Setting up the Flex 5000 to work with SATPC32

This article is aimed at current users of SATPC32. If you're new to satellite operations it is recommended that you check out the articles on AMSAT web page.

http://www.amsat.org/amsat-new/information/faqs/

In order to utilize your Flex 5000 for satellite operation your Flex 5000 must be equipped as follows;

V/U option

RX2 (required for full duplex operation)

A FlexControl is strongly recommended for linear transponder satellites.

The biggest issue with using SATPC32 with the flex 5000 is that SATPC32 does not natively support PowerSDR. The best option today is to use SATPC32's TS-2000 mode. Operating in this mode requires some tweaking of PowerSDR, primarily just to set up prior to the beginning of a satellite pass.

Note: The version of SATPC32 for ISS "SATPC32ISS" will not function properly with PowerSDR, it is recommended that you use the latest version of SATPC32 at http://www.dk1tb.de/indexeng.htm this version will allow you to use ISS with PowerSDR

Configuring SATPC32

Using SATPC32's TS-2000 mode with PowerSDR;

- VFO B is to be set to the uplink (TX) frequency
- VFO A is to set to the downlink (RX) frequency
- Operating Mode (FM,USB,LSB) is not set correctly by SATPC32 each time CAT is enabled in SATPC32, especially when using linear satellites.

First configure the CAT setup in SATPC32 using Setup->Radio Setup

Radio Setup				×
Radio 1 C Yaesu C Icom	1odel <	COM-Port (0 - 99) CAT Delay	3 5	
Kenwood		🗖 RTS +12 V	Autom. Rx/T	x Change
		KCT-Tuner	🔽 Satellite Mod	le
Radio 2	lone 💌	COM-Port (0 - 99)	0	Help
C Yaesu		🔲 RTS + 12V		Cancel
Clcom				Store
C Kenwood		For detailed hints op	oen menu "?/Hint	s [Radio]''

- Where COM-Port is set to match the Com Port you have set up to connect CAT to PowerSDR.
- Make sure "Autom. Rx/Tx Change" is checked.
- All other SATPC32 settings (rotator, active satellites, etc.) do not change.

Setting up PowerSDR

- Start PowerSDR with CAT enabled.
- Set SATPC32 to the Satellite you will be using, let's say AO-27
- Enable CAT in SATPC32 (click the C-)



- When you enable CAT the downlink and uplink frequencies should now appear in PowerSDR's VFO's and you should see them update for Doppler compensation. Verify that the VFO frequencies are close to the downlink and uplink frequencies in SATPC32 and changing . PowerSDR will not be updated at the same rate as SATPC32.

cycle	🔀 SatPC32 V. 12.8b [Registered to David Beu	umer, W0DHB]	
	File Tracking Satellites CAT Rotor M	1ode Setup Programs Accy ?	
	D: AO-27	Downlink 0 Corr.(+/-) 0 Uplink 20 100 500 1k 5k	Sat in Sun
	R-C+A-V-TO L AL CW-	436786.928 145852.695	08.05.2012
	M- Z1G-S+D+W2P1 2D	-8.072 2.695	16:08:45 L
ysten	Is™ PowerSDR™ v2.3.5 FLEX-5000: 0208-5281		
emory	Wave Equalizer XVTRs CWX Mix	er Antenna ATU FlexControl ESC Get Help Heros About	t
-		VFO B	
	136 786 022	VFO Sync Tune Sten: - 50Hz + 115 8F	52 604
	430.700 933	VFO Lock 140.00	
IUN	70CM Satellite Only	7.000000 Save Restore TX 2M Satel	ite 🛛 🗌
ATU			

- If you get the following error when you enable CAT in SATPC32



Not to panic, disable CAT in SATPC32 and click ok to error and any other that follow and re-enable CAT in SATPC32. Be sure to follow the steps outlined below to restore PowerSDR to the proper configuration.

- In PowerSDR
 - o For FM satellites and ISS
 - Click on VFO B TX button
 - Set Mode to FM

- If required, set CTCSS frequency
- Set RX1 squelch to 0
- o For Linear Transponder Satellites
 - Turn on RX2
 - Click on VFO B TX button
 - Set RX1 mode to USB
 - Set RX2 mode to LSB
- The V/U's 60 watt power output is more than sufficient and in most cases too much for satellite work. Most satellites can be worked with 10 to 20 watts and much less with higher gain antennas. You will need to adjust the power output down with the PowerSDR Drive control.

Note that on 2m and 70cm the behavior of the PowerSDR Drive control is different than for HF.

- For HF, the drive control setting is very close to the percentage of full power a setting of 50 means 50% of full power or approximately 50 watts (linear tracking).
- For 2m and 70cm the drive setting versus power output tracks exponentially. Below is a chart which shows the tracking of one V/U unit. Your mileage will vary.

	Power	
Drive	out	% full
Setting	(watts)	power
100	50	100%
90	35	70%
80	22	44%
70	18	36%
60	15	30%
50	11	22%
40	8	16%
30	6	12%
20	3	6%
10	2	4%

- The 2 most popular FM satellites currently in use are AO-27 and SO-50. As of May 2012 AO-27 's downlink frequency is running high by about 2.3KHz and SO-50's downlink frequency occasionally jumps about 4Khz. When this occurs you can use RIT to tune in the downlink. Most folks don't notice these shifts, but with a panadapter it's glaringly obvious !
- You are now ready to work FM satellites -- If you prefer to monitor your transmissions (Full Duplex), use the linear Transponder setup described below with RX1 and RX2 mode both set to FM. Note: Full duplex operation with ISS or any other Satellite who's downlink and uplink frequencies are on the same band is not possible due to Flex hardware limitations.

PowerSDR Operation with Linear Transponder Satellites (Full Duplex)

- Listening for you own signal
 - o In PowerSDR Setup RX2 Tab, uncheck "Auto Mute RX1 on VFO B TX"

NowerSDR Setup	
General Audio Display DSP Transmit PA Settings Appearance Keyboard CAT Control	Tests
Hardware Config Options Calibration Filters RX2 Navigation	
V Auto Mute RX2 on VFO A TX	
Auto Mute RX1 on VFO B TX	
☑ Disconnect RX2 RF Input on TX	
Factory Defaults Import Database Export Database OK Cancel	Apply

- o Hit MOX to transmit
- Tune yourself in using PowerSDR XIT Note that when you are listening for yourself you may start out as much as 5 Khz off. Watch for yourself on the panadapter as you tune. Note the XIT offset when you are tuned in for each satellite and use this as a starting point when you use the satellite the next time . For experienced SATPC32 users you can also configure SATPC32 to apply the offset. Note that as of May 2012 VO-52 requires a 4.8 Khz offset and it is periodically changing.
- Tuning in and working stations
 - Set your PowerSDR tuning step size (50 Hz works nicely)
 - It is recommended that you utilize the AGC-T control as recommended by FlexRadio <u>http://kc.flexradio.com/KnowledgebaseArticle50153.aspx?Keywords=AGC</u>
 - o Tune in a station as you would normally (click tune, Mouse wheel, FlexControl), SATPC32 will automatically adjust your uplink frequency in PowerSDR
 - o Call the station !
 - By checking and un-checking the "Auto Mute RX1 on VFO B TX" box you can either monitor yourself or not. To keep your audio latency down so you don't sound too drunk when you monitor yourself use the highest PowerSDR sample rate you can (PowerSDR Setup Audio Tab, Primary Tab) like 192K and your PowerSDR Phone DSP buffers small (PowerSDR Setup DSP Tab, Options Tab) like 1024.

Sample PowerSDR Screen setup for an FM Satellite

S FlexRadio Systems	Is™ PowerSDR™ v2.3.5 FLEX-5000: 0208-5281	
Setup Memory	Wave Equalizer XVTRs CWX Mixer Antenna ATU F <u>l</u> exControl ESC GetHel <u>p</u> Her <u>o</u> s About	
	VFO A- 435.249 420 VFO Lock Tune Step: - 50Hz + 70CM Satellite Only TX 7.00000 Save Restore 2M Satellite	35 Signal ▼ Mic ▼ -108 dBm
MUT BYP	435.180 435.200 435.220 435.240 435.260 435.280 435.300 435.	320
REC PLAY	-40	
	-60 -80 -100 -120 -140	
AGC-1. 80	435,180 435,200 435,220 435,240 435,260 435,280 435,300 435,	320 HE
Drive: 100		
T		LSB USB DSB
AGC Preamp		CWL CWU FM
Med 🔽 On		AM SAM SPEC
SQL: 0	-7674.5Hz -119.8dBm 435.241 746	MHz DIGL DIGU DRM
T	Pan: Center Zoom: 0.5x 1x 2x	4x
RX1: UHF	SPLT A > B NR ANF Panafall Mic 1 20 Transmit Profile	
TX: ANTT RX2: VHF	0 Beat A < B NB NB2 AVG Peak Deviation 2.5k 5.0k RPTR Offset (MI	Hz)
	IF->V A ↔ B SR BIN TNF +TNF CTCSS 67.0 ▼ 0.600	🛨 🛛 Low -8000 🔶 High 8000 🔶
5/9/2012	XIT 0 RIT 0	+ Width: T-
LOC 09:10:21 CPU %: 8.4	VAC1 VAC2	Rev Shift Reset
		DV2 Matar
RX2	Pan AGC-T: 90 NR ANF Panadapter - LSB USB DSB 5.0k 4.4k	3.8k Signal -
Preamp	V I NB NB2 CWL CWU FM 3.3k 2.9k	2.7k 00 dBm
RX2 Band:	L SQL: -150 SR BIN AVG TEAK AM SAM 2.4k Var 1	
VU 2m 👻		

Sample PowerSDR Screen setup for a Linear Transponder Satellite

🧏 FlexRadio Systems'	™ PowerSDR™ v2.3.5 FLEX-5000: 0208-5281	- • •
Setup Memory	Wave Equalizer XVTRs CWX Mixer Antenna ATU F <u>l</u> exControl ESC Get Hel <u>p</u> Her <u>o</u> s About	
	VF0 A VF0 Sync Tune VF0 B 435.862 723 VF0 Lock 50Hz + 145.935 726 70CM Satellite Only TX 7.00000 Save Restore 2M Satellite	RX1 Meter TX Meter Signal ▼ Mic ▼ -116 dBm
MOX ATU		1 3 5 7 9 +20 +40 +60
MUT BYP	80 435.800 435.820 435.840 435.860 435.880 435.900 435.920 435.9	
REC PEAT		2m 70cm 2
AF: 78		3 4 5
T-		
AGC-1: 80	145.860 145.880 145.900 145.920 145.940 145.960 145.980 146.000	
Drive: 100	-40	
T		LSB USB DSB
AGC Preamp		CWL CWU FM
Med 👻 On	-140	AM SAM SPEC
SQL: -160	-61310.8Hz -108.0dBm 435.801 412 MHz	DIGL DIGU DRM
T	Pan: Center Zoom: 0.5x 1x 2x 4x	5.0k 4.4k 3.8k
	SDIT AND ANE Panadaster Transmit Profile	3.3k 2.9k 2.7k
TX: ANT1	0 Beat A < B NB NB2 AVG Peak Mic 19 Headset	2.4k 2.1k 1.8k
RX2: VHF	IF->V A <> B SR BIN THE THE DX I 3 Show TX Filter	1.0k Var 1 Var 2
5/9/2012	CPDR 1 ^{III} on Display	Low 150 🔶 High 2850 🔶
LOC 11:11:08	2450 🚔 10 🊔 🚽 T 🔤 MultiRX VOX T 262 RX EQ TX EQ	Width:
CPU %: 4.7	VAC1 VAC2 I Swap DEXP I -40	Shift Reset
RX2	Pan AGC-T: 90 NR ANF LSB USB DSB 5.0k 4.4k 3.8k	RX2 Meter
	V NB NB2 Panadapter CWL CWU FM 3.3k 2.9k 2.7k	Signal 🔻
BX2 Band	L SQL: -150 SR BIN AVG Peak AM SAM 2.4k Var 1 Var 2	-99 dBm
VU 2m →	Mute AGC: Med ▼ DIGL DIGU DRM Low 2850 ⇔High 150 ⇔	1 3 <mark>5 7 9 +20 +40 +60</mark>