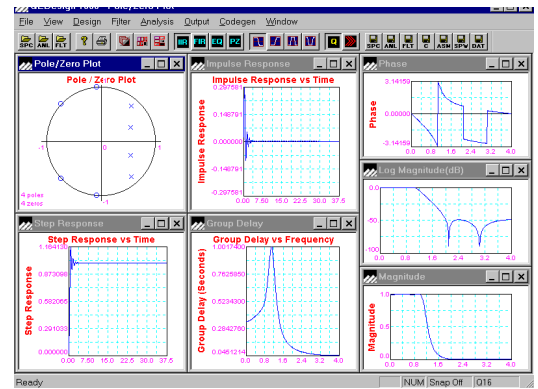


## QEDesign

QEDesign is a family of **easy to use** digital filter design packages for Microsoft's **Windows 9x and NT**.

QEDesign designs **FIR and IIR** filters. FIR filters can be designed using the **Window or Parks McLellan** (equiripple) methods. Many choices of window are supported. IIR filters can be designed using **parallel or cascade structures**, with **direct form I or direct form II** based on a choice of **Butterworth, Bessel, Tchsebyshev, or Elliptic** designs: **bilinear and impulse invariant design** methods are supported.

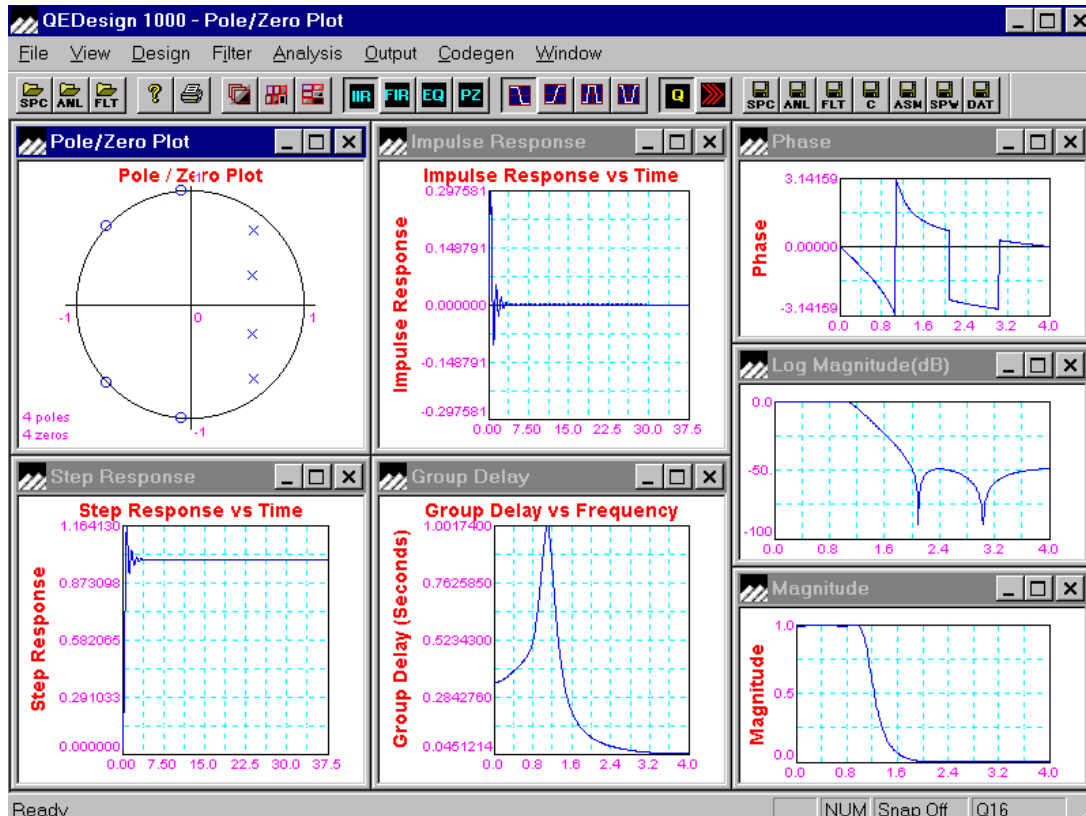
Filter design requires very **accurate calculations**: QEDesign uses **64 bit floating point arithmetic** throughout, with **128 bit for critical design areas**. It also correctly takes account of **quantization of coefficients** and can model the effects including scaling and grouping to minimize quantization error.



### Features:

- FIR and IIR filter design
  - cascade and parallel IIR forms
  - window and equiripple FIR design
  - coefficient quantization and modelling
  - **optional DSP code generators \***
  - **arbitrary magnitude and group delay designs \***
  - **raised cosine FIR window designs \***
  - **z domain and s domain filter specification \***
  - **graphical design by pole/zero placement \***
- (\* = not in QEDesign Lite version)
- QEDesign Lite is a simple 'starter' package
  - QEDesign 1000 will suit most users
  - QEDesign 2000 is an advanced package for power users.

Details and demo software are also available on line:  
<http://www.mds.com/software/qedesign.htm>



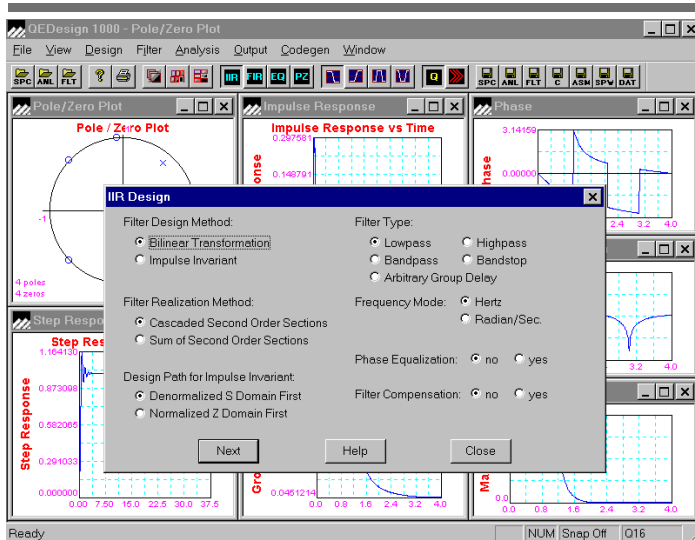
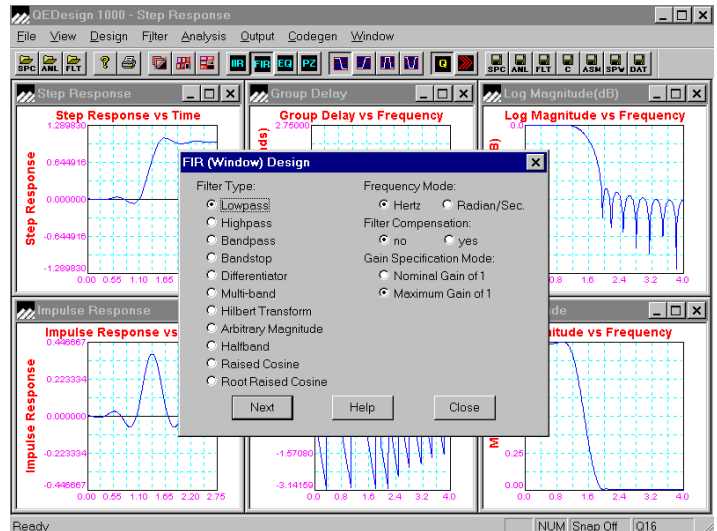
# QEDesign data sheet

## FIR filter design

QEDesign supports FIR filter design by the **window** and **Parks McLellan** (equiripple) methods.

Many window functions are available including **Hanning, Hamming, Blackman, Harris, Kaiser and cosine** windows. FIR designs include **arbitrary magnitude, hilbert, halfband, and raised cosine** shapes. Window filters **up to 8192 coefficients** can be designed.

The Parks McLellan design has choices to allow **modification of the 'equiripple' characteristic** and to **specify roll off**. The program uses extended arithmetic - essential in the design of long filters. Parks McLellan filters can be designed with **up to 4089 coefficients**.



## IIR filter design

QEDesign 1000 supports IIR filter designs using the **bilinear** and **impulse invariant** methods, based on **Butterworth, Bessel, Tschbyshev and Elliptic** prototypes.

IIR designs can be **cascade or parallel**, using either **direct form I or direct form II** implementation.

IIR filters can be specified by band attenuations, or through **direct input of z domain or s domain parameters**.

**IIR filter orders up to 80** (low and high pass) **or 160** (band and arbitrary group delay) can be designed.

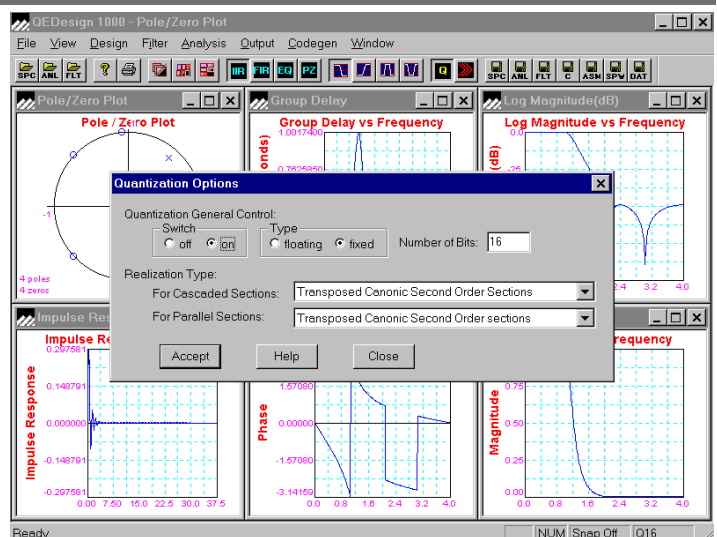
## Coefficient quantization

QEDesign 1000 handles **coefficient quantization** from **8 to 32 bits** in **fixed and floating point** format, and models the effects of quantization on the filter's actual response.

Filters can have nominal or maximum gain of 1, and **scaling for quantization effects**.

For selected filter types the **transition regions** can be specified.

Output **coefficient files are ASCII text**. Optional **DSP assembler and C code generators** are available.



QEDesign data sheet.fm - preliminary, 28th March, subject to change