Rick Walker

Rick Walker was born in San Rafael, California in 1960. He received his BS degree in Engineering and Applied Science from the California Institute of Technology in 1982, and his MS degree in Computer Science from California State University at Chico in 1992. Rick worked at Agilent Laboratories (formerly Hewlett-Packard) from 1981 until 2003, where he was a principal project engineer specializing in phased-locked loop theory, high-speed clock recovery design, and data coding techniques for fiber-optic data transmission. He has authored numerous professional papers and holds 35 U.S. patents in the areas of high-speed links and circuit design. In particular, Rick was the inventor of the 64b/66b line code adopted by the IEEE for use in 10Gb/s Ethernet.

Linux software

Nrm - "new rm".
A recoverable file delete and undelete program for Linux. Use it to replace your stock 'rm' program to recover deleted files up to three days later.

Pdplot
A public domain re-implementation of Bob Jewett's autoplot X11 graph program. Pdplot takes x,y pairs from standard input, interspersed with optional formatting commands and creates a nicely scaled graph in an X11 window.

Piglet
A public domain re-implementation of HP's Piglet technical drawing editor. Piglet is notable for it's hierarchical definitions of drawings, something that is very rare in PD CAD drawing programs.

Post
A post-processor for Ngspice, Berkeley Spice and HSPICE raw files. Post() provides a shell interface with command line history, and a yacc-based waveform math and measurement language. It is a from-scratch implementation loosely modeled after HP's internal post() tool for plotting and analyzing HPSPICE rawfiles. Post() is in early development, so expect changes in the waveform processing language with each release. Please contact me if you are interested in post() and I'll keep you in the loop about latest releases. This version uses Gnuplot for the graphing engine. This current version lets you load a raw file with ci "rawfile". The basic data type is the piece-wise-linear (PWL) complex waveform. A waveform can be either loaded from a SPICE run, or defined with something like "a={0,0 1,1 2,3+4*i}" You can do math on piece-wise-linear waveforms such as "a=mag(v1+sqrt(5)*v2)" or "deriv=(v2-delay(v2,1u))/1u". (yes, engineering suffix notation is supported in the parser). There are waveform measurement verbs such as "t1=xcrossp(v1,5)", which translates to finding the time of the

fifth positive-going zerocrossing of a waveform "v1". Some interesting features: An RC low-pass filter can be created with "lpf(p1,tau)". Of course a high-pass signal is just "1-lpf(p1,tau)". Post() solves the differential equation for each segment of the PWL and then outputs an anti-aliased uniform-sampled waveform for subsequent processing. You can graph several signals: a,b,c,d on on graph with "gr a,b,c,d", or on two seperate y-axes with "gr a,b;c,d". You can limit the x-axis range with "gr a,b;c,d xl 1 10". Each graph can be similiarly scaled and limited in the yaxis by using the "yl min max" command. Read the HELP file for a current list of functions and commands.

velo

A command line program that takes ASCII data consisting of lines of x,y,z,w coordinates and computes coordinate stepper motor drive pulses for feeding to a 4-axis CNC. Can be used in conjunction with piglet(1) above to do engraving with DXF and Hershey fonts. Simple awk or perl programs can easily machine expeller screws or parabolic surfaces. The program source includes velo(1) the trapezoidal velocity and acceleration constrained optimizer, and feed(1) which sends the encoded step pulses to a simple USB PIC processor for converting to standard step and direction pulses for controlling a stepper driver. The input files to velo(1) can easily be plotted with pdplot(1). A simple awk script can be used to select any two of x,y,z,w to give an orthogonal projection of the toolpath.

bbsim

A bang-bang Phase-locked-loop (PLL) simulator written in C, which allows quick development of design intuition by simulating bang-bang loops under lots of cases quickly...

aplay - "audio playing program".

A pitch-shifting, speed-shifting program to play or loop any desired segment of a cd-format .wav file. Invaluable for musicians to learn licks by playing them at slow speeds, or to learn a song in a different key by pitch-shifting a classic cover tune.

tm - "typemon, monitor keyboard mouse usage and suggest rest breaks"

Tm attempts to reduce repetitive stress injury (RSI) by monitoring mouse and keyboard activity to suggest periodic rest breaks. If the consecutive time of typing or mousing exceeds the user-defined limits, then a warning window pops up advising the user to take a rest break. The window remains until there has been no typing or mousing for the user-defined rest time. A log file ~/.typelog keeps track of the total cumulative typing and mousing times for each day. This data can be plotted in histogram form using the script typehisto. Tm is a graphical tck/tk program written for modern linux kernels. It uses the /proc/interrupts file for keyboard and mouse monitoring, but can be easily modified for other platforms.

Other links

Papers, Talks and Patents

PDF files of papers, public talks, and issued patents.

Carnivorous Plant Database

A taxonomic database of all carnivorous plants (with photos!)

Recent Paintings

Paintings that I've done at the AHA! Center from 2004-present.

Rick Walker
rick_walker "AT" omnisterra.com

Publications , White Papers , Talks and Patents

Publications:

[YWF87]
Yen, C., R. Walker and B. McFarland, **Delay Calculation for Emitter-Coupled Logic Gates - How Fast is HP1X Process?**, Proceedings of the Hewlett-Packard 1987 VLSI Design Technology Conference, May 18-20, 1987, S10.3.1-8.

[WSM87] [clean paper (no figures)] [scanned paper w/figures)]
Walker, R., W. McFarland, C. Stout, C. Yen, **A 46 I/O Package for Prototyping Multi-GHz Circuits**, 1987 HPL Internal Report.

[Wal87] [paper] [figs1] [figs2] [scanned paper w/figs]
Walker, R., **A Monolithic High-Speed Voltage Controlled Ring Oscillator** , Proceedings of the Hewlett-Packard 1987 VLSI Design Technology Conference, May 18-20, 1987, S10.6.1-5.

[CKM88] [paper]
Colinge, J. P., J. Kang, W. McFarland, C. Stout and R. Walker, **Evaluation Results For Several High-Speed SOI CMOS Circuits**, Proceedings of the Hewlett-Packard 1988 VLSI Design Technology Conference, May 23-25, 1988, 356-363.

[Wal88]
Walker, R., **A Monolithic Clock Extraction and Retiming Circuit for Gigahertz Rate Data Links** , Proceedings of the Hewlett-Packard 1988 VLSI Design Technology Conference, May 23-25, 1988, 279.

[WPS89] [paper]
Walker, R., K. Poulton, C. Stout, B. McFarland and J. Kang, **Circuit Optimization Using the Simplex Algorithm**, Proceedings of the Hewlett-Packard 1989 VLSI Design Technology Conference, May 22-24, 1989, 390-397.

[CKM88]
Colinge, J.P., J. Kang, W. McFarland, C. Stout, R. Walker, **Gigahertz CMOS/SIMOX circuits**, SOS/SOI Technology Workshop, 1988. Proceedings., 1988 IEEE.

[WHY89] [paper]
Walker, R. C., T. Hornak, C. Yen and K. Springer, **A Chipset for Gigabit Rate Data Communication**, Proceedings of the 1989 Bipolar Circuits and Technology Meeting, September 18-19, 1989, 288- 290.

[WHY90] [scanned paper]
Walker, R. C., T. Hornak, C. Yen, J. Doernberg and K. Springer, **A 1.5 Gb/s Link Interface Chipset For Computer Data Transmission**, HP Laboratories Technical Report HPL-90-105(July 1990).

[LaW90]
Lai, B. and R. Walker, **A Monolithic 622 MBit/s Clock Extraction Data Retiming Circuit**, Proceedings of the Hewlett-Packard 1990 VLSI Design Technology Conference, May 22-25, 1990, 237-244.

[DMW91]
Doernberg, J., W. McFarland, R. C. Walker and T. A. Knotts, **Rapid Techniques to Beat the Competition, An 8-week, 1.5 Gwords/s, PRWS IC Design**, Proceedings of the Hewlett-Packard 1991 VLSI Design Technology Conference, May 21-24, 1991 , 249-256.

[LaW91] [paper]
Lai, B. and R. Walker, **A Monolithic 622 MBit/s Clock-Extraction Data Retiming Circuit**, ISSCC Digest of Technical Papers 34 (February 13-15, 1991), 144-145.

[WHY91] [paper]

Walker, R. C., T. Hornak, C. Yen, J. Doernberg and K. H. Springer, **A 1.5 Gb/s Link Interface Chipset For Computer Data Transmission**, IEEE Journal on Selected Areas in Communications 9, 5 (June 1991).

[Wal92a] [thesis]
Walker, R. C., **The Design and Implementation of a Chipset for Gigabit/Second Computer Networks**, Graduate Thesis for Master of Science in Computer Science, California State University, Chico CA. Summer 1992, 1-51.

[Wal92b] [scanned paper]
Walker, R. C., **Bang-Bang Loop Analysis**, Hewlett- Packard Journal, October 1992, 110.

[WWS92] [paper]
Walker, R., J. Wu, C. Stout, B. Lai, C. Yen, T. Hornak and P. Petruno, **A 2-Chip 1.5Gb/s Bus-Oriented Serial Link Interface**, ISSCC Digest of Technical Papers 35(February 19-21, 1992).

[WSL92]
Walker, R., C. Stout, B. Lai, C. Yen, T. Hornak and P. Petruno, **A 2-Chip 1.5Gb/s Bus-Oriented Serial Link Interface** , Proceedings of the Hewlett-Packard 1992 VLSI Design Technology Conference, May 19-22, 1992, 85-91.

[WSW92] [paper]
Walker, R. C., C. L. Stout, J. Wu, B. Lai, C. Yen, T. Hornak and P. T. Petruno, **A 2-Chip 1.5 Gigabaud Serial Link Interface**, IEEE Journal of Solid State Circuits 27, 12 (December 1992), 1805-1.

[LaW92]
Lai, B. and R. C. Walker, **Monolithic Chip Retimes Data at 622 Mb/s**, Microwaves & RF, March 1992, 202-205.

[MWS92] [paper]
McFarland, W., R. Walker, C. Stout, J. Wu, B. Lai, G. Kwan and C. Yen, **HP's Link Interface Chipset for Serial-HIPPI**, Compcon Proceedings, February 24-28, 1992.

[YWP92] [scanned paper]
Yen, C., R. C. Walker, P. T. Petruno, C. Stout, B. W. H. Lai and W. J. McFarland, **G-Link: A Chipset for Gigabit-Rate Data Communication**, Hewlett- Packard Journal, October 1992, 103-109, 111-116.

[LWS92]
Lai, B., R. Walker, C. Stout, J.T. Wu, **A 1.5 GBaud/sec Serial Link Monolithic Chip Set**, Microwave Conference, 1992. 22nd European, Volume: 1.

[YWM92] [paper]
Yen, C., R. Walker, W. McFarland, D. Cunningham, G. Kwan, T. Hornak, **Serial Extension for 800/1600 Mb/s Computer Interconnect** , Supercomm ICC 14-18 June, 1992, 981-4 vol.2.

[YWS92] [paper]
Yen, C., R. Walker, C. Stout, B. Lai, J. Wu, **A General Purpose Link Interface Chipset for Gigabit Rate Data Communication**, IEEE Conference 6-9 Dec. 1992, 197-200 vol.1

[TeW92] [paper]
Teetzel, A. and R. Walker, **A GaAs IC Broadband Variable Ring Oscillator and Arbitrary Integer Divider** , Trans. MTT Symposium, December 1992.

[WuW92] [paper]
Wu, J. and R. C. Walker, **A Bipolar 1.5 Gb/s Monolithic Phase-Locked Loop for Clock and Data Extraction**, Symposium on VLSI Circuits Digest of Technical Papers, June 1992, pp. 70-71.

[HGM93]
Hornak, T., A. Grzegorek, B. McFarland, R. Walker, S. Willingham **Image Rejection Improvements in Superheterodyne Radio Receivers by Time Sharing,** HP Laboratories Technical Report, HPL-93-53, June, 1993, pp 1-56.

[WFW93] [paper]
Wuppermann, B., B. Fox, R. Walker, S. Atkinson, D. Budin, C. Lanzl and S. Bleiweiss, **A 16-PSK Modulator with Phase Error Correction** , ISSCC Digest of Technical Papers 36, 27 (February 24-25 1993), 138-139.

[HMW94]

Hornak, T., B. McFarland, R. Walker **Quadrature Mixers with Improved Gain Matching and Single Phase Local Oscillator Signal,** HP Laboratories Technical Report, HPL-94-80, August, 1994, pp 1-56.

[YTW94]
Young, I.A., S.S. Taylor, R.C. Walker **INTRODUCTION TO THE SPECIAL ISSUE**, IEEE Journal of Solid-State Circuits 29(12):1412-1414, November 1994.

[WSY97] [paper]
Walker, R. C., C. Stout, C. Yen and L. R. Dove, **A 2.488-Gbit/s Silicon Bipolar Clock and Data Recovery Circuit for SONET Fiber-Optic Communications Networks** , Hewlett-Packard Journal, December 1997, 111-119.

[WSY97a] [paper] [pdf slides]
Walker, R.C., C. Stout, C. Yen, **2.488 Gb/s Si-Bipolar Clock and Data Recovery IC with Robust Loss of Signal Detection**, ISSCC Digest of Technical Papers 40 (February 1997), 246,247,466.

[WSY97b] [paper]
Yen, R. W. C. S. C., **A 2.488 Gb/s Si-Bipolar Clock and Data Recovery IC with Robust Loss of Signal Detection**, HP Design Conference Digest of Technical Papers 40(May 23, 1997).

[WHK98] [paper] [pdf slides]
Walker, R. C., K. Hsieh, T. A. Knotts and C. Yen, **A 10Gb/s Si-Bipolar TX/RX Chipset for Computer Data Transmission** , ISSCC Digest of Technical Papers 41(February 1998), 302,303,450.

[Wal03] [preprint]
Walker, R.C., **Designing Bang-bang PLLs for Clock and Data Recovery in Serial Data Transmission Systems**, pp. 34-45, a chapter appearing in "Phase-Locking in High-Performance Sytems - From Devices to Architectures", edited by Behzad Razavi, IEEE Press, 2003, ISBN 0-471-44727-7.

White Papers:

[Wal00]
Walker, R., **"A monolithic calibration technique for precise multi-phase clock generation"**, Agilent Labs Patent Disclosure, February 25, 2000. (See patent application [Wal03c], below)

[Wal01a]
Walker, R., **"A tuneable 40Gb/s CDR with jitter stimulus/response designed for fast-track implementation in Agilent test equipment (draft)"**, Agilent Labs Internal Memo, May 23, 2001.

[Wal09a]
Walker, R., **"PBUS+, A flexible network for factory control"**, Project Report, February 2, 2009. "A simple RS485 network is implemented for factory control using Microchip PIC processors for $5/node".

[Wal09b]
Walker, R., **"Watchdog"**, Project Report, February 23, 2009. A Hardware device for alerting operators to a firmware-lockup condition in a Czochralski crystal growth furnace.

[Wal09c]
Walker, R., **"Czochralski Process Development and Control with Dsim"**, Project Report, March 23, 2009. "A simple timestep-based simulation of a Czochralski Crystal Growth Control Algorithm is presented".

[Wal09d]
Walker, R., **"A High-Efficiency Control Algorithm for Electric Vehicles"**, Project Report, June 15, 2009. "It is shown that a substantial efficiency gain can be achieved by dynamically limiting the duty cycle of the motor controller based on RPM to force the system to avoid the low efficiency regime".

[Wal11a]
Walker, R., **"Baseline tracking and touch detection"**, Project Report, May 20, 2011. Outlines an algorithm for Baseline tracking and touch detection for a prototype optical touch screen.

[Wal11b]
Walker, R., **"Photocurrent signal to noise ratio"**, Project Report, May 23, 2011. Analyzes the noise of a photdiode signal using both transimpedance and switched integrator amplifier circuits.

[Wal11c]
Walker, R., **"A single-inductor multiple-output buck-boost converter"**, Project Report, July 20, 2011. Presents a novel multi-voltage converter that requires a single inductor to generatre an arbitrary number of regulated output voltages.

[Wal12]
Walker, R., **"Encrypted Product Sequence Numbers"**, Project Report, October 15, 2012. Putting a sequential number in a product can leak build volumes to competitors. This report presents a scheme using the skipjack32 encryption system to create a random permutation of sequence numbers based on a secret 80 bit key. The code allows a sequential factory build number to be converted into a random product ID for public perusal, and then later converted back to the original sequence number by product support.

[Wal13b]
Walker, R., **"Reflection and Transmission Coefficient"**, Project Report, April 22, 2016, Searching for "reflection coefficient" yields immediate results. However, the transmission coefficient is rarely mentioned. In any practical problem involving scattering of waves in non-uniform structures, it is important to be able to calculate both the forward and reverse waves at each scattering site. Although many engineers take the reflection coefficient as a given, it is instructive to note that the expression is uniquely determined by just two principles. These are 1) voltage continuity at the scattering boundary, and 2) conservation of power between the incident wave and the two scattered waves.

[Wal16]
Walker, R., **"Mutual Inductance of Collinear Solenoids"**, Project Report, July 29, 2016, "Efficient and accurate approximations to solenoidal inductance exist. By breaking a given solenoid into two pieces, it is possible to compute the mutual coupling between two adjacent solenoids. Breaking a solenoid into three segments, it is possible to bootstrap the process to calculate the coupling between all three segments. From this it possible to create an accurate model for either an arbitrarily tapped inductor, or two collinear solenoids separated by an arbitrary gap."

Talks:

Tutorials and Short Courses

[Wal97]
Walker, R., **Clock and Data Recovery for Serial Data Communications**, ISSCC Tutorial, February 1997. (Wal98, Wal02a are successively updated versions).

[Wal98] [cdr checklist and references]
Walker, R., **Clock and Data Recovery for Serial Data Communications (with a tutorial on Bang-Bang Loop design)**, BCTM Tutorial, September 27 1998. (Wal02a is an updated version).

[Wal02a] [mp3 audio file (40Meg)]
Walker, R. C. **Clock and Data Recovery for Serial Data Communications, focussing on bang-bang CDR design methodology**, ISSCC Short Course, February 2002.

IEEE802.3 10 Gigabit Ethernet Presentations

[Wal99b]
R. C. Walker, **10GbE over coaxial cable,** prepared for IEEE 802.3 High Speed Study Group, July 6-7, 1999, Montreal, PQ.

[WaD99]

R. C. Walker, R. Dugan **Low overhead coding proposal for 10Gb/s serial links,** IEEE 802.3 High Speed Study Group, November 9-10, 1999, Kauai, HI.
http://grouper.ieee.org/groups/802/3/ 10G_study/public/nov99/walker_1_1199.pdf

[WaD00]
R. C. Walker, R. Dugan **64b/66b low-overhead coding proposal for serial links,** IEEE 802.3 High Speed Study Group, January 18-20, 2000 Dallas, TX.
http://grouper.ieee.org/groups/802/3/10G_study/public/jan00/walker_1_0100.pdf

[WAK00]
Rick Walker, Birdy Amrutur, Tom Knotts, Richard Dugan, **64b/66b coding update,** IEEE 802.3 High Speed Study Group, March 7-8, 2000, Albuquerque, NM.
http://grouper.ieee.org/groups/802/3/ae/public/mar00/walker_1_0300.pdf

[WDA00]
Rick Walker, Richard Dugan, Birdy Amrutur, John Ewen, Rich Taborek, Don Alderrou, Howard Frazier, Paul Bottorff, Brad Booth, Kevin Daines, Osamu Ishida, **64b/66b PCS,** 802.3 High Speed Study Group, May 23-25, 2000, Ottowa, Ontario, Canada. (Final presentation to IEEE as accepted for the "blue book" draft standard).
http://grouper.ieee.org/groups/802/3/ae/public/may00/walker_1_0500.pdf

[ThW01]
Pat Thaler, Rick Walker **An optimized self-test function for 64b/66b** 802.3 High Speed Study Group, March 12, 2001, Hilton Head, South Carolina.
http://grouper.ieee.org/groups/802/3/ae/public/mar01/thaler_1_0301.pdf

Optical Internetworking Forum Presentations

[WaD01]
R. C. Walker, R. Dugan, **SFI-4 Phase 2 Interface using the 64b/66b Line Code** Optical Internetworking Forum, Contribution OIF2001.586, November 6-8, 2001, Frisco, Texas.

[WDL02]
R. C. Walker, R. Dugan, Allan Lui **SFI-4 Phase 2: 64b/66b Line Code Update** Optical Internetworking Forum, Contribution OIF2002.018.00, January 28-30, 2002, San Diego, CA.

Industry trends

[Wal99]
R. C. Walker, **Tb/s Chip I/O - how close are we to practical reality?**, 10th Annual Workshop on Interconnections within High Speed Digital Systems, May 9-12, 1999, Santa Fe, New Mexico.

Philosophy

[Wal01 (pdf slides)] [mp3 audio file 14Meg]
Rick Walker, **Conciousness, Communication and Cooperation - in brains, bodies, businesses and biospheres,** A chalk talk presented at Agilent Labs, Palo Alto, CA, June 29, 2001. Present the philosophical underpinnings of, and a model of human conciousness based on quantum computation and eastern thought.

Patents:

[McW88]

McFarland, W. and R. C. Walker, **Pseudo-Random Word Sequence Generator and Synchronizer,** U.S. Patent (1) #4791653, December 13, 1988.

[Wal89]
Walker, R. C., **A Fully Integrated High-Speed Voltage Controlled Ring Oscillator,** U.S. Patent (2) #4884041, Nov. 28, 1989.

[CHN90]
Corsetto, C., T. Hornak, R. Nordby, R. C. Walker and C. Yen, **Phase Locked Loop for Clock Extraction in Gigabit Rate Data Communication Links,** U.S. Patent (3) #4926447, May 15, 1990.

[LaW91]
Lai, B. and R. C. Walker, **Method and Apparatus for Clock Recovery and Data Retiming for Random NRZ data,** United States Patent (4) #5012494, April 30, 1991.

[WaB91]
Walker, R. C. and H. Braun, **Device to block unauthorized modem access over a PBX line,** United States Patent (5) #5018190, May 21, 1991.

[CHH91]
Crandall, D., S. R. Hessel, T. Hornak, R. Nordby, K. H. Springer, C. Corsetto, **DC- Free Line Code for Arbitrary Data Transmission,** United States Patent (6) #5022051, June 4, 1991. (note: due to a filing error my name was left off this patent, it was never corrected. See USP #5438621 below for an expanded filing of the same title).

[DWM92]
Domokos, J., R. C. Walker and W. J. McFarland, **High Frequency Common Mode Choke,** United States Patent (7) #5138287, August 11, 1992.

[CHH95]
Crandall, D., S. R. Hessel, T. Hornak, R. Nordby, K. H. Springer, C. Corsetto and R. C. Walker, **DC-Free Line Code for Arbitrary Data Transmission,** United States Patent (8) #5438621, August 1, 1995.

[LaW96]
Lai, B. and R. C. Walker, **Unity Gain Positive Feedback Integrator with Programmable Charging Currents,** U.S. Patent (9) #5498992, March 12, 1996.

[HGM97]
Hornak, T., A. Z. Grzegorek, W. J. McFarland, R. C. Walker and S. D. Willingham, **Modulation and Frequency Conversion by Time Sharing,** United States Patent (10) #5678222, October 14, 1997.

[KSW98]
Knotts, T., Stout, C., Walker, R. C., **Fully Integrated High-Speed Interleaved Voltage-Controlled Ring Oscillator,** United States Patent (11) #5841325, November 24, 1998.

[WuW00]
Wu, Bin, R. C. Walker, **Oversampling Rotational Frequency Detector,** United States Patent (12) #6055286, April 25, 2000.

[BGW01]
Blalock, Travis, N. Gaddis, R. Walker, **Analog pixel drive circuit for an electro-optical material-based display device,** United States Patent (13) #6249269, June 19, 2001.

[WBG01]
Walker, Richard C., Travis N. Blalock, Neela B. Gaddis, **Electro-optic material based display device having analog pixel drivers,** United States Patent (14) #6329974, December 11, 2001.

[WAD01a]
Walker, Richard C., B. Amrutur, R. Dugan, **Coding for packetized serial data,** European Patent Application EP1133124A2, Sept. 12, 2001.

[WAD01b]
Walker, Richard C., B. Amrutur, R. Dugan, **64b/66b decoding for packetized serial data,** European Patent Application EP1133123A2, Sept. 12, 2001.

[WMB01]
Walker, Richard C., P. Mertz, B. Bronson, K. Nishimura, **Personal viewing device with system for providing information to a connected system,** European Patent Application EP1132870A2, Sept. 12,

2001.

[Wal02b]
Walker, Richard C., **Method and system for compensating for defects in a multi-light valve display system,** United States Patent (15) #6359662. March 19, 2002.

[WAM01]
Walker, Richard C., Bharadwaj Amrutur, Peter Mottishaw, Steven C. Joiner, Larry A. Chesler, Ian Hardcastle, **Network monitoring system with built-in monitoring data gathering,** European Patent Application EP1152570A2, November 7, 2001.

[WaT01]
Walker, Richard C., Patricia A. Thaler, **Data Communication System with Self-Test Function,** European Patent Application EP1241823A1, March 6, 2002.

[WMT01]
Walker, Richard C., Pierre Mertz, Barclay J. Tullis, **Immersive Display System,** European Patent Application EP1152279A2, Sept. 12, 2001.

[HFW02]
Ho, Peter, Graham M. Flower, Richard C. Walker, **Multiplexer with channel sectioning, selectively actuated current sources, and common-base amplifiers** European Patent Application EPEP1187382a2, March 13, 2002.

[Wal02c]
Walker, Richard C., **System and method for encoding an input data stream by utilizing a predictive, look-ahead feature,** United States Patent (16) #6501404. December 31, 2002.

[Wal03b]
Walker, Richard C., **Immersive Display System,** United States Patent (17) #6552698. April 22, 2003.

[AmW03]
Amrutur, Bharadwaj S., Richard C. Walker, **Serial communications system and method,** European Patent Application EP1320208A2, September 30, 2002.

[Wal03c]
Walker, Richard C., **Multi-phase sampling** United States Patent Application #20030123591. July 3, 2003.

[WAD03d]
Walker, Richard C., B. Amrutur, R. Dugan, **Decoding method and decoder for 64b/66b coded packetized serial data,** United States Patent (18) #6650638. November 18, 2003.

[WAD04a]
Walker, Richard C., B. Amrutur, R. Dugan, **Coding method and coder for packetized serial data with low overhead,** United States Patent (19) #6718491. April 6, 2004.

[HWM04]
Helbing, Rene P., Walker, Richard C., Mertz, Pierre, Bronson, Barry, Nishimura, Ken A., **Personal viewing device with system for providing identification information to a connected system,** United States Patent (20) #6735328. May 11, 2004.

[HFW04]
Ho, Peter, Graham M. Flower, Richard C. Walker, **Multiplexer with channel sectioning, selectively actuated current sources, and common-base amplifiers,** United States Patent (21) #6760349, July 6, 2004.

[SNW04]
Seet, Adrian Wan-Chew, Ken Nishimura, Richard C. Walker, **Adaptive decoder for skin effect limited signals,** United States Patent (22) #6760551, July 6, 2004.

[WBN04]
Walker, Richard C., Travis N. Blalock, Neela B. Gaddis, **Electro-optical material-based grey scale generating method ,** United States Patent (23) #6795064, September 21, 2004.

[WaT05]
Walker, Richard C., Patricia A. Thaler, **Data communication system with self-test facility,** United States Patent (24) #6862701, March 1, 2005.

[WMT05]

Walker, Richard C., Pierre H. Mertz, Barclay J. Tullis, **Immersive Display System,** United States Patent (25) #6870520, March 22, 2005.

[WAM05]
Walker, Richard C., Bharadwaj Amrutur, Peter Mottishaw, Steven C. Joiner, Larry A. Chesler, Ian Hardcastle, **Network monitoring system with built-in monitoring data gathering,** United States Patent (26) #6975617, December 13, 2005.

[Wal06]
Walker, Richard C., B. Amrutur, R. Dugan, **Coding method for coding packetized serial data with low overhead,** United States Patent (27) #7055073 May 30, 2006.

[AmW07]
Amrutur, Bharadwaj S.,Walker, Richard C., **Serial communications system and method,** United States Patent Application () #20070168835 July 19, 2007.

[Wal07]
Walker, Richard C., **Multi-phase sampling** United States Patent (28) #7221723. May 22, 2007.

[Wal12a]
Walker, Richard C., **Apparatuses, systems, and methods for facilitating optical communication between electronic devices,** United States Patent Application () #20120141132, June 7, 2012

[Wal13]
Walker, Richard C., **Apparatuses, systems, and methods for facilitating optical communication between electronic devices,** United States Patent (29) #8403571, March 26, 2013.

[KOT13]
Jeffrey King, Tim Orsley, Rick Trutna, Richard Walker, **Optical Touch-Screen Systems And Methods Using A Planar Transparent Sheet,** United States Patent Application () #20130135258 , May 30, 2013.

[GMW13]
Brian Jeffrey Galloway, Joseph Peter Manca, Richard Clayton Walker, **Receiver optical assemblies (ROAS) having photo-detector remotely located from transimpedance amplifier, and related components, circuits, and methods,** European Patent Application EP13783457.8, October 16, 2013.

[Wal14]
Walker, Richard C., **Integrated circuit for facilitating optical communication between electronic devices,** United States Patent (30) #8824838, September 2, 2014.

[KPW15]
Jeffrey King, Dragan Pikula, Richard Walker, **Robust Optical Touch - Screen Systems And Methods Using A Planar Transparent Sheet,** United States Patent (31) #9046961, June 2, 2015.

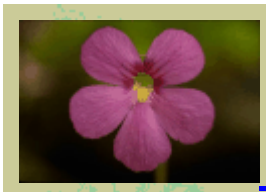
[KOT15]
Jeffrey Stapleton King, Timothy James Orsley, William Richard Trutna, Richard Clayton Walker, **Optical Touch - Screen Systems And Methods Using A Planar Transparent Sheet,** United States Patent (32) #9213445, December 15, 2015.

[CTW15]
Mathieu Charbonneau-Lefort, Willam Richard Trutna, Richard Clayton Walker, Michael John Yadlowski, **Optical Engines and Optical-Cable Assemblies Capable of Low-Speed And High-Speed Optical Communication,** United States Patent (33) #9225423, December 29, 2015.

[CTY16]
Mathieu Charbonneau-Lefort, Richard Clayton Walker, Michael John Yadlowski, **Optical Engines and Optical-Cable Assemblies having Electrical Signal Conditioning,** United States Patent (34) #9497525, November 15, 2016.

[Wal18]
Richard Clayton Walker, **Methods, Circuits and Optical Cable Assemblies for Optical Transmission of High-Speed Data and Low-Speed Data,** United States Patent (35) #9882651, January 30, 2018.

Rick Walker
rick_walker "AT" omnisterra.com



Carnivorous Plant Database

You are visitor # **447435** since **02/18/10 11:29:17,** The last update was done **Jan 27 2015**.

This taxonomic portion of this database was compiled by Jan Schlauer and includes over 3000 entries giving an exhaustive nomenclatural synopsis of all Carnivorous Plants. If you'd like to join the list of database contributors please take a look at the image submission guidelines.

Entries which are currently recognized and accepted here are shown in the database in **boldface** . For some entries, pictures or other information is available, by clicking on highlighted descriptions in the entry.

Enter a search pattern in the box below. All entries in the database that contain that pattern will be printed. Take care that you don't type a trivial string or your response may be quite large! If you have never used this system before, you might like to take a look at a definition of the database entry format. If your browser doesn't have FORMS capability, then try this Text-based interface.

Reset Query: Submit

- (•) show **all** matching entries, including synonyms, cultivars, and common names
- ( ) show only **accepted** names
- ( ) show only **cultivar** names

Other links:

[Show me the Photos!]	[Slide Shows]	[CP FAQs]	[Listserv discussion group]	[CP Societies]	[Plant Trading Post]	[Other CP Pages]

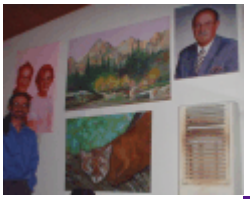
Or check out the International CP Society web ring:

Previous Site	ICPS Webring	Next Site

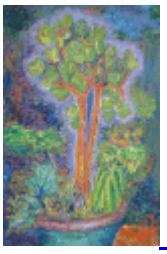
Photos, artwork, monographs, conservation studies, or any other CP information are all welcome for inclusion in the database. Contact Rick Walker if you would like to use this database for distributing your data to the CP community!

Rick Walker
rick_walker "AT" omnisterra.com

Rick Walker's Paintings

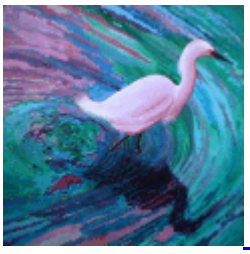

"in the living room" Here are some paintings that I've done recently. I helped ToeKnee Stanger do some of the mural painting at the AHA! Center, and he gave me some tips on how to work with paint. These are my efforts to practice what he showed me. The paintings are presented in chronological order. Click on the thumbnail for a bigger version.


"Clearing" An exercise in layering. canvas 28"x42". Latex House paint + Acrylic highlights. Sponge, roller, brush. March, 2004.

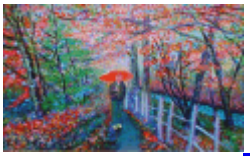

"Noah's Ark" A pot of 12 different succulent plants given to me by my next door neighbor, Mr. Shipley, when I was five years old. This painting had some finishing touches from Alicia Lind during a shared painting session. Acrylic on canvas, 24"x36".


"TaiChi Dream" A butterfly I first saw at Joe Deisher's Tai Chi camp in Mendocino, CA. 34"x25.5" acrylic on canvas.


"Lion of Judah" This is a painting done from a newspaper photo of a mountain lion that strayed into residential Palo Alto. He was shot by a police officer seconds after the photo was taken. 34"x25.5" acrylic/oil on canvas.


"Bolsa Chica Egret" 4'x4' acrylic on stretched canvas. From a photo taken by my sister Wendy, an avid birder. 
"Goat on Bald Mountain"

From a picture by my sister, Kristen, taken in near Yellowstone National Park. This picture reminds me of a gruelling climb that our family made to the top of Mt. Baldy in southern California. 18"x27" acrylic on canvas.


"Back from the Cross"

From a photo of Sherry's brother taken in a garden in Japan. Sherry is the caretaker of the AHA! center's garden. Finished early January, 2005. 18"x27" acrylic on canvas.


"Balance" Acrylic on canvas, 24"x36". Inspired by the pen and ink drawing on the last inner page of the Whole Earth Catalog, "Dragon Steamboat" (1971) by Gurney Norman. During the time this painting was being worked on, some comments I received were: "they are just playing with each other", "those daemons", "two dragons", "fiercely struggling in a battle of life and death", etc. It is fun to see how a simple symbol can be interpreted all the way from "kid's playing" (do adults ever play?) to "death struggle". Finished middle January, 2005.


"Selvakumar" Acrylic on canvas, 18"x27". Standing there is mama Sangeeta, and those are her three boys. The one seated is Dinakaran. When the tsunami hit, Sangeeta tragically realized that she could only carry two of her boys. She picked up the two youngest and left seven-year-old Dinakaran, hoping he could run fast enough. She made it to safety, but was grief-stricken because Dinakaran had misunderstood and ran in the wrong direction - to the family's beachfront cabin. The dog, named Selvakumar, chased after the boy, pulled him out of the hut by his collar, and nudged and nipped him to safety. Good dog! Sangeeta's brother-in-law gave her the puppy, following the birth of her second son. When the brother-in-law died in an accident two years ago, they changed the dog's name to his. "Selva" means "riches" or "money". "Kumar" means "boy". Together, you get something like: "person-of-wealth" - a common name in South India. The painting is from a news photo, and is still not quite finished here. February 11, 2005.


"bubbles" Acrylic on canvas, airbrush and roller, 24"x36". Maybe lots of the same things the dragons were playing with. February 20, 2005.


"with Amos and Martha" 
"Amos and Martha" Acrylic on canvas base finished out with water-based oils. 24"x36". My Mother's Father and Mother. The painting is from wallet-sized print, and is still not quite finished here. I need to let it hang on the wall for a while to really see what needs adjustment... In particular, the clothes are left at just the raw acrylic base-coat stage. I'll have to decide if I like the rustic look, or whether I should finish them to the same detail as the faces. First posted March 2, 2005,, an update posted April 19, 2005, which had lots of work on Martha and some softening of the colors in the clothes. The current version posted November, 2014.

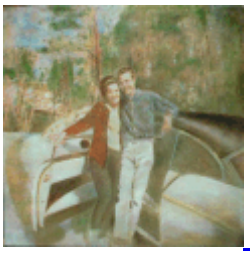

"A view of the Tetons" Acrylic base on canvas finished out with water-based oils with walnut oil medium. 28"x42". This is a copy of a print of Robert Wood's "in the Tetons", which hung over our television at home. The sky is white house paint colored pink with several shades of acrylic paints, then over brushed with blue/lavender house paint thinned with acrylic medium. All the rest is oil paint. the wet canvas. "First version" posted March 18, 2005. Current version posted November 2014.


"Larry Walker" 
"Any resemblance?" My Father. Background is latex housepaint and acrylic applied on canvas with a roller. A thin sizing of walnut oil and turpentine prepares the ground. The rest of the image is done with water-based oils in thin layers using walnut oil for long drying time and Grumbacher "quick dry" medium for layering. The glasses shrunk the eyes by 20% in the original photo so I used the GIMP photo editor correct them and to remove the reflections in the glass. April 19, 2005. 20"x24".

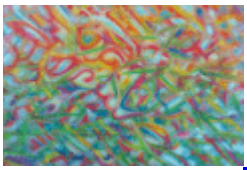

"Banjo Player" A self portrait, about age 16, based on a set of B&W photos taken during a summer job at Bill Cheney's photo studio in Escondido, CA. The final image is a GIMP photo-montage of 4 different negatives: face, body, legs, banjo. I did the inital roughing-in using a video projector. The face was blocked-in using xerox transfer and then overpainted. The background and figure base are acrylic. The first version was posted June 4, 2005 and only has one layer of overpainting in water-based oils. I expect another

4 or 5 layers to be required before the painting is complete. 24"x30". The current version was posted November 2014.


"Wizard of OZ" Joe Deisher. My good friend and taichi teacher. He sits here taking a break and reviewing the books, keeping everything organized. Stretched canvas 8"x10". This is my first gum-bichromate print. Photo taken by Kevyn Warnock at Joe's annual taichi camp at OZ ranch near Point Arena, CA circa 2003. The RGB color separations were made using the linux GIMP photo editor and printed on an HP laser printer. I printed Magenta using the G negative, Yellow with B negative and Cyan with the Red negative. Five minute exposures were made through white xerox paper using the noontime sun. Each layer was developed by floating the canvas for 30 minutes in a tray of water. Finished sometime around July 4, 2005.


"Spring Snow in San Gabriel" A picture of my parents taken (I am guessing) in the San Gabriel Mountains of Southern California. The car is my Dad's 1957 Chevy. I can remember riding in the shelf of the back seat, laying on my back and seeing the stars through the window. Sort of like one those little bobble-headed dog mascots. The canvas was treated with Golden porous watercolor gesso and the initial image was created with a three-color gum-bichromate separation. This photo shows the picture after about two layers of water-based oil paint retouching. 20"x20" stretched canvas. July 24, 2005.


"Sisters at Hart Canyon" My two sisters, Wendy left and Kris right. Dressed for a Rendezvous in Hart Canyon with muzzle loading rifles amidst oaks and pines. Probably two more overpainting sessions before I'll be happy with the expressions. Acrylic underpainting with waterbased oils, 24"x36" stretched canvas. August 16, 2006.


"Abstract" This started out as a painting of bamboo shadows and then turned into an attempt to increase constrast and saturation while still keeping the shapes and patterns "interesting". It was painted, and can be displayed, in all 4 orientations. I see lots of interesting shapes: horses, humans, crabs, bunnies, birds, and so on. It proves that the unconcious is constantly expressing itself whether we are conciously controlling it or not. Stretched canvas.

 "Milo" My cat Milo. He would sit and listen to guitar lessons when Michele Duva would visit. Michele wrote a book about him titled "Waiting for Dawn" and this image became the cover. Stanford developed the grassy field next to my house, driving out all the native rodents. Their attempt to control the situation led to Milo eating a poisoned blue-jay. He died three days later from kidney failure. This is his memorial picture. Multimedia on 2'x2' masonite panel.

 "Yosemite Church" Just a sketch of the Church in Yosemite valley. Maybe I'll paint some more on it later. Multimedia on 2'x2' masonite panel.

 "Desert Fox" A desert fox. Looks pretty happy. Originally was 2'x2' masonite panel, but Chia-Lin said he looked "cramped". I then extended the composition on both sides with wooden framing, more masonite, spackling and lots of blending. Now he has room to run. Still a sketch. Maybe I'll paint some more later.

 "a pair of Taichi Masters" Joe Deisher and Jane Yao. This was from a photo of them sitting at San Francisco airport just prior to me leaving with Jane for the November 2007 World Cup TaiChi competition. Multimedia on Stretched 22"x28" Canvas.

 "Zelda" My dear Aunt Zelda from a photo taken a few months before she passed. She's in a wheelchair at the nursing home. My cousin David has put a hat on her to protect her from the sun. To me, she has the expression of a buddha. Making the best of life and enjoying the visit with family and friends. Just looking in her eyes, I can remember all the happy times we shared together as I was growing up. Multimedia on 2'x2' masonite panel.