

# Hdb2Win

Interpreter

Version 2 – May 2020

Hdb2Win 2.4.2

## Content

<b>Content</b> .....	<b>1</b>
<b>General remarks</b> .....	<b>6</b>
What contains this document? .....	6
Which software is needed? .....	6
Which hardware is needed? .....	6
What is new in this version? .....	6
<b>The Integrated Developers Environment</b> .....	<b>7</b>
Screen .....	7
Sections .....	7
Variables .....	8
Tables .....	9
<b>Operators and functions</b> .....	<b>10</b>
<b>Basics</b> .....	<b>10</b>
Data types .....	10
Operators .....	10
Numerical operators (DT=data type, RT=return type) .....	10
Character operators .....	10
Operators without type .....	11
Functions .....	11
Functions without parameter .....	11
Numerical .....	12
String .....	12
Date and time .....	13
Database .....	13
Logical .....	14
Type conversion .....	14
Without type .....	15
System .....	15
Variables and constants .....	15
<b>Commands</b> .....	<b>16</b>
Conventions in the formal description .....	16
Compreter directives .....	16
#COMMENT <on   off>   <1   0> (Rarely) .....	16
#DEBUG <on   off>   <1   0> (Occasionally) .....	17
#ECHO <on   off>   <1   0> (Rarely) .....	17

#ERROR <on   off>   <1   0   2> (Rarely) .....	17
#FORMAT <const   &ivar> (Occasionally).....	17
#I <programme file> (Rarely).....	18
#PROGRAM <on   off>   <1   0 > (Rarely).....	18
#REFR (Rarely).....	19
#STATUS <on   off>   <1   0 > (Rarely) .....	19
#VAR (Rarely) .....	19
#VERSION <cconst> (Rarely).....	19
Variables .....	20
DEFINE <cconst   &cvar>, < C   R   I > [, <const   'default'>[, <const>[, <const>]]] (Always) .....	20
FNC <var>, <expression> (Rarely).....	21
SX <cconst   &cvar> (Rarely).....	21
MOV <var>, <const   var   expression> (Always).....	21
MMOV <var   &var>, <const   var   expression   &var> (Rarely).....	22
STOR <array>, <const   ivar>, <var   expression> (Occasionally) .....	23
RANDOM <nvar> (Very rarely).....	24
Program control .....	24
REQ <cconst   &cvar>, <const>[, <ivar>] (Regularly) .....	24
XREQ <cconst   &cvar>, <const>[, <ivar>[, <ivar>]] (Rarely) .....	25
CALL <label> (Occasionally).....	26
RET (Occasionally).....	26
EXIT (Always).....	26
TERM (Very rarely).....	26
Conditions and programme flow .....	27
CMP <expression>, <expression> (Always) .....	27
SFLT <expression> (Rarely).....	27
CND (Rarely).....	28
CFLT (Rarely).....	28
JMP <label> (Regularly).....	28
JE <label> (Always) .....	28
JNE <label> (Always) .....	29
JA <label> (Regularly) .....	29
JAE <label> (Regularly).....	30
JB <label> (Regularly).....	30
JBE <label> (Regularly) .....	30
JNEOF <label> (Always).....	30
File system.....	31
CDA (Occasionally) .....	31
CD <cconst   &cvar> (Occasionally).....	31
MD <cconst   &cvar> (Rarely).....	31
DSEL <cvar>[, <0   1>] (Occasionally).....	32
FFND <cconst   &cvar>, <cvar>[, <ivar>] (Occasionally).....	32
NFND <cvar>[, <ivar>] (Occasionally) .....	32
FSEL <cvar   &cvar>[, <cconst>[, <cconst   &cvar>]] (Rarely) .....	33
FILEX <cconst   &cvar> (Occasionally) .....	34
FSIZE <cconst   &cvar> , <ivar> (Rarely) .....	34
CPF <cconst   &cvar>, <cconst   &cvar>[, <cconst   &cvar>] (Rarely) .....	35
FDEL <cconst   &cvar> (Rarely) .....	35
Screen input/output .....	36
CON <const   var   expression> (Always).....	36
CONX <const   var   expression> (Occasionally).....	36
KBD <cconst   &cvar>, <var>[, <C   N>] (Regularly).....	36
SELCOL <cvar>[, <D   H>] (Rarely).....	37
OPT.INI <const   &ivar>[, <cconst   &cvar>[, <const>[, <const>]]] (Regularly).....	37

OPT.LBL <iconst   &ivar>,<cconst   &cvar> (Regularly).....	38
OPT.SET <iconst   &ivar>,<iconst   &ivar> (Occasionally) .....	38
OPT.ENB <iconst   &ivar>,<iconst   &ivar> (Rarely) .....	38
OPT.RD <ccont   &cvar> (Occasionally) .....	39
OPT.EXE [<ivar>] (Regularly).....	39
OPT.RES <iconst   &ivar>,<ivar> (Regularly).....	40
OPT.ONE <ivar> (Occasionally) .....	40
OPT.WR <ccont   &cvar> (Occasionally) .....	41
LB.TOC <ivar> (Rarely) .....	41
LB.CLR (Rarely) .....	41
LB.ADD <ccont   &cvar> (Rarely) .....	42
LB.SEL <ivar> (Rarely) .....	42
LB.CAP <ivar> (Rarely).....	42
LB.IDX <ivar> (Rarely) .....	42
LS.INI <ccont   &cvar>[,<0   1>] (Rarely) .....	43
LS.ADD <ccont   &cvar> (Rarely).....	43
LS.SIZE <ivar>,<ivar> (Rarely).....	43
LS.EXE <ivar>[,<cvar>] (Rarely) .....	44
LAB.TOC <ivar> (Rarely).....	44
LAB.CAP <ccont   cvar> (Rarely) .....	44
IMG.TOC <ivar> (Rarely).....	45
IMG.SHOW <cconst   &cvar> (Rarely).....	45
ALB.CR <iconst &ivar>[,<cconst &cvar>] (Rarely).....	46
ALB.ADD <cconst &cvar>[,<cconst &cvar>] (Rarely).....	46
ALB.SHOW [<ivar>] (Rarely).....	47
File input/output .....	48
STRM [<con>   <cconst   &cvar>[,<cconst>]] (Always).....	48
OUT <const   var   expression>[,<format>] (Always).....	48
OUTL <const   var   expression>[,<format>] (Always).....	49
OUTTEXT <cconst>[,<format>] (Occasionally).....	49
OUTP <const>[,<format>] (Occasionally) .....	50
OUTPL <const>[,<format>] (Occasionally).....	50
TXT.CR <cconst   &cvar> (Occasionally).....	51
TXT.OP <cconst   &cvar>,<0   1> (Occasionally) .....	51
TXT.RS (Occasionally) .....	52
TXT.AP (Rarely).....	52
TXT.RD <cvar> (Occasionally).....	52
TXT.RDL <cvar>,<cvar>,<cvar>,<cvar> (Rarely).....	52
TXT.WR <expression> (Occasionally) .....	53
TXT.WL <expression> (Occasionally) .....	53
TXT.CL (Occasionally).....	54
Database operation : create, open and close tables.....	54
FCREA <cconst   &cvar> (Rarely).....	54
OPEN <cconst   &cvar>[,<iconst>] (Always).....	54
FILE <cconst   &cvar>[,<iconst>] (Always).....	55
RESET (Always).....	55
SLN (Rarely).....	56
SLF <iconst   &ivar> (Very rarely) .....	56
TSK <iconst   &ivar> (Very rarely) .....	57
RLD (Very rarely) .....	57
POB <cconst   &cvar> (Occasionally).....	57
POPL (Rarely).....	58
REIDX (Very rarely) .....	58
CLB (Occasionally).....	58
CLA (Regularly).....	58

CAO (Very rarely).....	59
Database operation : read / show / modify / write records.....	59
GO <iconst   ivar> (Regularly).....	59
SKIP (Always).....	59
APR (Rarely).....	60
CLR (Rarely).....	60
APB (Occasionally).....	60
EDT (Occasionally).....	60
EDTM (Rarely).....	61
EDM <cconst> (Rarely).....	61
DSP (Rarely).....	61
BRW <cconst   &cvar>[,<ivar>] (Occasionally).....	61
PUT <dbfield>,<const   var   expression> (Regularly).....	62
MPUT <dbfield   &cvar>,<const   var   expression   &var> (Rarely).....	62
FLSH (Regularly).....	63
SETD (Rarely).....	64
CLRD (Rarely).....	64
QDEL (Rarely).....	64
WRMEMO <cconst   &cvar>,<cconst   &cvar>[,<0   1   2>] (Very rarely).....	65
RDMEMO <cconst   &cvar>,<cconst   &cvar>[,<0   1   2>] (Very rarely).....	65
RSEL <cconst   &cvar>,<ivar>[,<iconst>] (Occasionally).....	66
RSUB <cconst   &cvar>,<dbfield>,<ivar>[,<iconst>] (Occasionally).....	66
CRDB (Very rarely).....	67
DLDB (Very rarely).....	68
SAVEREC (Very rarely).....	68
RESTREC (Very rarely).....	68
Database operation : index and find.....	68
INDEX <var   expression>,<cconst> [, <O   U   Q> [,<iconst>]] (Regularly).....	68
FIND <const   var   expression> (Occasionally).....	69
JNF <label> (Occasionally).....	69
USEIND [<cconst>] (Rarely).....	70
XCHI (Occasionally).....	71
Database operation : data fields and structure.....	71
FLDEXS <cconst   &cvar> (Occasionally).....	71
GFN <cconst   &cvar>,<ivar> (Rarely).....	71
FLDD <iconst   &ivar>,<cvar> (Rarely).....	72
ADDFLD <cconst   &cvar> (Rarely).....	72
CPS <cconst   &cvar>[,<O   Q>] (Rarely).....	73
CFL (Rarely).....	73
FFL (Rarely).....	73
AFL <cconst   expression   var > (Rarely).....	74
DFL <cconst   expression   var > (Rarely).....	74
Database operation : whole table operations.....	74
CPY <cconst   &cvar>[,<A   B   O   Q>] (Rarely).....	75
ADDF <cconst   &cvar> (Rarely).....	75
ADDR <cconst   &cvar> (Rarely).....	75
CMPR <cconst   &cvar> (Very rarely).....	76
PCK (Rarely).....	76
CHBI (Very rarely).....	76
CHB (Very rarely).....	76
System options.....	77
GSYS <ivar   iconst> , <cvar> (Very rarely).....	77
SSYS <iconst   ivar>,<cconst   &cvar> (Rarely).....	77
NSYS <iconst   ivar>,<svar> (Rarely).....	78

---

REG.RINT <cconst   &cvar>,<ivar> (Rarely) .....	78
REG.RREAL <cconst   &cvar>,<rvar> (Rarely) .....	79
REG.RSTR <cconst   &cvar>,<cvar> (Rarely) .....	79
REG.WRITE <cconst   &cvar>,<var> (Rarely) .....	79
External libraries.....	80
EXEC [<cconst   &cvar>]   [<cconst   &cvar>] (Occasionally) .....	81
CVT <cconst   &cvar>,<cconst>,<cconst   &cvar>[,<cconst>[,<0   1>]] (Occasionally).....	81
VECDRAW <cconst   &cvar>[,<cconst>] (Rarely) .....	82
VECCHRT <cconst   &cvar>,<cconst   &cvar>[,<cconst>] (Rarely).....	82
<b>Index.....</b>	<b>84</b>

## **General remarks**

### ***What contains this document?***

This document is a description how to use the interpreter of the database management system Hdb2Win. Hdb2Win includes the interpreter to realise multiple functions of the applications (lists in edit forms, complex queries, output data as text or HTML, or output for graphics or geographic data). The interpreter is a very powerful tool because it is able to realise very complex tasks mainly dedicated to data output and data analysis.

### ***Which software is needed?***

To be able to use all here described functions you need an installation of Hdb2Win from version 2.4.2 on. Applications such as PaleoTax or PalCol are not needed, but the interpreter without data does not give you many options, except you design your own application.

### ***Which hardware is needed?***

Nothing extraordinary special. Processor speed is not important. A few megabytes of free hard-disk space is needed for the database programme, and the space for your data (128 MB of free main memory is enough even for complex programmes and/or large databases).

### ***What is new in this version?***

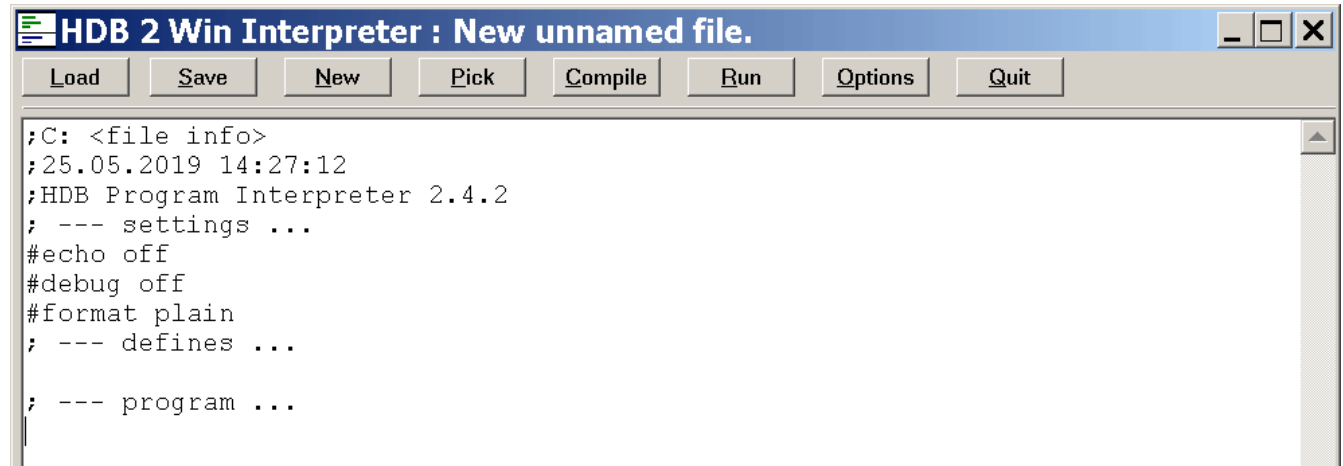
Version 2 compared to version 1.0

Of course, new functions and commands are introduced. Perhaps really new is the incorporation of selected functions of PaleoTax/Graph that can be directly called from Hdb2Win. Version 2 encompasses a more detailed description of the Integrated Developers Environment.

## The Integrated Developers Environment

### Screen

The Interpreter application is a simple environment for programme developing and testing.



Load – Loads an existing programme into the workspace.

Save – Saves the current programme to the hard disc.

New – Cleans the workspace and prepares a new programme.

Pick – Selects one of the last edited programmes.

Compile – Checks and translates the programme.

Run – Executes the programme.

Options – Modify the font and font size in the workspace.

Quit – Terminates the interpreter.

### Sections

A new programme has the following structure:

```
;C: <file info>
;25.05.2019 14:32:48
;HDB Program Interpreter 2.4.2
; --- settings ...
#echo off
#debug off
#format plain
; --- defines ...

; --- programme ...
```

The first three lines, following the ;C: (content), are reserved for a short programme description. The first line is in German, the second in English and the third in Spanish (languages so far supported by the database programme). As for instance:

```
;C: Das ist ein Test.
;C: This is a test.
;C: Eso es una prueba.
```





Once variables are declared they can be used. All variables have an initial values; numerical variables are zero and strings are empty. Field variables start always with one as index and are the items are addressed with brackets:

```
stor      ai,1,100
mov       ip,ip+ai[1]
```

### ***Tables***

Before using a table, it must be opened, by the commands open or file. Within a database, a table can be selected via file. A file command should be followed with a reset command to assure that the request starts with the first record.

```
; show deleted records:
open      species
file      genera
reset                                ; do not forget the reset command
:begin
cmp       deleted,0
je        skip
con       'Deleted : '+gname
:skip
skip      ; do not forget to skip
jneof    begin
cla
exit
```

## Operators and functions

### Basics

One of the principal components of the database engine is the parser module. This module analyses and resolves any type of equation, numerical or text. The module also resolves variables, symbols, functions, and field names of the tables. The interpreter, that is usually used to analyse data, makes intense use of this module. Therefore, data types, operators, and functions are described briefly.

### Data types

Characters (C)		Numbers (N)	
C (char)	'A'	R (real)	3.142
C (string)	'Alpha'	I I (Integer)	3

### Operators

#### Numerical operators (DT=data type, RT=return type)

Name/ Symbol	Explanation	DT	RT	Example
-	sign	N	N	$-(-1) = 1$
^ , sqr	square	N	N	$2^8 = 256$ $2 \text{ sqr } 8 = 256$ $9 \text{ sqr } 0.5 = 3$
% , mod	rest of a integer division	I	I	$21 \% 8 = 5$
DIV	integer division	I	I	$21 \text{ DIV } 8 = 2$
/	real division	R	R	$21.0 / 8 = 2.625$
*	multiplication	N	N	$10 * 2 = 20$
-	subtraction	N	N	$10 - 13 = -3$
+	numerical addition	N	N	$10 + 13 = 23$
shl	bit-by-bit shift to the left	I	I	$2 \text{ shl } 4 = 32$
shr	bit-by-bit shift to the right	I	I	$256 \text{ shr } 4 = 16$
and , &	logical and	I	I	$1 \& 0 = 0$
or ,	logical or	I	I	$1 \text{ or } 0 = 1$

#### Character operators

Name/ Symbol	Explanation	DT	RT	Example
\$	subtext in text, case insensitive	C	I	'a' \$ 'halt' = 1
in	subtext in text, case sensitive	C	I	'A' in 'halt' = 0
+	string addition	C	C	'Ha'+ 'lt' = 'Halt'

## Operators without type

Name/ Symbol	Explanation	DT	RT	Example
<	smaller		I	'a' < 'b' = 1
<=	smaller or equal		I	'a' <= 'a' = 1
>	larger		I	'g' > 'G' = 1
>=	larger or equal		I	25 >= 25 = 1
<>	unequal		I	'a' <> 'A' = 1
=	equal		I	'a' = 'A' = 0

## Functions

### Functions without parameter

Functions without parameters return constants or status variables of the system or tables.

Owner	Name	Type	Example
System	Date	C	01/05/2019
	Time	C	20:00
	T	I	1
	F	I	0
	Totalfree	I	3735552
	Allocated	I	3231904
	Heapstat	I	0
	Release	C	2.4.2.55
	Language	C	ENG
	Symbolstatus	I	0
	Userpath	C	C:\Documents and settings\Putzi\Documents
	Ideoutput	I	0
	Apppath	C	C:\Documents and settings\Putzi\Application data\Hdb2Win
	Programname	C	E:\Turbo\SRC\HDB2WIN.EXE
	Docpath	C	C:\Documents and settings\Putzi\Documents
	Random	R	0.000000000233
	Curdir	C	C:\Documents and settings\Putzi\Documents\Hdb2Win
	Screenwidth	I	1680
Screenheight	I	888	
Table	Reccount	I	(number of records in a table)
	Fieldcount	I	(number of fields in a table)
	Filename	C	(name of the table)
Record	Recno	I	(current record)
	Deleted	I	(status of the record)

## Numerical

Name	Description	Parameter(s)	RT	Example
ABS	returns the absolute value	N	N	ABS(-12.2) = 12.2 ABS(6) = 6
ROUND	rounds a number	N	N	ROUND(100) = 100 ROUND(12.9) = 13
SIN	returns the sinus of a value between 0 and 90	N	R	SIN(90) = 1

## String

Name	Description	Parameter(s)	RT	Example
ANSI	converts an ASCII string into an ANSI string	C	C	
ASCII	converts an ANSI string into an ASCII string	C	C	
AT	position of a string in another string	1 = C (search string) 2 = C (string)	I	AT('a','halt') = 2
DELETE	deletes a substring in a string	1 = C (string) 2 = I (start position) 3 = I (number)	C	DELETE('yes',2,1) = 'ys'
DELINS	deletes a substring in a string and inserts another substring	1 = C (string) 2 = I (start position) 3 = I (number of characters to be deleted) 4 = C (substring to be inserted)	C	DELINS('Good morning',6,7,'night') = 'Good night'
INSERT	inserts a substring into a string	1 = C (string) 2 = I (position) 3 = C (substring to be inserted)	C	INSERT('negate',6,'iv') = 'negative'
ISNUM	returns 1, if a string is a valid number	C	I	ISNUM('yes') = 0 ISNUM('7') = 1
LEN	returns the length of a string	C	I	LEN('HELLO') = 5
LOCASE	converts a string into small letters	C	C	LOCASE('ABC') = 'abc'
LPOS	returns the last position of a char in a string	1 = C (char) (search value) 2 = C	I	LPOS('l','hello') = 4
LTRIM	removes spaces to the left of the string	C	C	LTRIM(' name ') = 'name'
POS	returns the first position of a char in a string	1 = C (char) (search value) 2 = C	I	POS('l','hello') = 3
REPLSTR	replaces a substring in a string by another substring	1 = C (string) 2 = C (search string) 3 = C (substring to be inserted)	C	REPLSTR('seven','se','hea') = 'heaven'
RTRIM	removes spaces to the right of the string	C	C	RTRIM(' name ') = ' name'

SIM	Fuzzy text comparison (delivers a percentage value)	C	I	SIM('LOESER','LOSER') = 64
SPACE	returns a number of spaces	I	C	SPACE(1) = ''
SUBSTR	returns a substring	1 = C (string) 2 = I (start value) 3 = I (number of characters)	C	SUBSTR('hello',2,2) = 'el'
TRIM	removes all spaces in a string	C	C	TRIM(' my name ') = 'myname'
UPCASE	converts a string into capital letters	C	C	UPCASE('aBc') = 'ABC'

### Date and time

Name	Description	Parameter(s)	RT	Example
DATSTR	converts an integer into a date (string)	I	C	DATSTR(1)=' 1. 1. 0' DATSTR(731094) = 31.08.2001
DATVAL	converts a date (string) into an integer	C	I	DATVAL('12.3.2001')=730922
DOW	gives the day of the week (0=Sunday, 1=Monday, etc.)	I	I	DOW(DATVAL(date)) = 1
DOY	gives the day of the year	I	I	DOY(DATVAL(date)) = 64
MONTH	gives the months of a date	I	I	MONTH(DATVAL(date)) = 3
DYEAR	returns the year of a numerical date	I	I	DYEAR(DATVAL(date)) = 2020
DDAY	returns the day of a numerical date	I	I	DDAY(DATVAL(date)) = 100
TIMESTR	converts a numerical value (seconds since midnight) into a time string	I	C	TIMESTR(70000) = 19:26:40
TIMEVAL	converts a time string into a numerical value (seconds since midnight)	C	I	TIMEVAL('12:28:12') = 44892

## Database

Name	Description	Parameter(s)	RT	Example
FIELD	gives the name of the field (according to field list)	I	C	FIELD(10) =
FLDINF	gives field information (according to field list)	I	C	FLDINF(10) =
FLDLEN	returns the length of a data field	C		FLDLEN('fname') = 25
FLDPOS	returns the position of a data field in the buffer			FLDPOS('fname') = 2
FULLTEXT	full text search in the current record	C	I	FULLTEXT('name') = 0
GRAW	gets data from the buffer	I (position of the field) I (length of the field)	C	GRAW(2,10) ='Anonymous'

## Logical

Name	Description	Parameter(s)	RT	Example
NOT	logical negate	I	I	NOT(4) = 0 NOT(0) = 1

## Type conversion

Name	Description	Parameter(s)	RT	Example
CHR	number to char	I (0 .. 255)	C	CHR(65) = 'A'
DECIM	converts a hexadecimal number into an integer	C	I	DECIM('FF') = 255
INT	cuts the decimal part from a real number without rounding	N	R	INT(12.9) = 12 INT(100) = 100
HEX	converts a integer into a hexadecimal number	I	C	HEX(255) = 'FF'
ORD	converts a char into the ASCII value	C (char)	I	ORD('@') = 64
REAL	converts an integer into a real number	I	R	REAL(6) = 6
STR	converts a number into a string	1 = N [2 = I (length)] [3 = I (decimals)]	C	STR(12.5) = 12.5 STR(12.5,5) = ' 12.5' STR(12.5,7,2) = ' 12.50'
TRUNC	converts a real number into an integer without rounding	N	I	TRUNC(2.2) = 2 TRUNC(9.9) = 9
VAL	converts a string into a number	C	R	VAL('12.5') = 12.5 VAL('x') = error
XSTR	converts a number into a string, but inserts commas	1 = N [2 = I (length)] [3 = I (decimals)]	C	XSTR(10^7) = 10,000,000

**Without type**

Name	Description	Parameter(s)	RT	Example
IFF	a value is returned, depending on the result of a condition	1 = I (condition) 2 = CN (if true) 3 = CN (if false)	CN	IFF(3>2,'true','false') = 'true' IFF(name="",0,len(name))=12

**System**

Name	Description	Parameter(s)	RT	Example
FUNCINFO	gives information about a function	I	C	FUNCINFO(15) = DELETE(C,I,I) = C
SYMBOL	returns a value or 0, depending whether a variable or field exists	C	I	? SYMBOL('author') = 5

***Variables and constants***

<b>Variable</b>	<b>Constant</b>
Its value may change.	Its value does not change.
Are declared during programme execution. Data fields are also variables but are declared by the DBMS when opening a table	Are not declared.
Variables have a type through declaration.	Constants have a type, but are not declared.

## Commands

### *Conventions in the formal description*

<const>	Character constant
<cvar>	Character variable
<iconst>	Integer constant
<ivar>	Integer variable
<const>	Constant without type (!)
<var>	Variable without type (!)
&	macro operator
<&cvar>	Character variable
<&ivar>	Integer variable
<const   &cvar>	= or
[ ]	optional
<expression>	complex combination of variables and constants

Where a <var> is allowed not always a <const> is allowed and viceversa.

Set of constants:

<on | off>

< 1 | 0>

<A | B | O | Q>

Other keywords:

'default'      cconst

<label>      label for programme control

<format>      any format information

<array>      field of variables

<dbfield>      database field

### *Compreter directives*

**#COMMENT <on | off> | <1 | 0> (Rarely)**

Allows to insert a section of comments.

Example

```
#comment on
This programme ....
#comment off
```



**#DEBUG <on | off> | <1 | 0> (Occasionally)**

Switches Step-by-step execution on or off.

Remarks

Works only in the IDE (Integrated Developers Environment).

**#ECHO <on | off> | <1 | 0> (Rarely)**

Copy all output data to the screen on or off.

Remarks

Works only in the IDE.

**#ERROR <on | off> | <1 | 0 | 2> (Rarely)**

Defines which action is taken when an error occurs.

Parameters

ON   0	Displays error and terminates programme. Default value.
1	Displays error and queries whether programme should be terminated.
OFF   2	Does not display the error but stores the error value in the variable LASTERROR.

Remarks

When the directive is set off (value 2) and the execution of a command causes an error, in LASTERROR a value other than zero will be stored. The error can be controlled and must be handled by the user. LASTERROR becomes zero when #ERROR 2 is called again.

When an error occurs and there exist a label :onerror, the programme continues at this label in order to return to a specified table or record. This label should be used mainly in programmes called by the database through edit forms.

Example

```
#error 2
FILE test ; try to use the table test
#error 0
CMP lasterror,0 ; ask whether an error occurred
JE ok ; no error, so go to label ok
CON 'Table test not found!' ; message
JMP end ; do anything ese
:ok
CON 'Table test is ready !'
; do anything with this table
:end
EXIT
```

## #FORMAT <iconst | &ivar> (Occasionally)

Defines the output format via STRM.

### Parameters

<iconst   &ivar>	Format Definition
0	Plain – ASCII (Standard)
1	Word – Word
2	RTF – RTF
3	HTM – HTM
4	Simple RTF – simple RTF (when ANSI is exported)
5	N – ANSI

### Remarks

Take care that options 1, 2, and 4 require proper formatting (see OUT, OUTL). When the CVT command will be used (to convert the text into RTF or Word), corresponding format files (style sheets) must be available. The RTF style sheets can be created in Application library / Options / Tools / Edit style sheets 2.0. Word conversion is outdated.

### Errors

1 Macro evaluation of the first parameter failed

### Example

```
#format RTF
```

## #I <programme file> (Rarely)

Adds another programme file to the current programme.

### Parameters

<programme file>	Program file to be included. If the file does not exist, the compiler will report this and abort compilation of the programme.
------------------	--

### Remarks

A so called include file may be a library of often used functions (that can be applied using the CALL command). Note that the include files are included at the very end of the programme, after the exit command. A library usually starts with the EXIT command to avoid that is executed accidentally.

### Example

```
CDA
; lot of programme stuff
EXIT
; ---- include files MUST be at the end of the programme
#I library.lib
#I c:\Users\Putzi\AppData\Roaming\Hdb2Win\HTMMLIB.LIB
```

**#PROGRAM <on | off> | <1 | 0 > (Rarely)**

Displays the current programme line.

Remarks

Works only in the IDE.

**#REFR (Rarely)**

Refresh display.

Remarks

Works only in the IDE.

**#STATUS <on | off> | <1 | 0 > (Rarely)**

Opens the status window on the right hand side of the screen.

Remarks

Works only in the IDE.

**#VAR (Rarely)**

Lists all variables with their values.

Remarks

This is a help in finding programme errors.

Example

```
DEFINE i,i ; integer variable
DEFINE r,n ; float (or real) variable
DEFINE ca,c,default,7; field of ten strings
DEFINE v,i,default,0,100 ; integer variable with an initial value of 100
DEFINE hw,c,default,0,'Hello, World' ; string variable with an initial value
of 'Hello, World'
MOV i,100 ; constant
MOV r,i+10 ; expression
MOV v,v+v ; expression
MOV hw,hw+', folks.' ; expression
;MOV ca,'Monday' ; that would cause an error
#var
```

```
I = 100
R = 110
CA =
V = 200
HW = 'Hello, World, folks.'
---
OK.
```

**#VERSION <const> (Rarely)**

Assigns a version to the programme.

**Remarks**

The version number may help if different versions exist, but all were published under the same name (as it is usual the case in programmes of applications).

**Example**

```
#version 1.2
```

**Variables****DEFINE <const | &cvar>, < C | R | I > [,<const | 'default'>[,<const>[,<const>]]] (Always)**

Defines a variable.

**Parameters**

<const   &cvar>	Name of the variable
< C   R   I >	Data type. I, integer; R, real; C, string of characters (up to 250 characters). Variables referring to record numbers in tables should always be of the integer type (I).
<const   'default'>	The constant or the reserved word 'default' refers to a programme modul. Do not put anything else than 'default'.
<const>	If the variable should be an array, here the number of elements should be indicated.
<const>	Initial value that must coincide with the data type.

**Remarks**

Variables can be defined in any place of the programme but it is recommendable to gather all definitions in the section Defines in the top section of the programme. The name of the variable must start with a letter. All variables are deleted when terminating the programme. When persistent variables are needed, they must be declared with a different owner ID, and with preference in a PTX start file.

**Errors**

- 1 Macro evaluation of the first parameter failed
- 2 ID constant (third parameter) is invalid (must be an integer value)
- 3 Field dimension constant (fourth parameter) is invalid (must be an integer value)
- 4 The variable could not be created (probably because it already exists, or it is an reserved or invalid name)
- 5 The initial value is invalid and could not be assigned to the variable (possibly a data type error)

**Example**

```
DEFINE i,i ; integer variable
DEFINE rl,r ; float (or real) variable
DEFINE ca,c,default,10 ; field of ten strings
DEFINE v,i,default,0,100 ; integer variable with an initial value of 100
DEFINE hw,c,default,0,'Hello, World' ; string variable with an initial value
of 'Hello, World'

#var
```

```
I =
RL =
CA =
V = 100
HW = 'Hello, World'
---
OK.
```

### **FNC <var>,<expression> (Rarely)**

Assigns a function to a variable.

#### Parameters

<var>                                   The name of the function is a variable that must be have declared before.  
 <expression>                         The expression must have the same result type as the function.

#### Remarks

This command helps to shorten complicated expressions.

#### Errors

1     Evaluating the expression caused an error

#### Example

```
DEFINE    cfunc, c
DEFINE    i, i
FNC       cfunc, IFF (i=0, 'Sunday', IFF (i=6, 'Saturday', 'week day'))
MOV       i, dow (datval (date))
CON       'Today is a '+cfunc
```

### **SX <const | &cvar> (Rarely)**

A request whether a certain variable exists.

#### Parameters

<const | &cvar>                       Variable to be checked.

#### Errors

1     Macro evaluation of the first parameter failed

#### Example

```
SX        name
JE        ok
DEFINE    name, c
:ok
#var

NAME =
---
OK.
```

**MOV <var>,<const | var | expression> (Always)**

Assigns a value to a variable.

**Parameters**

<var>	Name of a variable
<const   var   expression>	A constant, a variable, an numerical or character expression, or the content of a data field can be assigned to a variable. To assign a value to field variables, the command STOR must be used.

**Remarks**

Assigns the expression of the right hand side to the variable of the left hand side. MOV is a very important and often used command.

**Errors**

- 1 Memory allocation problem (anything internally that should not happen)
- 2 Parsing : one of the parameters is invalid (variable or data field probably unknown) or expression simply invalid
- 3 Could not write value into variable (because it is probably a constant)
- 4 Could not write value into variable (because the data types are not compatible)
- 5 The second parameter could not be resolved
- 6 Could not write value into variable or data field

**Example**

```

DEFINE i,i ; integer variable
DEFINE r,n ; float (or real) variable
DEFINE ca,c,default,7; field of ten strings
DEFINE v,i,default,0,100 ; integer variable with an initial value of 100
DEFINE hw,c,default,0,'Hello, World' ; string variable with an initial value
of 'Hello, World'
MOV i,100 ; constant
MOV r,i+10 ; expression
MOV v,v+v ; expression
MOV hw,hw+', folks.' ; expression
;MOV ca,'Monday' ; that would cause an error
#var

```

```

I = 100
R = 110
CA =
V = 200
HW = 'Hello, World, folks.'
---
OK.

```

**MMOV <var | &var>,<const | var | expression | &var> (Rarely)**

Assigns a value to a variable with involved macro operators.

**Parameters**

<var   &var>	Name of a variable. Macro operators are allowed.
<const   var   expression   &var>	A constant, a variable, an numerical or character expression, or the content of a data field can be assigned to a variable. To assign a value to field variables, the command STOR must be used.

**Remarks**

Assigns the expression of the right hand side to the variable of the left hand side with macro operators involved. This is very rarely the case.

**Errors**

- 1 Memory allocation problem (anything internally that should not happen)
- 2 Parsing : one of the parameters is invalid (variable or data field probably unknown) or expression simply invalid
- 3 Could not write value into variable (because it is probably a constant)
- 4 Could not write value into variable (because the data types are not compatible)
- 5 Evaluating the expression caused an error
- 6 Could not write value into variable (not exist? wrong type?)
- 11 Macro evaluation of the first parameter failed
- 12 Macro evaluation of the second parameter failed

**STOR <array>,<iconst | ivar>,<var | expression> (Occasionally)**

Writes a value into an array.

**Parameters**

<array>	The array variable.
<iconst   ivar>	The index in the array.
<const   var   expression>	The value that should be stored in the array.

**Remarks**

The lowest index is 1, the highest that indicated in the corresponding DEFINE command. Array values will be obtained using brackets.

**Errors**

- 1 Macro evaluation of the first parameter failed
- 2 Variable does not exist
- 3 Variable is not an array
- 4 Memory allocation problem (anything internally that should not happen)
- 5 Parsing : index or expression are invalid (variable or data field probably unknown)
- 6 Could not write value into variable (because the data types are not compatible)
- 7 Evaluating the index caused an error
- 8 Evaluating the expression caused an error

## Example

```
DEFINE ar,c,default,7
STOR ar,1,'Monday'
STOR ar,2,'Tuesday'
CON ar[1]+' / '+ar[2]+' / '+ar[3]
```

Monday / Tuesday /

---

OK.

## **RANDOM <nvar> (Very rarely)**

Returns a random value between 0 and 1.

### Parameters

<nvar> Variable for the random value.

### Remarks

Generates a random values and stores it in the given variable.

### Errors

- 1 Parameter(s) is/are lacking
- 2 Could not write value into variable (not exist? wrong type?)

### Example

```
define n,nv
random nv
con nv
exit
```

## ***Program control***

### **REQ <const | &cvar>,<iconst>[,<ivar>] (Regularly)**

Opens a message box.

### Parameters

<const | &var> Text of the question.

<iconst> Mode describes which buttons should appear:

0 – OK

3 – YES + NO + CANCEL

1 – OK + CANCEL

4 – YES + NO

2 – ABORT + RETRY + IGNORE

5 – RETRY + CANCEL

<ivar> Optional variable for the result (which button has been selected):

1 – OK

2 – CANCEL

3 – ABORT

4 – RETRY

5 – IGNORE

6 – YES

7 – NO

8 – CLOSE

9 – HELP



## Remarks

REQ is the classical Windows dialog box. The return value is optional.

## Errors

- 1 Macro evaluation of the first parameter failed
- 2 Invalid numerical expression
- 3 Could not write value into variable or data field

## Example

```

DEFINE    iq,i
DEFINE    sf,c
FSEL      sf,*.bak
REQ       &("Do you want to delete the file "+sf+"?"),4,iq ; 4 = YES | NO
CMP       iq,7 ; NO
JE        nodel
FDEL      &sf ; File is deleted
REQ       &("File "+sf+" was deleted."),0 ; return value is optional
:nodel

```

## **XREQ <cconst | &cvar>,<iconst>[,<ivar>[,<ivar>]] (Rarely)**

Opens a message box with more options.

## Parameters

<cconst   &cvar>	Text of the question.
<iconst>	Mode describes which buttons should appear: bit 1 (1) – OK bit 2 (2) – YES bit 3 (4) – NO bit 4 (8) – CANCEL bit 5 (16) – (small question box)
<ivar>	Optional variable for the result (which button has been selected): 1 – OK 2 – YES 4 – NO 8 – CANCEL
<ivar>	Optional variable for the result (whether the small box was marked): 1 – NO 2 – YES

## Remarks

XREQ allows in comparison to REQ to store the result globally and apply it automatically if the user wants it. Both return values are optional.

## Errors

- 1 Macro evaluation of the first parameter failed
- 2 Macro evaluation of the second parameter failed
- 3 Invalid numerical expression
- 4 Could not write value into variable (not exist? wrong type?)

5 Could not write value into variable (not exist? wrong type?)

### Example

```
DEFINE    iq,i
DEFINE    io,i
XREQ      "Do you want to create the index file?",22,iq,io ; YES + NO + small box
CMP       iq,2 ; NO
JE        noindex
; INDEX ...
:noindex
CON       "You will be futurely "+IFF(io=1,"not","")+ " be asked."
```

### CALL <label> (Occasionally)

Call of a subroutine.

### Remarks

The command continues at the indicated label and returns with the command after the CALL command when coming to the return command (RET). They should be located at the very end of the programme, still behind the EXIT command. They can be also gathered in a programme library that is indicated behind the EXIT command:

EXIT

#i library.lib

This library is another programme file that starts with the command EXIT to avoid that it is started accidentally. Large projects that gather hundreds of lines usually work with libraries. Parameters must be transmitted through variables.

### Example

```
CALL      outputimage
...
EXIT
; --- subroutines following here
:outputimage
OUT       image
...
RET
```

### RET (Occasionally)

Returns after proceeding a subroutine to the calling command.

### Remarks

See under CALL for explanation.

### EXIT (Always)

Terminates the programme.

**TERM (Very rarely)**

Terminates the execution of the database system after termination the interpreter.

## Remarks

This command is only used for installation purposes or programme updates.

***Conditions and programme flow*****CMP <expression>, <expression> (Always)**

Compares two expressions.

## Parameters

<expression>                      Left expression.  
<expression>                      Right expression.

## Remarks

Depending on the result, two flags are set: the EQUAL flag if the two expressions are equal and the ABOVE flag if the left expression is larger than the right one. CMP should be followed by one of these commands: JE, JNE, JA, JAE, JB, JBE.

## Errors

- 1 Memory allocation problem (anything internally that should not happen)
- 2 Parsing : one of the parameters is invalid (variable or data field probably unknown) or expression simply invalid
- 3 Parameter(s) is/are lacking
- 4 Parameter(s) is/are lacking
- 5 Evaluating the expression caused an error

## Example

```
DEFINE   i, i
MOV      i, 10
CMP      i, 100
JE       equal   ; no
JA       above   ; no
JB       below   ; yes
```

**SFLT <expression> (Rarely)**

Sets a global filter.

## Remarks

The filter is valid for the commands CND, CPY, ADDF, ADDR, CMPR, BRW. Do not confound this filter with the field list. For some operations, the table must be opened using FILE, not OPEN.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Memory allocation problem (anything internally that should not happen)
- 3 Could not resolve the condition (complex error, see history)

## Example

```
FILE      authors
SFLT      recno<50
BRW
```

## CND (Rarely)

Checks whether or not a condition is fulfilled.

## Remarks

The condition can be set by an external programme (for instance the database machine) or by the command SFLT. If the condition is fulfilled, the EQUAL flag is set. A following JE (jump if equal) proceeds with the command next to the indicated label.

## Errors

1      Could not resolve the condition (complex error, see history)

## Example

```
FILE      authors
RESET
SFLT      substr(fname,6,1)='a'
:begin
CND
JNE       skip      ; jump if not equal
CON       fname
:skip
SKIP
JNEOF     begin
FILE
```

```
Ali-Zade
Arzamastsev
Beauvais
Beauvais
Vrblyanski
Bhargava
...
---
OK.
```

## CFLT (Rarely)

Clears the global filter.

## JMP <label> (Regularly)

Continues the programme at the label without condition.

## Remarks

Forces the programme to continue at the given label.

### **JE <label> (Always)**

Continues the programme at the label if the compared values are equal.

#### Remarks

JE is preceded by a CMP command. The programme continues at the label when the EQUAL flag is set after a comparison.

#### Example

```
FILE      genera
RESET
:begin
CMP       gname, ''
JE        genusempty
CON       genus
:genusempty
SKIP
JNEOF    begin
```

### **JNE <label> (Always)**

Continues the programme at the label when the preceding comparison results in not equal.

#### Remarks

Must be preceded by a CMP command. The programme continues at the label when the EQUAL flag is not set after a comparison.

#### Example

```
CMP       dow(datval(date)),0
JNE       workday
CON       'Sunday'
JMP       exit
:workday
CON       'Monday to Saturday'
:exit
```

### **JA <label> (Regularly)**

Continues the programme at the label if the left expression of a comparison is larger.

#### Remarks

This command follows directly after a CMP command. The programme continues at the label when the ABOVE flag is set after a comparison.

#### Example

```
CMP       6,5
JA        larger ; yes, the programme continues at larger
              ; because 6 ist larger than 5
; ...
:larger
CMP       1,1
JA        notlarger ; does not jump to notlarger
              ; because the values are equal
```

**JAE <label> (Regularly)**

Continues the programme at the label if the left expression is larger or equal to the left.

**Remarks**

JAE is preceded by a CMP command. The programme continues at the label when the both ABOVE and EQUAL flag is set after a comparison.

**Example**

```
CMP      value,100
JAE      v1; jumps if value>=100
```

**JB <label> (Regularly)**

Continues the programme at the label if the left expression of a comparison is smaller.

**Remarks**

This command follows directly after a CMP command. The programme continues at the label when neither the EQUAL nor the ABOVE flag is set after a comparison.

**Example**

```
CMP      6,5
JB       smaller ; the programme does not continues at smaller
           ; because 6 ist larger than 5
; ...
:smaller
CMP      1,1
JB       notlarger ; does not jump to notlarger
           ; because the values are equal
```

**JBE <label> (Regularly)**

Continues the programme at the label if the left expression is below or equal to the right expression.

**Remarks**

JBE is preceded by a CMP command. The programme continues at the label when the ABOVE flag is not set after a comparison. The EQUAL flag has no meaning.

**Example**

```
CMP      value,100
JBE      v1; jumps if value<=100
```

**JNEOF <label> (Always)**

Continues the programme at the label if the end of the table has not been reached.

**Remarks**

This command (Jump if Not End Of File) is used if a table is systematically revised until the end of the table is reached.

**Example**

```
DEFINE   rv,n
FILE     payments
```

```

RESET
:begin
MOV      rv,rv+amount
SKIP
JNEOF    begin    ; if the end of the table is NOT reached, the programme
                ; continues with the :begin label, otherwise it goes on
CON      `Total : `+str(rv)
FILE

```

## ***File system***

### **CDA (Occasionally)**

Sets the current directory to the place where the interpreter programme is stored.

#### Remarks

Let's assume the default working directory is `c:\Users\<username>\AppData\Roaming\Hdb2Win\` but your data are stored in `e:\data\fossils\`, also most programmes will be stored in `e:\data\fossils\`. Calling CDA sets the current directory from `...\Hdb2Win\` to `e:\data\fossils\`.

#### Errors

1 Invalid path

### **CD <const | &cvar> (Occasionally)**

Selects a file path.

#### Parameters

<&const>                      The path to be selected.

#### Errors

1 Macro evaluation of the first parameter failed  
 2 Invalid path

#### Example

```

CD      e:\paleo\database
CD      &path    ; path is a variable

```

### **MD <const | &cvar> (Rarely)**

Creates a new directory.

#### Parameters

<const | &cvar>                Name of the directory.

#### Errors

1 Macro evaluation of the first parameter failed  
 2 Error creating the directory

#### Example

```

MD      data

```

**DSEL <cvar>[,<0 | 1>] (Occasionally)**

Selection of a directory.

**Parameters**

<cvar>                                    Variable for the selected path.  
<0 | 1>                                    Optional value that defines whether the change of the drive is allow (1) or not (0).

**Errors**

- 1     Parameter(s) is/are lacking
- 2     Macro evaluation of the first parameter failed
- 3     Variable does not exist
- 4     Could not write value into variable (not exist? wrong type?)

**Example**

```
DEFINE    dn, c
DSEL      dn
CON       dn
```

**FFND <const | &cvar>,<cvar>[,<ivar>] (Occasionally)**

Searches a file.

**Parameters**

<const | &cvar>                        Search mask.  
<cvar>                                    Variable for the filename.  
<ivar>                                    Optional file attribute.

**Remarks**

This command is used to initialize file searching. To get the next file use NFND.

**Errors**

- 1     Macro evaluation of the first parameter failed
- 2     The file name could not be assigned to the variable (does not exist, or a data type error)
- 3     The attribute could not be assigned to the variable (does not exist, or a data type error)

**Example**

```
DEFINE    s, c
DEFINE    i, i
FFND      *.prf, s, i
CON       s
CON       i
```

```
$test.PRF
128
---
OK.
```



**NFND <cvar>[,<ivar>] (Occasionally)**

Continues with file searching.

**Parameters**

<cvar>                                    Variable for the filename.  
 <ivar>                                    Optional file attribute.

**Remarks**

The command FFND should be used before using NFND.

**Errors**

- 1     The command FFND must used before NFND
- 2     The file name could not be assigned to the variable (does not exist, or a data type error)
- 3     The attribute could not be assigned to the variable (does not exist, or a data type error)

**Example**

```
DEFINE    s,c
DEFINE    i,i
FFND     b*.prf,s,i
:begin
CMP       s,``
JE        notmorefiles
CON       s+' ('+str(i)+' )'
NFND     s,i
JMP       begin
:notmorefiles
CON       "That's all."
```

```
BINOM1.PRF (128)
BT2PAS.PRF (128)
That's all.
---
OK.
```

**FSEL <cvar | &cvar>[,<cconst>[,<cconst | &cvar>]] (Rarely)**

Selects a file.

**Parameters**

<cvar | &cvar>                            Character variable or macro with variable for the result.  
 <cconst>                                 Optional character constant for the file search mask.  
 <cconst | &var> Optional constant or macro with initial path.

**Remarks**

Selects a file. If the selection is canceled the programme will stop.

**Errors**

- 1     Parameter(s) is/are lacking
- 2     Macro evaluation of the third parameter failed
- 3     Macro evaluation of the first parameter failed
- 4     Macro evaluation delivered an empty string

5 Could not write value into variable (not exist? wrong type?)

### Example

```
DEFINE    fname,c
FSEL     fname,*.txt
FSEL     fname,*.db2,e:\paleo\database
```

## **FILEX <const | &cvar> (Occasionally)**

Checks whether a file exists.

### Parameters

<const | &var>                      File name.

### Remarks

The result of the command sets the EQUAL flag. After calling FILEX the command JE or JNE should follow.

### Errors

- 1     Parameter(s) is/are lacking
- 2     Macro evaluation of the first parameter failed

### Example

```
FILEX    authors.dbf
JE       found
CON     'Not found : authors.dbf'
JMP     end
:found
CON     'File found : authors.dbf'
:end
EXIT
```

## **FSIZE <const | &cvar> , <ivar> (Rarely)**

Gets the file size in byte of a file.

### Parameters

cconst | [&]cvar                    Filename (Char) as constant or variable with macro operator.  
ivar                                  Integer variable for the return value.

### Remarks

Evaluation of the length of a file in byte. Returns -1 if the file was not found (programme will not interrupt, but you have to handle the reported file size). Long names are supported.

### Errors

- 1     Parameter(s) is/are lacking
- 2     Second parameter is lacking
- 3     Macro evaluation of the first parameter failed
- 4     Could not write value into variable (not exist? wrong type?)

### Example

```
DEFINE    ifs,i
FSIZE    $test.prf,ifs
```

```
CON      ifs
FSIZE    doesntexist.txt,ifs
CON      ifs

249
-1
---
OK.
```

### **CPF <cconst | &cvar>,<cconst | &cvar>[,<cconst | &cvar>] (Rarely)**

Copies a file.

#### Parameters

<cconst   &cvar>	Source file.
<cconst   &cvar>	Target path.
<cconst   &cvar>	Optional target file name.

#### Remarks

The command copies any given file to another path. If no target file name is indicated, the target file has the same name as the source file.

#### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Macro evaluation of the second parameter failed
- 3 Macro evaluation of the third parameter failed
- 4 Complex file copy error (see history)

#### Example

```
CPF      *.txt,\copy\  
CPF      name.db2,,newname.db2
```

### **FDEL <cconst | &cvar> (Rarely)**

Deletes one or more files.

#### Parameters

<cconst   &cvar>	File mask.
------------------	------------

#### Remarks

Take care with this command, there is no request.

#### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Parameter(s) is/are lacking

#### Example

```
FDEL     *.BAK
```

## ***Screen input/output***

### **CON <const | var | expression> (Always)**

Screen output.

#### Remarks

This commands has only effect within the IDE or if an output screen is defined. Each CON output is written in a separate line. CON without parameter clears the output area.

#### Errors

1 Expression invalid

#### Example

```
CON      date
CON      time
CON      1+1
CON      100*10
CON      `Hello `+'World`
```

```
04.03.2018
13:09:39
2
1000
Hello World
---
OK.
```

### **CONX <const | var | expression> (Occasionally)**

Screen output.

#### Remarks

The difference to CON is, that the result is written in the same line.

#### Errors

1 Expression invalid

#### Example

```
FILE      authors
RESET
:begin
CONX      recno
SKIP
JNEOF     begin
```

### **KBD <cconst | &cvar>,<var>[,<C | N>] (Regularly)**

Reads a value from the screen.

#### Parameters

<cconst   &cvar>	Description of the value
<var>	Variable
<C   N>	Optional datatype (C for character, N for numerical)

## Errors

- 1 Macro evaluation of the first parameter failed
- 2 Variable does not exist
- 3 The value could not be assigned to the variable (possibly a data type error)

## Example

```
DEFINE    name, c
DEFINE    year, i
KBD      'Enter name', name, C
KBD      'Enter year', year, N
```

## **SELCOL <cvar>[,<D | H>] (Rarely)**

Selects a color from a color palette.

### Parameters

<cvar>                                Variable where the colour will be stored.  
 [<D | H>]                            Optional selection of the format, (H) for hexadecimal, (D) for decimal.

### Remarks

Take into account that the variable is a character not an integer. When the selection was not successful (= canceled), nothing will be assigned to the variable.

## Errors

- 1 Could not write value into variable (not exist? wrong type?)

## Example

```
DEFINE    sc, c
SELCOL    sc, H
CON      'Selected color '+sc
```

## **OPT.INI <iconst | &ivar>[,<cconst | &cvar>[,<iconst>[,<iconst>]]] (Regularly)**

Creates an option table.

### Parameters

<iconst | &ivar>                    Number of items.  
 <cconst | &cvar>                    Optional heading.  
 <iconst>                            Does not allow the selection of more than one option when set to 1. Optional.  
 <iconst>                            Forces to convert the header from ASCII to ANSI when set to 1. Optional.

### Remarks

To use a table of (programme) options, this command must be the first. The caption is optional, but has to be used when a third and/or fourth parameter is applied.

## Errors

- 1 Macro evaluation of the first parameter failed
- 2 Invalid numerical expression
- 3 Macro evaluation of the second parameter failed

## Example

```

DEFINE    res,i
OPT.INI   3,"Select value ... ",1
OPT.LBL   1,'100'
OPT.LBL   2,"1,000"
OPT.LBL   3,"10,000"
OPT.SET   1,1
OPT.EXE
OPT.ONE   res
CMP       res,0    ; Canceled
JE        exit
CON       `Your selection : `
CON       STR(IFF(res=1,100,IFF(res=2,1000,10000)))
:exit
EXIT

```

### **OPT.LBL** <iconst | &ivar>,<cconst | &cvar> (Regularly)

Assigns a label to a specified option in the list.

#### Parameters

<iconst   &ivar>	Number of the option.
<cconst   &cvar>	Label.

#### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Invalid numerical expression
- 3 Macro evaluation of the second parameter failed

### **OPT.SET** <iconst | &ivar>,<iconst | &ivar> (Occasionally)

Sets or clears an option.

#### Parameters

<iconst>	Number of the option in the list.
<iconst>	Zero clears the box, 1 marks it.

#### Errors

- 1 Invalid numerical expression
- 2 Macro evaluation of the first parameter failed
- 3 Macro evaluation of the second parameter failed

### **OPT.ENB** <iconst | &ivar>,<iconst | &ivar> (Rarely)

Enables or disables an option.

#### Parameters

<iconst   &ivar>	Number of the option in the list.
<iconst   &ivar>	Zero disables the option, any value different from zero enables it.

#### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Invalid numerical expression

- 3 Macro evaluation of the second parameter failed
- 4 Invalid numerical expression

### Example

```

DEFINE    iopt1,i
DEFINE    iopt2,i
DEFINE    iopt3,i

OPT.INI   4,"Mother's birthday..."
OPT.LBL   1,"Call mom in the morning"
OPT.LBL   2,"Buy flowers"
OPT.LBL   3,"Get the pie"
OPT.LBL   4,"Meet later the boys at the pub"
OPT.ENB   4,0      ; Option 4 is disabled and cannot be selected
OPT.EXE
OPT.RES   1,iopt1
OPT.RES   2,iopt2
OPT.RES   3,iopt3

```

### **OPT.RD** <ccont | &cvar> (Occasionally)

Reads options from a file.

#### Parameters

<ccont | &cvar>                      Textfile.

#### Remarks

Normally the option file was created by the command OPT.WR.

#### Errors

- 1 Option object not created (OPT.INI)
- 2 Macro evaluation of the first parameter failed
- 3 Textfile not found or could not be opened
- 4 The text file has a format error

### Example

```

OPT.INI   3
OPT.LBL   1,'ABC'
OPT.LBL   2,'DEF'
OPT.LBL   3,'GHI'
FILEX    optfile.opt
JNE      exe
OPT.RD   optfile.opt
:exe
OPT.EXE
OPT.WR   optfile.opt

```

### **OPT.EXE** [<ivar>] (Regularly)

Requests the options.

#### Parameters

[<ivar>]                      Bitwise coded initial values (that overruns values set by OPT.SET). If the option is not enabled, the value is not set. The same variable returns the result. <ivar> must be a variable, it may not be a constant value.

## Remarks

This command must be preceded by OPT.INI and OPT.LBL. When the operation is canceled, the programme will be aborted. From version 2.4.2 on: an optional parameter (that must be a variable) may contain bitwise coded initial values (that overruns values set by OPT.SET). In the same variable, the results are bitwise returned.

## Errors

- 1 Evaluating the variable caused an error
- 2 Invalid numerical expression
- 3 Could not write value into variable (not exist? wrong type?)

## Example

```
define    iopt,i
reg.rint  user.myapp.programmes.analisis1.option1,iopt
opt.ini   5,"Options 1"
; ...
opt.exe   iopt
reg.write user.myapp.programmes.analisis1.option1,iopt
```

## **OPT.RES <iconst | &ivar>,<ivar> (Regularly)**

Returns the result of a option in the list.

### Parameters

<iconst   &ivar>	Number of option.
<ivar>	Variable to store the result.

## Errors

- 1 Invalid numerical expression
- 2 Could not write value into variable (not exist? wrong type?)
- 3 Macro evaluation of the first parameter failed

## Example

```
DEFINE    iopt1,i
DEFINE    iopt2,i
DEFINE    iopt3,i

OPT.INI   4,"Mother's birthday..."
OPT.LBL   1,"Call mom"
OPT.LBL   2,"Buy flowers"
OPT.LBL   3,"Get the pie"
OPT.LBL   4,"Hang out in the bar"
OPT.ENB   4,0
OPT.EXE
OPT.RES   1,iopt1
OPT.RES   2,iopt2
OPT.RES   3,iopt3
```



**OPT.ONE <ivar> (Occasionally)**

Store the first (or only) selected option.

## Parameters

<ivar>                                      Variable to store the value.

## Errors

- 1      Could not write value into variable (not exist? wrong type?)

**OPT.WR <ccont | &cvar> (Occasionally)**

Writes the options to a file.

## Parameters

<ccont | &cvar>                              Textfile.

## Errors

- 1      Option object not created (OPT.INI)
- 2      Macro evaluation of the first parameter failed
- 3      Could not create the file (? invalid name or path)

**LB.TOC <ivar> (Rarely)**

Assigns the token of a listbox to a variable.

## Parameters

<ivar>                                      Token of the listbox.

## Remarks

This command is only used for process communication, e.g. when a programme needs the address of a listbox to write items.

## Errors

- 1      Memory allocation problem (anything internally that should not happen)
- 2      Evaluating the first parameter caused an error
- 3      Evaluating the expression caused an error
- 4      Invalid numerical expression

**LB.CLR (Rarely)**

Clears the listbox.

## Remarks

The command LB.TOC must be applied before using this command.

## Errors

- 1      The object (label, listbox, image) is unknown

**LB.ADD <ccont | &cvar> (Rarely)**

Adds an item to a listbox.

**Parameters**

<ccont | &cvar>                   Item to be added.

**Remarks**

The command LB.TOC must be applied before using this command.

**Errors**

- 1     Memory allocation problem (anything internally that should not happen)
- 2     Evaluating the expression caused an error
- 3     The object (label, listbox, image) is unknown
- 4     Evaluating the expression caused an error

**LB.SEL <ivar> (Rarely)**

Sets the current item in the list box.

**Parameters**

<ivar>                            Item to be set.

**Remarks**

The command LB.TOC must be applied before using this command. If the listbox is empty or the item above the capacity of the listbox, the command is ignored.

**Errors**

- 1     Memory allocation problem (anything internally that should not happen)
- 2     Evaluating the expression caused an error
- 3     The object (label, listbox, image) is unknown
- 4     Evaluating the expression caused an error
- 5     Invalid numerical expression

**LB.CAP <ivar> (Rarely)**

Stores the capacity of a listbox in a variable.

**Parameters**

<ivar>                            Variable.

**Remarks**

The command LB.TOC must be applied before using this command.

**Errors**

- 1     The object (label, listbox, image) is unknown
- 2     Could not write value into variable (not exist? wrong type?)

**LB.IDX <ivar> (Rarely)**

Stores the currently selected item of a listbox in a variable.

**Parameters**

<ivar>                                      Variable.

**Remarks**

The command LB.TOC must be applied before using this command.

**Errors**

- 1     The object (label, listbox, image) is unknown
- 2     Could not write value into variable (not exist? wrong type?)

**LS.INI <ccont | &cvar>[,<0 | 1>] (Rarely)**

Initiated a list from which an item can be selected.

**Parameters**

<ccont | &cvar>                              Caption of the list.  
<0 | 1>                                      When 1, the caption is converted into ANSI.

**Errors**

- 1     Macro evaluation of the first parameter failed

**Example**

```
DEFINE    isel, i
DEFINE    ssel, c
LS.INI    `Select`
LS.ADD    `Monday`
LS.ADD    `Tuesday`
LS.ADD    `Wednesday`
LS.SIZE   400, 300
LS.EXE    isel, ssel
CON       isel
CON       ssel
```

**LS.ADD <ccont | &cvar> (Rarely)**

Adds an item to the list.

**Parameters**

<ccont | &cvar>                              The item to be added.

**Errors**

- 1     Macro evaluation of the first parameter failed

**LS.SIZE <ivar>,<ivar> (Rarely)**

Defines the size of the form.

**Parameters**

<ivar>                                   Width of the form.  
<ivar>                                   Height of the form.

**Errors**

- 1     Invalid numerical expression

**LS.EXE <ivar>[,<cvar>] (Rarely)**

Returns the result of the selection.

**Parameters**

<ivar>                                   Number of the item in the list that was selected.  
<cvar>                                   Optionally the selected item.

**Errors**

- 1     Could not write value into variable (not exist? wrong type?)
- 2     Could not write value into variable (not exist? wrong type?)

**Example**

```
DEFINE    isel, i
DEFINE    ssel, c
LS.INI    `Select`
LS.ADD    `Monday`
LS.ADD    `Tuesday`
LS.ADD    `Wednesday`
LS.SIZE   400, 300
LS.EXE    isel, ssel
CON       isel
CON       ssel
```

**LAB.TOC <ivar> (Rarely)**

Assigns the token of a label to a variable.

**Remarks**

This command is only used for process communication, e.g. when a programme needs the address of a label to write a caption.

**Errors**

- 1     Memory allocation problem (anything internally that should not happen)
- 2     Evaluating the first parameter caused an error
- 3     Evaluating the expression caused an error
- 4     Invalid numerical expression

## LAB.CAP <ccont | cvar> (Rarely)

Assigns a caption to a label.

### Parameters

<ccont | cvar>                      Text that should be assigned to the label.

### Remarks

Before using LAB.CAP, LAB.TOC should be used. The most frequent application is the function of showing a small blue text box at the top of various tables in the application library of the database.

### Errors

- 1     Memory allocation problem (anything internally that should not happen)
- 2     Evaluating the first parameter caused an error
- 3     The object (label, listbox, image) is unknown
- 4     Evaluating the expression caused an error

### Example

```
LAB.TOC    lbparam  
LAB.CAP    genent_s
```

## IMG.TOC <ivar> (Rarely)

Assigns the token of a image area to a variable.

### Parameters

<ivar>                              Token of the image. The image must be declared in a FRM file with the ID number 198. The token will be assigned by the database to the variable imparam.

### Remarks

This command is only used for process communication, e.g. when a programme needs the address to display an image.

### Errors

- 1     Memory allocation problem (anything internally that should not happen)
- 2     Evaluating the first parameter caused an error
- 3     Evaluating the expression caused an error
- 4     Invalid numerical expression

### Example

```
IMG.TOC    imparam  
IMG.SHOW   &pcrecord.pgraph
```

**IMG.SHOW <const | &var> (Rarely)**

Shows an image.

**Parameters**

<const | &var>                      Filename.

**Remarks**

The command IMG.TOC must have been executed before.

**Errors**

- 1     Macro evaluation of the first parameter failed
- 2     The object (label, listbox, image) is unknown

**ALB.CR <iconst|&ivar>[,<const|&cvar>] (Rarely)**

Opens an album of images.

**Parameters**

<iconst|&ivar>                      The size of the album in percent from the screen size. The value must be between 11 and 100.

[,<const|&cvar>]                      An optional caption of the album.

**Remarks**

An album is an rectangular area where up to 48 images can be displayed. These images comes normally from a table. This command creates the album.

**Errors**

- 1     Macro evaluation of the first parameter failed
- 2     Percent value must be larger than 10 and lower than 100
- 3     Macro evaluation of the second parameter failed

**Example**

```
ALB.CR     80, 'My first Album'
```

**ALB.ADD <const|&cvar>[,<const|&cvar>] (Rarely)**

Adds an item (an image) to the album.

**Parameters**

<const|&cvar>                      The name of the file.

[,<const|&cvar>]                      An optional caption.

**Remarks**

The item must be an image file.

**Errors**

- 1     Album is not opened (use ALB.CR beforehand)
- 2     Macro evaluation of the first parameter failed

### 3 Macro evaluation of the second parameter failed

#### Example

```
; This programme shows all images of
; the type specimens of a selected
; genus of a PaleoTax database.
; --- settings ...
#echo off
#debug off
#format plain
; --- defines ...
define    igenus,i
define    itypesp,i
define    scaption,c
; --- programme ...
cda
open      types,4
open      dbpictur,4
file      genera
rsel      `Select genus`,igenus,0
cmp       igenus,0
je        exit
go        igenus
alb.cr    80,&gname
file      types
reset

:beginotypes
cmp       t_spec.c_genus,igenus
jne       skiptypes
con       t_spec.key
mov       itypesp,t_specmn
mov       scaption,t_specmn.spmncoll.acronym+#32+t_specmn.spmnno
file      dbpictur
reset

:beginimages
cmp       dbrecord,ityesp
jne       skipimages
cmp       at(`.SPECMENS`,owner),0
je        skipimages
alb.add   &(pcrecord.pgraph,2,200),&scaption

:skipimages
skip
jneof     beginimages
file      types
:skiptypes
skip
jneof     begintypes
alb.show

:exit
exit
```

**ALB.SHOW [<ivar>] (Rarely)**

Displays the album.

## Parameters

[<ivar>] Returns optionally the value of a tagged item.

## Remarks

Shows the album. If no items were added, no album is shown. An optional variable stores the selected image.

## Errors

- 1 Album is not opened (use ALB.CR beforehand)
- 2 Could not write value into variable (not exist? wrong type?)

***File input/output*****STRM [<con> | <cconst | &cvar>[,<cconst>]] (Always)**

Opens a file for output.

## Parameters

<con> Console, the output windows below the programme area.  
 <cconst | &cvar> The target file name.  
 <cconst> An optional letter stands for (A)ppend, (B)ackup, (O)verwrite, and (Q)uest, if the file already exists. The default value is Q.

## Remarks

Opens an output channel, which is usually the console or a text file. STRM without parameter just closes the current output stream.

## Errors

- 1 Macro evaluation of the first parameter failed
- 2 Could not create the output file (invalid name, no writing rights, invalid path)

**OUT <const | var | expression>[,<format>] (Always)**

Output of an expression into a file.

## Parameters

<const | var | expression> Expression to be sent to the output channel.  
 <format> Character [and paragraph] format. Valid formats are 'nn' for the character and 'n' for the paragraph. There can be up to 99 character formats ('01' to '99'), and up to 16 paragraph formats ('1' to 'F').

The formats must correspond to definition of the style sheet used for conversion (see CVT). A paragraph format cannot stand alone (a character format can). So the convention is the following:

OUT <expression>[,CC ; character format

or



OUT <expression>|CC|P ; character and paragraph format  
 but never  
 OUT <expression>|P ; paragraph format alone

#### Remarks

The parameter is resolved and sent into the output channel defined by STRM. The format is only valid for files which are to be later converted into Word or RTF. The difference to OUTL is, that no end of line code is inserted.

#### Errors

- 1 Memory allocation problem (anything internally that should not happen)
- 2 Parsing : one of the parameters is invalid (variable or data field probably unknown) or expression simply invalid
- 3 Evaluating the expression caused an error
- 4 Output of expression/constant failed (complex error, see history)
- 5 Output of format failed (complex error, see history)

#### Example

```
OUT 'Hello World' ; constant
OUT date ; predefined variable
OUT 100+10+value ; expression
OUT author.fname ; dbfield
OUT c_genus.gname,|02 ; dbfield with a character format
OUT c_genus.author.fname,|03|1; dbfield with character and paragraph format
```

### **OUTL <const | var | expression>[,<format>] (Always)**

Output of an expression into a file.

#### Parameters

See above (OUT).

#### Remarks

The parameter is resolved and sent into the output channel defined by STRM. The format is only valid for files which are to be later converted into Word or RTF. The difference to OUT is, that a end of line code is inserted.

#### Errors

- 1 Memory allocation problem (anything internally that should not happen)
- 2 Parsing : one of the parameters is invalid (variable or data field probably unknown) or expression simply invalid
- 3 Evaluating the expression caused an error
- 4 Output of expression/constant failed (complex error, see history)
- 5 Output of format failed (complex error, see history)

**OUTTEXT <const>[,<format>] (Occasionally)**

Output of the data of a text field.

**Parameters**

<const>	A database field of the M type, also called memo field. Can be also a field of interconnected tables.
<format>	A format specification (see OUT).

**Errors**

- 1 Complex text (memo) field output error
- 2 Output of format failed (complex error, see history)

**Example**

```

CMP      c_genus.gennote,0
JE      notextoutput
OUT      'Note. ',|02
OUTTEXT c_genus.gennote,|01|1
: notextoutput

```

**OUTP <const>[,<format>] (Occasionally)**

Output of a constant value into a file.

**Parameters**

<const>	Constant to be sent to the output channel.
<format>	Character [and paragraph] format

**Remarks**

The difference between OUT and OUTP is that OUTP accept only constant values, no expressions, table data etc.

**Errors**

- 1 Output of expression/constant failed (complex error, see history)
- 2 Output of format failed (complex error, see history)

**Example**

```

FILE      authors
RESET
OUTP      'fname' ; set inverted comma to conserve small and large caps
OUTP      ' - ' ; set inverted comma to conserve spaces
OUTP      fname
OUT       ' - '+fname

```

fname - FNAME - Anonymous

---

OK.

**OUTPL <const>[,<format>] (Occasionally)**

Output of a constant value into a file.

**Parameters**

<const>                      Constant to be sent to the output channel.  
 <format>                      Character [and paragraph] format

**Remarks**

The difference to OUTP is that a new line is inserted.

**Example**

```
FILE      authors
RESET
OUTPL    `fname` ; set inverted comma to conserve small and large caps
OUTPL    fname
OUTL     fname

fname
FNAME
Anonymous
---
OK.
```

**TXT.CR <cconst | &cvar> (Occasionally)**

Creates a textfile.

**Parameters**

<cconst | &cvar>              File to be created.

**Remarks**

Creates a text file.

**Errors**

- 1      Macro evaluation of the first parameter failed
- 2      Empty file name
- 3      Could not create the file (? invalid name or path)

**TXT.OP <cconst | &cvar>,<0 | 1> (Occasionally)**

Opens an existing text file.

**Parameters**

<cconst | &cvar>              File to be opened.  
 <0 | 1>                        Allowance whether the pool path is allowed; 0 = not allowed, 1 = allowed.

**Errors**

- 1      Macro evaluation of the first parameter failed
- 2      Empty file name
- 3      Could not open the file (? does not exist, invalid name or path)

### **TXT.RS (Occasionally)**

Resets the text file to the beginning.

#### Errors

- 1 Textfile is not opened/created.
- 2 Text file reset error

### **TXT.AP (Rarely)**

Prepares an open textfile for appending new items.

#### Remarks

Command TXT.OP must precede this command to open an existing file, or TXT.CR to create a new text file.

#### Errors

- 1 Textfile is not opened/created.

#### Example

```
TXT.CR names.txt
TXT.AP
TXT.WL 'This is a new file.'
```

### **TXT.RD <cvar> (Occasionally)**

Reads one line into the variable.

#### Remarks

If the end of the file is reached, the variable contains the string <EOF>. The EOF flag is not set! Only 253 characters are stored; if the line has more characters than that, they get lost. In this case use the command TXT.RDL.

#### Errors

- 1 Textfile is not opened/created.
- 2 Text file read error
- 3 Could not write value into variable (not exist? wrong type?)

#### Example

```
DEFINE s,c
TXT.OP names.txt
:begin
TXT.RL s
CON s
CMP s,'<EOF>'
JNE begin
TXT.CL
```

**TXT.RDL <cvar>,<cvar>,<cvar>,<cvar> (Rarely)**

Reads a long line in up to four variables.

**Parameters**

<cvar>,<cvar>,<cvar>,<cvar> Variables to store the various parts of the string.

**Remarks**

A string of up to 1000 characters is read and split into four variables. This command is mainly used for importing data.

**Errors**

- 1 Textfile is not opened/created.
- 2 Could not write value into variable (not exist? wrong type?)
- 3 Text file read error
- 4 Parameter(s) is/are lacking
- 5 Could not write value into variable (not exist? wrong type?)

**Example**

```
DEFINE    s1,c
DEFINE    s2,c
DEFINE    s3,c
DEFINE    s4,c
TXT.OP    text.txt
MOV       s1,``
MOV       s2,``
MOV       s3,``
MOV       s4,``
TXT.RDL   s1,s2,s3,s4
CON       `The string has a length of `+STR(LEN(S1)+LEN(S2)+LEN(S3)+LEN(S4))+`
          characters.`
```

**TXT.WR <expression> (Occasionally)**

Writes the expression to a text file without a line skip.

**Parameters**

<expression> Expression to be written.

**Errors**

- 1 Memory allocation problem (anything internally that should not happen)
- 2 Evaluating the first parameter caused an error
- 3 Textfile is not opened/created.
- 4 Evaluating the expression caused an error
- 5 Text file write error

**TXT.WL <expression> (Occasionally)**

Writes the expression to a text file with a line skip.

## Errors

- 1 Memory allocation problem (anything internally that should not happen)
- 2 Evaluating the first parameter caused an error
- 3 Textfile is not opened/created.
- 4 Evaluating the expression caused an error
- 5 Text file write error

**TXT.CL (Occasionally)**

Closes the text file.

***Database operation : create, open and close tables*****FCREA <cconst | &cvar> (Rarely)**

Creates a new table.

## Parameters

<cconst | &cvar>                      Name of the new table.

## Remarks

Creates a table.

## Errors

- 1 Macro evaluation of the first parameter failed
- 2 Error during file creating (see error histoy)

## Example

```
FCREA     datafile
```

**OPEN <cconst | &cvar>[,<iconst>] (Always)**

Opens a table with all interconnected tables.

## Parameters

<cconst   &cvar>	Table to be opened.
<iconst>	Open mode
	bit1 (1) = checks access index.
	bit2 (2) = creates access index if not available.
	bit3 (4) = opens cache and reads the data in the main memory.
	bit4 (8) = reads alias names from the form files.
	bit5 (16) = extended open mode, not used.
	bit6 (32) = opens base in the read-only mode.
	bit7 (64) = data pooling is not allowed.
	bit8 (128) = unused.

To set an open mode, the values in parentheses have to be totaled. A good choice are the first three options, so the open mode (1+2+4) would be 7.

### Remarks

The command can be repeated if various tables, that are not interconnected with each other should be used.

### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Open mode (second parameter) is invalid (must be an integer value < 256)
- 3 Memory allocation problem (anything internally that should not happen)
- 4 Open table complex error (see history)
- 5 Memory allocation problem (anything internally that should not happen)

### Example

```
OPEN      citation,7
```

### **FILE <const | &var>[,<iconst>] (Always)**

Opens a table.

### Parameters

<const   &var>	Name of the table.
<iconst>	A number between 1 and 128 as a kind of identification.

### Remarks

FILE without parameter closes the current file. FILE opens only the indicated table, not interconnected tables. If a databases has been opened beforehand, FILE selects one file of the database. FILE without name has no effect; it does not close a specified table from the base because the base can only be opened o closed as a whole.

### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Memory allocation problem (anything internally that should not happen)
- 3 Error closing file
- 4 Memory allocation problem (anything internally that should not happen)
- 5 Open table complex error (see history)
- 6 Memory allocation problem (anything internally that should not happen)
- 7 Invalid file selector (second parameter)

## RESET (Always)

Resets the table.

### Remarks

This command sets the current record at the beginning of the table (physical beginning or according to an index). This command should always be applied after using FILE and before any operation that goes through the whole table.

### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 It was not possible to go to the beginning of the table (empty?)
- 3 Error reading the record

### Example

```
FILE      genera
RESET
:begin
CMP       gauthor,0
JE        noauthor
```

## SLN (Rarely)

Forces the file command to use a new task and not the present one.

### Remarks

This command can only be used immediately before the FILE command, unless the table is opened with interconnected tables.

### Example

```
FILE      test,1 ; open table as task 1
FILE      new,2  ; open table as task 2
           ; but close table test
; therefore :
FILE      test,1
SLN
FILE      new,2
SLF      1 ; use table test
SLF      2 ; use table new
```

## SLF <iconst | &ivar> (Very rarely)

Selects a table by a personal task number.

### Parameters

<iconst | &ivar>                      File number (see command FILE)

### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Invalid numerical expression
- 3 Task is nil or table name is empty (= no file)
- 4 Memory allocation problem (anything internally that should not happen)



## Example

```
FILE      test,1  ; open table as task 1
FILE      new,2   ; open table as task 2
           ; but close table test
; therefore :
FILE      test,1
SLN
FILE      new,2
SLF       1 ; use table test
SLF       2 ; use table new
```

## **TSK <iconst | &ivar> (Very rarely)**

Selects table by global task number.

### Parameters

<iconst | &ivar>                    Task number.

### Remarks

This is a very rare command that is only used for internal or test purposes.

### Errors

- 1     Macro evaluation of the first parameter failed
- 2     Invalid numerical expression
- 3     Task is nil or table name is empty (= no file)
- 4     Memory allocation problem (anything internally that should not happen)

## **RLD (Very rarely)**

Save and reload a database.

### Remarks

This command is used when complex modifications in the database were realized. The data are saved to the harddisk and the base is loaded again into the main memory.

### Errors

- 1     Complex reload error (see history)

## **POB <cconst | &cvar> (Occasionally)**

Request whether a specified table forms part of the database and is opened.

### Parameters

<cconst | &cvar>                    Name of the table.

### Remarks

The purpose of this command is mainly to guarantee in programmes that are called by edit forms, the necessary tables are opened. If a table is opened by the user in the file mode from the command line application, many programmes that fill listboxes etc. cannot be executed properly because not all necessary files are opened.

## Errors

- 1 Macro evaluation of the first parameter failed

### Example

```
POB      citation
JNE      exit
FILE     citation
RESET
; ...
:exit
EXIT
```

## **POPL (Rarely)**

Request whether the current table is located in the pool path.

### Remarks

The command should be follow by a JE or JNE. The command is mostly applied for internal checks.

### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Macro evaluation of the first parameter failed

## **REIDX (Very rarely)**

Invalidates the access file for this table.

### Remarks

This is more an internal command that improves data consistency. It should be only applied when numerous changes in key fields were undertaken.

## **CLB (Occasionally)**

Close database.

### Remarks

CLB is used when a table was beforehand opened with OPEN.

### Errors

- 1 Complex close base error (see history)

## **CLA (Regularly)**

Closes all tables.

### Remarks

The command CLB closes only a database, e.g. tables that were opened using OPEN, but not other files opened using the FILE command. CLA closes (and saves) all tables.

### Errors

- 1 Complex close base error (see history)
- 2 Complex close all error

**CAO (Very rarely)**

Clears all variables created by the DMS.

## Remarks

To be used only after CLB, otherwise a crash of the programme may occur. The use of this command is rather internal. Be careful in its application.

***Database operation : read / show / modify / write records*****GO <iconst | ivar> (Regularly)**

Moves the file pointer to the specific record and read it.

## Parameters

<iconst | ivar>                      The value must be an integer.

## Errors

- 1      Memory allocation problem (anything internally that should not happen)
- 2      Parsing : the parameters is invalid
- 3      Evaluating the first parameter caused an error
- 4      Invalid numerical expression
- 5      Error reading the record

## Example

```
FILE        authors
RESET
GO           500
CON         fname
```

Náprstek

---

OK.

**SKIP (Always)**

Moves the file pointer one record forward.

## Remarks

If the file end is reached the EOF flag is set. After SKIP always the question should follow whether the end of the file has been reached (JNEOF). The JNEOF command resets the EOF flag.

## Errors

- 1      Cannot obtain next record (mostly a problem of the index file)
- 2      Error reading the record

## Example

```
FILE        authors
RESET
:begin
CON         fname+', '+cname
SKIP
JNEOF       begin
```

### **APR (Rarely)**

Writes the current records as a new record.

#### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Record writing error
- 3 Error reading the record

### **CLR (Rarely)**

Clears the current record.

#### Errors

- 1 Task is nil or table name is empty (= no file)

### **APB (Occasionally)**

Appends an empty record to the table.

#### Remarks

Identical with the commands APR and CLR.

#### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Record writing error
- 3 Error reading the record

#### Example

```
FILE      authors
APB
PUT       fname, 'Einstein'
PUT       cname, 'A.'
FLSH     ; without FLSH, the new record will not be saved
```

### **EDT (Occasionally)**

Edits one record.

#### Remarks

The command FLSH must be used after editing.

#### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Complex edit record error

#### Example

```
; The error check should be preferably switched off and the result controlled:
#error 2
EDT
#error 0
CMP      lasterror, 0
JNE      error
FLSH
```

```
JMP      ok
:error
CON      `Edit was canceled...`
:ok
```

### **EDTM (Rarely)**

Edits multiple records.

Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Complex edit record error

### **EDM <const> (Rarely)**

Edits the text of a text (Memo) field of the current record.

Parameters

<const>                      Name of the data field.

Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Field is unknown
- 3 Field is not a text (memo) field
- 4 Edit text field error

### **DSP (Rarely)**

Shows a record in the edit mask but the record cannot be modified.

Errors

- 1 Task is nil or table name is empty (= no file)

### **BRW <const | &var>[,<ivar>] (Occasionally)**

Shows selected records / fields as a table.

Parameters

<const | &var>                      Caption.  
<ivar>                              Optional variable for storing the selected record.

Remarks

The number of the selected (by double click) record is optionally stored in a variable.

Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Macro evaluation of the first parameter failed
- 3 Complex browse error (see history)
- 4 Could not write value into variable (not exist? wrong type?)

## Example

```
DEFINE    i,i
FILE     authors
RESET
SFLT     recno<50
BRW      "Authors",i
CON      i
```

## PUT <dbfield>,<const | var | expression> (Regularly)

Stores a value into a data field.

### Parameters

<dbfield>                      Valid field name. This can be also the name of a field of an interconnected table.  
 <const | var | dbfield | expression>      Any expression, but it must have the same data type as the data field.

### Remarks

Stores a value into a data field. Any PUT command should be followed by a FLSH to write the record back to the disk. Several PUT commands can be followed by a terminating FLSH, not each PUT needs a separate FLSH. The macro operator (&) is not allowed here, please compare to MPUT.

### Errors

- 1      Memory allocation problem (anything internally that should not happen)
- 2      Parsing : one of the parameters is invalid (variable or data field probably unknown) or expression simply invalid
- 3      Could not write value into variable (because it is probably a constant)
- 4      Could not write value into variable (because the data types are not compatible)

## Example

```
OPEN     species,4
FILE     genera
RESET
:beginreset
PUT      numspec,0
FLSH    ; !!!
SKIP
JNEOF   beginreset
FILE     species
RESET
:begin
PUT      c_genus.numspec,c_genus.numspec+1
; in interconnected tables no FLSH necessary
SKIP
JNEOF   BEGIN
CLA
EXIT
```

**MPUT <dbfield | &cvar>,<const | var | expression | &var> (Rarely)**

Stores a value into a data field with involved macro operators.

**Parameters**

<dbfield   &cvar>	Valid field name. This can be also the name of a field of an interconnected table.
<const   var   dbfield   expression   &var>	Any expression, but it must have the same data type as the data field.

**Remarks**

Stores a value into a data field. Any MPUT command should be followed by a FLSH to write the record back to the disk. Several MPUT commands can be followed by a terminating FLSH, not each MPUT needs a separate FLSH. The macro operator (&) is allowed here.

**Errors**

- 1 Memory allocation problem (anything internally that should not happen)
- 2 Parsing : one of the parameters is invalid (variable or data field probably unknown) or expression simply invalid
- 3 Could not write value into variable (because it is probably a constant)
- 4 Could not write value into variable (because the data types are not compatible)
- 5 Evaluating the expression caused an error
- 6 Could not write value into variable or data field
- 11 Macro evaluation of the first parameter failed
- 12 Macro evaluation of the second parameter failed

**Example**

```

; given table has numerous fields such as data1 to data30
; to reset this values to zero, 30 commands (PUT data1,0)
; would be needed, but with the MPUT command
; this can be shorter
DEFINE    ic,i
FILE     data
RESET
:begin
MOV      i,1
:begin2
MPUT     &(data+str(i)),0
MOV      i,i+1
CMP      i,31    ; > max
JNE      begin2
SKIP
JNEOF    begin
; the programme is shorter, but the execution time is longer
; because MPUT is more complex than PUT

```

## FLSH (Regularly)

Writes the current data buffer back to the cache or HDD.

### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Record number is zero or no current record (forgotten RESET command?)
- 3 Record writing error

### Example

```
FILE      test
RESET
:begin
PUT       name, ''
FLSH     ; if FLSH is lacking, the record will not be saved to the disk
SKIP
JNEOF    begin
EXIT
```

## SETD (Rarely)

Marks the current record as being deleted.

### Remarks

The record is not modified, just one character is set as mark.

### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Record writing error

### Example

```
FILE      authors
RESET
:begin
SETD
; no FLSH needed
SKIP
JNEOF    begin
```

## CLRD (Rarely)

Undelete the current record.

### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Record writing error



**QDEL (Rarely)**

Requests whether a record is marked as deleted.

Remarks

QDEL should be followed by a jump command (JE, JNE).

Errors

1 Task is nil or table name is empty (= no file)

Example

```
FILE      authors
RESET
:begin
QDEL
JNE      skip
con      'Deleted : '+fname
:skip
SKIP
JNEOF    begin
```

**WRMEMO <const | &var>,<const | &var>[,<0 | 1 | 2>] (Very rarely)**

Writes the content of a text (memo) field into a textfile.

Parameters

<const   &var>	The name of the data field.
<const   &var>	The name of the text file.
<0   1>	Optional order to convert the text into (1) ASCII, into (2) ANSI, or (0) no conversion at all.

Remarks

The command is rather rarely used, mainly for data conversion purposes.

Errors

- 1 Parameter(s) is/are lacking
- 2 Macro evaluation of the first parameter failed
- 3 Macro evaluation of the second parameter failed
- 4 Invalid numerical expression
- 5 Complex text (memo) field output error

**RDMEMO <const | &var>,<const | &var>[,<0 | 1 | 2>] (Very rarely)**

Reads a text file into a text (memo) field.

Parameters

<const   &var>	The name of the data field.
<const   &var>	The name of the text file.
<0   1>	Optional order to convert the text into (1) ASCII, into (2) ANSI, or (0) no conversion at all.

## Remarks

The command is rather rarely used, mainly for data conversion purposes.

## Errors

- 1 Parameter(s) is/are lacking
- 2 Macro evaluation of the first parameter failed
- 3 Macro evaluation of the second parameter failed
- 4 Invalid numerical expression
- 5 Complex text (memo) field output error

## **RSEL <const | &cvar>,<ivar>[,<iconst>] (Occasionally)**

Selects an item from the current table.

## Parameters

<const   &cvar>	Text
<ivar>	Variable to store the result.
<iconst>	Optional value that indicates whether it is allowed to append new items (1) or not (0)

## Remarks

Table must be opened via OPEN not via FILE.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Macro evaluation of the first parameter failed
- 3 Key of the specified table is not defined (probably the table is not opened using OPEN)
- 4 Key of the specified table is invalid (nil)
- 5 Could not write value into variable (not exist? wrong type?)

## Example

```
DEFINE   ia, i
OPEN     authors, 4
RSEL     `Select author`, ia, 0
```

## **RSUB <const | &cvar>,<dbfield>,<ivar>[,<iconst>] (Occasionally)**

Selects an item from an interconnected table.

## Parameters

<const   &cvar>	Text
<dbfield>	Data field that should be selected.
<ivar>	Variable to store the result.
<iconst>	Optional value that indicates whether it is allowed to append new items (1) or not (0)

## Remarks

The data field must be an interconnection to another table.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Macro evaluation of the first parameter failed
- 3 Field is unknown
- 4 Could not write value into variable (not exist? wrong type?)

## Example

```

DEFINE    an,i
OPEN      publicat,4
;RSUB     "Select the year...",year,an      ; not allowed
RSUB      "Select an author...",author,an
RESET
:begin
CMP       author,an
JNE       skip
CON       year+#32+title
:skip
SKIP
JNEOF     begin

```

## CRDB (Very rarely)

Creates a data buffer for the current table.

## Remarks

This command saves the current record in a temporary buffer. This command is often necessary when during appending a record to a table the same table should be revised for any reason. If the current record is not saved, its data can get lost and it is better to save them.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Memory allocation problem (anything internally that should not happen)

## Example

```

DEFINE    c,c
DEFINE    k,i
DEFINE    j,i
MOV       c,spsampl.smsite.smplpnt
CRDB      ; current buffer is saved
RESET     ; same file is used
:begin
CMP       substr(spmnno,1,5),c
JNE       skip
MOV       j,trunc(val(substr(spmnno,6,3)))
MOV       k,IFF(j>k,j,k)
:skip
SKIP
JNEOF     begin
MOV       k,k+1
MOV       c,c+IFF(k>99,'',IFF(k>9,'0','00'))+str(k)
DLDB     ; buffer is restored
PUT       spmnno,c; one field modified
:exit
EXIT

```

**DLDB (Very rarely)**

Restores the data buffer created by CRDB.

## Errors

- 1 Task is nil or table name is empty (= no file)

**SAVEREC (Very rarely)**

Saves the content of the current record.

## Remarks

The current record of a table is saved into an internal buffer. This operation is only necessary for complicated database operation.

## Errors

- 1 Task is nil or table name is empty (= no file)

**RESTREC (Very rarely)**

Restores the content of the current record.

## Remarks

The current record of a table is restored from an internal buffer. This operation is only necessary for complicated database operation.

## Errors

- 1 Task is nil or table name is empty (= no file)

***Database operation : index and find*****INDEX <var | expression>,<cconst> [, <O | U | Q> [,<iconst>]] (Regularly)**

Creates an index on the expression and saves it under the given filename.

## Parameters

<var   expression>	Expression for the index.
<cconst>	Index file name.
<O   U   Q>	The optional mode stands for O(overwrite), U(se) or Q(uestion) and is applied if the index file exists and is valid.
<iconst>	Optional length of the index expression.

## Remarks

An index is created when data should be classified for output or analyse. Calling the comand without parameter closes the current index.

## Errors

- 1 Macro evaluation of the first parameter failed
- 2 Error closing current index
- 3 Complex index creation error (see history for details)

- 4 Cannot find first record
- 5 Error reading the record

### Example

```
FILE      authors
RESET
INDEX     fname+cname,author
STRM     liste.txt
:begin
OUTL     fname+', '+cname
SKIP
JNEOF    begin
STRM
INDEX
```

### **FIND <const | var | expression> (Occasionally)**

Searches an activated index for an expression.

#### Parameters

<const | var>                      The search expression. This can be also a variable.

#### Remarks

Before using FIND, an index must be created.

#### Errors

- 1 There is no index activated
- 2 Search expression could not be resolved (scanning or parsing error)
- 3 Error in the find subroutine (index corrupted or not up to date?)
- 4 Error reading the record

### Example

```
FILE      publicat
INDEX     year,yr
FIND     '1980'
JNF      notfound
:begin
CMP      year,'1980'
JNE      notfound
CON      title
:skip
JNEOF    begin
:notfound
CON      'Not (more) found.'
INDEX
FILE
```

### JNF <label> (Occasionally)

Continues the programme at the label when the expression was not found.

#### Parameters

<label>                                      A label in the source code

#### Remarks

Can only be used directly after FIND. There is an option (which is generally set) which says that the condition is also fulfilled by any item larger than the one searched for. So it is necessary to control whether the found item fulfils the condition. If there is no index activated, the result is equal to 'not found'.

#### Example

```
FILE      publicat
INDEX     year,yr
FIND      '1980'
JNF       notfound
:begin
CMP       year,'1980'           ; here it is checked whether the condition is
                                fulfilled
JNE       notfound
CON       title
:skip
JNEOF     begin
:notfound
CON       'Not (more) found.'
INDEX
FILE
```

### USEIND [<cconst>] (Rarely)

Closes an index or reopen an index.

#### Parameters

<cconst>                                      Index file name

#### Remarks

The use of the command without parameter just closes the current index. Errors may occur if the index file is not consistent with the table.

#### Errors

- 1      Error closing current index
- 2      Error opening (new) index
- 3      It was not possible to go to the beginning of the table (empty?)
- 4      Error reading the record

#### Example

```
FILE      authors
INDEX     fname,fn
...
USEIND
EXIT
```

**XCHI (Occasionally)**

Saves index data when a programme is called from the database.

## Remarks

XCHI is a command that is very often applied in programmes that form part of an application. It should avoid that an index created within the application is overwritten by the programme called. XCHI should be called always twice: at the beginning and at the end of the programme.

## Errors

- 1 Task is nil or table name is empty (= no file)

***Database operation : data fields and structure*****FLDEXS <const | &cvar> (Occasionally)**

Checks whether a specified field exists in a table.

## Parameters

<const | &cvar>                      Fieldname.

## Remarks

The command should be followed by a JE or JNE command.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Macro evaluation of the first parameter failed

## Example

```
FILE      authors
FLDEXS   fullcname           ; check whether the fieldname exists
JE       nonewfield
ADDFLD   fullcname,c,30
:nonewfield
```

**GFN <const | &cvar>,<ivar> (Rarely)**

Stores the current number of a data field in a variable.

## Parameters

<const | &cvar>                      Name of the data field.  
<ivar>                                Variable where the number has to be stored.

## Remarks

If the field does not exist, a zero is written in the variable.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Macro evaluation of the first parameter failed
- 3 Could not write value into variable (not exist? wrong type?)

## Example

```
DEFINE    ifld,i
FILE     authors
GFN      fname,ifld
CON      ifld
```

```
1
---
OK.
```

## FLDD <iconst | &ivar>,<cvar> (Rarely)

Stores the data of a data field in a variable.

### Parameters

<iconst | &ivar>                    The field number.  
<cvar>                                A character variable to store the result.

### Remarks

It is the same format as required by the ADDFLD command. If the field number is zero or above the number of data fields, the resulting string is empty.

### Errors

- 1     Task is nil or table name is empty (= no file)
- 2     Macro evaluation of the first parameter failed
- 3     Invalid numerical expression
- 4     The value could not be assigned to the variable (possibly a data type error)

## Example

```
DEFINE    s,c
FILE     authors
FLDD     1,s
CON      s
```

```
FNAME,C,25,
---
OK.
```

## ADDFLD <cconst | &cvar> (Rarely)

Adds a new data field to a table.

### Parameters

<cconst | &cvar >                    Format description of the new field in the form name,type,length[,decimals].  
Valid types are C (character), N (numerical), M (text), and L (logical). Decimals are only required in case of a float number.  
Valid description would be the following:  
name,c,100  
year,n,4  
dtext,m,10  
mark,l,1



## Remarks

The file should not be opened via OPEN, only via FILE. An error occur when the field already exists.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Table is opened via OPEN not via FILE
- 3 Macro evaluation of the first parameter failed
- 4 Memory allocation problem (anything internally that should not happen)
- 5 Complex modify structure error (see history)
- 6 Memory allocation problem (anything internally that should not happen)

## Example

```
FILE      authors
FLDEXS   fullname          ; check whether the fieldname exists
JE       nonewfield
ADDFLD   `fullname,c,30`
:nonewfield
```

## **CPS <cconst | &cvar>[,<O | Q>] (Rarely)**

Copies the structure of a table into new table.

### Parameters

<cconst   &cvar>	Target file name.
<O   Q>	Optional mode in the case the target file already exists, O for over write, Q for question.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Target file name is empty
- 3 Macro evaluation of the first parameter failed
- 4 Complex table copy error (see history)

## **CFL (Rarely)**

Clears the field list.

## Remarks

Clears the list of data fields. See the commands FFL and AFL.

## Example

```
OPEN     publicat,4
CFL      ; clear the list
AFL     author.key      ; fill the list
AFL     year
AFL     title
BRW      ; show as table
```

**FFL (Rarely)**

Fills the field list for copy or browse procedures with all fields.

**Remarks**

In contrary to CLF, FFL fills the list with all data fields.

**Errors**

- 1 Task is nil or table name is empty (= no file)

**Example**

```
OPEN      publicat,4
FFL       ; show all fields
BRW       ; as table
```

**AFL <const | expression | var > (Rarely)**

Adds a field (or expression) to the fields list.

**Parameters**

<const | expression | var | dbfield> Any expression to be shown.

**Remarks**

Adds an expression to the field list. This must not be a data field, it can be also a complex expression with variables and constants involved. The expression is not checked by the interpreter but by the function applied (CPY, BRW). Expressions cannot be used with CPY.

**Errors**

- 1 Parameter(s) is/are lacking
- 2 Maximum of the field list is reached

**Example**

```
FILE      authors
AFL       fname
AFL       cname
AFL       fname+', '+cname
BRW
```

**DFL <const | expression | var > (Rarely)**

Removes a field (or expression) from the fields list.

**Errors**

- 1 Parameter(s) is/are lacking

## ***Database operation : whole table operations***

### **CPY <const | &cvar>[,<A | B | O | Q>] (Rarely)**

Copies records to a new table from the field list.

#### Parameters

<const   &cvar>	Target file name.
[,<A   B   O   Q>]	Optional mode when the file already exists: O for overwrite), B for backup, A for append) or q for question.

#### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Parameter(s) is/are lacking
- 3 Macro evaluation of the first parameter failed
- 4 Complex table copy error (see history)

#### Example

```
FILE      authors
FFL
CPY       authors2,Q
```

### **ADDF <const | &cvar> (Rarely)**

Adds records to an existing table from the field list.

#### Parameters

<const   &cvar>	Target file name.
-----------------	-------------------

#### Remarks

Field names have priority. The routines only adds fields that exist in both tables.

#### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Parameter(s) is/are lacking
- 3 Macro evaluation of the first parameter failed
- 4 Complex table copy error (see history)

### **ADDR <const | &cvar> (Rarely)**

Adds records to an existing table from the field list.

#### Parameters

<const   &cvar>	Target file name.
-----------------	-------------------

#### Remarks

The record size has priority. If both tables do not have the same record size, no records will be added. Fields are not taken into account.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Parameter(s) is/are lacking
- 3 Macro evaluation of the first parameter failed
- 4 Complex table copy error (see history)

## **CMPR <const | &cvar> (Very rarely)**

Writes a table, but compresses the table according to an index.

### Parameters

<const | &cvar>                      Target file name.

### Remarks

Records that have the same content of an index impression, are only written once. This command is mainly used during importation processes, to remove double items.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Parameter(s) is/are lacking
- 3 Macro evaluation of the first parameter failed
- 4 Complex table copy error (see history)

## **PCK (Rarely)**

Packs a table. Records marked as being deleted are removed.

### Remarks

This is a very dangerous command and should not used of tables that are interconnected with other tables.

### Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Complex table copy error (see history)

## **CHBI (Very rarely)**

Initiation of the search for unused records.

### Remarks

CHBI marks all records of all tables of the currently opened database as deleted. The following CHB command – wisely used – then recalls used records. Unused records keep marked as being deleted. Both commands are rather for internal use.

### Errors

- 1 Complex check base error

**CHB (Very rarely)**

Search for unused records.

## Errors

- 1 Task is nil or table name is empty (= no file)
- 2 Table is opened via FILE not via OPEN
- 3 Complex check base error

***System options*****GSYS <ivar | iconst> , <cvar> (Very rarely)**

Stores an internal system value in a variable.

## Parameters

<ivar>                                    Number of the internal system variable.  
 <cvar>                                    Char variable to store the result.

## Remarks

The Hdb2Win kernel system and the application library have about 130 internal system variables that can be read and partly modified. This command is for reading the variable. Unless of their real data type, these variables are always kept as char variables. For setting see SSYS.

## Errors

- 1 Evaluating the first parameter caused an error
- 2 First parameter is beyond allowed limits
- 3 Could not write value into variable (not exist? wrong type?)

## Example

```
DEFINE   csys,c
GSYS    26,csys ; 26 = language, 1 = English
CON     csys
DEFINE   i,i
MOV     i,1
GSYS    i,csys
CON     csys
```

```
1
Times New Roman
---
OK.
```

**SSYS <iconst | ivar>,<cconst | &cvar> (Rarely)**

Sets an internal system variable.

## Parameters

<iconst | ivar>                        Number of the intern symbol.  
 <cconst | &cvar>                      New value.

## Remarks

The value to be set ist always a character.

## Errors

- 1 Evaluating the first parameter caused an error
- 2 Invalid numerical expression
- 3 Macro evaluation of the second parameter failed
- 4 Could not set system variable

## Example

```
SSYS      36, ''
```

## **NSYS <icont | ivar>,<svvar> (Rarely)**

Returns the name of an internal system variable.

## Parameters

<icont   ivar>	Number of the internal variable.
<svvar>	Return value is written to this variable.

## Errors

- 1 Evaluating the expression caused an error
- 2 Variable does not exist
- 3 Could not write value into variable (not exist? wrong type?)

## Example

```
DEFINE    sy,c
NSYS      1,sy
CON       sy
```

```
HDFRM.Font0
```

```
---
```

```
OK.
```

## **REG.RINT <cconst | &cvar>,<ivar> (Rarely)**

Reads an integer value from the internal registry.

## Parameters

<cconst   &cvar>	Name of the key
<ivar>	Return value of the key

## Remarks

Reads an integer value from the internal registry. If the key is unknown to the registry, the value zero is returned. Please compare to REG.WRITE for more details.

## Errors

- 1 Macro evaluation of the first parameter failed
- 2 Could not write value into variable (not exist? wrong type?)

## Example

```
define    i,i
reg.rint  hdb2win.user.runcount,i
con      `Run count = `+str(i)
```

## **REG.RREAL <const | &cvar>,<rvar> (Rarely)**

Reads a real value from the internal registry.

### Parameters

<const   &cvar>	Name of the key
<rvar>	Return value of the key

### Remarks

Reads a real value from the internal registry. If the key is unknown to the registry, the value zero is returned. Please compare to REG.WRITE for more details.

### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Could not write value into variable (not exist? wrong type?)

## Example

```
define    r,n
reg.rreal hdb2win.user.change,r
con      `Change = `+str(r)
```

## **REG.RSTR <const | &cvar>,<cvar> (Rarely)**

Reads a string value from the internal registry.

### Parameters

<const   &cvar>	Name of the key
<cvar>	Return value of the key

### Remarks

Reads a string value from the internal registry. If the key is unknown to the registry, the value zero is returned. Please compare to REG.WRITE for more details.

### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Could not write value into variable (not exist? wrong type?)

## Example

```
define    c,n
reg.rstr  hdb2win.user.name,c
con      `Name = `+c
```

## REG.WRITE <cconst | &cvar>,<var> (Rarely)

Writes a value into the internal registry.

### Parameters

<cconst   &cvar>	Name of the key
<var>	Value of the key

### Remarks

The internal registry allows to keep values of user defined variables. They can be read and written only by the interpreter. Keys defined by the user should always start with the text hdb2win.user. to separate them from internal keys. The registry data are not written into the Windows Registry but a text file in the user data area. Please take care that assignation of values to a key or reading a key from the registry is only by the means of variables. This is necessary to conserve type compatibility.

### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Variable does not exist
- 3 Evaluating the variable caused an error
- 4 The variable has not the required datatype (you cannot use data fields)
- 5 The variable could not be written to the registry

### Example

```
define    iarea,i
define    q,i
file      LocAreas
reset
reg.rint  hdb2win.user.area,iarea    ; read from registry
cmp       iarea,0                    ; not found in the registry or not defined
je        SelectArea
go        iarea
req       &('Do you want to use this area : '+areaname+' ?'),4,q
cmp       q,6                        ; yes
je        SelectAreaDone

:SelectArea
rsl       Select area,iarea,0
reg.write hdb2win.user.area,iarea    ; write into registry

:SelectAreaDone
```



## *External libraries*

### **EXEC [<const | &cvar>] | [,<const | &cvar>] (Occasionally)**

Calls a external programme, optionally with a parameter.

#### Parameters

<const   &cvar>	Name of the programme. If no programme is given, Windows is looking for the most convenient programme, depending on the parameter.
<const   &cvar>	Optional parameter. The parameter is normally a file that should be opened or an Internet page that should be visisted.

#### Remarks

There must be at least one parameter (the programme name). A programme parameter is optional.

#### Errors

- 1 Parameter(s) is/are lacking
- 2 Macro evaluation of the first parameter failed
- 3 Macro evaluation of the second parameter failed
- 4 Complex execute error

#### Example

```
EXEC    notepad.exe,data.txt
EXEC    www.paleotax.de
EXEC    C:\Programme\MSOffice\Office10\EXCEL.EXE
```

### **CVT <const | &cvar>,<const>[,<const | &cvar>[,<const>[,<0 | 1>]]] (Occasionally)**

Text conversion.

#### Parameters

<const   &cvar>	Source file.
<const>	Format description file (style sheet).
<const   &cvar>	Optional targetfile.
<const>	An optional letter stands for (A)ppend, (B)ackup, (O)verwrite, and (Q)uest, if the file already exists. The default value is Q.
<0   1>	If the optional parameter is set to '1', the command will not display any messages (quiet mode).

#### Remarks

The commands converts an ASCII file into a RTF file, taking into account the format specification.

#### Errors

- 1 Macro evaluation of the first parameter failed
- 2 Macro evaluation of the third parameter failed
- 3 Target cannot be the console
- 4 Target file name is empty
- 5 Invalid option for the decision taken when the target file exists
- 6 Text conversion failed (complex, often a format error, see history)

**VECDRAW <const | &cvar>[,<const>] (Rarely)**

Calls the Vector programme.

**Parameters**

<const   &cvar>	Name of the input file. This must be a text file in the PaleoTax/Graph vector format.
<const>	Optional configuration file. This file will be saved with the changes made in the PaleoTax/Graph application and can be used again to apply the same options.

**Remarks**

The vector graphic module (that forms part of PaleoTax/Graph) can be called directly from Hdb2Win. The programme of the interpreter is stopped as long the window of the VectorDraw module is open. For the commands compare to the documentation on PaleoTax/Graph. – Only from Hdb2Win Version 2.4.2 on.

**Errors**

- 1 Macro evaluation of the first parameter failed
- 2 Textfile not found or could not be opened
- 3 Screen size insufficient for the external library
- 4 PaleoTax/Graph initial error (cannot read error definitions)
- 5 PaleoTax/Graph initial error (cannot read messages)

**Example**

```
strm      vectest.pgr,o
outl     `goto    10,10`
outl     `rect    100,100`
outl     `goto    20,50`
outl     `text    "Hello, World",24,Arial,red,1`
strm
vecdraw  vectest.pgr
exit
```

**VECCHRT <const | &cvar>,<const | &cvar>[,<const>] (Rarely)**

Call of the external PaleoTax/Graph Chart module.

**Parameters**

<const   &cvar>	Name of the input file. This must be a text file in the PaleoTax/Graph chart format.
<const   &cvar>	Name of the raster. This must be a text file in the PaleoTax/Graph raster chart format.
<const>	Optional configuration file. This file will be saved with the changes made in the PaleoTax/Graph application and can be used again to apply the same options.

**Remarks**

The command calls the Chart module of PaleoTax/Graph. The programme of the interpreter is stopped as long the window of the VectorDraw module is open. For the file format compare to the documentation on PaleoTax/Graph. – Only from Hdb2Win Version 2.4.2 on.

## Errors

- 1 Macro evaluation of the first parameter failed
- 2 Textfile not found or could not be opened
- 3 Macro evaluation of the second parameter failed
- 4 Textfile not found or could not be opened
- 5 Screen size insufficient for the external library
- 6 PaleoTax/Graph initial error (cannot read error definitions)
- 7 PaleoTax/Graph initial error (cannot read messages)

## Example

```
VECCHRT mychart.pgr,raster.psc,mychart.cfg
```

# Index

#COMMENT .....	12	FDEL.....	29	OPT.SET.....	32
#DEBUG.....	12	FFL.....	66	OPT.WR.....	35
#ECHO.....	12	FFND.....	26	OUT.....	42
#ERROR.....	12	FILE.....	48	OUTL.....	43
#FORMAT.....	13	FILEX.....	28	OUTP.....	43
#I.....	13	FIND.....	61	OUTPL.....	44
#PROGRAM.....	14	FLDD.....	64	OUTTEXT.....	43
#REFR.....	14	FLDEXS.....	63	PCK.....	68
#STATUS.....	14	FLSH.....	56	POB.....	50
#VAR.....	14	FNC.....	16	POPL.....	51
#VERSION.....	14	FSEL.....	28	PUT.....	55
ADDF.....	67	FSIZE.....	28	QDEL.....	57
ADDFLD.....	65	GFN.....	64	RANDOM.....	18
ADDR.....	67	GO.....	52	RDMEMO.....	58
AFL.....	66	GSYS.....	69	REG.RINT.....	70
ALB.ADD.....	40	IMG.SHOW.....	39	REG.RREAL.....	71
ALB.CR.....	40	IMG.TOC.....	39	REG.RSTR.....	71
ALB.SHOW.....	41	INDEX.....	61	REG.WRITE.....	71
APB.....	53	JA.....	24	REIDX.....	51
APR.....	53	JAE.....	24	REQ.....	19
BRW.....	54	JB.....	24	RESET.....	49
CALL.....	20	JBE.....	25	RESTREC.....	60
CAO.....	52	JE.....	23	RET.....	21
CD.....	25	JMP.....	23	RLD.....	50
CDA.....	25	JNE.....	23	RSEL.....	58
CFL.....	66	JNEOF.....	25	RSUB.....	59
CFLT.....	23	JNF.....	62	SAVEREC.....	60
CHB.....	69	KBD.....	31	SELCOL.....	31
CHBI.....	68	LAB.CAP.....	39	SETD.....	57
CLA.....	51	LAB.TOC.....	38	SFLT.....	22
CLB.....	51	LB.ADD.....	36	SKIP.....	52
CLR.....	53	LB.CAP.....	36	SLF.....	49
CLRD.....	57	LB.CLR.....	36	SLN.....	49
CMP.....	21	LB.IDX.....	37	SSYS.....	69
CMPR.....	68	LB.SEL.....	36	STOR.....	18
CND.....	22	LB.TOC.....	35	STRM.....	42
CON.....	30	LS.ADD.....	37	SX.....	16
CONX.....	30	LS.EXE.....	38	TERM.....	21
CPF.....	29	LS.INI.....	37	TSK.....	50
CPS.....	65	LS.SIZE.....	38	TXT.AP.....	45
CPY.....	67	MD.....	26	TXT.CL.....	47
CRDB.....	59	MMOV.....	17	TXT.CR.....	44
CVT.....	73	MOV.....	16	TXT.OP.....	45
DEFINE.....	15	MPUT.....	55	TXT.RD.....	45
DFL.....	67	NFND.....	27	TXT.RDL.....	46
DLDB.....	60	NSYS.....	70	TXT.RS.....	45
DSEL.....	26	OPEN.....	47	TXT.WL.....	47
DSP.....	54	OPT.ENB.....	33	TXT.WR.....	47
EDM.....	54	OPT.EXE.....	34	USEIND.....	62
EDT.....	53	OPT.INI.....	31	VECCHRT.....	74
EDTM.....	54	OPT.LBL.....	32	VECDRAW.....	73
EXEC.....	72	OPT.ONE.....	35	WRMEMO.....	57
EXIT.....	21	OPT.RD.....	33	XCHI.....	63
FCREA.....	47	OPT.RES.....	34	XREQ.....	20

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Internet <http://www.paleotax.de/>

E-Mail [info@paleotax.de](mailto:info@paleotax.de)

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