Tick Listener

Component Design Document

1 Description

This is the Tick Listener component. It is attached to a tick and provides a connector which will give the caller a count. The count includes the number of times the tick has been received since the last invocation of the connector. This component is a useful substitute for the Interrupt Listener component when you want to simulate interrupts with software ticks.

2 Requirements

No requirements have been specified for this component.

3 Design

3.1 At a Glance

Below is a list of useful parameters and statistics that give a quick look into the makeup of the component.

- **Execution** - *passive*
- **Number of Connectors** - 2
- **Number of Invokee Connectors** - 2
- **Number of Invoker Connectors** - *None*
- **Number of Generic Connectors** - *None*
- **Number of Generic Types** - *None*
- **Number of Unconstrained Arrayed Connectors** - *None*
- **Number of Commands** - *None*
- **Number of Parameters** - *None*
- **Number of Events** - *None*
- **Number of Faults** - *None*
- **Number of Data Products** - *None*
- **Number of Data Dependencies** - *None*
- **Number of Packets** - *None*

3.2 Diagram

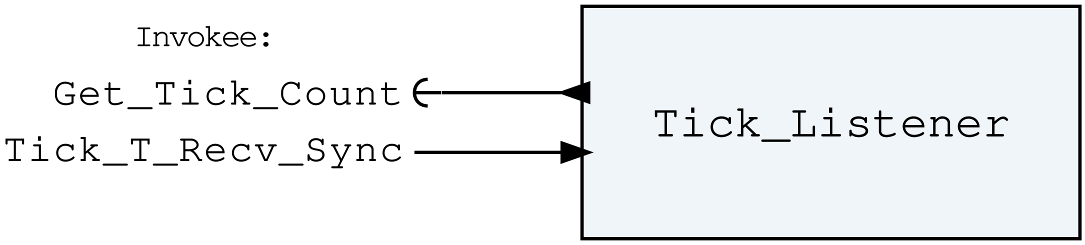

Figure 1: Tick Listener component diagram.

3.3 Connectors

Below are tables listing the component's connectors.

3.3.1 Invokee Connectors

The following is a list of the component's *invokee* connectors:

Table 1: Tick Listener Invokee Connectors

Name	Kind	Type	Return_Type	Count
Get_Tick_Count	return	-	Packed_Natural.T	1
Tick_T_Recv_Sync	recv_sync	Tick.T	-	1

Connector Descriptions:

- **Get_Tick_Count** - The interrupt counter get connection.
- **Tick_T_Recv_Sync** - The tick receive connection.

3.3.2 Invoker Connectors

None

3.4 Initialization

Below are details on how the component should be initialized in an assembly.

3.4.1 Component Instantiation

This component contains no instantiation parameters in its discriminant.

3.4.2 Component Base Initialization

This component contains no base class initialization, meaning there is no init_Base subprogram for this component.

3.4.3 Component Set ID Bases

This component contains no commands, events, packets, faults or data products that need base identifiers.

3.4.4 Component Map Data Dependencies

This component contains no data dependencies.

3.4.5 Component Implementation Initialization

This component contains no implementation class initialization, meaning there is no `init` subprogram for this component.

4 Unit Tests

The following section describes the unit test suites written to test the component.

4.1 *Tests* Test Suite

This is a unit test suite for the Tick Listener component. It tests the component in a Linux environment, responding to ticks.

Test Descriptions:

- **`Test_Tick_Handling`** - This unit test sends many ticks to the Tick Listener component and expects it to count them correctly.

5 Appendix

5.1 Packed Types

The following section outlines any complex data types used in the component in alphabetical order. This includes packed records and packed arrays that might be used as connector types, command arguments, event parameters, etc..

Packed_Natural.T:

Single component record for holding packed Natural value.

Table 2: Packed_Natural Packed Record : 32 bits

Name	**Type**	**Range**	**Size (Bits)**	**Start Bit**	**End Bit**
`Value`	`Natural`	`0 to 2147483647`	32	0	31

Field Descriptions:

- **`Value`** - The 32-bit Natural Integer.

Sys_Time.T:

A record which holds a time stamp using GPS format including seconds and subseconds since epoch (1-5-1980 to 1-6-1980 midnight).

Table 3: Sys_Time Packed Record : 64 bits

Name	**Type**	**Range**	**Size (Bits)**	**Start Bit**	**End Bit**
`Seconds`	`Interfaces.Unsigned_32`	`0 to 4294967295`	32	0	31

Subseconds	Interfaces.Unsigned_32	0 to 4294967295	32	32	63

Field Descriptions:

- **Seconds** - The number of seconds elapsed since epoch.
- **Subseconds** - The number of 1/(2^32) sub-seconds.

Tick.T:

The tick datatype used for periodic scheduling. Included in this type is the Time associated with a tick and a count.

Table 4: Tick Packed Record : 96 bits

Name	Type	Range	Size (Bits)	Start Bit	End Bit
Time	Sys_Time.T	-	64	0	63
Count	Interfaces.Unsigned_32	0 to 4294967295	32	64	95

Field Descriptions:

- **Time** - The timestamp associated with the tick.
- **Count** - The cycle number of the tick.