

MODEL LX-L
AUTOMATIC LEVELER
OPERATING MANUAL

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GENERAL

The COMREX Model LX-L Auto Leveler is designed for use with COMREX Model RTLX or 2XR Two Line Frequency Extender Decoders for the purpose of automatically adjusting the transmission loss of two telephone lines to equality. It is imperative that the signals transmitted from the PTLX or 2XP Two Line Encoder to the RTLX or 2XR Two Line Decoder experience the same telephone line circuit losses if the system is to operate properly. This setting can be done either manually at the RTLX or 2XR or automatically through the LX-L.

The LX-L must be connected to the two incoming telephone lines through external telephone couplers. Usually, automatic answering couplers are installed so that the receiving end operation is totally automatic. COMREX Model TCB-2A Auto-Answer Couplers are suitable for this purpose.

In manual operation, circuit losses are set to equal as follows: The test tone switch on the PTLX or 2XP Two Line Encoder is placed in the ON position. This causes a 1 KHz tone of reference level to be transmitted on both lines at the same time. At the receiving end, the two front panel potentiometers on the RTLX or 2XR are adjusted so that the two front panel level indicators show the proper level. When this adjustment has been made, the test tone switch on the Two Line Encoder is turned OFF. This adjustment must be made for each transmission because one can never be certain of the routing of the two

lines. If the adjustments are not made for each transmission the likelihood of proper operation is very small.

Because it is necessary that these adjustments are made for each transmission, an operator is required at the receiving site. The LX-L Auto Leveler was developed so that the COMREX Two Line Frequency Extender System could be used at unattended sites such as remote transmitters or satellite uplinks.

The LX-L is a device which accepts a command to adjust its two gains so that the 1KHz outputs are equal. It then stops adjusting until next instructed to adjust. It is not feasible to use a conventional limiter or AGC system to accomplish the required gain setting because the compander action in the Two Line Frequency Extender System would be defeated by the continuous adjustments.

The COMREX Model LX-L works as follows: There are two very carefully designed 1 KHZ detectors (one for each line) which produce a logic low whenever 1 KHZ is present. The two outputs are fed to a NAND gate. If 1 KHz is present at both inputs, the output of the NAND gate will go low. The output of this gate is fed to an inverter and then to a slow charge /fast discharge timing circuit. If the tones are present for two seconds, the timer will reset the digital servo which is the heart of the LX-L. When the digital servo receives a reset, it begins to adjust the gains of the two digital VCAs until their

outputs are both 0.778 volts. The setting continues until 4096 counts of the internal clock have occurred, at which time the gain setting ceases.

The gains of the two channels will remain at the values in them at the moment the counting stopped and will not change until a new reset command is received. The strategy built into the reset circuit prevents program or noise from initiating a reset. Only the presence of the two tones for at least two seconds can cause reset to occur. If one channel receives 1 KHz and the other does not, the reset will not occur. If both receive 1KHZ tones but the time that they are on is less than two seconds, reset will not happen.

In addition to requiring that the tones appear on both lines for two seconds to initiate reset, they must remain on for a further ten seconds for proper gain setting to occur.

OPERATION

Operation of the LX-L is quite straightforward. The outputs of the LX-L are connected to the corresponding inputs of the COMREX Model RTLX or 2XR Two Line Decoder and the inputs to the LX-L are connected to telephone couplers. For proper pin connections, refer to the attached hookup diagrams and select the appropriate one according to the Two Line Decoder model you are using.

To set initial levels, dial the two receiving program line numbers through a COMREX PTLX or 2XP

Encoder. (See PTLX or 2XP operation manual for Two Line Encoder operating instructions.) Switch the TEST TONE at the Two Line Encoder to ON and leave it on for at least one minute. At the receiving end, the LX-L will adjust so that the levels at its two output terminals are both 0.778 V RMS.

At this time (while the test tone is still on), adjust the front panel potentiometers to show proper equal levels. (See the RTLX or 2XR operation manual for an explanation of the front panel level indications.)

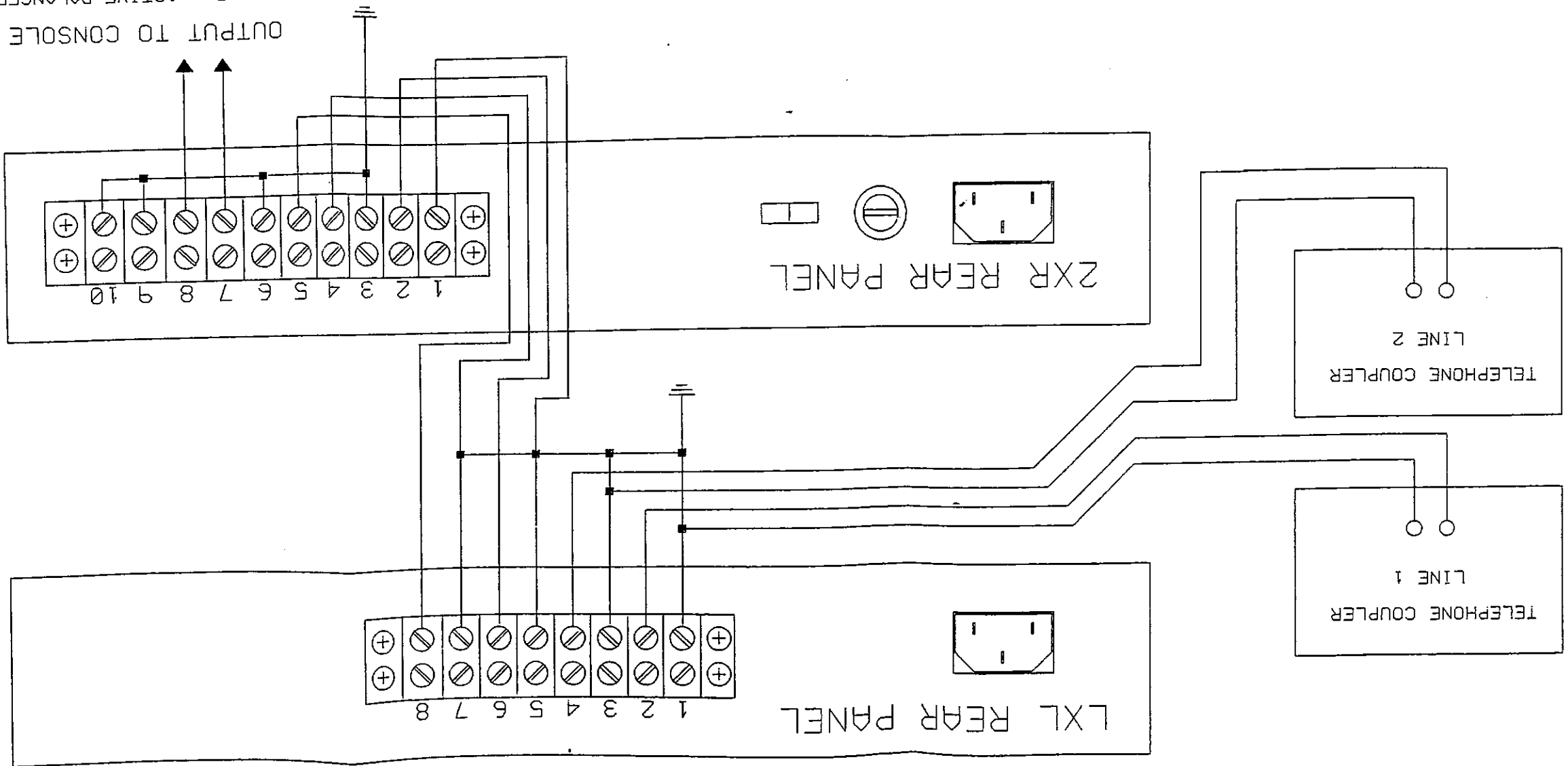
This completes the setup of the LX-L and the Two Line Decoder. It will not be necessary to make this adjustment again. In fact operators should make certain that no attempt is made to adjust the front panel potentiometers after this setup, at least not until they are willing to go through the initial setup procedure again. It is advisable to mark the settings so that it may be determined if a setting has been changed inadvertently.

After the initial setup has been made, operation will consist of establishing the telephone connections and then turning the Two Line Encoder TEST TONE on for about 15 seconds. At the end of this time, the LX-L will have automatically leveled the two lines and the test tone can be turned off.

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 TITLE LXL TO ZXR INTERCONNECTIONS
 DWG. NO. 8116-2010
 DATE 27 DEC 1989

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OUTPUT TO CONSOLE
 ("0" dbm, ACTIVE BALANCED)



COMREX CORP.
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TITLE LXL TO RTLX
 INTERCONNECTIONS

DATE 27 DEC 1989
 DWG. NO. 8116-2020

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