



FQ990



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Theory and Specifications

For the general user, as well as those with a more technical knowledge, these sections briefly describe the high points of the design incorporated in the LUXMAN receiver FQ990.

Even this cursory view should reveal the high degree to which the present state of the art has been incorporated in the design, human engineering and electronic performance of this unit.

FM Section

The highly specialized FM section of the FQ990 is based upon a 4 gang FET cascode varactor tuner, providing manual and pre-set tuning. Due to the use of premium parts and advanced circuitry, exceptional sensitivity and selectivity have been achieved in its performance and combined with high reliability.

The following intermediate frequency amplifier is outstanding in its features and design concept. Three ultra-high gain integrated circuits, in combination with crystal filters, provide an exceptional IF amplifier. The special broadband detector completes the signal part, providing a signal of unusually low distortion and noise to the multiplex section.

The multiplex section incorporates integrated circuits for low distortion and noise-free amplification of the stereo signal. Specialized filter circuits eliminate all unwanted signals and noises, and are then processed by an amplifier for optimum noise-free separation in stereo reception.

The most remarkable part of the FM section is precision tuning for complete noise suppression. Unlike its counterparts in the high fidelity market the LUXMAN receiver is tuned via computer. This simply means that if the receiver is tuned off-station there will be only silence; or if you tune quickly across the dial there will be no sound. A computer circuit evaluates the signal strength, distortion and the perfect center tuning. Then and only then, when the "CENTER TUNE LIGHT" is illuminated, the audio is silently and instantly turned on. When the unit is tuned silently to another station, and the optimum tuning point is reached, the "CENTER TUNE LIGHT" lights and the sound turns on without the clicks and pops normally associated with muting circuits. Actually, this is not muting in the conventional sense of the term, because the computerized circuit works at all signals and does not sacrifice receiver sensitivity to achieve muting action. In the FQ990, full, perfect muting is accomplished at 1.2 μ Volts. The sensitivity is set at the factory. The muting switch included in the FQ990 is actually a local/distance switch. This means that by moving the switch to "MUTING" all stations not in the immediate metropolitan area will be eliminated, avoiding the clogging of stations across the dial. This performance is especially notable, many tuners and receivers, available on the market today, showing much less capability. Additional evidence of the receiver's superiority will be found in the addendum (p. 4) showing the performance specifications of the receiver.

AM Section

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While the performance of the AM section of most receivers tends to be ignored, or not considered to the same degree as the FM section, this is not so in the FQ990. In this receiver, the AM section receives the same technical treatment as the FM section and the same computing network is used, in combination with the center tune light, to assure performance comparable to the FM. The computerized logic circuit, which provides inter-station noise suppression without reducing sensitivity, is fully active on AM as well. We believe this may be called "the first high fidelity AM." Without detailing the circuitry and detector used for AM, suffice it to state that the AM circuitry is of such nature that the only possible way, at the present state of the art, to improve the FQ990's AM reception would be to allow the station to broadcast a wider bandwidth than the FCC permits.

Audio Section

The audio circuitry of the FQ990 is at least as innovative and imaginative as its RF circuitry, for a number of specific reasons.

The Preamplifier

Besides careful design, and the use of premium parts, (including an ultra-low-noise integrated circuit) the preamplifier of the FQ990 has a remarkable signal-to-noise figure, combined with an overload characteristic never achieved before. Two tape speeds and two individual phono inputs give the user all the flexibility needed in using the FQ990.

One highly important feature is the overload characteristic. Loud passages on records or tape can overload the preamplifier stage of conventional high fidelity equipment. The FQ990 provides an overload level of 100m Volts — more than enough for even the highest amplitude passages.

The Tone Control Section

The receiver provides all the flexibility required for variations in equalization to suit recording studios and broadcasting engineers, the individual ear response, or speaker and room acoustics. This is accomplished by employing a turnover selector switch working in conjunction with the bass and treble controls. The low-frequency turnover switch can be set at 150, 300 or 600 Hz and the high-frequency turnover at 1.5, 3 or 6 KHz. With the baxandall-type controls the user can individually adjust the left and the right channel, and the bass and treble response, for best performance. By selecting the correct turnover frequency, the mid-frequencies are kept flat and only the specific frequencies required may be boosted or cut, according to the speaker's performance. The controls may be switched out of the circuit entirely resulting in an entirely flat response.

Needless to say, the unit has also a full complement of filters.

The high cut filter cuts sharply at 7 KHz, fully eliminating unwanted hiss and record noise.

The low cut filter eliminates rumble from old records at the tip of a finger. The loudness switch provides bass and treble boosts at lower listening levels. It is exceptionally effective in background music.

Another improvement assuring superior performance is the quad volume control system. It is an uncomfortable fact that quiet passages, played at high volume, tend to sound noisy. This is because only one volume control on the input of the tone control amplifier is taking effect. The added noise in the tone control amplifier cannot be controlled. In the FQ990, ganged potentiometers are used to control the volume on the output and input of the tone control amplifier. Thus, the signal-to-noise ratio is kept constant regardless of volume level, producing whisper-quietness in low passages even when the unit is played at concert volume.

The principle of the quad control represents a considerable improvement over the usual volume-balance control. The quad controls have the advantages of noise reduction and balance control maintained by a clutch, once the proper room balance has been set.

The Power Amplifier

Describing the performance of the power amplifier from a response and distortion viewpoint is unnecessary, once the specifications are read. What is outstanding, however, are the power rating and the incorporated safety features.

If you have a technical background, you may have already noted that the power figures are stated only in objectively measurable RMS watts, rather than in other less scientific figures.

The 150 watt RMS (both channels driven) figure is a respectable one indeed. In addition, you will note that the power bandwidth is rated at full power at all frequencies, at the specified distortion ± 0 , -1 DB points — assuring full power capability at all frequencies no matter how hard the receiver may have to be driven, and how low the efficiency of the speakers may be. To protect the high powered quasi-complimentary output stage from overload and short circuit, a special safety circuit is included, in addition to fuses. The circuit senses any overload conditions of the output devices and limits all currents in abnormal conditions (e.g. shorts, four low impedance speakers) by altering the bias of the output stage. Where problems are not severe, the safety circuit will permit output at reduced levels until the problems are corrected. In addition, to guard against the effect of long-term direct shorts, speaker fuses are provided for the left and the right channel.

Conclusion

Summing up, the LUXMAN FQ990 receiver offers all features found in the finest component tuners and amplifiers today. In some areas, the FQ990 is even superior to these, and thus represents the ultimate in receiver technology available today.

Description and specifications

AUDIO SECTION

Mechanical

Extruded front panel with endbells.
Three dimensional dial separate AM/FM illumination.
Anodized aluminum knobs dual concentric.
Slope selector switch knob with black insert.
Two position toggle switches with anodized metal handle.
Push-buttons black.
Pre-set push-buttons black with gold insert.
Size: 18.5" length x 6" high at 13.7" deep.

Electrical

Inputs: aux., tape 3-3/4, tape 7-1/2, AM, FM, Phono high, phono low; tape in, tape out with front dubbing jacks.
Secondary switches: tape monitor, mode stereo mono.
Filter switches: noise, rumble, loudness.
Speaker switches: Speaker main, speaker remote, phones.
Slope selector switches:
Treble: off, 1.5, 3.0, 6.0 KHz.
Bass: off, 150, 300, 600 Hz.
Pre-sets: for FM: 1 manual, 3 pre-sets,
On-off switch: light indicator button.

Indicators

Light indicated functions:
tape 3-3/4, 7-1/2, phono high, phono low, aux.
Light indication separately:
AM, FM.
Light indicator: stereo.
Light indicator: mono.
Light indicator: center tune.
Light indicator: pre-set manual, 1, 2, 3 (on FM only).
Indicator light: power on-off.
Field strength meter: back lit.
AM dial: light on AM only.
FM dial: light on FM only.
Pointer: illuminated on AM and FM.
Pre-set dial: back lit on FM only.

Inputs Selector	Sensitivity	Impedance	Over Load	Hum, Noise
Tape 3 3/4	1.8 MV	100 K	130 MV	-55 DB
Tape 7 1/2	2.0 MV	100 K	130 MV	-55 DB
Phono high	2.0 MV	50 K	130 MV	-60 DB
Phono low	10 MV	50 K	650 MV	-60 DB
AM	2.0 μ V	-----	-----	-6 DB S/N
FM	1.5 μ V	-----	-----	-30 DB
FM	3.0 μ V	-----	-----	-60 DB
Auxiliary	100 MV	100 K	5 V	-75 DB
Tape in (front & rear)	100 MV	50 K	-----	-75 DB
Outputs	Watts RMS.	Impedance	Harm. Distortion%	Im. Distortion%
Single channel	100	4 OHM	0.1	0.2
Single channel	75	8 OHM	0.1	0.2
Both channels	160	4 OHM	0.2	0.3
Both channels	140	8 OHM	0.1	0.2
Single channel	10	4 & 8 OHM	0.1	0.2
Single channel	1	4 & 8 OHM	0.1	0.2
Performance	HZ	KHZ	THD% $\pm$ 1DB	Remarks
power bandwidth	15	30	0.5	-----
Frequency response	10	40	-----	-----
Square wave response	50	-----	5% tilt	no belly
Damping factor	4 OHM	-----	35 min.	-----
Damping factor	8 OHM	-----	50 min.	-----
Hum and Noise	Volume Control	Frequency	-DB Max.	-DB min.
Residual	"0"	-----	-90	-80
Cross talk aux.	max.	1 KZ	-70	-65
Cross talk phono	max.	1 KZ	-65	-60
Filters	Frequency	Boost +DB	Cut -DB	Control Setting
High cut	6 KHZ	-----	3	max.
Low cut	100 HZ	-----	3	max.
Loudness	100 HZ	5	-----	10 O'clock
Loudness	50 HZ	7	-----	10 O'clock
Treble	10 KHZ	13	14	slope 1.5 KHZ
Treble	10 KHZ	10	10	slope 3.0 KHZ
Treble	10 KHZ	5	5	slope 6.0 KHZ
Bass	100 HZ	5	5	slope 150 HZ
Bass	100 HZ	9	9	slope 300 HZ
Bass	100 HZ	13	13	slope 600 HZ

RF SECTION

Tuning range	87.5 to 108.5 MHZ
IHF Sensitivity	2 μ V
Image ratio	60 dB
IF. rejection	70 dB
Capture ratio	1 dB
Selectivity	50 dB
SN ratio	60 dB
Frequency response	30 HZ to 15 KHZ
FM stereo separation	36 dB
Carrier leak	-40 dB
Distortion 100% mod	mono 0.2%
	stereo 0.5%
FM Antenna impedance	300 Ω / 75 Ω

FM Section

87.5 to 108.5 MHZ
2 μ V
60 dB
70 dB
1 dB
50 dB
60 dB
30 HZ to 15 KHZ
36 dB
-40 dB
mono 0.2%
stereo 0.5%
300 Ω / 75 Ω

AM Section

525 to 1 605 KHZ
18 μ V
60 dB
60 dB

50 dB
50 HZ to 4 KHZ

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