

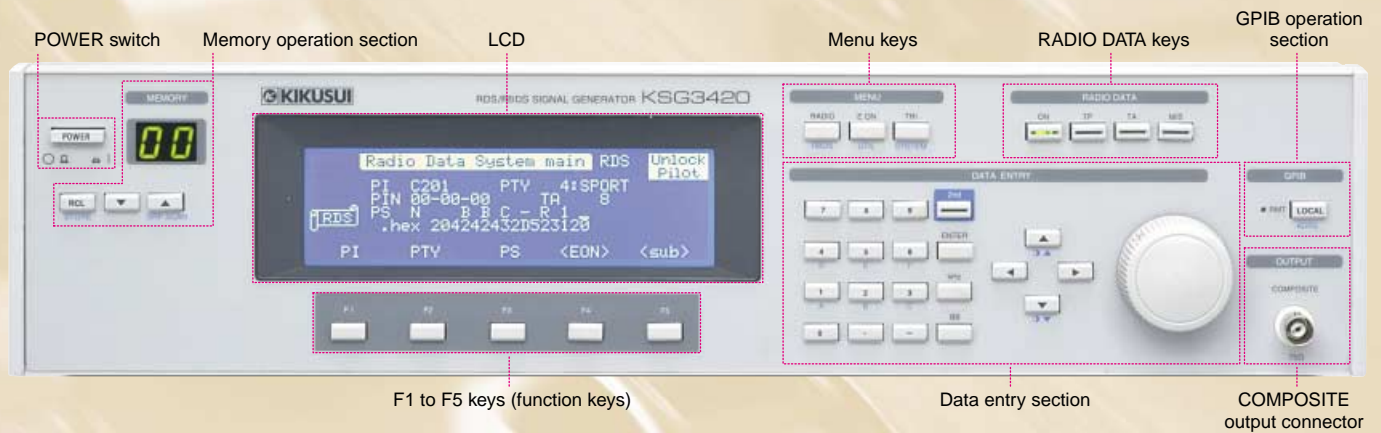


RDS/RBDS Signal Generator KSG3420/3421

- Compatible with European RDS and American RBDS receivers.
- Offers data-editing and stereo modulation functions.
- Comes standard with a GPIB or RS-232C interface.

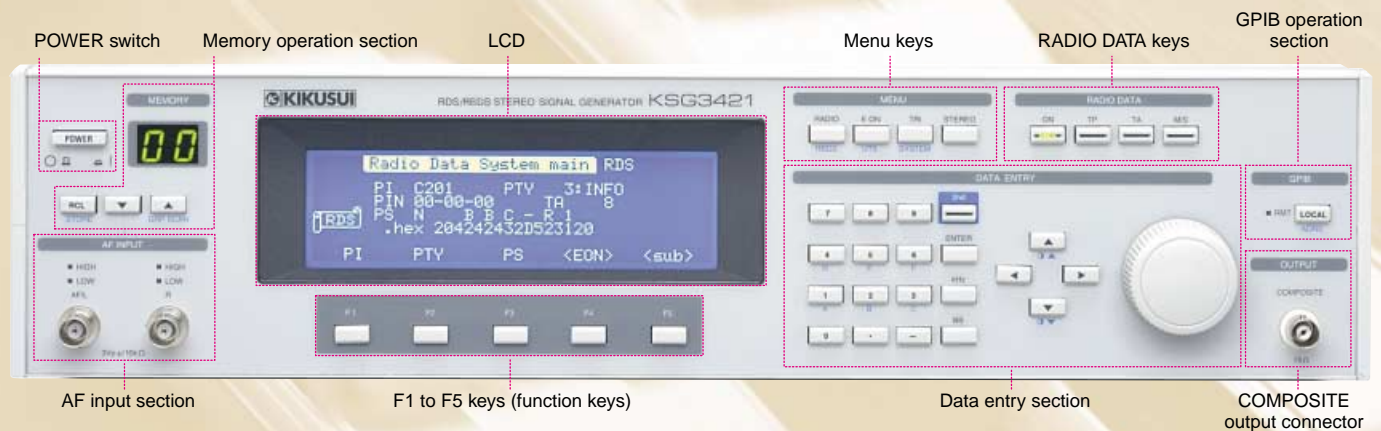
KSG3420

RDS/RBDS Signal Generator



KSG3421

RDS/RBDS Stereo Signal Generator



The Radio Data Signal Generator which comply with European RDS/North American RBDS.

Capable of Simulation Test for EON and the Editing of TMC.

In addition, it is possible to edit the Data independently by the unit itself separated from the Computer.

The KSG3420/3421 are instruments that generate RDS (Radio Data System) signals conforming to EN50067:1998, RBDS (Radio Broadcast Data System) signals partly conforming to the United State RBDS Standard standardized by the National Radio Systems Committee (NRSC), and stereo signals on which a TRI (=ARI) signal is superimposed (model KSG3421 only). They can be used as modulators for FM broadcasting equipment or IC chips for RDS or RBDS. They are also used, for example, in trial production or research departments, for adjustment or testing of ICs or adapters for stereo demodulation (including RDS/RBDS) and of advanced RDS/RBDS-equipped FM stereo receivers or tuners and for measurements of various characteristics of such equipment. Connecting an output signal of the KSG

3420/3421 to a KSG Series FM-AM standard signal generator supplies a stereo signal, RDS or RBDS signal, or a composite signal on which a TRI signal has been superimposed through the high-frequency output block to a stereo receiver, RDS/RBDS receiver, or TRI receiver. The RDS/RBDS data and a clock signal (1187.5 Hz) are output at the TTL level from the rear panel, allowing incorporation into instruments that test the logic part of an RDS/RBDS receiver or other applicable equipment. Data can be created and edited on the LCD display of the instrument or sent to a PC via the GPIB or RS-232C interface for creation or editing on the PC. The output data is modified in real-time. Up to 100 different data sets can be stored in the instrument's memory.

Stereo signal part

- The separation of right-and-left channel is 66 dB or better in the midrange.
- Superior pilot phase stability eliminates the need for calibration before use.
- The oscillator for internal modulation allows settings in the range of 20 Hz to 20 kHz at a resolution of 10 Hz. Distortion is as low as 0.01% or less. Signals generated by the internal modulation oscillator can be transmitted externally, allowing the KSG 3420/3421 to serve as a low-distortion oscillator.

Operation

- Permits easy setting or modification of various data from the LCD display using the numeric keys or rotary knob.

RDS/RBDS signal

- Data can be created and edited on the instrument LCD display. Permits easy creation and editing of EON (Enhanced Other Network) data on the LCD.
- The data is composed of a data set consisting of PI, PS, AF, and other data types and a group type sequence that transmits the data set. The instrument allows creation and editing of each of these data types.
- Required codes are automatically extracted from a data set based on input data to configure group data, which is output in real-time.
- Check word and offset word are created automatically.
- Permits easy insertion or deletion of data, group type sequence, and other variables.
- The phase of a 57 kHz sub-carrier can be set to 0° and 90° (with respect to the 3rd harmonics of a 19 kHz pilot signal). Moreover, the phase of a 57 kHz sub-carrier can be varied within ±10° in increments of 1°.
- Superior 57 kHz sub-carrier suppression ratio
- RDS/RBDS data can be output from the rear panel and a synchronous signal received by 1187.5 Hz clock output. The 1187.5 Hz clock output can also be reversed.

Memory Function

- All information displayed on the panel and RDS/RBDS data can be stored in memory. Up to 100 data points can be stored and recalled.

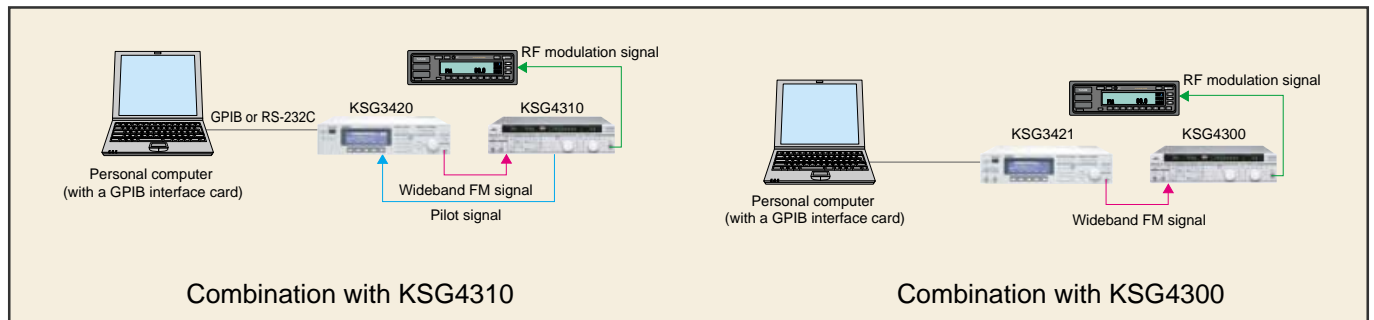
External Control

- GPIB,RS-232C interfaces come standard.
- Most front-panel operations can be controlled by remote control.

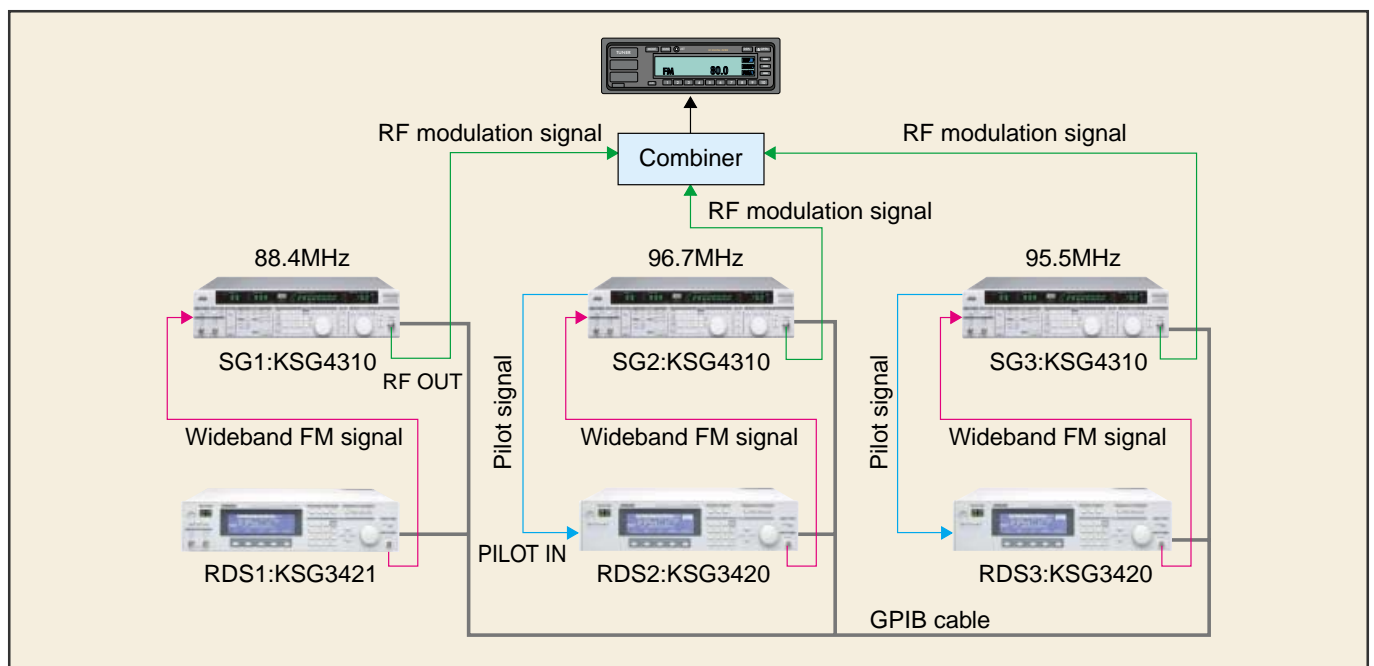
Dedicated Software

- The use of dedicated software (Quick Pattern Builder for KSG3420 Basic Edition) allows easy remote control operations, data editing, and data management.

●Example of KSG3420/3421 System Configuration

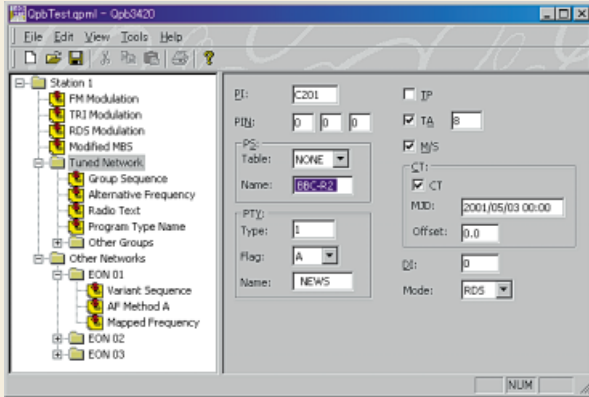


●Example of System Configuration for Simulation Tests of a Receiver's EON Traffic Information



● Application Software (Quick Pattern Builder for KSG3420 Basic Edition)

The Quick Pattern Builder for KSG3420 Basic Edition (hereafter called QPB3420 Basic) is a program that allows remote control of the RDS/RBDS multiplex signal generator KSG3420/3421. The design concept of the QPB3420 Basic significantly improves the operability of the KSG3420/3421 via remote control.



▲ Tuned Network main screen

Easy setting and editing on the KSG3420/3421!!

Parameters are categorized and displayed in an easy to grasp tree view. Parameters are displayed on the right part of the screen. When the KSG3420/3421 is connected via the RS-232C or GPIB interface, data entry details are immediately reflected on the instrument.

Easy data management!!

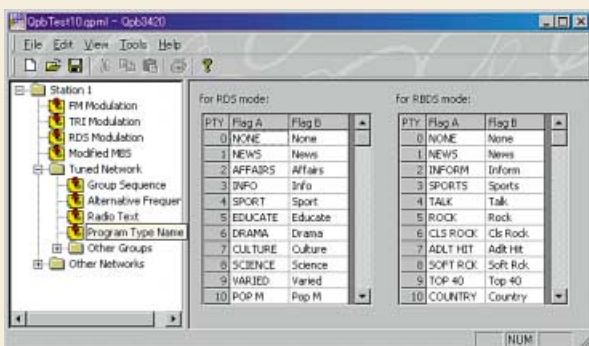
Data is saved to a single file. To read or save data, simply specify a file name. The highly extendible XML format allows easy customization or addition of functions in the future.

(Also compatible with KSG 3400S support software data of the PC9801 version.)

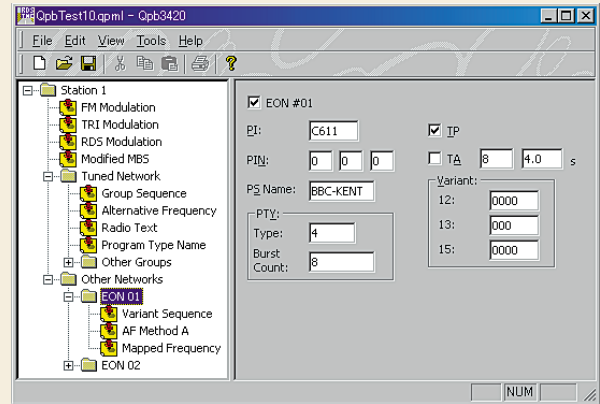
System Requirements

PC/AT compatible machine	CPU Pentium 100 MHz or better
OS	Windows 98/Me/NT4/2000/XP
Memory	Minimum 32 MB
Hard disk	Minimum free space of 10 MB
Communication port	RS-232C or VISA-compatible GPIB adapter
	Only RS-232C allows communication with KSG3410
Others	CD-ROM drive (during setup)
	Internet Explorer 4.01 or later
	VISA library 2.6 or later

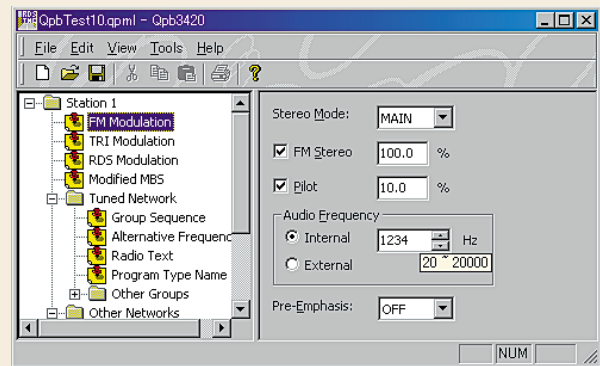
A separate straight cable is required for remote control via the RS-232C interface.



▲ Program Type Name edit screen



▲ Screen of Enhanced Other Network



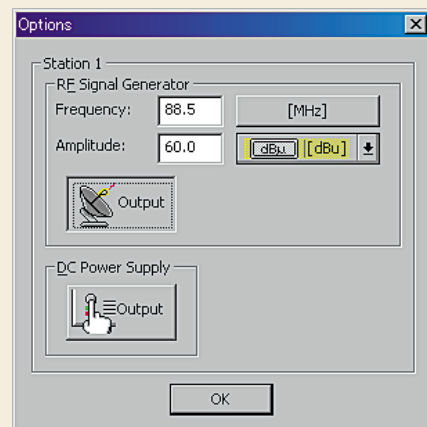
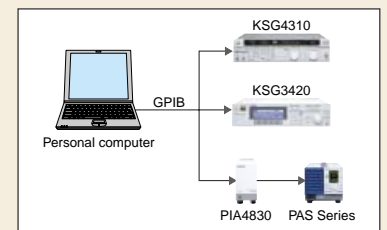
▲ KSG3421/4310 FM Modulation setting screen

Permits control of operations in addition to data editing!!

In addition to the KSG3420/3421, the operator can perform remote control of RF signal generators and DC power supplies, which are often concurrently used with the instrument.

- Kikusui
- Example of system configuration

- RF signal generators
 - RF frequency
 - RF power
 - ON/OFF of output
- DC power supplies
 - ON/OFF of output

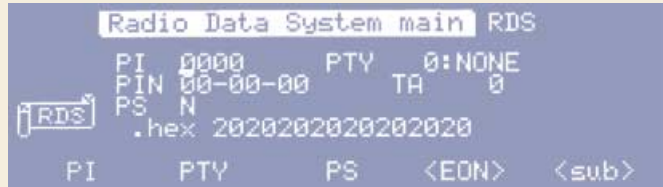


▲ Use this screen to control the KSG4310 and DC power supplies remotely.

●KSG3420/3421 allows stand-alone data editing

Radio Data System main screen

This is the top-end screen for setting RDS/RBDS signals. Press the [RADIO] menu key to select alternately the Radio Data System main RDS screen or Radio Data System main RBDS screen.



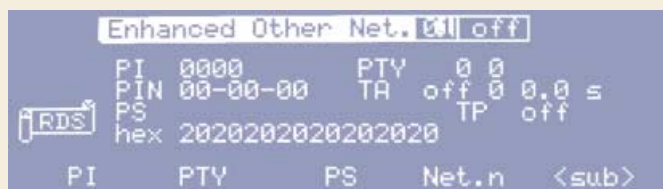
Radio Data System sub-screen

To call up this screen, press the [F5] (<sub>) key on the Radio Data System main screen.



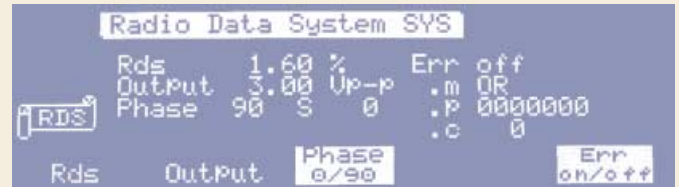
Enhanced Other Net.xx xxx screen

This screen can be called up directly by pressing the [EON] menu key. Alternately, press the [F4] (<EON>) key on the Radio Data System main screen. If one of the other network data areas has been set, the Enhanced Other Net.01 on/off screen appears as shown below.



Radio Data System SYS screen

The screen can be invoked directly by pressing the [2nd] key and then pressing the [SYSTEM] menu key. Or press the [2nd] key, and then press the [F5] (<SYS>) key on the Radio Data System main screen.



Memory Manage screen

To call up this screen, press the [2nd][F1] (<memo>) key on the Radio Data System SYS screen. The screen displays the memory usage status and allows you to set memory groups or free memory that isn't needed.



Traffic Radio Information screen

This screen can be called up directly by pressing the [TRI] menu key. Use the screen to set ON/OFF of SK, DK, and BK.



● Specifications

RDS/RBDS Signal Generation Block

Sub-carrier	Frequency	57 kHz
	Frequency accuracy	±0.01 %
	Suppression ratio	50 dB or more
	Phase	Setting 0° or 90° with respect to the 3rd harmonic of the pilot signal Variable range ±10° Resolution 1°
Switching function ON/OFF of the TP, TA, MS, and RDS signals		
Data output	Group type	0A to 15B and user-defined groups
	Connector	BNC connector on the rear panel, TTL level*1
Clock output	Pattern	All0, All1, and PN9
	Polarity	Positive or negative
Data input	Connector	BNC connector on the rear panel, TTL level*1
	Frequency	1.1875 kHz
	Frequency accuracy	±0.01 %
	Polarity	Positive or negative
RDS signal output	Connector	BNC connector on the rear panel, TTL level*1
	Level	0.00 % to 10.00 % of the prescribed output level
Pilot signal input*2	Level resolution	0.01 %
	Setting accuracy	±5 % (prescribed output level 10 Vp-p, when level is 10.00 %)
	Center frequency	19 kHz
	Frequency range	±0.02 % from the center frequency
Pilot signal output*3	Connector	BNC connector on the rear panel
	Level range	0.3 V to 3 Vp-p
	Impedance	10 kΩ ±1 kΩ
	Center frequency	19 kHz
Composite signal output	Frequency accuracy	±0.01 %
	Connector	BNC connector on the rear panel
	Level	3 Vp-p
	Level accuracy	±10 %
Composite signal output	Impedance	600 Ω
	Impedance accuracy	±10 %
	Connector	BNC connectors on the front and rear panels
	Prescribed output level	1.5 V to 10 Vp-p, EMF, 10-mV steps
Composite signal output	Impedance	75 Ω
	Impedance accuracy	±10 %

TRI Signal Generation Block

SK Transmitter identification signal		
Frequency	57 kHz	
Frequency accuracy	±0.01 %	
Modulation level		
Range	0 % to 10 %	
Resolution	0.1 %	
Accuracy	±2 % (prescribed output level 10 Vp-p, when level is 10.00 %)	
DK Announce identification signal		
Modulation frequency	125 Hz (pilot signal frequency × 3/456)	
Modulation level		

Range	0 % to 40 %
Resolution	1 %
Accuracy	±5 % (at 40 % modulation)
Distortion factor	0.8 % or less (demodulation bandwidth of 15 Hz to 15 kHz)

BK Area identification signal	
Modulation frequency	
A	23.75 Hz (pilot signal frequency/800)
B	28.27 Hz (pilot signal frequency/672)
C	34.93 Hz (pilot signal frequency/544)
D	39.58 Hz (pilot signal frequency/480)
E	45.67 Hz (pilot signal frequency/416)
F	53.98 Hz (pilot signal frequency/352)
Modulation level	
Range	0 % to 80 %
Resolution	1 %
Accuracy	±5 % (at 80 % modulation)
Distortion factor	0.8 % or less (demodulation bandwidth of 15 Hz to 15 kHz)
Area selection	
Numeric keypad and rotary knob	
Area scan function	
Interval setting	0.1 s to 12.0 s
Resolution	0.1 s
Skip	Able to set pass on each area

External Interface and Memory

GPIB	IEEE std. 488-1978	
RS-232C	SH1, AH1, T4, L2, SR1, RL1, PP0, DC1, DT0, C0, E1	
	Baud rate	9600 bps
	Data length	8 bits
	Stop bit	1 bit
External control	Parity	None
	Connector	25-pin D-SUB connector on the rear panel
Signal level	TTL level I/O	
Control items	8-bit input/output Memory UP/DOWN Return	
Memory function	Stores and recalls 10 points × 10 or 100 continuous points of setup status	

General Specifications

Spec guarantee temperature/humidity range	
Temperature	15 °C to 35 °C
Humidity	20 % to 85 % RH (no condensation)
Operating temperature/humidity range	
Temperature	0 °C to 40 °C
Humidity	20 % to 85 % RH (no condensation)
Storage temperature/humidity range	
Temperature	-10 °C to 60 °C
Humidity	Less than or equal to 90 % RH (no condensation)
Warm-up period	At least 30 minutes
Allowable line voltage range	90 V to 110 V, 104 V to 126 V 194 V to 236 V, 207 V to 250 V
Allowable line frequency range	45 Hz to 65 Hz
Maximum power consumption dimensions (MAX)	35 VA maximum 430(450)WX99(115)HX380(445)Dmm
Weight	Approx. 6.5 kg
Battery backup	Backs up setup information

Safety	Complies with the following standard. IEC61010-1:1990-09 / A2:1995-07 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use Designed as a Class I instrument connected to a power supply classified as Overvoltage Category I or II under Pollution Degree 2 environment.	
Accessories	Power cord	× 1
	Operation manual	× 1
	Fuse :1 A(T), AC250 V	× 2
	:0.5 A(T), AC250 V	× 2

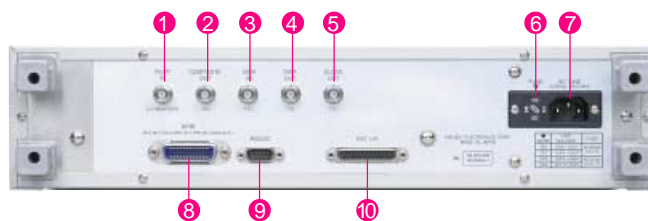
FM Stereo Modulation Block (KSG3421 only)

Pre-emphasis	OFF, 25 μs, 50 μs, and 75 μs
Mono, Main, L, R, and Sub signals	
Modulation factor	0 % to 125 % of the prescribed output level
Resolution setting	0.1 %
Accuracy setting	±5 % (prescribed output level 10 Vp-p, when level is 100 %)
Pilot signal	
Frequency	19 kHz
Frequency accuracy	±0.01 %
Amplitude range	0 % to 15 % of the prescribed output level
Resolution setting	0.1 %
Accuracy setting	±5 % (prescribed output level 10 Vp-p, when level is 10 %)
Distortion factor	0.01 % or less (for INT signal from 20 Hz to 20 kHz) 0.02 % or less (for EXT signal from 20 Hz to 15 kHz)
S/N ratio	86 dB or more, at bandwidth of 20 Hz to 30 kHz
Separation	66 dB or more (AF = 400 Hz or 1 kHz) 60 dB or more (AF = 20 Hz to 15 kHz)
External modulation signal	
Input connector	BNC connector on the front panel
Frequency characteristics	20 Hz to 15 kHz Within ±0.5 dB (1 kHz reference)
Rated input voltage	3 Vp-p
HIGH/LOW monitor	Turns off within ±2 % of the rated input voltage
Input impedance	10 kΩ
Input impedance accuracy	±10 %
Internal modulation signal	
Frequency	20 Hz to 20 kHz sine wave
Resolution setting	10 Hz
Frequency accuracy	±0.01 %

- *1 TTL level is 0 V to 1 V for low and 3.5 V to 5 V for high.
- *2 KSG3420 only
- *3 KSG3421 only

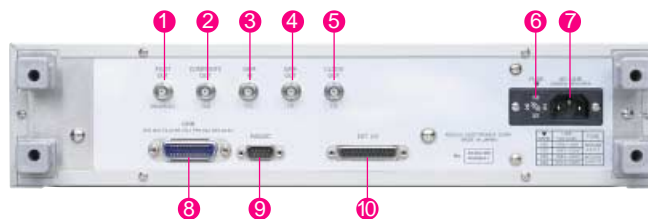
●Rear Panel

KSG3420



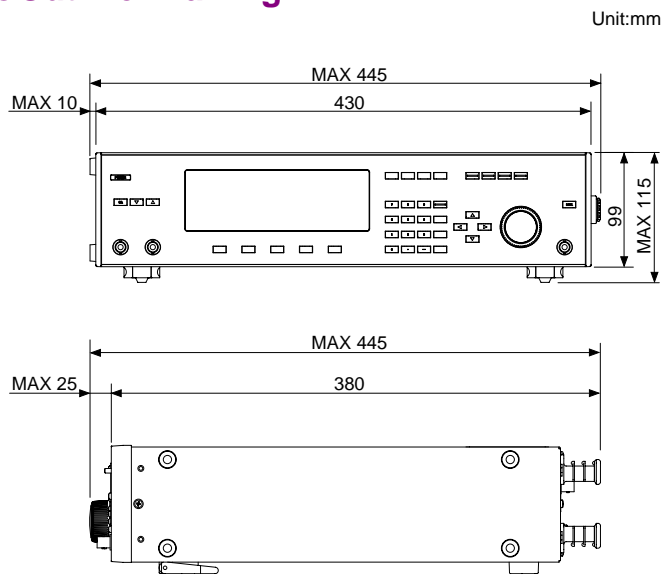
- | | |
|---------------------------|----------------------|
| 1.PILOT IN connector | 6.Fuse holder |
| 2.COMPOSITE OUT connector | 7.AC LINE connector |
| 3.DATA IN connector | 8.GPIB connector |
| 4.DATA OUT connector | 9.RS-232C connector |
| 5.CLOCK OUT connector | 10.EXT I/O connector |

KSG3421



- | | |
|---------------------------|----------------------|
| 1.PILOT OUT connector | 6.Fuse holder |
| 2.COMPOSITE OUT connector | 7.AC LINE connector |
| 3.DATA IN connector | 8.GPIB connector |
| 4.DATA OUT connector | 9.RS-232C connector |
| 5.CLOCK OUT connector | 10.EXT I/O connector |

●Outline Drawing



KSG4310

FM/AM Stereo Signal Generator



Model KSG4310 is FM/AM stereo signal generator that cover a frequency range of 10 kHz to 280 MHz. The PLL (A phase-lock loop) system is used to enable the instruments to generate signals as consistent as $\pm 2 \times 10^{-7}$ /week. Incorporating FM stereo and AM stereo (Motorola C-QUAM™ system) modulators, model KSG4310 is also highly desirable for their compact and labor-saving design. It also incorporates several new features and improvements, such as newly electronic attenuators for improved reliability, a variable AF generator, and a memory scan function, all added while keeping costs at low levels. As a result, the KSG4310 has become the standard in signal generators while at the same time offering superior cost performance.

Features

- Wide bandwidth of 280 MHz covering low frequency to VHF band
- High resolution of 10 Hz in a full bandwidth and 8-digit display
- Signal generator, FM stereo modulator, AM stereo modulator, and AF generator incorporated into a single unit
- High output of +19 dBm (2 V) with a setting resolution of 0.1 dB
- Improved reliability resulting from the use of electronic attenuators
- Continuous mode that forcibly stops switching of step attenuators
- Indications in eight types of units: EMFdBμ, EMFmV, EMFμV, dBμ, dBm, dBf, mV, and μV
- Internal modulation frequency can be arbitrarily set between 50 Hz and 15 kHz at resolution of 50 Hz.
- Memory capable of storing 100 different panel settings
- Memory scan that recalls memory at any time-interval for executing stored data
- ΔFREQ (frequency Deviation) function, useful for frequency selectivity characteristic tests
- ΔdB (output level Deviation) function, useful for attenuation characteristic tests
- Equipped with GPIB as standard
- EXT I/O port to expand the range of applications available

Specifications

Frequency range	10 kHz to 280 MHz, 8-digit display
Frequency stability	$\pm 2 \times 10^{-7}$ /week
Output level	-133 to +19dBm, Setting resolution:0.1dB
FM modulator	0 to 300kHz 3-digit display
Distortion factor	0.01% or less (RF = 76MHz to 90 MHz and 98.0 and 10.7±1 MHz.)
AM modulator	0 to 99.9% 3-digit display
Distortion factor	0.1% or less(30% modulation, RF = 400 kHz to 2 MHz, AF = 1 kHz)
Supply voltage	100, 115, 215, and 230 V AC ±10% each, selectable
Dimensions/Weight	430(445)W X 99(110)H X 380(440)Dmm, Approx.10kg



KIKUSUI ELECTRONICS CORP.
 1-1-3,HIGASHIYAMATA,TSUZUKI-KU,YOKOHAMA, 224-0023, JAPAN
 TEL: (+81)45-593-7570, Fax: (+81)45-593-7571
 Internet: <http://www.kikusui.co.jp/>

●Distributor:

■ All products contained in this catalogue are equipment and devices that are premised on use under the supervision of qualified personnel, and are not designed or produced for home-use or use by general consumers. ■ Specifications, design and so forth are subject to change without prior notice to improve the quality. ■ Product names and prices are subject to change and production may be discontinued when necessary. ■ Product names, company names and brand names contained in this catalogue represent the respective registered trade name or trade mark. ■ Colors, textures and so forth of photographs shown in this catalogue may differ from actual products due to a limited fidelity in printing. ■ Although every effort has been made to provide the information as accurate as possible for this catalogue, certain details have unavoidably been omitted due to limitations in space. ■ If you find any misprints or errors in this catalogue, it would be appreciated if you would inform us. ■ Please contact our distributors to confirm specifications, price, accessories or anything that may be unclear when placing an order or concluding a purchasing agreement.