```
file:///C:\\Data\\Trial1\\control.ibw (on Windows only)
file:///Users/bob/Data/Trial1/control.ibw (on Macintosh only)
```

For most operations and functions that take a *urlStr* parameter, only the scheme and host parts of the URL are required. See the **Supported Network Schemes** section for information on which schemes are supported by which operations and functions, and which port is used by default if it is not provided as part of the URL.

Usernames and Passwords

You can provide a username and password as part of the URL. However authentication credentials may not be supported by all schemes (such as file://). Some operations allow you to provide a username and password by using a flag, such as the /U and /W flags with **FTPDownload** or the /AUTH flag with **URLRequest**.

If a URL contains a username and password in the URL and the authentication flags are also used, the values specified in the flags override values provided in the URL.

If you do not provide a username and password as part of the URL, and you do not use the authentication flags, then no authentication is attempted. An exception to this rule is that the FTP operations will login to the FTP server using "anonymous" as the username and a generic email address as the password.

If either the username or password contains special or reserved characters, those characters must be percent-encoded.

Supported Network Schemes

Different operations and functions support different schemes:

Operation	Supported Schemes	Default Port
FetchURL and **URLRequest**	http	80
	https	443
	ftp	21
	file	Not applicable
FTP operations*	ftp	21

* Includes **FTPUpload**, **FTPDownload**, **FTPDelete**, and **FTPCreateDirectory**.

Percent Encoding

Percent encoding is a way to encode characters in URLs that would otherwise have a special meaning or could be misinterpreted by servers. For example, a space character in a URL is encoded as "%20" using a percent character followed by the hex code for a space in the ASCII character set.

Most URLs contain only the letters A-Z and a-z, the digits 0-9, and a few other characters such as the underscore (_), hyphen (-), period (.), and tilde (~).

A URL may also contain "reserved characters" that may have special meaning depending on the way that they are used. Every URL contains the reserved characters ":" and "/" and may also contain one or more of the following reserved characters: !*'();@&=+$,?#[].

All operations and functions provided by Igor Pro that accept a URL string parameter expect that the URL has already been percent-encoded as necessary.

In most cases you don't need to worry about percent encoding because most URLs don't use reserved characters except for their special meaning. If you need to use a reserved character in a way that differs from the character's special meaning, you must percent-encode the character. You can use the **URLEncode** function for this purpose.

It is important that you not pass your entire URL to URLEncode to be encoded because that URL will not be understood by a server. URLEncode percent-encodes all reserved characters in the string you pass to it, because it cannot distinguish between reserved characters used for their special meaning and reserved characters used outside of their special meaning. Instead, you must pass each piece of the URL through URLEncode so that the final URL uses the correct syntax.

As an example, we'll use URLEncode to properly encode a URL that contains the following parts:

Part Name	Example
Scheme	http
Username	A. MacGyver
Password	yj@!2M
Host	www.example.com
Path	/tape/duct
Query	discount=10%&color=red

Without any percent-encoding, the URL is:

```
http://A. MacGyver:yj@!2M@www.example.com/tape/duct?discount=10%&color=red
```

If this URL were passed to **FetchURL**, the result would be an error because the URL contains several reserved characters that are not intended to be used in their standard way. For example, the "@" character indicates the separation between the username:password information and the start of the host name, but in this case the password itself also contains the "@" character. In addition, the "%" character is typically used to indicate that the next two characters represent a percent-encoded character, but in this example it is also part of the query. Finally, the username contains a space character. The space character is not technically a reserved character, but should be percent-encoded to ensure that it is handled correctly.

The following table shows the values of the parts of the URL that need to be percent-encoded by passing them through the URLEncode function:

Part Name	Encoded Value
Username	A%2E%20MacGyver
Password	yj%40%212M
Host	www.example.com
Path	/tape/duct
Query	discount=10%25&color=red

The properly percent-encoded URL is:

```
http://A%2E%20MacGyver:yj%40%212M@www.example.com/tape/duct?discount=10%25&color=red
```

For keyword-value pairs that make up the query part, each keyword and value must be percent-encoded separately because the "=" character that separates the key from the value and the "&" character that separates the pairs in the list must not be percent-encoded.

For more information on percent-encoding and reserved characters, see http://en.wikipedia.org/wiki/Percent-encoding.