

AKC6955 stereo FM / TV / MW / SW / LW digital tuning radio

Device Overview

AKC6955 Integrated FM radio complete
/ The television audio / MW / SW receiver function, including
input from the antenna to the stereo audio output of all modules.
Chip supports worldwide FM / TV sound / long wave / MW / SW
bands.

application

- Desktop radios, portable radios
- Clock radios
- Boom boxes

Package

- TSSOP24 Package

Features

- stand by 30 ~ 230MHz Any frequency FM demodulation
- stand by 0.15 ~ 30MHz Any frequency AM demodulation
- Preset FM band (64 ~ 108 MHz)
- stand by TV1 audio(56.25 ~ 91.75 MHz)
- stand by TV2 audio(174.75 ~ 222.25 MHz)
- Presets wave band (520 ~ 1730 KHz)
- Preset shortwave band (3.2 ~ 21.9 MHz)
- Preset long-wave band (150 ~ 285 KHz)
- Custom support band
- It supports a wide supply voltage range: 2.0V ~ 4.5V
- stand by 32.768KHz & 12MHz Passive mode crystal reference clock and
- Integrated audio amplifier (maximum power differential 0.5W)
- Two kinds of control volume: volume potentiometer and the volume register
- Two kinds of de-emphasis modes: 50us / 75us
- Support tuning lamp function
- The audio output may be in phase, may be inverted output
- Support for stereo line input
- Support low-power standby mode, 3V When power consumption 10uA
- Internal integrated PLL
- Intelligent frequency control
- AGC
- Precise digital demodulation
- Smart mute function
- SW Increased tracking filter, greatly improving SW Audibility
- MW Precise tuning adaptive front end
- FM Subwoofer
- integrated LDO
- According to the battery voltage, automatically adjust the volume
- Pb-free / RoHS compliant

Pin

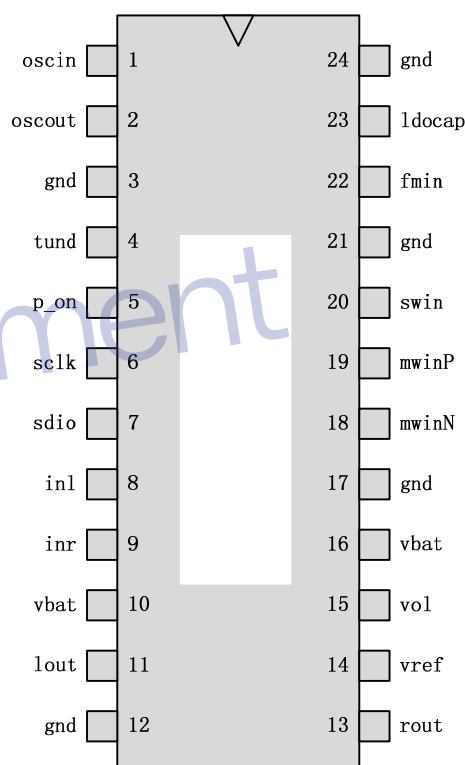


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1 Technical Specifications

1.1 Limit indicator

Table 1. Limit indicator

parameter	Symbols or test strips Item	Min	Typ	Max	unit
Power supply	VBAT	- 0.5	-	5.8	V
I2C interface input voltage	SCLK, SDIO	- 0.3	VBAT	VBAT + 0.3	V
Operating temperature		- 40	-	85	° C
Storage temperature		- 55	-	150	° C
The maximum signal reception				0.8	Vpk
Pin antistatic			2		KV

Beyond the limits of the conditions listed above, it can cause permanent damage or deterioration indicator device.

1.2 Recommended operating conditions

Table 2. Recommended operating conditions

parameter	Symbols or test conditions	Minimum	Typical	Max	unit
Power supply	VBAT	2	3.3	4.5	V
Input digital signal low threshold	SCLK, SDIO			0.3 * VBAT	V
Input digital signal high threshold	SCLK, SDIO	0.7 * VBAT			V
Low threshold output digital signal	SDIO, TUND			0.2 * VBAT	V
High threshold output digital signal	SDIO, TUND	0.8 * VBAT			V
Operating temperature		- 40	-	85	° C

1.3 DC Characteristics

(VBAT = 3V, VIO = 3 V, TA = 25 ° C, The other is the default, unless otherwise noted)

Table 3. DC Characteristics

parameter	Symbols or test conditions	Min	Typ	Max	Units
FM mode					
Drive external audio amplifier	Maximum volume, is not connected speakers or headphones		32.5	35	mA
Built-in audio amplifier driving	Maximum volume, is not connected speakers or headphones		34	37	mA
TV Sound Mode					
Drive external audio amplifier	Maximum volume, is not connected speakers or headphones		32.5	35	mA
Built-in audio amplifier driving	Maximum volume, is not connected speakers or headphones		34	37	mA
AM mode					
Drive external audio amplifier	Maximum volume, is not connected speakers or headphones		30.5	33	mA
Built-in audio amplifier driving	Maximum volume, is not connected speakers or headphones		32	35	mA
Shortwave mode					
Drive external audio amplifier	Maximum volume, is not connected speakers or headphones		30.5	33	mA
Built-in audio amplifier driving	Maximum volume, is not connected speakers or headphones		32	35	mA
SHUTDOWN mode					
Quiescent Current	When the 3V power supply from about 45uA about 10uA, 4.5V power		10	30	μA

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1.4 Reception characteristics

(VBAT = 3V, T_A = 25 ° C, The other is the default, unless otherwise noted)

1.4.1 FM and TV sound

Table 4. FM reception characteristics

parameter name	symbol	Test Conditions	Typical minimum value	maximum value	unit	
FM Frequency Range	FM fr	Predefined band	64	-	108	MHz
TV1 Frequency Range	TV1 fr		56.25	-	91.75	MHz
TV2 Frequency Range	TV2 fr		174.25	-	222.25	MHz
Low noise amplifier input resistor	Zin		-	200	-	ohm
LNA input capacitance	Cin		-	2	-	pF
Practical sensitivity	Sen	Mod = 22.5K Ref out SINAD = 30dB	-	7	-	dBuV
Best signal to noise ratio	SNR	URF = 1mV Ref out Mod = 22.5K	-	50	-	dB
Stereo lighting sensitivity		Mod = 75K pilot & stereo	-	twenty three	-	dBuV
Stereo separation		URF = 1mV Mod = 75K Pilot & Stereo	-	31	-	dB
Image Rejection	IMR	Mod = 22.5K IMR = RF + 2 * IF SNR = 30dB	-	43	-	dB
300K Adjacent Channel selectivity ACS _{300K}		Mod = 22.5K +/- 300K SNR = 30dB	-	NA	-	
Spurious suppression		Mod = 22.5K ± 1MHz SNR = 30dB	-	60	-	dB
AM suppression		URF = 1mV FM mod = 22.5K AM mod = 30%	-	50	-	dB
Left and right channel amplitude balance		URF = 1mV Mod = 22.5K Ref out	-	0.1	-	dB
Audio Frequency Response		URF = 1mV Mod = 22.5K 50uS De loss = 6dB	125	-	4500	Hz
Distortion	THD	URF = 1mV Mod = 22.5K Ref out Vdd = 3V	-	0.6	-	%
The maximum distortion	THD _{max}	URF = 1mV Mod = 22.5K Max out Vdd = 3V	-	20	-	%
Strong signal distortion		URF = 100mV Mod = 75K Ref output	-	4	-	%
22.5K Maximum power		Vdd = 3.6V Urf = 1mV Mod = 22.5K Max out	-	50	-	mW
75K Maximum power		Vdd = 3.6V Urf = 1mV Mod = 75K Max out	-	600	-	mW
The audio output common mode	Vcm		-	VDD / 2	-	V
Station search time			-	40	-	ms / chan
boot time			-	1	-	ses
The minimum operating voltage	MinV		-	2	-	V

1.4.2 Medium wave and long wave reception characteristics

Table 5. Polish and Long wave reception characteristics

parameter name	symbol	Test Conditions	Typical minimum value	maximum value	unit	
LW Frequency Range	LW fr	Predefined band	150	-	285	KHz
MW Frequency Range	MW fr	Predefined band	510	-	1730	KHz
Practical sensitivity	Sen	Long bar magnet 80mm Lind = 350uH ~ 450uH SNR = 20dB	-	82	-	dBuV
Signal to Noise Ratio	SNR	Mod = 30% Urf = 100dBuV	-	40	-	dB

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Adjacent Channel selectivity	ACS	Mod = 30% ADJ = RF +/- 10KHz SINAD = 20dB	-	40	-	dB
30% The maximum volume output		VDD = 3.6V Mod = 30% Max vol	-	50	- mW	
80% The maximum volume output		VDD = 3.6V Mod = 80% Max vol	-	380	- mW	
Audio Frequency Response		Urf = 100dBuV Mod = 30% Loss = 6dB	50	-	4000	Hz
Distortion	THD	Urf = 100dBuV Mod = 30% Ref out	-	1.2	-%	
Image Rejection	IMR	Mod = 30% Fimr = Fr + 2 * IF SINAD = 20dB	-	50	-	dB
Best signal to noise ratio			-	49	-	dB
The maximum random noise		Max Vol Mod = off	-	30	- mV	
LNA input impedance	Zin		-	> 1M	-	ohm
Output common mode	Vcm		-	VDD / 2	-	V
Zapping time			-	35	-	us / chan
boot time			-	1	-	S

1.4.3 Shortwave reception characteristics

Table 6. Shortwave reception characteristics

parameter name	symbol	Test Conditions	Typical	minimum	value	maximum	value	unit
Frequency Range	Fr	Predefined band	3.2	-	-	21.9	MHz	
Practical sensitivity	Sen	30% of modulation, SINAD = 20dB	-	20	-	-	dBuV	
Signal to Noise Ratio	SNR	60dBuV, 30% of modulation	-	50	-	-	dB	
10KHz adjacent channel rejection	ACS	30% of modulation, SINAD = 20dB	-	40	-	-	dB	
30% of the maximum volume output		Maximum volume, 3.6V power supply	-	50	-	-	mW	
80% of the maximum volume output		Maximum volume, 3.6V power supply	-	380	-	-	mW	
Audio Frequency Response		100dBuV, AF = 1KHz, Mod = 30%, corresponding to an output audio frequency attenuation 6dB	50	-	-	4000	Hz	
Distortion	THD	100dBuV, Mod = 30%, AF = 1KHz	-	1.2	-	-	%	
Image Rejection	IMR	SINAD = 20dB + 2 * IF	-	45	-	-	dB	
AGC characteristic		Urf = 126dBuV, Urf reduced until the audio output attenuation 10dB, Urf1-Urf2	-	> 79	-	-	dB	
Modulation hum		Differences Urf = 126dBuV, to the modulation and modulation	-	- 49	-	-	dB	
The maximum random noise		The maximum volume output, to modulate	-	30	-	-	mV	
LNA input impedance			-	> 1	-	-	Mohm	
The audio output common mode voltage			-	VDD / 2	-	-		
Zapping time			-	35	-	-	us / chan	
boot time			-	1	-	-	S	

1.5 Crystal property requirements

Table 7. Passive crystal properties

parameter name	symbol	Test Conditions	Typical	minimum	value	maximum	value	unit
32.768KHz Passive crystal	ESR	Series resonant impedance				100	KΩ	
Crystal frequency deviation			--100	0	100	ppm		
12MHz Passive crystal string	ESR	United resonant impedance				50	KΩ	
Crystal frequency deviation			--20		20	ppm		

Table 8. The active reference clock characteristics

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parameter name	symbol	Test Conditions	Typical	minimum value	maximum value	unit
Rms jitter		Audio output SINAD more than the 40dB			2	ns
Low voltage input reference clock		Support sine and square wave	-0.1		0.4	V
A high voltage input reference clock		Support sine and square wave	1.2		1.8	V
Clock frequency deviation			--100	0	100	ppm

2 I2C Interface Timing

The chip supports I2C protocol version 2.1, the maximum data rate of 400KHz. Below are a timing chart of write:

Table 9. I2C Interface Timing

parameter	symbol	Minimum	Typical values	Maximum	unit
SCLK frequency	Fscl		-	400	KHz
SCLK high duration	Thigh	0.6	-	-	us
SCLK low duration	Tlow	1.3	-	-	us
I2C start falling SDIO advance	Tsu: sta	0.6	-	-	us
I2C start falling retention capacity SDIO	Thd: sta	0.6	-	-	us
I2C falling edge on the end of hysteresis SDIO	Tus: tso	0.6	-	-	us
SDIO input to the rising edge of SCLK advance	Tsu: dat	100	-	-	ns
SDIO retention amount is input to the rising edge of SCLK	Thd: dat	0	-	900	ns
Started to the end of time	Tbuf	1.3	-	-	us
Enter the pulse time	Tsp	-	-	50	ns

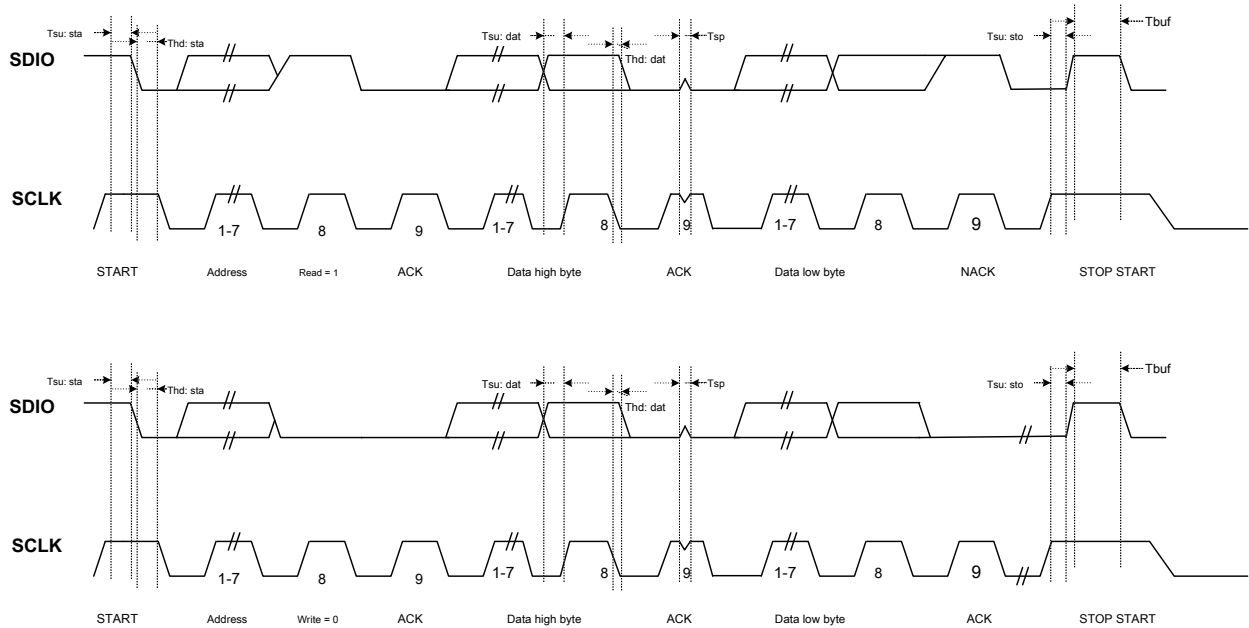
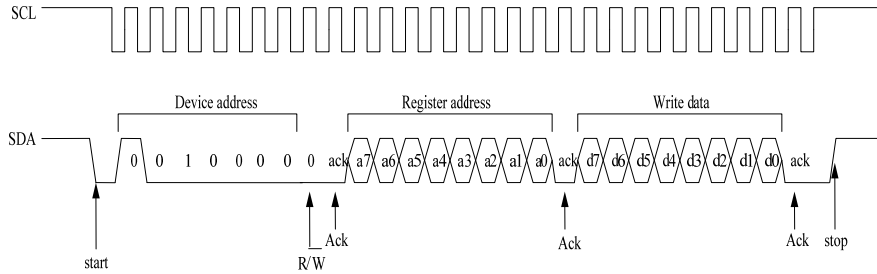


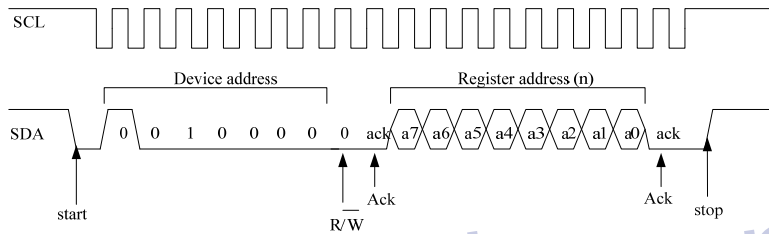
Figure 1. I2C Read and write timing control

3 I2c A single-byte register operation

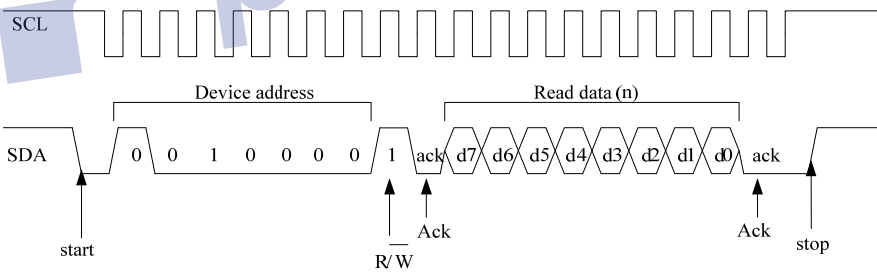
3.1 Single-byte write operation



3.2 A single-byte read



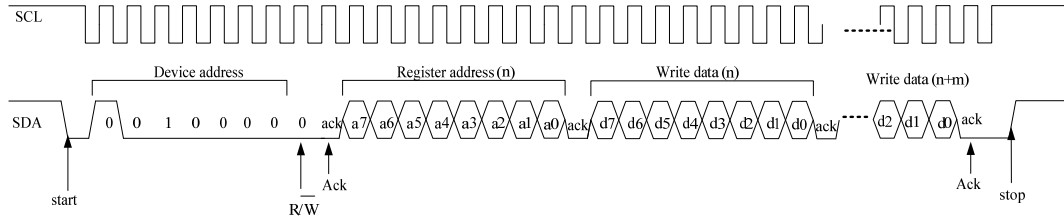
Step1 : Address configuration register (a write operation)



Step2 : Read register value (i2c Read)

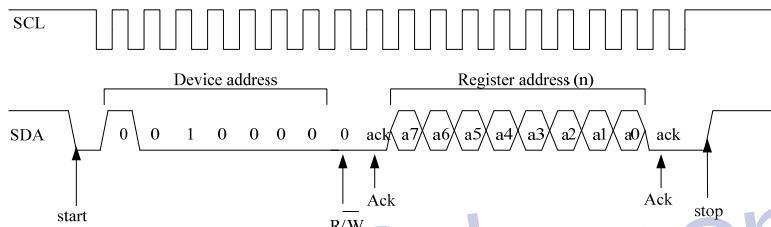
4 I2c Multi-byte register operation

4.1 Multi-byte write (continuous write, byte count >= 2)

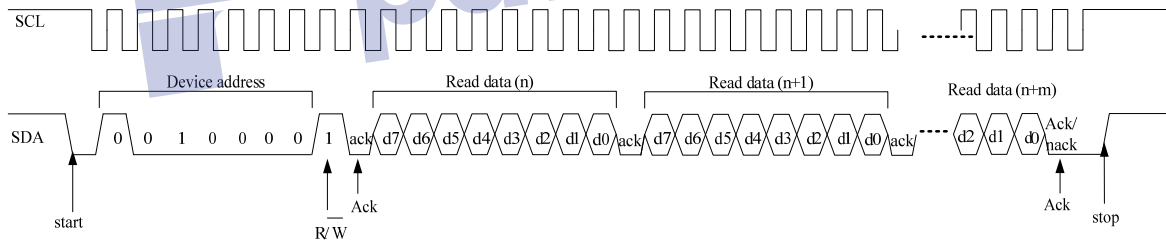


Note: If the current write is the last register (address = 0x1D), the Slave in the Ack cycle will Nack sent to the I2C master, reminding the end of the current write operation.

4.2 Multi-byte read operation (continuous reading, the number of bytes >= 2)



Step1 : Address configuration register (a write operation)



Step2 : Read register value (i2c Sequential read operation)

5 Quick station search logic

a) fast channel search preparations:

Setup Mode	fm_en = "1" FM mode, "0" AM mode;
Set Band	Have decided to register amband and fmband
Station search direction	seekup = "1", the channel number is increased toward a search direction "0", the direction of the channel number reduced search, the band end after the other end to the band
Also set for the FM station search interval	Tuning register space intervals determined

b) do a tune operation and will register tune set to "0", then set to "1"

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c) seek register is set to "0" and then to "1" to trigger the fast channel search logic;

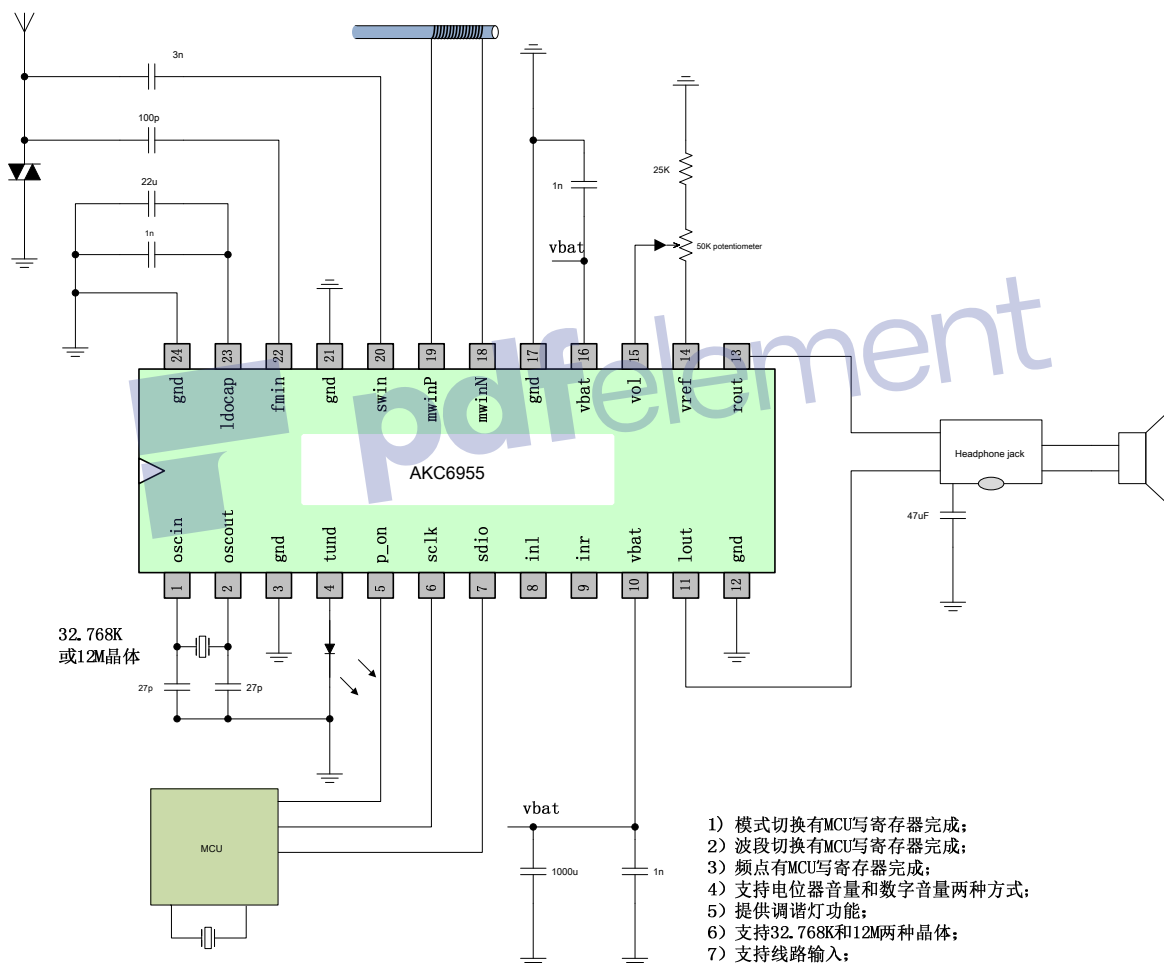
d) before the internal logic channel search is not over, as desired interrupted intentionally seek register may be set to "0" to;

Automatic end condition e) has an internal two channel search logic: End station search, the whole band without end station, whichever junction Beam, the register set will stc to "1", the client can learn mode register stc polling station search logic is finished;

f) determining whether the station can be tuned in accordance with the register is "1" determination, "1" is the radio

g) Each number takes about 35ms.

6 Application Circuit



note:

All radio operations, both MCU write register to complete, including the mode switching, band switching, frequency settings, like zapping operation, the MCU further HMI is completed, including the management of the display, and the like deposit station station search operation ;

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7 Register Definition

The chip I2C register array corresponding to the address is "0,010,000."

7.1 Register Map

Register read-write registers 0 to 19, 20 to 27 for the read-only registers.

address	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0_RW 0x4C	power_on? "0"?	fm_en? "1"?	tune? "0"?	seek? "0"?	seekup? "1"?	mute? "1"?	rsv? "00"?	
1_RW 0x10	amband [4: 0]? "00010" MW2,9K wave?				fmband [2: 0]? "000" FM1,87 ~ 108?			
2_RW 0x4A	rsv? "0"?	ref_32kmode "1"?	mode3k? "0"?	chan [12: 8] 13'd2760?? "01010"?				
3_RW 0xC8	chan [7: 0] 13'd2760?? "11001000"?							
4_RW 0x19	usr_chan_start [7: 0]? "8'd25" FM 50M???							
5_RW 0x32	usr_chan_stop [7: 0]? "8'd50" FM 70M???							
6_RW 0xA1	volume [5: 0]? "101000" volume level 48?						line? "0"?	phase_inv? "1"?
7_RW 0xA1	rsv? "1"?	rsv? "0"	De? "1"?	BBEN? "0"?	Stereo? "0"?	Mono? "0"?	bw [1: 0]? "01"?	
8_RW 0x58	fm_cnr_th [1: 0]? "01"?	am_cnr_th [1: 0]? "01"?		fd_th [1: 0] "10"??		stereo_th [1: 0]? "00"?		
9_RW 0x07	rsv? "0000"?				pd_adc_vol? "0"?	osc_en? "1"?	rsv? "1"?	lv_en? "1"?
10_RW 0x7F	rsv? "0111" 1111"?							
11_RW 0xE0	rsv? "11"?		space [1: 0]? "10"?		rsv? "0000"?			
12_RW 0x00	pd_adc? "0"?	??	pd_rx? "0"?	rsv? "0000" 0000"?				
13_RW 0x00	rsv? "0"?	st_led? "0"	rsv? "00"?		vol_pre? "00"?		rsv? "00"?	
14 ~ 19_RW	Chip reserved word, using the internal digital logic tests, values of these registers do not change during normal use? ? "40" "82" "CC" "FD" "80" "80"?							
20_R	ST? "0"?	STC? "0"?	Tuned? "0"?	readchan [12: 8]? "00000000"?				
21_R	readchan [7: 0]? "00000000"?							
22_R	mode3k_f? "0"?	cnram [6: 0]? "000000"?						
23_R	st_dem? "0"?	cnrfm [6: 0]? "000000"?						
24_R	pgalevel_rf [2: 0]? "00"?			pgalevel_if [2: 0]? "00"?			rsv? "00"?	lvmode? "00"?
25_R	rsv? "00"?		vbat [5: 0]? "00000"?					
26_R	fd_num [7: 0]? "0000000"?							
27_R	rsv? "0"?	rssi [6: 0]? "000000"?						

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7.2 Register operations, detailed explanation

7.2.1. Register operations

I2C write mode: 0-19 registers, a write operation may be performed continuously, from the register 0 to register 19 all finished, may be performed a single register write operation;

I2C read mode: 0-27 registers, a read operation may be performed continuously, from the register 0 to register 27 read all, may be performed a single register read operation;

7.2.2 Detailed explanation Register

Table 10. Register Description

Reg0: configure register 0 (default: 0x4c) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x00 (RW)	7	power_on	0	1- 0 - Chip chip work does not work	
	6	fm_en	1	1-- FM mode 0-- AM mode	
	5	tune	0	0-> 1 Trigger tune process The STC bit is set high when the tune operation completes.	
	4	seek	0	0-> 1 Trigger tune process The STC bit is set high when the tune operation completes.	
	3	seekup	1	Seek direction control bit 0 - Seek down 1 - Seek up	
	2	mute	1	1 - Mute L / R channel 0 - Normal operation	
	1: 0	rsv	00	Debug use, do not change this value using	

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Reg1: configure register 1 (default: 0x10) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x01 (RW)	7: 3	amband	0x2	00000, LW, 0.15 ~ 0.285, 3K station search 00001, MW1,0.52 ~ 1.71, 5K station search 00010, MW2,0.522 ~ 1.62, 9K station search 00011, MW3,0.52 ~ 1.71, 10K station search 00100, SW1,4.7 ~ 10, 5K station search 00101, SW2,3.2 ~ 4.1, 5K station search 00110, SW3,4.7 ~ 5.6, 5K station search 00111, SW4,5.7 ~ 6.4, 5K station search 01000, SW5,6.8 ~ 7.6, 5K station search 01001, SW6,9.2 ~ 10, 5K station search 01010, SW7,11.4 ~ 12.2, 5K station search 01011, SW8,13.5 ~ 14.3, 5K station search 01100, SW9,15 ~ 15.9, 5K station search 01101, SW10,17.4 ~ 17.9, 5K station search 01110, SW11,18.9 ~ 19.7, 5K station search 01111, SW12,21.4 ~ 21.9, 5K station search 10000, SW13,11.4 ~ 17.9, 5K station search 10010, MW4, 0.52 to 1.73, 5K station search Other, custom band, station search interval = mode3k 3K: 5K	Band seek logic chip only valid for tune logic, frequency can be adjusted at any stage
				2: 0	fmband

Reg2: configure register 2 (default: 0x4A) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x02 (RW)	7	rsv	0	Chip test, do not change this value	
	6	Ref_32k_mode	1	1- 32.768K 0- reference clock to the reference clock 12M	
	5	Mode3k	0	AM is 1- 3K custom channel number as the AM mode 0- custom channel number pattern 5K	
	4: 0	Chan [12: 8]	0x0A	High channel number 5, the channel number and frequencies related as follows: FM mode: Channel Freq = 25kHz * CHAN + 30MHz AM mode, when 5K channel number pattern.: Channel Freq = 5kHz * CHAN AM mode, 3K channel number pattern. when: Channel Freq = 3kHz * CHAN.	

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Reg3: configure register 3 (default: 0xC8) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x03 (RW)	7: 0	Chan [7: 0]	0xC8	The lower 8 bits of the channel number Note: MCU, when the work MW2, into channel number must be a multiple of three to ensure. Otherwise, the radio will be a mess.	

Reg4: configure register 4 (default: 0x19) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x04 (RW)	7: 0	usr_chan_start	0x19	Custom channel band start number chan = $32 * \text{usr_chan_start}$	

Reg5: configure register 5 (default: 0x32) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x05 (RW)	7: 0	usr_chan_stop	0x32	Custom end-band channel number chan = $32 * \text{usr_chan_stop}$	

Reg6: configure register 0 (default: 0xA1) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x06 (RW)	7: 2	volume	0xA0	Volume: 0 ~ 63 <24: mute, 24 ~ 63 40 Total volume control, 1.5dB 24 each stage: - min volume 63: - max volume	pd_adc_vol = 1 by volume when the register
	1	line	0	0- line input mode Radio Mode 1 -	To conserve power, the time line may be set to 1 pd_rx and pd_adc
	0	phase_inv	1	0- audio output inphase, 1- speakers for audio output, push the two inverted for pushing a speaker	

Reg7: configure register 0 (default: 0xA1) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x07 (RW)	7	rsv	1	Measured using, set to "0" during normal use	
	6	rsv	0	Measured using, do not change this value	
	5	de	1	De-emphasis mode selection 0- 75 μ s (USA) 1- 50 μ s (China)	
	4	bbsen	0	Base boost enable 0- Close bass 1- The subwoofer	
	3	stereo	0	{Stereo, Mono}	
	2	mono	0	"00" the auto stereo, there Stereo_th control threshold "10" as long as the pilot is forced stereo "x1" forced mono demodulator	

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	1: 0 bw	01	FM channel bandwidth selection 00 150K 01 200K 10 50K 11 100K	
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Reg8: configure register 8 (default: 0x58) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x08 (RW)	7: 6	fm_cnr_th 01		When the FM mode, chip sets and lighting sentence carrier to noise ratio limit 00-2dB 01-3dB 10-4dB 11-5dB door	
	5: 4	am_cnr_th 01		When AM mode, chip sets and lighting sentence carrier to noise ratio threshold MW / LW SW 00: 6dB 3dB 01: 10dB 7dB 10: 14dB 11dB 11: 18dB 15dB	
	3: 2	fd_th	10	Taiwan chip and sentenced to light with the frequency deviation threshold FM LW MW / SW 00: 12K 0.2K 0.6K 01: 24K 0.6K 1.2K 10: 36K 1K 1.8K 11: 48K 1.4K 2.4K	
	1: 0	stereo_th	00	FM stereo demodulation start CNR threshold 00-4, 01-8, 10-12, 11-16	

Reg9: configure register 0 (default: 0x07) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x09 (RW)	7: 4	rsv	0000	Measured using, do not change this value	
	3	pd_adc_vol 0		0- volume potentiometer mode register volume 1-i2c	
	2	osc_en	1	Oscillator source selection 0-External XO 1-Crystal	
	1	rsv	1	Measured using, do not change this value	
	0	lv_en	1	When low voltage power supply, whether to enter the low-voltage operation mode can	

Reg11: configure register 11 (default: 0xE0) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x0B (RW)	7: 6	rsv	11	Measured using, do not change this value	
	5: 4	space	10	FM station search stepping 00-25kHz 01-50kHz 10-100kHz 11-200kHz, TV1 and TV2 for the file is still 100K	
	3: 0	rsv	0000	Measured using, do not change this value	

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Reg12: configure register 11 (default: 0xE0) Address

(Type)	BIT	Label	Default	Function Description	Remark
0x0B (RW)	7	pd_adc	0	0-- signal channel ADC ADC signal path Close Open 1--	
	6	res	0		
	5	pd_rx	0	0-- analog and RF analog and RF channels open channel closed 1--	
	4:0	rsv	0000	measured using, do not change this value	

Reg13: configure register 13 (default: 0x00) Addr

(Type)	BIT	Label	Default	Function Description	Remark
0x0D (RW)	7	rsv	0	Measured using, do not change this value	
	6	st_led	0	0-tund pin is tuned lamp When 1-FM and non wtmode, tund indicator pin is stereo demodulation, tuning lamp remainder	
	5:4	rsv	00	Measured using, do not change this value	
	3:2	vol_pre	00	Adjusting the output volume of the entire values: 00: 0dB 01: 3.5dB 10: 7dB 11: 10.5dB	
	1:0	rsv	00	Measured using, do not change this value	

Reg20: Read only register 0

Address (Type)	BIT	Label	Default	Function Description	Remark
0x14 (R)	7	st		1- 0 to the current situation other FM stereo radio	
	6	stc		Seek or Tune completion flag logic 0-Not complete 1-Complete during Seek and Tune in the register 0.	
	5	tuned		When transferred to station 1, station search software can use this determination bit table	
	4:0	readchan [12:8]		Current Channel No (high 5bit): FM mode: Channel Freq = 25kHz * READCHAN + 30MHz AM mode, mode3k_f = 0: Channel Freq = 5kHz * READCHAN AM mode, mode3k_f = 1: Channel Freq = 3kHz * READCHAN	

Reg21: Read only register 1

Address (Type)	BIT	Label	Default	Function Description	Remark
0x15 (R)	7:0	readchan [7:0]		Current Channel No (low 8bit):	

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Reg22: Read only register 2

Address (Type)	BIT	Label	Default	Function Description	Remark
0x16 (R)	7	mode3k_f		"1" AM channel spacing No. 3K "0" AM channel spacing No. 5K	
	6: 0	cnram		Carrier to noise ratio of the AM signal format, in dB	

Reg23: Read only register 3

Address (Type)	BIT	Label	Default	Function Description	Remark
0x17 (R)	7	st_dem		Only the demodulated FM stereo (Stereo ratio is greater than 30%) show only one	
	6: 0	cnfm		Carrier to noise ratio of the FM signal format, in dB	

Reg24: Read only register 4

Address (Type)	BIT	Label	Default	Function Description	Remark
0x18 (R)	7: 5	pgalevel_rf		RF power control loop gain level, the greater the level, a high gain of approximately	
	4: 2	pgalevel_if		RF power control loop gain level, the greater the level, a high gain of approximately	
	1	rsv 0			
		lvmode		Low voltage maximum volume limit mode indication bit	

Reg25: Read only register 5

Address (Type)	BIT	Label	Default	Function Description	Remark
0x19 (R)	7: 6 rsv 5: 0				
	6: 0	vbat		6-bit unsigned number, indicating the supply voltage: $vcc_bat (V) = 1.8 + 0.05 * vbat [5: 0]$	

Reg26: Read only register 6

Address (Type)	BIT	Label	Default	Function Description	Remark
0x1A (R)	7: 0	fd_num		When the frequency offset indicated, complement format, greater than 127, 256 can be reduced to normal values, attention here to 1KHz units FM, AM in units of 100Hz	

Reg27: Read only register 7

Address (Type)	BIT	Label	Default	Function Description	Remark
0x1B (R)	7	rsv			
	6: 0	rssi		Antenna aperture can be calculated using signal levels rssi, pgalevel_rf, pgalevel_if FM / SW: Pin (dBuV) = 103 - rssi - 6 * pgalevel_rf - 6 * pgalevel_if MW / LW: Pin (dBuV) = 123 - rssi - 6 * pgalevel_rf - 6 * pgalevel_if	

8 Pin definitions

8.1 AKC6955 Pin definitions

Table 11. Pin Description

Pin name	Pin explanation	
1	oscin	Bonding or passive 32.768K 12MHz crystal to ground, or receive an external clock reference signal
2	oscout	Passive other end connected to the crystal, when connected to an external clock, this pin floating
3	gnd	Close to ground
4	tund	Radio lock indicator pin, connected directly to the light emitting diode; Tuning the MCU software when the pin may also be used as a stop sign.
5	p_on	On-chip power switch, high input power chip; the chip down in a low-power standby state, power consumption of approximately 10uA
6	sclk	I2C clock signal input
7	sdio	I2C bidirectional data signal input / output
8	inl	External audio signal input L, proposes to add blocking capacitor 1uF
9	inr	External audio input signal R, proposes to add blocking capacitor 1uF
10	vbat	Then the power pins need to pay attention to the nearest ground 0.1uF decoupling capacitance to ground
11	lout	Left channel audio output
12	gnd	Close to ground
13	rout	Right channel audio output
14	vref	Precision 1.5V output pin, to provide a baseline volume potentiometer
15	vol	Variable volume potentiometer connected end, the fixed end of a potentiometer directly connected to VREF, and the other end through a resistor to ground. The resistance ratio of the resistor and potentiometer as 1: 2
16	vbat	Then the power pins need to pay attention to the nearest ground 0.1uF decoupling capacitance to ground
17	gnd	Close to ground
18	mwinN	MW and LW differential input signal
19	mwinP	
20	swin	Shortwave signal input terminal, note add blocking capacitor recommended 3nF
twenty one	gnd	Close to ground
twenty two	fmin	FM radio frequency signal input terminal, note add blocking capacitor, 100pF recommendations
twenty three	ldocap	Internal LDO output pin, nearest the need decoupling capacitors, recommendations 47uF
twenty four	gnd	Close to ground

9 Receiving TV sound

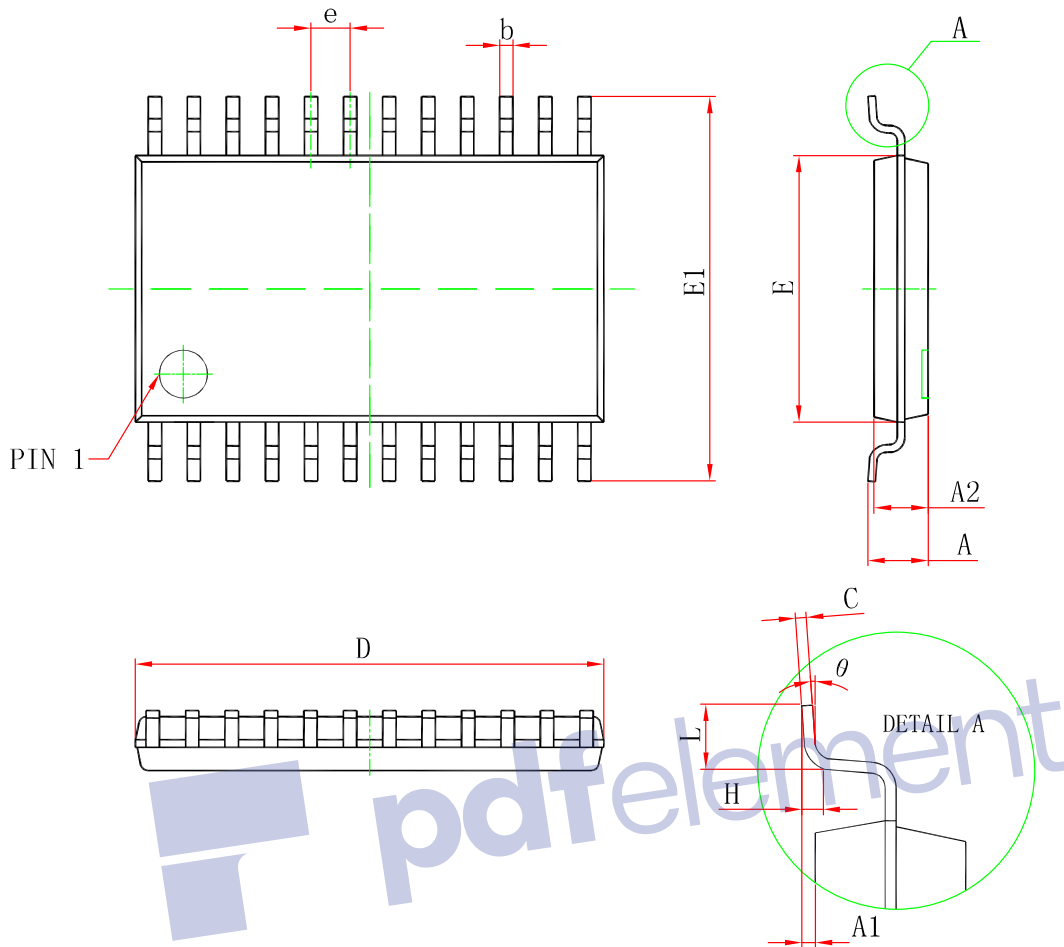
TV sound fundamental difference with the general FM stations that sound is an odd multiple of 50KHz. Here are a few national television with audio points:

Table 13. TV with audio point

National television channel 1 (MHz)	TV channel 2 (MHz)		TV Channel 3 (MHz)		TV Channel 4 (MHz)		TV Channel 5 (MHz)		TV Channel 6 (MHz)				
	Video	audio video	audio video	audio video	audio video	audio video	China	audio	audio	audio			
							49.75	56.25	57.75	64.25	65.75	72.25	77.25
							83.75	85.25	91.75	168.25	174.75		
United States			55.25	59.75	61.25	65.75	67.25	71.75	77.25	81.75	83.25	87.75	
Australia	57.25	62.75	64.25	69.75	86.25	91.75	95.25						
new Zealand	45.25	50.75	55.25	60.75	62.25	67.75	175.25	180.75	182.25	187.75	189.25	194.75	
Indonesia	48.25	53.75	55.25	60.75	62.25	67.75	175.25	180.75	182.75	187.75	189.25	194.75	Italy
	53.75	59.25	62.25	67.75	82.25	87.75	175.25	180.75	183.25	188.75	192.25	197.75	
CCIR	41.25	46.75	48.25	53.75	55.25	60.75	62.25						
								67.75	175.25	180.75	182.25	187.75	



10 TSSOP 24 Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
D	7.700	7.900	0.303	0.311
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
A		1.002		0.039
A2	0.800	1.000	0.031	0.039
A1	0.050	0.150	0.002	0.006
e	0.65 (BSC)		0.026 (BSC)	
L	0.500	0.700	0.020	0.028
H	0 ±YT (5)		0 ±YT (1)	
θ	1	7°	1	7°