CDMA Control Channel
Traffic Analyzer
The Big Picture

1) Tune Radio
2) Listen to Pilot Channel
3) Listen to Synchronization Channel
4) Transmit Sync data via RS232
5) Listen to Paging Channel
6) Transmit Paging data to PC
Main Control Unit

PC Serial Interface

DCM

Pilot Channel Module

QPSK Demodulator

In-Phase Signal

Quadrature Signal

Demod = DT

YES

FINISHED

Sync Channel Module

QPSK Demodulator

In-Phase Signal

Quadrature Signal

Symbol Buffer

Symbol De-Interleaver

Viterbi Convolutional Decoder

Frame Processor

FINISHED

Paging Channel Module

1.228 megachips per second are converted to 4800kbps or 9600kbps

QPSK Demodulator

In-Phase Signal

Quadrature Signal

Walsh Code Generator

Walsh Lookup Table

Walsh Code Generator

Long Code-Word Generator

Short PN Sequencer

Long PN Sequencer

Error Handler

Array Abstraction Module
Main Control Unit
X: Max retries before retrying previous stage

Sync to Pilot Channel

Success?

Capture Sync Channel Data

Success?

Transmit Sync Channel Data to PC

Failure?

n = X

n + 1

n < X

n = X

n + 1

n < X

n = X

Report Failure to PC

Report Failure to PC

Listen to Main Paging Channel

Success?

n = 0

Failure?

n = X

Transmit Paging Channel Data to PC

Report Failure to PC
Computer Interface

- High Speed USB->UART converter chip for communications between the FPGA and PC
- Each control unit will have access to talk to host PC
- Software written in Python will interface with the USRP to set center frequency
- USRP transmits I/Q data to PC, which then forwards it to the FPGA
Pilot Channel

QPSK Demodulator

In-Phase Signal

Quadrature Signal

Demod = 0?

YES

FINISHED
Synchronization Channel

[Diagram of synchronization channel with labels for different signals and components such as CLOCK, START, RESET, I-PN Sequence, Q-PN Sequence, In-Phase Signal, Quadrature Signal, Walsh Code Generator, Symbol Buffer, Symbol De-interleaver, Viterbi Convolutional Decoder, Frame Processor, FINISHED, LONG_PN_OFFSET.]
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Paging Channel

- Clock
- Start
- Reset
- Page Speed

1-PN Sequence
Q-PN Sequence
Current Long PN Sequence

QPSK Demodulator
Symbol Buffer
Symbol De-interleaver
Viterbi Convolutional Decoder
Frame Processor

Long Code Mask Generator

FINISHED
and perhaps in the future…
Full-duplex voice conversations