

Using Aggregator with the Reverse Beacon Network

Version 6.0
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Based on Aggregator 6.0

Dick Williams, W3OA
Pete Smith, N4ZR

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1.0 Introduction This document provides instructions on how to send spots from various forms of Skimmers to the Reverse Beacon Network (RBN) servers using the Aggregator program provided by the RBN team. This document is mainly a compilation of many of the posts by Pete Smith, N4ZR, on the Reverse Beacon blog (<http://reversebeacon.blogspot.com/>) updated as necessary to cover the current version of Aggregator.

2.0 What Aggregator Does Aggregator is a Windows program that performs the following functions:

- Establishes a telnet connection to one or multiple Skimmer programs to receive spots. These sources may be CW Skimmer, Skimmer Server, RTTY Skimmer Server, RCKskimmer, or an external program which in turn connects to other spot sources.
- Monitors several UDP ports for messages containing FT4 and FT8 spot data.
- Processes and filters the spots in a number of ways determined by the operator.
- Forwards selected spots to the RBN server via an Internet connection.
- Provides facilities for external programs to monitor the spot flows via a telnet connection.
- Provides the capability to change a Skimmer's .ini file at scheduled times.

3.0 Basic Skimmer Setup The following paragraphs describe the actions needed to make sure Aggregator can communicate with the various versions of Skimmer. They are based on the assumptions that Skimmer is already set up and operating according to the relevant set of Skimmer instructions.

3.1 CW Skimmer Aggregator receives spots via a telnet connection with CW Skimmer. So it's important that CW Skimmer's telnet connection is enabled by placing a check in the top check box in CW Skimmer's Settings window, Telnet tab (see Figure 3.1). Aggregator also sends a SKIMMER/SETT command to Skimmer to find information about the Skimmer such as the operator's callsign, the location, etc. So the Allow SKIMMER commands check box must also be checked. Then click the OK button.

3.2 Skimmer Server Skimmer Server's telnet server is always enabled and telnet commands are always allowed so the actions described in paragraph 3.1 for CW Skimmer are not needed for Skimmer Server.

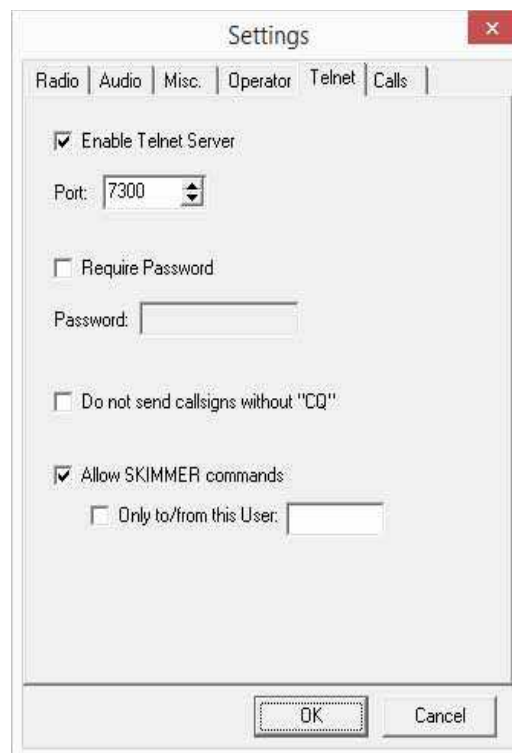


Figure 3.1 CW Skimmer

3.3 RTTY Skimmer Server As with Skimmer Server, RTTY Skimmer Server's telnet server is always enabled and telnet commands are always allowed so the actions described in paragraph 3.1 for CW Skimmer are not needed for RTTY Skimmer Server.

3.4 RCKskimmer You also need to enable the Telnet server in RCKskimmer. Do this by clicking Setup, then Program Setup, then clicking the Expert tab. Check the Expert Setup Options at the top of the tab and you will see a Telnet box at the bottom of the tab. Click the Enable Telnet Server check box and then the Apply Button.

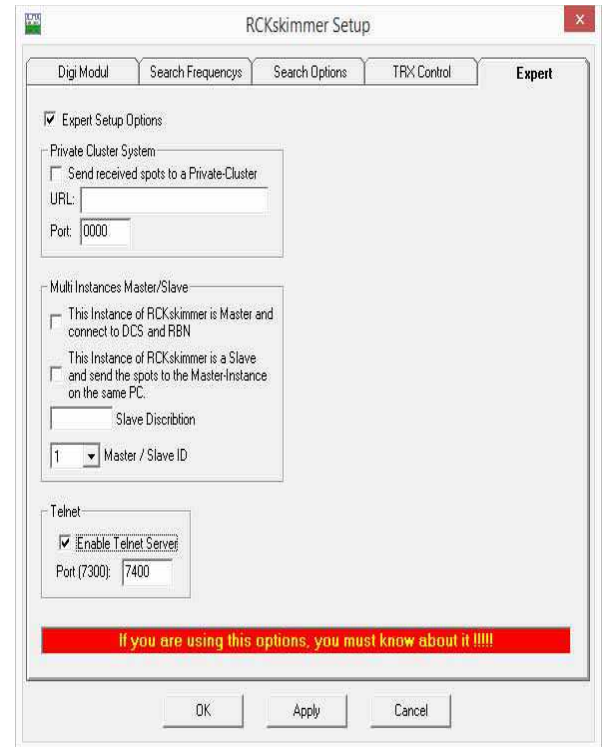


Figure 3.2 RCKskimmer

4.0 Aggregator Basic Setup

4.1 Getting Aggregator Aggregator is available for no charge at the RBN web page. Go to <http://www.reversebeacon.net/> and click on the “downloads” tab. You will get the .exe program file.

4.2 Installing Aggregator The .exe program you downloaded is ready to run when you receive it. It makes no changes to the system registry and does not require an installer. Save the file where you want it to live. Users of Windows version more modern than XP need to put the .exe file in a folder where the operating system will allow Aggregator to write files. That means almost anywhere but the Program Files directory - many operators use C:\Ham Radio\ as an alternate location, to avoid these issues.

You must also have Microsoft's .NET, version 4.0 or later, installed on your computer. .NET is a free download from <http://www.microsoft.com/net> .NET is included in Windows 10 installations.

Some security software (Norton Security's SONAR, for one) will try to block Aggregator from running, and

may even remove it from the installed location. These packages make their "decisions" based on what they regard as "risky software behavior." If you run into this, you will need to tell the busybodies that you know best; all these security software packages have provision for reversing their "decisions."

You may also want to put a shortcut to Aggregator on your Desktop.

4.3 Initial Configuration The first time Aggregator runs it will open with the Connections tab showing as in Figure 4.1.

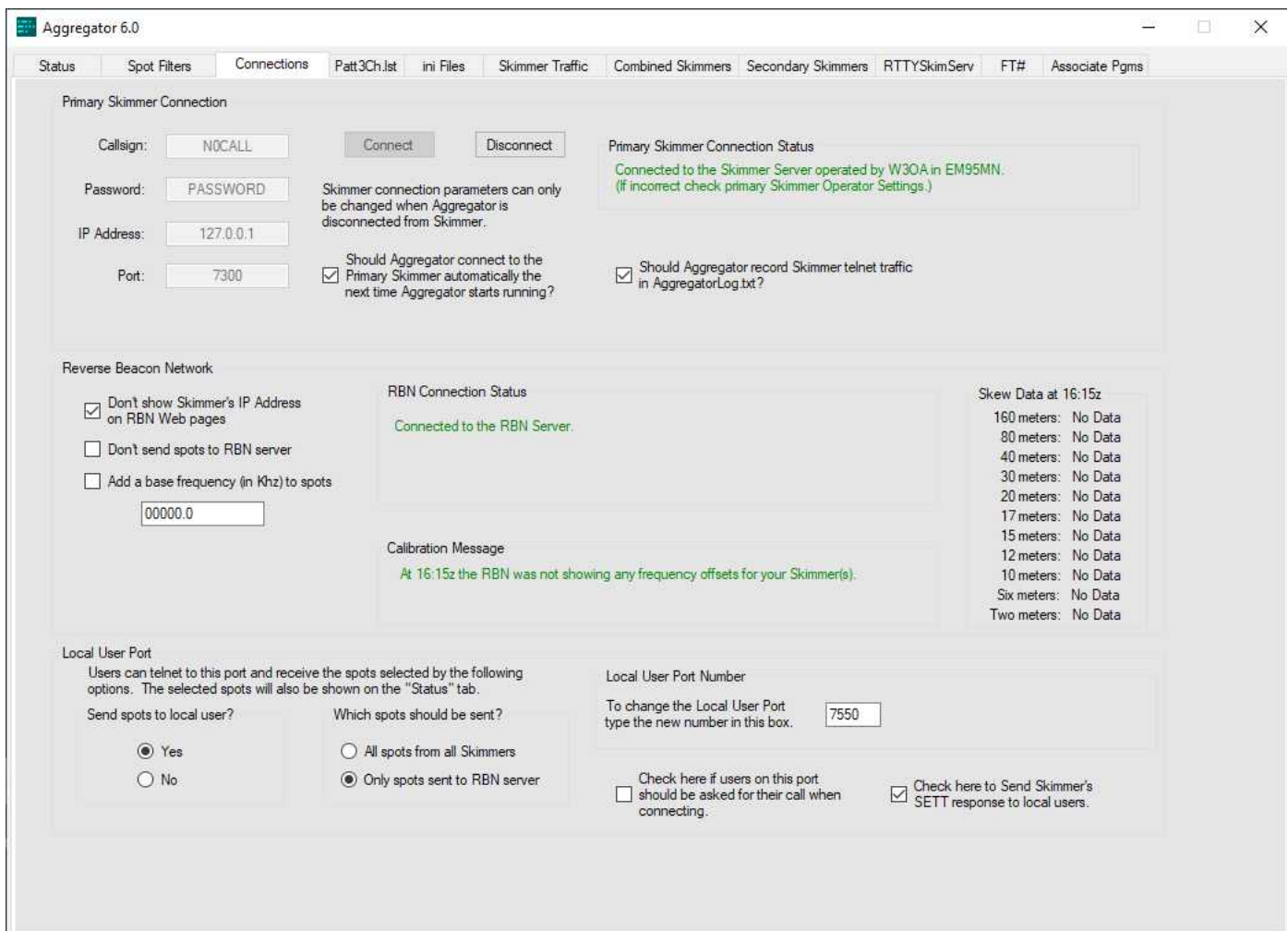


Figure 4.1 Aggregator's Connections Tab

All the essential settings needed to start Aggregator sending spots to the RBN are in the top third of the Connections tab, in the group box labeled "Primary Skimmer Connection". In most cases if Aggregator and Skimmer are both running on the same computer you will not need to change any of Aggregator's default settings. Make sure Skimmer is running. Then just click the "Connect" button. Now you can monitor Aggregator's progress in connecting to Skimmer in the box marked "Primary Skimmer Connection Status" and see if Aggregator has successfully contacted the RBN by looking at the "RBN Connection Status" box in the middle of the "Connections" tab.

The settings in the four white boxes in the upper left corner of the “Connections” tab are used to establish the telnet connection to Skimmer. If you have set Skimmer to require a password or to only accept commands from a specific user you'll need to set the callsign and password here to match. In any case the callsign must be one that Skimmer recognizes as being in a valid callsign format or Skimmer will not send Aggregator any responses. If Aggregator and Skimmer are both running on the same computer you can leave the IP address as 127.0.0.1. If they are on different computers on a local network you will need to enter the internal IP Address of the Skimmer computer in the “IP Address” box. And if you have changed the port Skimmer's Telnet server is using you will need to put that number in box labeled “Port”. You cannot make these changes while Aggregator is connected or trying to connect to Skimmer, so you may need to click the “Disconnect” button. If Aggregator fails to connect to Skimmer or later loses the connection to Skimmer for any reason, the green message in the “Primary Skimmer Connection Status” will change to red to alert you.

If you don't want to manually initiate Aggregator's connection to Skimmer every time Aggregator starts put a check in the appropriate check box in the same area of the “Connections” tab.

Next look at the four check boxes in the “Reverse Beacon Network” group box, middle of the “Connections” tab. The list of Skimmer details on the RBN web page normally shows the external IP Address of each Skimmer. Put a check in the top box if you don't want the IP Address shown.

A check in the second check box will prevent Aggregator from sending any spots to the RBN. This is a way to prevent sending false spots during testing activities.

If the Primary Skimmer is connected to a transverter, the third box and its associated textbox can be used to tell Aggregator to add a base frequency to all spots from the Skimmer.

Now that all the essentials are setup you can go to the “Status” tab, Figure 4.3, to monitor how things are going.

The idea behind this tab is to allow you to see the status of all of Aggregator's activities in one place. So you will see the status of the Skimmer and RBN connections as you saw them on the “Connections tab. The status of a lot of other activities that we haven't discussed yet are also shown here – more on these later. The right side of the tab shows the most recent flow of spots. This is there to give you confidence Aggregator is set up and running correctly.

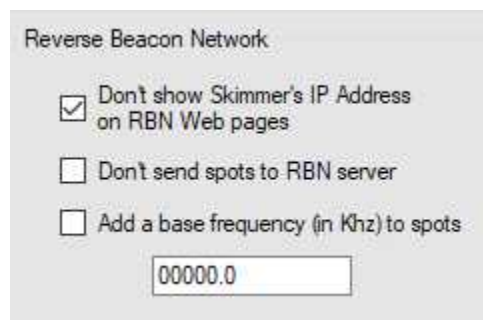


Figure 4.2 RBN Check Boxes

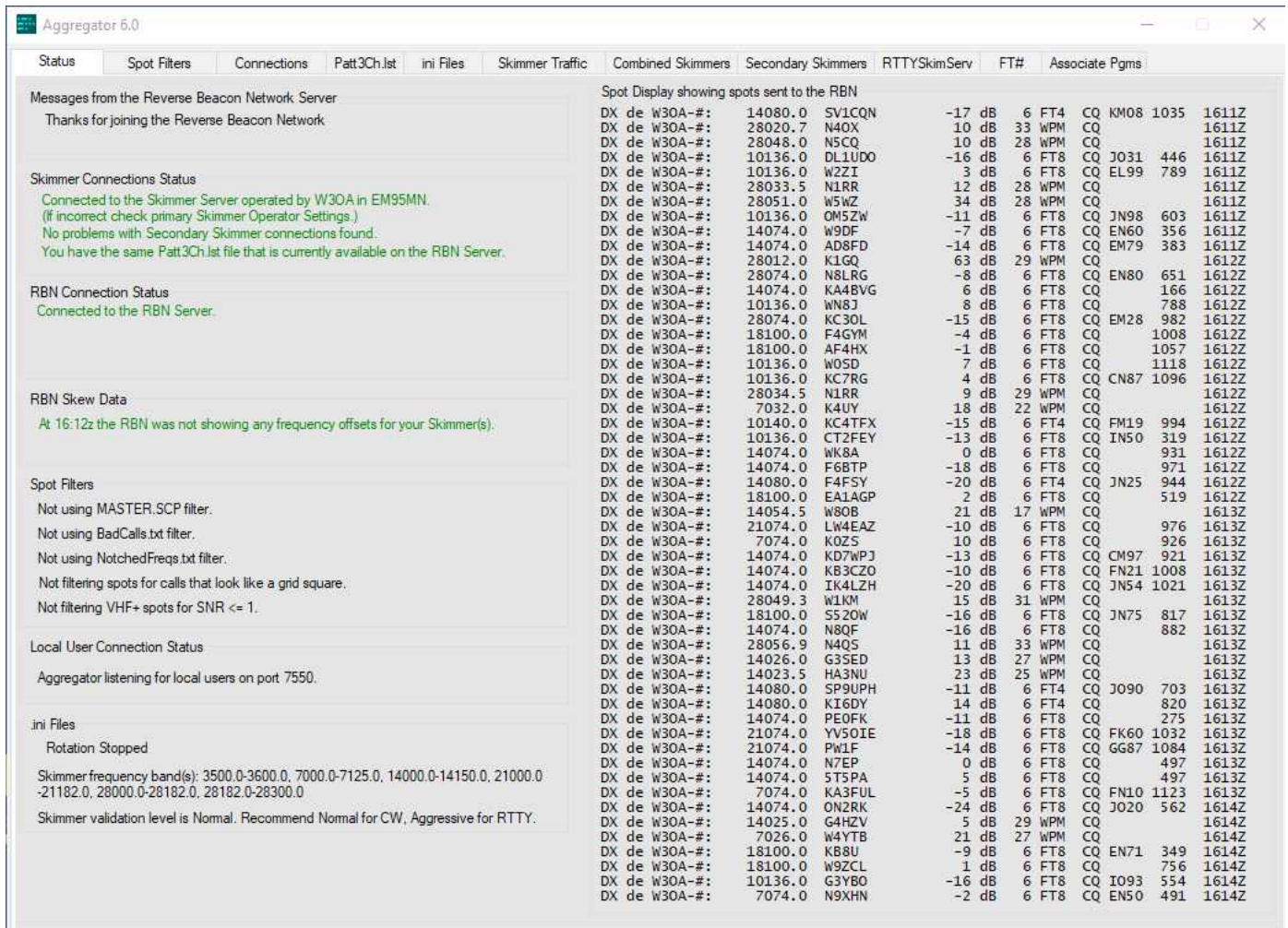


Figure 4.3 Aggregator Status Tab

When you get tired of watching the “Status” you may want to minimize Aggregator's window. But Aggregator's minimize and red X buttons don't work the same way as on a lot of other Windows programs. These buttons on Aggregator mimic the same buttons on Skimmer Server. **When you click the minimize or red X buttons Aggregator goes to the system tray. Right click the icon in the system tray to restore or close Aggregator.** Left clicks on the system tray icon toggles between showing and hiding Aggregator.

5.0 Using Aggregator's Filters Aggregator provides a number of tools to prevent Aggregator from sending certain spots to the RBN. You access most of these tools through the “Spot Filters” tab shown in Figure 5.1. Aggregator will apply these filters to all the spots it processes, from both the Primary and Secondary Skimmers.

5.1 The Spot Filters Tab The tab contains four group boxes. Three of them set the parameters for one of the filters and the fourth, in the lower right-hand corner, provides the ability to select which filters to use at the current time. We will discuss each group box individually.

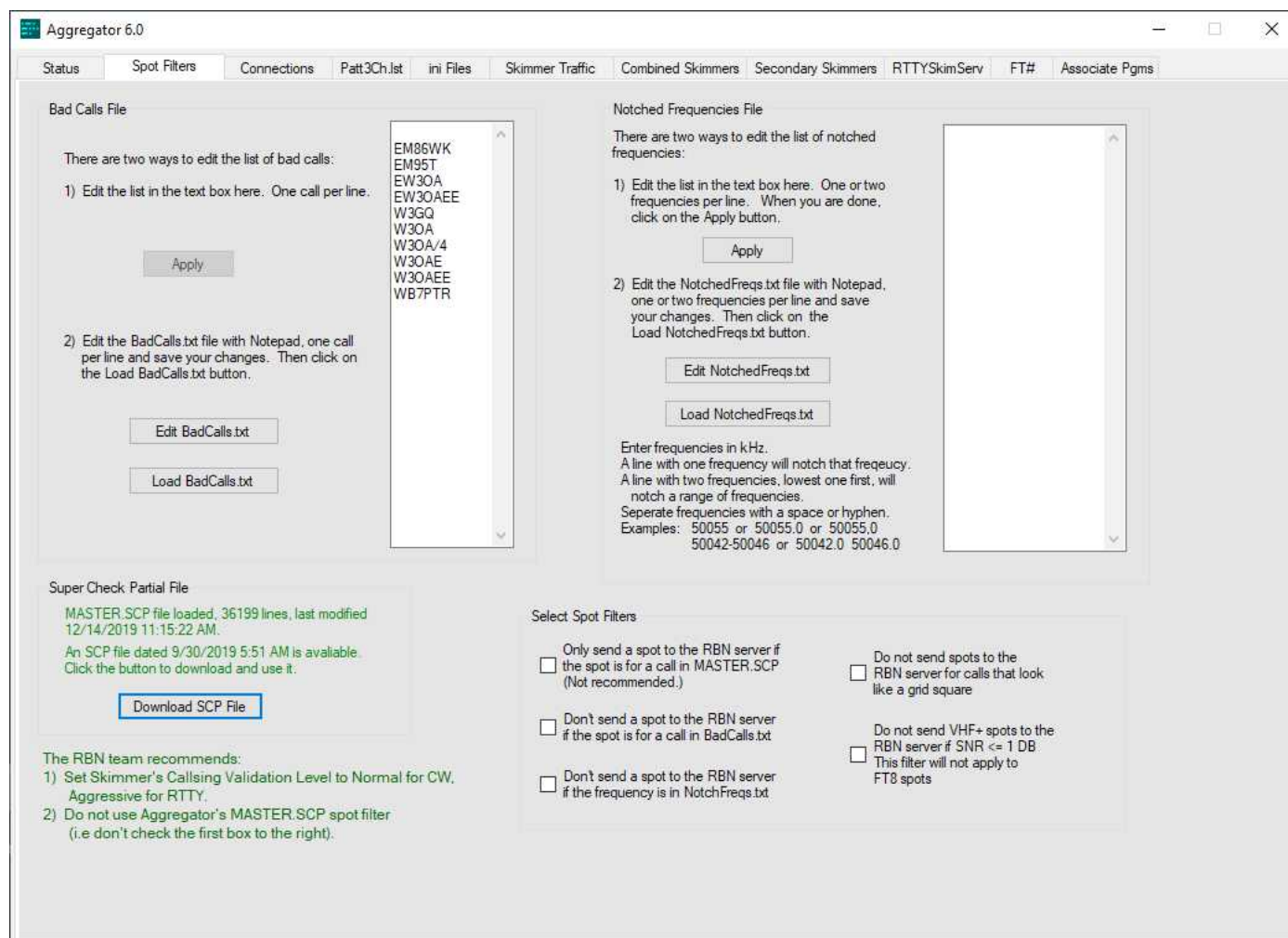


Figure 5.1 Aggregator Spot Filter Tab

5.2 Bad Calls File This group box provides the ability to create a list of calls the Skimmer operator knows are bad. This is pretty much self-explanatory. You type in a list of callsigns in the scrolling text box, one call per line, and then click the “Apply” button. The “Apply” button is grayed out until you make more changes. Another way to do the same thing is to click the “Edit BadCalls.txt” button. This will open your BadCalls.txt file in Notepad. Then you make your changes in Notepad, close Notepad saving the file, and click the “Load BadCalls.txt” button.

5.3 Notched Frequencies File Some users had expressed a need to notch out specific frequencies where signals are frequently generating false spots. This group box provides that capability. Using this box is also pretty much self-explanatory. You type in a list of frequencies in the scrolling text box. A line with one frequency will notch that frequency. A line with two frequencies, lowest one first, will notch a range of frequencies. The values must be in kHz and, if there are two, separated by a space or hyphen. After you have typed in your values click the “Apply” button. The “Apply” button is grayed out until you make some changes. Another way to do the same thing is to click the “Edit NotchedFreqs.txt” button. This will open your EditNotchedFreqs.txt file in Notepad. Then you make your changes in Notepad, close Notepad saving the file, and click the “Load EditNotchedFreqs.txt” button.

5.4 Super Check Partial File Aggregator provides the functionality of the "Paranoid" validation setting in CW Skimmer, which is absent in Skimmer Server. As shown below this group box, the RBN team recommends against using this filter. The original intent was to screen out busted calls, but in fact the master file contains a great many of those and also screens out a lot of new calls, as well as those of casual testers.

If this option is selected, only spots that match calls in a master file are forwarded to the RBN. Aggregator uses the text version of the widely-used master.dta file, called MASTER.SCP. The “Super Check Partial File” group box tells you the date of the MASTER.SCP that is in the same folder with Aggregator (if any) and the date of the same file available on the RBN server. The “Download SCP File” button provides a convenient way to update the version on your computer to the version on the RBN server.

5.5 Select Spot Filters The bottom right panel lets you decide which of the three filters discussed above will be used in processing spots by placing check marks in the appropriate boxes. Two other filters available here are mainly for VHF and above Skimmers. One filters out spots above 28.145 Mhz for callsigns in the same format as grid square identifiers and the other filters spots above 49.999 MHz with a signal to noise ratio of 1 DB or less.

5.6 The Ultimate Filter There is one filter that is not on the “Spot Filters” tab. It is selected in the “Reverse Beacon Network” group box on the “Connections” tab and shown in Figure 5.2. A check in the second check box will prevent Aggregator from sending any spots to the RBN server. Presumably you’d only want to do that when testing.

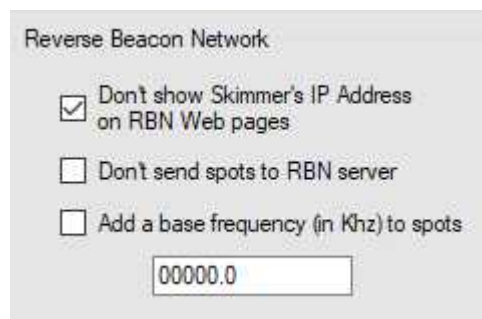


Figure 5.2 Portion of "Connections" Tab

6.0 Skimmer Traffic Tab This Tab shown in Figure 6.1 displays all of the messages Aggregator receives from the Skimmers it's connected to, and the results of Aggregator's analysis of each spot it receives. This can be useful to see if your setup is operating as expected and in trouble-shooting.

Skimmer	Call Sign	Time	dB	Mode	Analysis	Power	Frequency	Offset	Frequency	Mode	Analysis	Power	Frequency	Offset	Frequency	Mode	Analysis	Power	Frequency	Offset	Frequency	Mode	Analysis		
29DX	de W30A-#:	10136.0	GOUGO	-16	dB	6	FT8	CQ	880	1617Z	+	10136.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8					
13DX	de W30A-#:	14074.0	NLIKI	-15	dB	6	FT8	CQ	EM38	497	1617Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
0DX	de W30A-#:	28030.8	K5LG	21	dB	30	WPM	CQ			1617Z	+	28030.8	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	14100.0	YV5B	7	dB	21	WPM	CQ			1617Z	+	14100.0	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	14027.9	C08HH	-2	dB	20	WPM				1617Z	-	14027.9	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
12DX	de W30A-#:	7074.0	W8UM	-2	dB	6	FT8	CQ		626	1617Z	+	7074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
12DX	de W30A-#:	7074.0	KD2MFX	-17	dB	6	FT8	CQ	FNO2	355	1617Z	+	7074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	PJ2MAN	-24	dB	6	FT8	CQ	FK52	957	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
0DX	de W30A-#:	14017.7	4U1UN	34	dB	38	WPM	CQ			1618Z	-	14017.7	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	7027.6	W8HGT	17	dB	20	WPM	DE			1618Z	-	7027.6	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
13DX	de W30A-#:	14074.0	K0BLT	5	dB	6	FT8	CQ		335	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
30DX	de W30A-#:	18100.0	K2QJ	-19	dB	6	FT8	CQ		1119	1618Z	+	18100.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
12DX	de W30A-#:	7074.0	KD2PMF	1	dB	6	FT8	CQ		861	1618Z	+	7074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
12DX	de W30A-#:	14074.0	K05T	9	dB	6	FT8	CQ	EM12	594	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	AC9HA	-5	dB	6	FT8	CQ	DM61	970	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	VE2SCA	-22	dB	6	FT8	CQ		219	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	N4QBI	-17	dB	6	FT8	CQ	DN06	926	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
0DX	de W30A-#:	21150.0	YV5B	7	dB	22	WPM				1618Z	+	21150.0	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	14108.7	W5QC	35	dB	26	WPM				1618Z	-	14108.7	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
18DX	de W30A-#:	14080.0	W2JAD	2	dB	6	FT4	CQ		541	1618Z	+	14080.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT4				
0DX	de W30A-#:	14100.0	W6WX	14	dB	22	WPM				1618Z	+	14100.0	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	14008.6	K8XA	21	dB	29	WPM	DE			1618Z	-	14008.6	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
12DX	de W30A-#:	7074.0	K4MJJ	8	dB	6	FT8	CQ		412	1618Z	+	7074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
12DX	de W30A-#:	7074.0	W8BEKG	-1	dB	6	FT8	CQ	FM09	758	1618Z	+	7074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	PA7PYR	-20	dB	6	FT8	CQ	JO21	833	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
30DX	de W30A-#:	18100.0	F1DSZ	-17	dB	6	FT8	CQ		750	1618Z	+	18100.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
29DX	de W30A-#:	10136.0	W1CEW	-16	dB	6	FT8	CQ		650	1618Z	+	10136.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
0DX	de W30A-#:	14055.0	K08XB	30	dB	16	WPM	DE			1618Z	-	14055.0	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	14019.2	W6SAN	22	dB	28	WPM				1618Z	-	14019.2	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	14030.1	K4ZDDX	-16	dB	22	WPM	CQ			1618Z	-	14030.1	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
12DX	de W30A-#:	7074.0	KC1IOK	-7	dB	6	FT8	CQ		354	1618Z	+	7074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	WF3P	-23	dB	6	FT8	CQ	FN20	797	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	W8SKQ	-23	dB	6	FT8	CQ		1019	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	F4BQS	-24	dB	6	FT8	CQ	JO10	771	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
0DX	de W30A-#:	28031.5	W1LITU	18	dB	27	WPM	CQ			1618Z	+	28031.5	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	14022.6	E7TESANJ	18	dB	29	WPM	CQ			1618Z	+	14022.6	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	28026.0	W1LAN	18	dB	26	WPM	CQ			1618Z	+	28026.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	28009.8	VE90A	10	dB	21	WPM				1618Z	-	28009.8	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	14048.0	W88BNS	22	dB	14	WPM	DE			1619Z	+	14048.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	14012.0	W2YK	25	dB	27	WPM	DE			1619Z	-	14012.0	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
0DX	de W30A-#:	28016.0	W5M	12	dB	26	WPM	CQ			1619Z	-	28016.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
13DX	de W30A-#:	14074.0	AC8ZE	5	dB	6	FT8	CQ		354	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	W1OPR	-7	dB	6	FT8	CQ		926	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	K4EAY	-1	dB	6	FT8	CQ		1008	1618Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
29DX	de W30A-#:	10136.0	KK4LB	1	dB	6	FT8	CQ	EM79	785	1618Z	+	10136.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
30DX	de W30A-#:	18100.0	PV5EJ	-17	dB	6	FT8	CQ		797	1618Z	+	18100.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
29DX	de W30A-#:	10136.0	FSPEZ	-21	dB	6	FT8	CQ	JO10	1089	1618Z	+	10136.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
30DX	de W30A-#:	18100.0	IK4TVP	-18	dB	6	FT8	CQ		223	1619Z	+	18100.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
13DX	de W30A-#:	14074.0	WR7X	-10	dB	6	FT8	CQ		58	1619Z	+	14074.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT8				
0DX	de W30A-#:	14019.7	KE0Z	39	dB	25	WPM				1619Z	-	14019.7	NCQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	CW				
18DX	de W30A-#:	14080.0	AD8FD	-9	dB	6	FT4	CQ	EM79	428	1619Z	+	14080.0	CQ	NVHF	NNotc	NBcn	NBCa11	Ngd	NODb	FT4				

Figure 6.1 Aggregator Skimmer Traffic Tab

6.1 The Left Side Most of the rows in the Tab are for Skimmer spots. These are shown on the left side of the display. The leading digit in each row shows which Skimmer the spot came from. Those with a zero in the first position came from the primary Skimmer. Spots from secondary Skimmers will have digits 1 through 8 in this position. FT4 and FT8 spots from UDP messages will have digits 11 through 43 in this position. The Tab also displays other Skimmer traffic such as Skimmer's response to SETT commands

6.2 The Right Side The right side of each spot line, the portion to the right of the spot time, shows the results of Aggregator's analysis of that spot. They are arranged in columns and the following paragraphs explain each column.

6.2.1 Plus/Minus A plus sign indicates Aggregator decided to forward this spot to the RBN server. A minus sign indicates Aggregator decided not to forward that spot.

6.2.1 Frequency This is the frequency Aggregator will use for this spot. Usually it is the same as the frequency shown in the spot but if Aggregator has been told to use a base frequency for that Skimmer, as when using a transverter, the frequency here will show the result of adding the base frequency to the spot frequency..

6.2.3 CQ? “CQ” means the spot was for a station calling CQ, “NCQ” the station was not calling CQ.

6.2.4 VHF? “VHF” means the frequency was above 50 MHz, “NVHF” below 50 MHz.

6.2.5 Notched? “Notc” means the frequency was in the range of the user's notched frequencies, “NNotc” means it was not.

6.2.6 Beacon? “Bcn” means Aggregator has identified the station as a beacon, “NBcn” Aggregator does not think the station is a beacon.

6.2.7 Master? “Mast” means the spot is for a callsign in the MASTER.SCP file, “NMast” means it is not. This column is only shown if the operator has checked the “Only send a spot to the RBN if the spot is for a call in MASTER.SCP” box on the “Spot Filters” tab.

6.2.8 Bad Call? “Bcall” means the spot was for a station on the users Bad Call list, “NBcall” means it was not.

6.2.9 Grid? “Gd” means the station callsign format matched that of a grid square designator, “NGd” means it did not.

6.2.10 Zero dB? “0Db” means Skimmer reported a signal-to-noise ratio less than 1 Db, “N0Db” the signal-to-noise ratio was 1 Db or higher.

6.2.11 Mode This shows the mode Aggregator sends to the RBN server for this spot.

6.3 “Freeze this Display” and “Copy to Clipboard” These controls provide two different methods to see a snap shot of the text currently displayed. Note that there are provisions, discussed elsewhere, to capture all the information shown here in a log file.

7.0 Skimmer Patt3Ch.lst Tab CW Skimmer, CW Skimmer Server, and RTTY Skimmer Server all use a Patt3Ch.lst file to aid in discriminating between valid and busted callsigns using pattern matching with known valid callsigns. The Patt3Ch.lst file contains those patterns. This Tab, shown in Figure 7.1, provides a way to verify your Skimmer(s) are using the current version stored on the RBN Server. This takes just a few steps.

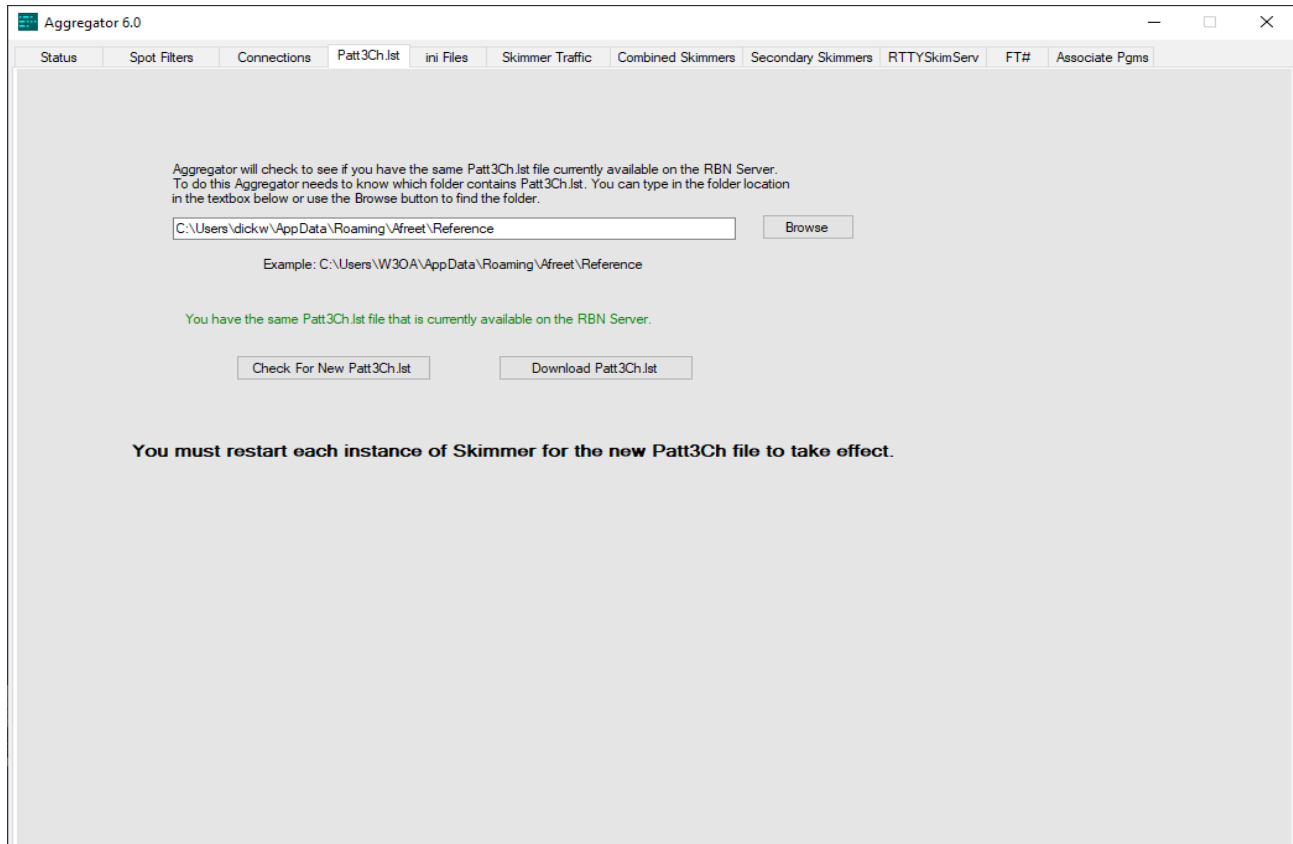


Figure 7.1 Aggregator Patt3Ch.lst Tab

7.1 Step 1 Tell Aggregator where your Patt3Ch.lst file is stored. You can do this by typing in the location in the text box provided or by clicking the “Browse” button.

7.2 Step 2 Click the “Check For New Patt3Ch.lst” button. Aggregator will compare the versions on your computer and on the RBN Server and tell you if a different version is available. This comparison will be done automatically every time Aggregator starts and approximately every 20 minutes thereafter.

7.3 Step 3 Click the “Download Patt3Ch.lst” button if a different version is available.

7.4 Step 4 Restart each Skimmer so it will start using the new file.

8.0 Rotating Skimmer Server or RTTY Skimmer Server .ini Files

8.1 Skimmer Server .ini Files The descriptions in this section refer to Skimmer Server but they also apply to RTTY Skimmer Server. When Skimmer Server starts, it reads an .ini file to determine, among other things, what band segment options to present to the user, which segments are selected, the center frequencies for each segment, and the segment bandwidth selected. It is possible to automatically change the values Skimmer Server uses for these parameters by stopping and then restarting Skimmer Server with a different .ini file. This Tab, shown in Figure 8.1, provides a means to do this stopping and restarting on a scheduled basis. Note this will only work if Aggregator and Skimmer Server are both running on the same computer.

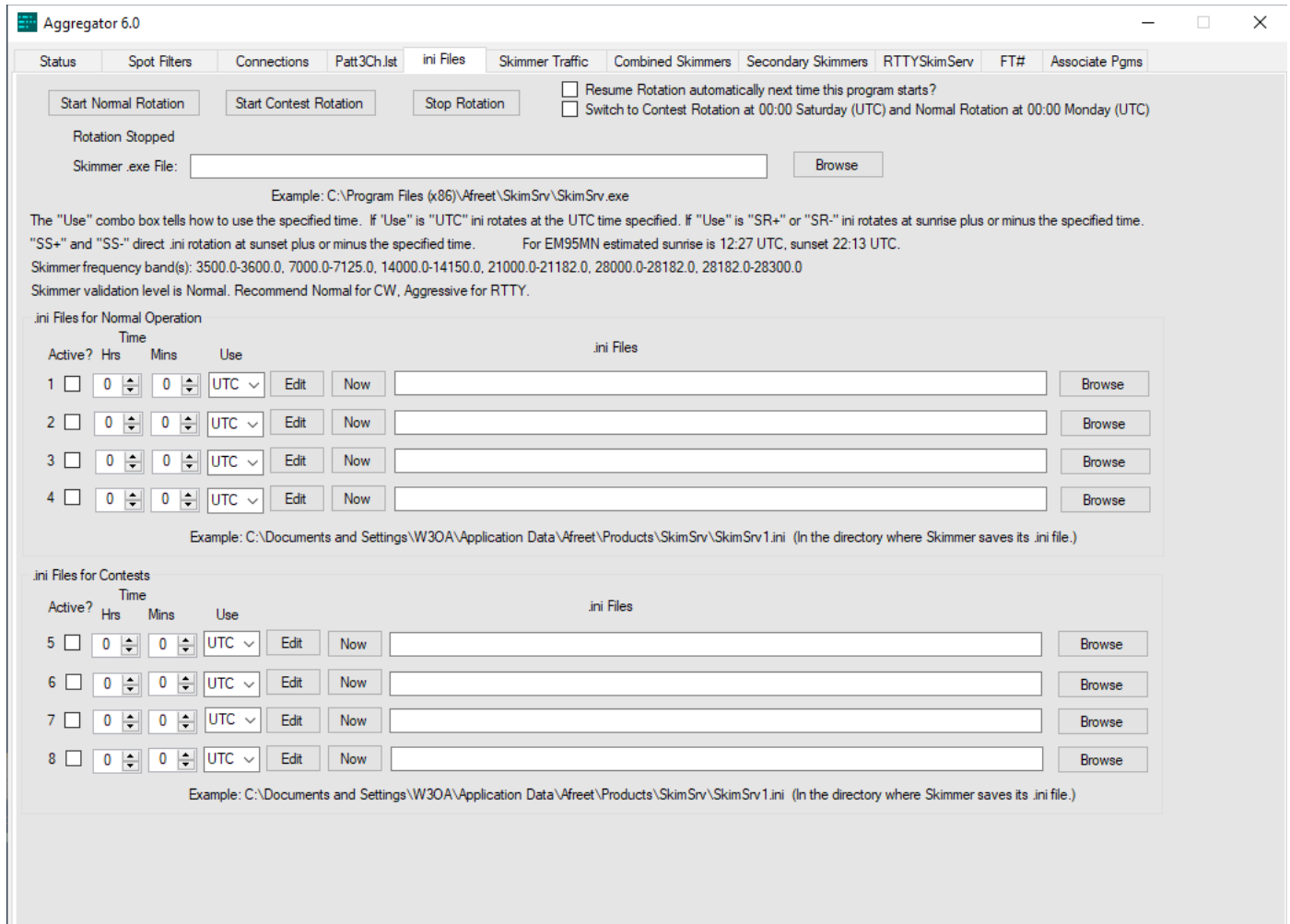


Figure 8.1 Aggregator ini Files Tab

8.2 Starting and Stopping Rotations Aggregator allows you to set up two different schedules for changing Skimmer Server's .ini files up to four times each day. One schedule is for normal day-to-day operations, the second is for CW contest periods. The buttons at the top of this Tab provide the means to start rotation through either of these two schedules or to stop rotation. There is also a check box that will tell Aggregator to start a rotation automatically the next time Aggregator starts and a check box telling

Aggregator to use Contest Rotation on weekends and Normal Rotation during the week. Beneath the buttons are two labels which show which rotation schedule Aggregator is currently using and which .ini file was used the last time Aggregator changed the .ini file. Moving down the Tab, the next line has a text box and a browse button you must use to tell Aggregator where the SkimSrv.exe file is located.

8.3 Setting the Rotation Schedule Parameters. There are two identical group boxes in the bottom two thirds of the Tab. Use the group box in the middle to specify the parameters for the Normal Rotation and the bottom group box for Contest Rotation. Each group box contains four lines allowing you to specify up to four different .ini files for each rotation. Lets look at the elements in each line.

8.3.1 Active? Place a check in this box if you want the .ini file specified in the line to be part of the rotation schedule. Leave the box blank if you don't specify an .ini file in this line or you don't want Aggregator to use the file specified in the line.

8.3.2 Time Use the two up/down boxes to specify the time (in hours and Minutes) when Aggregator should tell Skimmer to start using the .ini file specified on this line.

8.3.3 Use This drop-down list provides five choices, "UTC", "SR+", "SR-", "SS+", and "SS-". The choice selected tells Aggregator how to use the time specified on this line.

8.3.3.1 "UTC" Rotation will occur at the specified UTC time.

8.3.3.2 "SR+" Aggregator will add the specified time to a calculated time for local sunrise and rotate the .ini file at this new time. So the rotation will occur after local sunrise. The calculation of sunrise and sunset times is reasonably accurate from 70 degrees North to 70 degrees South. If this calculation fails Aggregator will not rotate the .ini file.

8.3.3.3 "SR-" Aggregator will subtract the specified time from a calculated time for local sunrise and rotate the .ini file at this new time. So the rotation will occur before local sunrise.

8.3.3.4 "SS+" Aggregator will add the specified time to a calculated time for local sunset and rotate the .ini file at this new time. So the rotation will occur after local sunset.

8.3.3.5 "SS-" Aggregator will subtract the specified time from a calculated time for local sunset and rotate the .ini file at this new time. So the rotation will occur before local sunset.

8.3.4 "Edit" Button Clicking this button will open the .ini file on this line in Notepad for editing.

8.3.5 "Now" Button This button is provided as an aid in setting up the rotation. Clicking it will cause Aggregator to immediately cause Skimmer Server to stop and restart using the .ini file specified on this line.

8.3.6 .ini File Location Here is where you tell Aggregator where to look for the appropriate .ini file. You can type the full location here or ...

8.3.7 "Browse" Button If you click the browse button a dialog box will open to aid in finding the location of the appropriate .ini file.

8.4 Making a Rotation Work Here is an example procedure for setting up a rotation schedule for normal, non contest, operations. It assumes there are two .ini files for Skimmer Server. One, SkimSrvNormalLow.ini is to be used during the night. The second, SkimSrvNormalHighWithSix.ini, is for day time operation. (Appendix A2 provides guidance on making these .ini files.)

8.4.1 Tell Aggregator Where To Find SkimSrv.exe Use the top-most text box on the “ini Files” tab to tell Aggregator where to find SkimSrv.exe. You can type the location in the box or use the “Browse” button to the right of the box to find the file and enter its location automatically.

8.4.2 Tell Aggregator What .ini Files To Use Use the first two rows in the “Normal” group box to specify the locations for the two .ini files. Again, you can type in the location or browse for them.

8.4.3 Make Sure You Have The Correct .ini Files You can test each .ini file by clicking on the associated “Now” button. Aggregator will stop SkimSrv and re-start it with the .ini file you have selected. This takes a few seconds, The full name and path of the ini file to which you switched and frequency bands covered by SkimSrv using the new .ini file will appear near the top of the tab. If the frequencies shown are not the ones you wanted you can click on the associated “Edit” button. This will open the .ini file in Notepad. You can then make needed changes to the file, save it , and use the “Now” button to test your changes.

8.4.4 Set Times and Use Set the time and Use for each .ini file to tell Aggregator when Skimmer should start using that file. You can adjust the time in five minute increments.

8.4.5 Click the “Active?” Check Boxes. Putting a check in one of the “Active?” check boxes tells Aggregator you want to include the .ini file on that row in the rotation. Aggregator will ignore rows that do not have a check in the “Active?” check box.

8.4.6 Start the Rotation Start the rotation by clicking the “Start Normal Rotation” button in the upper left corner of the “ini Files” tab. Aggregator will stop Skimmer Server and restart it with the .ini file you have specified for the current time of day. This will be indicated by the labels just below the button.

9.0 Using Multiple Skimmers Aggregator can send spots from multiple sources to the RBN using two different methods. The preferred way for nine or fewer sources uses Aggregator's "Secondary Skimmers" tab. For more than nine sources use the "Combined Skimmers" tab and an external program to combine the spots from multiple Skimmers into one telnet stream.

9.1 Secondary Skimmers This Tab provides places to enter information on up to eight possible secondary Skimmers, one in each row, numbered 1 through 8. These are in addition to the primary Skimmer (assigned the number 0) whose information is entered on the "Connections" tab. The text at the top of the tab explains how to use the secondary Skimmers. Note that connections to the secondary Skimmers will not be functional if Aggregator is not connected to a primary Skimmer.

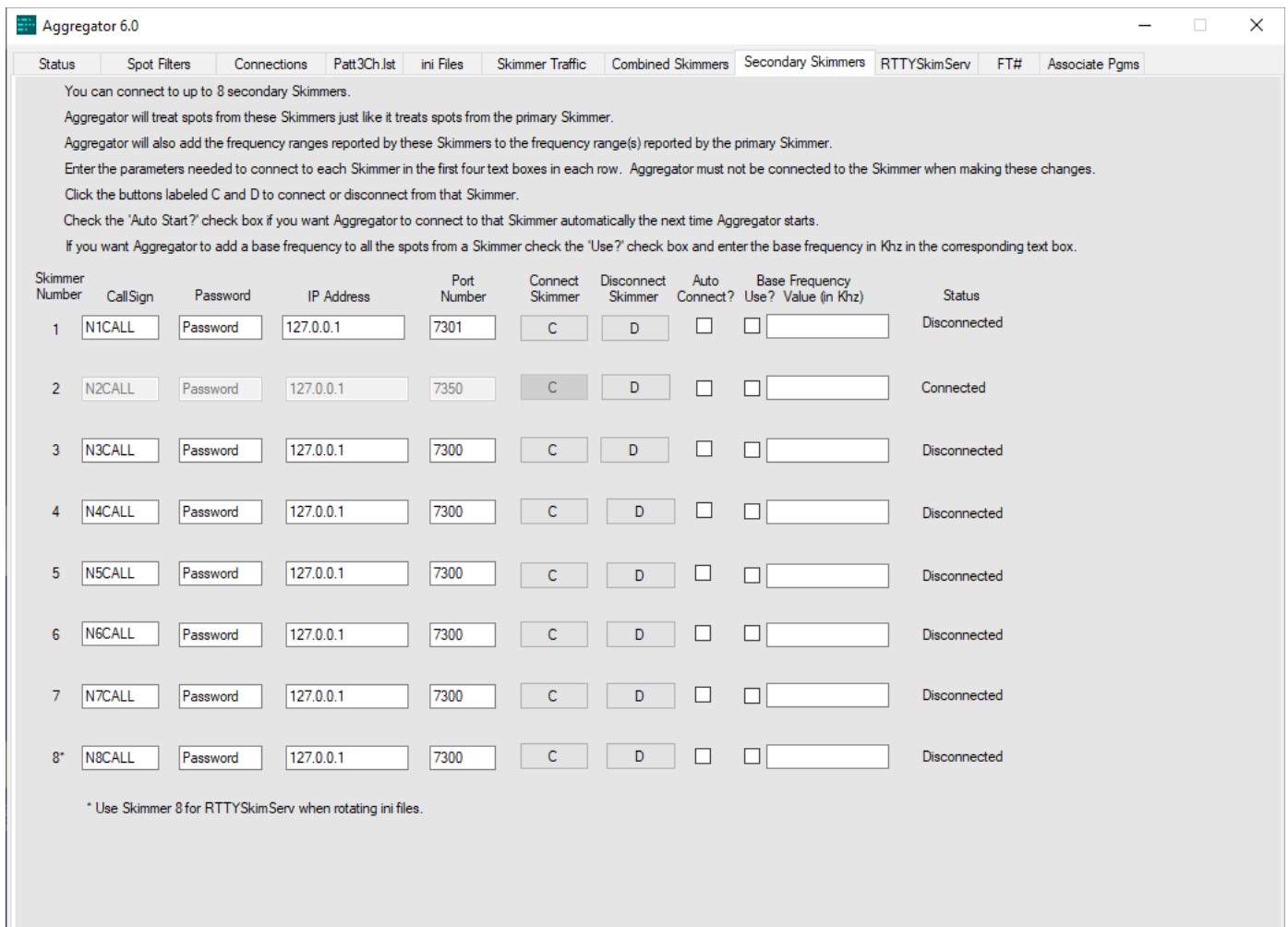


Figure 9.1 Aggregator Secondary Skimmers Tab

9.2 Combined Skimmers Aggregator's "Combined Skimmers" tab provides the ability to send spots from more than nine Skimmer's to the RBN. Here it is necessary to use an external program such as WintelnetX or ARCluster Server to combine the spots from these sources and make them available via one telnet connection from Aggregator. When connecting directly to a Skimmer Aggregator relies on Skimmer's SETT command to provide information on the operator, location, bands covered, and more. If Aggregator does not receive a response to a SETT command to a Skimmer, it will not forward spots from that source. Neither WintelnetX or ARCluster Server will respond to the SETT command, so this tab provides a place to manually specify this information. Placing a check in the box at the top of the tab instructs Aggregator to use the information entered here instead of trying fruitlessly to get a response.

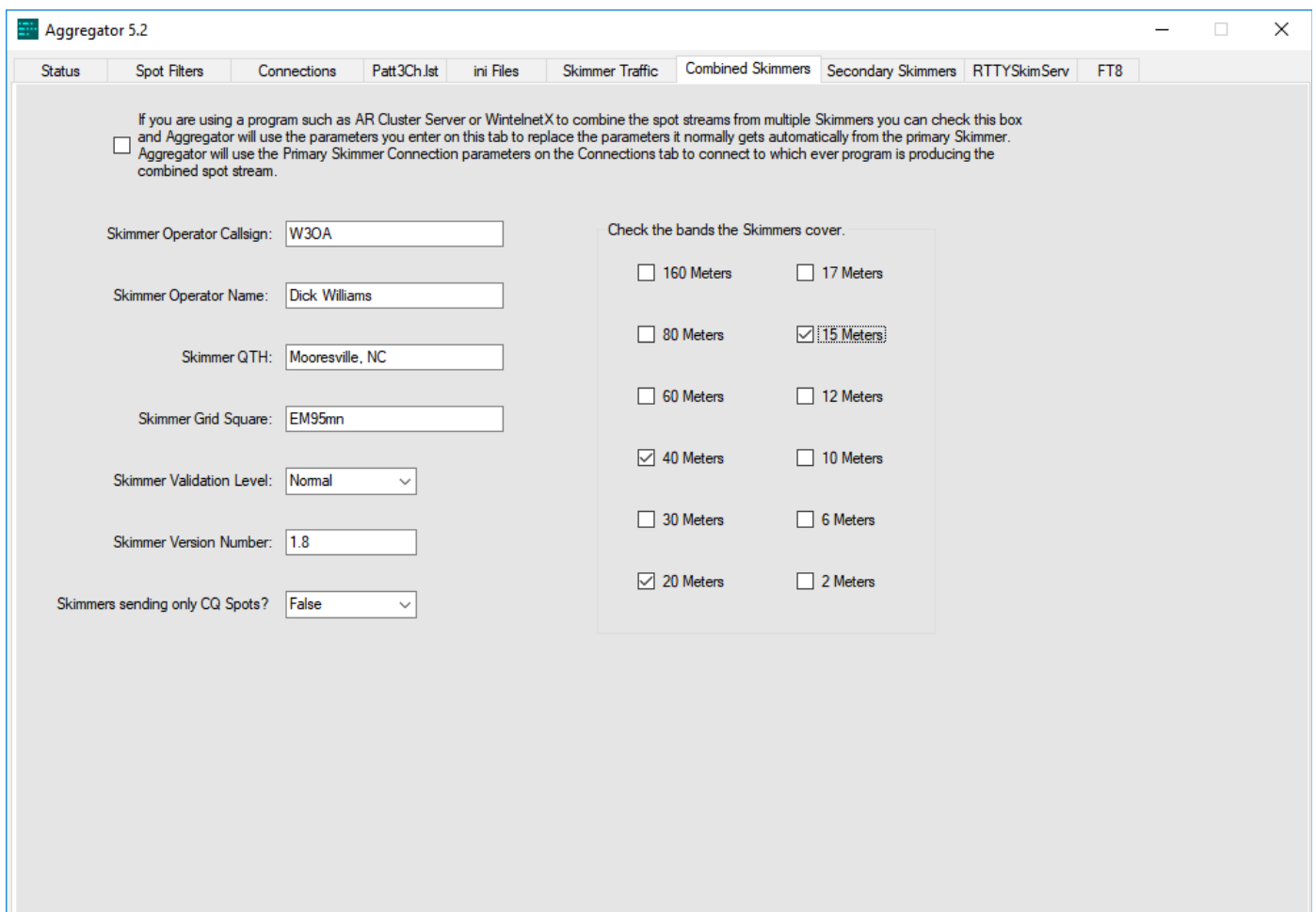


Figure 9.2 Aggregator Combine Skimmers Tab

10.0 Local Users Aggregator provides a Telnet port that can feed spots directly to multiple user programs. The operation of this port is controlled by settings in the “Local User Port” group box at the bottom of the “Connections” tab and shown in Figure 9.1

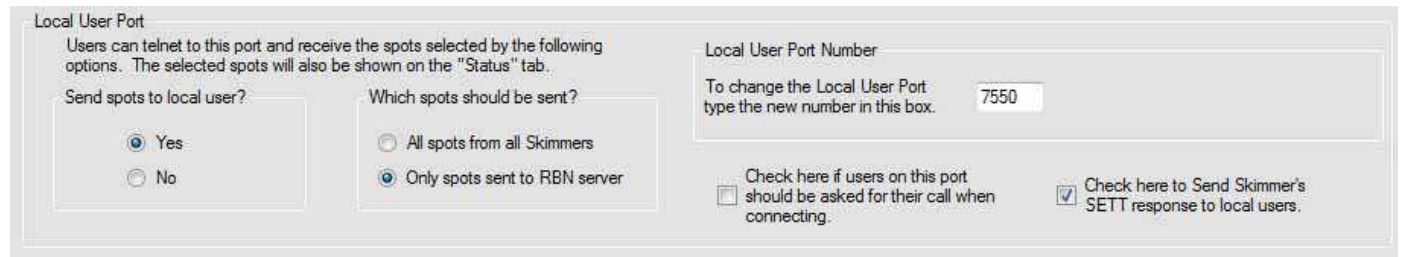


Figure 10.1 Local User Port Group Box

10.1 What Spots Go To Local Users? The first two sets of radio buttons on the left determine which spots Aggregator will send through the local port. The possible results are don't send any spots, send only spots that are sent to the RBN, or send all the spots Aggregator receives.

10.2 Local User Port Number The default port for local users is 7550. This can be changed by typing the new port number in the box at the upper right corner of the group box. If you change the port number Aggregator will tell you to close and restart Aggregator for the change to take effect.

10.3 Ask For Call? Some logging programs don't recognize a server connection until the server asks for a callsign. This option is provided for use with such programs.

10.4 Send SETT Response? This option is provided for those with special applications that use parameters from Skimmer. For instance a program could select an antenna depending on what band Skimmer was monitoring.

10.5 Telnet Commands The Telnet port will recognize the following commands:

BYE or bye	Disconnect
Control-D	Disconnect
sh/dx	Shows the last 10 spots
sh/dx XX	Shows the last XX spots
sh/dx XXm	Shows spots from the last XX minutes

You can add " CW" or " RTTY" to each sh/dx command to restrict which spots are displayed.

11.0 RTTYSkimServ Tab This tab is used when running both CW and RTTY Skimmer Servers from the same SDR **and** using Aggregator's ini file rotation feature. If both these conditions are true you must place the correct information in each field. The fields are self explanatory.

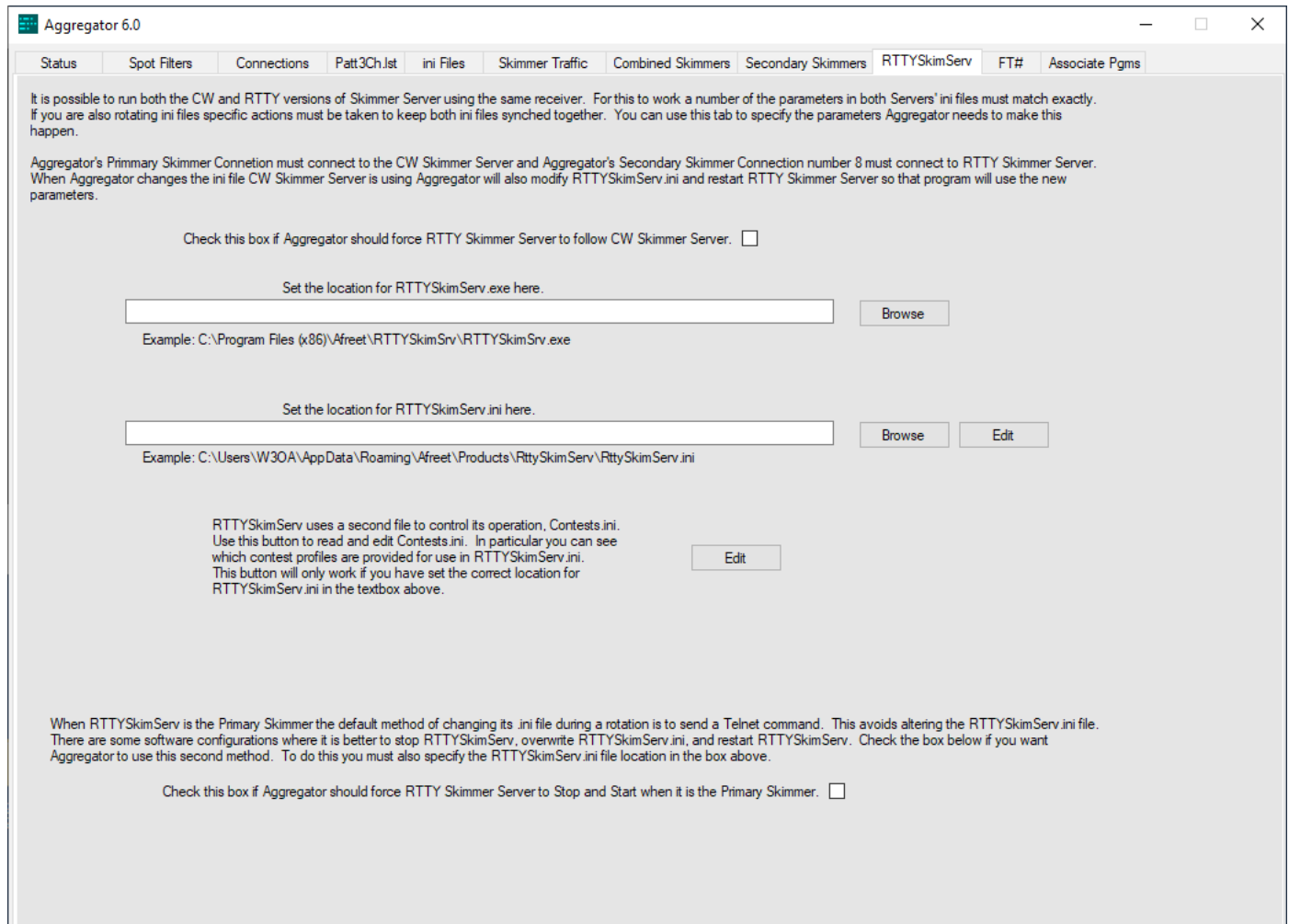


Figure 11.1, RTTYSkimServ Tab

11.1 RTTYSkimServ.ini Edit Button RTTY Skimmer Server does not have a graphical user interface (similar to that of CW Skimmer Server) to change its operating parameters. Instead, RTTY Skimmer Server relies on the user to manually edit RTTYSkimServ.ini. This button provides a convenient method to do that. Note that changes made here will not take effect until RTTY Skimmer Server is restarted. The parameters you will probably want to change most frequently are the name of the contest profile (Contest=) and the string of RTTY segments (RTTYSegments=) to be used. **Be cautious in making changes to the Center Frequencies, Segment Select, Rate, and Frequency Calibration parameters because changes to these parameters can prevent RTTY and CW Skimmer Servers from continuing to operate together.**

11.2 Contests.ini Edit Button The Contests.ini file holds the list of contest profiles RTTY Skimmer Server will recognize. So you can use this button to find the valid values for the Contest= parameter in RTTYSkimServ.ini. You can also edit and add contest profiles here.

11.3 Force RTTY Skimmer Server to Stop and Start The text at the bottom of this tab describes what selecting this option does. This option was added so that ini File Rotation would operate correctly when the Primary Skimmer is RTTY Skimmer Server and its Device Name is “CWSL_Tee on RedPitaya”. There may be other software configurations requiring this option.

11.4 Further Information Further information on operating the two Skimmer Servers on the same Aggregator is available on the [RBN Web site](#).

12.0 FT# Tab This tab allows you to set up Aggregator to monitor the UDP messages from up to 33 instances of WSJT-X or JTDX for FT4 and FT8 stations calling CQ and forward corresponding spots to the RBN. The text on the tab is self explanatory.

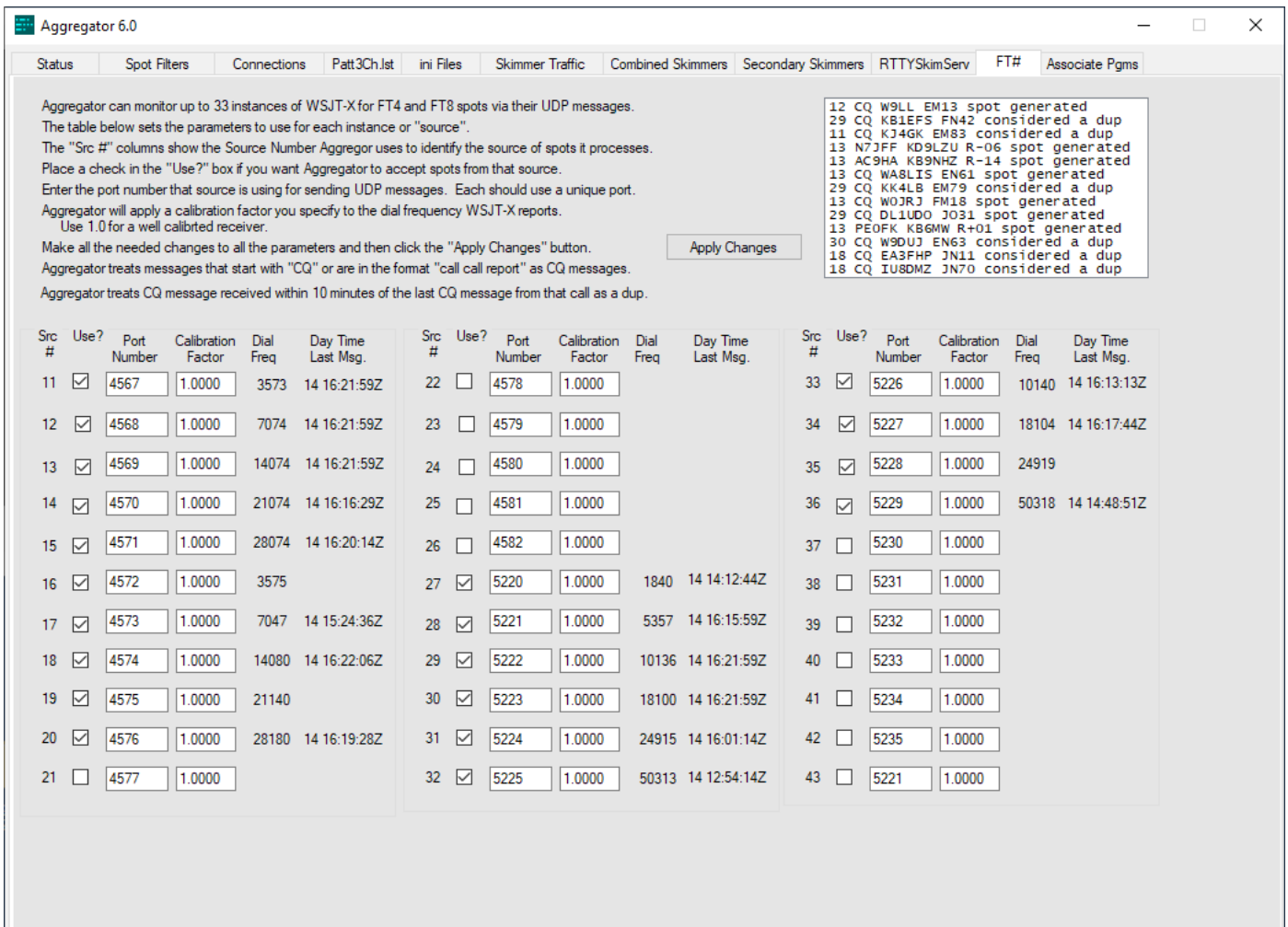


Figure 12.1, FT# Tab

12.1 Setting Up For One Instance of WSJT-X This will send spots from just one band from an instance of WSJT-X running on the same computer with Aggregator. Here are the steps to follow:

1. Obtain the current WSJT-X version from <https://physics.princeton.edu/pulsar/k1jt/wsjt.html>
2. Install WSJT-X on your Aggregator computer and follow the installation instructions so that WSJT-X is decoding FT4 or FT8 messages from your receiver's audio output on your band of choice.
3. On WSJT-X click the File/Settings/Reporting option and look at the “UDP Server:” and “UDP Server port number:” text box. The default values should be 127.0.0.1 and 2237, respectively.
4. Make sure no other programs are using port 2237. There are ways to work around this restriction but I will skip these for this initial capability.
5. If Aggregator is not already running start it and set it up so it's sending CW spots to the RBN.
6. Go to Aggregator's FT# tab. Click the “Use?” box for Source Number 11. The default Port Number and Calibration Factor for Source Number 11 should be 2237 and 1.000, respectively.
7. Click the “Apply Changes” button just to the left of the text box at the top of the tab .
8. You should see WSJT-X UDP messages show up in the large text box at the top, right corner of the tab. Aggregator will process these messages and send spot data to the RBN as appropriate.

Success may inspire you to expand your FT4/8 capability to cover multiple bands and multiple audio frequencies on individual bands using more than one SDR. There are many ways to do this. One uses Skimmer Server, CWSL_Tee, CWSL_SSBWave, virtual audio cables, and WSJT-X. Setting up all these parts to run together manually is very tedious. So I have written a program called FT#Startup to automate the process. FT#Startup and instructions are available at <http://www.reversebeacon.net/>

13.0 Associate Pgms Tab This tab provides a convenient way to start up to eight other programs frequently run simultaneously with Aggregator. When you have everything set up as you like you can put a shortcut to Aggregator in the Windows startup folder and all the parts of your RBN node can start running automatically when the computer boots up.

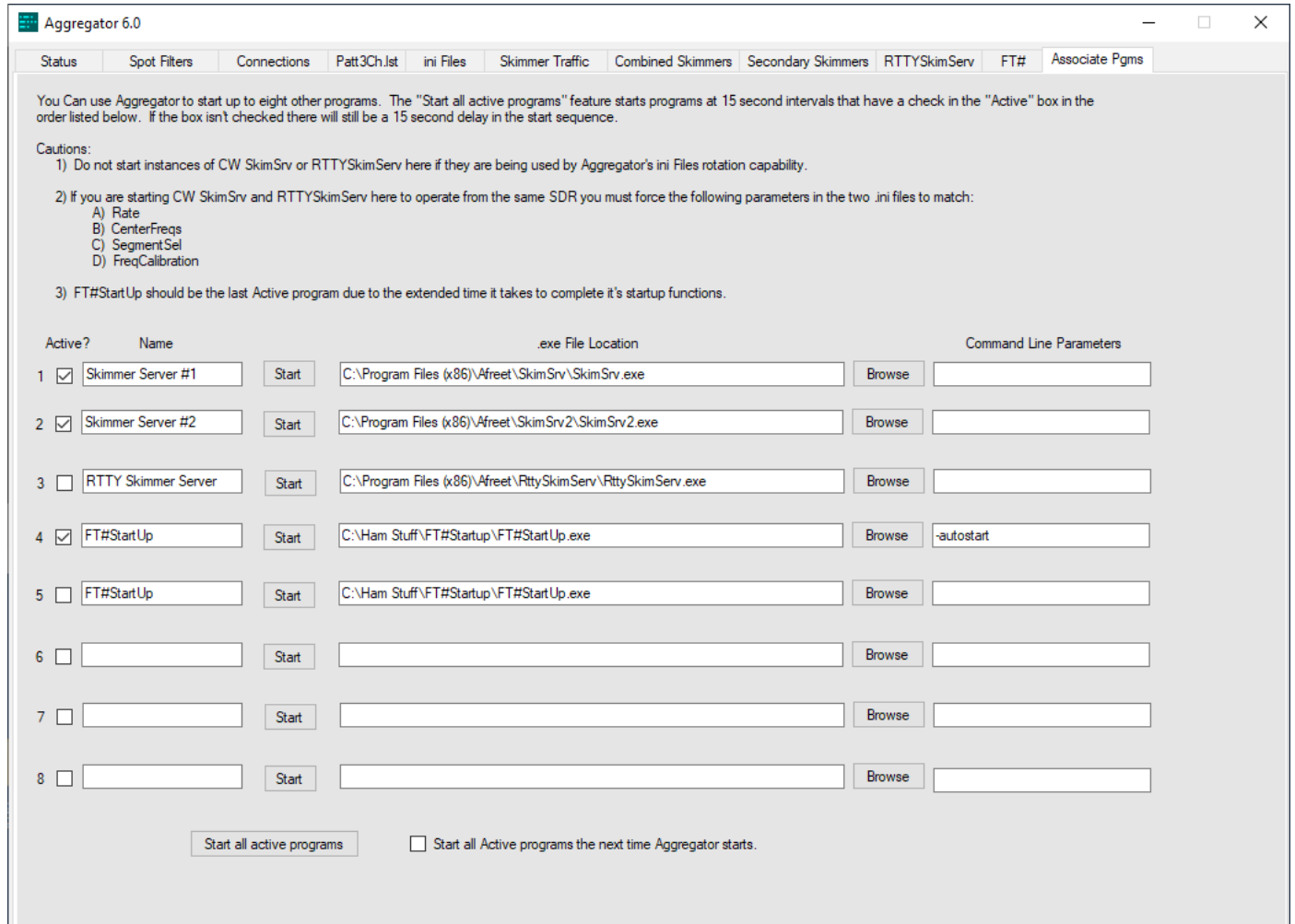


Figure 12.1, Associate Pgms Tab

13.1 Setting Up Program 1 Use the first row of boxes and buttons to set up to start the first program. Put something in the “Name” box that reminds you what program 1 does. The location of the .exe file for program 1 goes in the “.exe File Location” box. You can use the “Browse” button to find the file and fill in the location automatically. If the program takes command line parameters put them in the last box in line 1. Then click the “Start” button to test the setup. Finish off by killing program 1 using that programs kill function.

13.2 Additional Programs Repeat the steps in paragraph 13.1 for additional programs you desire. Kill each after you are satisfied each starts correctly using its “Start” button.

13.3 Test Sequential Starts Check the “Active?” box for each program you want to start in an automatic sequence. Then click the “Start all active programs” button. Aggregator will go down the list considering each program at 15 second intervals. If the program's active box is checked Aggregator will simulate clicking the “Start” button. Even if the active box is not checked Aggregator will still wait 15 seconds before considering the next program. You can use this feature to force more time between starting successive programs if necessary.

13.4 Start Programs When Aggregator Starts Check the “Start all Active programs the next time Aggregator starts” box to make this happen.

A1 Calibrating CW Skimmer and Skimmer Server

The following is from the RBN blog (<http://reversebeacon.blogspot.com/>).

Frank, W3LPL has introduced me to a really easy way to calibrate your RBN CW Skimmer or SkimServ. It goes like this.

1. Set a filter on <http://reversebeacon.net> to pass only spots from your continent, and only on 12 and 10 meters. The reason to use these bands is that any error in calibration increases as you go up in frequency.
2. Wait till the time of day when those bands open, and compare the frequency reported by your Skimmer with those reported by others in your area. The vast majority of Skimmers in Europe and North America are accurately calibrated now, so that if your calibration is off, it will probably stand out among multiple spots of the same station.
3. Calculate a correction factor by dividing your displayed frequency by the true frequency. For example, if you spot a station at 28005.4, and the majority report 28005.1, then the resulting correction factor would be 1.00001071.
4. Now open either CWSkimmer.ini or Skimserv.ini, depending on which Skimmer software you are using. You can use Notepad for this purpose.
5. See if you have a line that reads "FreqCalibration=....". **If you do not**, then add that line, with your correction factor from step 3 inserted to the right of the "=" sign. **If you do**, then multiply the correction factor by the number you find there, and **enter the new number instead**.
6. Now save your change, close Notepad and close your Skimmer. When you reopen the correction will be added.
7. Recheck your calibration. You should be very close. If you are still off in either direction, repeat the steps in 3-5 above, making sure to multiply this new correction factor by the value already in the .ini file to derive the new FreqCalibration value.

That's all there is to it. Please check your frequency calibration and help us build the RBN's reputation for producing accurate spots for all users.

Thanks and 73,

Pete N4ZR

A2 Modifying Skimmer's .ini Files

The following is from the RBN blog (<http://reversebeacon.blogspot.com/>).

When you run Skimmer or SkimSrv without Aggregator it goes looking for CW Skimmer.ini or SkimSrv.ini, and loads those settings.

Here's an excerpt from the .ini file I am using, which I opened in Notepad.

```
[Skimmer]
CenterFreqs48=1822750,3522750,3568250,7022750,10122750,14022750,14068250,18090750,21022750,21068250,24912750,28022750,28068250
CenterFreqs96=1845500,3545500,7045500,10145500,14045500,18113500,21045500,24935500,28045500,28136500,50045500,50136500
CenterFreqs192=1891000,3591000,7091000,10191000,14091000,18159000,21091000,24981000,28091000,50091000
SegmentSel48=000101001
SegmentSel96=001111111
SegmentSel192=001111111
CwSegments=1800000-1840000,3500000-3590000,7000000-7090000,10100000-10130000,14000000-14090000,18068000-18095000,21000000-210
ThreadCount=1
DeviceName=01 QuickSilver QS1R
Rate=0
```

Center Frequencies refer to the centers of the bands that are covered by SkimSrv, depending on whether you have selected 48, 96 or 192 KHz bandwidth. For example, on 80 meters, using 96 KHz bandwidth, the center frequency is 3545500 Hz, or 3545.5 KHz. The frequency coverage, then, is from 3500.0 to 3591 KHz (it's not quite the full 96 KHz, for technical reasons). You can set these values to anything you want, or add additional ones, and SkimSrv will then display them as the choices you can make on the Skimmer tab.

In the example we're using for this explanation, I created two special .ini files to allow me to watch the low bands during darkness and the high bands during daylight. I did this by setting SkimSrv up for the 7 low bands, closing the program (which re-writes the .ini file), and then renaming a copy of the SkimSrv.ini file to Low.ini. I then went back, re-opened SkimSrv with the default SkimSrv.ini file, repeated this process for High.ini, and could have done any number more the same way.

There's no way to avoid some manual editing if you want to set up wider CW segments, because this parameter cannot be set from inside SkimSrv. Looking again at the .ini file, it's pretty simple.

```
[Skimmer]
CenterFreqs48=1822750,3522750,3568250,7022750,10122750,14022750,14068250,18090750,21022750,21068250,24912750,28022750,28068250
CenterFreqs96=1845500,3545500,7045500,10145500,14045500,18113500,21045500,24935500,28045500,28136500,50045500,50136500
CenterFreqs192=1891000,3591000,7091000,10191000,14091000,18159000,21091000,24981000,28091000,50091000
SegmentSel48=000101001
SegmentSel96=001111111
SegmentSel192=001111111
CwSegments=1800000-1840000,3500000-3590000,7000000-7090000,10100000-10130000,14000000-14090000,18068000-18095000,21000000-210
ThreadCount=1
DeviceName=01 QuickSilver QS1R
Rate=0
```

All you do is edit the CwSegments line so that Skimmer will decode over the full frequency range you want. Of course, the actual coverage range depends on both the bandwidth chosen and the size of the CW segments, whichever is less. After you have made the edits you want, save the .ini file under a descriptive name like Contest Low.ini, and you're done.

From time to time, people ask me how to spot more beacons, or why RBN nodes don't spot more.

For many beacons, the question has a trite answer - because the nodes aren't covering and decoding the frequencies where the beacons are. The question is "why?", and the answer lies in the SkimServ.ini file used by the Skimmer Server software, **and** in your Skimmer Server settings. **The NCDXF beacons are a special case, and we'll deal with that a bit later.**

First, the easy ones. Open Skimmer Server, and select the Telnet tab. Make sure that the box "Send only CQ Spots" is unchecked. Unless you do this, you'll never send any beacon spots. Set the Validation level to "Normal", because the beacons may not be sending the keywords or the optimum number of repeats of their call signs needed to be recognized by CW Skimmer.

Now let's fix the .ini file. The first small challenge is to find the file. In Windows XP, it is typically installed in the Afreet folder under Program Files. In Windows 7 and beyond, you'll most likely find it in C:\Users\[your logon name]\AppData\Roaming\Afreet\Products.

Once you track it down, open it and you'll see this group of lines:

```
CenterFreqs48=1822750,3522750,3568250,7022750,10122750,14022750,14068250,18090750,  
21022750, 21068250,24912750,28022750,28068250,50022750,50068250,50113750,50159250  
CenterFreqs96=1845500,3545500,7045500,10145500,14045500,18113500,21045500,24935500,  
28045500, 28136500,50045500,50136500  
CenterFreqs192=1891000,3591000,7091000,10191000,14091000,18159000,21091000,24981000,  
28091000,50091000  
SegmentSel48=000101001  
SegmentSel96=001111111  
SegmentSel192=001111111  
CwSegments=1800000-1840000,3500000-3590000,7000000-7090000,10100000-10130000,  
14000000-14090000,18068000-18095000,21000000-21090000,24890000-24920000,  
28000000-28090000,50000000-50100000
```

The first three rows are center frequencies for each of the three possible bandwidths. You'll note that the actual bandwidth covered by each is slightly less than its name would suggest - for example, 192 KHz actually covers 91 KHz below and 91 KHz above the center frequency, not 96. With many of the beacons you want to spot 100 and more KHz above the lower band edge, you'll want to run 192 KHz bandwidth to be sure to find them - on 10 meters, some are even above 28.182, so you may want to define a second 10-meter segment to allow your QS1R to listen higher.

The next magic trick is in the line titled "CWSegments." This is something that Alex added in order to conserve computer power by not decoding a lot of junk, like RTTY, PSK31, etc. Fortunately, the way Alex implemented it is quite flexible. You can add segments at will, simply by adhering to the format, which uses frequencies to the nearest Hz, and separating them with a comma. For example, if you want to capture the NCDXF beacon frequency on 20 meters, you'll want to add a CW Segment of 14095000-14105000. To avoid all the RTTY activity on 20 meters, you might want to split the 20M segment in two - 14000000-14070000,14095000-14105000.

Incidentally, if you like to make as many contest spots as possible, you may also want to modify this line, because during CW contests people frequently operate up into and well beyond the RTTY/PSK segment. The cost of opening it up, of course, is that if the RTTY guys stick it out during the CW contest, you'll get some of the "EE5EEE" type of junk spots.

The NCDXF beacons are a special case, because they only sign their callsigns once before they begin their power step-downs, and then the next beacon takes over. As a result, CW Skimmer and Skimmer Server often don't hear enough repetitions to validate and spot a callsign.

CW Skimmer has a special function called a Watch List, which is discussed in its Help file. Put the beacon callsigns on the list, and they will be spotted the first time they are heard. Skimmer Server also has this feature but it is invisible. Since both programs use the same Watch List, you can use the Watch List editor in CW Skimmer to create a Watch List that will work with Skimmer Server.

A3 Computer Needs

The following is from the RBN blog (<http://reversebeacon.blogspot.com/>).

The computer described below was designed before RTTY Skimmer Server was available, and is more than ample for CW Skimmer Server. RTTY Skimmer Server requires 3-4 times as much computer power for similar coverage, and you will probably need to experiment with bandwidths and decoding segments to get the best results with any given computer.

A Low-Cost Specialized Skimmer Computer

I thought others might be interested in the specs and design criteria of my new Skimmer computer.

First, I should say that my old Skimmer computer, running an E2200 dual-core Pentium, was distinctly unhappy in contests at 96 KHz coverage of 6 bands, and was absolutely knocked flat at 192 KHz.

I couldn't spend a lot of money, but wanted to do better. Here's what I came up with:

An AMD FX-8350 8-core processor. This processor has a [Passmark](#) score of over 900-, compared to the E2200's 1160. The AMD is far more cost-effective than Intels of comparable performance, and it even comes with its own cooler

An ASUS M5A78L-MLX Plus motherboard. This is quite an old design, but is the only one I could find that still has onboard video and audio and takes decently fast memory. And it is really cheap. I've always liked Asus, not least for their comprehensive user manuals.

8 GB of DDR3 1666 MHz memory. I have never seen more than about 3 GB of memory in use by Skimmer, but memory is cheap these days, so why not.

I reused my case, power supply, PCI wifi adapter and the DVD drive from the old computer. Total cost, including a new full copy of Windows 7 Home Premium, was US\$ 375.

How does it work? This weekend, with over 1000 decoders and over 1100 spots per 30 minutes, and 192 KHz bandwidth on 7 bands, Skimmer Server was consuming 8-11 percent of the CPU. I think this bodes very well.

73, Pete N4ZR

A4 More Complex Setups

Wes Cosand, WZ7I, posted the following entries on the RBN blog which describe in great detail how he set up his very successful and complex Skimmer/Aggregator installation.

<http://reversebeacon.blogspot.com/2013/03/magic-with-qs1r-two-apps-at-once.html>

<http://reversebeacon.blogspot.com/2013/03/two-apps-at-once-part-2.html>