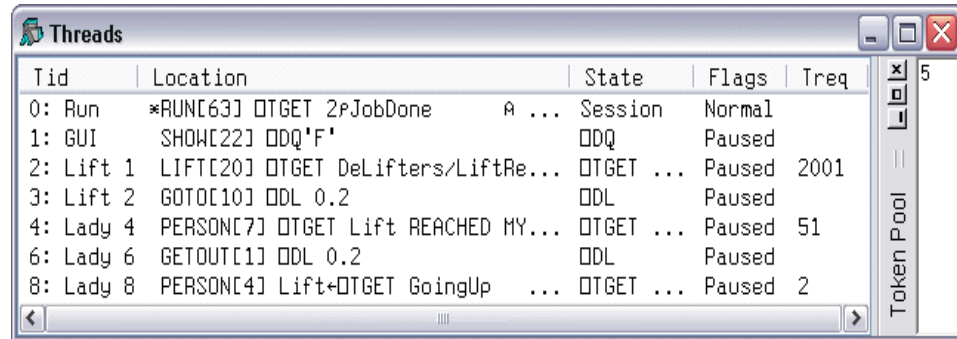




Threads Tool

The Threads Tool is used to monitor and debug multi-threaded applications. To display the Threads Tool, select Show Threads Tool from the Session Threads menu, or Threads from the Session pop-up menu.

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The above picture illustrates a situation using the LIFT.DWS workspace after executing the function RUN. The Pause on Error option was enabled and a Stop was set on `RUN[6 3]`. When `RUN` suspended at this point, all other threads (1-8) were automatically Paused. Note that all other threads happen to be Paused in the middle of calls to system functions

The columns of the Threads Tool display the following information.

| | |
|----------|---|
| Tid | The Thread ID (<code>□TID</code>) and name (<code>□TNAME</code>) if set |
| Location | The currently executing line of function code |
| State | Indicates what the thread is doing. (see thread states) |
| Flags | Normal or Paused. |
| Treq | The Thread Requirements (<code>□TREQ</code>) |

Flags

Paused/Normal

In addition to the thread states, a thread may be Paused or Normal as shown in the Flags column.

A Paused thread is one that has temporarily been removed from the list of threads that are being scheduled by the thread scheduler, A Paused thread is effectively frozen.

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Thread States

The third column in the Threads Tool shows the state of each thread. The various thread states are listed below.

| | |
|---------------------------------|---|
| Pending | Not yet running |
| Initializing | Not yet running |
| Defined function | Between lines of a defined function |
| Dynamic function | Between lines of a dynamic function |
| Suspended | Indicates that the thread is suspended and is able to accept input from the Session window. |
| Session | Indicates that Session window is connected to this thread. |
| (no stack) | Indicates that the thread has no SI stack and the Session is connected to another thread. This state can only occur for Thread 0. |
| Exiting | About to be terminated |
| <i>:Hold</i> | Waiting for a <i>:Hold</i> token |
| <i>:EndHold</i> | Waiting for a <i>:Hold</i> token |
| <i>□DL</i> | Executing <i>□DL</i> |
| <i>□DQ</i> | Executing <i>□DQ</i> |
| <i>□NA</i> | Waiting for a DLL (<i>□NA</i>) call to return. |
| <i>□TGET</i> | Executing <i>□TGET</i> , waiting for a token |
| <i>□TGET(Ready to continue)</i> | Executing <i>□TGET</i> , having got a token |
| <i>□TSYNC</i> | Waiting for another thread to terminate |
| Awaiting request | Indicates a thread that is associated with a .NET system thread, but is currently unused |
| Called .Net | Waiting for a call to .NET to return. |



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Threads Tool Pop-up Menu

| |
|--|
| S <u>witch to</u> I <u>nterrupt</u> |
| R <u>efresh Now</u> |
| <input checked="" type="checkbox"/> A <u>uto Refresh</u> |
| <input checked="" type="checkbox"/> P <u>ause Threads on Error</u> |
| <input checked="" type="checkbox"/> P <u>ause</u> P <u>ause All</u> R <u>esume All</u> |
| R <u>estart All</u> |

| | |
|------------------------|--|
| Switch to | Selecting this item causes APL to attempt to suspend (if necessary) and switch to the selected thread., connecting it to the Session and Debugger windows. |
| Refresh Now | Refreshes the Threads Tool display to show the current position and state of each thread. |
| Auto Refresh | Selecting this item causes the Threads Tool to be updated continuously, so that it shows the latest position and state of each thread. |
| Pause Threads on Error | If this item is checked, APL automatically Pauses all other threads when a thread suspends due to an error or an interrupt. |
| Paused | This item toggles a thread between being Paused and Normal. It Pauses a Normal thread and resumes a Paused thread. |
| Pause All | This item causes all threads to be Paused. |
| Resume All | This item resumes all threads. |
| Restart All | This item resumes all Paused threads, restarts all suspended threads, and closes the Debugger. |

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