The LG 3238 and LG 3219 generate CW, FM, AM, and simultaneous FM and AM signals in the frequency range of 100 kHz to 140 MHz as well as CW and FM signals in the frequency range of 162 MHz to 163 MHz. They are equipped with remote control capabilities. These generators feature monaural FM and AM functions and an FM stereo modulator that complies with FM stereo broadcast standards.

Fundamental oscillation is used to generate frequencies between 70 MHz to 140 MHz and 162 MHz to 163 MHz directly. These signals are used to derive 100 kHz to 35 MHz signals through the heterodyne method and 35 MHz to 70 MHz signals through the 1/2 frequency division method. The LG 3238 and LG 3219 are synthesized signal generators that produce accurate RF signals, which are phase-locked at all times to the internal reference crystal oscillator. The frequency resolution is 100 Hz.

The ΔF function can be used to get a direct reading of how much the frequency is offset from the reference frequency. In addition, the frequency can be changed in preset steps. The output level can be set to a value from -20 dBμV [emf] to 126 dBμV [emf] in 0.1 dB steps. With the exception of the use of a relay to switch to 106 dBμV [emf], a solid-state attenuator is used to switch the output levels in order to extend the generator’s service life.

The ΔdB function can be used to get a direct reading of how much the output level is offset from the reference level. In addition, the output level can be changed in preset steps.

These generators can apply frequency modulation and amplitude modulation simultaneously. This feature can be used to combine internal modulation signals with one external modulation signal. The internal stereo modulator generates composite stereo modulation signals that comply with FM stereo broadcasting systems.

These generators have a preset function that can store 100 sets of frequency, output-level, modulation-mode, and external-control output-signal settings. A preset can be recalled as necessary to reconfigure the generator. The front panel settings are retained even when the power is turned off. If the generator is turned off and then turned back on, the previous settings are restored.

These specifications and features are the reasons why these generators are used in a wide variety of ways. They are used as automation devices for the manufacturing and inspection of AM and FM receivers and electronic components and as signal generators for servicing, research, and development.

Available Only on the LG 3219

The LG 3219 is equipped with RDS and TRI (or ARI) modulators for use with services provided mainly in Europe. It contains RDS (Radio Data System) signals, TRI (Traffic Radio Information) signals, and RBDS (Radio Broadcast Data System) signals. RDS is a type of digital data transmission system for FM stereo broadcasts used in various European countries. TRI is used to provide traffic information in Europe. RBDS is used in the US. These signals can be multiplexed into composite stereo modulation signals during FM stereo modulation.
Wide-Band, High-Level Output
These generators cover a wide frequency range from 100 kHz to 140 MHz and generate a high level of output at 126 dBμV [emf].

High Stability
The RF output signal is always phase-locked to the internal crystal oscillator to ensure high stability at \( \pm 5 \times 10^{-6} \) (5 ppm).

Long Service Life
A solid-state attenuator is used for varying the RF output signal level to extend the generator’s service life.

\( \Delta F \) and \( \Delta dB \) Readout Functions
The \( \Delta F \) function displays the relative RF frequency from a given reference. The \( \Delta dB \) function displays the relative output level from a given reference.

Preset Memories
Up to 100 sets of frequency, output-level, modulation, and other settings can be stored as presets and recalled as necessary.

Output-Signal Setting Adjustment
The rotary knob can be used to change a specific digit of an RF-frequency, output-level, or depth setting.

Remote Control
The generators are standard equipped with GP-IB, RS232C, and external control interfaces.

Weather Band Output
The generators can internally produce RF output from 162.0000 MHz to 163.0000 MHz (only FM monaural modulation).

Internal Stereo Modulator
Equipped with an FM stereo modulator, a single LG 3238 or LG 3219 can generate stereo modulation signals for performing tests and measurements on FM multiplex receivers.

DDS for Internal Modulation
As internal modulation signal sources, these generators have a DDS in addition to an RC oscillator. The DDS enables frequency settings ranging from 20 Hz to 20 kHz in 1 Hz steps. It can be used to test the frequency response of receivers.

Available Only on the LG 3219

RDS and TRI Signal Sources
Equipped with an RDS or an RBDS signal source and a TRI (or ARI) signal source, a single LG 3219 can generate modulated signals for performing tests and measurements on FM multiplex receivers.
SPECIFICATIONS

Specifications for Both the LG 3238 and LG 3219

**Frequency**
- **Range:** 0.1 MHz to 140 MHz
- **Resolution:** 100 Hz
- **Frequency Bands:**
  - Band 1: 0.1000 MHz to 35.0000 MHz
  - Band 2: 35.0001 MHz to 70.0000 MHz
  - Band 3: 70.0001 MHz to 140.0000 MHz
- **Accuracy:** ±5×10^-6
- **Internal Reference Oscillator Temperature Stability:** ±5×10^-5

**Output Level**
- **Range:** -20 dBμV to 126 dBμV
- **Resolution:** 0.1 dB
- **Accuracy:** ±1.5 dB (output level ≥ 0 dBμV)
- **Impedance:** 50 Ω
- **VSWR:** ≤ 1.3 (output level ≤ 101 dBμV)
- **Attenuator Contact:** Solid-state

**Spurious Output**
- **Harmonics (2nd, 3rd):** Spurious Output
- **Impedance:** ±2.0 dB (output level < 0 dBμV)

**Resolution**
- Band 3: 70.0001 MHz to 140.0000 MHz
- Band 2: 35.0001 MHz to 70.0000 MHz
- Band 1: 0.1000 MHz to 35.0000 MHz

**Range:**
- ≤ -40 dBc (band 1: 0.1 MHz ≤ fs ≤ 35 MHz)
- ≤ 300 Hz (bands 1 to 3: 0.15 MHz to 140 MHz)
- ≤ 150 Hz (band 1: 0.4 MHz to 1.7 MHz)
- ≤ 100 % depth, 50 Hz to 15 kHz demodulation bandwidth, 50 μs de-emphasis.

**Incidental FM**
- ≤ 5 % (60 % to 80 % AM)
- ≤ 1.5 % (30 % to 60 % AM)
- ≤ 0.5 % (0 % to 30 % AM)

**Distortion**
- ≤ ±1 dB (20 Hz to 15 kHz, 1 kHz reference)
- ≤ ±1 dB (20 Hz to 15 kHz, 1 kHz reference)

**FM Stereo**
- **Optimal Range:** Frequency ≥ 0.3 MHz
- **Main and Sub Channel Signals:**
  - Modulation Mode Modulation Signal Description
  - INT, EXT Stereo modulation based on one signal
  - MONO Monaural modulation

**Depth**
- **Range:** 0 % to 127 %
- **Resolution:** 1 %
- **Accuracy:** ≤ ±1 % (1 kHz reference)
  - (at 10.7 MHz ± 1 MHz, 76 MHz to 108 MHz)

**Stereo Separation**
- ≥ 55 dB (400 Hz to 1 kHz modulation frequency)
  - (at 10.7 MHz to 1 MHz, 76 MHz to 108 MHz)
- ≥ 55 dB (400 Hz to 1 kHz modulation frequency)
  - (at 10.7 MHz ± 1 MHz, 76 MHz to 108 MHz)

**Subcarrier Leakage**
- ≤ -50 dB

**Simultaneous FM and AM**
- **FM Mono, AM:**
  - (1) FM mono (EXT) - AM (INT)
  - (2) FM mono (INT) - AM (EXT)
  - (3) FM mono (EXT) - AM (EXT)
- **FM Stereo, AM:**
  - (1) FM stereo (EXT) - AM (INT)
  - (2) FM stereo (INT) - AM (EXT)
  - (3) FM stereo (EXT) - AM (EXT)
  - (4) FM stereo (INT) - AM (INT)

**Preset Function**
- **Description:** Stores and recalls these settings: frequency, output level, modulation mode (AM/FM, external/internal, depth, on/off), external control output. (Maximum number of presets: 100)

**DOS Signal**
- **Oscillation System:** 12-bit direct digital synthesizer
- **Frequency Range:** 20 Hz to 20 kHz
- **Resolution:** 1 Hz
- **Frequency Accuracy:** ±0.1 %
- **Flatness:** Same as the external modulation characteristics

**Weather Band Output**
- **Frequency Range:** 162.0000 MHz to 163.0000 MHz
- **Resolution:** 100 Hz
- **Frequency Accuracy:** ±5×10^-6
- **Optimal Modulation Mode:** FM monaural
### External Interface

#### SCA INPUT
- **Input Level:** 0.56 V [P-P] (0.2 V [rms]) (corresponds to a level ratio of 10 %)
- **Frequency Range:** 20 kHz to 99 kHz, ±1 dB (57 kHz reference)
- **Input Impedance:** Approx. 10 kΩ
- **COMP OUTPUT:** Modulation signal’s monitor output connector
- **Output Voltage:** Approx. 5 V [P-P] (into 600 Ω, 100 kHz FM mono)
- **Output Impedance:** Approx. 600 Ω

#### PILOT OUTPUT
- **Output Voltage:** Approx. 1 V [rms]
- **Output Impedance:** Approx. 1 kΩ

#### GP-IB
- **Capability**
  - Type: SH1, AH1, T7, L3, SR0, RL1, PP0, DG1, DT0, C0
- **Description**
  - Source handshaking
  - Accepter handshaking
  - Talker
  - Listener
  - Service request
  - Remote/local
  - Parallel polling
  - Device clear
  - Device trigger
  - Controller

#### RS232C
- **Baudrate:** 38400 bps
- **Character Length:** 8 bits
- **Parity:** EVEN
- **Flow Control:** Xon, Xoff
- **Stop Bits:** 1 bit

#### External Control Interface
- **Description:**
  - (1) Remote sequential recall
  - (2) Remote modify
  - (3) Remote direct recall
  - (4) Control output
  - (5) Relay drive output Output voltage: Approx. 5 V Output current: Approx. 50 mA

### Power Requirements
- **Voltage Range:** 90 to 250 VAC
- **Frequency:** 50/60 Hz
- **Power Consumption:** ≤ 60 VA

### Temperature and Humidity Range
- **Operating Temperature:** 0 °C to 40 °C, 20 % to 90 % (RH)

### Overvoltage Category
- **Category:** CAT II

### Dimensions and Weight
- **Dimensions:** 426 (W) × 99 (H) × 300 (D) mm (excluding knobs and legs)
- **Weight:** Approx. 9.0 kg

### Accessories
- Instruction manual (CD) .......................... 1
- Power cord........................................ 1

### Specifications Only for the LG 3219

#### RDS Signal
- **Level Range:** 0.0 % to 10 % (75 kHz FM deviation is taken to be 100 %)
- **Level Resolution:** 0.1 %
- **Accuracy:** ±(Setting × 0.1 + 0.5) %
- **Spurious Output:** ≤ -50 dB (at 53 kHz, 10 % output)
  - ≤ -40 dB (at 61 kHz, 10 % output)
- **Subcarrier:**
  - **Frequency Accuracy:** 57 kHz ± 6 Hz
  - **Phase:** 0° or 90° (with respect to the pilot signal)
  - **Phase Accuracy:** ±10°
  - **Leakage:** ≤ -50 dB

#### Internal Data
- **Mode:** Subcarrier, null data, internal data
- **Patterns:** 16 patterns max.
- **Pattern Length:** 2048 groups max.

*The LG 3219 does not contain RDS pattern data.*

### TRI (or ARI) Signal

#### SK Signal
- **Level Range:** 0.0 % to 10 % (75 kHz FM deviation is taken to be 100 %)
- **Level Resolution:** 0.1 %
- **Accuracy:** ±(Setting × 0.1 + 0.5) %
- **Frequency Accuracy:** 57 kHz ± 6 Hz
- **Phase:** 0° (with respect to the pilot signal)
- **Phase Accuracy:** ±10°

#### DK Signal
- **Frequency Accuracy:** 125 Hz (57 kHz / 456) ± 1 %
- **AM Depth:** 0 % to 80 %
- **AM Resolution:** 1 %
- **AM Accuracy:** ±5 %
- **AM Distortion:** ≤ 2 % (SK = 5.3 %, AM = 60 %)

#### BK Signal
- **Frequency Accuracy:** Code A: 23.75 Hz (57 kHz / 2 400) ± 1 %
- **Code B:** 28.27 Hz (57 kHz / 2 016) ± 1 %
- **Code C:** 34.93 Hz (57 kHz / 1 632) ± 1 %
- **Code D:** 39.58 Hz (57 kHz / 1 440) ± 1 %
- **Code E:** 45.67 Hz (57 kHz / 1 248) ± 1 %
- **Code F:** 53.98 Hz (57 kHz / 1 056) ± 1 %
- **AM Depth:** 0 % to 80 %
- **AM Resolution:** 1 %
- **AM Accuracy:** ±5 %
- **AM Distortion:** ≤ 2 % (SK = 5.3 %, AM = 60 %)

### Accessory
- RDS Data Editor (CD) ............................. 1
  (for Windows XP and 2000)

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