<u>Software for Contesters – January/February, 2009</u>
<u>Exploring Windows XP to Solve Problems</u>

2008 was quite a year for amateur radio software – here's hoping that 2009 is as exciting. Probably the biggest single software event of the year was the birth of VE3NEA's *CW Skimmer* , but the most important may have been the emergence of software-defined transceivers into the mainstream of amateur radio. It's not that there haven't been SDRs around before, and a growing number of brave souls either homebrewed their own or were early adopters of the first commercial products. Beginning with the Ten-Tec Orion I and II, hybrid SDR/hardware transceivers have set the standard for receiver performance. But from a contester's perspective, the idea really came to maturity with the arrival of Elecraft K3, which showed just how good such radios can be for contesting. What makes the K3 such a big step forward? I'd say hardware and software excellence, strong technical support, and an affordable price, not necessarily in that order.

Anyway, back to software. One of the ways I spent my summer vacation was experimenting with *CW Skimmer* , and particularly trying to understand the amount of CPU demand that it imposes on a single-core computer. This was complicated further by my discovery that something on my computer was causing momentary breaks in the USB data stream between my SDR-IQ SDR and the computer. This caused "Ts" to be decoded as "EE", "D's" to turn into "B's", and all sorts of other decoding mischief.

I really needed a tool for looking more closely at what was going on inside my computer. My starting point, like most folks, was the *MSCONFIG* utility that is part of Windows XP (probably Vista, too, but I have no experience with that). After I spent hours modifying the computer's start-up procedures, re-booting each time, checking the CPU demands, and doing it all over again, I decided that I needed a better toolkit.

After a bit, I discovered *Process Explorer*, part of a freeware system internals suite on the Microsoft web site (http://technet.microsoft.com/en-us/sysinternals/default.aspx). You can elect to install it to replace XP's *Task Manager*, or run it as a separate program. Either way, it provides a large measure of insight and control over the things that happen out of sight in your computer. I used it to track how much CPU capacity *CW Skimmer* was using, and to identify other processes burdening the machine that could readily be shut off. *Process Explorer* lets you stop and restart processes quickly, so that you can see in real time what effect it has.   Figure 1 gives you a sense of what it can do. You can also reset the relative priority of individual processes, which is very cool for trying to make a demanding program like *CW Skimmer* and a powerful contest logging program coexist on the same machine.

Process Explorer - Sysinternals: www.sysinternals.com [PETE\Pete Smith]

File   Options   View   Process   Find   Handle   Users   Help

Process ▲	PID	CPU	Description	Company Name
aawservice.exe	1756		Ad-Aware Service	Lavasoft
AcroRd32.exe	5852		Adobe Reader 8.1	Adobe Systems Incorporated
AcroTray.exe	1432		AcroTray	Adobe Systems Inc.
alg.exe	3276		Application Layer Gateway Service	Microsoft Corporation
csrss.exe	648		Client Server Runtime Process	Microsoft Corporation
ctfmon.exe	2616		CTF Loader	Microsoft Corporation
CwSkimmer.exe	2128	2.60		
CwSkimmer.exe	5240	10.39		
D4.exe	2456		Dimension 4	Thinking Man Software
DPCs	n/a	2.60	Deferred Procedure Calls	
DSAgnt.exe	3036		Dell Support	Gteko Ltd.
Eudora.exe	3428		EUDORA	QUALCOMM Incorporated
EXCEL.EXE	3024		Microsoft Excel for Windows	Microsoft Corporation
explorer.exe	1540	1.30	Windows Explorer	Microsoft Corporation
firefox.exe	3568	2.60	Firefox	Mozilla Corporation
GA311.exe	3228	3.90	NETGEAR GA311 Configuration Utility	
GhostStartService.exe	1064		Norton Ghost Start	Symantec Corporation
GhostStartTrayApp.exe	1532		Norton Ghost Start	Symantec Corporation
GoogleToolbarNotifier.exe	2536		GoogleToolbarNotifier	Google Inc.
GoogleUpdaterService.exe	1076		gusvc	Google
hpztsb04.exe	1420			HP
Interrupts	n/a		Hardware Interrupts	
IonoProbe.exe	2832		Space weather monitor	Afreet Software, Inc.
iPodService.exe	3724		iPodService Module	Apple Inc.
iTunesHelper.exe	224		iTunesHelper Module	Apple Inc.
IviRegMgr.exe	1172		RegMgr Module	InterVideo

Type ▼	Name	
WmiGuid		
WindowStation	\Windows\WindowStations\WinSta0	
WindowStation	\Windows\WindowStations\WinSta0	
Token	PETE\Pete Smith:160d2	
Token	PETE\Pete Smith:160d2	
Token	PETE\Pete Smith:160d2	
Token	PETE\Pete Smith:160d2	
Token	PETE\Pete Smith:160d2	
Token	NT AUTHORITY\SYSTEM:3e7	
Timer		
Timer		
Thread	winlogon.exe(672): 5132	

CPU Usage: 40.26%   Commit Charge: 40.73%   Processes: 73

There turned out to be three problems with Process Explorer for this particular project – for some reason, it causes regular interruptions in the flow of USB data, far more serious than the intermittent interruptions I was trying to troubleshoot. Clearly, I couldn't use it for that. I also discovered that any priorities you reset with it only last until the program is shut down. And finally, it uses about 10 percent of my CPU's capacity all by itself.

Before I leave this topic, let me suggest you go to the URL I listed above – the "sysinternals" suite includes a lot of problem-solving stuff that sounds intriguing, but that I haven't had time to try. For example, there is a program called *Autoruns* that gives you a lot of insight into the programs that start each time you start your computer. Software writers have become promiscuous about writing "quickstart" programs that run in the background, consuming "just a few meg" of memory. Now you can ferret them out easily.
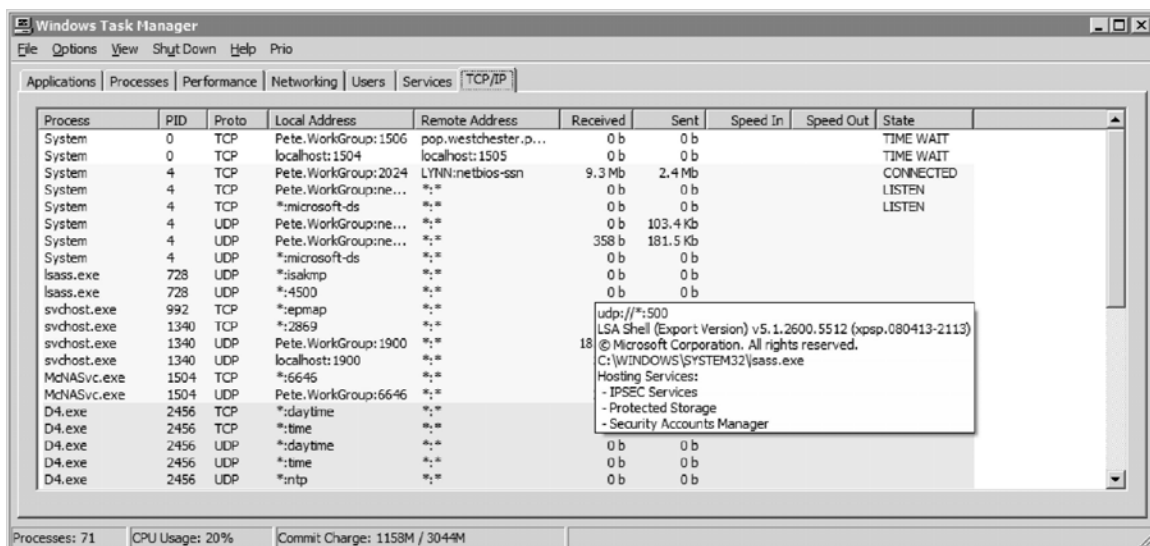
Since I still needed to fix the *CW Skimmer* problem, and particularly because I wanted to be able to set its priority permanently, relative to other programs, I kept looking until I found *PRIO* (http://www.prnwatch.com/prio.html). This is another

piece of freeware – unlike *Process Explorer*, it does not run by itself, instead running as part of the regular Windows *Task Manager*, which it modifies to include a flock of additional capabilities. You run the *PRIO* installer once, it puts a few DLLs on your system and links them to *Task Manager*, and from then on you just hit Ctrl+Alt+Del to bring up the *Task Manager* (If you want to get rid of *PRIO*, an uninstaller program is included that puts everything back the way it was).

PRIO causes no detectable interruption to the USB data flow. The modified *Task Manager* only uses 1-3 percent of my CPU capacity, and when you modify a program's priority with *PRIO*, it stays changed until you change it again. Very nice.

An illustration of why this matters. I originally used *PRIO* to set the priority of *CW Skimmer* at "high", because I found this made the USB data pretty much immune from any breaks caused by other program activity. Then I got into CW Sweepstakes, and discovered that with *CW Skimmer* running, there was a perceptible delay in running relatively software-iuntensive SO2R operations, such as calling a station on the S&P radio in the midst of a CQ on the Run radio. I was consistently a couple of tenths of a second late, and that just wouldn't do!

After the contest, I experimented with PRIO, and discovered that I could run *CW Skimmer* at "above normal" rather than "high" priority, while regaining normal responsiveness in N1MM Logger. I'm still experimenting with this setting to make sure it doesn't introduce an unacceptable error rate in *CW Skimmer* , but the signs are good so far. Figure 2 gives a glimpse at PRIO. You'll note that one of the added tricks is a way to monitor IP traffic – I was surprised to find out how many processes are open to the Internet during a normal computer session.

 These tools seem pretty far outside the normal interest range of contest operators, until you need one. I hope you find this useful.