

**Agenda Item:** Release 2000 Issues – Hybrid ARQ  
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## Multiplexing Chain for HARQ

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### Introduction

As one of the Release 2000 enhancements, HARQ became subject of intensive discussions in different WGs and TSG RAN. Whilst WG2 was designated to be the leading WG on the corresponding Work Item, there will also be a certain impact to WG1 specifications.

In this contribution, we want to visualise how HARQ can be supported by Physical Layer multiplexing scheme. The scheme depicted is flexible and shall be adapted to requirements set by WG2; in other words the proposed multiplexing chain is intended to become a starting point for discussions in WG1 how to serve the HARQ scheme evaluated by W2.

### Outline and Rationale for the proposed Multiplexing Chain

The proposed multiplexing chain for support of HARQ by Physical Layer is depicted in Figure 1. During evaluation of the chain, the following design guidelines were taken into account:

- **Reuse of as many Layer 1 multiplexing blocks as possible**  
Due to reusing the regular Layer1 multiplexing entities, impact to implementation is be minimised.
- **Retaining protocol termination points in UTRAN**  
Termination of MAC and RLC protocol remains under control of higher layers.
- **Retaining characteristics of Transport Channel**  
According to the understanding of TrCH, Physical Layer is responsible for delivering a quality indication to higher layers, in other words L1 is in charge of termination for Transport Channels. The proposed structure pays respect to this by enabling Physical Layer at RX side to derive a quality check (including CRC check) for each redundancy step inside HARQ transmission.
- **Effectively enabling different coding/puncturing schemes**  
For HARQ, a number of different coding/puncturing schemes are possible, e.g. including usage of Turbo or Convolutional Coding. Due to the block oriented approach different schemes can be realised effectively and furthermore future enhancements are possible.

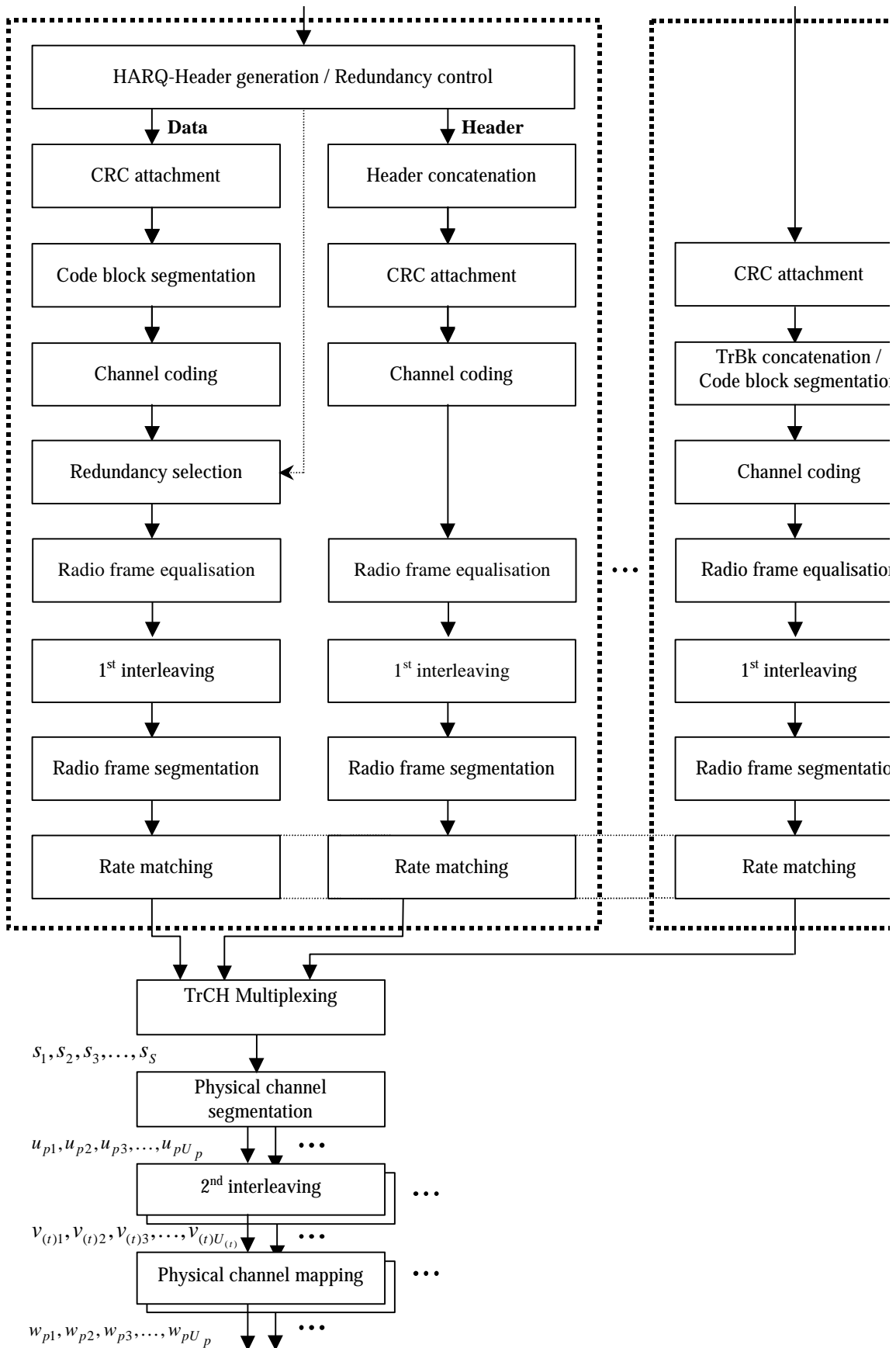
- **Applicability to Dedicated Channels and Shared Channels**

- **Applicability to both UTRA modes, FDD and TDD**

Despite the fact figure 1 shows the multiplexing chain for TDD mode, similar chains for FDD UL and DL can be derived easily in the same way. It is the intention of our proposal to provide as similar schemes for both modes as possible. Nevertheless, as different coding/puncturing schemes can be applied for different modes, optimisation of coding taking into account typical FDD/TDD characteristics is not precluded.

## **Conclusion**

By presenting a multiplexing chain adapted for HARQ in this contribution, we intend to show how HARQ Type II/III can be handled by Physical Layer Multiplexing in a efficient and flexible manner.



**Figure 1: L1 Multiplexing Chain for Hybrid ARQ Type II/III**