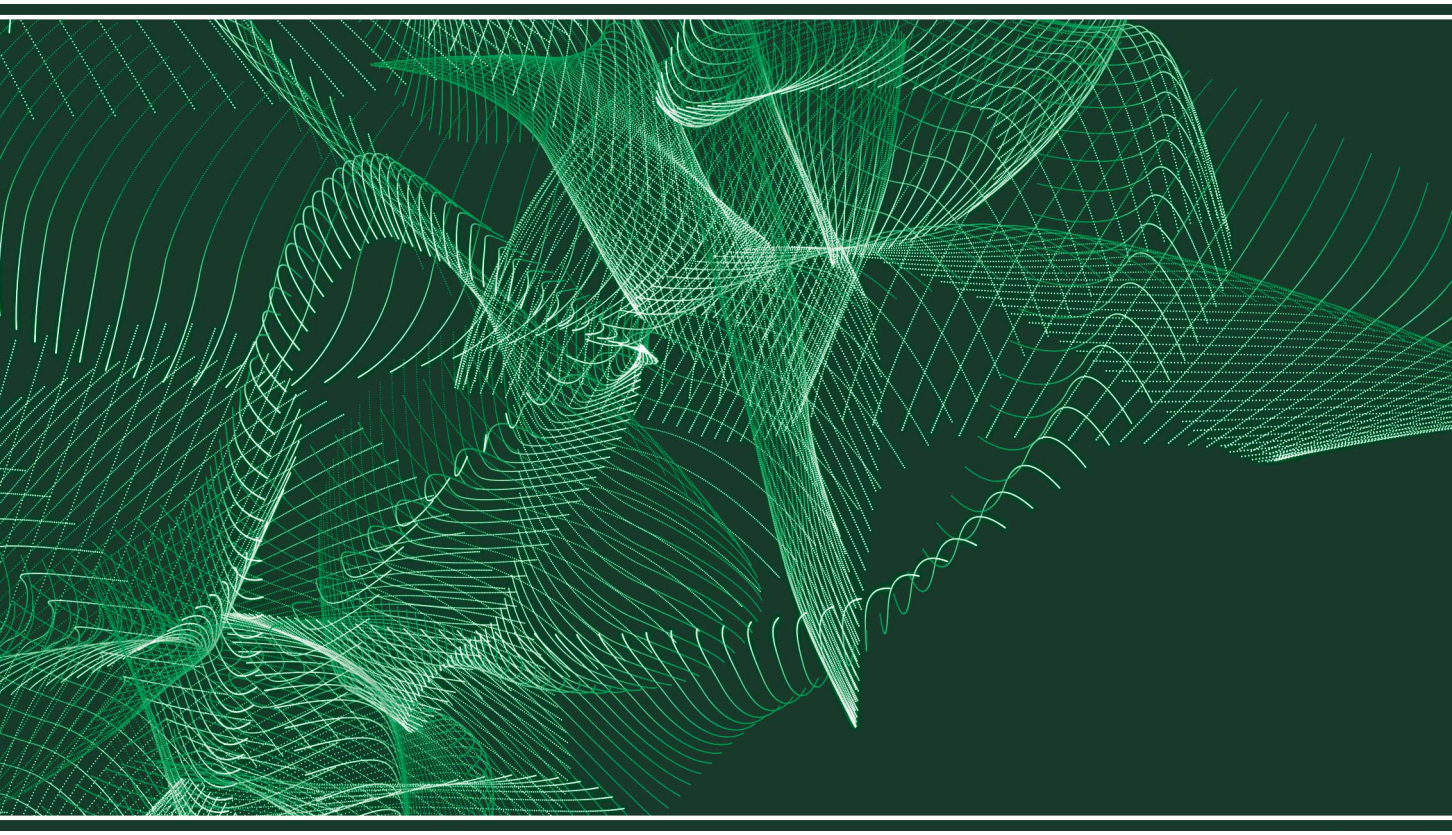
Dyalog for Microsoft Windows Installation and Configuration Guide

Dyalog version 16.0



DYALOG

The tool of thought for software solutions

Dyalog is a trademark of Dyalog Limited

Copyright © 1982-2017 by Dyalog Limited

All rights reserved.

Version: 16.0

Revision: 2972 dated 20230217

Please note that unless otherwise stated, all the examples in this document assume that ⎕IO is 1, and ⎕ML is 1.

No part of this publication may be reproduced in any form by any means without the prior written permission of Dyalog Limited.

Dyalog Limited makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Dyalog Limited reserves the right to revise this publication without notification.

email: support@dyalog.com
http://www.dyalog.com

TRADEMARKS:

SQAPL is copyright of Insight Systems ApS.

UNIX is a registered trademark of The Open Group.

Windows, Windows Vista, Visual Basic and Excel are trademarks of Microsoft Corporation.

Oracle and Java are registered trademarks of Oracle and/or its affiliates.

macOS®, Mac OS® and OS X® (operating system software) are trademarks of Apple Inc., registered in the U.S. and other countries.

Array Editor is copyright of davidliebtag.com

All other trademarks and copyrights are acknowledged.

Contents

Chapter 1: Installation and Configuration **1**
Documentation 1
Files and Directories 2
APL Fonts 8
Inter-operability 9
The APL Command Line 13
APL Exit Codes 15
Configuration Parameters 16
Registry Sub-Folders 42
Window Captions 45
Workspace Management 47
Interface with Windows 48
Auxiliary Processors 48
Access Control for External Variables 50
Creating Executables and COM Servers 51
Run-Time Applications and Components 56
COM Objects and the Dyalog APL DLL 65
APL Application as a Service 68
APLService Logging Events 73

Chapter 2: Configuring the IDE **79**
The Configuration Dialog Box 79
Colour Selection Dialog 112
Print Configuration Dialog Box 115

Index **123**

Chapter 1:

Installation and Configuration

Documentation

The documentation set for Dyalog is installed in the `help` sub-directory of the main Dyalog installation directory.

The latter is given by the expression:

```
      ⎕←2 ⎕NQ'.' 'GetEnvironment' 'DYALOG'
C:\Program Files\Dyalog\Dyalog APL-64 15.0 Unicode
```

Example:

```
      dyalog←2⎕nq'.' 'GetEnvironment' 'DYALOG'
      ⎕cmd 'dir "',dyalog,'/help"'
 Volume in drive C is OS
 Volume Serial Number is 3013-866E

 Directory of C:\Program Files\Dyalog\Dyalog APL-64 15.0
Unicode\help

18/01/2016  11:53    <DIR>          .
18/01/2016  11:53    <DIR>          ..
11/01/2016  17:20           182,965 APL Workspace Transfer
Guide.pdf
11/01/2016  17:20           467,005 Application Tuning Guide.pdf
11/01/2016  17:20           587,605 Code Libraries Reference
Guide.pdf
11/01/2016  17:20           249,461 Compiler User Guide.pdf
11/01/2016  17:20           451,949 Conga User Guide.pdf
...
```

Files and Directories

Unicode and Classic Editions

Dyalog APL continues to be available in two separate editions; *Unicode* and *Classic*.

- The *Unicode* edition is intended for users who need to develop Unicode applications now, and are prepared to make the necessary (usually small) changes to existing applications in order to support new Unicode character types.
- The *Classic* edition is intended for customers who want to take advantage of other product enhancements, but do not wish to use Unicode at this time.

The two different editions are maintained from the same source code, and every effort will be made to ensure that they are identical except for the handling of character arrays, and the transfer of data into and out of the workspace.

32-Bit and 64-Bit Versions

Two separate versions of Dyalog for Microsoft Windows are available. The 32-bit version will run on both 32-bit and 64-bit Operating Systems; the 64-bit version will only run on a 64-bit Operating System.

Files

The following tables show files that are included in the different versions and editions under Microsoft Windows. These are referred to in the remainder of this document and in other documents by the name shown in the first column of the tables.

With the exception of the following all these files may be distributed as part of end-user applications, under the terms and conditions of a Dyalog APL Run-Time Agreement. Please contact Dyalog or your distributor, or see the Dyalog web page for more information.

Non-Distributable Development Components

- Development EXE
- Development DLL
- Array Editor

Name	File
32-bit Unicode	**Dyalog APL 16.0Unicode**
Development EXE	dyalog.exe
Development DLL	dyalog160_32_unicode.dll
Array Editor	dlaedit32.dll
Run-Time EXE	dyalogrt.exe
Run-Time DLL	dyalog160rt_unicode.dll
Bridge DLL	bridge160_unicode.dll
Dyalog DLL	dyalog32.dll
DyaRes DLL	dyares160_32.dll
DyalogProvider DLL	dyalogprovider.dll
DyalogNet DLL	dyalognet.dll
APLScript Compiler	dyalogc_unicode.exe
For Conga and RIDE	conga30ssl32.dll
For Conga and RIDE	conga30_32.dll
	exestub.dll
	dllstub.dll
SQAPL INI	sqapl.ini
SQAPL ERR	sqapl.err
SQAPL DLL	cwdya62u32w.dll
APLUNICD INI	aplunicd.ini
	sharpplot.dll
	sharpplot.xml

Name	File
32-bit Classic	**Dyalog APL 16.0 Classic**
Development EXE	dyalog.exe
Development DLL	dyalog160_32.dll
Array Editor	dlaedit32.dll
Run-Time EXE	dyalogrt.exe
Run-Time DLL	dyalog160rt.dll
Bridge DLL	bridge160.dll
Dyalog DLL	dyalog32.dll
DyaRes DLL	dyares160_32.dll
DyalogProvider DLL	dyalogprovider.dll
DyalogNet DLL	dyalognet.dll
APLScript Compiler	dyalogc.exe
For Conga and RIDE	conga30ssl32.dll
For Conga and RIDE	conga30_32.dll
	exestub.dll
	dllstub.dll
SQAPL INI	sqapl.ini
SQAPL ERR	sqapl.err
SQAPL DLL	cwdya62c32w.dll
APLUNICD INI	aplunicd.ini
	sharpplot.dll
	sharpplot.xml

Name	File
64-bit Unicode	**Dyalog APL-64 16.0 Unicode**
Development EXE	dyalog.exe
Development DLL	dyalog160_64_unicode.dll
Array Editor	dlaedit64.dll
Run-Time EXE	dyalogrt.exe
Run-Time DLL	dyalog160_64rt_unicode.dll
Bridge DLL	bridge160-64_unicode.dll
Dyalog DLL	dyalog64.dll
DyaRes DLL	dyares160_64.dll
DyalogProvider DLL	dyalogprovider.dll
DyalogNet DLL	dyalognet.dll
APLScript Compiler	dyalogc64_unicode.exe
For Conga and RIDE	conga30ssl64.dll
For Conga and RIDE	conga30_64.dll
	exestub.dll
	dllstub.dll
SQAPL INI	sqapl.ini
SQAPL ERR	sqapl.err
SQAPL DLL	cwdya62u64w.dll
APLUNICD INI	aplunicd.ini
	sharpplot.dll
	sharpplot.xml

Name	File
64-bit Classic	**Dyalog APL-64 16.0 Classic**
Development EXE	dyalog.exe
Development DLL	dyalog160_64.dll
Array Editor	dlaedit64.dll
Run-Time EXE	dyalogrt.exe
Run-Time DLL	dyalog160_64rt.dll
Bridge DLL	bridge160-64.dll
Dyalog DLL	dyalog64.dll
DyaRes DLL	dyares160_64.dll
DyalogProvider DLL	dyalogprovider.dll
DyalogNet DLL	dyalognet.dll
APLScript Compiler	dyalogc64.exe
For Conga and RIDE	conga30ssl64.dll
For Conga and RIDE	conga30_64.dll
	exestub.dll
	dllstub.dll
SQAPL INI	sqapl.ini
SQAPL ERR	sqapl.err
SQAPL DLL	cwdya62c64w.dll
APLUNICD INI	aplunicd.ini
	sharpplot.dll
	sharpplot.xml

File Naming Conventions

The following file naming conventions have been adopted for the various files distributed with and used by Dyalog APL.

Extension	Description
.dws	Dyalog APL Workspace
.dse	Dyalog APL Session
.dcf	Dyalog APL Component File
.DXV	Dyalog APL External Variable
.din	Dyalog APL Input Table
.dot	Dyalog APL Output Table
.dft	Dyalog APL Format File
.DXF	Dyalog APL Transfer File
.dlf	Dyalog APL Session Log File
.dyalog	Dyalog APL SALT file
.dyapp	Dyalog APL SALT application file

Note that some of these extensions, notably .dcf, .dlf, .dot and .DXF, are not unique to Dyalog and conflict with the same extensions used by other software applications. Although all the above file extensions are associated with Dyalog during its installation, these associations may subsequently be changed by the installation of other software or by a Windows System restore.

APL Fonts

Unicode Edition

The default font for the Unicode Edition is APL385 Unicode[1] which is a TrueType font and is installed as part of Dyalog APL. APL385 Unicode is the font used to print APL characters in this manual. In principle, you may use any other Unicode font that includes the APL symbols, such as Arial Unicode MS (available from Microsoft).

Classic Edition

In the Classic Edition, there are two types of APL font provided; bitmap (screen) and TrueType. There are also two different layouts, which are referred to as *Std* and *Alt*.

The bitmap fonts are designed for the screen alone and are named *Dyalog Std* and *Dyalog Alt*. The TrueType fonts have a traditional 2741-style italic appearance and are named *Dyalog Std TT* and *Dyalog Alt TT*[1].

The *Std* layout, which was the standard layout for Versions of Dyalog APL up to Version 10.1 contains the APL underscored alphabet A̲–Z̲. **The underscored alphabet is a deprecated feature and is only supported in this Version of Dyalog APL for backwards compatibility.**

The *Alt* layout, which replaced the *Std* layout as the standard layout for Version 12.0 Classic Edition onwards, does not have the underscored alphabet, but contains additional National Language characters in their place. Note that the extra National Language symbols share the same ⎕AV positions with the underscored alphabet. If, for example, you switch from the *Std* font layout to the alternative one, you will see the symbol Á (A-acute) instead of the symbol A̲ (A-underscore).

You may use either a bitmap font or a TrueType font in your APL session (see *UI Guide: Session Operations* for details). You MUST use a TrueType font for printing APL functions.

[1]The Dyalog Std TT, Dyalog Alt TT, and APL385 Unicode fonts are the copyright of Adrian Smith.

Inter-operability

Introduction

Workspaces and component files are stored on disk in a binary format (illegible to text editors). This format differs between machine architectures and among versions of Dyalog. For example, a file component written by a PC may well have an internal format that is different from one written by a UNIX machine. Similarly, a workspace saved from Dyalog Version 16.0 will differ internally from one saved by a previous version of Dyalog APL.

It is convenient for versions of Dyalog APL running on different platforms to be able to *interoperate* by sharing workspaces and component files. From Version 11.0, component files and workspaces can generally be shared between Dyalog interpreters running on different platforms. However, this is not always possible, for example:

- Component files created by Version 10.1 can often not be shared across platforms, even when used by later versions.
- *Small-span* (32-bit) component files become read-only when opened on a different architecture from that on which they were created.

Note however that the system function `⎕FCOPY` can be used to make a logically identical copy of an old file, but the copy will be fully inter-operable.

The following sections describe other limitations in inter-operability:

Code and ⎕ORs

Code that is saved in workspaces, or embedded within `⎕OR`s stored in component files, can only be read by the Dyalog version which saved them and later versions of the interpreter. In the case of workspaces, a load (or copy) into an older version would fail with the message:

```
this WS requires a later version of the interpreter.
```

Every time a `⎕OR` object is read by a version later than that which created it, time may be spent in converting the internal representation into the latest form. Dyalog recommends that `⎕OR`s should not be used as a mechanism for sharing code or objects between different versions of APL.

"Ordinary" Arrays

With the exception of the Unicode restrictions described in the following paragraphs, Dyalog APL provides inter-operability for arrays that only contain (nested) character and numeric data. Such arrays can be stored in component files - or transmitted using `TCPSocket` objects and Conga connections, and shared between all versions and across all platforms.

As mentioned in the introduction, full cross-platform interoperability of component files is only available for large-span component files.

Null Items (⎕NULL)

`⎕NULL`s created in Version 16.0 can be brought into Versions 14.0, 14.1 and 15.0 provided that the interpreters have been patched to revision 29846 or higher. Attempts to bring `⎕NULL` into earlier versions of Dyalog APL or lower revisions of the aforementioned versions will fail with a `DOMAIN ERROR: Array is from a later version of APL`.

Object Representations (⎕OR)

An attempt to `⎕FREAD` a component containing a `⎕OR` that was created by a later version of Dyalog APL will generate `DOMAIN ERROR: Array is from a later version of APL`. This also applies to APL objects passed via Conga or TCPSockets, or objects that have been serialised using `220⌶`.

32 vs. 64-bit Component Files

It is no longer possible to *create* small-span (32-bit) files; however it is still currently possible to *read* and *write* small span files. Setting the second item of the right argument of `⎕FCREATE` to anything other than 64 will generate a `DOMAIN ERROR`.

Note that *small-span* (32-bit-addressing) component files cannot contain Unicode data. Unicode editions of Dyalog APL can only write character data which would be readable by a Classic edition (consisting of elements of `⎕AV`).

External Variables

External variables are implemented as small-span (32-bit-addressing) component files, and are subject to the same restrictions as these files. External variables are unlikely to be developed further; Dyalog recommends that applications which use them should switch to using mapped files or traditional component files. Please contact Dyalog if you need further advice on this topic.

32 vs. 64-bit Interpreters

From Dyalog APL Version 11.0 onwards, there are two separate versions of programs for 32-bit and 64-bit machine architectures (the 32-bit versions will also run on 64-bit machines running 64-bit operating systems). There is complete inter-operability between 32- and 64-bit interpreters, except that 32-bit interpreters are unable to work with arrays or workspaces greater than 2GB in size.

Note however that under Windows a 32-bit version of Dyalog APL may only access 32-bit DLLs, and a 64-bit version of Dyalog APL may only access 64-bit DLLs. This is a Windows restriction.

Unicode vs. Classic Editions

Two editions are available. Unicode editions work with the entire Unicode character set. Classic editions (a term which includes versions prior to 12.0) are limited to the 256 characters defined in the atomic vector, `⎕AV`).

Component files have a Unicode property. When this is enabled, all characters will be written as Unicode data to the file. The Unicode property is always off for small-span (32-bit addressing) files, as these cannot contain Unicode data. For large-span (64-bit addressing) component files, the Unicode property is set *on* by Unicode Editions and *off* by Classic Editions, by default. The Unicode property can subsequently be toggled on and off using `⎕FPROPS`.

When a Unicode edition writes to a component file that cannot contain Unicode data, character data is mapped using `⎕AVU`; it can therefore be read without problems by Classic editions.

A `TRANSLATION ERROR` will occur if a Unicode edition writes to a non-Unicode component file (that is either a 32-bit file, or a 64-bit file when the Unicode property is currently off) if the data being written contains characters that are not in `⎕AVU`.

Likewise, a Classic edition will issue a `TRANSLATION ERROR` if it attempts to read a component containing Unicode data that is not in `⎕AVU` from a component file.

A `TRANSLATION ERROR` will also be issued when a Classic edition `)LOAD`s or `)COPY`s a workspace containing Unicode data that cannot be mapped to `⎕AV` using the `⎕AVU` in the recipient workspace.

`TCPSocket` objects have an `APL` property that corresponds to the Unicode property of a file, if this is set to `Classic` (the default) the data in the socket will be restricted to `⎕AV`, if Unicode it will contain Unicode character data. As a result, `TRANSLATION ERROR`s can occur on transmission or reception in the same way as when updating or reading a file component.

The symbols ⍸, ⍳, ⍥, ⌸, ⌹ and ⌺ used for the Nest (Interval Index) and Where (Partition) functions, the Rank, Variant, Key and Stencil operators respectively are available only in the Unicode edition. In the Classic edition, these symbols are replaced by `⎕U2286`, `⎕U2378`, `⎕U2364`, `⎕U2360`, `⎕U2338` and `⎕U233A` respectively. In both Unicode and Classic editions Variant may be represented by `⎕OPT`.

Very large array components

An attempt to read a component greater than 2GB in 32-bit interpreters will result in a `WS FULL`.

TCPSockets and Conga

TCPSockets and Conga can be used to communicate between differing versions of Dyalog APL and are subject to similar limitations to those described above for component files.

Auxiliary Processors

A Dyalog APL process is restricted to starting an AP of exactly the same architecture from the same operating system. In other words, the AP must share the same word-width and byte-ordering as its interpreter process.

Session Files

Session (.dse) files can only be used on the platform on which they were created and saved.

The APL Command Line

The command line for Dyalog APL/W is described below; the command line for UNIX versions of Dyalog APL is documented in *Dyalog for UNIX UI Guide: Starting APL*.

Usually the command line is specified in the Target: field of the APL shortcut. The full pathname to the Dyalog executable is usually surrounded by double quotes as it contains spaces.

Command Line

dyalog [options] [debug] [ws] [param] [param] [param]...

where:

[dyalog]

Is the location of the Dyalog executable. Usually this is the full pathname, surrounded by double quotes.

[options]

-x	No ⎕LX execution on workspace loads.
-a	Start in USER mode.
-b	Suppress the banner in the Session..
-s	Disable the Session. This option is ignored in Windows versions.
-q	Don't quit APL on error (used when piping input into APL).
-c	Signifies a command-line comment. All characters to the right are ignored.

[debug]

-Dc	Check workspace integrity after every callback function.
-Dw	Check workspace integrity on return to session input.
-DW	Check workspace integrity after every line of APL (application will run slowly as a result)
-DK	Log session keystrokes in (binary) file **./apllog**.

[ws]

The name of a Dyalog APL workspace to be loaded. Unless specified, on Windows the file extension .DWS is assumed.

[param]

A parameter name followed by an equals sign (=) and a value. The parameter name may be one of the standard APL parameters (see *Configuration Parameters* on page 16) or a name and value of your own choosing (see *Object Reference Guide: GetEnvironment Method*). Note that this differs from Dyalog APL under UNIX, where parameters **must** be passed as environment variables.

Examples:

```
"c:\program files\…\dyalog.exe" myapp maxws=64000

"c:\program files\…\dyalog.exe" session_file=special.dse

"c:\program files\…\dyalog.exe -x myapp aplt=mytrans.dot
                    default_io=0 myparam=42"
```

APL Exit Codes

When APL or a bound .EXE terminates, it returns an exit code to the calling environment. If APL is started from a desktop icon, the return code is ignored. However, if APL is started from a script (UNIX) or a command processor, the exit code is available and may be used to determine whether or not to continue with other processing tasks. The return codes are:

0	successful `⎕OFF`, `)OFF`, `)CONTINUE`, graphical exit from GUI
1	APL failed to start. This will occur if there was a failure to read a translate file, there is insufficient memory, or a critical parameter is incorrectly specified or missing.
2	APL was terminated by SIGHUP or SIGTERM (UNIX) or in response to a QUIT WINDOWS request. APL has done a clean exit.
3	APL issued a syserror.
4	Runtime violation. This occurs if a runtime application attempts to read input from the Session. Only a development version has a Session.
5	APL was unable to load the Conga libraries (14.1.25383 onwards). In 16.0 the RIDE libraries have been included in the Conga libraries.
6	RIDE_INIT or one of its components was ill-defined, or APL was unable to use the port, and/or unable to resolve the hostname (14.1.25383 onwards)
7	Reserved
8	Windows rejected APL's request to create a session window (in earlier versions this generated a syserror 126)

Notes:

Under UNIX exit codes greater than 127 indicates (127+signal number) of the untrapped signal which caused the process to terminate.

APL applications can generate a custom return code by specifying an integer value to the right of `⎕OFF`. Dyalog recommends using values greater than 10 for this purpose.

Configuration Parameters

Introduction

Dyalog APL is customised using a set of configuration parameters which are defined in a registry folder.

In addition, parameters may be specified as environment variables or may be specified on the APL command line.

Furthermore, you are not limited to the set of parameters employed by APL itself as you may add parameters of your own choosing.

Although for clarity parameter names are given here in mixed case, they are case-independent under Windows. Under UNIX and Linux, Dyalog parameters must be specified as environment variables and must be named entirely in upper-case.

Setting Parameter Values

You can change the parameters in 4 ways:

- Using the Configuration dialog box that is obtained by selecting *Configure* from the *Options* menu on the Dyalog APL/W session. See *The Configuration Dialog Box* on page 79 for details.
- By directly editing the Windows Registry using `REGEDIT.EXE` or `REGEDIT32.EXE`.
- By defining the parameters as environment variables.
- By defining the parameters on the APL command line.

This scheme provides a great deal of flexibility, and a system whereby you can override one setting with another. For example, you can define your normal workspace size (*maxws*) in the Registry, but override it with a new value specified on the APL command line. The way this is done is described in the following section.

How APL Obtains Parameter Values

When Dyalog APL/W requires the value of a parameter, it uses the following rules.

1. If the parameter is defined on the APL command line, this value is used.
2. Otherwise, APL looks for an environment variable of the same name and uses this value.
3. Otherwise, if the parameter in question is **inifile**, the default value of `Software\Dyalog\Dyalog APL/W 16.0 Unicode` (Unicode Edition) or `Software\Dyalog\Dyalog APL/W 16.0 Classic` (Classic Edition) is assumed.
4. Otherwise, if the parameter in question is **dyalog**, the name of the directory from which the Dyalog APL program was loaded is assumed.
5. The value of any other parameter is obtained from the registry folder defined by the value of **inifile**.

Note that the value of a parameter obtained by the GetEnvironment method (see *Object Reference Guide: GetEnvironment Method*) uses exactly the same set of rules.

The following section details those parameters that are implemented by Registry Values in the top-level folder identified by **inifile**. Values that are implemented in sub-folders are *mainly* internal and are not described in detail here. However, any Value that is maintained via a configuration dialog box will be named and described in the documentation for that dialog box in The APL Environment.

Specifying Size-related Parameters

Several of the configuration parameters define sizes.

The value of the parameter must consist of an integer value, optionally followed immediately by a single character which denotes the units to be used. If the value contains no character the units are assumed to be KiB.

Valid values for units are:

K(KiB), M(MiB), G(GiB), T(TiB), P(PiB) and E(EiB).

Specifying an invalid value will prevent Dyalog APL from starting.

AddClassHeaders

This parameter specifies what the Tracer displays when tracing the execution of a function in a script. If set to 1, the Tracer displays just the first line of the script and the function in question. If set to 0, the entire script is shown in the Tracer window.

APL_CODE_E_MAGNITUDE

The introduction of decimal floating point numbers lead to the maximum allowable print precision being increased from 17 to 34, which resulted in a change in the way numbers in the range `(10*17) to (10*34)` in function bodies are descanned[1]. For example, the number one sextillion (10^{21}) in a function is descanned by Version 12.1 as `1E21` and by Version 13.0 as `1000000000000000000000`.

Whilst this change has no other deleterious effect, it means that code that contains such numbers is harder to read, and the result of `⎕CR` (and other character representations) of the same function may have changed between Version 12.1 and later versions of Dyalog causing undesired affects in code management systems.

The **APL_CODE_E_MAGNITUDE** parameter allows the user to choose between the behaviour seen in Version 12.1 and the behaviour seen in later versions. It also allows the user to specify the size of numbers above which numbers are displayed in exponential format.

If the **APL_CODE_E_MAGNITUDE** parameter is undefined or set to 0 (the default), numbers are descanned and displayed as normal.

If **APL_CODE_E_MAGNITUDE** has the value -1, numbers greater than or equal to 10^{17} will be displayed using exponential format, as in Version 12.1.

If **APL_CODE_E_MAGNITUDE** has a value between 2 and 34, numbers greater than or equal to 10^{value} will be displayed using exponential format.

The effect of setting this parameter to any other value is undefined.

---

[1]Descanning refers to the internal process used to convert the internal representation of APL code into a character array. For numbers in function statements, this process uses the maximum value of Print Precision.

APL_COMPLEX_AS_V12

Support for Complex Numbers means that some functions produce different results from older Versions of Dyalog APL. If **APL_COMPLEX_AS_V12** is set to 1 the behaviour of code developed using Version 12.1 or earlier will be unchanged; in particular:

- Power (`*`) and logarithm (`⍟`) do not produce Complex Numbers as results from non-complex arguments.
- `⎕VFI` will not honour "J" or "j" as part of a number.
- `¯4○Y` will be evaluated as `(¯1+Y*2)*0.5`, which is positive for negative real arguments.

If **APL_COMPLEX_AS_V12** is set to any other value or is not set at all then code developed using version 12.1 or earlier may now generate Complex Numbers.

Note that this feature is provided to simplify the transition of older code to currently supported Versions of Dyalog APL. It does not prevent the generation and use of Complex Numbers using newer features (such as explicitly specifying a Complex Number literal), and the intention is that it will be removed in a future release of Dyalog APL.

APL_FCREATE_PROPS_C

This parameter specifies the default checksum level for newly-created component files. If unspecified, the default checksum level is 1.

APL_FCREATE_PROPS_J

This parameter specifies the default journaling level for newly-created component files. If unspecified, the default journaling level is 1.

APL_FAST_FCHK

This parameter specifies whether Dyalog APL should optimise `⎕FCHK` by allowing it to reliably determine whether a component file had been properly untied and therefore does not need to be checked (this is overridable using the `⎕FCHK` option 'force').

Optimising `⎕FCHK` in this way has a performance impact on `⎕FUNTIE` and it is recommended this optimisation is switched off if your application frequently ties and unties files.

Note: this only affects component files with journaling enabled.

The values of the parameter are:

0	Do not optimise `⎕FCHK` (optimise `⎕FUNTIE` instead)
1	Optimise `⎕FCHK`

The default values of the parameter are 0 on Windows and 1 on Linux/AIX. On Windows, setting the value 1 has no effect.

APL_MAX_THREADS

Specifies the maximum number of system threads that are to be used for parallel execution. The default is the number of virtual processors that the computer is configured to have and the maximum value is 64.

AplCoreName

This parameter specifies the directory and name of the file in which *aplcore* should be saved. The optional wild-card character (*) is replaced by a number when the file is written. If there is more than one "*" in AplCoreName, the string is used as is; no substitution is made. See *MaxAplCores* on page 32

Note that APL terminates with an exit code of 3 when an aplcore file is generated.

aplk (Classic Edition Only)

This parameter specifies the name of your Input Translate Table, which defines your keyboard layout. The keyboard combo in the *Configure* dialog box displays all the files with the .DIN extension in the APLKEYS sub-directory. You may choose any one of the supplied tables, and you may add your own to the directory. Note that the FILE.DIN table is intended for input from **file**, and should not normally be chosen as a keyboard table.

aplkeys (Classic Edition Only)

This parameter specifies a search path for the Input Translate Table and is useful for configuring a run-time application. The directory paths are specified using Operating System specific conventions and separated by ";" (Windows) or ":" (UNIX). Its default value is the aplkeys sub-directory of the directory in which Dyalog APL/W is installed (defined by **dyalog**).

aplnid

Under Windows, this parameter specifies the *user number* that is used by the component file system to control file sharing and security. If you wish to share component files and/or external variables in a network it is essential that each user has a unique **aplnid** parameter. It may be any integer in the range 0 to 65535. Note that an **aplnid** value of 0 causes the user to bypass APL's access control matrix mechanism.

Under UNIX, the *user number* is obtained from the Operating System (UID) and **aplnid** is not used. If the user is "root", APL's access control mechanism is ignored.

When a user creates a component file, his *user number* is recorded in the file to identify him as its owner.

aplt

This parameter specifies the name of the Output Translate Table. On Windows the default is WIN.DOT and there is rarely a need to alter it.

apltrans

This parameter specifies a search path for the Output Translate Table and is useful for configuring a run-time application. The directory paths are specified using Operating System specific conventions and separated by ";" (Windows) or ":" (UNIX). Its default value is the sub-directory apltrans in the directory in which Dyalog APL/W is installed.

auto_pw

This parameter specifies whether or not the value of ⎕PW is derived automatically from the current width of the Session Window. If **auto_pw** is 1, the value of ⎕PW changes whenever the Session Window is resized and reflects the number of characters that can be displayed on a single line. If **auto_pw** is 0 (the default) ⎕PW is independent of the Session Window size.

AutoDPI

This parameter determines whether or not the Dyalog program registers the application as DPI-Aware when it initialises. If 1, (the default), Dyalog performs the auto-scaling; if 0, scaling is the responsibility of the programmer or operating system.

AutoFormat

This parameter specifies whether or not you want automatic formatting of Control Structures in functions. The default value is 1 which means that formatting is done automatically for you when a function is opened for editing or converted to text by ⎕CR, ⎕NR and ⎕VR. Automatic formatting first discards all leading spaces in the function body. It then prefixes all lines with a single space except those beginning with a label or a comment symbol (this has the effect of making labels and comments stand out). The third step is to indent Control Structures. The size of the indent depends upon the **TabStops** parameter. To turn off automatic formatting, set **AutoFormat** to 0.

AutoIndent

This parameter specifies whether or not you want semi-automatic indenting during editing. The default value is 1. This means that when you enter a new line in a function, it is automatically indented by the same amount as the previous line. This option simplifies the entry of indented Control Structures.

CFEXT

This parameter specifies component file filename extensions.

CFEXT is a string that specifies a colon-separated list of one or more extensions, including any period (".") which separates the extension from its basename.

If undefined, CFEXT defaults to `.dcf:` on Windows and OS X, and `.dcf:.DCF:` on all other platforms.

In the Windows case, this means that `'myfile'⎕FTIE 0` will search first for a file named `myfile.dcf`, and then for a file named `myfile` (with no extension). As file names are not case-sensitive under Windows, this will find `myfile.DCF` or `MyFile.Dcf` and so forth. If none are found with this extension, it will load `myfile`, `MyFile`, `MYFILE` etc.

In the second (non-Windows) case note that `'myfile'⎕FTIE 0` will search first for a file named `myfile`, then `myfile.dcf`, then `myfile.DCF`.

ClassicMode

This parameter specifies whether or not the Session operates in *Dyalog Classic mode*. The default is 0. If this parameter is set to 1, the Editor and Tracer behave in a manner that is consistent with earlier versions of Dyalog APL.

ClassicModeSavePosition

This parameter specifies whether or not the current size and location of the first of the editor and tracer windows are remembered for next time. It applies only when Classic Mode is enabled.

The size and location of the windows are saved in the registry in the subfolder WindowRects/EditWindow and TraceWindow.

CMD_PREFIX and CMD_POSTFIX

These parameters defines strings within which operating system commands specified as the arguments to `⎕CMD` and `⎕SH`, and `)CMD` and `)SH`, are wrapped. Its purpose is to run the command arguments under a non-standard command shell. This applies to Windows only.

See *Language Reference Guide: Windows Command* for implementation details.

confirm_abort

This parameter specifies whether or not you will be prompted for confirmation when you attempt to abort an edit session after making changes to the object being edited. Its value is either 1 (confirmation is required) or 0. The default is 0.

confirm_close

This parameter specifies whether or not you will be prompted for confirmation when you close an edit window after making changes to the object being edited. Its value is either 1 (confirmation is required) or 0. The default is 0.

confirm_fix

This parameter specifies whether or not you will be prompted for confirmation when you attempt to fix an object in the workspace after making changes in the editor. Its value is either 1 (confirmation is required) or 0. The default is 0.

confirm_session_delete

This parameter specifies whether or not you will be prompted for confirmation when you attempt to delete lines from the Session Log. Its value is either 1 (confirmation is required) or 0. The default is 1.

default_div

This parameter specifies the value of ⎕DIV in a clear workspace. Its default value is 0.

default_io

This parameter specifies the value of ⎕IO in a clear workspace. Its default value is 1.

default_ml

This parameter specifies the value of ⎕ML in a clear workspace. Its default value is 1.

default_pp

This parameter specifies the value of ⎕PP in a clear workspace. Its default value is 10.

default_pw

This parameter specifies the value of ⎕PW in a clear workspace. Note that ⎕PW is a property of the Session and the value of default_pw is overridden when a Session file is loaded.

default_rtl

This parameter specifies the value of ⎕RTL in a clear workspace. Its default value is 0.

default_wx

This parameter specifies the value of ⎕WX in a clear workspace. This in turn determines whether or not the names of properties, methods and events of GUI objects are exposed. If set (⎕WX is 1), you may query/set properties and invoke methods directly as if they were variables and functions respectively. As a consequence, these names may not be used for global variables in GUI objects.

DMXOUTPUTONERROR

This parameter specifies in which windows DMX error messages are displayed. It is an integer whose value is the sum of the specified windows where 1 = Status Window and 2 = Session Window.

DockableEditWindows

This parameter specifies whether or not individual edit windows can be undocked from (and docked back into) the (MDI) Editor window. Its default value is 0. This parameter does not apply if **ClassicMode** is set to 1.

DoubleClickEdit

This parameter specifies whether or not double-clicking over a name invokes the editor. Its default is 1. If DoubleClickEdit is set to 0, double-clicking selects a word and triple-clicking selects the entire line.

dyalog

This parameter specifies the name of the directory in which Dyalog APL is installed.

DyalogEmailAddress

This parameter specifies the contact email address for Dyalog Limited.

DYALOG_EVENTLOGGINGLEVEL

This parameter applies under Windows only, and specifies whether a log entry is written to the Windows Event Log or not when Dyalog APL would pop up a message box due to an unexpected termination of Dyalog APL. See *Programming Reference Guide: Handling Unexpected Errors* for more information.

DYALOG_EVENTLOGNAME

This parameter applies under Windows only, and is either the name of the event log to which an event message will be written, or the source of the event message (depending on the registry entries which may or may not have been defined) when Dyalog APL would pop up a message box due to an unexpected termination of Dyalog APL. See *Programming Reference Guide: Handling Unexpected Errors* for more information.

DyalogHelpDir

This parameter specifies the full pathname of the directory that contains the Dyalog APL help file (dyalog.chm).

DyalogInstallDir

This parameter specifies the full pathname of the directory in which Dyalog APL is installed.

DYALOG_NOPOPUPS

This parameter specifies whether a MsgBox will appear (0, the default) or will not (1) when Dyalog APL terminates unexpectedly. This applies to APL on Windows only. See *Programming Reference Guide: Handling Unexpected Errors* for more information.

DYALOG_PIXEL_TYPE

When the Coord property is set to `'Pixel'`, this parameter specifies how it is interpreted. If the value of DYALOG_PIXEL_TYPE is RealPixel or if DYALOG_PIXEL_TYPE is undefined, the object behaves as if Coord was `'RealPixel'`. If the value of DYALOG_PIXEL_TYPE is ScaledPixel, the object behaves as if Coord were `'ScaledPixel'`.See *Object Reference Guide: Coord Property*.

DyalogWebSite

This parameter specifies the URL for the Dyalog web site.

edit_cols, edit_rows

These parameters specify the initial size of an edit window in character units.

edit_first_x, edit_first_y

These parameters specify the initial position on the screen of the *first* edit window in character units. Subsequent edit windows will be staggered. These parameters only apply if **ClassicMode** is 1.

edit_offset_x, edit_offset_y

These parameters specify the amount by which an edit window is staggered from the previous one.

ErrorOnExternalException

This parameter specifies the behaviour when a System Exception occurs in an external DLL. If this parameter is set to 1, and an exception occurs in a call on an external DLL. APL generates an `EXTERNAL DLL EXCEPTION` error (91), instead of terminating with a System Error. This error may be trapped.

EditorState

This is an internal parameter that remembers the state of the last edit window (normal or maximised). This is used to create the next edit window in the appropriate state.

ExternalHelpURL

If **UseExternalHelpURL** is 1, Dyalog attempts to use the Microsoft Document Explorer and online help, for example from Visual Studio (if installed), to display help for external objects, such as .Net Types. This parameter specifies the URL to be used. In most cases the default setting of "ms-help://ms.mscc.v80" will be sufficient. On some configurations it may be necessary to change this. See *UseExternalHelpURL* on page 38

greet_bitmap

This parameter specifies the filename of a bitmap to be displayed during initialisation of the Dyalog APL application. It is used typically to display a product logo from a runtime application. The bitmap will remain until either an error occurs, or it is removed using the GreetBitmap method of the Root object.

```
greet_bitmap=c:\myapp\logo.bmp
```

history_size

This parameter specifies the size of the buffer used to store previously entered (input) lines in the Session. See *Specifying Size-related Parameters* on page 17 for further details about defining a valid value for this parameter.

inifile

This parameter specifies the name of the Windows Registry folder that contains the configuration parameters described in this section. For example,

```
INIFILE=Software\Dyalog\mysettings
```

InitialKeyboardLayout (Unicode Edition Only)

This parameter specifies the name of the keyboard to be selected on startup. When you start an APL session, this layout will automatically be selected as the current keyboard layout if the value of **InitialKeyboardLayoutInUse** is 1.

InitialKeyboardLayoutInUse (Unicode Edition Only)

This Boolean parameter specifies whether or not the keyboard specified by **InitialKeyboardLayout** is selected as the current keyboard layout when you start an APL session.

InitialKeyboardLayoutShowAll (Unicode Edition Only)

This Boolean parameter specifies whether or not all installed keyboards are listed in the choice of keyboards in the Configuration dialog box (Unicode Input tab).

input_size

This parameter specifies the size of the buffer used to store marked lines (lines awaiting execution) in the Session. See *Specifying Size-related Parameters* on page 17 for further details about defining a valid value for this parameter.

KeyboardInputDelay

This parameter specifies the delay (in milliseconds) before the system reacts to a user keystroke by:

- updating the name of the Current Object in the Session statusbar. See *UI Guide: The Current Object*.
- offering a list of names for auto-completion. See *Auto Complete Tab* on page 103

lines_on_functions

This parameter specifies whether or not line numbers are displayed in edit and trace windows. It is either 0 (the default) or 1.

Note that this parameter determines your overall preference for line numbering, and this setting persists between APL sessions. You can however still toggle line numbering on and off dynamically as required by clicking *Line Numbers* in the *Options* menu on the Session Window. These temporary settings are not saved between APL sessions

localdyalogdir

This parameter specifies the name of the directory in which Dyalog APL/W is installed on the client, in a client/server installation

log_file

This parameter specifies the pathname to the Session log file; it can be absolute or relative to the working directory.

log_file_inuse

This parameter specifies whether or not the Session log is saved in a session log file.

log_size

This parameter specifies the size of the Session log buffer. See *Specifying Size-related Parameters* on page 17 for further details about defining a valid value for this parameter.

mapchars (Classic Edition Only)

In previous versions of Dyalog APL, certain pairs of characters in ⎕AV were mapped to a single font glyph through the output translate table. For example, the ASCII pipe ¦ and the APL style | were both mapped to the APL style |. From Version 7.0 onwards, it has been a requirement that the mapping between ⎕AV and the font is strictly one-to-one (this is a consequence of the new native file system). Originally, the mapping of the ASCII pipe and the APL style, the APL and ASCII quotes, and the ASCII ^ and the APL ^ were hard-coded. The mapping is defined by the **mapchars** parameter.

mapchars is a string containing pairs of hexadecimal values which refer to 0-origin indices in ⎕AV. The first character in each pair is mapped to the second on output. The default value of **mapchars** is `DB0DEBA7EEC00BE0` which defines the following mappings.

From			To		
Hex	**Decimal**	**Symbol**	**Hex**	**Decimal**	**Symbol**
DB	219	‘	0D	13	'
EB	235	^	A7	167	^
EE	238	⎕	C0	192	|
0B	11	.	E0	224	.

To clear all mappings, set `MAPCHARS=0000`.

MaxAplCores

This parameter is used in conjunction with the **AplCoreName** parameter to control the maximum number of *aplcore* files that are saved. It applies when the string specified by **AplCoreName** ends with an asterisk (*). If so, when saving an *aplcore* file, Dyalog performs the following steps:

1. Identifies the highest number ending of those files that match the directory/name pattern specified by **AplCoreName**. If none, assume 0.
2. Increments that number, then saves the *aplcore* in a new file ending with the new number.
3. If necessary, deletes lower-numbered files to retain only the maximum number of files specified by **MaxAplCores**.

See also: *AplCoreName* on page 20.

maxws

This parameter determines your workspace size and is the amount of memory allocated to the workspace at APL start-up. **MAXWS**. See *Specifying Size-related Parameters* on page 17 for further details about defining a valid value for this parameter.

The default value is 256M (256MiB), with the exception of the Raspberry Pi where the default is 64M. Values less than 4M are ignored, and the maximum value is 15E.

For example, to get a 4GiB workspace, set:

```
MAXWS=4G
```

Dyalog APL places no implicit restriction on workspace size, and the virtual memory capability of the underlying operating system allows you to access more memory than you have physically installed. However if you use a workspace that **greatly** exceeds your physical memory you will encounter excessive *paging* and your APL programs will run slowly. You may also cause the system to crash.

Note that the memory used for the workspace must be *contiguous*.

32-bit versions of Dyalog APL are typically limited to between 1.3GiB to 1.9GiB under Windows, and 1.9GiB under UNIX. These are operating system limitations imposed on 32-bit processes rather than ones imposed by Dyalog APL, and are affected by the number and size of DLLs/shared libraries that are loaded into the process space.

64-bit versions of Dyalog APL have no such limitations; Dyalog has used workspaces of 96GiB on various platforms.

OverstrikesPopup (Unicode Edition Only)

This is a Boolean parameter that specifies whether or not the Overstrikes popup is enabled.

PassExceptionsToOpSys

This is a Boolean parameter that specifies the default state of the *Pass Exception* check box in the *System Error* dialog box. See *Programming Reference Guide: Handling Unexpected Errors* for more information.

pfkey_size

This parameter specifies the size of the buffer that is used to store programmable function key definitions. See *Language Reference Guide: Program Function Key*. See *Specifying Size-related Parameters* on page 17 for further details about defining a valid value for this parameter.

ProgramFolder

This parameter specifies the name of the folder in which the Dyalog APL program icons are installed.

PropertyExposeRoot

Each workspace contains a flag that specifies whether or not the names of Properties, Methods and Events of the Root object are exposed. If set, you may query/set the Properties of Root and invoke the Root Methods directly as if they were variables and functions respectively. As a consequence, these names may not be used for global variables in your workspace. This parameter determines the default value of the flag in a `CLEAR WS`.

PropertyExposeSE

Each workspace contains a flag that specifies whether or the names of Properties, Methods and Events of the Session object are exposed. If set, you may query/set the Properties of `⎕SE` and invoke `⎕SE` Methods directly as if they were variables and functions respectively. As a consequence, these names may not be used for global variables in the `⎕SE` namespace. This parameter determines the default value of the flag in a `CLEAR WS`.

qcmd_timeout

This parameter specifies the length of time in milliseconds that APL will wait for the execution of a Windows command to start. Its default value is 5000 milliseconds.

ResolveOverstrikes (Unicode Edition Only)

Specifies whether or not the user may enter an APL composite symbol using overstrikes.

RIDE_INIT

This parameter determines how the interpreter should behave with respect to the RIDE protocol. Setting this configuration parameter on the machine that hosts the interpreter enables the interpreter-RIDE connection.

The format of the value is:

```
<setting> : <address> : <port>
```

setting is the action the interpreter should take. Valid values are:

- serve – listen for incoming connections
- connect – connect to the specified RIDE and end the session if this fails
- poll – try to connect to the specified RIDE at regular intervals and reconnect if the connection is lost

address is the machine on which to listen for a connection (if **setting** is serve) or connect to (if **setting** is connect/poll). Valid values are:

- the name of the machine
- the IPv4 address of the machine
- the IPv6 of the machine
- empty – if **setting** is serve then the interpreter listens to everything on every network interface, if **setting** is connect/poll then the interpreter only listens for local connections (127.0.0.1).

port is the TCP port to listen on

The RIDE_INIT configuration parameter is set automatically when launching a new Dyalog Session from the RIDE.

RIDE_SPAWNED

If non-zero, this parameter disables `⎕SR` and `)SH` which instead generate `DOMAIN ERROR`. This parameter is used to prevent certain user-interfaces from being executed from a RIDE session which does not support them, and which would otherwise cause the RIDE session to become unresponsive. See *RIDE Reference Guide*.

RunAsService

When RunAsService is set to 1 (the default is 0) Dyalog APL will not prompt for confirmation when the user logs off, and the interpreter will continue to run across the logoff logon process

SaveContinueOnExit

Specifies whether or not your current workspace is saved as `CONTINUE.DWS` before APL terminates.

SaveLogOnExit

Specifies whether or not your Session log is saved before APL terminates.

SaveSessionOnExit

Specifies whether or not your current Session is saved in your Session file before APL terminates.

Serial

Specifies your Dyalog APL/W Serial Number.

session_file

This parameter specifies the name of the file from which the APL session (⎕SE) is to be loaded when APL starts. If not specified, a .dse extension is assumed. This session file contains the ⎕SE object that was last saved in it. This object defines the appearance and behaviour of the Session menu bar, tool bar(s) and status bar, together with any functions and variables stored in the ⎕SE namespace.

SessionOnTop

Specifies whether or not the Session may appear on top of Edit and Trace Windows in Classic Dyalog mode. See *ClassicMode* on page 23.

ShowStatusOnError

Specifies whether or not the Status window is automatically displayed (if required) when APL attempts to write output to it.

SingleTrace

Specifies whether there is a single Trace window, or one Trace window per function. This applies only if **ClassicMode** is 1.

SkipBlankLines

This parameter causes the Tracer to automatically skip lines that contain no executable statement (i.e. blank lines and comment lines), with the exception of the first line in the function, and in the case of a traditional function (not a dfn), the last line if it is a comment. If SkipBlankLines is 1, the Tracer skips blank lines. If SkipBlankLines is 2, the Tracer skips comment lines. If SkipBlankLines is 3, the Tracer skips both blank lines and comment lines.

StatusOnEdit

Specifies whether or not a status bar is displayed at the bottom of an Edit window.

sm_cols, sm_rows

These parameters specify the size of the window used to display ⎕SM when it is used *stand-alone*. They are **not** used if the window is specified using the SM object.

TabStops

This parameter specifies the number of spaces inserted by pressing the Tab key in the editor. Its default value is 4.

trace_cols, trace_rows

These parameters specify the initial size of a trace window in character units.

trace_first_x, trace_first_y

These parameters specify the initial position on the screen of the *first* trace window in character units. Subsequent trace windows will be staggered. This applies only if **ClassicMode** is 1.

trace_offset_x, trace_offset_y

These parameters specify the amount by which a trace window is staggered from the previous one. These apply only if **ClassicMode** is 1 and **SingleTrace** is 0.

Trace_level_warn

This parameter specifies the maximum number of Trace windows that will be displayed when an error occurs and **Trace_on_error** is set to 1. If there are a large number of functions in the state indicator, the display of their Trace windows may take several seconds. This parameter allows you to restrict the potential delay to a reasonable value and its default is 16. If the number of Trace windows would exceed this number, the system instead displays a warning message box. This parameter is ignored if you invoke the Tracer explicitly. This parameter applies only if **ClassicMode** is 1 and **SingleTrace** is 0.

Trace_on_error

This parameter is either 0 (the default) or 1. If set to 1, **Trace_on_error** specifies that the Tracer is automatically deployed when execution of a defined function halts with an error. A stack of Trace windows is immediately displayed, with the top Trace window receiving the input focus.

TraceStopMonitor

This parameter specifies which of the ⎕TRACE (1), ⎕STOP (2) and ⎕MONITOR (4) columns are displayed in Trace and Edit windows. Its value is the sum of the corresponding values.

UnicodeToClipboard (Classic Edition only)

This parameter specifies whether or not text that is transferred to and from the Windows clipboard is treated as Unicode text. If **UnicodeToClipboard** is 0 (the default), the symbols in ⎕AV are mapped to ASCII text (0-255). In particular, the APL symbols are mapped to ASCII symbols according to their positions in the Dyalog APL font. If **UnicodeToClipboard** is 1, the symbols in ⎕AV are mapped to Unicode text and the APL symbols are mapped to their genuine Unicode equivalent values.

UseExternalHelpURL

This parameter specifies whether or not Dyalog attempts to use the Microsoft Document Explorer and online help to display help for external objects, such as .Net Types. See *ExternalHelpURL* on page 28.

WantsSpecialKeys (Unicode Edition Only)

This parameter specifies a list of applications (e.g. *putty.exe*) that use the command strings in the Input Translate Tables.

WrapSearch

This parameter specifies whether or not Search/Replace in the Editor stops at the bottom or top of the text (depending upon the direction of the search), or continues the search from the start or end as appropriate.

WSEXT

This parameter specifies workspace filename extensions. It complements the **WSPATH** parameter in that together they determine the file search order to satisfy `)LOAD` or `)COPY`; it also specifies the filename extension to add on `)SAVE` if none is explicitly provided.

WSEXT is a string that specifies a colon-separated list of one or more extensions, including any period (".") which separates the extension from its basename.

If undefined, WSEXT defaults to `.dws:` on Windows and OS X, and `:.dws:.DWS` on all other platforms.

In the Windows case, this means that `)LOAD myws` will search first for a file named `myws.dws`, and then for a file named `myws` (with no extension). As file names are not case-sensitive under Windows, this will find `myws.DWS` or `MyWs.Dws` and so forth. If none are found with this extension, it will load `myws`, `MyWs`, `MYWS` etc.

In the second (non-Windows) case note that `)LOAD myws` will search first for a file named `myws`, then `myws.dws`, then `myws.DWS`.

WSPATH

This parameter defines the workspace path. This is a list of directories that are searched in the order specified when you `)LOAD` or `)COPY` a workspace and when you start an Auxiliary Processor. The directory paths are specified using Operating System specific conventions and separated by ";" (Windows) or ":" (UNIX).

The following Windows example causes `)COPY`, `)LOAD` and `)LIB` to look first in the current directory, then in `D:\MYWS`, and then in the (normal) *installation workspace* directory.

```
WSPATH=.;D:\MYWS;C:\Program Files\Dyalog\Dyalog APL 14.1
Unicode\ws
```

XPLookAndFeel

This Boolean parameter specifies whether or not *Native Look and Feel* is used. This affects the appearance of user-interface controls such as Buttons. The default is 1. See *The Configuration Dialog Box* on page 79.

yy_window

This parameter defines how Dyalog APL is to interpret a 2-digit year number. If **yy_window** is not set (the default) then under Windows, Version 13.2 onwards will adhere to the rules specified in the Windows Region and Language 2-digit year settings.

Dyalog allows a choice of input date formats for ⎕SM and GUI edit fields. If you have chosen a 2-digit year format such as MM/DD/YY, then an input of 02/01/00 will by default be interpreted as 1st February 1900 - not 1st February 2000.

If your application uses a 4-digit year format such as YYYY-MM-DD, the problem will not arise.

You can use the **yy_window** parameter to cause your application to interpret 2-digit dates in as required without changing any APL code.

Sliding versus Fixed Window

Two schemes are in common use within the industry: Sliding or Fixed date windows.

Use a Fixed window if there is a *specific year*, for example 1970, before which, dates are meaningless to your application. Note that with a fixed window, this date (say 1970) will still be the limit if your application is running in a hundred years' time.

Use a Sliding window if there is a *time period*, for example 30 years, before which dates are considered too old for your application. With a sliding window, you will always be able to enter dates up to (say) 30 years old, but after a while, specific years in the past (for example 1970) will become inaccessible.

Setting a Fixed Window

To make a fixed window, set parameter **yy_window** to the 4-DIGIT year which is the earliest acceptable date. For example:

YY_WINDOW=1970

This will cause the interpreter to convert any 2-digit input date into a year in the range 1970, 1971 ... 2069

Setting a Sliding Window

To make a sliding window, set parameter **yy_window** to the 1- or 2-DIGIT year which determines the oldest acceptable date. This will typically be negative.

YY_WINDOW=-30

Conversion of dates now depends on the current year:

If the current year is 1999, the earliest accepted date is 1999-30 = 1969.

This will cause the interpreter to convert any 2-digit input date into a year in the range 1969, 1970 ... 2068.

However if your application is still running in the year 2010, the earliest accepted date then will be 2010-30 = 1980. So in the year 2010, a 2-digit year will be interpreted in the range 1980, 1981 ... 2079.

Advanced Settings

You can further restrict date windows by setting an upper as well as lower year limit.

```
YY_WINDOW=1970,1999
```

This causes 2-digit years to be converted only into the range 1970, 1971 ... 1999. Any 2-digit year (for example, 54) not convertible to a year in this range will cause a `DOMAIN ERROR`.

The sliding window equivalent is:

```
YY_WINDOW=-10,10
```

This would establish a valid date window, ten years either side of the current year. For example, if the current year is 1998, the valid range would be (1998-10) – (1998+10), in other words: 1988, 1989, → 2008.

One way of looking at the **yy_window** variable is that it specifies a 2-element vector. If you supply only the first element, the second one defaults to the first element + 99.

Note that the system uses only the number of digits in the year specification to determine whether it refers to a fixed (4-digits) or sliding (1-, or 2-digits) window. In fact you can have a fixed lower limit and a sliding upper limit, or vice versa.

```
YY_WINDOW=1990,10
```

Allows dates as early as 1990, but not more than 10 years hence.

```
YY_WINDOW=0,1999
```

Allows dates from the current year to the end of the century.

If the second date is before, or more than 99 years after the first date, then any date conversion will result in a `DOMAIN ERROR`. This might be useful in an application where the end-user has control over the input date format and you want to disallow any 2-digit date input.

```
YY_WINDOW=1,0
```

Registry Sub-Folders

A large amount of configuration information is maintained in the Windows Registry in sub-folders of the main folder identified by **inifile**.

Many of these values are dynamic, for example the position of the various Session windows, is maintained in a Registry sub-folder so that their appearance is maintained from one invocation of APL to the next. These types of Registry values are considered to be internal and are therefore not described herein.

However, and Registry Value that is maintained via a configuration dialog box will be named and described in the documentation for that dialog box in Chapter 2.

AutoComplete

This contains registry entries that describe your personal AutoComplete options. See *Auto Complete Tab* on page 103.

Captions

This contains registry entries to customise the Captions used in the various windows of the Dyalog APL IDE. See *Window Captions* on page 45.

Colours

This contains entries that describe the colour schemes you have and your personal preferences. See *Colour Selection Dialog* on page 112.

Editor

This contains certain entries for the Editor.

Event Viewer

This contains entries that describe your settings for the Event Viewer. See *UI Guide: The Event Viewer*.

Explorer

This contains entries that describe your settings for the Workspace Explorer. See *UI Guide: The Workspace Explorer Tool*.

files

This contains the size of your recently used file list (see *General Tab* on page 79) and the list of your most recently loaded workspaces.

KeyboardShortcuts

This contains the definitions of your Keyboard Shortcuts (Unicode Edition only). See *Keyboard Shortcuts Tab* on page 87.

LanguageBar

This contains the definitions of the symbols, tips, and help for the symbols in the LanguageBar.

Printing

This contains the entries for your Printer Setup options. See *Print Configuration Dialog Box* on page 115.

SALT

This contains entries for SALT. See *SALT* on page 105.

Search

This contains dynamic entries for the Find Objects Tool. See *UI Guide: Find Objects Tool*.

Threads

This contains entries to remember your preferences for Threads. See *UI Guide: The Threads Menu*.

UnicodeIME

This contains entries for the Dyalog Unicode IME.

ValueTips

This contains entries for your Value Tips preferences. See *UI Guide: Value Tips*.

WindowRects

This contains entries to maintain the position of various Session tool windows so that they remain consistent between successive invocations of APL.

Array Editor

The Array Editor stores its settings in the following registry sub-folder:

```
HKEY_CURRENT_USER\Software\DavidLiebtag.com\Array Editor\1.1\
                                                    Options
```

Window Captions

The captions of the various windows that comprise the Dyalog Integrated Development Environment (IDE) are user-configurable and defined by entries in the Windows registry in the *Captions* subkey of the main Dyalog key.

Note that this only applies when the windows are floating (un-docked). When a window is docked Dyalog displays a fixed non-configurable caption.

Note also that the *Captions* subkey is not created by the interpreter; the user must create the subkey and the values.

Each entry is a string value whose name identifies the window as follows:

Window Name	Description
Session	The main Dyalog APL session window
Editor	The Editor window
SysTray	The hint on Dyalog icons in the System Tray
MessageBox	The notification Message Box that is displayed in various circumstances; for example, when an object cannot be fixed by the Editor
Explorer	The Workspace Explorer tool
Rebuild Errors	The dialog box that is displayed if one or more objects cannot be re-instantiated when a workspace is loaded
Status	The Status window
Event Viewer	The Event Viewer
FindReplace	The Find/Replace dialog box
ExitDialog	The Exit dialog box that is displayed when the user closes the Session window
WSSearch	The Find Objects tool
Syserror	The Syserror Message Box

Each string value should contain a mixture of your own text and keywords which are enclosed in braces, e.g. {TITLE}. Keywords act like variables and are replaced at display time by corresponding values as described in the table below.

Keyword	Value
{TITLE}	The window name shown in the first column of the previous table
{WSID}	Workspace ID (⎕WSID)
{NSID}	Current Namespace
{SNSID}	Current Namespace (short version)
{PRODUCT}	The name of the Dyalog product, e.g. "Dyalog APL/W - 64"
{VER_A}	The main version number, e.g. "14"
{VER_B}	The secondary version number, e.g. "0"
{VER_C}	The tertiary version number (currently the internal revision number)
{PID}	The process ID
{CHARS}	"Classic" or "Unicode"
{BITS}	"32" or "64"
{XLOC}	The namespace currently being explored (Explorer only)

For example, if the Registry contains .*Captions**Session* whose value is:

```
My APL ({WSID}) Version {VER_A}.{VER_B}[{VER_C}]  - {PID}
```

then the caption displayed in a new Dyalog APL Session window might be:

```
My APL (CLEAR WS) Version 14.0[20105] - 4616
```

Workspace Management

Workspace Size and Compaction

The *maximum* amount of memory allocated to a Dyalog APL workspace is defined by the **maxws** parameter (on non-Windows platforms this is defined by the environment variable MAXWS).

Upon `)LOAD` and `)CLEAR`, APL allocates an amount of memory corresponding to the size of the workspace being loaded (which is zero for a clear ws) plus the *workspace delta.*

The workspace delta is 1/16th of maxws, except if there is less than 1/16th of **maxws** in use, delta is 1/64th of **maxws**. This may also be expressed as follows:

```
delta←maxws{⌈⍺÷⍨(⍵>⍺÷16)⌽64 16}ws
```

where `maxws` is the value of the **maxws** parameter and `ws` is the currently allocated amount of workspace. If **maxws** is 16384KB, the workspace delta is either 256KB or 1024 KB, and when you start with a `clear ws` the workspace occupies 256KB.

When you erase objects or release symbols, areas of memory become free. APL manages these free areas, and tries to reuse them for new objects. If an operation requires a contiguous amount of workspace larger than any of the available free areas, APL reorganises the workspace and amalgamates all the free areas into one contiguous block as follows:

1. Any un-referenced memory is discarded. This process, known as *garbage collection*, is required because whole cycles of refs can become un-referenced.
2. Numeric arrays are *demoted* to their tightest form. For example, a simple numeric array that happens to contain only values 0 or 1, is demoted or *squeezed* to have a `⎕DR` type of 11 (Boolean).
3. All remaining used memory blocks are copied to the low-address end of the workspace, leaving a single free block at the high-address end. This process is known as *compaction*.
4. In addition to any extra memory required to satisfy the original request, an additional amount of memory, equal to the workspace delta, is allocated. This will always cause the process size to increase (up to the **maxws** limit) but means that an application will typically achieve its working process size with at most 4+15 memory reorganisations.
5. However, if after compaction, the amount of used workspace is less than 1/16 of the Maximum workspace size (**maxws**), the amount reserved for working memory is reduced to 1/64th **maxws**. This means that workspaces that are operating within 1/16th of **maxws** will be more frugal with memory

Note that if you try to create an object which is larger than free space, APL reports `WS FULL`.

The following system function and commands force a workspace reorganisation as described above:

```
⎕WA, )RESET, )SAVE, )LOAD, )CLEAR
```

However, in contrast to the above, *any spare workspace above the workspace delta is returned to the Operating System*. On a Windows system, you can see the process size changing by using Task Manager.

The system function `⎕WA` may therefore be used judiciously (workspace reorganisation takes time) to reduce the process size after a particularly memory-hungry operation.

Note that in Dyalog APL, the SYMBOL TABLE is entirely dynamic and grows and shrinks in size automatically. There is no `SYMBOL TABLE FULL` condition.

Additional functions for managing the memory used by the workspace are described in *Language Reference Guide: Memory Management Statistics* and *Language Reference Guide: Specify Workspace Available* .

Interface with Windows

Windows Command Processor commands may be executed directly from APL using the system command `)CMD` or the system function `⎕CMD`. This system function is also used to start other Windows programs. For further details, see the appropriate sections in Language Reference.

Auxiliary Processors

Introduction

Auxiliary Processors (APs) are non-APL programs which provide Dyalog APL users with additional facilities. They run under the control of Dyalog APL.

Typically, APs are used where speed of execution is critical, for utility libraries, or as interfaces to other products. APs may be written in any compiled language, although C is preferred and is directly supported.

Dyalog would recommend that rather than creating APs, customers should now create DLLs (Dynamic Shared Libraries)/shared libraries. If very high performance is required, customers should consider DWA (Direct Workspace Access); contact support@dyalog.com for more information about DWA, including pre-requisite training courses.

Starting an AP

An Auxiliary Processor is invoked using the dyadic form of ⎕CMD. The left argument to ⎕CMD is the name of the program to be executed; the value of the **WSPATH** parameter is used to find the named file. In Dyalog APL/W, the right argument to ⎕CMD is ignored.

```
'xutils' ⎕CMD ''
```

On locating the specified program, Dyalog APL starts the AP and initialises a memory segment for communication between the workspace and the AP. This communication segment allows data to be passed from the workspace to the other process, and for results to be passed back. The AP then sends APL some information about its external functions (names, code numbers and calling syntax), which APL enters in the symbol table. APL then continues processing while the AP waits for instructions.

Using the AP

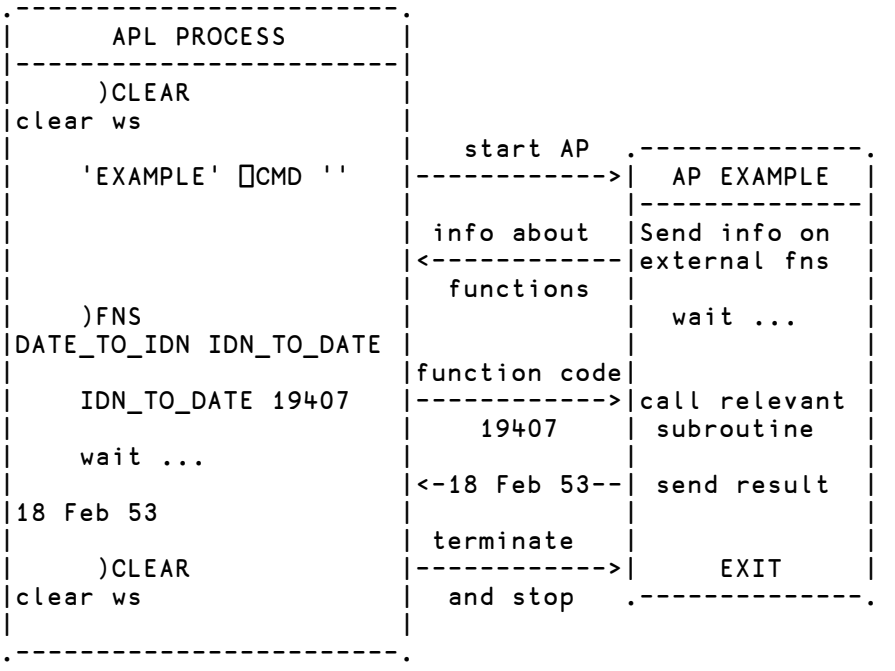
Once established, an AP is used by making a reference to one of its external functions. An external function behaves as if it was a locked defined function, but it is in effect an entry point to the AP. When an external function is referenced, APL transmits a code number to the AP, followed by any arguments. The AP then takes over and performs the desired processing before posting the result back.

Terminating the AP

An AP is terminated when all the last of its external functions is expunged from the active workspace. This could occur with the use of)CLEAR,)LOAD,)ERASE, ⎕EX,)OFF,)CONTINUE or ⎕OFF.

Example:

Start an Auxiliary Processor called `EXAMPLE`. This fixes two external functions called `DATE_TO_IDN` and `IDN_TO_DATE` which deal with the conversion of International Day Numbers to Julian Dates.



Access Control for External Variables

External variables may be EXCLUSIVE or SHARED. An exclusive variable can only be accessed by the owner of the file. If you are on a Local Area Network (LAN) a shared external variable may be accessed (concurrently) by other users. The exclusive or shared status of an external variable is set by the `XVAR` function in the UTIL workspace.

Access to an external variable is faster if it has exclusive status than if it is shared. This is because if several users are accessing the file data must always be read and written directly to disk. If it has exclusive status, the system uses buffering and avoids disk accesses where possible.

Creating Executables and COM Servers

Dyalog APL provides the facility to package an APL workspace as a Windows executable (EXE), an OLE Server (in-process or out-of-process), an ActiveX Control or a .NET Assembly. This may be done by selecting *Export ...* from the *File* menu of the APL Session window which brings up the *Create bound file* dialog box as illustrated later in this section.

The *Create bound file* dialog box offers selective options according to the type of file you are making. The system detects which of these types is most appropriate from the objects in your workspace. For example, if your workspace contains an ActiveXControl namespace, it will automatically select the *ActiveX Control* option.

If you are creating an executable (EXE) the system provides the following options:

- You may bind your EXE as a Dyalog APL run-time application, or as a Dyalog APL developer application. The second option will allow you to debug the application should it encounter an APL error.
- You may bind your EXE as a console-mode application. A console application does not have a graphical user interface, but runs as a background task using files or TCP/IP to perform input and output.
- You may specify whether or not your .EXE will honour *Native Look and Feel*.

You can package the workspace as a stand-alone executable or as a .EXE file that must be accompanied by the Dyalog APL Dynamic Link Library (`dyalog150.dll` or `dyalog150rt.dll`), in which case the DLL should be installed in the same directory (as the EXE) or in the Windows System directory.

Various Dyalog-supplied files are required (such as the runtime DLL for creating a bound runtime executable); all such files are assumed to reside in the **Dyalog** directory, as specified by default in the registry. The location of this directory is most easily reported by calling

```
+2⎕nq '.' 'GetEnvironment' 'Dyalog'
```

The creation of both in-process and out-of-process COM servers produces a .TLB (Type Library) file. This file is created in the same directory as the workspace - so write access must be allowed to this directory. In the case of an in-process server, the content of this file is then embedded into the DLL, and the file is deleted. For an out-of-process server the file persists and may be needed at runtime. This requirement means that even if you do not `)Save` the workspace, you should set the workspace name so that `)SAVE` would work - that is the directory where the workspace would be saved has write access.

In addition, a temporary copy of your workspace is created, the location of which is determined by the Windows function `GetTempPath()`.

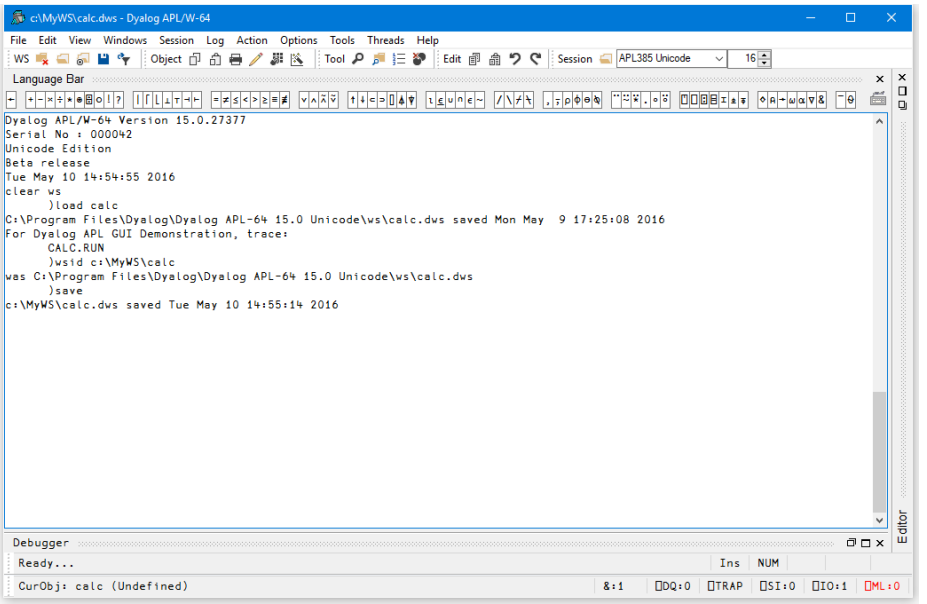
All registration information is written to HKEY_LOCAL_MACHINE in the registry which will require enhanced permissions (aka "run as administrator") for the Dyalog interpreter. Later versions of the interpreter may provide an option to write to HKEY_CURRENT_USER.

The *Create bound file* dialog box contains the following fields. These will only be present if applicable to the type of bound file you are making.

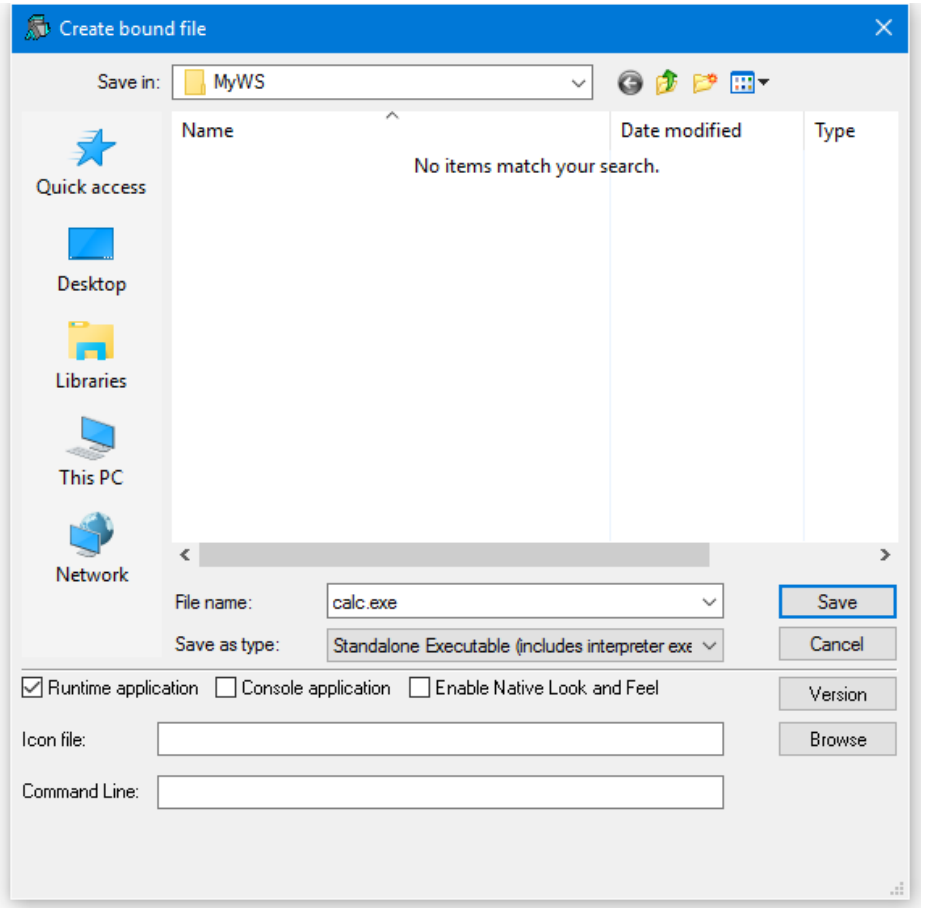
Item	Description
File name	Allows you to choose the name for your bound file. The name defaults to the name of your workspace with the appropriate extension.
Save as type	Allows you to choose the type of file you wish to create
Runtime application	If this is checked, your application file will be bound with the Run-Time DLL. If not, it will be bound with the Development DLL. The latter should normally only be used to permit debugging.
Console application	Check this box if you want your executable to run as a console application. This is appropriate only if the application has no graphical user interface.
Enable Native Look and Feel	If checked, *Native Look and Feel* will be enabled for your bound file; otherwise it will be disabled.
Icon file	Allows you to associate an icon with your executable. Type in the pathname, or use the *Browse* button to navigate to an icon file.
Command line	For an out-of-process COM Server, this allows you to specify the command line for the process. For a bound executable, this allows you to specify command-line parameters for the corresponding Dyalog APL DLL.

The following example illustrates how you can package the supplied workspace `calc.dws` as an executable. Before making the executable, it is essential to set up the latent expression to run the program using `⎕LX` as shown. Notice that in this case it is not necessary to execute `⎕OFF`; the `calc.exe` program will terminate normally when the user closes the calculator window and the system returns to Session input.

In this example, the supplied workspace `calc.dws` is first saved to a directory to which the user has write access and, just to make certain, the Dyalog program is run as Administrator.



Then, when you select *Export...* from the *File* menu, the following dialog box is displayed.



The *Save as Type* option has been set to *Standalone Executable (includes interpreter exe)* which means that a single .exe will be created containing the Dyalog APL executable and the CALC workspace.

The *Runtime application* checkbox is checked, indicating that `calc.exe` is to incorporate the runtime version of Dyalog APL.

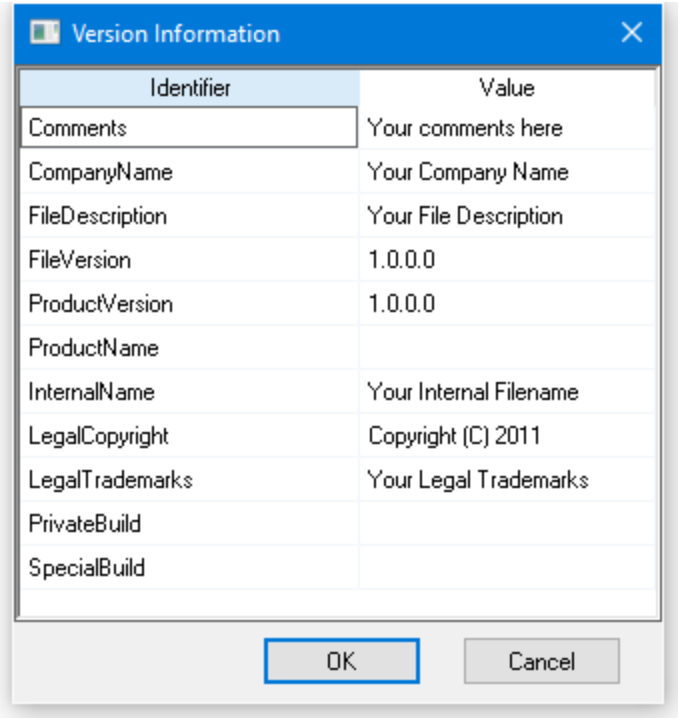
As this is a GUI application, the *Console application* checkbox is left unset.

Note that if you enter the name of a file containing an icon (use the *Browse* button to browse for it) that icon will be bound with your executable and be used instead of the standard Dyalog APL icon.

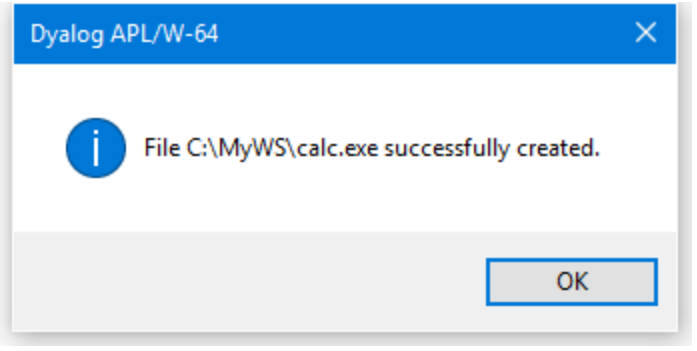
The *Command Line* box allows you to enter parameters and values that are to be passed to your executable when it is invoked.

Version Information

You may embed version information into your .exe by clicking the *Version* button and then completing the *Version Information* dialog box that is illustrated below.



On clicking *Save*, the following message box is displayed to confirm success.



Run-Time Applications and Components

Using Dyalog APL you may create different types of run-time applications and components. Note that the distribution of run-time applications and components requires a Dyalog APL Run-Time Agreement. Please contact Dyalog or your distributor, or see the Dyalog web page for more information.

For a list of the distributable components and their corresponding file names, for the different versions of Dyalog, see *Files* on page 2 .

These components are referred to in hereafter by the name shown in the first column of the table. It is essential that you distribute the components that are appropriate for the Edition you are using.

Universal C Runtime DLLs

Under Windows, many of the Dyalog APL run-time components (.EXE and .DLL) are linked dynamically with the Microsoft Universal C Runtime library (the UCRT) which is supplied and installed as part of the normal Dyalog development installation.

At execution time it is important that the Dyalog runtime components bind with a version of the UCRT that is compatible with (i.e. the same as or newer than) the one with which they were built.

Windows 10

If the end-user of the Dyalog application is known to be running Windows 10, the Dyalog application will pick up the system-wide UCRT which is part of Windows 10. There is therefore no need to include the UCRT with a Dyalog run-time application.

Other Versions of Windows

The UCRT is not supplied with versions of Windows prior to Windows 10. On these platforms, it is therefore necessary to install the UCRT as part of the installation of the Dyalog run-time application. There are two ways to achieve this which are referred to herein as the VCRedist installation and App-local installation. Dyalog recommends the former.

VCRedist Installation (Recommended)

The VCRedist package, which includes the UCRT, is supplied with the Dyalog development package.

Simply copy the `vc_redistx86.exe` (32-bit version) or `vc_redistx64.exe` (64-bit version) program from the Dyalog development package into your own installation package and execute it as part of the installation of your Dyalog run-time application. This installs the UCRT into a shared Windows location; in effect the UCRT becomes part of the Windows system. The installation therefore requires Administrator privileges.

App-local Installation

An alternative is to install the UCRT components into the same directory as your Dyalog run-time application. There are two ways to obtain these files.

Either:

Install the Dyalog development package (ideally onto a separate system just for this purpose) without administrator rights. This will perform an App-local installation of Dyalog itself. Then copy the UCRT files into your installation package. These files are:

- those beginning with `api-ms*`
- `ucrtbase.dll`
- `vcruntime140.dll`

Or:

Download and install the Windows 10 SDK from:
https://developer.microsoft.com/en-us/windows/downloads/windows-10-sdk, and follow the instructions in the link
below.
https://blogs.msdn.microsoft.com/vcblog/2015/03/03/introducing-the-universal-crt

Finally, modify your installer to add these files to the same folder as your Dyalog run-time application.

Stand-alone run-time

This is the simplest type of run-time to install. Using the *File/Export* menu item on the Session window, you can create a standard Windows executable program file (EXE) which contains your workspace and the Run-Time version of the Dyalog APL interpreter. To distribute your application, you need to supply and install:

1. your bound executable (EXE)
2. whatever additional files that may be required by your application

The command-line for your application should simply invoke your EXE, with whatever start-up parameters it may require. Note that your application icon and any start-up parameters for the Run-Time Interpreter are specified and bound with the EXE when you make it.

If your application uses any component of the Microsoft .NET Framework, you must distribute the Bridge DLL and DyalogNet DLLs. These DLLs must either be on the system path or placed in the same directory as your EXE. If you are going to use your application with ASP.NET, the DLLs must also be installed in the global assembly cache (GAC) using the `gacutil.exe` utility program.

Bound run-time

This option requires the separate installation of the Run-Time DLL, but compared with the stand-alone executable option, may save disk space and memory if your customer installs and runs several different Dyalog applications. Using the File/Export menu item on the Session window, you can create a standard Windows executable program file (EXE) which contains your workspace bound to the Run-Time DLL. To distribute your application, you need to supply and install:

1. your bound executable (EXE)
2. The Run-Time DLL

whatever additional files that may be required by your application

The command-line for your application should simply invoke your EXE, with whatever start-up parameters it may require. Note that your application icon and any start-up parameters for the Run-Time DLL are specified and bound with the EXE when you make it.

If your application uses any component of the Microsoft .NET Framework, you must distribute the Bridge DLL and DyalogNet DLLs. These DLLs must either be on the system path or placed in the same directory as your EXE. If you are going to use your application with ASP.NET, the DLLs must also be installed in the global assembly cache (GAC) using the `gacutil.exe` utility program.

Workspace based run-time

A workspace based run-time application consists of the Dyalog APL Run-Time Program (Run-Time EXE) and a separate workspace. To distribute your application, you need to supply and install:

1. your workspace
2. the Run-Time EXE
3. whatever additional files that may be required by your application

The command-line for your application invokes the Run-Time EXE, passing it start-up parameters required for the Run-Time EXE itself (such as MAXWS) and any start-up parameters that may be required by your application. You will need to associate your own icon with your application during its installation.

If your application uses any component of the Microsoft .NET Framework, you must distribute the Bridge DLL and DyalogNet DLLs. These DLLs must either be on the system path or placed in the same directory as your EXE. If you are going to use your application with ASP.NET, the DLLs must also be installed in the global assembly cache (GAC) using the `gacutil.exe` utility program.

Out-of-process COM Server

To make an out-of-process COM Server, you must:

1. establish one or more OLEServer namespaces in your workspace, populated with functions and variables that you wish to export as methods, properties and events.
2. use the *File/Export ...* menu item on the Session window to register the COM Server on your computer so that it is ready for use.

The command-line for your COM Server invokes the Run-Time EXE, passing it the start-up parameters required for the Run-Time EXE itself (such as MAXWS) and any start-up parameters that may be required by your application.

To distribute an out-of-process COM Server, you need to supply and install the following files:

1. your workspace
2. the associated Type Library (.tlb) file (created by *File/Export*)
3. the Run-Time EXE
4. whatever additional files that may be required by your application

To install an out-of-process COM Server you must set up the appropriate Windows registry entries. See Interface Guide for details.

In-process COM Server

To make an in-process COM Server, you must:

1. establish one or more OLEServer namespaces in your workspace, populated with functions and variables that you wish to export as methods, properties and events.
2. use the *File/Export ...* menu item on the Session window to create an in-process COM Server (DLL) which contains your workspace bound to the Run-Time DLL. This operation also registers the COM Server on your computer so that it is ready for use.

To distribute your component, you need to supply and install

Your COM Server file (DLL)

1. the Run-Time DLL
2. whatever additional files that may be required by your COM Server.

Note that you must register your COM Server on the target computer using the `regsvr32.exe` utility.

ActiveX Control

To make an ActiveX Control, you must:

1. establish an ActiveXControl namespace in your workspace, populated with functions and variables that you wish to export as methods, properties and events.
2. use the *File/Export ...* menu item on the Session window to create an ActiveX Control file (OCX) which contains your workspace bound to the Run-Time DLL. This operation also registers the ActiveX Control on your computer so that it is ready for use.

To distribute your component, you need to supply and install

Your ActiveX Control file (OCX)

1. the Run-Time DLL
2. whatever additional files that may be required by your ActiveX Control.

Note that you must register your ActiveX Control on the target computer using the `regsvr32.exe` utility.

Microsoft .NET Assembly

A Microsoft .NET Assembly contains one or more .NET Classes. To make a Microsoft .NET Assembly, you must:

1. establish one or more NetType namespaces in your workspace, populated with functions and variables that you wish to export as methods, properties and events.
2. use the *File/Export ...* menu item on the Session window to create a Microsoft .NET Assembly (DLL) which contains your workspace bound to the Run-Time DLL.

To distribute your .NET Classes, you need to supply and install

1. your Assembly file (DLL)
2. the Run-Time DLL
3. the Bridge DLL
4. the DyalogNet DLL
5. whatever additional files that may be required by your .NET Assembly.
6. the Bridge DLL and DyalogNet DLLs must either be on the system path or placed in the same directory as your EXE. If you are going to use your Assembly with ASP.NET, the DLLs must also be installed in the global assembly cache (GAC) using the `gacutil.exe` utility program.

Additional Files for Syncfusion

Under a licensing agreement with Syncfusion, Dyalog includes the Syncfusion library of WPF controls. These may be used by Dyalog APL users to develop applications, and may be distributed with Dyalog APL run-time applications.

The Syncfusion libraries comprise a set of .NET assemblies which are supplied in the *Syncfusion/4.5* sub-directory of the main Dyalog APL installation directory (for example: *c:\Program Files\Dyalog\Dyalog APL-64 14.0 Unicode\Syncfusion\4.5*.

If you use any of the Syncfusion controls in your runtime application, you must include the Syncfusion library.

Accessing your Application Using RIDE

If you wish to access your run-time application remotely using the RIDE, you must put a copy of the appropriate Conga DLLs (see *Files* on page 2) in the same directory as your .EXE or workspace. This is different from previous versions of Dyalog which had separate RIDE DLLs.

Additional Files for SQAPL

If your application uses the *SQAPL/EL ODBC* interface, you must distribute and install four additional components.

- SQAPL INI
- SQAPL ERR
- SQAPL DLL
- APLUNICD INI

For the names of the files corresponding to these components, see *Files* on page 2.

The SQAPL DLL must be installed in the user's Windows directory or be on the user's path.

Miscellaneous Other Files

DyaRes DLL

If your run-time application uses any of the bitmaps or other GUI resources that are built into the Dyalog Session, you must include the DyaRes DLL with your application.

AUXILIARY PROCESSORS

If you use any of the Auxiliary Processors (APs) included in the sub-directory `xutils`, you must include these with your application. Note that, like workspaces, Dyalog APL searches for APs using the **WSPATH** parameter. If your application uses APs, you must ensure that you specify **WSPATH** or that the default **WSPATH** is adequate for your application..

DYALOG32 and/or DYALOG64

This DLL is used by some of the functions provided in the `QUADNA.DWS` workspace. If you include any of these in your application this DLL must be installed in the user's Windows directory or be on the user's path.

Registry Entries for Run-Time Applications

The Run-Time DLL does not obtain any parameter values from the Windows registry. If you need to specify any Dyalog APL parameter values, they must be defined in the command line when you create an EXE.

The Run-Time EXE *does* obtain parameter values for the Windows registry, but does not require them to be present. If the default values of certain parameters are inappropriate, you may specify their values on the command line. There is normally no requirement to install registry entries for a run-time application that uses the Run-Time EXE.

For example, your application may require a greater or lesser **maxws** parameter (workspace size) than the default value. This may be done by adding the phrase `MAXWS=nnnn` (where `nnnn` is the required workspace size) after the name of your application workspace on the command line, for example:

```
dyalogrt.exe MYAPP.DWS MAXWS=200M
```

Note that the default value of the **DYALOG** parameter (which specifies where it looks for various other files and sub-directories) is the directory from which the application (`dyalogrt.exe`) is loaded.

Nevertheless, registry entries will be required in the following circumstances.

1. If your Classic Edition run-time application requires that the user inputs APL characters, you will need to specify input/output tables (parameters **APLK**, **APLT**, **APLKEYS** and **APLTRANS**).

Installing Registry Entries

To specify parameters using the Registry, you must install a suitable registry folder for each user of your application. By default, Version 16.0 will use registry folders similar to:

```
HKEY_CURRENT_USER\Software\Dyalog\
                           Dyalog APL/W 16.0 Unicode
```

or

```
HKEY_LOCAL_MACHINE\SOFTWARE\Dyalog\
                            Dyalog APL/W-64 16.0
```

You may choose a different name for your registry folder if you wish. If so, you must tell Dyalog APL the name of this folder by specifying the **INIFILE** parameter on the command line. For example:

```
dyalogrt.exe myapp.dws INIFILE=Software\MyCo\MyApplication
```

You may install entries into the registry folder in one of two ways:

1. Using a proprietary installation program such as *InstallShield*
2. Using the `REGEDIT` utility. This utility program installs registry entries defined in a text file that is specified as the argument to the program. For example, if your file is called `APLAPP.REG`, you would install it on your user's system by executing the command:

   ```
   REGEDIT APLAPP.REG
   ```

   An example 5-line file that specifies the **APLNID** and **MAXWS** parameters might be as follows:

   ```
   Windows Registry Editor Version 5.00

   [HKEY_CURRENT_USER\Software\Dyalog\Dyalog APL/W 16.0]
   "aplnid"="42"
   "maxws"="8096"
   ```

COM Objects and the Dyalog APL DLL

Introduction

Each different implementation of Dyalog contains two versions of the Dyalog APL Dynamic Link Library, a development version (Development DLL) and a run-time version (Run-Time DLL). For further details, see *Files* on page 2.

In the remainder of this section, the term *Dyalog APL DLL* is used to refer to any one of these DLLs. The term *COM object* is used to refer to a Dyalog APL in-process OLE Server (OLEServer object) or a Dyalog APL ActiveX Control (ActiveXControl object).

The Dyalog APL DLL is used to host COM objects and .NET objects written in Dyalog APL. Although this section describes how it operates with COM objects, much of this also applies when it hosts .NET objects. Further information is provided in the *.NET Interface Guide*.

Classes, Instances and Namespace Cloning

A COM object, whether written in Dyalog APL or not, represents a class. When a host application loads a COM object, it actually creates an instance of that class.

When a host application creates an instance of a Dyalog APL COM object, the corresponding OLEServer or ActiveXControl namespace is cloned. If the host creates a second instance, the original namespace is cloned a second time.

Cloned OLEServer and ActiveXControl namespaces are created in almost exactly the same way as those that you can make yourself using ⎕OR and ⎕WC except that they do not have separate names. In fact, each clone believes itself to be the one and only original OLEServer or ActiveXControl namespace, with the same name, and is completely unaware of the existence of other clones.

Notice that cloning does not initially replicate all the objects within the OLEServer or ActiveXControl namespace. Instead, the objects inside the cloned namespaces are actually represented by pointers to the original objects in the original namespace. Only when an object is changed does any information get replicated. Typically, the only objects likely to differ from one instance to another are variables, so only one copy of the functions will exist in the workspace. This design enables many instances of a Dyalog APL COM object to exist without overloading the workspace.

Workspace Management

By default, the Dyalog APL DLL does not use a fixed maximum workspace size, but automatically increases the size of its active workspace as required. If you write a run-away COM object, or if there is insufficient computer memory available to load a new control, it is left to the host application or to Windows itself to deal with the situation.

Nevertheless, it is possible to specify a value for **MAXWS** for the application in which the Dyalog APL DLL is embedded. This is achieved by defining a Registry key named:

```
HKLM\Software\Dyalog\Embedded\<appname>
```

where `<appname>` is the name of the application, containing a String Value named `maxws` set to the desired size. If you were running an APL in-process server from Microsoft Excel, the application name would be `excel.exe`.

When an application loads its first Dyalog APL COM object, it starts the Dyalog APL DLL which initialises a `CLEAR WS`. It then copies the namespace tree for the appropriate OLEServer or ActiveXControl object into its active workspace.

This namespace tree comprises the OLEServer or ActiveXControl namespace itself, together with all its parent namespaces *with the exception of* the root workspace itself. Note that for an ActiveXControl, there is at least one parent namespace that represents a Form.

For example, if an ActiveXControl namespace is called `#.F.Dual`, the Dyalog APL DLL will copy the contents of `#.F` into its active workspace when the first instance of the control is loaded by the host application.

If the same host application creates a *second instance* of the *same* OLEServer or ActiveXControl, the original namespace is cloned as described above and there is no further impact on the workspace

If the same host application creates an instance of a *different* Dyalog APL COM object, the namespace tree for this second object is copied from its DLL or OCX file into the active workspace. For example, if the second control was named `X.Y.MyControl`, the entire namespace `X` would be copied.

This design raises a number of points:

1. Unless you are in total control of the user environment, you should design a Dyalog APL COM object so that it can operate in the same workspace as another Dyalog APL COM object supplied by another author. You cannot make any assumptions about file ties or other resources that are properties of the workspace itself.
2. If you write an ActiveXControl whose ultimate parent namespace is called `F`, a host application could not use your control at the same time as another ActiveXControl (perhaps supplied by a different author) whose ultimate parent namespace is also called `F`.
3. Dyalog APL COM objects must not rely on variables or utility functions that were present in the root workspace when they were saved. These functions and variables will *not* be there when the object is run by the Dyalog APL DLL.
4. A Dyalog APL COM object may *create* and subsequently *use* functions and variables in the root workspace, but if two different COM objects were to adopt the same policy, there is a danger that they would interfere with one another. The same is true for `⎕SE`.

Multiple COM Objects in a Single Workspace

If your workspace contains several OLEServer or ActiveXControl objects which have the same ultimate parent namespace, the Dyalog APL DLL will copy them all into the active workspace at the time when the first one is instanced. If the host application requests a second COM object that is already in the workspace, the namespace tree is not copied again.

If the workspace contains several OLEServer or ActiveXControl objects which have different ultimate parents, their namespace trees will be copied in separately.

Parameters

With the exception of **maxws** (see above) the Dyalog APL DLL does not read parameters from the registry, command-line or environment variables. This means that all such parameters will have their default values.

APL Application as a Service

Introduction

Dyalog APL provides a mechanism for users to register and manage an application workspace as a Windows service. The application workspace must implement an interface to handle messages from the Windows Service Control Manager (SCM) in addition to the code required to drive the application.

Windows Services run as background tasks controlled by the SCM. When the computer is started, Windows Services are run before a user logs on to the system and do not normally interact with the desktop. A Dyalog service is run under the auspices of *Local System*.

Installing and Uninstalling a Dyalog Service

To install a Dyalog service it is necessary to run `dyalog.exe` from the command line with administrator privileges, specifying the application workspace and the following parameters, where *service_name* is a name of your choice.

- **APL_ServiceInstall=service_name**

The command must specify the full pathname to `dyalog.exe` and to the application workspace. A slightly modified version of this command line will be stored by the SCM and re-executed whenever the service is started.

Dyalog installs the service with a *Startup Type* of *Automatic*. This means that it will be started automatically whenever the computer is restarted. However, it is necessary to start it manually (using the SCM) the first time after it is installed.

The same command must be used to uninstall the service, but with:

- **APL_ServiceUninstall=service_name**

The following table summarises the parameters that can be specified by the user. Other parameters will appear on the command line in the SCM, but should not be specified by the user.

Parameter	Description
APL_ServiceInstall	Causes Dyalog to register the named service, using the current command line, but with **APL_ ServiceRun** replacing **APL_ServiceInstall** in the SCM.
APL_ServiceUninstall	Causes Dyalog to uninstall the named service.

The Application Workspace

The application workspace must be designed to handle and respond (in a timely manner) to notification messages from the SCM as well as to provide the application logic. SCM notifications include instructions to start, stop, pause and resume.

SCM notification messages generate a ServiceNotification event on the Root object. To handle these messages, it is necessary to attach a callback function to this event, and to invoke the Wait method or ⎕DQ'.' to process them. This must be executed in thread 0.

If the application is designed to be driven from events such as Timer or TCPSocket or user-defined events, it too may be implemented via callbacks in thread 0 under the control of the same Wait method or ⎕DQ'.'. If the application uses Conga it is recommended that it runs in a separate thread.

The workspace `ws\aplservice.dws` is included in the APL release. Its start-up function is as follows:

```
      ⎕lX←'Start'


      ∇ Start;ServiceState;ServiceControl
[1]     :If 'W'≠3⊃#.⎕WG'APLVersion'
[2]         ⎕←'This workspace only works using Dyalog APL for
                Windows version 14.0 or later'
[3]         :Return
[4]     :EndIf
[5]     :If 0∊⍴2 ⎕NQ'.' 'GetEnvironment' 'RunAsService'
[6]         Describe
[7]         :Return
[8]     :EndIf
[9]     ⍝ Define SCM constants
[10]    HashDefine
[11]    ⍝ Set up callback to handle SCM notifications
[12]    '.'⎕WS'Event' 'ServiceNotification' 'ServiceHandler'
[13]    ⍝ Global variable defines current state of the service
[14]    ServiceState←SERVICE_RUNNING
[15]    ⍝ Global variable defines last SCM notification to the
          service
[16]    ServiceControl←0
[17]    ⍝ Application code runs in a separate thread
[18]    Main&0
[19]    ⎕DQ'.'
[20]    ⎕OFF
      ∇
```

Handling ServiceNotification Events

To give the workspace (which may be busy) time to respond to SCM notifications, Dyalog responds immediately to confirm that the service has entered the appropriate pending state. For example, if the notification is SERVICE_CONTROL_STOP, Dyalog informs the SCM that the service state is SERVICE_STOP_PENDING. It is then up to the callback function to confirm that the state has reached SERVICE_ STOPPED.

The following sample function is provided in `aplservice.dws`.

ServiceHandler Callback Function

```
     ∇ r←ServiceHandler(obj event action state);sink
[1]   ⍝ Callback to handle notifications from the SCM
[2]
[3]   ⍝ Note that the interpreter has already responded
[4]   ⍝ automatically to the SCM with the corresponding
[5]   ⍝ "_PENDING" message prior to this callback being reached
[6]
[7]   ⍝ This callback uses the SetServiceState Method to confirm
[8]   ⍝ to the SCM that the requested state has been reached
[9]
[10]   r←0  ⍝  so returns a 0 result (the event has been handled,
[11]        ⍝ no further action required)
[12]
[13]  ⍝ It stores the desired state in global ServiceState to
[14]  ⍝ notify the application code which must take appropriate
[15]  ⍝ action. In particular, it must respond to a "STOP or
[16]  ⍝ "SHUTDOWN" by terminating the APL session
[17]
[18]   :Select ServiceControl←action
[19]   :CaseList SERVICE_CONTROL_STOP SERVICE_CONTROL_SHUTDOWN
[20]       ServiceState←SERVICE_STOPPED
[21]       state[4 5 6 7]←0
[22]
[23]   :Case SERVICE_CONTROL_PAUSE
[24]       ServiceState←SERVICE_PAUSED
[25]
[26]   :Case SERVICE_CONTROL_CONTINUE
[27]       ServiceState←SERVICE_RUNNING
[28]   :Else
[29]       :If state[2]=SERVICE_START_PENDING
[30]           ServiceState←SERVICE_RUNNING
[31]       :EndIf
[32]   :EndSelect
[33]   state[2]←ServiceState
[34]   sink←2 ⎕NQ'.' 'SetServiceState'state
     ∇
```

The Application Code

The following function illustrates how the application code for the service might be structured. It is merely an illustration, but however it is done, it is important that the code handles the instructions to pause, continue and stop in an appropriate manner. In this example, the function `Main` creates a log file and writes to it when the state of the service changes.

```
     ∇ Main arg;nid;log;LogFile
[1]    ⎕NUNTIE ⎕NNUMS
[2]    log←{((⍕⎕TS),' ',⍵,⎕UCS 13 10)⎕NAPPEND ⍺}
[3]    LogFile←'c:\ProgramData\TEMP\APLServiceLog.txt'
[4]    :Trap 22
[5]        nid←LogFile ⎕NCREATE 0
[6]    :Else
[7]        :Trap 22
[8]            nid←LogFile ⎕NTIE 0
[9]            0 ⎕NRESIZE nid
[10]       :Else
[11]           ⎕←'Unable to tie or create logfile'
[12]       :EndTrap
[13]   :EndTrap
[14]   nid log'Starting'
[15]   :While ServiceState≠SERVICE_STOPPED
[16]       :If ServiceControl≠0 ⋄
               nid log'ServiceControl=',⍕ServiceControl ⋄ :EndIf
[17]       :If ServiceState=SERVICE_RUNNING
[18]           nid log'Running'
[19]       :ElseIf ServiceState=SERVICE_PAUSED
[20]           ⍝  Pause application
[21]       :EndIf
[22]       ServiceControl←0 ⍝ Reset (we only want to log changes)
[23]       ⎕DL 10 ⍝ Just to prevent busy loop
[24]   :EndWhile
[25]   ⎕NUNTIE nid
[26]   ⎕OFF 0
     ∇
```

Debugging Dyalog Services

Services are run in the background under the auspices of *Local System*, and not associated with an interactive user. Neither the APL Session nor any GUI components that it creates will be visible on the desktop. This prevents the normal editing and debugging tools from being available.

However, the Dyalog APL Remote Integrated Development environment (RIDE) may be connected to any APL session, including one running as a Windows Service, and provide a debugging environment. For more information, see the *RIDE User Guide*. Note however that the Conga DLLs/sahred libraries must be available - usually they should reside in the same directory as the interpreter. In previous versions of Dyalog separate RIDE DLLs/shared libraries were supplied; these have been subsumed into the Conga libraries in 16.0.

Event Logging

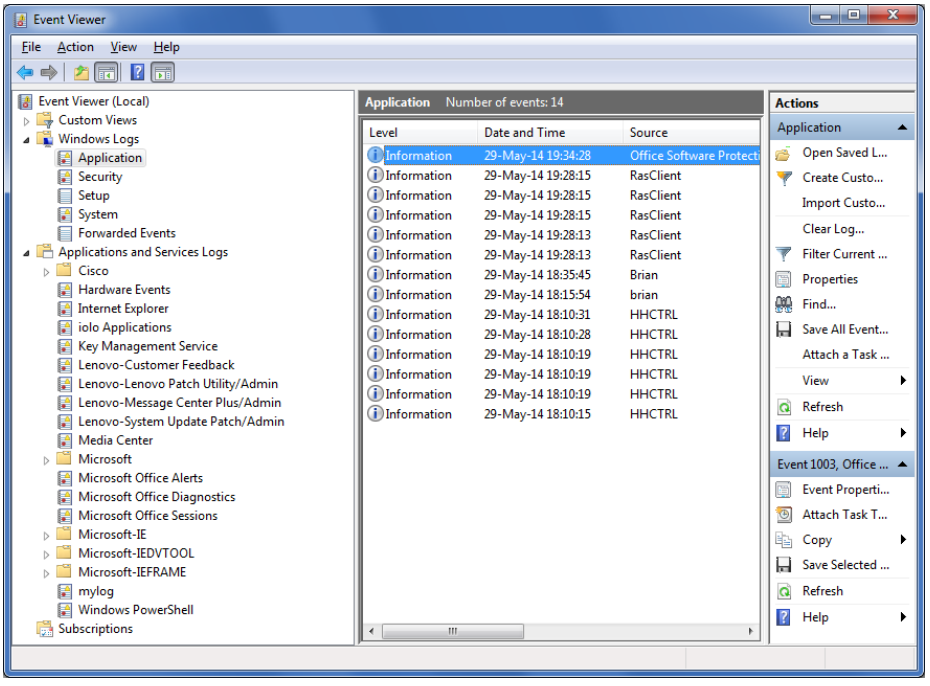
When a service is installed or removed, Dyalog APL records events in the Dyalog APL section of the *Applications and Services Logs* which can be viewed using the Windows system *Event Viewer*.

APLService Logging Events

The `aplservice` workspace contains the class **`SysLog`** which can be used to log events to the Windows Event Log. These events can be accessed programmatically or viewed using the Windows Event Viewer found in the Windows Administrative Tools.

Windows Event Log Concepts

Every message logged in the Windows Event Log has a named source. Frequently this source will be the name of the application which generates the message. Windows has multiple event log files. By default, messages will be logged in the Application log file found in the Windows Logs section of the Windows Event Viewer. Alternatively, you can create a custom log located in the Applications and Services Logs section in the Windows Event Viewer as shown by the "mylog" entry in the screenshot below. Multiple applications can use the same source and multiple sources can write to the same log file, but a given source may only write to a single log file.



Using SysLog in Your Application

Before deploying your Dyalog APL application as a service, you should:

1. Consider what events or messages the application should log and their severity level. `SysLog` allows you to specify severity levels of Error, Warning, and Informational.
2. Create the log source and optionally its custom log using `SysLog.CreateEventSource`. This must be done when running Dyalog as an administrator and prior to running your Dyalog service. Once the event source is created, it is not necessary to run your application as an administrator in order to write to the Windows Event Log.
3. Within your application, you have two options for writing to the Windows Event Log:
   a. You may use the `SysLog.WriteLog` method. `SysLog.WriteLog` will verify that the log source exists and then write your message. This has the advantage of being standalone and can be called whenever you desire
   b. You may create an instance of the `SysLog` class and use the `Write` method. This has the advantage of not incurring the overhead of verifying the existence of the log source each time a log message is written

SysLog Usage

`SysLog` implements an interface to a subset of the functionality of Microsoft's `System.Diagnostics.EventLog` class. Some of `SysLog`'s methods, namely `CreateEventSource`, `DeleteEventSource` and `DeleteLog`, require you to run Dyalog **as an administrator** to be fully functional.

All of the methods in `SysLog` with the exception of `Write` are shared methods meaning you do not have to create an instance of `SysLog` in order to execute them.

SysLog.CreateEventSource sourcename {logname}

Purpose:

Creates a new Windows Event Log source and optionally specifies or creates a Windows Event Log for the source.

Argument	Description
`sourcename`	character vector source name that does not already exist
`{logname}`	optional character vector log name with which to associate the source name. If not supplied, the source will be associated with the Windows Logs/Application log. If there is no log named `logname`, it will be created.

{level} SysLog.WriteLog sourcename message

Purpose:

Writes a message to the Windows Event Log associated with `sourcename`, optionally specifying a severity level.

Argument	Description
`sourcename`	character vector source name of an existing source
`message`	character vector message to write to the log
`{level}`	optional singleton indicating the severity level of the message; defaults to informational if `level` is not specified: `1`,`'E'` or `'e'` may be used for error messages `2`,`'W'` or `'w'` may be used for warning messages `3`,`'I'` or `'i'` may be used for informational messages

{level} instance.Write message

Purpose:

Writes a message to the Windows Event Log associated with source name specified for the `SysLog` instance, optionally specifying a severity level.

Argument	Description
`sourcename`	character vector source name of an existing source
`message`	character vector message to write to the log
`{level}`	optional singleton indicating the severity level of the message; defaults to informational if `level` is not specified: `1`,`'E'` or `'e'` may be used for error messages `2`,`'W'` or `'w'` may be used for warning messages `3`,`'I'` or `'i'` may be used for informational messages

Example:

```
logger←⎕NEW SysLog 'mysource'
1 logger.Write 'The sky is falling!'
```

Boolean←SysLog.LogExists logname

Purpose:

Returns 1 if a Windows Event Log named `logname` exists, 0 otherwise.

Argument	Description
`logname`	character vector Windows Event Log log name

Boolean←SysLog.EventSourceExists sourcename

Purpose:

Returns 1 if a Windows Event Log source named `sourcename` exists, 0 otherwise.

Argument	Description
`sourcename`	character vector Windows Event Log source name

logname←LogNameFromSourceName sourcename

Purpose:

Returns the Windows Event Log log name associated with the source named `sourcename`.

Argument	Description
`sourcename`	character vector Windows Event Log source name
`logname`	character vector Windows Event Log log name

DeleteEventSource sourcename

Purpose:

Deletes the Windows Event Log source named `sourcename`.

Argument	Description
`sourcename`	character vector Windows Event Log source name

DeleteLog logname

Purpose:

Deletes the Windows Event Log log named `logname`.

Argument	Description
`logname`	character vector Windows Event Log log name

Chapter 2:

Configuring the IDE

The Configuration Dialog Box

General Tab

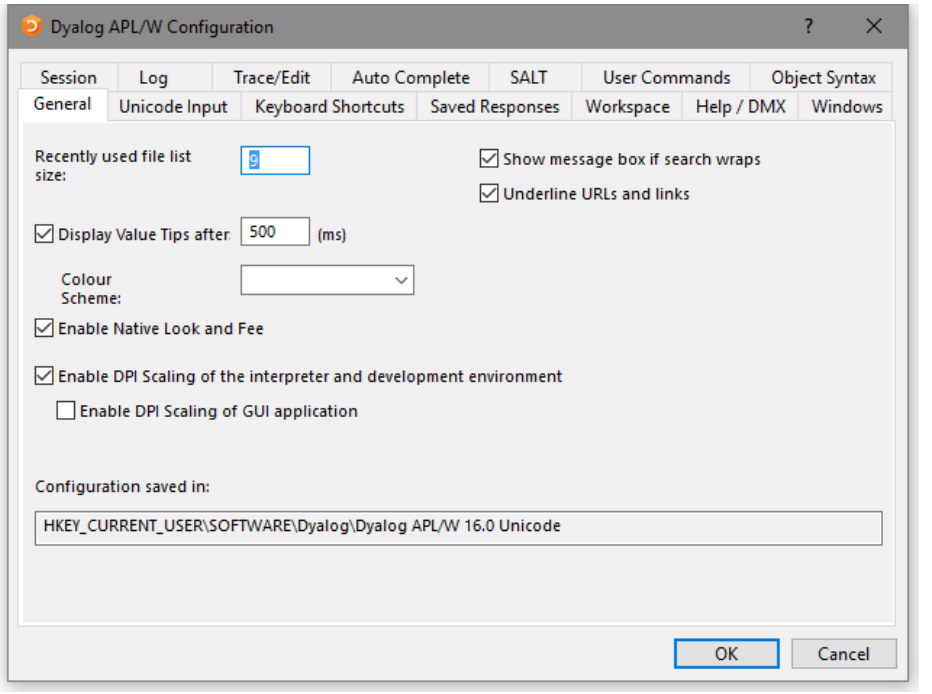


Table 1: Configuration dialog: General

Label	Parameter	Description
Recently used file list size	file_stack_size	Specifies the number of the most recently used workspaces displayed in the File menu.
Show message box if text wraps		Specifies whether or not a message box is displayed to inform the user when the search wraps. See also: *Allow search to wrap* on page 100.
Underline URLs and links	URLHighlight	Specifies whether or not URLs and links are highlighted in Session and Edit windows.
Display Value Tips after	ValueTips/Delay	Specifies the delay before APL will display the value of a variable or the code for a function when the user hovers the mouse over its name.
Colour Scheme	ValueTips/ ColourScheme	Specifies the colour scheme used to display the value of a variable or the code for a function when the user hovers the mouse over its name.
Enable Native Look and Feel	XPLookAndFeel	Specifies whether or not *Native Look and Feel* is enabled. This changes the appearance of user-interface controls such as Buttons in both the Session and the Dyalog GUI.

Label	Parameter	Description
Enable DPI Scaling of the interpreter and development environment	AUTODPI	Enables or disables DPI scaling for the APL Session
Enable DPI scaling of GUI application	DYALOG_PIXEL_TYPE	Sets the value of the DYALOG_PIXEL_TYPE parameter which determines whether Coord `'Pixel'` is treated as ScaledPixel or RealPixel.
Configuration saved in	inifile	Specifies the full pathname of the registry folder used by APL

Underline URLs and links

If this option is selected, valid URLs are identified when the cursor is in the Session or in an Edit or Trace window. When the mouse pointer is over a URL, the URL is underscored and the appropriate items in the Session Popup menu are activated. These allow you to open the link or copy it to the clipboard.

You may also open a URL using Ctrl+Click (Left Mouse button).

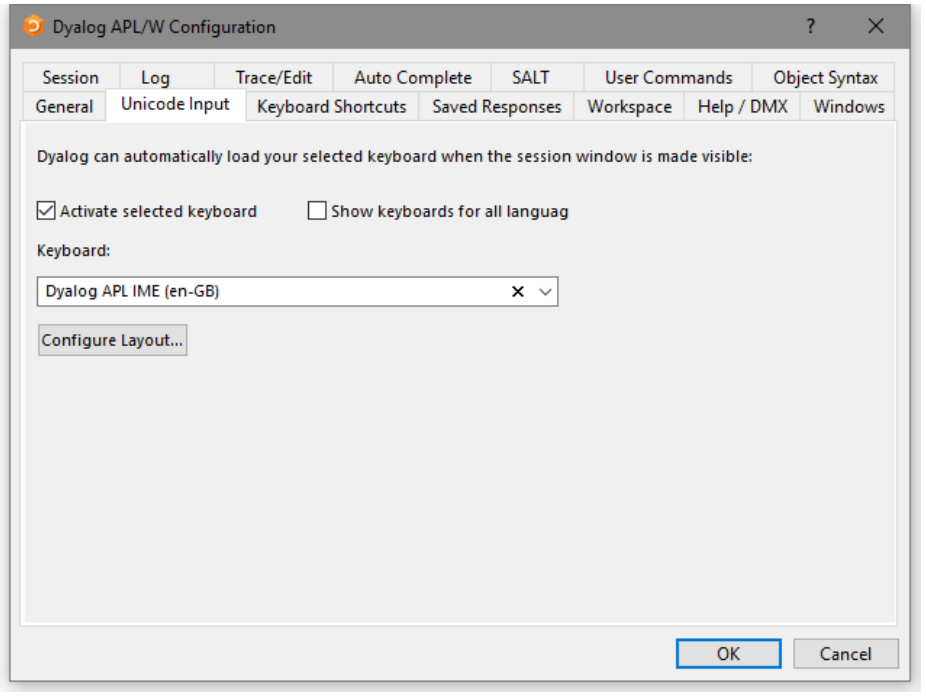
Currently a URL string is defined to be a string starting with any of the following strings:

- http://
- https://
- www.
- mailto:

Unicode Input Tab (Unicode Edition Only)

Unicode Edition can optionally select your APL keyboard each time you start APL.

To choose this option, select one of your installed APL keyboards, enable the *Activate selected keyboard* checkbox, then click *OK*



Label	Parameter	Description
Activate selected keyboard	InitialKeyboardLayoutInUse	1 = automatically select the specified APL keyboard on start-up. 0 = no action
Show keyboards for all Languages	InitialKeyboardLayoutShowAll	1 = show list of all installed keyboards 0 = show only the Dyalog keyboards
Keyboard	InitialKeyboardLayout	the name of the APL keyboard to be selected.
Configure Layout		Displays the *Dyalog APL Input Method Editor Properties* dialog (see below)

Input Method Editor Properties

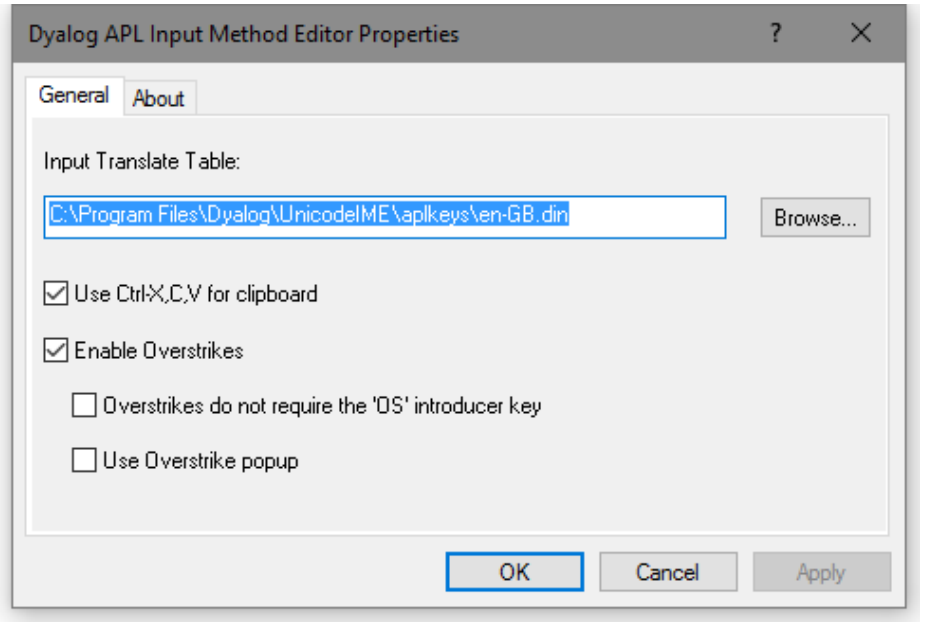


Table 2: Dyalog APL Input Method Editor Properties

Label	Parameter	Description
Use Ctrl-X,C,V for clipboard	UseCSV	0 = process Ctrl+X, Ctrl+C and Ctrl+V normally (via the appropriate .DIN file) 1 = pass Ctrl+X, Ctrl+C and Ctrl+V untranslated to the host application
Enable Overstrikes	ResolveOverstrikes	1 = enable overstrikes. 0 = disable overstrikes
Overstrikes do not require the <OS> key		1 = IME identifies overstrike operation automatically 0 = IME requires the <OS> key to signal an overstrike operation
Use Overstrike popup	OverstrikesPopup	1 = enable the overstrike popup. 0 = disable the overstrike popup

Notes

The **UseCSV** parameter is defined for the IME in the Registry section `HKEY_CURRENT_USER\Software\Dyalog\UnicodeIME\`

When **UseCSV** is 1, the keystrokes Ctrl+X, Ctrl+C and Ctrl+V are passed untranslated to `dyalog.exe` which treats them as CT, CP and PT respectively. This is likely to be true for other host applications using the Dyalog keyboard.

The standard Dyalog keyboard (*.din) files map Shift+Del to CT, Ctrl+Ins to CP, and Shift+Ins to PT. These will therefore work independently of the **UseXCV** option.

The standard Dyalog keyboard (*.din) files map BOTH Ctrl+X and Ctrl+Shift+Xto ⊃ So if **UseCSV** is set to 1, you must use Ctrl+Shift+X to obtain ⊃. Likewise for C and V.

Input Tab (Classic Edition Only)

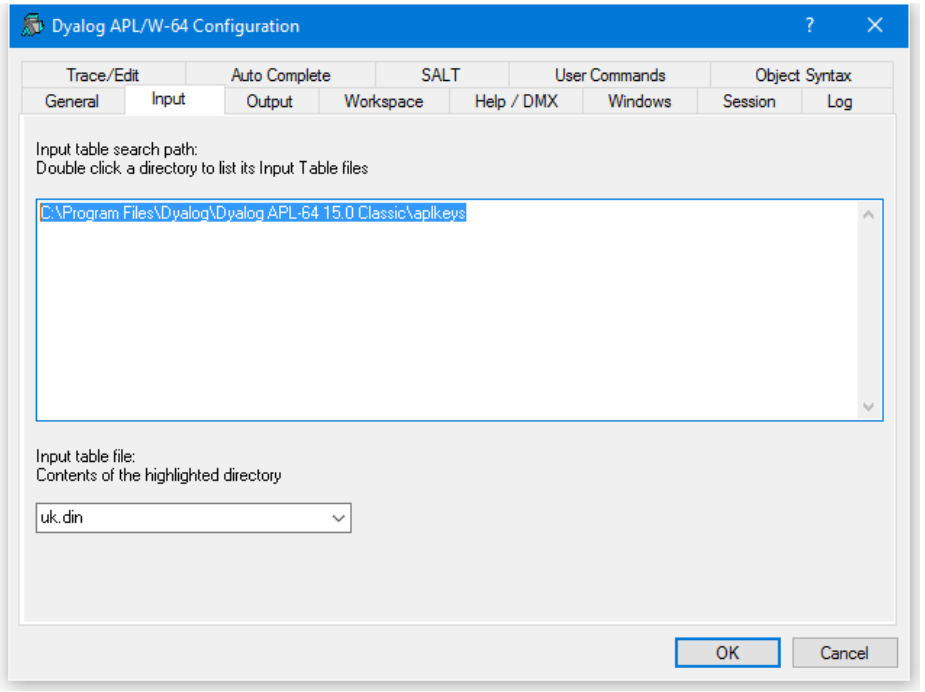


Table 3: Configuration dialog: Keyboard

Label	Parameter	Description
Input table search path	aplkeys	A list of directories to be searched for the specified input table
Input table file	aplk	The name of the input table file (.DIN)

Output Tab (Classic Edition Only)

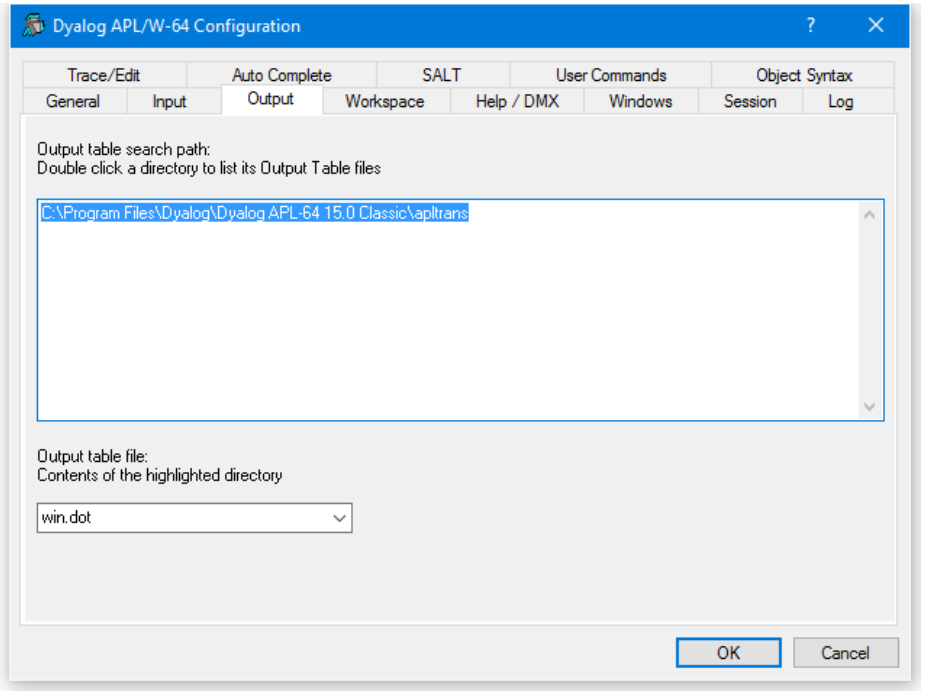
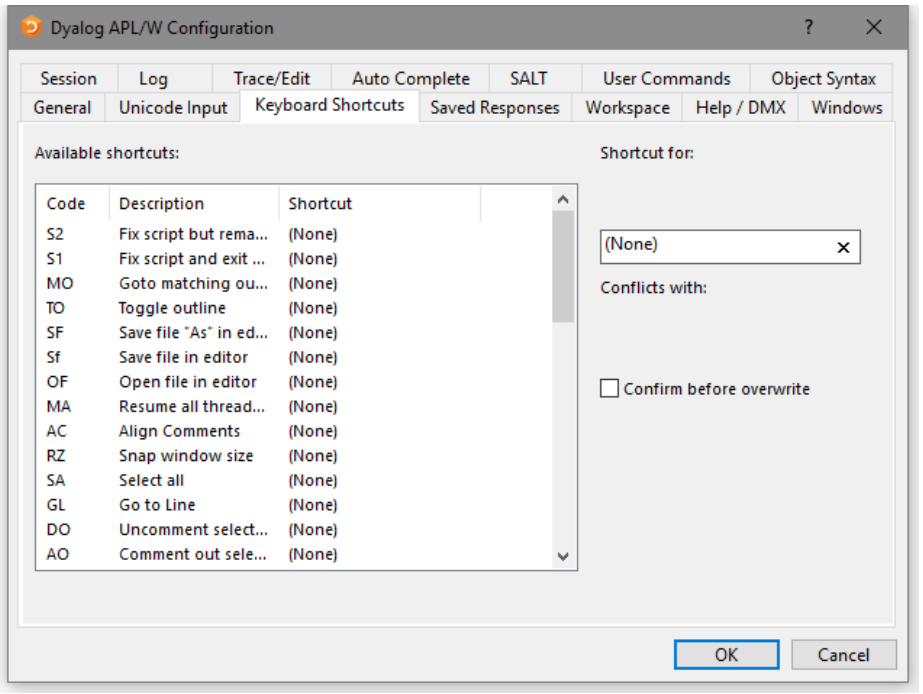


Table 4: Configuration dialog: Output

Label	Parameter	Description
Output table search path	apltrans	A list of directories to be searched for the specified output table
Output table file	aplt	The name of the output table file (.DOT)

Keyboard Shortcuts Tab



To alter the keystroke associated with a particular action, simply select the action required and press the keystroke. For example, to change the keystroke associated with the action <UA> (undo all changes) from (None) to Ctrl+Shift+u, simply select the corresponding row in the list and press Ctrl+Shift+u. If *Confirm before Overwrite* is checked, you will be prompted to confirm or cancel before each and every change is written back to the registry.

Note that clicking on the column headings will sort on that column; shift and mouse click will sort in reverse order.

Workspace Tab

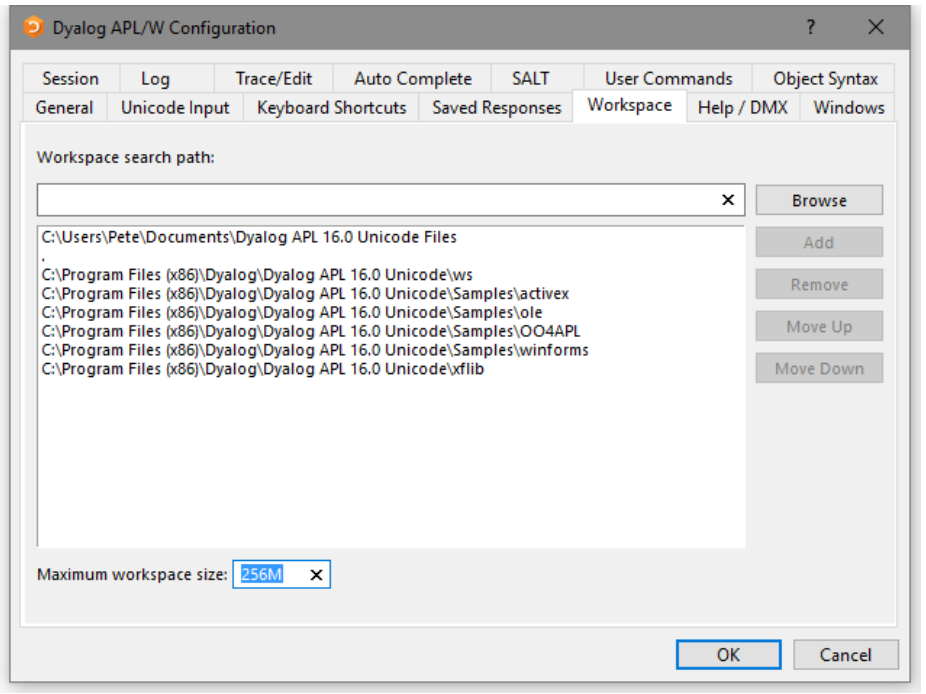


Table 5: Configuration dialog: Workspace

Label	Parameter	Description
Workspace search path	WSPATH	A list of directories to be searched for the specified workspace when the user executes `)LOAD` wsname. "." must be included in order to load workspaces from the current directory
Maximum workspace size	maxws	The maximum size of the workspace. Size is defined as an integer value followed by one of K, M, or G which stand for Kilobytes, Megabytes and Gigabytes respectively. If no character is included, units default to K (Kilobytes). MAXWS defaults to 64M on the

		Raspberry Pi, and 256M on all other platforms.

Help/DMX Tab

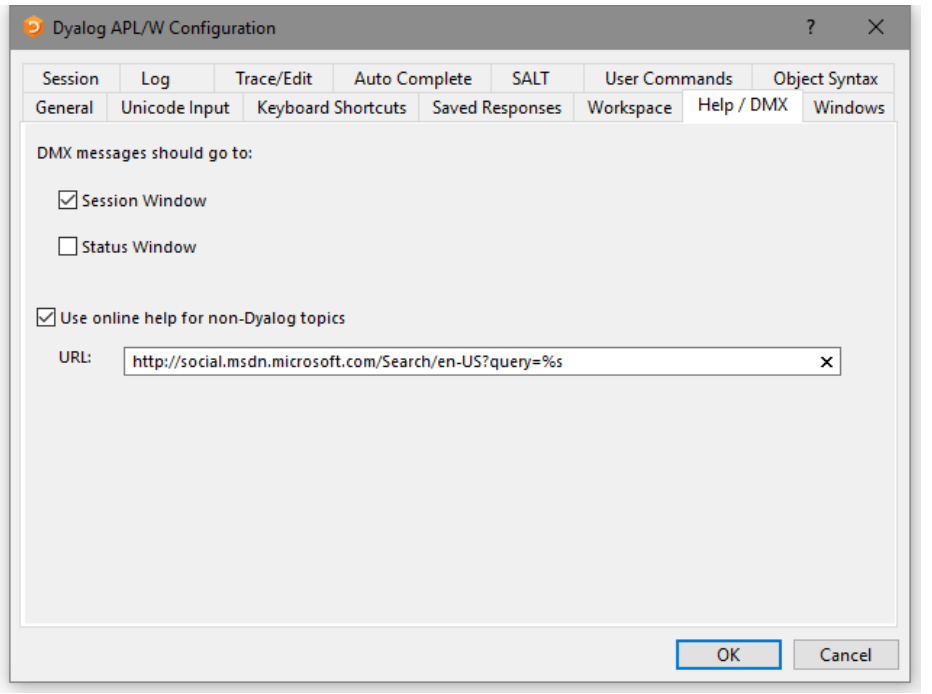


Table 6: Configuration dialog: Help/DMX

Label	Parameter	Description
DMX messages should go to	DMXOUTPUTONERROR	If checked, these boxes cause APL to display ⎕DMX messages in the corresponding window (s).
Use Microsoft's documentation centre for non-Dyalog topics	UseDefaultHelpCollection	If this option is checked, APL will look for help for external objects at Microsoft's documentation center, which is identified by the specified URL.
URL	ExternalHelpURL	The URL for the documentation centre.

Windows Tab

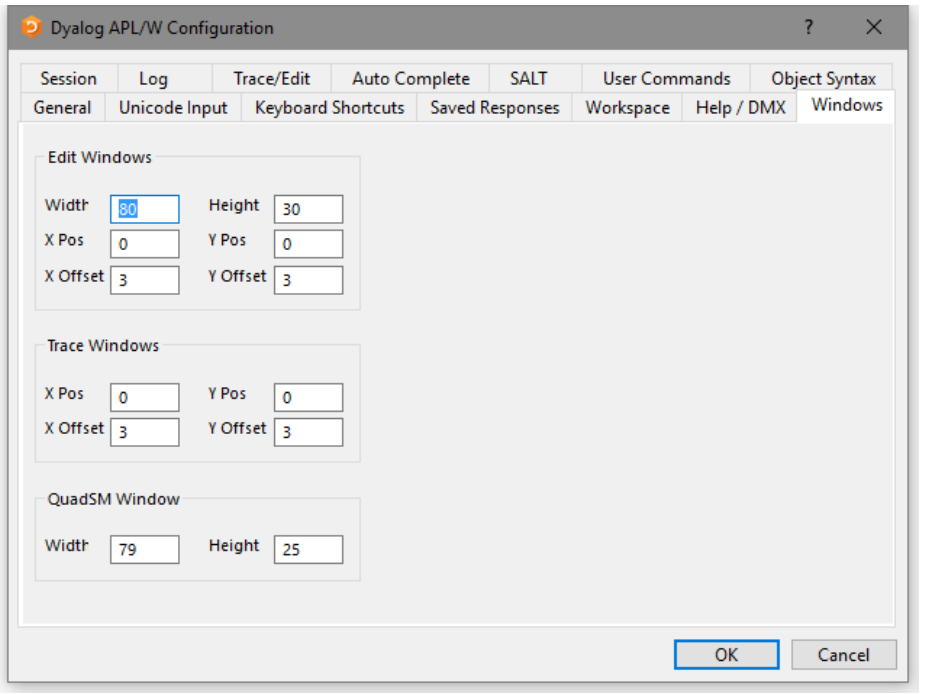

Dyalog APL/W Configuration
Session
Log
Trace/Edit
Auto Complete
SALT
User Commands
Object Syntax
General
Unicode Input
Keyboard Shortcuts
Saved Responses
Workspace
Help / DMX
Windows
Edit Windows
Width
80
Height
30
X Pos
0
Y Pos
0
X Offset
3
Y Offset
3
Trace Windows
X Pos
0
Y Pos
0
X Offset
3
Y Offset
3
QuadSM Window
Width
79
Height
25
OK
Cancel

Table 7: Configuration dialog: Windows (Edit Windows)

Label	Parameter	Description
Width	edit_cols	The maximum number of rows displayed in a new edit window.
Height	edit_rows	The maximum number of columns displayed in a new edit window.
X Pos	edit_first_x	The initial horizontal position in characters of the first edit window.
Y Pos	edit_first_y	The initial vertical position in characters of the first edit window.
X Offset	edit_offset_x	The initial horizontal position in characters of the second and subsequent edit windows relative to the previous one.
Y Offset	edit_offset_y	The initial vertical position in characters of the second and subsequent edit windows relative to the previous one.

Table 8: Configuration dialog: Windows (Trace Windows)

Label	Parameter	Description
X Pos	trace_first_x	The initial horizontal position in characters of the first trace window.
Y Pos	trace_first_y	The initial vertical position in characters of the first trace window.
X Offset	trace_offset_x	The initial horizontal position in characters of the second and subsequent trace windows relative to the previous one.
Y Offset	trace_offset_y	The initial vertical position in characters of the second and subsequent trace windows relative to the previous one.

Table 9: Configuration dialog: Windows (QuadSM Window)

Label	Parameter	Description
Width	sm_cols	The width of the QSM and prefect windows.
Height	sm_rows	The height of the QSM and prefect windows.

Session Tab

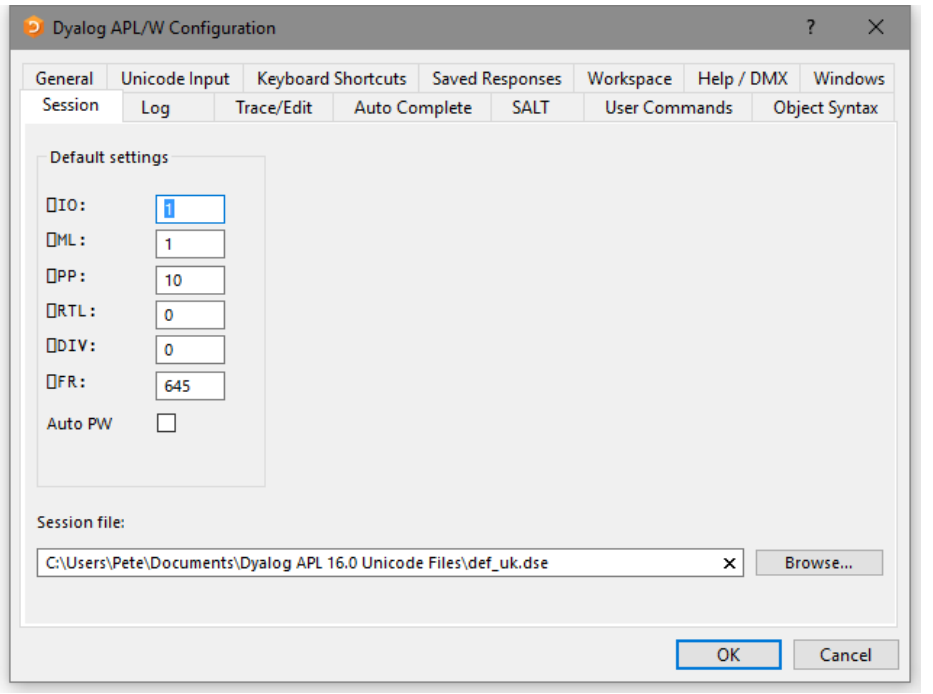

Dyalog APL/W Configuration
General
Unicode Input
Keyboard Shortcuts
Saved Responses
Workspace
Help / DMX
Windows
Session
Log
Trace/Edit
Auto Complete
SALT
User Commands
Object Syntax
Default settings
⎕IO:
1
⎕ML:
1
⎕PP:
10
⎕RTL:
0
⎕DIV:
0
⎕FR:
645
Auto PW
Session file:
C:\Users\Pete\Documents\Dyalog APL 16.0 Unicode Files\def_uk.dse
Browse...
OK
Cancel

Table 10: Configuration dialog: Session

Label	Parameter	Description
⎕IO	default_io	The default value of ⎕IO in a `clear ws`.
⎕ML	default_ml	The default value of ⎕ML in a `clear ws`
⎕PP	default_pp	The default value of ⎕PP in a `clear ws`.
⎕RTL	default_rtl	The default value of ⎕RTL in a `clear ws`.
⎕DIV	default_div	The default value of ⎕DIV in a `clear ws`.
⎕WX	default_wx	The default value of ⎕WX in a `clear ws`.
Auto PW	auto_pw	If checked, the value of ⎕PW is dynamic and depends on the width of the Session Window.
Session file	session_file	The name of the Session file in which the definition of your session (⎕SE) is stored.

Log Tab

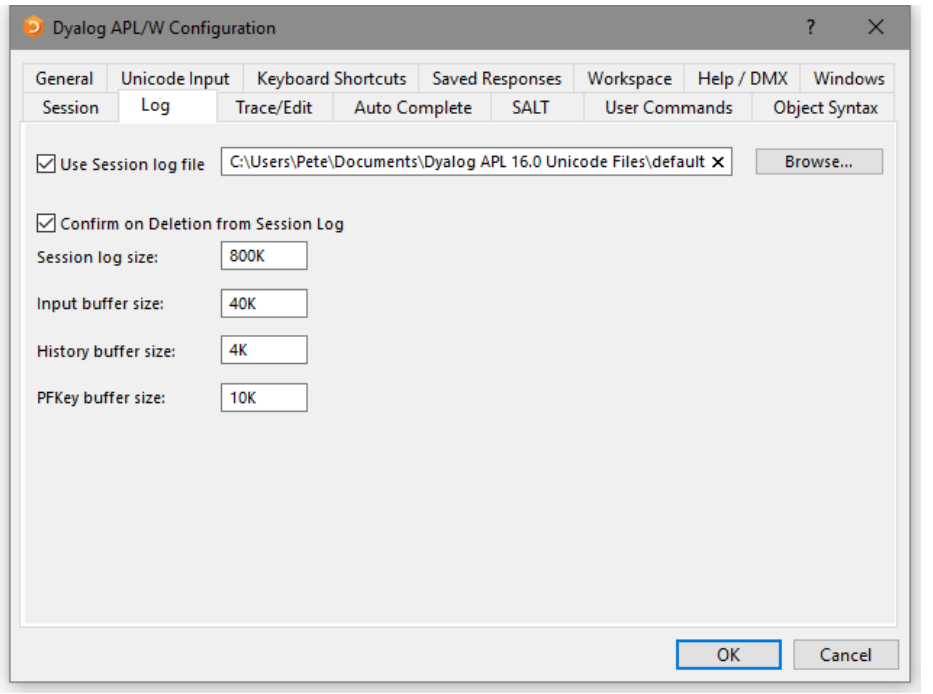

Dyalog APL/W Configuration
General
Unicode Input
Keyboard Shortcuts
Saved Responses
Workspace
Help / DMX
Windows
Session
Log
Trace/Edit
Auto Complete
SALT
User Commands
Object Syntax
Use Session log file
C:\Users\Pete\Documents\Dyalog APL 16.0 Unicode Files\default
Browse...
Confirm on Deletion from Session Log
Session log size:
800K
Input buffer size:
40K
History buffer size:
4K
PFKey buffer size:
10K
OK
Cancel

Table 11: Configuration dialog: Log

Label	Parameter	Description
Use Session log file	log_file_inuse	Specifies whether or not the Session log is saved in a session log file
Use Session log file	log_file	The full pathname of the Session log file
Confirm on Deletion from Session log	confirm_session_delete	Specifies whether or not you are prompted to confirm the deletion of a line from the Session (and Session log).
Session log size	log_size	The size of the Session log buffer.
Input buffer size	input_size	The size of the buffer used to store marked lines (lines awaiting execution) in the Session.
History size	history_size	The size of the buffer used to store previously entered (input) lines in the Session
PFKey buffer size	pfkey_size	The size of the buffer used to store PFKey definitions (□PFKEY)

Note: The value of size-related values defined in the above table is specified as an integer value followed by one of K, M, G, T, P or E. The default, where no character is included, is K (Kilobytes).

Trace/Edit Tab

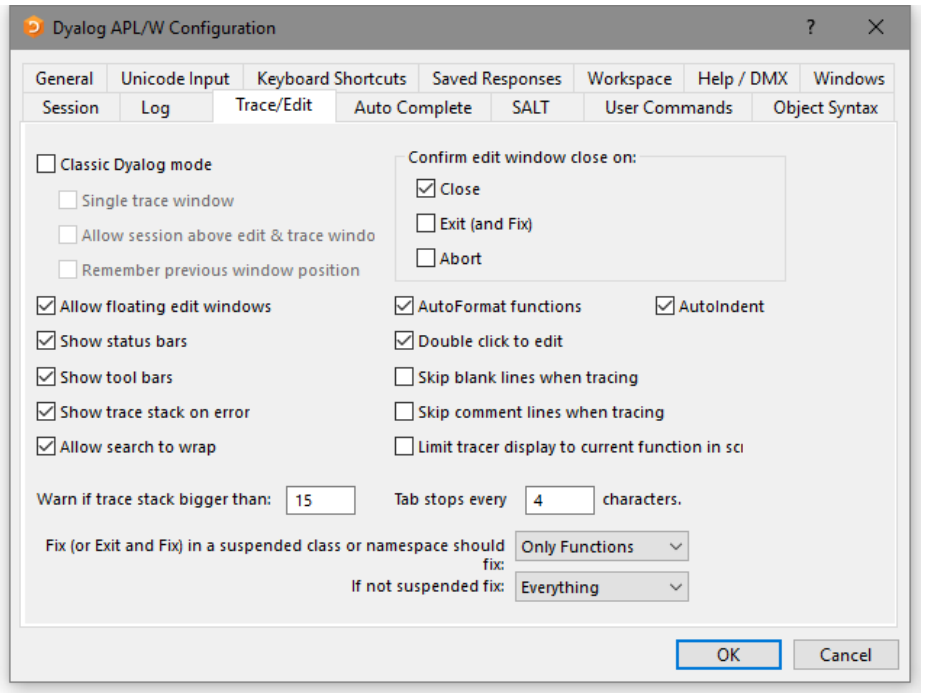


Table 12: Configuration dialog: Trace/Edit

Label	Parameter	Description
Classic Dyalog mode	ClassicMode	Selects pre-Version 9 behaviour for Edit and Trace windows. Note that in this mode, a maximum of 50 Trace windows may be displayed.
Allow session above edit windows	SessionOnTop	Specifies whether or not the Session may appear on top of Edit and Trace Windows
Single trace window	SingleTrace	Specifies whether or not there is a single Trace window
Remember previous window position	ClassicModeSavePosition	Specifies whether or not the current size and location of the first of the editor and tracer windows are remembered in the registry for next time.
Allow floating edit windows	DockableEditWindows	Allows individual Edit windows to be undocked from (and re-docked in) the main Edit window
Show status bars	StatusOnEdit	Specifies whether or not status bars are displayed along the bottom of individual Edit windows
Show tool bars	ToolBarsOnEdit	Specifies whether or not tool bars are displayed along the top of individual Edit windows
Show trace stack on error	Trace_on_error	Specifies whether or not the Tracer is automatically invoked when an error or stop occurs in a defined function

Label	Parameter	Description
Allow search to wrap	WrapSearch	Specifies whether or not Search/Replace in the Editor stops at the top or bottom of the text, or continues from the start or end as appropriate. See also: *Show message box if text wraps* on page 80.
Warn if trace stack bigger than	Trace_level_warn	Specifies the maximum stack size for automatic deployment of the Tracer.
Confirm edit window close on Close	confirm_close	Specifies whether or not a confirmation dialog is displayed if the user alters the contents of an edit window, then closes it without saving
Confirm edit window close on Edit (and Fix)	confirm_fix	Specifies whether or not a confirmation dialog is displayed if the user alters the contents of an edit window, then saves it using *Fix* or *Exit*
Confirm edit window close on Abort	confirm_abort	Specifies whether or not a confirmation dialog is displayed if the user alters the contents of an edit window, then aborts using
Autoformat functions	AutoFormat	Selects automatic indentation for Control Structures when function is opened for editing
Autoindent	AutoIndent	Selects semi-automatic indentation for Control Structures while editing
Double-click to Edit	DoubleClickEdit	Specifies whether or not double-clicking over a name invokes the editor

Label	Parameter	Description
Skip blank lines when tracing	SkipBlankLines	If enabled, this causes the Tracer to automatically skip blank lines.
Skip comment lines when tracing	SkipBlankLines	If enabled, this causes the Tracer to automatically skip comment lines.
Limit tracer display to current function in script	AddClassHeaders	When Tracing the execution of a function in a script, the Tracer displays either just the first line of the script and the function in question (option enabled), or the entire script (option disabled).
Paste text as Unicode (Classic Edition only)	UnicodeToClipboard	Specifies whether or not text transferred to and from the Windows clipboard is to be treated as Unicode
Tab stops every	TabStops	The number of spaces inserted by pressing Tab in an edit window
Exit and fix ...	InitFullScriptSusp	See Fixing Scripts below
If not ...	InitFullScriptNormal	See Fixing Scripts below

Fixing Scripts

When using the Editor to edit a script such as a Class or Namespace you can specify whether, when you Fix the script and Exit the Editor, just the functions in the script are re-fixed, or whether the whole script is re-executed, thereby re-initialising any Fields or variables defined within.

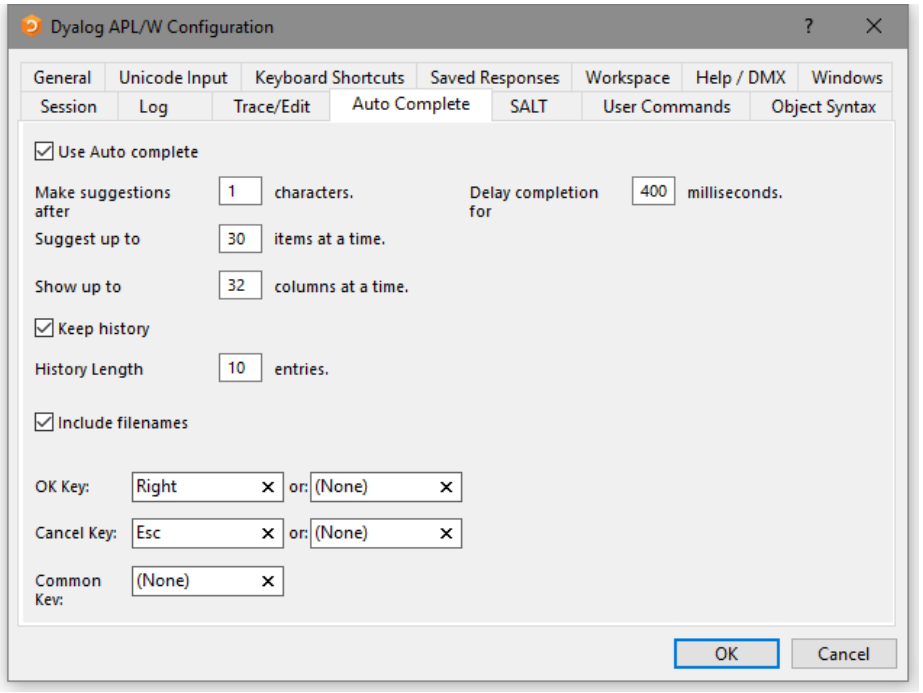
These two actions always appear in the Editor File menu, but you can specify which is associated with the <EP> (Esc) key by selecting the appropriate option in the drop-downs labelled:

- *Exit and save changes (EP) in a suspended class or namespace should fix:*
- *If not suspended fix:*

In both cases, you may select either *Only Functions* or *Everything*.

The label for the corresponding items on the Editor File menu (see *UI Guide: Editor (The File Menu, editing a script)*) will change according to which behaviour applies. Note that if you specify a keystroke for <S1> in the *Keyboard Shortcuts* tab, this will be associated with the unselected action.

Auto Complete Tab



Note: To enter values in the *OK Key* and *Cancel Key*fields, click on the field with the mouse and then press the desired keystroke.

Table 13: Configuration dialog: Auto Complete

Label	Parameter	Description
Use Auto Complete	Enabled	Specifies whether or not Auto Completion is enabled.
Make suggestions after	PrefixSize	Specifies the number of characters you must enter before Auto Completion begins to make suggestions
Delay completion for	KeyboardInputDelay	Specifies the delay in milliseconds before Auto Completion begins to make suggestions

Label	Parameter	Description
Suggest up to	Rows	Specifies the maximum number of rows (height) in the AutoComplete pop-up suggestions box.
Show up to	Cols	Specifies the maximum number of columns (width) in the AutoComplete pop-up suggestion box
Keep History	History	Specifies whether or not AutoComplete maintains a list of previous AutoCompletions.
History Length	HistorySize	Specifies the number of previous AutoCompletions that are maintained
Include filenames	ShowFiles	Specifies whether or not AutoCompletion suggests directory and file names for `)LOAD`, `)COPY` and `)DROP` system commands.
OK Key	CompleteKey1 CompleteKey2	Specifies two possible keys that may be used to select the current option from the Auto Complete suggestion box.
Cancel Key	CancelKey1 CancelKey2	Specifies two possible keys that may be used to cancel (hide) the Auto Complete suggestion box.
Common Key	CommonKey1	Specifies the key that will auto-complete the *common prefix*. This is defined to be the longest string of leading characters in the currently selected name that is shared by at least one other name in the Auto Complete suggestion box.

SALT

SALT is the Simple APL Library Toolkit, a simple source code management system for Classes and script-based Namespaces. SPICE uses SALT to manage development tools which "plug in" to the Dyalog session

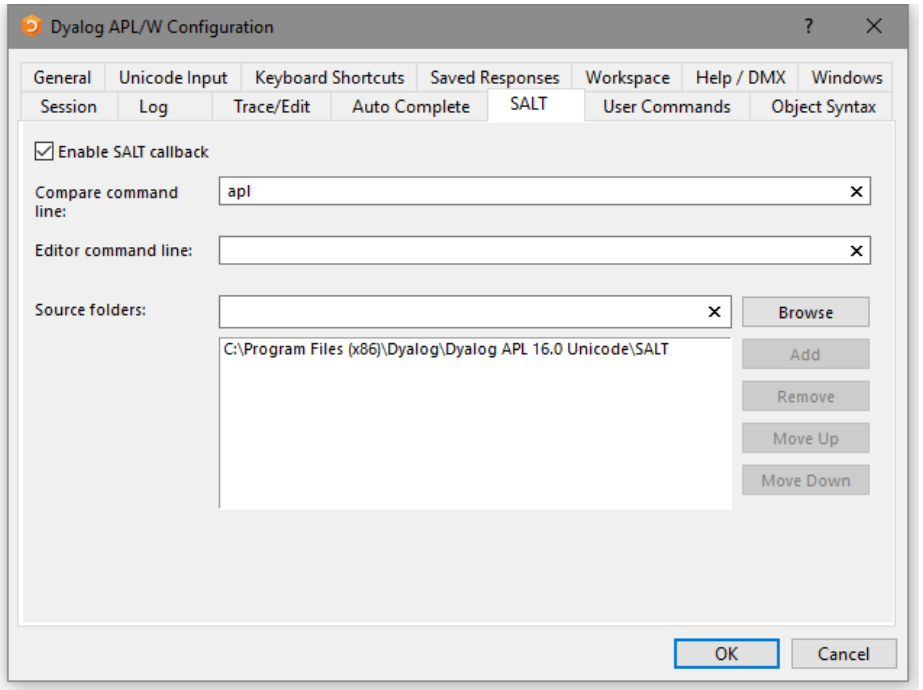
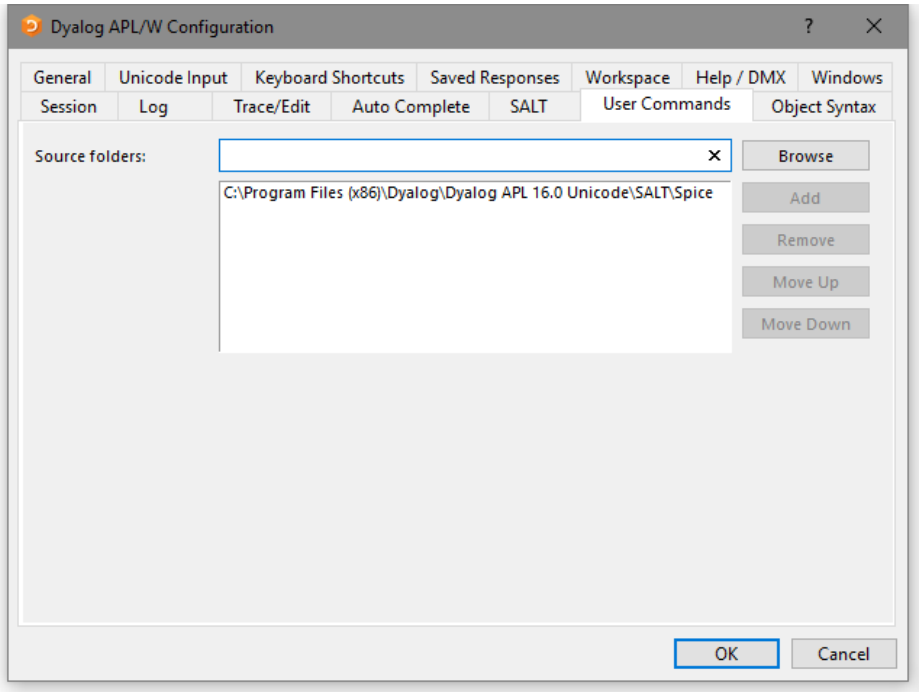


Table 14: Configuration dialog: SALT

Label	Parameter	Description
Enable Salt	AddSALT	Specifies whether or not SALT is enabled
Compare command line	CompareCMD	The command line for a 3rd party file comparison tool to be used to compare two versions of a file. See note.
Editor	Editor	Name of the program to be used to edit script files (default "Notepad").
Class source folders	SourceFolder	Sets the SALT working directory; a list of folders to be searched for source code. Include "." on a separate line to include source files from the current working directory

User Commands Tab

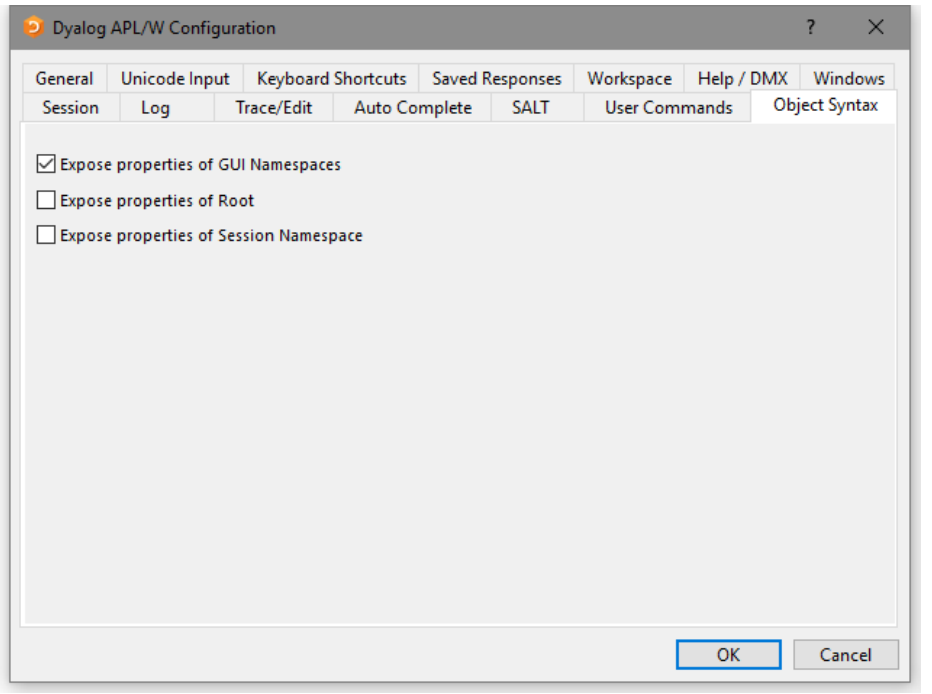


This page is used to specify and organise a list of folders that contain User-Command files. When you issue a User Command, these folders will be searched for the source of the command in the order in which they appear in this list.

Table 15: Configuration dialog: User Commands

Label	Parameter	Description
Source Folders	SALT\CommandFolder	Use this field to add folders to the list of folders that will be searched for User Commands.

Object Syntax Tab



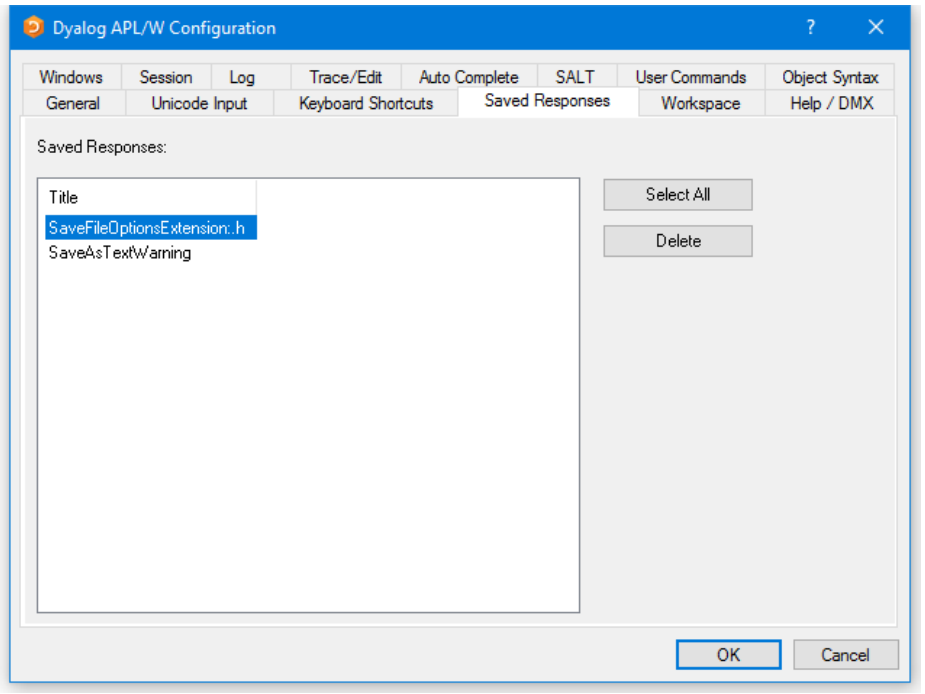
The *Object Syntax* tab of the *Configuration* dialog is used to set your *default preferences* for Object Syntax.

The Object Syntax settings for the current workspace are reflected by the *Object Syntax* submenu of the *Options* menu. Use *Options/Object Syntax* to change them. These settings are saved in the workspace.

Table 16: Configuration dialog: Object Syntax

Label	Parameter	Description
Expose properties of GUI Namespaces	default_wx	Specifies the value of ⎕WX in a clear workspace. This in turn determines whether or not the names of properties, methods and events of GUI objects are exposed. If set (⎕WX is 1), you may query/set properties and invoke methods directly as if they were variables and functions respectively. As a consequence, these names may not be used for global variables in GUI objects.
Expose properties of Root	PropertyExposeRoot	Specifies whether or not the names of properties, methods and events of the Root object are exposed. If set, you may query/set the properties of Root and invoke the Root methods directly as if they were variables and functions respectively. As a consequence, these names may not be used for global variables in your workspace.
Expose properties of Session Namespace	PropertyExposeSE	Specifies whether or not the names of properties, methods and events of the Session object are exposed. If set, you may query/set the properties of ⎕SE and invoke ⎕SE methods directly as if they were variables and functions respectively. As a consequence, these names may not be used for global variables in the ⎕SE namespace.

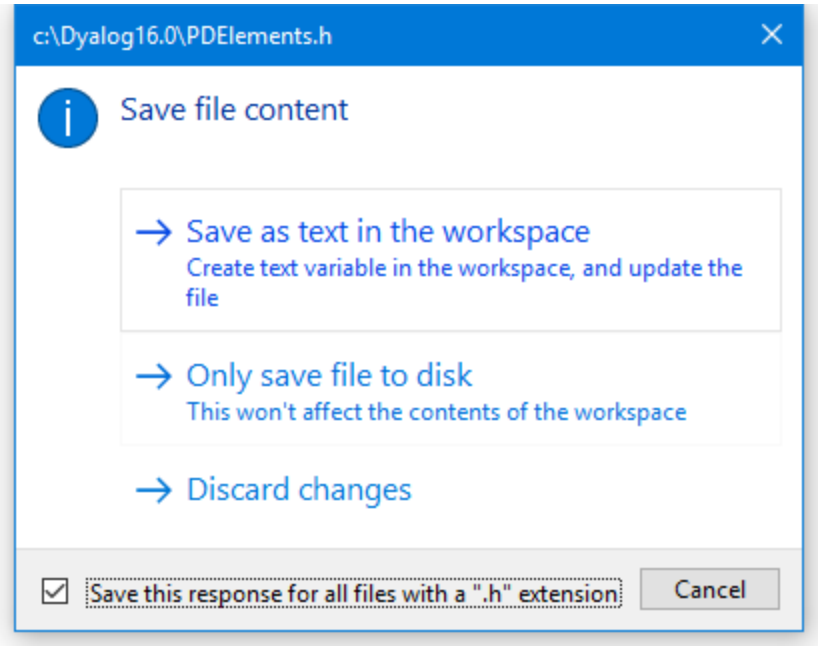
Saved ResponsesTab

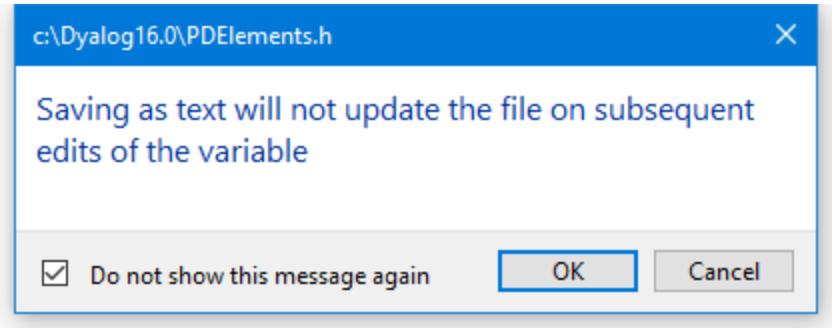


The *Saved Responses* tab of the *Configuration* dialog is used to remove preferences that the user has previously established.

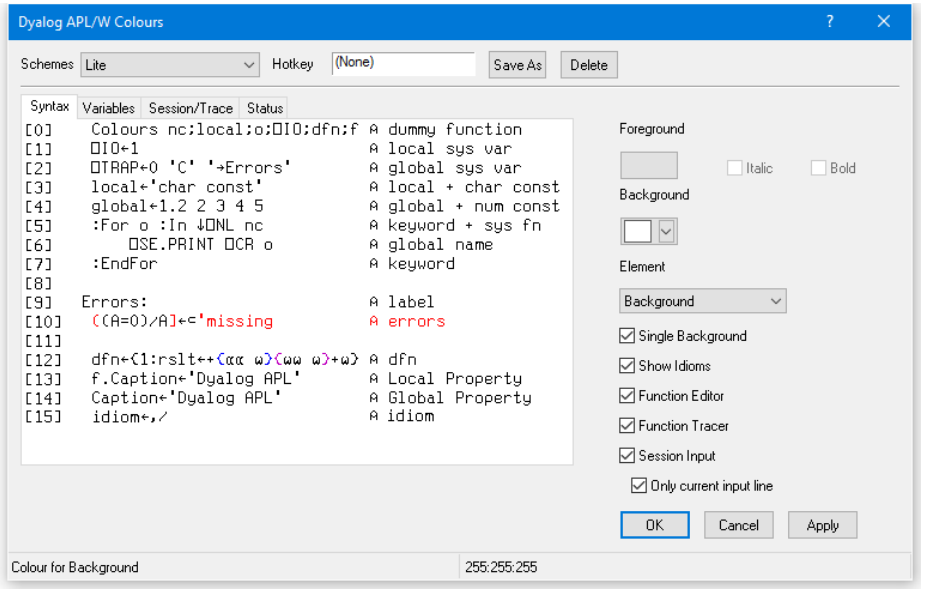
In the example illustrated above, the user has at some point chosen to save a text file with a `.h` extension as text in the workspace and, by checking the option *Save this response for all files with a ".h" extension*, saved this as a preference for all such text files. Similarly, the user has checked the option *Do not show this message again* when responding to the warning dialog *Saving as text will ...*.

If the user wishes to reverse these decisions, even temporarily, it is necessary to select the corresponding option /preference name(s) and click *Delete*. The names are intended to be self-explanatory and are not listed here.


c:\Dyalog16.0\PDElements.h
Save file content
Save as text in the workspace
Create text variable in the workspace, and update the file
Only save file to disk
This won't affect the contents of the workspace
Discard changes
Save this response for all files with a ".h" extension
Cancel


c:\Dyalog16.0\PDElements.h
Saving as text will not update the file on subsequent edits of the variable
Do not show this message again
OK
Cancel

Colour Selection Dialog



The Colour Selection dialog box allows you to select colours for:

- Syntax colouring
- Edit, Trace and Session windows
- Status window

The colour selection dialog box is selected by the `[ChooseColor]` system action which by default is attached to the *Options/Colours* menu item on the Session menubar and to the *Colours* menu item in the Session pop-up menu.

Syntax Colouring

Syntax colouring allows you to visually identify various components in the function edit and session windows by assigning different colours to them, such as:

- Global references (functions and variables)
- Local references (functions and variables)
- Primitive functions
- System functions
- Localised System Variables
- Comments
- Character constants
- Numeric constants
- Labels
- Control Structures
- Unmatched parentheses, quotes, and braces

Schemes

You may define a number of different syntax colouring schemes which are suitable for different purposes and a selection of schemes is provided. Choose the scheme you wish to use from the Combo box provided. If you change a colour allocation, you may overwrite an existing Colour Scheme or define a new one by clicking *Save As* and then entering the name of the Scheme. You may delete a Colour Scheme using the *Delete* button.

Changing Colours

To allocate a colour to a syntax element, you must first select the syntax element. You may select a syntax element from the Combo box provided, or by clicking on an example in the sample function provided. Having selected a syntax element, choose a colour using the *Foreground* or *Background* selectors as appropriate.

Show Idioms

The *Show Idioms* checkbox allows you to choose whether or not idioms are to be identified by syntax colouring.

Single Background

The *Single Background* checkbox allows you to choose whether to impose a single background colour, or to allow the use of different background colours for different syntax elements.

Function Editor

Check this box if you want to enable syntax colouring in Edit windows.

Function Tracer

Check this box if you want to enable syntax colouring in Trace windows.

Session Input

Check this box if you want to enable syntax colouring in the Session window. Note that the colour scheme used for the Session may differ from the colour scheme selected for Edit windows and is specified by the *Session Colour Scheme* box on the *Session/Trace* tab.

Only current input line

This option only applies if Session syntax colouring is enabled. Check this box if you want syntax colouring to apply only to the current input line. Clear this box, if you want to apply syntax colouring to all the input lines in the current Session window. Note that syntax colouring of input lines is not remembered in the Session log, so input lines from previous sessions do not have syntax colouring.

HotKeys

You may associate a different *hot key* with any or all of your colour schemes.

When you depress a hot key over a function in an Edit window, the function is displayed using the scheme associated with the hot key. Releasing the hot key causes it to be displayed in the normal scheme.

This feature is intended to allow you to quickly check for certain syntax elements. For example, you may define a special scheme that only highlights global names and associate a hot key with it. Pressing the hot key will temporarily highlight the globals for you.

To associate a hot key with a colour scheme, click on the *Hotkey* field, and then make the desired keystroke. To disassociate a hot key, use <backspace>.

Print Configuration Dialog Box

The Print Configuration dialog box is displayed by the system operation `[PrintSetup]` that is associated with the *File/Print Setup* menu item. It is also available from Edit windows and from the *Workspace Explorer* and *Find Objects* tools.

There are four separate tabs namely *Setup*, *Margins*, *Header/Footer* and *Printer*.

Note that the printing parameters are stored in the Registry in the Printing sub-folder

Setup Tab

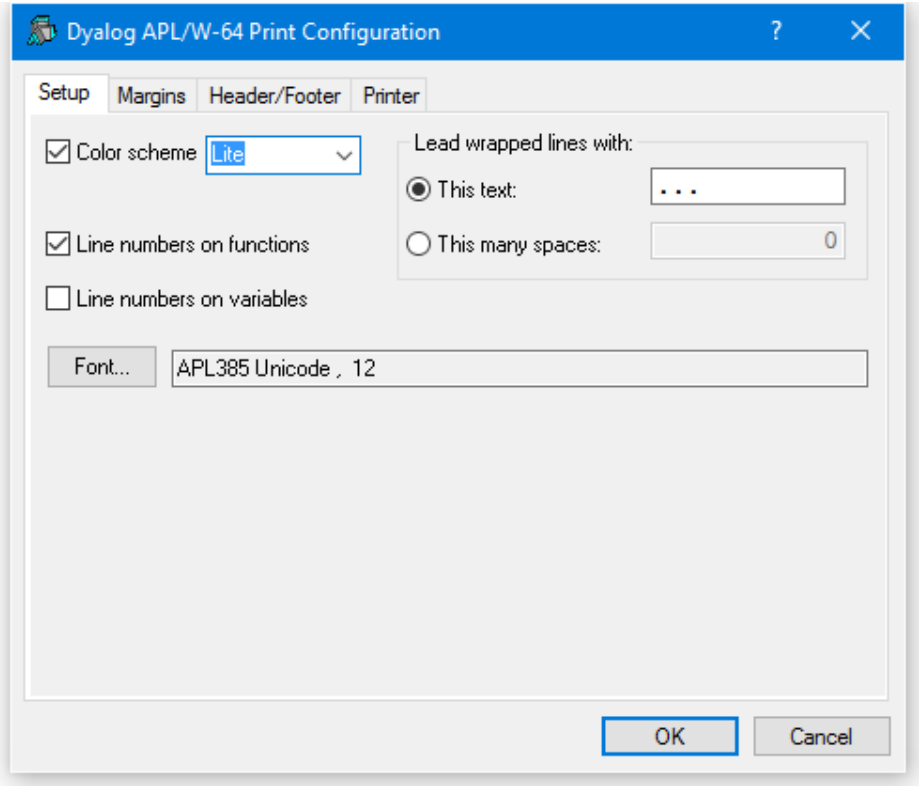


Table 17: Print Configuration dialog: Setup

Label	Parameter	Description
Color scheme	InColour	Check this box if you want to print functions with syntax colouring. Note that that printing in colour is slower than printing without colour.
Color scheme	SchemeName	Select the colour scheme to be used for printing.
This text	WrapWithText	Check this option button if you wish to prefix wrapped lines (lines that exceed the width of the paper) with a particular text string
This text	WrapLeadText	Specifies the text for prefixing wrapped lines
This many spaces	WrapWithSpaces	Check this option button if you wish to prefix wrapped lines with spaces.
This many spaces	WrapLeadSpaces	Specifies the number of spaces to be inserted at the beginning of wrapped lines.
Line numbers on functions	LineNumsFns	Check this box if you want line numbers to be printed in defined functions.
Line numbers on variables	LineNumsVars	Check this box if you want line numbers to be printed in variables. If you choose this option, line numbering starts at ⎕IO.
Font	Font	Click to select the font to be used for printing. Note that only fixed-pitch fonts are supported.

Margins Tab

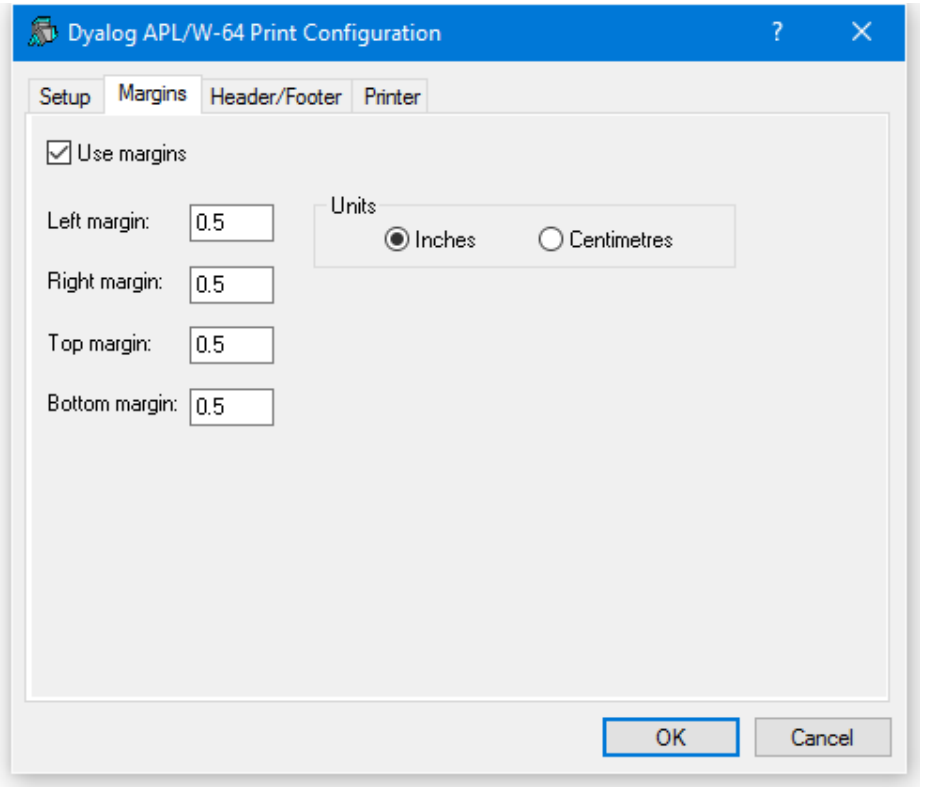


Table 18: Print Configuration dialog: Margins

Label	Parameter	Description
Use margins	UseMargins	Check this box if you want margins to apply
Left margin	MarginLeft	Specifies the width of the left margin
Right margin	MarginRight	Specifies the width of the right margin
Top margin	MarginTop	Specifies the height of the top margin
Bottom margin	MarginBottom	Specifies the height of the bottom margin

Label	Parameter	Description
Inches	MarginInch	Specifies that the margin units are inches
Centimetres	MarginCM	Specifies that the margin units are centimetres

Header/Footer Tab

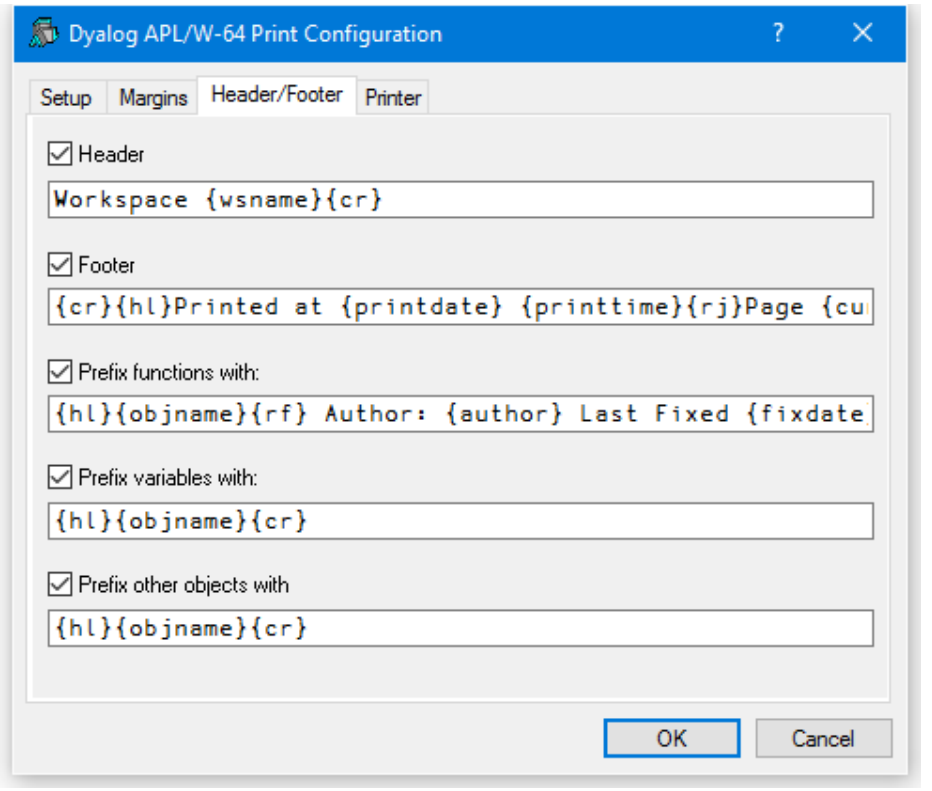


Table 19: Print Configuration dialog: Header/Footer

Label	Parameter	Description
Header	DoHeader	Specifies whether or not a header is printed at the top of each page
Header	HeaderText	The header text
Footer	DoFooter	Specifies whether or not a footer is printed at the bottom of each page
Footer	FooterText	The footer text
Prefix functions with	DoSepFn	Specifies whether or not text is printed before each defined function
Prefix functions with	SepFnText	The text to be printed before each defined function. This can include its name, timestamp and author
Prefix variables with	DoSepVar	Specifies whether or not text is printed before each variable.
Prefix variables with	SepVarText	The text to be printed before each variable. This can include its name.
Prefix other objects with	DoSepOther	Specifies whether or not text is printed before other objects. These include locked functions, external functions, NA functions, derived functions and namespaces.
Prefix other objects with	SepOtherText	The text to be printed before other objects. This can include its name.

The specification for headers and footers may include a mixture of your own text, and keywords which are enclosed in braces, e.g. {objname}. Keywords act like variables and are replaced at print time by corresponding values.

Any of the following fields may be included in headers, footers and separators.

{WSName}	{WS}	Workspace name
{NSName}	{NS}	Namespace name
{ObjName}	{OB}	Object name
{Author}	{AU}	Author
{FixDate}	{FD}	Date function was last fixed
{FixTime}	{FT}	Time function was fixed
{PrintDate}	{PD}	Today's date
{PrintTime}	{PT}	Current time
{CurrentPage}	{CP}	Current page number
{TotalPages}	{TP}	Total number of pages
{RightJustify}	{RJ}	Right-justifies subsequent text/fields
{HorizontalLine}	{HL}	Inserts a horizontal line
{CarriageReturn}	{CR}	Inserts a new-line

For example, the specification:

Workspace: {wsname} {objname} {rj} Printed {PrintTime} {PrintDate}

would cause the following header, footer or separator to be printed at the appropriate position in each page of output:

Workspace: U:\WS\WDESIGN WIZ_change_toolbar Printed 14:40:11 02 March 1998

Printer Tab

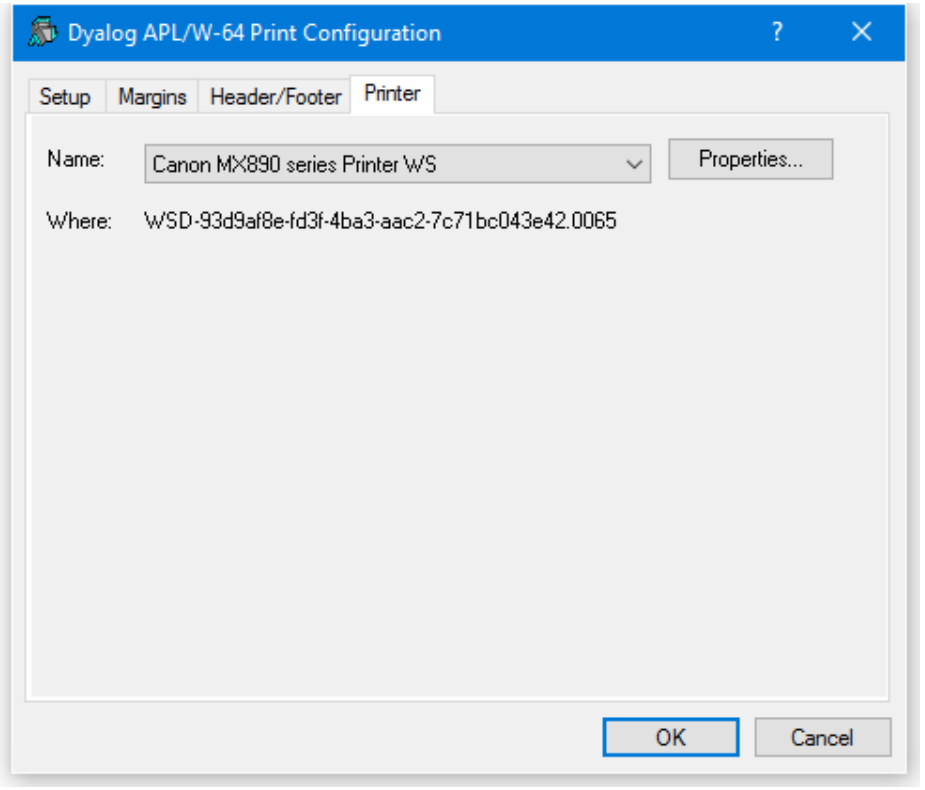


Table 20: Print Configuration dialog: Print

Label	Parameter	Description
Name	PrinterField	The name of the printer to be used for printing from Dyalog APL.
Properties		Click this to set Printer options.
Where		Reports the printer device
Print		Allows you to choose between printing all of the current object or just the selection. Note that this option is present only when the dialog box is displayed in response to selecting Print.

Index

3

32-bit version 2

6

64-bit version 2

A

ActiveX control 60
AddClassHeaders 18
AddClassHeaders parameter 101
APL_CODE_E_MAGNITUDE 18
APL_COMPLEX_AS_V12 19
APL_FAST_FCHK 20
APL_FCREATE_PROPS_C 19
APL_FCREATE_PROPS_J 19
APL_MAX_THREADS parameter 20
aplcore 20, 32
aplcorename parameter 20
aplk parameter 20, 85
aplkeys parameter 21, 85
aplnid parameter 21
APLScript compiler 3-6
APLService
    Logging Events 73
aplt parameter 21, 86
apltrans parameter 21, 86
aplunicd.ini 3, 5, 62
Array Editor 3-6, 44
auto_pw parameter 22, 95
AutoComplete
    registry entries 42
AutoDPI parameter 22
AUTODPI parameter 81
AutoFormat parameter 22, 100
AutoIndent parameter 22, 100
auxiliary processors 48

B

bridge dll 3, 5, 58-59, 61
Build runtime application 54

C

CancelKey (AutoComplete) parameter 104
captions
    registry entries 42
CFEXT parameter 23
Classic Edition 17, 20-21, 31, 38, 101
ClassicMode parameter 23, 26, 28, 36-37, 99
ClassicModeSavePosition 99
CMD_POSTFIX parameter 23
CMD_PREFIX parameter 23
colour selection dialog 112
colours
    registry entries 42
colourscheme parameter 80
Cols (AutoComplete) parameter 104
COM server
    in-process 60
    out-of-process 59
command line 13
command processor 48-49
CommandFolder parameter 107
CommonKey (AuotComplete) parameter 104
CompleteKey (AutoComplete) parameter 104
configuration dialog
    autocomplete tab 103
    help/dmx tab 90
    input tab 85
    keyboard shortcuts tab 87
    log tab 96
    object syntax tab 108
    output tab 86
    saved responses tab 110
    session tab 94
    trace/edit tab 98
    unicode input tab 82

user commands tab 107
windows tab 91
workspace tab 88
configuration parameters 16
confirm_abort parameter 24, 100
confirm_close parameter 24, 100
confirm_fix parameter 24, 100
confirm_session_delete parameter 24
Create bound file dialog 52
creating executables 51

D

default_div parameter 25, 95
default_io parameter 25, 95
default_ml parameter 25, 95
default_pp parameter 25, 95
default_pw parameter 25
default_rtl parameter 26, 95
default_wx parameter 26, 95, 109
delay parameter 80
development dll 3-6
development exe 3-6
division method 25
DMXOUTPUTONERROR parameter 26, 90
DockableEditWindows parameter 26, 99
Documentation 1
DoubleClickEdit parameter 26, 100
DPI-Aware 22
Dyalog APL DLL
classes, instances and cloning 65
workspace management 66
dyalog dll 3, 5-6
dyalog parameter 17, 21, 26
dyalog.chm 27
DYALOG_EVENTLOGGINGLEVEL parameter 27
DYALOG_EVENTLOGNAME parameter 27
DYALOG_NOPOPUPS parameter 27
DYALOG_PIXEL_TYPE parameter 27, 81
dyalog32 dll 62
DyalogEmailAddress parameter 26
DyalogHelpDir parameter 27
DyalogInstallDir parameter 27
dyalognet dll 3-6, 58-59, 61
dyalogprovider dll 3-6
DyalogWebSite parameter 28
dyares DLL 3-6, 62

E

edit window geometry 28
edit_cols parameter 28, 92
edit_first_x parameter 28, 92
edit_first_y parameter 28, 92
edit_offset_x parameter 28, 92
edit_offset_y parameter 28, 92
edit_rows parameter 28, 92
editor
registry entries 42
EditorState parameter 28
Enabled (AutoComplete) parameter 103
environment variables 16-17
ErrorOnExternalException parameter 28
event viewer
registry entries 42
exit codes 15, 20
Export menu item 51
external variables
sharing 50
ExternalHelpURL parameter 28, 90

F

file extensions 7
file_stack_size parameter 80
files 2
registry entries 42

G

GetEnvironment method 17
global assembly cache 58-59, 61
greet_bitmap parameter 29

H

History (AutoComplete) parameter 104

history_size parameter 29, 97
HistorySize (AutoComplete) parameter 104
hot keys
    syntax colouring 114

I

index origin 25
inifile parameter 17, 29, 81
InitFullScriptNormal parameter 101
InitFullScriptSusp parameter 101
InitialKeyboardLayout 29
InitialKeyboardLayout parameter 83
InitialKeyboardLayoutInUse parameter 29, 83
InitialKeyboardLayoutShowAll parameter 29, 83
input translate table 20
input_size parameter 30, 97
interface with Windows 48
Interoperability 9

K

key operator 12
keyboard shortcuts
    registry entries 43
keyboardinputdelay parameter 30
KeyboardInputDelay parameter 103

L

language bar
    registry entries 43
lines_on_functions parameter 30
localdyalogdir parameter 30
log_file parameter 30, 97
log_file_inuse parameter 97
log_size parameter 31, 97
logfileinuse parameter 30

M

mapchars parameter 31
MaxAplCores parameter 32
maxws parameter 32, 47, 66-67, 88
Microsoft Document Explorer 28
migration level 25

N

nest 12
Net assembly 61

O

output translate table 21
OverstrikesPopup parameter 33, 84

P

page width 25
PassExceptionsToOpSys parameter 33
pfkey_size parameter 33, 97
PrefixSize (AutoComplete) parameter 103
print configuration dialog 115
    header/footer Tab 118
    margins tab 117
    printer tab 121
    setup tab 115
print precision 25
printing
    registry entries 43
programfolder parameter 33
PropertyExposeRoot parameter 33, 109
PropertyExposeSE parameter 33, 109

Q

qcmd_timeout parameter 34
quadna workspace 62

R

rank operator 12
registry entries
    run-time installation 63
ResolveOverstrikes parameter 34, 84

response time limit 26
return code 15
RIDE 35, 61
RIDE_INIT parameter 34
RIDE_SPAWNED parameter 35
Rows (AutoComplete) parameter 104
run-time
  applications 56
  bound 58
  stand-alone 58
  workspace based 59
run-time applications 54
run-time dll 3, 5, 58, 60-61
run-time exe 3, 5, 59, 63
RunAsService parameter 35

S

SALT 105
  registry entries 43
SaveContinueOnExit parameter 35
SaveLogOnExit parameter 35
SaveSessionOnExit parameter 35
Serial parameter 35
session object 36
session_file parameter 36, 95
SessionOnTop parameter 36, 99
ShowFiles (AutoComplete) parameter 104
ShowStatusOnError parameter 36
SingleTrace parameter 36-37, 99
SkipBlankLines parameter 36, 101
sm_cols parameter 36, 93
sm_rows parameter 36, 93
SPICE 105
sqapl.dll 3, 5, 62
sqapl.err 3, 5, 62
sqapl.ini 3, 5, 62
StatusOnEdit parameter 36, 99
stencil operator 12
syntax colouring 113
system error dialog 33

T

TabStops parameter 22, 37, 101
ToolBarsOnEdit 99
trace window geometry 37
trace_cols parameter 37
trace_first_x parameter 37, 93
trace_first_y parameter 37, 93
Trace_level_warn parameter 37, 100
trace_offset_x parameter 37, 93
trace_offset_y parameter 37, 93
Trace_on_error parameter 37, 99
trace_rows parameter 37
TraceStopMonitor parameter 38

U

Unicode and Classic Editions 2
Unicode Edition 17, 29, 33-34, 38
UnicodeToClipboard parameter 38, 101
Universal CRT 56
URLHighlight parameter 80
UseDefaultHelpCollection parameter 90
UseExternalHelpURL parameter 38
UTIL workspace 50

V

value tips
  colourscheme parameter 80
  delay parameter 80
  registry entries 43
valuetips
  registry entries 43
variant operator 12
Version information
  for a bound executable 55

W

WantsSpecialKeys parameter 38
where 12
Window Captions 45

window expose 26, 109
windowrects
    registryentries 43
workspace explorer
    registry entries 42
workspace size 32, 47, 66
WrapSearch 100
WrapSearch parameter 38
WSEXT parameter 39
WSPATH parameter 39, 49, 62, 88

X

XPLookAndFeel parameter 39, 80
XVAR function 50

Y

year 2000 compliance 40
yy_window parameter 40