

Kofax Communication Server

TC/Archive Technical Manual

Version: 10.2.0



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TABLE OF CONTENTS

1. STRUCTURE OF THE PRODUCT	6
1.1 Overview	6
1.1.1 Dedicated Archive Server	6
1.1.2 TC/ARCHIVE on TCOSS Server	7
1.2 Benefits, Strengths	7
1.3 Archiving.....	8
1.4 Document Retrieval.....	8
1.5 Administration.....	8
1.6 Software Components.....	9
1.6.1 Program and Configuration Files	9
1.6.2 Database Files	10
2. FUNCTIONALITY	12
2.1 Administration Functionality Overview	12
2.2 Retrieval Functionality	13
2.3 Retrieval User Interface (Overview):	13
2.4 Security	14
2.4.1 Security Against Data Loss	14
2.4.2 Security Against Inaccessible Data.....	14
2.4.3 Security Against Unauthorized Access	14
2.4.4 Access Control.....	15
2.5 Indexing.....	15
2.5.1 Indexes	15
2.5.2 Full Text Index	15
2.6 Advanced Index Management	16
2.6.1 Index Volume Feature.....	17
2.7 Storage Management.....	18
2.7.1 Selective Archiving.....	18
2.7.2 Flexible Content Filtering	21
2.8 All Send Attempts and User-Defined Log Entries	24
2.8.1 All Send Attempts	24
2.8.2 User-Defined Log Entries.....	25
2.9 TCOSS Code Page Support	25
2.10 Jukebox Support.....	26
2.11 Automatic CD and DVD Writing	26
2.11.1 Restrictions	27
2.12 Jukebox and CD Writer Operation	27
2.13 DVD Support.....	28
2.13.1 Multiple Archive Volumes on a Backup Medium	29
2.14 Network Storage Support	30
2.15 Manual Writing of CDs Using "WinOnCD"	31
2.16 Manual Writing of CDs Using "GEAR Multimedia"	34
2.17 TC/Archive for Application Service Providers.....	38
2.17.1 Multiple TC/Archive Instances on the Same Storage Server.....	38
2.17.2 Shared Jukebox.....	38
3. PREREQUISITES	40
3.1 TCOSS Server Configuration.....	40
4. INSTALLATION	41
4.1 Prerequisites	41
4.2 Disk Partitioning	41
4.2.1 Disk Partitioning for DVD Writing.....	41
4.3 Installation Overview	42
4.4 Jukebox installation.....	42
4.4.1 Jukebox Connectors	42
4.5 Point Jukebox Manager Release 4.1 Installation	42
4.5.1 Uninstall Existing Jukebox Manager Release.....	42

4.5.2	Point Jukebox Manager Setup.....	43
4.5.3	Configuring the Jukebox Manager for a Single CD Writer.....	51
4.5.4	Configuring the Jukebox Manager for a Jukebox	52
4.5.5	Create a Performance Profile	53
4.5.6	Set User Rights in Jukebox Manager	55
4.5.7	General Jukebox Manager Configuration Settings	57
4.5.8	Copy File "uid.dat"	57
4.5.9	Jukebox Manager Settings for DVD Writing	58
4.5.10	Point Jukebox Manager License.....	58
4.6	Archive Setup	58
4.6.1	Setup for DVD Writing, Upgrade of Existing Archive	65
4.6.2	Setup for DVD Writing, New Archive	65
4.6.3	Setup for CD Writing with 700 MB Media	65
4.6.4	Installing TCJUKE on a Separate Workstation	65
4.7	Network Settings	66
4.7.1	Settings for Native NETBIOS Transport	66
4.8	System Upgrade with Different Logical Drives.....	67
4.9	Configuration of Very Small Archive.....	67
4.10	Upgrade to Unicode.....	67
4.10.1	Unicode Activation	67
4.10.2	Restrictions	68
4.10.3	Unicode Deactivation	68
4.10.4	Release Downgrade.....	68
4.10.5	Archive Tool	68
4.11	Registry Keys.....	69
4.11.1	Archive Database.....	69
4.11.2	Unicode Support	70
4.11.3	Word Index	71
4.11.4	Selective Archiving.....	71
4.11.5	Flexible Content Filtering	71
4.11.6	TCOSS Server Settings	72
4.11.7	TC/Archive Operator	72
4.11.8	Customer Definition	72
4.11.9	CD and DVD Handling	73
4.11.10	Network Storage Support.....	73
4.11.11	Jukebox Support	73
4.11.12	Automatic CD Writing.....	74
4.11.13	Remote TCJUKE Process.....	74
4.11.14	Supervisor Service	75
4.11.15	TCARCH Trace	75
4.11.16	Advanced Technician Settings.....	76
4.11.17	Jukebox Support and CD Writer Process "TCJUKE"	76
4.12	Archive Restore from CDs.....	77
4.13	Archive Settings for New or Cleared TCOSS Server	79
5.	ERROR HANDLING.....	80
5.1	KCS Monitor	80
5.2	Event Log Entries	81
5.3	Operator Warnings.....	85
5.4	Handling of Configured Disk Space Limit.....	86
5.5	Handling of Inaccessible Logical Drives.....	86
5.6	Search in Archive with Some Volumes Missing	87
5.7	Handling of Very Large Messages	87
5.8	"Search Too Complex" Information in Search Result	87
5.9	Administrator Function "Set State of Volume".....	88
5.10	Administrator Function "Re-Create Index Volume"	88
5.11	Search in Archive with Time Loop	88
6.	COMPATIBILITY	90
6.1	Downgrade to Releases Before 2.00.00	90

- 6.2 Downgrade to Releases Before 2.03.0090
- 6.3 Downgrade to Releases 2.03.00 .. 2.06.0390
- 7. PERFORMANCE91**
 - 7.1 Archiving.....91
 - 7.2 Retrieval91
- 8. CONFORMANCE TO LAWS AND DIRECTIONS92**
- 9. RESTRICTIONS.....93**
- 10. FURTHER DOCUMENTS94**
- 11. IMPLEMENTATION ISSUES95**
 - 11.1 Overview of Fields in Word Index:.....95

1. Structure of the Product

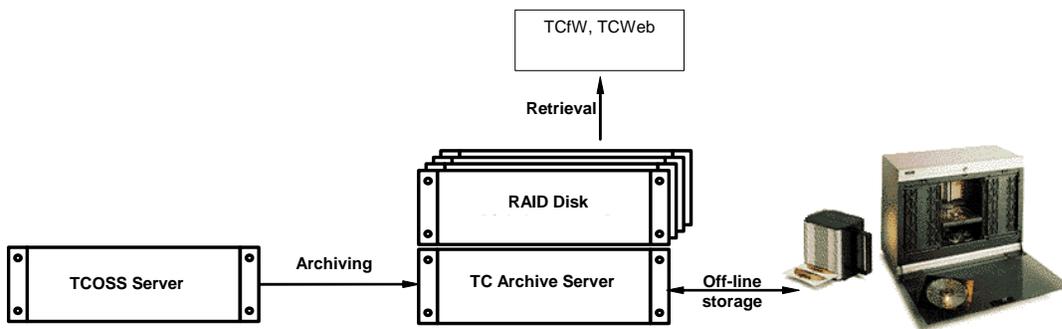
1.1 Overview

The TC Archive Application (TC/ARCHIVE) is always connected to a TCOSS server. The TCOSS provides connectivity to all types of systems and services. With its advanced queuing and routing functionality it is the ideal combined messaging and archive hub.

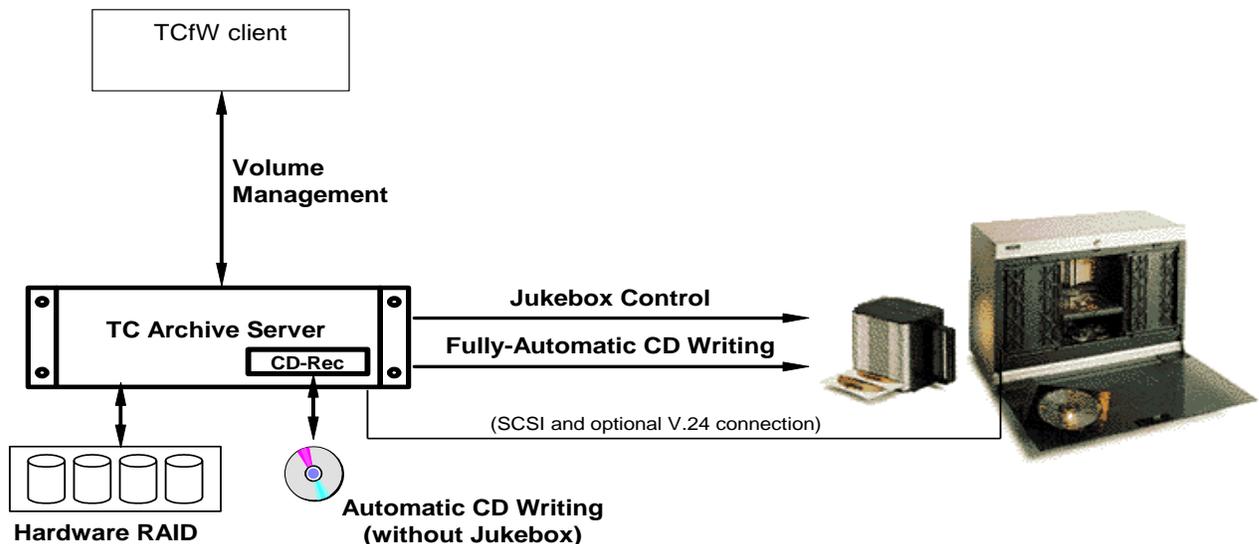
- First the TCOSS server puts documents to its local short-term archive. This happens on sending or reception of messages or on a dedicated archive request from any mail link or service (documents may be sent to dummy users with Auto Terminate set).
- Then TC/ARCHIVE takes the documents from the short-term archive. It analyzes the content, creates a full index and saves the document plus entry to its disk array.
- For retrieval, clients directly access the Archive Server. Switching between both servers is completely transparent for the user.
- TC/ARCHIVE may run on a computer in parallel with TCOSS or on a dedicated Archive Server.
- To run TC/ARCHIVE on a TCOSS Server a separate license is required.

1.1.1 Dedicated Archive Server

The dedicated Archive Server is a high-end solution for customers with strong archiving needs.



Automatic CD-Writing and Jukebox Control and support of Hardware RAID:

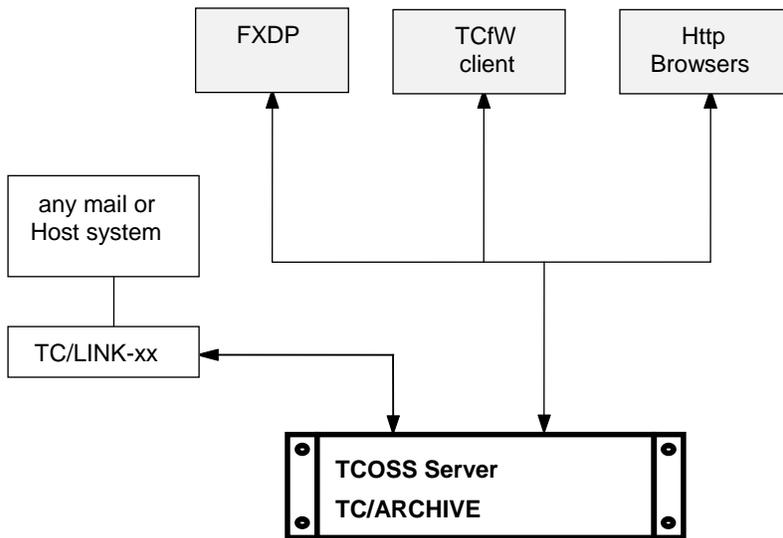


- The interface between the Archive Server and the Jukebox is SCSI. Each drive within the Jukebox requires one SCSI ID. Non-NSM jukeboxes additionally require one SCSI ID for robotic control. NSM jukeboxes require a V.24 (serial) connection for robotic control.
- Multiple Jukeboxes can be connected allowing virtually unlimited scalability (limited by number of free SCSI-ID's. NSM jukeboxes allow daisy chaining of V.24)

1.1.2 TC/ARCHIVE on TCOSS Server

TC/ARCHIVE running on a TCOSS Server offers advanced indexing and retrieval functionality. It offers affordable archive functionality from the start.

A TCOSS plus TC/Archive with DVD writing configuration has been tested on a HP Proliant DL380 Server (RAID 0+1, 3 GHz dual processor, 2MB L2 cache, 2GByte RAM, hyperthreading enabled, 2x146GByte hard disk, TEAC DV-W28EW DVD writer). It's guaranteed to work without any performance restrictions.



1.2 Benefits, Strengths

New with TC/ARCHIVE Version 2:

- Jukebox support providing automatic access to 1000+ offline volumes (Terabytes of storage)
- Advanced Index Management allows fast responses to long term (10 years or more) archive searches while balancing storage requirements between on- and offline volumes. Index information is available on fast online storage while actual message content is optionally stored within slower jukebox systems. This combination provides fast access to any message stored during any period of time.
- Fully automatic CD / DVD writing with Jukeboxes. No operator actions required.
- Automatic CD / DVD writing for non-jukebox installations.
- Support of complete NSM jukebox range including Satellite, Mercury and CDR100 family. Support for other jukebox vendors are provided upon request.
- Fully scalable by simply adding new jukeboxes.
- Flexible Content Filtering to optimize storage requirements. Either archive the original message (for example word document), additionally archive a Fax image (for example to guarantee future readability) or archive both.
- New Hardware RAID support as alternative to Windows soft-RAID

TC/ARCHIVE Version 2 further enhances the Unified Messaging Archive. Features already offered by TC/ARCHIVE Version 1 include:

- Full Archiving of all internal and external messages in one archive
- Administrators have full control over the complete internal message traffic (logging)
- Users do not need to archive messages locally

- All messages in one, full text retrievable, archive. This means all knowledge about business transactions, can be found at one place, TC/Archive.
- The Archive uses alternative-content technology. Messages are stored in the archive in both the original message format (for re-use) and in a final form image format (for legal purposes).
- The retrieval interface offers flexible search options: simple text search, limit by date/time and advanced Boolean and structured searches.
- Archived messages can be displayed via Quick View before they are actually opened within the native client. When the archive search returns multiple matches, quick view helps to manually find the required document by quickly providing a final form view on the archived message.
- The final form view presented by Quick View shows the message exactly as the TCOSS System transmitted it. This is convenient to prove a case and important to guarantee long term access. After some years an application may not be available that can interpret the original message format. Quick view does not need the original application to display the content of attachments.

1.3 Archiving

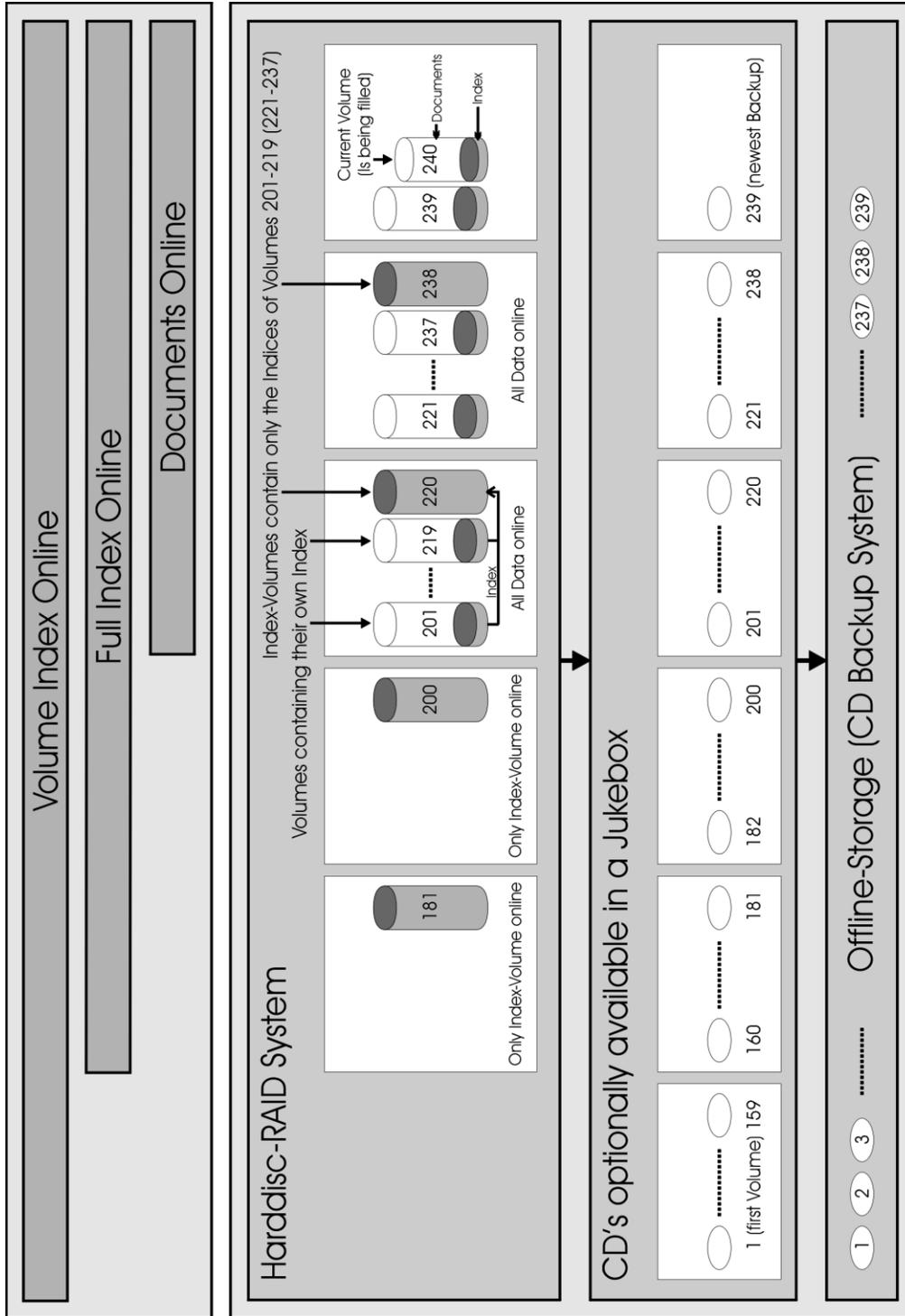
Documents can be archived from any service, system or client that is connected to the TCOSS server. Each archived document consists of an archive entry and the document itself. The archive entry holds all the fields of a standard TCOSS mail entry.

1.4 Document Retrieval

Can be done with TCfW or Browser Clients.

1.5 Administration

Data on the Archive Server is usually organized into CD-sized archive volumes. These volumes can be handled on administrator level. Archive volumes can be written to CD / DVD, or restored to the archive. Each installation of the archive system has a unique installation ID (customer ID + system ID), each archive volume has a unique volume number. Volume numbering starts with system installation. Installation ID and Volume number together form a globally unique id for each volume. Archive volumes can be written to CD as soon as they are full. The oldest volume is subject to cyclical erasure.



1.6 Software Components

1.6.1 Program and Configuration Files

Most program and configuration files can be found in the C:\TCOSS\SYSTEM and C:\TOPCALL\SHARED directories:

TCARCH.EXE	TCARCH process
TCJUKE.EXE	TCJUKE process
STOPFILE.TXT	stop word file, may be edited by the customer
TCTI32.DLL	DLL used by TCARCH
TCLIB32.DLL	DLL used by TCARCH and TCSR
TCRPC32.DLL	DLL used by TCARCH and TCSR
TP80.DLL	DLL used by TCARCH and TCSR
TOS32.DLL	DLL used by TCARCH
TPLINK.SYS	TPLINK service used by TCSR
TCSR.VEXE	supervisor service
SC.EXE	used by SETUP
TCMON32.EXE	KCS Monitor
MSVCRT.DLL	used by TCSR and TCMON32
TCSI32.DLL	DLL used by TCARCH
TCMSG.DLL	DLL used by TCARCH

Files taken from the Windows directory:

TOPCALL1.INI configuration file for TCSI with TCTI client functions (used by all clients)

The jukebox and automatic CD / DVD writing support option uses files from the Point Jukebox Manager install directory (default "C:\Program Files\Jukebox Manager") and from the Windows directory.

1.6.2 Database Files

The archive database is located in the configurable volume root path and consists of a volume index file and a subdirectory for each on-line volume:

- VOLIDX ... volume index file
- USRPRF ... replicated user profiles
- 000001 ... subdirectory volume 1
- 000002 ... subdirectory volume 2
- 000003 ... subdirectory volume 3

The volume index file contains the time range and some statistical information of all (on-line and off-line) volumes. It also stores the state (on-line, off-line, ..) of each volume. Deleting the volume index file deletes the whole archive database on disk (even if volume subdirectories exist they are not found and get overwritten if the volume index is missing).

The user profiles (the part which is used for the rights checking) are saved in the file "USRPRF". The format of this file is the TCSI ASCII stream format (the password is encrypted). At system start up all user profiles from this file are loaded and used for the rights checking until the first complete update from the TCROSS server's user profiles has been finished. This means it is only important in case the Archive server is booted and has no connection to the TCROSS server.

In case that no "USRPRF" file exists already, the setup utility will install a "USRPRF" file which contains only the "TCTECH" user. This file will be overwritten with the actual user profile data after the first log-in to the TCROSS message server.

The volume subdirectories contain the following files:

- 00 ... temporary undo file on disk / volume index backup on CD
- 10 ... word index, contains all search strings in a B*-tree structure
- 20 ... occurrence lists, compressed bit strings of search string occurrences
- 30 ... time cluster index
- 40 ... mail entry index
- 50 ... mail entries
- 60 ... message index
- 70 ... messages

The files 10 and 20 are created as 11 and 21 on a new volume and built in their final form as 10 and 20 by a reorganization step after the volume is closed. Each database file has a 4k file header containing format information, file number, volume number, customer identification and system ID.

Note: Never delete any archive database file. (All database files are locked when the archive process is running.)

2. Functionality

2.1 Administration Functionality Overview

The archive administration window allows to keep track of the status of each volume. It shows whether it exists on RAID storage, is closed or open and the number of copies that have been made.

- general status information:
 - state of archiving (fetching messages from TCOSS server): active / stopped
 - state of archive search: active / stopped
 - number of volumes
 - time of newest archive entry (last entry fetched from TCOSS server)
 - time of oldest archive entry on disk
 - time of oldest archive entry on CD or DVD (archive start)
 - number of messages on disk / CD or DVD / total
 - number of mail entries on disk / CD or DVD / total
- general administration operations
 - start / stop archiving
 - start / stop archive search
- status information for each logical volume created since first installation:
 - time range
 - number of messages / mail entries
 - number of backup media written
 - status (open / complete on disk / deleted from disk)
 - path to offline volume
- possible operations on on-line volumes with the automatic CD writing option installed:
 - write CD / DVD immediately
 - write CD / DVD scheduled
 - verify CD / DVD only
- possible operations on on-line volumes using manual CD writing:
 - prepare file for CD / DVD creation
 - make CD / DVD
 - verify CD / DVD only
 - verify CD / DVD and increment count
 - remove file for CD creation
- possible operations on off-line volumes:
 - restore volume from CD / DVD
 - restore index from CD / DVD
 - set path for off-line volume

Deletion of disk volumes which have already been saved to CD / DVD is done automatically. An operator message is generated some time before a volume is due for deletion and has not been saved yet.

The administration function “restore volume from CD / DVD” is only used to rebuild an existing archive on a new archive server (see separate section).

Restriction: The following per-volume fields of the archive maintenance folder are not stored permanently on disk and are therefore empty if the TCARCH process is stopped and restarted: “offline volume path”, “last action”, and “result”

2.2 Retrieval Functionality

The following retrieval functions are provided by TC/Archive. Whether and how these functions are available to the user depends on the type of client used.

- A string may be searched in a particular field (like the subject field or text content) or in all fields.
- If the time is not explicitly specified the search is only done within the index available on disk, starting with the most recent volume.
- The archive search returns a list of mail entries. Opening the full document is a separate action.
- If one document was sent to a number of recipients all mail entries will appear in the search result (this does not apply to the in-box-only view).
- The result list of an archive search is always sorted by archiving time (starting with the most recent message). Archiving time is the time when the mail entry was entered into the TCOSS short term archive.
- The archive search supports in-box and out-box views as in the TCOSS short term archive. Additionally a general view of all entries (without consideration if an entry is visible in an in- or out-box) is available.
- Optimized access for all text content plus the following fields:

fields from mail entry:

- archivation time (= send / receive time)
- subject
- recipient user ID
- recipient group
- originator user ID
- originator group
- document number
- normalized address
- recipient digits (allows search for any part of fax or telephone number)
- normalized originator
- originator info
- originator digits (allows search for any part of fax or telephone number)
- envelope name
- message ID
- custom fields 1 ..4

fields from the envelope's header (if existing, from originator and recipient):

- Recipient ID
- Service
- Company
- Department
- Fullname

2.3 Retrieval User Interface (Overview):

The general functionality will be the same for all client platforms. (See detailed description in the respective user manual.)

Find button opens find window

selectable: IN/OUT/Both
from/to (name, number, user id)
text (in subject, content, filename, etc., AND, OR, NOT)
time (as date, range)
search content (checkbox)

buttons: find now, stop, new search (similar to Windows 95 find function)

When the user starts a search, the found entries are entered smoothly into the search window as they are found. When the search window is full the Archive Server continues the search in the background. When the user then scrolls down, the next entries are displayed immediately.

If an off-line volume is required (either for index or data) the client opens a notification window - the requested volume may then be made available either as shared resource (CD-ROM at users workstation, user specifies path) or the CD may be put to the Archive-Server's CD-drive.

2.4 Security

2.4.1 Security Against Data Loss

One advantage of the TC/Archive solution is that the data can always be kept at minimum two separate systems or locations, providing very high security in cases of disaster.

1. Document transfer to TCOSS

Documents are not deleted on the connected system before they are securely stored on the Primary and Secondary servers which make up a TCOSS Tandem System.

At this time the document exists on two different TCOSS Servers, they can be on different locations.

2. Transfer to Archive

The Archive Server permanently fetches documents from the TCOSS server and indexes and archives them on the local RAID.

At this time the document exists on 3 locations with a Tandem TCOSS Server and on 2 locations with a single TCOSS server.

3. Writing of CD / DVD

It can be configured how many CDs or DVDs are automatically written of each volume. Normally 2 backup media will be written, one kept in the Jukebox or at the shelf for long term retrieval, the other stored away at a safe site.

From now on the data exists on the Archive RAID plus the number of media written.

2.4.2 Security Against Inaccessible Data

Storage medium

The writeable CD / DVD combines low cost with long term stability (Kodak specifies 100 years of readability).

Reading devices

Standard CD is perhaps the most widely available data format today. Reading devices for standard CDs and DVDs will thus be available for the foreseeable future.

File System

CD volumes are formatted to the CDFS file system. CDFS is a file system with open specification (ISO 9660). It will be supported by standard systems within the foreseeable future.

Data Structure

The data structure within volumes is proprietary. New versions of the TC/Archive will always be downwards compatible to the version 1 of the data structure.

On request, Kofax will make the documentation available for storage at a mutually trusted organization.

2.4.3 Security Against Unauthorized Access

Each CD / DVD volume holds information about the customer's identification, installation ID, serial number, period of archivation and some statistical information like the number of messages.

The contents of the archive CDs / DVDs will be encrypted with a built-in key. The volume information exists in unencrypted form as well (in the database file headers and in the volume index file).

It is not possible to read media with a different customer identification.

2.4.4 Access Control

A single user log on (user ID and password) is required to gain access to the TCOSS and/or the Archive Server. This is completely transparent to the user, the client will automatically log on to the required server. There are basically two groups of users:

- users who can only see their own messages (recipient or originator is own user ID or representative or in same group with user), have to choose between either in-box or out-box view
- users who can see all messages, may select in-box, out-box or combined view

Messages which a user is not entitled to access because of insufficient rights will be completely hidden from that user so that he will not notice their existence.

All user profiles from the TCOSS server are replicated on the archive server to optimize user authentication and rights checking. This feature is needed for integrated archiving and requires TCOSS release 7.24.01 or higher.

2.5 Indexing

The TC/Archive holds a highly optimized index for most of the fields of the message entry, the message header and the full text of the message.

2.5.1 Indexes

Each volume carries its own full index. This index is cyclically erased with the volume.

A general volume index is always kept on disk. It holds start and end time for all the volumes written to CD since system installation.

2.5.2 Full Text Index

A list of stop words (words not included in the word index, e.g. "a", "the", "and" ,...) is provided as text file and may be adopted by the customer. The stop list applies to words in the text content and to all fields which are separated into words.

The stop word file name is set in the registry, normally to "C:\TCOSS\SYSTEM\STOPFILE.TXT". The stop words are entered (separated by spaces or on separate lines) using Windows code page #1252. (Code page #1252 is used with US and most western Europe language settings including English, French, German, Danish, Spanish and Portuguese but not for Greek, Turkish, Polish, Czech etc..)

The word index is case insensitive for letters 'A' .. 'Z', umlauts, accented and other special letters which have upper and lower case forms. Text in cover sheets is not included in the word index.

The fields Recipient, Originator, DocumentNumber and FileName are stored in the index as one word and are not checked against the stop word list. The content of the other fields is separated into words using the algorithm and the stop word list applied to the text content. A special algorithm is applied to the fields NormalizedAddress and NormalizedOriginator.

From the fields NormalizedAddress and NormalizedOriginator the first alternative address (if there are more than one) is extracted and the leading channel specification (like "F:" or "05:") is cut off. The resulting string is indexed without separation into words or checks for stop words.

The indexing of fax and telephone numbers is done by extracting the digits from the normalized address field. The originator and recipient digits are indexed separately and in a way to enable a search for any part of the number. If a received fax has a "from" field like "+4318635320", a search for "86353", "35320", "1863532", etc. will be successful.

The following characters are treated as separation characters by the word separation algorithm:

!"%&'()*+,-./:;<=>@[]^_`{|}~ space and all other kind of accents like ring or umlaut and other punctuation marks like the Spanish inverted ! and ?

Note: Search in Archive always search for indexed words. It does not support a wildcard "*" before text.

2.6 Advanced Index Management

Advanced Index Management allows fast responses to long term (10 years or more) archive searches while balancing storage requirements between on- and offline volumes. Index information is available on fast online storage while actual message content is optionally stored within slower jukebox systems. This combination provides fast access to any message stored during any period of time.

The following table gives an overview of storage requirements:

(Fax-) msg's per day (50Kb / msg)	Monthly message volume (GB)	Volume in GB after:					
		1 year		5 years		10 years	
		content	index	content	index	content	index
500	0.5	6	0,3	30	1.5	60	3
1,000	1	12	0,6	60	3	120	6
5,000	5	60	3	300	15	600	30
10,000	10	120	6	600	30	1,200	60
50,000	50	600	30	3,000	150	6,000	300

The storage can be dynamically divided between on-line (Harddisk, RAID) and off-line (CD, jukebox) storage. On-line storage provides fast responses to search requests and opening of messages. Off-line storage requires some time to mount the volume automatically from a jukebox (see below) or manually. As it normally is more important to provide quick response times to long term archive searches than for fast retrieval of messages, it is recommended to reserve as much space as possible for the online index. TC/ARCHIVE can keep an on-line copy of the complete full-text index of each volume. This means that a user does not have to wait for the Jukebox or an administrator to load a particular off-line volume to perform a query. Only after the user has selected a particular document from the query result, TC/ARCHIVE needs to access the actual archived message and requires the volume to be loaded. The maximum amount of space reserved by the on-line index is configurable. As with automatic cyclic erasure of volumes, the on-line index is also cyclically erased when the maximum is reached. Until that limit is reached all space is used to store volumes. As more volumes are moved off-line the total number of on-line volumes is decreased (via cyclic erasure) to make room for the on-line index.

Based on the different requirements, several configurations are possible:

Configuration / Requirements	Automatic writing	Fast opening of messages	Fast response times to long term search request	RAID Size	Jukebox Size
Backup solution. Occasional retrieval. Low volume.	no	no	no	9 Gb	-
Occasional fast historic search. Low volume.	no	no	yes	index + 5% of content	-
Fast retrieval of recent content. Low volume	no	yes	no	content	-
Fast historic lookup and retrieval. Low volume.	no	yes	yes	index + content	-
Backup solution. Occasional retrieval. High volume.	yes	no	no	9 Gb	small writer
Fast historic search with occasional retrieval. High volume.	yes	no	yes	index + 5% of content	content
Fast retrieval of recent content. High volume	yes	yes	no	content	small writer
Fast historic lookup and retrieval. High volume.	yes	Yes	Yes	index + content	small writer

2.6.1 Index Volume Feature

Index volumes are used to keep the full index and entry information of off-line volumes on-line allowing fast queries to off-line data. The off-line data is only accessed when a message is opened from a search result. As the size of the index and entry information is typically about 5 % of the total size of a volume, it may be kept on disk for a large number of volumes.

When a new archive is started, the available disk space is gradually filled with on-line volumes. In between the regular volumes so called "index volumes" are created which contain index and entry information for a group of regular volumes. Assuming an index size of 5 % an index volume would cover 20 regular volumes.

When the disk space is totally filled with on-line volumes, the cyclic delete function will delete the oldest regular on-line volume (provided it has been saved to CD), but no index volumes. In this way the mail entries and the full index are kept on-line.

As the archive keeps growing, more and more of the disk space is used for the index. The index is allowed to grow up to a configurable percentage limit of the available disk space (e.g. 20 %), then the oldest on-line index volumes also get removed, keeping the percentage of disk space occupied by the index and entry information of off-line volumes at or below the configured limit.

Registry value in the "HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH" registry section:
OfflineIndexPercentageMax (REG_DWORD): 0 ..100, percentage limit for index, default value: 20%

Example: TC/Archive system with 90 GB RAID may hold (assuming an index size of 5 %)

- 150 on-line volumes (0 % for index configured) or
- 120 on-line volumes plus 30 index volumes containing index and entries of 600 off-line volumes (20% for index configured) or
- 75 on-line volumes plus 75 index volumes containing index and entries of 1500 off-line volumes (50% for index configured)

The feature, that index volumes are created for optimized search of on-line and off-line volumes, has to be switched on with a registry key.

Registry value in the "HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH" registry section:
CreateIndexVolumes (REG_DWORD): default value is 0

- 0 = no
- 1 = yes, make sure that all regular volumes are included in index volumes. If any regular volume, which should be included in the next index volume, is off-line, the archive process will stop with error 728 ("index volume can't be created"). The same happens if the index volume would exceed the maximum volume size or contain too many (more than 64) regular volumes. An event log entry detailing the exact cause of the problem will be generated in all error cases. Those problems may occur only if the index volume feature is switched "on" for an existing archive or if an existing archive had been incompletely restored from CDs. All regular volumes from the most recent volume back to the last index volume (or back to volume number 1 if no index volumes have been created yet) have to be "on-line" or "index and entries on-line".
- 2 = create next index volume also if some volumes are missing or can't be included because of the volume size limit, for update of an existing archive or continuation of an incompletely restored archive. As a result the index volume coverage of the archive may be incomplete. After creation of the next index volume this value will be automatically reset to 1.

Creation of index volumes should be switched off for entry-level and very small archives, which have less than 10 on-line volumes or do not keep off-line data.

Restrictions:

- A maximum of 64 regular volumes is covered by one index volume.
- Index volumes may not use the available volume size fully, because they are created when a certain limit (normally 95 %) of the volume size is reached when closing a regular volume.

- The operator warning, that an index volume not yet saved to CD is due for cyclic deletion, comes early. If it was a regular volume, it would be due for cyclic deletion, actually it may be deleted much later.

The index volumes represent an additional optimization for the on-line search and are necessary to keep the index of off-line volumes on-line. They combine index and entry data of a group of volumes and are therefore redundant. It is possible to recreate an index volume from the associated group of regular volumes. Nevertheless, index volumes should be saved to CDs like regular volumes, because they also optimize the search in completely off-line data and because they speed up the restore procedure in case of a RAID failure.

2.7 Storage Management

TC/Archive provides two methods of controlling the amount of archived information:

- Selective archiving
- Flexible content filtering

Selective archiving is applied first to select those messages from the message server's short-term archive which should be stored. Flexible content filtering then takes a look at the content of the selected messages and removes unwanted content types.

Both methods should be employed with great care as all information excluded from archiving is lost and will not be available at a later time.

2.7.1 Selective Archiving

Selective archiving means that a freely configurable filter algorithm is applied to messages from the short term archive, which results in some messages being stored on the archive server and others not.

As this selection is done while the archive is being built, it is a non-reversible process. One should be very careful when doing filter settings so that no message which might be needed in the future is excluded from being archived. A test mode, which allows to evaluate the effect of a certain filter setting without actually applying it, has been provided to facilitate this task.

The short term archive on the TCOSS server itself is not changed by selective archiving, messages not selected to be archived on the archive server still remain in the TCOSS short term archive.

Remember also that a message sent internally from a TCOSS user 'A' to another TCOSS user 'B' has only one mail entry which appears both in the out-box of user 'A' and in the in-box of user 'B'. If this entry is not archived, the message is removed from both the out-box of user 'A' and in the in-box of user 'B'.

A third thing to keep in mind when doing selective archiving is that the archive optimizes the storage of one message sent to several recipients. Although several entries appear in the search result, the message itself is only stored once. This means that by removing some, but not all entries of a given message through selective archiving, you will get fewer entries in the search result, but the effect on the overall archived data size will be small.

All user-defined settings for this feature are stored under the registry key
"HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\SelectiveArchiving".

Like other registry settings of TC/Archive, the selective archiving parameters are only loaded at system start up. For any changes to get effective the TCARCH process needs to be restarted.

The selection of messages to be archived is done in two steps:

- All "exclude" conditions are applied to the message
- If none of the "exclude" conditions is true, the message is archived
- If any of the "exclude" conditions is true, all "include" conditions are checked. If any of the "include" conditions is true, the message is archived also, otherwise it is skipped.

“Exclude” conditions are set using the multi-string registry values “**Exclude0**”, “**Exclude1**”, .. “**Exclude99**” (REG_MULTI_SZ). There is a logical ‘OR’ relation between the individual conditions.

“Include” conditions are set using the multi-string registry values “**Include0**”, “**Include1**”, .. “**Include99**” (REG_MULTI_SZ). There is a logical ‘OR’ relation between the individual conditions.

Any condition (include or exclude) has access to all integer and string fields of the mail entry and may be constructed using the following elements:

- String compare (using wildcards is possible) e.g. TS_RECIPIENT="F"
- Integer compare e.g. INT_DEL_TYPE=1
- Flag compare e.g. INT_DOC_CLASS&16
- ‘AND’, ‘OR’ and ‘NOT’ operators
- Parentheses () to define the evaluation order
- comments, starting with a comma (,) and ending with the end of the line

Example:

((TS_RECIPIENT="F" OR TS_ORIGINATOR="F") AND TS_DEL_TYPE=1)

A condition is evaluated from left to right unless parentheses force a different order.

A condition may use several lines of the multi-string registry value. The way how it is spread over the lines is not relevant, except for comments. It is recommended to put a comment characterizing the condition in the first line, also because this first line will appear in most trace outputs.

Detailed description of condition elements:

String compare:

It is specified in the format TS_constant="string". The string value must be enclosed in double quotation marks. The wildcard "*" may be used in all strings, in the formats "start*" (match beginning of string), "*end" (match end of string), "*part*" (match part of string at any position) or "*" (match always). The string compare is case-insensitive, the configured TCROSS code page is taken into account.

Integer compare:

It is specified in the format INT_constant=value. Value is a number in decimal notation. The condition is true if the actual value and the specified "value" are equal.

Flag compare:

It is specified in the format INT_constant&value. Value is a number in decimal notation. The condition is true, if all bits set in the given "value" are also set in the actual value of this field. Bits which are not set in "value" are not relevant for the compare. The flag compare may be applied to any integer field, of course it makes only sense for fields which actually contain flags like INT_DOC_CLASS or INT_EVENT_TYPES.

A test mode may be activated using registry value “**ApplySelection**” (REG_DWORD):

ApplySelection = 0 ...	all messages archived, only trace output of messages which would have been skipped if selective archiving were active. Use this setting together with the selective archiving trace bit described below to get a good trace.
ApplySelection = 1 ...	do selective archiving

A bit in the registry value **TraceLevel** (REG_DWORD) has been defined to trace selective archiving, independent of whether it is active or not. A second bit allows to trace all details of applying the configured conditions to the actual entry values.

decimal	hex	trace
16384	4000	selective archiving
32768	8000	selective archiving details

Error Handling:

- If a condition contains a syntax error or an unknown TCSI identifier, an error trace is written and the selective archiving feature is disabled (as if ApplySelection were set to 0). The syntax check is done at start up time.
- If a compare on a string or integer child object of the mail entry is done and the current mail entry does not contain this child object, the compare expression is evaluated as being false.
- An empty or comment only condition passes the syntax check and is evaluated as being false.

Overview of mail entry fields which may be used in selective archiving conditions

TCSI identifier	Field name in TCfW inbox or archive folder view (see note 1)	Description
TS_RECIPIENT	To:	recipient user ID or channel group ("F") or queue user ID ("TCSMQ0")
TS_ORIGINATOR	...From Continued	originator user ID or channel group ("F") or queue user ID ("TCSMQ0")
TS_TOS_FOLDER	(not displayed by TCfW)	" +MAIL" for messages posted via TCSI, "+MAIL5V" for messages created by fax or telex channels or using ..commands
TS_FILE_NAME	File Name	numerical string like "00006123788" for messages posted via TCSI, like "ATF2646", "ATB3742" for received or back-received faxes or telexes
TS_ENV_NAME_POSTED	Message Name	equal to TS_FILE_NAME if not set by application when posting the message, normally set to "Untitled" by TCfW
TS_REF	Subject:	subject of the message, truncated to a maximum length of 31 characters
TS_RECIPIENT_INFO	... To Continued	like "FXI\$193" for inbound faxes, otherwise recipient information in several syntax variations (see note 2)
TS_ORIGINATOR_INFO	From:	like "FAX\$*432225333867" for inbound faxes, otherwise originator information in several syntax variations (see note 2)
TS_RECIPIENT_GROUP	Recip.Group:	recipient group, empty string ("") for outgoing faxes and telexes
TS_ORIGINATOR_GROUP	Orig.Group:	originator group, empty string ("") for incoming faxes and telexes
TS_COST_CENTER	Cost Center	cost center, empty string ("") if no cost center was set (e.g. incoming faxes)
TS_NODELIST	Node List	string with all node letters the message has passed, "A" on non-LCR systems
INT_DEL_TYPE	cc/To:	delivery type, possible values: 1 ... TO 2 ... CC 3 ... BCC 4 ... AUTHORIZE
INT_STATUS	Status	message status, possible values: 25 ... positive termination (sent ok) 30 ... negative termination (cancelled)
INT_NPAG	Pages	number of pages
INT_DOC_CLASS	(not displayed by TCfW)	document class, possible flags: 2 ... text 4 ... image (TC image blocks) 8 ... binary blocks 16 .. voice
INT_PRIORITY	Priority	message priority, possible values:

		48 ... low 49 ... normal 50 ... high
INT_ER_RECIPIENT	Receiver Position	receiver position in header: 0 ... first recipient 1 ... second recipient, etc.
INT_MSG_TYPE	(not displayed by TCfW)	message type, possible values: 49 ... normal message 5 ... routed message 10 ... message is notification
INT_EVENT_TYPES	Triggered By	event types, possible flags: 1 ... inbound or outbound message 2 ... delivery notification 4 ... non-delivery notification 8 ... back-reception 16 ... message waiting "on" 32 ... message waiting "off" 2048 ... generated by action in user profile

Note 1: The TCfW field caption is different for the in-box and out-box views, so when working with this table be sure to use a TCfW in-box view.

Note2: In the recipient and originator info fields TCfW will display a '\$' character as comma, so an actual value of "FXI\$193" will be displayed as "FXI,193".

Example 1:

- Exclude0: INT_DOC_CLASS & 16 , exclude voice messages
- Exclude1: INT_DEL_TYPE = 3 , exclude BCC recipients
- Include0: INT_PRIORITY=50, but include all high priority messages

Example 2:

- Exclude0: NOT () , exclude all messages unless explicitly included
- Include0: TS_RECIPIENT="F", include all outgoing faxes
- Include1: TS_ORIGINATOR="User1", include all messages sent by User1
- Include3: TS_RECIPIENT="User2", include all messages received by User2
- Include50: TS_ORIGINATOR_GROUP = "Manage" , include all messages sent by management

2.7.2 Flexible Content Filtering

To optimize storage requirements, content filtering provides a flexible method of selecting the amount of archived information. Filtering applies only to documents with alternative contents.

Content filtering provides two functions, which can be configured separately:
 Replacement of original content by an alternative content (exchange with alternative)
 Filtering of alternative contents (delete alternative)

Step 1 ensures that a suitable alternative replaces the original content before it is filtered, avoiding that an empty shell is archived. Step 2 does the actual removal of unwanted content.

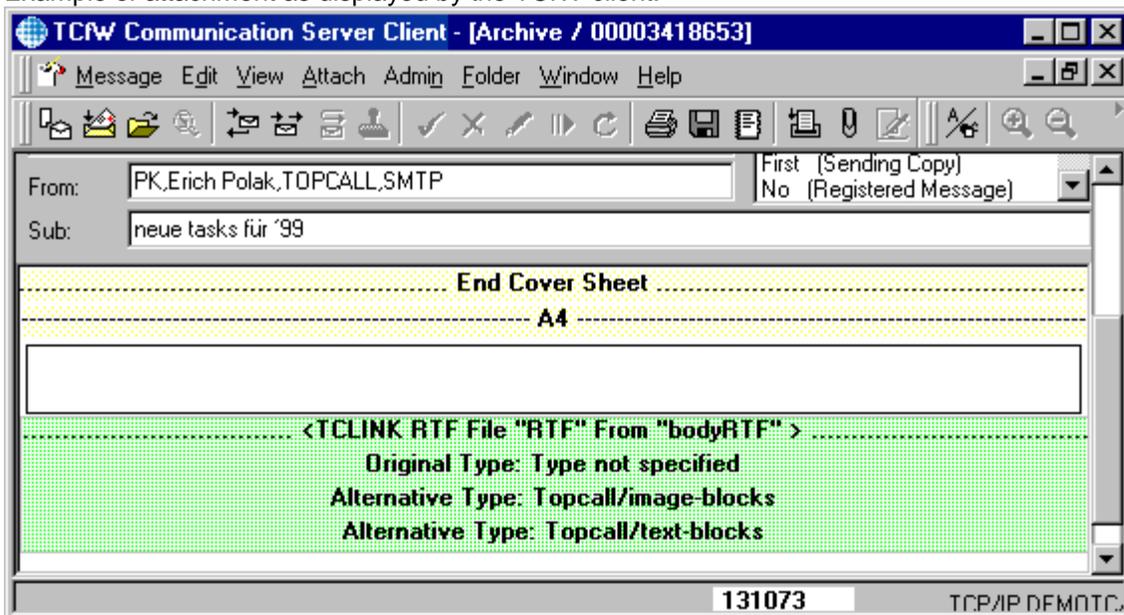
Exception: No content filtering is applied to the cover part of messages. Usually the covers do not contain alternative contents, and the cover filtering algorithm on message type and service could be negatively affected by any change.

All registry keys for content filtering are placed in the registry section
 "HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\ContentFilter".

All registry values for content filtering refer to the type of an attachment. If the type is not set, the file name is taken instead for filtering. The wildcard "*" may be used in all strings, in the formats "start*" (match beginning of string), "*end" (match end of string), "**part**" (match part of string at any position) or "*" (match always). For example "*.doc" will filter all file names with ".doc" extension. All registry strings are expected to be given in Windows code page 1252 and are converted to TCOSS code page 0 for the compare. All compares are case insensitive.

Note: If the content filter registry values are changed on an existing archive (and the TCARCH process restarted), the new values will apply only to messages archived after the change. All messages archived before remain unchanged. The storage optimization (the same document is only archived once on the same volume even if it was sent to several recipients) will not consider changed content filter registry settings. Once a document has been stored, it will not be re-archived on the same volume, even if changed content filter values would result in a different form of the document.

Example of attachment as displayed by the TCfW client:



The RTF attachment in this example has no type specified, Filtering may be done on the file name "bodyRTF" (The file name is displayed after the keyword "From"). There are two alternatives in this example, both with type specification: "Topcall/image-blocks" and "Topcall/text-blocks".

Note: If the original content is replaced with an alternative, the file name, comment and other descriptive fields displayed by the TCfW client, are also taken from the alternative content. In some cases these fields are not filled and the attachment is displayed with a line like --- < "" > ---.

2.7.2.1 Replacement of Attached Content by Alternative

The content of an attachment may be replaced by an alternative content, provided that this alternative exists. The original content is not overwritten in this case but exchanged with the alternative. After being placed in the list of alternative contents, the original content may be removed by the function "filtering of alternative contents" (see next chapter).

Registry value "**ReplaceContent0**" (REG_MULTI_SZ): List of original content type (1st string) and possible replacements (2nd string, 3rd string, ..). At least one type of replacement has to be specified. If several replacement types are specified, the first replacement type has priority over the second, the second over the third, and so on. All possible replacements for a particular content type have to be specified in the same registry list (and not spread over several lists).

The registry values “**ReplaceContent1**” .. “**ReplaceContent99**” have the same functionality as “**ReplaceContent0**”. They are evaluated in the order indicated by the number, ‘0’ .. ‘99’. Once the actual content type matches the value specified, further registry values regarding replacement are not evaluated.

Example: “**ReplaceContent0**” is set to

“bodyRTF”
“Topcall/image-blocks”
“Topcall/text-blocks”

The content of attachments without a type specification but with file name “bodyRTF” is replaced by an alternative of type “Topcall/image-blocks” and put into the list of alternative contents. If there is no alternative of type “Topcall/image-blocks”, an alternative of type “Topcall/text-blocks” is inserted instead. If there is no alternative of either type, the attachment remains unchanged. If the replacement took place, the alternative with file name “bodyRTF” may be removed in the filtering step (see next chapter).

2.7.2.2 Filtering of Alternative Contents

If an attached object has alternative contents, the list of alternatives which remains after the content replacement step is subject to filtering. The result of filtering may be that some or all alternatives are removed before a message is archived.

Filtering is configured by means of adding types (or file names or extensions if the type is not set) to an exclude and include list. All types in the exclude list are excluded unless the type is specified in the include list. Both lists can contain wildcards.

Registry value “**ExcludeAlternative**” (REG_MULTI_SZ): list of types or file names of alternative contents to be removed from an archived message, default: empty

Registry value “**IncludeAlternative**” (REG_MULTI_SZ): list of types or file names of alternative contents to be included in an archived message overriding the exclude list, default: empty

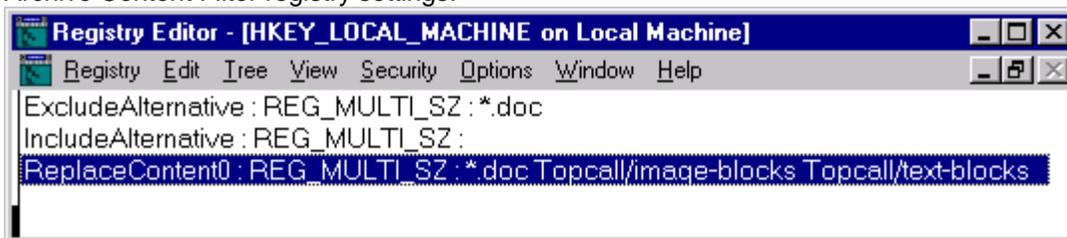
Examples:

- Registry value “**ExcludeAlternative**” set to “Topcall/Image-blocks”: All TCI blocks will be removed from the alternative content list.
- Registry value “**ExcludeAlternative**” set to “*”, “**IncludeAlternative**” set to “Topcall/Image-blocks”: All types of alternative contents will be removed, except TCI blocks.

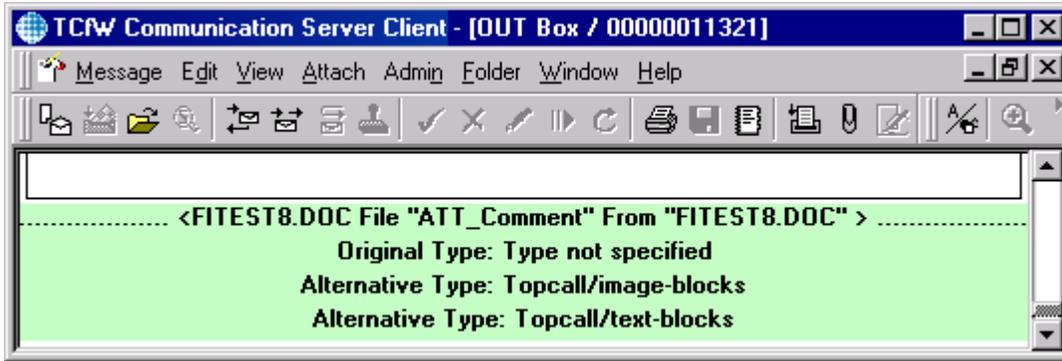
Note: Removing alternative contents of type “Topcall/text-blocks” or “Topcall/ocr-blocks” should be avoided because text blocks are used to build the full-text index and removing them would reduce the search capabilities.

2.7.2.3 Content Filter Example

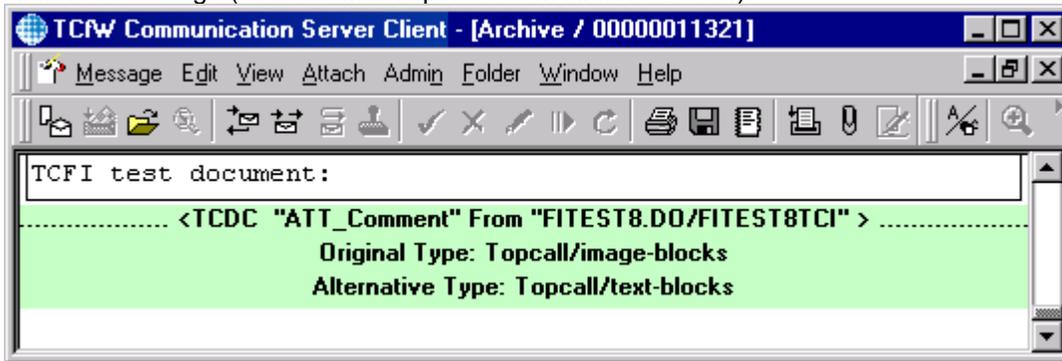
Archive Content Filter registry settings:



Original message as seen in TCOSS outbox:



Archived message (as seen when opened from Archive Server):



The original message content with file name "FITEST8.DOC" is first exchanged with the "Topcall/image blocks" alternative and then removed from the list of alternatives.

2.8 All Send Attempts and User-Defined Log Entries

Normally unsuccessful send attempts and user-defined log entries are not archived. The archiving of all send attempts and user-defined log entries is enabled using the registry value "HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\SelectiveArchiving\FolderType". This registry entry has to be created manually (setup does not create it).

Possible FolderType values:	0x7	... regular in- and out-folder only (default value)
	0x17	... with all send attempts
	0x27	... with user-defined log entries
	0x37	... with send attempts and log entries

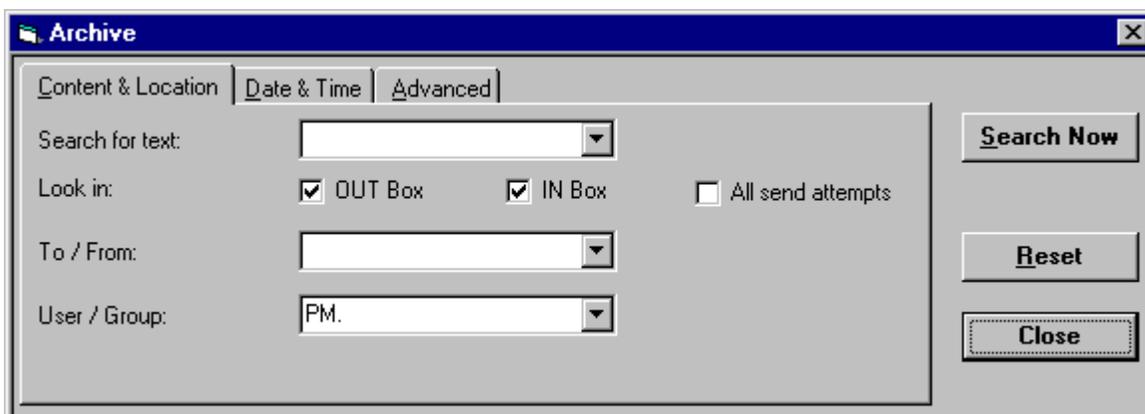
This registry value specifies the folder type which is used by TC/Archive to fetch entries from the TCROSS short-term archive. By default additional send attempts and user-defined log entries are not archived.

Do not set the "..\TCARCH\SelectiveArchiving\FolderType" to any value not given in the list above. A wrong folder type setting might result in messages not being archived. As with other selective archiving conditions, the inclusion or exclusion of entries by folder type is permanent, and any change in the folder type value applies only to entries archived after the change.

2.8.1 All Send Attempts

The additional send attempt entries are indexed and handled in the same way as the regular entries.

An archive search in the normal in- and out-folder will not return the additional send attempt entries, one has to explicitly select the search in all send attempts.



2.8.2 User-Defined Log Entries

Exclude and include conditions of the selective archiving feature also apply to the user-defined log entries, but only two fields of the archive entry are available for filtering: TS_LOG_USER and INT_MSG_TYPE. In future releases the selective archiving condition syntax may be extended to access user-defined fields and structure names.

All user-defined log entries selected for archiving are fully indexed by including the following values:

- time of archiving
- log user
- user-defined structure names
- user-defined field names
- user-defined string field contents

The indexing of user-defined fields does not preserve the object level or hierarchy where a particular field is found, nor does it distinguish between structure and field names.

User-defined field and structure names are indexed as there are, without word separation. To the field contents word separation is applied, but no check for stop words.

TC/Archive allows to search for user-defined log entries specifying the following search conditions:

- time period of archiving
- log user
- existence of structure with user-defined name
- existence of field with user-defined name
- string value in a particular field, in one of several fields (list of names), or in any field

Currently TCfW does not support the archive search for user-defined log entries.

2.8.2.1 Queue Length Log Entries

Queue length log entries generated by TCOSS are probably not intended to be stored on the archive server. To suppress archiving queue length log entries one can set a selective archiving “exclude” condition like
(INT_MSG_TYPE = 20) AND (TS_LOG_USER="QUEUELEN") , exclude queue length log entries

2.9 TCOSS Code Page Support

TC/Archive supports two code pages, TCOSS 0 and 1. The actually used code page is selected by configuration when the archive is first installed; it is not possible to work with two code pages simultaneously. It is also not allowed to change the code page later when messages have been archived already. The configured code page of the archive has to match the code page set in the system configuration of the TCOSS server.

Registry section “**HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH**”:

CodePage (REG_DWORD): TCOSS code page, 0 (Latin) or 1 (Eastern Europe). Default value: 0

The setup utility does not write the CodePage registry key. For installations in Eastern Europe it has to be added manually with a value of 1, otherwise it defaults to 0.

The search in archives with code page 1 works similar to code page 0 archives: It is case insensitive, but sensitive to accents, caron, ogonek, etc.

The archive relies on the code page setting to generate case insensitive search keys. The appropriate conversion from lower case to upper case letters is applied to all key values when building the index and also when searching it. If the code page were changed with some messages already archived, the code conversion in the index would be inconsistent and some keys would not be found later.

Note: Never change the code page setting of an existing archive.

See also: *Upgrade to Unicode*.

2.10 Jukebox Support

The jukebox support feature is activated by a registry key and requires a separate jukebox license (to be set on the TCOSS message server). TCOSS release 7.26.00 or higher is required on the message server.

The jukebox support task, if activated, will scan the connected jukebox(es) for archive CDs and set the off-line volume path to point to the appropriate jukebox path, so that the CD is accessed without user intervention when offline data is needed (e.g. when a message is opened or when a volume is restored from CD). Only 1 CD is mounted per archive volume in case that duplicate CDs are found.

The scanning of jukebox(es) for archive CDs is repeated periodically and also triggered by any unsuccessful attempt to access an off-line volume (a CD may have been removed or just been inserted into a jukebox).

The jukebox task connects to the “TCJUKE” process and controls its activity (see separate chapter).

2.11 Automatic CD and DVD Writing

The automatic CD writing feature is covered by any jukebox license (to be set on the TCOSS message server). If no jukebox is installed and semi-automatic CD writing is done using the built-in CD writer, a single CD jukebox license has to be set on the TCOSS message server. TCOSS release 7.26.00 or higher is required on the message server.

The manual and semi-automatic CD writing uses the built-in CD writer of the archive server, the fully automatic CD writing is done on a jukebox CD writer and requires the jukebox support feature.

A jukebox CD writer, while it is not recording CDs, is also used for reading and improves the jukebox's response time to read requests. When recording a CD, the CD writer is used exclusively by the CD writing software and read requests to the jukebox are served by the remaining CD drives.

The automatic writing task looks periodically (every 10 minutes) for on-line volumes which do not yet have enough backup media written. If several volumes require writing of CDs, the oldest volume is recorded first. The “**CdsPerVolume**” registry key (in the TCARCH section) defines how many CDs are written. The new administrator functions “Write CD Immediately” and “Write CD Scheduled” may be used to trigger the writing of 1 CD manually.

The CD writing may be scheduled to occur only at configurable time intervals, because CD writing slows down the archive search performance (multiple periods may be set).

The number of blank media in the jukebox or in the single writer is checked periodically and an operator warning (in the form of an event log entry) is generated, if there are not enough blank media. The number of blank media required is 1 for a single writer and 5 for a jukebox. It may be set to a different value using a registry key.

Event log entries will be generated in the following cases:

- CD / DVD written and verified correctly (information)
- Empty medium required (warning)
- Error encrypting volume (warning)
- Error writing CD / DVD (warning)
- Error verifying CD / DVD (warning)

Any error during an automatically scheduled action by the CD writer task will stop all further automatic activity for 8 hours. This timeout is cancelled by the manually triggered administrator actions "Write CD Immediately" and "Write CD Scheduled". After the timeout automatic scheduling of CD write actions continues until enough CDs of all online volumes have been written.

The CD writer task connects to the "TCJUKE" process and controls its activity.

The label of an automatically written CD will be set to "AVxxxxxxCDy" (xxxxxx ... volume number, 6 digits with leading zeros, y ... CD number, 1 digit).

Example: "AV000007CD1" ... first CD of archive volume number 7

In the Jukebox file system an archive CD will appear as subdirectory "AVxxxxxxCDy" with the short (8.3) directory name "AVxxxxxx.CDy". The subdirectory name of a newly written CD will be set to "AVxxxxxxCDy unverified". After verification it is changed to "AVxxxxxxCDy" or, if verification fails, to "AVxxxxxxCDy verify failed".

All CDs written are single-session CDs which means it is not possible to add data to the CD later.

2.11.1 Restrictions

- If automatic CD writing is done on a jukebox CD writer, the jukebox has to be equipped with at least one more CD drive to provide read access to offline volumes during CD writing. Otherwise read access to offline volumes is not possible during CD writing (any read access will fail, without interrupting the CD recording).
- All installed jukeboxes are for exclusive use by TC/Archive and can't be shared with other applications.
- There are maximum values for the number of drives, magazines and slots per jukebox and also for the number of jukeboxes:

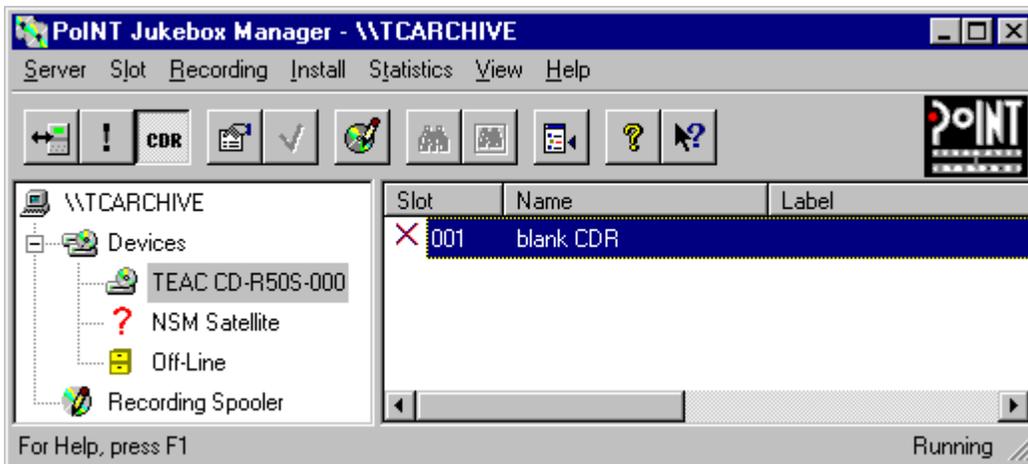
	release 2.06.00 or later	release 2.00.00 – 2.05.00
drives per jukebox	20	10
magazines per jukebox	100	50
slots per jukebox	1000	500
jukeboxes	5	5

2.12 Jukebox and CD Writer Operation

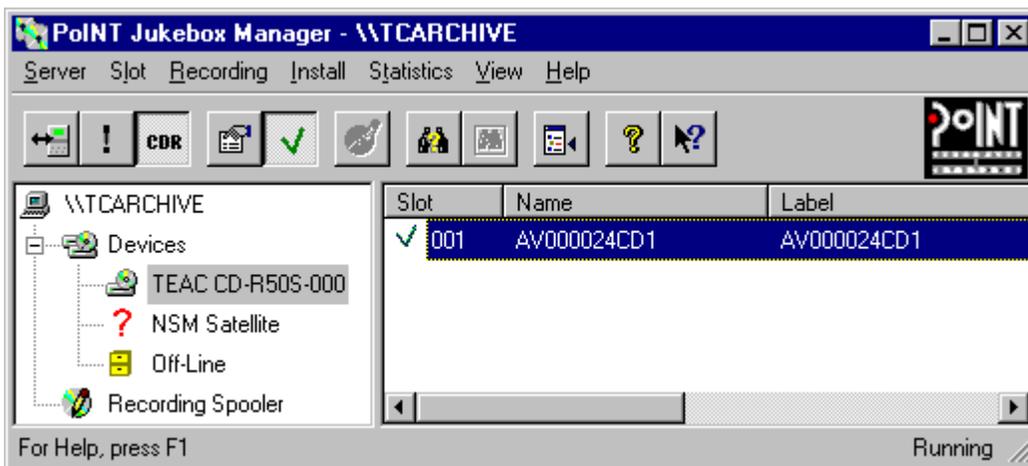
For all jukebox management functions, and also for loading and removing CDs from the built-in CD writer in case of semi-automatic CD writing, use the Point Jukebox Manager Software. The following examples are for a single CD writer:



Use the menu “Device”, option “Import disc” to put a blank CD into the CD writer.



Use the menu “Slot”, option “Export disc” to remove a newly written disc from the CD writer and to insert a blank disc.



2.13 DVD Support

TC/Archive supports automatic and semi-automatic writing of archive volumes to DVD-R media.

Manual writing of DVDs is also possible with the restriction that the customer is responsible for choosing and operating a suitable DVD writing software, TC/Archive only implements the functionality to provide the encrypted volume copies to be written to DVD and the verify actions.

All configuration parameters referring to CDs also apply to DVDs, e.g. the registry key "**CDsPerVolume**" with a value of 2 means that 2 DVDs are written of each volume in a DVD writing environment.

Note that TC/Archive can be set up to write either CD or DVD backups, but not both, like a CD and a DVD of each volume. Upgrade of archive installations from CD to DVD writing is possible, existing CDs can be accessed, together with newly written DVDs, in a DVD jukebox.

2.13.1 Multiple Archive Volumes on a Backup Medium

Multiple archive volumes can be written to a backup medium allowing to use large capacity backup media like DVDs without changing the volume size.

The strategy to put multiple volumes on a DVD instead of increasing the volume size to 4.4 GB has been chosen because of

- easy upgrade of existing archive installations
- downgrade is possible
- better error handling (if a file becomes unreadable this will affect only part of the backup data)
- decoupling of volume and backup medium size

The number of archive volumes which are put on a backup medium is fixed and determined by configuration:

Registry value in the HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH section:

VolumesPerCD (REG_DWORD) ... number of archive volumes on a backup medium (CD or DVD)
default value: 1
maximum supported value: 10

To work with single-sided DVD-R media **VolumesPerCD** may be set to 7 (see 4.6.1 Setup for DVD Writing, Upgrade of Existing Archive and 4.6.2 Setup for DVD Writing, New Archive)

Multiple archive volumes on a backup medium come always as sequence of volumes immediately following each other, the volume label is determined by the first volume in the sequence.

Example: With the registry value **VolumesPerCD** set to 7 the first automatically written DVD will get the label "AV000001CD1" and contain the seven volumes 1,2,3, ..7 in sub-directories 000001, 000002, ... 000007.

Automatically written DVDs always contain the configured number of volumes, i.e. writing of a DVD is not triggered until the configured number of volumes is ready. This restriction does not apply if the backup medium write action is entered manually by an operator. The "write CD / DVD" action is set for the first volume in the sequence, the following e.g. 6 volumes are included automatically if available.

These operator actions include the following volumes (if available) up to the configured value **VolumesPerCD** and are therefore only set for the first volume in the sequence:

- write CD scheduled
- write CD immediately

All other operator actions still apply to a single volume only:

- verify CD only
- verify CD and increment CD count
- restore volume form CD
- restore index only
- prepare file for CD creation (for manual CD or DVD writing)
- remove file for CD creation (for manual CD or DVD writing)

Note on DVD Storage Capacity

In the DVD world the term “gigabyte” means 1 billion bytes and not, as usual, 1024*1024*1024 bytes. A standard, single-sided DVD-R with a capacity specification of 4.7 GB holds only around 4.38 GB (4707319808 bytes).

2.14 Network Storage Support

The network storage support is implemented similar to the jukebox support with automatic CD or DVD writing. The idea of operation is that closed archive volumes are automatically written to a network share instead of being written to a CD or DVD. The local disk space of the archive server is used to build-up new volumes and to store some of the more recent volumes and the complete index (in index volumes). All other volumes are “offline” i.e. not stored on the local disk of the archive server, but are assumed to be accessible on the network share.

The network storage support is activated by configuration as an alternative to the jukebox support (and therefore the registry value HKLM\SOFTWARE\TOPCALL\TCARCH\CDWriter\Automatic must be set to 0).

All registry values for the network storage support are found in registry section “**HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\NetworkStorage**”:

Active (REG_DWORD): 0 = not active, 1 = active, default value is 0

Path (REG_SZ): absolute path to network directory, drive letter or UNC syntax, maximum length 63 characters

The configured directory is used for automatic writing of volumes. It also serves as default value for the offline volume path.

Schedule (REG_MULTI_SZ): “ss:ss-ee:ee”, multiple periods may be set, default: “00:30-3:00”
ss:ss... start time of CD writing period (24 hour clock)
ee:ee ... end time of CD writing period (24 hour clock)

Similar to the automatic CD writing the network storage writing may be scheduled to occur only at configurable time intervals. This may be useful to define periods for backup or maintenance of the network storage.

Writing of volumes to the network storage may also be triggered manually with the TCfW client by setting the volume action “write DVD / CD immediately”.

The volumes written to the network storage are encrypted and can't be copied back to the archive server. Instead the action “restore volume from DVD / CD” has to be used.

The number of DVDs / CDs in the archive maintenance overview is used to track whether a particular volume has already been written to the network storage or not. If a CD count of more than 1 is configured (registry value **CdsPerVolume** in the **TCARCH** section) it will be handled like being 1 because it makes no sense to copy the same volume a second time to the same network share overwriting the first copy.

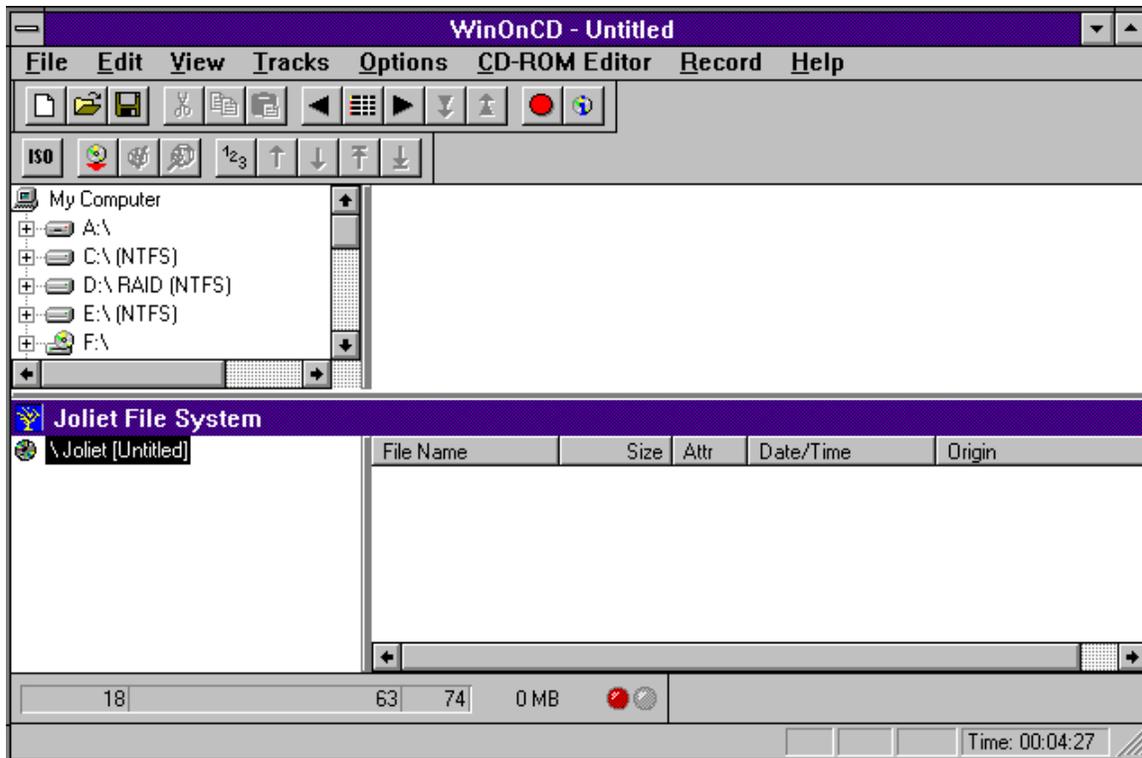
If working with network storage it is recommended to switch on the index volume feature (registry value **CreateIndexVolumes** in the **TCARCH** section). It might also be appropriate to increase the disk space percentage limit for index volumes (registry value **OfflineIndexPercentageMax**, default 20%).

Except for the automatic copy the administration of the network share has to be done manually by the customer. For example the customer could do a tape backup of the network storage and remove very old volumes if the disk space gets filled up. The data files on the network storage are only opened by the archive process when they are actually accessed and closed again immediately. So the files are not locked permanently and may be easily removed or copied back.

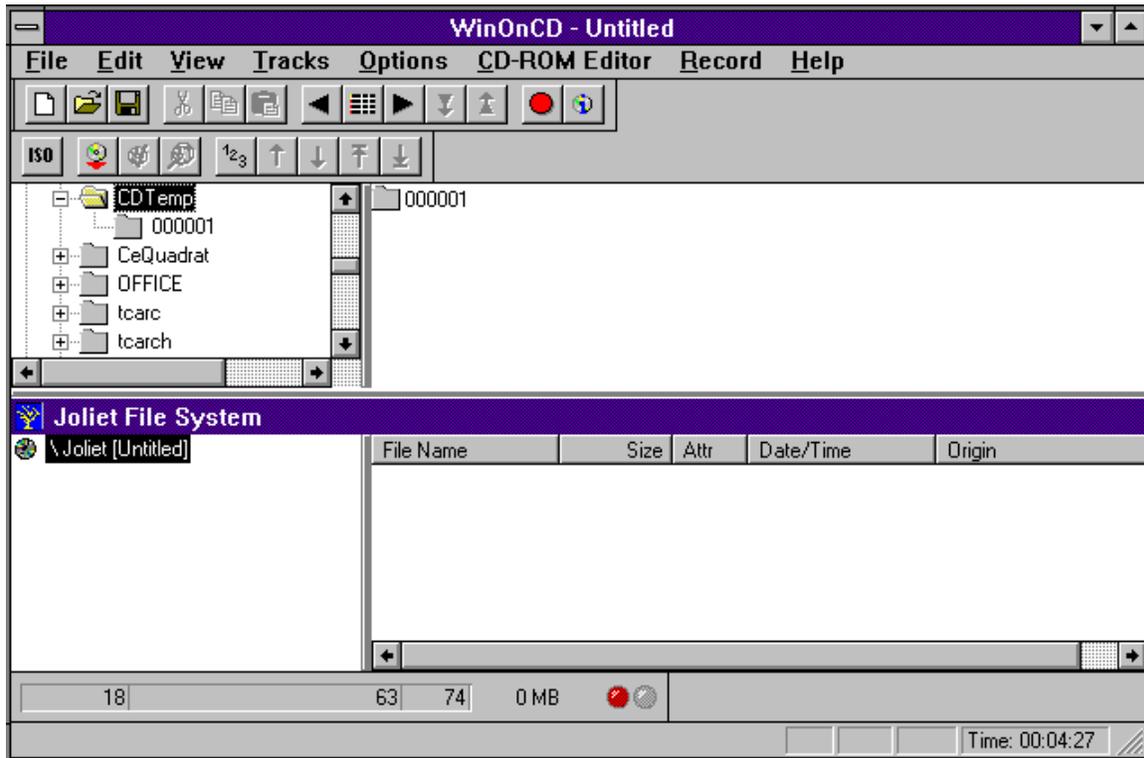
2.15 Manual Writing of CDs Using “WinOnCD”

If the automatic or semi-automatic CD write option is not installed do the following steps to write CDs with “WinOnCD”:

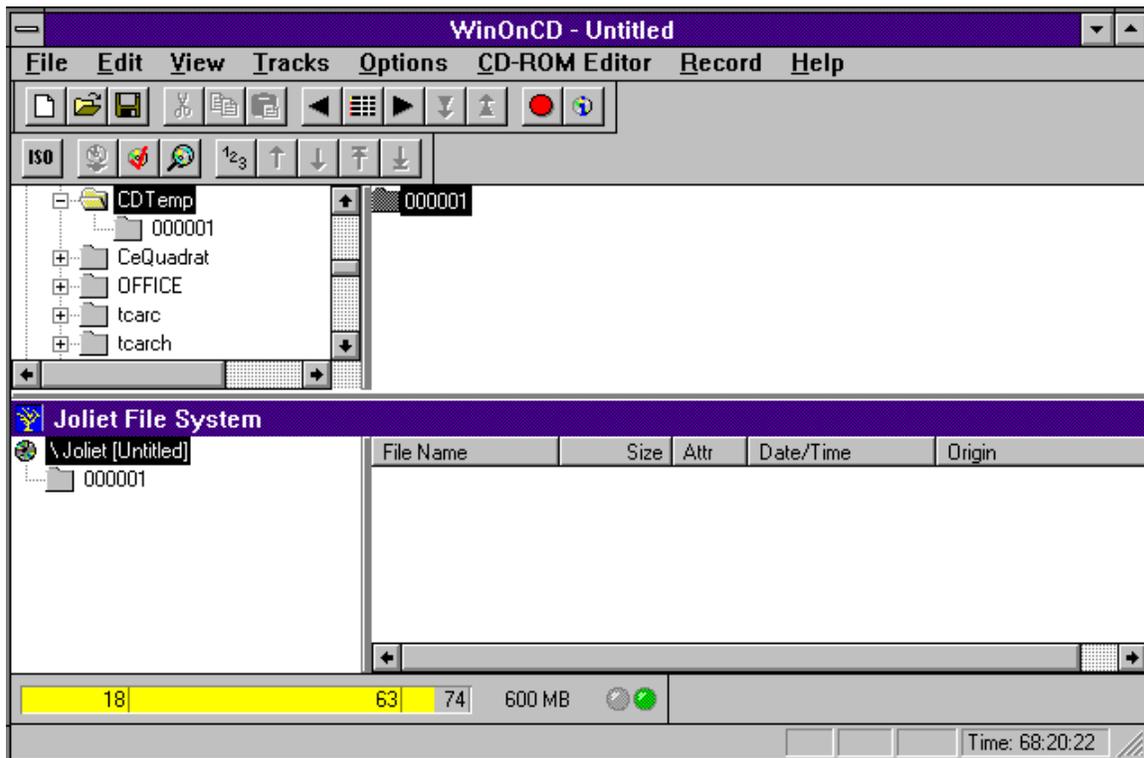
- a) Use the TCfW archive maintenance window to stop archiving and searching in the archive (2 “Stop” buttons).
- b) From the TCfW archive maintenance window double-click on the volume in the volume list, select next action “prepare file for CD creation” and confirm with the “Make Action” button. It will take the archive process about 30 minutes to complete this task. Check with the “Refresh” button if the action is complete.
- c) Start action “Make CD” in the same window. TCfW will start the “WinOnCD” application:



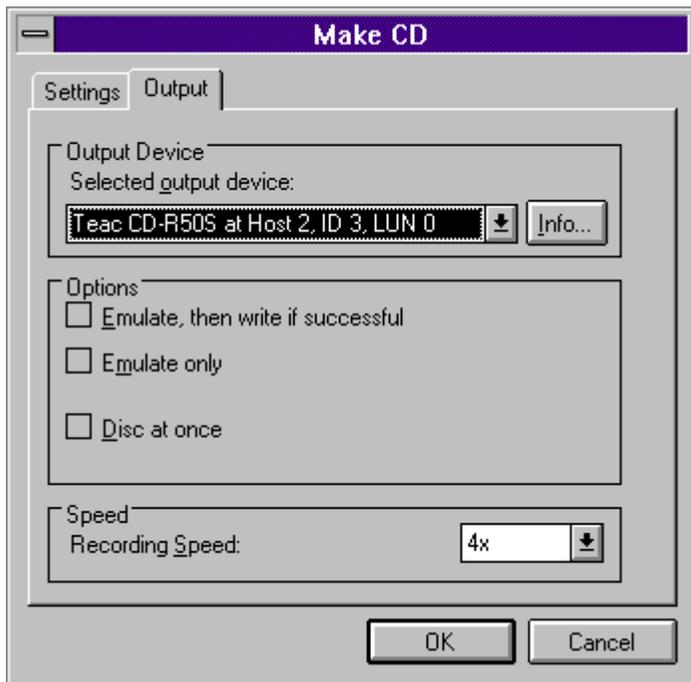
d) Click on the directory tree in the upper left part of the window to locate the directory with the temporary files for CD creation. The path is set in the TCARCH configuration, in this example it is CDTemp:



e) Take the subdirectory with the volume number (000001 in this example) from the upper right part of the window and drag it into the lower right part:



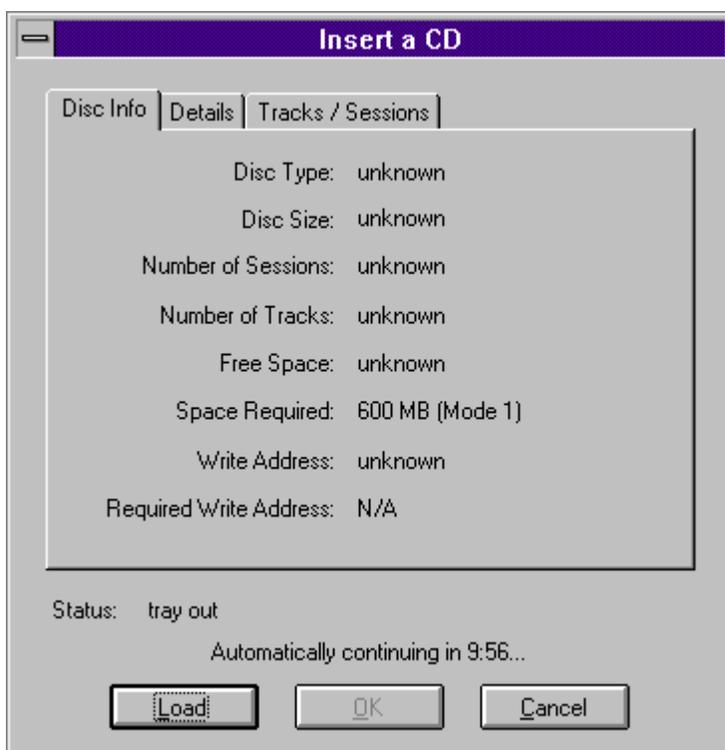
f) Press the red “Make CD” button and check the CD write options (normally there is no need to change them):



g) Insert a new writable CD into the CD writer and press the “OK” button:



h) If the CD was not already inserted the following screen appears (insert a CD and press “OK”):



i) After writing of the CD is complete close the “WinOnCD” application, re-insert the CD into the CD drive and start action “Verify CD and Increment CD count” from the TCfW archive maintenance. (If you only want to re-check a CD without changing the CD count select action “Verify CD only”). The action takes about 30 minutes.

j) Restart archiving and archive search (2 “Start” buttons). Archiving and archive search may also be restarted before the “Verify” action.

2.16 Manual Writing of CDs Using “GEAR Multimedia”

If the automatic or semi-automatic CD write option is not installed do the following steps to write CDs with “GEAR Multimedia - Pro”:

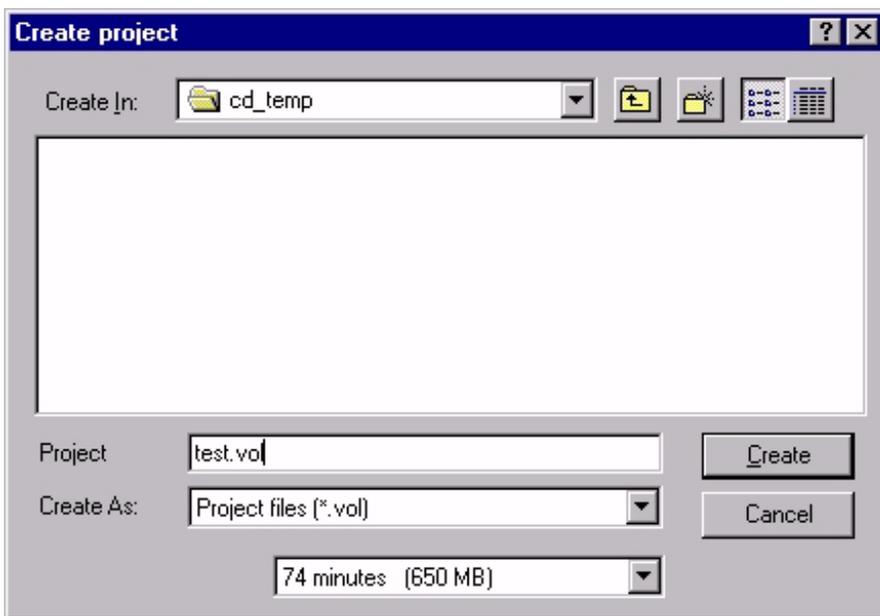
a) Use the TCfW archive maintenance window to stop archiving and searching in the archive (2 “Stop” buttons).

b) From the TcfW archive maintenance window double-click on the volume in the volume list, select next action “prepare file for CD creation” and confirm with the “Make Action” button. It will take the archive process about 30 minutes to complete this task. Check with the “Refresh” button if the action is complete.

c) Start action “Make CD” in the same window. TcfW will start the “GEAR Multimedia - Pro” application:



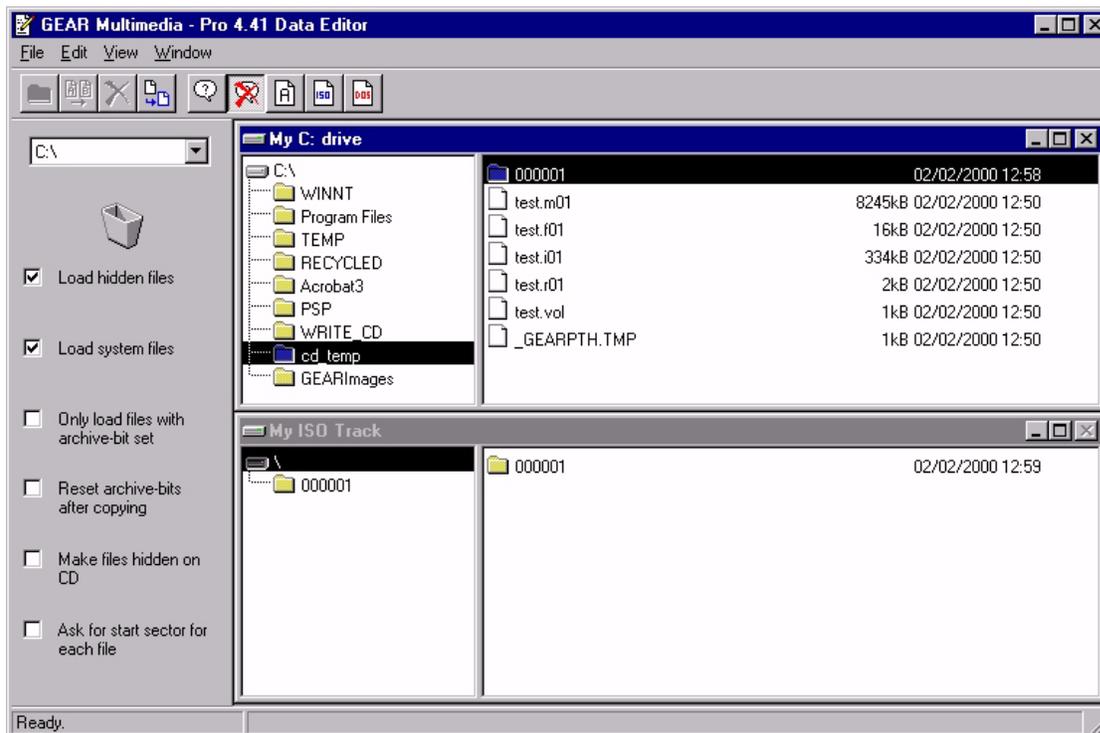
d) Select “New CD-ROM” from “Gear Project” and press the “Create” button.



e) Type in a new name for the project and press “Create”.



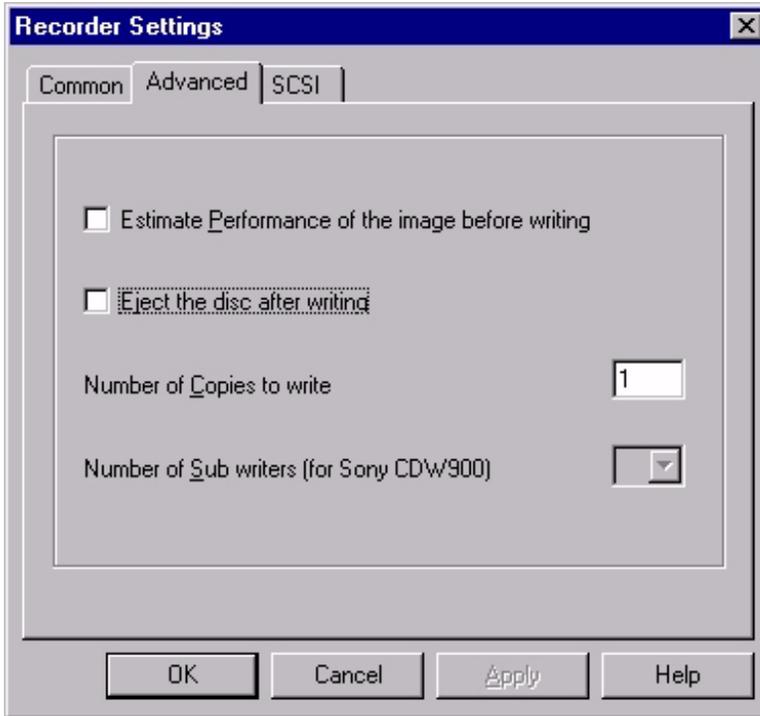
f) Now click Edit to select the files and directories which you like to burn on CD:



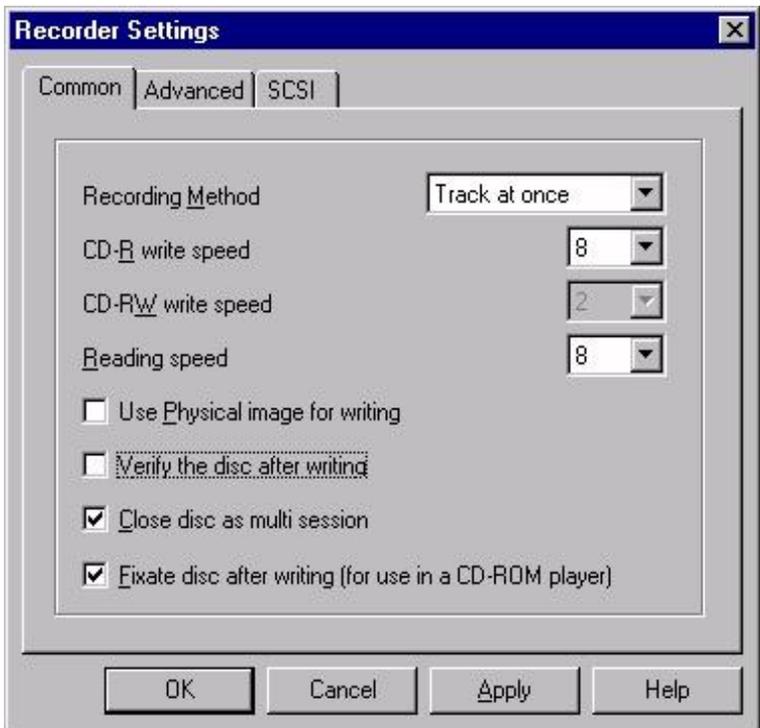
g) Click on the directory tree in the upper middle part of the window to locate the directory with the temporary files for the CD creation. The path is set in the TC/Archive configuration, in this example it is "C:\cd_temp".

e) Take the subdirectory with the volume number (000001 in this example) from the upper right part of the window and drag it into the lower right part. Then select File/Save & Close.

f) Before starting the CD writing make sure that the option "eject the disc after writing" in the recorder settings (can be found under: Options/Devices/Recorder) is disabled:



Normally there is no need to change the “Common Recorder Settings”. The “Verify disc after writing” option is not required because an extra verify between the CD and the original archive data is done afterwards using a TCfW Archive Maintenance action. The verify by the “GEAR” software would only compare the CD with the “temporary files for CD creation” i.e. this verify would not cover the whole process.



g) After all settings have been done click on “Recorder/Write Gear Project” and Gear will start to write the CD.



h) After writing of the CD is complete close the “GEAR” application and start action “Verify CD and Increment CD count” from the TCfW archive maintenance. (If you only want to re-check a CD without changing the CD count select action “Verify CD only”).

i) Restart archiving and archive search (2 “Start” buttons). Archiving and archive search may also be restarted before the “Verify” action.

2.17 TC/Archive for Application Service Providers

2.17.1 Multiple TC/Archive Instances on the Same Storage Server

The TC/SP setup utility supports installation of multiple archive instances, it is usually not necessary to enter any of the configuration options described in the following manually.

A new command line option (/k:subkey) has been implemented to specify a registry sub-key where configuration values are taken from (instead of using the fixed “TCARCH” sub-key, configuration values are taken from “TCARCH01”, “TCARCH02” etc.). This allows to have different configurations for different customers on the same server.

The start-up of multiple TC/Archive instances on the same server is optimized by applying a global lock to the start-up procedure.

All TC/Archive instances use the same license (issued for the storage server’s CPU number and covering the total disk space), which is set in each customer’s TCOSS. The way the total disk space is split between individual customers should be reflected in separate disk partitions, i.e. a separate logical drive should be created for each customer.

2.17.2 Shared Jukebox

It is now possible to share a single jukebox or a cluster of jukeboxes between several TC/Archive instances. The jukebox will be controlled by a single “TCJUKE” process which may be accessed by several “TCARCH” processes.

The volume labels of CDs written in the jukebox have the format “xxnnnnnnCDa”, xx = 2 byte customer code, nnnnnn = 6 digit volume number, a = 1 digit CD number

The 2-byte customer code is defined by a new registry value “**CustomerCode**” under the “.\Topcall\TCARCH\CDWriter” sub key, default value is “AV” (compatible to previous releases). The **customer code** has to be in **capital letters only**, e.g. “TC”, not “Tc”.

The individual "TCARCH" processes of each customer will scan the jukebox file path using the customer prefix to see only its own CDs (registry value "**..\TCARCH\Jukebox\FilePath**" set to "Z:\xx*" instead of "Z:*").

It is recommended that different customers have different schedules for CD writing configured: Registry section "**HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\CDWriter**", value **Schedule** (REG_MULTI_SZ): "ss:ss-ee:ee", multiple periods may be set, default: "00:30-3:00"
ss:ss... start time of CD writing period (24 hour clock)
ee:ee ... end time of CD writing period (24 hour clock)

All TC/Archive instances use the same jukebox license (issued for the archive server's CPU number and covering the total number of jukebox slots), which will be set in each customer's TCOSS.

All TC/Archive instances share the same pool of empty CDs in the jukebox(es). It is not possible to limit the number of slots used by individual customers.

3. Prerequisites

TC/Archive can be installed with any model of TCOSS Server (LAN access required), operating with TCOSS release 7.08.00 or higher. The integrated archiving feature requires TCOSS release 7.24.01 or higher. The jukebox support and automatic CD writing option requires TCOSS 7.26.00 or higher.

- TC/Archive requires a per workstation license.
- The jukebox support and automatic CD writing option requires a separate license and is only available on dedicated archive servers. The jukebox license includes the automatic CD writing option and is ordered according to the number of slots in the jukebox(es). The semi-automatic CD writing option (using the archive server's built-in CD writer) requires a jukebox license for one slot.

For clients such as TCfW a TCTI version equal or higher than 2.09.07 is required. Only this version supports the enhanced path feature needed to be able to access TC/ARCHIVE.

TCfW versions 2.11.00 or higher provide the user interface for TC/ARCH. TCfW version 3.06 or higher is required for full support of administrator functions.

3.1 TCOSS Server Configuration

The short term archive of the TCOSS server has to be set larger than an archive volume (600MB, mail archive entries and files together) to back up the last, open volume of the archive server which has no CD backup. The TCOSS short term archive size depends on two settings: The size of the archive file which holds the mail entries (system configuration, line 13, position 3 and 4) and the size of the mail system area (consisting of number of files and KB) which holds the documents and may be changed using TCDISK.EXE.

To do an exact calculation one would need to know the average size of the messages and the mail entries. For a rough estimate take 50K average message size, this gives about 12000 messages on an archive volume and therefore 12000 files and 600MB (or more) for the +MAIL folder. Assuming an average mail entry size of 500 bytes gives 6M as lower limit for the TCOSS short term archive file size.

The archive server connects to the TCOSS server's short term archive. It should be checked whether all messages which should go to the archive server are put into the short term archive.

On the other hand one might also want to avoid multiple archivation of the same message. Although the message is stored only once on the archive server, any search for message content or subject would return a number of mail entries. Check event settings in the user profiles if the "archive entry" option is "on" where it's not necessary (e.g output to a printer or break message).

In some cases inbound fax messages are distributed manually via a distribution user. The archivation of the first hop between the fax module and the distributor may be suppressed by switching off both the out-box archivation setting of the fax module (config line 41, 4th position) and the in-box archivation of the distribution user (in the user profile, default setting is "on").

4. Installation

4.1 Prerequisites

Same operating system requires as Kofax Communication Server.

Additionally for semi-automatic CD writing:

Point Jukebox Manager Software version 4.1 (available on Lotus Notes)

TCJCD-1 license (jukebox license for 1 slot)

Additionally for jukebox support and fully automatic CD writing:

Point Jukebox Manager Software version 4.1 (available on Lotus Notes)

TCJCD-xx license (jukebox license, xx = number of slots in jukebox)

NSM jukebox

One free serial port on the archive server for jukebox robotic control

4.2 Disk Partitioning

When installed on a TCOSS server the storage size for TCOSS must be limited to reserve space for the TC/ARCHIVE volumes if both server applications use the same disk partition. By default TCOSS occupies all available disk space on its partition. This may be limited during setup.

If there is a different partition (or even a different disk) for both TC/ARCHIVE and TCOSS, automatic disk allocation is not an issue. Both TC/ARCHIVE and TCOSS can occupy all available space on their corresponding partition.

Note: The installation procedure of TC/ARCHIVE allows to specify the drive to be used while TCOSS always uses drive D:.

When TC/ARCHIVE is installed as an upgrade to an existing TCOSS server, the total disk storage must be increased because the storage size of TCOSS cannot be reduced.

This can be done by adding a second disk (4 or 9 GB) dedicated to TC/ARCHIVE or by changing the disk to a larger one. In case the disk is changed, the TCOSS partition must be copied to the new disk. The remaining free storage must be at least 1.5 GB.

It is recommended that separate logical drives for the exclusive use of storing archive volumes are created with the disk manager when setting up a new archive system. Example:

- Logical Drive C: total size about 2 GB for Windows, system software and temporary files for CD creation, or about 500 MB if no CDs are created or created on a separate workstation. There are 3 directories to be configured for temporary files for CD access, and all of them should be located on that drive ("TempCDPath" in the "TCARCH" registry section for the encrypted volume copy, "TempDir" in the "TCJUKE" registry section for the CD writing software, and a read cache directory of the Point Jukebox Manager Software).
- Logical Drive E: remaining disk space, used only for archive volumes, VolumePathList set to "E:\TCARCH\VOLUMES"

4.2.1 Disk Partitioning for DVD Writing

Set aside at least 5 GB to hold temporary files for DVD writing, either by creating a separate disk partition or by restricting the disk size used for archive volumes (specify the remaining size in MB in the "VolumePathList" registry value in the "TCARCH" section).

These 5 GB will be used for encrypted archive volume files ("TempCDPath" in "TCARCH" registry section) with a size of 4.4 GB, intermediate files of the CD writing software ("TempDir" in the "TCJUKE" registry

section) with a size of around 100 MB, and the read cache directory of the Point Jukebox Manager software of 500 MB.

4.3 Installation Overview

For an installation with jukebox follow the steps

- Jukebox installation
- Point Jukebox Manager installation
- TC/ARCHIVE installation

For an installation without jukebox but with semi-automatic CD writing see

- Point Jukebox Manager installation
- TC/ARCHIVE installation

For an installation without jukebox and with manual CD writing see only

- TC/ARCHIVE installation

4.4 Jukebox installation

Install SCSI adapter and drivers if not already installed in archive server.

Installation steps for jukebox depend on type of jukebox. See jukebox manual for details. In general the following steps have to be done:

- Set the SCSI-IDs of the drives
- Set the RS232 robotics ID
- Switch jukebox power on and reboot Windows

4.4.1 Jukebox Connectors

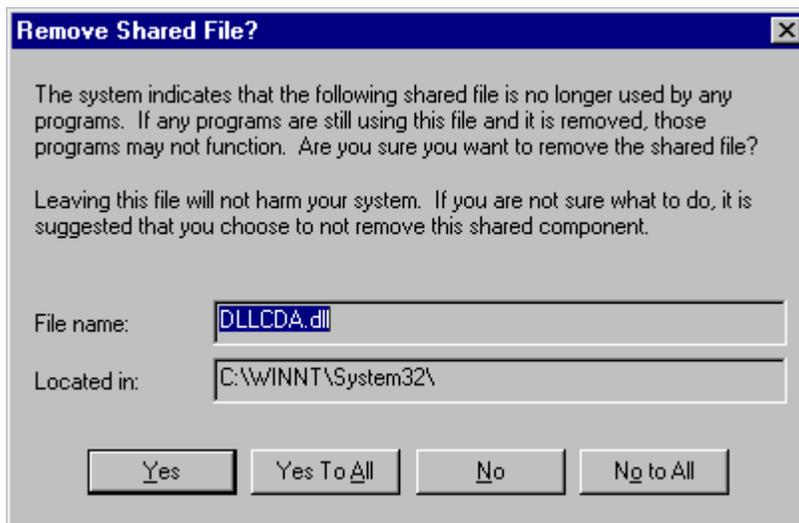
A DVD-R drive in the jukebox has to be connected using a dedicated SCSI bus. A second SCSI bus is required to connect the DVD-ROM drive(s).

The jukebox robotic is controlled by an RS 232 connection. The SCSI robotics control option is not supported. (Usually NSM jukeboxes have the SCSI robotics control connected to the same internal SCSI bus as the DVD-R drive, so it can't be activated because the DVD-R drive requires a dedicated bus).

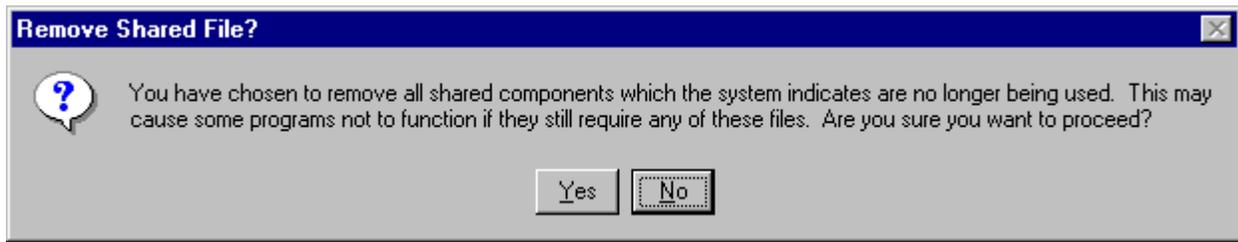
4.5 Point Jukebox Manager Release 4.1 Installation

4.5.1 Uninstall Existing Jukebox Manager Release

If you already have a jukebox manager release installed, chose "Uninstall PoINT Jukebox Manager" from the "Start – Programs – PoINT Jukebox Manager" menu. Please do not start the "deinst.exe" directly.



Answer the remove shared files question with “Yes to All”. “Shared” here means shared by other Point applications, the jukebox manager is the only Point application we are using.



Confirm deletion of shared DLLs with “Yes”. Do system reboots as required.

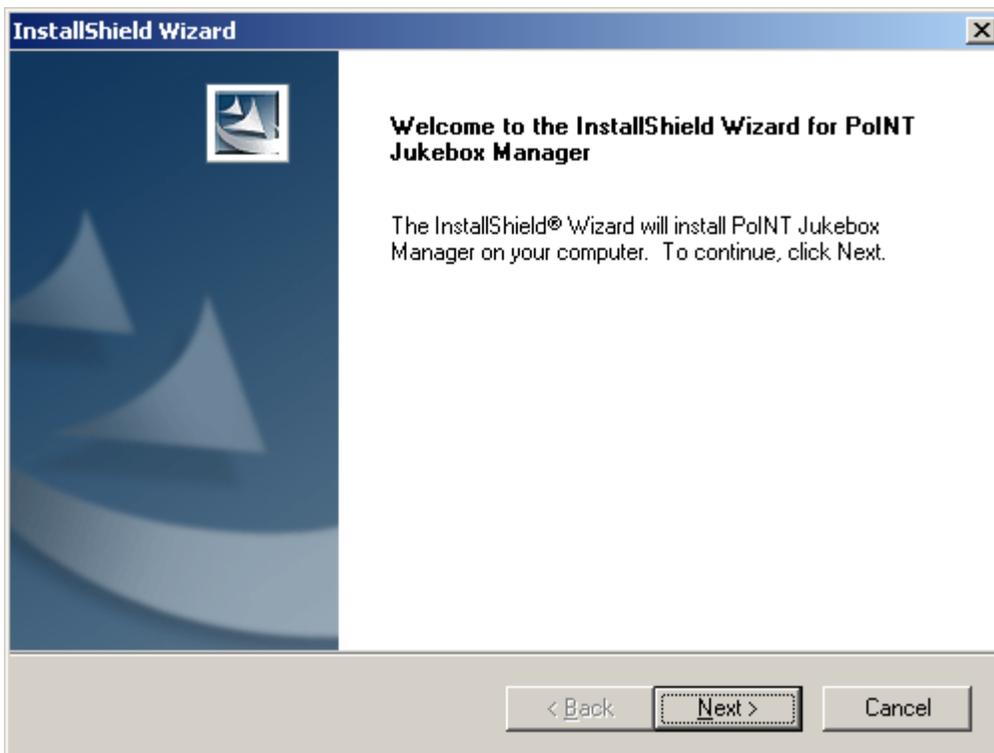
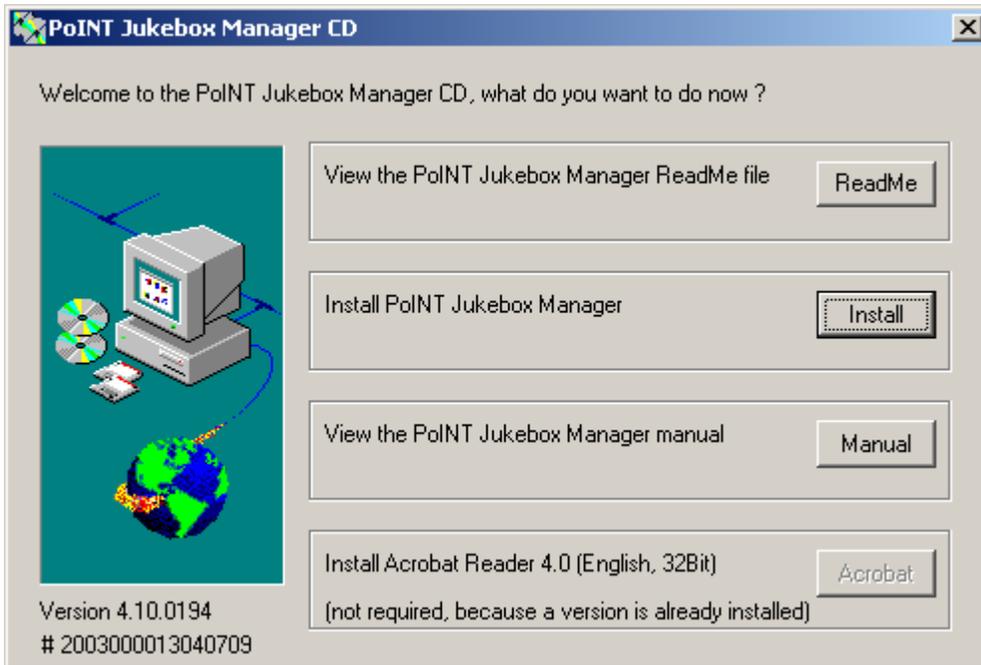
4.5.2 Point Jukebox Manager Setup

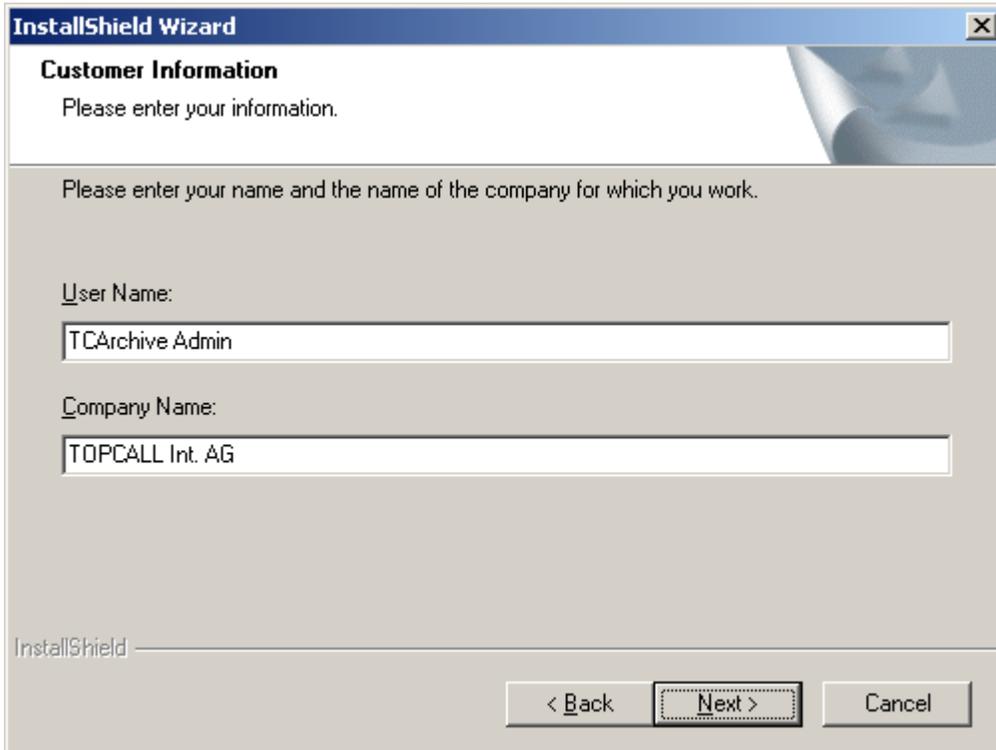
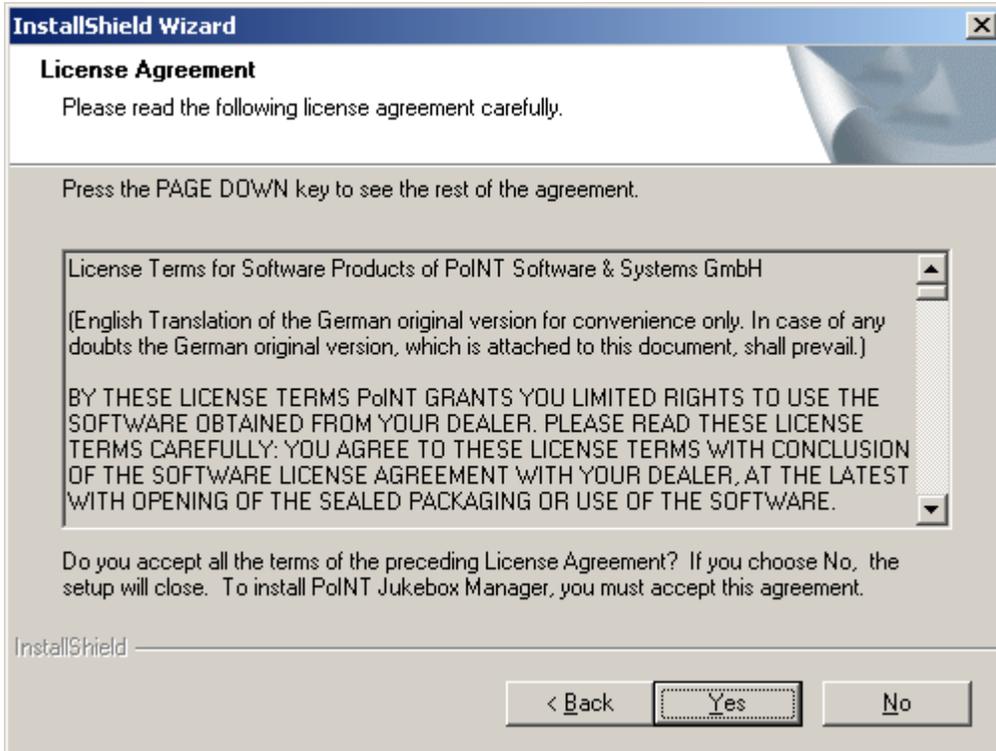
Before installing the Point jukebox manager, start the Windows Disk Administrator and remove the drive letter assignment for all CD drives in the jukebox or for the archive server's CD writer in case of semi-automatic CD writing (menu "Tools", option "Assign drive letter", setting "Do not assign a drive letter"). All jukebox drives should appear under Windows at this stage, and if one does not remove the drive letter assignment, the CD writing will not work afterwards.

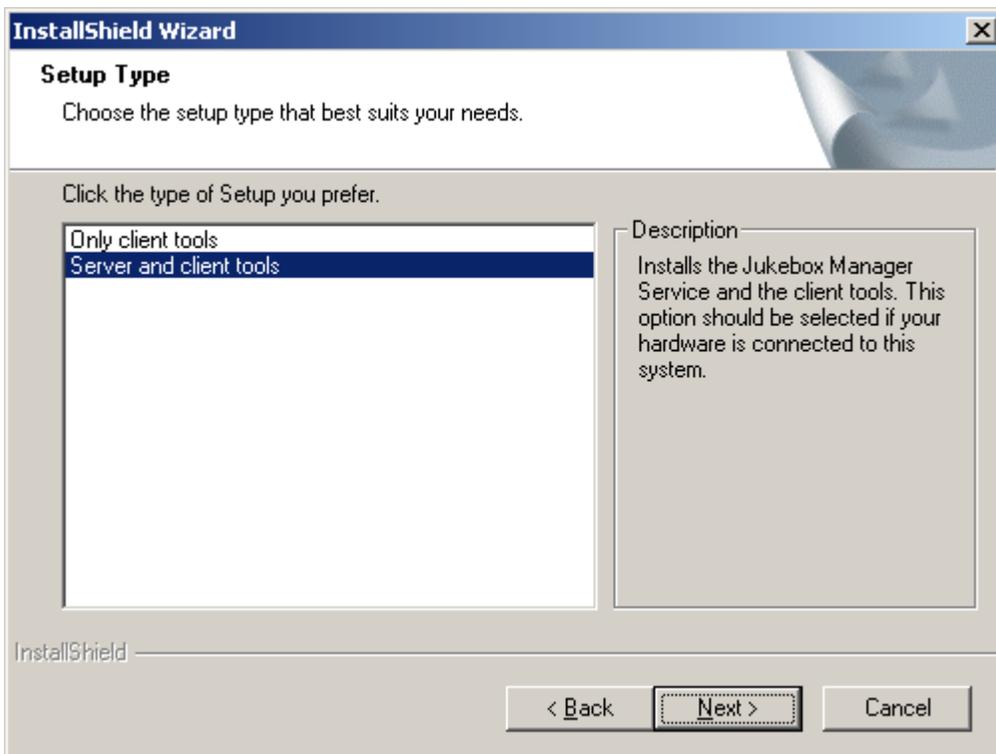
If you have already installed the jukebox manager software, but forgot to remove the drive letter assignment, set the jukebox manager service startup type to "manual" (using the jukebox manager application), reboot Windows, remove the drive letter assignment, set the jukebox manager service startup type to "Automatic" and reboot Windows again. (The drive letter assignment is not visible after the jukebox manager service has started.)

The Point Jukebox Manager software is available on the Lotus Notes Software Releases – TC/SP Database.

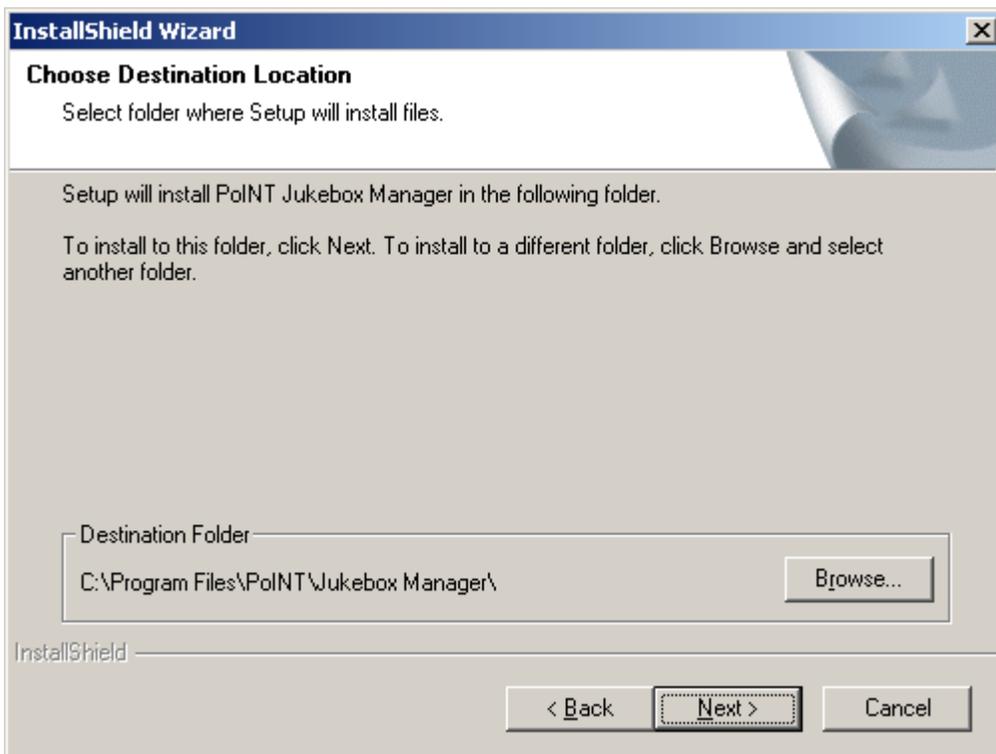
1. Create a new directory
2. Copy the file point.exe to the new directory to extract the files.
3. Execute Setup.exe from package sub directory to proceed with setup.



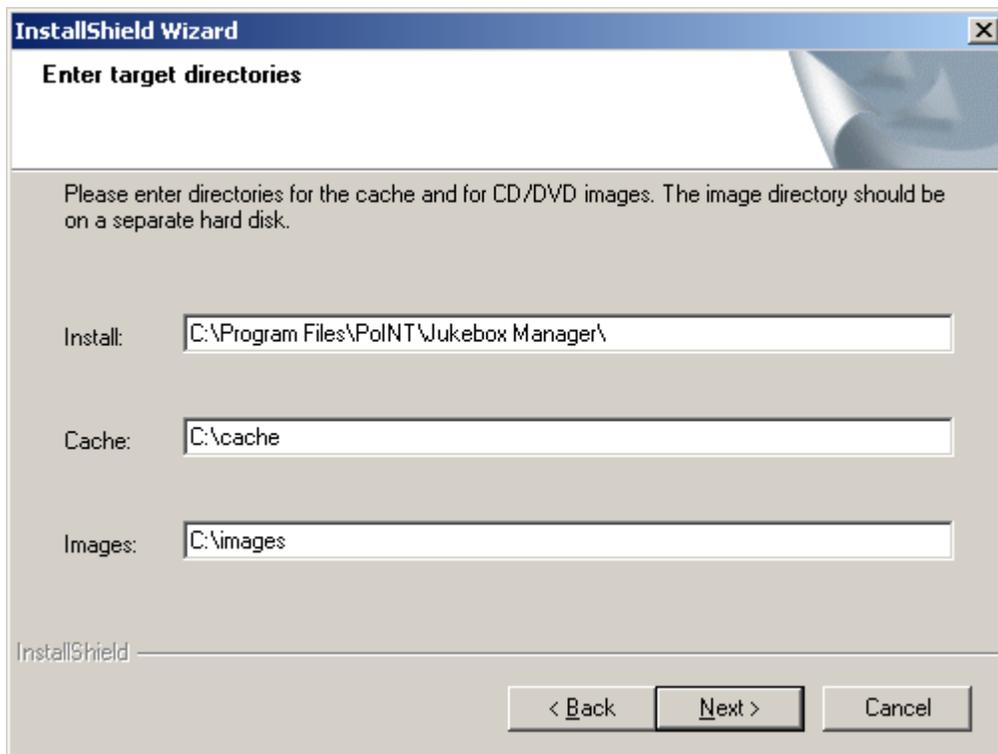




Select **“Server and Client tools”**.



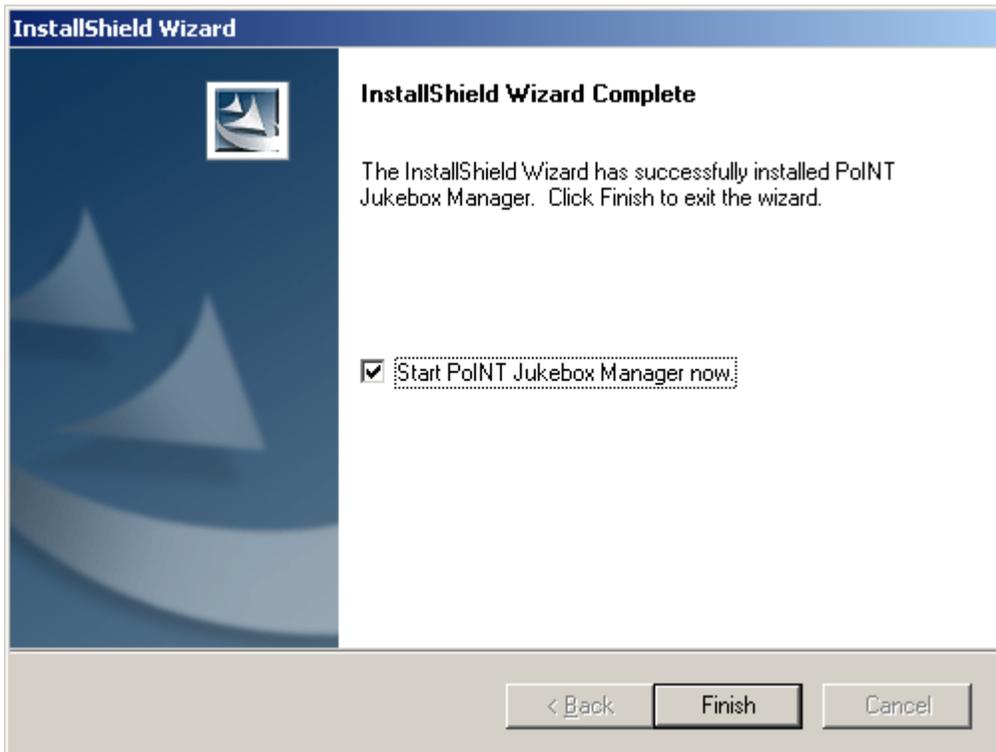
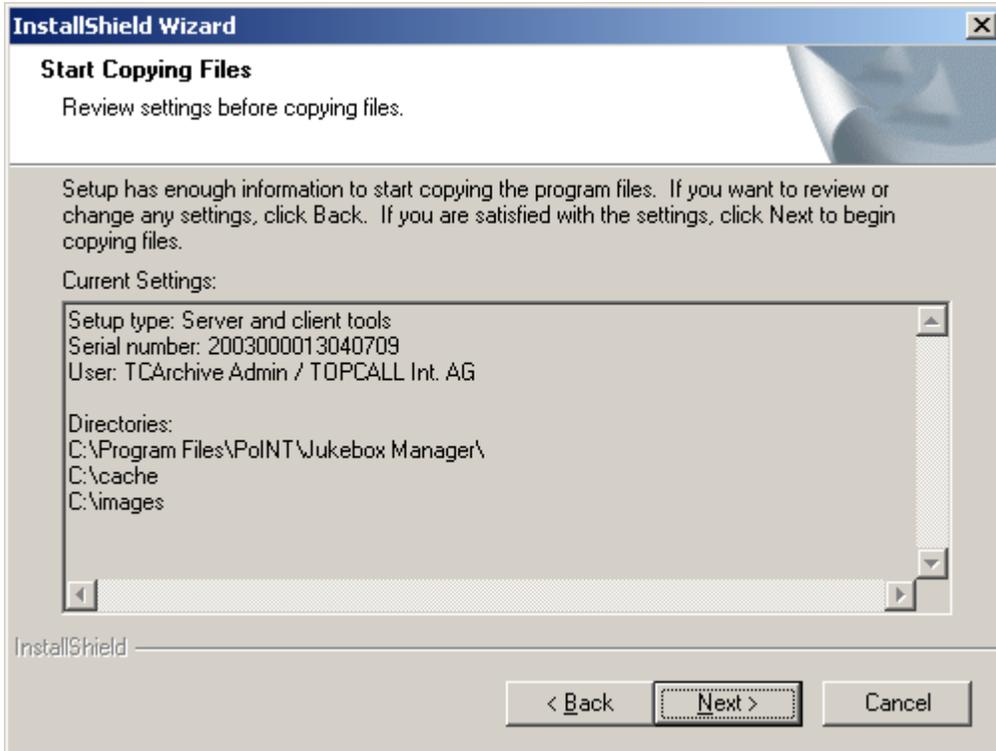
Continue with **“Next”** to select the installation directory **“C:\Program Files\Point\Jukebox Manager”**.



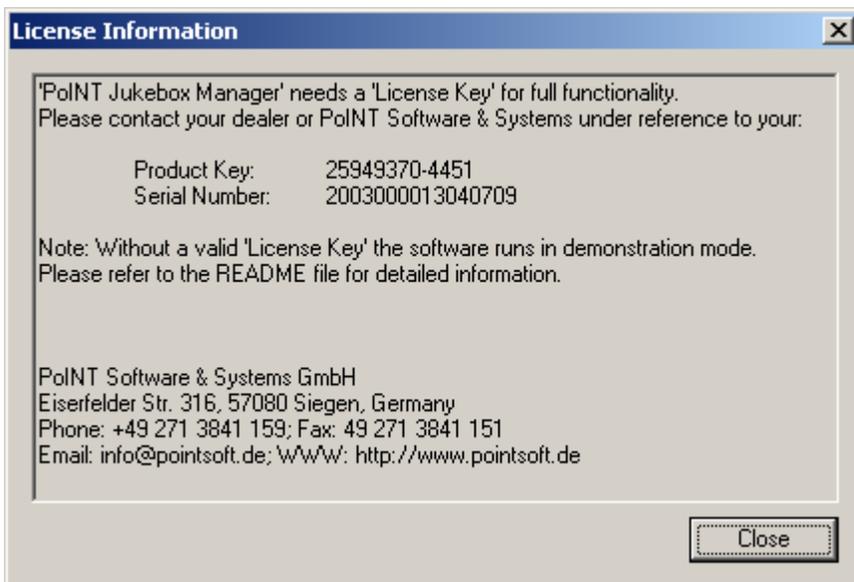
Enter an appropriate cache directory.

The cache directory should not be located on the same logical drive where you plan to put the archive volumes. It is recommended to create a separate disk partition of about 1.5 GB which holds all temporary files and cache directories. (There are 2 more directories for temporary files: “TempCDPath” in the “TCARCH” registry section and “TempDir” in the “TCJUKE” registry section.) The partition size is calculated as 2 times the volume size (2 * 600 MB) plus the jukebox manager cache size.

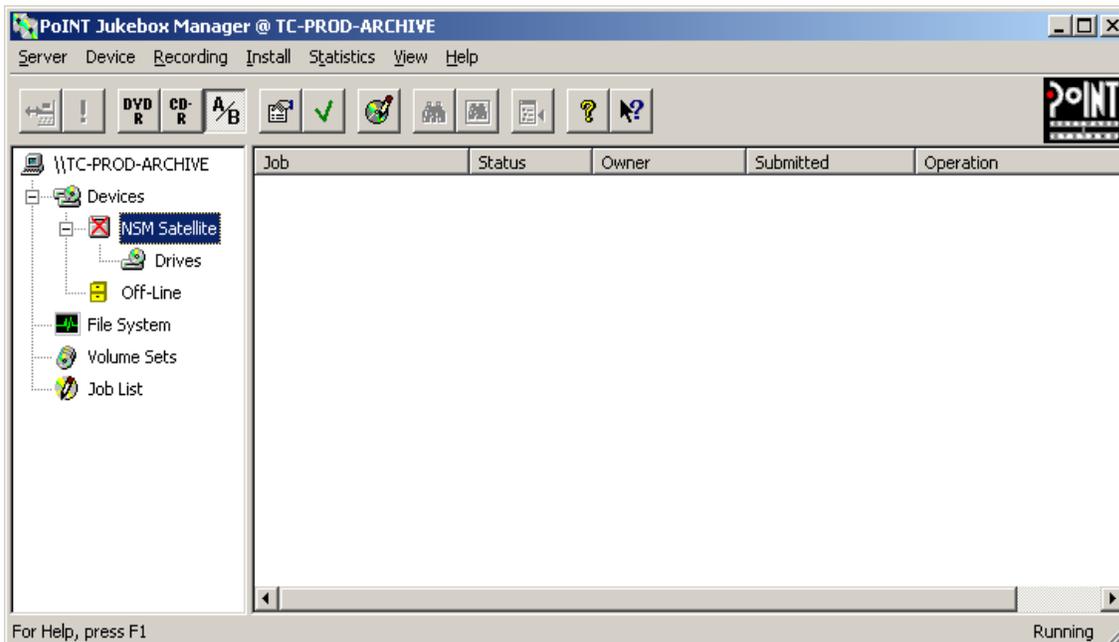
The image directory is actually not used, you should enter the same directory as specified in “Directory for Temp Files of CD writer software” in the TC/Jukebox setup (stored in registry value “..\TCJUKE\TempDir”).



Start the Jukebox Manager Application (C:\Program Files\Jukebox Manager\JBXadmin.exe) if you did not select to start it automatically. A license information window will pop-up:



This can be ignored, an appropriate Point 'License Key' will be set later by the TCJUKE process according to the jukebox license set on the TCOSS server. If the jukebox is already connected it will be detected automatically:

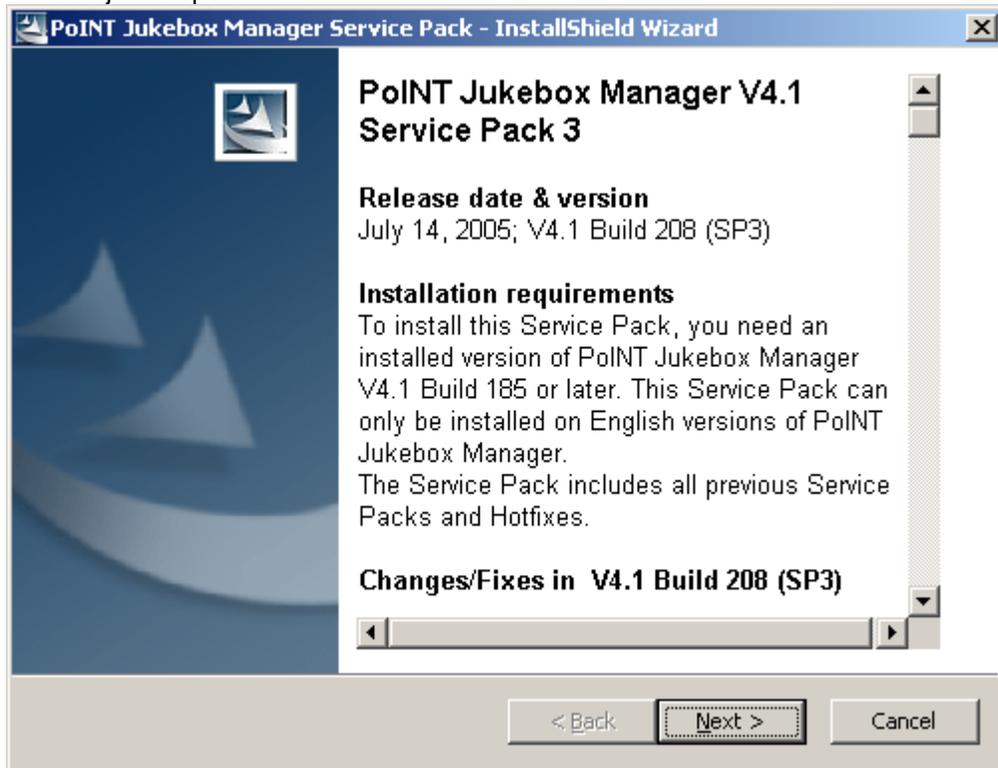


4.5.2.1 Apply Service Pack 3 to Point Jukebox Manager 4.1

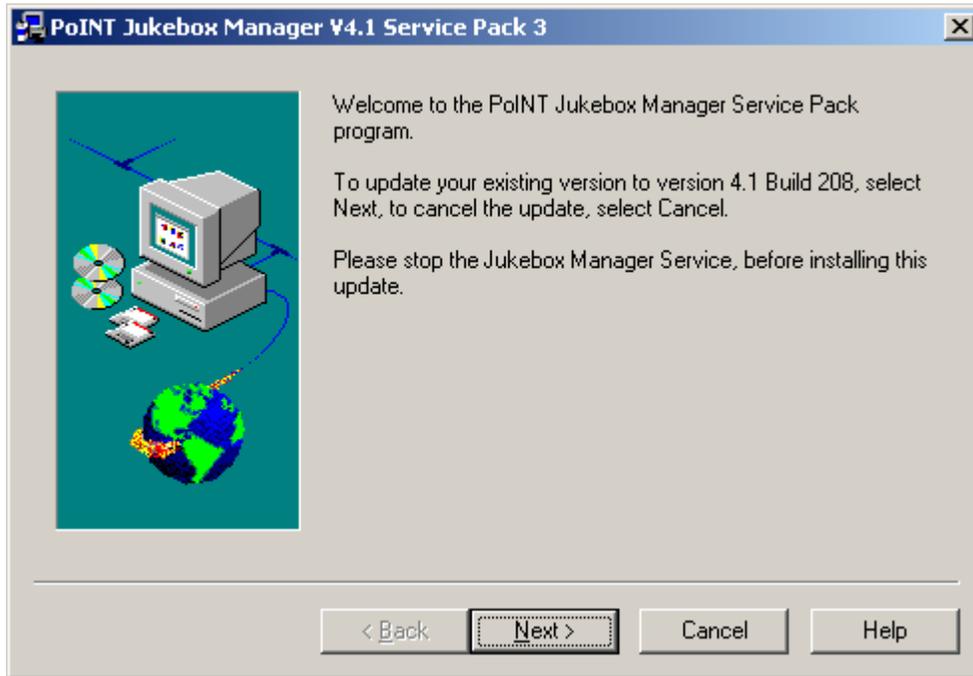
Get the file jbm41sp3.exe from the Lotus Notes *Software Releases – TC/SP Database*.

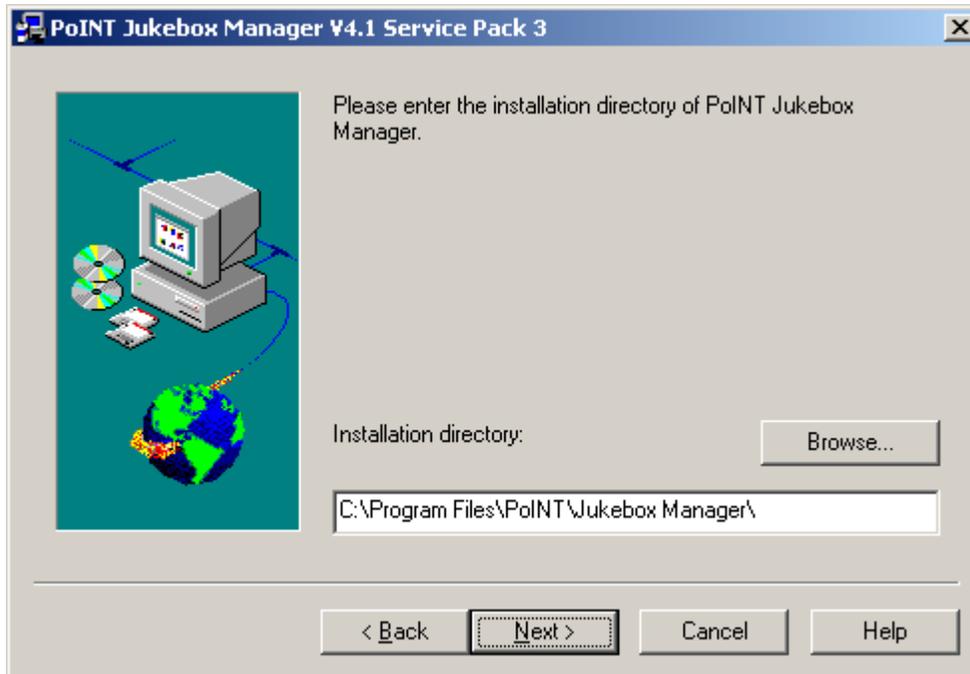
Stop the Jukebox Manager Service with the JBXadmin application and close the application.

Run the jbm41sp3.exe:



Proceed with “Next”:



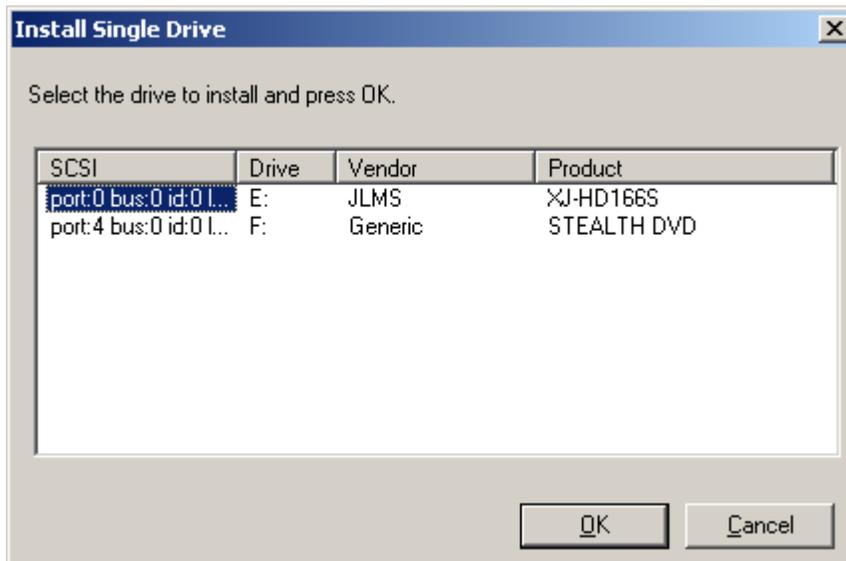


Make sure that the installation directory matches and proceed to install the list of files shown in the next screen.

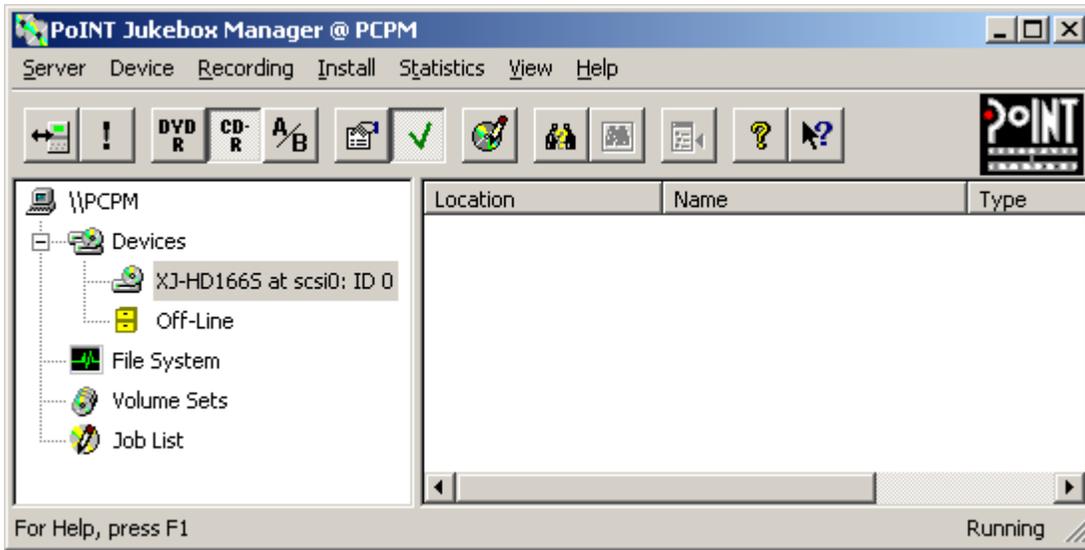
Restart Windows if prompted to do so.

4.5.3 Configuring the Jukebox Manager for a Single CD Writer

Select "Single CD-Drive" from the "Install" menu of the Jukebox Manager Application:

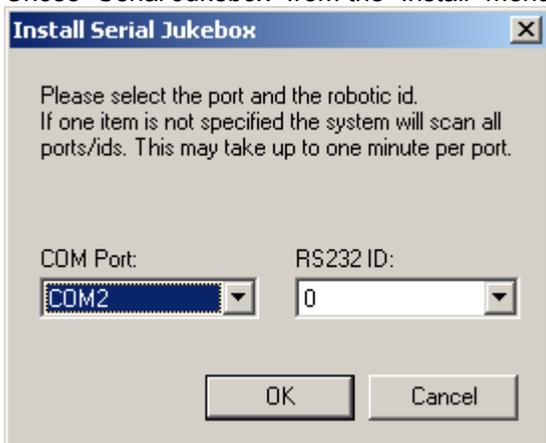


Select the drive and click OK.

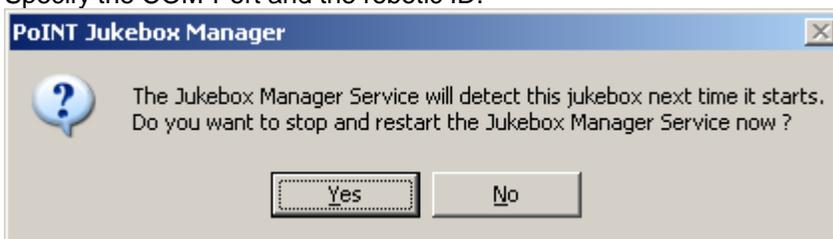


4.5.4 Configuring the Jukebox Manager for a Jukebox

Chose “Serial Jukebox” from the “Install” menu of the Jukebox Manager Application:

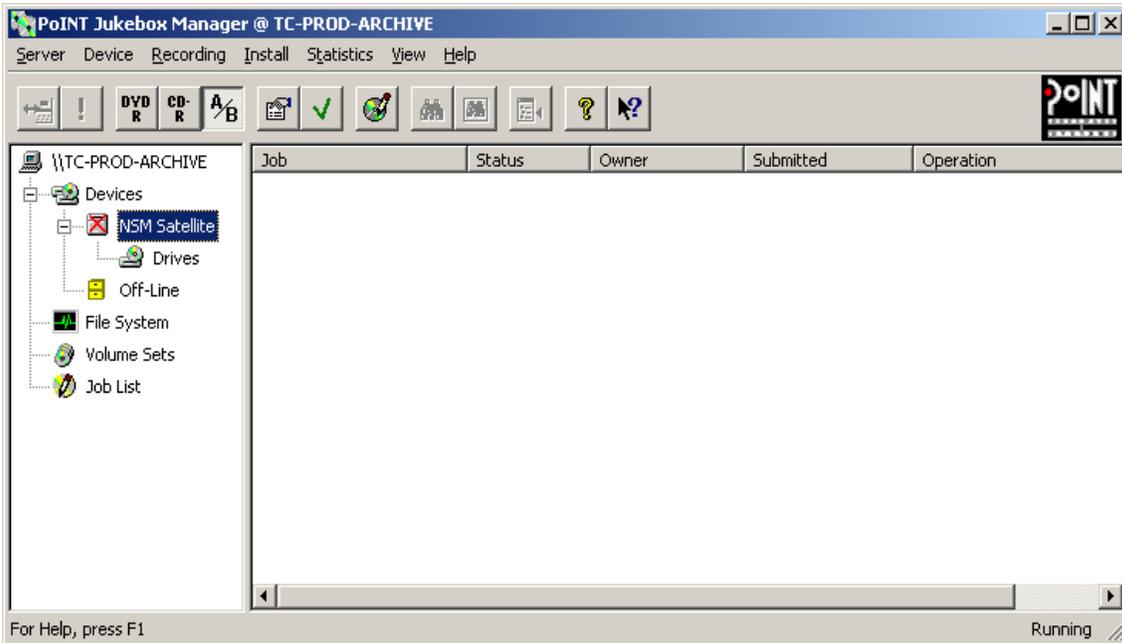


Specify the COM-Port and the robotic ID.



Click Yes.





After activating a jukebox for the first time the Jukebox Manager scans all slots in the jukebox looking for CDs to read their file system. This may take some time (about 30 minutes for 100 slots):



If the Jukebox Manager can't automatically assign the drives the installed jukebox is marked as inactive (with a red cross) and you have to manually assign the correct drive(s) to the jukebox:

Select the jukebox in the left window, click on the '+' sign to display the sub folder 'Drives' and select the sub folder 'Drives'. Now you should see a list of drives in the right window. (If you don't see any drives reboot Windows with the jukebox connected and switched on).

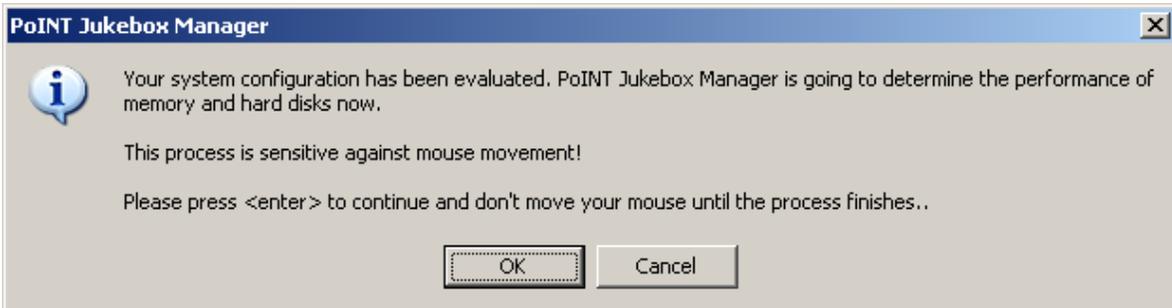
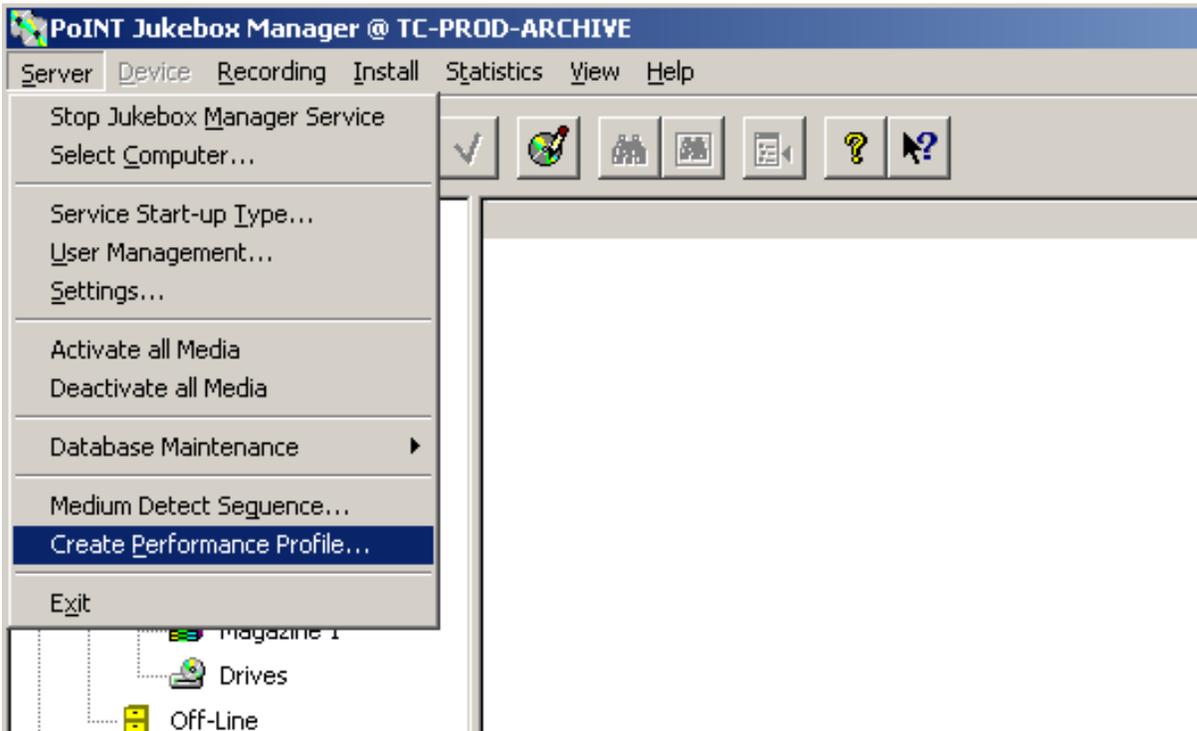
For all appropriate drives in the list (all drives which are really part of that jukebox) do the following: Open the context menu for the drive by clicking on the drive with the right mouse button and select 'Assign'. Select the according drive from the list and click OK. Now the drive should be activated (a green check mark).

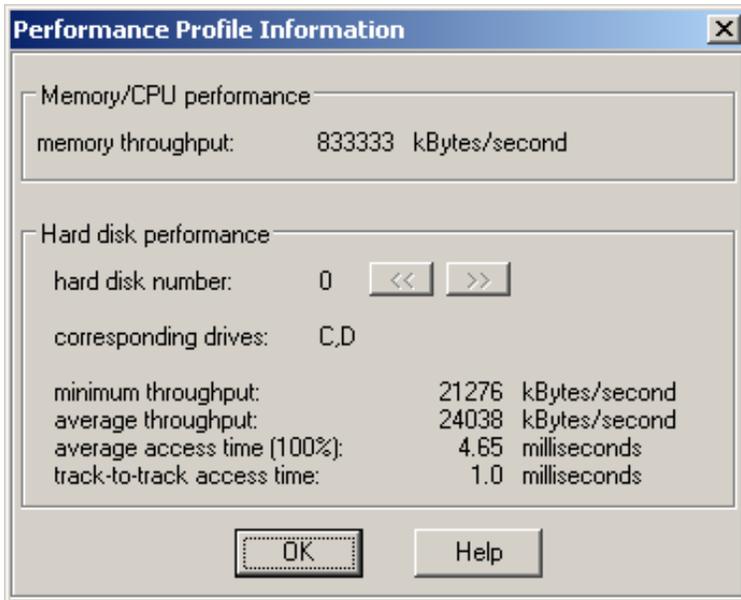
After assigning all drives for a device you should activate the device.

4.5.5 Create a Performance Profile

Writing of CDs with the Point Jukebox Manager software relies on a performance profile to determine optimizations and partial image preparation. A performance profile has to be created before CD writing is possible.

To create a performance profile start the jukebox manager admin tool "JBXadmin.exe", select menu "Server – Create Performance Profile" and follow the instructions.





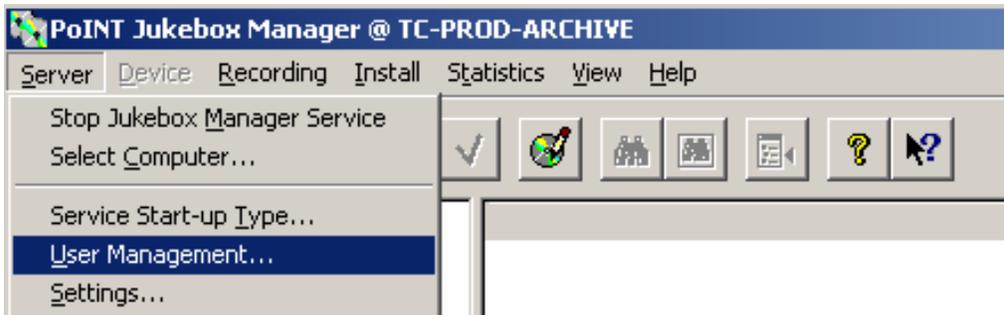
The performance profile creation step should be repeated after significant hardware changes like disk or memory upgrades.

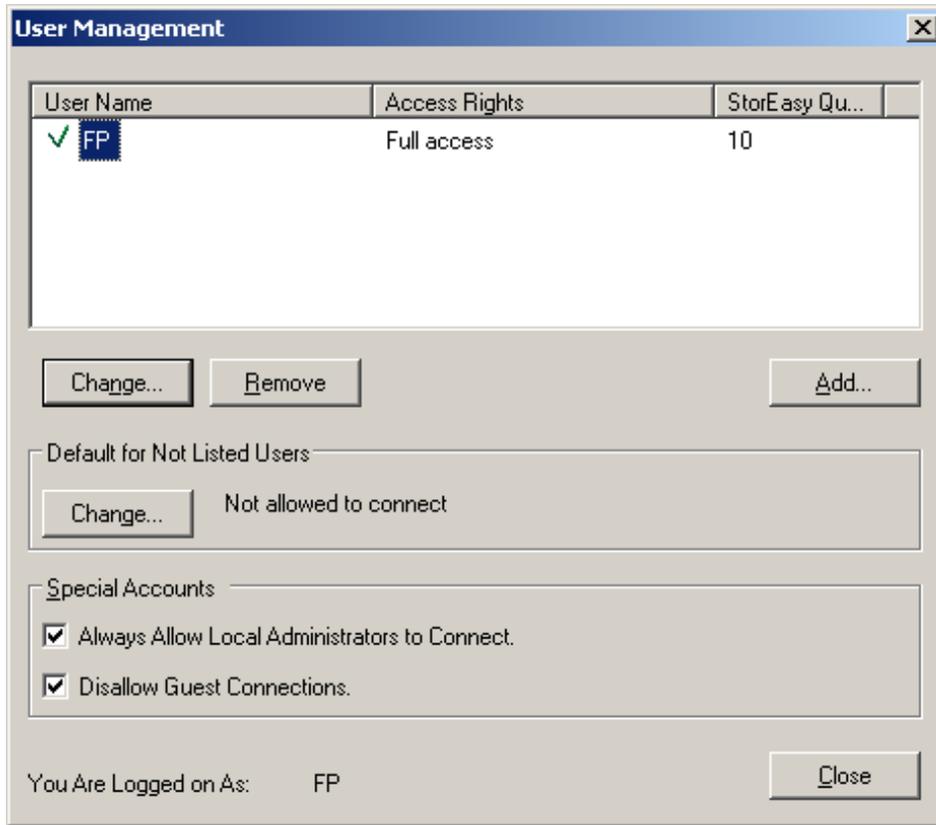
4.5.6 Set User Rights in Jukebox Manager

The Point Jukebox Manager includes user management. It is necessary to set user rights of the jukebox manager so that the TCJUKE process is allowed access to the jukebox.

This can be done by giving full control to the Windows user which is defined for the TCJUKE process. Alternatively one may allow full control for any user not known to the JBM user management. This approach is documented here:

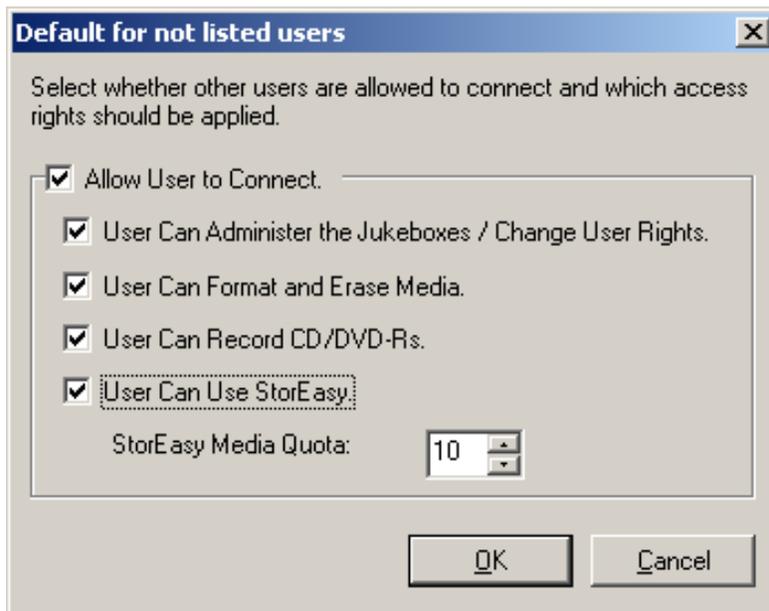
Start the jukebox manager admin tool "JBXadmin.exe" and select menu "Server – User Management".





Press “Change” button in “Default for Not Listed Users”.

Allow not listed users full access:

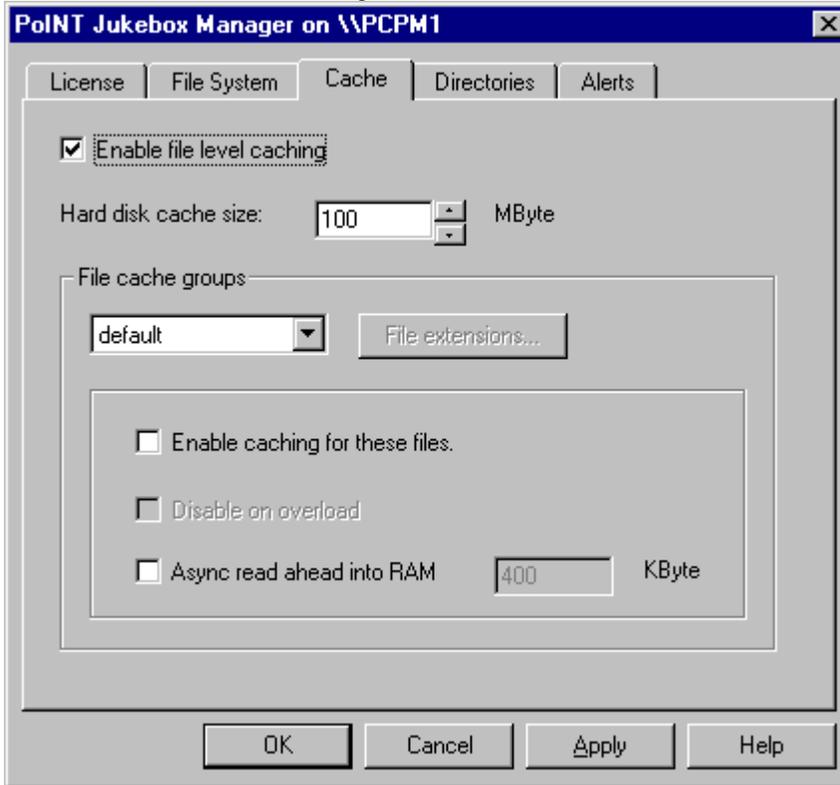


Confirm with “OK” button.

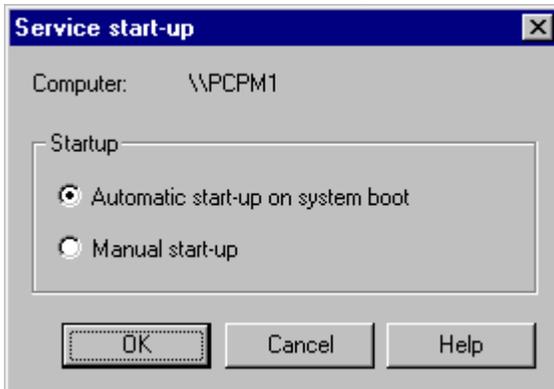
4.5.7 General Jukebox Manager Configuration Settings

Press the 'CDR' button in the toolbar to rescan CDs always with the recording drive. This is important for blank CDs, which are only detected by a CD writer, a CD reader would see a blank CD as invalid CD. (If the 'CDR' button is not pressed it still works, but importing blank CDs may take longer.)

Leave the default cache settings:



From the "Server" menu select "Service Start-up Type" and set "Automatic start-up on system boot":



4.5.8 Copy File "uid.dat"

This step is not necessary if you are going to run the TC/Jukebox set up afterwards. If the TC/Jukebox set up has been done before the jukebox manger update, take the file "uid.dat" from the directory "C:\Program Files\PoINT\Jukebox Manager" and copy it to the "C:\Tcoss\System" directory (it has to be placed into the same directory as the "TCJUKE.EXE" program).

No patches need to be installed with Point Jukebox Manager release 3.2.

4.5.9 Jukebox Manager Settings for DVD Writing

To avoid problems while creating archive DVDs with TC/JUKE, change the AllowBurnProof=1 from 0 to 1 in the [DeviceIO] section of the file PUBBLD.INI in the C:\TCOSS\SYSTEM directory. Restart TC/ARCHIVE and TC/JUKE- creating DVD's with TC/JUKE and JukeBoxManager 4.0/ 4.1 is then working properly.

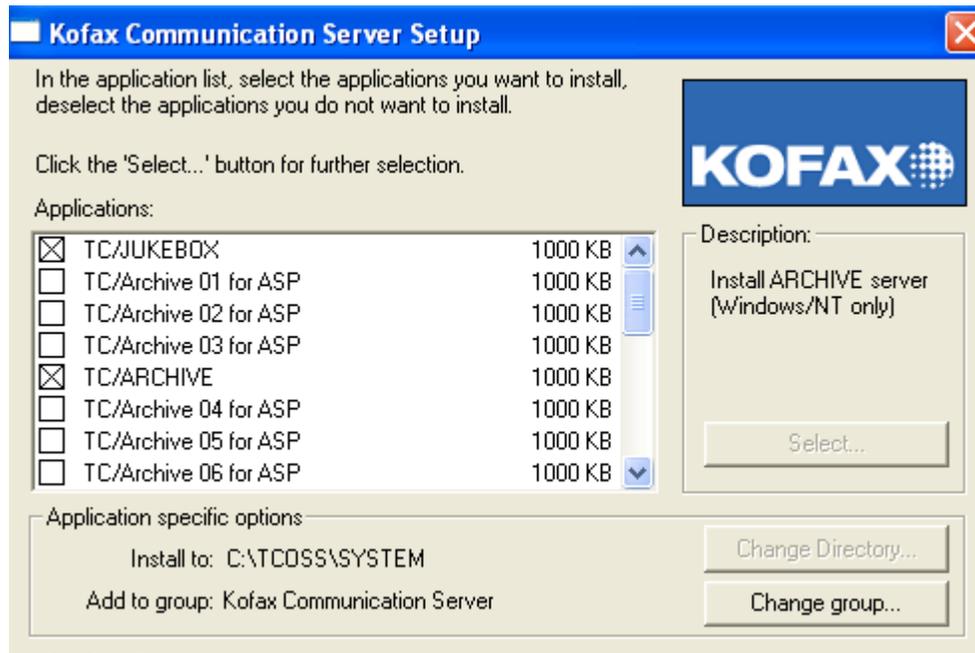
4.5.10 Point Jukebox Manager License

The license for the Point Jukebox Manager will be set automatically from the TCOSS jukebox license after the archive has started and logged in to the TCOSS message server.

4.6 Archive Setup

TC/ARCHIVE installation is part of the standard KCS Server Package.

Use the "Select" button to select TC/Archive, TC/Jukebox or both. TC/Jukebox is required for jukebox support and also for the automatic and semi-automatic CD writing feature.



For an ASP installation with multiple archive instances on a single server select "TC/Archive 01 for ASP", "TC/Archive 02 for ASP" etc. instead of "TC/Archive".

The "Archive Server Parameters" window of the archive setup is used to set the Windows user account and the server transport protocols:

TC/ARCHIVE - Archive Server Parameters

Enter or modify the parameters below

Windows NT User Account: WinUser

Domain (blank for local computer): DM1

Password (default or '*' leaves existing setting): *

TCTI Transport: RPC

Linktypes for Native Transport: TCP/IP

Buttons: OK, Cancel

In the "TCOSS client Parameter" window the client side of the archive is configured (the part of the archive which logs in to TCOSS like a client to read all new messages). The field "KCS ID" is the server ID. It can be left unchanged. The only parameter of this window not used for log in is the KCS Operator Address. This KCS user will find the archive warnings "Volume xxxxxx has not been saved to CD yet (it will be due for cyclic deletion)" in its in box.

TC/ARCHIVE - Archiv Server - TCOSS Client Parameter

Enter or modify the parameters below

Kofax Communication Server UserID: ARCUSER

Kofax Communication Server Password (default or '*' leaves existing setting): *****

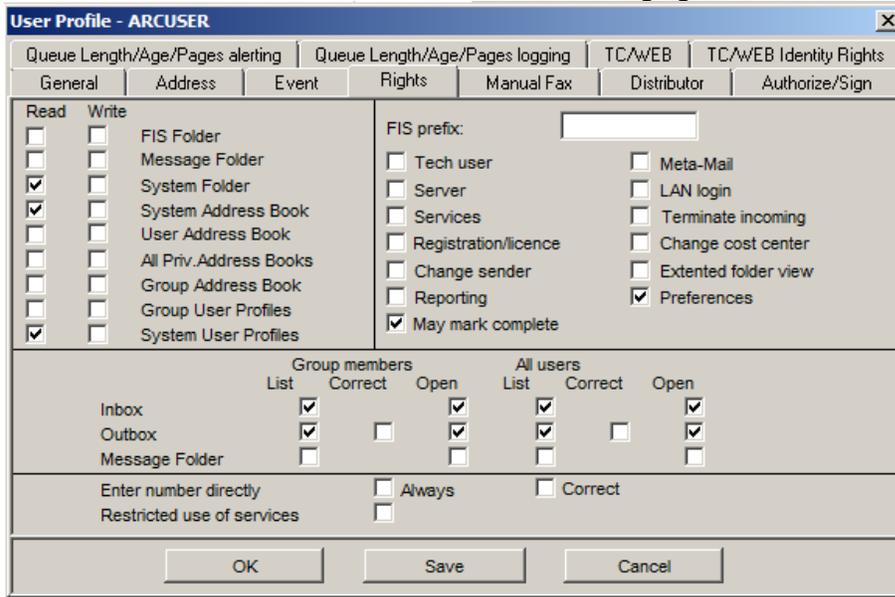
Kofax Communication Server Operator Address (type FREE): SmoothOperator:

KCS ID: KCS

Path to TCOSS server (linktype,name): TCP/IP,KCS

Buttons: OK, Cancel

Note: The KCS User ID must have at least the following rights:



The “Archive Parameters” window allows setting of a customer name and system ID. These 2 parameters may be set only at a new installation and must not be changed later.

“CD Drive path”: Path to built-in CD-ROM drive

“Path for temporary copy of CD”: Path where an encrypted copy of a volume is stored before being written to CD

“Minimum CDs per volume”: Number of CDs which have to be made before a volume may be deleted automatically. May be set to 0 if operation of the archive without CDs is intended, in that case the oldest volume on disk is deleted automatically and without warning if the available disk space has been filled up and a new volume needs to be created.

“Archiving start time”: Start time of archive in format “yymmdd:hhmmss”. May be set to the current date when the archive is started or to an earlier date if the archive connects to a TCOSS server with a short term archive of considerable size. Set the start time to a point where both entries and messages exist in the TCOSS short term archive. If the start time is set too far back the archive server may fetch mail entries without message content from the TCOSS server.

“Path to volumes 1 ..4”: Each entry gives a full path (starting with a drive letter) where archive volumes are stored. Optionally a disk space limitation in MB may be added after a comma.

“Path to volumes 1” is also called primary volume path. It holds the volume index for all volumes (file VOLIDX) and the most recent, open volume.

New archive volumes are always built on the primary volume path. If the primary volume path has been filled up, the oldest volume on this path is moved to another path before a new volume is created.

“Path to volumes 2”, 3 and 4 are used for systems with 2, 3 or 4 RAID cabinets. Do not change the order of entries in the path list of an existing archive.

TC/ARCHIVE - Archive Parameters

Enter or modify the parameters below

Customer name	ACME Inc.
System ID	Production Archive One
Path to volumes 1	D:\TCARCH\VOLUMES
Path to volumes 2	
Path to volumes 3	
Path to volumes 4	
CD Drive path	E:
Path for temporary copy of CD	D:\CDTemp
Minimum CDs per volume	2
Archiving start time (YYMMDD:hhmmss)	090101:000000

OK Cancel

By default the archive will assume it can use the total capacity of all logical drives specified in the volume path list to store archive volumes.

If the archive cannot use the total capacity of a logical drive, because the same drive is used for temporary files for CD writing or holds a TCOSS file structure or any other software, a disk space limitation has to be set manually in the volume path. The disk space setting is not done automatically by the setup program.

How to calculate the disk space limit: Start the Windows "Disk Administrator" and select the "Volumes" view. Take the capacity of the logical drive (it is displayed in MB) and subtract the amount you want to set aside for other applications or a TCOSS file structure. Subtract also the space required for temporary files and cache directories for CD writing, unless put those on a separate logical drive as recommended (see chapter "disk partitioning"). The remaining disk space figure is then appended to the volume path after a comma:

TC/ARCHIVE - Archive Parameters

Enter or modify the parameters below

Customer name: ACME Inc.

System ID: Production Archive One

Path to volumes 1: E:\TCARCH\VOLUMES.42740

Path to volumes 2: F:\TCARCH\VOLUMES

Path to volumes 3:

Path to volumes 4:

CD Drive path: D:

Path for temporary copy of CD: E:\CDTemp

Minimum CDs per volume: 2

Archiving start time [YYMMDD:hhmmss]: 090101:000000

OK Cancel

In the example above the total capacity of drive E: is 43340 MB and 600 MB were set aside for temporary files for manual CD writing. The total capacity of drive F: is reserved for archive volumes.

TC/ARCHIVE - Archive Parameters

Enter or modify the parameters below

Create index volumes: Yes - complete

CD write and Juke-Box support: Semi-auto [local CD-Write]

OK Cancel

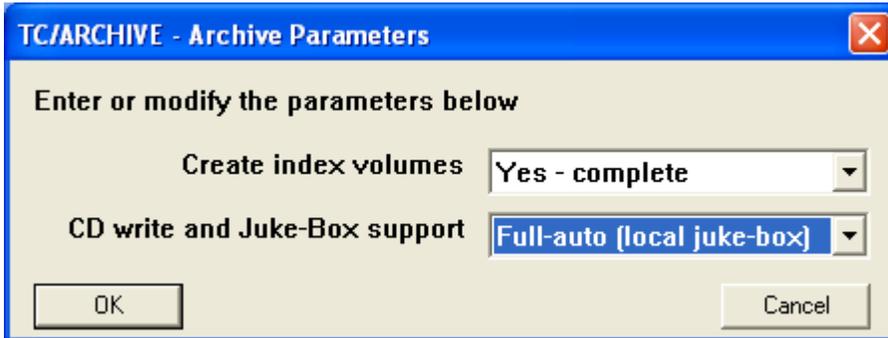
“Create Index volumes”: Select “NO” for entry-level and very small archives, which have less than 10 on-line volumes or do not keep off-line data, otherwise take “Yes – complete”. If it’s a release upgrade of an existing archive do the following:

Procedure for upgrading an existing archive to use index volumes:

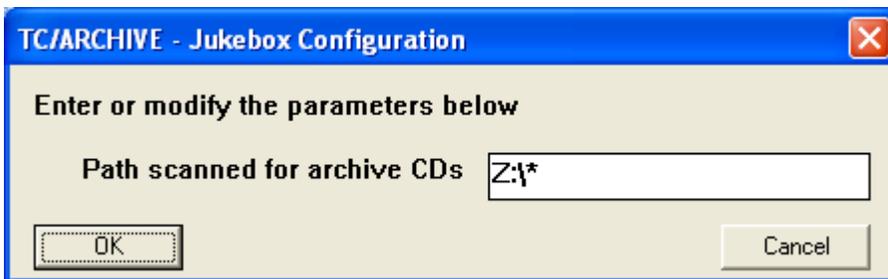
- Check if all volumes are on-line. If there are off-line volumes, restore them from CD, either completely or index and entries only (to save disk space).
- Set the “CreateIndexVolumes” registry value to 1 (= “Yes – complete”) and restart the archive.
- If the archive process stops with an error, check the event log to see what caused the error. Unless the problem can be fixed by restoring a volume from CD, set the “CreateIndexVolumes” registry value to 2 (= “Yes – skip offline volumes”) and restart the archive process.

- When the archive is in a state where it stops with an error, and you still want to do some administrator action like restoring a volume: Set the "InitActiveState" registry value to 0, restart the archive and do the restore. Then set "InitActiveState" back to 3 and restart again.

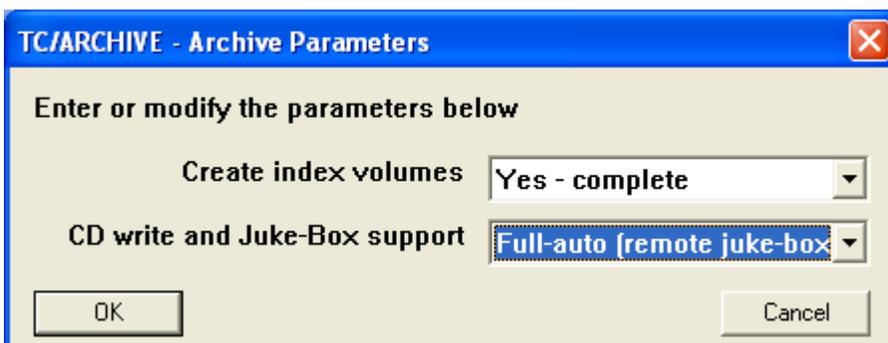
"CD write and Jukebox support": "Manual" requires a number of separate operator actions to create a CD (as with TC/Archive rel. 1.04). "Semi-Auto" uses the archive server's built-in CD writer to record CDs automatically. "Full-Auto" writes CDs automatically in a jukebox, here you have the option to install the jukebox locally (connect it to the archive server), or connect it to a separate workstation.



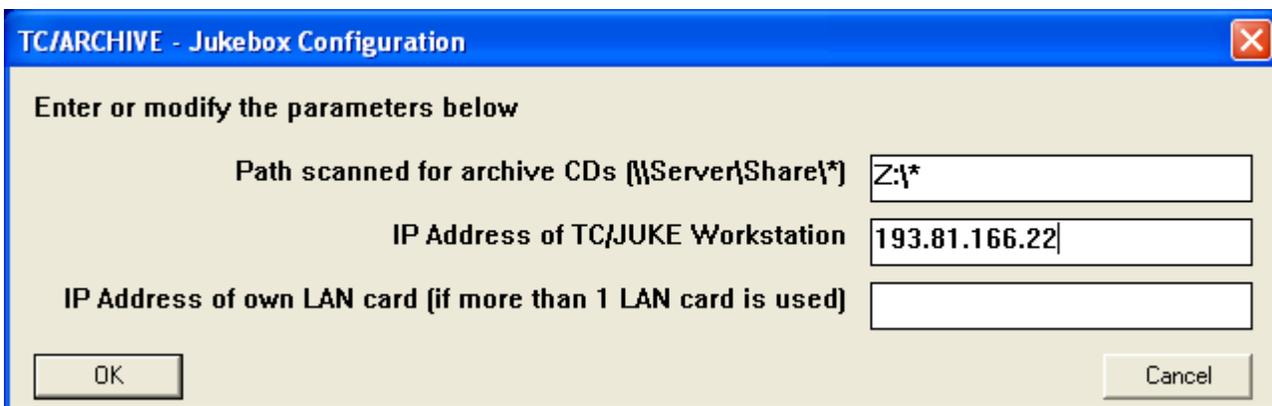
For the jukebox, if it's installed locally, the following window comes next:



"Path scanned for archive CDs": Specify the drive letter of the jukebox file system plus "*". The default drive mapping of the Point jukebox file manager software (to drive "Z") matches the default value offered by the setup program, so normally there is no need to change it.

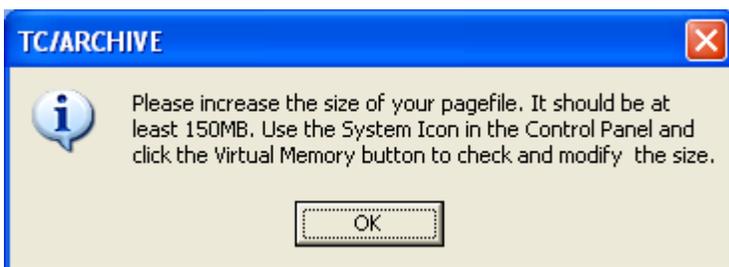


In case of a remote jukebox installation:



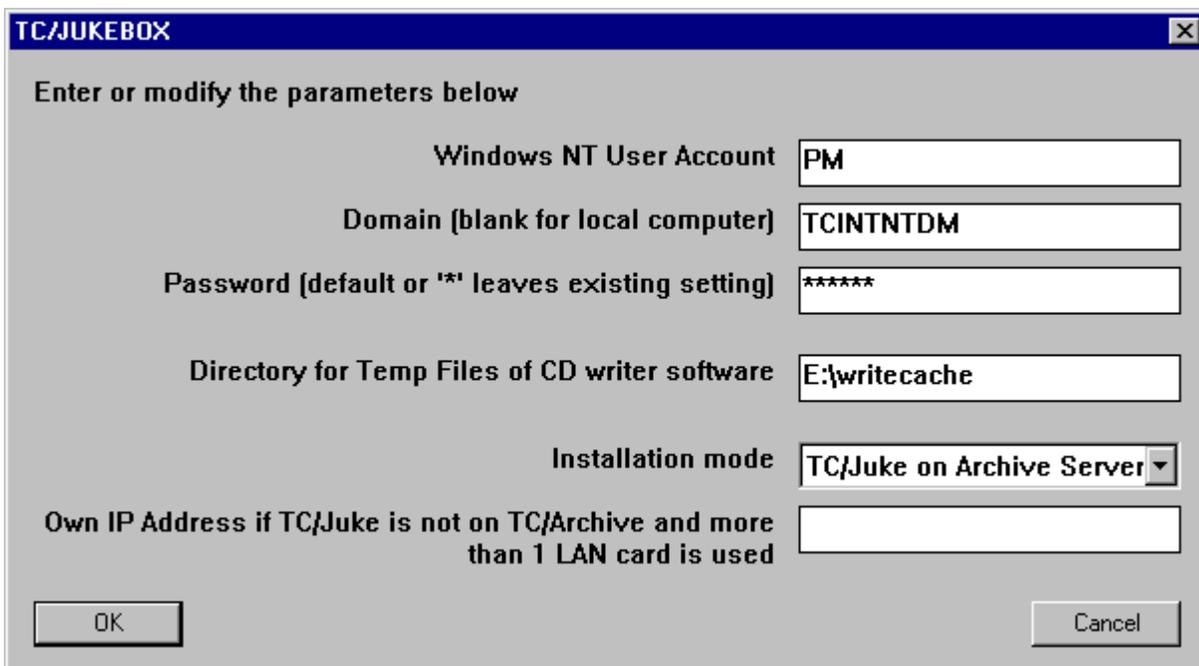
“Path scanned for archive CDs”: Specify the server name of the remote workstation and the share name of the jukebox file system plus “*”. The default share of the Point jukebox file manager software is “Jukebox”.

The following window is a reminder to set the size of the page file to at least 150 MB. This is necessary for the case that one very big message has to be archived, because it is loaded completely into memory before it is saved:



This concludes the TCARCH setup.

If you have chosen to install TCJUKE as well, for jukebox support and for automatic or semi-automatic CD writing, enter the Windows user account parameters as before for the TCARCH process:



“Directory for temporary files of CD writer software”: Should not be placed on the same logical drive as the archive volumes, see chapter “disk partitioning”. The disk space required for the write cache will not exceed the volume size (600 MB). The CD writing software will determine automatically the workstation’s performance and may create only partial image files, so the actual disk space used may be much less.

“Installation mode”: locally or on a remote workstation

“Own IP Address ..”: only required for installation on a remote workstation, leave blank otherwise

4.6.1 Setup for DVD Writing, Upgrade of Existing Archive

To fully utilize the capacity of standard “4.7 GB” DVD-R media adapt the following registry keys. The volume size is only increased slightly so that a downgrade to CD writing would still be possible:

- Set “HKEY_LOCAL_MACHINE\Software\Topcall\TCARCH\VolumeSize” (REG_DWORD) to 0x28000000 (decimal 671088640) for a volume size of 640 MB
- Create “..\TCARCH\VolumesPerCD” (REG_DWORD) and set it to 7

4.6.2 Setup for DVD Writing, New Archive

To fully utilize the capacity of standard “4.7 GB” DVD-R media adapt the following registry keys. The number of 5 volumes on a backup medium allows easier maintenance, but the volumes will be too large to fit on a CD. Do not increase volume size beyond the value given below:

- Set “HKEY_LOCAL_MACHINE\Software\Topcall\TCARCH\VolumeSize” (REG_DWORD) to 0x38000000 (decimal 939524096) for a volume size of 896 MB
- Create “..\TCARCH\VolumesPerCD” (REG_DWORD) and set it to 5

4.6.3 Setup for CD Writing with 700 MB Media

When using 700 MB CD-R media it is recommended to increase the volume size setting from the default 600 MB to 680 MB:

1. Set “HKEY_LOCAL_MACHINE\Software\Topcall\TCARCH\VolumeSize” (REG_DWORD) to 0x2a800000 (decimal 713031680).

4.6.4 Installing TCJUKE on a Separate Workstation

For TC/Archive configurations with jukebox there is the option to install the “TCJUKE” process on a separate workstation. In this configuration the Archive server connects to a RAID and runs the TCARCH process, while the jukebox is connected to a separate workstation running the “TCJUKE” process.

The advantage of this setup is increased data security: The archive data of closed volumes is stored in 2 separate locations, the disk RAID and the jukebox. (The open volume is backed-up by the TCOSS message server.)

The disadvantage is increased network traffic. Also CD writing may take a little longer as the encrypted copy of the archive volume is written via the network to the jukebox workstation. Depending on the speed of the network this step of the CD writing operation may take up to 60 minutes instead of 25 minutes when it is done locally.

4.6.4.1 Settings on Archive Server with RAID

On the Archive Server install only the “TCARCH” process. Make sure to set Windows User ID, Domain and Windows password (network access does not work without Windows User). Check the following values in the registry section “HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH” (written by the setup program):

“**TCARCHtoTCJUKEChannelType**” (REG_DWORD): 1 = TCP/IP connection

“**TCARCHtoTCJUKEPath**” (REG_SZ): path in format “TCJUKE_IP_ADDR:Port/TCARCH_IP_ADDR”

- e.g. “193.81.166.136:64387/193.81.166.93”
- IP address of archive server: 193.81.166.93 (optional)
- IP address of workstation with TCJUKE: 193.81.166.136 (example)
- port number: 64387 (fixed)

“**Jukebox\FilePath**” (REG_SZ): path scanned for archive CDs

set to “\\TCJUKE_PCNAME\JUKEBOX_SHARE*” e.g. “\\PCJU\Jukebox*”

“**TempCDPath**” (REG_SZ): path for encrypted volume copy for CD writing

set to a directory on a shared drive of the TCJUKE workstation using the share name “xxxxd\$” where “d” is the local drive letter on the TCJUKE workstation,

e.g. “\\PCJU\DriveE\$\Cdtemp” or “\\PCJU\E\$\Cdtemp” (using administrative share “E\$”)

Windows network time out:

“HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\LanmanWorkstation\Parameters\SessTimeout” (REG_DWORD): time out in seconds. Set to 120.

4.6.4.2 Settings on Workstation with Jukebox

On the separate workstation install only the “TCJUKE” process. The following values in the registry section “HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCJUKE” will be written by the setup program:

“**TCARCHtoTCJUKEChannelType**” (REG_DWORD): 1 = TCP/IP connection

“**TCARCHtoTCJUKEPath**” (REG_SZ): path in format “TCARCH_IP_ADDR/TCJUKE_IP_ADDR:Port”

e.g. “193.81.166.93/193.81.166.136:64387”, both IP addresses are optional

4.7 Network Settings

By default TC/ARCHIVE has the TCTI server type “ARCHIVE”. This allows TCOSS and TC/ARCHIVE to have the same TCTI network name (required when running on the same server). The server type defines the TCTI endpoint at which a server listens for incoming connections.

A client application such as TCfW must specify the endpoint in the path to be able to connect to the archive server (e.g. “TCP/IP,YourServerName:ARCHIVE”). There is no other way to change the default endpoint (“TCOSS”) at the client side.

4.7.1 Settings for Native NETBIOS Transport

Native NETBIOS transport is only supported if TC/ARCHIVE is installed on a dedicated archive server.

Different endpoints are not supported with native NETBIOS, so the default TCOSS endpoint is used by the archive. This can of course work only if the archive runs on a separate server.

The client setting has to specify a path without endpoint, e.g. “TCP/IP, YourServerName” instead of “TCP/IP,YourServerName:ARCHIVE”.

For the server side, do the following change in the registry section

“HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\tctiServer\rpc”

ServerType (REG_SZ): set to “TCOSS” instead of “ARCHIVE”

Note: Whenever TC/SP Setup is started, the ServerType is set back to ARCHIVE. This means that it must set back to TCOSS after TC/SP setup!

4.8 System Upgrade with Different Logical Drives

Archive volumes may be moved to a different path and rearranged in case of a system upgrade:

- Stop the archive process before moving any volumes.
- Move only complete volume sub-directories (like 000001) with all files they contain.
- The volume index (file VOLIDX) and the most recent volume (the volume with the highest number) must be placed on the primary volume path (the first path set in "VolumePathList").
- A free disk space of at least twice the volume size must be available on the primary volume path. It is needed during build up and compression of the most recent volume.
- Put the most recent volumes on the primary volume path, and fill up the other logical drives in the order they appear in the VolumePathList with the next older volumes.

4.9 Configuration of Very Small Archive

If an archive is to be set up on less than 3 GB of disk space (between 1.5 GB and 3 GB), some changes to the standard configuration are necessary.

The minimum archive is only suited for operation without CDs and only on sites with less than about 10000 messages per week (less than 600 MB of archive data per week).

Registry settings under HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH:

VolumeSize: (REG_DWORD) 0x12c00000

CDsPerVolume: (REG_DWORD) 0

The size of the volumes is reduced to 300 MB (standard is 600 MB) to get a more efficient usage of the available disk space. Volumes are deleted cyclically as necessary without CDs being written.

4.10 Upgrade to Unicode

Before upgrading to the new release check if the TCOSS code page is configured correctly:

- Registry value **CodePage** (REG_DWORD): 0 (Latin), 1 (Eastern Europe)

The archive stores and retrieves TCOSS messages transparently, the code page setting only affects the case-insensitive search. For this purpose internal indexes are built up with strings converted to upper case.

The new release uses Unicode functions internally, even if Unicode is not activated. These functions rely on the correct setting of the TCOSS (legacy) code page.

Do not upgrade to the new release if the Archive is running with a wrong code page. The code page setting must not be changed.

4.10.1 Unicode Activation

Activate Unicode in the Archive before switching the connected TCOSS to Unicode. This will ensure that all Unicode messages on TCOSS are archived as Unicode.

An Archive with Unicode activated will build its index in UTF-8 and try a Unicode login to TCOSS. It also runs with a non-Unicode TCOSS.

Unicode support in the Archive is activated in the registry section

"HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH" using the new registry value "UnicodeSupported" (REG_DWORD):

- Registry value "**UnicodeSupported**" (REG_DWORD): 0 = no (default), 1 = yes

When updating an existing archive the archive's code page which is set in the registry section "HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH" must not be changed. The configured code page is used to convert data stored before Unicode was activated.

- Registry value **CodePage** (REG_DWORD): 0 (Latin), 1 (Eastern Europe)

At startup the actually used code pages are written to the TCARCH trace file with a line like:

```
17/14:04:17.334 (1e1c/1ab8) TCARCH server code page 65001 (legacy code page 0)
```

A server code page value of 65001 (UTF-8) shows that Unicode is activated. The legacy code page is the configured "CodePage" value. If Unicode is not activated server code page and legacy code page are equal.

4.10.2 Restrictions

- The registry values for selective archiving are restricted to the Windows ANSI code page (registry section "TCARCH\SelectiveArchiving").
- The registry values for content filtering are restricted to the ASCII character encoding (registry section "TCARCH\ContentFilter").
- The volume path must be all ASCII (registry value "TCARCH\VolumePathList").
- User-defined attribute names in archived log entries are expected to be all ASCII.
- The stop word file can be entered in UTF-8 with a UTF-8 BOM at the beginning, otherwise it is expected to be in the Windows ANSI code page.

4.10.3 Unicode Deactivation

Some preparation steps will be required before Unicode can be deactivated in the archive: The current open volume has to be closed and an index volume has to be built (if this feature is active). Note that at least two regular volumes are required after the last index volume before another index volume can be created. These manual steps will ensure that the last regular volume ends with a Unicode entry, and that the last index volume, if this feature is active, also ends with a Unicode entry. At this point Unicode can be deactivated so that the next volume starts with a non-Unicode entry.

Here is a list of actions to follow for Unicode deactivation:

- If the index volume feature is active check whether there are at least two regular volumes after the last index volume. If there is only one regular volume Unicode deactivation will have to wait.
- Do a clean shutdown of TC/Archive (stop archiving before shutting down).
- Use the TcarchTool utility to set the state of the last volume to closed.
- If the index volume feature is active set registry value "CreateIndexVolumes" (REG_DWORD) from 1 to 5 to force creation of an index volume. It will be set back to 1 after the index volume has been created.
- Set the "UnicodeSupported" (REG_DWORD) registry value to 0.
- Restart TC/Archive.

4.10.4 Release Downgrade

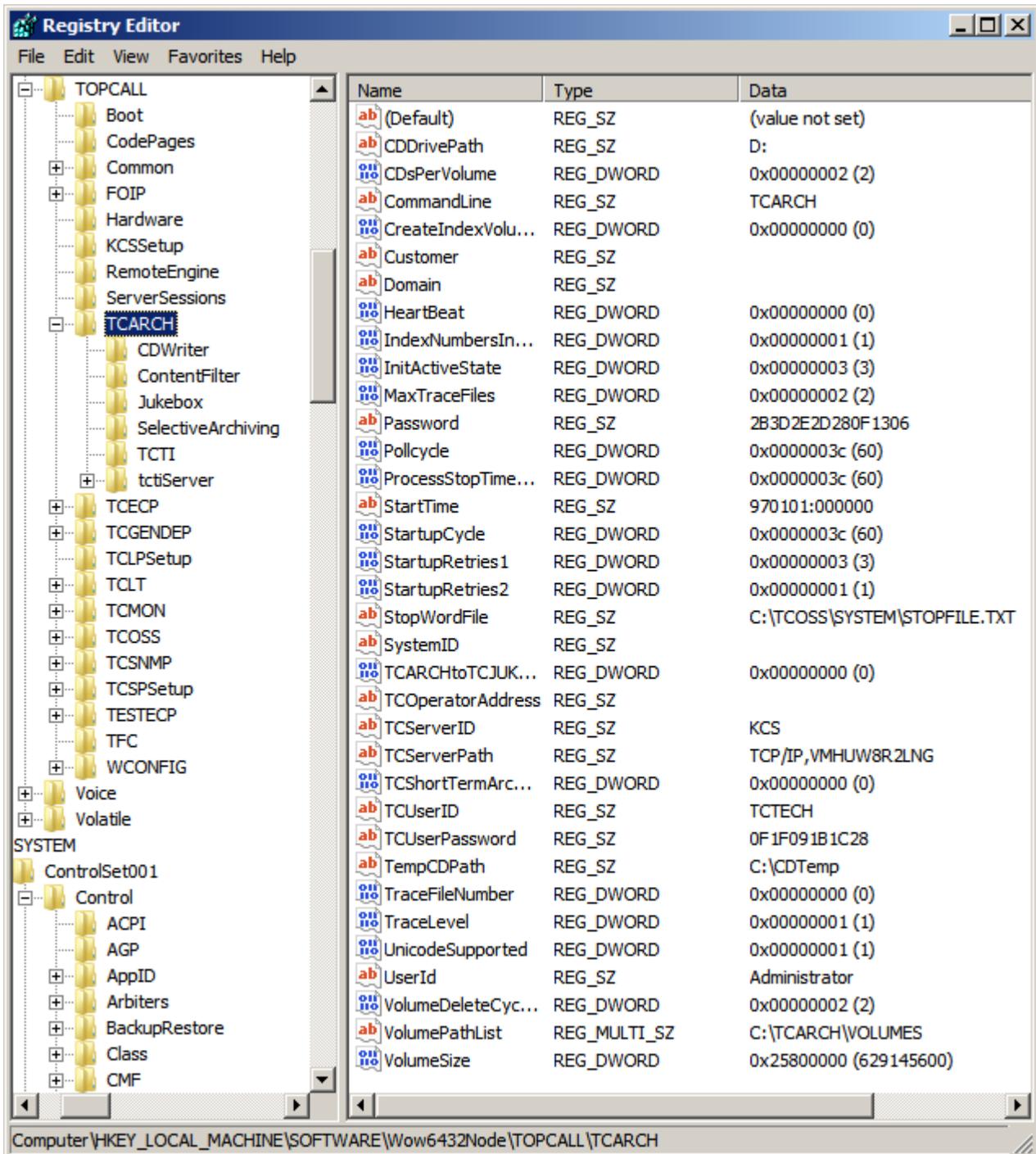
A release downgrade after Unicode has been activated is not supported. If it is done anyway Unicode indexed strings will not be found unless they are all ASCII.

4.10.5 Archive Tool

The TcarchTool.exe can handle both Unicode and code page volumes. It is included in the archive setup; copied to the installation directory so that it is available if a technician needs it.

4.11 Registry Keys

Configuration parameters are set in the registry and loaded at start up time. Unless specified otherwise the values are stored in the **HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH** section:



4.11.1 Archive Database

VolumePathList (REG_MULTI_SZ): volume path and space in MB (multi-string)

Up to 25 entries may be set. Each entry gives a full path (starting with a drive letter) where archive volumes are stored. Optionally a disk space limitation in MB may be added after a comma.

If no disk space is specified, the archive will use up the total capacity of the logical drive to store archive volumes. In this case it is not possible to place any other data (like temporary files for CD creation) on that logical drive.

Examples of entries in VolumePathList:

E:\TCARCH\VOLUMES	(without disk space limitation)
E:\TCARCH\VOLUMES,8192	(disk space for archive volumes limited to 8 GB)

The first path in the VolumePathList is also called primary volume path. It holds the volume index for all volumes (file VOLIDX) and the most recent, open volume. Do not change the entry order in the VolumePathList of an existing archive.

New archive volumes are always built on the primary volume path. If the primary volume path has been filled up, the oldest volume on this path is moved to another path before a new volume is created. If the total archive space has been filled, the oldest volume on disk will be deleted. Before deletion, the number of CDs written is checked.

StartTime (REG_SZ): start time of archive in format "yymmdd:hhmmss" May be set to the current date when the archive is started or to an earlier date if the archive connects to a TCOSS server with a short term archive of considerable size. Set the start time to a point where both entries and messages exist in the TCOSS short term archive. If the start time is set too far back the archive server may fetch mail entries without message content from the TCOSS server.

CreateIndexVolumes (REG_DWORD): whether index volumes are created, default value is 0

- 0 = no
- 1 = yes, make sure that all regular volumes are included in index volumes. If any regular volume, which should be included in the next index volume, is off-line, the archive process will stop with error 728 ("index volume can't be created"). The same happens if the index volume would exceed the maximum volume size or contain too many (more than 64) regular volumes. An event log entry detailing the exact cause of the problem will be generated in all error cases. Those problems may occur only if the index volume feature is switched "on" for an existing archive or if an existing archive had been incompletely restored from CDs.
- 2 = create next index volume also if some volumes are missing or can't be included because of the volume size limit, for update of an existing archive or continuation of an incompletely restored archive. As a result the index volume coverage of the archive may be incomplete. After creation of the next index volume this value will be automatically reset to 1.

Creation of index volumes should be switched off for entry-level and very small archives, which have less than 10 on-line volumes or do not keep off-line data.

OfflineIndexPercentageMax (REG_DWORD): disk space percentage limit for index volumes
0 ..100, default value: 20%

Example: TC/Archive system with 90 GB RAID may hold (assuming an index size of 5 %)
150 on-line volumes (0 % for index configured) or
120 on-line volumes plus 30 index volumes containing index and entries of 600 off-line volumes (20 % for index configured) or
75 on-line volumes plus 75 index volumes containing index and entries of 1500 off-line volumes (50 % for index configured)

4.11.2 Unicode Support

UnicodeSupported (REG_DWORD): Configure whether Unicode is active in Archive.
0 = no (default), 1 = yes

4.11.3 Word Index

IndexNumbersInText (REG_DWORD): whether numbers in a text block are included in the full word index, 0 = no, 1 = yes

StopWordFile (REG_SZ): stop word file name (full path)

CodePage (REG_DWORD): TCOSS code page, 0 (Latin) or 1 (Eastern Europe)
Default value: 0

The code page is selected when the archive is first installed, it is not allowed to change the code page later when messages have been archived already. The configured code page of the archive has to match the code page set in the system configuration of the TCOSS server.

4.11.4 Selective Archiving

All settings for selective archiving are stored under the registry key
"HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\SelectiveArchiving".

"Exclude" conditions are set using the multi-string registry values "Exclude0", "Exclude1", .. "Exclude99" (REG_MULTI_SZ). There is a logical 'OR' relation between the individual conditions.

"Include" conditions are set using the multi-string registry values "Include0", "Include1", .. "Include99" (REG_MULTI_SZ). There is a logical 'OR' relation between the individual conditions.

Please refer to the selective archiving chapter for a detailed description of exclude and include conditions. If no exclude condition is set all messages are archived.

ApplySelection (REG_DWORD): 0 or 1, default value is 0

0 ... all messages archived, only trace output of messages which would have been skipped if selective archiving were active. See also: TraceLevel, selective archiving trace bits.

1 ... do selective archiving by applying exclude and include conditions

FolderType (REG_DWORD)	0x7	... regular in- and out-folder only (default value)
	0x17	... with all send attempts
	0x27	... with user-defined log entries
	0x37	... with send attempts and log entries

The FolderType registry setting is always active and not controlled by the ApplySelection switch. The FolderType registry setting is not created during setup, it has to be created manually.

Do not set the FolderType to any value not given in the list above. A wrong folder type setting might result in messages not being archived.

4.11.5 Flexible Content Filtering

All registry keys for content filtering are placed in the registry section
"HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\ContentFilter".

All registry values for content filtering refer to the type of an attachment. If the type is not set, the file name is taken instead for filtering. The wildcard '*' may be used in all strings, in the formats "start*" (match beginning of string), "*end" (match end of string), "*part*" (match part of string at any position) or "*" (match always). For example "*.doc" will filter all file names with ".doc" extension. All registry strings are expected to be given in Windows code page 1252 and are converted to TCOSS code page 0 for the compare. All compares are case insensitive.

Content filtering provides two functions, which can be configured separately:

1. Replacement of original content by an alternative content (exchange with alternative)
2. Filtering of alternative contents (delete alternative)

“ReplaceContent0” (REG_MULTI_SZ): List of original content type (1st string) and possible replacements (2nd string, 3rd string, ..). At least one type of replacement has to be specified. If several replacement types are specified, the first replacement type has priority over the second, the second over the third, and so on. All possible replacements for a particular content type have to be specified in the same registry list (and not spread over several lists).

“ReplaceContent1” .. **“ReplaceContent99”** have the same functionality as **“ReplaceContent0”**. They are evaluated in the order indicated by the number, ‘0’ .. ‘99’. Once the actual content type matches the value specified, further registry values regarding replacement are not evaluated.

Filtering is configured by means of adding types (or file names or extensions if the type is not set) to an exclude and include list. All types in the exclude list are excluded unless the type is specified in the include list. Both lists can contain wildcards:

“ExcludeAlternative” (REG_MULTI_SZ): list of types or file names of alternative contents to be removed from an archived message, default: empty

“IncludeAlternative” (REG_MULTI_SZ): list of types or file names of alternative contents to be included in an archived message overriding the exclude list, default: empty

Note: Removing alternative contents of type “Topcall/text-blocks” or “Topcall/ocr-blocks” should be avoided because text blocks are used to build the full-text index and removing them would reduce the search capabilities.

4.11.6 TCOSS Server Settings

TCServerID (REG_SZ): TCOSS server ID

TCServerPath (REG_SZ): TCOSS server path

TCUserID (REG_SZ): user ID for login of archiving process on TCOSS Server

TCUserPassword (REG_SZ): password for login of archiving process on TCOSS Server (the password is encrypted and may only be set with the Setup utility)

4.11.7 TC/Archive Operator

TCOperatorAddress (REG_SZ): free address string of archive operator on TCOSS server. This TCOSS user will find the archive warnings “Volume xxxxxx has not been saved to CD yet (it will be due for cyclic deletion)” in its in box.

VolumeDeleteCycleWarn (REG_DWORD): for operator warnings before cyclic deletion (number of volumes in cycle)

Example: If the disk space allocated to the archive allows to keep 6 closed volumes on disk, “VolumeDeleteCycleWarn” is 2 and the archive has volumes 10,11,12,13,14,15 closed and volume 16 open on disk, a warning will be generated for volumes 10 and 11, if there are less CDs of these volumes than set in “CDsPerVolume”. The warning is generated when the archive process starts and when a new archive volume has been completed.

4.11.8 Customer Definition

Customer (REG_SZ): customer name (Do not change the customer name after the first archive CD has been written. Archive CDs from a different customer can not be read. If the name is changed, CDs written with the old name setting are no longer readable.)

SystemID (REG_SZ): descriptive string of installation (one customer may have several installations)

4.11.9 CD and DVD Handling

CDDrivePath (REG_SZ): Path to built-in CD-ROM drive (used only for the “verify CD” function)

TempCDPath (REG_SZ): Path where an encrypted copy of a volume is stored before being written to CD

CdsPerVolume (REG_DWORD): Number of CDs which have to exist before a volume may be deleted automatically. With the automatic and semi-automatic CD writing option, this number of CDs is written automatically, otherwise they have to be recorded and verified manually. For an archive installation without CD writing set this value to 0, so that the cyclic delete function can remove the oldest volume when the disk gets full.

VolumesPerCD (REG_DWORD) ... number of archive volumes on a backup medium (CD or DVD)
default value: 1
maximum supported value: 10

see 4.6.1 Setup for DVD Writing, Upgrade of Existing Archive and 4.6.2 Setup for DVD Writing, New Archive

4.11.10 Network Storage Support

All registry values for the network storage support are found in registry section “**HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\NetworkStorage**”:

Active (REG_DWORD): 0 = not active, 1 = active, default value is 0

Path (REG_SZ): absolute path to network directory, drive letter or UNC syntax, maximum length 63 characters

The configured directory is used for automatic writing of volumes. It also serves as default value for the offline volume path.

Schedule (REG_MULTI_SZ): “ss:ss-ee:ee”, multiple periods may be set, default: “00:30-3:00”
ss:ss... start time of CD writing period (24 hour clock)
ee:ee ... end time of CD writing period (24 hour clock)

Similar to the automatic CD writing the network storage writing may be scheduled to occur only at configurable time intervals. This may be useful to define periods for backup or maintenance of the network storage.

4.11.11 Jukebox Support

Registry section “**HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\Jukebox**”, values:

Active (REG_DWORD): 0 = not active, 1 = active, default value is 0

The jukebox support task, if activated, will scan the connected jukebox(es) for archive CDs and set the off-line volume path to point to the appropriate jukebox path, so that the CD is accessed without user intervention when offline data is needed (e.g. when a message is opened or when a volume is restored from CD). Only 1 CD is mounted per archive volume in case that duplicate CDs are found.

The scanning of jukebox(es) for archive CDs is repeated periodically (as defined by the **ScanCycle** registry value) and also triggered by any unsuccessful attempt to access an off-line volume (a CD may have been removed or just been inserted into a jukebox).

FilePath (REG_SZ): path scanned for archive CDs, default value is “Z:*”

If the "TCJUKE" process runs on a different workstation, the configured **FilePath** should include the workstation name e.g. "\\PCJU\Jukebox*".

ScanCycle (REG_DWORD): scan cycle in seconds, default value is 60 (1 minute)

4.11.12 Automatic CD Writing

Registry section "HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH\CDWriter", values:

Automatic (REG_DWORD): 0 = manual, 1 = semi-automatic, 2 = fully automatic, default value is 0

The manual and semi-automatic CD writing uses the built-in CD writer of the archive server, the fully automatic CD writing is done on a jukebox CD writer and requires the jukebox support feature.

Schedule (REG_MULTI_SZ): "ss:ss-ee:ee", multiple periods may be set, default: "00:30-3:00"
ss:ss... start time of CD writing period (24 hour clock)
ee:ee ... end time of CD writing period (24 hour clock)

The CD writing may be scheduled to occur only at configurable time intervals, because CD writing slows down the archive search performance. TCARCH uses the current time from the TCROSS Message Server to determine when to do scheduled CD writing.

Not only the actual CD writing is scheduled, but also the preparation steps (encrypt volume) and the verification of the CD afterwards. The configured schedule defines the time frame when an automatic CD write action (including encrypt volume and verify) may be started. Once started, the automatically scheduled action proceeds until completion. Volume encryption and verification take about 30 minutes each, the actual CD writing takes 70 minutes with normal writing speed or 35 minutes with double speed. This means that automatically scheduled activity may continue for up to 2 hours after the end of the configured schedule.

MinEmptyCDs (REG_DWORD): minimum number of blank CDs in jukebox, default: 0 = auto
1, 2, 3, .. minimum number of blank CDs in jukebox
0 automatic, 1 for single CD writer / 5 for jukebox

The number of blank CDs in the jukebox or in the single CD writer is checked periodically and an operator warning (in the form of an event log entry) is generated, if there are not enough blank CDs. The number of blank CDs required is 1 for a single CD writer and 5 for a jukebox.

4.11.13 Remote TCJUKE Process

Registry section "HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH":

"TCARCHtoTCJUKEChannelType" (REG_DWORD): 1 = TCP/IP connection, (0 = local)

"TCARCHtoTCJUKEPath" (REG_SZ): path in format "TCJUKE_IP_ADDR:Port/TCARCH_IP_ADDR"
e.g. "193.81.166.136:64387/193.81.166.93"
IP address of archive server: 193.81.166.93 (optional)
IP address of workstation with TCJUKE: 193.81.166.136 (example)
port number: 64387 (fixed)

Registry section "HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCJUKE":

"TCARCHtoTCJUKEChannelType" (REG_DWORD): 1 = TCP/IP connection, (0 = local)

"TCARCHtoTCJUKEPath" (REG_SZ): path in format "TCARCH_IP_ADDR/TCJUKE_IP_ADDR:Port"
e.g. "193.81.166.93/193.81.166.136:64387", both IP addresses are optional

4.11.14 Supervisor Service

Registry section “**HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH**”:

CommandLine (REG_SZ): command line for TCSRVS to start TCARCH process

LogonType (REG_SZ): for TCSRVS

UserId (REG_SZ): Windows user account for TCARCH process

Domain (REG_SZ): domain of Windows user set in “UserId”

Password (REG_SZ): password of the Windows user set in “UserId” (the password is encrypted)

4.11.15 TCARCH Trace

Registry section “**HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH**”:

TraceLevel (REG_DWORD): trace level for trace output from TCARCH process

The following flags are defined in TraceLevel

decimal	hex	trace
1	1	general error trace
2	2	main document content missing when message is archived
4	4	linked attached object missing when message is archived
8	8	writing documents to archive
16	10	writing entries to archive
32	20	create, reorganize, delete volumes
64	40	user actions on volumes
128	80	logon, logoff on KCS
256	100	size check of open volume
512	200	activate search threads
1024	400	commands to search threads
2048	800	results of search threads
4096	1000	user profile replication
8192	2000	content filtering
16384	4000	selective archiving
32768	8000	selective archiving details
65536	10000	File open and initialization

The **TraceLevel** registry value is read at start up time and reloaded in 1 minute intervals, a trace line is written if the trace level actually changed.

Set TraceLevel to 0xf1ff when first trying to trace a problem and refine the trace later if it gets too long. Use trace levels 512, 1024 and 2048 only on special advice as they produce a lot of trace output and slow down the system considerably.

TraceFile (REG_SZ): trace file name for trace output from TCARCH (default: C:\TCOSS\TRACE\TCARCH.TRC)

MaxTraceFiles (REG_DWORD): maximum number of trace files, normally set to 2

4.11.16 Advanced Technician Settings

Registry section “**HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCARCH**”:

InitActiveState (REG_DWORD): initial value of INT_ACTIVE in SET_STATE_ARCHIVE (contains two flags: 1 = archiving active, 2 = archive search active, see section “Archive Restore from CDs), normally set to 3

PollCycle (REG_DWORD): Server poll cycle in seconds, default value is 0x3C = 60 seconds. It is not recommended to use poll cycles less than 30 seconds, the minimum poll cycle is 10 seconds.

SearchSkipList (REG_MULTI_SZ): may contain up to 5 entries in the format “*yy-mm-dd hh:mm:ss, from volume/entry to volume/entry*” defining a range of entries in the archive to be skipped in the archive search. The date/time value gives the point in time where the loop is crossed, and from ... to ... specifies the range of entries which is skipped. See chapter “Search in Archive with Time Loop” on how to use this registry value.

TCShortTermArchiveLost (REG_DWORD): normally set to 0 (see section “Archive Settings for new TCROSS Server”)

VolumeSize (REG_DWORD): size of archive volumes (= size of CD) in bytes, normally set to 600 MB

Never change the volume size of an existing archive, because the volume size configured here is used by TC/Archive to calculate the disk space occupied by online volumes. If the VolumeSize value is changed after volumes have been closed already, the disk space calculation of TC/Archive will be incorrect (it will assume that all existing volumes have the configured size) and cyclic deletion may be done too early or too late.

OutOfDateTimeout (REG_DWORD): Maximum allowed difference between time of last archived entry and current TCROSS system time (in hours). If this value is exceeded, one of the warnings 21115 to 21117 is generated, depending on the cause of the problem. Default value is 0x18 = 24 hours.

MessageSizeLimit (REG_DWORD): Maximum message size in Bytes, default value is 0x6400000 = 104857600 (100 MB).

UserProfilesMax (REG_DWORD): Maximum number of user profiles. Default value is 0x2800 = 10240 users. User profiles are kept in memory, which is allocated at system start up according to this registry key. Each configured user uses 112 Bytes of memory.

4.11.17 Jukebox Support and CD Writer Process “TCJUKE”

Registry section “**HKEY_LOCAL_MACHINE\SOFTWARE\TOPCALL\TCJUKE**”, values:

TraceLevel (REG_DWORD): to trace the TCJUKE process, default: 0
the following bits are defined:

1	general error trace
2	set_license function trace
4	set_name function trace
8	write_cd function trace
16	scan_hardware function trace
32	rescan_slot function trace
64	trace jukebox info
128	trace drive info
256	trace magazine info
512	trace slot and CD info

The **TraceLevel** registry value is read at start up time and reloaded in 1 minute intervals, a trace line is written if the trace level actually changed.

TempDir (REG_SZ): Directory to be used for temporary files of CD writing software, no default

CDWriteSpeed (REG_DWORD): CD writing speed, default: 2

1 = normal speed, 2 = double speed, etc.

0 = use maximum speed supported by drive

For setting DVD recording speeds this registry value is used with the **DVD speed multiplied by a factor of 8**, e.g. for 1x DVD speed set CDWriteSpeed to 8, or to select 4x DVD speed set CDWriteSpeed to 32. (See also chapter 4.11.17.1 DVD Write Trace Example)

EjectAfterRecording (REG_DWORD): CD is moved out of the CD writer and re-inserted

- 0... no
- 1... yes
- 2... auto: 0 = no for a single CD writer, 1 = yes for a real jukebox

Default value is 2.

For a single CD writer the “EjectAfterRecording” workaround is switched off by default. Before activating it make sure that the tray of the CD writer is not blocked as the CD will be actually ejected and inserted back again.

In a real jukebox the “EjectAfterRecording” workaround is active by default. The CD is not exported from the jukebox but removed from the CD writer and verified in a different drive.

CommandLine (REG_SZ): command line for TCSRVR to start TCJUKE process

UserId (REG_SZ): Windows user account for TCJUKE process

Domain (REG_SZ): domain of Windows user set in “UserId”

Password (REG_SZ): password of the Windows user set in “UserId” (the password is encrypted)

4.11.17.1 DVD Write Trace Example

The following example of a DVD write trace (TCJUKE\Tracelevel bit 8) shows the different writing speeds supported by the DVD writer, in this case 1x, 2x, 4x and 8x DVD speed. By setting the **CDWriteSpeed** registry value to 32 decimal the DVD was recorded at 4x DVD speed.

```
14/07:51:00.241 JBS: Mounted for recording disc from slot 0 to drive: \Device\CdRom0 DV-W28EW
14/07:51:00.241 JBS: Comparing CDA-Device 0 with JBM-Device 0
14/07:51:00.241 JBS: Recording device is DV-W28EW. CDA device nr.: 0
14/07:51:00.241 JBS: 1 (of 18) attempt to open the recording-device 0
14/07:51:00.350 JBS: Note: speed in units of 1000 bytes/s, 1x CD speed = 176, 1x DVD speed = 1385
14/07:51:00.350 JBS: Drive supports 4 recording speeds, [0] is currently selected:
14/07:51:00.350 JBS: [0] WriteSpeed 11080 ReadSpeed 11080 Capacity 2298495 sectors RotCtrl 0
14/07:51:00.350 JBS: [1] WriteSpeed 5540 ReadSpeed 5540 Capacity 2298495 sectors RotCtrl 0
14/07:51:00.350 JBS: [2] WriteSpeed 2770 ReadSpeed 4817 Capacity 2298495 sectors RotCtrl 0
14/07:51:00.350 JBS: [3] WriteSpeed 1385 ReadSpeed 4817 Capacity 2298495 sectors RotCtrl 0
14/07:51:00.350 JBS: Set recording speed 1 (5540 x 1000 bytes/s)
14/07:51:00.412 JBS: Recording project created
14/07:51:00.428 JBS: Set the temporary project directory to G:\writecache
14/07:51:00.428 JBS: Set the Primary Volume Descriptor
14/07:51:00.428 JBS: Set the finalisation options
```

4.12 Archive Restore from CDs

In case the archive server is lost, the TC/Archive may be rebuilt from the volume CDs.

- a) Install TCARCH on a new archive server; do not start TCSRVR or TCARCH process. Run the TC/Archive setup in any case, also if for example only the RAID is new. Be sure to specify exactly the same customer name as in the original installation, otherwise the CDs can't be read.
- b) The setup program copies a "USRPRF" file to the TCOSS system directory. This file is required for log-in, and the one copied by the setup program contains the user "TCTECH".
- c) If you want to restore an archive from CDs in a jukebox, and the Point Jukebox Manager license is not yet set, because it's a new archive server, do the following steps. The same procedure also serves for synchronizing user profiles from the TCOSS server in case you can't work with the "TCTECH" user and its default password provided by the setup program.
Start the archive without a VOLIDX file restored, like you would when starting a completely new archive, and wait until it has logged-in to TCOSS and starts archiving.
Then stop it and delete the newly created "VOLIDX" file and the subdirectory "000001".
- d) Set registry value TCARCH\InitActiveState to 0 (archiving and archive search stopped).
- e) Set registry value TCARCH\CDWriter\Automatic to 0 (manual), note down its original value
- f) Put most recent CD into CD drive of archive server (the most recent is the one with the highest volume number), or locate it in the jukebox file system. Each archive CD also contains the volume index for the current and all previous volumes. So the complete volume index can only be restored from the most recent CD.
- g) Restore volume index: copy file 00 from CD as file VOLIDX into the volume root path e.g. **copy D:\000003\00 E:\TCARCH\VOLUMES\VOLIDX** (if volume nr. 3 is the most recent, drive D the CD drive and E:\TCARCH\VOLUMES the volume root path)
- h) Remove the "read only" attribute of the file VOLIDX
- i) Start TCARCH process (using TCMon32)
- j) If it's a configuration using index volumes (advanced index management for offline volumes in a jukebox) one has to do some disk space calculations to determine which volumes to restore, otherwise skip this step and restore as many volumes as possible starting with the most recent.

Get the maximum number of volumes which fit on each path from the trace or the event log
e.g. "ID:21001 path E:\TCARCH\VOLUMES closed volumes: 0, max: 69"
and add up the numbers if there is more than one volume path.

Use the TCfW archive maintenance folder with option "show only index volumes" to get the volume numbers of all index volumes.

Then figure out which volumes to restore on the available disk space considering the following:

1. The most recent volume has to be restored
2. All index volumes should be restored for a fast search in offline volumes kept in a jukebox. Index volumes which cover a volume range which is no longer available in a jukebox and which is searched only in exceptional cases may be left out.
3. All volumes between the last index volume and the most recent volume should be restored. If this is not possible because there is not enough disk space, do a full restore of volumes going backwards from the most recent until there is only space left for 1 or 2 volumes, then do a "restore index only" of the remaining volumes back to the last index volume. Calculate the space of one full volume for 20 "index only" volumes.

The volumes between the last index volume and the most recent volume are required for the creation of the next index volume, so at least the index of these volumes has to be restored. If there is no index volume yet this applies to all existing volumes back to volume number 1.

- k) Restore most recent volume from CD (using TCfW Archive Maintenance, log in as user "TCTECH")
- l) Run the action "Verify CD and increment CD count" on each restored volume, for two purposes:
 1. To double-check and verify the restored archive data
 2. To correct the CD count of the restored volume for cyclic deletion later onAlternatively you may skip this step and use the tcarchtool.exe after restore is complete to set the correct CD count of all restored volumes.
- m) Restore and verify next older volume until maximum number of volumes on disk is reached
- n) Stop TCARCH process

- o) Restore original value of registry key TCARCH\CDWriter\Automatic if necessary
- p) Set registry value InitActiveState to 0x3 (archiving and archive search active).
- q) Restart TCARCH process (using TCMon32)

Restore volumes only by using TCfW archive maintenance actions, not by copying files from CD back to disk, files on CD are encrypted and do not work online!

4.13 Archive Settings for New or Cleared TCOSS Server

The archive server keeps track of which entries it has already fetched from the TCOSS server (using an object included in the mail-archive entries by the TCOSS server). If the TCOSS server is replaced so that its short term archive is lost, the position objects on the archive server are no longer valid.

Similar to the replacement of a TCOSS server is the clearing of one disk of a TCOSS tandem server in state "disks desynchronized" as it may also cause a discontinuity of its short term archive.

If an existing archive should be continued with a different or cleared TCOSS server, follow this procedure:

- a) stop the TCARCH process before switching on the new TCOSS server or clearing a disk of a TCOSS tandem server.
- b) in the TCARCH registry set values
 - TCShortTermArchiveLost to 1
 - StartTime to the time of the most recent entry on the archive server
- c) restart the TCARCH process after the new or cleared TCOSS server started working
- d) the TCShortTermArchiveLost flag in the registry will be reset to 0 by the TCARCH process after the first new entry from the TCOSS Server has been fetched

Note: Do not set the **TCShortTermArchiveLost** value in the registry in any other case.

If **TCShortTermArchiveLost** is set, make sure to also set the **StartTime** registry value appropriately; otherwise old messages may be re-archived creating a time loop in the archive.

5. Error Handling

5.1 KCS Monitor



The Kofax Communication Server Monitor shows whether the archive process is running and gives some additional information about the state of the archiving task (not about the client and search tasks).

After "TCARCH" the customer name is shown, followed by a string describing the state of the archiving task, which can be one of the following:

"initializing"	after start of TCARCH process
"opening volume"	preparing to add new messages to the archive
"query TCOSS server"	query for new messages to be archived
"archiving"	fetching new messages from the TCOSS Message Server
"building index"	the index is being updated
"idle"	no new messages have been found on the TCOSS Message Server
"reorganizing volume"	a just completed volume is being compressed
"moving volume"	a volume is being moved from the primary to a secondary volume path
"creating index volume"	an index volume is being created
"restoring volume"	a volume is being restored from CD or DVD
"encrypting volume"	temporary files for CD burning are being created
"verifying volume"	a CD or DVD is being verified
"archiving stopped"	archiving stopped by operator
"delay after error"	delay before retry (see last error code)
"fatal error"	fatal error occurred, shutting down

The 3rd line in the format "volumes: n, documents: xxxx" shows the total number of volumes (on-line and off-line, including the last, unfinished volume) and the total number of documents stored in the archive (in on-line and off-line volumes).

If an error occurred in the states "query TCOSS server", "archiving" or "building index" it will be displayed with a line like "last error code 612 server temporarily busy". It may be a TCSI or a TCARCH error. The error is reset after a complete message has been archived successfully and the index updated.

The "TCJUKE" process is displayed by the KCS Monitor with 3 or 4 lines as follows:

- 1st line: "TCJUKE" + "waiting for TCARCH" or "no license" or "idle" or "writing CD"
- 2nd line: "release 2.xx.yy"
- 3rd line: "jukeboxes: xx, media mounted: yy, blank: zz"

4th line: "last error code" + last error occurred in jukebox or CD writer access

The "TCARCH" process will show an additional information line in KCS Monitor if it is unable to connect to the "TCJUKE" process: "no connection to jukebox / CD writer process"

5.2 Event Log Entries

The TC/ARCHIVE process writes entries to the application event log. They are grouped into information, warning and error messages.

Abbreviations:

S = Severity (I = information, W = warning, E = error)

T = SNMP trap (y = yes)

Nr.	S	T	Message, Parameters	Corrective action
21000	I		TC/ARCHIVE release %1 started %1: release string e.g. "1.03.00"	
21001	I		Startup information: archive path %1 closed online volumes: %2, maximum: %3%4 %1: archive path string %2, %3: number of volumes %4: "(not accessible)" or empty	
21002	I		Startup information: archive has %1 volumes %1: total number of volumes	
21003	I	y	New archive volume %1 complete, may be written to CD %1: volume number e.g. 000007	
21004	I		TC/ARCHIVE process terminated by operator	Restart archive with KCS Monitor
21005	I	y	CD #%1 of volume %2 has been written and verified %1 ... CD copy number 1,2,.. %2 ... Volume number 1,2,..	
21100	W		Stop word file %1 too long, truncated %1: file name (full path)	Check if the reported file was intended as stop word file. Check registry value "StopWordFile".
21101	W		Unable to open stop word file %1 %1: file name (full path)	Check if the stop word file can be found at the reported path. If the path is incorrect, check registry value "StopWordFile", specify full path. If operation without stop words is intended, copy an empty file to the specified path or ignore this warning.
21102	W	y	Unable to access logical drive %1 (error %2) %1: root path e.g. "e:\" %2: Windows error e.g. "3 - The system cannot find the path specified."	Check drive with the Windows disk administrator utility. Check path setting in registry value "VolumePathList".
21103	W		Create file %1 mode %2 error %3 %1: file e.g. "d:\arcvol\000001\40" %2: open mode e.g. 1 %3: Windows error e.g. "2 - The system cannot find the file specified."	See reported Windows error code. Check following event log entries.
21104	W	y	Write file position %1 size %2 written %3 Bytes error %4 %1: position e.g. 5570560 %2: size e.g. 4096 %3: number of Bytes e.g. 0 %4: Windows error e.g. "112 - There is not enough space on the disk."	See reported Windows error code. Check primary volume path with the Windows disk administrator utility.

21105	W		Read file position %1 size %2 read %3 Bytes error %4	See reported Windows error code. Check following event log entries.
			%1: position e.g. 294912 %2: size e.g. 4096 %3: number of Bytes e.g. 0 %4: Windows error e.g. "6 - The handle is invalid."	
21106	W		Remove Directory %1 error %2	See reported Windows error code. If the directory is not empty delete all non-archive files in there.
			%1: path e.g. "d:\arcvol\000004" %2: Windows error e.g. "145 - The directory is not empty."	
21107	W	y	Transaction start error %1	See Windows error code reported in previous event log entries. Check primary volume path with the disk administrator utility.
			%1: TCARCH error e.g. 714 (error in file access)	
21108	W	y	Transaction commit error %1	See Windows error code reported in previous event log entries. Check primary volume path with the disk administrator utility.
			%1: TCARCH error e.g. 714 (error in file access)	
21109	W	y	Corrupt %1 file record at position %2	Determine if problem occurs at startup, during archiving or in archive search (stop search and see if problem reappears). If occurring during archiving or at startup, cancel current open volume and rebuild it from the TCOSS server's short term archive.
			%1: "volume index" or "volume nnnnnn occurrence list" or "volume nnnnnn word tree" %2: position e.g.4480	
21110	W	y	Move volume %1 to path %2 error %3	Check destination drive with the disk administrator utility. If there is not enough free space (less than 600 MB), check for any non-archive files. Write CDs of closed archive volumes so that the automatic cyclic delete can proceed.
			%1: volume number e.g. 000004 %2: path e.g. "e:\arcvol" %3: TCARCH error e.g. 714 (error in file access)	
21111	W	y	Volume %1 has not been saved to CD yet (it will be due for cyclic deletion)	Write CD. If enough CDs have been written (see registry value "CDsPerVolume"), check if they have been verified using the "Verify CD and increment CD count" action in the TCfW archive maintenance window.
			%1: volume number e.g. 3	
21112	W	y	Disk full, extra cyclic delete / move to secondary path performed to free disk space	The disk full situation has been solved, but this should not happen in normal operation. Check if there are any non-archive files occupying disk space reserved for the archive on the primary volume path. Check also disk space setting for the primary volume path in first entry of registry value "VolumePathList".
21113	W	y	Document content (folder %1 file %2) already removed from short term archive	Check configuration of TCOSS Message Server (number of files in mail area, disk space reserved for files in mail area). If a new archive has just been set up, the start time (registry value "StartTime") should have been set to a more recent date.
			%1: TCOSS folder e.g. "+MAIL" %2: file e.g. "00001771695"	
21114	W	y	Linked attachment (folder %1 file %2) not found on Topcall Message Server	The linked attachment may have been deleted manually from the TCOSS Message Server before it could be archived. Check if it is really missing and why it has been deleted.
			%1: TCOSS folder e.g. "SB" %2: file e.g. "STDCOV CVR"	
21115	W	y	Archive not up-to-date, last message archived %1, last error %2 (%3)	If the reported last error is 100 (ok), the archive may be too slow in fetching all new

			%1: time e.g. 98-01-05 11:03:43 %2 (%3): TCSI or TCARCH error code with text e.g. "612 (server temporarily busy)"	messages from the TCOSS Message Server, or a new archive has just been started (in that case the warning may be ignored).
21116	W	y	Archive not up-to-date, last message archived %1, archiving stopped by operator %1: time e.g. 98-01-05 11:03:43	Start archiving in the TCfW archive maintenance window
21117	W	y	No new messages found to be archived since %1 %1: time e.g. 98-01-05 11:03:43	Check if there are really no new messages to be archived on the TCOSS Message Server. If the TCOSS Message server's hard disk drive has been replaced, see section "Archive settings for new TCOSS server" in archive manual. Check registry value "StartTime", it should not be set to a date in the future.
21118	W	Y	User %1 profile not loaded - error %2. %1: User ID %2: TCSI or TC/ARCH error code	If error code is 308 increase value of registry key UserProfilesMax and restart TC/ARCHIVE.
21119	W	y	Message too big, not archived: Folder: "%1", File:"%2", Size:%3, Date:%4, From:"%5 (%6)", To:"%7 (%8)", Subject: "%9". %1: TCOSS Folder, e.g. "+MAIL5V" %2: TCOSS File name, e.g. "TF8467" %3: Message size in Bytes %4: Date and time in format "yymmdd:hhmmss" %5: Originator queue %6: Originator %7: Recipient queue %8: Recipient %9: Subject of the message	Check setting of size limit in registry value "MessageSizeLimit". If required, try resending the message via TCfW after increasing the size limit.
21120	W	y	Linked attachment too big, not archived: Folder: "%1", File: "%2", Size: %3. %1: TCOSS Folder, e.g. "+MAIL5V" %2: TCOSS File name, e.g. "TF8467" %3: Message size in Bytes	Check setting of size limit in registry value "MessageSizeLimit". If required, try resending the message via TCfW after increasing the size limit.
21121	W	y	Please put a blank CD into the Archive server's CD writer.	
21122	W	y	Please put blank CDs into jukebox (current number of blank CDs in jukebox: %1)	
21123	W	y	Error %1 (%2) occurred preparing encrypted copy of volume %3 on path %4. %1: TCARCH error code e.g. 714 %2: TCARCH error string e.g. "error in file access" %3: volume number %4: path as set in registry value "TempCDPath"	Check free disk space on reported path (600 MB are required).
21124	W	y	Error %1 (%2) occurred writing CD of volume %3 %1: TCARCH error code e.g. 736 %2: TCARCH error string e.g. "no blank CD or no CD writer accessible" %3: volume number	
21125	W	y	Error %1 (%2) occurred verifying CD of volume %3 on path %4	

			%1: TCARCH error code e.g. 714 %2: TCARCH error string e.g. "error in file access" %3: volume number %4: path to CD volume	
21300	E		Hardware not supported (no TC9x detected)	Check hardware
21301	E		Hardware not supported (no TP80 detected)	Check hardware
21302	E		Hardware not supported (unable to read disk size, error %1)	See reported Windows error code. Check configuration of all physical disk partitions with the disk administrator utility.
			%1: Windows error e.g. "5 - Access is denied."	
21303	E		Logical drive %1 type %2 not supported	Check if the reported drive is a local, fixed hard disk. Removeable or remote drives are not supported. Check path setting in registry value "VolumePathList".
			%1: root path e.g. "I:\" %2: type e.g. 4 (remote drive)	
21304	E		Not enough disk space on %1	Check total available disk space on the reported drive and disk space limitation set in registry value "VolumePathList". Check volume size setting in registry value "VolumeSize".
			%1: root path e.g. "d:\"	
21305	E		Unable to access volume index on path %1	Check reported logical drive with the disk administrator utility. Check path setting in registry value "VolumePathList". Check also previous errors or warnings referring to the volume index file VOLIDX.
			%1: primary volume path e.g. "D:\ARCVOL"	
21306	E	y	Unable to open database file %1 of volume %2 on path %3	Check Windows error code in previous create file warning (ID 21103). May occur if the volume index has been restored and if some volume marked as online in the volume index has actually been cyclically deleted.
			%1: file name e.g. "40" %2: volume number e.g. 000001 %3: path e.g. "d:\arcvol"	
21307	E	y	Transaction rollback error %1	Check primary volume path with the disk administrator utility
			%1: TCARCH error e.g. 714 (error in file access)	
21308	E	y	Create volume %1 error %2	Check primary volume path with the disk administrator utility
			%1: volume number e.g. 000009 %2: TCARCH error e.g. 714 (error in file access)	
21309	E	y	Open volume %1 error %2	See reported error code. Check previous event log entries.
			%1: volume number e.g. 000008 %2: TCARCH error e.g. 725 (database file corrupt)	
21310	E	y	Close volume %1 error %2	Check primary volume path with the disk administrator utility
			%1: volume number e.g. 000010 %2: TCARCH error e.g. 714 (error in file access)	
21311	E	y	Reorganize volume %1 error %2	Check primary volume path with the disk administrator utility. Check free disk space.
			%1: volume number e.g. 000009 %2: TCARCH error e.g. 714 (error in file access)	
21312	E	y	Cyclic delete volume %1 error %2	Check primary volume path with the disk administrator utility
			%1: volume number e.g. 000009 %2: TCARCH error e.g. 714 (error in file access)	
21313	E	y	Corrupt volume index file size %1	Save corrupt VOLIDX file and report to Kofax. Restore archive from CDs
			%1: file size e.g. 524272	
21314	E	y	Corrupt volume index file header	Save corrupt VOLIDX file and report to Kofax. Restore archive from CDs
21315	E	y	Message too big to fit on archive volume, will skip message	Should occur only if one message is longer than 600 MB (or 300 MB if minimum archive on less than 3 GB disk space is configured). Check volume size setting in registry value "VolumeSize".
21316	E	y	TC/ARCHIVE process ends with error %1 (%2)	Check also previous errors and warnings in

			%1 (%2): TCSI or TCARCH error code with text e.g. "621 (Registration Limit reached)"	event log.
21317	E	y	Volume number %1 required for creation of index volume. %1: volume number e.g. 000029	If the reported volume is off-line, restore it from CD. If it is on-line but on an inaccessible logical drive, fix the problem with the logical drive and restart TC/Archive. If restore is not possible set registry key "CreateIndexVolumes" = 2 to accept that some volumes will not be included in an index volume.
21318	E	y	Index volume would exceed the maximum volume size (%1 Bytes). %1: maximum volume size e.g. 629145600	The index of some volumes can't be included in an index volume. May happen after switching the index volume feature on for an existing archive. Set registry key "CreateIndexVolumes" = 2 to accept that some volumes will not be included in an index volume.
21319	E	y	Index volume would include more than %1 regular volumes. %1: maximum number of regular volumes e.g. 64	The index of some volumes can't be included in an index volume. May happen after switching the index volume feature on for an existing archive. Set registry key "CreateIndexVolumes" = 2 to accept that some volumes will not be included in an index volume.

The warnings 21115 .. 21117 (archive out-of-date) are repeated once per day as long as the out-of-date situation continues. If the TCOSS system time can't be read because there is a connection problem to the TCOSS server, the local time of the archive server is taken instead for the out-of-date calculation.

Warnings 21113 and 21114 (document content already removed from short term archive or linked attachment not found) are issued only once if the same problem occurs for a number of messages in a row with less than 4 complete messages in between. This should prevent the event log of being filled with hundreds of similar warnings if for example the start time of the archive has been set incorrectly.

The warning 21118 (error loading user profile) is only written once, if there are a number of errors during a complete reload of all user profiles.

The warnings 21121 and 21122 (not enough blank CDs loaded) are repeated once per day until blank CDs are refilled.

5.3 Operator Warnings

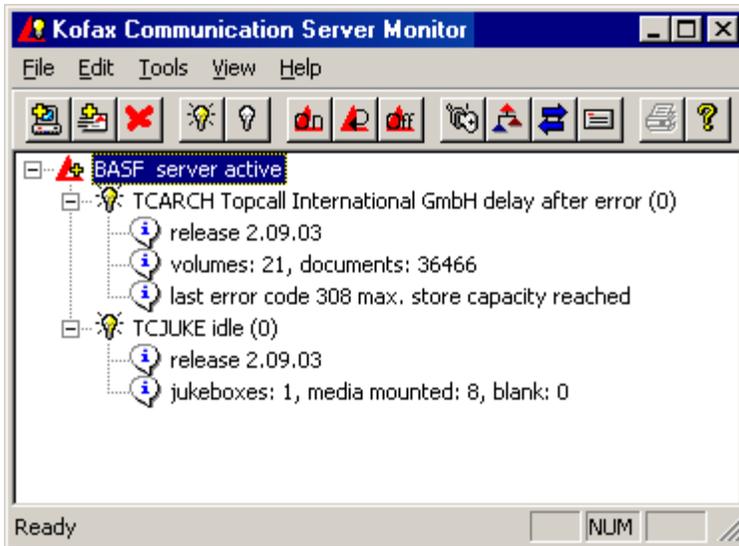
Early warnings are provided for all error conditions leaving enough time to correct the problem without loss of archiving:

- by the Archive Server if volumes due for cyclic deletion have not been saved to CD yet
- by the Archive Server if for any reason it falls back with archiving, implemented in TC/Archive release 1.03.00
- by the Archive Server if no fresh media is available for writing, implemented in TC/Archive release 2.00.00
- by the TCOSS Server if the Archive Server is down, implemented in TCOSS release 7.27.00 (The TCOSS server will buffer newly archived documents for a limited time until the Archive becomes operational again. For example a 9GB TCOSS system with 6 GB used for short term archive will give a buffer time of more than a week with 10.000 messages per day. During buffering the TCOSS server generates warnings.)

All warnings are given as Windows event entries and SNMP traps and are repeated every 24 hours until the error condition is resolved. The warning by the Archive Server, that volumes due for cyclic deletion have not been saved to CD yet, and the warning generated by the TCROSS server (that the Archive Server is down) may also be sent to an operator address.

5.4 Handling of Configured Disk Space Limit

In case that the disk space limit on the primary volume path is reached and TC/Archive can't move volumes to a secondary path (because it does not exist or is also full) and can't do cyclic deletion of volumes (because the configured number of CDs is not reached), TC/Archive will stop archiving new messages. This state will be displayed by the KCS Monitor as follows:



The check on disk space usage is only done when a new volume has to be created, i.e. after closing and reorganizing the current volume because it has reached its configured size. The size of the volume to be created is included in the disk space calculation to make sure it can be filled up later without running into disk space problems.

The TC/Archive trace flag “create, reorganize, delete volumes” (decimal 32, hex 20 in registry value TCARCH\TraceLevel) also enables traces on calculated and maximum disk space usage and may be useful in a “disk full” situation.

To get TC/Archive out of the “disk full” state insert empty media into the jukebox or single CD or DVD writer or start manual creation of backup media if the installation lacks the automatic CD or DVD writing feature.

5.5 Handling of Inaccessible Logical Drives

The archive state of each volume indicates whether there are any problems in accessing an online volume. A logical drive could be inaccessible because e.g. a RAID cabinet's power supply is switched off.

The archive process will not run (terminate with an error code) if the primary volume path is not accessible. If one of the other logical drives is out of order, the archive works with some restrictions:

- The search in online volumes will skip the inaccessible volumes (see “Search in Archive with some volumes missing”)
- The cyclic delete function may delete a more recent volume, if the oldest online volume is on an inaccessible drive. It is still checked if that volume has been saved to CD (according to the CdsPerVolume registry setting)

- If no cyclic erasure is possible, the archiving will continue until it runs into a file write error because of a “disk full” situation.

The archive process must be restarted after a problem with a logical drive has been fixed.

5.6 Search in Archive with Some Volumes Missing

On-line volumes within the specified search limits which are not accessible (and shown with state “access error” in the volume overview) are automatically skipped during the search. The condition that some volumes are not accessible may be temporary in case that one of several RAID cabinets is switched off, or permanent if an archive had to be restored from CDs and some CDs were missing.

Note: This applies to on-line volumes only. If a particular volume within an on-line volume range is off-line (e.g. if the CD was lost so it could not be restored), use the “set state of volume” function to set this volume on-line (see chapter “Advanced Maintenance Functions”).

5.7 Handling of Very Large Messages

The size limit may be set with the registry value “MessageSizeLimit”, the default value is 100 MB.

If a message larger than the configured limit is found, an event log entry ID 21119 or 21120 will be generated, depending on whether the main message or some linked attachment exceeds the size limit.

A linked attachment, which is too big, will be left as linked attachment and not converted into an embedded attachment as the archive would do normally. If such a message is retrieved and viewed in image mode, the TCfW client will try to resolve the link accessing the message on the TCOSS server. If the message referred to by the link does not exist on the TCOSS server, a line like **can't load file 'PM\ACOVER' from 'TCP/IP,DEMOTC'** will appear in the image view indicating that a link could not be resolved.

If the main message is too big, its entry will be archived, but the message content will be replaced by the following text:

"This message exceeded the maximum configured message size of the Archive System. The message content was not archived. Please contact the administrator for further information. (MESSAGETOOBIG)"

The string “MESSAGETOOBIG” is included to allow searching for all those cases in the archive.

5.8 “Search Too Complex” Information in Search Result

If a search is getting too complex, TC/Archive may return entries which do not meet all search criteria.

TC/Archive reports in all affected entries of a search result if some of the search conditions could not be resolved because too many matching strings exist in a particular volume. This may happen when using wildcards, e.g. when searching for “A*” in the text content. The search string “A*” matches all words in the index starting with ‘A’ like “aback”, “abacus”, “abaft”, “abalone”, “abandon” etc., but there is a maximum of 100 strings whose occurrences can be combined in one search. If the limit of 100 would be exceeded, the complete search attribute will be skipped (treated as always true).

A TCfW client release 3.04.01 or higher will mark the entries, which may not meet all search criteria, with a special icon containing a question mark.

In any “search too complex” case the result may contain more entries than the correct selection, but not less.

5.9 Administrator Function “Set State of Volume”

The administrator function “set state of volume” is intended for testing and for error recovery. It is not used during normal operation of the archive.

This function may only be called by the user “TCTECH” and the TCfW client will not show it in the list of possible actions for any other user.

The archive state may be switched between “on-line”, “index and entries on-line” and “off-line”. Additionally the “file error” flag may be set or reset for a particular volume. Setting the state does not delete or restore any archive database files.

Example 1:

In an archive containing only on-line volumes, the oldest volume (volume number 1) may be set “off-line” to test the off-line search functions. The database files of this volume are not deleted, so it may be set back to “on-line” after the test.

Example 2:

When restoring an archive from CDs, and a single CD is missing from the intended on-line range, this volume may be set “on-line” (although the database files of this volume are not on disk). It will then get the “file error” flag and be skipped during any search, but the search through the complete on-line range will not stop at the missing volume.

Example 3:

If you want to delete a volume without waiting for the automatic cyclic delete function, set the volume state to “offline” and delete the volume subdirectory (e.g. “000023” for volume number 23) manually.

Don't use this function on a customer's archive without consulting Kofax support!

5.10 Administrator Function “Re-Create Index Volume”

The administrator function “re-create index volume” is used to rebuild an index volume, e.g. in case that an archive has to be restored completely from CDs, the CD of an index volume was lost but the CDs of all covered regular volumes are available.

First all regular volumes covered by the index volumes have to be restored to disk using either the “Restore volume from CD” or the “Restore Index and Entries from CD” function. The state of the index volume has to be set to “off-line” (using the “Set state of volume” function) if it is not off-line already. Then the “re-create index volume” function is used to start re-building the index volume.

The index volume is always re-created on the primary volume path.

5.11 Search in Archive with Time Loop

A “time loop” can appear in the archived messages by incorrect handling of the “TCShortTermArchiveLost” registry value (see section “Archive Settings for new TCROSS Server”).

If the archive is in such a state that messages are archived twice, stop TC/Archive and use the “TcarchTool.exe” utility's option “5) check online volumes for time loop” to analyze the situation. The TcarchTool output will show something like:

```
time loop from 09-03-27 15:05:18 to 10-09-29 07:42:07 found
1st run from 1/1 to 7/4534 (22343 entries, 1 without content)
2nd run from 7/4535 to 20/5077 (22343 entries, 13607 without content)
```

TcarchTool will also prepare a registry value "SearchSkipListCandidates" in the TCARCH section with a value like "10-09-29 07:42:07, from 7/4535 to 20/5077". This value can be used to skip the 2nd run of the time loop.

To actually activate the skipping of the 2nd run of the time loop in the archive search rename registry value "SearchSkipListCandidates" to "SearchSkipList", and restart TC/Archive. Verify that the skipping is active by checking the TC/Archive trace file for a line like ""set search skip list entry..".

In the exceptional case that the 1st run of the time loop should be skipped manually edit the "SearchSkipList" registry value inserting the values of the 1st run, which in the above example will result in the entry "09-03-27 15:05:18, from 1/1 to 7/4534".

The search skip list feature described above requires TC/Archive release 2.20.02 or later and TcarchTool release 2.08.04 or later.

6. Compatibility

TC/Archive can be installed with any model of TCOSS Server (LAN access required), operating with TCOSS release 7.08.00 or higher. The integrated archiving feature requires TCOSS release 7.24.01 or higher. The jukebox support and automatic CD writing option requires TCOSS release 7.26.00 or higher.

For client applications a TCTI version 2.09.07 or higher must be used. Only this version supports the enhanced path feature needed to be able to access TC/ARCHIVE.

TCfW versions 2.11.00 or higher provide the user interface for TC/ARCH. TCfW version 3.06 or higher is required for full support of administrator functions.

Volumes created by TC/ARCHIVE on a TCOSS server are compatible with those on a dedicated archive server. For easy migration they may simply be copied from one platform to the other.

TC/Archive releases 2.00.00 or later work with the Point jukebox manager release 2.01.0055.

TC/Archive releases 2.06.03 or later also support jukebox manager release 3.2.

TC/Archive releases 2.09.00 or later work with Point Jukebox Manager releases 3.2, 4.0 and 4.1, for DVD writing JBM 4.0 or 4.1 is required.

6.1 Downgrade to Releases Before 2.00.00

A release downgrade to below 2.00.00 of an archive working with the "index volume" feature switched on and after index volumes have been created is not supported.

6.2 Downgrade to Releases Before 2.03.00

Downgrade to releases before 2.03.00 is not possible if working with TCOSS code page 1. Releases 2.03.00 .. 2.06.03 are fully compatible to previous releases if TCOSS code page 0 is used.

6.3 Downgrade to Releases 2.03.00 .. 2.06.03

A downgrade to releases 2.03.00 .. 2.06.03 is possible with some restrictions. If no user-defined log entries and no additional send attempts have been archived releases are fully compatible. Any archived additional send attempts or user-defined log entries may show up in a combined in- and out-box view after the downgrade. The in-box or out-box only views will be correct.

7. Performance

7.1 Archiving

In an environment where incoming messages are mostly faxes, an archive volume may hold around 10000 to 15000 messages. This amount of data is transferred from the TCOSS server's short term archive to the archive server in less than 2 hours (including the time to build the index).

If TC/ARCHIVE runs on a TCOSS Server, archiving throughput is heavily dependent on TCOSS load.

If TCOSS is idle the TC/ARCHIVE performance is similar to a dedicated server. Because archiving has lower priority than TCOSS, TC/ARCHIVE performance can be dramatically reduced when TCOSS is under stress.

Archiving volume, examples:

TC/ARCHIVE, 3 GB:	50.000 single page fax messages, 600.000 short (2k) text messages
TC/ARCHIVE ,9 GB:	150.000 single page fax messages, 2 Million short (2k) text messages
Model 295-9 GB:	150.000 single page fax messages, 2 Million short (2k) text messages
Model 295-45 GB:	1 Million single page fax messages, 13 Million short (2k) text messages

up to 4 Million fax pages, 50 Million short messages with full system (Model 295 + 4 x Model 290-45GB)

7.2 Retrieval

- Immediate response for the most recent entries.
- Very fast response if the approximate archiving time is specified, so that the search is narrowed to just a few volumes.
- Single word search through 250 volumes – 2 sec
- Two word AND search through 250 volumes – 4 sec

Note: Values given above assume TC/ARCHIVE running on a dedicated archive server. On a TCOSS server retrieval speed may be dramatically reduced depending on TCOSS load!

8. Conformance to Laws and Directions

Kofax guarantees access to archived data for 10 years, if:

- CDs are written with Kofax approved writer hardware and software
- CDs are verified
- media approved by Kofax are used (currently: Kodak CD-R Ultima & Ultima 80)

For longer time spans the availability of compatible drives cannot be foreseen. Should compatible drives become unavailable Kofax will provide a method to re-write the existing volumes to new media.

Data on mirrored disks or RAID is not secure. Only verified backup media provide data security.

9. Restrictions

- Using Windows compression on the archive disks is not supported.
- The size of a single archive volume is limited to 4000 MB.
- The total number of volumes in an archive is limited to 100000.
- TC/Archive supports two code pages, TCOSS 0 and 1. The actually used code page is selected by configuration when the archive is first installed, it is not possible to work with two code pages simultaneously. It is also not allowed to change the code page later when messages have been archived already. The configured code page of the archive has to match the code page set in the system configuration of the TCOSS server.
For information about Unicode support, refer to *Upgrade to Unicode*.
- The size of documents to be archived does not exceed 100 MB
- The number of documents which can be stored in a single archive volume is limited to 200 000. In the unlikely case that this number is reached before the volume size limit the volume is closed and the resulting volume is somewhat smaller than expected.
- Words included in the word index are limited to 128 characters
- attached objects are stored in the version available at archivation time (they may have changed since sending)
- If a linked attached object containing linked attached child objects (e.g. a master cover containing sub-covers) is already archived and one of the linked child objects (a sub-cover) is changed, this change will not be noticed by the archive server unless the main attached object (the master cover) is edited (changed or opened and saved without change) as well. This error persists only until a new archive volume is opened and all attached objects are archived again in their latest version.
- If a message is opened from an archive search result, the whole message including all attached objects is read and transferred to the client (no loading optimization as in TCOSS).
- The page-up function of the archive folder (going back to the beginning of the find list) has the following restrictions:
 - a) There are not more than 50 active searches at the same time (so that the search thread doing the background search is not reused for a different search request).
 - b) The search result list has not more than 1000 entries (if the list is longer one still can go back 1000 entries).
- If a user is deleted on the TCOSS server and later re-created with the same user ID, it will also see the archive entries of the former user.
- If any new objects are defined in the mail entry or in the envelope content, the TCSI32.DLL of the archive server has to be updated to the new release. Otherwise the new child objects will be deleted by the type checking of the out-of-date TCSI32.DLL and will not be archived.
- For TC/ARCHIVE running on the TCOSS server:
 - Native NETBIOS transport is not supported.
 - Clients must use TCTI version 2.09.07 or higher. This TCTI version supports the enhanced path syntax necessary to specify the archive endpoint. Paths to TC/ARCHIVE must include the correct endpoint specifier e.g. TCP/IP,DEMOTC:ARCHIVE

See also: *Restrictions*.

10. Further Documents

See TCfW manual for a detailed description of the archive user interface.

11. Implementation Issues

11.1 Overview of Fields in Word Index:

field name	child ID	parent object	word separation, stop word check
text content			yes
subject	TS_REF	SET_HEADER	yes
SMTP message ID	TS_MESSAGE_ID	SET_HEADER	
recipient user ID	TS_RECIPIENT	SET_ENTRY_MS_MAIL	
recipient group	TS_RECIPIENT_GROUP	SET_ENTRY_MS_MAIL	
originator user ID	TS_ORIGINATOR	SET_ENTRY_MS_MAIL	
originator group	TS_ORIGINATOR_GROUP	SET_ENTRY_MS_MAIL	
document number	TS_DOC_NR	SET_ENTRY_MS_MAIL	
envelope name	TS_ENV_NAME_POSTED	SET_ENTRY_MS_MAIL	
cost center	TS_COST_CENTER	SET_ENTRY_MS_MAIL	
TC message ID	TS_TC_MSG_ID	SET_ENTRY_MS_MAIL	
normalized address	TS_NORMALIZED_ADDR	SET_ENTRY_MS_MAIL	
recipient digits	TS_NORMALIZED_ADDR	SET_ENTRY_MS_MAIL	
normalized originator	TS_NORMALIZED_ORIG	SET_ENTRY_MS_MAIL	
originator digits	TS_NORMALIZED_ORIG	SET_ENTRY_MS_MAIL	
originator info	TS_ORIGINATOR_INFO	SET_ENTRY_MS_MAIL	yes
custom field 1	TS_CORREL_1	SET_ENTRY_MS_MAIL	yes
custom field 2	TS_CORREL_2	SET_ENTRY_MS_MAIL	yes
custom field 3	TS_CORREL_3	SET_ENTRY_MS_MAIL	yes
custom field 4	TS_CORREL_4	SET_ENTRY_MS_MAIL	yes
originator short name	TS_RECP_ID	SET_ENTRY_RS_ORIGINATOR	
originator service	TS_SERVICE	SET_ENTRY_RS_ORIGINATOR	
originator company	TS_COMPANY	SET_ENTRY_RS_ORIGINATOR	yes
originator department	TS_DEPTM	SET_ENTRY_RS_ORIGINATOR	yes
originator full name	TS_FULLNAME	SET_ENTRY_RS_ORIGINATOR	yes
recipient short name	TS_RECP_ID	appropriate child of L_RECIPIENTS	
recipient service	TS_SERVICE	appropriate child of L_RECIPIENTS	
recipient company	TS_COMPANY	appropriate child of L_RECIPIENTS	yes
recipient department	TS_DEPTM	appropriate child of L_RECIPIENTS	yes
recipient full name	TS_FULLNAME	appropriate child of L_RECIPIENTS	yes