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tech tips

How To Tune To Any Channel With The FS73 And FS74A CHANNELIZERS™

As more channels are being used in CATV and MATV systems, the need for a method to quickly and accurately test channels is becoming increasingly important. Slow, conventional test methods can't keep up with modern all channel systems. Today, you must be equipped to quickly check all channels, frequency offsets, drift, etc., to prove that modulators and signal processors are working properly

These tests are made more important by the FCC's allocation of cable TV channels that overlap with some of the communication bands (see figure 1). The TV channels overlapping the aeronautical bands are offset either 25 kHz or 12.5 kHz and require +/- 5 kHz accuracy.

In this Tech Tip, we will look at how the FS73 and FS74A CHANNELIZERS tune and check the

frequency of all TVRF channels with digital readings, 1 kHz resolution, and 10 ppm accuracy. Lets see how the CHANNELIZERS do the job for you.

Digital Accuracy From The CHANNELIZERS On Assigned Channels

The CHANNELIZER'S digital tuner displays the numeric channel designation and the offset from the FCC specified frequency. You simply look for a reading within the maximum allowable frequency shift. The CHANNELIZERS show frequency offsets with 1 kHz resolution in the Automatic Fine Tuning (AFT) mode.

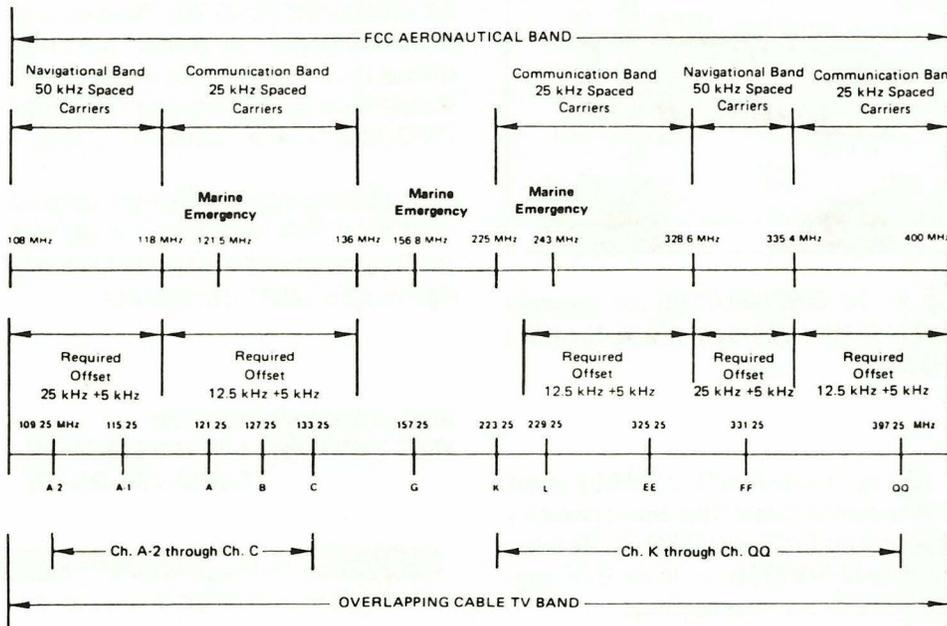
The CHANNELIZERS compensate for systems that use either the Harmonic Related Carrier (HRC) or the Incremental Coherent Carrier (ICC) shifting methods. They automatically retune in both the AFT and manual tuning modes by placing the CABLE SYSTEM switch into either the FCC, the HRC, or the ICC positions. If in either of the shifted modes, the offset readout is from the shifted carrier frequency.



Fig. 2: The CHANNELIZERS display the frequency offset from assigned values.

How To Tune Your CHANNELIZER To Any Assigned Channel:

1. Connect the signal to the RF input.
2. Select the RF BAND which contains the desired channel. (alpha numeric, numeric, VHF-UHF, FM)
3. Select the proper CABLE SYSTEM type (FCC, HRC, ICC), and select the measurement function.
4. Turn the TV CH • FM FREQ SELECT control until the desired TV channel number or FM frequency appears in the TV CH • FM FREQ • DVM display. Place the RF RANGE switch in the AUTO position for the fastest measurements.



FCC AERONAUTICAL FREQUENCIES FOR COMMUNICATION AND NAVIGATIONAL USE PLUS OVERLAPPING CABLE TV BAND

Fig. 1: The TV channels that overlap with the aeronautical frequencies must have a precise shift to prevent interference.

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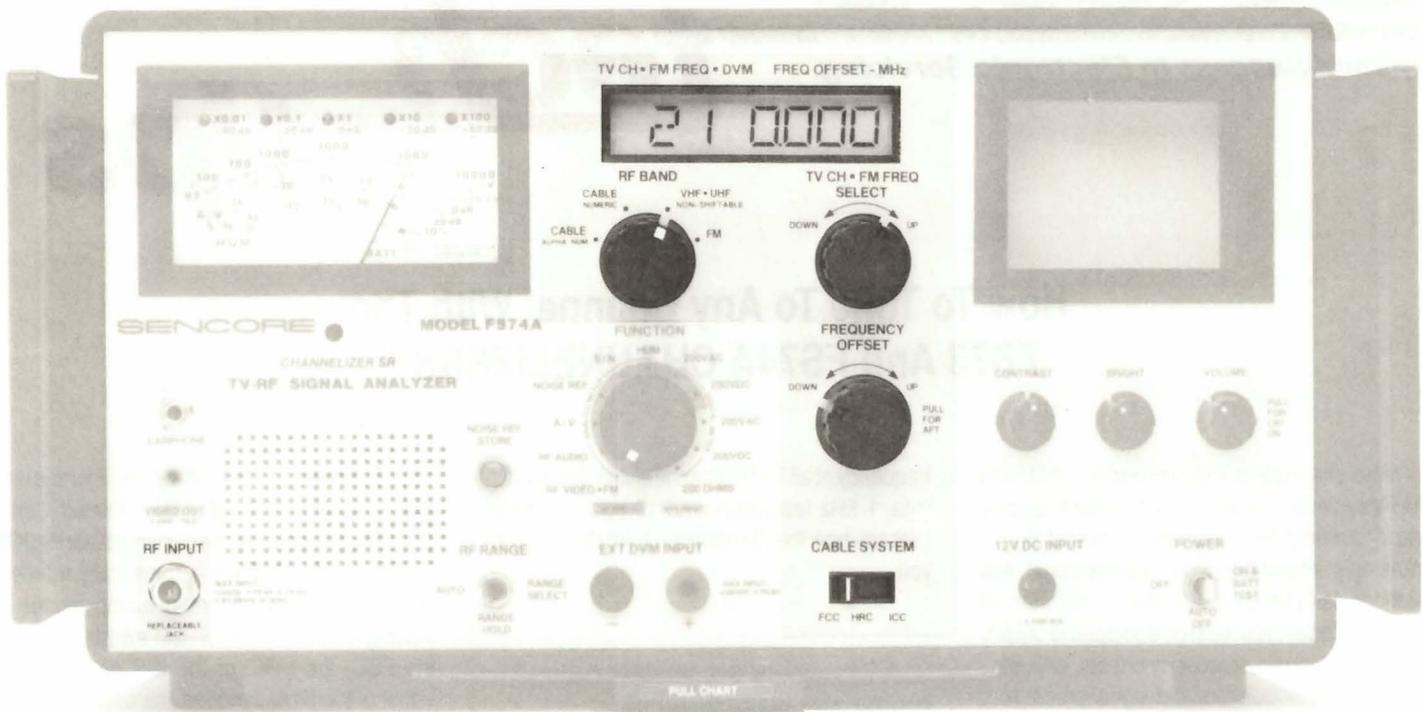


Fig.3: The CHANNELIZERS keep channel tests simple and accurate.

5. If the measured frequency is within +/- 1.25 MHz of assigned TV channel or 150 kHz of assigned FM frequency, pull the FREQUENCY OFFSET control outward to use the AFT mode.

6. Read the frequency offset between the CHANNELIZER'S tuned frequency and the assigned carrier frequency in the FREQ OFFSET - MHZ readout.

Tune To Non-FCC Channels In The Manual Tune Mode

You can also tune the CHANNELIZER to a non-FCC allocated channel in the manual tune mode. The manual tune mode allows you to offset from an FCC specified channel + or - 4 MHz in 50 kHz steps. This approach to tuning gives a high degree of accuracy, and still lets you tune to any special frequencies in your system.

How To Tune To A Frequency That Is Not An FCC Allocated Channel:

1. Connect the signal to the RF input.
2. Select the RF BAND (alpha numeric, numeric, VHF-UHF, FM) which contains a channel within +/- 4 MHz of the frequency you wish to measure.

Select the proper CABLE SYSTEM type (FCC, HRC, ICC), and select the measurement function.



Fig. 4: The CHANNELIZERS can manually tune in 50 kHz steps to any channel from 5 to 890 MHz.

4. Turn the TV CH • FM FREQ SELECT control until the channel closest to the desired frequency appears in the TV CH • FM FREQ • DVM display. Place the RF RANGE switch in the AUTO position for the fastest measurements.

5. Fine tune the CHANNELIZER by adjusting the FREQUENCY OFFSET control for the correct offset reading on the FREQ OFFSET - MHZ

display that when added to or subtracted from the frequency of the chosen channel equals the desired frequency.

For example: If you want to measure the RF level of a video signal at 505.25 MHz. You must select the RF BAND VHF-UHF position, and tune to channel 20 UHF (507.25 MHz video carrier as shown in figure 3). Then, manually offset with the FREQUENCY OFFSET control to a -2 MHz.

Both the FS73 CHANNELIZER Jr. and the FS74A CHANNELIZER Sr. allow you to tune and count TV RF frequencies in the 5 to 890 MHz band with digital accuracy and 1 kHz resolution.

**For more information
Call Toll Free 1-800-SENCORE
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VHF And Cable Channel Frequency Allocations

Channel Numeric	Alpha-Numeric	Frequency Range MHz	Picture Carrier	Sound Carrier	Channel Numeric	Alpha-Numeric	Frequency Range MHz	Picture Carrier	Sound Carrier	
Sub-Band	74	T-7	5.75-11.75	7.00	11.50	23	J	216-222	217.25	221.75
	75	T-8	11.75-17.75	13.00	17.50	24	K	222-228	223.25	227.75
	76	T-9	17.75-23.75	19.00	23.50	25	L	228-234	229.25	233.75
	77	T-10	23.75-29.75	25.00	29.50	26	M	234-240	235.25	239.75
	78	T-11	29.75-35.75	31.00	35.50	27	N	240-246	241.25	245.75
	79	T-12	35.75-41.75	37.00	41.50	28	O	246-252	247.25	251.75
	80	T-13	41.75-47.75	43.00	47.50	29	P	252-258	253.25	257.75
VHF (Lo)	2	2	54-60	55.25	59.75	30	Q	258-264	259.25	263.75
	3	3	60-66	61.25	65.75	31	R	264-270	265.25	269.75
	4	4	66-72	67.25	71.75	32	S	270-276	271.25	275.75
	5	5	72-82	77.25	81.75	33	T	276-282	277.25	281.75
	6	6	82-88	83.25	87.75	34	U	282-288	283.25	287.75
						35	V	288-294	289.25	293.75
Mid Band					36	W	294-300	295.25	299.75	
	69	A-5	90-96	91.25	95.75	37	AA	300-306	301.25	305.75
	70	A-4	96-102	97.25	101.75	38	BB	306-312	307.25	311.75
	71	A-3	102-108	103.25	107.75	39	CC	312-318	313.25	317.75
	72	A-2	108-114	109.25	113.75	40	DD	318-324	319.25	323.75
	73	A-1	114-120	115.25	119.75	41	EE	324-330	325.25	329.75
	14	A	120-126	121.25	125.75	42	FF	330-336	331.25	335.75
	15	B	126-132	127.25	131.75	43	GG	336-342	337.25	341.75
	16	C	132-138	133.25	137.75	44	HH	342-348	343.25	347.75
	17	D	138-144	139.25	143.75	45	II	348-354	349.25	353.75
	18	E	144-150	145.25	149.75	46	JJ	354-360	355.25	359.75
VHF (Hi)	19	F	150-156	151.25	155.75	47	KK	360-366	361.25	365.75
	20	G	156-162	157.25	161.75	48	LL	366-372	367.25	371.75
	21	H	162-168	163.25	167.75	49	MM	372-378	373.25	377.75
	22	I	168-174	169.25	173.75	50	NN	378-384	379.25	383.75
	7	7	174-180	175.25	179.75	51	OO	384-390	385.25	389.75
	8	8	180-186	181.25	185.75	52	PP	390-396	391.25	395.75
	9	9	186-192	187.25	191.75	53	QQ	396-402	397.25	401.75
	10	10	192-198	193.25	197.75	54	RR	402-408	403.25	407.75
	11	11	198-204	199.25	203.75	55	SS	408-414	409.25	413.75
	12	12	204-210	205.25	209.75	56	TT	414-420	415.25	419.75
	13	13	210-216	211.25	211.75	57	UU	420-426	421.25	425.75
						58	VV	426-432	427.25	431.75
						59	WW	432-438	433.25	437.75
					60	XX	438-444	439.25	443.75	
					61	YY	444-450	445.25	449.75	
					62	ZZ	450-456	451.25	455.75	
					63	AAA	456-462	457.25	461.75	
					64	BBB	462-468	463.25	467.75	
					65	CCC	468-474	469.25	473.75	
					66	DDD	474-480	475.25	479.75	
					67	EEE	480-486	481.25	485.75	
					68	FFF	486-492	487.25	491.75	

Fig. 5: VHF-UHF and cable channel frequency allocations used by the CHANNELIZERS. (Figure 5 continues on next page.)

UHF Channel Frequency Allocations

Channel Numeric	Frequency Range MHz	Picture Carrier	Sound Carrier
14	470-476	471.25	475.75
15	476-482	477.25	481.75
16	482-488	483.25	487.75
17	488-494	489.25	493.75
18	494-500	495.25	499.75
19	500-506	501.25	505.75
20	506-512	507.25	511.75
21	512-518	513.25	517.75
22	518-524	519.25	523.75
23	524-530	525.25	529.75
24	530-536	531.25	535.75
25	536-542	537.25	541.75
26	542-548	543.25	547.75
27	548-554	549.25	553.75
28	554-560	555.25	559.75
29	560-566	561.25	565.75
30	566-572	567.25	571.75
31	572-578	573.25	577.75
32	578-584	579.25	583.75
33	584-590	585.25	589.75
34	590-596	591.25	595.75
35	596-602	597.25	601.75
36	602-608	603.25	607.75
37	608-614	609.25	613.75
38	614-620	615.25	619.75
39	620-626	621.25	635.75
40	626-632	627.25	631.75
41	632-638	633.25	637.75
42	638-644	639.25	643.75
43	644-650	645.25	649.75
44	650-656	651.25	655.75
45	656-662	657.25	661.75
46	662-668	663.25	667.75
47	668-692	669.25	673.75
48	674-680	675.25	679.75
49	680-686	681.25	685.75

Channel Numeric	Frequency Range MHz	Picture Carrier	Sound Carrier
50	686-692	687.25	691.75
51	692-698	693.25	697.75
52	698-704	699.25	703.75
53	704-710	705.25	709.75
54	710-716	711.25	715.75
55	716-722	717.25	721.75
56	722-728	723.25	727.75
57	728-734	729.25	733.75
58	734-740	735.25	739.75
59	740-746	741.25	745.75
60	746-752	747.25	751.75
61	752-758	753.25	757.75
62	758-764	759.25	763.75
63	764-770	765.25	769.75
64	770-776	771.25	775.75
65	776-782	777.25	781.75
66	782-788	783.25	787.75
67	788-794	789.25	793.75
68	794-800	795.25	799.75
69	800-806	801.25	805.75
70	806-812	807.25	811.75
71	812-818	813.25	817.75
72	818-824	819.25	823.75
73	824-830	825.25	829.75
74	830-836	831.25	835.75
75	836-842	837.25	841.75
76	842-848	843.25	847.75
77	848-854	849.25	853.75
78	854-860	855.25	859.75
79	860-866	861.25	865.75
80	866-872	867.25	871.75
81	872-878	873.25	877.75
82	878-884	879.25	882.75
83	884-890	885.25	889.75