TVF8531-MF

FOR RF IN THE PC MULTI-MEDIA ENVIRONMENT

CUSTOMER APPROVAL

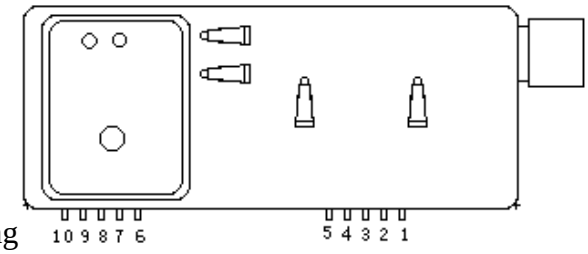
REV.	DESCRIPTION	DATE	SIGN
A	Original Release		

DESCRIPTION	APPROVAL	CHECK	DESIGN
Desktop Video tuner system NTSC N/M	DATE	DATE 01-01-2000	DATE 01-01-2000
DRAWING NO.			
REVISIONS / PAGES TOTAL **12**			

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
1. 4	IF System	True – synchronous vision IF demodulator
1. 5	Receiving System	Systems NTSC N/M
1. 6	Receiving Channels	Full frequency range from channel 2CH (55.25MHz) to channel 69CH (801.25MHz)
1. 7	Intermediate Frequency	System N/M (MHz) Picture Carried 45.75 Color Carried 42.17 Sound Carried 41.25
1. 8	Antenna Input Impedance	VHF/UHF: 75 ohm unbalanced
1. 9	Output Impedance	Demodulator Video output: AF Sound output
1. 10	Weight	Approximate: 50 grams
1. 11	Connection	Antenna : IEC Version

BAND	CHANNELS (MHz)
VHF LOW	55.25 to163.25
VHF HIGH	169.25to463.25
UHF	469.25 to 801.25

1. 12



SYMBOL	PIN	DESCRIPTION
V_T	1	Tuning Voltage
V_S	2	Supply Voltage tuner section: +5V
SCL	3	I^2C -bus Serial clock
SDA	4	I^2C -bus Serial date
AS	5	I^2C -bus address Select
N.C	6	Not connected
2nd IF Sound output	7	Second IF Sound output
CVBS	8	Composite video baseboard signal output
V_{IF}	9	Supply Voltage IF section:+5V
AF Sound output	10	AF sound output

NO	ITEM	SPECIFICATION
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
VS	Supply voltage	2	4.75	5.00	5.25	V
VS (ripple)	Peak-to-peak ripple voltage susceptibility (at 5V+5%): 20Hz to 100KHz >100KHz to 500KHz		-- --	-- --	20 10	mVp-p mVp-p
Is	Supply current		--	--	120	mA
Vscl	SCL-bus input Voltage	3	-0.3	--	+5.25	V
VSDA	SDA-bus input Voltage	4	-0.3	--	+5.25	V
ISDA	SDA-bus current open collector		+1	--	+5	mA
VAS	Address select Voltage	5	--	--	+5.25	V
ZIF	2ndIF Sound output load impedance DC AC	7	0.5 0.5	-- --	-- --	KΩ KΩ
ZCVBS	Compile Video Baseboard signal load impedance: DC AC	8	-- --	75 75	-- --	Ω Ω
TI	Load dune constant		--	--	100	ns
VIF	IF supply voltage	9	4.75	5.00	5.25	V
VIF (ripple)	Peak-to-peak ripple voltage susceptibility (at 5V±5%) 20Hz to 100KHz >100KHz to 500KHz		-- --	-- --	20 10	mVp-p mVp-p
IIF	IF supply carnet				100	mA
ZAF	AF Sound output load impedance DC AC	10	1.0 0.6	-- --	-- --	KΩ KΩ

NO	ITEM
1．17	Overall performance

SYMBOL	PARMETER	VALUE	UNIT
Tamp	Ambient temperature	25±5	℃
RH	Relative humidity	60±5	%
V_S	Supply voltage	5±0.125	V
Z_{CVBS}	Video output load impedance	75	Ω
Z_{IF}	IF sound output load impedance	>500	Ω
TPR	Pre-heating tune: +5V at pin	40	mnule
Z_{SAF}	Aerial source impedance unbalance	75	Ω

2. ELECTRICAL CHARACTERISTICS

NO	ITEM		SPECIFICATION					Notes
			Min	Typ	Max	Unit	Condition	
2．1	V_{SWR}		--	--	5			
2．2	Vant Radiation	0~1.75GHz			46	dBμV	75Ω Terminate	
2．3	Image rejection	VHF low VHF high UHF	51 55 46	70 70 55		dB		
2．4	If rejection		60	--		dB		
2．5	1/2 IF susceptibility off-air UHF		 50 56	-- -- --		dB		
2．6	Cross modulation		70	--		dBμV		
2．7	OSC Voltage at all pins		--	--	80	dBμV		
2．8	OSC lock-in time		--	--	150	ms		
2．9	The Video signal-to-Sound interference ratio with the tuner exposed to sound dingles in the audio frequency range 100Hz to 10KHz and sound pressure levels up to 105dB		40	--	--	dB		

3. Video and audio characteristics

NO	ITEM	Test Point	Min	Typ	Max	Unit	Condition	Notes
3．1	CVBS characteristics: Video amplitude signal at pin 8 DC level sync pulse at pin 8	 8 8	 0.7 --	 -- 0.35	 1.1 --	 V V		

NO	ITEM	Test Point	MIN	TYPE	MAX	UNIT	CONDITION	NOTES
3．2	Video amplitude drop with respect to modulation 0.1 MHz at Tarmb=45℃ At 1MHz At 2MHz At 3MHz At 4MHz At 4.43MHz	8	 -1.0 -1.5 -2.5 -3.0 -7.0	--	 +1.0 +1.5 +1.5 +2.0 +3.0	dB		
3．3	Sound carrier rejection	8	40	--	--	dB		
3．4	CVBS S/N(unweighted)	8	44	--	--	dB		
3．5	Gain limited sensitivity at 1dB reduction of Video output	8	--	--	30	dBμV		
3．6	Audio characteristics: AF output level measured via LP 20KHz filter RMS detector 50 us de-emphasis THD measured via LP 20KHz filter RMS detector 50 us de-emphasis S/N measured via CCIR filter peak CCIR detector 50 us de-emphasis	10	 0.25 -- 44	 0.35 -- --	 0.5 0.5 --	 V % dB		
3．7	AF 3dB response measured via LP 20KHz filter RMS detector de-emphasis off	10	16	--	--	KHz		
3．8	AM suppression ratio	10	40	--	--	dB		

4. Digital AFC Status

Parameter	Conditions	Frequency (KHz)	Digital read-out
	Input voltage at pin 1:0.00 to 0.15 Vs	-125	00
ADC word at I2C bus	Input voltage at pin 1:0.15 to 0.30 Vs	-62.5	01
During read operation	Input voltage at pin 1:0.30 to 0.45 Vs	0	02
	Input voltage at pin 1:0.45 to 0.60 Vs	+62.5	03
	Input voltage at pin 1:0.60 to 1.00 Vs	+125	04

5. Application information (I^2C -bus date format)

A detailed description of the I^2C -bus specification with application, is gives in brochure “the I^2C -bus and how to use it”, This brochure may ordered using the code number 9398 393 40011.

BYTE	MSB	DATA BYTE						LSB	COMMAND
Address byte (ADB)	1	1	0	0	0	MA1	MA2	0	A
Divider byte (DB1)	0	N_{14}	N_{13}	N_{12}	N_{11}	N_{10}	N_9	N_8	A
Divider byte (DB2)	N_7	N_6	N_5	N_4	N_3	N_2	N_1	N_0	A
Control byte (CB)	1	CP	T2	T1	T0	RSA	RSB	OS	A
Ports byte (PB)	P7	P6	P5	P4	P3	P2	P1	P0	A

NOTE:

5．1 A = Acknowledge

5．2 Address selection

Vs = +5V(PLL supply voltage)

Voltage applied on as input	MA1	MA0	Address
0 to 0.1 Vs	0	0	C0
0.2 to 0.3 Vs	0	1	C2
0.4 to 0.6 Vs	1	0	C4
0.9 to 1 Vs	1	1	C8

IF the as pin is left floating, the internal bias will automatically set address to C2.

5．3 Divider ratio:

N=16/{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)

$N=2^{14}\times N_{14}+2^{13}\times N_{13}+2^{12}\times N_{12}+ \cdots +2^{2}\times N_{2}+2^{1}\times N_{1}+2^{0}\times N_{0}$

5．4 Ratio select bits

RSA	RSB	STEP SIZE
X	0	50KHz
0	1	31.25KHz(for slow picture search)
1	1	62.50KHz(for normal picture search)

5．5 Band switching

BAND	BITE							
	P7	P6	P5	P4	P3	P2	P1	P0
Low band	1	0	1	0	X	0	0	0
mid band	1	0	0	1	X	0	0	0
High band	0	0	1	1	X	0	0	0

NOTES:

1. X = don't care P0 to P7 are output ports on the PLL device.
2. P3 is a system switch output for customer applications.

5．6 Control Byte：

CP=1 for fast tuning.

CP=0 for moderate speed turning with slightly better residual oscillator FM.

5．7 Test mode settings：

T2=T1=0; T=1 for normal operation.

5．8 PLL disabling：

OS=0, for normal operation.

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

5．9 Write mode：

Start-Adb-Ack-Db1-Ack-Db2-Ack-cb-Ack-pb-Ack–Stop.

Start-Adb-Ack -cb-Ack-pb-Ack-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

Db1 = divider byte1 Db2 = divider byte2 Cb = control byte

Pb = ports byte Stop = stop condition

5．10 READ mode：

The in-lock can be to read by setting the R/W bit to logica1.

BYTE	MSB	DATA BYTE						LSB	COMMAND
Address byte	1	1	0	0	0	MA1	MA0	1	A
Status byte	POR(1)	FL(2)	I2(3)	I1(3)	I0(3)	A2(4)	A1(4)	AO(4)	A

NOTES：

1. POR = Power on Reset, POR=1 at power-on.
2. FL = In-lock flage, FL=1: loop is phase-locked.
3. I2 to I0=digital levels for I/O ports P2, P1 and P0 respectively.
4. A2 to A0=digital outputs of the 5-level ADC.
5. A = Acknowledge.
6. READ mode.

Start-Adb-Ack-STB-Ack-STRObz-stoping Ack form processor-End-of data.

Start-Adb-Ack-STB-stoping Ack form processor-End-of data.

Where：

STB = status bytes.

FREQUENCY TABLE

UNIT: 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

FREQUENCY TABLE

UNIT: 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

FREQUENCY TABLE

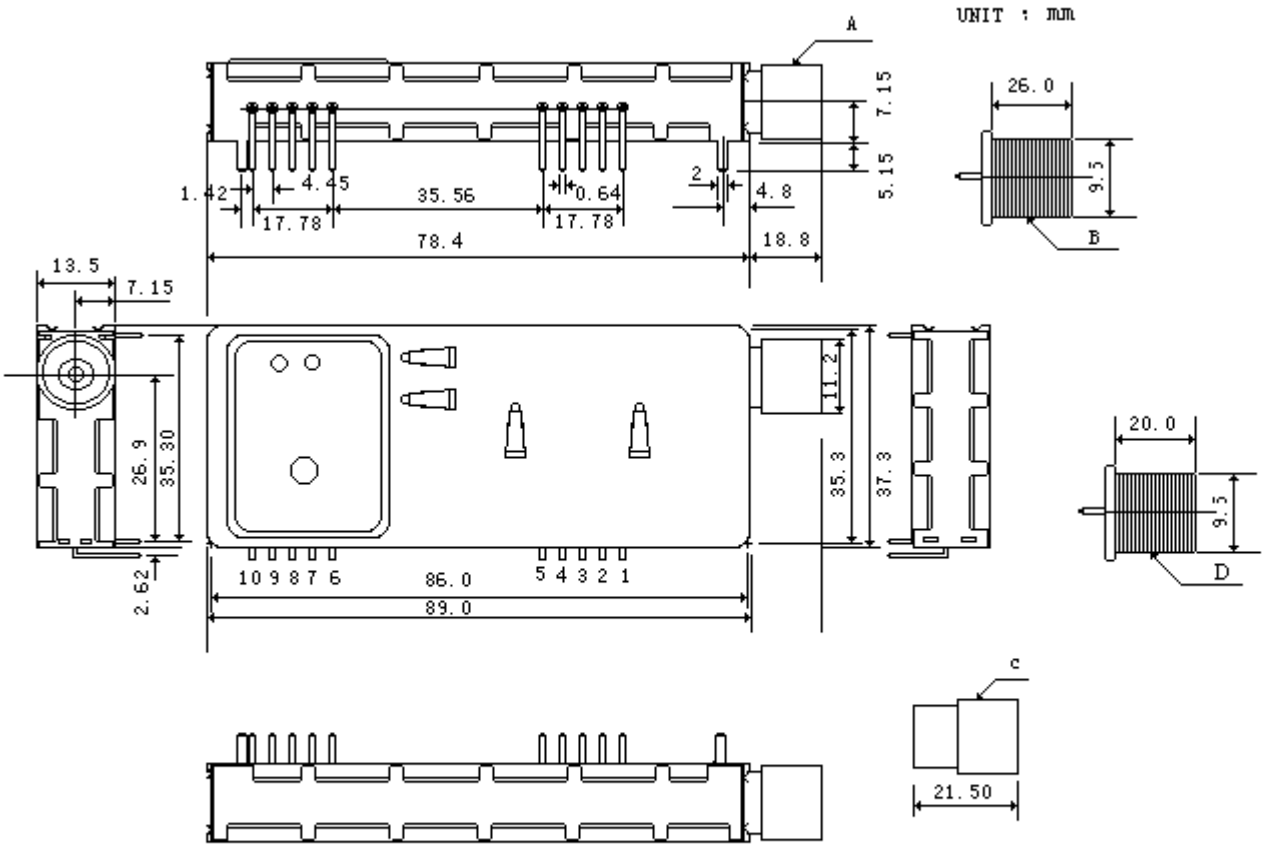
UNIT: MHz

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

FREQUENCY TABLE

UNIT: 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



TVF3531## Connector : D
TVF5531## Connector : B
TVF8531## Connector : A
TVF9531## Connector : C

SYMBOL	PIN	DESCRIPTION
V_T	1	Tuning Voltage
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