SPIRIT CORP
DSP Software Source
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TMS320C54CST
UNIVERSAL MULTI TONE
DETECTOR/GENERATOR ALGORITHM
SPRS182A – OCTOBER 2001 – REVISED MARCH 2003

- **Configuration Includes Creation of the List of Signals to be Detected/Generated With Possibility to Set Operational Frequencies, Bandwidth and Thresholds, Amplitudes, Twist, and Cadence Timing for Each Signal**
- **Supported Recommendations:**
  - **Standard and Extended Set of CPTD Tones**
  - **DTMF Tones**
  - **MF–R1, MF–R2, Caller ID CAS Tones, Modem Specific Tones (Bell 103 Answer Tone, V23 Forward/Backward Mark Bit, CED, CNG, ANS, and ANSam)**
- **Can be Easily Configured to Conform to Specific Standards (Either During Compilation or Dynamically at Run Time)**
- **Direct Interface With PCM 8-kHz Sampled Data. Both Sample-By-Sample and Block-Based Processing Supported**

- **Tested According to MITEL and Bellcore Procedures**
- **Can Generate Signals With Amplitude Modulation and Phase Reversals**
- **Generator Output can be Optionally Filtered to Remove Clicks**
- **Detector can Send "Early Detection" Event to the User to Minimize Detection Latency and to Enable Tone Rejection**
- **Can be Used as an Extremely Fast Spectrum Analyzer for Customer Applications**
- **eXpressDSP-Compliant Algorithm. Code is Reentrant, Supports Mulithreading and Dynamic Memory Allocation. At the Same Time Allows Direct (Non-eXpressDSP) Interface to Enable Static Memory Allocation**
- **Can be Easily Ported to any Platform**

description

The SPIRIT UMTD/UMTG is a unique product on the market that supports a wide range of recommendations and can be effectively used to generate, detect, and decode a broad range of telephone service tones.

resource requirements

ALGORITHM	PEAK MIPS	PROGRAM MEMORY (KWORDS)	CONSTANT MEMORY (KWORDS)	DYNAMIC MEMORY (KWORDS)
Generator	0.12	1.4	0.165	0.1
Detector	2.86	2.5	0.2	0.304

NOTE: MIPS and memory requirements can significantly vary depending on the standards used. The requirements are given for the case when UMTD/UMTG is configured for DTMF tones and for standalone variants of these objects. In actual systems it is possible to reduce memory requirements by sharing common resources with other algorithms supplies by SPIRIT.

availability

The SPIRIT DMTF is available in four forms:

- eXpressDSP-compliant object code for TMS320C54x
- Portable C code
- Assembly code

The algorithm is supplied with test environment and integration example code.

Detailed product annotation and user guide documents describing testing procedures, interface and integration of this product, as well as PC-based and DSP-based (TI TMS320VC5406 EVM and TMS320VC5402 DSK) demos are available for evaluation upon request. To get additional information on CST software, go to www.spiritdsp.com/CST.

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supported recommendations

SPECIFICATION	VALUE
CPTD	**Standard tones:** ITU–T E.180/Q.35 (busy, dial, ringback, reorder)
	Extended set of tones: ITU–T E.180, Supplement 2; EIA/TIA–464–A (recall dial tone, special ringback tone, intercept tone, call waiting tone, busy verification tone, executive override tone, confirmation tone)
DTMF	ITU–T Q.23, ITU–T Q.24
MF–R1	ITU–T Q.320, ITU–T Q.322, ITU–T Q.323
MR–R2	ITU–T Q.441
Caller ID CAS	ETS 300 778–1, ETS 300 778–2, SIN227 Issue 03
Modem specific tones	Bell 103 answer tone, V.23 forward/backward mark bit CCITT V.23, CED, CNG, ANS, ANSam (ITU–T V.25), etc.

performance

SPECIFICATION	VALUE
GENERATOR	
Total harmonics	<–60 dBc
Frequency accuracy	better than 1 Hz
Row/Column tones ration	2 ± 0.5 dB
DETECTOR	
Guaranteed detected minimum tone duration	Adjustable
Acceptable tones twist ratio (for dual tone signals)	Adjustable
Dynamic range	40 dB
SNR	Adjustable
Bandwidth	Adjustable
Talk off tests:	
. . False responses on speech	<6 per 30 minute sample
. . False responses on music	<2 per 30 minute sample

TEXAS
INSTRUMENTS

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