



**PRODUCT  
SPECIFICATION**

MODEL  
**TVF8531-D/IF**

PAGE  
1

DESCRIPTION  
**Desktop Video tuner  
System PAL D/K I**

**TVF8531-D/IF**

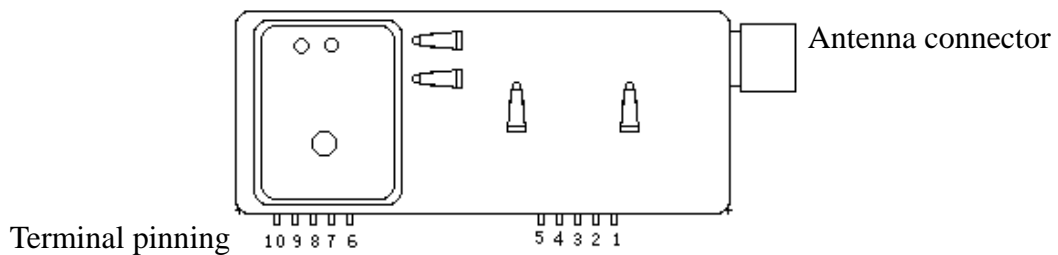
**FOR RF IN THE PC MULTI-MEDIA ENVIRONMENT**

**CUSTOMER APPROVAL**

A	Original Release		
REV.	DESCRIPTION	DATE	SIGN
DESCRIPTION <b>Desktop Video tuner system PAL D/K I</b>		APPROVAL DATE	CHECK DATE 01-01-2000
DRAWING NO.			DESIGN DATE 01-01-2000
REVISIONS	PAGES TOTAL <b>11</b>		

NO	ITEM	SPECIFICATION																
1 .	GENERAL																	
1 . 1	Supply Voltage	True 5V device (low power dissipation)																
1 . 2	Control system	I <sup>2</sup> C 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 PALD/K I																
1 . 6	Receiving Channels	Full frequency range from channel 1CH (49.75MHz) to channel 57CH (863.25MHz)																
		<table border="1"> <thead> <tr> <th>BAND</th> <th>CHANNELS (MHz)</th> </tr> </thead> <tbody> <tr> <td>VHF LOW</td> <td>49.75 -160.25</td> </tr> <tr> <td>VHF HIGH</td> <td>168.25-464.25</td> </tr> <tr> <td>UHF</td> <td>471.25 to 863.25</td> </tr> </tbody> </table>	BAND	CHANNELS (MHz)	VHF LOW	49.75 -160.25	VHF HIGH	168.25-464.25	UHF	471.25 to 863.25								
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VHF HIGH	168.25-464.25																	
UHF	471.25 to 863.25																	
1 . 7	Intermediate Frequency	<table> <thead> <tr> <th>System</th> <th>D/K</th> <th>I</th> <th>(MHz)</th> </tr> </thead> <tbody> <tr> <td>Picture Carried</td> <td></td> <td>38.00</td> <td></td> </tr> <tr> <td>Color Carried</td> <td></td> <td>33.57</td> <td></td> </tr> <tr> <td>Sound Carried</td> <td></td> <td>31.50</td> <td>32.00</td> </tr> </tbody> </table>	System	D/K	I	(MHz)	Picture Carried		38.00		Color Carried		33.57		Sound Carried		31.50	32.00
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Picture Carried		38.00																
Color Carried		33.57																
Sound Carried		31.50	32.00															
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																

1 . 12



SYMBOL	PIN	DESCRIPTION
V <sub>T</sub>	1	Tuning Voltage
V <sub>S</sub>	2	Supply Voltage tuner section: +5V
SCL	3	I <sup>2</sup> C -bus Serial clock
SDA	4	I <sup>2</sup> C -bus Serial data
AS	5	I <sup>2</sup> C -bus address Select
N.C	6	Not connected
2 <sup>nd</sup> IF Sound output	7	Second IF Sound output
CVBS	8	Composite video baseboard signal output
V <sub>IF</sub>	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	-- --	-- --	K K	
	ZCVBS	Compile Video Baseboard signal load impedance: DC AC		8	-- --	75 75	-- --	
	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	-- --	-- --	K K

NO	ITEM							
1 . 17	Overall performance							
	SYMBOL	PARMETER	VALUE	UNIT				
	Tamp	Ambient temperature	25 ± 5					
	RH	Relative humidity	60 ± 5	%				
	V <sub>s</sub>	Supply voltage	5 ± 0.125	V				
	Z <sub>CVBS</sub>	Video output load impedance	75					
	Z <sub>IF</sub>	IF sound output load impedance	>500					
	TPR	Pre-heating tune: +5V at pin	40	mnule				
	Z <sub>SAF</sub>	Aerial source impedance unbalance	75					
2 .	ELECTRICAL CHARACTERISTICS							
NO	ITEM		SPECIFICATION					Notes
2 . 1	V <sub>SWR</sub>		Min	Typ	Max	Unit	Condition	
			--	--	5			
2 . 2	Vant Radiation	0~1.75GHz			46	dB μ V	75 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	--		dB μ V		
2 . 7	OSC Voltage at all pins		--	--	80	dB μ V		
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	dB $\mu$ V		
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 I <sup>2</sup> C 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<sup>2</sup>C -bus date format)

A detailed description of the I<sup>2</sup>C -bus specification with application, is gives in brochure “the I<sup>2</sup>C -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 <sub>14</sub>	N <sub>13</sub>	N <sub>12</sub>	N <sub>11</sub>	N <sub>10</sub>	N <sub>9</sub>	N <sub>8</sub>	A
Divider byte (DB2)	N <sub>7</sub>	N <sub>6</sub>	N <sub>5</sub>	N <sub>4</sub>	N <sub>3</sub>	N <sub>2</sub>	N <sub>1</sub>	N <sub>0</sub>	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

V<sub>s</sub> = +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<sub>RF</sub> and f<sub>IF</sub> are expressed in MHz.

f<sub>osc</sub>=N/16(MHz)

$N=2^{14} \times N_{14} + 2^{13} \times N_{13} + 2^{12} \times N_{12} + \dots + 2^2 \times N_2 + 2^1 \times N_1 + 2^0 \times N_0$

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 logical1.

BYTE	MSB	DATA BYTE						LSB	COMMAND
Address byte	1	1	0	0	0	MA1	MA0	1	A
Status byte	POR	FL	I2	I1	I0	A2	A1	AO	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-STROb2-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	DS-1	49.75	56.25	88.65	127.55
	DS-2	57.75	64.25	96.65	135.55
	DS-3	65.75	72.25	104.65	143.55
	DS-4	77.25	83.75	116.15	155.05
	DS-5	85.25	91.75	124.15	163.05
	Z-1	112.25	118.75	151.15	190.05
	Z-2	120.25	126.75	159.15	198.05
	Z-3	128.25	134.75	167.15	206.05
	Z-4	136.25	142.75	175.15	214.05
	Z-5	144.25	150.75	183.15	222.05
	Z-6	152.25	158.75	191.15	230.05
	Z-7	160.25	166.75	199.15	238.05
	VHF HIGH	DS-6	168.25	174.75	207.15
DS-7		176.25	182.75	215.15	254.05
DS-8		184.25	190.75	223.15	262.05
DS-9		192.25	198.75	231.15	270.05
DS-10		200.25	206.75	239.15	278.05
DS-11		208.25	214.75	247.15	286.05
DS-12		216.25	222.75	255.15	294.05
Z-8		224.25	230.75	263.15	302.05
Z-9		232.25	238.75	271.15	310.05
Z-10		240.25	246.75	279.15	318.05
Z-11		248.25	254.75	287.15	326.05
Z-12		256.25	262.75	295.15	334.05
Z-13		264.25	270.75	303.15	342.05
Z-14		272.25	278.75	311.15	250.05
Z-15		280.25	286.75	319.15	358.05
Z-16		288.25	294.75	327.15	366.05
Z-17		296.25	302.75	335.15	374.05

**FREQUENCY TABLE**

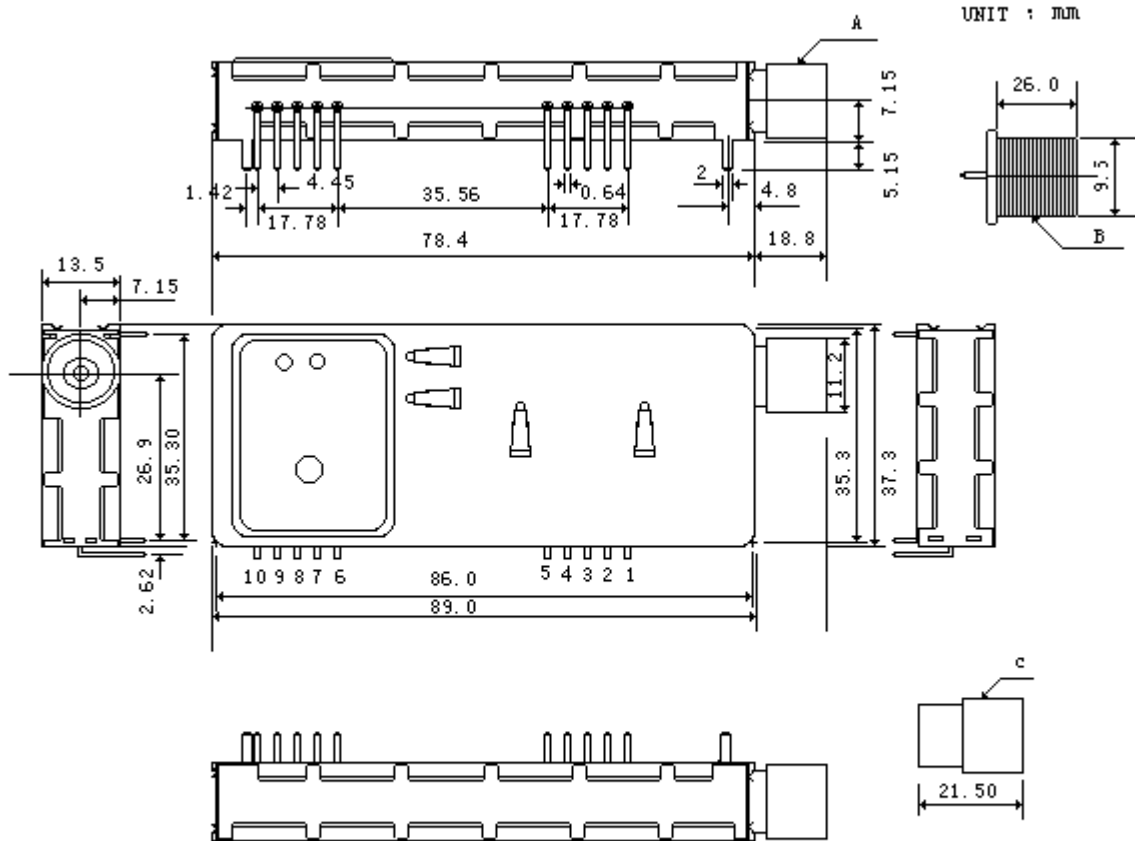
UNIT: MHz

BAND	CHANNEL NO.	PICTURE FREQ.	SOUND FREQ.	LOCAL OSC FREQ.	IMAGE FREQ.
VHF HIGH	Z-18	304.25	310.75	343.15	382.05
	Z-19	312.25	318.75	351.15	390.05
	Z-20	320.25	326.75	359.15	398.05
	Z-21	328.25	334.75	367.15	406.05
	Z-22	336.25	342.75	375.15	414.05
	Z-23	344.25	350.75	383.15	422.05
	Z-24	352.25	358.75	391.15	430.05
	Z-25	360.25	366.75	399.15	438.05
	Z-26	368.25	374.75	407.15	446.05
	Z-27	376.25	382.75	415.15	454.05
	Z-28	384.25	390.75	423.15	462.05
	Z-29	392.25	398.75	431.15	470.05
	Z-30	400.25	406.75	439.15	478.05
	Z-31	408.25	414.75	447.15	486.05
	Z-32	416.25	422.75	455.15	494.05
	Z-33	424.25	430.75	463.15	502.05
	Z-34	432.25	438.75	471.15	510.05
	UHF	Z-35	440.25	446.75	479.15
Z-36		448.25	454.75	487.15	526.05
Z-37		456.25	462.75	495.15	534.05
Z-38		464.25	470.75	503.15	542.05
DS-13		471.25	477.75	510.15	549.05
DS-14		479.25	485.75	518.15	557.05
DS-15		487.25	493.75	526.15	565.05
DS-16		495.25	501.75	534.15	573.05
DS-17		503.25	509.75	542.15	581.05
DS-18		511.25	517.75	550.15	589.05
DS-19	519.25	525.75	558.15	597.05	
DS-20	527.25	533.75	566.15	605.05	
DS-21	535.25	541.75	574.16	613.05	
DS-22	543.25	549.75	582.15	621.05	
DS-23	551.25	557.75	590.15	629.05	
DS-24	559.25	565.75	598.15	637.05	

**FREQUENCY TABLE**

UNIT: MHz

BAND	CHANNEL NO.	PICTURE FREQ.	SOUND FREQ.	LOCAL OSC FREQ.	IMAGE FREQ.
UHF	DS-25	607.25	613.75	646.15	985.05
	DS-26	615.25	621.75	654.15	693.05
	DS-27	623.25	629.75	662.15	701.05
	DS-28	631.25	637.75	670.15	709.05
	DS-29	639.25	645.75	678.15	717.05
	DS-30	647.25	658.75	686.15	725.05
	DS-31	655.25	661.75	694.15	733.05
	DS-32	663.25	669.75	702.15	741.05
	DS-33	671.25	677.75	710.15	749.05
	DS-34	679.25	685.75	718.15	757.05
	DS-35	687.25	693.75	726.15	765.05
	DS-36	695.25	701.75	734.15	773.05
	DS-37	703.25	709.75	742.15	781.05
	DS-38	711.25	717.75	750.15	789.05
	DS-39	719.25	725.75	758.15	797.05
	DS-40	727.25	733.75	766.15	805.05
	DS-41	735.25	741.75	774.15	813.05
	DS-42	743.25	749.75	782.15	821.05
	DS-43	751.25	757.75	790.15	829.05
	DS-44	759.25	765.75	798.15	837.05
	DS-45	767.25	773.75	806.15	845.05
	DS-46	775.25	781.75	814.15	853.05
	DS-47	783.25	789.75	822.15	861.05
	DS-48	791.25	797.75	830.15	869.05
	DS-49	799.25	805.75	838.15	877.05
	DS-50	807.25	813.75	846.15	885.05
	DS-51	815.25	821.75	854.15	893.05
	DS-52	823.25	829.75	862.15	901.15
	DS-53	831.25	837.75	870.15	909.15
DS-54	839.25	845.75	878.15	917.05	
DS-55	847.25	853.75	886.15	925.05	
DS-56	855.25	861.75	894.15	933.05	
DS-57	863.25	869.75	902.15	941.05	



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

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V <sub>T</sub>	1	Tuning Voltage
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SDA	4	I <sup>2</sup> C -bus Serial data
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N.C	6	Not connected
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