

In DSP-GPU heterogeneous computing system, the load stabilization of different processor units is improved by setting a free resource list in DSP. To optimize the parallel process, the tasks are assigned by message transferring. The transferred message includes control command and pointer. The control command triggers task and the pointer points to task data.

IV. COMMUNICATION BETWEEN DSP UNIT AND GPU UNIT

In DSP-GPU heterogeneous computing system, “Master-slave” communication structure is adopted and shown in Fig.5[8]. In which the message control unit is independent and can run parallel with DSP and GPU. Data intensive task is assigned by DSP and this procedure is called data transfer communication. In our communication model, this procedure is separated into two steps. First, DSP transfers the task characteristic information to message control unit. Second, message control unit transfers the computing task to GPU from shared memory according to the characteristic information. At the same time, the control information of result given by GPU is transferred to message control unit and the computed result is transferred to shared memory.

To accomplish the first step, the mail box is defined as a message receiver to receive the message transferred from DSP and GPU. To accomplish the second step, the special data transfer module is set in the message control unit. Except for the two steps, few message communication and data in phase need real-time transfer and are usually communicated by PCIE bus.

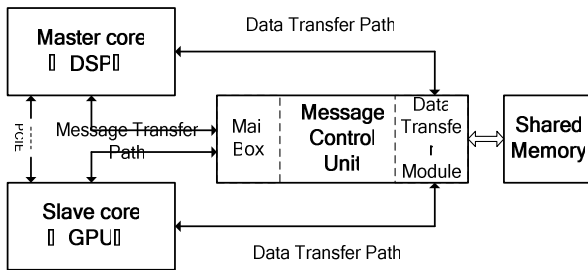


Figure 5. Model of communication between DSP and GPU

V. CONCLUSION

In this paper, DSP-GPU heterogeneous computing system is presented. Master-slave model is designed for heterogeneous computing system. DSP and GPU are defined as master core and slave core separately. The computing task parallel analysis and assignment are processed in DSP and the independent parallel computing task is transferred to GPU unit by message control unit. At the same time, the dependent and serial computing tasks are processed by DSP. Finally, the computed data of DSP and GPU are integrated by DSP and the final result is given. To improve the communication speed, master-slave communication model is designed. The message control unit can run parallel with DSP and GPU so that the heterogeneous computing system work with great efficiency and speed.

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