LG 3850 DIGITAL TV SIGNAL GENERATOR

Low-Cost, Compact Signal Generator for Digital Broadcasts

The LG 3850 is a signal generator with switchable, separately sold encoding software that can support the different digital broadcasting methods of various countries. It has a built-in encoder and up converter that enable you to vary channel frequencies and output levels. It is suitable for use in a TV production line or similar location.

FEATURES
- Ability to change the encoding software from a PC connected to the LG 3850 through USB
- Seamless output of still-image and audio patterns
- Variable levels and channels
- Ability to save 99 preset configurations in the internal memory

SPECIFICATIONS

Transmission Encoding
Software Sold Separately: For details, see the specifications for the encoding software.

RF Signal Generator

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Resolution</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range: 50 to 900 MHz</td>
<td>1 MHz (an offset of 1/7 MHz is added to ISDB-T and SBTVD-T)</td>
<td>Range: 10 to 99 dBμV (75 Ω termination)</td>
</tr>
<tr>
<td>Resolution: 1 dB</td>
<td>Output Connector: BNC</td>
<td>Output Impedance: 75 Ω</td>
</tr>
</tbody>
</table>

*1: This is the guaranteed operating range. The guaranteed performance range is 39 to 99 dBμV (75 Ω termination). If signals in the range of 10 to 38 dBμV (75 Ω termination) will be generated, we recommend that an external attenuator be connected to the LG 3850.

Input/Output Signal Source

- Internal Signal: Software Sold Separately: The details are different depending on the encoding software. For details, see the specifications for the encoding software.
- USB Interface: Specification: 1 USB Type B connector (shared with remote control) USB 2.0
- Input Bit Rate: 0.2 to 40,000 Mbps max.
- Input Packet Format: 188 or 204 bytes
- Supported Stream: MPEG-2 TS (ISO/IEC13818-1)

Broadcast System Switching:
It takes approximately 30 minutes to reprogram the fixed pattern data on the PLD. CPU: Intel (R) Core (TM) 2 Duo, 1.6 GHz or more Memory: 1 GB or more HDD: 1 GB or more of free space OS: Windows(R) XP SP3

Display
- Power ON/OFF: Indicated by an LED
- Still-Image and Audio Pattern Selection: Indicated by LEDs that correspond to each pattern
- Channels: Indicated by the 7-segment LED
- Level: Indicated by the 7-segment LED
- Illegal Display: Indicated by error codes on the 7-segment LED

Environmental Conditions
- Operating Temperature Range: 0 to 40 °C
- Operating Humidity Range: 85 %RH or less (no condensation)
- Operating Environment: Indoors
- Elevation: Up to 2000 m
- Overvoltage Category: II
- Pollution Degree: 2

Power Requirements
- Supply Voltage: 90 to 250 VAC (50/60 Hz)
- Power Consumption: 20 Wmax.

Dimensions and Weight
- Dimensions: 219 (W) × 44 (H) × 400 (D) mm (excluding protrusions)
- Weight: Approx. 1.7 kg

Accessories
- Power cord
- Cover/inlet stopper
- USB cable
- Instruction manual

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LG 3850 OPTION (SOFTWARE)

FEATURERS

- **USB 2.0**
  Use a USB 2.0 connection between a PC and the LG 3850 to install broadcast-systems, configure the LG 3850, and play back broadcast transport streams on the LG 3850.

- **Still Images**
  Output four different still-image patterns seamlessly.

- **Audio Signal**
  Output separate audio signals with frequencies of 400 Hz or 1 kHz to the left and right channels.

- **Operating Environment**
  PC Specifications Required to Use This Product
  - OS: Microsoft Windows XP SP3
  - CPU: Intel (R) Core (TM) 2 Duo, 1.6 GHz (equivalent or superior)
  - Memory: 1 GB or more
  - HDD: 1 GB or more of free space
  - USB port: USB 2.0 (1 port)
  - The license key must be entered when the software is installed.

SPECIFICATIONS

**Broadcast System**
- Digital Terrestrial Television Broadcasting ISDB-T (ARIB-STD-B31) (*1)
  - *1: In accordance with the operation conditions (ARIB-TR-B14), only MODE2 and MODE3 are supported.
- Transmission Parameters
  - **Layers:** A, B, C
  - **Mode:** MODE2, MODE3
  - **Guard Interval:** 1/4, 1/8, 1/16, 1/32
  - **Carrier Modulation:** DQPSK, QPSK, 16QAM, 64QAM
  - **Convolutional Code Rate:** 1/2, 2/3, 3/4, 5/6, 7/8
  - **Time Interleaving Length:** 0 to 8
  - **Number of Segments:** The number of segments can be specified for each layer, but the total number of segments cannot exceed 13.
  - **Partial Reception:** Can be specified (*2)
  - *2: If the PCR packets in the TS are not independent, the partial receiver’s PCR cannot be updated.
- **External TS Input Specifications**
  - **Input Packet Format:** 204 bytes

**ISDB-T SOFTWARE**

- **Supported Stream:** MPEG-2 TS (ISO/IEC13818-1)
- **Input Data Rate:** 32,507936 Mbps (*3)
- **Number of PCRs That Can Be Updated:** up to 8
- **Update Parameter:** PCR
  - *3: Only for broadcast TS

**Internal Signal**
- **Pseudo Random Signal:** PN23 and PN15 (*4)
- **Still-Image Pattern:** Colorbar (simple animation), ramp, monoscope, natural picture
- **Format:** 1920×1080i (HDTV), 320×180p (1seg)
- **Audio (Tone):** 1 kHz (LR), 400 Hz (LR), 1 kHz (L) + 400 Hz (R)

**RF Signal Generator**
- **Output Channel:** Japan (channels 1 to 62), Brazil (channels 7 to 69) (*4)
- **Resolution:** 6 MHz (*5)
- **Output Range:** 10 to 99 dBμV (75 Ω termination)(*6)
- **Frequency Bandwidth:** 5.7 MHz
  - *4: Pseudo random signals and the Brazil output channels can be set from a PC.
  - *5: Configuration can only be performed through the setting of channels. (Japan channels and Brazil channels include a 1/7 MHz offset.)
  - *6: This is the guaranteed operating range. The guaranteed performance range is 39 to 99 dBμV (75 Ω termination). If signals in the range of 10 to 38 dBμV (75 Ω termination) will be generated, we recommend that an external attenuator be connected to the LG 3850.

**Control Application**
- The following settings can be configured from a PC that is connected to the LG 3850 through USB 2.0.
  - **Broadcast System Installation:** ISDB-T
  - **Output Level:** 1 dB steps (10 to 99 dBμV: 75 Ω termination)
  - **Output Channel:** Japan (channels 1 to 62), Brazil (channels 7 to 69)
  - **Pseudo Random Signal:** PN23 and PN15
  - **Still-Image Pattern:** Colorbar (simple animation), ramp, monoscope, natural picture
  - **Audio (Tone):** 1 kHz (LR), 400 Hz (LR), 1 kHz (L) + 400 Hz (R)
  - **Broadcast TS Operations:** Select, playback, stop
  - **Recall:** 99 selectable preset configurations
  - **Loading and Saving:** Preset configurations can be configured, loaded, and saved through LG 3850 panel operations.
  - **Alarm Displays:** Can’t connect to USB device, etc.

**Licenses**
- This product can only be used on one LG 3850.
- It cannot be installed on multiple LG 3850s.

**Environmental Conditions**
- Same as the LG 3850

**Contents**
- License key ......................................1
- CD-ROM
  - Includes transfer data and the control application.....1
- Instruction manual ..................................1

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The LG 3850SER03 ATSC software makes it possible to transfer broadcast systems to the LG 3850 and operate it from a PC. After a broadcast system has been transferred to the LG 3850, the LG 3850 can be used as an ATSC signal generator.

**FEATURES**

- **USB 2.0**
  Connect the LG 3850 to a PC through USB to perform operations such as transferring broadcast systems and playing back MPEG-2 transport streams.

- **Still Images**
  Output four different still-image patterns seamlessly.

- **Audio Signal**
  Output separate audio signals with frequencies of 400 Hz or 1 kHz to the left and right channels.

- **Operating Environment**
  PC Specifications Required to Use This Product
  - OS: Microsoft Windows XP SP3, Vista, Windows 7
  - CPU: Intel® Celeron® M, 1.4 GHz or higher
  - Memory: 512 MB or more
  - HDD: 1 GB or more of free space
  - USB: USB 2.0 (1 port)
  The license key must be entered when the software is installed.

**SPECIFICATIONS**

**Broadcast System**
- Digital Terrestrial
  - Television Broadcasting: ATSC (A/53B)
- Mobile Broadcasting: ATSC-M/H (A/153)(1)

**Transmission Parameters**
- Carrier Modulation: 8VSB
- External TS Input Specifications
  - Input Packet Format: 188 bytes, 204 bytes
  - Supported Stream: MPEG-2 TS (ISO/IEC13818-1)
  - Input Data Rate: 0.2 to 40 Mbps

**Standalone Operation of the LG 3850**
Through the transferring of a broadcast system to the LG 3850, the LG 3850 can be used as a standalone ATSC signal generator. When the LG 3850 is used in this manner, the following settings can be configured.

**RF Signal Generator(2)**
- Frequency
  - Channel: One of the following countries, selected using the control application.
    - Channels 2 to 83 for USA, channels 2 to 12 and 21 to 70 for Korea
  - Output Range: 10 to 89 dBµV(3)
  - Resolution: 1 dB

**ATSC SOFTWARE**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance</td>
<td>75 Ω</td>
</tr>
<tr>
<td>Internal Signal(4)</td>
<td></td>
</tr>
<tr>
<td>Pseudo Random Signal: PN23, PN15(5)</td>
<td></td>
</tr>
<tr>
<td>Still-Image Pattern: Colorbar (simple animation), ramp, monochrome, natural picture</td>
<td></td>
</tr>
<tr>
<td>Format:</td>
<td>ATSC-M/H IP data is multiplexed can be played back.</td>
</tr>
<tr>
<td>Audio (Tone):</td>
<td>ATSC MPEG-2 transport streams in which ATSC-M/H IP data is multiplexed can be played back.</td>
</tr>
<tr>
<td>Pseudo Random Signal: PN23, PN15</td>
<td></td>
</tr>
<tr>
<td>Still-Image Pattern: Colorbar (simple animation), ramp, monochrome, natural picture</td>
<td></td>
</tr>
<tr>
<td>Function:</td>
<td>Controls the LG 3850 from a PC over a USB connection</td>
</tr>
<tr>
<td>Country Setting:</td>
<td>Set the output channels for stand-alone mode by selecting one of the following countries, USA, Korea</td>
</tr>
<tr>
<td>System Switching:</td>
<td>LG 3850s that are configured to use different broadcast systems can be immediately switched to ATSC.</td>
</tr>
<tr>
<td>Internal Signal(3)</td>
<td></td>
</tr>
<tr>
<td>Frequency:</td>
<td></td>
</tr>
<tr>
<td>Channel:</td>
<td>Channels 2 to 83 for USA, channels 2 to 12 and 21 to 70 for Korea</td>
</tr>
<tr>
<td>Output Range:</td>
<td>10 to 89 dBµV(3)</td>
</tr>
<tr>
<td>Resolution:</td>
<td>1 dB</td>
</tr>
<tr>
<td>Impedance:</td>
<td>75 Ω</td>
</tr>
<tr>
<td>Output Control:</td>
<td>Output can be turned on and off</td>
</tr>
</tbody>
</table>

**Presets**
- Recall/Store: Stores and recalls presets(6)
- Alarm Display: Shown on the 7-segment display

**Licenses**
This product can only be used on one LG 3850. It cannot be installed on multiple LG 3850s.

**Contents**
- License key (A4 sheet) ................. 1
- CD-ROM ..................................... 1
- Instruction manual ....................... 1

*1 Files that contain digital terrestrial television broadcasting (ATSC) MPEG-2 transport streams in which mobile broadcasting (ATSC-M/H) IP data is multiplexed can be played back.

*2 Image waves are generated for all waves other than the fundamental wave. Therefore, it is desirable to use the LG 3850 signals separately. If you want to mix LG 3850 RF signals with cable television RF signals, you must use a separate filter to delete the image interference waves.

*3 This is the operating range. The optimal range is 39 to 89 dBµV (75 Ω termination). If signals in the range of 10 to 38 dBµV (75 Ω termination) will be generated, we recommend that an external attenuator be connected to the LG 3850.

*4 The still picture patterns and formats may be changed.

*5 The pseudo random signal can be transmitted when the LG 3850 is connected to a PC. (It can also be transmitted when the LG 3850 is not connected to a PC if presets have been stored through the use of the control application.)

*6 If a preset recall range has been set through the use of the control application, presets within that range are recalled.

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LG 3850 OPTION (SOFTWARE)

LG 3850SER04

The LG 3850SER04 DVB-T software makes it possible to transfer broadcast systems to the LG 3850 and operate it from a PC. After a broadcast system has been transferred to the LG 3850, it can be used as a DVB-T signal generator.

FEATURES

USB 2.0
Connect the LG 3850 to a PC through USB to transfer broadcast systems, play MPG-2 TSs, and configure transmission parameters.

Still Images
Output four different still-image patterns seamlessly.

Audio Signal
Output separate audio signals with frequencies of 400 Hz or 1 kHz to the left and right channels.

Operating Environment
PC Specifications Required to Use This Product
OS
Microsoft Windows XP SP3/Vista/
Windows 7
CPU
Intel (R) Core™ 2 Duo, 1.6 GHz or more
Memory 1 GB or more
HDD 1 GB or more of free space
USB port USB 2.0 (1 port)
The license key must be entered when the software is installed.

SPECIFICATIONS

Broadcasting System
Digital terrestrial television broadcasting, DVB-T (DVB EN300744) (*1)
*1 Hierarchy information is not included.

Transmission Parameters
FFT Mode: 2 k, 8 k
Guard Interval: 1/4, 1/8, 1/16, 1/32
Carrier Modulation: QPSK, 16QAM, 64QAM
Bandwidth: 6 MHz, 7 MHz, 8 MHz
Coding Rate: 1/2, 2/3, 3/4, 5/6, 7/8

External TS Input Specifications
Packet Length: 188 or 204 bytes
Supported Stream: MPEG-2 TS (ISO/IEC13818-1)
Bit Rate: 0.2 to 40 Mbps

Internal Signal(*2)
Pseudo Random Signal: PN23 and PN15 (*3)
Still-Image Pattern: Colorbar, ramp, monoscope, natural picture
Format: 1920×1080i (HDTV), 720×576i (SDTV), 720×480i (SDTV) (*4)
Frame Rate: 25 fps, 30 fps (*4)
Audio (Tone): 1 kHz (LR), 400 Hz (LR), 1 kHz (L) + 400 Hz (R)

Country-specific settings: *4
When you operate the LG 3850 in stand-alone mode, you can use the control application to set the country and format. The frame rate and transmission parameter combinations vary depending on the selected country as shown in table 1.

Table 1

<table>
<thead>
<tr>
<th>Country</th>
<th>Format</th>
<th>Frame Rate</th>
<th>B.W.</th>
<th>G.I.</th>
<th>Mod.</th>
<th>C.R.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>720×576i or 1920×1080i</td>
<td>25 fps</td>
<td>6 MHz</td>
<td>8 k</td>
<td>1/4</td>
<td>16QAM</td>
</tr>
<tr>
<td>Australia</td>
<td>7 MHz</td>
<td>8 k</td>
<td>1/16</td>
<td>64QAM</td>
<td>3/4</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>8 MHz</td>
<td>2 k</td>
<td>1/32</td>
<td>16QAM</td>
<td>3/4</td>
<td></td>
</tr>
<tr>
<td>Taiwan</td>
<td>720×480i</td>
<td>30 fps</td>
<td>8 MHz</td>
<td>8 k</td>
<td>1/4</td>
<td>16QAM</td>
</tr>
</tbody>
</table>

When 25 fps is selected, 720×480i cannot be selected. When 30 fps is selected, the format is fixed at 720×480i. Table 1 does not apply for the preset recall settings. When you connect the LG 3850 to a PC, you can set the country, all the channels, the format, the frame rate, and the transmission parameters.

RF Signal Generator
Output Channel: Channels 2 to 69 for Germany, channels 6 to 69 for Australia, channels 21 to 68 for the UK, channels 2 to 83 for Taiwan (*5)
Output Range: 10 to 99 dBμV (75 Ω termination) (*6)

*5 The range of channels that corresponds to the selected country can be output.
*6 This is the operating range. The optimal range is 39 to 99 dBμV (75 Ω termination). If signals in the range of 10 to 38 dBμV (75 Ω termination) will be generated, we recommend that an external attenuator be connected to the LG 3850.
Stand-Alone Operation of the LG 3850

When this product's broadcast system has been transferred to the LG 3850, the LG 3850 can operate in stand-alone mode as a DVB-T signal generator. When the LG 3850 operates in this way, the following settings can be configured.

**RF Signal Generator**
- **Output Level:** 1 dB steps (10 to 99 dBμV: 75 Ω termination)
- **Output Channel:** One of the following countries, selected using the control application. Channels 2 to 69 for Germany, channels 6 to 69 for Australia, channels 21 to 68 for the UK, channels 2 to 83 for Taiwan

**Internal Signal**
- **Pseudo Random Signal:** Generated through the saving of a preset using the control application followed by the recall of the preset in stand-alone mode
- **Still-Image Pattern:** Colorbar, ramp, monoscope, natural picture
- **Audio (Tone):** 1 kHz (LR), 400 Hz (LR), 1 kHz (L) + 400 Hz (R)

**Preset**
- **Recall/store:** Stores and recalls presets
- **Begin/end:** Sets the beginning and ending preset numbers on the LG 3850

**Alarm Displays:** 7-segment display

Control Application Operations

When this product's broadcast system has been transferred to the LG 3850 and the LG 3850 is connected to a PC through USB, the following settings can be configured.

**Transferring the Program**
- **Broadcasting System:** DVB-T
- **Country Setting:** Set the output channels for stand-alone mode by selecting one of the following countries. Germany, Australia, UK, Taiwan

**Transmission Parameters**
- **FFT Mode:** 2 k, 8 k
- **Guard Interval:** 1/4, 1/8, 1/16, 1/32
- **Carrier Modulation:** QPSK, 16QAM, 64QAM
- **Bandwidth:** 6 MHz, 7 MHz, 8 MHz
- **Coding Rate:** 1/2, 2/3, 3/4, 5/6, 7/8

**RF Signal Generator**
- **Output Level:** 1 dB steps (10 to 99 dBμV: 75 Ω termination)
- **Output Channel:** Channels 2 to 69 for Germany, channels 6 to 69 for Australia, channels 21 to 68 for the UK, channels 2 to 83 for Taiwan

**Internal Signal**
- **Pseudo Random Signal:** PN23 and PN15
- **Still-Image Pattern:** Colorbar, ramp, monoscope, natural picture
- **Audio (Tone):** 1 kHz (LR), 400 Hz (LR), 1 kHz (L) + 400 Hz (R)
- **Format:** 1920×1080i (HDTV), 720×576i (SDTV), 720×480i (SDTV) (*7)
- **Frame Rate:** 25 fps, 30 fps
- **External TS**
- **MPEG-2 TS Operations:** Select, playback, stop, set playback range, set bitrate setting automatically, set bitrate setting manually
- **Presets**
- **Recall/store:** Stores and recalls presets
- **Begin/end:** Sets the beginning and ending preset numbers on the LG 3850
- **Load/Save:** Collectively stores and writes 99 presets
- **Alarm Displays:** Can’t connect to USB device, etc.

*7 When the frame rate is set to 25 fps, 720×480i cannot be selected. When the frame rate is set to 30 fps, the format is fixed at 720×480i.

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