RedTitan User Guides

RedTitan Script Two

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RedTitan Script Two

EscapeE Software Development Kit scripting language

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Part I

About RS/2

About RS/2

RS/2 ("RedTitan Script Two") is part of the *EscapeE Software Development Kit*. It is the lightweight scripting language, based on Pascal, which provides RedTitan EscapeE with dynamic document features and extended field processing.

Three versions are available:

Version	Deploy	Usage
EVALUATE	EVALUATE.EEP must exist in the PLUGINS sub-directory of the ESCAPEE.EXE software folder.	Configured using EscapeE FIELD-ADVANCED. The evaluate plug-in will engage an RS/2 program (or a simple expression) to process a field.
RTRS2IN	RTRS2IN.DLL is co-located with ESCAPEE.EXE in the software folder.	EscapeE uses this filter to read and execute RS/2 programs (*.RS2) or the content of an RS/2 element in IDF.
RS2	RS2.EXE can be in any directory in the path.	RS2.EXE is a freestanding compiler and runtime system that can be used to execute RS/2 programs that do not require EscapeE capabilities. It is launched from the command line.

You can use RS/2 to dynamically create a new file by combining other resources, testing fields or processing disk files. An RS/2 program is a 'first class' EscapeE file – you can export the output to any supported format just like any other file.

EscapeE drawing capabilities can be accessed from an RS/2 program: see RS/2 syntax 5.

RS/2 syntax

The RS/2 language is a limited sub-set of Pascal.

- There are no type declaration blocks and types 7 are restricted to NUMBER, STRING, LIST and BOOLEAN.
- RS/2 requires the semi-colon in every position where Pascal permits.
- RS/2 has no runtime error messages. There is no exception handling.
- There are no objects or class syntax. Complex types are referenced using a typed handle, e.g. File handle.
- In IDF notation <RS2> tag may be used to introduce an RS/2 program.

The RS/2 source file is identified by the **preamble**

```
// REDTITAN RS2 CONTROL
```

Any other instance of // in a script indicates the start of a **comment** which RS/2 ignores. A comment is terminated at the end of the line of text.

Identifiers

An identifier type is declared by its first use;

Example assignment	Type
`A:=3;`	Number
`PI:=3.142;`	Number
`LX:=[];`	List (empty)
`S:='';`	String (empty)

An identifier may *not* be re-declared as a different type.

Statements

The following constructs are supported:

```
BEGIN ... END
IF ... THEN ... ELSE
CASE ... OF ...
REPEAT ... UNTIL ...
WHILE ... DO ...
FOR ... TO  ... DO ...
FUNCTION ...(...) BEGIN ... END
BREAK
EXIT
```

Operators

The following operators are available:

+	addition
-	subtraction
*	multiplication
/	division
¬	NOT
&	AND
!	OR
%	MOD

There is no operator order precedence, expression evaluation is left to right. Brackets may be be used specify an order.

- `writeln(3+4/5);` evaluates to `1.4`
- `writeln(3+(4/5));` evaluates to `3.8`

Runtime environment

RS/2 running in the freestanding RS/2 compiler has access to a console (WRITELN 37), a limited number of Windows® dialogs (SHOWMESSAGE 16, INPUTBOX 16, BROWSE 16) and access to the filestore (OPENFILE 33).

RS/2 running within *EscapeE* may also access a number of functions to draw in the EscapeE Window. This includes line drawing, text composition, display graphical resources, and field manipulation. If EscapeE is used to open an RS/2 file, the RS/2 program is executed for every page viewed or processed. EscapeE calls the RS/2 program to draw the selected page and passes the page number as a parameter.

Functions (private)

A user-defined function must be defined before first use. The formal parameter list may not contain VAR directives and may not be empty. The following function result types are permitted:

```
STRING
NUMBER
BOOLEAN
LIST
typed HANDLE
```

The private function returns a value by assigning a value to the RESULT identifier.

Notes on Types

NUMBER type

Numbers (Integer or Real) are held internally as floating point numbers.

STRING type

Strings are wide (16bit characters).

LIST type

An RS/2 list is a dynamic array of values, a type unique to RS/2. A list identifier may be instantiated using a bracketed array of constants:

```
LX:=['alpha',"beta",alpha,3.142];
```

The Pascal extended string syntax is permitted for an individual element but not mandated. As the RS/2 syntax is relaxed, comments 5 are not allowed in constant list definitions. Note that in this example the third constant element (alpha) is treated as if it was quoted (i.e. it is not a reference to an identifier 6). This format is intended as a way of storing a large number of constant elements in an easy interchange format (like a paragraph of text).
A number of functions are provided to manipulate lists,

```
LX:=['1.234',4,alpha,#13#10'new line',"element 4"];
writeln(list_numbers(lx,0)+list_numbers(lx,1));
writeln(list_strings(lx,3));
writeln(list_numbers(lx,4));
```

Elements are extracted from a list using the functions LIST_NUMBERS 17 or LIST_STRINGS 17. Where possible there is implicit type coercion between a string and a number when the list is first created. If a string cannot be interpreted as a number the value `-1` is returned.

Getting started

RS/2 scripts are text files that must start with the line

```
// REDTITAN RS2 CONTROL
```

The RS/2 program should signal the end of file condition to *EscapeE*. using a HALT 36 function with an error code greater than 0

```
// REDTITAN RS2 CONTROL
text(600,600,'This is page '+paramstr(1));
if paramstr(1)='5' then halt(1);
```

The example above will create a 5 page file when it is opened by EscapeE. See RS/2 procedures 10 for a list of the built-in standard functions and procedures.

An RS/2 file may be created with a simple text editor. The RS/2 file encoding format is UTF8. A plain text file is acceptable if the source text only contains characters in the ASCII character range $00 to $7F. If string constants contain characters outside this range or you wish to include other symbols then use a text editor that will display these characters (e.g. Microsoft® *Notepad*); select **Save As...** from the File menu and set the **Encoding** to **UTF-8**. A UTF-8 file will start with a sequence of special Byte Order Marks and UNICODE sequences will be encoded in UTF8 format. The RS/2 compiler can detect and repair some encoding problems automatically.

The Pound signs will be displayed correctly:

```
// REDTITAN RS2 CONTROL
flash('ff'); // Although these characters are ASCII $A3 (outside the
$00-$7F range)
halt(1);      // This file may be stored in plain text format
```

Greek letters, for example, will not be correct unless the source file has been stored in UTF-8 encoding

```
// REDTITAN RS2 CONTROL
flash('□XΦ'); // These characters are UNICODE $03A9 $03A7 $03A6
halt(1);      // This file should be stored in UTF-8 format
```

To learn more about UTF-8 see http://www.pcl.to/unicode/utf.xml

To automate the entry of unicode characters in simple editors like Notepad, download the RedTitan *Autoclick* utility – see http://www.pcl.to/unicode/

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Part II

RS/2 functions and procedures

RS/2 functions and procedures

RS/2 functions and procedures are *case insensitive*. Click a link in the list of RS/2 standard functions and procedures below to see a full description.

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The command key "**`markup:[`**" and "**`markup:]`**" is used to introduce variable data merge parameters. These parameters are name=value pairs and are added to paragraphs by the UBERED property editor or the CSV merge wizard. UBERED uses these sequences to dynamically create RS/2 scripts for variable data merge applications. These parameters are processed by UBERED in combination with a mark-up template (DEFAULT.MUP).

Strings

Copy(S:string; Index, Count: number): string;

Function

COPY returns a substring containing COUNT characters starting at S[INDEX]. If INDEX is larger than the length of S, then COPY returns an empty string or array.
If COUNT specifies more characters than are available, only the characters from S[INDEX] to the end of S are returned.

StrToIntDef(S: string; Default: number): number;

Function

STRTOINTDEF converts the string S (which represents a number in either decimal or hexadecimal notation) into a number.
If S does not represent a valid number, STRTOINTDEF returns the DEFAULT number.

Column example 39

See also STRTOFLOATDEF 11 and INTTOSTR 14 functions.

StrToFloatDef(S: string; Default: number): number;

Function

STRTOFLOATDEF converts the string S (representing a decimal number) to a floating-point number.
If S cannot be converted the DEFAULT is returned.

See also STRTOINTDEF 11 and INTTOSTR 14 functions.

Delete(var S: string; Index, Count:number);

Procedure

DELETE removes a substring, COUNT characters long, from string S starting with S[INDEX].
If INDEX is larger than the length of the string or less than 1, then no characters are deleted.
If COUNT specifies more characters than remain starting at the INDEX, then DELETE removes the rest of the string.
If COUNT is less than or equal to 0, no characters are deleted.

Pos(Substr: string; S: string): number;

Function

POS searches for a substring SUBSTR within a string S. POS is case-sensitive.
If SUBSTR is found then a number value that is the index of the first character of SUBSTR within S is returned.
If SUBSTR is *not* found then POS returns zero.

Trim(const S: string): string;

Function

TRIM removes whitespace – leading and trailing – from the string expression specified by S.

Table example: Variable data 46

LowerCase(const S: string): string;

Function

LOWERCASE returns string **S** converted to lower-case.

See also UPPERCASE 12 function, below.

UpperCase(const S: string): string;

Function

UPPERCASE returns string **S** converted to upper-case.

See also LOWERCASE 12 function, above.

Char(N:number):string;

Function

CHAR constructs a string consisting of a single wide character
$ffff>=N<=0

See also ORD 12 function, below.

Ord(const S: string): number;

Function

ORD returns the ordinal value of the first wide character of the string specified by **S**.
The result will be in the range **0..$ffff**

See also CHAR 12 function, above.

Split(Source,Separator:string;var LX:list);

Procedure

SPLIT procedure splits the **SOURCE** string into a number of elements delimited by the **SEPARATOR** string. The elements are returned in the list specified by the **LX** parameter. The previous contents of the list are lost.
If the **SEPARATOR** does not exist in the **SOURCE** string then the list will contain a single entry consisting of the entire **SOURCE** string.

```
split('alpha/beta/gamma','/',LX);
```

See also READCSV 33 procedure.

Numbers

Even(N:number):boolean;

Function

EVEN function returns **TRUE** if number **N** is not odd.

See also ODD 13 function, below.

Odd(N:number):boolean;

Function

ODD function returns **TRUE** if number **N** is odd.

See also EVEN 13 function, above.

Inc(var X [; N: number]);

Procedure

X is a number-type variable.
N is an optional number-type expression.

If **N** is specified then **X** increments by **N**; that is, **INC(X, N)** corresponds to the statement **X := X + N**.
If **N** is *not* specified then **X** increments by **1**; that is, **INC(X)** corresponds to the statement **X := X + 1**.
Note that **INC** generates optimized code and is especially useful in tight loops.

See also DEC 13 procedure, below.

Dec(var X[; N: number]);

Procedure

X is a number-type variable.
N is a number-type expression.

If **N** is specified then **X** decrements by **N**; that is, **DEC(X, N)** corresponds to the statement **X := X - N**.
If **N** is *not* specified then **X** decrements by **1**; that is, **DEC(X)** corresponds to the statement **X := X - 1**.
Note that **DEC** generates optimized code and is especially useful in tight loops.

See also INC 13 procedure, above.

Min(A,B: number): number;

Function

MIN returns the lower of the two values **A** and **B**; negative values are smaller than zero. Thus:

When	MIN returns	Example A	Example B	Example MIN
A>B	B	2	1	1
A<B	A	-2	-1	-2
A=B	B	2	2	2

See also MAX 14 function, below.

Max(A,B: number): number;

Function

MAX returns the higher of the two values **A** and **B**; negative values are smaller than zero. Thus:

When	MAX returns	Example A	Example B	Example MAX
A>B	A	2	1	2
A<B	B	-2	-1	-1
A=B	B	2	2	2

See also Min 14 function, above.

Random [Range: number]:number;

Function

RANDOM function returns a random number within the range:
`0 <= X < RANGE.`

IntToStr(N:number):string;

Function

INTTOSTRING converts number **N** to string representation.

Rotate example 44, Column example 39

See also STRINGTOINTDEF 11 and STRTOFLOATDEF 11 functions.

Values

FieldValue(Name:string):string;

Function

In EscapeE, **FIELDVALUE** will return the value of a mark-up or "composite" field.

```
s:=FieldValue('{field1}');
```

In the Windows RS2 JIT compiler, **FIELDVALUE** will return an empty string. It can be used to detect the supporting platform.

```
if fieldvalue('{_Iname}')='' then
begin
  showmessage('Please open with RedTitan EscapeE',3000);
  halt(1);
end;
```

Pred(I:number):number;

Function

The **PRED** function is equivalent to the assignment `I:=I-1;`

See also SUCC 15 function, below.

Table example: Variable data 46.

Succ(I:number):number;

Function

The **SUCC** function is equivalent to the assignment `I:=I+1;`

See also PRED 15 function, above.

Dialogs

InputBox(const ACaption, APrompt, ADefault: string): string;

Function

A modal dialog containing an "editable box" is displayed. **InputBox** function returns the string entered into this box by the user or, if the box is not edited, a default string.
ACaption specifies the text to be used in the title bar of the dialog.
APrompt specifies the text shown above the editable box.
ADefault supplies the text to be used if the editable box is not edited.

InputBox example 41

Flash(S:string);

Procedure

FLASH displays non-modal text alert window until another modal dialog or a new top window is selected.
String **s** contains the text to be displayed.

Query example 43

Query(Caption:string;[Timeout:number;Default:boolean]):boolean;

Function

QUERY function displays a dialog requesting a YES or NO response.
TIMEOUT (optional) parameter specifies the number of milliseconds to wait for user response.
DEFAULT (optional) parameter specifies whether the result is **TRUE** or **FALSE** if the dialog times out.

Query example 43

ShowMessage(S:string;[Timeout:number]);

Procedure

SHOWMESSAGE displays a modal dialog alert message.
The optional parameter **TIMEOUT** specifies the number of milliseconds to wait for user response.

Browse[(Caption[[,InitialDir],Filters]:string)]:string;

Function

BROWSE function returns the string resulting from a "Browse for a file" dialog.
CAPTION default value is **'Select file'**.
INITIALDIR default value is an empty string **''**.
FILTERS default value is **'*.*|*.*'**.

```
j:=browse(
   'Select',
   'c:\eeplugin',
   'Zip (*.zip)|*.zip|Async (*.abb)|*.abb|Async (*.asy)|*.asy'
   );
```

Tip: your RS/2 script should check for an empty string return: this indicates the dialog has been cancelled.

Table example: Variable data 46

Lists

Length(LS:string|list): number;

Function

If **LS** is a *string* expression, then **LENGTH** returns the number of *characters* in the string. If **LS** is a *list*, then **LENGTH** returns the number of *elements* in the list.

Table example: Variable data 46

See also LIST_STRINGS 17 function.

List_Strings(L:list;I:number):string;

Function

LIST_STRINGS function returns the element of list **L** specified by index number **I** as a string.

Table example: Variable data 46

See also LENGTH 17, LIST_NUMBERS 17 functions.

List_Add(L:list;S:string):number;

Function

LIST_ADD adds a string element **S** to the list **L** then returns the element index number.

List_Clear(L:list);

Procedure

LIST_CLEAR removes all elements in list **L**.

List_Numbers(L:list;I:number):number

Function

LIST_NUMBERS returns element **I** of list **L** as a number.
If the list element cannot be interpreted as a number then **LIST_NUMBERS** returns **-1**.

See also LENGTH 17, LIST_STRINGS 17 functions.

List_IndexOf(L:list;SearchFor:string;[CaseBlind:boolean=true;[StartIndex:number=0]]):number;

Function

LIST_INDEXOF returns the index of a specified string **SEARCHFOR** in list **L**. If the specified string is not found then **LIST_INDEXOF** returns **-1**. The function defaults to case-blind string matching and searches from the first element of the list.

```
l:=['alpha','Beta','gamma'];
writeln(list_indexof(l,'beta')); // returns 1
writeln(list_indexof(l,'beta',false)); // returns -1
```

See also LIST_STRINGS 17, LIST_NUMBERS 17 functions.

Columns

Col_Create:cHandle;

Function

EscapeE only

COL_CREATE function creates a column-formatting resource. All "text in column" formatting procedures require a column object handle – CHANDLE. There must be a corresponding COL_FREE 19 call for each COL_CREATE function.

```
cx:=col_create;
for i:=1 to 30 do col_text(cx,'hello world ');
col_compose(cx,4200,'rj');
col_display(cx,300,2600);
col_free(cx);
```

Column example 39

Col_Text(Cx:cHandle;S:string);

Procedure

EscapeE only

COL_TEXT adds text S to a "text in column" formatting object referenced by column object handle CX. No text is drawn by this operation. Any amount of text may be added before the object is composed and displayed.

Use COL_FONT 18 and COL_STYLE 18 procedures to control the font face and style used by COL_TEXT.

Column example 39

Col_Font(Cx:cHandle;Pt:number;FontName:string);

Procedure

EscapeE only

COL_FONT selects the font to be used for the COL_TEXT 18 procedure.

```
col_Font(cx,12,'Tahoma');
```

Column example 39

Col_Style(Cx:cHandle;Style:string);

Procedure

EscapeE only

COL_STYLE selects the font style to be used for the COL_TEXT 18 procedure.

STYLE options are BOLD and ITALIC; an empty string selects "NORMAL" style.

```
col_Style(cx,'Bold');
```

Column example 39

Col_Compose(Cx:cHandle;Width:number;Format:string);

Procedure

EscapeE only

COL_COMPOSE prepares the "text in column" formatting object for display. Specify a column **WIDTH** (in pixels at 600dpi) and a column **FORMAT** option – '**LJ**', '**CJ**', '**RJ**' or '**FILL**'. The column's height and line count properties are calculated for the chosen option; these values may be recovered using the COL_HEIGHT 20 and COL_COUNT 20 functions. The stored text is not destroyed by this procedure and it may be repeated for the same text with different parameters.

Column example 39

See also COL_LEADING 20 procedure.

Col_Display(Cx:cHandle;X,Y:number);

Procedure

EscapeE only

COL_DISPLAY draws text, previously formatted using the COL_COMPOSE 19 procedure, at the specified position **X,Y** on the page. The stored text is not destroyed by this procedure and it may be repeated for the same text with different parameters.

Column example 39

Col_Free(Cx:cHandle);

Procedure

EscapeE only

COL_FREE recovers column formatting resources. See COL_CREATE 18 function.

Column example 39

Col_Break(Cx:cHandle);

Procedure

EscapeE only

COL_BREAK inserts a line break in a column formatting object.

Column example 39

Col_Blank(Cx:cHandle;Lines:number);

Procedure

EscapeE only

COL_BLANK inserts a number of blank **LINES** in a column formatting object.

Column example 39

Col_Height(Cx:cHandle):number;

Function

EscapeE only

COL_HEIGHT returns the composed height of a column.

Column example 39

See also COL_COUNT 20 function and COL_COMPOSE 19, COL_LEADING 20 procedures.

Col_Count(Cx:cHandle):number;

Function

EscapeE only

COL_COUNT returns the number of lines in a composed column (see COL_COMPOSE 19 procedure).

Column example 39

Col_Leading(Cx:cHandle;L:number);

Procedure

EscapeE only

COL_LEADING allows the inter-line gap to be adjusted before a column is displayed (see COL_DISPLAY 19 procedure).

Column example 39

Drawing

Line(X1,Y1,X2,Y2:number);

Procedure

EscapeE only.

LINE procedure draws a line from **X1,Y1** to **X2,Y2** using the the current PEN 21 and COLOR 21, see below.

- Line example 42

Color(Red,Green,Blue: number);
Colour 21(Red,Green,Blue: number);

Procedure

EscapeE only.

COLOR procedure (*or* the alternative spelling **COLOUR**) specifies a color for TEXT 29 and LINE 21 drawing.
RED, **GREEN** and **BLUE** may take values **>=0**, **<=255** in decimal or **>=$00**, **<=$FF** in hexadecimal.

- **COLOR(255,128,0)** would be orange. (Equivalent to **COLOR($FF,$80,$00)** in Hex.)
- Rotate example 44, Line example 42.

See also BRUSH 21 procedure below.

Brush(Red,Green,Blue: number);

Procedure

EscapeE only.

BRUSH specifies the color for filled regions; see BOX 22 and BUTTON 22 procedures below.
RED, **GREEN** and **BLUE** may take values **>=0**, **<=255** in decimal or **>=$00**, **<=$FF** in hexadecimal.

- **BRUSH(0,255,255)**

would be cyan. (Equivalent to **BRUSH($00,$FF,$FF)** in Hex.)

See also COLOR 21 and FRAME 18 procedures.

Pen(Width:number);

Procedure

EscapeE only.

PEN specifies the pen's **WIDTH** in pixels (at 600dpi) for LINE 21 drawing.

- Table example: Variable data 46

Box(X,Y,Dx,Dy:number);
Box 22 **(TH:tableHandle);**

Procedures

EscapeE only.

BOX fills an area **DX** wide by **DY** high at position **X,Y** (in pixels at 600dpi) using the color specified by BRUSH 21.
The **BOX** function optionally takes a tableHandle **TH** (see TAB 24 function).

See also the FRAME 23 and BUTTON 22 functions.

Button(X,Y,Dx,Dy:number);
Button 22 **(TH:tableHandle);**

Procedures

EscapeE only.

BUTTON draws a filled button shape (lozenge) in the selected BRUSH 21 color.
The **BUTTON** function optionally takes a tableHandle **TH** (see TAB 24 function).

See also the FRAME 23 and BOX 22 functions.

Circle(X,Y,R[,Section]:number);

Procedure

EscapeE only.

CIRCLE draws a complete circle or a **SECTION** of a circle, radius **R** centered at position **X,Y,** (measured in pixels at 600dpi) using the current PEN 21 and COLOR 21.
If **SECTION** parameter is omitted a complete circle is drawn.

section=0 draws a complete circle (default)
section=1 draws the top right quadrant
section=2 draws the bottom right quadrant
section=3 draws the bottom left quadrant
section=4 draws the top left quadrant

Rotate example 44, Line example 42.

Curve(L:list);

Procedure

EscapeE only.

CURVE displays a Bezier curve.
L is a list of point-coordinate pairs, consisting of a start point pair (x,y) followed groups of three coordinate pairs. (Specified in pixels at 600dpi.)

```
L:=
[750, 1350,
150,750,   750,150,   1350,750,
1950,1350, 2550,1350, 3150,750,
...
```

See rs2 demo files and choose **poly.rs2**

PolyLine(L:list);

Procedure

EscapeE only.

Displays a **POLYLINE** linking all points specified by lists of coordinates in list **L**.

See rs2 demo files and choose **poly.rs2**

Frame(X,Y,Dx,Dy:number);
Frame 23 **(TH:tHandle);**

Procedure

EscapeE only.

FRAME draws a rectangle **DX** wide by **DY** high at **X,Y** (measured in pixels at 600dpi) using the selected PEN 21 and COLOR 21.
An overload of this function takes a **T**able **H**andle (see TAB 24 function): a filled rectangle is drawn using the BOX 22 function.

Tables

Tab(Xpos,Ypos:number;Htabs:list;Vspace:number):tableHandle;

Function

TAB defines a table.

XPOS,YPOS specify the position of the top-left corner of the table.
HTABS is a comma-separated list of default column widths (in pixels at 600dpi). There must be at least one value in the list. If there are fewer widths specified than the data requires, extra columns are added at the right of the table: the last value in the list is used to supply their default width. If there are more widths specified than the data requires, the extra values are ignored: no spurious columns are generated.
VSPACE specifies the default row height.

A number of related functions may be used to display table cells containing text with simple formatting: see TAB_ALIGN 24, TAB_BORDERS 26, TAB_CELL 24, TAB_PAD 25, TAB_VALIGN 25 procedures and TAB_FORMAT 26, TAB_HOME 25, TAB_NEXTROW 25 functions.

Table example: Basic 45, Table example: Variable data 46.

Tab_Cell(TH:tableHandle;S:string);

Procedure

TAB_CELL displays text **S** in a cell of the table specified by **TH**.

Table example: Basic 45, Table example: Variable data 46.

See TAB 24 function, above.

Tab_Align(TH:tableHandle;AlOpt:string);

Procedure

TAB_ALIGN specifies the *horizontal* text alignment.

ALOPT may be:

L for Left,
C for Center,
R for Right *or*
N for None. This option suppresses any composition in the FORMAT 27 and TAB_FORMAT 26 functions.

Table example: Basic 45, Table example: Variable data 46.

See also TAB_VALIGN 25 procedure, below.

Tab_VAlign(TH:tableHandle;AlOpt:string);

Procedure

TABVALIGN specifies the *vertical* text position.

ALOPT may be:

T for Top,
M for Middle *or*
B for Bottom

See also TABALIGN 24 procedure, above.

Tab_Pad(TH:tableHandle;Padding:number);

Procedure

TAB_PAD specifies the offset from the edge of cell to the text position, in pixels at 600dpi.

Table example: Basic 45, Table example: Variable data 46.

Tab_NextRow(TH:tableHandle[;Rulings:boolean=true]):number;

Function

TAB_NEXTROW is used to start a new row of a table: it returns the vertical position of the top of the next row down (in pixels at 600dpi). Row height is determined by the maximum of the vertical spacing specified by the **T**able **H**andle and the tallest text composed on the row.

RULINGS (optional) set to **TRUE** to draw lines at cell boundaries.

Table example: Basic 45, Table example: Variable data 46.

See also PEN 21 and TAB_PAD 25 procedures.

Tab_Home(TH:tableHandle):number;

Function

TAB_HOME returns to the first column cell position without advancing the vertical position. This function my be used to add additional text in each cell (in a different position) or add borders in particular positions.
Cell drawing may be repeated using the cell height determined by the maximum of the vertical spacing specified by the **T**able **H**andle and the tallest text composed on the row.

Tab_Borders(TH:tableHandle;Borders:string);

Procedure

TAB_BORDERS adds borders to a cell.

Borders options are a combination of:

T for TOP
L for LEFT
B for BOTTOM
R for RIGHT

Tab_Format(TH:tableHandle;FormattedText:list):number;

Function

TAB_FORMAT adds formatted text to a cell. See FORMAT 27 parameters for **FORMATTEDTEXT** list options.

Format

Format(AttributeList,FormattedText:list):number;

Function

FORMAT and **TAB_FORMAT** are analogues of the IDF Rich Text container used in the dynamic composition number of text paragraphs.
ATTRIBUTELIST specifies the overall text attributes as an ordered list of up to 13 properties as follows:

Left, Top, Width, Height, Padding, BorderWidth, Rotate, LineJoin, LineEnd, BorderStyle, Borders, BorderColor, BGColor

```
[600, 600, 900, 1050, 0, 0, 0, "round", "round", "solid", "T,L", "Black", "#408000"]
```

FORMATTEDTEXT list consists of "commandkey:value" pairs expressed as strings.

```
["text:hello","break:","text:world"]
```

Command key	Description	Example
text:	Sequence	text:hello world
font:	Font face name	font:Arial
size:	Point size	size:12
break:	Argument ignored. Insert line break	break:
blank:	Argument ignored. Insert blank line	blank:
align:	Set text alignment. LJ, RJ, CJ, or FILL	align:lj
bold:	Engage bold font	bold:
italic:	Engage italic font	italic:
underline:	Engage text	underline:
color:	Engage specified color	color:#0000ff

FormatFloat(S:string;N:number):string;

Function

FORMATFLOAT uses the string **S** to specify how the floating-point number **N** should be displayed. **S** may take these values:

0	Forces digit display or 0
#	Optional digit display
,	Forces display of thousands
.	Forces display of decimals
E+	Forces signed exponent display
E-	Optional sign exponent display
;	Separator of +ve and -ve and zero values

This table shows the effect of different strings on the way numbers are displayed.

string	N=1234	N=-1234	N=0.5	N=0
'0'	1234	-1234	1	0
'0.00'	1234.00	-1234.00	0.50	0.00
'#.##'	1234	-1234	.5	
'#,##0.00'	1,234.00	-1,234.00	0.50	0.00
'#,##0.00;(#,##0.00)'	1,234.00	(1,234.00)	0.50	0.00
'#,##0.00;;Zero'	1,234.00	-1,234.00	0.50	Zero
'0.000E+00'	1.234E+03	-1.234E+03	5.000E-01	0.000E+00
'#.###E-0'	1.234E3	-1.234E3	5E-1	

Font(PointSize:number;FontName,Style:string);

Procedure

EscapeE only

FONT engages the specified font.

- **Font(12,'Arial','bold');**
- Line example 42, Table example: Basic 45.

See also TEXT 29 and EXTENT 29 procedures, below.

Text(X,Y:number;S:string)

Procedure

EscapeE only

TEXT draws text **S** on page at **X,Y** (measured in pixels at 600dpi).

- Line example 42, Rotate example 44, Table example: Variable data 46.

See also FONT 29 procedure, above.

Rotate(Angle: number);

Procedure

EscapeE only.

ROTATE specifies the **ANGLE** in degrees counter-clockwise for TEXT 29 display.

- Rotate example 44, Line example 42.

Extent(S:string;var Ascent,Descent,Width:number);

Procedure

EscapeE only

EXTENT procedure returns text metrics for the string **S** in pixels at 600dpi.

ASCENT variable gives the font maximum height above the baseline.
DESCENT variable gives the text maximum depth below the baseline.
WIDTH variable gives the overall length of the string.

Now(Format:string):string;

Function

NOW specifies current date and time in one of these **Format** options:

y	Year; last 2 digits
yy	Year; last 2 digits
yyyy	Year as 4 digits
m	Month number; no-leading 0
mm	Month number as 2 digits
mmm	Month using ShortMonthNames (Jan)
mmmm	Month using LongMonthNames (January)
d	Day number; no-leading 0
dd	Day number as 2 digits
ddd	Day using ShortDayNames (Sun)
dddd	Day using LongDayNames (Sunday)
ddddd	Day in ShortDateFormat
dddddd	Day in LongDateFormat
c	Use ShortDateFormat + LongTimeFormat
h	Hour number; no-leading 0
hh	Hour number as 2 digits
n	Minute number; no-leading 0
nn	Minute number as 2 digits
s	Second number; no-leading 0
ss	Second number as 2 digits
z	Millisecond number; no-leading 0s
zzz	Millisecond number as 3 digits
t	Use ShortTimeFormat
tt	Use LongTimeFormat
am/pm	Use after h : gives 12 hours + am/pm
a/p	Use after h : gives 12 hours + a/p
ampm	As a/p but TimeAMString,TimePMString
/	Substituted by DateSeparator value
:	Substituted by TimeSeparator value

```
NOW('ddd mmm yyyy hh:mm:ss.zzz');
```

Column example 39

Paper

Orient(Direction:string);

Procedure

EscapeE only

ORIENT specifies the orientation of display. **DIRECTION** may take one of these values:
'P' = portrait (default)
'L' = landscape
'I' = inverse (portrait rotated 180degrees)
'J' = journal (landscape rotated 180degrees)

- Table example: Variable data 46

See also PAPER 31 and CUSTOM 32 procedures, below

Plex(Option:string);

Procedure

EscapeE only.

PLEX specifies whether one or both sides of the paper may be used. In the case of **DUPLEX**, edge-binding may be specified.

[SIMPLEX|DUPLEX][LONG|SHORT]

- **Plex('DUPLEX LONG');**
- Line example 42

See also ORIENT 31 procedure, above.

Copies(N:number);

Procedure

EscapeE only.

COPIES specifies the number, **N**, of copies required.

Paper(Option:string;Force:boolean);

Procedure

EscapeE only.

Set paper type.

- **Paper('A4',false);**
- Table example: Variable data 46

See also CUSTOM 32 procedure, below.

Custom(W,H:number);

Procedure

EscapeE only.

CUSTOM sets the width **W** and height **H** (in pixels at 600dpi) for custom paper.

See also PAPER 31 procedure, above.

SetTrays(T,B:number);

Procedure

EscapeE only.

Set input paper tray **T** and output bin **B**.

See also PAPER 31 procedure, above.

Files and resources

NewFile(Name:string);

Procedure

EscapeE only.

NEWFILE starts a new output file for this page. (**NAME** is currently ignored)

OpenFile(Name:string):fileHandle;

Function

OPENFILE returns a handle to a text file for reading. Use the handle in READLINE 33, READCSV 33 and EOF 33 functions.

```
h:=openfile('test.txt');
while not eof(f) do
  begin s:=readline(h); writeln(s); end;
```

Table example: Variable data 46

ReadLine(var Handle:fileHandle):string;

Function

READLINE returns the next string read from the file specified by the **HANDLE** identifier (created by OPENFILE 33).

See also READCSV 33 below.

ReadCSV(var Handle:fileHandle;var Lx:list;
[Separator:string[1]]);

Procedure

READCSV returns the next CSV record from the file specified by the **HANDLE** identifier (created by OPENFILE 33) in the list specified by **LX**.
If **SEPARATOR** is not specified then a comma is used to separate the elements. Each element will contain a field from the CSV record.

A multi-line field is normalized to a string containing a number of lines delimited by 'Line Feed' (#10) characters, i.e. 'CR' (#13) is not stored. Use the SPLIT 12 function to decompose multi-line fields.

Table example: Variable data 46

EOF(var Handle:fileHandle):boolean;

Function

EOF tests if any more data can be read from a file previously opened using OPENFILE 33. If **EOF** fails, the **HANDLE** is no longer valid, and the file is closed.

Table example: Variable data 46

CreateFile(FileName:string):fileHandle;

Function

CREATEFILE creates a file named **FILENAME** and returns a handle that can be used for WRITELINE 34 procedure and CLOSEFILE 34 function.

- Tip: "**CREATEFILE WRITELINE WRITELINE CLOSEFILE**" summarizes the file create process.

WriteLine(var Handle:number;S:string);

Procedure

WRITELINE writes a string **S** to a file previously opened with CREATEFILE 34 function (see above).

CloseFile(Handle:number):boolean;

Function

CLOSEFILE closes a file previously created with CREATEFILE 34 function.

FileExists(FN:string):boolean;

Function

FILEEXISTS returns **TRUE** if the file – specified by the file named by **FN** string – is extant.

- Table example: Variable data 46

Resource(FN:string; [X,Y:number;[Scale:number;[Page:number; [Transparent:boolean[,ClipLeft,ClipTop,ClipRight,ClipBottom:number]]]]]):boolean;

Function

EscapeE only

RESOURCE function adds the designated resource to the EscapeE page. If the resource cannot be found, or the requested page does not exist in the file, the function returns **FALSE**.

FN must be the name of a file in a format that EscapeE can view (PCL, PDF, TIFF, RS2 etc.) and is *mandatory*.
X optional number of pixels at 600dpi, default **0** (left-hand side of page).
Y optional number of pixels at 600dpi, default **0** (top of page).
SCALE optional number, default **1** (i.e. unscaled).
PAGE optional number, default **1**.
TRANSPARENT optional boolean, default **TRUE**.
CLIPLEFT, **CLIPTOP**, **CLIPRIGHT** and **CLIPBOTTOM** are optional numbers (default **0**) specifying a clip region.

- To draw a graphic at the top left-hand corner of the page:

```
resource('TEST.PNG');
```

ResourcePDF(FN:string; [X,Y:number;[Scale:number;[Page:number; [Transparent:boolean[,ClipLeft,ClipTop,ClipRight,ClipBottom:number]]]]]):boolean;

Function

EscapeE only

RESOURCEPDF function is used to engage special processing for PDF export only. The **RESOURCEPDF** File Name is only stored once in the output file and the content reused by each page as an embedded resource. If the resource cannot be found, or the requested page does not exist in the file, the function returns **FALSE**.

FN this string expression specifies the resource's File Name and is *mandatory*.
X optional number of pixels at 600dpi, default **0** (left-hand side of page).
Y optional number of pixels at 600dpi, default **0** (top of page).
SCALE optional number, default **1** (i.e. unscaled).
PAGE optional number, default **1**.
TRANSPARENT optional boolean, default **TRUE**.
CLIPLEFT, **CLIPTOP**, **CLIPRIGHT** and **CLIPBOTTOM** are optional numbers (default **0**) specifying a clip region.

In this example, the 50-page PDF output file is only a little larger than the 1-page source:

```
// REDTITAN RS2 CONTROL

resourcePDF('overlay.pdf');
text(100,100,'Page '+paramstr(1));

if paramstr(1)='50' then halt(1);
```

See also RESOURCE 34, above.

Processing

ParamCount:number;

Function

PARAMCOUNT returns the number of parameters passed to the program on the command line.
See also PARAMSTR 36 below.

ParamStr(Index: number): string;

Function

PARAMSTR returns the parameter from the command line that corresponds to **INDEX**, *or* if **INDEX** is greater than PARAMCOUNT 36, then **PARAMSTR** returns an empty string.
For example, an **INDEX** value of 2 returns the second command-line parameter.

In EscapeE the **INDEX** values 0 and 1 have special meanings:
PARAMSTR(0) returns the path and file name of the RS/2 program e.g. "Table.RS2".
PARAMSTR(1) supplies the page number.
In EscapeE (v8.85+) extended command line filename syntax, the filename parameter may be followed by a number of other parameters. Each parameter is separated from the next by a comma;
PARAMSTR(n) for **n>1** to **n<=PARAMCOUNT** returns the **n**th parameter on the command line.

- This command line contains the file name parameter "Table.RS2" followed by the name parameter of the data file used to fill the table "Sales.csv". (**/PDF** and **/X** are EscapeE switches – see EscapeE Help.)
  ...ESCAPEE Table.RS2,Sales.csv /pdf /x
  then **PARAMSTR(2)** would return "Sales.csv".
- Column example 39, Table example: Variable data 46.

Halt(N:number);

Procedure

In Windows RS2 JIT compiler, **HALT** terminates program execution and returns the exit code **N**.

In EscapeE, **HALT(1)** is used to signal 'end of file'.

- Column example 39, Rotate example 44, Line example 42, Table example: Basic 45, Table example: Variable data 46.

See also EOF 33 and CLOSEFILE 34 functions.

Sleep(Millisecs:number);

Procedure

SLEEP suspends processing for specified period.

Pipe(PipeName,Query:string):string;

Function

The RS/2 function **PIPE** provides inter-process communication on a local computer to another program that implements the pipe server named **PIPENAME**. For example, to send database queries to Microsoft® *SQL Server*®.
Strings of up to 8000 bytes may be sent and received.

See also NAMESERVER.ZIP in the rs2 demo files.

WriteLn(P1 [, P2, ...,Pn]);

Procedure

WriteLn writes lines of text to the *console* window.

In EscapeE this is the LOG window.

(To write to a *file* see WRITELINE 34 procedure.)

WriteLn example 47

Part III

Examples

Examples

This section contains worked examples.

To try an example

1. Sweep out the text in a blue box then copy and paste it into a text editor such as Microsoft® *Notepad*.
2. Save the file in plain TXT format but change the file extension to "RS2".
3. Open the RS2 file in *EscapeE*.

- Column 39
- InputBox 41
- Line 42
- Query 43
- Rotate 44
- Table: Basic 45
- Table: Variable data 46
- WriteLn 47

Column example

```
Col_Create:cHandle;
Col_Free(Cx:cHandle);
```

There are four columns of text shown on each of nine pages in this example:

Each of the four columns is composed with a different alignment:

Column1 FILL
Column2 CJ
Column3 LJ
Column4 RJ

The time at which each page was created is shown in Column4 using the NOW function.

(Text to be printed on the page shown in black.)

```
// REDTITAN RS2 CONTROL
PAGENUMBER:= strtointdef(paramstr(1),0);
if PAGENUMBER>10 then halt(1);

CX1:= col_create;  //COLUMN1
  col_font(CX1,14,'Tahoma');
  WORDS1:= 'Column1: use the COL_CREATE function to set up a column then
COL_TEXT procedure to enter the text. Specify the width of the column and
the alignment of the text within the column using COL_COMPOSE procedure.
COL_DISPLAY procedure places the composed column on the page then
COL_FREE procedure releases the handle set up by   COL_CREATE.';
  col_text(CX1,WORDS1);
  col_compose(CX1,1800,'fill'); col_display(CX1,600,600);
  H1:= col_height(CX1);
col_free(CX1);

CX2:= col_create;  //COLUMN2
  col_font(CX2,14,'Tahoma');  col_text(CX2,'Column2: use the COL_FONT
procedure to change the font ');
  col_font(CX2,18,'Tahoma');  col_text(CX2,'size ');
  col_font(CX2,14,'Tahoma');  col_text(CX2,'and ');
  col_font(CX2,14,'Times New Roman');  col_text(CX2,'typeface. ');
  col_font(CX2,14,'Tahoma');  col_text(CX2,'The COL_STYLE procedure is
often a more convenient way of making spot changes to font ');
  col_style(CX2,'italic');  col_text(CX2,'style ');
  col_font(CX2,14,'Tahoma');  col_text(CX2,'and ');
  col_style(CX2,'bold');  col_text(CX2,'weight.');
  col_font(CX2,14,'Tahoma');
  col_break(CX2);
  col_text(CX2,'COL_BREAK procedure forces a line-break in a column. A
COL_BLANK procedure here');
  col_blank(CX2,2);
  col_text(CX2,'inserts a line-break and two blank lines.');
  col_compose(CX2,1800,'cj'); col_display(CX2,2600,600);
  LINES2:= inttostr(col_count(CX2));
col_free(CX2);

CX3:= col_create;  //COLUMN3
  col_Font(CX3,14,'Tahoma');
  WORDS3:= 'Column3: the COL_HEIGHT function has been used here to make a
gap of 1 inch between this column and column1. The COL_COUNT function
returns the number of lines used to compose a column: there are '+LINES2
+' lines in column2.';
  col_text(CX3,WORDS3);
  col_compose(CX3,1800,'lj'); col_display(CX3,600,1200+H1);
col_free(CX3);

CX4:= col_create;  //COLUMN4
  col_Font(CX4,14,'Tahoma');
  WORDS4:= 'Column4: the COL_LEADING procedure inserts gaps between the
lines of text in a column. It is now '+now ('hh:nn:ss')+' on '+
now('ddddd')+' ("ShortDateFormat").';
  col_text(CX4,WORDS4); col_compose(CX4,1800,'rj');
  col_leading(CX4,150); col_display(CX4,2600,3600);
col_free(CX4);

if PAGENUMBER=9 then halt(1);
```

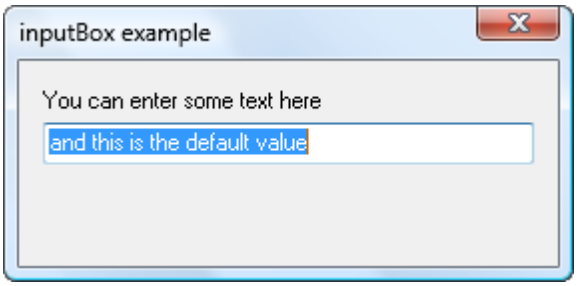
InputBox example

`InputBox(const ACaption, APrompt, ADefault: string): string;`

This RS/2 script:

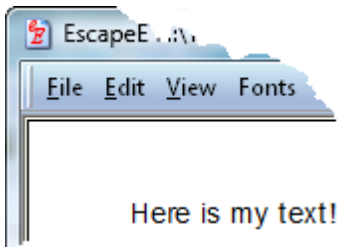
```
// REDTITAN RS2 CONTROL
s:=inputbox('inputBox example','You can enter some text here','and this is the default value');
text(300,300,s);
```

displays this modal dialog:



Try typing Here is my text! in the editable box to overwrite the **`ADefault`** string **`and this is the default value`**.

The *EscapeE* Applications Programming Interface will display:



Line example

Line(X1,Y1,X2,Y2:number);

Print this on a sheet of A4 paper then fold along the lines to make a paper dart.

```
// REDTITAN RS2 CONTROL

Plex('DUPLEX LONG');
Font(10,'Arial','');
PAGENUM:=strtointdef(paramstr(1),0);

case PAGENUM of
  1:begin
    line(2478,0,2478,7014);
    rotate(270);
    text(2600,2000,'1: fold paper in half along this line so that the
red circle is visible');
    color(120,120,220);
    line(0,1239,1239,1239); //line3 ext
    color(120,220,120);
    line(3717,1239,4956,1239); //line5 ext
  end;

  2:begin
    color(120,170,220);
    line(2478,0,4956,2478);
    rotate(315);
    text(3500,950,'2: fold this corner down');

    color(120,120,220);
    line(3717,1239,3717,7014);
    rotate(270);
    text(3750,3800,'3: fold edge down');

    color(120,220,170);
    line(2478,0,0,2478);
    rotate(45);
    text(1000,1350,'4: fold this corner down');

    color(120,220,120);
    line(1239,1239,1239,7014);
    rotate(90);
    text(1200,4250,'5: fold edge down');

    color(255,0,0);
    rotate(0);
    text(2000,3000,'6: hold here to launch');
    circle(2478,3000,500);
  end;

else halt(1);

end;
```

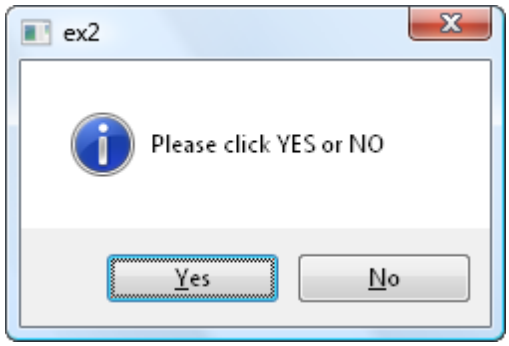
Query example

Query(Caption:string;[Timeout:number;Default:boolean]);

Running this RS/2 script:

```
// REDTITAN RS2 CONTROL
repeat
  if query('Please click YES or NO') then writeln('RESPONDED YES') else writeln('RESPONDED NO');
  flash('User interaction'#10'demo');
  writeln(query('JUST LET THIS TIMEOUT (1)',3000,TRUE));
  writeln(query('JUST LET THIS TIMEOUT (2)',3000,FALSE));
until not query('Carry on?');
```

displays a dialog containing YES button and a NO button under the **Caption** **Please click YES or NO**:



If you click YES, **writeln** 37 procedure writes **RESPONDED YES** in the *EscapeE* log but if you click NO, **RESPONDED NO** is written instead.
Another dialog then appears with the caption **JUST LET THIS TIMEOUT** to demonstrate **Timeout** in use.
If you click YES, **TRUE** is logged, if you click NO, **FALSE** is logged. If you do not click the YES or NO buttons then after 3 seconds, **Query** 16 function times-out and **TRUE** is written to the log.
Another timeout dialog appears to demonstrate the **Default** value **FALSE** being logged.
The last dialog appears with **Carry on?** as the **Caption**
Click YES to run through the example again or NO to finish.

Rotate example

Rotate(Angle: number);

In this example, text and digits are shown at a range of angles to form a protractor for text.

```
// REDTITAN RS2 CONTROL

circle(1200,1200,600);
ANGLE:=0;
TANGLE:=inttostr(ANGLE);
N:=15;
ROT:=ANGLE;

repeat
  TANGLE:=inttostr(ROT);
  rotate(ROT);
  text(1200,1200,'.            ..... ' + TANGLE + ' degrees');
  ROT:=ROT+N;
until ROT>350;

halt(1);
```

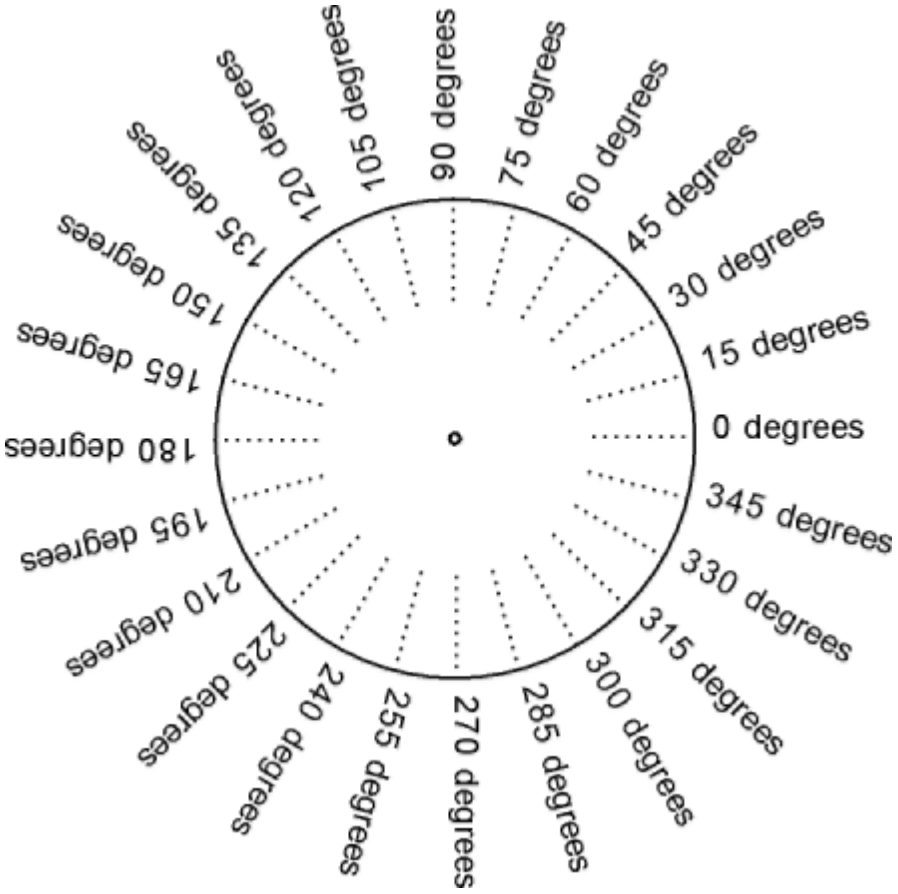


Table example: Basic

Tab(Xpos,Ypos:number;Htabs:list;Vspace:number):tableHandle;

A simple, self-contained, 3-column x 4-row table.

```
// REDTITAN RS2 CONTROL

tx:=tab(300,600,[500,1200,1500],5);
tab_pad(tx,40);

//table headings

font(12,'Arial','bold');
tab_align(tx,'c');

tab_cell(tx,'');
tab_cell(tx,'Telephone');
tab_cell(tx,'email');
tab_nextrow(tx,true);

//table body

font(10,'Arial','');
tab_align(tx,'l');

tab_cell(tx,'UK');
tab_cell(tx,'(+44) [0]1494 811 420');
tab_cell(tx,'help@redtitan.com')
tab_nextrow(tx,true);

tab_cell(tx,'USA');
tab_cell(tx,'770.924.1226');
tab_cell(tx,'help@redtitan.com')
tab_nextrow(tx,true);

tab_cell(tx,'France');
tab_cell(tx,'(+33) [0]2 32 60 20 53');
tab_cell(tx,'RTfrance@RedTitan.fr')
tab_nextrow(tx,true);

tab_cell(tx,'Germany');
tab_cell(tx,'(+49) [0] 30 60985629');
tab_cell(tx,'deutschland@redtitan.com')
tab_nextrow(tx,true);

halt(1);
```

Table example: Variable data

```
Tab(Xpos,Ypos:number;Htabs:list;Vspace:number):tableHandle;
OpenFile(Name:string):fileHandle
ReadCSV(var Handle:fileHandle;var Lx:list;[Separator:string[1]]);
```

You need a separate CSV file to supply the data for this RS/2 file.

```
// REDTITAN RS2 CONTROL

paper('a1',false);

if paramstr(1)='1' then
  begin  // first page only
    filename:=paramstr(2);
    if fileexists(FILENAME) then fx:=openFile(FILENAME) else
      begin
        filename:=browse('CSV file','','CSV files (*.csv)|*.csv|All
files (*.*)|*.*');
        if trim(filename)='' then halt(1);
        fx:=openfile(filename);
      end;
    csv_buffer:=[];
    readcsv(fx,CSV_BUFFER);
    headings:=csv_buffer;
  end;

orient('L');
pen(1);
tx:= tab(200,800,[600],5);
tab_align(tx,'1');
tab_pad(tx,40);

// display headings on every page

text(200,200,Filename);

for i:=0 to pred(length(headings)) do
tab_cell(tx,list_strings(headings,i));

tab_nextrow(tx,true);
repeat
  readcsv(fx,CSV_BUFFER);
  for i:=0 to pred(length(csv_buffer)) do
tab_cell(tx,trim(list_strings(csv_buffer,i)));
  if tab_nextrow(tx)>12600 then break;
until eof(fx);

if eof(fx) then halt(1);
```

WriteLn example

WriteLn(P1 [, P2, ...,Pn]);

This RS/2 script shows how information may be placed in the *EscapeE* log.

```
// REDTITAN RS2 CONTROL

// WriteLn procedure can accept most parameter types, but not unsupported
or structured types (e.g. list).

x:=1; y:=2; b:=(x=y); s:='My string';

writeln('x = ',x,' y = ',y,' b = ',b,' s = ',s);
writeln('Each WriteLn statement is placed ');
writeln('on a separate line.');
```

The resulting Log page shows this text:

```
x = 1 y = 2 b = FALSE s = My string
Each WriteLn statement is placed
on a separate line.
```

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/

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