

08/31/2005 - from the TEF List Serve
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There has been some question as to why one would want to buy a TEF25 vs a TEF20 and I'd like to post some information that can help each of you make an informed decision on the subject.

While the TEF20 is a fine device, please, remember it is a design that is over 15 years old, having been first introduced in 1990. In its day it was truly revolutionary as DSP was in its first beginnings, 16 bit at 48KHz sample rate; man what a rocket! Made and programmed by long hairs and nerds with slide rules there was a number of firsts in its creation. But face it, how many of you have anything, other than a TEF10/12, that's computer oriented that you still rely on today to get your work done? Precious few I'd bet. Hey, don't get me wrong I still love mine but the airlines don't. Almost all airlines have a 50 lb. limit on luggage and by the time I get the rest of the stuff I need together my rig typically comes in at 69 lbs; and I still have to sacrifice things to get down to that. Did I mention the Jensen 123BLCF transformer I carry around to balance the BNC output of my TEF; that alone weighs 1.5 Lbs.

It has always piqued me that the TEF20 has BNC connections and I have to carry around all kinds of adapters to function in the audio world. Did I already mention that the output is un-balanced?

Interface in the TEF20 is Serial or Parallel for practical purposes. How many of you still actually have serial ports on your portable computers? How many new portable computers have serial ports? For that matter how many new computers have Parallel ports on them? Of course Gold Line offers a USB to HI interface for the TEF20 as an optional piece of equipment but it is slower than the interface on the TEF25 and is just another of those things you can forget when you go out the door.

The long term serviceability is also a concern. The Crown TEF20s actually have some components inside of them that are no longer available from the manufacturers and some of the sockets and connections can become trouble prone. Gold Line units will be facing the same situation in the future as well.

As for computational capacity the TEF20 has a Motorola 56001 operating at 27Mhz. This resource is set and will not ever have any greater capacity. The DSP code for the 56001 is old and very stringy and largely undocumented. This has deterred the TEF20 from actually having the ability to do other measurements. Again, a testament to the vision of the original programmers that it has been able to persist as long as it has and do as much as it does.

So, let's take a look at the short list of differences between the TEF20 and the TEF25.

	TEF20HIPC	TEF25USB	DIFFERENCE
Weight:	10lb.7oz	2lb.	-8lb.7oz 525% LESS
Bandwidth:	~22KHz	~96KHZ	+74KHz 400% Wider
Sample Rate:	FIXED	VARIABLE	More versatile
Resolution:	16 Bit	24 Bit	+8 bits 50% More
Mic Inputs:	2 @ Max +2dBv	2 @ Max +4dBv	+2dB More versatile
Line Inputs:	2 @ Max +2dBv	2 @ +24 dBv	+20dBv Greater range
Outputs:	1 @ +2.2dBv un-bal	2 @ +8dBv (2.5 volts)	XLR Balanced outs
Dual Channel:	Synchronous	Selectable	True Dual Channel operation

In almost every respect the TEF25 out weighs the TEF20; except in size and weight. The TEF25 is 5 times less weight than the TEF20 and less than one quarter the size.

The TEF25 is more suited to audio work than the TEF20 with its wider range and audio standard connections. Its wider bandwidth will allow for greater measurement capabilities.

The TEF25 will continue to be compatible with computers for the foreseeable future. Since the computational processing is not inside of the TEF25 the capabilities and capacities will continue to increase with the continuous growth in computer hardware. We have finally removed the measurement processing out of the TEF box and brought it into the host computer to take advantage of the enormous resources being exerted in forward development in general computing. This will free the TEF from growth limitations based on internal computational capacity.

The input settings in the TEF25 are under software control and set in their increments. This allows the TEF25 to be calibrated and to be used without the need for field calibration to have reasonable confidence of the levels you are obtaining. The recent thread about calibrators on the SAC list is fueled by other I/O units that do not offer incremental set preamp gains. Not to say that calibration isn't a good practice.

Although the TEF25 is relatively new its potential to allow for growth far exceeds the TEF20. While there have been some minor modifications needed at the onset the box, as it is today, is stable and reliable. Hey, the TEF20 went through 3 significant redesigns in its early deployment. There will be further expansion of the TEF25 capabilities when the ASIO driver is written for the unit allowing it to be used with other audio processing software; but that is not a hardware change as the TEF25 is already capable of supporting that driver once it is written. It has not been written as of yet as the resources at Gold Line have been focused in getting the software and hardware to work with the existing software packages. That has largely been accomplished and although there will be a process of getting all of the various packages through a review and testing process most work now with the TEF25 and that will only improve as time goes on.

And finally, the price of the TEF20 is \$ 4,150.00USD and the TEF25 is \$ 1,400.00USD. The TEF25 is one third the cost of the TEF20.

My Conclusions:

Frankly I wanted to see the TEF20 be replaced well before now but, as evidence to its robustness, it has endured. I, for one, did not want to have the calibration issues that arise from using some of the general audio interfaces out there and the nature of TDS required absolute synchronization during measurements and there wasn't anything available that had that attribute. The TEF20 has continued to be useable just long enough to allow development of the TEF25. It was absolutely essential that the TEF processing be brought out of the Hardware Interface box and into the Host Computer environment; the TEF25 does that.

Am I saying go out and trash your TEF20?, absolutely not. What I am saying is that it is long in the tooth and keeping them functional and able to communicate with new computers will only become more difficult as time goes on.

I see the TEF25 as the next step in the evolution of TEF and the furtherance of TDS as well as other measurement capabilities. While I expect there will be some deployment issues they should be quite minor and rapidly correctable in course.

It is up to you to make your own conclusions and I and the folks at Gold Line will be available to answer your questions as you need.

PS: Listed below is a synopsis of the TEF20 and TEF25 specifications. Please feel free to go to the Gold Line website and check them out for yourself.

TEF20HI:

The TEF20 is a 16bit/48KHz fixed sample rate machine.
Digital signal processor Motorola DSP56001, running at 27 MHz
Digital-to-analog converter 16 bits, 8 times over-sampled
Analog-to-digital converter 16 bits, 64 times over-sampled (synchronously sampled 2-channel)
Data format IEEE floating point, 24-bit mantissa, 8-bit exponent
Data sample rate 48 kHz, fixed
Dynamic range 96 dB
THD + noise -85 dB at 1 kHz (0.006%)
It has 4 inputs and one output.

The microphone inputs are on XLRs and have phantom power applied to them constantly, unless you remove the cover and relocate a jumper, in which case both channels either have Phantom Power or don't. Their maximum input is 1V RMS with a maximum gain of 64dB in 4dB steps. Input impedance is 6.8K ohms with Phantom power on and 100K with phantom power off.

The Line inputs are on BNC connectors and are unbalanced. There is no gain available and the MAX input level is 1V RMS. Input impedance is 1M ohm in AC and 2M ohm in DC.

The Single output is delivered on a BNC connector and has a source impedance of 50 or 0 ohms. The maximum output is 1v RMS.

The weight is: 10 lbs. 7 oz. (4.73 kg) and the size is: Dimensions 17" x 12 3/8" x 1 3/4" (43.2 cm x 31.4 cm x 4.4 cm)

The unit requires 100-240V AC electrical supply.

Communications are RS232 Serial, Proprietary Host Interface (HI), Parallel port or OPTIONAL USB1 to HI port adapter.

There are major parts that are no longer manufactured for the Crown manufactured units and service life will be limited. The GL manufactured units are still fully serviceable at the present time.

TEF25:

Sample Rate: A/D 24 Bit - 48kHz to 192kHz Variable
Sample Rate: D/A 24 Bit - 48kHz to 192kHz Variable
On Board DSP: 75Mhz 75MIPS

Frequency Response: 6Hz to 90kHz $\hat{A}\pm$ 1dB
Signal to Noise: > 114dB Unity Gain, ref +4dBV, 1kHz
THD + Noise: < 0.1 +4dBu 1kHz
Noise Floor: -130dBV
Dynamic Range: > 114dB
Gain: 60dB Selectable Stages, 1dB steps

INPUTS: 4

Micphone: X2 XLR Active Balanced/20k Ohms Max Input: +4 dBV
Line: X2 TRS Active Balanced/20k Ohms Max Input: +24 dBV

OUTPUTS: X2 XLR Servo Ballanced 100 Ohms/leg Max Out +8dBV (~2.5V)

Size / Weight: 6.75"(W)x 5.25"(L)x 2.25"(H) 2 lbs.

Unit powers directly from most USB ports on the host computer. When powered from the computer only the Phantom power is +24VDC at the XLR inputs. When powered from an external +12VDC @500ma power supply the phantom power delivers a full +48VDC to the phantom powering of the Microphone inputs.

The interface is USB2.0, which is available on most moderately current computers and will be for some time to come.