



DivXMux

Command Line Reference

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Table of Contents

Table of Contents	i
Document License	ii
1 Introduction	1
2 DivX Media Format Features	2
3 Construction Process	4
3.1 Titles	5
3.2 Menus	11
4 Internationalization	12
4.1 Language Codes	12
4.2 Country Codes	15

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1 Introduction

DivXMux is the “Swiss Army Knife” of DivX tools. It performs all the necessary file preparation and assembly required to construct DivX files, including DivX Media Format features; alternate audio tracks, multiple subtitle tracks, metadata, multiple titles, chapter points, and interactive menus.

2 DivX Media Format Features

Listed below is the feature set from the DivX Media Format:

- Multiple titles
 - Each title may be a full- length feature, special features, an episode, or any other piece of media content.
 - Titles do not have to use the same video resolution or audio format as the main feature.
 - Maximum of 100 titles.

- Chapter points
 - Each chapter point has a label associated with it. This is useful when a file has no menu, or the menu is not in play.
 - Chapter points are defined by start and end time stamps.
 - Maximum of 100 chapters points per title.

- Alternate audio tracks
 - Maximum of 8 per title.
 - Supports MPEG 1/2 Layer 3 (MP3), Dolby Digital (AC3), MPEG 1/2 Layer 2 (MP2) audio formats.

- Multiple subtitle tracks
 - Maximum of 8 per title.
 - Maximum of 3 colours per track.

- Metadata

The metadata is limited to the first title in the file, and not following titles. The following table lists and describes the supported metadata fields:

Field	Description
Title	Title of the Content
Type	Movie, Series
Copyright License	Rights
Encoded By	Person who encoded the file
Website	Persons Website
Genre	The genre of the content
Publisher	The studio that published the content
Cast/Creators	Content Cast

Encoder Version	Name and Version of the Encoding Application
Codec Name	Name of the codec used for the track
Codec Version	Name and Version of the Codec Used
CLI settings	Command Line flags and options
Quantizer Distribution - per pass	Q1-Q32 Integers per pass (max 3 passes)
Frame Type Distribution - per pass	I,B,P,S Integers per pass (max 3 passes)
Frame Period	Rate x Scale
Resolution	Width x Height x Frame Rate
Pixel Aspect Ratio	Par Height, Par Width
Source Input	Original Source Format (DV, MPEG-2, CAPTURE, TV)
Runtime	Runtime length in seconds
Certification	DivX Certification

- Interactive menus
 - Interactive menus contain background video, with optional audio, and buttons. Each button is a specified region on the background video, with an accompanying highlight. The highlight is an overlay is supports a maximum of 3 colours, and is displayed when the button is selected.
 - Supports transitions into menus and titles. Transitions are video, with optional audio, which is played before a menu or title appears.
 - Supports switching a title's active audio or subtitle track on button selection.
 - Supports playing a title, a playing a title from a chapter point, entering a menu or transition on button selection.
 - Maximum of 1000 menus, each with a maximum of 100 buttons.

Note: At this time the DivX Media Format is only available in Home Theatre resolutions, and not High Definition resolutions.

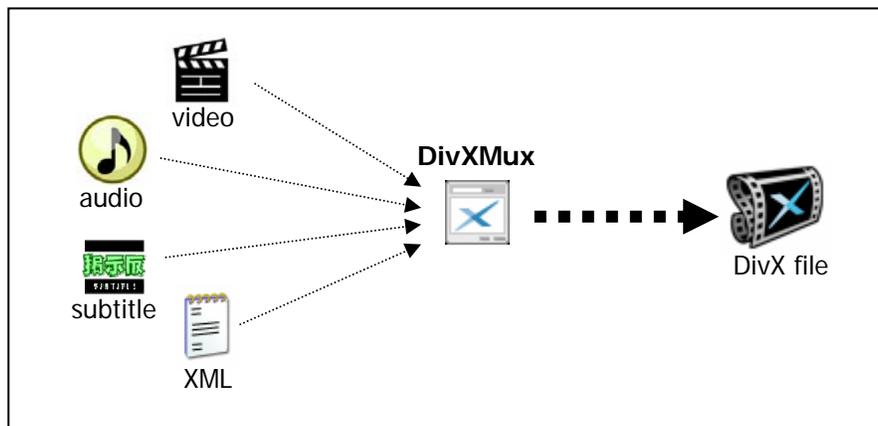
3 Construction Process

With the introduction of the DivX Media Format feature sets, DivX files are no longer thought of as just linear video. We introduce two new concepts when talking about DivX files; titles and menus.

A title is a continuous piece of content, such as a movie or sports game. A title contains multiple media streams, one video stream being mandatory, with an optional (up to 8) audio and subtitle streams. Every DivX file without the DivX Media Format can be considered a title. It is important to keep the meaning of a "title" in mind when working with DivX files.

Menus involve an interactive experience, with multiple menu screens and buttons which perform actions such as transitioning to other menus, switching audio and subtitle tracks on titles, and initiating playback of titles.

Below is a high level look at the construction flow between media files, the DivXMux, and the output DivX file.



The output from DivXMux is always a single DivX file, although the purpose of this file is dependent on the construction process. The following command line option is used to specify the location of the output DivX file:

```
--outfile <filename>
```

<filename> is the relative or full path to the output DivX file. If the path does not end in the “.divx” extension the “.divx” extension will be appended.

The following sections will explain in more detail the process of constructing the two distinct types of DivX files.

3.1 Titles

Since titles are simply a collection of synchronized streams which make up a linear playback experience, they are fairly simply to construct. The process involves providing several media streams to DivXMux, waiting for it to perform the construction process, which results in a DivX file.

3.1.1 Video

The following command line option is used to specify a video input source file to be included in the title being constructed:

```
--video [(strn data)] <filename>
```

<filename> is the relative or full path to the input file. Valid input file types are *.divx and *.avi, with one of the following fourCCs; 'DIVX', 'DX50', or 'XVID'.

The optional field (strn data) is a string used to tag the stream with metadata which describes the stream's language, country of origin, and content type. See section *3.1.5 DivX Stream Name Information* — *'strn'* for details.

3.1.2 Audio

The following command line option is used to specify an audio input source file to be included in the title being constructed:

```
--audio [(strn data)] [#<track>] [o<offset>] <filename>
```

<filename> is the relative or full path to the input file. Valid input file types are *.divx, *.avi, *.mp3, and *.ac3.

The optional field (strn data) is a string used to tag the stream with metadata which describes the stream's language, country of origin, and content type. See section *3.1.5 DivX Stream Name Information* — *'strn'* for details.

The optional field #<track> specifies the audio track number from the *.divx or *.avi input source file to be included in the title being constructed. The number is relative to the number of audio tracks in the

file. For example, a *.divx file contains 1 video track, 3 audio tracks, and 1 subtitle track for a total of 5 tracks. The valid audio track numbers are 1, 2, and 3.

The optional field o<offset> specifies the amount of offset, in milliseconds, to apply to the input source audio. Negative values are accepted.

3.1.3 Subtitle

The following command line option is used to specify a subtitle input source file to be included in the title being constructed:

```
--subtitle [(strn data)] [#<track>] <filename>
--audio [(strn data)] [#<track>] [o<offset>]
<filename>
```

<filename> is the relative or full path to the input file. Valid input file

types are *.divx, *.avi, *.srt (SubRip), *.idx, *.txt (DivX Subtitle Linker Text file). See section 3.1.6 *DivX Subtitle Linker Text File* for details.

The optional field (strn data) is a string used to tag the stream with metadata which describes the stream's language, country of origin, and content type. See section 3.1.5 *DivX Stream Name Information — 'strn'* for details.

The optional field #<track> specifies the subtitle track number from the *.divx or *.avi input source file to be included in the title being constructed. The number is relative to the number of subtitle tracks in the file. For example, a *.divx file contains 1 video track, 3 audio tracks, and 1 subtitle track for a total of 5 tracks. The valid subtitle track number is 1.

3.1.4 Menu Building Blocks

The following command line option specifies the output file will be used to hold the tracks for a menu. These files are temporary building blocks for interactive menus, and are referenced by the XML configuration file (-xmi option). These files are not compatible with playback devices or software. These files require one video track, and support an optional audio and subtitle track.

```
--menumode
--audio
[(strn
data)]
[#<track>]
[o<offset>
]
<filename>
```

3.1.5 DivX Stream Name Information — 'strn'

The DivX Stream Name information is a string which describes a video, audio, or subtitle stream's content type, language and associated country.

Video and audio streams do not require a valid string, however subtitle streams require a valid string.

The syntax is as follows:

```
"streamType [- [languageTag[-countryTag]];typeTag]"
```

Items inside square brackets are optional.

3.1.5.1 streamType

streamType identifies the stream's content type. The following are valid values:

- Video
- Audio
- Subtitle

3.1.5.2 *languageTag*

languageTag identifies the language of the stream's content. It is a case-insensitive 2 character language code as specified in section 4.1 *Language Codes*. As shown in the syntax, the languageTag is optional.

Each language code has an associated string which contains the full name of the language it represents. If languageTag is present, then the corresponding language should be displayed on screen. This would typically occur when switching audio and subtitle tracks, or displaying detailed track information. When possible, the language should be localized to the locale of the playback device for an improved user experience. If a languageTag is not provided, or the languageTag provided does not correspond to a known or defined language then nothing is displayed.

3.1.5.3 *countryTag*

countryTag identifies the country of the stream's content. It is a case-insensitive 2 character country code as specified in section 4.2 *Country Codes*. As shown in the syntax, the countryTag is optional. It is only permitted if languageTag is present.

Each country code has an associated string which contains the full name of the country it represents. If desired, the corresponding country could be displayed on screen for an improved user experience, however the display of country information is not required. Display would typically occur when switching audio and subtitle tracks, or displaying detailed track information. When possible, the country should be localized to the locale of the playback device for an improved user experience. If a countryTag is not provided, or the countryTag provided does not correspond to a known or defined country then nothing is displayed.

3.1.5.4 *typeTag*

typeTag identifies the content type for the stream. They are case-insensitive 2 character codes which are unique for each streamType.

For the streamType of "Video" the following are the identifiers and their corresponding description:

Video Types	
Codes	Description
CO	Commercial
HV	Home Video
MO	Movie
MT	Movie Trailer
MV	Music Video
TS	Television Show
VC	Video Clip

For the streamType of "Audio" the following are the identifiers and their corresponding description:

Audio Type	
Codes	Description
01	Other
02	Primary Feature
03	Director Commentary
04	Writer Commentary
05	Producer Commentary
06	Cast Commentary
07	Critic Commentary
08	Score Commentary
09	Production Designer Commentary
10	Special Effects Commentary
11	Fan Commentary
12	Other Commentary
13	Isolated Score
14	Soundtrack
15	Interview
16	For Visually Impaired
17	Alternative Director Commentary

For the streamType of "Subtitle" the following are the identifiers and their corresponding description:

Subtitle Type	
Code	Description
01	Other
02	Normal
03	Letterbox
04	Wide Screen
05	Full Screen
06	Closed Captioned
07	Forced
08	Karaoke
09	Not Specified
10	Large
11	Children
12	Director Commentary
13	Large Director Commentary
14	Director Commentary for Children
15	Normal Captions
16	Large Captions
17	Children's Captions

3.1.6 DivX Subtitle Linker Text File

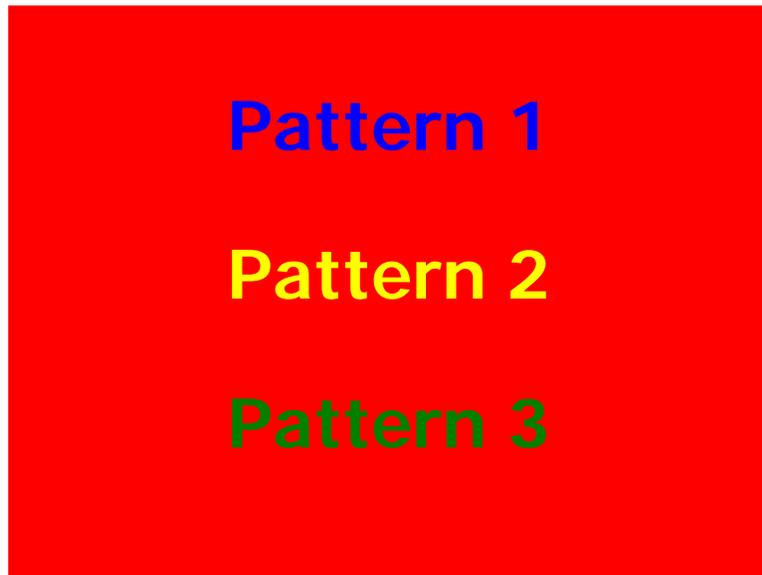
The DivX Subtitle Linker Text file is used to reference bitmap (.bmp) files which make up a subtitle stream. The file also includes subtitle display start and end timestamps, positioning information, and

colour palette. The file is used when making menu building blocks with the *-menumode* command line option.

The bitmap (.bmp) files referenced by the file must have the following qualities:

- For menus, the resolution (width and height in pixels) must match the resolution of the video used for that menu.
- For titles, the resolution must be 640 x 480 or less.
- The width (in pixels) must be a multiple of two.
- The height (in pixels) must be a multiple of two.
- It must use 4 bits per pixels. This means the bitmap uses a color lookup table of 16 colors.
- The pixels in the bitmap must only use the first 4 colors in the index table.

It must be noted how the colors used in the bitmap relate to the colors used when the subtitle is displayed. The input bitmap uses 4 bits per pixel, which means there is the possibility of 16 colors. DivX subtitles only support 3 colors, and care must be taken to ensure only the first 4 colors in the bitmap's color lookup table are used. The first color is used to identify the pixels which are to be transparent when displayed, and the following 3 are opaque, not blended with the video, and are displayed in full. The following is an example of a bitmap:



And the corresponding bitmap's colour lookup table:

Color Index	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-------------	---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

Any pixel which uses a color outside the first four in the color lookup table will be ignored. The colors specified in the color lookup table are not the colors used when the subtitle is displayed. The display colors are specified separately, as shown below.

The DivX Subtitle Linker Text file's syntax is as follows:

```

0 = ( 0, 0, 0)
1 = ( Red1, Green1, Blue1 )
2 = ( Red2, Green2, Blue2 )
3 = ( Red3, Green3, Blue3 )

SUBPALETTE ( 0 1 2 3 )
HH1:MM1:SS1.XXX1   HH2:MM2:SS2.XXX2   "file.bmp"1 (Left1 Top1 Right1 Bottom1)

```

Where:

Symbol	Definition
0	Reserved.
1	The RGB value of a pattern pixel in the bitmaps. Pixels in the bitmap which use the second color in the color lookup table will use this color when displayed.
2	The RGB value of a pattern pixel in the bitmaps. Pixels in the bitmap which use the third color in the color lookup table will use this color when displayed.
3	The RGB value of a pattern pixel in the bitmaps. Pixels in the bitmap which use the fourth color in the color lookup table will use this color when displayed.
Red _n	The pixel's red channel value. Valid values range 0 to 255.
Green _n	The pixel's green channel value. Valid values range 0 to 255.
Blue _n	The pixel's blue channel value. Valid values range 0 to 255.
HH ₁ :MM ₁ :SS ₁ .XXX ₁	The time for when the subtitle should be displayed. Where HH ₁ is hours, MM ₁ is minutes, SS ₁ is seconds, and XXX ₁ is milliseconds. The time is relative to the video stream. When used for menus these values are irrelevant and ignored.
HH ₂ :MM ₂ :SS ₂ .XXX ₂	The time for when the subtitle should be cleared. Where HH ₂ is hours, MM ₂ is minutes, SS ₂ is seconds, and XXX ₂ is milliseconds. The time is relative to the video stream. When used for menus these values are irrelevant and ignored.
"file.bmp" ₁	The relative or full pathname to the bitmap (.bmp) file.

Left ₁	The position in the available subtitle window, where the subtitle's left edge is located. For menus this value must be 0.
Top ₁	The position in the available subtitle window, where the subtitle's top edge is located. For menus this value must be 0.
Right ₁	The position in the available subtitle window, where the subtitle's right edge is located. This value is the width of the subtitle minus, ie. Right ₁ = (width - 1).
Bottom ₁	The position in the available subtitle window, where the subtitle's bottom edge is located. This value is the height of the subtitle minus one, ie. Bottom ₁ = (height - 1).

When generating subtitles overscan must be considered. Most televisions have overscan (resulting in only 80-90% of the video frame being displayed). Some combinations of display and decoding devices may display the entire video image; others may crop the border of the video.

For DivX the safe viewing area is 6.7% from the left, 6.7% from the right, 5% from the top, and 5% from the bottom. The number of pixels is rounded up to the next even number. The following table shows the safe viewing area dimension and position:

Certification Profile	Dimension		Position			
	Width	Height	Left	Top	Right	Bottom
Portable	552	432	44	24	595	455
Home Theater						

The DivXMux will enforce these rules on all subtitles. For optimal quality, subtitles should respect the safe viewing area before feed into the DivXMux.

3.2 Menus

The menu construction process is based around the interpretation of an XML configuration file which details the menu structure and references the temporary menu building blocks and titles needed. The temporary menu building blocks are constructed using the *-menumode* command line option, each one represents an individual menu screen.

The following command line option is used to specify the location of the XML configuration file:

```
--xml <filename>
```

<filename> is the relative or full path to the XML configuration file. Please refer to the *DivX Media Format XML Reference* for details on the XML configuration file specification.

The following command line option is used to specify the location of the temporary direction to be used for temporary files generated in the menu construction process:

```
--temp <directory path>
```

<directory path> is a full path to the temporary directory.

3.2.1 Menus Resolutions

Menus are supported in the following range of resolutions:

- 4:3 aspect ratio - 320 x 240 to 640 x 480.
- 16:9 aspect ratio – 320 x 180 to 720 x 404.

Menus can be of any resolution between the minimum and maximum supported resolutions stated above for both 4:3 and 16:9 aspect ratios. Both the width and heights must be multiples of 4.

4 Internationalization

DivX technology is language and country agnostic and not specific to any region – it embraces the true value of electronic delivery and IP-based networks (ie. the Internet). Language and country codes are a form of metadata used to customize the viewing experience to the native language of the viewer, including interactive menuing and multiple tracks. For example, when switching audio tracks the description of the track is shown on screen in the native language of the viewer.

4.1 Language Codes

Language codes are two-letter codes for the representation of names of languages. The codes cover most of the major languages of the world that are not only mostly frequently represented in the total body of the world's literature, but which also comprise a considerable volume of specialized languages and terminologies.

The codes below are devised from ISO 639:1988 – Code for the representation of names of languages. The codes are not case-sensitive. There are 136 supported language codes. The recommended use of the language codes is in lower case, but they should be considered case-insensitive and are unique codes regardless of case. The localization of the language code description is allowed and recommended.

Code	English Description
aa	Afar
ab	Abkhazian
af	Afrikaans
am	Amharic
ar	Arabic
as	Assamese
ay	Aymara
az	Azerbaijani
ba	Bashkir
be	Byelorussian

DivXMux Command Line Reference

bg	Bulgarian
bh	Bihari
bi	Bislama
bn	Bengali
bo	Tibetan
br	Breton
ca	Catalan
co	Corsican
cs	Czech
cy	Welsh
da	Danish
de	German
dz	Bhutani
el	Greek
en	English
eo	Esperanto
es	Spanish
et	Estonian
eu	Basque
fa	Persian
fi	Finnish
fj	Fiji
fo	Faeroese
fr	French
fy	Frisian
ga	Irish
gd	Gaelic
gl	Galician
gn	Guarani
gu	Gujarati
ha	Hausa
hi	Hindi
hr	Croatian
hu	Hungarian
hy	Armenian
ia	Interlingua
ie	Interlingue
ik	Inupiak
in	Indonesian
is	Icelandic
it	Italian
iw	Hebrew
ja	Japanese
ji	Yiddish
jw	Javanese
ka	Georgian
kk	Kazakh
kl	Greenlandic

DivXMux Command Line Reference

km	Cambodian
kn	Kannada
ko	Korean
ks	Kashmiri
ku	Kurdish
ky	Kirghiz
la	Latin
ln	Lingala
lo	Laothian
lt	Lithuanian
lv	Latvian
mg	Malagasy
mi	Maori
mk	Macedonian
ml	Malayalam
mn	Mongolian
mo	Moldavian
mr	Marathi
ms	Malay
mt	Maltese
my	Burmese
na	Nauru
ne	Nepali
nl	Dutch
no	Norwegian
oc	Occitan
om	Oromo
or	Oriya
pa	Punjabi
pl	Polish
ps	PashtoPushto
pt	Portuguese
qu	Quechua
rm	Rhaeto-Romance
rn	Kirundi
ro	Romanian
ru	Russian
rw	Kinyarwanda
sa	Sanskrit
sd	Sindhi
sg	Sangro
sh	Serbo-Croatian
si	Singhalese
sk	Slovak
sl	Slovenian
sm	Samoan
sn	Shona
so	Somali

sq	Albanian
sr	Serbian
ss	Siswati
st	Sesotho
su	Sudanese
sv	Swedish
sw	Swahili
ta	Tamil
te	Tegulu
tg	Tajik
th	Thai
ti	Tigrinya
tk	Turkmen
tl	Tagalog
tn	Setswana
to	Tonga
tr	Turkish
ts	Tsonga
tt	Tatar
tw	Twi
uk	Ukrainian
ur	Urdu
uz	Uzbek
vi	Vietnamese
vo	Volapuk
wo	Wolof
xh	Xhosa
yo	Yoruba
zh	Chinese
zu	Zulu

4.2 Country Codes

Country codes are two-letter codes for the representation of names of countries.

The codes below are devised from ISO 3166:1988 – Code for the representation of countries and their subdivisions. The codes are not case-sensitive. There are 240 supported country codes. The recommended use of the country codes is in upper case, but they should be considered case-insensitive and are unique codes regardless of case. The localization of the country code description is allowed and recommended.

Code	English Description
AF	Afghanistan
AX	Åland Islands

AL	Albania
DZ	Algeria
AS	American Samoa
AD	Andorra
AO	Angola
AI	Anguilla
AQ	Antarctica
AG	Antigua and Barbuda
AR	Argentina
AM	Armenia
AW	Aruba
AU	Australia
AT	Austria
AZ	Azerbaijan
BS	Bahamas
BH	Bahrain
BD	Bangladesh
BB	Barbados
BY	Belarus
BE	Belgium
BZ	Belize
BJ	Benin
BM	Bermuda
BT	Bhutan
BO	Bolivia
BA	Bosnia and Herzegovina
BW	Botswana
BV	Bouvet Island
BR	Brazil
IO	British Indian Ocean Territory
BN	Brunei Darussalam
BG	Bulgaria
BF	Burkina Faso
BI	Burundi
KH	Cambodia
CM	Cameroon
CA	Canada
CV	Cape Verde
KY	Cayman Islands
CF	Central African Republic
TD	Chad
CL	Chile
CN	China
CX	Christmas Island
CC	Cocos (Keeling) Islands
CO	Colombia
KM	Comoros
CG	Congo

CD	The Democratic Republic of the Congo
CK	Cook Islands
CR	Costa Rica
CI	Cote D'ivoire
HR	Croatia
CU	Cuba
CY	Cyprus
CZ	Czech Republic
DK	Denmark
DJ	Djibouti
DM	Dominica
DO	Dominican Republic
EC	Ecuador
EG	Egypt
SV	El Salvador
GO	Equatorial Guinea
ER	Eritrea
EE	Estonia
ET	Ethiopia
FK	Falkland Islands (Malvinas)
FO	Faroe Islands
FJ	Fiji
FI	Finland
FR	France
GF	French Guiana
PF	French Polynesia
TF	French Southern Territories
GA	Gabon
GM	Gambia
GE	Georgia
DE	Germany
GH	Ghana
GI	Gibraltar
GR	Greece
GL	Greenland
GD	Grenada
GP	Guadeloupe
GU	Guam
GT	Guatemala
GN	Guinea
GW	Guinea-Bissau
GY	Guyana
HT	Haiti
HM	Heard Island and McDonald Islands
VA	Holy See (Vatican City State)
HN	Honduras
HK	Hong Kong
HU	Hungary

IS	Iceland
IN	India
ID	Indonesia
IR	Islamic Republic of Iran
IQ	Iraq
IE	Ireland
IL	Israel
IT	Italy
JM	Jamaica
JP	Japan
JO	Jordan
KZ	Kazakhstan
KE	Kenya
KI	Kiribati
KP	Democratic People's Republic of Korea
KR	Republic of Korea
KW	Kuwait
KG	Kyrgyzstan
LA	Lao People's Democratic Republic
LV	Latvia
LB	Lebanon
LS	Lesotho
LR	Liberia
LY	Libyan Arab Jamahiriya
LI	Liechtenstein
LT	Lithuania
LU	Luxembourg
MO	Macao
MK	The Former Yugoslav Republic of Macedonia
MG	Madagascar
MW	Malawi
MY	Malaysia
MV	Maldives
ML	Mali
MT	Malta
MH	Marshall Islands
MQ	Martinique
MR	Mauritania
MU	Mauritius
YT	Mayotte
MX	Mexico
FM	Federated States of Micronesia
MD	Republic of Moldova
MC	Monaco
MN	Mongolia
MS	Montserrat
MA	Morocco
MZ	Mozambique

MM	Myanmar
NA	Namibia
NR	Nauru
NP	Nepal
NL	Netherlands
AN	Netherlands Antilles
NC	New Caledonia
NZ	New Zealand
NI	Nicaragua
NE	Niger
NG	Nigeria
NU	Niue
NF	Norfolk Island
MP	Northern Mariana Islands
NO	Norway
OM	Oman
PK	Pakistan
PW	Palau
PS	Occupied Palestinian Territory
PA	Panama
PG	Papua New Guinea
PY	Paraguay
PE	Peru
PH	Philippines
PN	Pitcairn
PL	Poland
PT	Portugal
PR	Puerto Rico
QA	Qatar
RE	Reunion
RO	Romania
RU	Russian Federation
RW	Rwanda
SH	Saint Helena
KN	Saint Kitts and Nevis
LC	Saint Lucia
PM	Saint Pierre and Miquelon
VC	Saint Vincent and the Grenadines
WS	Samoa
SM	San Marino
ST	Sao Tome And Principe
SA	Saudi Arabia
SN	Senegal
CS	Serbia And Montenegro
SC	Seychelles
SL	Sierra Leone
SG	Singapore
SK	Slovakia

SI	Slovenia
SB	Solomon Islands
SO	Somalia
ZA	South Africa
GS	South Georgia and the South Sandwich Islands
ES	Spain
LK	Sri Lanka
SD	Sudan
SR	Suriname
SJ	Svalbard and Jan Mayen
SZ	Swaziland
SE	Sweden
CH	Switzerland
SY	Syrian Arab Republic
TW	Taiwan, Province of China
TJ	Tajikistan
TZ	United Republic of Tanzania
TH	Thailand
TL	Timor-Leste
TG	Togo
TK	Tokelau
TO	Tonga
TT	Trinidad and Tobago
TN	Tunisia
TR	Turkey
TM	Turkmenistan
TC	Turks and Caicos Islands
TV	Tuvalu
UG	Uganda
UA	Ukraine
AE	United Arab Emirates
GB	United Kingdom
US	United States
UM	United States Minor Outlying Islands
UY	Uruguay
UZ	Uzbekistan
VU	Vanuatu
VE	Venezuela
VN	Viet Nam
VG	Virgin Islands, British
VI	Virgin Islands, U.S.
WF	Wallis And Futuna
EH	Western Sahara
YE	Yemen
ZM	Zambia
ZW	Zimbabwe

