APPLICATION NOTE

ABSTRACT
The UCB1300 is an advanced modem/audio analog front-end. It is an enhanced version of the UCB1200 intended for V.90 modem applications, and it also has some other small performance enhancements.

AN809
Differences between UCB1300 and UCB1200

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INTRODUCTION

The UCB1300 is an advanced modem/audio analog front-end. It is an enhanced version of the UCB1200 intended for V.90 modem applications and it also has some other small performance enhancements.

The UCB1300 and UCB1200 have the same package, pinout, programming interface and block diagram. The differences in the design of UCB1300 are:

- ID register has revision 5.
- Telecom input has +6 dB as well as –6 dB gain settings.
- Telecom local analog loopback is no longer available.
- Audio input offset cancellation has been improved.
- Vrefbyp external filter mode has low output impedance.
- Touch screen pressure measurment uses resistor divider.

ID REGISTER

Reading UCB1300 Identification (ID) register at address 0xC of the control register returns 0x0001 for supplier information, and 0x000000 for device information of the IC. Both of these information are the same as the UCB1200 except version information which returns 5 (0x000101) for UCB1300. Refer to Table 1.

Table 1. ID register at address 0xC

IC type	Version [5:0]	Device [11:6]	Supplier [15:12]
UCB1200	0x000100	0x000000	0x0001
UCB1300	0x000101	0x000000	0x0001

TELECOM INPUT

UCB1200 has a –6 dB setting for the telecom input in order to avoid clipping when the signal is very high. A setting of –6 dB can be useful when the incoming signal is very strong, or in some European countries where dial tone signal is rather large, this function can be used to prevent clipping o fthe ADC.

An additional +6 dB setting has been implemented in the UCB1300 to take advantage of the dynamic range of the ADC when the incoming signal is not so strong. For example, when the signal from the central office is attenuated (e.g., 6 dB pad in the central office, or long line length).

The functionality of Control Register 0x5 (telecom control register A) is modified (refer to Table 2). Control Register 0x6 (telecom control register B) remain unchanged.

Table 2. Telecom control register A (0x5)

IC type	Bit 7
UCB1200	Tel_Loop
UCB1300	Tel_Amp (+6dB setting)

Table 3. Audio control register A (0x7)

IC type	AUD_GAIN
UCB1200	[00000] to [01111]
UCB1300	[00000] to [11111]

AUDIO INPUT OFFSET CANCELLATION

In order to avoid clipping of the audio ADC when a very high gain is used on the MICP path (above + 30 dB), it is recommended to enable the input offset cancellation circuitry by programming the AUD_OFF_CAN bit (bit 13) of the control register 0xD. In the UCB1200 the offset cancellation circuit is not effective at very high gain and the maximum recommended gain is 22.5 dB for MICP.

UCB1300 supports the full 46.5 dB input gain with offset cancellation. Performance with such a high gain is very susceptible to board layout and microphone connections.

VREFBYP

Programming the VREFBYP_CON of register address 0xA allows the internal bias to be decoupled outside by connecting a decoupling capacitor on pin 16. In the UCB1200 this was not recommended since the internal impedance on pin 16 would then be very high (30 MΩ). The startup time constant would then be excessive and it takes a long time for V_{ref} to reach 1.2 V.

The UCB1300 presents a 50 kΩ impedance making an external filtering practical.

TOUCH SCREEN PRESSURE MEASUREMENT

A resistive measurement mode is available in the touch screen interface to allow plate resistance compensation and pressure measurement. The methodology used in the UCB1200 for measuring resistance is to force a known voltage and measure the current using an internal current mirror. This mode makes the measurement somewhat inaccurate when the current mirror is in extreme conditions: i.e., when the resistance is very high (light touch), the mirror is not biased properly and is inaccurate; when the resistance is very low (full scale), the mirror stops working, in particular at low supply voltage.

In the UCB1300, a resistive divider has been implemented. Programming stays identical. The reading for a given measured resistor is different but the slope stays the same (most software drivers use the slope to detect a valid touch). The measurement is much more accurate, in particular for detecting a light touch from an open. The minimum measurable resistance is also decreased.

A 1 kΩ resistor (current sensor resistor) is added in series with the plate in UCB1300. This may requires a longer settling time based on the capacitance used (see Figure 1). The amount of time delay depends on the resistance and capacitance values on the touch screen. For improved accuracy, it is recommended that the user implements an extra delay on their driver after the pressure mode is selected before performing the resistance measurement.

TOUCH SCREEN POSITION MEASUREMENT

In position mode, there will be a delay in opening the ts..ground switch (see Figure 1) for UCB1300. This delay is due to the redesign of resistive divider circuit for the touch screen. In order to avoid this unpredictable delay after changing the plates configuration, the touch screen interface should be programmed to pressure mode first for a duration of 1 SIB frame before setting to position mode for measurement.

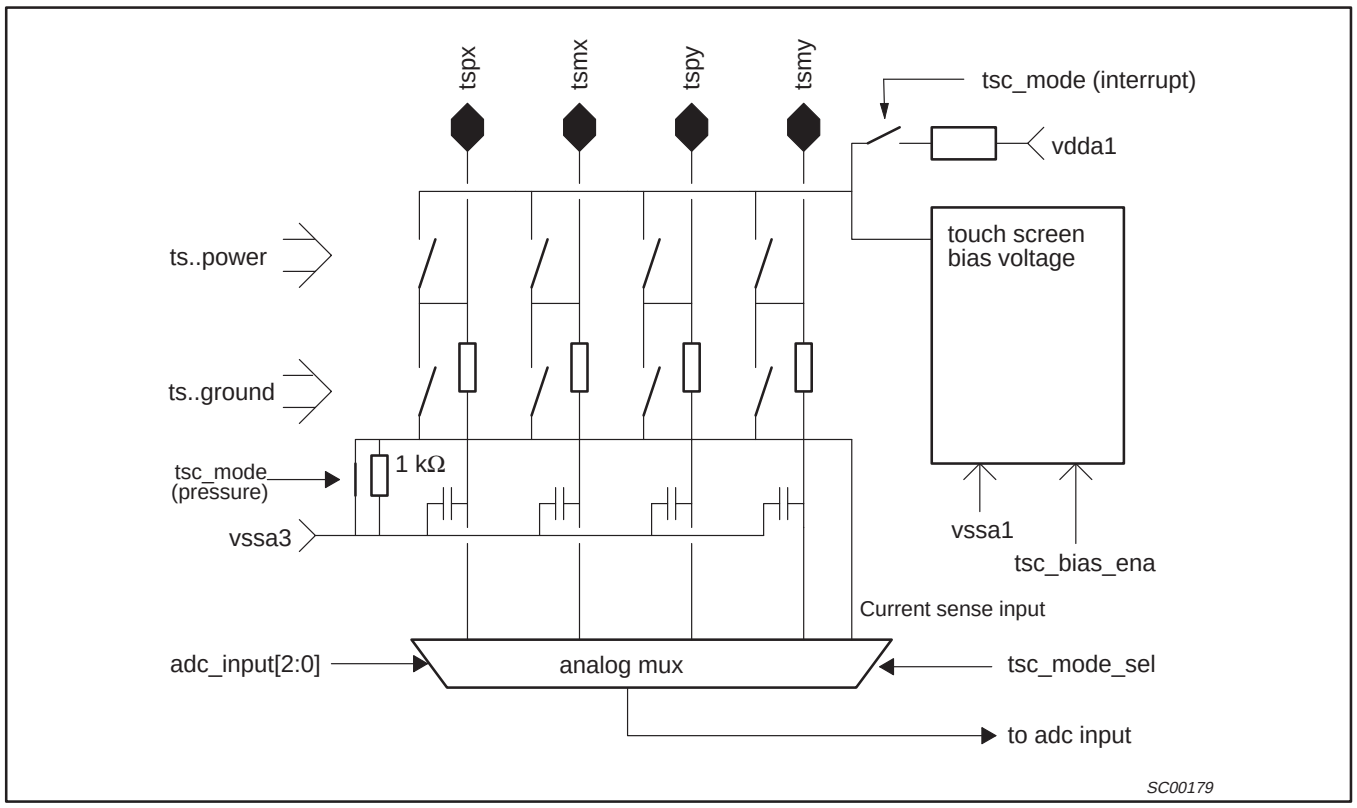

Figure 1. Block diagram of the UCB1300 touch screen interface

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Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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