TECHNICAL DATA

WATKINS-JOHNSON

TYPE 737 RECEIVER

The Type 737 Receiver is designed for AM, FM, and Pulse reception over the frequency range of 90 MHz to 500 MHz. This frequency range is covered in two bands using separate tuners which cover 90-260 MHz and 250-500 MHz. Each tuner features a steel tape dial frequency readout. The tuning range of each band is spread out over approximately 25 inches of tape for maximum readability and resetability. A dial accuracy of 1% is maintained for both bands. The 250-500-MHz tuner features a 60-MHz IF frequency for high image and IF rejection. A 21.4-MHz IF is used in the 90-260-MHz tuner. Modern solid-state design techniques are utilized in the tuners to provide wide dynamic range, low noise figure, and excellent intermodulation characteristics. The 60-MHz IF output from the 250-500-MHz tuner is down converted to 21.4 MHz. Front panel selectable IF bandwidths of 50 kHz, 300 kHz, and 1 MHz are provided. A crystal filter is used to establish the 50-kHz bandwidth and LC filters are used to set the 300-kHz and 1-MHz bandwidths. For the demodulation of FM signals a crystal discriminator is used for the 50-kHz bandwidth. A single LC Foster-Seeley circuit is used for both the 300-kHz and 1-MHz bandwidths. A predetection 21.4-MHz IF output is available at the rear panel of the receiver. Provision is made to lock the tuned frequency in 1-kHz increments over the entire tuning range using the DAFC capability of suitable CEI Division counters. In addition, a conventional AFC circuit is provided which may be selected by a front-panel switch.

The 737 Receiver is provided with a built-in spectrum display unit which gives a visual display of signal activity over a frequency range of up to 1.5 MHz on both sides of the tuned frequency. The sweep width of the display is continuously variable by means of a front panel control up to 3 MHz maximum dispersion. A 21.4-MHz crystal controlled marker oscillator built into the display may be used to indicate the exact center of the receiver's IF passband.

All active elements in the 737 Receiver are solid state with the exception of the CRT in the spectrum display. A carrier operated relay (COR) and audio squelch circuit is included in the receiver. Threshold level for the COR/squelch circuit is adjustable from a front panel control. The COR provides DPDT contacts which are brought out to a rear-panel barrier strip. Audio output from the receiver is provided from a front-panel phones jack and a rear-panel barrier strip. A signal strength meter is included which indicates the relative level of received signals. Prime operating power is 115 or 230 Vac, 48-400 Hz.

WATKINS-JOHNSON COMPANY • CEI DIVISION • 6006 Executive Blvd., Rockville, Md. 20852
(301) 881-3300 • TWX: 710-824-9603 • Telex: 89-2558 • Cable: WJCEI

SPECIFICATIONS

Receiver Section

Frequency Range	90-500 MHz in two bands: 90-260 MHz and 250-500 MHz
Types of Reception	AM, FM, and Pulse
IF Bandwidths	50 and 300 kHz, and 1 MHz
Intermediate Frequencies:	
90-260 MHz	21.4 MHz
250-500 MHz	60 MHz first IF, 21.4 MHz second IF
Input Impedance	50 ohms, nominal
Input VSWR:	
90-260 MHz	3:1, maximum
250-500 MHz	2.5:1, maximum
Noise Figure:	
90-260 MHz	7 dB, maximum
250-500 MHz	9 dB, maximum
Frequency Stability:	
90-260 MHz	LO frequency drifts less than 10 kHz per hour at a constant temperature after initial one-hour warm-up.
250-500 MHz	LO frequency drifts less than 30kHz per hour at a constant temperature after initial one-hour warm-up.
Tape Dial Accuracy	1%, both bands
IF Rejection:	
90-260 MHz	60dB, minimum
250-500 MHz	80 dB, minimum
Image Rejection	60 dB, minimum, both bands
LO to Antenna Conduction	4 μV, maximum, both bands
RF Bandwidth:	
90-260 MHz	3 MHz, minimum
250-500 MHz	3 MHz, minimum
Sensitivity:	
90-260 MHz Band	
50-kHz IF Bandwidth	AM: -101 dBm input modulated 50% by 1-kHz tone produces 10 dB (s plus n)/n, minimum FM: -98 dBm input modulated at 1-kHz rate with 17-kHz deviation produces 21 dB (s plus n)/n, minimum

300-kHz Bandwidth	AM: -93 dBm input modulated 50% by 1-kHz tone produces 10 dB (s plus n)/n, minimum FM: -90 dBm input modulated at 1-kHz rate with 100-kHz deviation produces 21 dB (s plus n)/n, minimum
1-MHz IF Bandwidth	AM: -88 dBm input modulated 50% by 1-kHz tone produces 10 dB (s plus n)/n, minimum FM: -85 dBm input modulated at 1-kHz rate with 330-kHz deviation produces 21 dB (s plus n)/n, minimum
250-500 MHz Band	
50-kHz Bandwidth	AM: -99 dBm input modulated 50% by 1-kHz tone produces 10 dB (s plus n)/n, minimum FM: -96 dBm input modulated at 1-kHz rate with 17-kHz deviation produces 21 dB (s plus n)/n, minimum
300-kHz IF Bandwidth	AM: -91 dBm input modulated 50% by 1-kHz tone produces 10 dB (s plus n)/n, minimum FM: -88 dBm input modulated at 1-kHz rate with 100-kHz deviation produces 21 dB (s plus n)/n, minimum
1-MHz IF Bandwidth	AM: -86 dBm input modulated 50% by 1-kHz tone produces 10 dB (s plus n)/n, minimum FM: -83 dBm input modulated at 1-kHz rate with 330-kHz deviation produces 21 dB (s plus n)/n, minimum
	Pulse: -92 dBm tangential sensitivity, minimum
LO Output Level	50 mV, minimum, into 50-ohm load
Predetection IF Output	21.4 MHz center frequency; provides 100 mV, minimum, into 50-ohm load for input signals above AGC threshold
COR Sensitivity	From 6 dB below input signal levels specified for 10 dB (s plus n)/n, minimum
COR Range	Continuously adjustable to operate on minimum threshold input signals and up to -40 dBm input
COR Operate Time	5 ms, maximum
COR Release Time	6 sec, ±20%
AM Output Stability with AGC	Output changes by no more than 6 dB for input signal levels specified for 10 dB (s plus n)/n, minimum for each band and IF bandwidth and -10 dBm
Gain Control Characteristics:	
Pulse AGC, 1-MHz Bandwidth	Charge time sufficiently short to permit pulse widths as narrow as 1 usec and as wide as a square wave. Discharge time sufficiently long to operate with PRR of 100 pps.

Manual Control	Range 70 dB, minimum
Audio Output Power	100 mW, minimum, into 600-ohm load, balanced at phones jack or at rear-panel barrier strip
Audio Frequency Response	Within 3 dB from 100 Hz to 20 kHz (all IF bandwidths)
Video Output Power	1-Vrms, maximum, into 100-ohm load
Video Amplifier Response	Within 3 dB from 20 Hz to 1 MHz
Meter	Relative signal strength
Operating Temperature	0°C to 50°C
Input Power	115 or 230 Vac (±10%), 48-400 Hz
Dimensions	3.5 inches high, 19 inches wide, and 18 inches deep

Spectrum Display Section

Sweep Width	0 to 3 MHz, continuously adjustable
Resolution	10 kHz
Sweep Rate	22.5 Hz, nominal
Marker Frequency	21.4 MHz ±0.01%
Flatness of Response	±1 dB
CRT Display	1 inch by 3 inches (3ASP1 tube)

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