HAMMARLUND SP-600 REVIEW

by Phil Bytheway

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The SP-600 comes from a long line of snazzy Hammarlund 'Super Pro' receivers, the most notable being the subject of this review. Some models come with a 'J' added to designate a 'militarized' version that used "components having characteristics which are the equivalent of military component specification insofar as practicable" [1]. The 'X' versions can receive 6 fixed channel crystal frequencies in the 0.75 - 54 MHz range. The 'xx' number after the final hyphen indicates the model number within the series that ends with the -26 model. Its design dates from 1950 and variants were built up to the early 1960s. It was advertised for sale in QST as late as 1969. Most were originally sold to the military, government agencies and research laboratories for $1000, but they are now available for a between $50-200 depending on condition.

The SP-600 sports a 20 tube complement, self contained power supply (no solid state!) and can easily be mounted in a 19 inch rack. It is 10 1/2 inches high and 16 1/2 inches deep, weighing between 75 and 95 pounds depending on whether or not it comes in a cabinet.

The SP-600 was designed for the reception of AM, CW, RTTY and can be used in diversity applications. Coverage is continuous and ranges from 540 kHz up to 54 MHz (6 meters) in 6 bands. The band breaks are at the following frequencies: 1.35, 3.45, 7.40, 14.8 and 29.7 MHz. There is some overlap between the bands. The power supply is designed to operate from AC between 50 and 60 Hz and line voltages between 95 and 270 volts (8 tap settings on main transformer). The marshmallow toasting factor or typical power draw is 130 watts (1.25 A at 117 volts max).

First class construction techniques were used throughout the SP-600-J series. The main tuning capacitor is gold plated and the RF coils for the different bands are contained within a silver turret assembly which rotates the proper coils into position. The VFO drive train is a well made brass gear assembly and the chassis is made from anodized aluminum. To top it off, some sets have all solder connections coated with conformal coating for corrosion protection.

Over the course of my research, I sent questionnaires to 15 SP-600 users, and will quote their responses throughout this review.

FRONT PANEL

Figure 1 shows the front panel of a SP-600-JX-17. Noted SW DXer John Bryant feels that the general appearance of the SP-600...

> "…is one of the most beautiful major receivers made (SX-28 being first, then the SX-88, maybe tied with the SP-600). Unlike the R-390A, the SP-600 is just a pleasure to sit in front of. I also think all of the large knobs are just exactly the right size for hours of use (others have made this exact same comment). Using this receiver shows me, clearly, what we gave up to the miniaturization thrust of 'modern' receivers. Finally, the size and feel of ALL of the controls lets you know that you are dealing with a SERIOUS radio."

Other survey responses are in agreement with John and no one indicated a desire to relocate any of the knobs.

A tour of the front panel follows. Numbers correspond to those used in Figure 1.

1) The "PHONES" jack delivers 15 mw to an 8000 ohm load if the 600 ohm output (on the back panel) is driving 500 mw to 600 ohms. Audio is very weak with 8 ohm headphones as expected. However

it does work well into "auto-level" and "adjustable level" tape recorders. The user can also use the 600 ohm outputs on the rear chassis for audio.

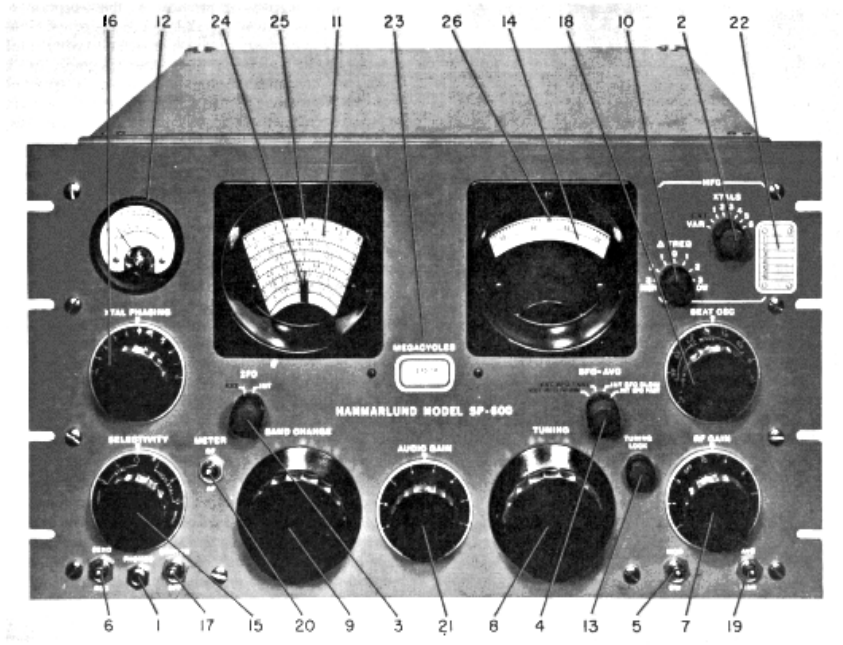

Figure 1 - Front Panel Controls

2) This switch is used to select the fixed crystal controlled frequencies and must be set in 'VAR' for normal tuning operation.

3) Selects between internal and external 2nd mixer frequencies (some models). I have not seen this on any of the sets I've viewed and no one mentioned having a set with this switch, so the manual I have is somewhat unique.

4) BFO internal/external, AVC fast/slow control (some models). Once again, I have not seen this on any set but certainly some sort of AVC control is preferred. John Leary mentioned that he built a separate AVC circuit for his set. In the course of normal DXing, situations will arise in which the user needs more than on/off AVC control. On BCB, the 'flutter' associated with so called 'graveyard' (local) channels demands a much slower AVC than on the regional or clear channels.

5) Turns the BFO on/off. Definitely a preferred feature. So often the 'modern' radio designers have decided when to enable the BFO, often excluding certain bandwidth selections unless in SSB. You can use the SP-600s BFO with all selectivity selections.

6) Puts the set in standby, thus disabling the RF amplifiers via screen voltage. B+ is applied at all times.

7) RF gain also contains the AC on/off switch.

8) Tuning knob. This is connected to a flywheel counter balance that allows for very easy tuning (and high speed spinning!). John Bryant notes: "the aesthetic thrill of giving the tuning knob a spin is WONDERFUL! The gear train and the big flywheel seem perfectly matched to move quickly and accurately across the bands. Clearly, the best main tuning knob in the business." Anti-backlash gear tensioners are used in all interfaces and there is no discernible backlash when tuning. The ratio for tuning to
main dial is 50:1.

9) This large knob is used to change bands. Like all boat anchors, it is difficult to turn and a good grip with high torque is required. Keep in mind that 4 sets of coils are being manipulated when changing bands (a la HRO!). Note: the tuning/band knob arrangement of the Super Pro series differs from the 'traditional' Hammarlund/Collins arrangement of leftmost knob for tuning, rightmost knob for band changing/band spread. For someone moving between an HQ-180/R-390A and the SP-600, a bit of

reorientation is necessary. Do NOT try standing on your head. Those of us who are left-handed (a minority to which I belong) are further hampered by having to cross the front of the receiver to tune the set. I still love the ease of tuning however; it really flies!

10) This allows +/- 3 kHz variation of the tuning frequency when in the fixed crystal mode... nice to have front panel fine-tuning when using a crystal.

11) Readout in 10 kHz to 1.35 MHz, 20 kHz to 3.45, 50 kHz to 7.40, 100 kHz to 29.7 and 200 kHz to 54 MHz. In addition, at the top, a 0 to 5 log scale is provided for use with the vernier dial (explained later).

12) S-meter, 0-200 μA, calibrated directly in kHz with respect to 455 kHz. This one also shows AF strength, although most folks don't use this feature. More users rated the S-meter performance as 'ok', a couple indicated 'accurate' and only one called it 'poor'. There are adjustments on the rear chassis for this so perhaps a wide range of opinions is possible. On my set, I noted that there was less than full deflection when tuning in locals and slight deflection when tuning in weak signals, much more dynamic than a lot of signal strength meters I've used. I prefer a meter that doesn't pin easily, which allows me a visual means of 'peaking/tweaking' antennas and tuners. If the S-meter pins easily, one can still use the slightly detuned BFO audio technique for peaking external devices.

13) Locks the internal tuning mechanism, although the tuning knob still rotates.

14) The Vernier dial is a full 0-100 with markings every 0.5. This dial, combined with the log scale at the top of (11) can be used to return to a known frequency within 1 kHz, you just have to write the log value down!

15) Bandwidth, 13.0, 8.0 and 3.0 kHz bandwidths are available without the crystal filter. The crystal filter is switched in for bandwidths of 1.3, 0.5 and 0.2 kHz. Most folks use either the 1.3 or 3.0 kHz position for DXing and the 3.0 or 8.0 position for casual listening. Close DX situations almost always require the 1.3 kHz filter.

16) This control is used when in the 1.3, 0.5 or 0.2 positions to adjust the phasing of the single pole crystal filter. The single notch can be moved through the passband. I can't find any documentation on the notch depth. The manual describes it as 'extreme selectivity for the high attenuation of closely adjacent interfering signals[1]. Most users rate the usefulness of this feature as "excellent" to "good".

17) The noise limiter tends to mess up the audio, because it is designed to reduce noise from ignition systems and other pulse noise sources.

18) The BFO frequency control is very handy. It is calibrated to +/- 3 kHz in 0.5 kHz increments that are at least 1/4 inch apart. When combined with 'normal' band station separation (10 kHz BCB, 5 kHz SW), it can be used to determine the frequency of off channel stations within 0.1 kHz. Of course a frequency counter/readout would be a better solution, but for a strictly analog readout, this set-up is most impressive.

19) Enables/disables the AVC. It's a shame this set doesn't have an adjustable AVC timing. It would help out quite a bit in some BCB flutter frequency situations.

20) This allows the user to switch between RF and AF readings on the 'S-meter'. AF is generally only used for adjusting low-level audio into a telephone cable. These receivers were often installed in

remote receiver sites. Audio outputs went to a control station through telephone circuits in which levels needed to be closely controlled. For use with a speaker at the same site as the receiver, the AF meter option really isn't needed.

21) Controls the volume into the headphones and rear 600 ohm outputs.

22) A good idea to keep track of the crystal values plugged into the crystal rack, just in case you forget such things.

(23) It's also a good idea to know what band the set is tuned to, even though the pointer (24) moves up (and down) as the band is changed.

25) Combined with the pointer in the Vernier window (26), station 'log' values are tabulated.

So much for the front of the set. The antenna connection is located 'inside' the set mounted on top of the RF chassis (mine is BNC). On the back there is a power connection, a couple of fuses and a spare fuse box (usually missing!). You will also find an array of screws for the diode output, AVC and audio output connections. A four line 'remote' female connector allows access to various internal signals. A PL-259 connector is available for the IF output (not specified, but measured 3.5 V peak-to-peak). Rear mounted screw adjustable potentiometers allow for BFO and 'S-meter' adjustments for both the RF and AF modes. On the -17 versions, two additional PL-259 connections provide inputs for externally supplied 2nd VFO and BFO signals.

[1] GENERAL PURPOSE COMMUNICATIONS RECEIVER MODEL SP-600-JX AND MODEL SP-600-J INSTRUCTIONS, published by The Hammarlund Mfg Co, 460 W 34th St, New York NY (out of print I would suspect)

[This article is in two parts; part 2 will be published in HSN #43 - editor]

HAMMARLUND SP-600 SUFFIX NUMBERS

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Over the years, many articles have been written on the performance and modification of the SP-600 Super-Pro receivers. Most state (incorrectly I might add) that production ended with the JX-26. After a great deal of research, conversations with SP-600 owners and having several of these fine receivers pass through my hands, the following list was compiled. Most of this information was taken from a Hammarlund “model number designation for type SP-600( ) receivers” list. The dates are engineering revision dates taken from the engineering revision “sign off” sheets, so they are only approximate production dates.

The only SP-600’s not included on this list that I am aware of are the “Hybrid” SP-600’s manufactured during the Vietnam war. I believe the military designation was R-1511/GR. These models had only 9 tubes, dual voltage regulators, 8 printed circuit boards, and a 200 khz bandpass filter. Usually used in banks of five receivers and connected to video recorders. Used for signal intercept work in the HF spectrum. The reels of tape were sent to the NSA in Ft. Meade, Maryland. Many SP-600’s were used by the U. S. Navy for signal intercept work, however, I do not believe SP-600’s were ever used aboard ships, only at shore installations.

Another variation was the R-450/FRR-28. These were standard Hammarlund JX receivers that were modified by Northern Radio; USN stock no. F 16-Q-112117-200, contract number Nobsr-52132, 19 Dec.

1950. These were designated SP-600-MX. Installed in a relay rack cabinet, with a LS-187/UR speaker, AM-615/UR amplifier detector, KY-79/UR keyer, O-165/UR high stability oscillator, S-224/UR patch panel and an AN/URA-b fsk converter-comparator. The X-tal frequency control at the top r.h. corner was removed and covered with Buships/Northern Radio order no. nameplate. Northern Radio, located in New York City, made many modifications available for SP-600's such as an IF gain control located where the dial lock was normally located. This was a very common modification.

Hopefully this list will help SP-600 owners and users in identifying various models of Hammarlund SP-600 receivers.

Engineering revision dates	**Suffix number**	**Notes**
Sept 1951	SP-600-JX-1	Std frequency range, 540khz-54mhz. Also designated R-274A/FRR. Signal Corps. order no. 1689-Phila-51-01. Part of AN/MRR-4, GRC-38A & B Sets.
Sept 1951	SP-600-JLX-2	Frequency range, 100-400khz, 1.35-29.7 mhz
Sept 1951	SP-600-J-3	Std. frequency range, 540kz-54mhz. No x-tal frequency control
Sept 1951	SP-600-J-4	Std. frequency range, 540khz-54mhz. No x-tal frequency control. Signal Corps. R-320A/FRC, order no. 19474-Phila-50-06. Also has separate IF gain control. Part of OA-58B/FRC set.
Nov. 1951	SP-600-J-5	Std. frequency range, 540khz-54mhz. No x-tal frequency control. Equipped w/25-60 cycle (hertz) power supply. Signal Corps. R-483/FRR. Order number 21478-Phila-50. Also part of SCR-244D Set, had antenna and accessory items included, cabinet mounted.
Sept. 1951	SP-600-JX-6	Std. frequency range, 540khz-54mhz. BFO range + or – 10 khz. US Navy model R-274B/FRR, order number NObsr-52039 19 Oct 1954. Navships manual 91661.
Sept. 1951	SP-600-JX-7	Std. frequency range 540khz-54mhz.
Sept. 1951	SP-600-JX-8	Std. frequency range, 540khz-54mhz. Manufactured for Welch contract no. XG-479.
Sept. 1951	SP-600-JL-9	Frequency range 100-400khz, 1.35-29.7mhz. No x-tal frequency control.
Nov. 1951	SP-600-JX-10	Std. frequency range, 540khz-54mhz. Replaces JX-7
Nov. 1951	SP-600-J-11	Std. frequency range, 540khz-54mhz. No x-tal frequency control. Replaces J-3.
Nov. 1951	SP-600-JX-12	Std. frequency range, 540khz-54mhz. Signal Corps. R-274A/FRR, order number 3376-Phila-52. Replaces JX-1.
Nov. 1951	SP-600-J-13	Std. frequency range, 540khz-54mhz. No x-tal frequency control. Signal Corps. Order number 16838-Phila-51. Serial no's. 52 to 67. Equipped w/25-60 cycle power supply. Replaces J-5
April 1952	SP-600-JX-14	Std. frequency range, 540khz-54mhz. Signal Corps. R-274C/FRR, order number 3376-Phila-52. Also designated previously as R-542/FRR. Replaces JX-10.
June 1952	SP-600-JLX-15	Frequency range 100-400khz, 1.35-29.7mhz. Replaces JLX-2.
June 1952	SP-600-JL-16	Frequency range 100-400khz, 1.35-29.7mhz. No x-tal frequency control. Replaces JL-9.
June 1952	SP-600-JX-17	Std. frequency range, 540khz-54mhz. Diversity receiver, manufactured for Air Material Command. Most common of all

		SP-600 receivers. Easily identified by "red metal knobs" on front panel.
June 1952	SP-600-JX-18	Std. frequency range, 540khz-54mhz. Manufactured for "GAUVREAU" contract. Replaces JX-10
Aug. 1952	SP-600-J-19	Std. frequency range, 540khz-54mhz. No x-tal frequency control. Equipped w/25-60 cycle power supply. Replaces J-13.
Aug. 1952	SP-600-J-20	Std. frequency range, 540khz-54mhz. No x-tal frequency control. Signal Corps. R-483/FRR, order number 3479-Phila-52. Equipped w/25-60 cycle power supply. Replaces J-19.
Feb. 1953	SP-600-JX-21	Std. frequency range, 540khz-54mhz. Replaces JX-10 and JX-14.
Feb. 1953	SP-600-J-22	Std. frequency range, 540khz-54mhz. No x-tal frequency control. Replaces J-11.
Feb. 1953	SP-600-JLX-23	Frequency range 100-400khz, 1.35-29.7mhz. Replaces JLX-15.
Feb. 1953	SP-600-JL-24	Frequency range 100-400khz, 1.35-29.7mhz. No x-tal frequency control. Replaces JL-16.
Feb. 1953	SP-600-J-25	Std. frequency range, 540khz-54mhz. No x-tal frequency control. Equipped w/25-60 cycle power supply. Replaces J-19.
Feb. 1953	SP-600-JX-26	Std. frequency range, 540khz-54mhz. Signal Corps. R-274C/FRR, order number 3376-Phila-52. Replaces JX-14 and JX-21.
March 1953	SP-600-JLX-27	Special frequency range, 200-400khz, 540khz-29.7mhz.
October 1953	SP-600-JX-28	Std. frequency range, 540khz-54mhz. Signal Corps. R-620/FRR, order no. 25693-Phila-53-61. Contract no. DA-36-039-SC-49453.
March 1954	SP-600-JX-29	Std. frequency range, 540khz-54mhz. Manufactured for CIA contract no. XG-1178.
Dec. 1954	SP-600-JX-30	Std. frequency range, 540khz-54mhz. Diversity receiver. Replaces JX-17.
Dec. 1954	SP-600-VLF-31	Special frequency range, 10-540khz. X-tal frequency control (4 position). Very low frequency receiver.
Dec. 1954	SP-600-JX-32	Std. frequency range, 540khz-54mhz. Black wrinkle finish front panel with white engraved lettering. Manufactured for Mackay Radio, their order no. M-41666, Hammarlund production order no. 2467-300. Internally same as JX-21.
Dec. 1954	SP-600-JLX-33	Frequency range, 100-400khz, 1.35-29.7mhz.
Aug. 1956	SP-600-JL-34	Special frequency range, 100-200khz, 540khz-14.8mhz. Manufactured for CIA, their contract no. XG-1765.
Aug. 1956	SP-600-JX-35	Std. frequency range, 540khz-54mhz. X-tal frequency control. BFO range +/- 10khz. US Navy R-274B/FRR, order no. NObsr-71369. Navships manual 91661.
Oct. 1957	SP-600-JX-36	Std. frequency range, 540khz-54mhz. X-tal frequency control. Manufactured for FBI, their order no. FBI-16876, their contract no. J-FBI-3873. Same as JX-21 except for addition of audio input jack on chassis rear.
Oct. 1957	SP-600-JL-24 (Special)	Frequency range, 100-400khz, 1.35-29.7mhz. No x-tal frequency control. US Navy R-274B/FRR. Reason for the "Special" designation is not known.
Mar. 1961	SP-600-JX-37	Std. frequency range, 540khz-54mhz. X-tal frequency control. 25-60 cycle power supply. Same as JX-21

Mar. 1961	SP-600-VLF-38	Special frequency range, 10-540khz. X-tal frequency control (4 position). Very low frequency receiver. Equipped with 25-60 cycle power supply. Otherwise, same as VLF-31
July, 1961	SP-600-JX-39	Std. frequency range, 540khz-54mhz. X-tal frequency control. Manufactured for FAA contract no. FA-2338.
1971-1972	SP-600 JX-21A	Std. frequency range, 540khz-54mhz. X-tal frequency control. This was the last series of SP-600 receivers manufactured. It had 22 tubes, a product detector, LSB, USB, CW and MOD switch. The appearance was different from other SP-600's in that the knobs had no metal skirts. The front panel was engraved with markings for Xtal Phasing, Selectivity, Bfo, Audio Gain, and RF Gain. Also, is engraved JX-21A on front panel below "Hammarlund Model SP-600". This is probably the rarest of the SP-600 series.