



SMR-5688e LOW COST MICROWAVE RECEIVER



FEATURES

- 0.5 to 20 GHz Tuning Range
- Synthesized Tuning in 10 kHz Steps
- Excellent Phase Noise Performance < 0.5 degrees RMS
- 1.0 GHz IF Output, 100 MHz Bandwidth (Optional)
- Selectable 70/140/160 MHz Wideband IF Outputs:
 - Single, Fixed Gain Output
 - Adjustable Gain (Post Filtered IF) Outputs
- AM, FM and LOG Video, and Stretched AM Audio Outputs
- Five Switched IF Bandwidths
- Ethernet, RS-422 and Compatibility with Existing TN-616 and TN-340 System Interfaces

DESCRIPTION

M/A-COM's new SMR-5688e meets the need for a low cost, high performance microwave receiver with direct applicability to replace or enhance current TN-616 or TN-340 assets. The receiver has all the necessary features for high data rate PCM/TDM reception while maintaining high pulse fidelity for RADAR interception. The SMR-5688e electrical design features the low group delay distortion, low phase noise characteristics and high dynamic range necessary in today's demanding signal environments. Through the use of state of the art commercial components coupled with a high volume production line, M/A-COM's SMR-5688e sets a new standard for performance-to-cost value in microwave signal reception.

The operator-selectable IF frequency of 70 MHz, 140 MHz or 160 MHz is available at one fixed gain wideband output and a variable gain, switched bandwidth output. IF gain can be adjusted manually by the operator or automatically by the internal AGC circuit. The wideband IF output provides minimum IF bandwidths of 50 MHz for a 70 MHz IF and 80 MHz for the 140 MHz and 160 MHz IFs. Additionally, a 1 GHz IF output is available with fixed gain and a bandwidth of 100 MHz minimum. The available demodulator provides AM, FM and LOG video with user selectable bandwidths from 250 kHz to 50 MHz (please consult factory for optional configurations). A stretched audio output is also available for low PRF signal monitoring. A post-filtered IF output is available with the demodulator option. This predetected output provides access to five user selectable bandwidths centered at an IF output frequency of 160 MHz.

All receiver functions are controllable from the front panel or

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remotely using the fully compatible TN-616 or TN-340 parallel interface, the optional Ethernet interface or the RS-422 interface. Control and status functions include tuned frequency, IF output frequency, IF/Video bandwidth, IF gain mode (AGC/MGC), IF Gain level, AM and FM video levels, AM and FM audio levels, signal strength, BIT status and receiver I.D. All parameters can be quickly adjusted. A system kill command is provided in order to reset all functions to a default condition and clear memory.

Other features include a 10 MHz reference output, external 10 MHz reference input with autoselect function and built-in-test (BIT) of power supply voltages, internal temperature and phase lock status. The unit is operational over the -10° to $+50^{\circ}$ Celcius temperature range. The SMR-5688e is housed in a 1 RU (1.75 inches high), full rack-

width chassis. All connectors are located on the rear panel. Positive forced air-cooling is provided through front panel cooling fans. Mechanical construction, shielding and filtering techniques assure EMI/RFI compliance with MIL-STD-461C.

The SMR-5688e is designed to minimize life-cycle costs and for ease of maintenance. All assemblies and modules are field replaceable. Power, control and signal lines are contained within the same harness and are keyed and labeled to prevent accidental misconnection. No alignment or adjustment is required after module replacement, and modules are interchangeable between receivers.

SMR-5688e RECEIVER SPECIFICATIONS

| | | | |
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| Frequency Coverage | 0.5 to 20 GHz | Fixed Gain IF Output Frequency | 70 MHz, 140 or 160 MHz |
| Frequency Resolution | 10 kHz | IF Bandwidths (3 dB) | 50 MHz, minimum at 70 MHz 80 MHz, minimum at 140/160 MHz |
| External Reference Input | 10 MHz, 0 dBm | Gain | 20 dB, nominal |
| Internal Reference Output | 10 MHz, +3 dB \pm 1 dB | Variable Gain IF Output Frequency | 160 MHz |
| Internal Reference Accuracy and Aging | 3×10^{-7} after 1 hr. warmup Aging less than 1×10^{-6} per year | Bypass Bandwidths | 50 MHz at 70MHz IF 80 MHz at 140/160 MHz IF |
| Noise Figure | 15 dB, maximum 0.5-18 GHz; 10 dB, typical | Standard Filter Bandwidths (other bandwidths available, consult factory) | 2.5, 5, 10, 20, and 80 MHz bypass at 160 MHz |
| Phase Noise | <0.5° rms, typical | IF Output Level (AGC) | -20 dBm |
| Input VSWR | 2.5:1, maximum | Gain Control (MGC) | 60 dB gain control range in 1 dB steps |
| Preselection | Suboctave filters | Video Outputs | AM and FM outputs available only when selected IF frequency matches demodulator frequency (160 MHz). |
| LO Radiation | -90 dBm, maximum antenna conducted | Log Video Output Dynamic Range | 70 dB, minimum |
| Image Rejection | 60 dB, minimum; 80 dB, typical | Output | 0.0 to 2.5 Vdc |
| Third Order Input Intercept Point | -5 dBm, minimum; 0 dBm, typical | Linearity | \pm 1.5 dB, maximum |
| LO Spurious | -55 dBc, maximum | Rise Time | 20 ns, maximum |
| Tuning Speed | 50 ms, maximum | Connector Type | BNC, females |
| IF Spectrum Sense 1 GHz Output (Optional) | Sense dependent on tuned frequency | Impedance | 75 ohm |
| Other IF Outputs | Selectable | IF Bandwidths | 2.5, 5, 10, 20, and 80 MHz at 160 MHz |
| 1 GHz IF Output (Optional) | | | |
| IF Bandwidth (3 dB) | 100 MHz, min. | | |
| Gain | 20 dB, nom. | | |
| Noise Figure | 13 dB, max., 10 dB, typ. | | |
| IP3 | -3 dBm, min., +4 dB, typ. | | |

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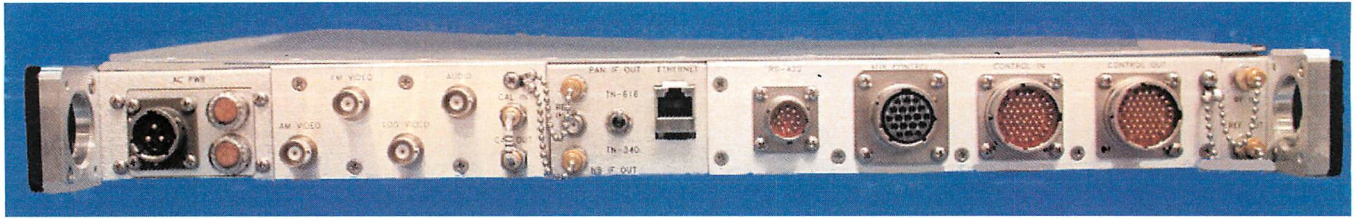
| | |
|--|--|
| Linear AM Video Output Level (100 %) | 1.0 Vpk \pm 10% (for -20 dBm IF peak output) |
| Video Response (3 dB) | 1/2 selected IF bandwidth, minimum |
| Coupling | DC |
| AM Video Gain Range | 0% to 100%, 5% steps |
| Connector Type | BNC, female |
| Impedance | 75 ohm |
| FM Video Output Level (100%) | 1.0 Vp-p ($2 \times \Delta F = 2/3$ IF bandwidth) |
| Video Response (3 dB) | 1/2 Selected IF bandwidth |
| Coupling | DC |
| FM Video Gain Range | 0% to 100%, 5% steps |
| Connector Type | BNC, female |
| Impedance | 75 ohm |
| Switched Video Output Video Mode | Log Video, Linear AM Video, FM Video; selectable |
| Gain Control | 0% to 100% for AM and FM |
| AM Stretched Audio Output (derived from Linear AM Video only) Level | 2Vp-p (at 0 dB attenuation) |
| Audio Response (3 dB) | 15 kHz, nom. |
| Attenuation Range | 0 dB to 80 dB, 1 dB steps (± 4 dB at 80 dB attenuation) |
| Impedance | 600 ohms, nom., unbalanced |
| Connector Type | BNC, female |

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| Shock | Meets or exceeds MIL-STD-810D, method 516.3 |
| Vibration | Meets or exceeds, MIL-STD-810D, method 514.3-1 |
| Temperature Range, Operating | 0 ^o to +50 ^o C |
| AC Power | Universal Input - 95-265 Vac, 47-440 Hz |
| Built-In-Test (BIT) | Power supply voltages, temperature, phase lock status |
| EMI Shielding | Built to Meet MIL-STD-461C, CE03, and RE02 |
| Humidity | 90% non-condensing at +50 ^o C |
| Size | 1.75" H x 22" D x 17" W 4.38 cm H x 55.88 cm D x 43.18 cm W Mounts in Standard 19" rack |
| Weight | 20 lbs. (9.07 kg) |
| Control Interface | RS-422, standard Front panel control, standard 55-pin parallel interface can be configured internally to emulate the CLUSTER SNOOP or CLUSTER SPECTATOR system commands |

Specifications guaranteed at 25^oC.
Specifications are subject to change without notice.

OPTIONS

- Ethernet 10/100
- Frequency range extended to 40 GHz using FE-3820 Frequency Extender.



SMR-5688e Rear Panel Photo

ORDERING INFORMATION

SMR-5688e-01 IF Bandwidth set is 2.5, 5, 10, and 20 MHz, and 80 MHz bypass. Filters are centered at 160 MHz.

SMR-5688e-02 IF Bandwidth set is 2.5, 5, 10, and 20 MHz, and 80 MHz bypass. Filters are centered at 160 MHz. Additional IF output at 1 GHz.

SMR-5688e-03 IF Bandwidth set is 2.5, 10, 15, and 20, and 80 MHz bypass. Filters are centered at 160 MHz.

SMR-5688e-04 See separate data sheet for this tuner.

SMR-5688e-05 IF Bandwidth set is 2.5, 10, 15, and 20, and 80 MHz bypass. Filters are centered at 160 MHz. Additional IF output at 1 GHz.

SMR-5688e-06 IF Bandwidth set is 2.5, 5, 10, and 20, and 80 MHz bypass. Filters are centered at 160 MHz. Additional IF output at 1 GHz. Using -04 firmware.



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