

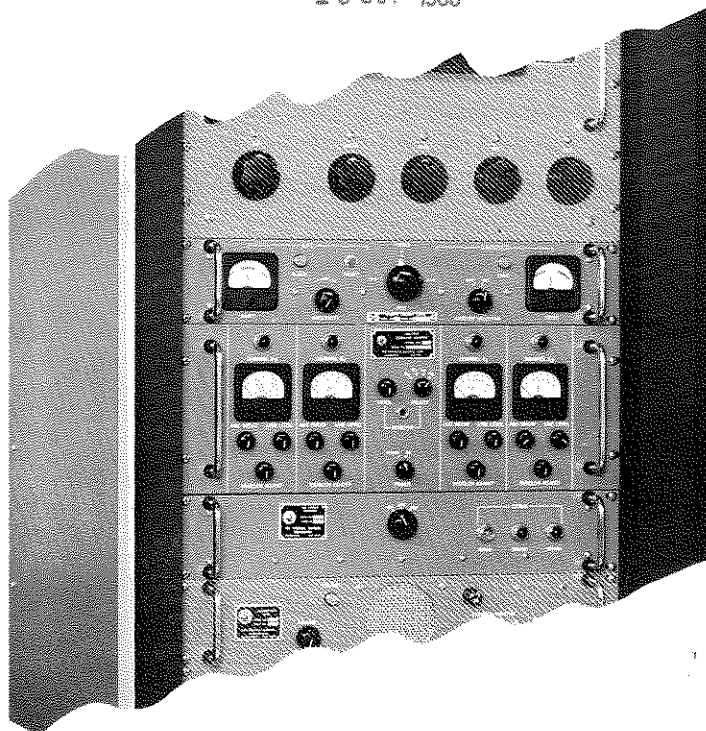


TECHNICAL BULLETIN NUMBER 4004B

Four Channel Independent AGC System
TMC Models MSG-2
MSG-3

PROPERTY OF SPECIFICATIONS
AND STANDARDS ENGINEERING

1 8 OCT 1966



PURPOSE

Model MSG-() is an independent AGC Sideband Adapter Group that modifies ANY STANDARD COMMUNICATIONS RECEIVERS to allow reception of four independent AGC controlled ISB channels. This group has Automatic Frequency Control operable with up to 30 db carrier suppression. Each of the four 3 kHz channels is maintained at commercial telephone quality with uniform gain controlled independently within each channel.

APPLICATION

- To expand present ISB service from 2 to 4 channels
- To adapt any nonsideband receiver to sideband reception
- Point-to-Point Service
- Commercial telephone service
- Voice tactical circuit

FEATURES

- 60 db AGC action within each demultiplexed IF channel
- AFC for pilot carrier reception
- Front panel metering on each channel
- Front panel audio monitor
- MSG-2 1.75 MHz input
- MSG-3 455 kHz input

Four Channel Independent AGC System

DISCUSSION

The Four Channel Independent AGC System, TMC Model MSG-(), was designed to fulfill the ever increasing requirements of rapid speaker-to-listener commercial telephone quality voice communications via long distance radio circuits.

In the early days of independent sideband transmission, one sideband was allocated as a voice order wire/telephone channel and the other channel was used as multiple tone telegraph. The increased stability of sideband transmitters and receivers has made possible the use of audio translation equipment, thus providing four 3 kHz channels for use on a single transmission circuit. For those who are not familiar with voice translation techniques, this is accomplished by a heterodyning process whereby two separate 3 kHz intelligence channels are created within 6 kHz of spectrum space. By this means, four distinctly separate circuits, which may be used for voice, multiple tone telegraph, data, etc., are transmitted by a single transmitter.

TECHNICAL SPECIFICATIONS, MODEL MSG-()

INPUT FREQUENCY:	MSG-2 — 1.75 MHz, MSG-3 — 455 kHz (other IF input frequency units available).
INPUT IMPEDANCE:	50 ohms nominal.
CARRIER REINSERTION:	1. Oven controlled crystal oscillator. 2. Reconstructed carrier from AFC. 3. From HFS-2 synthesizer.
INPUT VOLTAGE RANGE:	0.3 to 300 millivolts.
UNWANTED SIDEBAND REJECTION:	Undesired sideband, removed more than 250 Hz from the carrier, are suppressed a minimum of 60 db.
INTERMODULATION:	Intermodulation products are down 40 db from the maximum tone in the desired sideband as a result of two signals in the unwanted sideband.
SELECTIVITY:	No less than 20 db of attenuation to the carrier frequency as a result of sideband selection filters.
IF BANDWIDTHS:	Nominal 3 kHz (in accordance with CCIR specifications).

TMC Model MSG-()

STABILITY:	Stability is a function of the operating modes as follows: <ol style="list-style-type: none">1. Synthesized operation — 1 part in 10^8.2. AFC operation — resultant audio output within 1 cycle of transmitted intelligence.3. Internal crystal control — at least 5 parts in 10^6.
AGC CHARACTERISTICS:	Fast attack time; the decay time is variable from 1 to 10 seconds by front panel control on each channel.
MONITORING:	A monitoring circuit is provided to permit head-phone monitoring of any audio channel without affecting the audio output (line) circuits.
AUDIO OUTPUTS:	0 to 10 milliwatts into balanced and center tapped 600 ohm audio per channel.
AUDIO RESPONSE:	The amplitude response of each audio channel is ± 1.5 db over the frequency range of 50 to 10,000 Hz.
METERING:	Independent VU meters are provided to monitor each 600 ohm audio channel.
AF DISTORTION:	Intermodulation products better than 40 db below full output through the audio channel.
HUM LEVEL:	—50 db below full audio output.
ENVIRONMENT:	Designed for continuous duty with a temperature range of 0 to 50° C and any value of humidity up to 90%.
ORIENTATION:	Any.
INPUT POWER:	340 watts from associated Power Supply.
SIZE:	7" h \times 19" w \times 17" d.

Four Channel Independent AGC System

INSTALLED WEIGHT: Approximately 25 lbs.

COMPONENTS AND CONSTRUCTION: All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.

TECHNICAL SPECIFICATIONS, MODEL MCG-1

CRYSTALS: DEMULTIPLEXING
Assembly containing crystal in secondary standard
Oven controlled minimum stability 1 part in 10^6
per day after aging.

IFO FREQUENCIES
1 CR-27/U
1 CR-47/U
Oven controlled, minimum stability 1 part in 10^6 .

OUTPUT: 1 volt rms into 50 ohms nominal (2 outputs for each crystal frequency).

INPUT POWER: 100 watts from associated Power Supply.

SIZE: $3\frac{1}{2}''$ h \times 19'' w \times 12'' d.

INSTALLED WEIGHT: 8 lbs.

TECHNICAL SPECIFICATIONS, MODELS AFC

CARRIER SUPPRESSION: 0 db to -25 db.

CARRIER INSERTION: Reconstructed or local carrier output to MSA-1.

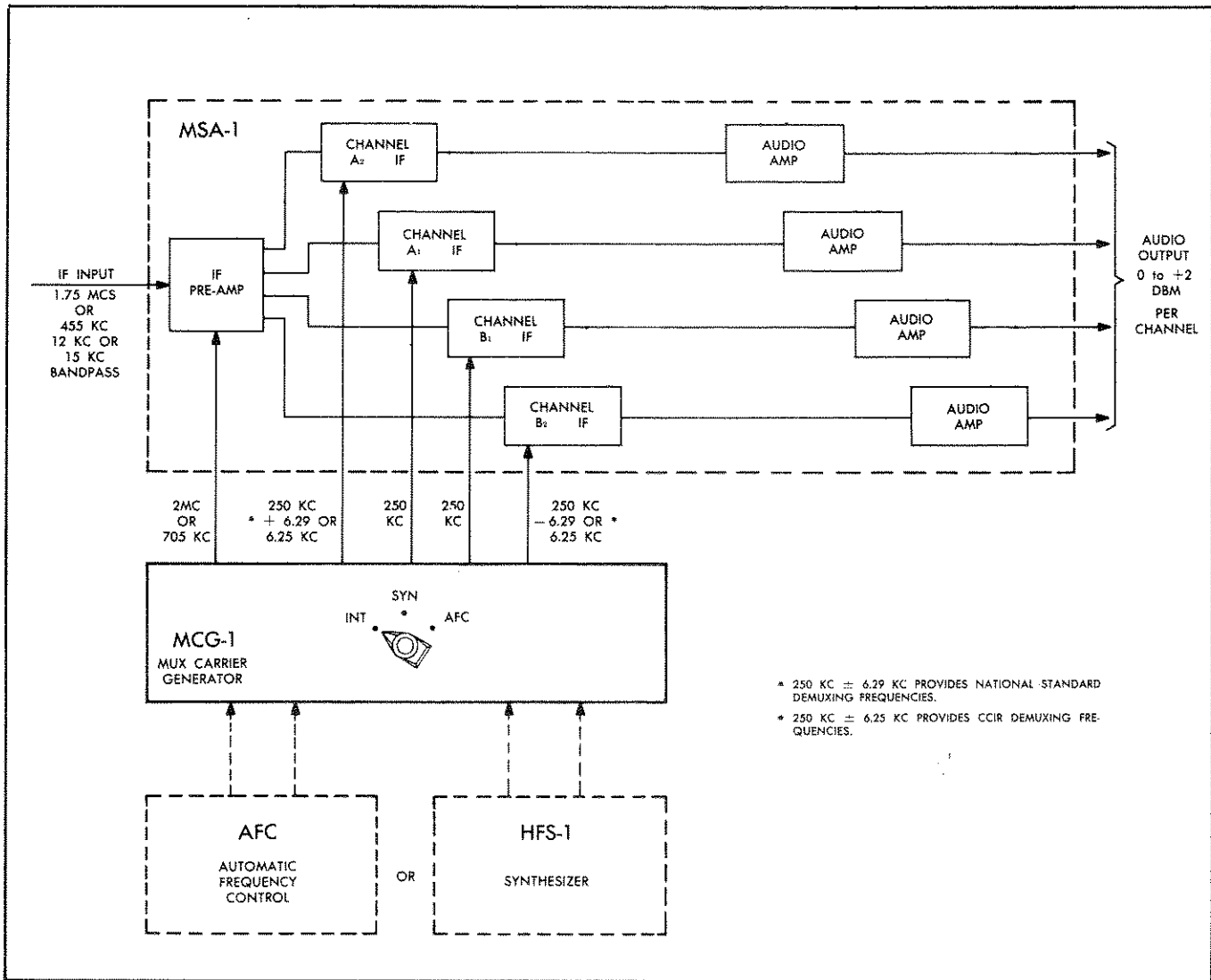
INPUT TUNING RANGE: \pm 3 kHz electrical bandspread tuning is provided.

AGC SYSTEM: Provides AGC for external control voltage derived from the carrier.

ACCURACY: Less than 1 hertz error over the entire AFC control range.

TMC Model MSG-()

CHARACTERISTICS:	The AFC system will synchronize with an IF signal ± 50 Hz and suppressed 25 db at 1 millivolt and 30 db at 5 millivolts, and will remain synchronized for ± 750 Hz of drift at a maximum drift rate of 10 Hz per second. Memory circuits will maintain tuning position during signal fades or momentary outages.
CORRECTION:	The AFC circuit will maintain the frequency of the audio output within a residual error of less than 1 hertz of the transmitted intelligence.
DRIFT ALARM:	A drift alarm light indicates when the carrier error is greater than ± 750 Hz.
FADE ALARM:	A fade alarm circuit is incorporated which provides a visual indication of carrier interruption of fading below a predetermined level. Connections for a remote fade alarm indicator are available on rear apron.
THRESHOLD:	A continuously adjustable threshold control is provided on the front panel to reduce the system sensitivity when excess noise is encountered.
METERING:	A. AFC drift indicator. B. Carrier level indicator.
TEMPERATURE & HUMIDITY:	Models AFC are designed for continuous duty within a temperature range of 0° to 50° and any value of humidity up to 90%.
ORIENTATION:	Any.
INPUT POWER:	150 watts from associated Power Supply.
SIZE:	$3\frac{1}{2}''$ h \times 19'' w \times 17'' d.
INSTALLED WEIGHT:	16 lbs.
SHIPPING WEIGHT & CUBE: (Approximate)	28 lbs., 1.3 cu. ft.
COMPONENTS AND CONSTRUCTION:	All equipment manufactured in accordance with JAN/MIL specifications wherever practicable.



FUNCTIONAL BLOCK DIAGRAM MSG



THE TECHNICAL MATERIEL CORPORATION

CABLE "TEPEI"

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