REFERENCE GUIDE

AMU 3.10

AML

MANAGEMENT

UNIT

Order No.DOC E00 024-B

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1 Introduction

1.1 Contents

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

1.2 Target Audience

The manual is designed for system administrators; service technicians and users operating the AMU. Familiarity with the operating system OS/2 is assumed.

1.2.1 Structure of the Manual

The manual contains the following chapters:

Chapter 1	*Introduction* Information concerning use of the manual as well as safety instructions
Chapter 2	*Overview of AMU* Description of the functions of the AML Management Unit
Chapter 3	*For Your safety* Information concerning safe operation of AMU
Chapter 4	*Operating Console* Explanation of functions of the AMU operating console (CON)
Chapter 5	*Configuration* Explanation of the configuration features for AMU (AMU and OS/2)
Chapter 6	*Utilities* Utility programmes for diagnosis and installation of AML Systems

Chapter 7	*Procedures* Description of important procedures (start, software update etc.)
Chapter 8	*Useful System Functions* Information on OS/2 operating system, database manager and TCP/IP functions in connection with AMU
Chapter 9	*Messages* Log messages of AMU
Appendix	glossary, trace levels, media and device types

1.3 Further Documentation

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

1.4 Explanation of Symbols and Notes

The following symbols and notes call attention to important information.



A detailed explanation of these symbols is found in QVW.

<1>+<2>	press keys simultaneously
italic	headline, e.g. chapter 3, *Safety* filename, e.g. *amuconf.ini* variable, e.g.*client_name*
Chicago	term appearing on the operating console of AMU
bold	special term, e. g. **Scratch-Pool**
`courier`	line or term appearing in an input window - programme message - command - parameter or file

`[courier]`	optional parameter
`Param1 | Param2`	alternative parameter
`(dism)`	abbreviated command
☞	cross reference

1.5 Technical Support

If you cannot solve a problem with the aid of this document or if you are interested in a recommendation regarding training, please contact your contract partner or the ADIC Technical Assistance Center (ATAC).

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1.6 Product Observation

We are obliged by law to monitor our products even **after** delivery to the customer.Therefore please communicate every point of interest.

- modified set-up data
- experience with the product
- repetitive faults
- difficulties with this manual

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2 Overview of AMU

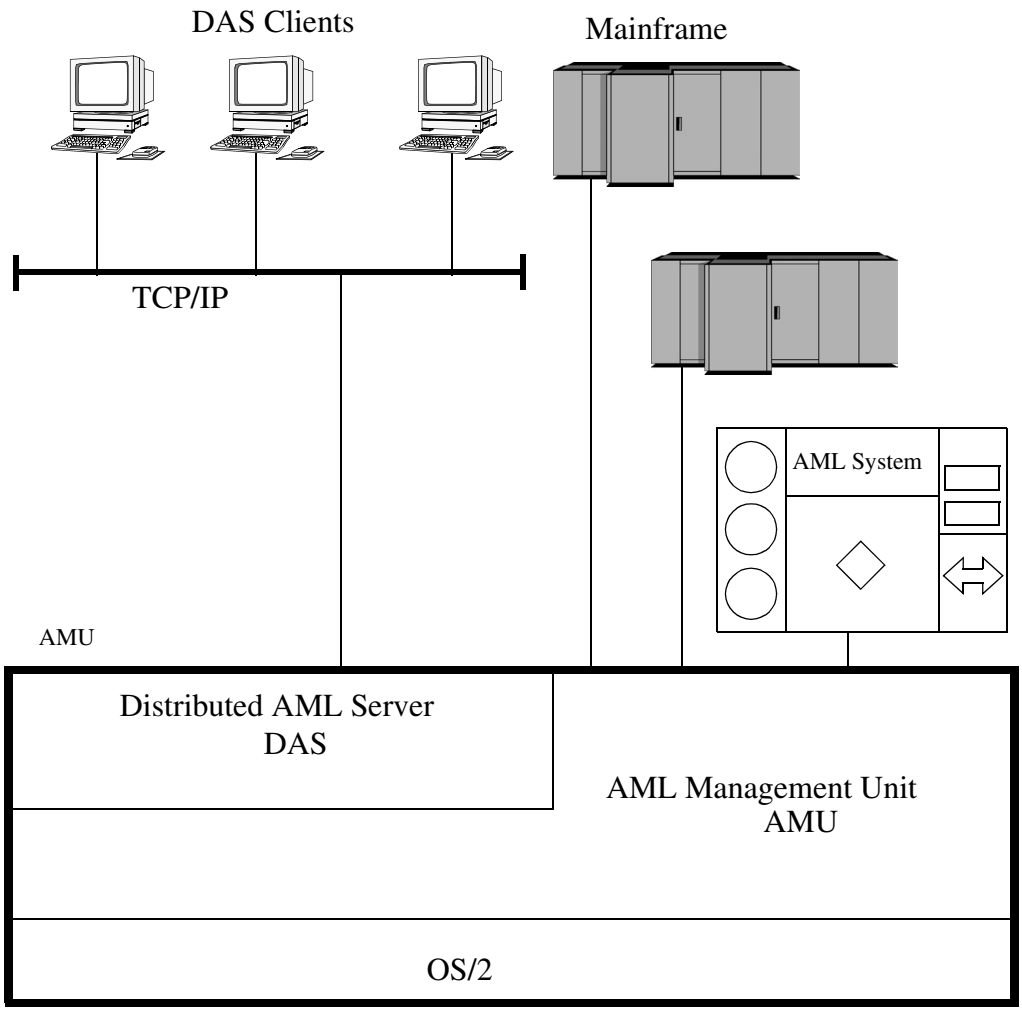


Fig. 2-1: AMU in a Multi-Host Environment

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 programmes are running
  - AML Management Software (AMU) and
  - 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
- Scalar 1000

Information

In den following chapters the AML Management Unit (AMU) described. Information on DAS is found in following manuals:

- **DAS Administration Guide**
- **DAS Interfacing Guide**

2.1 Tasks of AMU

2.1.1 Command Management

AMU accepts commands incoming via various interfaces:

- host interfaces
- graphic operating console on AMU processor (☞ Page 4-1)

The commands are either processed immediately and acknowledged (e.g. database querries) or entered on a command queue according to priority. The software can enter up to 50 commands on the command queue. All important events related to these commands are recorded in a log file.

With AMU 3.00 can be mounted also not "Foreign Cartridges" from the I/O unit. But the user make sure, that this compartment are still empty for the Keep (Dismount)

2.1.2 Dismount Management

Dismounting includes:

- the unload command to the drive
- the process inside the drive preparing the unloading (e. g. rewinding on 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 take up a differing amount of time depending on the type of drive. With the aid of the Dismount Manager these procedures can be adapted to the different drive types, and be controlled even if there are time differences for dismounting by the robots.(☞ “Drive” on page 5 - 22)

For DLT-Low-Profile-drives operation is precondition the Drive Control Interface (DCI). This direct drive interface to the AMU prevent not necessary dismount actions and a drive controlled cleaning.

2.1.3 Clean Management

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

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

To determine the cleaning mode required for your drive turn 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.

Information

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 preferrably.

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 cleanpool.

The cleanpool is the amount of cleaning media of a certain type, and each medium in the cleanpool has a barcode label. Parameters required are assigned the cleanpool, such as maximum number of uses of the medium and minimum number of cleaning media required.

The cleanpool is filled by special insert commands for cleaning media. The application receives a message when the number of available cleaning media drops below the minium 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.

DLT-LowProfile drives sends the clean request via DCI to the AMU, so that the Clean Manager clean the drive only in the right situation.

2.1.4 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 with stopping the robot (I/O unit/D -HICAP AML/J)

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

- host-controlled
- AMU-controlled

Host-Controlled

The operator request the I/O unit by pressing a push-button and thereby makes it 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

The operator request the I/O unit by pressing a push-button and thereby makes it 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 therein do not require a barcode label for identification. The assignment is made via the compartments and virtual volsers (e.g.*FR001).

2.1.5 Database

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

- serial number of the medium represented by a barcode (VOLSER),
- kind of coordinate (CTYPE), e.g., can a cleaning or data medium 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.e. 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) and
- POOL (scratch and cleaning media).

The database is automatically accessed with every host command.

Archive Organization

The table COORDINATES can be configurated for various applications:

- **Hierarchical Archive Organization**
  Volser are assigned to coordinates in rising order. To allow for this, ranges (Volser ranges) are defined when the database is set up, and the data records are preassigned to these.
  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 Vosers in the archive change frequently).
  If a Volser as yet unknown to the system is to be 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).

2.1.6 Data Safety

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

Dual AMU

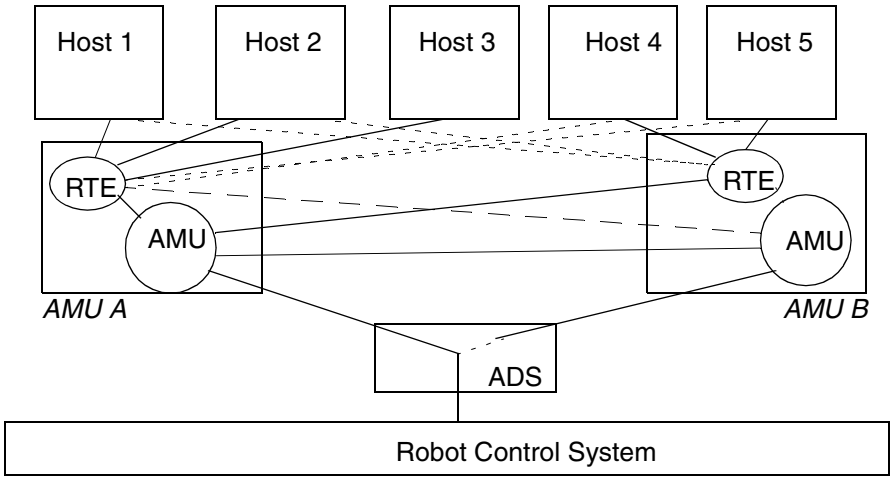


Fig. 2-2: Functional Principle Dual AMU

Dual AMUs are two identical computers for control of ADIC archives (AML/2 and AML/E). 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.

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
(☞ Process Configuration or Database Backup).

You can switch the database backup function on or off with an entry in the configuration file AMUCONF.INI (☞ “Process Configuration” from page 4-30).

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

Information

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 entirity (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. To do that the following is required

- backup file,
- corresponding journal file and

on the AMU operating console in menu Service the command Restore
(☞Page 4-41).
During the restoration, the backup and journal files are checked for integrity.

2.1.7 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.

Information

Log files up to version 2.40J are saved in binary format and must be converted for reading. You can detect this on the 3 letters LOG in the filename for binary, instead of LO for the ASCII-File.

2.1.8 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
(☞ “Ejection Procedure for Disaster Recovery” from page 7-9).

2.1.9 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 can be extracted from 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, Ethernet and 3270-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

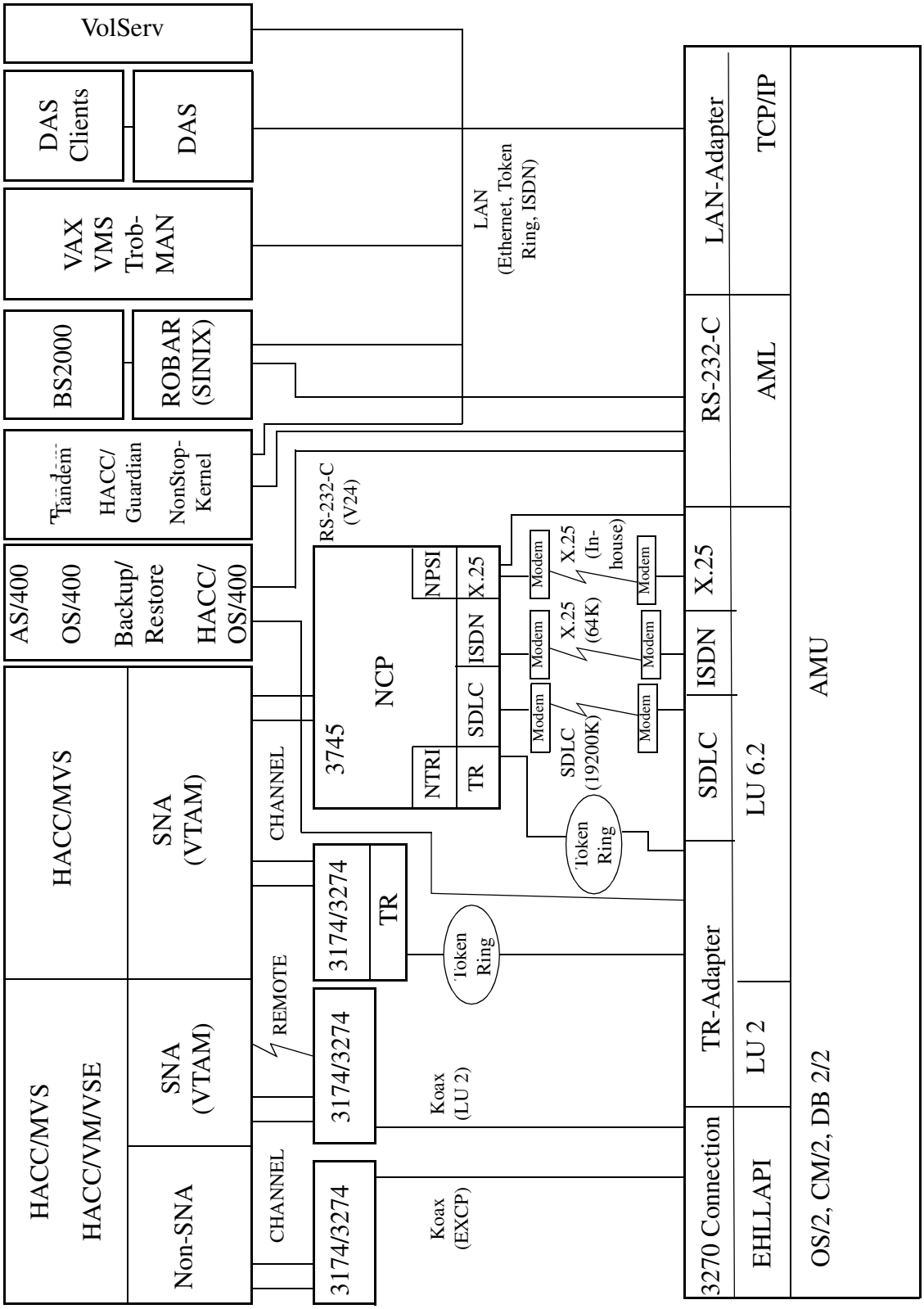
Limitations

In an environment with several hosts the following limitations apply

- 1 coaxial connection (EXCP / LU 2) per AMU,
- 1 Token Ring connection with n x LU 6.2- and 1 coaxial connection in parallel,
- simultaneous connection of HACC/MVS and HACC/VM:
  - HACC/MVS via LU 6.2,
  - HACC/VM via EXCP/LU 2,
- always additionally possible is: TCP/IP via Ethernet,
- always additionally possible is: AML via RS-232-C.

Connecting Options

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


VolServ
DAS Clients
DAS
VAX VMS Trob-MAN
BS2000
ROBAR (SINIX)
Tandem
HACC/ Guardian
NonStop-Kernel
AS/400
OS/400
Backup/ Restore
HACC/ OS/400
LAN (Ethernet, Token Ring, ISDN)
HACC/MVS
HACC/VM/VSE
SNA (VTAM)
Non-SNA
CHANNEL
REMOTE
3174/3274
TR
Koax (LU 2)
Koax (EXCP)
Token Ring
RS-232-C (V24)
3745
NCP
NTRI
TR
SDLC
ISDN
NPSI
X.25
Modem
SDLC (19200K)
X.25 (64K)
X.25 (In-house)
LAN-Adapter
TCP/IP
RS-232-C
AML
X.25
ISDN
SDLC
LU 6.2
TR-Adapter
LU 2
3270 Connection
EHLLAPI
AMU
OS/2, CM/2, DB 2/2

2.1.10 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 right to the system,
administrator	system administrator and task preparation have access to configuration of the system,
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”.

2.2 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.

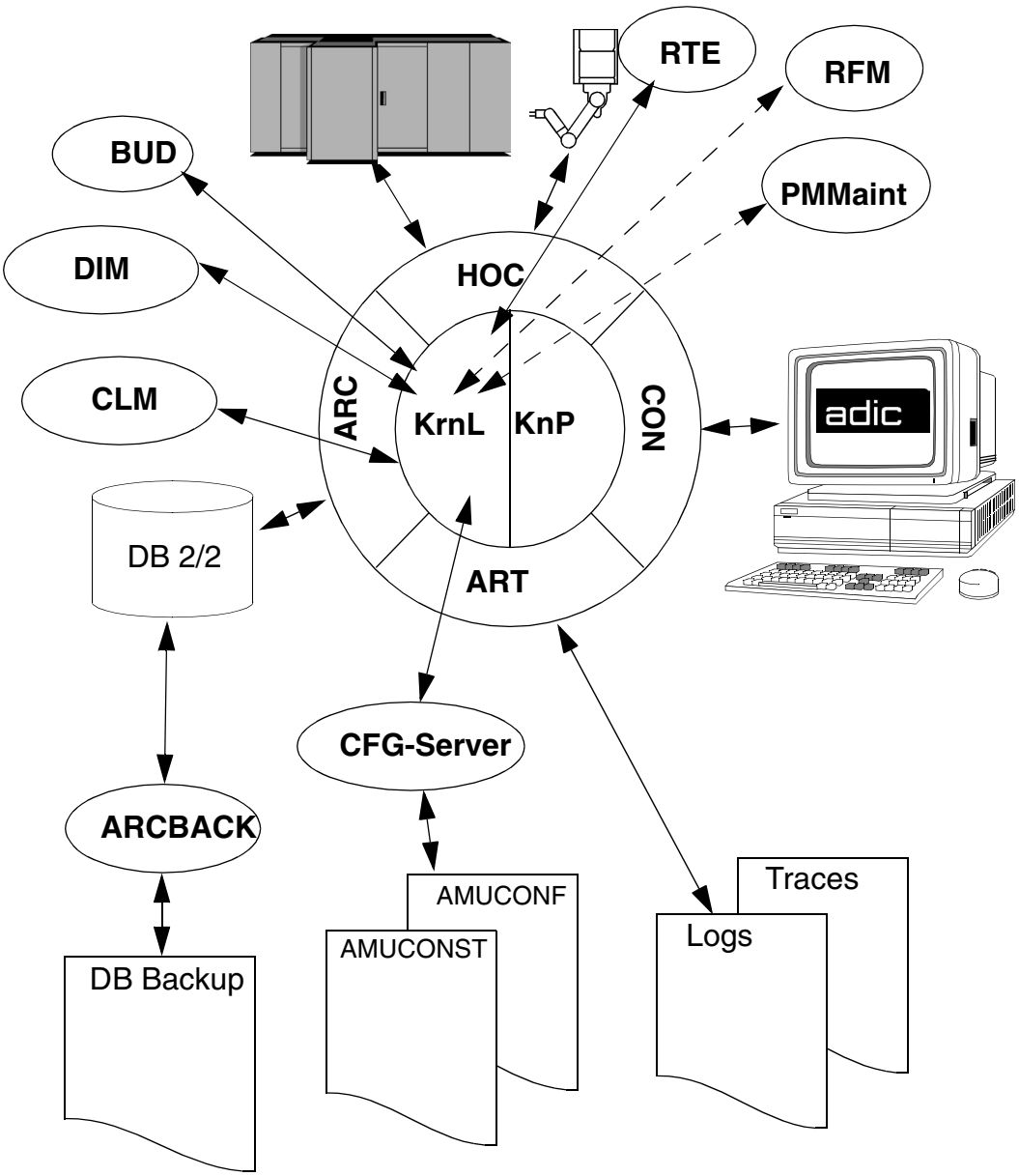


Fig. 2-3: AMU Processes

Functions of Processes

Abbreviation	Name	Explanation
Arc	**Arc**hive	manages and protocols (journaling) archive catalog; SQL database
ArcBack	**Arc**hive-**Back**up	short-term, writes backup file
ART	**A**lerter	wirtes logs and traces
BUD	**B**ackup **D**aemon	background process for control of data transfer between dual AMUs
Clm	Clean Manager	monitors cleaning of drives
Con	AMU Operator **Con**sole	operator surface for application, installation and maintenance
Dim	Dismount Manager	monitors drive cleaning
Hoc	**Ho**st and **o**ther **C**ommunication	process controlling the communication to all external systems (e.g. HACC/MVS, robot control unit of AML/2)
KRN-L	(**Kern**el-logical	central logic, converts host commands to control commands
KNP	**Kern**el-physical	processing for robot (compute coordinates)
RTE	Router	set up routing table, passes on host commands from passive AMU computer to active AMU computer and back

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 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 diagnosys program for AML/J control unit (PMAC)
patini	patini	allows to edit binary configuration files
RFM	Rho File manager	file transer 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

2.3 AMU System Requirements

2.3.1 Hardware

Processor	min. Intel Pentium 120 MHz
Main storare	min. 32 MB RAM (64 MB recommended, required for systems with 2 or more hosts)
Harddisk	min. one harddisk with 850 MB (2 harddisks recommended)
Graphics adapter	XGA min. resolution 1024 x 768
Input device	keyboard and mouse or trackball

2.3.2 Software

Operating system	OS/2 3.0 (Warp) MPTS Fixpack WR08610
Data Base Manager	IBM DATABASE 2 (Single User) (Version 2.1 or higher)
Communication	optional, depending on host connection IBM Communications Manager CM/2 2.1 or higher IBM TCP/IP 3.0 (part of Warp Connect)

2.3.3 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	
Scalar 1000 control unit	Microcode 1.01 or higher	Driver SCSI-Util (version 1.02 or higher) required for it
DAS	1.2	UNIX
	3.01 or higher	OS/2
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	

3 For Your Safety

Information

In addition to the safety instructions in this chapter, local and special safety instructions relating to this kind of product apply.

Avoid hazard during maintenance and operation of the system by

- safety-conscious behaviour,
- careful action.

ATTENTION!

Knowledge of and adherence to these instructions are indispensible preconditions for safe maintenance of the AML system.

3.1 Hazard Alert Messages

We classify the hazards in several categories. The following table shows the relation of symbols, signal words, the actual hazard, and its possible consequences.

Symbol	Damage to...	Signal Word	Definition	Consequences
	People	**DANGER!**	imminently hazardous situation	death or serious injury (maiming)
		WARNING!	potentially hazardous situation	possibly death or serious injury
		CAUTION!	less hazardous situation	possibly minor or moderate injury
	Property	**ATTENTION!**	potentially damaging situation	possibly damaging to: • the product • its environment
		**Information**	tips for users and other important/ useful information and notes	No hazardous or damaging consequences for people or property

3.2 Further Symbols

The table below lists all symbols used in this manual and explains their meanings.

Symbol	Damage to...	Signal Word	Definition	Consequences
	**People**	WARNING! Hazardous voltage!	Potentially hazardous situation Replaces the pictorial  when the source of hazard is electric energy.	Possibly death or serious injury. After an EMERGENCY STOP and also after power-down of the main switch, voltage may still be present at locations identified by this pictorial. Hazard of fatal electric shock!
	**People**	**CAUTION! Laser - radiation! Do not look into the laser beam!**	Less hazardous situation. Laser radiation	Possibly minor or moderate injury. Laser radiation is emitted upon opening.
		-	Calls attention to the address of your service contact.	No hazardous or damaging consequences for people or property

3.3 Scope of Application

These instructions apply to the AML system.

Further safety regulations for the components used in the system are not invalidated by the present instructions.

Information

The documents of component suppliers are part of this AML documentation.

4 Operating Console

Input at the operating console of the AMU have the same access priority to the system as host commands.

ATTENTION!

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 change of the configuration restart of AMU (AMU and DAS) is mandatory.

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 (☞ Operator Guide)
- during installation
- during maintenance

Information

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

4.1 Application

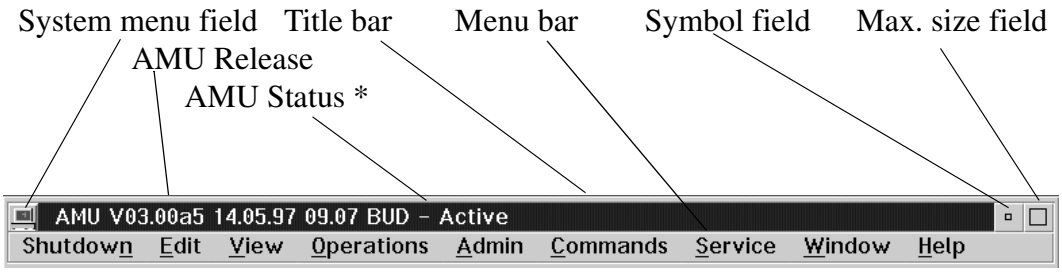
Design and application conform to the SAA standard.

It it operated with

- the keyboard
- the mouse

Further information is found in the OS/2 manuals.

4.1.1 Design of the 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

Fig. 4-1: Design of the AMU Menu Bar

Information

In the active window the title bar´s 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

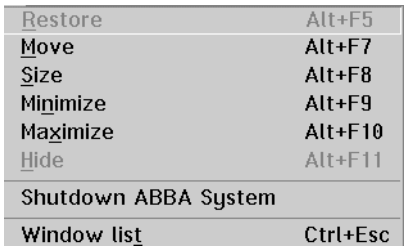


Fig. 4-2: System Menu Field of AMU

4.1.2 Selecting a Command

With the mouse

a) Move the mouse pointer to the desired menu in the menu bar.

b) Click on the menu; the menu opens.

c) Click on the command in the menu; the command window opens.

With the keyboard

a) Press the <ALT> key and the underlined letter in the menu bar. The menu opens.

b) Now press the underlined letter in the menu to select the command.

With a command code

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

4.1.3 Altering a Window´s Size

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

a) Move the mouse to any corner of the active window.
The mouse pointer changes into a double arrow.

b) Press the mouse button and pull the window to the desired size while keeping the mouse button pressed.

4.1.4 Moving a Window

a) Move the mouse pointer onto the title bar.

b) Move the window while keeping the mouse button pressed.

4.1.5 Closing a Window

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

4.2 Overview of Menus

All commands of the AMU operating console are explained here:

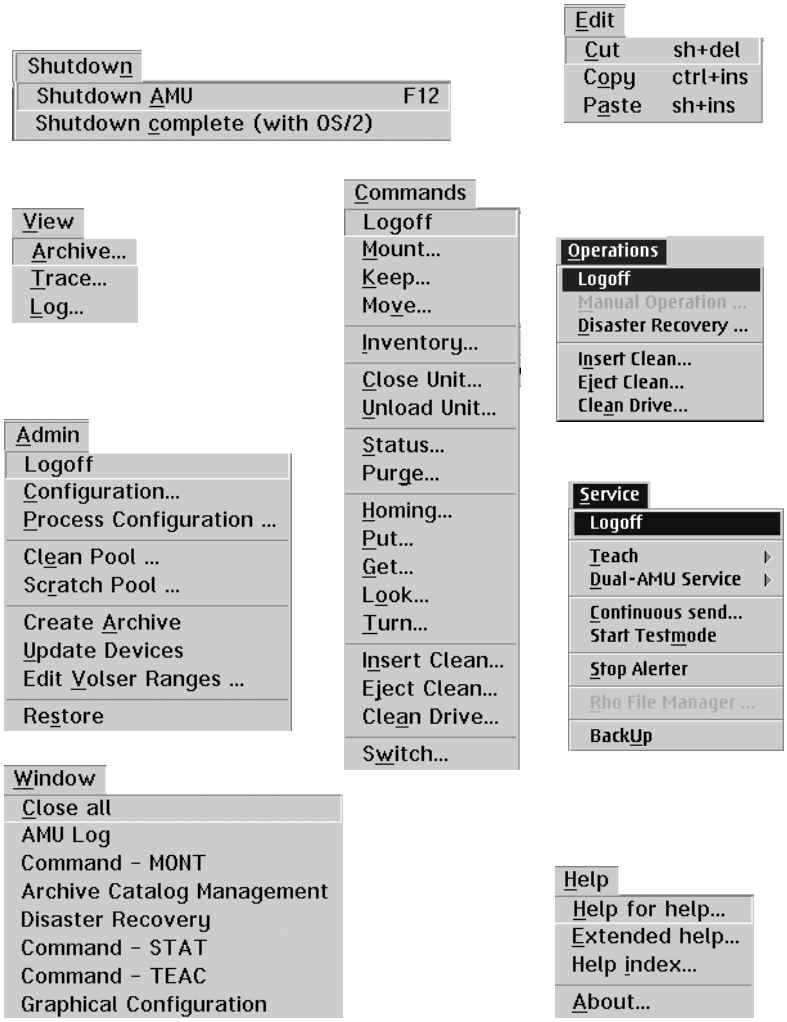


Fig. 4-3: Overview of Menus of AMU

Information

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.

4.3 Menu Shutdown

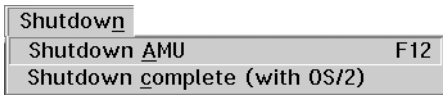


Fig. 4-4: Menu “Shutdown”

Command	Field	Explanation
Shutdown AMU	Prepare shutdown of the AML system.	

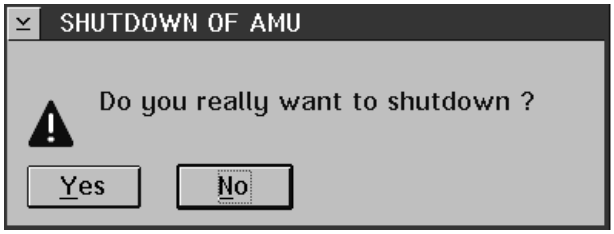


Fig. 4-5: Window “SHUTDOWN OF AMU”

ATTENTION!

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.

Information

Shutting down of the system ☞ Operator Guide.

No — Return to the program, no shut-down.

Command	Field	Explanation
Shutdown complete (with OS/2)		Prepare shutdown of the AML system (like Shutdown only AML-System), thereafter terminate all processes running under OS/2 and perform OS/2 system shutdown.

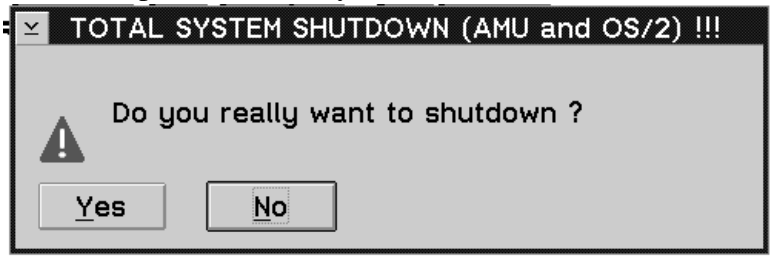


Fig. 4-6: Window "TOTAL SYSTEM SHUTDOWN"

ATTENTION!

Before shutting down, interrupt the communication with the host computer (e.g. with HOLD 1,1).

4.4 Menu Edit

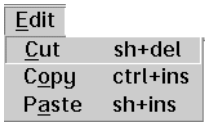


Fig. 4-7: Menu “Edit”

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>

4.5 Menu View

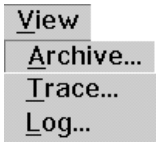


Fig. 4-8: Menu "View"

Calls up information in various windows.

4.5.1 Archive

Allows to check and 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.

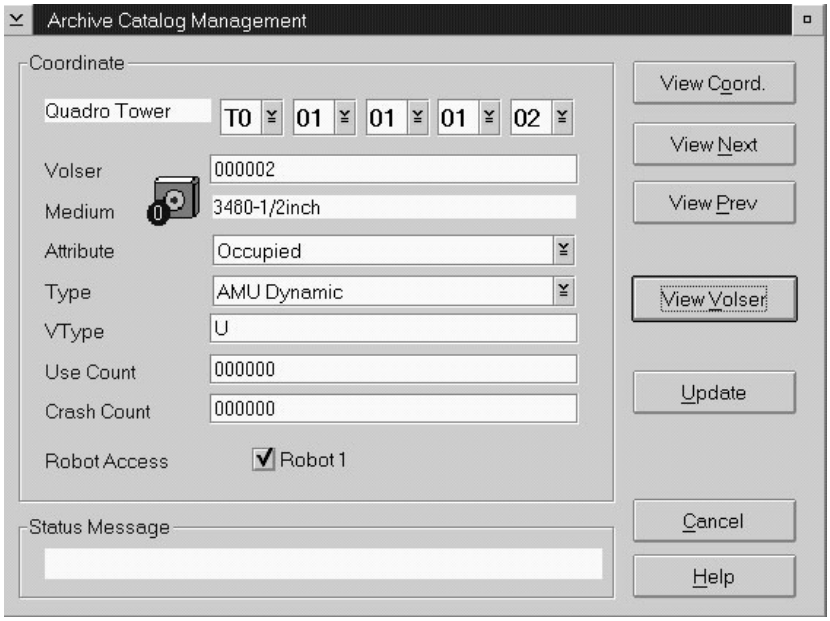
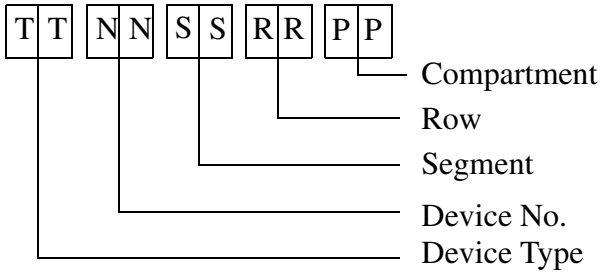


Fig. 4-9: Window "Archive Catalog Management"

.

Field	Explanation
Coordinate	Logic coordinates of the medium in the archive. **Information** **One optical disk occupies 2 logic coordinates, one for each side.** The digits of the coordinates indicate the following:  List of device types (☞Page 10-10) With the aid of the four selection windows, select the desired coordinate for display of the data record of a coordinate.
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. Following Volsers are not allowed: • 0000000000000000 • CLEAN Enter the Volser on the field to search the medium in the database.

Field	Explanation
Medium	Type of medium for monitoring of assignment of archive - drive. Medium cannot be changed in the Archive Catalog Management.  **Information** **Not all media types are generally differentiated even if they have the same kind of housing.** List of media types (QVW)
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)	Campartment 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. **Information** **The value of this filed 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

Field	Explanation
Robot Access	Access right of robot to compartment
Status Message	Reply of AMU with message number (☞Page 8-1) 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	**Information** **This command can only be used after logon as administrator or supervisor.** Update the archive catalog entry for the archive coordinate. **ATTENTION!** **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.**

4.5.2 Trace

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

Information

The selection of trace can slow down the processing!

Change the selection only after consulting ADIC Technical Support. Standard selection: no traces.

ATTENTION!

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

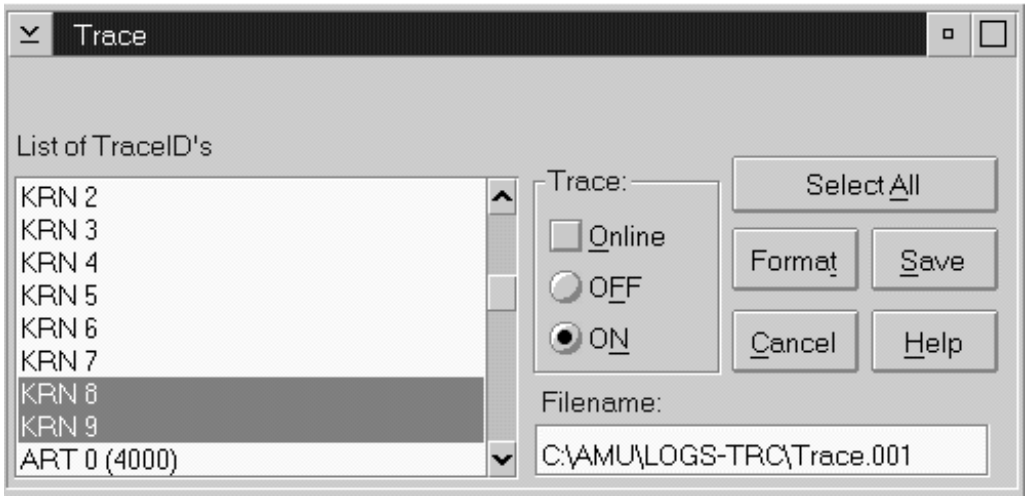


Fig. 4-10: Window "Trace"

Field/Command	Explanation
List of TraceID's	Trace levels can be selected with the <SPACE> bar or the mouse. List of all trace ID's (☞Page 10-4)

Trace:
✔ Online

The running trace is additionally displayed on-screen with

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

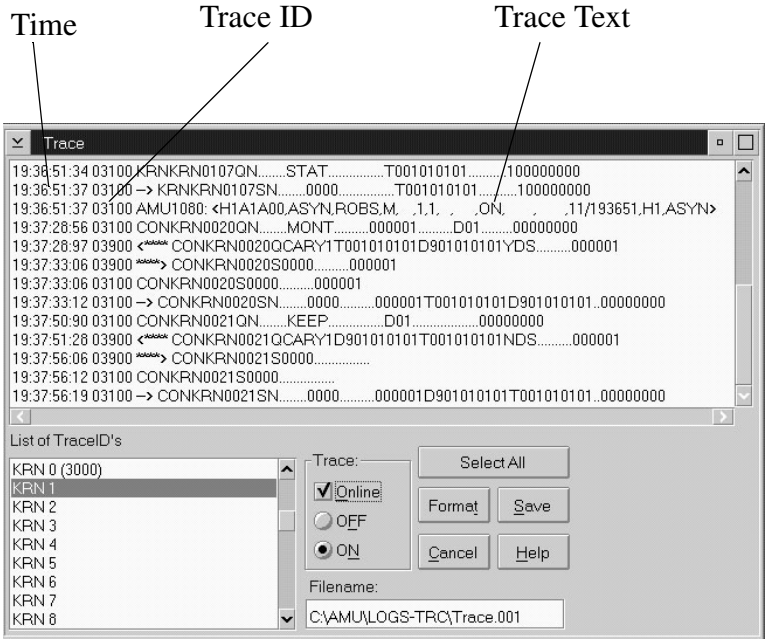


Fig. 4-11: Window “Trace” (Online)

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 of 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 (☞ Format) with the OS/2 Print command.

Format

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

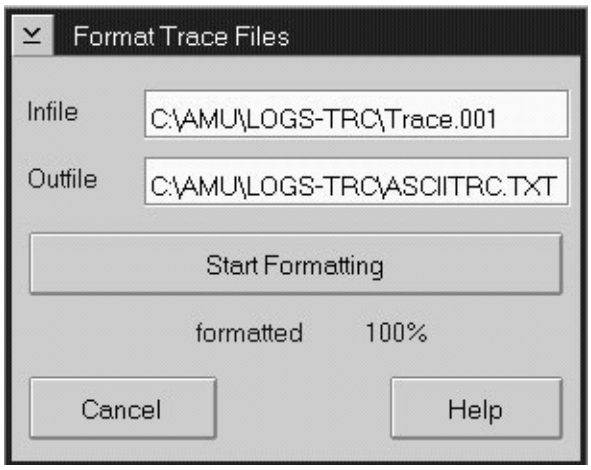


Fig. 4-12: Window "Format Trace Files"

Target filename with path
(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

4.5.3 Log

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

Examples:

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

Log files begin daily at 0.00 hours. If the available storage on the harddisk drops below the value set in the configuration file ARTCFG.DAT (default 40 MB), the oldest log files are deleted (☞ Page 5-62).

Information

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

Information

The first line in each log file contains the version number of the current AMU.

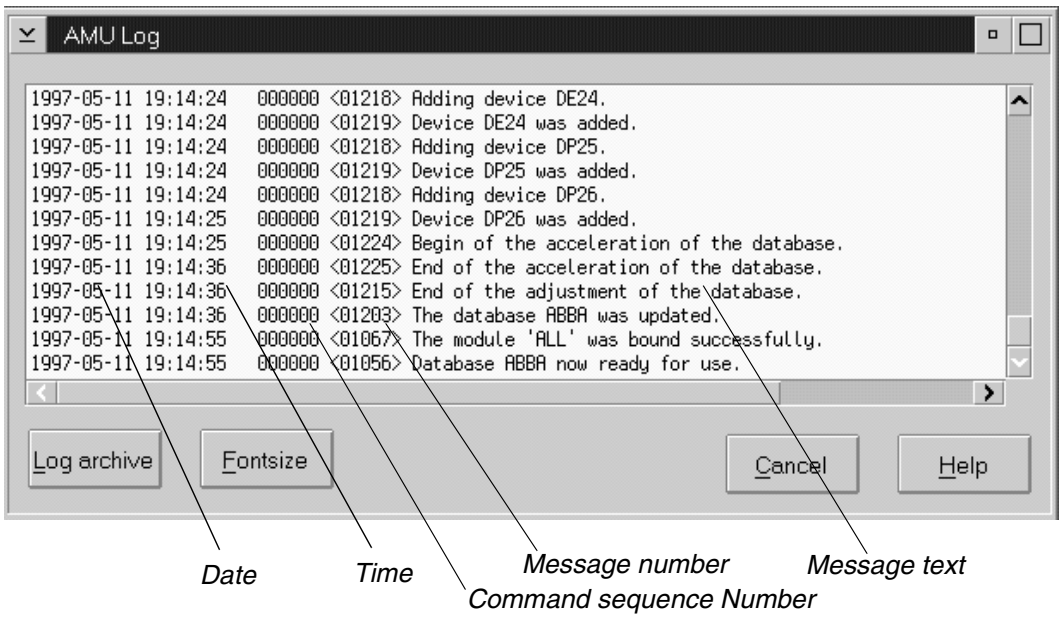


Fig. 4-13: Window “AMU Log”

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 comprises `lo` <Day><Month>.`001`

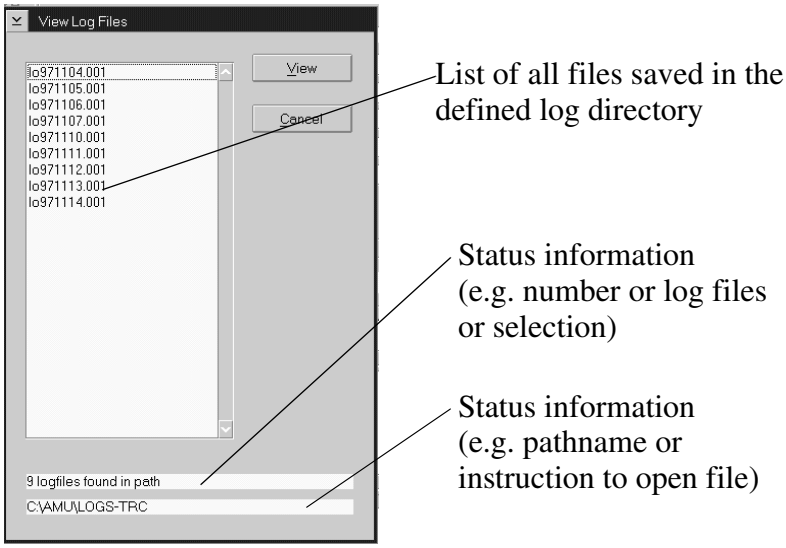


Fig. 4-14: Window "View Log Files"

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

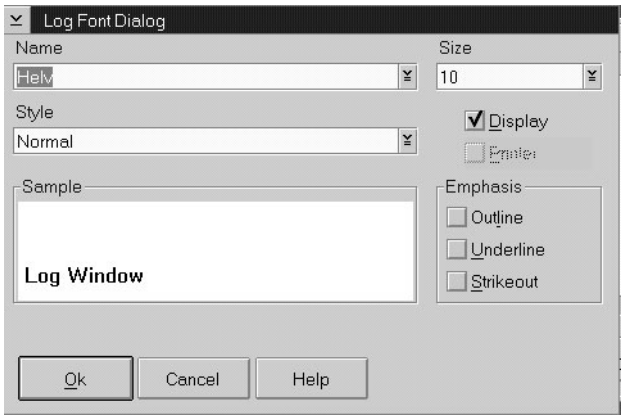


Fig. 4-15: Window "Log Font Dialog"

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

4.6 Menu Operations

Fig. 4-16: Menu “Operations”

4.6.1 Login/Logoff (Operator)

Command	Field	Explanation
Login (Operator) / Logoff		If you wish to use the locked function in menu Operator, you must log on as operator, administrator or supervisor To protect the system from unauthorized use, logoff when you have completed operations

Fig. 4-17: Window “Operator Login”

Password	Field for input of the operator password. Request this password from your system administrator
Ok	Perform login.

4.6.2 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.

Information

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, 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 Confirm the execution of the command displayed with OK.
Execution of the instruction is acknockledged 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.

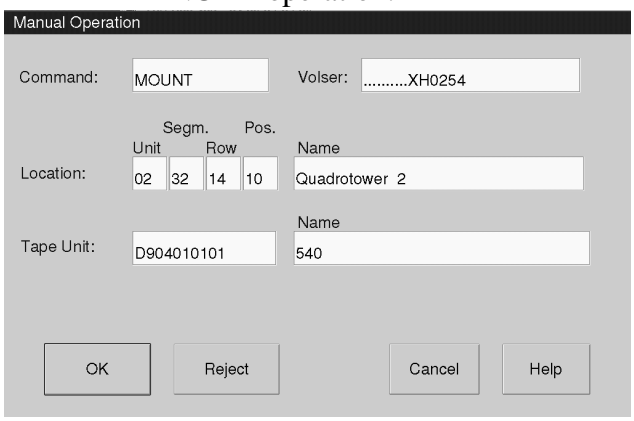


Fig. 4-18: Window “Manual Operation”

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.

Command/ field	Explanation
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.

4.6.3 Disaster Recovery

Dialog window starting ejection of preselected media in case of emergency (Disaster Recovery). Thes window has two areas for independent ejection of media in AML/2 twin-robot systems.

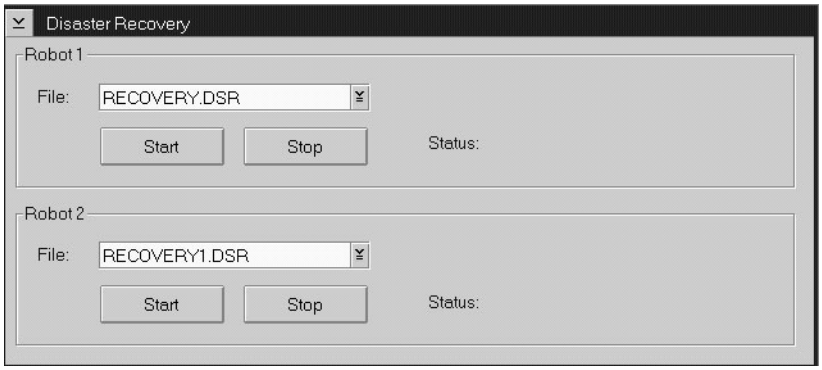


Fig. 4-19: Window “Disaster Recovery

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` (☞ “Structure of the file” from page 7-8)
Start	Start the ejection of media listed in the selected file.
Stop	Stop ejection
Status	Display the current eject status

4.6.4 Insert Clean

Insert cleaning media.

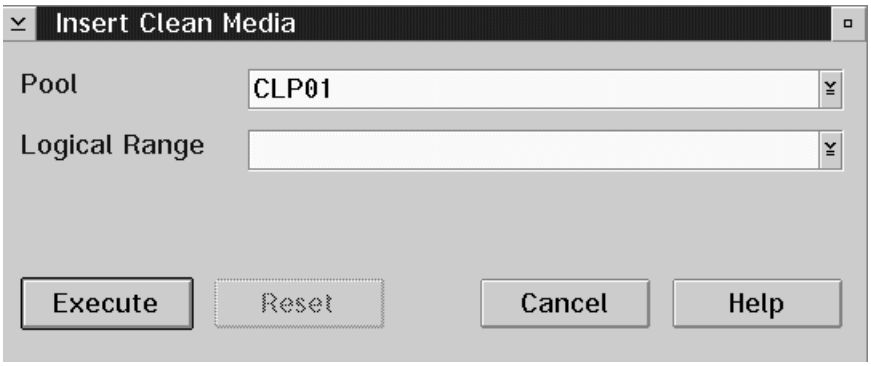


Fig. 4-20: Window “Insert Clean Media”

ATTENTION!

All media in the insert range are treated as cleaning media. Be sure there are not data media in the insert range while this command is executed.

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

4.6.5 Eject Clean

Eject used cleaning media

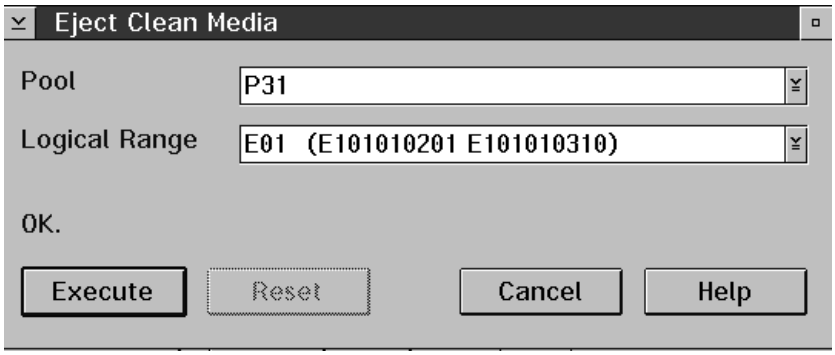


Fig. 4-21: Window "Eject Clean Media"

ATTENTION!

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.

4.6.6 Clean Drive

Clean drive outside automatic cleaning process.

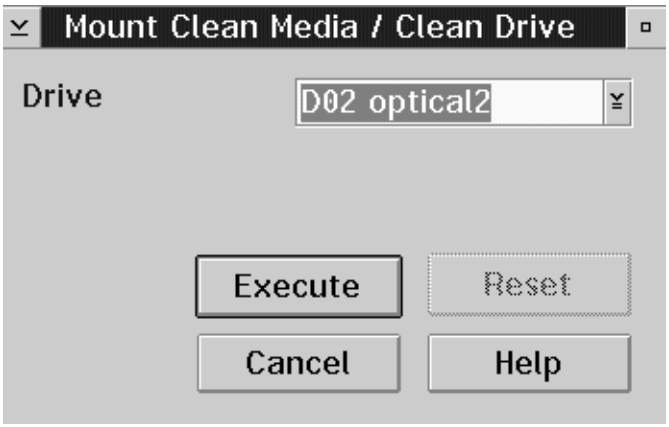


Fig. 4-22: Window “Mount Clean Media / Clean Drive”

ATTENTION!

The servicelife 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

4.7 Menu Admin

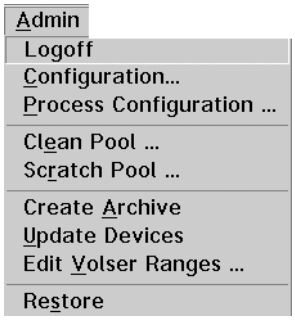


Fig. 4-23: Menu “Admin”

4.7.1 Login (Administrator)

Command	Field	Explanation
Login (Administrator) / Logoff		If you wish to use the locked function in menu Admin, you must log on as operator, administrator or supervisor To protect the system from unauthorized use, logoff when you have completed operations

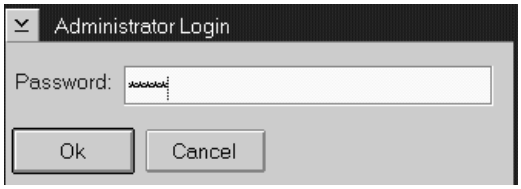


Fig. 4-24: Window “Administrator Login”

Password	Field for input of administrator password. Request this password from ADIC Technical Service.
Ok	Perform Login.

4.7.2 Configuration

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

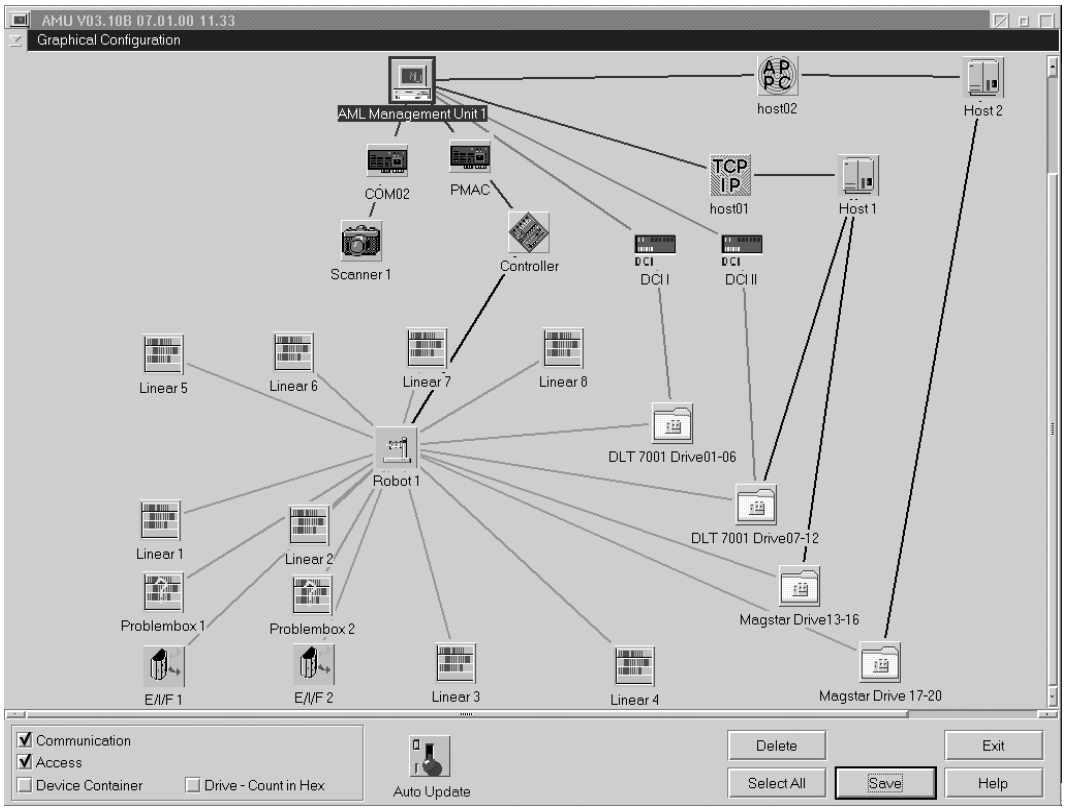


Fig. 4-25: Window “Graphical Configuration” example AML/J with DCI

4.7.3 Process Configuration

Overview of system settings within the AMU and possibility to set the parameters for the database backup. All these parameters are save in the file AMUCONF.INI.

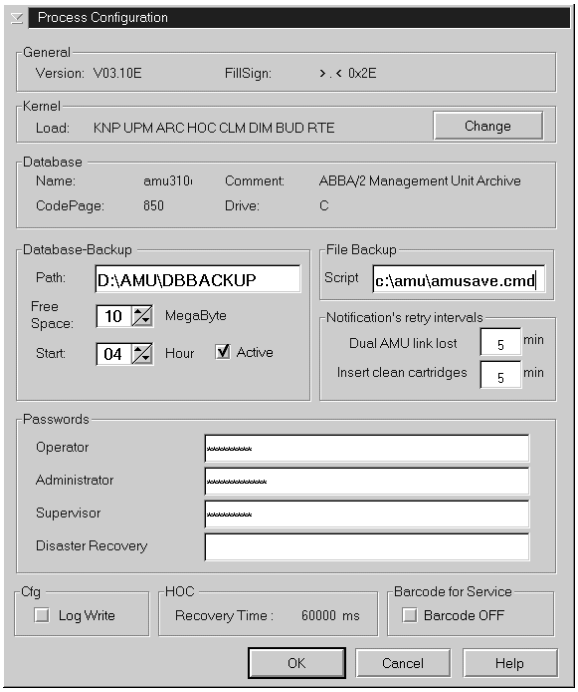


Fig. 4-26: Window "Process Configuration"

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).

Range	Field	Explanation
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- und Other-Communication • BUD: Backup Daemon • RTE: Router • DIM: Dismount Manager • CLM: Clean Manager From AMU 3.10 BUD and RTE should no longer started with this function. Please use therefore the batch c:\amu\AmuStart.cmd
Database	Parameter set used to create the SQL database upon execution of the command Create Archive. Change these parameters only if you have been specifically asked to 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)

Range	Field	Explanation
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. harddisk), an additional harddisk can be installed or files may be saved via LAN to another drive (parameter PROC DBBACKUPPATH).  **ATTENTION!** **Activated only after restart of AMU!**
	Active	Switch on/off backup system (parameter PROC DBBACKUPACTIVE).
	FreeSpace	• Information on the storage management of the backup system. If the vacant space drops bewlo 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 DBBACKUP-STARTHOUR).
File Backup	Identifies the script used to execute the backup.	
	Script	Path and Name of the backup script

Range	Field	Explanation
Notification's Retry Interval	Set the length of time that communication retries will be attempted between Dual AMUs.	
	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
Passwords	Assignment of passwords for various AMU areas	
	Operator	Password for call-up of functions in menu Operations (display is coded)
	Administrator	Password for call-up of functions in the menus Admin ad Operations (display is coded)
	Supervisor	Password for call-up of functions in the menus Service, Commands, Admin and Operations (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 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 to operate the system (Mount, Keep, Eject) without reading of barcodes. For insertion and inventory barcode reading is always active (parameter PROC BARCODEOFF).

Range	Field	Explanation
		**Information** **Select this function when scanner or vision system do not function, until they are repaired. As long as barcode reading is inoperative, media cannot be inserted into the archive.**

4.7.4 Clean Pool

Call up 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

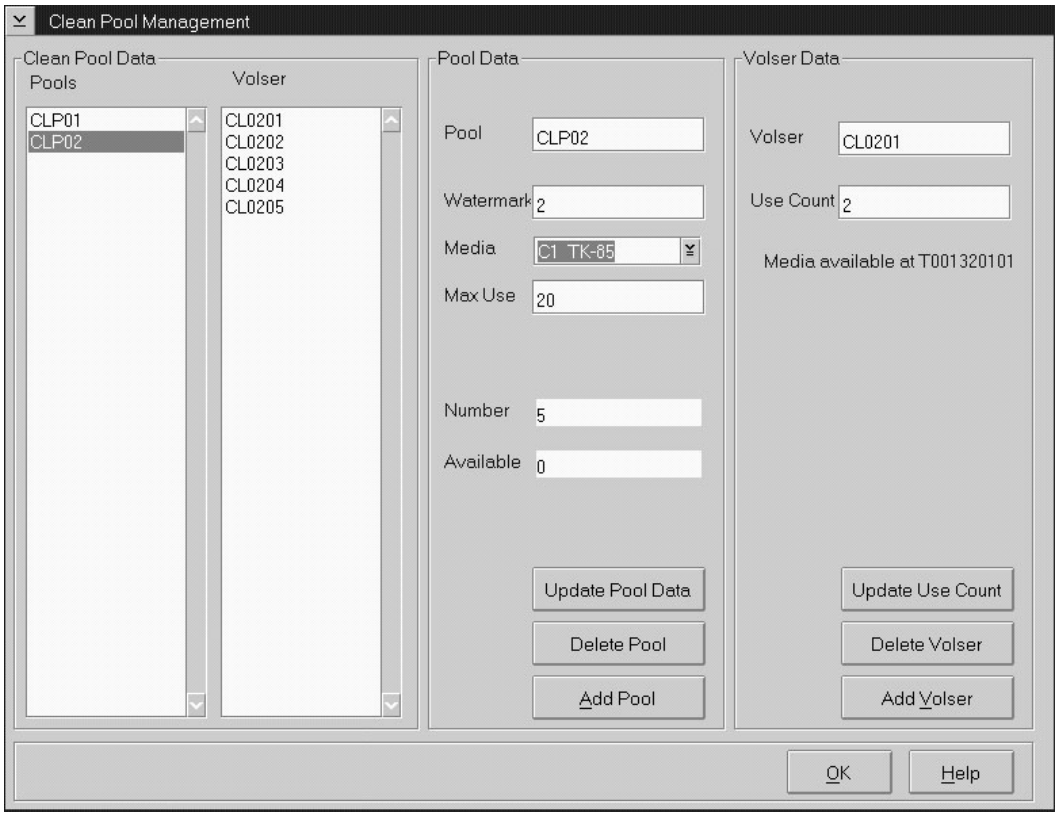


Fig. 4-27: Clean Pool Management

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.
		**ATTENTION!** **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.**
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 guiding value take the number of drives to be cleansed from this pool.
	Media	Cleaning media type; select media type used

Range	Field	Explanation
	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 sofar performed with this medium
	Update Use Count	Change the number of cleaning cylces 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 are updated in the window	
Ok	Terminates the dialog in Clean Pool Management	

4.7.5 Scratch Pool

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

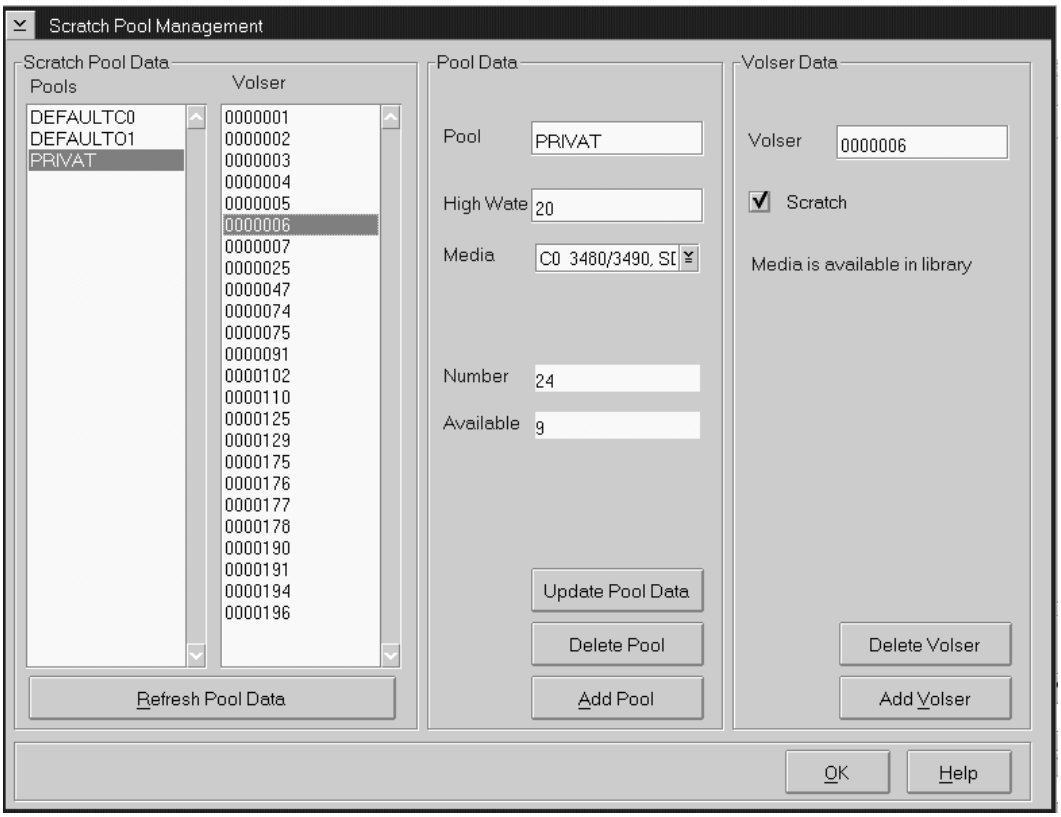


Fig. 4-28: Window Scratch Pool Management

Range	Field	Explanation
Scratch Pool Data	Pools	Display and selection field for all defined groups of scratch media in the AMU data-base
	Volser	Display Volsers in selected scratch pool. The display only indicates tha 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	

Range	Field	Explanation
	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
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.
		**Information** **This is a 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	

4.7.6 Create Archive

ATTENTION!

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

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

Fig. 4-29: Window “Create a New Archive”

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.

4.7.7 Update Devices

Function for adaption of the archive catalog to the graphical configuration.

It must be used when the kind and number of components has been changed.

Fig. 4-30: Window “Update Devices of Archive”

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.

4.7.8 Edit Volser Ranges

Function for reassignment of compartments. The archive catalog is internally restructured and not created afresh (☞ Page 5-51).

4.7.9 Restore

Restore the archive catalog when the database backup system is on

Information

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.**

Fig. 4-31: Window “Restore Database”

4.8 Menu Commands

Fig. 4-32: Menu “Commands”

4.8.1 Login (Supervisor)

Command	Field	Explanation
Login (Supervisor) / Logoff		If you wish to use the locked functions in menu Command, you must log on as operator, administrator or supervisor To protect the system from unauthorized use, logoff when you have completed operations

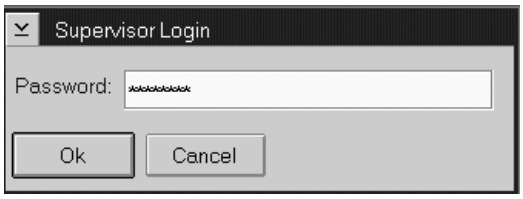


Fig. 4-33: Window "Supervisor Login"

Password	Field for input of the supervisor password. Request this password from ADIC.
Ok	Perform login.

All commands in this menu open the command window.

Information

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.

ATTENTION!

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 descrepancies in the archive catalogs.

The following functions are identical in all command windows:

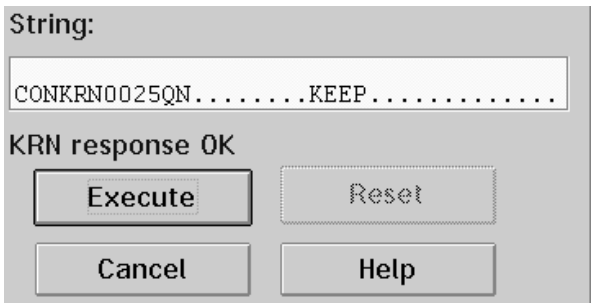


Fig. 4-34: Window “Command”

Field	Explanation
String:	Display command string (☞ command string convention see below)
Status	Display messages, e.g. Cmd sent, rc 0 rc = Return Code: • 0 = COMMAND in execution • KRN response OK: command execution successfully completed • otherwise error number, e.g. error from KRN 1033 (☞Page 9-5)
Execute	Execute command
Reset	Prepare window for new command, no consequence for current command execution

4.8.2 Command String Conventions

Information

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

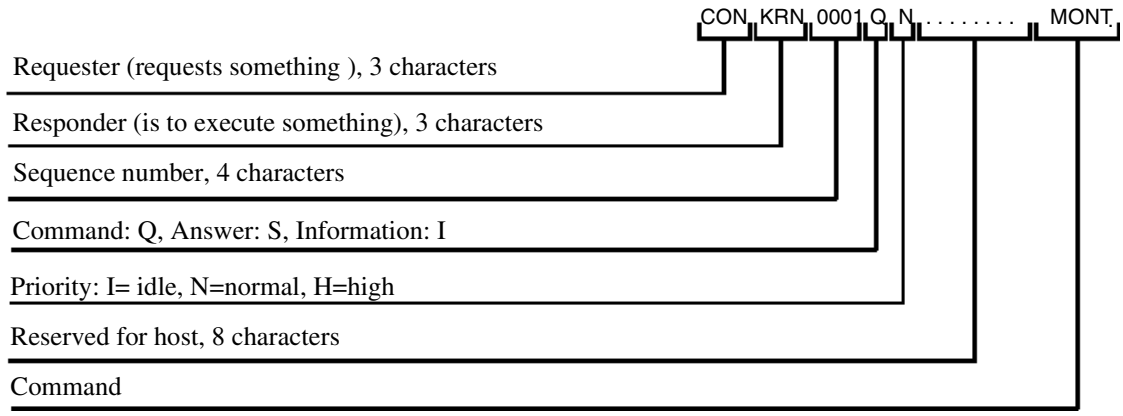


Fig. 4-35: Composition of Command String Part 1

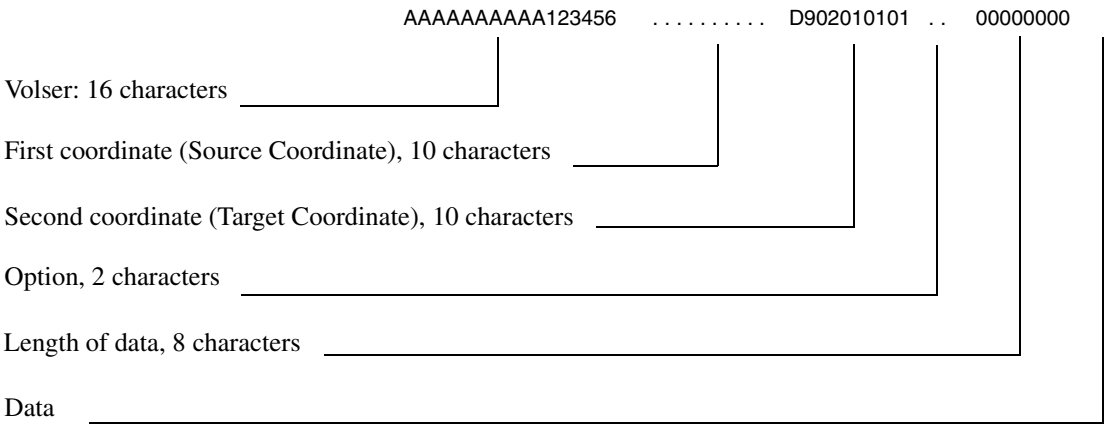


Fig. 4-36: Command String Convention Part 2

4.8.3 Command “Mount...”

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

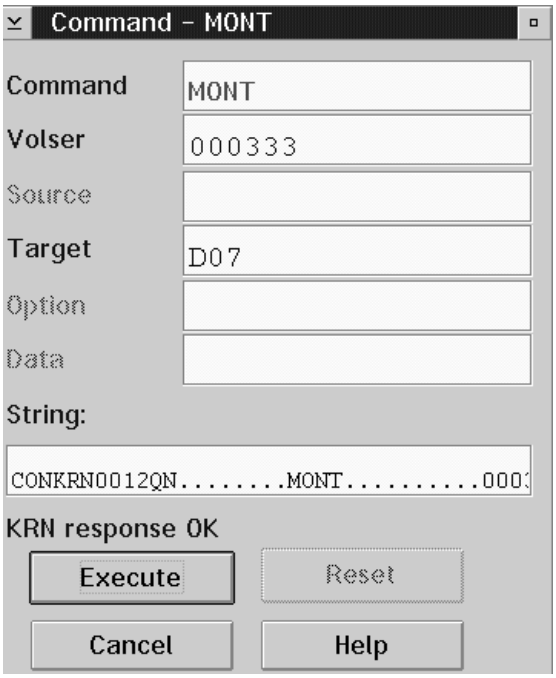


Fig. 4-37: Window “Command - MONT”

Field	Explanation
Command	Selected command: MONT
Volser	Enter: • Volser of the medium (e.g. 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).

4.8.4 Command “Keep...”

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

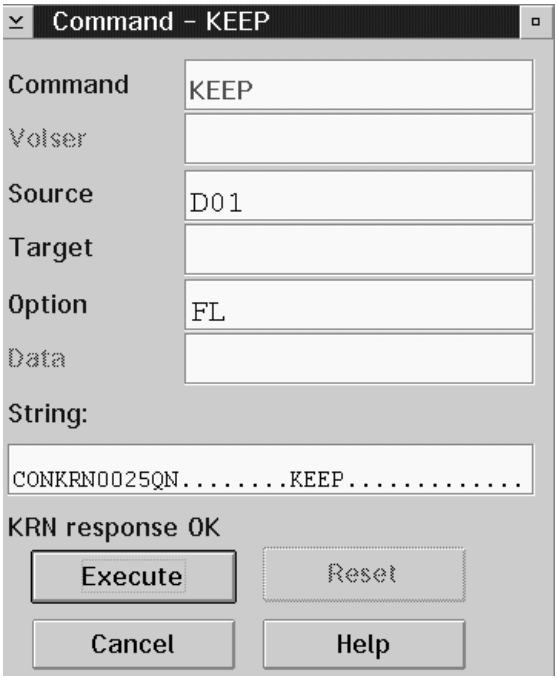


Fig. 4-38: Window “Command - KEEP”

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.

4.8.5 Command “Move...”

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

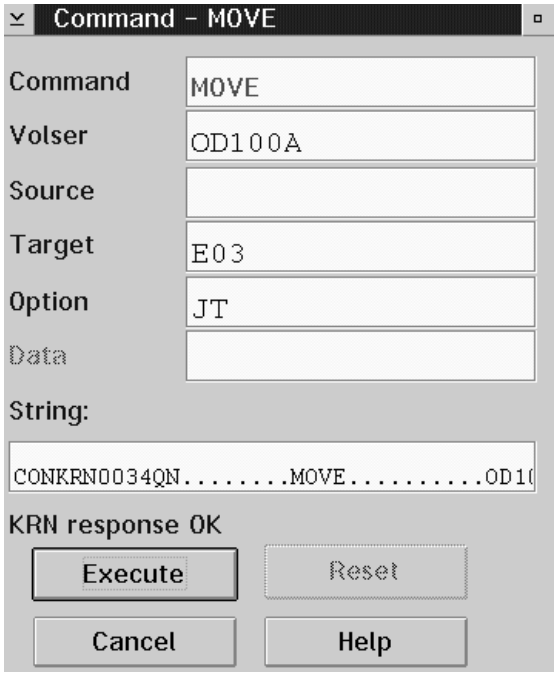


Fig. 4-39: Window “Command - MOVE”

Field	Explanation
Command	Selected command: MOVE
Volser	- enter the Volser only (read barcode and compare to database entry) or - enter the Volser and
Source	the coordinates of the Volser to be moved (read barcode and compare to database entry and Volser in the command) or -enter only the coordinate of the Volser to be moved (medium is moved without barcode reading)
Target	Enter the target coordinate or enter the logical eject range in the I/O unit (e.g. E03). It will become the new home position of the medium. (For OD only coordinates not resulting in turning of the OD are allowed)

Field	Explanation
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).

4.8.6 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)
- Scalar 1000: database upload from control unit to AMU

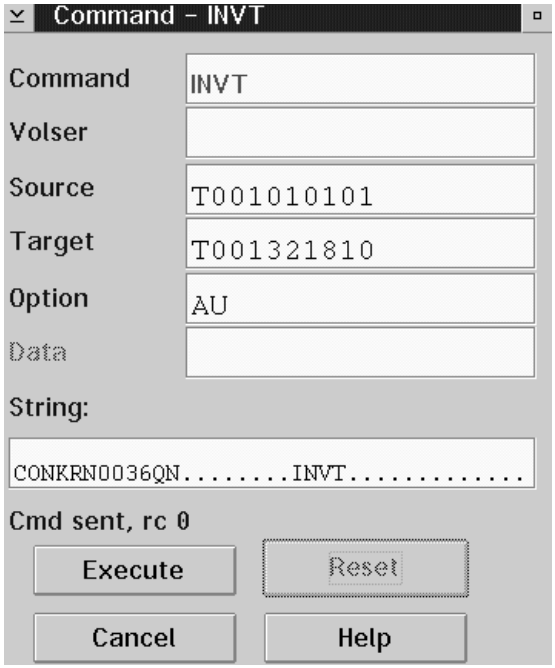


Fig. 4-40: Window “Command - INVT”

Field	Explanation
Command	Selected command: INVT
Volser	Enter the Volser if you want to check only one medium.
Source	Enter • 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)

Field	Explanation
Target	**Source- and target coordinate must be on one “Device” (e.g. linear shelf, storage tower). An inventory across several component is not possible with one command. To perform such functions you can list commands with Continous send.** Enter the end coordinates if you want to check an entire range.
Option	**ATTENTION!** **When you select option “AI”, enter only source coordinates of the type “AMU-Dynamic”.** **An Optical Disk in the I/O unit, with confused side A and B will not be inserted if it does not have a home position in the archive.** 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 positon in the archive. **ATTENTION!** **When you select option “AU”, only the AMU archive catalog is altered.** **Differences between it and the archive catalog in the host may be the consequence! 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.

4.8.7 Command “Close Unit...”

Close the drive cover of the specified 3X80 drive.
(this command is not supported by Scalar 1000)

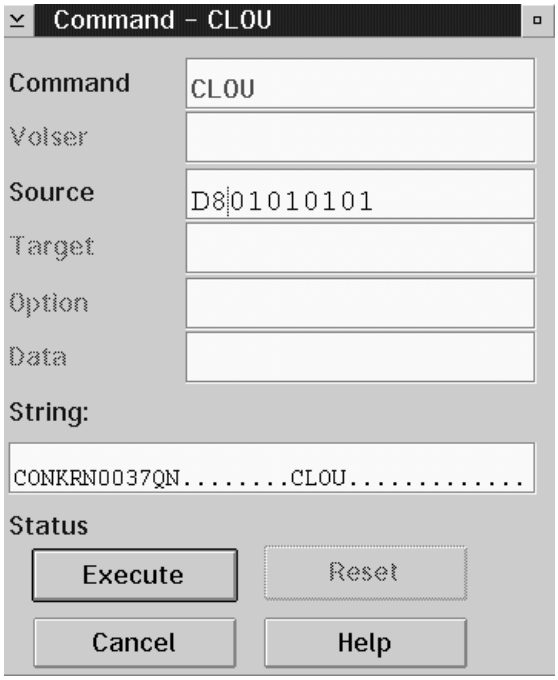


Fig. 4-41: Window “Command - CLOU”

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.

4.8.8 Command “Unload Unit...”

Buttons on the selected drive are actuated by the robot (dismounting)
This command is not supported by Scalar 1000.

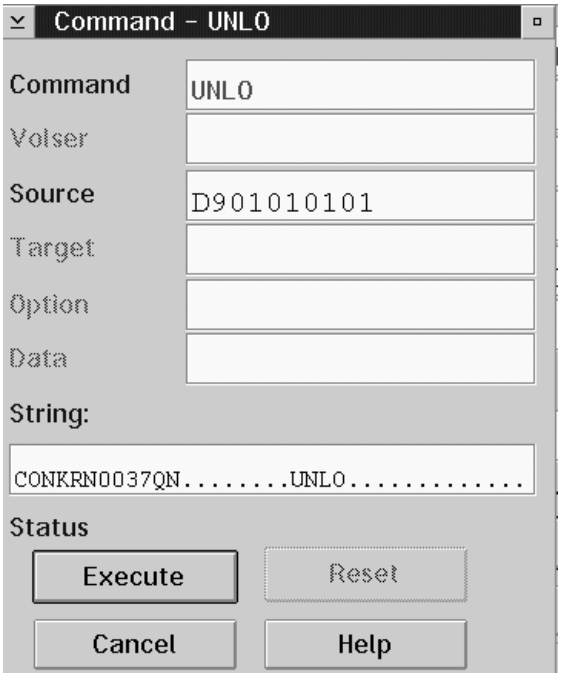


Fig. 4-42: Window “Command - UNLO”

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

Drives supported:

- all drives with eject button

Information (only for 3X90)

After this command, the robot first grabs for 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 grabs at the “Keep” position.

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

4.8.9 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)

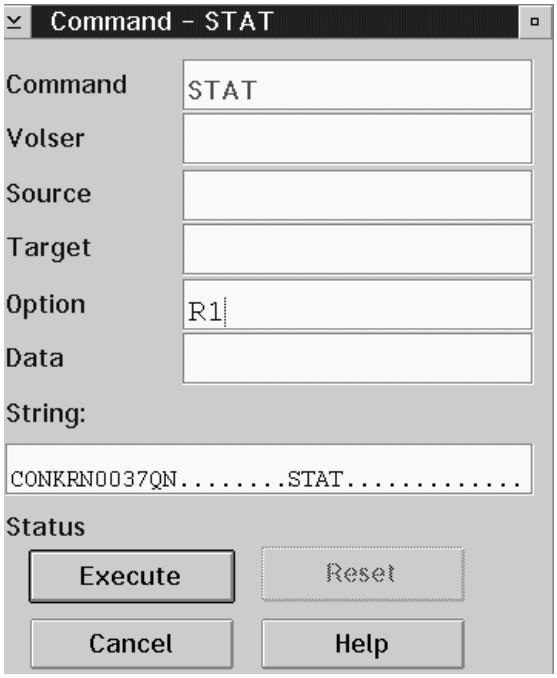


Fig. 4-43: Window “Command - STAT”

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

Field	Explanation
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 (diplayed 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.

Information

Sign the robot back on with the option R1 (R2), if the robot reports “not ready”.

4.8.10 Command “Purge...”

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

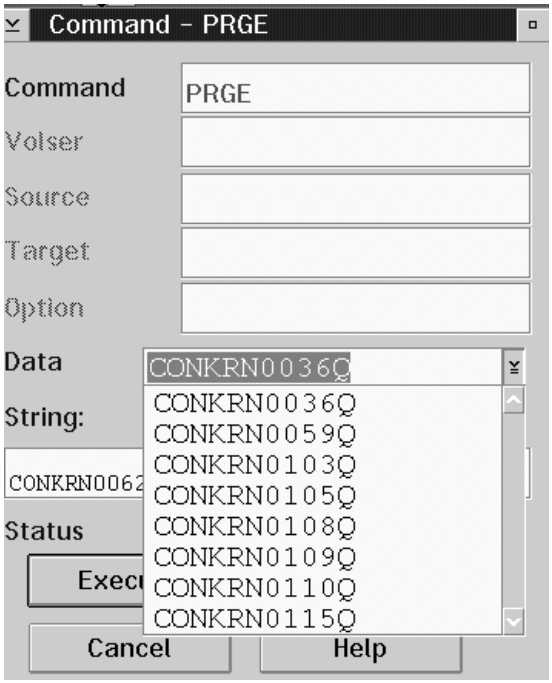


Fig. 4-44: Window “Command - PRGE”

ATTENTION!

Use this command only in exceptional cases! It can lead to inconsistencies in the database.

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)

4.8.11 Command “Homing...”

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

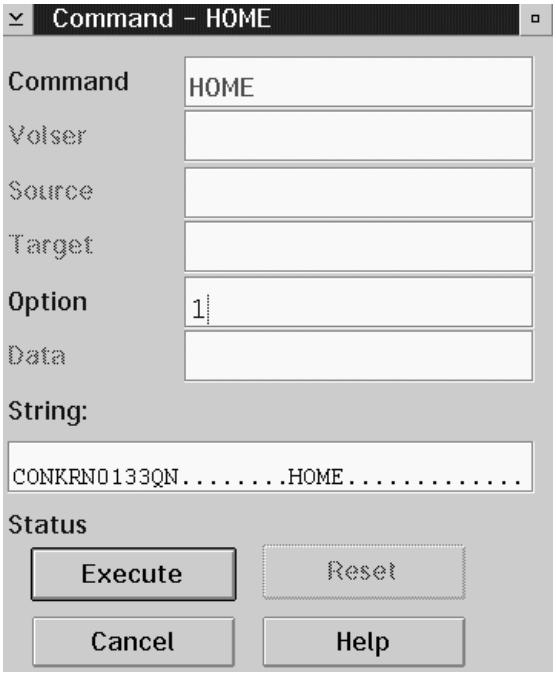


Fig. 4-45: Window “Command - HOME”

Information

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.

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

ATTENTION!

Home is 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 (☞ Page 7-1).**

4.8.12 Command “Put...”

Subcommand: put medium in position.
This command is not supported by Scalar 1000.

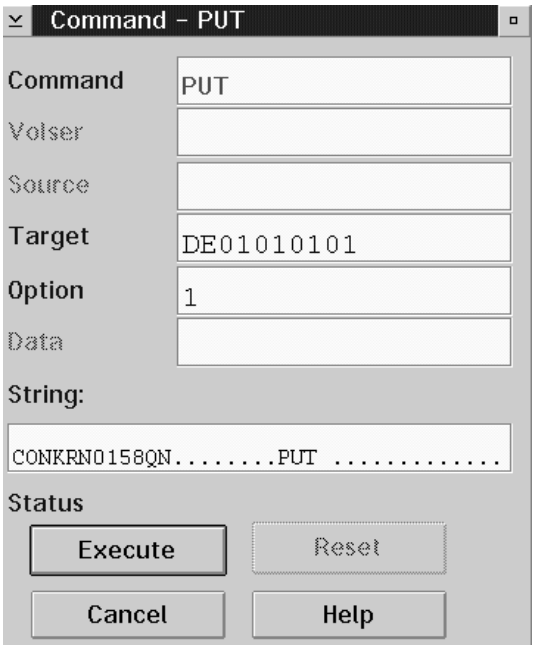


Fig. 4-46: Window “Command - PUT”

ATTENTION!

The archive catalog is not accessed.

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

4.8.13 Command “Get...”

Subcommand: get medium from position.
This command is not supported by Scalar 1000.

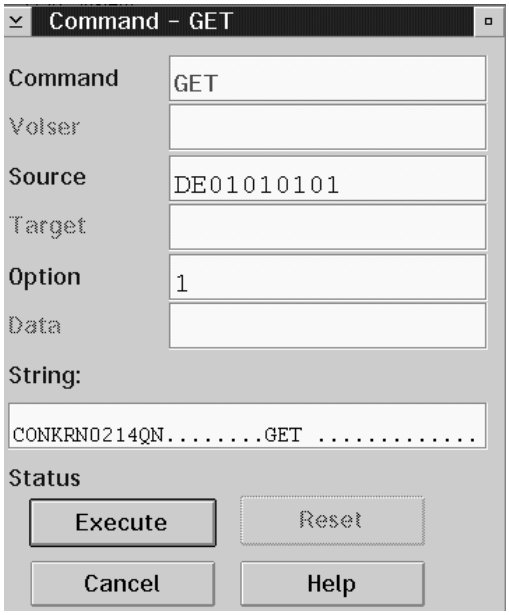


Fig. 4-47: Window “Command - GET”

ATTENTION!

The archive catalog is not accessed.

Field	Explanation
Command	Selected command: GET
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

4.8.14 Command “Look...”

Subcommand: read barcode and check attribute.
This command is not supported by Scalar 1000.

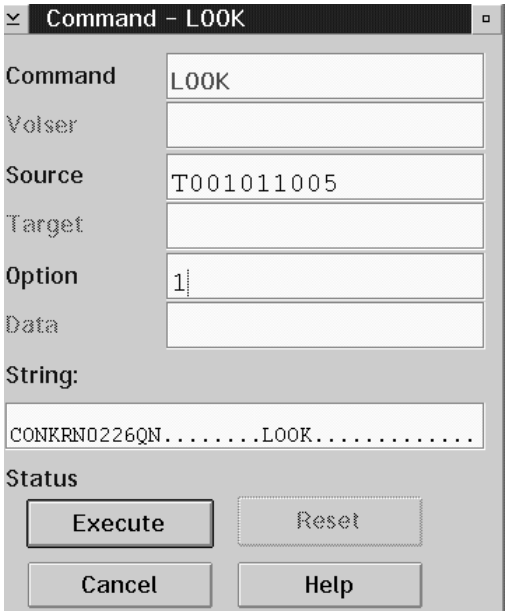


Fig. 4-48: Window “Command - LOOK”

ATTENTION!

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 (otional parameter): M: medium type D2 medium S: medium type D2 small

4.8.15 Command “Turn...”

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

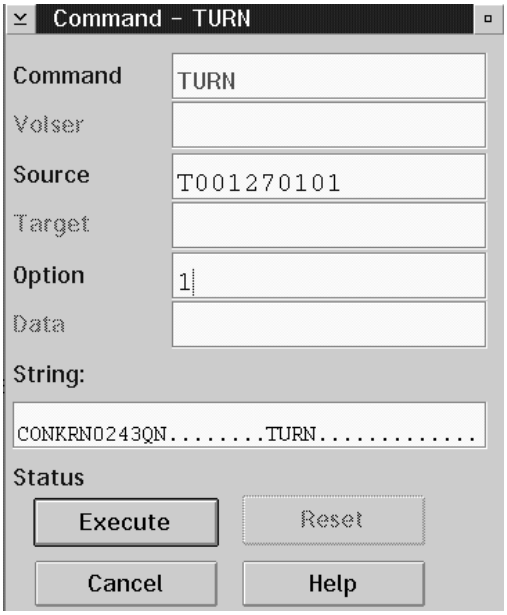


Fig. 4-49: Window “Command - TURN”

ATTENTION!

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).

4.8.16 Command “Insert Clean...”

Insert cleaning media.

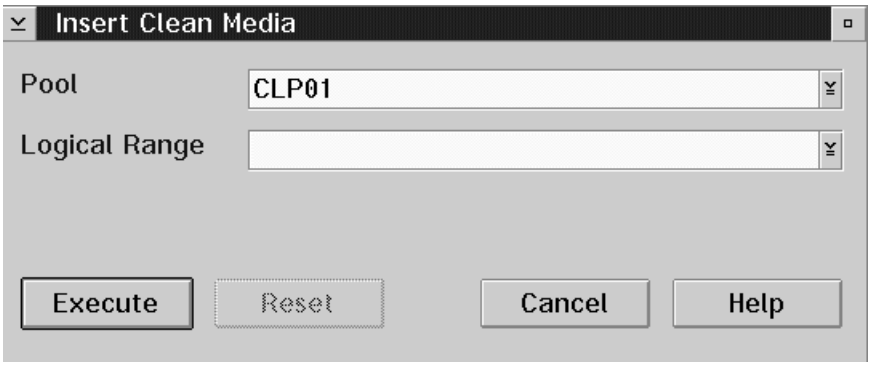


Fig. 4-50: Window “Insert Clean Media”

ATTENTION!

All media in the insert range are treated as cleaning media. Be sure there are not data media in the insert range while this command is executed.

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

4.8.17 Command “Eject Clean...”

Eject used cleaning media

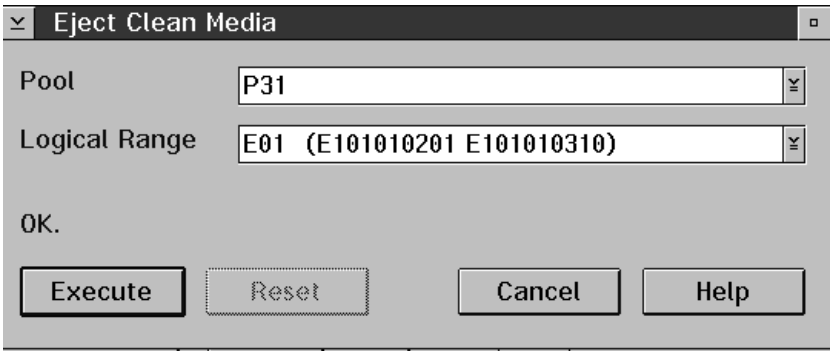


Fig. 4-51: Window “Eject Clean Media”

ATTENTION!

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.

4.8.18 Command “Clean Drive...”

Clean drive outside automatic cleaning process.

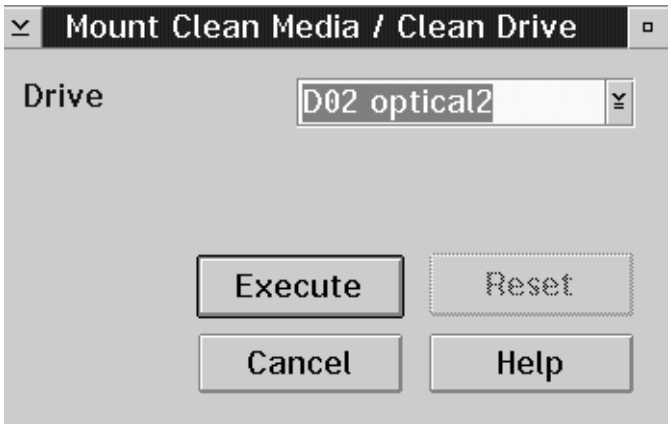


Fig. 4-52: Window “Mount Clean Media / Clean Drive”

ATTENTION!

The servicelife 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

4.8.19 Command “Switch”

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

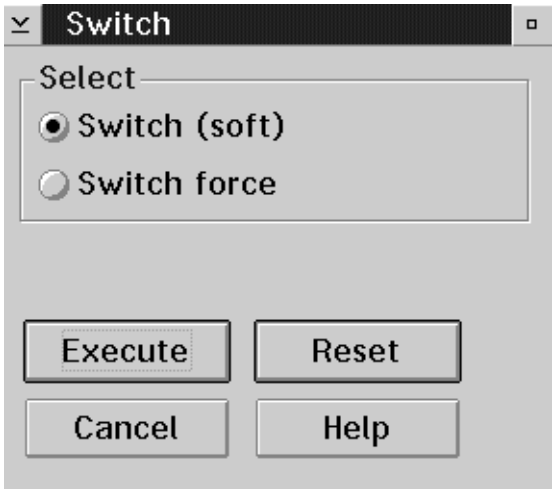


Fig. 4-53: Window “Switch”

ATTENTION!

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 proecessed, 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.

4.9 Menu Service

Fig. 4-54: Menu “Service”

4.9.1 Login (Supervisor)

Command	Field	Explanation
Login (Supervisor) / Logoff		If you wish to use the locked functions in menu Service, you must log on as operator, administrator or supervisor. To protect the system from unauthorized use, logoff when you have completed operations

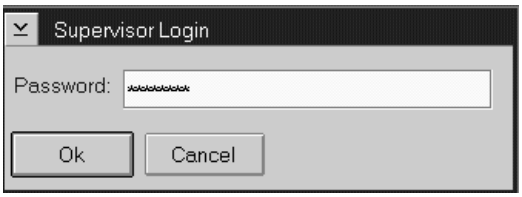


Fig. 4-55: Window “Supervisor Login”

Password	Field for input of supervisor password. Request this password from ADIC.
OK	Perform login.

4.9.2 Command “Teach singlecommand”

ATTENTION!

Transfer the changed teach-point file to the backup or dual-AMU after teaching (only when available) (☞ Page 4-71)and save the file on diskette.

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

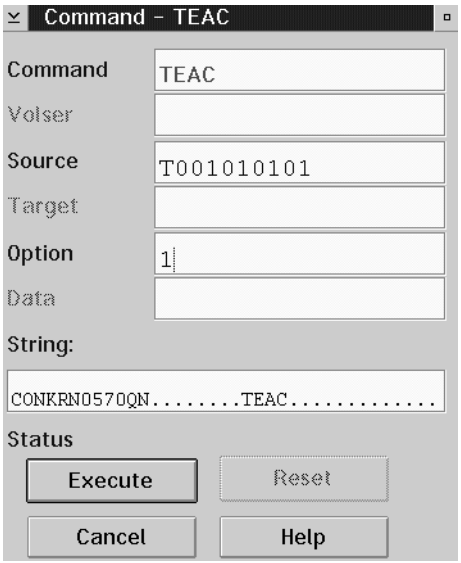


Fig. 4-56: Window “Command - TEAC”

Information

This is the more complicated way of teaching. For initial teaching of the entire system it is too cumbersome.
Use this command when teaching individual components.

Field	Explanation
Command	Selected command: TEAC
Source	Enter the logic coordinate of the component to be taught.

Field	Explanation
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).

4.9.3 Command “Teach MTCGDialog”

ATTENTION!

Transfer the changed teach-point file to the backup or dual-AMU after teaching (only when available) (☞ Page 4-71) and save the file on diskette.

Select this command from the menu Service - Teach.

Graphically supported teaching, e. g. of a Quadro tower, several drives or the entire system.

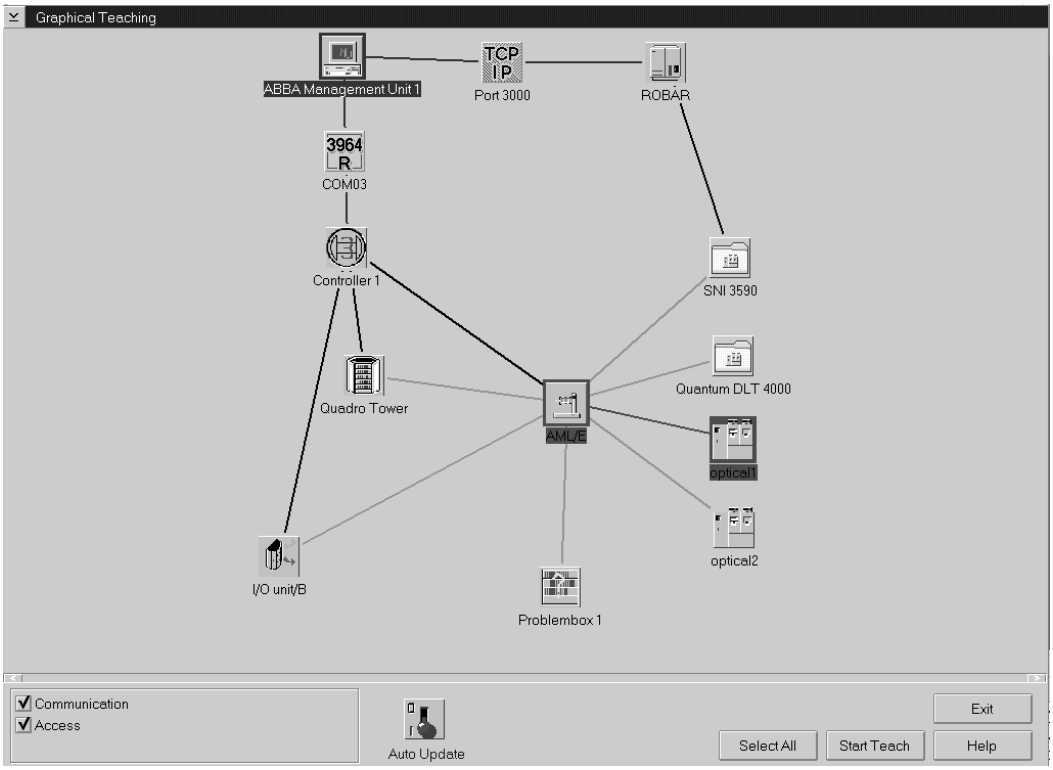


Fig. 4-57: Window “Graphical Teaching”

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

Command	Explanation
Unselect All	Unselect all components. 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.  **Information** **To define which robot teaches the component, you must mark the robot, the component and the connection. If you teach drives, the system prompts you for the teach rule.** **How to proceed with a twin robot:** • **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.

4.9.4 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.

Information

Precondition for the function is a TCP/IP connection.

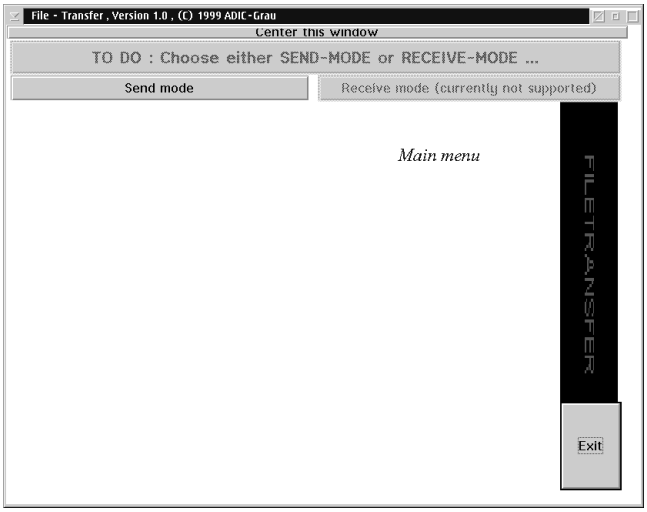


Fig. 4-58: Window „File - Transfer“

Command/ Field	Description
Center this window	moved the window in the centre of the screen
Send mode	opened the dialog for the file transfer from the local AMU to any other computer
Receive mode	not supported (Dialog for filtransfer of any source computer to the local AMU)
Exit	Ended the program File-Transfer

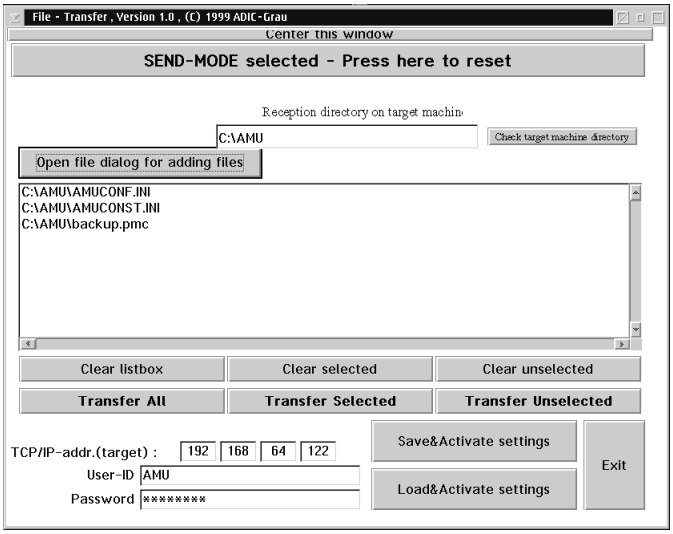


Fig. 4-59: Window „File - Transfer Send mode“

Command/Field	Description
Center this window	moved the window in the centre of the screen
Send mode selected - Press here to reset	stopped the dialog for the File-Transfer from the local AMU to any target computer
Reception directory on target machine	Commitment of 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	Possibility to configure one or more files for the transfer to the target system. The files may be located in different directory on the source computer, but only in one target directory (during one file transfer). The selection will be saved on the end of the program.
Clear listbox	All files will be removed from the selection
Clear selected	Only the markedl 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 transfered to the target computer
Transfer Selected	Only the marked files will be transfered to the target computer

Command/Field	Description
Transfer Unselected	Only the not marked files will be transfered to the target computer
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	Die gespeicherten Einstellungen werden geladen und für die benutzung aktiviert.
Exit	Das programm wird beeendet.

4.9.5 Dual-AMU Service: Activate this AMU

The function change the status of the local AMU from status Passive to the Status active, if the AMU is in the moment 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 wit AMU version 3.10C (☞ Release Notes)

4.9.6 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”.

Information

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).

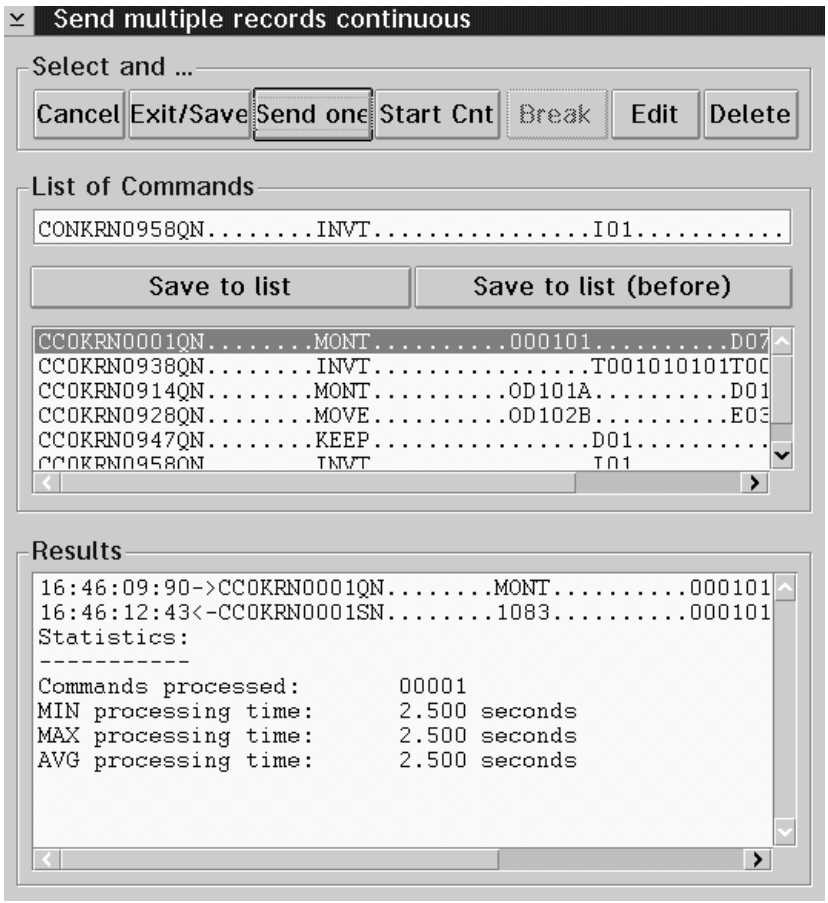


Fig. 4-60: Window “Send multiple records continuous”

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. Stop the “Continuous send” after execution of the last command in the loop.
	Break	Break 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 save with Save to list and Save to list (before)
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.

Command/ field	Explanation	
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
	`process-ing time (MIN, MAX,AVG)`	time required per command (maximum, minimum and average)

Procedure illustrated with a "Move" command.

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

Step 2 Select Move... (menu Commands)

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 botton 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

4.9.7 Start Testmode

ATTENTION!

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

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).

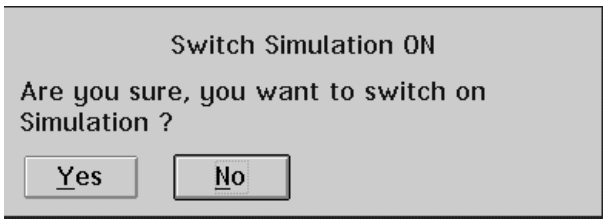


Fig. 4-61: Window “Switch Simulation ON”

4.9.8 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

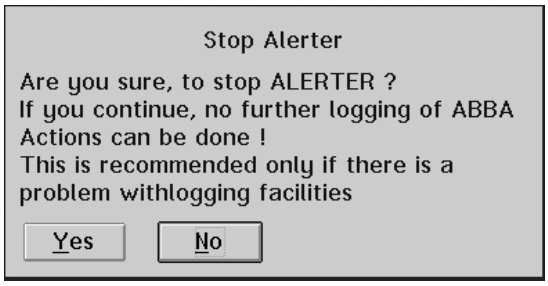


Fig. 4-62: Window "Stop Alerter"

Step 3 copy the log file

Step 4 restart the alerter (open AMU log)

ATTENTION!

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

4.9.9 Rho File Manager

The Rho File Manager transfers files between the AMU and the rho control in both directions (☞Page 6-1).

ATTENTION!

Stop the communication of 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).

4.10 Menu Window

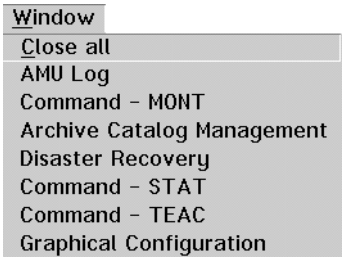


Fig. 4-63: Menu "Window"

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

4.11 Menu Help

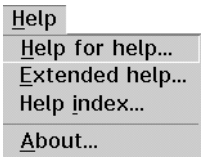


Fig. 4-64: Menu “Help”

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

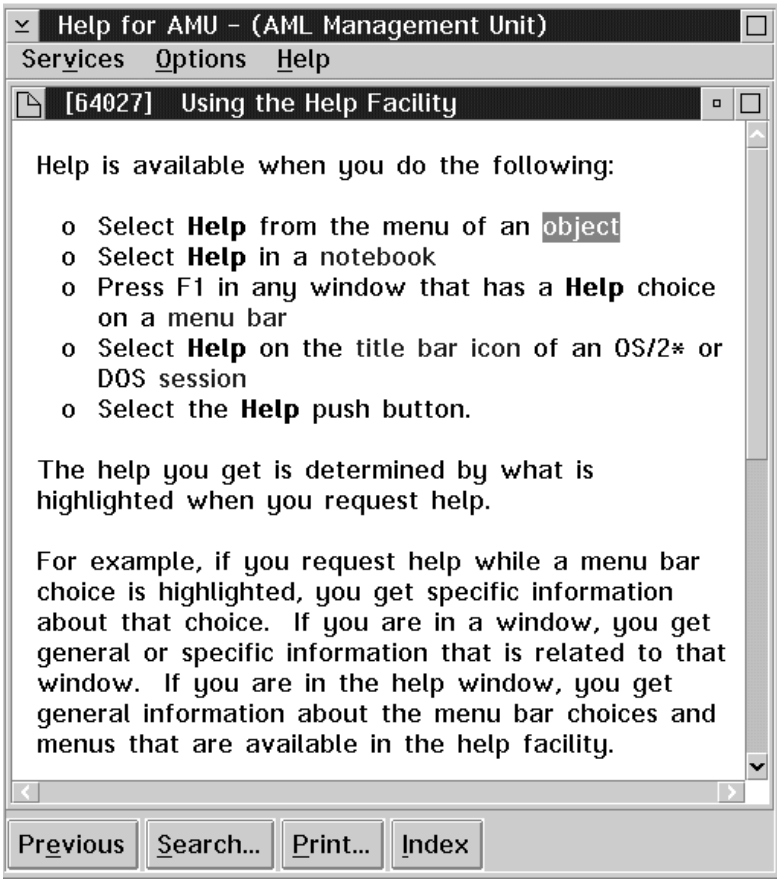


Fig. 4-65: Window “Using the Help Facility”

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

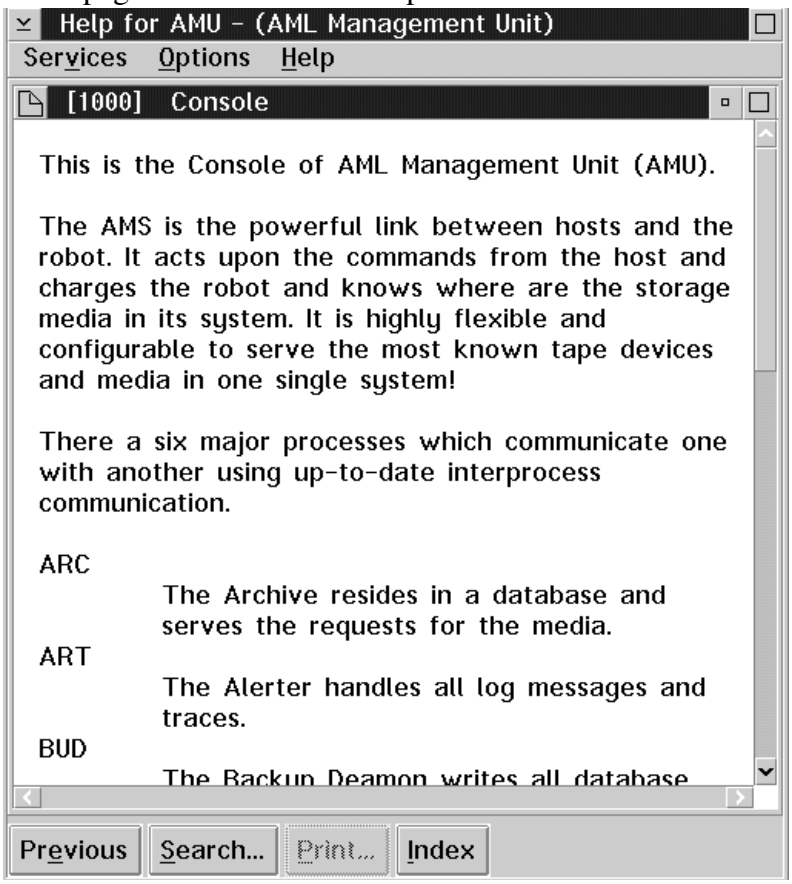


Fig. 4-66: Window “Help for AMU - (AML Management Unit)”

Command	Explanation
Help index...	Help index

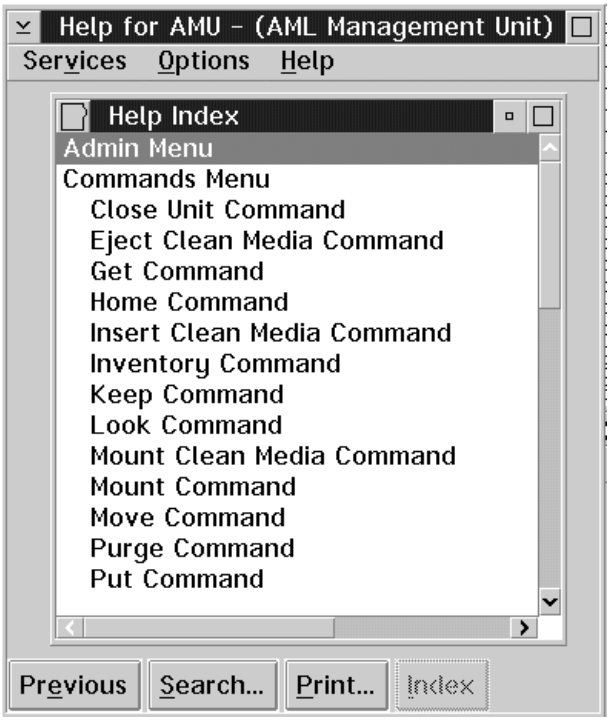


Fig. 4-67: Window "Help Index"

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

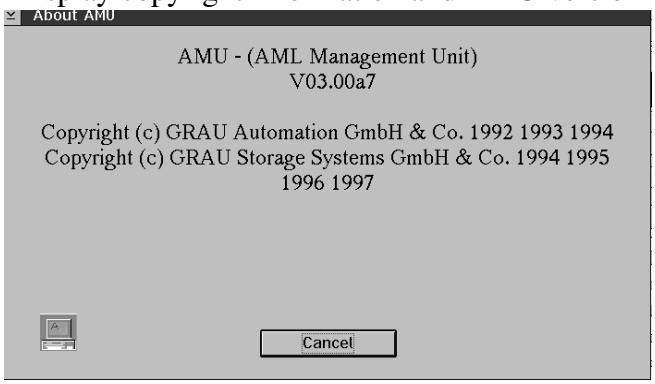


Fig. 4-68: Window About AMU"

5 Configuration

This chapter describes all configuration options within AMU.

5.1 Window “Graphical Configuration”

This window is used to configurate 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 changes on the configuration files direct (☞ Page 6-82).

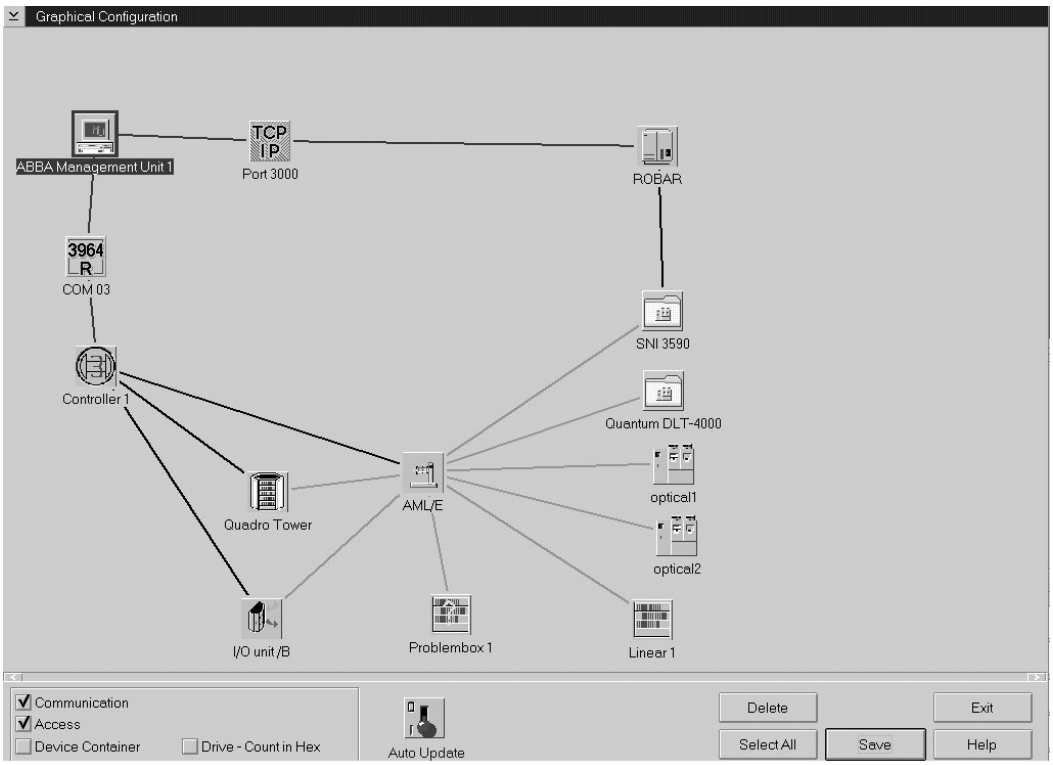


Fig. 5-1: Window “Graphical Configuration” (Example AML/E)

Field	Explanation
Device Container	Switch allowing to show/hide the window Device Container.

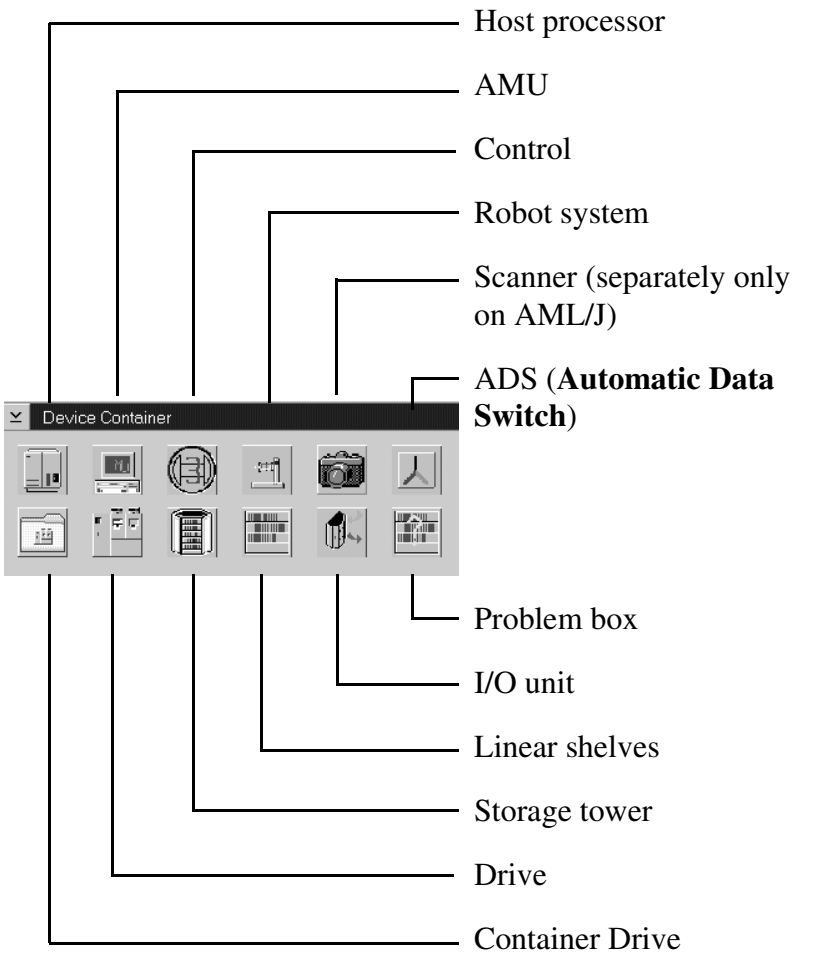


Fig. 5-2: Window “Device Container”

Communication	Switch allowing to show/hide the connections. Communication (black): hardware connection
Access	Switch allowing to show/hide the connections. Access (green): responsible = logic connection

Field	Explanation
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.  **Information** **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.**  **Information** **After saving the configuration file, transfer it to the backup or dual-AMU (only if available) (☞ Page 4-71) 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.

5.1.1 The Configuration Procedure

Configuring a component

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

Step 2 Open the configuration window with a double click on the item.

Information

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 on 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

From	To
AMU	Control units
	ADS
	Scanner (AML/J)
	Dual AMU
	Drive container (Drive Control Interface)

From	To
Control unit	Robot
	Storage tower
	I/O unit

From	To
Robot	Drive
	Storage tower
	Linear shelves
	I/O unit
	Problem box

Saving the configuration

Step 1 After configuring click on Save.

5.1.2 Configuration Windows of Components

Information

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**

Information

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

a) Click on Media Container.
The window Media Container appears.

b) Pull the selected medium onto the desired segment or handling box with the right mouse button pressed.

Fig. 5-3: Window Media Container

Host Computer

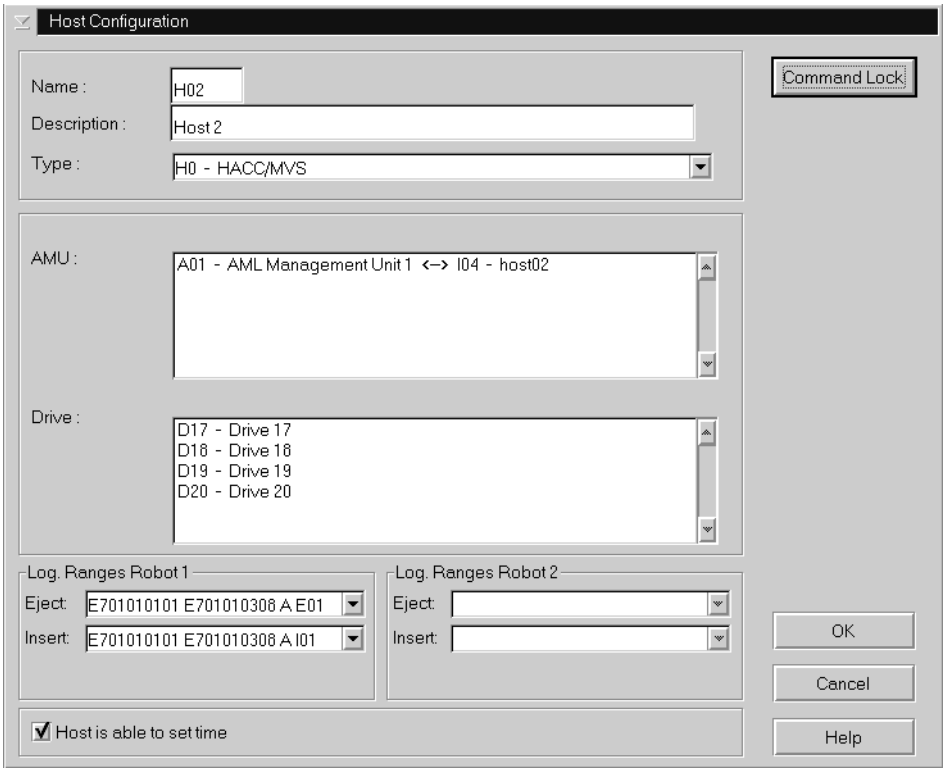


Fig. 5-4: Window “Host Configuration”

Field	Explanation
Name:	Name of the component (H01, H02 …).
Description:	Description of the component in the log strings.
Type:	Component type ☞ “Drives” on page 10-10
AMU:	List of connected AMUs.
Drive:	List of connected drives.
Command Look	Opens a window allowing to lock selected commands for this host.

Field		Explanation
Log. Ranges Robot	Insert	Default area in the insert/eject unit, which will be used for this host for insert, if the host not send a other area with the insert command
	Eject	Default area in the insert/eject unit, which will be used for this host for eject, if the host not send a other area with the eject command
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.

Information

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

Command Look

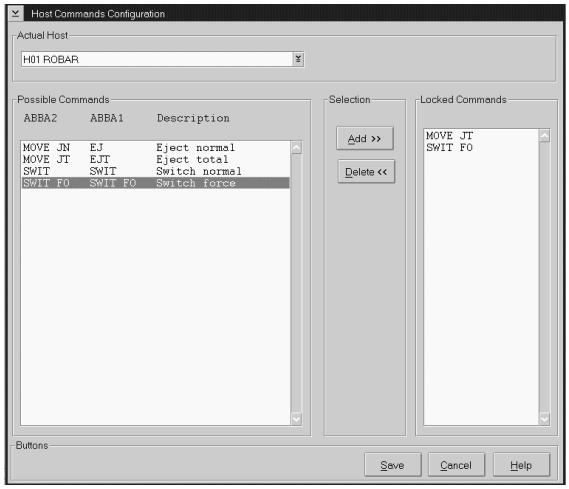
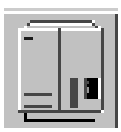


Fig. 5-5: Window “Host Commands Configuration”

Field	Explanation
Actual Host	Selection box for all host configurated; for command configuration it does not matter which icon you used to open the Host Configuration.

Field	Explanation	
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 of 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)
	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.

Field	Explanation
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 hos to perform ejects.
NTFY HICAP request	Asynchronous information for request of I/O unit/D
NTFY Robot is home	Asynchronous information for shut-down of the robot (ROBS-OFF-mes-sage)
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 clean-ing of drive
NTFY Clean successfully	Asynchronous information on clean-ing of drive
NTFY Clean failed	Asynchronous error message on auto-matic 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



Field	Explanation
Selection	 **Information** **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

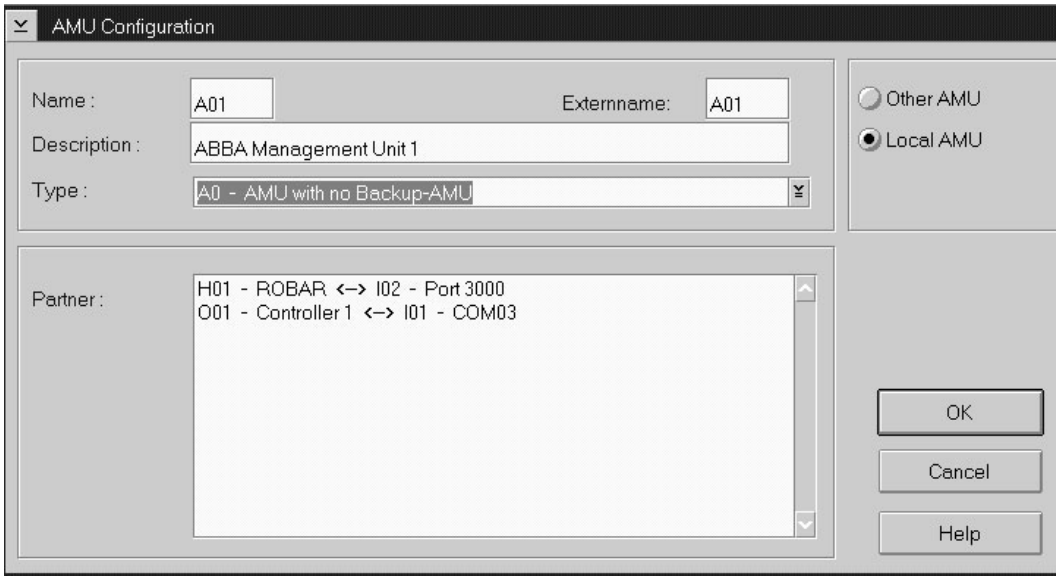


Fig. 5-6: Window “AMU Configuration”

Field	Explanation
Name:	Name of component (A01, A02 …).
Externname:	Name for the telegrams to the connected hosts (actual operate all hosts with the name A01
Description:	Description of the component in the log strings.
Type:	Component type (☞ “AMU” from page 10-14)
Local AMU	Configuration of local AMU hardware.
Other AMU	Configuration of AMU connected to local AMU.
Partner:	List of connected communication partners.

Control

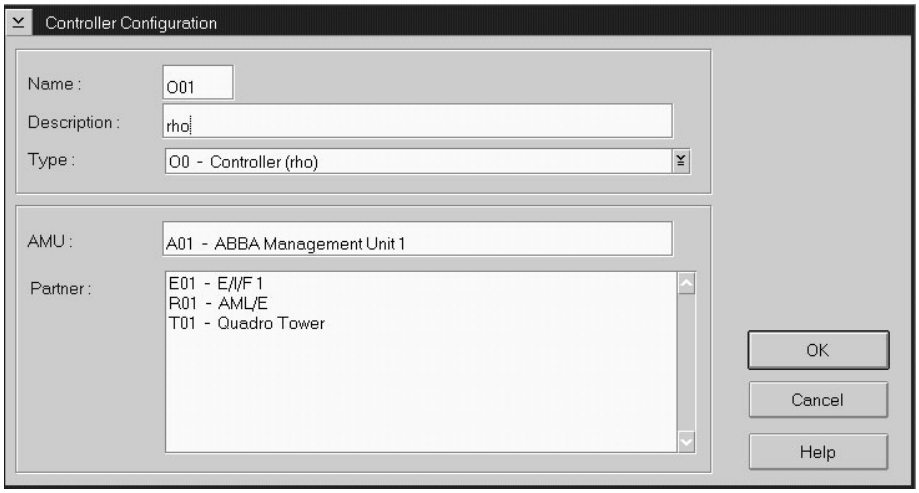
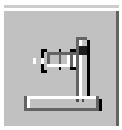


Fig. 5-7: Window “Controller Configuration”

Field	Explanation
Name:	Name of component (O01, O02 …).
Description:	Description of the component in the log strings.
Type:	Component type: (☞ “Control Units” from page 10-14)
AMU:	List of connected AMUs (default A01).
Partner:	List of connected units.



Robot System

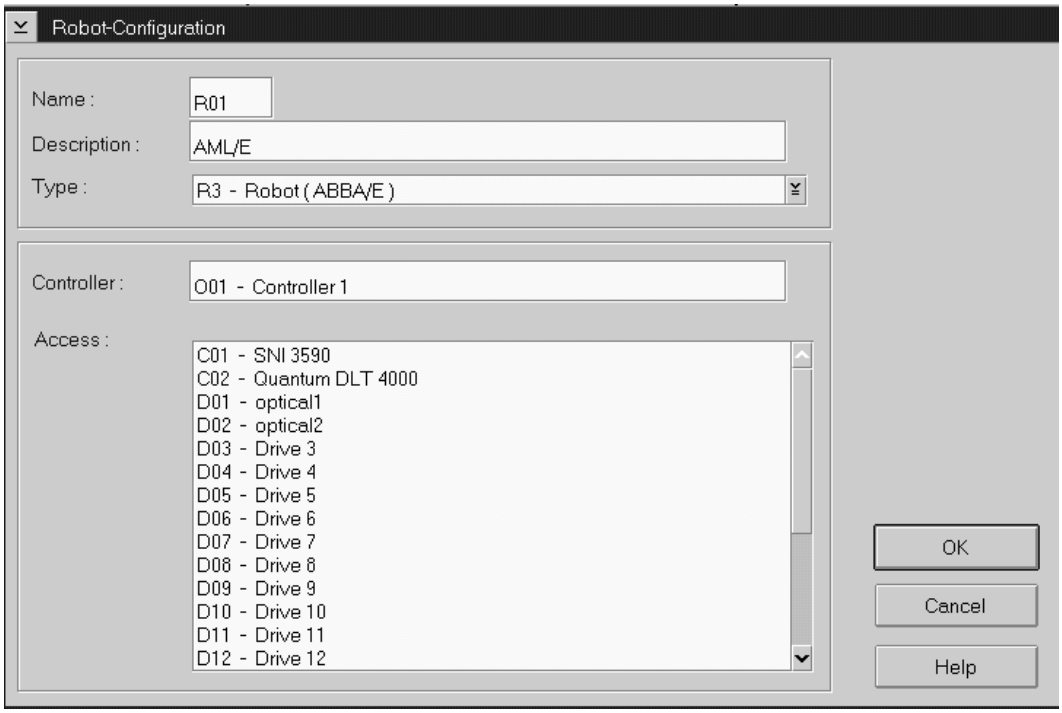


Fig. 5-8: Window “Robot Configuration”

Field	Explanation
Name:	Name of the component (R01, R02). AML/E, AMLJ and Scalar 1000 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 (☞ “Robots” from page 10-14)
Controller:	Connection to controller.
Access:	List of units connected that can be accessed by the robot (green lines).

Scanner (barcode reading system for AML/J only)

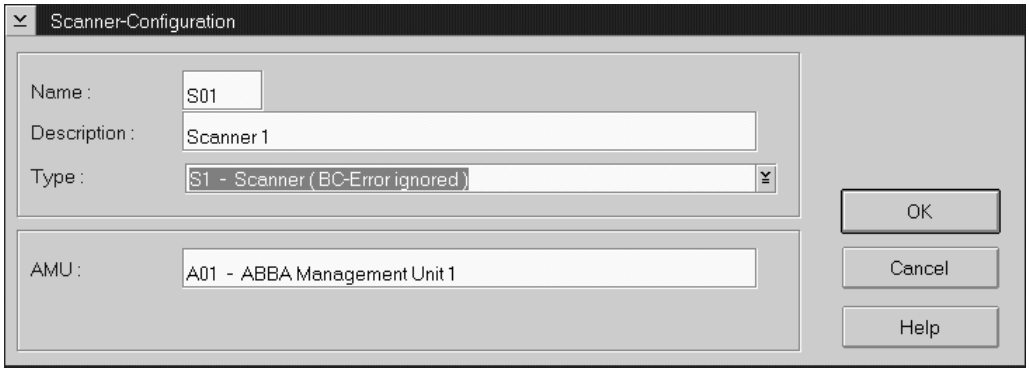
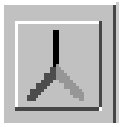


Fig. 5-9: Window “Scanner-Configuration”

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

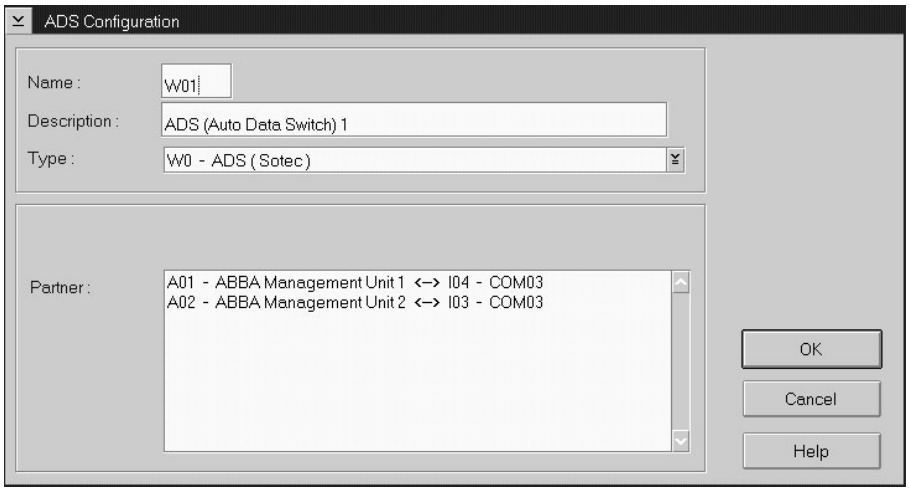
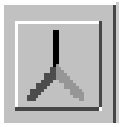


Fig. 5-10: Window “ADS Configuration”

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).

Information

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

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.

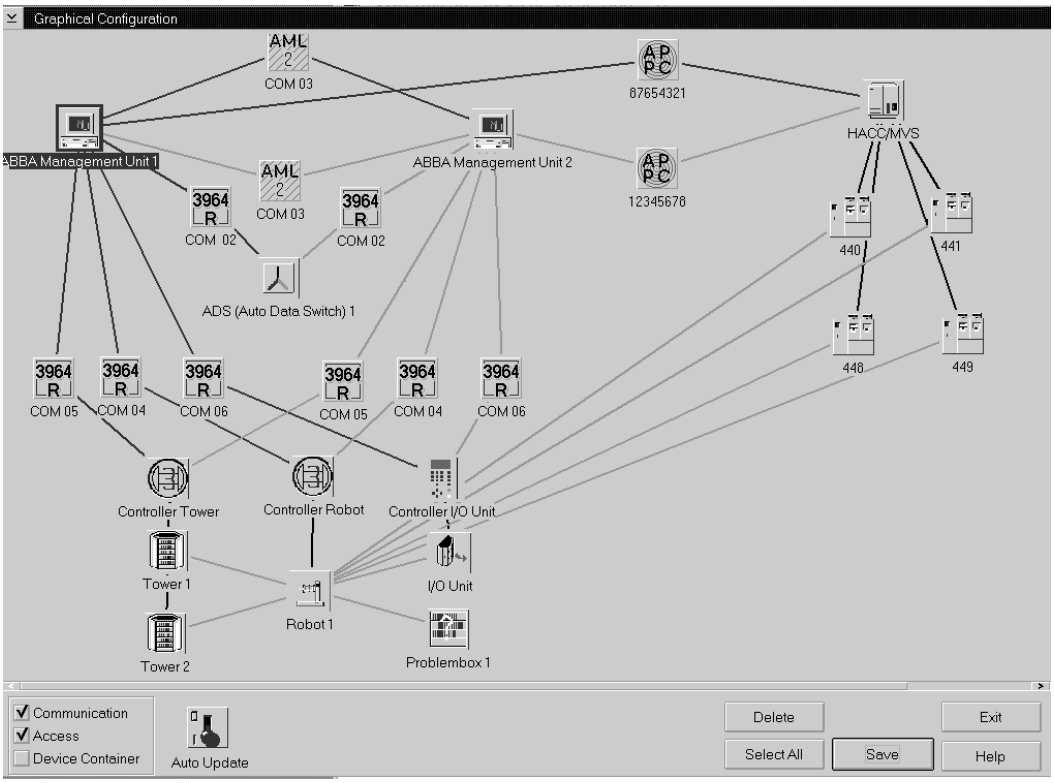
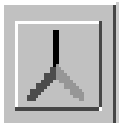


Fig. 5-11: Window “Graphical Configuration” with Dual-AMU and ADS

Step 9 Setup 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
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.

Information

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

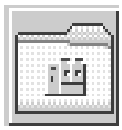
Step 12 Configurate communication paths between
- the AMUs
- AMU and Host
- AMU and Controller

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

Folder allowing 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.

Information

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

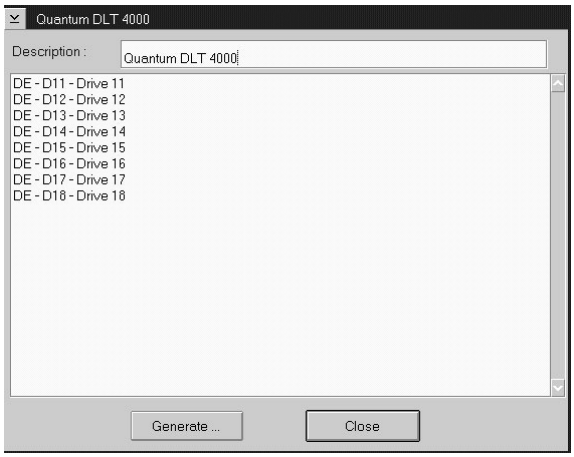


Fig. 5-12: Window “Container Drive”

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 (☞ Page 5-22).
Generate	Call up the dialog window for generation of drive configurations from the container drive
Close	Close the window Container Drive.

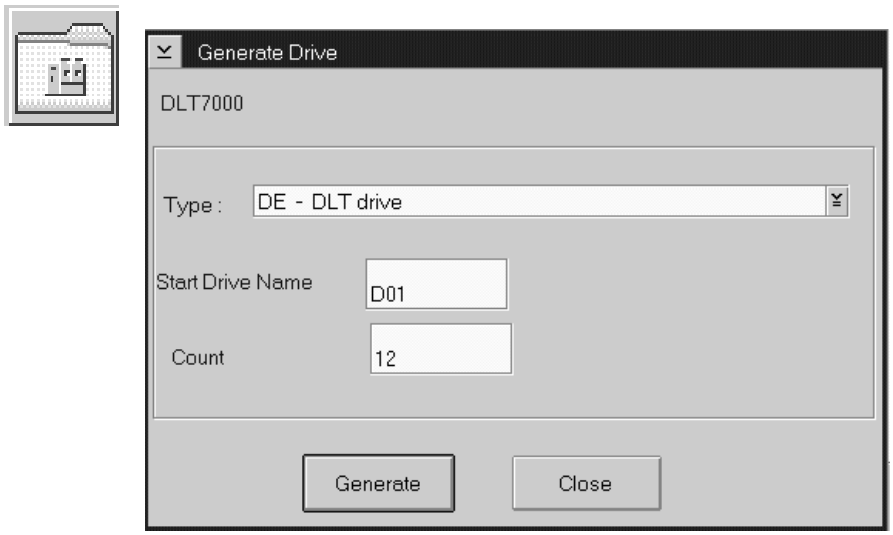
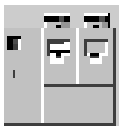


Fig. 5-13: Window “Generate Drive”

Field	Explanation
Type:	Select the drive type of all drive configurations to be generated in the container drive (☞ Page 10-10)
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 decimal or hexadecimal.
	Information **Generation of drive configurations will have success only if no other drives are configurated 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
Close	Close the window Generate Drive



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

Information

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.

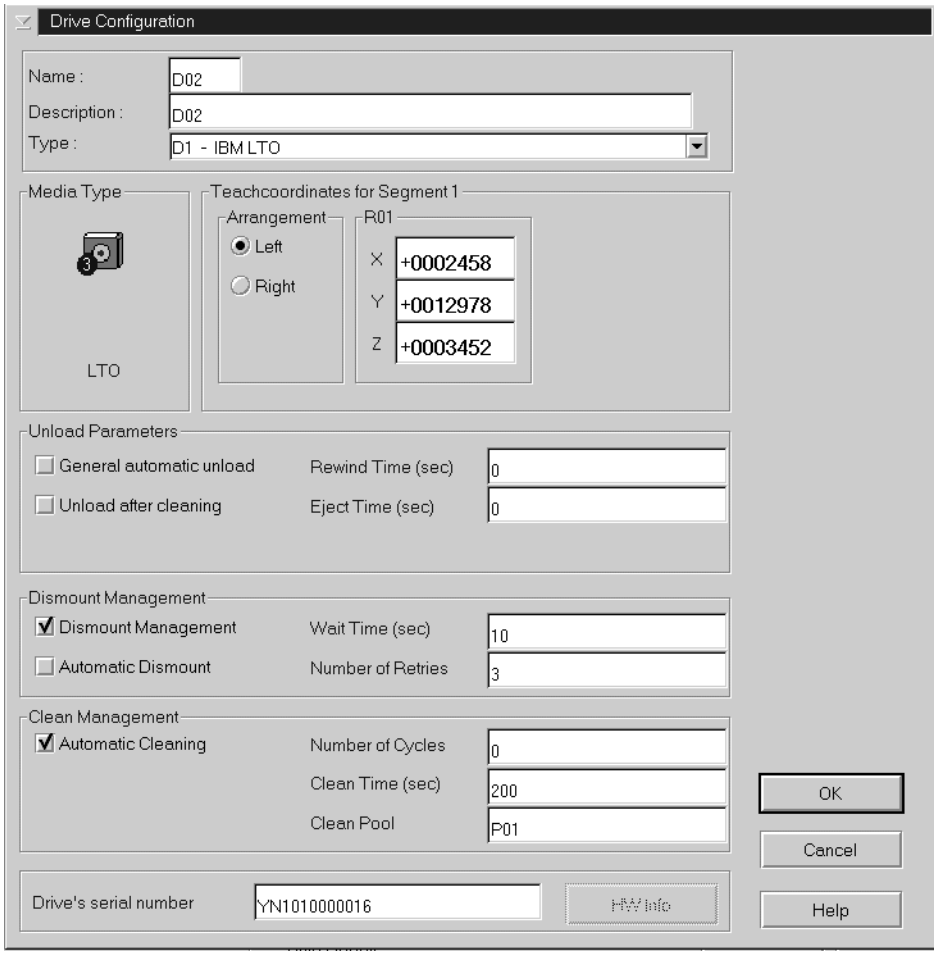
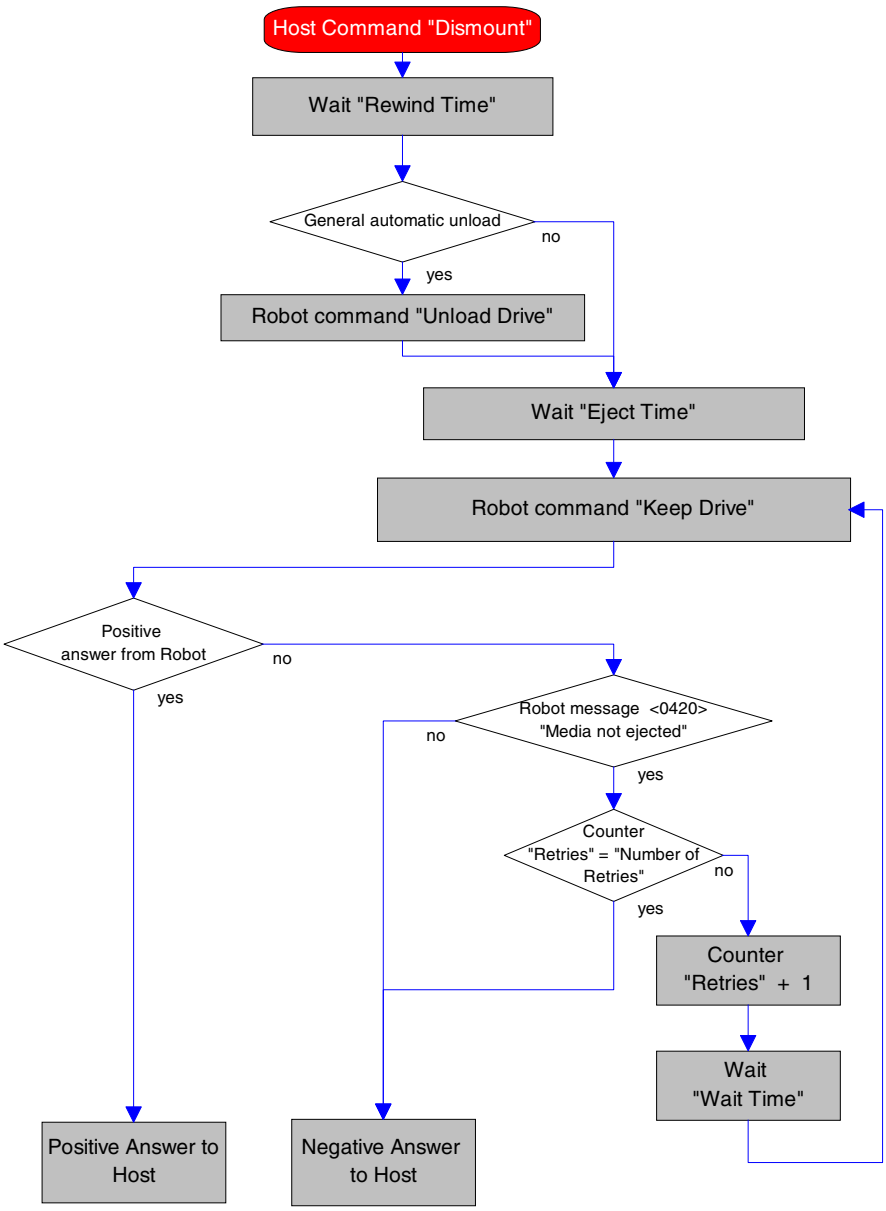


Fig. 5-14: Window “Drive Configuration”

Range	Field	Explanation
Name:	Name of component (D01, D02 …,DZZ).	
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 ☞ DAS Administration Guide)	
Type	Drive type (☞ “Drives” from page 10-10)	
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 - Newteach)
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.

Range	Field	Explanation
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 feature is enabled for DCI drives only and is not implemented in this release.	

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



Storage Tower

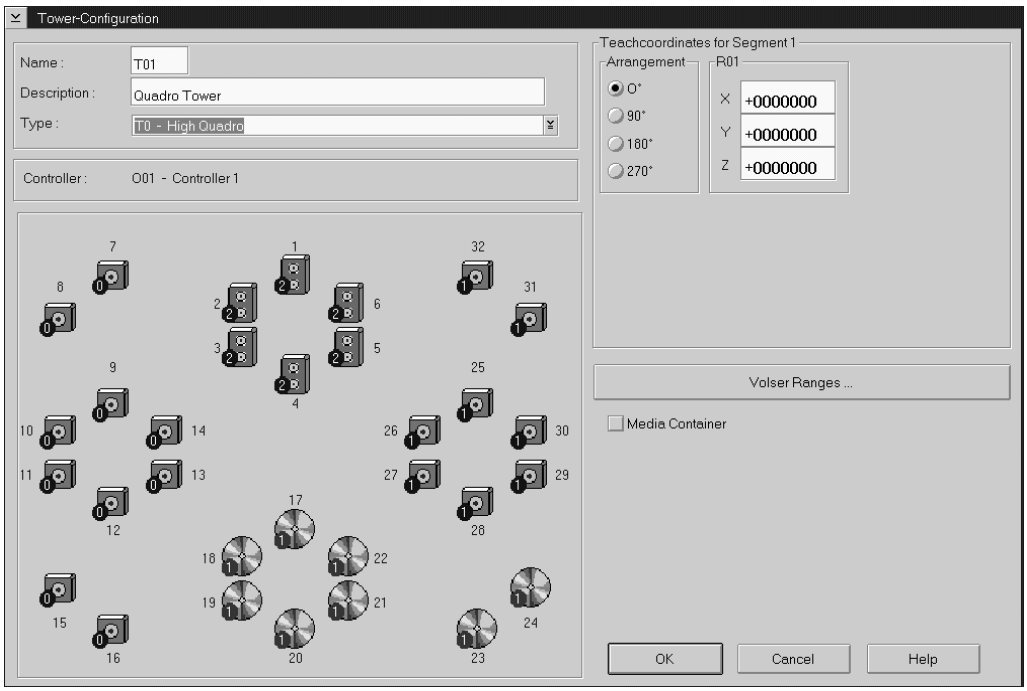


Fig. 5-15: Window “Tower Configuration”

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 (☞ “Storage Units” from page 10-13)
Controller:	Connection to controller.
Arrangement	Arrangement of towers in the robot archive.
Volser Ranges	Call up configuration window for numbering ranges.
Teach coordinate R01/ R02	Position of the bottom left teach label of robot 1 or robot 2 on twin systems.

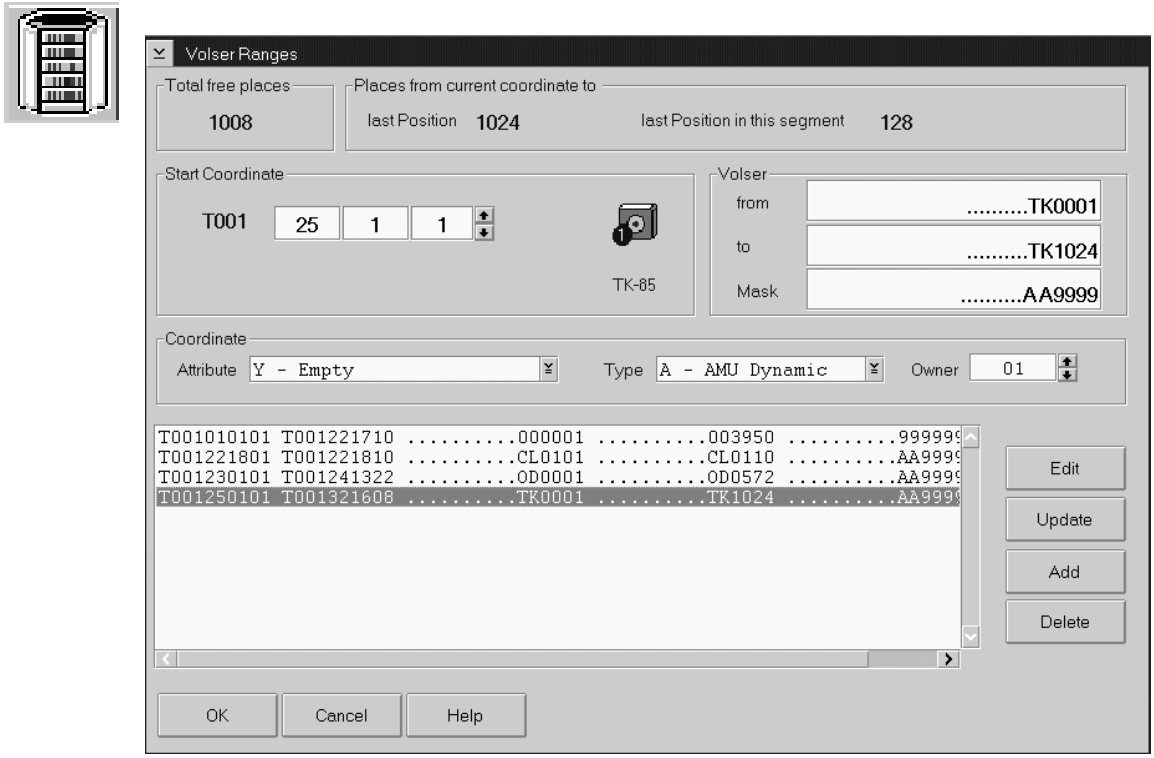


Fig. 5-16: Window “Volser Ranges”

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

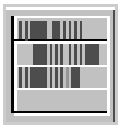
Field	Explanation
Coord. Attr.	Status of the medium • O-Occupied: compartment occupied • E-Ejected: medium has been ejected • Y-Empty: campartment empty • M-Mounted: medium mounted on drive • R-Reverse Side Mounted (for double sided storage media) • J-in Jukebox (IBM 3995 is beeing served)
Coord. Owner	Medium owner: indicates the robot or the robots which can access this medium.
Coord. Type	Type of compartment • 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	A99999O 1 S
T001061101	T001311010	B00001	B04500	A99999O 1 S
T001231101	T001321810	C00001	C00260	A99999E 1 A

Information

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.



Linear shelf

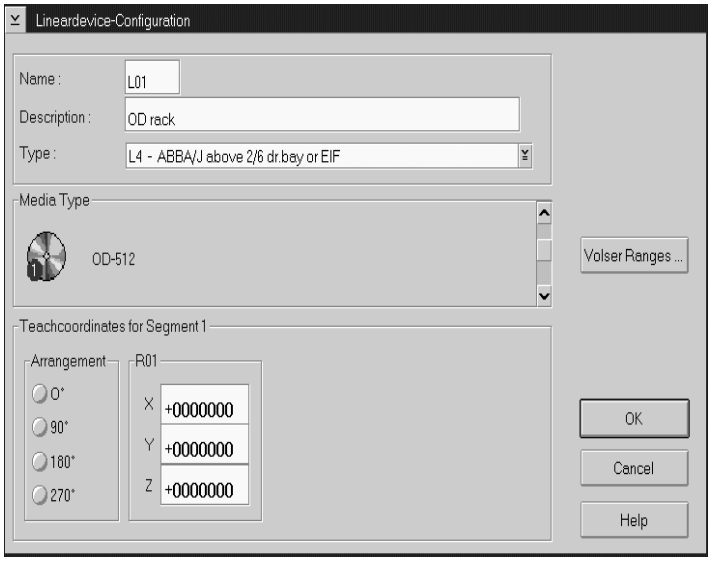


Fig. 5-17: Window “Lineardevice-Configuration”i

Field	Explanation
Name:	Name of storage component with running number (e. g. T01, L02, ...)
Type:	Component type: (☞ “Storage Units” from page 10-13)
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.
Arrangement	Arrangement of the systems in the robot archive.
Teach coordinate R01	Position of bottom left teach label.

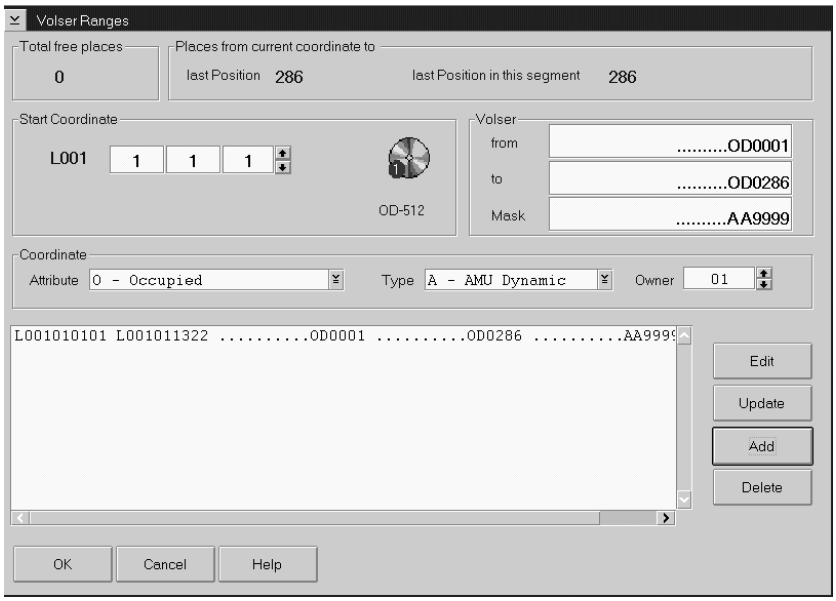


Fig. 5-18: Window “Volser Ranges” for Linear Shelf AML/J

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

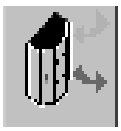
- Volser: `0000000000000000`
- Attribute: `empty`
- Type: `AMU-Dynamic`

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: campartment empty • M-Mounted: medium mounted on drive • R-Reverse Side Mounted (for double sided storage media) • J-in Jukebox (IBM 3995 is beeing served)
Coord. Owner	Medium owner: the robot that can access this medium.
Coord. Type	Type of compartment • S-Storage: archive compartment for hierarchically defined volser ranges or HACC-MVS management • N-Clean: cleaning medium compartment • R-Scratch range for free (scratch) media (not on HACC/MVS) • A-AMU Dynamic:homeposition 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

L402010101 L402010101 000001 000175 999999O 1 S



I/O Unit

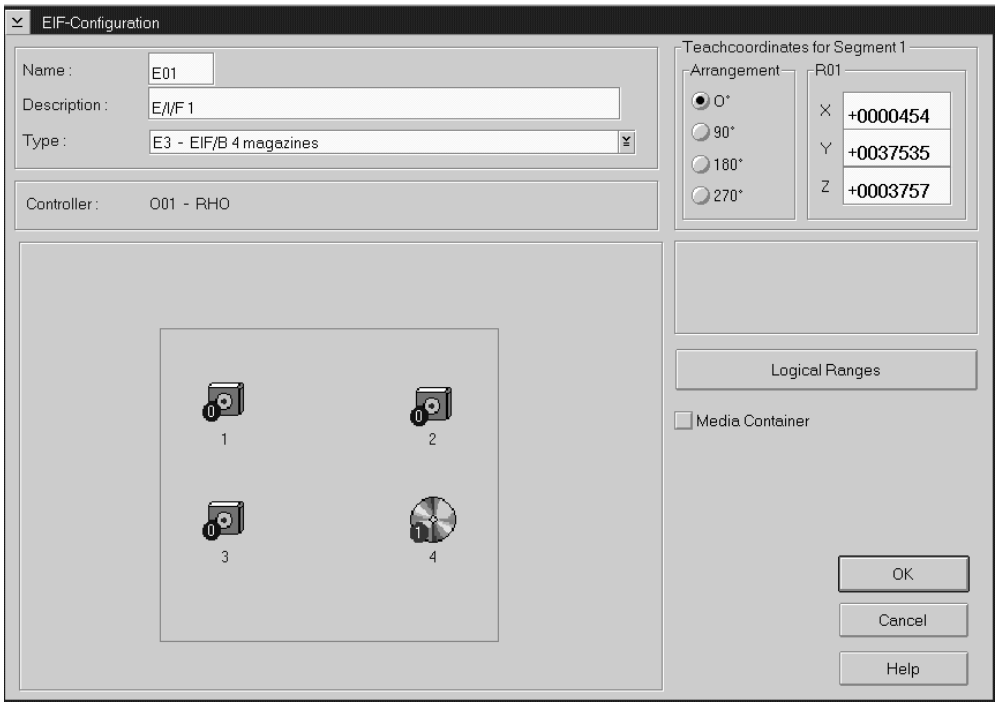


Fig. 5-19: Window “E/I/F Configuration”

Field	Explanation
Name:	Name of component (E01, E02 …).
Description:	Description of the component in the log strings.
Type:	Component type (☞ “I/O Unit” from page 10-12)
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	Call up the configuration window for the numbering ranges.

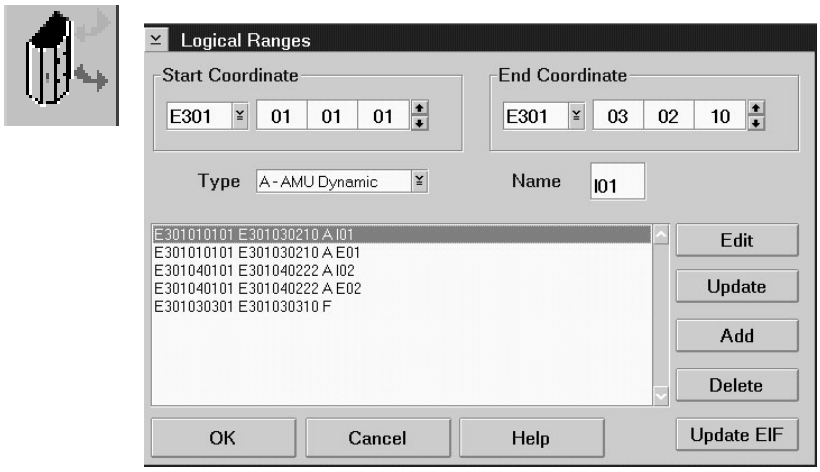
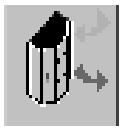


Fig. 5-20: Window “Logical-Ranges” (Example AML/E I/O unit/B)

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)** **Information** **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	Types for I/O Unit	
	Foreign	**AMU-Dynamic**
HACC/ MVS	Compartments defined as foreign in the host software. The Volsers must be defined as *11001 - *22999.	Comparment for insert and eject, without using of logical ranges in the AMU.
HACC/VM	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)
ROBAR		
HACC/ GUARDIAN		
HACC/ OS400		Compartments for dynamic use for insert and eject, overlapping is possible. Names *) Insert: Ixx Eject: Exx
DAS 1.2	Compartments are automatically defined by DAS commands as *10001-*10099	
DAS 1.3	Compartments to be used by DAS for foreign mount. The Volsers are automatically assigned according to coordinates, e.g. as *E101030301	

*) If the name E01 and I01 is used, this range is automatically used standard insert and eject area by ROBAR,HACC/VM etc.

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

E001010101	E001010310	A	I01
E001020101	E001020210	A	E01
E001020301	E001020310	F	

Problem box

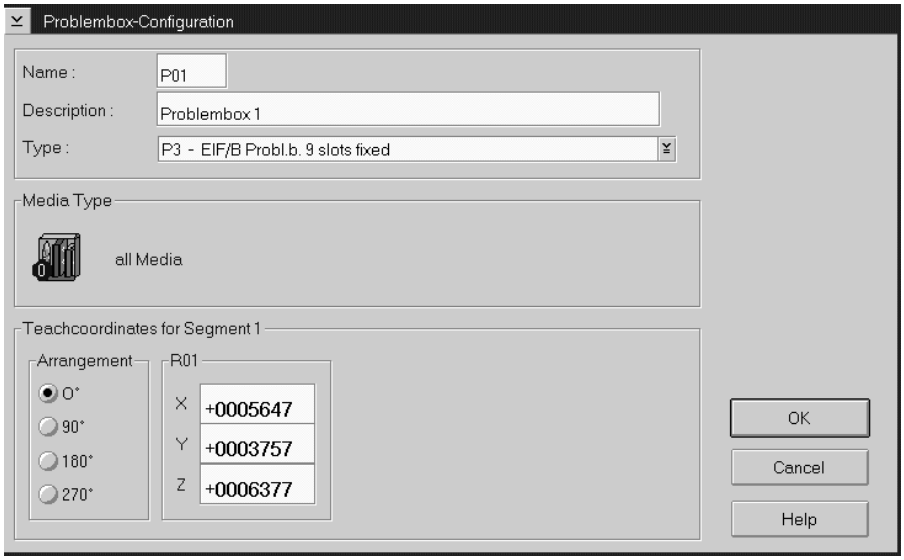


Fig. 5-21: Window “Problembox Configuration”

Field	Explanation
Name:	Name of component: (P01, P02)
Description:	Description of the component in the log strings.
Type:	Component type (☞ “I/O Unit” from page 10-12)
Arrangement	Arrangement in the system.
Teach coordinate	Position of the left teach label on the problem box.

Configuration Window for AMU Communication

Interface Configuration

Information

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.

a) Open the icon with a double click.
The window Interface Configuration open.

b) In the field Type select the type of communication.

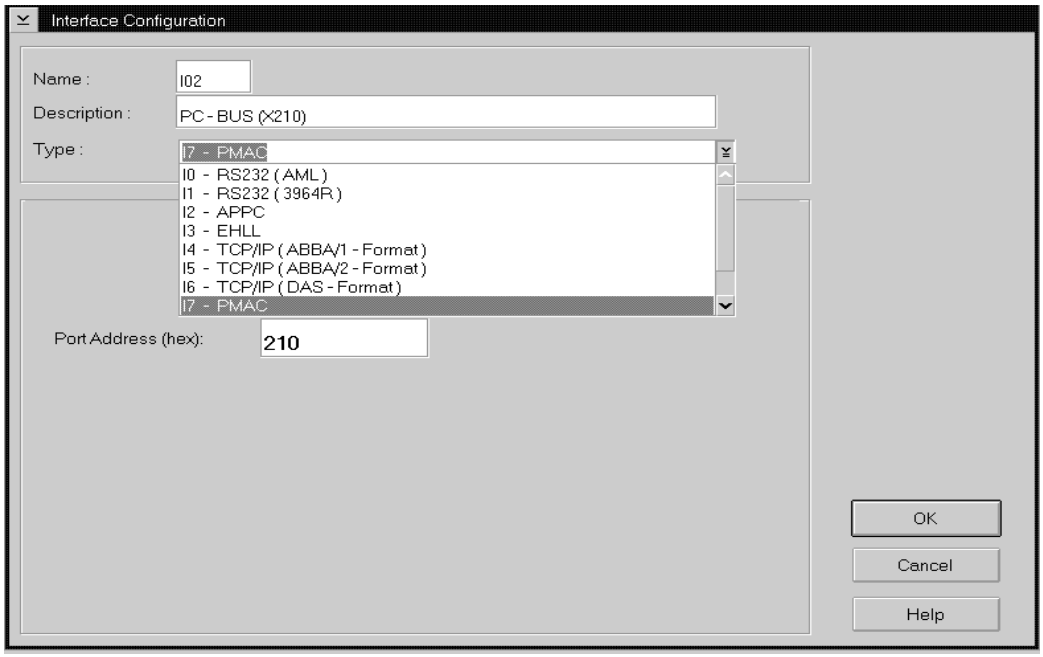
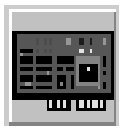


Fig. 5-22: Window “Interface Configuration” (Example AT-Bus Communication AML/J)

Types

	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)	Tokenring; ISDN, Ethernet, FDDI, SDLC	HACC/MVS, HACC/OS400
	I3	EHLL (LU2)	Tokenring; Ethernet COAX	HACC/MVS
		EXCP (3270)	COAX	HACC/MVS, HACC/VM
	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 until version 1.2mb * LMS (M&T Consults)
	I7	PMAC	AT bus	PMAC board (AML/J)
	I8	RS232 Scanner	RS 232C	AML/J barcode scanner
	IA	SCSI	SCSI Kontroller Karte	Scalar 1000
	ID	CAN-Bus	CAN-Controller Adapter + DCI	AML with DLT-Low Profile drives

* DAS/2 1.3 does not requires input in the graphical configuration

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

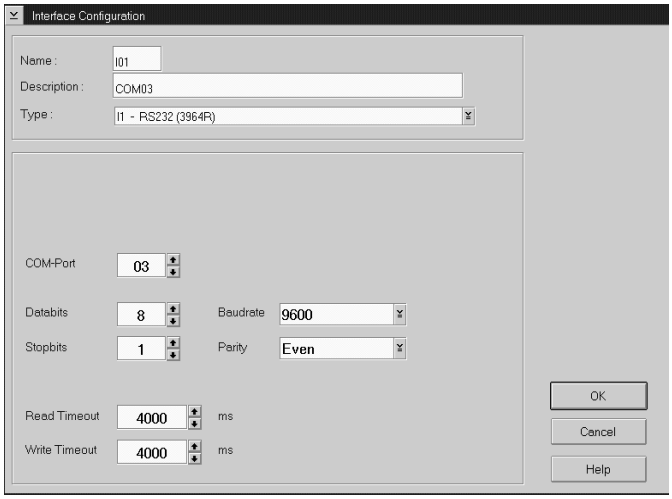


Fig. 5-23: Example RS232 Interface

Field	Explanation	
Interface Type	**AML** • AMU - Host computer • AMU - AMU	Siemens 3964R • 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 (LU6.2)

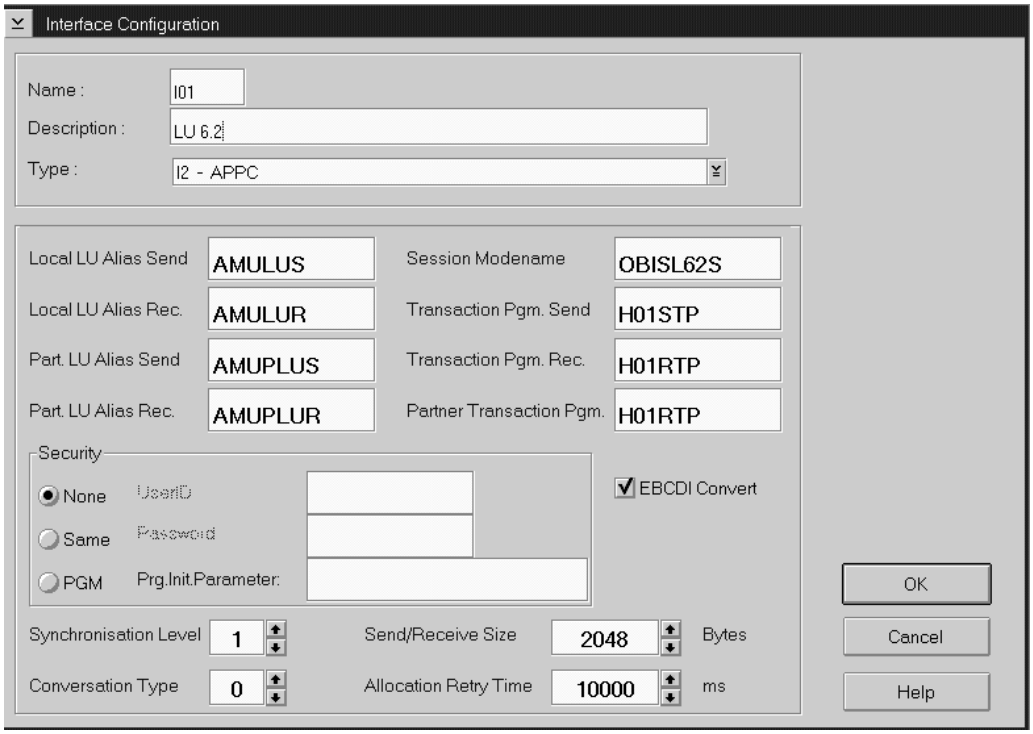


Fig. 5-24: Example APPC Interface

Field	Explanation
Name	Automatically generated name of internal connection (I01, I02 …).
Description	Free comment
	Information 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

Field	Explanation
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
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	Logmode in host software VTAM and HACC (description of the session characteristics)  **Information** Configure the modename to be the same as in the Communications Manager. Be sure to observe correct upper case/lower case spelling. Defaults: • Single Session: OBISL62S • Parallel Session: OBISL62P
Transaction Pgm. Send	Define verbs and parameters at the protocol interface to LU 6.2 for sending (☞ IBM documentation APPN) Default: H01STP

Field	Explanation
Transaction Pgm. Recv.	Define verbs and parameters at the protocol interface to LU 6.2 for receiving (☞ IBM documentation APPN) Default: H01RTP
Partner Transaction Pgm.	Define verbs and parameters at the protocol interface to LU 6.2 of partner LU (☞ IBM documentation APPN) Default: H01RTP
Security	**Information**  This parameter is used only on HACC/ OS400.
None	Security parameters are not changed.
Same	During setup of the conversation (connection between two transaction programs TPs) user-Id and password are checked.
PGM	Parameters for transaction program are transferred from the Atach 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 dir transaction programs, which are transferred from the Atach 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

Field	Explanation
Conversation Type	Type of conversation (☞ IBM documentation APPN) 0: Basic Conversation - for HACC/MVS 1: Mapped Conversation - for HACC/OS/400
Synchronisation Level	Conversation with confirmation (☞ IBM documentation APPN) 0: none 1: confirm (default)
Allocation Retry Time	Interval for new “ALLOCATE” trial (setup of connection) Default: 10000 ms

I3 EHLL (LU 2,EXCP)

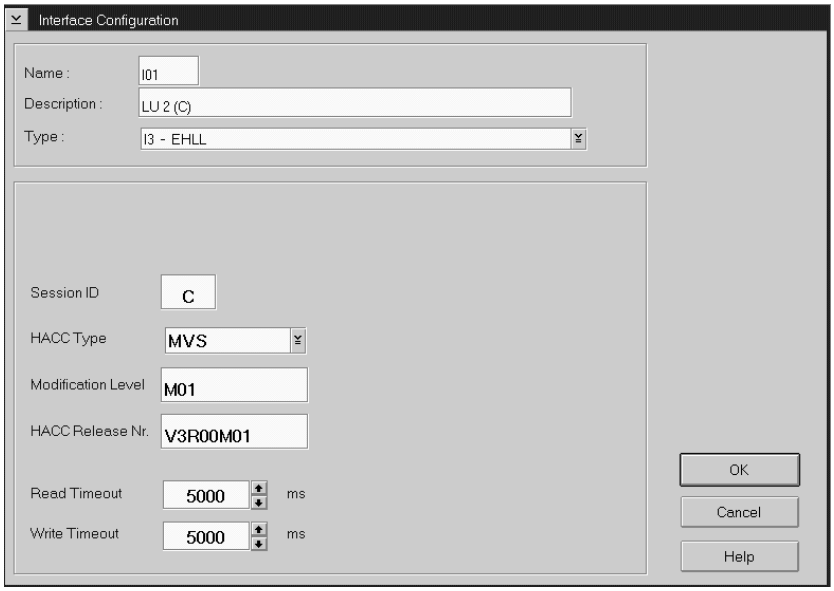


Fig. 5-25: Example EHLL Interface

Field	Explanation
Name	Automatically generated name of internal connection (I01, I02 …).
Description	Free comment
Session ID	Same name as in the Communication Manager (CM), default C (A, B, C, D, E are possible).
HACC Typ	VM or MVS (parameter adjusting the timing characteristics of the communication)
Modification Level	M00 echo line in presentation space not expected M01 echo line in presentation space expected
HACC Release Nr.	HACC release (input is compared with the version statement in the presentation space but not processed further. Errors are not processed.)
Timeout Read	05000 ms
Timeout Write	05000 ms

TCP/IP Connections

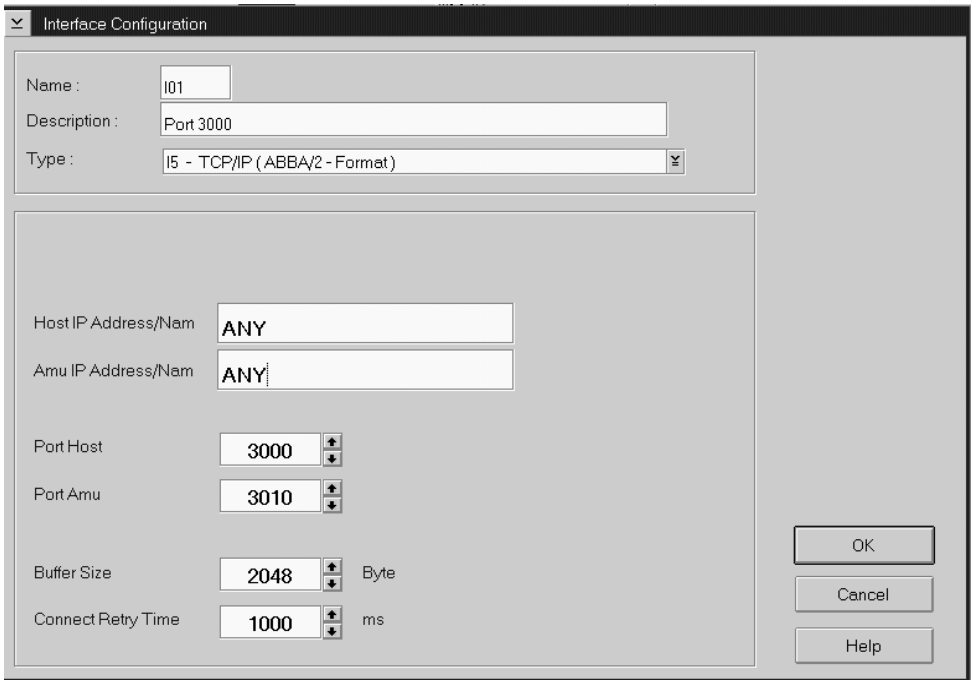


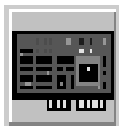
Fig. 5-26: Example TCP/IP Interface

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**.**

Field	Explanation
Internet Adress Host	Adress 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 (☞ TCP/IP Documentation)
Internet Adress 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 (☞ TCP/IP Documentation).
Port Host	Port at the AMU-PC via 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.

Information

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



I7 PMAC Interface

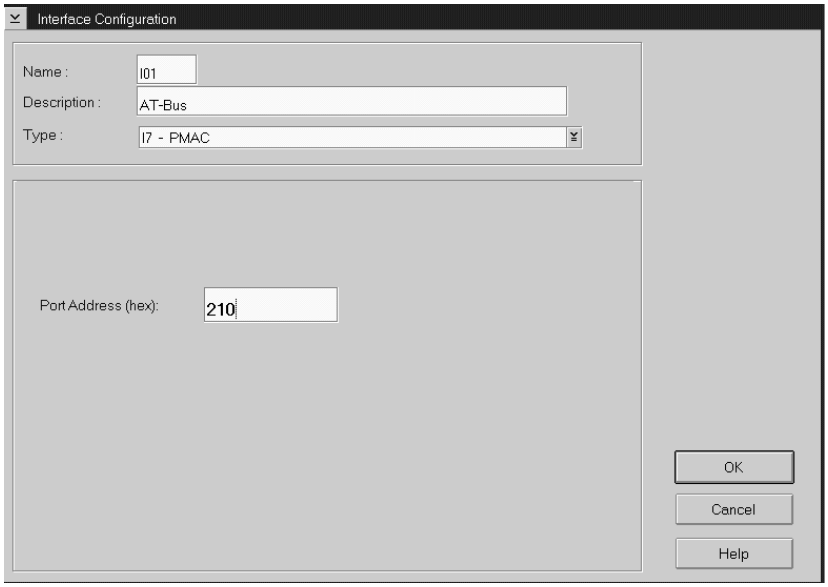
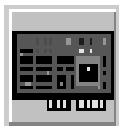


Fig. 5-27: Interface Configuration PMAC

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



I8 RS232 Scanner

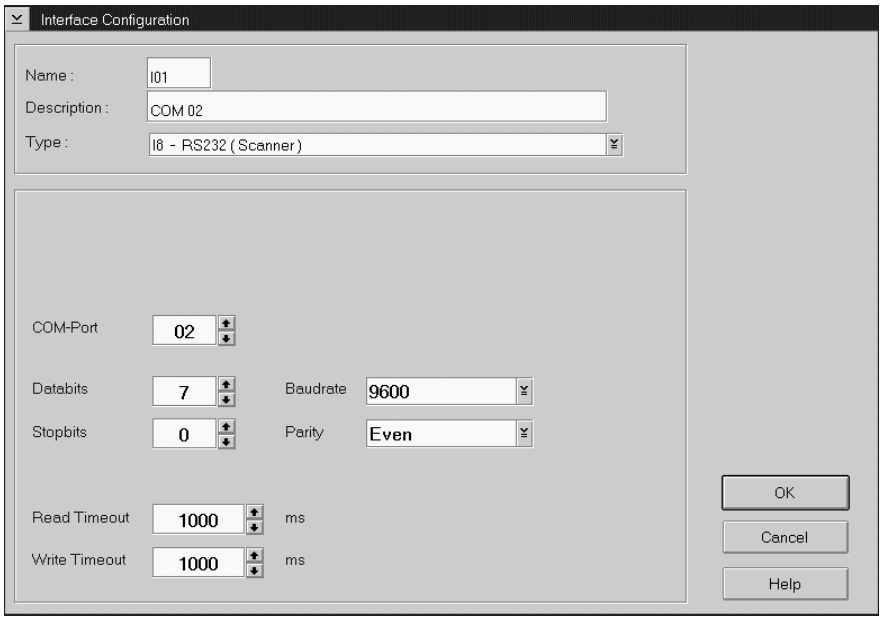
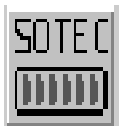


Fig. 5-28: Example RS232 Interface

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 (3964 R) Protocol)

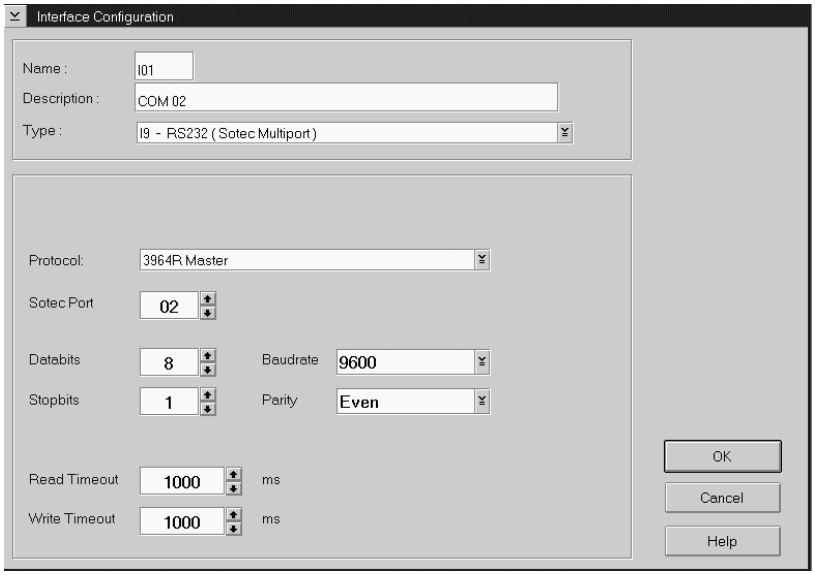


Fig. 5-29: Example RS232 Interface

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 or	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

IA SCSI Interface

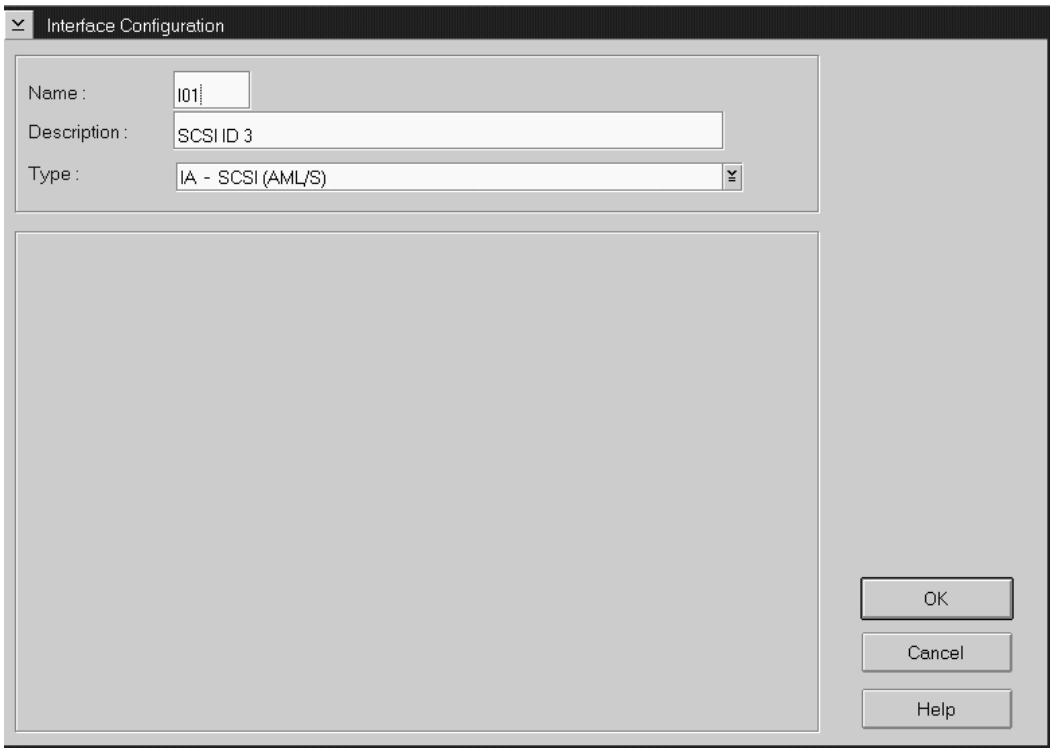


Fig. 5-30: Interface Configuration SCSI

Field	Explanation
Name	Automatically generated name of internal connection (I01, I02 …).
Description	Free comment

Information

The SCSI driver AMLS.SYS is required for SCSI communication.

D CAN-Interface (DCI)

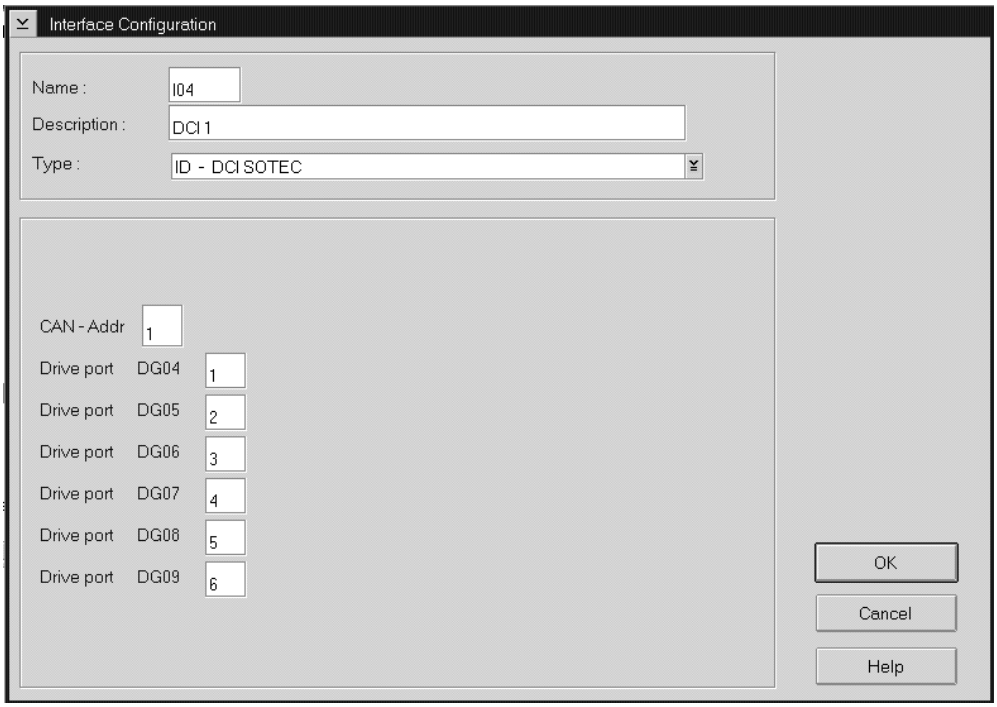


Fig. 5-31: Interface Configuration SCSI

Feld	Erklärung
Name	Automatisch generierter Name der internen Verbindung (I01, I02 …).
Description	frei wählbarer Kommentar
CAN Addr.	CAN Adresse des DCI (wie mit DIP-Schaltern eingestellt)
Drive port	Serielle Schnittstelle vom DCI zum Laufwerk

Information

Für die CAN-Kommunikation wird der CAN-Treiber candrv.sys benötigt.

AMU version 3.10A allowed only up to 9 DCI, from version 3.10B are up to 64 DCI.

(☞ “Configuration of the Drive Control Interface” on page 5 - 57)

5.2 Configuration Of Volser Numbering

5.2.1 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

5.2.2 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 only restructured internally, but not created afresh.

Edit Volser Ranges changes

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

ATTENTION!

A correctly created archive catalog is the precondition for AMU operation. You are responsible to ensure that the 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.

ATTENTION!

Changes to the database made with Edit Volser Range **or with SQL commands are not procolled 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.

Information

Be sure to use the field Mask **correctly for calculation of the coordinate range (☞ Page 5-53).**

5.2.3 Window Edit Volser Ranges

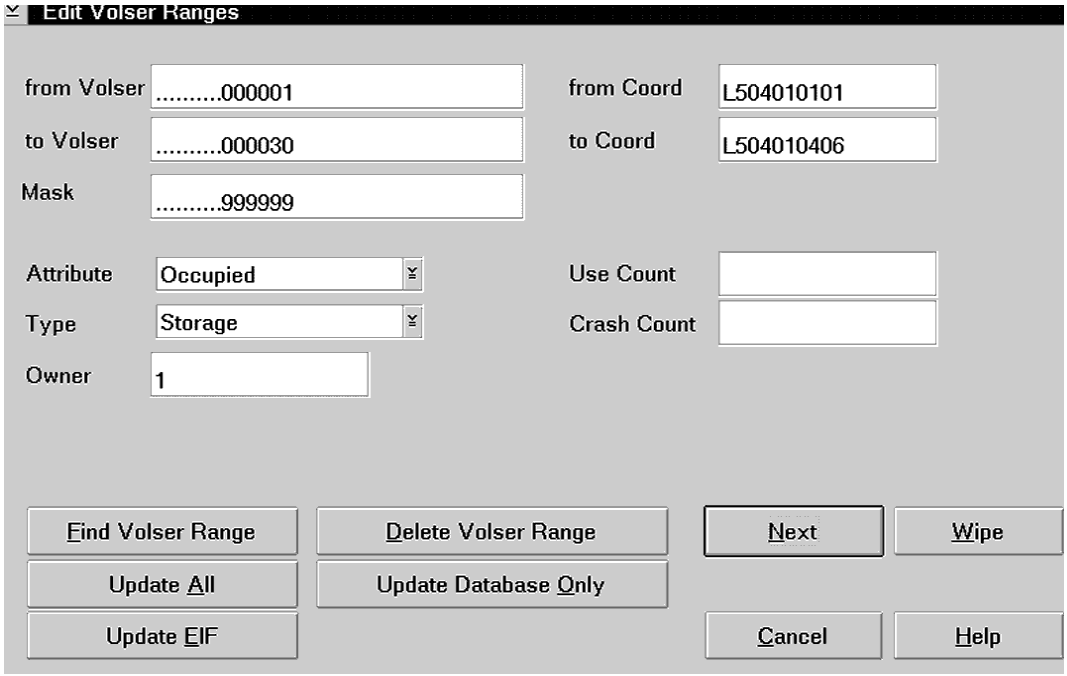


Fig. 5-32: Window "Edit Volser Ranges"

Field	Explanation
from Volser	**Information** **Always fill up the volser to 16 digits using fill-in characters (e. G. .....000001).** First volser of the volser range.

Field	Explanation
to Volser	 **Information** **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	Firat 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: campartment empty • Mounted: medium mounted on drive
Owner	Medium owner: indicates the robot or the robots 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. Every 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.
Delete Volser Range	 **ATTENTION!** Delete Volser Range **deletes the entire volser range from the configuration.**

Field	Explanation
Next	Displays the next volser range.
Wipe	Deletes all input from the window.
Update all	Changes the archive catalog and the configuration.
	 **ATTENTION!** **The existing archive catalog entries and the configuration are overwrittten!** A list of all changes apperars. The changes are executed after confirmation. A message appears after the execution (e. g. Database Update performed successfully!).
Update Data-base only	Changes the archive catalog.
	 **ATTENTION!** **The existing archive catalog entries are over-written!** **Inconsistencies between archive catalog and configuration are possible!** A list of all changes apperars. The changes are executed after confirmation. A message appears after the execution (e. g. Database Update performed successfully!).
Update E/I/F	Activate the changes in **Graphical Configuration** of **Logical Ranges** in the I/O unit in the database.
	 **ATTENTION!** **First change the graphical configruation and restart the AMU (QVW S. 3-93). (☞ Page 5-32)**

5.2.4 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

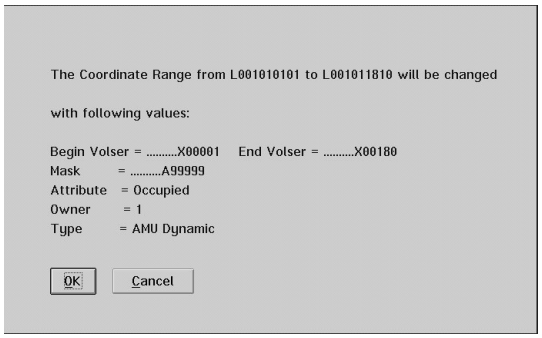


Fig. 5-33: Window "Update Volser Range"

5.2.5 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

5.2.6 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

5.2.7 Changing individual archive catalog entries

Step 1 Click on Wipe to remove all input

Step 2 Define the archive catalog entry or entries with their
- volser or archive coordinate

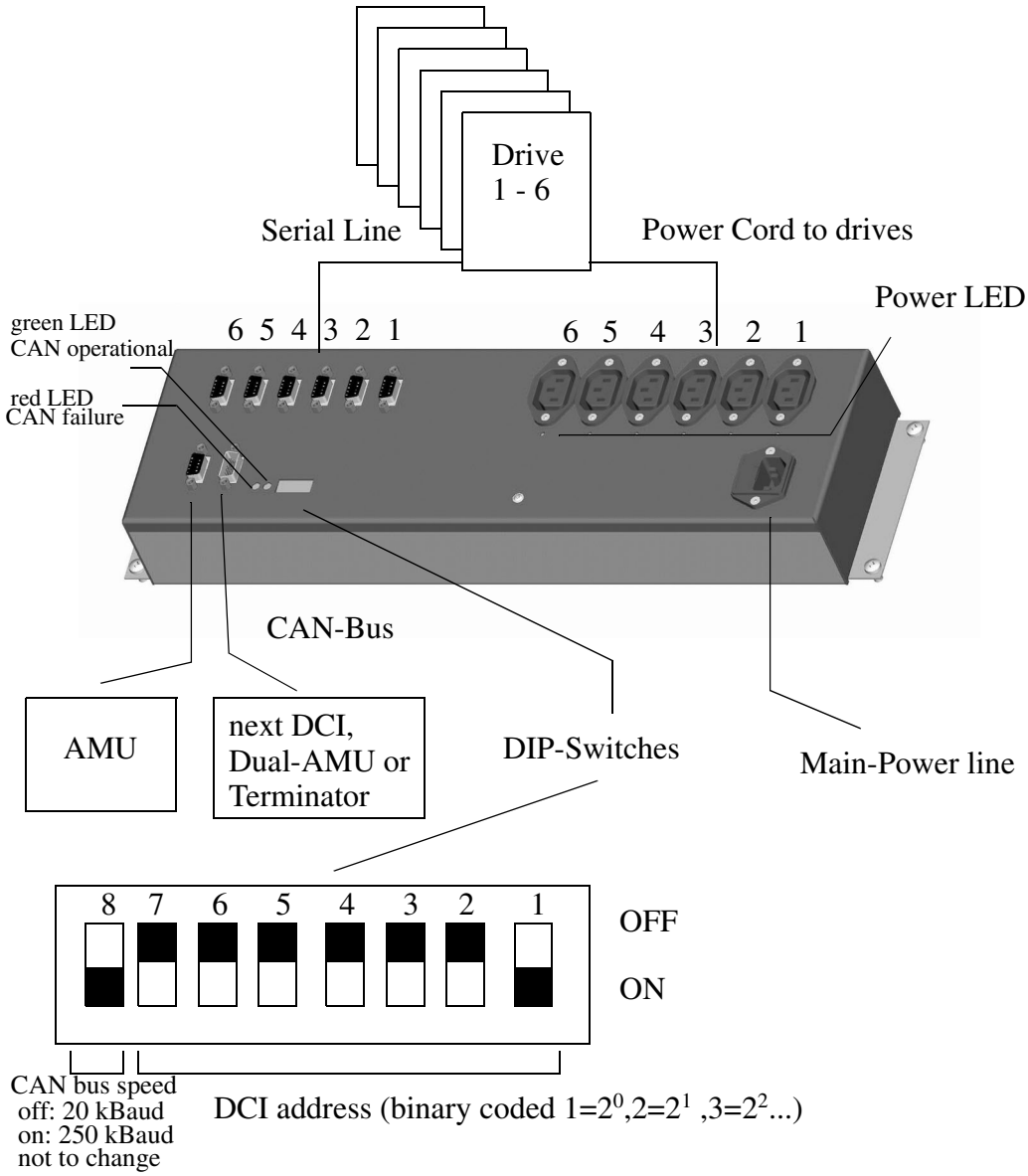
Step 3 Delete all input that is not to be changed

Step 4 Change the remaining input or enter changes

Step 5 Click on Update Database only

5.3 Configuration of the Drive Control Interface

The Drive Control Interface is necessary for controlling the DLT 7001 and DLT 8001 (Low Profile) drives.



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 for each DCI one drive container
  - Create connection lines from 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

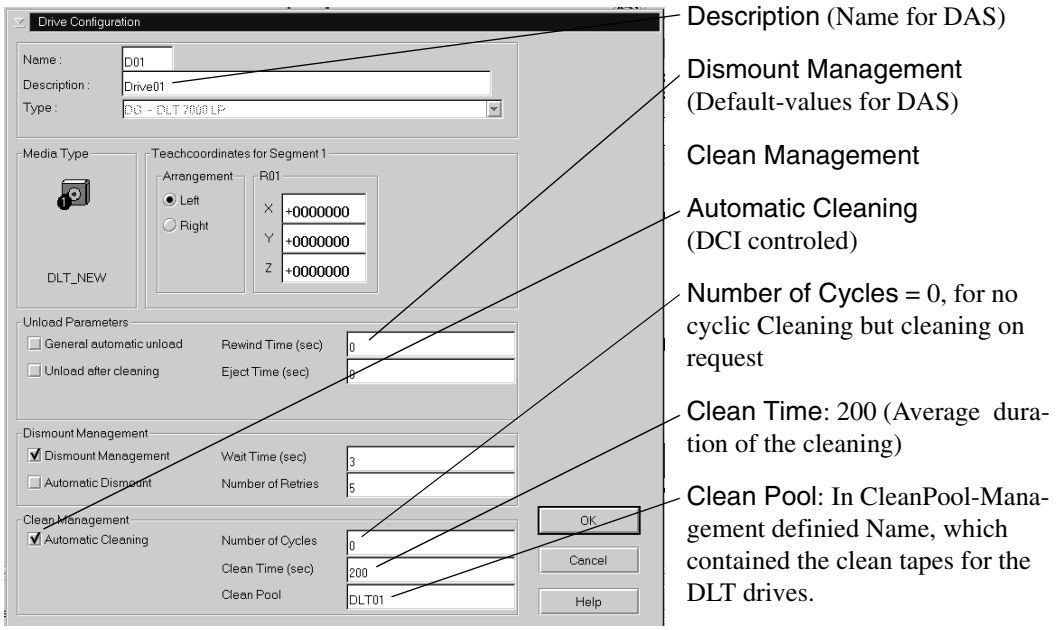


Fig. 5-34: Drive configuration for DLT with DCI

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

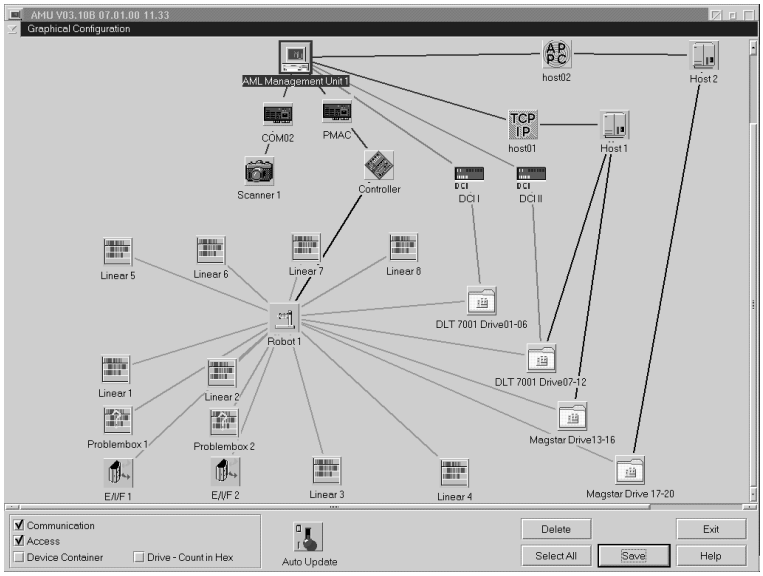
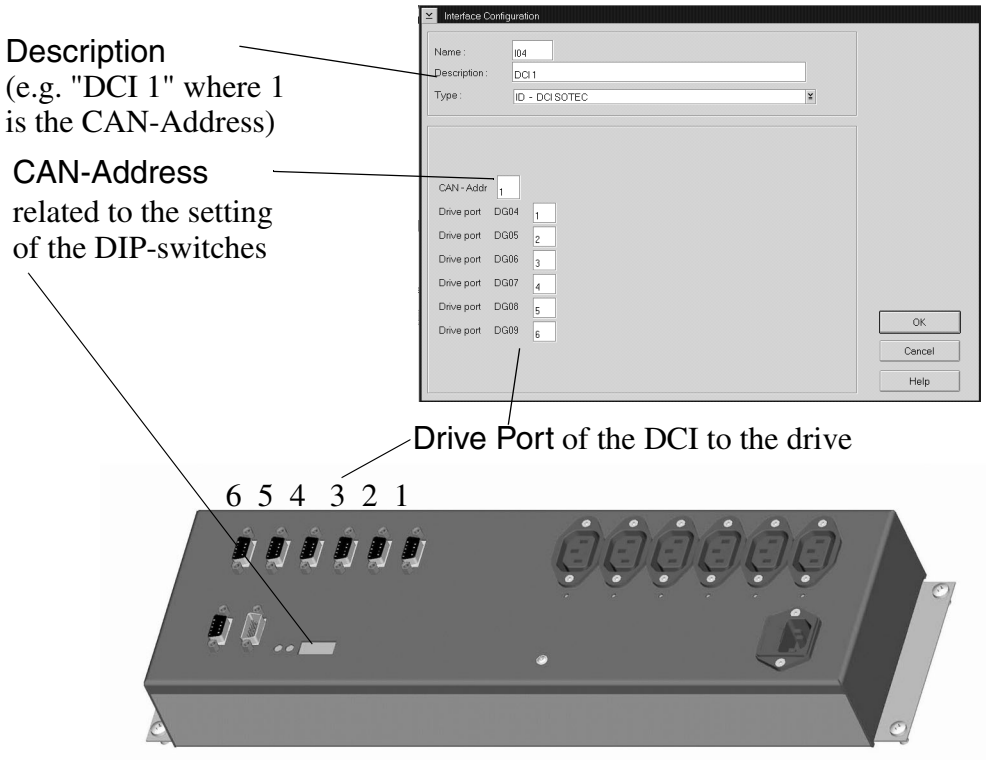


Fig. 5-35: Example of AML/J configuration with DCI in the "Graphical Configuration"

- Open the new arised communikation symbol between drive container and AMU
- Set up the following values.



5.4 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

- mininum 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 (menu Admin)

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 menü Graphical Configuration 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

5.5 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 parameters for each pool
- minimum number of scratch media
- media type

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

Step 5 Define the volsers for the individual pools

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

5.6 Configuration of AMU Log

If only a very small harddisk 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 configurated 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 (☞ example above).

Field	Explanation
`LogPath`	Drive and path to which log files are automatically written. Default for directory is “logs-trc” in AMU directory.
	 **Information** **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.
	 **Information** **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.

5.7 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 configurated.
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.

Line	Explanation
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 or LU 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.

5.7.1 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 /S /R /B
start /C /min "AMU Router" rte
start /C /min "AMU Backup Deamon" bud
start con /L
exit
```

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 /R /B`	Start of the AMU-Kernel with Options /C window will be closed at the end /min window started in symbol size /S communication with DAS /R Option AMU-Router /B Option AMU-Backup Deamon
`start /C /min "AMU Router" rte`	Start of the AMU-Routes
`start /C /min "AMU Backup Deamon" bud`	Start of the Backup-Deamons
`start con /L`	Start of the AMU-GUI with Option: /L Log-window will be opened automatic
`EXIT`	exit of the window AMUSTART.CMD

5.8 Symbols on the Operating Console

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

Step 1 Opfen the folder “Templates”

Information

The folder “Templates” 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.

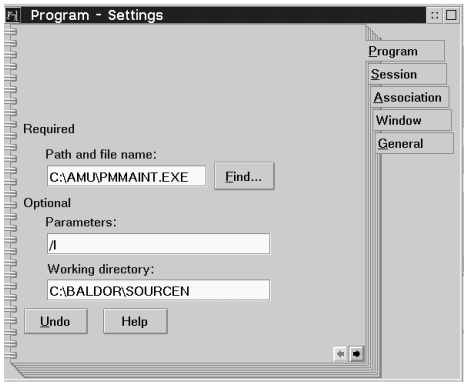


Fig. 5-36: Window “Program - Settings”

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

- drive index letter,
- directory and
- 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

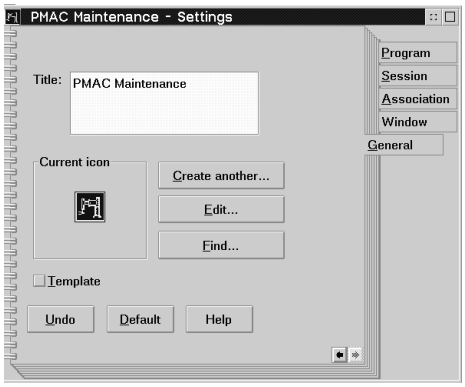


Fig. 5-37: Window “Program - Settings”

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

Step 7 Close the window by a double-click on the system symbol (left top corner)

5.9 Archiving Function of the Operating System OS/2

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.

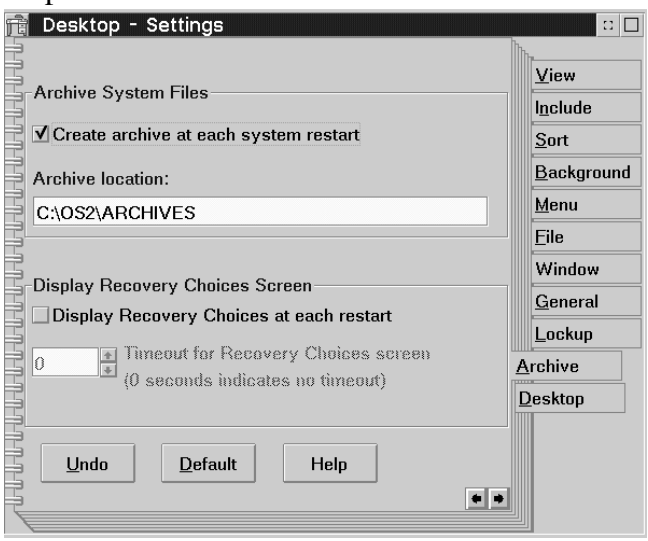


Fig. 5-38: Window "Desktop - Setting Order Archive

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

Information

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 to switch this function off after three backups, to ensure the defined configuration can be restored at any time.

5.10 Logic Coordinates

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

5.10.1 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

Information

Host system operating with the AMU using the ABBA/1 format must exclusively process command with 6-digit volsers.
During input and inventories in multi-host systems bes sure to adhere to the proper ranges from I/O unit, archive.

5.10.2 Comparison of AMU and ABBA/1 Coordinates

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

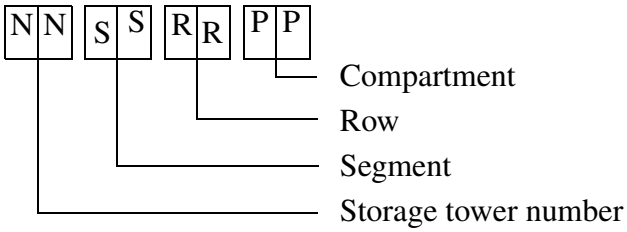
These logical coordinates are converted by the AMU software into physical increments counted from a zero-point (x-, y-, z-axis).

5.10.3 Structure

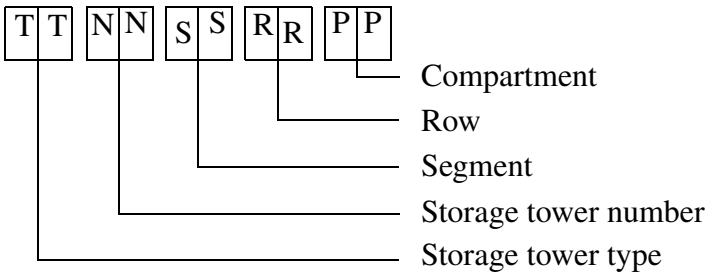
AMU convertes the logic coordinates from the host computer into AMU coordinates.

Storage segments

Host processor

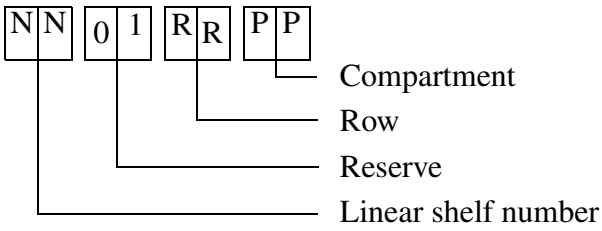


AMU

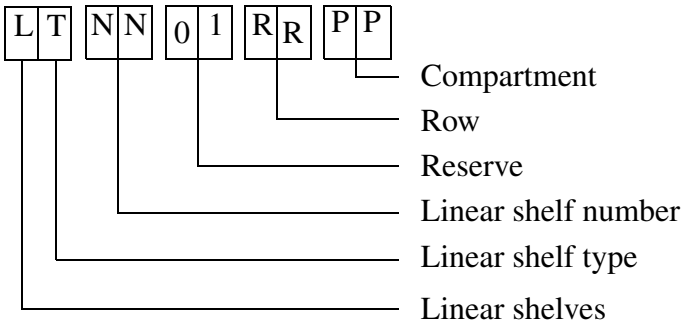


Linear shelves

Host processor



AMU


L T N N 0 1 R R P P
Compartment
Row
Reserve
Linear shelf number
Linear shelf type
Linear shelves

5.10.4 Archive Coordinates

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

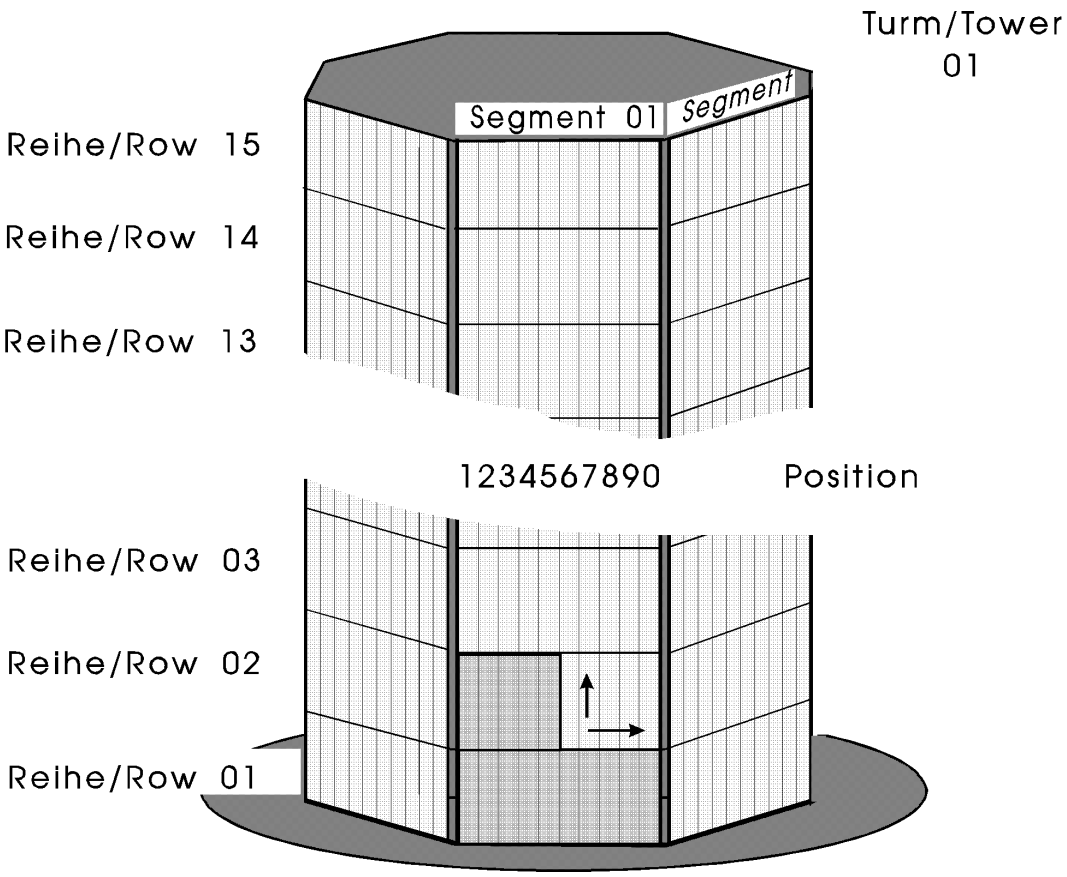


Fig. 5-39: Numbering of Coordinates Row by Row

5.10.5 Special Coordinates

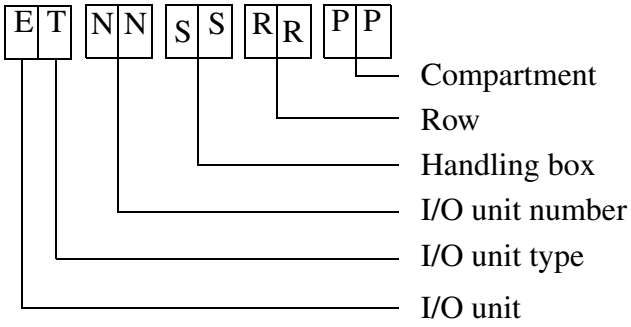
I/O units

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

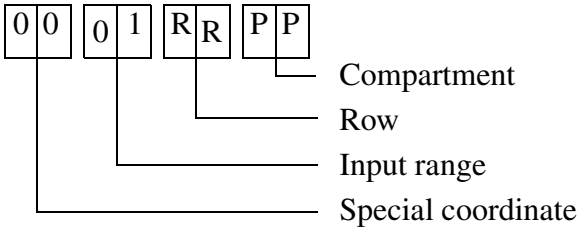
The I/O unit has ranges for

- input
- output
- foreign media

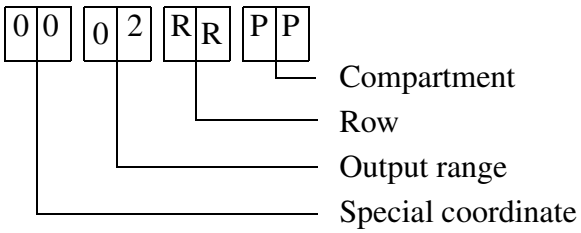
AMU



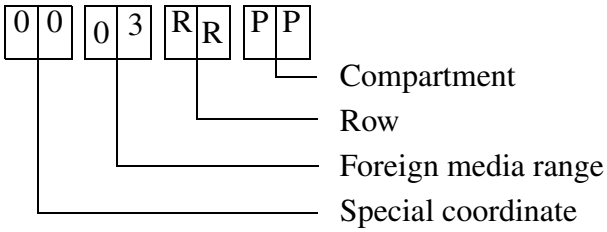
Host computer input range (e.g. 00 01 03 10)



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

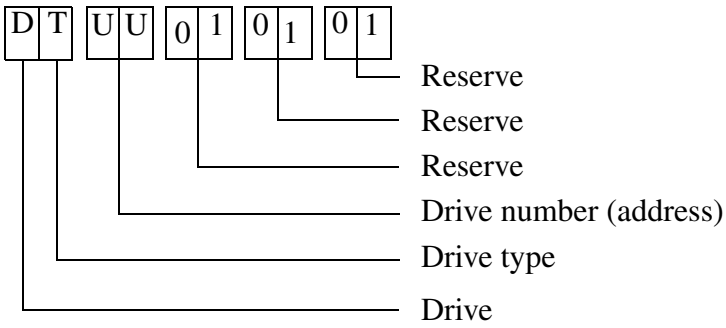


Host computer foreign media range (e. g. 00 03 06 01)

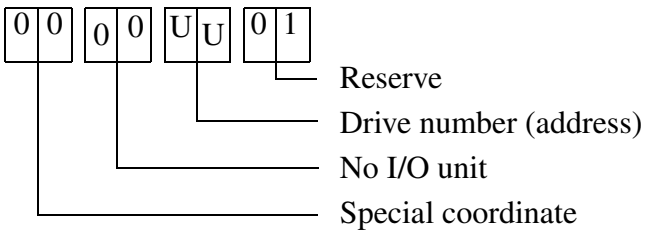


Drives

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”

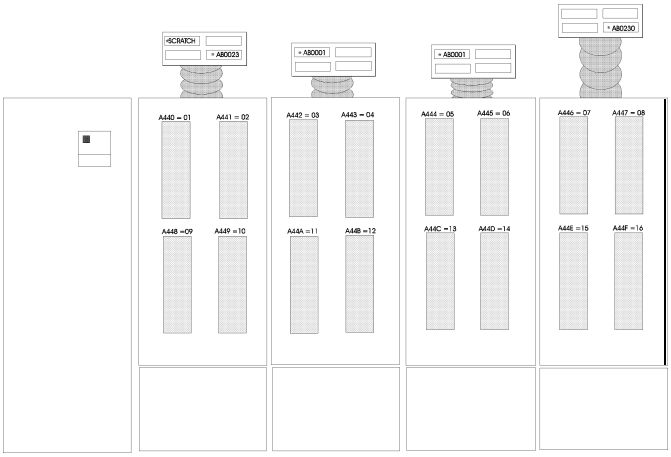
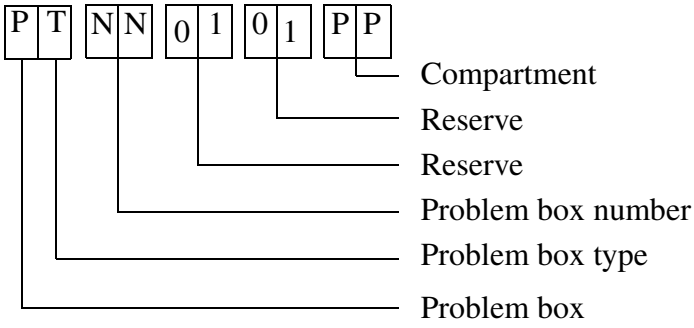


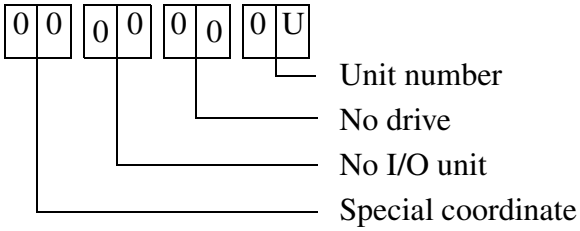
Fig. 5-40: Count Mode for Drives

Problem box

AMU



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



5.10.6 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

5.10.7 Coordinates for Scalar 1000

The logic AMU coordinates for Scalar 1000 coordinate are assigned according to the following illustrations:

Basic module without drives

		A	B	C	D	E
1		E801010101	LU 01010	LU 01010	LU 01010	LU 01010
2		E801010102	LU 01010	LU 01010	LU 01010	LU 01010
3		E801010103	LU 01010	LU 01010	LU 01010	LU 01010
4		E801010104	LU 01010	LU 01010	LU 01010	LU 01010
5		E801010105	LU 01010	LU 01010	LU 01010	LU 01010
6		E801010106	LU 01010	LU 01010	LU 01010	LU 01010
7		E801010107	LU 01010	LU 01010	LU 01010	LU 01010
8		E801010108	LU 01010	LU 01010	LU 01010	LU 01010
9		E801010109	LU 01010	LU 01010	LU 01010	LU 01010
10		E801010110	LU 01010	LU 01010	LU 01010	LU 01010
11		E801010111	LU 01010	LU 01010	LU 01010	LU 01010
12		E801010112	LU 01010	LU 01010	LU 01010	LU 01010
13		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
14		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
15		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
16		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
17		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
18		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
19		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
20		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
21		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
22		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
23		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
24		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
25		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
26		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
27		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
28		LU 01010	LU 01010	LU01010201	LU 01010	LU 01010
202		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
203		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
204		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
205		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
206		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
207		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
208		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
209		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
210		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
211		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
212		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
213		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
214		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010
215		LU 01010	LU 01010	LU 01010	LU 01010	LU 01010

Basic module with max. 2 drives

		A	B	C	D	E
1		E801010101	LV010102	LV010103	LV010104	LV010105
6		E801010102	LV010107	LV010108	LV010109	LV0101010
11		E801010103	LV0101012	LV0101013	LV0101014	LV0101015
16		E801010104	LV0101017	LV0101018	LV0101019	LV0101020
21		E801010105	LV0101022	LV0101023	LV0101024	LV0101025
26		E801010106	LV0101027	LV0101028	LV0101029	LV0101030
31		E801010107	LV0101032	LV0101033	LV0101034	LV0101035
36		E801010108	LV0101037	LV0101038	LV0101039	LV0101040
41		E801010109	LV0101042	LV0101043	LV0101044	LV0101045
46		E801010110	LV0101047	LV0101048	LV0101049	LV0101050
51		E801010111	LV0101052	LV0101053	LV0101054	LV0101055
56		E801010112	LV0101057	LV0101058	LV0101059	LV0101060
61		LV01010101	LV01010102	LV01010103	LV01010104	LV01010105
106		LV01010107	LV01010108	LV01010109	LV01010110	LV01010111
112		LV01010113	LV01010114	LV01010115	LV01010116	LV01010117
118		LV01010119	LV01010120	LV01010121	LV01010122	LV01010123
124		LV01010125	LV01010126	LV01010127	LV01010128	LV01010129
130		LV01010131	LV01010132	LV01010201	LV01010202	LV01010203
204		LV01010205	LV01010206	LV01010207	LV01010208	LV01010209
210		LV01010211	LV01010212	LV01010213	LV01010214	LV01010215
216		LV01010217	LV01010218	LV01010219	LV01010220	LV01010221
222		LV01010223	LV01010224	LV01010225	LV01010226	LV01010227
228		LV01010229	LV01010230	LV01010231	LV01010232	LV01010233
234		LV01010235	LV01010236	LV01010237	LV01010238	LV01010239
240		LV01010241	LV01010242	LV01010243	LV01010244	LV01010245
246		LV01010247	LV01010248	LV01010249	LV01010250	LV01010251
252		LV01010253	LV01010254	LV01010255	LV01010256	LV01010257
258		LV01010259	LV01010260	LV01010261	LV01010262	LV01010263
264		LV01010265	LV01010266	LV01010267	LV01010268	LV01010269
270		LV01010271	LV01010272	LV01010273	LV01010274	LV01010275
276		LV01010277	LV01010278	LV01010279	LV01010280	LV01010281
282		LV01010283	LV01010284	LV01010285	LV01010286	LV01010287
288		LV01010289	Dx01010101		Dx01010101	
290		LV01010291				
292		LV01010293				
294		LV01010295				
296		LV01010297				
298		LV01010299				
300		LV01010301				
302		LV01010303				
304		LV01010305				
306		LV01010307				

Basic module with max. 4 drives

		A	B	C	D	E
1		E801010101	LW010102	LW010103	LW010104	LW010105
6		E801010102	LW010107	LW010108	LW010109	LW0101010
11		E801010103	LW0101012	LW0101013	LW0101014	LW0101015
16		E801010104	LW0101017	LW0101018	LW0101019	LW0101020
21		E801010105	LW0101022	LW0101023	LW0101024	LW0101025
26		E801010106	LW0101027	LW0101028	LW0101029	LW0101030
31		E801010107	LW0101032	LW0101033	LW0101034	LW0101035
36		E801010108	LW0101037	LW01010201	LW01010202	LW01010203
204		E801010109	LW01010205	LW01010206	LW01010207	LW01010208
209		E801010110	LW01010210	LW01010211	LW01010212	LW01010213
214		E801010111	LW01010215	LW01010216	LW01010217	LW01010218
219		E801010112	LW01010220	LW01010221	LW01010222	LW01010223
224		LW01010101	LW01010102	LW01010103	LW01010104	LW01010105
106		LW01010107	LW01010108	LW01010109	LW01010110	LW01010111
112		LW01010113	LW01010114	LW01010115	LW01010116	LW01010117
118		LW01010119	LW01010120	LW01010121	LW01010122	LW01010123
124		LW01010125	LW01010126	LW01010127	LW01010128	LW01010129
130		LW01010131	LW01010132	LW01010133	LW01010134	LW01010135
136		LW01010137	LW01010138	LW01010139	LW01010140	LW01010141
142		LW01010143	LW01010144	LW01010145	LW01010146	LW01010147
148		LW01010149	LW01010150	LW01010151	LW01010152	LW01010153
154		LW01010155	LW01010156	LW01010157	LW01010158	LW01010159
160		LW01010161	Dx01010101		Dx02010101	
162		LW01010163				
164		LW01010165				
166		LW01010167				
168		LW01010169				
170		LW01010171				
172		LW01010173				
174		LW01010175				
176		LW01010177				
178		LW01010179				
180		LW01010181	Dx03010101		Dx04010101	
182		LW01010183				
184		LW01010185				
186		LW01010187				
188		LW01010189				
190		LW01010191				
192		LW01010193				
194		LW01010195				
196		LW01010197				
198		LW01010199				

Add-on module without drives

		A	B	C	D	E
1		LX01010101	LX01010102	LX01010103	LX01010104	LX01010105
106		LX01010107	LX01010108	LX01010109	LX01010110	LX01010111
112		LX01010113	LX01010114	LX01010115	LX01010116	LX01010117
118		LX01010119	LX01010120	LX01010121	LX01010122	LX01010123
124		LX01010125	LX01010126	LX01010127	LX01010128	LX01010129
130		LX01010131	LX01010132	LX01010133	LX01010134	LX01010135
136		LX01010137	LX01010138	LX01010139	LX01010140	LX01010141
142		LX01010143	LX01010144	LX01010145	LX01010146	LX01010147
148		LX01010149	LX01010150	LX01010151	LX01010152	LX01010153
154		LX01010155	LX01010156	LX01010157	LX01010158	LX01010159
160		LX01010161	LX01010162	LX01010163	LX01010164	LX01010165
166		LX01010167	LX01010168	LX01010169	LX01010170	LX01010171
172		LX01010173	LX01010174	LX01010175	LX01010176	LX01010177
178		LX01010179	LX01010180	LX01010181	LX01010182	LX01010183
184		LX01010185	LX01010186	LX01010187	LX01010301	LX01010302
303		LX01010304	LX01010305	LX01010306	LX01010307	LX01010308
309		LX01010310	LX01010311	LX01010312	LX01010313	LX01010314
315		LX01010316	LX01010317	LX01010318	LX01010319	LX01010320
321		LX01010322	LX01010323	LX01010324	LX01010325	LX01010326
327		LX01010328	LX01010329	LX01010330	LX01010331	LX01010332
333		LX01010334	LX01010335	LX01010336	LX01010337	LX01010338
339		LX01010340	LX01010341	LX01010342	LX01010343	LX01010344
345		LX01010346	LX01010347	LX01010348	LX01010349	LX01010350
351		LX01010352	LX01010353	LX01010354	LX01010355	LX01010356
357		LX01010358	LX01010359	LX01010360	LX01010361	LX01010362
363		LX01010364	LX01010365	LX01010366	LX01010367	LX01010368
369		LX01010370	LX01010371	LX01010372	LX01010373	LX01010374
375		LX01010376	LX01010377	LX01010378	LX01010379	LX01010380
381		LX01010382	LX01010201	LX01010202	LX01010203	LX01010204
205		LX01010206	LX01010207	LX01010208	LX01010209	LX01010210
211		LX01010212	LX01010213	LX01010214	LX01010215	LX01010216
217		LX01010218	LX01010219	LX01010220	LX01010221	LX01010222
223		LX01010224	LX01010225	LX01010226	LX01010227	LX01010228
229		LX01010230	LX01010231	LX01010232	LX01010233	LX01010234
235		LX01010236	LX01010237	LX01010238	LX01010239	LX01010240
241		LX01010242	LX01010243	LX01010244	LX01010245	LX01010246
247		LX01010248	LX01010249	LX01010250	LX01010251	LX01010252
253		LX01010254	LX01010255	LX01010256	LX01010257	LX01010258
259		LX01010260	LX01010261	LX01010262	LX01010263	LX01010264
265		LX01010266	LX01010267	LX01010268	LX01010269	LX01010270
271		LX01010272	LX01010273	LX01010274	LX01010275	LX01010276
277		LX01010278	LX01010279	LX01010280	LX01010281	LX01010282

Basic module with max. 2 drives

		A	B	C	D	E
1		LY01010101	LY01010102	LY01010103	LY01010104	LY01010105
106		LY01010107	LY01010108	LY01010109	LY01010110	LY01010111
112		LY01010113	LY01010114	LY01010115	LY01010116	LY01010117
118		LY01010119	LY01010120	LY01010121	LY01010122	LY01010123
124		LY01010125	LY01010126	LY01010127	LY01010128	LY01010129
130		LY01010131	LY01010132	LY01010133	LY01010134	LY01010135
136		LY01010137	LY01010138	LY01010139	LY01010140	LY01010141
142		LY01010143	LY01010144	LY01010145	LY01010146	LY01010147
148		LY01010149	LY01010150	LY01010151	LY01010152	LY01010153
154		LY01010155	LY01010156	LY01010157	LY01010158	LY01010159
160		LY01010161	LY01010162	LY01010163	LY01010164	LY01010165
166		LY01010167	LY01010168	LY01010201	LY01010202	LY01010203
204		LY01010205	LY01010206	LY01010207	LY01010208	LY01010209
210		LY01010211	LY01010212	LY01010213	LY01010214	LY01010215
216		LY01010217	LY01010218	LY01010219	LY01010220	LY01010221
222		LY01010223	LY01010224	LY01010225	LY01010226	LY01010227
228		LY01010229	LY01010230	LY01010231	LY01010232	LY01010233
234		LY01010235	LY01010236	LY01010237	LY01010238	LY01010239
240		LY01010241	LY01010242	LY01010243	LY01010244	LY01010245
246		LY01010247	LY01010248	LY01010249	LY01010250	LY01010251
252		LY01010253	LY01010254	LY01010255	LY01010256	LY01010257
258		LY01010259	LY01010260	LY01010261	LY01010262	LY01010263
264		LY01010265	LY01010266	LY01010267	LY01010268	LY01010269
270		LY01010271	LY01010272	LY01010273	LY01010274	LY01010275
276		LY01010277	LY01010278	LY01010279	LY01010280	LY01010281
282		LY01010283	LY01010284	LY01010285	LY01010286	LY01010287
288		LY01010289	LY01010290	LY01010291	LY01010292	LY01010293
294		LY01010295	LY01010296	LY01010297	LY01010298	LY01010299
300		LY01010301	LY01010302	LY01010303	LY01010304	LY01010305
306		LY01010307	LY01010308	LY01010309	LY01010310	LY01010311
312		LY01010313	LY01010314	LY01010315	LY01010316	LY01010317
318		LY01010319	LY01010320	LY01010321	LY01010322	LY01010323
324		LY01010325	Dx01010101		Dx01010101	
326		LY01010327				
328		LY01010329				
330		LY01010331				
332		LY01010333				
334		LY01010335				
336		LY01010337				
338		LY01010339				
340		LY01010341				
342		LY01010343				

Add-on module with max. 4 drives

		A	B	C	D	E
1		LZ01010101	LZ01010102	LZ01010103	LZ01010104	LZ01010105
106		LZ01010107	LZ01010108	LZ01010201	LZ01010202	LZ01010203
204		LZ01010205	LZ01010206	LZ01010207	LZ01010208	LZ01010209
210		LZ01010211	LZ01010212	LZ01010213	LZ01010214	LZ01010215
216		LZ01010217	LZ01010218	LZ01010219	LZ01010220	LZ01010221
222		LZ01010223	LZ01010224	LZ01010225	LZ01010226	LZ01010227
228		LZ01010229	LZ01010230	LZ01010231	LZ01010232	LZ01010233
234		LZ01010235	LZ01010236	LZ01010237	LZ01010238	LZ01010239
240		LZ01010241	LZ01010242	LZ01010243	LZ01010244	LZ01010245
246		LZ01010247	LZ01010248	LZ01010249	LZ01010250	LZ01010251
252		LZ01010253	LZ01010254	LZ01010255	LZ01010256	LZ01010257
258		LZ01010259	LZ01010260	LZ01010261	LZ01010262	LZ01010263
264		LZ01010265	LZ01010266	LZ01010267	LZ01010268	LZ01010269
270		LZ01010271	LZ01010272	LZ01010273	LZ01010274	LZ01010275
276		LZ01010277	LZ01010278	LZ01010279	LZ01010280	LZ01010281
282		LZ01010283	LZ01010284	LZ01010285	LZ01010286	LZ01010287
288		LZ01010289	LZ01010290	LZ01010291	LZ01010292	LZ01010293
294		LZ01010295	LZ01010296	LZ01010297	LZ01010298	LZ01010299
300		LZ01010301	LZ01010302	LZ01010303	LZ01010304	LZ01010305
306		LZ01010307	LZ01010308	LZ01010309	LZ01010310	LZ01010311
312		LZ01010313	LZ01010314	LZ01010315	LZ01010316	LZ01010317
318		LZ01010319	LZ01010320	LZ01010321	LZ01010322	LZ01010323
324		LZ01010325	Dx01010101		Dx02010101	
326		LZ01010327				
328		LZ01010329				
330		LZ01010331				
332		LZ01010333				
334		LZ01010335				
336		LZ01010337				
338		LZ01010339				
340		LZ01010341				
342		LZ01010343				
344		LZ01010345	Dx03010101		Dx04010101	
346		LZ01010347				
348		LZ01010349				
350		LZ01010351				
352		LZ01010353				
354		LZ01010355				
356		LZ01010357				
358		LZ01010359				
360		LZ01010361				
362		LZ01010363				

6 Utilities

6.1 Rho File Manager

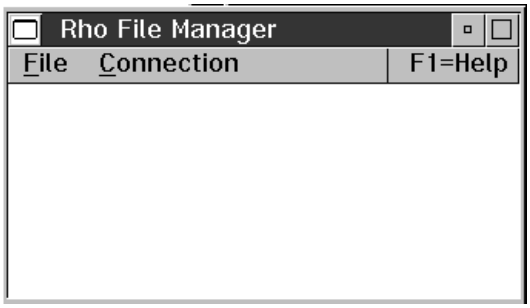


Fig. 6-1: Window “Rho File Manager” Overview

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.

6.1.1 Starting the Rho File Manager

ATTENTION!

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

During operation

Step 1 Execute command Home

Step 2 Press reset push-button on the PS 75 board of rho control

Step 3 Start Rho File Mangager

After booting the control system

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

Information

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

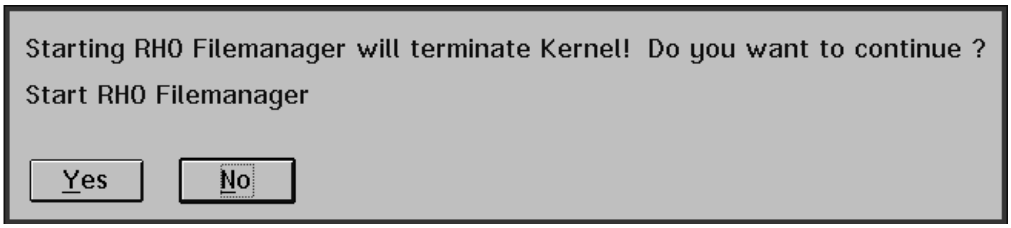


Fig. 6-2: Window “Start Rho File Manager”

6.1.2 Menu File

Command	Explanation
About	Display copyright information and version number.
Exit	Exit Rho File Manager.

Information

After exiting the Rho File Manager

- **the interface for data communication with AMU is automatically configurated**
- **the AMU kernel restarts**

6.1.3 Menu Connection

Command	Field	Explanation
List		Display contents of rho control.

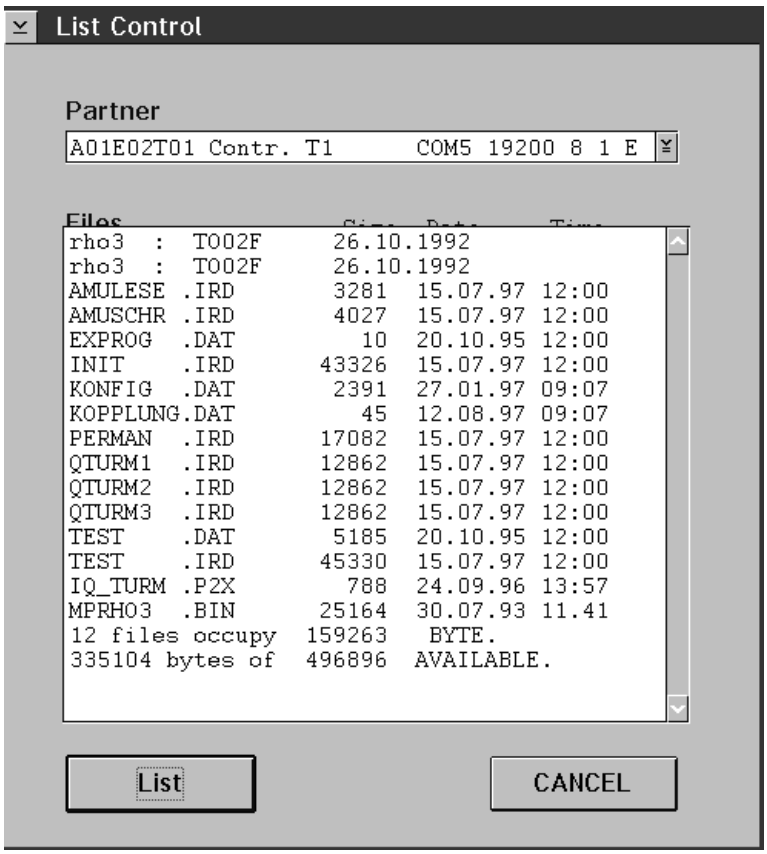


Fig. 6-3: Window "List Control"

Partner — Select partner (rho control) with a double click. It may take a few seconds to activate the connection.

Information

If no partner has been selected you are prompted for a selection.

Command	Field	Explanation
List (continued)	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.

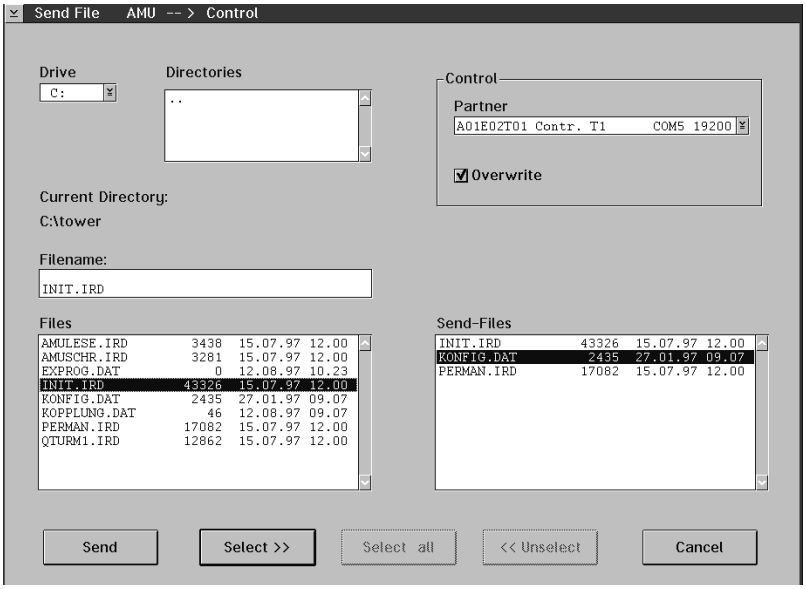


Fig. 6-4: Window “Send File AMU --> Control”

ATTENTION!

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

Information

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

Command	Field	Explanation
Send to Rho (continued)	Drive	Select the drive.
	Directories	Display all directories of current drive.
	Current Directory	Display the current directory path.
	Filename	Enter • filename • search criterion with variables (*, ?) • absolute or relative path with final "\" (e.g. c:\amu\)
	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.  **Information** **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.

Command	Field	Explanation
Send to Rho (continued)	Send	Send selected files.

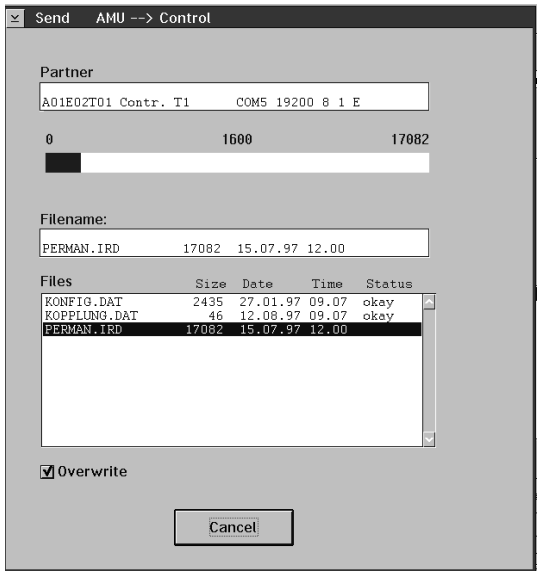


Fig. 6-5: Window „Send AMU --> Control“

- 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.

Information

The file “MPRHO3.BIN” appears in the window only after the command List **has been used.**

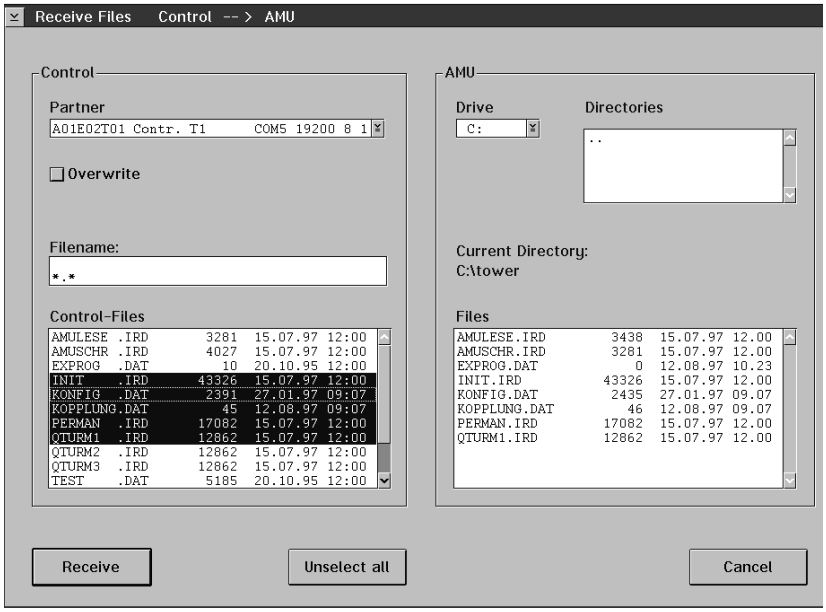


Fig. 6-6: Window “Receive Files Control --> AMU”

Partner — Select partner (rho control) with a double click. It may take a few seconds to activate the connection.

Information

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.

Command	Field	Explanation
Receive from Rho (continued)	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.
	Receive	Send selected files.
	Unselect all	Unselect all files selected for transfer.

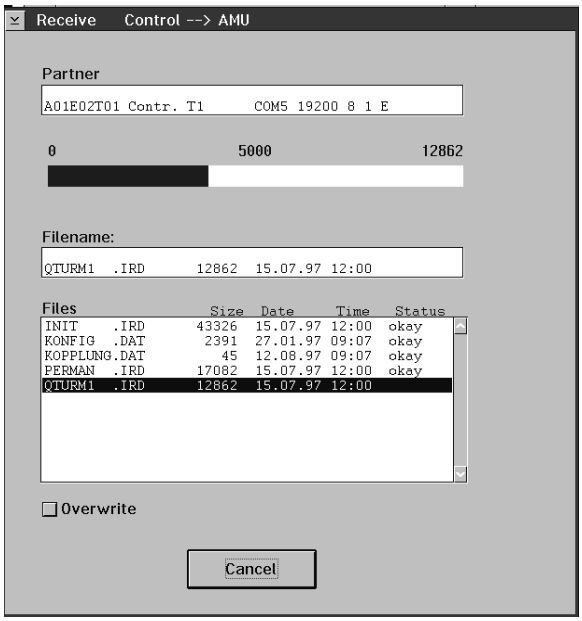


Fig. 6-7: Window „Receive Control --> AMU“

- 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

Command	Field	Explanation
Delete		Delete a file in rho.

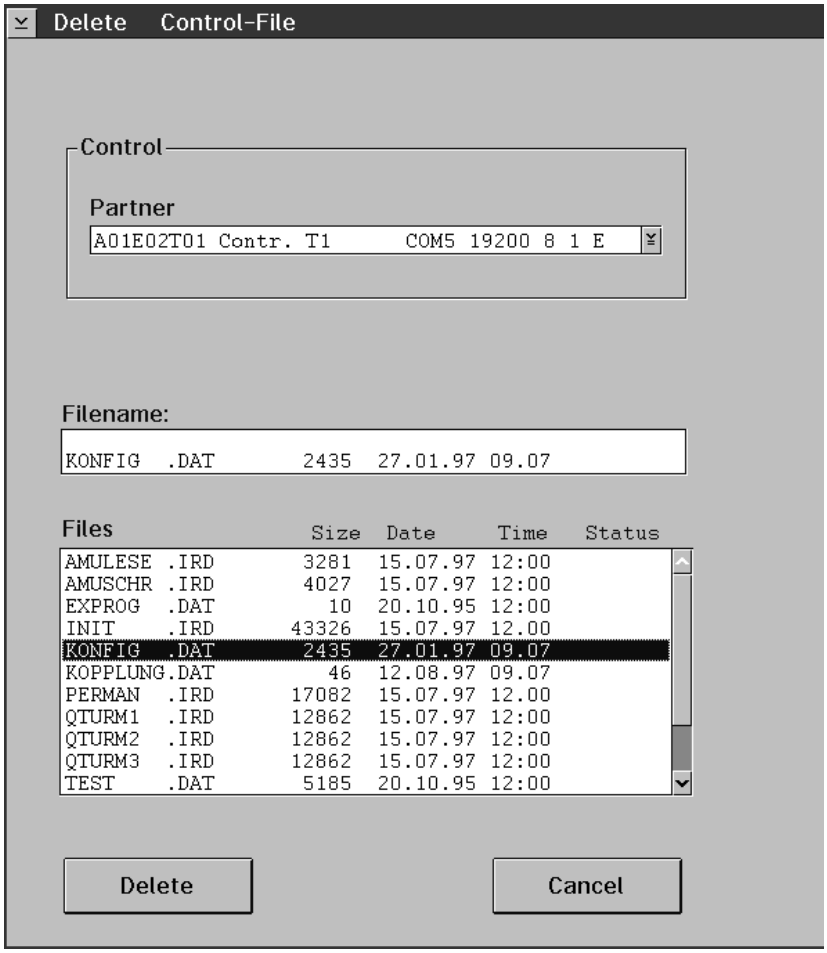


Fig. 6-8: Window “Delete Control-File”

Partner — Select partner (rho control) with a double click. It may take a few seconds to activate the connection.

Information

If no partner has been selected you are prompted for a selection.

Command	Field	Explanation
	Filename	Enter • filename • search criterion with variables (*, ?)
Delete (continued)	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.	

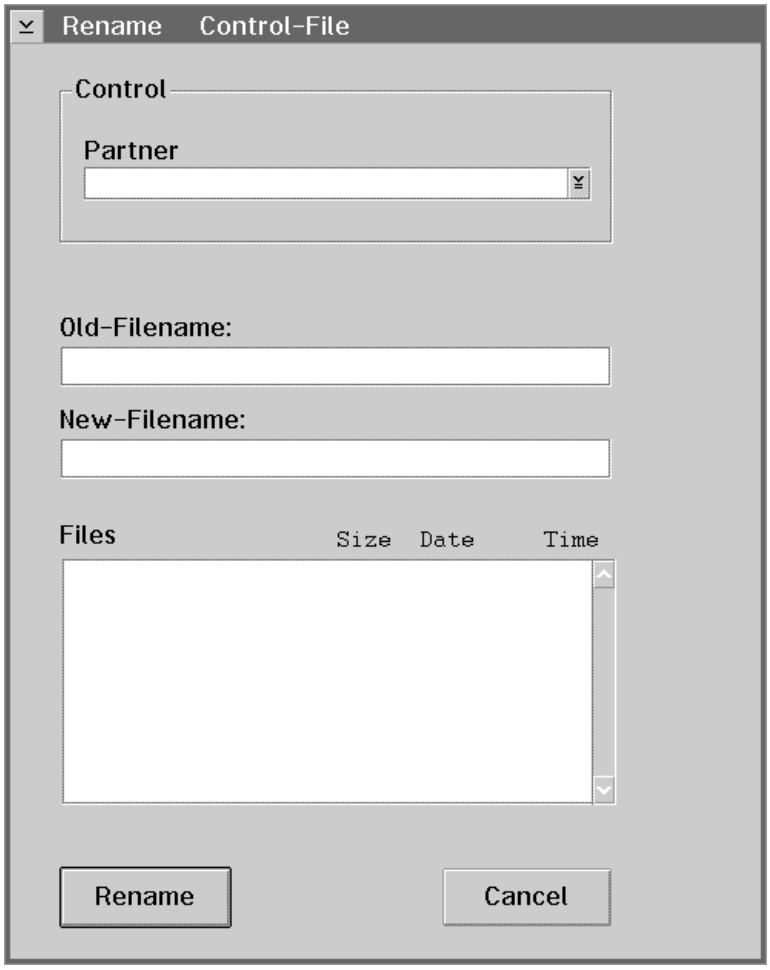


Fig. 6-9: Window “Rename Control-File”

ATTENTION!

Active files and files required by rho must not be renamed. This could lead to failures.

Command	Field	Explanation
Rename (continued)	Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection.
		Information **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.
Backup		Backup all files in rho to AMU.

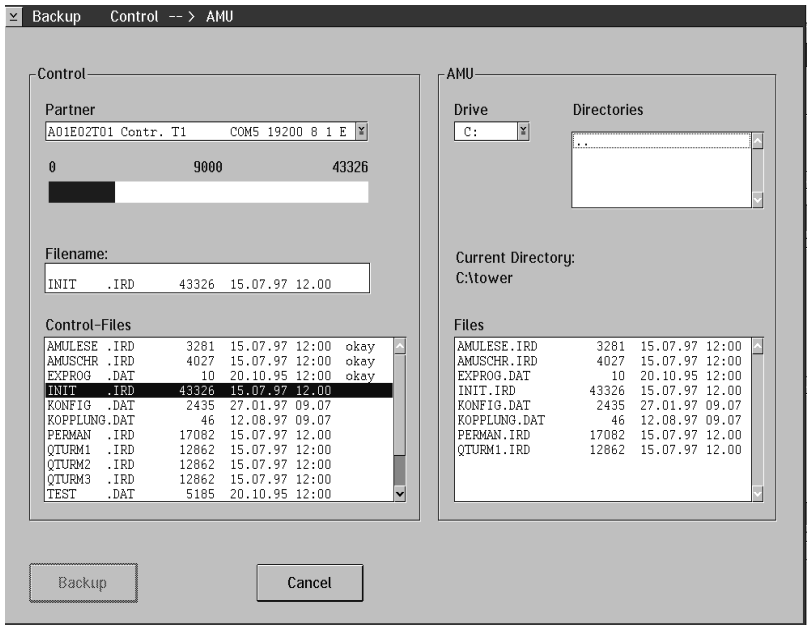


Fig. 6-10: Window “Backup Control --> AMU”

Command	Field	Explanation
	Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection. **Information** **If no partner has been selected, you are prompted for a selection.**
Backup (continued)	Filename	During the transfer, the file currently transferred is displayed.
	Control-Files	Display files in rho. Marks are without 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).

Information

Before starting restore you must actuate the write-protect switches at the control unit (☞ MG).

Information

First restore files with the extension *.BIN to rho. These define the storage to the correct size.

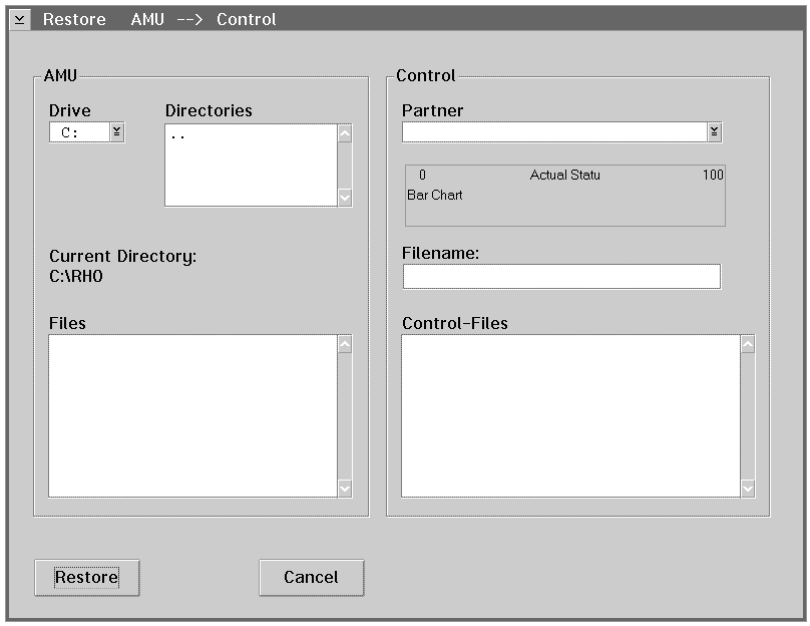


Fig. 6-11: Window "Restore AMU --> Control"

Restore (continued)	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
	Partner	Select partner (rho control) with a double click. It may take a few seconds to activate the connection.  **Information** **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

6.2 “JUSTUTIL.EXE”

AML/E and AML/2 only

Information

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”.

Information

Insert all values in 1/100 mm.

Start “JUSTUTIL.EXE”

a) Open an OS/2 window

b) Enter the following commands:

```
[C:\]cd amu
[C:\amu]justutil
```

The window “JustUtil-32.exe” appears:

Fig. 6-12: Window “JustUtil-32””

Commands

AML/E and AML/2 only

Command	Field	Description
Update		Changes individual teach point coordinates.

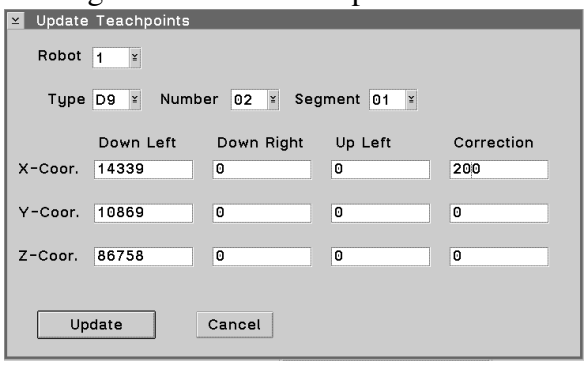


Fig. 6-13: Window "Update Teachpoints"

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. Even upon reteaching, these values are retained. Used for instance 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.

Command	Field	Description
Move		Move teach points of a component at once, e. g. for moving a complete tower.

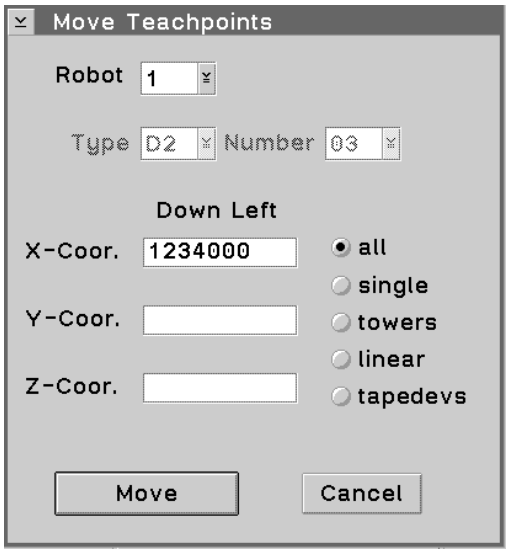


Fig. 6-14: Window “Move Teachpoints”

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	Individaul 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

Command	Field	Description
Rename		Change the name of a teachpoint e. g. for change drive adresses.

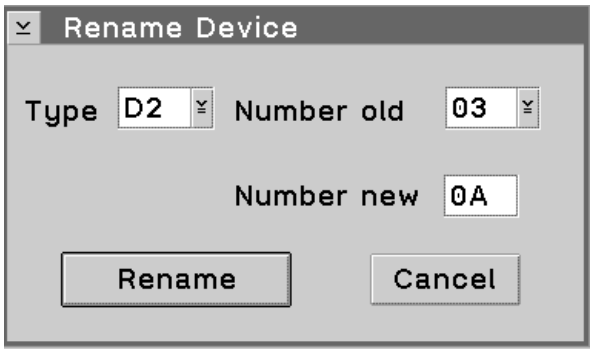


Fig. 6-15: Window “Rename Teachpoints”

Type	Component type
Number old	Number of component befor rename
Number new	Number of component after rename

Delete — Deletes a teach point.

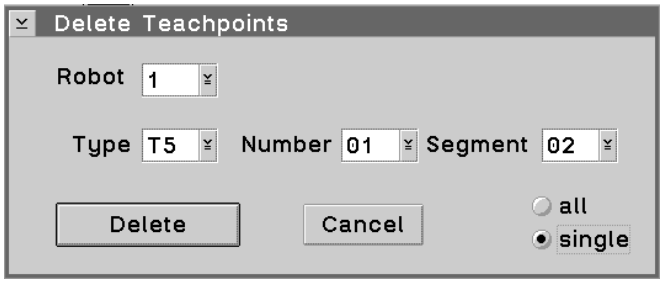


Fig. 6-16: Window “Delete Teachpoints”

Robot	Robot connected
Type	Component type
Number	Number of the component
Delete	Deletes a teach point.

Command	Field	Description
List	Lists all teach points of the system.	

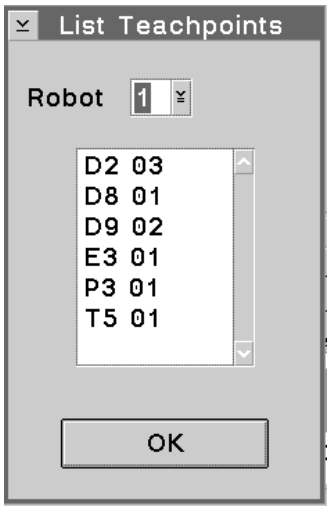


Fig. 6-17: Window “List Teachpoints”

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

Activate changes in the list of teach points

a) Terminate “JUSTUTIL.EXE” by a double click on the system menu field

b) Terminate AMU with Shutdown AMU...
The “CMD.EXE” window appears

c) Restart AMU.Enter the following in the “CMD.EXE” window
`[C:\amu]startup`

d) Test the handling

e) After teaching transfert the changed teach-point file to the backup or dual-AMU (only if available, (☞ Page 4-71)) and save this file on diskette.

6.3 PMMaint

Installation and diagnosis program for AML/J.

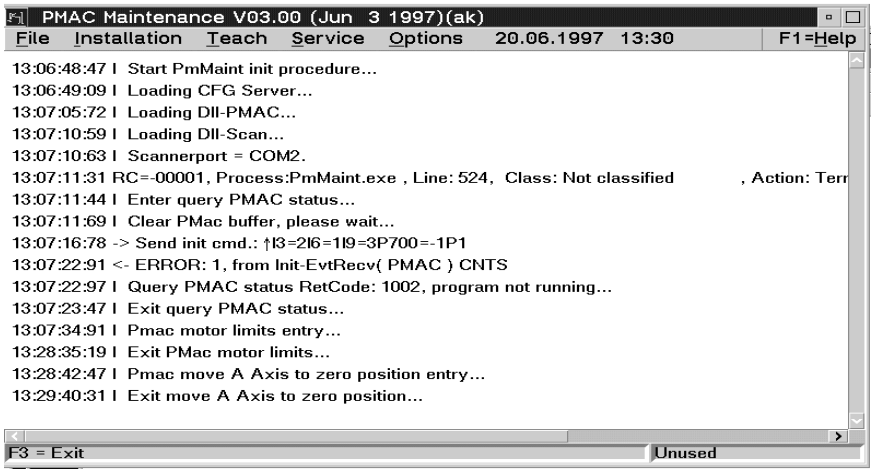


Fig. 6-18: Window „PMac Maintenance“

6.4 Starting PMMaint

Information

Terminate AMU process, before starting PMMaint.
Für the work with drives on the DCI, the CAN adapter microcode must downloaded before with \AMU\CAN\DL.BAT.

Starting from OS/2 desktop

a) Double-click on symbol „PMMaint“.
Window „PMac Maintenance“ opens.

Starting from OS/2 command line

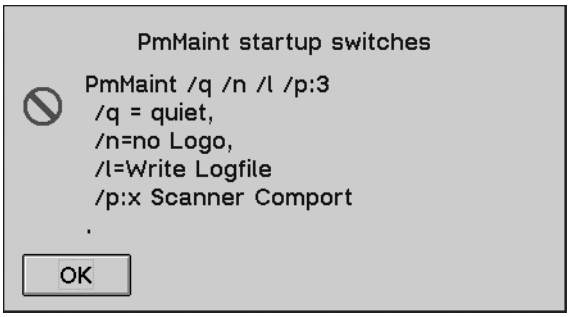


Fig. 6-19: Window „PMMaint startup switches“ in PMMaint Menu „F1=Help“

a) 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)

6.4.1 Menu File

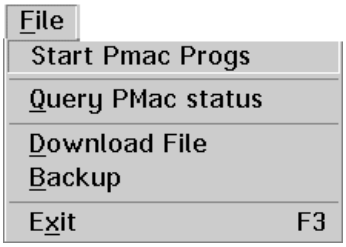


Fig. 6-20: Menu “File”

Start/Stop Pmac Progs

Command	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 ...

Command	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).

Information

Click on Query PMac status **when the robot has finished its reference movements, but the menu itmes are not shaded in gray.**

Download File

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

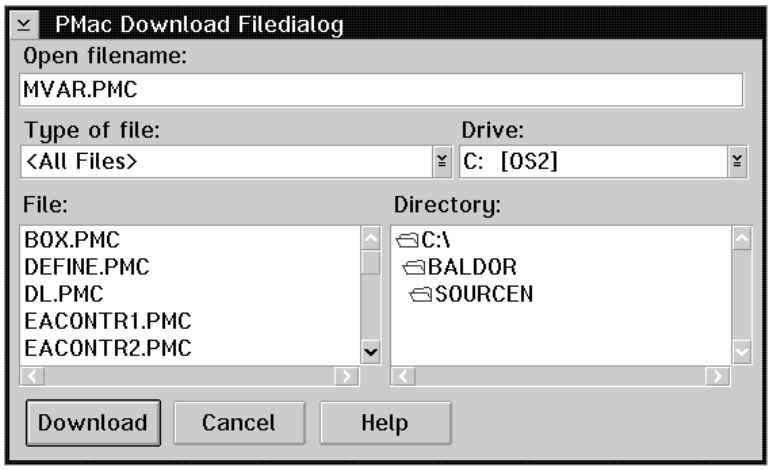


Fig. 6-21: Window „PMac Download Filedialog“

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

Backup

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

6.4.2 Menu Installation

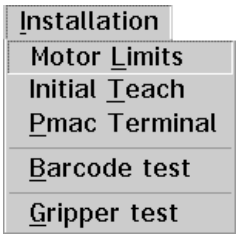


Fig. 6-22: Menu „Installation“

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).

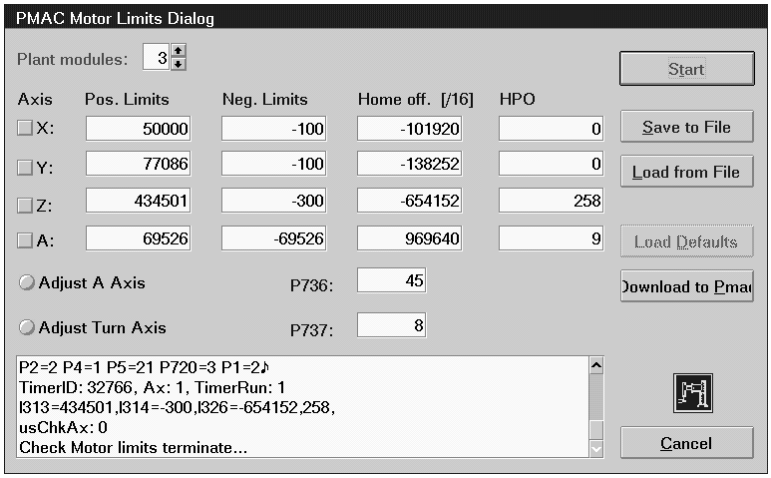


Fig. 6-23: Window „PMAC Motor Limits Dialog“

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.

Command	Field	Explanation
Motor Limits (Continued)	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]
	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 (☞ Page 6-28).

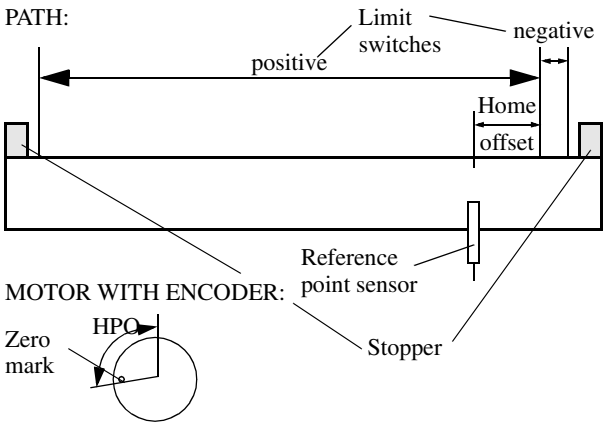


Fig. 6-24: Home Position Offset (HPO)

Command	Field	Explanation
Motor Limits (Continued)	Start	Robot starts parameter definition for selected axes
	Save File	Save parameters found on PMAC board
		Information **Additionally, the values are save in file C:\AMU\PmAxConf.DAT.**
	Load File	The parameters are read from the file PmAxConf.DAT and loaded to the window.
		ATTENTION! **The values will not necessarily agree to those on the PMAC board.**
	Load Defaults	**ATTENTION!** **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 Only when the system is inactive (robot not ready): load defaults to window. 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
Motor Limits (Continued)	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.

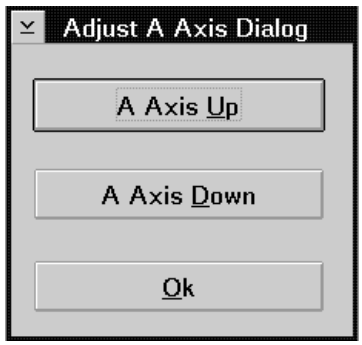


Fig. 6-25: Window „Adjust A Axis Dialog“.

	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.

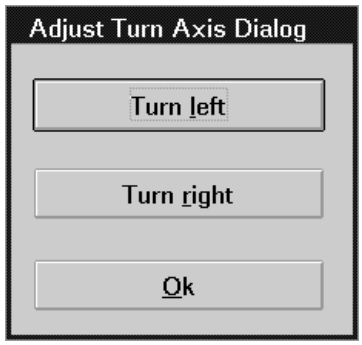


Fig. 6-26: Window „Adjust Turn Axis Dialog“

	P736:	Handling offset A axis (+90 °) [in 1/100 °]
	P737:	Home Offset C axis

Initial Teach

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

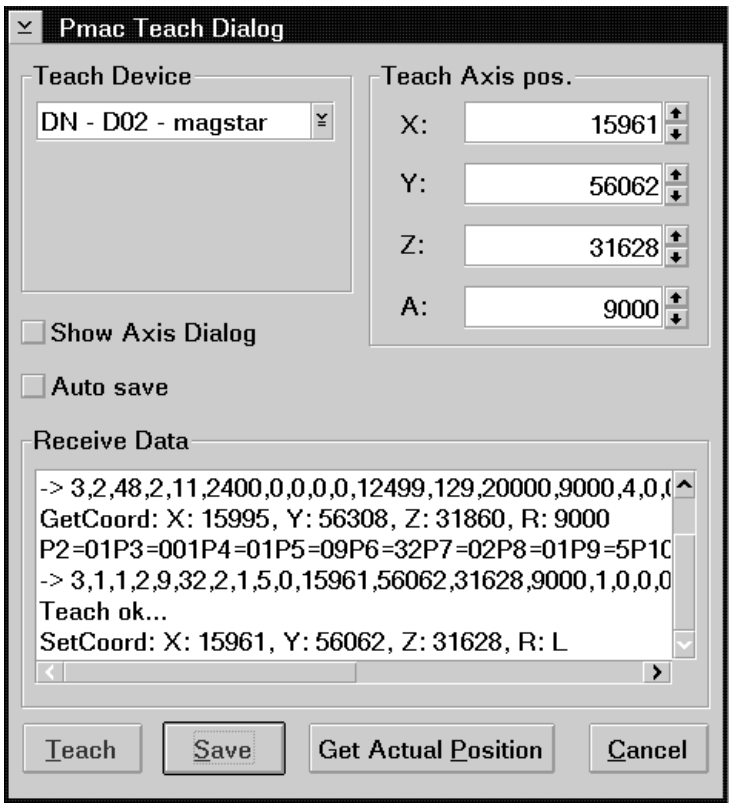


Fig. 6-27: Window „Pmac Teach Dialog“

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

Command	Field	Explanation
Initial Teach (Continued)	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 (☞ Page 6-34) 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 (☞ Page 6-34)
	Auto save	Upon positive acknowledgement of Teach, the values are automatically written to AMUCONF.INI übernommen.
	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

Command	Field	Explanation
Initial Teach (Continued)	Show Axis Dialog	Move axes.

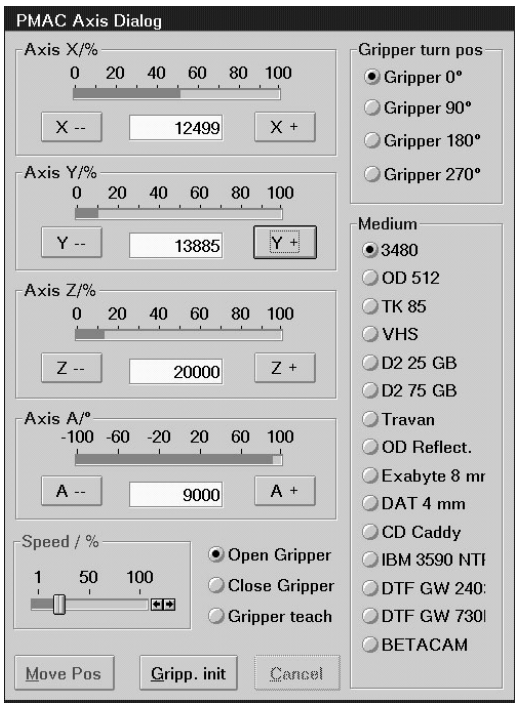


Fig. 6-28: Window „Pmac Axis Dialog“

	Speed / % 1..100	Select speed in percent. **Information** **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 - axis Y - axis Z • in degrees (0 ° = gripper upper) - for axis A

Command	Field	Explanation
Initial Teach (Continued)	X--/X+ Y--/Y+ Z--/Z+	**Information** **For small movements first reduce the value for** Speed**.**
	A--/A+	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.
		Information **On axis Y, Z or A the speed will automatically increase ife you click on the respective field for longer than three seconds.**
	Move Pos	**WARNING!** **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
Initial Teach (Continued)	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.	

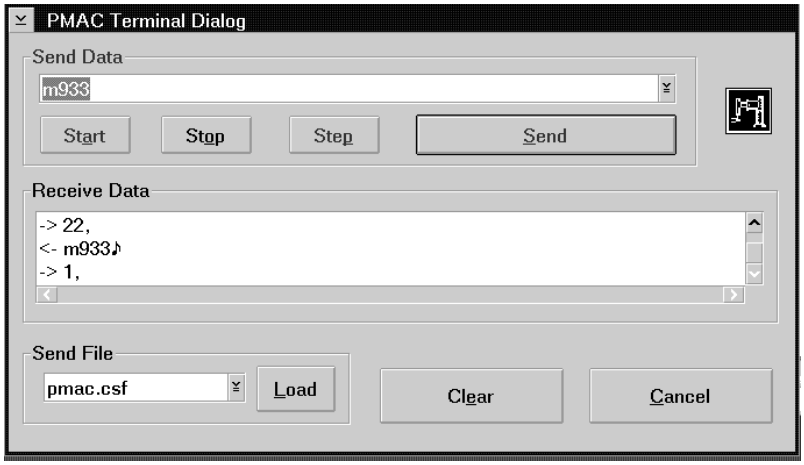


Fig. 6-29: Window „PMAC Terminal Dialog“

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

Command	Field	Explanation
Pmac Terminal (Continued)	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

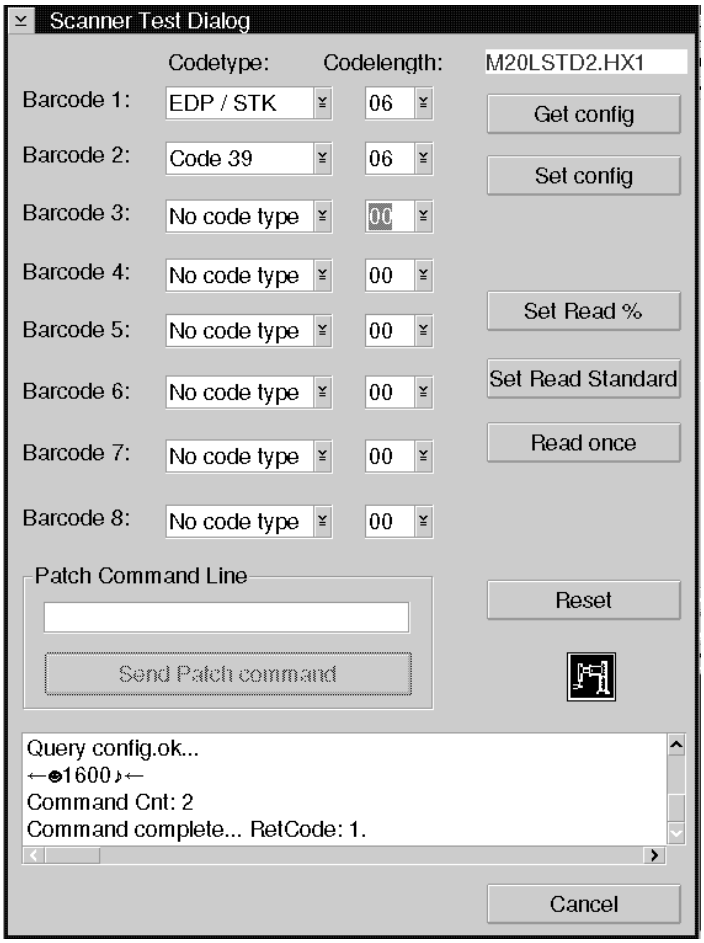


Fig. 6-30: Window „Scanner Test Dialog“

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

Command	Field	Explanation
Barcode test (Continued)	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)
	Codelength:	Number of characters in each volser:  **Information** **Defined codelengths should be used preferrably. 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 %	Switch on quality diagnosis for barcode reading. During each subsequent Read the scanner returns the volser and the read quality in % (☞ Log window).  **Information** **Select this command only to optimize** Read**.**
	Set Read Standard	Switch quality diagnosis off immediately after Read optimizing (= standard during production)

Command	Field	Explanation
Barcode test (Continued)	Read once	Read at current robot position. Result display (☞ Log window)
	Reset	Prepare window for new command. Reset scanner communication
	Patch Command Line	Command line for input of CRT commands (☞ 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.	

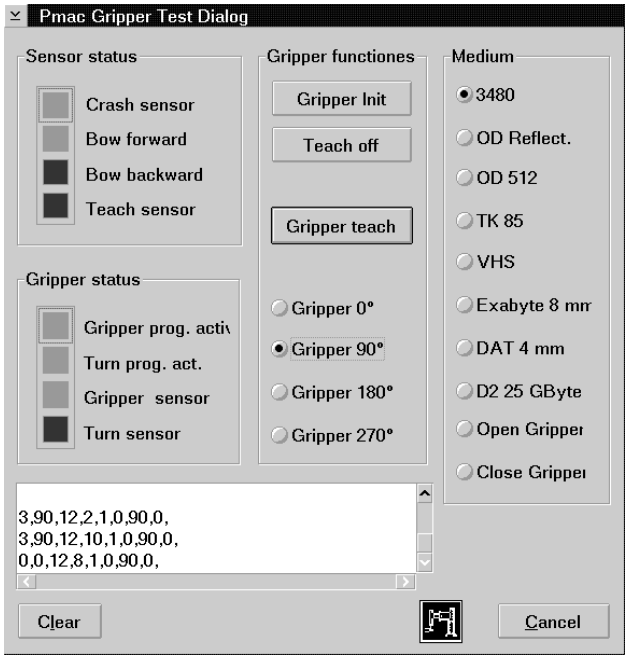


Fig. 6-31: Window „Pmac Gripper Test Dialog“

Sensor status

Possible status of gripper sensors:

- red = sensor active
- green = sensor inactive
- yellow = no information

Gripper sensors displayed:

- Crash sensor
- Bow forward (querry pin)
- Bow backward (querry 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

Command	Field	Explanation
Gripper test (Continued)	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

6.4.3 Menu Teach

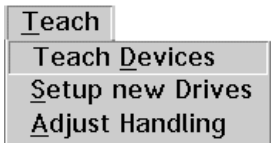


Fig. 6-32: Menu „Teach“

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

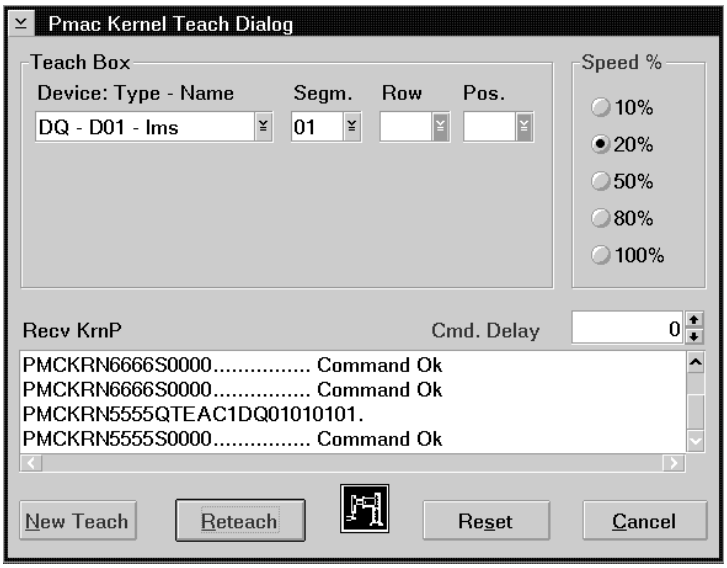


Fig. 6-33: Window „Pmac Kernel Teach Dialog“

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
Teach Box (Continued)	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.	

Information

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.

Information

Command delay is useful in larger systems.

Recv KrnP — Log window for display of data exchange with KRN/P of AMU

New Teach — Re-teach a component (AMU-Option 1N).

ATTENTION!

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 (AMU-CONF.INI) the robot determines the coordinate of all required teach points of the component.
- Teach points are automatically save in file KrnRefPt.R00.

Command	Field	Explanation
RecvKrnP (Continued)	Reteach	Reteach a component (AMU-Option 1).  **ATTENTION!** **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  **Information** 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.	

Fig. 6-34: 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:

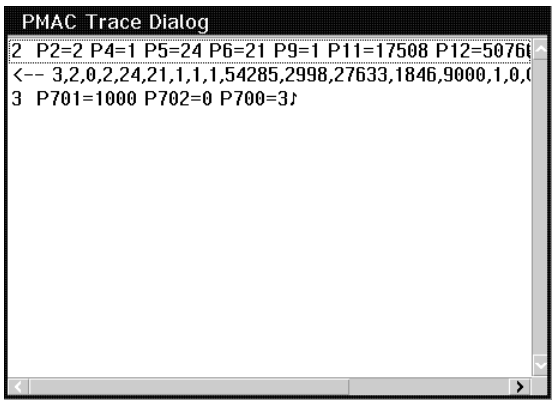


Fig. 6-35: Window „PMAC Trace Dialog“

Command	Field	Explanation
Setup new Drives (Continued)	PVar	PVAR values are displayed when you click here:

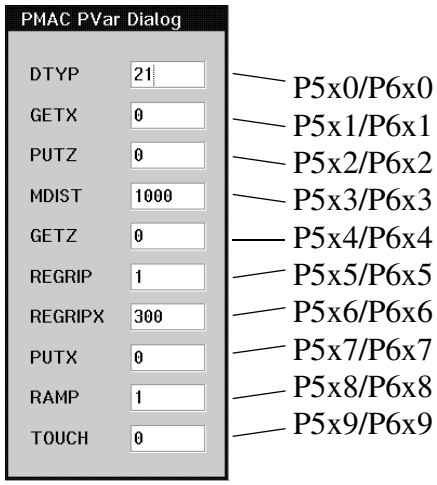


Fig. 6-36: Window „PMAC PVAR Dialog“

(☞ Page 6-50)

Make changes via Pmac Terminal
(☞ Page 6-36)

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

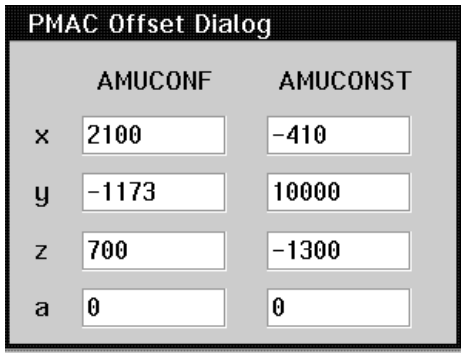


Fig. 6-37: Window „PMAC Offset Dialog“

You can also change offsets in the AMUCONF with Adjust Handling (☞ Page 6-51)

Command	Field	Explanation
Setup new Drives (Continued)	Coor.	The X, Y, and Z coordinates in AMU-CONF.INI or KRNREFPT.R00 are displayed when you click here:

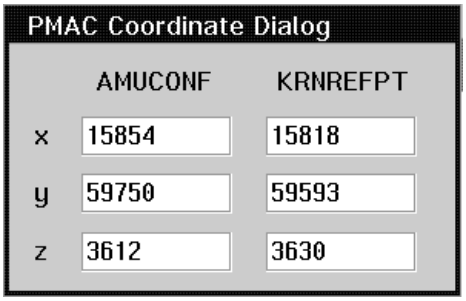


Fig. 6-38: Window „PMAC Coordinate Dialog“

Change teach coordinates in AMUCONF with Initial Teach
(☞ Page 6-32)

Change teach coordinate in KRNREFPT with Teach Devices
(☞ Page 6-43)

	axis	Select axis to be moved.
	mm/step	Select step width (in mm/step).
	action	Select command: • Get: get medium from drive • Put: put medium into drive • Disc: press eject button
	Join Offset	When you click here, the offsets of Get and Put are set to the same value.
	New Drive	Basic adjustment. Slows the speed for set-up of new drives. Robot moves to save starting position infront of drive. Move the robot step by step to the target position, using the mouse.

Command	Field	Explanation
Setup new Drives (Continued)	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. Only active when manual axis movement is possible.
	regrip?/push tape? y/n	Questions on drive handling. REGRIP (☞ Page 6-50) MDIST (☞ Page 6-50)
	save	Save parameters found to • PMAC board (P500..P699) • AMUCONF.INI (Offsets)

PMAC PVAR Dlalog

- You may define up to 10 drives (x = 0 .. 9):

Parame-ter	PVAR	Explanation
5x0 6x0	DTYP	Drive type: PMAC value (defined in AMUCONST.INI) (☞ table on next page)
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]
5x4 6x4	GETZ	Z offset for Get [in 1/100 mm]
5x5 6x5	REGRIP	Regrip during Keep (0 = No, 1 = Yes)
5x6 6x6	REGRIP X	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 pushign 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

- drive handling: enter the required values for correct handling for the above parameters P5x1 through P6x9
- drive type: Enter the PMAC values for the parameter P5x0

Adjust Handling

Dialog for inspection and adjustment of handling.

- with the functions Put, Get, Look, Unload Unit and Discharge from the AMU operating console (☞ ARB)
- 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

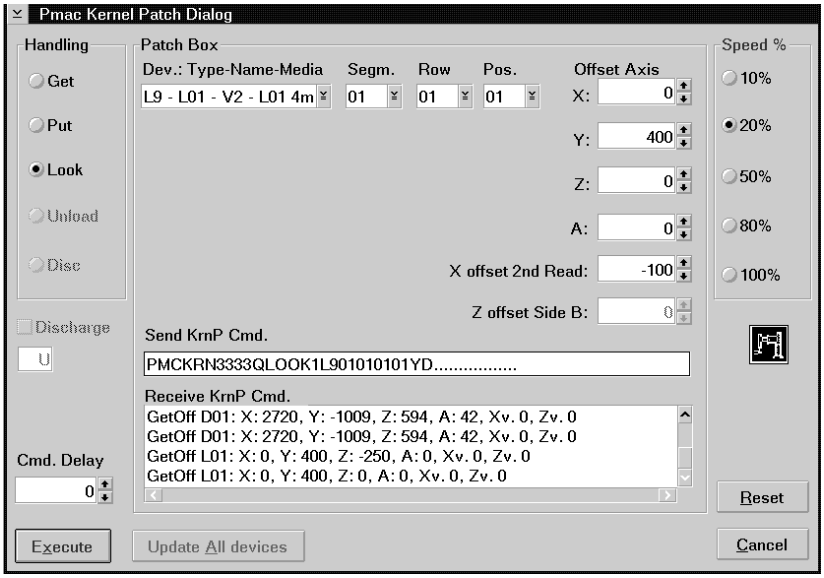


Fig. 6-39: Window „Pmac Kernel Patch Dialog“

Command	Field	Explanation
Pmac Kernel Patch Dialog	Patch Box 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. **Information** **Especially check the handling of extreme positions (top and bottom rows).**
	Pos.	Number of compartment **Information** **Each Optical Disk occupies two compartments.**

Command	Field	Explanation
Pmac Kernel Patch Dialog (Continued)	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.

Information

Reduce the speed to be able to watch the handling carefully.

Command	Field	Explanation
Pmac Kernel Patch Dialog (Continued)	Receive KrnP Cmd.	Log window for display of data exchange with KRN/P of AMU
	Cmd Delay	Wait time between click on field Execute and execution of the command by the robot.  **Information** **Command delay is useful in larger systems.**
	Execute	Click on Execute to start the command previously selected
	Update All devices	 **ATTENTION!** **Destroys all handling adjustments!** **When you click on 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**
	Reset	Active only when handling has been selected. • Reset contents of Log window • Prepare window for start of new command  **Information** Reset **does not reset the command processing by the PMAC board.**

6.4.4 Menu Service

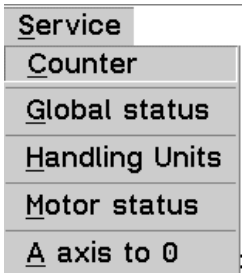


Fig. 6-40: Menu “Service”

Counter

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

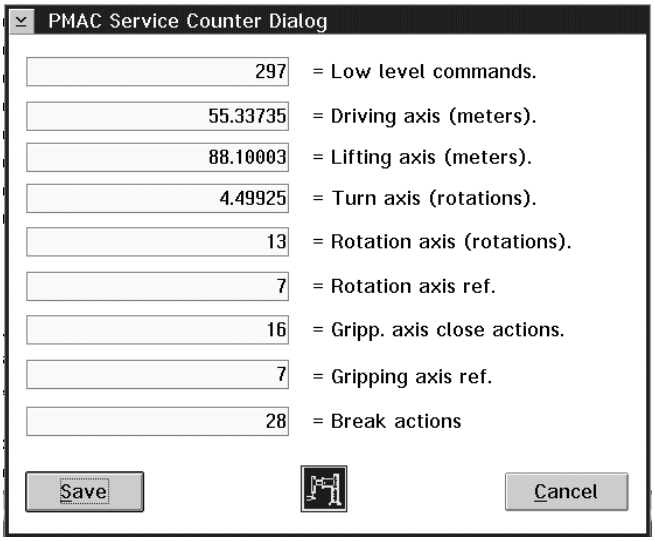


Fig. 6-41: Window „PMAC Service Counter Dialog“

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

Command	Field	Explanation
Counter (Continued)	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.	

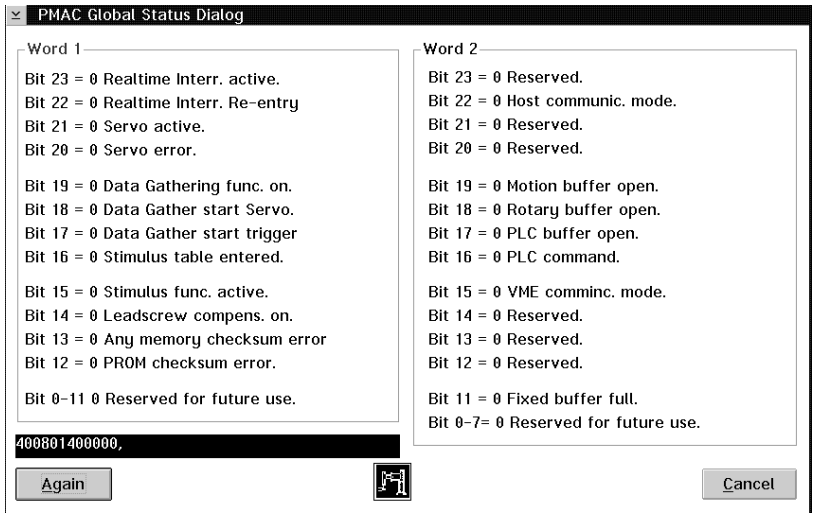


Fig. 6-42: Window „PMAC Global Status Dialog“

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.

Command	Field	Explanation
Global status (Continued)	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
	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

Command	Field	Explanation
Global status (Continued)	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.	

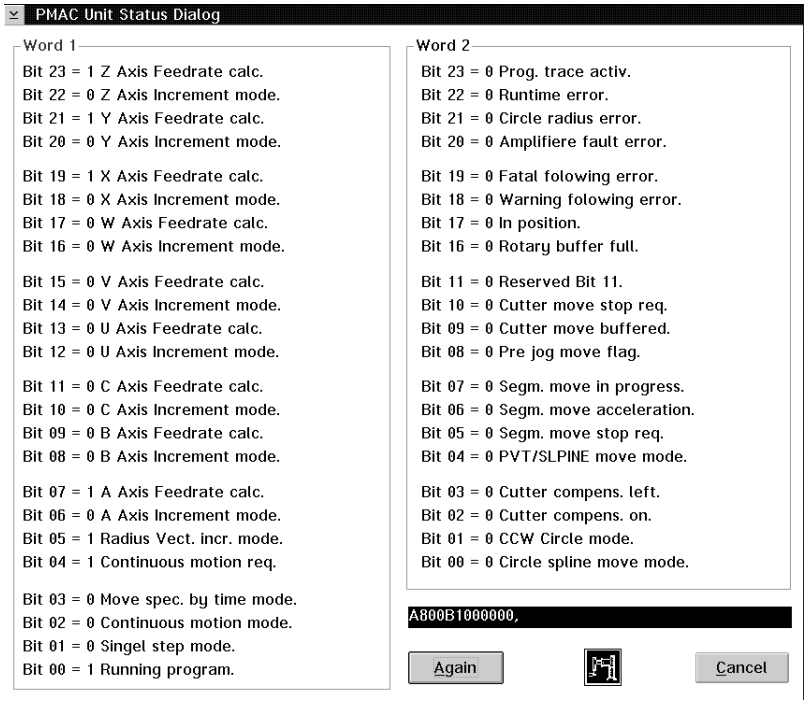


Fig. 6-43: Window „PMAC Unit Status Dialog“

	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
Handling units (Continued)	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

Command	Field	Explanation
	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)
Handling units (Continued)	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

Command	Field	Explanation
	Running program.	Coordinate system performs a motion program
	Prog. trace activ.	Motion program Trace is active (command TRACE). Stop with ENDTRACE
	Runtime error.	Coordinate system has stopped motion program due to an error (e.g. jumpt to non-existant mark in program or wrong processing time)
	Circle radius error.	Command for cicular 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)
Handling units (Continued)	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

Command	Field	Explanation
	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
	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.

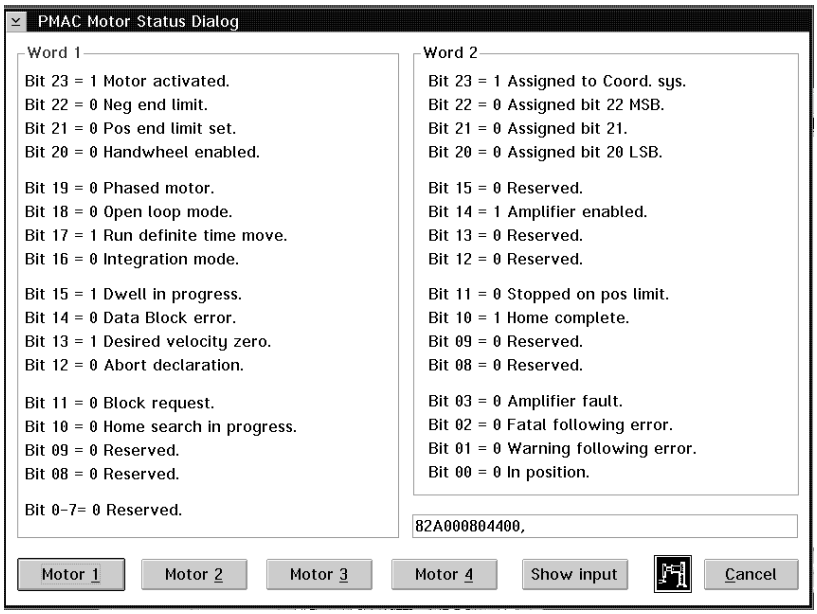


Fig. 6-44: Window „PMAC Motor Status Dialog“

	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
Motor status (Continued)	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 pre-defined 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)
Motor status (Continued)	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

Command	Field	Explanation
	Assigned bit 22 MSB	
	Assigned bit 21	Binary coded value for motor address (number in coordinate system - 1)
	Assigned bit 20 LSB	
	Amplifier enabled	Outputs for drive amplifier have been released: • either 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)
	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“
Motor status (Continued)	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.

Command	Field	Explanation
	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	**Information** **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.

6.5 SCSIUtil

SCSIUtil is an installation and diagnosis program for Scalar 1000. If you select Scalar 1000 support the program will be installed together with AML. This program can be used to execute all SCSI standard commands for “Media Changer”, as well as software download and saving of log and trace information of Scalar 1000. Detailed information on the individual SCSI commands is found in the Scalar 1000 SCSI Reference Manual.

Attention!

The program is designed exclusively for Scalar 1000 and should be used by trained technicians only.

6.5.1 Start SCSIUTIL

Start from OS/2 desktop

(only possible if a symbol has been arranged for)

a) Double-click on symbol „Scalar 1000 SCSI Diagnostic“.

The window „PMac Maintenance“ opens.

Start from OS/2 command line

Step 1 Enter

```
c:\amu\scsi\scsiutil
```

6.5.2 Scalar 1000 SCSI Diagnostic Window

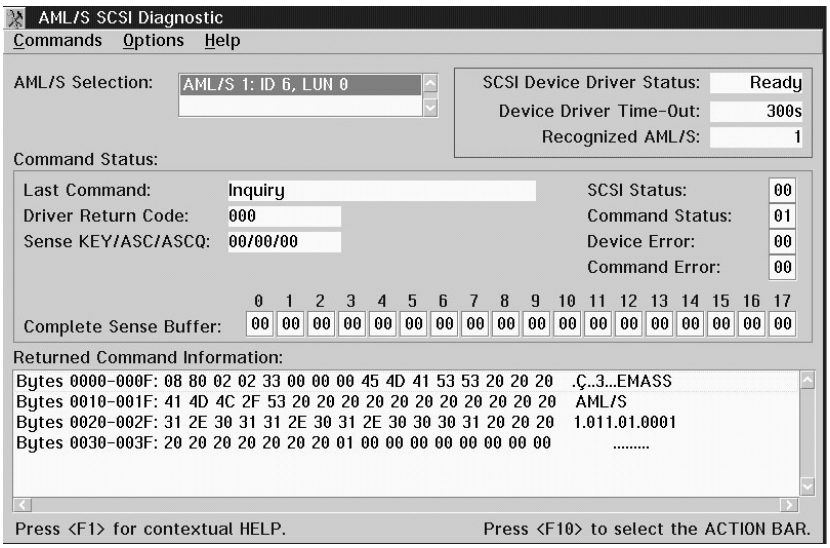


Fig. 6-45: Window „Scalar 1000 SCSI Diagnostic“

Field	Explanation
Scalar 1000 Selection	Select Scalar 1000 for the command. In the field mark the Scalar 1000 for data exchange.
SCSI Device Driver Status	Currently traced status of Scalar 1000 SCSI device driver (is loaded while the operating system is initialized (config.sys)). • Ready: driver is ready • Not Ready: driver is not ready
Device Driver Time-Out:	time monitoring of SCSI commands to Scalar 1000. Increase the value if problems with the timing of Scalar 1000 occur during acknowledgement of commands.
Recognized Scalar 1000	Number of Scalar 1000 systems connected to the SCSI bus
Last Command:	Last command sent with the SCSI Utils

Field	Explanation
Driver Return Code	Return value of Scalar 1000 SCSI driver to AMU. Is converted into a log message by AMU and results from the return value of Scalar 1000. • GOOD: 00h • CHECK CONDITION: 02h • BUSY: 08h • RESERVATION CONFLICT: 18h
Sense Key/ASC/ASCQ	Return value for • Advanced Sense Code • Advanced Sense Code Qualifier From Scalar 1000 control unit (☞ Scalar 1000-SCSI Reference Guide)
Complete Sense Buffer:	Return value of Scalar 1000 control unit (☞ Scalar 1000-SCSI Reference Guide)
SCSI Status	Information about the SCSI status • 00 Good Status • 01 Check Condition • 02 Condition Met (no error) • 03 Busy (error) • 08 Intermediate/Good • 0A Intermediate/Condition Met • 0C Reservation Conflict
Command Status	Information about command status • 01 command completed successfully • 05 command successful after retry • 07 subsequent hardware error • 0A completion of command immediately pending • 0C command terminated with error • 0E command with error condition Met • 0F sequence error in software
Device Error	Information about a device error (☞ Online help)
Command Error	Information about an SCSI command error

Field	Explanation
Return Command Information	All data returned with the command. (☞ Scalar 1000-SCSI Reference Guide)

6.5.3 Menu Commands

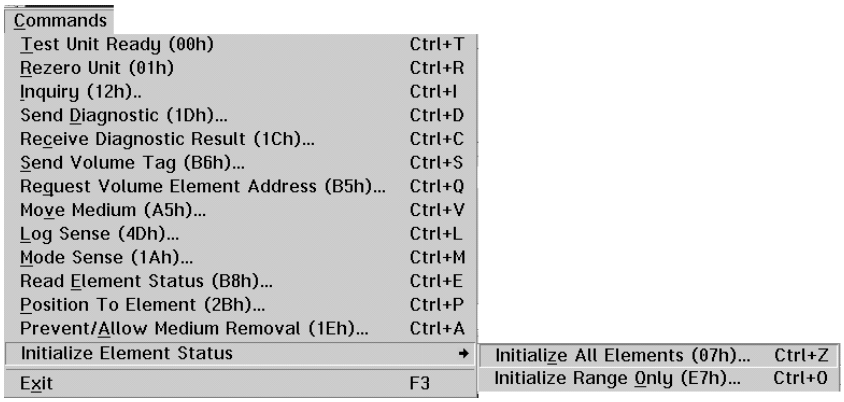


Fig. 6-46: Menu "Commands"

Details about the individual SCSI commands are found in the "SCSI-Reference Guide"

Menu Options

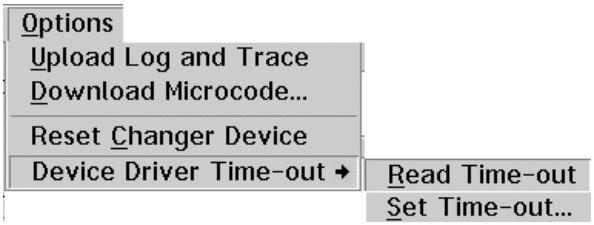


Fig. 6-47: Menu Options

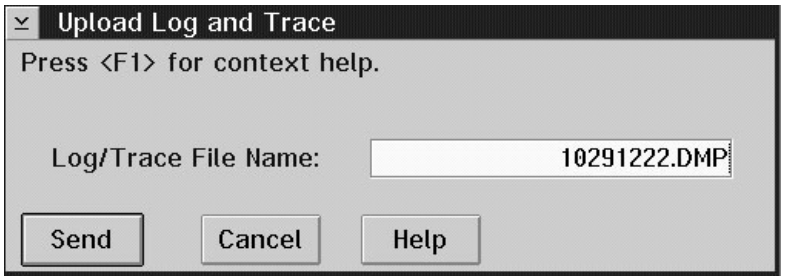
Command	Field	Explanation
Upload Log and Trace		

Fig. 6-48: Window „Upload Log and Trace“

Log/Trace File Name	Enter the name under which the files is to be saved in the current directory (default: c:\amu\scsi).
Send	Start transfer from Scalar 1000 to AMU

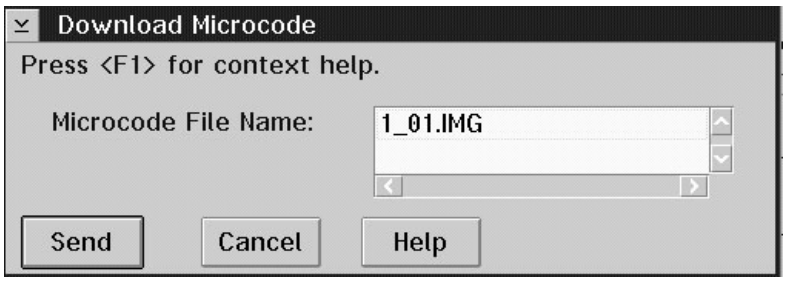
Command	Field	Explanation
Download Microcode.		
		Microcode File Name: Select the name of the microcode version to be transferred. The name contains the version number of the microcode. The file must be in the current directory (default: c:\amu\scsi).
		Send: Start transfer from AMU to Scalar 1000
Reset Changer Device	Initiate a reset of the control unit in the Scalar 1000. The Scalar 1000 begins to reinitialize.	

Fig. 6-49: Window „Upload Log and Trace“

Menu Help

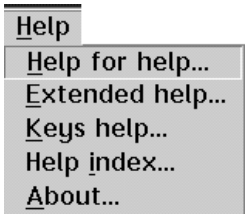


Fig. 6-50: Menu Help

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

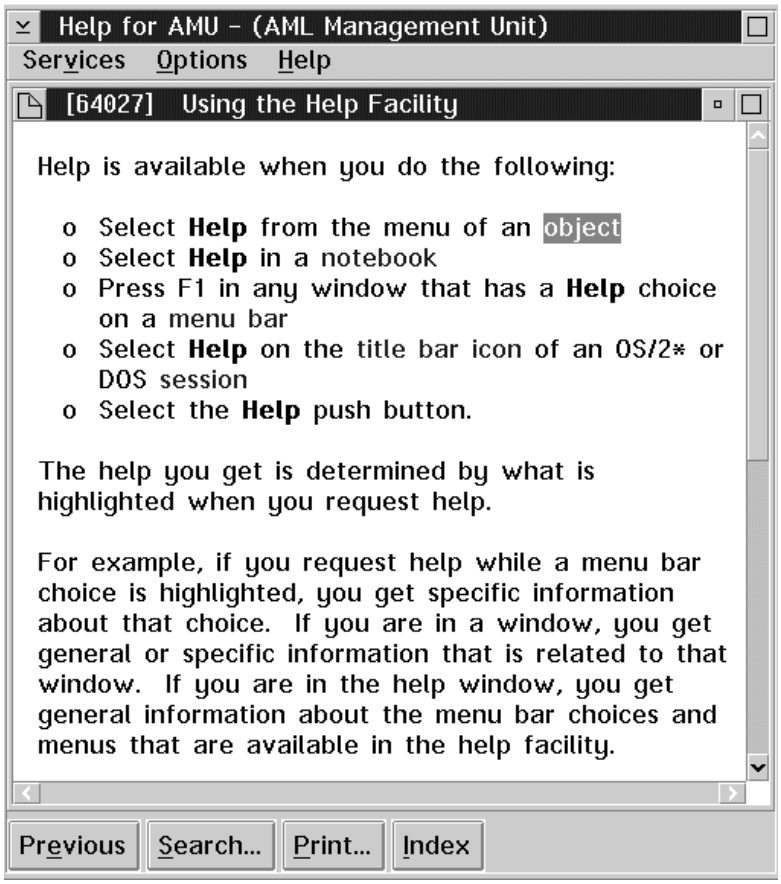


Fig. 6-51: Window „Using the Help Facility“

Command	Explanation
Extended help...	Start page for Scalar 1000-SCSI diagnostic online help.

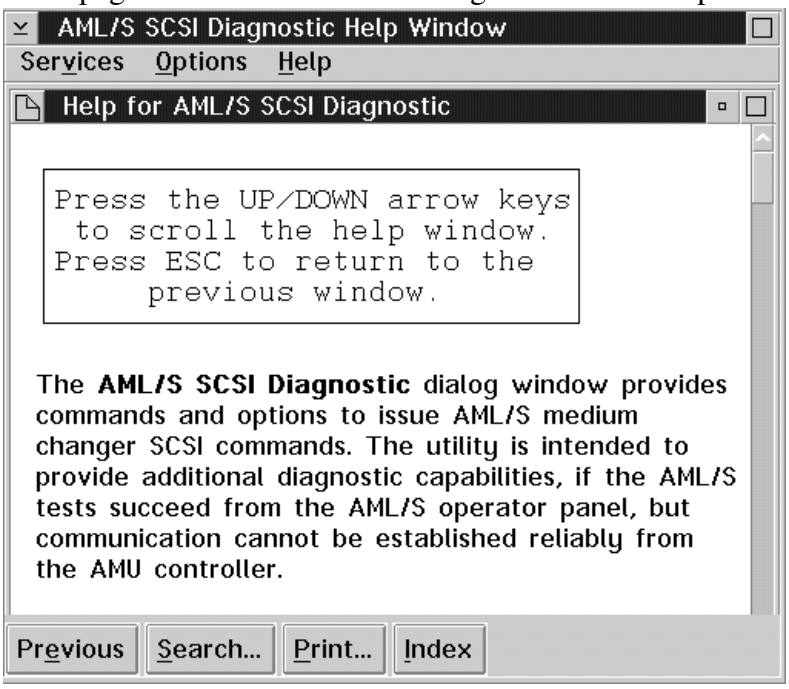


Fig. 6-52: Window „Help for Scalar 1000 SCSI Diagnostic“

Help index...	Help index

Fig. 6-53: Window „Help Index“

Command	Explanation
About...	Display of copyright and SCSI-Utils version No.

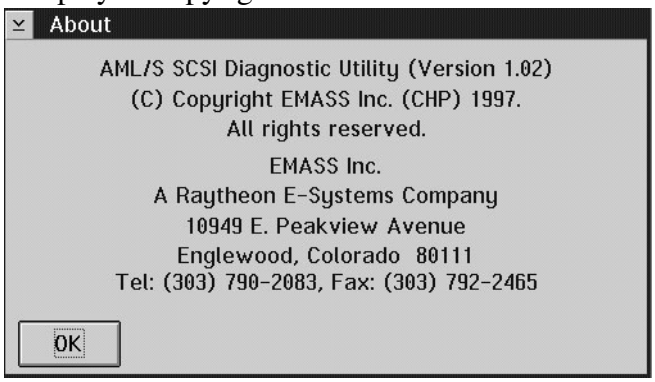


Fig. 6-54: Window About“

6.6 LOG2ASC

Tool 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

6.7 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 ☞ Table). 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.

Command	Explanation
`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
`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 2.40
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	Alle 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

6.8 PATINI

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

ATTENTION!

The program must exclusively 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 ☞ table). 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 harddisk (if installed)
- on dual AMU (if installed)

Syntax

Command	Explanation
`patini -h`	Display command syntax
`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

7 Procedures

7.1 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 menu View.

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

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

7.2 Starting the AMU Operating Console

Information

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

a) Press <CTRL> + <ESC> (process list).

b) Check whether CON and KRN have been started.

Only „KRN.EXE“ has been started

a) Change to an OS/2 input window.

b) Enter the following commands in the OS/2 input window:

```
[C:\]cd amu
[C:\AMU]con
```

Only AMU has been started

a) Change to an OS/2 input window.

b) Enter the following commands in the OS/2 input window:

```
[C:\]cd amu
[C:\AMU]krn
```

c) Press <CTRL> + <ESC> (process list) and change the AMU process.

None of the two processes has been started

a) Change to an OS/2 input window.

b) Enter the following commands in the OS/2 input window:

```
[C:\]startup
```

7.3 Terminating the AMU Operating Console

ATTENTION!

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!

7.3.1 Switching the AMU Computer Off

Information

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

ATTENTION!

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 (☞Page 7-4)

System Shutdown OS/2 Version 2.1 or 3.0

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.

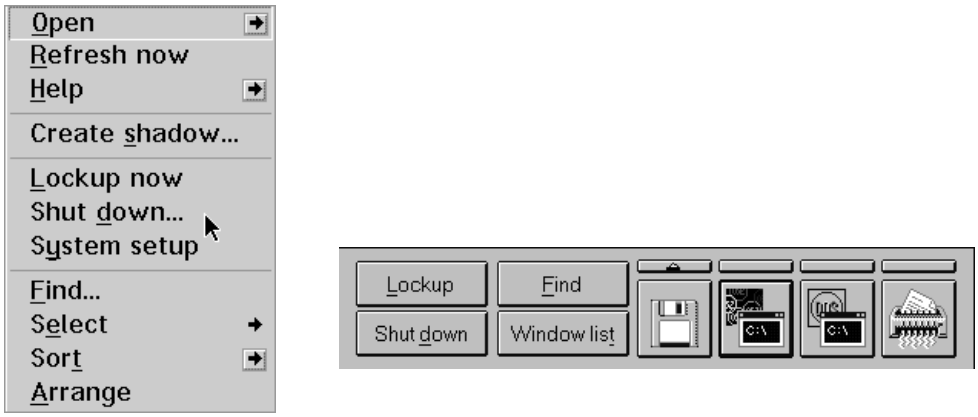


Fig. 7-1: System Menu OS/2

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.

7.4 Remote Power ON/OFF

Due to the separate location of operating and AML system it will sometimes 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.

7.5 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.

7.5.1 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 command in the AMU queue are negatively acknowledged (N603 or 1332).
- All new commands incoming after the switch command, until completion of the switch-over are turned down with N603 and 1332.

7.5.2 Switch-Force

Command for switch-over, when active AMU fails

Preconditions

- 2 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 Stopp 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 or a further error exist 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:

- 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 database of AMU

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

7.6 Disaster Recovery Support

Ejecting predefined media from the AML archive without HOST.

7.6.1 Precondition

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

7.6.2 Preparing the Disaster Recovery Support

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`.

Information

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 of 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
```

Information

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

7.6.3 Ejection Procedure for Disaster Recovery

a) Unload all drives.

b) Return the media unloaded to their home positions using the KEEP command.

c) In the menu Service select the command Disaster Recovery.

d) Enter the password (defined with Process Configuration (☞ Page 4-30)).

e) Select the file to eject.

Information

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

f) Start the ejection with Start.

g) Upon being prompted, unload all media from all I/O units.

h) Confirm the ejection with OK.
The media are ejected in the sequence indicated in the file.

i) Clear the I/O unit when the prompt to do so appears on the operating console.

j) Continue the ejection with OK.
When the laste medium has been ejected, the command is acknowledged positively.

7.7 Installing the AML Management Software

Perform the following steps to install the AMU version 3.10 :

Step 10 Check the correct level of your system software with the command `syslevel` (MPTS, DB/2)
AMU 3.02 does not work with a older Database Manager and without the MPTS Fixpack WR08610)

Step 11 If you install an update stop the current processing. Run shutdown AMU. If you run an initial installation, begin with step 5.

Step 12 Open an OS/2 window.

Step 13 Change the name of the file STARTUP.CMD to STARTUP.ORG.

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

Step 14 Restart the computer (shutdown and boot).

Step 15 Insert the first diskette of AMU Software into the diskette drive or the CD-ROM in the CD-ROM drive.

Information

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

Step 16 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 amu310
```

Step 17 Enter in this directory

```
E:\AMU310> install
```

Step 18 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  3.10b
                  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 3.10b

3 = AMU Update from AMU 2.30x, 2.40xx or 3.0x to AMU 3.10b

4 = AMU Update from AMU 2.41 to AMU 3.10b

5 = AMU Update from AMU 2.1xx or 2.2xx to AMU 3.10b

6 = AMU Update from AMU 2.0xx to AMU 3.10b
    (Are you sure you have the correct robot software?)

7 = AMU Update from AMU 1.xxx to AMU 3.10b
    (Are you sure you have the correct robot software?)

8 = Deinstallation (Rollback) of a previously installed AMU 3.10b

9 = End

Select an Option:
```

Step 19 Select your hardware.

```
           I N S T A L L A T I O N     O p t i o n s
                 AMU -  V E R S I O N  3.10b

1 = Installation without Options
     (only AML/2, AML/E and AML/J)

2 = Installation with Drive Control Interface (DCI)

3 = Installation with Quadron Software for RIC adap. (only AML/2)

4 = Installation with Quadron Software and DCI (only AML/2)
   (Are you sure you have the correct robot software?)

5 = Installation for Scalar 1000

Select an Option:
```

Step 20 Login with `AMUADMIN` when prompted to log on.

Warning

Please do not interrupt the installation process.

Step 21 For User of Dismount Manager Clean Manager, for a new installation, this step must be done after the first start of the AMU:
Write the modules for automatic start in the file

AmuConf.INI
Use the following command, like the following example:

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

Table 7-2 Load modules for Kernel

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

Step 22 If you run an update installation, reverse the renaming of the filename of STARTUP.CMD und change the part
START KRN START CON to START AmuStart

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

Step 23 Configure the AMU start options in AmuStart.cmd

Step 24 After the first start and the actualisation of the table pool:
- insert the of clean cartridges from Host in the AMU database
- insert and actualisation of scratch tape pools
stop the AMU and run:

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

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

Step 25 Terminate OS/2 and restart the computer.

Step 26 Wait until the following appears on the top left corner on the monitor:
■ OS/2

Step 27 Press keys <Alt>+<F1>

```
                                RECOVERY CHOICES

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

ESC - Continue the boot process using \CONFIG.SYS without changes
C   - Go to command line, (no files replaced, used orginal 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 savrd 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) Orginal archive from INSTALL created 18.6.97 10.00.00
```

Step 28 Select <C> as command line.

Enter the following command:

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

For Systems with VTAM Connection: Please have a look at the AMU Reference Guide and the CM/2 Documentation.

8 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.

8.1 Useful OS/2 Commands

Information

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

8.1.1 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
```

8.1.2 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

          Parent
Process   Process   Session   Process   Thread
  ID        ID        ID       Name       ID    Priority   Block ID   State

0013      0000       00      C:\OS2\EPWMUX.EXE    01      0200     FFFE0785
0059      000D       18      C:\AMU\ART.EXE    01      0100     FDEFBE38   Block
02      0406     FFFE458C   Block
0058      000D       13      C:\AMU\CON.EXE    01      0200     FDFAAAFC   Block
02      0200     FDF55EA8   Block
03      0400     FFFE4656   Block
000E      000D       00      C:\OS2\SYSTEM\HARDERR.EXE    01      0300     04000E0C
Block
02      0300     04001120   Block
03      0300     04001144   Block
```

8.1.3 Syslevel Command

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

Syntax

```
syslevel
```

Example

```
c\> syslevel

C:\GRPWARE\SYSLEVEL.WCB
OS/2 WARP Connect without WIN-OS2
Version 3.00     Component ID 562267100
Current CSD level: IP08000
Prior   CSD level: IP08000
C:\IBMCOM\SYSLEVEL.TRP
IBM OS/2 LAN Adapter and Protocol Support
Version 2.60.5     Component ID 562280700
Current CSD level: WR08000
Prior   CSD level: WR08000
C:\MPTN\SYSLEVEL.MPT
IBM OS/2 User Profile Management
Version 4.00     Component ID 562246104
Current CSD level: WR08000
Prior   CSD level: WR08000
C:\OS2\INSTALL\SYSLEVEL.GRE
IBM DB2 for OS/2 Single-User
Version 2.11     Component ID 562204401
Type 32-bit

Current CSD level: WR08080
Prior   CSD level: WR08000
C:\tcpip\BIN\SYSLEVEL.TCP
IBM TCP/IP Version 3.0 for OS/2
Version 3.00     Component ID 562281300
Current CSD level: IC00000
Prior   CSD level: IC00000
```

8.1.4 Restoring the OS/2 System

When the system is shut down uncontrolledly (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 before.

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

            correponding to the archive desired.


            ESC - Continue the boot process using \CONFIG.SYS without changes

            C   - Go to command line, (no files replaced, used orginal CON-
            FIG.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 CON-
            FIG.SYS,

            Desktop directory, and INI files with older versions. These older
            versions

            might be different from your current files. Your current files are
            savrd 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) Orginal archive from INSTALL created 18.6.97 10.00.00
```

ATTENTION!

With <X> all changes in the system configuration are removed. Installed programs (e.g. database manager) are removed from the configuration and cannot be executed anymore.

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

Information

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 system menu settings, in folder archive remove the mark Create archive at each system restart

8.1.5 Saving Files

Regularly save the log and trace files.

AMU stores these in the directory `c:\amu\logs-trc`.

The log´s filename (e.g. `log1904.001`) comprises

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

The trace´s filename (e.g. `trce.001`) comprises

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

a) Change to an OS/2 window

b) Convert the file into an ASCII file (☞ “LOG2ASC” on page 6 - 77)

c) Compress files before copying them, if necessary (☞ Page 8-6).

d) 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:`)

8.1.6 Compressing Files

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

a) Change to an OS/2 window.

b) Change to the directory storing the file to be compressed.

c) Enter `pkzip2 Par1 Par2`
   - `Par1`: name of compressed file (.zip is automatically added)
   - `Par2`: specification of files to be compressed (e.g. `log*.*`)

d) Copy the compressed file onto a diskette.

Information

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

8.1.7 Decompressing Files

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

a) Change to an OS/2 window.

b) Copy the compressed file into the directory in which you want to store the decompressed files.

c) Change to that directory.

d) Enter `pkunzip2 Par1`
   - `Par1`: name of the compressed file

e) Delete the compressed file if necessary.

Information

Enter pkunzip2 without parameters to display information on this program.

8.2 TCP/IP Commands

8.2.1 “ping” Command

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

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 hostname)
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
```

8.2.2 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
```

8.2.3 rpcinfo Command

This command displays information on applications using RPC queries.

Syntax

```
rpcinfo
```

Example

```
c\> rpcinfo
```

8.3 Database Manager DB/2

8.3.1 Database Destroyed - What to do?

Information

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

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 harddisk of the AMU processor (all data on the harddisk)

Special SQL error message

SQL0818N A timestamp conflict occured

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`).

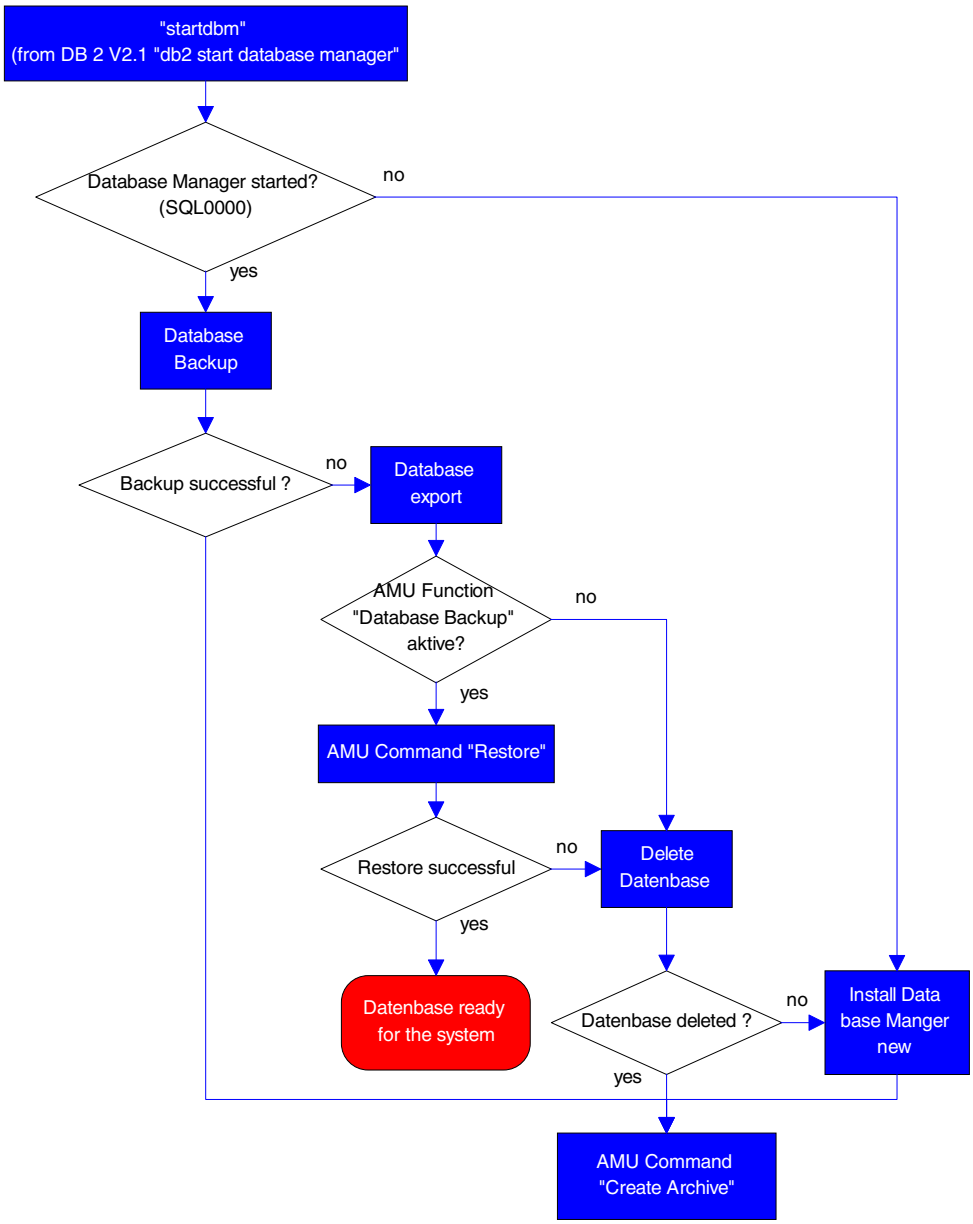


Fig. 8-1: Procedure “Restore database”

Step 1 The further steps depend on the configuration of your system

HACC/MVS	Dual AMU	DB Backup	Archive Type	How to proceed
yes	yes or no	yes		a) In the Service menu select the command Create Archive - Restore. If this command does not function, perform a "Download" from HACC.
yes or no	yes or no	yes		a) In the Service menu select the command Create Archive - Restore. If this function should not work proceed as described for "DB Backup".
yes or no	yes	yes or no		a) 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). b) Repair the defective AMU. c) After repair start the computer as passive AMU (all changed data records are automatically transferred).
yes	yes or no	yes or no		a) Unload the media from the drives and hand-carry them into the archive. b) In the Service menu select the command Create Archive. c) Start the `Download` from HACC.

HACC/MVS	Dual AMU	DB Backup	Archive Type	How to proceed
yes or no	yes or no	yes or no	hierarchical	a) Unload the media from the drives and hand-carry them into the archive. b) In the Service menu select the command Create Archive. c) In the Commands menu select the command Inventory for the entire archive - - 1st coordinate - last coordinate d) Manually resolve the discrepancies. Use the log files to trace them.
yes or no	yes or no	yes or no	dynamic	a) Unload the media from the drives and hand-carry them into the archive. b) In the Service menu select the command Create Archive. c) In the Commands menu select the command Inventory with update for the entire archive - 1st coordinate - last coordinate - Option AU

8.3.2 Backup of Database

Information

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.

Information

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`.

Information

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`**".**

Information

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 (☞ Page 7-2)
- open an OS/2 input window and enter "`startup`" or
- perform a system shutdown and a restart thereafter

8.3.3 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).

Information

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.

Information

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 (☞ Page 7-2)
- open an OS/2 input window and enter "`startup`" or
- perform a system shut-down and a restart thereafter

8.3.4 Exporting Tables from 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).

Information

By entering the command `dbm stop using database` **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
```

8.3.5 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 describe 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'
```

8.3.6 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
```

9 Messages

9.1 General Information

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.

Additionally the host processor receives an 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 the ADIC Technical Service.

CAUTION!

If you need to enter the archive to find or resolve an error, be sure to observe the safety rules (☞ MG chapter 3 “Safety”).

9.2 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: querry 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 occurpied, 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:comunication 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

9.3 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” (☞ MG 4.5.13 d) “Menu Tree of rho: PHG Operating System“).

9.3.1 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 errror 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 programd	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
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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
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 (timecontrol interpolator-stop [0072]).		not used in AML	error 72	2
0015		Controller runtime error (positon 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 errror 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 1too 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 (resolvererror 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 (resolvererror 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 (resolvererror 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 (resolvererror 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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0055		Controller CAN error (resolvererror 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 (resolvererror 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
0059		Controller CAN error (CAN parametererror 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 parametererror 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 parametererror 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 parametererror 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 parametererror 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 parametererror [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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
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
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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
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
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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
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
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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
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
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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
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 reservedr						
0132		Controller measuring system error (endswitch 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 (endswitch 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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
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
0135		Controller measuring system error (endswitch 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 (endswitch 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 (endswitch 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 (endswitch [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 prozessor 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 prozessor 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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
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
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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
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 misss-ing	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
0178		Controller generell 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 generell 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 generell warning (interpolator stop warning axis 1 [1280]).	Mechanics move hard, crash or prob-lems 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 generell warning (interpolator stop warning axis 2 [1281]).	Mechanics move hard, crash or prob-lems 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 generell warning (interpolator stop warning axis 3 [1282]).	Mechanics move hard, crash or prob-lems 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 generell warning (interpolator stop warning axis 4 [1283]).	Mechanics move hard, crash or prob-lems 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

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0189		Controller generell 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 generell 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 generell 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 generell 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						
0250		%1 Scalar 1000 SCSI Device Driver not installe, rc = %2.	The SCSI device driver was not installed on boot up: • the CONFIG.SYS statement to load the driver is missing or incorrect • the device driver did not attach to OS2SCSI.DMD • the CONFIG.SYS statement to load the driver is missing or incorrect • OS2SCSI.DMD did not install since the Scalar 1000 is not connected • OS2SCSI.DMD did not install since the SCSI adapter device driver AIC770.ADD did not install or did not detect the connected Scalar 1000. the Scalar 1000 is powered off	• Check that the Scalar 1000 is connected and powered on • Check that the CONFIG.SYS has the proper entries to load the *AMLS.SYS*, *OS2SCSI.DMD*, and *AIC770.ADD* • Reboot AMU controller and verify that *OS2SCSI.DMD* installs. Then verify that the *AMLS.SYS* device driver installs properly.		

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0251	N002	%1 Scalar 1000 SCSI Device Driver Error.	• The device driver built an incorrect SCSI command packet • The SCSI adapter card firmware reports a problem	• Retry command • Check if any other commands succeed • If error persists, shut down AMU AMU and start SCSIUtil diagnostic program. Issue commands and verify that the SCSI adapter card is operational. • Reboot AMU controller and retry commands.		
0252	N006	%1 Firmware error detected for %2	The Scalar 1000 microcode detected an erroneous state or condition, from which it cannot recover	• Examine Scalar 1000 command and error logs to determine and correct the cause of the problem. • Use the SCSIUtil SCSI diagnostic utility to upload the error logs for error analysis. Switch off Scalar 1000 and turn it back on. Continue operation		
0253 - 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 03and 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

9.3.2 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 wasn´t 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 - 0349 reserved					
0350		“Wrong element address from AMU for “	During data transmission to the Scalar 1000 control unit a conflict has occurred because of undefined coordinates.	Check the graphical configuration of AMU. Check the configuration in the Scalar 1000. If necessary reteach thes system for reconfiguration.	2
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
352		SCSI device driver time-out for	The command to Scalar 1000 (SCSI) has not been acknowledged withinthe time allotted (300s).	Check if AMU/S is ready. Check connecting cables between AMU and Scalar 1000.	

9.3.3 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, make 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	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

AMU	Host	AMU Error Message	Cause	Note	Severity
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
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 positon.	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	Rackposition empty for .	There is a difference between database entry and the compartment in the archive.	Check the database.	4
0441	N403	Rackposition occupied for .	The compartment is already occupied.	Check the database.	4

AMU	Host	AMU Error Message	Cause	Note	Severity
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
0451		Drive occupied for	Roboter has found a cassette in the drive.	Check the command, may be 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

9.3.4 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
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					

AMU	Host	AMU Error Message	Cause	Note	Severity
0522		Turmaxis 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		Gripaxis 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					

9.3.5 Hardware Errorss

AMU	Host	AMU Error Message	Cause	Note	rho Error	Severity
0601	N016	Gripper error , recognized during initialisation.	Gripper error during booting.	Check the gripper.		2
0602	N016	Barcodereadingsystem malfunction , recognized during initialisation.	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 initialisation.	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 initialisation.	Buffer battery to old or almost depleted.	Replace rho-3 buffer battery.	error 1312 Buffer battery voltage too low	2
0605	N016	I/O powersupply malfunction, recognized during initialisation.	PIC board or I/O boards are supplied with separate voltage.	Check fuses and cables to the power supply.		2
0606 - 0699 reserved						

9.3.6 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 lightbarrier 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 initialisation.	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- / Testprogram 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

AMU	Host	AMU Error Message	Cause	Note	Severity
0799		is being initialized.	Initialization has been started.	Wait for ready message.	

9.3.7 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 adresses 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 adresses 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
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

AMU	Host	AMU Error Message	Cause	Note	Severity
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
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

AMU	Host	AMU Error Message	Cause	Note	Severity
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		Initialisation 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.	

9.3.8 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 betweens AMU and operating panel I/O unit/A (MLT).	Check communication parameters, interface and cable, replace MLT if necessary.	3
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 lostt) 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

AMU	Host	AMU Error Message	Cause	Note	Severity
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	
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 to 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 - 949 reserved					
0950		EIF at is currently open.	I/O unit on Scalar 1000 has been opened by operator, although the robot currently tries to execute a command at the I/O unit.	Close the I/O unit. If necessary, check the sensor.	5
0951		EIF at cannot be opened or locked.	Access to the I/O unit by the Scalar 1000 failed.	Check I/O unit on Scalar 1000.	4

Messages in AML/2 Format (AMU)

AMU	Host	AMU Error Message	Cause	Note	Severity
0952 - 979 reserved					

9.3.9 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
987- 1000 reserved					

9.3.10 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 eventhandler .	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
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.	

AMU	Host	AMU Error Message	Note	Severity
1024 (Info)		HOC detects new state PENDING ACTIVE for Partner.	Modul 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 unadmissible 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:	Interal 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
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.	

AMU	Host	AMU Error Message	Note	Severity
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

Messages in AML/2 Format (AMU)

AMU	Host	AMU Error Message	Note	Severity
1080			Internal AMU information (trace).	2
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

Messages in AML/2 Format (AMU)

AMU	Host	AMU Error Message	Note	Severity
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	
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 be proccessed.	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 prensentation 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 confuguration mode.	A selected command cannot be executed in the current operating mode Change to the operating mode.	5

AMU	Host	AMU Error Message	Note	Severity
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 succesful.		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	
1146	N001	Stringlength of AMU/L string is incorrect.		4
1147	N001	Stringlength 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 occuppied. The executting 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.		

AMU	Host	AMU Error Message	Note	Severity
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	AMUP 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	
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 commuinication and the Communications Manager. Check the error message of the Communications Manager.	3
1178			Problem with the EHLL commuinication and the Communications Manager. Check the error message of the Communications Manager.	3
1179			Problem with the EHLL commuinication and the Communications Manager. Check the error message of the Communications Manager.	3

AMU	Host	AMU Error Message	Note	Severity
1180			Problem with the EHLL commuinication and the Communications Manager. Check the error message of the Communications Manager.	3
1181			Problem with the EHLL commuinication and the Communications Manager. Check the error message of the Communications Manager.	3
1182			Problem with the EHLL commuinication and the Communications Manager. Check the error message of the Communications Manager.	3
1183			Problem with the EHLL commuinication 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
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

AMU	Host	AMU Error Message	Note	Severity
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.	
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.	

AMU	Host	AMU Error Message	Note	Severity
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 attribue “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 futher 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
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 futher 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 futher 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	

AMU	Host	AMU Error Message	Note	Severity
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 renameing 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 , returncode		
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
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.	

AMU	Host	AMU Error Message	Note	Severity
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 inifile.	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	

AMU	Host	AMU Error Message	Note	Severity
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	
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	

AMU	Host	AMU Error Message	Note	Severity
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	
1344		DUMMY_ENTRY: %1.	reserved message	
1345		DUMMY_ENTRY: %1.	General warning for dual AMU	4
1346		Device %1 is actually locked by %2.	Scalar 1000 has locked the selected component. Commands can be executed after release only.	5
1347		Archive upload for %1 is started.	AMU is receiving the database from Scalar 1000 control unit. The transmission may take up to one minute.	
1348		Archive upload for %1 is complete.	The transmission of the database from the Scalar 1000 has been completed.	
1349		Archive upload for %1 interrupted.	The database transmission has been interrupted, further operation of the Scalar 1000 is not possible, the control unit is not ready.	5
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 startet the internal restore of the database	
1352	N003	Status of coordinate %1 is unknown.	Der Status eines Stellplatzes ist unbekannt. Eine Inventur des Archives ist notwendig.	5
1353		.ARC restore is starting...%0	a user has startet 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 backupfile %1.	ArcBack started to read the Backup file from backup directory	
1356		ARC restore: Backupfile %1 could not be opened. Restore not successfull!	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

AMU	Host	AMU Error Message	Note	Severity
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 journalfile %1.		
1362		ARC restore: Journalfile %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 keept 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
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.	

AMU	Host	AMU Error Message	Note	Severity
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 simultanous 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

10 Appendix

10.1 Terms Used

AML
Automatic Mixed Media Library; (in old documents and systems named "ABBA"
software and physical archive.

- ABBA/1 means 1st version
- AML/2 means 2nd version
- AML/E means Entry
- **AML/J** means junior

AMU
AML Management **U**nit
Central itelligence 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 are 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.
Scalar 1000	The smallest AML-System
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; their 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	English: **vol**ume **ser**ial number An up to sixteen-digit 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.

10.2 Trace 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 diaglogs, 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
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)
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: initilalization and reading errors during log
ART8	Log: problems in communication with alerter process
ART9	Log: other events

ARC-Trace (Archive Catalog Managment)

Trace-Level	Configuration
ARC0	Event control
ARC1	Database querry
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	Initializing, termination
BUD1	Initialisation of BUD-Objects (Constructor/Destructors)
BUD2	Database access
BUD3	processing in the status "Active"
BUD4	processing in the status "Active on Error"
BUD5	Verarbeitung im Status "Passive"
BUD6	changes in the system status
BUD7	Dispatchment - Event-handler
BUD8	Aggregation in classes allocation
BUD9	other not assigned Traces

DAS trace (diagnosis for DAS/2 Version 1.3)

Trace-Level	Configuration
DAS0	Communication between RPC and ACI

Trace-Level	Configuration
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, semaphor 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
DCM7	CLM: error handling
DCM8	CLM: list of program abortions
DCM9	CLM: requests to time control

10.3 Media Types

Type	Description	Manu-facturer	AMU Type
3480	1/2 Tape (different length available)	3M	C0
3490	1/2 Tape (different length available)	3M	C0
3490E	1/2 Tape	3M	C0
3490E D-3	1/2 Tape (STK-Redwood)	STK	C0
3590	1/2 Tape (NTP=>New Tape Product)	3M	C2
4MM-60M	Digital Audio Tape (DAT)	Fuji	V2
4MM-90M	Digital Audio Tape (DAT)	Fuji	V2
4MM-120M	Digital Audio Tape DDS-2 (DAT)	Fuji	V2
4MM-125M	Digital Audio Tape DDS-3 (DAT)	Fuji	V2
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
Audio cassette	Standard audio cassette		VA
AIT	AIT Cartridge	SONY	V1
BetaCAM - Large	Analoge Tape Format	SONY	V9
BetaCAM - Small	Analoge Tape Format	SONY	V8
CD-Caddy	CD with enclosure		C6
D1-M	D1 medium tape	ADIC	V4
D1-S	D1 small tape	ADIC	V3
D2-M	D2 medium tape	ADIC	V4
D2-S	D2 small tape	ADIC	V3
Digital BetaCAM - Large	Digital Tape Format (like DTF-L)	SONY	V9
Digital BetaCAM - Small	Digital Tape Format (like DTF-S)	SONY	V8
DLT Tape III XT	Digital Linear Tape	maxell	C1
DLT CompacTape-III	Digital Linear Tape	digital	C1
DLT CompacTape-IV	Digital Linear Tape	Quantum	C1

Type	Description	Manu-facturer	AMU Type
DTF-L	DTF-Large tape ,(Digital Tape Format)	SONY	V7
DTF-S	DTF-Small tape ,(Digital Tape Format)	SONY	V6
LTO	LTO Ultrium		C3
OD-512	Optical Disk 5 1/4	3M	O1
OD-R	Optical Disk 5 1/4	Reflection	O0
SD-3	1/2 Tape (STK-Redwood)	STK	C0
S-VHS	Super - Video Home Service	SONY	V0
TRAVAN TR-1	Streamer Tape	3M	V5
TRAVAN TR-2	Streamer Tape	3M	V5
TRAVAN TR-3	Streamer Tape	3M	V5
TRAVAN TR-4	Streamer Tape	3M	V5
VHS	Video Home Service	3M	V0
DVCM	Digital Video		VB
DVCL	Digital Video		VB

10.4 Component Types

10.4.1 Drives

Type	Drive Name and Number	Medium	Manufacturer
D1	Colorado T1000	TRAVAN	HP
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

Type	Drive Name and Number	Medium	Manufacturer
DA	DST 310	D2	AMPEX
DA	DVR 2100	D1 small	SONY
DC	8205-8mm	8mm cassette	EXABYTE
DC	7208 011, Mammouth	8mm cassette	IBM
DC	DC MK 13	8mm cassette	SNI
DE	DLT 2000 (modified)	DLT cassette	ADIC
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 Kassette	ADIC
DG	DLT 8000 Low Profile mit DCI	DLT Kassette	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 Kassette	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

Type	Drive Name and Number	Medium	Manufacturer
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
DQ	7492	3490 cassette	HDS
DR	Audio cassette deck	Audio cas.	e.g. Uher
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-Kassette	Fujitsu

10.4.2 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
- E9: I/O unit AML/S Mixed Media

10.4.3 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)
- H7: VolServ, HACC/OS400

10.4.4 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

AML/S Module Types

- LU - basic module without drives
- LV - basic module with max. 2 drives
- LW - basic module with max. 4 drives
- LX - add-on module without drives
- LY - add-on module with max. 2 drives
- LZ- add-on module with max. 4 drives

10.4.5 Robots

- R0: robot system (AML/2)
- R3: handling unit (AML/E)
- R4: handling unit (AML/J)
- R5: robot “Accessor” (AML/S)

10.4.6 AMU

- A0: AMU without dual AMU
- A1: AMU with dual AMU
- A2: AMU as backup AMU

10.4.7 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
- O3 AML/S

10.5 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 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 modificatione 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 Mmanager. Predefined files with names AMU3270, 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

Directory	Filename	Explanation
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

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