

RF Signal Generator for Digital Broadcasts



Upon request



LG 3810 RF SIGNAL GENERATOR

GENERAL

The LG 3810 is an RF signal generator with optional encoders that can be installed to add support for the standards of a variety of digital broadcast systems. The LG 3810 contains a TS generator, an encoder, a C/N generator, and an up converter. The modulation method is switchable. So it is easy to transmit a modulation signal at a channel frequency in the VHF or UHF band. The LG 3810 also contains pseudo-random (PN) signal sources and a BER counter, so this one instrument is all that's necessary to perform BER measurements of receivers and tuners. In addition to an internal TS signal, an external TS signal or a signal played back from the internal HDD can also be used as the signal source. This enables a pre-existing TS to be used in video and audio checking. Combining this feature with the BER measurement feature makes more comprehensive testing of receivers possible.

FEATURES

All-in-One
Because the LG 3810 contains the features of both a signal generator and a BER measuring instrument in a single case, it can be used to check video in transport streams used in actual broadcasts as well as to perform BER measurements on front-end devices. The LG 3810 is also suitable for use as a comprehensive signal generator for STB or tuner production lines.

- **User-Selectable Digital Broadcast System**
Optional encoders can be installed that add support for the standards of the desired digital broadcast systems. These encoders can also be added to the LG 3810 after it has been installed in a location. The modulation method can be specified easily from the front panel, which uses a QVGA LCD to display the LG 3810's settings graphically.
- **Real-time MPEG-2 TS Encoding and Modulation**
The LG 3810 can encode and modulate, in real time, a transport stream that is applied to the DVB-ASI or SPI connector or that is saved to the HDD.
- **HDD That Can Play Back Long Transport Streams**
Because the LG 3810 has an 80 GB HDD, it can play back data that requires a large amount of storage memory, such as streams that contain HDTV contents and transport streams that run for a long time.
- **External HDD and DVD Drive Connectability**
When an external HDD or DVD drive is connected to one of the LG 3810's USB 2.0 ports, the LG 3810 can play back a TS directly from the HDD or DVD-ROM. TS data that has been recorded to a DVD-ROM or CD-ROM can be copied to the internal HDD. This enables a variety of videos from pre-existing transport streams to be used in video checking.
- **100 Presets**
Up to 100 preset conditions can be stored in the memory. Since the stored contents can be categorized into 10 groups, the preset mode is convenient for inspection applications.

Options (Add-in software)

LG 38SER02	ISDB-T MODULATOR	
LG 38SER03	ATSC MODULATOR	NEW
LG 38SER04	DVB-T/H MODULATOR	NEW
LG 38SER05	CATV MODULATOR	

Rear Panel



SPECIFICATIONS

LG 3810

Channel Coding Section

Option; sold separately

For details, see the transmission encoder option's specifications.

RF Signal Generator

Frequency

Range:	30 to 960 MHz
Resolution:	1 kHz (When the frequency is being set)
Channels:	Differs according to the broadcast system
Accuracy:	$\pm 0.3 \times 10^{-6}$

Output

Range:	-110.0 to +13.0 dBm (50 Ω termination) -63.0 to +60.0 dBmV (50 Ω termination) -3.0 to +120.0 dB μ V (50 Ω termination)
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Resolution:	0.1 dB
Impedance:	50 Ω
Level Accuracy:	± 1.2 dB (When the output is CW, the level is 0 dBm, and C/N is OFF)

Output Control: On/Off (*1), Modulation/Carrier

Output Connector: N connector

Harmonics: -30 dBc

Spurious: -50 dBc

*1: Does not turn output OFF completely, but applies the maximum attenuation.

Input/Output Signal Source

Internal Signal

Pseudo Random Signal: PN23 and PN15

Still Images

Pattern (Common): Color, Ramp, and Monoscope (*2)

Audio (Tone): 1 kHz (LR), 400 Hz (LR), and 1 kHz (L) + 400 Hz (R)

Video: TS playback from disk and TS storage to disk

*2: The pattern and audio may differ depending on the installed optional encoders.

DVB-ASI Input

Input Connector:	BNC
Input Impedance:	75 Ω
Input Level:	0.8 Vp-p
Transmission Rate:	270 Mbps

DVB-SPI Input

Input Connector:	D-sub25
Input Impedance:	Differential, 100 Ω
Input Level:	LVDS
Input Format:	Automatic input switching between MPEG-2 TS and BER count

ASI, SPI Input Specifications

Input Packet Format: 188 or 204 bytes

Supported Stream: MPEG-2 TS (ISO/IEC13818-1)

External REF Input

Input Connector:	BNC
Input Impedance:	50 Ω
Input Level:	3.3 Vp-p
Input Frequency:	10 MHz

REF Output

Output Connector:	BNC
Output Impedance:	50 Ω
Output Level:	3 dBm
Output Frequency:	10 MHz

IF Output

Output Connector:	BNC
Output Impedance:	50 Ω
Output Level:	-22 dBm
Output Frequency:	140 MHz

TS Source Section

Internal HDD (*3)

Size and Format:	2.5 inches and IDE interface
Format:	EXT3
Capacity:	80 GB
Number of Drives:	1

Compatible External HDDs (*4)

External hard drives with the specifications listed below can be used.

Interface:	USB 2.0
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Format: VFAT and NTFS (Read only)

Disk Spin Speed: 5400 rpm or higher

Maximum Connections: 4

Compatible External DVD-ROM Drives (*4, *5, *6, *7)

External DVD-ROM drives with the specifications listed below can be used.

Interface: USB 2.0

Maximum Connections: 2 (1 connection each on the front and back panels)

Supported Stream

Format: MPEG-2 TS

Packet Length: 188 or 204 bytes

File Size: Up to 1 TB

Playback

Playback Bit Rate: 0.2 to 40 Mbps

Loop Playback: Available (seamless loop playback is not supported)

Range Playback: Start and end times can be specified.

Memory Playback: Selectable

*3: Copy TS data over an Ethernet or from the connected USB 2.0 storage medium. Real-time capturing of TS data is not supported.

*4: The LG 3810 may not operate properly depending on its compatibility with the connected devices. The LG 3810 cannot receive power over USB.

Only connect devices that have been confirmed to work with the LG 3810. For details, contact your local LEADER agent.

*5: Program streams are not supported, so you cannot load contents from commercial DVD software or media that has been recorded to conform to the same system onto the LG 3810.

*6: Depending on the transport stream's bit rate and the state of its recording, the video may be distorted.

*7: The LG 3810 cannot write to DVDs.

C/N Generator Section

C/N Adjustment Range: 0 to 40 dB

Resolution: 0.1 dB

BER Counter Section

Input

Packet Length: 204 bytes (including 16 bytes of Reed-Solomon code)

Input Connectors: Parallel LVDS (D-sub 25 pin)

* Not a general-purpose BER counter

Go/No Go Test

Test Limits: Upper or lower limit of the BER

Test Result Display: GO or NO GO is displayed at the top of the panel

External Interface

USB Interface

Specifications: USB 2.0 (two ports on both the front and rear panels)

Ethernet Interface

Specifications: 10BASE-T/100BASE-TX

GPIO Interface

Specifications: ANSI/IEEE Std 488.1-1978

Connector: 24-pin rectangular connector

Display

Display device: 5.7-inch color-TFT LCD, QVGA (320 x 240)

Environmental Conditions

Operating Temperature Range: 5 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: 80 W max.

Dimensions and Weight

Dimensions: 426 (W) x 132 (H) x 450 mm (D)
(excluding protrusions)

Weight: Approx. 11 kg

Accessories

Power cord..... 1

Instruction manual..... 1

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To the website inquiry form about products

LG 38SER02

ISDB-T MODULATOR

This add-in software adds ISDB-T modulation functionality to the LG 3810.

FEATURES

- This software enables the LG 3810 to modulate signals as outlined in the ISDB-T/Tsb standard.

SPECIFICATIONS

Channel Coding Section

Broadcast System

Digital Terrestrial Television Broadcasting:
ISDB-T (ARIB-STD-B31)

Digital Terrestrial Audio Broadcasting:
ISDB-Tsb (ARIB-STD-B29)

Transmission Parameters

Layers

ISDB-T 13seg: A, B, C

ISDB-Tsb 3seg, 8-3seg:
A, B

ISDB-Tsb 1seg, 8-1seg:
A only

Mode: MODE1, 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 32 (differs based on the broadcast system and the mode)

Number of Segments

ISDB-T 13seg: The number of segments can be specified for each layer, but the total number of segments cannot exceed 13.

ISDB-Tsb 3seg, 8-3seg:
The number of segments can be specified for each layer, but the total number of segments cannot exceed 3.

ISDB-Tsb 1seg, 8-1seg:
1 segment

Sequential Transmission:

8-segment, pseudo-random sequential transmission (*1)

Partial Reception: Can be specified (*2)

*1: The segment configuration is specified by the range of the subchannels that are occupied and the subchannels.

*2: If the PCR packets in the TS are not independent, you cannot update the partial receiver's PCR.

External TS Input Specifications

Input Connectors: DVB-ASI, DVB-SPI

Input Packet Format: 188 or 204 bytes

Supported Stream: MPEG-2TS (ISO/IEC13818-1)

Input Data Rate (*1)

ISDB-T 13seg: 23.234700 Mbps

ISDB-Tsb 3seg, 8-3seg:
5.36185 Mbps

ISDB-Tsb 1seg, 8-1seg:

1.787285 Mbps

Number of PCRs That Can Be Updated:

Up to 8

Seamless Playback: Only possible when an internal TS is being used (*2)

Update Parameter: PCR

*1 Example when the guard interval is 1/32, carrier modulation is 64QAM, and the code rate is 7/8.

The maximum input data rate varies depending on the modulation parameter.

*2 Only when using the standard-equipped internal TS (still images and videos) or TS data that is saved to the HDD.

RF Signal Generator

Output Channel

VHF, UHF: Japan (channels 1 to 62), Brazil (channels 7 to 69) (*1)

CATV: Japan (channels C13 to C63) (*1)

Subchannels

ISDB-Tsb 1seg, 8-1seg:
Channels 3 to 40

ISDB-Tsb 3seg, 8-3seg:
Channels 6 to 37

*1 You can configure a custom channel table in the user settings.

Output Range

ISDB-T 13seg, ISDB-Tsb 8-3, 8-1seg:
-110.0 to +13.0 dBm (50 Ω termination)
-63.0 to +60.0 dBmV (50 Ω termination)
-3.0 to +120.0 dBμV (50 Ω termination)

ISDB-Tsb 3seg:
-115.0 to +8.0 dBm (50 Ω termination)
-68.0 to +55.0 dBmV (50 Ω termination)
-8.0 to +115.0 dBμV (50 Ω termination)

ISDB-Tsb 1seg:
-120.0 to +3.0 dBm (50 Ω termination)
-73.0 to +50.0 dBmV (50 Ω termination)
-13.0 to +110.0 dBμV (50 Ω termination)

I/O and Signal Source

IF Output

Output Level: -22 dBm (ISDB-T 13seg, ISDB-Tsb 8-3, 8-1seg)
-27 dBm (ISDB-Tsb 3seg)
-32 dBm (ISDB-Tsb 1seg)

Environmental Conditions

Same as the LG 3810

Contents

License key 1
USB memory device (sample TS).... 1
Instruction manual 1

Licenses

You can only use this add-in software on one LG 3810. You cannot install it on multiple LG 3810s.

Sample TS

This product comes with a USB memory device that contains an original sample TS for checking the LG 3810's operations. The sample TS that is included is listed below.

ISDB-T sample TS

LG 38SER05

CATV MODULATOR

LG 38SER05 is an add-in software that adds CATV (DVB-C/J.83A, J.83B, and J.83C) modulation functionality to the LG 3810.

FEATURES

- This software enables the LG 3810 to modulate signals as outlined in the DVB-C/J.83A, J.83B, and J.83C standards.

SPECIFICATIONS

Channel Coding Section

Broadcast System

Cable Television Broadcast:

DVB-C/J.83A(DVB EN300429/
ITU-T J.83 Annex A)
J.83B (ITU-T J.83 Annex B)
J.83C (ITU-T J.83 Annex C)

Carrier Modulation

DVB-C/J.83A: 16QAM, 32QAM, 64QAM, 128QAM, 256QAM
J.83B: 64QAM, 256QAM
J.83C: 64QAM

Symbol Rate

DVB-C/J.83A: 1.00 to 8.00 Msps (*1)
J.83B: 5.00 to 6.00 Msps
Default 64QAM: 5.057 Msps
256QAM: 5.361 Msps
J.83C: 5.00 M to 6.00 Msps
Default 5.274 Msps

*1: The specifications are guaranteed from 6.40 to 6.96 Msps.

RF Signal Generator

Frequency

Range: 30 to 960 MHz

Channels

Standard	Table	CATV Channel	VHF, UHF	Frequency
DVB-C/ J.83A	Europe	Channels S1 to S41	Channels 2 to 69	Set directly
J.83B	USA STD	Channels C2 to C135	Channels 2 to 83	
	USA IRC	Channels C1 to C135		
	USA HRC	Channels C1 to C135		
J.83C	Japan	Channels C13 to C63	Channels 1 to 62	
	Japan	Channels C13 to C63		

Output

Range: -110.0 to +13.0 dBm (50 Ω termination)
-63.0 to +60.0 dBmV (50 Ω termination)
-3.0 to +120.0 dBμV (50 Ω termination)

Internal Signal

Still-Image Pattern: Colorbar, ramp, monoscope (*2)
PSI/SI information: Representative terrestrial broadcast values are stored for the NIT, SDT, BIT, and PMT of each specification.

Still-Image Format²

DVB-C/J.83A: 720×576i, 1920×1080i
J.83B: 1920×1080i, 1280×720p, 704×480p, 704×480i (16:9), 704×480i (4:3)
J.83C: 1920×1080i, 1440×1080i, 720×480i (16:9), 720×480i (4:3)
Audio: 1 kHz (LR)/400 Hz (LR)/1 kHz (L) + 400 Hz (R)

*2: The still image patterns and formats may be changed.
The LG 3810 does not have a 1440×1080i (J.83C) monoscope pattern.

Environmental Conditions

Same as the LG 3810

Contents

License key 1
USB memory device (with sample TS) .. 1
Instruction manual 1

Licenses

You can only use this add-in software on one LG 3810.
You cannot install it on multiple LG 3810s.

Sample TS

This product comes with a USB memory device that contains original sample TSs for checking the LG 3810's operations. The sample TSs that are included are listed below.

DVB-C sample TS

J.83B sample TS

J.83C sample TS