

# THE FM-4

## Stereo Processing System



Circuit Research Labs, Inc.

**CRL AUDIO**

THE PROCESSING SPECIALISTS



## WHY YOUR FM STATION NEEDS THE FM-4

Your radio station is in the business of selling SOUND. In order to get results for your clients and improve your billing, you must provide your listeners with the best programming, and the best sound possible. Many radio stations have similar formats and play the same music. Thus, the station that SOUNDS the best will have a competitive edge. CRL will give you that edge by putting the best possible audio on the air AND by increasing the coverage of your station to the maximum. It's the next best thing to a power increase.

The **FM-4 Control System** is the result of years of research and development by engineers who have grown up in the Broadcast Industry. Our work has resulted in a careful blend of superb sounding stereo multiband AGC's, low distortion pre-emphasis limiters, and overshootless low pass clipping filters which make outstanding quality and loudness improvements EASY TO OBTAIN.

If you are truly a broadcast perfectionist and want the VERY BEST for your radio station . . . you need to have your station order the **CRL FM-4 Audio Control System** on our two week trial plan today.

## THE INPUT UNIT OF THE FM-4 SPP-800 Stereo Preparation Processor

The unique design of the **SPP-800** allows it to automatically correct for errors in audio source program levels, tonal balance, and other qualities most AGC's simply cannot handle. Totally unlike any other AGC, the **SPP-800** actually enhances transient musical qualities and punch while maintaining perfect level control.

### MAIN FEATURES:

**ASYMMETRY REMOVAL** (optional). The **SPP-800** first passes the audio through a harmonic phase rotator in order to reduce any exaggerated asymmetry in the program content which could adversely affect later processing and cause distortion.

**MULTIBAND GAIN CONTROL.** The audio is next split apart into two bands for independent level conditioning. The splitting frequency and patented gain control designs eliminate "pumping and hole punching" found in normal AGC's.

Sudden bass and other tonal bursts are prevented from causing unnatural level changes in vocals and other instruments.

**USER CONTROLLED LOUDNESS.** Program dependent gain control action is user controlled in three ranges, allowing your programmer to safely and easily tailor your station's sound needs.

**USER CONTROLLED OUTPUT EQUALIZING.** The low and high frequency bands are recombined back together by a unique control circuit which lets you custom tailor the output tonal balance without affecting the output level of the unit.

**DE-ESSING.** Aggravating sibilance and essing are greatly reduced in voices and commercials by special transient limiters.

**DYNAMIC EQUALIZATION.** Program audio which is deficient or excessive in bass and highs is automatically re-balanced and improved while normal program audio is unaffected.

### ADDITIONAL FEATURES:

**PROGRAMMABLE AGC'ING OF LOW INPUT LEVELS.**

**SELECTABLE AGC GATING ACTION.**

**MAINTENANCE FREE, HIGH TECHNOLOGY INTERNAL CIRCUITRY.**

**INTERNAL PINK NOISE GENERATION FOR EASY SYSTEM SET UP.**

**ACTIVE BALANCED INPUT AND OUTPUT CIRCUITRY.**

**SPECIAL STEREO STRAPPING TECHNIQUE.**



## THE CENTER UNITS OF THE FM-4: SEP-400A Spectral Energy Processor

The **SEP-400A** is designed to give you the capability of carefully shaping and altering the program tonal quality in four precisely chosen bands per channel. It also provides an increase in audio loudness while maintaining a musical quality.

### MAIN FEATURES:

**FOUR CHANNEL MULTIBAND CONTROL.** The audio is first split into four separate bands. The splitting frequencies are chosen to divide the incoming audio into musical bass, voice resonance and intelligibility, and musical highs for the maximum quality processing potential. The dynamic ranges of the four bands are separately and carefully reduced or compressed by four gain reduction stages. The bands are controlled by complex gain determining signals derived from the audio bands themselves. Convenient user selection over the operating speeds allows maximum flexibility.

**SELECTABLE PEAK TRANSIENT LIMITERS.** In addition to the above gain control circuitry, over-shoot limiters may be internally selected for even greater audio control.

**FOUR CHANNEL EQUALIZER CONFIGURATION.** The output of the four gain reduction circuits are recombined through a network of four level controls for most any kind of tonal balance desired for your format.

### ADDITIONAL FEATURES:

**SELECTABLE LEVEL FOUR BAND GATING ACTION.**

**MAINTENANCE FREE INTERNAL CIRCUITRY.**

**ACTIVE BALANCED INPUT AND OUTPUT CIRCUITRY.**

**LEFT AND RIGHT CHANNELS ARE CLOSELY BALANCED.**

## THE OUTPUT UNIT OF THE FM-4 SMP-800 Stereo Modulation Processor

The **SMP-800** is the final unit in the **FM-4** system. It is a combination processor/limiter utilizing patented CRL circuits and filters for maximum fidelity and modulation levels.

### MAIN FEATURES:

**INPUT AGC'S FOR PRECISE PRE-EMPHASIS CONTROL.** High quality input AGC's provide transparent yet wide range input level control to insure proper levels to the following multiband pre-emphasis circuitry.

**REDUCED DISTORTION MULTIBAND PRE-EMPHASIS CONTROL.** Audio is next separated into low and high frequency bands which are gain controlled by audio program and frequency content in a manner which anticipates the action of the following clipping filter. This achieves both maximum audio loudness and minimum audible distortion.

**NO OVERSHOOT 15 KHZ LOW PASS FILTER CONTROL.** A high performance but simple patented 15 KHz low pass clipping filter insures both absolute peak control and complete stereo pilot and sub-channel protection.

**TRANSPARENT TRANSIENT FIDELITY DESIGN.** The special design concepts of the pre-emphasis gain control circuits and the low pass clipping filter are selected to minimize the FM limiting degradation of transient fidelity which exists in other pre-emphasis limiting techniques.

**TOTALLY ALIGNMENT FREE INTERNAL CIRCUITRY.** All internal gain control and filter circuitry are developed from self aligning CRL pioneered techniques which eliminate maintenance and most importantly, improves equipment reliability.

### ADDITIONAL FEATURES:

**(AUTO CLIP) FEEDBACK OF CLIPPING FILTER TO INPUT G/R STAGES.**

**SELECTABLE BYPASS OF INTERNAL AGC STRAPPINGS.**

**25, 50 OR 75 MICROSEC. PRE-EMPHASIS OPTIONS.**

**AUTOMATIC INTERNAL AGC GATING.**

**HIGH MODULATION DENSITY.**

**BALANCED INPUT AND OUTPUT CIRCUITRY.**



# STATIC TEST SPECIFICATIONS OF THE CRL FM-4

## SPP-800 – STEREO PREPARATION PROCESSOR (Split-Band AGC)

Dimensions: 19" rack mount × 1¾" × 12"  
Operating Temperature Range: 0 C. to 50 C.  
Power Requirements: 20 W nominal @ 110 - 125 VAC.  
Input Level Range: - 30 dbm to + 20 dbm re: input G/R threshold  
Input Impedance: 600 Ohms or 10K Ohms balanced or unbalanced. Active Transformerless Output  
Output Level Range: - 10, .0, + 10 dbm switchable  
Output Impedance: Less than 200 Ohms balanced or unbalanced. Active Transformerless Output  
Frequency Response: + .15, - .5 db 50 Hz to 15 KHz  
THD: Less than .1% in proof; .4% in operate  
S + N/N: Better than 70 db in proof; 60 db in operate  
G/R Type: 2 band VCR alignment free design (patented)  
Maximum G/R Range: 30 db overall; programmable in 3 db steps to - 15 db below calibrated input G/R threshold  
Multiband Crossover Frequency: 400 Hz with 6 db/octave filters  
Attack and Release Times: Program dependent with user selection of Slow, Medium, or Fast activity  
Output E.Q. Range: + 6, - 6, low band to high band with constant summed output level  
Stereo Tracking: either channel within 1 db of controlling channel thru 30 db G/R range.

## SEP-400A SPECTRAL ENERGY PROCESSOR (STEREO PAIR)

Dimension: 19" rack mount × 1¾" × 12"  
Operating Temperature Range: 0 C. to 50 C.  
Total Power Requirements: 15 W Nominal @ 110 - 125 VAC.  
Input Level Range: - 30 dbm to + 15 dbm re: input G/R threshold  
Input impedance: 600 Ohms or 10 K Ohms balanced or unbalanced. Active Transformerless Input  
Output Level Range: Adjustable to + 6 dbm per channel  
Output Impedance: Less than 200 Ohms balanced or unbalanced. Active Transformerless Output  
Frequency Response: + 1, - 1 db 50 Hz to 15 Hz  
THD: Less than .3% in proof; 1.5% in operate  
S + N/N: Better than 65 db in proof; 55 db in operate  
G/R Type: 4 band followed by 1 band FET design per channel  
Maximum G/R Range: 30 db overall; programmable to 3 db steps to - 12 db below calibrated input G/R threshold  
Multiband Crossover Frequency: 100 Hz, 800 Hz, 5 KHz with 6 db/octave filters  
Attack and Release Times: Program dependent with user selection of Slow, Medium, or Fast activity.  
Output E.Q. Range: + 6, - 12 db from standard output reference level

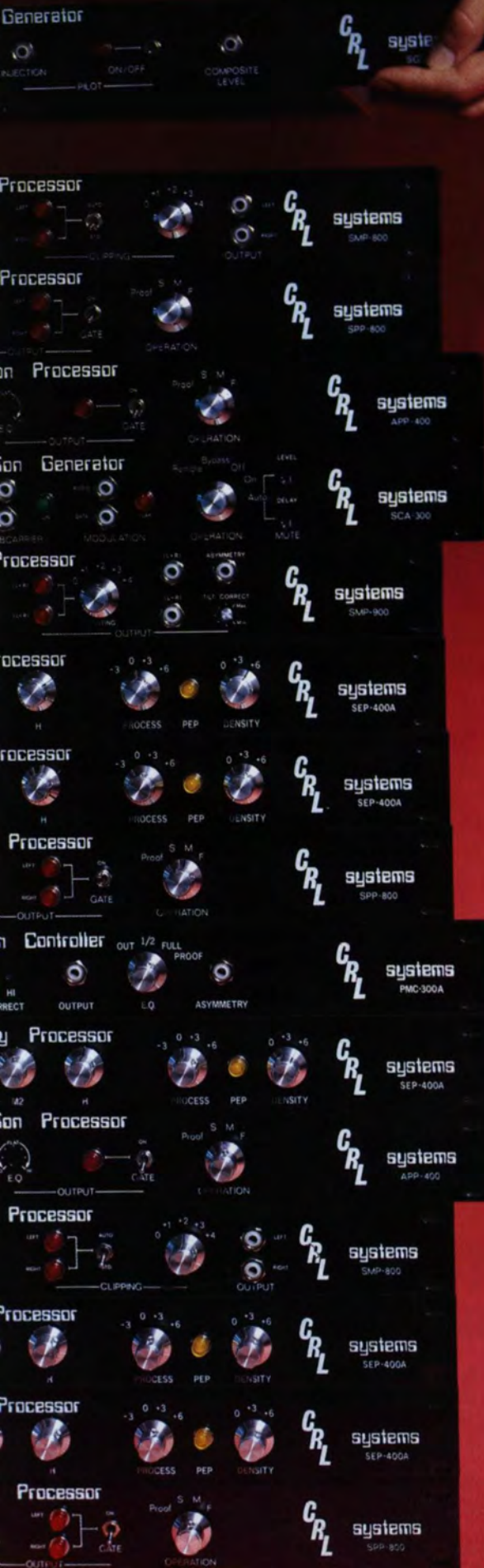
## SMP-800 – STEREO MODULATION PROCESSOR (LIMITER)

Dimension: 19" rack mount × 1¾" × 12"  
Operating Temperature Range: 0 C. to 50 C.  
Power Requirements: 20 W nominal @ 110 - 125 VAC.  
Input Level Range: - 15 dbm to + 15 dbm re: input G/R threshold  
Input Impedance: 600 Ohms or 10K Ohms balanced or unbalanced. Active Transformerless Input  
Output Level Range: Adjustable to + 15 dbm  
Output Impedance: Less than 200 Ohms balanced or unbalanced. Active Transformerless Input  
Frequency Response: + .8, - .8 db 50 Hz to 15 KHz  
THD: Less than .1% in proof; .2% in operate  
S + N/N: Better than 65 db in proof; 60 db in operate  
Dynamic Pilot Protection: Better than 60 db  
Dynamic L-R Protection: Better than 50 db  
G/R Type: Stereo 1 band AGC followed by stereo 2 band. Clipper/Limiter VCR alignment free design  
Maximum G/R Range: 30 db overall; programmable in 3 db steps to - 15 db below calibrated input G/R threshold  
Multiband Crossover Frequency: 2 KHz with 18 db/octave filters  
Attack and Release Times: Program dependent with low pass clipping filter controlled AGC threshold

## THE FM-4 SYSTEM IS AVAILABLE FOR A FREE TWO WEEK TRIAL

All specifications subject to change or improvement without notice.





# SEE HOW OUR NEW STEREO GENERATOR STACKS UP!

Now the finest stereo processor in the country has a stereo generator to match. This latest addition to our product line offers outstanding performance at a modest price. It is the first stereo generator **designed** to handle highly processed audio.

The SG 800 has outstanding specs. One of the reasons is CRL's exclusive Balanced Modulator design. This allows ultra-linear modulation of the 38kHz subcarrier, while maintaining a precision digital phase lock with the pilot to prevent any frequency drift. Complete specs are on the reverse side.

The SG 800 is available now for use with the SMP 800 stereo limiter. **SPECIAL INTRODUCTORY PRICE IS ONLY \$1450.** Call **Bob Richards** now at **800-535-7648** to arrange your free two week trial. Remember . . . don't just optimize . . . MAXIMIZE YOUR SIGNAL WITH CRL.



THE PROCESSING SPECIALISTS

## Circuit Research Labs, Inc.

(602) 438-0888 or  
(800) 535-7648

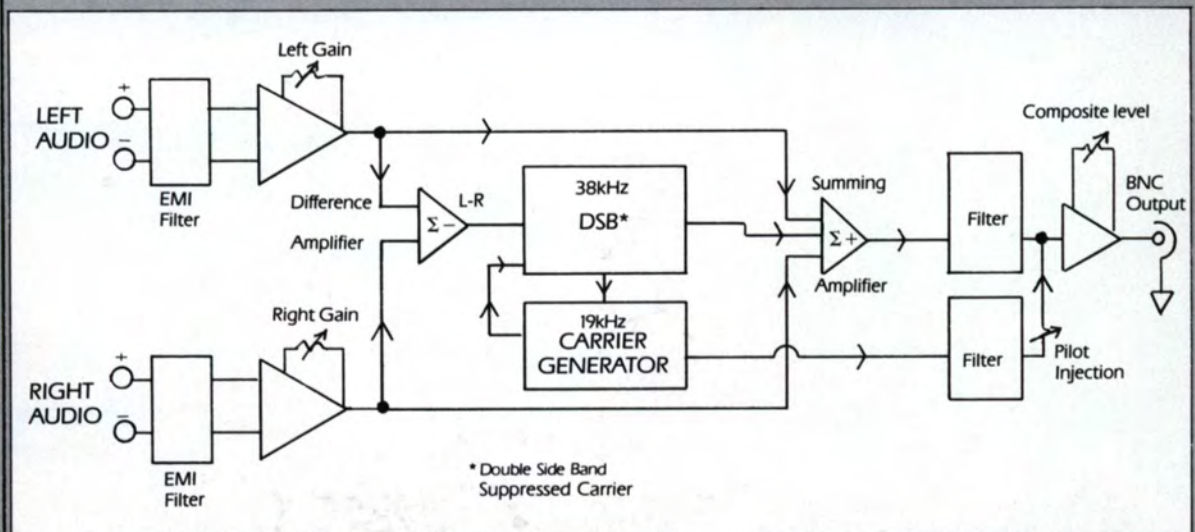
2522 W. Geneva Drive  
Tempe, Arizona 85282





## SG 800 STEREO GENERATOR SPECIFICATIONS

Dimensions: 19" rack mount by 1 $\frac{3}{4}$ " by 12"  
 Operating Temperature Range: - 10° C to + 40° C.  
 Power Requirements: 10 watts nominal, 110 to 125 VAC.  
 Input level sensitivity: - 10 dbm  
 Input Impedance: 600 Ohms, balanced or unbalanced. Active Transformerless input.  
 Composite Output Level: 6 Volts, peak  
 Audio Frequency Response; 10Hz to 15kHz, plus or minus 0.2 db.  
 THD Distortion: (10 to 15kHz) less than .03%  
 IM Distortion: less than .03% (60Hz/7kHz at 4:1)  
 S + N/N: 80db or greater, referenced to calibrate level  
 Pilot Frequency Stability: Less than 1Hz from - 10° C to + 40° C.  
 Crosstalk: Left/Right and Right/Left, 60db or greater  
 Crosstalk: Main to Sub and Sub to Main, 60 db or greater  
 Pre-emphasis: none  
 Low Pass Filter: none  
 Controls: Left and right input levels  
           Pilot on/off  
           Pilot injection level  
           Composite output level  
 Indicators: Power on/off  
               Pilot on/off  
               Audio input level





## PRICE LIST

Effective November 1, 1983

### PREPARATION PROCESSOR

APP 400 and SPP 800

\$1150 mono

\$1750 stereo

This is a two band AGC unit that is gated to prevent noise pull-up. Keeps levels consistent and will correct for tonal imbalance. Has high speed transient limiter for de-essing. Includes built in pink-noise generator.

### SPECTRAL ENERGY PROCESSOR

SEP 400A

\$1350 mono

\$2700 stereo

This is a four band compressor/expander with gating in each band. Builds tremendous sound density for maximum loudness. Output control on each band allows user to "shape" audio for any format. Each band has switchable limiter for maximum control.

### PEAK MODULATION CONTROLLER

PMC 300A

\$1050 mono

This unit provides absolute peak control without overshoot by using a combination of limiting and clipping. Has adjustable high frequency pre-emphasis for maximum received fidelity. Compensation circuit for plate modulated transmitters is included to improve low frequency response.

### AM STEREO MATRIX PROCESSOR

SMP 900

\$1950

This is a state-of-the-art limiter for AM Stereo. Processes L+R and L-R separately. Prevents any loss of coverage to mono listeners. Now in use at major stations with all AM stereo systems.

### FM STEREO MODULATOR PROCESSOR

SMP 800

\$1750

This unit provides absolute peak control and maximum fidelity. Has patented no overshoot filters for maximum modulation. Built-in pre-emphasis with selectable curve for 25, 50 or 75 micro-seconds. Excellent pilot protection. Users say it's the best FM limiter available.

### SCA MODULATION GENERATOR

SCA 300

\$1400

This is the SCA generator everyone has been waiting for. Outstanding specs and audibly superior sound, using the latest technology available.

### CRL HAS SYSTEMS FOR EVERY NEED

#### THE AM-2 SYSTEM

\$2200 mono

\$3700 stereo

This is a two band system at a budget price. Consists of two units, the APP 400 and PMC 300A for mono, or SPP 800 and SMP 900 for stereo. May be upgraded at any time.

#### THE AM-4 SYSTEM

\$3550 mono

\$6400 stereo

This four band system will outperform any other multi-band compressor. Provides maximum density to increase coverage and pre-emphasis for improved fidelity. Contains three units, APP 400 and SEP 400A, and PMC 300A for mono. Stereo system consists of SPP 800, (2) SEP 400A, and SMP 900.

#### THE FM-2 SYSTEM

\$2900 mono

\$3500 stereo

This two-band system is perfect to upgrade your audio at a modest cost. Connects directly to your stereo generator for an audience pleasing sound. Includes SPP 800 and SMP 800.

#### THE FM-4 SYSTEM

\$6200 stereo

This is the ultimate FM system. Maximum fidelity, maximum loudness, and maximum control. Connects to your stereo generator. The perfect system for very competitive markets. The next best thing to more power. Includes SPP 800, SMP 800, and two SEP 400A units.

#### THE TV 2 SYSTEM

\$2900 mono

\$3500 stereo

This unit provides a startling improvement to typical TV sound. Gated to avoid noise pull-up during pauses. Perfect peak control for maximum, audio coverage. Includes APP 400 and SMP 800.

#### THE SCA 2 SYSTEM

\$2550 mono

This system combines a state-of-the-art SCA generator; model SCA 300 with the APP 400, split band AGC for audibly superior sound.

—CIRCUIT RESEARCH LABS, INC. 3204 S. Fair Lane, Tempe, AZ 85282—