

stereo





AM-4S STEREO PROCESSING SYSTEM

CRL has incorporated the latest advances in AM broadcast processing technology into its new line of AM Stereo processing systems to make them more flexible and even better.

The CRL AM systems consist of input STEREO GAIN CONTROL, MULTIBAND COMPRESSION and final PEAK LIMITING devices which may be configured to obtain the desired audio control and meet budget requirements of the broadcast facility.

When used together these units provide complete audio control to maximize modulation while maintaining tonal clarity and integrity of the original source material.

SGC-800: As the input unit to either the CRL top performance AM-4 or budget oriented AM-2 systems, the SGC-800 STEREO GAIN CONTROLLER offers the following main features:

LINEARIZED, DUAL BAND AUTOMATIC GAIN CONTROL. User may select wide band, dual band, or a combination of both. When combined, average levels are gain controlled in wide band, followed by dual band peak control. Crossover frequency is 340 Hz with gentle 6 dB per octave filters. Linearized control circuits provide low distortion, typically less than .15% with 9 dB of gain reduction.

GATING. This circuit freezes gain at a pre-determined threshold (typically -20 dB) to prevent amplification of the noise floor during pauses in program content. Internally adjustable from -10 to -30 dB below reference level.

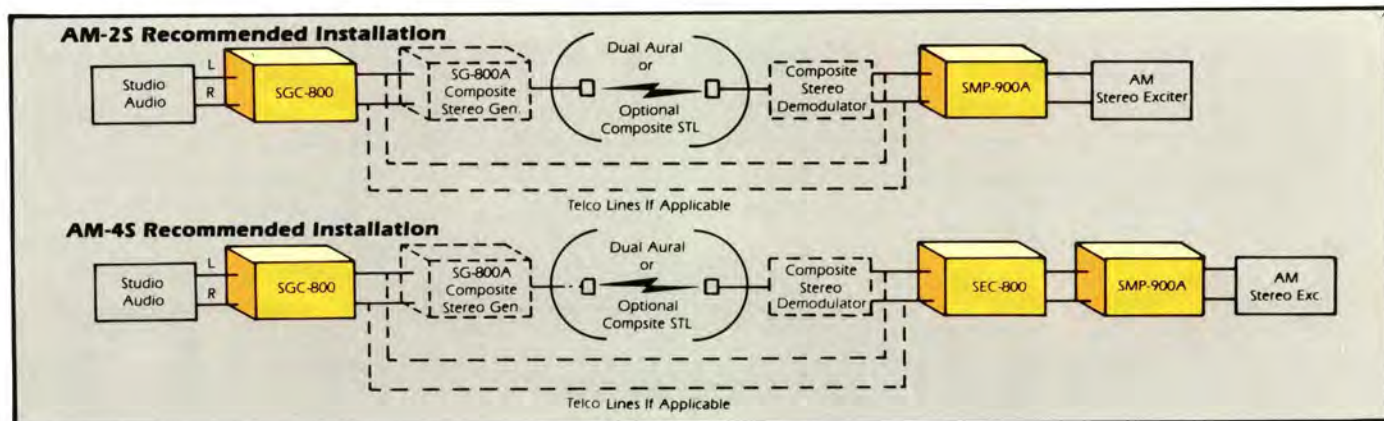
DYNAFEX® NOISE REDUCTION. This CRL patented circuit (U.S. Patent #4,609,878) dramatically improves the signal to noise ratio of program sources. With the threshold control set at -25 dB, the SGC-800 has an operating S+N/N ratio of better than 80 dB! This circuit uses downward expansion coupled with a sliding bandwidth filter to achieve outstanding improvement in nearly all noisy source material, without degrading high quality audio sources. See Fig. A.

PULSED OR STATIC USASI NOISE GENERATOR: These internal noise generators can be inserted during calibration to accurately simulate the frequency and dynamics of typical program sources, making proper adjustment quick and easy.

AUDIO ASYMMETRY REMOVAL. Many voices, unlike musical program, are asymmetrical in nature. And clipping these waveforms can result in audible distortion. An internal jumper selectable circuit removes the asymmetry, thereby reducing distortion.

E.O. BALANCE: Equalization is adjustable +/- 6 dB. Increasing the output of the low band (below 340 Hz) reduces the output of the high band (above 340 Hz), and vice versa, in order to maintain a constant RMS total output. The output of the two bands is summed into this front panel screwdriver adjustment, permitting "tweaking" of the sound balance without requiring readjustment of later processing units. Overall output level is not affected.

ATTACK AND RELEASE TIME CONSTANTS: Attack time is determined by the program material, resulting in instantaneous adjustment regardless of program source. The release time is user adjustable by a front panel control for slow, medium or fast.



SEC-800: The SEC-800 SPECTRAL ENERGY COMPRESSOR is a musical sounding four band compressor/limiter featured in the AM-4 system and may be added to existing AM-2 systems.

MULTIBAND CROSSOVER FREQUENCIES AND FILTERS: Like the human ear the SEC-800 interprets sound according to the predominant characteristics of the audio spectrum: musical bass, voice fundamentals, voice presence and musical high frequencies. When a high frequency sound, such as a cymbal crash, occurs at the same time as a low frequency bass, both qualities are preserved even with high levels of compression. Output equalization of each band is adjustable from +6 dB to -12 dB; crossover points are 200 Hz, 1 kHz and 5 kHz. Since gentle 6 dB per octave filters are used, the transition from one band to the next is subtle and smooth without the ripple caused by sharper filters.

The design of this unit allows it to act as a dynamic equalizer as well. For example, material that is lacking in highs will be brightened, and material that is overly bright will have the highs reduced. The same is true of each of the four bands, providing a very consistent, full bodied sound.

SMP-900A: SMP-900A AM STEREO MATRIX PROCESSOR. AM Stereo is quite different from FM and requires special techniques to provide full stereophonic fidelity while maintaining monophonic compatibility. The SMP-900A incorporates a patented Matrix processing system designed specifically to meet this criteria. The SMP-900A includes the following main features:

INPUT GAIN CONTROL: 0-8 dB of input L+R controlled gain reduction provides mono support by providing consistent levels into the limiter circuits. This eliminates "pumping," and other side effects caused by excessive peak limiting.

MODIFIED MATRIX LIMITING: The SMP-900A utilizes a CRL patented (US Pat. #4,679,239) combination of sum and difference limiting and adjustable single channel limiting. This insures full monophonic compatibility and prevents high density negative L only or R only peaks from causing excessive negative carrier modulation which could cause receiver decoding problems. See fig. B.

STEREO ENHANCEMENT: The SMP-900A uses a variable gain L-R component in front of the limiting network to allow the L-R component to be increased by up to 3 dB. This can be used to produce dramatic improvements in perceived separation in many receivers.

TILT CORRECTION: Pioneered by CRL, this low frequency gain/phase adjustable equalizer compensates for low frequency phase

SELECTABLE MULTIBAND COMPRESSION RATIO: The action of each band is dependent on a master compression ratio, selectable in 3 dB steps up to -15 dB of input reference. Recommended setting for most applications is -6 dB. This means that the input can fall as much as 6 dB below threshold without a drop in output level. An intelligent feedback circuit determines the combined and weighted value of each band to ensure consistent sound quality.

JUMPER SELECTABLE BASS EQ: To help compensate for deficiencies in receiver bass response, the SEC-800 includes a jumper selectable 3 dB bass boost at 90 Hz, with a gentle roll off below. This filter is designed to prevent subaudible transmission problems and to eliminate intermodulation effects common to medium or small speakers.

TIME CONSTANTS: Like the SGC-800, the SEC-800 offers program dependent attack time constants and a selection of slow, medium or fast release. A front panel switch allows the selection of "limit" or "compress." In the limit position attack times are shortened to provide even faster control of peaks. This setting is ideal for some music formats that require a more restricted dynamic range that is free of clipping distortion artifacts.

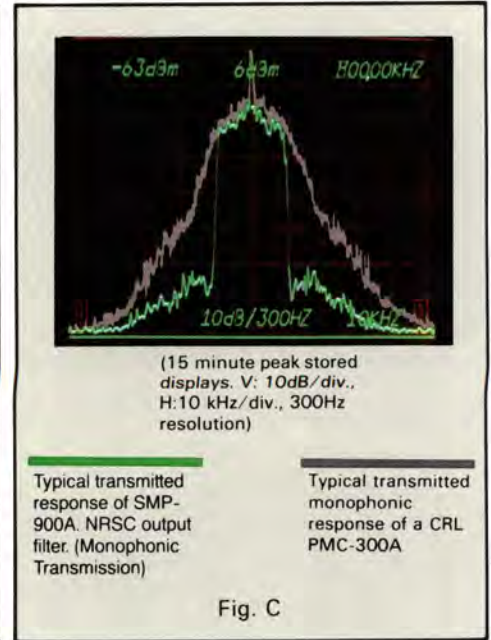
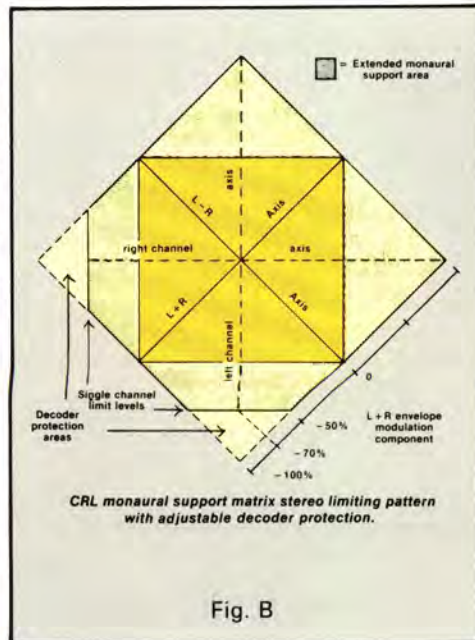
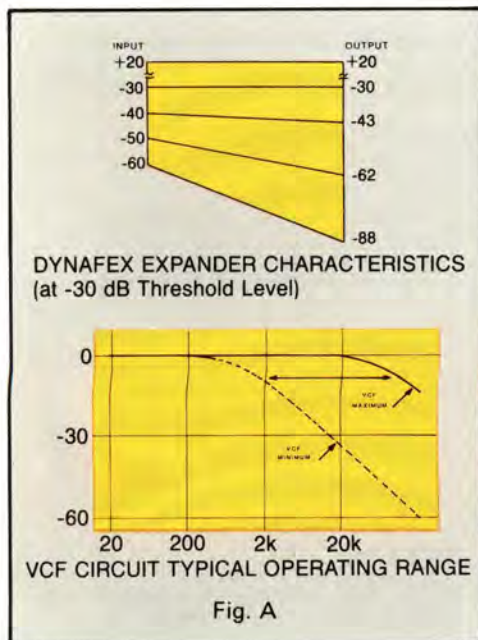
shift common in plate modulated and some other transmitters. This circuit allows older transmitters to perform nearly as well as recent designs. Low frequency distortion is reduced and modulation capability can be increased from 5 to 20 percent in these transmitters.

NRSC STANDARD PRE-EMPHASIS & LOW PASS FILTERING: The voluntary standards adopted by the NRSC are implemented in this unit. These consist of a modified 75 micro-second pre-emphasis curve, combined with a sharp low pass filter that reduces the bandwidth to 10 kHz. (See fig. C.) Response is down 40 dB at 11 kHz. In addition, a front panel switch allows selection of adjustable pre-emphasis and a rear panel switch permits an optional 11 kHz bandwidth position. (1)

JUMPER SELECTABLE BASS EQ: To help compensate for Bass response deficiencies in small and medium sized receivers, the SMP-900A includes a jumper selectable 3 dB bass boost at 105 Hz, with an aggressive roll off below. This filter helps protect stereo pilots and reduces low frequency modulation requirements of transmitters, which helps to maintain higher modulation levels.

MONAURAL OUTPUT: For stand-by auxillary transmitters, or for normal monaural operation, a separate mono output with its own level control and tilt correction system is provided.

Note (1): 11 kHz operation is NOT recommended by CRL and does not comply with the U.S. NRSC Voluntary Standards.



SPECIFICATIONS

<p>SGC-800</p> <p>INPUT (Ref. 0 dBm = 0.775 VRMS) TYPE: Active balanced (differential) IMPEDENCE: >10 k ohms balanced bridging >5 k ohms unbalanced TERMINATION: 600 ohms (selectable) LEVEL: -30 TO +20 dBm referenced to input G/R threshold</p> <p>OUTPUT TYPE: Active balanced (transformerless) IMPEDENCE: <200 ohms balanced (designed to drive 600 ohm load) LEVEL: Selectable in steps: -10, 0, +4, +8, +10 dBm</p> <p>FREQUENCY RESPONSE +/- 0.25 dB proof, +/- 0.5 dB operate at 9 dB G/R (BAND switch in BOTH position), 50 Hz to 20 kHz, +10 dBm output level</p> <p>HARMONIC DISTORTION <0.1% proof, <0.25% operate (<0.15% typical) at 9 dB G/R (BAND switch in BOTH position) 50 Hz to 20 kHz, +10 dBm output level</p>	<p>IM DISTORTION <0.05% proof, <0.25% operate (<0.15% typical) at 9 dB G/R (BAND switch in BOTH position) SMPTE method, 4:1 ratio</p> <p>S+N/N >80 dB proof, >70 dB operate (>72 dB typical) >80 dB operate with dynaflex NR in (dynaflex threshold at -25 dB) measured from threshold of G/R, 50 Hz to 20 kHz bandwidth</p> <p>STEREO SEPARATION: >60 dB proof, >50 dB operate (55 dB typical) at 9 dB G/R (BAND switch in BOTH position) 50 Hz to 20 kHz</p> <p>STEREO TRACKING: Each channel of wideband AGC within 1 dB of control channel over 30 dB G/R range</p> <p>GAIN REDUCTION RANGE >30 dB, 50 Hz to 20 kHz</p> <p>COMPRESSION RATIO 20:1 typical above 9 dB G/R</p>	<p>TIME CONSTANTS Program dependent attack, switch selectable release action (Slow, Medium, Fast)</p> <p>GAIN REDUCTION METHOD Two independent linearized bands of gain reduction riding atop a wideband AGC platform. BAND switch allows individual selection of WIDEband only, MULTiband only or BOTH</p> <p>CROSSOVER FREQUENCY 340 Hz, DUAL and BOTH operating modes</p> <p>GAIN REDUCTION ELEMENTS Voltage controlled resistor (patented by CRL)</p> <p>GATE FUNCTION Locks gain reduction at 20 dB below G/R threshold to prevent amplification of noise floor. Internally adjustable (-30 to -10 dB)</p> <p>NOISE GENERATOR Pulsed or Static USASI weighted (jumper selectable)</p> <p>FRONT PANEL INDICATORS: Dual 10 Segment LED relative input levels meter with 22 dB, (28 dB with OVLD) dynamic range</p>
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<p>SEC-800</p> <p>INPUT (Ref. 0 dBm = 0.775 VRMS) TYPE: Active balanced (differential) IMPEDENCE: >10 k ohms balanced bridging >5 k ohms unbalanced TERMINATION: 600 ohms (selectable) LEVEL: -30 TO +20 dBm referenced to input G/R threshold</p> <p>OUTPUT TYPE: Active balanced (transformerless) IMPEDENCE: < 200 ohms balanced (designed to drive 600 ohm load) LEVEL (maximum): +18 dBm into 600 ohms @ 400 Hz</p> <p>FREQUENCY RESPONSE +1 to -6 dB proof, at 9 dB G/R (BAND switch in MULTI position), 50 Hz to 15 kHz, +4 dBm output level</p> <p>HARMONIC DISTORTION <0.25% proof, <0.6% operate (<0.25% typical) at 9 dB G/R (BAND switch in MULTI position) 100 Hz to 15 kHz, +4 dBm output level</p>	<p>IM DISTORTION <0.08% proof, <0.35% operate (<0.3% typical) at 9 dB G/R (BAND switch in MULTI position) SMPTE method, 4:1 ratio</p> <p>S+N/N >75 dB proof, >70 dB operate (>75 dB typical) measured from threshold of G/R, +10 dBm input/output level</p> <p>GAIN REDUCTION RANGE >30 dB, 50 Hz to 150 kHz</p> <p>STEREO SEPARATION >55 dB proof, >45 dB operate (>50 dB typical) at 9 dB G/R (BAND switch in MULTI position) 50 Hz to 10 kHz</p> <p>STEREO TRACKING Each channel of wideband AGC within 0.2 dB of control channel over 30 dB G/R range</p> <p>TIME CONSTANTS Program dependent attack, switch selectable release action (Slow, Medium, Fast)</p>	<p>GAIN REDUCTION METHOD 4 band VCR alignment free design followed by 4 output control VCA's. BAND switch allows individual selection of WIDEband only, or MULTiband</p> <p>CROSSOVER FREQUENCY 200 Hz, 1 kHz, and 5 kHz with 6dB/ octave filters</p> <p>GAIN REDUCTION ELEMENTS Voltage controlled resistor (patented by CRL)</p> <p>GATE FUNCTION Locks gain reduction at 10 or 20 dB below G/R threshold (switch selectable) to prevent amplification of noise floor.</p> <p>FRONT PANEL INDICATORS: Dual 10 Segment LED relative input level meters with 22 dB, (28 dB with OVLD) dynamic range</p>
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<p>SMP-900A</p> <p>INPUTS (Ref. 0dBm = 0.775 VRMS) TYPE: Active balanced (differential) IMPEDENCE: >10 K ohms bridging TERMINATION: 600 ohms (selectable) LEVEL (adjustable): <-10 TO +20 dBm referenced to 0 dB indication on front panel level meter</p> <p>OUTPUTS TYPE: Active balanced (differential) IMPEDENCE: 100 ohms (designed to drive 600 ohm load) LEVEL (adjustable): <20 to +20 dBm, ref. to 100% negative modulation level, as established internally</p> <p>FREQUENCY RESPONSE 10 dB ref. at 400 Hz, +10 dBm input/output 9.5 kHz filter) 50 Hz to 8 kHz, +0/-1.5 dB bandwidth selected. -3 dB to 9.5 kHz >30 dB atten. at 10.5 kHz >40 dB atten. at 11.0 kHz Confirms to NRSC standard using required dynamic measurement method 11 kHz filter bandwidth selected 50 Hz to 10 kHz, +0/-1.5 dB</p>	<p>-3 dB at 11 kHz >30 dB atten. at 13.5 kHz Proof mode: 50 Hz to 15 kHz, +/- 1.0 dB</p> <p>HARMONIC DISTORTION (+10 dBm input/output, 20 kHz bandwidth) 9.5 or 11 kHz BW <0.25% over selected operating bandwidth, at or below 100% negative modulation level Proof mode: <0.1%</p> <p>S+N/N: >65 dB proof, >60 dB operate</p> <p>STEREO SEPARATION: Operate mode: >35 dB over selected operating bandwidth >45 dB typical Proof mode: >50 dB</p> <p>CROSSTALK: Operate Mode: L+R to L-R or L-R to L+R, >35 dB over selected bandwidth, >40 dB typical. Proof mode: >40 dB</p> <p>INPUT GAIN REDUCTION Input leveling AGC, selectable in 2 dB increments to 8 dB >20 dB overall range</p>	<p>LIMITING: Selectable in 1 dB increments from 0 to +5 dB, dual band, crossover frequency: 3.5 kHz</p> <p>SINGLE CHANNEL LIMITER: Adjustable threshold from OFF to -50%; used to prevent more than -70% envelope modulation produced by a single channel. (Required by Motorola C-Quam® System)</p> <p>STEREO ENHANCE: Adjustable 0 to +3 dB</p> <p>PRE-EMPHASIS Follows NRSC standard pre-emphasis characteristic, 20 Hz to 10 kHz when front panel PRE-EMPHASIS ins in STD position continuously variable via front panel HI-FREQ EQUALIZATION control when front panel PRE-EMPHASIS switch is in VAR. position</p> <p>FRONT PANEL INDICATORS: Dual 10 Segment LED relative input level meters with 22 dB, (28 dB with OVLD) dynamic range L+R and L-R limit indicators monitor activity of patented overshoot-corrected filter circuitry</p>
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GENERAL SPECIFICATIONS
 (SGC-800, SEC-800, SMP-900A)

<p>POWER REQUIREMENTS: 100-130 OR 200-250 VAC, 48-440 Hz, 20 VA max EMI suppressed, IEC connector standard</p> <p>OPERATING TEMPERATURE RANGE 32 to 122 degrees F (0 to 50 degrees C)</p>	<p>OPERATING HUMIDITY: 0-95% HR, non-condensing</p> <p>OPERATING ALTITUDE: 0-15,000 feet AMSL</p> <p>*C QUAM is a registered trademark of Motorola Inc.</p>	<p>DIMENSIONS: 19" (48.3 cm) W, 1.75" (4.5 cm) H, 16" (40.6 cm) D including protruding controls and connectors.</p> <p>SHIPPING WEIGHT: 18 lbs. (including standard accessories)</p> <p>® Dynaflex is a registered trademark of Circuit Research Labs, Inc.</p>
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**THE
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CRL Systems
 2522 West Geneva Drive
 Tempe, Arizona 85282
 (800) 535-7648 (602) 438-0888
 TELEX: 350464 CRL TMPE. UD.
 FAX (602) 438-8227