Scott Kurtz

DSP Software Engineer

Mount Laurel, NJ - Email me on Indeed: indeed.com/r/Scott-Kurtz/0d2e2370ba4e6247

To work in the field of Digital Signal Processing and/or embedded software development.
Authorized to work in the US for any employer

WORK EXPERIENCE

Senior Engineer

DSP Soundware - Medford, NJ - 2014 to Present

• Designed, simulated, and implemented (in software) the following algorithms:
o Acoustic Echo Canceller
o Single Microphone Noise Reduction
o Dereverberation
o Acoustic Beamforming
o Spatial Audio Mixer
o Active Noise Cancellation
• Developed a low-overhead C-based framework and methodology that encompasses the following functionality:
o Object instantiation
o Memory management including leak and stray write detection, and a software stack
o Diagnostic test points

Co-Founder, VP of Engineering (hands-on)

Adaptive Digital Technologies - Plymouth Meeting, PA - 1997 to 2014

• Developed a rich DSP software product line for Voice-Over-IP and voice communication
• Designed, simulated, and implemented numerous algorithms, including:
o An acoustic echo canceller that, according to one customer, achieved the same performance found in high-end Polycom conference speakerphones
o A G.168 line echo canceller that was certified by AT&T's voice quality test lab
o Tone detection, generation, Caller ID modems, High Density Voice Conferencing, Automatic Gain Control, Voice Activity Detection, Noise Reduction
• Architected a low-overhead, highly configurable VoIP software framework, optimized for use on Digital Signal Processors
• Developed and implemented a software-based Voice-Over-IP Engine that runs under iOS, Android (native), PC/Windows and Linux, and ARM/Linux.
• Handled technical sales and proposal writing

DSP Software Engineering

InterDigital Communications Corporation - King of Prussia, PA - June 1986 to December 1997

• Developed baseband modem and embedded control software for wireless local loop subscriber and base station. The technology in InterDigital's system encompassed groundbreaking technology and was, in fact, the predecessor to the 3G mobile communications standards.
• Worked on RF modem design, speech compression, waveform coding, telecom systems engineering, and embedded software development. By being involved in so many aspects of the system, I became a de-facto systems engineer in the process.

Member, Engineering Staff

Radio Corporation of America (RCA), Government Communications System Division - Camden, NJ - 1983 to 1986

• Developed and implemented a Low Probability of Intercept (LPI) modem whose claim to fame is that it could successfully transmit in the HF radio band at transmit levels that were so low that they could not be detected above the background noise.
• Demonstrated transmission over a distance of 300 miles using 2 watts of transmit power using sky-wave transmission.

EDUCATION

MSEE in Digital Signal Processing, Communication, Information Theory

Drexel University
1992

BSEE

Lehigh University
1983

SKILLS

Electrical Engineering (10+ years), DSP Software (10+ years), Algorithm Development (10+ years), TI DSP (10+ years), C/C++ (10+ years), Embedded Software (10+ years), iOS Software Development (1 year), Android Software Development (1 year), Embedded Linux Software Development (1 year), Simulation (10+ years), MATLAB (1 year), SVN (1 year), Simulation (10+ years), Assembly Language (10+ years), Eclipse (4 years), Java (1 year), Windows MFC (5 years)

LINKS

https://www.youtube.com/watch?v=2NCYis0Jdhk

PATENTS

Method and apparatus for compressing and transmitting ultra high speed data (#8,503,372)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=8,503,372.PN.&OS=PN/8,503,372&RS=PN/8,503,372
October 2006
Voiceband compression techniques are employed in order to enable an RF telecommunications base station to accommodate data signals of high speed voiceband modems and FAX machines. An Ultra-High Speed Codec supports voiceband modem and FAX transmissions up to 14.4 kb/s and operates using four 16-phase RF slots. Because these codecs transmit information over several RF slots which can be contiguous, the slots within RF communication channels are dynamically allocated. The Dynamic Time slot/Bandwidth Allocation feature detects and monitors the data transmission and forms a data channel from the necessary number of slots.

Modularly clustered radiophone system (#7,245,596)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=7,245,596.PN.&OS=PN/7,245,596&RS=PN/7,245,596
July 2002
A subscriber cluster unit for a wireless telecommunication system provides a wireless interface with a base station for a plurality of subscriber units. The cluster unit has a plurality of frequency agile modems for processing wireless communications with the base station and a plurality of subscriber line circuits, each for providing a telecommunication connection with a subscriber unit. A control processor assigns a modem for each communication between the base station and a selected subscriber unit which is coupled to one of the line circuits and associates that line circuit with the assigned modem for that communication. Thus, a subscriber unit coupled with any of the line circuits can communicate with the base station via any of the modems.

Method for base station compressing and transmitting high speed data (#7,126,934)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnetahtml%2FPTO%2Fsearch-adv.htm&r=4&f=G&l=50&d=PTXT&p=1&S1=((Scott.INNM.+AND+Kurtz.INNM.)+AND+data.ABTX.)&OS=IN/Scott+AND+IN/Kurtz+AND+ABST/data&RS=((IN/Scott+AND+IN/Kurtz)+AND+ABST/data)
March 2002
Two related voiceband compression techniques are employed in order to enable an RF telecommunications base station to accommodate data signals of high speed voiceband modems and FAX machines. A High Speed Codec enables the base station to pass voiceband modem and FAX transmissions at up to 9.6 kb/s. An Ultra-High Speed Codec supports voiceband modem and FAX transmissions up to 14.4 kb/s. The High Speed Codec operates using three 16-phase RF slots or four 8-phase RF slots, and the Ultra-High Speed Codec operates using four 16-phase RF slots. Because these codecs transmit information over several RF slots which can be contiguous, the slots within RF communication channels are dynamically allocated. The Dynamic Time slot/Bandwidth Allocation feature detects and monitors the data transmission and forms a data channel from the necessary number of slots.

Plural subscriber system utilizing synchronized timeslots on a single frequency (#7,106,819)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=7,106,819.PN.&OS=PN/7,106,819&RS=PN/7,106,819
July 1999
A wireless digital telephone system containing at least one emulated base station plus one or more subscriber stations, the emulated base station comprising a station similar to the subscriber station but having the capability of initiating a synchronization process whereby it is enabled to assign time slots to the subscriber station within the frame pattern of an amplitude signal by means of monitoring for positive edges in the signal.

Base station for compressing and transmitting high speed data (#7,061,885)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=7,061,885.PN.&OS=PN/7,061,885&RS=PN/7,061,885
Two related voiceband compression techniques are employed in order to enable an RF telecommunications base station to accommodate data signals of high speed voiceband modems and FAX machines. A High Speed Codec enables the base station to pass voiceband modem and FAX transmissions at up to 9.6 kb/s. An Ultra-High Speed Codec supports voiceband modem and FAX transmissions up to 14.4 kb/s. The High Speed Codec operates using three 16-phase RF slots or four 8-phase RF slots, and the Ultra-High Speed Codec operates using four 16-phase RF slots. Because these codecs transmit information over several RF slots which can be contiguous, the slots within RF communication channels are dynamically allocated. The

Dynamic Time slot/Bandwidth Allocation feature detects and monitors the data transmission and forms a data channel from the necessary number of slots.

Tone detection (#6,914,979)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,914,979.PN.&OS=PN/6,914,979&RS=PN/6,914,979
April 2001
A DFT is used to compute the magnitude and phase of the frequencies desired to be detected in a frame of sampled data by performing 2 dot products for each such frequency. The two dot products are calculated using the samples in the frame and an equal number of equally spaced cosine and sine coefficients for each frequency to be detected.

Subscriber unit for compressing and transmitting high speed data (#6,888,815)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,888,815.PN.&OS=PN/6,888,815&RS=PN/6,888,815
March 2002
Two related voiceband compression techniques are employed in order to enable an RF subscriber unit to accommodate data signals of high speed voiceband modems and FAX machines. A High Speed Codec enables the subscriber unit to pass voiceband modem and FAX transmissions at up to 9.6 kb/s. An Ultra-High Speed Codec supports voiceband modem and FAX transmissions up to 14.4 kb/s. The High Speed Codec operates using three 16-phase RF slots or four 8-phase RF slots, and the Ultra-High Speed Codec operates using four 16-phase RF slots. Because these codecs transmit information over several RF slots which can be contiguous, the slots within RF communication channels are dynamically allocated. The Dynamic Time slot/ Bandwidth Allocation feature detects and monitors the data transmission and forms a data channel from the necessary number of slots.

Echo Canceller (#6,766,021)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,766,021.PN.&OS=PN/6,766,021&RS=PN/6,766,021
March 2001
A method of echo cancellation for a signal transmission system in which the size of the step used to adapt filter coefficients is adjusted in accordance with the echo delay and in which stationary signals are avoided by determining when the mean and variance of coefficients obtained from a second order linear predictive coding analysis of successive far end samples exceed preset thresholds.

Base Station Emulator (#6,711,223)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,711,223.PN.&OS=PN/6,711,223&RS=PN/6,711,223
February 2001
A wireless digital telephone system containing at least one emulated base station plus one or more subscriber stations, the emulated base station comprising a station similar to the subscriber station but having the capability of initiating a synchronization process whereby it is enabled to assign time slots to the subscriber station within the frame pattern of an amplitude signal by means of monitoring for positive edges in the signal.

Method for subscriber unit compressing and transmitting high speed data (#6,574,207)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,574,207.PN.&OS=PN/6,574,207&RS=PN/6,574,207
March 2002
Two related voiceband compression techniques are employed in order to enable an RF telecommunications subscriber unit to accommodate data signals of high speed voiceband modems and FAX machines. A High Speed Codec enables the subscriber unit to pass voiceband modem and FAX transmissions at up to 9.6 kb/s. An Ultra-High Speed Codec supports voiceband modem and FAX transmissions up to 14.4 kb/s. The High Speed Codec operates using three 16-phase RF slots or four 8-phase RF slots, and the Ultra-High Speed Codec operates using four 16-phase RF slots. Because these codecs transmit information over several RF slots which can be contiguous, the slots within RF communication channels are dynamically allocated. The Dynamic Time slot/Bandwidth Allocation feature detects and monitors the data transmission and forms a data channel from the necessary number of slots.

Method and apparatus for compressing and transmitting high speed data (#6,526,383)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,526,383.PN.&OS=PN/6,526,383&RS=PN/6,526,383
May 2000
Two related voiceband compression techniques are employed in order to enable an RF telecommunications system to accommodate data signals of high speed voiceband modems and FAX machines. A High Speed Codec enables the telecommunications system to pass voiceband modem and FAX transmissions at up to 9.6 kb/s. An Ultra-High Speed Codec supports voiceband modem and FAX transmissions up to 14.4 kb/s. The High Speed Codec operates using three 16-phase RF slots or four 8-phase RF slots, and the Ultra-High Speed Codec operates using four 16-phase RF slots. Because these codecs transmit information over several RF slots which can be contiguous, the slots within RF communication channels are dynamically allocated. The Dynamic Timeslot/Bandwidth Allocation feature detects and monitors the data transmission and forms a data channel from the necessary number of slots.

Communication signal compression system and method (#5,072,308)

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=5,072,308.PN.&OS=PN/5,072,308&RS=PN/5,072,308
November 1990
A telecommunication system and method for communicating communication signals between various stations over a selected carrier medium. An improved encoder and method is provided for compressing a communication signal into a selectively formatted encoded signal to facilitate its transmission over the selected carrier medium. The method is particularly useful for encoding fax and modem data signals which do not exhibit the harmonics of a voice signal. A decoder and method for reconstruction of the encoded signal are also provided.

PUBLICATIONS

All Bits are not Created Equal

http://eecatalog.com/blog/2015/10/06/all-bits-are-not-created-equal/
October 6, 2015
This article brings together concepts in probability, information theory, and data compression in an intuitive way.

The Slow Extinction of a Brilliant Invention - The Analog Telephone

http://eecatalog.com/atca/2015/08/27/the-slow-extinction-of-a-brilliant-invention%E2%80%94the-analog-telephone/
August 27, 2015
This article discusses the simple but brilliant ideas that went into the design of the analog telephony network. We, as engineers, can all learn something by looking taking a look back.

ADDITIONAL INFORMATION

Skills
Digital Signal Processing, algorithm design and simulation, systems engineering, C, C++, Objective C, Java, MATLAB,
TI C6000 and C5000 assembly language, Windows, Linux, Android, and iOS programming, PVCS, SVN, Pascal,
FORTRAN, intel 8051 assembly language, Word, Excel, Powerpoint, Access. Excellent writing skills.