

Custom Measurements

Create Custom Processing Functions In Your WaveMaster

One of the most exciting capabilities of the WaveMaster™ family of digital oscilloscopes is the ability to create custom processing and measurement functions using a variety of third party software tools such as Visual Basic or MatLab. Scripts created with any of these programs can be embedded in the scopes processing chain and run just like the internal math functions. The scripts use an automation interface based upon Microsoft's Component Object Module (COM) standard. This common automation interface works across panel setups, remote operation as well as internal scripting.

Custom math functions can be accessed with WaveMaster scope equipped with the XMAP, Master Analysis functions option. Figure 1 shows the math setup dialog box including the Wave script selection which supports custom math definitions based on Visual Basic scripts. This math function

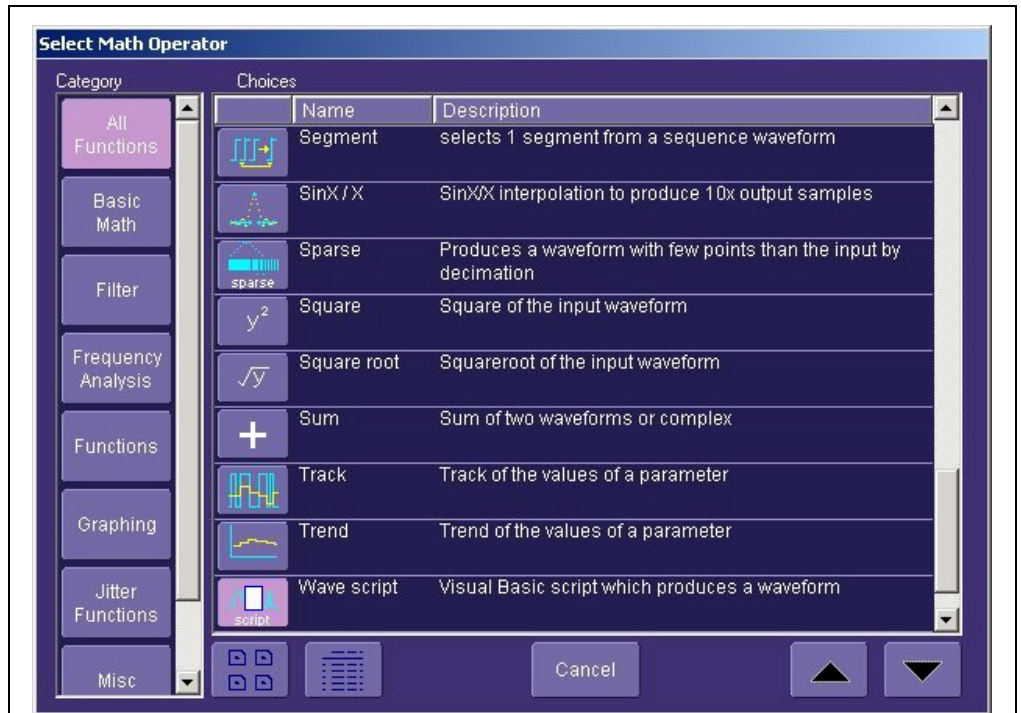


Figure 1 Evoking the Wave Script math function which allows Visual Basic scripts to be used in creating custom processing and measurement functions

provides an input data array from any of the WaveMaster's input or processing functions. The output of the Vbscript is another array which will be accepted by the WaveMaster.

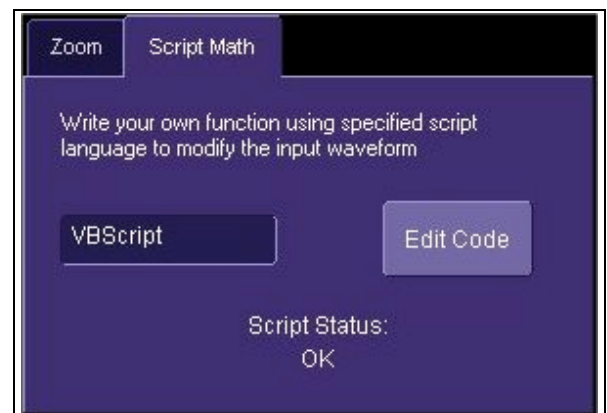


Figure 2 The Wavescript editor selection

Once the Wave script function is selected the math setup offers access to a Visual Basic editor, shown in figure 2. Pressing the Edit Code button allows the user to access the text editor. At this point the user can enter the code manually or by importing a Visual Basic file, with a .vbs extension. Figure 3 shows a part of a Visual Basic script for displaying an FFT function using a logarithmic frequency axis. The input of this function is a data array from an FFT function, which is normally displayed with a linear frequency axis. This function takes the FFT display and converts the frequency axis to a logarithmic scale. The math setup also displays execution status in the Wavescript menu. It lists any interpreter errors in the area marked script status.

This script is executed whenever this math function is evoked. The results are illustrated in figure 4. If a setup file is saved this script will be included. So once the script is written and debugged, it can be reproduced very simply by

```

Script Editor
oldk = 1
For i = 1 To endData - 1
  ii = csng(i)
  y = unscaledData(i)
  k = endData + (endData/Decades)*(log(ii/ed)/log10)
  ki = k
  deltak = ki - oldki : deltax = y - oldy
  if deltak > 1 then
    for n = 0 to deltak
      m = n + oldki
      if ((m>1) and (m<endData)) then
        newDataArray(m) = oldy + (deltax * n) / deltak
      end if
    next
  else
    if ((k>1) and (k<endData)) then
      newDataArray(k) = y
    end if
  end if
  oldki = ki : oldy = unscaledData(i)
Next
OutResult.DataArray(False) = newDataArray
    
```

Clear Load Save Apply Close

Figure 3 Part of a VBscript for displaying an FFT function on a logarithmic axis

saving and recalling the scope setup.

This is a simple illustration of a very significant capability in a digital oscilloscope. In earlier instruments custom math functions could only be executed external to the instrument. Wavemaster's Xstream™ technology allows this

functionality to be incorporated within the instruments as an extension of the existing math functions.

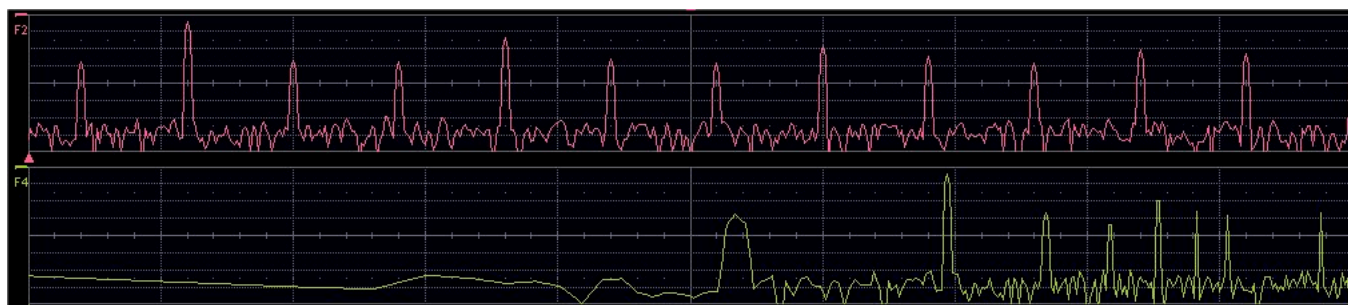


Figure 4 The output of the Visual Basic script converts the frequency axis of the FFT from linear to logarithmic and displays it on the scope display.