TECHNICAL DESCRIPTION, AS5100TW-HHU

SYSTEM DESCRIPTION

The AS5100TW-HHU board is used in the Remote end of a half duplex car starter/alarm system and operates at 433.920MHz. After transmission, the receiver is activated by the Microprocessor, and monitors the status sent by the Car module.
The board is powered by 2 - 3 volt CR2025 batteries in series. System timing and control is done by 2 microprocessors, 1 in the Car, and 1 in the Remote.

CIRCUIT DESCRIPTION

Receiver Section

The design uses a Wide-Band FM single conversion super-het receiver with an image filter and LNA.

The signal enters via J1 and LPF L1, C2 to a SPDT MMIC RF switch (S1) and is forwarded to Q1 and Q2, a matched cascade transistor amplifier.(3.0V supply) Signal is then fowarded to FL1, a SAW Band Pass Filter. The output from the filter is matched to U2, pin 26 a complete MMIC Transceiver in stand alone user mode.(3.3V supply)
The 433.920MHz signal is down converted to a 10.7MHz IF. The 10.7MHz IF signal is filtered by a ceramic filter (FL2, 180KHz BW) and then amplified and demodulated by the MMIC. Baseband filtering and slicing time constants are provided by C24. Baseband signal is then fowarded to thre microprocessor, U1, pin 7.
The receiver is activated by a logic HI on U2 pin 15, which turns on U2, and also provides 3V to bias LNA, Q1,2.

Q4 provides inverted logic for S1.

Transmitter Section

U2 also has a complete synthesized transmitter.(Used in stand alone user mode) The Tx function is activated with U2, pin 16 HI. The 7.1505MHz oscillator is WBFM modulated via U2 pin11. (internal PIN diode switch) The Output of U2 pin 25 is matched to 50 ohms by L8, C17, C13, L5 and C9. Output power is forwarded via S1. (On during Tx)

Tx Data is forwarded from U1 Micro to U2, pin 12.

DC Power Control
Any switch activation will turn on Q3, a PNP transistor switch.This in turn, applies voltage to U3, a 3.3 Volt low drop-out regulator. This will activate the Micro (U1) which will force U1 pin 17 High to hold Q3, via Q5.
Voltage divider R19, 20 (Low voltage alm) drops the battery voltage so that it can be compared with the Micro (U1) internal comparator. Internal reference in the micro is set to 3.3V/2. The alarm trip point is at approx 4.0V battery supply.The battery check is done during the receive timing.

Sounder
The sounder in activated from the 2730Hz generated by U1. AND Gate U4 is on only during Rx. AND Gate U4 drives Q6, an NPN transistor.
(Tx data and the sounder frequency are time shared from Micro pin18.)

The Tx and the sounder are never on at the same time.

LED,s
LED,s are ON when the micro logic output is LOW.

INTERNAL CIRCUIT VOLTAGES

A reference schematic is provided for in circuit voltages. These voltages are provided to help trouble-shoot defective circuit boards. The values may vary ±10%.

AS5100TW-HHU
TRANSCEIVER SPECIFICATION

TRANSCEIVER BOARD

RECEIVE SECTION	Design Requirement	Actual
Receiver Frequency	433.920 MHz	√
Receiver Sensitivity (50 ohms)	-111dBm min	Typ. –113dBm
6dB IF Bandwidth	180 KHz min	
Image Rejection	-40dBc	-45dBc
LO feedthrough at Antenna Input	-60 dBm max	Typ. -70 dBm
Receive Data Rate	1.56Kbit/sec max	√
Data Format (Rx)	Nutek code with 6 preamble	√
Pulse Distortion	<5%	<5%
Frequency Deviation Acceptance	± 25KHz Nom.	√
Rx Data Out (3.3V to Micro)	0 to 3.1 V min.	√
Rec. Offset Frequency Acceptance for 3 dB degrad. of Sensitivity	± 32KHz	√
Bat Input Voltage #1 (neg. Gnd.)	+6.V Nom., +4.0V Min.	√
LNA Current @ 3.3 V	2.2mA	√
Total Current Consumption (@ 6.0V) During Rx	12 mA max.	√
P1dB(ref.to input and measured @10.7MHz IF filter output)	-25 dBm	√
Temperature range	-10°C to +60°C	√
Humidity	100% conden. @ 0°C	√

TRANSMIT SECTION		
Transmitter Frequency	433.920 MHz	√
Fre Tol. @ 25C	+/- 25KHz	√
Output	12,000 uV/M @ 3M	√
Transmitter Har. Spurious Output	-50 dBc min	Typ. –55 dBc
Data Rate Transmit66/33% D. Cycle	1Kbit/sec max with 6 preamble	√
Tx Modulator Input	0 to +3.3 volts Square Wave	√
Frequency Deviation	±22 KHz Typ.	15Min., 30 Max.
Input voltage	+6.0V nom., 4.0V min.	
Current Consumption (during Tx)	28 mA peak max @ 6.0V	√
Frequency tolerance	±32KHz Max Over Temp.	√
Temperature range	-10°C to +60°C	√
Humidity	100% conden. @ 0°C	√