Index

Editor's Note: Except for commonly used phrases and abbreviations, topics are indexed by their noun names. Many topics are also cross-indexed. The names of software programs are italicized.

The letters "ff" after a page number indicate coverage of the indexed topic on succeeding pages.

A separate Project Index and Author Index follow the main index.

1-Wire: 14.4
4nec2 by Arie Voors: 21.21
555 timer IC: 3.55
8-level vestigial sideband (8-VSB): 8.11
802.11 network: 4.29

A

A index: 19.12
AADE Filter Design and Analysis: 11.26
Abbreviations list: 22.62
Absorption: 19.2
  Atmospheric: 19.23
  D-layer: 19.13
  MF: 19.32
Absorption Glass Mat, battery (AGM): 7.44
Absorption wavemeter: 25.10
AC circuit models: 5.14ff
AC component: 25.1, 25.8
AC coupling: 3.28
  Oscilloscope: 25.11
AC ground: 3.29
AC measurements: 25.8
  Average: 25.8
  Frequency response: 25.9
  Oscilloscope: 25.9
  Peak, peak-to-peak: 25.8
  RMS: 25.8
  RMS, true-RMS: 25.8ff
AC power: 7.2ff
AC-DC power conversion: 7.4
  Comparison of rectifier circuits: 7.7
  Filter, capacitive and inductive: 7.5
  Full-wave bridge and center-tap rectifier: 7.6
  Half-wave rectifier: 7.5
  Ripple: 7.4
AC-line filter: 27.23
Accuracy: 25.2
Active filter: 3.46, 11.18ff
  Design tools: 11.22
Adaptive compression: 16.4
Adaptive filter (DSP): 15.17
Adcock antenna: 21.69
Adjacent channel rejection: 25.32
Adjacent-channel power: 8.21
Admittance (Y): 2.47
Advanced Circuits (PCB vendor): 6.16
Advanced Design System (*ADS*): 6.10
AF (*see* Audio Frequency)
AGC (*see* Automatic gain control)
Airmail: 16.26
Alias: 15.7
Aliasing
  Digital oscilloscope: 25.13
Alignment tools: 23.6, 23.24
Alternating current (AC): 2.15
  Average values: 2.21
  Frequency: 2.16
  Fundamental: 2.16
  Harmonic: 2.16
  Instantaneous values: 2.19
  Non-sinusoidal measurements: 2.21
  Peak and peak-to-peak values: 2.20
  Peak envelope power (PEP): 2.21
  Peak power: 2.20
  Period: 2.16
  Periodic waveform: 2.16
  Phase: 2.17
  Root-mean-square (RMS): 2.20
  Waveform measurements: 2.21
  Waveforms: 2.15
Alternator: 2.16
Alternator whine: 27.37
Aluminum
  Alloy types and specifications: 22.41
  Tubing sizes: 21.34
AM (*see* Amplitude modulation)
Amateur Radio
  American Radio Relay League (ARRL): 1.1
  Call sign: 1.6
  Contesting: 1.12
  Direction finding: 1.17
  DXing: 1.13
  Getting on the air: 1.10
  In the classroom: 1.19
  License: 1.5
  Log (on-air activity): 1.9
  Mobile operating: 1.16
  Modes: 1.10
  Operating awards: 1.14
  Public service: 1.18
  QRP (Low power operating): 1.15
  QSLs: 1.14
  Resources: 1.20
  Rules and regulations: 1.2
  Satellites: 1.15
  Study guides: 1.4
  VHF, UHF, microwave: 1.16
Amateur Radio Emergency Service (ARES): 1.18
Amateur television (ATV): 8.18
  8-VSB: 8.19
  Digital: 8.19
  DVB-S: 8.19
  NTSC channel: 8.18
  Remote sensing: 14.11
AMBE vocoders: 16.28, 16.31, 18.14
American Radio Relay League (ARRL): 1.1, 1.6
Ammeter: 25.2

Ammeter, RF: 25.19, 25.45
Ampere (A): 2.2
Ampere-hours (Ah): 2.11
Amplification: 3.1
  Linear: 17.2
Amplifier: 3.1
  Bode plot: 3.3
  Buffer: 3.40
  Class: 3.29, 5.16, 17.2, 17.7ff, 17.31
  Classes of operation: 13.26
  Common-emitter/base/collector: 3.31, 3.32
  Configuration: 3.29
  Cutoff (corner) frequency: 3.5
  Dynamic range: 3.2
  Emitter-follower (EF): 3.31
  Feedback: 5.17
  Field-effect transistor: 3.36
  Frequency response: 3.2, 3.28
  Gain: 3.2
  Half-power frequency: 3.5
  High-frequency model: 3.29
  Hybrid: 13.27
  Input impedance: 3.33
  Large-signal model: 3.29
  Limiter: 3.5
  Linear: 13.26ff, 17.2
  Load line: 3.32
  Log: 3.5
  Low-frequency model: 3.29
  Microphone: 13.10
  Nonlinear: 13.26
  Operating point: 3.32
  Output impedance: 3.35
  QSK Controller: 24.43
  Quiescent (Q) point: 3.32
  Slew rate: 3.2
  Small-signal model: 3.29
  Stability: 3.4
  Summing: 3.4
  TR switching: 13.32
  Transconductance: 3.6
  Transmitter: 13.26ff
  Wideband 25.28
  Vertical: 25.11
Amplifier, RF power: 17.1ff
  Automatic level control (ALC): 17.25
  Broadband transformer: 17.30
  Cold tuning: 17.13
  Combiners and splitters: 17.33
  Common cathode: 17.6
  Comparison of solid state vs vacuum tube: 17.3
  Component ratings: 17.13ff
  Cooling methods: 17.19ff
  DC blocking capacitor: 17.17
  Filament voltage: 17.17
  Grid bias: 17.18
  Grounded grid: 17.6
  Harmonic rejection: 17.10ff
  Impedance matching: 17.31ff
  Mobile operation: 29.12
  MOSFET design: 17.26ff
  Neutralization: 17.21
  Parasitic oscillation: 17.23
  Parasitic suppressor: 17.24
  Pi network: 17.10
  Pi-L network: 17.11
  Plate voltage: 17.17
  Protection and control circuits: 17.37
  References: 17.50
  RF choke: 17.16
  Screen voltage: 17.18
  Solid state: 17.31ff
  Solid state HF amplifier design: 17.36ff
  Solid state, advantages: 17.31
  Stabilization: 17.21ff, 17.34ff
  Surplus parts: 17.42
  Tank circuit: 17.9ff
  Tank circuit design methods: 17.10ff
  Transmission line transformer: 17.29
  Troubleshooting: 26.28ff
  Tuning procedure: 17.14
  VHF/UHF tank circuit 17.13
Amplitude modulation (AM): 3.5, 8.3, 10.5ff
  Demodulation: 3.5, 10.8
  Full-carrier, double-sideband: 13.5
  Modulator: 13.4
  Transmitter: 13.4
Amplitude-shift keying (ASK): 8.8
Analog (signal): 4.1
Analog Filter Wizard by Analog Devices: 11.22
Analog switches and multiplexers: 3.56
  Crosspoint switch: 3.56
  Crosstalk: 3.56
Analog systems: 3.27
  Analog signal: 3.1
  Black box: 3.27
  Buffering: 3.29
  Cascading stages: 3.28
  Interstage loading: 3.28
  Network: 3.27
  Port 3.27
  Signal processing: 3.1
  Terminology: 3.6
  Transfer function: 3.27
Analog-digital conversion: 3.48
  Accuracy: 3.48
  ADC, DAC: 3.48
  Aliasing: 3.49, 15.7
  Anti-aliasing filter: 15.7
  Band-limiting: 3.49
  Bandwidth: 3.49
  Binary coded decimal (BCD): 3.48
  Bipolar and Unipolar: 3.48
  Choosing a converter: 3.54
  Code: 3.48
  Conversion rate: 3.49
  Decimation: 15.8
  Differential nonlinearity: 3.49
  Digitization: 3.48
  Effective number of bits (ENOB): 3.49
  Full-scale (FS) value: 3.48
  Full-scale error: 3.49
  Hexadecimal: 3.48
  Integral nonlinearity (INL): 3.49
  Interpolation: 15.9
  Jitter: 3.49
  Least significant bit (LSB): 3.48
  Linearity error: 3.49
  Nyquist frequency: 3.49
  Nyquist rate: 3.49
  Nyquist Sampling Theorem: 3.49
  Offset: 3.49
  Over- and undersampling: 3.49
  Percentage resolution: 3.48
  Quantization: 15.9ff
  Quantization code: 3.48
  Quantization error: 3.49, 15.2, 15.10
  Range: 3.48
  Reconstruction filter: 15.8
  Resolution: 3.48, 15.2
  Sample: 3.49
  Sample rate: 15.2, 15.6ff
  Sampling: 15.6ff
  Signal-to-noise and distortion ratio (SINAD): 3.49
  Sinc function: 15.8
  Spurious-free dynamic range (SFDR): 3.49, 15.2
  Step size: 3.48
  Total harmonic distortion+noise (THD+N): 3.49
  Zero-stuffing: 15.9

Analog-digital interfacing: 4.20
Analog-to-digital converter (ADC): 4.21, 15.2
Analog and digital ground: 3.52
Delta-encoded converters: 3.51
Dual-slope integrating converter: 3.51
Flash (direct-conversion) converter: 3.50
Input buffering and filtering: 3.52
Parallel I/O interfaces: 4.20
Sample-and-hold (S/H): 3.51
Serial I/O interfaces: 4.20
Sigma-delta converter: 3.51
Single-ended and differential inputs: 3.52
Successive-approximation converter (SAC): 3.50
AND gate: 4.5
Anderson Powerpole: 29.6
Angle modulation: 10.9ff
Analog signals: 8.6
Demodulation: 10.12
Digital signals: 8.10
Equations: 10.9
Quadrature detection: 10.12
Transmitter: 13.6
Angle, radians and degree-radian conversion: 2.17
Ansoft Designer SV2: 6.2
Antenna
Azimuth(al) pattern: 21.4
Balun: 21.8, 21.38, 21.57
Bandwidth: 21.3
Coaxial dipole: 21.58
Conductor diameter: 21.3
Construction: 21.8
Construction, Yagi: 21.35ff
Current and voltage distribution: 21.2
Delta loop: 21.41
Dipole: 21.6ff
Dipole, multiband: 20.6
Dipole, sloping and vertical: 21.28ff
Directivity: 21.1
E- and H-field: 21.2
Effects of ground: 21.5
Elevation angle: 21.5
Elevation pattern: 21.4
Far (near) field: 21.22
Feed point impedance: 21.2
Feeding, ground-plane: 21.25
Folded dipole: 21.12, 21.57
Gain: 21.1, 21.4, 21.55
Glossary: 21.74
Ground losses: 21.22, 21.50
Ground systems: 21.23
Ground-plane: 21.22ff
Height above ground: 21.3
HF mobile: 21.45
Impedance matching: 21.38, 21.51
Impedance matching at VHF/UHF: 21.56
Installation: 28.17
Insulators: 21.9
Inverted-L: 21.28
Inverted-V: 21.11
Isotropic: 21.1
Length-to-diameter (l/d) ratio: 21.3
Lightning arrestor: 28.9
Loading: 21.25, 21.47ff
Lobes and nulls: 21.4
Loop: 21.39
Loop and halyard: 28.13
Magnet (mag) mount: 18.7
Mast material: 28.17
Mobile mounting: 21.50, 21.54
Modeling: 21.21
Multiband: 21.44
Multiband dipole: 21.13
National Electrical Code (NEC): 28.8
Pattern ratios (F/B, F/S, F/R): 21.5
Polarization: 21.2, 21.55
Portable operation: 29.18ff
Quad: 21.39
Radiation pattern: 21.4, 21.56
Radiation resistance: 21.2
Radio direction finding (RDF): 21.66
References: 21.75
Remotely-tuned antennas: 21.49, 21.51
Repeater operation (home station): 18.7
Safety: 28.13ff
Safety references: 28.21
Satellite: 21.61
Sense: 21.68
Skeleton slot: 21.43
Stacking: 21.60
T antenna: 21.28
Temperature: 5.31
Through-the-glass (mobile): 18.7
Trap dipole: 21.14, 21.17
Trap vertical: 21.27
Turnstile: 21.61
Vertical: 21.22
VHF/UHF: 21.55ff
VHF/UHF mobile: 18.7
Whip: 21.45ff
Wire strength: 22.40
Yagi, optimized designs: 21.36
Yagi, Yagi-Uda: 21.32ff, 21.60
Zoning: 28.13
Antenna analyzer: 25.24
Broadcast interference: 26.33
Antenna coupler: 20.14
Antenna switch
Automatic: 24.14
Remote: 24.18, 24.50
Antenna systems
Troubleshooting: 26.32ff
Antenna tuner (ATU): 20.14
Adjusting: 20.16
Antenna tuner (ATU, Antenna coupler, Matchbox, Transmatch): 20.14
Balanced and unbalanced load: 20.14
Location in the antenna system: 20.15
T configuration: 20.10, 20.15
Unbalanced-to-balanced: 20.14
Z-Match: 24.1
Anti-VOX: 13.29
Anticyclone: 19.24
APCO-25: 16.27
Apparent power: 2.49
Application-specific integrated circuit (ASIC): 3.27, 15.3
APRS: 16.23
Automatic Identification System (AIS): 16.24
Beacon: 16.23
D-STAR and DPRS: 16.25
Email: 16.25
GPS: 16.23
Igate: 16.23
Relay: 16.23
Secondary Station ID (SSID): 16.23
Software: 16.23
Tactical call: 16.23
Tracker: 16.23
Winlink: 16.25
Arbitrary waveform generator (AWG): 25.17
Arcing: 5.10
Arduino: 4.23
SDR control accessory: 24.34
Arithmetic logic unit (ALU): 15.4
Armstrong, Maj. Edwin: 12.7
ARRL: 1.1
RF Safety Committee: 28.22
Section Manager (SM): 27.2
Technical Coordinator (TC): 27.2
Technical Information Service (TIS): 22.2

ARRL Lab
Receiver test procedure: 25.29ff
Transmitter test procedure: 25.21, 25.33ff
ARRL Radio Designer: 6.5
ASAPS: 19.22
ASK (*see* Amplitude-shift keying)
Astrotex (shock mounts): 29.9
Atmosphere: 19.6
Attenuation: 3.1, 11.2
Conversion between reflection coefficient, SWR, and return loss: 22.61
Free space: 19.2
Of transmission lines: 20.4
Attenuation constant (α): 20.7
Attenuator: 3.3, 25.27
Pi- and T-network values: 22.44
ATV (*see* Amateur television)
Audio
Intelligibility enhancement: 24.36
Radio interface: 24.40
Audio amplifier IC: 3.56
Audio equalizer, intelligibility enhancement: 24.36
Audio equipment RFI: 27.33
Audio frequency (AF): 2.18
Audio frequency shift keying (AFSK): 8.14
Aurora: 19.14
Auroral E: 19.14
Authority having jurisdiction (AHJ): 28.2
AutoCAD: 6.3
Automatic frequency control (AFC): 9.30
Automatic gain control (AGC): 12.23ff
Circuits: 12.26
DSP-based: 15.28
Automatic level control (ALC): 13.11, 13.17, 17.2, 17.25
Automatic link establishment (ALE): 16.16
FSK: 16.16
Link quality analysis (LQA) 16.16
Scanning: 16.16
Automatic noise limiter (ANL): 12.26
Automatic Packet Reporting System (APRS)
Position data: 14.8
Remote sensing: 14.7
Telemetry: 14.7
Tracking: 14.10
Automatic repeat request (ARQ): 16.17
Automotive RFI: 27.36, 29.14
Alternator whine: 27.37
Electric vehicle (EV): 27.39
Hybrid-electric vehicle (HEV): 27.39
Ignition noise: 27.38
Autoranging: 25.5
Autotransformer: 2.66
Avalanche breakdown: 3.15

B

B2 Spice: 6.3
Back-EMF: 2.35
Background noise: 5.33
Backscatter: 19.18
Backwave: 13.16
Balanced modulator: 8.5, 10.30ff, 13.11
MC1496P: 10.33ff
Balun: 20.16, 21.8, 21.38, 21.57
Bazooka: 20.17
Bead: 20.24
Broadband: 20.22
Choke: 20.17ff
Coiled coaxial: 20.22
Combination ferrite and coiled coax: 20.25
Current: 5.23, 20.19ff
Current (ferrite bead) balun: 20.19
Quarter-Three-Quarter Wave (Q3Q): 20.19
Quarter-wave: 20.18
Transmitting, ferrite: 20.23
Voltage: 20.19
Wound-coax ferrite choke: 20.23
Band-pass filter: 11.2
Band-stop (band-reject) filter: 11.2
Bandpass filter: 3.5
Transmitter: 13.23
Bandwidth
Antenna: 21.3
Communication modes: 12.9
Digital signals: 8.17
Filter: 11.3ff
Occupied: 8.21
Resonant circuits: 2.57
Barkhausen criteria: 9.3
BASIC Stamp: 4.23
Battery: 7.32
Absorption Glass Mat (AGM): 7.35, 7.45
Alkaline: 7.34ff
Battery Monitoring System (BMS): 29.12
Cold-cranking amps (CCA): 7.44
Deep-cycle: 7.35, 7.44
Discharging methods: 7.41
Electronic Load Detector (ELD): 29.12
Handling guidelines: 7.43ff
Lead acid: 7.34ff
Lithium chemistries: 7.34ff
Marine: 7.44
NiCd: 7.34ff
NiMH: 7.34ff
Recycling: 7.44
Remote sensing: 14.9
Reserve capacity (RC): 7.44
Safety: 7.32
Starter-lights-ignition (SLI): 7.35, 7.44
Test and monitoring: 7.43
Voltage regulation: 29.17
Battery charging: 7.37ff
Chargers: 7.37
From USB: 7.38
Full charge detection: 7.39
Lead acid: 7.38
Lithium chemistries: 7.40
NiCd: 7.39
NiMH: 7.40
Battery Council Institute (BCI): 7.44
Battery Monitoring System (BMS): 29.12
Baud rate: 8.9
Bazooka (balun): 20.18
Beacon (radio propagation): 19.22
Transmitter: 13.38
Beam antenna: 21.33
Beat frequency: 2.17
Beat frequency oscillator (BFO): 8.5, 12.2
Bermuda high: 19.26
Bessel (constant delay) filter: 11.5
Beta (current gain): 3.17, 3.31
Bias (amplifier): 3.7, 17.2
Bias point: 3.7
Quiescent (Q) point: 3.7
Bias (device), forward and reverse: 3.9
Bias-Tee: 24.49
Bilateral diode switch (*see* Diac)
Bilateral networks: 5.26
Bill of Materials (BOM): 6.17
Binary
Number: 4.2
State: 4.3
Binary coded decimal (BCD): 3.48, 4.3
Binary phase-shift keying (BPSK): 8.11, 10.24
Bipolar junction transistor (BJT): 3.10, 3.18
Active (linear) region: 3.18
Breakdown region: 3.19
Common-emitter/base/collector: 3.19, 3.29
Current gain (β): 3.18
Cutoff region: 3.18

Dynamic emitter resistance, r_e: ... 3.31
Early effect: ... 3.19
Ebers-Moll model: ... 3.31
Emitter, collector, and base: ... 3.18
High-frequency models: ... 5.15
Hybrid-pi model: ... 3.32, 5.16
Operating parameters: ... 3.19
Phototransistor: ... 3.21
Saturation region: ... 3.18
Small-signal characteristics: ... 3.19
Specifications: ... 22.25
Birdies: ... 25.33
Bit error ratio (BER): ... 25.37
Bit rate ... 16.1
Audio and video: ... 16.6
BJT (*see* Bipolar junction transistor)
Bleeder resistor: ... 2.26, 7.13
High-voltage supplies: ... 7.29, 7.30
Blocking dynamic range (BDR): ... 25.30
Blocking gain compression: ... 12.20
Bluetooth: ... 4.26
BNC connector: ... 29.7
Boat Anchor Manual Archive: ... 26.14
Bode plot: ... 3.3
Bolometer: ... 25.19
Boolean
Algebra: ... 4.4
Theorems: ... 4.6
Boost converter: ... 7.23
BPL (broadband over power lines): ... 27.5
BPSK (*see* Binary phase-shift keying)
Branch (circuit): ... 2.7
Break-in (CW): ... 13.29
Breakdown, dielectric: ... 5.10
Brick wall response (filter): ... 11.3
Bridge
LCR: ... 25.17
Wheatstone: ... 25.3
Wien: ... 25.16
Broadband noise: ... 27.14
Buck converter: ... 7.21
Critical inductance: ... 7.22
Buck-boost converter: ... 7.23
Buffer (digital), inverting and non-inverting: ... 4.6
Buffer amplifier
Cascode buffer: ... 3.40
Darlington pair: ... 3.40
Emitter-follower (EF): ... 3.40
Source-follower: ... 3.40
Burden voltage: ... 25.6
Butterworth (maximally flat) filter response: ... 11.3
Bypass capacitor (RFI): ... 27.23
Bypassing: ... 5.10
Paralleling capacitors: ... 5.11

C

C-rate: ... 7.33
C4FM: ... 16.29, 16.31, 18.15
Cable TV, frequencies and leakage: ... 27.30ff
CadWeld: ... 28.8
Calibration (sensors): ... 14.4
Call sign: ... 1.6
Capacitance (C): ... 2.22
Capacitor: ... 2.22
AC current and voltage: ... 2.27
AC-rated: ... 27.24
Axial and radial leads: ... 2.29, 5.5, 22.6
Ceramic, disc and monolithic: ... 22.6
Charging and discharging: ... 2.26
Color codes, obsolete: ... 22.9
DC blocking: ... 17.17
Dielectric constant: ... 2.24
Dissipation factor (DF): ... 2.29
Effective series resistance (ESR): ... 2.28
EIA identification and marking: ... 22.10
Electrolytic, aluminum and tantalum: ... 22.7
Electrolytic, reforming: ... 26.36
Equivalent (effective) series inductance (ESL): ... 5.5
Film: ... 22.6
High-voltage: ... 7.29
Labeling: ... 22.8
Leakage resistance: ... 2.28
Loss angle or tangent (θ): ... 2.29
Oil-filled: ... 7.29
Parasitic inductance: ... 5.5
Parasitic inductance model: ... 5.5
Poly-chlorinated biphenyls (PCB): ... 7.30
Ratings: ... 2.29
Ratings, RF power amplifier: ... 17.15
RC time constant (τ): ... 2.25
Series and parallel capacitors: ... 2.25
Standard values: ... 22.6
Temperature characteristics: ... 22.7
Temperature coefficient (tempco): ... 2.29
Types: ... 2.29
Voltage ratings: ... 22.9
Capacity (battery): ... 7.33
Capture effect: ... 8.7, 10.13
Capture range: ... 9.32
Carabiner: ... 28.15
Carrier squelch: ... 18.8
Carrier-current device: ... 27.5
Carson's rule: ... 8.7
Cascode buffer: ... 3.40
Cathode-ray tube (CRT): ... 3.27
Cauer (elliptic function) filter: ... 11.4
Cavity resonator oscillator: ... 9.27
CDMA (*see* Code-division multiple access spread spectrum)
Ceramic microphone: ... 13.10
Channel capacity: ... 8.17
Characteristic (surge) impedance (Z_0): ... 20.3
Characteristic curve: ... 3.6, 17.4ff
Charge-coupled device (CCD): ... 3.27
Chatter (comparator): ... 3.45
Chebyshev (equiripple) filter response: ... 11.3
Chinook wind: ... 19.26
Chip rate: ... 8.15
Chip64 and Chip128
Spread spectrum: ... 16.12
Choke, common-mode: ... 27.25ff
Choke balun: ... 20.17ff
Chordal hop: ... 19.16
Circuit: ... 2.2
Branches and nodes: ... 2.7
Equivalent circuit: ... 2.9
Open (short) circuit: ... 2.2
Parallel (series) circuit: ... 2.2
Circuit breaker: ... 2.13, 7.2
Ground fault circuit interrupter (GFCI or GFI): ... 7.2, 28.5
Ratings: ... 2.13
Circuit simulation
Component models and sources: ... 6.4
DC operating or bias point: ... 6.7
Electromagnetic: ... 6.13
Harmonic balance: ... 6.10, 6.13
Limitations at RF: ... 6.12
Scale factors: ... 6.3
Sources, voltage and current: ... 6.4
Switchmode power conversion: ... 7.28
Time and frequency domain: ... 6.8
Time step: ... 6.6
Transient: ... 6.8
Circular mil: ... 22.39
Clamping (*see* Clipping)
Class (amplifier): ... 13.26, 17.2, 17.7ff, 17.31
A, B, AB, C, D, E, F: ... 3.29, 5.16
Efficiency: ... 5.17
Clipping: ... 3.5
Audio, speech: ... 13.10

Clock frequency and period: 4.8
CLOVER: 16.20
  Coder efficiency: 16.20
  Modulation: 16.20
  Phase-shift modulation (PSM): 16.20
CMOS: 3.13
  Families: 4.17
  Integrated circuit (IC): 4.17
  Interface to TTL: 4.19
Coaxial cable (coax): 20.1
  Center insulator: 20.1
  Dielectric: 20.2
  Hardline: 20.1
  Jacket: 20.1, 20.6
  Shield: 20.1
  Types of: 20.6
Coaxial detector: 25.28
Code-division multiple access spread spectrum (CDMA): 8.16
Codec: 16.4
CODEC2 vocoder by VK5DGR: 16.16, 18.15
Coded orthogonal frequency-division multiplexing (COFDM): ... 8.12
Coded squelch (repeater): 18.8
COFDM (*see* Coded orthogonal frequency-division multiplexing)
Cohn ladder crystal filter: 11.25
Coil (*see* Inductor)
Cold Cranking Amps: 7.33
Color code
  AC wiring: 28.4
  Capacitor, obsolete: 22.9
  Diode: 22.16
  Inductor: 22.11
  Resistor: 22.3
  Transformer: 22.15
Colpitts oscillator: 9.9
Combinational logic: 4.4ff
Combiner, power: 20.21
Common reference potential: 28.7
Common-base (CB) amplifier: 3.31, 3.35
  Current gain: 3.35
  Input impedance: 3.36
  Output impedance: 3.36
Common-collector (CC) amplifier: 3.31
  Input impedance: 3.35
  Output impedance: 3.35
  Power gain: 3.35
Common-drain (CD) amplifier: 3.38
  Output impedance: 3.38
Common-emitter (CE) amplifier: 3.31
  AC performance: 3.35
  Fixed-bias: 3.33
  Frequency response: 3.35
  Input impedance: 3.34, 3.35
  Output impedance: 3.34
  Power gain: 3.35
  Self-bias: 3.33
  Voltage gain: 3.35
Common-gate (CG) amplifier: 3.39
  Input impedance: 3.40
  Output impedance: 3.40
  Voltage gain: 3.39
Common-mode: 27.9, 27.22
  Current: 20.17
Common-mode rejection ratio (CMRR): 3.42
Common-source (CS) amplifier: 3.37
  AC performance: 3.39
  Input impedance: 3.37
  Output impedance: 3.37
  Self-bias: 3.39
  Source bypass: 3.39
  Source degeneration: 3.38
  Voltage gain: 3.37
Comparator
  Hysteresis: 3.45
  Voltage: 3.44
Compensation
  Frequency 3.42
  Oscilloscope probe: 25.14
Complex frequency: 3.3
Complex loss coefficient (η): 20.7
Compression
  Audio, speech: 13.11
  Receiver dynamic range: 12.20
Compression (data): 16.4, 16.4ff
Compression (signal): 3.5
Computer-aided circuit design (CAD) (*see* Circuit simulation)
Conductance (G): 2.3
  Leakage: 5.3
  Series and parallel: 2.8
  Siemens (S): 2.3
Conducted emissions: 27.6
Conduction current: 5.5
Conductor: 2.1
Connector: 29.6ff
  Audio: 29.6
  BNC: 22.47, 22.49
  Coaxial, types: 22.50
  Computer, pinouts: 22.44
  Crimp: 29.6
  Data: 29.8
  F: 22.52
  Identification guide: 22.53
  N: 22.51
  Powerpole, Anderson: 29.6
  RF: 29.7
  RJ: 29.8
  Troubleshooting: 26.7
  UHF: 22.46
  Weatherproofing: 28.18
Constellation diagram: 8.11, 15.24
Construction techniques
  Circuit layout: 23.21ff
  Common standard parts: 23.15
  Component mounting: 23.16
  Crimping tools: 23.6
  Drill sizes: 23.5
  Drilling: 23.30
  Electrostatic discharge (ESD): 23.14
  Enclosure fabrication: 23.30
  Ground-plane (dead-bug, ugly): 23.16
  High-voltage: 23.25
  Manhattan style: 23.18
  Mechanical fabrication: 23.29
  Metalworking: 23.29
  Microwave: 23.27
  Nibbling tool: 23.6
  Painting: 23.30
  Panel layout: 23.33
  PCB fabrication services: 23.20
  Perforated board: 23.18
  Point-to-point: 23.16
  Printed-circuit board (PCB): 23.20ff
  Recommended tools: 23.4
  Socket or chassis punch: 23.6
  Soldering: 23.7ff
  Solderless breadboard or prototype board: 23.18
  Surface-mount technology (SMT): 23.10
  Terminal and wire: 23.18
  Tools: 23.3ff
  Winding coils: 23.25
  Wire-wrap: 23.18
  Wired traces (lazy PC board): 23.18
  Wiring: 23.25
Consumer Electronics Association (CEA): 27.17
Contesting (radiosport): 1.12
Continuous conduction mode (CCM): 7.22
Continuous tone-coded squelch system (CTCSS): 18.6ff
  Tone frequencies: 18.8
Continuous wave: 9.2

Control interface
Audio: 24.40
Serial, RS-232: 24.25
Transceiver: 24.22
USB: 24.26
Control wiring, low-voltage: 28.6
Conventional current: 2.2
Conversion
Attenuation, SWR, return loss: 22.61
Degrees and radians: 2.17
Power and voltage: 22.60
Conversion loss: 10.21
Convolution: 15.12
Cooperative agreement, utilities: 27.22
Coordination (repeater): 18.8
Corona discharge: 19.31, 27.21
Coronal hole: 19.12
Coronal mass ejection (CME): 19.12
Coulomb (C): 2.2
Counter
Flip-flops: 4.11
Frequency 25.9
Coupling (inductive): 2.37
Courtesy tone: 18.4
Crimp connector: 29.6
Critical frequency: 19.8
Cross-reference, semiconductor: 3.8, 26.10
Crossband repeater: 14.10
Crosspoint switch: 3.56
Crosstalk: 3.56
Crowbar overvoltage protection (OVP): 7.20
CRT (oscilloscope): 25.11
Crystal (lattice) filter 11.24
Superheterodyne receiver: 12.11
Crystal ladder filters 11.25, 11.36
Transmitter: 13.13
Crystal, quartz
AT-cut: 11.23
Characterization: 11.26
Equivalent (effective) series resistance (ESR): 11.23
Equivalent circuit: 9.21, 11.23
Fundamental: 11.23
Holders: 22.38
Oscillator: 9.19ff
CTCSS (*see* Continuous tone-coded squelch system)
CubeSats: 14.1
Current
Conventional: 25.2
Electronic: 25.2
Current (I): 2.1
Ampere (A): 2.2
Conventional current: 2.2
Current source: 2.9
Electronic current: 2.2
Current balun: 5.23
Current divider: 2.7
Current gain (β): 3.18
Current inrush: 7.11
Current shunt: 25.7
Current transfer ratio (CTR): 3.23
Cutoff (corner) frequency: 3.5, 11.2
Cutoff (semiconductor): 3.11
CW
Backwave: 13.16
Keying waveform: 13.2, 13.15
Modulation: 10.6
Transmitter: 13.15
Waveshaping: 8.8

D

D layer propagation: 19.12
D'Arsonval meter movement: 25.2
*d*Chat*: 16.29
D-RATS: 16.29
D-STAR: 16.27, 16.29, 18.12ff
Backbone: 16.28
Call sign routing: 16.27
*d*Chat*: 16.29
D-RATS: 16.29
D-STAR TV: 16.29
Digital data (DD): 16.28
Digital voice (DV): 16.28
Dplus: 16.29, 18.13
DPRS: 16.29
DV Dongle: 16.29
Ethernet bridge: 16.28
Gateway: 16.28
Hidden transmitter: 16.28
JARL: 16.27
Network overview: 18.11
References: 18.14
Repeater hardware: 18.13
Station ID: 18.12
Station routing: 18.12
Texas Interconnect Team: 16.28
Trust server: 16.27
D-type flip-flop: 4.10
Damping: 9.2
Darlington pair: 3.40, 7.16
Pass transistor: 7.16
Data converter: 15.2
Data logger: 25.5
Data sheet: 3.7
dBd: 21.1
dBi: 21.1
dBm: 25.19
DC channel resistance, r_{DS}: 3.19
DC component: 25.1, 25.8
DC coupling: 3.28
Oscilloscope: 25.11
DCS (*see* Digital coded squelch)
Dead reckoning: 14.7
Decimation: 15.8
Decoupling: 5.11
Deep-cycle battery: 7.44
Delta loop antenna: 21.41
Delta match: 21.56
Demodulator: 10.1ff
I/Q: 8.12, 15.22ff
DeMorgan's Theorem: 4.7
Depletion region: 3.9
Design cycle: 6.2
Detection: 10.8
Detector
Amplitude modulation (AM), DSP-based: 15.29
Diode: 25.19
Quadrature: 10.12
Thermocouple: 25.19
Deviation (frequency): 8.6, 10.9
Measurement: 25.36
Deviation ratio: 8.6
Diac: 3.10
Diamagnetic: 2.32
Dielectric breakdown and arcing (strength): 5.10
Dielectric constant: 2.24
Transmission line: 20.2, 20.8
Dielectric resonator oscillator: 9.28
Difference amplifier: 3.44
Differential amplifier: 3.44
Differential phase-shift keying (DPSK): 8.10
Differential quadrature phase-shift keying (DQPSK): 8.12
Differential-mode (signal, current): 20.19, 27.9, 27.22
Digipeater: 16.24
Digital (signal): 3.1, 4.1, 15.6
Digital audio
Audio formats: 16.3
Bit depth: 16.3
Bit rate: 16.4
Codec: 16.4

MIDI: ... 16.3
MP3: ... 16.4
Digital coded squelch (DCS): ... 18.8
Digital data (mode): ... 16.1
Automatic repeat request (ARQ): ... 16.2
Baud: ... 16.1
Baudot code: ... 16.2
Bit, bit rate (bps): ... 16.1
Bridge: ... 16.23
Checksum: ... 16.2
Code pages: ... 16.3
Control characters: ... 16.3
Cyclical redundancy check (CRC): ... 16.2
Data rate: ... 16.1
Dibit: ... 16.9
Emission designator: ... 16.1
Encryption: ... 16.6
Error detection and correction: ... 16.2
Error-correcting code (ECC): ... 16.2
Forward error correction (FEC): ... 16.2
FSK: ... 16.6
Gray code: ... 16.10
Gross and net bit rate: ... 16.1
Hybrid ARQ: ... 16.2
Networking modes: ... 16.17
Parity: ... 16.2
Sound card: ... 16.5
Symbol, symbol rate: ... 16.1
Table of modes: ... 16.30
Throughput (bps): ... 16.2
Unicode: ... 16.3
Varicode: ... 16.2, 16.9
Viterbi algorithm, coding: ... 16.9
Digital downconverter (IC): ... 15.27
Digital image
Color depth: ... 16.3
High, true color: ... 16.3
JPEG: ... 16.4
Palette: ... 16.3
Pixel: ... 16.3
Raster: ... 16.3
Vector: ... 16.3
Digital logic
3.3 V - 5 V interface: ... 4.19
Bipolar families: ... 4.14
Combinational: ... 4.4ff
Comparing families of: ... 4.13
Families: ... 22.31
Gates: ... 4.5
Positive and negative: ... 4.7
Programmable devices: ... 4.22
Sequential: ... 4.8ff
Transistor-transistor logic (TTL): ... 4.14
Digital Mobile Radio (DMR): ... 16.31, 18.14
Digital modulation: ... 8.8
Bit error ratio (BER): ... 25.37
Channel capacity: ... 8.17
Constellation diagram: ... 8.11
Packet error ratio (PER): ... 25.37
Test procedures: ... 25.37
Digital Radio Mondiale (DRM): ... 16.15
Slow-scan television (SSTV): ... 8.20
Digital sensor interfaces: ... 14.4
Digital signal processing (DSP): ... 15.1ff
Adaptive filter: ... 15.17
Analytic signals: ... 15.21ff
Automatic gain control (AGC): ... 15.28
Embedded systems: ... 15.6
Filters: ... 12.12, 15.11ff
Finite impulse response (FIR) filter: ... 15.11ff
Glossary: ... 15.32
Hilbert transformer: ... 15.23
I/Q demodulator: ... 15.22ff
I/Q modulator: ... 15.22ff
Infinite impulse response (IIR): ... 15.16ff
Microprocessors: ... 15.4
Modulation: ... 15.21ff
Modulator and demodulator: ... 10.14, 15.29
References: ... 15.31
Sine wave generation: ... 15.17ff
Speech processing: ... 15.30
SSB modulator and demodulator: ... 15.22ff
Tone decoder: ... 15.19
Digital TV modulation: ... 8.11
Digital video: ... 16.3
Bit rate: ... 16.4
Codec: ... 16.6
Digital voice, HF: ... 16.15
AOR: ... 16.15
Dream: ... 16.15
FreeDV: ... 16.15
WinDRM by HB9TLK: ... 16.15
Digital-analog converter: ... 4.21
Digital-to-analog converter (DAC): ... 15.2
Binary weighting ... 3.53
Current output DAC: ... 3.53
Monotonicity: ... 3.53
Parallel I/O interfaces: ... 4.20
R-2R ladder DAC: ... 3.53
Serial I/O interfaces: ... 4.20
Settling time: ... 3.53
Summing: ... 3.53
Diode: ... 3.14, 22.15
AC circuit model: ... 5.14
Anode: ... 3.14
At high frequencies: ... 5.14
Cathode: ... 3.14
Color code: ... 22.16
Dynamic resistance: ... 5.14
Fast-recovery: ... 3.15, 7.10
Forward voltage: ... 3.14, 3.15
Free-wheeling: ... 7.5, 7.22
Package dimensions: ... 22.17
Peak Inverse Voltage (PIV, PRV): ... 3.15
Photodiode: ... 3.21
PIN: ... 3.15
Point-contact: ... 3.15
Ratings: ... 3.14
Schottky: ... 3.15, 7.10
Specifications: ... 22.16
Switching time: ... 5.14
Transient voltage suppressor (TVS): ... 3.16
Vacuum tube: ... 17.4
Varactor: ... 3.16
Zener: ... 3.16
Diode detector: ... 25.19
Diode mixer: ... 10.18ff
Dip (grid dip) meter: ... 25.10, 26.3
Diplexer: ... 10.22ff
Diplexer Designer by W4ENE: ... 11.41
Dipole: ... 21.6ff
Coaxial: ... 21.58
Fan: ... 21.13
Folded: ... 21.12, 21.57
Inverted-V: ... 21.11
Multiband: ... 21.13
Near Vertical Incidence Skywave (NVIS): ... 21.14
Sloping: ... 21.11, 21.28ff
Trap: ... 21.14, 21.17
Vertical: ... 21.28ff
Direct conversion receiver: ... 12.12
Direct current (dc): ... 2.15
Direct digital synthesis (DDS): ... 9.30, 15.17, 15.28
Sine-wave generator: ... 25.17
Direct FM: ... 10.11
Direct sampling: ... 12.2
Direct sequence spread spectrum (DSSS): ... 8.16
Direction finding: ... 1.17
Directional coupler: ... 25.28
Directional wattmeter (*see also* Reflected power meter): ... 25.19

Discharge (battery): 7.41
Discontinuous conduction mode (DCM): 7.22
Displacement current: 5.5
Dissipation (power): 2.11
Distributed elements: 5.1
Dithering: 15.10
DMM (digital multimeter): 25.4
  Autoranging: 25.5
DominoEX: 16.10
Doppler shift: 21.73, 25.11
  Mobile communication: 19.27
Double sideband (DSB): 8.4, 10.7
Double-balanced mixer: 10.20ff
Doubler (frequency): 13.7
Dplus: 16.29
DPRS: 16.29
DPSK (*see* Differential phase-shift keying)
DQPSK (*see* Differential quadrature phase-shift keying)
Dream: 16.15
Drift velocity: 3.12
Driver array IC: 3.54
DSP (*see* Digital signal processing)
DSP filter: 11.18
DTMF (*see* Dual-tone multi-frequency)
DTV, HDTV (*see* Digital television)
Dual-tone multi-frequency (DTMF)
  Tone frequencies: 18.8
Ducting: 19.25ff
Dummy load: 25.27, 26.3
Duplexer: 18.4
  Adjustment using spectrum analyzer: 25.23
DVB-S: 8.19
DVD (Digital Video Disk) player RFI: 27.32
DXing: 1.13
Dynamic microphone: 13.10
Dynamic range: 3.2, 12.1
  Blocking (BDR): 12.20
  Compression (CFDR): 12.20
  Intermodulation distortion (IMD): 10.14, 10.16, 25.31
  Receiver: 12.19
  Spectrum analyzer: 25.21
  Spurious-free (SFDR): 12.21
  Test procedures, receiver: 10.16
Dynamic resistance: 2.58, 5.14

E

E layer propagation (E skip): 19.13ff
E-field: 21.2
EAGLE (CAD software): 6.2
Earth-Moon-Earth (EME) communication
  Propagation: 19.30
Ebers-Moll transistor model: 5.15
EchoLink: 18.10
Eddy current: 2.39, 2.65
Education
  Amateur Radio in the classroom: 1.19
Effective sunspot number (SSNe): 19.21
Efficiency (Eff, η): 2.12
EHF (frequency range classification): 2.19
EIA-RS-232: 4.28
Electret microphone: 13.10
Electric charge: 2.1
  Coulombs (C): 2.2
Electric fence RFI: 27.15
Electric field
  Electromagnetic wave: 19.1
  Electrostatic field: 2.22
  RF exposure: 28.25
Electric vehicle (EV) RFI: 27.39
Electrical length (L_e, transmission line): 20.7
Electroluminescence: 3.23
Electromagnetic
  Radiation: 19.1
  Spectrum: 19.1
  Wave: 19.1
Electromagnetic compatibility (EMC): 27.1
Electromagnetic interference (EMI): 27.1
Electromotive force (EMF): 2.1
  Voltage (V, E): 2.1
Electron: 2.1
  Free electron: 2.1, 3.8
  Mobility: 3.12
Electronic current: 2.2
Electronic Design Automation (EDA) (*see* Circuit simulation)
Electronic Load Detector (ELD): 29.12
Electrostatic discharge (ESD): 3.20
  Prevention: 23.14
Elliptic-function filter: 11.4
Elmer: 1.6
Elsie by W4ENE: 11.9
Embedded system (DSP): 15.6
EME (Earth-Moon-Earth) communication: 1.16
Emergency communication: 1.18
  Using repeaters: 18.3
Emission designators: 8.1
  Table, ITU Radio Regulations: 8.2
Emitter-follower (*see* Common-collector amplifier)
Encryption: 16.6
Energy and work: 2.2, 2.11
  Ampere-hours (Ah): 2.11
  Energy density: 2.11
  Horsepower (hp): 2.11
  Joule (J): 2.2
  Potential energy: 2.22
  Watt (W): 2.11
  Watt-hour (Wh): 2.11
Envelope detection: 10.8
Equator, geomagnetic: 19.19
Equipment
  Arranging a station: 29.3
  Interconnection: 29.5
  Mobile mount: 29.9
Equivalent (effective) series inductance (ESL): 5.5
Equivalent (effective) series resistance (ESR)
  Capacitor: 2.28
  Quartz crystal: 11.23
Error vector magnitude: 8.22
Error, measurement: 25.2
Ethernet: 4.25, 4.29
  Bridge: 29.24
  RFI: 27.14
European Telecommunications Standards Institute
  (ETSI): 16.31, 18.15
Excess noise ratio (ENR): 25.26
Excess temperature: 5.30
ExpressPCB (PCB vendor): 6.16, 17.36, 17.49
Eye diagram: 8.22
EZNEC by W7EL 21.21

F

F layer propagation: 19.16ff
Facsimile (Fax): 8.19, 16.13
  Formats: 16.13
  Index of cooperation: 16.13
Fading
  Digital signals: 19.28
  Ionospheric: 19.9
  Tropospheric: 19.27
FAI: 19.14
Fair-Rite Products Corp: 5.19
Fan-out: 4.14
Farad (F): 2.23
Faraday rotation: 19.30
Fast Fourier transform (FFT): 8.14, 15.18, 16.10, 25.24
Fast-scan television (FSTV) (*see* Amateur television)
FCC
  Basis and Purpose: 1.2
  Citation: 27.22

Field Inspector: ... 27.22
Interference Handbook: ... 27.32
Notice of Apparent Liability (NAL): ... 27.22
RF Interference, cooperation with ARRL: ... 27.10
RFI: ... 27.2ff
FCC Part 15: ... 27.4
Absolute emission limits: ... 27.7
Certification: ... 27.9
Declaration of conformity: ... 27.9
Notification: ... 27.9
Operator requirements: ... 27.11
RFI rules and definitions: ... 27.8
FCC Part 18: ... 27.4
FCC Part 2 definitions: ... 27.6
FCC Part 97: ... 1.2, 27.2ff
Spurious emission limits: ... 27.4
Feed line (*see* Transmission line)
Feed line radiation: ... 27.24
Feed point impedance: ... 20.7, 21.1
Feed-through termination: ... 25.28
Feedback: ... 3.4
Oscillator: ... 9.3
Feld-Hell: ... 16.13
Ferri- and ferromagnetic: ... 2.32
Ferrite: ... 5.19
Bead: ... 5.20
Chokes: ... 5.23
Equivalent circuits: ... 5.19, 5.22
Permeability: ... 5.19
Permeability vs frequency: ... 5.21
Resonances of cores: ... 5.20
Toroid cores: ... 22.14
Type 31 material ... 5.23
Type or mix: ... 5.19, 22.11
Use for EMI suppression: ... 5.23
Ferrite bead
Current balun: ... 20.24
FET (*see* Field-effect transistor)
FFT (*see* Fast Fourier transform)
Fiber optics: ... 3.23
Field
Electric (electrostatic): ... 2.22, 19.1
Magnetic: ... 2.31, 19.1
Field Day stub filters: ... 20.9
Field programmable gate array (FPGA): ... 4.20, 4.22, 15.3
Field-aligned irregularities (FAI): ... 19.14
Field-effect transistor (FET): ... 3.12, 3.18
Breakdown region: ... 3.20
Channel: ... 3.12
CMOS, NMOS, PMOS: ... 3.13
Common-source/gate/drain: ... 3.20, 3.37
Cutoff region: ... 3.20
DC channel resistance, r_{DS}: ... 3.19
Depletion mode: ... 3.13
Enhancement mode: ... 3.13
Forward transconductance, g_m: ... 3.19
Gate leakage current, I_G: ... 3.19
High-frequency circuit model: ... 5.16
Junction breakpoint voltage: ... 3.19
Junction FET (JFET): ... 3.12
Mixer: ... 10.17ff
MOSFET: ... 3.12
N-channel, P-channel: ... 3.12
Ohmic region: ... 3.20
On resistance, $r_{DS(ON)}$: ... 3.12
Operating parameters: ... 3.20
Phototransistor: ... 3.21
Pinch-off: ... 3.12
Saturation region: ... 3.20
Small-signal model: ... 5.17
Source, drain, and gate: ... 3.12
Specifications: ... 22.24, 22.28
Field-strength meter (FSM): ... 25.37
Filter: ... 3.4
Active: ... 3.46
Active filter design tools: ... 11.22
Active RC: ... 11.18, 11.20
Adaptive (DSP): ... 15.17
All-pass: ... 3.5
Anti-aliasing: ... 15.7
Band-stop (band-reject): ... 11.2
Bandpass: ... 3.5
Bandpass, transmitting: ... 13.23
Bandwidth: ... 11.3ff
Basic types and definitions: ... 11.2ff
Bessel (constant delay): ... 11.5
Brick wall response: ... 11.3
Butterworth (maximally flat): ... 11.3
Capacitor- and inductor-input: ... 11.6
Cauer (elliptic function): ... 11.4
Center frequency: ... 11.6
Chebyshev (equiripple): ... 11.3, 11.24
Crystal ... 11.36
Cutoff frequency: ... 11.2
Denormalizing (scaling): ... 11.15
Design examples: ... 11.11ff
Digital: ... 15.11ff
Digital commutating: ... 10.28
Digital signals: ... 8.17
Effect of component Q: ... 11.9
Effect of ripple: ... 11.10
Family comparison: ... 11.5
Family selection: ... 11.15
Finite impulse response (FIR): ... 15.11ff
Group delay: ... 11.4
Helical resonator: ... 11.32ff
High-, Low-, Bandpass: ... 11.2
High-pass: ... 3.5
Infinite impulse response (IIR): ... 15.16ff
Insertion loss: ... 11.9
Intermediate frequency (IF): ... 12.2
Ladder: ... 11.6
Linear phase response: ... 11.25
Low-pass: ... 3.5
Lumped-element (LC): ... 11.5
Magnitude response: ... 11.2
Mesh capacitor-coupled: ... 11.9
Mid-band response: ... 3.5
Multiple-feedback: ... 11.20
Nodal-capacitor- and -inductor-coupled: ... 11.8
Normalized design values: ... 11.11
Normalized value tables: ... 11.12
Notch: ... 11.2
Order: ... 11.3
Overshoot: ... 11.5
Passband: ... 3.5, 11.2
Phase response: ... 11.2
Reconstruction: ... 15.8
Return loss: ... 11.11
RFI: ... 27.22
Ringing: ... 11.5
Ripple: ... 11.3
Ripple bandwidth: ... 11.3
Ripple-VSWR-Return Loss table: ... 11.10
Roll-off: ... 3.5, 11.3
Sallen-Key: ... 11.20
Scaling, frequency and impedance: ... 11.15
Stop band: ... 3.5, 11.2
Stop band depth and frequency: ... 11.4
Switched-capacitor (SCAF): ... 11.18ff
Topology: ... 11.7
Transformation, high-pass to band-stop: ... 11.7
Transformation, low-pass to band-pass: ... 11.6
Transition region: ... 11.2
Ultimate attenuation: ... 11.2
Use at VHF and UHF: ... 11.35
Filter, crystal: ... 11.23ff
Cohn minimum-loss (min-loss): ... 11.25
Dishal crystal-ladder filter: ... 11.25
Evaluation: ... 11.28

Group delay: 11.25
Half-lattice: 11.24
Insertion loss: 11.24
Monolithic: 11.24
Motional parameters: 11.23
Overtone: 11.23
Parallel-resonator-end-section (PRES): 11.25
Parameters: 11.24
Pole-zero separation (PZ): 11.23
Shape factor: 11.24
Transmitting: 13.13
Unloaded Q: 11.23
Filter, surface acoustic wave (SAW): 11.28
Filter, transmission line: 11.28
Band-pass: 11.30
Emulating LC filters: 11.31
Hairpin resonator: 11.30
Interdigital: 11.30
Microstrip: 11.29
Quarter-wave: 11.30
Stripline: 11.29
FilterPro by Texas Instruments: 11.22
Finite impulse response (FIR) filter: 15.11ff
Coefficient: 15.14
Tap: 15.12
Window function: 15.13
Window function equations: 15.15
Fire extinguisher: 29.5
FireWire (IEEE-1394): 4.29
Flat topping: 17.2
FLDIGI by W1HKJ: 16.5
Flip-flop (digital): 4.9ff
Flyback converter: 7.23
Flywheel effect: 17.9
Foldback current limiting: 7.18
Forecast (propagation) 19.20ff
Tropospheric ducting: 19.27
Forward bias: 3.9
Forward converter: 7.25
Forward resistance: 3.9
Fourier transform: 15.18
Free space attenuation: 19.2
FreeDV by KDØEAG and VK5DGR: 16.15
Frequency: 2.16
Calibration: 25.11
Complex: 3.3
Counters: 25.9ff
Deviation: 8.6, 10.9
Discrimination: 10.11
Marker generators: 25.10
Measurement: 25.10, 25.14
Multiplier: 10.10
Frequency accuracy, receiver: 25.33
Frequency coordination, repeater: 18.9
Frequency counter 25.9
Use for troubleshooting: 26.6
Frequency Division Multiple Access (FDMA): 16.31, 18.14
Frequency domain: 25.20
Frequency hopping spread spectrum (FHSS): 8.15
Frequency modulation (FM): 8.6, 10.9
Equipment, FM voice: 18.6
Receiver: 12.28ff
Transmitter: 13.7
Frequency multiplier: 13.7, 13.22
Frequency response: 3.2, 3.28
AC measurement: 25.9
Measurement with noise source: 25.27
Frequency shift keying (FSK): 8.10, 16.6
Frequency stability, receiver: 25.33
Frequency standard stations: 25.11
Frequency synthesizer
Automatic frequency control (AFC): 9.30
Direct analog (DAS) and digital synthesis (DDS): 9.30
Fractional-N: 9.41
Phase noise: 9.43
Phase-locked loops (PLL): 9.30ff
Voltage-controlled oscillator (VCO): 9.43
Friis formula: 5.31
FSK441: 16.14
Bit sequences and messages: 16.14
Meteor scatter: 16.14
Ping Jockey: 16.14
Synchronization to WWV: 16.14
FSTV (*see* Amateur television)
FTP: 16.23
Full-bridge converter: 7.25
Quasi-square wave: 7.25
Full-wave bridge, center-tap rectifier: 7.6
Output voltage: 7.6
Voltage ratings: 7.6
Function generator: 25.16ff
Fundamental (signal): 2.16
Fundamental diode equation: 3.9
Fundamental overload: 27.12ff
Fuse: 2.13, 7.2
Fuse holders: 2.14
High-voltage: 7.31
Ratings: 2.13

G

G-TOR: 16.20
Golay FEC: 16.20
Huffman A and B coding: 16.20
GaAs FET: 3.21
Gain
Amplifier: 3.2, 3.6
Antenna: 21.1, 21.55
Noise: 5.31
Voltage, current, and power: 3.2
Gain-bandwidth product (F_T, GBW): 3.28, 3.42, 5.15
Gallium Arsenide (GaAs): 3.12
Gamma match: 21.38, 21.57
Gap noise circuit: 27.15
Gate (digital): 4.5
Gate leakage current, I_G: 3.19
Gateway (D-STAR): 18.12
Gauss (G): 2.32
Gaussian filter: 8.10
Gaussian minimum-shift keying (GMSK): 8.10
GC Prevue (CAD software): 6.24
gEDA (CAD software): 6.2
Generator, function: 25.16
Generator, power: 28.5, 29.15ff
Safety: 29.17
Generator, signal: 25.26
Generator, tracking: 25.23
Generic array logic (GAL): 4.20, 4.22, 15.3
Geomagnetic equator: 19.19
Geomagnetic storm: 19.12
Gerbv: 6.24
Germanium (device): 3.9
Gilbert (Gb): 2.32
Gilbert cell mixer: 10.5, 10.30ff, 10.33ff
Gin-pole: 28.15
Global Positioning System (GPS): 25.11
Glossary
AC theory and reactance: 2.22
Amateur Radio, general terms: 1.21
Analog electronic terms: 3.57
Antenna: 21.74
DC and basic electricity: 2.2
Digital electronics: 4.30
Digital modes: 16.31
Digital signal processing (DSP): 15.32
Filters: 11.44
FM and Repeater: 18.15
Modulation: 8.23
Oscillators and Synthesizers: 9.47
Power sources: 7.45

Propagation: 19.31
Radio frequency interference (RFI): 27.42
Remote stations: 29.27
RF techniques: 5.36
Software defined radio (SDR): 15.32
Test equipment and measurements: 25.56
Transmission lines: 20.28
GMSK (*see* Gaussian minimum-shift keying)
GPIB: 25.6, 25.16, 25.26
GPS: 14.7ff
Sentences (data): 14.7
Gray (grey) line propagation: 19.17
Gray code: 16.10, 16.11
Grid (vacuum tube): 17.5
Bias: 17.18
Control: 17.5
Screen: 17.5
Suppressor: 17.5
Grid-dip meter (GDO): 25.10
Measuring L and C: 25.17
Ground: 29.2
AC (signal) ground: 3.29
Bonding: 28.6, 28.10
Coax shields: 28.9
Cold water pipe: 28.7
Common reference potential: 28.7
Concrete encased grounding electrode (CEGR): 28.7
Conductors: 28.8, 28.10
Dissimilar metals: 28.10
Earth: 28.7
Exothermic welding (CadWeld): 28.8
Galvanizing: 28.10
Lightning dissipation: 28.7
Methods of grounding: 28.7
Radio frequency interference (RFI): 27.13
RF ground: 28.6
Safety ground: 27.13, 28.6
Single-point: 28.10
Soldering and brazing: 28.7
Star: 27.13
Ground fault circuit interrupter (GFCI or GFI): 7.2, 28.5
RFI: 27.35
Ground loop: 27.13
Ground rod: 28.7
Ground wave: 19.6
Ground-plane antenna: 21.22ff
Feeding: 21.25
Grounded grid: 17.6
Group delay (filter): 11.4
Guanella transformer: 20.20
Gummel-Poon transistor model: 5.16
Guy wire, lengths to avoid: 22.40

H

H (hybrid) parameters: 5.15, 5.35
H-field: 21.2
Half-bridge converter: 7.25
Half-power frequency: 3.5
Half-wave rectifier: 7.5
Output voltage: 7.5
Voltage ratings: 7.6
Half-wave vertical dipole (HVD): 21.11
Ham Radio Deluxe digital communications software: 16.13
Hamfests: 1.8
Hardware description language (HDL): 15.3
Harmful interference: 27.4, 27.6
Harmonics: 2.16
Measurement with spectrum analyzer: 25.21
RFI: 27.4, 27.12
Hartley oscillator: 9.10
Harvard architecture: 15.4
Heat management: 2.67
Forced-air and water cooling: 2.70
Heat pipe cooling: 2.70
Rectifiers: 2.70
RF heating: 2.70
RF power amplifier: 17.19ff
Thermoelectric cooling: 2.70
Transistor derating: 2.70
Heat sink: 2.68, 7.11
Selection: 2.68
Helical by W4ENE: 11.33
Helical resonator: 11.32ff
Coupling: 11.35
Design nomograph: 11.33
Insertion loss: 11.35
Tuning: 11.34
Hellschreiber: 16.12
Henry (H): 2.34
Hertz (Hz): 2.16
Heterodyne: 12.2
Hexadecimal: 3.48, 4.3
HF (frequency range classification): 2.19
h_{FE}, h_{fe}: 3.18
HFTA (HF Terrain Analysis): 29.21
High-pass filter: 3.5, 11.2
RFI: 27.3, 27.23
High-voltage power supply: 7.29
Bleeder resistor: 7.29, 7.30
Capacitors: 7.29
Construction techniques: 7.30, 23.25
Equalizing resistors: 7.29
Fuses: 7.31
Grounding stick (hook): 7.31, 28.12
Inductors: 7.30
Metering: 7.30
Transformers: 7.30
Hilbert transformer: 15.23
Hipot test: 7.30
Hop rate: 8.15
Horizon (radio): 19.23
Horsepower (hp): 2.11
Hot stick: 27.21
Hot, neutral, ground wiring: 7.2, 28.4
Hot-carrier diode (*see* Schottky diode)
HP8640B generator: 25.26
HPIB: 25.6, 25.16
Huffman coding: 16.4
Hybrid combiner: 25.24
Wilkinson: 25.29
Hybrid-electric vehicle (HEV)
Automotive RFI: 27.39
Hybrid-pi transistor model: 3.31, 5.15
Hysteresis (comparator): 3.45
Hysteresis (magnetic): 2.34

I

I-V curves: 3.6
I/Q
Demodulator: 8.12, 15.22ff
Modulator: 8.12, 15.22ff
I2C: 14.5
IC (*see* Integrated circuit)
ICAP4: 6.15
IEC (International Electrotechnical Commission): 27.24
IEEE-1394 (FireWire): 4.29
IEEE-488: 25.6, 25.16
IF (*see* Intermediate frequency)
IF rejection: 25.32
Ignition noise: 27.38
Image
Frequency: 12.4, 12.9
GIF: 16.3
Image modulation: 8.18
Image rejection: 25.32
Image response: 5.32
IMD (*see* Intermodulation distortion)
Immunity, RF: 27.4, 27.9

Impedance (Z): ... 2.44
Antenna: ... 21.2
Calculating from R and X: ... 2.46
Equivalent series and parallel circuits: ... 2.47
Graphical representation: ... 2.44
Mobile antenna: ... 21.50
Ohm's law for impedances: ... 2.47
Phase angle: ... 2.44
Polar and rectangular forms: ... 2.45
Polar-rectangular conversion: ... 2.45
Power factor: ... 2.49
Reactive power (VA): ... 2.49
Rectangular form: ... 2.44
Impedance inversion, pi networks: ... 5.26
Impedance matching: ... 5.24ff
Antenna to transmission line: ... 20.11
Antennas: ... 21.56
Conjugate matching: ... 20.10
L network: ... 5.24, 20.10ff
Network: ... 20.10
Pi network: ... 5.26, 17.10, 20.10
Pi-L network: ... 17.11
Quarter-wave (Q) section: ... 20.12
Resonating the antenna: ... 20.12
Series- and shunt-input circuits: ... 20.10
Solid state amplifier: ... 17.31ff
Switching: ... 24.11
T network: ... 5.26, 20.10ff, 20.15
Transformer: ... 20.12, 21.57
Transmission line: ... 20.10, 20.13
Twelfth-wave transformer: ... 20.13
Vertical antenna: ... 24.9
Impedance matching unit (*see* Antenna Tuner)
Impedance transformer
Transmission line: ... 20.19ff
Incidental emitters: ... 27.5
Independent sideband (ISB): ... 10.7
Indirect FM: ... 10.11
Inductance (L): ... 2.35
Air core formula: ... 2.51
Henry (H): ... 2.34
Induced voltage (back-voltage): ... 2.35
Mutual inductance (M): ... 2.36
Straight wires: ... 2.52
Inductance index (A_L): ... 2.54
Inductor: ... 2.31
AC current and voltage: ... 2.38
Air core: ... 2.50
Air gap: ... 2.35
At radio frequencies: ... 5.6
Color code: ... 22.11
Coupling: ... 2.36
Eddy current: ... 2.38
Effects of coupling: ... 5.7
Effects of shielded enclosures: ... 5.7
Encapsulated: ... 2.50
Energizing and de-energizing: ... 2.38
Ferrite toroid cores: ... 22.14
Ferrite toroidal: ... 2.55
High-voltage: ... 7.30
Inductance index (A_L): ... 2.54
Iron core: ... 2.53
Kick-back: ... 2.38
Laminations: ... 2.39
Machine-wound coil specifications: ... 22.42
Parasitic capacitance: ... 5.6
Powdered-iron toroid cores: ... 2.54, 22.12
Ratings, RF power amplifier: ... 17.15
RL time constant (τ): ... 2.37
Saturation: ... 2.35
Series and parallel: ... 2.37
Series resistance: ... 5.6
Slug-tuned: ... 2.54
Standard values: ... 22.11
Swinging choke: ... 7.14
Infinite impulse response (IIR) filter: ... 15.16ff, 15.17
Insertion loss (filter): ... 11.9
Insertion loss (IL): ... 5.13
Instrumentation amplifier: ... 3.44
Insulated-gate FET (*see* MOSFET)
Insulator: ... 2.1
Antenna: ... 21.9
Integrated circuit (IC): ... 22.18
Application-specific IC (ASIC): ... 3.27
Bipolar families: ... 4.14
CMOS: ... 4.16
Comparing logic families: ... 4.13
Digital: ... 4.13ff
Latch-up: ... 3.27
Metal-oxide semiconductor (MOS): ... 4.16
Mixer: ... 10.30ff
NMOS: ... 4.16
Parasitic SCR: ... 3.27
PMOS: ... 4.16
Programmable-gate arrays (PGA): ... 3.27
Transistor-transistor logic (TTL): ... 4.14
Integrated circuits (Linear): ... 3.24
Hybrid circuits: ... 3.24
Monolithic: ... 3.26
Silicon-on-sapphire (SOS): ... 3.26
Substrate: ... 3.26
Intentional emitters ... 27.5
Inter-IC Communication (I2C) bus: ... 4.20, 4.21
Inter-symbol interference: ... 8.10, 8.17, 19.29
Intercept point (IP): ... 10.15, 10.16, 25.31
Receiver: ... 12.21
Interface
Analog-digital: ... 4.20
Between logic families: ... 4.18
Bluetooth: ... 4.26
Digital to analog I/O: ... 4.19
Ethernet: ... 4.25
High voltage equipment: ... 29.8
Microcontroller: ... 4.22
Microcontroller I/O: ... 4.21
PC parallel (LPT) port: ... 4.24
PC serial (COM) port: ... 4.24
Personal computer: ... 4.27ff
RS-232: ... 4.25
USB: ... 4.25
WiFi: ... 4.26
Zigbee: ... 4.26
Interference (*see* Electromagnetic interference)
Intermediate frequency (IF): ... 12.2
Speech clipping: ... 13.13
Intermodulation distortion (IMD): ... 8.20, 10.4, 12.20
Dynamic range: ... 10.14, 10.16, 12.20
Dynamic range test procedures: ... 10.16
Identifying: ... 27.16
Measurement: ... 25.31ff
Products: ... 12.20
RFI: ... 27.4, 27.12ff
Spectrum analyzer: ... 25.21
Internal impedance
Voltage and current sources: ... 2.9
International power standards: ... 28.4
Internet Radio Linking Project (IRLP): ... 18.10
Interpolation: ... 15.9
Inverse FFT: ... 8.14
Inversion: ... 19.24
Inverted-L antenna: ... 21.28
Inverted-V antenna: ... 21.11
Inverter (digital): ... 4.6
Inverters, dc-ac: ... 7.44
Sine-wave output: ... 7.44
Square-wave output: ... 7.44
Volt-ampere (VA) product, rating: ... 7.44
Inverting amplifier: ... 3.43
Ion: ... 2.1
IONCAP: ... 19.22

Ionogram: 19.8
Ionosonde: 19.8
Ionosphere: 19.7ff
Ionospheric
  Fading: 19.9
  Forward scatter: 19.2
  Refraction: 19.7
IR drop (*see* Voltage, Voltage drop)
ISM (Industrial, Scientific, Medical): 27.4
Isolation
  Summing amplifier: 3.4
Isotropic: 21.1
Isotropic path loss: 5.33
ITU emission designators: 8.2

J

J-K flip-flop: 4.10
Johnson, Johnson-Nyquist noise: 5.30
Joules (J): 2.2
JPEG compression: 16.4
JT65: 16.14
  Data compression: 16.14
  Earth-moon-earth (EME): 16.14
  Reed-Solomon code: 16.15
  Synchronization: 16.15
JT6M: 16.14
  FSK, 44-tone: 16.14
  Ping Jockey: 16.14
  WSJT by K1JT: 16.14
Junction FET (JFET): 3.12

K

K index: 19.12
Kelvin, Lord (*see* Thompson, Sir William)
Key click: 8.7, 10.7, 13.2, 26.18
Keyer, miniature, TiCK-4: 24.31
Keying interface, universal: 24.29
Keying, CW waveform: 10.7, 13.2
Kicad (CAD software): 6.2
Kirchoff's Current Law (KCL): 2.7
Kirchoff's Voltage Law (KVL): 2.7
Kit, transceiver: 13.32
Klystron: 9.29
Knife-edge diffraction: 19.2

L

L network: 5.24, 20.10ff
Ladder (filter): 11.6
Lagging (leading)
  Power factor: 2.49
Large-signal model: 3.29
Laser diode: 3.23
  Lasing current: 3.23
  Monochromatic light: 3.23
Latch-up: 3.27
Lead acid battery: 7.32ff
Leakage current: 7.29
Leakage flux: 2.64
Leakage path: 5.10
Leakage reactance: 2.65
Leakage resistance
  Capacitor: 2.28
Least significant bit (LSB): 3.48
Level converter: 29.9
LF (frequency range classification): 2.19
Licensing: 1.5
Light-emitting diode (LED): 3.23
  Circuit design: 3.23
  Electroluminescence: 3.23
Lightning (source of noise): 19.31
Lightning protection
  Cable entrance panel: 28.10
  Lightning arrestor: 28.9
  Suppliers: 28.10
Limiter (amplifier): 3.5, 8.7
Limiting: 3.5
Line loss: 20.4
Line of sight propagation: 19.22
Linear (system): 3.1
Linear amplifier: 13.26ff, 17.2
Liquid-crystal displays (LCD): 3.27
Lithium-ion battery
  Charging: 7.40
Litz wire: 2.51, 5.6
Loading (antenna): 21.25
Lock range: 9.32
Log (logarithmic) amplifier: 3.47
Log (on-air activity): 1.9
Logbook of The World (LoTW): 1.14
Logic analyzer: 25.36
Logic probe: 25.36
Logic-gate oscillator: 9.26
Logical operations: 4.5ff
Long-path propagation: 19.17
Loop antenna: 21.39
Loss
  Filter insertion loss: 5.13
Loss angle or tangent (θ): 2.29
Losses (radiative): 5.10
Lossless and lossy compression: 16.4
Low-pass filter: 3.5, 11.2
  DC motors: 27.37
  RFI: 27.3, 27.23
  Telephone RFI: 27.33
Lowest usable frequency (LUF): 19.9
LTSpice by Linear Technologies: 6.2, 17.11
LUF: 19.9
Lumped elements: 5.1
Lumped-element (LC) filter: 11.5
LZW compression: 16.4

M

M-factor: 19.9
Macros: 16.5
Magnetic circuit analogies: 2.32
Magnetic field: 2.31
  Electromagnetic wave: 19.1
  Gauss (G): 2.32
  Hysteresis: 2.34
  Magnetic field strength (H): 2.32
  Magnetic flux: 2.32
  Magnetic flux density (ϕ): 2.32
  Magnetic flux linkage: 2.34
  Magnetomotive force (MMF, $\Im$): 2.32
  Mean magnetic path length: 2.32
  Oersted (Oe): 2.32
  Permeability (μ): 2.32
  RF exposure: 28.25
  Right-hand rule: 2.32
  Saturation: 2.34
  Tesla (T): 2.32
Magnetic flux
  Maxwell (Mx): 2.32
  Weber (Wb): 2.32
Magnetism: 2.31
Magnetometer: 19.12
Magnetomotive force (MMF, $\Im$): 2.32
  Reluctance ($\Re$): 2.33
Magnetosphere: 19.6
Magnetron: 9.29
Magnitude response (filter): 11.2
Manuals, equipment: 26.14
Marine battery: 7.44
Marine layer: 19.26
Marker generator: 25.10
Master-slave flip-flop: 4.10

MATCH by WØIYH: 20.11
Matchbox (*see* Antenna Tuner)
Maunder minimum: 19.10
Maxim, Hiram Percy: 1.1
Maximum usable frequency (MUF): 19.8
  Prediction: 19.20ff
Maxwell (Mx): 2.32
Megger: 7.30
MESFET: 3.21
Metal-oxide semiconductor (MOS)
  Integrated circuit (IC): 4.16
Metal-oxide varistor (MOV)
  Specifications: 22.37
Meteor
  Scatter: 19.15
  Shower: 19.16
Meter
  Digital panel (DPM): 25.7
  Internal resistance: 25.3
  Panel: 25.6
  Protection diodes: 25.7
  Resistance: 25.6
  Scales: 25.7
  Shunt: 25.5
Meter Basic by W4ENE: 17.49
Method of moments: 21.21
Metric units: 22.59
MF (frequency range classification): 2.19
MF propagation: 19.32
MFSK (*see* Multi-level FSK)
MICROCAP9: 6.15
Microcontroller: 4.23, 4.23ff
  CPU size: 4.24
  Development tools: 4.25
  FLASH memory: 4.26
  I/O: 4.21
  I/O requirements: 4.24
  Interfacing: 4.22
  Memory: 4.24
  Peripherals: 4.24
  Programming: 4.25
  Resources: 4.26
  Selecting: 4.24
Microphone
  Amplifier: 13.10
  Types of: 13.10
Microprocessor: 15.4
Microstrip: 11.29
Microwave construction techniques: 23.27
Microwave band designations: 25.28
Microwire: 4.20, 4.21, 14.5
Military Auxiliary Radio Service (MARS): 1.19
Minimum discernible signal (MDS): 25.21, 25.29
Minimum-shift keying (MSK): 8.10
Mirror scale, meter: 25.6
Mix (ferrite and powdered iron): 2.54
Mix (ferrite): 5.19
Mix, Tom 1TS: 14.1
Mixer: 10.1ff
  Diode: 10.18ff
  Diplexer: 10.22
  Double-balanced: 10.20ff
  Dynamic range: 10.14ff
  Equations: 10.3
  FET: 10.17ff
  Gain controlled amplifier: 10.16ff
  Gilbert cell: 10.26ff
  Image: 12.4
  Image-rejecting: 12.12
  MOSFET: 10.19.29
  NE602/SA602/SA612: 10.30ff
  Nonlinear signal combinations: 12.3
  References: 10.35
  Switching: 10.18ff
  Tayloe: 10.28ff
  Transistor: 10.24ff
Mixing products: 10.4
MixW digital communications software: 16.12
Mobile
  Antenna impedance matching: 21.50
  Antenna mounting: 21.50, 21.54
  Antennas (HF): 21.45
  Antennas (VHF/UHF): 21.54
  Ground losses: 21.50
  Impedance matching: 21.51
  Remotely-tuned antennas: 21.49, 21.51
  SSB and CW antennas at VHF/UHF: 21.54
Mobile operation: 29.9ff
  Air bags: 29.11
  Amplifiers: 29.13
  Automotive interference: 29.14
  Cables and wiring: 29.10ff
  Mounts, control head: 29.10
  Operating techniques: 29.15
  RFI: 27.36
  Shock mounts: 29.9
  VHF/UHF propagation: 19.27ff
Modem 16.17
Modes: 8.1ff
  Digital 16.1ff
  Typical bandwidths: 12.9
Modulation: 8.1ff
  Accuracy: 8.21
  Amplitude modulation (AM): 3.5, 8.3, 10.5ff
  Amplitude-shift keying (ASK): 8.8
  Analog: 8.3ff
  Angle: 8.6ff, 10.9ff
  Continuous wave (CW): 8.8, 10.6
  Digital: 8.7
  Digital signal processing (DSP): 15.21ff
  Double sideband (DSB): 8.4
  Frequency modulation (FM): 8.6
  Image 8.18
  Impairments: 8.20ff
  Linearity: 10.6
  Multi-carrier: 8.13
  On-off keying (OOK): 8.8
  Phase modulation (PM): 8.6
  Products: 3.5
  Pulse: 8.9
  Quadrature: 8.11ff
  Single sideband (SSB): 8.5
  Transmitter: 13.24
Modulation index
  AM: 8.3
  FM: 8.6
Modulation percentage
  Measurement: 25.36
Modulator: 10.1ff, 10.35
  Balanced: 8.5, 13.11
  Balanced, MC1496: 10.33ff
  I/Q: 8.12, 15.22ff
Molex connector: 29.6
Monolithic microwave IC (MMIC)
  Specifications: 22.22
Monopole: 21.22
Monte Carlo analysis: 6.1
Moonbounce (*see* EME)
Morse code: 8.8
MOSFET: 3.12, 3.20
  Depletion mode: 3.21
  Electrostatic discharge (ESD): 3.21
  Enhancement mode: 3.21
  Pass transistor: 7.17
  Power: 3.21
MOSFET, RF Power
  Data sheet parameters and ratings: 17.28
  Gate structures: 17.26
  LDMOS vs VDMOS: 17.27
  RF power amplifier design: 17.26ff

Thermal design: ... 17.28
Transfer characteristics: ... 17.30
Voltage ratings: ... 17.27
Moxon rectangle: ... 21.61
MP3 compression: ... 16.4
MSFK16: ... 16.9
Convolution code: ... 16.10
Fast Fourier Transform (FFT): ... 16.11
Gray code: ... 16.10
Hamming distance: ... 16.11
Interleaver: ... 16.10
Modulation: ... 16.11
Quadbit, nibble: ... 16.10
MSK (*see* Minimum-shift keying)
MT63: ... 16.12
Error-correction: ... 16.12
Latency: ... 16.12
Navy MARS: ... 16.12
Noise immunity: ... 16.12
Tuning error: ... 16.12
Walsh function: ... 16.12
MUF (*see* Maximum usable frequency)
Multi-level FSK (MFSK): ... 8.10
Multi-protocol controller (MPC): ... 16.17
Multimeter: ... 25.3
Input impedance: ... 25.6
Specifications: ... 25.5
Use of: ... 25.5
Used and surplus: ... 25.6
Multimode communications processor (MCP): ... 16.17
Multipath propagation: ... 19.28
Multiplier, frequency: ... 13.7, 13.22
MultiPSK: ... 16.13
Multivibrator: ... 4.12
Astable (free-running): ... 4.13
Bistable: ... 4.12
Monostable (one-shot): ... 4.12
Mutual inductance (M): ... 2.36, 2.62

N

N connector: ... 29.7
NAND gate: ... 4.5
Narrowband and wideband FM: ... 8.6
Narrowband noise: ... 27.14
National Bureau of Standards (NBS): ... 25.1
National Electrical Code (NEC): ... 28.2
Antennas: ... 28.8
National Institute of Standards and Technology (NIST): ... 25.1
National Recognized Testing Laboratories (NRTL): ... 28.2
National Traffic System (NTS): ... 1.19
Navigation data: ... 14.7
NE602/SA602/SA612 mixer: ... 10.30ff
Near field: ... 25.37
Near-vertical incidence skywave (NVIS): ... 19.9, 21.14
NEC modeling engine: ... 21.21
Negative resistance: ... 9.4
Neper: ... 20.7
Netlist: ... 6.6, 6.17
Network, wireless: ... 4.29
Network analyzer: ... 25.25ff
Neutralization: ... 17.21
NiCd battery ... 7.35
Charging: ... 7.39
NiMH battery ... 7.35
Charging: ... 7.40
NIST: ... 25.1
NIST traceable standard: ... 25.1
Node (circuit): ... 2.7
Noise: ... 5.30ff
Atmospheric: ... 12.17
Background: ... 5.33
Bandwidth: ... 12.17
Broadband: ... 27.14
Cosmic: ... 19.31
Effects on receivers: ... 12.17
Factor (F) or Figure (NF): ... 3.28
Friis formula: ... 5.31
From losses: ... 5.31
Gain: ... 5.31
Galactic: ... 12.17
Gap noise: ... 27.15
Generator, use in transmission line measurements: ... 20.9
Ignition: ... 27.38
Image response: ... 5.32
Immunity (digital IC): ... 4.14
Johnson noise ... 3.28
Johnson, Johnson-Nyquist: ... 5.30
Man-made: ... 12.17, 19.30
Narrowband: ... 27.14
Noise blanker (NB): ... 12.27
Noise limiter (ANL, NL): ... 12.26
Of cascaded amplifiers: ... 5.31
Of preamplifiers: ... 5.32
Phase noise: ... 12.17
Power: ... 5.30, 12.18
Pulse noise: ... 12.26
Signal-to-noise ratio (SNR): ... 3.28
Simulation: ... 5.17
Sun: ... 5.32
Temperature: ... 5.30
Thermal: ... 12.17
Thermal noise: ... 3.28
White: ... 5.30
Wideband, transmitting: ... 13.16
Noise bandwidth: ... 25.30
Noise factor (F): ... 3.28, 5.31
Noise figure (NF): ... 3.28, 5.31, 12.18, 25.30
Measuring: ... 25.26
Relationship to noise temperature (Table): ... 22.43
Noise floor: ... 12.1
Noise reduction (NR)
DSP: ... 12.28
Pulse noise: ... 12.26
Noise source: ... 25.26
Noise temperature
Relationship to noise figure (Table): ... 22.43
Nominal value: ... 2.4, 22.2
Non-inverting amplifier: ... 3.43
Non-linear junction: ... 27.16
NOR gate: ... 4.5
Northern California DX Foundation (NCDXF): ... 19.21
Norton equivalent circuit: ... 2.10
Norton's Theorem: ... 2.10
Notch filter: ... 11.2
NTSC (analog TV): ... 8.18
Number systems: ... 4.2ff
Binary: ... 4.2
Binary coded decimal (BCD): ... 4.3
Conversion techniques: ... 4.3
Hexadecimal: ... 4.3
Numerically controlled oscillator (NCO): ... 15.17
NVIS (*see* Near-vertical incidence skywave)
Nyquist
Criterion: ... 8.10, 15.6ff
Frequency: ... 3.49, 8.10, 15.6ff
Rate: ... 3.49, 15.6ff
Nyquist filter: ... 8.17
Nyquist sampling theorem: ... 3.49

O

O wave: ... 19.9
Occupied bandwidth: ... 8.21
Oersted (Oe): ... 2.32
OFDM (*see* Orthogonal frequency-division multiplexing)
Off-center fed dipole: ... 21.7
Offset quadrature phase-shift keying (OQPSK): ... 8.12
Ohm (Ω): ... 2.3
Ohm's law: ... 2.3

Power formulas: 2.12
Ohmmeter: 25.3
Oil-filled capacitor: 7.29
Olivia: 16.12
MFSK: 16.12
Orthogonal tones: 16.12
On-off keying (OOK): 8.8, 13.2
Open-collector output: 3.45
Open-wire line: 21.7
Operational amplifier (op-amp): 3.42
Active filter: 3.46
Common-mode rejection ratio (CMRR): 3.42
Comparator: 3.44
Compensation (frequency): 3.42
Difference amplifier: 3.44
Differential amplifier: 3.44
Gain: 3.42
Gain-bandwidth product (F_T, GBW): 3.42
Input and output impedance: 3.42
Input bias current: 3.42
Input offset voltage: 3.42
Instrumentation amplifier: 3.44
Inverting and non-inverting amplifier: 3.43
Log amplifier: 3.47
Open-loop gain: 3.42
Peak detector: 3.47
Power-supply rejection ratio (PSRR): 3.42
Rail-to-rail: 3.42
Rectifier circuit: 3.46
Specifications: 22.32
Summing amplifier: 3.44
Summing junction: 3.43
Transimpedance: 14.3
Unity-gain buffer: 3.44
Use of feedback: 3.43
Virtual ground: 3.43
Voltage-current converter: 3.47
Voltage-follower circuit: 3.43, 3.44
Optoisolator: 3.23, 4.20
Circuit design: 3.23
Current transfer ratio (CTR): 3.23
OR gate: 4.5
Order (filter): 11.3
Orthogonal frequency-division multiplexing (OFDM): 8.13
Oscillation: 3.4
Oscillator
Active device selection: 9.17
Audio frequency: 25.16ff
Capacitor selection: 9.15
Cavity resonator oscillator: 9.28
Crystal: 9.19ff
Crystal circuits: 9.22ff
Crystal test: 11.27
Dielectric resonator oscillator: 9.28
Disciplined: 25.11
Feedback loop: 9.3
Inductor selection: 9.17
LC circuits: 9.9ff
Logic-gate oscillator: 9.26
Negative resistance: 9.4
Numerically controlled (NCO): 15.17
Phase noise: 9.5ff, 12.17
RC circuits: 9.11
Resonator: 9.3
Shielding: 9.19
Start-up: 9.4
Temperature compensation: 9.18
Transmitter: 13.22
Troubleshooting: 26.24
Twin-T, audio: 25.16
UHF and above: 9.26
Variable crystal oscillator (VXO): 9.25
VFO construction: 9.15ff
Wien bridge: 25.16
YIG-tuned oscillator: 9.28
Oscillators and Synthesizers
Glossary: 9.47
References: 9.48
Oscilloscope: 25.11ff
AC measurement: 25.9
Analog: 25.11
Buying used: 25.16
Digital: 25.13
Dual-trace: 25.12
Features and specifications: 25.15ff
Probes: 25.14
Rise time and bandwidth: 25.13
Use for troubleshooting: 26.4
Use of: 25.14ff
X-Y mode: 25.13
OSI networking model: 16.17
Layers: 16.17
Protocol stack: 16.17
Out-of-band emissions: 27.4
Overmodulation: 10.5
Overshoot: 11.5
Ozonosphere: 19.6

P

P25: 16.29
APCO-25: 16.29
Continuous 4-level FM (C4FM): 16.29
Improved MultiBand Excitation (IMBE): 16.29
Tetra: 16.29
Packet error ratio (PER): 25.37
Packet radio (AX.25): 16.23
APRS: 16.24
Cluster: 16.23
Digipeater: 16.24
FTP: 16.24
KISS: 16.24
Packet bulletin-board systems (PBBS): 16.23
TCP/IP: 16.24
TNC interface: 16.23
PACTOR
Contact flow: 16.18
Link establishment: 16.18
PACTOR-I, -II, -III: 16.18
PACTOR-III link establishment: 16.19
Speed comparison: 16.18
Panadapter: 25.24
Parallel I/O interface: 4.20, 4.27ff
Parallel-bridge converter: 7.25
Paramagnetic: 2.32
Parasitic: 5.1
Capacitance (stray): 5.3, 5.5
Capacitance of inductors: 5.6
Effect on filter performance: 5.13
Effect on Q: 5.8
Effects of parasitic characteristics: 5.3
General component model: 5.3
Inductance: 5.3, 5.17
Inductance of capacitors: 5.5
Inductance of resistors: 5.4
Inductance per inch of wire: 5.3
Inter-electrode capacitance: 5.6
Leakage conductance: 5.3
Oscillation: 17.23, 17.34
Package capacitance: 5.6
Parasitic SCR: 3.27
Radiative losses: 5.10
Resistance: 5.3
Self-resonance: 5.9
Parasitic suppressor: 17.24, 17.32
Parasitics (oscillation): 27.4, 27.12
Part 15 devices: 27.4
Part 18 devices: 27.4
Passband (filter): 11.2
PC board construction: 23.20ff

PC board layout: 6.15ff
Annotation, forward and backward: 6.17
Annular ring: 6.18
Auto-placement: 6.20
Auto-router (autorouting): 6.22
Bill of Materials (BOM): 6.17
Board house: 6.17
Component and solder sides: 6.17
Component footprint: 6.16
Copper fill: 6.23
Design Rule Check (DRC): 6.23
Double- and multi-layer: 6.17
Drill file: 6.24
Excellon file: 6.24
Gerber file (RS-274X): 6.23
Net: 6.16
Netlist: 6.17
Panelizing: 6.18
Photoplotter: 6.24
Plated-through hole: 6.17
RF interference: 6.22
Routing (traces): 6.20
Silkscreen: 6.18
Software: 6.15ff
Solder mask: 6.18
Surface-mount component: 6.17
Symbol library: 6.16
Through-hole component: 6.17
Tin plating: 6.18
Trace current limits: 6.23
PC board material, FR4: 6.17
PCB fabrication services: 6.17ff
Peak and peak-to-peak values: 2.20
Peak detection: 3.5
Peak detector: 3.47
Peak envelope power (PEP): 2.21, 25.19
Peak inverse voltage (PIV, PRV): 3.15, 7.11
Peak power: 2.20
Peak surge current, I_{SURGE}: 7.11
Pedersen ray: 19.16
Peltier effect: 2.70
Pentode: 17.5
Performance requirements: 3.31, 6.2, 11.11
Period: 2.16
Permeability (μ): 2.32
Ferrite: 5.19
Of magnetic materials: 2.33
Phase: 2.17
Lag and lead: 2.17
Phase shift: 3.3
Phase angle (impedance): 2.44
Phase constant (β): 20.7
Phase detector: 9.31, 9.35
Phase modulation (PM): 8.6, 10.9
Transmitter: 13.8
Phase noise: 9.5ff, 12.17
Frequency synthesizer: 9.43
Measurement: 9.6
Reciprocal mixing: 9.7
Transmitted: 9.8
Phase response (filter): 11.2
Phase-locked loops (PLL): 9.30ff
Capture range: 9.32
Charge pump: 9.36
Demodulator: 10.13
Dynamic stability: 9.33
Frequency resolution (step size): 9.33
Lock range: 9.32
Loop bandwidth: 9.31, 9.33
Loop filter: 9.32, 9.39ff
Measurement and troubleshooting: 9.45
Modulator: 10.11
Noise: 9.33
Phase (frequency) detector: 9.35
Phase detector: 9.31
Prescaling: 9.38
Reference oscillator: 9.32, 9.39ff
Voltage-controlled oscillator (VCO): 9.32
Phased array: 21.69
Phasing line: 20.12
Phasing method (SSB generation): 8.5, 12.12, 13.6
Phasor diagram: 15.22
Photoconductivity: 3.21
Photoconductor: 3.8, 3.21
Photodiode: 3.21
Photoelectricity: 3.22
Photoisolator (*see* Optoisolator)
Photoresistor: 3.22
Phototransistor: 3.22
Optoisolator: 3.23
Photovoltaic cell: 3.22
Conversion efficiency: 3.23
Open-circuit, V_{OC}, or terminal, V_T, voltage: 3.22
Photovoltaic potential: 3.22
Short-circuit current, I_{SC}: 3.23
Solar panel: 3.23
Pi network: 5.26, 20.10
Impedance inversion: 5.26
RF power amplifier: 17.10
PI-EL Design by W4ENE: 17.10
Pi-L network
Component selection: 17.11
RF power amplifier: 17.10
Table of values: 17.12
PICAXE: 4.23
Picket fencing: 19.28
Piezoelectric effect: 9.19
Pilot carrier: 13.8
PIN diode: 3.15
Pinch-off: 3.12
Pinouts: 3.7
PL-259 connector: 29.7
Plasma frequency: 19.8
Plastic repair and restoration: 26.38
PN junction: 3.8
Anode: 3.9
Barrier (threshold) voltage: 3.9
Cathode: 3.9
Depletion region: 3.9
Forward resistance: 3.9
Forward voltage drop: 3.10
Fundamental diode equation: 3.9
Junction capacitance: 3.15
Recombination: 3.8
Response speed, recovery time: 3.15
Reverse breakdown voltage: 3.15
Reverse leakage current: 3.9, 3.15
Reverse-bias saturation current, I_S: 3.10, 3.15
PNPN Diode: 3.10
Point-contact diode: 3.15
Polar cap absorption (PCA): 19.12
Polarity (phase): 2.18
Polarity (voltage): 2.1
Polarization
Antenna: 21.2, 21.55
Circular: 21.56
Radio wave: 19.9
Pole (transfer function): 3.4, 11.20, 11.23
Port, electronic: 25.24
Portable operation: 29.15ff
Antennas: 29.18ff
DC power sources: 29.17
Power sources: 29.15ff
Potentiometer: 2.6
Taper (log, audio): 2.6
Powdered-iron core: 22.12
Power: 2.11
Horsepower (hp): 2.11
Joule (J): 2.2
Station: 29.2

Watt (W): ... 2.11
Watt-hour (Wh): ... 2.11
Power density
Spectral: ... 5.30
Power divider: ... 25.29
Power factor: ... 2.49
AC measurement: ... 25.8
Power filtering
Bleeder resistor: ... 7.12
Capacitor-input: ... 7.13
Choke inductor constant (A): ... 7.14
Choke-input: ... 7.14
Swinging choke: ... 7.14
Power strip load rating: ... 28.2
Power supply: ... 7.1ff
Fault symptoms: ... 26.22
Use for troubleshooting: ... 26.5
Power supply regulation: ... 7.12
Crowbar OVP circuit: ... 7.20
Foldback current limiting: ... 7.18
Linear regulator: ... 7.16
Load resistance: ... 7.12
MOSFET: ... 7.17
Over-voltage protection (OVP): ... 7.20
Overcurrent protection: ... 7.17
Pass transistor: ... 7.16
Pass transistor power dissipation: ... 7.16
Remote sensing: ... 7.16
Series and shunt regulator: ... 7.15
Three-terminal voltage regulator: ... 7.18
Voltage regulation: ... 7.12
Zener diode regulator: ... 7.15
Power-line noise: ... 27.15, 27.18ff
Cooperative agreement: ... 27.22
Corona discharge: ... 27.21
Noise-locating equipment: ... 27.19
Signature or fingerprint: ... 27.20
Ultrasonic location: ... 27.19
Utility complaint: ... 27.18
Powerpole, Anderson: ... 29.6
Powerstat (transformer): ... 2.66
Preamplifier: ... 12.18
Noise: ... 5.32
Precipitation static: ... 19.31
Precision (value): ... 2.4
Precision rectifier circuit: ... 3.46
Precision resistor: ... 2.4, 22.2
Prescaler: ... 9.38, 25.9
Preselector: ... 11.1
Primary battery: ... 7.32
Probe
Logic: ... 25.36
Oscilloscope: ... 25.14
RF: ... 25.18
Sniffer: ... 25.22
Voltage: ... 25.22
Processing gain: ... 8.14
Product detector: ... 8.5
Programmable Array Logic (PAL): ... 4.20
Programmable gate array (PGA): ... 3.27, 4.22
Programmable logic device (PLD): ... 4.19, 4.22, 15.3
Propagation: ... 19.1ff
Back- and sidescatter: ... 19.18
Below AM broadcast: ... 19.32
Chart: ... 19.19
D layer: ... 19.13
Delay (digital circuit): ... 4.4
E layer: ... 19.13ff
Emerging theories: ... 19.19
F layer: ... 19.16ff
Forecast: ... 19.20ff
Glossary: ... 19.31
References: ... 19.33
Sky wave: ... 19.6ff
Software: ... 19.21, 19.22
Space communication: ... 19.30ff
Summary by band: ... 19.4ff
Tropospheric: ... 19.22ff
VHF/UHF mobile: ... 19.27ff
PropLab Pro: ... 19.22
Protocol, digital
APRS: ... 16.24
Automatic repeat request (ARQ): ... 16.2, 16.17
B2F: ... 16.26
Broadcast: ... 16.17
CLOVER: ... 16.20
Connected and connectionless: ... 16.17
D-STAR: ... 16.27
G-TOR: ... 16.20
Multicast: ... 16.17
P25: ... 16.29
Packet radio (AX.25): ... 16.23
PACTOR: ... 16.18ff
RMS: ... 16.26
SMTP: ... 16.24
Stack: ... 16.17
TCP/IP: ... 16.17, 16.24
TELNET: ... 16.24, 16.26
Terminal node controller (TNC): ... 16.17
UDP: ... 16.17
Unicast (point to point): ... 16.17
WINMOR: ... 16.22
PSK31: ... 16.8
BPSK, QPSK: ... 16.9
Convolution code: ... 16.9
Dibit: ... 16.9
Envelope modulation: ... 16.9
Phase-shift modulation: ... 16.9
PSK63, PSK125: ... 16.9
Varicode: ... 16.9
Viterbi algorithm: ... 16.9
PSPICE: ... 6.14
Public service: ... 1.18
Public-address equipment RFI: ... 27.34
Pull-up resistor: ... 3.45
Pulse modulation: ... 8.9
Pulse noise reduction: ... 12.26
Pulse-amplitude modulation (PAM): ... 8.10
Pulse-position modulation (PPM): ... 8.10
Pulse-width modulation (PWM): ... 8.10
Switchmode power conversion: ... 7.22, 7.26
Push-to-talk (PTT): ... 13.29

Q

Q section: ... 20.12
QAM (*see* Quadrature amplitude modulation)
QRP (Low power operating): ... 1.15
QSL card: ... 1.14
Quad antenna: ... 21.39
QuadNet by W4ENE: ... 11.21
Quadrature amplitude modulation (QAM): ... 8.11ff
Quadrature detector: ... 10.12
Quadrature phase shift keying (QPSK): ... 8.12, 10.24
Quality factor (Q): ... 2.50
Amplifier tank circuit: ... 17.9
Loaded: ... 2.61
Loaded and unloaded: ... 5.13
Of components: ... 2.50
Unloaded: ... 2.55
Quantization: ... 15.6ff, 15.9ff
Quantization error: ... 15.2, 15.3.50, 15.10

R

Radians: ... 2.17, 11.4
Radiated emissions: ... 27.6
Radiation
Ionizing and non-ionizing: ... 28.20
Radiation inversion: ... 19.24

Radiation pattern: 21.4, 21.56
Radiation resistance: 21.2
Radio Amateur Civil Emergency Service (RACES): 1.18
Radio direction finding (RDF): 1.17, 21.66ff
  Doppler shift: 21.73
  Electronic antenna rotation: 21.70
  Methods at VHF/UHF: 21.70
  RFI: 27.18
  Switched antennas: 21.72
  Time of arrival: 21.72
Radio frequency (RF): 2.18
Radio frequency interference (RFI): 27.1ff
  AC line (brute-force) filter: 27.24
  Alternator whine: 27.37
  Audio equipment: 27.33
  Audio filter: 27.34
  Automotive: 27.36
  Bypass capacitors: 27.23
  Choke placement: 27.29, 27.35
  Common-mode: 27.9, 27.22
  Common-mode choke: 27.25ff
  Computers and accessories: 27.34
  Consumer Electronics Association (CEA): 27.17
  Cooperative agreement: 27.22
  Corona discharge: 27.21
  Differential mode: 27.9, 27.22
  Electric fence: 27.15
  Electric vehicle (EV): 27.39
  Electrical noise: 27.15
  Fundamental overload: 27.12ff
  Glossary: 27.42
  Ground: 27.13
  Ground loop: 27.13
  Ground-fault circuit interrupters (GFCI): 27.35
  Harmful interference: 27.4
  High-pass filter: 27.3, 27.23
  Hybrid-electric vehicle (HEV): 27.39
  Identifying: 27.13
  Ignition noise: 27.38
  Immunity: 27.4, 27.9
  Intermodulation distortion (IMD): 27.4, 27.12ff
  Keeping a log: 27.14
  Locating source of: 27.16
  Low-pass filter: 27.3, 27.23
  Non-linear junction: 27.16
  Notch filter: 27.28
  Path: 27.9
  Power-line noise: 27.15, 27.18ff
  Product review testing: 27.4
  Public-address equipment: 27.34
  References: 27.43
  Source: 27.9
  Speakers: 27.34
  Survival kit: 27.27
  Susceptibility: 27.3ff
  Switching supplies: 27.35
  Telephone: 27.32
  Transmitters: 27.27
  Troubleshooting: 27.26ff
  Ultrasonic location: 27.19
  Utility complaint: 27.18
  Victim: 27.9
Radio horizon: 19.23
Radio propagation: 19.1ff
Radio spectrum: 2.18
  Classifications: 2.19
Radiosport (contesting): 1.12
Radioteletype (RTTY): 16.6
  AFSK, FSK: 16.6
  Baudot code: 16.6
  Diddle character: 16.6
  F1B *versus* F2B: 16.6
  Fading: 16.8
  Inverted or reverse shift: 16.6
  Keyed AFSK: 16.6
  Mark: 16.6
  Minimal shift keyed (MSK): 16.8
  Shift, LTRS and FIGS: 16.6
  Shifts: 16.8
  Space: 16.6
  Spotting an RTTY signal: 16.6
  Start and stop bit: 16.6
  Terminal Unit (TU): 16.6
  Tone pair: 16.6
  Unshift-on-space (USOS): 16.8
  USB and LSB: 16.6
Rain scatter: 19.24
Ramp wave: 2.16
Rate of change (Δ): 2.34
Rayleigh fading: 19.27
RC time constant (τ): 2.25
Reactance (X): 2.27
  Capacitive (X_C): 2.27
  Chart *versus* frequency: 2.40
  Complex waveforms: 2.44
  Inductive (X_L): 2.40
  Like, in series and parallel: 2.41
  Ohm's law for reactance: 2.40
  Unlike, in parallel: 2.42
  Unlike, in series: 2.42
Reactance modulator: 10.10
Reactive power (VA): 2.49
Reber, Grote W9GFZ: 14.1
Receive converters
  VHF and UHF: 12.29
Receiver
  Automatic gain control (AGC): 12.23ff
  Bandwidth, various modes: 12.7ff
  Beat frequency oscillator (BFO): 12.2
  Direct conversion: 12.3ff
  Dynamic range: 12.1, 12.19
  FM: 12.28ff
  Frequency accuracy: 25.33
  Frequency stability: 25.33
  Front end: 12.2
  Image: 12.4, 12.9
  Image rejection: 12.9, 12.12, 12.19
  Intercept point (IP): 10.16
  Intermediate frequency (IF): 12.2
  Intermediate frequency (IF) selection: 12.9
  Limiting, FM: 12.29
  Noise and sensitivity: 12.17
  Noise figure: 12.18
  Noise floor: 12.1
  Preamplifier: 12.18
  Selectivity: 12.1
  Sensitivity: 12.1, 12.17, 25.29
  Software defined radio (SDR): 15.25ff
  Superheterodyne (superhet): 12.2, 12.7ff
  Third-order intercept point (IP3): 10.16
  Troubleshooting: 26.25
  Two-tone IMD test: 10.16
  UHF and microwave: 12.30ff
  Up- and down-converting: 12.19
  VHF and UHF: 12.28ff
Reciprocal mixing: 9.7, 25.31
Recombination: 3.8
Reconstruction filter: 15.8
Rectification: 3.5, 7.4
Rectifier: 7.10
  Average dc current rating, I_0: 7.11
  Circuits: 3.17
  Current inrush: 7.11
  Equalizing resistors: 7.11
  Fast-recovery: 7.10
  Heat sinking: 7.12
  Inrush current limiting: 7.11
  Parallel diodes: 7.11
  Peak inverse voltage (PIV, PRV): 7.11
  Peak repetitive forward current, I_{REP}: 7.11

Peak surge current, I_{SURGE}: ... 7.11
Power dissipation: ... 7.11
Ratings and protection: ... 7.11
Reverse recovery time: ... 7.11
Schottky diode: ... 7.10
Semiconductor: ... 7.10
Series diode strings: ... 7.11
Switching speed: ... 7.11
Thermal resistance (θ): ... 7.11
Reed-Solomon code: ... 16.15
References
Analog basics: ... 3.59
Antenna: ... 21.75
Antenna safety: ... 28.21
Computer-Aided Circuit Design: ... 6.24
D-STAR: ... 18.16
Digital electronics: ... 4.31
Digital modes: ... 16.33
Digital signal processing (DSP): ... 15.31
Electrical safety: ... 28.12
Filters: ... 11.44
Mixers, Modulators and Demodulators: ... 10.29ff
Modulation: ... 8.25
Oscillators and Synthesizers: ... 9.48
PC-board layout: ... 6.24
Power sources: ... 7.47
Propagation: ... 19.33
Radio frequency interference (RFI): ... 27.43
Receivers: ... 12.36
Remote stations: ... 29.27
RF power amplifier: ... 17.50
RF techniques: ... 5.37
Software defined radio (SDR): ... 15.31
Telemetry and Navigation Data: ... 14.11
Test equipment and measurements: ... 25.54
Transmission lines: ... 20.29
Transmitters and Transceivers: ... 13.39
Troubleshooting: ... 26.39
Reflection: ... 19.2
Reflection coefficient (Γ,ρ): ... 5.36, 20.4
Conversion between attenuation, SWR, return loss: ... 22.61
Refraction: ... 19.2
Ionospheric: ... 19.7
Tropospheric: ... 19.24
Refractive index: ... 19.2
Regeneration: ... 3.4
Register
Formed by flip-flops: ... 4.11
Shift: ... 4.11
Storage: ... 4.11
Relay: ... 2.14
Configurations: ... 2.14
Construction: ... 2.14
Ratings: ... 2.14
Types of relays: ... 2.15
Reluctance ($\Re$): ... 2.33
Remote sensing: ... 14.1
Batteries: ... 14.9
HF payloads: ... 14.11
High-altitude: ... 14.10
Payloads: ... 14.10
Platform design: ... 14.9
Remote stations: ... 29.19ff
Basic HF station: ... 29.25
Connecting and controlling: ... 29.20ff
Electrical power: ... 29.21
Ethernet bridge: ... 29.24
Insurance and security: ... 29.22
Internet and telephone access: ... 29.24
Internet bandwidth: ... 29.24
Latency: ... 29.24
Licensing: ... 29.22
Property and access: ... 29.21
Requirements: ... 29.20
Resources: ... 29.25
Safety: ... 29.22
Site preparation: ... 29.21
Repeater: ... 18.1ff
AM and SSB: ... 18.2
Amateur television (ATV): ... 18.2
Closed: ... 18.6
Controller: ... 18.4
Coordination: ... 18.2, 18.9
D-STAR ... 18.12ff
D-STAR hardware: ... 18.13
Digital: ... 18.2, 18.3
Digital voice: ... 18.15
DMR: ... 18.14
Duplexer: ... 18.4
FM voice: ... 18.2, 18.4ff
Glossary: ... 18.12
History: ... 18.1
Internet linking: ... 18.10
Linking: ... 18.4, 18.9
Narrowbanding: ... 18.9
Offsets, standard: ... 18.9
Operation (FM voice): ... 18.4
P25: ... 18.15
Remote receiver: ... 18.5
Rules and regulations: ... 18.3
Timer: ... 18.4
Tone access: ... 18.6
Reserve capacity, battery (RC): ... 7.44
Resistance (R): ... 2.3
Bridge circuits: ... 25.3
Effect of temperature: ... 2.4
Equivalent resistance: ... 2.7
Four-wire resistance measurement: ... 25.5
Ohmmeter: ... 25.3
Resistivity (ρ): ... 2.3
Resistor: ... 2.2, 2.5
Bleeder: ... 7.13
Carbon composition (carbon comp): ... 22.2
Carbon film: ... 22.2
Color code: ... 22.3
EIA identification and marking: ... 22.4
Equalizing: ... 7.29
Metalized film: ... 22.2
Non-inductive: ... 5.4
Package dimensions: ... 22.3
Parallel resistors: ... 2.7
Parasitic inductance: ... 5.4
Parasitic inductance model: ... 5.4
Power: ... 22.4
Precision: ... 2.4, 22.2, 25.3
Pull-up: ... 3.45
Resistor pack: ... 3.44
Series resistors: ... 2.8
Standard values: ... 22.5
Temperature coefficient (tempco): ... 2.5
Thick-film power: ... 22.3
Thin-film resistor: ... 3.26
Types of resistors: ... 2.5
Wire-wound: ... 22.3
Resolution: ... 25.2
Resolution bandwidth (RBW): ... 25.21
Resonance: ... 2.43, 9.1
Of ferrite cores: ... 5.20
Resonant circuits: ... 2.55
Antiresonance: ... 2.57
Bandwidth: ... 2.57
Circulating current: ... 2.60
Parallel: ... 2.58
Parallel, above and below resonance: ... 2.59
Parallel, loaded Q: ... 2.61
Parallel, use for impedance matching: ... 2.61
Resonant frequency: ... 2.55
Selectivity: ... 2.56
Series: ... 2.56
Series and parallel: ... 2.43

Series, unloaded Q: ... 2.56
Resonant frequency: ... 2.55
Return loss (RL): ... 5.36, 11.11, 20.4
Converting between attenuation, reflection coefficient, and SWR: ... 22.61
Return loss bridge (RLB): ... 25.24
Reverse Beacon Network: ... 19.21
Reverse bias: ... 3.9
Reverse breakdown voltage: ... 3.15
Reverse leakage current: ... 3.9
RF ammeter: ... 25.19, 25.45
RF amplifier
Feedback: ... 5.17
Power amplifiers: ... 17.1ff
RF choke: ... 2.55, 17.16, 22.10
RF connectors: ... 22.46ff, 29.7
RF exposure and safety: ... 28.21ff
Cardiac pacemakers: ... 28.26
Environments, controlled and uncontrolled: ... 28.24
FCC exposure regulations: ... 28.25
Low-frequency fields: ... 28.27
Maximum permissible exposure (MPE): ... 28.22
MPE limits table: ... 28.25
Power density: ... 28.28
Power threshold table: ... 28.26
RF awareness guidelines: ... 28.29
RF Exposure and You: ... 28.29
RF safety standards: ... 28.24
Specific absorption rate (SAR): ... 28.22
Station evaluation: ... 28.26
Thermal and athermal effects: ... 28.22
RF heating: ... 2.70, 5.8
RF impedance measurements: ... 25.24
RF interference (RFI): ... 27.1ff
Automotive: ... 29.14
RF measurements: ... 25.18ff
RF power amplifier: ... 17.1ff
RF power measurements: ... 25.19
RF power modules
Specifications: ... 22.31
RF power transistors (MOSFET)
Specifications: ... 22.28ff
RF probe: ... 25.18
RF sniffer: ... 27.41
RF transformers: ... 5.27
Air-core resonant: ... 5.27
Binocular core: ... 5.29
Broadband ferrite: ... 5.28
RF Voltmeter: ... 25.54
Right-hand rule: ... 2.32
Ringing (filter): ... 11.5
Ripple: ... 7.4
Bandwidth (filter): ... 11.3
Filter: ... 11.3
Frequency: ... 7.13
Voltage: ... 7.13
Rise and fall time
Keying: ... 25.35
RJ connector: ... 29.8
RL time constant (τ): ... 2.37
Roll-off: ... 3.5
Roll-off (filter): ... 11.3
Root-mean-square (RMS): ... 2.20, 25.8
Non-sinusoidal waveforms: ... 25.8
Rope: ... 28.15
RS-232: ... 4.25, 4.28
RS-274X: ... 6.24
RS-422: ... 4.29
Run length encoding (RLE): ... 16.4
Ruthroff transformer: ... 20.21

S

S (scattering) parameters: ... 5.35
S-R flip-flop: ... 4.9
Safe operating area (SOA): ... 3.14, 7.17
Safety
Antenna: ... 28.13ff
Bleeder resistor: ... 7.30
Chemical properties and hazards: ... 23.2
Electrical: ... 28.1ff
Electrical safety rules and guidelines: ... 26.1ff
Generator: ... 29.15
Remote stations: ... 29.22
RF exposure: ... 28.21ff
Soldering: ... 23.9
Workbench and shop: ... 23.1ff
Safety ground: ... 7.2
Safety, electrical: ... 28.1ff
Back-feeding ac line: ... 28.5
Class 1, 2, 3 wiring: ... 28.5
Distribution box: ... 28.3
Energized circuits: ... 28.11
Lockout: ... 28.2
National Electrical Code (NEC): ... 28.2
References: ... 28.12
Solar panel: ... 28.11
Uninterruptible power supply (UPS): ... 28.11
Safety, RF exposure: ... 28.21ff
Sample rate: ... 15.2
Sampling, analog-digital conversion: ... 15.6ff
Satellite
Propagation: ... 19.30
Space weather: ... 19.21
Satellites (amateur): ... 1.15
Saturation (magnetic): ... 2.34
Saturation (semiconductor): ... 3.11
Sawtooth wave: ... 2.16
Scalar network analyzer: ... 25.25
Scale, meter: ... 25.7
Scaling: ... 3.1
Scatter
Forward: ... 19.12
Rain: ... 19.23
Tropospheric: ... 19.23
Scattering: ... 19.2
Scattering (S) parameters: ... 25.25
Schematic capture
Subcircuits: ... 6.6
Schematic capture software
Eagle: ... 6.16
Kicad: ... 6.16
Schematic diagram: ... 2.2
Schottky barrier: ... 3.15
Schottky diode ... 3.15
Scintillation: ... 19.26, 19.30
SCR (*see* Silicon controlled rectifier)
Screen grid: ... 17.5
SDR (*see* Software defined radio)
Secondary (battery): ... 7.32
Secondary emission: ... 17.5
Section Manager (SM): ... 27.2
Selective fading: ... 8.4, 8.10
Selectivity: ... 12.1
Self-discharge: ... 7.32
Self-resonance: ... 5.9
Semiconductor
Acceptor and donor impurities: ... 3.8
Compound: ... 3.8
Cross-reference: ... 26.10
Cutoff (semiconductor): ... 3.11
Depletion region: ... 3.9
Doping: ... 3.8
Extrinsic: ... 3.8
Free electron: ... 3.8
Hole: ... 3.8
Intrinsic: ... 3.8
Junction semiconductor: ... 3.9
Majority and minority carriers: ... 3.8
Monocrystalline: ... 3.8

N-type, P-type: ... 3.8
Photoconductor: ... 3.8
PN junction: ... 3.8
Polycrystalline: ... 3.8
Recombination: ... 3.8
Safe Operating Area (SOA): ... 3.14
Saturation: ... 3.11
Substitution: ... 26.11
Substrate: ... 3.12
Temperature effects: ... 3.14
Thermal runaway: ... 3.14
Sensitivity: ... 12.1, 12.17
Sensors: ... 14.1ff
Calibration: ... 14.4
Capacitance-based: ... 14.3
Current-based: ... 14.2
Digital interfaces: ... 14.4
Powering: ... 14.6
Remote sensing: ... 14.1
Resistance-based: ... 14.2
Voltage-based: ... 14.3
Sequencing, transverter: ... 13.35
Sequential logic: ... 4.8ff
Serenade: ... 6.10
Serial I/O interface: ... 4.20ff, 4.27ff
IEEE-1394 (FireWire): ... 4.29
RS-232: ... 4.28
RS-422: ... 4.29
Universal serial bus (USB): ... 4.29
Serial Peripheral Interface (SPI): ... 4.20, 4.21, 14.5
Service monitor: ... 25.36
Shack notebook: ... 26.6
Shannon-Hartley theorem: ... 8.17
SHF (frequency range classification): ... 2.19
Shield, RFI: ... 27.22
Shielding, oscillator: ... 9.19
Shift register: ... 4.11
Shock hazards and effects: ... 26.1, 28.12
Shock mounts: ... 29.9
Short skip: ... 19.13
Shortwave broadcast bands: ... 19.22
Shunt feed: ... 21.25
Sidescatter: ... 19.18
Siemens (S): ... 2.3, 2.28, 2.39
Signal generator: ... 25.26
Use for troubleshooting: ... 26.5
Signal injector
Use for troubleshooting: ... 26.5
Signal source
Use for troubleshooting: ... 26.5
Signal to noise ratio (SNR): ... 5.30
Signal tracing: ... 26.6
Signal tracing and injection: ... 26.15ff
Signal-to-noise and distortion ratio (*see* SINAD)
Signal-to-noise ratio (SNR): ... 3.28, 12.1
Silicon (device): ... 3.9
Silicon controlled rectifier (SCR): ... 3.11
Anode gate: ... 3.11
Cathode gate: ... 3.11
Use in a crowbar circuit: ... 3.11
Use in ac power control: ... 3.11
Simplex: ... 18.2
Simplex repeater: ... 14.10
SINAD: ... 3.49, 25.30
Sinc function: ... 8.17, 15.8
Sine wave: ... 2.16
Sine wave generation (DSP): ... 15.17ff
Single sideband (SSB): ... 8.5, 10.7
DSP modulator and demodulator: ... 15.22ff
Filter method: ... 8.5, 13.5
Lower and upper sideband (LSB and USB): ... 8.5
Phasing method: ... 8.5, 13.6
Single-sideband, suppressed-carrier: ... 13.5
Weaver method: ... 8.5, 13.6, 15.24
Skeleton slot antenna: ... 21.43
Skew path: ... 19.19
Skin effect: ... 5.6, 5.8, 20.1
Skin depth (δ): ... 5.8
Skip zone: ... 19.8
Sky wave propagation: ... 19.6ff
Slew rate: ... 3.2
Slow-scan television (SSTV): ... 8.19, 16.13
Analog modes: ... 8.19
Digital modes: ... 8.20
Frame sequential: ... 8.19
Line sequential: ... 8.19
Redundant digital file transfer (RDFT): ... 8.20
Remote sensing: ... 14.10
Vertical interval signaling (VIS): ... 8.19
Small-signal transistor model: ... 3.29, 5.16
BJT: ... 3.29
FET: ... 3.36
Smith chart: ... 20.4
Sniffer probe: ... 25.22
Snubber network: ... 2.38
Software
4nec2 by Arie Voors: ... 21.21
AADE Filter Design and Analysis: ... 11.26
Airmail: ... 16.26
Analog Filter Wizard by Analog Devices: ... 11.22
ASAPS: ... 19.22
CODEC2 by VK5DGR: ... 16.16
*d*Chat*: ... 16.29
D-RATS: ... 16.29
Diplexer Designer by W4ENE: ... 11.41
Dplus: ... 16.29, 18.13
DPRS: ... 16.29
Dream: ... 16.15
Elsie by W4ENE: ... 11.9
ExpressPCB: ... 17.36, 17.49
EZNEC by W7EL: ... 21.21
FilterPro by Texas Instruments: ... 11.22
FLDIGI by W1KHJ: ... 16.5
FreeDV by KDØEAG and VK5DGR: ... 16.15
GC Prevue: ... 6.24
Gerbv: ... 6.24
Helical by W4ENE: ... 11.33
HFTA (HF Terrain Analysis): ... 29.21
IONCAP: ... 19.22
LTSpice: ... 17.11
MATCH by WØIYH: ... 20.11
Meter Basic by W4ENE: ... 17.49
Modulators and demodulators: ... 15.29
MUF prediction: ... 19.22
MultiPSK: ... 16.13
PC-board layout: ... 6.15ff
PI-EL Design by W4ENE: ... 17.10
PropLab Pro: ... 19.22
QuadNet by W4ENE: ... 11.21
SVC Filter Designer by W4ENE: ... 11.11, 17.31
TLW by N6BV: ... 20.4
TubeCalculator: ... 17.7ff
VOACAP: ... 19.22
W6ELProp: ... 19.22
Webench by National Semiconductor: ... 11.22
WinDRM by HB9TLK: ... 16.15
WSJT by K1JT: ... 16.14
Software (CAD)
Advanced Design System (*ADS*): ... 6.10
Ansoft Designer SV2: ... 6.2
ARRL Radio Designer: ... 6.5
AutoCAD: ... 6.3
B2 Spice: ... 6.3
EAGLE: ... 6.2
gEDA: ... 6.2
ICAP4: ... 6.15
Kicad: ... 6.2
LTSpice: ... 6.2
MICROCAP9: ... 6.15
OrCAD: ... 6.2

PSPICE: 6.14
RF-fluent: 6.9
Serenade: 6.10
Software defined radio (SDR): 15.1, 15.25ff
Control accessory: 24.34
Dynamic range: 15.26
Glossary: 15.32
Hardware: 15.25ff
Local oscillator (LO): 15.28
Modulators and demodulators: 15.29
References: 15.31
Sampling at RF: 15.27
Software architecture: 15.28ff
Speech processing: 15.30
Solar (Sunspot) Cycle 24: 19.11
Solar 27-day rotation: 19.12
Solar battery or cell (*see* Photovoltaic cell)
Solar cycle: 19.10
Solar flare: 19.12
Solar flux: 19.10
Solar panel: 3.23
Solar power
Remote stations: 29.21
Solar wind: 19.6
Soldering: 23.7ff
Desoldering: 23.9
Irons and guns: 23.7
Lead-free: 23.8
Printed-circuit board (PCB): 23.21
Reduction of Hazardous Substances (RoHS): 23.8
Safety: 23.9
Solder types: 23.7
Surface-mount technology (SMT): 23.11
Solenoid: 2.14
Solenoidal coil: 2.32
Solid-state relay: 4.20
Sound card: 16.5
Test equipment: 25.38
Source, RFI: 27.11
Source-follower (*see* Common-drain amplifier)
Space weather satellite: 19.22
Span, frequency: 25.21
Speakers
RFI: 27.34
Twisted-pair cable: 27.34
Specific energy (battery): 7.33
Specific power (battery): 7.33
Spectral power and voltage density: 5.30
Spectral purity
Transmitter: 25.33
Spectrum analyzer: 25.19ff
Features and specifications: 25.23ff
Tracking generator: 25.23
Use of: 25.21ff
Spectrum, frequency range classifications: 2.19
Speech
Clipping, AF: 13.11
Clipping, IF: 13.13
Compression: 13.11
Processing: 13.10
Processing, with digital signal processing (DSP): 15.30
Spike (*see* Transient)
Splatter: 8.21
Split operation: 18.2
Repeater offsets: 18.9
Splitter, power: 20.21
Sporadic E propagation: 19.13
Spread spectrum (SS): 8.14ff, 16.12
Chip rate: 8.15
Code-division multiple access (CDMA): 8.16
Direct sequence (DSSS): 8.16, 16.12
Frequency hopping (FHSS): 8.15
Processing gain: 8.14
Spreading: 16.12
Spurious emissions: 27.4ff, 27.12
Spurious response
Spectrum analyzer: 25.21
Spurious signals
Transmitter: 13.16
Spurious-free dynamic range (SFDR): 3.49, 15.2
Square wave: 2.16
Square-law device: 3.37
Squegging (squeeging): 9.11
Squelch: 18.8
Sensitivity test: 25.32
SSNe: 19.21
SSTV (*see* Slow-scan television)
Standard cell (battery) sizes: 7.32
Standard frequency stations: 25.11
Standards
Measurements: 25.1
Traceability and transfer: 25.1
Standing-wave ratio (SWR, VSWR, ISWR): 20.4
Bridge: 20.24
Bridge, audible: 24.20
Conversion of attenuation, reflection coefficient, and return loss: 22.61
Converting to return loss: 5.36
Flat line: 20.4
Myths about: 20.16
Star ground: 27.13
Static (precipitation): 19.31
Station
Accessory projects: 24.1ff
Assembly: 29.1ff
Documentation: 29.8
Layout: 29.2ff
Location: 29.1
Power: 29.2
Stefan-Boltzmann's constant (k): 5.30, 5.33
Step recovery diode (SRD): 13.7
Stethoscope
Use for troubleshooting: 26.6
Stop band (filter): 11.2
Stop band depth and frequency: 11.4
Storage register: 4.11
Stratosphere: 19.6
Stripline: 11.29
Stub (transmission line): 20.7
As filters: 20.7
Combinations: 20.8
Connecting: 20.8
Field Day stub filters: 20.9
Measuring: 20.8
Quarter- and half-wave: 20.7
Universal: 20.24
Subaudible tone: 18.8
Subaudible tone (*see also* CTCSS): 18.6
Substitution guide (semiconductor): 3.8
Sudden ionospheric disturbance (SID): 19.12
Summing amplifier: 3.44
Sunspot: 19.10
Sunstone Circuits (PCB vendor): 6.16
Superheterodyne (superhet) receiver: 12.2, 12.7ff
Bandwidth, various modes: 12.7
Collins system: 12.11
Crystal lattice filters: 12.10
IF selection: 12.9
Multiple conversion: 12.11
Sensitivity: 12.17
Superheterodyne (transmitter): 13.9
Superposition: 3.1
Suppression, sideband
Measurement: 25.34
Surface acoustic wave (SAW): 11.28
Surface-mount technology (SMT): 22.2, 23.10
Package types: 23.10
Soldering: 23.11

Susceptance (B): 2.28
Capacitive (B_C): 2.28
Inductive (B_L): 2.39
Susceptibility, RF: 27.3ff
SVC Filter Designer by W4ENE: 11.11, 17.31
Sweep, oscilloscope: 25.12
Swinging choke: 7.14
Switch: 2.12
Make and break: 2.13
Poles and positions: 2.13
Ratings: 2.13
Types of switches: 2.13
Switched-capacitor filter (SCAF): 11.19
Switching circuit: 3.41
Circuit design: 3.41
High-side and low-side switching: 3.41
Power dissipation: 3.41
Reactive loads: 3.41
Transistor selection: 3.41
Switching mixer: 10.18ff
Switching supplies (also *see* Switchmode power supplies)
RFI: 27.35
Switching time: 5.14
Switchmode power conversion: 7.21
Boost converter: 7.23
Bridge converter: 7.25
Buck converter: 7.21
Buck-boost converter: 7.23
Continuous conduction mode (CCM): 7.22
Design aids and tools: 7.28
Discontinuous conduction mode (DCM): 7.22
Flyback converter: 7.23
Forward converter: 7.25
Pulse-width modulation: 7.22, 7.26
RFI: 7.21, 27.13
Switching loss: 7.21
SWR meter: 25.37, 26.4
SWR monitor: 24.4
Symbol library (PCB layout): 6.16
Symbol rate: 8.8
Synchronicity (logic): 4.8
Synchronous detector: 8.4
Synchronous transformer: 20.12
Synthesizer, frequency 9.30ff
Direct digital synthesis (DDS): 15.17
System Fusion (Yaesu): 16.29, 18.15

T

T antenna: 21.28
T match: 21.38
T network: 5.26, 20.10
Design: 20.15
Tank circuit: 9.1, 17.9ff
Component ratings: 17.15ff
Efficiency: 17.10
Flywheel effect: 17.9
Manual design methods: 17.12
Tayloe mixer: 10.28ff
TCP/IP: 16.23
Technical Coordinator (TC): 27.2
Technical Coordinator (TC), ARRL: 26.2
Technical Specialist (TS), ARRL: 26.2
Telemetry: 14.7
Digital modes: 14.8
Non-licensed: 14.8
Telephone
RFI: 27.32
RFI filter: 27.33
Television interference (TVI): 27.1, 27.27ff
Analog TV: 27.29
Cable TV: 27.30ff
Channel guide: 27.30
Digital TV: 27.29
DVD and VCRs: 27.32
Electrical noise: 27.30
Fundamental overload: 27.27
High-pass filter: 27.28
Preamplifiers: 27.28
Spurious emissions: 27.29
Temperature
Antenna: 5.31
Excess: 5.30
Noise: 5.30
Temperature coefficient (tempco): 2.5, 22.2
Capacitor: 2.29
Temperature compensated oscillator: 9.21
Temperature compensation: 2.71
Oscillator: 9.18
Temperature inversion: 19.24
Temperature sensor: 3.59
Terminal node controller (TNC): 16.17
Modem: 16.17
Multi-protocol controller (MPC): 16.17
Multimode communications processor (MCP): 16.17
Terminations: 25.15, 25.27
Tesla (T): 2.32
Test equipment
Troubleshooting: 26.3ff
Test probes: 26.4
Inductive pickup: 26.4
Use for troubleshooting: 26.4
Tetra (protocol): 16.29
Tetrode: 17.5
Thermal conductivity (k): 2.67
Thermal resistance (θ): 2.67
Rectifier: 7.11
Thermal runaway: 3.14
Thermionic emission: 17.4
Thermistors: 2.71
Thermocouple detector: 25.19
Thevenin equivalent circuit: 2.9
Thevenin's Theorem: 2.9
Thin-film resistor: 3.26
Third-order intercept point (IP3): 10.16, 25.31
Thompson, Sir William (Lord Kelvin: 25.1
Three-terminal voltage regulator: 7.18
Adjustable regulator: 7.19
Current source: 7.20
Increasing output current: 7.20
Low dropout regulator: 7.19
Throb: 16.12
Thyristor: 3.10
Time base
Frequency counter: 25.9ff
Time constant (τ)
RC: 2.25
RL: 2.37
Time Division Multiple Access (TDMA): 16.31, 18.14
Time domain: 2.17, 25.19
Time standard stations: 25.11
Time-invariant: 3.1
Timer (multivibrator) IC: 3.55
Astable (free-running): 3.55
Monostable (one-shot): 3.55
TLW by N6BV: 20.4
Tolerance: 2.4, 22.2
Tone
Decoder, DSP: 15.19
Repeater access: 18.6
Tools
Care of: 23.3
Recommended for electronics: 23.4
Toroid winding: 5.29
Total harmonic distortion+noise (THD+N): 3.49
Tower
Base, concrete: 28.15
Carabiner: 28.15
Climbing harnesses and belts: 28.19
Climbing safety: 28.19

Crank-up: ... 28.9
Erection and maintenance: ... 28.15
Gin-pole: ... 28.15
Ground crew: ... 28.19
Guy wires, lengths to avoid: ... 22.40
Guyed: ... 28.14
Guying and guy wires: ... 28.16
Legal considerations: ... 28.13
Roof-mounted: ... 28.15
Ropes: ... 28.15
Safety references: ... 28.21
Safety tips: ... 28.21
Self-supporting: ... 28.14
TIA-222: ... 28.13
Wind load: ... 28.13
TR switching: ... 13.30
Amplifier interfacing: ... 13.32
Tracking generator: ... 25.23
Transceiver
Architecture: ... 13.28ff
Break-in (CW): ... 13.29
Handheld: ... 18.7
Home station (FM voice): ... 18.7
Mobile (FM voice): ... 18.7
Push-to-talk (PTT): ... 13.29
Software defined radio (SDR): ... 15.25ff
TR switching: ... 13.30
Troubleshooting: ... 26.28
Upconverting: ... 13.28
Voice-operated-transmit (VOX): ... 13.29ff
Transconductance: ... 3.6
Forward transconductance, g_m: ... 3.19
Transducer: ... 2.16
Transequatorial propagation (TE): ... 19.19
Transfer characteristics: ... 3.3
Transfer function: ... 3.3, 3.27
Transfer switch: ... 28.5
Transformer: ... 2.62
50 Hz considerations: ... 7.3
Broadband (RF): ... 17.31
Color code: ... 22.15
Evaluating: ... 7.3
High-voltage: ... 7.30
Impedance matching: ... 20.12, 21.57
Impedance ratio: ... 2.64
Interwinding capacitance: ... 2.65
Isolation: ... 7.3
Laminations: ... 2.63
Leakage flux: ... 2.65
Leakage reactance: ... 2.65
Losses: ... 2.65
Magnetizing inductance: ... 7.3
Power: ... 7.3
Power ratio: ... 2.64
Primary and secondary: ... 2.62
RF: ... 5.27
Shielding: ... 2.66
Step-up and step-down: ... 2.63
Turns ratio: ... 2.63
Volt-ampere rating: ... 7.3
Voltage and current ratio: ... 2.63
Transient: ... 7.12
Transient protection
Gas tube: ... 7.12
Varistor: ... 7.12
Zener diode: ... 7.12
Transient suppressor diode (TVS): ... 3.17
Transimpedance amplifier: ... 14.3
Transistor
Gain *versus* frequency: ... 5.16
Switching circuits: ... 3.41
Transistor array IC: ... 3.54
Transistor tester
Use for troubleshooting: ... 26.6
Transistor-transistor logic (TTL): ... 4.14
Circuits: ... 4.15
Driving CMOS: ... 4.18
Three-state outputs: ... 4.16
Unused inputs: ... 4.16
Transition region (filter): ... 11.2
Transition time (digital circuit): ... 4.4
Transmatch (*see* Antenna Tuner)
Transmission line
Attenuation (loss): ... 20.4
Attenuation of two-conductor twisted pair: ... 22.41
Balanced and unbalanced load: ... 20.17
Balancing devices: ... 20.17
Coaxial cable: ... 20.1
Digital circuits: ... 20.27
Effects of loss: ... 20.5
Impedance of two-conductor twisted pair: ... 22.41
Impedance transformation: ... 20.7
Impedance transformer: ... 20.19ff
Incident, forward, and reflected waves: ... 20.4
Ladder line: ... 20.6
Length per dB of loss: ... 20.6
Load: ... 20.3
Lumped-constant: ... 20.3
Matched and mismatched: ... 20.3
Matched- (ML) and mismatched-line loss: ... 20.5
Mechanical considerations: ... 20.6
Microstrip: ... 11.29
Open-wire: ... 20.1
Parallel-conductor (twin-lead): ... 20.1
Phasing antennas: ... 20.12
Quarter-wave (Q) section: ... 20.12
Radiation cancellation in: ... 20.1
Radiation from: ... 20.17
Selecting type of line: ... 20.5
Specifications: ... 22.48
Stripline: ... 11.29
Stubs: ... 20.7
Synchronous transformer: ... 20.12
Termination: ... 20.3
Transformer: ... 17.29
Twin-lead: ... 20.1
Velocity factor (VF): ... 20.1, 20.8
VHF/UHF: ... 21.56
Waveguide: ... 20.28
Weatherproofing: ... 28.18
Window line: ... 20.1
Transmitter
Amplitude modulation (AM): ... 13.4
Angle modulation (FM, PM): ... 13.6
Automatic level control (ALC): ... 13.17
Bandpass filter: ... 13.23
Beacon: ... 13.38
Carrier and unwanted sideband suppression: ... 25.34
CW keying waveform: ... 13.2
CW mode: ... 13.15
Frequency modulation (FM): ... 13.7
Intermodulation distortion: ... 25.34
Modulation: ... 13.24
Oscillator: ... 13.22
Phase modulation (PM): ... 13.8
Speech processing: ... 13.10
Spurious signal: ... 13.16
Superheterodyne, SSB/CW: ... 13.9
Troubleshooting: ... 26.26
Two-tone test: ... 13.14, 25.34
VHF signal sources: ... 13.19
Wideband noise: ... 13.16
Transverse electromagnetic mode (TEM): ... 11.29
Transverter controller: ... 13.35
Trap (antenna): ... 21.14, 21.17, 21.27
Traveling wave tube: ... 9.29
Tri-state gate: ... 4.6
Triac: ... 3.11
Triangle wave: ... 2.16

Triggering
Oscilloscope: 25.12, 25.16
Triggering, flip-flop: 4.9
Triode: 17.5
Tripler (frequency): 13.7
Triplexer: 20.8
Troposphere: 19.6
Tropospheric
Bending: 19.27
Ducting: 19.25ff
Fading: 19.27
Propagation: 19.22ff
Refraction: 19.24
Scatter: 19.23
Troubleshooting
Amplifier circuits: 26.23
Amplifiers, power: 26.28ff
Antenna systems: 26.32ff
Assessing symptoms: 26.13
Battery hazards: 26.8
Circuit-level, analog: 26.18ff
Circuit-level, digital: 26.20ff
Completing repair: 26.21
Component level: 26.7ff
Connectors: 26.7
General symptoms: 26.26
Inspections: 26.14
Microprocessor equipment: 26.17
Newly constructed equipment: 26.14
Oscillators: 26.24
Power supplies: 26.22
Professional repair: 26.22
Radio frequency interference (RFI): 27.26ff
Receivers: 26.25
Recommended equipment: 26.3ff
References: 26.39
Search engines: 26.2
Semiconductors: 26.9ff
Shack notebook: 26.6
Signal tracing and injection: 26.15ff
Systematic vs instinctive: 26.12
Television interference (TVI): 27.27
Transceiver: 26.28
Transmit amplifier modules: 26.25
Transmitters: 26.26
Tube tester: 26.36
Vacuum tubes: 26.12
TTL (*see* transistor-transistor logic)
Tube (*see* Vacuum tube)
Tube tester: 26.36
TubeCalculator software: 17.7ff
Tubing, aluminum: 21.34
Tuned circuit
Single-tuned circuit: 5.13
Tuned radio frequency (TRF) receiver: 12.3
Tuning procedure
Amplifier, RF power: 17.14
Tuning tools: 23.6, 23.24
Turn-around time, transmitter: 25.35
Turnstile antenna: 21.61
Tuska, Clarence: 1.1
Twelfth-wave transformer: 20.13
Twisted-pair speaker cable: 27.34
Two-port network: 3.27
Two-port network parameters: 5.34
Two-port parameters: 5.34
Two-tone IMD: 8.21, 10.16
Two-tone test: 25.34
Transmitter: 13.14

U

Ufer ground: 28.7
UHF (frequency range classification): 2.19
UHF connector: 29.7
Ultimate attenuation (filter): 11.2
Ultraviolet radiation: 19.6
Underwriter Labs (UL): 28.1
Unintentional emitters: 27.5
Uninterruptible power supply (UPS): 28.11
Unipolar transistor (*see* Field-effect transistor)
Units
Systems of measurement: 25.1
Units and conversion factors: 22.58
Unity-gain buffer: 3.44
Universal serial bus (USB): 4.29
Universal stub: 20.24
USB: 4.25
Battery charging: 7.38

V

Vackar oscillator: 9.12
Vacuum tube: 17.4ff
Cathode: 17.4
Construction: 17.6
Cooling methods: 17.6
Grid (control, screen, suppressor): 17.5
Grid dissipation: 17.14
Nomenclature: 17.5
Operating parameters: 17.8ff
Pentode: 17.5
Plate (anode): 17.4
Plate dissipation: 17.14
Ratings: 17.14
Screen dissipation: 17.13
Secondary emission: 17.5
Specifications: 22.34
Tetrode: 17.5
Thermionic emission: 17.4
Triode: 17.5
Troubleshooting: 26.12
Varactor diode: 3.16, 13.7
Specifications: 22.19
Variable crystal oscillator (VXO): 9.25
Variac (transformer): 2.66
Varicode: 8.8, 16.3, 16.8ff
Varistor: 7.12
VCR (Videotape Cassette Recorder) RFI: 27.32
Vector: 2.44
Vector network analyzer (VNA): 20.9, 25.25
Velocity (radio wave): 19.1
Velocity factor (VF): 20.1, 20.8
Vertical amplifier: 25.11
Vertical antenna: 21.22ff
Trap: 21.27
Vertical interval signaling (VIS): 8.19
Vestigial sideband (VSB): 8.18
Digital television: 8.11
VFO (*see* Oscillator)
VHF (frequency range classification): 2.19
VHF/UHF
FM voice equipment: 18.7
Home station antenna (for repeaters): 18.7
Mobile antennas: 18.7
Propagation (mobile): 19.27ff
Victim, RFI: 27.11
Video bandwidth: 25.21
Vintage equipment: 1.17
Repair and restoration: 26.35ff
Virtual height: 19.7
VLF (frequency range classification): 2.19
VOACAP: 19.22
Vocoder: 16.28, 18.15
Voice-operated transmit (VOX): 13.29ff
Volt-amp reactive (VAR): 2.49
Volt-ampere rating (transformer): 7.3
Voltage
Potential difference: 25.2

Voltage (V, E): ... 2.1
Potential: ... 2.1
Voltage drop: ... 2.9
Voltage source: ... 2.9
Volts (V): ... 2.1
Voltage divider: ... 2.8
Voltage multiplier: ... 7.7, 7.10
Full-wave voltage doubler: ... 7.7, 7.8
Half-wave voltage doubler: ... 7.7
Voltage tripler and quadrupler: ... 7.8
Voltage probe: ... 25.22
Voltage reference IC: ... 3.54
Voltage regulation: ... 7.13
Adjustable regulator: ... 7.19
Dynamic and static regulation: ... 7.13
Generator: ... 29.16
Three-terminal voltage regulator: ... 7.18
Voltage regulator IC: ... 3.54, 22.17
Specifications: ... 22.20
Voltage-controlled oscillator (VCO): ... 9.32, 9.37
Noise: ... 9.43
Phase-locked loops (PLL): ... 9.37
Voltage-current converter: ... 3.47
Voltage-follower circuit: ... 3.44
Voltage-power conversion: ... 22.60
Voltmeter
Digital multimeter (DMM): ... 25.4
Multiplier resistor: ... 25.7
RF: ... 25.54
Sensitivity, ohms-per-volt: ... 25.3
Vacuum-tube, VTVM: ... 25.3
Volunteer Consulting Engineer (VCE), ARRL: ... 28.1
Volunteer Examiner (VE): ... 1.5
VOM (volt-ohm-meter): ... 25.3
Von Neumann architecture: ... 15.4
VOX (*see* Voice-operated transmit)
VSB, 8-VSB (*see* Vestigial sideband)

W

W1AW: ... 1.7
W6ELProp: ... 19.22
Waterfall display: ... 16.5
Watt (W): ... 2.11
Watt-hour (Wh): ... 2.11
Wattmeter: ... 26.4
Directional: ... 20.4, 25.19
Reflectometer: ... 20.4
Wave cyclone: ... 19.26
Waveguide: ... 20.26
Coax-to-waveguide adapters: ... 25.28
Coupling to: ... 20.27
Cutoff frequency: ... 20.26
Dimensions: ... 20.27
Dominant mode: ... 20.27
Modes (TM, TE): ... 20.27
Wavelength (λ): ... 2.18, 19.1
Wavemeter: ... 25.10
Waveshaping, CW: ... 8.8, 10.7
Weaver method (SSB generation): ... 8.5, 13.6, 15.24
Webench by National Semiconductor: ... 11.22
Weber (Wb): ... 2.32
Weston, Edward: ... 25.3
Wheatstone bridge: ... 25.3
Whip antenna: ... 21.45ff
Loading: ... 21.47
White noise: ... 5.30
Wien bridge: ... 25.16
Oscillator: ... 25.43
WiFi: ... 4.26
Wilkinson hybrid combiner: ... 25.28
WinCAP Wizard: ... 19.22
WinDRM by HB9TLK: ... 16.15
Winlink 2000 (WL2K): ... 16.25ff
Airmail: ... 16.26
B2F: ... 16.26
Common Message Servers (CMS): ... 16.26
Paclink: ... 16.24
PACTOR: ... 16.24
PMBO: ... 16.26
Radio Message Server (RMS): ... 16.26
TELNET: ... 16.26
WINMOR: ... 16.22
Comparison to PACTOR: ... 16.22
SCAMP: ... 16.22
Sound card: ... 16.22
TNC interface: ... 16.22
Wire size
Mobile installations: ... 29.13
Wire, specifications: ... 22.39
Wireless network: ... 4.29
WIRES-X (Yaesu): ... 18.15
WSJT by K1JT: ... 16.14
Meteor scatter: ... 19.15
WSPR: ... 16.15
Wullenweber antenna: ... 21.70
WWV, WWVH: ... 19.21, 25.11
Propagation forecast: ... 19.10, 19.12

X

X wave: ... 19.9
XOR gate: ... 4.5

Y

Y (admittance) parameters: ... 5.35
Yagi antenna: ... 21.32ff
Stacking: ... 21.60
VHF/UHF: ... 21.60
YIG-tuned oscillator: ... 9.28

Z

Z (impedance) parameters: ... 5.35
Zener diode: ... 3.16
Noise generation: ... 3.18
Specifications: ... 22.18
Voltage regulator: ... 7.15
Zepp (antenna): ... 21.7
Extended, double: ... 21.22
Zero (transfer function): ... 3.4, 11.20, 11.23
Zero bias: ... 17.2
Zero-stuffing: ... 15.9
Zigbee: ... 4.26

Project Index

A

Amplifier, RF Power
- 10 GHz 2 W Amplifier: ... 17.40
- 250-W Broadband Linear Amplifier: ... 17.36
- 3CX1500D7 RF Linear Amplifier: ... 17.45
- 6-Meter Kilowatt Amplifier: ... 17.49
- All-Mode, 2 Meter, 80 W Linear Amp: ... 17.38
- Everyham's Amplifier: ... 17.42
- QSK Controllers for Amplifiers: ... 24.43

Antenna accessory
- Eight-Channel Remote-Control Antenna Switch: ... 24.50
- Legal-Limit Bias-Tee: ... 24.49

Antenna tuner
- 160 and 80 Meter Matching Network for Your 43-Foot Vertical: ... 24.9
- Switching the Matching Network for Your 43-Foot Vertical: ... 24.11
- Z-match: ... 24.1

Antenna, accessory
- Audible Antenna Bridge: ... 24.20
- External Automatic Antenna Switch for Use with Yaesu or ICOM Radios: ... 24.14
- Low-cost Remote Antenna Switch: ... 24.18
- Microprocessor-controlled SWR Monitor: ... 24.4
- Mounts for Remotely-Tuned Antennas: ... 21.52
- Transmitting Choke Baluns: ... 20.22

Antenna, HF
- 40-15 Meter Dual-Band Dipole: ... 21.16
- All-Wire 30 Meter CVD: ... 21.32
- Compact Vertical Dipole (CVD): ... 21.30
- Extended Double-Zepp For 17 Meters: ... 21.22
- Family of Computer-Optimized HF Yagis: ... 21.37
- Five-Band, Two-Element HF Quad: ... 21.40
- Half-Wave Vertical Dipole (HVD): ... 21.29
- Low-band Quad and Delta Loops: ... 21.41
- Multiband Center-Fed Dipole: ... 21.14
- Multiband Horizontal Loop Antenna: ... 21.44
- Retuning a CB Whip Antenna: ... 21.53
- Skeleton Slot for 14-30 MHz: ... 21.43
- Top-Loaded Low-Band Antenna: ... 21.26
- Triband Moxon Yagi Antenna: ... 21.38
- Two W8NX Multiband, Coax-Trap Dipoles: ... 21.21
- Two-Band Loop for 30 and 40 Meters: ... 21.43
- W4RNL Inverted-U Antenna: ... 21.17

Antenna, VHF/UHF
- A Medium-Gain 2 Meter Yagi: ... 21.61
- Cheap Yagis by WA5VJB: ... 21.62
- Fixed Moxons for Satellite Operation: ... 21.65
- Homebrew Coaxial Dipole for VHF or UHF: ... 21.58
- Simple, Portable Ground-Plane Antenna: ... 21.58
- Three and Five-Element Yagis for 6 Meters: ... 21.60

C

Computer interface
- Simple Serial Interface: ... 24.25
- Trio of Transceiver/Computer Interfaces: ... 24.22
- USB Interfaces for Your Ham Gear: ... 24.26

CW Keyer
- TiCK-4 -- A Tiny CMOS Keyer: ... 24.31
- Universal Keying Adapter: ... 24.29

F

Filter, audio
- Audio Intelligibility Enhancer: ... 24.35

Filter, RF
- Band-pass filter for 145 MHz: ... 11.42
- Broadcast-Band Reject Filter: ... 11.37
- Crystal Ladder Filter for SSB: ... 11.35
- Diplexer Filters: ... 11.39
- Field Day Stub Assembly: ... 20.9
- High-Performance, Low-Cost 1.8 to 54 MHz Low-Pass Filter: ... 11.41
- Optimized Harmonic Transmitting Filters: ... 11.39
- Wave Trap for Broadcast Stations: ... 11.38

O

Oscillator
- JFET Hartley VFO: ... 9.15
- Low-noise Differential Oscillator: ... 9.12
- Modified Vackar VFO: ... 9.12

P

Power source
- 12-V, 15-A Power Supply: ... 7.50
- 13.8-V, 5-A Regulated Power Supply: ... 7.53
- Adjustable Resistive Load: ... 7.54
- Adjustable Tracking Power Supply: ... 7.61
- Automatic Sealed-Lead-Acid Battery Charger: ... 7.58
- Four-Output Switching Bench Supply: ... 7.48
- High-Voltage Power Supply: ... 7.56
- Inverting DC-DC Converter: ... 7.54
- Overvoltage Crowbar Circuit: ... 7.63
- Overvoltage Protection for AC Generators: ... 7.62
- Reverse-Polarity Protection Circuits: ... 7.57

R

Receiver
- 10 GHz Preamplifier: ... 12.33
- 430 MHz Preamplifier: ... 12.31
- Micro R2 SSB or CW Receiver: ... 12.13
- Rock-Bending Receiver for 7 MHz: ... 12.3

RF Interference
- RF Sniffer: ... 27.41

S

Station accessory
- An Arduino-based Knob Box for SDR: ... 24.34
- Audio Interface Unit for Field Day and Contesting: ... 24.40

T

Test equipment
- Bipolar Transistor Tester: ... 25.38
- Fixed-Frequency Audio Oscillator: ... 25.42
- Gate-Dip Oscillator: ... 25.49
- High-Power RF Samplers: ... 25.47
- Hybrid Combiners for Signal Generators: ... 25.49
- Inductance Tester: ... 25.41
- Logic Probe: ... 25.40
- RF Current Meter: ... 25.44
- RF Oscillators for Circuit Alignment: ... 25.48
- RF Power Meter: ... 25.53
- RF Step Attenuator: ... 25.46
- RF Voltmeter: ... 25.54
- Two-Tone Audio Generator: ... 25.43
- Wide-Range Audio Oscillator: ... 25.42

Transceiver
- A West Coast Lightwave Project: ... 13.1
- TAK-40 SSB/CW Transceiver: ... 13.33

Transmitter
- A 50 MHz CW Beacon Exciter: ... 13.38
- MicroT2 Single-Band SSB Transmitter: ... 13.18
- MkII Universal QRP Transmitter: ... 13.19, 13.30
- Near-Space Tracker: ... 14.10
- Pebble Crusher 7 MHz QRP CW Transmitter: ... 13.3
- VHF Signal Sources (50 and 144 MHz): ... 13.20

Transverter
- A Microwave Transverter Controller: ... 13.35

Author Index

Author	Call	Topic	Section Ref	Page Ref
Adams, Chuck	K7QO	Making PC Boards With Printed Artwork	Chapter 25	CD-ROM
Applegate, Alan	KØBG	Mobile antennas	21.8	21.51ff
		Mobile battery selection	7.13.8	7.37
		Mobile stations	29.2	29.9ff
Bartholomew, Wayde	K3MF	Dual-band antenna for 146/446 MHz	Chapter 21	CD-ROM
Belrose, John	VE2CV	Mobile antenna efficiency	21.8.9	21.57
		Mobile ground losses	21.8.5	21.55
		Sloping antennas	21.5.1	21.33
Blackburn, Wally	AA8DX	Station Construction	Chapter 29	29.1ff
Blevins, Ken	K5ALQ	Adapting Aviation Headsets to Amateur Radio	Chapter 24	CD-ROM
Bloom, Alan	N1AL	Digital Signal Processing (DSP)	Chapter 15	15.1ff
		Modulation	Chapter 8	8.1ff
		Test Equipment and Measurements	Chapter 25	25.1ff
		Digital Mode Table	16.5	16.30
		Test Instrument Bibliography	Chapter 25	CD-ROM
Botkin, Dale	NØXAS	Digital Basics	Chapter 4	4.1ff
Bramwell, Denton	K7OWJ	RF Step Attenuator	25.8.9	25.46
Brenner, James	NT4B	Two-band Loop for 30 and 40 Meters	21.49	21.49
Britain, Kent	WA5VJB	Cheap Yagi antennas	21.11	21.69
Brown, Bill	WB8ELK	Remote Sensing Payloads	Chapter 14	14.8-10
Brown, Jim	K9YC	Ferrite materials	5.4	5.14ff
		Ferrite transmitting chokes	20.5.4	20.21ff
		Measuring chokes	Chapter 20	CD-ROM
Buchmann, Isidor		Batteries and Charging	7.13	7.32-7.45
Bunsold, Pat	WA6MHZ	Refurbishing Vintage Equipment	26.11.5	26.38
Burningham, John	W2XAB	Introduction to DMR	18.5	18.14
Buxton, Al	W8NX	Multiband, coax-trap dipoles	21.1	21.21
Campbell, Jeremy	KC8FEI	Automotive RF interference	27.9	27.36ff
Campbell, Rick	KK7B	Binaural I-Q receiver	Chapter 12	CD-ROM
		Micro R2 Receiver	12.3.2	12.16
		RF semiconductor design	Chapter 5	5.1ff
		VHF Signal Sources	13.2	13.19
Cebik, LB	W4RNL	Inverted-U antenna	21.1	21.17
		Medium-gain 2 meter Yagi	21.11	21.61
		Fixed Moxons for Satellite Operation	21.11	21.65
Chen, Kok	W7AY	Unstructured Digital Modes	16.2	16.5ff
Christensen, Paul	W9AC	QSK Controller	24.16	24.43
Cooknell, DA	G3DPM	Oscillator construction	9.3.2	9.16
Colville, Jim	W7RY	QSK Controller	24.16	24.43
Coval, Jeff	ACØSC	FLDIGI	16.1	16.5
Cutsogeorge, George	W2VJN	Transmission Lines	Chapter 20	20.1ff
Danzer, Paul	N1II	Digital Basics	Chapter 4	4.1ff
		FM voice repeaters	Chapter 18	18.1ff
		Parallel-port interface	Chapter 4	CD-ROM
Daughters, George	K6GT	6 Meter Kilowatt Amplifier	17.12	17.49
Dehaven, Jerry	WAØACF	Phase-locked loops	9.7	9.34ff
Demaw, Doug	W1FB	Tuna Tin 2 transmitter	13.3.2	CD-ROM
Dobbs, George	G3RJV	QRP CW Transmitter for 7 MHz	13.3.2	13.5
Dodd, Peter	G3LDO	Skeleton Slot Antenna for 14-28 MHz	21.7	21.50
Doig, Al	W6NBH	Multiband quad antenna	21.7	21.43ff
Duffey, Jim	KK6MC	Circuit Construction	Chapter 23	23.1ff
Eenhoorn, Anjo	PAØZR	Active attenuator	Chapter 27	CD-ROM
Eisenberg, Joe	KØNEB	Construction Techniques	Chapter 23	23.1ff
Fitzsimmons, John	W3JN	Restoring vintage equipment	26.9	26.32
Fletcher, Terry	WAØITP	Reverse-Polarity Protection Circuits	7.16.5	7.51
Ford, Jim	N6JF	Return Loss Bridge	25.8.12	CD-ROM
Ford, Steve	WB8IMY	Digital Communications	Operating Supplement	CD-ROM
		Space Communications	Operating Supplement	CD-ROM
Frey, Dick	K4XU	250 W Broadband Linear Amplifier	17.11	17.36
		Solid-state amplifiers	17.26-17.30	17.29ff
		RF Transistor tables	Chapter 22	22.28-31
Geiser, Dave	W5IXM	Simple seeker RFI receiver	Chapter 27	CD-ROM
Gordon-Smith, Dave	G3UUR	Crystal filters	11.6	11.30ff
Grebenkamper, John	KI6WX	Tandem match	25.8.14	CD-ROM
Grover, Dale	KD8KYZ	PC-board CAD	6.3	6.31ff
Gruber, Mike	W1MG	RF Interference	Chapter 27	27.1ff
Grumm, Linley	K7HFD	Low-noise oscillator	9.3.2	9.15
Hallas, Joel	W1ZR	Receivers	Chapter 12	12.1ff
		Transceivers	Chapter 14	14.1ff
		Transmitters	Chapter 13	13.1ff
		Annual Transceiver Survey	CD-ROM	CD-ROM
		Receiver and Transmitter Architectural History	CD-ROM	CD-ROM

Author	Call	Topic	Section Ref	Page Ref
Halstead, Roger	K8RI	Amplifier tuning	17.9	17.26
Halstead, Roger	K8RI	Surplus amplifier parts	17.11	17.44
Hansen, Markus	VE7CA	High-Performance HF Transceiver - HBR-2000	Chapter 14	CD-ROM
		A West Coast Lightwave Project	Chapter 13	13.1
Harden, Paul	NA5N	Component Data and References	Chapter 22	22.1ff
Hare, Ed	W1RFI	Circuit Construction	Chapter 23	23.1ff
		RF Interference	Chapter 27	27.1ff
		Troubleshooting and Maintenance	Chapter 26	26.1ff
Hartnagel, Hans		The Dangers of Simple Usage of Microwave Software	Chapter 6	CD-ROM
Hayward, Roger	KA7EXM	JFET Hartley VFO	9.3.2	9.17
Hayward, Wes	W7ZOI	JFET Hartley VFO	9.3.2	9.17
		Oscillator temperature compensation	9.3.5	9.19
		RF semiconductor design	Chapter 5	5.1ff
		Segment-tuned VCO	9.7.7	9.50
Henderson, Dan	N1ND	RFI Management	27.2	27.4
Henderson, Randy	WI5W	Rock-bending Receiver for 7 MHz	12.2.1	12.5
Hilding, Rick	K6VVA	Remote Stations	29.4	29.18ff
Hollingsworth, Riley	K4ZDH	RF Interference and the FCC	27.2	27.10
Honnaker, Scott	N7SS	Digital Modes	Chapter 16	16.1ff
Hood, Mike	KD8JB	All-copper, 2 meter J-pole antenna	Chapter 21	CD-ROM
Hranac, Ron	NØIVN	Cable and digital television	27.8.3-27.8.4	27.29ff
		HDTV modulation	8.3	8.11
Humbertson, Ken	WØKAH	FLDIGI	16.1	16.5
Hutchinson, Chuck	K8CH	Antennas	Chapter 21	21.1ff
Hutchinson, Sylvia	K8SYL	75 and 10 meter dipole	Chapter 21	CD-ROM
Jones, Dave	KB4YZ	Slow-scan television	Operating Supplement	CD-ROM
Jones, Bill	K8CU	1.8 to 54 MHz Low-Pass Filter	11.11.6	11.49
Karlquist, Rick	N6RK	Audio latency measurement system	29.4.3	29.21
		Mixers, Modulators, and Demodulators	Chapter 10	10.1ff
Kay, Leonard	K1NU	Analog Basics	Chapter 3	3.1ff
		RF Techniques	Chapter 5	5.1ff
Keuken, Jack	KE2QJ	Base-loading system for whip antennas	21.8.3	21.54
Kleinschmidt, Kirk	NTØZ	Generators	29.3	29.13
Klitzing, James	W6PQL	All-Mode, 2 Meter, 80 W Linear Amp	17.11	17.38
Lakhe, Rucha		Mathematical stability problems in modern non-linear simulations programs	Chapter 6	CD-ROM
Lampereur, Steve	KB9MWR	10 GHz 2 W Amplifier	17.11	17.40
Langton, Anthony	GM4THU	RF Voltmeter	25.8.15	25.54
Lapin, Greg	N9GL	Analog Basics	Chapter 3	3.1ff
Larkin, Bob	W7PUA	RF semiconductor design	Chapter 5	5.1ff
Lau, Zack	W1VT	ARRL phase noise measurement	9.2.5	9.10
Lewellan, Roy	W7EL	JFET Hartley VFO	9.3.2	9.17
Lindquist, Rick	WW3DE	What Is Amateur Radio	Chapter 1	1.1ff
Loveall, Pete	AE5PL	D-STAR repeaters	18.4	18.11
Luetzelschwab, Carl	K9LA	Propagation	Chapter 19	19.1ff
Lux, Jim	W6RMK	Electrical Safety	28.1	28.1ff
Martin, Mike	K3RFI	Power-line RF Noise	27.6	27.17ff
McClellan, Jim	N5MIJ	D-STAR repeaters	18.4	18.11
McCune, Earl	WA6SUH	Oscillators	Chapter 9	9.1
McDonald, Steve	VE7SL	A West Coast Lightwave Project	Chapter 13	13.1
Miller, Russ	N7ART	2 meter RF power amplifier	Chapter 17	CD-ROM
Moell, Joe	KØOV	Radio Direction-finding antennas	21.12	21.72ff
		Radio Direction-finding techniques	Chapter 27	CD-ROM
Montgomery, Christine	KGØGN	Digital Basics	Chapter 4	4.1ff
Morris, Steve	K7LXC	Tower and antenna safety	28.2	28.12ff
Mullett, Chuck	KR6R	CAD for power supplies	17.11	17.28
Newkirk, David	W9VES	Computer-Aided Circuit Design	Chapter 6	6.1ff
		Mixers, Modulators, and Demodulators	Chapter 10	10.1ff
O'Hara, Tom	W6ORG	Amateur television	Operating Supplement	CD-ROM
Ott, Henry	WA2IRQ	Electromagnetic Compatibility	Chapter 27	27.1ff
Pearce, Gary	KN4AQ	FM voice repeaters	Chapter 18	18.1ff
Pittenger, Jerry	K8RA	3XC1500D7 RF Linear Amplifier	17.11	17.45
Pocock, Emil	W3EP	Propagation	Chapter 19	19.1ff
Portune, John	W6NBC	Coaxial Dipole for VHF or UHF	Chapter 21	21.64
Rado, John	KØIZ	Adapting Aviation Headsets to Amateur Radio	Chapter 24	24.34
Rauch, Tom	W8JI	RF Current Meter	25.8.7	25.44
Rogers, Robert	WA1PIO	Inductance Tester	25.8.3	25.41

Author	Call	Topic	Section Ref	Page Ref
Rohde, Ulrich	N1UL	2 meter down-converter	12.7.4	12.34
		Butler oscillator	9.5.4	9.27
		Mathematical stability problems in modern non-linear simulations programs	Chapter 6	CD-ROM
		Measuring intermodulation performance	10.4	10.16
		Mixer performance capability	Chapter 10	CD-ROM
		Modified Vackar oscillator	9.3.1	9.15
		Oscillator design	Chapter 9	CD-ROM
		Phase noise	Chapter 9	CD-ROM
		Simulation at RF	6.3	6.28ff
		Testing mixer performance	10.5	10.21
		The Dangers of Simple Usage of Microwave Software	Chapter 6	CD-ROM
		Using Simulation at RF	Chapter 6	CD-ROM
		VHF/UHF Grounded-base Oscillator	Chapter 9	CD-ROM
Rowe, David	VK5DGR	Digital Voice - CODEC2	16.4.5	16.15
Sabin, Bill	WØIYH	Conversion Loss in Mixers	10.5.2	10.19ff
		CW Key Waveform	13.3.7	13.17
		Diplexer Filter	11.11.5	11.46
		Half-Lattice Single-Crystal Filter	11.6	11.31
		IF Speech Clipper	13.3.6	13.16
		MATCH by WØIYH	20.4.2	CD-ROM
		MATCH by WØIYH	5.6	CD-ROM
		Superhet Receiver	12.3.2	12.15
		Thermistor Uses	2.15.10	2.70
		Transmission-line transformers	20.5.2	20.19ff
Sapp, Michael	WA3TTS	VHF/UHF Beacon Transmitters	13.5.4	13.38
Severns, Rudy	N6LF	Power Sources	Chapter 7	7.1ff
Silver, Ward	NØAX	Amplifier maintenance	26.5.4	26.21
		Analog Basics	Chapter 3	3.1ff
		Antennas	Chapter 21	21.1ff
		Electrical Fundamentals	Chapter 2	2.1ff
		Filters	11.1-11.4	11.1ff
Siwiak, Kai	KE4PT	Discussion of Q	2.11, 2.16	2.49, 2.56
Stanley, John	K4ERO	Amplifiers, Vacuum-Tube	17.1-17.9	17.1ff
		Everyham's Amp	17.11	17.42
		Optimum Ground Systems	21.3.1	21.23
Steffka, Mike	WW8MS	Automotive RF Interference	27.9	27.36ff
Stein, William	KC6T	Multiband quad antenna	21.7	21.43ff
Stewart, Jim		Inverting DC-DC Converter	7.16.5	7.54
Stockton, David	GM4ZNX	Oscillators	9.1-9.6	9.1ff
		Poles and zeros	3.1.2	3.3
		Fractional-n Synthesizers	9.7.3	9.41
Stott, Michael	VE3EBR	An Arduino-based Knob Box for SDR	24.13	24.34
Straud, Dick	W9SR	Top-loaded, low-band antenna	21.3.3	21.29
Straw, Dean	N6BV	Antenna modeling and design	Chapter 21	21.1ff
		HFTA antenna modeling software	29.4.2	29.18
		Transmission Lines	Chapter 20	20.1ff
Stuart, Ken	W3VVN	Power Sources	Chapter 7	7.1ff
Tayloe, Dan	N7VE	Active Filters	11.5	CD-ROM
		Tayloe mixer	10.5.5	10.28
Taylor, Joe	K1JT	Background noise	5.8.9	5.33ff
		Earth-Moon-Earth (EME) Communications	Operating Supplement	CD-ROM
Taylor, Roger	K9ALD	DC circuits and resistance	Chapter 2	2.1ff
Telewski, Fred	WA7TZY	Poles and zeros	3.1.2	3.3
		Synthesizers	9.7	9.33ff
Thompson, Tom	WØIVJ	High-Power RF Samplers	25.8.10	25.47
Tonne, Jim	W4ENE	Filters	11.1-11.4	11.1
		Optimized Harmonic Transmitting Filters	11.11.4	11.46
Tracy, Mike	KC1SX	ARRL phase noise measurement	9.2.5	9.10
Ulbing, Sam	N4UAU	Surface-mount technology	Chapter 23	CD-ROM
Veatch, Jim	WA2EUJ	TAK-40 SSB/CW Transceiver	14.7.2	14.19
Verhage, Paul	KD4STH	Remote Sensing and Navigation Data	Chapter 14	14.1-8
	Near-space Tracker		14.3.3	14.10
Wade, Paul	W1GHZ	Noise theory	Chapter 5	CD-ROM
		Microwave Construction Techniques	23.6	23.26-28
Wetherhold, Ed	W3NQN	Broadcast-band Reject Filter	11.11.2	11.45
Whitten, Mel	KØPFX	Digital Voice	16.4.5	16.15
Yoshida, Wayne	KH6WZ	Surface-mount device desoldering	Chapter 23	CD-ROM
Youngblood, Gerald	K5SDR	Tayloe mixer	10.5.5	10.28