



digipax

Version 1.3.4.0

Administrator's Guide

Installation and Administration

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1 General

This document is confidential!
Passing onto third parties without written permission
from company digipaX GmbH is not allowed!

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.

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

2 Symbols

Symbol	Meaning
	Attention
	Tip

3 Hardware

3.1 System requirements

3.1.1 Server

Recommended system configuration:

Processor	Dual-core processor 2,5 GHz or higher
Main memory	2 GB RAM
Operating system	Windows XP Prof.
Graphics card	Minimum 128 MB DVI (dual), 1280 x 1024
Harddisk	System disk min. 80 GB + additional image store (RAID system)
Network	1000BaseT (Gigabit Ethernet)

Minimum system requirements:

Processor	Pentium 4 or similar min. 2,1 GHz
Main memory	1 GB RAM
Operating system	Windows 2000 or higher
Graphics card	On-board graphics, 1280 x 1024
Harddisk	System disk min. 80 GB + additional image store (RAID system)
Network	100BaseT

3.1.2 Workstation

Recommended system configuration:

Processor	Dual-core processor 2,5 GHz or higher
Main memory	2 GB RAM
Operating system	Windows XP Prof.
Graphics card	Minimum 128 MB DVI (dual), 1280 x 1024
Harddisk	320 GB or more
Network	1000BaseT (Gigabit Ethernet)

Minimum system requirements:

Processor	Pentium 4 or similar min. 2,1 GHz
Main memory	1 GB RAM
Operating system	Windows 2000 or higher
Graphics card	On-board graphics, 1280 x 1024
Harddisk	Min. 80 GB
Network	100BaseT

3.1.3 Supported operating systems

Windows 2000, Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7

3.2 RAID system und backup



The data of archived images are to be saved on a RAID system to minimise the data loss risk. RAID 1 or RAID 5 are recommended.

In addition, the data are to be put on further harddisks by their mirroring or daily backup (see also 20 Archivi).

3.3 Safety

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.

It is necessary to ensure proper functioning of the installed hardware components before the software will be installed and taken in use.

3.4 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.

3.5 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.

3.6 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
Detector:	Teleoptic PRA, Ltd.	Alpha 4600
Generator:	JOSEF BETSCHART AG	GENESIS 50 RFT
	Provotec	ProVario
Dose-area-product meters:	Wellhöfer	KermaX IDP

While connecting the equipment the instructions of the manufacturers of devices must be followed.

In particular it is to ensure galvanic isolation if necessary.

3.7 Installation and connection instructions

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

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. Displays should also stand safely so that they cannot be pulled down accidentally. Cables are to be so installed that loose hanging is avoided.

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

3.8 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.

3.9 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 specially if such cleaning of installed hardware is not acceptable.

3.10 Software

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

4 Installation guidelines

4.1 Server guidelines

Process	Page number for information
1. Installation of digipaX Installation of digipaX	14
2. Installation of image archive(s) Installation of MySQL + MySQL GUI tools Installation of Conquest Commissioning Conquest (AE-title, port, data base init.)	18 14 18
3. Installation of worklist server Installation of worklist server Configuration of worklist server	15 29
4. Archiving tool + DICOM tool Installation and configuration of backup Installation of DICOM editor	86
5. Installation of other tools Installation of Nero Installation of remote control Installation of tool or image for daily visual inspection	15 9
6. digipaX configuration Commissioning digipaX (fill physician`s data, enable modules) Connecting image archives / DICOM configuration Connecting worklist server Adjusting caches Adjusting X-Ray journal / storage location Setting as veterinary version GDT connection Configuration of TurboMed / PDE-TOP / MediStar / DOCConcept / Quincy digipaX configuration	15 22 30 64 67 70 34 / 40 / 43 / 44 / 45 59

4.2 Workstation guidelines

Process	Page number for information
1. Installation of digipaX Installation of digipaX	14
2. Installation of other tools Installation of Nero Installation of software remote control	15

Installation of tool or image for daily visual inspection	9
3. digipaX configuration	
Commissioning digipaX (fill physician`s data, enable modules)	15
Connecting image archives / DICOM configuration	22
Connecting worklist server	30
Adjusting caches	64
Setting as veterinary version	70
GDT connection	
Configuration of TurboMed / PDE-TOP /	34 / 40 /
MediStar / DOCCConcept / Quincy	43 / 44 / 45
digipaX configuration	59

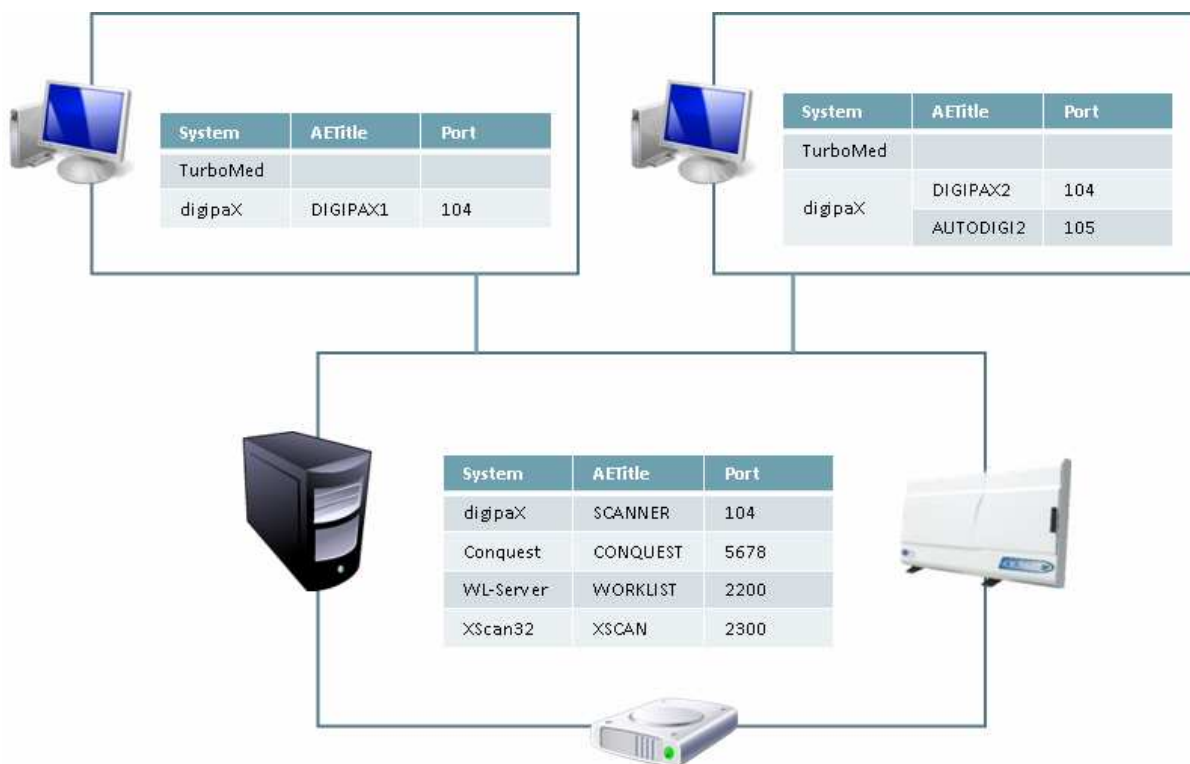
4.3 Completion of overall system

Process	Page number for information
1. Routing setup	
Enabling image receiving in digipaX	28
Adding ExportConverter in Conquest	28
2. Archiving	
Configuration of Conquest	84
Setting up a backup CD/DVD	86
Setting drive monitoring in digipaX	87
3. Acceptance of system	
Acceptance testing	91
Completing checklist	91

4.4 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 it's 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).

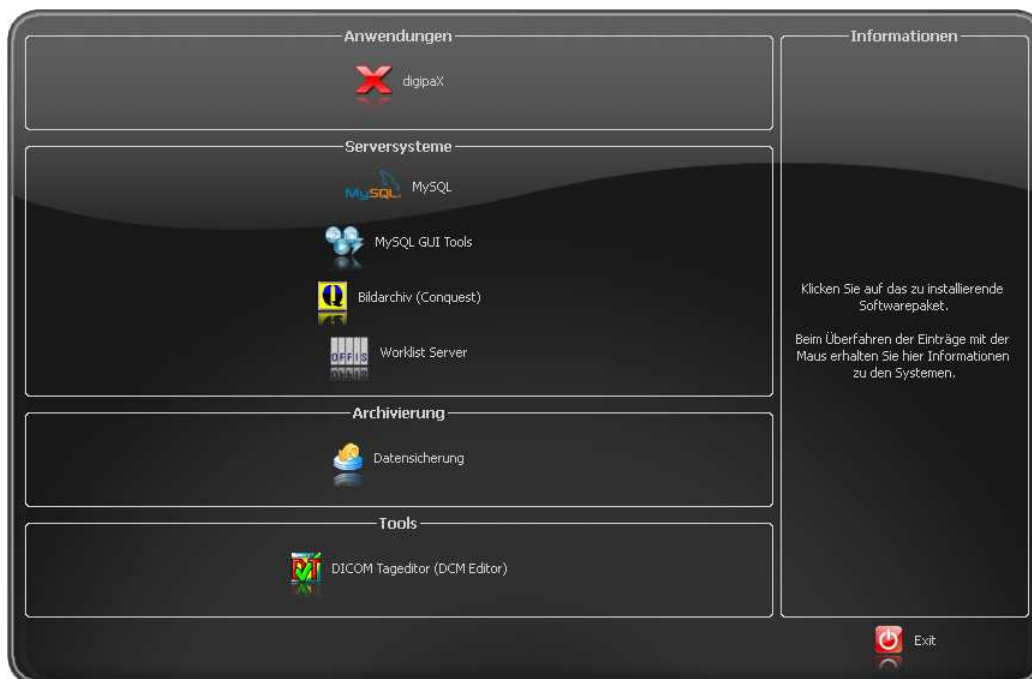
Example of a simple system structure:



5 Program installations

5.1 Xinstall

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.

5.2 digipaX

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

In the installation program, use of special Procedure Codes can be enabled. Then, a special organ table is installed, which already contains the Procedure Codes for desired device or devices.

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

5.3 PACS server: Conquest + Xadmin

A PACS server is absolutely necessary for operating the system.



The installation directory must not contain blank spaces. Otherwise, Conquest server cannot be logged in as a service! Select also e.g. under Windows Vista or Windows 7 the directory C:\Conquest or C:\digipaX\Conquest.

If needed, the tool Xadmin can also be used to support some administrator's tasks. Currently Xadmin supports acquisition of existing data (DICOM images from previous system), modifications of tags in batch mode and creation of X-ray journals from the tags of the DICOM files. The program starts through Xadmin.exe. For more read the Xadmin user's manual.

Conquest image is based on database system MySQL.

5.4 Worklist server: wlmcpfs

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

5.5 Backup

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

5.6 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.

5.7 Nero

If burning of patient CDs (DVDs) directly in digipaX is intended to be performed, the Nero software shall be installed on computer concerned.

6 Commissioning / general configurations

6.1 digipaX

6.1.1 Configuration of informations about practice and physicians

In the configuration on the page "Informations about practice and physicians" doctor's name and address are to be put in. If necessary, doctor's or company's identification number can be added (for more see Chapter 21 Tips for group medical practices (team practices) Notes for joint practices).

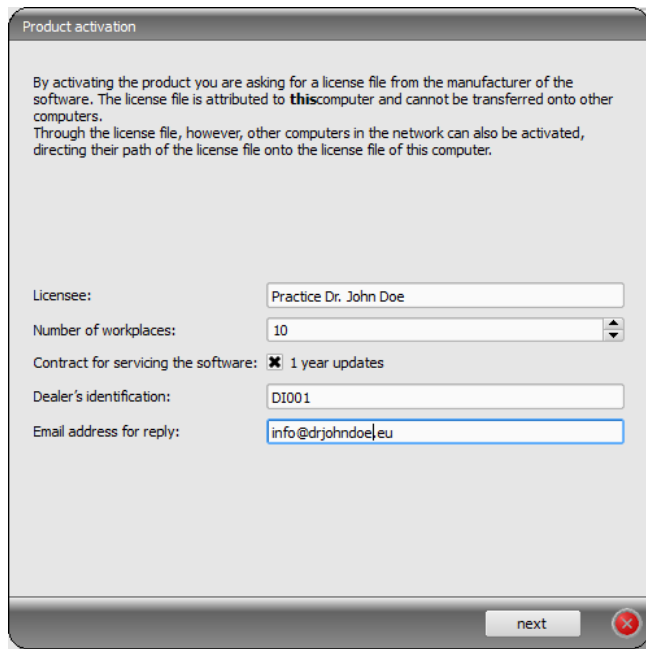
6.1.2 Licensing

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.

6.1.2.1 Product activation flow

1. Launch the digipaX on the server and open the configuration page "License"
2. Click the button "Product activation ..." to start the application process
3. Enter all required informations on the page 1 of the assistant



Product activation

By activating the product you are asking for a license file from the manufacturer of the software. The license file is attributed to **this** computer and cannot be transferred onto other computers.
Through the license file, however, other computers in the network can also be activated, directing their path of the license file onto the license file of this computer.

Licensee:

Number of workplaces:

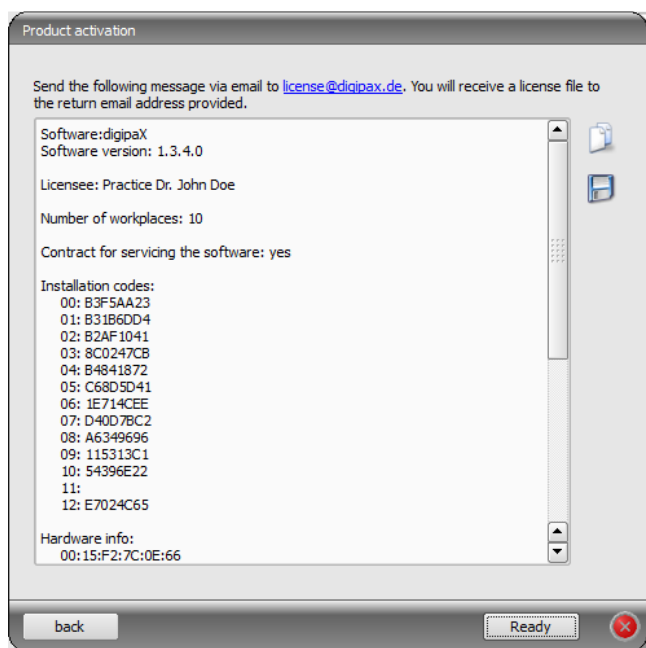
Contract for servicing the software: ☒ 1 year updates

Dealer's identification:

Email address for reply:

Then continue with „next“.

4. Sending data



Product activation

Send the following message via email to license@digipax.de. You will receive a license file to the return email address provided.

Software: digipaX
Software version: 1.3.4.0

Licensee: Practice Dr. John Doe

Number of workplaces: 10

Contract for servicing the software: yes

Installation codes:
00: B3F5AA23
01: B31B6DD4
02: B2AF1041
03: 8C0247CB
04: B4841872
05: C68D5D41
06: 1E714CEE
07: D40D7BC2
08: A6349696
09: 115313C1
10: 54396E22
11:
12: E7024C65

Hardware info:
00: 15:F2:7C:0E:66

Either send data directly via link license@digipax.de as text with the Standard Email Client or copy the text with the right button to clipboard and send it yourself to the email

address. You can also save the text in a text file, e.g. on a flash drive, and send the file from any other PC.

-> Text must be sent in any case by email or, if possible, also per fax to the company digipaX.

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.

6.1.2.2 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").

6.1.3 Activating modules

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

6.1.4 Error codes for license checking

If the license checking fails at the program launch, an 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

6.2 Conquest

For trial or demo installation with low volume of coming images DBASE III as database is offered. It is accessible easily without any additional softwares. But compared to other databases it is very large and the startup time can be very long.

In normal systems MySQL database should be used. At the installation you can additionally use the user's guide "windowsmanual.pdf", provided by the Conquest system (English).

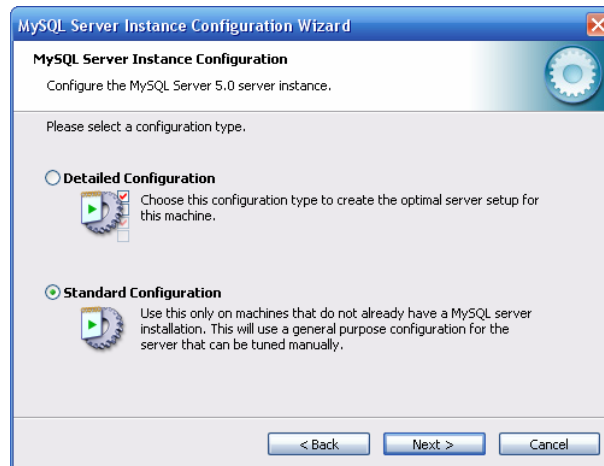


Consider exactly your choice of database in advance. A later change of the database system is possible only with high expenses possible.

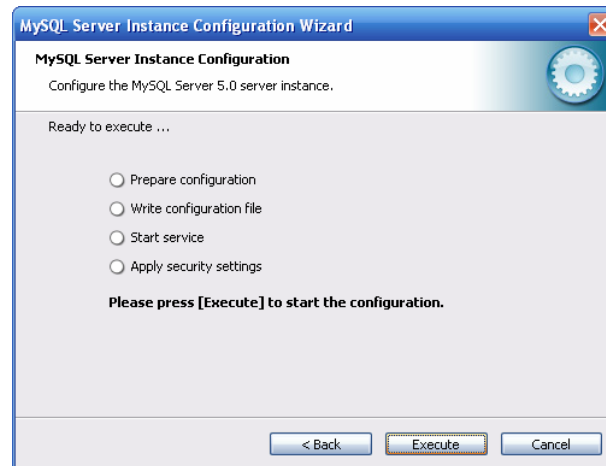
6.2.1 MySQL

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.

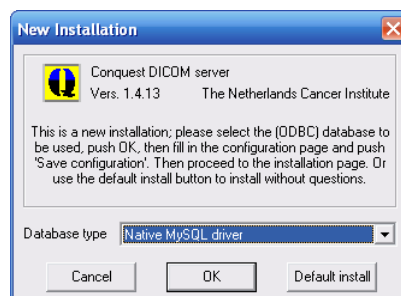


Additionally, the installation of "MySQL Workbench" is recommended. It includes tools for testing and optimizing the database, which could be used immediately when only needed. The creating of an automatic backup of the MySQL database is described under point 20.3.

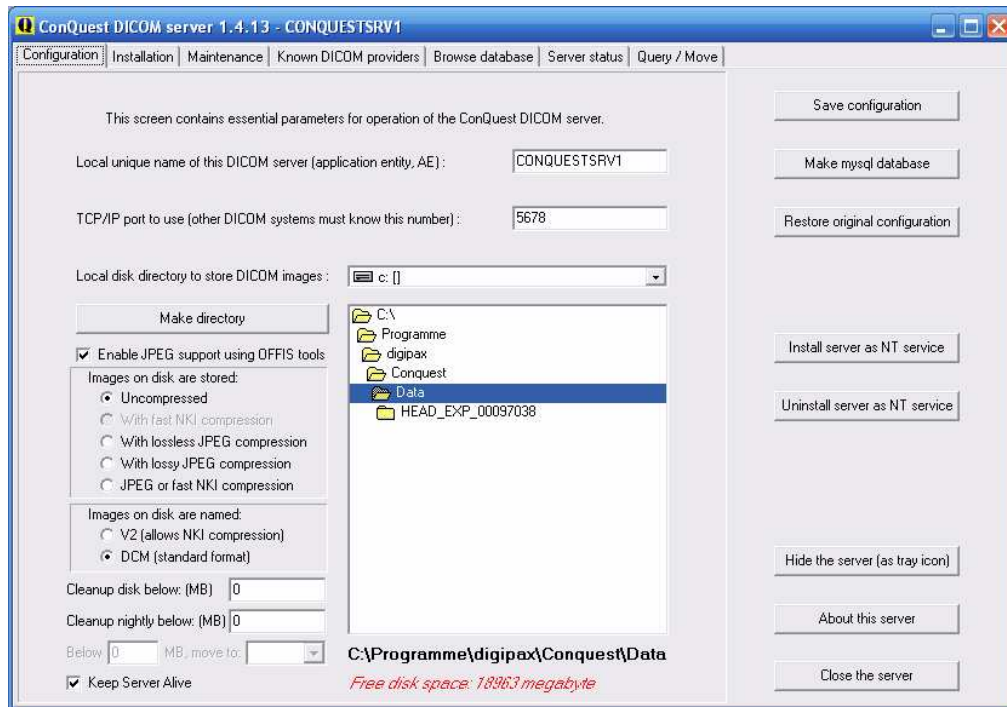


If using Windows 7, after installation of MySQL a reboot is required!

Install the Conquest files on the target computer (e.g. C:\digipaX\Conquest) and launch ConquestDICOMServer.exe. At the first launch select "Native MySQL driver" as database driver.

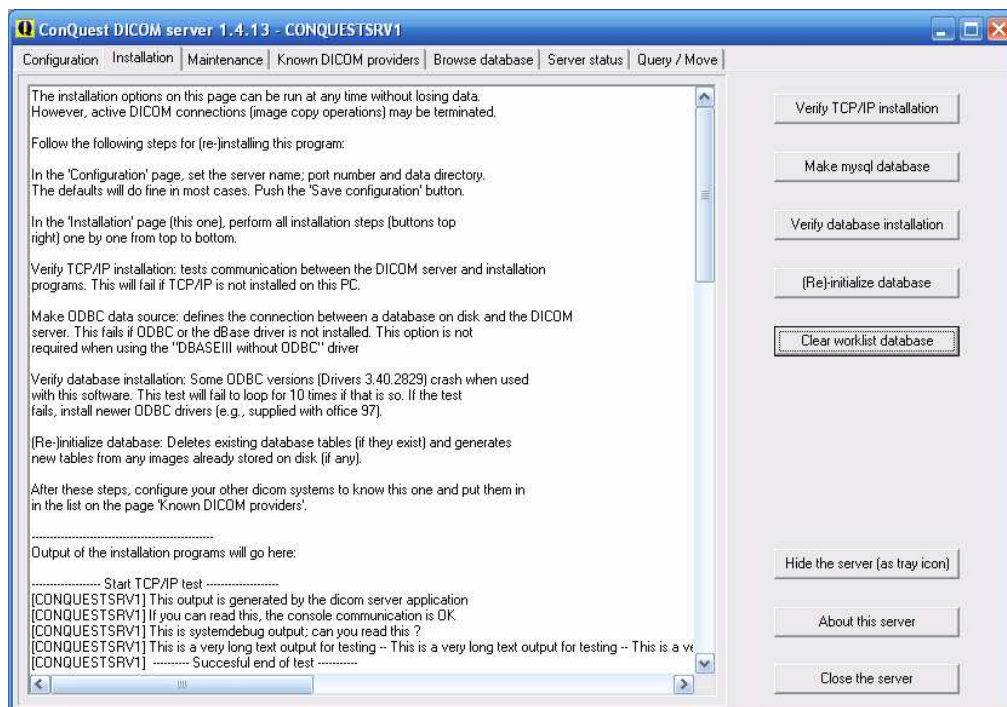


On the first configuration page enter AE Title and port and save the settings. It is recommended to set the checkbox „Keep Server Alive“ in order to restart the Conquest automatically after a server crash. Furthermore, select the file format DCM in order to be able to read the saved files images with 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.

6.2.2 DBASE III

At the first launch of Conquest the database „DBASE III“ is to be selected.



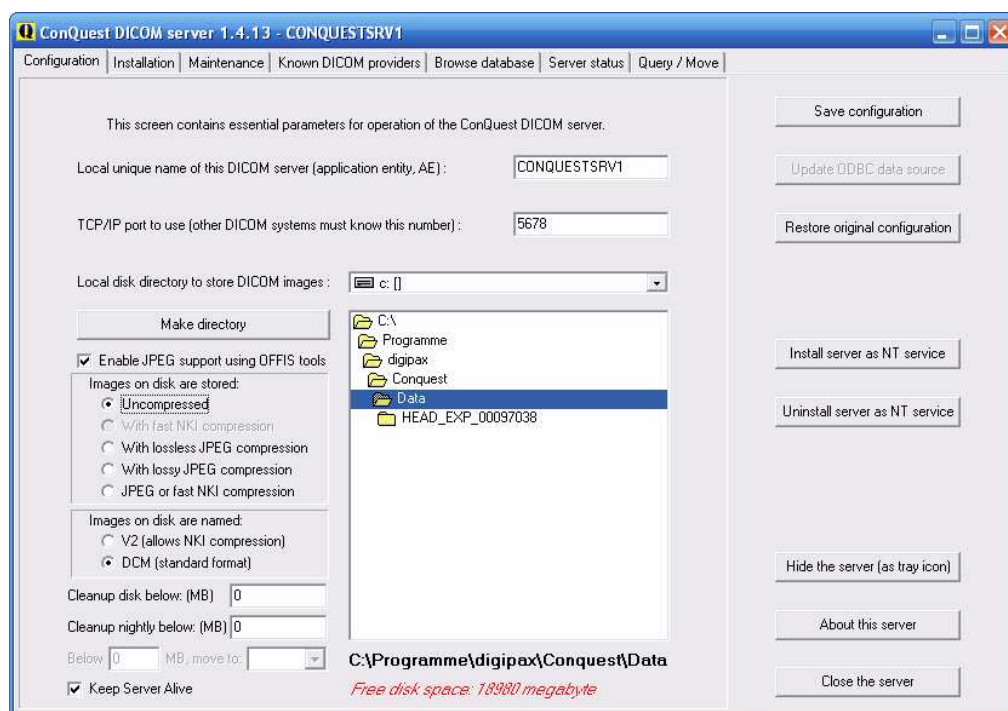
Then enter AE titel (e.g. CONQUEST1 or CONQUEST2) and a port, which is still not yet used (5678 can be left or e.g. 5679, if another server already runs).

Coming images will be saved in an Conquest-specific format V2 by default. The format can be later also read only with Conquest. Select the option „DCM (standard format)“ in group „Images on disk are named“ in order to store files in the standard DICOM format so that they can be then read with any program.

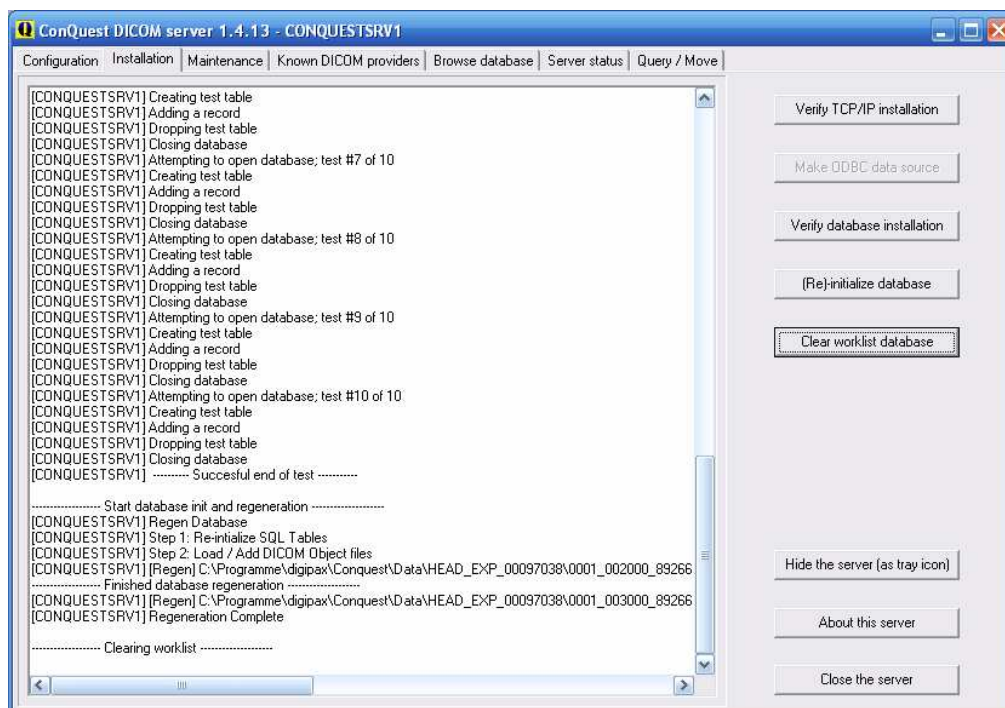
It is recommended to use option „Keep Server Alive“, because it restarts the server automatically after a crash.

Choose a suitable storage location (directory) on the RAID system for the data is. Make sure that there is enough disk space for the coming images. You can do the choice in the middle of directory window.

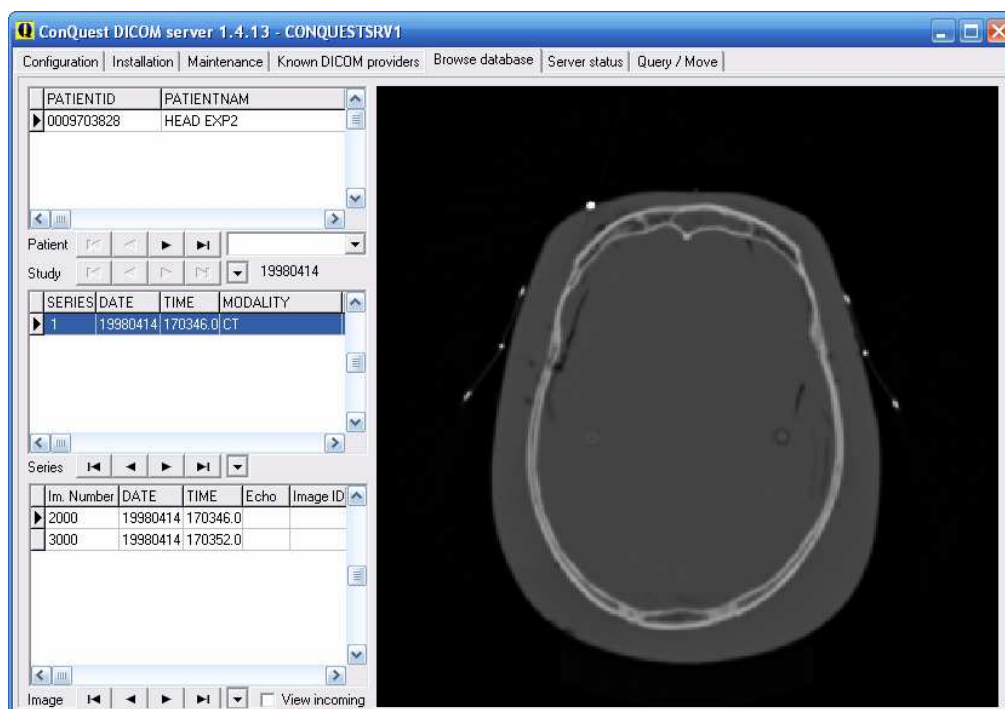
With button „Install server as NT service“, register this PACS server as a Windows service, so that the server starts automatically always at the system boot and is always active in the background.



On the page „Installation“ use the buttons for testing the TCP/IP connection and the database and create the database with the button „(Re)-initialize database“.



Now, an image should be already seen in the tab „Browse Database“.

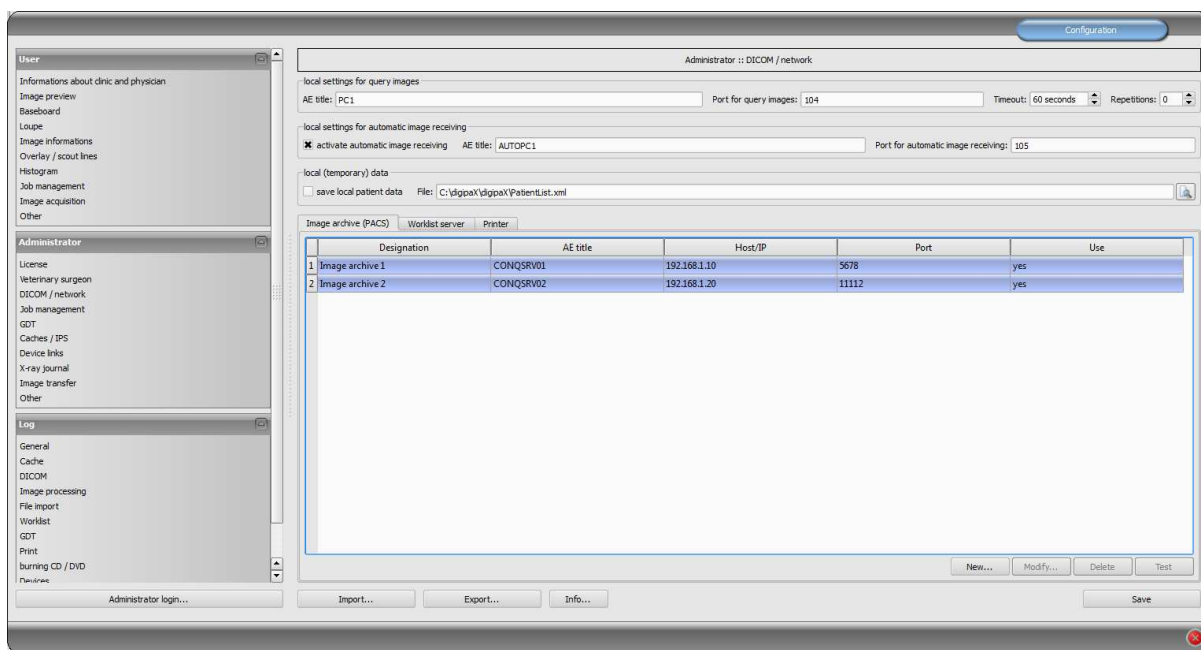


This installed standard test patient can be removed in the context menu of the image („Delete this Patient“).

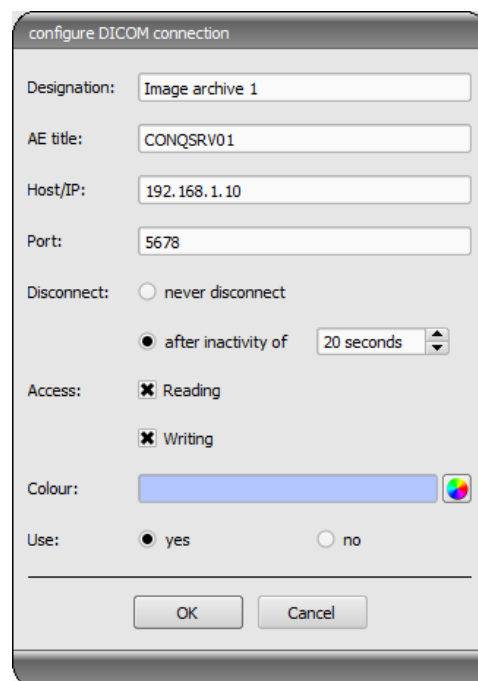
The installation is now completed.

7 DICOM configuration

In digipax, one or more PACS systems can be set up. The system can work with several 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 informations 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.

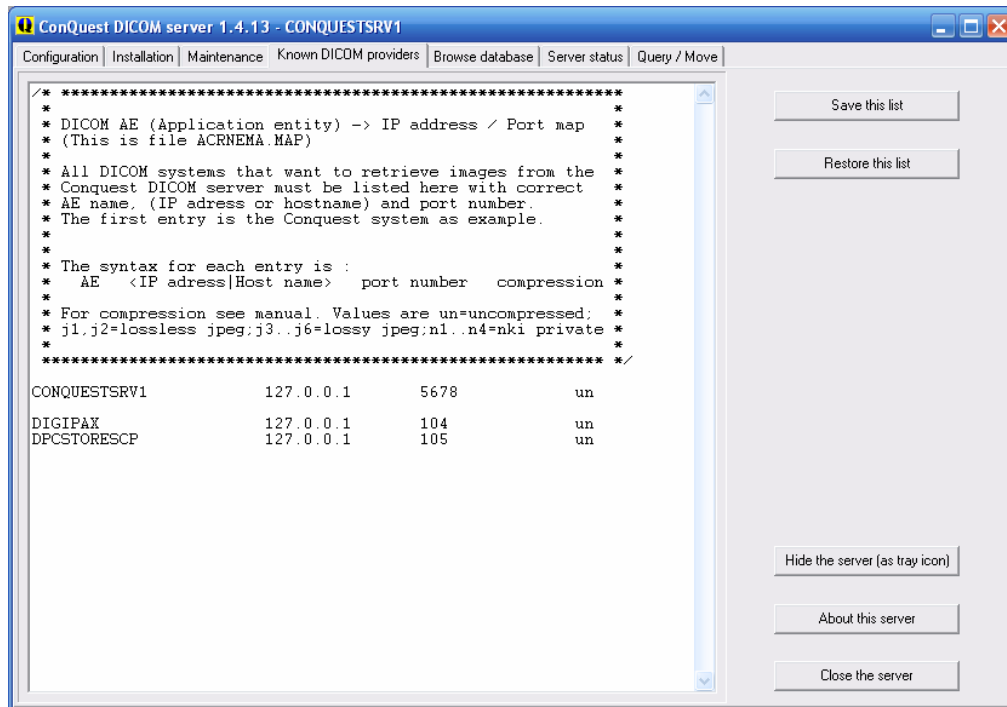
For a better support for the user, each archive has its own colour for faster and better identification, when data from different archives are shown in the system or the user has to choose only one archive. Thereby, colourful colours are assigned in sequence automatically, if this is not modified.

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, übliche 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 abort too early. The number of retries tells how often the system should repeat retrieving 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 acquire 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, identification should be reduced to patient ID. You find this settings under Administrator / Others.

8 Routing

8.1 General

In routing the images, that 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.

8.2 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.

8.3 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 extentions in the file dicom.ini are necessary:

```
# Configuration of routing
ExportConverters      = 1
ExportModality0       = *
ExportConverter0      = forward to DPCSTORESCP
```



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

DPCSTORESCP can be replaced with another, used AE title.

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

```
# Configuration of routing
ExportConverters      = 2
ExportModality0       = *
ExportConverter0       = forward to AUTODIGI1
ExportModality1       = *
ExportConverter1       = forward to AUTODIGI2
```

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.

8.4 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 digipaX 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.

9 DICOM worklist

9.1 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.

9.2 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 most easily with batch file WLSSetup.bat contained in the same directory. Open it

first to edit and adjust the values, which are set in it, to your custom needs. The 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)

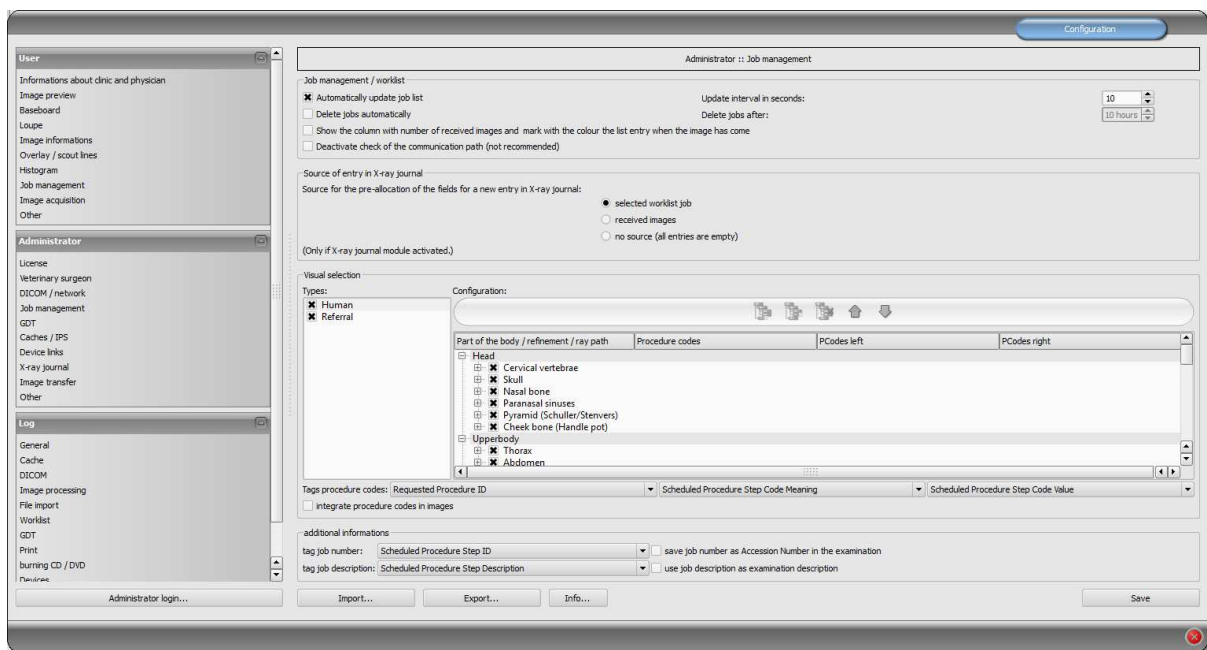
Save the changes and run the batch by double click. Choose "I" for installation of the service. You can uninstall the service by rerun of the batch file and then choose of the option "R".

For more information about the server wlmcpfs.exe read server`s manual ("wlmcpfs manual.pdf").

9.3 digipaX configuration

The configuration of the worklist server is to be done on 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.

Further setting 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 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". From which 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 tell 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.

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.

9.4 Procedure Codes

For each beam path, 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 path. 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.

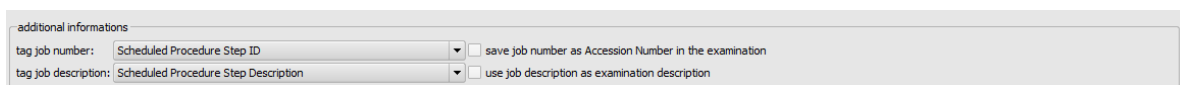
Procedure Codes can also be used for iCR devices manufactured by Xscan. However, they are transferred by the digipaX software, using the scanning interface with the provided ini files for this purpose to the software. It is not possible then to reselect the body parts by the user. The Procedure Code 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.

9.5 Additional information

If through the GDT 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. Initially the following tags are normally pre-set:

Job number	ScheduledProcedureStepID (0x0040, 0x0009)
Job description	ScheduledProtocolCodeSequence (0x0040, 0x0008)



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 10 „GDT Interface“ and 10.11.3 „Field assignment (mapping)“.

9.6 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 withouth 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)

9.7 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. The user should check in the explorer, if they 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.

10 GDT Interface

10.1 General

GDT tagging:

The system uses GDT interface version 2.1.

10.2 TurboMed connection

10.2.1 General

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

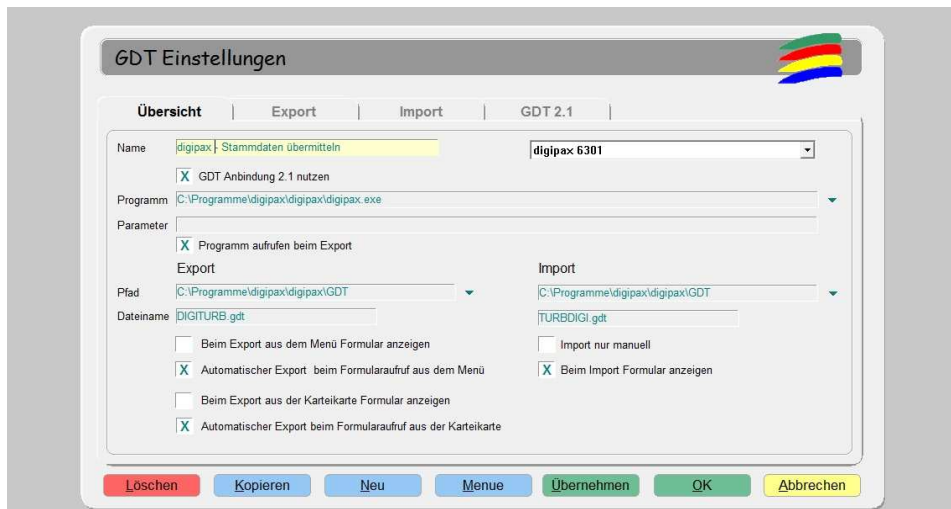
The import and export paths must be the same as the paths set in digipaX. You can also use the same path for the import and export.

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, in digipaX as an option, you can choose to receive from GDT "every job immediately." In this way, right after the request to digipaX system is made requesting a new study, 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.

10.2.2 Transferring constant data (record type 6301)



GDT Einstellungen

Übersicht | Export | Import | GDT 2.1

Name: digipax - Stammdaten übermitteln | digipax 6301

☒ GDT Anbindung 2.1 nutzen

Programm: C:\Programme\digipax\digipax.exe

Parameter:

☒ Programm aufrufen beim Export

Export: C:\Programme\digipax\digipax\GDT

Import: C:\Programme\digipax\digipax\GDT

Dateiname: DIGITURB.gdt

☐ Beim Export aus dem Menü Formular anzeigen

☒ Automatischer Export beim Formularaufruf aus dem Menü

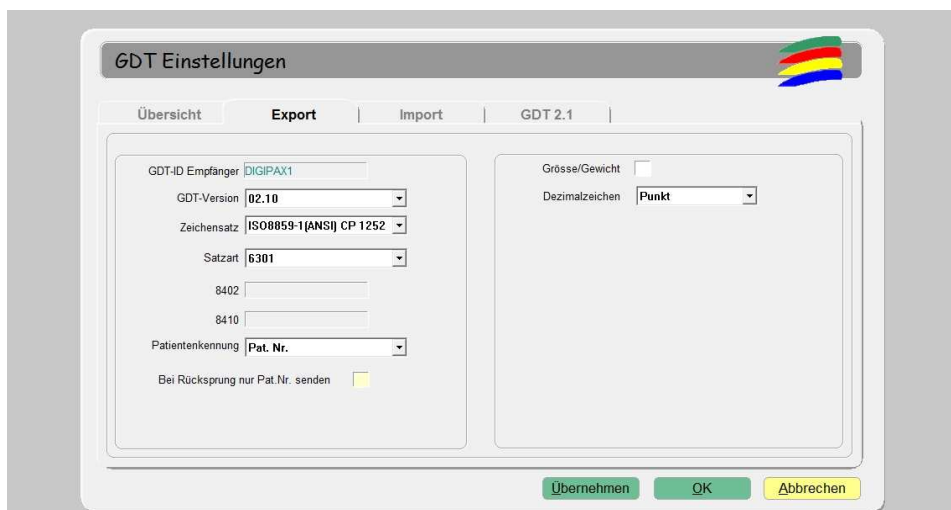
☐ Beim Export aus der Karteikarte Formular anzeigen

☒ Automatischer Export beim Formularaufruf aus der Karteikarte

☐ Import nur manuell

☒ Beim Import Formular anzeigen

Löschen Kopieren Neu Menue Übernehmen OK Abbrechen



GDT Einstellungen

Übersicht | **Export** | Import | GDT 2.1

GDT-ID Empfänger: DIGIPAX1

GDT-Version: 02.10

Zeichensatz: ISO0859-1 (ANSI) CP 1252

Satzart: 6301

8402:

8410:

Patientenkennung: Pat. Nr.

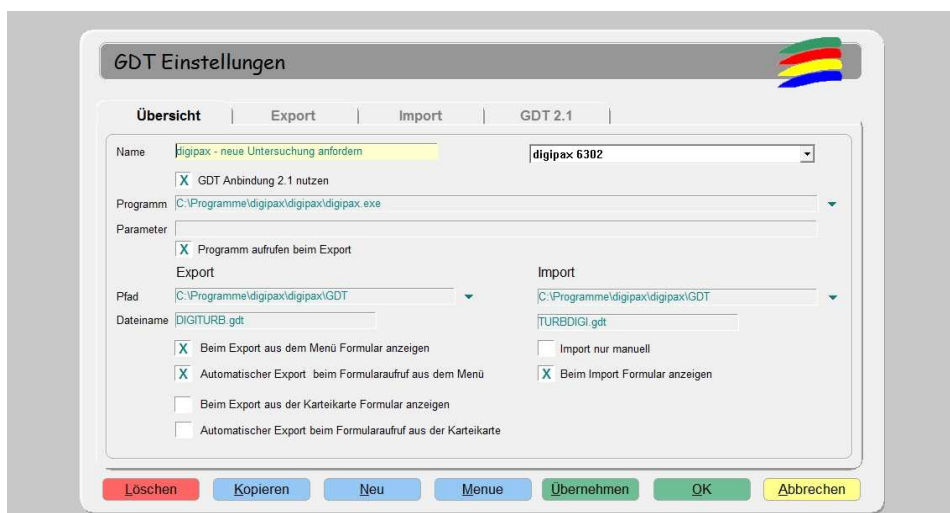
Bei Rücksprung nur Pat.Nr. senden: ☐

Größe/Gewicht: ☐

Dezimalzeichen: Punkt

Übernehmen OK Abbrechen

10.2.3 Requesting new study (record type 6302)



GDT Einstellungen

Übersicht | Export | Import | GDT 2.1

Name: digipax - neue Untersuchung anfordern | digipax 6302

☒ GDT Anbindung 2.1 nutzen

Programm: C:\Programme\digipax\digipax.exe

Parameter:

☒ Programm aufrufen beim Export

Export: C:\Programme\digipax\digipax\GDT

Import: C:\Programme\digipax\digipax\GDT

Dateiname: DIGITURB.gdt

☒ Beim Export aus dem Menü Formular anzeigen

☒ Automatischer Export beim Formularaufruf aus dem Menü

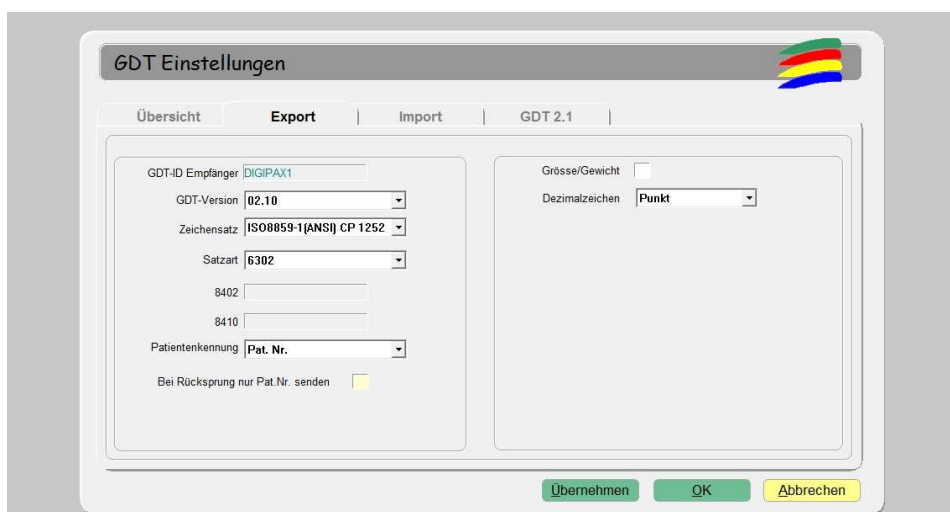
☐ Beim Export aus der Karteikarte Formular anzeigen

☐ Automatischer Export beim Formularaufruf aus der Karteikarte

☐ Import nur manuell

☒ Beim Import Formular anzeigen

Löschen Kopieren Neu Menue Übernehmen OK Abbrechen



GDT Einstellungen

Übersicht | Export | Import | GDT 2.1

GDT-ID Empfänger: DIGIPAX1

GDT-Version: 02.10

Zeichensatz: ISO0859-1(ANSI) CP 1252

Satzart: 6302

8402:

8410:

Patientenkennung: Pat. Nr.

Bei Rücksprung nur Pat.Nr. senden ☐

Grösse/Gewicht ☐

Dezimalzeichen: Punkt

Übernehmen OK Abbrechen

10.2.4 Requesting new study through the job worklist (record type 6302)

GDT Einstellungen

Übersicht	Export	Import	GDT 2.1
------------------	--------	--------	---------

Name

☒ GDT Anbindung 2.1 nutzen

Programm

Parameter
☒ Programm aufrufen beim Export

Export **Import**

Pfad

Dateiname

☒ Beim Export aus dem Menü Formular anzeigen

☒ Automatischer Export beim Formularaufruf aus dem Menü

☐ Beim Export aus der Karteikarte Formular anzeigen

☐ Automatischer Export beim Formularaufruf aus der Karteikarte


☐ Import nur manuell

☒ Beim Import Formular anzeigen

Löschen
Kopieren
Neu
Menue
Übernehmen
OK
Abbrechen

With the help of the „/w“ **parameter** a dialogue is displayed to create a new job from the worklist.

GDT Einstellungen



Übersicht
Export
Import
GDT 2.1

GDT-ID Empfänger

GDT-Version

Zeichensatz

Satzart

8402

8410

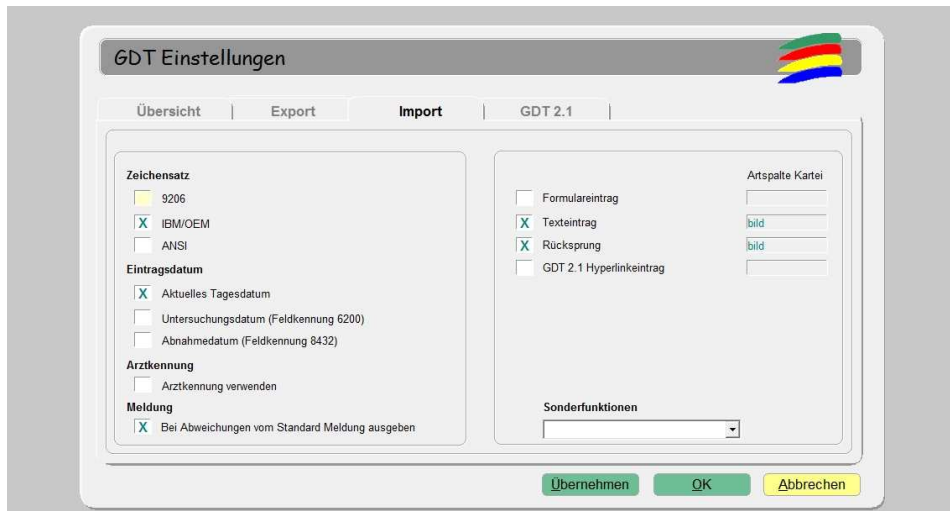
Patientenkennung

Bei Rücksprung nur Pat.Nr. senden ☐

Grösse/Gewicht

Dezimalzeichen

Übernehmen
OK
Abbrechen



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

In addition, you may need to activate the automatic reception of images in digipaX and the PACS server must transfer the images (routing). If in digipaX the receiving type is set to "every job right away," this will not be necessary.

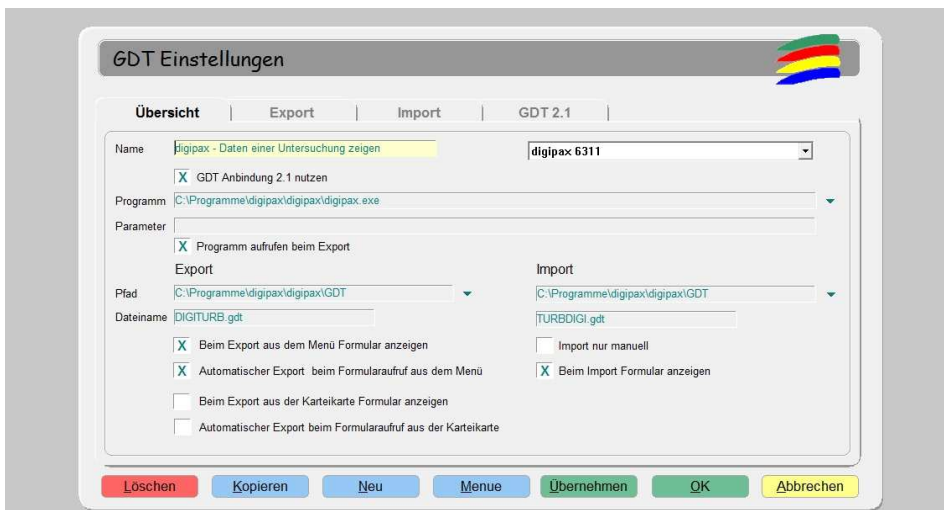
The **character set** setting must match the character set setting in digipaX. Warning: If it's set to "9206", it will always automatically use the ANSI set (in TurboMed version 7.3.1).

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.

10.2.5 Displaying study data (record type 6311)



GDT Einstellungen

Übersicht | Export | Import | GDT 2.1

Name: digipax - Daten einer Untersuchung zeigen | digipax 6311

☒ GDT Anbindung 2.1 nutzen

Programm: C:\Programme\digipax\digipax.exe

Parameter: ☒ Programm aufrufen beim Export

Export: C:\Programme\digipax\digipax\GDT

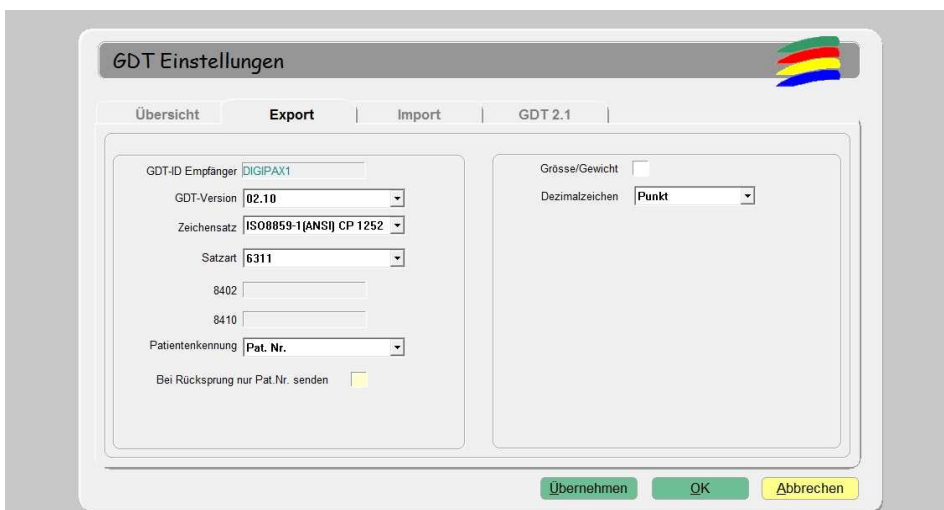
Import: C:\Programme\digipax\digipax\GDT

Dateiname: DIGITURB.gdt | TURBDIGI.gdt

☒ Beim Export aus dem Menü Formular anzeigen
☒ Automatischer Export beim Formularaufruf aus dem Menü
☐ Beim Export aus der Karteikarte Formular anzeigen
☐ Automatischer Export beim Formularaufruf aus der Karteikarte

☐ Import nur manuell
☒ Beim Import Formular anzeigen

Löschen Kopieren Neu Menue Übernehmen OK Abbrechen



GDT Einstellungen

Übersicht | **Export** | Import | GDT 2.1

GDT-ID Empfänger: DIGIPAX1

GDT-Version: 02.10

Zeichensatz: ISO8859-1 (ANSI) CP 1252

Satzart: 6311

8402:

8410:

Patientenkennung: Pat. Nr.

Bei Rücksprung nur Pat.Nr. senden: ☐

Grosse/Gewicht:

Dezimalzeichen: Punkt

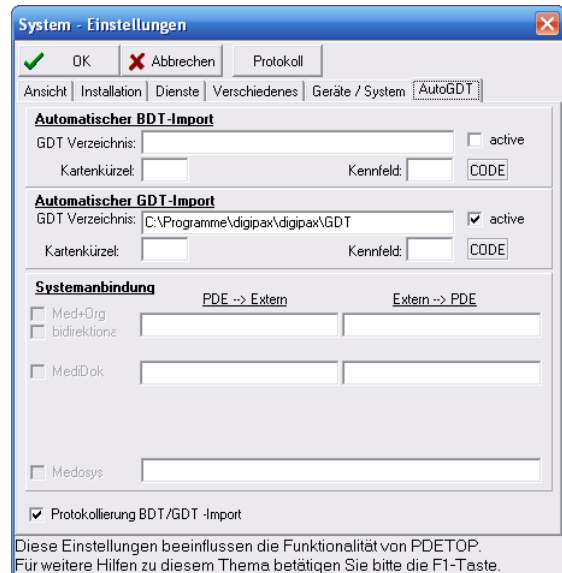
Übernehmen OK Abbrechen

10.3 Connecting PDE-TOP

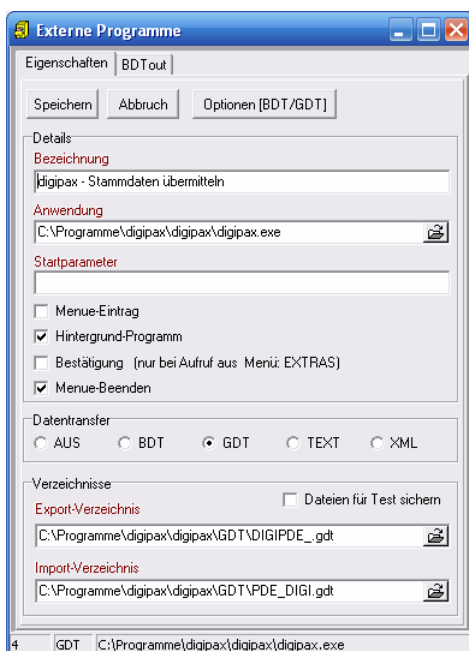
10.3.1 General

In job to get to the GDT configuration interface, you must first go to the patient's dialogue, and then use the "Extern" (Strg + Shift + X). Here you can configure starting digipaxX 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.



10.3.2 Transferring constant data (record type 6301)

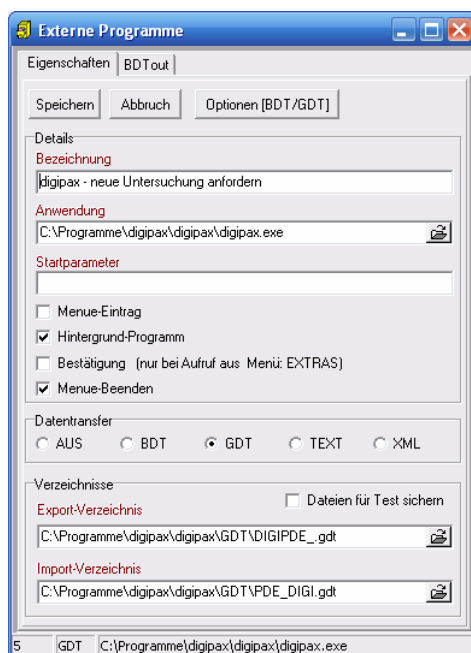


Verify that the export and import directory have the file names entered.

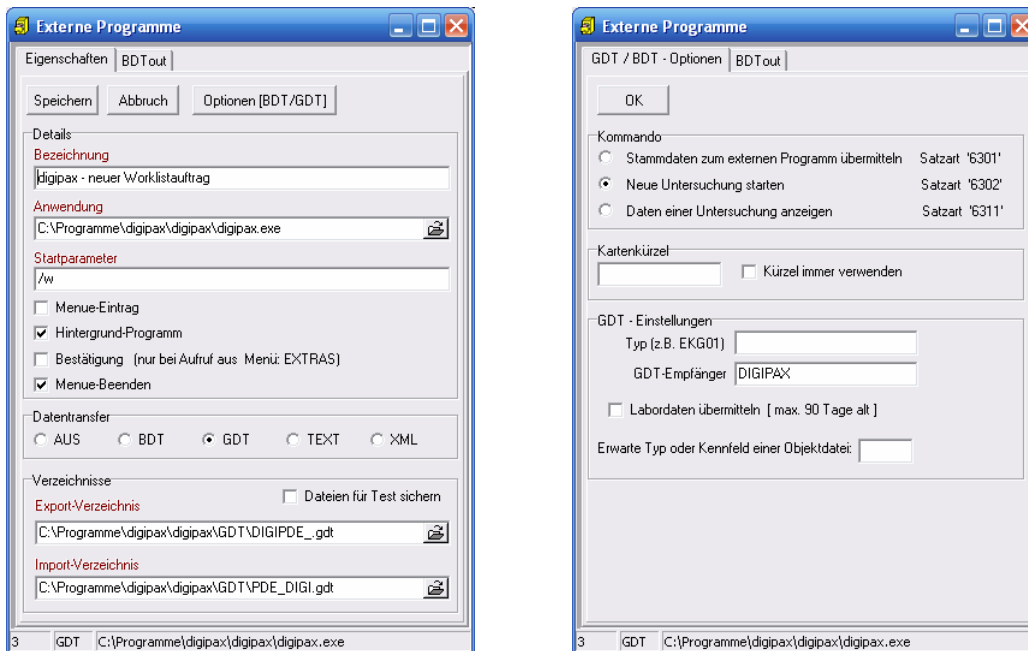


These settings also apply to all subsequent connections.

10.3.3 Requesting new study (record type 6302)

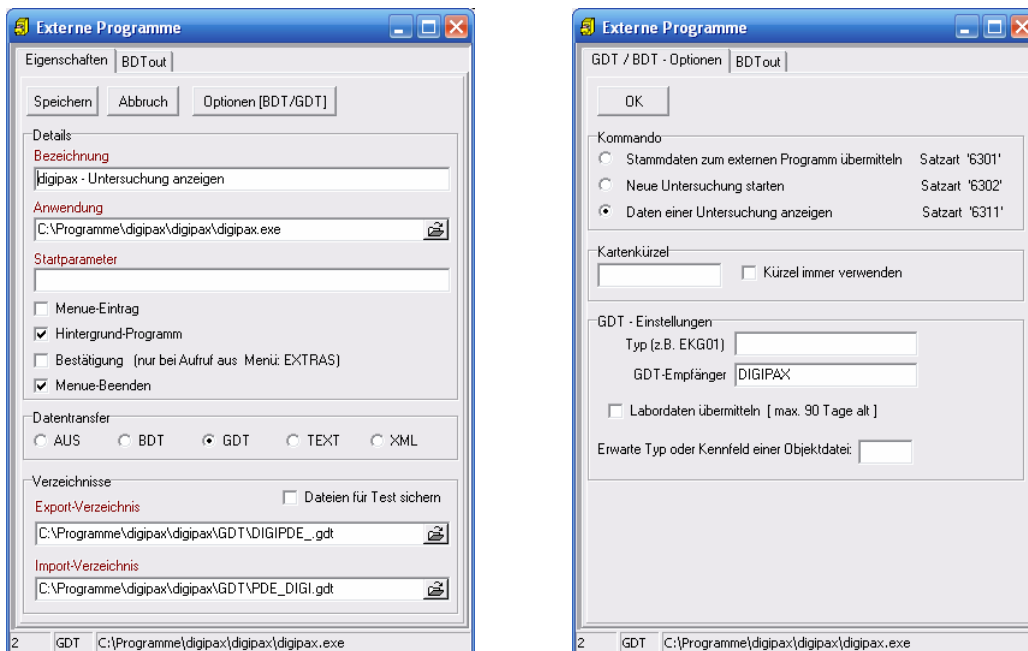


10.3.4 Requesting new study through the job worklist (record type 6302)

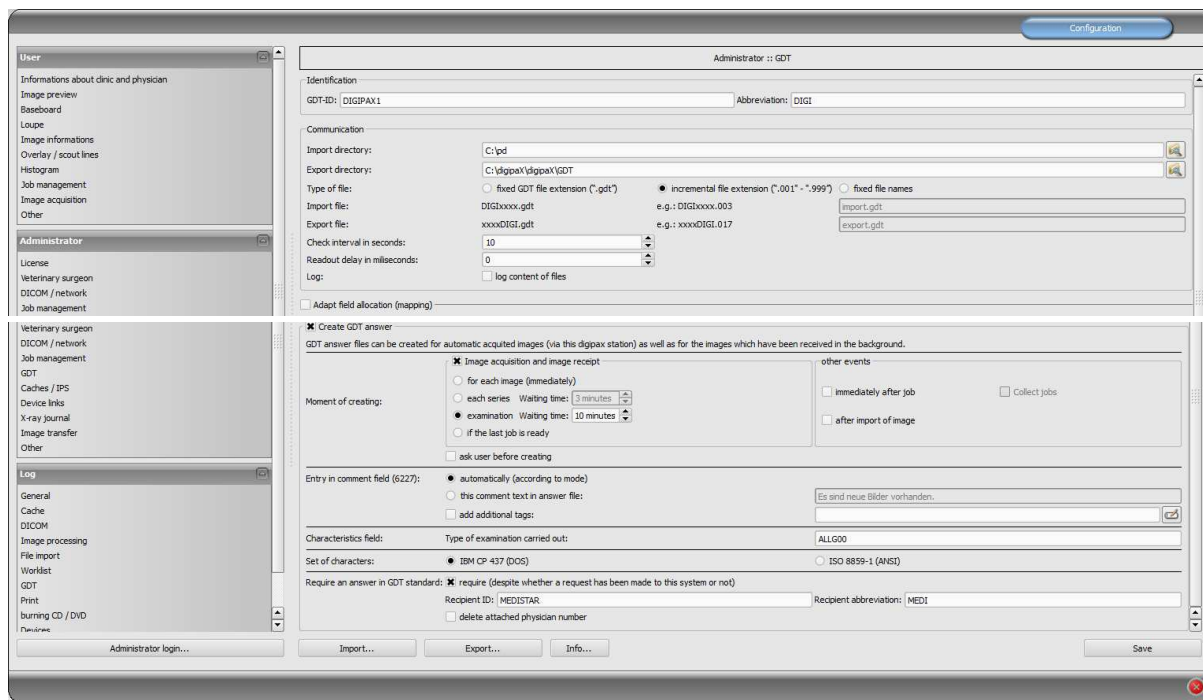


With the help of the „/w“ **start parameter** a dialogue is displayed to create a new job from the worklist.

10.3.5 Displaying study data (record type 6311)



10.4 Connecting MediStar

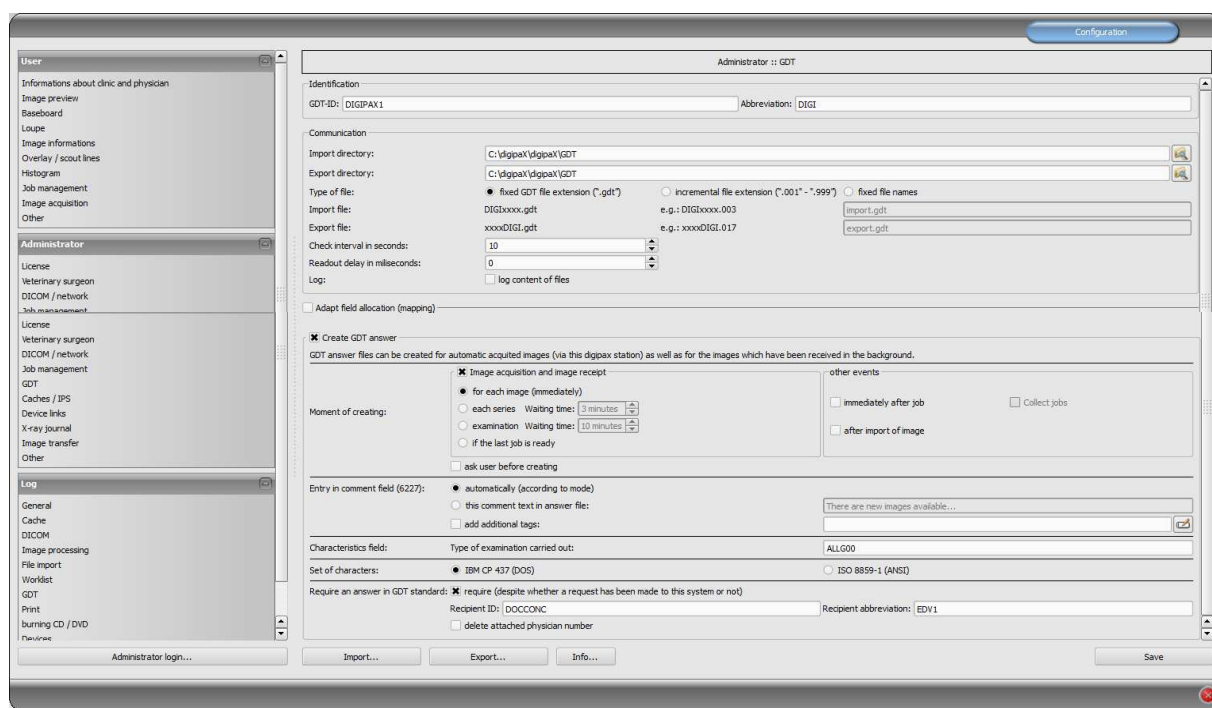


Settings in MediStar are done by the administrator of the system and cannot be independently adjusted.

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.

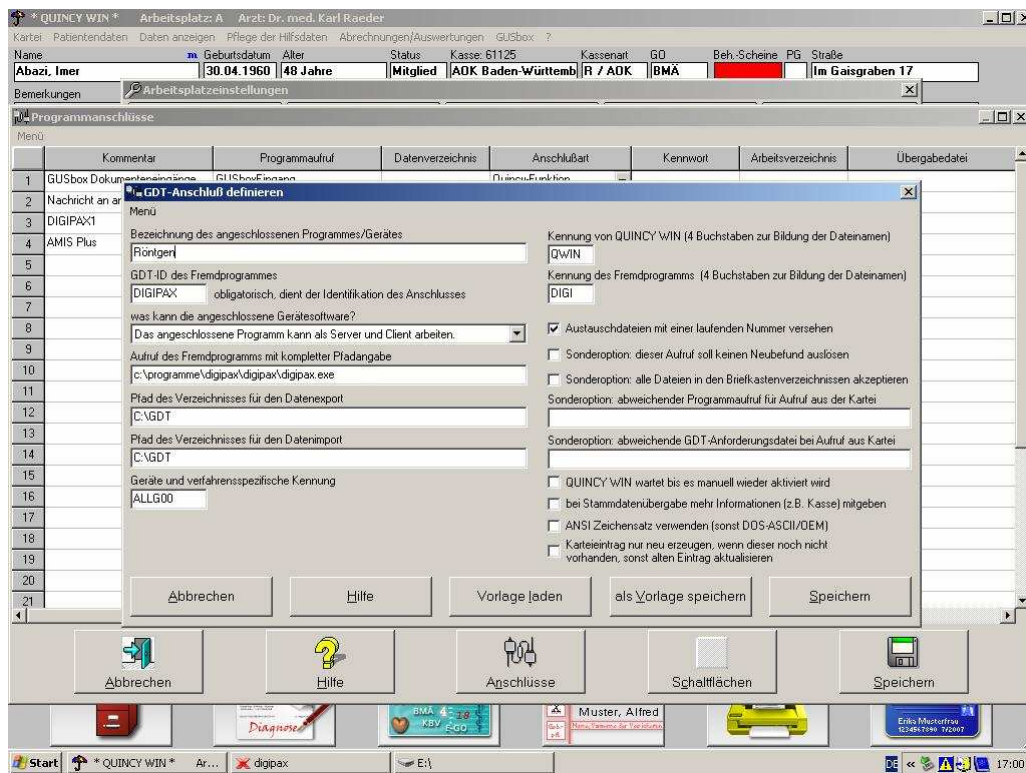
10.5 Connecting DOCCONCEPT



The settings shown in the above illustration outline the correct connection set up.

10.6 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).

In case of new installations:

Select empty row

„Connect” button

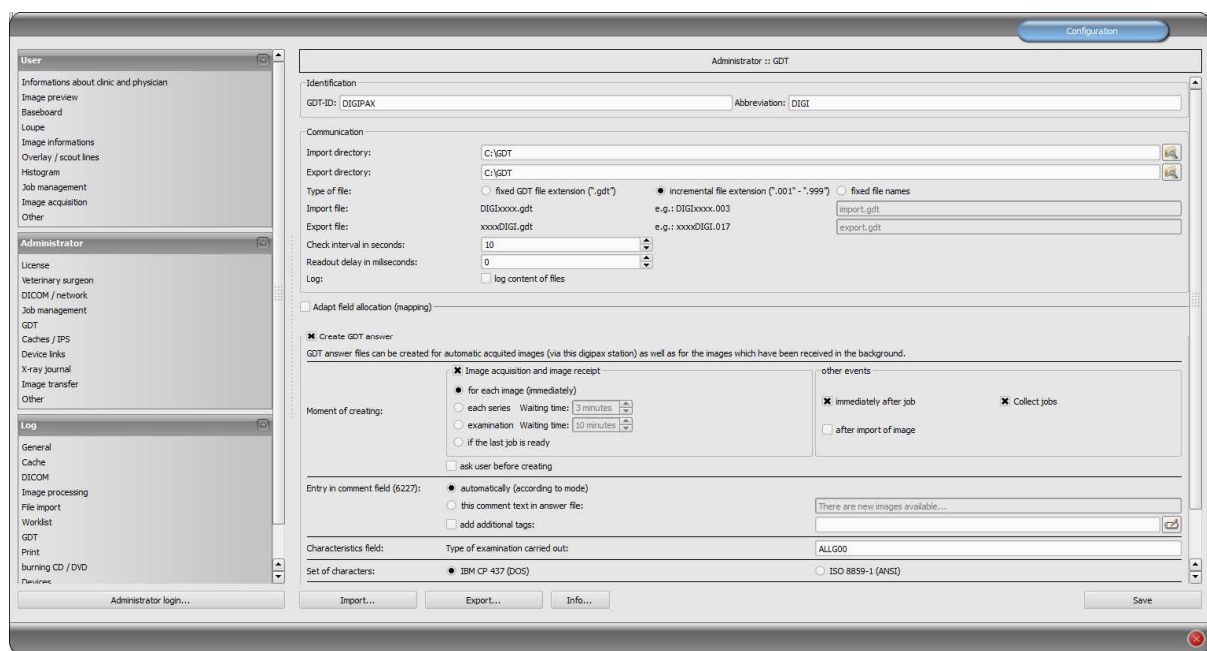
Choose the other program with GDT connection

In job to modify:

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.



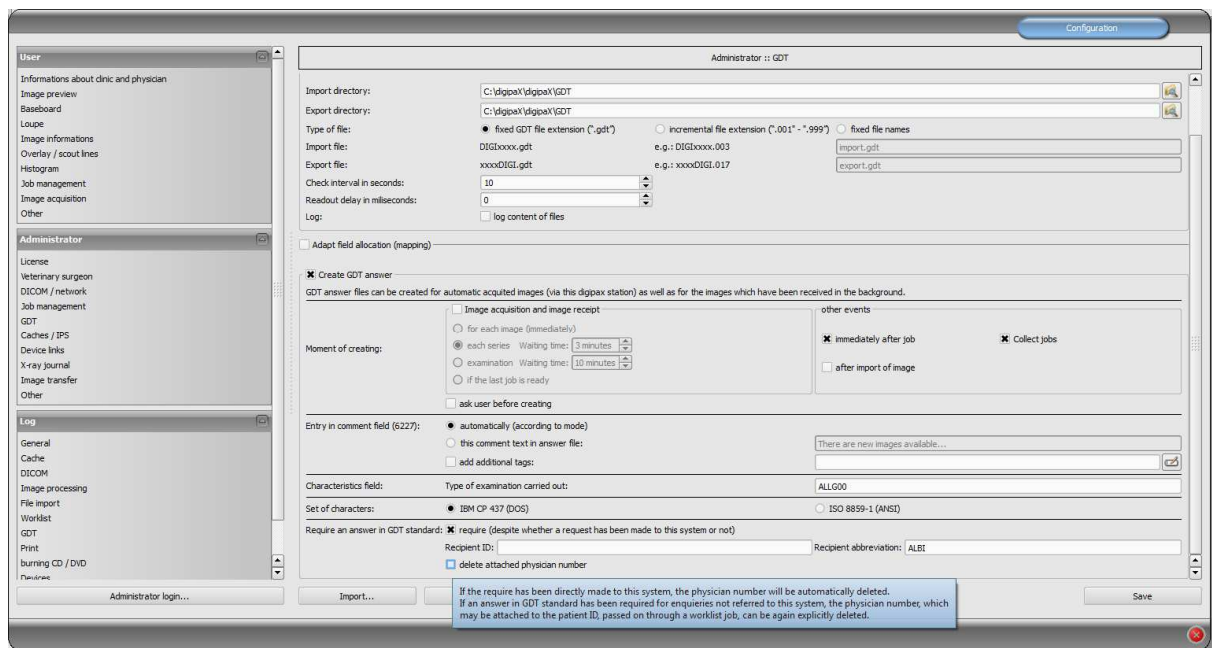
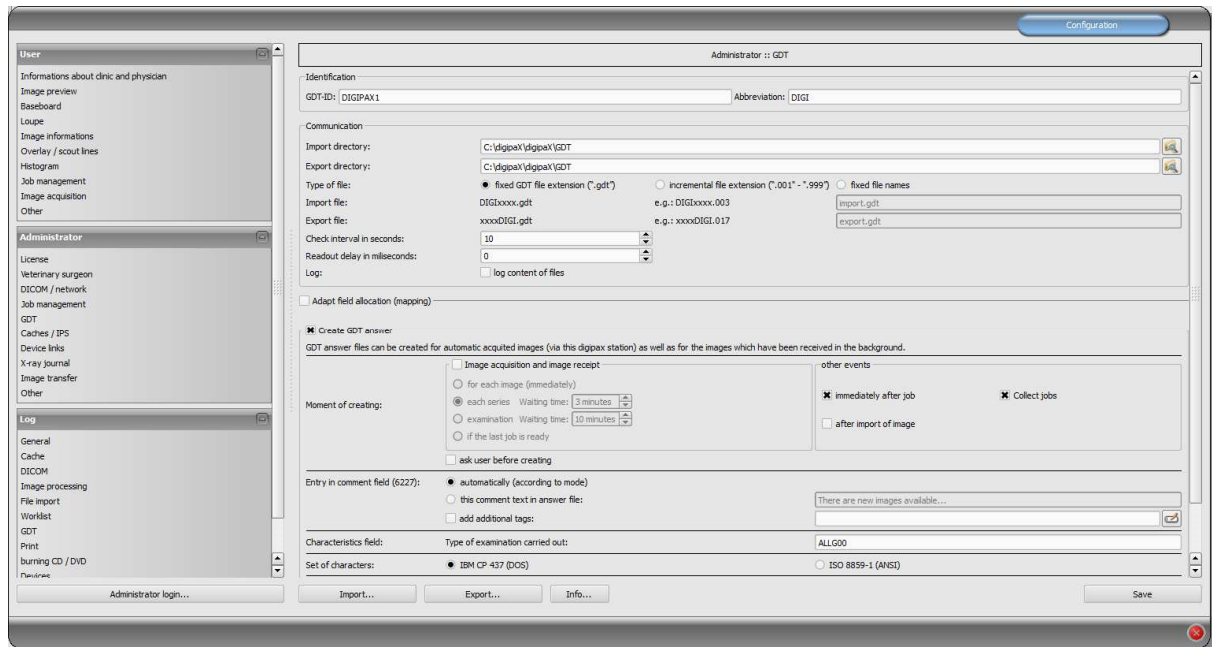
The screenshot shows the 'Administrator :: GDT' configuration window. The left sidebar contains a tree view with categories: User, Administrator, and Log. The main area is divided into several sections:

- Identification:** GDT-ID: DIGIPAX, Abbreviation: DIGI
- Communication:**
 - Import directory: C:\GDT
 - Export directory: C:\GDT
 - Type of file: ☒ incremental file extension ("001"-"999")
 - Import file: DIGIxxxx.gdt (e.g.: DIGIxxxx.003)
 - Export file: xxxxDIGI.gdt (e.g.: xxxxDIGI.017)
 - Check interval in seconds: 10
 - Readout delay in milliseconds: 0
 - Log: ☐ log content of files
- Adapt field allocation (mapping):** ☐
- Create GDT answer:**
 - GDT answer files can be created for automatic acquired images (via this digipaX station) as well as for the images which have been received in the background.
 - ☒ Image acquisition and image receipt
 - ☒ for each image (immediately)
 - ☐ each series Waiting time: 3 minutes
 - ☐ examination Waiting time: 10 minutes
 - ☐ if the last job is ready
 - ☐ ask user before creating
 - other events:
 - ☒ immediately after job
 - ☐ after import of image
 - ☒ Collect jobs
- Entry in comment field (6227):**
 - ☒ automatically (according to mode)
 - ☐ this comment text in answer file: There are new images available...
 - ☐ add additional tags:
- Characteristics field:** Type of examination carried out: ALLG00
- Set of characters:** ☒ IBM CP 437 (DOS) ☐ ISO 8859-1 (ANSI)

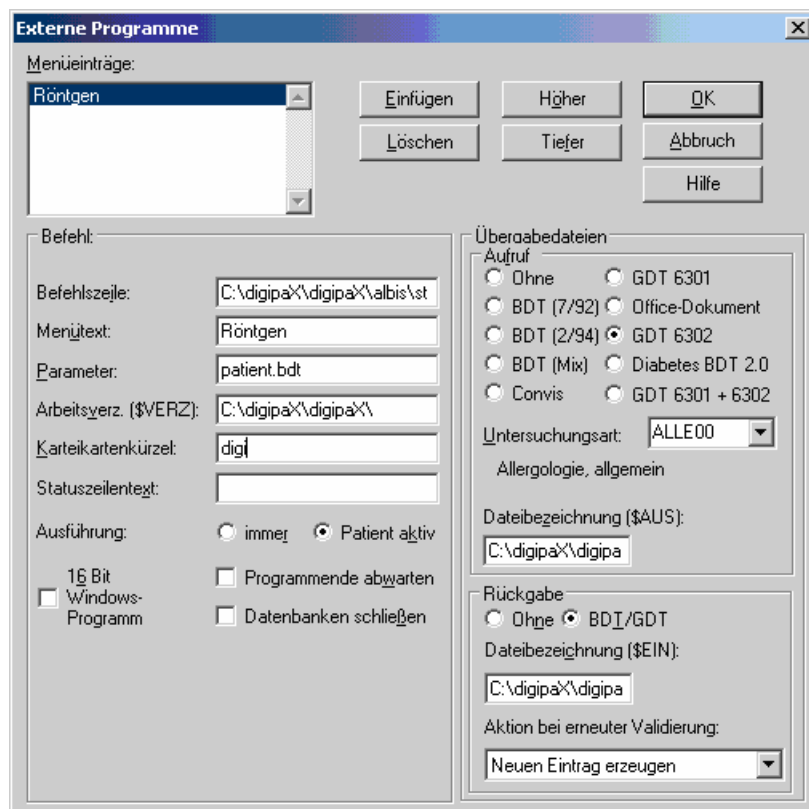
Buttons at the bottom: Import..., Export..., Info..., Save.

10.7 Connecting Albis

Configuration in digipax should be done as shown in the 2 illustrations below:



Settings in Albis should be done as shown below:



Befehlszeile: C:\digipaX\digipaX\albis\start.bat
(\$AUS): C:\digipaX\digipaX\gdt\digialbi.gdt
(\$EIN): C:\digipaX\digipaX\GDT\albiDIGI.gdt

In the local directory C:\digipaX\digipaX\ create folder „Albis“.

-> C:\digipaX\digipaX\Albis

In this folder create start.bat with following contents:

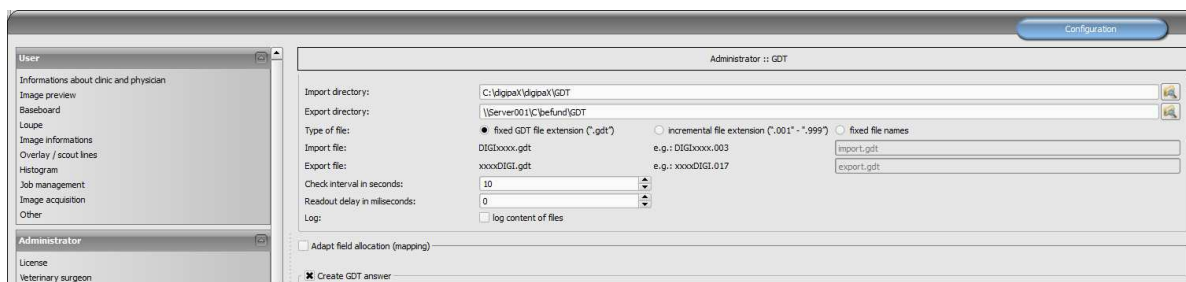
```
del C:\digipaX\digipaX\GDT\albiDIGI.gdt /y
C:\digipaX\digipaX\digipax.exe
Exit
```

10.8 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

Job configuration procedure from the worklist in the Duria system

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

Row configuration for creating a job from the worklist (6302)

The screenshot shows the 'Duria Telnat Client' window with a menu bar (Verbindung, Bearbeiten, Einstellungen, Duria, Fenster, Hilfe) and a toolbar with function keys F2-F11 and an OK button. The main area displays a patient record for 'MVZ, Hillebrand/Weinz' with details like 'Allenerstr. 35, 59457 Werl', '0DKM', '02922-9792.0', 'PR', 'info\$pentling.com', 'PRE', 'M', 'Kein Fall', and 'AB', 'gesundheitszentrum Pentling'. Below this is a table for row configuration:

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

At the bottom, there are buttons for 'Korrektur', 'Erfassung', and 'Löschen'. The status bar shows '16:31:53'.

Row configuration to display images (6311)

The screenshot shows the 'Duria Telnat Client' window with the same menu bar and toolbar. The main area displays system configuration settings for importing GDT files:

Dateien einlesen 23.04.2010

Import Gerät/Typ.....: DIGI

Dateiname / Port.....: //SERVER001/C/BEFUND/GDT/DURIDIGI.*

Datei löschen.....: Ja seriell einlesen...: Ja

Datei-Format.....: BDT

Feldkennung, TG.: 8402, DPAX-6227, DPAX-6201, DPAX-6200, DPAX (siehe F1) ..:

Hintergrund / Bildschirm.: Vordergrund Warte Sekunden.....:

Zeichen ersetzen.....: durch.....:

Auswerte-Programm.....:

vorher Export-Programm....:

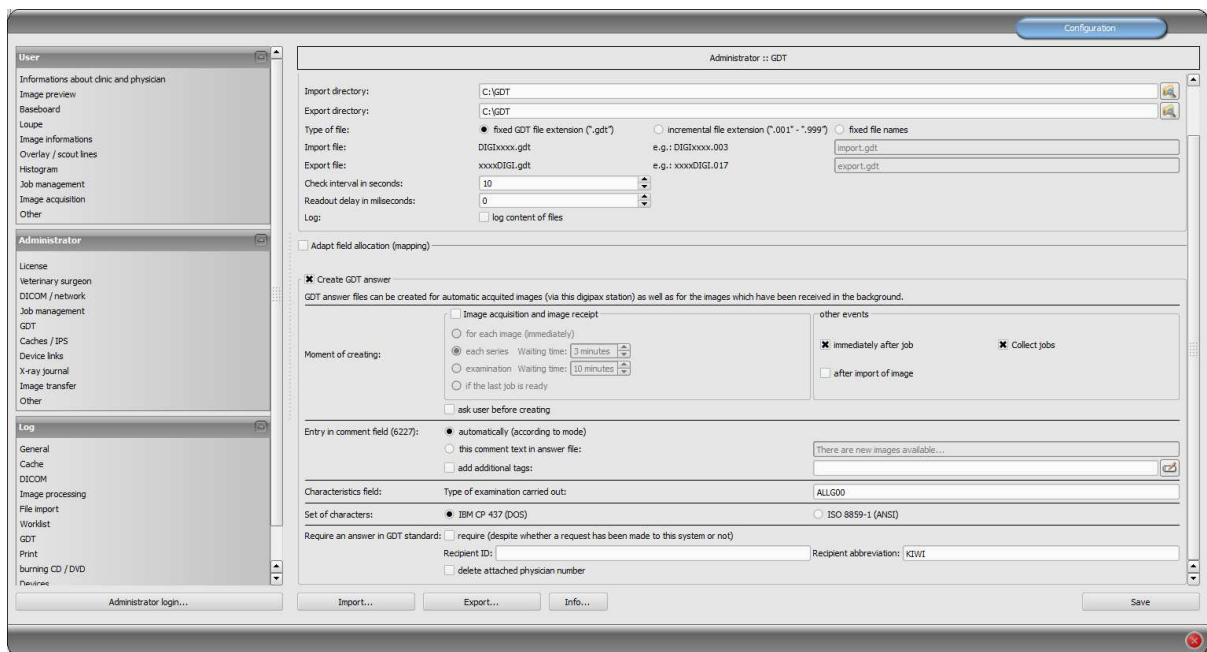
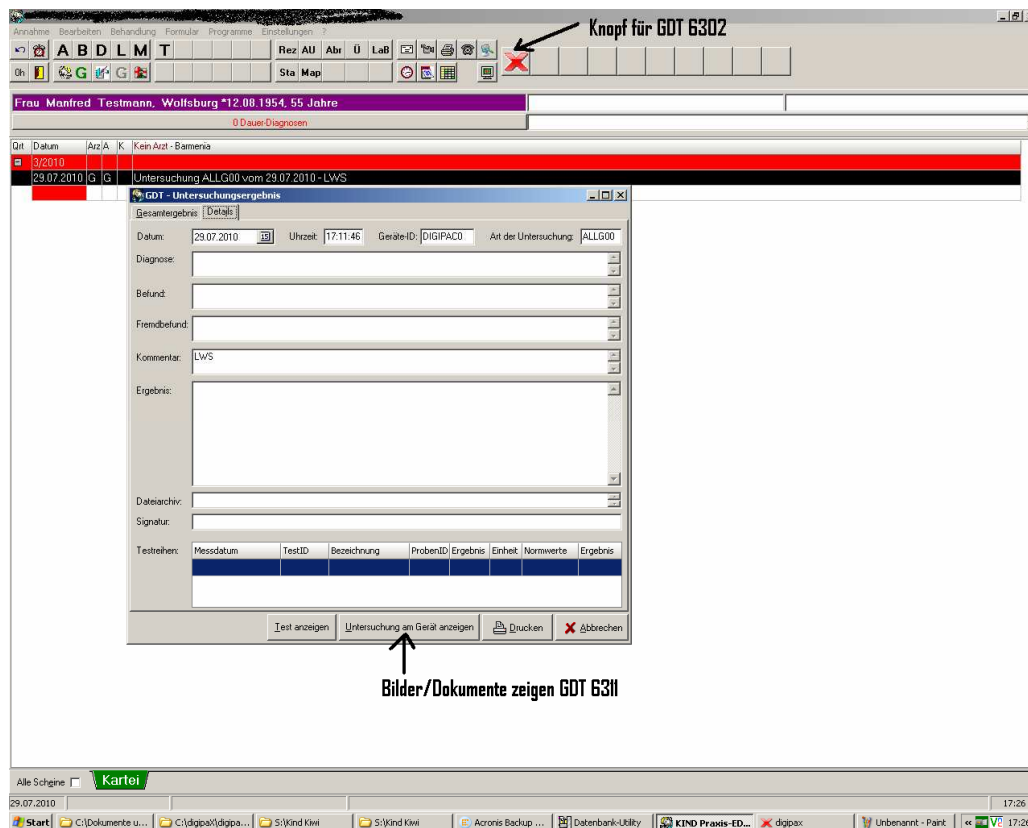
Freitext oder Anfangsbuchstaben Vorauswahlen-> ,(<- ->) #2 2/003 23.04. Kyo E

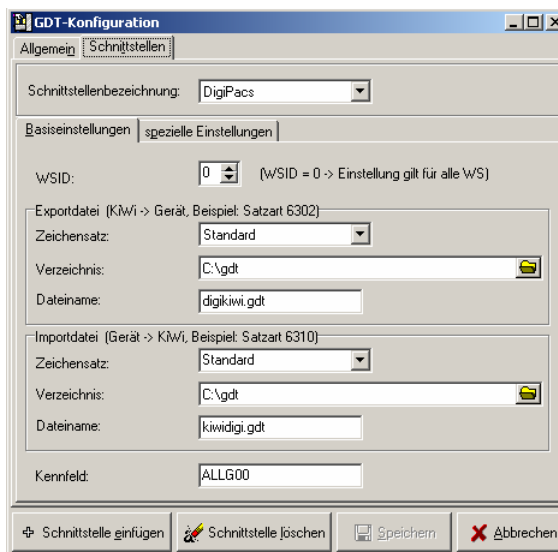
The status bar shows '16:32:52'.

Duria system configuration for importing GDT files

10.9 Connecting KiWi (KIND hearing aids)

The illustrations below demonstrate connecting GDT to the KiWi system.





GDT-Konfiguration

Allgemein | Schnittstellen

Schnittstellenbezeichnung: DigiPacs

Basiseinstellungen | spezielle Einstellungen

WSID: 0 (WSID = 0 -> Einstellung gilt für alle WS)

Exportdatei (KiWi -> Gerät, Beispiel: Satzart 6302)

Zeichensatz: Standard

Verzeichnis: C:\gdt

Dateiname: digikiwi.gdt

Importdatei (Gerät -> KiWi, Beispiel: Satzart 6310)

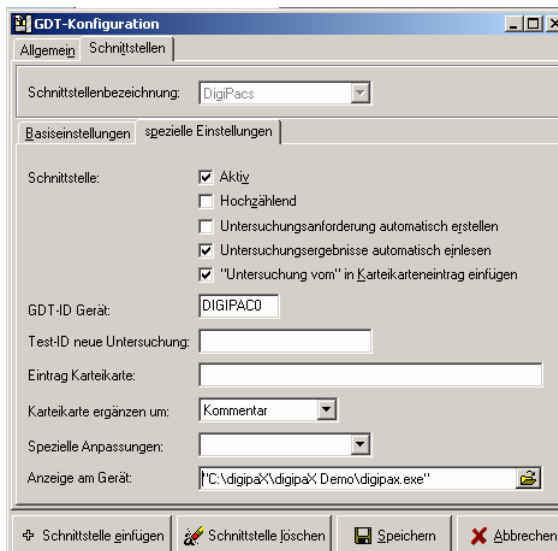
Zeichensatz: Standard

Verzeichnis: C:\gdt

Dateiname: kiwidigi.gdt

Kennfeld: ALLG00

➔ Schnittstelle einfügen ✎ Schnittstelle löschen 💾 Speichern ✖ Abbrechen



GDT-Konfiguration

Allgemein | Schnittstellen

Schnittstellenbezeichnung: DigiPacs

Basiseinstellungen | spezielle Einstellungen

Schnittstelle:

- ☒ Aktiv
- ☐ Hochzählend
- ☐ Untersuchungsanforderung automatisch erstellen
- ☒ Untersuchungsergebnisse automatisch einlesen
- ☒ "Untersuchung vom" in Karteikarteneintrag einfügen

GDT-ID Gerät: DIGIPAC0

Test-ID neue Untersuchung:

Eintrag Karteikarte:

Karteikarte ergänzen um: Kommentar

Spezielle Anpassungen:

Anzeige am Gerät: "C:\digipaX\digipaX\Demo\digipax.exe"

➔ Schnittstelle einfügen ✎ Schnittstelle löschen 💾 Speichern ✖ Abbrechen

10.10 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 in job 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.

10.10.1 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

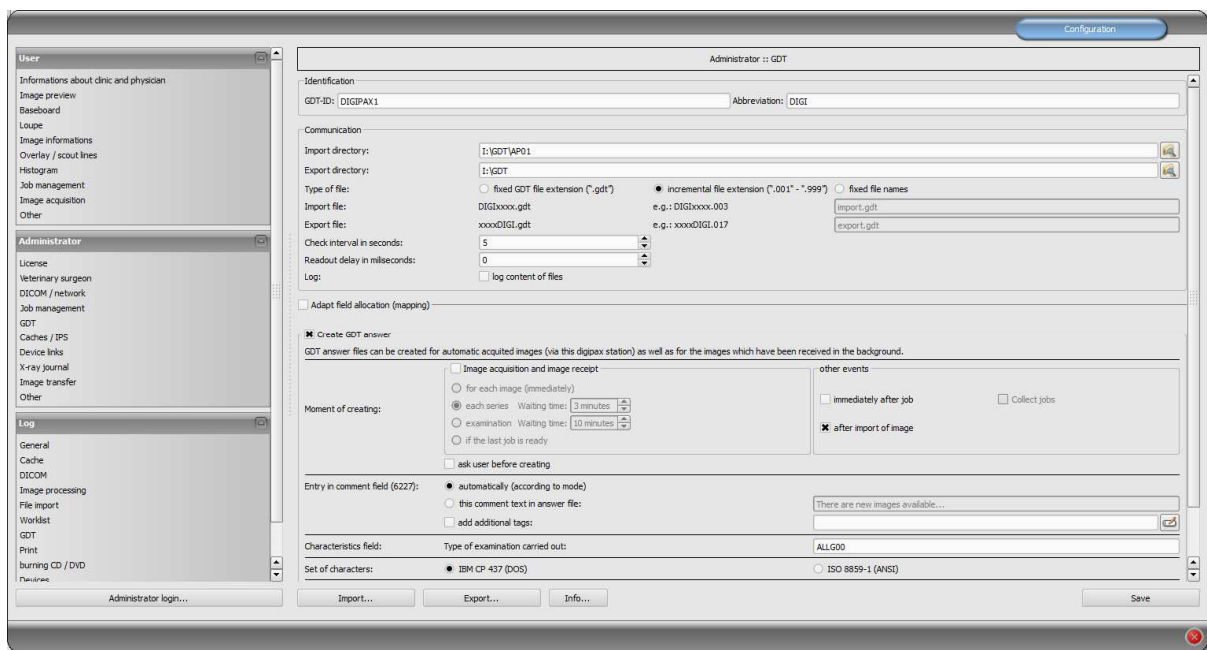
I:\GDT\AP02

...

I:\GDT\AP05

10.10.2 Workstation configuration:

10.10.2.1 digipaX:



GTD-ID should be the same for all stations, because MCS is 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

import directory is monitored and digipaX launches itself when a GDT file is created in the directory.

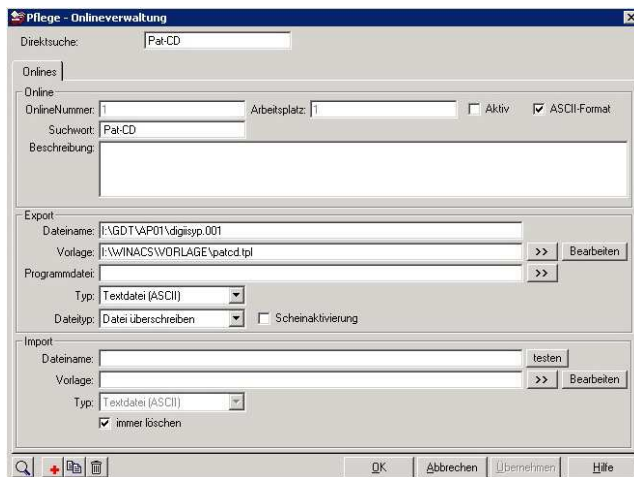
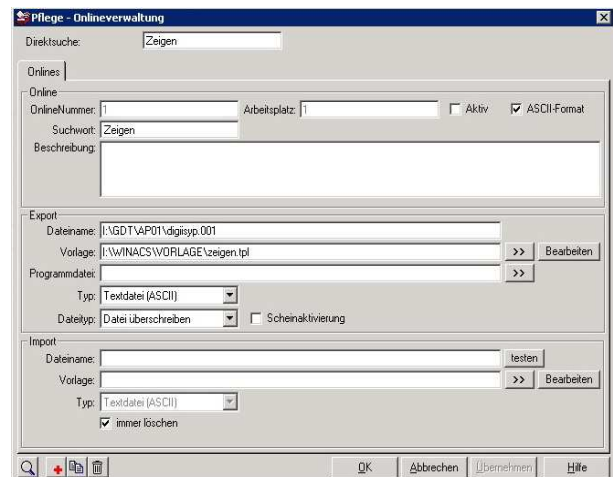
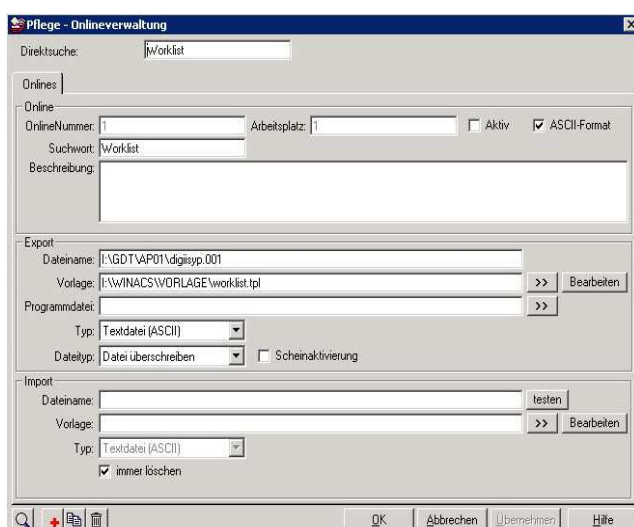
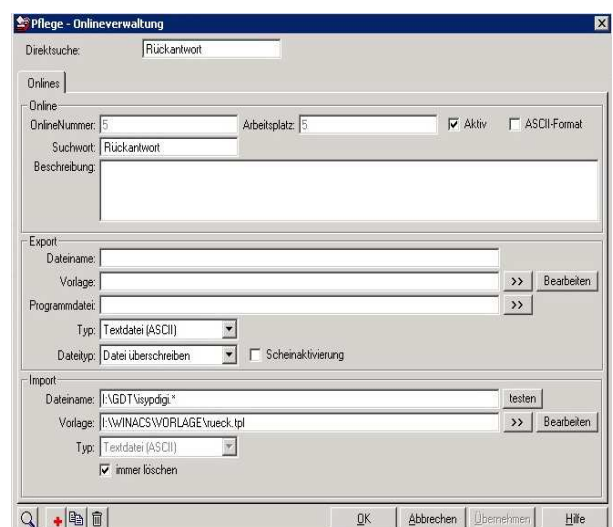
10.10.2.2 MCS Isynet:

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

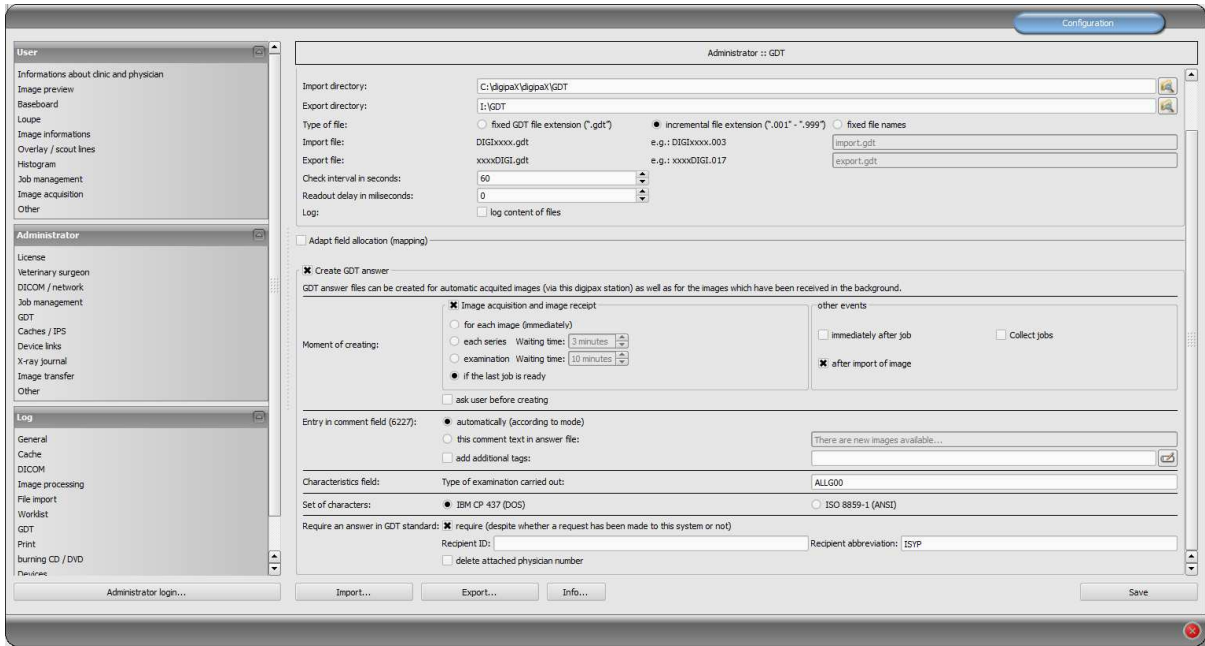
3 buttons need to be configured individually for each station using the "Online service management." Also here, the GDT directory must be modified for each station. The GDT file name for digipaX is set permanently as "digiisyp.001" (the basis for the 001 is an incremental extension of the file in digipaX).

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.

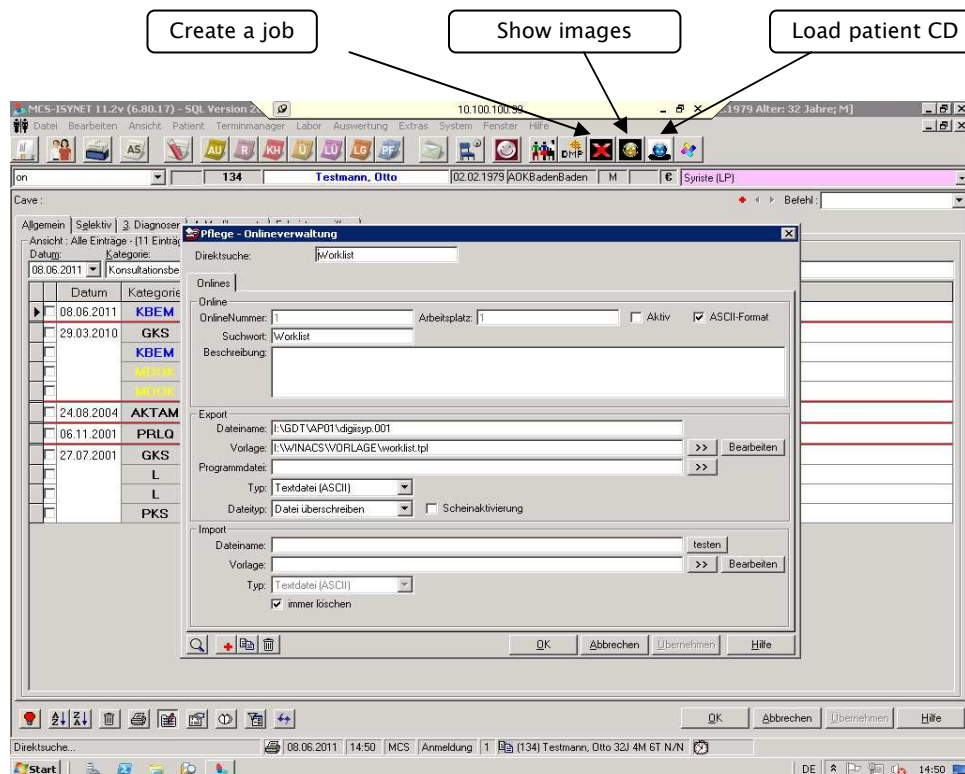
10.10.3 Image server configuration:



The image server is not really 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 directory, 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.



10.10.4 Templates:

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

worklist.tpl

zeigen.tpl

patcd.tpl

```
*** GDT Worklist anlegen ***
[@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]
```

```
*** GDT Bilder Zeigen ***
[@SL]80006311
[@SL]8100[FL]
[@SL]8315DIGIPAX1
[@SL]8316MCS-ISYNET
[@SL]8402
[@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]
```

```
*** GDT Pat CD einlesen ***
[@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]
```

rueck.tlp

```

'*****
'***  GDT-Format einlesen ***
'*****

'*** Finde Zeichenkette '3000' an Position 4 und nehme in gefundener
'*** Zeile ab Pos.8 5 Zeichen und ordne sie der Variablen "PATNR" zu.
[@PATNR:$FIND(4,3000);8;5]

'*** Finde alle Zeilen mit Zeichenkette '6228' (Tabellarischer Text)
'*** an Position 4 und nehme in den gefundenen Zeilen ab Pos.8 bis zum
'*** Ende der Zeile (99) alles und ordne Sie der Variablen "TEXT" zu.
[@TEXT:$FIND+(4,6227);8;99]

'*** 6220 ist die Befundkennung des GDT
[@BEF:$FIND+(4,6220);8;99]

'*** 6221 ist die Fremdbefundkennung des GDT
[@FBEF:$FIND+(4,6221);8;99]

'*** Datum im Format TTMMJJJJ
[@DATUM:$FIND(4,6200);8;8]

'*** 8402 Geräte- bzw. Verfahrensspezifisches KenFeld (muss als Krankenblatt-
'*** kategorie in MCS-NEXUS für MCS-ISYNET angelegt sein.
[@KAT:$FIND(4,8402);8;6]

[@Zeit:$FIND+(4,6201);8;99]

'*** Angabe des Programmes das aufgerufen werden soll, wenn in MCS-ISYNET
'*** auf den Karteikarteneintrag ein Doppelklick ausgeführt wird.
'[@PROG:C:\GERAETE\xxxxxx.lnk]

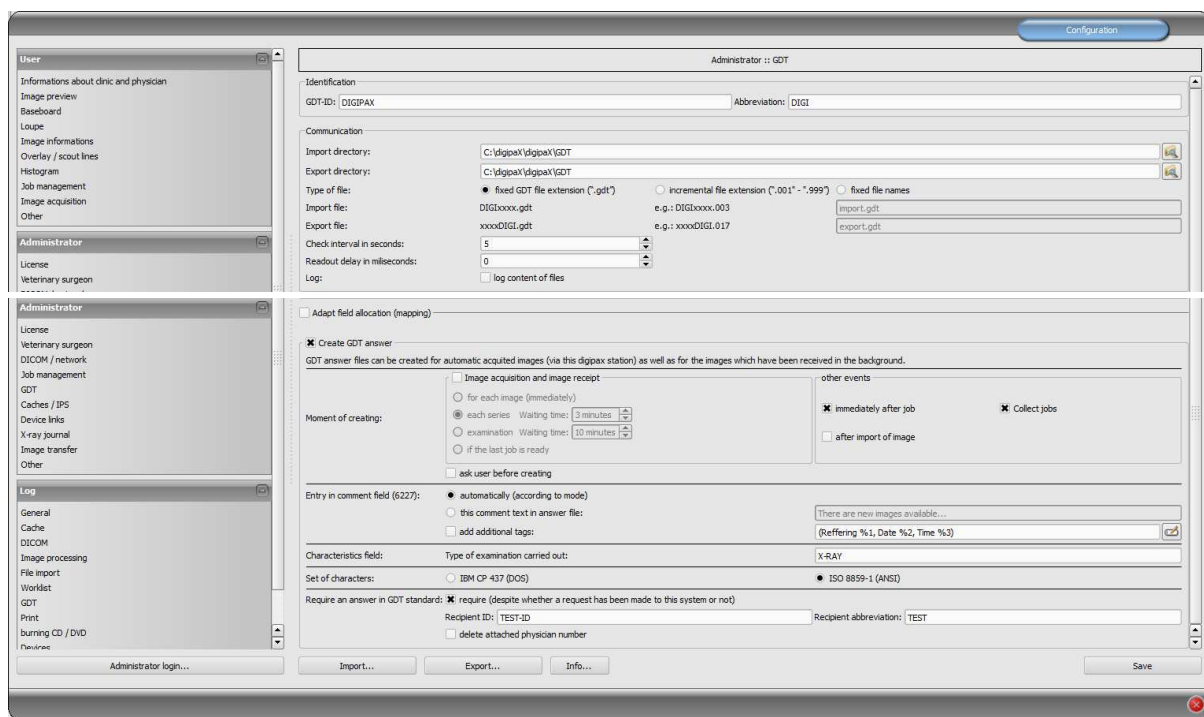
'*** Hier beginnt der Bereich für die Ablaufsteuerung in MCS-ISYNET
$ASS

'*** Eintrag einer Programmverknüpfung für das Krankenblatt
M PACS:[Datum] [Zeit] [TEXT]

```

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

10.11 digipaX configuration



10.11.1 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).

10.11.2 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 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).

10.11.3 Field assignment (mapping)

10.11.3.1 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.

10.11.3.2 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 9 DICOM worklist section 9.5 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.

10.11.3.3 Veterinary area:

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

10.11.3.4 Standard fields

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

10.11.4 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.

10.11.4.1 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 response 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 order with a user-defined comment (after reading the GDT file of record type 6302). The clinic management systems, such as TurboMed, who 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 analysis and receiving an image" 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 newly 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 a series of images or studys after receiving the first image, as opposed to after you save a new image, a "countdown" begins. If until the moment the countdown ends no other images will be uploaded for this series, as opposed to an study, or no other image is received, 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 a station receives the images directly and also uses the job management system, then select "When last job is ready." If the final order will be deleted and for the given patient new images are received, then the response file is created. Information is also sent regarding the new study (StudyDescription).

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 (eg patient 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.

10.11.4.2 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 job of the worklist (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 / Others" you can specify whether the beam paths are to be included in the description of the study.

10.11.4.3 Characteristics map

The value sent in field 8402 can be selected freely. The „ALLGOO“ standard for general studies.

10.11.4.4 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.

10.11.4.5 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 order, you can close the system, and at station B after the pictures 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's ID, removal of such an identifier may only be done by using the option "Remove the added physiscian's ID" (relates only to aperatures used by many physicians).

10.11.4.6 Program exit

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

10.12 Activities control system digipaX

10.12.1 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	Effect
6301: Send constant data	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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 gidipaX version 1.1.0). ▪ If the image acquisition module is not available or the <code>„/w“</code> parameter was passed, at this time the worklist component is loaded and a dialogue for creating new jobs is displayed. ▪ If the <code>„/i“</code> parameter was passed, at this time the import component is loaded. ▪ If the <code>„//pm “</code> parameter was passed, at this time the patient management module is loaded.
6311: Show study data	<ul style="list-style-type: none"> ▪ 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 at the start of the program no valid GDT file is found, the parameter `"/w"`, `"/i"` as opposed to `"/pm"` has no meaning.

10.12.2 GDT 8402 or 8410 field

In the GDT file record type 6302 ("Request a new study"), 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	Meaning
ACQ	ACQUIRE	Requests direct image acquisition. Available only if the image acquisition module is active.
WL	WORKLIST	Loading the worklist component and opening the dialogue to create the job.
IMP	IMPORT	Loading the import component for importing image files or scanning of documents.
PM	PATIENT MANAGEMENT	Loading patient management, e.g. for importing patient's CD or other images DOCOM for this patient.

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

10.13 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 / Others" in the "Patient ID" group, you can change this feature to compare to "Only patient's ID." In this way, only IDs will be compared and not the names and dates of birth of patients.

10.14 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 patients 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.

11 Caches / IPS

11.1 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 (cache-log).

11.2 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.

11.3 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.

11.4 Presentation States

Information on the presentation of gray 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.

11.5 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 the remaining series images", after clicking 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, immediately and automatically images are 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.

12 Image acquisition configuration and connecting devices

12.1 General

For image acquisition functions, you can integrate with the system various types of devices: scanners, detectors, generators and equipment for measuring dose-area factors. 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 is described in the user manual.



Additional instructions are available for connecting specific devices!

In the tools set you can customize both text and the symbol for the "Scan" button. In the tools set the equipment model names are shown (if it's possible to set their settings).

12.2 Image acquisition configuration

Settings for image acquisition may be mostly defined by the user (automatic transformations of images, the number of backups, etc.) The administrator selects only the optional acquisition settings on the memory card (standard: lack of optional fields – kV, mAs, dose-area product, are of optional fields). Besides this, on the same configuration page ("Administrator / Others"), you can select the unit for the dose-area product ($\text{dGy}\cdot\text{cm}^2$ or $\mu\text{Gy}\cdot\text{m}^2$), 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, the system automatically calculates the mAs product. In this case, the value of mA and ms are also copied 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 a decimal place. The "Text Mode" allows you to enter any text in 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 really necessary.

With the "Enter the mAs and ms separately" and "unit for the dose-area product in $\mu\text{Gy}\cdot\text{m}^2$ " options, the values for the tags are calculated from the input boxes. In such cases, the option "Free text" is not available.

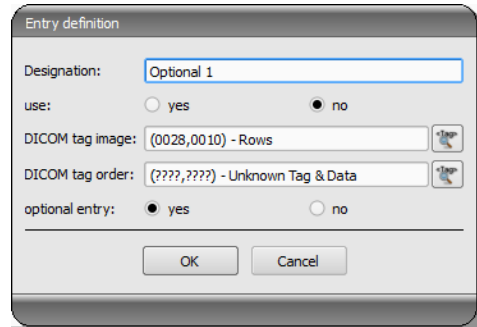
12.3 Simulation

The program can be started with the help of the /ds (Device Simulation) parameter to activate the simulation mode. In the simulation mode, for each device type there is an additional simulation device, which can be used for demo or testing purposes. In addition, in the "Scanning" tools set, 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.

13 X-ray journal

13.1 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, are marked with a check mark the used entries. 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.



13.2 New entry

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

To paste the entries from the image, the routing must be correctly set. If a user makes a new entry in the X-ray journal, they can choose from a list of previously received images and image for which they 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 job from the DICOM worklist 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 yes used entries which are optional for the X-ray journal. They can be freely configured to add additional fields to the journal.

13.3 Storage location

The X-ray journal file location in memory can be set freely in the configuration. The place can chosen so that, for example, the journal was always written by the backup system or there existed increased protection by the RAID system.

13.4 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 when saving the journal, you can use it as a backup

13.5 Automatic generating 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.

14 Visually choosing organs

14.1 Configuration

On the "Order Management" configuration page, you can specify settings for the selection of organs in the image when creating jobs from the worklist. In the standard system there is only type "Man". However, the list of types can be freely extended (eg, "dog", "cat", "Horse" – see separate user instructions). 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 paths. For further detailed instructions for this, refer to the user guide, as the user is also able to modify this list to your needs.

For each beam path 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 "Procedure Code tags" dropdown lists. Both the definition of the Code, as well as the selection of tags questions must be pasted to the target device parameters, as opposed to the device must be aligned with 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 "Body.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 several 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:

Image=Body.png

Modality=US

Station=STATION1

Symbol=Symbol.png

Overlay=Overlay.png

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

15 DICOM Print



DICOM Print is available only when the 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, title AE, 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 Available DICOM printers). With the additional parameters you can customize the printout (see 15.3 Additional printing 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 Available 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 out 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 printing parameters

For printing, you can use a number of additional parameters. It should be noted that not all printers will have all the DICOM printing 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 PRESENTATION 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]lut 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]value: integer (0..65535)
    set illumination to v (in cd/m^2)

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

15.3.3 Basic film session options

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

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

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

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

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

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

15.3.4 Annotation options

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

-a --annotation [t]text: 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]value: string
    set requested image size to v (width in mm)

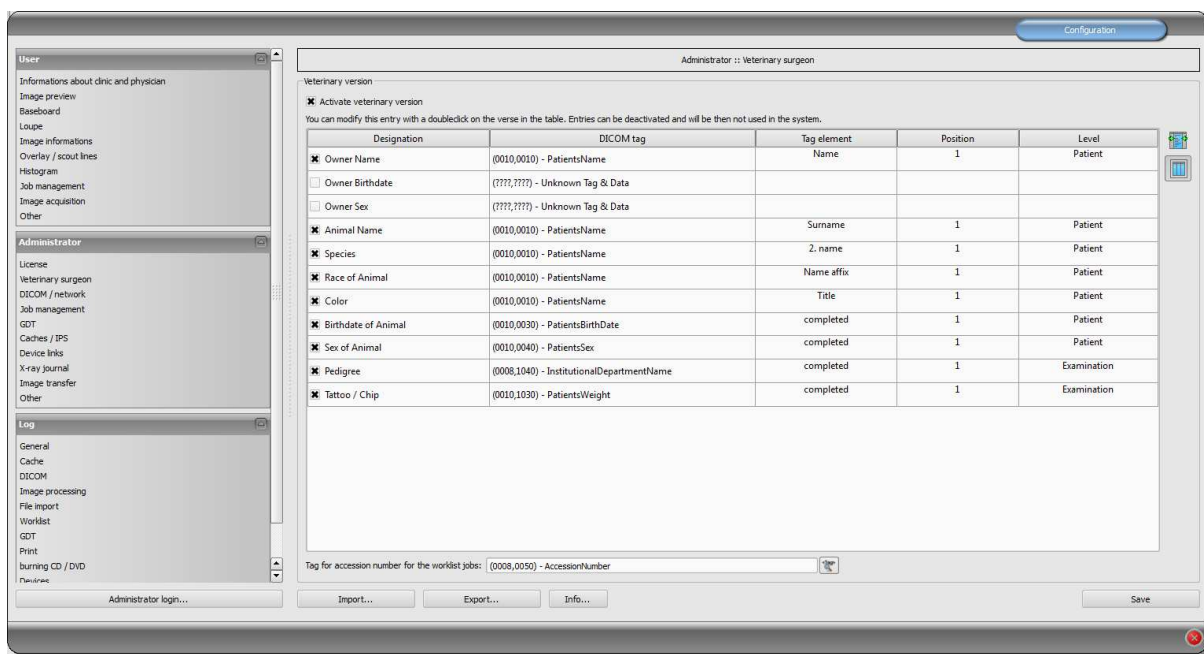
--img-magnification [v]value: string
    set image box magnification type to v

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

--img-configinfo [v]value: 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 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 you do not need to integrate with other system suppliers, 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 a 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 (multiples), 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 specified search 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, changes to the appropriate modality (modalities) settings which have already been entered, and enter new rows to display the requested information about the animals. Using 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 gender	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 gender	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 gender	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 Own defined settings

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

Description	Tag	Tag element	Position	Level
Owner`s name	0010,0010 (PatientsName)	First name	1	Patient
Oenwr`s date of birth	0010,0030 (PatientsBirthDate)	entirely	1	Patient
Owner`s gender	0010,0040 (PatientsSex)	entirely	1	Patient
Name of animal	0010,0010 (PatientsName)	Surname	1	Patient
Animal species	0010,0010 (PatientsName)	2. name	1	Patient

Features such as breed, coat, date of birth of the animal, animal gender, pedigree and tattoo / chip, should be used only when they are actually needed. First of all, in the 0010.0010 (name of patient) tag, "Title" and "Addition to the name" tag elements 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 Serie:

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 Bild:

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 Using the Accession Number tag

When using the worklist application component in digipaX, the tag 0008.0050 – Accession Number is used for assignment of jobs. If it is used differently in relation to the characteristics of the animal, then you must define another tag for job management in the configuration. This tag cannot be used for animal characteristics and it must be one of the following tags that are available on the server worklist:

(0008,0005) SpecificCharacterSet

```

(0008,0050) AccessionNumber
(0008,0080) InstitutionName
(0008,0081) InstitutionAddress
(0008,0090) ReferringPhysiciansName
(0008,1080) AdmittingDiagnosesDescription
(0008,1110) ReferencedStudySequence
    (0008,1150) > ReferencedSOPClassUID
    (0008,1155) > ReferencedSOPInstanceUID
(0008,1120) ReferencedPatientSequence
    (0008,1150) > ReferencedSOPClassUID
    (0008,1155) > ReferencedSOPInstanceUID
(0010,0010) PatientsName
(0010,0020) PatientID
(0010,0030) PatientsBirthDate
(0010,0040) PatientsSex
(0010,1000) OtherPatientIDs
(0010,1001) OtherPatientNames
(0010,1020) PatientsSize
(0010,1030) PatientsWeight
(0010,1040) PatientsAddress
(0010,1080) MilitaryRank
(0010,2000) MedicalAlerts
(0010,2110) ContrastAllergies
(0010,2160) EthnicGroup
(0010,21a0) SmokingStatus
(0010,21b0) AdditionalPatientHistory
(0010,21c0) PregnancyStatus
(0010,21d0) LastMenstrualDate
(0010,4000) PatientComments
(0020,000d) StudyInstanceUID
(0032,1032) RequestingPhysician
(0032,1033) RequestingService
(0032,1060) RequestedProcedureDescription
(0032,1064) RequestedProcedureCodeSequence
    (0008,0100) > CodeValue
    (0008,0102) > CodingSchemeDesignator
    (0008,0103) > CodingSchemeVersion
    (0008,0104) > CodeMeaning
(0038,0010) AdmissionID
(0038,0011) IssuerOfAdmissionID
(0038,0050) SpecialNeeds
(0038,0300) CurrentPatientLocation
(0038,0500) PatientState
(0040,0100) ScheduledProcedureStepSequence
    (0008,0060) > Modality
    (0032,1070) > RequestedContrastAgent
    (0040,0001) > ScheduledStationAETitle
    (0040,0002) > ScheduledProcedureStepStartDate
    (0040,0003) > ScheduledProcedureStepStartTime
    (0040,0004) > ScheduledProcedureStepEndDate
    (0040,0005) > ScheduledProcedureStepEndTime
    (0040,0006) > ScheduledPerformingPhysiciansName
    (0040,0007) > ScheduledProcedureStepDescription
    (0040,0008) > ScheduledProtocolCodeSequence
        (0008,0100) > > CodeValue
        (0008,0102) > > CodingSchemeDesignator
        (0008,0103) > > CodingSchemeVersion
        (0008,0104) > > CodeMeaning
    (0040,0009) > ScheduledProcedureStepID
    (0040,0010) > ScheduledStationName
    (0040,0011) > ScheduledProcedureStepLocation

```

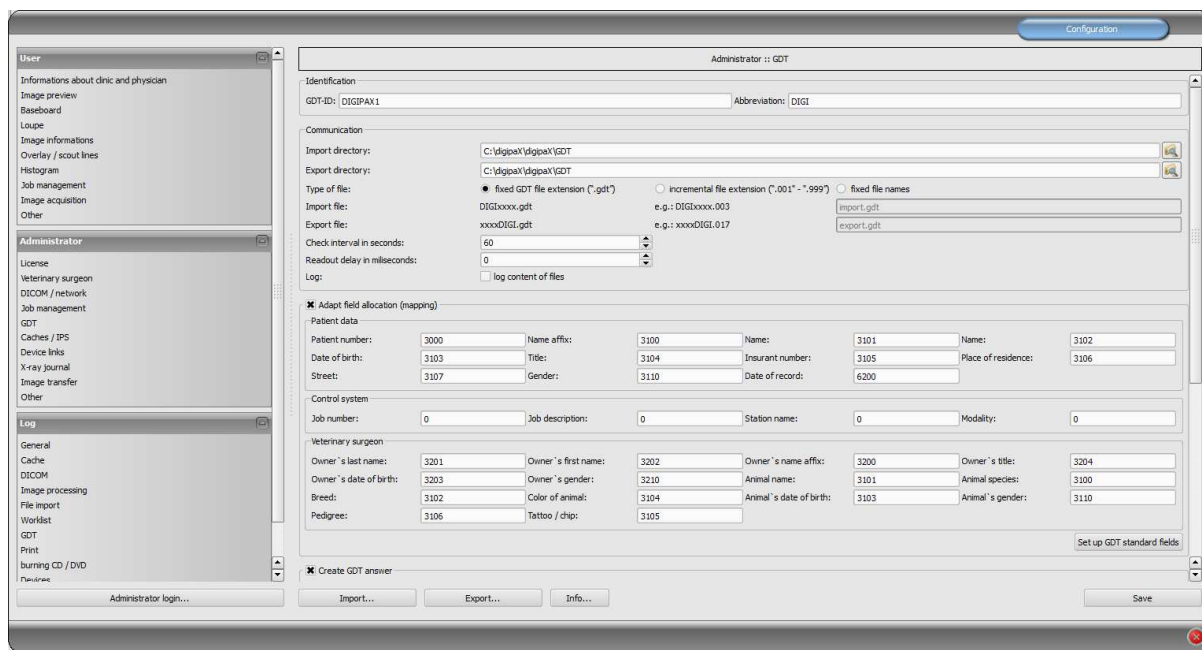
```
(0040,0012) > PreMedication
(0040,0020) > ScheduledProcedureStepStatus
(0040,0400) > CommentsOnTheScheduledProcedureStep
(0040,1001) RequestedProcedureID
(0040,1002) ReasonForTheRequestedProcedure
(0040,1003) RequestedProcedurePriority
(0040,1004) PatientTransportArrangements
(0040,1005) RequestedProcedureLocation
(0040,1008) ConfidentialityCode
(0040,1009) ReportingPriority
(0040,1010) NamesOfIntendedRecipientsOfResults
(0040,1400) RequestedProcedureComments
(0040,2001) ReasonForTheImagingServiceRequest
(0040,2004) IssueDateOfImagingServiceRequest
(0040,2005) IssueTimeOfImagingServiceRequest
(0040,2008) OrderEnteredBy
(0040,2009) OrderEnterersLocation
(0040,2010) OrderCallbackPhoneNumber
(0040,2016) PlacerOrderNumberImagingServiceRequest
(0040,2017) FillerOrderNumberImagingServiceRequest
(0040,2400) ImagingServiceRequestComments
(0040,3001) ConfidentialityConstraintOnPatientDataDescription
```

The chosen tag cannot be any other tag being used.

Some tags which may be suitable are shown in bold on the list.

16.5 GDT Field assignment / mapping

When connecting using GDT to the veterinary medicine clinic's management systems, the GDT connection fields should be adjusted. For example, on the 3110 field, patient's gender is transferred. In the veterinary version, this field often is the gender 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 10.11.3 „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. Changing the settings in the digipaX viewer is not possible.

17 Other configurations

17.1 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, in the background images are still received, 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.

17.2 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 patient's data is to be initiated at this time, and whether during the automatic loading process the digipaX logo is to be shown.

17.3 Area of application settings

In the 1.2.4 version, all the settings for each user are stored separately. Since 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 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 filing the record card entry. Do not use together with /w or /i.
/a	Admin	Automatically login as an administrator. Manual logging in with providing a password is no longer necessary. Warning: Do not use 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 tools set 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-Modul	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 patient CDs on the receiving station.

19 Image archive with several disks

For larger data resources you can use several 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
MAGDeviceThreshold      = 0
MAGDevices               = 2
MAGDevice0              = E:\Images0\
MAGDevice1              = F:\Images1\
NightlyCleanThreshold   = 0
NightlyMoveThreshold     = 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 MAGDeviceThreshold and NightlyCleanThreshold because they remove the pictures, when the hard disk is full! These values must always be set to 0!

With the usage of the values for NightlyMoveThreshold, 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".

20 Archiving

20.1 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 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 Conquest (MirrorDevice) 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.

20.2 Conquest Configuration

For the purposes of setting up the mirroring of data for the Conquest DICOM server, edit the file dicom.ini and enter the following lines:

```
# Configuration of mirror disk(s) to store images
MIRRORDevices = 1
MIRRORDevice0 = H:\mirror_data\
```

It is important to modify the path (the disk which the mirrored data is to be saved to). Further information on this subject are also in the Conquest manual (windowsmanual.pdf).

This disk must be properly checked in digipaX (footer bar – see 20.5 Monitoring the capacity status of the archive).

With this configuration, all incoming data is further protected on the chosen disk and eventually also deleted when data is deleted from Conquest. The folder structure is the same as in the original data.

20.3 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 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. Template for the batchfile.

MySQL_Backup.bat:

```
@echo off
setlocal

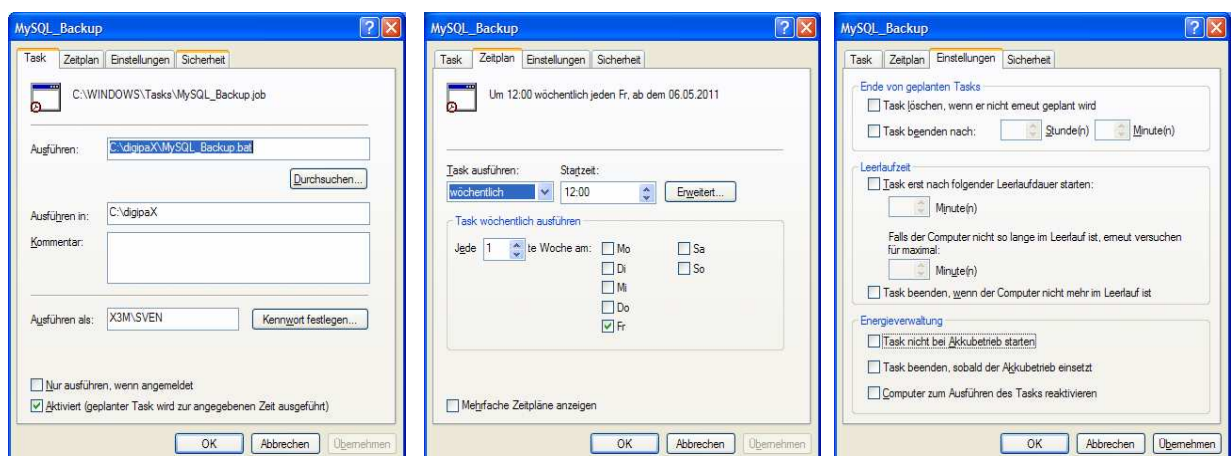
set hostname=localhost
set username=root
set password=root
set port=3306
set backup_file=C:\digipaX\MySQL_Backup.spl

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

mysqldump --host=%hostname% --user=%username% --password=%password% --port=%port% --databases "%database1%" "database2" ... > %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
```

20.4 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.

20.5 Monitoring the capacity status of the archive

20.5.1 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 is no longer has available space, a warning message is sent (once per session).

20.5.2 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.

21 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.

21.1 General rules of conduct

It is recommended to use as 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 medical company number), which is added to the patient's ID. At the receiving station, the DICOM router is given as the archive target.

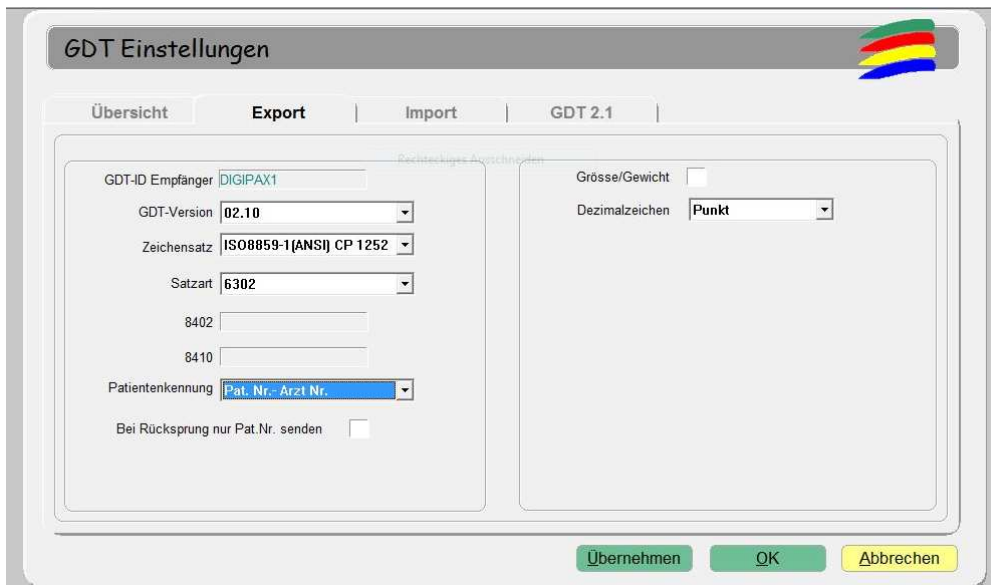
21.2 Adding physician's identification tag to the patient's ID

21.2.1 Without GDT

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

21.2.2 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's 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.

21.3 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."

In the dicom.ini file, the following router settings should be made:

```
# Configuration of routing
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
```

Connections used for used AE titles must be given in the "Known DICOM providers" card in Conquest.



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's 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 the images sent through the router are also stored, including Router-DICOM archive. This has the advantage of automatically creating a copy of the image. However, a threshold must also be set so that the router archive does not overflow:

```
MAGDeviceThreshold    = 1024
```

This value is the amount of free memory space in MB that cannot be exceeded. The patients which are rarely used are always removed, when the memory free space exceeds this value.

21.4 Tips for worklists

If the receiving station system supports the downloading of jobs worklists from different worklists servers, you should also use separate working list servers as opposed to the same server with different titles AE (see Chapter 9 DICOM worklist) genutzt werden.

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,

"ARZT1" and for list 2, "ARZT2." If the system receives all jobs, they are displayed without filtering. In the case of physician 1's system, as a filter for jobs from the worklist, enter the station name "ARZT1", so that only his/her jobs are received. In the case of a physician 2, it should appropriately be entered, "ARZT2."

22 Transferring the image

This module is used to transmit to their own image archive, that for example, has been received from an external device. To use this, you must activate the "Image Transfer" license module.

22.1 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 receiving the image does not work 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.

22.2 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 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 wait 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.

22.3 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 jobs from the worklist. 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 jobs from the worklist."

23 System commissioning

23.1 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.

23.2 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.

24 Image assignment correction

If the image has been mistakenly assigned to the incorrect patient, the user is unable to correct this. This is the job of the administrator. For this purpose, it is necessary to change the appropriate tags in the DICOM image.

24.1 General procedure

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.

24.2 Backing up data and removing invalid images

Patient's ID can be determined in digipaX or possibly also in patient management. In Conquest, you can then use the ID on the "Browse database" page, select the patient who has improperly assigned images. Patient images can be scrolled here (you can use "Force display of (large) image" in the context menu.) Incorrectly assigned images you can then determine the file name – context menu "View or edit database", the "OBJECTFILE" filed in the table of images. **All** patient's files, including those assigned correctly, you should be copied to a separate folder (e.g. C:\Fehler), and then removed from Conquest using the "Delete this patient" in the context menu.

24.3 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	Gender 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) <u>or</u> create a new study number (UID) by adding additional digits (eg "1" or ".1")

Save the changed file.

This procedure must be repeated for all files assigned incorrectly.

24.4 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:\Fehler) can be deleted.

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

25 Deleting images from the database

Search the conquest for the image to be removed. It is best to use the patient's ID for this purpose. In the image context menu select "Remove image from database." If the file also has to be physically removed from the disc, you should find the specified in the dialogue file in the Conquest server data directory. After finding the file, in the dialogue confirm whether the image is actually to be removed by typing "Yes", and then delete the file on your hard disk as well.

Usually, you must also delete the file from the disc, because otherwise with the eventual rebuild of the image database, it will be downloaded back to the database.

26 Others

26.1 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.

26.2 Saving settings

The digipaX system settings are stored in the registry under the following key:

HKEY_CURRENT_USER\Software\digipaX\digipaX

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

C:\Dokumente und Einstellungen\<Nutzername>\Anwendungsdaten\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, this path is:
Users\<Nutzername>\AppData\Roaming

26.3 Transferring configurations

After logging into digipaX as an 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.

26.4 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/>

27 Administrator password

To log into the configuration page, provide the following password:

digi4admin

The system here distinguishes between uppercase and lowercase letters.

The software can be started with the program parameter /a, so that administrator rights are immediately given without having to log on.

Product: digipaX

Manufacturer: digipaX GmbH
Bitterfelder Str. 12
04129 Leipzig

The product is CE marked: CE 0494

Recent changes in this guide: 18.08.2011