AUDIO LIMITER

MODEL TFL-280

BULLETIN 255A

FM LOUDNESS AND CLARITY without compromise!

FOR

- ☐ FM MONAURAL
- ☐ FM STEREO
- ☐ QUADRAPHONIC
- ☐ FM SCA
- ☐ TV AURAL

MOSELEY ASSOCIATES, INC.

A FLOW GENERAL COMPANY

Loudness and clarity without compromise . . . the Model TFL-280 Audio Limiter. Modulation levels of FM-type transmission systems are precisely controlled without the undesirable effects commonly associated with audio limiting devices. FM monaural, stereo and quadraphonic as well as FM SCA or TV audio can all be expertly processed. This frequency-conscious limiter cleanly solves the problems associated with the transmission of pre-emphasized audio. Clipping and its attendant problems, especially in stereo and quadraphonic transmission, are fully controlled by the use of agile circuitry. Monolithic semiconductor arrays and wideband operational amplifier circuitry are but some of the technological advances incorporated into the TFL-280. High-speed, critically-damped metering circuitry allows accurate monitoring of the degree of limiting. The unit is supplied with 75μsecond pre-emphasis, but is easily field-altered to other time constants. An output de-emphasis network may be switched into service when the unit is to be used in conventional audio applications requiring overall flat response. Fully temperature-compensated, the TFL-280 operates over the range of −20°C to +60°C.

High Leverage — The TFL-280 features outstanding input/output leverage. Once the threshold of limiting has been reached, the output level remains essentially constant. For example, increasing the input 30 dB above the threshold of limiting results in an output increase of only 0.6 dB or less.

Wide Control Range — The TFL-280 can easily tolerate input variations of 35 dB; older designs can sometimes handle only 15 dB — or even as few as 12 dB of compression.

Agile Limiting Circuitry — Virtually eliminates steady state clipping commonly associated with audio processors.

Multi-Channel Capability — The TFL-280 is a single-channel processor with multi-channel AGC-interconnect capability. Use one for monaural, or for TV or SCA; two for stereo; or four for quadraphonic. Trimmable pre-emphasis allows exact audio channel phase matching.

Distortion-Reducing Techniques — The TFL-280 employs distortion-reducing techniques which result in low harmonic and inter-modulation distortion. Even at the lowest audio frequencies, the harmonic distortion remains low regardless of the amount of limiting.

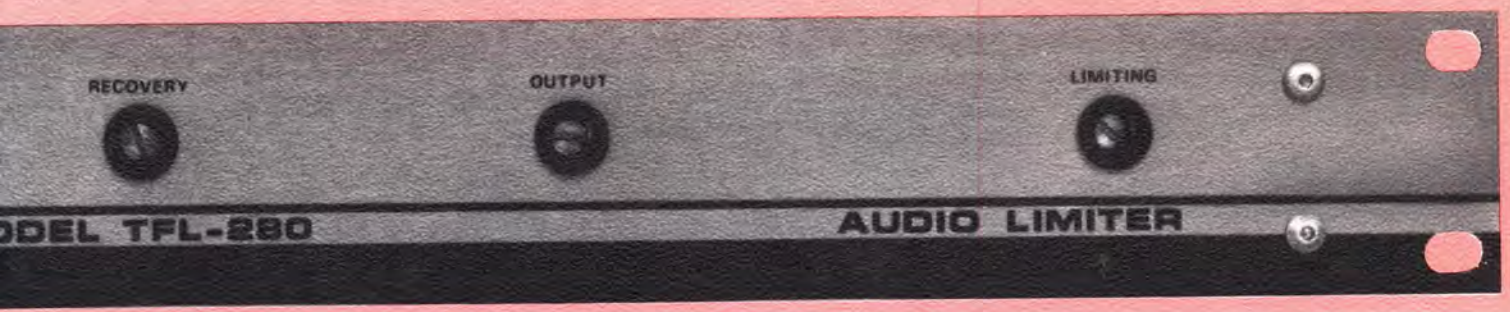
Built-in Lowpass Filter — Completely protects the stereo pilot region as well as the SCA subchannel regions without sacrificing loudness. It is located electrically in the limiter in a manner which renders overshoot harmless. The filter is easily removed if desired.

All Silicon Solid-State Technology — The circuitry in the TFL-280 uses standard off-the-shelf parts . . . no black boxes, no matched FET's or photocells.

No Test Switch — The design and manufacturing philosophies of the TFL-280 produce a unit which is so transparent that it may be left "on line" during a proof. All circuitry is operational at all times; no bypassing of distortion-producing elements is required for proofing.

Noise-Reduction Encoder Compatibility — An optional noise reduction encoder may be inserted after the first AGC System but prior to the audio low-pass filter and treble AGC System. The encoder then operates at precisely the correct level and maximum efficiency. A rear-panel switch permits insertion or removal of the noise reduction encoder.

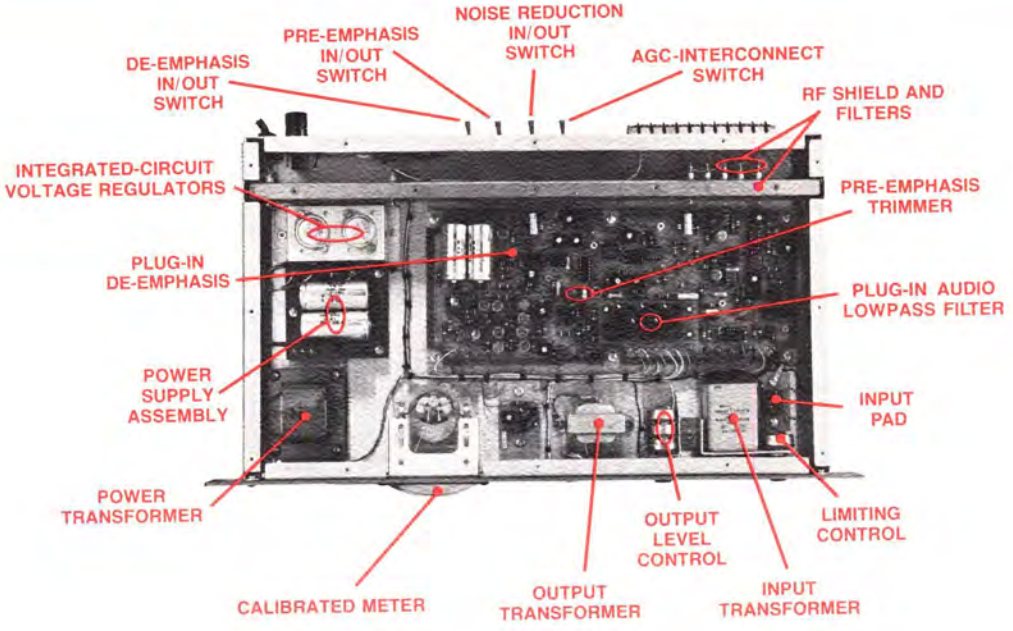
MODEL TFL-



CIRCUIT DESCRIPTION

Input sensitivity enables direct operation from most telephone program circuits as well as from studio-transmitter link receivers, AGC amplifiers, or directly from the audio source. The fully balanced input contains an H-pad isolator and is converted to single-ended by the input transformer. The limiting control immediately follows this transformer. All input signals, regardless of their frequency, are then processed by a wideband voltage-controlled attenuator. Using a monolithic semiconductor array, this variolosser has a very wide control range — greater than 35 dB. This reverse acting circuitry has pedestal components 40 dB to 60 dB below program material rendering thumps inaudible. Remaining circuitry around this variolosser is full-wave, peak-sensitive, and features wideband operational amplifiers. Great care has been taken in the design of the TFL-280 to ensure gain and level stability over the entire operating temperature range. To monitor the degree of limiting, the AGC voltage is displayed on a high-speed meter movement with carefully controlled acceleration.

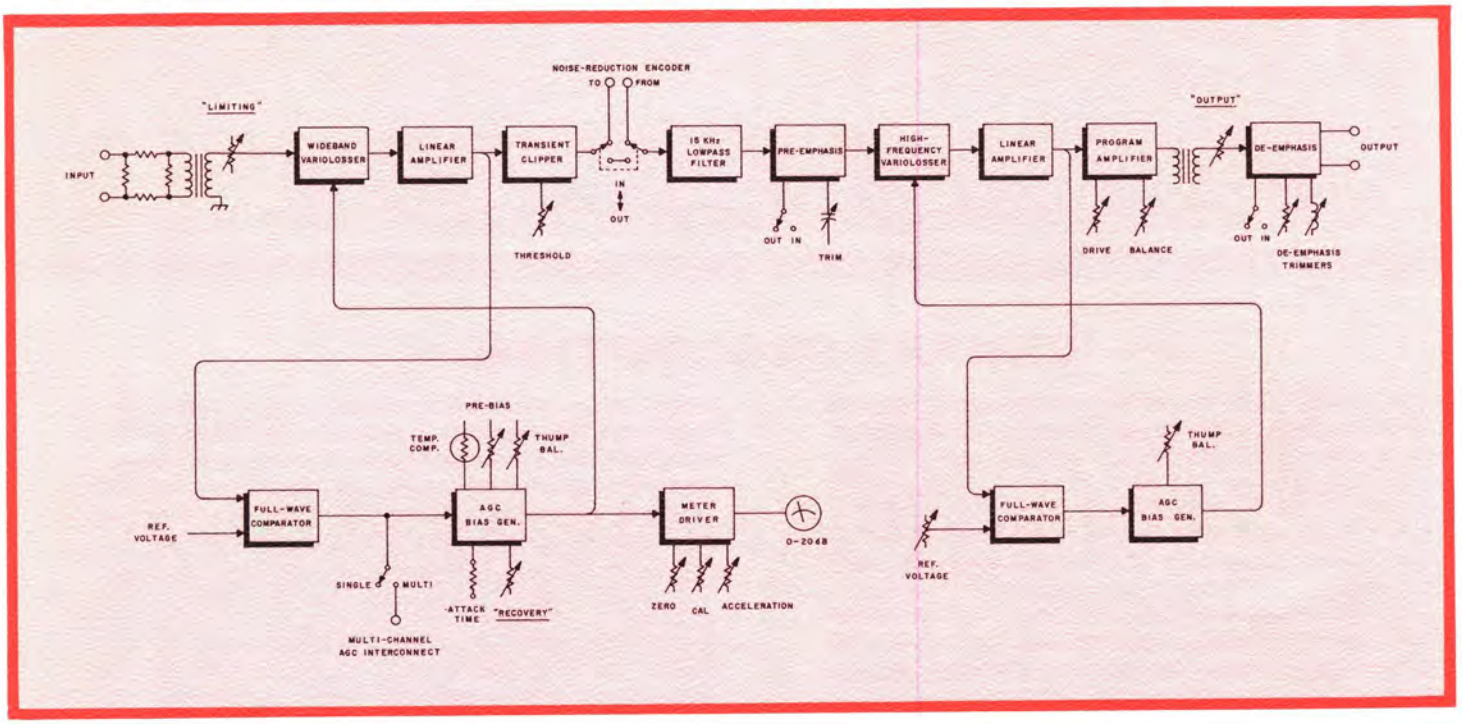
The output of this section is applied to a transient clipper with adjustable threshold. The clipper is used to remove those brief signals which may escape the AGC circuitry. The clipper output is routed to an input/out connection allowing use of an optional external noise-reduction encoder. Following this is the audio lowpass filter which affords protection to those regions occupied by the stereo pilot, stereo subchannel and SCA subcarrier. Pre-emphasis precedes the second limiter and is adjustable to enable phase tracking in multi-channel applications. The second limiter is non-distorting and controls only higher frequency audio components. Basic design of this limiter is similar to the first AGC system, but has been skillfully optimized to handle the problems peculiar to the higher frequency audio components. The program amplifier is a discrete operational amplifier and feeds the output transformer. Output level is established by an adjustable pad. The final circuit component is a de-emphasis network which may be switched in or out as the desired service dictates. The power supply uses integrated circuit voltage regulators for long-term stability and noise-free operation. Special note should be taken that *ALL* controls or adjustments appear in the block diagram on the rear of this product bulletin — no complicated setup procedures are required.



-280 AUDIO LIMITER*

*Patent Pending

MODEL TFL-280 AUDIO LIMITER



ORDERING INFORMATION

The TFL-280 Audio Limiter comes equipped with a 15 kHz audio lowpass filter as well as 75μsecond pre-emphasis and de-emphasis networks, but can be easily field-altered to other time constants. Strapping for multi-channel operation is accomplished as a routine part of installation. Simply order the number of units needed for the intended application. The TFL-280 is also available in a combination package with the Model SCG-9 Stereo Generator for uncompromised performance.

SPECIFICATIONS

Input Level ..... -20 dBm for low-frequency limiting threshold, with limiting control at maximum

Input Impedance ..... 600 ohms ±10%, resistive, balanced, floating

Output Level ..... Adjustable up to +17 dBm maximum

Load Impedance ..... 600 ohms resistive, balanced or unbalanced

Control Range ..... Greater than 35 dB

Control Mechanism ..... Monolithic Semiconductor arrays

Input/Output Leverage ..... Greater than 50:1 in dB

AGC Attack Times ..... High-frequency controller: less than 20 microseconds; Wideband controller: field alterable from 20 to 2000 microseconds, shipped at 100 microseconds

Recovery Times ..... High-frequency controller: 50 to 500 milliseconds, program-operated; Wideband controller: 0.2 to 5 seconds, program-operated triple-timing, variable from the front panel.

Frequency Response ..... ±1 dB, 50 Hz to 15 kHz (below limiting thresholds)

Harmonic Distortion ..... Less than 0.7% at any frequency (50 Hz to 15 kHz) and any degree of limiting

Signal-to-Noise Ratio ..... Better than 70 dB (de-emphasized)

Audio Frequency Filtering ..... Plug-in lowpass filter located prior to the high-frequency AGC

Metering ..... High-speed critically-damped meter calibrated 0-20 dB of limiting.

Power Requirements ..... 120/240 VAC ±10%, 50/60 Hz, 10 watts

Temperature Range ..... -20°C to +60°C

Size ..... 4.5 cm H x 48.4 cm W x 25.4 cm D (1-3/4" H x 19" W x 10" D)

Specifications subject to change without notice.

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