ISDB-T RF Signal Generator

▶ RTX100A

Product Information

The RTX100A ISDB-T RF Signal Generator offers a flexible, affordable solution for design evaluation and conformance testing of digital video products conforming to the Integrated Service Digital Broadcasting-Terrestrial (ISDB-T) standard for digital terrestrial TV systems. The RTX100A provides the capability to record and play out MPEG-2 transport streams and modulate the up converted RF signal. In the digital terrestrial broadcasting environment, with applications from fixed to mobile and portable reception, powerful signal generation functionality is required in a portable form factor for design, test and maintenance.

The RTX100A includes the ISDB-T modulator and up-converter as standard, and can directly output the ISDB-T RF modulated signal. This removes the need to have a separate transport stream generator, ISDB-T modulator, and up-converter to generate the ISDB-T modulated RF test signal. The RTX100A can output test signals from the Transport Stream to the modulated RF in a half rack 3U portable unit. DVB-SPI and ASI interfaces are provided as standard, allowing recording and playout of MPEG-2 Transport Streams.

▶ Features & Benefits

Provides a Complete Solution for ISDB-T Signal Generation by Integrating an ISDB-T Modulator, Up Converter and MPEG Generator in a Portable Form Factor

Rapid Setup Using Automatic Detection of Parameters from the Broadcast Stream, to Modulate the RF Accordingly

The RTX100A Can Be Used as a Simple ISDB-T Modulator as it Can Modulate the Stream from ASI Directly Without the Need to Store the Stream

Real-time Updating of Timestamps, Time Tables and ISDB-T Reed Solomon FEC for Error-free Looping

IEEE1394b, USB2.0, DVD Drive, and GbE Interface Download of Transport Streams for Optimum Flexibility in Storing and Managing Transport Stream Libraries

Integration with Automated Systems Enabled by Ethernet Remote Control Using SCPI (Standard Command for Programmable Instruments) Command Set

Quick and Easy Interpretation of Complex Structures by Utilizing a Color Hierarchical Display of Transport Stream Components

Easy Integration With Tektronix MPEG Analysis Tools for Transport Stream Creation to Support Compliance and Stress Testing of Video Products Using MPEG-2 Technology

Integrated with Tektronix Monitoring Tools for Powerful and Cost-effective Transport Stream Monitoring and Error Recording

▶ Applications

ISDB-T Consumer Receiver Design and Manufacturing Test

Evaluation of Professional ISDB-T Equipment

Performance Verification of ISDB-T Systems

Simulation of Digital Terrestrial Broadcasting Transmission

Scheduling of Stream Playout and Recording for Broadcast and Production Line Applications

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The RTX100A takes the Transport Stream transmission parameters and uses these to modulate and up convert to RF. The RTX100A can modulate either directly from a real-time ASI input, or from a Transport Stream stored on disk.

The RTX100A is the best tool for design and evaluation of consumer ISDB-T equipment such as set-top box, televisions, car navigation systems, and cellular phones, as these devices require a direct modulated RF input. It is possible to use the RTX100A as a signal source for end-to-end broadcast system evaluation and maintenance.

The RTX100A offers continuous, error-free transport stream looping for long duration playout and PCR jitter insertion for stressing designs. Users can continuously loop all sample streams, including updating of all timestamps, continuity counters, time tables and ISDB-T Reed Solomon FEC, without fear of buffer under- or overflow. Ethernet network remote control functionality enables control of functions such as Play, Record, Clock Rate and Jitter Insertion using the SCPI (Standard Control for Programmable Instruments) command set, allowing easy integration into ATE and automated broadcast environments. An optional scheduler application enables the RTX100A to be used as a simple content scenario server for broadcast and manufacturing test signal transmission. The extendable storage allows users to tailor the amount of storage they require.

The Solution for ISDB-T Streams

MTXS01: ISDB-T Re-multiplex Software

MTXS01 is a complete multiplexer tool for ISDB-T standard streams. It provides off-line multiplexing of existing transport streams and ISDB-T information in order to produce ISDB-T transport streams. It can also be used to multiplex existing ISDB-T transport streams and modify ISDB-T information.

► Characteristics

System Characteristics

MPEG Stream Source Characteristics – Supports MPEG-2, DVB, ATSC and ISDB Transport Stream protocols. Records and plays out MPEG Transport Streams in multiple formats. Error-free looping. PCR jitter insertion.
Packet Length – 188, 204 or 208 bytes, and Non-TS.
Maximum Data Rate –
- Memory: 200 Mbps.
- Disk: 120 Mbps.

Minimum Data Rate – 256 Kbps.
Number of Input/Output Interfaces – One DVB SPI I/O, one ASI In, one ASI Out and one RF Out.
DVB Synchronous Parallel Interface – Connector: 25-Pin D-sub.
Maximum data rate: 200 Mbps.
Asynchronous Serial Interface – Connector: BNC.
Maximum data rate: 200 Mbps.
User-selectable burst and non-burst transmission format.
Internal Storage Capacity – 160 GB.
Internal Reference Clock – 27 MHz ±1 ppm.
External Reference Input – 27 MHz ±1 ppm (recommended).

RF Signal Characteristics

Broadcasting System – Digital Broadcasting TV (ARIB STD-B31).
Packet Length – 204 bytes.
Internal Reference Clock – 27 MHz ±1 ppm.
Output Connector – BNC, 50 Ω.
Frequency Range – UHF 13 ch to 62 ch (473 MHz to 767 MHz).
Frequency Offset – 1/7 MHz.
Output Level – Fixed, –21 dBm to –29 dBm (Mode1), –18 dBm to –26 dBm (Mode2), –15 dBm to –23 dBm (Mode3).
Mode – Mode1, Mode2, Mode3.
Guard Interval – 1/4, 1/8, 1/16, 1/32.
Carrier Modulation – QPSK, 16QAM, 64QAM.
Coding Rate – 1/2, 2/3, 3/4 5/6, 7/8.
Time Interval Length – 0 to 32 (depends on mode).

Platform Characteristics

Operating System – Microsoft Windows XP.
Disk Space – System: 5 GB. MPEG storage: 155 GB.
RAM – 512 MB.
Optical Storage Drive – CD-R/W, DVD-R/RW, DVD+R/RW.
Display – LCD, 640x480.
Character Input – Keypad.
Keyboard and Mouse – Standard.
Interfaces – VGA output, Printer port, Serial port, USB2.0, 1000Base-T Ethernet, IEEE 1394b.

Environmental Characteristics

Temperature –
Operating: +5 ºC to +40 ºC.
Nonoperating: –20 ºC to +60 ºC.
Humidity –
Operating: 20% to 80% (noncondensing).
Nonoperating: 5% to 90% (noncondensing).
Altitude –
Operating: Up to 3 km.
Nonoperating: Up to 12 km.

Regulatory

EMC – EN61326-1
Safety –
UL61010-1, CAN/CSA C22.2 No. 61010-1-04, EN61010-1.
Australia Declaration of Conformity – AS/NZS 2064.

Power Requirements

Mains Voltage Range – 100 to 240 VAC.
Mains Frequency – 50/60 Hz.
Power Requirements – 180 VA Max.

Physical Characteristics

Dimensions	**mm**	**in.**
Height	132	5.2
Width	214	8.4
Depth	435	17
Weight	**kg**	**lbs.**
	6.2	13.7

PC System Requirements for Scheduler Software

The Following PC Configuration Is Required for Installation –
Intel or 100% compatible motherboard chipset.
Windows 2000 Operating System or Windows XP Operating System.
256 MB RAM.
2 to 3 MB of available hard disk space for applications and documentation.
VGA (640x480) resolution video adapter and monitor. (XVGA 1024x768) or higher resolution recommended).
CD-ROM or DVD drive.
Keyboard and Microsoft Mouse or compatible pointing device.
Important Note –
Apart from those specifically authorized by Tektronix, no other applications should be installed on the PC. If other applications are installed, they may interfere with the operation of the software supplied. Software operation under these circumstances cannot be guaranteed.

▸ Ordering Information

RTX100A ISDB-T RF Signal Generator

Includes: Stream capture and playout with error-free looping and PCR jitter insertion, ISDB-T RF signal output, 512 MB RAM, 160 GB MPEG stream storage, sample streams, USB Keyboard and Mouse, Front Cover and User Manual.

Please specify power plug when ordering.

RTX100A Options

Product Options

Opt. SC – Scheduler.

Service Options

Opt. C3 – Calibration Service 3 Years.

Opt. C5 – Calibration Service 5 Years.

Opt. D1 – Calibration Data Report.

Opt. D3 – Calibration Data Report 3 Years (with Opt. C3).

Opt. D5 – Calibration Data Report 5 Years (with Opt. C5).

Opt. R3 – Repair Service 3 Years.

Opt. R5 – Repair Service 5 Years.

Power Plug Options

Opt. A0 – North America Power.

Opt. A1 – Universal EURO Power.

Opt. A2 – United Kingdom Power.

Opt. A3 – Australia Power.

Opt. A4 – 240 V, North America Power.

Opt. A5 – Switzerland Power.

Opt. A6 – Japan Power.

Opt. A10 – China Power.

Opt. A99 – No power cord.

Language Options

Opt. L0 – English Manual.

Opt. L5 – Japanese Manual.

Optional Accessories

MTXS01 – ISDB-T Re-multiplex Software.

071-1757-xx – Service Manual.

WFM7F05 – Rackmount Kit.

1700F06 – Blank Panel.

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Our most up-to-date product information is available at:
www.tektronix.com

Product(s) are manufactured in ISO registered facilities.

Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

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