

Aculab DSP Firmware Modules

DTMF and U.S. call progress tone generation

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Revision Record

Rev	Date	Author	Detail
1.0	20.06.03	NMC	First issue - DTMF and U.S call progress tone generation
1.1	30.06.03	NMC	Additional U.S call progress tones added to previous build

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1 Introduction

This document describes the DTMF and U.S based call progress tone generation firmware. It includes the timeslots on which DTMF and U.S call progress tones are transmitted and describes the various U.S call progress tones available.

The DSP generates the tones, which are permanently fixed to particular timeslots on the output stream. These tones are accessed by the host via the switch matrix and are then directed to where they are required.

2 The DTMF and Call Progress Firmware Module Structure for DSP32

The DSP32 program provides the facility to generate:

- DTMF tones fixed to timeslots 1 to 15 and 17, corresponding to DTMF digits 1-9, *, 0, #, 'A', 'B', 'C' and 'D'.
- Call Progress tones on timeslots 18 to 27 includes standard tones such as dial, busy, reorder and ringing.

The DTMF tones are comprised of two tones:

- One high tone (-10dBm)
- One low tone (-12dBm)

Timeslot	DTMF digit
0	Silence
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	*
11	0
12	#
13	A
14	B
15	C
16	Silence
17	D

Timeslot	Call progress tones	Description
18	US Dial Tone	350 Hz (-13dBm) + 440 Hz (-13dBm)
19		480 Hz (-21dBm) + 620 Hz (-21dBm)
20	US Busy Tone	as timeslot 19, 0.25s on / 0.25s off
21	US Reorder Tone	as timeslot 19, 0.25s on / 0.25s off
22		440 Hz (-16dBm) + 480 Hz (-16dBm)
23	US Audible Ringing Tone	as timeslot 22, 2s on / 4s off
24	US Audible Ringing Tone Modern PABX	as timeslot 22, 1s on / 3s off
25		440 Hz (-13dBm)
26	US Call Waiting Tone	as timeslot 25, 0.3s on burst every 10s
27	US Busy Verification Tone	as timeslot 25, 0.5s on burst every 10s

3 The DTMF and Call Progress Firmware Module Structure for DSP65

The DSP65 program provides the facility to generate:

- DTMF tones fixed to timeslots 0 to 15, corresponding to DTMF digits 1-9, *, 0, #, 'A', 'B', 'C' and 'D'.
- Silence on timeslot 16
- Call Progress tones on timeslots 17 to 24 includes standard tones such as dial, busy, reorder and ringing.

The DTMF tones are comprised of two tones:

- One high tone (-10dBm)
- One low tone (-12dBm)

Timeslot	DTMF digit
0	1
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9
9	*
10	0
11	#
12	A
13	B
14	C
15	D
16	silence

Timeslot	Call progress tones	Description
17	US Dial Tone	350 Hz (-13dBm) + 440 Hz (-13dBm), continuous
18	US Busy Tone	480 Hz (-21dBm) + 620 Hz (-21dBm), 0.5s on / 0.5s off
19	US Reorder Tone	480 Hz (-21dBm) + 620 Hz (-21dBm), 0.25s on / 0.25s off
20	US Audible ringing Tone	440 Hz (-16dBm) + 480 Hz (-16dBm), 2s on / 4s off
21	US Audible Ringing Tone Modern PABX	440 Hz (-16dBm) + 480 Hz (-16dBm), 1s on / 3s off
22		440 Hz (-13dBm)
23	US Call Waiting Tone	As timeslot 22, 0.3s on burst every 10s
24	US Busy Verification Tone	As timeslot 22, 0.5s on burst every 10s

4 External interfaces

4.1 User Interface

The procedure for download utilises the program, `fwdspldr.exe` and is used in the following manner:

Downloading on DSP32

```
Fwdspldr <dsp_pos> <dsp_firmware.bin> <port_no> <pm4_filename>
```

`dsp_pos` = dspa OR dspb
`dsp_firmware` = any firmware title with the extension `.bin`.
For DTMF and Call Progress generation: `cpdtmfu.bin` for mu-law
`port_no` = 0, 1, 2.....n. As many ports as supported with DSP32s
`pm4_filename` = any pm4 filename with ZAP loader

Downloading on DSP65

```
Fwdspldr -t65 <dsp_pos> <dsp_firmware.b65> <port_no> <pm4_filename>
```

`dsp_pos` = dspa OR dspb
`dsp_firmware` = any firmware title with the extension `.b65`.
For DTMF and Call Progress generation: `cpdtmfu.b65` for mu-law
`port_no` = 0, 1, 2.....n. As many ports as supported with DSP65s
`pm4_filename` = any pm4 filename with ZAP loader

4.2 Program types Available

There are two types of program available:

`cpdtmfu.bin` (for mu-law DSP32)

`cpdtmfu.b65` (for mu-law DSP65)

Refer to the DSP firmware guide for information on Card types, DSP's and their associated streams.