

COM2020



The Steering Column Control Module COM2020 (SCCM) is the interface between the steering wheel and the steering column necessary to transfer the driver's input rotation. It integrates clock springs, steering angle sensors, power tilt/telescope column controls, pedal position controls, and other simple and complex switches.

**Product Features:**

- Turn indicator lever
- Wipers lever
- TRSP (immobilizer)
- HF (Key remote control)
- Sound (80dBa, mono sound)

General information			
Product name	KOSTAL COM2020 EMC0		
Model name	COM2020		
Power supply EUT:	DC		
Supply voltage EUT:	$U_{nom} = 13.5 \text{ V}$	$\underline{U}_{min} = 8 \text{ V}$	$\underline{U}_{max} = 16 \text{ V}$
Temperature range:	-40 °C to +85 °C		
Lowest / highest internal frequency:	125 kHz / 16 MHz		
Receiver frequency:	433 MHz		
Minimum distance between <u>TXantenna</u> and customer:	20 cm		

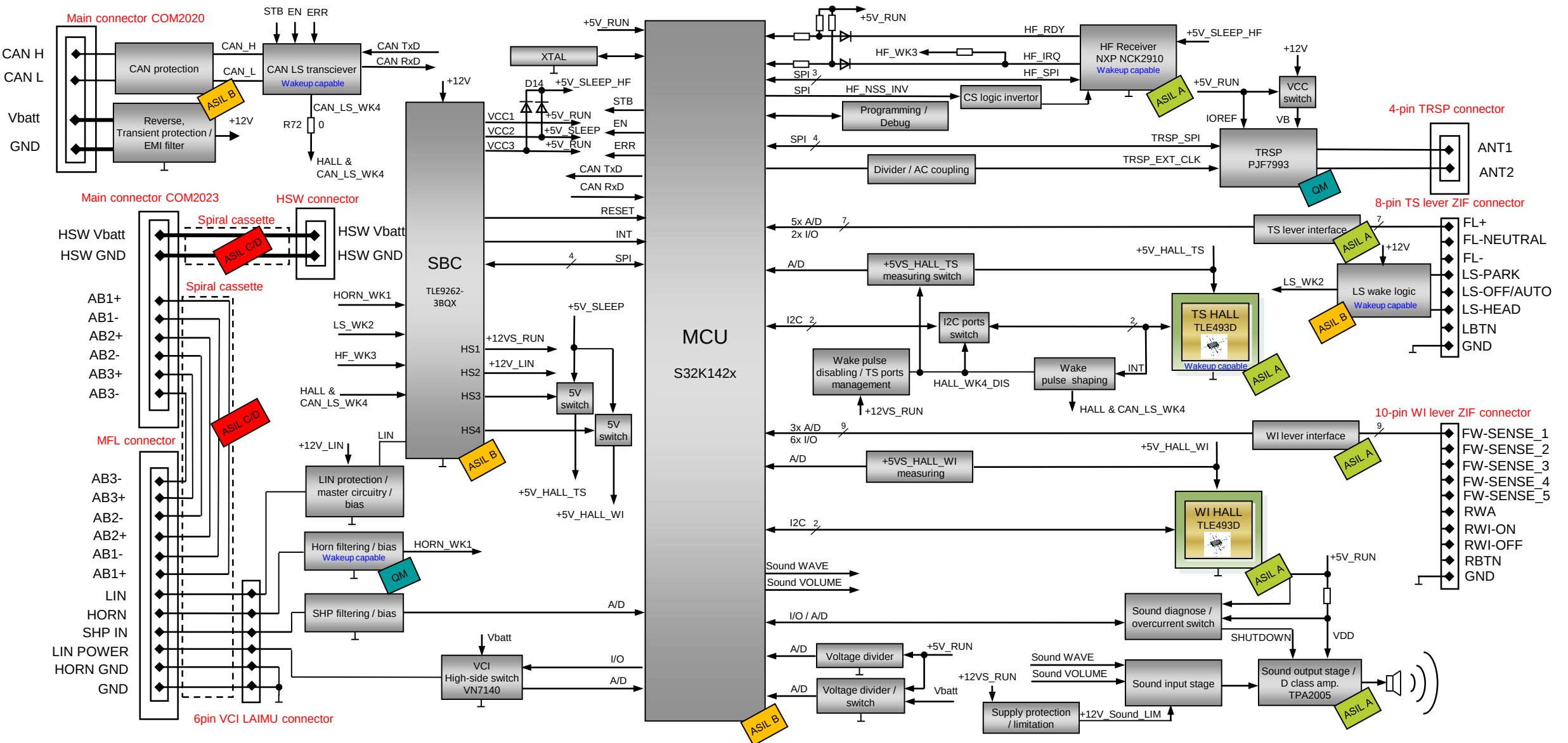
COM2020 module continuously evaluate mechanical status of the control levers (Turn signal lever – TS lever, Wiper lever – WI lever), electronic gear shifter control (SHP) and share this information with rest of the car as a message on the LS-CAN bus. COM2020 module also serves as LIN gateway.

COM2020 module being LIN master powers and monitors LIN slave steering unit hereinafter as VCI.

COM2020 module includes sound system which provides acoustic feedback to the driver.

Full variant of COM2020 module includes immobilizer functionality (TRSP) and also high frequency FSK receiver (433,92MHz) providing remote locking/unlocking of vehicle (HF).

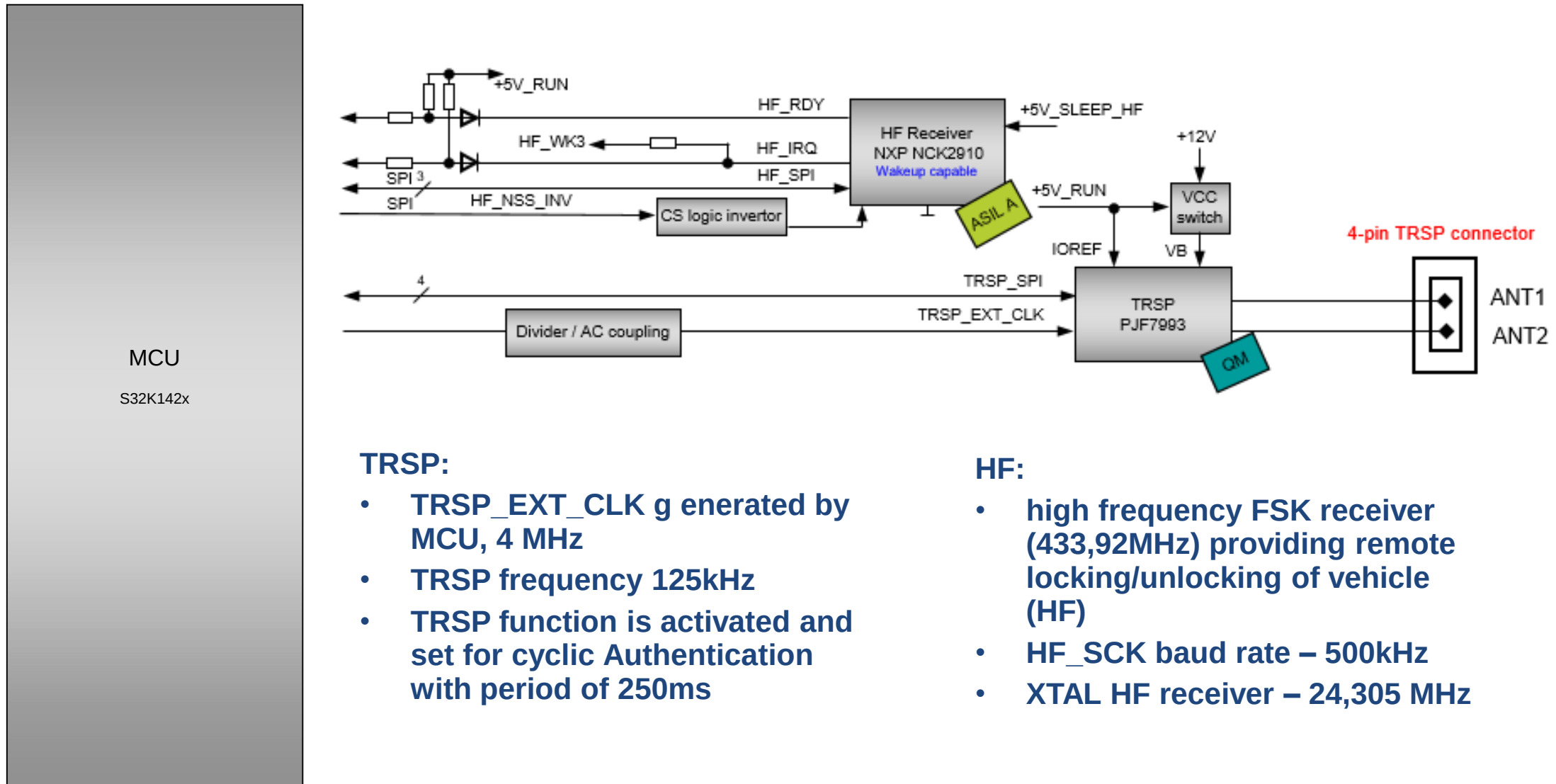
COM2020 – HW block diagram – Main PCB

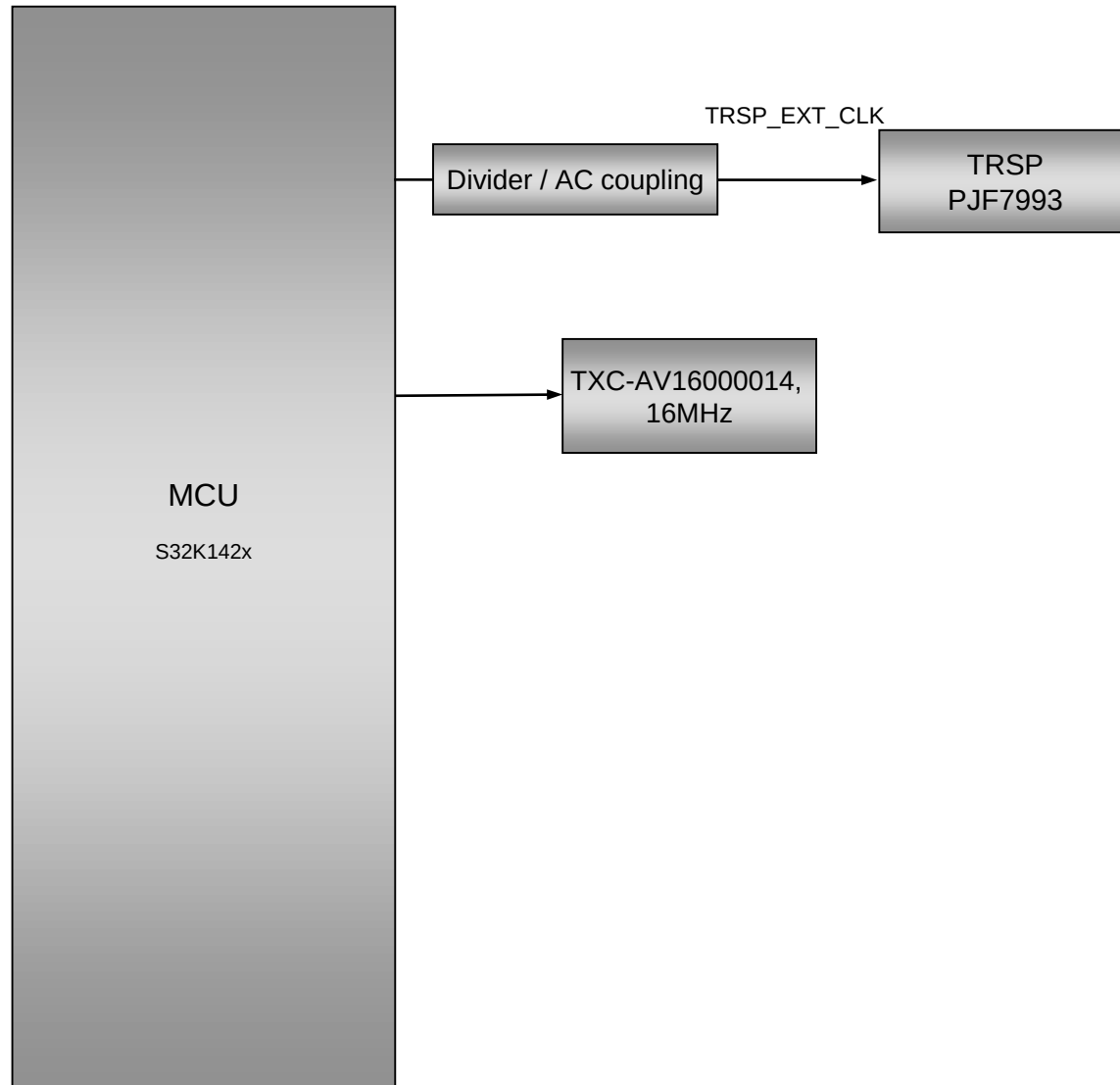


This table contains all noise sources of COM2020:

Name	Frequency	Function
CAN-HS interface	typ. 500 kHz	CAN-HS baud-rate = 500 <u>kBaud</u>
CAN-LS interface	typ. 125 kHz	CAN-LS baud-rate = 125 <u>kBaud</u>
LIN interface	typ. 19200 Hz	LIN <u>baudrate</u> = 19,2 <u>kBaud</u>
XTAL main <u>uC</u>	16 MHz	
XTAL HF receiver	24,305 MHz	
MCU VCO	320 MHz	Main <u>uC</u> VCO, jitter +-0,024%
MCU SPLL	160 MHz	
Sound VOLUME	78,8 kHz	Sound volume PWM, variable duty cycle
Sound WAVE	78,8 kHz	Sound wave PWM, variable duty cycle
Sound D-class	200-300 kHz	D-class amp. Switching freq. typ. 250kHz
I2C bus – 2x Hall sensor	450 kHz	SCL baud rate
SPI bus – SBC-MCU interface	377 kHz	CLK baud rate
SPI bus – HF-MCU interface	500 kHz	HF_SCK baud rate
SPI bus – TRSP-MCU interface	300 kHz	TRANS_CLK baud rate
HF FSK receiver	433,92 MHz	FSK receiver
TRSP receiver	125 kHz	TRSP receiver

TRSP (Key transponder) + HF (high frequency FSK receiver)





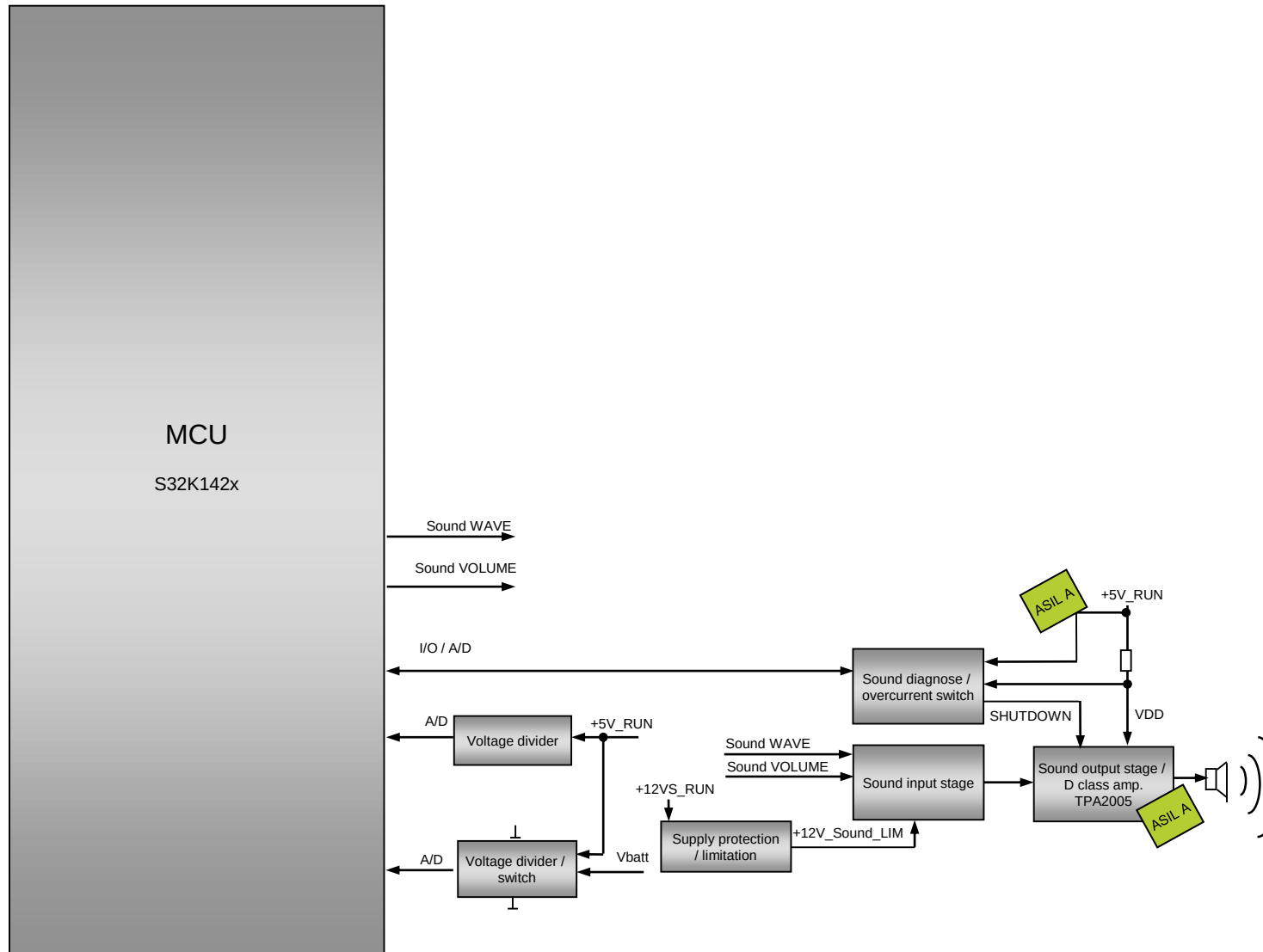
Clock sources:

1. Main CLK:

TXC-AV16000014, 16 MHz

2. TRSP_EXT_CLK

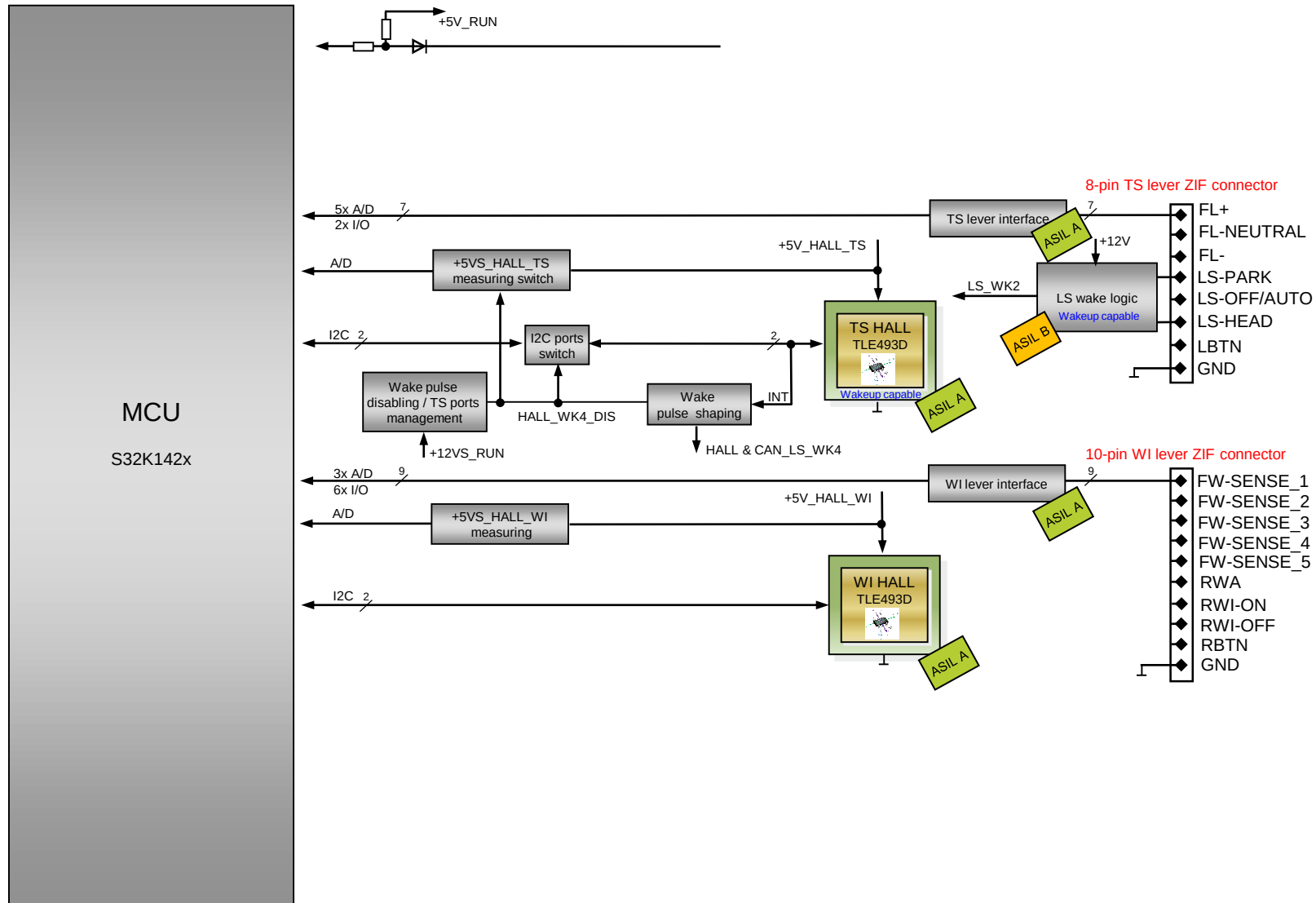
Generated by MCU, 4 MHz



SND:

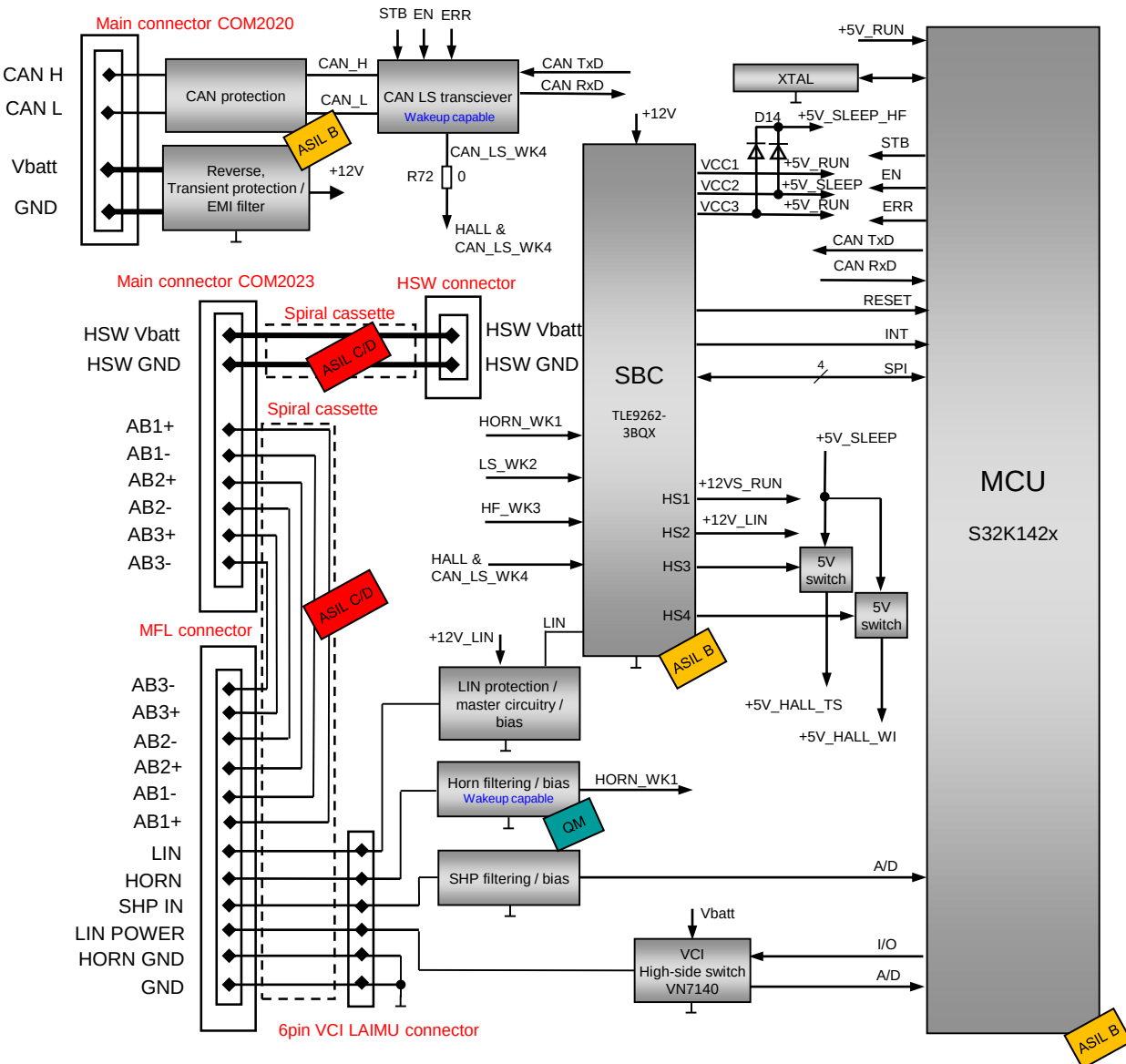
- COM2020 module includes sound system which provides acoustic feedback to the driver
- Module do SND self diagnose after start
- Sound 400Hz – 15kHz

Levers – TS Lever (Turn signal), WI Lever (Wiper)



COM2020 continuously evaluate mechanical status of the control levers (Turn signal lever – TS lever, Wiper lever – WI lever)

2x HALL sensor TLE493D, communication by I2C bus, SCL baud rate 450kHz



SBC (System Basis Chip:

- Power supply for module (+5V_SLEEP, +5V_RUN, +5V_SLEEP_HF, +12VS_RUN, +12V_LIN)
- provides LIN interface, 19.2 kHz

CAN LS (low speed) interface by CAN LS transceiver TJA1055T/1

Version	Changes	Date	Author
0000	Initial revision	2024-09-24	rott001