



 GLOBAL IP SOUND



draft-andersen-ilbc-01
draft-duric-rtp-ilbc-01

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iLBC - IETF work

- IETF deliverables, submitted during February '02:
 - iLBC codec specification draft standards track - experimental
 - iLBC RTP Payload Profile track (AVT) - regular standards
 - Statement about IPRs in ILBC and its “freeware nature”



Changes since 00 version

- Bit packing prepared for ULP (8,12,32)
 - Class I – most sensitive = 8 bytes
 - Class II = 12 bytes
 - Class III = 32 bytes
- Bit rate decreased to 13.867 kbps
 - 416 bits instead of 419 bits per 30 ms
- Other (minor) corrections in code
- Some of the descriptions in the draft are improved



Changes since 00 version - bit allocation

240 samples encoded to 419 bits
= 13.967 kbit/s

Parameter	Bits
LPC	52
Start state position	4
Start state scale	6
Start state samples	174
Shapes	129
Gains	50
Gain correction	4
Total	419

Draft version 00

240 samples encoded to **416** bits
= **13.867** kbit/s

Parameter	Bits
LPC	52
Start state position	4
Start state scale	6
Start state samples	171
Shapes	129
Gains	50
Gain correction	4
Total	416

Draft version 01



Coding steps

- Linear prediction analysis to obtain an LPC filter and an LPC residual signal.
- Encoding the LPC filter coefficients.
- Identifying the dominant segment of the residual signal.
- Encoding the dominant segment of the residual signal.
- Prediction based encoding of the remaining segments of the residual signal.
- Applying an enhancement method to the encoded residual signal to improve the subjective quality of the enhancer.
- Generating the coded speech signal by filtering the enhanced encoded residual signal with the LPC synthesis filter.



Changes since 00 version – bitstream

Bitstream structure:

Parameter		Bits	Class 1,2,3	
LSF	LSF 1	Split 1	8	8,0,0
		Split 2	8	8,0,0
		Split 3	8	8,0,0
	LSF 2	Split 1	9	9,0,0
		Split 2	9	9,0,0
		Split 3	10	10,0,0
	Sum	52		
Block Class.		3	3,0,0	
Scale Factor State Coder		6	6,0,0	
Quantized Residual State Samples	Sample 0	3	0,1,2	
	Sample 1	3	0,1,2	
	:	:	:	
	:	:	:	
	:	:	:	
	Sample 55	3	0,1,2	
	Sample 56	3	0,1,2	
	Sum	171		



	Indices sub-block 1	Stage 1	8	0,6,2
		Stage 2	8	0,0,8
		Stage 3	8	0,0,8
CB sub-blocks	Indices sub-block 2	Stage 1	9	0,7,2
		Stage 2	9	0,0,9
		Stage 3	9	0,0,9
	Indices sub-block 3	Stage 1	9	0,7,2
		Stage 2	9	0,0,9
		Stage 3	9	0,0,9
	Indices sub-block 4	Stage 1	9	0,7,2
		Stage 2	9	0,0,9
		Stage 3	9	0,0,9
	Sum		105	
Gain sub-blocks	Gains sub-block 1	Stage 1	4	0,1,3
		Stage 2	3	0,0,3
		Stage 3	3	0,0,3
	Gains sub-block 2	Stage 1	4	0,1,3
		Stage 2	3	0,0,3
		Stage 3	3	0,0,3
	Gains sub-block 3	Stage 1	4	0,1,3
		Stage 2	3	0,0,3
		Stage 3	3	0,0,3
	Gains sub-block 4	Stage 1	4	0,1,3
		Stage 2	3	0,0,3
		Stage 3	3	0,0,3
	Sum		40	
CB for 23 samples in start state		Stage 1	8	2,5,1
		Stage 2	8	0,0,8
		Stage 3	8	0,0,8
	Sum		24	
Gain for 23 samples in start state		Stage 1	4	0,1,3
		Stage 2	3	0,0,3
		Stage 3	3	0,0,3
	Sum		10	
	Position 23 sample segment		1	1,0,0
	Gain correction factor		4	0,2,2
	SUM		416	



Comming features and future work

- ✓ • Reduction to 52 bytes payload per 30ms
- ✓ • Bit packing prepared for ULP (8,12,32)
- 20 ms frame option
- Voice activity detection and comfort noise generation
- Complexity optimization related work

New item



Available implementation

- **iLBC runs in demo SIP client**

To obtain executable:

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