



MORCOM FSG-2T-PS VHF-AM Transceiver

OVERVIEW

The FSG-2T-PS is MORCOM's basic VHF-AM compact, light-weight radio transceiver. Designed by Walter Dittel, the FSG-2T-PS is a very reliable, ground-to-air aeronautical band portable radio. Ideal for use as a back-up VHF radio in control towers or in the field, this unit will provide you with many years of reliable service. This transceiver is:

- Ideal for tower emergencies or field use
- Comes with portable "PS" Case
- Built-in speaker and high-capacity battery
- Whip antenna included; Battery test function

The actual transceiver is VHF/AM, measuring only 63 x 61 x 218 mm and comes mounted in the transport case. However the radio is also available separately for mounting in an aircraft or other types of platforms, if desired. The transceiver can be tuned to up to 760 channels within the range of 118.000 – 136.975 MHz. This radio has a 25 kHz channel spacing and a 20 channel memory. The RF output is 5 Watt (carrier) — equivalent to 16 W PEP.

GENERAL SPECIFICATIONS

Type	FSG-2T, article number F10350 Amplitude modulated (AM) VHF Avionics Transceiver
Frequency range	118.000...136.975MHz
Channels	760 channels, 25 kHz spacing
Frequency selection	VFO, digital
Frequency display	5 digit 7-segment LCD display (backlit)
Frequency control	PLL frequency synthesizer, microprocessor controlled
Memories	20, stored in a non-volatile EPROM
Power supply voltage	Nominal 13.8 Vdc (normal 11.0...16.1 Vdc)

RECEIVER SPECIFICATIONS

Receiver Type	Single Superheterodyne
IF Frequency	IF 21.4 MHz, high injection
Sensitivity (m = 30% / 1,000 Hz)	≤ 1 μV (s -107 dBm / 50 Ω) for 6 dB S+N/N
Selectivity (AGC method)	≤ 6 dB at ± 8 kHz ≥ 60 dB at ± 17 kHz ≥ 70 dB at ± 25 kHz
Squelch Type, manual override	Automatic (FM noise /Carrier override), adjustable on front panel
AGC (m = 30% / 1 kHz)	≤ 6 dB, 1 μV (-107 dBm) to 1 V (+13 dBm / 50 Ω)
AGC Delay (RX), m = 30%/1 kHz	≤ 0.2 sec, 5 mV (-33 dBm) to 5 μV (-93 dBm / 50 Ω)
AGC Recovery after TX	≤ 0.1 sec at 5 μV (-93 dBm / 50 Ω), after TX end
Transfer time RX to TX	≤ 50 msec
Modulation distortion	≤ 10%, 350 ... 3,400 Hz (m = 85%)
Audio Frequency Response / AF Fidelity	≤ 6 dB (+2 dB / -4 dB), 350 ... 3,400 Hz, ≥ -20 dB at 4 kHz, 25 kHz Ch spacing (Climax Offset Operation)
Nominal AF Output (Speaker)	≥ 4 Watt into 4 Ω (at 9 Vdc ...16.1 Vdc supply)
Nominal AF Output (Phone)	≥ 50 mW into 300 Ω (at 9 Vdc ...16.1 Vdc supply)
AF Noise Level, normal operation (under environmental conditions)	≥ 35 dB (≥ 25 dB), m = 30% / 1,000 Hz at 100 μV to 5 mV / -67 dBm to -33 dBm / 50 Ω
AF External Input (OPTION)	ca. 1 Volt into 600 Ω for rated AF output
Receiver Immunity Spurious Response for s 6 dB S+N/N (m = 30% / 1 kHz)	≥ 5 mV (-33 dBm / 50 Ω) a) 108 - 156 MHz (any 25 kHz Test Channel s ± 8 kHz), except assigned channel and adjacent channels b) 50 kHz - 1,215 MHz, except 108 - 156 MHz
Cross Modulation	Max. AF output level ≥ 10 dB below nominal AF output level: a) Wanted signal 10 μV (-87 dBm) to 250 μV (-59 dBm / 50 Ω), unmodulated at assigned RX channel, plus additional b) Unwanted signal 5 mV (-33 dBm), m = 30% / 1000 Hz, frequency 100 - 156 MHz (assigned channel ± 2 RX channels)
Intermodulation (FM Immunity)	≤ 6 dB AF Quieting (-5 dBm / 50 Ω, 87.5 - 107.9 MHz), 2 signals
RF Intermodulation within the VHF Frequency Band	≥ 70 dB, for 6 dB AF Quieting (unmodulated test signals) Any VHF / AM Ch +1/+2 Ch, -1/-2 Ch, +1/+2 MHz, -1/-2 MHz
Desensitization	≥ 6 dB S+N/N, at wanted signal 10 μV (-87 dBm), at RX frequency, m = 30% / 1,000 Hz, in the presence of: Unwanted signal A 5 mV (-33 dBm / 50 Ω), unmodulated, any frequency 108 ... 156 MHz, except used CH and ± 1 RX CH, or Unwanted signal B 100 mV (-7 dBm / 50 Ω); minimum 5 mV (-87 dBm), unmodulated, frequency 50 kHz - 1,215 MHz, except 87.5 MHz ... 156 MHz, or Unwanted signal C 125 mV (-5 dBm), unmodulated, frequency 87.5 ... 156 MHz
Receiver Spurious Emission	≤ 141 μV / 400 pW / -64 dBm (50 kHz ... 8 GHz)
Channel Selection Time	≤ 0.4 sec, AF level within 3 dB, max. 20 Memory Channels
Receiver Muting, Squelch (CLIMAX RX Operation)	Simultaneous input of: a) Wanted Signal A : 5 μV (-93 dBm) +8 kHz (m = 30% / 1,000 Hz), Squelch is open. b) Unwanted Signal B : More than 12 μV (-85 dBm), m = 30% / 1000 Hz. While this channel frequency is varied slowly from -8 kHz to +4 kHz, Squelch must remain open.

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TRANSMITTER SPECIFICATIONS

TX RF Output Power (also during emergency operation)	approximately 5 Watts (carrier), 18 Watts (PEP), at 9 Vdc ... 16.1 Vdc, -0.5 dB ... + 1,5 dB
TX Duty Cycle	1 : 4 (1 minute TX / 4 minutes RX)
Frequency Tolerance	≤ 10 ppm (-20°C ... + 55°C / -4°F ... + 131°F) ≤ 5 ppm (0°C ... + 40°C / +32°F ... + 104°F)
Modulation	Amplitude modulation, AM (7K00A3EJN)
Depth of Modulation	85% \pm 2%, approx. 60-70% AM <u>average</u> with Voice modulation
Modulation Distortion	$\leq 10\%$, m = 70% / 1,000 Hz $\leq 15\%$, m = 70% / 350 ... 3,400 Hz
Modulation Audio Frequency Response	≤ 6 dB (+2 dB / -4 dB), 350 ... 3,400 Hz
Modulation AF Input for m = 70% Located on the rear panel DIL switches and potentiometers allow proper customized microphone type selection and proper modulation adjustment for each MIC input	Standard factory setting: Mike 1: Dynamic Microphone: ≤ 1 ... 10 mV symmetrical, sensitivity adjustable. Mike 2: Amplified / Carbon Microphone: ≤ 80 ... 500 mV unsymmetrical, sensitivity adjustable. Note: One, or two <u>identical</u> , dynamic <u>or</u> Standard Carbon microphone(s) may be used on each mike input. For Standard Carbon microphone(s) the supply current can be set to 2 mA, 8 mA, 10 mA, or none.
Transmit Audio Sidetone	≥ 50 mW into 300 Ω (at 9 Vdc ... 16.1 Vdc supply) average phone volume is adjustable on equipment's rear side
Carrier Noise Level	≥ 35 dB (m = 70% / 1000 Hz)
Emission of RF Energy (≤ 1 GHz)	≤ 0.25 μ W (-36 dBm) / 71 dB μ V / 3.54 mV / 50 Ω ≤ 25 nW (-46 dBm) / 61 dB μ V / 1.12 mV / 50 Ω , from 47 ... 68, 87.5 ... 108, 162 ... 244, 328 ... 336, 470 ... 862 MHz
Emission of RF Energy (≥ 1 GHz)	** 1 μ W / ** -30 dBm / ** 77 dB μ V / ** 7 mV / 50 Ω
Transmitter Spectrum Mask	≥ 70 dB attenuation at 1,250 Hz modulation / m = 60%, + 10 dB
Channel Selection Time	≤ 0.1 sec
Unwanted Frequency Modulation	≤ 1.0 kHz at m = 70% / 1000 Hz
TX Intermodulation	≥ 45 dB
TX Time-Out-Timer (TOT)	After 2 minutes in continuous transmit Mode the transmitter is disabled. The LC display flashes as time-out warning. RX now possible.
Antenna Mismatching	VSWR $\leq 3 : 1$, normal operation At VSWR 3 : 1 the requirements for modulation distortion, spurious and harmonics output as well as frequency stability are met. In addition, the RF output is $\geq 40\%$ / ≥ 2 Watt into 50 Ω At VSWR $\leq 5 : 1$ Transmitter is still functional.



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