COMPANY OVERVIEW

- Premier provider of technically demanding RF/microwave, electromagnetic, power, and security solutions for defense, aerospace, commercial and medical industries
- Founded in 1981; Listed on NASDAQ June 2011 with a new company vision
  - Today, one of the largest non-Prime provider of RF/Microwave and microelectronics products and services
- 1,975 employees worldwide
- 3,000+ customers worldwide
- Revenue breakdown
  - ~75% Domestic / 25% International
  - ~60% Defense & Government / 40% Commercial
**DELAY LINES | OVERVIEW**

**API Technologies Designs & Manufactures 5 Types of Delay Lines:**

- BAW (Bulk Acoustic Wave)
- SAW (Surface Acoustic Wave)
- Coaxial
- Lumped Constant (LC)
- Dispersive Steel (Pulse Compression)
BAW DELAY LINES (BULK ACOUSTIC WAVE)

- Frequency Range: 10MHz to 120 MHz
- Delay: .5 µsec – 3,000 µsec
- Insertion Loss: 6dB to 65dB
- Bandwidth: 10% to > 50%
- Multiple interface options
- Small package size
- Wide range of delay available
- Temperature compensation available
SAW DELAY LINES (SURFACE ACOUSTIC WAVE)

- Frequency Range: 20 MHz to 2000 MHz
- Delay: 0.1 µsec – 10µsec
- Insertion Loss: 3dB, increases with delay & bandwidth
- Bandwidth: Fractional bandwidths between 5% & 55%
- Multiple interface & package options
- Wide frequency of operation
- Small size
- Variable Bandwidth
- Able to withstand harsh environments
COAXIAL DELAY LINES

- Frequency Range: DC to 6GHz
- Delay: 1 nSec – 250 nSec
- Insertion Loss: 0.2dB – 50dB
- Adjustable 0-10ns Steps
- Package Size: DIL to 24” cans & dependent on amount of delay
- Multiple interface options
- Low loss up to 50nSec
- Excellent temperature stability
- Semi-standard options available for quick-turn solution
LUMPED CONSTANT DELAY LINES

- Frequency Range: DC to 150 MHz
- Delay: 10nSec – 5000nSec
- Insertion Loss: 5%
- Adjustable
- Multiple interface options
- Advantage in Physical Size & Good Frequency Stability
- Wide frequency and range of delay
- Easily configurable for new applications
STEEL (PULSE COMPRESSION) DELAY LINES

- Frequency Range: 5MHz to 65MHz
- Delay: 15 µsec – 350 µsec
- Insertion Loss: 20-45 dB
- Pulse Compression
- Package Size: Up to 2”x12” & dependent on amount of delay
- Multiple interface options
- Precision delay for high-reliability applications
- Can be heated for stability (ovenized)
DELAY LINES – API ADVANTAGES

• Custom designs to meet exact specifications
• Semi-standard options available for a quick-turn solution
• Matched delay available for multiple units
• Expertise in various delay line technologies for wide range of applications
• Extensive heritage in delay line design and manufacturing
APPLICATIONS

- Electronic Warfare
- Communications Systems
- Ultrasonic Imaging Systems
- Steering of Phased Array Antennas
  - Linear & Non-Linear FM Generation
- Signal Processing Circuits
  - Transponders
  - EW target generation
  - Radar systems
  - Pulse-Doppler signaling
  - Clock synchronization
  - Spectrum estimation
MANUFACTURING EXPERTISE

• Extensive handling and mounting expertise with very large geometry transistor die
• Braised waveguide splitter/combiner structures
• In-house Laser Sealing for Hermetic and Environmental Integrity
• In-house Thin & Thick Film
• Precision Hybrid & MIC
• Automated SMT & CCA
• In-house SAW Fab
• Precision Machining
• Comprehensive Metal Works
• IPC-610 Soldering Standard
• In house Machining Capability
• Custom Design Software
• Wafer Polishing Capability
EXTENSIVE TESTING

- Full RF/Microwave and Environmental Testing
- Complete ATE Development
- 100% Electrical Testing
- Shock Testing & On-site Random and Sinusoidal Vibration to 30g
- Conversion Gain
- Spurious Testing
- IP2, IP3 and IP2H
- Current Draw
- Group Delay
- Temperature Cycling (-55°C to +85°C)
API TECHNOLOGIES’
FEATURED CERTIFICATIONS

- All Manufacturing Facilities Certified to ISO 9001:2008
- 6 Certified AS9100 Facilities
- ANSI 20.20 Compliant Facilities
- Department of State ITAR Compliant
- Cleared Facilities & Personnel
- Six Sigma Greenbelts
- Hybrid Lab certified MIL-PRF-38534 (Class H and K)
- QPL MIL-PRF-15733 & MIL-PRF-28861 (Selected Products)
- MIL-STD 790 (DSCC), MIL-STD 1553 (Data Bus), MIL-STD 883 (Hybrid),
  MIL-STD 202 (Passive), MIL-STD-810 (Systems), MIL-STD 461
  A/B/C/D/E (EMC), MIL-STD 1399 Surge (EMC)
- Solder/Assembly J-STD-001 Class 3 and IPC-A-610
- NEBS Approved (Selected Products)
- RoHS Compliant (Selected Products)
- TEMPEST Certifications including: CID/09/15(A), NSTISSAM
  TEMPEST/I-92, SDIP 27.
Delay Lines Point of Contact

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