33.7 Time-Stamp Support

Some applications need to determine the result value at certain points of time inbetween two regular output values. The interpolation algorithm needs to determine the position of the required point of time in relation to the regular results.

This interpolation is supported by providing a timestamp that marks the delay since the last regular output value. This timestamp is the number of modulator clock cycles that have passed since the last result value has been generated. Depending on the configured decimation/integration factors this defines the fraction of an output cycle and, therefore, enables the interpolation.

The timestamp information is generated by the timestamp counter. This 16-bit counter is clocked with the optionally prescaled modulator clock (see **TSCNTx (x=0-13)**.TSCLK). It covers the following cycles:

- CIC filter decimation: up to 512
- FIR filter decimation: up to 4
- Integrator decimation: up to 64

The timestamp information is captured into the timestamp register upon a trigger event. For this purpose, the trigger signal is used, which is selected by bitfield TRSEL in register **DICFGx (x=0-13)**. Bitfield TSTRMODE selects the edge(s) that capture(s) timestamp information.

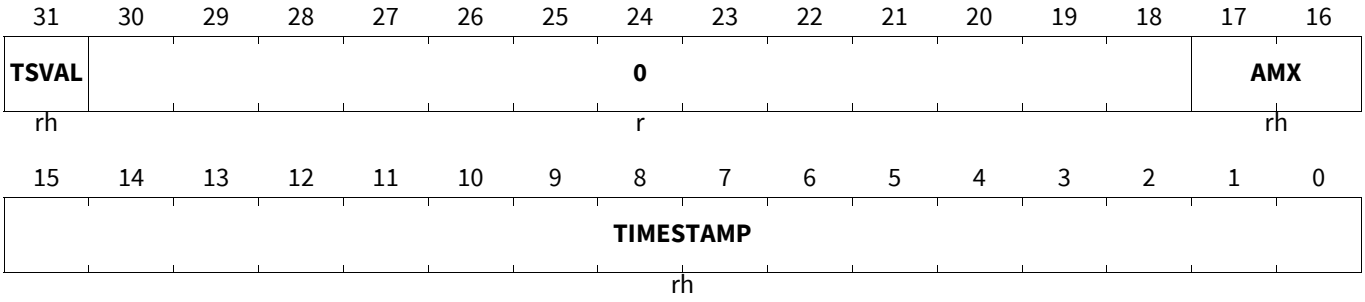
A timestamp trigger can generate a service request if selected by bitfield SRGA in register **FCFGMx (x=0-13)**.

The valid flag TSVAL is set when timestamp information is stored and is cleared when register TSTMP is read. This indicates to the application software if or not a timestamp trigger has occurred before the corresponding result value was generated.

When timestamp information is stored, a service request can optionally be generated. This allows application software to operate on all result data, even if multiple timestamp triggers occur before a regular result service request. The timestamp data is also available via the standard result register (see **Table 290** and **"Result Service Request Generation and Read Sequencing" on Page 76**).

Time-Stamp Register x

TSTMPx (x=0-13)
Time-Stamp Register x **(0150_H+x*100_H)** **Application Reset Value: 0000 0000_H**



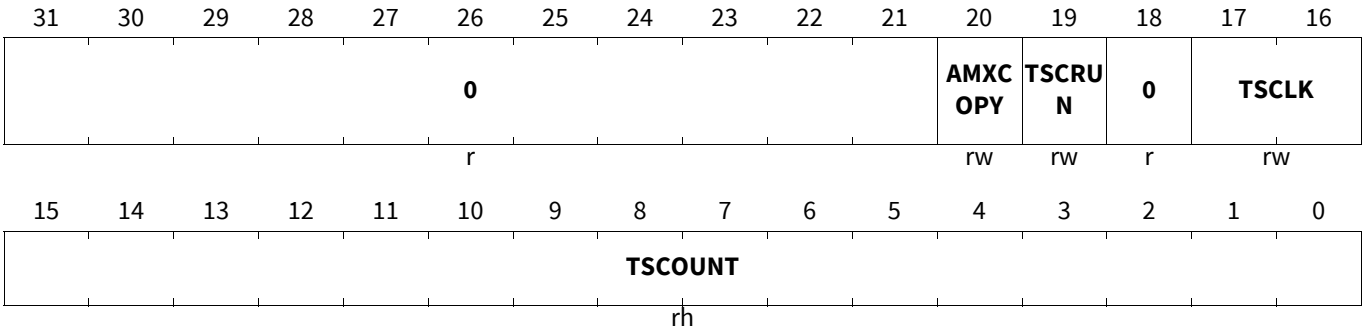
Field	Bits	Type	Description
TIMESTAMP	15:0	rh	**The Most Recent Captured Timestamp Value** This value is copied from the timestamp counter TSCOUNT *Note: If bit AMXCOPY in register **TSCNTx** is 1, bits TIMESTAMP[15:14] are replaced with a copy of bitfield AMX.*
AMX	17:16	rh	**Analog Multiplexer Setting** This value is copied from bitfield INMUX in register MODCFGx

Field	Bits	Type	Description
TSVAL	31	rh	**Timestamp Valid** Indicates valid timestamp information. 0_B No timestamp trigger occurred since last read access 1_B Timestamp information has been stored after a timestamp trigger
0	30:18	r	**Reserved, write 0, read as 0**

Time-Stamp Counter x

TSCNTx (x=0-13)

Time-Stamp Counter x **(0154_H+x*100_H)** **Application Reset Value: 0000 0000_H**



Field	Bits	Type	Description
TSCOUNT	15:0	rh	**Timestamp Counter Value** TSCOUNT is clocked with the modulator clock and is cleared when a new result value has been generated.
TSCLK	17:16	rw	**Timestamp Counter Clock Selection** 00_B $f_{TSTMP} = f_{MOD}$ 01_B $f_{TSTMP} = f_{MOD} / 2$ 10_B $f_{TSTMP} = f_{MOD} / 4$ 11_B $f_{TSTMP} = f_{MOD} / 8$
TSCRUN	19	rw	**Timestamp Counter Run Control** 0_B Timestamp counter is off 1_B Timestamp counter is counting at the rate selected by bitfield TSCLK
AMXCOPY	20	rw	**Analog MUX Setting Copy Enable** Allows copying of bitfield AMX into bitfield TIMESTAMP (in register **TSTMPx**). 0_B Do not copy, timestamp uses all 16 bits 1_B Copy AMX to bits TIMESTAMP[15:14], timestamp uses lower 14 bits
0	18, 31:21	r	**Reserved, write 0, read as 0**