September 2012

Issue: 4

THE FLEX INSIDER

In This Issue

What is a GPSDO and Why Would I Want One?

Home Networking Survey

FLEX-6700 Signature Series Jacket Survey

Can I Pay Down My Order?

Upcoming Events

October 6, 2012
Belton Hamfest
Belton, TX

October 12-14, 2012
Pacificon
San Jose, CA

November 3-4, 2012
Stone Mountain Hamfest
Lawrenceville, GA

November 10, 2010
HamJam 2012
Lawrenceville, GA

November 17-18, 2012
Fort Wayne Hamfest
Fort Wayne, IN

A Word from our CEO

Dear Customer,

I'm thinking of taking up juggling... It can't be that much harder than what we've been up to this last month! A host of hardware performance numbers to be measured... SmartSDR™ software to be integrated... Production issues to be dealt with... There are a million details that go into turning a dream into an amazing SDR radio product. Ok, so maybe not a million - But a lot of them! It's very exciting watching the team here at FlexRadio work through the details in preparation for the FLEX-6000 Signature Series™ release. Some days it's a real circus in the lab! The good news is that we haven't dropped any balls and it's all coming together nicely. I hope you are getting as excited as we are! In addition this month, we released the new PowerSDR v2.4 software for the FLEX-Series™ radios. The feedback on the improved DSP and CW performance with the new FireWire driver has been very positive. It's just one more ball to keep in the air, but definitely worth the effort. Well, back to my juggling act. Enjoy this month's FlexInsider!

73,

Gerald Youngblood, K5SDR
President & CEO

What is a GPSDO and Why Would I Want One?

- by Steve Hicks - N5AC, VP Engineering

All radios need one or more oscillators that are ultimately used to set the frequency where you will be listening or transmitting. If these oscillators are off frequency then you will be listening or transmitting off frequency. How far off frequency? You can tell how far you are likely to be off by looking at the stability of the oscillator and which frequency you are on. For example, if the oscillator is rated as five parts-per-million (5ppm) and you are listening on 1MHz (one million Hertz), you could be off as much as 5 Hz. A typical temperature controlled crystal oscillator (TCXO) for an amateur HF radio is 0.5ppm. To calculate how far off you

might be on 20-meters, again we just multiply the accuracy in ppm by the frequency in MHz, or 0.5 x 14.2 = 7.1 Hz. Over time, all oscillators will also drift. These drift specifications are sometimes forgotten, but they are additive to the stability specifications. Aging in a 1-5ppm oscillator are often in the same range of 1ppm or so. So 10 years after purchase, your radio can drift an additional 5-10ppm (70-140Hz). If this drift is the "bad" about TCXOs, the good is that they have very good short-term stability. So even though they can drift a lot over a long period of time, in the short term they are very stable.

Most amateurs know that a Global Positioning System (GPS) receiver can help out with this problem. A GPS receiver is designed to solve a system of equations that have variables of time and position. A GPS receiver becomes "locked" when it finds a solution to these equations. The result is that the receiver knows precisely what time it is and where it is. If the GPS receiver continues to track satellites, it will continue to maintain good time and position information. But it is interesting to note that as the GPS solves the equations, there is short-term drift caused by a number of factors. This jitter presents as short-term instability that, should we rely solely on a GPS for frequency data, would be continually moving around our transmit or receive frequency. So in a sense, a GPS receiver is the opposite of a TCXO --- it has bad short term stability and good long-term stability.

The GPS Disciplined Oscillator (GPSDO) is the melding of these two worlds to create something with both good short term and good long term stability. How does this work? Because of the aging problem, most TCXOs have either a voltage steering line that allows the frequency to be adjusted with a voltage or a variable control that can be adjusted with a screwdriver. What if we used a microprocessor to compare the TCXO frequency output to that from a GPS and made adjustments over time to the TCXO to keep it in line for long-term stability? This is exactly what a GPSDO is. The GPSDO module for the FLEX-6000 achieves 0.005ppm stability as long as the GPS has an antenna connected and at least one GPS satellite is in view. Comparing with just a TCXO as we did before, we might be off by 72 milli-Hertz (0.072Hz) on 20-meters. So this is the first key benefit of a GPS receiver in the radio: you will always be on frequency.

The second benefit from a GPSDO is the ability to get precise time information. Having the current time is important for a number of ham applications such as contest logging or digital modes and a GPS can help with this. It can also be used to time-stamp data coming out of the radio. Why would you want to do this? Let's say that you are a net control station on HF and you are coordinating information from a large geographic area. Even with a good station, propagation can work against you and make it difficult to talk to certain geographic areas. Often there are others that are in a HF net that can hear other participants and these other operators can perform the relay service: they offer to relay the message from the station the net control cannot hear to the net control. But what if this could be done in a more automatic fashion?

What if we could take the RF signal from that operator and send it,

timestamped, to the net control and his radio could either select between or combine the RF stream from his radio and the remote radio in order to hear better. Performing these operations is easier if you have good information about the relative time differences in the data and have data that is at the same exact sampling rates. There are three pieces of information required to achieve this: the current time, a precision oscillator and an indication for the start of each second of time (1PPS), all of which are provided with the internal GPSDO from FlexRadio. By using a GPS to synchronize the oscillators at both stations and to time-stamp the data, we are able to make better decisions about how best to combine these two RF streams. While this capability (optimal combining) will not exist with the first release of SmartSDR, it is something that will evolve over time.

Home Networking Survey

- by FlexRadio Engineering/Support

In order to better understand and support our customer environments, FlexRadio Systems invites you to respond to our Home Networking Survey. Your responses are anonymous unless you opt-in to our follow-up call option at the end of the survey. In this case, all information collected will be held in strict confidence and not utilized for marketing purposes. To participate in the survey click on the following link or cut and paste it into your browser. Thank you in advance for your time and participation.

http://survey.constantcontact.com/survey/a07e6bkz4iwh6gt5og9/start

FLEX-6700 Signature Series Jacket - Order Survey

Thank you to all those Flex owners that have taken the time to fill out your jacket order specifications. As a reminder, of those FlexRadio enthusiasts that pre-ordered a Limited Edition version of the FLEX-6700 Signature Series transceiver, we are in the process of collecting your information for production of your FLEX-6700 Signature Series jacket. If you haven't already done so, please click on the following link or cut and paste into your browser and take our quick survey. This will allow us to get your jacket into production so it is ready to ship with your radio. Thank you.

FLEX-6700 Jacket Order Survey

If you have questions on sizing here is a link to our supplier's sizing chart.

http://www.apparelvideos.com/cs/CatalogBrowser?todo=ss&productId=J764

- FlexRadio Marketing

Can I Pay Down My FLEX-6500 / FLEX-6700 Order?

We've received numerous calls asking if we will accept additional monies towards the down payment on your FLEX-6XXX order. The simple answer is yes. If you would like to arrange for an additional payment or work out a payment plan please contact your sales representative or call our accounting department at 512-535-4713, ext. 204.

FlexRadio Systems
4616 W. Howard Lane, Ste. 1-150
Austin, TX 78728
512-535-4713(main), 512-233-5143 (fax)
www.flexradio.com / sales@flexradio.com