Tektronix

Audio Signal Generators: Two Channel ASG 100 Four Channel ASG 140

Tektronix audio generators offer potent solutions for audio testing. The two-channel ASG 100 and four-channel ASG 140 combine compact size, ease-of-use and programmability. Operated manually or automatically, they produce signals used for aligning, servicing and testing of audio facilities.

Test signal capability starts with simple line up, polarity, and level signals. Added to these are tone sweeps for checking distortion, frequency response and crosstalk. Industry standard CCITT 0.33 signals and newly developed Multitone signals support advanced audio analysis capability found in the VM 700A. Digital synthesis of signals ensures signal stability and repeatability.

The ASG 100/140 are operated by simple front-panel controls. Alternately, users may operate these generators via their rear-panel RS-232 remote control port. Supporting a variety of baud rates, this interface permits seamless integration of audio signal generators in ATE test schemes. A wide variety of editing schemes permits user-defined values to be stored for later reuse.

ASG 100 Applications

The two-channel ASG 100 is for situations where the generator is inserted in-line with the audio path of interest. When used in this fashion, the ASG 100 can insert a variety of test signals into the audio program. The output impedance is programmable, allowing it to be used with either power-matched or voltage-driven signal distribution schemes.

ASG 140 Applications

The ASG 140 is designed for situations requiring no in-line connections. Its four audio outputs are grouped in two stereo pairs making it the ideal choice for service and alignment of MII, Betacam, D1, D2, D3,... VTRs. Its audio output features 10fi output impedance.

COMMON FEATURES
20 Hz to 20 kHz
24 dBu to -90 dBu
4 second Voice ID
Balanced XLR signal paths

CONTROLS
RS-232 remote control
Front panel lockout
Contact closure

SPECIAL MEASUREMENT SIGNALS
Multitone test signals
Audio/video delay signals
CCITT 0.33 signals
TEKTRONIX autosequences

ASG 140 FEATURES
Four balanced XLR signals
Fixed 10 Ohm output impedance

ASG 100 FEATURES
Balanced, loop-through operation
Programmable output impedance

Output Signals

Several different types of audio test signals, ranging from simple to complex, are produced. The most basic of these signals are simple tones.

Tone, **L Tone** and **R Tone** consist of sine waves that are programmable in amplitude and frequency. Many standard test procedures specify tones for their purpose. These requirements are satisfied by the **Tone** set available in Tektronix signal generators. One combination of **Tone** amplitude and frequency may be saved as a default value. This might be used as a test signal or can even be used for an alert or warning signal.

Frequency	Length	Total Time
25 Hz	1 Sec	1.0 Sec
31	1	2.0
40	1	3.0
50	1	4.0
63	1	5.0
80	1	6.0
100	1	7.0
125	1	8.0
160	1	9.0
200	1	10.0
250	1	11.0
315	1	12.0
400	1	13.0
500	1	14.0
630	0.5	14.5
800	0.5	15.0
1000	0.5	15.5
1250	0.5	16.0
2500	0.5	16.5
3150	0.5	17.0
4000	0.5	17.5
5000	0.5	18.0
6300	0.5	18.5
8000	0.5	19.0
10000	0.5	19.5
12500	0.5	20.0
16000	0.5	20.5
20000	0.5	21.0

Table 1. ASG 100 & ASG 140 Sweep Signals.

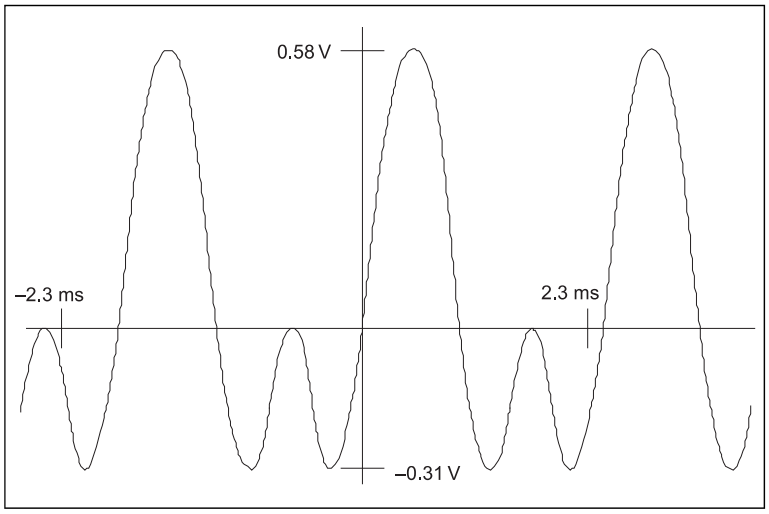


Figure 1. Polarity signal waveform.

LINE UP permits users to define a tone to be used for alignment purposes. In this case, a front-panel button affords easy access to this signal.

VOICE plays back 4 seconds of user-recorded signal intended for voice ID purposes. This signal is recorded by the front-panel microphone incorporated in the signal generator.

POLARITY is a troubleshooting signal consisting of an asymmetrical waveform (Figure 1). This signal may be used to detect if the plus and minus connectors of an audio conductor have been reversed.

SILENCE is an active mute signal. Its suggested uses include determining the noise floor of a system as well as providing a rapid way to silence an output signal.

SWEEP generates frequency sweep signals on Left, Right or both channels simultaneously. When a Left or Right Sweep is active, the undriven channel is grounded through its characteristic impedance. The amplitude of the Sweep signal is controlled by a programmable "Sweep Level" control. Table 1 describes the sweep frequencies and durations.

Sweep signals are commonly used to measure particular audio characteristics over a frequency range. For example, **Sweep** provides a constant amplitude signal throughout the frequency range. When this signal passes through a system, the resulting output signal indicates the amplitude response of that system. Other uses for **Sweep** include the measurement of distortion vs. frequency and phase response vs. frequency. L Sweep and R Sweep provide signals that enable a user to measure crosstalk or channel isolation vs. frequency. The levels of Sweep, L Sweep and R Sweep are programmable. A particular level may be defined as the user default value.

CCITT 0.33:01				TEK:90			
Seconds	Freq. L	Freq. R	Level	Seconds	Freq. L	Freq. R	Level
1	1650/1850	1650/1850	12 dBm0	1.0	1650/1850	1650/1850	-12
1	1020	1020	0	1.0	400	400	0
1	1020	1020	-12	1.0	400	400	-8 dB
1	40	40	-12	.250	15000	15000	-8
1	80	80	-12	.250	13999	13999	-8
1	200	200	-12	.250	12503	12503	-8
1	500	500	-12	.250	11243	11243	-8
1	820	820	-12	.250	9001	9001	-8
1	1900	1900	-12	.250	7500	7500	-8
1	3000	3000	-12	.250	6203	6203	-8
1	5000	5000	-12	.250	3499	3499	-8
1	6300	6300	-12	.250	953	953	-8
1	9500	9500	-12	.250	400	400	-8
1	11500	11500	-12	.500	101	101	-8
1	13500	13500	-12	1.0	50	50	-8
1	15000	15000	-12	1.0	400	400	+10
1	1020	1020	+9	2.0	—	—	—
1	—	—	—				
1	60	60	+9				
1	2040	—	-12				
1	—	2040	-12				
1	820	820	+6				
1	820	820	-6				
1	820	820	+6				
8	—	—	—				

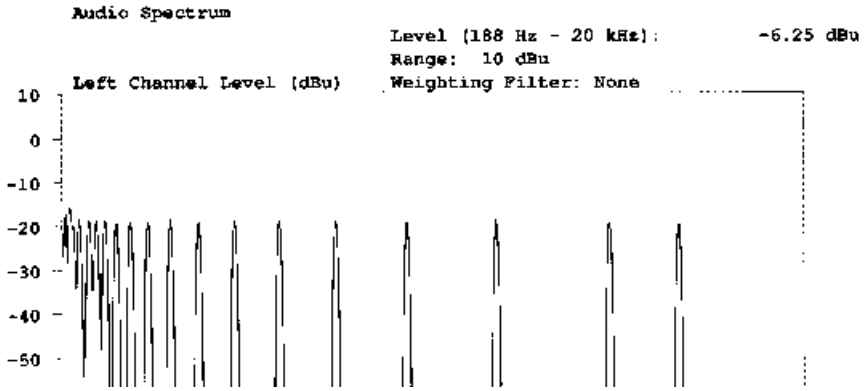
Table 2. Examples of Autosequences produced by the ASG 100 and ASG 140.

Autosequences

Another class of output signals is autosequences. Two general categories are available. Industry standard **CCITT** 0.33 sequences consist of a 1 second identifying FSK preamble followed by a series of tones with specific durations and levels. Six different sequences are produced, each with unique tones and levels. Furthermore, certain sequences are intended for monophonic applications while others are intended for stereo situations. These autosequences are powerful because certain advanced audio analyzers, such as the Tektronix VM 700A, automatically initiate an extensive series of tests each time the identifying preamble is detected. Thus automatic, yet unattended testing schemes are very easily implemented.

Tektronix autosequences are similar to those defined by the CCITT specification. However, **TEK:90-95** sequences include test signal level information in the identifying preamble. This further simplifies the implementation of test schemes. CCITT and TEK autosequences are ideal for testing telecommunication and broadcast contribution links. Since the identifying preamble coordinates generator and analyzer, split site tests, whether performed over an STL, satellite link, or coast-to-coast copper or fiber connection are simple to use.

In total, 6 CCITT and 6 Tektronix autosequences are available. VOICE may be appended to the beginning of each of these signals to aid source identification. Table 2 lists examples of both a CCITT and a Tektronix autosequence.



MTone1	MTone2	MTone3	MTone4
59 Hz	23 Hz	47 Hz	23 Hz
117	94	141	117
187	141	281	234
246	223	656	750
293	270	1031	867
375	352	2016	1758
422	562	4031	3492
949	879	8109	6984
1184	1113	1500	13992
1512	1395		20016
1887	1758		
2391	2227		
3000	2789		
3785	3516		
4758	4430		
6012	5590		
7570	7043		
9539	8871		
12012	11180		
15000	14074		
	17742		
	19992		

Table 3. Multitone Test Signals.