

# ITRON Newsletter No.4

ITRON Technical Committee, TRON Association  
 Katsuta Building 5F, 3-39, Mita 1-chome, Minato-ku, Tokyo 108, JAPAN  
 TEL: (03) 3454-3191 FAX: (03) 3454-3224

## ITRON-related Publications

Listed in another page are the publications prepared and issued by the ITRON Technical Committee as of August 1, 1993. The ITRON- $\mu$ ITRON Standard Handbook is a one-volume compilation of the  $\mu$ ITRON (Ver.2.0) and ITRON2 specifications. Each of the publications below can be obtained directly from the sources indicated.

## ITRON Product Seminar

As announced in Newsletter No.2, the latest ITRON Product Seminar was held in July. These seminars are held once a year for the purpose of introducing the latest results of work on ITRON specifications and to provide updates on their implementations. This was the third time the event was held. Approximately 90 persons attended this very successful seminar.

A reception was held following the seminar, giving those in attendance a chance to meet informally and share information. Around 50 persons stayed to enjoy the human fellowship.

The seminar contents are outlined below.

**Date:** July 14, 1993; 10:00am – 5:00pm

**Place:** Shinagawa Ward General Community Hall,  
 large conference room on 6th floor

### Presentations:

- (a) Overview of the ITRON Subproject  
 Kiichiro Tamaru (Toshiba Corp.)
- (b) Outline explanation of  $\mu$ ITRON3.0 Specification  
 Hideo Tsubota (Mitsubishi Electric Corp.)
- (c) Panel discussion:  
 “Development environments for real-time OSs”  
 Chairman: Tsuyoshi Shimizu (Hitachi, Ltd.)  
 Norihiko Itoh (Microtec Research, Inc.)

† This newsletter is reprinted from TRONWARE vol.23 and TRON PROJECT BIMONTHLY No.29.

Tetsuhiro Kodama (YHP, Ltd.)  
 Tetsuo Takagi (Nippondenso Create Co., Ltd.)  
 Katsuhito Fukuoka (Toshiba Corporation)  
 Hiroaki Takada (University of Tokyo)

- (d) Introduction to the latest ITRON-related products  
 “ $\mu$ ITRON-specification real-time OS AAAOS86”  
 Naoaki Tanaka (Three A’s Computer Co., Ltd.)  
 “ $\mu$ ITRON-specification real-time OS ARIOS960M”  
 Kiyohiro Magariyama (System Algo Co., Ltd.)
- (e) Special Speech  
 “The TRON project and ITRON in the future”  
 Ken Sakamura (University of Tokyo)

## ITRON Q&A

Some of the questions most frequently directed to the ITRON Technical Committee are taken up here because of their general interest.

- Q. Can application programs developed originally for  $\mu$ ITRON Ver.2.0 be readily ported to  $\mu$ ITRON3.0?
- A. The  $\mu$ ITRON specifications leave many aspects that must be decided based on the CPU and other implementation requirements. Whether porting will be easy or not depends on how those implementation-dependent matters were decided. Another factor is the kinds of functions used by the application. As a general answer, in cases where  $\mu$ ITRON3.0 is implemented with careful attention paid to ease of porting from the earlier  $\mu$ ITRON version, a large portion of application programs should be portable with simple mechanical changes alone.

To give a specific example, if the functions of the earlier  $\mu$ ITRON up to level 3 are mapped to the  $\mu$ ITRON3.0 specification level S and some of the level C functions, the differences in the specifications are as follows.

## ITRON-related Publications

Name	Type	Price	Publisher	ISBN No.
ITRON- $\mu$ ITRON Standard Handbook	Specification (Japanese)	4,800Yen	Personal Media Co.	4-89362-079-7
$\mu$ ITRON3.0 Standard Handbook	Specification (Japanese)	4,000Yen	Personal Media Co.	4-89362-106-8
ITRON/FILE Standard Handbook	Specification (Japanese)	3,000Yen	Personal Media Co.	4-89362-092-4
ITRON Standard Guidebook '92-'93	Textbook (Japanese)	3,500Yen	Personal Media Co.	4-89362-197-6
$\mu$ ITRON Specification Ver.2.01.00.00	Specification (English)	12,000Yen	TRON Association	–
ITRON2 Specification Ver.2.02.00.10	Specification (English)	15,000Yen	TRON Association	–

## NOTES:

- Prices do not include consumption tax.
- Prices indicated for TRON Association publications apply to Association members.
- English-language specifications are also distributed free of charge via the Internet. The method for downloading is explained in Newsletter No.2.

- The error codes have been substantially reorganized.
- A task starting code has been added as a parameter to `sta_tsk`. When porting, a dummy task starting code may be assigned.
- The 1-bit event flag has been eliminated. It must be replaced by a 1-word event flag. This is a largely mechanical procedure.
- The system call names `tsk_sts`, `wai_tsk`, `pget_blk`, and `rel_blk` have been changed to `ref_tsk`, `tslp_tsk`, `pget.blf`, and `rel.blf`, respectively. These are now supported at level E. In many cases `wai_tsk` can be replaced by `dly_tsk`. There are changes also in the calling interface of `tsk_sts`.
- There are changes in the calling interface of `def_int`.
- The name of `iXX_sts` has been changed to `ref_iXX`.
- `ret_wup` is now supported at level E. This combines the functions of `wup_tsk` and `ret_int`, so it can easily be replaced by system calls at level S or below.

In addition, where `dis_int` or `ena_int` were used, in many cases these should be replaced by `loc_cpu` and `unl_cpu`.

- Q. So what is to be done about the earlier  $\mu$ ITRON level 4?
- A. The functions of the earlier  $\mu$ ITRON level 4 are all included in  $\mu$ ITRON3.0 level E. Here again, the differences in specifications are as follows.
- The name `???_sts` has been changed to `ref.???`, and the calling interface has been modified.
  - The calling interfaces of `def_cyc` and `def_alm` have been modified.

- The name `get_blk` has been changed to `get.blf`.

Q. In the  $\mu$ ITRON3.0 rendezvous function, why is it that `acp_por` and `fwd_por` are not supported by the connection functions (that is, these system calls cannot be used to manipulate ports in other nodes)?

A. In order to support `acp_por` and `fwd_por` in the connection functions, it would be necessary to add a special packet or procedure to the connection protocol. Specifically, if `acp_por` were supported in the connection functions, a problem would arise when the task issuing `cal_por`, the task issuing `acp_por`, and the port were all in different nodes (e.g., nodes A, B, and C). In this case it would not be clear whether the answer message is to be sent directly from node A to B or via node C.

Moreover, compared to `cal_por` there would seem to be less of a need to support `acp_por` in the connection functions. In designing the  $\mu$ ITRON3.0 connection function specifications, importance was given to simplicity for the sake of application to small-scale systems and to ease the implementation load. Supporting these less important functions was seen as complicating the connection protocol and therefore not advantageous.

If, however, there is a stronger demand by users for these functions in the future, consideration will be given to supporting them by defining an extended protocol.

Q. Does  $\mu$ ITRON3.0 allow for supporting all of the level S functions and only some of the level E functions?

A. Yes, it does. In this case it should be clearly indicated that the product is “a  $\mu$ ITRON3.0-

specification kernel with all level S and some level E functions.”

- Q. How does an implementor go about obtaining the manufacturer's code that can be referenced with the `get_ver` system call?
- A. In the product registration system operated by the TRON Association for implementations of the ITRON specifications, the Association assigns a manufacturer's code to products at the time they are registered, if one has not been assigned previously. To obtain a manufacturer's code, products can be registered with the Association under this system. Details of this registration system are available from the Association, or can be found in the ITRON Standard Guidebook '92-'93, section I.5.