Dual DSP Synchronization in sDSP SDK

v1.0

Synchronization primitives

- Event APIs defined in $sDSP_sdk/inc/vpu_event.h
  - int32_t vpu_event_set(uint32_t event);
  - int32_t vpu_event_clear(uint32_t event);
  - int32_t vpu_event_get(uint32_t event);
- Comes with compilation directives "_VPU_CORE0_" & "_VPU_CORE1_"
- Usage example in $sDSP_sdk/library/algo1/main_proc.c

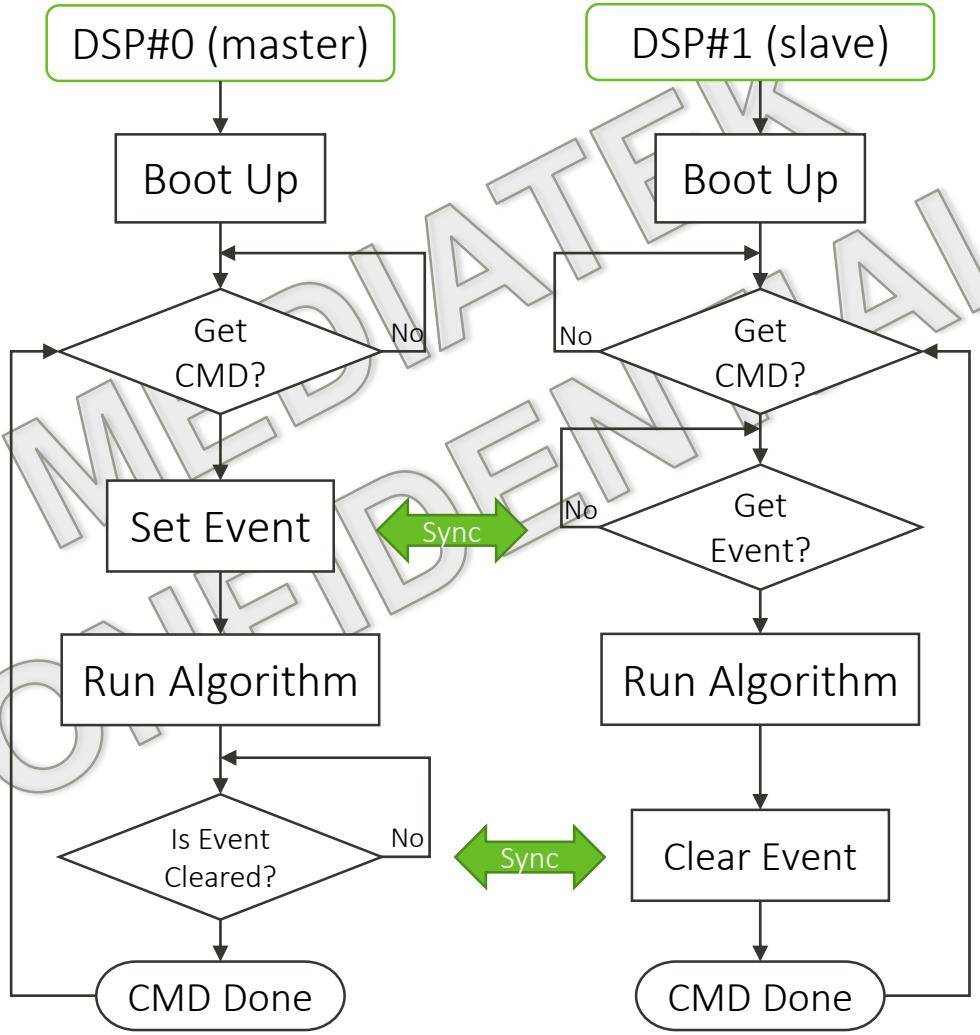
DSP#0 (master)

```
void algo3(void *pInfo) {
...
// Dual DSP Sync Point #3
#if defined(_VPU_CORE0_)
   printf("Core#0 Prepare Data for Core#1!\n");
   vpu_event_set(VPU_EVENT_OBJ_TO_CORE1);  /* trigger core1 */
#endif
...
#if defined(_VPU_CORE0_)
   while (vpu_event_get(VPU_EVENT_OBJ_TO_CORE1) != VPU_EVENT_CLEAR)
      ;
   printf("Core#0 got clear event from Core#1!\n");
#endif
}
```

DSP#1 (slave)

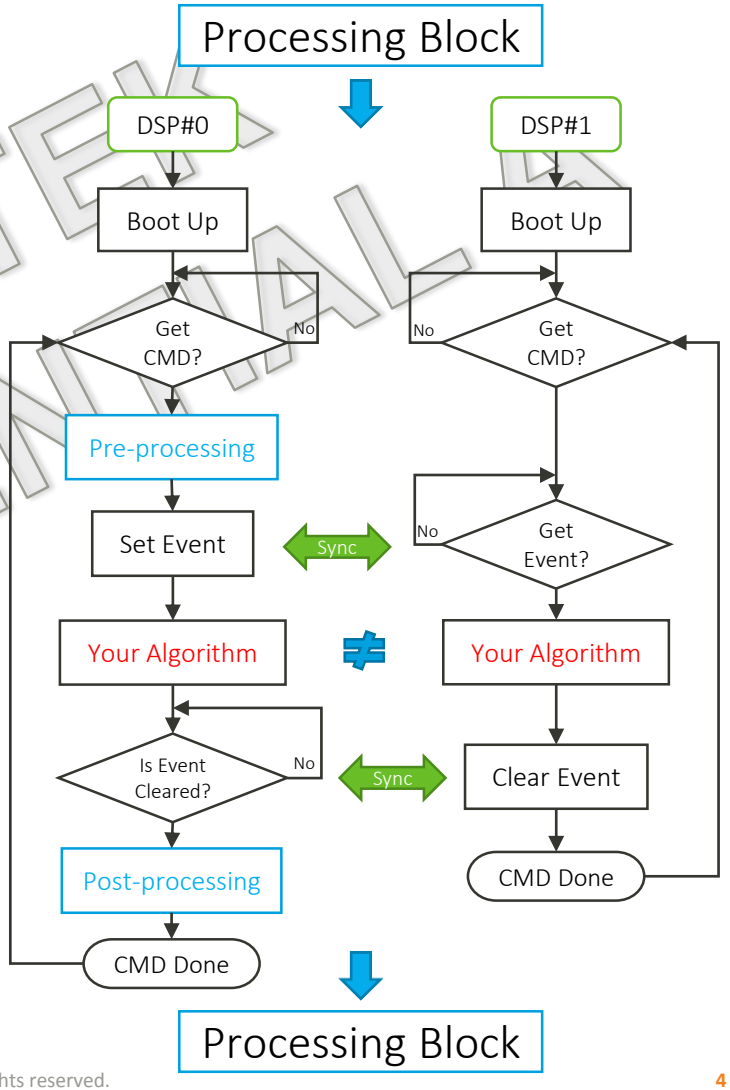
```
void algo3(void *pInfo) {
...
#if defined(_VPU_CORE1_)
   printf("Core#1 waits event form Core#0!\n");
   while (vpu_event_get(VPU_EVENT_OBJ_TO_CORE1) != VPU_EVENT_SET)
      ;
#endif
...
#if defined(_VPU_CORE1_)
   printf("Core#1 finished Algo3, notify Core#0!\n");
   vpu_event_clear(VPU_EVENT_OBJ_TO_CORE1);    /* to notify core0 */
#endif
}
```

Master/slave basic use case



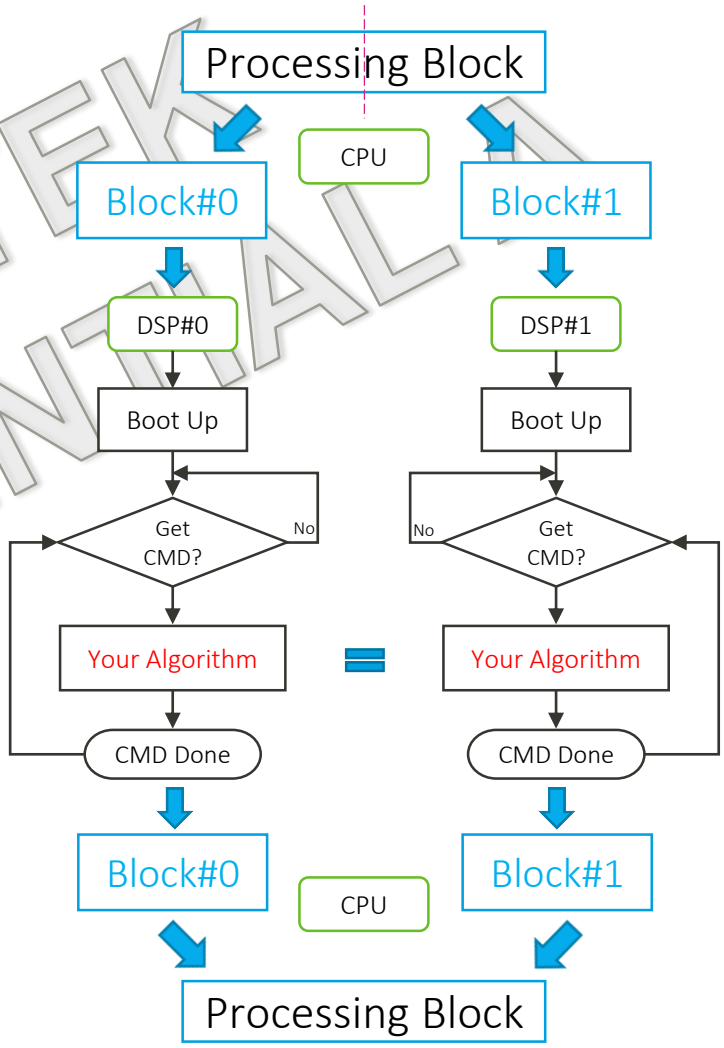
One possible way for dual-DSP processing

- Need pre-processing & post-processing at DSP side
- Implementation in each DSP core may be different



Another way for dual-DSP processing

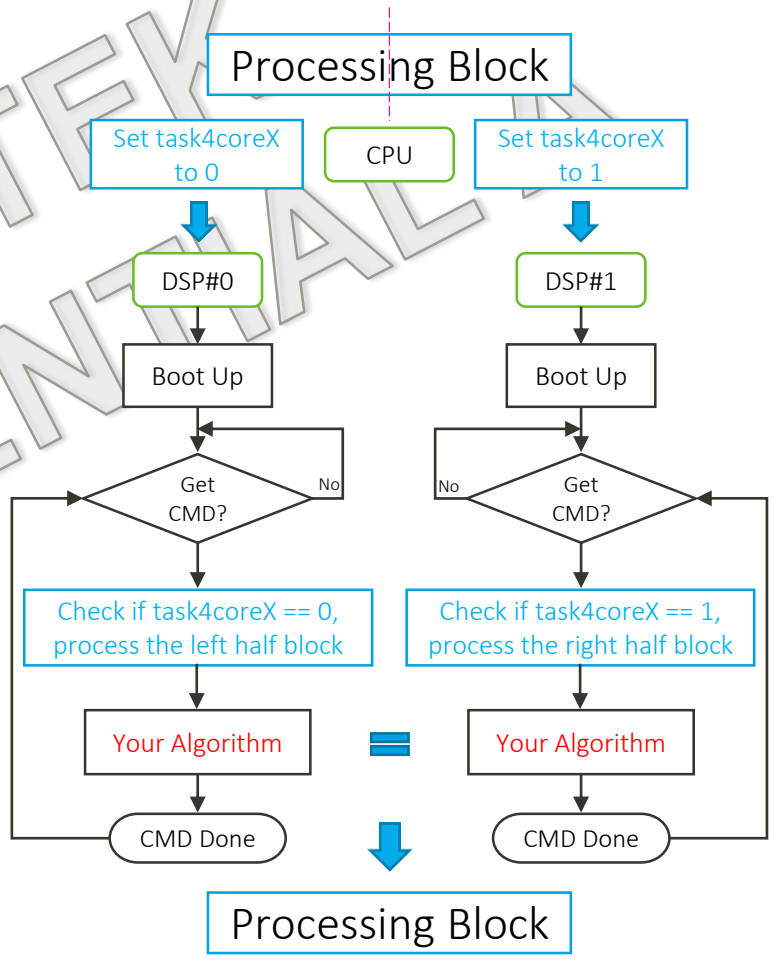
- Need pre-processing & post-processing at CPU side
  - Divide each processing block into two (equal) parts before processing, and merge them after processing at CPU side
- Use the same implementation in each DSP core



The other way for dual-DSP processing

- Add new structure member to “vpu_prop_t” at both CPU & DSP side
  - Assign its value of the structure member at CPU side, and check its value at DSP side
- Use the same implementation in each DSP core

```
@SDK/inc/vpu_drv.h
...
struct vpu_prop {
    uint32_t cmd;
    uint32_t result;
    uint32_t count;
    uint32_t task4coreX;
};
```



Caution: structure of “vpu_prop_t” **MUST** be synced at both CPU & DSP side

everyday genius