AML Management Unit

Reference Guide

Version 3.12

Document Number: 6-00440-02

ADIC USA	ADIC Europe	ADIC Germany Beteiligungs GmbH, KG
Tel.: +1-303-705-3900	ZAC des Basses Auges	Eschenstrasse 3
Fax: +1-303-792-2465	1, rue Alfred de Vigny	D-89558 Boehmenkirch, Germany
ATAC: 1-800-827-3822	78112 Fourqueux, France	Tel:+00.800.9999.3822
www.adic.com	Tel.: +33.1.3087.5300	
	Fax: +33.1.3087.5301	

Document number: 6-00440-02

Published: 22 Jul 2003 Printed in the USA

Contents

Introduction

Description

Operating Console

Configuration

Utilities

Procedures

Useful System Functions

Messages

Appendix

Index

Introduction

This manual contains information and instructions required to set up and operate the AML Management Unit (AMU).

Intended Audience

This guide is intended for use by system programmers and administrators working with the AMU software. Familiarity with the operating system OS/2 is assumed.

Organization

This publication contains the following chapters:

Chapter 1	*Introduction* - Information concerning use of the manual as well as safety instructions.
Chapter 2	*Description* - Description of the functions of the AML Management Unit
Chapter 3	*Operating Console* - Explanation of functions of the AMU operating console (CON)
Chapter 4	*Configuration* - Explanation of the configuration features for AMU (AMU and OS/2)
Chapter 5	*Utilities* - Utility programs for diagnosis and installation of AML Systems
Chapter 6	*Procedures* - Description of important procedures (start, software update, etc.)
Chapter 7	Useful System Functions - Information on OS/2 operating system, database manager and TCP/IP functions in connection with AMU.
Chapter 8	*Messages* - Log messages of AMU.
Appendix A	*Appendix* - Glossary, trace level, media and device types.
Index	

Explanation of Symbols and Conventions

The following symbols and highlighted passages note important information:

Symbol	Damage to...	Signal Word	Definition	Consequence
	Person	**WARNING:**	Imminent hazardous electrical situation	Death or serious injury
	Material	**CAUTION:**	Potential damaging situation	Possible damage to the product, data, or environment
		NOTE:	Indicates important information that helps make better use of the system	No hazardous or damaging consequences

The following is a list of formatting conventions used throughout this document:

Italics	• headline, for example, *Chapter 2*, *Description* • filename, e.g. *amuconf.ini* • variable, e.g. *client_name*
Helvetica	term appearing on the operating console of AMU
Bold	• Special Term, for example, **Utilities** line or term appearing in an input window
`Courier`	• program message • command • parameter or file
`[Courier]`	optional parameter
Param1 | Param2	alternative parameter
(dism)	abbreviated command

Associated Documents

This manual contains references to following documents:

DOC E00 003	AMU Installation Guide
DOC E00 018	AMU Problem Determination Manual
DOC E00 014	AML-Controller User Guide
DOC F00 018	HACC/DAS Administration Guide

Customer Assistance

Advanced Digital Information Corporation (ADIC) provides the following types of customer assistance for the AMU.

Technical Assistance

Telephone and e-mail support, as well as training for the AMU, is available through ADIC.

Contacting Support

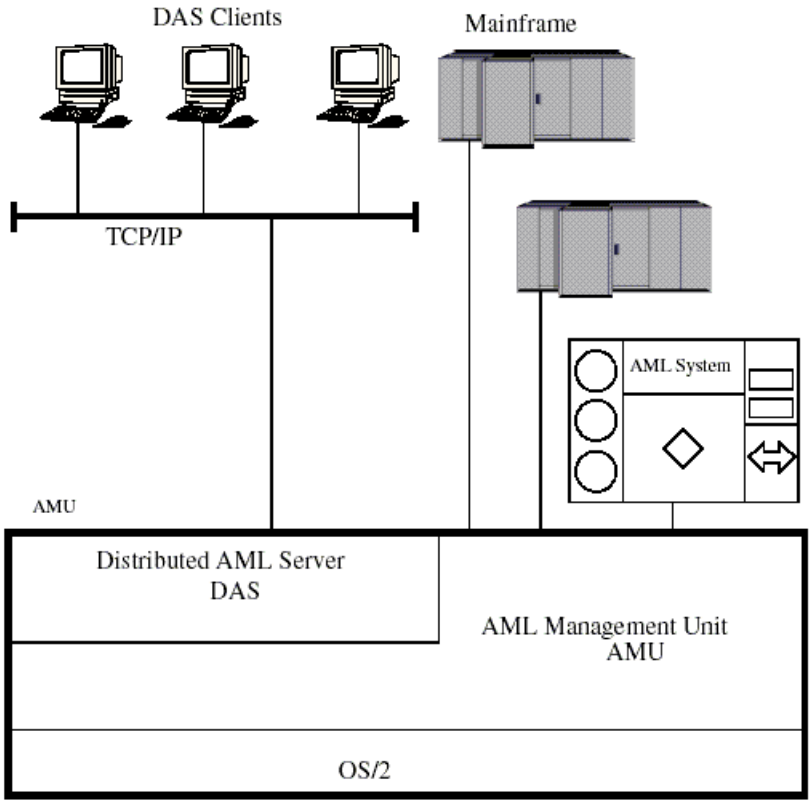
Depending on how the technical support is purchased, telephone support is provided either through your reseller or directly through ADIC.

The ADIC Technical Assistance Center (ATAC) provides world-wide service and support.

In the USA	800.827.3822
World-wide free call	00.800.9999.3822
In the Germany	49.07332.83458
Phone number	0033-(0) 130875300
Fax number	0033-(0) 130875301
Send email to	support@adic.com

Description

Figure 2-1 *AMU in a Multi-Host Environment*



The AMU:

- is the main processor of the AML Mixed-Media Library (for each AML one AMU is required),
- is the central interface of the unmanned AML system,
- conducts the configuration service for hardware related AML functions,
- can be connected to several hosts,
- manages a database (SQL database DB/2 for OS/2) for;
  - assignment of volsers to compartments,
  - cleaning media,
  - groups for rewritable media (scratch pools),
- is the hardware on which the following programs are running;
  - AML Management Software (AMU),
  - Distributed AML Server (DAS) (optional for connection of Distributed AML Clients),
- can be connected to a second AML to enhance the failure safety (DUAL AMU).

With the appropriate configuration, AMU can control various kinematics:

- AML/2

- AML/E
- AML/J

NOTE: The AML Management Unit (AMU) is described in the following chapters. The information on DAS can be found in the following manuals:

- DAS Administration Guide
- DAS Interfacing Guide

AMU Tasks

The following section describes the various AMU tasks.

Command Management

AMU accepts commands from various interfaces:

- host interfaces
- graphic operating console on AMU processor (Refer to *Operating Console* on page 3-1)

The commands are either processed immediately and acknowledged (e.g. database queries) or entered on a command queue according to priority. The software can enter up to 240 commands on the command queue. All important events related to these commands are recorded in a log file.

AMU 3.12 accepts "foreign" cartridges from the I/O unit. You must, however, keep this compartment empty for the dismount procedure.

Dismount Management

Dismounting includes:

- the unload command to the drive
- the process inside the drive preparing the unloading (e.g. rewinding tape drives)
- the dismounting (medium is moved to dismounting position)
- the robot command to move the medium from the drive to a new position (e.g. home position)

These procedures can take different amounts of time depending on the drive type. With the aid of the Dismount Manager these procedures can be adapted to the different drive types, and can be controlled even if there are time differences for dismounting. (Refer to *Drive* on page 4-15)

AMU supports Drive Control Interface (DCI) for some types of drives.By means of this interface, the AMU can get drive status, send unload commands and handle clean request from drive.

Supported drives and required DCI unit hardware

The following drives are supported in current release of the AMU software.

Drive	DCI hardware version	Notes
Quantum DLT	ver. 4 or above	
Quantum SDLT	ver. 4 or above	
IBM LTO	ver. 4 or above	
IMB LTO 2 FC	ver. 4 or above	
IBM 3590	ver. 4 or above	Require a special connection cable (part no. 407000529)
SONY AIT-1	ver. 4 or above	
SONY AIT-2	ver. 4 or above	
SONY AIT-3	ver. 4 or above	

Clean Management

In an AML some drives may require cleaning. The following modes are differentiated:

- drive is cyclically cleaned manually
- drive is cyclically cleaned automatically using a cleaning medium
- drive is cleaned manually as needed
- drive is cleaned automatically as needed

To determine the cleaning mode required for your drive refer to the drive´s documentation or ask the drive´s manufacturer.

Clean Management supports cyclical automatic cleaning and automatic cleaning as needed. Cyclical cleaning is based on a count of the mount procedures.


NOTE: If your application should support cleaning of drives as needed or cleaning based on the read and write procedures of the drive, use this version.

The cleaning cycle for the drive in the archive is individually adjusted for each drive. When cleaning is required, the Clean Manager selects a cleaning medium from the clean pool.

The clean pool is the amount of cleaning media of a certain type, and each medium in the clean pool has a barcode label. Required parameters are assigned by means of the clean pool, such as maximum number of uses and minimum number of cleaning media required.

The clean pool is filled by special insert commands for cleaning media. The application receives a message when the number of available cleaning media drops below the minimum amount. The eject command for cleaning media is used to eject exhausted cleaning media.

In addition to this cyclical cleaning the application also offers a command for immediate cleaning of a drive.

DCI-connected drives send the clean request via DCI interface to the AMU (except for the IBM 3590 drive, which does not support this). Thus Clean Manager cleans the drive only in the correct procedure.

Import/Export Management

In AML systems, ranges and units are defined for import and export of media. AMU differentiates these according to the type of I/O unit:

- import and export without stopping the robot
- import and export while stopping the robot (I/O unit/D -HICAP AML/J);

As well as according to the type of host connection for import and export:

- host-controlled
- AMU-controlled.

Host-Controlled

When the operator presses a push-button to request the I/O unit, it then becomes unavailable for the system (I/O unit cannot be used by the robot while operator is active).

After release by the system, the operator opens the I/O unit and removes the media from the I/O unit as well as puts other media into the I/O unit.

When the I/O unit has been closed, it is automatically made available to the system.

Robot activities designed to check the changes made, are started by commands send by the HOST software (HACC/MVS).

AMU-Controlled

When the operator presses a push-button to request the I/O unit, it then becomes unavailable for the system (I/O unit cannot be used by the robot while operator is active).

After release by the system, the operator opens the I/O unit and removes the media from the I/O unit as well as puts other media into the I/O unit.

When the I/O unit has been closed it is automatically made available to the system. AMU starts checking the open ranges. Movement of media (filing in a storage area) is triggered by a host command.

Foreign Mount

In the I/O unit a range for direct mount can be reserved (without insertion into archive shelves or towers). The media stored there do not require a barcode label for identification. The assignment is made via the compartments and virtual volsers (e.g.*FR001).

Database

The information on compartments in the archive and the media in the archive is saved in a relational database. Such information includes:

- serial number of the medium represented by a barcode (VOLSER)
- kind of coordinate (CTYPE), e.g., whether a cleaning or data medium can be stored on this coordinate
- qualities of the coordinate (CATTR)
  - is it occupied or empty
  - has the Volser just been mounted on a drive

- how often has it been used (USECOUNT)
- which robots have access right (COWNER)
- type of media that can be stored on this coordinate (MEDIA)
- backup status in case a DUAL-AMU is used (BUDSTATE)
- time of the last change (TIMESTMP)
- status of the medium, e.g. scratch (VTYPE)
- number of uses of the medium/drive for drive cleaning (COUNTER).

The AML database consists of three tables:

- COORDINATES (compartments in the archive)
- SCOORDINATES (drives and I/O unit)
- POOL (scratch media, cleaning media and data for Media Identifier convertion).

The database is automatically accessed with every host command.

Archive Organization

The table COORDINATES can be configured for various applications:

- **Hierarchical Archive Organization**
  Volser are assigned to coordinates in increasing order. To allow for this, ranges (Volser ranges) are defined when the database is set up, and the data records are preassigned. A Volser can be stored in the system only if it is within a Volser range and therefore has a home coordinate (home position). Identification is made automatically with the aid of the barcode label on the storage medium.
- **Dynamic Archive Organization**
  no fixed assignment of coordinates and Volsers upon setup of the database. Volser are filed in random order in the archive (this type of organization is recommended if the Volsers in the archive change frequently).
  If a Volser as yet unknown to the system is inserted, it is automatically inserted at the first vacant compartment in the dynamic range. This compartment remains the home position of the Volser until it is ejected from the system with the "Eject Total" option.
- **Dynamic Archive Organization with HACC/MVS**
  The host software HACC/MVS runs its own archive.When a new Volser is inserted into the system, the target coordinate (new home position) is assigned by HACC/MVS.
  This system also differentiates temporary and total ejection.

In one archive several organization principles may be used in combination (e.g. 1st range dynamic, 2nd range hierarchical).

Data Safety

The AMU plays a key roll in the connection between host systems and the robot system. An AMU failure leads to a standstill of the entire robot system.

DUAL AMU

DUAL AMUs are two identical computers for control of ADIC archives (AML/2, AML/E, AML/J with serial PMAC). The AMU computers are connected to the control units of the archives by means of *Automatic Data Switch* (ADS) via an RS232C connection.

The ADS is a remote-controlled switch creating the connection between AMU PC and control components. If one AMU fails, a command shifts the switch and processing is resumed by the second AMU.

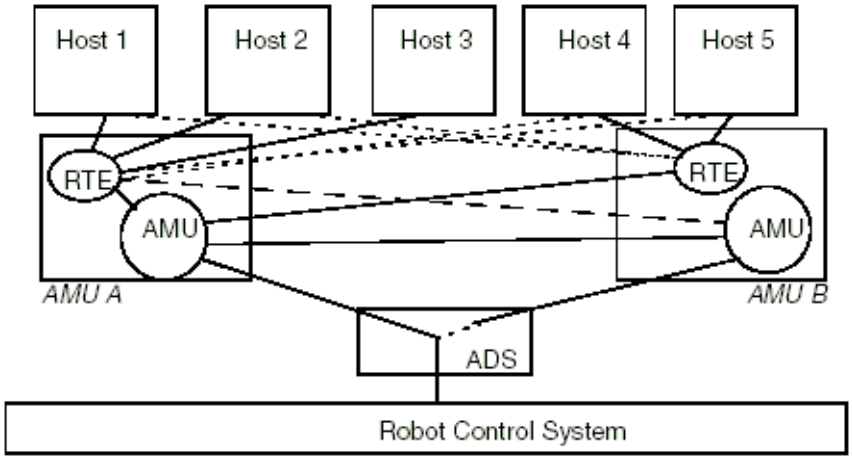
The two AMU computers are linked by an RS232 interface or a LAN. This connection is used to

- synchronize the databases
- transfer commands (routing function)
- transfer configuration data (command controlled).

For the host systems the DUAL AMU is a single system (not two separate computers). The information on which of the two AMU computers is currently holding the connection to the robot control unit, is irrelevant for the function. Both AMU computers can receive host commands.

The commands are automatically sent to the active AMU and the robot control unit.

Figure 2-2 Functional Principle DUAL AMU



If the AMU (AML Management Unit) fails, the router (RTE) continues to run. In the example (shown in Figure 2-2) there is no change in Host-AMU-communication when AMU fails on AMU A. Only the ADS is switched by the switch command and the router of AMU A sends the host commands to the AMU of AMU B. If AMU A fails entirely, the router is likewise no longer available. In this situation the host-AMU-communication must be changed. Since host 3 in the above example is not connected to AMU B, it would not be able to control the AML system if AMU A fails entirely.

Database Backup

Independent of the DUAL AMU, a constant, current backup of the database can be created: the database backup (Refer to *Process Configuration* on page 3-19).

You can switch the database backup function on or off with an entry in the configuration file AMUCONF.INI (Refer to *Process Configuration* on page 3-19).

By means of an entry in the configuration file you can determine where backup and journal files will be saved.

You can write these files

- to a second physical hard disk in the AMU PC
- via the IBM-LAN-Requester to a LAN server (accessory). This would also provide protection from possible disk crashes

NOTE: If a LAN server is used, the function of the network must be guaranteed. A functional defect in the connection to the LAN server can cause a failure of AMU.

Also, after interruption of the connection to a LAN server (e.g. after shutdown of the LAN server) manual intervention for sign-on to the LAN server is required.

The database backup starts once per day: when AMU is idling ("Idle Time") at a programmable time.

The backup runs as an independent task in the background, that is, while the system operates. All data records in the database are written to an ASCII file in their entirety (complete backup). Additionally, all current changes are protocolled in separate files (journal files).

Since the database backup is created outside the database system, it will remain available for restoration even if the database manager fails.

You can completely restore a database. You must have the following

- backup file
- corresponding journal file

on the AMU operating console in menu *Service* the command *Restore* (Refer to *Restore* on page 3-28). During the restoration, the backup and journal files are checked for integrity.

Log Function

The activities of the archive software on the AMU computer (AMU, DAS) are recorded in the AMU log.

For each day (beginning at 0.00 hours) a new log file is opened. The log file is written into a defined directory (preset to: C:\AMU\LOGS-TRC). If the available storage capacity drops below a defined value (preset to 40 MB), the oldest log files are deleted.

The log files are saved in ASCII format and can be read with any ASCII viewer.

Disaster Recovery Support

After a failure of the entire data processing center (host and disk storage), some media are immediately required from the archive, to be able to continue operating with a spare data processing center (Disaster Recovery). Since the host and therefore the software for control of the AML system is not longer available in this case, the export is controlled by AMU. Refer to *Ejection Procedure for Disaster Recovery* on page 6-5.

Host Connections

Host connection is made either

- directly by AMU (mainframes)
- or by DAS (Distributed AML Clients).

AMU as Server

In environments with several hosts, AMU operates as a server. It takes over the entire coordination, since several host computers can access the AML system in parallel.

To enhance fail safety of the system, two AMU computers can be connected to one AML system (DUAL AMU).

The corresponding host software components communicate with AMU via various connections.

Selection and Number of Connections

The connection types available for the respective host type are described in the table below and the diagram in this chapter.

The number of possible parallel host connections to AMU is limited only by the AMU hardware. If the version does not provide what is required, select the next higher hardware version.

The AMU hardware currently employed can be used for systems with up to three physically differing host connections (e.g. Token Ring, and Ethernet Connection).

Host	Host Software
IBM - MVS	HACC/MVS
IBM - VM/VSE	HACC/VM/VSE
Siemens BS2000	ROBAR (BS2000)
IBM - AS400	LMS (M&T Consults)
Tandem	TwinATL
UNIX	HACC/DAS
DEC	HACC/Open VMS

Limitations

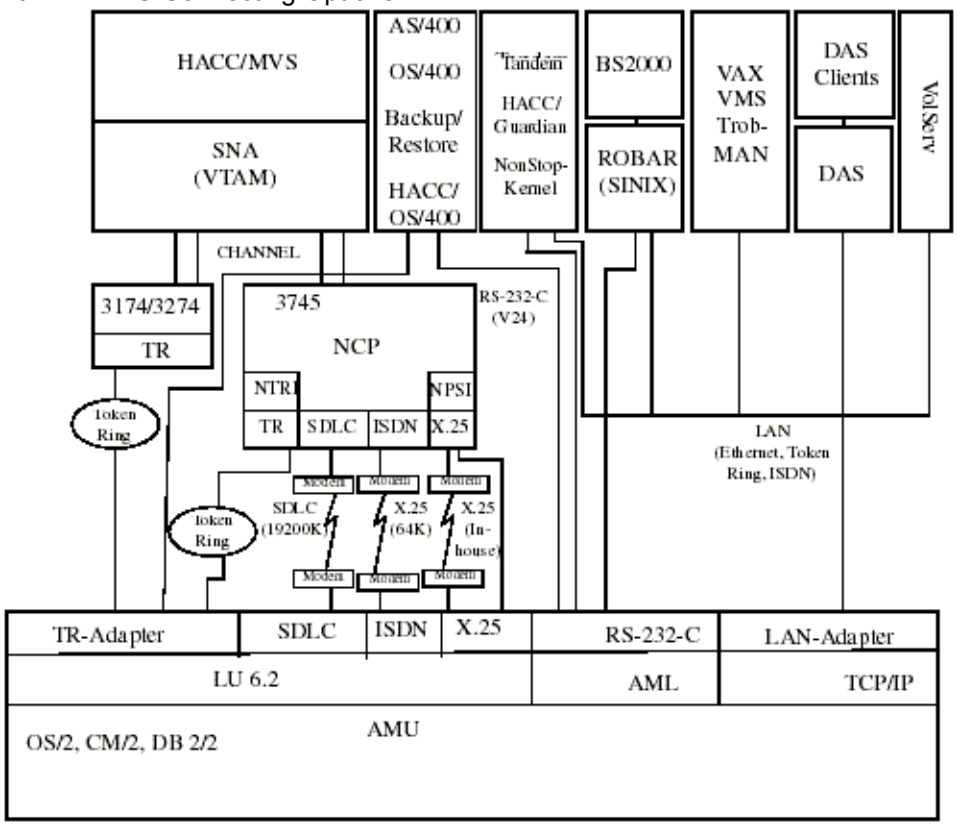
In an environment with several hosts the following limitations apply

- one Token Ring connection with n x LU 6.2-connections in parallel
- simultaneous connection of HACC/MVS and HACC/VM:
  - HACC/MVS via LU 6.2
  - HACC/VM via LU 6.2
- as an option: TCP/IP via Ethernet
- as an option: AML via RS-232-C.

Connecting Options

The following chart provides an overview of the various connecting options.

Figure 2-3 AMU Connecting Options



Access Rights

Access rights to the functions of the AMU software are assigned to different levels.

Access to AMU Operating Console

Three user groups are differentiated:

- supervisor - system technician with full access rights to the system
- administrator - system administrator and task preparation has access to system configuration
- operator - system operator, user of the system, without access to configuration.

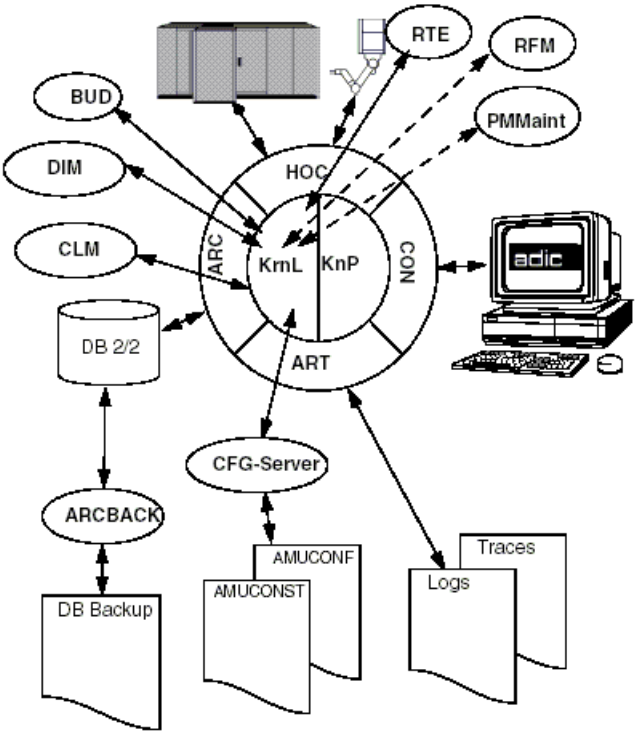
Database Access

Authorization for database access is automatically made with the user identification "AMUADMIN."

AMU Processes

The software consists of individual programs (processes) running in parallel (multi-tasking). Each process accomplishes a specific task. Additionally, there are various service utilities.

Figure 2-4 AMU Processes



Functions of Processes

The following table lists all functions and processes of AMU.

Abbreviation	Name	Explanation
Arc	Archive	manages and protocols (journaling) archive catalog; SQL database
ArcBack	Archive-Backup	short-term, writes backup file
ART	Alerter	writes logs and traces
BUD	Backup Daemon	background process for control of data transfer between DUAL AMUs
Clm	Clean Manager	monitors cleaning of drives
Con	AMU Operator Console	operator interface for application, installation and maintenance
Dim	Dismount Manager	monitors drive cleaning
Hoc	Host and other Communication	process controlling the communication to all external systems (e.g. HACC/MVS, robot control unit of AML/2)

Abbreviation	Name	Explanation
KRN-L	Kernel-logical	central logic, converts host commands to control commands
KNP	Kernel-physical	processing for robot (compute coordinates)
RTE	Router	set up routing table, passes host commands from passive AMU computer to active AMU computer and back

Service Programs

The following table lists all AMU service programs.

Abbreviation	Name	Explanation
INI2CONF	AMUINI Converter	converts AMUINI.IN file in AMU version 2.00 to AMUCONF.INI
JustUtil	JustUtility	editor for teach point files for AML/2, AML/J, and AML/E
Log2Asc	Log to ASCII	converts binary coded log file from AMU version 2.4 and earlier to ASCII file
PmMaint	PMAC Maintenance	microcode download and diagnosis program for AML/J control unit (PMAC)
patini	patini	allows editing of binary configuration files
RFM	Rho File manager	file transfer to rho control when Kernel, HOC and ARC (incl. DB 2/2) have been stopped
showini	showini	displays binary-coded configuration file in ASCII format

AMU System Requirements

This section describes the AMU system requirements.

Hardware

Hardware	Required level
Processor	min. Intel Pentium 350 MHz
Memory	min. 64 MB RAM (128 MB recommended, required for systems with two or more hosts)
Hard disk	min. one hard disk with 850 MB free space (2 hard disks recommended)
Graphic adapter	min. XGA, 1024 x 768
Input device	keyboard and mouse / trackball

Software

Software	Required level
Operating system	OS/2 4.0 with fixpack 15, MPTS 6.0 and TCP/IP 4.31
Database manager	IBM DATABASE 7.01
Communication	TCP/IP 4.31

Compatibility

This AMU version requires the following host and control software versions:

Software	Version	Comments
AML/2 control unit	2.20D or higher	Standard gripper
	2.30D or higher	Parallel gripper
AML/E control unit	2.20D or higher	Standard gripper
	2.30C or higher	Parallel gripper
AML/J control unit	2.40D or higher	
DAS	3.12	
ROBAR	V2.5 or higher	V3.02 recommended
HACC/OS400	V2.2 or higher	
HACC/MVS	3.0 PTF ZY30015	older version does not support the DUAL- and CLEAN function
TwinATL	S0308D20 or higher	
HACC/VM	1.4.2	

Operating Console

System operation is identical whether you input commands at the operating console of the AMU or at the host. Each has the same access priority to the system.

CAUTION:

Especially when using the commands Put**,** Get**,** Look**, and** Teach**, be sure to prevent conflicts with host commands. If in doubt, restart the AMU after using any of these commands.**

After any change of the configuration, you must restart the AMU (AMU and DAS).

Input at the AMU must be restricted to the following situations:

- **host communication failure**
- **robot failure (manual update of the archive catalog after manual interventions (Refer to Operator Guide)**
- **during installation**
- **during maintenance**

NOTE: All non-executable commands or options are displayed with a shadow.

Application

Design and application conforms to the SAA standard.

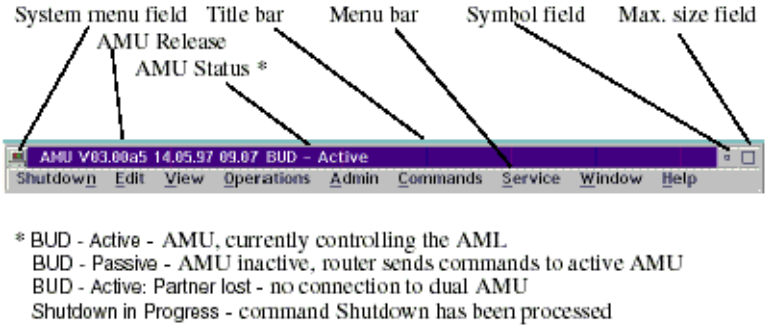
It it operated with

- the keyboard
- the mouse

Further information can be found in the OS/2 manuals.

Design of the Menu Bar

Figure 3-1 AMU Menu Bar



* BUD - Active - AMU, currently controlling the AML
BUD - Passive - AMU inactive, router sends commands to active AMU
BUD - Active: Partner lost - no connection to dual AMU
Shutdown in Progress - command Shutdown has been processed

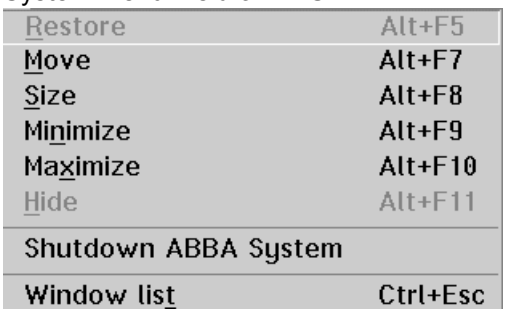
NOTE: In the active window the title bar background is dark; in inactive windows the title bar´s background is light.

The following functions are the same in all windows:

Button	Function
Cancel	Cancels the current function and closes the window.
Help	Opens online help.

System menu field

Figure 3-2 System Menu Field of AMU



Selecting a Command

With the mouse

1. Move the mouse pointer to the desired menu in the menu bar.
2. Click on the menu; the menu opens.
3. Click on the command in the menu; the command window opens.

With the keyboard

1. Press the <ALT> key and the underlined letter in the menu bar. The menu opens.
2. Now press the underlined letter in the menu to select the command.

With a command code

1. If a key or a combination of keys is specified following the command you can directly select the command with it.

Altering a Window´s Size

Resizeable windows have a frame all around (e.g. Trace window).

1. Move the mouse to any corner of the active window. The mouse pointer changes into a double arrow.
2. Press the mouse button and pull the window to the desired size while keeping the mouse button pressed.

Moving a Window

1. Move the mouse pointer onto the title bar.
2. Move the window while keeping the mouse button pressed.

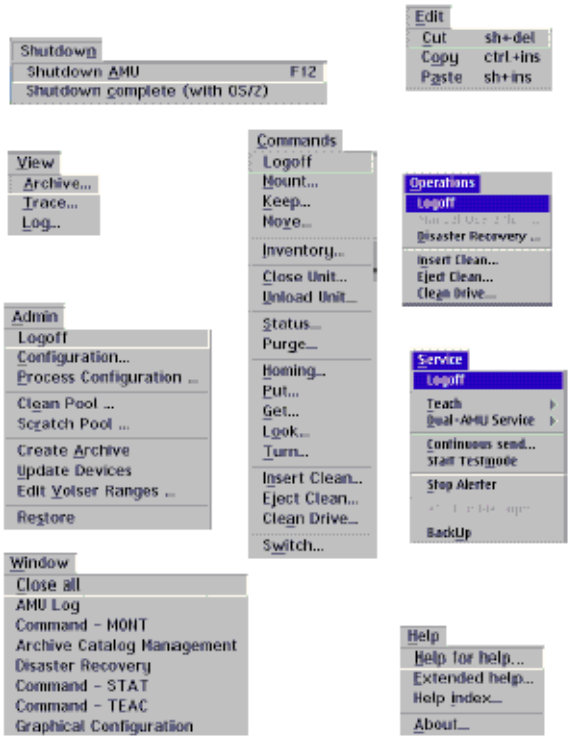
Closing a Window

1. Close the window by a double click on the system menu field.

Overview of Menus

All commands of the AMU operating console are explained here:

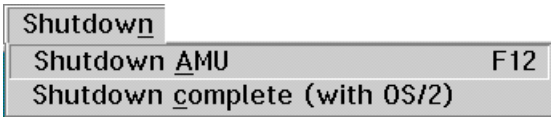
Figure 3-3 Overview of Menus of AMU



NOTE: When DUAL AMU is used, only the command Switch can be processed by the passive AMU (even the command View Archive Catalog Management is not allowed for the passive AMU). Enter all commands at the active AMU.

Menu Shutdown

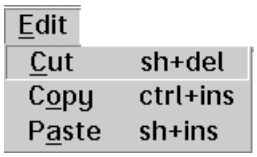
Figure 3-4 Menu "Shutdown"



Command	Field	Explanation
Shutdown AMU		Prepare shutdown of the AML system. Before shutting down, interrupt the communication with the host computer (e.g. with HOLD 1,1). Short-cut: function key F12
	Yes	The current command will still be processed. After that, all modules of the AMU will be terminated and the database will be closed. Refer to the *Operator Guide*.
	No	Return to the program, no shut-down.
Shutdown complete (with OS/2)		Prepare to the shutdown of the AML system (like Shutdown only AML-System), thereafter terminate all processes running under OS/2 and perform OS/2 system shutdown. Before shutting down, interrupt the communication with the host computer (e.g. with HOLD 1,1).

Menu Edit

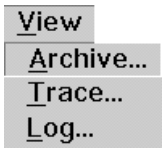
Figure 3-5 Menu "Edit"



Command	Explanation
Cut	Cut the marked object and file it in the intermediate storage (computer main storage). Short-cut: press keys <Shift>+<Del>
Copy	Copy marked object to the intermediate storage. Short-cut: press keys <Control>+<Ins>
Paste	Insert object from intermediate storage at the current cursor position. Short-cut: press keys <Shift>+<Ins>

Menu View

Figure 3-6 Menu "View"



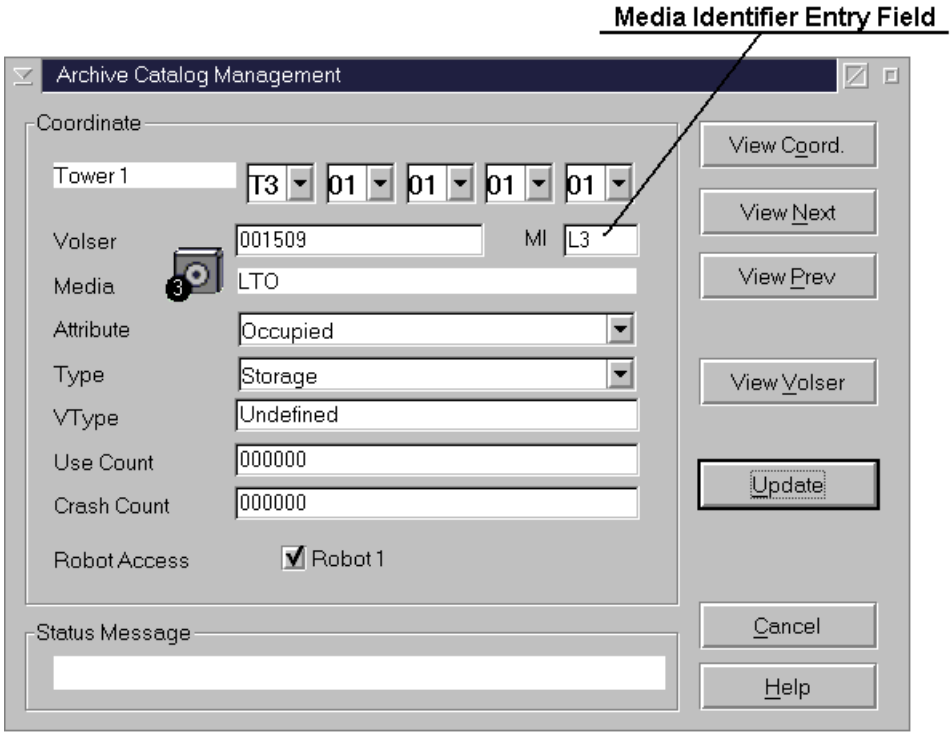
Calls up information in various windows.

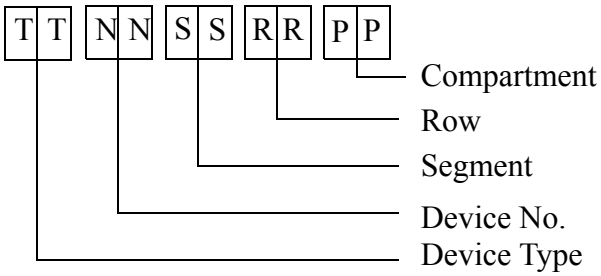
Archive

Allows you to check and to change archive catalog entries for compartments.

After input of a Volser or selection of a coordinate, all corresponding information in the database is displayed. If a Volser occurs more than once, only the first entry in the database is shown.

Figure 3-7 Window "Archive Catalog Management".



Field	Explanation
Coordinate	Logic coordinates of the medium in the archive. (One optical disk occupies two logic coordinates, one for each side.) The digits of the coordinates represent the following:  For the list of device types refer to *Component Types* on page A-9. With the aid of the four selection windows, select the desired coordinate for display of the data record of a coordinate.

Field	Explanation
Volser	Serial number of the medium, represented by a barcode, also referred to as VSN. Volsers are alphanumeric and between 1 and max. 16 characters long. The following Volsers are not allowed: • 0000000000000000 • CLEAN Enter the Volser on the field to search the medium in the database.
MI	Media Identifier for this volser. The field will show only for systems which have active Media Identifier settings. This field will not be shown for standard systems. Also this field allowed for editing only for AIT, DLT, LTO media. This new feature has been added for ADIC common barcode label support.
Medium	Type of medium for monitoring of assignment of archive - drive. Medium cannot be changed in the Archive Catalog Management. Not all media types are generally differentiated even if they have the same kind of housing.
Attribute	Status of medium (the characters in brackets are the variables for the database)
	Occupied (O) — Compartment occupied by medium
	Ejected (E) — Compartment is empty, medium has been ejected
	Mounted (M) — Compartment is empty, medium is mounted in drive
	Initial (I) — Not used
	In Jukebox (J) — Compartment is empty, Optical Disk is in the jukebox
	Reverse Side Mounted (R) — Compartment is empty, Optical Disk is mounted in drive (reverse side)
	Empty (Y) — Compartment is empty
	Undefined (U) — Undefined (special attribute for HACC/MVS)
	Temp Away (T) — On AML/2 twin-robot system the compartment in the storage tower is temporarily occupied for transfer to the other robot
	Temp Here (A) — Occupied compartment in the problem box

Field	Explanation	
Type	Type of compartment in the archive	
	Storage (S)	Archive compartment for • hierarchically-defined Volser ranges • dynamically-defined Volser ranges, on HACC/MVS only • no cleaning medium compartment
	Clean (N)	Cleaning media compartment
	AMU-Dynamic (A)	(not on HACC/MVS) archive compartment for dynamic insert and transit
	Type of compartment in the I/O unit	
	Foreign (F)	Foreign media compartment
	Problem (P)	Compartment in the problem box (I/O unit)
	HACC-Dynamic (D)	not used
	AMU-Dynamic (A)	Archive compartment for dynamic use of the I/O unit
VType	Volser type of storage media • Undefined (U): Undefined (neither scratch medium nor scratch media management on AMU) • Scratch (S): Scratch medium VType cannot be changed in the Archive Catalog Management. The value of this field can be changed in the menu Admin with Scratch Pool or with a host command.	
Use Count	Number of accesses to compartment. Use Count cannot be changed in the Archive Catalog Management.	
Crash Count	Not used	
Robot Access	Access right of robot to compartment	
Status Message	AMU reply containing message number (refer to *Useful System Functions* on page 7-1) after execution of a command has failed (e.g. Not found: RC = 1032)	

Commands

Command	Explanation
View Coordinate	Display the archive catalog entry for the logic archive coordinate entered.
View Next	Display the archive catalog entry of the next coordinate of the component. When the last coordinate has been reached no scrolling occurs.
View Prev	Display the archive catalog entry for the previous coordinate of the component. When the first coordinate has been reached no scrolling occurs.
View Volser	Display the archive catalog entry for the volser entered.
Update	Update the archive catalog entry for the archive coordinate. This command can only be used after log on as administrator or supervisor. The existing entry in the archive catalog will be overwritten. Wrong entries can lead to discrepancies between the archive and the HACC/MVS archive catalog.

Trace

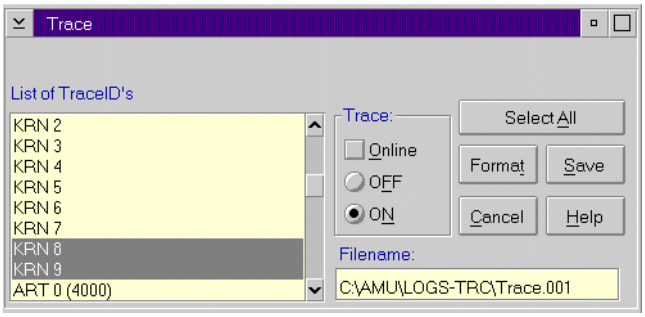
Online or offline protocol of internal processes of the AMU software (AMU and DAS). The records can be selected by levels (AMU processes).

NOTE: The selection of trace can slow down the processing! Change the selection only after consulting ADIC Technical Support.

Standard selection: no traces.

CAUTION: The memory for the current trace is limited. When failures occur you must file the trace as soon as possible.

Figure 3-8 Window "Trace"



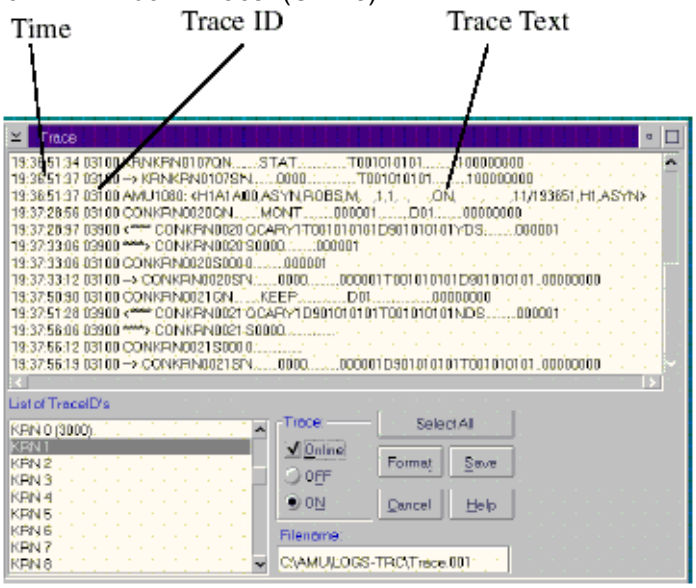
Field/Command	Explanation
List of TraceIDs	Trace levels can be selected with the <SPACE> bar or the mouse. For the list of all trace IDs refer to *Trace Levels* on page A-3.

Trace: Online

The running trace is displayed on-screen with

- time
- trace ID (e.g. 03100 means trace KRN 1)
- trace entry (depending on type of trace)

Figure 3-9 Window "Trace" (Online)



OFF

Switch trace off.

ON

Write current traces into the main storage (1 MB reserved). When the storage is full the oldest entry is overwritten.

Select All / Unselect All

All entries in the Online trace window are marked or the mark is removed

Filename

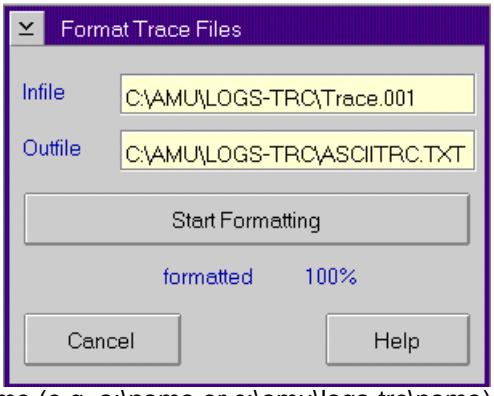
Path and filename of trace in binary format, after processing the command Save

Save

Save protocolled traces in a file with the binary code name preset in field Filename.
Select this command immediately after a problem has occurred to ensure the trace information is not lost. After formatting, this file can be printed (refer to *Format*) with the OS/2 Print command.

Format — Converts a trace file stored with Save into a printable format (ASCII).

Figure 3-10 Window "Format Trace Files"



Target filename (e.g. a:\name or c:\amu\logs-trc\name). Start formatting. The execution will be confirmed by display of the message "formatted 100%".

Infile	Path and name of binary-coded trace file for conversion to ASCII format (default: C:\AMU\LOGS-TRC)
Outfile	Path and name of ASCII trace file after conversion to ASCII Format
Start Formatting	Start formatting process. Select this command after your have entered the filenames in the fields Infile and Outfile.
formatted	Status display for formatting; when its shows 100%, formatting is complete

Log

The alerter sets protocols for all messages (even when the window AMU-Log Control Center is not open). Examples:

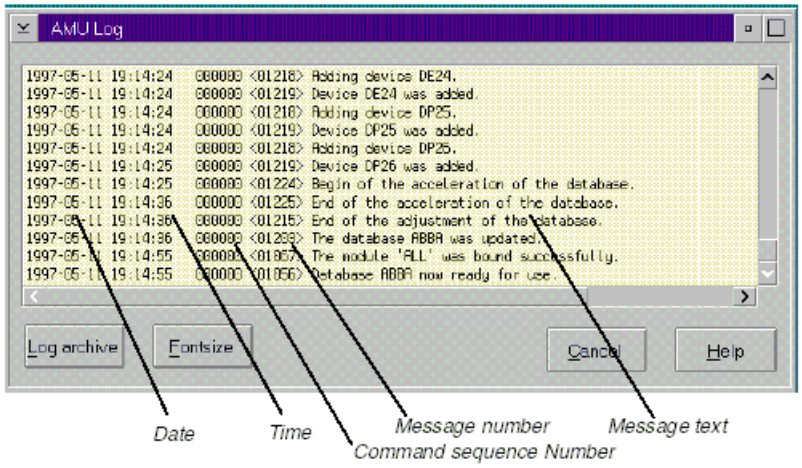
- host computer commands
- execution of host commands
- messages to the host computer
- user interventions
- error messages

Log files begin daily at 0.00 hours. If the available storage on the hard disk drops below the value set in the configuration file ARTCFG.DAT (default 40 MB), the oldest log files are deleted (refer to *Configuration of AMU Log* on page 4-50).

NOTE: Log files cannot cover several days! There is only one log file for each day.

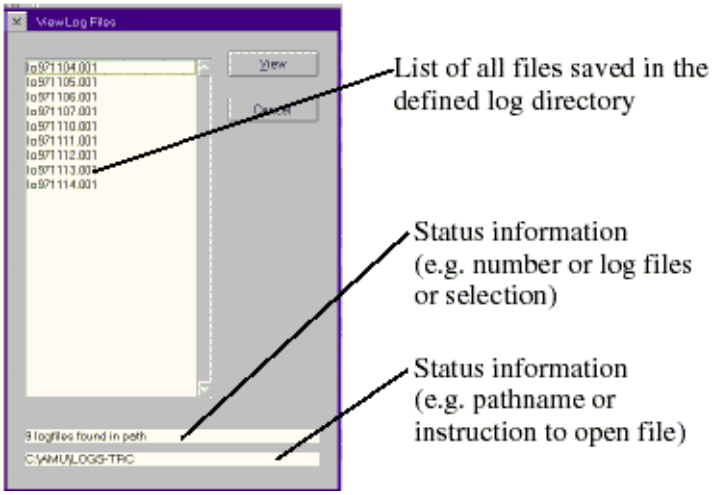
The first line in each log file contains the version number of the current AMU and, if DAS is installed, the DAS version that is running.

Figure 3-11 Window "AMU Log"



Field/command	Explanation
Log archive	Open a window for selection of stored log files with automatic display in the OS/2 editor EPM. The log filename contains `lo` <Day><Month>`.001`

Figure 3-12 Window "View Log Files"

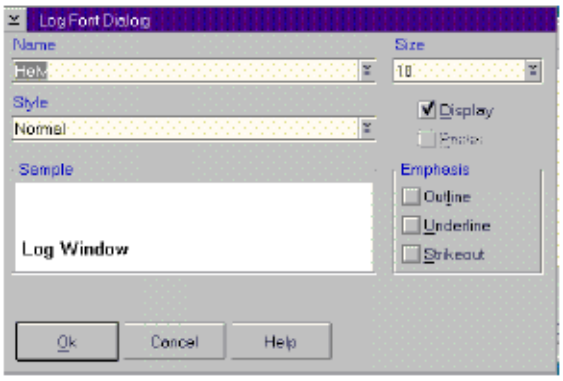


View	Copy the selected file into a temporary file (logview.txt). This file is displayed in the OS/2 editor EPM and can be processed as desired.

Fontsize

Select font type, size and style for the contents in window AMU Log.

Figure 3-13 Window "Log Font Dialog"



Name	Selection window for all installed font types
Size	Selection window for font size in points
Style	Selection window for font styles (available for some font types only)
Display	Selection of display fonts, does not change settings
Printer	Not used
Outline	Contour font
Underline	Underlined font
Strikeout	Strikeout font
Sample	Display sample of selected font
Ok	Activate selection for currently running AMU Log. When the AMU Log window is opened again, the default font is again displayed (System VIO).

Menu Operations

Figure 3-14 *Menu "Operations"*

Login/Logoff (Operator)

Command	Field	Explanation
Login (Operator) / Logoff	If you wish to use the locked function in the Operator menu, you must log on as operator, administrator or supervisor. To protect the system from unauthorized use, logoff when you have completed operations	
	Password	Field for input of the operator password. Request this password from your system administrator
	Ok	Perform login.

Manual Operation

AML/2 only

Precondition: "MANUAL" operating mode

Manual execution of the host commands Mount (mount medium) and Eject (eject medium) by the operator. This operating mode is designed exclusively for AML/2 with active Quadro towers.

NOTE: AML/2 twin systems cannot run automatically and manually at the same time

Step 1 On AML/2 switch the key switch on the operating panel to "MANUAL."

Step 2 On AML/2 close all guard doors of Quadro towers. The quadro tower rotates but the robot does not move.

Step 3 On AML/2 open the guard door to a Quadro tower and remove the medium.

Step 4 If a Mount command has been received, mount the medium on the drive indicated.

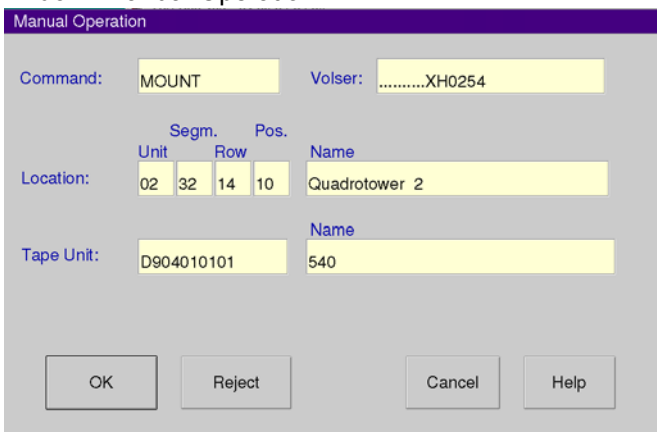
Step 5 Select OK to confirm the execution of the command.
Execution of the instruction is acknowledged to the host computer, and the latter displays the next command.

The subsequent Keep is automatically acknowledged by AMU (database changed), but is not displayed.

Step 6 If a Mount command for the same drive follows, remove the medium and put it into the I/O unit.

Step 7 When resuming automatic operation, first insert all media used during MANUAL operation.

Figure 3-15 Window "Manual Operation"



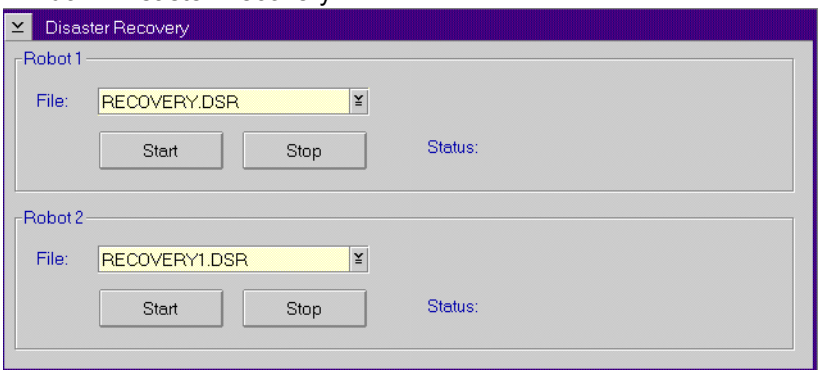
AML/2 only

Command/field	Explanation
Command	Command from host to be executed by the Operator
Volser	Search the Location according to the Volser or VSN, to be able to execute the command.
Location	Indicates the coordinate in the archive, where the Volser for the command is currently located
	Unit — Number of storage tower or shelf
	Segm. — Number of segment in storage towers
	Row — Row in the segment (counted from bottom to top)
	Pos. — Compartment (counted from left to right)
	Name — Designation (comment) defined in the configuration for the component.
Drive	Mount the medium with the Volser in the drive given in this field. For EJECT commands (eject medium) this field remains vacant.
	Name — Designation (comment) defined in the configuration for the drive.
OK	Select OK when the command has been executed by the operator, database update is performed, host receives positive confirmation.
Reject	Select Reject when the command will not be executed by the operator. Database update is not performed, host receives negative confirmation.

Disaster Recovery

Dialog window that starts ejection of preselected media in event of an emergency (Disaster Recovery). This window has two areas for independent ejection of media in AML/2 twin-robot systems.

Figure 3-16 Window "Disaster Recovery"

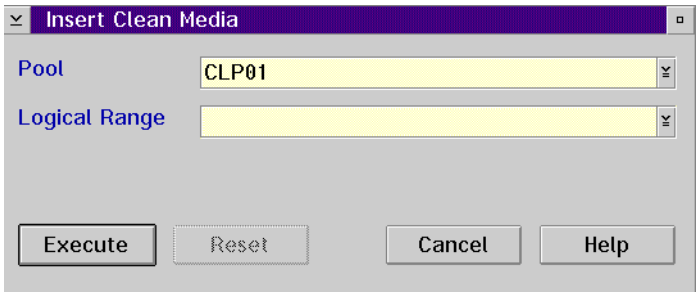


Command/field	Explanation
File	Window for selection of prepared files listing Volsers to be ejected. Display all files in the directory C:\AMU\RECOVERY\ with the filename `*.DSR` (refer to *Structure of the file* on page 6-5).
Start	Start the ejection of media listed in the selected file.
Stop	Stop ejection
Status	Display the current eject status

Insert Clean

Insert cleaning media.

Figure 3-17 Window "Insert Clean Media"



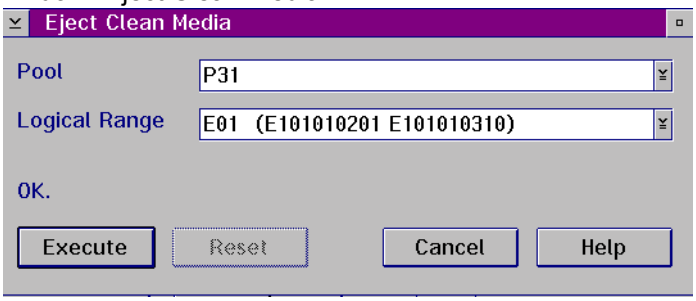
CAUTION: **All media in the range are treated as cleaning media. Be sure there are no data media in the insert range while this command is executed.**

Field	Explanation
Pool	Select the clean pool to which the cleaning media are to be added.
Logical Range	Select the range into which you have put the cleaning media.

Eject Clean

Eject used cleaning media

Figure 3-18 Window "Eject Clean Media"



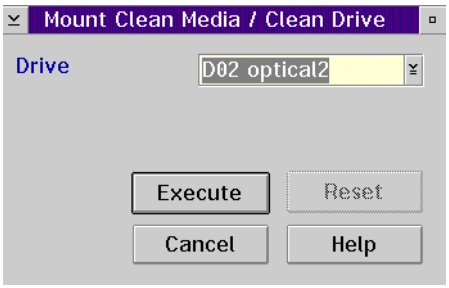
CAUTION: **Do not reinsert used cleaning media. If they are used beyond the maximum Use Count, drive failure may result.**

Field	Explanation
Pool	Select the pool from which to eject used cleaning media.
Logical Range	Select the eject range into which the used cleaning media are to be put.

Clean Drive

Clean drive outside automatic cleaning process.

Figure 3-19 Window "Mount Clean Media / Clean Drive"

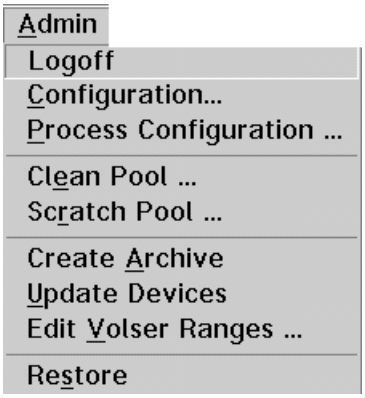


CAUTION: **The service life of some drive types is drastically shortened by frequent cleaning. Clean drives only if it is definitely necessary.**

Field	Explanation
Drive	Select drive to be selected

Menu Admin

Figure 3-20 Menu "Admin"



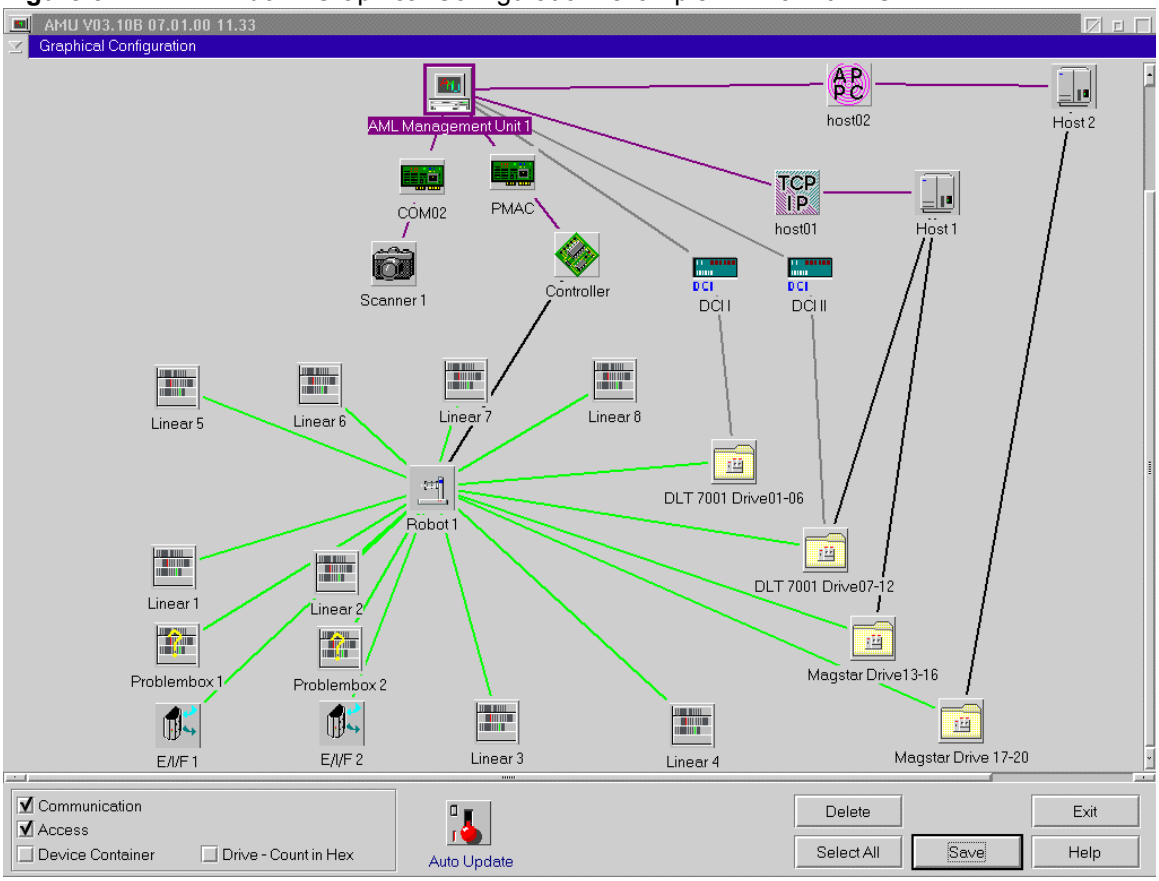
Login (Administrator)

Command	Field	Explanation
Login (Administrator) / Logoff	If you wish to use the locked function in the Admin menu, you must log on as operator, administrator or supervisor. To protect the system from unauthorized use, log off when you have completed operations	
	Password	Field for input of administrator password. Request this password from ADIC Technical Service.
	Ok	Perform Login.

Configuration

The Graphical Configuration window is used to enter all settings for system components. The settings are saved in the file AMUCONF.INI.

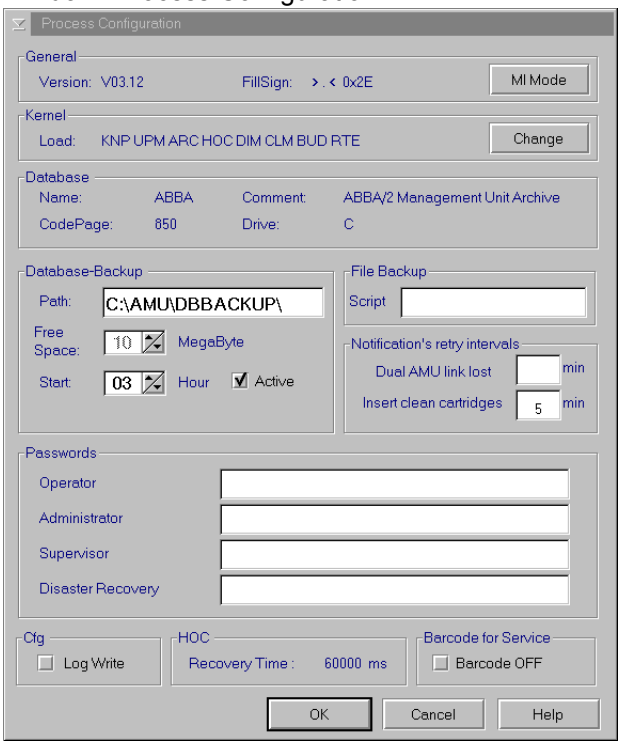
Figure 3-21 Window "Graphical Configuration" example AML/J with DCI



Process Configuration

This screen provides an overview of system settings within the AMU and the abilty to set the parameters for the database backup. All these parameters are saved in the file AMUCONF.INI.

Figure 3-22 Window "Process Configuration"



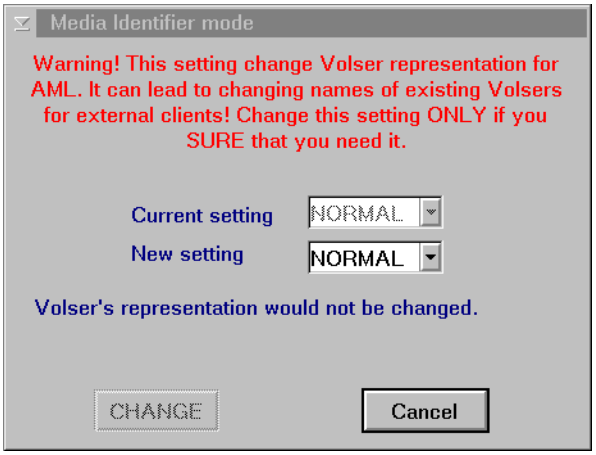
Range	Field	Explanation
General	Version	Display current software release (parameter PROC VERSION).
	FillSign	Display which sign is used to complete the variables (e.g. Volser to 16 characters) in the command string (default: <.>, corresponds to ASCII 0x2E) (parameter PROC FILLSIGN).
	MI Mode	This button activate Media Identifier mode dialog. The button is available for supervisor only. Refer to *Media Identifier Mode* on page 3-22.
Kernel	Load	Display all processes started by the Kernel (parameter PROC KRNLOAD). • KNP: Physical Kernel Module • UPM: User Profile Manager • ARC: Archive Handler • HOC: Host- and Other-Communication • BUD: Backup Daemon • RTE: Router • DIM: Dismount Manager • CLM: Clean Manager
	Change	This button activates the Change setting dialog. The button is available for supervisor only. Refer to *Change Settings* on page 3-24.

Range	Field	Explanation
Database	Parameter set used to create the SQL database upon execution of the command Create Archive. Change these parameters only when you have been specifically asked to do so by ADIC.	
Database	Name:	Name of SQL database (parameter PROC DBNAME default: ABBA)
	Comment	Comment on name in SQL database (parameter PROC DBCOMMENT, default: ABBA/2 Management Unit Archive)
	CodePage	Information on codepage of SQL database (parameter PROC DBCODEPAGE, default: 850)
	Drive	Drive on which the SQL database is stored (parameter PROC DBDRIVE, default: C)
Database-Backup	Path	Directory and drive storing the backup and journal files. C:\AMU\DBBACKUP is the standard directory. To have access to the backup even when the AMU computer hardware is damaged (e.g. hard disk failure), an additional hard disk can be installed or files may be saved via LAN to another drive (parameter PROC DBBACKUPPATH).
	Active	Switch on/off backup system (parameter PROC DBBACKUPACTIVE).
	FreeSpace	Information on the storage management of the backup system. If the vacant space drops below the set value in the directory defined with Path, the oldest backup and journal files are deleted (until the value for FreeSpace is again reached). Information. If the same drive is used for AMU and DBBACKUP, the value of 10 MB cannot be altered!
	Start	Start time for database backup. When the time is reached, the system waits until the processor idles, the command execution is then halted until the backup is complete (parameter PROC DBBACKUPSTARTHOUR).
File Backup	Identifies the script used to execute the backup.	
	Script	Path and Name of the backup script
Notification Retry Interval	Set the amount of time for the communication retries.	
	DUAL AMU link lost	Time in minutes (1... 120 minutes) default is blank
	Insert clean cartridges	Time in minutes (1... 120) default is 5 minutes

Range	Field	Explanation
Passwords	Assignment of passwords for various AMU areas	
	Operator	Password for call-up of functions in the Operations menu (display is coded)
	Administrator	Password for call-up of functions in the Admin and Operations menus (display is coded)
	Supervisor	Password for call-up of functions in the Service, Commands, Admin and Operations menus (display is coded)
	Disaster Recovery	Password for call-up of the disaster recovery procedure (display is coded). When the entry on this field is erased, the function Disaster Recovery can be called up without a password.
Cfg	Log Write	Switch selecting log write for configuration activities (parameter PROC CFGLOG).
HOC	Recovery Time	Time interval after which the communication module checks all configured communication connections (parameter PROC HOCRECOVERYTIME).
Barcode for Service	Barcode OFF	Allows you to operate the system (Mount, Keep, Eject) without reading barcodes. For insertion and inventory barcode reading is always active (parameter PROC BARCODEOFF).
	When scanner or vision system do not function, select this function until they are repaired. As long as barcode reading is inoperative, media cannot be inserted into the archive.	

Media Identifier Mode

Figure 3-23 Window "Media Identifier mode"



Field	Explanation
Current setting	Show current MI mode.
New setting	This list box can be used for change MI mode

Field	Explanation
Change	The button can be used for apply MI mode changes. The user has an additional opportunity to cancel changes through an additional Media Identifier Mode confirmation dialog.

AMU supports media identifier (MI) for the following medias:

- LTO
- DLT
- AIT

AMU has the following states for MI processing:

- NORMAL. In this state AMU ignores MI information from the robot and show to the clients the real barcode from the robot. In turn, the robot (on AML/2, AML/J, and AML/E, at least) can be tuned in such way that it will strip MI information by itself, for example.
- REMOVE. In this case AMU detects MI information in volser , storse it in the separate table and hides it from the clients. For example, LTO cartridge with volser 123456L2 will be shown to the clients as 123456. When the client asks for mount volser 123456, AMU looks in the table to find a volser with MI. When AMU finds it, the full name of this volser (123456L2) is sent to the robot in the command with the full volser name.
- IN FRONT. In this case the MI information would be put in the front of the volser. For example, LTO volser 123456L2 will be shown to the clients as L2123456. This mode was implemented for compatibility with Scalar libraries.

Here are short rules to recognize MI:

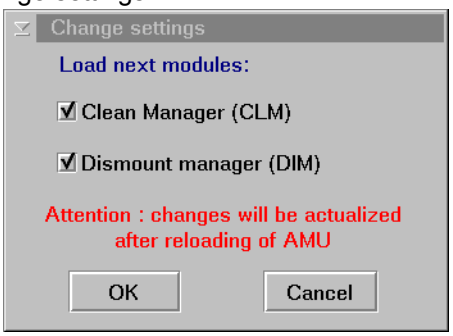
- for LTO cartridges, if barcode has 8 chars and last 2 characters are "Lx" (where 'x' can be '1','2','3' etc.) then this cartridge has MI information and 'x' stands for LTO media types (like LTO-1, LTO-2, cleaning LTO etc.).
- for DLT cartridges, if barcode is 7 chars then the last chararacter is MI char.
- for AIT cartridges, if barcode is 7 chars then the last character is checksum.

CAUTION: **Changes will applied immediately and can lead to change of volser representation for AMU and client programs! Change Media Identifier mode ONLY if you need that.**

NOTE: This dialog is enabled for supervisor only.

Change Settings

Figure 3-24 Window "Change settings"



This dialog change default (after restart) loading mode for DIM and CLM modules.

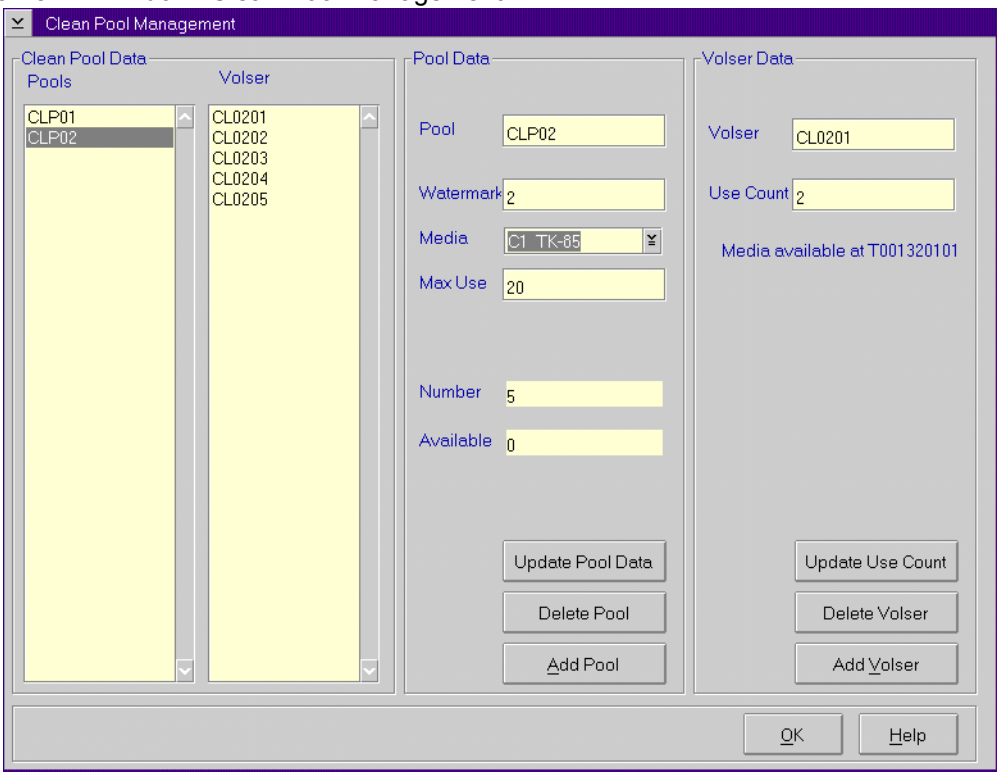
NOTE: This dialog is enabled for supervisor only.

Clean Pool

Calls up a window for assignment of cleaning media to various groups (pools). A clean pool is a group of cleaning media with the same qualities:

- Maximum number of cleaning cycles per medium
- Media type (e.g. 3480, 3590, DLT)
- Minimum number of cleaning media in the system
- Each individual drive can be assigned to such a pool

Figure 3-25 Window "Clean Pool Management"



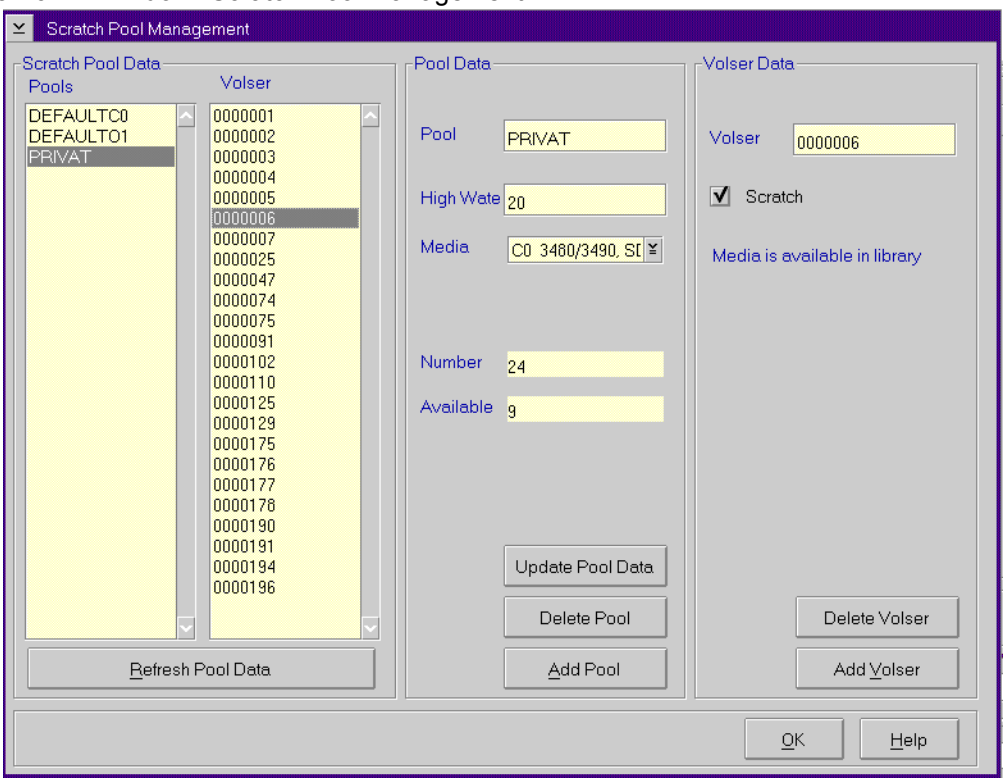
Range	Field	Explanation
Clean Pool Data	Pools	Display and selection field for all groups of cleaning media defined in the AMU database. The standard names for these pools for hosts that do not use clean pool names are Paa, aa being the clean pool identifier.
	Volser	Display Volser in selected clean pool. The display only indicates that the Volser has been assigned to the pool, but does not indicate that the cleaning medium is actually present in the archive. The standard names for these Volsers for host that do not use clean pool names are `CLaabb`, `aa` being the clean pool identifier and `bb` the cartridge identifier.
CAUTION:		**The volser with the standard names for cleaning media must not be used as Volsers for data (CL0000 - CL9999). If the prefix CL is used for data media, the parameter CLMVOLSERHEADER in PROC in the file AMUCONF.INI can be adapted after consulting ADIC.**

Range	Field	Explanation
Pool Data	Display data for clean pool marked in Pools	
	Pool	Display selected clean pool. Enter the pool name on the field, to set up a new clean pool
	Watermark	Display minimum number of cleaning media in the archive. As a guiding value, take the number of drives to be cleaned from this pool.
	Media	Cleaning media type; select media type used
	Max Use	Maximum number of cleaning cycles per cleaning medium. When it has been depleted, the medium must be ejected. Enter the value communicated by the drive manufacturer or cleaning medium supplier.
	Number	Display media currently assigned to the pool
	Available	Display cleaning media inserted in the archive for the pool
	Update Pool Data	Enters the changes made in the AMU database
	Delete Pool	Delete pool with all corresponding data from the AMU database
	Add Pool	Add new pool with selected data to the AMU database
Volser Data	Data for the cleaning medium selected in Volser	
	Volser	Volser (VSN) of cleaning medium. Enter the Volser (barcode number) for a new cleaning medium on this field.
	Use Count	Number of cleaning cycles performed with this medium
	Update Use Count	Change the number of cleaning cycles saved in the database for the selected Volser
	Delete Volser	Remove the Volser from the pool (not from the archive)
	Add Volser	Add Volser with preset Use Count to the pool
Refresh Pool Data	Information concerning the pool is updated in the window	
Ok	Terminates the dialog in Clean Pool Management	

Scratch Pool

Calls up a window for assignment of storage media to different groups (pools). A scratch pool is a group of storage media reserved by certain host applications.

Figure 3-26 Window "Scratch Pool Management"



Range	Field	Explanation
Scratch Pool Data	Pools	Display and selection field for all defined groups of scratch media in the AMU database
	Volser	Display Volsers in selected scratch pool. The display only indicates that the Volser has been assigned to the pool, but does not mean the storage medium is actually in the archive.
Pool Data	Display data of scratch pool marked in Pools	
	Pool	Display selected pool. Enter the pool name on the field, to set-up a new pool.
	High Wate	Display minimum number of scratch media in the archive
	Media	Storage media type, select media type used.
	Number	Display media currently assigned to selected pool
	Available	Display storage media available in the archive that bear the attribute scratch and belong to the pool
	Update Pool Data	Enters changes made in the AMU database
	Delete Pool	Delete pool with all corresponding data from the AMU database
	Add Pool	Add new pool with selected data to the AMU database

Range	Field	Explanation
Volser Data	Data of the storage medium selected with Volser	
	Volser	Volser (VSN) of the storage medium. Enter the Volser (barcode number) for a new storage medium on this field. The medium is assigned to the marked pool.
	Scratch	Display medium attribute scratch (Read Only field).
	Delete Volser	Delete Volser from the pool (not from the archive)
	Add Volser	Add Volser to the pool
Refresh Pool Data	Pool data is refreshed in the window	
Ok	Completes the dialog in Scratch Pool Management	

Create Archive

CAUTION: **This command creates a new archive catalog. The existing archive catalog is irrevocably deleted!**

The new archive catalog is created on the basis of the configuration data.

Confirm the warning and follow the process in the AMU log. The process is complete when the message "Database AML now ready for use" appears.

Update Devices

Function for adaptation of the archive catalog to the graphical configuration. It must be used when the kind and number of components has been changed.

Confirm the warning and follow the process in the AMU log. The process is complete when the message "Database AML now ready for use" appears.

If a DUAL AMU is installed, the process must also run on the DUAL AMU after the configuration has been transferred to it.

Edit Volser Ranges

Function for reassignment of compartments. The archive catalog is internally restructured rather than recreated (refer to *Configuration Of Volser Numbering* on page 4-43).

Restore

Restore the archive catalog when the database backup system is on

NOTE: The database backup system saves the entire archive catalog daily at the time entered in Process Configuration and protocols all changes occurring thereafter.

Changes by Edit Volser Range or SQL commands are not listed in the journal file.

Menu Commands

Figure 3-27 Menu "Commands"

Login (Supervisor)

All commands in this menu open the command window.

NOTE: Information not required for execution of a specific command appears shaded in the command window.

You can open several command windows at the same time.

Command	Field	Explanation
Login (Supervisor) / Logoff		If you wish to use the locked functions in the Command menu, you must log on as operator, administrator or supervisor. To protect the system from unauthorized use, log off when you have completed operations
	Password	Field for input of the supervisor password. Request this password from ADIC.
	Ok	Perform login.

CAUTION: **All AMU commands in the commands menu are designed for test and initial operation. Automatic operation is controlled by the host computer.**

In HACC/MVS systems, the archive catalog of the host computer remains unchanged when these AMU commands are used. Improper use can result in discrepancies in the archive catalogs.

The following functions are identical in all command windows:

Field	Explanation
String:	Display command string (refer to *Command String Conventions*).
Status	Display messages, e.g. Cmd sent, rc 0 rc = Return Code: • 0 = COMMAND in execution • KRN response OK: command execution successfully completed • error number, e.g. error from KRN 1033 (Refer to *Messages in AML/2 Format (AMU)* on page 8-3)
Execute	Execute command
Reset	Prepare window for new command, no consequence for current command execution

Command String Conventions

NOTE: The command string may contain fill characters "." (Default).

Figure 3-28 Command String Convention Part 1

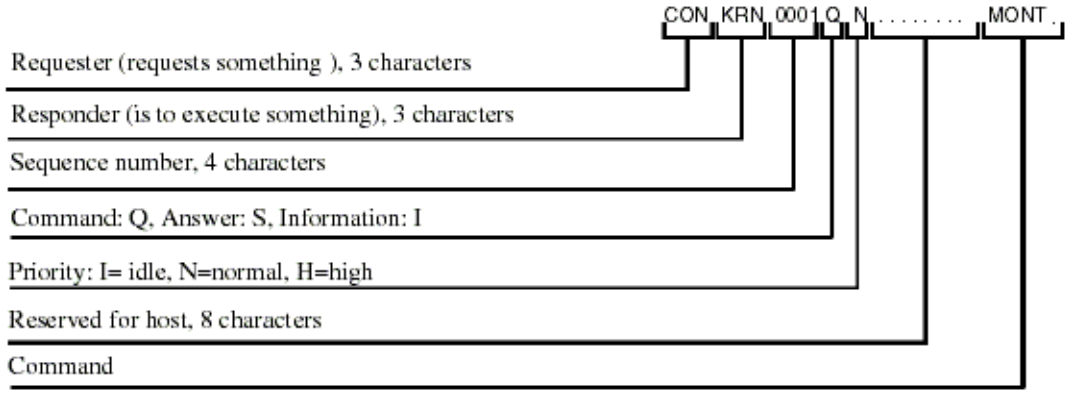
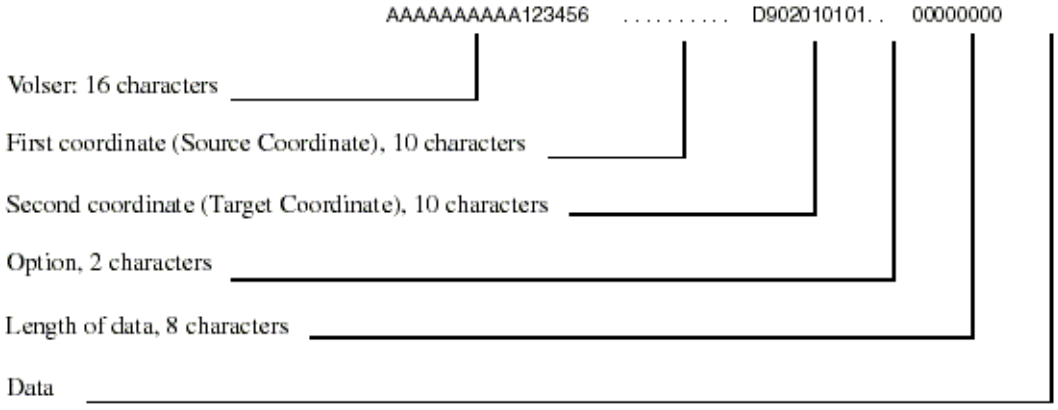


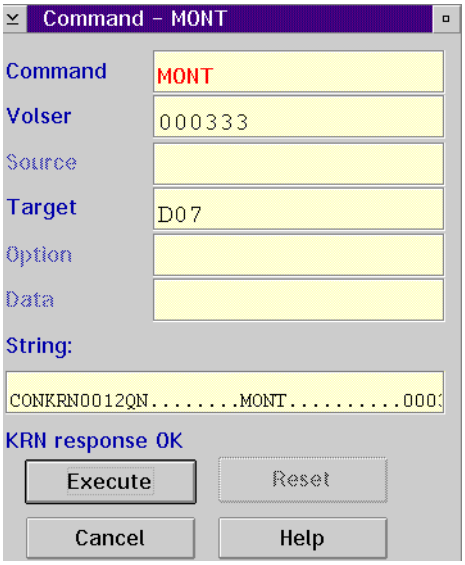
Figure 3-29 Command String Convention Part 2



Command "Mount..."

Mount the medium with the Volser indicated on the drive specified.

Figure 3-30 Window "Command - MONT"

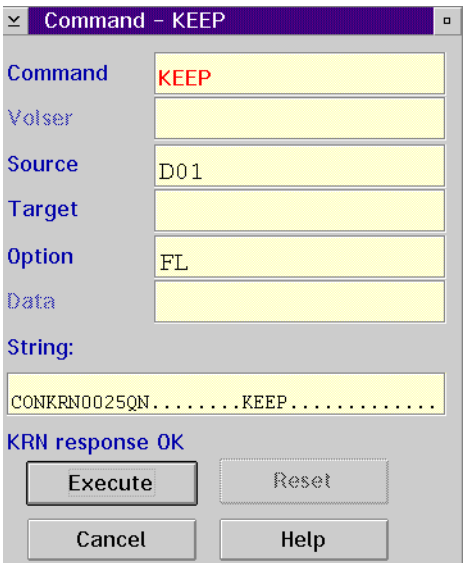


Field	Explanation
Command	Selected command: MONT
Volser	• Volser of the medium (e.. 123456) • CLEAN (for mounting of first defined medium of type Clean) • symbolic Volser (e.g. *FR001 or *11001) for foreign medium
Target	Enter the target coordinates of the drive or the drive name (e.g. D01).

Command "Keep..."

Empty drive selected and return medium to its home position or a selected compartment, or turn Optical Disk inside drive.

Figure 3-31 Window "Command - KEEP""

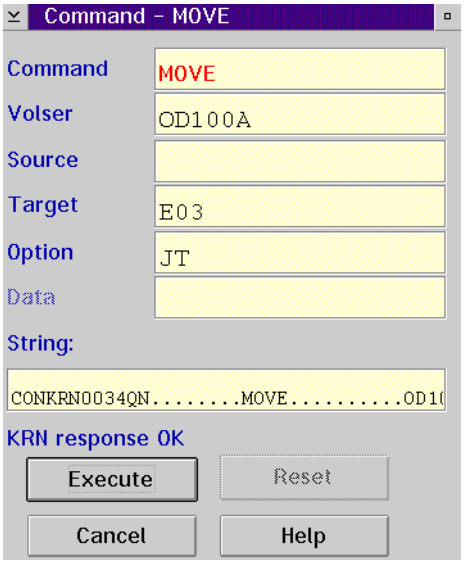


Field	Explanation
Command	Selected command: KEEP
Source	Enter the source coordinates of the drive or the drive name (e.g. D01).
Target (optional)	Enter target coordinates only when • you do not want to return the medium to its home position • you want to assign a new home position to the medium • you want to perform a drive swap
Option (optional)	Only for KEEP of media type "Optical Disk": • FL: (Flip) The optical disk is removed from the drive, turned by 180° and then remounted on the drive.

Command "Move..."

Move a medium from one compartment to another (new home position).

Figure 3-32 Window "Command - MOVE"



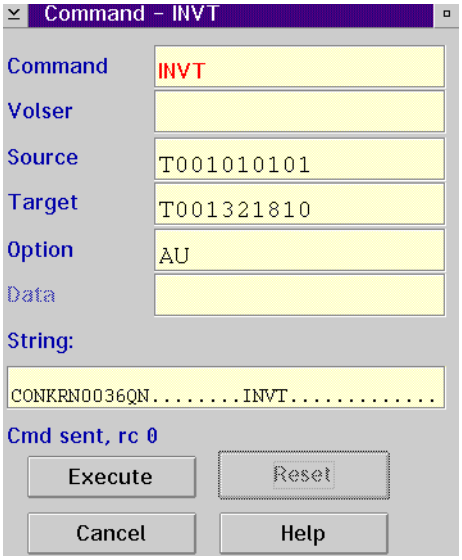
Field	Explanation
Command	Selected command: MOVE
Volser	Volser only (read barcode and compare to database entry)
Source	The coordinate of the Volser to be moved (if volser is omitted the medium is moved without reading the barcode)
Target	Enter the target coordinate or enter the logical eject range in the I/O unit (e.g. E03). It will become the new medium home position. (For OD only coordinates not resulting in turning of the OD are allowed)
Option	Only for MOVE to the I/O unit • JN: (Eject Normal) eject medium, but reserve compartment for the medium (default, also used without option) • JT: (Eject Total) eject medium and release compartment for a new medium (Volser is set to zero-Volser).

Command "Inventory..."

Command for archive management:

- Read barcode of a compartment or several compartments and check the archive-catalog entry
- Insert media (MOVE from I/O unit to archive)

Figure 3-33 Window "Command - INVT"

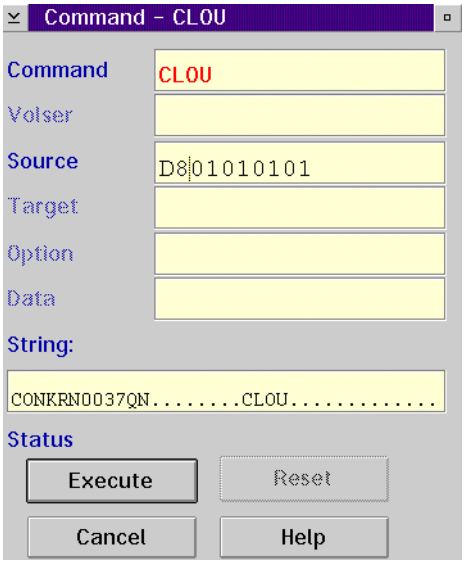


Field	Explanation
Command	Selected command: INVT
Volser	Enter the Volser if you want to check only one medium.
Source	• the source coordinates if you want to check only one medium or one drive • the start coordinate if you want to check an entire range • a logic input range (e.g. I01)
Target	Enter the end coordinates if you want to check an entire range. Source and target coordinate must be on one "Device" (e.g. linear shelf, storage tower). An inventory across several components is not possible with one command. To perform such functions you can list commands with Continuous send.
Option	AI: (Automatic Insert) only for archive coordinates defined in AMU as "AMU-Dynamic". The Volser found (= read by the robot) is inserted if it has a home position in the archive. **When you select option "**AI**", enter only source coordinates of the type "AMU-Dynamic."** An Optical Disk in the I/O unit, with undetermined side A and B will not be inserted if it does not have a home position in the archive. **When you select option "**AU**", only the AMU archive catalog is altered. This can result in differences between it and the archive catalog in the host. If the scanner is failing, the real Volsers in the database are replaced by symbolic Volsers (e.g. *I0001).** AU: (Automatic Update) only for archive coordinates of the archive. The Volser found (= read by the robot) is automatically entered into the archive catalog. (The existing entry is overwritten.) Empty compartments with the attributes "Mounted" or "Ejected" are not altered. Only inconsistencies are protocolled in the LOG Control Center.

Command "Close Unit..."

Close the drive cover of the specified 3X80 drive.

Figure 3-34 Window "Command - CLOU"



Drives supported:

- IBM 3480/3490 with cover
- Siemens 3590 with cover

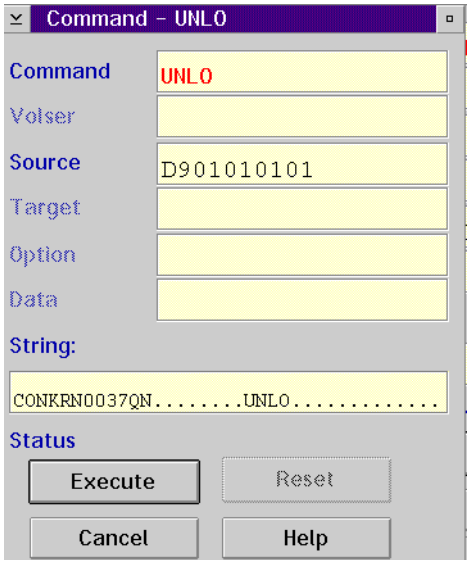
Select this command if the robot has not closed the cover of the drive or if the cover has reopened.

Field	Explanation
Command	Selected command: CLOU
Source	Enter the source coordinates of the drive.

Command "Unload Unit..."

Buttons on the selected drive are actuated by the robot (dismounting).

Figure 3-35 Window "Command - UNLO"



Select this command to actuate the eject button on the drive.

Drives supported:

- all drives with eject button

NOTE: (only for 3X90) After this command, the robot first grips the medium in the "Mount" position during execution of the subsequent "Keep" command, to unload a medium that may not have been drawn in by the drive. If this is not successful, it then grips the "Keep" position.

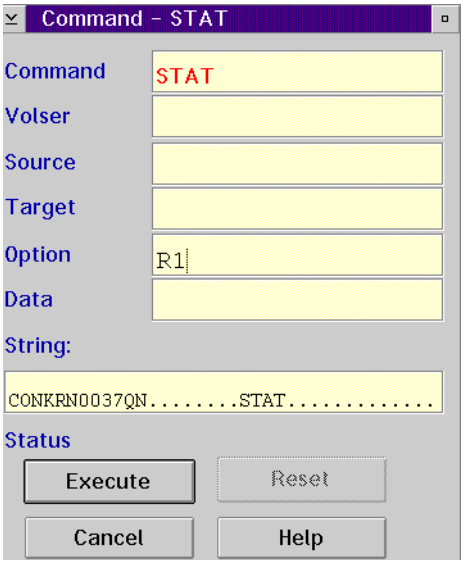
Field	Explanation
Command	Selected command: UNLO
Source	Enter the source coordinates of the drive or the drive name (e.g. D01).

Command "Status..."

Query and set the status of the robot or storage tower, as well as switch-over of the Automatic Data Switch (if provided for).

NOTE: Sign the robot back on with the option R1 (R2), if the robot reports "not ready."

Figure 3-36 Window "Command - STAT"



Field	Explanation
Command	Selected command: STAT
Source	Enter the source coordinates of the storage tower. The source coordinate is always required for sign-on (ready) of a storage tower.

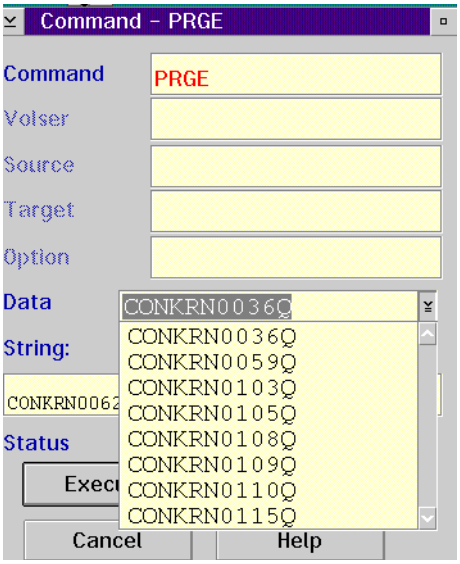
Option	Enter the option:
	• 10: robot 1 ready
	• 20: robot 2 ready
	• 11: robot 1 not ready
	• 21: robot 2 not ready
	• 0: tower ready
	• 1: tower not ready
	• A.: query versions
	  • Volser: AMU version
	  • Source: robot 1 version
	  • Target: robot 2 version (displayed in trace KRN1 only)
	• R1: query robot and, if positive confirmation results, set robot 1 ready (ADS switches connection over to control unit)
	• R2: query robot and, if positive confirmation results, set robot 2 ready (ADS switches connection over to control unit)
	• QQ: Write all running commands from the AMU command queue in the AMU-Log.
	Please use this function in case of the message ***Kernel state mismatch*** or if there are a problem with the command processing. The information is very important for the problem analysis.

Command "Purge..."

Purge a command not yet executed from the AMU command queue.

CAUTION: **Use this command only in exceptional cases. It can lead to inconsistencies in the database.**

Figure 3-37 Window "Command - PRGE"



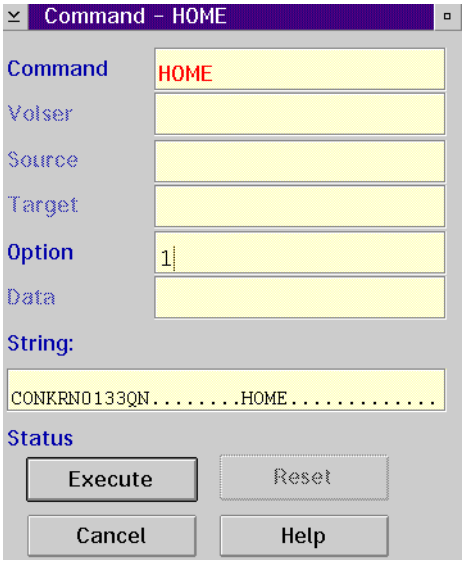
Field	Explanation
Command	Selected command: PRGE
Data	Select the command to be purged in the pop-up menu and purge the command with Execute (e.g. CONKRN0332...): • sender (CON) • requester (KRN) • sequence number (0332)

Command "Homing..."

Move robot to initial position (shut-off position).

NOTE: When the robot has moved to its initial position, it reports "not ready." The status command can be used to set the robot to ready.

Figure 3-38 Window "Command - HOME"



Field	Explanation
Command	Selected command: HOME
Option	Enter the robot number (1 or 2).

CAUTION: **Home is a low-level command. This command might lead to conflicts with other host commands.**

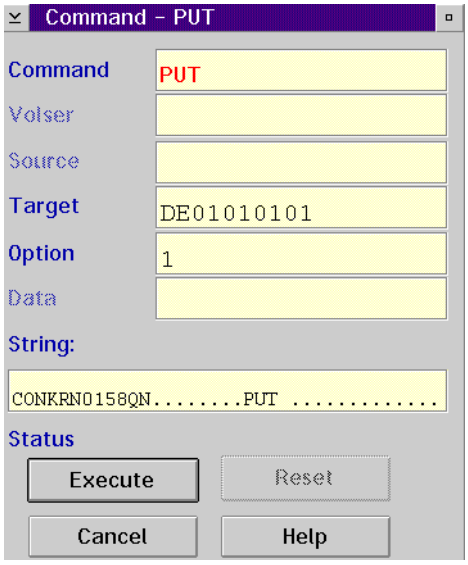
Before executing it, stop the host communication or perform Shutdown AMU **and** startup **before restarting production with the system (refer to *Switching the AMU Computer On* on page 6-1).**

Command "Put..."

Subcommand: put medium in position.

CAUTION: **The archive catalog is not accessed.**

Figure 3-39 Window "Command - PUT"



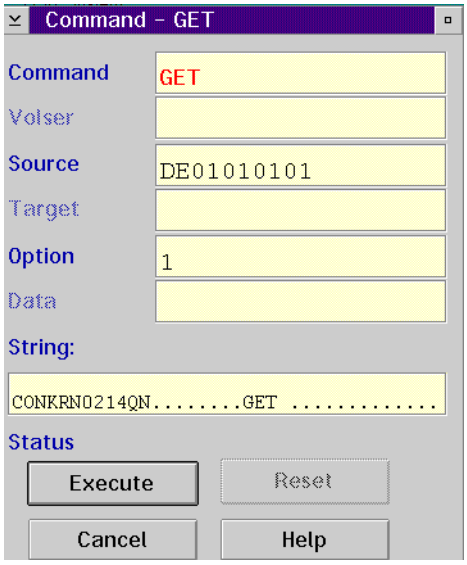
Field	Explanation
Command	Selected command: PUT
Target	Enter target coordinates.
Option	Enter: • 1st digit (required parameter): the robot number (1 or 2) • 2nd digit (optional parameter): M: medium type D2 medium S: medium type D2 small

Command "Get..."

Subcommand: get medium from position.

CAUTION: **The archive catalog is not accessed.**

Figure 3-40 Window "Command - GET"

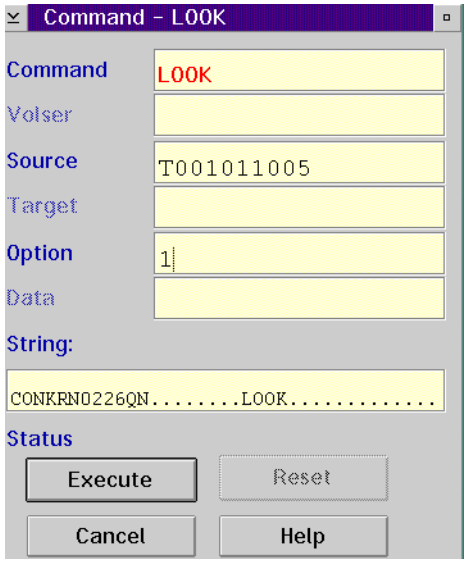


Field	Explanation
Command	Selected command: GET
Target	Enter target coordinates.
Option	Enter: • 1st digit (required parameter): the robot number (1 or 2) • 2nd digit (optional parameter): M: medium type D2 medium S: medium type D2 small

Command "Look..."

Subcommand: read barcode and check attribute.

Figure 3-41 Window "Command - LOOK"



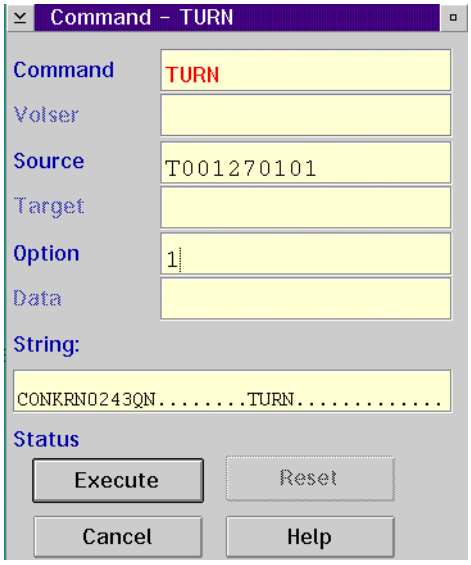
CAUTION: **The result is not compared to the archive catalog entry.**

Field	Explanation
Command	Selected command: LOOK
Source	Enter the source coordinates.
Option	Enter: • 1st digit (required parameter): the robot number (1 or 2) • 2nd digit (optional parameter): M: medium type D2 medium S: medium type D2 small

Command "Turn..."

Subcommand: turn storage tower to segment. This command is only supported by AML/2 and AML/E with storage towers.

Figure 3-42 Window "Command - TURN"



CAUTION: **The result is not compared to the archive catalog entry.**

Field	Explanation
Command	Selected command: TURN
Source	Enter the source coordinates.
Option	Enter the robot number (1 or 2).

Command "Insert Clean..."

Insert cleaning media. Refer to *Insert Clean* on page 3-16.

Command "Eject Clean..."

Eject used cleaning media. Refer to *Eject Clean* on page 3-16.

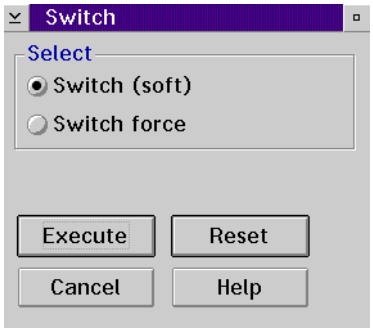
Command "Clean Drive..."

Clean drive outside automatic cleaning process. Refer to *Clean Drive* on page 3-17.

Command "Switch"

When DUAL AMU is used, this command switches over from active to passive AMU.

Figure 3-43 Window "Switch"

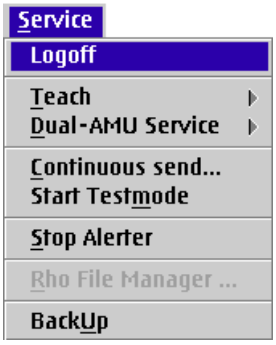


CAUTION: **This command is reserved for test and service applications. Use the command exclusively to check the switch-over function, or when there is no other possibility to switch over (outdated host software without switch command).**

Field	Explanation
Switch (soft)	Upon execute, all running commands are completely processed, the databases are synchronized; then only switch-over occurs.
Switch force	Upon execute, switch-over to the passive AMU occurs immediately regardless of possible data loss. Use this option only if AMU cannot be switched over any other way.

Menu Service

Figure 3-44 Menu "Service"



Login (Supervisor)

Command	Field	Explanation
Login (Supervisor) / Logoff	If you wish to use the locked functions in the Service menu, you must log on as operator, administrator or supervisor. To protect the system from unauthorized use, log off when you have completed operations.	
	Password	Field for input of the supervisor password. Request this password from ADIC.
	Ok	Perform log in.

Command "Teach single command"

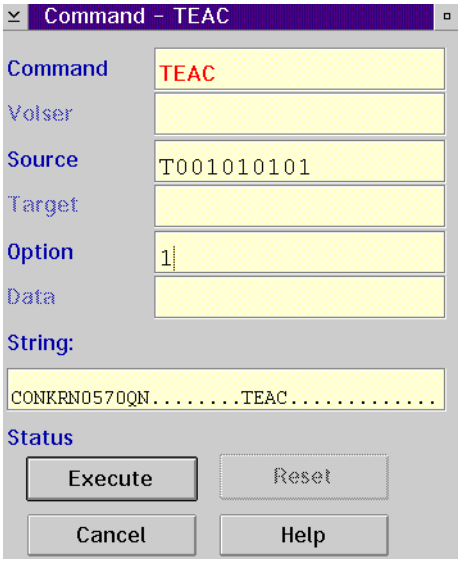
Teach a single object, e.g. a tower segment or a drive.

CAUTION: **Transfer the changed teach-point file to the backup or DUAL-AMU after teaching (only when available) (refer to *DUAL-AMU Service: File Transfer* on page 3-47) and save the file on diskette.**

NOTE: This is a complicated method of teaching. It is too cumbersome for initial teaching of the entire system .

Use this command when teaching individual components.

Figure 3-45 Window "Command - TEAC"



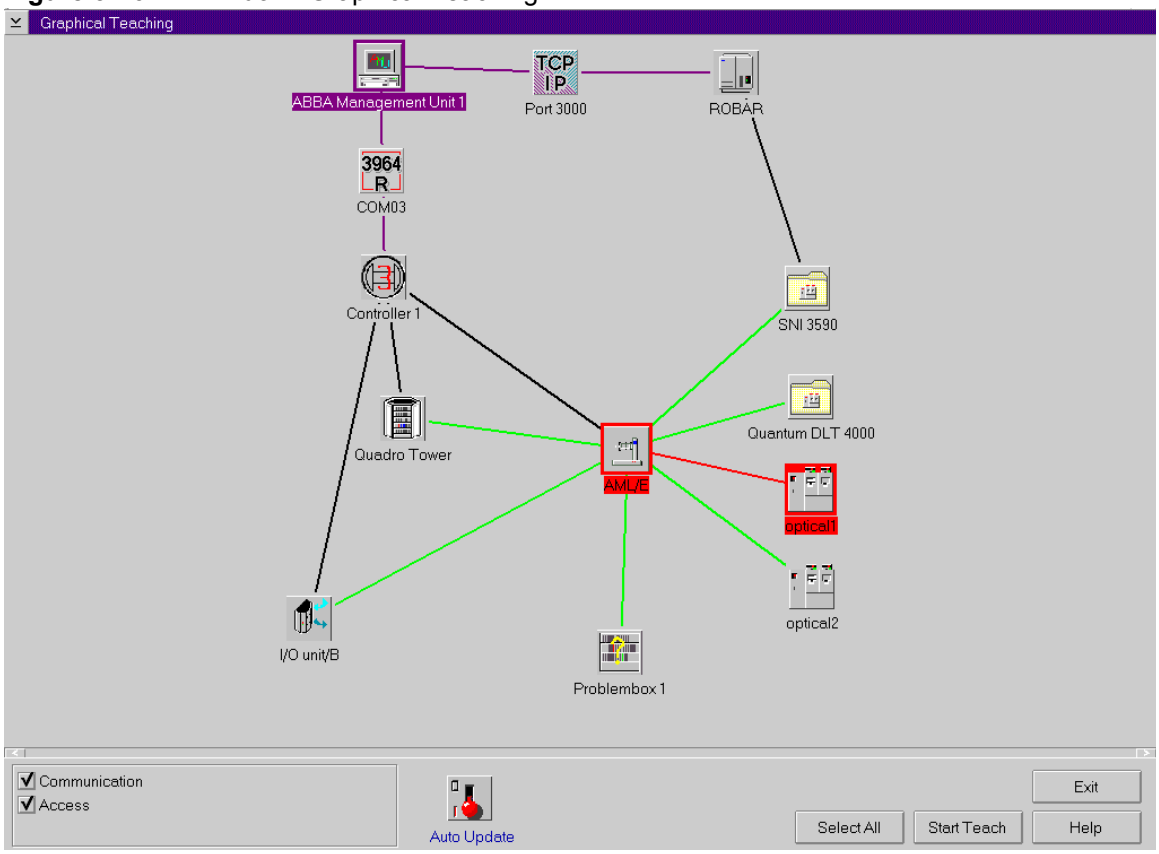
Field	Explanation
Command	Selected command: TEAC
Source	Enter the logic coordinate of the component to be taught.
Option	Enter the parameter for closer specification: • on AML/J only 1, 1N • on AML/E only 1, 1N • on AML/2 for robot 1 1, 1N for robot 2 on twin systems also 2, 2N • 1N or 2N: new-teach (All data of the component in KRNREFPT.R01 or KRNREFPT.R02 or KRNREFPT.R00 are deleted. The target coordinates are retrieved from the configuration. The entire component must be retaught.) • 1 or 2: correction of the coordinates (the data from KRNREFPT.R01 or KRNREFPT.R02 or KRNREFPT.R00 are corrected).

Command "Teach MTCGDialog"

Select this command from the menu Service - Teach. Graphically supported teaching, e.g. of a Quadro tower, several drives or the entire system.

CAUTION: **Transfer the changed teach-point file to the backup or DUAL-AMU after teaching (only when available) (refer to *DUAL-AMU Service: File Transfer* on page 3-47) and save the file on diskette.**

Figure 3-46 Window "Graphical Teaching"



Command	Explanation
Connection	Switch allowing you to display or to hide the connections • Communication: data connection • Access: mechanic access
Auto Update	Deactivates update of connecting lines
Select All	Select all components.
Unselect All	Unselect all components.

Command	Explanation

Teach	Selecting a single component:
	• teach (1): click once with the left mouse button - the component is shown in red
	• re-teach (1N): click twice with the left mouse button - the component is shown in dark blue
	To select several components keep <CTRL> pressed.
	
	To define which robot teaches the component, mark the robot, the component and the connection. If you teach drives, the system prompts you for the teach rule.
	robot 1 begins with the first tower in ascending order
	robot 2 begins with the last tower in descending order
	
	After teaching:
	• component appears green: no errors
	• component appears dark brown: error message and prompt
	  • Retry: teach once more
	  • Ignore: ignore failure and teach next component
	  • Abort: abort the teaching (all components)

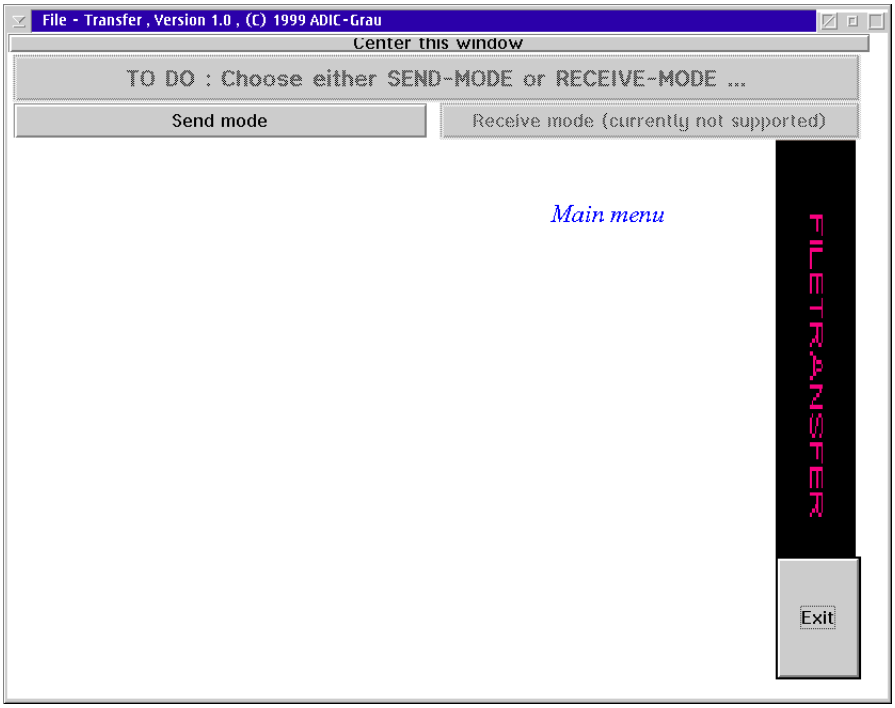
Start Teach	Start the teach routine for the selected components.
Stop Teach (during teaching only)	Stop the teach routine.

DUAL-AMU Service: File Transfer

Dialog for the transfer of any files (e.g. configurations data and database) to the DUAL-AMU or a other computer in the TCP/IP network.

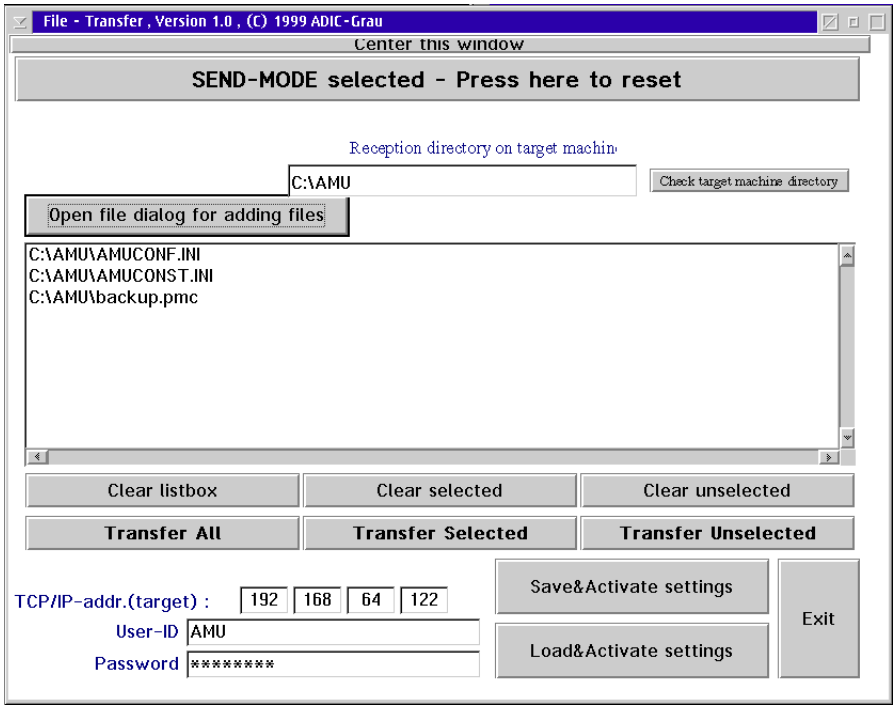
NOTE: Precondition for the function is a TCP/IP connection.

Figure 3-47 Window "File - Transfer"



Command/Field	Description
Center this window	moves the window to the center of the screen
Send mode	opens the dialog for the file transfer from the local AMU to any other computer
Receive mode	not supported (Dialog for file transfer of any source computer to the local AMU)
Exit	ends the program File-Transfer

Figure 3-48 Window "File - Transfer Send mode"



Command/Field	Description
Center this window	moves the window to the center of the screen
Send mode selected - Press here to reset	stopps the dialog for the File-Transfer from the local AMU to any target computer
Reception directory on target machine	Identifies the directory on the target computer, where the files should be copied
Check target machine directory	checked, if the defined directory exist on the target system (New directories will be not created)
Open file dialog for adding files	May be used to configure one or more files for the transfer to the target system. The files may be located in a different directory on the source computer, but only in one target directory (during one file transfer). The selection will be saved at the end of the program.
Clear listbox	All files will be removed from the selection
Clear selected	Only the marked files will be removed from the selection
Clear unselected	Only the not marked files will be removed from the selection
Transfer All	All files will be transferred to the target computer
Transfer Selected	Only the marked files will be transferred to the target computer
Transfer Unselected	Only the unmarked files will be transferred to the target computer

Command/Field	Description
TCP/IP-addr. (target)	TCP/IP-Address of the target computer
User-ID	Username for the FTP-support on the target computer
Password	To the user ID-related password
Save&Activate settings	Settings will be prepared for the save in the file FILETR.DAT and for the usage activated.
Load&Activate settings	Settings will be loaded for the usage activated.
Exit	End the program.

DUAL-AMU Service: Activate this AMU

This function changes the status of the local AMU from passive to the active Status, if the AMU is currently passive.

Please use this command in case of a ADS malfunction or in case of problems with the status of a not DUAL-AMU.

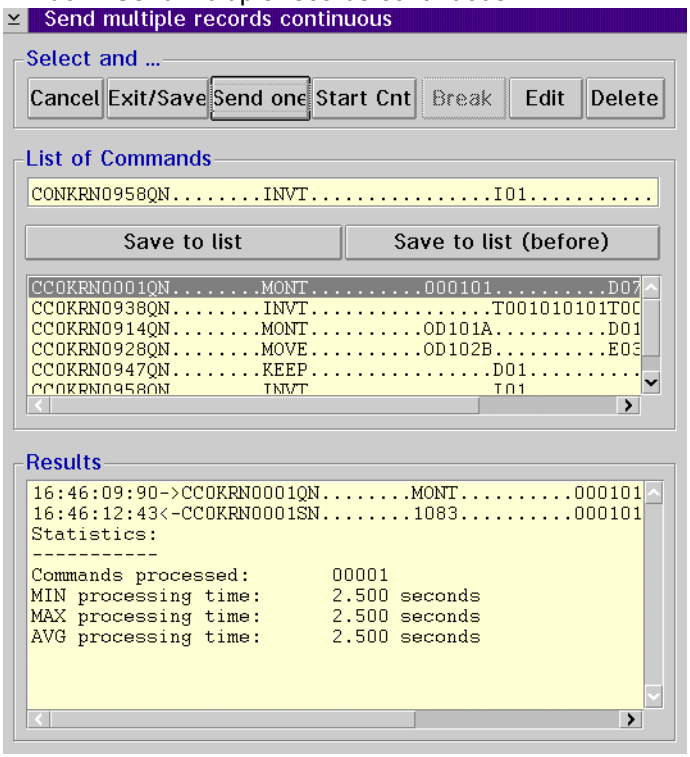
The function is available from AMU version 3.10C (refer to *Release Notes*).

Continuous Send

System test tool used without host: execute a single command or several commands in continuous sequence. The commands are stored in the file "CONCONT.INI."

NOTE: The file CONCONT.INI from version 2.0 must not be used in version 2.2 or higher (wrong format results in AMU software crash).

Figure 3-49 Window "Send multiple records continuous”



Command/field	Explanation
Select and ...	Commands executed with the marked command sequences in the range List of Commands
Send one	Execute the selected commands once (command sequence).
Start Cnt	Execute the selected commands continuously in a loop. The item changes to Stop Cnt as the commands are executed.
Stop Cnt	Displayed only while a loop is being executed. Stops the "Continuous send” after execution of the last command in the loop.
Break	Breaks the "Continuous send” after execution of the current command.
Select All	All commands in the field List of Commands are marked and will be started when Start Cnt is confirmed.
Edit	Process first marked command (command is entered on the line for processing.
Delete	Delete all selected commands.
Exit	Quit the window "Continuous send” (the commands are saved with Save to list and Save to list (before)

Command/field	Explanation	
List of Commands	Range for selection and change of individual command sequences	
	Save to list	Add the command edited with Edit at the end of the list. The commands are saved in the file CONCONT.INI.
	Save to list (before)	Add the command edited with Edit before the selected command. The commands are saved in the file CONCONT.INI.
Results	This window contains a log of commands executed. At the end of the process, a statistic is displayed. • Command processed - number of commands executed • processing time (MIN, MAX,AVG) - time required per command (maximum, minimum and average)	

*Procedure illustrated with a "*Move*" command.*

Step 1 Select Continuous send... (Service menu)

Step 2 Select Move... (Commands menu)

Step 3 Enter the parameters

- Volser
- source coordinates
- target coordinates

Step 4 Copy the command string (from the command window)

- select the command string (put the cursor at the beginning of the string and mark the entire string keeping the left mouse button pressed)
- select Copy (menu Edit)

Step 5 Put the command string into the window Continuous send

- put the cursor on "List of Commands"
- select Paste (menu Edit)

Step 6 Select the command Save to list or Save to list before

Step 7 Select all commands to be executed

Step 8 Select Start Cnt or Send one. All selected commands are executed

Start Testmode

Switch for simulation mode: No processing of commands outside AMU. AMU processes the commands as far as possible and confirms their execution to the host (positive acknowledgement).

CAUTION: **Command execution alters the archive catalog although no medium is actually moved. Use only for test and training systems.**

Stop Alerter

The alerter (program ART.EXE) writes logs and traces. Terminate the alerter, e.g. if you want to copy an active log file to disk:

Step 1 stop the host communication (e.g. hold on HACC)

Step 2 select Stop Alerter

Step 3 copy the log file

Step 4 restart the alerter (open AMU log)

CAUTION: **When the alerter has been stopped no logs and traces are written. Restart the alerter as soon as possible.**

Rho File Manager

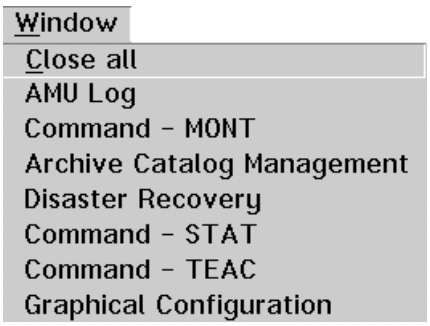
The Rho File Manager transfers files between the AMU and the rho control in both directions (refer to *Rho File Manager* on page 5-1).

CAUTION: **Stop the communication between host and AMU before calling up the Rho File Manager.**

After a safety query, the robot moves to its initial position and the AMU function stops (kernel is terminated).

Menu Window

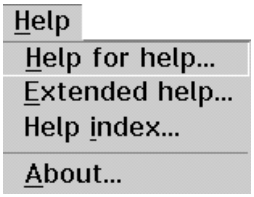
Figure 3-50 Menu "Window"



Command	Explanation
Close all	Close all open windows.
Window (List of all open windows)	Call up the respective window.

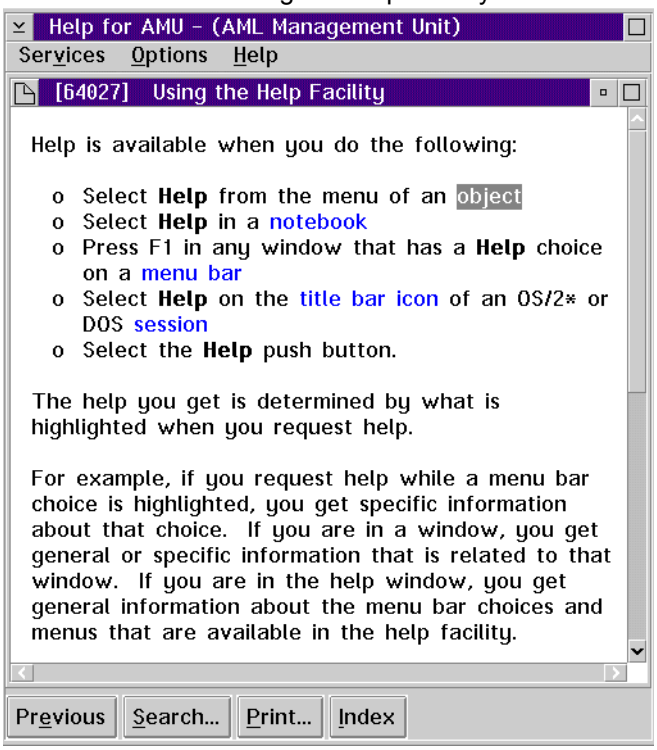
Menu Help

Figure 3-51 Menu "Help"



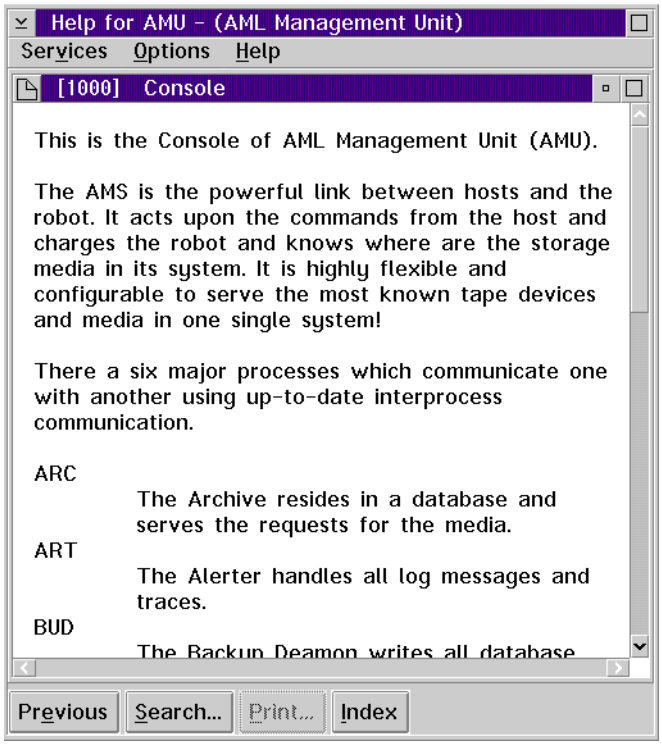
Command	Explanation
Help for help...	Information on the use of the start page for help functions.

Figure 3-52 Window "Using the Help Facility"



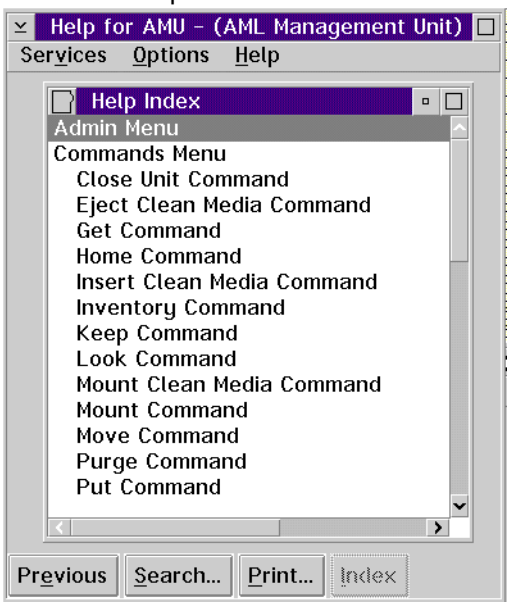
Command	Explanation
Extended help...	Start page for AMU online help

Figure 3-53 Window "Help for AMU - (AML Management Unit)"



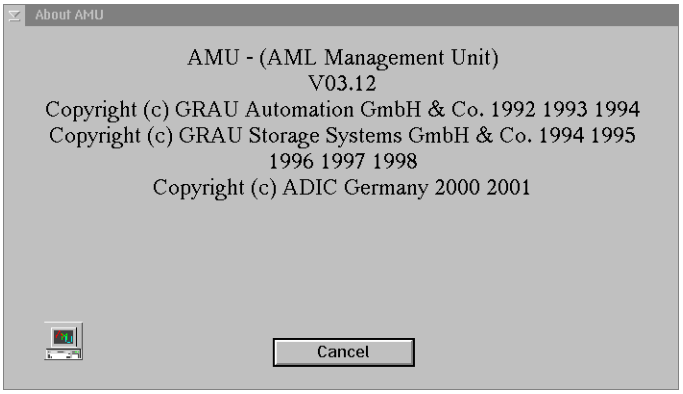
Help index...	Help index

Figure 3-54 Window "Help Index"



Command	Explanation
About...	Display copyright information and AMU version number.

Figure 3-55 Window About AMU”



Configuration

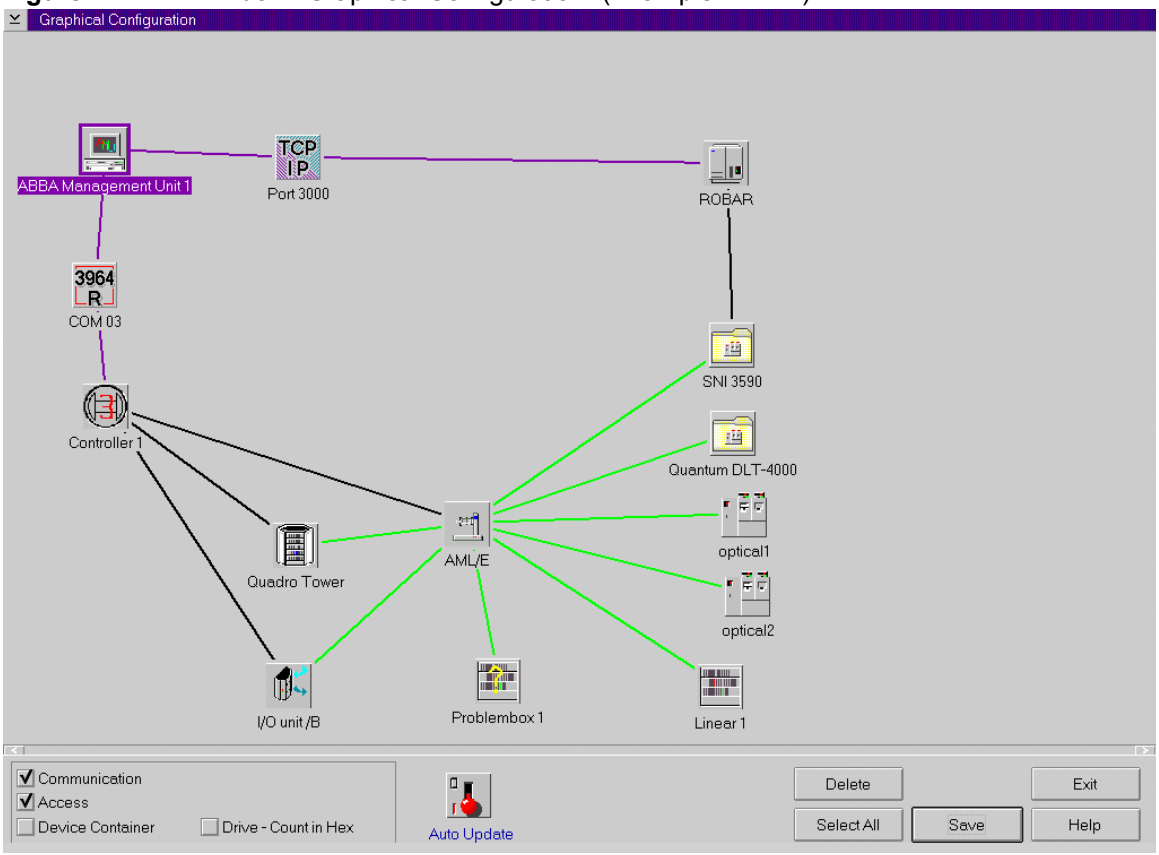
This chapter describes all configuration options within AMU.

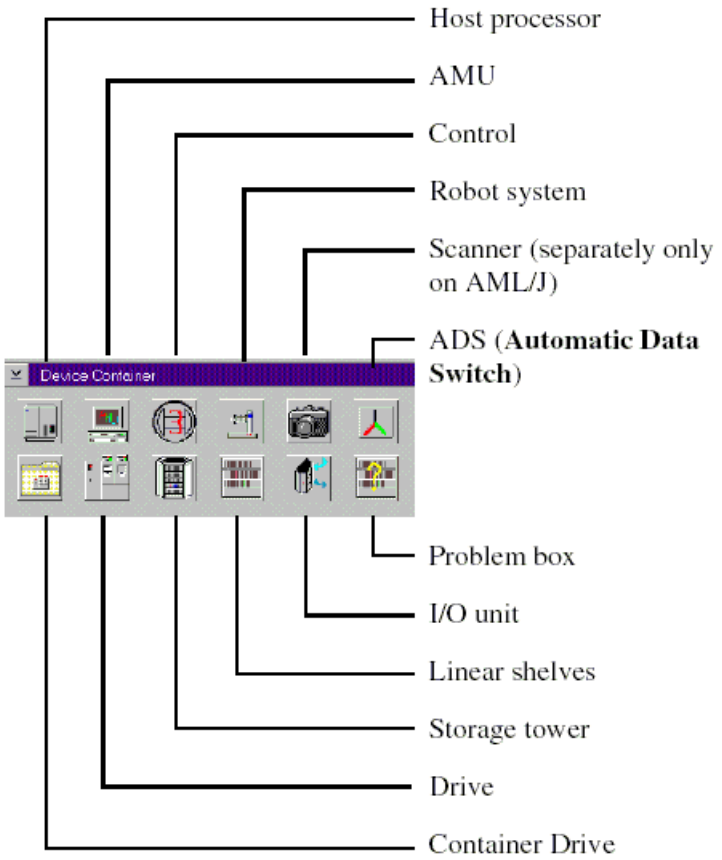
Window "Graphical Configuration”

This window is used to configure all AML components.

In DUAL AMU systems, changes of the configuration must be made at the **active** AMU. Only changes for dismount management, Clean Management and Logical Ranges for Insert/Eject will be activated on a running system. For all other changes, you must be restart the AMU. AMU and DAS must be down for direct changes on the configuration files (refer to *PATINI* on page 5-49).

Figure 4-1 Window "Graphical Configuration” (Example AML/E)



Field	Explanation
Device Container	Switch allowing to show/hide the window Device Container. 
Communication	Switch allowing you to show/hide the connections. Communication (black): hardware connection
Access	Switch allowing you to show/hide the connections. Access (green): responsible = logic connection
Drive-Count in Hex	Switch for count mode of drive names (hexadecimal or decimal). Select hexadecimal if more than 100 drives are involved (on HACC/MVS HACCPARM parameter UNITNUM=HEX)
Auto Update	Automatic update of display contents after each change. To switch over, click on the switch with the **right** mouse button.
Save	Save the configuration in AMUCONF.INI and save the old file to CONFAMU.INI. After saving the configuration file, transfer it to the backup or DUAL-AMU (only if available) (refer to *DUAL-AMU Service: File Transfer* on page 3-47) and save the file on a diskette.
Delete	Delete the selected (marked in red) component from the layout.
Select All	Select all elements (icons).
Exit	Exit the graphic configuration without saving.

The Configuration Procedure

This section describes the AMU configuration procedure.

Configuring a component

Step 1 Pull the desired component into the configuration window. Position the icon in the configuration window by clicking the right mouse button and moving the mouse.

Step 2 Double click on the item to open the configuration window.

NOTE: Only one configuration window at a time can be opened.

Deleting a component

Step 1 Mark the icon or connecting line you wish to erase by clicking on it (symbol is marked red). Mark several symbols by keeping the <CTRL> button pressed.

Step 2 To delete all selected symbols, click Delete.

Defining connections

Step 1 Click on the first icon with the left mouse button, keep the mouse button pressed and pull the mouse to the second symbol.
On AMU communication connections an icon is shown on the connecting line (communication parameters).

Required connections

From	To
HOST	AMU
	Drive
AMU	Control units
	ADS
	Scanner (AML/J)
	DUAL AMU
	Drive container (Drive Control Interface)
Control unit	Robot
	Storage tower
	I/O unit
Robot	Drive
	Storage tower
	Linear shelves
	I/O unit
	Problem box

Saving the configuration

Step 1 After configuring, click Save.

Configuration Windows of Components

NOTE: The coordinates contain the name and the type of the respective component.

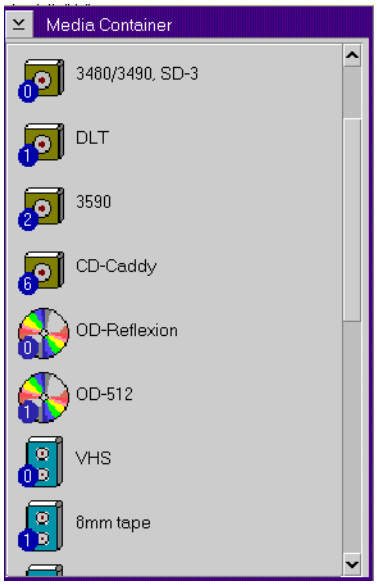
- name: 1st, 3rd + 4th digit of the coordinate
- type: 1st + 2nd digit of the coordinate

Example:
drive coordinate: D902010101 - name: D02 type: D9

NOTE: For storage tower, linear shelf and I/O units the various media types can be selected in the Media Container.

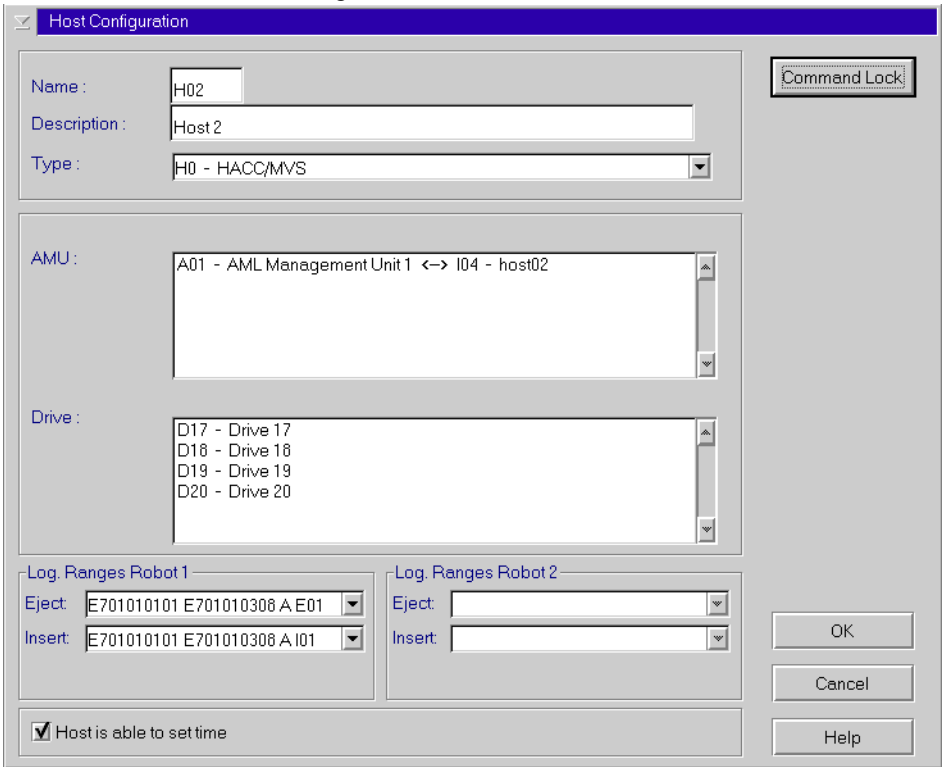
1. Click on Media Container. The window Media Container appears.
2. Pull the selected medium onto the desired segment or handling box with the right mouse button pressed.

Figure 4-2 Window Media Container



Host Computer

Figure 4-3 Window "Host Configuration"

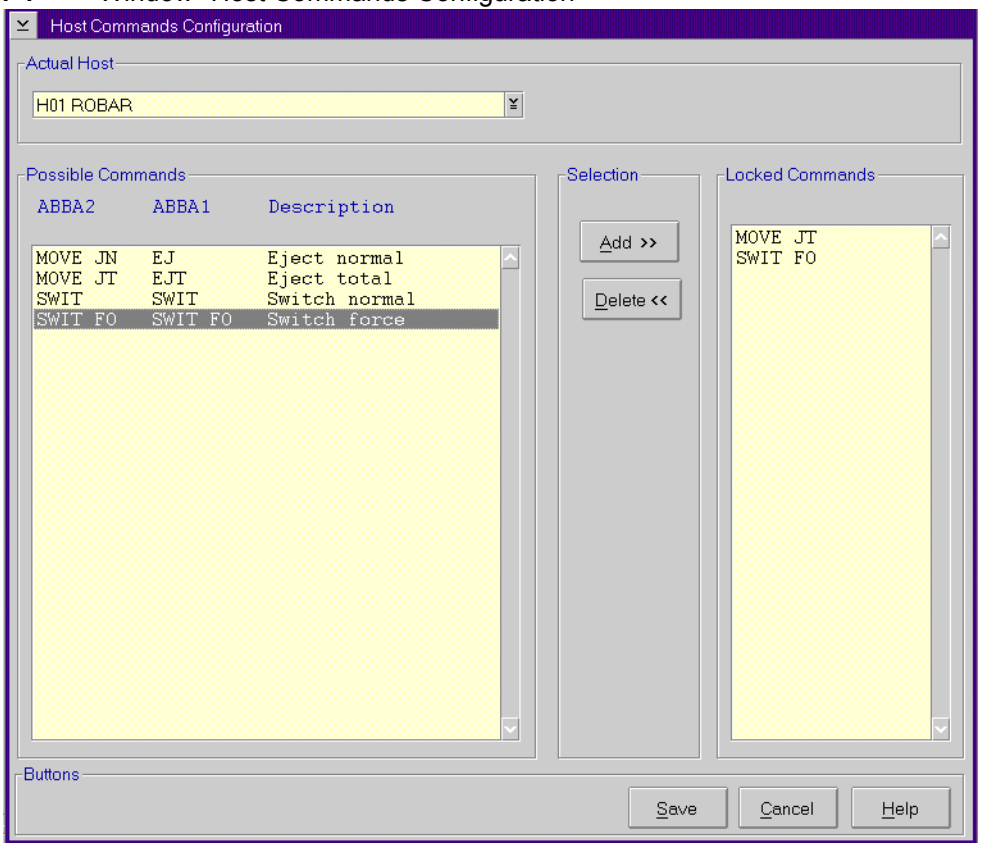


Field		Explanation
Name:		Name of the component (H01, H02 …).
Description:		Description of the component in the log strings.
Type:		Component type (refer to *Drives* on page A-9)
AMU:		List of connected AMUs.
Drive:		List of connected drives.
Command Look		Opens a window allowing you to lock selected commands for this host.
Log. Ranges Robot	Insert	Default area in the insert/eject unit, which will be used by this host for insert if the host does not use the insert commant to specify another area.
	Eject	Default area in the insert/eject unit, which will be used by this host for eject if the host does not use the eject commant to specify another area.
Host is able to set time		With the ROSA or STATUS command, the system time of the AMU computer is set to the value in the command string.

NOTE: DAS/2 as host beginning with version 1.3 is no longer configured in the AMU.

Command Look

Figure 4-4 Window "Host Commands Configuration"

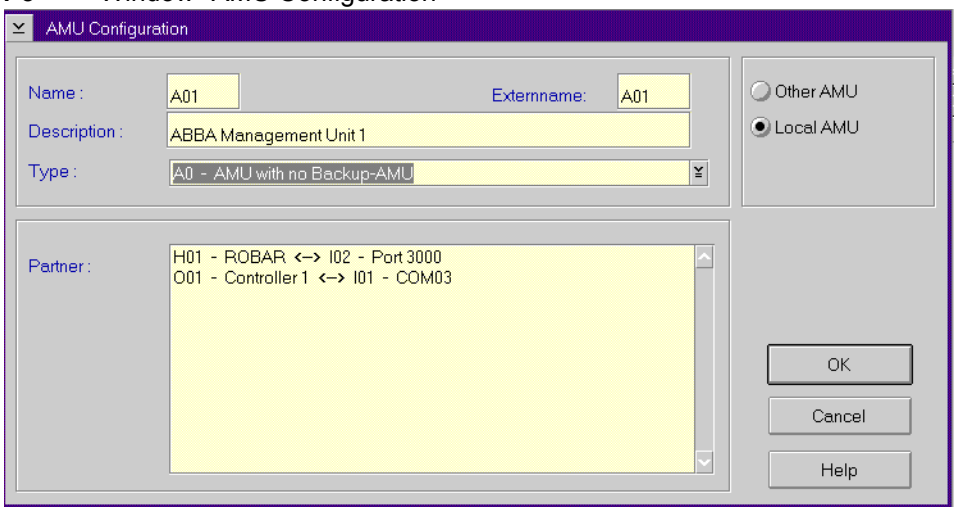


Field	Explanation	
Actual Host	Selection box for all host configured; for command configuration it does not matter which icon you select to open the Host Configuration.	
Possible Commands	List of all commands that can be locked for individual hosts, in AML/2 and ABBA/1 format	
	Automatic Mode	Terminate the manual mode (intermediate operation without robot)
	Cleaning	HACC/MVS command for query and change of CLM parameters
	Robot start	Command setting the robot ready
	Robot stop	Command setting the robot offline and moving it to its home position
	Barcode off	Switch off barcode reader for Mount and Eject
	Barcode on	Switch on barcode reader
	Eject clean media	Eject cleaning media
	Insert clean media	Insert cleaning media
	Insert normal	Insert storage media
	Manual mode	Switch to manual mode (operation without robot)

Field		Explanation
	Test mode	Switch on AMU diagnosis operation (diagnosis without AML system)
	Mount clean media	Immediate drive cleaning
	Eject normal	Eject medium while keeping its home coordinate. Switch this command off if this host operates exclusively with dynamic archiving, or if you do not wish this host to perform ejects.
	Eject total	Eject medium and delete its Volser completely from the archive. Switch this command off if this host operates exclusively with hierarchical archiving, or if you do not with this host to perform ejects.
	NTFY HICAP request	Asynchronous information for request of I/O unit/D
	NTFY Robot is home	Asynchronous information for shutdown of the robot (ROBS-OFF-message)
	NTFY Robot ready	Asynchronous information for power-up of the robot (ROBS-ON-message)
	NTFY Volser available now	Asynchronous information on inserted media
	NTFY Volser removed	Asynchronous information on ejected media
	NTFY Autom. invent. ended	Asynchronous information on end of inventory of I/O unit
	NTFY Start of cleaning	Asynchronous information on cleaning of drive
	NTFY Clean successfully	Asynchronous information on cleaning of drive
	NTFY Clean failed	Asynchronous error message on automatic cleaning of drive
	NTFY Clean media required	Asynchronous information on missing cleaning media in AML system
	Shutdown	Shutdown AMU
	Switch normal	Switch-over to DUAL AMU without failure
	Switch force	Switch-over to DUAL AMU in case of failure
	Download	AMU database changed by host
Selection	Change the selection only after consulting ADIC Technical Service. Uncoordinated changes can lead to system failures.	
	Add	Lock selected command for this host
	Delete	Unlock selected command for this host
Locked Commands	Display locked commands	
Save	Quit window after change of configuration. Save changes in window Graphical Configuration with Save to the file AMUCONF.INI.	

AMU

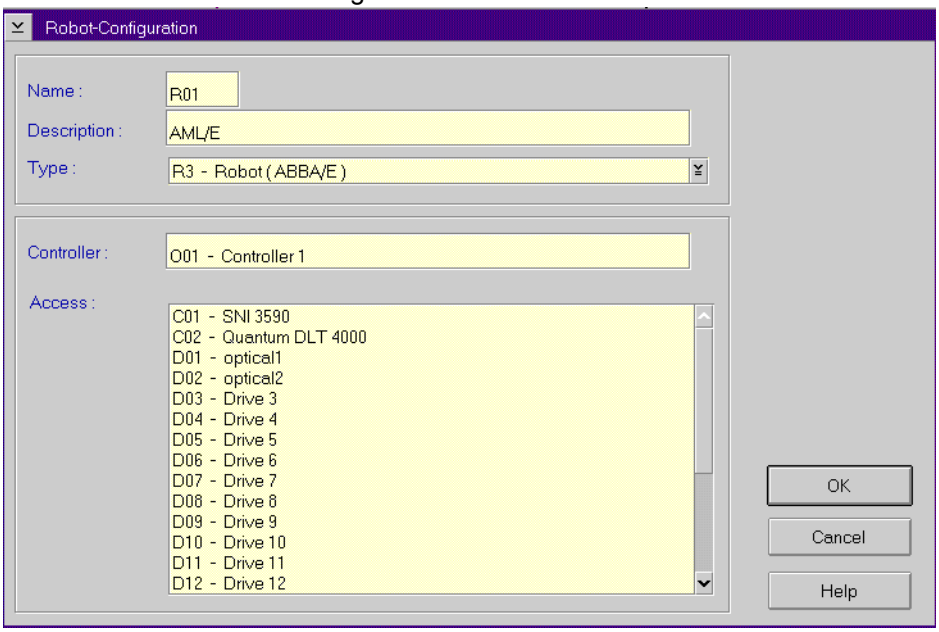
Figure 4-5 Window "AMU Configuration"



Field	Explanation
Name:	Name of component (A01, A02 …).
Externname:	Name for the telegrams to the connected hosts (actually operates all hosts with the name A01
Description:	Description of the component in the log strings.
Type:	Component type (refer to *AMU* on page A-13)
Local AMU	Configuration of local AMU hardware.
Other AMU	Configuration of AMU connected to local AMU.
Partner:	List of connected communication partners.

Robot System

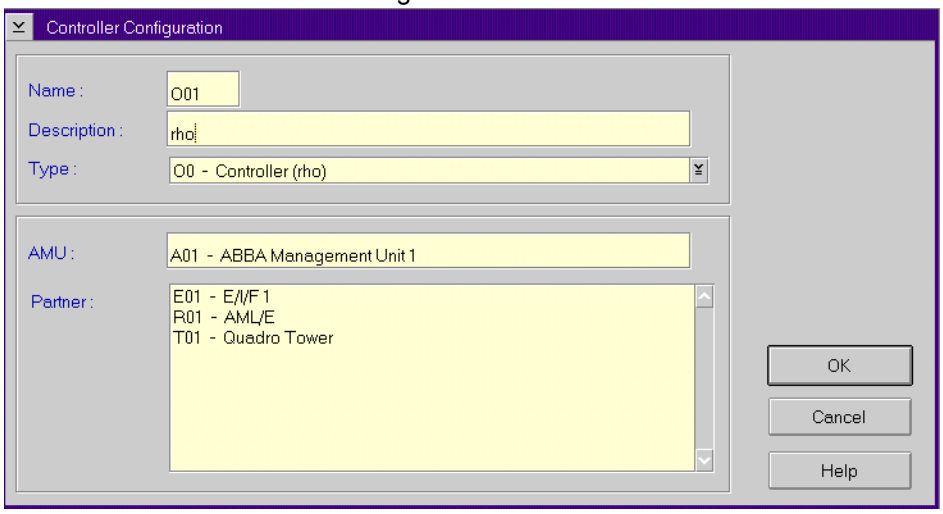
Figure 4-6 Window "Robot Configuration”



Field	Explanation
Name:	Name of the component (R01, R02). AML/E and AML/J always have only one robot, AML/2 can have one or two robots.
Description:	Description of the component in the log strings.
Type:	Component type (refer to *Robots* on page A-12).
Controller:	Connection to controller.
Access:	List of units connected that can be accessed by the robot (green lines).

Control

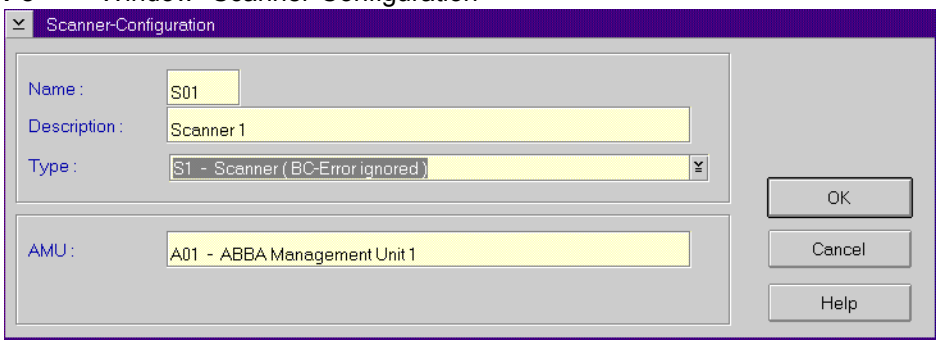
Figure 4-7 Window "Controller Configuration"



Field	Explanation
Name:	Name of component (O01, O02 …).
Description:	Description of the component in the log strings.
Type:	Component type: refer to *Control Units* on page A-13.
AMU:	List of connected AMUs (default A01).
Partner:	List of connected units.

Scanner (barcode reading system, for AML/J only)

Figure 4-8 Window "Scanner-Configuration"



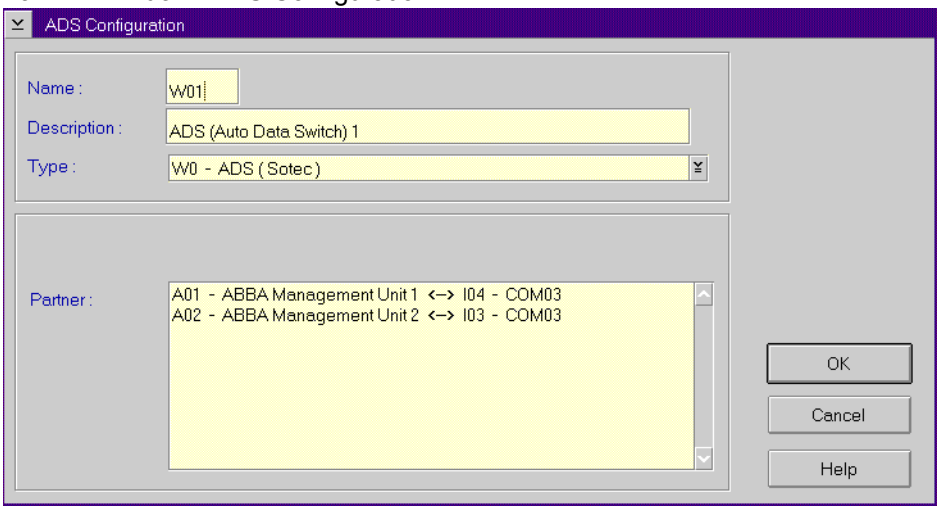
Field	Explanation
Name:	Name of component (S01)
Description:	Description of the component in the log strings.

Field	Explanation
Type:	Reaction of scanner when problems occur • S0 - scanner read error leads to termination of command with negative acknowledgement • S1 - scanner read error is ignored, command will be executed and acknowledged positively
AMU:	Indicates connected AMU

ADS (Automatic Data Switch)

- automatic switch-over between the DUAL-AMUs
- switch-over is prompted by a host command

Figure 4-9 Window "ADS Configuration”



Field	Explanation
Name:	Name of component (W01)
Description:	Description of the component in the log strings.
Type:	Component type • W0 - ADS (SOTEC)
Partner:	List of connected AMUs

Configuration of an AML System with DUAL AMU and Automatic Data Switch

Step 1 Insert a second icon "AMU” in the configuration.

Step 2 Insert the icon "ADS.”

Step 3 Create a connection from AMU(A) to AMU(B).

Step 4 Create a connection from AMU(B) to AMU(A).

NOTE: Check that one of the connections is from A01 to A02 and the other connection from A02 to A01. This are necessary for display the actual connections of the AMU. If nothing or both connections marked, create the configurations of the connections anew.

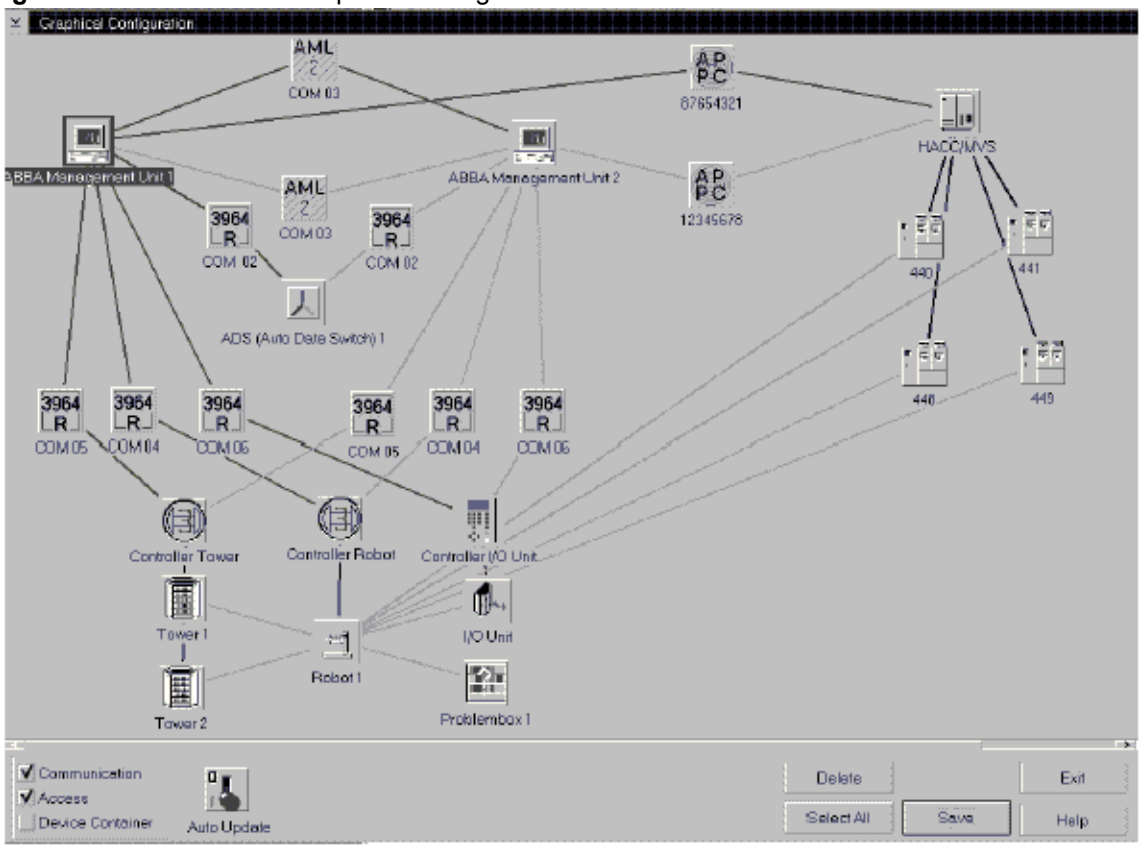
Step 5 Create connections from AMU(A) to each Host.

Step 6 Create connections from AMU(B) to each Host.

Step 7 Create connections from AMU(A) and AMU(B) to each controller (Control Tower, Control Robot, Control I/O Unit/A).

Step 8 Create connections from AMU(A) and AMU(B) to the ADS.

Figure 4-10 Window "Graphical Configuration" with DUAL-AMU and ADS



Step 9 Set up the following values in the window AMU configuration

Field	Parameter AMU(A)	Parameter AMU(B)
Name:	A01	A02
Externname:	A01	A01
Description:	AML Management Unit1	AML Management Unit2

Field	Parameter AMU(A)	Parameter AMU(B)
Type:	A1-AMU with DUAL-AMU	A1-AMU with DUAL-AMU
Other AMU		✔
Local AMU	✔	

Step 10 On the PC AMU(A) create the file LOCAL.AMU in directory C:\AMU with the entry A01.

Step 11 On the PC AMU(B) create the file LOCAL.AMU in directory C:\AMU with the entry A02.

NOTE: Use the same interfaces for AMU(A) and AMU(B).

Step 12 Configure communication paths between

- the AMUs
- AMU and Host
- AMU and Controller

Step 13 Save the new adjustments with Save.

Step 14 Restart AMU.

Meaning of the file LOCAL.AMU

The configuration parameters are saved on both AMUs. The assignment of the active communication parameters is made using the AMU names (A01 or A02). This name appears in the ASCII-file LOCAL.AMU in the directory C:\AMU.

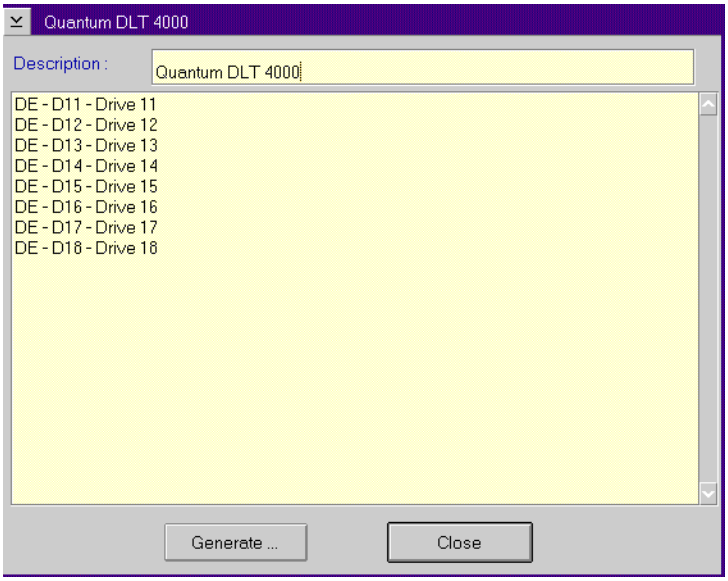
Drive Folder (Drive Container)

Folder that allows you to arrange new or existing drives in a group.

Drives can be added to the folder by dragging with the mouse or with the command Generate.

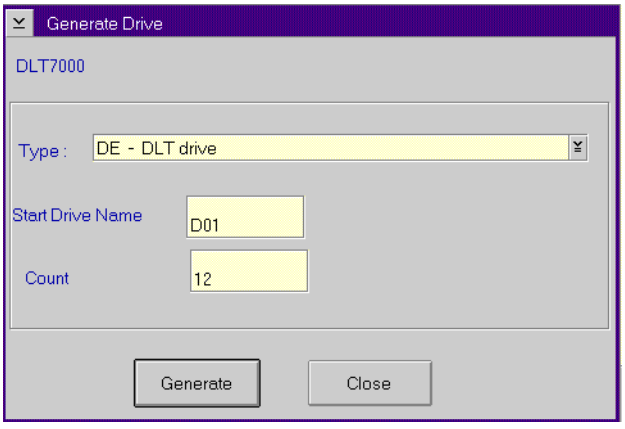
NOTE: The connecting line from drive folder to robot must be drawn before the drives are added to the folder. Otherwise the teach point data will be lost.

Figure 4-11 Window "Container Drive"



Field	Explanation
Description:	Description of the component in the log strings. Table with all drives defined in the container drive: • drive type • drive address (AMU) • description (name for HACC/DAS clients) When you double-click one line, the window Drive Configuration opens (see Figure 4-13 on page 4-15).
Generate	Call up the dialog window for generation of drive configurations from the container drive (see Figure 4-12).
Close	Close the window Container Drive.

Figure 4-12 Window "Generate Drive"

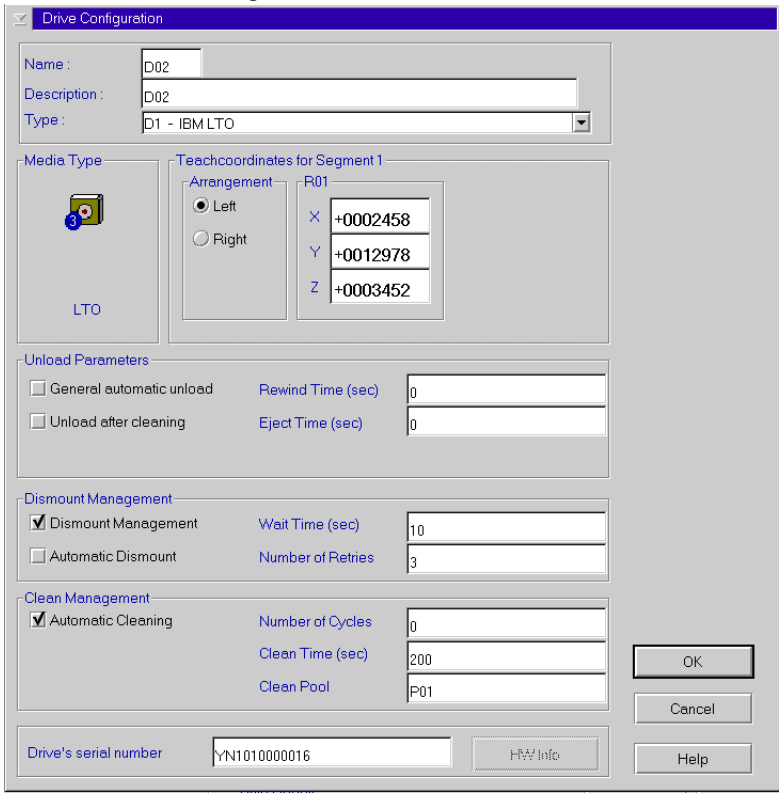


Field	Explanation
Type:	Select the drive type of all drive configurations to be generated in the container drive (refer to *Drives* on page A-9).
Start Drive Name:	Enter name of first drive in the container drive. Depending on the inputs made in the window Graphical Configuration the names are counted in decimal or hexadecimal. **Generation of drive configurations is successful only when no other drives are configured for the selected range of names.**
Count:	Number of all drives generated in the container drive (recommended maximum number: 16)
Generate	Generate drive configurations with the selected parameters

Drive

Definition of drives in the archive with assignment of parameters for position in the archive, drive type and further options for drive cleaning and error handling during dismounting.

Figure 4-13 Window "Drive Configuration”



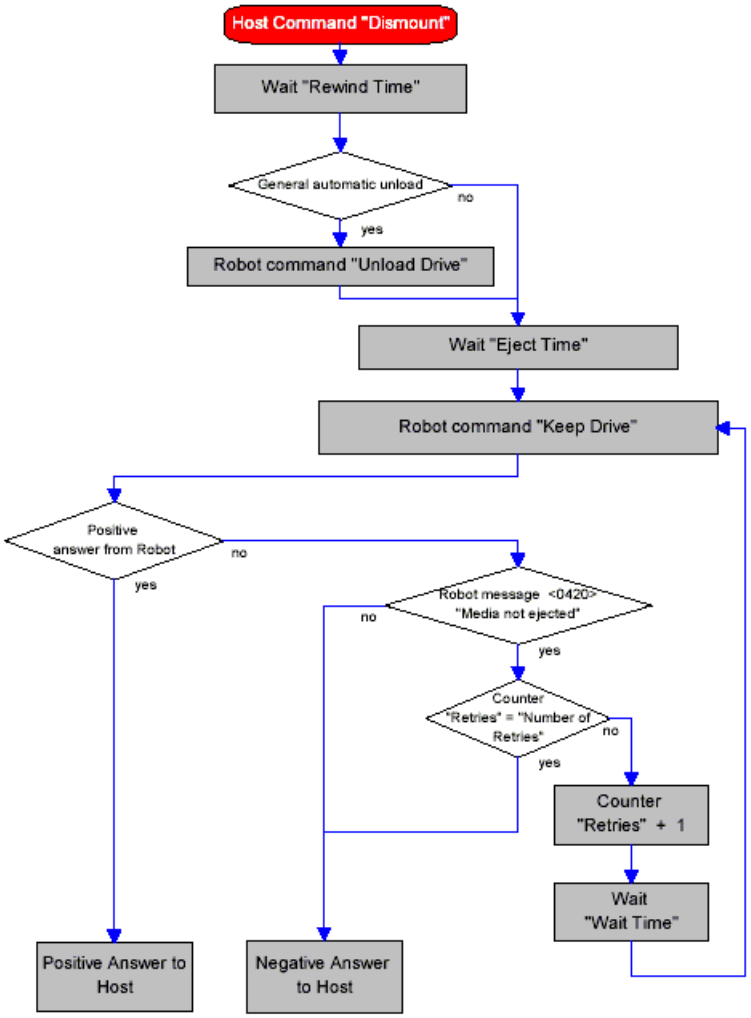
Range	Field	Explanation
	Name:	Name of component (D01, D02 …, DZZ).

Range	Field	Explanation
Description:	Description of the component in the log strings. For practical reasons, the drive address of the host should be entered here (for drives in a DAS environment max nine alphanumeric characters can be entered). See *DAS Administration Guide*.	
Type	Drive type (refer to *Drives* on page A-9).	
Media Type	Automatic assignment of media type to drive	
Teach coordinates for segment 1	Arrangement	Arrangement of drives in the system
	R01 (R02) X Y Z	Basic teach coordinate (for first teaching - New teach)
Unload Parameters	General automatic unload	Robot actuates the eject button (Get on drive) of the drive (Unload)
	Unload after cleaning	Robot actuates the eject button of the drive prior to every Keep of a cleaning medium (Unload)
	Rewind Time (sec)	Average time required from the command to eject the medium from the drive until the medium is actually ready to unload.
	Eject Time (sec)	Time required to eject medium.
Dismount Management	Dismount Management	Problem handling if irregularities with the drive occur (wait and repeat the Keep command)
	Automatic Dismount	not used
	Wait Time (sec)	Time between two attempts at unloading the medium from the drive
	Number of Retries	Maximum number of attempts to unload the medium from the drive. If the last attempt ends negatively, also, the command will be acknowledged negatively.
Clean Management	Automatic Cleaning	Drive cleaning is controlled by the AMU. After each clean command the AMU generate a KEEP of the cleaning cartridge. (Cyclic or DCI controlled)
	Number of Cycles	Number of Mount commands after automatic start of a cleaning mount. Request this value from your drive manufacturer. For DLT-Low Profile must the value "0" for DCI controlled cleaning
	Clean Time (sec)	Average time during which cleaning medium will remain in the drive.
	Clean Pool	Name of clean pool from which media are extracted for drive cleaning.
Drive's serial number	Field "Drive's serial number" is available for reading/changing and it can be used to assign any sequence up to 50 characters.	
HW info	This button works only for DCI-connected drives and it opens the drive hardware information dialog box. The description of all available DCI drives follows.	

NOTE: If a large number of drives is involved, use the symbol "Container Drive" for drives connected to the same host and operated by the same robot. Refer to *Drive Folder (Drive Container)* on page 4-13.

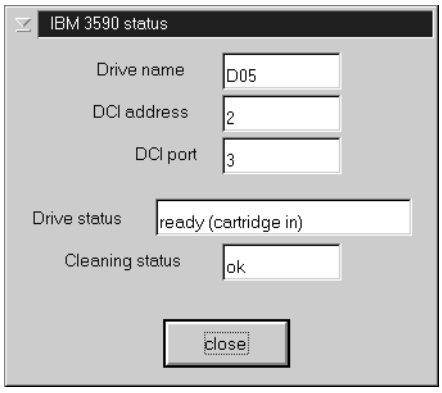
The following figure illustrates the function of the Dismount Manager and the effect of the individual parameters.

Figure 4-14 Dismount Manager Function Scheme



IBM 3590 drive parameters

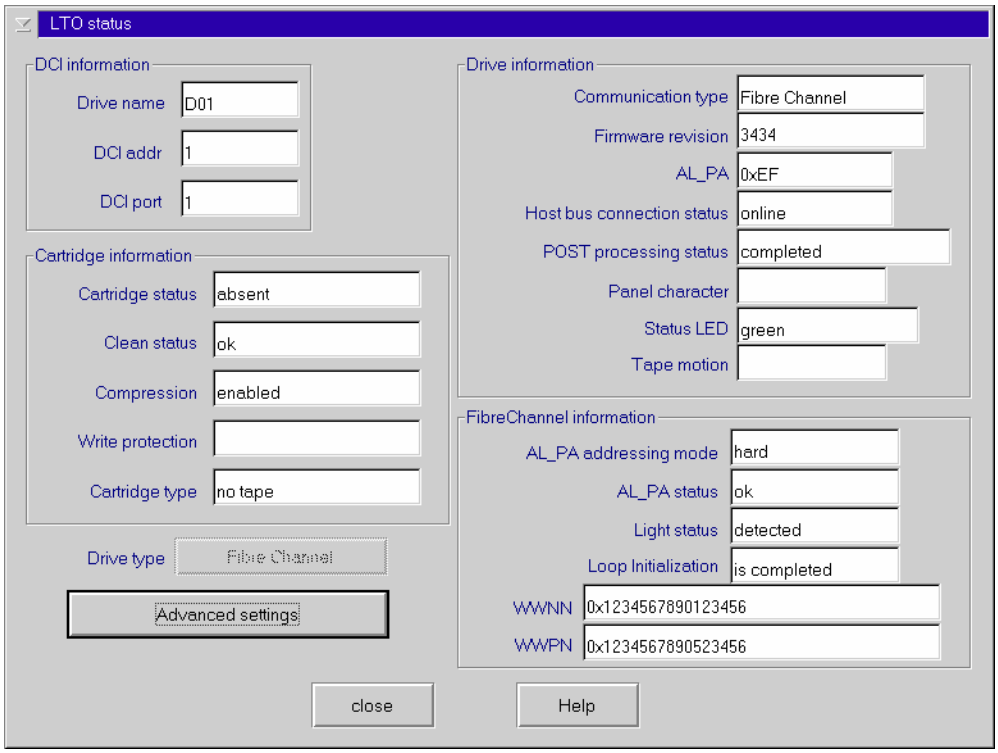
Figure 4-15 Window "IBM 3590 drive hardware information"



Field	Explanation
Drive name	The drive name, as known to AMU
DCI addr.	The DCI unit address
DCI port	The DCI unit communication port number
Drive status	The current drive status. Can be "ready", "cartridge in transit", "cartridge in feeder slot", "load error" etc.
Cleaning status	The drive cleaning status. Can be "ok" or "required"

IBM LTO drive parameters

Figure 4-16 Window "IBM LTO drive hardware information"

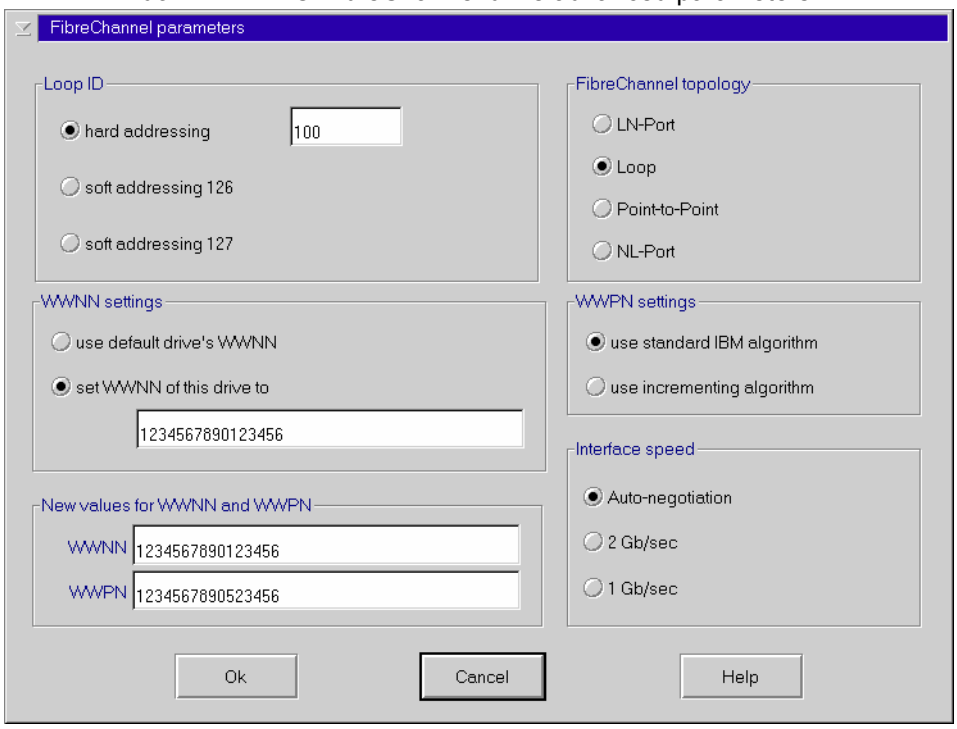


Field/Button	Explanation
Drive name	The drive's name, as known to AMU
DCI addr	The DCI unit address
Communication type	Drive host interface type. Can be "Fibre Channel" or "SCSI". This field also can contain the value "DCI is not operational" or "The drive is powered off" under corresponding conditions.
Firmware revision	This field shows the firmware revision of the tape drive
SCSI ID	The SCSI address of the drive (for IBM LTO SCSI drives only). The possible values range from 0 till 15.
AL_PA	Arbitrated Loop Physical Address (for IBM LTO Fibre Channel drives only). The value will be shown in hexadecimal representation (with prefix 0x).
Host bus connection srarus	This field shows the status of the connection to the host bus. The possible values include "online" and "offline."

Field/Button	Explanation
Port processing status	This field shows the POST (Power-On Self Test) status. The available values include "completed" and "POST is in progress."
Panel character	Displays the panel character on the front of the drive.
Status LED	Displays the status LED state
Tape motion	This field shows the tape's motion. The possible values include: • reading • writing • erasing • locating
FibreChannel information	This block will be active only if a Fibre Channel IBM LTO drive is connected.
AL_PA addressing mode	Show AL_PA mode. The possible values include "hard" (AL_PA was selected by the drive) or "soft" (AL_PA was selected by host). When FC communication is in Point-to-Point mode, this field will show "soft."
AL_PA status	This field shows the status of AL_PA. The possible values include "ok" and "conflict". The "conflict" status means there are 2 identical AL_PA on the loop, therefore proper communicate is not possible.
Light status	This field shows the status of the light from the Fibre Channel connector. The possible values include "detected" and "no light".
Loop initialization	This field shows the status of the Fibre Channel loop initialization. The possible values include "is completed" and "is not completed."
WWNN	This field shows the information about World Wide Node Name. It is a 8-byte hexadecimal number, which uniquely identifies a node in the Fibre Channel environment.
WWPN	This field shows the information about World Wide Port Name.
Cartridge status	Shows the cartridge status. It can be shown as "present", "absent", "LTO-CM position" and "E/L position" (eject/loadable position).
Clean status	Show the status of cleaning, requested by the drive. The possible values include "ok" (the drive doesn't need a cleaning) and "requested" (the drive needs a cleaning).
Compression	Shows the status of data compression. The possible values include "enabled" and "disabled."
Write protection	Shows whether this cartridge is write-protected. The possible values include "read/write" and "read/only."
Cartridge type	Show sthe type of the loaded cartridge. The possible values include "LTO Generation 1", "Cleaner", "FMR", and "invalid."
Drive type	This button is enabled only if AMU cannot determine the actual drive type (drive is switched off or is not connected). By using this button, you can override the drive's type. You may need it because the "Advanced settings" button opens two different dialogs depending on drive type (Fibre Channel / SCSI).
Advanced settings	This button opens the dialog box "Advanced settings", where you can set the parameters of an operational drive. Refer to *Advanced SCSI Parameters* on page 4-21 and *Advanced FibreChannel Parameters* on page 4-20.

Advanced FibreChannel Parameters

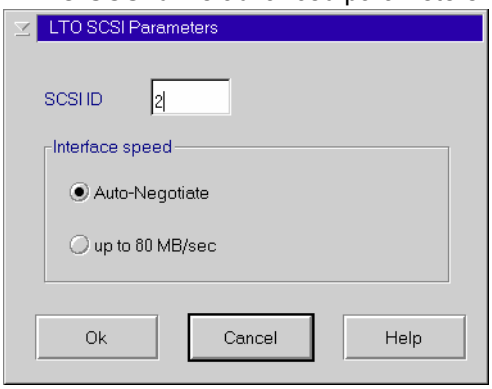
Figure 4-17 Window "IBM LTO FibreChannel drive advanced parameters"



Field/Button	Explanation
Loop ID	This group allows you to set a Loop ID for Fibre Channel loop. It has 3 modes - hard addressing (Loop ID from 0 to 125) and two soft modes (Loop ID 126 and 127). Use soft mode only when host settings explicitly require it.
WWNN settings	This group allows you to set a drive's WWNN. You can use drive default WWNN or set it to some given value. Note that actual WWNN and WWPN also depends from "WWPN settings" group.
FibreChannel Topology	You can use this group to override a topoly selection algorithm. The available options include "LN-Port" (try Loop first, then PtoP), "Loop", "Point-to-Point" and "NL-Port" (try first PtoP then Loop). The first option (LN-Port) is preferred.
WWPN settings	This group allows you to select a WWPN (World Wide Port Name) generation algorithm). There are 2 options available, IBM standard and incrementing algorithms, see online help for more information.
Interface speed	This group allows you to override a speed selection on Fibre Channel cable. Use "Auto-negotiation."
New values for WWNN and WWPN	These fields show the new values for WWNN and WWPN. They are calculated from WWNN initial value (see group WWNN settings) and WWPN algorithm.

Advanced SCSI Parameters

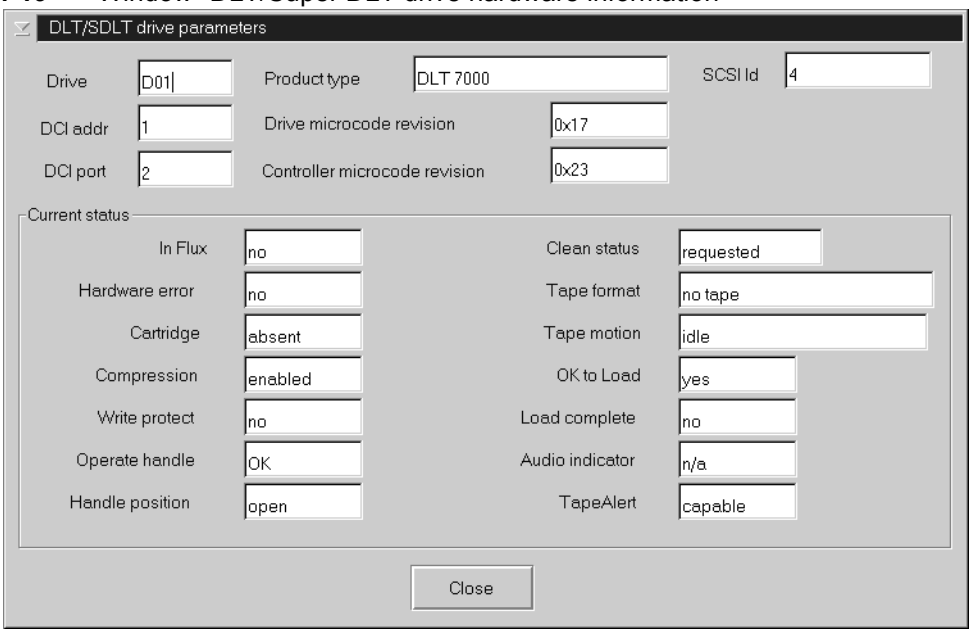
Figure 4-18 Window "IBM LTO SCSI drive advanced parameters"



Field/Button	Explanation
SCSI ID	This field allows you to set a SCSI ID of the drive. Note that SCSI ID can also e set by jumpers on the drive and the jumper settings take a priority.
Interface speed	This group allows you to reduce the maximum speed on SCSI bus. The available choices are "Auto-Negotiation" and "up to 80MB/sec."

DLT/SDLT drive parameters

Figure 4-19 Window "DLT/Super DLT drive hardware information"

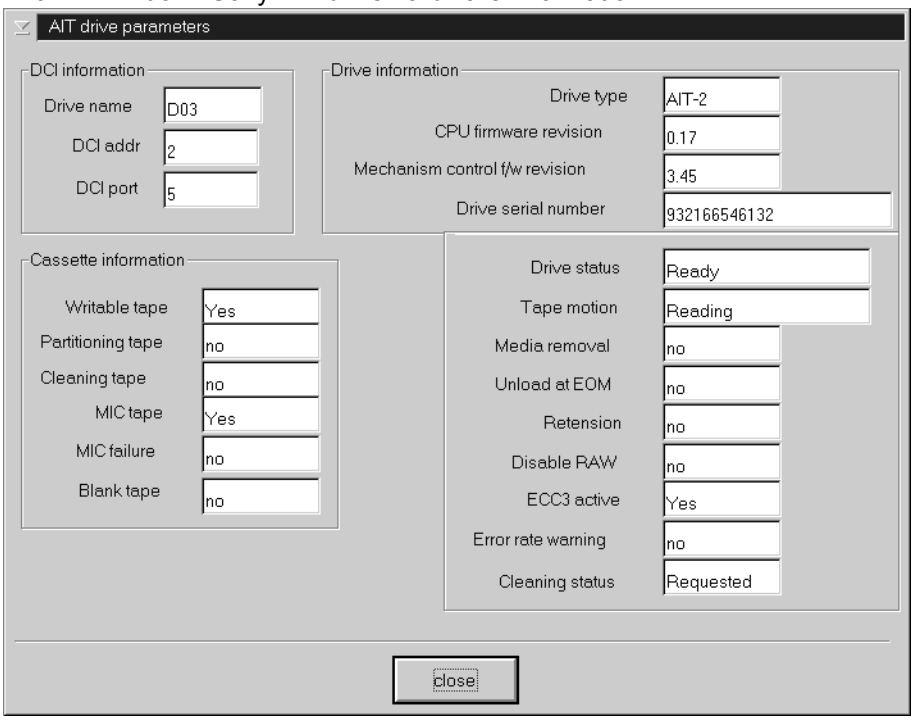


Field	Explanation
Drive	The drive's name, as known to AMU
DCI addr.	The DCI unit address
DCI port	The DCI unit communication port number

Field	Explanation
Product type	For DLT drivers the following values are available: • DLT 4000 • DLT 7000 • DLT 8000 For Super DLT drives the following values are available: • SDLT 220 • SDLT 320
Drive microcode revision	The drive microcode revision, as it is reported by drive
Controller microcode revision	The controller microcode revision, as it is reported by drive
SCSI ID	The SCSI address of drive (possible values are from 0 till 15). This field can also show "not set" under the corresponding condition.
In Flux	Yes/no. When 'Yes', this shows that drive now is under changing conditions and reported status is not accurate
Hardware error	Yes/no. “Yes” shows the occurrence of hardware error
Cartridge	The cartridge status. Available values are "present" and "absent."
Compression	The compression status of drive. Available values are "enabled" and "disabled."
Write protect	The write protection status of drive. Can be "yes" or "no."
Operate handle	Has actual meaning only for DLT drives that can operate with the drive handle. The possible values are "OK" and "no"
Handle position	Has actual meaning only for DLT drives. It shows the current handle position. Can be "open" or "closed."
Clean status	It shows the clean request from the drive. This value can be blank (no pending clean request from the drive), the other values are: REQUESTED — the drive requests cleaning REQUIRED — the drive requires cleaning immediately EXPIRED — the inserted clean cartridge is expired and cannot be used for cleaning purposes
Tape format	This field shows the actual tape format
Tape motion	This field shows the current tape motion. The available values include "idle", "rewinding", "reading" etc.
OK to Load	This field has actual meaning only for DLT 7000 and above (and also for SuperDLT drives). Can be "yes", "no", or "n/a."
Load complete	It shows when the actual cartridge loading operation has been completed. The application can work with tape only when this field shows “yes.”
Audio indicator	This field is meaningful only for the DLT 7000 drive. It shows the status of the audio indicator of the drive
TapeAlert	This field shows whether the drive is able to provide TapeAlert data. Possible values are "capable" and "no."

Sony AIT Drive Parameters

Figure 4-20 Window "Sony AIT drive hardware information"

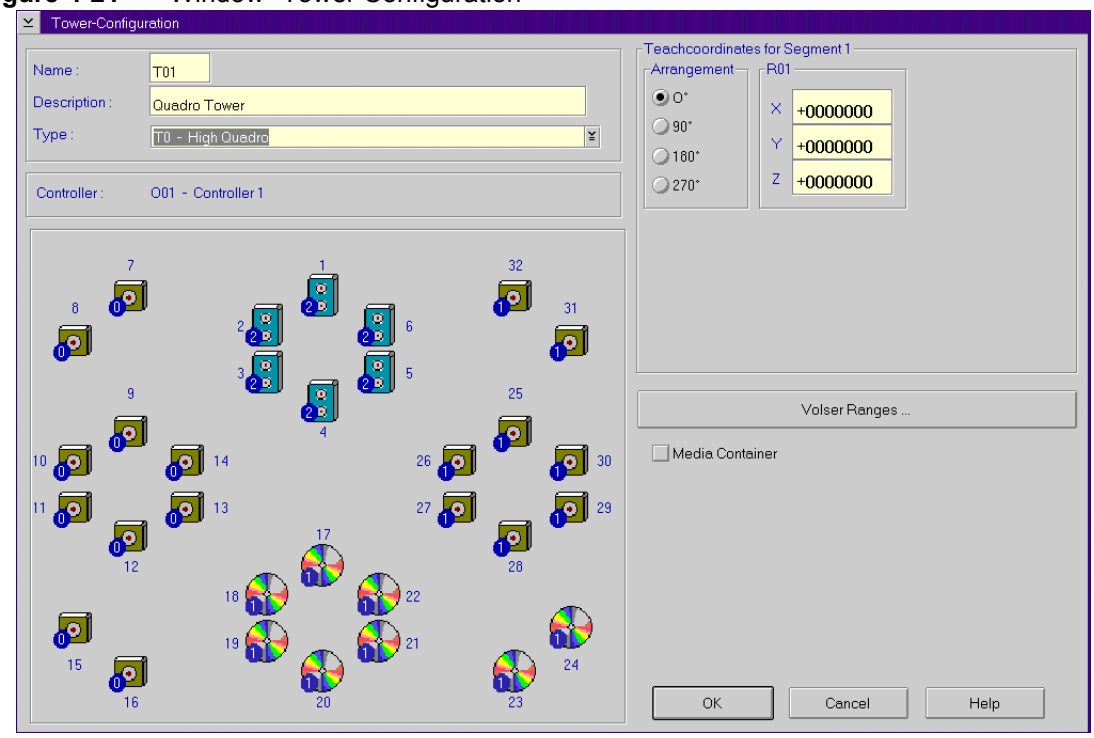


Field	Explanation
Drive	The drive's name, as known to AMU
DCI addr.	The DCI unit address
DCI port	The DCI unit communication port number
Product type	The drive type. Possible values are "AIT-1", "AIT-2" or "AIT-3"
CPU firmware revision	The drive's CPU firmware revision
Mechanism control firmware revision	The firmware revision of mechanism control.
Drive serial number	The serial number as reported by drive
Drive status	The current drive status. Can be "Ready" (cartridge loaded), "No tape", "Loading", "Hardware error" etc.
Tape motion	The current tape motion. Can be "idle", "writing", "loading" etc.
Media removal	The corresponding media status (yes/no)
Unload at EOM	The corresponding drive status (yes/no)
Retension	The corresponding media status (yes/no)
Disable RAW	The corresponding drive status (yes/no)
ECC3 active	The status of ECC3 error detection code
Error rate warning	The status of error rate
Cleaning status	The clean status of drive. Can be "Normal", "Requested", or "Exhausted."
Writable tape	The ability to write on this tape
Partitioning tape	The partitioning tape status
Cleaning tape	"Yes" when cleaning tape is present

Field	Explanation
MIC tape	Shows whether this tape has a MIC (memory in cassette)
MIC failure	Shows failure of MIC
Blank tape	The blank tape status

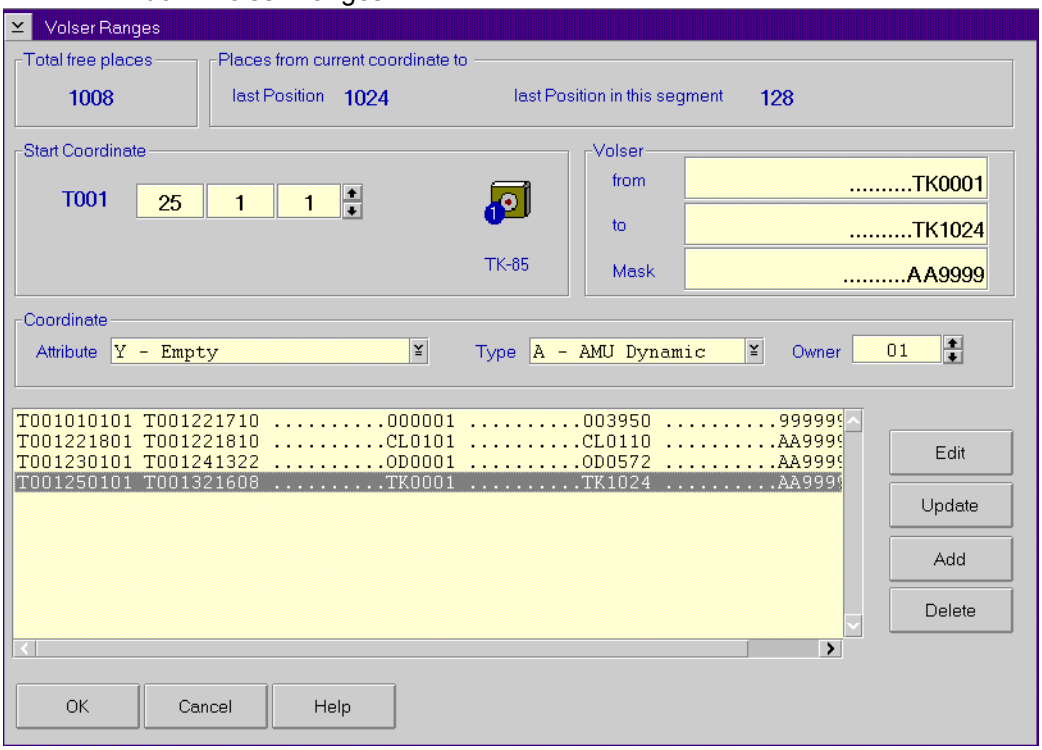
Storage Tower

Figure 4-21 Window "Tower Configuration"



Field	Explanation
Name	Name and running number of the storage component (e.g. T01, T02...)
Description	Description of the component in the log strings.
Type	Component Type (refer to *Storage Units* on page A-12).
Controller	Connection to controller.
Arrangement	Arrangement of towers in the robot archive.
Volser Ranges	Calls up configuration window for numbering ranges. See Figure 4-22.
Teach coordinate R01/R02	Position of the bottom left teach label of robot 1 or robot 2 on twin systems.

Figure 4-22 Window "Volser Ranges"



If no Volser ranges defined, the AMU will set the coordinates with following defaults:

- Volser: `0000000000000000`
- Attribute: `empty`
- Type: `AMU-Dynamic`

Field	Explanation
Total free Places	Number of free compartments without Volser.
Start Coordinate	Start coordinate of a Volser range.
Volser ... from	First Volser of a Volser range.
Volser ... to	Last Volser of a Volser range.
Volser ... Mask	• 9 - automatic count in the Volser • A - symbol, no automatic count in the Volser
Coord. Attr.	Status of the medium • O-Occupied: compartment occupied • E-Ejected: medium has been ejected • Y-Empty: compartment empty • M-Mounted: medium mounted on drive • R-Reverse Side Mounted (for double sided storage media) • J-in Jukebox (IBM 3995 is being served)
Coord. Owner	Medium owner: indicates the robot or the robots which can access this medium.

Field	Explanation
Coord. Type	• S-Storage: archive compartment for hierarchically-defined Volser ranges or HACC-MVS management • N-Clean: Cleaning media compartment (define ranges only if Clean Manager is not used) • A-AMU Dynamic: home position for not hierarchically-arranged compartments and temporary compartments for transit (not on HACC/MVS)
Update	Update the marked Volser range.
Edit	Edit the marked Volser range.
Add	Create a new Volser range.
Delete	Delete the marked Volser range.

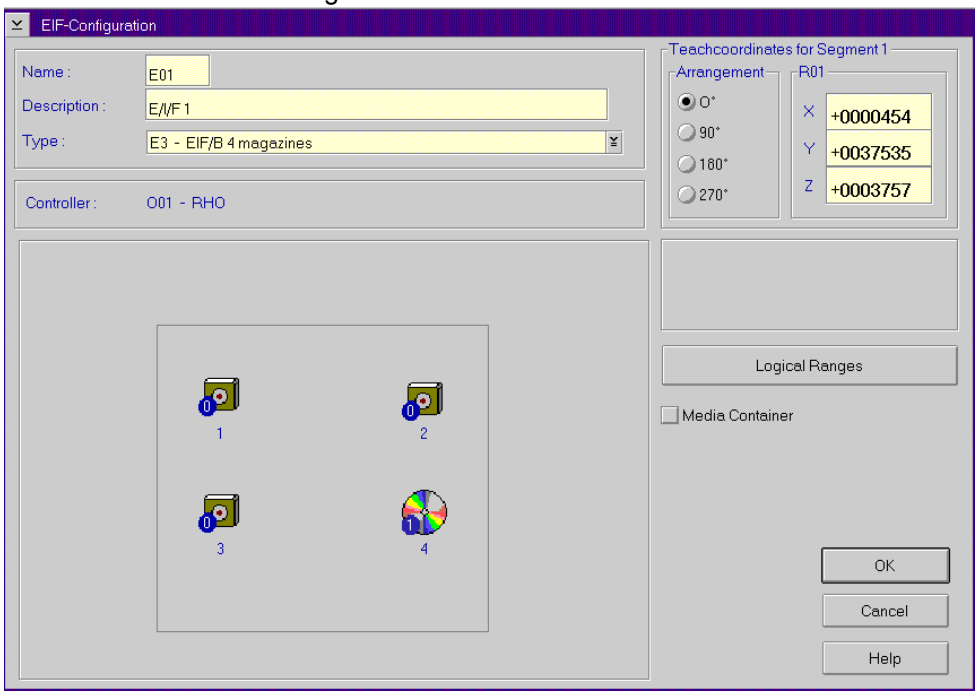
Example Volser Ranges

T001010101	T001061010	A00001	A01000	A99999	O 1 S
T001061101	T001311010	B00001	B04500	A99999	O 1 S
T001231101	T001321810	C00001	C00260	A99999	E 1 A

NOTE: If you operate with mixed configuration (storage and AMU dynamic) locate the dynamic range near the I/O unit, and if the system has a twin-robot, in an area that is not accessible to one of the robots.

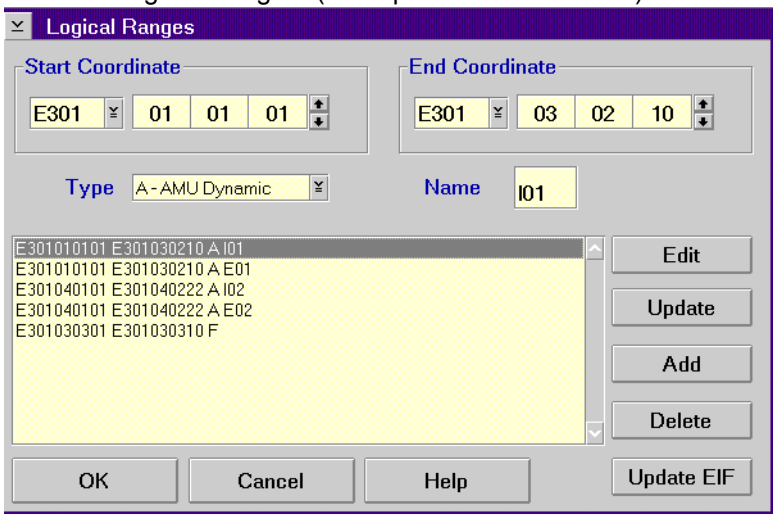
I/O Unit

Figure 4-23 Window "EIF-Configuration"



Field	Explanation
Name	Name of component (E01, E02 …).
Description	Description of the component in the log strings.
Type	Component type (refer to *I/O Unit* on page A-11).
Controller	Connected controller
Arrangement	Arrangement in the system.
Teach coordinate	Position of bottom left teach label on the top handling box (seen from inside).
Logical Ranges	Calls up the configuration window for the numbering ranges. See Figure 4-24.

Figure 4-24 Window "Logical-Ranges" (Example AML/E I/O unit/B)



Field	Explanation
Start Coordinate	Start coordinate of a Volser range.
End Coordinate	End coordinate of a Volser range.
Name	Abbreviated name for command call-up (only for AMU dynamic) Assign names for consecutive ranges. If a name is assigned twice, only the first range is addressed by the software.
Coord. Type	Type of compartment • F-Foreign: archive compartment for foreign media • A-AMU Dynamic: range for insert/eject
Update	Update the marked Volser range.
Edit	Edit the marked Volser range.
Add	Create a new Volser range.
Delete	Delete the marked Volser range.
Update EIF	Update the AMU database after change or saving of range assignment

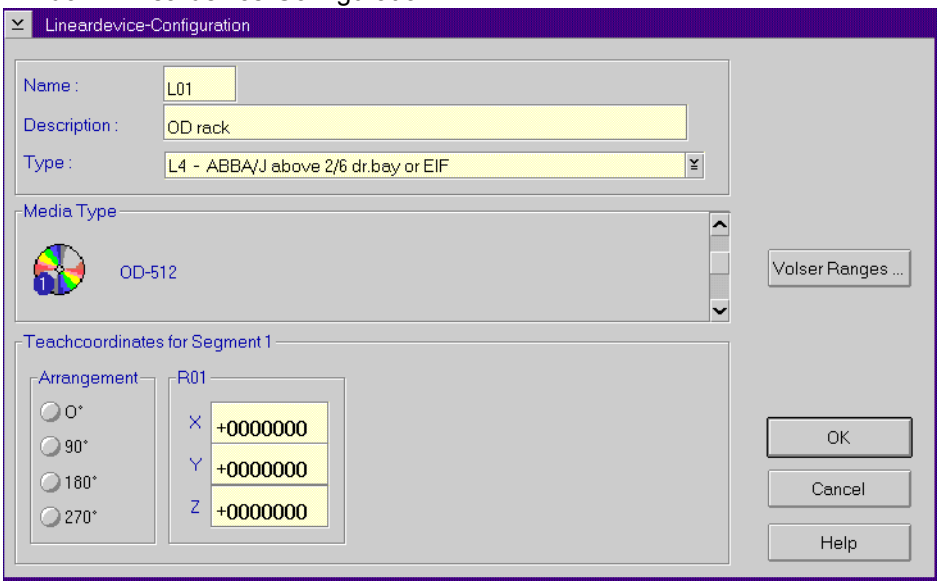
Host Software	Foreign I/O Unit	AMU-Dynamic I/O Unit
HACC/MVS	Compartments defined as foreign in the host software. The Volsers must be defined as *11001 - *22999.	Compartment for insert and eject, without using of logical ranges in the AMU.
HACC/VM ROBAR HACC/ GUARDIAN	Compartments to be used for foreign mount. The Volsers must be defined from *FR001 - *FR999.	Compartments for insert and eject: default names: • E01 (eject robot 1) • E02 (eject robot 2) • I01 (insert robot 1) • I02 (insert robot 2)
HACC/OS400		Compartments for dynamic use for insert and eject, overlapping is possible. Ixx (Insert), Exx (Eject). If the name E01 and I01 is used, this range is automatically used as standard insert and eject area by ROBAR, HACC/VM etc.
DAS 1.3	Compartments to be used by DAS for foreign mount. The Volsers are automatically assigned according to coordinates, e.g. as *E101030301	

Example Logical Ranges (without host database, e.g. ROBAR and HACC/VM)

E001010101	E001061010	A	I01
E001061101	E001311010	A	E01
E001231101	E001321810	F	

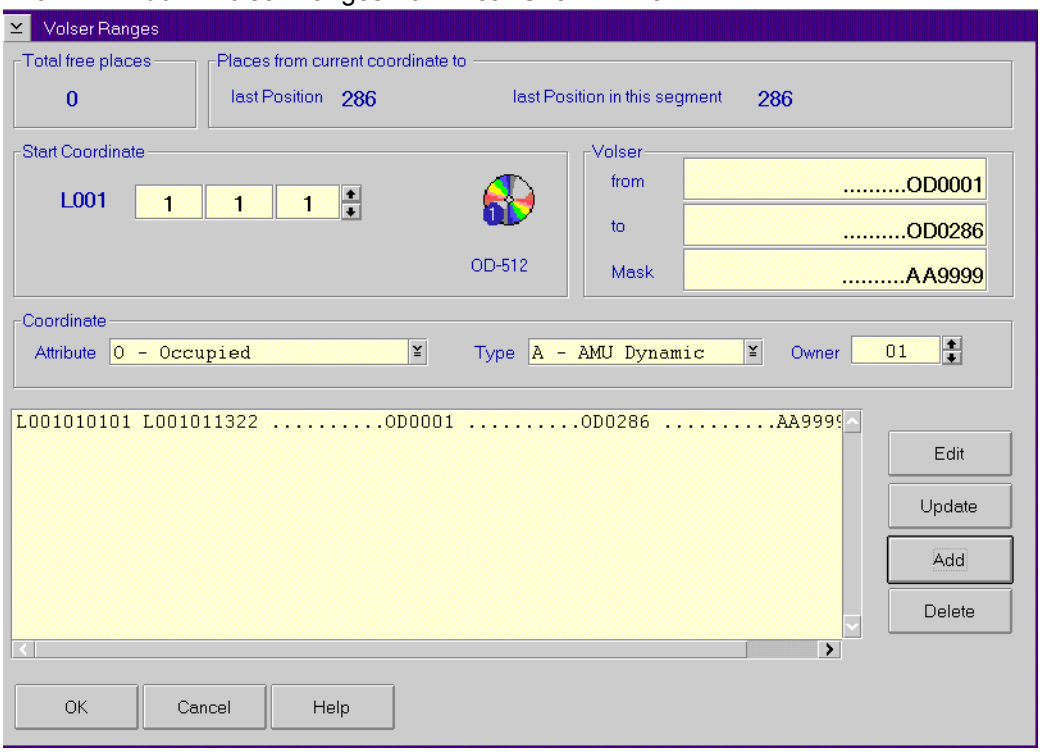
Linear shelf

Figure 4-25 Window "Lineardevice-Configuration"



Field	Explanation
Name:	Name of storage component with running number (e.g. T01, L02...)
Type:	Component type: (refer to *Storage Units* on page A-12).
Controller:	Connection to controller.
Description:	Description of the component in the log strings.
Arrangement	Arrangement in the system.
Volser Ranges	Call up configuration window for numbering ranges. See Figure 4-26 on page 4-29.
Arrangement	Arrangement of the systems in the robot archive.
Teach coordinate R01	Position of bottom left teach label.

Figure 4-26 Window "Volser Ranges" for Linear Shelf AML/J



If no Volser ranges defined, the AMU will set the coordinates with following defaults:

- Volser: `0000000000000000`
- Attribute: `empty`
- Type: `AMU-Dynamic`

Field	Explanation
Total free Places	Number of free compartments without Volser.
Start Coordinate	Start coordinate of a Volser range.
Volser ... from	First Volser of a Volser range.
Volser ... to	Last Volser of a Volser range.
Volser ... Mask	• 9 - automatic count in the Volser • A - symbol, no automatic count in the Volser

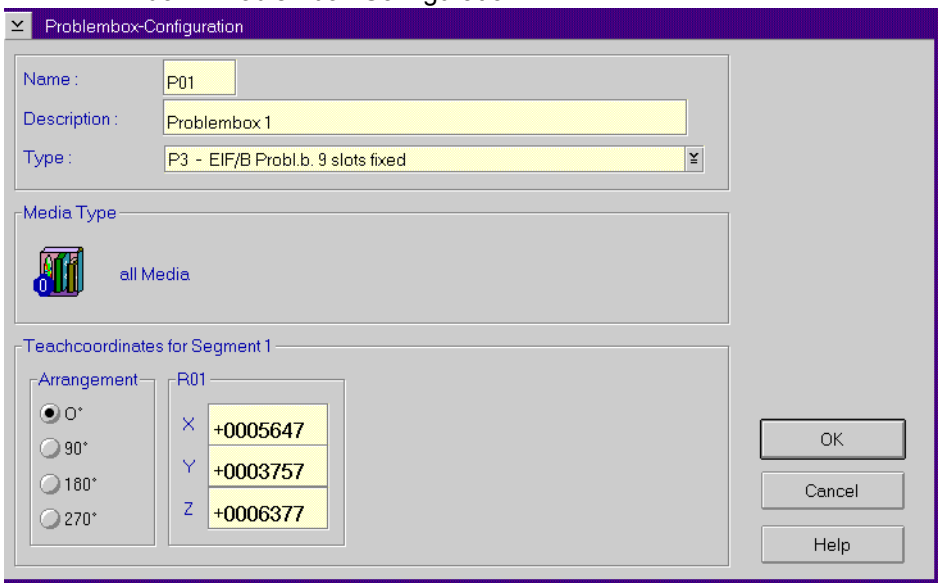
Field	Explanation
Coord. Attr.	Status of the medium • O-Occupied: compartment occupied • E-Ejected: medium has been ejected • Y-Empty: compartment empty • M-Mounted: medium mounted on drive • R-Reverse Side Mounted (for double sided storage media) • J-in Jukebox (IBM 3995 is being served)
Coord. Owner	Medium owner: the robot that can access this medium.
Coord. Type	Type of compartment • S-Storage: archive compartment for hierarchically defined VolserVolser ranges or HACC-MVS management • N-Clean: cleaning medium compartment • R-Scratch range for free (scratch) media (not on HACC/MVS) • A-AMU Dynamic: home position for not hierarchically arranged compartments and temporary compartments for transit (not on HACC/MVS)
Update	Update the marked Volser range.
Edit	Edit the marked Volser range.
Add	Create a new Volser range.
Delete	Delete the marked Volser range.

Example Volser Ranges

T001010101	T001061010	A00001	A01000	A99999	O 1 S

Problem box

Figure 4-27 Window "Problembox Configuration"



Field	Explanation
Name:	Name of component: (P01, P02)
Description:	Description of the component in the log strings.
Type:	Component type (refer to *I/O Unit* on page A-11).
Arrangement	Arrangement in the system.
Teach coordinate	Position of the left teach label on the problem box.

Configuration Window for AMU Communication

This section describes the configuration windows for AMU communication.

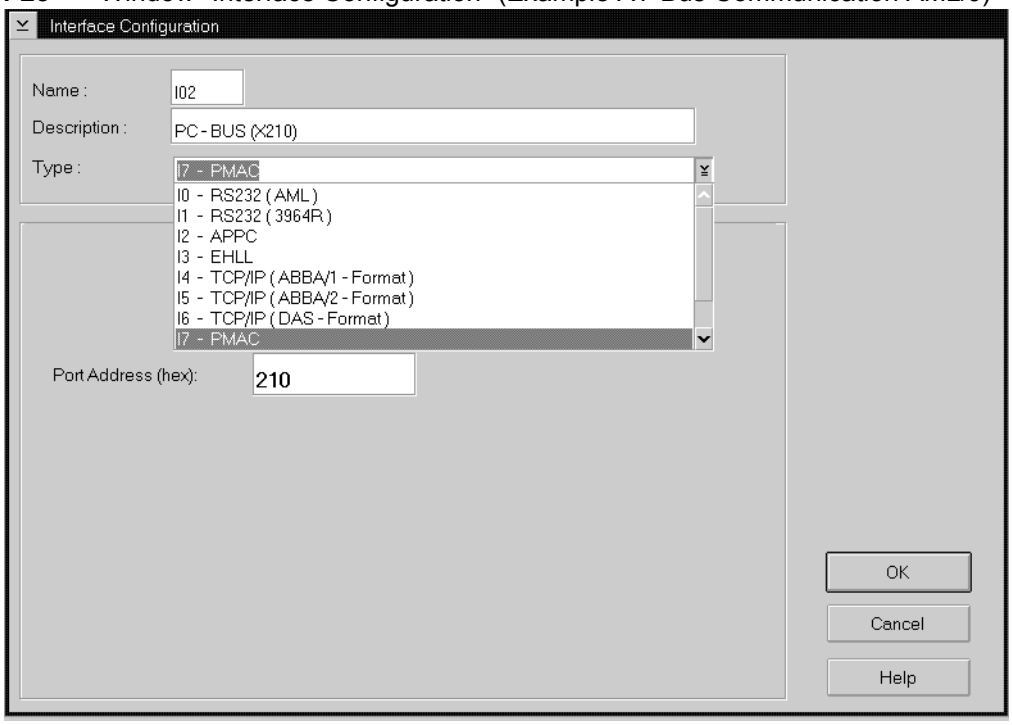
Interface Configuration

NOTE: The communication adjustments in the AMU software must agree with the adjustments in the communication software of AMU and host.

On the black connecting lines to AMU you can see communication icons.

1. Open the icon with a double click. The window Interface Configuration opens.
2. In the Type field select the type of communication.

Figure 4-28 Window "Interface Configuration" (Example AT-Bus Communication AML/J)



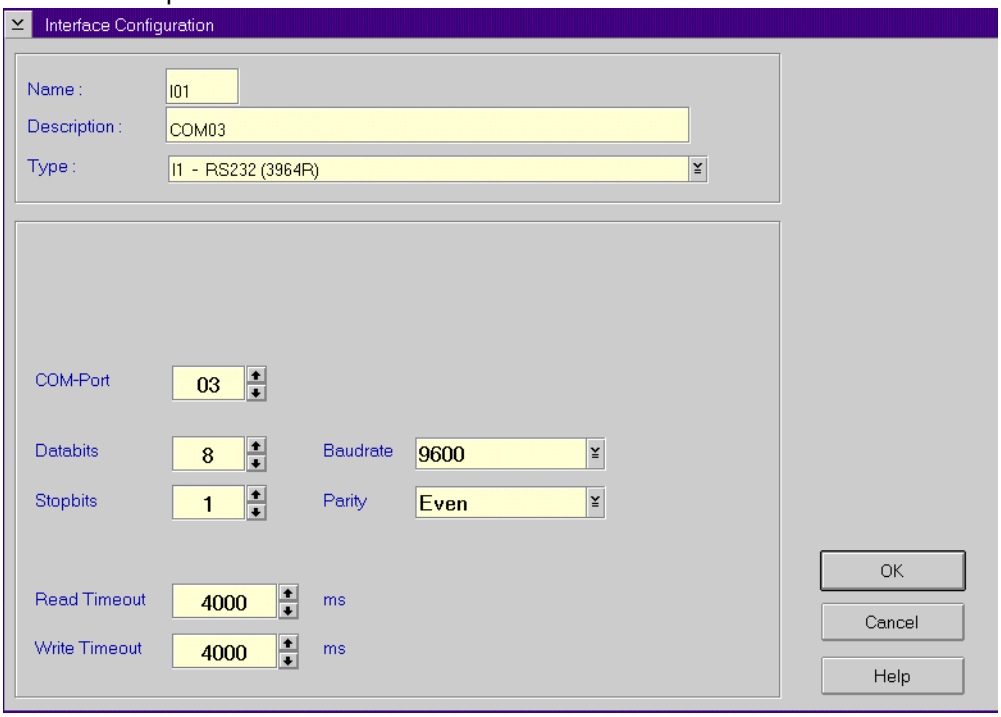
Interface Types

Icon	Type	Description	Hardware	Standard Applications
	I0	RS 232 (AML)	RS 232C	ROBAR, HACC Guardian, DUAL-AMU (for compatibility, please prefer TCP/IP)
	I1	RS232 (3964R)	RS 232C	robot control rho, I/O unit/A
	I2	APPC (LU6.2)	Token Ring; ISDN, Ethernet, FDDI, SDLC	HACC/MVS, HACC/OS400
	I4	TCP/IP (ABBA/1 format)	Ethernet, Token Ring, ISDN, FDDI	ROBAR (as of version 2.6), TwinATL
	I5	TCP/IP (AML/2 format)		AMASS, VolServ, DUAL-AMU
	I6	TCP/IP (DAS format)		DAS Unix and DAS/2, LMS (M&T Consults)
	I7	PMAC Internal	AT bus	PMAC board (AML/J)
	I8	RS232 Scanner	RS 232C	AML/J barcode scanner
	I9	RS232 Interface (SOTEC Multiport)	RS 232C	
	IB	Serial PMAC		works only with AML/J version 4.11
	ID	CAN-Bus	CAN-Controller Adapter + DCI	AML with DLT-Low Profile drives

RS232 Interface

(I0 - RS232 (AML) Protocol + I1 - RS232 (3964R) Protocol)

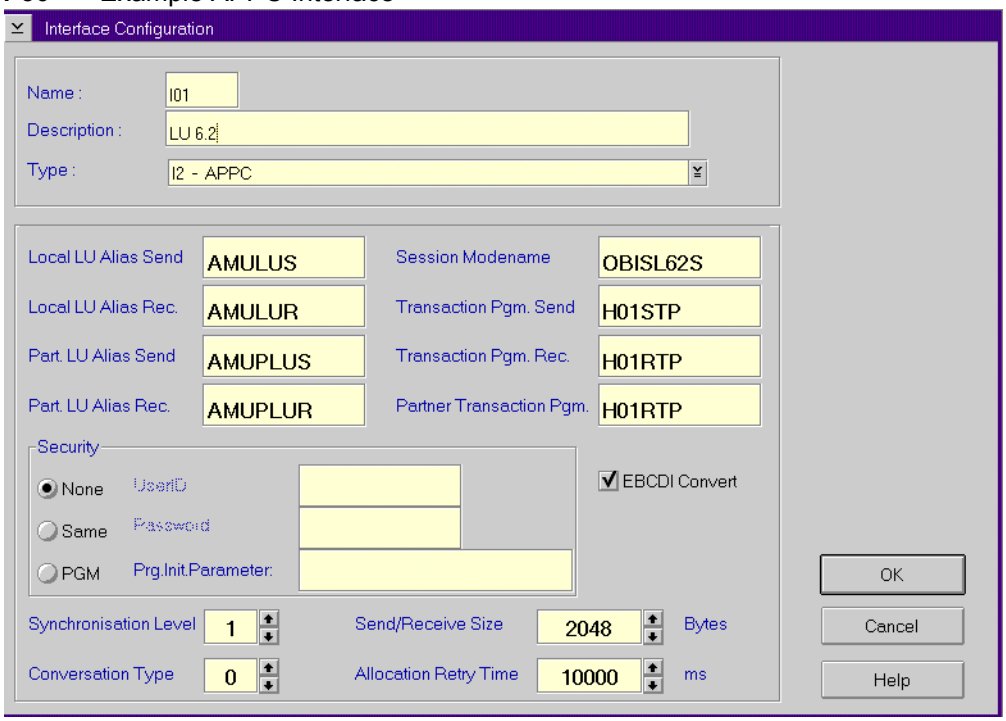
Figure 4-29 Example RS232 Interface



Field	Explanation	
Interface Type	AML	Siemens 3964R
	• AMU - Host computer • AMU - AMU	• AMU - rho • AMU - I/O unit/A
Name	Automatically generated name of internal connection (I01, I02 …).	
Description	Free comment (e.g. name of the interface "COM 02")	
COM-Port	Hardware interface; COM port (e.g. 02)	
Databits	Length of data byte: 8 Bit	
Stopbits	2 stop bits	1 stop bit
Parity	None (no parity bit)	Even (even parity bit)
Baudrate	Baudrate: 09600 (for communication with rho, 19200 are also possible but not recommended)	
Read Timeout	4000 ms	do not change
Write Timeout	4000 ms	do not change

I2 APPC (LU 6.2)

Figure 4-30 Example APPC Interface



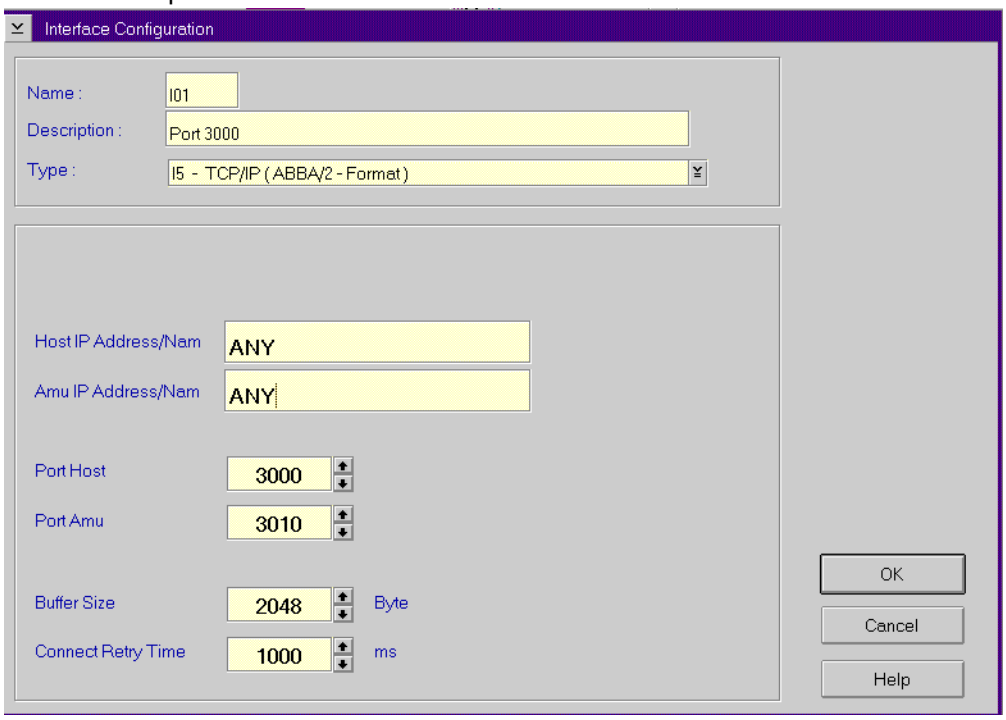
Field	Explanation
Name	Automatically generated name of internal connection (I01, I02 …).
Description	Free comment **The adjustment of the following parameters "Alias names" in the AMU software must agree with the adjustments in the Communications Manager.**
Local LU Alias Send	Alias (reference name) for the local Logical Unit (LU of AMU) for sending. Defaults: • Single Session: AMULUS • Parallel Session: AMULU
Local LU Alias Rec.	Alias (reference name) for the local Logical Unit (LU of AMU) for receiving. Defaults: • Single Session: AMULUR • Parallel Session: AMULU
Part. LU Alias Send	Alias (reference name) for the partner Logical Unit (LU of HOSTs or partner AMU) for sending. Defaults: • Single Session: AMUPLUS • Parallel Session: AMUPLU

Field	Explanation
Part. LU Alias Rec.	Alias (reference name) for the partner Logical Unit (LU of HOSTs or partner AMU) for receiving. Defaults: • Single Session: AMUPLUR • Parallel Session: AMUPLU
Session Modename	**Configure the mode name to be the same as in the Communications Manager. Be sure to observe correct upper case/lower case spelling.** Log mode in host software VTAM and HACC (description of the session characteristics). Defaults: • Single Session: OBISL62S • Parallel Session: OBISL62P
Transaction Pgm. Send	Define verbs and parameters at the protocol interface to LU 6.2 for sending (refer to IBM documentation APPN). Default: H01STP
Transaction Pgm. Recv.	Define verbs and parameters at the protocol interface to LU 6.2 for receiving (refer to IBM documentation APPN). Default: H01RTP
Partner Transaction Pgm.	Define verbs and parameters at the protocol interface to LU 6.2 of partner LU (refer to IBM documentation APPN).Default: H01RTP
Security	Security parameters are not changed. **This parameter is used only on HACC/OS400.**
Same	During setup of the conversation (connection between two transaction programs TPs) user ID and password are checked.
PGM	Parameters for the transaction program are transferred from the Attach Manager to the transaction program.
UserID	Name of the user authorized to start the conversation.
Password	Password of the user authorized to start the conversation.
Prg Init. Parameter	Start parameters for the transaction programs, which are transferred from the Attach Manager to the transaction program of the partner.
EBCDI Convert	Convert data from ASCII into EBCDI format and back. Must be switched off for AMU <=> AMU connection via APPC.
Send/Receive Size	Size of the internal buffer for sending and receiving Default: 2048 bytes
Conversation Type	Type of conversation (refer to IBM documentation APPN). • 0: Basic Conversation - for HACC/MVS • 1: Mapped Conversation - for HACC/OS400
Synchronization Level	Conversation with confirmation (refer to IBM documentation APPN). • 0: none • 1: confirm (default)
Allocation Retry Time	Interval for new "ALLOCATE” trial (setup of connection). Default: 10000 ms

TCP/IP Connections

(I4, I5, I6)

Figure 4-31 Example TCP/IP Interface



Field	Explanation
Name	Automatically generated name of internal connection (I01, I02 …).
Description	Free comment
Type	• I4-TCP/IP (ABBA/1-Format) - Command protocol ”ABBA/1” (66 or 80 bytes string length) for communication with host software e.g. HACC/MVS and HACC/VM via Ethernet. • I5-TCP/IP (AML/2-Format) - Command protocol ”AML/2” (variable string length with fixed protocol head length and variable data field) for communication with host software. • I6-TCP/IP (DAS format) - Command protocol as for "AML/2”, but with additional acknowledgement after each telegram for communication with LMS software.
Internet Address Host	• Address in format 123.123.123.123, OR • name of host (max. 64 characters) allowed to communicate with AMU, OR • ANY for any communication partner (the name must be contained in file C:\TCPIP\ETC\HOSTS or be available on a Domain Name Server (refer to TCP/IP documentation)
Internet Address AMU	Address or name of the AMU in the TCP/IP net (max. 64 characters) that is allowed to communicate with AMU, indicated in the format 123.123.123.123 (the name must be contained in file C:\TCPIP\ETC\HOSTS or be available on a Domain Name Server (refer to TCP/IP documentation)

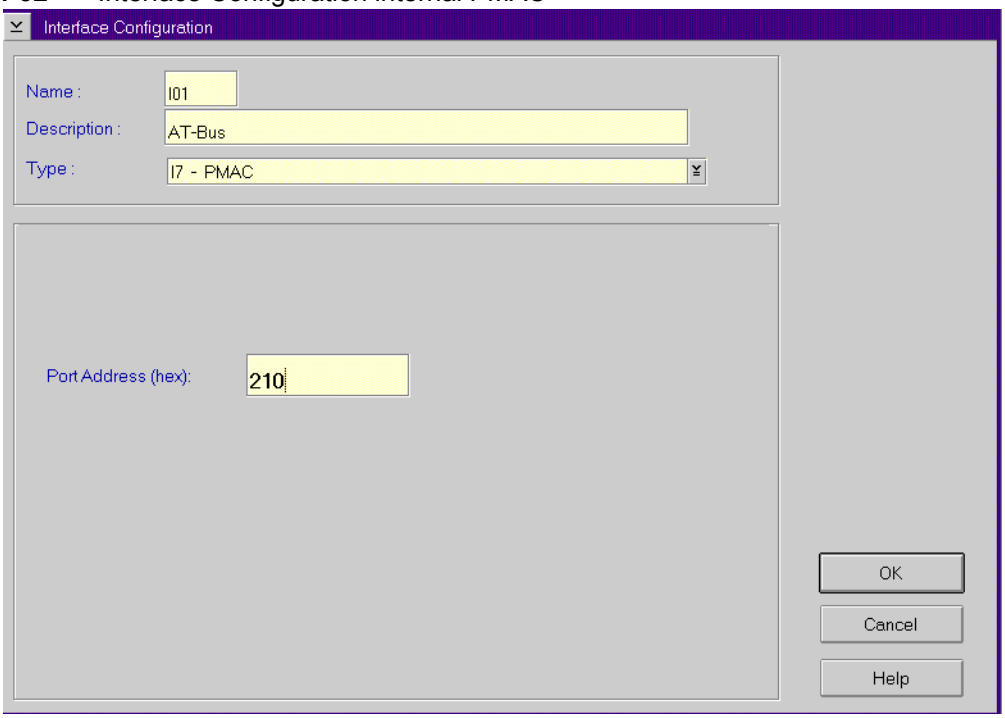
Field	Explanation
Port Host	Port at the AMU-PC by which the partner communicates with AMU
Port AMU	Port of AMU (for internal communication). Change this port only if the port is occupied by other software.
Buffer Size	Size of receive buffer storage (for standard applications the default adjustment of 2048 bytes is sufficient).
Connect Retry	Parameter for recovering internal communication.

NOTE: The parameter Internet Address AMU must correspond to the value set in the TCP/IP software.

For AMU to AMU connections port numbers (Port HOST and Port AMU) can be the same.

I7 Internal PMAC Interface

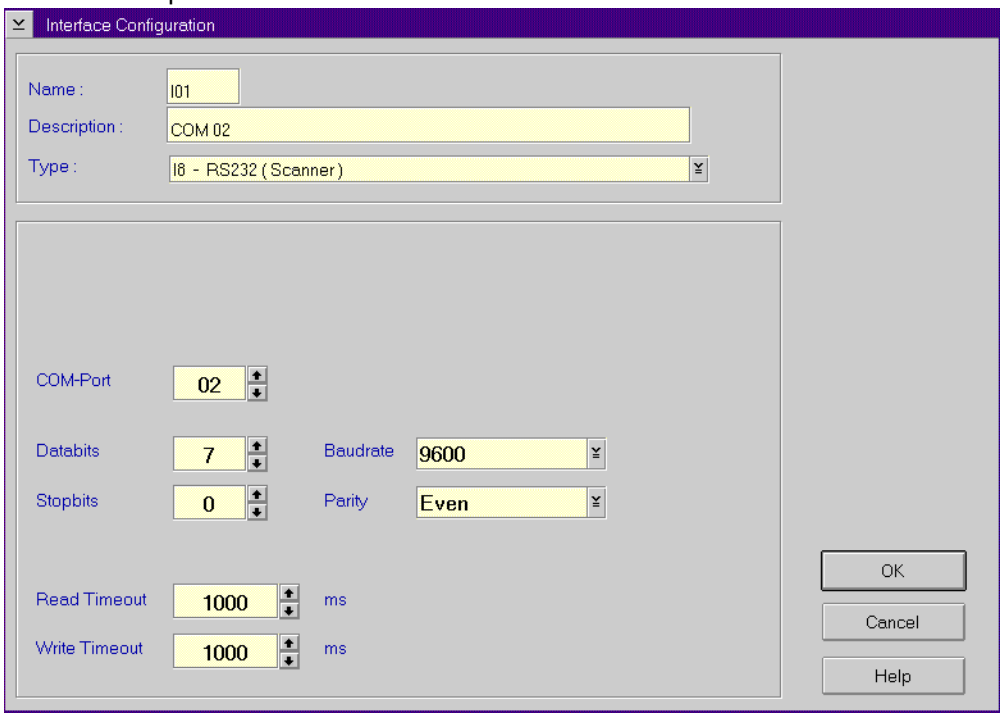
Figure 4-32 Interface Configuration internal PMAC



Field	Explanation
Name	Automatically generated name of internal connection (I01, I02 …).
Description	Free comment
Port Address (hex)	Address port set on the PMAC board with jumpers. Default: 210

I8 RS232 Scanner

Figure 4-33 Example RS 232 Interface

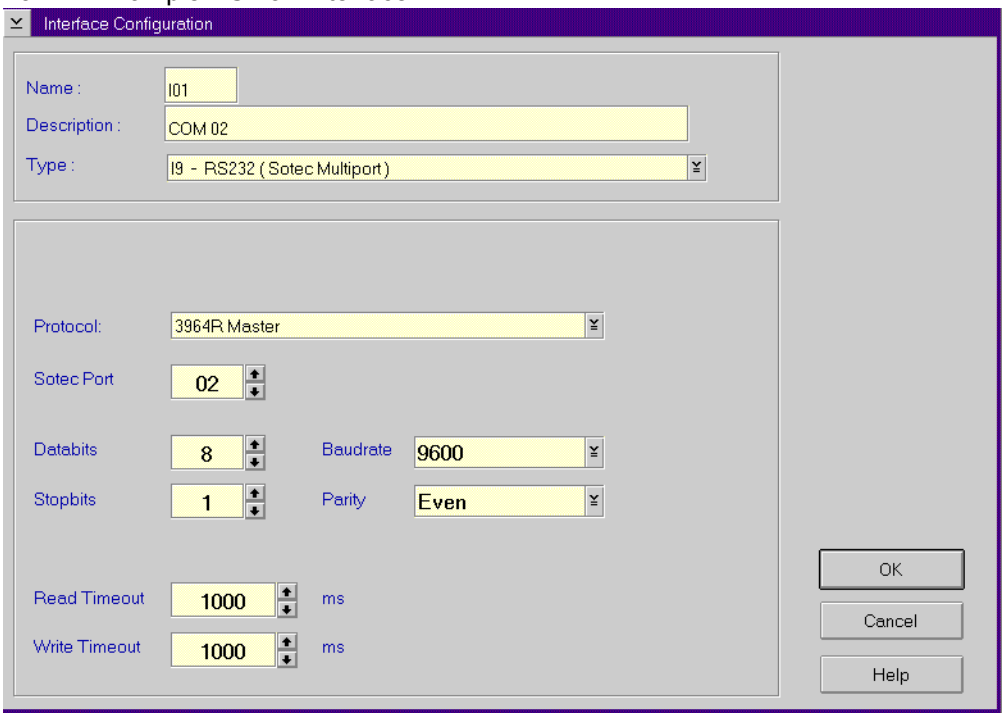


Field	Explanation
Name	Automatically generated name of internal connection (I01, I02 …).
Description	Free comment (e.g. name of the interface "COM 02")
COM-Port	Hardware interface; COM port (e.g. 02)
Databits	Length of data byte: 7 bits
Stopbits	0 stop bit
Parity	Even (even parity bit)
Baudrate	Baudrate: 09600
Read Timeout	1000 ms
Write Timeout	1000 ms

I9 RS232 Interface (SOTEC Multiport)

(RS232 (AML) Protocol + RS232 (3964R) Protocol)

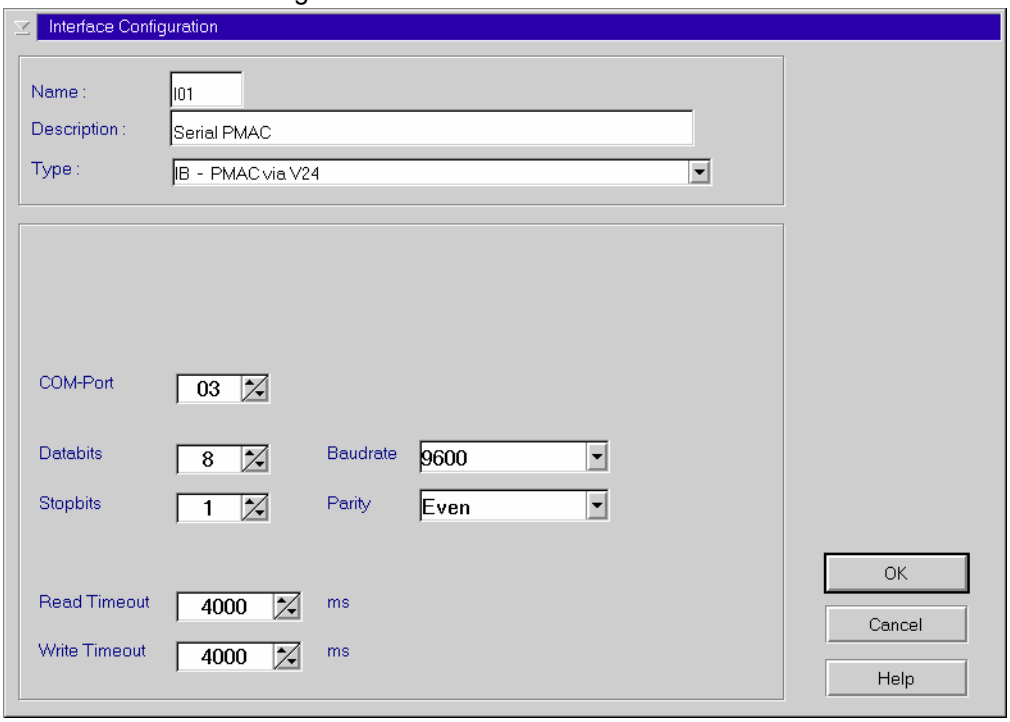
Figure 4-34 Example RS 232 Interface



Field	Explanation	
Name	Automatically generated name of internal connection (I01, I02 …).	
Description	Free comment (e.g. name of the interface "COM 02")	
Protocol	AML/2	3964R (Siemens)
Sotec-Port	Hardware interface; (e.g. 02)	
Databits	Length of data byte: 8 Bit	
Stopbits	2 stop bits	1 stop bit
Parity	None (no parity bit)	Even (even parity bit)
Baudrate	Baudrate: 09600	
Read Timeout	2000 ms	do not change
Write Timeout	1000 ms	do not change

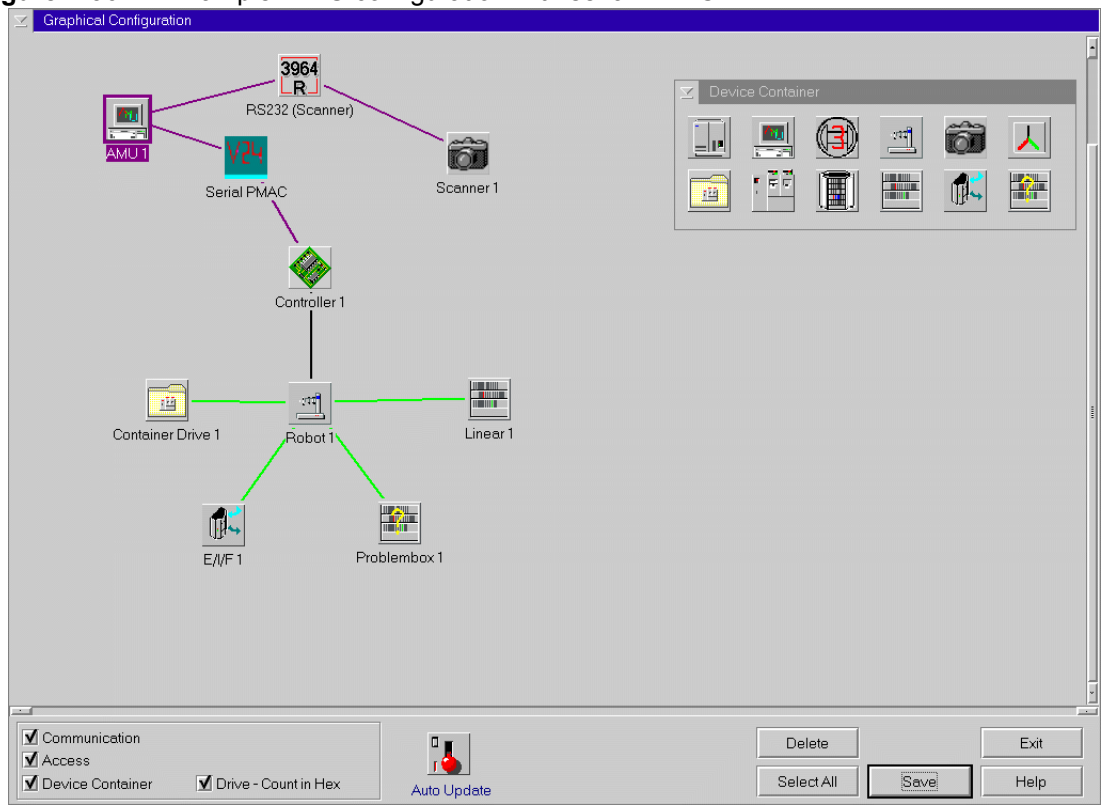
IB Serial PMAC Interface

Figure 4-35 Interface Configuration Serial PMAC



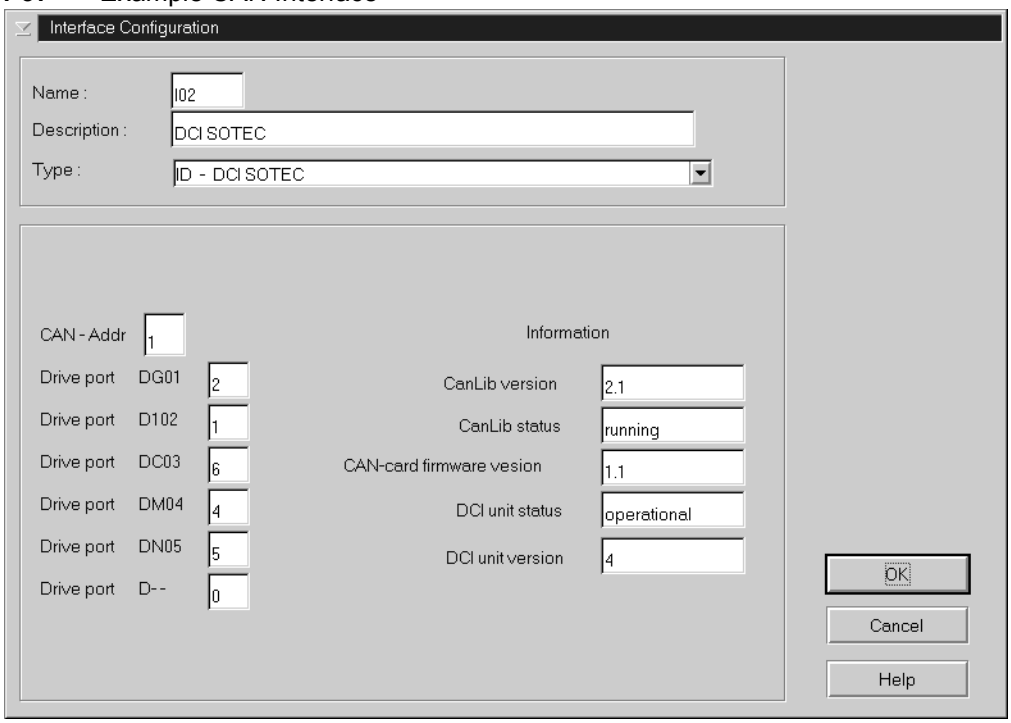
Field	Explanation
Name	Automatically generated name of internal connection (I01, I02 …).
Description	Free comment
COM-Port	Hardware interface; COM port (e.g. 03)
Databits	Length of data byte: 7 bits
Stopbits	0 stop bit
Parity	Even (even parity bit)
Baudrate	Baudrate: 09600
Read Timeout	1000 ms
Write Timeout	1000 ms

Figure 4-36 Example: AMU configuration with serial PMAC



ID CAN-Interface (DCI)

Figure 4-37 Example CAN Interface



Field	Explanation
Name	Automatically generated name of internal connection (I01, I02...).
Description	Free comment (e.g. name of the interface "DCI 01")
CAN Addr.	CAN address of DCI (as set by DIP switches on DCI unit)
Drive port	DCI serial port number, connected to given drive
CanLib version	The current CanLib version number
CanLib status	The current CanLib status. Possible values are • "running" - normal operation • "running (passive)" - CanLib is running, but this AMU is passive and CanLib generates no activity • "not running" - CanLib is not running
CAN-card firmware version	The firmware version of CAN-card
DCI unit status	The associated DCI unit status. Can be "operational" or "non-operational"
DCI unit version	Corresponding DCI unit firmware version. Refer to *Supported drives and required DCI unit hardware* on page 2-2.

NOTE: For CAN-communication the CAN-driver candrv.sys should be loaded in CONFIG.SYS

Configuration Of Volser Numbering

This section describes the configuration of Volser numbering.

Terms

- Coordinate Range - connected compartments in a storage system (e.g. storage tower, I/O unit, problem box)
- Volser Range - Volser range assigned the compartments in a Coordinate Range

Overview

This function is used to reassign compartments.

In the archive catalog you can assign connected compartments (coordinate ranges) new Volser ranges without changing the archive catalog entries of the remaining compartments (e.g. by reassigning empty compartments after ejecting the media previously stored in them). The archive catalog is restructured internally and it is not recreated.

Edit Volser Ranges changes

- in the configuration and the archive catalog, or
- only in the archive catalog

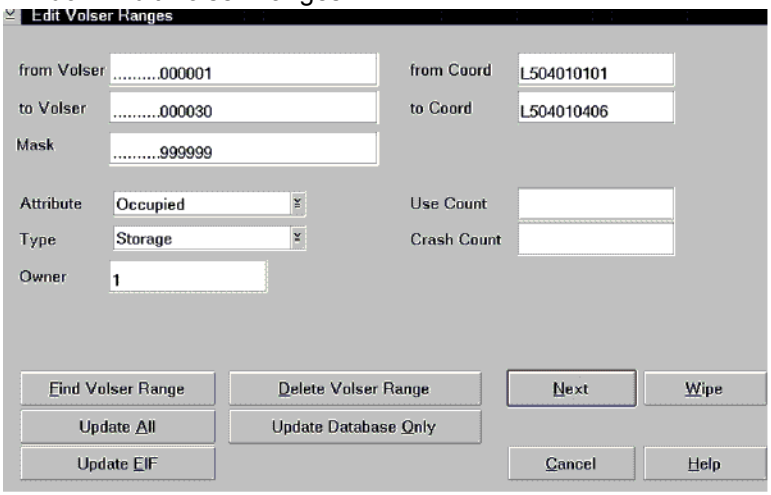
CAUTION: **A correctly created archive catalog is the precondition for AMU operation. You must ensure that archive catalog entries agree with the configuration. Deliberate inconsistencies are possible and the user will be responsible for them. Before making changes check the consistency of archive catalog and configuration.**

CAUTION: **Changes to the database made with** Edit Volser Range **or with SQL commands are not protocolled in the journal file of the database backup system. If the** Restore **command is used within 24 hours, the database will be reset to the status before the changes were made. The changed data records are immediately transferred to the backup or DUAL-AMU.**

NOTE: Be sure to use the field Mask correctly for calculation of the coordinate range (refer to *Mask* on page 4-44).

Window Edit Volser Ranges

Figure 4-38 Window "Edit Volser Ranges"



Field	Explanation
from Volser	**Always fill up the Volser to 16 digits using fill-in characters (e.g. .....000001).** First Volser of the Volser range.
to Volser	**Always fill up the Volser to 16 digits using fill-in characters (e.g. .....000001).** Last Volser of the Volser range
Mask	• 9 - automatic count in the Volser • A - symbol, no automatic count in the Volser
from Coord	First archive coordinate of coordinate range
to Coord	Last archive coordinate of coordinate range
Attribute	Status of the medium • Occupied: compartment occupied • Ejected: medium has been ejected • Empty: compartment empty • Mounted: medium mounted on drive
Owner	Medium owner: indicates the robot(s) which can access this medium.
Type	Type of compartment • Storage archive compartment for hierarchically defined Volser ranges • Foreign: foreign media compartment • Clean: cleaning media compartment • HACC-Dynamic: range exclusively for HACC/MVS • AMU-Dynamic: range for insert/eject of certain host software • Problem: compartment in the problem box (I/O unit)
Use Count	Number of accesses to compartment.
Crash Count	Not used (number of faulty accesses to the compartment. Each time the crash sensor on the gripper is actuated, the counter is incremented).
Find Volser Range	Displays the remaining data when an existing Volser or the archive coordinate of a Volser range is entered.

Field	Explanation
Delete Volser Range	Delete Volser Range **deletes the entire Volser range from the configuration.**
Next	Displays the next Volser range.
Wipe	Deletes all input from the window.
Update all	Changes the archive catalog and the configuration.
	The existing archive catalog entries and the configuration are overwritten. A list of all changes appears. The changes are executed after confirmation. A message appears after the execution (e.g. *Database Update performed successfully!*).
Update Database only	Changes the archive catalog.
	The existing archive catalog entries are overwritten. Inconsistencies between archive catalog and configuration are possible. A list of all changes appears. The changes are executed after confirmation. A message appears after the execution (e.g. *Database Update performed successfully!*).
Update EIF	Activate the changes in **Graphical Configuration** of **Logical Ranges** in the I/O unit in the database.
	First change the graphical configuration and restart the AMU. Refer to *I/O Unit* on page 4-26.

Inserting a new Volser range

Step 1 Enter the desired Volser range

Step 2 Enter the next available archive coordinate. The end coordinate is inserted automatically

Step 3 If necessary, change the automatic entries for new Volser ranges:

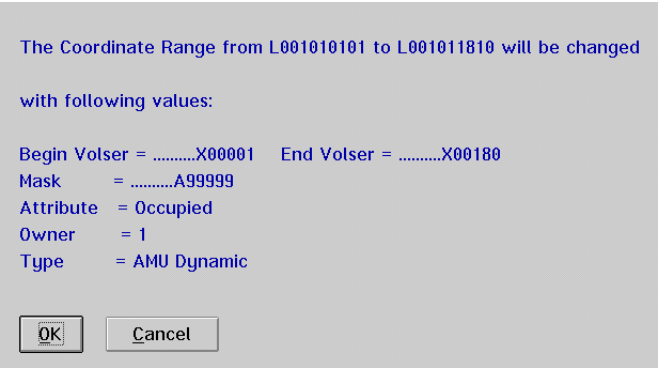
- Attribute: **Occupied**
- Owner: 1
- Use Count: 0
- Crash Count: 0

Step 4 Change the following

- Volser
- Mask
- Owner
- Type

Step 5 Click on Update all

Figure 4-39 WIndow "Update Volser Range"



Changing an existing Volser range

Step 1 Move the Volser range to be changed into the window (either click on Next or enter a Volser/an archive coordinate and click on Find Volser Range).

Step 2 Delete all input that is not to be changed.

Step 3 Change the remaining input or enter changes.

Step 4 Click on Update all.

Defining a dynamic range

Step 1 Delete existing numbers in the range you plan to use for Dynamic

- Move the Volser range to be changed into the window
- Click on Delete Volser Range

Step 2 In from Volser and to Volser enter the zero Volser (`0000000000000000`).

Step 3 Delete the entry from Mask.

Step 4 Enter the first coordinate of the dynamic range in from Coord.

Step 5 Enter the last compartment of the dynamic range in to Coord.

Step 6 In the field Attribute select `Empty` and in the field Type select `AMU Dynamic.`

Step 7 Click on Update all.

Changing individual archive catalog entries

Step 1 Click Wipe to remove all input.

Step 2 Define the archive catalog entry or entries with their Volser or archive coordinate.

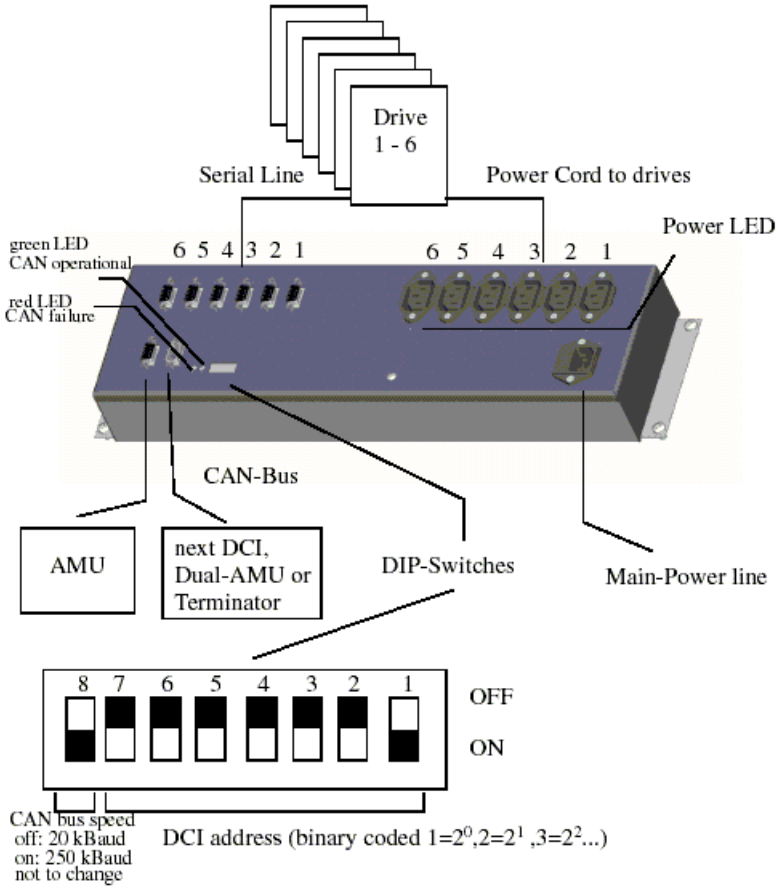
Step 3 Delete all input that is not to be changed.

Step 4 Change the remaining input or enter changes.

Step 5 Click on Update Database only.

Configuration of the Drive Control Interface

Figure 4-40 Drive Control Interface Scheme



The Drive Control Interface is necessary for controlling the DLT 7001 and DLT 8001 (Low Profile) drives. It also can be used for IBM LTO, IBM 3590, Quantum Super DLT and Sony AIT-1/AIT-2/AIT-3 drives.

NOTE: IBM 3590 drive requires a special connection cable (p/n 407000529).

The Configuration will be done in

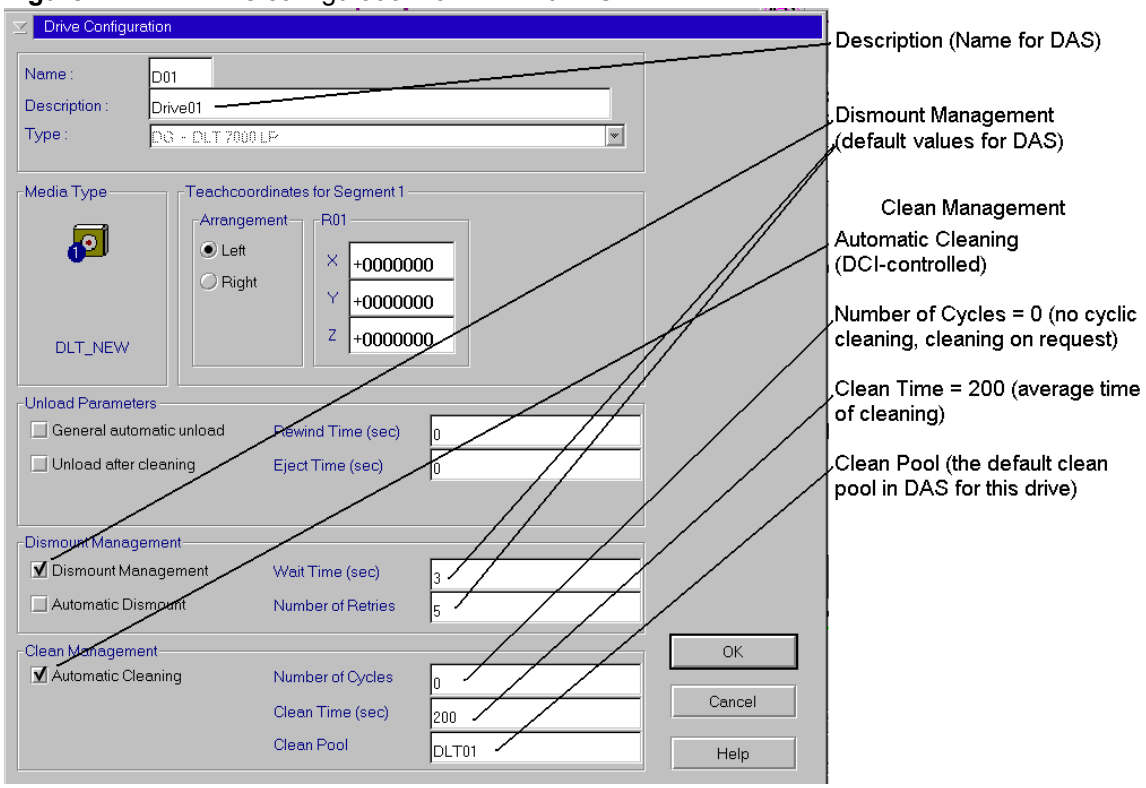
- Graphical Configuration of the AMU (AMUCONF.INI), and
- for loading microcodes in AMUSTART.CMD
  the following setting is necessary in the AMUSTART.CMD:

```
cd CAN
DL
```

- Please do following steps in the Graphical Configuration of the AMU:

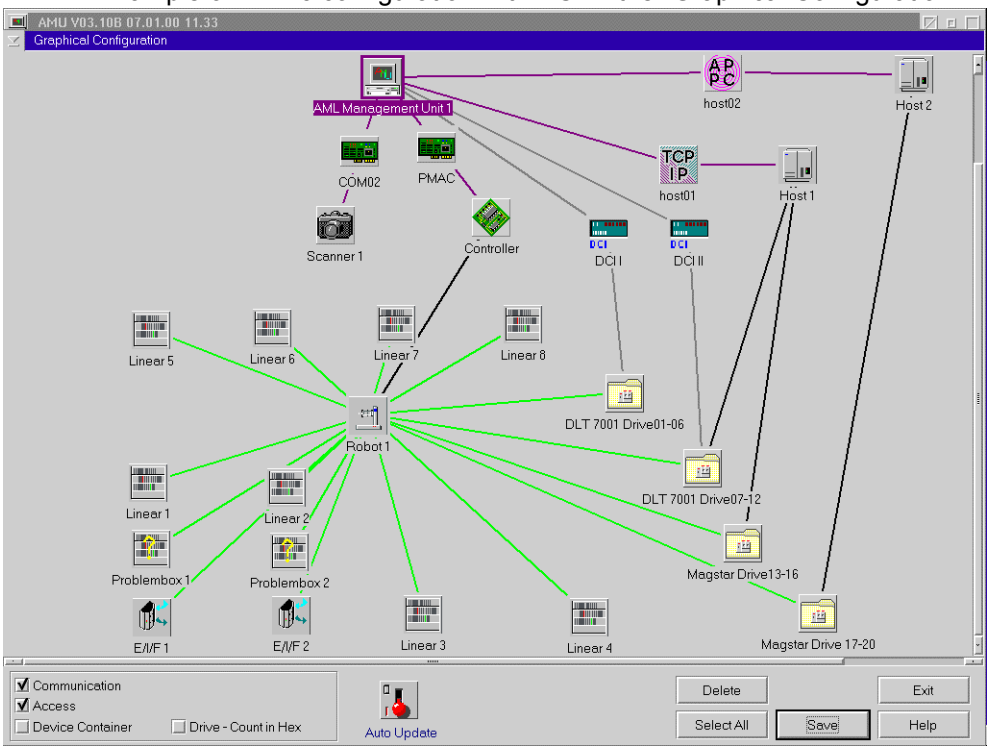
- Create one drive container for each DCI
- Create connection lines from the container to the robot
- Open the container and move the DLT drives in the container or create drives
- Open the drive configuration and set up the following values:

Figure 4-41 Drive configuration for DLT with DCI



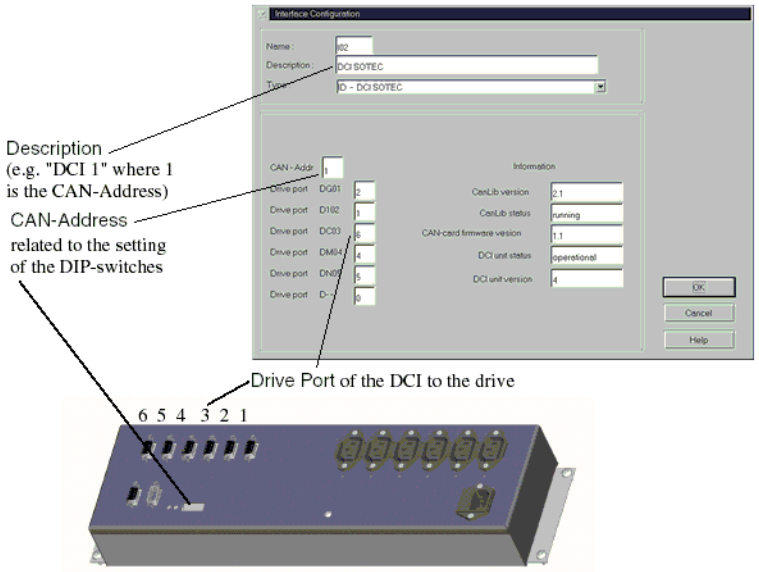
- Leave the container
- Create a connection line between container and AMU symbol

Figure 4-42 Example of AML/J configuration with DCI in the "Graphical Configuration"



- Open the new communication symbol between the rive container and the AMU
- Set up the following values

.



Configuration of Drive Cleaning

For configuration of drive cleaning follow these steps:

Step 1 Define a range for variable use in the archive (AMU Dynamic) for each media type with cleaning media.

Step 2 Define groups of cleaning media, arranged according to media type and drives

Step 3 Assign pool names to these groups or use the standard names P01 - P99

Step 4 Define parameters for each individual pool:

- minimum number of cleaning media (As guideline use number of drives to cleaned from this pool. When the actual value drops below this number, an asynchronous message is sent to the hosts.)
- maximum use of each individual cleaning medium (Extract this value from the information supplied by the manufacturer of the cleaning medium or drive.)

Step 5 Enter the values in the window Clean Pool Management (Admin menu)

Step 6 Define the Volsers for the cleaning media or use the standard names CL0101 -CL9999

Step 7 Define the cleaning data for each drive to be cleaned periodically in the Graphical Configuration menu in window Drive Configuration

- automatic cleaning
- number of mounts until next drive cleaning
- time for cleaning medium to remain in drive
- clean pool from which to clean the drive

Step 8 Now insert the first cleaning media.

Configuration of Scratch Pools

For configuration of scratch pools follow these steps:

Step 1 Define groups of media according to media type and group of users (lock periods, storage location, etc.)

Step 2 Define pool names for these groups.

Step 3 Define the minimum number of scratch media and media type for each pool.

Step 4 Enter the values in window Scratch Pool Management (Admin menu)

Step 5 Define the Volsers for the individual pools.

Step 6 Now insert the first scratch media for the individual pools.

Configuration of AMU Log

If only a very small hard disk is available, or if the number of AMU messages is very high, the default values for the AMU log may be changed. The AMU log is configured in the ASCII file ARTCFG.DAT. If the file ARTCFG.DAT is not present in the AMU directory, the default values are used. Changes can be made with the OS/2 Editor EPM or E.

Example ARTCFG.DAT

```
LogPath=C:\AMU\LOGS-TRC
FreeSpace=40
MaxWrites=100
```

The syntax of the file must be accurate. If the file is missing or its syntax faulty, the default values are used (see example above).

Field	Explanation
LogPath	Drive and path to which log files are automatically written. Default for directory is "logs-trc" in AMU directory. **Do not select a LAN drive, since network failures could otherwise lead to problems in AMU processing.**
FreeSpace	Storage to be maintained available on the target drive for AMU log files. If the vacant space drops below this value, the oldest log files are deleted. **Under high workload the file Swapper.dat on the OS/2 drive may grow rapidly.**
MaxWrites	Number of entries in the log file after which free space is to be checked.

Configuration of AMU Start

The automatic start of all processes is controlled by the batch file STARTUP.CMD. This file is written during installation of AMU.

Example STARTUP.CMD

```
CALL TCPSTART
\das\tools\os2sleep 10
STARTCM
CMWAIT -w 600
CD \qcf\os2exe
REM *** RESET THE RIC CARD 0 ***
QRESET 0
REM *** LOAD REALTIME CONTROL MICROCODE ***
REM ***      512KB RIC cards only       ***
REM ***      Rem out for 1MB RIC cards  ***
QLD ICAAIM.COM /C0
REM *** LOAD qCOM ON RIC 0 AS TASK 2 ***
QCOMLOAD 0 2
CD \AMU
START AMUSTART
START NNLINK
EXIT
```

Line	Explanation
CALL TCPSTART	Call up batch file with processes for TCP/IP communication (e.g. Portmapper, Telnet), only required if TCP/IP communication is configured.

Line	Explanation
`os2sleep 10`	This program stops the command execution of the batch file for the time indicated in the parameter (e.g. 10 seconds) OS2SLEEP is used to allow sufficient time for start of the preceding call-up in the batch file, before communication is set up.The program is part of the DAS software.
`STARTCM`	Call up IBM Communications Manager. Required only if SNA connection to AMU is needed (e.g. LU6.2 on HACC/MVS).
`CMWAIT -w 600`	Start a program causing batch processing to wait until the Communications Manager has been activated completely. CMWAIT checks the status of the CM kernel. Required only in connection with the Communication Manager.
`QRESET 0` `QCOMLOAD`	Call up processes initializing the IBM-Realtime Interface Coprocessors (RIC). RIC board is used on AML/2 systems only.
`CD \AMU`	Change to AMU home directory.
`START AMUSTART`	Start the script for the start of the AMU processes. The script is also usable for the manual start of the AMU.
`START NNLINK`	Start process monitoring the network links with the CM/2 (e.g. LU6.2). After failure or restart on the host end, the system automatically tries to reconnect. Required only in conjunction with the Communications Manager.
`EXIT`	Close window STARTUP.CMD.

AMUSTART.CMD

The automated start of all AMU processes will be controlled by a batch script AMUSTART.CMD. With the AMU Installation this file will be copied in the AMU directory and must be configured by the installation people.

Example AMUSTART.CMD

```
cd can
DL
cd ..
start /C /min "AMU Kernel" krn
start con /L
```

Line	Description
`cd can`	Changed the directory for the Drive Control Interface Software
DL	Load of the Drive Control Interface Software in the CAN-Bus-Adapter
`start /C /min "AMU Kernel" krn [/S]`	Start of the AMU-Kernel with Options • /C - window will be closed at the end • /min - window started in symbol size • /S - (optional) communication with DAS
`start con /L`	Start of the AMU-GUI with Option: • /L Log-window will be opened automatic
EXIT	exit of the window AMUSTART.CMD

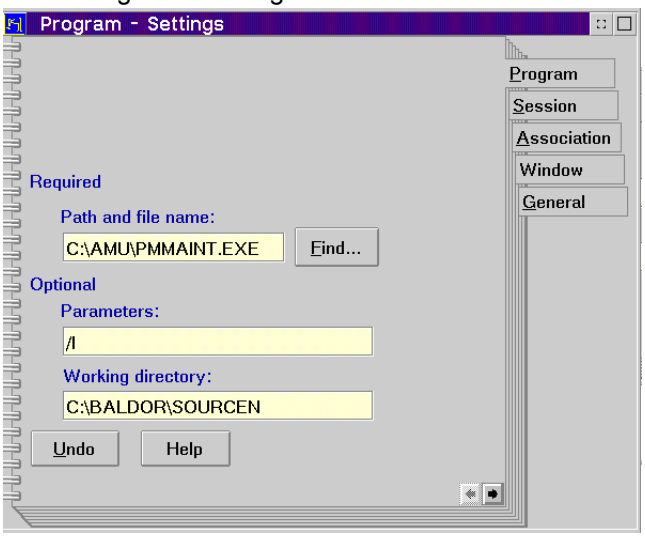
Symbols on the Operating Console

Symbols can be put on the desktop to allow rapid start of applications. A double-click the symbol will start an application.

Step 1 Open the folder "Templates." This folder may be contained in another folder (e.g. OS/2 System).

Step 2 Click on the symbol "Program" and while keeping the right mouse button pressed move it onto the desktop. The window "Program - Settings" with the folder Program opens.

Figure 4-43 Window "Program - Settings"



Step 3 Enter the program on the field Path and file name indicating:

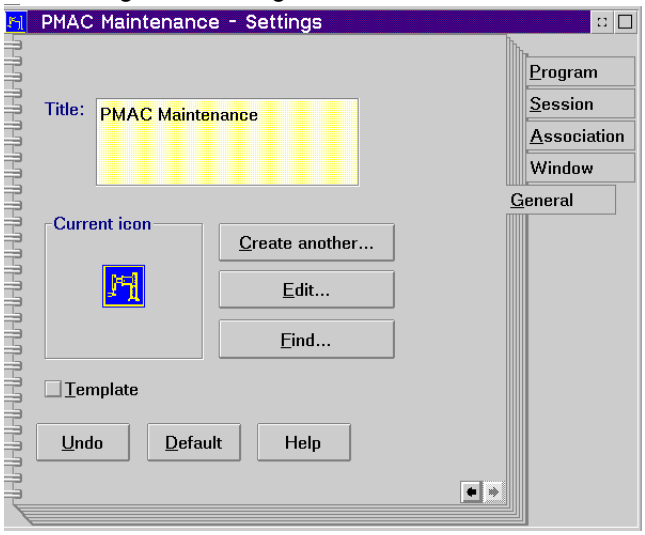
- drive index letter
- directory
- complete filename

Step 4 Enter further parameters (optional):

- start parameters in field Parameters:
- working directory (selection windows open in this directory) in field Working directory:

Step 5 Change to folder General.

Figure 4-44 Window "Program - Settings"



Step 6 Enter a title for the symbol on the Title field:

Step 7 Double-click on the system symbol (left top corner) to close the window.

Archiving Function of the OS/2 Operating System

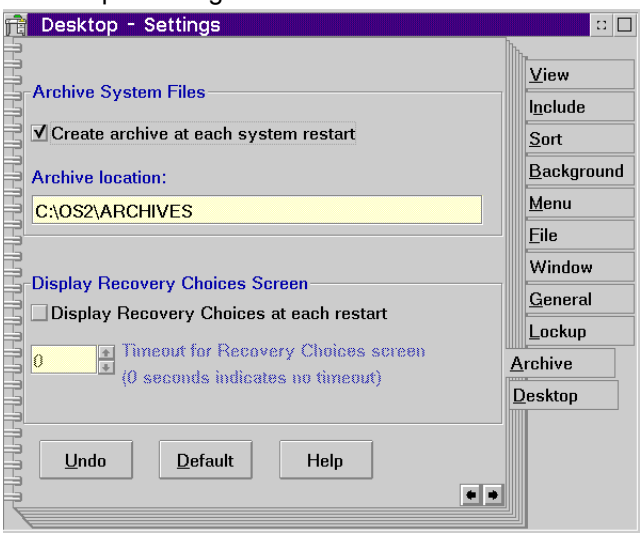
When the configuration of the computer has been completed, define archives for the system files. This allows the operating system to restore the configuration even if the system files have been destroyed.

Step 1 With the right mouse button click on a vacant space on the desktop. The system menu appears.

Step 2 Select the function Settings. The window Desktop Settings appears.

Step 3 Select the folder Archive.

Figure 4-45 Window "Desktop - Setting Order Archive"



Step 4 Terminate AMU (Shutdown complete (with OS/2)) if it is active or terminate OS/2

NOTE: When the archiving function has been activated, a backup is made during every start-up of the operating system and the older backups are overwritten. ADIC recommends switching this function off after three backups, to ensure the defined configuration can be restored at any time.

Logic Coordinates

For organization of the archive, the compartments are subdivided into logic coordinates in the AMU. The following section describes the details of this coordinate system.

ABBA/1 Coordinates

AMU allows the host software to use the older ABBA/1 format. This format is then converted into AMU format by AMU.

The ABBA/1 format is used with the following host software:

- HACC/MVS
- HACC/VM/VSE
- ROBAR
- HACC/Guardian

Volser in an Archive with ABBA/1 Host Communication

NOTE: A host system operating with the AMU using the ABBA/1 format must exclusively process commands using 6-digit Volsers.

During input and inventories in multi-host systems be sure to adhere to the proper ranges from I/O unit and archive.

Comparison of AMU and ABBA/1 Coordinates

All target locations of the system which can house media are described by logical coordinates.

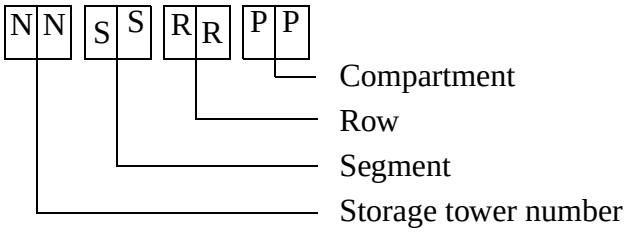
These logical coordinates are converted by the AMU software into physical increments counted from a zero-point (x-, y-, z-axis).

Structure

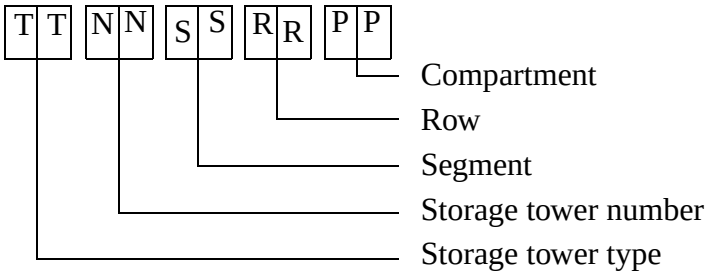
AMU converts the logic coordinates from the host computer into AMU coordinates.

Storage segments

Host processor

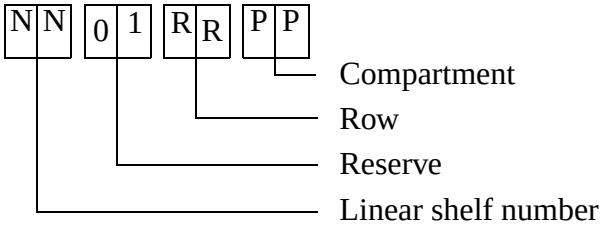


AMU

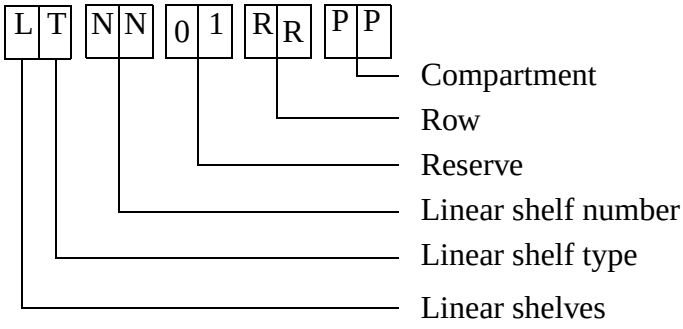


Linear shelves

Host processor



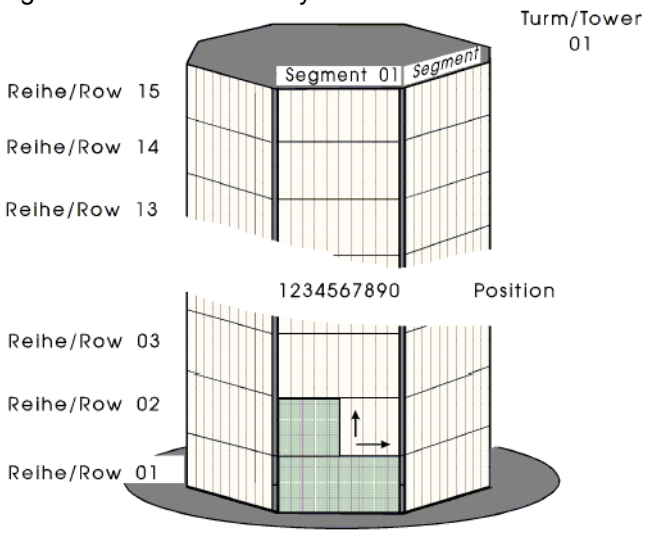
AMU



Archive Coordinates

Storage towers (Quadro towers, Hexa towers, Linear shelves).

Figure 4-46 Numbering of Coordinates Row by Row



Special Coordinates

This section describes the special coordinates.

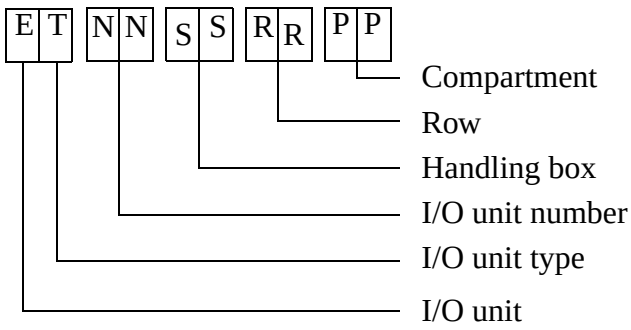
I/O units

Each robot in an AML/2 system has an I/O unit.

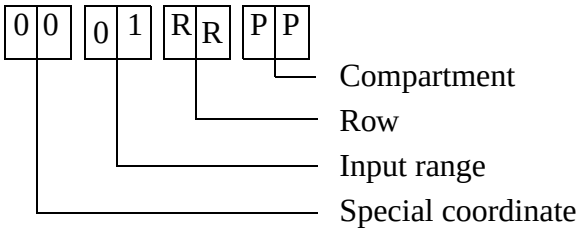
The I/O unit has ranges for

- input
- output
- foreign media

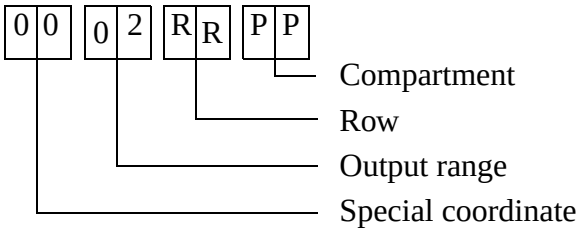
AMU



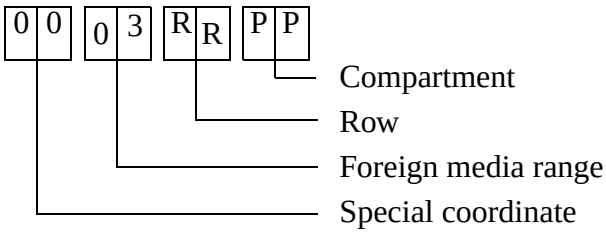
Host computer input range (e.g. 00 01 03 10)



Host computer output range (e.g. 00 02 05 01)

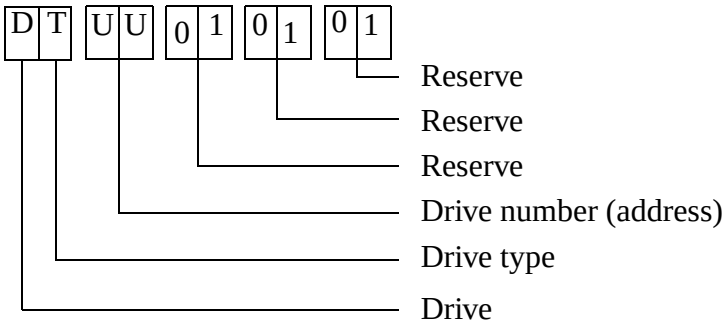


Host computer foreign media range (e.g. 00 03 06 01)

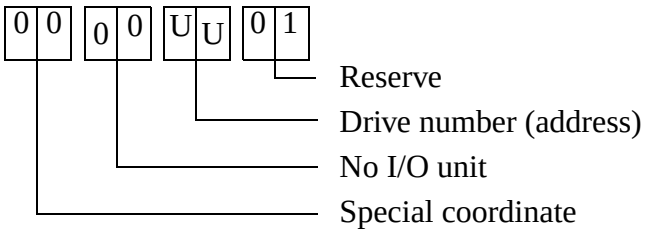


Drives

AMU (z.B. D9 04 01 01 01)

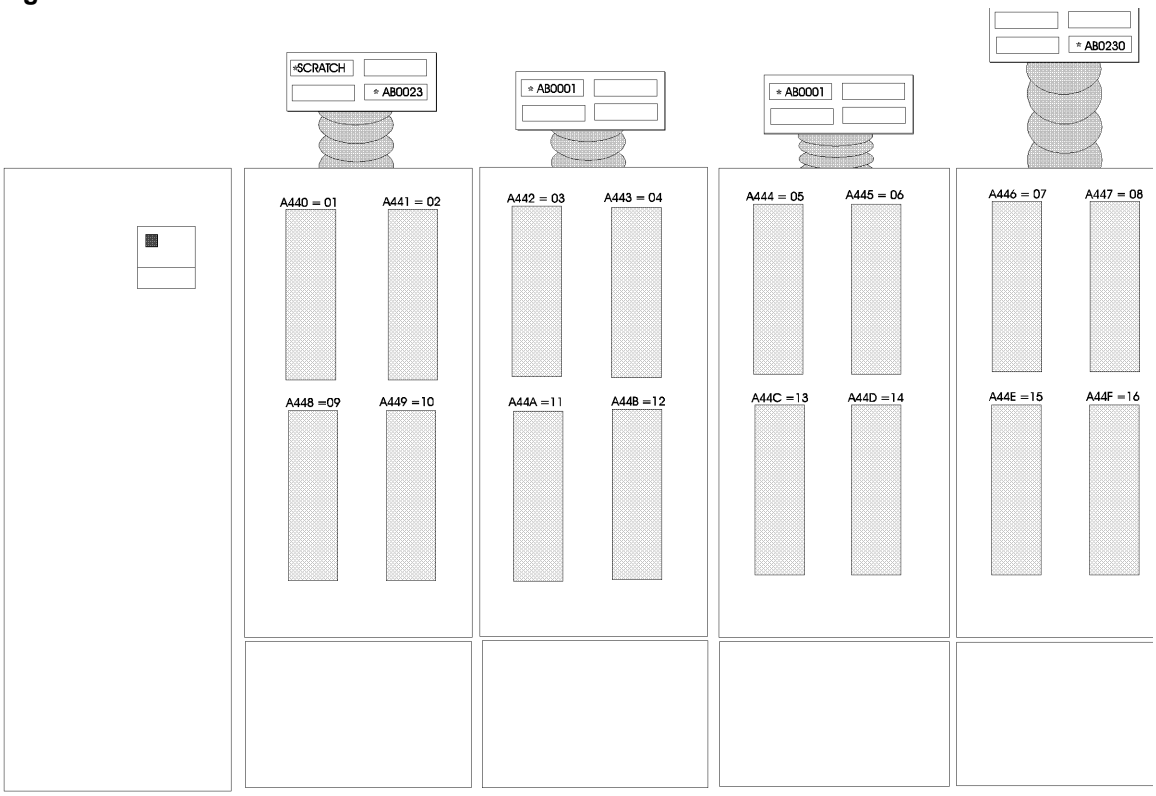


Host computer (z.B. 00 00 04 01)



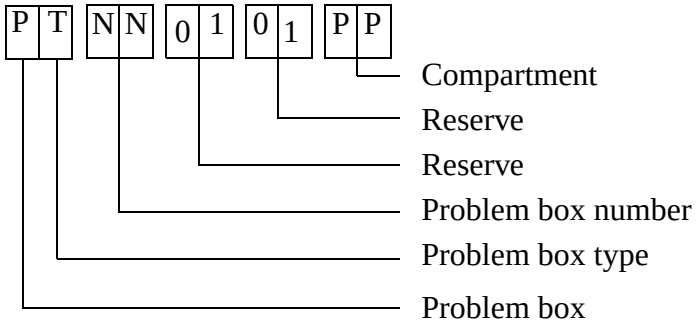
Example: AMU "D9 04 01 01 01” = host computer "00 00 04 01”

Figure 4-47 Count Mode for Drives

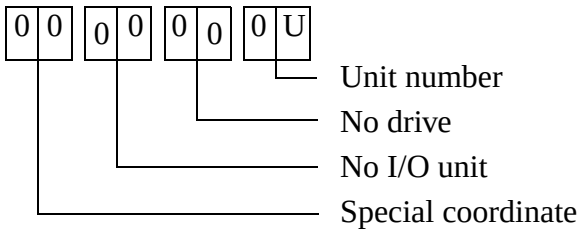


Problem box

AMU



Host computer (e.g. 00 00 00 01)



Status of Coordinates

In the communication protocol the host computer uses abbreviations for the status and the type of compartments.

HOST - Logic Status	**AMU -** Coordinate Type
M - Magnetic tape	S - Storage
O - Optical Disk	S - Storage
C - Cleaning cartridge	C - Clean
0 - Special status	

HOST - Physical Status	**AMU -** Coordinate Attribute
B - in storage tower or in drive	O - Occupied
E - Ejected	E - Ejected
M - Mounted	M - Mounted
L - Initial (only for special status)	Y - Empty

Examples for status display (display at the host computer console or in AMU trace):

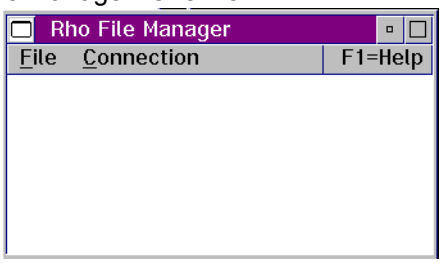
- empty compartment in archive - OL
- compartment in tower during mount - MM
- occupied compartment in archive - MB
- compartment for cleaning cartridge in tower - CB
- compartment for cleaning cartridge during clean mount - CM
- compartment in archive for ejected medium - ME

Utilities

This section describes the tools and utilities of AMU software.

Rho File Manager

Figure 5-1 Window "Rho File Manager" Overview"



The Rho File Manager transfers files between AMU and the rho control units in both directions. It is required for initial operation and maintenance jobs.

Starting the Rho File Manager

CAUTION: **Stop the communication of host and AMU before calling up the Rho File Manager.**

This section describes the process of starting the Rho File Manager utility.

During operation

Step 1 Execute command Home.

Step 2 Press reset pushbutton on the PS 75 board of rho control.

Step 3 Start Rho File Manager

After booting the control system

Step 1 Start the Rho File Manager only immediately after a reset of the rho control (e.g. upon start) without <CONTROL ON>. The AMU function stops (kernel is terminated).

NOTE: When several processes of AMU are active, connection to the control unit may fail. In such cases, perform a complete shutdown and start only the Rho File Manger.

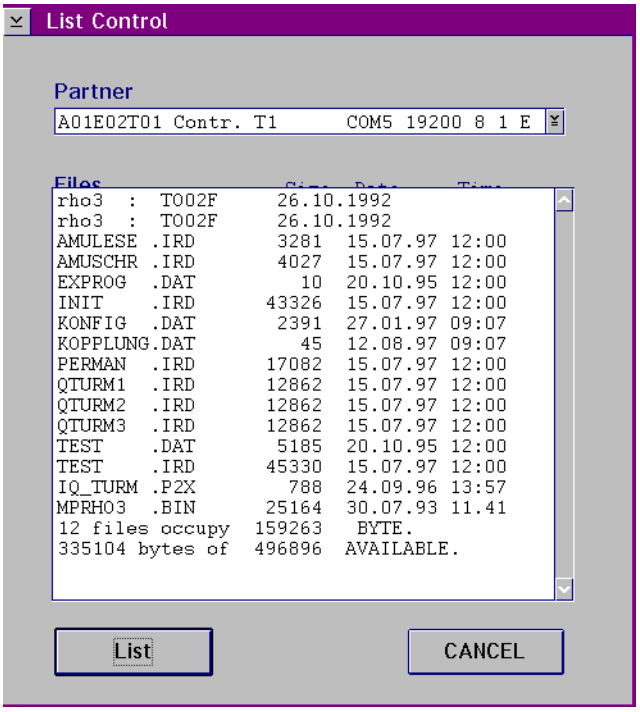
Menu File

Command	Explanation
About	Display copyright information and version number.
Exit	Exit Rho File Manager. After exiting the Rho File Manager the interface for data communication with AMU is automatically configured and the AMU kernel restarts.

Menu Connection

Command	Field	Explanation
List		Display contents of rho control.

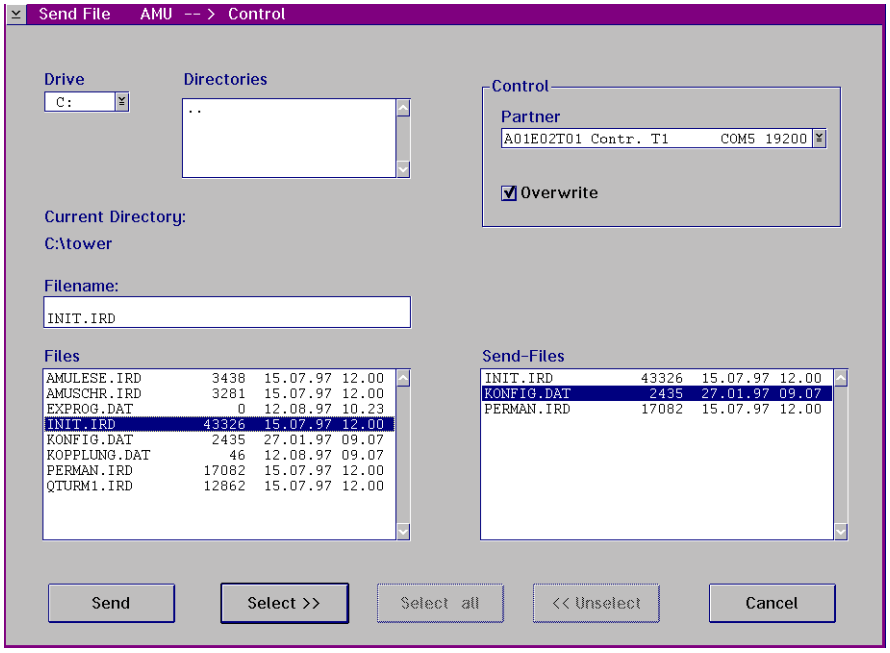
Figure 5-2 Window "List Control"



Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection. **If no partner has been selected, you are prompted for a selection.**

Command	Field	Explanation
	Files	Display all stored files with • file size - can differ between rho and PC for the files *.DAT and *.P2X (different storage mode for zeros) • issue date • Information on • operating system version • storage engagement
	List	Update the display.
Send to Rho		Send one or more files to the rho control.

Figure 5-3 Window "Send File AMU --> Control"



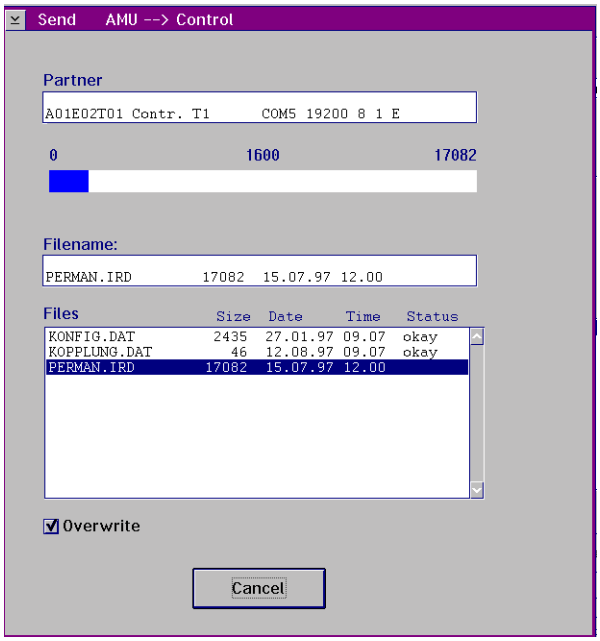
Transfer only files required by rho. Transferring other or additional files can cause failures.

Before transferring files *.BIN or *.P2X you must actuate the write-protect switches at the control unit (refer to MG).

Drive	Select the drive.
Directories	Display all directories of current drive.
Current Directory	Display the current directory path.
Filename	• filename • search criterion with variables (*,?) • absolute or relative path with final "\" (e.g. c:\amu\)
Files	Display files in the Current Directory.

Command	Field	Explanation
	Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection. **If no partner has been selected, you are prompted for a selection.**
	Overwrite	Overwrite files with identical names during transfer. Files with file extension DAT are excluded.
	Send Files	Display files to be sent.
	Send	Send selected files.

Figure 5-4 Window "Send AMU --> Control"

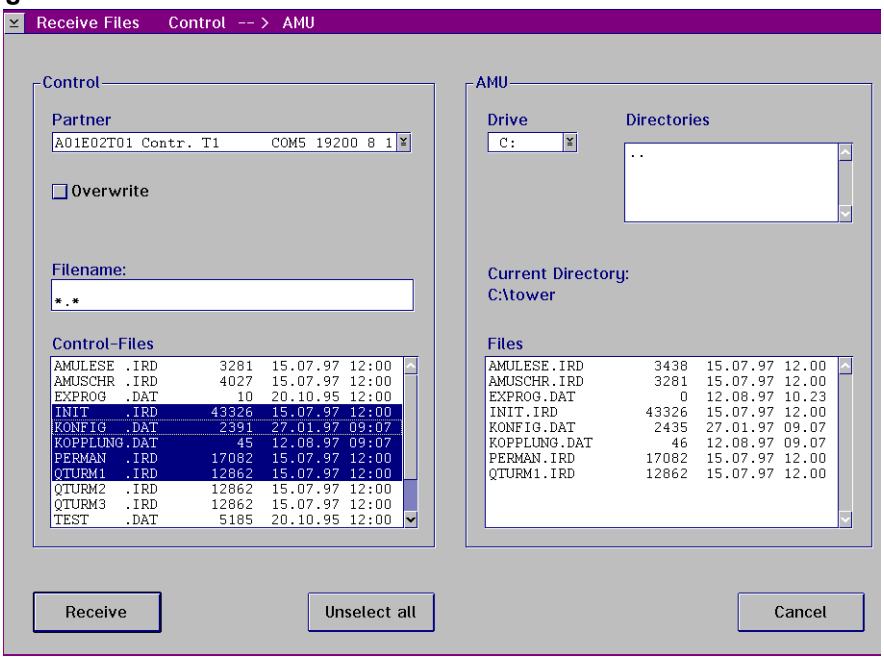


- Actual Status - The bar indicates the bytes transferred. The overall length corresponds to the file size.
- Filename - file information of current transfer.
- Files - transfer status
- Okay - successful transfer
- Error - error during transfer
- Existed - existing file has not been overwritten

	Select	Select marked files for transfer.
	Select all	Select all files for transfer that match the search criterion entered under Filename.
	Unselect	Unselect the files already selected for transfer.

Command	Field	Explanation
Receive from Rho		Transfer one or more files from rho to AMU. **The file "MPRHO3.BIN" appears in the window only after the command** List **has been used.**

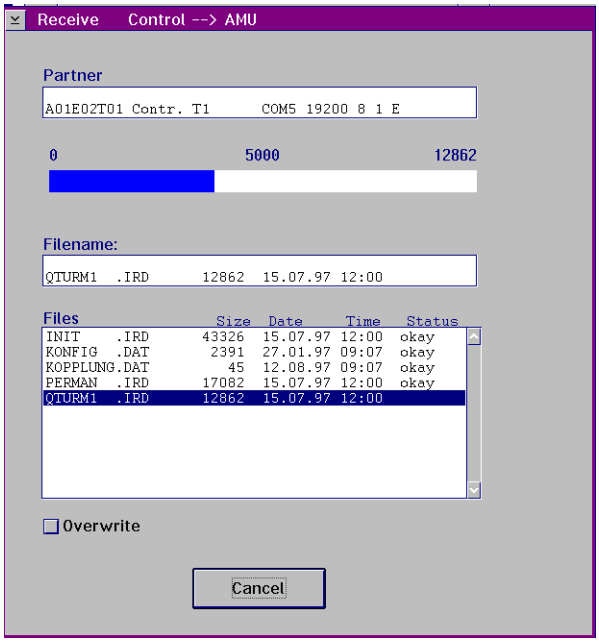
Figure 5-5 Window "Receive Files Control --> AMU"



Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection. **If no partner has been selected, you are prompted for a selection.**
Overwrite	Overwrite files with identical names during transfer. Files with file extension DAT are excluded.
Filename	Display the current file.
Control-Files	Display files in rho. Marked files are transferred.
Drive	Select the drive.
Directories	Display all directories of current drive.
Current Directory	Display the current directory path.
Files	Display files in the Current Directory.

Command	Field	Explanation
	Receive	Send selected files.

Figure 5-6 Window "Receive Control --> AMU"

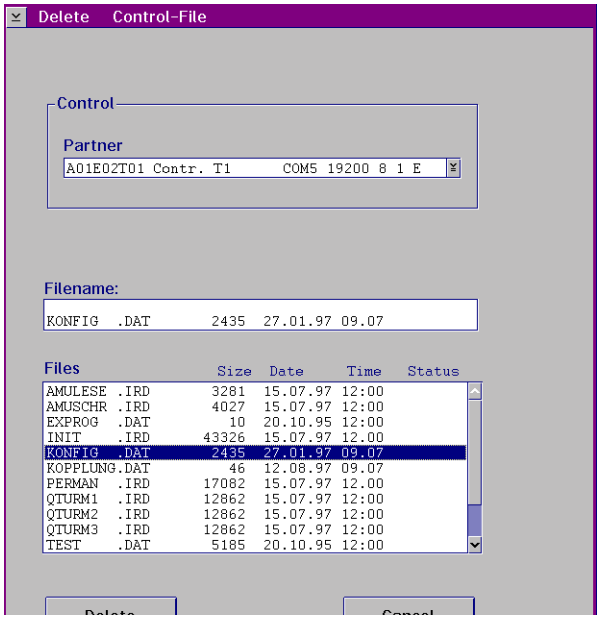


- Actual Status - The bar indicates the bytes transferred. The overall length corresponds to the file size.
- Filename - file information of current transfer.
- Files - transfer status
- Okay - successful transfer
- Error - error during transfer
- Existed - existing file has not been overwritten

	Unselect all	Unselect all files selected for transfer.

Command	Field	Explanation
Delete		Delete a file in rho.

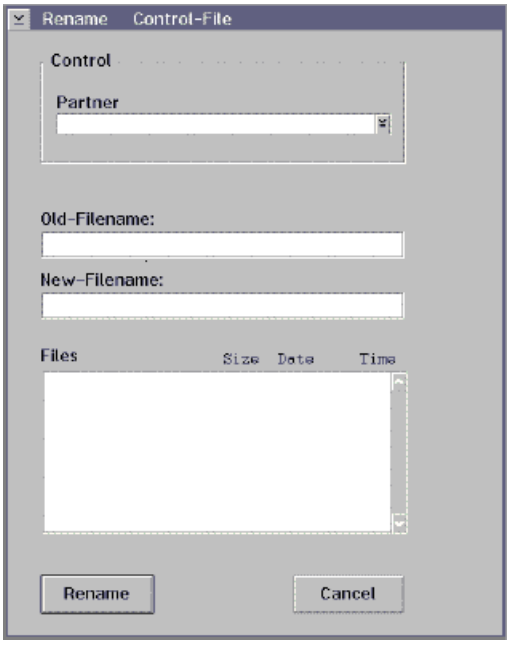
Figure 5-7 Window "Delete Control-File"



Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection. **If no partner has been selected, you are prompted for a selection.**
Filename	• filename • search criterion with variables (*, ?)
Files	Display files in rho. Marked files are deleted. Exceptions: files with the extensions BIN and P2X.
Delete	Delete the marked file.

Command	Field	Explanation
Rename	Rename files in rho.	

Figure 5-8 Window "Rename Control-File"

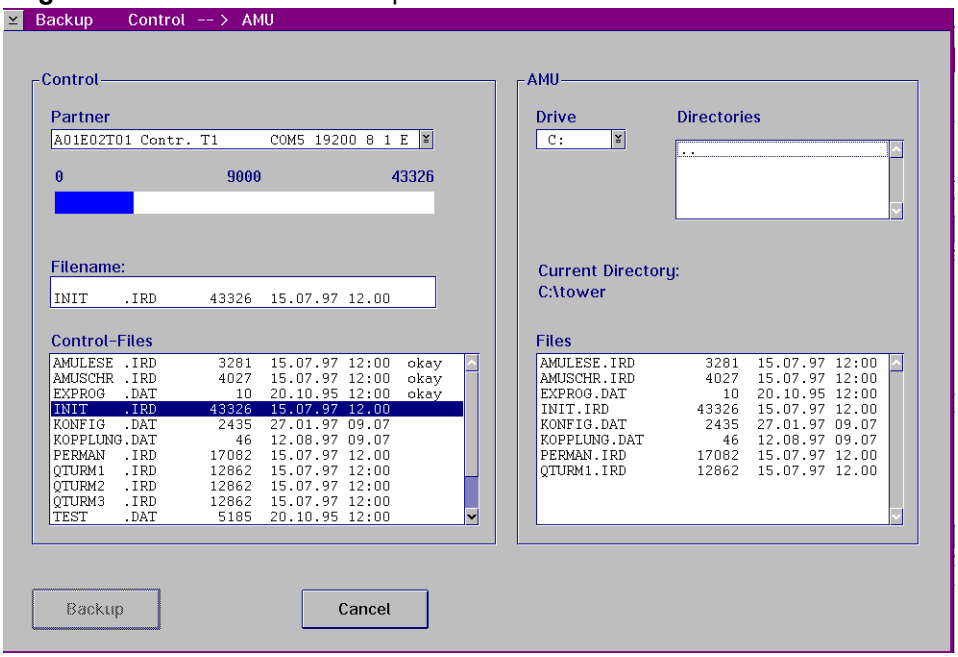


Active files and files required by rho must not be renamed. This will cause failures.

Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection. **If no partner has been selected, you are prompted for a selection.**
Old-Filename	Select the file to be renamed.
New-Filename	Enter new filename.
Files	Display files in rho.
Rename	Rename the file.

Command	Field	Explanation
Backup		Backup all files in rho to AMU.

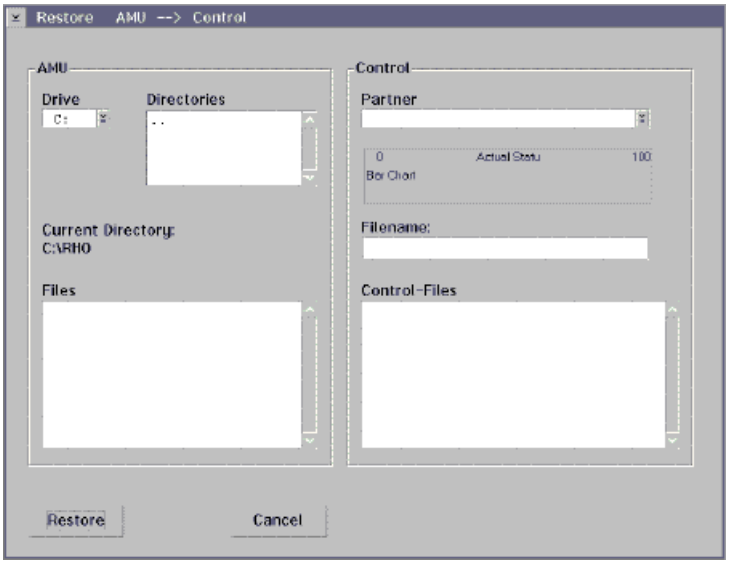
Figure 5-9 Window "Backup Control --> AMU"



Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection. **If no partner has been selected, you are prompted for a selection.**
Filename	During the transfer, the file currently transferred is displayed.
Control-Files	Display files in rho. Marks have no meaning.
Drive	Select the drive.
Directories	Display all directories of current drive.
Current Directory	Display the current directory path.
Files	Display files in the Current Directory.
Backup	Backup all files. The window "Receive Control --> AMU" appears.

Command	Field	Explanation
Restore		Restore all files stored in the AMU directory to rho (e.g. after replacing board).
		Before starting restore you must actuate the write-protect switches at the control unit (refer to MG).
		First restore files with the extension *.BIN to rho. These define the storage to the correct size.

Figure 5-10 Window "Restore AMU --> Control"



Drive	Select the drive.
Directories	Display all directories of current drive.
Current Directory	Display the current directory path.
Files	Display files in the current directory.
Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection. **If no partner has been selected, you are prompted for a selection.**
Filename	During the transfer the file currently transferred is displayed.
Control-Files	Display files in rho. Marks are without meaning.
Restore	Restore all files in the AMU directory to rho. The window "Send AMU --> Control" appears

JUSTUTIL.EXE

NOTE: Use Justutil only for AML/2 and AML/E.

Editor for the teach point files "KRNREFPT.R01” and "KRNREFPT.R02”.

With "JUSTUTIL.EXE” you can move individual teach points. The values are saved in the teach point file "KRNREFPT.R01” or "KRNREFPT.R02”.

NOTE: Insert all values in 1/100 mm.

Start "JUSTUTIL.EXE”

1. Open an OS/2 window
2. Enter the following commands:
   ```
   [C:\]cd amu
   [C:\amu]justutil
   ```
   The window "JustUtil-32.exe” appears:

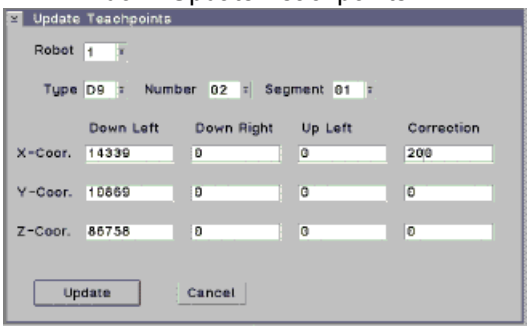
Figure 5-11 Window "JustUtil-32”

AML/E and AML/2 only

Commands

Command	Field	Description
Update	Changes individual teach point coordinates.	

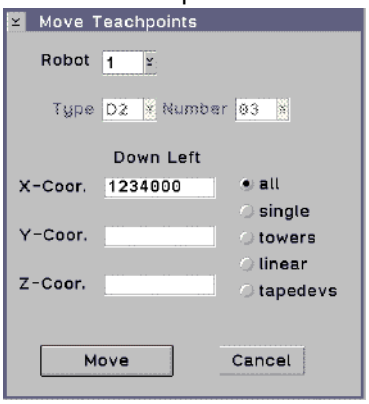
Figure 5-12 Window "Update Teachpoints"



Robot	Robot connected
Type	Component type
Number	Number of the component
Segment	Segment number
Up Left	Coordinates of the top left teach label
Down Left	Coordinates of the bottom left teach label
Down Right	Coordinates of the bottom right teach label
Correction	Unchangeable correction values. These values are retained after reteaching. Used, for example, for drives of the same type but of different condition (old - new).
X-Coor.	Longitudinal coordinate (X) in 1/100 mm
Y-Coor.	Transverse coordinate (Y) in 1/100 mm
Z-Coor.	Vertical coordinate (Z) in 1/100 mm
Update	Changes individual teach point coordinates. Update becomes active only after a restart.

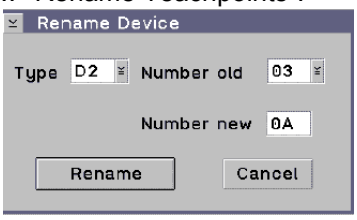
AML/E and AML/2 only

Command	Field	Description
Move		Move teach points of a component at once, e.g. for moving a complete tower.
	Figure 5-13	Window "Move Teachpoints”



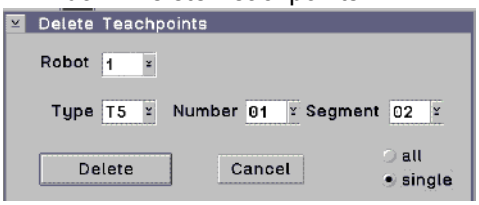
Robot	Robot connected
Type	Component type
Segment	Segment number
Down Left	Coordinates of the bottom left teach label
X-Coor.	Longitudinal coordinate (X) in 1/100 mm
Y-Coor.	Transverse coordinate (Y) 1/100 mm
Z-Coor.	Vertical coordinate (Z)
all	All teach points
single	Individual teach point
towers	All teachpoints of the storage towers
tapedevs	All teachpoints of the drives
linear	All teachpoints of the linear shelves
Move	Starts moving the teach points

Rename		Change the name of a teach point e.g. for change drive addresses
	Figure 5-14	Window "Rename Teachpoints”.

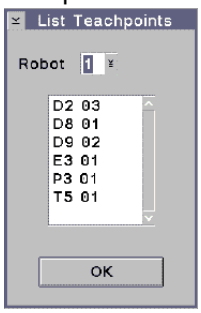


Type	Component type
Number old	Number of component before rename

Command	Field	Description
	Number new	Number of component after rename
Delete	Deletes a teach point.	
	Figure 5-15	Window "Delete Teachpoints”



	Robot	Robot connected
	Type	Component type
	Number	Number of the component
	Delete	Deletes a teach point.
List	Lists all teach points of the system.	
	Figure 5-16	Window "List Teachpoints”



	Robot	Robot connected
	OK	Closes the window "List Teachpoints”.

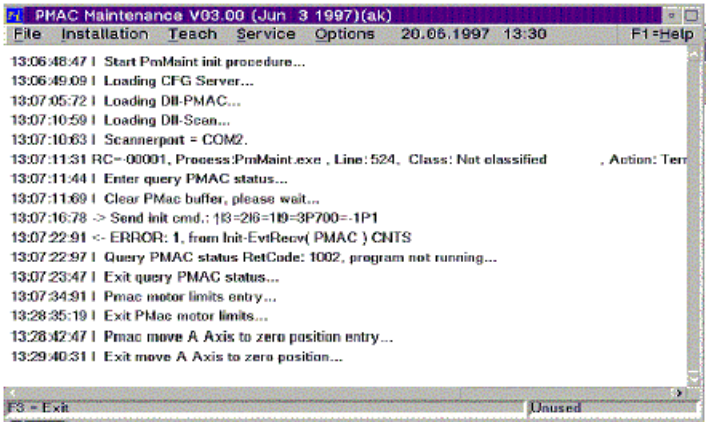
Activate changes in the list of teach points

1. Terminate "JUSTUTIL.EXE” by a double click on the system menu field.
2. Terminate AMU with Shutdown AMU... The "CMD.EXE” window appears.
3. Restart AMU.Enter the following in the "CMD.EXE” window
   `[C:\amu]startup`
4. Test the handling.
5. After teaching, transfer the changed teach point file to the backup or DUAL-AMU (only if available (refer to *DUAL-AMU Service: File Transfer* on page 3-47) and save this file on diskette.

PMMaint

Installation and diagnosis program for AML/J.

Figure 5-17 Window "PMac Maintenance"



Starting PMMaint

The starting sequence for PMMaint program is described here.

NOTE: Terminate AMU process, before starting PMMaint.

For the work with drives on the DCI, the CAN adapter microcode must be downloaded before with \AMU\CAN\DL.BAT.

Starting from OS/2 desktop

1. Double-click "PMMaint." The "PMac Maintenance" window opens.

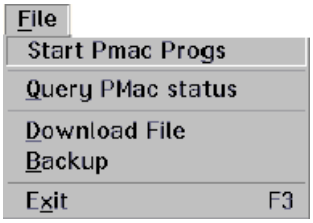
Starting from OS/2 command line

1. Enter `pmmaint [/q] [/n] [/l]`

Option	Explanation
`/q`	suppresses all acoustic messages
`/n`	starts PMMaint without ADIC logo
`/l`	write log file (filename e.g. DEZ08_95.LOG)

Menu File

Figure 5-18 Menu "File"



Start/Stop PMac Progs

Field	Explanation
Start PMac Progs	The PLC program 0 (GLOBAL.PMC) on the PMAC board is started (i5=1). It starts all further processes on the PMAC board. If the initialization is acknowledged positively (message 700), all menu items are released.
Stop PMac Progs	Active programs on PMAC board are stopped (i5=0). Menu items Teach and Initial Teach under menu item Installation are locked on the operating console. Now the following is possible • file transfer to PMAC board (with Download File) • backup

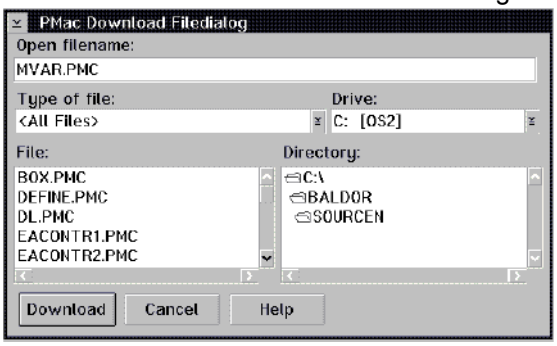
Query PMac status...

Field	Explanation
Query PMac status...	Status query to PMAC board, is robot ready? (`waiting for 700 message`). If the initialization is acknowledged positively (message 700), all menu items are released (except Download/Backup). **Click on** Query PMac status **when the robot has finished its reference movements, but the menu items are not shaded in gray.**

Download File

Command	Field	Explanation
Download File		Transfer PMC files from AMU to PMAC board.

Figure 5-19 Window "PMac Download File dialog"



Open filename	Name of file to be transferred, selectable with Drive, Directory and File
Type of file	Type of file to be transferred (only select *.PMC files for transfer)
Drive	Select drive
File	List of all files in the corresponding directory

Command	Field	Explanation
	Directory	Select directory `C:\AMU` (default for file BACKUP.PMC) or `C:\BALDOR\SOURCEN` (for all other *.PMC files)
	Download	Starts transfer

Backup

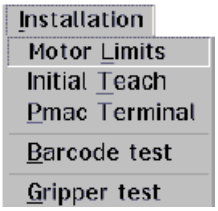
Command	Explanation
Backup	Save all system specific data of the PMAC board in file BAKKUP.PMC in directory C:\AMU: • drive data • adjustment point data • motor limits

Exit

Command	Explanation
Exit	Terminate PMMaint program. The status of the programs on the PMAC board is not changed.

Menu Installation

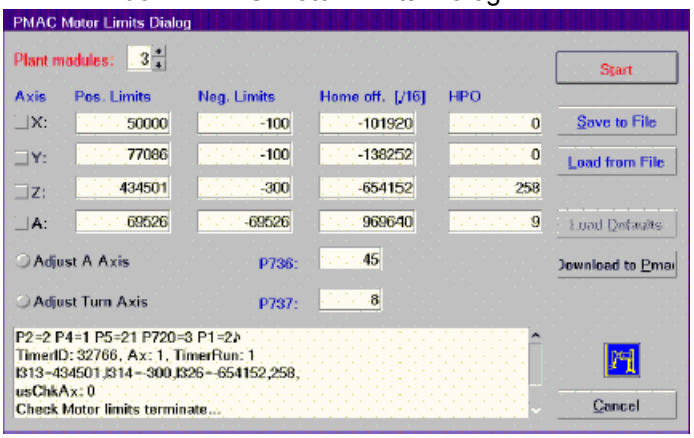
Figure 5-20 Menu "Installation"



Motor Limits

Command	Field	Explanation
Motor Limits		Load current values from PMAC board. The highlighted fields can be edited (you may enter values on them).

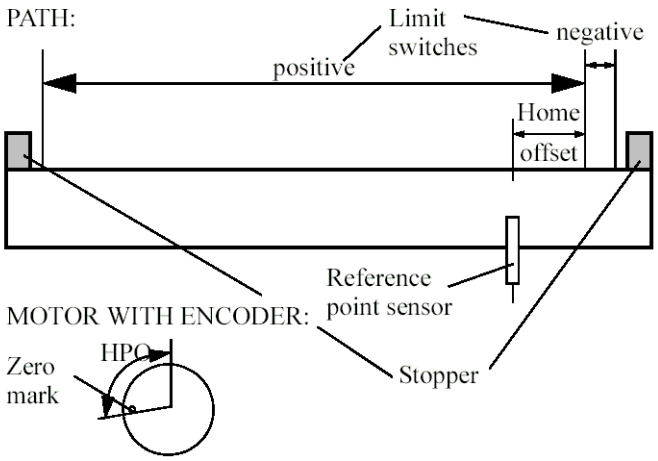
Figure 5-21 Window "PMAC Motor Limits Dialog"



Plant modules:	Number of modules (basic module + all add-on modules). For fast determination of the positive software limit switch on axis Y.
Axis	Select the axes on which you wish to change something (replace motor, replace v-belt, etc.) and set parameters.
Pos. Limits	Maximum positive path of robot on this axis (variable ix13) [in 1/16 counts]
Neg. Limits	Maximum negative path of robot on this axis (variable ix14) [in 1/16 counts]
Home off. [/16]	Distance between reference point (reference point sensor + zero pulse of encoder) and the zero point of the coordinate system [in 1/16 counts]

Command	Field	Explanation
	HPO	Distance between reference point sensor and zero pulse of encoder. If the value is < 45° or > 315°, a warning is displayed and you must shift the reference point sensor. Repeat the procedure Motor Limits (refer to *Motor Limits* on page 5-18).

Figure 5-22 Home Position Offset (HPO)



Start	Robot starts parameter definition for selected axes
Save File	Save parameters found on PMAC board **Additionally, the values are saved in file C:\AMU\PmAxConf.DAT.**
Load File	The parameters are read from the file PmAxConf.DAT and loaded to the window. **The values will not necessarily agree to those on the PMAC board.**
Load Defaults	**Loading the defaults will destroy the existing values for all five axes.** If one axis must be readjusted, it is better to proceed as follows: • click on only this axis under Axis • click on Start Load defaults to window only when the system is inactive (robot not ready). The AML/J system always uses these defaults for its reference movements.
Save to PMac	Download values from the window and save them on the PMAC board.

Command	Field	Explanation
	Adjust A Axis	Start dialog for exact measurement of the A axis (swivelling axis) with a machine level, e.g. after replacing of gripper or after a crash.
	Adjust Turn Axis	Start dialog for exact measurement of the C axis (turning axis) with a machine level, e.g. after replacing of gripper or after a crash.
	P736:	Handling offset A axis (+90 °) [in 1/100 °]
	P737:	Home Offset C axis

Figure 5-23 Window "Adjust A Axis Dialog".

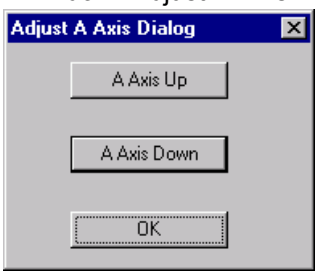
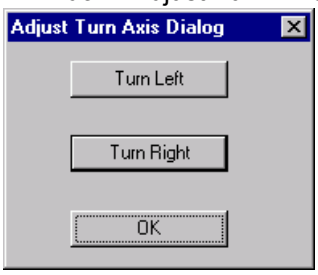


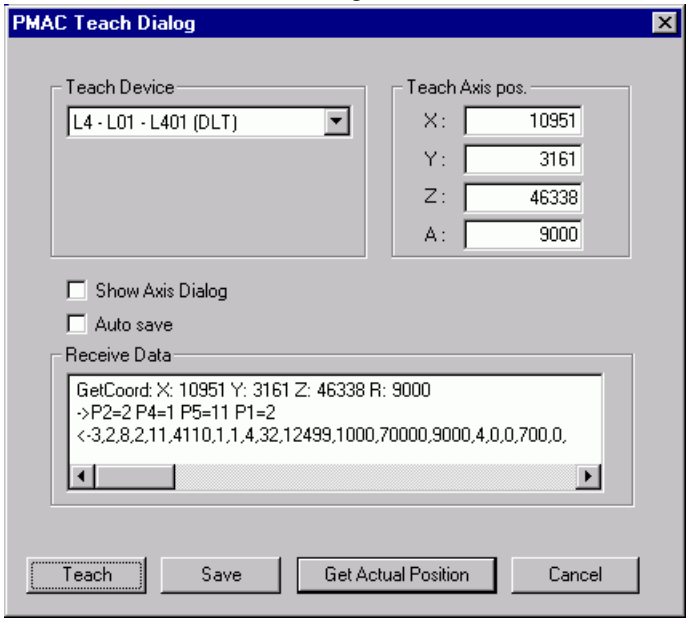
Figure 5-24 Window "Adjust Turn Axis Dialog"



Initial Teach

Command	Field	Explanation
Initial Teach		Determines the coordinates for one teachpoint per component (in the AMU: Graphical Configuration).

Figure 5-25 Window "PMac Teach Dialog"



Teach Device

Component for which to determine teach point. You can select all components defined in the Graphical Configuration (AMUCONF.INI).
Example: Display E5 - E01 - E/I/F 1:

- component type: e.g. E5 (I/O unit/C)
- component address: e.g. E01 (first I/O unit)
- description: e.g. E/I/F 1

Teach Axis pos.

Coordinates of teach point. Values change when:

- Teach Device is selected
- Get Actual Position is selected
- mouse pointer is transferred from PMac Axis Dialog (refer to *Show Axis Dialog* on page 5-22) to PMac Teach Dialog
- robot has determined teach coordinates

The values [in 1/100 mm or 1/100 °] can also be edited manually.

Show Axis Dialog

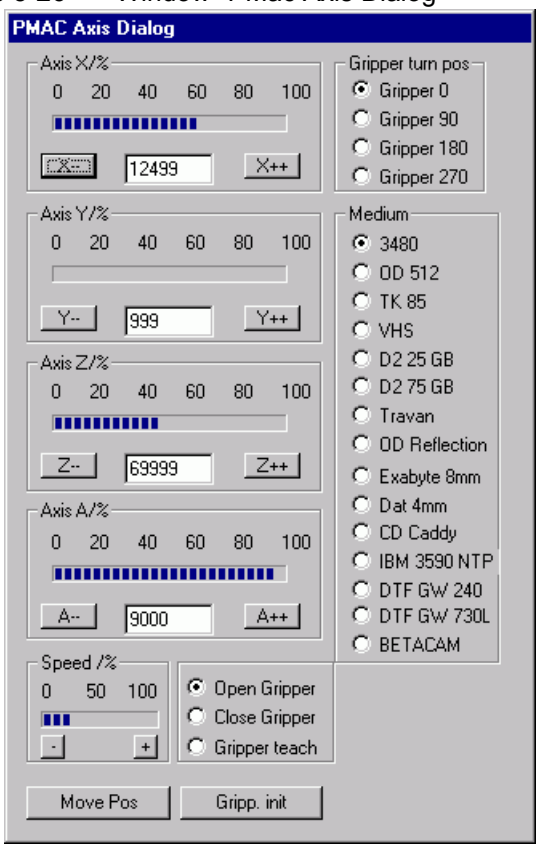
When you click on this, the window PMac Axis Dialog will also open (refer to *Show Axis Dialog* on page 5-22)

Auto save

Upon positive acknowledgement of Teach, the values are automatically written to AMUCONF.INI.

Command	Field	Explanation
	Receive Data	Log of commands during Initial Teach
	Teach	The robot begins to search for the teach label at the coordinates indicated in Teach Axis
	Save	Save coordinates from Teach Axis in file AMUCONF.INI (Graphical Configuration)
	Get Actual Position	Enter coordinates of current robot position in Teach Axis
	Show Axis Dialog	Move axes.

Figure 5-26 Window "PMac Axis Dialog"



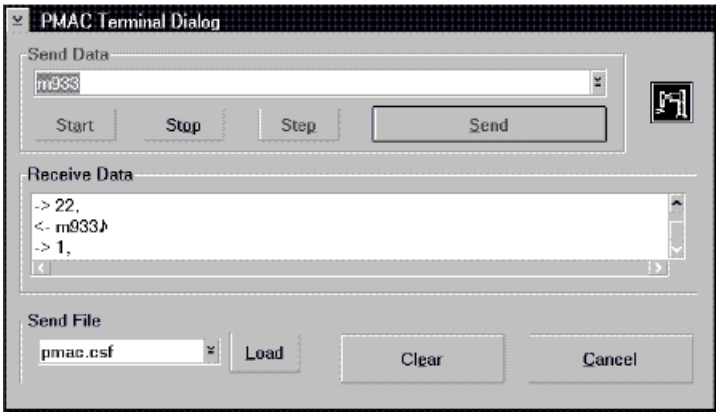
	Speed / % 1..100	Select speed in percent. **Speed values only apply to the** PMac Axis Dialog**.**
	Axis X% 0..100 Y% 0..100 Z% 0..100 A° -100..100	Current position of robot: • in percent of overall length of axis X, Y, Z • in degrees (0 ° = gripper upper) for axis A

Command	Field	Explanation
	X--/X+ Y--/Y+ Z--/Z+ A--/A+	**For small movements first reduce the value for** Speed**.** Move axis X, Y, Z or A by clicking on the respective field.The robot moves as long as you keep the mouse button pressed. **On axis Y, Z or A the speed will automatically increase if you click on the respective field for longer than three seconds.**
	Move Pos	**POTENTIAL FOR CRUSHING OF LIMBS! DAMAGE TO SYSTEM!** **Use this command exclusively to access known coordinates.** The robot moves to the position of the coordinates displayed [in 1/100 mm or in 1/100°].
	Open Gripper	Open gripper.
	Close Gripper	Close gripper.
	Gripper teach	Teach gripper. Close gripper jaws to allow light beam of teach sensor to hit teach label.
	Gripper turn pos	Gripper 0°/90°/180°/270° Turn gripper (axis C) to angle selected
	Medium	Adjust gripper to specific medium. The selection of the medium corresponds to the opening/closing stroke of the gripper.
	Gripp. init	New reference movement of stepper motors (A and C axis).

PMac Terminal

Command	Field	Explanation
PMac Terminal	Send PMAC Online commands.	

Figure 5-27 Window "PMAC Terminal Dialog"

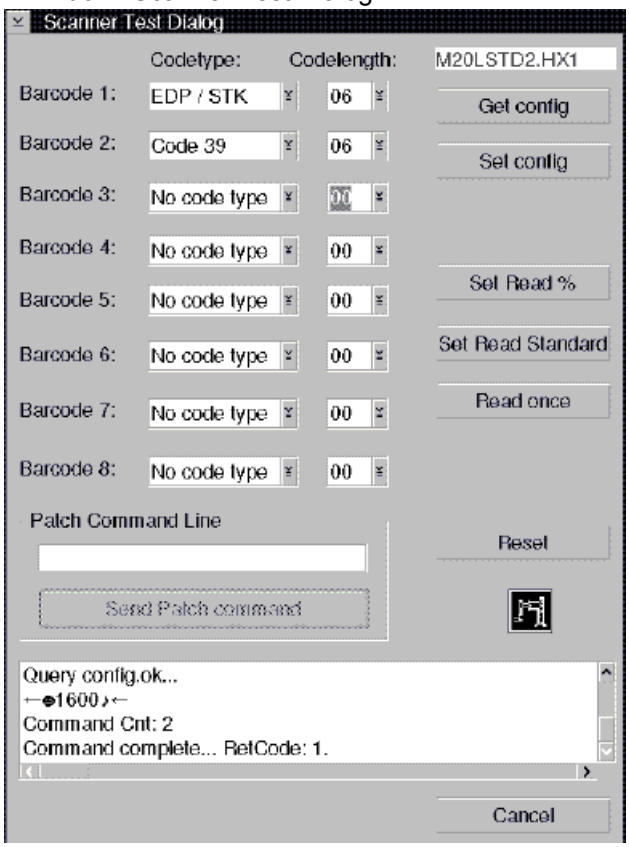


Command	Field	Explanation
	Send Data	Input field for online commands. You can enter commands directly or select them from the file under Send File.
	Start	Start commands from the file in field Send File
	Stop	Stop loop
	Step	Execute one command from the file in field Send File and switch to next command
	Send	Send contents of field Send Data. The result is shown in field Receive Data
	Receive Data	Log of executed command, the answers come in from the PMAC board. Communication with the PMAC board: • -> to PMAC • <- from PMAC
	Send File	Select a file from the list of all *.CSF file in directory C:\AMU. The commands in the selected file appear in field Send Data
	Load	The file selected with Send File is loaded to the program
	Clear	Clear window Receive Data

Barcode Test

Command	Field	Explanation
Barcode test		Test scanner function. Configuration of readable barcode types

Figure 5-28 Window "Scanner Test Dialog"



Barcode 1..8: Register for barcode types that may be configured. Depending on the scanner software, a max. 4 or max. 8 different barcode settings may be configured.

Codetype: Barcode type Select types used in the system:

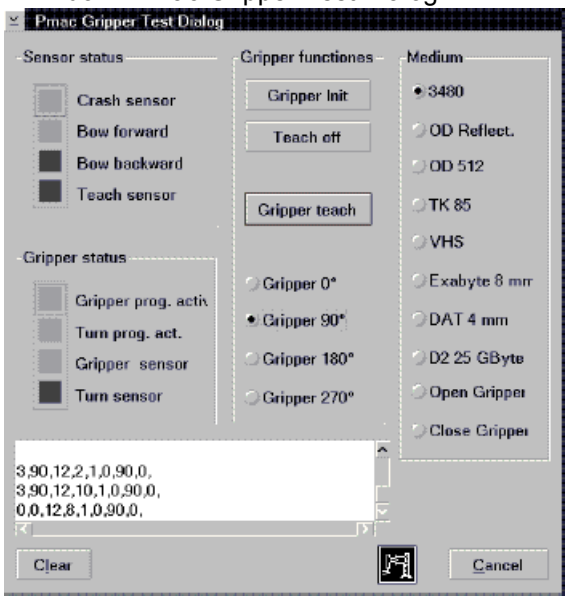
- Straight 2 of 5
- Interleaf 2 of 5
- EDP/STK (Code 39 modified)
- Code 39
- Code 128
- No code type (register not configured)

Command	Field	Explanation
	Codelength:	Number of characters in each volser: **Defined codelengths should be used preferably. This largely reduces the likeliness of the error "Wrong Barcode".** • 00 = any number of characters • 01..16 = depending on volser length
	Get config	Load scanner configuration into window Scanner Test Dialog
	Set config	Send parameters set in window Scanner Test Dialog (and additional standard parameters to the scanner. Save parameters in scanner EEPROM
	Set Read %	Activates quality diagnosis for barcode reading. During each subsequent Read the scanner returns the volser and the read quality in % (see in Log window). **Select this command only to optimize** Read**.**
	Set Read Standard	Switch quality diagnosis off immediately after Read optimizing (= standard during production)
	Read once	Read at current robot position. Result display (see in Log window).
	Reset	Prepare window for new command. Reset scanner communication
	Patch Command Line	Command line for input of CRT commands (see Documentation for AML/J components)
	Send Patch command	Send commands listed in Patch Command Line to Scanner

Gripper test

Command	Field	Explanation
Gripper test		Test sensors and motors on gripper.

Figure 5-29 Window "PMac Gripper Test Dialog"



Sensor status	Possible status of gripper sensors: • red = sensor active • green = sensor inactive • yellow = no information Gripper sensors displayed: • Crash sensor • Bow forward (query pin) • Bow backward (query pin) • Teach sensor
Gripper status	Display signals for gripper motors (stepper motors axis B and C) • Gripper prog. active • Turn prog. act. • Gripper sensor • Turn sensor
Gripper functions	• Gripper Init - Re-reference gripper motors • Teach on/off - Switch on/off reflected light sensor (= teach sensor) • Gripper teach - Close gripper jaws to allow light beam of teach sensor to hit teach labels • Gripper 0°/90°/180°/270° - Turn gripper (axis C) to angle selected

Medium	The selection of the medium corresponds to the opening/closing stroke of the gripper. • Open Gripper - Open gripper • Close Gripper -Close gripper
Clear	Clear Log window

Menu Teach

Figure 5-30 Menu "Teach"

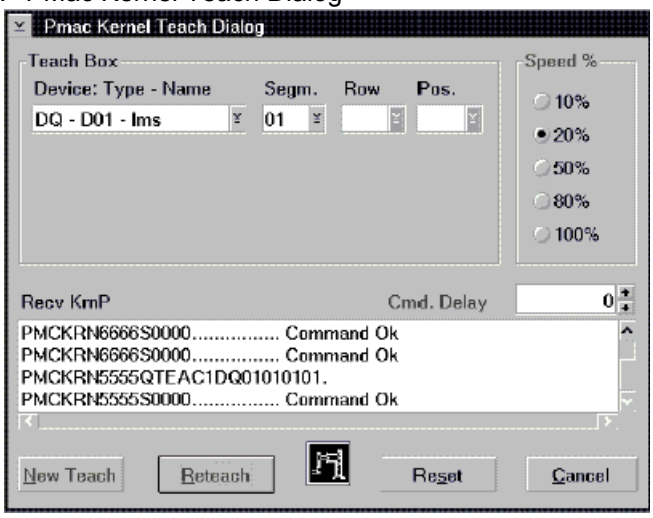
Teach Devices

Teach command with the same functions of the teach command available on the AMU operating console.

Program PMMaint

- start KRN/P from AMU
- send commands to KRN/P

Figure 5-31 Window "PMac Kernel Teach Dialog"



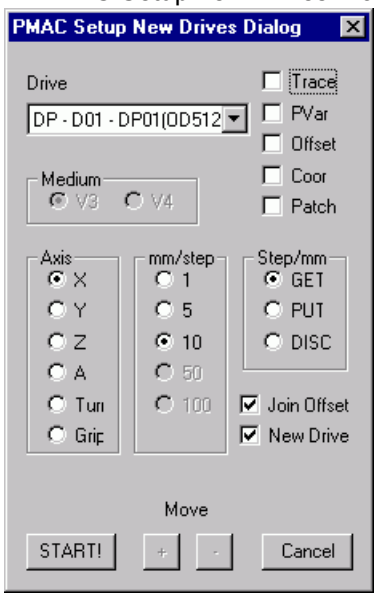
Command	Field	Explanation
Teach Box	Device: Type - Name	Select component to teach (from all components defined in the Graphical Configuration - file "AMUCONF.INI"). Display DQ - D01 - Philips LMS • component type: e.g. DQ (drive Philips) • component address: e.g. D01 (first drive) • description: e.g. Philips LMS

Command	Field	Explanation
	Segm.	Select segment in storage tower (always 1 on AML/J, exception I/O unit/D (HICAP): 1 or 2)
	Row	not used
	Pos.	not used
Speed %	Speed for teach. **Reduce the speed if you are not sure if the teach coordinate is correct.**	
Cmd. Delay	Wait time between clicking on field Execute and execution of the command by the robot. **Command delay is useful in larger systems.**	
Recv KrnP	Log window for display of data exchange with KRN/P of AMU	
	New Teach	Reteach a component (AMU-Option 1N). **Reteach only segment 1 of the I/O unit/D (HICAP) with New Teach.** • Values existing for this component in file KrnRefPt.R00 will be deleted. • From the basic teach coordinate (AMUCONF.INI) the robot determines the coordinate of all required teach points of the component. • Teach points are automatically save in file KrnRefPt.R00.
	Reteach	Reteach a component (AMU-Option 1). **Always reteach segment 2 of I/O unit/D (HICAP) with Reteach.** • On the basis of the teach point file KrnRefPt.R00 the robot defines the coordinates of all required teach points. • Changed values are automatically saved in file KrnRefPt.R00.
	Reset	• Reset contents of Log window • Prepare window for start of new command Reset **does not reset the command processing by the PMAC board.**

Setup new Drives

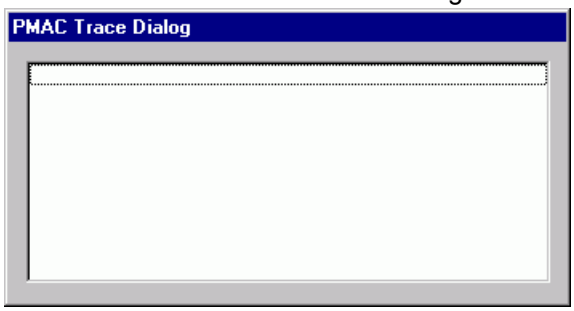
Command	Field	Explanation
Setup new Drives		Set up handling of drives.

Figure 5-32 Window "PMAC Setup new Drives Dialog"



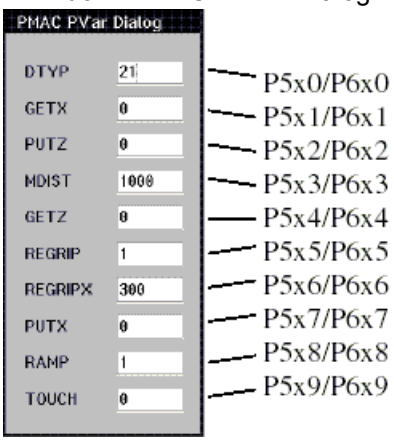
Drive	Select drive defined in the Graphical Configuration.
Trace	The communications window PMAC Trace Dialog opens when you click here:

Figure 5-33 Window "PMAC Trace Dialog"



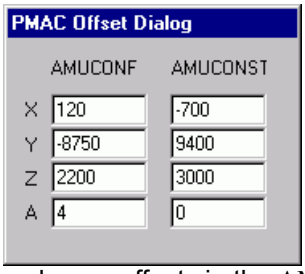
Command	Field	Explanation
	PVar	PVAR values are displayed when you click here. (refer to *PVAR* on page 5-32). Make changes via PMac Terminal (refer to *PMac Terminal* on page 5-23).

Figure 5-34 Window "PMAC PVAR Dialog"



	Offset	The offset values in AMUCONF.INI or AMUCONST.INI are displayed when you click here:

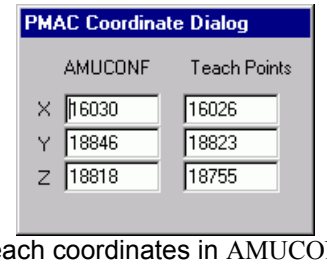
Figure 5-35 Window "PMAC Offset Dialog"



You can also change offsets in the AMUCONF with Adjust Handling (refer to *Adjust Handling* on page 5-33).

	Coor.	The X, Y, and Z coordinates in AMUCONF.INI or KRNREFPT.R00 are displayed when you click here:

Figure 5-36 Window "PMAC Coordinate Dialog"



Change teach coordinates in AMUCONF with Initial Teach (refer to *Initial Teach* on page 5-21). Change teach coordinate in KRNREFPT with Teach Devices (refer to *Teach Devices* on page 5-28).

	axis	Select axis to be moved.

Command	Field	Explanation
	mm/step	Select step width (in mm/step).
	action	• Get: get medium from drive • Put: put medium into drive • Disc: press eject button
	Join Offset	Set offsets of Get and Put to the same value.
	New Drive	Basic adjustment. Slows the speed for set up of new drives. Robot moves to save starting position in front of drive. Move the robot step by step to the target position, using the mouse.
	GO!/CLOSE GO!/OPEN	• GO! - Start movement for Get/Put/Disc • CLOSE- Close gripper for Get • OPEN - Open gripper for Put
	move +/-	Direction of movement in room coordinates. Active when manual axis movement is possible.
	regrip? / push tape? (y/n)	Drive handling. • REGRIP (refer to *PMAC PVAR DIalog* on page 5-32) • MDIST (refer to *PMAC PVAR DIalog* on page 5-32)
	save	Save parameters found to PMAC board (P500..P699) AMUCONF.INI (Offsets)

PMAC PVAR DIalog

- You can define up to 10 drives (x = 0.. 9).
- drive handling: enter the required values for correct handling for the parameters P5x1 through P6x9
- drive type: Enter the PMAC values for the parameter P5x0

Parameter	PVAR	Explanation
5x0 6x0	DTYP	Drive type: PMAC value (defined in AMUCONST.INI)
5x1 6x1	GETX	Distance for forward movement after a medium has been recognized during Keep X-Offset [in 1/100 mm]
5x2 6x2	PUTZ	Z offset for Put [in 1/100 mm]
5x3 6x3	MDIST	Defines how far the gripper will push the medium into the drive: • -3500 - no pushing • 0 - push forward by 3500 [in 1/100 mm]

Parameter	PVAR	Explanation
5x4 6x4	GETZ	Z offset for Get [in 1/100 mm]
5x5 6x5	REGRIP	Regrip during Keep (0 = No, 1 = Yes)
5x6 6x6	REGRIPX	Distance during regrip during Keep 0 - 1300 [in 1/100 mm] other values - 1300 [in 1/100 mm] + value
5x7 6x7	PUTX	X offset for subsequent Put (after Get at drive) Use this parameter if it is not necessary to grab the medium completely. ("Complete" here means "No space between medium and the two gripper pins")
5x8 6x8	RAMP	Factor for ramp acceleration during pushing for Put (higher values correspond to lower acceleration)
5x9 6x9	TOUCH	For drive type D9 only: recognize medium during Keep • 0 - touch • 1 - no touch

Adjust Handling

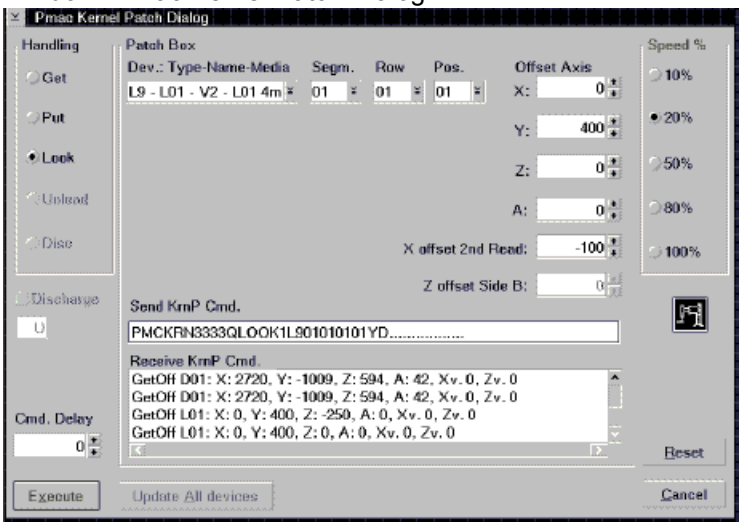
Dialog for inspection and adjustment of handling.

- with the functions Put, Get, Look, Unload Unit and Discharge from the AMU operating console.
- connected with the edit function for file AMUCONF.INI for handling offset values (OSET)

Program PMMaint

- starts KRN/P of AMU
- sends command to KRN/P

Figure 5-37 Window "PMac Kernel Patch Dialog"

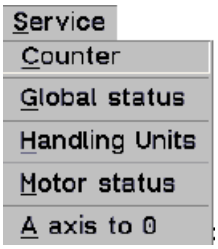


Command	Field	Explanation
PMac Kernel Patch Dialog	Device: Type - Name	Select component to patch (from all components defined in the Graphical Configuration AMUCONF.INI). Display L9 - L01 - 4mm • component type: e.g. L9 (linear shelf across 3 of 6 slide-in modules) • component address: e.g. L01 (first linear shelf) • description: e.g. 4mm
	Segm.	Select a segment of storage towers (always 1 on AML/J, except I/O unit/D (HICAP): 2 segments)
	Row	Select row of linear shelf. Always 1 on drives and problem box. **Be sure to check the handling of extreme positions (top and bottom rows).**
	Pos.	Number of compartment **Each Optical Disk occupies two compartments.**
	Offset Axis	Correction values in gripper coordinates [in 1/100 mm or 1/100 °] for the selected handling command. The values are saved when you click on field Execute (in file AMUCONF.INI). X offset 2nd Read - X offset for Look (2nd read) Z offset Side B - Z offset for Get, Put from drive for Optical Disks on B side
	Get	Get medium. This command can be executed only if there is not medium in the gripper. After positive acknowledgement the program automatically changes to Put.
	Put	Put medium. This command can only be executed if a medium is in the gripper. After positive acknowledgement the program automatically changes to Get.
	Look	Read barcode. This command can only be executed when no medium is in the gripper. After positive acknowledgement the volser is displayed in field Recv KrnP - Command.
	Unload	For 3490 drives only. Corresponds to a Keep after Disc. Get unloaded medium from drive).
	Disc.	Actuate eject button on drive
	Discharge	Reserved for future use
	Speed %	Speed for Patch. **Reduce the speed to be able to watch the handling carefully.**
	Receive KrnP Cmd.	Log window for display of data exchange with KRN/P of AMU

Command	Field	Explanation
	Cmd Delay	Wait time between click on field Execute and execution of the command by the robot. **Command delay is useful in larger systems.**
	Execute	Click on Execute to start the command previously selected
	Update All devices	**Destroys all handling adjustments!** When you click this button, update to the values in the active window is started for the following components • all linear shelves • all drive of the same type • all I/O units/C Active only when handling has been selected.
	Reset	Reset contents of Log window Prepare window for start of new command Reset **does not reset the command processing by the PMAC board.**

Menu Service

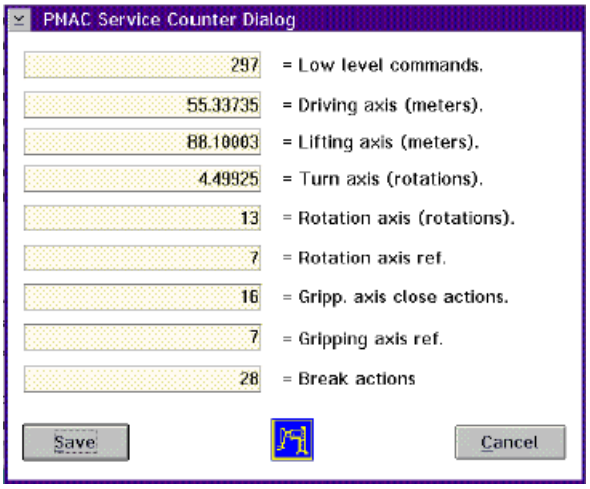
Figure 5-38 Menu "Service"



Counter

Command	Field	Explanation
Counter	Performance counter of system (maintenance intervals).	

Figure 5-39 Window "PMAC Service Counter Dialog"

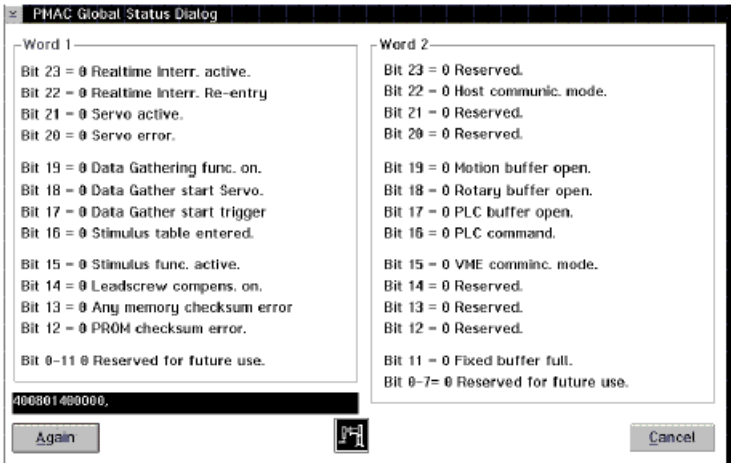


Low level commands	Number of all individual commands (each AMU command is composed of several individual commands)
Driving axis (meters).	Distance travelled in Y axis [in m]
Lifting axis (meters)	Distance travelled in Z axis [in m]
Turn axis (rotations).	Distance travelled in A axis [in revolutions]
Rotation axis (rotations).	Distance travelled in C axis [in revolutions]
Rotation axis ref.	Number of reference movements of C axis
Gripp. axis close act.	Number of gripping actions
Gripping axis ref.	Number of reference movements of B axis
Brake actions	Number of changes in brake status of Z axis
Save	Save counter values in a file in directory C:\AMU (e.g. FEB27_96.CNT)

Global status

Command	Field	Explanation
Global status	Display global status bits. For error diagnosis.	

Figure 5-40 Window "PMAC Global Status Dialog"



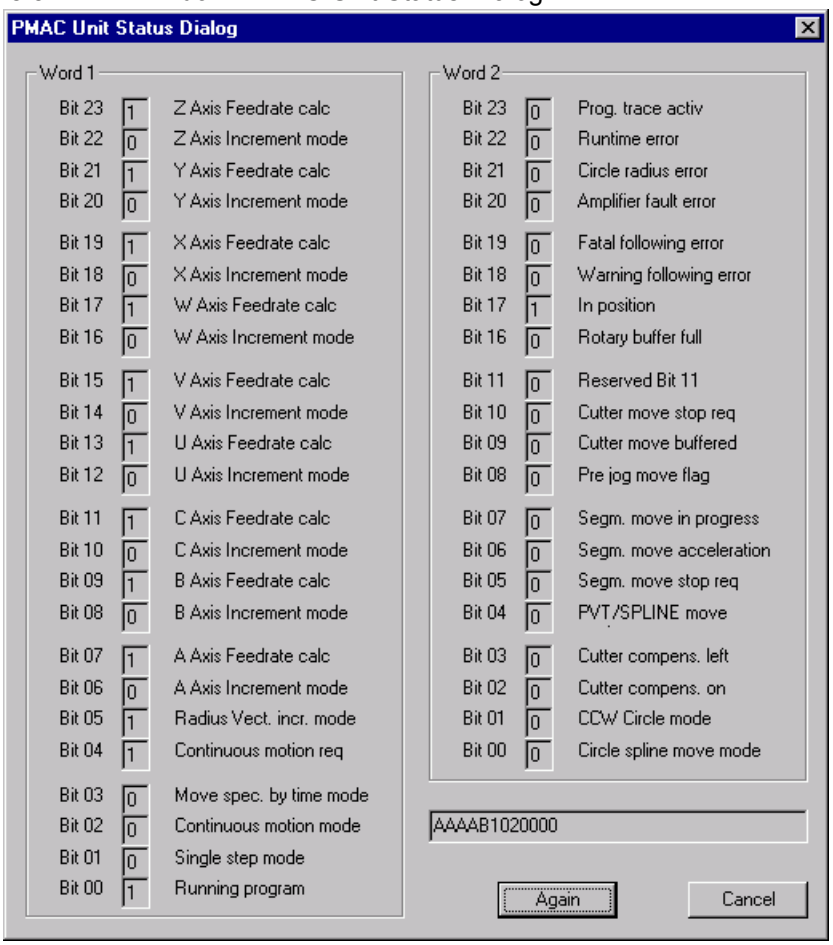
Realtime Interr. active	For internal use (in PMAC board), during communication this bit is 0. PMAC processes a program on the realtime interrupt level (PLC 0 or motion planning)
Realtime Interr. Re-entry	Program on realtime interrupt level has required more time (I8+1 Servo cycles). The subsequent realtime interrupt has already been tripped.
Servo active.	For internal use (in PMAC board), during communication this bit is 0. PMAC processes a program with servo update
Servo error.	PMAC could not completely process servo routines
Data Gathering func. on.	"Data Gathering" function in PMAC is active
Data Gather start servo	"Data Gathering" function will be activated during the next cycle
Data Gather start trigger	"Data Gathering" function will be activated with start of machine input 2
Stimulus table entered.	"Stimulus table" was loaded to PMAC board
Stimulus func. active.	"Stimulus table" in PMAC board is active
Leadscrew compens. on.	"Leadscrew Compensation" is active on PMAC board

Command	Field	Explanation
	Any memory checksum error	Checksum error has occurred in PMAC firmware or in application program memory
	PROM checksum error.	Checksum error has occurred in PROM of PMAC firmware
	Host communic. mode.	Alphanumeric character has been received via "Host port". Thus the board is prepared for "Host communication" (PC bus or STD bus). This bit is set to 0 with <CTRL> <Z> via the serial interface (AML uses PC bus only)
	Motion buffer open.	Motion buffer memory is open (PROG or ROT) for input
	Rotary buffer open.	Rotary motion buffer is open (ROT) for input
	PLC buffer open	PLC program buffer is open for input
	PLC command.	PLC command currently being executed. (Bit for internal use)
	VME comminc. mode.	Alphanumeric character has been received via "Mailbox port". Thus the board is ready for "VME Bus Communication". This bit is set to 0 with <CTRL> <Z> via the serial interface (AML uses PC bus only)
	Fixed buffer full.	• either no fixed motion program is open, OR • PLC buffer is open, OR • less than the free space defined in variable I18 is available while the buffer is open
	Again	Update display

Handling units

Command	Field	Explanation
Handling units	Display status bits for the handling unit.	

Figure 5-41 Window "PMAC Unit Status Dialog"



Z-Axis Feedrate calc.	Axis performs "Vector-based feedrate" for "F-based" movement in coordinate system
Z Axis Increment mode	Axis performs shift motion from last programmed point (command INC)
Y Axis Feedrate calc.	Axis performs "Vector-based feedrate" for "F-based" movement in coordinates system
Y Axis Increment mode	Axis performs shift movement from last programmed point (command INC)
X Axis Feedrate calc.	Axis performs "Vector-based feedrate" for "F-based" movement in coordinate system

Command	Field	Explanation
	X Axis Increment mode	Axis performs shift movement from last programmed point (command INC)
	W Axis Feedrate calc.	Axis performs "Vector-based feedrate" for "F-based" movement in coordinate system
	W Axis Increment mode	Axis performs shift movement from last programmed point (command INC)
	V Axis Feedrate calc.	Axis performs "Vector-based feedrate" for "F-based" movement in coordinate system
	V Axis Increment mode	Axis performs shift movement from last programmed point (command INC)
	C Axis Feedrate calc.	Axis performs "Vector-based feedrate" for "F-based" movement in coordinate system
	C Axis Increment mode	Axis performs shift movement from last programmed point (command INC)
	B Axis Feedrate calc.	Axis performs "Vector-based feedrate" for "F-based" movement in coordinate system
	B Axis Increment mode	Axis performs shift movement from last programmed point (command INC)
	A Axis Feedrate calc.	Axis performs "Vector-based feedrate" for "F-based" movement in coordinate system
	A Axis Increment mode	Axis performs shift movement from last programmed point (command INC)
	Radius Vect. incr. mode.	Coordinate system performs shift movement for circular movement
	Continuous motion req.	A command with several movements has been started for the coordinate system (e.g. R-command)
	Move spec. by time mode.	The current movement is based on a time value (TM or TA)
	Continuous motion mode.	Coordinate system performs a sequence of movements without intermediate stop
	Single step mode.	Motion program performs individual steps (individual movements or blocks of movements) or a Q command (Quit) has been sent
	Running program	Coordinate system performs a motion program
	Prog. trace activ.	Motion program Trace is active (command TRACE). Stop with ENDTRACE

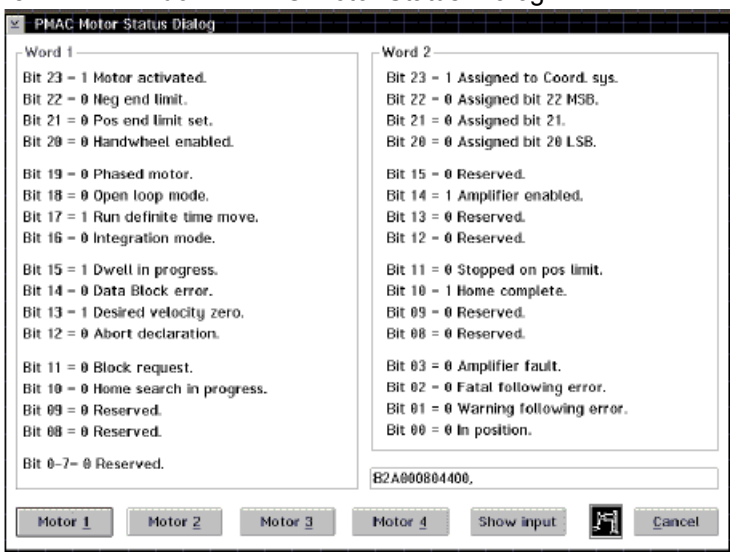
Command	Field	Explanation
	Runtime error	Coordinate system has stopped motion program due to an error (e.g. jump to non-existent mark in program or wrong processing time)
	Circle radius error.	Command for circular motion with more than twice the radius of the circle
	Amplifier fault error.	One motor in the coordinate system has received an amplifier error
	Fatal following error	One motor in coordinate system cannot follow the motion commands (Ix11)
	Warning following error	One motor in coordinate system has an increased difference between actual position and setpoint (Ix12)
	In position.	All axes in coordinate system are in their setpoint positions • set speed is 0 • no motion command with time (DWELL) is active • axes within the follow up error limits (Ix28)
	Rotary buffer full.	"Rotary buffer" has been activated for the coordinate system, but more command lines than defined in variable I16 are in the memory
	Cutter move stop req.	A movement with "Cutter Compensation" is stopped
	Cutter move buffered.	During a movement with "Cutter Compensation", a new movement is computed and buffered
	Pre jog mode flag.	An axis in the coordinate system performs a jog movement (J-command)
	Segm. move in progress.	Bit for internal use. Coordinate system performs movement in "Segmentation mode" (I13 > 0)
	Segm. move acceleration.	Bit for internal use. Coordinate system performs movement in "Segmentation mode" (I13 > 0) and accelerates from standstill
	Segm. move stop req.	Bit for internal use. Coordinate system performs movement in "Segmentation mode" (I13 > 0) and brakes until standstill
	PVT/SLPINE move mode.	Coordinate system performs movement in "PVT/SPLINE mode"
	Cutter compens. left.	"Cutter Compensation" is active. The compensation is made on the left side in the direction of motion
	Cutter compens. on.	"Cutter Compensation" is active in coordinate system

Command	Field	Explanation
	CCW Circle mode.	Coordinate system is in "CIRCLE2 move mode" (command counterclockwise arc)
	Circle spline move mode.	Coordinate system is in CIRCLE/SLINE move mode (bit 4 decides whether it is SPLINE or CIRCLE mode)
	Again	Update monitor display

Motor status

Command	Field	Explanation
Motor status	Display status bits of DC motors.	

Figure 5-42 Window "PMAC Motor Status Dialog"



	Motor activated	Motor activated (Variable Ix00) • servo calculation every 30 µsec/cycle • no unconditional motor release
	Neg. end limit.	Current position value is lower than value of negative software limit switch (Ix14) • motor movements and motion programs are interrupted • motors are braked according to Ix15
	Pos. end limit set.	Current position value is higher than value of positive software limit switch (Ix13) • motor movements and motion programs are interrupted • motors are braked according to Ix15
	Handwheel enabled.	Follow up mode is activated (Ix06)

Command	Field	Explanation
	Phased motor.	Motor control (commuting) is performed by PMAC board (Ix01) • phasing calculation every 3 µsec/cycle • two analog outputs for the motor
	Open loop mode.	Position control loop is open (bit for amplifier release)
	Run definite time move.	Motor performs a movement with predefined end position and end time.
	Integration mode.	"Servo Loop Integrator" is active only when the set speed is 0 and Ix34 is 1
	Dwell in progress.	Motor coordinate system executes the command DWELL (dwell time between two movements)
	Data Block error.	Movement has been interrupted, because the values for the next motion cycle were not present in time
	Desired velocity zero.	Motor control loop is closed and the set speed is 0 (current position is maintained)
	Abort declaration.	Motor brakes because of interrupt command or because software limit switch is reached
	Block request	Motor has reached new movement section (for internal use)
	Home search in progress.	Motor searches reference point signal (signal will be reset, when trigger signal comes in)
	Assigned to Coord. sys.	Motor has been assigned to one axis in coordinate system
	Assigned bit 22 MSB	Binary coded value for motor address (number in coordinate system - 1)
	Assigned bit 21	Binary coded value for motor address (number in coordinate system - 1)
	Assigned bit 20 LSB	Binary coded value for motor address (number in coordinate system - 1)
	Amplifier enabled	Outputs for drive amplifier have been released: • in "Open-loop" operating mode, or • in "Closed-loop" operating mode
	Stopped on pos limit.	Motor has been stopped at software limit switch. This bit remains set even if the condition for stop is no longer present.
	Home complete	Reference point movement has been completed successfully (axis has regular coordinate system)
	Amplifier fault	Amplifier has shut off due to an error (amplifier error signal)

Command	Field	Explanation
	Fatal following error.	Motor has shut off due to exceeding of "Fatal Following Error Limits" (Ix11)
	Warning following error.	Motor has exceeded the value "Warning Following Error"
	In position	"desired velocity bit" = 1 (no motion command active and position control loop closed) all program timers are off (DWELL and DELAY commands) value of position deviation is lower than variable Ix28
	Motor 1	Monitor display of X motor status. Select this field if problems with the X axis have occurred.
	Motor 2	Monitor display of Y motor status. Select this field if problems with the Y axis have occurred.
	Motor 3	Monitor display of Z motor status. Select this field if problems with the Z axis have occurred.
	Motor 4	Monitor display of A motor status. Select this field if problems with the A axis have occurred.
	Show Input	**Enter a 12 digit hex number and a colon on the field.** Sets input in field to the individual bits of word 1 and word 2.

LOG2ASC

The Tool for converting the binary Log-File in the directory C:\AMU\LOGS-TRC into the ASCII-format. The conversion is only required for log files of AMU version 2.40 or earlier.

Syntax

```
[drive][path]log2asc <logfile> [outfile] [msgfile]
```

Parameter	Explanation
`logfile`	Path and filename of the AMU log file to be converted into binary format
`outfile`	Path and filename of the ASCII log file to be generated Default: `log2asc.out`
`msgfile`	Path and name of the file with the texts of the AMU system. Default: `c:\AMU\AMU.MSG`

Example

```
c>  c:\amu\log2asc c:\amu\logs-trc\log3011.001 log3011.txt
```

Structure of Log-Filename:

- identification: log
- date with zeros: e.g. 3011
- count number: e.g. 001

SHOWINI

Showini is a program for display of the content of configuration files in OS/2 Format (ini). The program is called up from an OS/2 window in the directory in which the configuration file is saved (default C:\AMU).

Step 1 Open an OS/2 window, change to the directory in which the file is saved, e.g.

```
c> cd amu
```

Step 2 Enter the command Showini (Syntax see below). If the output exceeds one window you can view it page by page with the option "more", e.g.

```
c:\amu> showini -c ZTYP |more
```

Syntax

Command	Explanation
`showini`	Display all ranges in the file AMUCONF.INI (RANGE) with short descriptions
`showini RANGE`	Display all parameters and their values in the file AMUCONF.INI in the selected RANGE
`showini RANGE ITEM`	Display only selected parameter with its value in file AMUCONF.INI
`showini -a`	Display complete file AMUCONF.INI
`showini -m STRING`	Display all parameters in file AMUCONF.INI which contain the string entered. Uppercase and lowercase letters are differentiated. String is made up with the format of a "regular expression" according to standard UNIX conventions.
`showini -c`	Display all ranges in the AMUCONST.INI (RANGE) with a short description
`showini -c RANGE`	Display all parameters and their values in the file AMUCONST.INI in the selected RANGE
`showini -c RANGE ITEM`	Display only the selected parameter with its value in file AMUCONST.INI
`showini-c -a`	Display complete file AMUCONST.INI
`showini -c -m STRING`	Display all parameters in the file AMUCONST.INI containing the string entered. Uppercase and lowercase letters are differentiated.
`showini -t`	Test files AMUCONF.INI and AMUCONST.INI for completeness

Command	Explanation
`showini -f filename`	Display any INI file

Range in the file AMUCONF.INI

RANGE	Explanation
TEPO	Basic teach points (T01R01: +XXXXXX +YYYYYY +ZZZZZZ L)
LIDE	Linear shelves (component and media)
INFA	Interfaces of AMU (types and parameters)
LORA	"Logical Ranges" (range definition in I/O unit) (0001: E001010101 E001020304 A I01)
TOWR	Storage towers (component, media and options)
POBO	Problem box (component and media)
HOST	Host (component)
CTRL	Control unit (device info)
VERSION	AMU 3.12
SCAN	Barcode scanner for AML/J (device info)
SWIT	ADS (device info)
OSET	Offset values for AML/J Handling STYP: xyz for Get Put ...
DCNT	Drive folder
EIF	I/O unit (device info, Media and options)
ROBO	Robot (device info)
AMU	AMU (device info and options)
DRIV	Drives (device info)
PROC	Process configuration (general parameters for database; authorization, backup)
CONI	Connections (communication and robot access)
VORA	Volser numbering (0001: T001010101 T002030405 12345 65432 AAA999 Y S 1)

Ranges in file AMUCONST.INI

RANGE	Explanation
INIT	Maximum values for all components (not used)
MTYP	All media types
DTYP	All components with basic values for number of segments and default media
STYP	All segment types (S+DTYP+MTYP) with number of rows and columns for all media
ITYP	All communication modes
ZTYP	Offsets for all segment types (S+DTYP+MTYP)
MODL	Parameters for start of AMU modules by the Kernel
CMDS	Commands that can be locked

PATINI

Patini is a program allowing to change parameters in configuration files in OS/2 ini format, outside graphical input windows.

CAUTION: **The program must only be used by trained technicians consulting with the service department of ADIC. Improper use can lead to failure of AMU and damage of the system.**

Step 1 Open an OS/2 window, change to the directory in which the ini file to be edited is saved, e.g.

```
c> cd amu
```

Step 2 Enter the patini command (syntax see below). Observe uppercase and lowercase conventions, strings with spaces must be enclosed in " ", e.g.

```
c:\amu> patini PROC DBDRIVE D
```

Step 3 Check changes on the display

```
-----------------------------------------------------
patini-Super 2.1 started.
patini-Super uses D:\amu\AMUCONF.INI.
-----------------------------------------------------
BEFORE: PROC   DBDRIVE: C
AFTER : PROC   DBDRIVE: D
```

Step 4 Terminate all processes accessing the configuration data: AMU, DAS, PMMAINT etc. (if in doubt, perform OS/2 shutdown)

Step 5 Start AMU

Step 6 Save changed files

- on diskette
- on second hard disk (if installed)
- on DUAL AMU (if installed)

Syntax

Command	Explanation
`patini -h`	Display command syntax

Command	Explanation
`patini RANGE ITEM VALUE`	Change ITEM in RANGE to the new VALUE in file AMUCONF.INI
`patini -c RANGE ITEM VALUE`	Change ITEM in RANGE to new VALUE in file AMUCONST.INI
`patini -f INIFILENAME RANGE ITEM VALUE`	Change ITEM in RANGE to new VALUE in file INIFILENAME

Procedures

This section describes the main procedures you need to know in order to operate the AMU software.

Switching the AMU Computer On

Step 1 Switch the alternating switch for monitor, mouse and keyboard to the computer you wish to switch on (only on systems with DUAL-AMU).

Step 2 Switch the ADS to AUTO (only on systems with DUAL-AMU).

Step 3 Switch the computer on

- computer Bios initializes
- operating system is loaded
- command file `startup` is automatically processed (starts communication and AMU processes)

Step 4 Select the window "AMU V.." by clicking on the headline of the window.

Step 5 If the window AMU Log does not open automatically, select the command Log from the View menu.

Step 6 Check the messages for errors during startup (see the Problem Determination Guide).

Step 7 Repeat the procedure for the second AMU computer (if installed)

Starting the AMU Operating Console

NOTE: Only if the AMU operating console does not appear on screen anymore or if it has been terminated unintentionally, start it as follows:

1. Press <CTRL> + <ESC> (process list).
2. Check whether CON and KRN have been started.

When only "KRN.EXE" has been started

1. Change to an OS/2 input window.
2. Enter the following commands in the OS/2 input window:
```
[C:\]cd amu
[C:\AMU]con
```

When only AMU has been started

1. Change to an OS/2 input window.
2. Enter the following commands in the OS/2 input window:
```
[C:\]cd amu
[C:\AMU]krn
```
3. Press <CTRL> + <ESC> (process list) and change the AMU process.

When none of the two processes has been started

1. Change to an OS/2 input window.
2. Enter the following commands in the OS/2 input window:
   `[C:\]startup`

Terminating the AMU Operating Console

CAUTION: **Deviate from the following procedure for termination of the AML system only in case of emergency. Otherwise some files required for restart of the system may be altered or destroyed.**

The description of terminating the AMU operating console follows.

Switching the AMU Computer Off

NOTE: The computer runs continuously and therefore is not controlled by the main switch of the AML system.

CAUTION: **Possible loss of data or very long startup procedure. Switch the AMU computer off only as described here.**

Before switching the AMU computer off:

- terminate the AMU operating console and OS/2 with Shutdown complete (with OS/2), or
- terminate the AMU operating console with Shutdown AMU and perform a system shutdown afterwards (refer to *System Shutdown OS/2 4.0* on page 6-2).

System Shutdown OS/2 4.0

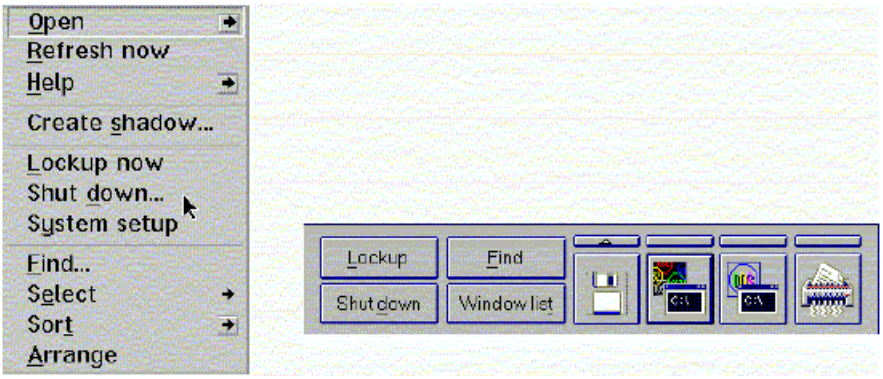
Step 1 Change to the OS/2 desktop.

- Open the task list with <CTRL> + <ESC>.
- Select "Desktop Icon - View."

Step 2 Call up the system menu.

- If an icon is selected press <SPACE>.
- Press <SHIFT> + <F10> or the right mouse button.

Figure 6-1 System Menu OS/2



Step 3 Select Shut down… (system shutdown).

Step 4 Confirm the subsequent prompts.

Step 5 Wait for the message "Shutdown has completed. It is now safe to turn off your computer, or restart the system by pressing Ctrl+Alt+Del".

Step 6 Switch the computer off only after the above message has appeared.

Remote Power ON/OFF

Due to the separate locations of operating and AML systems, it can be necessary to perform a remote shutdown.

A complete shutdown of AMU (software), the operating system, and therefore an orderly termination for the file system, HPFS can be initiated with the host command "AOFF" or "killamu" as of AMU version 2.1.

The physical shutdown or power-up of the system can be controlled thereafter by automation products such as ATOP (Automatic Operator) or data control center installations requiring some minor changes in the electrical supply to the AML system.

Switching Over between the DUAL-AMU Computers

The switch-over turns the passive AMU into the active AMU and, where possible, the active AMU into the passive AMU. The switch-over is initiated by the host command "Switch" and is executed by the passive AMU. There are two types of the switch command.

Switch (Switch-Normal)

- Switch-over command for functional test and for maintenance work on the AMU computer.
- The current command (command in the robot control unit) is still processed (only if there is no answer from the robot control unit for this command after the wait time, the command is negatively acknowledged with N604 or 1333).
- All further commands in the AMU queue are negatively acknowledged (N603 or 1332).
- All new commands arriving after the switch command, until completion of the switch-over, are turned down with N603 and 1332.

Switch-Force

Command for switch-over, when active AMU fails

Preconditions

- Two AMU computers are installed and are running
- Automatic Data Switch is installed and is set to AUTO (automatic).
- Both AMU computers are of identical configuration.

Procedure

Step 1 Stop command stream to system:

- with command "HOLD" on HACC/MVS
- by setting the drive on the system "Offline"

Step 2 Switch the AMU over with the command "Switch-Force" (the syntax for this command is found in the host software description)

Step 3 Check whether the components of the system are still reporting ready after the switch-over. If the robot does not report ready, another error exists in the system.

Step 4 Find out which commands have not yet been acknowledged by the AMU software:

- HACC/MVS command "DRQ all"
- search log file of host software for commands to AMU remaining without acknowledgement

Step 5 Find out where the media involved in these commands are located:

- enter the archive and inspect the drives and home positions in the archive
- use command "Inventory" on the home positions of the media involved (the syntax for this command is contained in the host software description)

Step 6 Compare these positions to the entries in the AMU database

Step 7 If there are differences, change the AMU database and in HACC/MVS systems and also change the HACC/MVS database

Step 8 Start the communication to the system

- with the HACC/MVS command Release
- by setting the drives "Online"

Step 9 Repeat the open commands as far as still required. Delete commands no longer required from the command queue.

Disaster Recovery Support

Ejecting predefined media from the AML archive without HOST.

Precondition

The file `*.DSR` with the media to be ejected is stored in `C:\AMU\RECOVERY`.

Preparing the Disaster Recovery Support

Follow the instructions.

Create a file listing the media to be ejected

Create the file with any ASCII editor. Copy the file into the directory `C:\AMU\RECOVERY`.

NOTE: To create and edit the file you can also use the OS/2 Editor "E" on the AMU PC.

Structure of the file

- Put the Volsers of media at the beginning of the lines.
- For optical disks give only one of the two Volsers.
- All Volsers in a file are the same media type.
- Enter the Volsers without filling signs (.).
- At least one blank must follow the Volser.
- Any comment can follow the blank.
- Line length is limited to 80 characters.
- Close lines with CR/LF.

Example:

```
004711 recovery medium 1
004712 recovery medium 2
00123456789 recovery medium 3
...
000815 recovery medium n
```

NOTE: On AML/2 twin robot systems file media for Disaster Recovery only in ranges which can be accessed by both robots.

Ejection Procedure for Disaster Recovery

1. Unload all drives.
2. Return the media unloaded to their home positions using the KEEP command.
3. In the menu Service select the command Disaster Recovery.
4. Enter the password (defined with Process Configuration (refer to *Process Configuration* on page 3-19).
5. Select the file to eject.

NOTE: The entire I/O unit is used for disaster recovery (incl. foreign mount compartments)

6. Start the ejection with Start.
7. At the prompt, unload all media from all I/O units.
8. Confirm the ejection with OK. Media are ejected in the sequence indicated in the file.
9. Clear the I/O unit when the prompt to do so appears on the operating console.
10. Continue the ejection with OK. When the last medium has been ejected, the command is acknowledged positively.

Installing the AML Management Software

Perform the following steps to install the AMU version 3.12:

Step 1 Check the correct level of your system software with the command syslevel (MPTS, DB/2). AMU 3.12 cannot installed with a Database Manager Version previous then 7.01 and without MPTS 6.0, TCP/IP 4.31, and OS/2 Fixpak XR_M015.

Step 2 If you install an update stop the current processing. Run shutdown AMU. If you run an initial installation, begin with step 5.

Step 3 Open an OS/2 window.

Step 4 Change the name of the file STARTUP.CMD to STARTUP.ORG.

```
C:move startup.cmd startup.org
```

Step 5 Restart the computer (shut down and boot).

Step 6 Insert the first diskette of AMU Software into the diskette drive or the CD-ROM in the CD-ROM drive.

NOTE: Do not interrupt the installation process. This may lead to undefined conditions and problems with the database.

Step 7 Open an OS/2 window and change to the drive or directory, where your AMU software is located, e.g.

```
C:> e:<Enter>
E:> cd amu312
```

Step 8 Enter in this directory

```
E:\AMU312> install
```

Step 9 Select the installation options

```
I N S T A L L A T I O N     U T I L I T Y
AMU -  V E R S I O N  3.12
ADIC/GRAU Storage Systems

1 = New Installation of AML Management Software
(Installation without backup of an older Version)
2 = AMU Update from AMU 3.10 to AMU 3.12
3 = Deinstallation (Rollback) of a previously installed AMU
3.10
4 = End
Select an Option:

(Enter only a number 1, 2, 3, or 4)
```

Step 10 Select your hardware.

```
I N S T A L L A T I O N  - Robot Selection
AMU - V E R S I O N  3.12

Please select the kind of robot which you want control with this
AMU
1 = Installation for AML/2, AML/E and AML/J
(AML/2 without IBM-RIC adapter)
2 = Installation for AML/2 with Quadron Software for RIC adapter
3 = End
Select an Option:

(Enter only a number 1, 2, or 3)
```

Step 11 Login with `AMUADMIN` when prompted to log on.

CAUTION: **Please do not interrupt the installation process.**

Step 12 When you use Dismount Manager Clean Manager, for a new installation, this step must be done after the first start up of the AMU. Enter the modules for automatic start in the file AmuConf.INI. See the command in the following example:

```
C:> cd amu
C:\AMU> patini PROC KRNLOAD "KNP UPM ARC HOC CLM
DIM"
```

Using functions	Load modules
Dismount Manager	`KNP UPM ARC HOC DIM`
Clean Manager	`KNP UPM ARC HOC DIM CLM`

Step 13 If you run an update installation, reverse the renaming of the filename of STARTUP.CMD and change the part
`START KRN START CON` to `START AmuStart`

```
C:> copy startup.org startup.cmd
```

Step 14 Configure the AMU start options in AmuStart.cmd

Step 15 After the first start and the actualization of the table pool:

- insert the clean cartridges from Host in the AMU database
- insert and actualization of scratch tape pools
- stop the AMU and run:

```
C:\amu> arcbndit
```

The following steps only apply to systems with a second hard disk (AML controller).

Step 16 Terminate OS/2 and restart the computer.

Step 17 Wait until the following appears on the top left corner on the monitor:
■ OS/2

Step 18 Press keys <Alt>+<F1>.

```
RECOVERY CHOICES

Select the system configuration file to be used, or enter the option
corresponding to the archive desired.

ESC - Continue the boot process using \CONFIG.SYS without changes
F2 - Go to command line (no files replaced, use original CONFIG.SYS)
F3 - Reset pimary video display to VGA and reboot
F4 - Restart the system from the Maintenance Desktop (Selective
Install)
F5 - Enable full hardware detection

Choosing an archive from the list below replaces your current
CONFIG.SYS, Desktop directory, and INI files with older versions.
These older versions might be different from your current files. Your
current files are saved in \OS2\ARCHIVES\CURRENT.

0) Original archive from INSTALL created 9.7.2002 16.24.36
```

Step 19 Select <C> as command line.

Enter the following command:

```
C:> amu\hddcopy
```

Useful System Functions

This chapter describes selected commands and procedures for the operating system OS/2 and the database manager DB/2, which may be useful in connection with AMU. Further information on these and other commands is found in OS/2, DB/2 and SQL database literature.

Useful OS/2 Commands

The useful OS/2 commands follow.


NOTE: The help command combined with the command designation (e.g. help mode) calls up help information on this OS/2 system command.

Mode Command

This command changes the operating mode of certain components:

- serial interface (COM-Port)
- parallel interface (LPT-Port)
- diskette drive (write and compare)
- display (size of OS/2 and DOS window)

Syntax

```
mode device arguments for display:
mode number of characters per line, number of characters per
column
```

Example

```
c\> mode 150,40
```

Pstat Command

This command displays all processes and "Threads" currently running on the computer. Hidden and background processes which do not appear on the task list are also displayed.

Syntax

```
pstat [/C | /S |/L | /M | /P:pid ]
```

Option	Explanation
/C	Display current process information of system
/S	Display system semaphore for each thread
/L	Display "Dynamic-Link Libraries" for each process
/M	Display resources by all processes
/P:pid	Display information on process ID indicated

Example

```
c:\pstat /C
                        Process and Thread Information
Process ID  Parent Process ID  Session ID  Process Name          Thread ID  Priority  Block ID    State
0013        0000               00          C:\OS2\EPWMUX.EXE     01         0200      FFEE )785
0059        000D               18          C:\AMU\ART.EXE        01         0100      FDEF BE38   Block
                                                                 02         0406      FFFE 458C   Block
0058        000D               12          C:\AMU\CON.EXE        01         0200      FDFA AAFC   Block
                                                                 02         0200      FDF5 5EA8   Block
                                                                 03         0400      FFFE 4656   Block
000E        000D               00          C:\OS2\SYSTEM\
                                           HARDERR.EXE           01         0300      0400 0E0C   Block
                                                                 02         0300      0400 1120   Block
                                                                 03         0300      0400 1144   Block
```

Syslevel Command

This command displays the version and the status of correction of all system programs.

Syntax

```
syslevel
```

Example

```
c:\>syslevel

C:\OS2\INSTALL\SYSLEVEL.OS2
IBM OS/2 Base Operating System
Version 4.00     Component ID 5639A6100
Type 0C
Current CSD level: XRUM015
Prior   CSD level: XRU4000

C:\OS2\INSTALL\SYSLEVEL.FPK
OS/2 Warp 4 Service Level
Version 1.00     Component ID 566933010
Type Fixpak
Current CSD level: XR0M015
Prior   CSD level: XR0M015

C:\SQLLIB\SYSLEVEL.SQC
IBM DB2 Universal Database Personal Edition
Version 7.01     Component ID 5648D4500
Current CSD level: WR10000
Prior   CSD level: WR00000

C:\TCPIP\bin\SYSLEVEL.TCP
IBM TCP/IP for Warp
Version 4.31     Component ID 5639A6600
Current CSD level: UN02200
Prior   CSD level: UN02100

C:\IBMCOM\SYSLEVEL.TRP
IBM OS/2 LAN Adapter and Protocol Support
Version 6.00     Component ID 5639A5700
Current CSD level: WR08701
Prior   CSD level: WR08700

C:\CMLIB\SYSLEVEL.ACS
OS/2 Access Feature for Personal Communications
Version 5.00     Component ID 5639C9400
Current CSD level: WR09000
Prior   CSD level: WR00000
```

Restoring the OS/2 System

When the system is shut down in an uncontrolled manner (e.g. power failure) data may be lost in the HPFS file system. If system files or structural file of the desktop are affected, AMU cannot run with its full functionality. The system files can be restored with the aid of backups made previously.

Step 1 Switch the computer on

Step 2 Wait until the following appears on the top left corner of the monitor:
- OS/2

Step 3 Press keys <Alt>+<F1>

```
 RECOVERY CHOICES
Select the system configuration file to be used, or enter the option
corresponding to the archive desired.
ESC - Continue the boot process using \CONFIG.SYS without changes
C - Go to command line, (no files replaced, used original CONFIG.SYS)
V - Reset primary video display to VGA and reboot
M - Restart the system from Maintenance Desktop (Selective Install)
Choosing an archive from the list below replaces your current
CONFIG.SYS,Desktop directory, and INI files with older versions.
These older versions might be different from your current files. Your
current files are saved in \OS2\ARCHIVES\CURRENT.
1) Archive created 18.6.97 12.00.00
2) Archive created 18.6.97 12.10.00
3) Archive created 18.6.97 12.20.00
X) Original archive from INSTALL created 18.6.97 10.00.00
```

CAUTION: **With <X> all changes in the system configuration are removed. Installed programs (e.g. database manager) are removed from the configuration and can no longer be executed.**

Step 4 Select one of the backups made: <1>, <2> or <3> for restoration. The operating system automatically starts the restoration process.

NOTE: If the restoration stops with an error, or if the restoration process stops completely, press keys <Ctrl>+<Alt>+<Del> to restart the operating system.

Step 5 In the archive folder in system menu settings, remove the mark Create archive at each system restart.

Saving Files

Regularly save the log and trace files. AMU stores these in the directory `c:\amu\logs-trc`.

The log filename (e.g. `log1904.001`) consists of

- `log`: log file
- `1904`: date (19th April)
- `.001`: count number

The trace filename (e.g. `trce.001`) consists of

- `trce`: trace file
- `.001`: count number

1. Change to an OS/2 window
2. Convert the file into an ASCII file (refer to *LOG2ASC* on page 5-45).

3. Compress files before copying them, if necessary (refer to *Compressing Files* on page 7-5).
4. Copy the files with `copy Par1 Par2`
   - `Par1`: source file with path (e.g. `c:\amu\logs-trc\log*.*` or `c:\amu\logs-trc\trace.*`)
   - `Par2`: target directory (e.g. `a:`)

Compressing Files

You can compress files with the programs "pkzip" or "pkzip2" and reduce them to about half of their original size.

1. Change to an OS/2 window.
2. Change to the directory storing the file to be compressed.
3. Enter `pkzip2 Par1 Par2`
   - `Par1`: name of compressed file (.zip is automatically added)
   - `Par2`: specification of files to be compressed (e.g. `log*.*`)
4. Copy the compressed file onto a diskette.

NOTE: Enter pkzip or pkzip2 without parameters to display information on these programs.

Decompressing Files

You can decompress files with the programs `pkunzip2` or `pkunzip` (depending on the OS/2 version).

1. Change to an OS/2 window.
2. Copy the compressed file into the directory in which you want to store the decompressed files.
3. Change to that directory.
4. Enter `pkunzip2 Par1`
   - `Par1`: name of the compressed file
5. Delete the compressed file if necessary.

NOTE: Enter `pkunzip2` without parameters to display information on this program.

TCP/IP Commands

The useful TCP/IP commands follows.

"ping" Command

This command displays when the physical connection to the communication can be established. With a Ping on your own address, you can check the function of the communication adapter and the TCP/IP software .

Syntax

```
ping [-?drv] <host> [size [packets]]
```

Option	Explanation
-?	Display command syntax
d	Switch debug function on
r	Ignore information in routing table
v	Extended information (contains all ICMP packets received)
host	Target (TCP/IP address or host name)
size	Size of data packet
packets	Number of packets to be sent

Example

```
c\> ping
PING AMU: 56 data bytes
64 bytes from 192.168.64.199: icmp_seq=0. time=0. ms
64 bytes from 192.168.64.199: icmp_seq=1. time=0. ms
64 bytes from 192.168.64.199: icmp_seq=2. time=0. ms
----AMU PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/0/0
```

Netstat Command

This command displays the connections and their conditions at the individual ports running with TCP/IP.

Syntax

```
netstat [ -? ] | [ -mtuisprcna ]
```

Option	Explanation
-?	Display command syntax
m	Display mbufs
t	Display tcp
u	Display udp
i	Display ip
s	Display sockets
p	Display arp
r	Display routes
c	Display icmp
n	Display interfaces
a	Display address

Example

```
c:\ netstat
AF_INET ADDRESS FAMILY:
SOCK  TYPE    FOREIGN PORT   LOCAL PORT     FOREIGN HOST    STATE
63    STREAM  0              3274           0.0.0.0         LISTEN
58    STREAM  1043           3000           194.31.193.36   ESTABLISHED
56    STREAM  3000           1043           194.31.193.36   ESTABLISHED
54    STREAM  0              1042           0.0.0.0         LISTEN
52    STREAM  0              0              0.0.0.0         CLOSED
6     STREAM  0              sunrpc...111   0.0.0.0         LISTEN
4     DGRAM   0              sunrpc...111   0.0.0.0         UPD
AF_OS2 Address Family:
program       vers           proto          port
536875008     1              tcp            1042
```

rpcinfo Command

This command displays information on applications using RPC queries.

Syntax

```
rpcinfo
```

Example

```
c\> rpcinfo
```

Database Manager DB/2

The database manager information follows.

Database Destroyed - What to do?

NOTE: Always switch the Database Backup in window Process Configuration to Active. This minimizes the damage when a problem occurs with the database.

Before working with the database try to save it

- database backup
- database export

Step 1 Check the AMU log for SQL error messages.

Step 2 Test whether the Database Manager still reacts to AMU queries:
In the View menu select the command View Archive

Step 3 Find out what exactly has been damaged

- special SQL errors
- the database
- the database and the Database Manager
- the hard disk of the AMU processor (all data on the hard disk)

Special SQL error message

SQL0818N A timestamp conflict occurred

Step 1 Stop the AMU software (shutdown AMU...).

Step 2 Open an OS/2 window.

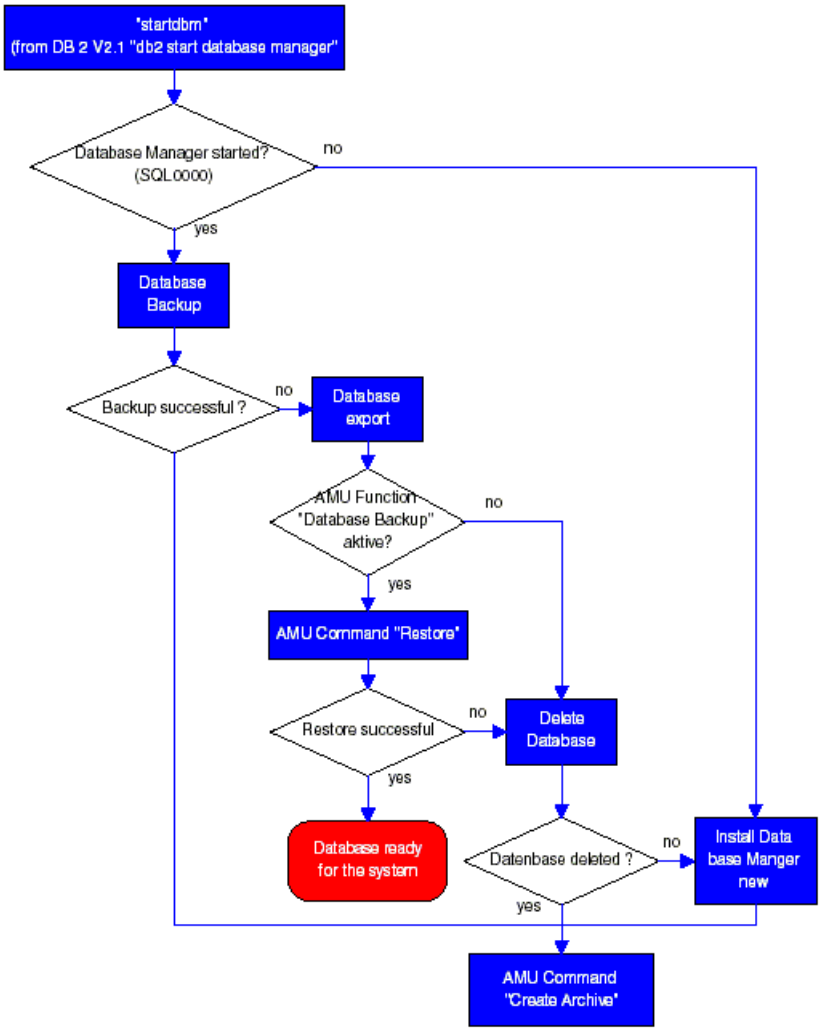
Step 3 Enter `logon /1 amuadmin /p=xxxxxx` (logon as AMU administrator, xxxxxx = password).

Step 4 Change to the AMU directory (`cd AMU`).

Step 5 Enter `arcbndit` (database and AMU are relinked).

Step 6 Start the AMU (`startup`).

Figure 7-1 Procedure "Restore database"



Step 7 The need for additional steps depends on the configuration of your system

HACC /MVS	DUAL AMU	DB Backup	Archive Type	How to proceed
yes	yes or no	yes		1. In the Service menu select the command Create Archive - Restore. 2. If this command does not function, perform a "Download" from HACC.
yes or no	yes or no	yes		1. In the Service menu select the command Create Archive - Restore. 2. If this function does not work, proceed as described for "DB Backup".

HACC /MVS	DUAL AMU	DB Backup	Archive Type	How to proceed
yes or no	yes	yes or no		1 Switch over to the DUAL AMU with the host command `ROSA` (the DUAL AMU takes over the full function until the AMU with the defective database functions again). 2 Repair the defective AMU. 3 After repair, start the computer as passive AMU (all changed data records are automatically transferred).
yes	yes or no	yes or no		1 Unload the media from the drives and manually carry them into the archive. 2 In the Service menu select the command Create Archive. 3 Start the `Download` from HACC.
yes or no	yes or no	yes or no	hierar chical	1 Unload the media from the drives and manually carry them into the archive. 2 In the Service menu select the command Create Archive. 3 In the Commands menu select the command Inventory for the entire archive (1st coordinate - last coordinate) 4 Manually resolve the discrepancies. Use the log files to trace them.
yes or no	yes or no	yes or no	dynamic	1 Unload the media from the drives and manually carry them into the archive. 2 In the Service menu select the command Create Archive. 3 In the Commands menu select the command Inventory with update for the entire archive • 1st coordinate - last coordinate • Option AU

Backup of Database

NOTE: Prepare some formatted diskettes. The backup requires a lot of storage space.

Step 1 Select Shutdown AMU… The kernel is terminated, the archive catalog no longer accessible.

Step 2 Change to the OS/2 desktop.

Step 3 Open an OS/2 window.

NOTE: Help on command syntax is available in the OS/2 window when you enter `dbm ?.`

Step 4 Enter `startdbm` (the Database Manager starts).

Step 5 Enter `logon /1 amuadmin /p=xxxxxx` (logon as AMU administrator, xxxxxx= password).

Step 6 Put the first diskette into the target drive. Depending on the size of the archive catalog several diskettes may be required.

Step 7 Enter `dbm backup database abba to a`.

NOTE: As of DB/2 version 2.1 a memory size must be entered together with the command: `dbm backup database abba to a buffer 16`

The prompt for diskette change is the message SQL2059 "A device full warning... (c/d/t)".
After inserting a new diskette, confirm the message by typing "`c`".

NOTE: Should the database still be in use (error message SQL1035N "The database is currently in use"), the access must be released in the corresponding task (window) with the command `dbm stop using database`.

Step 8 Restart AMU (refer to *Starting the AMU Operating Console* on page 6-1).

- open an OS/2 input window and enter "`startup`," or
- perform a system shutdown and a restart thereafter

Restoring the Database

Step 1 Select Shutdown AMU… The kernel is terminated, the archive catalog no longer accessible.

Step 2 Change to the OS/2 desktop.

Step 3 Open an OS/2 window.

Step 4 Enter `stardbm` (the Database Manager starts).

NOTE: By entering the command `dbm stop using database` ensure no process will try to access AMU.

Step 5 Enter `logon /1 amuadmin /p=xxxxxx` (logon as AMU administrator, xxxxxx = password).

Step 6 Put the first backup diskette into the drive A:.
Depending on the size of the archive catalog several diskettes may be required.

NOTE: As of DB/2 version 2.1 a memory size must be entered together with the command: `dbm restore database ABBA from a to c buffer 16`

The prompt for diskette change is the message SQL2059 "A device full warning... (c/d/t)".
After inserting a new diskette, confirm the message by typing "`c`".

Step 7 Enter `dbm restore database ABBA from a to c`

Step 8 Restart AMU (refer to *Starting the AMU Operating Console* on page 6-1).

- open an OS/2 input window and enter "`startup`", or
- perform a system shutdown and a restart thereafter

Exporting Tables from the Database

Step 1 Select Shutdown AMU… The kernel is terminated, the archive catalog is no longer accessible.

Step 2 Change to the OS/2 desktop.

Step 3 Open an OS/2 window.

Step 4 Enter `stardbm` (the Database Manager starts).

NOTE: By entering the command `dbm stop using database` you ensure no process will try to access AMU.

Step 5 One after the other, enter the following commands and confirm them with <Enter>

```
c:\amu> logon /l amuadmin /p=xxxxxx
(logon as AMU Administrator, xxxxxx = password)
c:\amu> dbm start using database abba
c:\amu> dbm export from abba to db_coo.del of del
messages db_coo.msg select * from amu.coordinates
c:\amu> dbm export from abba to db_scoo.del of del messages
db_scoo.msg select * from amu.scoordinates
c:\amu> dbm export from abba to db_pool.del of del messages
db_pool.msg select * from amu.pool
c:\amu> dbm stop using database abba
```

Query Database

With simple commands entered at the command line you can call up information from the database (locally from OS/2 window or from remote via telnet or remote shell). The complete syntax is described in SQL literature.

The following are some examples for local queries:

Step 1 Change to the OS/2 desktop.

Step 2 Open an OS/2 window.

Step 3 One after the other, enter the following commands and confirm them with <Enter>

```
c:\> mode 150,40
c:\> startdbm
c:\> dbm  start using database abba
```

Example 1 (drive engagement of all drives)

```
c:\> dbm select coordinate, volser, cattr from amu.scoordinates
where coordinate like 'D%'
```

Example 2 (on which drive is Volser 000815?)

```
c:\> dbm select * from amu.scoordinates where volser = '000815'
```

Example 3 (are there several entries for Volser 000815?)

```
c:\> dbm select * from amu.coordinates where volser = '000815'
```

Assignment of Volsers to Compartments

With the following command file (e.g. DbOut.cmd) you can create two files containing the assignment of volsers to compartments:

```
startdbm
call dbm start using database abba
call dbm -r(coord.txt)  select coordinate,volser,cattr from
amu.coordinates
call dbm -r(scoord.txt) select coordinate,volser,cattr from
amu.scoordinates
call dbm stop using database
stopdbm
```

Messages

All messages, including the error messages, are displayed in the log window of the AMU operating console. The error number appears in brackets at the end of the message.

In addition, the host processor receives error information.

You can call up additional information on the operating system level (in an OS/2 window).

Enter `help amu` and the error number. The message is classified according to the severity of the error:

Severity Number	Message Type	Explanation
1	Fatal error	The system is no longer ready to operate. Fatal errors can only be resolved by ADIC Technical Service.
2	Critical error	The system is no longer ready to operate. Operators can resolve such errors (Restart etc.).
3	Severe error	The error has affected the production. Processing in unaffected areas can continue.
4	Minor error	The error has affected the production. Processing can continue in all areas. The error was automatically resolved.
5	Warning	Irregularities have occurred in the system, the production has not been effected, however.

If no measure is listed for a remedy or if the error cannot be resolved, inform ADIC Technical Service.

WARNING: **IF YOU NEED TO ENTER THE ARCHIVE TO FIND OR RESOLVE AN ERROR, BE SURE TO OBSERVE THE SAFETY RULES.**

Error Codes (ABBA/1 Format)

N001: syntax error

N002: unexpected answer from robot

N003: grave error in AMU configuration

N004: grave error in AMU database

N005: robot not ready

N006: robot error

N007: error not recognized

N010: unknown robot command

N011: invalid assignment (e.g. Robot-Volser)

N012: command interrupted by manual intervention

N014:	command interrupted by program request
N015:	tower has not turned into position
N016:	robot hardware error
N017:	command cannot be executed
N101:	robot crash while dismounting/mounting of cassette
N102:	timeout robot
N104:	gripper lost medium
N105:	medium is in gripper
N110:	crash while getting a medium from archive or I/O unit
N111:	crash while putting a medium into archive or I/O unit
N112:	crash while dismount a medium from a drive
N113:	crash while mounting a medium in a drive
N201:	unknown drive
N202:	drive still occupied (traced by AMU)
N203:	drive is empty (traced by AMU)
N206:	medium cannot be dismounted from drive
N207:	cover of drive cannot be closed
N208:	query pin of gripper not activated
N209:	medium for this command is wrong
N301:	unknown volser
N302:	volser not in archive
N303:	volser is already mounted in the drive specified
N304:	barcode label not legible
N305:	no medium found in insert range
N306:	wrong volser found at coordinate specified
N307:	keep was ok, but volser in drive was wrong
N308:	volser has been ejected
N309:	volser is already mounted in different drive
N401:	coordinate not defined
N402:	no cartridge on specified coordinate
N403:	position is occupied, but should be empty
N404:	media type not admissible at coordinates specified
N405:	no compartment vacant in dynamic archive
N501:	door of an I/O-rack is not closed
N502:	I/O tower definitions do not agree

N503: eject device compartment full

N504: cartridge in cartridge box

N505: problem box is full

N506: wrong volser - medium filed in problem box

N507: problem box was full - command cannot be executed

N600: error during switch-over to DUAL AMU

N602: communication with DUAL AMU fails

N603: switch-over to DUAL AMU running - command cannot be executed

N604: robot command not completed upon switch-over to DUAL AMU

N700: no cleaning media found

N701: clean pool does not exist

Messages in AML/2 Format (AMU)

Robot system errors.

When the errors 1 through 299 occur the robot is set to the "not ready" state by AMU. A subsequent host processor command is answered with "robot not ready" N005.

If AMU does not display error messages, the PHG may display the current errors: Mode 7.2 "Diagnosis Errors."

Robot Control System Errors

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0001	N006	Controller runtime error [0001 - 0255].	Robot control system runtime error without subsequent error.	Reset the robot control system to restart it.	error 1 - 255	1
0002	N006	Controller runtime error (transformation error [0007]).	Transformation of coordinates in robot control system stopped due to a program error.	Reset robot control system to restart, inform ADIC service department.	error 7 transformation error in IRDATA program	1
0003	N006	Controller runtime error (IRD- or PKT-file is missing [0008]).	Files are missing in the robot control system.	List the files currently in the memory of the robot control system. Copy missing files into the control system. Reset the control system to restart it.	error 8 IRD- or PKT- file does not exist.	1
0004	N006	Controller runtime error (negative wait time entry [0009]).	Variables error in the robot control program.	Reset the control system to restart, inform ADIC service department.	error 9 negative wait time has been programmed	1
0005	N006	Controller runtime error (EXTENSION is not active [0017]).	Wrong rho3 machine parameters with inactive extensions of the control system.	Copy the backup of the machine parameters into the control system, reset the control system to restart it.	error 17 extension not active	1

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0006	N006	Controller runtime error (wrong format in DAT file [0028]).	Data type of the variable to be read does not agree with the format in the file.	Check all DAT files for wrong input of parameters. Reset the control system to restart it.	error 28 format error in DAT-file	2
0007	N006	Controller runtime error (error in transmission layer [0032]).	The value to be written into the robot control system is higher than the format allows.	Check the connecting cable.	error 32 protocol error during writing	1
0008	N006	Controller runtime error (error in transmission layer [0033]).	The format read in the robot control system does not agree with the set format.	Check the connecting cables.	error 33 protocol error during reading	1
0009	N006	Controller runtime error (process hung up [0040]).	Robot control system error in the program.	Reset robot control system to restart,	error 40 application processor	2
0010	N006	Controller runtime error (memory error [0054]).	Application memory is full.	Delete files not required for the system from the memory and compress files in the memory by a reset.	error 54 application memory full.	2
0011	N006	Controller runtime error (end of file error [0059]).	The number or read accesses in the program exceed the number of values in the file.	Check the DAT files for completeness.	error 59 During READ access the end of file was reached in the file EA.	2
0012	N006	Controller runtime error (missing file error [0061]).	The selected file is not available or has a wrong name.	List the files currently in the memory of the robot control system. Copy missing files into the control system. Reset the control system to restart it.	error 61 file does not exist during READ or WRTIE	2
0013	N006	Controller runtime error (data format error [0070]).	The data format of the DAT files in control system is not correct.	Check the DAT files.	error 70 error in data format	2
0014		Controller runtime error (time control interpolator stop [0072]).		not used in AML	error 72	2
0015		Controller runtime error (position control error [0073]).		not used in AML	error 73	2
0016		Controller runtime error (wrong number of kinematics [0010]).	The number of kinematics in the machine parameters does not agree with those defined in the TKONFIG.DAT (Quadro tower 0 or 1).	Check the TKONFIG.DAT and the machine parameters 1	error 10 number of kinematics in program and control system do not agree	2
0017 - 0018 reserved						
0019		Controller runtime error [0001 - 0255].	Robot control system runtime error without subsequent error.	Reset the robot control system to restart it.	error 1 - 255	2
0020		Controller CAN error (intermediate circuit axis 1 voltage above 400 V [0272]).	Errors in the drive amplifier for axis 1 and the power supply board for the drive amplifiers, may be to fast switch-on/off (intermediate circuit voltage of the drive amplifier is too high).	Switch off the main switch and switch it back on after approx. 2 minutes.Check the fuse F1 of power supply 160. Possibly the ballast resistor or the power supply 160 is defective.	error 272 CAN ZWK voltage > 400 V axis 1	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0021		Controller CAN error (intermediate circuit axis 2 voltage above 400 V [0273]).	Errors in the drive amplifier for axis 2 and the power supply board for the drive amplifiers (temperature >110 °C, intermediate circuit voltage >400 V or loss of phase for 100 ms, may be to fast switch-on/off).	Switch off the main switch and switch it back on after approx. 2 minutes.Check the fuse F1 of power supply 160. Possibly the ballast resistor or the power supply 160 is defective.	error 273 CAN ZWK voltage > 400 V axis 2	2
0022		Controller CAN error (intermediate circuit axis 3 voltage above 400 V [0274]).	Errors in the drive amplifier for axis 3 and the power supply board for the drive amplifiers (temperature >110 °C, intermediate circuit voltage >400 V or loss of phase for 100 ms, may be to fast switch-on/off).	Switch off the main switch and switch it back on after approx. 2 minutes.Check the fuse F1 of power supply 160. Possibly the ballast resistor or the power supply 160 is defective.	error 273 CAN ZWK voltage > 400 V axis 3	2
0023		Controller CAN error (intermediate circuit axis 4 voltage above 400 V [0275]).	Errors in the drive amplifier for axis 4 and the power supply board for the drive amplifiers (temperature >110 °C, intermediate circuit voltage >400 V or loss of phase for 100 ms, may be to fast switch-on/off).	Switch off the main switch and switch it back on after approx. 2 minutes.Check the fuse F1 of power supply 160. Possibly the ballast resistor or the power supply 160 is defective.	error 275 CAN ZWK voltage > 400 V axis 4	2
0024		Controller CAN error (intermediate circuit axis 5 voltage above 400 V [0276]).	Errors in the drive amplifier for axis 5 and the power supply board for the drive amplifiers (temperature >110 °C, intermediate circuit voltage >400 V or loss of phase for 100 ms, may be to fast switch-on/off).	Switch off the main switch and switch it back on after approx. 2 minutes.Check the fuse F1 of power supply 160. Possibly the ballast resistor or the power supply 160 is defective.	error 276 CAN ZWK voltage > 400 V axis 5	2
0025		Controller CAN error (intermediate circuit axis 6 voltage above 400 V [0277]).	Errors in the drive amplifier for axis 6 and the power supply board for the drive amplifiers (temperature >110 °C, intermediate circuit voltage >400 V or loss of phase for 100 ms, may be to fast switch-on/off).	Switch off the main switch and switch it back on after approx. 2 minutes.Check the fuse F1 of power supply 160. Possibly the ballast resistor or the power supply 160 is defective.	error 277 CAN ZWK voltage > 400 V axis 6	2
0026		Controller CAN error (transistor temperature axis 1 too high [0288]).	Heat sink temperature of the power transistor in the drive amplifier for axis 1 <85 °C.	Check the control cabinet fans and the ambient temperature, if necessary replace the drive amplifier for axis 1. Restart by main switch off/on.	error 288 CAN transistor temperature axis 1	2
0027		Controller CAN error (transistor temperature axis 2 too high [0289]).	Heat sink temperature of the power transistor in the drive amplifier for axis 2<85 °C.	Check the control cabinet fans and the ambient temperature, if necessary replace the drive amplifier for axis 2. Restart by main switch off/on.	error 289 CAN transistor temperature axis 2	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0028		Controller CAN error (transistor temperature axis 3 too high [0290]).	Heat sink temperature of the power transistor in the drive amplifier for axis 3 <85 °C.	Check the control cabinet fans and the ambient temperature, if necessary replace the drive amplifier for axis 3. Restart by main switch off/on.	error 290 CAN transistor temperature axis 3	2
0029		Controller CAN error (transistor temperature axis 4 too high [0291]).	Heat sink temperature of the power transistor in the drive amplifier for axis 4 <85 °C.	Check the control cabinet fans and the ambient temperature, if necessary replace the drive amplifier for axis 4. Restart by main switch off/on.	error 291 CAN transistor temperature axis 4	2
0030		Controller CAN error (transistor temperature axis 5 too high [0292]).	Heat sink temperature of the power transistor in the drive amplifier for axis 5 <85 °C.	Check the control cabinet fans and the ambient temperature, if necessary replace the drive amplifier for axis 5. Restart by main switch off/on.	error 292 CAN transistor temperature axis 5	2
0031		Controller CAN error (transistor temperature axis 6 too high [0293]).	Heat sink temperature of the power transistor in the drive amplifier for axis 6 <85 °C.	Check the control cabinet fans and the ambient temperature, if necessary replace the drive amplifier for axis 6. Restart by main switch off/on.	error 293 CAN transistor temperature axis 6	2
0032		Controller CAN error (motor temperature axis 1 too high [0304]).	Motor on axis 1 overheated (>155 °C), mechanic overload of the motor due to hard movement, wrong drive amplifier parameters or motor defect.	Check for easy mechanic movement and check the drive amplifier parameters. Restart by main switch off/on.	error 304 CAN motor temperature axis 1	2
0033		Controller CAN error (motor temperature axis 2 too high [0305]).	Motor on axis 2 overheated (>155 °C), mechanic overload of the motor due to hard movement, wrong drive amplifier parameters or motor defect.	Check for easy mechanic movement and check the drive amplifier parameters. Restart by main switch off/on.	error 305 CAN motor temperature axis 2	2
0034		Controller CAN error (motor temperature axis 3 too high [0306]).	Motor on axis 3 overheated (>155 °C), mechanic overload of the motor due to hard movement, wrong drive amplifier parameters or motor defect.	Check for easy mechanic movement and check the drive amplifier parameters. Restart by main switch off/on.	error 306 CAN motor temperature axis 3	2
0035		Controller CAN error (motor temperature axis 4 too high [0307]).	Motor on axis 4 overheated (>155 °C), mechanic overload of the motor due to hard movement, wrong drive amplifier parameters or motor defect.	Check for easy mechanic movement and check the drive amplifier parameters. Restart by main switch off/on.	error 307 CAN motor temperature axis 4	2
0036		Controller CAN error (motor temperature axis 5 too high [0308]).	Motor on axis 5 overheated (>155 °C), mechanic overload of the motor due to hard movement, wrong drive amplifier parameters or motor defect.	Check for easy mechanic movement and check the drive amplifier parameters. Restart by main switch off/on.	error 308 CAN motor temperature axis 5	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0037		Controller CAN error (motor temperature axis 6 too high [0309]).	Motor on axis 6 overheated (>155 °C), mechanic overload of the motor due to hard movement, wrong drive amplifier parameters or motor defect.	Check for easy mechanic movement and check the drive amplifier parameters. Restart by main switch off/on.	error 309 CAN motor temperature axis 6	2
0038 reserved						
0039		Controller CAN error (CAN Logicpower 5V/15V missing [0256 - 0267]).	The logic voltage is not generated correctly in the power supply 160.	Replace the power supply 160.	error 256 - 267 CAN logic voltage 5V/15V axes 1 - 12	2
0040 reserved						
0041	N016	Controller CAN error (intermediate circuit voltage above 400 V [0272 - 0283]).	Errors in the drive amplifiers and the power supply board for the drive amplifiers (temperature >110 °C, intermediate circuit voltage >400 V or loss of phase for 100 ms, may be to fast switch-on/off).	Switch off the main switch and switch it back on after approx. 2 minutes.Check the fuse F1 of power supply 160. Possibly the ballast resistor or the power supply 160 is defective.	error 272 - 283 CAN ZWK voltage > 400 V axes 1 - 12	2
0042	N016	Controller CAN error (transistor temperature too high [0288 - 0299]).	Heat sink temperature of the power transistor in the drive amplifier <85 °C.	Check the control cabinet fans and the ambient temperature. Restart by main switch off/on.	error 288 - 299 CAN transistor temperature axes 1 - 12	2
0043	N016	Controller CAN error (motor temperature too high [0304 - 0315]).	Motor overheated, mechanic overload of the motor due to hard movement, wrong drive amplifier parameters or motor defect.	Check for easy mechanic movement and check the drive amplifier parameters. Restart by main switch off/on.	error 304 - 315 CAN motor temperature axes 1 - 12	2
0044 - 0050 reserved						
0051		Controller CAN error (resolver error axis 1 [0320]).	Connection drive amplifier - position measuring system (Resolver) axis 1 faulty.	Check the resolver cable, if necessary replace the motor.	error 320 CAN resolver error axis 1.	1
0052		Controller CAN error (resolver error axis 2 [0321]).	Connection drive amplifier - position measuring system (Resolver) axis 2 faulty.	Check the resolver cable, if necessary replace the motor.	error 321 CAN resolver error axis 2.	1
0053		Controller CAN error (resolver error axis 3 [0322]).	Connection drive amplifier - position measuring system (Resolver) axis 3 faulty.	Check the resolver cable, if necessary replace the motor.	error 322 CAN resolver error axis 3.	1
0054		Controller CAN error (resolver error axis 4 [0323]).	Connection drive amplifier - position measuring system (Resolver) axis 4 faulty.	Check the resolver cable, if necessary replace the motor.	error 323 CAN resolver error axis 4.	1
0055		Controller CAN error (resolver error axis 5 [0324]).	Connection drive amplifier - position measuring system (Resolver) axis 5 faulty.	Check the resolver cable, if necessary replace the motor.	error 324 CAN resolver error axis 5.	1
0056		Controller CAN error (resolver error axis 6 [0325]).	Connection drive amplifier - position measuring system (Resolver) axis 6 faulty.	Check the resolver cable, if necessary replace the motor.	error 325 CAN resolver error axis 6.	1
0057		Controller CAN error (resolver error [0320 - 0331]).	Connection drive amplifier - position measuring system (Resolver) faulty.	Check the resolver cable, if necessary replace the motor.	error 320 - 331 CAN resolver error axes 1 - 12.	1
0058		Controller CAN error (CAN parameter error axis 1 [0336]).	Initialization error or RAM defective in drive amplifier (wrong checksum).	Replace drive amplifier, inform ADIC service department.	error 336 CAN parameter error axis 1	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0059		Controller CAN error (CAN parameter error axis 2 [0337]).	Initialization error or RAM defective in drive amplifier (wrong checksum).	Replace drive amplifier, inform ADIC service department.	error 337 CAN parameter error axis 2	2
0060		Controller CAN error (CAN parameter error axis 3 [0338]).	Initialization error or RAM defective in drive amplifier (wrong checksum).	Replace drive amplifier, inform ADIC service department.	error 338 CAN parameter error axis 3	2
0061		Controller CAN error (CAN parameter error axis 4 [0339]).	Initialization error or RAM defective in drive amplifier (wrong checksum).	Replace drive amplifier, inform ADIC service department.	error 337 CAN parameter error axis 4	2
0062		Controller CAN error (CAN parameter error axis 5 [0340]).	Initialization error or RAM defective in drive amplifier (wrong checksum).	Replace drive amplifier, inform ADIC service department.	error 340 CAN parameter error axis 5	2
0063		Controller CAN error (CAN parameter error axis 6 [0341]).	Initialization error or RAM defective in drive amplifier (wrong checksum).	Replace drive amplifier, inform ADIC service department.	error 341 CAN parameter error axis 6	2
0064		Controller CAN error (CAN parameter error [0336 - 0347]).	Initialization error or RAM defective in drive amplifier (wrong checksum).	Replace drive amplifier, inform ADIC service department.	error 336 - 347 CAN parameter error axis 1 - 12	2
0065		Controller CAN error (temperature warning axis 1 [0352]).	Temperature of amplifier > 70° or of motor > 130 °C. The drive amplifiers output a warning.	Check the fans, filter mats and the ambient temperature.	error 352 CAN temperature warning axis 1	2
0066		Controller CAN error (temperature warning axis 2 [0353]).	Temperature of amplifier > 70° or of motor > 130 °C. The drive amplifiers output a warning.	Check the fans, filter mats and the ambient temperature.	error 353 CAN temperature warning axis 2	2
0067		Controller CAN error (temperature warning axis 3 [0354]).	Temperature of amplifier > 70° or of motor > 130 °C. The drive amplifiers output a warning.	Check the fans, filter mats and the ambient temperature.	error 354 CAN temperature warning axis 3	2
0068		Controller CAN error (temperature warning axis 4 [0355]).	Temperature of amplifier > 70° or of motor > 130 °C. The drive amplifiers output a warning.	Check the fans, filter mats and the ambient temperature.	error 355 CAN temperature warning axis 4	2
0069		Controller CAN error (temperature warning axis 5 [0356]).	Temperature of amplifier > 70° or of motor > 130 °C. The drive amplifiers output a warning.	Check the fans, filter mats and the ambient temperature.	error 356 CAN temperature warning axis 5	2
0070		Controller CAN error (temperature warning axis 6 [0357]).	Temperature of amplifier > 70° or of motor > 130 °C. The drive amplifiers output a warning.	Check the fans, filter mats and the ambient temperature.	error 357 CAN temperature warning axis 6	2
0071		Controller CAN error (temperature warning [0352 - 0363]).	Temperature of amplifier > 70° or of motor > 130 °C. The drive amplifiers output a warning.	Check the fans, filter mats and the ambient temperature.	error 352 - 363 CAN temperature warning axes 1 - 12	2
0072		Controller CAN error (CAN short circuit [0368 - 0379]).	Hardware error, connection to the motor, MCO module connected wrongly, or drive amplifier defective (current sensor of one of the three phase signals a short-circuit).	Check the connecting cable, MCO module, if necessary replace the amplifier board.	error 368 - 379 CAN short circuit error axes 1 - 12	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0073		Controller CAN error (no sync. byte [0384 - 0395]).	Initialization telegram for communication not received by robot control system, amplifier board or connecting cable defective. Control system - drive amplifier.	Check the connecting cable, if necessary replace the amplifier board.	error 384 - 395 CAN no sync. byte for axes 1 - 12	2
0074		Controller CAN error (interpolator stop axis 1 [0400]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 400 CAN interpolator stop axis 1	2
0075		Controller CAN error (interpolator stop axis 2 [0401]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 401 CAN interpolator stop axis 2	2
0076		Controller CAN error (interpolator stop axis 3 [0402]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 402 CAN interpolator stop axis 3	2
0077		Controller CAN error (interpolator stop axis 4 [0403]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 403 CAN interpolator stop axis 4	2
0078		Controller CAN error (interpolator stop axis 5 [0404]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 404 CAN interpolator stop axis 5	2
0079		Controller CAN error (interpolator stop axis 6 [0405]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 405 CAN interpolator stop axis 6	2
0080		Controller CAN error (interpolator stop [0400 - 0411]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 400 - 411 CAN interpolator stop axes 1 - 12	2
0081		Controller CAN error (no nominal value [0416 - 0427]).	Communication error between control system and drive amplifier.	Check the connecting cable, if necessary replace the amplifier board.	error 416 - 427 CAN no setpoint for axes 1 - 12	2
0082		Controller CAN error (no actual value [0432 - 0443]).	Communication error between control system and drive amplifier.	Check the connecting cable, if necessary replace the amplifier board.	error 432 - 443 CAN no actual value for axes 1 - 12	2
0083		Controller CAN error (movement limit axis 1 [0448]).	Software limit switch of drive amplifier reached.	Check amplifier parameters and software version (EPROM).	error 448 CAN position limit axis 1	2
0084		Controller CAN error (movement limit axis 2 [0449]).	Software limit switch of drive amplifier reached.	Check amplifier parameters and software version (EPROM).	error 449 CAN position limit axis 2	2
0085		Controller CAN error (movement limit axis 3 [0450]).	Software limit switch of drive amplifier reached.	Check amplifier parameters and software version (EPROM).	error 450 CAN position limit axis 3	2
0086		Controller CAN error (movement limit axis 4 [0451]).	Software limit switch of drive amplifier reached.	Check amplifier parameters and software version (EPROM).	error 451 CAN position limit axis	2
0087		Controller CAN error (movement limit axis 5 [0452]).	Software limit switch of drive amplifier reached.	Check amplifier parameters and software version (EPROM).	error 452 CAN position limit axis 5	2
0088		Controller CAN error (movement limit axis 6 [0453]).	Software limit switch of drive amplifier reached.	Check amplifier parameters and software version (EPROM).	error 453 CAN position limit axis 6	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0089		Controller CAN error (movement limit [0448 - 0459]).	Software limit switch of drive amplifier reached.	Check amplifier parameters and software version (EPROM).	error 448 - 459 CAN position limit axes 1 - 12	2
0090		Controller CAN error (movement offset axis 1 [0464]).	Mechanics move hard, crash or problems with the motor control (axis does not reach the target position).	Check the mechanics and the drive amplifier parameters, replace the axis amplifier or motor if necessary.	error 464 CAN motion offset error axis 1	2
0091		Controller CAN error (movement offset axis 2 [0465]).	Mechanics move hard, crash or problems with the motor control (axis does not reach the target position).	Check the mechanics and the drive amplifier parameters, replace the axis amplifier or motor if necessary.	error 465 CAN motion offset error axis 2	2
0092		Controller CAN error (movement offset axis 3 [0466]).	Mechanics move hard, crash or problems with the motor control (axis does not reach the target position).	Check the mechanics and the drive amplifier parameters, replace the axis amplifier or motor if necessary.	error 466 CAN motion offset error axis 3	2
0093		Controller CAN error (movement offset axis 4 [0467]).	Mechanics move hard, crash or problems with the motor control (axis does not reach the target position).	Check the mechanics and the drive amplifier parameters, replace the axis amplifier or motor if necessary.	error 467 CAN motion offset error axis 4	2
0094		Controller CAN error (movement offset axis 5 [0468]).	Mechanics move hard, crash or problems with the motor control (axis does not reach the target position).	Check the mechanics and the drive amplifier parameters, replace the axis amplifier or motor if necessary.	error 468 CAN motion offset error axis 5	2
0095		Controller CAN error (movement offset axis 6 [0469]).	Mechanics move hard, crash or problems with the motor control (axis does not reach the target position).	Check the mechanics and the drive amplifier parameters, replace the axis amplifier or motor if necessary.	error 469 CAN motion offset error axis 6	2
0096		Controller CAN error (movement offset [0464 - 0475]).	Mechanics move hard, crash or problems with the motor control (axis does not reach the target position).	Check the mechanics and the drive amplifier parameters, replace the axis amplifier or motor if necessary.	error 464 - 475 CAN motion offset error axes 1 - 12	2
0097		Controller CAN error (global CAN error [0496 - 0507]).	Drive amplifiers have been shut down due to an error, the error is specified by other messages.	Check further CAN error messages in the log file or in the control system.	error 496 - 507 global CAN error axis 1 - 12	1
0098		%1Controller %2 measuring system error (controller has been switched off)	Main switch S3 on AML/J has been actuated.	Check system for proper condition. Switch the system back on with main switch S3.		4
0099		Controller CAN error [0256 - 0511]).	General combined error message for errors on the drive amplifiers.	Restart by main switch off/on.	error 256 - 511 group 1 CAN error	2
0100 - 0101 reserved						
0102	N016	Controller measuring system error (emergency stop [0528]).	Signal E 0.5 on AML/2 and AML/E is not present in the rho control. Emergency stop circuit has been cut or <Control off> has been pressed.	Check the emergency stop circuit, switch on the control system, input board may be defective.	error 528 emergency stop input	4

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0103		Controller measuring system error (CAN alarm axis 1 [0512]).	Communication error control system - amplifiers.	Check the parameters in the drive amplifiers (cycle time), check the connecting cable, if necessary replace the amplifier board.	error 512 general CAN error CAN alarm axis 1	2
0104		Controller measuring system error (CAN alarm axis 2 [0513]).	Communication error control system - amplifiers.	Check the parameters in the drive amplifiers (cycle time), check the connecting cable, if necessary replace the amplifier board.	error 513 general CAN error CAN alarm axis 2	2
0105		Controller measuring system error (CAN alarm axis 3 [0514]).	Communication error control system - amplifiers.	Check the parameters in the drive amplifiers (cycle time), check the connecting cable, if necessary replace the amplifier board.	error 514 general CAN error CAN alarm axis 3	2
0106		Controller measuring system error (CAN alarm axis 4 [0515]).	Communication error control system - amplifiers.	Check the parameters in the drive amplifiers (cycle time), check the connecting cable, if necessary replace the amplifier board.	error 515 general CAN error CAN alarm axis 4	2
0107		Controller measuring system error (CAN alarm axis 5 [0516]).	Communication error control system - amplifiers.	Check the parameters in the drive amplifiers (cycle time), check the connecting cable, if necessary replace the amplifier board.	error 516 general CAN error CAN alarm axis 5	2
0108		Controller measuring system error (CAN alarm axis 6 [0517]).	Communication error control system - amplifiers.	Check the parameters in the drive amplifiers (cycle time), check the connecting cable, if necessary replace the amplifier board.	error 517 general CAN error CAN alarm axis 6	2
0109		Controller measuring system error (CAN alarm [0512 - 0523]).	Communication error control system - amplifiers.	Check the parameters in the drive amplifiers (cycle time), check the connecting cable, if necessary replace the amplifier board.	error 512 - 523 general CAN error CAN alarm axes 1 - 12	2
0110 - 0112 reserved						
0113		Controller measuring system error ([0512 - 0767]).	General combined error message for errors of the processor and the measuring system with band synchronization.	Restart by pressing reset on the PS 75 board.	error 512 - 599 group 2 P2 error, measuring system error	4
0114		Controller measuring system error (speed overrun axis 1 [0600]).	Speed limit for axis 1 exceeded due to an error in the control system.	Restart by pressing reset on the PS 75 board. Inform ADIC service department.	error 600 max. axis speed exceeded axis 1	2
0115		Controller measuring system error (speed overrun axis 2 [0601]).	Speed limit for axis 2 exceeded due to an error in the control system.	Restart by pressing reset on the PS 75 board. Inform ADIC service department.	error 601 max. axis speed exceeded axis 2	2
0116		Controller measuring system error (speed overrun axis 3 [0602]).	Speed limit for axis 3 exceeded due to an error in the control system.	Restart by pressing reset on the PS 75 board. Inform ADIC service department.	error 602 max. axis speed exceeded axis 3	2
0117		Controller measuring system error (speed overrun axis 4 [0603]).	Speed limit for axis 4 exceeded due to an error in the control system.	Restart by pressing reset on the PS 75 board. Inform ADIC service department.	error 603 max. axis speed exceeded axis 4	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0118		Controller measuring system error (speed overrun axis 5 [0604]).	Speed limit for axis 5 exceeded due to an error in the control system.	Restart by pressing reset on the PS 75 board. Inform ADIC service department.	error 604 max. axis speed exceeded axis 5	2
0119		Controller measuring system error (speed overrun axis 6 [0605]).	Speed limit for axis 6 exceeded due to an error in the control system.	Restart by pressing reset on the PS 75 board. Inform ADIC service department.	error 605 max. axis speed exceeded axis 6	2
0120 - 0121 reserved						
0122		Controller measuring system error (speed overrun [0600 - 0619]).	Speed limit exceeded due to an error in the control system.	Restart by pressing reset on the PS 75 board. Inform ADIC service department.	error 600-619 max. axis speed exceeded axes 1 - 20	2
0123		Controller measuring system error (software limit switch overrun axis 1 [0624]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 624 driving range reached on axis 1	2
0124		Controller measuring system error (software limit switch overrun axis 2 [0625]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 625 driving range reached on axis 2	2
0125		Controller measuring system error (software limit switch overrun axis 3 [0626]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 626 driving range reached on axis 3	2
0126		Controller measuring system error (software limit switch overrun axis 4 [0627]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 627 driving range reached on axis 4	2
0127		Controller measuring system error (software limit switch overrun axis 5 [0628]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 628 driving range reached on axis 5	2
0128		Controller measuring system error (software limit switch overrun axis 6 [0629]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 629 driving range reached on axis 6	2
0129		Controller measuring system error (software limit switch overrun [0624 - 0643]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 624-643 driving range reached on axes 1 - 6	2
0130 -0131 reserved						
0132		Controller measuring system error (end switch axis 1 [0648]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 648 driving range reached on axis 1	2
0133		Controller measuring system error (end switch axis 2 [0649]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 649 driving range reached on axis 2	2
0134		Controller measuring system error (endswitch axis 3 [0650]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 650 driving range reached on axis 3	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0135		Controller measuring system error (end switch axis 4 [0651]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 651 driving range reached on axis 4	2
0136		Controller measuring system error (end switch axis 5 [0652]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 652 driving range reached on axis 5	2
0137		Controller measuring system error (end switch axis 6 [0653]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 653 driving range reached on axis 6	2
0138		Controller measuring system error (end switch [0648 - 0667]).	Software limit switch reached, error in machine parameters or robot control program.	Check the machine parameters 202 - 205 and the teach values in the graphical configuration.	error 648-667 driving range reached on axes 1 - 20	2
0139		Controller measuring system error ([0512 - 0767]).	General combined error message for errors of the processor and the measuring system.	Restart by pressing reset on the PS 75 board. Inform ADIC service department.	error 668 - 719 group 2 P2 error, measuring system error	2
0140		Controller measuring system error (measuring system alert axis 1 [0720]).		Measuring system not used on AML.	error 720 measuring system alarm axis 1	2
0141		Controller measuring system error (measuring system alert axis 2 [0721]).		Measuring system not used on AML.	error 721 measuring system alarm axis 2	2
0142		Controller measuring system error (measuring system alert axis 3 [0722]		Measuring system not used on AML.	error 722 measuring system alarm axis 3	2
0143		Controller measuring system error (measuring system alert axis 4 [0723]).		Measuring system not used on AML.	error 723 measuring system alarm axis 4	2
0144		Controller measuring system error (measuring system alert axis 5 [0724]).		Measuring system not used on AML.	error 724 measuring system alarm axis 5	2
0145		Controller measuring system error (measuring system alert axis 6 [0725]).		Measuring system not used on AML.	error 725 measuring system alarm axis 6	2
0146		Controller measuring system error (measuring system alert [0720 - 0739]).		Measuring system not used on AML.	error 720-739 measuring system alarm axes 1 - 20	2
0147		Controller measuring system error ([0512 - 0767]).	General combined error message for errors of the processor and the measuring system.	Restart by pressing reset on the PS 75 board.	error 739 - 767 group 2 P2 error, measuring system error	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0148		Controller servo / inpos error (axis processor stopped servo-board 1 [0768]).		Axis board type not used on AML.	error 768 axis processor standstill servo board 1	2
0149		Controller servo / inpos error (axis processor stopped servo-board 2 [0769]).		Axis board type not used on AML.	error 769 axis processor standstill servo board 2	1
0150 - 0151 reserved						
0152		Controller servo / inpos error (servo error axis 1 [0776]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 30%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 776 servo error axis 1	1
0153		Controller servo / inpos error (servo error axis 2 [0777]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 30%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 777 servo error axis 2	1
0154		Controller servo / inpos error (servo error axis 3 [0778]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 30%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 778 servo error axis 3	1
0155		Controller servo / inpos error (servo error axis 4 [0779]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 30%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 779 servo error axis 4	1
0156		Controller servo / inpos error (servo error axis 5 [0780]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 30%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 780 servo error axis 5	1
0157		Controller servo / inpos error (servo error axis 6 [0781]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 30%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 781 servo error axis 6	1
0158		Controller servo / inpos error (servo error [0776 - 0795]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 30%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 776-795 servo error axes 1 - 20	1
0159		Controller servo / inpos error (interpolator stop error axis 1 [0800]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 800 interpolator-stop error axis 1	1
0160		Controller servo / inpos error (interpolator stop error axis 2 [0801]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 801 interpolator-stop error axis 2	1
0161		Controller servo / inpos error (interpolator stop error axis 3 [0802]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 802 interpolator-stop error axis 3	1
0162		Controller servo / inpos error (interpolator stop error axis 4 [0803]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 803 interpolator-stop error axis 4	1
0163		Controller servo / inpos error (interpolator stop error axis 5 [0804]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 803 interpolator-stop error axis 5	1

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0164		Controller servo / inpos error (interpolator stop error axis 6 [0805]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 803 interpolator-stop error axis 6	1
0165		Controller servo / inpos error (interpolator stop error [0800 - 0819]).	Mechanics move hard, crash or problems with the motor control (motor cable).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 800-819 interpolator-stop error axes 1 - 20	1
0166		Controller servo / inpos error (not inpos error axis 1 [0824]).	Error during standstill monitoring, may be due to mechanic hard movement or crash.	Check mechanics, restart by pressing reset on PS 75 board.	error 824 not inpos error axis 1	2
0167		Controller servo / inpos error (not inpos error axis 2 [0825]).	Error during standstill monitoring, may be due to mechanic hard movement or crash.	Check mechanics, restart by pressing reset on PS 75 board.	error 825 not inpos error axis 2	2
0168		Controller servo / inpos error (not inpos error axis 3 [0826]).	Error during standstill monitoring, may be due to mechanic hard movement or crash.	Check mechanics, restart by pressing reset on PS 75 board.	error 826 not inpos error axis 3	2
0169		Controller servo / inpos error (not inpos error axis 4 [0827]).	Error during standstill monitoring, may be due to mechanic hard movement or crash.	Check mechanics, restart by pressing reset on PS 75 board.	error 827 not inpos error axis 4	2
0170		Controller servo / inpos error (not inpos error axis 5 [0828]).	Error during standstill monitoring, may be due to mechanic hard movement or crash.	Check mechanics, restart by pressing reset on PS 75 board.	error 828 not inpos error axis 5	2
0171		Controller servo / inpos error (not inpos error axis 6 [0829]).	Error during standstill monitoring, may be due to mechanic hard movement or crash.	Check mechanics, restart by pressing reset on PS 75 board.	error 829 not inpos error axis 6	2
0172		Controller servo / inpos error (not inpos error [0824 - 0843]).	Error during standstill monitoring, may be due to mechanic hard movement or crash.	Check mechanics, restart by pressing reset on PS 75 board.	error 824-843 not inpos error axes 1 -20	2
0173		Controller servo / inpos error (power on release missing [0848 - 0867]).	Software error in the robot control system.	Restart by pressing reset on PS 75 board, inform ADIC service department.	error 848-867 power on release is missing axis 1 - 20	2
0174		Controller servo / inpos error (movement release missing [0872 - 0891]).	Software error in the robot control system.	Restart by pressing reset on PS 75 board, inform ADIC service department.	error 872-891 movement release is missing axes 1 - 20	2
0175		Controller servo / inpos error (power on not allowed [0896 - 0919]).	Software error in the robot control system.	Restart by pressing reset on PS 75 board, inform ADIC service department.	error 896-919 power on not allowed axes 1 - 20	2
0176		Controller servo / inpos error (power servo board failure [0920]).		not used on AML	error 920 power on servo board is missing	2
0177		Controller servo / inpos error ([0768 - 1023]).	Combined error message drive control monitoring.	Restart by pressing reset on PS 75 board, inform ADIC service department.	error 0768 - 1023 group 3 servo error, inpos error	2

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0178		Controller general error (missing power for input/ output cards [1024]).	External power on NC-SPS-I/O board missing.	Check the 24 V connection on the NC-SPS-I/O board.	error 1024 power on I/O board(s) missing (64E/40A)	2
0179 - 0183 reserved						
0184		Controller general error ([1024 - 1279]).	General combined error message for the robot control system.	Restart by pressing reset on the PS 75 board.	error 1024 - 1279 group 4: other errors	1
0185		Controller general warning (interpolator stop warning axis 1 [1280]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 10.5%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 1280 interpolator-stop warning axis 1	2
0186		Controller general warning (interpolator stop warning axis 2 [1281]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 10.5%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 1281 interpolator-stop warning axis 2	2
0187		Controller general warning (interpolator stop warning axis 3 [1282]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 10.5%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 1282 interpolator-stop warning axis 3	2
0188		Controller general warning (interpolator stop warning axis 4 [1283]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 10.5%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 1283 interpolator-stop warning axis 4	2
0189		Controller general warning (interpolator stop warning axis 5 [1284]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 10.5%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 1284 interpolator-stop warning axis 5	2
0190		Controller general warning (interpolator stop warning axis 6 [1285]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 10.5%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 1285 interpolator-stop warning axis 6	2
0191		Controller general warning (interpolator stop warning [1280 - 1299]).	Mechanics move hard, crash or problems with the motor control (motor cable) (rated offset exceeded by 10.5%).	Check the mechanics, if necessary replace motor cable, axis amplifier or motor.	error 1280-1535 interpolator-stop warning axes 1 - 20	2
0192 - 0194 reserved						
0195		Controller general warning ([1280 - 1535]).	General warnings of the robot control system.	Check the warning with the PHG.	error 1280 - 1535 group 5: warnings	2
0196 - 0201 reserved						
0202		Controller error group 6 - 12 ([1536 - 3327]).	Drive amplifier parameter error.	Diagnose with PHG.	error 1536 - 3327 group 6 - 12	2
0203 - 0211 reserved						
0212		Controller runtime error ([3328 - 3583]).	Combined error message rho 3.2 operating system error.	Restart by pressing reset on PS 75 board, inform ADIC service department.	error 3328 - 3583 group 13: P2 run time error at rho 3.2	1
0213 - 0249 reserved						

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0250 - 0289 reserved						
0290		Controller system error ([3584 - 3839]).	Software error in rho 3 operating system.	Restart by pressing reset on PS 75 board, inform ADIC service department.	error 3584 - 3839 group 14: system error	4
0291 - 0297 reserved						
0298		Controller another system error ([3840 - 4095]).		System error message not used on operating system TO 03 and TO 05L.	error 3840 - 4095 group 15: system error (reserve)	1
0299		Controller undefined RHO error ([0001 - 4095]).	Unexpected error of the robot control system.	Restart by pressing reset on PS 75 board, inform ADIC service department, verify the error with the PHG.		1

Logic Errors of the Application Program

AMU	Host	AMU Error Message	Cause	Note	Severity
0300 reserved					
0301	N001	Syntax error in command string from AMU.	Unidentified command received by AMU or AMU and controller software not compatible	Check the addresses of the robot control system and the AMU in KONFIG.DAT (pos. 1 and 2), also check the addresses and drive types in the graphical configuration.	4
0302	N005	Buffer overflow. Too many messages from AMU to controller.	Commands sent to robot control system that was not ready (too many commands received by control system).	Stop the host communication and restart the control system by pressing reset on the PS 75 board.	3
0303	N102	Timeout error Tower- or E/I/F access is denied.	The robot control system awaits the release by the towers or the I/O unit, or communication with AMU fails.	Check: is I/O door closed, signals present on the input boards, error message of the frequency converter for the Hexa towers. If there is a communication error (log message HOC ERROR COM xx), restart AMU.	3
0304	N011	Coordinate send by AMU is out of range	The target coordinate for the robot is out of the parameterized range.	Check the teach-in points and the KONFIG.DAT values for position limits.	3
0305	N006	Command from AMU has been cancelled from.	The control system is not able to execute the AMU command due to a previous error.	Check the log for an earlier error in the command sequence.	4
0306 - 0350 reserved					
0351		"Wrong media from AMU for "	The media types for the command do not agree with the command.	In the graphical configuration check media types entered. Check the command.	4
0352 reserved					

Handling Errors

AMU	Host	AMU Error Message	Cause	Note	Severity
0401	N101	Touch sensor. Unexpected collision.	Mechanic resistance found within operating range or defective sensor.	Reset the control system, check the working area, perform a gripper test.	4
0402	N104	Cartridge not in gripper.	The robot cannot properly grab the medium during a Keep.	Check the drive hardware, if necessary re-teach. If the error occurs on several drives, check the handling offset.	4
0403 (Warning)	N206	Cartridge control activated, please check the gripper handling for.	Check gripper and gripper handling, readjust if necessary.	Check gripper and gripper handling an readjust if necessary.	4
0404	N011	Handling not configured.	One of the handling sub routines has received an erroneous command.	Check graphical configuration and file KONFIG.DAT in rho or P_variables of AML/J.	4
0405	N206	Flap of requested tape drive for is closed.	The robot cannot take out a medium because the drive´s cover is closed.	Check the drive.	4
0406 (Warning or error)	N207	Flap of requested tape drive for is open.	The robot cannot close the drive´s cover.	Check the drive, if necessary correct the robot handling or re-teach it.	4
0407 (Warning or error)	N105	Cartridge in gripper.	Medium cannot be positioned or can be positioned only after realignment.	Check medium, compartment and robot handling.	4
0408	N402	Originates from gripper during handling.	Medium not grabbed properly.	Check compartment, gripper jaws, medium and robot handling.	4
0409 (Warning)		Common warning.	Cartridge is not drawn in during Mount, or the Unload button cannot be reached.	Check the drive, if necessary correct the robot handling	4
0410		Gripper not in horizontal position.	Sensor "Gripper horizontal" not recognized.	Run gripper test, if necessary replace the gripper.	4
0411		Gripper not in vertical position.	Sensor "Gripper vertical" not recognized.	Run gripper test, if necessary replace the gripper.	4
0412		Gripper not open.	Sensor or valve for gripper opening is defective.	Run gripper test, if necessary replace the gripper.	4
0413		Gripper not closed.	Sensor or valve for gripper closing is defective.	Run gripper test, if necessary replace the gripper.	4
0414		Gripper not tilted to 0°.	Sensor "Gripper 0°" not recognized.	Run gripper test, if necessary replace the gripper.	4
0415		Gripper not tilted to 7°.	Sensor "Gripper 7°" not recognized.	Run gripper test, if necessary replace the gripper.	4
0416		Bow not in back position.	Sensor or valve for bracket backward is defective.	Run gripper test, if necessary replace the gripper.	4
0417		Bow not in forward position.	Sensor or valve for bracket forward is defective.	Run gripper test, if necessary replace the gripper.	4
0418	N104	Cartridge lost.	Gripper could not hold onto medium, it has dropped to the archive floor.	Pick up the medium in the archive and let the robot reinsert it, check the robot handling.	4

AMU	Host	AMU Error Message	Cause	Note	Severity
0419	N016	Pressure to low.	Gripper pressure too low.	Check the power supply to the compressor, check for leaks in the hoses (not used on AML/2).	4
0420	Tape control activated, please check the tape handling for.	Cartridge not ejected from drive for.	Gripper does not find a medium during Keep.	Check the drive, if necessary increase the time for rewinding in the host software or in the KONFIG.DAT. If the medium is in the correct position, check the robot handling.	4
0421	N205	The position is empty.	Empty compartment has been accessed, may be the medium has been removed manually from the archive.	Check the database.	4
0422	N112	Touch sensor during GET from drive.	The robot moves too deep into the drive during Keep or the medium is in a wrong position.	Check the drive, if necessary check robot handling or re-teach.	2
0423	N113	Touch sensor during PUT to drive.	The robot bumps into a mechanic obstacle during Mount.	Check the drive, if necessary check medium handling or re-teach.	2
0424 (Status message)		Pressure ok for.	Pressure is okay again after loss of pressure.	not used on AML/2.	4
0425 - 0429 reserved					
0430	N208	Cartridge present sensor is defect for %2.	The query pin tracing if a medium is in the gripper, is not activated.	Check the gripper with the test program. Replace defective gripper.	2
0431 - 0439 reserved					
440	N402	Rack position empty for.	There is a difference between database entry and the compartment in the archive.	Check the database.	4
0441	N403	Rack position occupied for.	The compartment is already occupied.	Check the database.	4
0442	N110	Touch sensor during GET from rack.	The robot bumps into an obstacle while grabbing the medium.	Check the handling, if necessary re-teach and adjust handling values in KONFIG.DAT (pay special attention when using ribbed surface E-casettes), check the gripper open valve, check the bracket.	2
0443	N111	Touch sensor during PUT to rack.	The robot bumps into an obstacle during Put.	Check the robot handling.	2
0444 - 0445 reserved.					
0446		Did not finish the action at.	The robot has successfully completed the command execution, but the tower has not.	Check the tower control (frequency converter)	2
0447 - 0500 reserved					
0450		Drive empty for	Robot could not find cassette in drive.	Check if the drive has been unloaded. Check gripper handling for the drive.	4

AMU	Host	AMU Error Message	Cause	Note	Severity
0451		Drive occupied for	Robot has found a cassette in the drive.	Check the command, it may be that a Keep command is missing before new cassette can be mounted.	4
0452		Unable to move %2 media changer.	Robot cannot move due to a failure.	Check the system (doors closed, servo voltage, etc.). Check if Service Action Codes are displayed by the control unit.	4
0453		from gripper during handling %2.	Command will not be executed due to a gripper problem.	Check if the control unit displays Service Action Codes. Check the gripper.	2

Barcode and Teaching Errors

AMU	Host	AMU Error Message	Cause	Note	Severity
0501	N016	Teach label not recognized.	Robot does not find a teach label.	Check teach label for cleanness and correct size, repeat the process and watch the red search point of the sensor. If necessary check the power supply to the teach sensor.	4
0502 (Warning or error)	N304	Barcode not recognized.	Barcode label cannot be read by the scanner.	Check the label. If necessary check the reading position with the program.	4
0503	N304	Illegal parameter to vision system.	Error in communication with Vision system.	Check the connection and the communication parameters, if required use new VISION software.	4
0504	N304	Wrong record selected.	Error in communication with Vision system.	Check the connection and the communication parameters, if required use new VISION software.	4
0505	N306	Illegal barcode.	Wrong or other volser has been read.	Check the label, the archive and the database.	4
0506	N016	Illegal range during teaching.	The rack has not been reached by the bracket forward sensor.	Start distance for teaching is too high (check coordinates), check the bracket forward sensor.	4
0507	N304	Illegal input variables.	Error in communication with Vision system.	Check the connection and the communication parameters, if required use new VISION software.	4
050 (Warning)		Retry reading barcode.	Barcode could not be read during the first reading attempts (4 -> Code 39, 8 -> STK).	Check the label and the reading positions with the test program. Reteach if necessary.	4
0509 (Warning)		Different volser reading during action for.	A different volser has been read during the command execution.	Check the label, optimize the reading position with the test program.	4
0510	N304	No communication between rho and barcode reading system.	Error in the connection of control system and scanner.	Check connection, reset scanner or vision system and rho control by switching its main switch off. If necessary, replace interface converter or gripper or vision system.	2

AMU	Host	AMU Error Message	Cause	Note	Severity
0511 (Warning)		Different volser read during insert for.	A different volser has been read during insertion or inventory.	Check the label, optimize the barcode reading with the test program. Reteach if necessary.	4
0512 (Warning)		Vision interface initialized for.	Vision system has been reset and is reinitialized.	Wait until the Vision system has started. If the reset was unintended check the power supply to the Vision system.	4
0513		Communication retry between rho and barcode scanner for.	Permanent failure in the communication of control system and scanner.	Check cables and power supply to the scanner or the vision system.	4
0514 - 0521 reserved					
0522		Turn axis not ready	PMAC control program does not receive answers to control signals sent to the stepper motor board for the turning axis (C).	Switch AMU off altogether and restart the system. Replace the stepper motor control. Replace the gripper.	2
0523 reserved					
0524		Grip axis not ready	PMAC control program does not receive answers to control signals sent to the stepper motor board for the gripper open/close axis (B).	Switch AMU off altogether and restart the system. Replace the stepper motor control. Replace the gripper.	2
0525 - 0600 reserved					

Hardware Errors

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0601	N016	Gripper error, recognized during initialization.	Gripper error during booting.	Check the gripper.		2
0602	N016	Barcode reading system malfunction, recognized during initialization.	No connection to the scanner or camera defective during initialization.	Check the connection. If necessary replace the interface converter or the gripper. For operating without barcode reading the scanner test can be interrupted by applying 24 V to E3.0.		2
0603	N016	Vision system malfunction, recognized during initialization.	Vision system found defective during initialization.	Check Vision system, fuse in the Vision system may be defective.		2
0604	N016	Battery of controller is empty, recognized during initialization.	Buffer battery to old or almost depleted.	Replace rho-3 buffer battery.	error 1312 Buffer battery voltage too low	2
0605	N016	I/O power supply malfunction, recognized during initialization.	PIC board or I/O boards are supplied with separate voltage.	Check fuses and cables to the power supply.		2
0606 - 0699 reserved						

Robot Status Messages

AMU	Host	AMU Error Message	Cause	Note	Severity
0700		ready.		Ready message from the robot.	
0701	N005	Arm not in straight position.	Reflex light barrier for stretched out arm position does not send signal to rho (E 6.1) during initialization.	Stretch out the robot arm or replace the sensor.	2
0702	N003	Wrong checksum, error in KONFIG.DAT, recognized during initialization.	Error in the structure of the file KONFIG.DAT.	Check the file KONFIG.DAT.	2
0703 (Warning)		Different software version in one or more modules for.	During a software replacement a module with the wrong version number has been inserted.	Use the entire software of one version.	1
0704		WARNING: One or more CAN stepper module(s) are OFFLINE.	Communication problems with the stepper motor modules on the drives have occurred.	Check the connecting cables and boards.	
0710		Setup- / Test program started by operator, robot not longer ready for AMU	The test program has been started with <ALT>+<shift>+<deadman> on the PHG	Do not start AMU or host commands as long as the test program is selected.	
0798		Error while reading 'Konfig.dat' at position for.	Error in the file KONFIG.DAT	Check the file KONFIG.DAT.	2
0799		is being initialized.	Initialization has been started.	Wait for ready message.	

Message Storage Tower

AMU	Host	AMU Error Message	Cause	Note	Severity
0800		ready.		Tower is ready for system.	
0801	N015	Command queue overflow.	Commands have been sent to a tower control system that was not ready (too many commands).	Stop the host communication and restart the control system by pressing reset on the PS 75 board.	2
0802	N011	Illegal tower address.	A command has been sent to a tower which is not defined in TKONFIG.DAT.	Check TKONFIG.DAT and the graphical configuration.	4
0803	N011	Illegal send address.	Erroneous command received by AMU.	In the KONFIG.DAT compare the addresses of the tower control with the addresses of the graphical configuration.	4
0804	N010	Illegal command.	Unidentified command received by AMU.	In the KONFIG.DAT compare the addresses of the tower control with the addresses of the graphical configuration.	4
0805	N011	Illegal segment number.	Configuration error of the database, software error in the AMU software or communication error.	Check the database, inform ADIC service department.	4
0806	N011	Illegal robot number.	Command with wrong robot number received by AMU.	Check the graphical configuration in AMU.	4

AMU	Host	AMU Error Message	Cause	Note	Severity
0807		Wrong telegram type.	A wrong telegram has been transferred to the tower control system.	Check the configuration.	4
0808 - 0809 reserved					
0810	N005	No power for turning.	EMERGENCY STOP situation of tower control.	Check doors and position of the operating mode selector switch.	2
0811	N102	allocated to robot 1.	The robot control program does not run anymore or the release signal from robot control is missing.	Reset the robot control system, check release signal.	2
0812	N102	allocated to robot 2.	The robot control program does not run anymore or the release signal from robot control is missing.	Reset the robot control system, check release signal.	2
0813	N102	not accessed by robot 1.	The robot control program does not run anymore or the release signal from robot control is missing.	Reset the robot control system, check signal exchange between robot and tower control.	2
0814	N102	not accessed by robot 2.	The robot control program does not run anymore or the release signal from robot control is missing.	Reset the robot control system, check signal exchange between robot and tower control.	2
0815	N102	not released by robot 1.	The robot control program does not run anymore or the release signal from robot control is missing.	Reset the robot control system, check release signal.	2
0816	N102	not released by robot 1.	The robot control program does not run anymore or the release signal from robot control is missing.	Reset the robot control system, check release signal.	2
0817 (Warning)	N015	door closed on robot 1.	Sensor "Tower door open for robot 1” not activated.	Open tower door for robot 1.	2
0818 (Warning)	N015	door closed on robot 2.	Sensor "Tower door open for robot 1” not activated.	Open tower door for robot 2.	2
0819 reserved					
0820		has not completed reference.	Quadro tower not referenced.	Check the reference switches, reboot the control system.	2
0821 (Warning)		Different software version in one or more modules for.	During a software replacement a module with the wrong version number has been inserted.	Use the entire software of one version.	1
0822 - 0840 reserved					
0841		has not completed reference.	During the reference movement the input of the reference point switch is not activated. • The Hexa tower turns at low speed and then stops on a segment: reference switch defective • The Hexa tower turns continuously: relay K5 (frequency converter release) ”ON” continuously (relay jammed). • The Hexa tower does not turn anymore: relay K6 (motor contactor) defective.	Check the cabling of the Hexa tower, the frequency converter and the Hexa tower motor. • Check the reference switch and replace it if necessary. • Check the relay K5 and replace it if necessary. • Check the relay K6 and replace it if necessary.	2

AMU	Host	AMU Error Message	Cause	Note	Severity
0842		Inpos sensor not detected at.	The INPOS sensor is not activated during a Hexa tower command execution. • The Hexa tower stops immediately after the first rotation: INPOS sensor defective. • Position of the Hexa tower is not reached: Relay K4 (Hexa tower running fast). • Hexa tower does not turn at all: no release of the frequency converter (relay K5) • The Hexa tower does not turn anymore: relay K6 (motor contactor) defective.	Check the cabling of the Hexa tower, the frequency converter and the Hexa tower motor. • Check the INPOS sensor and replace it if necessary. • Check relay K4 and replace it if necessary. • Check the relay K5 and replace it if necessary. • Check the relay K6 and replace it if necessary.	2
0843		Problem with check sensor or frequency convertor at.	The CHECK sensor is not activated on the reference point after a reference movement. • Hexa tower turns a little and then stops in undefined position.	Check the cabling of the Hexa tower, the frequency converter and the Hexa tower motor. • Check the CHECK sensor and replace it if necessary.	2
0844		did not reach its position.	The CHECK sensor is not activated during a Hexa tower command execution. • Hexa tower turns to a segment, corrects in both directions and then stops in undefined position.	Check the cabling of the Hexa tower. • Check the CHECK sensor and replace it if necessary.	2
0845		Problem with the frequency convertor at.	The input E 6.0 "Hexa tower stands still" is not activated (after a rotation of the Hexa tower)	Check the frequency converter and the cabling.	2
0846		Robot did not finish the action at.	The tower has completed the command execution, but the robot has not.	Check the robot control system.	2
0847 - 0896 reserved					
0897		Initialization failed	Error during the reference movement.	Check the reference point switch, restart the control system.	2
0898 (Status)		ready for manual operation.		Tower is ready for manual operation.	
0899 (Status)		is being initialized.	Tower is referencing.	Wait until reference movements are complete.	

I/O Unit Messages

AMU	Host	AMU Error Message	Cause	Note	Severity
0900 (Status)		ready.		The I/O unit has been initialized correctly.	
0901 (Status)		MLT communication malfunction.	Communication error between AMU and operating panel I/O unit/A (MLT).	Check communication parameters, interface and cable, replace MLT if necessary.	3

AMU	Host	AMU Error Message	Cause	Note	Severity
0902	N501	Error opening or closing EIF door.	Signals for door open, door closed not recognized.	Call up test program for I/O unit/A and check signals. Replace sensors or MLT if necessary.	3
0903	N501	Door not closed at initialization.	Door for I/O unit/A open during power-up.	Close door.	2
0904	N015	Position not reached.	Turning error on I/O unit A.	Call up test program for I/O unit/A and check the signals, if necessary replace sensors, frequency converter or MLT.	3
0905	N015	Problembox not in correct position.	Sensor for position monitoring of the problem box of I/O unit/A is not active.	Check position of problem box. Call up test program for I/O unit/A and check signals. Replace sensors or MLT if necessary.	4
0906	N015	Problembox not in correct position at initialization.	Sensor for position monitoring of the problem box of I/O unit/A is not active during power-up.	Check position of problem box. Call up test program for I/O unit/A and check signals. Replace sensors or MLT if necessary.	4
0907	N015	Position not reached at initialization.	Turning error of I/O unit/A during program start	Call up test program for I/O unit/A and check the signals, if necessary replace sensors, frequency converter or MLT.	3
0908	N102	Timeout error while waiting for tower release.	Release signal from rho missing.	Call up test program for I/O unit/A and check signals. Replace sensors or MLT if necessary.	3
0909	N015	Data lost.	Communication error (data lost) between AMU and operating panel I/O unit/A (MLT).	Check communication parameters, interface and cable, replace MLT if necessary.	4
0910	N015	Error in 3964 communication.	Communication error (protocol error) between AMU and operating panel of I/O unit/A (MLT).	Check communication parameters, interface and cable, replace MLT if necessary.	3
0911	N015	Error in AMU datastring.	Communication error (error in data record) between AMU and operating panel of I/O unit/A (BDE).	Check communication parameters, interface and cable, replace MLT if necessary.	3
0912	N102	Timeout error during robot access.	Timeout of wait time at the I/O unit during a robot access.		4
0913	N102	Timeout error while waiting for release after robot access.	Timeout at the I/O unit after a robot access.		4
0914	N102	Timeout error while waiting for problem box release.	Timeout of wait time for release from problem box.		4
0915 (Status)		turned by operator.	Problem box has been turned by operator.	only for I/O unit/A	
0916 (Warning)		not turned by operator.	Problem box has been unlocked but not turned by 180° by the operator	only for I/O unit/A	
0917		was turned by operator, action was not completed.	Handling box of I/O unit/A has been requested but the door has not been opened.	only for I/O unit/A	
0918 - 0920 reserved					
0921 (Warning)		not opened by operator.	Problem box of I/O unit/A has been requested but not been turned by operator.	only for I/O unit/A	

AMU	Host	AMU Error Message	Cause	Note	Severity
0922 (Status)		empty.		Problem box is empty.	
0923 (Warning)		not empty.		Problem box is not empty.	4
0924 (Warning)		requested by operator, nothing changed.	Handling box of I/O unit/A has been requested but the door has not been opened.	only for I/O unit/A	
0925 (Status)		demanded	Insertion or ejection has been requested or the door of I/O unit/B has not been properly closed during initialization (signal "door closed" missing).	Close I/O unit/B door properly by lightly pressing against the door, if necessary readjust door switch.	4
0926 (Status)		Shutter needs too much time for closing.	The signal to close the shutter has not become active.	Check the sensor for shutter closed and the shutter drive.	
927		Not all handling boxes available in EIF device.	The signals for the handling boxes in the I/O unit are messing.	Put the missing handling boxes into the I/O unit. Check the input signals.	
0928 - 929 reserved					
930		Operator request %2 handling at %5.	The request button at HICAP AML/J has been actuated.	The system now expects a ROSO command from the host.	
931		%2 at %5 ready for operator handling	Door lock on HICAP has been opened.	Within 60 seconds all HICAP doors can be opened now.	
932		%2 opened by operator	HICAP doors were opened.	The system remains stopped until the doors are closed again and the <Control ON> button (S2) at the control cabinet has been pressed.	
0933 - 979 reserved					

Automatic Data Switch Messages

AMU	Host	AMU Error Message	Cause	Note	Severity
980		ADS is switched to this AMU. (Automatic Mode)	ADS is connected to the contoller while the switch is in automatic mode (AMU is in the status BUD active).	Check if the hosts are connected to the correct AMU.	5
981		ADS is switched to other AMU.(Automatic Mode)	ADS is not connected to the controller while the switch is in automatic mode (AMU is in the status BUD passive)	Check if the hosts are connected to the correct AMU.	5
982		ADS is switched to this AMU.(Manual Mode)	ADS has been switched over manually. AMU is connected to the controller.	You must switch over to automatic, to operate the DUAL-AMU.	5
983		ADS is switched to other AMU.(Manual Mode)	ADS has been switched over manually. AMU is not connected to the controller.	You must switch over to automatic, to operate the DUAL-AMU.	5
984		Syntax error in command string from AMU to ADS.	Error in the command string syntax sent to ADS.	Repeat the command. Inform the Customer Help Desk at ADIC.	4
985		3964R communication error (ADS).	Error in the transfer protocol 3964R to ADS.	Repeat the command. Check the interface parameters of AMU. Inform the Customer Help Desk at ADIC.	4
986		ADS hardware error:	Memory error in ADS.	Check the power supply and the battery of the ADS. Replace the ADS.	4

AMU	Host	AMU Error Message	Cause	Note	Severity
987- 1000 reserved					

AMU Information and Error Messages

AMU	Host	AMU Error Message	Note	Severity
1001		Internal error in AMU System Software.	Check the correct configuration, correct syntax in the commands, restart AMU.	2
1002	N002	Event is unknown for event handler.	Possibly software installation error, check the program modules (especially KRNSET.DLL).	3
1003	N005	The module cannot be loaded, rc =.	Check your .DLL files in directory C:\AMU\DLL	1
1004	N005	The module cannot be linked, rc =.	Check your .DLL files in directory C:\AMU\DLL	1
1005 (Info)		The module is starting...	Wait for the start message of all software modules before entering commands.	
1006 (Info)	N005	The module is started.		2
1007 (Info)	N005	The module is not started because of an error.	Check the configuration or the software modules. Stop all modules still running. Restart the system.	5
1008 (Warning)		Cannot find an ICON file in startup.	Restart OS/2 and check the *.INI files and directories for the correct ICON file.	5
1009 (Warning)	N005	Cannot find the directory.	Change the name of the directory and try it again.	5
1010 (Warning)	N005	Cannot find the drive.	Change the name of the drive and try it again.	5
1011 (Info)	N005	There was an error starting up the AMU.	Check the configuration AMUINI.INI or AMUCONF.INI.	5
1012	N005	There is no in the current directory or in the DPATH.	The file AMUINI.INI has not been found. Check if the file exists and if the path entered is correct.	3
1013	N003	There is no entry in configuration file.	The file AMUINI.INI contains an unexpected entry. Use a backup copy or create a new AMUINI.INI file.	5
1014	N005	The command cannot be processed because of an initialization error.	The command cannot be executed due to the command 1012 or 1013.	3
1015 (Warning)	N003	There's no entry in configuration file.	Check the configuration and the file AMUINI.INI.	2
1016	N005	There's not enough memory. Function:.	Check the Config.sys concerning the Swap_path. Check if the there is sufficient space on the drive.	2
1017	N003	Service in .INI couldn't be started.	A service specified in the configuration file cannot be started.	2
1018	N003	Configuration data couldn't been written.	Configuration data could not be saved.	2
1019	N005	HOC detects errors for partner ..: module in HocInit returns rc ...	The module HOC found an error during the initialization.	2
1020 (Warning)	N005	None of the defined communication partners could be found. Module: .	The defined communication partners could not be initialized.	5

AMU	Host	AMU Error Message	Note	Severity
1021 (Info)	N005	HOC detects new state INACTIVE for Partner.	Module HOC found a connection has been terminated.	
1022 (Info)		HOC detects new state PENDING INACTIVE for Partner.	Module HOC is ready to terminate a new connection.	
1023 (Info)		HOC detects new state ACTIVE for Partner.	Module HOC has connected to communication partner.	
1024 (Info)		HOC detects new state PENDING ACTIVE for Partner.	Module HOC is read to start new connection.	
1025	N010	KRN cannot identify message:	The message cannot be identified. The data associated with this message is discarded.	4
1026 (Warning)	N010	Not supported ABBA/1 command:	AMU received an ABBA/1 command not supported.	5
1027 (Warning)	N011	Missing or wrong data in command: Option:.	The host command contains inadmissible data. This data is ignored.	4
1028 (Info)		<--	Data telegram in ABBA/1 Format	
1029 (Info)	N002	The ABBA/1 command was not in proper format:1	The telegram format does not correspond to what is expected by AMU.	4
1030 (Info)		Command:	AMU has receive host command for execution.	
1031 (Info)		<--	Information was sent to communication partner.	
1032	N301	The given volser not found in database.	The volser queried is not in the database.	5
1033	N401	The given position could not be found in database.	The coordinate queried is not contained in the database.	5
1034	N011	No robot could be selected.	No robot could be assigned to the action.	2
1035	N004	A severe error in archive mirror has occurred. Volser:, Coordinate:	An error in the database occurred for this entry. Check database.	4
1036 (Info)			Internal information on software structure.	
1037 (Warning)		HOC error:	Host communication cannot be assumed at this time.	4
1038	N002	Unknown option in host command.	The command will not be executed because of an unknown command option.	5
1039 (Info)		A command is processed in function: task = .	Internal AMU information.	
1040 (Info)		AMU INFO:	Internal AMU information.	
1041 (Info)		answer:	Command has been completed.	
1042 (Info)		Event -execution.	Internal AMU information (trace).	
1043	N005	There is no communication partner connected to	No communication partner has been found at the serial interface.	
1044	N005	Failure setting the device control block of	Serial interface could not be initialized.	2
1045	N005	Failure getting the device control block of	Hardware information for initialization of the interface could not be read.	2
1046	N005	Failure setting the modem control signal of	Error has occurred during set up of handshake lines to serial interface.	2
1047	N005	Failure setting the line characteristics of	Error has occurred during set up of hardware information to serial interface.	2
1048	N005	Failure setting the baud rate of	Error has occurred during set up of data transfer rate to serial interface.	2
1049	N005	Failure opening	Error upon opening of serial interface.	2
1050	N005	Could not start the read thread for	Internal initialization for serial communication impossible.	2

AMU	Host	AMU Error Message	Note	Severity
1051	N005	Could not start the write thread for	Internal initialization for serial communication impossible.	2
1052 (Info)		The module ended normally.	Message upon termination of software with the shutdown command.	
1053		The module ended abnormally, because of a software trap.	Internal error caused termination of software module. Restart AMU.	2
1054		The module ended abnormally, because of a kill process command.	The software was terminated by pressing keys <CTRL> + <C>.	
1055		The module ended abnormally, because of a hardware error abort.	Software was terminated due to an hardware error.	2
1056 (Info)			Internal AMU information (trace).	
1057 (Info)		The module is stopped.	Software module was terminated.	
1058 (Info)		The module did not stop correctly due to an error.	The database system was not correctly terminated due to an error.	
1059	N004		Message of DB/2 (database manager) used by AMU will be displayed.	
1060 (Warning)		The database will be created.	Software begins to create new database.	
1061 (Warning)		The database was created.	New database has been created.	
1062	N004	The database wasn't created, there is an OS/2 database engine error.	The new database has not been created due to a database error. Check corresponding messages of the database manager.	2
1063 (Info)		The table will be created.	The database tables will be created	
1064 (Info)		The table was created.	The database tables have been created.	2
1065	N004	The table was not created, because of an OS/2 database engine error.	The database tables have not been created because of a database error. Check the corresponding messages of the database manager.	5
1066 (Info)		The module will be linked.	The database will be linked to the AMU software.	2
1067 (Info)		The module was linked successfully.	The database has been linked to the AMU software.	
1068	N004	The module was not linked successfully.	The AMU was not connected to the database. Check the database.	2
1069 (Info)		Building started.	An object in the database is built.	
1070 (Info)		Building ended successfully.	An object in the database has been built.	
1071	N004	Building ended with an error.	An object in the database could not be built. Check corresponding messages of the database manager.	2
1072 (Warning)			Internal AMU information (trace).	
1073 (Warning)			interne AMU-Info (Trace)	
1074 (Warning)		Begin with reading the datastring from	Internal AMU information (trace).	
1075 (Info)		ARC	Internal AMU information (trace).	
1076 (Info)		****>	Internal AMU information (trace).	
1077 (Info)		****>	Internal AMU information (trace).	
1078 (Info)		----> to	Internal AMU information (trace).	
1079			Internal AMU information (trace).	2
1080			Internal AMU information (trace).	2

AMU	Host	AMU Error Message	Note	Severity
1081	N005	The AMUPATH environment variable not set correctly, cannot find AMUCONF.INI.	The environment variable AMUPATH does not reference the directory containing file AMUCONF.INI.	1
1082	N302	The requested position does not contain a cartridge (Archive catalog).	The move command refers to a compartment that is currently empty.	5
1083	N202	The requested drive is not empty (Archive catalog).	The mount command refers to a drive already occupied.	4
1084	N001	The specified requester is not known to AMU.	AMU receives a command from an erroneously configured host or a host that has not been configured at all.	5
1085	N005	No robots configured at all.	No robot is configured for AMU. Check the configuration.	2
1086	N005	There is no robot available at this moment.	Currently no robot is reporting ready. Set the robots ready with the status command.	4
1087 (Info)		ARC -exec Opt: Volser: Coordinate	Internal AMU information (trace).	
1088 (Info)			Internal AMU information (trace).	
1089 (Info)			Internal AMU information (trace).	
1090 (Info)			Internal AMU information (trace).	
1091	N205	The requested position does not contain a cartridge (checked by robot).	AMU database and robot inventory do not agree, robot could not find cassette with barcode reading and tracing.	5
1092	N204	The requested drive is not empty (checked by robot).	Robot finds that drive is occupied during mount.	4
1093 (Info)			Internal AMU information (trace).	
1094	N203	The requested drive is empty (Archive catalog).	The Keep command refers to a drive already listed as empty in the database.	4
1095	N403	The requested position is not empty (Archive catalog).	The Keep command refers to a coordinate already occupied in the archive (database).	5
1096 (Info)			Internal AMU information (trace).	
1097 (Info)			Internal AMU information (trace).	
1098	N003	Unused	reserved message	
1099	N003	Unused	reserved message	
1100	N003	Unused	reserved message	
1101	N003	Unused	reserved message	
1102	N011	Coordinate for not found in file.	Coordinate for a component was not found in teach point file.	2
1103	N011	Unused	reserved message	
1104	N001	The message with the sequence number is unknown for AMU/P.	AMU received message from rho control which cannot be assigned.	4
1105	N001		Message from control unit contained syntax error.	2
1106	N016	Unused	reserved message	
1107		Krn searched for.		
1108	N001	Unused	reserved message	
1109	N016	Unused	reserved message	
1110	N102	Unused	reserved message	
1111	N001	The given AMU-command is invalid.	Module KrnPhys.Dll received unknown command from KRN/L.	4
1112 (Info)		The given All coordinates for will be created in file.	The coordinates indicated will be added to the file.	5
1113	N016	Unused	reserved message	

AMU	Host	AMU Error Message	Note	Severity
1114 (Info)		ARC Format	Internal AMU information (trace).	5
1115 (Info)		The module is already started.	Module has been started a second time. First terminate the software before restarting AMU.	
1116 (Info)		File will be created.	File indicated will be created.	
1117		Unused	reserved message	
1118		Unused	reserved message	
1119 (Info)		Item in dialog clicked	Operator has selected a menu option.	
1120 (Info)		<--.	Host command in ABBA/1 format. Command is converted by AMU.	
1121 (Warning)	N306	Inconsistency during INVT detected. Coordinate: expected volser: volser in fact:	Robot found deviations from AMU database during inventory.	4
1122	N007	A sequence number has been used twice. Therefore the second command cannot proceed.	The running command number was assigned twice by the host. Only the first command will be executed.	4
1123	N007	The host(s) sent more commands than executable at one time.	Number of commands in command queue exceeded.	4
1124		Could not start the read thread for HACC session	Communication error with host software.	3
1125		Could not start the write thread for HACC session	Communication error with host software.	3
1126		Could not start the thread wait for presentation space for HACC session	Communication error with host software.	4
1127		Failure connect to Presentation Space for session with session ID	Communication error with host software.	4
1128 (Info)			Error in EHLL communication.	4
1129 (Info)			EHLL communication information.	
1130 (Info)			Internal AMU information (trace).	
1131	N007	Command cannot be executed in test or configuration mode.	A selected command cannot be executed in the current operating mode Change to the operating mode.	5
1132 (Info)			Internal AMU information (communication test)	
1133 (Info)		The priority is set correct.	The correct priority for the thread indicated has been adjusted.	
1134 (Warning)		The priority not set correctly, OS/2 error code:	An error has occurred during setting of process priority of Kernel.	5
1135 (Info)		-->	Command execution was terminated.	
1136	N403	The requested target device is not empty (Archive catalog).		4
1137	N402	The requested source device is empty (Archive catalog).		4
1138	N005	The desired robot is not available.		4
1139	N007	The desired robot is not known to AMU.		2
1140	N011	The desired coordinate is wrong.		2
1141		The update of was not successful.		2
1142 (Info)		The inventory is being terminated because of an error.		
1143	N001	Unused	reserved message	
1144	N001	Unused	reserved message	
1145	N001	Unused	reserved message	

AMU	Host	AMU Error Message	Note	Severity
1146	N001	String length of AMU/L string is incorrect.		4
1147	N001	String length of controller is incorrect.		4
1148	N005	AMU cannot send string to partner.		4
1149 (Info)		<----	Internal AMU information (trace).	
1150 (Info)		<****	Internal AMU information (trace).	
1151 (Info)		There is no entry in configuration at position	Internal AMU information (trace).	
1152	N502	This coordinate can not be updated because it is not the expected type of coordinate. CTYPE = .	The coordinate cannot be updated because the coordinate is not of the type required.	4
1153	N507	All positions in Problem box are occupied. The executing procedure must be stopped because the Problem box is needed.”	All positions of problem box are identified as occupied in the database.	2
1154	N007	The current insertion of cartridges could not be finished because of an error in processing.	An insert could not be completed because of an error.	4
1155 (Warning)	N305	The current cartridges insertion has completed because no cartridges were found in the insertion area.	The system did not find cartridges in the I/O unit.	5
1156 (Info)	N302	The insert array does not contain a cartridge.		
1157	N503	There is no free eject position in EIF-device.	The eject range is already occupied in the database. Empty the I/O unit or update the database.	4
1158	N011	The desired tower is not known to AMU.		4
1159	N011	The desired EIF-device is not known to AMU.	The requested I/O unit has not been defined.	4
1160 (Info)	N011	Change of home position occurred.	Information about change of compartment in the archive.	
1161 (Warning)		The archive catalog will be deleted.	Information about command to delete the database.	
1162	N302	The requested cartridge is not in a storage position.	A requested cartridge is not available in the archive.	5
1163	N016	AMU/P moved cartridge back to the source position.	A robot action has been interrupted due to an error. The cartridge was returned to its initial position.	3
1164	N101	AMU/P tells AMU/L to move a cartridge to the problembox.	A robot action was interrupted due to an error. The cartridge has been filed in the problem box.	3
1165	N016	Coordinate check failed during teaching.	The teach coordinates received by the robot are invalid, since the deviation exceeds 5 cm.	2
1166	N201	The device is unknown to the archive catalog.	The drive is not specified in the AMU database.	4
1167 (Info)		All coordinates for will be deleted in file.		
1168	N017	There was no command found, that could be purged out of queue.	The command has not been found in the command queue and cannot be deleted.	
1169 (Info)	N014	The command in process is being purged.		
1170	N102	did not respond to AMU/P message, timeout error.	Robot, storage tower, scanner or I/O unit do not report within time allotted.	3
1171	N102	Unused	reserved message	

AMU	Host	AMU Error Message	Note	Severity
1172	N102	Unused	reserved message	
1173	N207	The drive cannot be closed.	The drive cover cannot be closed by the robot.	3
1174 (Info)		AML MANAGEMENT UNIT is now ready to process commands.	Information about the status of the software.	
1175	N504	The cartridge was moved to the problem box because of a severe error.	A robot action has been terminated due to an error. The cartridge was file in the problem box.	3
1176			Host configuration is invalid for EHLL communication.	3
1177			Problem with the EHLL communication and the Communications Manager. Check the error message of the Communications Manager.	3
1178			Problem with the EHLL communication and the Communications Manager. Check the error message of the Communications Manager.	3
1179			Problem with the EHLL communication and the Communications Manager. Check the error message of the Communications Manager.	3
1180			Problem with the EHLL communication and the Communications Manager. Check the error message of the Communications Manager.	3
1181			Problem with the EHLL communication and the Communications Manager. Check the error message of the Communications Manager.	3
1182			Problem with the EHLL communication and the Communications Manager. Check the error message of the Communications Manager.	3
1183			Problem with the EHLL communication and the Communications Manager. Check the error message of the Communications Manager.	3
1184	N302	There was no clean cartridge found in database	Check if cleaning media are listed in the database. Insert unused cleaning cassettes.	3
1185	N016	The robot that was found to do the job is not configured in configuration file.		4
1186 (Info)		Initialization request from.	Information about initialization of the operating panel of the I/O unit/A.	
1187	N016	The coordinate is invalid.	Entries for PUT and GET in the dialog box are invalid.	4
1188 (Info)		Configured robot(s) (not) ready for AMU.	Information about status of robots.	
1189 (Info)		AMU received autorepeat but command was still in progress.	Information about command status in queue.	
1190 (Info)		Configured tower(s) ready for AMU.	Information about status of storage towers.	
1191	N011	The desired tower is not available.	A storage tower requested is not indicated as ready by AMU. Set storage tower ready with status command.	4

AMU	Host	AMU Error Message	Note	Severity
1192		AMU/P tells AMU/L to move a cartridge with unknown volser to the problem box.	A robot action was terminated due to an error. The cartridge has been filed in the problem box.	2
1193 (Info)		Request from canceled.	The command was not executed by the control unit.	4
1194	N204	The keep of the desired drive has not been finished, yet.	Mount command to an occupied drive has been requested, although Keep has not yet been completed.	
1195 (Info)		The EIF-Device No. Segment was opened by an operator.	Information on status of I/O unit.	
1196	N503	The eject area is full, AMU/P moved cartridge back to the source position.	The eject range of the I/O unit is occupied. The cartridge has been returned to its initial position.	4
1197	N503	The eject area is full, AMU/P tells AMU/L to move a cartridge to the problem box.	The eject range of the I/O unit is occupied. The cartridge has been filed in the problem box.	2
1198 (Info)		Check of EIF-Device No. Segment is complete.	Information on status of I/O unit.	
1199 (Info)		A pending KEEP-Command was purged.	Information about deletion of Keep command from command queue.	
1200 (Info)		This machine is a AML MANAGEMENT UNIT.	Internal AMU information (communication test)	
1201	N005	AMU is still not ready. Command is lost.	Command received during initialization phase. The command will not be executed.	4
1202 (Info)		The database will be updated.	Status information on AMU database.	
1203 (Info)		The database was updated.	Status information on AMU database.	
1204		The database was not updated.	The database could not be updated. Check the database and look up the SQL error messages in the log file.	
1205 (Info)		Begin of reading the database configuration.	Status information on AMU database.	
1206 (Info)		End of reading the database configuration.	Status information on AMU database.	
1207		Unsuccessful end of reading the database configuration.	The current configuration of the database could not be determined.	4
1208 (Info)		Begin of reading the configuration file.	Status information on AMU database.	
1209 (Info)		End of reading the configuration file.	Status information on AMU database.	
1210		Unsuccessful end of reading the configuration file.	The configuration file AMUCONF.INI contains errors and could not be read completely.	4
1211 (Info)		Begin of comparing the database and configuration file.	Status information on AMU database.	
1212 (Info)		End of computing the differences.	Status information on AMU database.	
1213		Unsuccessful end of database comparison.	Errors have been found during comparison of database and the information in the file AMUCONF.INI.	4
1214 (Info)		Begin of the adjustment of the database.	Status information on AMU database.	
1215 (Info)		End of the adjustment of the database.	Status information on AMU database.	
1216		Unsuccessful end of database adjustment.	Errors have occurred during database update.	4
1217 (Info)		No difference found, therefore no adjustment required.	Status information on AMU database.	

AMU	Host	AMU Error Message	Note	Severity
1218 (Info)		Adding device.	Status information on AMU database.	
1219 (Info)		Device was added.	Status information on AMU database.	
1220		The device could not be added.	The component could not be added to the database.	4
1221 (Info)		Deleting device.	Status information on AMU database.	
1222 (Info)		Device was deleted.	Status information on AMU database.	
1223		The device could not be deleted.	The component could not be deleted from the database.	4
1224 (Info)		Begin of the acceleration of the database.	Status information on AMU database.	
1225 (Info)		End of the acceleration of the database.	Status information on AMU database.	
1226		Error during device configuration utility procedure occurred.	Error during reading of the configuration.	4
1227 (Info)		Begin of database editing:	Status information on AMU database.	
1228 (Info)		The database edit was done successfully.	Status information on AMU database.	
1229		An error occurred during the database update.	Database could not be updated with "Edit Volser Range”.	4
1230 (Info)		Begin of database update:	Status information on AMU database.	
1231 (Info)		The database update was done successfully.	Status information on AMU database.	
1232		An error occurred during the database update.	An error has occurred during database update.	4
1233	N012	The command can no longer be purged.	The command cannot be deleted from the command queue.	5
1234		The module is already running.	Module has been started a second time. First terminate the software before restarting AMU.	
1235		has no access to.	During teaching the robot has no access to the storage tower. Check the configuration or the entry in the dialog box.	4
1236		There was no scratch cartridge found in database.	No cartridges with the status "Scratch” could be found in the database.	4
1237	N401	There is no dynamic position defined in your AML system.	No compartments with the attribute "AMU Dynamic” have been defined in the AMU database.	4
1238		All dynamic positions in your AML system are occupied.	All compartments with the attribute "AMU-Dynamic” are already occupied.	4
1239 (Warning)		Manual operation started.		5
1240 (Warning)		Manual operation stopped.		5
1241	N012	Command has not been executed by operator.	In operating mode "Manual” a command has been rejected by the operator with "Reject”.	3
1242		Command not accepted. Other command pending.	In operating mode "Manual” several commands should have been processed simultaneously. In this operating mode, however, only one command at a time is allowed.	3
1243		Actually unused AMU message. Reserved for further use.	reserved message	
1244		The Rho error number is unknown for Rho File Manager	Unknown failure number from robot control unit during operation of "Rho File Manager”.	4

AMU	Host	AMU Error Message	Note	Severity
1245		Timeout error while waiting for rho response.	Message from "Rho File Manager" during timeout by control unit.	4
1246		Actually unused AMU message. Reserved for further use.	reserved message	
1247 (Info)		Start of communication:	"Rho File Manager" status information	
1248 (Info)		End of communication:	"Rho File Manager" status information	
1249		Actually unused AMU message. Reserved for further use.	reserved message	
1250 (Info)		RFM Function:	"Rho File Manager" status information	
1251 (Info)			"Rho File Manager" status information	
1252 (Info)		of listing the Rho contents	"Rho File Manager" status information	
1253 (Info)		of sending the file to the Rho	"Rho File Manager" status information	
1254 (Info)		of receiving the file from the Rho	"Rho File Manager" status information	
1255 (Info)		of deleting the Rho file	"Rho File Manager" status information	
1256 (Info)		of renaming the Rho file	"Rho File Manager" status information	
1257 (Info)		Rho Error	System error message of robot control unit during operation of "Rho File Manager".	4
1258		Missing response to command with seq.nr.: sent to at. The command will be deleted from table in CON.		4
1259		Open DB-Cursor failed.		4
1260		Fetch with DB-Cursor failed.		4
1261		Close DB-Cursor failed.		4
1262 (Info)		View in table scoordinates, search by		
1263 (Info)		View in table coordinates, search by		
1264 (Info)		Update in table scoordintes, search by, update		
1265 (Info)		Update in table coordinates, search by, update		
1266 (Info)		Start of function		
1267		Internal error in function, return code		
1268 (Info)		Start of ArcEventDispatch function, Event:		
1269		The database was not deleted.	The database could not be deleted due to an error.	
1270	N 505	A Cartridge was moved to the problem box. The problem box is now full.	Several cartridges have already been put into the problem box, which is now full. If another cartridge is moved to the problem box, the system will stop.	3
1271	N209	The media types of source- and target coordinate in command %1 do not match.%0	A cartridge is to be moved to a position assigned to another media type.	4
1272 (Info)		CFG-Info: Scope %1 : %2 %3.%0	Information of CFG server	
1273 (Warning)		CFG-Warning: Scope %1 : %2 %3.%0	Warning of CFG server	4
1274		CFG-Error: Scope %1 : %2 %3.%0	Error message of CFG server	2
1275 (Info)		Database %1 for module %2 is starting...%0	Status information on AMU database.	
1276 (Info)		Database %1 for module %2 is started.%0	Status information on AMU database.	
1277		Database %1 for module %2 not started because of an error.%0	The DB/2 command "start using database" was not successful.	2

AMU	Host	AMU Error Message	Note	Severity
1278 (Info)		Database %1 for module %2 is stopped.%0	Status information on AMU database.	
1279 (Info)		Database %1 for module %2 did not stop correctly due to an error.%0	The DB/2 command "stop using database" was not successful.	
1280 (Info)		Grant SELECT, UPDATE on table %1 to PUBLIC failed.%0	An error has occurred during assignment of access rights for reading and change of lines in the database.	2
1281 (Info)		Database %1 does not exist.%0	Status information on AMU database.	
1282 (Info)		Start of function %1, Input: %2.%0	Status information on AMU database.	
1283 (Info)		Grant EXECUTE, BIND on program %1 to PUBLIC was successful.%0	Status information on AMU database.	
1284 (Info)		Grant EXECUTE, BIND on program %1 to PUBLIC failed.%0	An error has occurred during assignment of access rights for executing and binding of database.	4
1285 (Info)		Starting open the configuration dialog	Information of CFG server	
1286 (Info)		Saving the configuration	Information of CFG server	
1287 (Info)		%1 %2(s) in configuration (%3).	Information of CFG server	
1288 (Warning)		A cartridge with unexpected volser was dismounted. Expected volser: %1, dismounted volser: %2.	During a Keep from an Optical jukebox an unexpected volser has been found.	
1289 (Info)		%1.%0	Status information of AMU module Backup Daemon	
1290		A command was cancelled because of an error recovery situation by robot %1.	Command has been terminated due to error handling routine running on robot.	4
1291		The file for disaster recovery could not be found.	The selected file *.DSR cannot be opened.	4
1292 (Info)		The eject of media for disaster recovery is finished. End of file reached.	Status message of Disaster Recovery	
1293 (Info)		The Volser %1 for disaster recovery is successfully ejected.	Status message of module Disaster Recovery	
1294 (Warning)		It was necessary to copy one of the ini file.	The file AMUCONF.INI or AMUCONST.INI was not found. Backup copies have been used instead.	5
1295 (Warning)		A conversion of the logical ranges was done, you have to add a name.	After a software update compartment types have been converted to AMU-Dynamic. These ranges must still be configured with names.	
1296 (Info)		DASxxxx	Message of DAS server. Information on this message is found in the DAS Administration Guide.	
1297		Actually unused AMU message. Reserved for future use.:	reserved message	
1298		Actually unused AMU message. Reserved for future use.:	reserved message	
1299		Actually unused AMU message. Reserved for future use.:	reserved message	
1300		Actually unused AMU message. Reserved for future use.:	reserved message	
1301		Actually unused AMU message. Reserved for future use.:	reserved message	
1302		Actually unused AMU message. Reserved for future use.:	reserved message	
1303		Actually unused AMU message. Reserved for future use.:	reserved message	

AMU	Host	AMU Error Message	Note	Severity
1304		Actually unused AMU message. Reserved for future use.:	reserved message	
1305		Actually unused AMU message. Reserved for future use.:	reserved message	
1306	N303	Volser %1 is already mounted on device %2.	Double command: cartridge is already mounted on drive.	4
1307	N309	Volser %1 is already mounted on different device %2.	Cartridge is already in a drive. Command cannot be executed.	4
1308	N308	Volser %1 is ejected on device %2.		4
1309		Cleaning will start for Drive: %1.	Status message of Clean-Manager	
1310		Cleaning ended successfully for Drive: %1.	Status message of Clean-Manager	
1311		Cleaning failed for Drive: %1.	Drive cleaning failed. Check drive.	4
1312		Insert clean cartridges for CleanPool: %1.	Status message of Clean-Manager	
1313		no cleaning cartridge available for Drive: %1.	No cleaning media are available for this drive in the archive.	3
1314		cleaning cartridge ejected successfully: %1.	Status message of Clean-Manager	
1315		eject of cleaning cartridge failed: %1.	Cleaning media could not be ejected.	4
1316		cleaning cartridge %1 moved to CleanPool: %2.	Status message of Clean-Manager	
1317		%1.	Status message of Clean-Manager	
1318		DUMMY_ENTRY: %1.	reserved message	
1319		DUMMY_ENTRY: %1.	reserved message	
1320		DUMMY_ENTRY: %1.	reserved message	
1321		DUMMY_ENTRY: %1.	reserved message	
1322		DUMMY_ENTRY: %1.	reserved message	
1323		DUMMY_ENTRY: %1.	reserved message	
1324		DUMMY_ENTRY: %1.	reserved message	
1325		DUMMY_ENTRY: %1.	reserved message	
1326		DUMMY_ENTRY: %1.	reserved message	
1327		DUMMY_ENTRY: %1.	reserved message	
1328		DUMMY_ENTRY: %1.	reserved message	
1329		DUMMY_ENTRY: %1.	reserved message	
1330		DUMMY_ENTRY: %1.	reserved message	
1331		DUMMY_ENTRY: %1.	reserved message	
1332		DUMMY_ENTRY: %1.	reserved message	
1333		DUMMY_ENTRY: %1.	reserved message	
1334		DUMMY_ENTRY: %1.	reserved message	
1335		DUMMY_ENTRY: %1.	reserved message	
1336		DUMMY_ENTRY: %1.	reserved message	
1337		DUMMY_ENTRY: %1.	reserved message	
1338		DUMMY_ENTRY: %1.	reserved message	
1339		DUMMY_ENTRY: %1.	reserved message	
1340		DUMMY_ENTRY: %1.	reserved message	
1341		DUMMY_ENTRY: %1.	reserved message	
1342		DUMMY_ENTRY: %1.	reserved message	
1343		DUMMY_ENTRY: %1.	reserved message	

AMU	Host	AMU Error Message	Note	Severity
1344		DUMMY_ENTRY: %1.	reserved message	
1345		DUMMY_ENTRY: %1.	General warning for DUAL AMU	4
1346-1349 reserver				
1350 (Warning)		Status of coordinate %1 is unknown.	The status of a compartment is unknown. An inventory of the archive is necessary.	5
1351		ARC restore is starting...%0	a user has started the internal restore of the database	
1352	N003	Status of coordinate %1 is unknown.	The status of a compartment is unknown. An inventory of the archive is necessary.	5
1353		ARC restore is starting...%0	A user has started the internal restore of the database	
1354		ARC restore: Cannot delete old database. Nothing done	An old database exists, but cannot be dropped. Stop AMU and use command line to drop the old database.	3
1355		ARC restore: Begin of reading backup file %1.	ArcBack started to read the Backup file from backup directory	
1356		ARC restore: Backup file %1 could not be opened. Restore not successful!	The given line should contain a corrupted record of one coordinate. To use this coordinate it is necessary to insert the record from the command line.	3
1357		ARC restore: Cannot insert line [%1]	The given line should contain a corrupted record of one coordinate. To use this coordinate it is necessary to insert the record from the command line.	4
1358		ARC restore: Line %1 contains invalid value(s).	Check the corresponding coordinate after end of restore.	3
1359		ARC restore: File %1 was restored successfully		
1360		ARC restore: File %1 was not restored successfully. ERR: %2. WRN: %3.		3/4
1361		ARC restore: Start of database update with journal file %1.		
1362		ARC restore: Journal file %1 could not be opened. Restore not complete.	Check if the journalfile is opened with exclusive use by another application (e.g. editor). Close this application and try it again.	3
1363		ARC restore ends successfully. Now the database is ready for use.%		3/4
1364		ARC restore does not end successfully.		
1365	N003	File %1 not found.	Copy desired file in AMU directory.	2
1366	N403	Home coordinate %1 of mounted volser %2 is occupied!	The volser needs a new home coordinate before a KEEP can be executed. Otherwise it will be kept to the problembox.	
1367	N007	Command not executable, because coordinate %1 is not scanned yet	The EIF was opened and the automatic inventory reached this position not yet. Wait till the automatic inventory reached the requested position and try the command again.	
1368	N011	Pool %1 is not known in AMU database.	For names of scratch or clean pools look in the Scratch / Clean Pool Management Dialog (Admin Menu).	4
1369	N504	Volser %1 stands at %2 and is not mountable.	Move the volser back to storage position and repeat the command.	4
1370	N017	Volser %1 is member of Pool %2 and can not be added to the Pool %3.	Remove the volser from the other pool, before you add the volser to the new pool.	4

AMU	Host	AMU Error Message	Note	Severity
1371		Hardware Error in DLT Tape Drive: %7 %8. %6	DLT Tape Drive in hardware error	2
1372		BUD requests command : PING to partner (PIPA).	This command is used to determine whether the partner AMU line connection is still there. BUD will ping the partner AMU each 2 minutes	
1373		BUD has sent a Sign of Life request to his partner which timed out.%0	Check the AMU line connection	4
1374		BUD received a Sign of Life response for his partner.	AMU line connection has been re-established. New state: active	
1375		BUD wants to synchronize the clocks.	BUD is trying to set the local clock time on the partner machine.	
1376		BUD received unknown request in active state.	Maybe AMUs do not have complementary states. If this message occurs frequently although both machines DO have complementary states you should check the AMU-Versions on both machines. They should not be less than 3.1.	4
1377		BUD received unknown request in active on error state.	Maybe AMUs do not have complementary states. If this message occurs frequently although both machines DO have complementary states you should check the AMU-Versions on both machines. They should not be less than 3.1.	4
1378		BUD received unknown request in passive state.	Maybe AMUs do not have complementary states. If this message occurs frequently although both machines DO have complementary states you should check the AMU-Versions on both machines. They should not be less than 3.1	4
1379		BUD detected state mismatch.	BUD has received an unknown response. This can happen when the 2 AMUs are in the same state or the AMU connection line is not proper.	4
1380		BUD received time from partner.	BUD received time from partner which has been set on this machine for that both AMUs has approximately simultaneous times.	
1381		The file LOCAL.AMU could not be found. Default A01 is used.	Copy a file named LOCAL.AMU in the AMU-directory. Contents: A0x where x=number of AM	5

Appendix

This chapter contains Glossary of terms used throughout the manual and other important information that may be helpful to the user.

Terms Used

AML	Automatic Mixed Media Library; (in old documents and systems named "ABBA" software and physical archive. • ABBA/1 means first version • AML/2 means second version • AML/E means Entry • AML/J means Junior
AMU	AML Management Unit; Central intelligence of the AML system. Consists of hardware and software.
Archive	The archive consists of physical archive and logical archive. The physical archive consists of storage segments for tape cartridges and optical disks (media). The logical archive (archive catalog) is the list of volsers assigned to the compartments in the physical archive.
Archive catalog	An OS/2 database with the logical archive. Contains the assignment of volsers to the compartments in the physical archive as well as further vital information about the media and the drives.
Archive coordinates	These define the compartment of a medium in the physical archive.
Barcode label	Label on the medium, contains the volser in a form readable for the robot (barcode). An Optical Disk has 2 volsers.
Click	Short pressing and releasing of the mouse button.
Command, instruction	Command, instruction sent to the AML system: • from the host computer • direct operator input at the AMU operating console
Configuration	Definition of the AML system. The configuration specifies the components and their connections. • Host processor • AMUs • controls • storage segments • linear shelves • robot • specials • drives

Foreign (non-system) media	Media not listed with a volser in the archive catalog. They are processed by the AML system via the I/O unit.
Handling box	Storage box for media in the I/O unit.
Host computer	Computer or computer network superior to AMU. The data of the host computer is stored on media in the archive of the AML system.
I/O unit	Input/output area. Media are inserted and ejected via the I/O unit.
Linear shelf	Storage archive (only one storage level)
Medium	Storage medium in the archive, e.g. a magnetic tape cartridge or optical disk.
Medium mount	Inserting (MOUNT) a medium in a drive is referred to as mounting. Removal of the medium is referred to as unmounting (KEEP).
Operator	Trained user of the AML-System.
Optical Disk (OD)	Optical storage medium (CD).
Problem box	Special compartments in the I/O unit. These house: • unidentified media • media in case of robot failure
Quadro tower	Storage archive with 32 segments.
Scratch media	Scratch media are system media released for rewriting. Without a volser they are used to output data (unspecific media request).
Segment	All rows in one column of a storage tower.
System media	System media have a volser, are stored and registered in the archive.
Teaching	Teaching of the robot system.
Teach label	White reference mark; the room coordinates are measured (resolution 1/100 mm). The data then allows the system to compute all points to be accessed by the robot. The coordinates of all points taught are saved in the file KRNREFPT.R0X.
Turning unit	Part of the I/O unit/A. In its sections a turning unit houses four handling boxes.
unspecific media request	Mount command for a scratch medium or cleaning cartridge.
Volser, VSN	Volume serial number. Contains a sixteen-digit (maximum) alphanumeric designation. It identifies one medium (cartridge, optical disk) in the archive. The volser is attached to the rear of the medium on a barcode label and can be read by the handling unit.

Trace Levels

This section contains useful information concerning tracing levels.

HOC-Trace (Communication)

Trace-Level	Configuration
HOC0	HOC process (modules)
HOC1	Event control
HOC2	TCP/IP communication
HOC3	Siemens 3964R communication with control
HOC4	APPC communication
HOC5	RHO3 protocol 4 robot communication (not used)
HOC6	AML2 communication, Siemens host, DUAL-AMU
HOC7	RHO3 protocol 4 tower communication (not used)
HOC8	RS422 communication for ABBA/1 tower communication (not used)
HOC9	EHLL communication (HACC 3174/3274 terminal emulation)

CON-Trace (Operating Console)

Trace-Level	Configuration
CON0	Load dialogs, list of program abortions
CON1	not used
CON2	Communication with kernel
CON3	Communication with kernel (telegram exchange)
CON4	Multi-purpose trace
CON5	Configurations server trace 1
CON6	Configurations server trace 2
CON7	Configurations server trace 3
CON8	Configurations server trace 4
CON9	Incoming results of partners of CON module; configuration errors

KRN-Trace (Central Logic)

Trace-Level	Configuration
KRN0	Module: bottom functional level of kernel, send/receive kernel events
KRN1	Inputs/outputs of kernel (host communication)
KRN2	Configuration

Trace-Level	Configuration
KRN3	Communication between KRN and CON
KRN4	Command queue of AMU/L
KRN5	AMU queue and robot selection
KRN6	Internal processes of AMU/P1 (ABBA/1)
KRN7	Processes of AMU/P1 (AML/2); tracing of DCI attached drives
KRN8	Physical coordinates of teach processes
KRN9	Processes of AMU/P2 (AML, commands to robots, towers, I/O unit)

ART-Trace (Log- and Trace Functions)

Trace-Level	Configuration
ART0	Alerter: events of server process
ART1	Alerter: special events in program
ART2	Alerter: write errors
ART3	Alerter: error during initialization and reading of log file
ART4	Error during file processing
ART5	not used
ART6	not used
ART7	Log: initialization and reading errors during log
ART8	Log: problems in communication with alerter process
ART9	Log: other events

ARC-Trace (Archive Catalog Management)

Trace-Level	Configuration
ARC0	Event control
ARC1	Database query
ARC2	Database change
ARC3	Creation of database
ARC4	Changes in the I/O unit
ARC5	Edit Volser ranges
ARC6	not used
ARC7	Database backup process
ARC8	Journaling
ARC9	Restore process

BUD-Trace (Data Transfer to DUAL-AMU)

Trace-Level	Configuration
BUD0	Trace of Bud Application
BUD1	State depended events and information
BUD2	Database update information
BUD3	Low level BUD traces
BUD4	Traces of configuration of BUD and state changes
BUD5	not used
BUD6	not used
BUD7	not used
BUD8	All warning messages for BUD
BUD9	All error messages for BUD

DAS trace (diagnosis for DAS/2 Version 1.3)

Trace-Level	Configuration
DAS0	Communication between RPC and ACI
DAS1	Communication between DAS and RQM
DAS2	Communication between RQM and AMU
DAS3	Details on DAS functions IN/OUT
DAS4	Details on RQM functions IN/OUT
DAS5	Details on DAS data
DAS6	Details on RQM data
DAS7	DAS errors
DAS8	RQM errors
DAS9	RQM timer and miscellaneous

DCM trace (Dismount and Clean Manager)

Trace-Level	Configuration
DCM0	DIM: processes, semaphore and list of program abortions
DCM1	DIM: program flow
DCM2	DIM: time and priority control
DCM3	not used
DCM4	CLM: events and control table
DCM5	CLM: mail events
DCM6	CLM: time control

Trace-Level	Configuration
DCM7	CLM: error handling
DCM8	CLM: list of program abortions
DCM9	CLM: requests to time control

Media Types

Type	Description	Manufacturer	AMU Type
3480	0.5 in. Tape (different length available)	3M	C0
3490	0.5 in. Tape (different length available)	3M	C0
3490E	0.5 in.Tape	3M	C0
3490E D-3	0.5 in.Tape (STK-Redwood)	STK	C0
SD-3	0.5 in.Tape (STK-Redwood)	STK	C0
DLT CompacTape-III	Digital Linear Tape	digital	C1
DLT CompacTape-IV	Digital Linear Tape	Quantum	C1
DLT Tape III XT	Digital Linear Tape	maxell	C1
Super DLT	Digital Linear Tape	Quantum	C1
3590	0.5 in.Tape (NTP=>New Tape Product)	3M	C2
3590E	0.5 in.Tape (Condor double capacity)	3M	C2
LTO 1	LTO Ultrium L1		C3
LTO 2	LTO Ultrium L2		C3
CD-Caddy	CD with enclosure		C6
OD-R	Optical Disk 5.5 in.	Reflection	O0
OD-512	Optical Disk 5.5 in.	3M	O1
S-VHS	Super - Video Home Service	SONY	V0
VHS	Video Home Service	3M	V0
8MM	8 MM tape (different length available)	3M	V1
8MM-112M	8mm Tape - 112m	EXABYTE	V1
8MM-160M	8mm Tape - 160m	EXABYTE	V1
8MM-54M	8mm Tape - 54m	EXABYTE	V1
AIT	AIT Cartridge	SONY	V1
AIT-2	AIT Cartridge	SONY	V1
AIT-3	AIT Cartridge	SONY	V1
4MM-120M	Digital Audio Tape DDS-2 (DAT)	Fuji	V2
4MM-125M	Digital Audio Tape DDS-3 (DAT)	Fuji	V2

Type	Description	Manufacturer	AMU Type
4MM-60M	Digital Audio Tape (DAT)	Fuji	V2
4MM-90M	Digital Audio Tape (DAT)	Fuji	V2
D1-S	D1 small tape	ADIC	V3
D2-S	D2 small tape	ADIC	V3
D1-M	D1 medium tape	ADIC	V4
D2-M	D2 medium tape	ADIC	V4
DTF-S	DTF-Small tape (Digital Tape Format)	SONY	V6
DTF-L	DTF-Large tape (Digital Tape Format)	SONY	V7
BetaCAM - Small	Analogue Tape Format	SONY	V8
Digital BetaCAM - Small	Digital Tape Format (like DTF-S)	SONY	V8
BetaCAM - Large	Analogue Tape Format	SONY	V9
Digital BetaCAM - Large	Digital Tape Format (like DTF-L)	SONY	V9
DVCL	Digital Video		VB
DVCM	Digital Video		VB

Component Types

This section contain useful information about component types.

Drives

Type	Drive Name and Number	Medium	Manufacturer
D1	IBM LTO1	LTO	IBM
D1	IBM LTO2 FC	LTO	IBM
D2	6380	3480 cassette	COMPAREX
D2	7480	3480 cassette	HDS
D3	6390	3490 cassette	COMPAREX
D3	7490	3490 cassette	HDS
D4	Eagle	Eagle	STK
D5	BVW 75P	BetaCAM large + small.	SONY
D5	BetaCAM PBC 2800	BetaCAM sm.	BetaCAM
D7	3480 with ACL	3480 cassette	IBM
D7	3580 with ACL	3480 cassette	SNI
D8	3480 with cover	3480 cassette	IBM
D8	3480 with cover	3480 cassette	SNI
D9	5480	3480 cassette	MEMOREX
D9	60/3590E	3490 cassette	MEMOREX
D9	3580, without cover	3480 cassette	SNI
D9	3590	3490 cassette	SNI
D9	3480 without cover	3480 cassette	IBM
D9	3490	3490 cassette	IBM
D9	3490-TA91	3490 cassette	DIGITAL
D9	9309 2	3490 cassette	IBM
DA	ER90	D2	AMPEX
DA	DST 310	D2	AMPEX
DA	DVR 2100	D1 small	SONY
DC	8205-8mm	8mm cassette	EXABYTE

Type	Drive Name and Number	Medium	Manufacturer
DC	7208 011, Mammouth	8mm cassette	IBM
DC	DC MK 13	8mm cassette	SNI
DE	DLT 4000 (modified)	DLT cassette	ADIC
DE	DLT 7000 (modified)	DLT cassette	ADIC
DF	DDS 7206 005	4 mm cassette	IBM
DF	HP 6400/1300 S (DDS-1)	4 mm cassette	HP
DF	HP 6400/4000 DC (DDS-2)	4 mm cassette	HP
DG	DLT 7000 Low Profile mit DCI	DLT cassette	ADIC
DG	DLT 8000 Low Profile mit DCI	DLT cassette	ADIC
DH	HP 1300	OD 512	HP
DJ	3995 Jukebox	OD 512	IBM
DK	4480	3480 cassette	STK
DL	4490 Silverstone	3480 cassette	STK
DL	9490 Timberline	3480 cassette	STK
DM	AIT	8mm cassette	SONY
DN	3591	3590 cassette	SNI
DN	3590 Magstar	3590 cassette	IBM
DN	8590	3590 cassette	ADIC
DO	RF7010E, MF for external unit	OD Reflection	PLASMON
DO	RF7010X, MF	OD Reflection	PLASMON
DP	IFD-1300-A Subsystem	OD 512	FUJITSU
DP	OD 1300T	OD 512	HP
DP	OD 6300 650/A	OD 512	HP
DP	NWP-559	OD 512	SONY
DP	MOD 2,6 GB	OD 512	SNI
DP	OS 13	OD 512	SNI
DP	Gigaburst	OD 512	STORM
DQ	M2485	3490 cassette	Fujitsu
DQ	M2483K-3480/90	3480 cassette	Fujitsu
DQ	LMS TD 3610	3480 cassette	Philips

Type	Drive Name and Number	Medium	Manufacturer
DQ	7492	3490 cassette	HDS
DR	SDLT	DLT cassette	Quantum
DS	3588-GL	3480 cassette	SNI
DS	4890 TwinPeak	3480 cassette	STK
DT	5180	3480 cassette	TANDEM
DU	5190	3480 cassette	TANDEM
DV	RSP 2150 Mountaingate	VHS cassette	METRUM
DW	OS 25 (HR 650)	CD-ROM	SNI
DW	XM 3501B	CD-ROM	Toshiba
DW	W2001	CD-ROM	SNI
DX	AKEBONO (GY-10D)	DTF-Small	SONY
DX	AKEBONO (GY-10C)	DTF-Large	SONY
DZ	Fujitsu M8100 (Diana-4)	3590 cassette	Fujitsu

I/O Unit

- P0: problem box via I/O unit/A (no longer used)
- P1: problem box via I/O unit/A
- P2: problem box via I/O unit/B
- P3: problem box via I/O unit/B Mixed-Media
- P4: problem box via I/O unit/B for D2 (7 compartments)
- P5: problem box via I/O unit/C
- P6: problem box via I/O unit/A Mixed Media (7 compartments)
- P7: problem box via I/O unit/E (1 compartment)
- E0: I/O unit/A 120 with 4 handling boxes
- E1: I/O unit/A 240 with 8 handling boxes
- E2: I/O unit/B 60 with 2 handling boxes
- E3: I/O unit/B 120 with 4 handling boxes
- E5: I/O unit/C
- E6: I/O unit/D HICAP (AML/J)
- E7: I/O unit/E with one handling box (AML/J)
- E8: I/O unit AML/S Single Media (no longer supported in AMU)
- E9: I/O unit AML/S Mixed Media (no longer supported in AMU)

Host Computers

- H0: MVS-HACC Host
- H1: VM-HACC host computer
- H2: BS 2000 (66 byte string length)
- H3: BS 2000 (80 Byte string length)
- H4: Tandem Host (66 Byte string length)
- H5: Tandem Host (80 Byte string length)
- H6: HACC/DAS (DAS-Unix and DAS/2 until ver. 1.2mb) (no longer supported in AMU)
- H7: VolServ, HACC/OS400

Storage Units

- T0: Quadro tower high
- T1: Quadro tower medium
- T2: Quadro tower small
- T3: Hexa tower high
- T4: Hexa tower medium
- T5: Hexa tower small
- L0: linear shelf large AML/2+E
- L1: linear shelf medium AML/2+E
- L2: linear shelf small AML/2+E

AML/J Linear Shelves

- L3 - shelf with space for one flat drive support
- L4 - shelf with space for two flat drive supports
- L5 - standard shelf
- L6 - shelf with space for four flat drive supports
- L7 - shelf with space for five flat drive supports
- L8 - shelf with one I/O unit/C
- L9 - shelf with space for three flat drive supports
- LA - shelf with space for one high drive support
- LB - shelf with space for two high drive supports
- LC - shelf with space for two high drive supports
- LD - shelf next to one I/O unit/E

Robots

- R0: robot system (AML/2)

- R3: handling unit (AML/E)
- R4: handling unit (AML/J)
- R5: robot "Accessor" (AML/S) (no longer supported in AMU)

AMU

- A0: AMU without DUAL AMU
- A1: AMU with DUAL AMU
- A2: AMU as backup AMU

Control Units

- O0: RHO3, robot control for AML/2 and AML/E
- O1: BDE, control for I/O unit/A
- O2: PMAC, control for AML/J

Important Configuration Files

The following table lists all important configuration files involved in the operation of AMU. The table does not contain the configuration files of robot control units for AML/2, AML/J, and AML/E.

During installation, make a backup of all files listed here (as far as applicable to your system) on diskettes and update these diskettes upon every modification of the system. This backup will allow fast restoration of the system.

Directory	Filename	Explanation
c:\	config.sys	OS/2 basic configuration file, with entries for AMU and DAS
	startup.cmd	Configuration of automatic start during start of operating system
c:\os2\	os2.ini os2sys.ini	OS/2 system configuration files (files are hidden)
c:\ibmcom\	protocol.ini	Configuration file of physical communication protocol (Token Ring, Ethernet etc.
c:\mptn\etc\	hosts, resolv2, trusers	Configuration files for TCP/IP communication (Routing, resolution of host names)
c:\mptn\bin\	setup.cmd	Configuration files for TCP/IP communication (local IP addresses)
c:\tcpip\bin\	tcpstart.cmd	Configuration of TCP/IP auto start functions (e.g. portmapper)
c:\cmlib	Configuration files for AMU communication via IBM Communications Manager. Predefined files with names AMUL62S, AMUL62SC, AMUL62P and AMUL62PC.	
	*.cf2 *.cfg *.sec	Binäry configuration file, is updated when saved in Communications Manager.
	*.ndf	ASCII configuration file for Communications Manager
c:\amu\	amuconf.ini	Configuration file of AMU (Graphical Configuration, Process Configuration and further internal AMU parameters)
	KrnRefPt.*	Binary files with current coordinate of teach points
	ConCont.ini	Configured Continous Send
	artcfg.dat	Configuration file of AMU log program
	local.amu	Configuration file of AMU name for use of DUAL AMU (A01 or A02)
	backup.pmc	Backup file for control parameters on AML/J
c:\amu\recovery	*.dsr	Configuration file for disaster recovery
C.\das\etc	config	Configuration file for DAS

Index

- W -