

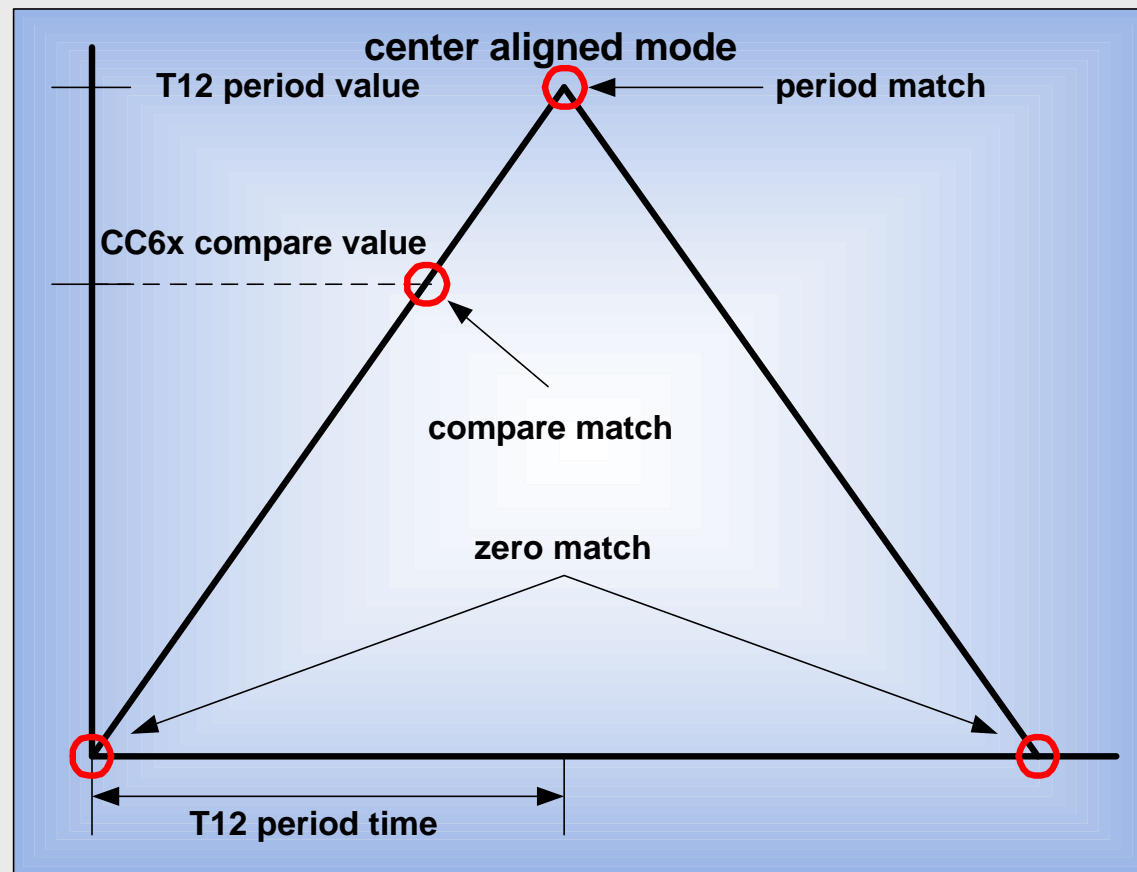
Capture/Compare Unit 6 Timer T12

- 16 Bit Timer T12 with corresponding shadow register
- 3 channel register with additional shadow registers
- Edge / center aligned mode
- Compare mode
 - The contents of the shadow registers are transferred simultaneously to the actual compare register during the T12 shadow transfer.
- Capture mode
 - The captured value of T12 can be read from the channel register Duty cycle of 0 % and 100 % are supported (enhanced counting/switching rules)

Capture/Compare Unit 6

Timer T12

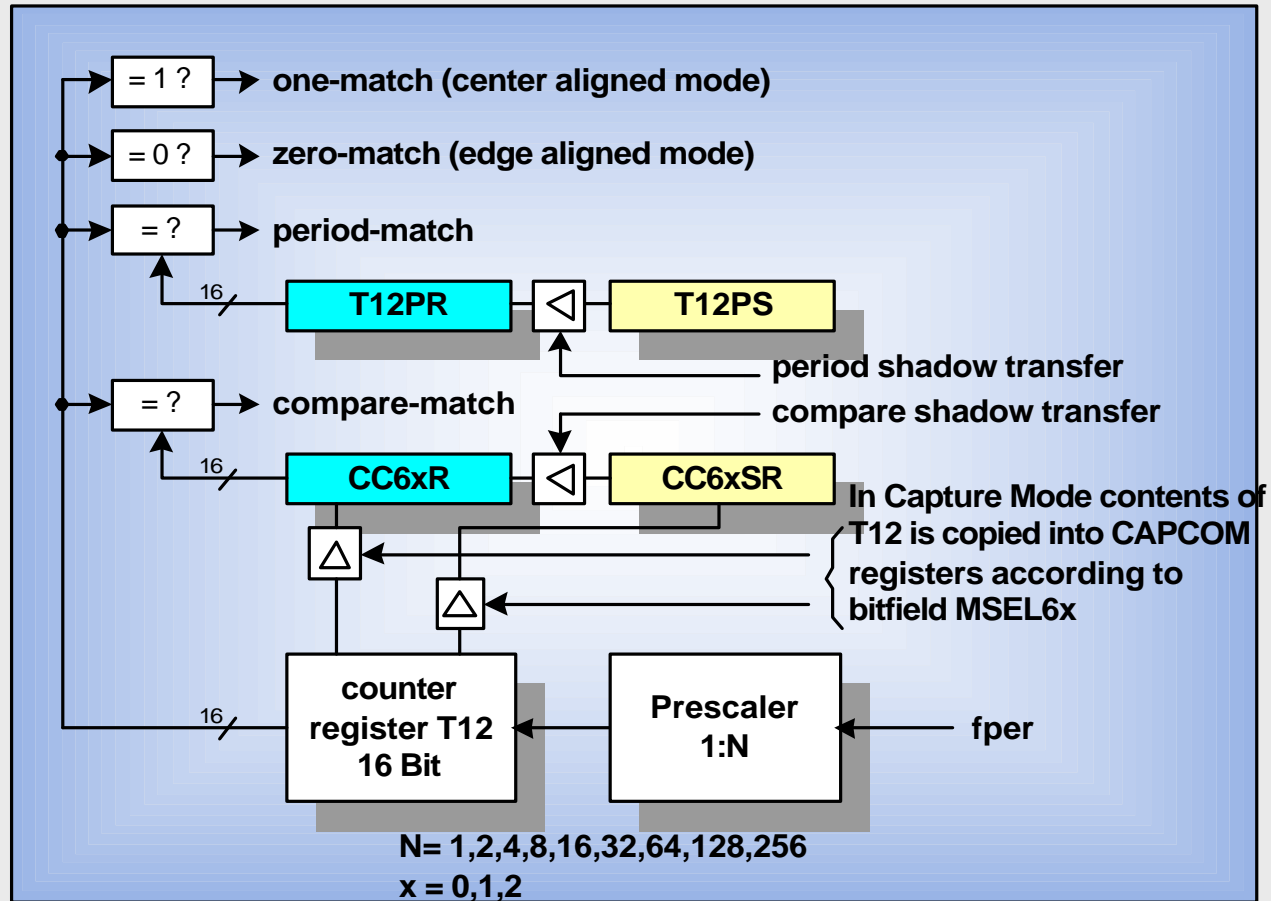
Timer 12 center aligned mode



Capture/Compare Unit 6

Timer T12

Timer 12 block diagram



Capture/Compare Unit 6

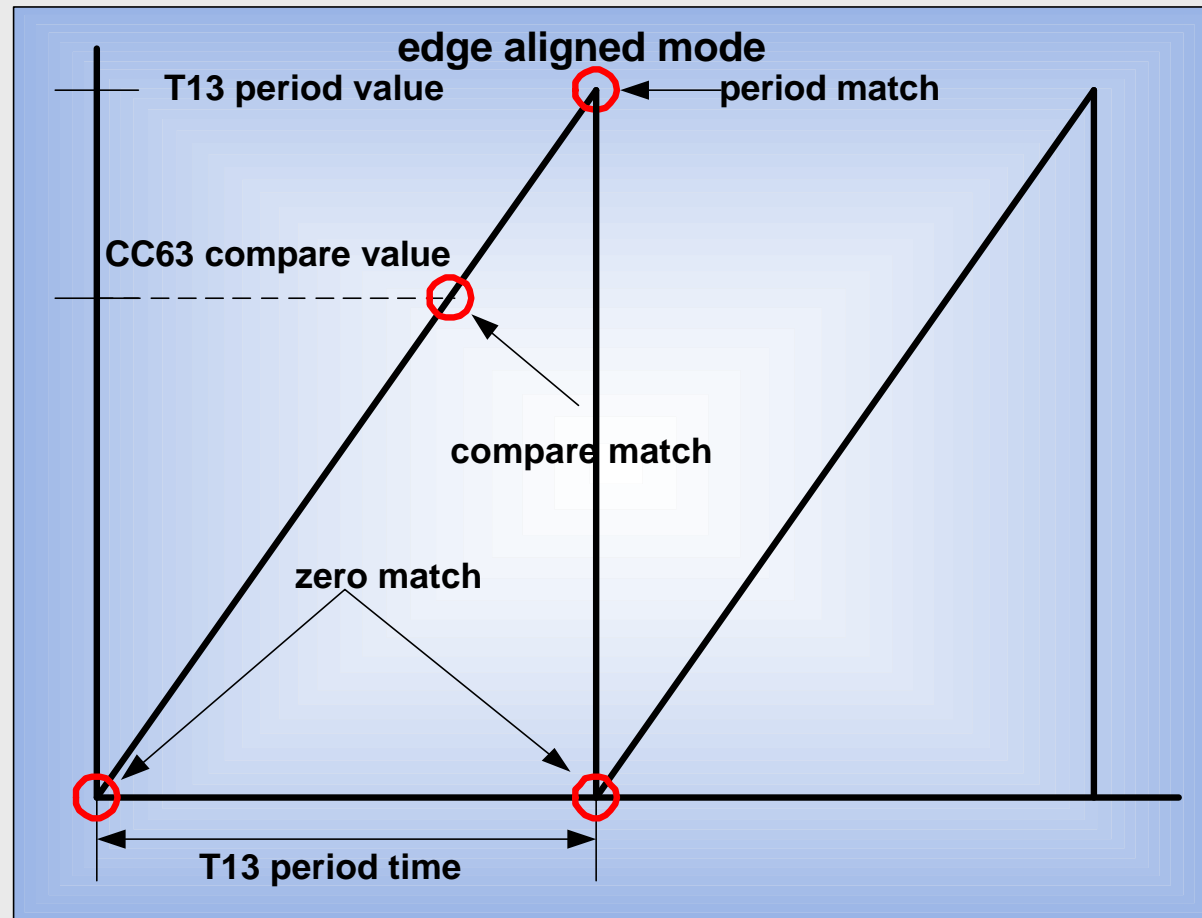
Timer T13

- 16 Bit Timer T13 with corresponding shadow register
- 1 channel register with additional shadow registers
- edge aligned mode
- Compare mode
 - The contents of the shadow registers are transferred simultaneously to the actual compare register during the T13 shadow transfer.
 - Duty cycle of 0 % and 100 % are supported (enhanced counting/switching rules)

Capture/Compare Unit 6

Timer T13

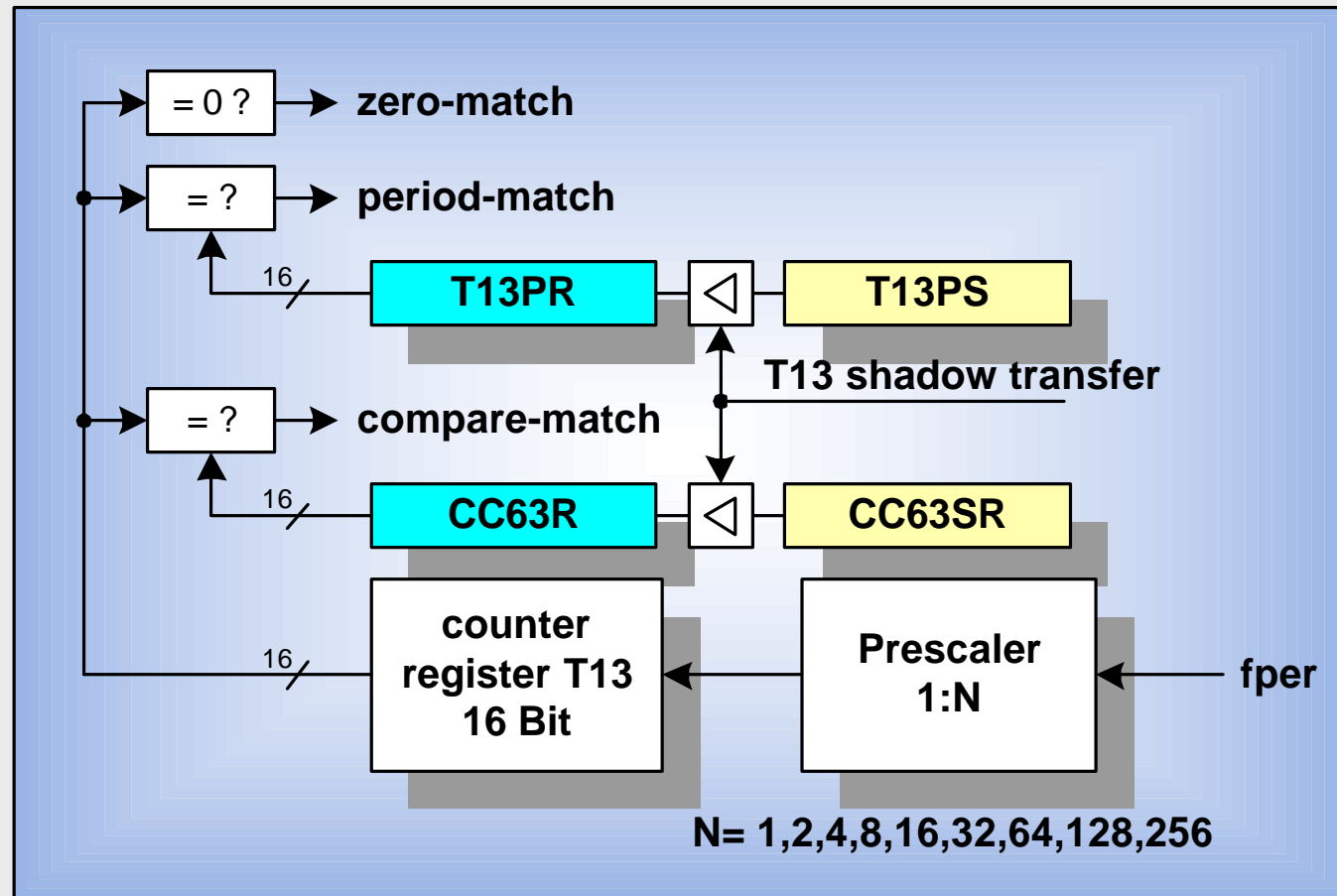
Timer 13 edge aligned mode



Capture/Compare Unit 6

Timer T13

Timer 13 block diagram

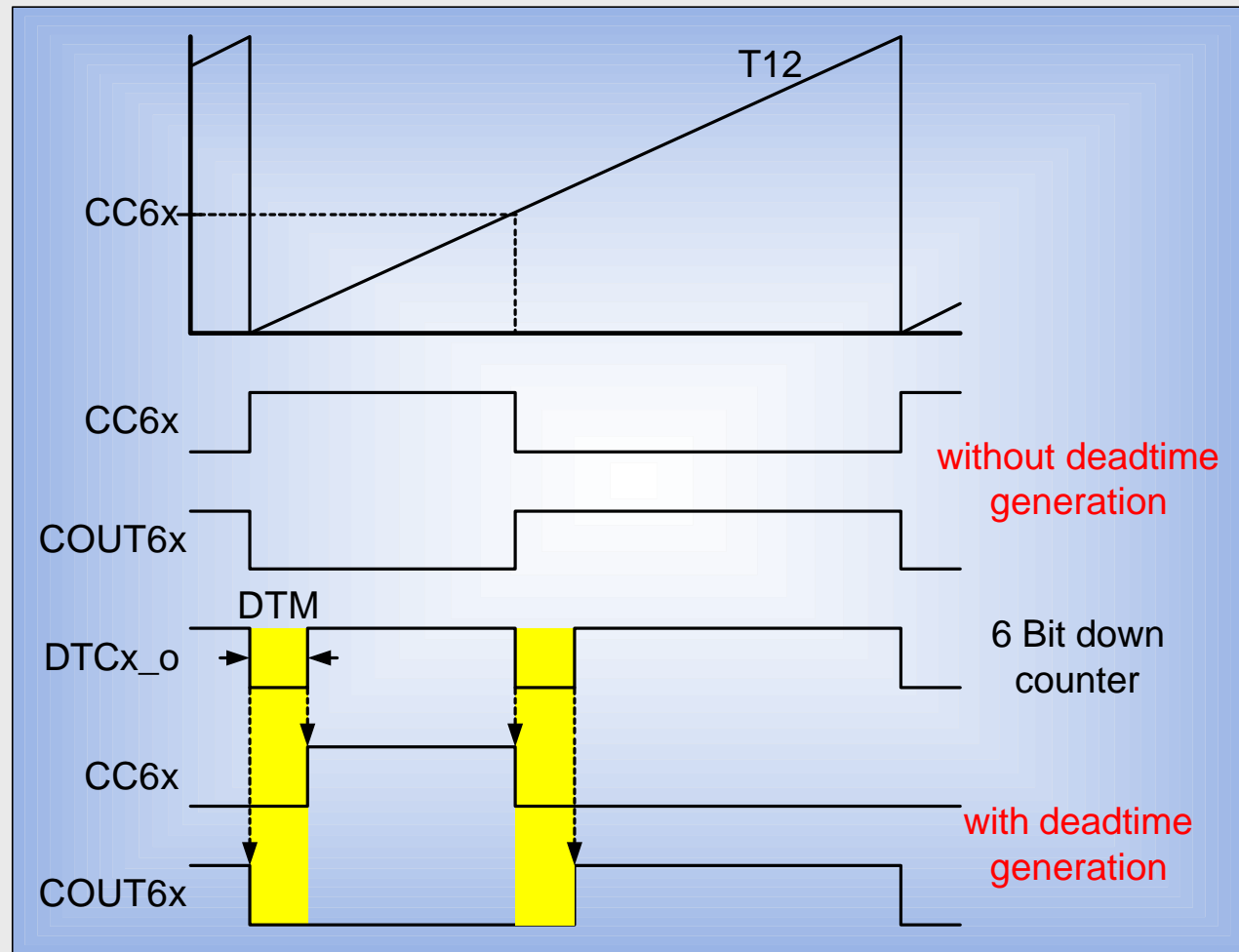


Capture/Compare Unit 6 Dead Time Generation

- Is required due to unsymmetrical switching behavior of the power switches.
- Each of the 3 channels works independently with its own 6 bit wide dead time counter
- The value of the bitfield DTM is valid for all of the 3 channels
- The bit field DTM determines the programming delay between switching from the passive state to the active state of the selected outputs.

Capture/Compare Unit 6

Dead Time Generation (Example)



Capture/Compare Unit 6

Multi-channel Mode

- The multi-channel mode allows to modulate all 6 output channels within one instruction.
- The bits in the bit field MCMP are used to select the outputs that may become active.
- Up date of the MCMP can be synchronized to T12/T13 events via the shadow register.

Capture/Compare Unit 6

How fit the CAPCOM6 to applications

■ Dead Time Control Unit:

- Is necessary for control algorithms like space vector control (sinusoidal)

■ Hysteresis / TRAP - like control mode:

- Can be used to implement a simple current control logic (2 point current controller)

■ Center-aligned mode:

- Is necessary for control algorithms like space vector control (sinusoidal)

■ Control modes for multi-channel AC-drives:

- Allows to adapt different motors (3phases, multi phases, etc.); different pattern (Block commutation, Space Vector Modulation, etc.)

Capture/Compare Unit 6

How fit the CAPCOM6 to applications

- Single shot mode / T13 with T12 synchronized:
 - For implementation of Back EMF detection Timer T13 can used to insert a delay e.g. demagnetization time.
- Hall Logic /Hall Sensors
 - Support the control of simple BLDC motors (trapezoidal) with a minimum of CPU load