

All RF generated frequencies between the LO(XIN – XOUT) and TX pin are inside the RFIC. See the excerpt below from the radio datasheet for a better explanation of RF frequency synthesis.

Transmission Frequency Synthesis

2. Functional Description

The Si446x devices are high-performance, low-current, wireless ISM transceivers that cover the sub-GHz bands. The wide operating voltage range of 1.8–3.6 V and low current consumption make the Si446x an ideal solution for battery powered applications. The Si446x operates as a time division duplexing (TDD) transceiver where the device alternately transmits and receives data packets. The device uses a single-conversion mixer to downconvert the 2/4-level FSK/GFSK or OOK modulated receive signal to a low IF frequency. Following a programmable gain amplifier (PGA) the signal is converted to the digital domain by a high performance $\Delta\Sigma$ ADC allowing filtering, demodulation, slicing, and packet handling to be performed in the built-in DSP increasing the receiver's performance and flexibility versus analog based architectures. The demodulated signal is output to the system MCU through a programmable GPIO or via the standard SPI bus by reading the 64-byte RX FIFO.

A single high precision local oscillator (LO) is used for both transmit and receive modes since the transmitter and receiver do not operate at the same time. The LO is generated by an integrated VCO and $\Delta\Sigma$ Fractional-N PLL synthesizer. The synthesizer is designed to support configurable data rates from 100 bps to 1 Mbps. The Si4463/61/60 operate in the frequency bands of 142–175, 283–350, 420–525, and 850–1050 MHz with a maximum frequency accuracy step size of 28.6 Hz. The Si4464 offers frequency coverage in bands not supported by Si4463/61/60. The transmit FSK data is modulated directly into the $\Delta\Sigma$ data stream and can be shaped by a Gaussian low-pass filter to reduce unwanted spectral content.

The Tapco Radio 154450 uses SI4460 transceiver version and all operating modes utilize the 850 – 1050MHz band.

Other External chip pins related to frequency generation are the TXpin, which is connected to the RF transmit circuit. TXRamp pin is not used.

This radio will use frequencies from 902.225MHz to 927.775MHz for FHSS modes, and 902.575MHz – 927.425MHz for DTS mode.

28.6Hz increments are available for a total of 893,356 channels for FHSS mode and 868,881 channels in DTS mode.

Operating mode frequency limitations are fixed in Host Firmware. The end user does not control which frequencies are used in the different modes of operation.

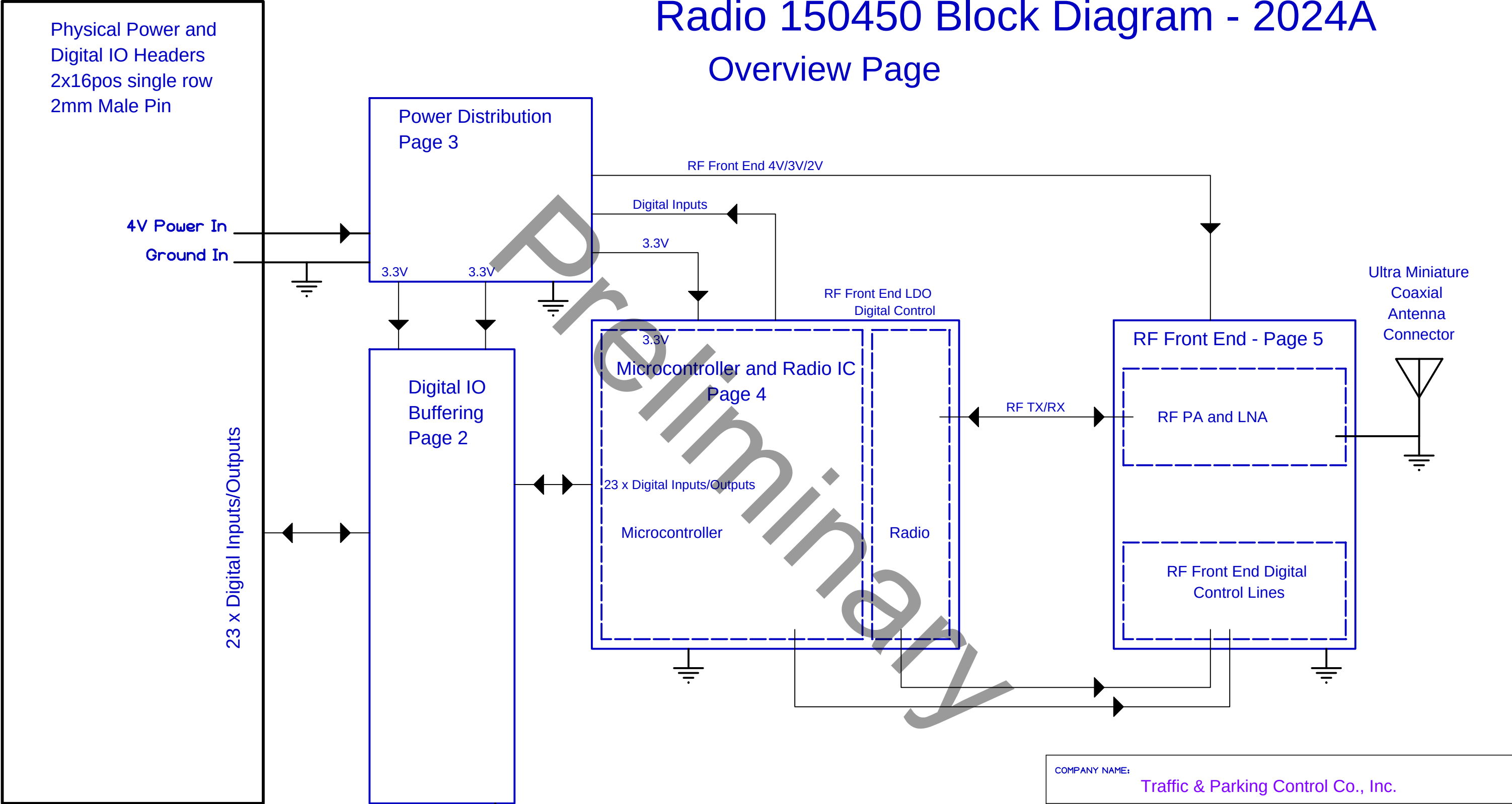
Frequency generation accuracy will be verified at the factory during test and calibration. 30MHz crystal tuning is used on the RF IC for fine tuning the RF transmission frequencies with sub kHz resolution.

30MHz crystal tuning is not available to the end user.

Microcontroller generated clock frequencies are not used for RF signal generation.

Radio 150450 Block Diagram - 2024A

Overview Page

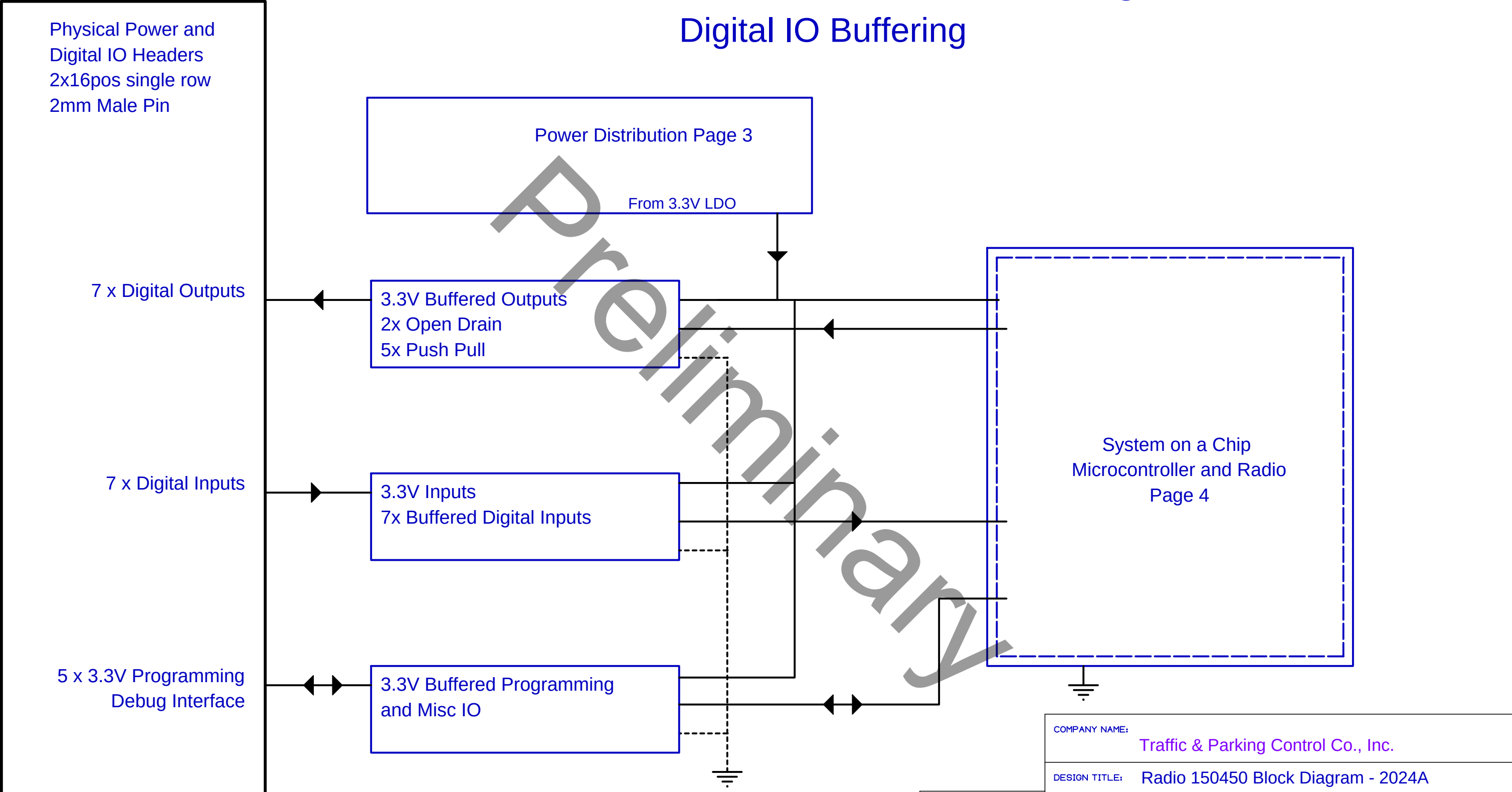


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Radio 150450 Block Diagram - 2024A

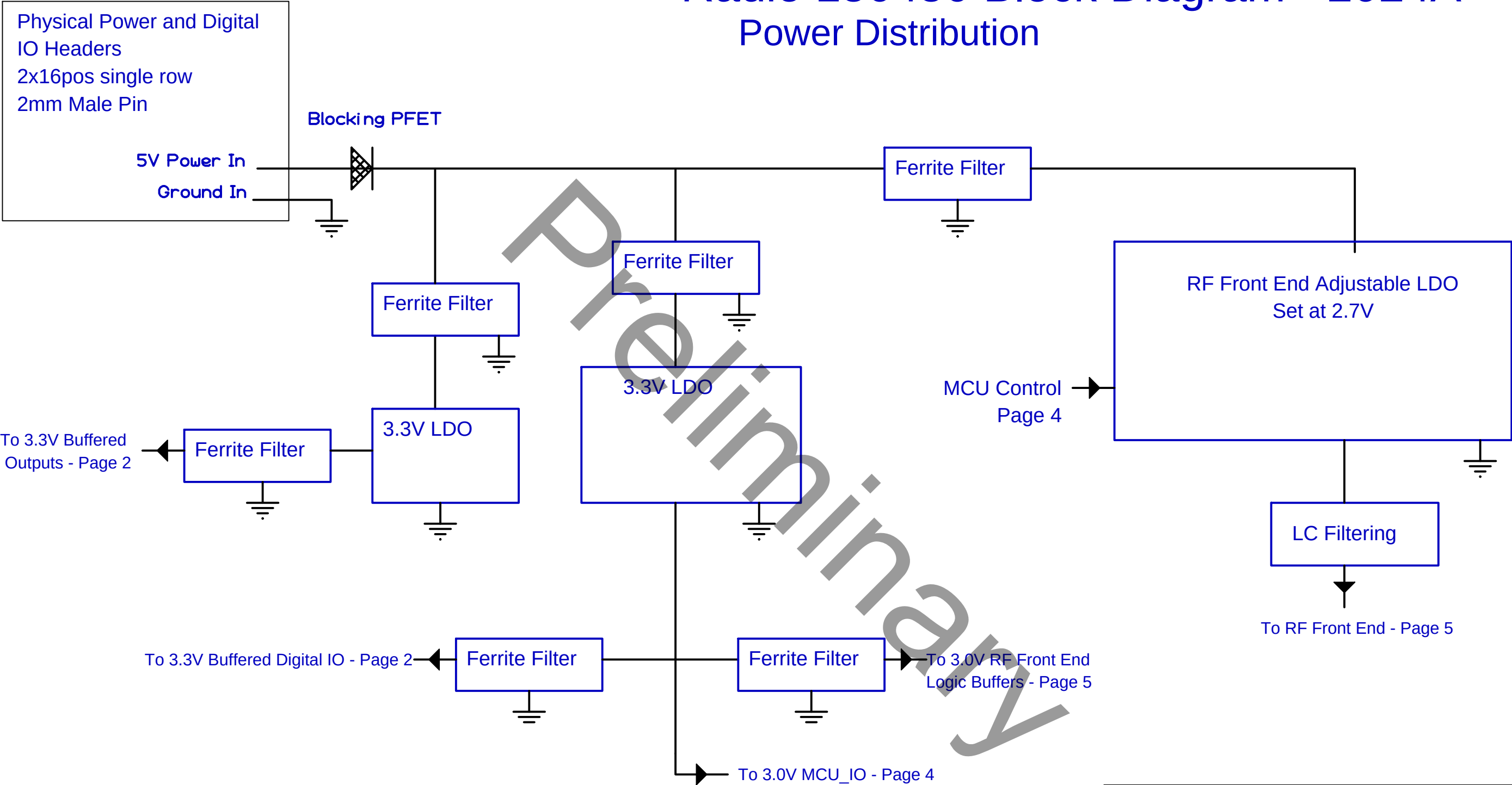
Digital IO Buffering



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Radio 150450 Block Diagram - 2024A

Power Distribution

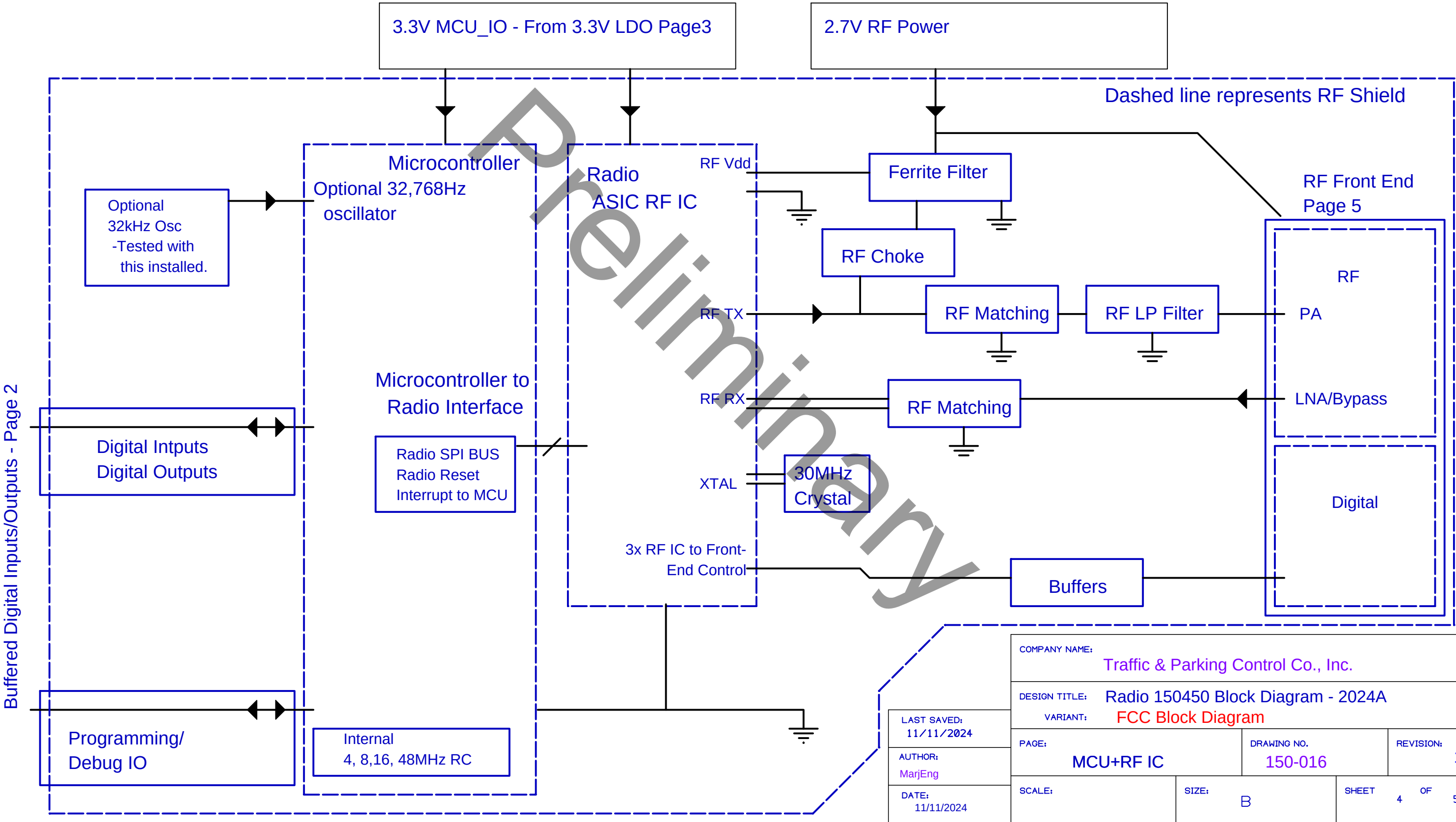


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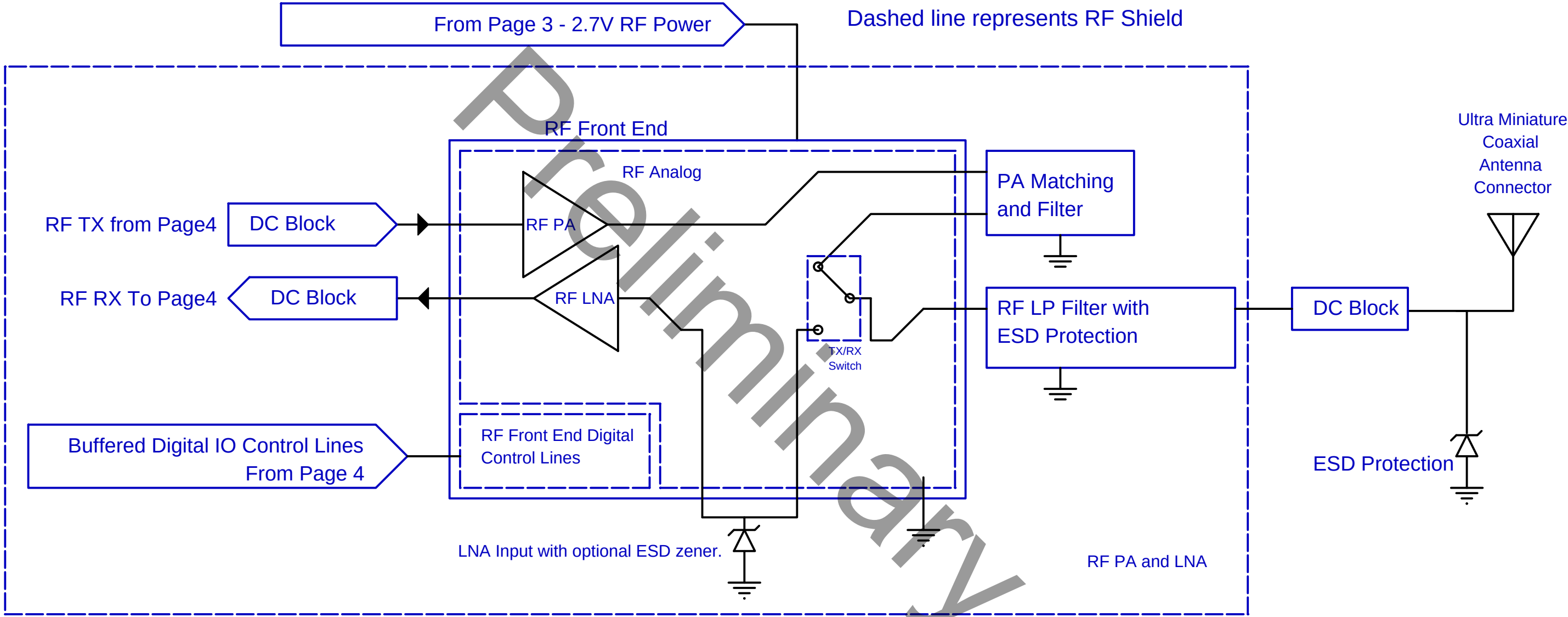
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Microcontroller + RF IC



Radio 150450 Block Diagram - 2024A

RF Front End



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