

Product: AL4200S
 HW Version: 1.1
 SW Version: 5.5g or higher
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VERSION	DATE	NAME	REMARKS	PROJECT
8	25.05.2008	Bircher	Busy detection added / Examples added / others	AL4200S
9	16.06.2008	Bircher	Corrections / move to Version 5.5f	
10	13.10.2008	Bircher	Move to 5.5g / Parameters changed	
13.10.08			1	AL4200S-FSP-110

1. Setting the Analog Voice Interface

The AL4200S Socket Modem supports 2 different Analog Voice Interfaces which may be selected with the following AT commands.

Interface Type	Select	Pins
Single-ended Analog Interface	AT%T85,0025,80EE (default)	Mic = 62 Spk = 64 AGND = 63
	AT%T85,003D,80EE (3 dB more Gain)	
Differential Analog Interface	AT%T85,002a,80EE	Mic+ = 56 Mic- = 57 Spk+ = 58 Spk- = 59 AGND = 63
	AT%T85,003a,80EE (3 dB more Gain)	
	AT%T85,003a,4449 (loopback mode)	

This command is sensitive to the location and order of the command chain. It should be issued just after the AT+VLS=7 command.

2. Call Progress Monitoring

The call progress monitoring signals can be routed to the Speakerphone Codec. This is selected with the following AT commands:

Function	Select
Call progress monitoring signals routed to FDSP codec.	AT%T222,1 (default)
Routing OFF	AT%T222

3. Setup for Speakerphone example

Phase	Modem A-Side	Modem B-Side
0	Hardware Reset	Hardware Reset
Init	AT&F0 AT+FCLASS=8	AT&F0 AT+FCLASS=8 ATS0=2
Link Establish	ATDTxxxx OK	R R OK
Full Duplex mode	ATS31=3	ATS31=3
Activate FDSP	AT+VLS=7	AT+VLS=7
Voice Link	Send Voice / DTMF →	Send Voice / DTMF →
Escape Sequence:	(1s +++ 1s) OK	(1s +++ 1s) OK
Hangup	ATH OK	ATH OK

4. Half / Full Duplex Mode

The AT Command ATS31=x set the modem to either full- or half-duplex mode. This command is sensitive to the location and order in the command chain. It should be issued just before the AT+VLS=7 command.

ATS31=0	ATS31=3 set the modem to half duplex which disables the AGC and then allows either the microphone or speaker to work at any one time not both.
ATS31=3	To go into full duplex speakerphone you would then set ATS31=3. In full duplex mode we do not regulate speaker and mic (they are always on.)

5. Not supported features in Speakerphone mode

- AT+VNH command is supported only in TAM mode.
- AT+VTS command supports only single tones in Speakerphone mode.

6. Disable the AGC (Automatic Gain Control)

The default firmware will always use the input/output AGC's enabled in voice mode. The AGC's can individually enabled or disabled using the following commands. This command is sensitive to the location and order in the command chain. It should be issued after the AT+VLS=7 command.

at&&r885,1fff	This command disables the Microphone AGC in the input audio path. Lower the 0x1fff value will reduce the fixed gain for the micro.
at&&r887,1fff	This command disables the Speaker AGC in the output audio path. Lower the 0x1fff value will reduce the fixed gain for the speaker.

If the +VGM, or the +VGS commands respectively, are issued after the &&r997 command, the settings of this command are discarded.

7. Detect busy in Speakerphone mode

SW Version: 5.5f or higher

Date: 22.05.2008

Software Version 5.5f is needed to enable the detection of busy tones in speakerphone mode. There is also new AT command added to allow the setting of the busy tone frequency. Without this command issued or setting both parameters to 0 will cause the default frequency (440Hz) to be used.

at%t410,xxxx,yyyy - both xxxx & yyyy are in hex format.

To generate xxxx and yyyy for specific frequency in Hz:

$$xxxx = 16384 * \cos(2 * \pi * \text{frequency} / 11025)$$

$$yyyy = 16384 * \cos(2 * \pi * \text{frequency} / 8000)$$

Both $(2 * \pi * \text{frequency} / \text{sampling freq})$ have unit of radian for cosine calculation. And xxxx,yyyy needs to be converted into hex format for the command.

Setup Speakerphone with differential analog interface:

Comment	Modem A-Side	Phone B-Side
Start	Hardware Reset	
Init	AT&F AT+FCLASS=8	
Set Interface	AT+VLS=7 AT%T85,003a,80EE	
Dialing	ATDT1234561	Ringing
Detect ringing tone	Modem sends <DLE-r>	
Connection establishment		Pick-up Handset
Detection off Off-hook transition on remote side.	After ringback-goes-away timer (50s) the modem sends: OK	
Disable Micro AGC if needed	AT&&R885,1fff	
Voice Link (FDSP)	Send Voice →	Send Voice →
Phone ON-Hook		Put Handset On-Hook
Detect BUSY signal	Modem sends DLE-b	
Hangup	ATH OK	

9. Microphone input levels:**Single ended (Pin 62)**

Comment	on Pin 62	result on phone line
Input level (Test tone 1000Hz)	1.0 Vp-p (max)	-13.6 dBm
DC Offset (from modem)	1.3V	
With AGC enabled (after 2s)		-26 dBm