VIDEO NOISE REDUCER

■ GENERAL DESCRIPTION

The NJM2224 is a video noise reducer IC of which operation is to reduce noise contained in video color and luminance signal, and at the same time to correct outline of horizontal and vertical image signal.

The NJM2224 is suited for VCR camera especially.

■ PACKAGE OUTLINE



NJM2224M

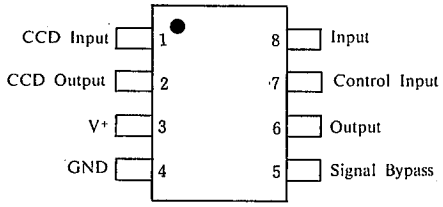
■ FEATURES

- Operating Voltage (+4.75V～+5.25V)
- Package Outline DMP8
- Bipolar Technology

■ RECOMMENDED OPERATING CONDITION

- Operating Voltage V^+ 4.75～5.25V

■ PIN CONFIGURATION



NJM2224M

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■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	8	V
Power Dissipation	P_D	300	mW
Operating Temperature Range	T_{opr}	−20～+75	℃
Storage Temperature Range	T_{stg}	−40～+125	℃

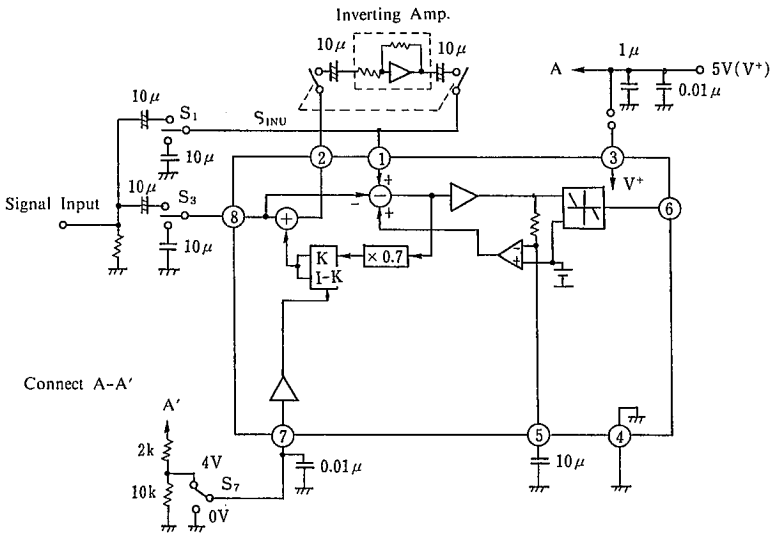
■ ELECTRICAL CHARACTERISTICS

(V^+=5V, f=100kHz, Ta=25℃)

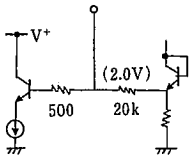
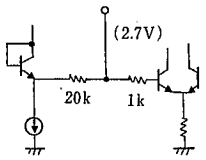
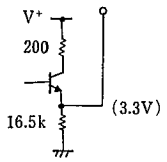
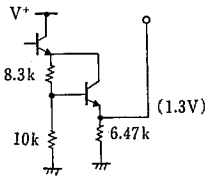
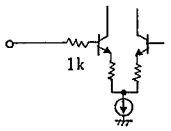
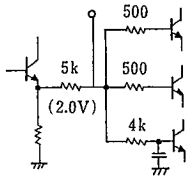
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}		—	6.9	10	mA
Voltage Gain (Pin8-Pin2)	A_{U11}	V_7=4V, V_{IN}=100mV_{P-P}	−1	0	+1	dB
	A_{U12}	V_7=0V, V_{IN}=100mV_{P-P}	−11.5	−10	−8.5	
Voltage Gain (Pin1-Pin2)	A_{U21}	V_7=4V, V_{IN}=100mV_{P-P}	—	−45	−38	dB
	A_{U22}	V_7=0V, V_{IN}=100mV_{P-P}	−4.2	−3.2	−2.2	
Voltage Gain (Pin8-Pin6)	A_{U31}	V_7=4V, Pin2−1(Inv. Amp), V_{IN}=20mV_{P-P}	—	—	−20	dB
	A_{U32}	V_7=4V, Pin2−1 (Inv. Amp), V_{IN}=300mV_{P-P}	−5	−3	−1	
Bandwidth (Pin8-Pin2)	f_{B1}	V_7=4V, V_{IN}=100mV_{P-P}	10	—	—	MHz
Bandwidth (pin1-pin2)	f_{B2}	V_7=0V, V_{IN}=100mV_{P-P}	10	—	—	MHz
Bandwidth (Pin8-Pin6)	f_{B3}	V_7=4V, V_{IN}=100mV_{P-P}	8	—	—	MHz
Pin6 DC Voltage	$V_{6\text{-}DC}$		—	1.3	—	V

Note: Unless specified, all items are tested by Test Circuit.

■ TEST CIRCUIT



■ TERMINAL FUNCTION

PIN NO.	PIN NAME	INSIDE EQUIVALENT CIRCUITS	PIN NO.	PIN NAME	INSIDE EQUIVALENT CIRCUITS
1	CCD Input		5	Signal Bypass	
2	CCD Output		6	Output	
3	V+	———	7	Control Input	
4	GND	———	8	Input	

■ APPLICATION NOTE

The NJM2224 is an integrated circuit of composing variable comb type filter which reduces noise mixed in chroma or luminance signal of VCR camera and others. The CCD delay device is suitable for outside delay element composing comb type filter, compared with a glass delay device. The basic circuit is the most excellent FB system with NULL.

Fig.1 is its basic block diagram and Fig.2 is actual block diagram of NJM2224.

Fig.3 is one of application examples.

The video noise reducer system is composed of three capacitors for connection and one capacitor for signal bypass and CCD delay device. The NJM2224 is applicable to both of chroma and luminous signal using CCD delay device suitable for each signal. High level input to the Control of Reduce/Enhance terminal (Pin7) makes enhance mode (increasing of high frequency part) and Low level input makes reduce mode (decreasing of high frequency part.) Its threshold level is about 2.25V at 5V supply voltage. Basic operating characteristics is shown in Fig.4.

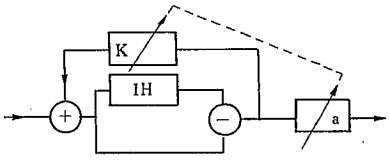


Fig. 1 Basic Block Diagram

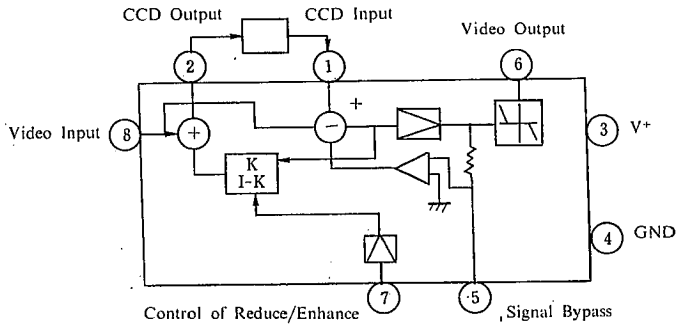


Fig. 2 Block Diagram

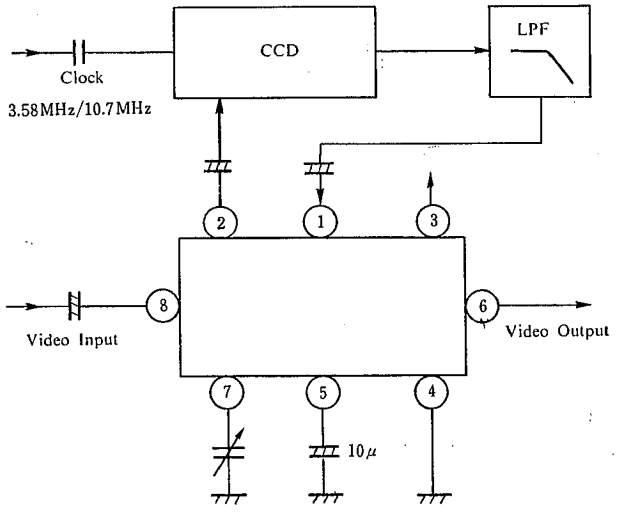


Fig. 3 Application

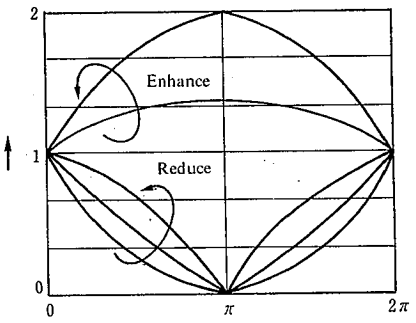


Fig. 4 Basic Operating Characteristic

The comb type filter has special frequency characteristics shown Fig.5, and is widely used to separate luminance and color signal in video-signal circuit. Using this comb type filter, the NJM2224 reduces noise and enhances signal in video signal, automatically.

Fig.6 shows video signal wave form and its frequency component.

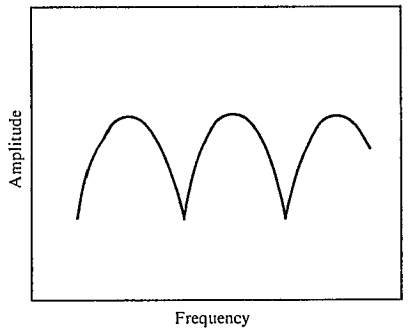


Fig. 5 Comb Type Filter Frequency Characteristic

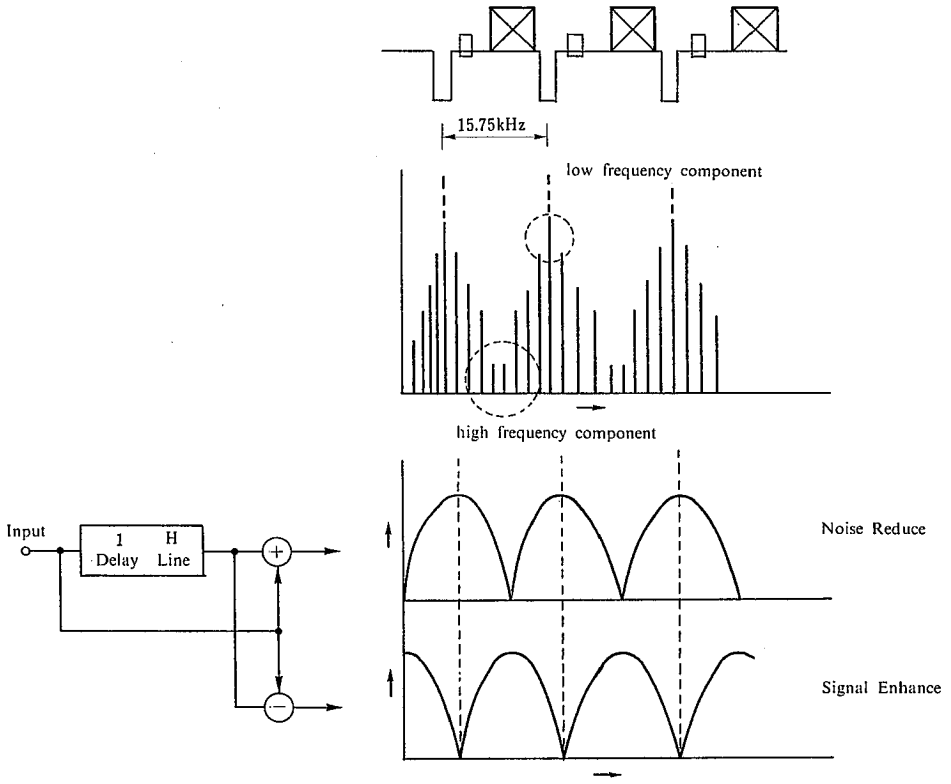
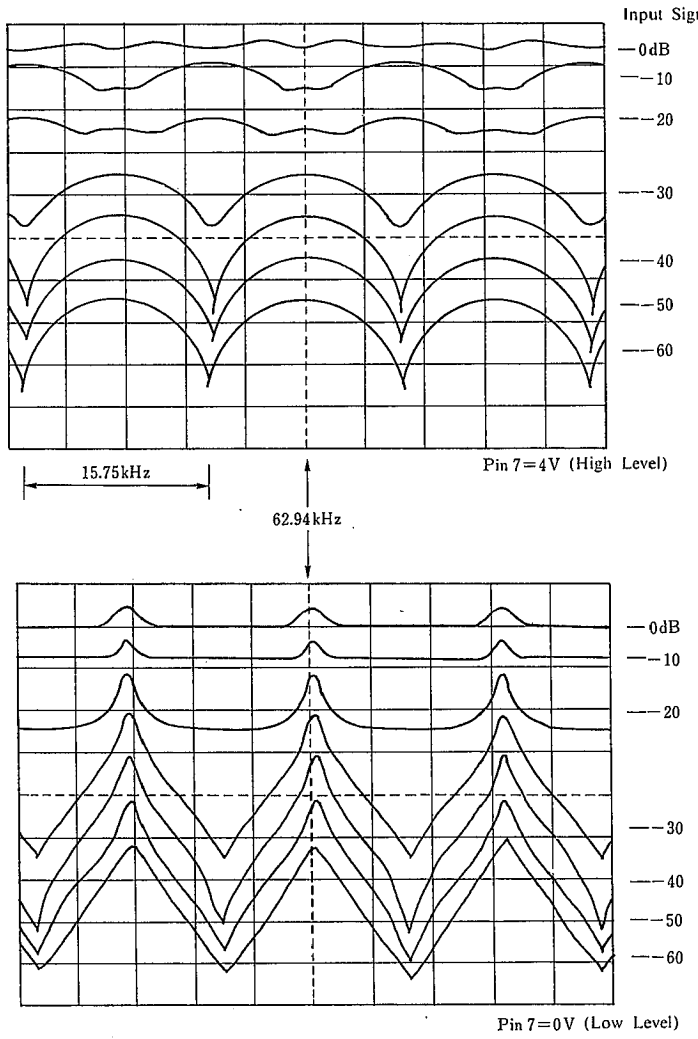


Fig. 6 Video Signal Waveform & Frequency Component

Fig.7 shows output characteristics determined by the input level to Pin7. The phase difference of each signal makes the output distortion of comb type filter characteristics, because FB system adds and substracts each signal. The NJM2224 phase difference is 2 degree at 4MHz. High dynamic range of video signal is realized by high supply voltage.

Fig. 7 Comb Type Filter Characteristics vs. Input Signal Level (800mV$_{P-P}$=0dB)



MEMO

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