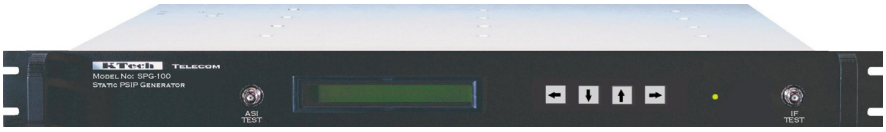
KTech TELECOMMUNICATIONS, INC.

Application Note

Static PSIP Generator
Model Number: SPG-100



Introduction

This application note describes the SPG-100 Static PSIP Generator and its applications.

Product Description

The SPG-100 is a Static PSIP Generator that generates the PSIP Tables that are required by the ATSC. The ATSC requires that every digital transport stream in terrestrial broadcast include STT, RRT, VCT, MGT and the first four Event Information Tables (EIT-0, EIT-1, EIT-2, EIT-3).

The main features of the SPG-100 are as follows:

- Generates STT, RRT, VCT, MGT and four static EIT
- At power up the unit automatically generates PSIP tables based on the information stored in its memory
- Allows user to create information for the VCT and update the transport stream ID in the PAT, via RS232
- Creates and stores virtual channel information for up to six program streams
- RF Channels 2-69, SMPTE-310M, and DVB-ASI inputs
- 1 SMPTE-310M and 2 DVB-ASI outputs
- Converts an 8-VSB signal to DVB-ASI and SMPTE-310M
- IF and ASI Front Panel Testpoints
- Null Packet Insertion and PCR Correction
- Loss of Transport Stream Alarm
- RS232 Control User Interface
- 1 RU rack mountable

Functional Block Diagram

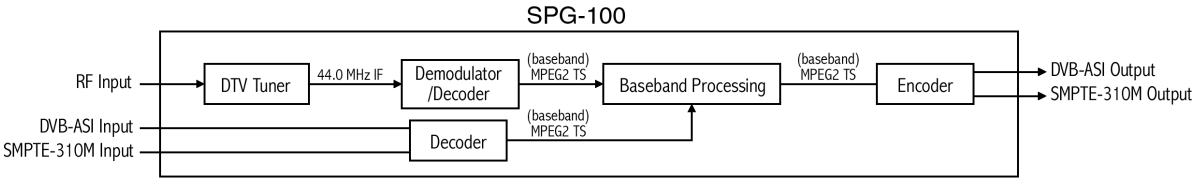


Figure 1: Functional Block Diagram of the SPG-100

DTV Tuner
The 8-VSB RF input signal is tuned to its RF channel frequency and down converted to 44.0 MHz IF by the DTV Tuner. The IF signal is available at a testpoint located on the front panel of the unit.

Demodulator/Decoder
The 8-VSB signal is demodulated down to baseband by the demodulator/decoder.

Decoder
A DVB-ASI or SMPTE-310M signal can also be fed into the SPG-100. These signals feed into a decoder which outputs an MPEG2 TS into the baseband process. Note: The SPG-100 can accept any DVB-ASI signal that has a rate less than or equal to 19.392 Mbps.

Baseband Processing
The baseband processing includes the Null Packet Insertion, PCR Correction and PSIP Insertion. The first step in the process is Null Packet Insertion. The Null Packet Insertion does the following:

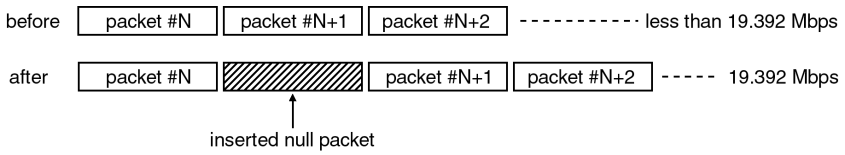


Figure 3-2: Null Packet Insertion

If the MPEG2 Transport Stream is less than 19.392 Mbps, null packets are inserted into the MPEG2 Transport Stream to bring the rate up to 19.392 Mbps.

The second step is PCR Correction. The Program Clock Reference (PCR), embedded within the transport stream, is used to synchronize a receiver's clock with an encoder's clock. The original PCR values that were stamped into the stream by the original encoder will not be the correct PCR values for the receiver after null packets are inserted into the stream. The PCR values need to be re-stamped so that the receiver will have the correct PCR values, thus avoiding PCR clock jitter at the receiver end.

The final step is the PSIP insertion where the STT, RRT, VCT, MGT and four static EIT are inserted into the null packets within the stream.

Encoder
The encoder transforms the baseband signal into DVB-ASI and SMPTE-310M format.

Front and Back Panel

The front panel of the SPG-100 is shown below in Figure 2.

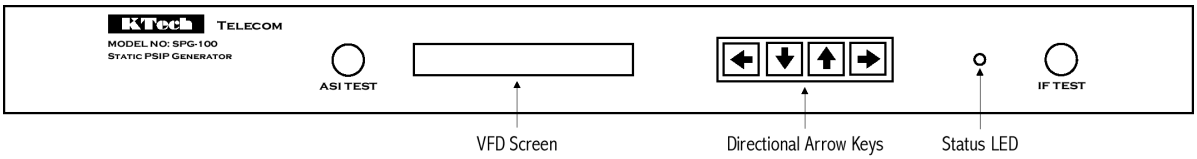


Figure 2: Front Panel of the SPG-100

Signal	Connector
DVB-ASI Output Testpoint	BNC
44.0 MHz IF Output Testpoint	BNC

The back panel of the SPG-100 is shown below in Figure 3.

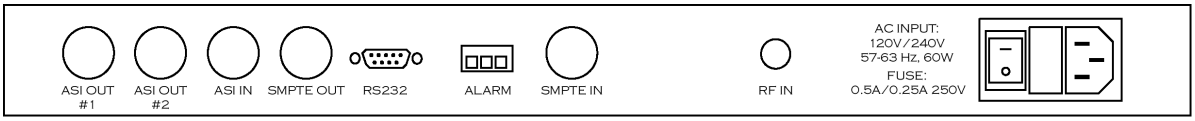


Figure 3: Back Panel of the SPG-100

Signal	Connector
DVB-ASI Output #1	BNC
DVB-ASI Output #2	BNC
DVB-ASI Input	BNC
SMPTE-310M Output	BNC
RS232	DSUB 9 Socket
Alarm	3 terminal Phoenix
SMPTE-310M Input	BNC
RF Input	75Ω F

Applications

The SPG-100 is used by DTV Broadcasters to add PSIP information into their transport streams before modulation. In this application, the broadcaster's existing NTSC signal is fed into an encoder that outputs a transport stream in DVB-ASI format. The DVB-ASI signal does not contain any PSIP information within it. The broadcast uses his/her own PC to type in the desired PSIP Information that is transmitted to the SPG-100 via RS232. The SPG-100 stores the PSIP information and automatically adds it to the DVB-ASI stream upon unit power up. The resulting output is a DVB-ASI stream that contains all the PSIP Tables required by the ATSC.

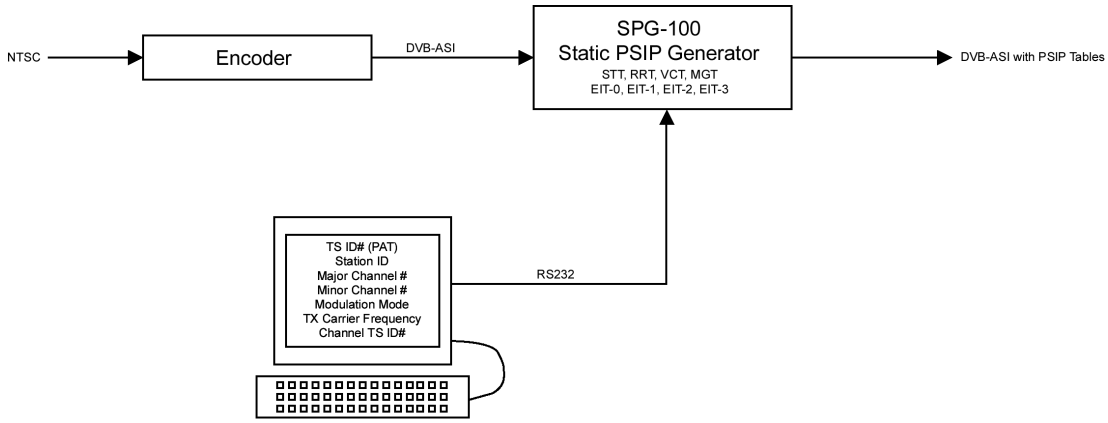


Figure 4: Application of the SPG-100

Specifications

General

	Specification	Comments
AC Power		
Frequency	47-63 Hz	
Voltage	90-264V	
Current	1.2A max	
Fuse	1.5 A, 250V	
Operating Conditions		
Temperature	0°-50°C	
Altitude	8,000 ft.	Max
Humidity	95%	Non-condensing
Cooling	fan	Forced Convection
Weight		
Net	20 lbs.	
Gross	24 lbs.	Shipping weight
Dimensions		
Height	1.75”	
Width	19”	
Depth	18”	
RS232 Settings		
Baud Rate	9600	
Data Bits	8	
Parity	None	
Stop Bits	1	
Flo Control	None	

RF Input Specifications

	Specification	Comments
Frequency	57.0-803.0 MHz	
USA Channel Numbers	2-69	
Impedance	75 ohms	
Connector	F	
RF Band	6.0 MHz	

Demodulator

Parameter	Specification	Comments
Mode	8-VSB Terrestrial	
Equalizer Span	-5.9μS to +40μS	
Data Rate	19.392658 Mbps	
SNR Threshold	15dB	

SMPTE310M Serial Interface (Baseband Data Input/Output)

Parameter	Specification	Comments
Connector	BNC	
Source Impedance	75 ohms	
Output Coupling	AC	AC inductively coupled
Signal Overshoot	<10%	
Data Format	Biphase Mark Coding	
Transport Stream Bit Rate	19.39265 Mbps	Raw serial data rate ± 2.8 ppm

DVB-ASI Serial Interface (Baseband Data Input/Output)

Parameter	Specification	Comments
Connector	BNC	
Source Impedance	75 ohms	
Output Coupling	AC	AC inductively coupled
Transport Stream Bit Rate (input)	2.6 Mbps Min 19.39265 Mbps Max	
Transport Stream Bit-Rate (output)	19.39265 Mbps	

PSIP Generator

Parameter	Specification	Comments
Inserted into the MPEG2 Stream	STT, RRT, VCT, MGT and four static EIT	
Configurable Parameters in VCT	Station ID Major Channel Number Minor Channel Number Modulation Mode Carrier Frequency Channel TSID	
Configurable parameter in MPEG2 PAT	Transport Stream ID	

Ordering Information

Part Number	Description
SPG-100	Static PSIP Generator

Additional Information at KTech Web Site: www.ktechtelecom.com
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