®TVision	**PRODUCT SPECIFICATION**	MODEL **TVF5831-MFF**	PAGE 1
		DESCRIPTION **Desktop Video &FM Radio System NTSC N/M**	

TVF5831-MFF

FOR RF IN THE PC MULTI-MEDIA ENVIRONMENT

CUSTOMER APPROVAL

Preliminnary Specification File
Under Integrated Circuits,Tuner

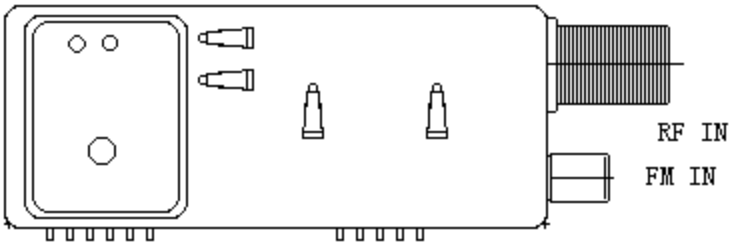
A	Original Release		
REV.	DESCRIPTION	DATE	SIGN

DESCRIPTION **Desktop Video tuner system NTSC N/M**	APPROVAL	CHECK	DESIGN
	DATE	DATE 01-04-1998	DATE 01-04-1998
DRAWING NO.	总经理 10，5，1998 张向东	工程部 8，5，1998 张德强	工程部 28，4，1998 刘建设
REVISIONS / PAGES TOTAL **16**			

NO	ITEM	SPECIFICATION
1.	GENERAL	
1. 1	Supply Voltage	True 5Vdevice (low power dissipation)
1. 2	Control system	I^2C bus control of tuning , address selection AFC status information
1. 3	Tuning System	PLL controlled tuning Programmable PLL step size (31.25,50 to 62.5kHz)
1. 4	IF System	True – synchronous vision IF demodulator (PLL) Ultra –linear FM PLL demodulator for FM radio broadcast
1. 5	Receiving System	Systems NTSC N/M and FM radio broadcast
1. 6	Receiving Channels	Full frequency range from channel A2 (55.25MHz) to channel A78 (855.25MHz)
1. 7	Intermediate Frequency	
1. 8	Antenna Input Impedance	VHF/UHF: 75 Ohm unbalanced
1. 9	Output	Demodulated video output ,AF sound output ,second sound IF output
1.10	Weight	Approximately 55g

BAND	CHANNELS (MHz)
FM radio band	87.5 to 108.00
VHF LOW	55.25 to 163.25
VHF HIGH	169.25 to 463.25
UHF	469.25 to 855.25

SYSTEM	FREQUENCY(MHz)
Picture Carried	45.75
Color	42.17
Sound 1	41.25
Sound 2	
FM	10.7

NO	ITEM	SPECIFICATION
1.11	Connection	Antenna : RCA version  PINING
1.12	Terminal	

SYMBOL	PIN	DESCRIPTION
V_T	1	Tuning Voltage (see note)
V_S	2	Supply Voltage tuner section: +5V
SDA	3	I^2C -bus Serial data
SCL	4	I^2C -bus Serial clock
AS	5	I^2C -bus Address select
AF O/P right	6	FM radio right channel
AF O/P left	7	FM radio left channel
2nd IF Sound output	8	Second IF Sound output
CVBS	9	Composite video baseboard signal output
V_{IF}	10	Supply Voltage IF section:+5V
AF Sound output	11	AF sound output

Notes :
1.1 pin for factory alignmment and testing purposes only .pin must be left open circuit in normal use

1.13	Operating Temp	-10℃ to +60℃: (Standard +25℃)
1.14	RH	0 to 90%: (Standard 60%)
1.15	Storage Temp	-20℃ to +80℃: (Standard +25℃)

1.16 Maximum Supply Voltage to terminal

SYMBOL	PARAMETER	PIN	MIN	TYP	MAX	UNIT
V_S	Supply voltage	2	4.75	5.00	5.25	V
V_S (ripple)	Peak-to-peak ripple voltage susceptibility (at 5V+5%): 20Hz to 100KHz >100KHz to 500KHz		 -- --	 -- --	 5 10	mVp-p mVp-p
Is	Supply current		--	--	120	mA
Vscl	SCL-bus input Voltage	3	-0.3	--	+5.25	V
V_{SDA}	SDA-bus input Voltage	4	-0.3	--	+5.25	V
I_{SDA}	SDA-bus current open collector		-1	--	+5	mA
V_{AS}	Address select Voltage	5	--	--	+5.25	V
$V_{AF\ right\ (FM)}$	FM right channel DC voltage	6	--	1.0	--	V
$Z_{AF\ right\ (FM)}$	FM right channel load impedance parallel connected : Resistive valve Capacitate valve		 -- --	 50 9	 -- --	 KΩ pF
$V_{AF\ left\ (FM)}$	FM left channel DC voltage	7	--	1.0	--	V
$Z_{AF\ left\ (FM)}$	FM left channel load impedance parallel connected : Resistive valve Capacitate valve		 -- --	 50 9	 -- --	 KΩ pF
Z_{IF}	2nd IF Sound output load impedance	8	0.5	--	--	KΩ
Z_{CVBS}	Compile Video Baseboard signal load impedance	9	--	75	--	Ω
tL	CVBS Load dune constant		--	--	100	ns
$V_{S(IF)}$	IF supply voltage	10	4.75	5.0	5.25	V
$I_{S(IF)}$	IF supply current		--	--	150	mA
Z_{AF}	AF Sound output load impedance Resistive valve Capacitate valve	11	 5.0 --	 -- --	 -- 4	 KΩ nF

1.17 OVERALL RERFORMANCE

Unless otherwise specified all electrical values for chapter “Overall performance” apply at the following conditions

SYMBOL	PARMETER	VALUE	UNIT
Tamp	Ambient temperature	25±5	℃
RH	Relative humidity	60±5	%
V_S	Supply voltage(tuner and IF section)	5±0.125	V
Z_{CVBS}	Video output load impedance(DC)	75	Ω
Z_{IF}	IF sound output load impedance(DC)	>500	Ω
TPR	Pre-heating time: (+5V at pin12)	10	minute
$Z_{S(AE)}$	Aerial source impedance (unbalanced)	75	Ω

NO.	ITEM	SPECIFICATION						Notes
2.	ELECTRICAL CHARCTERISICS							
			Min	Typ	Max	Unit	Condition	
2.1	V_{SWR}				5 4		Referred to 75Ω impedance (worst case on or between picture and sound carrer at maximum gain): all channel in TV mode FM (center of channel)	
2. 2	Vant				46	dBμV	<1.75 GHz	
2. 3	Image rejection (nominal gain to 10 gain reduction)	VHF LOW VHF HIGH UHF	55 55 46	70 70		dB		
2. 4	IF rejection (picture)		60			dB		
2. 5	1/2 IF susceptibility off-air UHF		60 56			dB	Up to 40dBgain control up to 30 dB minimum gain control	
2. 6	Cross modulation in –channel in –band VHF LOW (n±2) VHF HIGH(n±3) UHF(n±5) out of band		65 78 78 84 --	 100	 --	dBμV		
2.7	Breakthrough susceptibility channel A to 69		60	--	--	dBμV		
2. 8	Oscillator Voltage at all pins		--	--	70	dBμV		
2.9	OSC lock-in time		--	--	150	ms	Change pump logio high	
2.10	The Video signal-to-Sound interference ratio with the tuner exposed to sound singles in the audio frequency range 100Hz to 10KHz and sound pressure levels up to 105dB (20μ pa)		40	--	--	dB		
	Audio S/N radio		40	--	--	dB		
2.11	Electrostatic discharge (ESD) on all pins		2	--	--	kV		

NO	ITEM	SPECIFICATION					
3	Video and audio characteristics						
		Test Point	MIN	TYP	MAX	UNIT	CONDITION
3．1	CVBS characteristics: Video amplitude signal at pin 9 DC level sync pulse at pin 9	9	0.75 --	0.95 0.70	1.15 --	V V	Standard color bar 87.5% white100%
3．2	Video amplitude drop with respect to modulation 0.1 MHz at Tarmb=45℃ At 1 MHz At 2 MHz At 3 MHz At 4 MHz At 4.43 MHz	9	 -1.0 -1.5 -2.5 -4.0 -8.0	 -- -- -- -- --	 +1.0 +1.5 +1.5 +2.0 +3.0	 dB dB dB dB dB	
3．3	Sound carrier rejection	9	40	--	--	dB	
3．4	Residual 40.4 MHz signal in video channel :level of 1.5 MHz	9	--	--	68	dBμV	
3．5	Residual 77.8 MHz signal in video channel	9	--	--	80	dBμV	
3.6	Second IF sound output level at of 6.0&6.5 MHz	8	84	--	--	dBμV	
3.7	Test on 2T pules at Tamb =45 ℃ 2T pulse/bar response 2T pulse response	9	-2.8 --	-- --	+2.8 +3.5	% %	
3.8	CVBS S/N (unweighted)	9	41	--	--	dB	
3.9	Gain limited sensitivity at 1dB reduction of video output	9	--	--	30	dBμV	
3.10	Maximum useable single input signal	90	80	--	--	dBμV	
3．11	Audio characteristics: AF output level measured via LP 20KHz filter RMS detector ,50 μs de-emphasis THD(total Harmonic Distortion)measured via LP 20KHz filter, RMS detector 50 us de-emphasis S/N measured via CCIR filter, peak CCIR detector 50 us de-emphasis	11	 250 -- 44	 350 -- --	 500 0.5 --	 mV % dB	1KHz FM 50% MOD
3.12	AM oppression ratio	11	40	--	--	kHz	
3.13	Aerial input level for S/N =41 dB		--	--	41	dB	

NO	ITEM	SPECIFICATION					
4	FM radio characteristics						
		Test Point	MIN	TYP	MAX	UNIT	CONDITION
4．1	Limiting sensitivity for (S+N)/N		-- --	7 30	30 40	dBμV dBμV	
4．2	S/N radio Mono at f = 22.5kHz Mono at f = 75.0kHz Stereo		55 65 55	58 68 63	-- -- --	dB dB dB	
4．3	FM image rejection		53	65	--	dB	
4．4	Effective selectivity S300		50	--	--	dB	
4．5	Frequency response : Lower – 3.0 dB point Upper –3.0dB point		-- 14	20 18	40 --	Hz kHz	
4.6	AM suppression		33	--	--	dB	
4.7	FM AF output level at terminal 6/7 (RMS value) Mono Stereo		40 120	57 175	74 230	mV mV	
4.8	Stereo separation		33	--	--	dB	
4.9	Total harmonic distortion Stereo at 1kHz During Overmodulation at f=±100kHZ		-- 14	0.8 1.5	1..5 3	% %	

NO	ITEM	SPECIFICATION

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Digital AFC Status

Parameter	Conditions	Frequency (KHz)	Digital read-out
ADC word at I2C- bus During read operation	Input voltage at pin 10:0.0 to 0.15 Vs	-125	00
	Input voltage at pin 10:0.15 to 0.30 Vs	-62.5	01
	Input voltage at pin 10:0.30 to 0.45 Vs	0	02
	Input voltage at pin 10:0.45to 0.60 Vs	+62.5	03
	Input voltage at pin 1:0.60 to 1.00 Vs	+125	04

APPLICATION INFORMATION

A detailed description of the 12C- bus specifcation ,with applications ,is gives in brochure " the 12C-bus and how to use it ".This brochure may ordered using the number 9398 393 40011

WRITE mode

BYTE	**BITS**								
	7 MSB	6	5	4	3	2	1	0	A (1)
Address byte	1	1	0	0	0	MA1	MA0	0	A
Program divider byte 1	0	N_{14}	N_{13}	N_{12}	N_{11}	N_{10}	N_9	N_8	A
Program divider byte 2	N_7	N_6	N_5	N_4	N_3	N_2	N_1	N_0	A
Control information byte 1	1	CP	T2	T1	T0	RSA	RSB	OS	A
Control information byte 2	P7	P6	P5	P4	P3	P2	P1	P0	A

Note

1. A=Acknowledge
Address selection
Vs=+5V(PLL supply voltage)

NO	ITEM	SPECIFICATION

MA1	MA0	Address	VOLTAGE AT PIN 7(see note1)
0	0	C0	0 to 0.1 Vs
0	1	C2	0.2 to 0.3 Vs
1	0	C4	0.4 to 0.6 Vs
1	1	C8	0.9 to 1 Vs

Note :

0. IF the AS pin is left floating, the internal bias will automatically set address to C2 .
   Programmable divider setting (bytes 1 and 2)

Divider ratio:

$N=16\times\{f_{RF}(pc) + f_{IF}(pc)\}$, where (pc) is picture carrier and f_{RF} and f_{IF} are expressed in MHz.

$f_{OSC}=N/16(MHz)$

$N=(8192\times n13)+(4096\times n12)+(2048\times n11)+(1024\times n10)+(512\times n9)+(256\times n8)+(128\times n7)+(64\times n6)+(32\times n5)+(16\times n4)+(8\times n3)+(4\times n2)+(2\times n1)+n0$

Control byte

Change pump settings:

CP=1, for fast tuning

CP=0, for moderate speed tuning with slightly better residual oscillator FM

Test mode settings :

T2=T1=0; T0=1,for normal operation

PLL disabling :

OS=0,for normal operation

OS=1,for switching the change pump to the high impedance state.

Ratio select bits		MSA	MSB	STEP SIZE	
		X	0	50KHz	
		0	1	31.25KHz(for normal picture search)	

Ports byte	BAND	BIT(1)							
		P7	P6	P5	P4	P3	P2	P1	P0
Band switching	FM band	1	0	1	0		1		
	Low band	1	0	1	0		0		
	Mid band	1	0	0	1		0		
	High band	0	0	1	1		0		
	TV mode								
	Power down mode see note 1					0	0	0	1
	System 1 negative mode					0	0	0	0
	FM radio mode								
	AFC; see note 2					0	1	0	1
	RIF; see note 3					0	1	0	0
	Mono					0	1	1	0
	Mute					1	1	0	0

Note :

1. If the TV function is not required ,the tuner can be switching to power-down mode .In this mode the tuner reduces the current consumption by up to 100 mA.
2. By this setting the FM radio AFC status can be read from the A/D bits in the status byte.
3. By this setting the RF input level can be read from the A/D bits in the status byte.

TELEGRAM EXAMPLES (WRITE MODE)

Start –Adb –Ack – Db1 – ACK – Db2 – Ack – Cb – Ack –Pd –Ack - Stop

Start –Adb –Ack – Cb – Ack – Pd – Db1 – Ack - Db2 – Ack – Stop

Start –Adb –Ack – Db1– Ack – Db2 – Ack - Cb– Ack – Stop

Start –Adb –Ack – Db1– Ack – Db2 – Ack – Stop

Where:Start = start condition

Adb = address byte

Ack = acknowledge byte

Db1 = divider byte 1

Db2 = divider byte 2

Cb = control byte

Pb = ports byte

Stop = stop condition

Remark :for channel selection involving band switching ,and to ensure smooth tuning to the desired channel without causing unnecessary change pump action ,it is recommended to consider the difference between wanted channel frequency (fw) and current channel frequency (fc):

if fw < fc ,use telegram as :

Start – Adb – Ack – Db1 – Ack – Db2 – Ack – Cb – Ack – Pb – Ack – Stop

if fw <fc, use telegram as :

Start – Adb – Ack – Cb – Ack –Pb – Ack – Db1 – Ack – Db2 – Ack – Stop

Unnecessary change pump action will result in very low tuning (TV ≈0V) which may drive the oscillator to extreme conditions

READ mode

The in – lock can be read by setting the R/W bits to 1.

BYTE	BITS								
	7 MSB	6	5	4	3	2	1	0 LSB	A(5)
Address byte	1	1	0	0	0	MA1	MA0	1	A
Status byte	POR(1)	FL(2)	12(3)	11(3)	10(3)	A2(4)	A(4)	A0(4)	A

NOTES:

1. POR = Power On Reset, POR is internally set to 1 in case Vs drops below 3V ,The POR bit is reset when an end of data is detected by the PLL IC .
2. FL = In-lock flange, FL=1: loop is phase-lock. The loop must be phase during at least 8 periods of the intemal 7.8125 kHz reference frequency before the FL flag is internally set to 1.
3. 12,11and 10=digital information for I/O ports P2, P1 and P0 respectively
4. A2 ,A1 and A0 = built – in 5 – level A/D converter on I/O port p6 , AFC information to the controller of the IF section is available on pin 10 (see table “ digital AFC Status ”)
5. A = Acknowledge

TELEGAMPLES EXAMPLES (READ MODE)

Start-Adb-Ack-STB-Ack-STBDb2-Stop(no Ack form processor=End-of –data)

Start-Adb-Ack-STB-Stop –(no Ack form processor =End-of –data)

Where:

STB = status bytes

频 率 表

单位: MHz

BAND	CHANNEL NO.	PICTURE FREQ.	SOUND FREQ.	LOCAL OSC FREQ.	IMAGE FREQ.
VHF LOW	A2	55.25	59.75	101	146.75
	A3	61.25	65.75	107	152.75
	A4	67.25	71.75	113	158.75
	A5	77.25	81.75	123	168.75
	A6	83.25	87.75	129	174.75
	A-5	91.25	89.75	137	182.75
	A-4	97.25	95.75	143	188.75
	A-3	103.25	101.75	149	194.75
	A-2	109.25	107.75	155	200.75
	A-1	115.25	113.75	161	206.75
	A	121.25	119.75	167	212.75
	B	127.25	125.75	173	218.75
	C	133.25	131.75	179	224.75
	D	139.25	137.75	185	230.75
	E	145.25	143.75	191	236.75
	F	151.25	149.75	197	242.75
	G	157.25	155.75	203	248.75
	H	163.25	161.75	209	254.75
VHF HIGH	I	169.25	167.75	215	260.75
	A7	175.25	173.75	221	266.75
	A8	181.25	179.75	227	272.75
	A9	187.25	185.75	223	278.75
	A10	193.25	191.75	239	284.75
	A11	199.25	197.75	245	290.75
	A12	205.25	203.75	251	296.75
	A13	211.25	209.75	257	302.75
	J	217.25	215.75	263	308.75
	K	223.25	221.75	269	314.75
	L	229.25	227.75	275	320.75

频 率 表

单位: MHz

BAND	CHANNEL NO.	PICTURE FREQ.	SOUND FREQ.	LOCAL OSC FREQ.	IMAGE FREQ.
VHF HIGH	M	235.25	239.75	281	326.75
	N	241.25	245.75	287	332.75
	O	247.25	251.75	293	338.75
	P	253.25	257.75	299	344.75
	Q	259.25	263.75	305	350.75
	R	265.25	269.75	311	356.75
	S	271.25	275.75	317	362.75
	T	277.25	281.75	323	368.75
	U	283.25	287.75	329	384.75
	V	289.25	293.75	335	390.75
	W	295.25	299.75	341	396.75
	W+1	301.25	305.75	347	402.75
	W+2	307.25	311.75	353	408.75
	W+3	313.25	317.75	359	404.75
	W+4	319.25	323.75	365	410.75
	W+5	325.25	329.75	371	416.75
	W+6	331.25	335.75	377	422.75
	W+7	337.25	341.75	383	428.75
	W+8	343.25	347.75	386	434.75
	W+9	349.25	353.75	395	440.75
	W+10	355.25	359.75	401	446.75
	W+11	361.25	365.75	407	452.75
	W+12	367.25	371.75	413	458.75
	MM	373.25	377.75	419	464.75
	NN	379.25	383.75	425	470.75
	OO	385.25	389.75	431	476.75
	PP	391.25	395.75	437	782.75
	QQ	397.25	401.75	443	488.75
	RR	403.25	407.75	449	794.75
	SS	409.25	413.75	455	500.75
	TT	415.25	419.75	461	506.75
	UU	421.25	425.25	467	512.75
	VV	427.25	431.75	473	518.75

频 率 表

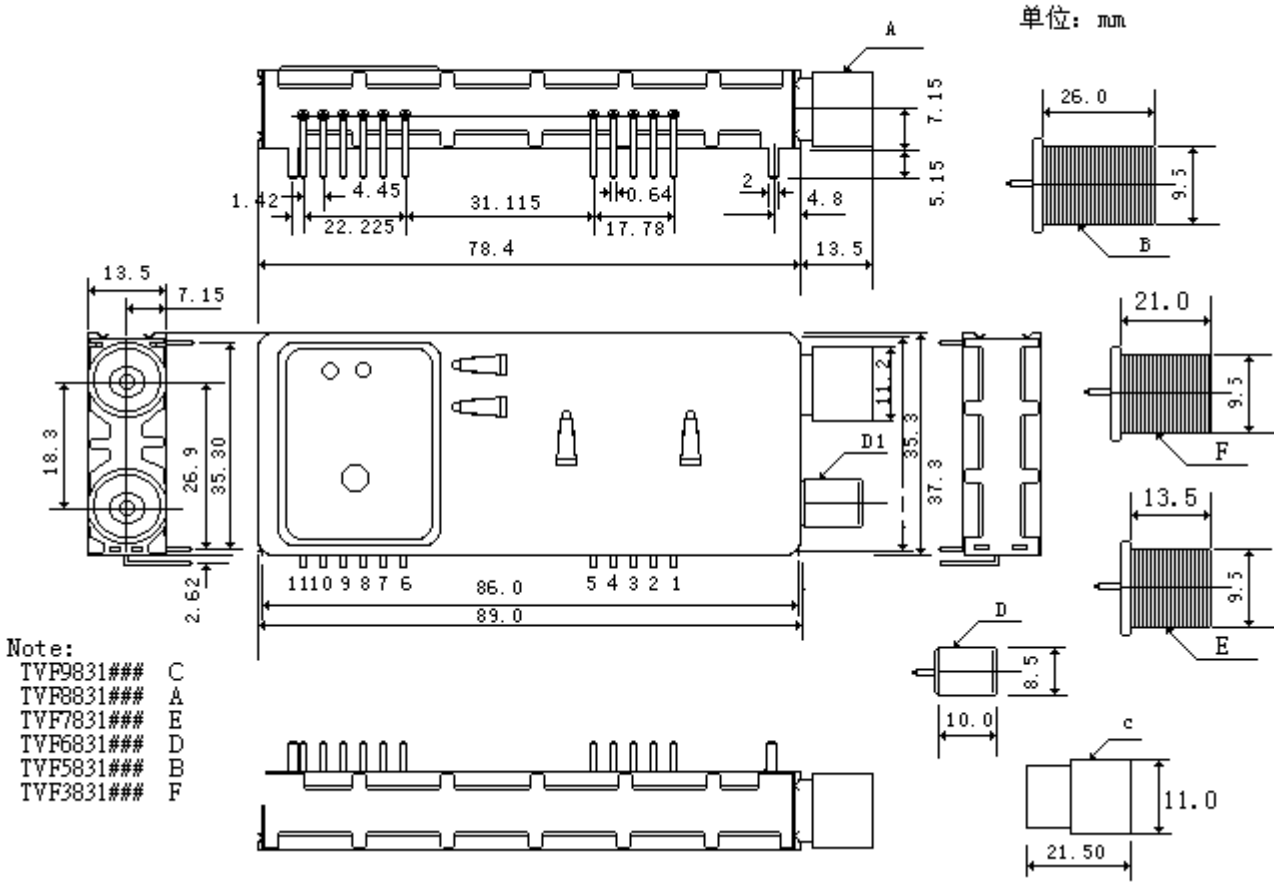
单位: MHz

BAND	CHANNEL NO.	PICTURE FREQ.	SOUND FREQ.	LOCAL OSC FREQ.	IMAGE FREQ.
VHF-H	WW	433.25	437.75	479	524.75
	AAA	439.25	443.75	485	530.75
	BBB	445.25	449.75	491	536.75
	CCC	451.25	455.75	497	542.75
	DDD	457.25	461.75	503	548.75
	EEE	463.25	467.75	509	554.75
UHF	FFF	469.25	473.75	515	560.75
	A14	471.25	475.25	517	562.75
	A15	477.25	481.75	523	568.75
	A16	483.25	487.75	529	574.75
	A17	489.25	493.75	535	580.75
	A18	495.25	409.75	541	586.75
	A19	501.25	505.75	547	592.75
	A20	507.25	511.75	553	598.75
	A21	513.25	517.75	559	604.75
	A22	519.25	523.75	565	610.75
	A23	525.25	529.75	571	616.75
	A24	531.25	535.75	577	622.75
	A25	537.25	541.75	583	628.75
	A26	543.25	547.75	589	634.75
	A27	549.25	553.75	595	640.75
	A28	555.25	559.75	601	646.75
	A29	561.25	565.75	607	652.75
	A30	567.25	571.75	613	658.75
	A31	573.25	577.75	619	664.75
	A32	579.25	583.75	625	670.75
	A33	585.25	589.75	631	676.75
	A34	591.25	595.75	637	682.75
	A35	597.25	601.75	643	688.75
	A36	603.25	607.75	649	694.75
	A37	609.25	613.75	655	700.75
	A38	615.25	619.75	661	706.75

频 率 表

单位: MHz

BAND	CHANNEL NO.	PICTURE FREQ.	SOUND FREQ.	LOCAL OSC FREQ.	IMAGE FREQ.
UHF	A39	621.25	625.75	667	712.75
	A40	627.25	631.75	673	718.75
	A41	633.25	637.75	679	724.75
	A42	639.25	643.75	685	730.75
	A43	645.25	649.75	691	736.75
	A44	651.25	655.75	697	742.75
	A45	657.25	661.75	703	748.75
	A46	663.25	667.75	709	754.75
	A47	669.25	673.75	715	760.75
	A48	675.25	679.75	721	766.75
	A49	681.25	685.75	727	772.75
	A50	687.25	691.75	733	778.75
	A51	693.25	697.75	739	784.75
	A52	699.25	703.75	745	790.75
	A53	705.25	709.75	751	796.75
	A54	711.25	715.75	757	802.75
	A55	717.25	721.75	763	808.75
	A56	723.25	727.75	769	814.75
	A57	729.25	733.75	775	820.75
	A58	735.25	739.75	781	826.75
	A59	741.25	745.75	787	832.75
	A60	747.25	751.75	793	838.75
	A61	753.25	757.75	799	844.75
	A62	759.25	763.75	805	850.75
	A63	765.25	769.75	811	856.75
	A64	771.25	775.75	817	862.75
	A65	777.25	781.75	823	868.75
	A66	783.25	787.75	829	874.75
	A67	789.25	793.75	835	880.75
	A68	795.25	799.75	841	886.75
	A69	801.25	805.75	847	892.75



SYMBOL	PIN	DESCRIPTION
V_T	1	Tuning Voltage (see note)
V_S	2	Supply Voltage tuner section: +5V
SDA	3	I^2C-bus Serial data
SCL	4	I^2C -bus Serial clock
AS	5	I^2C -bus address select
AF O/P right	6	FM radio right cannel
AF O/P left	7	FM radio left cannel
2nd IF Sound output	8	Second IF Sound output
CVBS	9	Composite Video Baseboard signal output
V_{IF}	10	Supply Voltage IF section: +5V
AF Sound output	11	AF sound output

Notes :

1. 1 pin for factory alignment and testing purposes only ,pin must be left open circuit in normal use .