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Proposal for Enhancements to the 10GBASE-KR Start-Up Protocol

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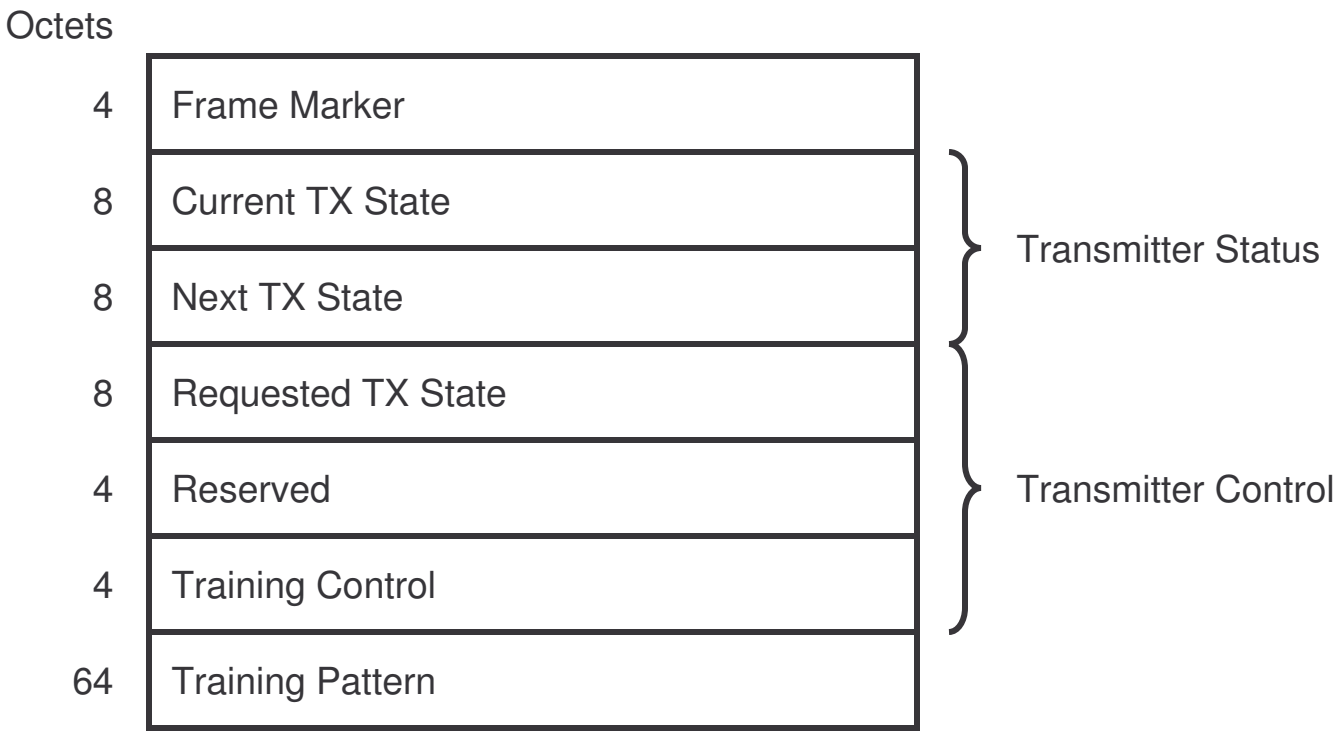
Current Concerns with Start-Up Protocol

- No indication of the transmitter state…
  - How does the receiver know that the requested transmitter update was received?
  - How does the receiver know if or when the requested transmitter update was implemented?
- Uncertainty related to tap range and resolution…
  - What if “increment” requests are sent for a tap that has hit the positive rail; how will the receiver know to give up?
  - How does the receiver know to manipulate the update gain? This is a function of the tap resolution.

Other Concerns Not Addressed Here…

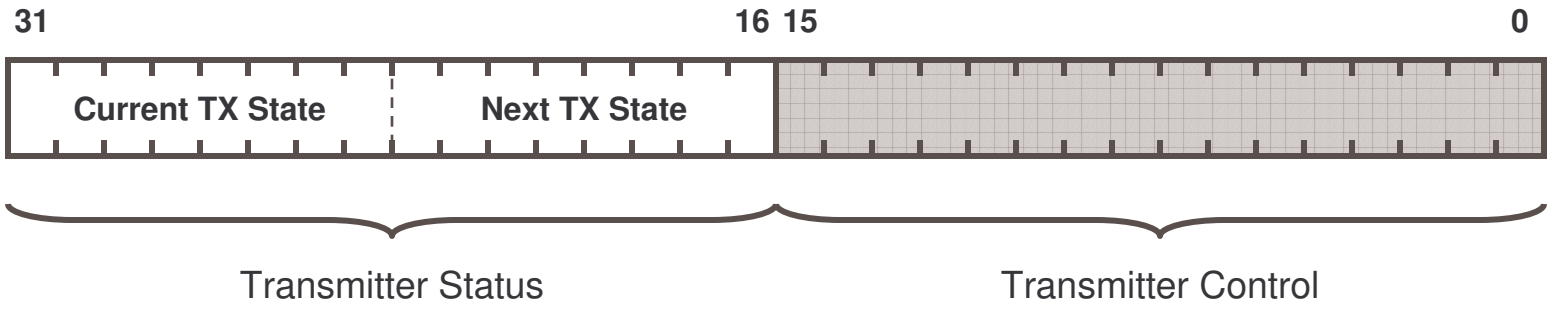
- Training pattern contents.

Proposed Training Frame Format



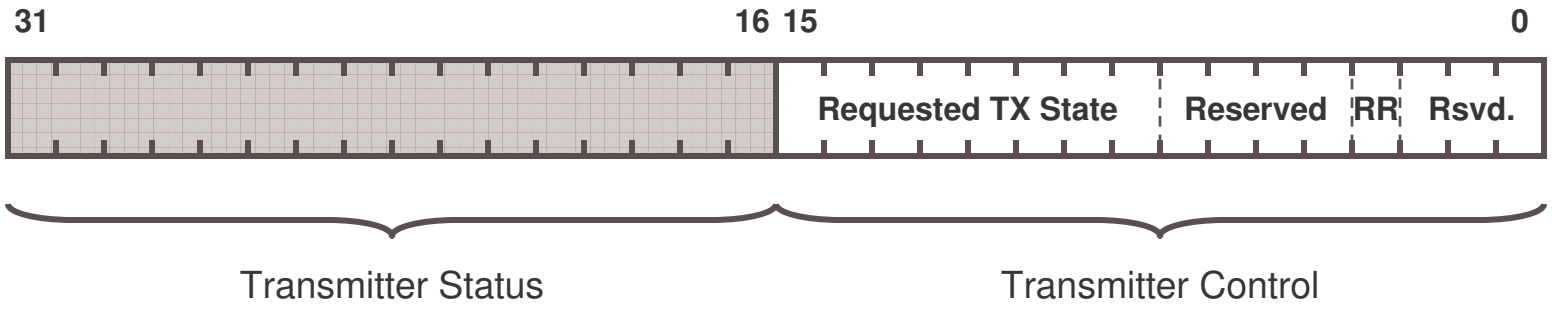
Transmitter Status Field

- 16-bit field (sent as 16-octets of 10.3125 Gb/s symbols after encoding and slow-down).
- Replaces current “Coefficient Update” field in location and “Status Report” in function.



Transmitter Control Field

- 16-bit field (sent as 16-octets of 10.3125 Gb/s symbols after encoding and slow-down).
- Replaces current “Status Report” field in location and “Coefficient Update” in function.



Definition: TX FIR State

- 8-bit encoding of the current transmit equalizer state
  - Up to 256 states may be encoded
  - State 0 shall be equalizer off
- Each state maps directly to a transmitted voltage waveform
- Eliminates uncertainty related to the transmit equalizer resolution and range
  - Receiver can rely upon a waveform with specific properties in response to a given configuration request

New Frame Format Features

- Current TX State
  - The transition of a state from “next” to “current” indicates to the receiver that the change has actually been implemented
  - It indicates that new statistics may be gathered and the next update computed
- Next TX State
  - This serves as an acknowledgement to the receiver that the request to change state was received
- Requested TX State
  - This is the equalizer state that the receiver is requesting the transmitter to assume
  - Replaces the “coefficient update” field

Training Control

- This field controls the training handshake process.
- Currently only contains the “receiver ready” bit from the original start-up protocol.

Conclusions

- Modifications are proposed to training frame format to address various concerns raised by the Task Force.
  - These modifications also affect the corresponding clause 45 registers.
- Proposal depends on a well-defined notion of “TX State”, which will be addressed in separate presentations.