



Encore's GSM-AMR

Processor

ARM9E-S Series.

Technology

GSM-AMR is an Adaptive Multi Rate (AMR) speech coder standard introduced by the 3rd Generation Partnership Project (3GPP), which is a partnership project of various standards organizations, for compressing the toll quality speech (8000 samples/second). This speech coder is mainly used for speech compression in the 3rd generation mobile telephony.

This codec has eight basic bit rates, 12.2, 10.2, 7.95, 7.40, 6.70, 5.90, 5.15 and 4.75 Kbit/s. This codec works on the principle of Algebraic Code Excited Linear Prediction (ACELP) for all bit rates. To reduce average bit rate, this codec supports the discontinuous transmission (DTX), using Voice Activity Detection (VAD) and Comfort Noise Generation (CNG) algorithms. There are two types of VAD algorithms.

The coder works on a frame of 160 speech samples (20 msec), and no look ahead is required. So the algorithmic delay for the coder is 20 msec.

Features

- Fully compatible with the following 3GPP GSM-AMR standards

| | |
|-----------------------|--|
| 3GPP TS 26.071 V4.0.0 | AMR Speech Codec; General Description |
| 3GPP TS 26.090 V4.0.0 | AMR Speech Codec; Transcoding functions |
| 3GPP TS 26.091 V4.0.0 | AMR Speech Codec; Error concealment of lost frames |
| 3GPP TS 26.092 V4.0.0 | AMR Speech Codec; Comfort noise aspects |
| 3GPP TS 26.093 V4.0.0 | AMR Speech Codec; Source controlled rate operation |
| 3GPP TS 26.094 V4.0.0 | AMR Speech Codec; Voice activity detector |

Fully bit exact with the following 3GPP GSM-AMR standard reference code

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|-----------------------|--|
| 3GPP TS 26.071 V4.0.0 | ANSI-C code for AMR speech codec (Code Version 7.5.0) |
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Fully tested using the test vectors given in the following 3GPP GSM-AMR standard

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|-----------------------|----------------------------------|
| 3GPP TS 26.074 V4.0.0 | AMR Speech Codec; Test sequences |
|-----------------------|----------------------------------|

- Coder bit rate selection (any of the 8 rates) and DTX (VAD/CNG) enabling or disabling can be done on a frame basis.
- Selection of VAD options (NO_VAD, VAD1 or VAD2) at the time of initialization.
- Full duplex multi-channel capability.
- Flexible interface with 'C' callability, with a single archive file for all functions.
- The code is interruptible and re-entrant. It can be used in systems with multi threaded software architecture.

Performance

Resource Requirements

(Internal Code Version 1.0), Code Warrior for ARM Developer Suite 1.2

Memory (Kbytes)

| Program Memory | Data Memory | | |
|----------------|-------------|----------------|---------------------|
| | Tables | Static/Channel | Stack Usage |
| 81.14 | 28.725 | 4.49 | 7 (to be optimized) |

MIPS

MIPS measurements are taken on **ARM9E-S** based target platform.

| Rate: 12.2 Kbps (GSM-EFR) | Maximum |
|-------------------------------------|---------|
| Encoder (VAD-CNG enabled, VAD2) | 40.51 |
| Decoder | 6.04 |
| Full duplex (VAD-CNG enabled, VAD2) | 46.5 |

Availability

Now.

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