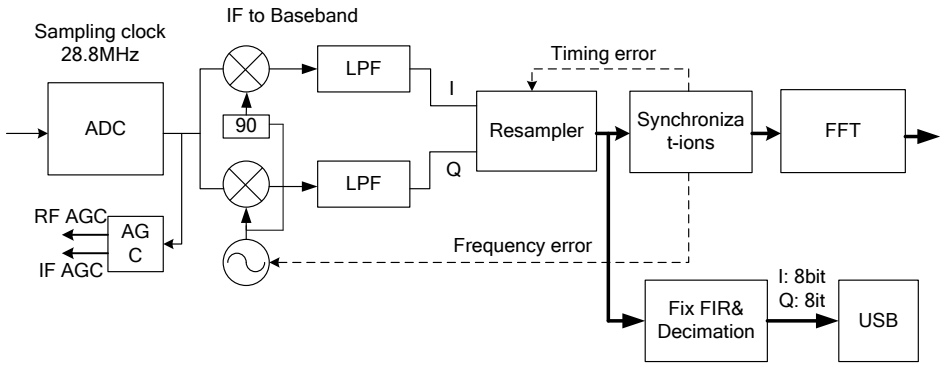

1.1. Digital Down Conversion (DDC)

The Analog-to-Digital Converter (ADC) block sub-samples Intermediate Frequency (IF) signals and a Digital Down Conversion (DDC) block converts the IF to base-band signal.

In normal cases, the tuner is high side mixing and the spectrum is inversed. The demodulator requires an inverse spectrum in the DDC (register *spec_inv*). In RTL2832U there is an adjacent channel canceller that is enabled or disabled by register *en_aci*. The initial IF frequency should be set by register *pset_iffreq*. This register setting depends on the crystal frequency. The equation of *pset_iffreq* is shown below:

$$pset\_iffreq = -floor\left(\frac{f_{IF\_D}}{f_{crystal}} \times 4194304\right)$$

where:

f_{IF_D}: Intermediate Frequency (IF) after sub-sampling

$f_{crystal}$: Crystal frequency

Examples:

- f_{IF}=4.57M, f_{ADC}=28.8M,
  pset_iffreq= -665554 =>2^22 – 665554 = 3528750 (two's complement)= **0x35D82E**
- f_{IF}=36.167M, f_{ADC}=28.8M, f_{IF_D}=36.167-28.8= 7.367,
  pset_iffreq= - 1072897 =>2^22 – 1072897 =3121407 (two's complement) = **0x2FA0FF**
- f_{IF}=36.125M, f_{ADC}=28.8M, f_{IF_D}=36.167-28.8= 7.367,
  pset_iffreq= - 1066780 =>2^22 –1066780 =3127524 (two's complement) = **0x2FB8E4**
- f_{IF}=0M, f_{ADC}=28.8M,

pset_iffreq=**0x0**

- DAB mode:
  pset_iffreq= -1066988 = 3127316 (two's complement) = **0x2FB814**

Table 1. Digital Down Conversion (DDC)

Register Name	Page	Offset{MSB,LSB}	Bits Used	R/W	Default (Hex)	Description
spec_inv	1	0x15	[0]	R/W	0	1: Spectrum inversion 0: Spectrum non-inversion
en_aci	1	0x15	[1]	R/W	1	1: Enable adjacent channel rejection 0: Disable adjacent channel rejection
pset_iffreq	1	{0x19,0x1B}	[21:0]	R/W		Set IF frequency

1.2. Resampler

As the ADC sampling clock is larger than the symbol ratio, there is a re-sampler to convert data of sampling rate to symbol ratio. The ratio could be set by register "*rsamp_ratio*". The *rsamp_ratio* is related with signal bandwidth and crystal frequency. The equation of *rsamp_ratio* is shown as below,

$$rsamp\_ratio = floor\left(\frac{f_{crystal}}{f_{symbol}} \times 4194304\right)$$

where $f_{crystal}$= crystal frequency

f_{symbol}= symbol ratio of different bandwidths

BW: 8MHz➔f_{symbol}=64/7 MHz, $f_{crystal}$=28.8MHz

- *rsamp_ratio* = 13212057 (dec)= **0x C99999**

BW: 7MHz➔f_{symbol}=8 MHz, $f_{crystal}$=28.8MHz

- *rsamp_ratio* = 15099494 (dec)= **0x E66666**

BW: 6MHz➔f_{symbol}=48/7 MHz, $f_{crystal}$=28.8MHz

- *rsamp_ratio* = 17616076 (dec)= **0x 10CCCC**

DAB mode:

- *rsamp_ratio* = 14745600 (dec)= **0x E10000**

Register Name	Page	Offset{MSB,LSB}	Bits Used	R/W	Default (Hex)	Description
rsamp_ratio	1	{0x9F, 0xA2}	[27:2]	R/W	C99999	resampler ratio