



LA7916

Peripheral Circuit for TV/VCR Frequency Synthesizer Channel Select System

Overview

The LA7916 contains CPU/PLL-excluded peripheral circuits such as switch, +5V power supply (with \overline{RST}), sync detector, low-pass filter for color TV/VCR frequency synthesizer channel select system use.

Functions

- Band switch (2-input 4-output).
- Video signal, flyback pulse, AFT output-used detection of tuning mode and horizontal sync mode.
- +5V power supply, with \overline{RST} output (for CPU).
- Operational amplifier for low-pass filter (for frequency synthesizer).

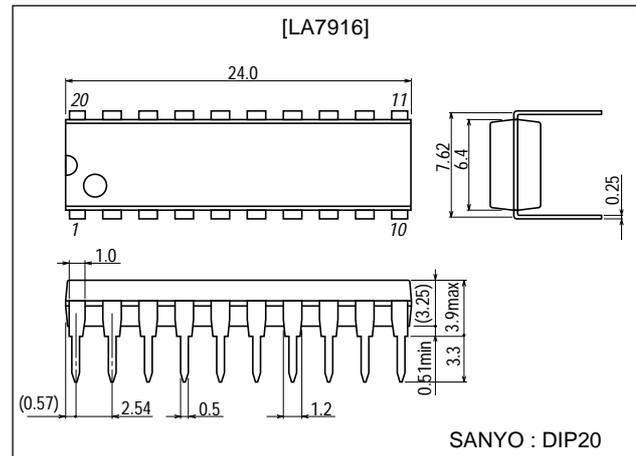
Features

- The band switch truth table can be changed in a short period of time at the user's option.
- The band switch is of pnp output type which need not be driven externally.
- The operational amplifier for low-pass filter is excellent in pulse response because of its high-impedance input pin.

Package Dimensions

unit:mm

3021C-DIP20



Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Allowable power dissipation	$P_d \text{ max}$	$T_a \leq 65^\circ\text{C}$	770	mW
Operating temperature	T_{opr}		-20 to +65	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +125	$^\circ\text{C}$
[Band switch section]				
V_{CC1} maximum supply voltage	$V_{13} \text{ max}$		15	V
Maximum load current	$I_{14}, I_{15} \text{ max},$ $I_{16}, I_{17} \text{ max}$		-50	mA
Maximum applied voltage	$V_{14}, V_{15} \text{ max},$ $V_{16}, V_{17} \text{ max}$	Output off	-15	V
Maximum applied voltage (input)	$V_6 \text{ max}, V_7 \text{ max}$	$V_{CC1}=14\text{V}$	12	V
[+5V power supply section]				
V_{CC2} maximum supply voltage	$V_{10} \text{ max}$		15	V
+5V output current	$I_8 \text{ max}$		-38	mA

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Parameter	Symbol	Conditions	Ratings	Unit
[Tuning detection section]				
Maximum input voltage	V_2 max		3.5	V
Maximum input voltage	V_3 max		V_{CC1}	V
Maximum input voltage (negative polarity)	$-V_2$ max		-1.4	V
Maximum comparator difference voltage	$V_{19}-V_{20}$		6	V
Maximum output current	I_1 max		-3	mA
[Operational amplifier section]				
Maximum applied voltage	V_{12} max		35	V
Maximum input voltage	V_{11} max		5.9	V

Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply voltage range	V_{10}		9.0	12	14.0	V
	V_{13}		9.0	12	14.0	V
Recommended output current in tuning detection section	I_4, I_5				3	mA
Recommended load current in operational amplifier section	I_{12}			3	5	mA
Recommended setting range of comparator voltage in tuning detection section	V_{19}		2.7		7.0	V

Operating Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[Band switch section]						
Quiescent current drain	I_{CC1}			16.0		mA
Output saturation voltage	F1 to 4 sat	$I_o = -40\text{mA}$	0		0.7	V
Input high-level voltage	V_{6TH}, V_{7TH}		2.2			V
Input low-level voltage	V_{6TL}, V_{7TL}		0		0.8	V
Output leakage current	I_{FL}	-15V			-50	μA
[+5V power supply section]						
Quiescent current drain	I_{CC2}			3.6		mA
+5V output voltage	V_8	$I_g = -30\text{mA}$	4.5		5.5	V
RST output voltage	V_9 sat	$I_g = -100\mu\text{A}$	4.5		5.5	V
[Tuning detection section]						
Input threshold voltage	V_{2TH}		0.4	0.72	1.5	V
Comparator voltage	V_{C19}		3.7	4.0	4.3	V
Window comparator high voltage	V_{CH}		5.7	6.0	6.3	V
Window comparator low voltage	V_{CL}		2.7	3.0	3.3	V
Output saturation voltage	V_4 sat	$I_{\text{sink}} = 2\text{mA}$	0	0.33	0.7	V
	V_5 sat	$I_{\text{sink}} = 2\text{mA}$	0	0.33	0.7	V
Low-pass filter output current	I_{OL}		-1.80		-0.90	mA
Sync separation start current	I_{1TH}		-150			μA
[Operational amplifier section]						
Output saturation voltage	V_{12} sat		0		0.3	V
Input threshold voltage	V_{11TH}		2.0		2.4	V
Input current	I_{11}				20	nA

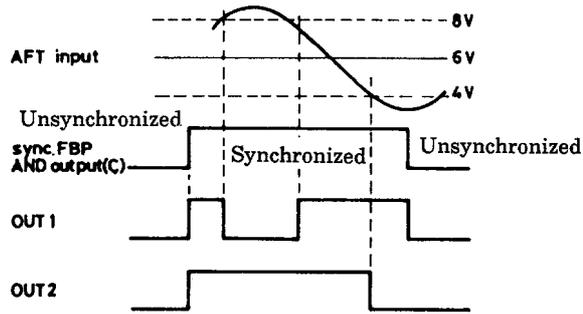
Band Switch Truth Table

Input		Output			
A (Pin 7)	B (Pin 6)	F1 (Pin 14)	F2 (Pin 15)	F3 (Pin 16)	F4 (Pin 17)
L	L	H	Z	Z	Z
H	L	Z	H	Z	Z
L	H	Z	Z	H	Z
H	H	Z	Z	Z	H

Operation of Tuning Detection Section

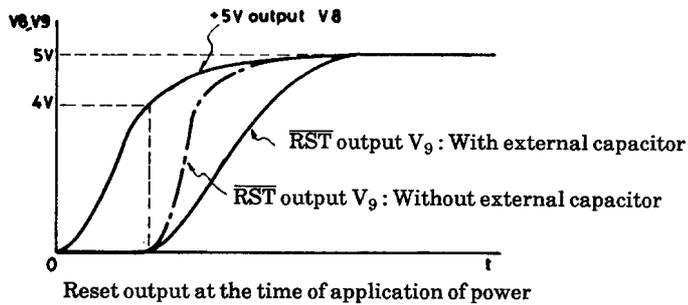
Tuning Mode	LPF Output	AFT	OUT1	OUT2
Unsynchronized	L	AFT-L	L	L
		AFT-C	L	L
		AFT-H	L	L
Synchronized	H	AFT-L	H	L
		AFT-C	H	H
		AFT-H	L	H

AFT-L : $V_{AFT} < V_{CL}$
 AFT-C : $V_{CL} < V_{AFT} < V_{CH}$
 AFT-H : $V_{AFT} > V_{CH}$



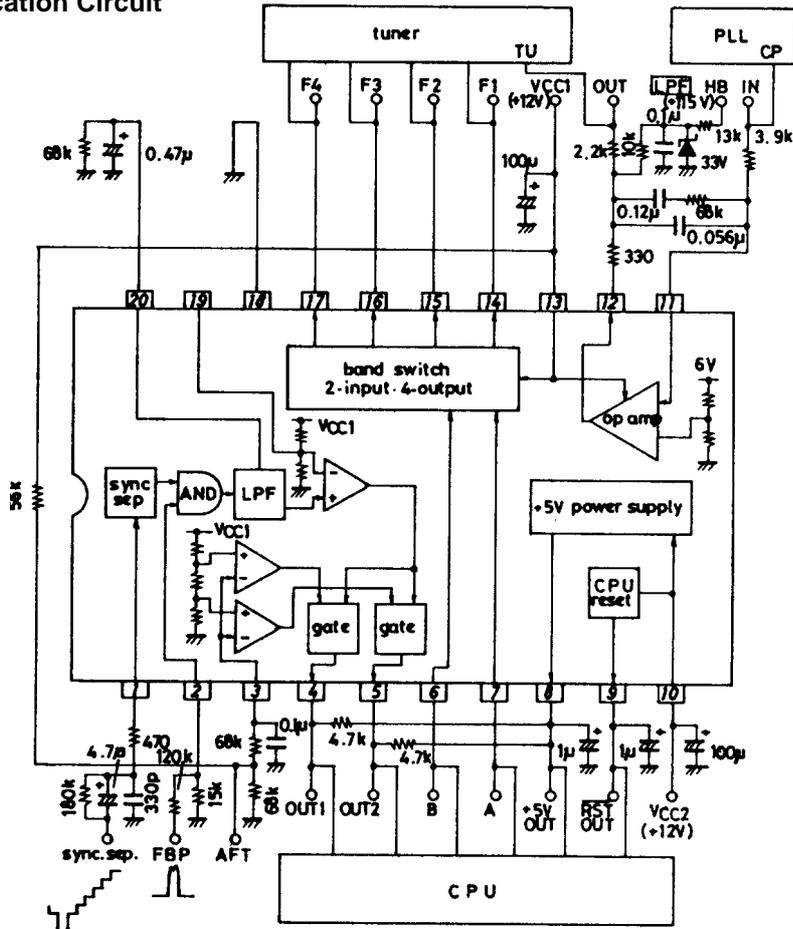
+5V Power Supply, \overline{RST} Output

When +5V output V_8 becomes approximately 4V at the time of application of power, the reset signal is delivered at pin 9. The reset signal can be delayed by a capacitor (recommended value : 1 μ F) externally connected to \overline{RST} output V_9 .



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Sample Application Circuit



Unit (resistance:Ω, capacitance:F)

VCR application : In VCR applications without flyback pulse, connected pin 2 to V_{CC} through a resistor.

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