

751 BTSC Aural Modulation Monitor/Decoder in Weighted Peak Mode indicating overmodulation of Main channel.

## 751 BTSC Aural Modulation Monitor/Decoder

**Precision modulation monitor for entire BTSC sound channel**

**Simultaneously displays all components necessary to ensure modulation remains within legal limits**

**Bars feature peak indicators with timed peak hold and easily set peak limits**

**Digital readout accompanies each bar for accurate setups**

**Electroluminescent bar graph display with precisely controlled dynamics**

**Alternate display of processed audio levels for left, right, sum, difference, SAP and PRO**

**Internal auto-calibrator ensures accurate modulation measurements**

**Selectable true peak or weighted peak modulation indication**

**RS-232C data output for remote display or data logging**

**Variable bar peak hold times and decay rates**

**Overmodulation counter on screen (overmod flashes/minute)**

**Precise on-screen RMS meter with difference mode**

The 751 BTSC Aural Modulation Monitor/Decoder provides accurate modulation monitoring and measurement of the BTSC encoded TV sound channel.

The 751 comes ready to monitor the entire BTSC sound channel, including SAP and PRO. Should the needs of your station

change, a simple soft-key controlled menu can add or delete SAP or PRO from the display.

The bars on the PROCESSED AUDIO screen indicate audio levels of L+R, L-R, Left, Right, SAP and PRO. These levels represent audio levels *after* front panel controlled processing.

Two sets of parameters, peak modulation and processed audio, can be alternately displayed by a simple front panel selection.

The 751 is designed to be driven by the baseband signal from the Tektronix 1450-1 Demodulator's Deviation Output. A second input has adjustable sensitivity and is untermi-nated for either direct connection to a stereo generator, or to pick-off the baseband signal between the generator and the aural transmitter.

Bar graph and digital readout units of measure can be changed from percent of maximum to kHz deviation or dB with the simple push of a button.

Also displayed are injection levels for SAP, PRO, and Stereo Pilot, as well as the level of Spurious Stereo Subcarrier.

Instantaneous peak values as well as "held" peak values are displayed as calibrated bars. Each bar is accompanied by a digital readout that corresponds to the "held" peak value. The bar and readout both indicate when an easily set peak limit has been exceeded.

As an alternative to true peak values, the 751 has a "Weighted Peak Mode." This mode provides the choice to view "true peaks" or "weighted peaks."

The "weighted peak" provides an alternate representation of modulation peaks by ignoring short duration peaks which have no

audible consequence. The Weighted Peak Mode ignores these transients and lets the operator monitor programming for appropriate modulation.

The 751 also retains its "true peak" measurement capability for broadcasters needing to view the highest peaks for engineering purposes. This registration is especially useful for broadcasters setting peak limiters and aural exciters, where highest peak accuracy is important.

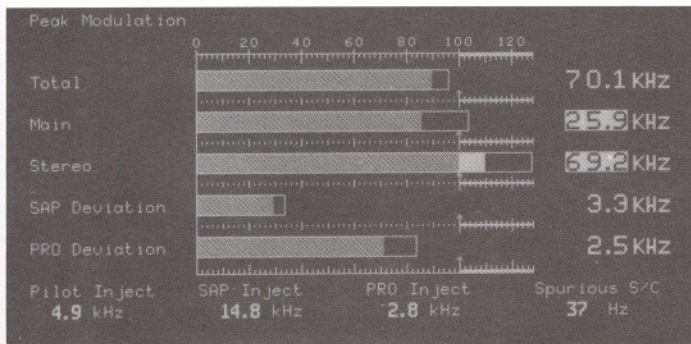
In addition to standard BTSC processing, De-emphasis and Flat modes are available for test purposes. The TEST OUTPUT connectors, provided on both the front and rear panels, are for external measurements of the Left and Right stereo channels, L+R, L-R, SAP, PRO and TOTAL (full baseband). A switchable headPHONES output is also located on the front panel.

Precisely decoded Left and Right stereo channels, SAP and PRO 600  $\Omega$  balanced line outputs are provided on the rear panel through XLR connectors.

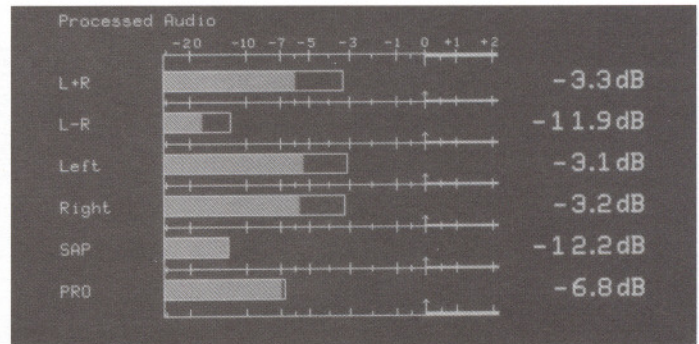
Remote alarm contact closures for No Pilot, Pilot/Sync Unlock and (stereo) Phase/Inverted are provided on the rear panel through a 9-pin D sub-miniature connector. Alarm conditions are also indicated on the display. H sync for measuring Pilot Phase Lock is obtained via the rear panel Composite Video loop-through connector.

Automatic calibration of the display is accomplished by an internally generated direct digital synthesis calibration signal routed through the 1450-1, which provides a calibrated 1450-1 Deviation Out signal. This operation, as well as a calibration test, is software controlled.

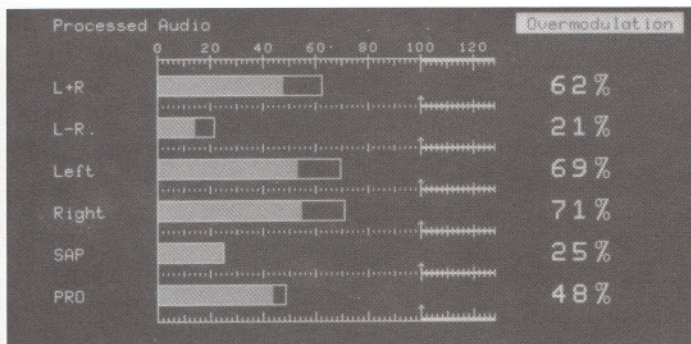




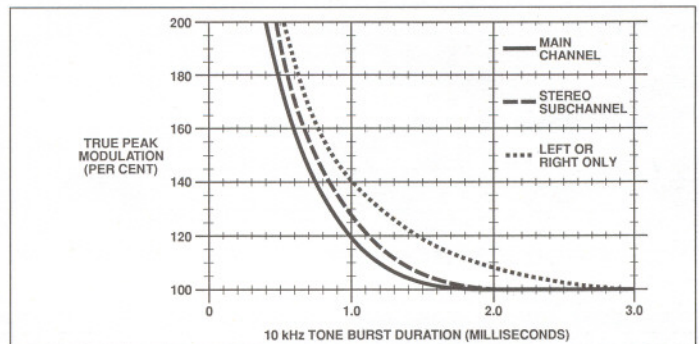
751 Peak Modulation screen indicating (in kHz) overmodulation of the Main channel and Stereo.



751 Processed Audio screen displaying audio levels in dB.



751 Processed Audio screen displaying audio levels (in %), with an OVERMODULATION flag indicating overmodulation of one or more bars on the Peak Modulation screen.



Typical time-weighting characteristic for Weighted Peak mode, showing what actual (True Peak) % modulation is required for a given length tone burst to indicate 100% with Weighted Peak indication selected.

## CHARACTERISTICS

**Calibrator** — Internal calibrator FM deviation error @ 4.5 MHz <0.1% (CALIBRATION SIGNAL output to 1450-1 Aural Inter-carrier Input).

**Display (Peak Modulation Screen)** — Aural Carrier Peak Deviation Accuracy with BTSC signal, 0-100% modulation, including crosstalk from other channels, for bars, digital indicators, and peak flashers; TOTAL:  $\pm 0.7$  kHz, 50 Hz-120 kHz; MAIN:  $\pm 1.5$  kHz  $-0.4$  kHz, 50 Hz-15 kHz; STEREO:  $\pm 2.0$  kHz  $-1.0$  kHz, 50 Hz-47 kHz excluding pilot

**Overshoot** — TOTAL, MAIN, STEREO <1%

**Subcarrier Peak Deviation Accuracy, 0-100% modulation** — SAP deviation  $\pm 0.5$  kHz, 50 Hz-10 kHz; PRO deviation  $\pm 0.15$  kHz, 50 Hz-3.4 kHz

**Injection Levels** — Pilot injection  $\pm 0.1$  kHz @ 5 kHz; SAP injection  $\pm 0.5$  kHz @ 15 kHz; PRO injection  $\pm 0.2$  kHz @ 3 kHz

**Spurious S/C (spurious stereo subcarrier, in-phase component)** —  $\pm 0.4$  dB @  $-46$  dB  $\pm 10$  Hz @ 250 Hz

**Display (Processed Audio Screen)** — Bars and digital peak indicators show same audio as is available at Test Output.

## TEST OUTPUT

**Frequency Response** — TOTAL 50 Hz-50 kHz,  $\pm 0.05$  dB; 50 Hz-120 kHz,  $\pm 0.1$  dB; L+R, L-R, L, R 50 Hz-15 kHz,  $\pm 0.1$  dB<sup>1</sup>; SAP BPF/LPF<sup>2</sup> in FLAT, 50 Hz-10 kHz,  $\pm 0.3$ ,  $-0.6$  dB; DE-EMP 50 Hz-10 kHz,  $\pm 0.4$ ,  $-0.7$  dB<sup>1</sup>; BTSC 50 Hz-10 kHz,  $\pm 1.0$  dB<sup>3</sup>; BPF/LPF out FLAT 50 Hz-10 kHz,  $\pm 0.2$  dB; DE-EMP 50 Hz-10 kHz,  $\pm 0.3$  dB<sup>1</sup>; BTSC 50 Hz-10 kHz,  $\pm 0.5$  dB<sup>3</sup>; PRO BPF in, FLAT, DE-EMP 50 Hz-3.4 kHz,  $\pm 0.5$  dB<sup>4</sup>; BPF out, FLAT, DE-EMP 50 Hz-3.4 kHz,  $\pm 0.3$  dB<sup>4</sup>

**Distortion (THD+N @ 100% modulation)** — L+R DE-EMP 50 Hz-14 kHz <0.2%<sup>5</sup>; L-R DE-EMP 50 Hz-14 kHz <0.2%; L, R DE-EMP 50 Hz-14 kHz <0.2%; L, R BTSC 300 Hz-14 kHz <0.2%<sup>6</sup>; SAP DE-EMP BPF/LPF in 50 Hz-3 kHz <1%, 3 kHz-10 kHz <1.5%; BPF/LPF out 50 Hz-10 kHz <0.2%; PRO DE-EMP BPF in 50 Hz-3.4 kHz <1.5%; BPF out 50 Hz-3.4 kHz <0.2%

**Signal-to-Noise Ratio, DE-EMP mode** — L+R, L-R, L, R >70 dB; SAP >66 dB; PRO >56 dB

**Channel Separation** — BTSC @ 10%-100% equivalent modulation; 100 Hz-1 kHz >40 dB; 50 Hz-14 kHz >36 dB @ 1% equivalent modulation; 100 Hz-8 kHz >32 dB; FLAT, DE-EMP 50 Hz-15 kHz >50 dB

<sup>1</sup> Referenced to ideal 75  $\mu$ s de-emphasis in DE-EMP mode.

<sup>2</sup> Internal bandpass and lowpass filters are menu selected and switched in for normal operation, out for tests.

<sup>3</sup> 1-100% 75  $\mu$ s equivalent input modulation.

<sup>4</sup> Referenced to ideal 150  $\mu$ s de-emphasis in DE-EMP mode.

<sup>5</sup> <0.1% to 15 kHz with Main channel only present.

<sup>6</sup> Below 300 Hz with sine wave input, THD rises in a 1/f fashion conforming to ideal expanded-only behavior.

## LINE OUTPUTS

**Output Level** — +8 dBm at 0 dB processed audio indication.

**Frequency Response and Distortion** — Same as Test Outputs.

## PHYSICAL CHARACTERISTICS

Dimensions	mm	in
Height	178	7.0
Width	483	19.0
Depth	597	23.5
<b>Weight</b>	<b>kg</b>	<b>lb</b>
Net	3.97	31.2



## 751 Peak Modulation Screen

COMPONENT DISPLAYED	DEFINITION	100% OR MAX
BARS and DIGITAL PEAK INDICATORS		
Total	Total modulation of aural carrier.	73 kHz*
Main	Sum (L+R) channel (30 Hz-15 kHz).	25 kHz
Stereo	Combination of Main channel (L+R) and stereo subchannel (L-R) (30 Hz-46.468 kHz less the 15.734 kHz pilot).	50 kHz
SAP Deviation	Modulation of Second Audio Program subcarrier at 78.671 kHz.	10 kHz
PRO Deviation	Modulation of PROfessional channel subcarrier at 102.273 kHz.	3 kHz
DIGITAL READOUTS		
Pilot Inject	Modulation of aural carrier by Pilot.	5 kHz, $\pm 0.5$ kHz
SAP Inject	Modulation of aural carrier by Second Audio Program subcarrier.	15 kHz
PRO Inject	Modulation of aural carrier by PROfessional channel subcarrier.	3 kHz
SPURIOUS S/C (SubCarrier)	Level of suppressed 31.468 kHz stereo subchannel subcarrier.	250 Hz or -46 dB

\*TOTAL bar 100% point can be rescaled to 70 kHz deviation if PRO is not present, 58 kHz if SAP is not present, or 55 kHz if neither SAP or PRO are present.

DISPLAY RANGE: Bars indicate to 128%, Digital Peak Indicators to 200%.

## 751 Front Panel Connectors

CONNECTOR NAME	TYPE	INPUT/OUTPUT LEVEL	CONFIGURATION/COMMENTS
TEST OUTPUT	BNC	10 V p-p nominal for 100% or 0 dB signal	Selectable from L+R, L-R, L, R, SAP, PRO, TOTAL (full baseband)
PHONES	1/4" stereo phone jack		Selectable from STEREO or TEST OUTPUT (tracks TEST OUTPUT selection)

## 751 Rear Panel Connectors

CONNECTOR NAME	TYPE	INPUT/OUTPUT LEVEL	CONFIGURATION/COMMENTS
POWER		Low Range: 115 V nominal (87-132 V, 47-63 Hz) High Range: 230 V nominal (174-250 V, 47-63 Hz)	
CALIBRATION SIGNAL	BNC	4.5 MHz frequency modulated cal signal	Connects to 1450-1 (wideband version) Aural Inter-carrier In
TEST OUTPUT	BNC	10 V p-p for 100% or 0 dB signal	Selectable from L+R, L-R, L, R, SAP, PRO, TOTAL (same as front panel output)
VIDEO or H-SYNC LOOP-THROUGH (input)	BNCs (2)	0.5 to 2 V p-p	Provides H sync to check Pilot frequency lock
BTSC BASEBAND INPUTS 1450-1 DEMOD INPUT	BNC	10 mV/kHz deviation	Primary baseband input for connection to 1450-1 Deviation Out (menu selected) $Z_{in} = 75\Omega$
STEREO GEN INPUT	BNC (BNC "Tee" supplied)	1 to 6 V p-p for generator output signal corresponding to 73 kHz deviation	For connection to stereo generator output: can be used with BNC "T" to pick off signal between stereo generator and aural transmitter modulation input (menu selected) $Z_{in} > 100\text{ k}\Omega$
REMOTE ALARMS CONTACT CLOSURES	Male 9-Pin D subminiature connector	Contact closures, 2 A @ 28 Vdc max (resistive)	Provides both normally-open and normally-closed contacts for the following conditions: Loss of Pilot, Pilot Unlocked, Stereo Phase Reversal
AUDIO OUTPUTS (LEFT, RIGHT, SAP, PRO)	Male XLR	+8 dBm into 600 $\Omega$	Active balanced line outputs

## 751 Processing Controls

CONTROL	SELECTION	EFFECT
STEREO	BTSC	BTSC expansion on Stereo subchannel and standard 75 $\mu$ s de-emphasis on Main channel
	DE-EMP	75 $\mu$ s de-emphasis on Main channel and Stereo subchannel
	FLAT	No processing on Main channel or Stereo subchannel
SAP	BTSC	BTSC expansion on SAP channel
	DE-EMP	75 $\mu$ s de-emphasis on SAP channel
	FLAT	No processing on SAP channel
PRO	DE-EMP	150 $\mu$ s de-emphasis on PRO channel
	FLAT	No processing on PRO channel

## ORDERING INFORMATION

When ordering, please use the nomenclature given here.

### 751 BTSC Aural Modulation Monitor/Decoder

**Includes:** Operators manual, Power cable assembly (161-0066-00), 75 $\Omega$  precision termination (011-0102-00), BNC T connector (103-0030-00), 9-pin female D connector (131-1006-00), 9-pin D connector housing (200-1170-00), Rackmount hardware (351-0636-00), Screw-lock assembly for 9-pin connector housing (213-0260-00), Loop clamp (343-0003-00), Loop clamp washer (210-0863-00).

## OPTIONAL ACCESSORY

**Extender board** — Order 670-9584-00