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are described above. If ALCHIA transmissions are not allowed, retransmission must be delayed until retransmission becomes allowed again.

4.4.4 Tolded ALCHIA Transmissions

When an ALCHIA transmission fails, the subscriber unit gives to the "DQ" state (see Section 7.1.7.8 on page 168). In the "DQ" state, the subscriber unit waits all relevant transmissions until scheduled and ALCHIA, performs channel scanning, and initiates a Zone registration request when an appropriate channel is found. A failed inbound command may be retained and marked as pending or aborted by the subscriber unit.

When registration is granted in a zone, the unit must reset the retry count for all pending inbound commands as described in rule 53 in Section 7.1.7.7 on page 167. It must use the ALCHIA parameters decided in that zone.

Note that when ALCHIA commands are re-transmitted, it may be necessary to learn the most recent information (for example, see Section 4.8.1.2 on page 113 and Section 4.8.1.1 on page 118).

4.5 Timing Structure

All reverse channel transmission control and timing information is delivered on the forward control channel(s) to the RTMs. The scheduled-ALCHIA boundaries can vary from frame to frame as traffic patterns demand. A subscriber unit transmission will be enabled only if the subscriber unit has decoded the required transmission command and timing information on the forward control channel, without detecting errors.

4.5.1 Transmission Time Boundaries

Timing information that pertains to the population at large will be delivered in the Block Information Words that are present in each system configuration information (SCI) frame transmitted on a control channel. This information includes the reverse channel speed and the boundary between scheduled and random access scheduled ALCHIA transmissions on the reverse channel.

System timing and synchronization has the following properties:

- All packet slot times are referenced to the same starting point which is the start of Block 0 of every frame.
- Base stations must be synchronized to the forward channel frame timing in order to determine the reverse channel packet slot timing. The base stations and base receivers must use a common timing reference. Synchronization using a GPS receiver is recommended (see Section 2.0 on page 13).

4.5.1.1 Reverse Channel Packet Timing

Example Slot Structure for 9600 bps Reverse Channel

(this figure is not to scale)



Example Slot Structure for 6400 bps Reverse Channel

(this figure is not to scale)



Example Slot Structure for 1600 bps Reverse Channel

(this figure is not to scale)



Example Slot Structure for RDS-type Reverse Channel
(this figure is not to scale)



Note that the reverse channel Block Information Words allow reverse channels to be controlled independently. A subscriber unit directed to use any one of the reverse channels available must use control information from the appropriate block information Words.

4.5.1.2 Boundary between Scheduled Messages and ALOHA

Transmissions from a subscriber unit must be either scheduled or ALOHA (random access). Separate reverse channel time intervals are allocated for these two different transmission types.

The 'set' bits in the forward channel Block Information Words specify the number of packet slots allocated to scheduled messages during the following frames (see Section 5.7.6.18 on page 54). This count is relative to the start of frame 0 of the following frame and can have a value less than or equal to the number of packet slots present in that frame. The reverse channel can be assigned exclusively to ALOHA, completely to scheduled transmission or any partitioning in between.

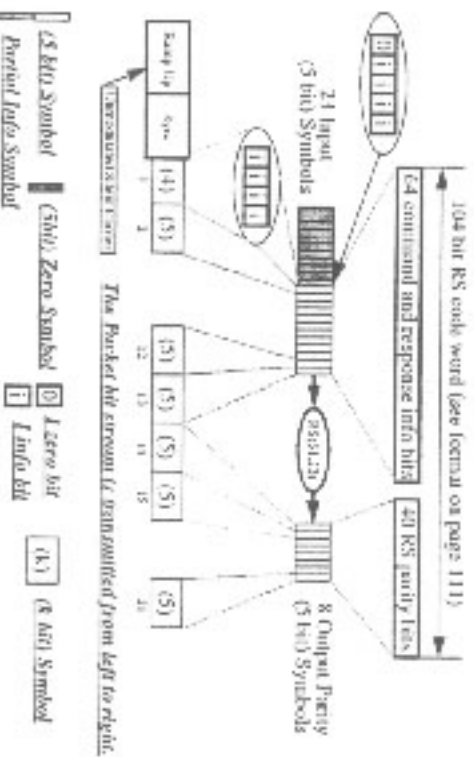
4.5.1.3 Reverse Channel Transmission Length

No reverse channel transmission may extend past the sync field of the following frame.

4.6 Command and Response Packet Construction

Command and response packets are self-contained transmission entities that are made up of a ramp up and synchronization pattern, followed by a Reed-Solomon encoded information code word. The construction of command and response packets is illustrated in the

Figure below: A detailed description of how to calculate the Reed-Solomon parity bits is provided (see "Reed-Solomon Encoding" on page 141).



The code will always correct 4 or fewer bit errors and can correct up to 20 bit errors.

The packet is constructed as follows:

1. Append the 61 information bits to 51 zero bits forming 21 (5 bit) symbols. The first 10 symbols will therefore all be zeros.
2. Using the 21 symbols from (1) as input, generate 8 (5 bit) parity symbols with the RS(21, 21) encoder (see Section 5.7.6.1 on page 141).
3. Append the 40 parity bits from (2), to the 61 information bits used in (1), to construct the code word.
4. Append the code word constructed in (3) to the Ramp Up and Sync pattern, to construct the packet.

The specific ramp up and sync pattern to be used depends on the speed of the reverse channel as is specified in the Block Information Words (see Section 5.7.6.14 on page 52). See Section 4.6.1 on page 107 for the ramp up and sync pattern to be used for the various reverse channel speeds.

The RS(21, 21) decoder will correct any combination of Reed-Solomon symbol errors in this packet such that 24 (number of undetected 5 bit symbol errors) ≤ 8 .