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Technical Note TN1012

QuickTime TV Tuner APIs

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This Technote describes the TV Tuner APIs.

The TV Tuner component is included in the Video Startup extension which is part of the Apple Video Player software. The component provides a standard API for accessing the TV tuner hardware available for the various Macintosh systems that have the TV tuner circuit or card available.

Most developers do not need to call the TV Tuner component directly. Any application that uses the `SGSettingsDialog` function will automatically get TV support without changes to their application.

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About TV Tuner Components

Before delving into the specific component calls, there are a few TV-related concepts that are important to discuss. If you are writing software for a specific country, some of these issues may not apply. However, to write global-ready software that uses the TV tuner, each of these issues need to be taken into consideration.

Channel Numbering

The number of channels and the frequencies assigned to those channels varies from country to country. Also, in some countries, users are accustomed to configuring the channels in whatever way they please. For example, in the UK, one user may have his or her TV configured so that BBC is on channel 2, while another may have the TV configured so that BBC is on channel 7. A list of the channel frequencies used by Apple Video Player is provided in the appendix.

Off-Air vs. Cable Channels

Most countries use a different set of channel frequencies, depending on whether a station is being broadcast over the air or via a cable system. In addition, in the US, some cable systems use an alternate set of frequencies (called HRC cable) that differ slightly from standard cable frequencies. Most TVs have an antenna/cable switch that allows the user to select the correct set of frequencies.

Channel Frequencies Are Not Absolute

TV stations do not always broadcast at the defined frequencies. For example, a TV station may broadcast slightly off frequency to avoid interference from another station broadcasting at the same frequency in another part of the country. To accommodate this, TVs generally provide either an automatic or manual fine tuning feature.

Video Standards

Different countries use different video standards. Color encoding, picture size, and frame rate vary from standard to standard. North America and Japan use NTSC, France and parts of eastern Europe use SECAM, while most of the rest of the world uses PAL. Most countries have standardized on a single format for TV broadcasts, but some users may live in areas where they receive TV broadcasts from different countries that use different standards.

TV Standards

Different countries also broadcast using different TV standards, also called systems. Each TV system uses a slightly different range of TV frequencies. Also, the distance between the picture carrier frequency and sound carrier frequency varies from system to system. North America and Japan use system M/N, the UK uses system I, France uses system L, China and eastern Europe use system D/K, while most of the rest of the world uses system B/G. In some parts of the world,

multi-standard TVs are common. For example, if a person lives near the French/German border, they might receive some French stations that broadcast using system L and some German stations that broadcast using system B/G.

Stereo Sound

Stereo sound is supported in most countries of the world. Dual language or Second Audio Program (SAP) support is also quite common. In Europe, two different types of stereo broadcast are common: analog FM stereo, and the more recent digital NICAM stereo.

TV Tuner Hardware Description

Many of Apple's multimedia computers have the option of installing a TV tuner card. The TV tuner card becomes an additional input (along with the composite and s-video inputs) to the video digitizer.

There are currently five different TV tuner cards: US (System M/N), Japanese (System M/N), UK (System I), International (System B/G), and French (System L and B/G). The two primary differences between the cards are the tuner modules and the stereo decoding circuitry. From the software point of view, the tuner modules all behave very similarly. The stereo decoders, however, differ in several ways:

- The US and Japanese cards can be set to one of three sound modes: stereo, SAP (second audio program), or mono. The other three cards can be set to stereo, language B, or mono/language A.
- The UK, International, and French cards can detect what type of sound is being broadcast (i.e. stereo, dual language, or mono) and return the information to the application. The US and Japanese tuner cards do not support this.
- The International tuner card can also return which type of stereo broadcast is being received (i.e. NICAM or FM stereo).

Other differences between the tuner cards:

- The US and Japanese tuners support closed captioning, while the UK and International cards support Teletext. The French card does not support Teletext or closed captioning.

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Using the TV Tuner Component

All access to the TV tuner is handled by the TV Tuner component. The following code demonstrates how to find and open the TV Tuner component.

```
ComponentDescription theDesc;
Component id;
ComponentInstance tunerInst;

theDesc.componentType = 'tunr';
theDesc.componentSubType = 0;
theDesc.componentManufacturer = 'appl';
theDesc.componentFlags = 0L;
theDesc.componentFlagsMask = 0L;
id = FindNextComponent(nil, &theDesc);
if (id != nil) {
    tunerInst = OpenComponent(id);
    if (tunerInst != nil)
        if (GetComponentVersion(tunerInst) < 0x00020000) {
            CloseComponent(tunerInst);
            tunerInst = nil;
        }
}
}
```

`FindNextComponent` will return `nil` if the TV Tuner component does not exist or if the component has determined that the tuner hardware does not exist. `OpenComponent` will return `nil` if the TV Tuner component has already been opened by another application. The code also checks to make sure the the component version is 2.0 or later. Versions of the compont prior to 2.0 will not function properly and should not be used.

When the application is finished using the component, it should close the component using the `CloseComponent` call.

In addition to opening the TV Tuner component, the application must also set the input of the video digitizer using the `VDSetInput` function. To determine which input to use, query each of the digitizer's inputs using the `VDGetInputFormat` call until you find an input of type `tvTunerIn`.

```
short FindTunerInput(ComponentInstance digitizer) {
    short count;
    short format;
    short i;
    short tvInput;

    tvInput = -1;
    if (VDGetNumberOfInputs(digitizer, &count) == noErr)
        for (i = count; i >= 0; --i)
```

```

        if (VDGetInputFormat(digitizer, i, &format) == noErr)
            if (format == tvTunerIn) {
                tvInput = i;
                break;
            }
    }
    return(tvInput);
}

```

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TV Tuner Component API Listing

TVSetFrequency

```

pascal ComponentResult TVSetFrequency(
    ComponentInstance ci,
    long frequency);

ci          component instance

frequency   frequency in hertz

```

This call sets the TV tuner to the selected frequency. The frequency is given in hertz. For example, to receive a channel that broadcasts at 189.25 Mhz, you would use a frequency value of 189250000.

TVGetFrequency

```

pascal ComponentResult TVGetFrequency(
    ComponentInstance ci,
    long *frequency);

ci          component instance
frequency   pointer to frequency

```

This call returns the last frequency set using TVSetFrequency.

TVGetCurrentFlags

```

pascal ComponentResult TVGetCurrentFlags(
    ComponentInstance ci,
    long *standardFlags,
    long *currentFlags);

ci          component instance

standardFlags pointer to standard flags
currentFlags  pointer to current flags

```

This function returns a set of flags for which features the TV tuner supports. Currently, the only flags defined are for the different systems that are supported. Because of this, standardFlags and currentFlags will always be the same.

TVSetSoundMode

```

pascal ComponentResult TVSetSoundMode(
    ComponentInstance ci,
    short soundMode);

ci          component instance

soundMode   sound mode to use

```

Returns tvParamErr if sound mode is out of range. Returns tvNoStereoErr if tuner does not support stereo sound.

This function sets the sound mode to be used by the TV tuner. In a way, this is really a preference more than a setting. The tuner will use the specified sound mode if available, but will revert to the next best thing if necessary. The three sound modes that can be specified are:

- tvMonoMode - This sets the sound mode to mono or, in the case of a dual language broadcast, to language A.
- tvSAPMode - This sets the sound mode to SAP (second audio program) or language B.
- tvStereoMode - This sets the sound mode to stereo. When applicable, it automatically selects the appropriate type of stereo (NICAM or FM).

TVGetSoundMode

```
pascal ComponentResult TVGetSoundMode(  
    ComponentInstance ci,  
    short *soundMode);  
  
ci          component instance  
  
soundMode  pointer to a sound mode
```

Returns `tvNoStereoErr` if tuner does not support stereo sound.

This function returns the sound mode last requested using the `TVSetSoundMode` function. This does not necessarily correspond to the sound mode currently being received. For that information, use the `TVGetAvailableSoundMode` routine.

TVGetAvailableSoundMode

```
pascal ComponentResult TVGetAvailableSoundMode(  
    ComponentInstance ci,  
    short *soundMode);  
  
ci          component instance  
  
soundMode  pointer to a sound mode
```

Returns `tvNoStereoErr` if tuner does not support stereo sound.

If supported by the stereo decoding hardware, this function will return the sound mode that is actually being received. The four sound modes that can be returned are:

- `tvUnknownMode` - This is returned if the hardware does not support sound mode detection or if the sound mode could not be determined (e.g. no signal is being received).
- `tvMonoMode` - This is returned if a mono signal is being received.
- `tvSAPMode` - This is returned if an SAP or dual language signal is being received.
- `tvStereoMode` - This is returned if a stereo signal is being received.

TVGetAvailableSoundType

```
pascal ComponentResult TVGetAvailableSoundType(  
    ComponentInstance ci,  
    short *soundType);  
  
ci          component instance  
  
soundType  pointer to a sound type
```

Returns `tvNoStereoErr` if tuner does not support stereo sound.

If supported by the stereo decoding hardware, this function will return the type of sound that is actually being received. The three sound types that can be returned are:

- `tvUnknownSoundType` - This is returned if the hardware does not support sound type detection or if the sound type could not be determined (e.g. no signal is being received).
- `tvAnalogSoundType` - This is the most common type of sound broadcast.
- `tvDigitalSoundType` - This is a fairly recent type of digital sound broadcast, commonly called NICAM. It is common in some European countries.

TVSetSoundSearchSpeed

```
pascal ComponentResult TVSetSoundSearchSpeed(  
    ComponentInstance ci,  
    short speed);  
  
ci          component instance  
  
speed      search speed
```

Returns `tvNotSupportedErr` if function not supported by tuner. Returns `tvParamErr` if invalid search speed specified.

If supported by the stereo decoding hardware, this function will set the speed at which the hardware determines the available sound mode and type. Using `tvSoundSlowSpeed` is more accurate than `tvSoundFastSpeed`, but may take

several seconds to determine the sound mode and type.

TVGetSoundSearchSpeed

```
pascal ComponentResult TVGetSoundSearchSpeed(  
    ComponentInstance ci,  
    short *speed);  
  
ci    component instance  
  
speed pointer to speed
```

Returns tvNotSupportedErr if function not supported by tuner.

This function returns the sound search speed set using the TVSetSoundSearchSpeed function.

TVSetStandard

```
pascal ComponentResult TVSetStandard(  
    ComponentInstance ci,  
    unsigned long standard);  
  
ci    component instance  
  
standard TV standard
```

This function sets the TV standard to use (i.e. system I, system M/N, etc.). When using a dual standard, specify only one of the two standards, not both. For example, to set system B/G use tunrStandardB or tunrStandardG, but not tunrStandardB+tunrStandardG.

TVGetStandard

```
pascal ComponentResult TVGetStandard(  
    ComponentInstance ci,  
    unsigned long *standard);  
  
ci    component instance  
  
standard pointer to TV standard.
```

This function returns the TV standard set using the TVSetStandard function.

TVGetDefaultStandard

```
pascal ComponentResult TVGetDefaultStandard(  
    ComponentInstance ci,  
    unsigned long *standard);  
  
ci    component instance  
  
standard pointer to TV standard
```

This function returns the default TV standard.

TV Tuner Component Constants:

```
#define tunrStandardA (1L<<0)  
#define tunrStandardB (1L<<1)  
#define tunrStandardC (1L<<2)  
#define tunrStandardD (1L<<3)  
#define tunrStandardE (1L<<4)  
#define tunrStandardF (1L<<5)  
#define tunrStandardG (1L<<6)  
#define tunrStandardH (1L<<7)  
#define tunrStandardI (1L<<8)  
#define tunrStandardK (1L<<9)  
#define tunrStandardL (1L<<10)  
#define tunrStandardLPrime (1L<<11)  
#define tunrStandardM (1L<<12)  
#define tunrStandardN (1L<<13)
```

```

#define tvUnimpErr -2201 /* feature unimplemented */
#define tvParamErr -2202 /* bad input parameter */
#define tvTooManyInstErr -2204 /* too many instances of tuner */
#define tvNoStereoErr -2205 /* no stereo decoder */
#define tvNotSupportedErr -2206 /* function not supported by HW*/

#define kSelectTVGetFrequency 0
#define kSelectTVSetFrequency 1
#define kSelectTVGetCurrentFlags 2
#define kSelectTVGetSoundMode 3
#define kSelectTVSetSoundMode 4
#define kSelectTVGetAvailSoundMode 11
#define kSelectTVGetAvailSoundType 12
#define kSelectTVGetStandard 13
#define kSelectTVSetStandard 14
#define kSelectTVGetDefaultStandard 15
#define kSelectTVGetSoundSearchSpeed 16
#define kSelectTVSetSoundSearchSpeed 17

#define tvUnknownMode (-1)
#define tvMonoMode 1
#define tvSAPMode 2
#define tvStereoMode 3

#define tvUnknownSoundType (-1)
#define tvAnalogSoundType 0
#define tvDigitalSoundType 1

#define tvSoundSlowSpeed 0
#define tvSoundFastSpeed 1

typedef ComponentInstance TVTunerComponent;

pascal ComponentResult TVGetFrequency(
    TVTunerComponent ci,
    long *frequency)
    FIVEWORDINLINE(0x2F3C, 0x04, kSelectTVGetFrequency, 0x7000, 0xA82A);

pascal ComponentResult TVSetFrequency(
    TVTunerComponent ci,
    long frequency)
    FIVEWORDINLINE(0x2F3C, 0x04, kSelectTVSetFrequency, 0x7000, 0xA82A);

pascal ComponentResult TVGetCurrentFlags(
    TVTunerComponent ci,
    long *standardsFlags,
    long *currentFlags)
    FIVEWORDINLINE(0x2F3C, 0x08, kSelectTVGetCurrentFlags, 0x7000, 0xA82A);

pascal ComponentResult TVSetSoundMode(
    TVTunerComponent ci,
    short soundMode)
    FIVEWORDINLINE(0x2F3C, 0x02, kSelectTVSetSoundMode, 0x7000, 0xA82A);

pascal ComponentResult TVGetSoundMode(
    TVTunerComponent ci,
    short *soundMode)
    FIVEWORDINLINE(0x2F3C, 0x04, kSelectTVGetSoundMode, 0x7000, 0xA82A);

pascal ComponentResult TVGetAvailableSoundMode(
    TVTunerComponent ci,
    short *soundMode)
    FIVEWORDINLINE(0x2F3C, 0x04, kSelectTVGetAvailSoundMode, 0x7000, 0xA82A);

pascal ComponentResult TVGetAvailableSoundType(
    TVTunerComponent ci,
    short *type)
    FIVEWORDINLINE(0x2F3C, 0x04, kSelectTVGetAvailSoundType, 0x7000, 0xA82A);

pascal ComponentResult TVSetSoundSearchSpeed(
    TVTunerComponent ci,
    short speed)
    FIVEWORDINLINE(0x2F3C, 0x02, kSelectTVSetSoundSearchSpeed, 0x7000, 0xA82A);

```

```

pascal ComponentResult TVGetSoundSearchSpeed(
    TVTunerComponent ci,
    short *speed)
    FIVEWORDINLINE(0x2F3C, 0x04, kSelectTVGetSoundSearchSpeed, 0x7000, 0xA82A);

pascal ComponentResult TVSetStandard(
    TVTunerComponent ci,
    unsigned long standard)
    FIVEWORDINLINE(0x2F3C, 0x04, kSelectTVSetStandard, 0x7000, 0xA82A);

pascal ComponentResult TVGetStandard(
    TVTunerComponent ci,
    unsigned long *standard)
    FIVEWORDINLINE(0x2F3C, 0x04, kSelectTVGetStandard, 0x7000, 0xA82A);

pascal ComponentResult TVGetDefaultStandard(
    TVTunerComponent ci,
    unsigned long *standard)
    FIVEWORDINLINE(0x2F3C, 0x04, kSelectTVGetDefaultStandard, 0x7000, 0xA82A);

```

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Appendix - TV Channel Frequencies (Mhz)

Tuner Version: US

TV System: M/N

Countries:

- US
- Canada
- Mexico

US Off Air Channels

Channel	Frequency	Display
2	55.25	2
3	61.25	3
4	67.25	4
5	77.25	5
6	83.25	6
7	175.25	7
8	181.25	8
9	187.25	9
10	193.25	10
11	199.25	11
12	205.25	12
13	211.25	13
14	471.25	14
15	477.25	15
16	483.25	16
17	489.25	17
18	495.25	18
19	501.25	19
20	507.25	20
21	513.25	21
22	519.25	22
23	525.25	23
24	531.25	24
25	537.25	25
26	543.25	26
27	549.25	27
28	555.25	28
29	561.25	29
30	567.25	30
31	573.25	31
32	579.25	32
33	585.25	33
34	591.25	34
35	597.25	35

36	603.25	36
37	609.25	37
38	615.25	38
39	621.25	39
40	627.25	40
41	633.25	41
42	639.25	42
43	645.25	43
44	651.25	44
45	657.25	45
46	663.25	46
47	669.25	47
48	675.25	48
49	681.25	49
50	687.25	50
51	693.25	51
52	699.25	52
53	705.25	53
54	711.25	54
55	717.25	55
56	723.25	56
57	729.25	57
58	735.25	58
59	741.25	59
60	747.25	60
61	753.25	61
62	759.25	62
63	765.25	63
64	771.25	64
65	777.25	65
66	783.25	66
67	789.25	67
68	795.25	68
69	801.25	69

US Cable Channels

Channel	Frequency	Display
4A	73.25	1
2	55.25	2
3	61.25	3
4	67.25	4
5	77.25	5
6	83.25	6
7	175.25	7
8	181.25	8
9	187.25	9
10	193.25	10
11	199.25	11
12	205.25	12
13	211.25	13
A	121.25	14
B	127.25	15
C	133.25	16
D	139.25	17
E	145.25	18
F	151.25	19
G	157.25	20
H	163.25	21
I	169.25	22
J	217.25	23
K	223.25	24
L	229.25	25
M	235.25	26
N	241.25	27
O	247.25	28
P	253.25	29
Q	259.25	30
R	265.25	31
S	271.25	32
T	277.25	33

U	293.25	34
V	289.25	35
W	295.25	36
W+1	301.25	37
W+2	307.25	38
W+3	313.25	39
W+4	319.25	40
W+5	325.25	41
W+6	331.25	42
W+7	337.25	43
W+8	343.25	44
W+9	349.25	45
W+10	355.25	46
W+11	361.25	47
W+12	367.25	48
W+13	373.25	49
W+14	379.25	50
W+15	385.25	51
W+16	391.25	52
W+17	397.25	53
W+18	403.25	54
W+19	409.25	55
W+20	415.25	56
W+21	421.25	57
W+22	427.25	58
W+23	433.25	59
W+24	439.25	60
W+25	445.25	61
W+26	451.25	62
W+27	457.25	63
W+28	463.25	64
65	469.25	65
66	475.25	66
67	481.25	67
68	487.25	68
69	493.25	69
70	499.25	70
71	505.25	71
72	511.25	72
73	517.25	73
74	523.25	74
75	529.25	75
76	535.25	76
77	541.25	77
78	547.25	78
79	553.25	79
80	559.25	80
81	565.25	81
82	571.25	82
83	577.25	83
84	583.25	84
85	589.25	85
86	595.25	86
87	601.25	87
88	607.25	88
89	613.25	89
90	619.25	90
91	625.25	91
92	631.25	92
93	637.25	93
94	643.25	94
A-5	91.25	95
A-4	97.25	96
A-3	103.25	97
A-2	109.25	98
A-1	115.25	99
100	649.25	100
101	655.25	101
102	661.25	102
103	667.25	103
104	673.25	104
105	679.25	105

106	685.25	106
107	691.25	107
108	697.25	108
109	703.25	109
110	709.25	110
111	715.25	111
112	721.25	112
113	727.25	113
114	733.25	114
115	739.25	115
116	745.25	116
117	751.25	117
118	757.25	118
119	763.25	119
120	769.25	120
121	775.25	121
122	781.25	122
123	787.25	123
124	793.25	124
125	799.25	125

Tuner Version: Japan

TV System: M/N

Countries:

- Japan

Japan Off Air Channels

Channel	Frequency	Display
1	91.25	1
2	97.25	2
3	103.25	3
4	171.25	4
5	177.25	5
6	183.25	6
7	189.25	7
8	193.25	8
9	199.25	9
10	205.25	10
11	211.25	11
12	217.25	12
13	471.25	13
14	477.25	14
15	483.25	15
16	489.25	16
17	495.25	17
18	501.25	18
19	507.25	19
20	513.25	20
21	519.25	21
22	525.25	22
23	531.25	23
24	537.25	24
25	543.25	25
26	549.25	26
27	555.25	27
28	561.25	28
29	567.25	29
30	573.25	30
31	579.25	31
32	585.25	32
33	591.25	33
34	597.25	34
35	603.25	35
36	609.25	36
37	615.25	37
38	621.25	38
39	627.25	39
40	633.25	40

41	639.25	41
42	645.25	42
43	651.25	43
44	657.25	44
45	663.25	45
46	669.25	46
47	675.25	47
48	681.25	48
49	687.25	49
50	693.25	50
51	699.25	51
52	705.25	52
53	711.25	53
54	717.25	54
55	723.25	55
56	729.25	56
57	735.25	57
58	741.25	58
59	747.25	59
60	753.25	60
61	759.25	61
62	765.25	62

Japan Cable Channels

Channel	Freq	Display
1	91.25	1
2	97.25	2
3	103.25	3
4	171.25	4
5	177.25	5
6	183.25	6
7	189.25	7
8	193.25	8
9	199.25	9
10	205.25	10
11	211.25	11
12	217.25	12
C13	109.25	13
C14	115.25	14
C15	121.25	15
C16	127.25	16
C17	133.25	17
C18	139.25	18
C19	145.25	19
C20	151.25	20
C21	157.25	21
C22	165.25	22
C23	223.25	23
C24	229.25	24
C25	235.25	25
C26	241.25	26
C27	247.25	27
C28	253.25	28
C29	259.25	29
C30	265.25	30
C31	271.25	31
C32	277.25	32
C33	293.25	33
C34	289.25	34
C35	295.25	35
C36	301.25	36
C37	307.25	37
C38	313.25	38
C39	319.25	39
C40	325.25	40
C41	331.25	41
C42	337.25	42
C43	343.25	43
C44	349.25	44
C45	355.25	45

C46	361.25	46
C47	367.25	47
C48	373.25	48
C49	379.25	49
C50	385.25	50
C51	391.25	51
C52	397.25	52
C53	403.25	53
C54	409.25	54
C55	415.25	55
C56	421.25	56
C57	427.25	57
C58	433.25	58
C59	439.25	59
C60	445.25	60
C61	451.25	61
C62	457.25	62
C63	463.25	63

Tuner Version: International

TV System: B/G

Countries:

- Germany
- Austria
- Australia
- Netherlands
- Italy
- Switzerland
- Malaysia
- Norway
- Denmark
- Belgium
- Spain
- New Zealand
- Singapore
- Middle East
- Sweden
- Finland
- Indonesia

B/G Off Air Channels

Channel	Freq	Display
E2	48.25	C02
E3	55.25	C03
E4	62.25	C04
E5	175.25	C05
E6	182.25	C06
E7	189.25	C07
E8	196.25	C08
E9	203.25	C09
E10	210.25	C10
E11	217.25	C11
E12	224.25	C12
IA	53.75	C13
IB	62.25	C14
IC	82.25	C15
ID	175.25	C16
IE	183.25	C17
IF	192.75	C18
IG	201.25	C19
IH	210.25	C20
21	471.25	C21
22	479.25	C22
23	487.25	C23
24	495.25	C24
25	503.25	C25
26	511.25	C26
27	519.25	C27
28	527.25	C28
29	535.25	C29

30	543.25	C30
31	551.25	C31
32	559.25	C32
33	567.25	C33
34	575.25	C34
35	583.25	C35
36	591.25	C36
37	599.25	C37
38	607.25	C38
39	615.25	C39
40	623.25	C40
41	631.25	C41
42	639.25	C42
43	647.25	C43
44	655.25	C44
45	663.25	C45
46	671.25	C46
47	679.25	C47
48	687.25	C48
49	695.25	C49
50	703.25	C50
51	711.25	C51
52	719.25	C52
53	727.25	C53
54	735.25	C54
55	743.25	C55
56	751.25	C56
57	759.25	C57
58	767.25	C58
59	775.25	C59
60	783.25	C60
61	791.25	C61
62	799.25	C62
63	807.25	C63
64	815.25	C64
65	823.25	C65
66	831.25	C66
67	839.25	C67
68	847.25	C68
69	855.25	C69
E2A	49.75	C70
AS1	57.25	C71
AS2	64.25	C72
AS3	86.25	C73
AS4	95.25	C74
AS5	102.25	C75
AS5A	138.25	C76
AS10	209.25	C77
AS11	216.25	C78
IH1	217.25	C79
IND2	55.25	C80
IND3	62.25	C81
IND4	175.25	C82
IND5	182.25	C83
IND6	189.25	C84
IND7	196.25	C85
IND8	203.25	C86
IND9	210.25	C87
IND10	217.25	C88
IND11	224.25	C89

B/G Cable Channels

Channel	Freq	Display
E2	48.25	E2
E3	55.25	E3
E4	62.25	E4
S01	69.25	S01
S02	76.25	S02
S03	83.25	S03
S1	105.25	S1

S2	112.25	S2
S3	119.25	S3
S4	126.25	S4
S5	133.25	S5
S6	140.25	S6
S7	147.25	S7
S8	154.25	S8
S9	161.25	S9
S10	168.25	S10
E5	175.25	E5
E6	182.25	E6
E7	189.25	E7
E8	196.25	E8
E9	203.25	E9
E10	210.25	E10
E11	217.25	E11
E12	224.25	E12
S11	231.25	S11
S12	238.25	S12
S13	245.25	S13
S14	252.25	S14
S15	259.25	S15
S16	266.25	S16
S17	273.25	S17
S18	280.25	S18
S19	287.25	S19
S20	294.25	S20
S21	303.25	S21
S22	311.25	S22
S23	319.25	S23
S24	327.25	S24
S25	335.25	S25
S26	343.25	S26
S27	351.25	S27
S28	359.25	S28
S29	367.25	S29
S30	375.25	S30
S31	383.25	S31
S32	391.25	S32
S33	399.25	S33
S34	407.25	S34
S35	415.25	S35
S36	423.25	S36
S37	431.25	S37
S38	439.25	S38
S39	447.25	S39
S40	455.25	S40
S41	463.25	S41

Tuner Version: UK

TV System: I

Countries:

- United Kingdom
- Ireland
- Hong Kong

I Off Air Channels

Channel	Freq	Display
A	45.75	C01
B	53.75	C02
C	61.75	C03
D	175.25	C04
E	183.25	C05
F	191.25	C06
G	199.25	C07
H	207.25	C08
J	215.25	C09
C10	223.25	C10

C11	231.25	C11
C13	247.25	C13
B21	471.25	C21
B22	479.25	C22
B23	487.25	C23
B24	495.25	C24
B25	503.25	C25
B26	511.25	C26
B27	519.25	C27
B28	527.25	C28
B29	535.25	C29
B30	543.25	C30
B31	551.25	C31
B32	559.25	C32
B33	567.25	C33
B34	575.25	C34
B35	583.25	C35
B36	591.25	C36
B37	599.25	C37
B38	607.25	C38
B39	615.25	C39
B40	623.25	C40
B41	631.25	C41
B42	639.25	C42
B43	647.25	C43
B44	655.25	C44
B45	663.25	C45
B46	671.25	C46
B47	679.25	C47
B48	687.25	C48
B49	695.25	C49
B50	703.25	C50
B51	711.25	C51
B52	719.25	C52
B53	727.25	C53
B54	735.25	C54
B55	743.25	C55
B56	751.25	C56
B57	759.25	C57
B58	767.25	C58
B59	775.25	C59
B60	783.25	C60
B61	791.25	C61
B62	799.25	C62
B63	807.25	C63
B64	815.25	C64
B65	823.25	C65
B66	831.25	C66
B67	839.25	C67
B68	847.25	C68
B69	855.25	C69
B1	45.00	C70
B2	51.75	C71
B3	56.75	C72
B4	61.75	C73
B5	66.75	C74
B6	179.75	C75
B7	184.75	C76
B8	189.75	C77
B9	194.75	C78
B10	199.75	C79
B11	204.75	C80
B12	209.75	C81
B13	214.75	C82
B14	219.75	C83

I Cable Channels

Channel	Freq	Display
A1	47.25	A1
A2	55.25	A2

A3	63.25	A3
A4	71.25	A4
A5	79.25	A5
A6	87.25	A6
A7	95.25	A7
A8	103.25	A8
A9	111.25	A9
A10	119.25	A10
A11	127.25	A11
A12	135.25	A12
A13	143.25	A13
A14	151.25	A14
A15	159.25	A15
A16	167.25	A16
A17	175.25	A17
A18	183.25	A18
A19	191.25	A19
A20	199.25	A20
A21	207.25	A21
A22	215.25	A22
A23	223.25	A23
A24	231.25	A24
A25	239.25	A25
A26	247.25	A26
A27	255.25	A27
A28	263.25	A28
A29	271.25	A29
A30	279.25	A30
A31	287.25	A31
A32	295.25	A32
E2	48.25	E2
E3	55.25	E3
E4	62.25	E4
S01	69.25	S01
S02	76.25	S02
S03	83.25	S03
S1	105.25	S1
S2	112.25	S2
S3	119.25	S3
S4	126.25	S4
S5	133.25	S5
S6	140.25	S6
S7	147.25	S7
S8	154.25	S8
S9	161.25	S9
S10	168.25	S10
E5	175.25	E5
E6	182.25	E6
E7	189.25	E7
E8	196.25	E8
E9	203.25	E9
E10	210.25	E10
E11	217.25	E11
E12	224.25	E12
S11	231.25	S11
S12	238.25	S12
S13	245.25	S13
S14	252.25	S14
S15	259.25	S15
S16	266.25	S16
S17	273.25	S17
S18	280.25	S18
S19	287.25	S19
S20	294.25	S20
S21	303.25	S21
S22	311.25	S22
S23	319.25	S23
S24	327.25	S24
S25	335.25	S25
S26	343.25	S26
S27	351.25	S27
S28	359.25	S28

S29	367.25	S29
S30	375.25	S30
S31	383.25	S31
S32	391.25	S32
S33	399.25	S33
S34	407.25	S34
S35	415.25	S35
S36	423.25	S36
S37	431.25	S37
S38	439.25	S38
S39	447.25	S39
S40	455.25	S40
S41	463.25	S41

Tuner Version: French

TV System: B/G, L

Countries:

- France
- Monaco
- Luxembourg

L Off Air Channels

Channel	Freq	Display
FA	47.75	C1
L2	49.25	C2
L3	54.00	C3
FB	55.75	C4
L4	57.25	C5
FC1	60.50	C6
FC	63.75	C7
F1	176.00	C8
F2	184.00	C9
F3	192.00	C10
F4	200.00	C11
F5	208.00	C12
F6	216.00	C13
B21	471.25	C21
B22	479.25	C22
B23	487.25	C23
B24	495.25	C24
B25	503.25	C25
B26	511.25	C26
B27	519.25	C27
B28	527.25	C28
B29	535.25	C29
B30	543.25	C30
B31	551.25	C31
B32	559.25	C32
B33	567.25	C33
B34	575.25	C34
B35	583.25	C35
B36	591.25	C36
B37	599.25	C37
B38	607.25	C38
B39	615.25	C39
B40	623.25	C40
B41	631.25	C41
B42	639.25	C42
B43	647.25	C43
B44	655.25	C44
B45	663.25	C45
B46	671.25	C46
B47	679.25	C47
B48	687.25	C48
B49	695.25	C49
B50	703.25	C50
B51	711.25	C51
B52	719.25	C52

B53	727.25	C53
B54	735.25	C54
B55	743.25	C55
B56	751.25	C56
B57	759.25	C57
B58	767.25	C58
B59	775.25	C59
B60	783.25	C60
B61	791.25	C61
B62	799.25	C62
B63	807.25	C63
B64	815.25	C64
B65	823.25	C65
B66	831.25	C66
B67	839.25	C67
B68	847.25	C68
B69	855.25	C69

L Cable Channels (same as B/G Cable)

Channel	Freq	Display
E2	48.25	E2
E3	55.25	E3
E4	62.25	E4
S01	69.25	S01
S02	76.25	S02
S03	83.25	S03
S1	105.25	S1
S2	112.25	S2
S3	119.25	S3
S4	126.25	S4
S5	133.25	S5
S6	140.25	S6
S7	147.25	S7
S8	154.25	S8
S9	161.25	S9
S10	168.25	S10
E5	175.25	E5
E6	182.25	E6
E7	189.25	E7
E8	196.25	E8
E9	203.25	E9
E10	210.25	E10
E11	217.25	E11
E12	224.25	E12
S11	231.25	S11
S12	238.25	S12
S13	245.25	S13
S14	252.25	S14
S15	259.25	S15
S16	266.25	S16
S17	273.25	S17
S18	280.25	S18
S19	287.25	S19
S20	294.25	S20
S21	303.25	S21
S22	311.25	S22
S23	319.25	S23
S24	327.25	S24
S25	335.25	S25
S26	343.25	S26
S27	351.25	S27
S28	359.25	S28
S29	367.25	S29
S30	375.25	S30
S31	383.25	S31
S32	391.25	S32
S33	399.25	S33
S34	407.25	S34
S35	415.25	S35
S36	423.25	S36

S37	431.25	S37
S38	439.25	S38
S39	447.25	S39
S40	455.25	S40
S41	463.25	S41

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