1. INTRODUCTION

The LSW-358A is a sweeper/marker generator for use in the first intermediate frequency range of television receivers for satellite broadcasting.

2. FEATURES

o Auto-tracking sweep
The LSW-358A sweep frequency automatically tracks the broadcast satellite tuner characteristic curve, displaying it at the center of the oscilloscope. This function is performed by simply switching the broadcast satellite tuner channel. There is no need to operate any switches or adjustments on the LSW-358A itself.

o Auto-tracking + full bandwidth sweep
Auto-tracking is performed on the forward sweep and full bandwidth sweep is performed on the return. This enables accurate adjustment on the auto-tracking side while the broadcast satellite tuner frequency position is scrutinized without tracking errors.

o Full bandwidth (wide mode) sweep, manual-mode sweep and CW functions are included, so frequency characteristics from wide band to narrow band ranges can be observed. The LSW-358A is easy to use as a signal generator.

o The LSW-358A has three intermediate frequency ranges: 70 MHz band, 134.26 MHz band and 402.78 MHz band.

o Response characteristics can be observed on two or three channels, enabling efficient interacting adjustments.

o The 10 MHz, 50 MHz and 100 MHz harmonic markers (birdies) ensure accurate frequency readings.

The 10 MHz, 50 MHz and 100 MHz harmonic markers all have different amplitudes, so they are easily distinguished.

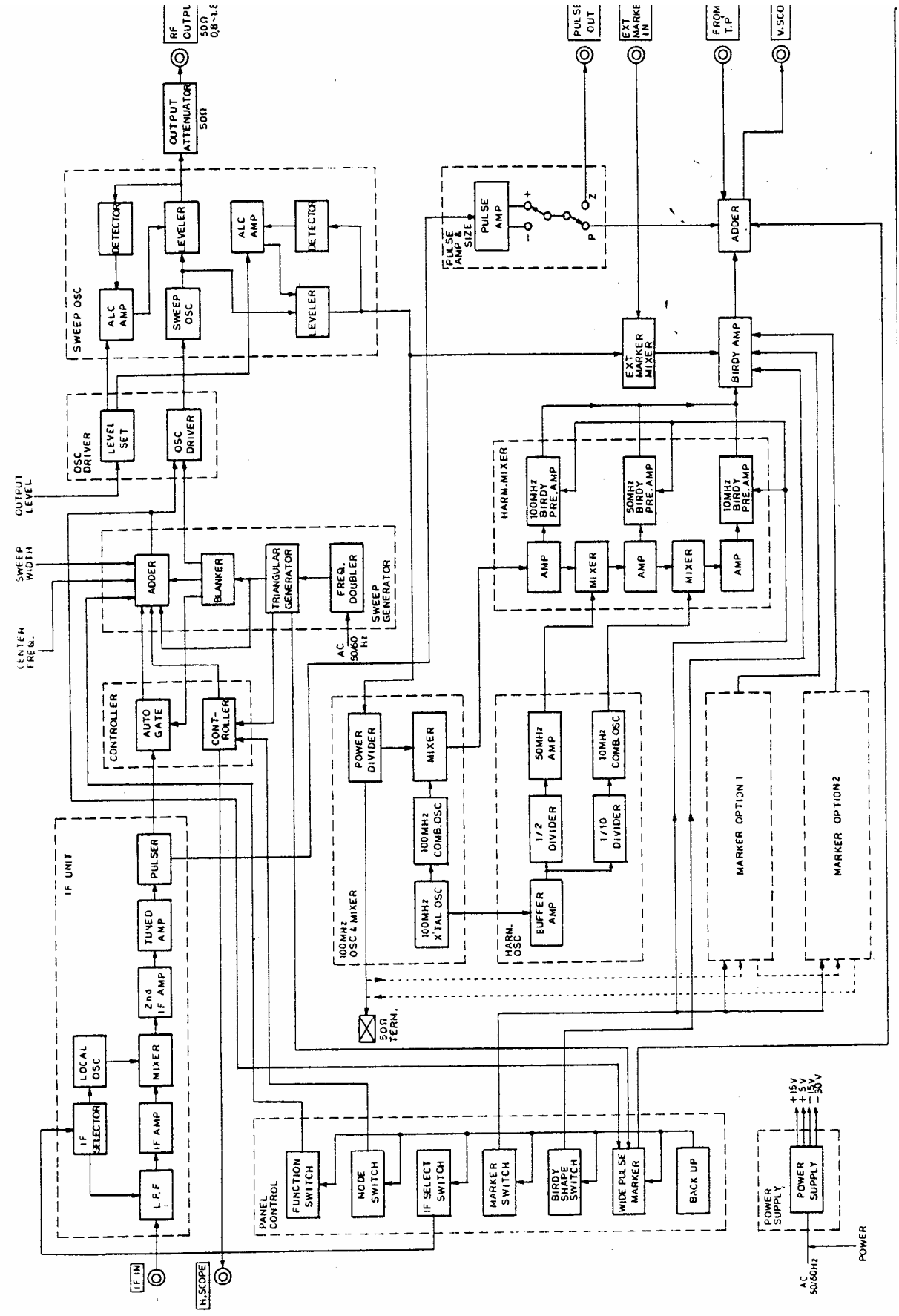
o Variable markers (pulses) make it easier to read frequencies when performing wide-mode sweep. The sweep frequency in manual-mode with a variable marker is the center frequency.

O Up to two birdy spot markers is can be added as an option.

3. SPEC IFICATIONS

<Sweep section>	
Oscillation frequency range	0.8 to 1.8 GHz
Adjustment setting accuracy	±20 MHz (at max. output level)
Sweep width	±10 to ±500 MHz
Sweep method	Varactor diode
Output voltage	0.5 Vrms (into 50 Ω load) (+7 dBm)
Output impedance	50 Ω, unbalanced
Output flatness	±1 dB
Linearity	Within 10%
Attenuator	Electronic type: 0-10 dB Rotary type: 10 dB x 6
Sweep time	3.2 ms line synchronized (one pass 100/120 Hz)
Horizontal output voltage	More than 10 Vp_p
<Marker section>	
IF marker (pulse)	3 points, accuracy ±0.5%, polarity switchable
IF marker frequency	Central frequency & central freq. ±13.5 MHz
70 MHz band	56.5, 70.0, 83.5 MHz
134.26 MHz band	120.76, 134.26, 147.76 MHz
402.78 MHz band	389.28, 402.78, 416.28 MHz
RF marker	**Variable marker** (wide-mode sweep only), polarity switchable, one pulse with ±20 MHz accuracy **Harmonic marker** 3 birdies with ±0.1% accuracy; frequencies: 10, 50 and 100 MHz **Optional marker (spot)** 2 birdies with ±0.1% accuracy; frequency range: 0.8 to 1.8 GHz **External marker terminal** 1 birdy Approx. 7 0 mV rms (-10 dBm) input voltage required to produce same amplitude as internal birdy marker
Birdy marker bandwidth	Switched between wide, intermediate and narrow bands
<Auto-tracking section>	
Auto-trigger range	1 to 300 mVrms
Input impedance	Approx. 7 5 Ω
Allowable difference between inputs for auto-tracking in multi-mode	more than 10 dB
<Other>	
FUNCTION	CW, MANUAL, AUTO, AUTO/WIDE, WIDE
MODE	Single and multi (dual or triple internally set)
Remote control	Function switches, Mode switches IF switch, Marker on/off switch, Birdy marker shape switch, Center frequency adjustment Sweep width adjustment, Output level adjustment
Power supply	50/60 MHz 100, 120, 220 or 240 V, as selected by purchaser, approx. 35 VA

SHEMATIC – BLOCK DIAGRAM



1. INTRODUCTION

The model LBO-9D-01 and LBO-9D-02 (with DC clamp) are dual channel alignment oscilloscope with a 9-inch electromagnetic deflection CRT. It may be used in combination with a sweep generator to monitor the frequency response of TV receivers, radio receivers, filters, etc.

2. FEATURES

- High sensitivity of 1 mV/div for the vertical axis and calibrated ranges.
- Incorporated clamping circuit for the vertical axis to provide fixed base line for input waveform changes.

[LBO-9D-02] - Polarity inversion for the vertical axis.
- Two types of markers; pulse marker and intensity modulation marker.

3. SPECIFICATIONS

Vertical Axis

Sensitivity:	1 mV/div to 1V/div 4 ranges in 10 times steps; uncalibrated VARIABLE control provides deflection factors continuously variable between range settings.
Bandwidth:	DC: DC to 10 kHz (-3 dB) at 4 div AC: 2 Hz to 10 kHz (-3 dB) at 4 div
Inpt impedance:	1 MO, approx. 50 pF
Input coupling:	AC - DC
Max. allowable inp. voltage:	200 V (DC + ACp-p)
Input terminal:	BNC connector
Polarity inversion:	Switchable
DC clamping:	Available by an ON-OFF switch.
[LBO-9D-02]	Clamping time can be set in synchronization with internal preset signal or external signal with positive or negative settings of a switch.
Operation mode:	CH-1: CH-1 only trace CH-2: CH-2 only trace ALT: Dual trace mode; alternate sweeping of CH-1 and CH-2 switched by 1/2 or 1/4 of horizontal input signal (triangle waveform of 25 Hz to200 Hz) or by external switching signal.

Horizontal Axis

Sensitivity:	100 mV/div or better
Attenuation:	Continuously variable to 0 sensitivity
Bandwidth:	DC: DC to 1 kHz (-3 dB) at 8 div AC: 2 Hz to 1 kHz (-3 dB) at 8 div
Input impedance:	500 kΩ, approx. 50 pF
Input coupling:	AC - DC
Max. input voltage:	200 V (DC + ACp-p)
Input terminal:	BNC connector
Polarity inversion:	Switchable

Z Axis (Intensity modulation terminal)

Sensitivity:	2 Vp-p or better
Attenuation:	Continuously variable to 0 sensitivity
Polarity switching:	Positive or negative automatic switching.
Input terminal:	BNC connector
Max. input voltage:	Less than 100 V (DC + ACp-p)

Pulse Marker Input Terminal

Sensitivity:	10 mV/div or better
Attenuation:	Continuously variable to 0 sensitivity
Polarity switching:	Switchable
Input impedance:	100 Ω
Input terminal:	BNC connector
Max. input voltage:	Less than 100 V (DC + AC p-p)