KEPEX™

Model 500

keyable program expander

OPERATIONS MANUAL

allison research, inc.

2817 Erica Place · P.O. Box 40288
Nashville, Tennessee 37204
Dial (615) "ALLISON" or (615) 385-1760

KEPEX™

OPERATIONS MANUAL

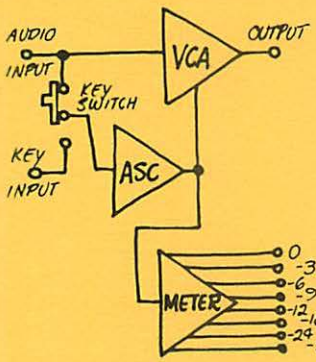
YOUR KEPEX 500 IS A GAIN EXPANDER MODULE DESIGNED FOR PROFESSIONAL AUDIO APPLICATIONS. IT FEATURES WIDE-BAND, LOW DISTORTION, LOW NOISE CIRCUITRY, AND A VARIABLE GAIN RANGE OF BETTER THAN 60 dB.

MAXIMUM GAIN IS FACTORY SET AT 0dB (UNITY GAIN).

MINIMUM GAIN IS ADJUSTABLE (BY MEANS OF THE RANGE CONTROL) FROM 0dB TO -60dB. GAIN IS AUTOMATICALLY CONTROLLED BETWEEN MAXIMUM AND MINIMUM BY THE LEVEL OF EITHER THE INPUT AUDIO SIGNAL OR BY A SEPARATE "KEYING" AUDIO SIGNAL.

A SEQUENTIAL-LIGHT METERING DEVICE PROVIDES VISUAL MONITORING OF THE INSTANTANEOUS OPERATING GAIN.

THE KEPEX 500 IS MADE UP OF 3 BASIC CIRCUITS:



① VOLTAGE CONTROLLED AMPLIFIER (VCA). VCA GAIN IS CONTROLLED BY A DC VOLTAGE COMING FROM THE:

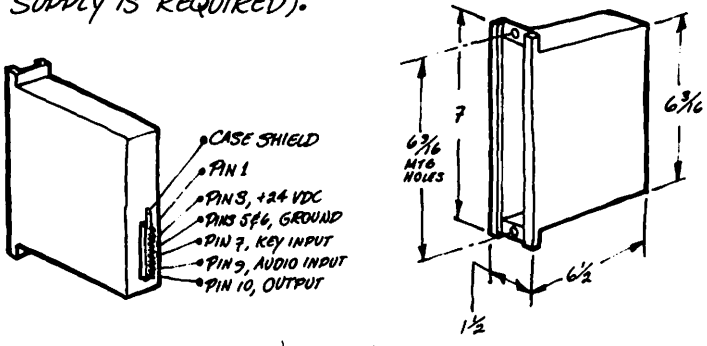
② ANALOG SIGNAL CONVERTER (ASC), SOMETIMES CALLED AN ENVELOPE DETECTOR, WHICH CONVERTS AN AUDIO SIGNAL TO A PROPORTIONAL DC VOLTAGE. THIS VOLTAGE IS APPLIED TO THE CONTROL INPUT OF THE VCA AND TO:

③ SEQUENTIAL-LIGHT GAIN MONITOR (METER), WHICH INDICATES THE OPERATING GAIN OF THE VCA.

MECHANICAL INSTALLATION

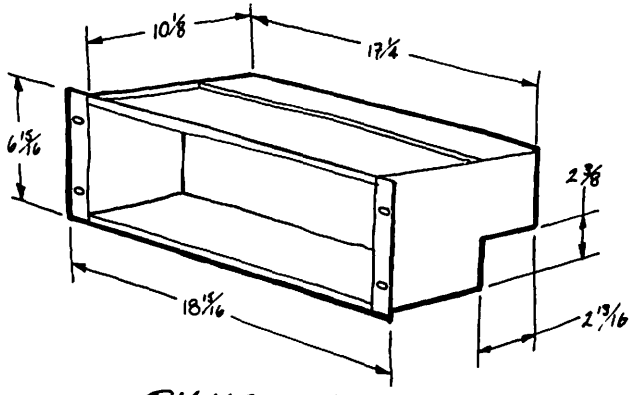
TWO TYPES OF ENCLOSURES ARE AVAILABLE FOR MOUNTING KEPEX 500 MODULES.

(1) THE CM·001 SINGLE CHANNEL CASE IS OF WELDED STEEL CONSTRUCTION AND IS SUITABLE FOR CUSTOM INSTALLATION IN CONTROL CONSOLES, FILM SOUND TRANSFER CHAINS, P.A. SYSTEMS, AND APPLICATIONS WHERE ONLY ONE OR A FEW CHANNELS OF KEPEX ARE REQUIRED. IT IS FITTED WITH A 10 PIN P.C. EDGE CONNECTOR WHICH CARRIES INPUT, OUTPUT, AND POWER SUPPLY CONNECTIONS (EXTERNAL POWER SUPPLY IS REQUIRED).



CM·001 WIRING & DIMENSIONS

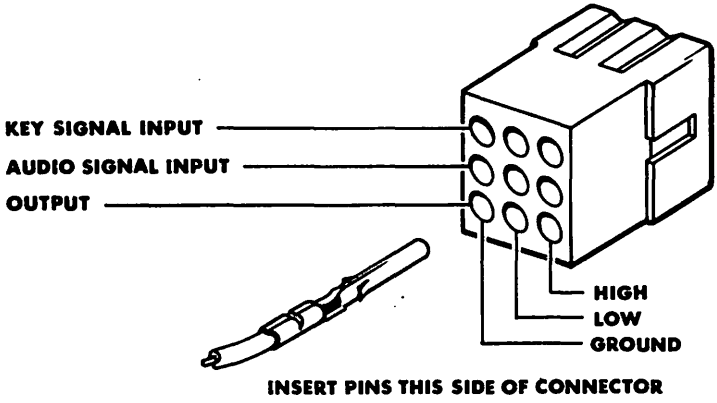
(2) THE RM·160 RACK MOUNTING CARD LIBRARY ACCEPTS UP TO 16 KEPEX 500 MODULES. IT INCLUDES AN INTEGRAL POWER SUPPLY AND A PLUG-IN POWER SWITCHING CARD (JUICE). THE POWER SUPPLY DELIVERS 24 VDC (REGULATED) AT 2 AMPS
NEGATIVE GROUND. THE POWER TRANSFORMER MAY BE STRAPPED FOR 105-125 OR 210-250 VAC, 50-60 Hz.



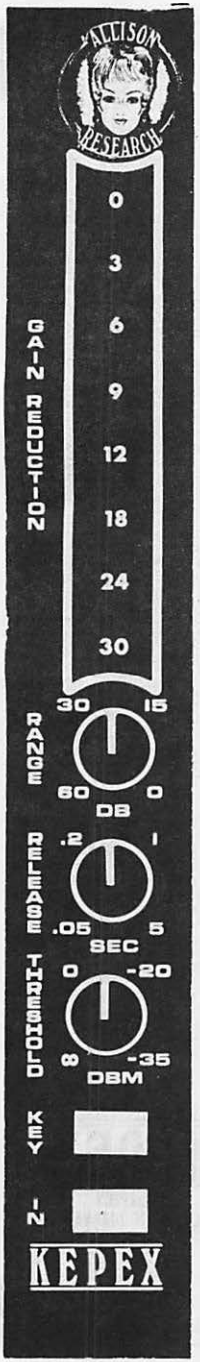
RM·160 DIMENSIONS

THE POWER SWITCHING (JUICE) CARD CARRIES FUSE PROTECTION FOR INPUT POWER (WITH INDICATOR LIGHT FOR BLOWN FUSE). FUSE PROTECTION FOR THE 24 VDC LINE IS LOCATED BEHIND THE REAR ACCESS PANEL.

AUDIO CONNECTIONS ARE MADE VIA THE 16 COLOR-CODED RECEPTACLES ON THE REAR OF THE CHASSIS. MATING PLUGS AND A CRIMPING TOOL ARE SUPPLIED WITH THE RM-160. AUDIO INPUTS AND OUTPUTS ARE UNBALANCED, AND CONNECTIONS TO THE PLUGS ARE MADE AS FOLLOWS:



KEPEX 500 MODULES MOUNTED IN CM-001 CASES REQUIRE AN EXTERNAL POWER SUPPLY DELIVERING 24 VDC (REGULATED) AT 75 mA. THE LX-100 POWER SUPPLY BY ALLISON RESEARCH, INC. IS RECOMMENDED. IT PROVIDES THE PROPER VOLTAGES AT SUFFICIENT CURRENT TO POWER UP TO EIGHT KEPEX 500 MODULES. THE TRANSFORMER MAY BE STRAPPED FOR LINE VOLTAGES FROM 105-125 AND 210-250 VAC, 50-60 Hz.



NOW THAT YOU'VE GOT A **KEPEX**, WHAT ARE YOU GOING TO DO WITH IT? NOISE REDUCTION (TAPE HISS, PRINT-THROUGH, HUM, LEAKAGE, BACKGROUND NOISE), "PRESENCE" IMPROVEMENT (REDUCTION OF ROOM REVERBERATION), AND ELECTRONIC EFFECTS ARE WITHIN THE SCOPE OF **KEPEX**'s CAPABILITIES. CONTROL SETTINGS ARE DEPENDENT ON THE DESIRED EFFECT AND THE NATURE OF THE PROGRAM MATERIAL. BEST RESULTS ARE OBTAINED BY INSPIRED EXPERIMENTATION, KEEPING IN MIND THE EFFECTS OF THE CONTROLS:

(1) METER... NOT A CONTROL, THE **METER** INDICATES THE INSTANTANEOUS GAIN OF **KEPEX**. IT IS CALIBRATED IN MINUS dB.

(2) **RANGE** CONTROL... ADJUSTS MAXIMUM REDUCTION OF GAIN WHEN SIGNAL LEVEL IS BELOW **THRESHOLD**. IN OPERATION THE GAIN OF **KEPEX** WILL RIDE UP AND DOWN WITH THE INPUT LEVEL BETWEEN MINIMUM AND UNITY GAIN. MAXIMUM GAIN REDUCTION IS 60dB.

(3) **THRESHOLD** CONTROL... DETERMINES THE LEVEL OF INPUT SIGNAL REQUIRED TO INCREASE THE GAIN FROM ITS MINIMUM VALUE TO WITHIN -1dB OF UNITY GAIN. HERE IS WHERE YOU SEPARATE THE SIGNAL FROM THE NOISE. IN NOISE REDUCTION APPLICATIONS THE **THRESHOLD** IS SET AS CLOSE AS POSSIBLE TO THE LOWEST LEVEL OF SIGNAL DESIRED TO BE PRESERVED, SO THAT LOWER LEVEL MATERIAL (THE NOISE) IS ATTENUATED. THIS RULE-OF-THUMB IS OFTEN BROKEN TO GOOD ADVANTAGE BY LIBERAL USE OF THE CONTROL LABELED:

(4) **RELEASE**... ADJUSTS THE TIME FOR THE GAIN TO RETURN TO THE MINIMUM VALUE AFTER THE SIGNAL DROPS BELOW **THRESHOLD**. RANGE OF ADJUSTMENT IS FROM 50 MILLISECONDS TO 5 SECONDS. A WORD OF WARNING AND A TIP TO THE CURIOUS; SHORT RELEASE TIMES WITH LOW FREQUENCY PROGRAM MATERIAL CAUSE SEVERE DISTORTION AS THE GAIN OF **KEPEX** RIDES UP AND DOWN

MATERIAL, LIKE DRUMS OR TICKING CLOCKS, SHORT RELEASE TIMES ARE USED TO ADVANTAGE. ELIMINATION OF ROOM REVERBERATION IS ACCOMPLISHED WITH SHORT RELEASE TIMES AND SHALLOW GAIN REDUCTION. GENERALLY IT IS BEST TO USE THE LONGEST POSSIBLE RELEASE TIME WHICH ACHIEVES THE DESIRED EFFECT.

⑤ KEY... THIS SWITCH ENABLES THE GAIN OF KEPEX TO BE CONTROLLED BY EXTERNAL AUDIO SIGNALS INDEPENDENT OF THE INPUT SIGNAL. KEY AN OSCILLATOR WITH YOUR VOICE! KEY YOUR VOICE WITH AN OSCILLATOR! CREATE STEREO EFFECTS! THE KEY FEATURE OF KEPEX PROVIDES POSSIBILITIES FOR A VARIETY OF SIGNAL PROCESSING TECHNIQUES. FOR EXAMPLE, IN CERTAIN NOISE REDUCTION APPLICATIONS THE OBJECTIONABLE NOISE MAY HAVE A FREQUENCY PASSBAND ESSENTIALLY DIFFERENT FROM THAT OF THE PRECIOUS SIGNAL... FILTER OUT THE NOISE PASSBAND AND KEY YOUR KEPEX WITH THIS PROCESSED SIGNAL, PASS THE ORIGINAL UNFILTERED (OR LIGHTLY FILTERED) SIGNAL THROUGH THE AUDIO INPUT AND YOUR KEPEX CAN BE SET FOR A LOWER THRESHOLD, AND BETTER NOISE REDUCTION CHARACTERISTICS.

⑥ IN... THIS SWITCH BYPASSES ALL ELECTRONICS IN KEPEX SO THAT THE INPUT IS CONNECTED DIRECTLY TO THE OUTPUT. USEFUL FOR A-B TESTS.

A FEW APPLICATION NOTES:

THE INPUT IMPEDANCE OF KEPEX IS NOMINALLY 3K OHMS AND IS ESSENTIALLY TOO HIGH TO PROPERLY LOAD AN UNTERMINATED 600Ω OUTPUT TRANSFORMER. WHEN FEEDING KEPEX FROM UNTERMINATED TRANSFORMERS IT MAY BE NECESSARY TO CONNECT A ½ WATT 600Ω RESISTOR ACROSS THE END TERMINALS OF R1 (INPUT GAIN TRIMMER).

KEPEX WORKS WELL WITH OTHER SIGNAL PROCESSING EQUIPMENT SUCH AS COMPRESSORS, LIMITERS, EQUALIZERS, ETC. USE KEPEX AFTER A LIMITER TO SUPPRESS WHOOSH. WITH EQUALIZERS IT IS BEST TO EXPERIMENT PLACING KEPEX BEFORE OR AFTER EQ TO DETERMINE BEST RESULTS FOR THE APPLICATION (PUTTING KEPEX ON THE WRONG END CAN CAUSE PERVERSIONS OF THE DESIRED EFFECT).

SPECIFICATIONS
KEPEX 500

ATTACK TIME — (TIME REQUIRED FOR GAIN TO INCREASE FROM -60 dB TO -1 dB AFTER THE APPLICATION OF A CONTROL SIGNAL WHOSE LEVEL EXCEEDS THRESHOLD) LESS THAN 20 MICROSECONDS

RELEASE TIME — (TIME REQUIRED FOR GAIN TO DECREASE BY 30 dB AFTER THE REMOVAL OF A CONTROL SIGNAL) VARIABLE FROM 50 MILLISECONDS TO 5 SECONDS

ACTIVE EXPANSION RANGE — VARIABLE FROM 0 dB TO GREATER THAN 60 dB

EXPANSION RATIO — 2:1 FROM 0 dB TO 15 dB EXPANSION, INCREASING TO 4:1 AT 60 dB EXPANSION

THRESHOLD OF EXPANSION — (MAGNITUDE OF CONTROL SIGNAL IN dBM REQUIRED TO CAUSE KEPEX TO REACH UNITY GAIN) VARIABLE FROM -35 dBM TO +20 dBM

INSERTION LOSS — 0 dB, INTERNAL ADJUSTMENT PROVIDES UP TO 20 dB GAIN

FREQUENCY RESPONSE — ±1 dB, 20 Hz TO 40 KHz

DISTORTION — LESS THAN 0.5% THD UNDER NORMAL OPERATING CONDITIONS (MEASURED DISTORTION MAY EXCEED THIS FIGURE IF VERY SHORT RELEASE TIMES ARE USED. THE DESIGN ALLOWS OPERATION IN THIS REGION IN ORDER TO TAKE ADVANTAGE OF THE SPECIAL EFFECTS PRODUCED BY SUCH OPERATION)

SIGNAL TO NOISE RATIO — MINIMUM 85 dB BELOW RATED OUTPUT

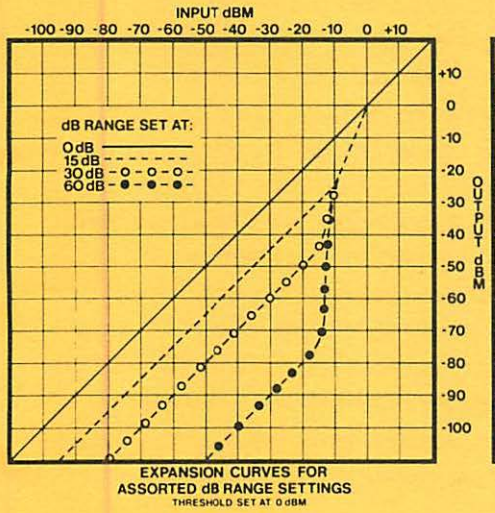
INPUT IMPEDANCE — 3 K OHMS IN NORMAL EXPANSION MODE

OUTPUT IMPEDANCE — 600 OHMS (EMITTER FOLLOWER)

MAXIMUM INPUT AND OUTPUT LEVELS — +17 dBM

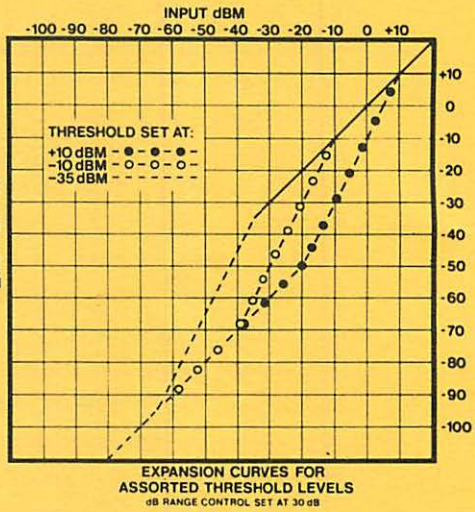
POWER REQUIREMENTS — +24 VDC @ 75 mA

NEGATIVE GROUND



EXPANSION CURVES FOR ASSORTED dB RANGE SETTINGS

THRESHOLD SET AT 0 dBM



EXPANSION CURVES FOR ASSORTED THRESHOLD LEVELS

dB RANGE CONTROL SET AT 30 dB

LX-100 SPECIFICATIONS

REGULATED OUTPUT — +24 VDC ±0.5%, 0.1% RIPPLE AT 1 AMPERE OUTPUT

INPUT VOLTAGE — 105-125 AND 210-250 VAC, 50-60 Hz

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Warranty

Allison Research, Inc. ("the Company") warrants all products of its manufacture to be free from defects in workmanship and material under normal use and service, said warranty to extend for a period of twelve months after date of purchase. In the case that any of the Company's products is believed to be defective, if the same is returned within twelve months after date of purchase, with transportation to the Company prepaid, and is found by the Company's inspection to be defective in workmanship or material, it will be repaired or replaced (at Company's election) free of charge and shipped, transportation prepaid, to any point in the United States. If inspection by the Company of such products does not disclose any defect in workmanship or material, the Company's regular charges will apply.

The foregoing warranty is Company's sole warranty, and all other warranties, expressed, implied, or statutory, are negated and excluded.