

B. Maximum filter length at different configurations

The model filter length and the control filter length are restricted by both computational capacity and the maximum on-chip RAM of the hardware. For different Control strategies, users should be aware of the maximum filter length in case that the active noise control fails because of overflow of the computational or storage burden. The maximum filter length in some commonly used configurations is summarized as follows.

For “Mono” Control strategy, the maximum filter length is shown in Table B.1.

Table B.1 Maximum filter taps in “Mono” Control strategy

Sampling Rate (kHz)	Working channel number (Control channel number equal to Error channel number)	Filter length of both the model filter and the control filter
32	1	1496
16	1	3000
	2	1400
<= 8	1	4096
	2	2048
	3	1360

For “Centralized” Control strategy, the maximum filter length is shown in Table B.2.

Table B.2 Maximum filter taps in “Centralized” Control strategy

Sampling Rate (kHz)	Working channel number (Control channel number equal to Error channel number)	Filter length of both the model filter and the control filter
16	1	3000
	2	800
8	1	4096
	2	2000
	3	800
	4	448
<=4	1	4096
	2	2048
	3	1360
	4	1024

C. TigerANC-Wifi-Q specifications

System Description

TigerANC-Wifi-Q is an active controller equipped with a visual interface. The controller communicates with the interface via Wi-Fi. All control parameters can be set through the interface where the control status also can be viewed. The hardware mainly includes a high-end float-point DSP, which is in charge of the core control algorithms. The controller also benefits from the ultra-low latency of AD/DA conversion, which makes it possible to realize a compact ANC system for many latency critical applications.

Number of Channels

- 6 analog input channels (reference and error inputs)
- 4 analog output channels
- Up to 3 reference signals (from software generated signals or from analog input channels)
- Up to 4 control signals

Adaptive Algorithms

Gradient descent feed-forward control using the FXLMS algorithm

Control Filter Types

FIR

Maximum Tap Length for Control Filters

Depends on the number of channels used

Adjustable Algorithm Parameters

- Cancellation path number
- Cancellation path transfer function taps

- Cancellation path identification signal strength
- Cancellation path identification stepsize
- Control filter number
- Control filter taps
- Control filter stepsize
- Control filter leakage coefficient

Cancellation Path System Identification

Adaptive FIR model with random noise as the excitation signal

Sampling Rates

There are 10 choices of sampling rates varying from 125 Hz to 64 kHz, with optional anti-aliasing low-pass filter

Output Filtering

The white noise generated by the internal signal generator can be high-pass, low-pass and band-pass filtered with 10 pre-defined different filters. Users can load their own filter parameters through a USB flash disk.

Analog Inputs

- Signal maximum is 10Vpp
- AC coupled inputs

Analog Outputs

- Signal maximum is 5 Vpp
- AC coupled outputs

Signal Generator

- 6 sine wave generators
- 1 white noise generator
- Frequency range 0 Hz to 32 kHz
- Generator signal can be set as the sum of the white noise and different sine waves

Saving Data

System data can be saved to “C:\DSPdata”

Signal Display

Software display

- Identification signal level
- Modeling error level
- Reference signal level
- Error signal level
- Cancellation path filters
- Control filters

Hardware

Digital Signal Processor

- Main processor, Texas Instruments (TI) 456MHz TMS320C6748 float-point

Analog Inputs

- 6 analog inputs sampled simultaneously
- 10 V_{pp} input range
- 16 bit precision
- High input impedance
- Selectable analog low-pass filter for each port
- RCA front-panel connectors

Analog Outputs

- 4 analog outputs sampled simultaneously
- 5 V_{pp} output range
- 16 bit precision
- Low output impedance for driving power amplifiers
- Selectable analog low-pass filter for each port
- RCA front-panel connectors

Sampling Rate

- There are 10 choices of sampling rates varying from 125 Hz to 64 kHz, with optional down-sampling low-pass filter

Group Delay

- Minimum of 187.5 μ s with analog low-pass filter @ 16 kHz sampling rate from AD input to DA output

Host Communication

- Visual interface developed by Labview.

Power Supply

- 12V DC power
- Less than 10 Watts power consumption
- IEC power cord connector