

18/20-Pin Enhanced Microcontroller with UHF ASK/FSK Transmitter Product Brief

High Performance RISC CPU:

- Only 33 single word instructions to learn
- All instructions are single cycle (1 μ s) except for program branches which are two-cycle
- Operating speed: DC - 4 MHz clock input
DC - 1 μ s instruction cycle

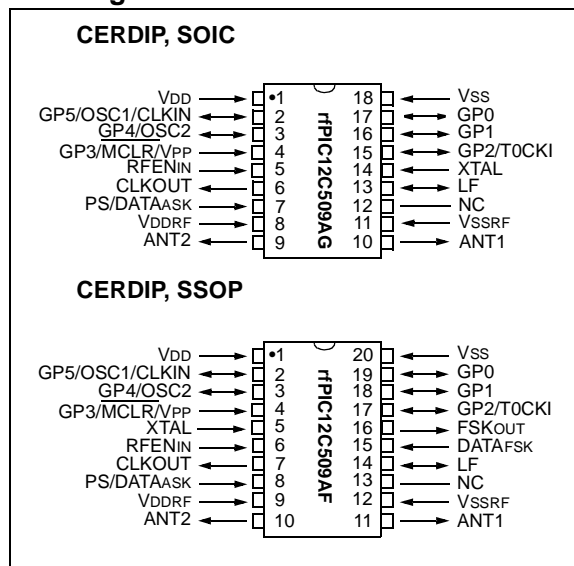
Device	Memory	
	EPROM Program	RAM Data
rfPIC12C509AG	1024 x 12	41
rfPIC12C509AF	1024 X 12	41

- 12-bit wide instructions
- 8-bit wide data path
- Seven special function hardware registers
- Two-level deep hardware stack
- Direct, indirect and relative addressing modes for data and instructions
- Internal 4 MHz RC oscillator with programmable calibration (separate from transmitter quartz crystal reference)
- In-Circuit Serial Programming™ (ICSP™)

Peripheral Features:

- Separate pin-outs for PICmicro® microcontroller (MCU) and transmitter provides for design flexibility
- 8-bit real time clock/counter (TMR0) with 8-bit programmable prescaler
- Power-On Reset (POR)
- Device Reset Timer (DRT)
- Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation
- Programmable code protection
- Power saving SLEEP mode
- Wake-up from SLEEP on pin change
- Internal weak pull-ups on I/O pins
- Internal pull-up on $\overline{\text{MCLR}}$ pin
- Selectable oscillator options:
 - INTRC: Internal 4 MHz RC oscillator
 - EXTRC: External low-cost RC oscillator
 - XT: Standard crystal/resonator
 - LP: Power saving, low frequency crystal

Pin Diagram



UHF ASK/FSK Transmitter:

- Conforms to US FCC Part 15.231 regulations and European ERC 70-03E and EN 300 220-1 requirements
- VCO phase locked to quartz crystal reference; allows narrow receiver bandwidth to maximize range and interference immunity
- Integrated crystal oscillator and VCO requiring minimum of external components
- Crystal frequency divide by 4 available (CLKOUT)
- Frequency range set by crystal: 310 – 480 MHz
- ASK Data rate: 0 – 40 Kbps
- FSK through crystal pulling allows modulation at 0 – 20 Kbps
- Adjustable output power: -12 dBm to +2 dBm
- Differential output configurable for single or double ended loop antenna
- Automatic power amplifier turn-on after PLL lock

CMOS Technology:

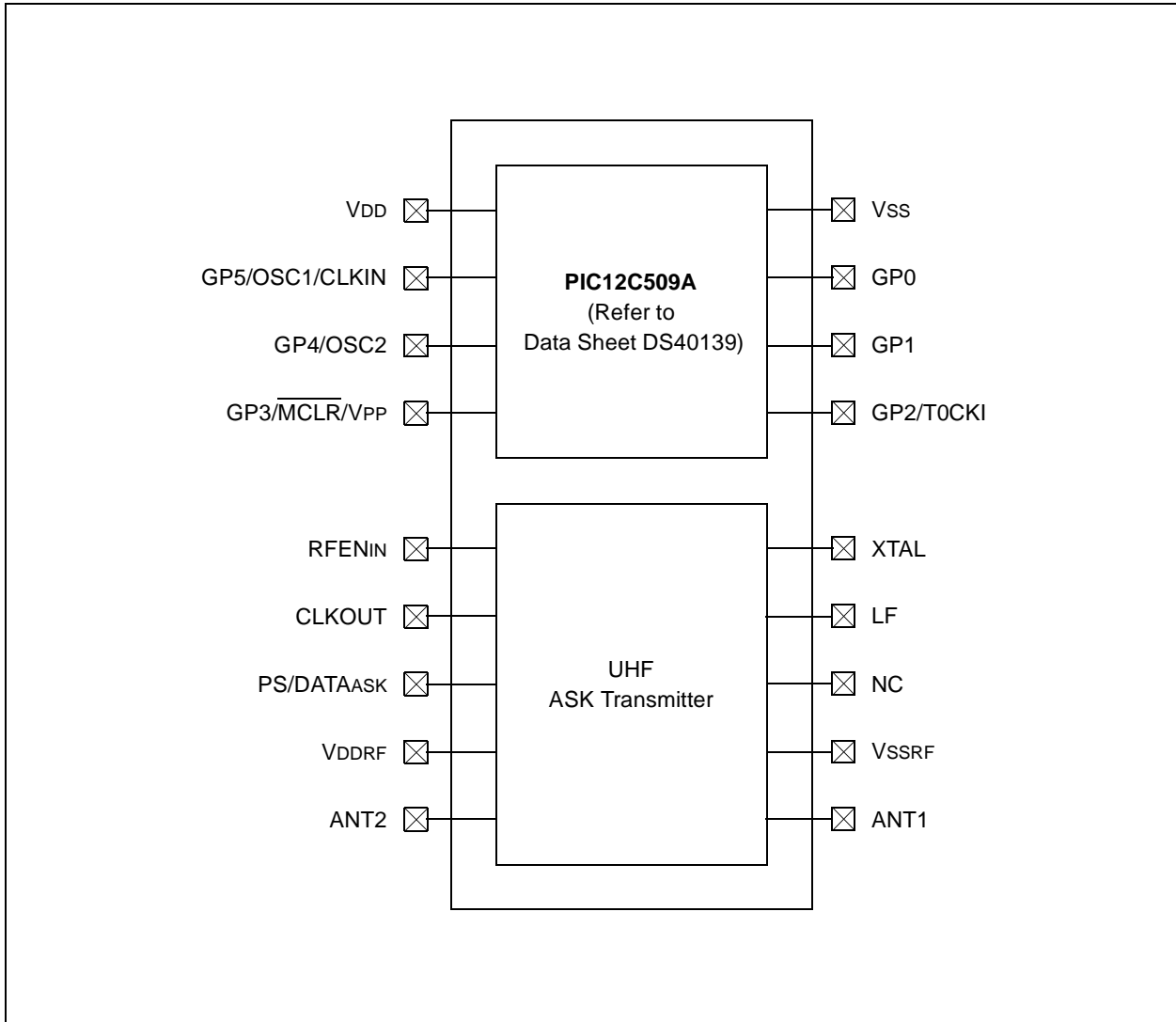
- Low power, high speed EPROM technology
- Fully static design
- Wide operating voltage range (2.5V to 5.5V)
- Wide temperature range:
 - Industrial: -40 C to +85 C

rfPIC12C509AG/509AF

CMOS Technology (cont):

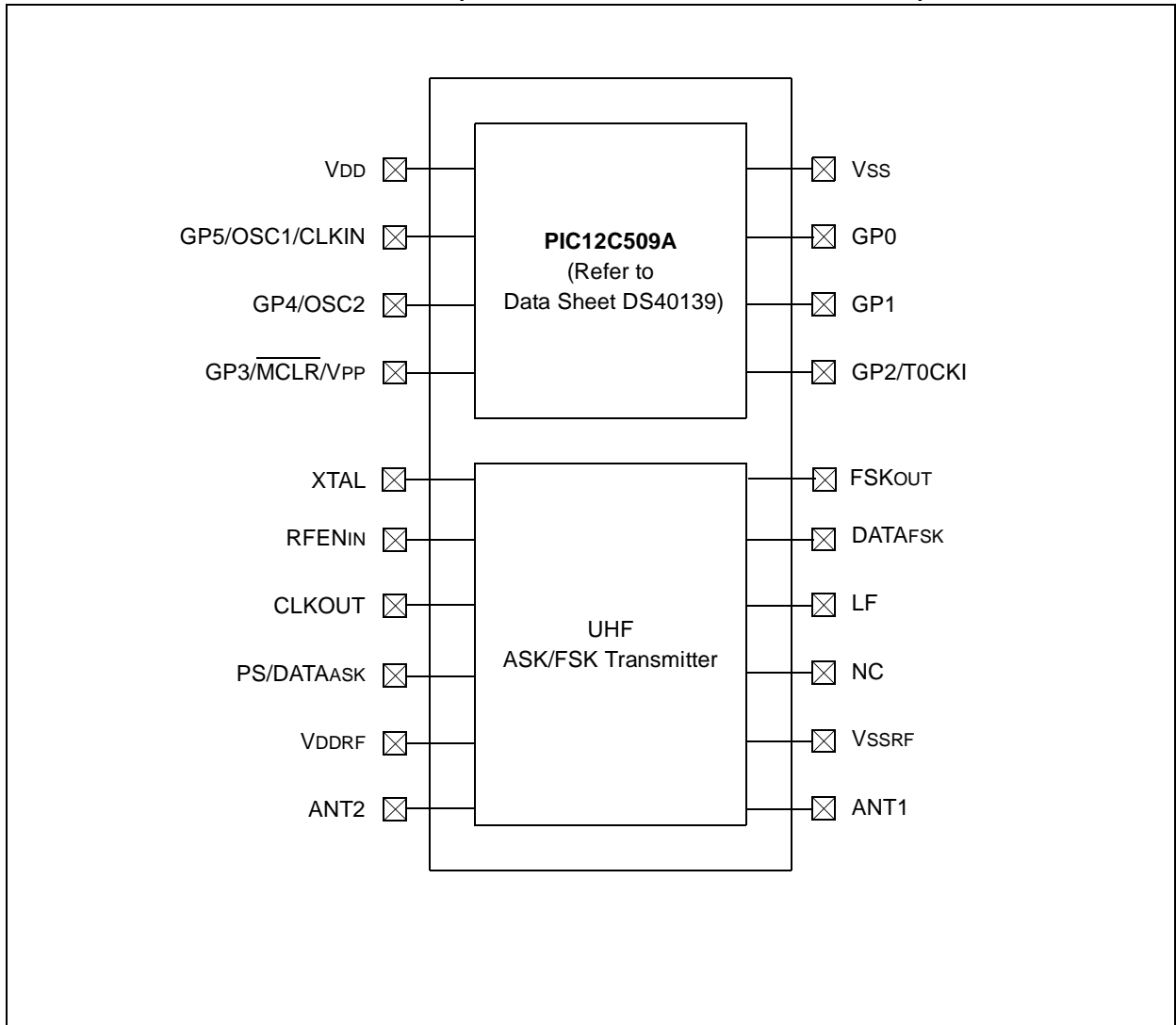
- PICmicro MCU power consumption:
 - < 2 mA @ 5V, 4 MHz
 - 15 μ A typical @ 3V, 32 KHz
 - < 1 μ A typical standby current
- Transmitter power consumption:
 - 4.8 mA to 11.5 mA @ 3V
 - <1 μ A typical standby current

rfPIC12C509AG BLOCK DIAGRAM (18-PIN WINDOWED CERDIP, SOIC)



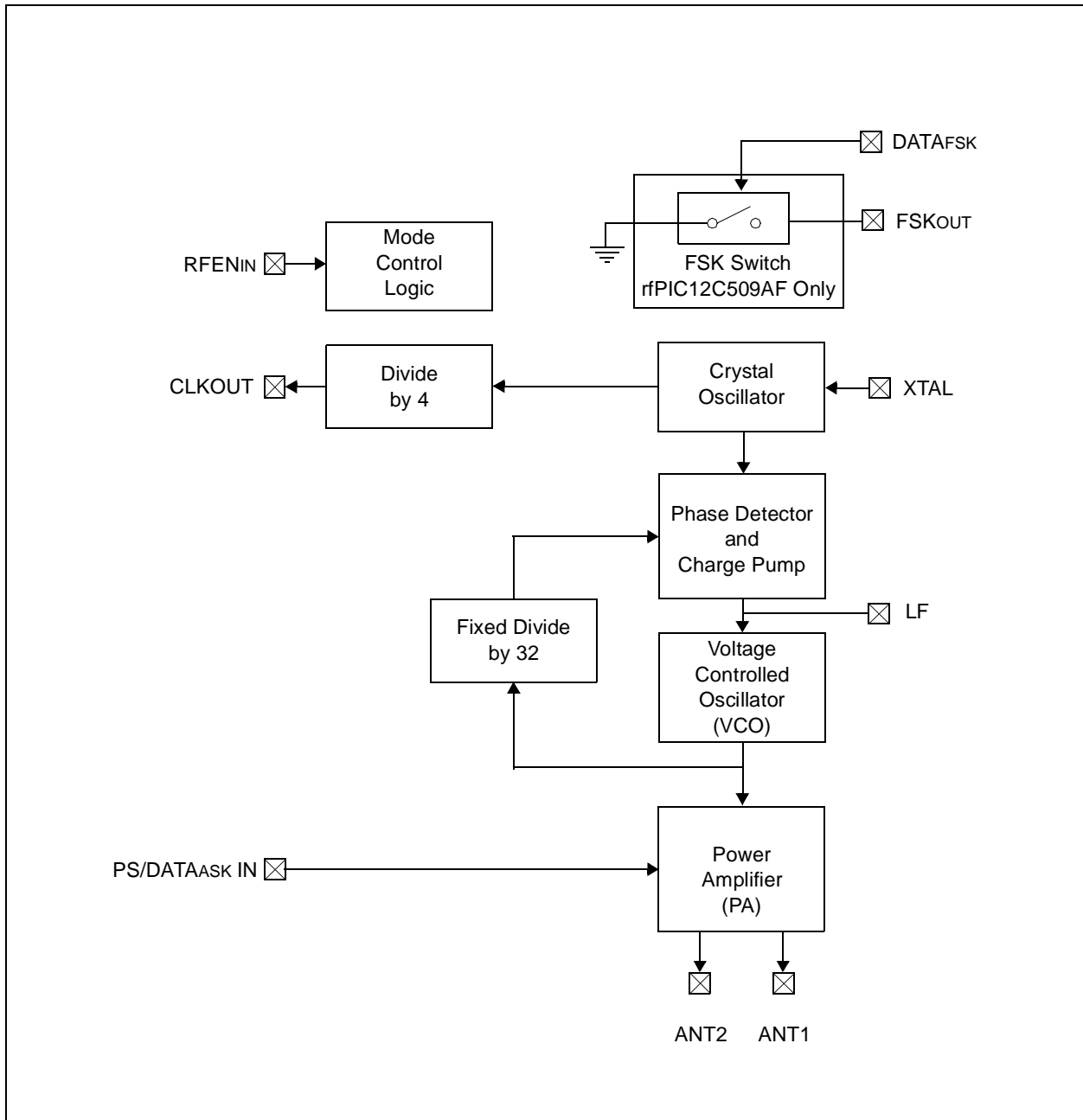
rfPIC12C509AG/509AF

rfPIC12C509AF BLOCK DIAGRAM (20-PIN WINDOWED CERDIP, SSOP)

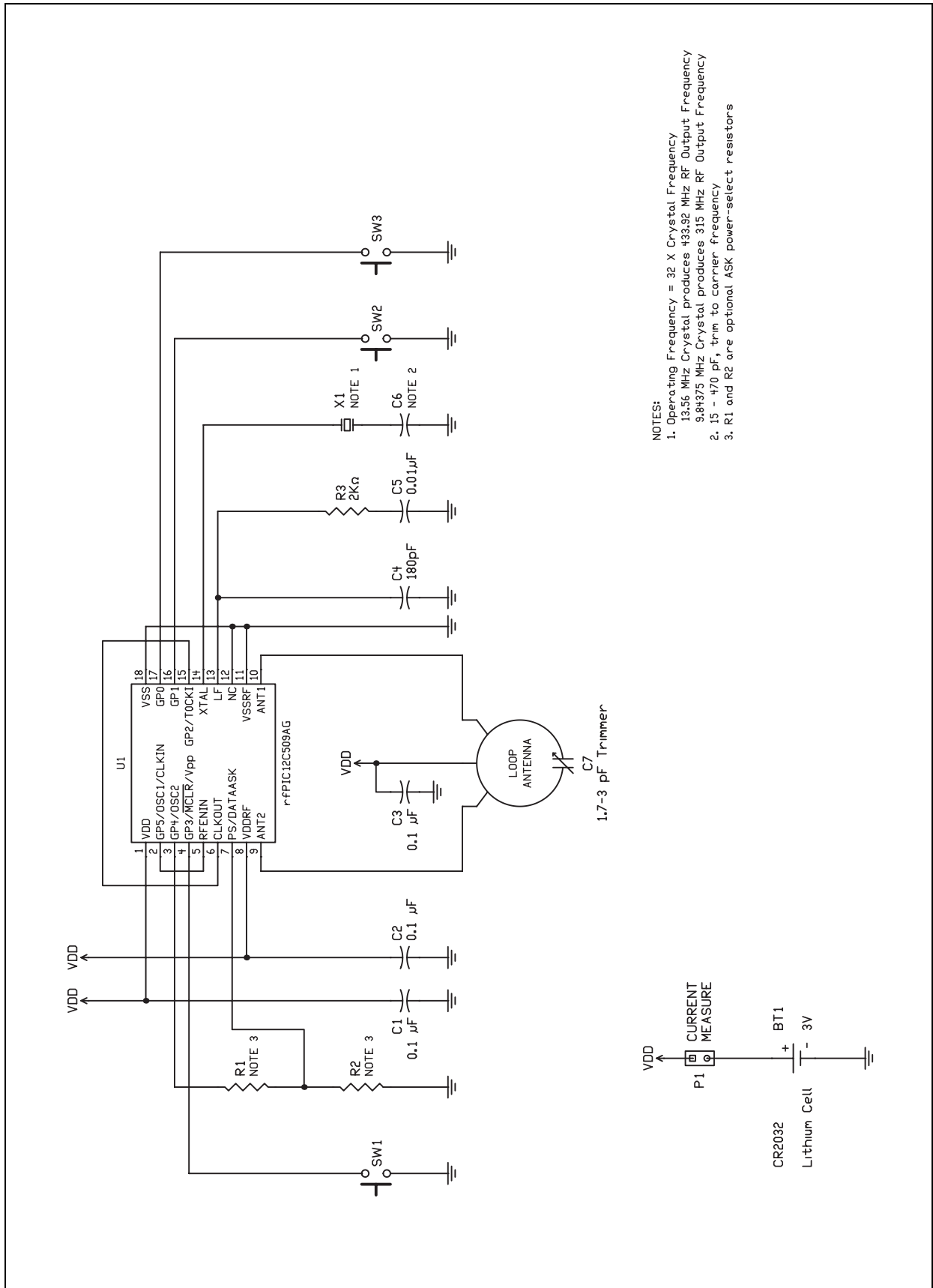


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UHF TRANSMITTER BLOCK DIAGRAM



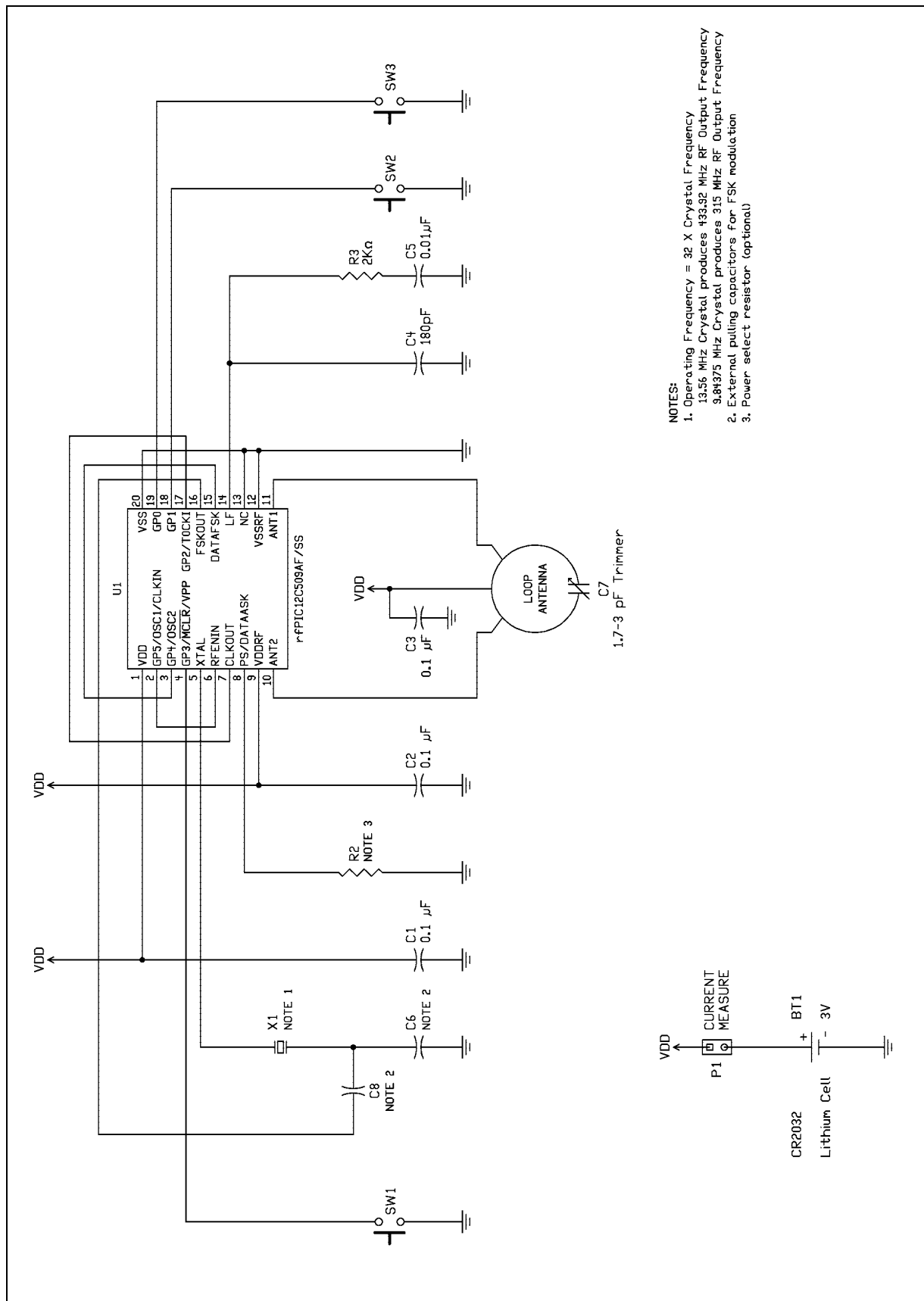
ASK EXAMPLE APPLICATIONS CIRCUIT



- NOTES:
- Operating Frequency = 32 X Crystal Frequency
13.56 MHz Crystal produces 433.92 MHz RF Output Frequency
9.84375 MHz Crystal produces 315 MHz RF Output Frequency
 - 15 - 470 pF, trim to carrier frequency
 - R1 and R2 are optional ASK power-select resistors

rfPIC12C509AG/509AF

FSK EXAMPLE APPLICATIONS CIRCUIT



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- The PICmicro family meets the specifications contained in the Microchip Data Sheet.
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- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the PICmicro microcontroller in a manner outside the operating specifications contained in the data sheet. The person doing so may be engaged in theft of intellectual property.
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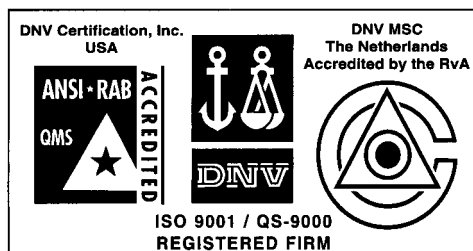
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08/01/01