Memory Map for pre-defined data readout scheme (revised)

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Common communication method using standard memory map over RMAP

- **Background**
  - PIM (Peripheral Interface Module) protocol for former Japanese scientific satellites has similar mechanism to RMAP.
  - PIM protocol can be implemented on SpaceWire by replacing its physical layer and the lower part of the data-link layer with SpaceWire and RMAP.
  - In Japan, we have been using a common communication method for house keeping data collection, command transfer, etc. We are defining common memory mapping to implement the method on RMAP. We have established the common memory map for ASTRO-H project.

- **Common RMAP memory map is established for ASTRO-H and other small satellite projects.**
  - Common telemetry and command registers, which were provided in former PIM protocol are mapped over RMAP memory space.
Memory Mapping for Japanese scientific satellites

Common Memory Map implementation (revised)

Network wide address assignment is in reference to IEEE1212 CSR architecture.

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Reserved Area is available for Configuration Information (ex) SpaceWire-RT QoS lookup table, etc.

- GPO/GPI register for functional check
- LED control for GSE
- SpaceWire Logical Address
- IP revision
- Buffer memory map information
- etc.
Consideration for SpaceWire-T requirement
(almost the same as SpaceWire-D)

- “Telemetry / Command Design Criteria” is established, which is based on SMCP (Spacecraft Monitor & Control Protocol) by ISAS.
- Assured communication, Resources/Channels, and Network Configuration Parameters are realized with RMAP and “Telemetry / Command Design Criteria”.
  - “Telemetry / Command Design Criteria” is applied for middleware and application program.
  - RMAP reply packet is used as ACK/NACK.
  - Re-transmission is realized by the ACK/NACK with CRC checking capability in RMAP packet format.
- **Timeliness by Time-Code.**
  - Time slot, scheduled system, and kill-equivalent function is realized with Time-Code for latency requirement.
- Priority and channel configuration are specified with category number shown in the secondary header of Space Packet.
- "All SpaceWire links in the network shall be set to operate at the same data rate.“, which is stated in SpaceWire-T “6. e) Network Configuration Parameters” is not satisfied, for which some relaxation is preferred.