

International Crystal SBX-9 Sideband Exciter

If you're one of those fellows who has been procrastinating about getting on VHF sideband, the new International Crystal 9 MHz sideband exciter is just what you're looking for. The high frequency addicts can read on too, because the SBX-9 is equally suitable for any of the ham bands below 30 MHz. Basically, this new exciter from International Crystal is a crystal controlled 9 MHz single sideband generator with selectable upper or lower sideband. It uses a very steep sided four crystal half lattice filter in conjunction with a 7360 balanced mixer to obtain a minimum of 45 dB carrier suppression with at least 40 dB suppression of the unwanted sideband.

In all, the SBX-9 uses four tubes to generate 0.5 volts of 9 MHz sideband energy across the 50 ohm load. In the input a high impedance dynamic or ceramic microphone is used to drive a 12AX7 audio amplifier; this audio signal is fed into one side of a 7360 balanced modulator. The control grid of the balanced modulator tube is fed by

the 9 MHz rf carrier which is generated by a 6BH6 crystal oscillator stage. The carrier is balanced out in the 7360 by the balance control which is connected to the tube's beam deflection plates. When the audio signal reaches the 7360, the balanced modulator becomes unbalanced at an audio rate and produces a double sideband suppressed carrier signal. This signal is fed into a crystal filter where the undesired sideband is suppressed and the desired sideband passes through to the grid of the 6BA6 rf amplifier. The desired sideband is selected by choosing the exact frequency of the 6BH6 crystal oscillator. Since the 2 kHz crystal filter is centered on 9000.00 kHz (9 MHz), the upper sideband will pass through the filter when a 8998.5 kHz crystal is used in the oscillator; conversely, the lower sideband will get through if a 9001.5 crystal is used. Because of the steep sides and narrow passband of the crystal lattice filter, the audio sideband outside the filter passband is suppressed some 50 dB. The 6BA6 rf amplifier is tuned to MHz and feeds the 50 ohm output through a link coupled to the plate tank.

There is a test switch provided on the front panel of the exciter which unbalances the balanced modulator and keys the push to talk relay. This is used where a carrier is necessary for adjustment of an external power amplifier or mixer. The internal push to talk relay has a number of contacts which are brought out to the accessory socket. These auxiliary contacts may be used for turning on external power amplifiers, switching antenna changeover relays and muting receivers and converters.

Since the SBX-9 has a fixed 9 MHz output, the front panel has a minimum number of controls. In fact, to put it on the air all you have to adjust are the carrier balance and audio gain controls. And, once the carrier balance is set, it requires very little further attention. A 100 microampere meter is connected across the plate circuit of the 6BA6 rf amplifier to measure the amount of carrier. All the operator has to do is

SBX-9 Specifications

Frequency:	9 MHz crystal controlled.
Operating mode:	Selectable upper or lower single sideband.
RF output:	0.5 volts across 50 ohms.
Sideband generation:	Four crystal half lattice filter. Carrier suppression 45 dB minimum. Unwanted sideband suppression 40 dB minimum.
Audio input:	High impedance dynamic or ceramic microphone.
Tube lineup:	6BH6 oscillator, 12AX7 audio amplifier, 7360 balanced modulator, 6BA6 rf amplifier.
Features:	Push to talk relay; front panel control of balanced modulator; full metering of rf output for balance adjustments.
Size and weight:	8 3/4" x 5 5/8" x 9 7/8". 12 pounds.
Power requirements:	115 volts ac, 50/60 Hz, 36 watts.
Price:	\$125.00

International Crystal SBA-50 50 MHz SSB Mixer-Linear Amplifier

turn the SBX-9 on, key the push to talk relay and adjust the balance control for minimum indication on the meter; then talk into the mike and adjust for proper audio gain as indicated on the meter. The complete adjustment takes only a couple of seconds and results in a minimum of 45 dB carrier suppression.

The SBX-9 is designed primarily as an exciter for the SBX-50 50 MHz mixer-amplifier, but it may be used with homebrew mixers on other amateur bands by the proper selection of frequencies. The use of a 5 MHz VFO and suitable mixer-amplifier circuits for instance would provide single sideband on either 75 or 20 meter phone. Other frequencies may be added by the addition of appropriate crystal controlled mixer stages.

The sideband signal from the SBX-9 is very clean on the scope and sounds very crisp and sharp. The high quality crystal filter and use of double tuned circuits results in high efficiency with maximum suppression of undesired signals. For the amateur who is interested in getting on sideband without going to a transceiver, particularly on the VHF bands, the International Crystal SBX-9 is an ideal choice.

The new International Crystal SBA-50 50 MHz single sideband mixer-linear amplifier was designed as a companion unit for the SBX-9 sideband exciter for operation on six meters. This dandy little transmitter takes the 9 MHz sideband output of the SBX-9, mixes it with a crystal controlled signal in the 41-45 MHz range and puts out 10 watts of single sideband single tone on six meters.

The circuitry of the SBA-50 is quite straightforward, starting out with the triode half of a 6U8 in a simple third overtone crystal oscillator circuit to provide the necessary output on 41 to 45 MHz. If VFO operation is designed, it may be connected to the SBA-50 through the accessory socket on the rear deck of the unit. However, one of the three crystal positions must be va-

cated and that switch position used when the transmitter is VFO controlled. The tetrode half of the 6U8 is operated as a VHF mixer. In this section of the 6U8 the 41 to 45 MHz signals from the crystal oscillator are heterodyned with the 9 MHz signal from the single sideband exciter. The resultant sum frequency at 50 to 54 MHz is selected by the tuned mixer plate circuit and inductively coupled to the grid circuit of the 12BY7 linear buffer amplifier. This six meter signal is further amplified by the 6360 linear power amplifier and link coupled from the power amplifier tank circuit to the 50 ohm coaxial output. This signal may be used for communications within the six meter band or used to drive a larger linear power amplifier.

SBA-50 Specifications

Frequency coverage:	50-54 MHz. Three crystal controlled channels selectable from the front panel or external 41-45 MHz VFO may be used.
RF output:	10 watts single sideband single tone.
RF drive required:	9 MHz single sideband, 0.5 volts across 50 ohms.
Output impedance:	50 ohms nominal.
Tube lineup:	6U8 crystal oscillator/VHF mixer, 12BY7 linear buffer amplifier, 6360 linear power amplifier plus two 0B2 voltage regulators.
Crystals required:	3rd overtone type in the 41-45 MHz range; three crystals furnished with unit.
Features:	Crystal or VFO control; provision for external push to talk control; complete metering of 9 MHz drive, oscillator grid, buffer grid, power amplifier grid and rf output.
Power requirements	115 volts ac, 50/60 Hz, 37 watts.
Size and weight:	8 $\frac{3}{4}$ " x 5 $\frac{5}{8}$ " x 9-9/16". 13 pounds.
Price:	\$145.00

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The SBA-50 is very easy to use and it only takes a few moments to completely tune it up. Once the SBX-9 9 MHz exciter has been properly tuned up, it is a simple matter to tune up the SBA-50. The switchable meter circuit may be used to read any one of five different circuits within the amplifier; the oscillator grid, 9 MHz drive (mixer grid), buffer grid, power amplifier grid, and rf output. Except for the input and output circuits to the final power amplifier stage, all the circuits have been factory adjusted so there is a minimum number of panel controls to worry about. Since most six meter operation is limited to 52 MHz and below, the circuits within the transmitter are broadbanded enough to require no further tuning. However, if operation from one end of the band to the other is required, it may necessitate tweaking up the circuits slightly when going from 50 to 54 MHz.

Adjustment of the final amplifier tuning controls is very straightforward; put the SBX-9 exciter in the test position, place the meter switch in the PA grid position and adjust the grid tuning control for maximum reading; then place the meter switch in the rf output position and adjust the plate tuning and loading controls for maximum rf power out. Once the audio gain control has been adjusted for the proper meter reading, you're ready for your first six meter single sideband QSO.

You won't find a great deal of six meter single sideband activity in some parts of the country, but with units like the SBX-9 and SBA-50, it shouldn't be too long before all the stations on 6 meters are using this more efficient mode found on the lower frequencies.

These two new units are ideally suited for the amateur who is interested in sideband communications on our VHF bands. Although this complete unit is designed for six meters, the resultant six meter signal may be heterodyned up to two meters, 220 or even 432 with a simple homebrew mixer circuit. These units are extremely well made, stable and put out a very clean and crisp signal. With the sunspots on the upswing, it won't be too long before there will be world wide openings on six meters. When the DX going gets rough, it has been proven that ssb is the mode to be using; the SBX-9 and SBA-50 provide an excellent base for an outstanding ssb signal on six meters.

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