

## HQ-180A SPECIFICATIONS

### FREQUENCY RANGE

540 KCS to 30 MCS, covered in the following ranges: .54-1.05 MCS; 1.05-2.05 MCS; 2.05-4.04 MCS; 4.0-7.85 MCS; 7.85-15.35 MCS; 15.35-30.0 MCS.

### AMATEUR BANDS COVERED

10, 15, 20, 40, 80 and 160 meter bands.

### BANDSPREAD CALIBRATION

Dial markings every 5 KCS on 15, 20, 40 and 80 meter bands; every 10 KCS on 10 meter band; plus arbitrary 0-100 logging scale.

### NO. OF FREQUENCY CONVERSIONS

Dual from .54 MCS to 7.85 MCS; triple from 7.85 MCS to 30.0 MCS.

### OUTPUT IMPEDANCE

500 and 3.2 ohms (EIA Standard). Audio output: 1.0 watt (undistorted).

### AVC ACTION

Operates on RF and 3 IF stages. Provides fast charge—adjustable discharge, smooth acting AVC. Delayed AVC applied to the RF stage. Better than .001 second attack time and .01—1—1 second decay time. Off position.

### ADJUSTABLE SELECTIVITY AND SELECTABLE SIDEBANDS

6 db bandwidths. Upper sideband 1-2-3 KCS. Lower sideband 1-2-3 KCS. Both sidebands .5-2-4-6 KCS.

### SENSITIVITY

Less than .8 microvolt on SSB and CW produces 10:1 signal-to-noise ratio.

### ANTENNA INPUT

72 ohms nominal balance or unbalanced. Provision for separate coaxial lead-in.

### ANTENNA COMPENSATOR

Permits compensation for loading effects of various type antennas, or balanced transmission line.

### BEAT FREQUENCY OSCILLATOR

Selectable: fixed for optimum SSB, variable  $\pm 2$  KCS for CW and OFF.

### SLOT FILTER

$\pm 5$  KCS of center frequency. Attenuation over 40 db. Maximum attenuation using slot depth control 60 db. Calibrations every 1 KCS. 8:1 vernier tuning ratio.

### TUBE COMPLEMENT

6BZ6, RF Amplifier	6BA6, 60 KCS IF Amp.
6BE6, 1st. Converter	6BV8, 60 KCS IF Amp. AVC-AM Det.
6C4, HF Oscillator	12AU7, SSB Product Det.
6BE6, 2nd. Converter	6AL5, Noise Limiter
— crystal controlled	12AU7, BFO—"S" Meter Amp.
6BA6, 455 KCS Gate	6AV6, 1st. AF Amp.—Delayed AVC
6BA6, 455 KCS IF Amp.	6AQ5, Audio Power Output
6BE6, 3rd. Converter	0A2, Voltage Regulator
6BA6, 60 KCS IF Amp.	6BZ6, Crystal Calibrator

### SEMICONDUCTOR COMPLEMENT

Two 800v P.I.V.,  $\frac{1}{2}$  amp. silicon rectifiers.

### POWER SUPPLY

115/230 Volts, 50/60 cps. A.C. Power Consumption 120 watts.

### "S" METER

Calibrated 1 to 9 in steps approximately 6 db each. Also includes db scale above S-9 to plus 40 db. (Meter deflects on all type signals).

### NOISE LIMITER

Adjustable series-type provides both positive and negative clipping.

### FRONT PANEL EQUIPMENT

Main Tuning	BFO Function Switch:
Band Spread Tuning	OFF, SSB, CW
Sensitivity (RF Gain):	CW Tone (BFO Pitch)
on/off Switch	Noise Limiter, adjustable-
Selectivity: 0.5-1-2-3 KCS	ON/OFF Switch
per sideband	AVC, off, slow, medium, fast.
Sideband: Upper-Lower-Both	Send-Receive-Calibrate-ON switch
Audio Gain	"S" Meter
Antenna Compensator	Phone Jack
Tuning Range (Band Selector)	Dial Scale Reset
Function Switch: AM-SSB/CW	Vernier Bandpass Tuning
Slot. Freq. Calib.	

### REAR PANEL EQUIPMENT

Terminal for speaker connections.  
Terminals for balanced and unbalanced antennas, with separate coaxial connector.  
Systems socket for simplified associated transmitter/receiver control.  
Accessory power socket for preamp, Q-multiplier, or convertor.  
Fuse.

### DIMENSIONS

10 $\frac{1}{2}$ " h x 19" w x 13" d. Wt. 38 lbs. Shipping Wt. 45 lbs.

## SPECIAL CRYSTAL-CONTROLLED FIXED FREQUENCY MODEL

### HQ-180AX

Crystal controlled model of the HQ-180A receiver accepts 11 fixed-frequency crystals. Six of the crystals are easily interchangeable from the front panel—the balance are located within the cabinet but are readily accessible from the trap-door top.  $\pm 3$  KC vernier tuning control permits compensation for minor frequency variations of the crystals. Crystals extra.

Note: When ordering HQ-180A for export, 50 OR 60 CYCLE CLOCK MUST BE SPECIFIED.

**24 HOUR CLOCK-TIMER** Combination clock and automatic timer. Aids in meeting prearranged schedules. Optional extra.

**S-200 SPEAKER** Matching HQ-180A electrically and mechanically. Extended range 6" x 9". 8 watt capacity. Housed in matching attractive metal cabinet. Optional extra.

Improved electrical and mechanical stability.

Panel mounted three position switch to select fixed BFO for optimum SSB, variable BFO for CW or AM reception-plus "off" position.

500 and 3.2 ohm audio output.

Separate systems socket for convenient transmitter/receiver control.

Multi-purpose power transformer for 115/230 volt, 50/60 cycle operation.

Separate, continuously running filament transformer reduces HF Oscillator and Mixer warm up time to an absolute minimum.



GENERAL COVERAGE  
VERSATILITY  
WITH UNEQUALLED  
AMATEUR BANDSPREAD

# HQ-180A HQ-180AX

Accessory power supply for converters, etc.

**TRIPLE CONVERSION**—17-tube superheterodyne circuit + silicon rectifiers.

**FREQUENCY RANGE**—Full dial coverage from .54 MCS to 30.0 MCS.

**BANDSPREAD**—Bandspread calibration marks every 5 KCS on 15, 20, 40, and 80 meter bands, and every 10 KCS on 10 meter band plus a 0-100 logging scale.

**SEPARATE VERNIER TUNING**—3 KCS passband tuning range remains constant throughout the frequency spectrum (540 KCS to 30 MCS).

**NEW HIGH FREQUENCY CRYSTAL FILTER**—A new version of the renowned Hammarlund Crystal Filter is employed at 3035 KCS to improve selectivity and shape factor of the 1st IF amplifier. Second converter crystal controlled for high stability.

**SLOT FILTER**—Razor sharp 1.5 KCS at 6 db. Adjustable  $\pm 5$  KCS over passband. Provides better than 60 db attenuation.

**CRYSTAL CALIBRATOR**—Built-in 100 KCS crystal calibrator.

**DIAL SCALE RESET**—Adjustable calibration for bandspread dial.

**SEPARATE LINEAR DETECTOR**—Linear product detector for CW and SSB reception, plus normal diode AM detection.

**60 KCS IF AMPLIFIER**—Seven selectivity positions provide mechanical filter type selectivity.

**SELECTABLE SIDEBAND**—Upper, lower, or both sidebands selectable from front panel.

**FAST ATTACK AVC**—Selectable, OFF, SLOW, MEDIUM, FAST decay speeds. AVC obtained from high selectivity 60 KCS IF.

Hammarlund's HQ-180 general coverage receiver attained world recognition by creating new standards of performance... Now, the HQ-180A and HQ-180AX raise these standards to an unsurpassed high. Some of the **NEW** features which make these receivers unexcelled for general coverage (540 KCS to 30 MCS) and amateur reception, include improved electrical and mechanical stability, tunable BFO for CW or fixed BFO for optimum SSB, silicon rectifiers, accessory power supply, and 115/230v, 50/60 cycle operation. For SSB reception at its very best, the HQ-180A combines a linear product detector, selectable sideband, 60 KC third IF, and vernier IF passband tuning. Selectivity is adjustable from 500 cycles to 6 KCS and a tunable slot filter provides heterodyne and adjacent channel attenuation of up to 60 db. An input signal of less than .8  $\mu$ volts will produce a 10/1 signal to noise ratio.

**HQ-180AX** The HQ-180AX retains all of the outstanding features of the HQ-180A but additionally provides the versatility of crystal-fixed frequency, accuracy, and stability for net, MARS, WWV, etc., operation. A unique feature of the HQ-180AX is that minor crystal differences can be compensated for with the vernier pass-band tuning control which provides a  $\pm 3$  KC deviation from the crystal frequency.

The Hammarlund HQ-180A and HQ-180AX are consistent with the universally recognized Hammarlund policy of "No compromise with quality."



Established 1910

## HAMMARLUND

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INDUSTRIAL, AMATEUR, COMMERCIAL AND MILITARY COMMUNICATIONS EQUIPMENT / VARIABLE AIR CAPACITORS



**CIRCUITRY** The HQ-180A is a 17-tube plus 2 silicon diode rectifier superheterodyne receiver with triple conversion from 7.85 MCS through 30.0 MCS and dual conversion from .54 MCS through 7.85 MCS. In the front-end, the HQ-180A utilizes a (6BZ6) tuned RF amplifier and a separate mixer (6BE6) and oscillator (6C4). This combination achieves a high degree of stability, extremely high gain, and a low noise factor. Throughout the receiver, drift after warmup is held to a minimum through the use of low-loss sockets, coil forms and bandswitch wafers, plus temperature-compensating capacitors and the application of regulated power to the oscillator circuit. The HF oscillator and mixer heaters are run continuously to reduce drift during initial warm-up to an absolute minimum.

**BANDSPREAD** The HQ-180A incorporates bandspread tuning with direct dial calibration on five amateur bands: 80, 40, 20, 15, and 10 meters. Through the use of two separate dials, optimum read-out and operation is provided. A 0-100 logging arbitrary scale is also included on the bandspread dial, to assist in logging of other than amateur band frequencies.

**TRIPLE CONVERSION** Very high image rejection rate and excellent selectivity are achieved through triple conversion in the IF from 7.85 MCS to 30.0 MCS. The IF frequencies used are 3035 KCS, 455 KCS and 60 KCS. The second IF is heterodyned with a crystal-controlled oscillator. The third IF is heterodyned with a high stability low frequency oscillator (395 KCS).

**IF AMPLIFIER** All IF circuits employ iron-core permeability-tuned transformers for high gain and retention of alignment accuracy. The 3035 KCS and 455 KCS IF amplifiers provide eight tuned circuits in three stages of amplification. The 60 KCS IF amplifier contains six tuned circuits and three stages of amplification. The 60 KCS amplifier is employed in both the triple and dual conversion circuits. Selectivity of this amplifier is controlled from the front panel, offering seven selections: 1-2-3 KCS on either sideband, and .5-2-4-6 KCS on both sidebands. The skirt selectivity of this system approaches that of the mechanical filter, without the inherent compromise of the mechanical "ringing." Another front panel control is used to select

upper, lower, or both sidebands for fast, simple sideband tuning.

**VERNIER (PASSBAND) TUNING** For additional versatility and easy tuning of the desired signal, a  $\pm 3$  KC vernier control is provided to allow extra-fine passband tuning. The  $\pm 3$  KC passband tuning range remains constant throughout the entire frequency spectrum (540 KC to 30 MC).

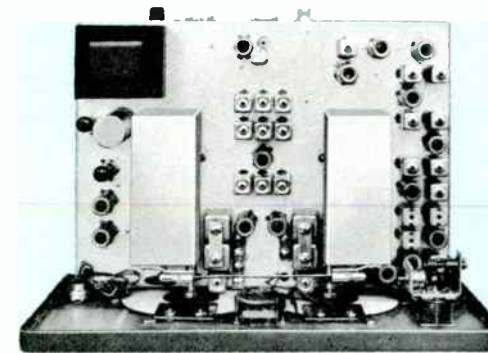
**SLOT FILTER** A bifilar "T" trap circuit is used as a slot filter. It is controlled from the front panel, providing a notch of up to 60 db attenuation. Slot filter tuning range is  $\pm 5$  KCS from the center of the 455 KCS IF. The 6 db width of the slot is approximately 1.5 KCS. An 8:1 vernier control permits accurate frequency adjustment.

**CRYSTAL CALIBRATOR** A built-in 100 KC crystal calibrator permits rapid and precise main dial setting for amateur bandspread in addition to accurate frequency readout from the broadcast band to 30 MC.

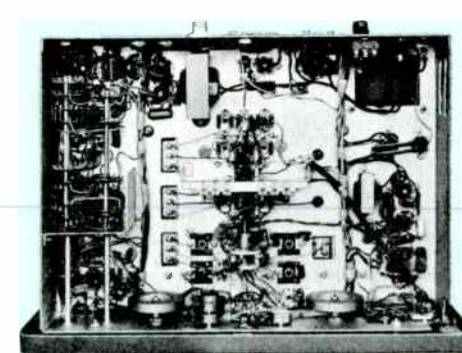
**AVC** The AVC in the HQ-180A is taken from the high selectivity 60 KCS IF. It is a fast-attack AVC with decay times selectable from the front panel. This control provides selection of OFF-FAST-MEDIUM or SLOW decay time.

**AUDIO** The exclusive Hammarlund Auto-Response circuit provides best-suited audio response under all receiving conditions. Auto-Response automatically adjusts the audio passband through a controlled feedback circuit. As the gain is increased, the circuit narrows the audio passband to provide the crisp audio signals necessary for accurate reading under weak signal conditions. As the gain is decreased, the Auto-Response circuit broadens the audio response for enjoyable, better fidelity listening. A (6AQ5) provides 1.0 watts for maximum undistorted audio output.

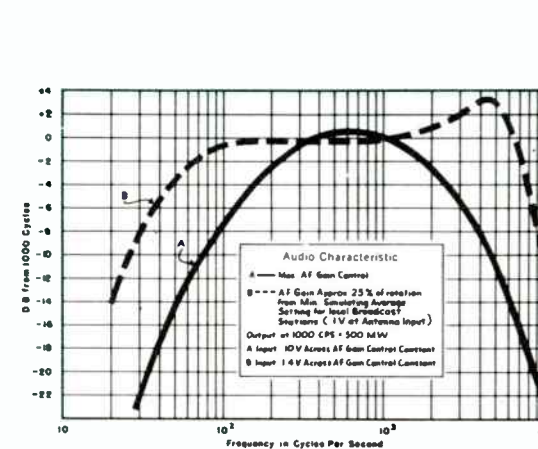
**S-METER** An S-Meter is provided on the HQ-180A for signal-strength read-out, and also as a visual aid in critical tuning. The S-Meter scale is factory-calibrated so a signal of 50 microvolts reads S-9. Calibrations are up to 40 db over S-9. Each S-unit indicates approximately a 6 db increase, equivalent to doubling the signal strength.



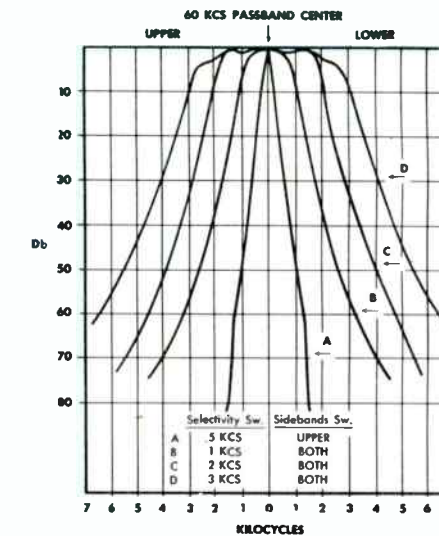
TOP VIEW



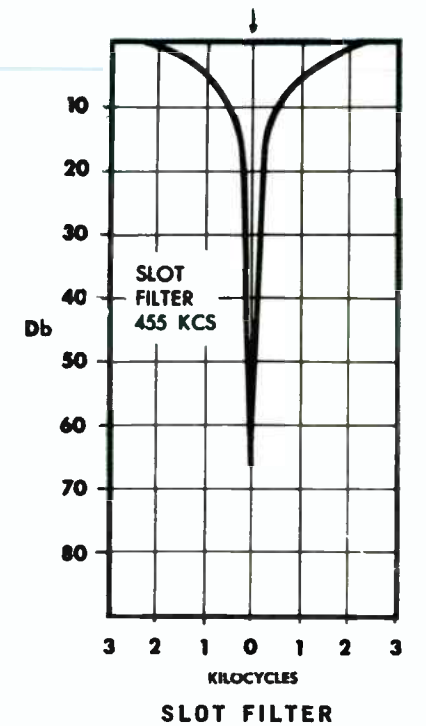
BOTTOM VIEW



AUDIO CHARACTERISTIC



60 KCS I.F. RESPONSE



## HQ-180AX

The HQ-180AX features 11 fixed-frequency crystal positions in addition to the VFO; six of which are available on the face of the instrument (in the area formally provided for the 24-hour clock-timer) the balance accessible through the trap door design of the cabinet. The five in-cabinet crystals may be used for those frequencies which are not likely to be changed, e.g. WWV frequencies. Crystal stability, coupled with an all-purpose receiver, not only meets the needs of the amateur in RTTY, MARS, C.A.P. and C.D. but provides excellent service in commercial and industrial applications.

A unique feature of this instrument is the ability to compensate for minor frequency variations of the crystals by means of the  $\pm 3$  KC vernier tuning control located on the face of the unit. This control provides exact frequency settings despite frequency tolerance of the crystals.



Closeup of crystal selector switch on front panel located in the area formerly occupied by the 24 hour clock-timer. Other indicated positions refer to the five in-cabinet crystals which are easily accessible through the trap door design of the HQ-180 AX cabinet.