

Technical Description

Users Manual

Key: 5FA 009 066-30



Hella KGaA Hueck & Co
59552 Lippstadt

Function description

PLL radio remote control transmitter

5FA 009 066 – 30

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1 Circuit Description

Atmel's integrated circuit ATAR862 is the central construction element of the radio remote control transmitter. This IC is a single-package fully integrated 4-bit mask-ROM microcontroller with PLL-RF-transmitter. As an alternative the pin- and function- compatible IC T48C862 may be used which contains a Flash-ROM programmable microcontroller.

ATAR862's integrated microcontroller is the same as the stand-alone device ATAR892, and the integrated PLL-transmitter is similar to the stand-alone-device T5753. PLL-Transmitter and microcontroller are placed into a single IC-package as separate dies without any internal electrical connection. The following **figure 1** shows a block diagram of the radio transmitter's electronic circuit.

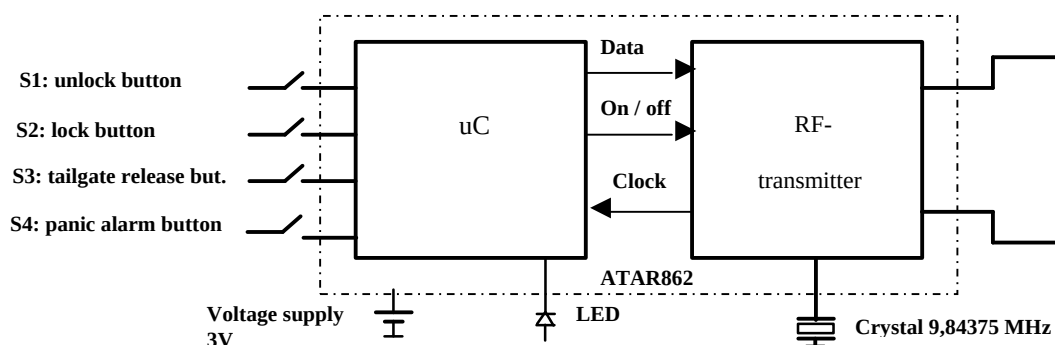


Figure 1: Block diagram of the transmitter's electronic circuit

Four push-buttons S1 to S4 and LED D1 act as interface to the user.

The microcontroller is responsible for monitoring the button signals, monitoring the power supply, encryption and encoding of the transmit data and control of RF-telegram transmission.

An integrated EEPROM serves as a storage device for transmitter-specific data.

The transmitter's power supply comes from a lithium coin-cell battery CR2032. The nominal value of the supply voltage is 3 volts. Capacitor C2 blocks the supply voltage for the microcontroller part of IC1.

By pressing buttons S1 to S4 logic-high level is applied to the microcontroller's inputs BP50, BP52, BP53 or BP63. Pulldown resistors R1 to R4 are actually not mounted because all button inputs of IC1 have internal pulldown elements for termination to logic-low level. Resistors R7 and R8 are used for decoupling of the connection between the push buttons S1 and S2 from the board antenna structure. The microcontroller's output port BP20 drives the LED D1 via Resistor R5. Switching on and off the PLL circuit of IC1 is done by means of output port BP23, whereas the modulation signal is supplied to the PLL-transmitter via output port BP42.

Capacitors C1, C4 and C11 are used for decoupling of the transmitter's supply voltage.

The PLL-part of IC1 contains a crystal oscillator circuit with Q1 and C3 as frequency determining elements. The oscillator's output signal is used as a reference for the transmitter's PLL-circuit and for clocking the microcontroller via an integrated 4:1-frequency-divider.

The PLL loop-filter is fully integrated into IC1.

The transmitter's output stage is switched on and off via input PA_ENABLE. Thus the transmitted signal is OOK-modulated with the data supplied by the microcontroller via output port BP42.

An on-board resonant loop antenna is used to radiate the output signal of the transmitter circuit. Capacitors C5 and C6 determine the resonance frequency of the antenna, whereas C7, L2 and C10 are used for lowpass-filtering of the transmitters' output signal. L1 serves as a DC-path to the transmitter's output stage.

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2 General Function

While none of the buttons is pressed, the microcontroller is in sleep mode and the transmitter's RF stage is disabled. Pressing any of the buttons S1 to S4 wakes up the microcontroller. At this time an integrated RC-oscillator is used as the microcontroller's clock source. The crystal oscillator and the PLL circuit will now be switched on via BP23. At the end of a short stabilisation phase the clock source for the microcontroller is switched from the RC-oscillator to the output of the integrated 4:1 frequency-divider. Message Data is fed from the microcontroller to the power amplifier via output port BP42 thus modulating the RF-carrier in OOK-Mode. After all buttons have been released, transmission will stop and the PLL-circuit is disabled by switching off output port BP23. The microcontroller returns to the sleep-mode again.

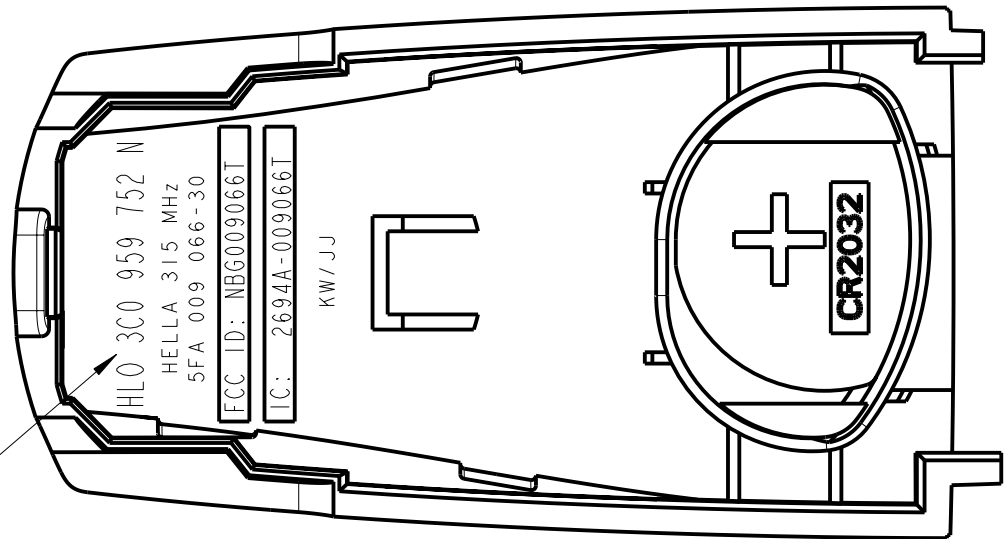
3 Technical data

Model designation	Buttons	Function
5FA 009 066-30	S1 S2 S3 S4	Unlock Lock Tailgate remote release Panic alarm
Supply Voltage	3V nominal (1 Lithium coin cell)	
Current consumption	approx. 8 mA	
Operating frequency	315,0 MHz $\pm$ 100 ppm	
Frequency synthesis	Quartz crystal stabilized PLL	
PLL reference frequency	9.84375 MHz	
Modulation scheme	Pulse Modulation (OOK)	
Type of transmission (ITU Designation)	A1D / simplex	
Modulation data rate	approx. 1,7 Kbit / s	
Signal strength	max. 6mV/m @ 3m	
Operating temperature range	-20°C ... +60°C	
Antenna	integrated PCB loop antenna	

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Zulassungslabel gelasert

Approval marking with laser beam

Hella Umweltnorm N20100-02 ist zu beachten

Hella Environmental Standard N20100-02 to be considered

2D	3D	A-Index Rev.Ind	war was	Blatt Page	Aenderung Rev.Description	Aender.-Nr. ECO-No.	Datum Date	K-Gr./Name Depart./Name
Oberflaeche Surface								
Werkstoff Material								
Allgemeintoleranz General Tolerance						Gewicht Weight		
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Maszstab Scale		Erstellt/Entw. Drawn		Datum Date		Name		
Projektionsmethode Projection		Freigegeben Checked		2004-10-27		OTHOLT		
X3 XXXXXXXXXX		Konstr.-Gr. Department		2004-10-27		HOENER		
		EE-32						
Benennung ZULASSUNGSBESCHRIFTUNG						Ordnungs-Nr. Ordering-No.		Revision
						Material-Nr. Material-No.		
						5FA 009066-30		
Title APPROVEL MARKING (EXAMPLES)						Zeichnungs-Nr. Drawing No.		Formal Size
						009066-30_Z1		A4
Ersatz fuer Replaces						Blatt: Page:		Blattzahl: Of:
Erstverwendung: First Project No.:								
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