

# UMESS

**Option 7  
CADLINK**

**Operating Instructions**



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# Preface

It is here assumed that the user is familiar with the coordinate measuring machine and its components. Please keep all printed materials delivered with the measuring machine ready to hand at all times.

## Principles in this operating manual

Before starting to work with this manual, the user has to familiarize himself with the applied principles.

In the following, you will find information on the used font types, signs and symbols.

### Typographic principles

The font types and font schemes used in this manual have the following meaning:

- **bold face**

- Dialog element on the screen

Example: "... the button **<TERMIN>**"

- Term

Example: "During calculation, the location of a **measuring element** in relation to a **reference element** is determined."

- File and directory names

Example: **/home/zeiss/UB**

- *italic*

- Highlighted text of which the content is very important

Example: "Click with the *right* mouse button ..."

- Cross reference

Example: "..., see also ➤ „*Configurations when using HOLOS*“ on page 1-2"

- **Courier bold face**

Text in dialog windows and protocols

## Signs and symbols

Special signs and symbols are used in this manual.

### Symbols for warnings and information



#### **Danger!**

In this case, special care is called for. The warning triangle indicates risk of injury. Non-observance of this warning may cause personal injury.



#### **Attention!**

This symbol warns against situations which may lead to loss of data, measuring errors, errors in the measuring run, collisions or damage to the machine and workpiece.



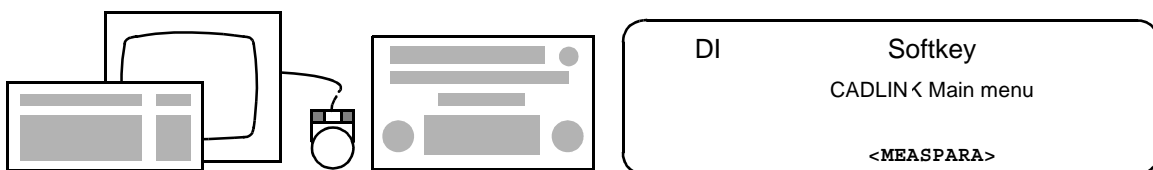
The **Note** symbol is shown next to important text and helpful additional information.

### Symbol for function call

There are several possibilities:

- Direct input by means of the DI number
- Function selection by means of the pull-down menu
- Selection by means of icons

Example:



### Symbol for softkey

Reference to softkeys in dialogs.

# Overview of chapters

This manual describes the function, operation and application possibilities of the measuring program UMESS Opt.7. You will find the following topics:

- „General“ on page 1-1
- „Communication with HOLOS-UX“ on page 2-1
- „Measuring run parameters“ on page 3-1
- „Travel commands“ on page 4-1
- „Probe change functions“ on page 5-1
- „Measurement“ on page 6-1
- „Digitizing“ on page 7-1



# Table of contents

<b>Principles in this operating manual</b>	<b>3</b>
Typographic principles	3
Signs and symbols	4
<b>Overview of chapters</b>	<b>5</b>
<b>Chapter 1 General</b>	
Program tasks	1-2
Preparations in UMESS	1-2
Configurations when using HOLOS	1-2
Calling CADLINK	1-3
<b>Chapter 2 Communication with HOLOS-UX</b>	
<b>Chapter 3 Measuring run parameters</b>	
<b>Chapter 4 Travel commands</b>	
<b>Chapter 5 Probe change functions</b>	
Probe change	5-2
Selecting the probe combination and configuration	5-3
<b>Chapter 6 Measurement</b>	
Manual measurement	6-2
Automatic measurement	6-3
Scanning	6-3
Starting a measuring run	6-3

## **Chapter 7 Digitizing**

Generating a point grid .....	7-2
Generating curves .....	7-4
Generating points .....	7-6



# Chapter

# 1

## General

---

### **This chapter contains:**

Program tasks . . . . .	1-2
Preparations in UMESS. . . . .	1-2
Configurations when using HOLOS . . . . .	1-2
Calling CADLINK . . . . .	1-3

## Program tasks

CADLINK forms the interface between the UMESS measuring software and the HOLOS-UX program package: During measurement, HOLOS-UX passes on data via CADLINK for controlling the coordinate measuring machine. The actual data is then returned to HOLOS-UX using CADLINK. When digitizing, unknown surfaces are probed with the coordinate measuring machine and passed on to HOLOS-UX using CADLINK.

## Preparations in UMESS

When starting CADLINK, the name of the computer on which HOLOS-UX is installed must be entered via DI 2024. This also applies even if CADLINK and HOLOS-UX are installed on the same computer.

Before calling CADLINK, the probes and the workpiece coordinate system must have been defined.

## Configurations when using HOLOS

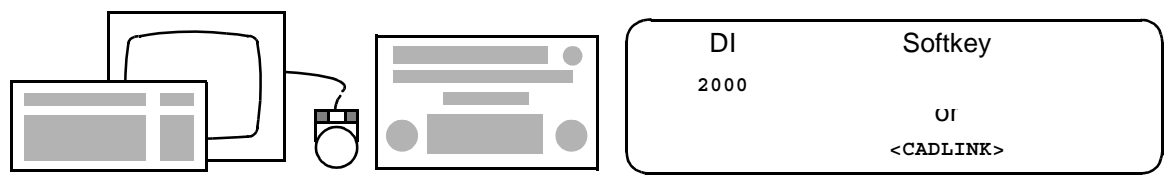
The following configurations are possible when using HOLOS:

- The measuring software and HOLOS-UX are run on the same computer, the output is made on the same display.
- The measuring software and HOLOS-UX are run on the same computer, the output is made separately on the system console and on an X-terminal.
- The measuring software and HOLOS-UX are run on different computers which are linked via a LAN. The output takes place on the display of the respective computer.

# Calling CADLINK

The basic menu contains information on the axis selection, the probing path and the clearance plane. With the exception of the axis selection, these parameters can be changed in CADLINK or HOLOS-UX.

## Function call



## Input mask

CADLINK Main menu

Manual measurement: Patch-Ident  
Free axis selection: Case no.1

No clearance plane  
Backaway path bef. probing = 2.00 mm  
Backaway path after prob. = 2.00 mm

PRB/IP

DIGI CUR

DIGI GRI

DIGI PT

\*

MAN MEAS

PRB CHAN

COMB CHA

PRB NO

BACK

SCAN MOD

SCAN MEA

STARTFIL

TRAVCOM

MEASPARA

HOST

INFO

## Softkeys

<b>DIGI CUR</b>	➤ „Generating curves" on page 7-4
<b>DIGI GRI</b>	➤ „Generating a point grid" on page 7-2
<b>DIGI PT</b>	➤ „Generating points" on page 7-6
<b>MAN MEAS</b>	➤ „Manual measurement" on page 6-2
<b>PRB CHAN</b>	➤ „Probe change" on page 5-2
<b>COMB CHA</b>	➤ „Selecting the probe combination and configuration" on page 5-3
<b>SCAN MOD</b>	➤ „Scanning" on page 6-3
<b>SCAN MEA</b>	➤ „Scanning" on page 6-3
<b>START FIL</b>	➤ „Scanning" on page 6-3
<b>TRAVCOM</b>	➤ „Travel commands" on page 4-1
<b>MEASPARA</b>	➤ „Measuring run parameters" on page 3-1
<b>HOST</b>	➤ „Communication with HOLOS-UX" on page 2-1

## Display of settings

**Free axis selection:**  
**Case no.1**

Display of the axis assignment made in UMESS <DI 1711>.

**No clearance plane,**  
**Backaway path bef.**  
**probing = 2.00 mm,**  
**Backaway path after**  
**probing = 2.00 mm**

Display of the setting made via <MEASPARA>.

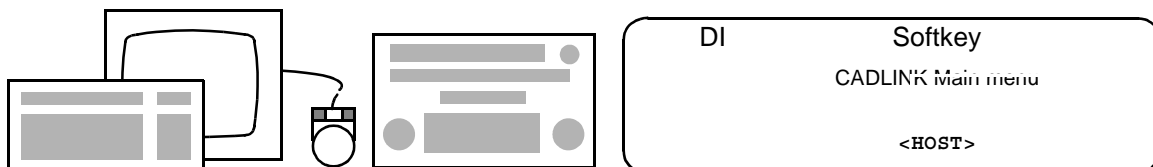
# Chapter

# 2

## Communication with HOLOS-UX

To ensure communication with HOLOS-UX a few tests and settings are provided which can be used during setup or when locating faults.

### Function call



### Input mask

CADLINK Main menu									
Free axis selection: Case no.1									
No clearance plane									
Backaway path bef. probing = 2.00 mm									
Backaway path after prob. = 2.00 mm									
	L-TEST	CLEAR	SENFIL	*	PARAM				
BACK								INFO	

## Softkeys

## L-TEST

Communication test with HOLOS-UX. Possible reactions:

**Host responding to line test! or**

Host not responding to line test! Link cancelled!

If a fault occurs, check whether the name of the host computer has been entered correctly and whether the network services are active.

**CLEAR**

Interface between CADLINK and HOLOS-UX is reset to initial status.

**SENDFIL**

Sends results of the last measuring run to HOLOS-UX again.

PARAM

In this input mask, the name of the host computer (HOLOS-UX computer) has to be entered during the startup of the software. This input also has to be made if the measuring software and HOLOS-UX are installed on the same computer. The remaining parameters are preset as default so that no other modifications are necessary.

Input of parameters for connection to host

Name of host computer   

No. of repetitions with  
Faulty data transfer       

Reaction time in secs.       

   \*

# Chapter

# 3

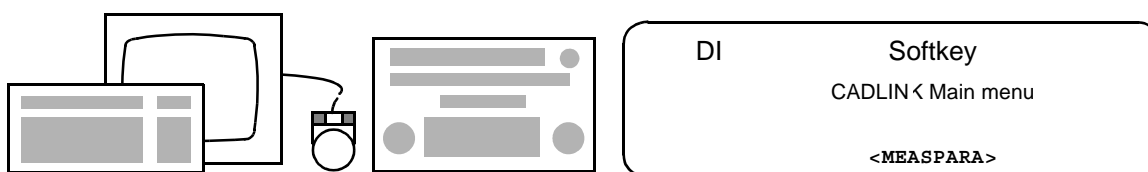
## Measuring run parameters



Different parameters can be defined for controlling the measuring run with HOLOS-UX.

A few of these parameters can also be defined in HOLOS-UX. If there the presetting deviates from the value zero, the value defined is used for the control. The values entered in CADLINK are then overwritten.

### Function call



## Input mask

Input of measuring run parameters

Backaway path bef. probing

2.00

Backaway path after prob.

2.00

Speed

65.00

Clearance plane:

No clearance plane

Y/Z - plane

X/Z - plane

X/Y - plane

Height of clearance plane ?

0.0000

Clearance plane in space

Manual input of clearance plane ?

or clearance plane with the help of

Define intermediate position ?

\* YES

NO

\*

TERMIN

BACK

INFO

## Input fields

**Backaway path bef. probing, Backaway path after prob.**

An intermediate point is generated for every measured point in the normal direction. The distance of this intermediate position before and after the probing is specified here. Also check input in HOLOS-UX!

**Speed**

Maximum travel speed in mm/s.

**Clearance plane**

If a clearance plane is preset, the measuring machine is positioned to this before the first probing and after the last probing. A clearance plane can be defined by

- one of the main planes of the workpiece coordinate system
- any plane in space, defined by three points or by a point and vector.

**../.. - plane, Height of clearance plane**

Input of a main plane with its distance to the zero point of the workpiece coordinate system.



### Clearance plane in space, manual input of clearance plane

Input of a 3D point with normal vector of the clearance plane. The following page is branched to:

Clearance plane in space

Point coordinates of a plane point:

X =

0.0000

Y =

0.0000

Z =

0.0000

Normal vector of the clearance plane :

Nx =

0.0000

Ny =

0.0000

Nz =

0.0000

\*

TERMIN

BACK

INFO

### Define clearance plane in space, clearance plane with help of intermediate positions

The three intermediate positions to be defined here can be determined using the **<PRB/IP> softkey** or the corresponding functions of the control panel. The intermediate positions must not lie on a line or describe an identical position.

#### NOTE

If the clearance plane is to be travelled to after each probing, this must be defined in the HOLOS-UX program part.

A clearance plane defined in the HOLOS-UX program part overwrites the corresponding definitions in the CADLINK program part. If no clearance plane is to be active, this must be defined in both program parts.



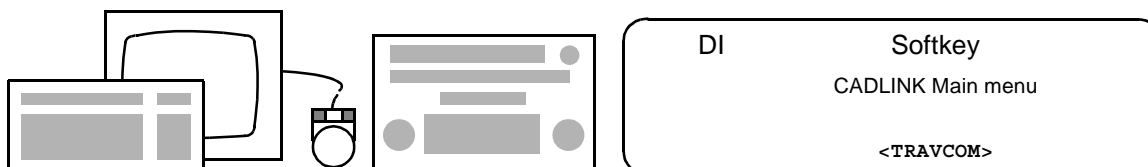
# Chapter

# 4

## Travel commands

The UMESS travel commands can be called in the CADLINK program part:

### Function call



### Input mask

CADLINK Main menu

Free axis selection: Case no.1

No clearance plane  
Backaway path bef. probing = 2.00 mm  
Backaway path after prob. = 2.00 mm

	POSITION	STEP	WPC LIST	*	DSE-POS	DSE-PAR		
BACK	RT-POS	RT STEP						INFO

### Softkeys

<b>POSITION</b>	Position in the workpiece coordinate system
<b>STEP</b>	Step in the workpiece coordinate system
<b>WPC LIST</b>	Display workpiece coordinates
<b>DSE POS</b>	Position of the articulating probe holder
<b>DSE PAR</b>	Position DSE to normal
<b>RT-POS</b>	Position of the rotary table
<b>RT STEP</b>	Step of the rotary table

For more details on operation, please refer to the UMESS operating instructions.

# Chapter

# 5

## Probe change functions

---

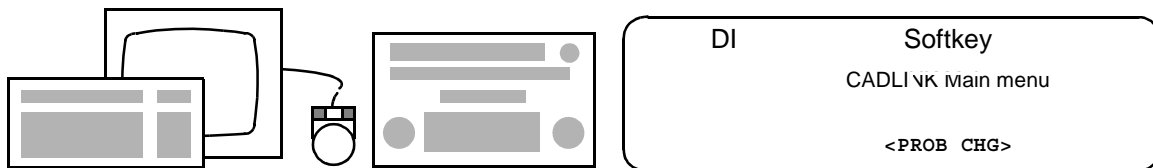
### **This chapter contains:**

Probe change. . . . .	5-2
Selecting the probe combination and configuration . . . . .	5-3

## Probe change

Various functions on the probe change can be called in the following input mask.

### Function call



### Input mask

Please select function

				*		REMOVE P	INSERT P	PRB CHAN
BACK	PRE MENU							INFO

### Softkeys

**REMOVE P**

To remove the probe manually.

**INSERT P**

To insert the probe manually.

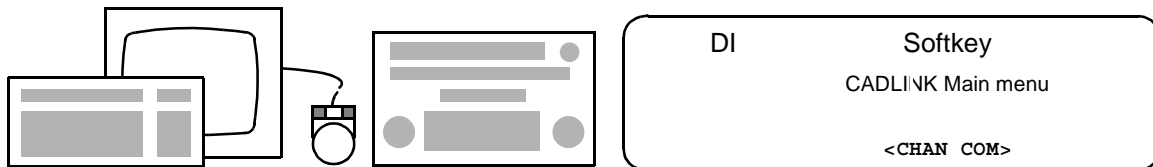
**PRB CHAN**

To change the probe automatically.

For more details on operation, please refer to the UMESS operating instructions.

## Selecting the probe combination and configuration

### Function call



### Input mask

Select probe combination and configuration

Combination
1
Configuration
1

\* YES
NO

\*

TERMIN

BACK

INFO





# Chapter 6

## Measurement

---

### **This chapter contains:**

Manual measurement . . . . .	6-2
Automatic measurement . . . . .	6-3
Scanning . . . . .	6-3
Starting a measuring run . . . . .	6-3

## Manual measurement

After calling the CADLINK program, points can be recorded manually with the coordinate measuring machine and forwarded to HOLOS-UX. There are two options available:

- Patch-Ident

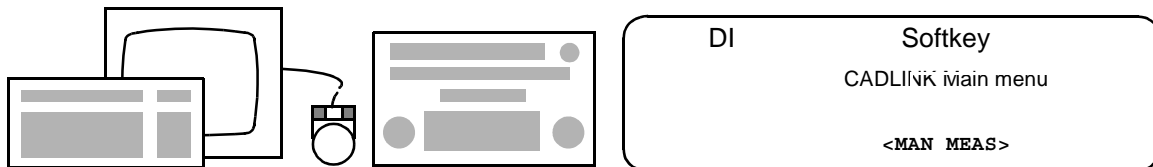
An identification of the corresponding surface element is made directly as well as its deviation calculated and displayed.

- Edge measurement

This setting makes it possible to probe metal edges, for example, and to output the distance of the edge from the nominal point of a neighboring patch. To do this, the normal direction of the nominal point is rotated 90° in the direction of the edge.

If the link between CADLINK and HOLOS-UX breaks down, an error message appears after the probing.

### Function call



### Input mask

CADLINK Main menu															
Manual measurement: Patch-Ident (Edgepoint measurement)															
PRB/IP	DIGI CUR	DIGI GRI	DIGI PT	*	MAN MEAS	PRB CHAN	COMB CHA	PRB NO							
BACK	SCAN MOD	SCAN MEA	STARTFIL		TRAVCOM	MEASPARA	HOST	INFO							

#### NOTE

Every time **<MAN MEAS>** is called the method set is changed. The current measuring method is displayed in the input mask by **Manual measurement: Patch-Ident** or **... Edge point measurement**.

## Automatic measurement

Automatic measuring runs are started in HOLOS-UX: The data for the measurement is forwarded from HOLOS-UX to CADLINK. This is then prepared with parameters for the control as CNC program and started automatically. The measured values gained are transferred to HOLOS-UX where the evaluation then takes place. If a measuring run is interrupted, e.g. with the **<CANCEL>** softkey, no measured data is returned to HOLOS-UX. A message appears on the cancellation of the measuring run.

## Scanning

After entering the scanning mode (**<SCAN MOD>** softkey in CADLINK main menu) the scanning run can be started (**<SCAN MEA>** softkey in the CADLINK main menu). The scanning points are collected in the CADLINK program part and forwarded to HOLOS-UX for evaluation.

The evaluation corresponds to the Patch-Ident: After transfer to HOLOS-UX, the applicable surface segment is first identified, in order to calculate and display the deviations.

For more detailed information on operation, please refer to the UMESS manual.

## Starting a measuring run

If you call the **<STARTFIL>** softkey in the CADLINK main menu, the last measuring run received by HOLOS-UX is restarted. If in this case the measured values are to be forwarded to HOLOS-UX, this must be initiated with the **<HOST>** / **<SEDNFIL>** softkeys.



# Chapter

## Digitizing

Curves and surfaces can be recorded by manual probing of points of the workpiece surface. The points are recorded in the CADLINK program part and transferred to HOLOS-UX for determining sculptured curves or sculptured surfaces. There are several methods available.

### NOTE

Before digitizing a new model, HOLOS-UX should be initialised for accepting a new model structure. (see HOLOS-UX operating instructions, Chapter Model management).

### This chapter contains:

Generating a point grid . . . . .	7-2
Generating curves . . . . .	7-4
Generating points . . . . .	7-6

## Generating a point grid

A point grid is generated with this function which is used in HOLOS-UX for the approximation of a surface.

### Function call



### Input mask

Digitize grid  
No. of points in U-direction 2  
No. of points in V-direction 2

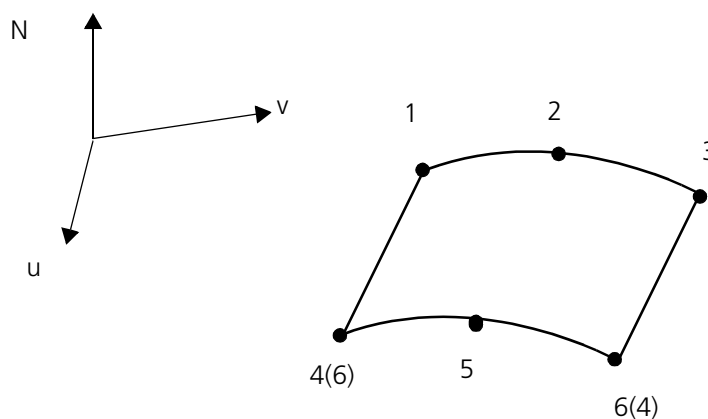
\*

### Input fields

**No. of points in U-direction .. , Number of points in V-direction..**

At least two points must be probed in each parameter direction. If there are curvatures in the surface to be defined, the number of probing points can be increased to allow information on these curvature changes to be included in the first calculation of the surface.

The number of grid points to be probed however should be kept as small as possible, as sufficient information on a surface can be collected by using other functions (see HOLOS-UX manual).



The grid points can either be probed along a meander-shaped or line-oriented path, whereby the order of the probing points defines the parameter directions of the surface.

The direction from the first to the second grid point probed defines the direction of the  $v$  parameter of the sculptured surface to be defined. The direction of the first grid line to the next grid line defines the direction of the  $u$  parameter.

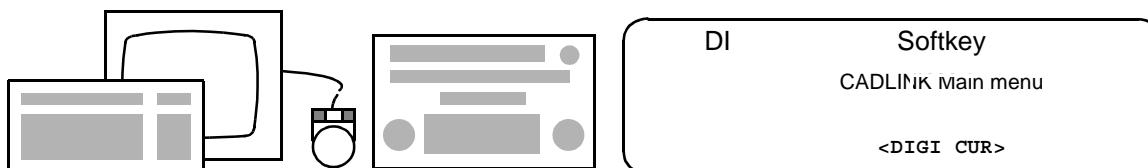
Different functions require surfaces to be oriented the same. Therefore this must be taken into consideration during the surface definition. If this is not done, this may lead to a surface which does not lie on the actual workpiece surface. The correction of the probe radius is then carried out in the wrong direction as the surface normal is incorrectly defined.

The polynomial degree of the surfaces calculated is dependent on the number of points probed in the respective parameter direction. Up to a certain limit, it is always one smaller than the number of points probed. The maximum polynomial degree can be controlled by the user with the parameters (see HOLOS-UX manual, Chapter Digitizing parameters).

## Generating curves

With this function, manually probed points can be used for approximating a sculptured surface.

### Function call



### Input mask

Digitize curve no. 1  
Probe point 1 or select function !

PRB/IP	WPC LIST	POSITION	STEP	*	SCAN RUN	DSE POS	PRB CHAN	TERMIN
BACK			CORR-1		SCAN MOD		COMB CHA	INFO

### Softkeys

**CORR-1**

Each call deletes the point recorded last.

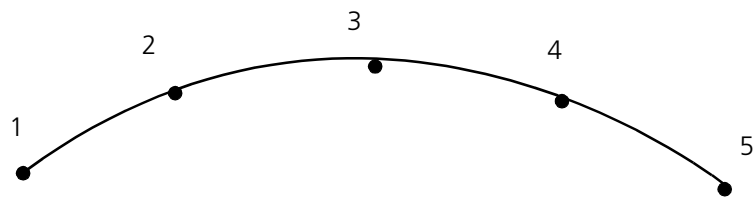
**SCAN-RUN**

Digitization of a curve using scanning.



**NOTE**

- In this input mask, travel commands, functions on the probe change and positioning the articulating probe holder can be called.
- The sequence of the points probed defines the orientation of a curve. Any orientation can be defined in HOLOS-UX. Therefore when probing the curve points, it is not of importance.
- Single points and scanning points cannot be mixed.

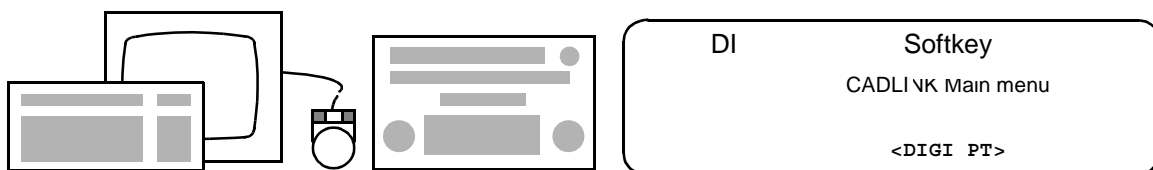


- When defining curves, at least two curve points must be probed. In order to receive information on curvature changes in the curve, any further number of points can be probed.
- The polynomial degree of a curve is dependent on the number of curve points. Up to a certain limit, it is always one smaller than the number of points probed. The maximum polynomial degree can be controlled by the user with the parameters (see HOLOS-UX manual).
- Further processing of curves for defining sculptured surfaces takes place in HOLOS-UX.

## Generating points

With this function, any number of points can be collected. In HOLOS-UX these points are displayed and managed as "**digitized points**". They can be used for the design of curves using interactive graphics.

### Function call



### Input mask

Digitize point cloud  
Probe point 1 or select function !

PRB/IP	WPC LIST	POSITION	STEP	*	SCAN RUN	DSE POS	PRB CHAN	TERMIN
BACK			CORR-1		SCAN MOD		COMB CHA	INFO

### Softkeys

**CORR-1**

Each call deletes the point recorded last.

**SCAN-RUN**

To record a point cloud using scanning.

### NOTE

- In this input mask, travel commands, functions on the probe change and positioning the articulating probe holder can be called.
- Single points and scanning points cannot be mixed with one another.

# Index

## **A**

Automatic measurement 6-3

## **C**

Calling CADLINK 1-3

Configurations when using HOLOS 1-2

## **D**

Digitizing 7-1

## **G**

Generating a point grid 7-2

## **M**

Manual measurement 6-2

## **P**

Preparations in UMESS 1-2

Program tasks 1-2

## **S**

Scanning 6-3

Starting a measuring run 6-3

## **T**

Travel commands 4-1

