AM57xx Linux System Timer

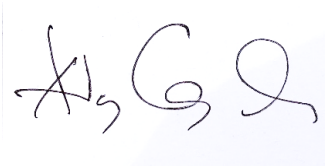
July 10, 2019

RE: System Timer issue on AM57x for Nari

Dear Nari team,

This letter will confirm that the problem mentioned in this document is accurately captured and to the best of our knowledge, the workaround described will address the issue.

Thank you for your interest in these TI products.

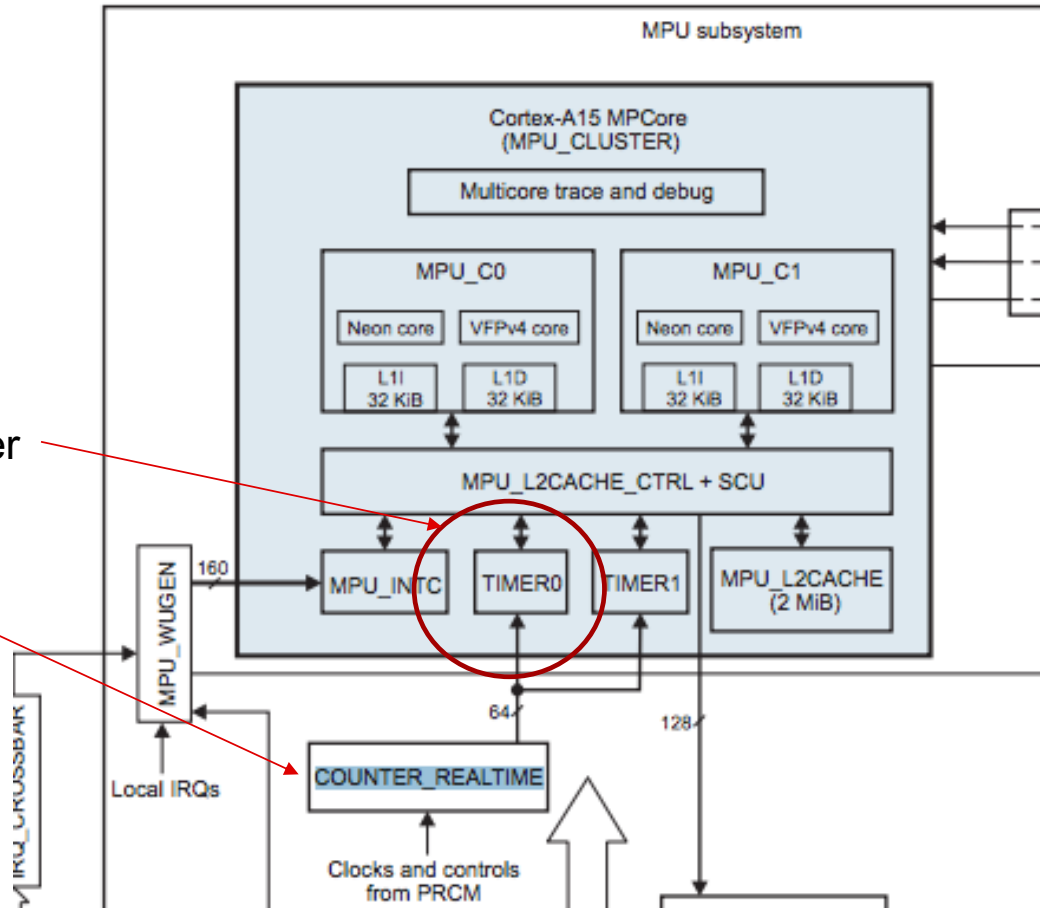


Adrian Valenzuela

Sitara Business Manager

Default Behavior

Diagram: Figure 4-1 from AM572x Sitara Technical Reference Manual (SPRUHZ6K)



Linux System Timer

COUNTER_REALTIME
Saturates (reaches 0xBB8000000000) at 40 bits and stops incrementing Linux System Timer

Result:

6147541HZ → 388 days 3 hours and 18.72 minutes

Linux Behavior Details

- When Linux system time stops, effectively all scheduling stops except for interrupt driven or command/response
  - Linux thinks time has stopped

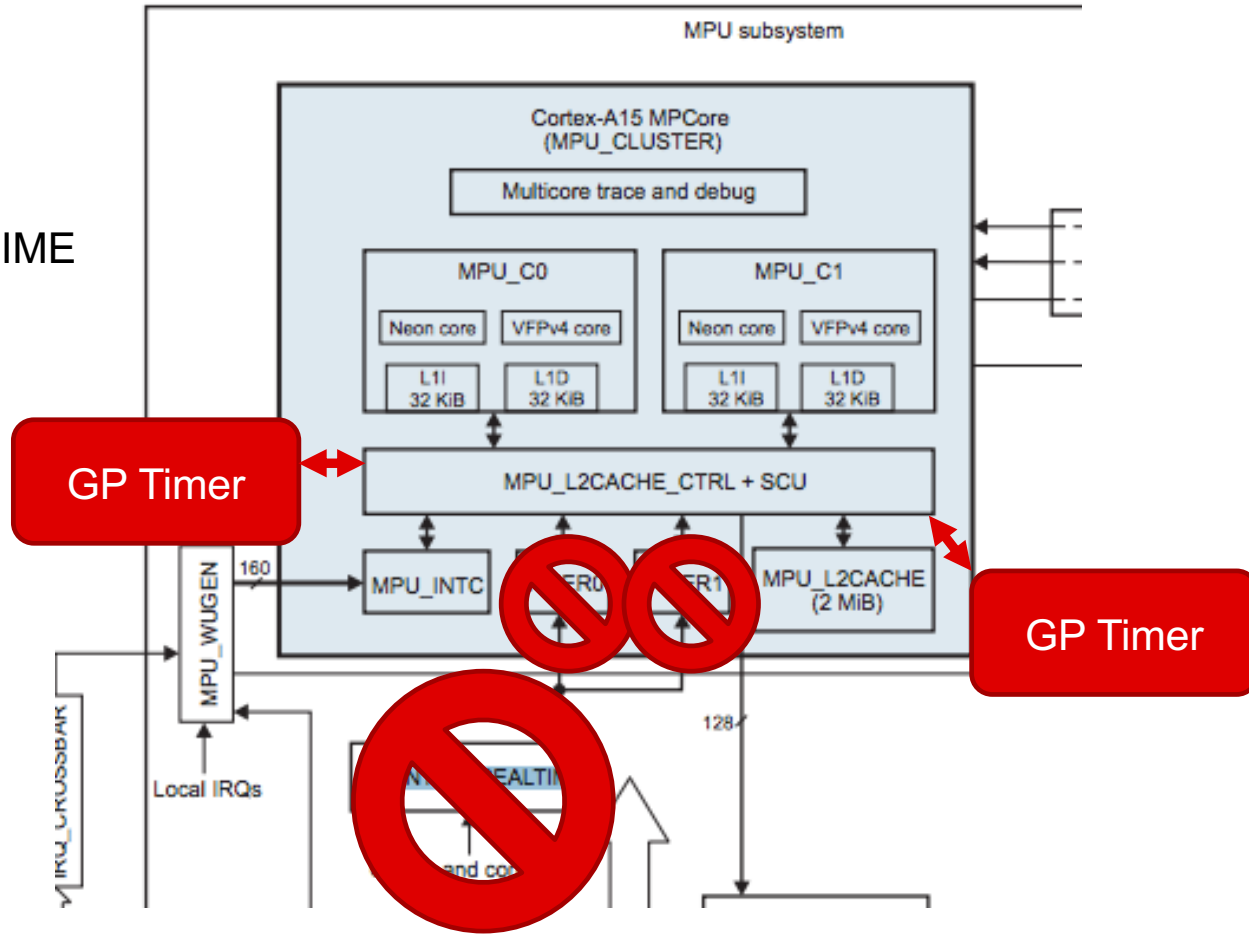
Uptime Change

Arch timers fed by COUNTER_REALTIME are no longer used

GP Timers are used instead, one for each MPU core

Another is used for System Time

This change should meet the system needs for uptime



Switching Linux from Arch to GP Timers

- Patchset provided to switch Processor SDK 2.00.02.11 from current Arch timers to use 4 GP Timers
  - 5 patches provided to disable ARCH timer and add support for GP Timers for time keeping
  - Patches may need porting to a specific HW platform
  - Tested on an AM572x GP EVM
- **This changes the uptime behavior as timers are reloaded when they expire**
  - **They do not saturate like COUNTER_REALTIME**
  - **Linux will keep going**

Applying the Change

- Apply all 5 patches in patch set
- Modify .config if these settings are not already present
- Rebuild kernel and dtbs