26J-3 Compression Amplifier/26U-3 Limiting Amplifier





If You Didn't Get This From My Site, Then It Was Stolen From... www.SteamPoweredRadio.Com The 26J–3 Auto-Level Compression Amplifier and 26U–3 Peak Limiting Amplifier working together give the broadcaster automatic level control of program material, permit higher average transmitter modulation, and minimize overmodulation.

Both units employ the latest solid-state techniques, including maximum use of linear integrated circuits for increased reliability and lower power dissipation.



26J-3 Compression Amplifier

A block diagram of the 26J-3 is shown at lower left with the exception of the power supply. It illustrates in greatly simplified form the unit's functional elements.

The input level control is a balanced H-pad network with 600-ohm impedance. The result is a truly balanced 600-ohm load for proper operation for a balanced or unbalanced source. AC amplifier (1) is a fixed gain amplifier which sets the relative level at which signal compression begins. The signal compression begins. The amplifier output is passed through the threshold level detector. The detector output is used to control the reference AGC level. This establishes the overall gain of the 261-3 for signal inputs below threshold level. The delay time in the detector serves to inhibit the reference AGC for a specified period of time after the input signal drops below the threshold level. This ensures that short pauses in program material are not recognized as a no-signal condition; and yet it allows the unit to return to nominal gain for long signal absences. This eliminates the noise background associated with amplifiers that return to maximum gain under no-signal conditions.

AC amplifier (2) serves as a level controlling device for the 26J-3 by means of negative feedback. As the output increases above the threshold level the voltage controlled resistor (R) becomes larger, allowing a greater amount of negative feedback and thus reducing the gain of the amplifier. This action continues until the input level has stabilized at a value where feedback holds the amplifier in equilibrium.

The amplifier also drives two level detectors that are DC isolated from each other. These level detectors are each part of a time constant circuit that generates a special time controlled AGC voltage. Level detector (1) is designed to charge at a nominally fast rate (10 ms), but its discharge rate may be as long as 10 seconds. This allows amplifier (2) to attenuate rapidly for a sudden signal impulse and respond slowly when it is apparent that the average signal is decreasing. Level detector (2) allows level detector (1) to hold its charge unless the average signal level suddenly decreases more than 6 db. When this point is reached, level detector (1) discharges thru detector (2) and assumes a new AGC level. The selected AGC is connected thru a diode gate to a DC amplifier. The reference AGC voltage is also connected to the DC amplifier and the signal with the greatest positive potential controls the gain of the unit. The output of the DC amplifier and an external AGC input are connected to the voltage variable resistor. The one of the greatest magnitude controls the gain of AC amplifier (2). For stereo operation, the AGC output of one unit is connected to the AGC input of the other. The channel with the larger signal input controls the gain of both channels. This helps to maintain near ideal channel separation. The meter merely indicates the relative gain of the unit and can be used to set the Input Level Control for nominal compression operation.

AC amplifier (2) also drives the output power amplifier through the output level control. The power amplifier output is a low impedance complementary emitter follower circuit connected to a transformer with dual 150-ohm seco daries. The output then may be connected as a 150-ohm of 600-ohm source with a power output of 20 dbm maximum.

Any mono broadcast installation utilizing the 26J-3 may simply convert to stereo operation by adding another unit and cross-coupling their respective AGC signals.

26U-3 Limiting Amplifier

The basic purpose of the 26U–3 is to ensure that peak signals are attenuated sufficiently to prevent over-modulation the transmitter output. Some "soft" means of accomplishing this is desirable to keep distortion, due to clipping, at a minimum, and yet keep the overall signal level as high as possible. This has been accomplished by utilizing optimum attack and release times for the AGC signal. Since the 26U– 3 is normally used in connection with the 26J–3 compression amplifier, the limiting required by the 26U–3 is of reasonably short periods.

In the 26U-3 block diagram, at lower right, the output of the AC amplifier drives a single level detector. The detector develops an AGC voltage that is controlled by an RC network. The shaped AGC signal is sent through the DC amplifier to provide impedance and level matching. The resistance value of R is controlled by either the DC amplifier thru CR1 or by the reference AGC through CR2. Whenever the input signal level is large enough to develop an AGC voltage that is larger than the reference AGC, the AC amplifier begins to compress the peak signals in a manner determined by the shape of AGC voltage. Fast attack time and release time corresponding to normal program level fluctuations assure a more constant output signal level.

The AGC signal is passed through a DC amplifier which drives a relative gain indicating meter and the voltage controlled resistor (R), which controls the gain of the AC amplifier. This operation is the same as described for the 26J–3.

In normal transmitter installations the peak limiting applifier is the final signal conditioner prior to the modulation circuitry. It thus becomes the responsibility of this unit to provide adequate means to keep transmitter overmodulation at an absolute minimum while maintaining average modulation at the highest possible level. The Collins 26U-3 Limiting Amplifier retains the proved method of diode clipping following the automatic gain control circuitry, and provides the operator the option to control the amount of clipping he desires. This, of course, may be significantly different from one installation to another, depending on the type of program material transmitted. The variable clipper shown in the block diagram enables the operator to select only one or both signal peaks for clipping. He may also adjust the amount of clipping from no clipping at all to approximately 6 db continuous clipping, referenced to a continuous sine wave. Both controls are a "behind the panel" adjustment so that inadvertent adjustment is impossible.

Manual control switches, S_1 and S_2 , engage pre-emphasis and de-emphasis networks for FM transmitter installations. The pre-emphasis network enables the automatic gain control amplifier to attenuate the higher frequencies to a greater extent. This feature is necessary to compensate for the pre-emphasis of signals in an FM transmitter. The deemphasis network, controlled by S_2 , matches the pre-emphasis network to reestablish proper signal level relationship ever the audio bandwidth.

The result of these additional functions allows the 26U-3 Limiting Amplifier to be used in either AM or FM installations. Because of the time constants chosen, cross-coupling for stereo is unnecessary, thus enabling any mono broadcast station utilizing the 26U-3 to convert to stereo operation.



Specifications

	26J-3	26U-3
Frequency Response	50–15 kHz Flat within 1 db	50–15 kHz Flat within 1 db
Total Distortion	Less than 1% at maximum out- put & all com- pression levels	Less than 1% at maximum out- put & all com- pression levels
Automatic Gain Control Range	30 db dynamic . range min.	10 db dynamic range min.
Compression Ratio	. 15:1 minimum	10:1 minimum
Normal Input/ Output Levels	. 10 dbm	10 dbm
Maximum Output Levels	20 dbm	20 dbm
Input Impedance	Fully balanced 600 ohms	Fully balanced 600 ohms
Output Impedance	Dual floating 150-ohm secon- daries for any 600 or 150 connections	Dual floating 150-ohm secon- daries for any 600 or 150 connections
Automatic Gain Control Threshold	20 dbm below normal input	Not applicable
Gain Below Threshold	Automatically returns to nominal gain after extended signal pause	Not applicable
Suggested Input Level Range	+ 30 to - 15 dbm	+ 20 to - 5 dbm
Power Requirements	. 30 watts max. @ 115 — 120 vac 60 Hz	30 watts max. @ 115 — 120 vac 60 Hz
Weight	15 lbs. max.	15 lbs. max.
Physical Dimensions	5¼" H x 15¾" D, std. 19" EIA rack mtg.	51%" H x 15%" D, std. 19" EIA rack mtg.
Peak Output Control	Not applicable	Adjustable clipping symmetrical or unsymmetrical
AM/FM Operation	Either	Either

Features

- 26J–3 has 10 db more automatic gain control range than units heretofore available.
- 26J–3 and 26U–3 provide a true balanced 600-ohm input, not just a floating input. Both units provide either 600-ohm or 150-ohm operation.
- Either unit may be added to a station's existing amplifier to establish stereo operation.
- The 26U-3 will operate in either AM or FM installations. Converting from one to the other is achieved with simple changes of two internal switches.
- In the 26U-3, symmetrical or unsymmetrical clipping is selected with a switch. Soldering of jumper wires on a circuit board is not required.

COMMUNICATION / COMPUTATION / CONTROL



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1103.97 3M P.P. 3/69