

# TG77AX

## BROADCAST INSTRUMENTS

### TEST SIGNAL GENERATOR



#### General

The TG77AX is a plug-in unit style, 1U-size test signal generator. Up to 4 units can be installed, enabling the user to build a compact, affordable system that best suits their needs. When used as a sync signal generator at broadcast stations, only a short time is required for signal generation to start after power is turned on.

#### Features

- User can be alerted by relay contact alarm in the event of a serious problem such as a sync abnormality.
- Equipped with 10 BASE-T LAN function, enabling the unit to report on logo reception, power voltage, the status of each unit, and other information.
- Last memory function restores status from previous use when power is turned on again.
- When two TG77AX units are connected as a main unit and a sub unit to the TS77AX or TS77NX changeover unit, the configuration can operate as a sync signal generator.
- Audio clock output (48 kHz) from a genlock unit is possible without an audio unit.

#### Specifications

##### ● HDTV systems

System name	Effective samples x Effective lines / Field frequency / Interlace ratio	Frame frequency (Hz)	Sampling frequency (MHz)	Samples per line (S/TL)	Scanning lines per frame	SMPTÉ standard
1035/60i	1920×1035/60/2:1	30	74.25	2200	1125	260M
1035/59.94i	1920×1035/59.94/2:1	$\frac{30}{1.001}$	$\frac{74.25}{1.001}$	2200	1125	
1080/60i	1920×1080/60/2:1	30	74.25	2200	1125	274M
1080/59.94i	1920×1080/59.94/2:1	$\frac{30}{1.001}$	$\frac{74.25}{1.001}$	2200	1125	
1080/50i	1920×1080/50/2:1	25	74.25	2640	1125	
1080/30p	1920×1080/30/1:1	30	74.25	2200	1125	
1080/29.97p	1920×1080/29.97/1:1	$\frac{30}{1.001}$	$\frac{74.25}{1.001}$	2200	1125	
1080/25p	1920×1080/25/1:1	25	74.25	2640	1125	
1080/24p	1920×1080/24/1:1	24	74.25	2750	1125	(RP211)
1080/23.98p	1920×1080/23.98/1:1	$\frac{24}{1.001}$	$\frac{74.25}{1.001}$	2750	1125	
1080/30PsF	1920×1080/30/1:1 (PsF)	30	74.25	2200	1125	
1080/29.97PsF	1920×1080/29.97/1:1 (PsF)	$\frac{30}{1.001}$	$\frac{74.25}{1.001}$	2200	1125	
1080/25PsF	1920×1080/25/1:1 (PsF)	25	74.25	2640	1125	296M
1080/24PsF	1920×1080/24/1:1 (PsF)	24	74.25	2750	1125	
1080/23.98PsF	1920×1080/23.98/1:1 (PsF)	$\frac{24}{1.001}$	$\frac{74.25}{1.001}$	2750	1125	296M
720/60p	1280×720/60/1:1	60	74.25	1650	750	
720/59.94p	1280×720/59.94/1:1	$\frac{60}{1.001}$	$\frac{74.25}{1.001}$	1650	750	

Specifications

● Television systems

Standards conformance

NTSC	EIA RS-170A
PAL	ITU-R BT.470-4
D1/D2	SMPTE 259M
HDTV	SMPTE 274M/240M/296M
HD-SDI	SMPTE 292M

● Unit

Max. number of units	
Dimensions	4 (excluding power unit) 75.4(W) x 340(H) x 40(D) mm (excluding protruding parts)

(\* )Note: Some units use 2 slots.

● System interface

Alarm output Total alarm relay contact output of factor selected for each user from alarm factors such as power supply abnormality, Genlock timing error, and fan stop.

Remote input Memory selection of 16 memory recalls (4 bits) and strobe signal (1 bit)

Connector type D-sub 9 pins socket

● Communications interface

Interface 10 BASE-T, 1 port (LAN)

Functions Main unit status report  
Software installation when new unit is mounted  
Installation of natural pictures, user test signals  
Version updates of software/hardware.

● Genlock unit (TG77AX001)

• Genlock section

References signals 525BB/625BB, 525SYNC/625SYNC, tri-level HDTV sync, CW  
Connector type BNC, 75 Ω loop through, 1 line  
Reference signal designation Manual setting selection  
Internal & external sync switching possible

Sync switching

• 525SYNC/625SYNC, tri-level HDTV sync

Input level -10 to +7 dB

Lock phase (STD) ±5.0 ns

Lock jitter ±5.0 ns

Sync phase variable Horizontal 54 MHz clock unit (rough adjust) & approx. 0.1 ns unit (fine adjust), Vertical 1 line unit

• 525BB/625BB (burst lock)

Input level -10 to +7 dB

Lock phase (STD) ±10°

Lock jitter ±0.5° for color subcarrier

Color frame detection When input reference SCH is within ±40°

Sync phase variable Horizontal 54 MHz clock unit (rough adjust) & approx. 0.1 ns unit (fine adjust), Vertical 1 line unit

• CW

Input continuous frequency 1, 3.58, 4.43, 5, 10 MHz

Input level 1 to 2.25 Vp-p (75 Ω during termination)

• BLACK output section

Connector type BNC, 75 Ω  
Number of outputs 4 (Output format & sync phase can be set independently for each line)  
NTSC (525BB) Blackburst signal, NTSC + 10 fields  
PAL (625BB) Blackburst signal  
HDTV Tri-level HDTV sync signal, conformance with SMPTE 240M/274M/296M

• Audio clock output section

Connector type BNC, 75 Ω  
Number of outputs 1, switched with BLACK output 4  
Output signal 48 kHz audio clock (rectangular wave)  
Output level 1 Vp-p

● SYNC/BB outputs unit (TG77AX002)

• BLACK output section

Connector type BNC, 75 Ω  
Number of outputs 4 (Output format & sync phase can be set independently for each line)  
NTSC(525BB) Blackburst signal, NTSC+10 fields  
PAL(625BB) Blackburst signal  
HDTV Tri-level HDTV sync signal, conformance with SMPTE 240M/274M/296M

● HD-SDI outputs unit (TG77AX003)

• Serial digital signal outputs

Standards conformance SMPTE 292M  
Quantization bits 10 bits  
Data rate 1.485, or 1.485/1.001 Gbps  
Output level 800 mVp-p ±10%  
Sync phase variable Horizontal 74.25 or 74.25/1.001 MHz clock unit, Vertical 1 line unit  
Connector type BNC, 75 Ω  
Number of outputs 2 (distributed output)

• Video signals

Output images Test signals; or characters, logos, illustration superimposed on natural pictures  
Quantization bits 10 bits (depending on output format)  
Natural picture ShibaSoku standard images (option, 8 or 10 bits), User-created BMP images  
Characters Max. 20 characters (alphanumerics, symbols, etc.)

• Additional functions

Bounce (overall display)  
Interval 0 to 10 fields cycles  
0 Stops bounce  
10 Repeats output start and stop between 10 fields  
Scrolling (Can be set individually for test signals, natural pictures and logos, characters, illustrations)  
Direction Horizontal/Vertical/Diagonal/Random  
Speed Horizontal:-60 to 60 pixels/field (2-pixel units)  
Vertical:-60 to 60 lines/field (2-line units)  
\* Note: Scrolling for logos, characters, illustrations occurs within rectangular area.

Format error addition

Digital bit errors can be inserted into EAV, SAV, active picture data.

Specifications

- Audio signals
  - Embedded audio output
    - Standards conformance SMPTE 299M
    - Quantization bits 20 or 24 bits
    - Number of channels Max. 16
    - Sampling frequency 48 kHz
    - Signal frequency (sine wave) 400, 1000, 3000 Hz
    - Signal level -18 dBFS / -20 dBFS  
Signal frequency & level can be set for each channel.
    - MUTE ON/OFF possible
    - Audio data packet multiplexing ON/OFF switchable in audio group units
    - Audio control packet multiplexing Linked with audio data packet multiplexing
- BLACK SDI outputs option (TG77AX203)
  - Sync format Same as standard output
  - Serial digital signal output Same as standard output (2 lines output)
  - Video signal output BLACK or 40% gray signal switching
  - Audio signal output Same as standard output, or all channels MUTE
  - Additional functions None (Bounce, scrolling, error added)
- Test signals
  - color bar ARIB HD multi color bar 1, 100% color bar, ARIB HD multi color bar 2, 75% color bar, ARIB HD multi color bar 3, 4:3 color bar, ARIB HD multi color bar 4, Vertical color bar, ARIB HD multi color bar 5, ARIB HD multi color bar 6, ARIB HD multi color bar 7, ARIB HD multi color bar 8, ARIB HD multi color bar 9, 8-colors color bar with black
  - Ramp Ramp 1 (Y), Ramp 2 (Y Pb Pr), Triangular ramp (Y), Shallow ramp 1, Shallow ramp 2, Shallow ramp 3, 10 stair step, 5 stair step
  - Sweep H-sweep 1 (w/marker), H-sweep 2 (w/marker), V-sweep 1, V-sweep 2, Multiburst 1, Multiburst 2
  - Raster White 100%, Yellow, Cyan, Green, Magenta, Red, Blue, Black, 40% gray
  - Crosshatch Crosshatch, Dot
  - Pathological Pathological 1, Pathological 2,
  - Pulse & bar Pathological 3,
  - Pattern Pulse & bar 1 (Y), Pulse & bar 2 (Y Pb Pr)
  - Others SQR, Contrast, Pluge, Window
  - Photo User's original test signal  
Natural pictures (option)
- D1/D2 output unit (TG77AX004)
  - Sync format Output possible with system selected from D1 (525/625), D2 (NTSC)
  - D1 serial digital outputs
    - Standards conformance SMPTE 272M
    - D1 serial digital outputs
      - Standards conformance SMPTE 259M
      - Sync phase variable In 1 frame : Horizontal 54 MHz clock unit, vertical 1 line unit
      - Number of outputs 2 (distributed)
  - D2 serial digital outputs
    - Standards conformance SMPTE 259M
    - Sync phase variable In 1 color frame : Horizontal 54 MHz clock unit, vertical 1 line unit
    - Number of outputs 2 (distributed)
  - Video signals
    - Output images Test signals; or characters, logos, illustration superimposed on natural pictures 10 bits
    - Quantization bits ShibaSoku standard images (option, 8 bits), User-created BMP images
    - Natural picture ShibaSoku standard images (option, 8 bits), User-created BMP images
    - Characters Max. 20 characters (alphanumerics, symbols, etc.)
  - Additional functions
    - Bounce (overall display)
      - Interval 0 to 10 fields cycles
      - 0 Stops bounce
      - 10 Repeats output start and stop between 10 fields
    - Scrolling (Can be set individually for test signals, natural pictures and logos, characters, illustrations)
      - Direction Horizontal/Vertical/Diagonal/Random
      - Speed Horizontal:-60 to 60 pixels/field (2-pixel units)  
Vertical:-60 to 60 lines/field (2-line units)  
(\* )Note: Scrolling for logos, characters, illustrations occurs within rectangular area.
    - Format error addition  
Digital bit errors can be inserted into EAV, SAV, active picture data.
  - BLACK SDI outputs option (TG77AX204)
    - Sync format Same as standard output
    - Serial digital signal output Same as standard output (2 lines output)
    - Video signal output BLACK or 40% gray signal switching
    - Audio signal output Same as standard output, or all channels MUTE
    - Additional functions None (Bounce, scrolling, error added)
  - Test signals
    - color bar ARIB HD multi color bar 1, 100% color bar, ARIB HD multi color bar 2, 75% color bar, ARIB HD multi color bar 3, 4:3 color bar, ARIB HD multi color bar 4, Vertical color bar, ARIB HD multi color bar 5, ARIB HD multi color bar 6, ARIB HD multi color bar 7, ARIB HD multi color bar 8, ARIB HD multi color bar 9, 8-colors color bar with black
    - Ramp Ramp 1 (Y), Ramp 2 (Y Pb Pr), Triangular ramp (Y), Shallow ramp 1, Shallow ramp 2, Shallow ramp 3, 10 stair step, 5 stair step

Specifications

- |                                       |   |   |
|---------------------------------------|---|---|
| Sweep                                 | H-sweep 1 (w/marker), H-sweep 2 (w/marker),<br>V-sweep 1, V-sweep 2,  | ●HD-SDI Outputs unit with BLACK SDI outputs (TG77AX203)                                 |
| Raster                                | Multiburst 1, Multiburst 2<br>White 100%, Yellow, Cyan, Green,<br>Magenta, Red, Blue, Black, 40% gray<br>Crosshatch, Dot  | • Adds 2 BLACK HD-SDI output lines to standard HD-SDI output unit (TG77AX003).          |
| Pathological                          | Pathological 1, Pathological 2,<br>Pathological 3,  | • Output sync phase is linked to standard output side.                                  |
| Pulse & bar Pattern                   | Pulse & bar 1 (Y), Pulse & bar 2 (Y Pb Pr)<br>SQR, Contrast, Pluge, Window  | • Embedded audio output is equivalent to standard output side, or MUTE can be selected. |
| Others                                | User's original test signal   | ●D1/D2 outputs unit with BLACK SDI outputs (TG77AX204)                                  |
| Photo                                 | Still pictures (options)  | • Adds 2 BLACK SDI output lines to standard D1/D2 output unit (TG77AX004).              |
| ●Audio outputs unit (TG77AX006)       |   | • Output sync phase is linked to standard output side.                                  |
| • AES/EBU digital audio signal output |   | • Embedded audio output is equivalent to standard output side, or MUTE can be selected. |
| Standards conformance                 | EIAJ CP-1201  | ●General specifications   |
| Number of channels                    | 8   | Power supply AC 85 to 132 V, 170 to 265 V, auto switched, 47/440Hz                      |
| Sampling frequency                    | 48 KHz  | Power consumption Max. 130 VA   |
| Audio data resolution                 | 20 or 24 bits   | Operating temperature range 0°C to 40°C   |
| Audio data frequencies                | Selectable from (Hz) :<br>No sound, 50, 100, 150, 200, 250, 300,<br>400, 500, 600, 700, 750, 800, 1000,<br>1200, 1500, 1600, 2000, 2400, 3000,<br>3200, 4000, 4800, 5000, 6000, 8000,<br>9600, 10000, 12000, 15000, 16000,<br>20000 | Relative humidity 25% to 90% RH (non-dewung)  |
| Audio data output level               | 0 to -60 dBFS (In 1 dB increments)  | Dimensions 426(W) x 44(H) x 521(D) mm   |
| Tone burst                            | Selectable from (sec) : OFF, 1, 2, 3, 4<br>(During 1 sec selection: audio output =<br>0.75 sec, no sound = 0.25 sec)<br>※Note: Audio data frequency, output<br>level, and tone burst can be set for each<br>channel.                | Weight Approx. 3.5 kg (main unit only)  |
| Relationship to video signal          | Free run. However, lock relationship<br>exists between video and audio clocks.  | Accessories User's manual × 1<br>AC power cable × 1<br>3P-2P converter × 1              |
| Output level                          | 1 Vp-p ± 20% (75 Ω during<br>termination)   |   |
| Connector type                        | BNC, 75 Ω   |   |
| Number of outputs                     | 4(CH1/CH2, CH3/CH4, CH5/CH6,<br>CH7/CH8)  |   |
| • Audio clock outputs                 |   |   |
| Clock frequency                       | 48 KHz  |   |
| Output level                          | CMOS level (5 Vp-p for no termination)  |   |
| Connector type                        | BNC, 75 Ω   |   |
| Number of outputs                     | 1   |   |



TG77AX.2.02.YO