

TECHNICAL DESCRIPTION, AS5000TW-FM -IVU
Version 1

SYSTEM DESCRIPTION, AS5000TW-FM-IVU-1

The CFM-1 board is used in a half duplex car starter/alarm system and operates at 433.920MHz. The receiver is continuously waiting for a signal from the AS5000TW-FM-HHU-1 remote transceiver. The unit can also page the remote transceiver in an alarm system to notify the user of an alarm condition.

The CFM-1 is connected to the car module with a 3-conductor cable. The transceiver is powered from the car module (5 volts). 1 pin is used for both Tx and Rx data. During transmit, 5 volts is applied to the transmit section via a transistor switch. System timing and control is done by 2 microprocessors, 1 in the car, and 1 in the remote.

CIRCUIT DESCRIPTION

Receiver Section

The receiver is a WBFM single conversion super-het design with an Image BPF. The signal enters via CON 1 and forwarded to LPF C11, L4. MMIC RF switch S1 forwards the 433.920MHz signal to a matched cascade amplifier Q3, Q4. SAW filter FLT1, provides image rejection and protection from strong out of band signals. The output of FLT1 is then matched to U4 by L8 and C33, U4 is a complete MMIC receiver. This IC contains a Colpitts 3rd overtone oscillator, a balanced multiplier tripler, IF amplifier, and FM demodulator.

The 433.920MHz signal is down converted to a 10.7MHz IF. The IF signal is band-pass filtered by a ceramic filter (FLT2) and then amplified, and demodulated by an FM quadrature detector. (L9, C26, C28) Baseband filtering and slicing time constants are provided by C20, C22, C23. The 3.3V baseband signal is forwarded to U3A, pin 3. (+ input)

U3A pin 1 outputs signal to J2 pin 2.

Transmitter Section

The transmitter is provided by U1, an integrated synthesized Tx IC. R3, C3 provide a 2 milliseclay to allow the synthesizer to lock before transmission. The output is matched to Q2, and matched to 50 ohms by C8, L3, C6, C6. S1 forwards signal to the antenna. The WBFM modulation is accomplished by the internal PIN switch in U1. (Pin 11)

Baseband Diplexer

U3A and U3B provide the bi-directional function for the Tx and Rx path.

A data signal above 4V peak will provide output at U3 pin 7. This output goes to RC time constant R2, C35 to turn ON Q1, Q5. With Q5 collector high, D2 holds U3A pin 1 high. Receive signals are held to 3.3V peak and will not trigger U3B. The threshold for U3B is 3.88V. D3 provided input transient protection.

U2 is a 3.3V regulator to power the board.

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 $\pm 10\%$.

CLCDWBFM-1 TRANSCEIVER SPECIFICATION

TRANSCEIVER BOARD

RECEIVE SECTION	Design Requirement	Actual
Receiver Frequency	433.920 MHz	√
Receiver Sensitivity	-106 dBm min	Typ -108 dBm
6dB IF Bandwidth	180 KHz min	√
Image Response	-40dBc min	Typ -45dBc
LO feedthrough at Antenna Input	-60 dBm max	-70 dBm
Receive Data Rate	1 Kbit/sec max	√
Pulse distortion 66/33% duty cycle	<10%	<5%
Modulation	WBFM ± 25 KHzNominal	√
Rx Data Out	0 to 3.15V min	0 to 3.22V Min.
Rec. Offset Frequency Acceptance for 3 dB degrad. of Sensitivity	± 32 KHz	√
J2 Pin 1 Input Voltage (neg. Gnd.)	+5 V $\pm .25$ V	√
Current Consumption (Rx)	11 mA max	√
P1dB (ref. to input)	-25 dBm	√
Temperature range	-30°C to +60°C	√
Humidity	100% conden. @ 0°C	√
TRANSMIT SECTION		
Transmitter Frequency	433.920 MHz	√
Transmitter Radiated Output	12,000uV/Meter max.	√
Transmitter Spurious Output	1200uV/Meter max.	Typ -40 dBc
Data Rate Transmit (Manchester Encoded)	1.56Kbit/sec max	√
Tx Modulator Input	0 to +4.8 volts Square Wave	√
Frequency Deviation	± 25 KHz typ.	20 Min, 35Max.
Current Consumption (Tx)	40 mA max	√
Frequency tolerance	± 32 KHz Max Over Temp.	√
Temperature range	-30°C to +60°C	√

Humidity	100% conden. @ 0°C	√
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POWER INTERFACE CONNECTIONS (0.098 Pin Spacing)

1	+ 5 Volts
2	Tx/Rx Data
3	Ground