

## Time & Frequency module for BTS



- ▶ Reference Source : GPS/SBAS, GLONASS
- ▶ Mezzanine type module on the base board
- ▶ Output to the system
- 10MHz locked clock (Accuracy :  $<1*10^{-9}$ )  
(Test: Lock to Ref., Holdover, 1sec gate)
  - TOD : UART IF, LVTTL
- 1PPS Phase :  $<\pm 100\text{ns}$ ,  $<\pm 50\text{ns}$  @98%
- ▶ Providing remote download
- ▶ Holdover @24hr : within 8us for 1PPS
- ▶ Size : 100 \* 100 \* 23 (mm)
- ▶ power feeding to GPS ant. & power ON/OFF
- ▶ Providing Position information
- Application: Mobile BTS, Master clock system

\* Can be redesigned by custom requirements

## Economic type FDD clock module



- ▶ Reference Source : GPS/SBAS, GLONASS
- ▶ Vertical type module on the base board
- ▶ Output
- System clock: 19.4MHz / 30.72MHz
  - 1PPS : 2.5V LVTTL,  $\pm 1\mu\text{s}$  accuracy
  - TOD : UART IF, LVTTL
- ▶ Support PLL function : TCXO + PD(PLD)
- ▶ Embedded DP-PLL on the system processor
- ▶ Size : 45 x 26 x 12 mm
- ▶ Application : FDD type BTS, economic design

\* Can be redesigned by custom requirements

# Global Leader in Precise Time Synchronization

[www.springwave.co.kr](http://www.springwave.co.kr)

springwave  
#B-703, U-space 1, 670 Sampyeong-dong  
Bundang-gu Seongnam-si, Gyeonggi-do, Korea  
463-400  
Tel: +82-70-7008-6081

springwave  
www.springwave.co.kr

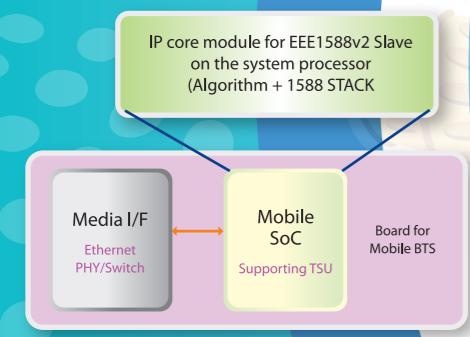
## Precision Time World

### IEEE1588v2 GrandMaster

- IS2000 model
  - Edge IEEE1588v2 Grandmaster
- IS5000 model
  - Carrier-class IEEE1588v2 Grandmaster

### IEEE1588v2 Slave solution

- Software based Algorithm&Stack
  - System processor embedded solution
- Stand-alone module
  - Mezzanine type sub-module on the B'd



### Clock Module for mobile base station

- Reference source : GNSS
- Synch Output : 10MHz, 1PPS, EVEN

### Application

- 2G, 3G, LTE network
- Wireless Ethernet Backhaul
- Passive Optical Network(PON)
- WiMAX
- Circuit Emulation Service(CES)

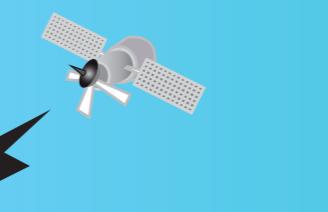


## IEEE1588v2 PTP Grandmaster

IS2000



19" Rack mountable  
1U, 340 x 259 mm



\* Handshaking IEEE1588v2 PTP  
packets bet. Master & slave

### IEEE1588V2 PTP GRANDMASTER KEY FEATURES

- Carrier-class IEEE1588v2-2008 Grandmaster clock - IS5000
- Edge Grandmaster clock for near the mobile network edge - IS2000
- GNSS(Global Navigation Satellite System) input with auto-protection.
  - GPS/SBAS, GLONASS(optional)
- 100/1000Mbps PTP port with combo Copper & Fiber with autosensing
- Hardware-based packet processing for time relative PTP messages, 5ns resolution timestamping
- Compliant with ITU-T G.8265.1 standard telecom profile
- Support unicast, multicast, and mixed-mode PTP processing
- Up to 500 multicast 1588 clients
- Up to 500/250/128/64/32 unicast 1588 clients
- No performance degradation as clients capacity grows
- VLAN Support, in/out-bound management
- Optionally carrier-class NTP server
- SNMP, WEB based and CLI management
- End-to-End IEEE1588v2 standard management

## IEEE1588v2 PTP Slave solution

### Software based IEEE1588v2 Algorithm & Protocol Stack

- Software license based design solution for IEEE1588v2 slave.
- Flexible launching 1588 slave solution on the target processor
- Can be providing FPGA logic, if system doesn't have time stamping
- Synchronizing the frequency and time from a 1588 master
- Provide the 1PPS and system clock to the client system
- Lock to synchronous-ethernet(Sync-E) for frequency syntonization
- Followed by IEEE1588v2-2008 PTP protocols, ITU-T G.826x series

### Stand-Alone module for supporting IEEE1588v2 Slave

- Mezzanine module with ARM-core processor
- Interface PTP ethernet port and module power with base board.



Embedded 1588 slave  
In PICO/Femto cells

### LTE mobile service

