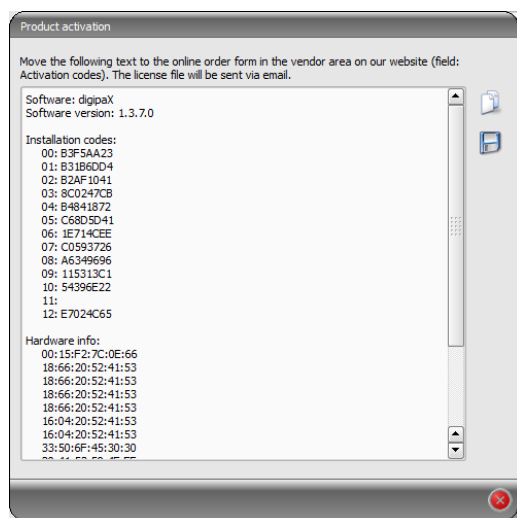
3. Copy the data using the appropriate button to the clipboard or text file
4. Log in on the website www.digipax.eu entering the vendor information, fill out an order form in the vendor area, paste text copied from the product activation and submit the order.
5. The company digipaX sends back to the email address provided the license file which must be again copied onto the server.
6. In the configuration of the server a new path to the license file must be specified, if the license file was copied in any another location.
   It is recommended to overwrite the default license file.

All other digipaX stations in the network must also use this license file, that means that the path of the license file is to be customized to the configuration.

5.1.2.2   Extension of update period

When the update period expires, it must be first extended before new updates can be installed. For extension of the update period the number of the license file is required. It can be found in the license viewer (license configuration page). This number is needed to order an activation key from the manufacturer for extension of the update period. Enter this key in the license viewer (button "Activation key").

5.1.3 Activating modules

The desired modules of the station are activated / deactivated on the configuration page "License".

5.1.4 Errors when checking the license

If the license checking fails at the program launch, an error message with the error code is displayed. The following table presents the meaning of these codes:

Code	Meaning
0	Licence Passed
1	Licence Demo Mode
2	Lic File Not Registered
3	Module Is No
16	Licence Expired
17	Demo Licence Expired
32	Too Many Module User
64	User Is Deactivated
128	No Lic File Access
129	No Registry Access
256	Module Not Found
257	Key Already Used
258	Key Not Readable
512	Invalid Licence
1024	Invalid Inst Code
2048	Invalid Lic File
3001	Webservice Error
4096	No User
4097	No Item
4098	Entry Not Found
4099	Invalid Type
4100	Module Exists
4101	Invalid Parameter
4102	Insufficient Licence

5000	User Cancel
8192	Unsupported Version
8193	Unknown Language
8194	Not Implemented
16382	Sysdate Changed
16383	Lic Tampered
16384	Unhandled Error

If, for example, the license file has been moved, a new path can be set up using switch „Select new license file".

Another reason for an error when checking the license can be that the PC has been replaced and the new computer has now a different computer name or the computer name has been simply changed in Windows only. Then, the old computer name is still activated in the license file and there is no license for the new computer name left. If this is the case, then you can open license viewer using switch „License Viewer" and deactivate the old name in the list. Afterwards, the license is available again and will be allocated to the new name after restart of digipaX.

The license viewer does not open if no license file is selected or the license does not belong to the system (Code 1024) or is damaged.

5.2 Conquest

The MySQL is used as the database for the image archive. There is an additional description „windowsmanual.pdf" (in English only) delivered by the Conquest in the installation directory. The GUI of the Conquest is started by using a connection in the start menu or by executing the file ConquestDICOMServer.exe. At first start-up choose the „Native MySQL driver" as database driver.
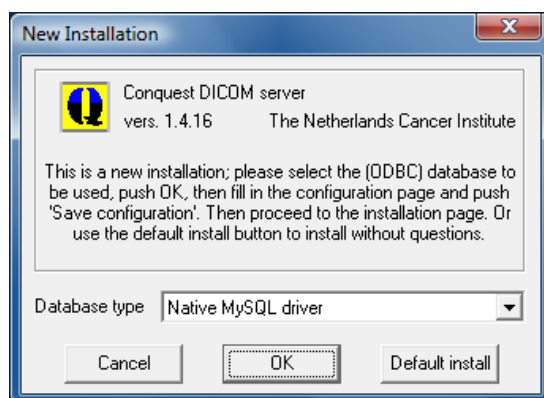
On the first configuration page enter AE Title and port and save the settings. It is recommended to set the checkbox „Keep Server Alive" in order to restart the Conquest automatically after a server crash. Furthermore, select the file format DCM in order to be able to read the saved files images with every DICOM standard software. The selected directory for data storage should have enough space for the expected volume of coming images and be stored on a RAID system.
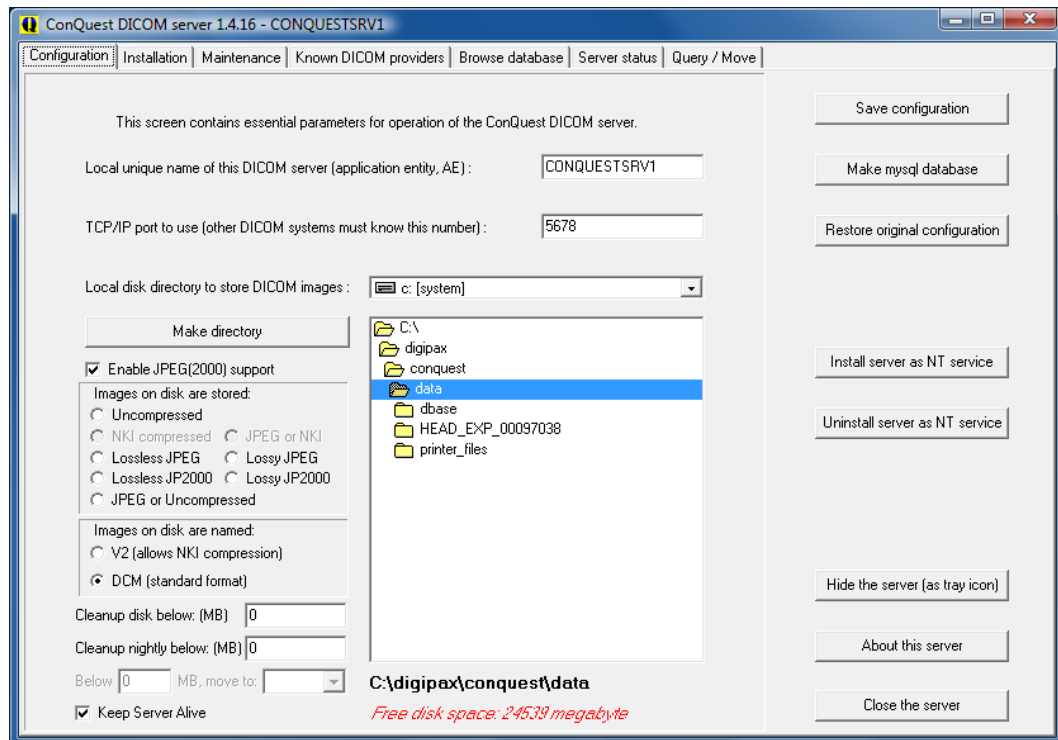
On the installation page, 5 top buttons on the right top-down can be used for proper creating and testing of the database.

Confirm the database name **conquest** (for multiple Conquest servers, you can select also e.g. „conquest1" and „conquest2") by using the button „Make mysql database" and enter it by using the password **root**. Confirm the question „Change TCPIP parameter to fix mysql problems?" with **Yes**.
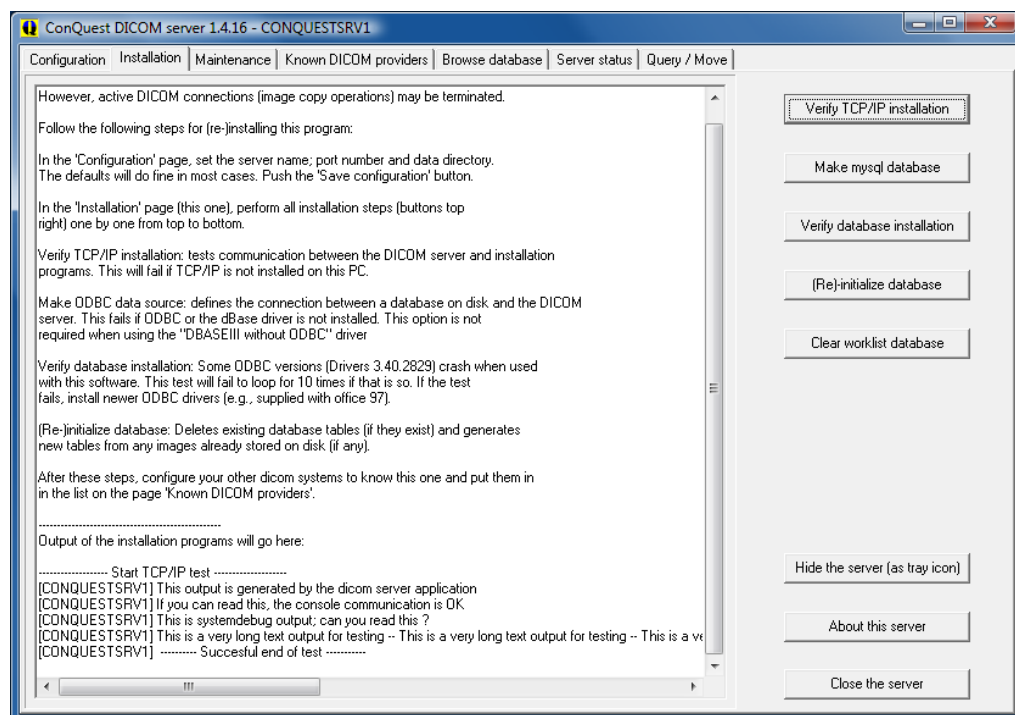
On a tab "Browse database" you can see an image, which is already contained in the tab by default.

This installed test patient can be deleted in the context menu of the image by using „Delete this patient".

On the page „Configuration" use also „Install server as NT service", so that the server starts automatically always at the system boot and is always active in the background.

If using Windows 7, administrator rights must already be established and User Account Control (UAC) must be disabled before the installation as a Windows service („Install server as NT service") will be done.

The installation is now completed.

5.2.1 Extensions in Conquest

It is recommended to get outright the extensions as described below. For the new installation of Conquest a pre-prepared configuration file „dicom.sql.ext" is installed in the Conquest directory. It contains all extensions described in the following sections. This file is to be just renamed to „dicom.sql" and the original file deleted priorly. It is recommended to create a backup of the original file before deleting.

If the file is edited manually, it is to keep in mind that the last line in each of the sections „*Study*", „*Series*" and „*Image*" is a link back to the upper section and thus it must not be modified. It is also described as a comment in the „dicom.sql".

The last defined element of Study is a link back to Patient

The last defined element of Series is a link back to Study

The last defined element of Image is a link back to Series

After the changes are made the Conquest needs to be robooted and the data base re-initialized.

5.2.1.1   Supporting international character sets and encoding

Supporting the international character sets and encoding when retrieving the archive is controlled through the tag „0008,0005 SpecificCharacterSet". To enable the supporting in the Conquest the file „dicom.sql" in the Conquest directory needs to be extended. For this, a next line must be added to each of the sections „*Patient*" and „*Study*".

```
*Patient*
{
        { 0x0010, 0x0020, "PatientID", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0010, "PatientName", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0030, "PatientBirthDate", 8, SQL_C_DATE, DT_DATE },
        { 0x0010, 0x0040, "PatientSex", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1040, "PatientsAddress", 64, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0005, "SpecificCharacterSet", 16, SQL_C_CHAR, DT_STR }
}

*Study*
{
        { 0x0020, 0x000d, "StudyInstanceUID", 64, SQL_C_CHAR, DT_UI },
        { 0x0008, 0x0020, "StudyDate", 8, SQL_C_DATE, DT_DATE },
        { 0x0008, 0x0030, "StudyTime", 16, SQL_C_CHAR, DT_TIME },
        { 0x0020, 0x0010, "StudyID", 16, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x1030, "StudyDescription", 64, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0050, "AccessionNumber", 16, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0090, "ReferPhysician", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1010, "PatientsAge", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1030, "PatientsWeight", 16, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0061, "StudyModality", 64, SQL_C_CHAR, DT_MSTR },
        { 0x0010, 0x0010, "PatientName", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0030, "PatientBirthDate", 8, SQL_C_DATE, DT_DATE },
        { 0x0010, 0x0040, "PatientSex", 16, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0005, "SpecificCharacterSet", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0020, "PatientID", 64, SQL_C_CHAR, DT_STR }
}
```

Please keep in mind that the last line in the section „*Study*" must not be modified. Please refer to chapter 5.2.1.

Finally, the Conquest needs to be rebooted and the data base re-initialized.

5.2.1.2   Extended patient data for the patient management

Additional columns can be activated in the patient management. These can be used e.g. for the address, telephone number and remarks and quoted at the manual recording patients data. This information will be then saved in the DICOM header on additional tags upon acquiring images. In order that this data can be also stored in the database and shown in the table of patients, an extension of the database layout is necessary. For this, the file „dicom.sql" in Conquest is to be edited. The same course of action applies for both database types (MySQL or DBASE III). In the sections „*Patient*" and "*Study*", the entries marked in red for the datasets must be added, so that the section looks as on the example below. Placement of a finishing comma after each row with exception of the last row is important.

```
*Patient*
{
        { 0x0010, 0x0020, "PatientID", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0010, "PatientName", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0030, "PatientBirthDate", 8, SQL_C_DATE, DT_DATE },
        { 0x0010, 0x0040, "PatientSex", 16, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0005, "SpecificCharacterSet", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1000, "OtherPatIDs", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1001, "OtherPatNames", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1040, "PatientsAddress", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x2154, "PatientsTelephoneNumbers", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0032, "PatientsBirthTime", 16, SQL_C_CHAR, DT_TIME },
        { 0x0010, 0x2160, "EthnicGroup", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x4000, "PatientComments", 254, SQL_C_CHAR, DT_STR }
        }

*Study*
{
        { 0x0020, 0x000d, "StudyInstanceUID", 64, SQL_C_CHAR, DT_UI },
        { 0x0008, 0x0020, "StudyDate", 8, SQL_C_DATE, DT_DATE },
        { 0x0008, 0x0030, "StudyTime", 16, SQL_C_CHAR, DT_TIME },
        { 0x0020, 0x0010, "StudyID", 16, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x1030, "StudyDescription", 64, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0050, "AccessionNumber", 16, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0090, "ReferPhysician", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1010, "PatientsAge", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1030, "PatientsWeight", 16, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0061, "StudyModality", 64, SQL_C_CHAR, DT_MSTR },
        { 0x0010, 0x0010, "PatientName", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0030, "PatientBirthDate", 8, SQL_C_DATE, DT_DATE },
        { 0x0010, 0x0040, "PatientSex", 16, SQL_C_CHAR, DT_STR },
        { 0x0008, 0x0005, "SpecificCharacterSet", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1000, "OtherPatIDs", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1001, "OtherPatNames", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x1040, "PatientsAddress", 64, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x2154, "PatientsTelephoneNumbers", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0032, "PatientsBirthTime", 16, SQL_C_CHAR, DT_TIME },
        { 0x0010, 0x2160, "EthnicGroup", 16, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x4000, "PatientComments", 254, SQL_C_CHAR, DT_STR },
        { 0x0010, 0x0020, "PatientID", 64, SQL_C_CHAR, DT_STR }
}
```

Here too, one should keep in mind that the last row in the section „*Study*" must not be modified. Please refer to chapter 5.2.1.

Finally the Conquest must be rebooted and the database re-initialized.

Activation and contents of the columns can be set up in the configuration under Administrator/Patient data (see chapter 17.2).

6 DICOM configuration

6.1 Without compression

In digipaX, one or more PACS systems can be set up. The system can work with multiple image archives at the same time.
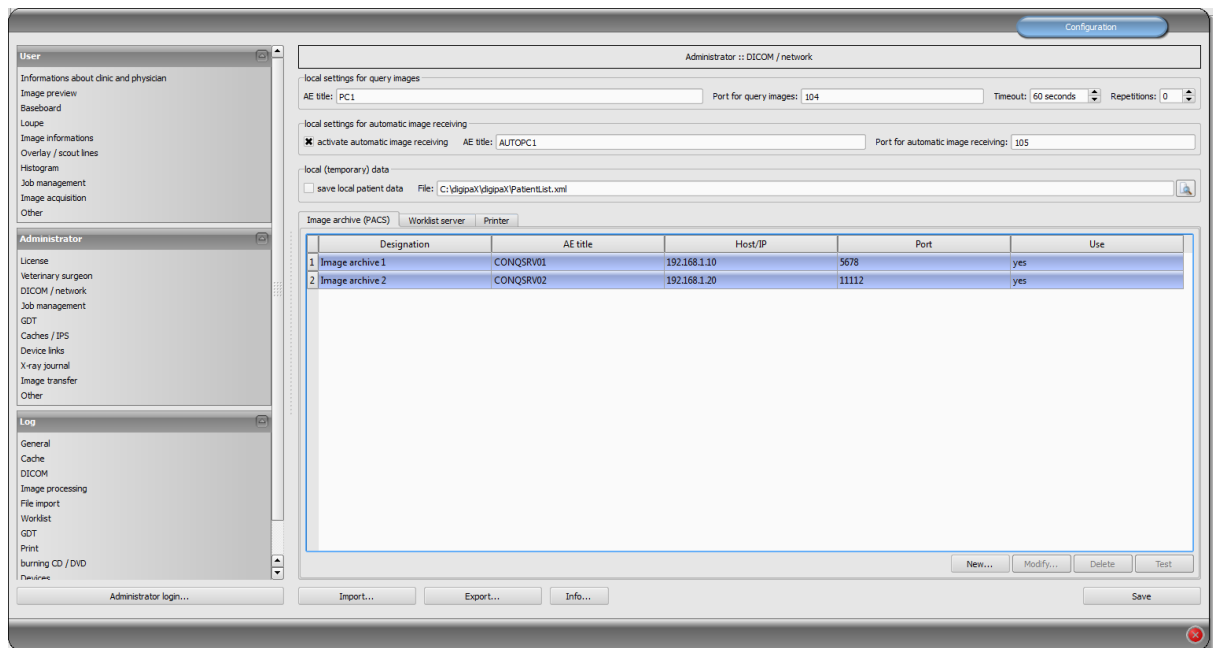
Each archive is to be added to a list of image archives by clicking on "New..." and all required information are to be entered in dialogue box. As name, enter the name, which will be later shown in the list of archives. For communication, AE Title, hostname or IP address and port are needed. For speeding up performance, the DICOM connection can be temporarily sustained (late disconnection). With subsequently coming data queries, the connection does not need to be permanently reconnected, hence an increase of performance is achieved.
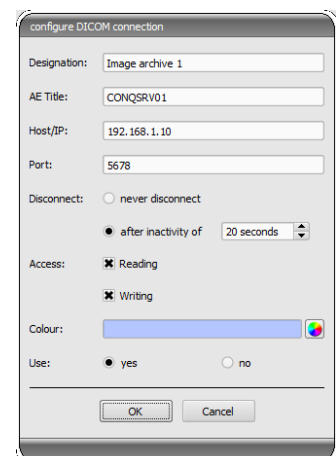
Not all DICOM systems can handle multiple connections at the same time. Therefore, it can occur that the systems might be blocked by late or failed any disconnection. With Conquest, multiple connections are possible, with the worklist server (wlmscpfs) are not. Too many opened connections at the same time also decrease the performance. For that reason, the system should work without disconnections only in exceptional cases.

For each archive, access for reading and writing can be declared separately. This is useful, when e.g. data have to be transferred from archive 1 to archive 2.

It is to note here, that the archives without read access are not presented in the list of queryable archives. Contrariwise, the archives without write access are not presented in the list of available archives while sending data. This is for a better overview.

For a better support for the user, each archive has its own colour for faster and better identification, when data from different archives are shown in the system or the user has to choose only one archive. Thereby, colours are assigned in sequence automatically, if this is not modified.

Archives can be disabled. Disabled servers are ignored during run of the system as if they would not be included in the list.

Some details about communication:

A port, that is to be indicated for each archive, is the port for DICOM communication (e.g. DICOM C-FIND). For retrieving the images (DICOM C-MOVE), the port in local settings provided is used. Normally, a common port 104 in DICOM is here used. If this port is not assigned, it should be replaced by another, free port. According to standards, each DICOM system should have an AE Title. A character string entered in the AE Title field will be assigned to the system and used for DICOM communications.

These settings are to be entered in Conquest in the list of „Known DICOM providers" as well. Already assigned connections with "*" are to be deleted as they could cause errors. This first entry in the list should be connection to itself, in order to be able to retrieve "Query / Move" for the own archive. After the modifications in the list are made, the list needs to be confirmed with the button „Save this list".
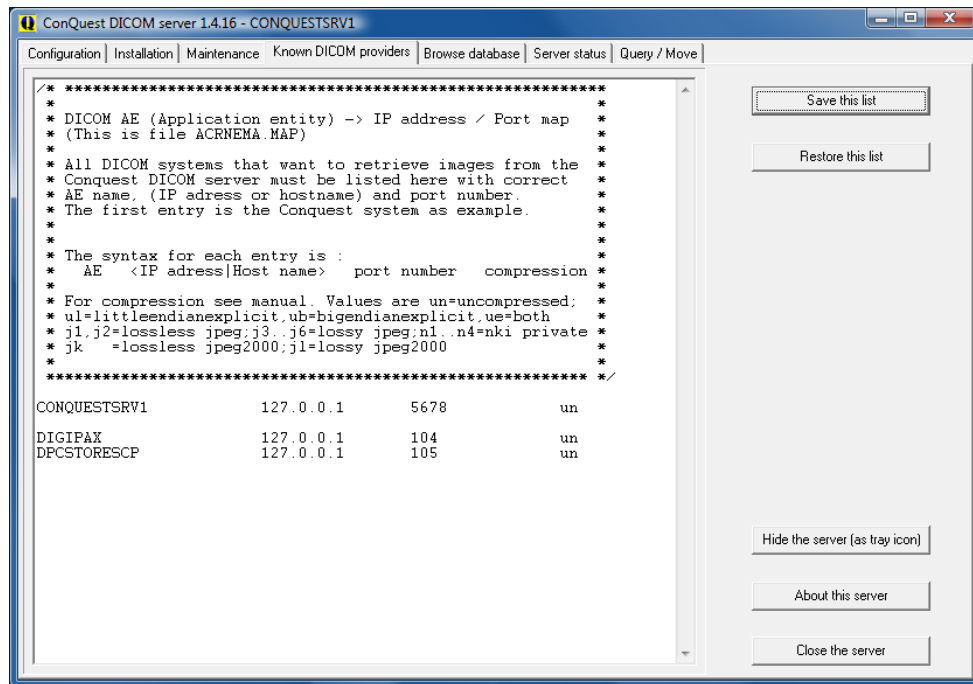
Correctness of settings can be checked by changing to patient management in the digipaX system and retrieving sample images.

Depending on performance of existing network and size of image files transfer of images can take a few seconds. Installed time-out aborts if errors occur. With slower networks and problems with connections it can be necessary to extend time-out accordingly in order to avoid aborts too early. The number of retries tells how often the system should repeat re-trieving an image in the case of an error. The default time-out is 60 seconds, the default number of retries is 0.

While sending images to the Conquest archive it can occur that the archive does not support normally this type – e.g. Enhanced CT Image Storage. In this case ac-quire an appropriate SOP class into the file dgatesop.lst. For this, add a new entry at the end of the file, e.g.:

EnhancedCTStorage 1.2.840.10008.5.1.4.1.1.2.1 sop

Note that the line must end with a line break!

Normally, patients are identified in the archives by patient's name, date of birth and patient ID. This may cause problems in special cases, e.g. when letters of the patient's name differ in digipaX and practice management (McDonald – MacDonald). In the cases like this, identifi-cation should be reduced to patient ID. You find this settings under Administrator / Patient data.

6.2 With compression

With the digipaX processing of compressed image data is possible. This does not apply on the own image acquisitions. Those remain uncompressed. However, the documents and graphics can be imported via import components and thereby processed as compressed. For this, a lossless JPEG compression is used. This saves storage space on the server. Besides it is possible to open the compressed images of third-party manufacturers (patient CDs) and send them to the archive. In order to do that, the configuration in the Conquest „dicom.ini" is to be processed. The target is that the Conquest retains the art of the compression at the saving. For this, the „dicom.ini" is to be changed as on the example below. After the change is done, the Conquest must be rebooted.

```
# Configuration of compression for incoming images and archival
DroppedFileCompression = un
IncomingCompression    = as
ArchiveCompression     = as
```

It is to note here that all images added to the archive per drag & drop are saved uncompressed (un). The IncomingCompression is to be set on „as" (as = store images as is, i.e. without changing the compression).

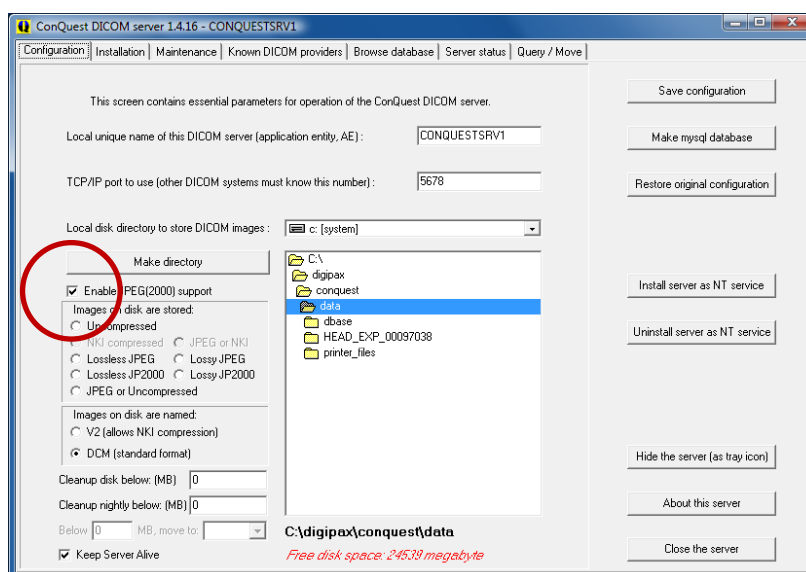⚠️ **In Conquest combined with digipaX only the options "un" and "as" for incoming files are allowed.**

For new installations it is recommended to enable the compression straight away.

6.3 Enabling JPEG support for the modules „Easy Report" and „Import"

To be able to transfer compressed files to the Conquest, the JPEG support must be enabled in the Conquest.

It is recommended to enable this option as a basic principle.

7 Routing

7.1 General

In routing the images which are sent to an archive are automatically forwarded from that archive to a work station as well. Hence, the images already exist there in a local cache for later viewing and do not need to be required first from server anymore – **speed and efficiency**. On the other hand, when using **worklist** component it can be defined for which jobs the images are ready. When using **GDT** interface, a response to the requesting system can be sent, that new images are available.

7.2 digipaX configuration

In digipaX, activate the automatic image receiving on the configuration page "DICOM / network". For this, a separate AE Title (e.g. DPSTORESCP or RECEIVER) and a separate port (e.g. 105) are to be indicated.

This port must not be the same as port for image query.

Whether the image receiving works correctly, can be tracked in DICOM log.
If the automatic image receiving is active, a C–STORE (SCP), i.e. an own small PACS server, that can receive the images, is running in the background of the digipaX system.
Thereby, the storescp.exe from DCMTK of the "Kuratorium OFFIS e.V." is used. It can be checked in the DICOM log, whether this background process started successfully. This process stores the received images in configured local cache for DICOM images.
The image receiving is also protocolled in the DICOM log and can be tracked there.
By modifications in the configuration conc. automatic image receiving the background process restarts. This can also be tracked in the log.

7.3 Conquest configuration

In Conquest, these connection data must be again acquired to the list of "Known DICOM providers" (e.g. "DPCSTORESCP   127.0.0.1   105   un"). Furthermore, the following changes or extensions in the file dicom.ini are necessary:

```
# Configuration of forwarding and/or converter programs to export DICOM slices

ForwardAssociationLevel      = IMAGE
ForwardAssociationCloseDelay   = 5
ForwardAssociationRefreshDelay = 3600
ForwardAssociationRelease      = 1

ExportConverters = 1
ExportModality0  = *
ExportConverter0 = forward to DPCSTORESCP

ForwardCollectDelay                 = 600
MaximumExportRetries                = 5
MaximumDelayedFetchForwardRetries = 0
```

This section does not initially exist in the dicom.ini and needs to be added completely.

DPCSTORESCP must be replaced with an appropriately used AE Title.

The configuration for several redirections could look like in the following example:

```
# Configuration of forwarding and/or converter programs to export DICOM slices

ForwardAssociationLevel        = IMAGE
ForwardAssociationCloseDelay   = 5
ForwardAssociationRefreshDelay = 3600
ForwardAssociationRelease      = 1

ExportConverters = 2
ExportModality0  = *
ExportConverter0 = forward to AUTODIGI1
ExportModality1  = *
ExportConverter1 = forward to AUTODIGI2

ForwardCollectDelay               = 600
MaximumExportRetries              = 5
MaximumDelayedFetchForwardRetries = 0
```

To improve performance (e.g. when importing patients' CDs), it is better to send all the images in the archive first, and then distribute them closed among stations in one round. Images can be transmitted thereby by series, studies or entirely for the patient. In order to do this first you need to change the row for export converter.

ExportConverter1 = forward SERIES to ...   forwards by series
ExportConverter1 = forward STUDY to ...   forwards by studies
ExportConverter1 = forward PATIENT to ... forwards all images of the patient

In the case of the "forward PATIENT to" option it is necessary to consider that even when for a patient only one new image comes in addition, there are always transferred all images of the patient. This could overload the network. Hence, forwarding by studies is certainly the most reasonable solution for most systems.

Furthermore, the row "ForwardAssociationLevel =" should also be adjusted. Also here the rule: series, study or patient applies.

The waiting time is set in the row "ForwardCollectDelay =" in seconds.

If there are forwardings with waiting time the configuration, for example, could look like this:

```
        # Configuration of forwarding and/or converter programs to export DICOM slices

        ForwardAssociationLevel        = STUDY
        ForwardAssociationCloseDelay   = 5
        ForwardAssociationRefreshDelay = 3600
        ForwardAssociationRelease      = 1

        ExportConverters = 2
        ExportModality0  = *
        ExportConverter0 = forward STUDY to AUTODIGI1
        ExportModality1  = *
        ExportConverter1 = forward STUDY to AUTODIGI2

        ForwardCollectDelay               = 600
        MaximumExportRetries              = 5
        MaximumDelayedFetchForwardRetries = 0
```

In addition, the entry "QueueSize =" for the waiting queue of export converters should be adjusted. According to the Conquest manual, each entry in the waiting queue requires 1.5K pro export converter. So, if you want to import a patient CD with 500 MRT images and distribute them to 2 stations, you will need 1.5K x 500 x 2 = 1500 + buffer.
Example: QueueSize = 2000

For more information read the Conquest manual.
Restart the Conquest server after these changes.

With the bottom "Save configuration" on the Conquest configuration page the file dicom.ini will be newly written by Conquest and possibly brought into a new structure. After that it can be checked in the file if the changes were accepted.

7.4 Special routing

In special cases, it may be necessary to send selected images only to another station. For instance, this could be the case in a situation, in which only the DX images are sent from the acquiring station (e.g. the DROC or Fuji system) to the station, where the X-ray journal is maintained.

```
          # Configuration of forwarding and/or converter programs to export DICOM slices

          ForwardAssociationLevel       = IMAGE
          ForwardAssociationCloseDelay   = 5
          ForwardAssociationRefreshDelay = 3600
          ForwardAssociationRelease      = 1


          ExportConverters   = 1
          ExportModality0    = DX
          ExportCalledAE0    = CONQUEST
          ExportCallingAE0   = DROC
          ExportFilter0      = *
          ExportConverter0   = forward to AUTO-XRAY-JOURNAL
```

ExportConverters	= 1	# number of recipients
ExportModality0	= DX	# only this modality
ExportCalledAE0	= CONQUEST	# AE Title of image archive
ExportCallingAE0	= DROC	# AE Title of acquiring station
ExportFilter0	= *	# filter not needed here
ExportConverter0	= forward to XRAY-JOURN	# AE Title of receiving station

Optionally, the station name entered on the image in the DICOM header by the acquiring station can be used:

ExportStationName0 = DROC   # Station AE Title in TAG 0008,1010

7.5 Test

The routing function can be tested by drag & drop (only up to version 1.4.14) of a DICOM file onto the Conquest server (sample images are contained in the installation directory of digi-paX software in the folder "Sample images"). From Conquest version 1.4.15, for the test purposes you must send an image from another source via DICOM to the Conquest server.
As well in the server log (page "Server status") as in the log of the digipaX system (category "DICOM") the entries must exist, that the file was forwarded and received automatically.

8 DICOM worklist

8.1 General

In relation to job creation and deletion, the digipaX system can only work together with the worklist server wlmscpfs.exe from the DCMTK of "Kuratorium OFFIS e.V.". Thereby, creating and deleting of the jobs is made by the creation and deletion of files in the established communication directory (subfolder <AE Title>).

If the worklist server is installed on a different machine than that of the digipaX system, date and time must match on both machines. Otherwise problems can occur during time-dependent, automatic deletion of the jobs.

MPPS (Modality Performed Procedure Step) for using the job status is not supported.

8.2 Configuration of worklist server

Install the worklist server files on the target system like described. The program wlmscpfs.exe is in effect the server which must be registered as a Windows service. This can be done with batch file WLSSetup.bat contained in the same directory. Execute this batch file by double click and select "I" to install the service. You can uninstall the service by re-executing the batch file and subsequent selecting the option "R".

Problems with Windows Vista/7/8 and Windows Server 2008:
Full administrator rights are necessary for installation of the batch file. In these operating systems the "user account control" might block in some circumstances accurate performance. In such a case start the command line (cmd.exe) under the admin account (right mouse key and select "Run as administrator"). Navigate in the input window to the path of the batch file (e.g. C:\digipaX\Worklist) and start the batch with the command „wlssetup".

Diverse parameters can be changed by editing the batch. Following changes may be necessary:

- *ApplicationPath:* customize installation path of worklist server
- *WorkListDir:* set another communication directory (local or network directory)
- *ServicePort*: change port for DICOM communication (default: 2200)

The service must be uninstalled before editing. Perform the changes in the file, saved them and re-install the service. The AE-Title setting of the worklist is done via digipaX configuration. The worklist server itself has no AE-Title and therefore there is also no need to specify any.

More information on the wlmscpfs.exe server can be obtained from the manual of the server („wlmscpfs manual.pdf").

8.3 digipaX configuration

The configuration of the worklist server is to be done in the same way like configuration of the image archives on the administration page "DICOM / Network". Create a new connection. Name and AE Titles are freely selectable. The port must match the worklist server port (default: 2200). The communication directory must also match directory of the worklist server. The worklist server, delivered by digipaX, always allows for a single connection only. This means that when one station is connected to the worklist server, no other station can establish a connection at the same time. Therefore, the disconnection option must be always set to "after inactivity time of 0 seconds" (that is, immediately). The option "do not disconnect" or the longer inactivity time is designated for those worklist systems, which allow for many simultaneous connections.

The "Read" and „Save" options are also designated for special circumstances. In the case of some systems, which use their own worklist server (such as AGFA systems), jobs may not be created or removed by digipaX, but only made available for preview. In such case, on the worklist server in digipaX, it is necessary to turn off the "Save" option to avoid errors. In absolutely exceptional cases, it is also possible to turn off the "Read" option as well.

The rows in the job list are presented in the colour selectable here. If more job lists are configured, particular lists in the job management can be optically easily distinguished by use of different colours.

Further settings for work with this component can be made on the administration page "Job management".
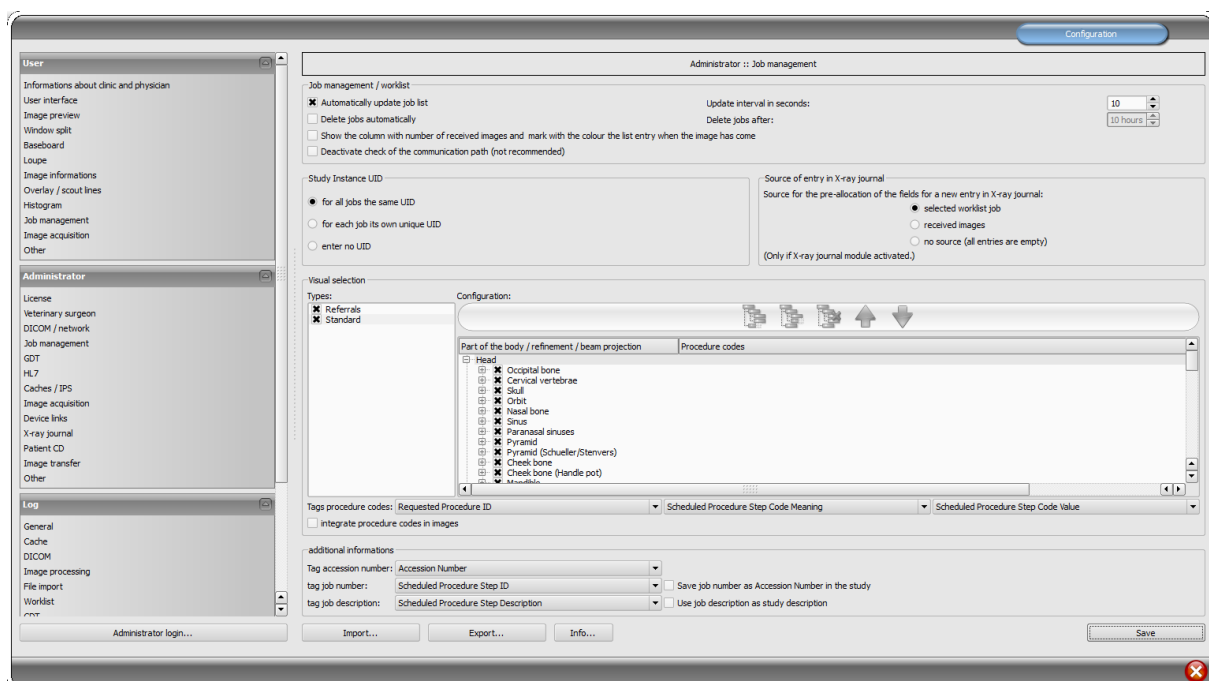
If digipaX is a station on which the jobs are worked on, then for certain an automatic list of jobs is refreshed. If the user opens the "Job management" component, the job list will be automatically updated in the programmed intervals to the most recent status.

If the station where the jobs are worked on is not a digipaX station, the jobs cannot be removed from the list. In this case, jobs can be deleted from the station where they have been created (or another digipaX station). This procedure can be done manually by the user directly, or while activating the option "Automatically remove jobs". Then, the jobs are deleted that are older than the programmed interval. It is necessary to set the interval in a way that the jobs are completed within that time.

The DICOM MPPS service is not supported, the system cannot inform of the jobs that have been completed. Deleting a file through the station working on the job poses no problem because you can easily know that by the lack of a job. If the station where the jobs are worked on is not a digipaX system, it therefore will not delete the jobs from the list, and no message is returned first. However, if the routing on the PACS server and the digipaX workstation is set correctly, digipaX can tell which images were transferred to the image archives. To the list of jobs you can add a column with the number of newly submitted images for each patient. Due to the simultaneous colour indications of rows for patients with a number greater than 0, the user can easily recognize whether the job has already been completed or is still in progress. In case of the workstation, this option is unnecessary. It should be used on the station on which the jobs are created or images are described.

When creating jobs for a patient, all the jobs get the same Study Instance UID by default (per generation process).

If the jobs are processed by another system, it can happen that those systems display then always the first job only (eg. Carestream). It can be set up for such cases that each job gets a separate Study Instance UID. However, each image lands in a separate study as a consequence.

If a third-party system should allocate the UID by itself, the UID can be released at the creating the job as a further possibility.

The entry in the X-ray journal can also be made through the job management system. If at the same time the image is completed the image parameters are saved (kV, mAs etc.), it is recommended to use these images as a base for new entries, because these values are automatically entered in the dialogue fields. Here also the column with the number of images received should be displayed. If the above mentioned values are not stored in the images, then you can create a job in the jobs database from the worklist, as it usually already contains the same values (the images do not contain additional values that are used for entries). Thanks to this option, you can create an entry, for example, during the scanning process.

8.4 Procedure Codes

For each beam projection, maximum of three Procedure Codes can be given, separated by a semicolon. From this we can distinguish between the positions body parts / organs (left, right, as well as front and back in the case of animals). The positions are defined when creating or customizing the Body.ini file, of the body of the patient. If the position does not have a Procedure Code, then a general Procedure Code is applied for the beam projection. If,

for example, left and right sides are the same, the code is entered only once in the general field (first column).

A separate document exists for creating templates for visually selecting the organs.

Each Procedure Code is sent in a single tag. Which are tags set on the configuration page "Administrator / Job management". At the same time note the manufacturers of the devices information, which receive the jobs and analyze the Procedure Codes.

Procedure Codes can also be used for iCR devices manufactured by Xscan. However, they are transferred by the digipaX software, using the scanning interface with the provided ini files for this purpose to the software. It is not possible then to reselect the body parts by the user. The Procedure Code tag set in the job management configuration must also be defined in the device configuration on the target computer as a Procedure Code tag.

Optionally, the Procedure Codes can be saved on the image. This can, for example, automatically send this information to the X-rays journal and generate in this way settlements or statistics.

8.5 Additional information

If through the GDT or HL7 the job number and/or job description are also sent, they will be sent to the job of the worklist. For this purpose, 2 of 5 tags are required, which are also used to transmit Procedure Codes. For Procedure Codes only 3 tags are available. Furthermore, for identification of jobs for each worklist job is generated a unique accession number by the digipaX system. This number is independent from the job number. Initially the following tags are normally pre-set:

```
▪   Accession number        AccessionNumber                (0x0008, 0x0050)
▪   Job number              ScheduledProcedureStepID       (0x0040, 0x0009)
▪   Job description         ScheduledProcedureStepDescription  (0x0040, 0x0007)
```


If image acquisition runs with third-party systems, it can be necessary to transmit the job number in the Tag AccessionNumber, to have it later available on the image. In such a case the tags for accession and job number are to be adjusted accordingly. An important advice is that it relates to the tags within worklist jobs and not the tags of the DICOM images. By checking the appropriate box, you can optionally save **on the image** the job number as Accession Number and description of the job as the Study Description. At the same time this data is also stored in the GDT response file.

For more information on this topic, refer to chapters 9.1 „GDT" and 9.1.14.3 „Field assignment (mapping)".

8.6 DICOM tags

The following tags are saved for a job:

AccessionNumber	(0x0008, 0x0050)
PatientID	(0x0010, 0x0020)
PatientsName	(0x0010, 0x0010)
PatientsBirthDate	(0x0010, 0x0030)
PatientsBirthTime	(0x0010, 0x0032)
PatientsAddress	(0x0010, 0x1040)
PatientsTelephoneNumbers	(0x0010, 0x2154)
PatientsSex	(0x0010, 0x0040)
PatientComments	(0x0010, 0x4000)
RequestedProcedureDescription	(0x0032, 0x1060)
RequestedProcedurePriority	(0x0040, 0x1003)
PatientsWeight	(0x0010, 0x1030)
PregnancyStatus	(0x0010, 0x21c0)
LastMenstrualDate	(0x0010, 0x21d0)
ContrastAllergies	(0x0010, 0x2110)
MedicalAlerts	(0x0010, 0x2000)
RequestingPhysician	(0x0032, 0x1032)
ReferringPhysiciansName	(0x0008, 0x0090)
InstitutionName	(0x0008, 0x0080)
CurrentPatientLocation	(0x0038, 0x0300)
AdditionalPatientHistory	(0x0010, 0x21b0)
ScheduledProcedureStepSequence	(0x0040, 0x0100)
Modality	(0x0008, 0x0060)
RequestedContrastAgent	(0x0032, 0x1070)
ScheduledStationAETitle	(0x0040, 0x0001)
ScheduledProcedureStepStartDate	(0x0040, 0x0002)
ScheduledProcedureStepStartTime	(0x0040, 0x0003)
ScheduledPerformingPhysiciansName	(0x0040, 0x0006)
ScheduledProcedureStepDescription	(0x0040, 0x0007)
ScheduledProcedureStepID	(0x0040, 0x0009)
PreMedication	(0x0040, 0x0012)
CommentsOnTheScheduledProcedureStep	(0x0040, 0x0400)
StudyInstanceUID	(0x0020, 0x000d)
RequestedProcedureID	(0x0040, 0x1001)

Other tags are saved without values to conform to the DICOM standard.

For transferring Procedure Codes, depending on the settings, the following tags are added or overwritten:

RequestedProcedureID	(0x0040, 0x1001)
CodeMeaning	(0x0008, 0x0104)
CodeValue	(0x0008, 0x0100)
ScheduledProcedureStepDescription	(0x0040, 0x0007)
ScheduledProcedureStepID	(0x0040, 0x0009)

ScheduledProtocolCodeSequence (0x0040, 0x0008)

8.7 Troubleshooting indicators

Problems can occur in case of incorrect network configurations. A registered digipaX system user must have access rights to a worklist computer server. You should check in the explorer, if you have access to set the path to the worklist files and the rights to read and save files. If necessary, contact your network administrator to have the correct settings. You should also check your firewall settings or deactivate it completely, if it will not cause any other problems. In some systems, you may need to edit the hosts file (C:\Windows\System32\drivers\etc) and indicate other computers on the network to enable a quick connection.

In some cases you may need to manually allow access to the communication directory. To do this you must first revoke the access rights, and then allow access to the folder on the network again.

In case of problems with the search speed, you can test the option of deactivating checking the communication paths. With this, you cannot check whether the directory exists and if the lockfile is in it.

9 Interfaces

9.1 GDT Interface

9.1.1 General

GDT tagging: | GDT-D-11 |

The system uses GDT interface version 2.1.

9.1.2 Connecting TurboMed

9.1.2.1   General

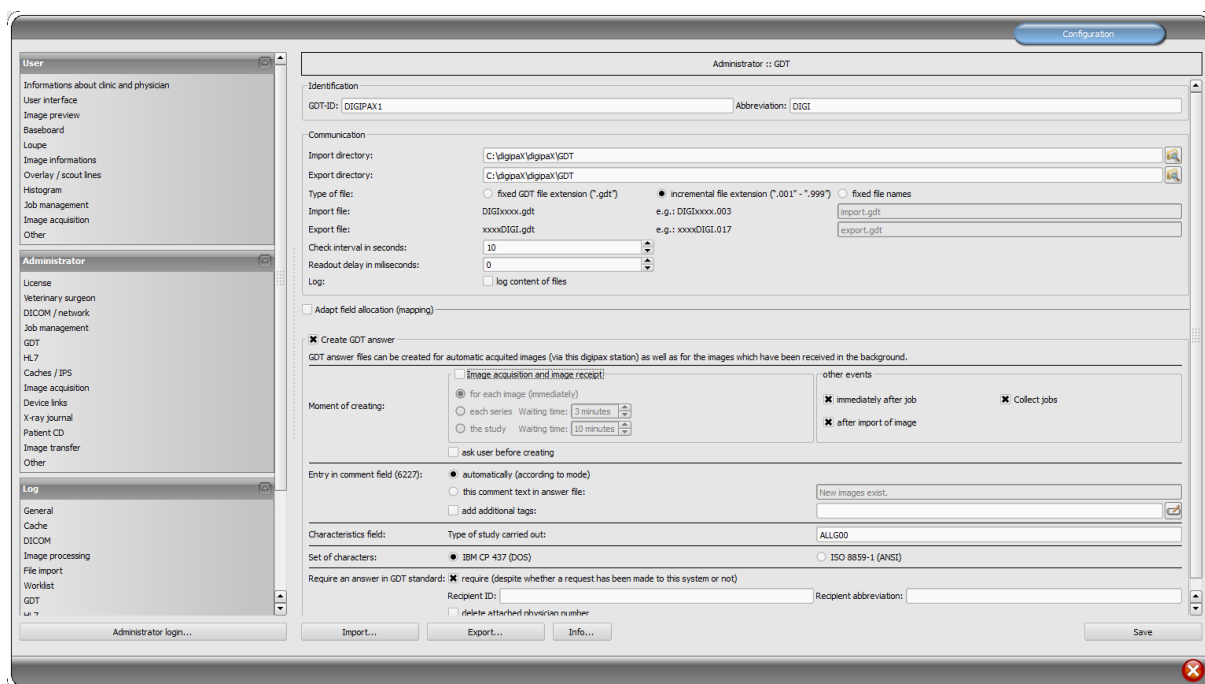The connection is done on the menu item "Devices / GDT interface settings" in the patient's record card.

The import and export paths must be the same as the paths set in digipaX. You can also use the same path for import and export.

The character set when exporting GDT files does not matter – digipaX identifies both correctly.

Because TurboMed performs the import only once at the end of the started GDT operations, you can choose in digipaX as an option for GDT response only "every job immediately or/and "after image acquisition". Jobs can also be consolidated. In this way, right after the request to digipaX system is made requesting a new study (record type 6302), the GDT response is written with information about the existence of new images, so that an appropriate new entry can be added to the record. The description of the created job in the worklist or a user-defined text is transferred, in this way an entry is also added to the record card.

During the import and export, you can work with both a fixed GDT extension, as well as incremental extensions, but in TurboMed enter digiturb.001 as an export file and turbdigi .* as an import file. While importing images of the patients, no matter whether via patient CD or import of images, a response file is written for each study (if more studies exist). Therefore, it is recommended to use an increasing file extension, if response for patient CD or image import is written.

9.1.2.2 digipaX settings

9.1.2.3 TurboMed settings for all functions

9.1.2.4 Showing images of a study (record type 6311)

9.1.2.5 Creating worklist job (record type 6302)

For imports in digipaX, writing the GDT response file must be enabled.

The **character set** setting must match the character set setting in digipaX. Warning: If it's set to "9206", it will always automatically use the ANSI set (in TurboMed version 7.3.1).

For the **entry date,** select the current date. When using the "field 6200 tag", the entry is not created in the record card if this field contains a date (TurboMed version 7.3.1).

If the **text entry** is selected, then the comment text will be pasted to the patient's record card. This text can be defined as the default in digipaX or it may correspond to the job description.

If the **back option** is active then in the record card an entry is added, which when double-clicked restarts the digipaX program and displays image record of type GDT 6311.

9.1.2.6   Reading patient–CD (record type 6302)

9.1.2.7 Import of images or documents through import component (record type 6302)
Example for documentation of a wound

9.1.3 Connecting PDE–TOP

9.1.3.1 General

To get to the GDT configuration interface, you must first go to the patient's dialogue, and then use the "Extern" (Ctrl + Shift + X). Here you can configure starting digipaX with GDT arguments.

Automatic importing and analyzing GDT files in the background can be set in the main program. To do this, select in the main menu "Options / System". On this dialogue you can change the settings accordingly. Activate the automatic GDT import and set the GDT directory.
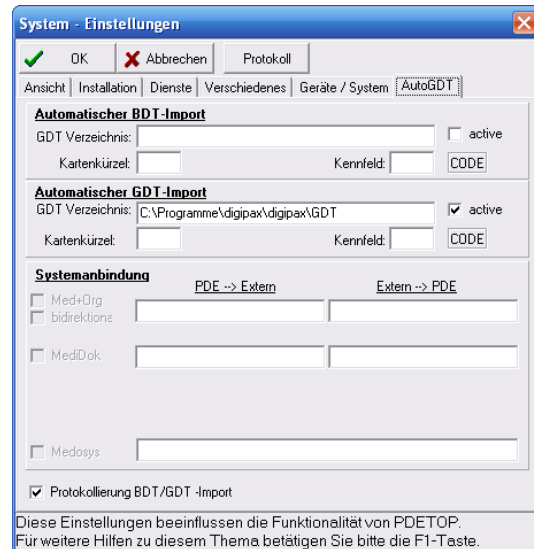
9.1.3.2   Transferring constant data (record type 6301)
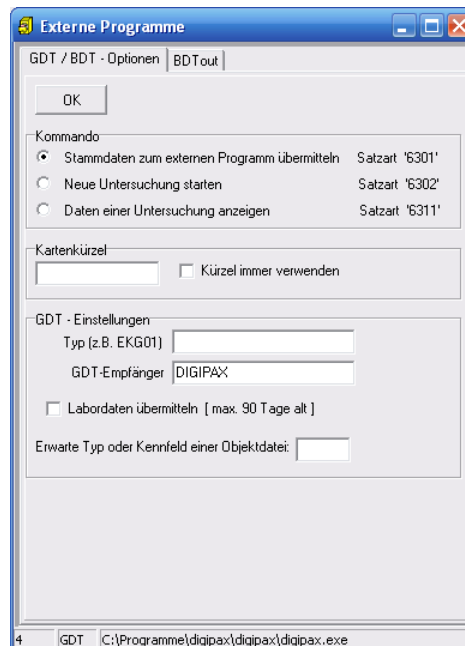
Verify that the export and import directory have the file names entered.

These settings also apply to all subsequent connections.

9.1.3.3   Requesting new study (record type 6302)
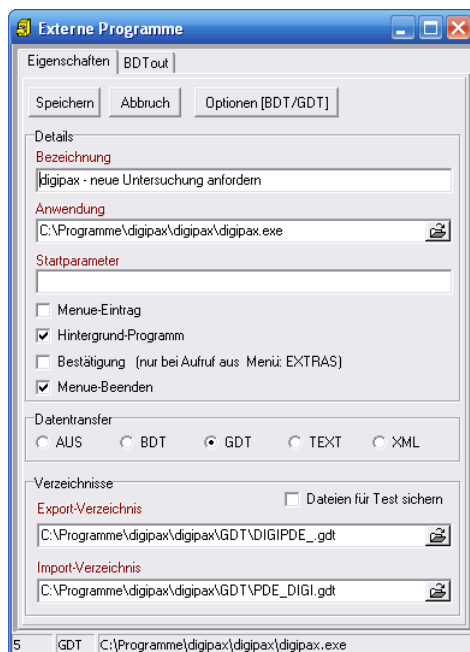
9.1.3.4 Requesting new study through the job worklist (record type 6302)
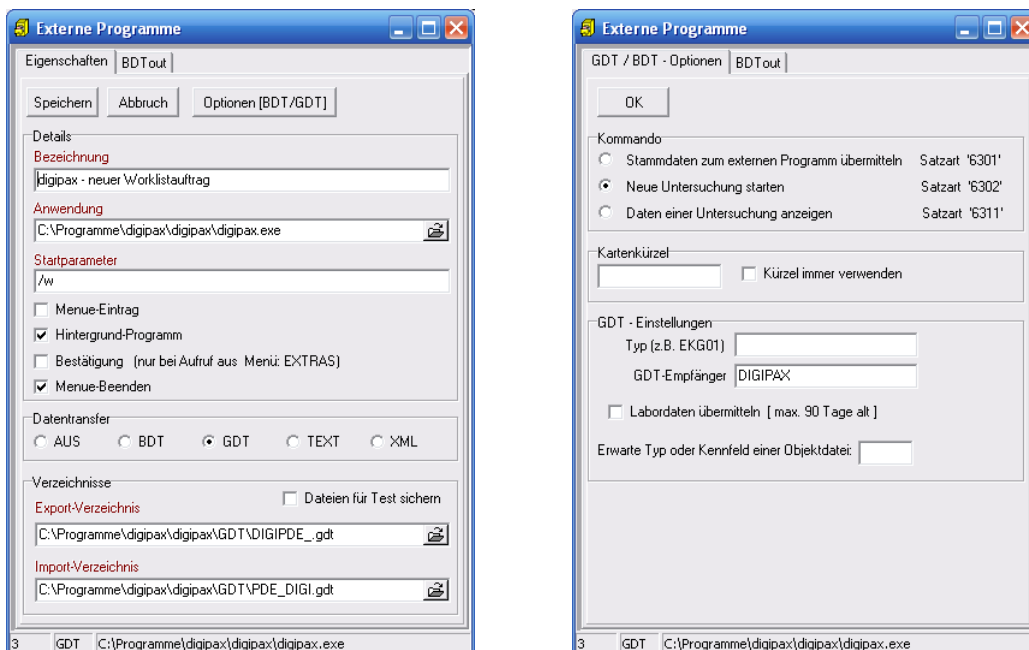
With the help of the „/w" **start parameter** a dialogue is displayed to create a new job from the worklist.

9.1.3.5 Displaying study data (record type 6311)
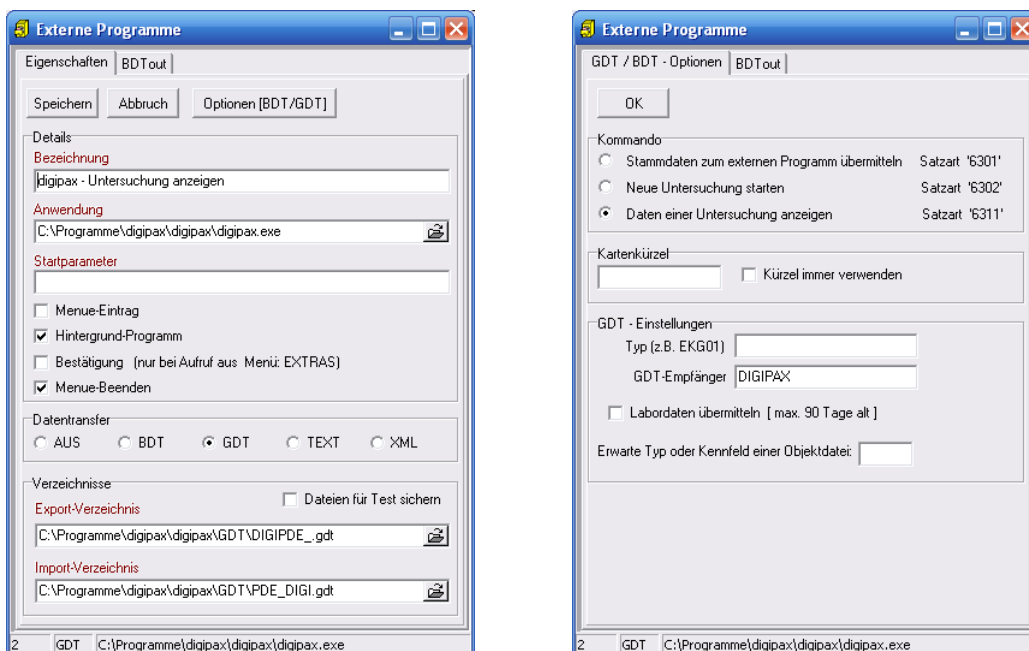
9.1.4 Connecting MediStar
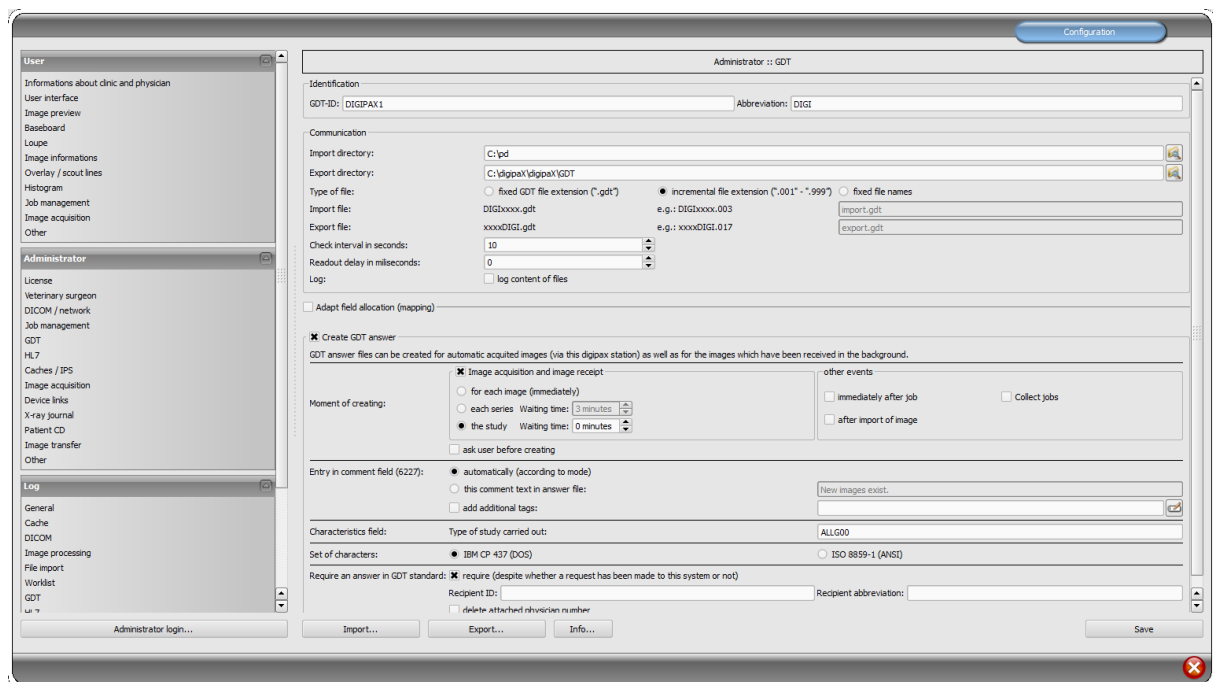
Settings in MediStar are done by the administrator of the system and cannot be independently adjusted.

The digipaX import directory is found on the local system, while the export directory is a directory shared on the network. It is recommended that incremental extensions of the file are applied to prevent data loss (in case of system failure data can be downloaded from there later).

The response file should be created only in this system, in which the images are received (ideally for each completed study). For this purpose, it is necessary to establish proper communication with the Conquest server to that system.

MediStar settings GDT form part 1

MediStar settings GDT form part 2

MediStar basic settings GDT server

MediStar export options GDT server
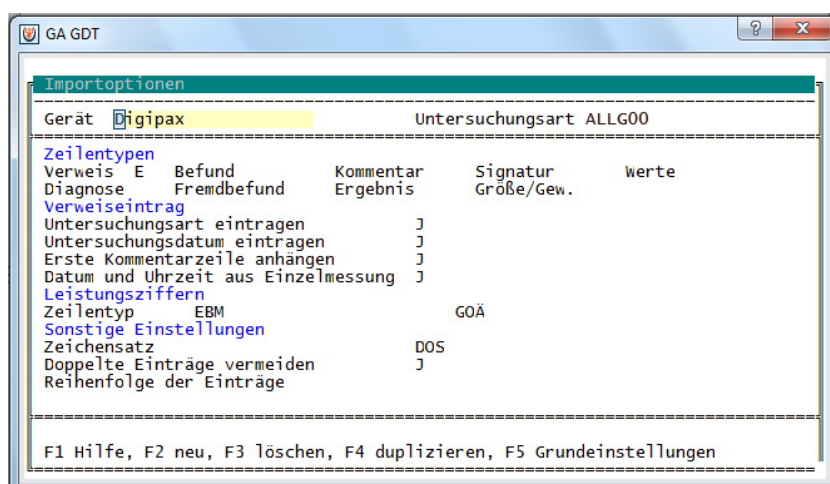
MediStar import options GDT server

9.1.5 Connecting x.concept (DOCConcept)

Connection has been made successfully with the following settings.

9.1.5.1   digipaX settings
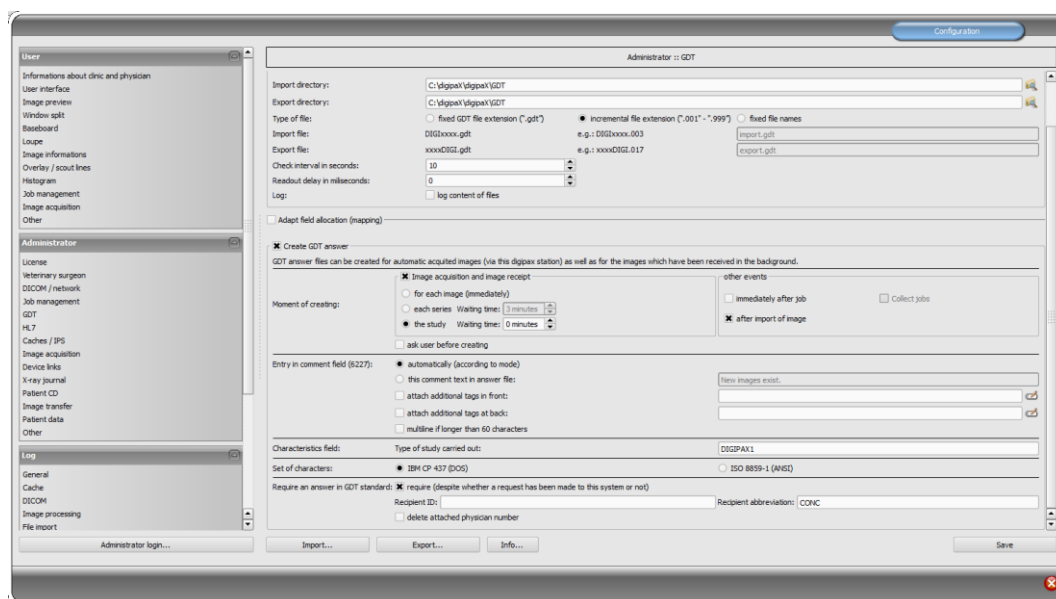
9.1.5.2   x.concept configuration

gdt.ini

```
IWL]
Titel=digipaX Worklist
Exe=C:\digipaX\digipaX\digipax.exe
GDTDatei=c:\digipax\digipax\gdt\DIGICONC.001
TYP=WL
Satzart=6302
UseDos=1
InternePatNr=0

[DIGIPM]
Titel=digipaX Pat-CD einlesen
Exe=C:\digipaX\digipaX\digipax.exe
GDTDatei=c:\digipax\digipax\gdt\DIGICONC.001
TYP=PM
Satzart=6302
UseDos=1
InternePatNr=0

[DIGIPAX1]
Titel=digipaX zeigen
Exe=C:\digipaX\digipaX\digipax.exe
GDTDatei=c:\digipax\digipax\gdt\DIGICONC.001
TYP=
Satzart=6311
UseDos=1
InternePatNr=0

[DIGIWD]
Titel=digipaX Wunddokumentation
Exe=C:\digipaX\digipaX\digipax.exe
GDTDatei=c:\digipax\digipax\gdt\DIGICONC.001
TYP=IMP
Satzart=6302
UseDos=1
InternePatNr=0

[DIGIPCD]
Titel=digipaX Pat-CD erstellen
Exe=C:\digipaX\digipaX\digipax.exe
GDTDatei=c:\digipax\digipax\gdt\DIGICONC.001
TYP=PCD
Satzart=6311
UseDos=1
InternePatNr=0
```

Creating new rubric
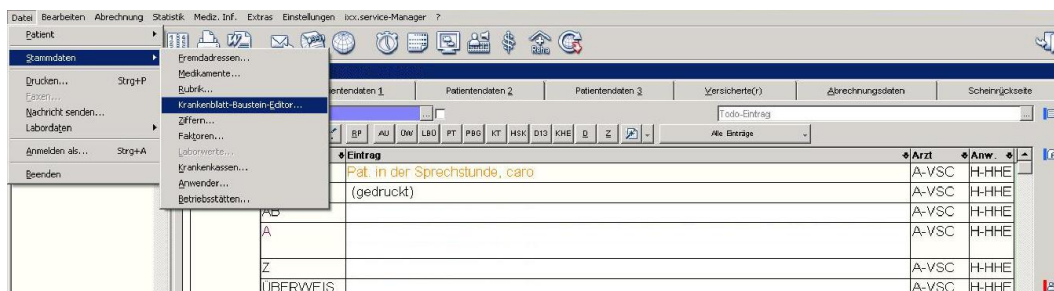
New rubric done
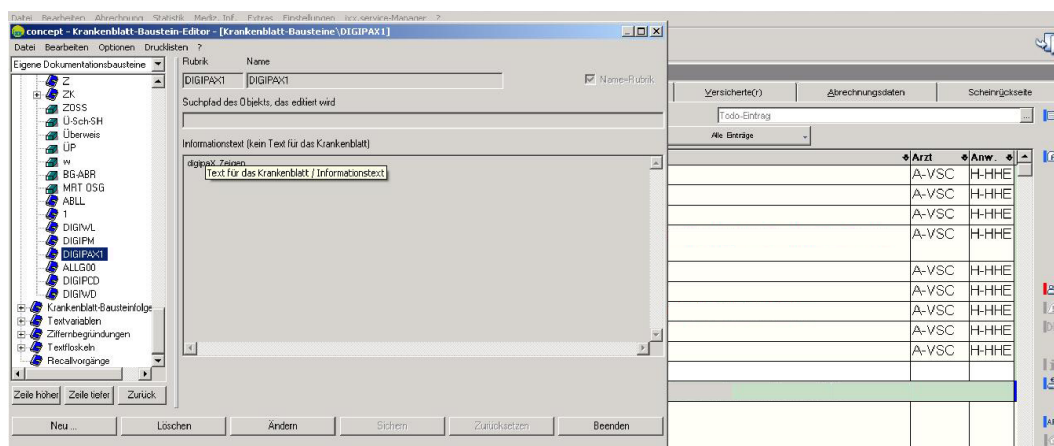
Selecting rubric
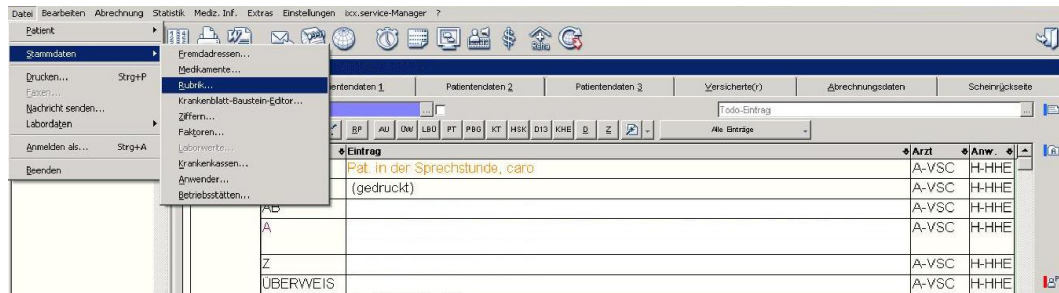
Assigning rubric
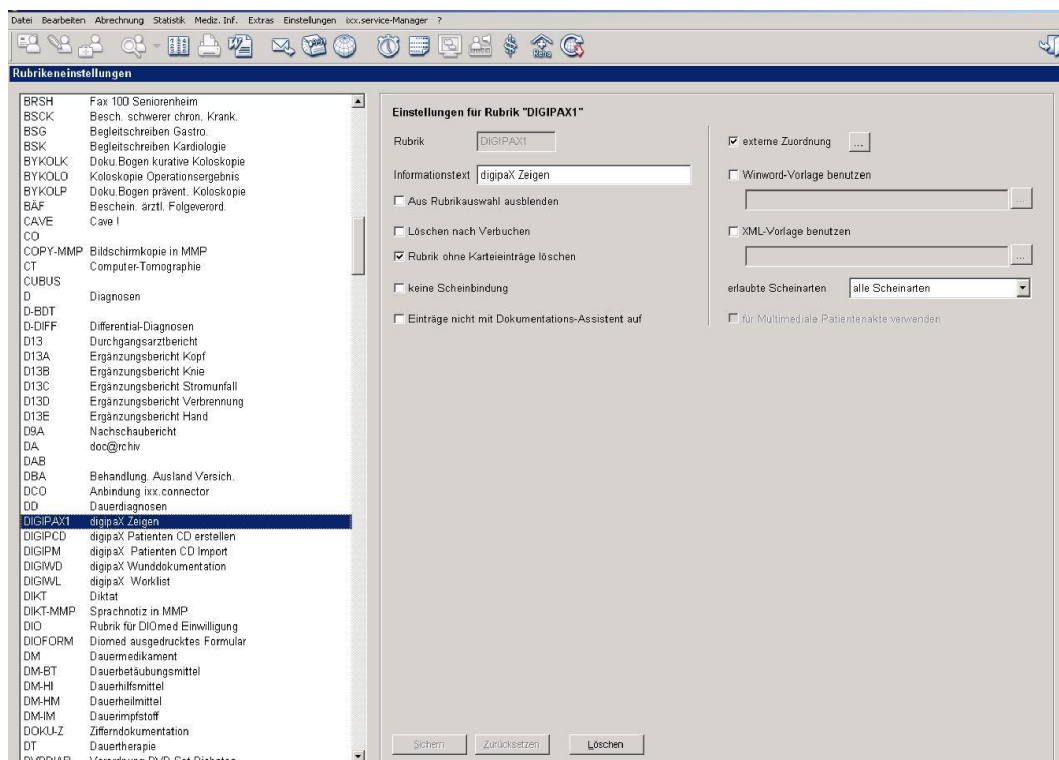
External links
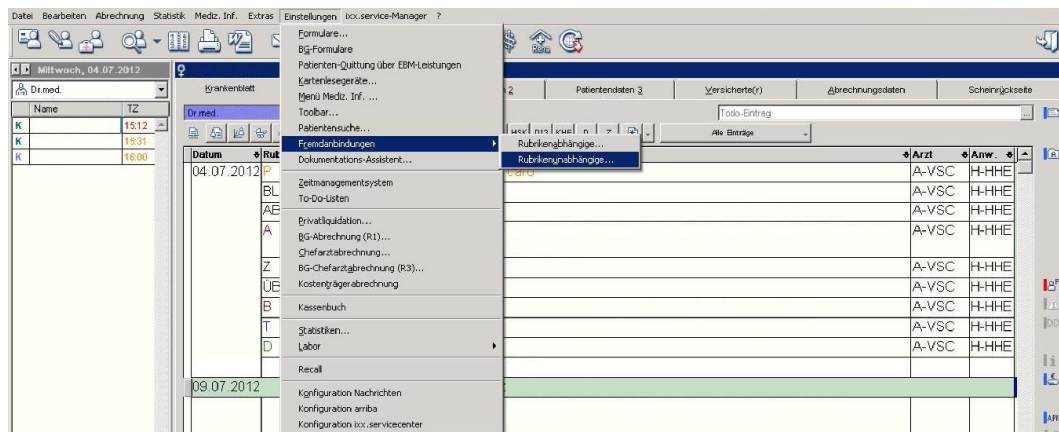
Creating new external link
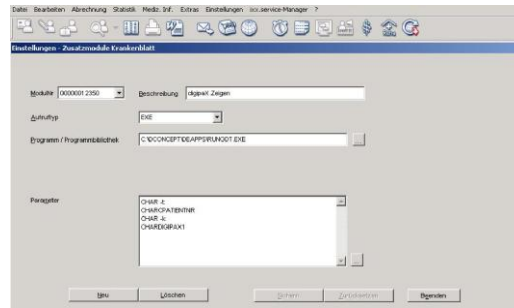
Configuring calling in general
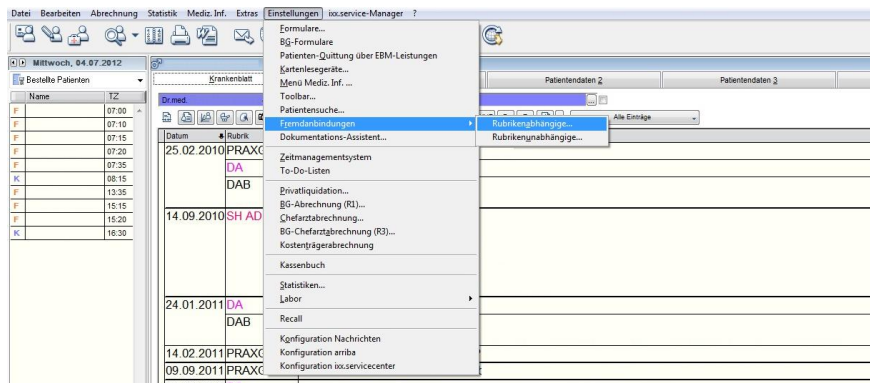
Selecting rubric
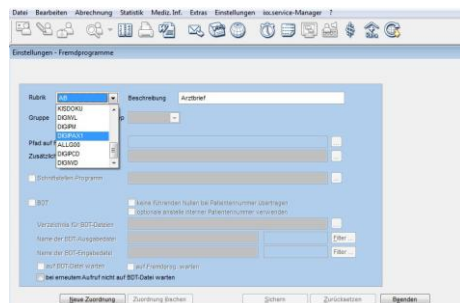
Entering calling in general
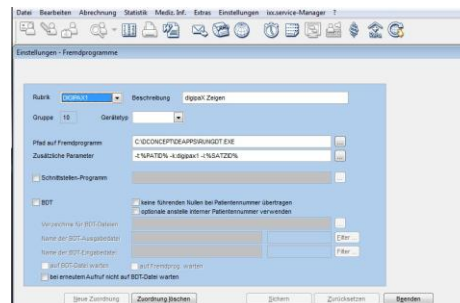
Polling settings for reverting entry
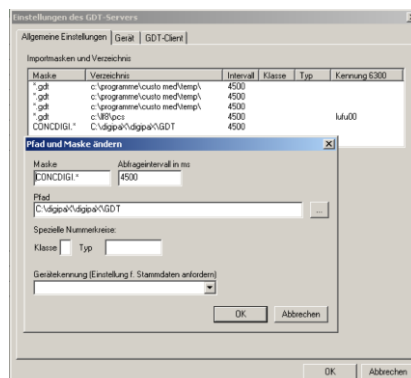
9.1.6 Connecting Quincy

Connecting to the Quincy clinic management software can be done independently if the system administrator is not present.
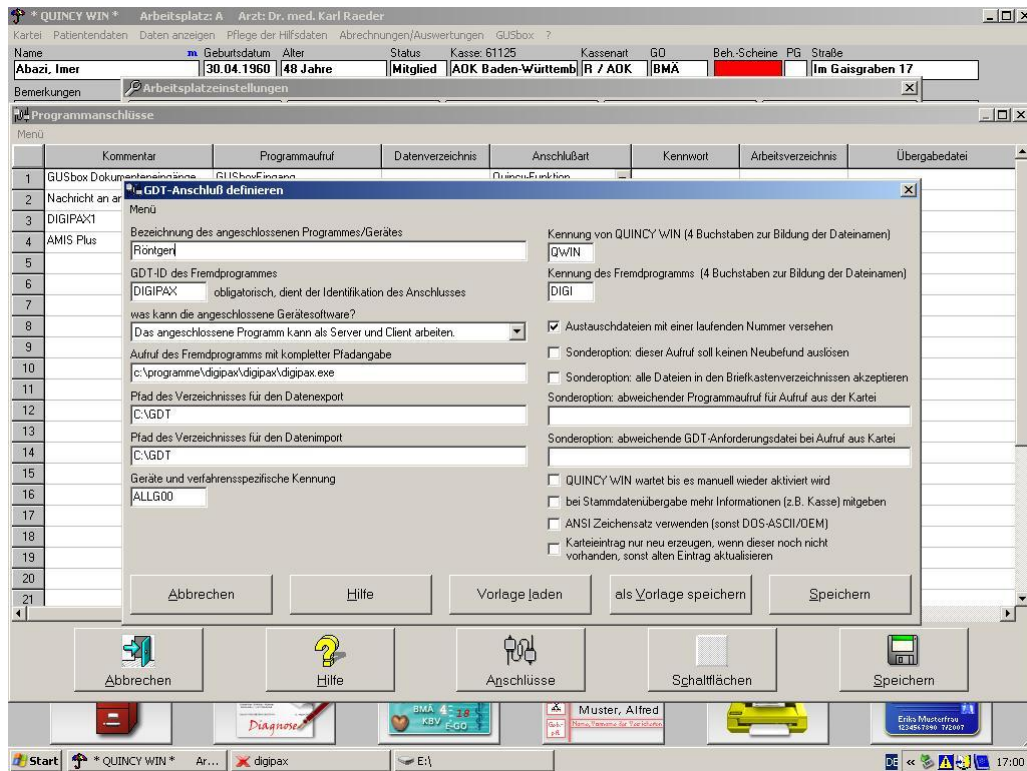
The menu item "Administration of support files / Workstation settings", then other programs (button below).
If new:
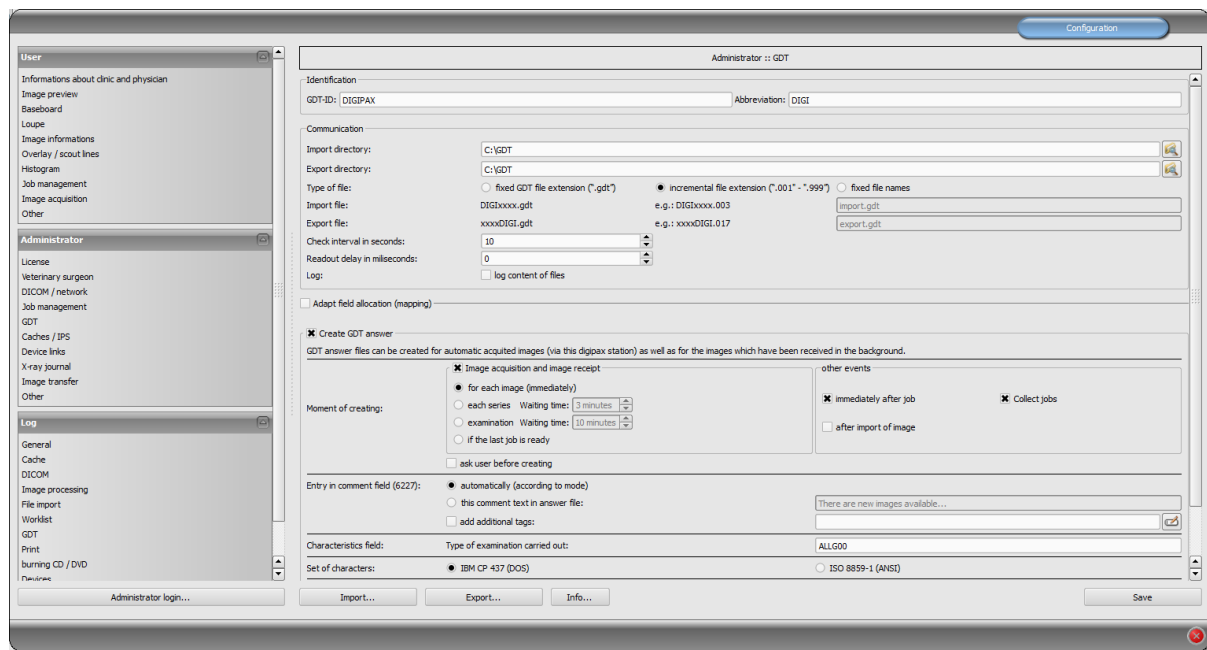
- Select empty row
- „Connect" button
- Choose the other program with GDT connection

To modify job:

- Click the row number

Setting for connections should be done as shown in the above illustration.

In digipaX it is necessary to set the incremental extension of data.

9.1.7 Connecting ALBIS

9.1.7.1 digipaX settings

Configuration in digipaX should be done as shown in the illustration below:
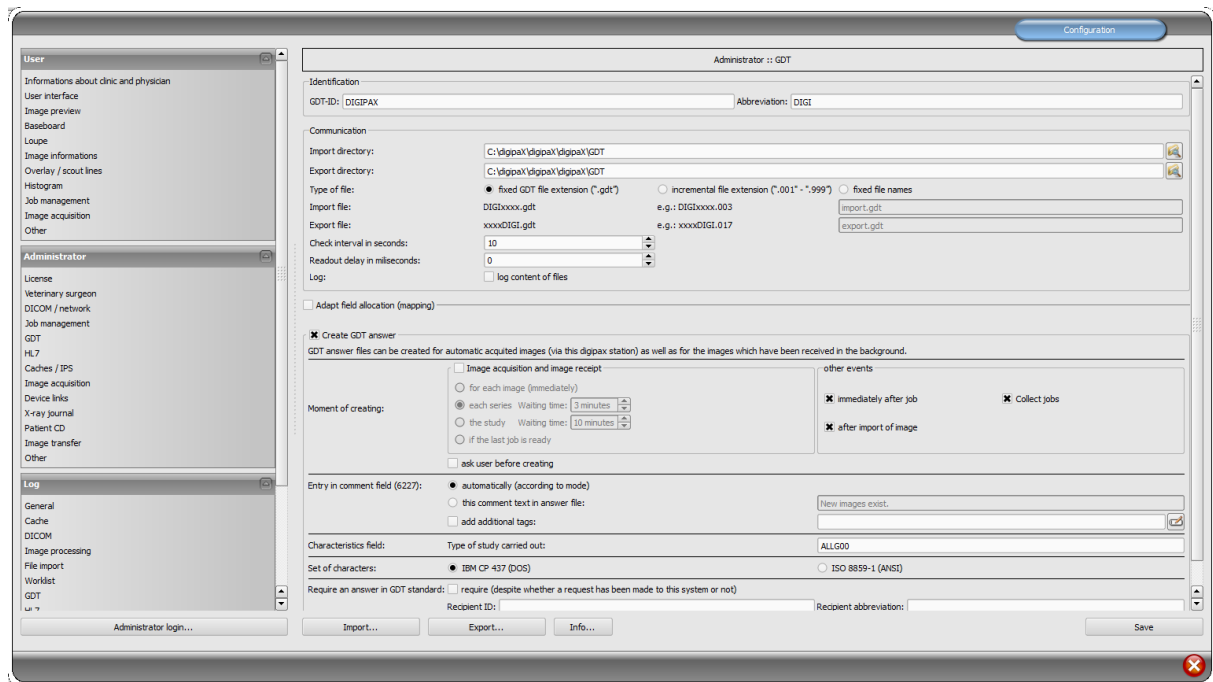
9.1.7.2 Settings in ALBIS

First, it is necessary to close all of the open tabs using „View/ Close all".
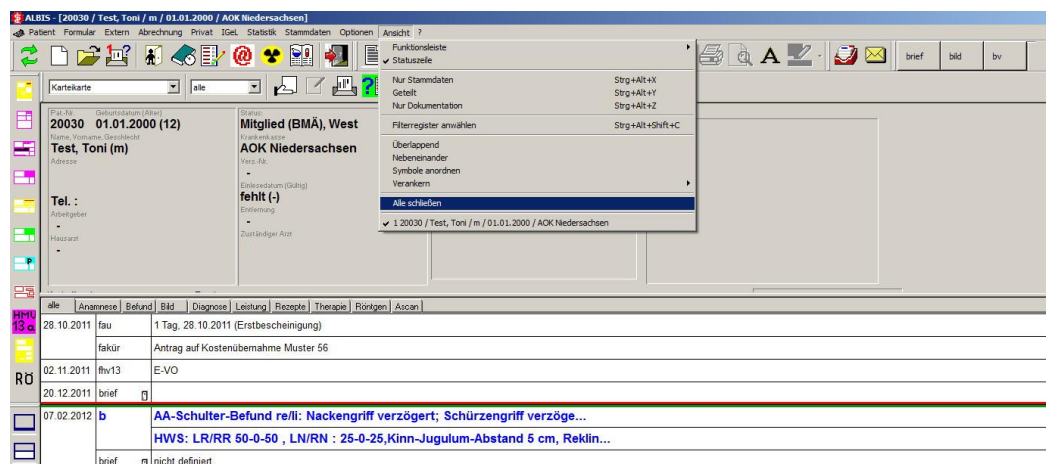
The ALBIS settings are available in the menu "Options/Service/External programs …".
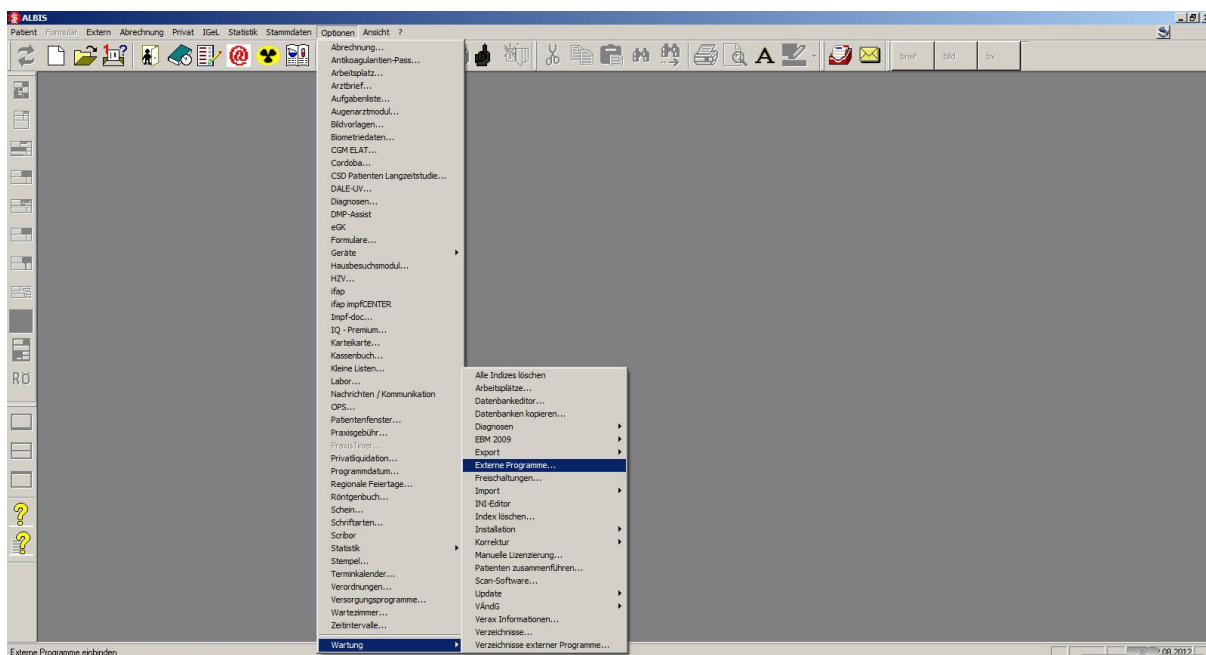
A single-day password is required for external program settings. In order to get the password, it is necessary to contact ALBIS.
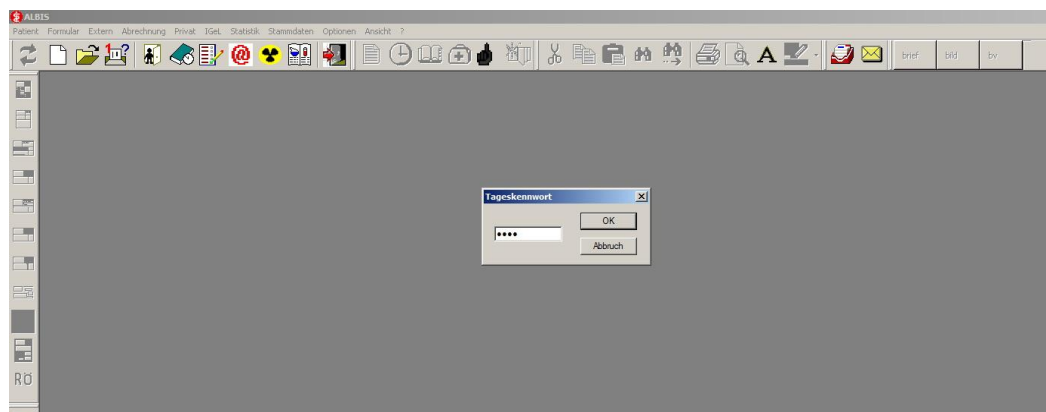
Upon expiry of the external program use period, it is also necessary to contact ALBIS.
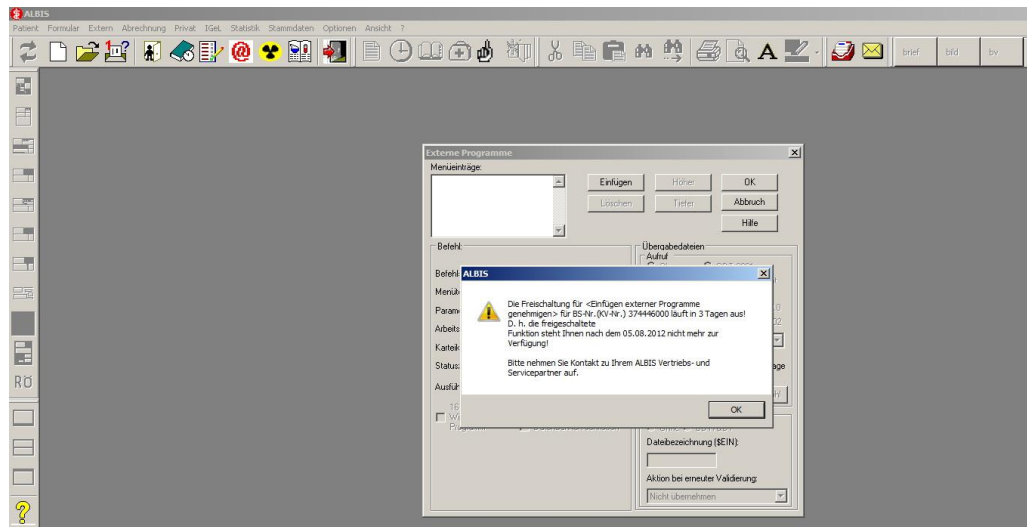
Creating a job:
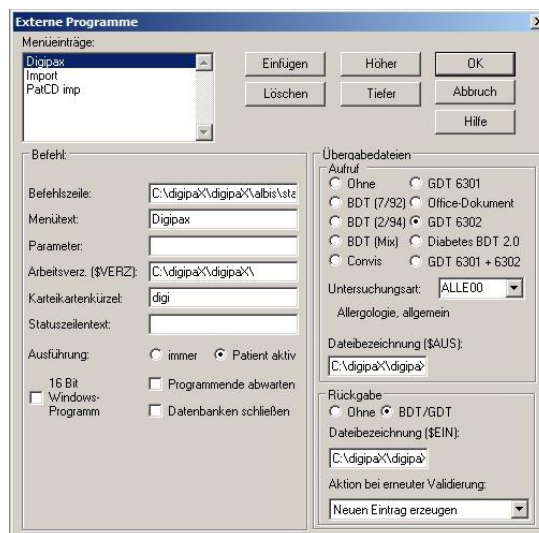
Command line: C:\digipaX\digipaX\albis\start.bat
($AUS): C:\digipaX\digipaX\gdt\digialbi.gdt
($EIN): C:\digipaX\digipaX\GDT\albiDIGI.gdt

File import (wound documentation):
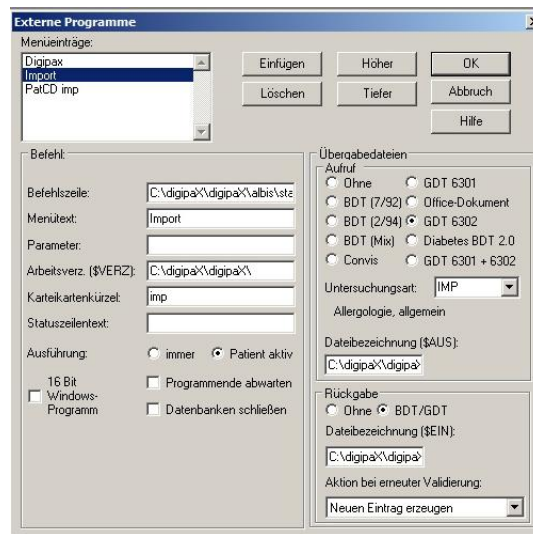
Command line: C:\digipaX\digipaX\albis\start.bat
($AUS): C:\digipaX\digipaX\gdt\digialbi.gdt
($EIN): C:\digipaX\digipaX\GDT\albiDIGI.gdt

Import of patient-CD:
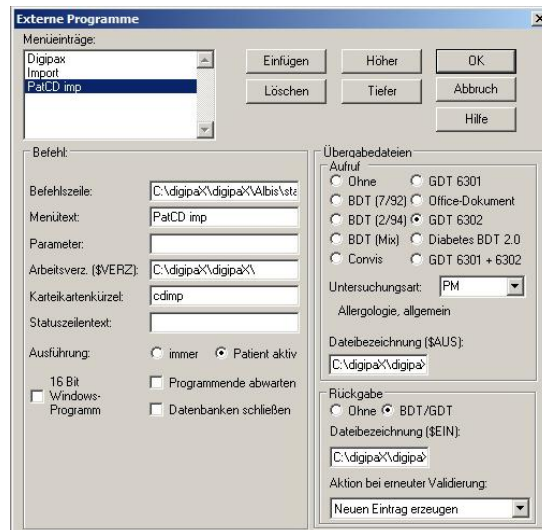
Command line: C:\digipaX\digipaX\albis\start.bat
($AUS): C:\digipaX\digipaX\gdt\digialbi.gdt
($EIN): C:\digipaX\digipaX\GDT\albiDIGI.gdt

9.1.7.3 Start.bat

If the GDT response file has not been received by ALBIS, digipaX may not write a new returned response. Therefore, the unnecessary GDT file must be removed prior to re-launching of digipaX. Therefore, digipaX is launched by ALBIS via a batch file.

Create folder „ALBIS" in the local directory C:\digipaX\digipaX\.
-> C:\digipaX\digipaX\ALBIS
In this folder, create start.bat with following contents:

```
@echo off
del C:\digipaX\digipaX\GDT\albiDIGI.gdt /q
start /d C:\digipaX\digipaX digipax.exe
```

If the digipaX is installed in another path, the path must be adjusted in the batch file as well and put in the path separated by blank spaces or in quotation marks.
Example:
start /d C:\Programme\digipaX\digipaX digipax.exe
start /d "C:\Program Files\digipaX\digipaX" digipax.exe

9.1.8 Connecting Duria

The Duria system does not possess a polling server. The digipaX server creates incremental GDT files on a shared disk on the server (locally is not possible).
While importing into the Duria system, all GDT files are imported in one sequence with assignments to the appropriate patients.

The illustrations below demonstrate the configurations:
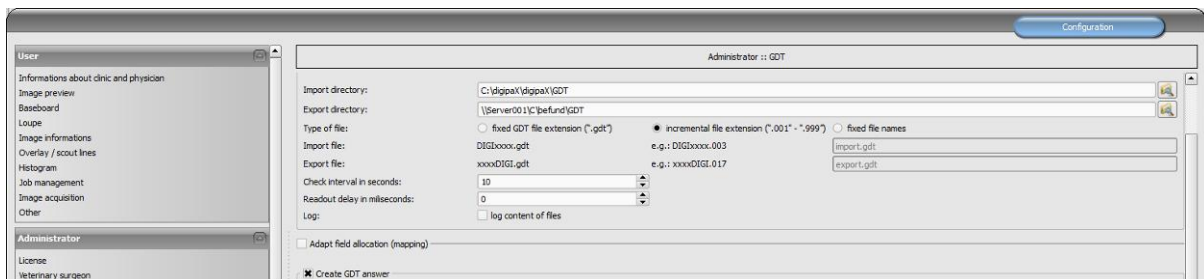
GDT configuration on a digipaX workstation
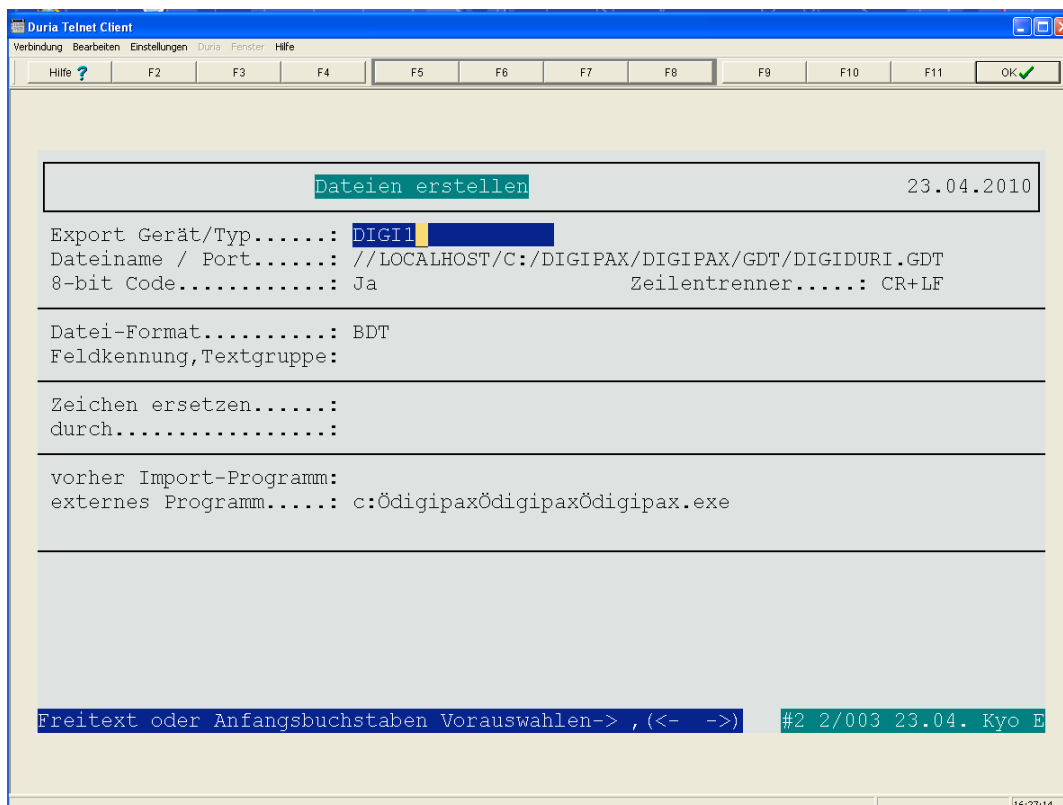
Configuration of the worklist job in Duria

Duria Telnet Client

Verbindung Bearbeiten Einstellungen Duria Fenster Hilfe

| Hilfe ? | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 | OK ✔ |

MVZ, Hillebrand/Weinz   W 30.06.1995 14/9 J P:1   103
Allenerstr. 35, 59457 Werl   0DKM   02922-9792.0
PR   PRE   M   Kein Fall
                 info§pentling.com
AB   gesundheitszentrum Pentling

Zeile	Inhalt (fix)	ab Pos.	Inhalt (variabel)	Textgr.	BDT	L.ze
1	01380006302				Ja	Nein
2	xxx8100§§§				Ja	Nein
3	xxx3000	8	Patienten Nr.		Ja	Nein
5	xxx3101	8	Nachname		Ja	Nein
6	xxx3102	8	Vorname		Ja	Nein
7	xxx3103	8	Geburtsdatum		Ja	Nein
13	xxx3110	8	Geschlecht 1/2		Ja	Nein

Korrektur   Erfassung   Löschen

16:28:15

Row configuration for creating a worklist job (6302)

Duria Telnet Client

Verbindung Bearbeiten Einstellungen Duria Fenster Hilfe

| Hilfe ? | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 | OK ✔ |

MVZ, Hillebrand/Weinz   W 30.06.1995 14/9 J P:1   103
Allenerstr. 35, 59457 Werl   0DKM   02922-9792.0
PR   PRE   M   Kein Fall
                 info§pentling.com
AB   gesundheitszentrum Pentling

Zeile	Inhalt (fix)	ab Pos.	Inhalt (variabel)	Textgr.	BDT	L.ze
1	01380006311				Ja	Nein
2	xxx8100§§§				Ja	Nein
3	xxx3000	8	Patienten Nr.		Ja	Nein
5	xxx3101	8	Nachname		Ja	Nein
6	xxx3102	8	Vorname		Ja	Nein
7	xxx3103	8	Geburtsdatum		Ja	Nein
13	xxx3110	8	Geschlecht 1/2		Ja	Nein

Korrektur   Erfassung   Löschen

16:31:53

Row configuration to display images (6311)
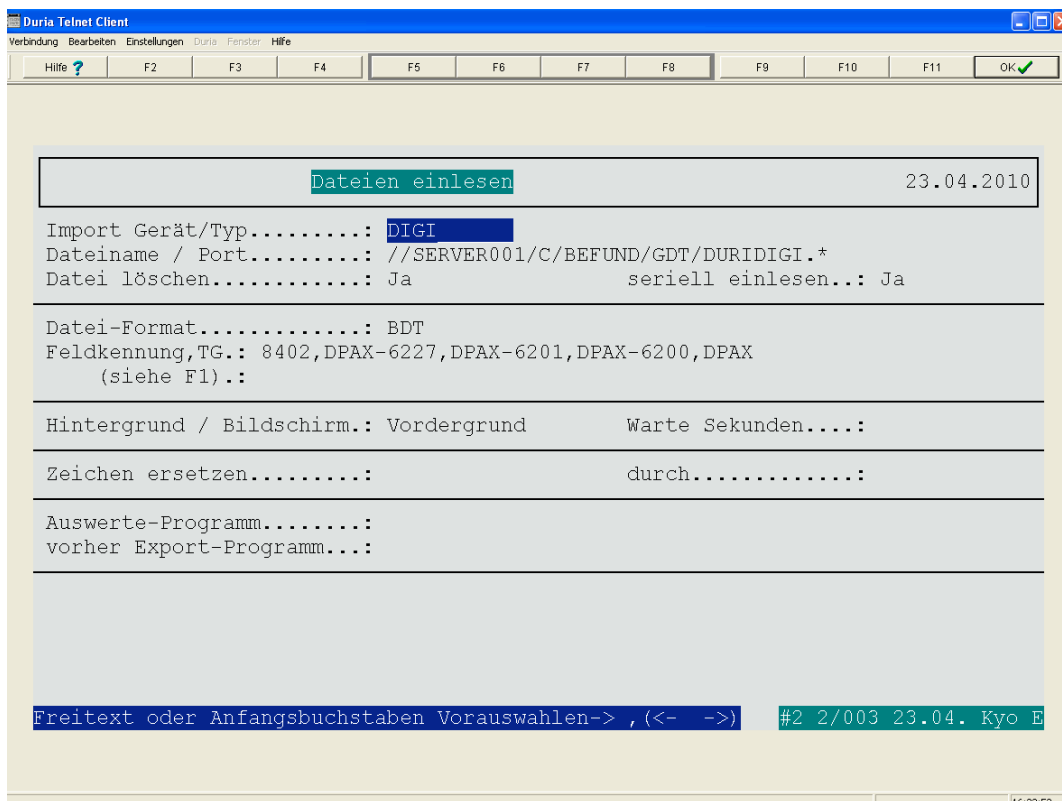
Configuration in Duria for importing GDT files

9.1.9 Connecting KiWi (KIND - Hearing Aids)

The illustrations below demonstrate connecting GDT to the KiWi system.

9.1.10 Connecting MCS Isynet (configuration with Windows terminal servers)

These instructions describe connecting of MCS using Windows terminal servers. MCS works on a terminal server and from each workstation a terminal client session is run on that server to allow working with MCS. However, digipaX runs locally on each workstation. The image server is not connected to MCS. The server receives the jobs through the worklist, scans images, stores them in the archive and writes the GDT response.

9.1.10.1   Terminal server configuration:

On the server a GDT directory is required. The directory is created on "I:\" (standard path Isynet). For each digipaX station, a separate subdirectory should be created. Responses are written directly in the GDT directory, which are used by all stations. Paths to individual stations may look like this:

I:\GDT\AP01

I:\GDT\AP02

…

I:\GDT\AP05

9.1.10.2   Workstation configuration

9.1.10.2.1 digipaX
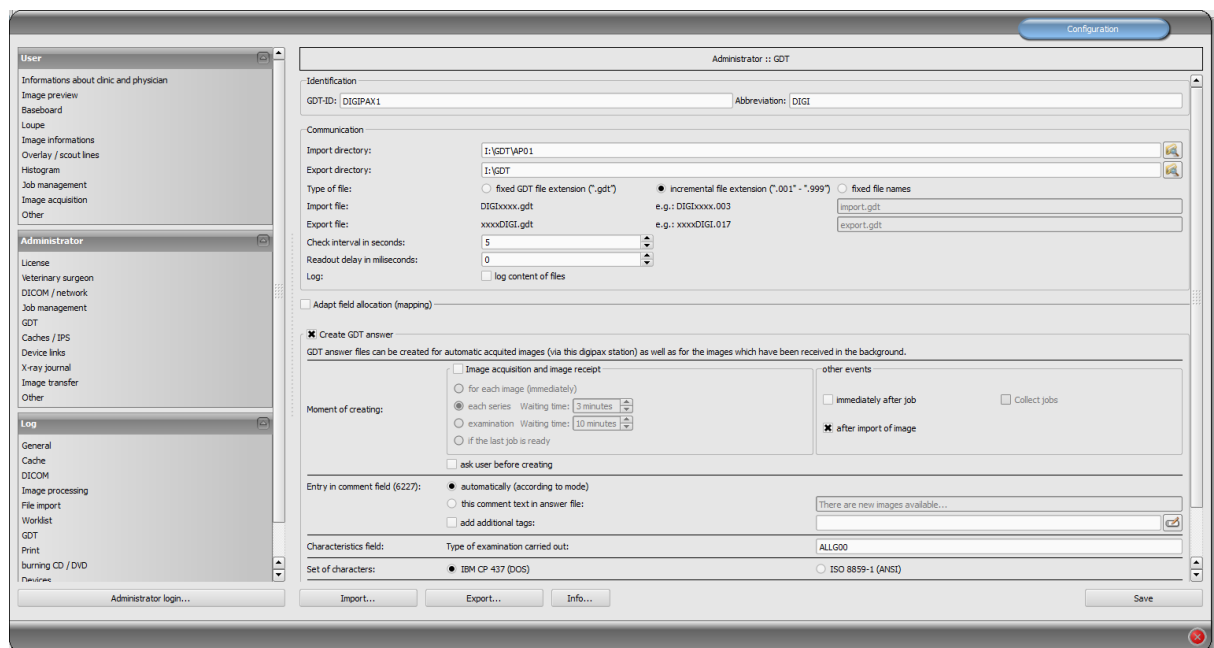
GTD-ID should be the same for all stations, because MCS works while creating files with predefined templates. For each station the import directory should be modified. The export directory is the "I:\GDT" directory. As the incremental file extension file types are used. Stations save the response only in the case of patient's CD import. For the character set use IBM CP-437. digipaX must be in the system tray and should launch on system start up. The im-

port directory is monitored and digipaX launches itself when a GDT file is created in the directory.
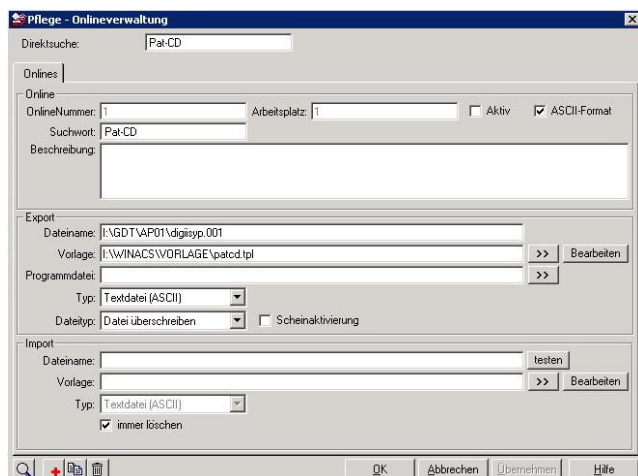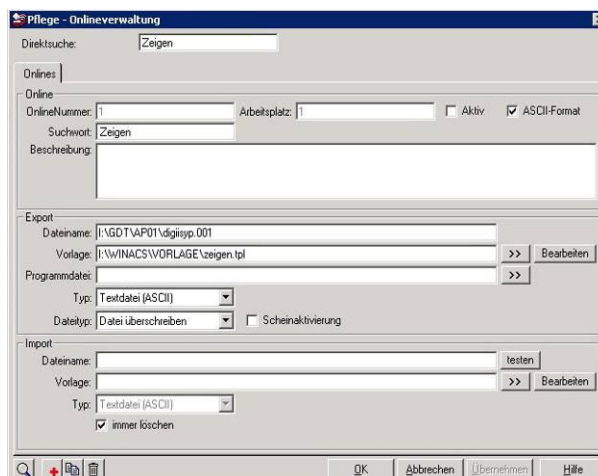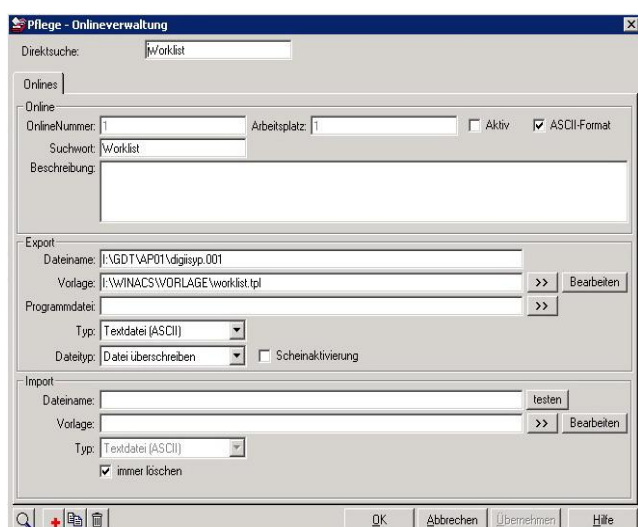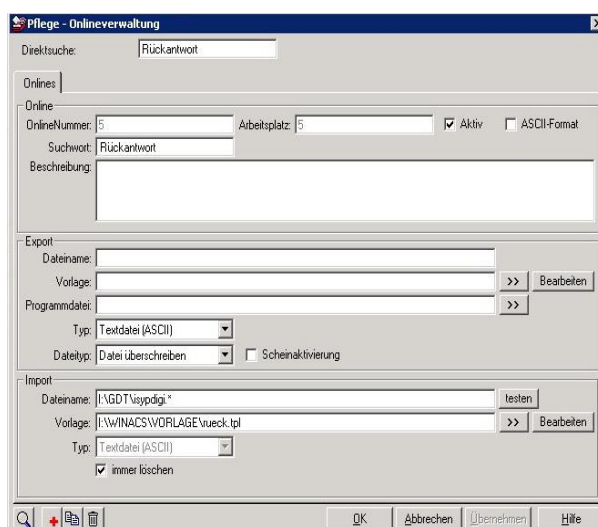
9.1.10.2.2 MCS Isynet:

In Isynet, 3 buttons are required: "Create a job", "Show image" and "Load patient's CD." The above mentioned templates are used for this.

3 buttons need to be configured individually for each station using the "Online service management." Also here, the GDT directory must be modified for each station. The GDT file name for digipaX is set permanently as "digiisyp.001" (the basis for the 001 is an incremental extension of the file in digipaX).

For the GDT file, specify the template (here, "worklist.tpl").

The import directory for the response is "I:\GDT." The file name is isypdigi.* and as a template the file "rueck.tpl" is used. Responses need to be configured only on one station. Only it controls the import directory.

To be able to re-call the images with double click at the revertive entry in the record card, the entry in MCS database is needed. In order to do this, "KRABLMEMO" must be entered in the "dbo.krablfeld" table after "Show digipaX".
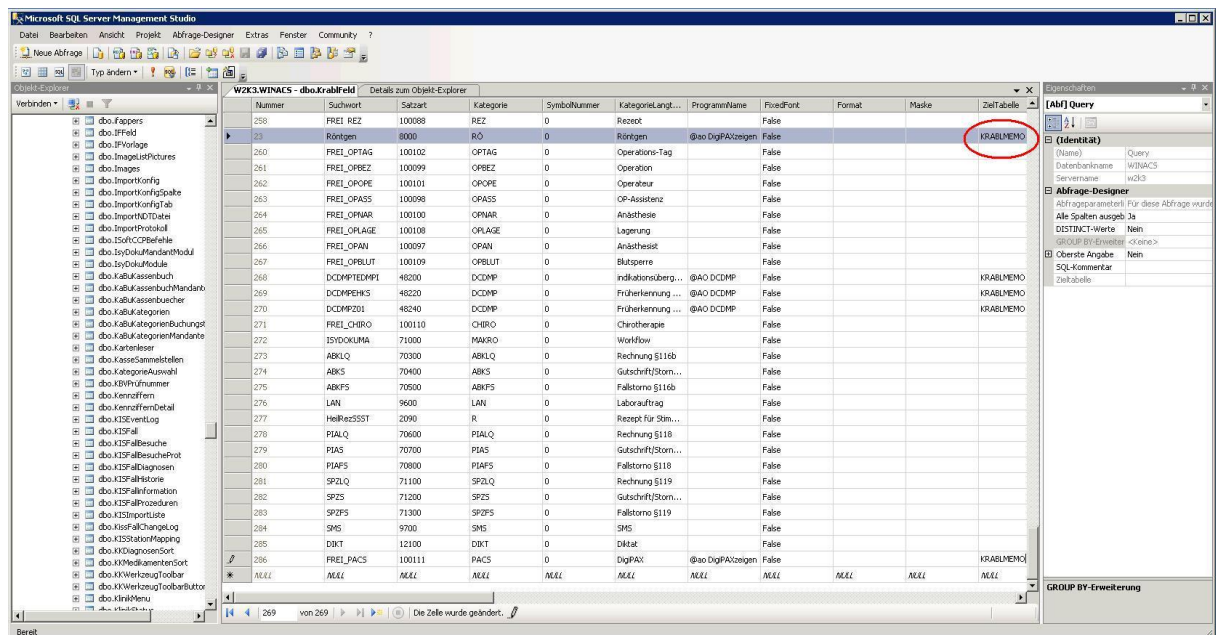
9.1.10.3   Image server configuration
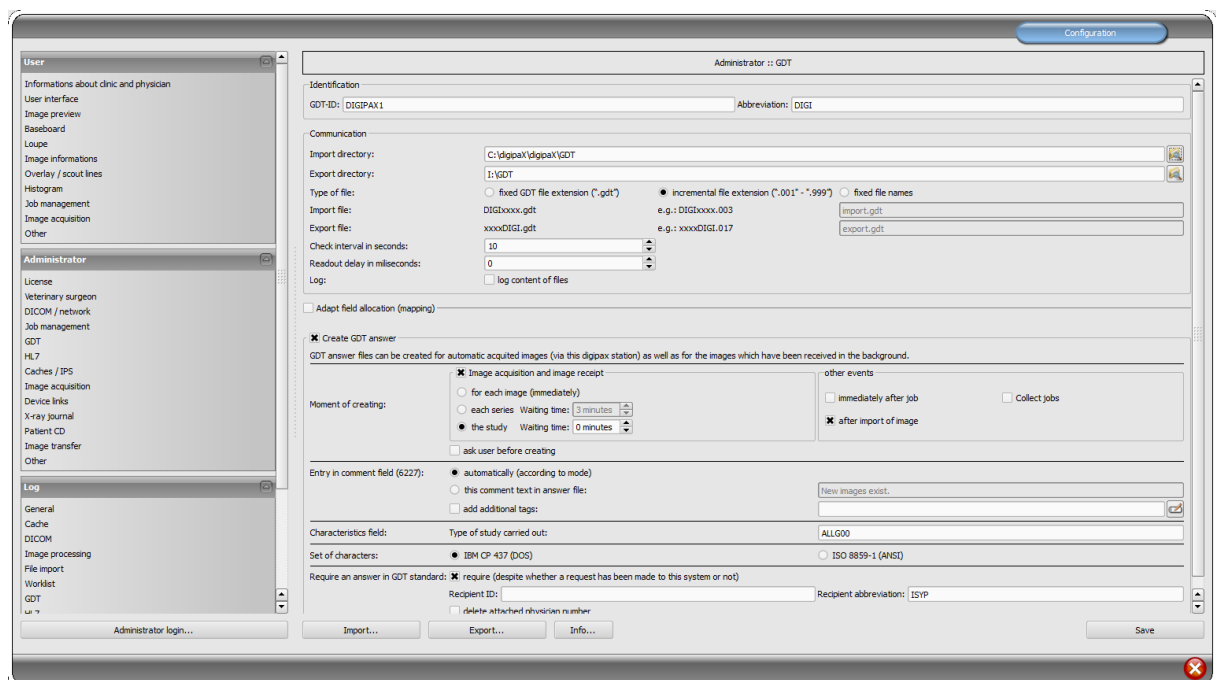
The image server is not actually connected to MCS, but here also an Isynet directory on the terminal server is connected to a network drive "I:\" and the export directory is set to "I:\GDT". A response file is saved after image acquisition, when the last job is completed and when the image is imported. The forced GDT response function must be active and set as a ISYP recipient shortcut.

As a result, all digipaX stations receive the GDT file for all 3 activities in its own GDT direc-
tory, but only write the response when loading the patient's CD to the commonly used GDT
directory as an incremental file.

The image server saves the response file when scanning and loading into the same directory.
For all 3 activities, 3 buttons are available in MCS. For the buttons, you can define different
symbols.

Create a job   Show images   Load patient's CD
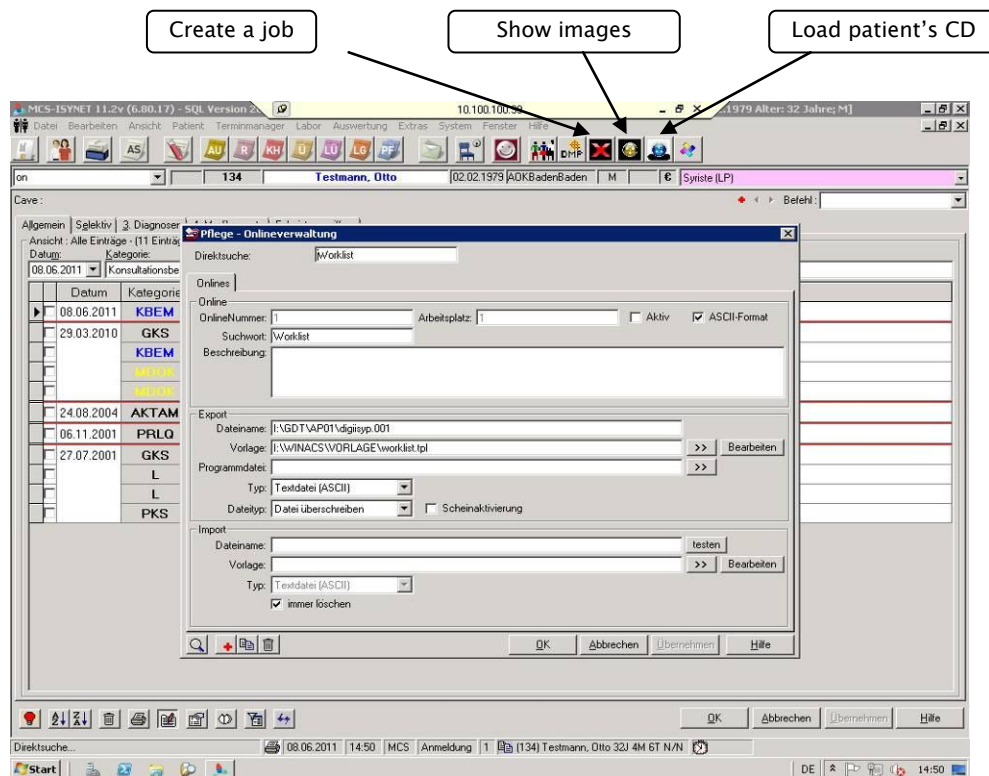
9.1.10.4   Templates

Templates are simple text files with "tpl" extensions. They can be edited using an editor, demonstrated in the 4 following examples:

worklist.tpl

```
*** Create GDT worklist ***
[@SL]80006302
[@SL]8100[@FL]
[@SL]8315DIGIPAX1
[@SL]8316MCS-ISYNET
[@SL]8402WL
[@SL]92180100
[@SL]3000[3000]
[@SL]3100[3100]
[@SL]3101[3101]
[@SL]3102[3102]
[@SL]3103[3103]
[@SL]3104[3104]
[@SL]3105[3105]
[@SL]3106[3106]
[@SL]3107[3107]
[@SL]3108[3108]
[@SL]3110[3110]
[@SL]3622[3622]
[@SL]3623[3623:/ 1000 # 000]
[@SL]3628[3628]
```

show.tpl

```
'*** Show GDT images ***
[@SL]80006311
[@SL]8100[@FL]
[@SL]8315DIGIPAX1
[@SL]8316MCS-ISYNET
[@SL]92180100
[@SL]3000[3000]
[@SL]3100[3100]
[@SL]3101[3101]
[@SL]3102[3102]
[@SL]3103[3103]
[@SL]3104[3104]
[@SL]3105[3105]
[@SL]3106[3106]
[@SL]3107[3107]
[@SL]3108[3108]
[@SL]3110[3110]
[@SL]3622[3622]
[@SL]3623[3623:/ 1000 # 000]
[@SL]3628[3628]
[@SL]8402[@KKDATA MEMO.Category]
'*** Category can vary, see Return
[@SL]8432[@KKDATA MEMO.Date]
[@SL]8439[@KKDATA MEMO.Time]
[@SL]6200[@KKDATA MEMO.Date]
[@SL]6201[@KKDATA MEMO.Time]
```

patcd.tpl

```
'*** Read GDT Pat CD ***
[@SL]80006302
[@SL]8100[@FL]
[@SL]8315DIGIPAX1
[@SL]8316MCS-ISYNET
[@SL]8402PM
[@SL]92180100
[@SL]3000[3000]
[@SL]3100[3100]
[@SL]3101[3101]
[@SL]3102[3102]
[@SL]3103[3103]
[@SL]3104[3104]
[@SL]3105[3105]
[@SL]3106[3106]
[@SL]3107[3107]
[@SL]3108[3108]
[@SL]3110[3110]
[@SL]3622[3622]
[@SL]3623[3623:/ 1000 # 000]
[@SL]3628[3628]
```

burnpatcd.tpl

```
'*** Burn GDT images on CD ***
[@SL]80006311
[@SL]8100[@FL]
[@SL]8315DIGIPAX1
[@SL]8316MCS-ISYNET
[@SL]8402PCD
[@SL]92180100
[@SL]3000[3000]
[@SL]3100[3100]
[@SL]3101[3101]
[@SL]3102[3102]
[@SL]3103[3103]
[@SL]3104[3104]
[@SL]3105[3105]
[@SL]3106[3106]
[@SL]3107[3107]
[@SL]3108[3108]
[@SL]3110[3110]
[@SL]3622[3622]
[@SL]3623[3623:/ 1000 # 000]
[@SL]3628[3628]
```

imageimport.tpl

```
'*** Import GDT image/graphics ***
[@SL]80006302
[@SL]8100[@FL]
[@SL]8315DIGIPAX1
[@SL]8316MCS-ISYNET
[@SL]8402IMP
[@SL]92180100
[@SL]3000[3000]
[@SL]3100[3100]
[@SL]3101[3101]
[@SL]3102[3102]
[@SL]3103[3103]
[@SL]3104[3104]
[@SL]3105[3105]
[@SL]3106[3106]
[@SL]3107[3107]
[@SL]3108[3108]
[@SL]3110[3110]
[@SL]3622[3622]
[@SL]3623[3623:/ 1000 # 000]
[@SL]3628[3628]
```

respons.tlp

```
'****************************
'***  Read GDT format ***
'****************************


'*** Find character string '3000' on position 4 and take in the found
'*** row from pos. 8 20 characters and assign them to variable "PATNR".
[@PATNR:$FIND(4,3000);8;20]


'*** Date in format DDMMYYYY
[@DATUM:$FIND(4,6200);8;8]


'*** Time in format HHMMSS
[@ZEIT:$FIND(4,6201);8;255]


'*** 8402 specific characteristic field for device or process (must be compiled as case sheet
'*** category in MCS-NEXUS for MCS-ISYNET).
'*** With the command $MAP characteristic fields are transformed in corresponding KK categories.
'*** There are significantly more characteristic field existing, e.g.EKG05 etc... Those are to be adjusted if need be.
[@KAT:$FIND(4,8402);8;6$MAP "R" RÖ EKG00 "EKG" EKG01 "R-EKG" EKG04 "LZ-EKG" ERGO00 "ERGO" ERGO01 "ERGO" LUFU00 "LUFU" LUFU01 "LUFU"
BDM00 "BDM" BDM01 "BDM"]


'*** Find all rows with character string '6228' (tabular text)
'*** on position 4 and take all in the found rows from pos. 8 to the
'*** row end (255) and assign it to variable "TEXT".
[@TEXT:$FIND+(4,6227);8;255]


'*** 6220 is result characteristic of GDT
[@BEF:$FIND+(4,6220);8;255]


'*** 6221 is foreign result characteristics of GDT
[@FBEF:$FIND+(4,6221);8;255]


'*** Variable MEMO
[@MEMO:Datum()


'*** Attach date (8432) to Variable MEMO.
'*** Date can also be in another field characteristic, e.g. 6200
[@MEMO+:$FIND(4,6200);8;255]


'*** Attach time to Variable MEMO.
[@MEMO+:)[CRLF]Time()


'*** Attach time (6201) to Variable mEMO (original value:8432)
[@MEMO+:$FIND(4,6201);8;255]


'*** Attach time to Variable MEMO.
[@MEMO+:)[CRLF]Category()


'*** Attach category (8402) to Variable MEMO.
[@MEMO+:$FIND(4,8402);8;255]


'*** Attach bracket to Variable MEMO.
[@MEMO+:)]



'*** Space for sequential control in MCS-ISYNET starts here
$ASS


'*** Entry of program linkage for the case sheet
'*** M command for easy transfer without memo entry
'*** MX command for memo entry fwd. double click from KK


'MX |[KAT]|Measurement|[MEMO]


MX |[KAT]|[Date] [Time] [TEXT]|[MEMO]
```

Symbols and templates can also be downloaded from the website www.digipax.eu on the "Downloads" tab.

9.1.11 Connecting ABOMED

9.1.11.1   ABOMED configuration

The settings for ABOMED must be performed on each local computer. ABOMED works solely on the network drive Z: and supports only file and directory names with max. 8 characters + 3 characters for file extension as it was with the old DOS file system (example: TEXTFILE.TXT).

Call up the configuration by using the Z I P keys. On the page 3 there are settings for the GDT interface. A separate directory for the GDT file transfer must be established for each PC.
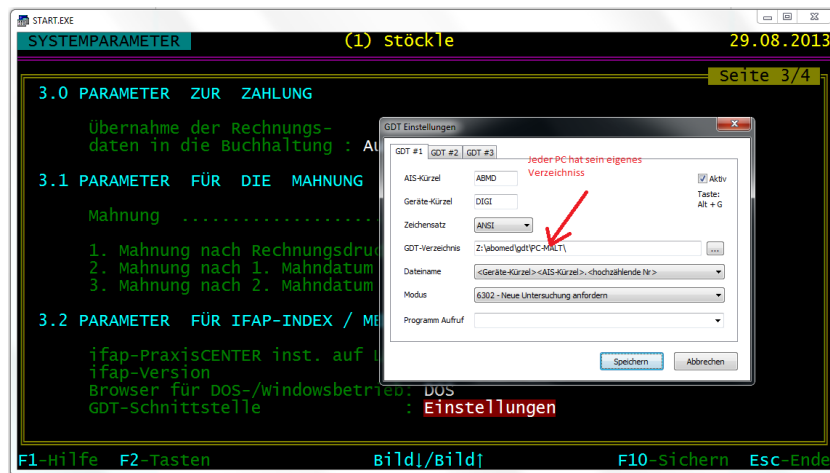
9.1.11.2   digipaX configuration

For each PC a corresponding directory must be established in the digipaX. Incremental file extensions are used. A revertive entry is not supported at present.
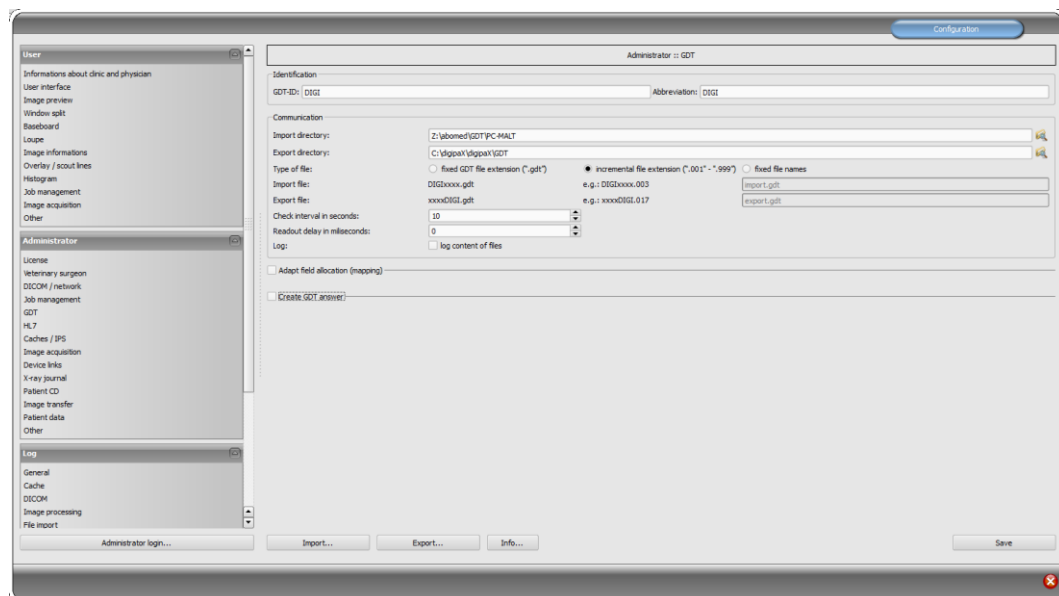
9.1.12 Connecting M1

9.1.12.1   M1 configuration

For M1 a path for the exchange directory must be configured in the registry.
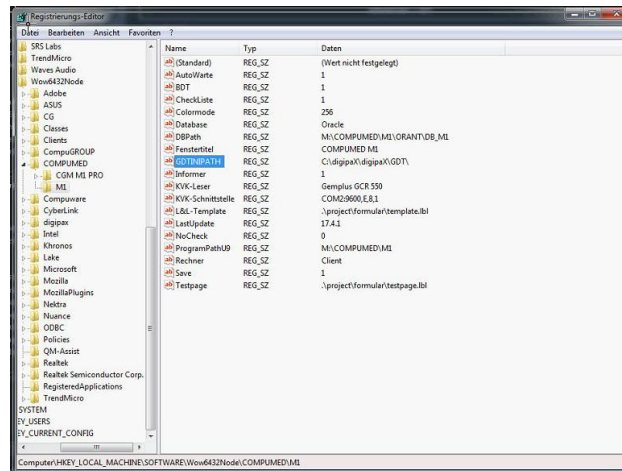
Two configuration files are required in this path. The first one is a GDT configuration file of M1. Any name can be chosen for this file. The GDT parameters are set in the file.
Example:.digipax_gdt.ini:

```
[Allgemein]
Prog = C:\digipaX\digipaX\digipax.exe
XDTART = GDT
XDTVER = 2.0
DATKEN = DIGI
EXTENS = GDT
BCKDAT = DEF

[Modi]
Modus001 = Anzeigen
Modus002 = Auftrag

[Modus001]
OutVerz = C:\digipaX\digipaX\GDT\
InVerz  = C:\digipaX\digipaX\GDT\

[Modus002]
OutVerz = C:\digipaX\digipaX\GDT\
InVerz  = C:\digipaX\digipaX\GDT\

[Funktionen]
Funk001 = Worklist

[Funk001]
Kennung = ALLG00
Modus001 = 6311
Modus002 = 6302

[6301]
Felder = 8000;8100;9218;3000;3101;3102;3103;3110

[6302]
Felder = 8000;8100;9218;3000;3101;3102;3103;3110;8402

[6310]
Felder = 8000;8100;9218;3000;3101;3102;3103;3110

[6311]
Felder = 8000;8100;9218;3000;3101;3102;3103;3110;8410
```

The other one is the„m1geraet.ini" file, in which reference is made to configuration file and the program switch in M1 is defined.
Example m1geraet.ini:

```
[Allgemein]
Geraet001=digipax_gdt.ini;digipaX
```

9.1.12.2   digipaX configuration
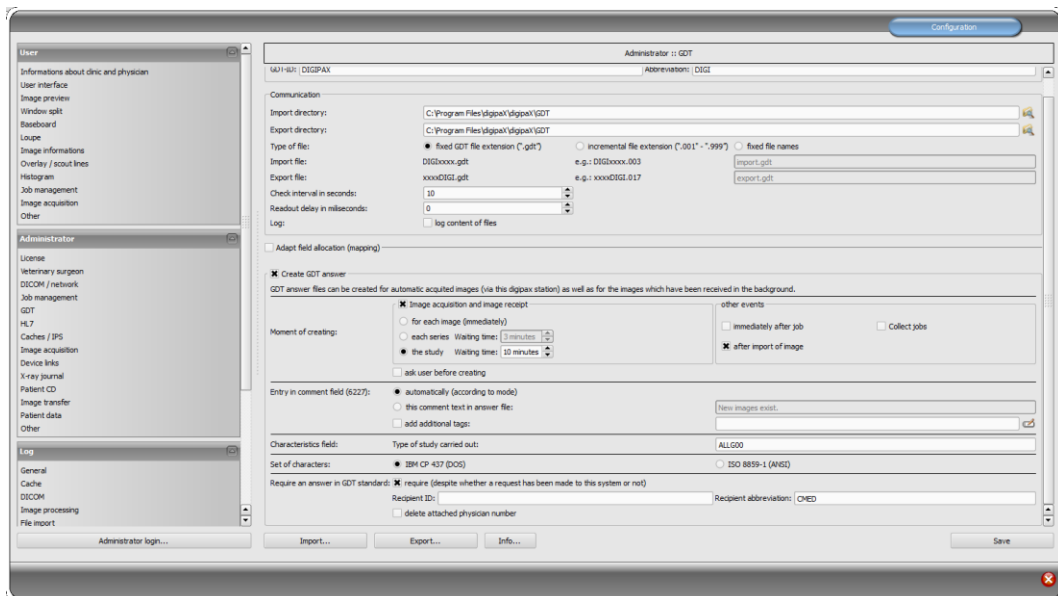
9.1.13 Connecting Apple Tomedo

Connection to Tomedo has been made successfully with the following settings.

9.1.13.1   Tomedo settings
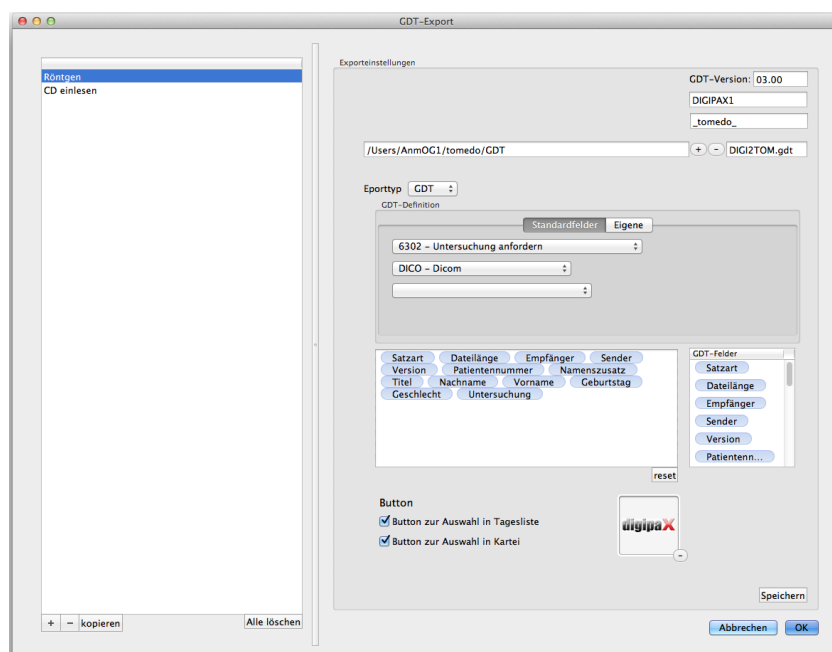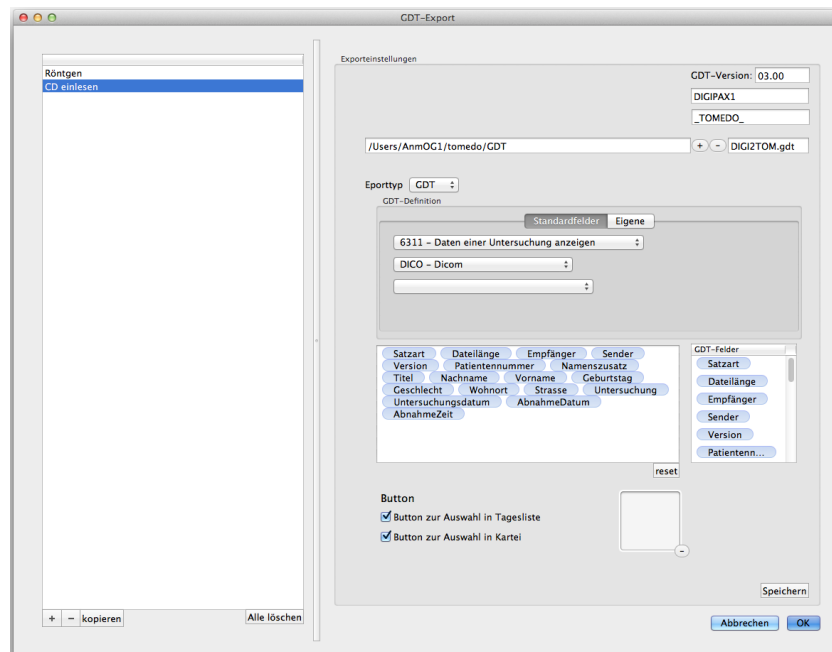
9.1.13.2   digipaX settings

GDT directory set in Tomedo is enabled, afterwards embedded in Windows as network drive and used for digipaX as GDT directory.
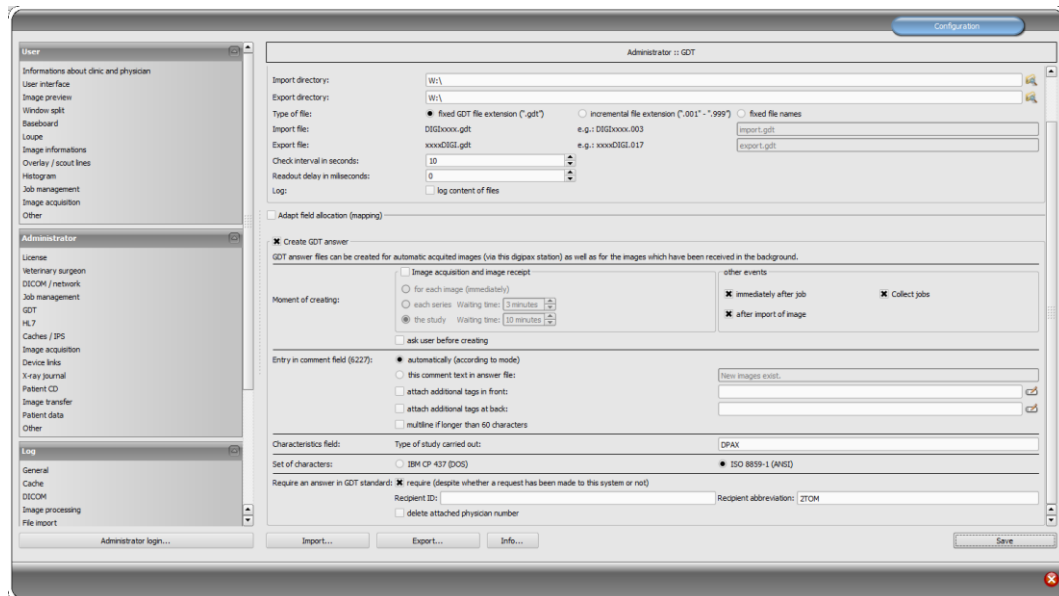
9.1.14 Additional digipaX GDT settings
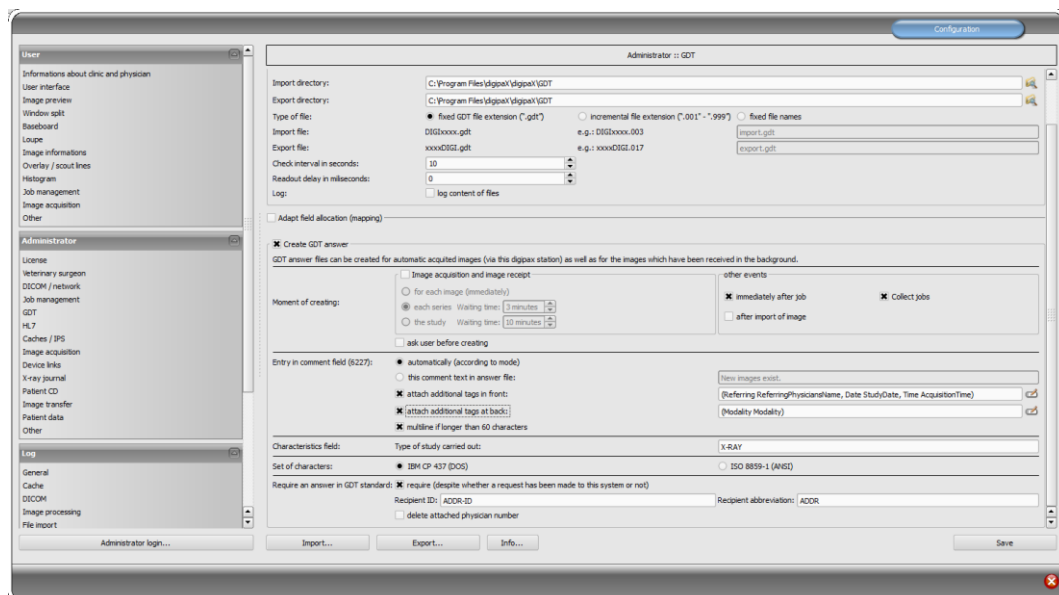
9.1.14.1   Identification

As described in the GDT standard in version 2.1, it is necessary to enter a unique identification (GDT-ID, 8 characters) and an abbreviation (4 characters).

9.1.14.2   Communication

Import and export files are exchanged through configured communication directories. As for file names, the following options are supported:

Variant	Description	Example	Standard
Constant GDT file extension („.gdt")	\<receiver abbreviation>\<sender abbreviation> . GDT	DIGITURB.gdt TURBDIGI.gdt	yes
Incremental file extension („.001" – „.999")	< receiver abbreviation >< sender abbreviation > . \<incremental no>	DIGITURB.003 TURBDIGI.017	yes
Constant file names	Any file name – this is often a simple alternative and allows you to adjust to most systems	import.gdt export.abc	no

Communication directory is monitored after each activity and also periodically searched to find new GDT files (polling), if there were to be problems with normal activity reception. The interval can be adjusted with the value of the periodic search (value in seconds, 5 seconds is recommended). The files, which could not be read or which are addressed to other recipients remain in the directory and are not read the second time (until you restart the application). All other files are imported, processed appropriately, and then the file is deleted, as required by the standard. In some other systems, it may be that the GDT is not written in one sequence. In such cases, you can enter a delay for reading the GDT.

For the purpose of testing and analysis of the contents of GDT files (incoming and outgoing) a log can be recorded (category GDT).

9.1.14.3   Field assignment (mapping)

9.1.14.3.1 Patient data area

GDT files that are inconsistent with the standard can cause errors in interpretation of the fields. Configuration of field assignments allows you to customize importing. For each value an appropriate field number can be given, from which value is read. When exporting, the data is restored back from the customized fields.

9.1.14.3.2 Controlling area

If the clinic management system sends the job number and a description of the job, you can configure the appropriate fields. Further processing of this data is done through job management. See chapter 8 DICOM worklist section 8.5 Additional information.

The following fields are the station name and modality. If they are defined, the data from the fields are passed to job management and while creating a job, the station number and modality will be set by default.

9.1.14.3.3 Veterinary area

This area is used for customizing the veterinary version. For this purpose, see section 16.5.

9.1.14.3.4 Standard fields

With the help of the „Set standard GDT fields" button, the field numbers are reset to the initial values.

9.1.14.4   Response file

For studies which have been requested from other systems using GDT files, a response GDT file can be created. As the recipient's ID, enter the requestor's ID. When using a GDT file type with a permanent extension, the requestor's abbreviation is used in the file name.

9.1.14.4.1 Point in time of creation

Usually the response GDT files are created after downloading the images for the respective study, and after directly acquiring the images in the digipaX system or when digipaX get the pictures from another system. This does not work, however if the target device may "incidentally" receive and analyze the GDT files. If that is not the case, then the GDT respond file must be created immediately after the creation of a job. Besides this, optionally you can also generate the GDT file after successful import of raster images.

With the "Immediately after job" option, the response GDT file is created when you create a job with the description contained in the order on the worklist or after the creating the job with a user-defined comment (after reading the GDT file of record type 6302). The clinic management systems, such as TurboMed, which do not constantly monitor the GDT directory, can read responses immediately after requesting them and then add entries to the patient's record card. It is recommended to activate the option "Job summary" to create a response file with a description of the summary for all jobs. Otherwise the system will try to generate a response file for each job. Systems, which also periodically search the communication directory for the presence of GDT files, should first obtain information if images were actually uploaded. Thus, one of the options in the "image acquisition and image receipt" must be selected. If the images on the station are not scanned by digipaX, the routing PACS server and digipaX system must be properly set, as this is the only way you can determine the creation of new images. If the "For every image" option is selected, the response GDT file is created when receiving an image or when saving a study for each scanned image. If the GDT file already exists with the same name (for example, is using the permanent GDT file extension option, when the previously created file has not yet been received by the recipient), the system will repeatedly try to create this file, with a specified time interval between the trials. If these attempts fail repeatedly, the process is interrupted. Therefore, we recommend the use of incremental file extensions, if it is supported by the second system

When creating a GDT response to series of images or a study for received images a "countdown" begins after receipt of the first image. If until the moment the countdown ends no other images will be uploaded for this series or study, the series / study will be deemed complete and a response file will be created. The countdown can be configured by entering the waiting time in minutes. If you enter 0, then immediately after the arrival of further images for a series or study response files will be created. If other images are not received to the series or study, no further response files will be created for this series / study.

If this station acquires images or image series directly, then after saving the study either for every series or complete study the response file is created. With this option, waiting time

makes little sense and should be set on „0". Here, it is also recommended to use incremental file extensions for the option „Each series".

Therefor, information on the new study (StudyDescription) is also transferred if needed.

When creating a GDT response file after importing an image (option "After image import") a GDT file is created, which in an automatic mode provides a description of the study, in the images which were saved. This GDT file is created when a user imports raster graphics (graphic files or images from a scanner) or DICOM files (e.g. patient's CD).

Due to the option "Prompt user before creating" each time before generating a response GDT file, user agreement is obtained. This option is useful when information for all tests or images is not to be sent back.

9.1.14.4.2 Comment field entry (6227)

In the comment field of the GDT response file (field number 6227) you can enter text. Text may be automatically specified to the description field of the worklist job (Requested Procedure Description: 0x0032, 0x1060), comment tag of the image (Image Comment: 0x0020, 0x4000), series (Series Description: 0x0008, 0x103e), study (Study Description: 0x0008, 0x1030) or user-defined. For option <When last order is ready> the Study Description of a new study is also used.

To the comment field you can also add user-defined tags and text. As in the case of displaying image information on the overlay, you can add up to 3 tags, or their parts.

Which tags will be used depends on the selected type of response (job, image, series or study). For one job different tags are available than for images.

On the configuration page "Administrator / Image acquisition" you can specify whether the beam projections are to be included in the description of the study.

If the comment field contains too many characters (long study descriptions), it can occur that the clinic management system cuts off the last characters. However, the comment field can be divided into several lines if the clinic management system supports this feature. Then, several lines are generated automatically, where each line contains up to 60 characters. For this feature, this option must be activated.

9.1.14.4.3 Characteristic field

The value sent in field 8402 can be selected freely. The „ALLG00" is standard for general studies.

9.1.14.4.4 Character set

You can select the character set used to create a GDT response file. The standard is "IBM CP 437". When downloading GDT files character set is automatically recognized and used. 7-bit character set is not supported by the system.

9.1.14.4.5 Forced GDT responses

The "Forced GDT response file" allows you to create response messages, to given stations where there has been no request by the GDT. If, for example at station A, a new study was requested by the GDT, then after creating the job, you can close the system, and at station B after the images have been created, a GDT response will be generated. At this time the receiver's GDT-ID and its GDT abbreviation is not known, therefore it should be entered into the configuration.

Since in this case you cannot determine whether the physician ID (or the company number) in the digipaX system was added to the patient ID, removal of such an identifier may only be done by using the option "Remove the added physician ID" (relates only to devices used by many physicians).

9.1.14.4.6 Program exit

If at the end of the program not all GDT response files have been created yet (in the case of option of series or study with a programmed waiting time), they will be saved automatically.

9.1.15 Activities control system digipaX

9.1.15.1   Program parameter

If in the set GDT communication directory, a valid, addressed to this system GDT file is found, then the effect on the start on the program will depend on the contained in the record type and the eventual passed the program parameter "/w" or "/i" (or „\w",„-w" as opposed to „\i", „-i"). This parameter determines the losing of the worklist or import component.

GDT record type	Action
6301: Send constant data	▪ Patient management start ▪ The patient passed in the GDT file is selected if the patient exists in the archives, or on the contrary, the patent in this case will be created locally
6302: Request new study	▪ Here also the patient gets selected or created locally ▪ If the image acquisition module is active, at this time the patient is updated and images can be read in (since digipaX version 1.1.0). ▪ If the image acquisition module is not available or the „/w" parameter was passed, at this time the worklist component is loaded and a dialogue for creating new jobs is displayed. ▪ If the „/i" parameter was passed, at this time the

	import component is loaded. ▪ If the „/pm" parameter was passed, at this time the patient management module is loaded.
6311: Show study data	▪ Here as well the patient is selected or created locally. ▪ No component is loaded, but all the available studies for this patient are displayed in a tree view format and can be immediately viewed in the browser. ▪ The first study image is displayed (if a study date has been passed and such study with this date has been found). ▪ If the „/pcd" parameter was passed, at this time the patient is selected and the module for creating the patient's CD is loaded.

If at the start of the program no valid GDT file is found, the parameter "/w", "/i" as opposed to "/pm" has no meaning.

9.1.15.2 GDT 8402 or 8410 field

In the GDT file record type 6302 ("Request a new study") or record type 6311 ("Show study data"), you can use the 8402 field "Tools and process characteristics map" or 8410 "Test-Ident", in order to pass instructions for a particular action.
The following table shows the possible settings:

Value	Name	Record type	Meaning
ACQ	ACQUIRE	6302	Requests direct image acquisition. Available only if the image acquisition module is active.
WL	WORKLIST	6302	Loading the worklist component and opening the dialogue to create the job.
IMP	IMPORT	6302	Loading the import component for importing image files or scanning of documents.
PM	PATIENT MANAGEMENT	6302	Loading patient management, e.g. for importing patent's CD or other DICOM images for this patient.
PCD	PATIENT'S CD	6311	Loading the patient's CD module for creating patient's CD of the selected patient.

Please enter only one of two fields, depending on what is supported by the system that creates the GDT file.

9.1.16 Patient data consistency

If the names and birth dates of patients do not match fully with the data management system and clinic image data archive, accurate assignment of patients cannot be done. This can happen after receiving complete data image from previous image archives. Therefore, on the configuration page "Administrator / Patient data" in the "Patient ID" group, you can change this feature to compare to "Only patient ID." In this way, only IDs will be compared and not the names and dates of birth of patients.

9.1.17 Working without being connected to GDT

digipaX can also be operated without being connected to the GDT as opposed to being connected to the clinic management system and perform basic patient management functions. It does not, however, have a local database of patients. This means that patient data are saved only when the image is in the archive.
However, you can temporarily save the patients created locally. This option can be activated in the configuration of the DICOM network "Save patients locally." These data can be archived centrally in the network and can be used by all stations. Thanks to this, patients who do not yet have images in the archive are also available to all other stations.

9.2 HL7 Interface

9.2.1 General

With HL7 the connection with radiology and hospital information systems is possible. Data exchange between digipaX and other systems takes place via the TCP/IP connection. Exchange of messages over the files is not possible. The settings in digipaX are made over the page Configuration / Administrator and over a configuration file (HL7.ini) in the digipaX directory.

9.2.2 Types of messages

ORM – general order message (event O01)
From the data fields of ORM message a worklist job is derived. It is either saved directly in the background in the worklist or a dialogue for creating a job is opened.

ORR – general response message to any ORM (event O02)
If the option for sending an acknowledgement is enabled, after the ORM message the ORR message is sent to the sender.

ORU – unsolicited transmission of an observation message (event R01)
After each image received via automatic image receipt or when the last job is completely processed and ready, a message is sent to the radiology/hospital information system, that the job is executed.

9.2.3 Action type

As with the GDT interface, an action type control can be forwarded with the HL7. The following functions are possible.

Value	Designation	Type of message	Meaning
ACQ	ACQUIRE	ORM	Requires direct image acquisition. Only possible if image acquisition module is enabled.
WL	WORKLIST	ORM	Depending on setting in the digipaX recalls worklist components and opens the dialogue for job creation or automatic job creation in the background.
IMP	IMPORT	ORM	Recalls import components for import of image data or scanning of the documents.
PM	PATIENT MANAGEMENT	ORM	Recalls the patient management, e.g. to import a patient CD or another DICOM images for that patient.

9.2.4 digipaX configuration
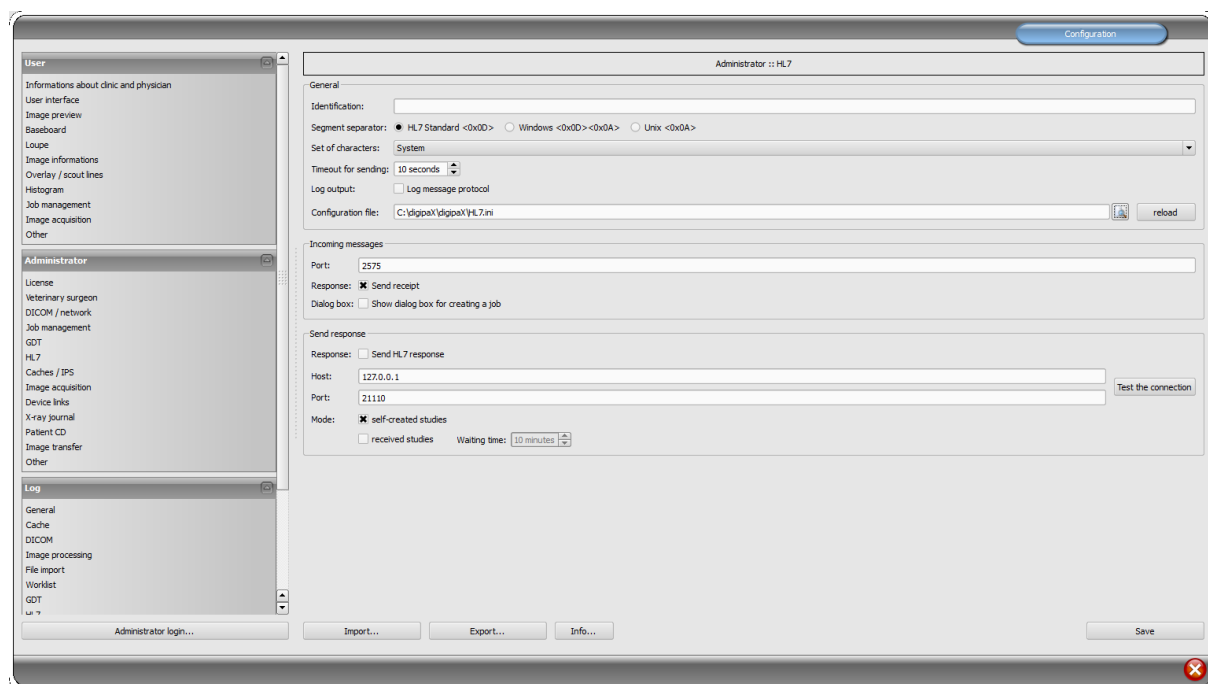
- General

  Identification: determines a unique identification name for a station. In this case only HL7 messages are processed, that are exactly defined for the system. If the field is blank, all incoming messages will be processed.

  Segment separator: determines, what character the segments within an HL7 message are separated with. The setting must be the same for all systems.

Character set: determines the set of characters that is used in the messages. As a standard the typical character set for Windows is used.

Timeout for sending: timeout for sending a message, if the recipient is not available.

Log output: all HL7 messages with the contents are protocolled in the log.

Configuration file: path to HL7 configuration file (HL7.ini), name and path can be freely chosen.

reload: with this button the loading of the configuration file is refreshed (e.g. after changes).

▪ Incoming messages

Port: port, on that digipaX receives the HL7 messages.

Response: if enabled, each incoming message is confirmed to the sender with receipt acknowledgement.

Dialogue: if enabled, a dialog box for creation a job is opened for incoming HL7 job. If disabled, a worklist job is created in the background.

▪ Send response

Response: if enabled, the messages can be sent to other systems, that e.g. a new image exists.

Host: the host name or IP address of another HL7 recipient.

Port: the port, on that the system receives the HL7 messages.

Test the connection: tests the connection with the defined recipient.

Self-created study: for each study acquired a message to the recipient is sent.

Received study: for images received via automatic image receipt a message for each study is sent.

Waiting time: waiting time after receipt of the last image; if no further image for the study comes in during this waiting time, a message for corresponding study is sent.

when the last job is executed: when the last job for the patient is executed and the image has been saved, a response is sent.

9.2.5 Configuration file HL7.ini

Various informations such as patient's name, patient CD, date of birth etc. are transmitted in each HL7 message in a defined field. The fields which those data are transmitted in can vary for different radiology / hospital information systems. In the HL7.ini the assignment of the fields is configured, so that the data are assigned properly. To be able to make the correct settings, you should also know which fields the data are transmitted in by the system to be connected.

Example for an HL7 message (ORM)

```
MSH|^~\&|SendingApp|Sender|ReceivingApp|Receiver|201201011200||ORM^O01|123456|P|2.3.1|||||de|||
PID|||1234567890||Mustermann^Max||200001010000|M|||Musterplatz 1^^Musterhausen^^99999^DE||0123 456789
PV1|||||||^Physician^Performing^^^|^Physician^Requesting^^^|||^1^2^^^^3^4^Station 5
AL1||Allergien
ORC|NW|0123^^^|||||^^^20120315112500^^T||||||||||^Institution^||
OBR||||RIS-ID-01^C-Spine / AP|||||||||Commends|||^Physician^Reffering^^^||||||||||||||||||||||||||||||||||||
ZDS|1.2.276.0.7.3|WL|X-RAY|75|||Medical notes|Contrast agent|Premedication|Patient history|CR|
```

This message creates for Max Mustermann, sex „male" with the patient ID „1234567890" a job „Cervical spine/AP" of the institution with a name „Institution".

Each row is designated as a segment. First 3 characters make the segment name. The segments are subdivided into fields separated with a pipe „|". In the fields the components are contained that again are separated (e.g. with a symbol „^").

In this example, the patient ID (1234567890) is in the segment **PID** field 3, patient's name Max Mustermann in the segment **PID** field 5, sex in the segment **PID** field 8 and name of the institution in the segment **ORC**, field 17, Component 2.

The HL7.ini is divided into 3 sections:

In the section „Incoming messages" [ORM] the fields for incoming messages and in the section „Outgoing messages" [ORU] the fields for outgoing messages are assigned. In the section „Value replace tables" the abbreviations used in DICOM and their values useable in HL7 standard are assigned. Thus the „US" modality from the DICOM corresponding with „RUS" in HL7 or pregnancy status is presented as „3=pregnant" in the DICOM and „B6=pregnant" in the HL7. As not all values are assignable, user-defined ones can be used as well.

The following fields are assignable with the job creating:

```
PatientName = Patient name
Birthdate   = Birth date
PatientID   = Patient ID
Sex         = Gender
Address     = Address
Telephone   = Phone number

DateStart   = Fixed date
TimeStart   = Fixed time
Modality    = Modality
StationAET  = Station (AE Title)
RequestedProcedurePriority = Priority

PatientsWeight   = Weight oft the patient
Pregnancy        = Pregnancy
LastMenstruation = Last menstruation

RequestedProcedureDescription = Job

ContrastAllergies     = Allergies
RequestedContrastAgent = Contrast agent
MedicalAlerts         = Medical notes
PreMedication         = Premedication

ReferringPhysician  = Referring physician
RequestingPhysician = Requesting physician
PerformingPhysician = Performing physician
InstitutionName     = Institution

PatientLocation = Patient's place of residence
PatientHistory  = Patient history/indication
Comments        = Remarks

AccessionNumber  = Accession number
StudyInstanceUID = Study ID

ProcedureCode1 = Procedure Code 1
ProcedureCode2 = Procedure Code 2
ProcedureCode3 = Procedure Code 3

ActionType = Action type

RISID         = RIS ID
RISDescription = RIS description

PlacerOrderNumber = Placer Order Number according HL7 standard
FillerOrderNumber = Filler Order Number according HL7 standard
```

The table below shows possible values and abbreviations of the section „Value replace tables". On the left the definitions for HL7 and on the right for DICOM are placed. For the values with no assignment individual definition should be made.

```
;Table for sex
[Sex]

;female
F=F

;male
M=M

;other
O=O

;unknown
;U=

;Table for priority
[Priority]

;promptly
S=STAT

;high
A=HIGH
P=HIGH
C=HIGH

;normal
R=ROUTINE

;low
T=MEDIUM

;Table for pregnancy status
[Pregnancy]

;not pregnant
;=1

;eventually pregnant
;=2

;pregnant
;B6=3

;unknown
;=4

;Table for modality
[Modality]

;Radiology
RAD=CR

;Ultrasound
RUS=US
```

Some rows of the HL7.ini, adequate for the message above look then as follows:
PatientID=PID|3(CX)
PatientName=PID|5(XPN)
Sex=PID|8(IS|Sex)
InstitutionName=ORC|17|2(ST)

The syntax up to that point is:
Identifier=Segment|Field{|Component}(DataType{|ValueReplaceTable})
The identifier, field and component are separated with a pipe. Afterwards the data type is attached in brackets. The data type is compatible with the way of interpreting of the data

record. The used data type must correspond with that of the radiology / hospital information system.

The Component and ValueReplaceTable are thereby optional and do not have to be specified. For the sex, the HL7 value must be converted into the DICOM value. For this, the table provided in the section "Value replace tables" [Sex] must be evaluated. Therefore, the name of the table pipe delimited is attached to the data type. Thus the value incoming from the HL7 (M for male) is translated by the DICOM for the worklist job (in this case also M).

Next segment of the HL7.ini is for outgoing messages. This segment is defined under [ORU]. For outgoing messages there are three forms of the values. The syntax is basically reversed here. The specified value, such as Patient-ID or Study-ID, is transmitted to radiological/hospital information system on the "X" segment in the "Y" field. In addition, each segment receives a segment number. This is important when one segment type is used repeatedly (e.g. OBX1 for Patient-ID or OBX2 for Study-ID).

There are three options of values for outgoing messages. The first one is transfer of variable values such as patient ID or patient's name. Another form is fixed values which are sent with each message always on the same position. Most of radiology / hospital information systems need such the fixed values for further internal processes.

As the third the contents of the DiCOM tags of received or self-acquired images or the assigned worklist job can be transferred. It is important to use the pipe symbol also upon specifying the tag.

In all three variants, the left part of rows begins always with the segment and segment number, followed by field and component, all separated with the pipe symbol. As for incoming messages, the value "Component" is optional and depends on the used radiology / hospital information systems as well as the segment and field.

The syntax for all three variants is:

Segment|SegmentNumber|Field{|Component}(DataType)=Identifier
Segment|SegmentNumber|Field{|Component}(DataType)=FixValue(Wert)
Segment|SegmentNumber|Field{|Component}(DataType)=DcmTag(xxxx|xxxx)

Variant 1 for variable values:
Example for patient-ID:
PID|1|3(CX)=PatientID

Variant 2 for fixed values:
In the following example, the value „F" is transferred on two fields.

Example for fixed values:
OBR|1|25(ID)=FixValue(F)
OBR|2|11(ID)=FixValue(F)

Variant 3 for DICOM tag:
Example for performing physician:

OBR|1|34(CM)= DcmTag(0008|1050)

Example of the section [ORU] for outgoing messages:

```
[ORU]
PID|1|3(CX)=PatientID
PID|1|5(XPN)=PatientName
PID|1|7(TS)=Birthdate
PID|1|8(ID)=Sex

; Receiving Application
MSH|1|4(HD)=FixValue(RIS-SYSTEM)
; Process Type
MSH|1|11(PT)=FixValue(P)
; Order Type (RE - observations to follow)
ORC|1|1(ID)=FixValue(RE)
; Result Status (always F - verified results)
OBR|1|25(ID)=FixValue(F)
; Observ Result Status (always F - verified results)
OBX|1|11(ID)=FixValue(F)
; Number of Segment OBX
OBX|1|1(SI)=FixValue(1)
; Value Type
OBX|1|2(ID)=FixValue(TX)

; Date and Time of performing
OBR|1|7(TS)=DcmTag(0008|0020)
; Date and Time of the Observation
OBX|1|14(TS)=DcmTag(0008|0020)
; Unique Order ID (Accession Number)
ORC|1|2(EI)=DcmTag(0008|0050)
; Orders Local Number
OBR|1|2(EI)=DcmTag(0008|0050)
; Exam's Name
OBR|1|4(CE)=DcmTag(0008|1030)
; Exam's Name
OBX|1|3(CE)=DcmTag(0008|1030)
; Technician
OBR|1|34(CM)=DcmTag(0008|1070)
```

10 Caches / IPS

10.1 General

Three areas in which files can be archived in must be defined. These areas are called caches, and in them DICOM files are stored for their temporary use by digipaX software, the related thumbnail and Presentation States, in which the user-defined information about the presentation of different images are archived.

Caches are created on the configuration page "Caches" and there they may also be cleared. There is an option to automatically clean the caches when exiting the program. For each cache a size in MB is set. If the file size exceeds the size set for files stored in the given cache, then the old data is removed from the cache. This process can be deactivated, so you can archive any number of files without checking the available memory space, or automatically delete old files.

Processes of caches can be tracked in the cache-log.

10.2 DICOM images

DICOM images must be saved in a local cache so that you can use them. The cache for DICOM images should have the appropriate size. Cache size should be more than 0,1 GB – this is the minimum capacity of the cache.

10.3 Thumbnails

Image thumbnail cache must be set up in a central place on the network. Checking for free space in the cache should be deactivated.

If it is necessary to limit the space, you should check the free space in the cache on your computer, which it is physically part of.

10.4 Presentation States

Information on the presentation of greyscale images are stored in Presentation State files, which also can be managed in the cache. These files are saved automatically.

The cache path should be created in such a way, so that all stations in the network have access to the same directory. Then the images will be displayed in the same way at all stations. Deactivate the control of the cache.

10.5 Intelligent Prefetch System (IPS)

IPS allows you to load images of the chosen patient, depending on the working memory option selected in the background, making them quickly accessible. It is useful, for instance, in the case of CT or MR series. Loading status is shown in the tree view format next to each node as a percentage and as the general status under the image preview bar in the form of a progress bar. With the option "Automatically download remaining images of the series", after clicking on the image other images in this series are downloaded automatically (without waiting time when scrolling through the CT or MR series). With the option "Automatically download images of the newest study", after activating the patient, images are immediately

and automatically downloaded from the new study. Both of these options can be combined with each other. With the option "Automatically download all images", all images are automatically downloaded to the working memory when you select a patient.

It is recommended to activate this feature only for the describing station and equip it with sufficient capacity working memory.

11 Image acquisition configuration and connecting devices

11.1 General

For image acquisition functions, you can integrate various types of devices with the system: scanners, detectors, generators and equipment for measuring dose-area product. These devices provide the appropriate values, or image data.

On the "Connected devices" configuration page you can activate and configure connected devices. First, you must activate the appropriate device type, if needed (for example, "Scanner"), deactivate the non existing types. From the drop-down list of available devices, select the appropriate device and adjust the settings according to the system. In the "Scanning" tools set on the right side of the main window (with image acquisition module activated), you can see at the top the integrated device. The operation and processes of the system with connected devices are described in the User's Guide.

Additional instructions are available for connecting specific devices!

11.2 Image acquisition configuration

Settings for image acquisition may be mostly defined by the user (automatic transformations of images, the number of backups, etc.) As administrator the following optional settings are assigned:

Station: if the station name and modality have been provided, these will be used automatically for new jobs, created directly in the planning tab, and the job display in the planning tab will be filtered according to the options provided here

Study description: upon launching, the beam path will be applied directly in the study description

Action after saving: after saving of all images, the part of the program specified here will be opened automatically

If automatic hang-up of the current study is activated in the user settings, the newly acquired images are automatically hung up in the viewer if the option "Activate image viewer" is here used.

The option "Clear acquisition assistant box" causes that this box is cleared after each saved study. This is handy if several assistants work at one acquiring station (e.g. joint practices that share one acquiring station).

Image parameters for image acquisition: specifying whether the kV, mAs and dose area product parameters are optional or mandatory data.

You can select the unit for the dose-area product (dGy*cm², µGy*m² or mGy*cm²), depending on which unit is indicated by the device. The system performs automatic conversion of units. If necessary, instead of entering mAs, you can enter the mA and ms separately, the system automatically calculates the mAs product. In this case, the value of mA and ms are

also transferred to the relevant DICOM tags (0018.1151 and 0018.1150). If entering of the mAs value is marked as optional (and therefore not a mandatory field), the same applies to the individual values of mA and ms.

With the "Allow mAs as decimal numbers" option, the values may also contain decimal places.

When entering you should use for all values the decimal separator used in the Windows regional and language settings.

The "Text mode" allows you to enter any text into the fields. This is useful when a few images are to be found on one film. This allows you to enter multiple values separated by a separator.

> **Decimal places for any mAs text are incompatible with the DICOM standard and should be activated only when it is actually necessary.**
>
> **With the "Enter mAs and ms separately" and "Unit for the dose-area product in μGy*m²" options, the values for the tags are calculated from the input boxes. In such cases, the option "Free text" is not available.**

11.3 Simulation

The program can be started with the help of the /ds (Device Simulation) parameter to activate the simulation mode. In the simulation mode, there is an additional simulation device for each device type, which can be used for demo or testing purposes. In addition, in the "Scanning" toolbox, under the information specifying the type field, a "Simulate reception of values" button is added. As a result, when you press this button, the system simulates the receipt of new values, just as if they actually were received by the device. In this way, you can check and demonstrate the system.

12 X-ray journal

The X-ray journal is activated and deactivated by the license setting.

12.1 Entry settings

The X-ray journal uses flexible fields, which can be set by the administrator. For this purpose, there is a special digipaX configuration page. It shows journal entries in a table. In the first column, the used entries are marked with a check mark. Double clicking on an entry in the table allows for modification of the field to the X-ray journal. A term creates a name in the header of the journal table and it is also used in the mask for the new entries. Some entries can be deactivated. Some fields, such as date and name of the patient, are mandatory fields and can not be deactivated.
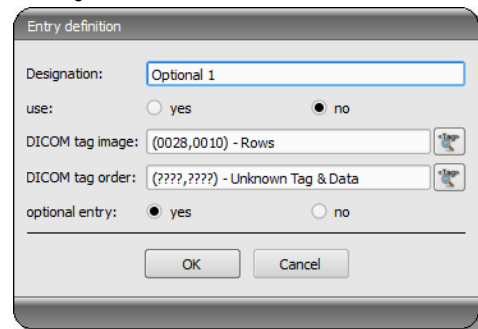
When pregnancy status is used, a query dialog box is displayed while recording data but only if the patient is female aged between 10 and 60 years and there is no information on pregnancy status in the data (job or image) so far. The stated pregnancy status is saved max. 24 hours or until reboot of digipaX software, so that the status for this patient is not inquired again in this time span. If the dialog box is closed without giving information on pregnancy status, the status is regarded as not inquired or not answered – so unknown – and will be inquired again if needed.

12.2 New entry

It is possible to paste the values from the DICOM image that was previously received in the background, or from a DICOM worklist job.

To paste the entries from the image, the routing must be correctly set. If you make a new entry in the X-ray journal, you can choose from a list of previously received images and image for which you wish to make a new entry for. In the dialogue for creating a new entry fields are already filled, according to the parameters for the selected image, but only if the image contains the appropriate parameters. Therefore, in the above dialogue, a connection to DICOM tag (image) is made, which contains the required parameters.

The X-ray journal entry may also be done on the order management system. At this time tags from the DICOM worklist job serve as a template for the entry. The connection is defined here, in the configuration using the DICOM tag for the job.

In case it lacks an existing tag which might be pasted to the X-ray journal, you should enter FFFFxFFFF.

There are fields that must be filled by the user and cannot remain empty. For these fields, set the "Entry optional" to "No". The user cannot add a new entry if not all fields are filled.

In the standard configuration, there are 3 not yet used entries which are optional for the X-ray journal. They can be freely configured to add additional fields to the journal.

It is also possible to apply values from a DICOM image that was previously received in the background. Routing must be set up properly in order to do this. Entries can be created automatically or manually.

Manually: if the user creates a new entry in the X-ray journal, he or she can prior to this select the image from a list of received images, for which the new entry is to be created. The fields in the dialog box for acquisition of the new entry are already completed accordingly to the values of the selected image provided that the values are contained in the image. Therefore a connection to DICOM tag (image) is established that contains the required value.

Automatically: entries for received images can be also made automatically in the background. The option for this feature must be activated. It should be noted that all required details must already exist in the image and no entry will be made, even for mandatory fields, if there is a lack of data in the image.

12.3 Storage location

The X-ray journal file location in memory can be set freely in the configuration. The place can be chosen so that, for example, the journal is always saved in the backup system or an increased protection by the RAID system is given.

The X-ray journal is edited on one station only, but, as an option, it can be viewed on other stations. For this purpose a path to the X-ray journal must be set by enabling or through the network drive. The checkmark „read only" must be activated on these stations.

12.4 Backup

Each time you start the program after a successful reading of the X-ray journal, a backup copy is created (file: xray.journal.bak). In the event of damage to the original file while saving the journal, you can use it as a backup.

12.5 Automatic generating of the journal

Using the Xadmin program, you can create the X-ray journal based on the DICOM files, further information on this topic can be found in the appropriate manual.

13 Visually choosing organs

On the "Order Management" configuration page, you can specify settings for the selection of organs in the image while creating worklist jobs. Depending on the specialization, the connected devices and modalities you can install different types of organ tables (Bodies). With the help of the BodyGenX tool (see chapter 14), you can create Bodies for various connected devices.

The standard license includes the use of only one modality due to organ tables. To use other modalities such as fluoroscopy apparatus, additional license is needed. The exception is the veterinary version, because in this case you need one table for all the animal species.

Types that are used are activated with the help of optional fields in front of their names. If several types are activated, they are displayed on various tabs for creating a job.

For a selected type, you can define on the configuration page on the right side of the tree view the details and beam projections. For further detailed instructions for this, refer to the User's Guide, as the user is also able to modify this list to your needs.

For each beam projection you can define up to 3 Procedure Codes. These codes must be separated by semicolon (";"). The Procedure Codes are transmitted on the specific DICOM tags. These tags can be chosen from the drop-down lists of "Procedure Code tags". When defining the Codes as well as selecting the tags defaults of target device must be overtaken or the device must be aligned to them.

The configuration files for different types are located in a subfolder "Body" in the digipaX installation directory. For each type there exists a folder, such as "human" for type "Man". It contains the file "Body2.ini" containing definitions of regions. In [GeneralSettings] you can preset for each type of modality and the station name for the jobs and a small icon. This icon will be displayed on the user interface on the tabs when there are multiple types activated. You can also specify an overlay image to be displayed. This overlay can also be an icon or a description, such as "X-RAY" or "ULTRASOUND".

Example:
LocalName=Radiology
Image=Body.png
Modality=DX
Station=STATION1
Symbol=Symbol.png
Overlay=Overlay.png

The file "Body2.ini" must be saved when editing in the file format "UTF-8" without BOM (Byte Order Mark). This is not possible with the Windows editors (Notepad & WordPad). It is recommended to use PSPad editor provided on the installation CD. A possibly still existing file "Body.ini" originates from the previous digipaX versions (1.3.4 or older) and is not used anymore. That file will be automatically converted onto „Body2.ini" (UTF-8 without BOM).

The symbol is an image of 64x64 px in PNG, BMP or JPG format. The file "BodyParts.xml" containes definitions of details and beam projections include Procedure Codes. This file can be replaced manually to e.g. upload a completed definition of all Procedure Codes for the specific device type.

It is also possible to set the background image for visual selection of body parts. It will be shown as the background when creating jobs and in the planning tab of the image acquisition module. For this purpose, it is sufficient to copy the image in the PNG format with the filename „background.png" to the „Body" register in the digipaX installation folder. Any resolution can be set; however, it should be adapted to the parameters of the monitor used.

14 Body Generator (BodyGenX)

14.1 General

The Body Generator (BodyGenX) tool allows you to create and install predefined types for job creation in human and veterinary version, including visual organs and Procedure Codes. Thereby, various specialities (ENT, urology etc.) or various animal species for the veterinary version can be selected in several languages. Moreover, the Procedure Codes for various devices are available and can be transferred into the BodyParts.xml whilst generating as well. Possibly, the Procedure Codes not for all organs and beam projections may be available. Those can be added manually later as described under point 13 Visually choosing organs.

Generated organ tables with the Procedure Codes serve only as templates. Therefore, correctness of the Procedure Codes must be verified before they are put into service.

The program is started by loading BodyGenX.exe in the digipaX installation directory. The language of the program corresponds with the language of the digipaX installation.

14.2 Selection and preview

14.2.1 Selection of area, subarea and language

After the tool has been loaded, the selection begins on the top left with "Area". The following areas are available: human medicine, veterinary medicine and "Other". Depending on the selection, which was made here, next possible selections are available in the field "Subarea". That means various specialities in the case of human medicine and various animal species in the case of a veterinary version can be selected. In the third field the target language for output data can be selected.
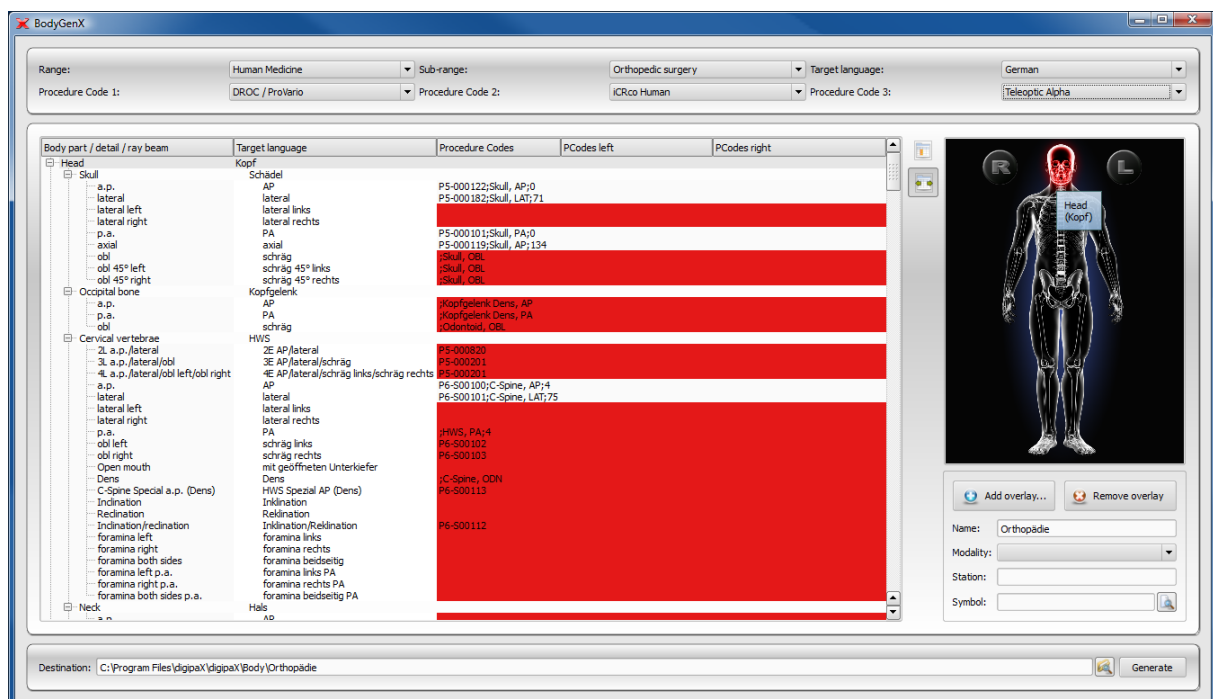
14.2.2 Selecting device (Procedure Codes)

The Procedures Codes for up to three devices can be passed into the organ table. Usually please select the requested device beginning from the left. The item selected in BodeGenX must then also be set in digipaX in the configuration of the job management as well as in the device connection.

14.3 Main window and preview

After the device has been selected, the corresponding Procedure Code appears in overview window behind the beam projection. If more devices are selected, the Codes are separated with semicolons. Rows marked in red indicate that there is no Procedure Code or the Procedure Code not for all selected devices for this beam projection is available. It is an important issue later for the generating. In the left column the body parts, organs / details and beam projections in the language of the program are shown, in the right column those are displayed already translated into the target language. In the right preview window an image for visual organ selection is displayed. By moving with the mouse over the body, its areas are displayed in the language of the program and in the target language as well.

14.4 Body2.ini settings

14.4.1 Inserting overlay

For optical shaping of visual organ selection overlays can be inserted, which will be then co-displayed. You may insert any symbols and text.
Click on overlay to add it. Select a symbol and click on "Insert".
Using the mouse, the symbol is moved to a desired location. In the same way you can insert a text. Using the mouse wheel, text and symbols can be made larger or smaller, rotated with the keys L and R on the keyboard, and deleted by pressing on "Delete" ("Del" key). By pressing on "Apply" the overlay is inserted.
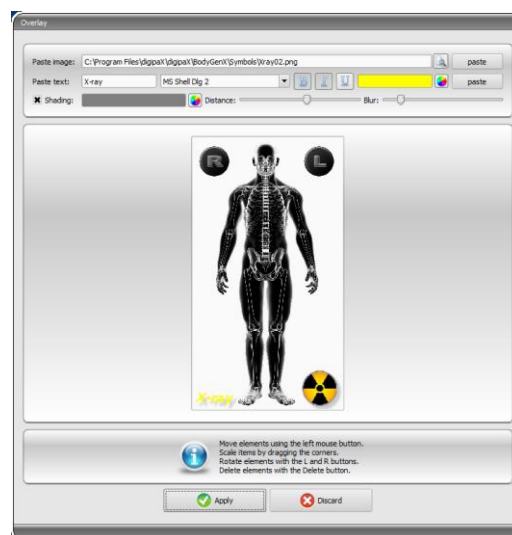
14.4.2 Name and other settings

In the field "Name" the name of the type is entered into Body2.ini under LocalName, which will then be displayed in the job management. Moreover, you can predefine settings for a station name and modality. Here you can also select a symbol, which will then be displayed in the tab of the user interface in the digipaX job management.
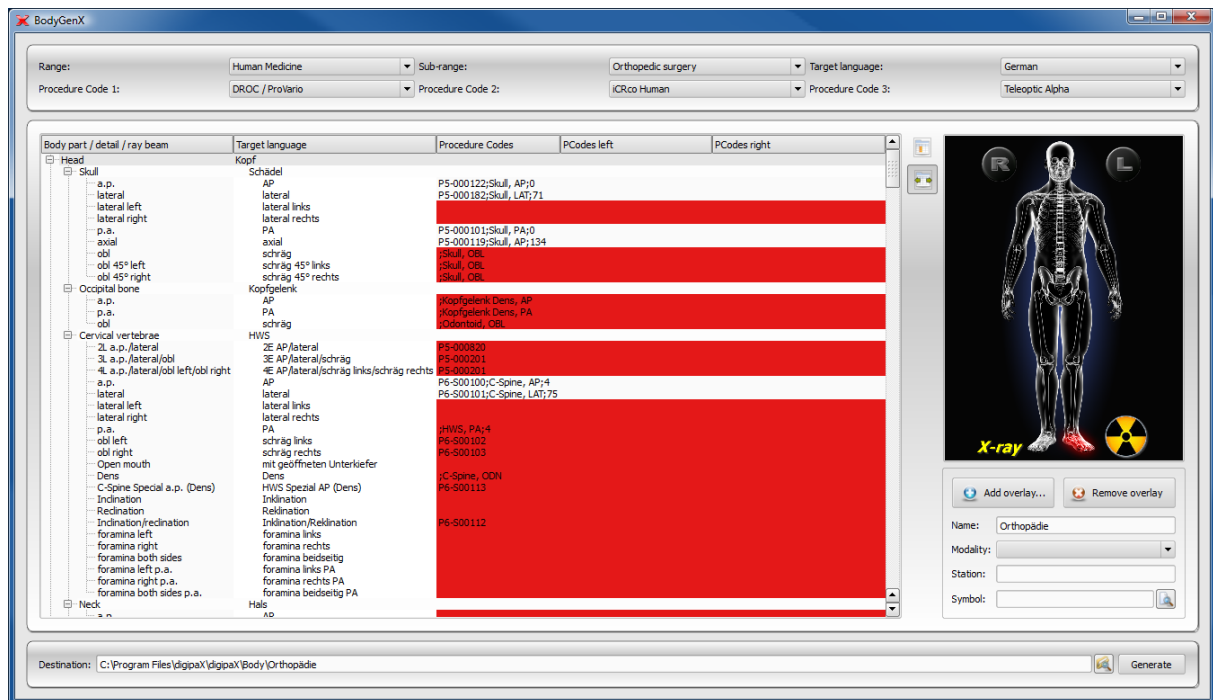
14.5 Output destination and generating

The output destination is by default the Body directory in the digipaX installation directory. However, a different output destination can be entered, e.g. in order to prepare the organ table for another system. After the output destination has been selected, click on "Generate". In most cases a dialogue in the form of questions follows, asking whether items with missing Procedure Codes are also to be applied. Please note that with "No" only the elements will be applied for those a Procedure Code at all selected devices is available. All items marked in red will not be applied. In the destination path the selected folder will then be created and all configuration and image files will be saved in it. This directory can be copied into any digi-paX installation.

15 DICOM print

DICOM Print is available only when the appropriate module is active.

15.1 General configuration

DICOM printers are connected in the same way as the image archives and worklist servers. On the "Administrator :: DICOM / Network" configuration page, you can add a printer to the system. To do this, click on "New ..." in the "Printers" group. Next on the new DICOM printer settings dialogue, (see illustration at right). As usual, you need to provide a name, AE Title, IP and port. The connection should disconnect immediately, so after 0 seconds. The printer type refers to the desired device to be connected. The Printers.cfg file in the installation directory indicates which types of printers are available (see 15.2 Supported DICOM printers). With the additional parameters you can customize the printout (see 15.3 Additional print parameters). Also here you can specify the colour, which can later be helpful in the case of a choice of many printers. Also, the DICOM systems can be activated and deactivated.

15.2 Supported DICOM printers

In the installation directory there is a configuration file called printers.cfg. In this directory, the entire series of DICOM printers are pre-configured. Because different models are appropriate for different settings and different types of film, you must enter them in the configuration file. The printers.cfg file can be freely edited and add without any additional printers. As a template, existing configured printers can be used. All keys are explained in the upper part of the file. With the help of these explanations and printer manufacturers information (technical data, DICOM Conformance Statement) other devices can also be connected.

15.3 Additional print parameters

You can use a number of additional parameters for print. It should be noted that not all printers will have all the DICOM print capabilities.

Details on the significance of the parameters can also be adopted from the DICOM standard, part 3 (BASIC FILM SESSION PRESENTATION MODULE ATTRIBUTES, BASIC FILM BOX PRESEN-TATION MODULE ATTRIBUTES, IMAGE BOX PIXEL PRESENTATION MODULE ATTRIBUTES).

15.3.1 Trim (border) options

```
--trim
  set trim on

--no-trim
  set trim off

--default-trim
  use printer default (default)
```

15.3.2 Print presentation LUT options

```
--default-plut
  do not create presentation LUT (default)

--identity
  set IDENTITY presentation LUT shape

--plut  [l]ut identifier: string
  add LUT l to print job

--inverse-plut
  render the inverse presentation LUT into the
  bitmap of the hardcopy grayscale image

--illumination  [v]alue: integer (0..65535)
  set illumination to v (in cd/m^2)

--reflection  [v]alue: integer (0..65535)
  set reflected ambient light to v (in cd/m^2)
```

15.3.3 Basic film session options

```
--copies  [v]alue: integer (1..100, default: 1)
  set number of copies to v

--medium-type  [v]alue: string
  set medium type to v

--destination  [v]alue: string
  set film destination to v

--label  [v]alue: string
  set film session label to v

--priority  [v]alue: string
  set print priority to v

--owner  [v]alue: string
  set film session owner ID to v
```

15.3.4 Annotation options

```
   --no-annotation
     do not create annotation (default)

-a   --annotation  [t]ext: string
     create annotation with text [t]
```

```
+pd  --print-date
      prepend date/time to annotation (default)

-pd  --print-no-date
      do not prepend date/time to annotation

+pn  --print-name
      prepend printer name to annotation (default)

-pn  --print-no-name
      do not prepend printer name to annotation

+pl  --print-lighting
      prepend illumination to annotation (default)

-pl  --print-no-lighting
      do not prepend illumination to annotation
```

15.3.5 Overlay options

```
+O   --overlay  [f]ilename : string, [x] [y] : integer
      load overlay data from PBM file f and display at position (x,y)

+Og  --ovl-graylevel  [v]alue: integer (0..4095)
      use overlay gray level v (default: 4095 = white)
```

15.3.6 Other print options

```
-l   --layout  [c]olumns [r]ows: integer (default: 1 1)
      use 'STANDARD\c,r' image display format

     --filmsize  [v]alue: string
       set film size ID to v

     --magnification  [v]alue: string
       set magnification type to v

     --smoothing  [v]alue: string
       set smoothing type to v

     --configinfo  [v]alue: string
       set configuration information to v

     --resolution  [v]alue: string
       set requested resolution ID to v

     --border  [v]alue: string
       set border density to v

     --empty-image  [v]alue: string
       set empty image density to v

     --max-density  [v]alue: string
       set max density to v

     --min-density  [v]alue: string
       set min density to v

     --img-polarity  [v]alue: string
       set image box polarity to v (NORMAL or REVERSE)
```

```
--img-request-size  [v]alue: string
  set requested image size to v (width in mm)

--img-magnification  [v]alue: string
  set image box magnification type to v

--img-smoothing  [v]alue: string
  set image box smoothing type to v

--img-configinfo  [v]alue: string
  set image box configuration information to v
```

16 Veterinary version

digipaX system can be used for veterinary purposes. To do this, change the appropriate settings in the "Veterinary medicine" configuration page. Fields which are inactive here are also not available in the creating of a new patient dialogue.
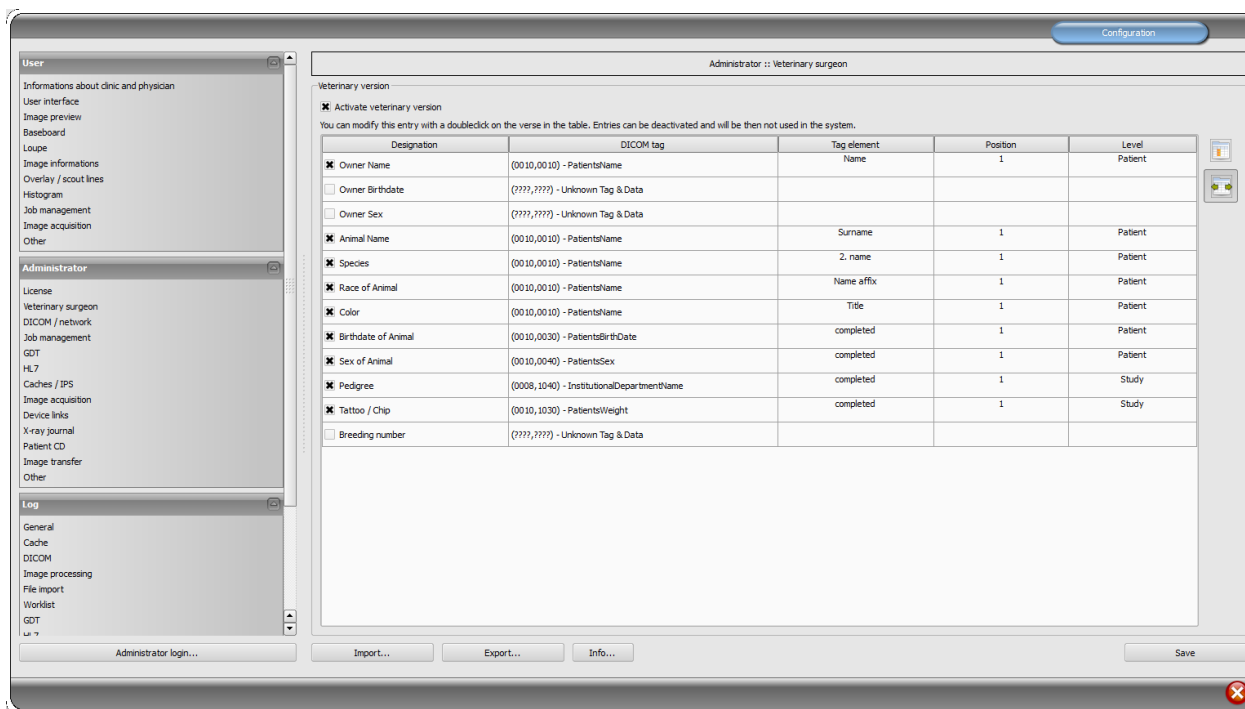
The DICOM standard does not provide tags for the different characteristics of animals (e.g. name of the animal and the animal species). Therefore, these features must be placed in other, initially unforeseen, tags for this purpose. Various companies, that provide software with DICOM tags, choose variety of tags for this purpose, and even parts of DICOM tags. If images already exist from other manufacturers or configuration must be adjusted so that digipaX can work with these systems, the tags used in digipaX must be modified according to the tags from other suppliers. In the installation program of the digipaX software, you can now choose preset configurations of tags.

If the cooperation with the systems of other suppliers is not needed, the tags can be selected freely. It should be noted that above all, you must choose the tags for the names of animals and animal species that will be available on the server when searching for C-FIND.

By double clicking on a row in the veterinary configuration table, the entry can be changed. Inactive entries are not used by the system (not all entries can be deactivated - some must be used by the system). If the selected tag is the patient's name (tag type PN), then you can choose whether all or only a part of the tag is to be used. If the selected tag has more entries (multiplicity), you can optionally specify the value's position. The level will be used to determine where on the Query-Retrieve-Level the information will be found. This means that if you select a tag level "series" (e.g. Series Description 0x0008,0x103e), then to determine the information a patient must first be searched for in all studies, and then all the image series, so that the server's response is searched for a specified tag (images are not transferred, but

only database entries). This may lead to a significant system slowdown. Therefore, it is recommended to always use patient level tags or, when necessary, the study level. We do not recommend the series or image level.

For tags that are not available on the server in searching C-FIND (on any of the levels), or for private tags you should provide the patient's level as the level, so as not to send unnecessary queries to the server.

Also, when reading DICOMDIR (patient's CD) there, the system tries to find information about the relevant tags. However, in DICOMDIR there is much less information than in the databases, so most of the information is relatively unused compared to being shown directly.

Viewing the information about the images on the overlay should be modified using selected settings ("About images" configuration page). Alternatively, change to the appropriate modality (modalities) settings which have already been entered, and enter new rows to display the requested information about the animals. Use the same tag settings as in the veterinary medicine configurations.

16.1 Adaptation to XScan

The XScan software in the veterinary version uses the following tags for the animals' characteristics:

Description	Tag	Tag element	Position	Level
Owner's name	0010,0010 (PatientsName)	First name	1	Patient
Name of animal	0010,0010 (PatientsName)	Surname	1	Patient
Animal species	0008,0050 (AccessionNumber)	entirely	1	Study
Animal's date of birth	0010,0030 (PatientsBirthDate)	entirely	1	Patient
Animal's sex	0010,0040 (PatientsSex)	entirely	1	Patient

Observe the comments on the Accession Number tag in section 16.4.

16.2 Adaptation to Promis / Hipax

Promis and Hipax software systems use the following settings:

Description	Tag	Tag element	Position	Level
Owner's name	0010,0010 (PatientsName)	entirely	1	Patient
Owner's date of birth	0010,0030 (PatientsBirthDate)	entirely	1	Patient
Owner's sex	0010,0040 (PatientsSex)	entirely	1	Patient
Name of animal	0008,1030 (StudyDescription)	entirely	1	Study
Animal species	0008,0090 (ReferringPhysiciansName)	entirely	1	Study
Breed	0021,0040 (private)	entirely	1	Patient
Colour	0021,0070 (private)	entirely	1	Patient
Animal's date of birth	0008,0020 (StudyDate)	entirely	1	Study
Animal's sex	0008,1010 (StationName)	entirely	1	Study
Pedigree	0020,0010 (StudyID)	entirely	1	Study
Tattoo / Chip	0008,0050 (AccessionNumber)	entirely	1	Study

Observe the comments on the Accession Number tag in section 16.4.

16.3 Self-defined settings

If compatibility with other systems is necessary, you can make your own settings yourself. We recommend the following definitions:

Description	Tag	Tag element	Position	Level
Owner's name	0010,0010 (PatientsName)	First name	1	Patient
Name of animal	0010,0010 (PatientsName)	Surname	1	Patient
Animal species	0010,0010 (PatientsName)	2. name	1	Patient
Breed	0010,0010 (PatientsName)	Name affix	1	Patient
Animal's sex	0010,0040 (PatientsSex)	entirely	1	Patient

Features such as owner's date of birth, owner's sex, colour, animal's date of birth, pedigree, tattoo / chip and breeding number should be used only if they are actually needed. First of all, in the 0010.0010 (name of patient) tag, "Title" tag element should be used, and then the appropriate tags from the study level, on which you can skip the actual content in practice.

The following tables provide a guide regarding the tags on different levels, which are generally suitable for use and are available on the DICOM server in the standard version of the Conquest system (conquest can accept additional tags to the database with appropriate configurations). When using another PACS, Conformance Statement should be searched for available and appropriate tags.

Level Patient:

Tag	Description	Type	Multiplicity
0010,0020	PatientID	Long String	1
0010,0010	PatientsName	Person Name	1
0010,0030	PatientsBirthDate	Date	1
0010,0040	PatientsSex	Code String	1

Level study:

Tag	Description	Type	Multiplicity
0008,0020	StudyDate	Date	1
0008,0030	StudyTime	Time	1
0020,0010	StudyID	Short String	1
0008,1030	StudyDescription	Long String	1
0008,0050	AccessionNumber	Short String	1
0008,0090	ReferringPhysicianName	Person Name	1

0010,1010	PatientsAge	Age String	1
0010,1030	PatientsWeight	Decimal String	1
0008,0061	ModalitiesInStudy	Code String	1 – n
0008,1010	StationName	Short String	1
0008,1040	InstitutionalDepartmentName	Long String	1

Level Series:

Tag	Description	Type	Multiplicity
0020,0011	SeriesNumber	Integer String	1
0008,0021	SeriesDate	Date	1
0008,0031	SeriesTime	Time	1
0008,103E	SeriesDescription	Long String	1
0008,0060	Modality	Code String	1
0018,5100	PatientPosition	Code String	1
0018,0010	ContrastBolusAgent	Long String	1
0008,0070	Manufacturer	Long String	1
0008,1090	ManufacturersModelName	Long String	1
0018,0015	BodyPartExamined	Code String	1
0018,1030	ProtocolName	Long String	1

Level Image:
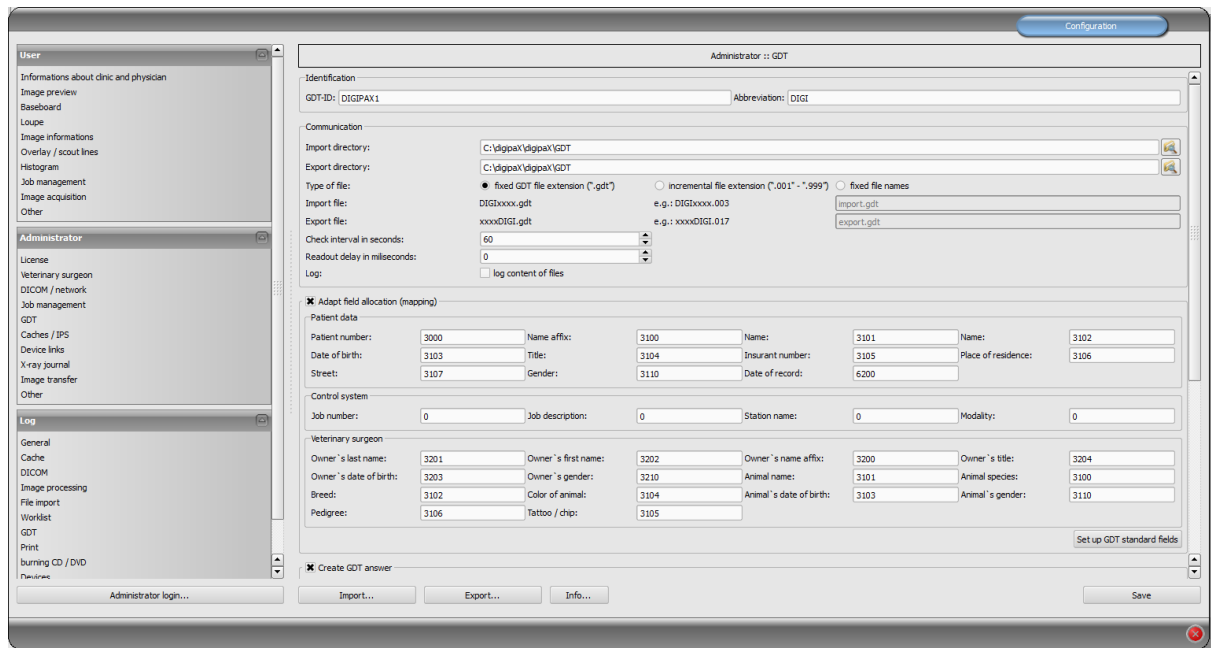
Tag	Description	Type	Multiplicity
0020,0013	InstanceNumber	Integer String	1
0008,0023	ImageDate	Date	1
0008,0033	ImageTime	Time	1
0018,0086	EchoNumbers	Integer String	1 – n
0008,0022	AquisitionDate	Date	1
0008,0032	AquisitionTime	Time	1
0018,1250	ReceiveCoilName	Short String	1
0020,0012	AquisitionNumber	Integer String	1
0054,0400	ImageID	Short String	1

16.4 Adjusting tags in association with worklist

When adjusting tags for veterinary application, special care must be taken that no collision with tags used in the job management or Procedure Codes occurs (see chapter 8.6). If one of the tags that are used there must be compulsorily used for one of the characteristics of the animal, then the other tag in the job management must be configured in another way accordingly.

16.5 GDT Field assignment / mapping

When connecting using GDT to the veterinary clinic's management systems, the GDT connection fields should be adjusted. For example, on the 3110 field, patient's sex is transferred. In the veterinary version, this field often is the sex of the animal that is transferred. If and which fields do you need to adjust depend on the clinic's management system. These fields can be modified under GDT configuration / Field assignment (mapping) / Veterinary medicine. See section 9.1.14.3 „Field assignment (mapping)".

These settings are effective only with an active veterinary version and partially annulled settings for patient data. The place of residence is taken in accordance with settings from the patient data, if it exists.

16.6 Viewer

Settings for the veterinary version are stored in the vet.ini file. Along with burning the patient's CD (DVD), they are transferred to the viewer. Thus, the viewer uses the same settings. Change of the settings in the digipaX viewer is not possible.

16.7 Connecting Vetinf
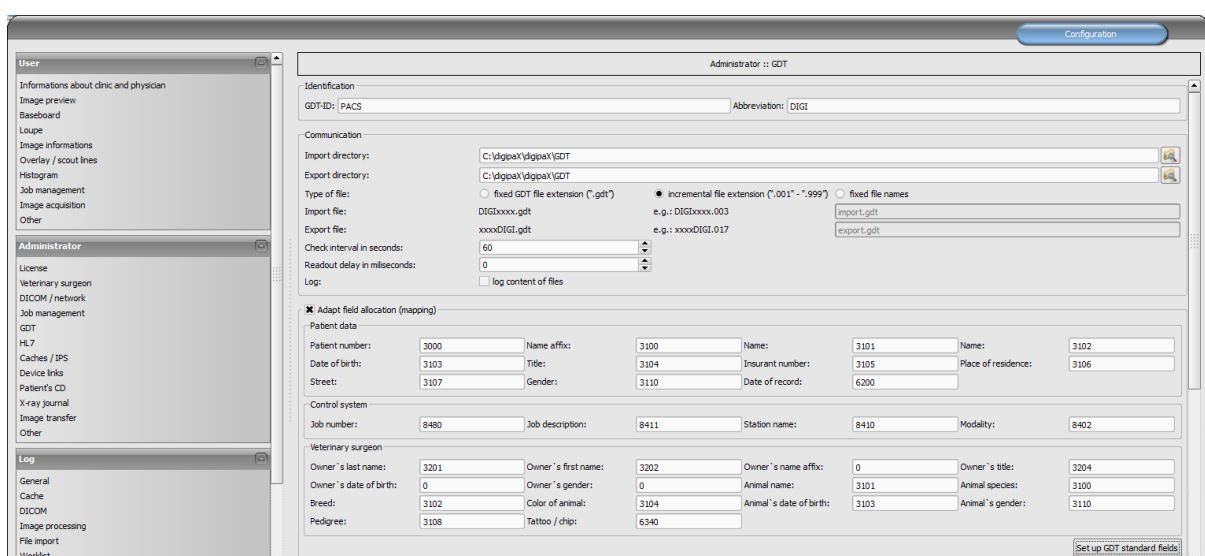
Vetinf can operate with transferred files both with fixed GDT, as well as incremental file extensions. You can also freely choose the import and export path, and the GDT fields have the flexibility to be adjusted, with a few exceptions. Vetinf supports "Send a request to the PACS," and "Request data from PACS." Additional request of patient's CD, or image import is not possible. A specific important feature is the Ventif **job number**, which is transmitted via the **GDT 8480** field. The job number can also be transferred to the image. Then it is possible to load the exact image using GDT. Field 8402 (specific for the characteristic map device) is used to transfer modalities, and the field 8410 (TEST-IDENT) is to transfer the AE Title. Therefore, when creating a job, loading digipaX with the "WL" option via GDT 8402 or 8410

fields cannot be applied. digipaX must be loaded by "digipax.exe /w". The following settings have been tested on Vetinf 17.06 version. Incremental file extensions were used. For tags settings, the standard settings were used (see chapter 16 Veterinary version). The „Tag for the access number for the job work list" is a tag which stores the Ventif job number in the image (default = 0008,0050).
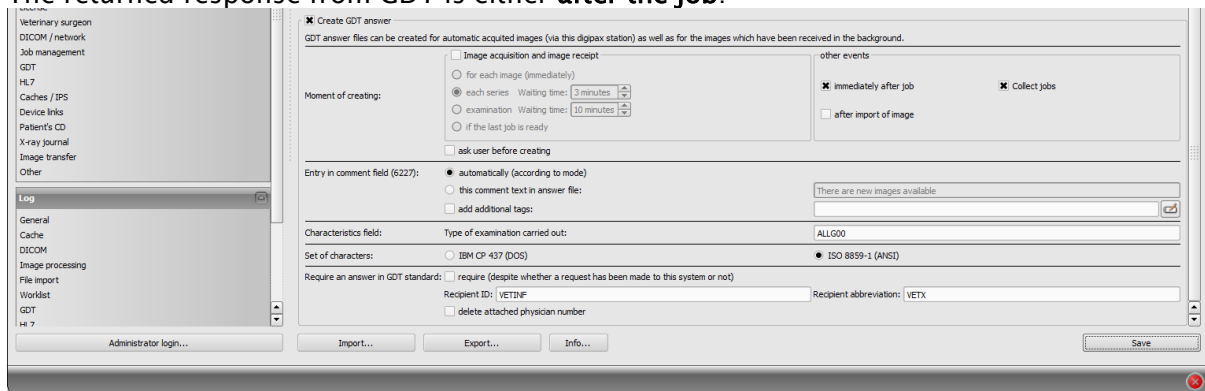
16.7.1 digipaX settings

16.7.1.1   GDT settings and field assignment (mapping)

Another specific feature is that Ventif always sends the GDT file to the recipient ID "PACS". This recipient ID must be entered into digipaX, so that digipaX can accept the GDT.

The returned response from GDT is either **after the job**:

or after downloading the image:
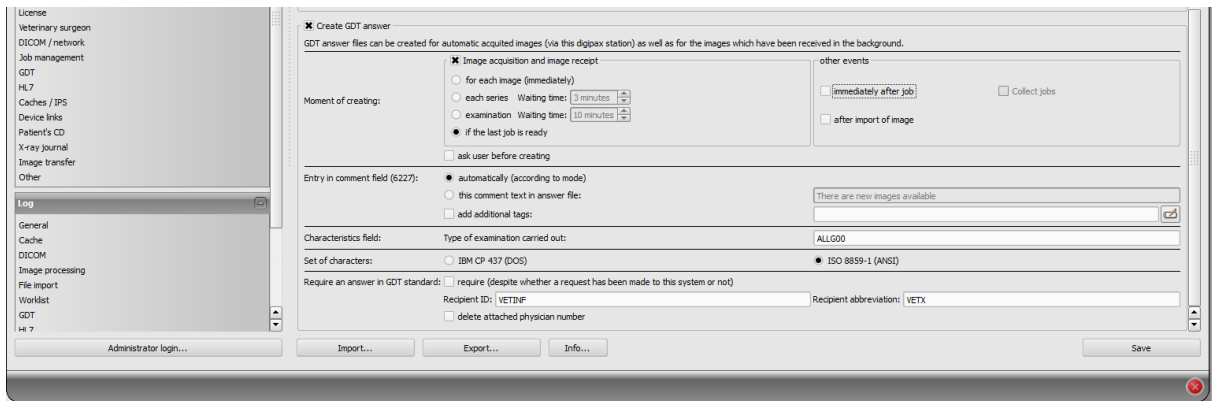
If the job sending station and receiving station are the same, digipaX must be loaded using the "/w" option. If images are not received at the job sending station, you can set in the configuration so that it is not the ordering station that responds, but the receiving station. In this case, on the receiving station the option "Request GDT response" must be activated and the recipient's abbreviation provided.
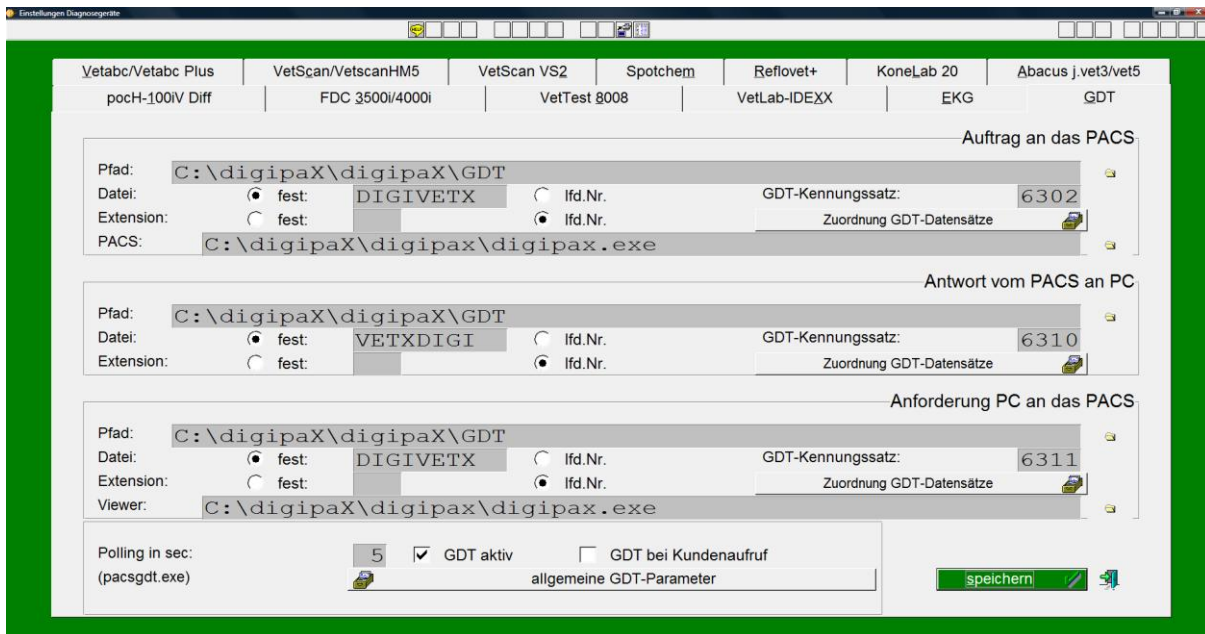
16.7.1.2 Job management
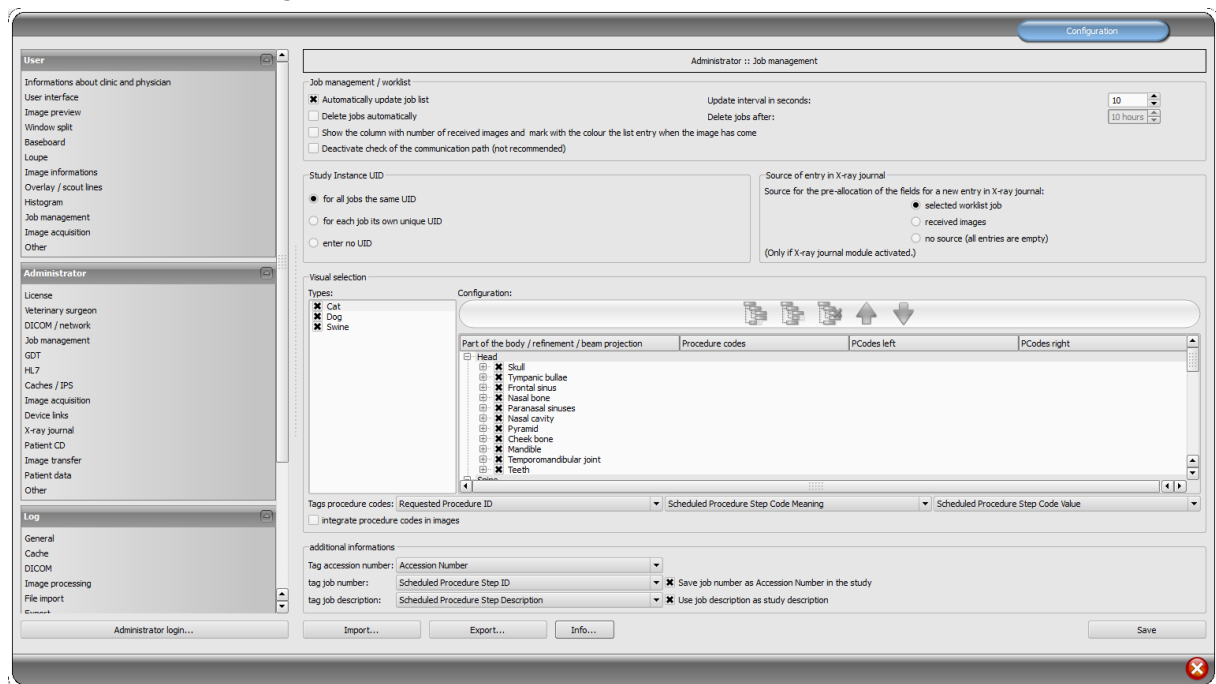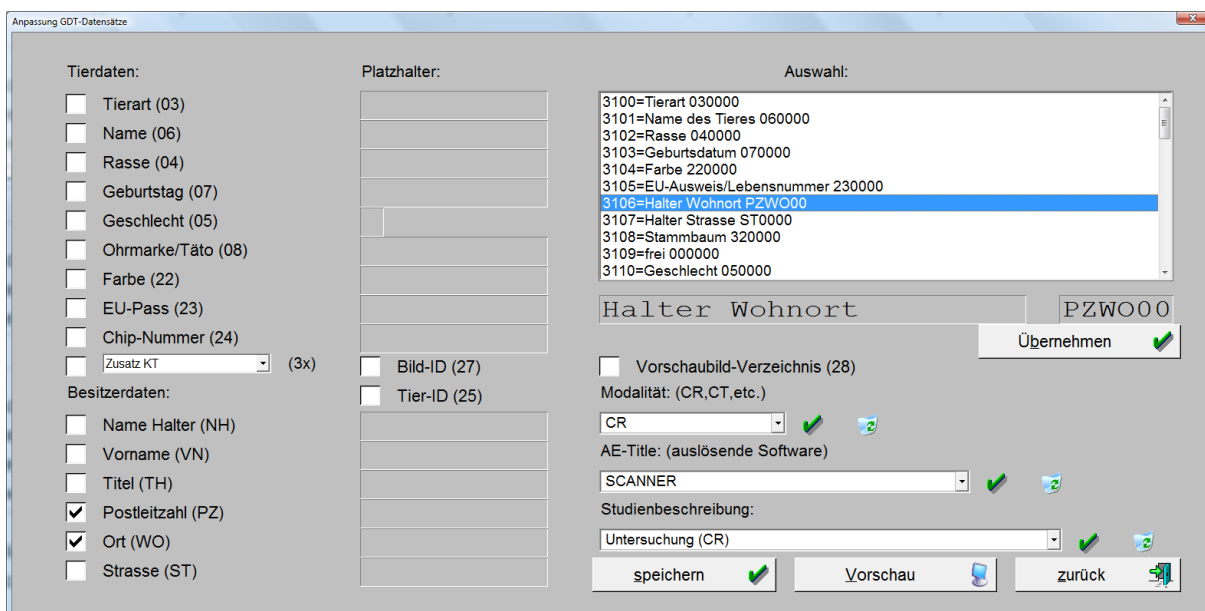
Here "Additional information" must be activated. There are the tags set, for which the work-list jobs will have the Vetinf job number sent and a description of the Ventif job. These settings must be identical at all stations, which use the worklist or GDT. In this way you can use preset tags, if they are still available, and not already used by the transmission of Procedure Codes.

16.7.2 Vetinf settings

The GDT settings are under Extras/Diagnostic Equipment/GDT. There you set the import and export paths and program parameters.

In the "General GDT parameters" section in case of Vetinf content fields in GDT content (record types) are set. Moreover, you can set initial settings for modalities, AE Titles and study description.

With "Record types assignment" requested GDT fields are selected.

Creating job:

Returned response:

Request for data:

Complete GDT settings are in the file XX in the YY Vetinf directory in the [GDT Interface] section. This section with the applied settings in this example can be downloaded in the downloads area on the www.digipax.eu site.

16.8 Connecting Vetera

Connection has been made successfully with the following settings.
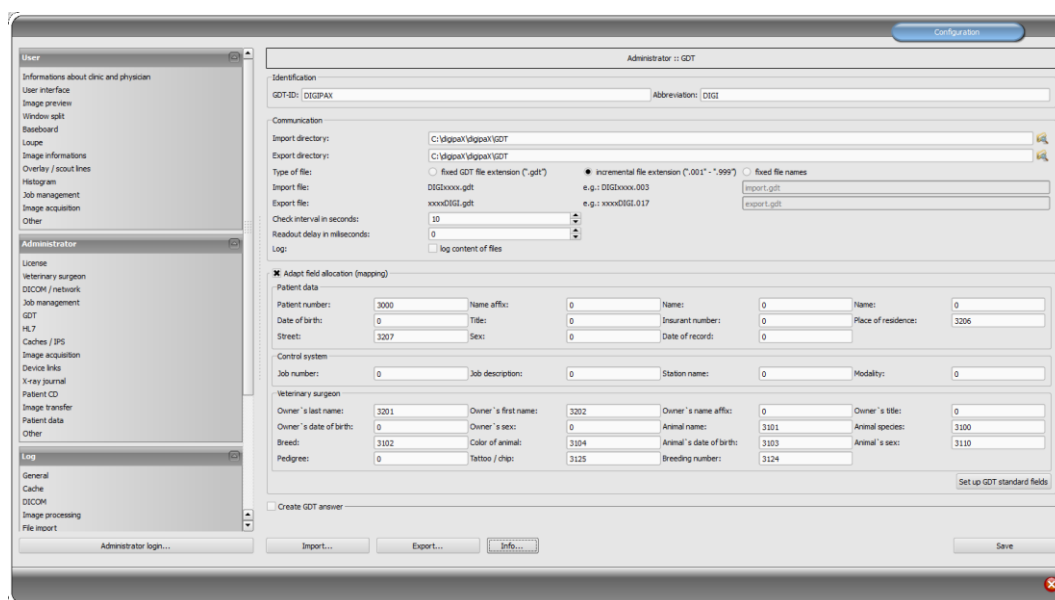
For Vetera, two ready-made configuration files are available accordingly to mapping settings shown in the image and Worklist calling in download area under www.digipax.eu. Settings of paths for GDT and program calling must be adjusted in Vetera accordingly.

17 Configuration card for patient data

17.1 Patient-ID

Building next patient-ID always as a new one

With this option the patient-ID is always automatically built as a new one, regardless of whether the data is delivered per GDT, HL7 or the patient data is recorded manually. The ID is always built as the last name-first name-date of birth.

Adding identifier to the patient-ID

For forwarding the patient-ID via GDT, HL7 or manual quotation of the patient-ID you can specify whether an identifier is to be added to the patient-ID. This may be required e.g. in joint practices with data separation where, for example, one router forwards images with "Patient-ID-001" to the archive A and images with "Patient-ID-002" to the archive B.

Adding GDT abbreviation to the patient-ID

A GDT abbreviation of the surgery management program will be attached to the patient-ID. This is necessary for data separation when various surgery management programs are used in one joint practice on the same computers and the jobs are to be forwarded to digipaX. A corresponding GDT abbreviation is then attached to the patient-ID, e.g. to the ID 12345 an abbreviation MEDI will be attached by the GDT file DIGIMED.gdt of Medistar and to the ID 56789 an abbreviation QUIN by the GDT file DIGIQUIN.gdt of Quincy. The IDs would then read 12345-MEDI and 567890-QUIN. If it is configurable in the surgery management system, digits can be used instead of letters. The GDT file of Medistar could then read DIDI0001.gdt instead of DIGIMEDI.gdt and the GDT file of Quincy DIGI0002.gdt instead of DIGIQUIN.gdt. However, this is only necessary if no letters are wanted in the patient-ID as the IDs are saved with a corresponding attachment in the DICOM header of the images.

Identification of the patient

This setting specifies whether e.g. the first and last name, date of birth and patient-ID or only the patient-ID is to be used for an unambiguous identification when calling the patient via GDT.

Building next ID automatically

With this option the patient-ID is assigned automatically when creating patient data manually. The archive is retrieved at that and the next higher number than the highest ID is selected. If this option is non active, an unambiguous ID must be assigned manually.

17.2 Additional fields

Additional fields can be activated for additional information on patients. These fields are then available at the manual recording of the patient data and can be shown as additional columns in the patient management. The columns can be shown and hidden with the right click on the head of the table. When acquiring the image this information is saved in the

DICOM header. In order to be able to use these fields the data base scheme of the archive needs to be extended (see chapter 5.2.1.2).

18 Other configurations

18.1 Delete function

This functionality is described in chapter 26.1 "Launching and configuration of the delete function for the users".

18.2 Easy Report

Easy Reports can be automatically stored as text files in other systems. Therefor you have to define a directory.

With this option, the user can easily open an image or a series, enter text into input field for Easy Report and as soon as image/series is closed again, the Report is automatically stored in a text file in the configured directory without the need for saving it separately as a DICOM file in the archive.

The Report is automatically shown again at the next image/series request and can be also modified at this point. Allocation between the image and text file occurs at that through SOPInstanceUID of the image or through SeriesInstanceUID in case of CT and MRT series. The text file receives this ID (e.g. 1.2.840.10008.5.1.4.1.1.1.txt) as filename.

If the text file is deleted from the directory, the Report will be no more shown too.

If an image is opened on several monitors at the same time and Easy Report is available on these monitors, the text can be then entered into input fields of the initially opened image only. The field of another image is then write-protected.

18.3 System tray icon

In order to have digipaX active permanently, you can activate this option on the "Administrator / Others" configuration page, which after ending (red X) minimizes digipaX to the system tray as an icon. This is also the default setting.

When the application is minimized to the System Tray, images are still received in the background, the cache is monitored and the "awakening" by GDT is faster than restarting the program. Through the context menu of system tray, you can re-open the main window, or close the application.

If by clicking on the red X to close the application at the same time you press one of the Shift or Ctrl controls keys, then the application will actually closed completely.

The computer can be normally shut down or restarted without closing digipaX. In such a case, digipaX is properly closed during the shutdown process.

18.4 Automatic start

Also on the "Administrator / Others" configuration page, you can activate the option to automatically start. With this, digipaX starts automatically with Windows and will be found on the system tray. When the desktop icon is double-clicked or it is loaded by another system (GDT), only the window is activated, which allows a faster "start". You can choose whether the patent's data is to be initiated at this time, and whether during the automatic loading process the digipaX logo is to be shown.

With the setting of initializing delay the auto boot of digipaX can be delayed e.g. to wait for start of the Windows and network services.

18.5 Patient's CD auto-start

In the installation directory there is file "dpview.ini". This file is copied to patients' CDs, if "Integrate browser" option is set. In this file, on the line "StartQuestion = true" resp. "StartQuestion = false", you can set whether the user will be prompted when you insert the CD, or whether you want to launch the browser. If "true", then the user will be prompted, and if "false", the browser will run automatically without asking the user. This setting must be set manually in the file with an editor.

18.6 Disabling CD/DVD AutoPlay

In order that the Windows dialog box does not appear permanently when inserting data medium in the disc burning driver, the Windows AutoPlay function can be disabled in the local group policies.

18.6.1 Windows XP

Through "Start", then "Execute" with the "qpedit.msc" command the Local Group Policies are opened.

In the subdirectory "\Computer configuration\Administrative templates\System" open "Disable AutoPlay" and set on "Activated/All drives".
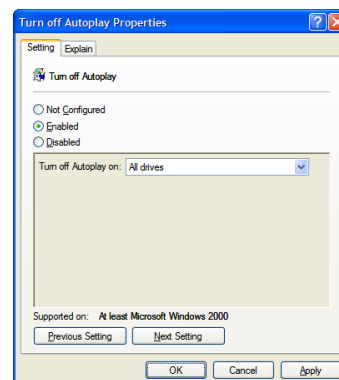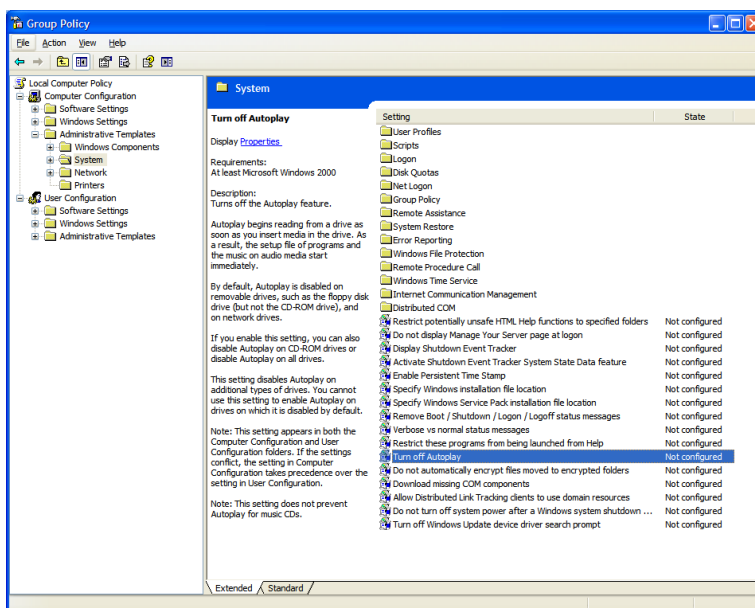
18.6.2 Windows Vista/7

Through "Start", then "Execute" or through "Start", "All programs / Accessories / Prompt" with the"qpedit.msc" command the Local Group Policies are opened. In the subdirectory "\Computer Configuration \ Administrative Templates \ Windows Components \ AutoPlay Policies" open the entry "Disable AutoPlay" and set on "Activated/All drives.
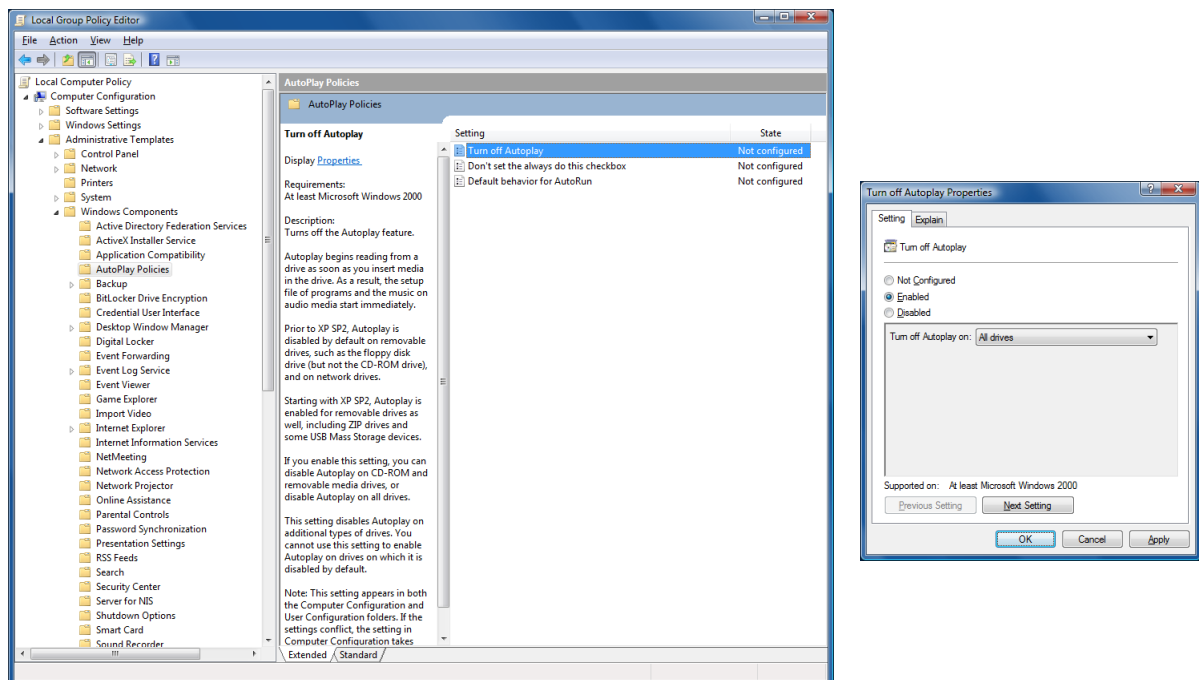
Changes will be effective only after Windows reboot and they apply to all users of that computer. For computers that are members of Windows domain, the domain policies are binding. If other settings were done there, the settings done here are ineffective. In such a case, the group policies of the domain must be adjusted on the domain controller

18.7 Selection of burning software

In the configuration, you can set under the "Administrator/Patient's CD," whether for burning patients' CDs/DVDs you want to use the built-in burning engine or Nero. To use Nero, Nero must be installed. The installation is described under point 4.11 Nero.

18.8 Burning robot

digipaX can support a connection to a burning robot. With the help of the robot, patients' CDs can be burned and printed automatically. Settings for the burning robot can be found in the configuration under "Administrator/Patient's CD." digipaX uses only devices shown in the drop-down list on "Burning robot type". A detailed description of the connecting and configuring is provided in the additional document designed for this purpose. The burning software choice described in chapter 18.7 has no impact on the use of the burning robot.

18.9 Specials

Activating checkbox "Specials" activates an additional feature in the dialog box for patient CDs.

Thereby, the data of patient CD are copied into a target directory and can optionally undergo further processing by an external program. This can be necessary if e.g. special drives or special data storage media are used.

- Caption:
  Under this indication a function appears in the dialog box for creation of patient CDs
- Target directory:
  A directory which the data of the patient CD is copied into
- Clean up target directory priorly:
  All data in the target directory are priorly deleted (no overwriting of existing data is possible, this means that no new data can by copied if data of the previous patient CD is still contained in the target directory)
- Program to be called up:
  This program is called up after data is copied (e.g. a special batch file that processes data subsequently)
- Attach disc name as a parameter:
  The disc name from the dialog box for patient CD is transferred as a parameter upon program start-up.

18.10 Area of application settings

In the 1.2.4 version, all the settings for each user are stored separately. From version 1.2.5, you can choose in the administrator (Others) settings, if the settings are to apply to all users or only for the current/logged in user. By default, with a new installation the option to all users is applied. When updating an older version, the option for the current user is still used – but it can be changed manually.

18.11 Label print

Templates, background images and graphics for printing labels can be found in the digipaX installation directory "Label print". Each template can be transferred to other stations simply by copying the "Label print" folders.

19 Program parameters list

The following table provides a list of possible parameters that can be passed to digipaX, and their meaning. Parameters can be passed in the following forms: /p \p or -p.

Parameter	Meaning	Description
/w	Worklist	Create a new job, even when the image receiving module (GDT) is active. Usually it is assumed that a new study is required as opposed to being received directly at the station. Do not use together with /i.
/i	Import	Loading the importing component, also when the image reception module (GDT) is active. Usually it is assumed that a new study is required as opposed to being received directly at the station. Do not use together with a /w.
/pm	Patient Management	Loading patient management when a new study is requested by the GDT. In this way, for example, patient's CD can be imported, and even follow up with a revertive entry in the record card. Do not use together with /w or /i.
/pcd	Patient's CD	Executing the patient's CD component after selecting a patient (GDT interface with record type 6311). In this way you can start burning the patient's CD directly in the patient management.
/a<*password*>	Admin	Automatically login as an administrator. Manual logging in with providing a password is no longer necessary. For "password" please use the set password. **Warning: Do not use it with a client!**
/ds	Device Simulation	Activation of the simulation module for receiving the image. Additional devices are then available only for simulation. Additional buttons in the toolbox for receiving an image to simulate the reception of values.
/systray	System Tray	Running the application in the system tray – thus only as a symbol on the right side of the taskbar.
/noinit	No Init	Without initiating patient data when you start it in the system tray. Only with the /systray option.
/nologo	No Logo	Without showing the start up logo when starting in the system tray. Only with the /systray option.
/mp	Multi-Patient-Module	Activation of the multi-patient module for this session. The image receiving module, alternatively is deactivated for this session. This makes it possible to burn a few patients' CDs on the receiving station.

/ami	Allow Multiple Instances	With this option launching of several digipaX instances is possible.
/pid <Patien-tID>	Patient-ID	Patient with appropriate patient-ID is loaded after program startup (example: /pid 12345)
/study <StudyUID>	Study	Study with appropriate StudyInstanceUID is loaded after program startup (example: /study 1.2.345.0.123...)

20 Device connections

Particular devices are activated by activating the group and then by selecting the device. Most devices require accompanying software that must be previously installed and set up. The pre-defined program paths and parameters correspond to the ordinary default settings or, if necessary, they must be adjusted accordingly.

Procedure Codes for different devices may be transferred to their softwares. The system supports up to 3 devices. For transfer, a separate tag in the worklist job for each Procedure Code is used. The set tag must also be additionally adapted in the job management (see also section 8.4 Procedure Codes).

Thorough staff training in details of using Procedure Codes is necessary. Depending on used devices resp. systems possible control means are to be pointed out that are available for checking transfer of the correct Codes (e.g. displaying clear text message for verification of chosen system settings). The user must check accuracy of the settings prior to each image acquisition process by this system. If settings are incorrect, please check Procedure Code and contact your system administrator if need be.

20.1 Scanner connections (CR-Reader)

20.1.1 Connecting iCRco

The following CR-Readers of this manufacturer are supported: iCR-1000, iCR-2600, iCR-3600. Installed XScan32 software and existing iscan.exe program are the prerequisites. crProc.icr and crProc.ini files are read from the set image path and imported. If necessary, further files can also be imported from this transfer folder (then, the filenames are: crProc.icr/ini, cr1Proc.icr/ini, cr2Proc.icr/ini etc.). Progressive image after image processing is recommended.

Scan program:	C:\XScan32\iscan.exe
Image path: (import):	C:\XScan32\import
Name of manufacturer:	iCRco
Name of model:	iCRxxxx

The options "Forward patient data and job description" and "Transfer Procedure Codes" are usually activated at the time. You must select a tag for Procedure Codes.

Due to XScan software it is possible that port 104 is already occupied and it cannot be used for image search. In this case, the port must be changed in the digipaX (configuration site "DICOM / Network" -> Port for image search). You can select any port from 1024, i.e. 2300. Care has to be taken that this port is also to be entered properly in Conquest ("Known DICOM Providers").

20.1.2 Orex connection

The following device is supported: PcCR 1417 ACL4 System.

Properly installed software for the device is a prerequisite.

Scan program:	C:\WINDOWS\scanner_interface.exe
Image path: (import):	C:\Orex
Name of manufacturer:	Orex
Filename of image file:	Orex.raw
Configuration file (INI):	C:\WINDOWS\Digident.ini

It may be necessary to adjust the path for image import and the name of image file in the Orex configuration.

20.1.3 Connecting Kodak PoC 360

The following device is supported: Kodak PoC 360 (in the meantime Carestream POINT-OF-CARE CR 360 System).

Properly installed „Kodak QC" software for the device is a prerequisite.

Scan program: C:\Program Files\Kodak\KodakQC\PoC 360\GenRAD\Bin\KodakQC.exe

Program parameters:	C:\Program Files\Kodak\KodakQC\Images\RTImages
Name of manufacturer:	Kodak
Name of model:	PoC 360

In order to avoid overflow of the harddisk storage capacity the RAW data in the „..\KodakQC\Images\RTImages" and „\KodakQC\Images\RTImages\Ar" directories is deleted after acquisition of each image.

Setting mode determines which mode the Reader will be driven in. For a Single Mode, a tag for transfer of Procedure Codes must be determined. Kodak software configuration can be accessed via "Kodak Setup".

20.1.4 Connecting Carestream Vita

The following device is supported: Carestream Vita.

The product Carestream Classic can be integrated as a Standalone System using DICOM interface, but not through a direct interface.

Properly installed software for the device is a prerequisite.

Scan program: C:\Program Files\Carestream\CarestreamCR\GenRAD\Bin\KodakQC.exe

Program parameters:	C:\Program Files\Carestream\CarestreamCR\Images\RTImages
Name of manufacturer:	Carestream
Name of model:	Vita LE

As in the case of Kodak, the RAW data in respective directories „..\Carestream\CarestreamCR\Images\RTImages"   and

„…\Carestream\CarestreamCR\Images\RTImages\Ar" is deleted after each image acquisition in order to prevent data overflow.

These settings are the same as in the case of Kodak system. Procedure Codes of Kodak are also used. Setting mode determines which mode the Reader will be driven in. For a Single Mode, a tag for transfer of Procedure Codes must be determined. Carestream software configuration can be accessed via "Carestream Setup".

20.1.5 Connecting DICOM scanner

This (virtual) scanner can be used when no direct connection to the device is possible as i.e. Proscan. In this case, the images are acquired regardless of digipaX and must be then transmitted manually to the import directory in order to be imported from there to the system. For this purpose, a path to the import directory must be set and, if necessary, a filter for the file ending of images.

Image path: (import):   C:\Import
Import filter (filename):   *.dcm

20.2 Detector connections

20.2.1 Connecting Teleoptic Alpha 4600

The following device is supported: Alpha 4600.
Properly installed software (SDK) to the device is a prerequisite. It must also be set in that manner that the file AlphaDR_Image.dcm is created in the specified image path.

Scan program: C:\Program Files\Teleoptic\AlphaPlusEUControl.SDK\Client\APGUI.exe
Image path: (import): C:\Program Files\Teleoptic\AlphaPlusEUControl.SDK\Server\Win32
Name of manufacturer: Teleoptic
Name of model: Teleoptic Alpha 4600

Procedure Codes can also be transferred for Alpha 4600. in order to do that the option must be activated and the tag selected.

20.2.2 Connecting Xcan detector

The following device is supported: XCAN DR-System.
Properly installed software to the device is a prerequisite.

Scan program: C:\Program Files\X-Ray Scanner System\XR_Scan.exe
Program parameters: C:\Program Files\X-Ray Scanner System\Images\dx.tif
Image path: (import):   C:\Program Files\X-Ray Scanner System\Images
Name of manufacturer: XCAN AG

Optionally, the values „Body Part Examined" and „View Position" can be read from "dx.ini" and inserted and saved as an image description. This is reasonable, for example, when you work without job management, where this data would be taken over from the jobs as a rule.

First, a directory for image import must be created. In doing so, the path can be chosen freely. If a different path is set, it must also be adjusted in the "Program parameters". The filename „dx.tif" **must not** be changed.

Acquisition parameters can also be transmitted through Xcan detector, if the detector is connected to a suitable measuring device. The values will be adopted automatically when they are transferred by the detector in the „dx.ini" file. The unit of transferred dose area product is „dGy*cm²".

20.3 Generator connections

The generator values can optionally be provided for manual creating the X-ray journal en-tries. For this purpose, an appropriate option must be activated.

20.3.1 Connecting GENESIS 50 RFT / DT

The following devices are supported: GENESIS 50 RFT / GENESIS DT.
Connection of the device with the computer via RS232 interface is a prerequisite.

Connection to the generator GENESIS 50 RFT is established by COM-Port (RS232). New con-nection must be created for setup.

20.3.1.1   Creating network connection via RS232 (Windows XP)
- Assistant for new connections
  - Setup extended connection
  - Establish connection directly with another computer
  - Guest
  - Enter name of another computer (e.g. X-RAY)
  - Select the appropriate connection (e.g. COM1)
  - Complete

- Connection properties
  - General: check COM1 (must be selected)
    - Configure
      - Baud rate: 38400

  - Options:
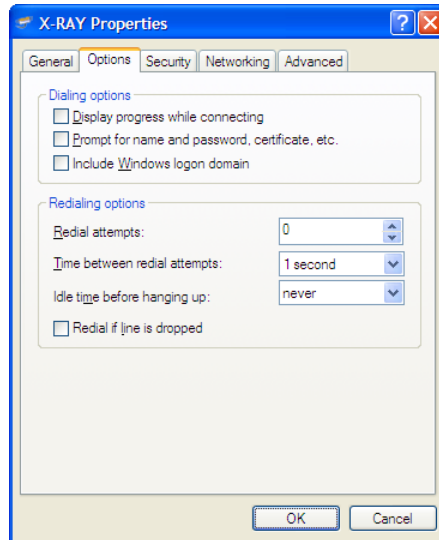
o Safety: typical (recommended setting); Allow unsafe password
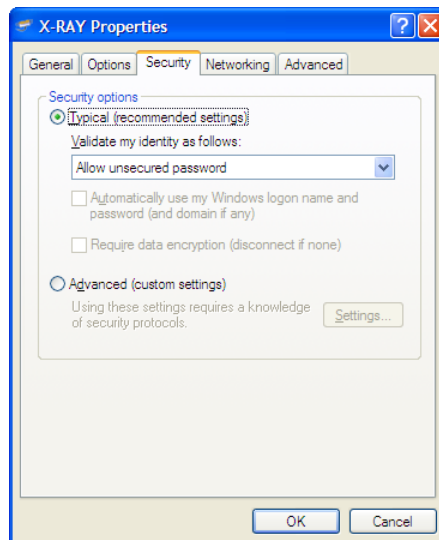
o Network
▪ PPP
• TCP/IP properties:
o Obtain IP automatically
o Extended: Deactivate „Use standard gateway for remote network"

▪ Activate Save the password
If needed, activate temporarily the option "Retrieve name, password, certificate etc." and then create the connection

- Verifying connection, if it can be created and then disconnected by connection context menu without showing the dialog boxes.

20.3.1.2   Creating network connection via RS232 (Windows Vista / Windows 7)

Installation of a "communication cable between two computers" may be necessary for Windows Vista or Windows 7.

- System control panel / hardware
  o Select hardware manually from the list…
  o Modems
  o Activate selection of the modem (no automatic identification)
  o Communication cable between two computers
  o Select the appropriate connection (e.g. COM1)
  o Complete

- System control panel / network and sharing centre
  o Setup connection or network
  o Setup dial-up connection
  o Dial-in number=0; User name=edv1; Password=edv1
  o Activate Save this password
  o Give the connection name X-RAY
  o Activate Allow other users, …

- Connection properties
  o General: check COM1 (must be selected)
    - Configure
      • Baud rate: 38400
      • Call number can be deleted
      • Deactivate Use dial-up rules

  o Options:
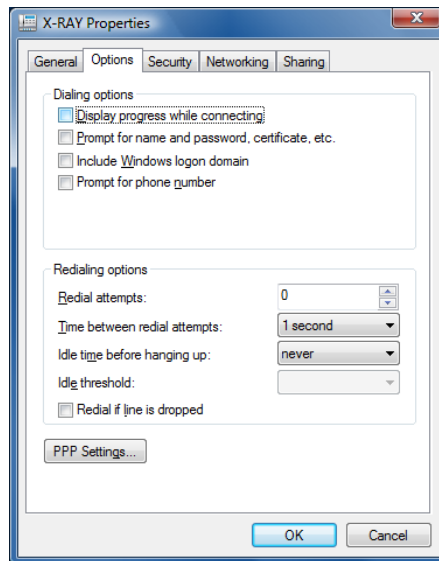
o   Safety: typical (recommended setting): Allow unsafe password
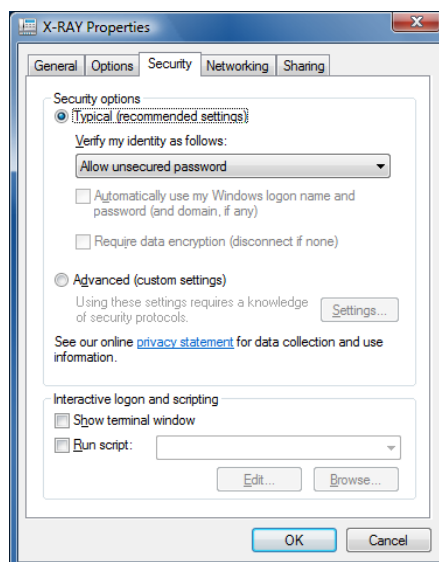
o   Network
▪   Deactivate all except of TCP/IPv4
•   TCP/IP properties:
o   Obtain IP automatically
o   Extended: deactivate „Use standard gateway for remote network"

▪   Activate Save the password
if needed, activate temporarily the option "Retrieve name, password, certificate etc."
and then create the connection

- Verifying connection, if it can be created and then disconnected by connection con-
  text menu without showing the dialog boxes.

20.3.1.3   digipaX settings

On the configuration page "Device connections" in the digipaX the generator connection is to
be activated. Select „GENESIS 50 RFT" as the generator type in the drop-down menu.
If the connection to the generator was not automatically established in a different manner, it
must be created by digipaX first. Activate the option "Connect and disconnect automatically"
and enter the selected name for connection (X-RAY).
The following settings are recommended by the manufacturer:

Hostname / IP	10.10.10.10
User name	edv1
Password	edv1
Directory	pub

Update interval indicates in how many seconds the new values are to be searched for (stan-
dard: 10 seconds).

20.3.1.4   Sending Procedure Codes

Using this connection, it is also possible to send the procedure codes for the generator. For
procedure codes, it is necessary to select the tag, which has also been set for the generator
codes in the job management. Moreover, the organ chart for job creation must contain the
codes for this device.

20.3.1.5   Adjusting X-ray journal settings

The dose area product (DAP) is transferred by the device in mGy*cm². dGy*cm² m is a default
setting in the X-ray journal. Therefore, the designation of that field in the X-ray journal
should be adapted to mGy*cm². No conversions are done (see 12 X-ray journal).

20.3.2 ProVario connection

Filename: C:\Provario\Database\dose.txt
Update interval: 10 seconds

When using Procedure Codes for ProVario, the tag for them cannot be changed. The tag „Requested Procedure ID" is always used. If Procedure Codes are additionally to be transferred from other devices (scanner), care should be taken to use a different tag for these devices.

20.4 Dosimeter connections

20.4.1 Connecting KermaX

The following device is supported: Wellhöfer/Pehamed KermaX (IDP/SDP).
Proper connection of the device to a RS232 interface (COM1 to COM10) is a necessary condition.

20.4.1.1   Default settings

Interface: COM1
Update interval: 10 seconds
Threshold value: 0,00 µGy*m²
Reset: activated

20.4.1.2   Connecting the device

The device shall be connected with the PC through one of COM-Ports 1 to 10 according to manufacturer's information (RS232). The settings for serial interface (Baud rate, parity etc.) do not need explicitly to be used. They will be set automatically implicitly by digipaX.

20.4.1.3   Device configuration

First, select the desired COM port in the configuration. The connection can be checked by pressing the "Device Info" button when the device is turned on. If errors occur while retrieving data, the port may be changed.

Update interval indicates in how many seconds the new values are to be searched for (standard: 10 seconds).

While shaking the device may show minor deviations. Therefore, you can specify the threshold value for retrieving values in the configuration. If the shakes that may lead to deviations are in principle excluded, then the preset 0.0 can be retained any value greater than 0 will then be accepted as a new measurement result. If, however, slight deviations can occur, it is recommended to rise the threshold value slightly. The two tables below show the pointers for their assignment.

X-ray	Dose area product (Priority) [cGy x cm²]	Incident dose [mGy]	Surface dose [mGy]

Skull ap/pa	110	3,7	5,0
Skull lat	100	2,3	3,0
Thorax pa	20	0,21	0,3
Thorax lat	100	1,1	1,5
Thoracic spine ap	220	5,2	7,0
Thoracic spine lat	320	9,0	12
Lumbar spine ap	320	7,4	10
Lumbar spine lat	800	22	30
Pelvis ap	500	7,0	10
Abdomen	550	7,0	10
Mammography (cc and mlo)	–	–	10

Diagnostic reference levels for X–rays of adults
(Source: Bundesamt für Strahlenschutz)

Type of study	Age	Dose area product (Priority) [cGy x cm²]
Thorax ap/pa	Premature babies (ca. 1000 g)	0,3
	Premature babies (ca. 3000 g)	0,8
	10 ± 2 months	2
	5 ± 2 years	3
	10 ± 2 years	4
Thorax lateral	5 ± 2 years	7
	10 ± 2 years	8
Abdomen ap/pa	10 ± 2 months	25
	5 ± 2 years	50
	10 ± 2 years	60
Pelvis ap	5 ± 2 years	25
	10 ± 2 years	30
Skull ap	10 ± 2 months	30
	5 ± 2 years	40
Skull lateral	10 ± 2 months	30
	5 ± 2 years	30
Miction cystourology	Premature babies (ca. 3000 g)	60
	10 ± 2 months	90
	5 ± 2 years	120
	10 ± 2 years	240

Diagnostic reference levels for paediatric X–rays
(Source: Bundesamt für Strahlenschutz)

For thoracic X-rays of premature babies the threshold value is to be set to a maximum of 0,3 μGy*m² (this is the equivalent of 0.3 cGy*m²). If, however, no thoracic X-rays of children but only those of adult patients will be done, the safer threshold value of 10 or 15 μGy*m² is possible. With this setting, receiving new values "accidentally" should not take place.

Usually, the values are reset immediately after their receipt by the device. If a longer displaying of the values on the device is needed, the option "Reset" can be deactivated. After receipt of a new value the system will then wait as long as the user prompts on his own the reset of the values by pressing the RESET button on the device. On that point, the values will still be retrieved until the 0 value for the dose is delivered. Then subsequently the values greater than 0 are again evaluated. Reset of the displayed values might be done just before the next acquisition, thus a shorter update interval is recommended, so as not to miss the 0.

20.4.1.4   Errors

What to do if a wrong value has been read anyhow?
Provided that the receipt of the value has been noticed immediately, the new job created as the result of that can be rejected on the spot. However, this usually does not happen.
All acquisitions can be performed further on irrespective of a redundant value.
In such case, values must be assigned manually to the appropriate image.
The received values can also be gathered entirely from the list of backups so that they are properly assigned and can be transferred to the appropriate images.
Should receiving of "wrong" values occur more often and the threshold value cannot be raised any higher, it is recommended to disconnect the device from the system and to enter the values manually.

20.4.1.5   Adjusting digipaX

The device displays DAP in μGy*m². Therefore it is recommended to adjust this unit also in the digipaX. The unit can be activated on the configuration page, Admin / Others (dGy*m² is the default setting because it is the value used in the DICOM standard). The value entered resp. shown on the memory card in the digipaX is automatically converted and stored in the "dGy*m²" unit in the DICOM Header.

20.4.2 Dosimeter values for entry in X-ray journal

If entries in X-ray journal are made not directly at the image acquiring station but manually, e.g. In the job management or via image reception, dosimeter values can be made available optionally through an additional table of values in the dialog box for data recording.
It is to be noted that the values are converted to „dGy*m²" upon receipt to be in conformity with DICOM standard. Hence designation of the appropriate field in the X-ray journal is to be be checked and adjusted accordingly if needed.

20.5 Connecting foot switches

When using the frame grabber module, foot switches can be used to control the functions „Start/Stop Livebild" and „Snapshot" as well as „Acquisition of image series".

Foot switches that simulate keypress on the keyboard (F5, F9) do not need to be specially configured in the digipaX. The keys to be controlled are set by the corresponding software. Moreover, there are foot switches with RS232 interface (COM port) supported that switch one of the control cables CTS, DSR, DCD or RI per pedal. The cables must be open (signal 0) and close only after pushing the pedal (signal 1). There must be a pedal connected for each function. Individual foot switches or one foot switch with a number of pedals can be used to various COM ports. For cable allocation to the devices in use please refer to the related documentation. The allocation can also be tested with the „Test control cable" in the configuration.
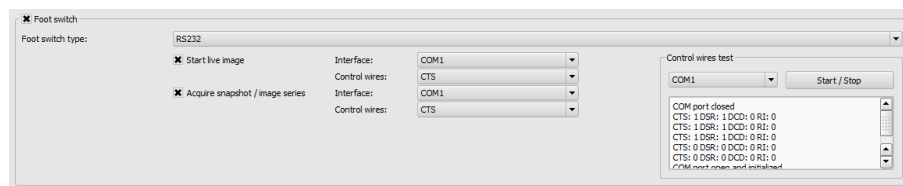
For that, select the COM port which the switch is connected to and start the test by pressing „Start/Stop". Four supported cables with related status are shown behind it. They all must be 0 when the pedals are not pushed. When a pedal is pushed and the cable connected to this pedal closes, the status changes from 0 over to 1. The pedals in the left part for live image and snapshot can be configured according to the cable allocation.

Example: schematic of one pedal
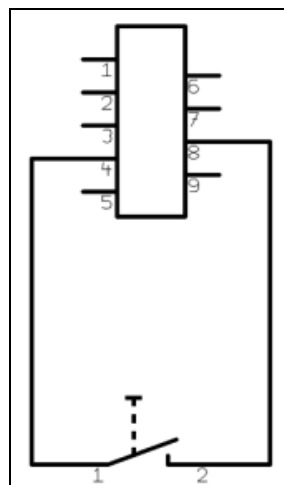
Example: schematic of two pedals
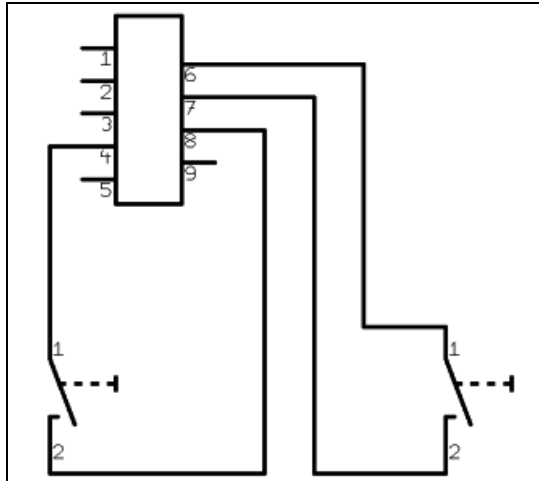
20.6 Connecting acquisition of image series

20.6.1 Importing graphics

With use of graphics import the devices can be connected, that acquire the images or image series independently and store them in a directory. Pixel graphics, RAW images or DICOM images can be processed. The directory is monitored by digipaX and imports image data after the adjustable waiting time.

Image path:	the path where the image data are stored
Delay:	waiting time until the import starts after receipt of the last image
Filter image files:	filter for filenames which are to be imported
Sorting:	sorting by filename or timestamp (change) of the file
Filter deletion:	filter for files, which are to be deleted from the directory after import
Error message:	shows error message when a file cannot be deleted, because it is still blocked by another application

Format: Format of imported data
- o DICOM: DICOM images
- o Standard pixel graphics: JPEG, BMP or TIFF
- o RAW format: only 8-bit greyscale is supported
  - ▪ Image width: width in pixel of RAW data
  - ▪ Image height: height in pixel of RAW data

20.7 Connecting video sources

By means of the frame grabber module video sources such as video converters, ultrasound devices or fluoroscopic X-ray units can be connected. There are frame grabbers/converters of the manufacturer "The Imaging Source" supported (e.g. DFG/USB2pro Video-to-ISB converter). They must have „WDM Stream Class Driver" (suitable for Windows version used) and support DirectShow. The operating systems Windows XP SP2 or higher, Windows Vista and Windows 7 all from version Professional or Business with 32 bit and 64 bit are supported. Moreover, DirectX9.0c or higher must be installed.

For video transmission and acquisitions acoustic signal tones can be played. These signal tones signalize that e.g. an image acquisition occurred. This function is used for control when the user does not have the monitor in view. For that, the PC must be equipped for sound playback (sound card, loudspeakers etc.).

For control foot switches with USB connections or serial interfaces (RS232) can be used. The foot switches with USB connections must have two pedals for which the "F5" and "F9" keys can be programmed. An example device for the USB connection is the USB Double Foot Switch II of Scythe.

Foot switches with serial connections must be devices that close the control cable by pushing them (NO switch) – see also section 20.5 Connecting foot switches.

20.8 Connecting burning robots

The settings for connecting a burning robot can be found in the configuration under Admin / Patient CD.

20.8.1 Connecting Epson Disc Producer PP-100/PP-100N

The burning robot is either connected via USB to the server or added via network interface to a network.

Burning jobs are forwarded from individual digipaX stations through shared folder on the server. The software of Epson burning robot takes over the execution of jobs and provides the tools for their control. This can be effected by means of PP-100N model from each station using the browser.

20.8.1.1   Installation

The following software systems are to be installed on the server (or at any other station, e.g. reception desk):

- Total Disc Maker (full)
- TD Bridge

Both systems are included in the delivery. Install the systems following the guides of the manufacturer.

The software „Total Disc Maker" is a generic interface for using the device. Using the software „TD Bridge" other applications, as the digipaX software in this case, can forward burning and printing jobs to the system.

20.8.1.2   Configuration

20.8.1.2.1 Total Disc Maker

Start the application „EPSON Total Disc Setup" in order to get to the configuration of the PP-100N model. Select the device and subsequently the function „Start Total Disc Net Administrator". A standard browser with a Login mask opens. This configuration is to be called-up at each workplace through the shown address (URL). While calling this site the first time, you will be asked to register as Admin. After you have successfully logged in, you can access to the settings of the device.

The device got two so-called staplers for blank disks. They can be filled with various types of media (CD, DVD or DVD-DL). The types used are determined in the configuration.

While creating a patient CD in the digipaX, the medium type is indicated and while burning, the appropriate stapler is automatically accessed.

20.8.1.2.2 TD Bridge

You reach these configurations calling-up the program „EPSON TD Bridge Environment Settings". The „Monitoring folder" selected here, and so the folder through which the jobs and data are exchanged, shall be shared in the network, so that all other users are able to write in it.

Additionally, set in the configuration the option „TD Bridge Startup Type" on "Automatic (when starting PC/service)". In this way, after computer boot all is ready for use of the device with the digipaX.
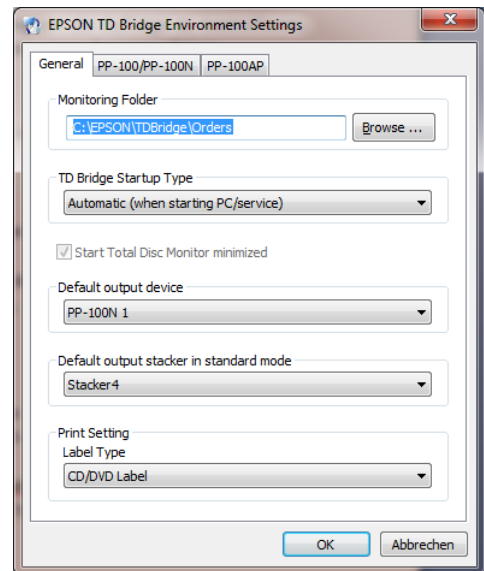
20.8.1.2.3 digipaX
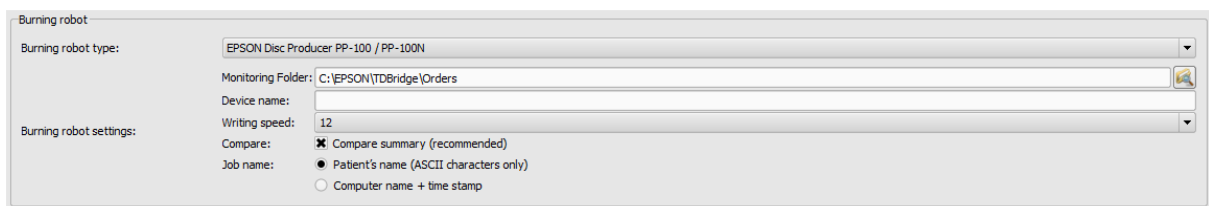
On the configuration page „Admin / Patient-CD" you define the necessary settings for proper use of the device with the digipaX.

First select the Epson Disc Producer as type of burner. Enter the same **Monitoring Folder** as in the settings for TD Bridge resp. folder shared in the network.

If you use more devices you can specify the target device for this station, indicating the **name of the device**. Leave this box blank if you have registered only one device in the network.

Specify burning speed that will be used in the setting **Writing speed**.

It is recommended to activate the option **Match** in order to discover errors in burning process. In the case of error an incorrect image will be printed on the disk and the disk will be automatically re-produced.

In the burning job management the jobs are listed with the **job names**. It is recommended to activate the option "Patient name" here so that it is easily recognized in the list of jobs, which patient-CDs will be burned. A serial number is added to each job, because the job names must be unique. However, the job names must be converted into ASCII codes, which is not always possible with character codes set in some systems. In such case the coming up

job names are no longer read easily and it is recommended to change to option "Computer name + timestamp".

20.8.1.2.4 Printer

Size of printable space is to be set in the print settings of the EPSON DiscProducer. In order to do this, call up the dialog box "Print properties" from the context menu of the printer „EPSON PP-100"/"EPSON PP-100N". Select "User-defined" as the label size. A dialog box for setup of circle diameter opens. Set "digipaX" as the name and specify inner and outer diameter in millimetres x 10. Confirm with OK and subsequently select "digipaX" as the label size.
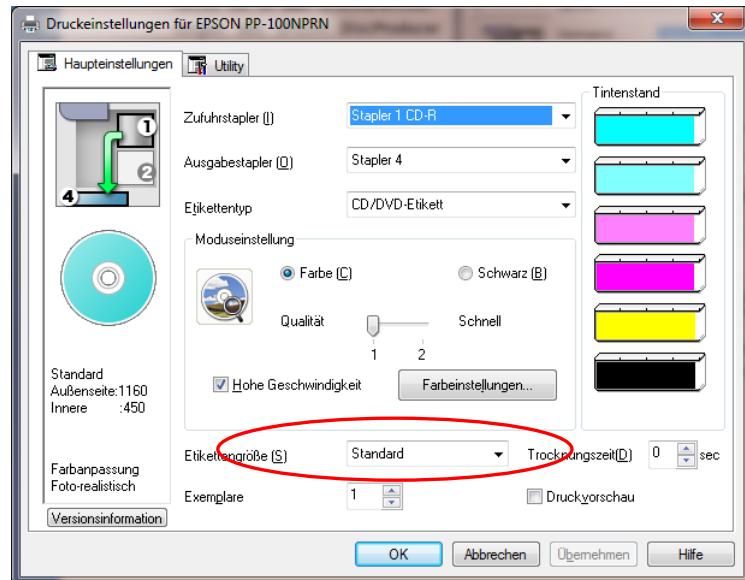
20.8.2 Connecting PRIMERA Disc Publisher

Burning robots are connected via USB to the server.

Through an enabled folder on the server burning orders are transmitted from particular digipaX stations. Software of the PRIMERA burning robot undertakes processing of the orders.

The following models are supported: Bravo XRP, Bravo XR, Bravo II, Bravo Pro, Bravo SE, Bravo Pro Xi and Bravo 4100.

20.8.2.1   Installation

The following software systems are to be installed on the server (or at any other station, e.g. reception desk):

- driver
- PTBurnService
- PTPublisher

The installation begins with the driver CD delivered by the manufacturer. Insert the CD and execute the steps up to and including "Printer setup".
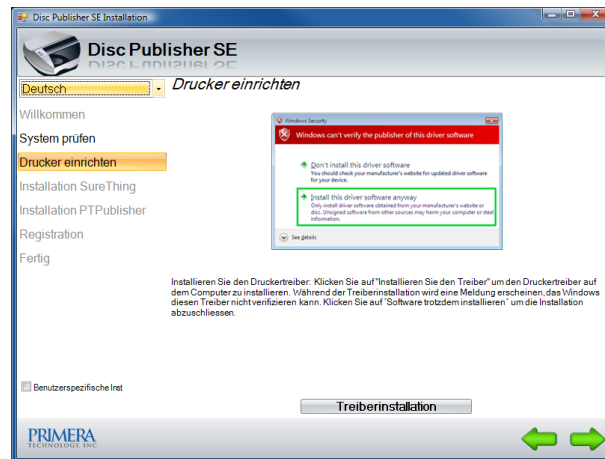
Next, PTBurnService and PTPublisher are to be installed. These are provided on the digipaX homepage in the download area. Versions of both programs must harmonize with each other. On the CD PTPublisher is delivered only, however, it might be that it has another version and does not work with the PTBurnService provided on the homepage.

Optionally, SureThing can be installed. This is a software delivered by the manufacturer for editing CD labels, however, it is not to be used for the labels on patient CDs.

After the installation is completed, reboot the computer. Leave at that PRIMERA on and connected. After reboot drive of the device will be installed automatically.

20.8.2.2   Configuration

20.8.2.2.1 Monitoring Folder

During the installation, a transfer folder for data is set up and configured in the software of the device. The default path is „C:\PTBurnJobs". This path can be changed. To do this, the line „LocalPath=C:\PTBurnJobs\" in section „SHARED FOLDER" of "PTSETUP.INI" of the PTBurnService must be adjusted accordingly. This file is in the directory „C:\Program Files\Primera Technology\PTBurnService". After a change is implemented, the service „PTBurnService" must be rebooted. In order that the other digipaX stations in the network can use Primera, the folder must be enabled with write permissions, so that those stations can store the jobs there.

Further settings for PRIMERA software are not required.

20.8.2.2.2 digipaX
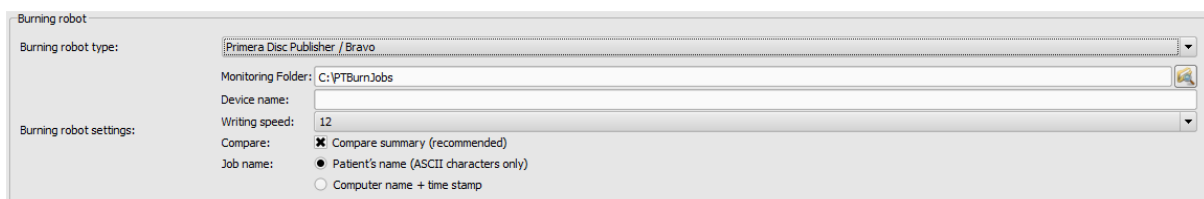
On the configuration page „Administrator / Patient CD" the settings required for proper use of the device with digipaX are defined.

First, select Primera Disc Publisher as a burner type. On the station, on that the device is connected, enter the same **Monitoring Folder** as in the settings of PTSETUP.INI. On the other stations select a network path for enabling (e.g. \\SERVER\PTBurnJobs).

If you use several devices, you can indicate a target device for this station by indicating the **Device name**. Leave this field blank if only one device is used.

With the setting **Write speed** you define burning speed to be used.

It is recommended to activate the option **Compare** in order to detect errors in burning process. If error occurs, a wrong image will be printed on the disc and a new disc will be automatically produced.

In the job management of burning orders these are listed by **Order name**. it is advisable to activate the option "Patient name" here, so that you can easily recognize in the job list (file list) which patient CDs are to be burned. In addition, always a serial number is yet attached, as job names must be unique. However, job names must be converted into ASCII characters which can be impossible for some defined character sets in the system. In this case, resulting job names are no more good readable and it is recommended to switch over to option "Computer name + timestamp.

21 Image archive with multiple disks

For larger data resources you can use multiple disks to save the image data to. The disks settings are configured in the dicom.ini file in the Conquest system. This procedure is illustrated in the following example:

```
# Configuration of disk(s) to store images
MAGDeviceThreshhold        = 0
MAGDevices                 = 2
MAGDevice0                 = E:\Images0\
MAGDevice1                 = F:\Images1\
NightlyCleanThreshhold     = 0
NightlyMoveThreshhold      = 0
NightlyMoveTarget          = 0
```

When the E disk is full, new images are automatically archived to the F disk. With digipaX the difference is unnoticeable, from which disk the images are downloaded from.

Do not use values for MAGDeviceThreshhold and NightlyCleanThreshhold because they remove the images, when the hard disk is full! These values must always be set to 0!

With the usage of the values for NightlyMoveThreshhold, images can be transmitted at night at 2:00 from the MAGDevice0 to NightlyMoveTarget, when the free memory space on the disk falls below the specified value in MB. Value for NightlyMoveTarget may be, for example, "MAG1.".

22 Archiving

22.1 General

The image archive data must be stored on a RAID system to guarantee data security. Every day, data should be protected on a separate disk, and once a week or every 14 days is to write new data to a CD or DVD.

Archiving of images is done by mirroring all incoming objects on a second and even a third data media. For this purpose, USB drives with appropriate size are suitable for this. The NTFS file system must be set on them (typically FAT32).

The method described in this manual uses the "robocopy.exe" tool for data mirroring capabilities of image archives. You can also use a different solution, such as special software used for backing up.

In addition, once a week or every 14 days, you should archive image data on CD/DVD manually.

22.2 Securing MySQL database

Just the backup copy of the MySQL database, without archived images is useless! Therefore, you must immediately secure the images.

As a rule, securing the MySQL database is not strictly necessary, because it contains only references to the actual data (images). In the case of data loss in the system, it is sufficient to restore the image archive and create a new database in the Conquest using the "(Re) initiate the database" button. However, the duration of creating a new database will depend on the system performance and the amount of data, from several seconds to several hours. To secure the database use the MySQL mysqldump.exe tool. With the help of a batch file and the Windows task scheduler, you can program periodic database backups.

Here a template for the batch file:
MySQL_Backup.bat:

```
@echo off
setlocal

set hostname=localhost
set username=root
set password=root
set port=3306
set backup_file=C:\digipaX\MySQL_Backup.spl

set database1=conquest1
set database2=conquest2
set database3=….

mysqldump --host=%hostname% --user=%username% --password=%password% --port=%port% --databases "%database1%" "databse2" … > %backup_file%

endlocal
```

Here, only the variables listed as a "set" have to be adjusted to the current system. Then you must add a new task to the task scheduler and select the batch file as the application, and set the desired schedule and extended settings for this task.
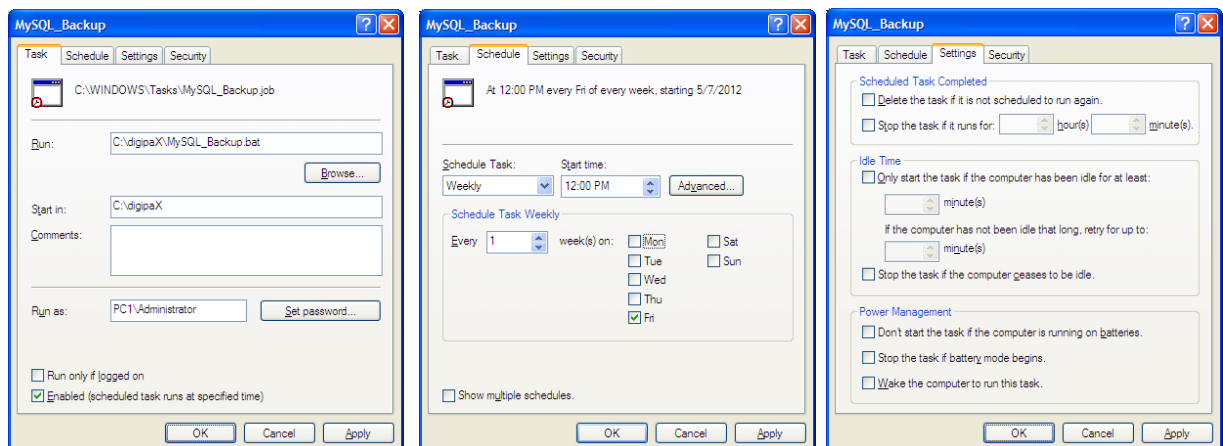
After a system crash, you first must restore Conquest, restore the backup database on the MySQL server and upload the images from the last backup created before the failure, back to the archive. Restoring the database can be done with the help of MySQL-Workbench, or through the command line, e.g.:

mysql --user=root --password=root <MySQL_Backup.spl

22.3 Mirroring archive data

To perform data mirroring of the Conquest DICOM server, you can use "robocopy.exe". Since Windows Vista, this tool is already a component of the operating system. For Windows 2000/XP this utility is also found on the digipaX installation CD in the "Tools" directory. Mirroring of the Conquest data directory "data" is performed. For this purpose, empty "Data" directory is created on the destination data medium. To make a mirror image of the data,

e.g. "C/digipaX" to "E/backup" the following command must be executed on the command line:

```
robocopy C:\digipaX\Conquest\data E:\Backup\data /mir
```

The details of the path to other systems are to be adjusted accordingly (the drive that the mirroring is to be saved on). To automate the mirroring you need to create a task in the task scheduler as described above in Section 22.2 Securing MySQL database. These tasks can also be combined, simply by adding the command line to the local batch file. The destination drive must be properly controlled in digipaX (footer bar – see 22.5 Monitoring the capacity status of the archive).

Through this configuration all incoming data are additionally secured on the selected drive and eventually also deleted when data deleting follows in Conquest. The folder structure is thereby the same as for original data.

22.4 Software „Datensicherung"

With the help of the software "Datensicherung", which is also available from digipaX, you can search and automatically burn files to CD / DVD based on specified dates. It is required that the software "Nero" is installed on the same computer.
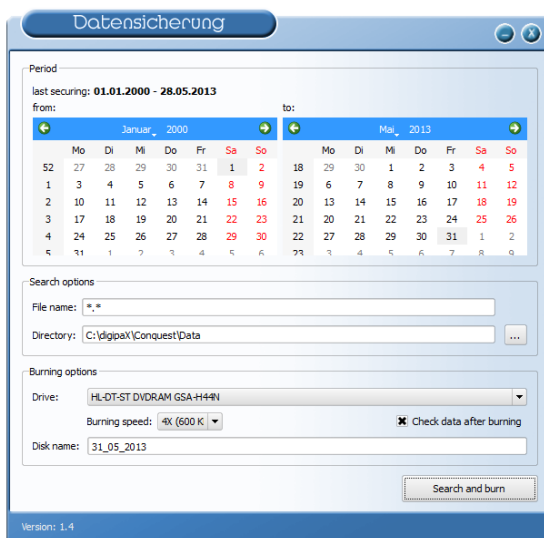
The selected date is used to find files (from, to) and the type of files, directory, the burner and the name of the CD / DVD. Settings are saved automatically and you do not have to enter them again. The end date becomes the start date next time the program starts. The ending date is always the current date.

Therefore, to this tag no further images should be added (in other cases, selected as the end date, the date for the previous day)!

For the appropriate drive, insert a blank data media and using the "Search and burn" change the display. Files are searched and automatically secured on one or more data media (without directory structure). At the end, a message appears on successful completion of burning, or in case of an error – an error message.

It is recommended to automatically start the program using the Windows task scheduler. Respective to the influx of data and the used media (CD/DVD) you can set the backups every week or every 14 days.

22.5 Monitoring the capacity status of the archive

22.5.1 digipaX

On the "Footer bar" configuration page, you can indicate any 3 disks to be checked. You can then permanently monitor, e.g. the local memory free space, the image archive memory free space, and free space on an external drive for data backups. As a prefix you should provide the usable description which is to be later displayed in the footer bar in front the free space on the disk. The critical value is the amount which is designed to show the user a warning. When the free disk space falls below the critical size determined for the drive, the message is sent to the user (once per session), so you can contact your system administrator or supplier for more memory. When the actual free memory will decrease to less than twice the size of the critical value, the display turns red, but a message does not yet appear. The user has a possibility to communicate with the system administrator for a sufficiently long time.
When the disk no longer has available space, a warning message is sent (once per session).

22.5.2 Quick-Drive-Info

On the installation CD is a small tool, "Quick-Info-Drive," which can also be used to monitor the drives. Even if digipaX system is not installed on all computers, it should still be possible to monitor the status of available disk space. For this purpose, you can install this tool on those computers. To install the tool, simply copy the file GDI.EXE to the target computer and run it. Using the context menu (right mouse click in the window – not on the frame) you can select "Options ...". The possible settings are self explanatory. The tool runs on Windows. On the "Disks" configuration page, you can double click on an entry to adjust its settings. Specify the critical value. The display, depending on the settings, becomes red for example when the critical value is exceeded. Alternatively, you must first share the drives using the "Connect network drive ..." (under the drive context menu). In this way, from any workstation, you can check both the free space in the archives memory, as well as the free space of mirrored records memory.

23 Tips for group medical practices (team practices)

In the following sections guides are provided on the configuration of the systems for medical group practices, when a single apparatus for imaging is used, but the data are stored in separate archives.

23.1 General rules of conduct

It is recommended to use a PACS server as a router that transmit incoming DICOM images to various archives. For transferring, an identification tag is sent (ID number, e.g. physician number or company number), which is added to the patient ID. At the receiving station, the DICOM router is given as the archive target.
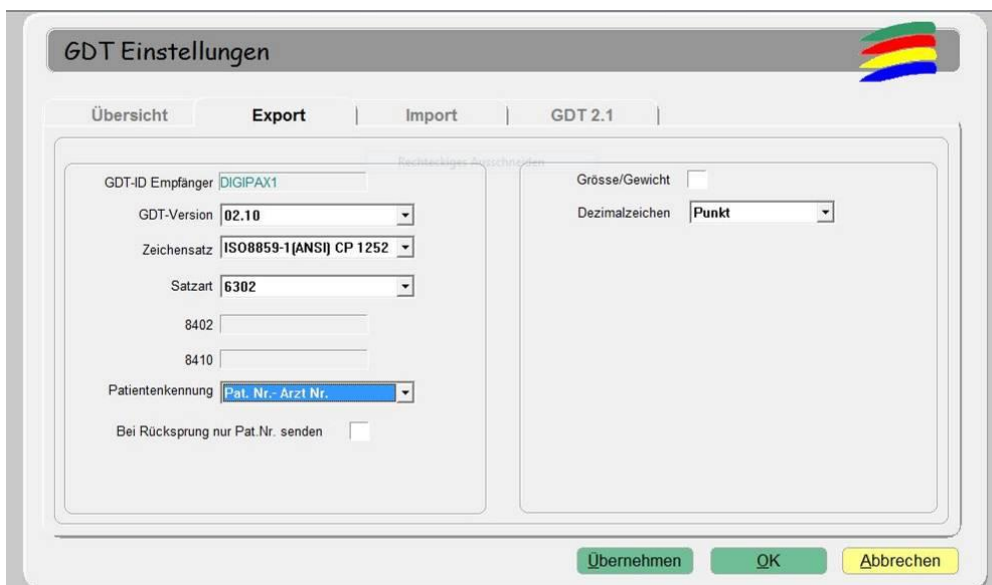
23.2 Adding physician identification tag to the patient ID

23.2.1 Without GDT

In the "Administrator / Others" configuration page, you can add any identification to each patient ID. Neither the number nor the option activation can be subsequently changed.

23.2.2 With GDT

In some clinic management systems, such as TurboMed, you can specify in the GDT device configuration, that the GDT export files will have the physician ID added to the patient's number.

Additionally, you can also here use the same options as described in section above, without connecting the GDT. Thanks to this, the number is also added in patients created directly in digipaX. The number must match the physician's number set in the clinic management system.

23.3 DICOM router configuration

At the imaging station, e.g. the X-ray apparatus, as the archive destination the Conquest server is given, which functions as a router. It should be given an appropriate AE Title, such as "DCMROUTER."

The following settings are to be made in the file dicom.ini of the router with an own archive:

```
# Configuration of forwarding and/or converter programs to export DICOM slices

ForwardAssociationLevel             = IMAGE
ForwardAssociationCloseDelay        = 5
ForwardAssociationRefreshDelay      = 3600
ForwardAssociationRelease           = 1

ExportConverters                    = 3
ExportModality0                     = *
ExportFilter0                       = ImagePat LIKE '%-1'
ExportConverter0                    = forward to CONQUEST1
ExportModality1                     = *
ExportFilter1                       = ImagePat LIKE '%-2'
ExportConverter1                    = forward to CONQUEST2
ExportModality2                     = *
ExportFilter2                       = ImagePat NOT LIKE '%-1' AND ImagePat NOT LIKE '%-2'
ExportConverter2                    = forward to CONQUEST3

ForwardCollectDelay                 = 600
MaximumExportRetries                = 0
MaximumDelayedFetchForwardRetries   = 0
```

Connections used for AE Titles must be given in the "Known DICOM providers" card in the router.

Conquest Archive, which is used as a router, cannot use the DBASE database, it can only be based on a MySQL database, otherwise the SQL-Statement "ImagePat NOT LIKE '%-1' AND ImagePat NOT LIKE '%-2'" will not work properly.

Each image sent to the archive is checked. If the patient ID ends in "-1", the image is transferred to the archive CONQUEST1. If the ID ends in "-2", it is transferred to CONQUEST2. All other images, which indicate an error, as it was not possible to use any assignment of ID, are transferred to CONQUEST3. When the images are lost, you need to load the CONQUEST3 archive, and from there manually send them to the appropriate archive. The values "-1" and "-2" should be adapted to the actual number used by the physician as well as the AE Title and target archives.

All images incoming by the router are saved in this DICOM archive too. This provides additional safety because a copy of the images comes automatically to existence though requires obviously more storage capacity. If you want to limit the storage capacity requirements needed additionally or to avoid router overflow, you will need to determine a threshold value from which the cache is emptied. For this purpose the value in the dicom.ini must be adjusted accordingly:

```
MAGDeviceThreshhold     = 1024
```

This value is a size of free storage space in MB that must not be undershot. The least used patients are always deleted if the remaining free space comes under this value.

The other possibility is limitation of time over that the files remain saved in the router and regular cleaning of the router and removing all files older than 30 days.

There are the „Tools for deleting older files from the archive (delage)" in the Downloads under http://www.digipax.de/downloads/Others/delage32.zip available for this operation. The course of action is described in a separate document that can be requested at digipaX.

23.4 Tips for worklist

If the receiving station system supports the downloading of worklist jobs from different worklist servers, you should also use separate worklist servers as opposed to the same server with different AE Titles (see Chapter 8 DICOM worklist).

If the receiving system supports only the retrieval of jobs from one server, for example Xscan, then you would have to always choose between the two lists of jobs, which is very inconvenient and uncomfortable. Here, it is recommended to use a common worklist and use different station names, if no station name is to be used as a filter on the receiving station. When creating jobs for list 1, understandable station names should be used, for example, "PHYSICIAN1" and for list 2, "PHYSICIAN2." If the system receives all jobs, they are displayed without filtering. In the case of physician 1's system, as a filter for worklist jobs, enter the station name " PHYSICIAN1", so that only his/her jobs are received. In the case of a physician 2, it should appropriately be entered, " PHYSICIAN2."

24 Transferring the image

This module is used to transmit to its own archive an image, that for example has been received from an external device. To use this, you must activate the "Image transfer" license module. With the activation of this module, it will automatically grant the license and start another modality (see chapter 13 Visually choosing organs) to set up special jobs for referrals.

24.1 Receiving the image

Activate in the configuration under sending the image automatically, receiving the image and the AE Title and port of the receiving station. These settings must also be set for the other side (remote PACS, which sends images). Next, you should establish the local or a directory which is not found on the network, where the received images will be saved. Once this is done, the image reception is active.

Important: The image receiving only works when digipaX is running and the station is ready for receiving. Stations, which for example receive images at night, cannot go into standby or sleep. There must also be carried out control over effective transmission on the transmitting station.

24.2 Image acquisition

Image acquisition may not necessarily be on the receiving station, but it can also be done by one of the other digipaX stations. To do this you must activate the appropriate station by the option "Notify the user" and set the path to which the receiving station stores the images on. The transmitting station checks the directory and notifies the user when the images are sent, using a symbol on the footer bar. The waiting time can be freely selected and it's the time the system waits for after the arrival of the last image. In this way, the user is informed of the arrival of the series after receiving the last image. Zero minutes means immediately after the first image.

24.3 Customization of the worklist

To integrate images into your own archives is necessary to adjust patient data (in particular patients ID). This is achieved best by creating the worklist jobs. With this, each time the patient is transferred, a job is created on the worklist. To do this, use a separate name for the station, even if the orders are generated for its own modalities.

Before importing, digipaX checks each received patient, whether a job exists for him/her on the worklist. It compares the first and last name, as well as the date of birth. By default the entire worklist is checked. By entering "Station (AE Title)" you can filter your list search by the specified work station names. Optionally, jobs can be automatically deleted after imported images are found. To do this, activate the check "Automatically delete worklist jobs".

25 System commissioning

25.1 Acceptance testing

After completing all the work related to installation and configuration, you should carry out an acceptance test. A separate document exists for the acceptance test.

In the acceptance test, the entire process in practice is checked, from creating a job to viewing of the completed image. The test should confirm proper operation of the workflow.

If necessary, this document can also be signed and given to the client as a confirmation of its proper operation.

25.2 Checklist

Based on the checklist, which is also available separately, you should check that you have fulfilled all the conditions necessary for proper usage of the system.

You should check and mark all the points of the checklist. Upon request, this document can also be signed and given to the client.

26 Image assignment correction

If the image has been mistakenly assigned to the incorrect patient, this can be corrected in some various ways. It is necessary to change the appropriate tags in the DICOM image. This can be done in several ways. In digipaX, it is possible to turn on and configure the delete function. This function allows the user to export images and then delete them and import them again with new patient data.

Another possibility is to manage the data directly in the DICOM header, using the Conquest and the DICOM editor, which is to be done by the administrator.

26.1 Launching and configuration of the delete function for the users

Delete function for the users works only if Conquest DICOM server from Version 1.4.1.4 is used. Other image archives are not supported.

The delete function is to be activated at the configuration, in the Administrator/Other tab. It is recommended that this function is activated only on one station, preferably the one, which acquires images. It is necessary to enter the backup folder name. This folder will be used for storage of backups of all images removed from the archive. The folder location should be the same as that of the archived data (e.g. RAID), and it should be secured regularly. Images will remain saved in the backup folder, and they can be deleted from this location only manually (if necessary). Upon each deletion procedure, images are moved to a separate sub-folder with date and time. For information purposes, a text file is always saved along with each image (info.txt). It is used to store the user data and the reason for removal of the image. The user must provide this information in order to activate data deletion.

It is also necessary to establish the deletion procedure password, which must be entered by the user for activation of the delete function.

Images should be deleted only by selected and properly trained persons, who are also familiar with the appropriate chapter of the User's Guide. The deletion password should be disclosed only to these persons.

26.2 Change of patient data in Conquest

In the Conquest the patients can be selected directly under "Browse database" or from the drop-down list. With the input into the field it can be filtered by name or ID. In the middle and bottom part various studies of the patient and the series contained therein are shown, if more of them exist. You can also change between them with the local drop-down lists or arrow keys.
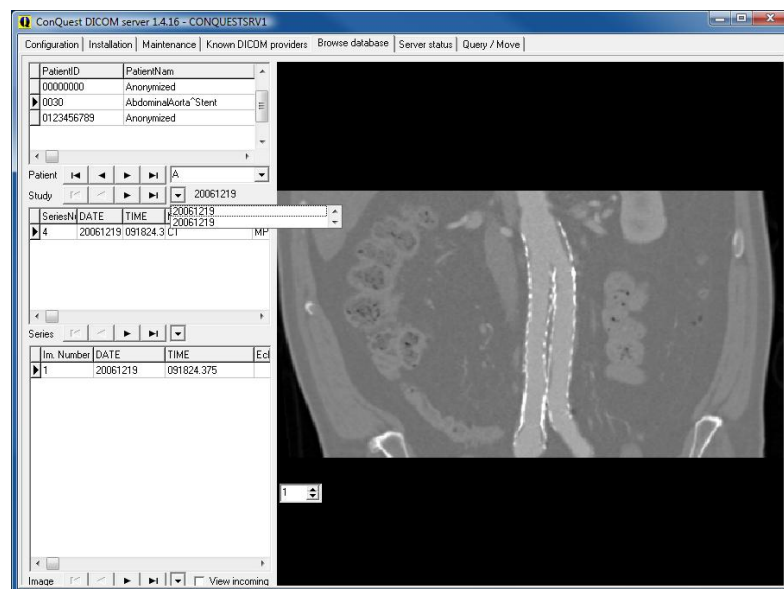
The single functions can be recalled there for each patient over the context menu with the right mouse key. Thereby the single images will show in the preview. Images from a size of 4096 KB are standardly not shown. It can be enforced with „Force display of (large) image". To present larger images automatically, the value „LargeFileSizeKB = 4096" must be increased in the "dicom.ini".
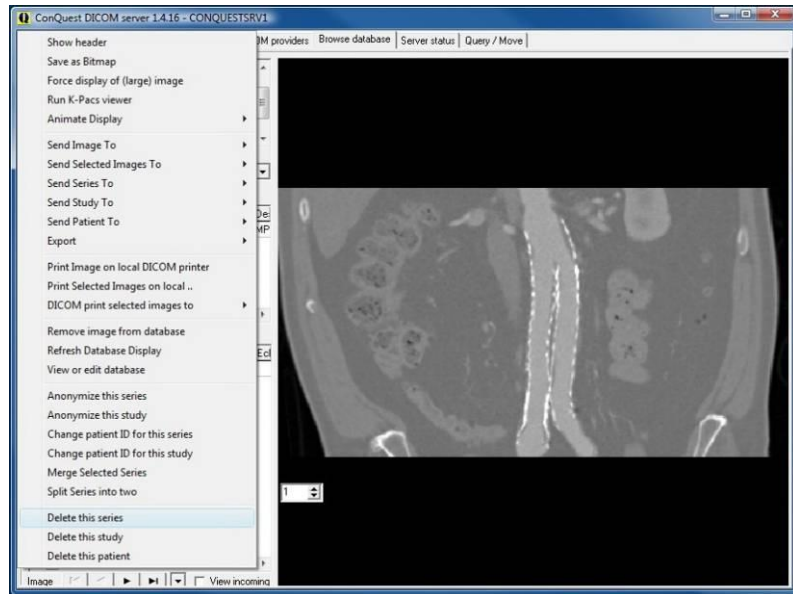
26.2.1 Change of patient ID

If there is a patient with several patient IDs in the archive, it is possible in the Conquest to change the ID. Mark the patient whose ID should be changed and select in the context menu "Change patient ID for this study", enter the desired ID and confirm with "ok". Possibly there are more studies under that ID. Then the procedure must be repeated for the other studies until all they have the same ID.

## 26.2.2 Deleting series, study or complete patient

NOTE! All deleting procedures are immediately effective and cannot be undone. The images are thereby deleted from the hard disk and from the database. Hence it is necessary to secure data prior to deleting!

A patient is simply deleted with „Delete this patient". Thereby all studies, series and images of this patient are deleted. To delete a single study, it must be first selected from the drop-down list and then removed with „Delete this study". Thereby only this study with all therein contained series and images is deleted. According to the same principle a series under a study is deleted. First select a series in the bottom part and then delete with „Delete this series".

26.2.3 Deleting single images

Deleting single images is not provided in the Conquest. Except of CT or MRT series, most often each image is in its own series, so that it can be deleted simply by deleting the series. To delete a single image within a series is a little bit more complicated. Initially the image must be found and selected, so that it can be seen in the preview. Using „Remove image from database" the image is deleted from the database but not from the archive.
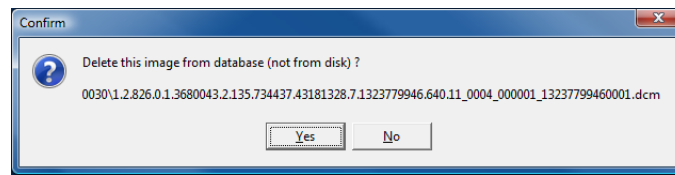
An image file shown in the message must be now deleted manually from the archive directory structure. If the image is deleted only from the database, it would be again recorded in the database by eventually rebuild of the database of the archive.

26.2.4 Assigning false assigned images to appropriate patient

Initially false assigned images must be exported. Export the images e.g. to a drive „C:\Failures". It can be done in the digipaX by export functions or directly in the Conquest too. Thereafter those images must be deleted from the archive. Finally the images must be again imported and assigned thereby to appropriate patient. Reboot the digipaX and open the appropriate patient and then go back to the patient management. Select using the component Single files the exported images that should be assigned to the patient. With the switch "Send patient images to image archive " the import dialogue is opening.
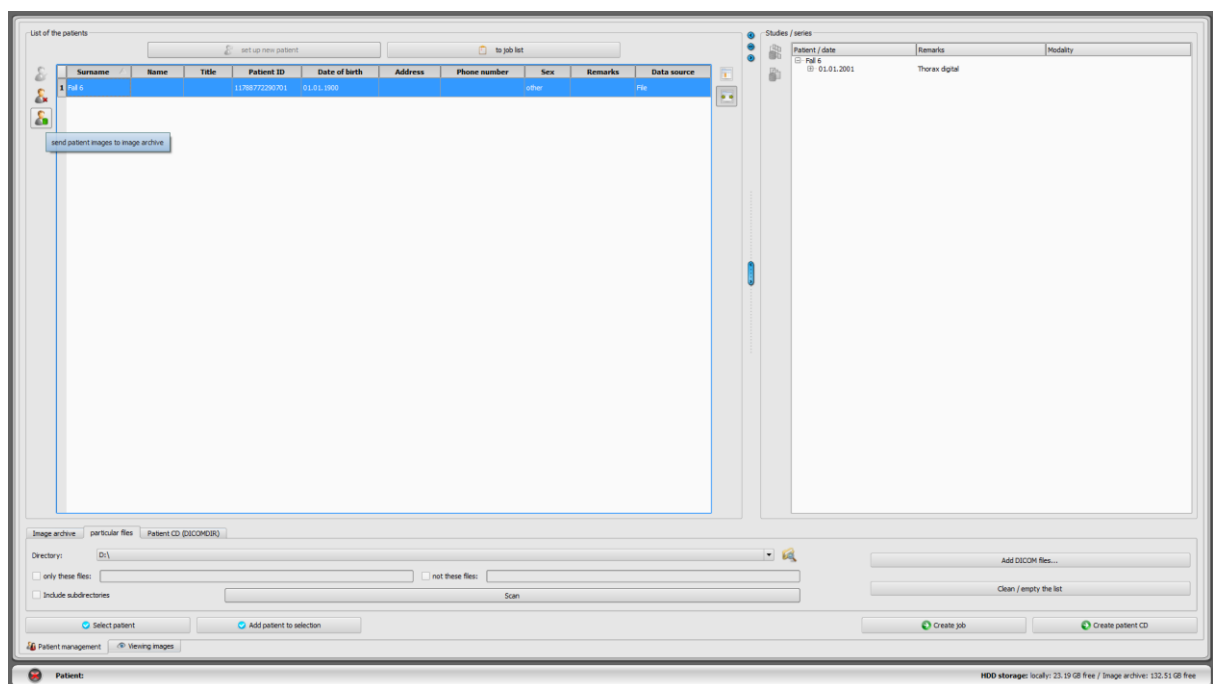
Press in the dialogue a switch „Data current patient", to apply data of the already opened patient.
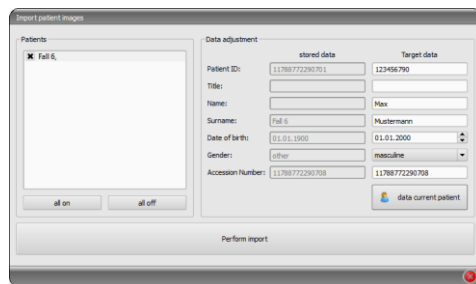
With „Perform import" they are then assigned to the desired patient and afterwards can be recalled with the appropriate patient in the archive. Subsequently the exported images can be again deleted.

26.3 Change of patient data with DICOM tag editor

DICOM Tag Editor provides another possibility for adjusting patient data.

Incorrectly assigned images should be found in Conquest, backup copy saved and deleted from the archive. Eventually, you must also remove the files from the backup to (external) drive. These files should be edited in the DICOM tags editor. Using drag & drop, add all the patient's files back to the Conquest, which now has properly assigned images.

26.3.1 Change of patient data in DICOM tag editor

On the installation CD you can find the "DCM Editor" program, which can be used for this purpose. However, you can also use any other program to edit the DICOM tags. "DCM Editor" you must install and run.

Backed up and improperly assigned files should be opened in an editor and the following tags modified:

Tag	Tag name	Meaning
0010,0010	Patients Name	Enter the name of the appropriate patient, Syntax: Last name^First name^2. First name^Title^Suffix
0010,0020	Patients ID	Enter the ID of the correct patient
0010,0030	Patients Birth Date	Patient's date of birth
0010,0040	Patients Sex	Sex of the patient, enter the appropriate letter: M – male F - female O – other
0020,000d	Study Instance UID	UID study of a patient to which you want to add this picture (or series) or create a new study number (UID) by adding addi-

		tional digits (e.g. "1" or ".1")

Save the changed file.

This procedure must be repeated for all files assigned incorrectly.

26.4 Sending changed files to the archive

All changed files can be sent back the Conquest image archive with the help of drag & drop.

In this way, the images are properly saved in the database.

Next, check the appropriate assignment in digipaX.

The temporary files (in C:\Failed) can be deleted.

Files are saved automatically the next time you save a backup.

27 Others

27.1 Log

In the configuration, you can view the current session's process, divided into subgroups.

In the log subfolder in the installation directory, the log files are written respectively for groups (e.g. dicom.log). When closing the session, they are automatically deleted. In case of system failure, these files are retained and when you restart the application they are located in the subfolders for error analysis.

In the installation directory the global.log file is written, which is constantly continued by all sessions.

> **The global.log file is never cleaned or removed. Over time it becomes very large. If necessary, you can save it in the backup, then delete it (or just rename it).**

In case of problems, you can activate a detailed reading of the log (the log configuration page) for more log entries.

27.2 Saving settings

The digipaX system settings are stored in the following locations.

when "Save the settings for: all users"

installation path at the digipaX.ini

when "Save the settings for: current users"

at the registry at HKEY_CURRENT_USER\Software\digipaX\digipaX

Furthermore, when working, the following path is used (e.g. saving presets, user-defined texts):

C:\Documents and Settings\<Username>\Application Data\digipaX\digipaX

> **The folder "Application Data" is a hidden folder. The option "Show all files and folders" need to be activated in Windows Explorer folder options.**

> Under Windows Vista and Windows Server 2008, Windows 7 and Windows 8 this path is:
> Users\<Username>\AppData\Roaming

27.3 Splash screen on program startup

An own user-defined image can be displayed on program startup. The image must be in PNG format, have filename „splash.png" and be copied to the digipaX installation directory. The image will be displayed 1to1 in the original pixel size on the program startup.

27.4 Transferring configurations

After logging into digipaX as administrator, you can use in the configuration the "Export ..." and "Import ..." buttons, so that all or part of the configurations are saved to the INI file, or are read from it. With the exception of the veterinary version settings (vet.ini) and tags for the image information (display.xml), which are archived in the specified files in the installation directory and can be exchanged between stations by a separately copying them.

27.5 Internet addresses

Conquest:

http://www.xs4all.nl/~ingenium/dicom.html

http://www.image-systems.biz/forum/viewforum.php?f=33

OFFIS-Tools DCMTK:

http://dicom.offis.de/dcmtk.php.de

http://forum.dcmtk.org/

28 Administrator password

To log into the configuration page and to choose another license file at the startup of the program as well as to call up the license viewer, please provide the following (pre-defined) password:

digi4admin

The system here distinguishes between uppercase and lowercase letters. Password can be changed on the configuration page under Administrator / Other.

The software can be started with the program parameter /a password (e.g. /a digi4admin), so that administrator rights are immediately given without having to log on. This option should be activated only during the administration or maintenance works.
The password is used to protect the software from unauthorized and erroneously settings changes. It should therefore be provided only to the persons responsible for managing the system.
If you lose your password, digipaX can reset it and set a new password.

Product: digipaX

Manufacturer: digipaX GmbH
                      Arno–Nitzsche–Str. 45
                      04277 Leipzig
                      GERMANY

The product is CE marked: CE 0494

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