LAMPKIN 107C

COMMUNICATION SERVICE MONITOR

FEATURES

- Measures frequencies from 10 kHz to 1000 MHz.
- Generates from 1 kHz to 1000 MHz
- Frequency accurate to ±0.00005% (0.5 PPM)
- Monitors FM deviations from 0-6 kHz.
- CW, AM or FM modulation with internal 50 Hz to 6000 Hz source.
- Satisfies FCC accuracy requirements for CATV and mobile radio
- Front-panel switch eliminates tone modulation effects while measuring transmitter frequencies
- Internal calibration standard (can be reset to WWV in field)
- Isolated ground for 12 VDC operation; 50-400 Hz for 115/220 VAC operation
- Weighs only 22 lbs.

APPLICATIONS

- Mobile and Public Safety radio service
- AM, FM, and TV broadcast service
- CATV frequency alignment and checks
- Marine radio service
- Aircraft transceiver service
- Commercial frequency measurement services

Radio transmission is like a chain . . . it's only as effective as its weakest link. One of the most crucial links is the transmitting frequency.

There are practical as well as legal reasons why this frequency should be as accurate as possible. A mobile transmitter which is off frequency might not be heard at the limit of its range by a monitoring station. And of course a mistuned transmitter or receiver can cause a message to be garbled beyond recognition and be the cause of inter-channel interference.

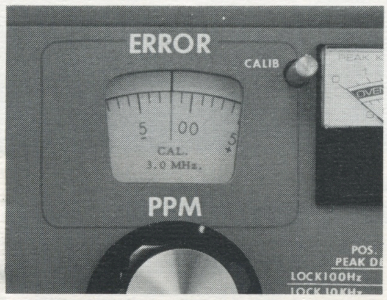
Legally, the FCC prescribes frequency tolerances for all radio transmitters which are licensed in the U.S.A. Presently for mobile radios above the 50 MHz band the tolerance is ±0.0005%, or 5 parts-per-million (PPM). Most recently, the FCC has prescribed limits on CATV channels of 1.25 MHz ± 25 kHz above the lower boundary for visual carriers, and 4.50 MHz ± 1 kHz above the visual for the aural carrier.

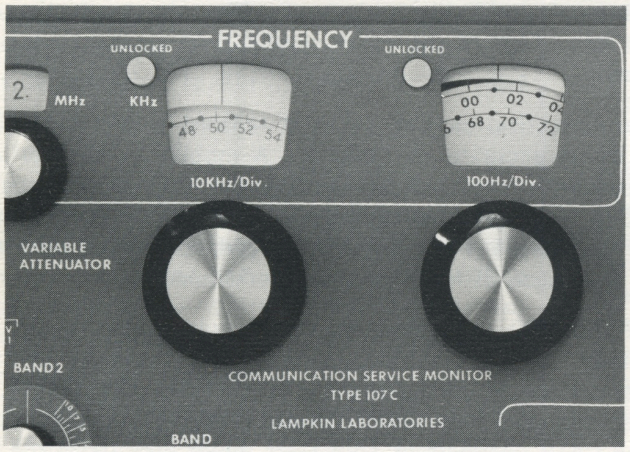
With a CSM you can put all transmitters, all receivers, all IF's and discriminators in a system **exactly** on frequency. As one experienced professional said, "I used the 107 to realign the whole receiver and upped the sensitivity from 1.0 microvolts to 0.5 microvolts." That's like money in the bank, tripling or quadrupling the effective transmitter power!

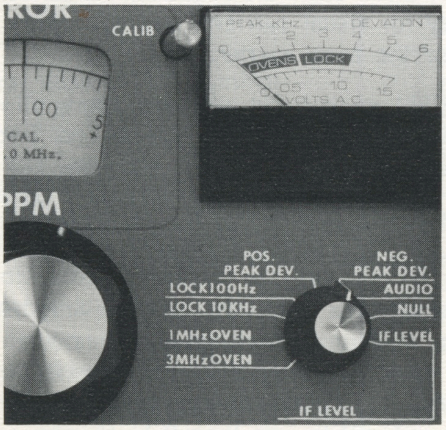
And now with the new 107C, you not only have a precision instrument for measuring frequencies extended to 1000 MHz, but one with a calibrated output which provides true signal generator capability. You can accurately provide a signal continuously variable from 1 mV to less than 0.1 μV, rms, with leakage less than 0.07 μV. The output can be either amplitude or frequency modulated by an external source or a 50 - 6000 Hz internal audio oscillator. **And you can measure FM deviations from 0 - 6 kHz!**

LAMPKIN LABORATORIES, INC.

LAMPKIN 107C...a precision meter/generator that's ea







TRANSMITTER ALIGNMENT & CHECKS

Frequency measurements and alignment are quick and easy. Just dial the desired frequency and set the Error dial to zero. As shown here, the three frequency settings give you a seven-place accuracy. When you "key" the transmitter, an audible beat note will be heard from the CSM speaker and can be seen on the front-panel meter ("Audio" setting). The frequency error can then be read directly in percentage on the Error dial by tuning it for zero beat. (The error in cycles is equal to the PPM times the carrier frequency in MHz).

Tone squelch or Private Line signals can be eliminated for accurate measurements by turning the meter switch to "null". No need to disconnect the transmitter tone module.

And, of course, aligning the transmitter is just as easy. Simply leave the Error control at zero and tune the transmitter crystal to zero beat on the CSM. Quick, simple, direct . . . and accurate to ±0.00005%!

RECEIVER ALIGNMENT & CHECKS

With the calibrated output on the 107C CSM, receiver sensitivity can be easily checked. Just dial in the center frequency of the tuner, add FM from the internal modulator on the CSM, and then use your accustomed method for measuring sensitivity (e.g., 12dB SINAD, 20 dB quieting, minimum discernable signal, etc.). The sensitivity in μV can be read directly from the calibrated dials on the CSM. And unlike a signal generator, the CSM will exhibit **no** carrier shift when you adjust FM or attenuator settings.

If the receiver operates on tone squelch or Private Line, the CSM will generate the proper frequency which can be used to modulate the CSM RF signal.

Measuring the receiver local-oscillator center frequency and IF bandwidth is also a snap with the CSM. Figure 1 shows the response usually desired — a nearly flat top with steep sides 60 to 100 dB or more down at the base. Trying to tune for a maximum on the flat top (as seen at "A") is not very accurate. But with the assigned center frequency still dialed into the CSM, one can set the output level to just below limiting . . . that is, when noise first

...y to use and highly reliable

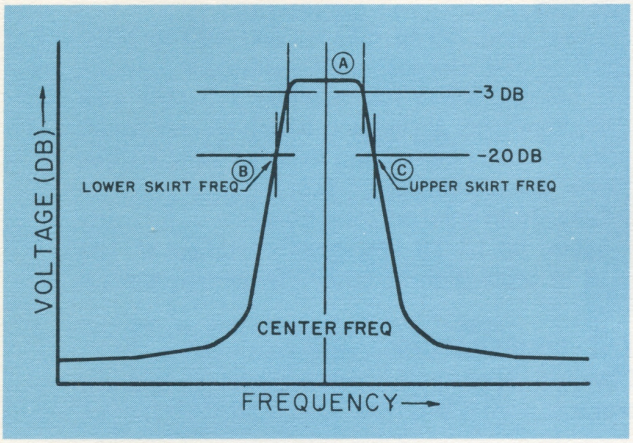


Figure 1. Typical IF Filter Pass Band

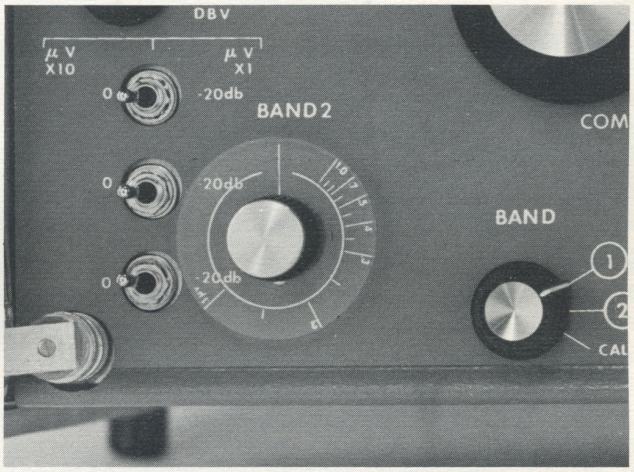
appears in the output or when the squelch cuts in at low level. Increase the level by 20 dB and tune the Error dial, first in the positive direction and then in the negative, noting the PPM reading when the noise first appears or the squelch cuts in, as shown at "B" and "C." The true center frequency is one-half the difference between the positive and negative readings, and the IF bandwidth is the algebraic sum of the readings.

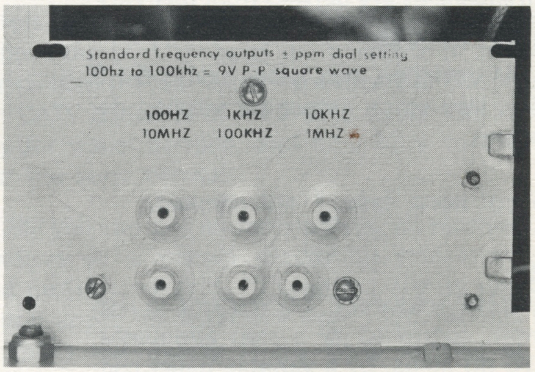
FM DEVIATION MEASUREMENT

Peak FM deviations can be read directly off the front-panel meter of the 107C. This gives you the capability to check out a transmission system with just one instrument without adding a separate modulation meter. Just set the meter switch on the CSM to either the POS. PEAK DEV. or NEG. PEAK DEV. settings, and the appropriate deviation can be read directly on the meter when the transmitter is modulated.

THE CSM AS A FREQUENCY STANDARD

Your CSM can also be used to calibrate scopes, counters, and other instruments requiring calibrated time bases, by using the 6 tip jacks shown here inside the snapoff cover on the left side of the CSM. These outputs provide 10^2, 10^3, 10^4, 10^5, and 10^6 Hz 9V p-p square waves and a 10^7 Hz 4V p-p sine wave. All can be tuned to ±55 PPM with the Error dial and are not affected by other control settings on the CSM.





LAMPKIN 107C

SPECIFICATIONS

FREQUENCY RANGE
For measurement of transmitting frequencies or of received signals, and for generation:
BAND 1: 1000 Hz to 9,999.9 kHz.
BAND 2: 10 MHz to > 1000 MHz.
All frequencies are tunable ±50 parts per million.
All frequencies are direct-reading, in 100 Hz steps.

RESOLUTIONS: Better than ±1 Hz.

FREQUENCY METER ACCURACY
Better than ½ part per million (±0.00005%) for six-month periods or more without reference to WWV. Over-range of PPM dial: ±0.5 PPM over ±20 PPM range.

INTERNAL STANDARD ACCURACY
Aging rate is less than 3 parts in 10^9 per day; stability is better than 1 in 10^8 (voltage and temperature). Internal crystal reference standard with proportional oven-temperature control operates at 3.0 MHz nominal, can be corrected to WWV, if needed, from the front panel.

VXO
The CSM has a 1 MHz variable frequency crystal oscillator (VXO), proportional oven-temperature controlled, with a calibrated dial ±50 parts per million easily correctable to the internal standard, if needed. All synthesized frequencies are derived from this VXO.

FM DEVIATION MONITORING
Measures peak FM deviation, two meter scales 0-1.5 kHz and 0-6 kHz. Has scope output for viewing demodulated waveform.

SENSITIVITY: 5 mV worst case, 1 mV nominal.

OUTPUT LEVEL
BAND 1: Fundamental frequency, 1.0 volt rms to less than 0.1 microvolt, controlled by a step attenuator, 0 to 60 dB in 10 dB steps, by a variable panel control and 3 switched 20 dB pads. Attenuator accuracy is ±2 dB, output impedance is 50 ohms resistive.
BAND 2: 1 millivolt to < 0.1 microvolts (±2 dB), continuous to 600 MHz. 100 uV max to 1000 MHz. Above 10 MHz, output is through a variable attenuator calibrated in dBm and referred to absolute microvolts; and 3 switched 20 dB pads.
A 40" telescoping antenna is also supplied.

MODULATION
Internal, two band, 50 to 600 Hz and 500 to 6000 Hz.
External, 50 to 10,000 Hz, requires 3 to 4 V rms into 1,000 ohm load, socket and switch on rear panel.
Frequency of both internal and external switches can be self-checked, or set, to < 0.5 Hz.
AM, variable from zero to over 50%.
FM, variable, up to 15 kHz peak deviation at 150 MHz, and in proportion at other carrier frequencies.

AMBIENT TEMPERATURE
The CSM will operate to specifications in ambient temperatures from -29°C (-20°F) to +50°C (+122°F).

SPURIOUS PRODUCTS
Will be greater than 30 dB down, referred to carrier, within ±100 kHz or ±0.1% of the desired frequency.

POWER SUPPLY
115/220 VAC 50-400 Hz 8 watts nominal, option of 12.5, 25, or 33 V nominal. CSM will operate over ±20% range from nominal voltages. Unit internally wired for any one of these at no charge. All 3 are available on special order. Nominal dc drain, 13 watts. DC is diode protected against reverse voltage. Separate power cords supplied for ac and dc individually fused.

WARM-UP TIME
About 15 minutes from 70°F room ambient, for stabilization of the two proportional ovens. Thereafter, the 107C can be kept hot, on the bench or in the vehicle, with little power.

NET WEIGHT: 22.3 pounds.

SIZE
7-3/8" high x 17-3/8" wide x 11" deep. A 3-3/4" standard relay-rack mounting kit is available.

GUARANTEE: For 1 year on parts & labor.

Lampkin Laboratories, Inc., reserves the right to make changes in design and construction, without notice and without incurring liability.

LAMPKIN LABORATORIES, INC. ▪ P. O. Box 9048 ▪ Bradenton, Fla. 33506 ▪ Ph. (813) 746-4175

No. 57573

Lampkin Laboratories Inc.

8400 Ninth Avenue N.W.
P. O. Drawer 2048
BRADENTON, FLORIDA 33506

A SUBSIDIARY OF PRECISE POWER CORPORATION

Phone (813) 746-4175

PRICE LIST

107C	Communication Service Monitor		$2975.00
	BP 107	Internal Battery Pack (includes one 10-cell, rechargeable, nickel-cadmium, 2 amp hours battery and recharging circuitry)	$ 125.00
	BA 107	Battery, 10-cell, rechargeable, nickel-cadmium, 2 amp hours each	$ 60.00
	CC 107	Carrying Case (Fits All Models)	$ 50.00
	FAP 20	Fused Pad, 20 db (included with New 107C)	$ 20.00
	FAP 6	Fused Pad, 6 db	$ 20.00
	FAP F	Spare Fuses (Pkg. of 5)	$ 10.00
302	TV Signal Conditioner		$ 495.00
205D	FM Deviation Meter		$ 525.00
	BP 205	Internal Battery Pack (includes one 10-cell rechargeable, nickel-cadmium, 1.2 amp hour battery and recharging circuitry)	$ 100.00
	BA 205	Battery, 10-cell, rechargeable, nickel-cadmium, 1.2 amp hour each.	$ 50.00
303	Two tone Generator		$ 390.00
501	Oscilloscope		$ 390.00

Terms of Sales: All shipments are made F.O.B. Bradenton, Fla. Florida residents add 4% Sales Tax or furnish certificate of registration number. Terms are 2% 10; Net 30 days, for customers with approved credit. Otherwise, shipment is made C.O.D. or Cash with order with 2% discount.

Repairs: Please contact factory before returning any equipment. All repairs should be sent prepaid, including detailed information concerning any problems there are with the unit. (We pay one-way surface transportation on warranty repairs.)

Guarantee: Lampkin equipment is guaranteed against defects in material and workmanship for one year from date of sale.

Prices effective April 27, 1976
Subject to Change Without Notice
Bulletin No. 127485