

Supported Codecs

The following table lists all supported codecs.

D..... = Decoding supported

.E.... = Encoding supported

..V... = Video codec

..A... = Audio codec

..S... = Subtitle codec

...I.. = Intra frame-only codec

....L. = Lossy compression

....S = Lossless compression

Type	Code	Description
D.VI..	012v	Uncompressed 4:2:2 10-bit
D.V.L.	4xm	4X Movie
D.VI.S	8bps	QuickTime 8BPS video
D.V..S	aasc	Autodesk RLE
D.VIL.	aic	Apple Intermediate Codec
DEVI.S	alias_pix	Alias/Wavefront PIX image
DEVIL.	amv	AMV Video
D.V.L.	anm	Deluxe Paint Animation
D.V.L.	ansi	ASCII/ANSI art
DEVIL.	asv1	ASUS V1
DEVIL.	asv2	ASUS V2
D.VIL.	aura	Auravision AURA
D.VIL.	aura2	Auravision Aura 2
D.V...	avrn	Avid AVI Codec
DEVI..	avrp	Avid 1:1 10-bit RGB Packer
D.V.L.	avs	AVS (Audio Video Standard) video
DEVI..	avui	Avid Meridien Uncompressed
DEVI..	ayuv	Uncompressed packed MS 4:4:4:4
D.V.L.	bethsoftvid	Bethesda VID video
D.V.L.	bfi	Brute Force & Ignorance
D.V.L.	binkvideo	Bink video
D.VI..	bintext	Binary text
DEVI.S	bmp	BMP (Windows and OS/2 bitmap)
D.V..S	bmv_video	Discworld II BMV video
D.VI.S	brender_pix	BRender PIX image
D.V.L.	c93	Interplay C93
D.V.L.	cavs	Chinese AVS (Audio Video Standard) (AVS1-P2, JiZhun profile)
D.V.L.	cdgraphics	CD Graphics video
D.VIL.	cdxl	Commodore CDXL video
DEV.L.	cinepak	Cinepak
DEVIL.	cljr	Cirrus Logic AccuPak

D.VI.S	cllc	Canopus Lossless Codec
D.V.L.	cmv	Electronic Arts CMV video (decoders: eacmv)
D.V...	cpia	CPiA video format
D.V..S	cscd	CamStudio (decoders: camstudio)
D.VIL.	cyuv	Creative YUV (CYUV)
D.V.L.	dfa	Chronomaster DFA
D.V.LS	dirac	Dirac
DEVIL.	dnxhd	VC3/DNxHD
DEVI.S	dpx	DPX (Digital Picture Exchange) image
D.V.L.	dsicinvideo	Delphine Software International CIN video
DEVIL.	dvvideo	DV (Digital Video)
D.V..S	dxa	Feeble Files/ScummVM DXA
D.VI.S	dxtory	Dxtory
D.V.L.	escape124	Escape 124
D.V.L.	escape130	Escape 130
D.VILS	exr	OpenEXR image
DEV..S	ffv1	FFmpeg video codec #1
DEVI.S	ffvhuff	Huffyuv FFmpeg variant
D.V.L.	fic	Mirillis FIC
DEV..S	flashsv	Flash Screen Video v1
DEV.L.	flashsv2	Flash Screen Video v2
D.V..S	flic	Autodesk Animator Flic video
DEV.L.	flv1	FLV / Sorenson Spark / Sorenson H.263 (Flash Video) (decoders: flv) (encoders: flv)
D.V..S	fraps	Fraps
D.VI.S	frwu	Forward Uncompressed
D.V.L.	g2m	Go2Meeting
DEV..S	gif	GIF (Graphics Interchange Format)
DEV.L.	h261	H.261
DEV.L.	h263	H.263 / H.263-1996, H.263+ / H.263-1998 / H.263 version 2
D.V.L.	h263i	Intel H.263
DEV.L.	h263p	H.263+ / H.263-1998 / H.263 version 2
DEV.LS	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10
D.V.L.	hevc	H.265 / HEVC (High Efficiency Video Coding)
D.V.L.	hnm4video	HNM 4 video
DEVI.S	huffyuv	HuffyUV
D.V.L.	idcin	id Quake II CIN video (decoders: idcinvideo)
D.VI..	idf	iCEDraw text
D.V.L.	iff_byterun1	IFF ByteRun1 (decoders: iff)
D.V.L.	iff_ilbm	IFF ILBM (decoders: iff)
D.V.L.	indeo2	Intel Indeo 2
D.V.L.	indeo3	Intel Indeo 3
D.V.L.	indeo4	Intel Indeo Video Interactive 4
D.V.L.	indeo5	Intel Indeo Video Interactive 5

D.V.L.	interplayvideo	Interplay MVE video
DEVILS	jpeg2000	JPEG 2000
DEVILS	jpegls	JPEG-LS
D.VIL.	jv	Bitmap Brothers JV video
D.V.L.	kgv1	Kega Game Video
D.V.L.	kmvc	Karl Morton's video codec
D.VI.S	lagarith	Lagarith lossless
D.VI.S	loco	LOCO
D.V.L.	mad	Electronic Arts Madcow Video (decoders: eamad)
D.VIL.	mdec	Sony PlayStation MDEC (Motion DECoder)
D.V.L.	mimic	Mimic
DEVIL.	mjpeg	Motion JPEG
D.VIL.	mjpegb	Apple MJPEG-B
D.V.L.	mmvideo	American Laser Games MM Video
D.V.L.	motionpixels	Motion Pixels video
DEV.L.	mpeg1video	MPEG-1 video
DEV.L.	mpeg2video	MPEG-2 video (decoders: mpeg2video mpegvideo)
DEV.L.	mpeg4	MPEG-4 part 2
D.V.L.	msa1	MS ATC Screen
D.V.L.	msmpeg4v1	MPEG-4 part 2 Microsoft variant version 1
DEV.L.	msmpeg4v2	MPEG-4 part 2 Microsoft variant version 2
DEV.L.	msmpeg4v3	MPEG-4 part 2 Microsoft variant version 3 (decoders: msmpeg4) (encoders: msmpeg4)
D.V..S	msrle	Microsoft RLE
D.V.L.	mss1	MS Screen 1
D.VIL.	mss2	MS Windows Media Video V9 Screen
DEV.L.	msvideo1	Microsoft Video 1
D.VI.S	mszh	LCL (LossLess Codec Library) MSZH
D.V.L.	mts2	MS Expression Encoder Screen
D.VIL.	mvc1	Silicon Graphics Motion Video Compressor 1
D.VIL.	mvc2	Silicon Graphics Motion Video Compressor 2
D.V.L.	mxpeg	Mobotix MxPEG video
D.V.L.	nuv	NuppelVideo/RTJPEG
D.V.L.	paf_video	Amazing Studio Packed Animation File Video
DEVI.S	pam	PAM (Portable AnyMap) image
DEVI.S	pbm	PBM (Portable BitMap) image
DEVI.S	pcx	PC Paintbrush PCX image
DEVI.S	pgm	PGM (Portable GrayMap) image
DEVI.S	pgmyuv	PGMYUV (Portable GrayMap YUV) image
D.VIL.	pictor	Pictor/PC Paint
DEV..S	png	PNG (Portable Network Graphics) image
DEVI.S	ppm	PPM (Portable PixelMap) image
DEVIL.	prores	Apple ProRes (iCodec Pro) (decoders: prores prores_lgpl) (encoders: prores prores_aw prores_ks)
D.VIL.	ptx	V.Flash PTX image

D.VI.S	qdraw	Apple QuickDraw
D.V.L.	qpeg	Q-team QPEG
DEV..S	qtrle	QuickTime Animation (RLE) video
DEVI.S	r10k	AJA Kona 10-bit RGB Codec
DEVI.S	r210	Uncompressed RGB 10-bit
DEVI.S	rawvideo	raw video
D.VIL.	rl2	RL2 video
DEV.L.	roq	id RoQ video (decoders: roqvideo) (encoders: roqvideo)
D.V.L.	rpza	QuickTime video (RPZA)
DEV.L.	rv10	RealVideo 1.0
DEV.L.	rv20	RealVideo 2.0
D.V.L.	rv30	RealVideo 3.0
D.V.L.	rv40	RealVideo 4.0
D.V.L.	sanm	LucasArts SANM/SMUSH video
DEVI.S	sgi	SGI image
D.VI.S	sgirle	SGI RLE 8-bit
D.V.L.	smackvideo	Smacker video (decoders: smackvid)
D.V.L.	smc	QuickTime Graphics (SMC)
D.V...	smv	Sigmatel Motion Video (decoders: smvjpeg)
DEV.LS	snow	Snow
D.VIL.	sp5x	Sunplus JPEG (SP5X)
DEVI.S	sunrast	Sun Rasterfile image
DEV.L.	svq1	Sorenson Vector Quantizer 1 / Sorenson Video 1 / SVQ1
D.V.L.	svq3	Sorenson Vector Quantizer 3 / Sorenson Video 3 / SVQ3
DEVI.S	targa	Truevision Targa image
D.VI.	targa_y216	Pinnacle TARGA CineWave YUV16
D.V.L.	tgq	Electronic Arts TGQ video (decoders: eatgq)
D.V.L.	tgx	Electronic Arts TGV video (decoders: eatgv)
DEV.L.	theora	Theora (encoders: libtheora)
D.VIL.	thp	Nintendo Gamecube THP video
D.V.L.	tiertexseqvideo	Tiertex Limited SEQ video
DEVI.S	tiff	TIFF image
D.VIL.	tmv	8088flex TMV
D.V.L.	tqi	Electronic Arts TQI video (decoders: eatqi)
D.V.L.	truemotion1	Duck TrueMotion 1.0
D.V.L.	truemotion2	Duck TrueMotion 2.0
D.V..S	tsc2	TechSmith Screen Capture Codec (decoders: camtasia)
D.V.L.	tsc2	TechSmith Screen Codec 2
D.VIL.	txd	Renderware TXD (TeXture Dictionary) image
D.V.L.	ulti	IBM UltiMotion (decoders: ultimotion)
DEVI.S	utvideo	Ut Video
DEVI.S	v210	Uncompressed 4:2:2 10-bit
D.VI.S	v210x	Uncompressed 4:2:2 10-bit

DEVI.	v308	Uncompressed packed 4:4:4
DEVI.	v408	Uncompressed packed QT 4:4:4:4
DEVI.S	v410	Uncompressed 4:4:4 10-bit
D.V.L.	vb	Beam Software VB
D.VI.S	vble	VBLE Lossless Codec
D.V.L.	vc1	SMPTE VC-1
D.V.L.	vc1image	Windows Media Video 9 Image v2
D.VIL.	vcr1	ATI VCR1
D.VIL.	vixl	Miro VideoXL (decoders: xl)
D.V.L.	vmdvideo	Sierra VMD video
D.V..S	vmnc	VMware Screen Codec / VMware Video
D.V.L.	vp3	On2 VP3
D.V.L.	vp5	On2 VP5
D.V.L.	vp6	On2 VP6
D.V.L.	vp6a	On2 VP6 (Flash version, with alpha channel)
D.V.L.	vp6f	On2 VP6 (Flash version)
D.V.L.	vp7	On2 VP7
DEV.L.	vp8	On2 VP8 (decoders: vp8 libvpx) (encoders: libvpx)
DEV.L.	vp9	Google VP9 (decoders: vp9 libvpx-vp9) (encoders: libvpx-vp9)
D.VILS	webp	WebP
DEV.L.	wmv1	Windows Media Video 7
DEV.L.	wmv2	Windows Media Video 8
D.V.L.	wmv3	Windows Media Video 9
D.V.L.	wmv3image	Windows Media Video 9 Image
D.VIL.	wmv1	Winnov WNV1
D.V.L.	ws_vqa	Westwood Studios VQA (Vector Quantized Animation) video (decoders: vqavideo)
D.V.L.	xan_wc3	Wing Commander III / Xan
D.V.L.	xan_wc4	Wing Commander IV / Xxan
D.VI..	xbin	eXtended BINary text
DEVI.S	xbm	XBM (X BitMap) image
DEVIL.	xface	X-face image
DEVI.S	xwd	XWD (X Window Dump) image
DEVI..	y41p	Uncompressed YUV 4:1:1 12-bit
D.V.L.	yop	Psygnosis YOP Video
DEVI..	yuv4	Uncompressed packed 4:2:0
D.V..S	zerocodec	ZeroCodec Lossless Video
DEVI.S	zlib	LCL (LossLess Codec Library) ZLIB
DEV..S	zmbv	Zip Motion Blocks Video
D.A.L.	8svx_exp	8SVX exponential
D.A.L.	8svx_fib	8SVX fibonacci
DEA.L.	aac	AAC (Advanced Audio Coding) (decoders: aac libfdk_aac) (encoders: aac libfdk_aac)
D.A.L.	aac_latm	AAC LATM (Advanced Audio Coding LATM syntax)
DEA.L.	ac3	ATSC A/52A (AC-3) (decoders: ac3 ac3_fixed) (encoders: ac3 ac3_fixed)

D.A.L.	adpcm_4xm	ADPCM 4X Movie
DEA.L.	adpcm_adx	SEGA CRI ADX ADPCM
D.A.L.	adpcm_afc	ADPCM Nintendo Gamecube AFC
D.A.L.	adpcm_ct	ADPCM Creative Technology
D.A.L.	adpcm_dtk	ADPCM Nintendo Gamecube DTK
D.A.L.	adpcm_ea	ADPCM Electronic Arts
D.A.L.	adpcm_ea_maxis_xa	ADPCM Electronic Arts Maxis CDROM XA
D.A.L.	adpcm_ea_r1	ADPCM Electronic Arts R1
D.A.L.	adpcm_ea_r2	ADPCM Electronic Arts R2
D.A.L.	adpcm_ea_r3	ADPCM Electronic Arts R3
D.A.L.	adpcm_ea_xas	ADPCM Electronic Arts XAS
DEA.L.	adpcm_g722	G.722 ADPCM (decoders: g722) (encoders: g722)
DEA.L.	adpcm_g726	G.726 ADPCM (decoders: g726) (encoders: g726)
D.A.L.	adpcm_g726le	G.726 ADPCM little-endian (decoders: g726le)
D.A.L.	adpcm_ima_amv	ADPCM IMA AMV
D.A.L.	adpcm_ima_apc	ADPCM IMA CRYO APC
D.A.L.	adpcm_ima_dk3	ADPCM IMA Duck DK3
D.A.L.	adpcm_ima_dk4	ADPCM IMA Duck DK4
D.A.L.	adpcm_ima_ea_eacs	ADPCM IMA Electronic Arts EACS
D.A.L.	adpcm_ima_ea_sead	ADPCM IMA Electronic Arts SEAD
D.A.L.	adpcm_ima_iss	ADPCM IMA Funcom ISS
D.A.L.	adpcm_ima_oki	ADPCM IMA Dialogic OKI
DEA.L.	adpcm_ima_qt	ADPCM IMA QuickTime
D.A.L.	adpcm_ima_rad	ADPCM IMA Radical
D.A.L.	adpcm_ima_smjpeg	ADPCM IMA Loki SDL MJPEG
DEA.L.	adpcm_ima_wav	ADPCM IMA WAV
D.A.L.	adpcm_ima_ws	ADPCM IMA Westwood
DEA.L.	adpcm_ms	ADPCM Microsoft
D.A.L.	adpcm_sbpro_2	ADPCM Sound Blaster Pro 2-bit
D.A.L.	adpcm_sbpro_3	ADPCM Sound Blaster Pro 2.6-bit
D.A.L.	adpcm_sbpro_4	ADPCM Sound Blaster Pro 4-bit
DEA.L.	adpcm_swf	ADPCM Shockwave Flash
D.A.L.	adpcm_thp	ADPCM Nintendo Gamecube THP
D.A.L.	adpcm_vima	LucasArts VIMA audio (decoders: adpcm_vima vima)
D.A.L.	adpcm_xa	ADPCM CDROM XA
DEA.L.	adpcm_yamaha	ADPCM Yamaha
DEA..S	alac	ALAC (Apple Lossless Audio Codec)
D.A.L.	amr_nb	AMR-NB (Adaptive Multi-Rate NarrowBand) (decoders: amrnb)
D.A.L.	amr_wb	AMR-WB (Adaptive Multi-Rate WideBand) (decoders: amrwb)
D.A..S	ape	Monkey's Audio
D.A.L.	atrac1	ATRAC1 (Adaptive TRansform Acoustic Coding)
D.A.L.	atrac3	ATRAC3 (Adaptive TRansform Acoustic Coding 3)
D.A.L.	atrac3p	ATRAC3+ (Adaptive TRansform Acoustic Coding 3+) (decoders: atrac3plus)

D.A.L.	avc	On2 Audio for Video Codec (decoders: on2avc)
D.A.L.	binkaudio_dct	Bink Audio (DCT)
D.A.L.	binkaudio_rdft	Bink Audio (RDFT)
D.A.L.	bmv_audio	Discworld II BMV audio
DEA.L.	comfortnoise	RFC 3389 Comfort Noise
D.A.L.	cook	Cook / Cooker / Gecko (RealAudio G2)
D.A.L.	dsd_lsbf	DSD (Direct Stream Digital), least significant bit first
D.A.L.	dsd_lsbf_planar	DSD (Direct Stream Digital), least significant bit first, planar
D.A.L.	dsd_msbf	DSD (Direct Stream Digital), most significant bit first
D.A.L.	dsd_msbf_planar	DSD (Direct Stream Digital), most significant bit first, planar
D.A.L.	dsicinaudio	Delphine Software International CIN audio
DEA.LS	dts	DCA (DTS Coherent Acoustics) (decoders: dca) (encoders: dca)
DEA.L.	eac3	ATSC A/52B (AC-3, E-AC-3)
D.A.L.	evrc	EVRC (Enhanced Variable Rate Codec)
DEA..S	flac	FLAC (Free Lossless Audio Codec)
DEA.L.	g723_1	G.723.1
D.A.L.	g729	G.729
D.A.L.	gsm	GSM
D.A.L.	gsm_ms	GSM Microsoft variant
D.A.L.	iac	IAC (Indeo Audio Coder)
D.A.L.	imc	IMC (Intel Music Coder)
D.A.L.	interplay_dpcm	DPCM Interplay
D.A.L.	mace3	MACE (Macintosh Audio Compression/Expansion) 3:1
D.A.L.	mace6	MACE (Macintosh Audio Compression/Expansion) 6:1
D.A.L.	metasound	Voxware MetaSound
D.A..S	mlp	MLP (Meridian Lossless Packing)
D.A.L.	mp1	MP1 (MPEG audio layer 1) (decoders: mp1 mp1float)
DEA.L.	mp2	MP2 (MPEG audio layer 2) (decoders: mp2 mp2float) (encoders: mp2 mp2fixed)
DEA.L.	mp3	MP3 (MPEG audio layer 3) (decoders: mp3 mp3float) (encoders: libmp3lame)
D.A.L.	mp3adu	ADU (Application Data Unit) MP3 (MPEG audio layer 3) (decoders: mp3adu mp3adufloat)
D.A.L.	mp3on4	MP3onMP4 (decoders: mp3on4 mp3on4float)
D.A..S	mp4als	MPEG-4 Audio Lossless Coding (ALS) (decoders: als)
D.A.L.	musepack7	Musepack SV7 (decoders: mpc7)
D.A.L.	musepack8	Musepack SV8 (decoders: mpc8)
DEA.L.	nellymoser	Nellymoser Asao
DEA.L.	opus	Opus (Opus Interactive Audio Codec) (decoders: opus libopus) (encoders: libopus)
D.A.L.	paf_audio	Amazing Studio Packed Animation File Audio
DEA.L.	pcm_alaw	PCM A-law / G.711 A-law
D.A..S	pcm_bluray	PCM signed 16 20 24-bit big-endian for Blu-ray media
D.A..S	pcm_dvd	PCM signed 20 24-bit big-endian
DEA..S	pcm_f32be	PCM 32-bit floating point big-endian
DEA..S	pcm_f32le	PCM 32-bit floating point little-endian
DEA..S	pcm_f64be	PCM 64-bit floating point big-endian

DEA..S	pcm_f64le	PCM 64-bit floating point little-endian
D.A..S	pcm_lxf	PCM signed 20-bit little-endian planar
DEA.L.	pcm_mulaw	PCM mu-law / G.711 mu-law
DEA..S	pcm_s16be	PCM signed 16-bit big-endian
DEA..S	pcm_s16be_planar	PCM signed 16-bit big-endian planar
DEA..S	pcm_s16le	PCM signed 16-bit little-endian
DEA..S	pcm_s16le_planar	PCM signed 16-bit little-endian planar
DEA..S	pcm_s24be	PCM signed 24-bit big-endian
DEA..S	pcm_s24daud	PCM D-Cinema audio signed 24-bit
DEA..S	pcm_s24le	PCM signed 24-bit little-endian
DEA..S	pcm_s24le_planar	PCM signed 24-bit little-endian planar
DEA..S	pcm_s32be	PCM signed 32-bit big-endian
DEA..S	pcm_s32le	PCM signed 32-bit little-endian
DEA..S	pcm_s32le_planar	PCM signed 32-bit little-endian planar
DEA..S	pcm_s8	PCM signed 8-bit
DEA..S	pcm_s8_planar	PCM signed 8-bit planar
DEA..S	pcm_u16be	PCM unsigned 16-bit big-endian
DEA..S	pcm_u16le	PCM unsigned 16-bit little-endian
DEA..S	pcm_u24be	PCM unsigned 24-bit big-endian
DEA..S	pcm_u24le	PCM unsigned 24-bit little-endian
DEA..S	pcm_u32be	PCM unsigned 32-bit big-endian
DEA..S	pcm_u32le	PCM unsigned 32-bit little-endian
DEA..S	pcm_u8	PCM unsigned 8-bit
D.A.L.	pcm_zork	PCM Zork
D.A.L.	qcelp	QCELP / PureVoice
D.A.L.	qdm2	QDesign Music Codec 2
DEA.L.	ra_144	RealAudio 1.0 (14.4K) (decoders: real_144) (encoders: real_144)
D.A.L.	ra_288	RealAudio 2.0 (28.8K) (decoders: real_288)
D.A..S	ralf	RealAudio Lossless
DEA.L.	roq_dpcm	DPCM id RoQ
DEA..S	s302m	SMPTE 302M
D.A..S	shorten	Shorten
D.A.L.	sipr	RealAudio SIPR / ACELP.NET
D.A.L.	smackaudio	Smacker audio (decoders: smackaud)
D.A.L.	sol_dpcm	DPCM Sol
DEA...	sonic	Sonic
D.A..S	tak	TAK (Tom's lossless Audio Kompressor)
D.A..S	truehd	TrueHD
D.A.L.	truespeech	DSP Group TrueSpeech
DEA..S	tta	TTA (True Audio)
D.A.L.	twinvq	VQF TwinVQ
D.A.L.	vima	LucasArts VIMA audio (deprecated id) (decoders: adpcm_vima vima)
D.A.L.	vmdaudio	Sierra VMD audio

DEA.L.	vorbis	Vorbis (decoders: vorbis libvorbis) (encoders: vorbis libvorbis)
D.A...	wavesynth	Wave synthesis pseudo-codec
DEA.LS	wavpack	WavPack
D.A.L.	westwood_snd1	Westwood Audio (SND1) (decoders: ws_snd1)
D.A..S	wmalossless	Windows Media Audio Lossless
D.A.L.	wmapro	Windows Media Audio 9 Professional
DEA.L.	wmav1	Windows Media Audio 1
DEA.L.	wmav2	Windows Media Audio 2
D.A.L.	wmavoice	Windows Media Audio Voice
D.A.L.	xan_dpcm	DPCM Xan
DES...	ass	ASS (Advanced SSA) subtitle
DES...	dvb_subtitle	DVB subtitles (decoders: dvbsub) (encoders: dvbsub)
DES...	dvd_subtitle	DVD subtitles (decoders: dvdsup) (encoders: dvdsup)
D.S...	hdmv_pgs_subtitle	HDMV Presentation Graphic Stream subtitles (decoders: pgssub)
D.S...	jacosub	JACOSub subtitle
D.S...	microdvd	MicroDVD subtitle
DES...	mov_text	MOV text
D.S...	mpl2	MPL2 subtitle
D.S...	pjs	PJS (Phoenix Japanimation Society) subtitle
D.S...	realtext	RealText subtitle
D.S...	sami	SAMI subtitle
DES...	srt	SubRip subtitle with embedded timing
DES...	ssa	SSA (SubStation Alpha) subtitle
DES...	subrip	SubRip subtitle
D.S...	subviewer	SubViewer subtitle
D.S...	subviewer1	SubViewer v1 subtitle
D.S...	text	raw UTF-8 text
D.S...	vplayer	VPlayer subtitle
DES...	webvtt	WebVTT subtitle
DES...	xsub	XSUB