

# section **5**

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## specifications

### 5.1 KWM-2 AND KWM-2A TRANSCEIVERS

The KWM-2 and KWM-2A transceivers are capable of covering any frequency within the ranges of 3.4 to 5.0 MHz and 6.5 to 30.0 MHz. With crystals furnished, they cover the entire amateur bands of 80, 40, 20, and 15 meters, the 28.5- to 28.7-MHz portion of the 10-meter band, and WWV at 15.0 MHz. The KWM-2 is equipped with 14 crystal sockets that are selectable from the front panel and provide 14 operating bands, each 200 kHz wide. The KWM-2A differs only in regard to the number of crystal sockets furnished, the method of switching crystals, and slight electrical and mechanical differences related to crystal switching. It is equipped with an extra crystal-mounting board that doubles the number of selectable crystal sockets. Crystals for added coverage may be plugged into spare sockets in either transceiver, or crystals for other bands may be substituted for those furnished.

### 5.2 REQUIREMENTS FOR OPERATION

Either transceiver requires a power supply such as the 516F-2 or PM-2 for fixed-station operation. It consumes approximately 190 watts of power from the line in receive function and approximately 430 watts on peaks in transmit function. The transceiver may be operated mobile by using a power supply such as the MP-1 for 12-volt dc operation or a 516E-2 for 24- to 28-volt operation. In mobile operation the transceiver requires 800 volts dc at approximately 175 mA; 275 volts dc at approximately 210 mA; a bias supply adjustable between -60 and -80 volts; and 6-, 12-, or 24-volt dc filament supply at 11.0, 5.5, or 2.75 amperes respectively. Any high-impedance crystal or dynamic microphone may be used. A 4-ohm speaker is required. The antenna and feed system must present a 50-ohm load with swr not exceeding 2.0 to 1.

### 5.3 SPECIFICATIONS

Frequency range....3.4 to 5.0 and 6.5 to 30.0 MHz. With crystals furnished, bands are as follows:

80 meters: 3.4 to 3.6 MHz, 3.6 to 3.8 MHz, and 3.8 to 4.0 MHz.

40 meters: 7.0 to 7.2 MHz and 7.2 to 7.4 MHz.

20 meters: 14.0 to 14.2 MHz, 14.2 to 14.4 MHz, and 14.8 to 15.0 MHz (WWV).

15 meters: 21.0 to 21.2 MHz, 21.2 to 21.4 MHz, and 21.4 to 21.6 MHz.

10 meters: 28.5 to 28.7 MHz.

Mode.....Single sideband (either sideband selectable) or CW.

Type of service.....SSB-continuous; CW - 50% duty cycle.

RTTY -continuous with a small blower directed at the power amplifier cage.

Power consumption from ac line.....190 watts in receive function.  
430 watts peak in lock-key.  
290 watts in voice transmit.

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Plate power input .....	175 watts pep on SSB, 160 watts on CW.	Calibration accuracy.....	1 kHz after midband calibration.
Power output .....	100 watts pep (nominal) into 50 ohms, on 80-, 40-, and 20-meter bands.	Backlash.....	Not more than 50 cycles.
	90 watts pep (nominal) into 50 ohms, on 15- meter band.	Keying.....	Break-in CW with side- tone provided.
	80 watts pep (nominal) into 50 ohms, on 10- meter band.	Audio-frequency response.....	300 to 2400 Hz $\pm$ 6 dB.
Audio input.....	High-impedance micro- phone or phone patch.	Audio compression characteristics .....	ALC operates on if band and rf amplifier stages and is capable of 10- dB compression.
Rf output impedance.....	50 ohms with not more than 2.0-to-1 swr.	Carrier suppression.....	Carrier 50 dB down from output signal.
Rf input impedance.....	50 ohms.	Unwanted sideband .....	50 dB down from output signal.
Rf feedback .....	Approximately 10 dB of rf feedback around pa and driver.	Oscillator feedthrough and/or mixer products (undesired).....	50 dB down from output signal (40 dB down at 3500 kHz).
Matching speaker impedance.....	4 ohms.	Second harmonic radiation.....	40 dB down from output signal.
Matching phone-patch impedance.....	500 to 1000 ohms, re- ceive output to phone patch; high-impedance phone-patch input to transmitter.	Third order distortion.....	30 dB down from output signal.
Calibrator.....	100-Hz crystal oscillator.	Noise level.....	40 dB below single tone carrier.
Frequency stability.....	Within 100 Hz during any 1-hour period fol- lowing 20-minute warm- up. Not more than 100 cycles with $\pm$ 10% line voltage variation.	Receiver sensitivity.....	0.5 microvolt for 10- dB signal-plus-noise to noise ratio in amateur bands.

<p>Receiver selectivity.....2.1-kHz bandwidth at 6 dB down, 5.3-kHz bandwidth at 60 dB down.</p> <p>Receiver spurious responses .....Image rejection better than 40 dB. Internal spurious signals below one microvolt equivalent antenna input.</p> <p>Automatic gain control.....Audio output level does not change more than 20 dB as the input signal is</p>	<p>changed from 10 microvolts to 1 volt. Fast attack and slow release AVC action on voice and CW.</p> <p>Receiver output level .....1.0 watt at AGC threshold.</p> <p>Size .....7-3/4 in h, 14-3/4 in w, 14 in d (19.69 cm h, 37.47 cm w, 35.56 cm d).</p> <p>Weight.....18 lb, 3 oz (8.25 kg).</p>
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#### 5.4 TUBE AND SEMICONDUCTOR COMPLEMENT

*Table 5-1. Tubes and Semiconductors.*

SYMBOL	FUNCTION	TYPE	SYMBOL	FUNCTION	TYPE
V1A	First microphone amplifier	6AZ8	V8	Transmitter driver	6CL6
V1B	First receiver if amplifier	6AZ8	V9	Transmitter power amplifier	6146A
V2A	Vfo cathode follower	6U8A	V10	Transmitter power amplifier	6146A
V2B	Tone oscillator	6U8A	V11A	Beat-frequency oscillator	6U8A
V3A	Microphone amplifier cathode follower	6AZ8	V11B	Second microphone amplifier	6U8A
V3B	Second receiver if amplifier	6AZ8	V12A	Crystal calibrator	6U8A
V4A	Transmitter if amplifier	6AZ8	V12B	Crystal oscillator cathode follower	6U8A
V4B	VOX relay actuator	6AZ8	V13A	High-frequency crystal oscillator	6U8A
V5	First transmitter mixer	12AT7	V13B	First receiver mixer	6U8A
V6	Second transmitter mixer	12AT7	V14A	VOX rectifier (one diode), antiVOX rectifier (other diode)	6BN8
V7	Receiver-transmitter rf amplifier	6DC6	V14B	VOX amplifier	6BN8

Table 5-1. Tubes and Semiconductors (Cont).

SYMBOL	FUNCTION	TYPE	SYMBOL	FUNCTION	TYPE
V15A	AVC rectifier (both diodes)	6BN8	CR1- CR4	Balanced modulator matched quad	FA4000
V15B	Product detector	6BN8	CR5	Receiver rf trimming	HC7001
V16A	First af amplifier	6EB8	CR6	Calibrator harmonic generator	1N34A
V16B	Receiver af output amplifier	6EB8	CR7	Screen voltage gate	1N1490
V17A	ALC rectifier (both diodes)	6BN8	CR8	ALC static bias control	1N458
V17B	Second receiver mixer	6BN8	CR9	Receiver mixer isolator	1N458
V301	Variable-frequency oscillator	7543	CR10	Cathode follower isolator	1N1490
			CR11	Rf amplifier AGC time-constant switch	1N458
			CR301	Diode switch for C308	1N34A

### 5.5 AVAILABLE ACCESSORIES

Table 5-2. Available Accessories.

ITEM	FUNCTION	COLLINS PART NUMBER
136B-2 Noise Blanker	Blanks noise pulses when the noise components present on the antenna have energy distribution in the 40-MHz portion of the spectrum and when the noise pulses have a repetition rate not in excess of 100,000 pulses per second.	522-1661-00
312B-3 Speaker	Station speaker.	522-1166-00
312B-4 Station Control	Speaker, phone patch, directional wattmeter, and station control switches.	522-1167-00
312B-5 Station Control	Combination of features and functions of 312B-4 with a vfo to permit separate transmit and receive frequencies.	522-1168-00
312C-1 Speaker	Single rack-mounted speaker.	522-3526-00
312C-2 Speaker	Two rack-mounted speakers.	522-3527-00
312C-3 Speaker	Three rack-mounted speakers.	522-3528-00
351D-2 Mobile Mount	Mount for KWM-2 or KWM-2A mobile operation.	522-1726-00
351E-4 Mounting Plate	Mount KWM-2 or KWM-2A on table or bench.	522-1482-00
351R-1 Rack	Mounts one KWM-2 or KWM-2A. Front panel edges are slotted to fit standard relay rack centers. Gray finish. 8-3/4 inches high by 13-3/16 inches deep.	522-2665-00
351R-2 Rack Mount	Mounts one 312B-4, 312B-5, or 516F-2. Front panel edges are slotted to fit standard relay rack centers. Gray finish. 8-3/4 inches high by 13-3/16 inches deep.	522-2666-00

Table 5-2. Available Accessories (Cont).

ITEM	FUNCTION	COLLINS PART NUMBER
Shockmounting kit	Provides isolators for shockmounting one KWM-2 or KWM-2A.	757-2787-001
516F-2 AC Power Supply	Ac power supply for fixed station operation (115 volts ac).	522-1170-00
MP-1 DC Power Supply	Mobile power supply for 12- to 14-volt dc source.	522-2750-00
PM-2 AC Power Supply	Portable power supply (115 or 230 volts ac).	522-2639-004
516E-2 DC Power Supply	Mobile power supply for 24- to 28-volt source.	522-0984-005
302C-3 Directional Wattmeter	Measure forward and reflected power.	522-1696-00
440E-1 Cable	Mobile power connections when 351D-2 is not used.	522-2051-00
	<div style="border: 1px solid black; display: inline-block; padding: 2px;">Note</div> <p>SM-1 and SM-2 Microphones may be used but are no longer available from the manufacturer.</p>	
SM-3 Microphone	Slender, gray and chrome, desk top unit that blends with KWM-2/2A. Frequency response of 250 to 3500 Hz, output level of -50 dB. Equipped with 5-foot length of Koiled Kord and a push-to-talk switch mounted on the friction swivel. Friction swivel permits 80° swing of microphone.	099-3288-00
MM-1 Microphone	Pressure-operated dynamic microphone for mobile use. Equipped with mounting kit and 5-foot length of Koiled Kord. Frequency response from 200 to 10,000 Hz with output level of -48 dB.	097-5945-00
MM-2 Microphone	High-impedance resistance microphone and single earphone for fixed or mobile operation. Frequency response from 100 to 7000 Hz, output level -50 dB.	097-6027-00
DL-1 Dummy Load	100-watt resistor load with switching capabilities allowing for remote (from the operating position) or front panel operation.	522-2771-000
CC-2 Carrying Case	Carrying case to carry the KWM-2/2A plus PM-2, the KWM-2/2A alone, the 30L-1, 51S-1, or 62S-1.	597-0393-000
CC-3 Carrying Case	Carrying case for accessory components. Accommodates a 312B-5 (or 312B-4) Station Control Console, a 516E-2 (or MP-1) Power Supply, and a TD-1 Dipole Antenna, as well as a 90-day supply of spare tubes and fuses.	597-0403-000
637T-2 Antenna	Dipole antenna designed for use when portability and operation on different frequencies are primary considerations.	772-5477-002
399B-5 Crystal Oscillator Adapter	Crystal controlled oscillator that is used for frequency control in place of the vfo in the transmit function.	522-1781-000

Table 5-2. Available Accessories (Cont).

ITEM	FUNCTION	COLLINS PART NUMBER
180S-1 Antenna Tuner	Basically a 1-kW pi network for matching various antenna impedances to a 50-ohm coaxial transmission line in the range of 3 to 30 MHz.	522-0651-000
CP-1 Crystal Packet	Provides crystals to insert in the KWM-2/2A crystal oscillator circuit for operation throughout the entire range of the system.	597-0404-000
Modification Kit 744H-1	Modification Kit 744H-1, when installed, converts the KWM-2 amateur band transceiver to a general coverage KWM-2A Transceiver by providing crystal positions for 14 additional 200-kHz frequency bands. Installation instructions are contained in Service Bulletin No 9, Revision 2, dated 15 October 1975.	622-0803-001