

473B

TV SOUND MULTIPLEX MODULATOR (USA SYSTEM) (FOR PRODUCTION LINE)



General

This unit is the signal generator incorporating each modulator of stereo, SAP (Second Audio Program) and telemetry and generates TV sound multiplex signal of U.S.A. system proposed by Zenith Corp., and in considering of the use on production lines, circuits to be considered as unnecessary for checking TV receiver are simplified.

Also, it is designed regarding easy usage as important by equipping function of "dbx-TV noise reduction" and in addition, various functions for easier checking of noise reduction motion.

Features

- Employing somewhat large push button switch for easier operation.
- Modulation is possible for stereo L and R, SAP and telemetry by switching internal sound oscillator. Modulation for all (telemetry is only by internal) by external signal is possible at the same time. Trigger output from oscillator is provided.
- Modulation degree can be varied to designated level by one touch. (Semi-fixed for 3 points)
- Each signal output can be varied to designated level by one touch. (Semi-fixed for 3 points)
- Incorporating 1kHz burst signal for noise reduction checking. Burst flag output for trigger is provided.
- The use as sound signal source is possible with output of internal oscillator in accordance with panel operation.
- Remote control is possible for all panel operations and it responds fully to high speed switching measurement with the employment of IC analog switches in each part.

Composition

Main Unit	1
Dimensions	425(W) × 149(H) × 380(D) mm (Excluding projections)
Weight	Approx. 12 kg
Accessories	
Power Cable (Including 3pin→2pin converter)	1
Rack Mount Adapter	1set
Instruction Manual and Test Result Sheet	1
Plug for Remote Terminal	1 (Except at the time of GP-IB)
Power Source	
Input Voltage Allowable Range	: AC 100V, AC120V, AC220V, AC240V by switch (50Hz/60Hz)
Power Consumption	: Approx. 40VA
Operating Environment	
Temperature	: + 5 °C ~ +40°C
Humidity	: 45% ~ 85%RH (No dew generation)

Rating

· Signal Input

MONO · L, R input

Sine wave signal within the range of 50Hz~8kHz

SAP input Sine wave signal within the range of 50Hz~8kHz

Video input Composite video signal of NTSC system. To be used as sync. reference of sub-carrier frequency.

· Input Impedance · Level

MONO · L, R input 600Ω (Unbalanced)

0dBm BNC-R

SAP input 600Ω (Unbalanced)

0dBm BNC-R

Video input High impedance bridge connection or 75Ω terminated.

V.S 1.0Vp-p BNC-R

· Composite Output

Sound multiplex composite signal of Zenith proposed system is output. Output of each signal is possible by select switch as independent.

Monaural

Stereo

L+R

L-R Carrier suppression amplitude modulation (SC DSB AM)

Sub-carrier frequency $2f_H$ (31.4684kHz)

Pilot signal frequency f_H (15.7342kHz)

SAP

Frequency modulation (FM)

Sub-carrier frequency $5f_H$ (78.671kHz)

Max. frequency deviation ± 10 kHz

Telemetry

Frequency modulation (FM)

Sub-carrier frequency $6.5f_H$ (102.2723kHz)

Max. frequency deviation ± 3 kHz

Output & modulation degree can be checked easily by meter incorporated.

· Output Impedance · Level

600Ω BNC-R

Monaural

2.0Vp-p

Stereo

Max. 4.4Vp-p

Pilot signal of 0.4Vp-p included

SAP

1.2Vp-p

Telemetry

0.24Vp-p

· Internal Oscillator

Normal sine wave

Generating 100Hz, 300Hz, 1kHz, 3kHz, 8kHz of normal sine wave by switching

Burst Signal

Generating burst signal of 8 cycle ON & 128 cycle OFF of 1kHz sine wave

Trigger Output

Normal sine wave output for synchroscope trigger and burst flag output for burst signal are provided at rear panel

1kΩ BNC-R

Internal Variable Output

Signal in accordance with panel operating is generated.

600Ω, 0dBm BNC-R

· Internal Reference Oscillator

Incorporating horizontal sync. frequency by X'tal oscillator

· Synchronization

Synchronizing to horizontal sync. frequency of applied video input or internal reference oscillator (When no video signal is existing, it is switched to internal reference oscillator automatically)

· Pre-emphasis

ON/OFF of standard 75μs is possible for monaural, stereo L+R (Gears with noise reduction) (Not be incorporated in telemetry)

· Noise Reduction

ON/OFF of "dbx-TV noise reduction" is possible for stereo L-R & SAP (In case of OFF, flat characteristic)

· Remote Control

As all push buttons of front panel are connected with remote terminals of rear panel in bit correspondence, remote control is possible (+5V CMOS level, negative logic)

Performance

· Total Frequency Response

○ Monaural, Stereo L, R

Measurement is made under the condition of emphasis & noise reduction

OFF, 100% of internal oscillator output and emphasis noise reduction ON,

-17dB of internal oscillator output

Within ± 0.5 dB at 100Hz, 300Hz, 1kHz, 3kHz & 8kHz

○ SAP

Measurement is made under the same condition of monaural, stereo L, R

Within ± 1 dB at 100Hz, 300Hz, 1kHz, 3kHz & 8kHz

○ Telemetry

Measurement is made under the condition of de-emphasis OFF, 100% of

internal oscillator output

Within ± 1 dB at 100Hz, 300Hz, 1kHz & 3kHz

Note) Measurement is made by Eiden's 466 type TV sound multiplex demodulator.

· Total Distortion Ratio Characteristic

○ Monaural, Stereo L, R

Measurement is made under the condition of pre-emphasis & noise

reduction OFF, de-emphasis ON, 100% of internal oscillator output and

emphasis & noise reduction ON, -17dB of internal oscillator output.

Less than 0.15% at 100Hz, 300Hz, 1kHz, 3kHz & 8kHz

○ SAP

Measurement is made under the condition of pre-emphasis & noise

reduction OFF, de-emphasis ON, 100% of internal oscillator output,

demodulator BPF OFF.

Less than 0.5% at 100Hz, 300Hz, 1kHz, 3kHz & 8kHz

Measurement is made under the condition of emphasis & noise reduction

ON, -17dB of internal oscillator output, demodulator BPF OFF.

Less than 0.5% at 100Hz, 300Hz, 1kHz & 3kHz

Less than 4.0% at 8kHz

○ Telemetry

Measurement is made under the condition of demodulator de-emphasis ON,

BPF OFF, 100% of internal oscillator output.

Less than 4% at 100Hz, 300Hz, 1kHz & 3kHz

• Stereo Separation Characteristic

Measurement is made under the condition of emphasis & noise reduction OFF, 100% of internal oscillator output
Both L→R & R→L
More than 50dB at 100Hz, 300Hz, 1kHz, 3kHz & 8kHz
Measurement is made under the condition of emphasis & noise reduction ON, -17dB of internal oscillator output.
Both L→R & R→L
More than 30dB at 100Hz, 300Hz, 1kHz & 3kHz
More than 25dB at 8kHz

• Cross-talk Characteristic

Measurement is made under the condition of emphasis & noise reduction OFF, demodulator BPF ON, 100% of internal oscillator output.

○Stereo→SAP

Less than -65dB at 100Hz, 300Hz, 1kHz, 3kHz & 8kHz

○SAP→Stereo

Less than -70dB at 100Hz, 300Hz, 1kHz, 3kHz & 8kHz

○Telemetry→SAP

Less than -60dB at 100Hz, 300Hz, 1kHz
Less than -55dB at 3kHz

Measurement is made under the condition of emphasis & noise reduction ON, demodulator BPF ON, -17dB of internal oscillator output as -17dB is 0dB.

○Stereo-SAP

Less than -60dB at 100Hz, 300Hz, 1kHz, 3kHz & 8kHz

○SAP→Stereo

Less than -55dB at 100Hz, 300Hz, 1kHz, 3kHz & 8kHz

• Signal to Noise Ratio

Measurement is made under the condition of pre-emphasis & noise reduction OFF, de-emphasis ON, 100% modulation degree and 300Hz as the reference

○Monaural, Stereo

More than 70dB

○SAP

More than 60dB

○Telemetry

More than 50dB

Measurement is made under the condition of emphasis & noise reduction ON, 100% modulation degree and 300Hz as the reference.

○Monaural, Stereo

More than 70dB

○SAP

More than 70dB

• Sub-carrier Suppression Degree (Carrier Leak)

Measured by level meter for amplitude ratio against L-R 100% modulation
Less than -60dB

• Frequency Accuracy

○At internal sync.

Pilot Within 15.734kHz \pm 10Hz (f_{H1})
SAP Within 78.671kHz \pm 50Hz ($5f_{H1}$)
Telemetry Within 102.27kHz \pm 65Hz ($6.5f_{H1}$)

○At external sync.

Automatic phase controlled (APC) at specified times of applied video signal horizontal sync. frequency.
Sync. separation capability is 1Vp-p \pm 6dB

■The reason why Eiden does not use wide-band LPF

In U.S.A. TV sound multiplex system, stereo and SAP can be transmitted at same time.

Accordingly, in modulator, it is needed to prevent interference for SAP (and commercial channel) by generation of harmonics from stereo modulation circuit. For that reason, wide-band LPF that covers stereo band is used generally (Refer to following figure). Eiden eliminated LPF by elaborating a plan on stereo modulation circuit and demodulation circuit. Especially, in demodulator, this effect is great and monitoring or measuring of stereo signal in high performance becomes possible even if at full multiplex condition.

465C-A modulator for measuring, 473B modulator for mass production, and 466 demodulator for measuring are designed based on without having wide-band LPF.

