

Tone Detector & Suppressor

Signaling Tones

PRODUCT OVERVIEW

The Adaptive Digital Technologies Signaling Tone detector is a carrier class Signaling Tone detector that provides exceptional channel densities. The ADT Signaling Tone Detector detects Signaling tones such as DTMF, MF R1, R2 Forward, R2 Reverse, and Call Progress signals. Adaptive Digital's proprietary algorithm is robust enough to meet Bellcore GR-506, and ITU Q455 recommendations while using few CPU cycles.

FEATURES

Detector

- eXpress DSP compliant
- ITU Q.24 compliant
- Meets Bellcore GR506, ITU Q455 specifications
- Robust detection
- Low per-channel memory requirements
- Low false alarm rate
- C-callable
- Designed for multi-channel operation
- Programmable Frame Size

Suppressor

- Rapid tone suppression
- Minimal distortion to speech during false early detection
- C-Callable
- Designed for multi-channel operation



AVAILABILITY

ADT G.723.1 is available on the following Platforms: Other configurations are available upon request.

Product	Platform	Memory Model	Endian	Code Gen Tool Version
ADT_dtmf_C64xp	TI TMS320C64x+	MmL3	Little	N/R
ADT_dtmf_C674x	TI TMS320C674x	MmL3	Little	N/R
ADT_dtmf_c64x	TI TMS320C64x	MmL3	Little	N/R
ADT_dtmf_c55x	TI TMS320C55x	Large	Little	N/R
ADT_dtmf_c54x	TI TMS320C54x	Far	N/A	N/R
ADT_dtmf_WIN32	Windows/x86	N/A	N/A	--
ADT_dtmf_cortex-m3, m4	Cortex-M3, M4	N/A	Little	--
ADT_dtmf_cortex-A8, A9, A15	Cortex-A8, A9, A15	N/A	Little	--

Endian, byte order: "Little Endian" means that the low-order byte of the number is stored in memory at the lowest address, and the high-order byte at the highest address. "Big Endian" means that the high-order byte of the number is stored in memory at the lowest address, and the low-order byte at the highest address.

PRODUCT DESCRIPTION

Adaptive Digital's proprietary **DTMF** algorithm at less than one half the CPU utilization measured in MIPS (Millions of Instructions Per Second) offers more than twice the channel density compared with the nearest competitor while maintaining strict compliance with industry specifications Bellcore/Telcordia GR506 and ITU Q455.

An optional DTMF suppressor is available to suppress DTMF tones in Voice-Over-Packet systems that employ tone passing via out-of-band signaling. This is useful when a low rate speech compression algorithm is unable to pass the DTMF tones without significant distortion.

The ADT DTMF Detector is capable of detecting DTMF tones on multiple channels. It is ideal for T1/E1, PBX, voice-mail, and computer telephony applications. Adaptive Digital's tone detector has been deployed since 1995, hosted on numerous platforms.

SPECIFICATIONS

TI TMS320

C64x+, C674x

CPU UTILIZATION & MEMORY REQUIREMENTS

All Memory usage is given in units of bytes.

Function	MIPS Per Channel	Program Memory	Data Memory	Per-Channel Data Memory
DTMF Detect	0.30	2592	3710	152
Fast DTMF	0.48*	4960	3738	208
<i>MFR1Detect</i>	0.22	1504	3272	152
<i>MFR2_FDetect</i>	0.33	1248	1736	152
<i>MFR2_RDetect</i>	0.33	1248	1736	152
<i>CprgDetect</i>	0.18	1312	2992	152
<i>Common</i>	---	2464	0	0
<i>Suppress</i>	0.38	1184	0	0

* Fast DTMF MIPS numbers are based on the frame size 40. Others are based on the frame size 80.

C64x

CPU UTILIZATION & MEMORY REQUIREMENTS

All Memory usage is given in units of bytes.

Function	MIPS Per Channel	Program Memory	Data Memory	Per-Channel Data Memory
DTMF Detect	0.30	2944	3710	152
Fast DTMF	0.48*	4960	3738	208
<i>MFR1Detect</i>	0.22	1632	3272	152
<i>MFR2_FDetect</i>	0.33	1408	1736	152
<i>MFR2_RDetect</i>	0.33	1408	1736	152
<i>CprgDetect</i>	0.18	1440	2992	152
<i>Common</i>	---	2784	0	0
<i>Suppress</i>	0.38	1696	0	0

* Fast DTMF MIPS numbers are based on the frame size 40. Others are based on the frame size 80.

C55x

CPU UTILIZATION & MEMORY REQUIREMENTS

All Memory usage is given in units of bytes.

Function	MIPS Per Channel	Program Memory	Data Memory	Per-Channel Data Memory
DTMF Detect	0.27	1311	3774	144
Fast DTMF	0.55*	2963	3774	200
MFR1Detect	0.22	1228	3256	144
MFR2_FDetect	0.46	1133	1660	144
MFR2_RDetect	0.46	1133	1660	144
CprgDetect	0.20	1290	2996	144
Common	---	1369	32	0
Suppress	0.17	598	0	0

* Fast DTMF MIPS numbers are based on the frame size 40. Others are based on the frame size 80.

C54x

CPU UTILIZATION & MEMORY REQUIREMENTS

All Memory usage is given in units of 16 bit-words.

LOW Memory					LOW MIPS			
Function	MIPS Per Channel	Program Memory	Data Memory	Per-Channel Data Memory	MIPS Per Channel	Program Memory	Data Memory	Per-Channel Data Memory
DTMF Detect	0.83	607	40	55	0.36	601	1704	72
MFR1Detect	0.69	587	66	55	0.31	598	1626	72
MFR2_FDetect	0.92	551	60	55	0.58	492	828	72
MFR2_RDetect	0.92	551	60	55	0.58	492	828	72
CprgDetect	0.55	610	32	55	0.25	576	1496	72
Common	---	689	16	0	---	597	16	0
Suppress	0.22	398	1680	0	0.22	368	0	0

ARM

Cortex-M3/M4

CPU UTILIZATION & MEMORY REQUIREMENTS

All Memory usage is given in units of byte.

Function	MIPS (Peak)	Program Memory	Data Memory	Per-Channel Data Memory
DTMF Detect	4	1958	3442	148

ARM Cortex-A8/A9/A15

CPU UTILIZATION & MEMORY REQUIREMENTS

All Memory usage is given in units of 8-bit byte.

Function	MIPS (Peak)	Program Memory	Data Memory	Per-Channel Data Memory	Scratch Memory
DTMF	3.0	3104	3792	152	400
CPRG Detect	1.6	1152	2992	152	400
Tone Detector Common		3376			

PC-WINDOWS

x86

CPU UTILIZATION & MEMORY REQUIREMENTS

All Memory usage is given in units of bytes.

Function	MIPS Per Channel	Program Memory	Data Memory	Per-Channel Data Memory
DTMF Detect	4.8	13772	3710	152

Adaptive Digital's Signaling Tone Detector Software supports the following types of signaling tones:

- Dual Tone Multi-Frequency (DTMF)
- Multi Frequency R1 (MFR1)
- Multi Frequency R2 Forward (MFR2F)
- Multi Frequency R2 Reverse (MFR2R)
- Call Progress (CPRG)
- Fast Dual Tone Multi-Frequency (DTMF Fast Detection)

FUNCTIONS

API function call summary

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DTMF_ADT_Init(. . .)
MFR1_ADT_Init(. . .)           MFR1_ADT_toneDetect(. . .)
MFR2_F_ADT_Init(. . .)         MFR2_F_ADT_toneDetect(. . .)
MFR2_R_ADT_Init(. . .)         MFR2_R_ADT_toneDetect(. . .)
CPRG_ADT_Init(. . .)           CPRG_ADT_toneDetect(. . .)
DTMF_ADT_toneDetect(. . .)     DTMF_ADT_toneSuppress(. . .)

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Adaptive Digital is a member of the ARM Connected Community, and Texas Instruments Developer Network.



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