## Responsive Link

# - Real-Time Communication Standard -

Responsive Link SG of Japan's SC25 WG4

## Purposes:

Real-time networks with point-to-point interfaces

#### Applications:

• Robots, factory automation, home automation, intelligent rooms/buildings, ITS, etc. · · ·

#### Characteristics of real-time communication:

- Soft real-time: A guarantee for the communication bandwidth
   ⇒ high throughput for bulky data
- Hard real-time: A guarantee for the communication latency
  ⇒ short latency for events

Packet Size	Larger	Smaller	
Throughput	Higher	Lower	
Latency	Longer	Shorter	

Large packet size: The throughput gets higher, but the packet latency becomes longer: soft real-time

Small packet size: The packet latency becomes shorter, but the throughput gets lower: hard real-time

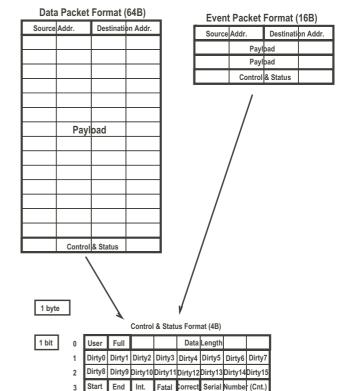
## The characteristics of Responsive Link:

- Separation of data transmission for soft real-time and event transmission for hard real-time
- •Fixed packet size: 64-byte data and 16-byte event
- Independent routing of the data link and the event link
- Point-to-point serial link
- •256 level priority (8-bit)
- Priority based packet overtaking (The packet with higher priority overtakes other packet at each node.)
- Packet acceleration/deceleration using priority replacement (Packet priority can be replaced with a new priority level at each node to accelerate/decelerate packets under distributed control.)
- •Prioritized routing (When multiple packets with different priority levels are sent to the same destination, the different route can be set to realize exclusive communication lines or detours.)
- Plug & Play
- Topology free
- Low latency

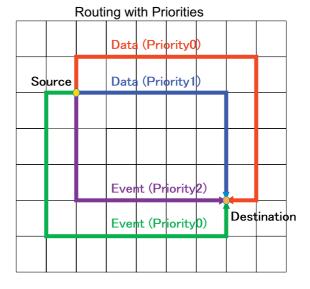
### Physical Interface:

- •Electronic interface: The LVDS signal is used.
- Forward Error Correction(FEC)
- Bit stuffing
- •NRZI(Non Return to Zero Inverted)
- DPLL(Digital Phase-Lock-Loop)
- Synchronized frame(Setup Pattern)
- \*Variable link speed (800, 400, 200, 100, 50, 25, 12.5[Mbaud])

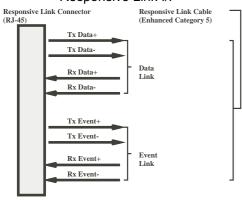
#### **Packet Format**



Frame Format (12bits)								
			Data bits				Redundancy bits	



## Responsive Link I/F



## Routing Table (5x5 Crossbar)

