Data Sheet

SysLink_02.00.00.56_alpha2

SysLink 02.00.00.56 alpha2 DataSheet

Introduction

The purpose of this document is to provide the performance data for the SYS/Link modules on **TI81XX** platform.

Terms and Abbreviations

Abbreviation	Description
CCS	Code Composer Studio
IPC	Inter-Processor Communication
GPP	General Purpose Processor e.g. ARM
DSP	Digital Signal Processor e.g. C64X
EVM	Evaluation Module
SysLink	SYS/Link
API	Application Programmable Interface
SFQ	Single Frame Queue
MFQ	Multiple Frame Queue

This bullet indicates important information. Please read such text carefully.

Processor Information

Processor core	Speed
ARM (Cortex A8)	986 MHz
DSP (C674x)	800 MHz

Setup details

- The following are the setup details

```
* TI81XX EVM
* L1 and L2 cache for DSP is enabled with following sizes
 * L1D: 32K
 * L1P: 32K
 * L2 : 128K
```

Build details

The performance numbers were obtained with the following build configurations:

- IPC product build and SysLink RTOS build (SYS/BIOS side)

```
* Whole program debug
* Disable asserts
* Disable logger
```

- Syslink HLOS build (Linux side)

```
* Optimized build (SYSLINK_BUILD_OPTIMIZE = 1)
* Release mode (SYSLINK_BUILD_DEBUG = 0)
* Disable all the traces (SYSLINK_TRACE_ENABLE = 0)
```

- Linux kernel

```
* Default configuration with kernel debugging disabled
```

Resource Usage

Notify

- Total available events = 32
- Usage by different modules is as follows:

Module	Event Ids used
FrameQBufMgr	0
FrameQ	1
MessageQ (TransportShm)	2
RingIO	3
NameServerRemoteNotify	4

Gate Hardware Spinlocks

- Total number of Gate hardware spinlocks = 64
- Usage by different modules is as follows:

Module	Number of spin locks used
Shared Region 0	1
Frame Queue instance	2
Frame Queue Buffer Manager instance	2
RINGIO instance	2

Note: The Frame Queue, Frame Queue Buffer Manager and RINGIO instances will utilize the above specified Gate Hardware Spinlocks only if the gate type

specifed is GateMP_RemoteProtect_SYSTEM.

Performance data

Frame Queue

API profiling (DSP side)

The frames are allocated and transferred (put) through the frame queue one after the other and after this the frames are received (get) and freed one after

the other in the same thread. Profile each API during the transfer of frame with in the same processor.

- Frame transfer using SFQ with in DSP with Notify Disabled

API	Average (cycles)
FrameQ_alloc	1909
FrameQ_put	3095
FrameQ_get	2138
FrameQ_free	3393
Total time	10535

- Frame transfer using MFQ with in DSP with Notify Disabled (16 frame pools and internal queues)

API	Average (cycles)
FrameQ_allocv	12643
FrameQ_putv	27775
FrameQ_getv	17357
FrameQ_freev	43266
Total time	101040

API profiling (ARM to DSP)

The frames are allocated and transferred (put) from ARM to DSP and on the DSP side the received (get) and freed one after the other. The same procedure is

repeated from DSP to ARM. The APIs are profiled during the above transfers.

- ARM side

API	Average time(usec)
FrameQ_alloc	26
FrameQ_put	36
FrameQ_get	32
FrameQ_free	30
Total time	123

- DSP side

API	Average (cycles)
FrameQ_alloc	3734
FrameQ_put	15335
FrameQ_get	8764
FrameQ_free	8348
Total time	36181

Message Queue

The time (round trip) taken for a message to travel from ARM to DSP and back to ARM is measured. Here is the procedure followed to get the round trip time:

- Transfer the message from ARM to DSP (Capture the time stamp "T1" before calling put() API on ARM side)
- Receive the message on the DSP and send the received message back to ARM on another messageQ to ARM
- Receive the message on the ARM (Capture the time stamp "T2" after get() API on ARM side)
- Measure the time elapsed "T2-T1"

Message round trip time

Message Size	Average Round Trip Time (in micro secs)
64 bytes	96.2
128 bytes	95.7
1 KB	94.1
10 KB	98.4
100 KB	127.8

Notify

The time (round trip) taken for a notification to travel from ARM to DSP and back to ARM is measured. Here is the procedure followed to get the round trip

time:

- On ARM side, send notification from ARM to DSP (Capture the time stamp "T1" before calling Notify send API)
- On DSP side, in Notify callback function, send notification to ARM
- On ARM side, receive the notification from DSP (Capture the time stamp "T2" after get() API on ARM side)
- Measure the time elapsed "T2-T1"

Notify round trip time

Round trip time: 63 micro seconds

RingIO

Data transfer from ARM to DSP

The numbers are captured while transfering 1Kbytes of data from ARM to DSP.

- ARM side (Writer)

APIs	Average time(usec)
Acquire() + Release()	86

- DSP side (Reader)

APIs	Cycles
Acquire() + Release()	26523

Data transfer from DSP to ARM

The numbers are captured while transfering 1Kbytes of data from DSP to ARM.

- DSP side (Writer)

APIs	Cycles
Acquire() + Release()	20587

- ARM side (Reader)

APIs	Average time(usec)
Acquire() + Release()	74

Proc Manager

The time taken to load and start the DSP image from ARM is captured. The size of the DSP image is 8.25MB and loaded through nfs

API Profiling

APIs	Average time(usec)
Proc load	62125
Proc start	46

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