Coefficient Update SM

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Supporters

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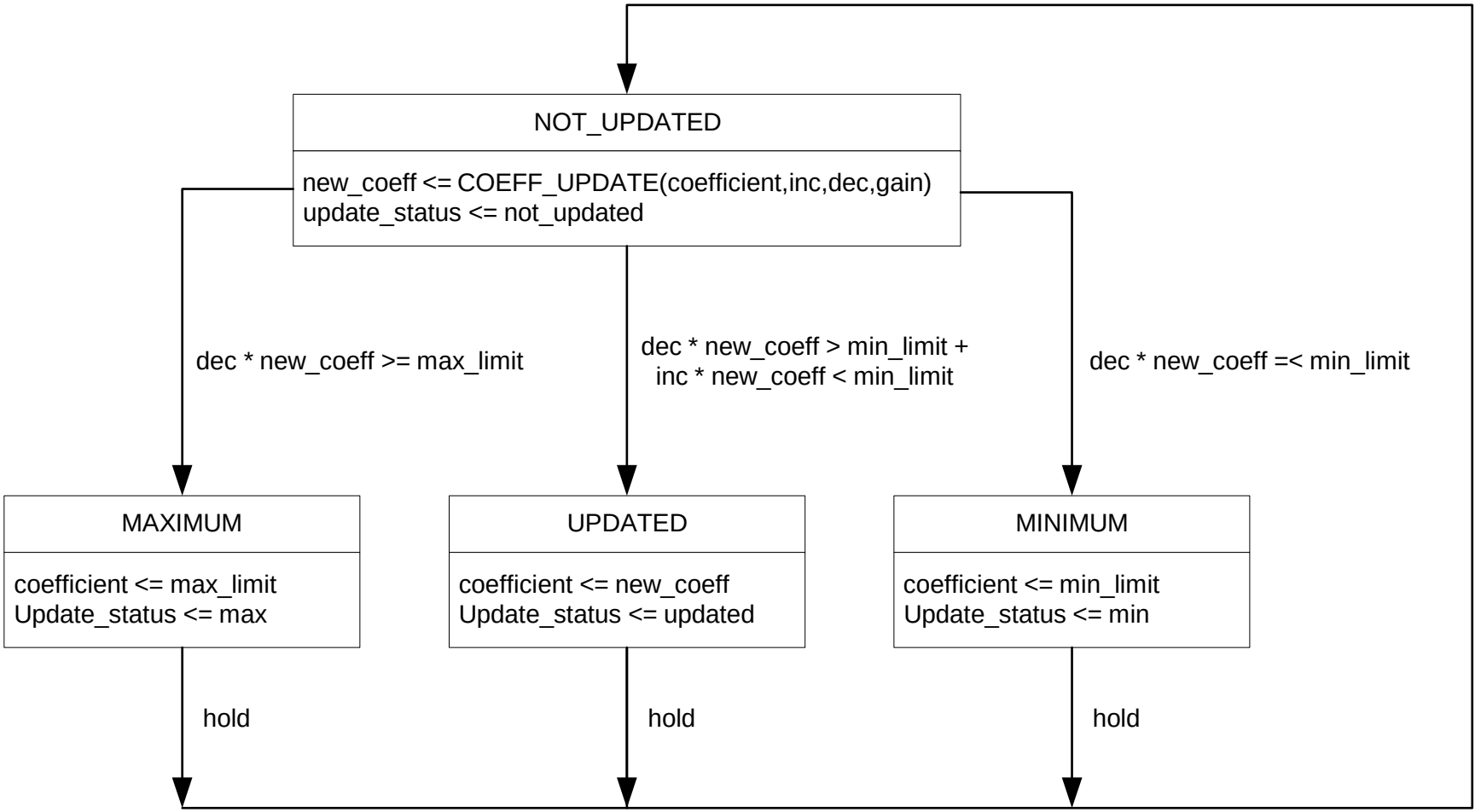
- XXXX

Some Issues with current definition

- **Coefficient updating is a state dependant process**
  - State dependant processes are best defined using State Machines
    - Clearer, less ambiguous than textual descriptions
- **The terms Over-run & Under-run imply arithmetic rollover and corruption**
  - What we have is non-destructive saturation of tap values
    - Change “over-run” to Maximum limit or max
    - Change “under-run” to Minimum limit or min
    - Indicate max, or min whenever limits are reached
      - Versus when they are exceeded

Proposed State Machine (one per tap)



SM Constants

min_limit

signed integer constant containing the minimum tap coefficient value

max_limit

signed integer constant containing the maximum tap coefficient value

- *Note the range/resolution of a tap is determined solely by its associated min_limit & max_limit constants*

SM Variables

inc

Boolean variable asserted when a training frame has been completely received and the coefficient update field of that frame for this tap = “inc”, and de-asserted on reception of any other value.

dec

Boolean variable asserted when a training frame has been completely received and the coefficient update field of that frame for this tap = “dec”, and de-asserted on reception of any other value.

hold

Boolean variable asserted when a training frame has been completely received and the coefficient update field of that frame for this tap = “hold”, and de-asserted on reception of any other value.

coefficient

signed integer variable containing a value that should be used as the tap coefficient.

new_coeff

signed integer variable containing the result of increment/decrement operations on the coefficient value

gain

signed integer variable containing the gain value indicated by the update_gain field of the most recently received training frame.

update_status

value to be transmitted in the Tap Update Status field for this tap of the next transmitted training frame.
values : as defined in Table 72-3

SM Functions

COEFF_UPDATE(coefficient,inc,dec,gain)

Adds or subtracts the requested gain value to the coefficient value.

If inc is TRUE the function returns coefficient + gain.

If dec is TRUE the function returns coefficient - gain.

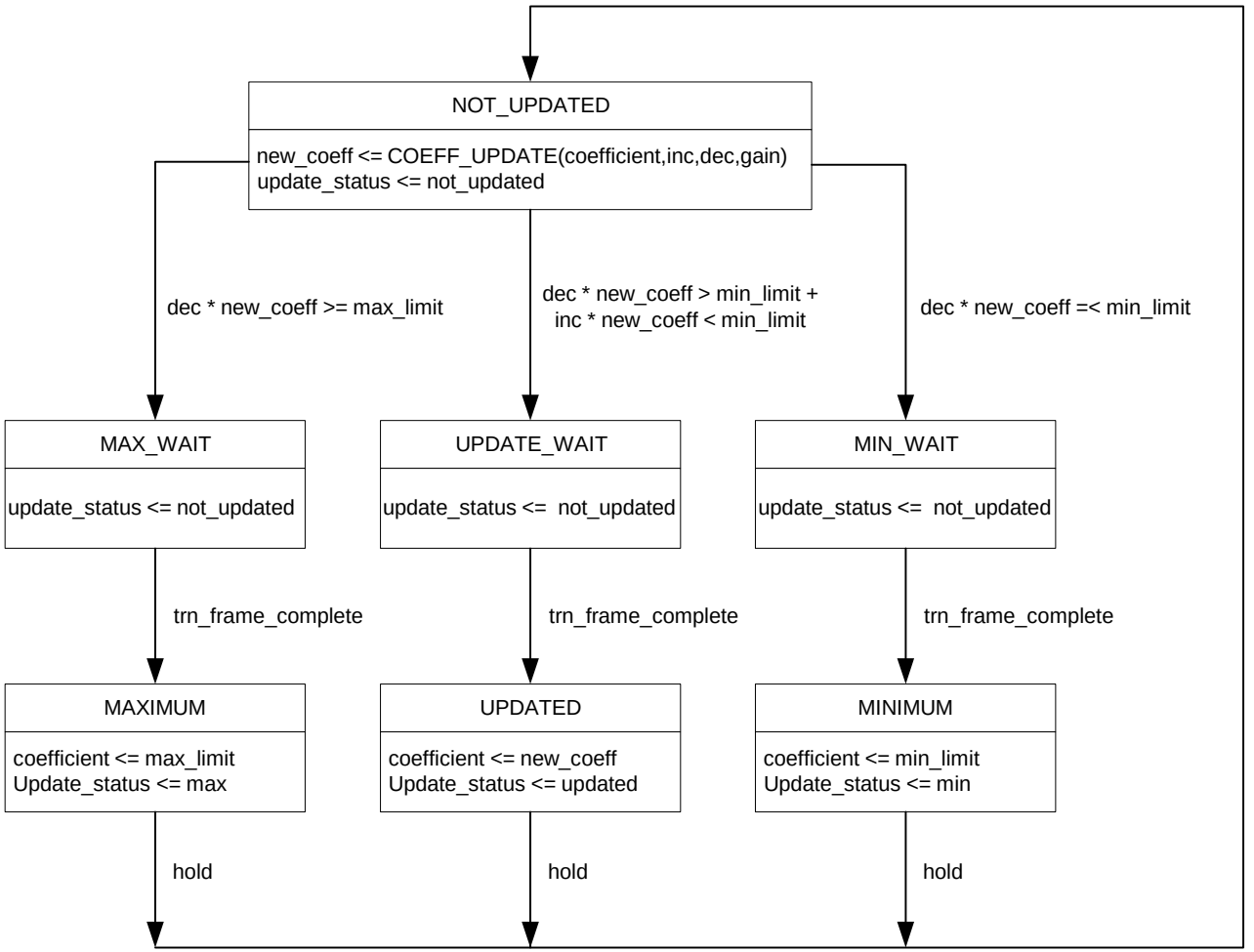
otherwise the function returns coefficient.

Backup Foils

Wait for Tx complete option

- **I can see no reason to wait for the current training frame to complete before changing equalizer values**
  - If this is required the SM can be extended to support it
  - See following slides

Alternate SM with Tx wait



SM Variables for alternate version

inc

Boolean variable asserted when a training frame has been completely received and the coefficient update field of that frame for this tap = “inc”, and de-asserted on reception of any other value.

dec

Boolean variable asserted when a training frame has been completely received and the coefficient update field of that frame for this tap = “dec”, and de-asserted on reception of any other value.

hold

Boolean variable asserted when a training frame has been completely received and the coefficient update field of that frame for this tap = “hold”, and de-asserted on reception of any other value.

trn_frame_complete

Boolean variable asserted when a training frame has been completely sent.

coefficient

signed integer variable containing a value that should be used as the tap coefficient.

new_coeff

signed integer variable containing the result of increment/decrement operations on the coefficient value

gain

signed integer variable containing the gain value indicated by the update_gain field of the most recently received training frame.

update_status

value to be transmitted in the Tap (k) Update Status field of the next transmitted training frame.
values : as defined in Table 72-3