

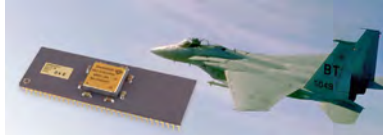


DEFENSE LOGISTICS AGENCY

GEM & AME PROGRAMS

Analog Microcircuit Emulation

Form-Fit-Function-Interface (F3I), Military Grade, QML Class Q Microcircuits to Replace Your Obsolete Parts



- Flight Control System
- Communication Systems
- Data Acquisition
- Cockpit Display Instruments
- Flight Control Computer



- Gyrocompass
- PA System/Ship Horn
- Servo Motor Control
- Engine Room/Deck Alarms
- Missile Seeker



- Radar
- Power Management
- Turret Control
- Video/Audio Control
- Fire Control System

The Defense Logistics Agency (DLA), provides a permanent solution for microcircuit obsolescence through the Generalized Emulation of Microcircuits (GEM) and Advanced Microcircuit Emulation (AME) programs. As an accredited Trusted manufacturer of microcircuits, our flexible foundry provides a continuing source of military quality, Form-Fit-Function-Interface (F3I) replacement for non-procurable parts. The Emulation programs are leveraging their existing military-quality manufacturing expertise to cost-effectively and efficiently develop a solution for obsolete analog components.

THE NEED

Industry solutions for microcircuit obsolescence have mainly focused on digital components rather than analog. The priority to address digital logic obsolescence was based on the Diminishing Manufacturing Sources and Material Shortages (DMSMS) in the market. However, analog or linear components started to follow the digital obsolescence trend, and are now becoming exceedingly difficult to source, representing a higher risk for systems readiness. To address this industrial base shortfall, meet weapon-system requirements, and satisfy DLA's wide-ranging needs, a cost-effective, reliable source for analog or linear microcircuits is being implemented with DLA's Emulation programs.

Analog Obsolescence Solutions

Op Amps

Switches

Voltage
Regulators

Voltage
References

Analog-
to-Digital
Converters

Digital-
to-Analog
Converters

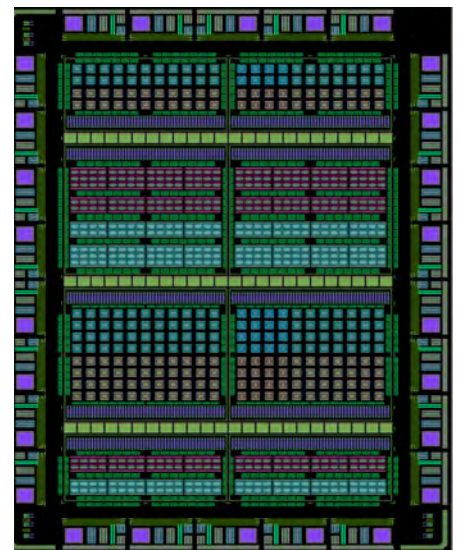
High
Power

THE EMULATION APPROACH

The DLA Emulation program fabrication process uses split manufacturing, in which wafer lots are processed through the majority of the manufacturing flow and held in inventory. This technology is based on gate arrays fabricated with predefined circuit elements (base wafers) which are interconnected with multiple levels of metal conductors (wafer personalization). This manufacturing approach minimizes the wafer production time for Emulated components and allows microcircuits which were originally manufactured in diverse technologies, to be produced from a managed inventory of standardized base wafers.

The AME program is currently developing BiCMOS arrays on Silicon on Insulator (SOI) wafers, optimized for Op Amps (operational amplifiers) and other analog functions. The op amp is one of the most common linear circuit building blocks in analog electronics. A BiCMOS process was selected as it combines both bipolar and CMOS technologies on the same component. The dual technology has the advantage of the inherent benefits of each technology and offers the greatest flexibility to meet the electrical requirements of many different Op Amp microcircuits. The 20 V analog base array is available in production, and a 40 V array is in development. A 20 V small dimension analog base array is in development to target voltage references enclosed in 2 or 3 lead metal CAN packages. To establish additional solutions, the AME program is evaluating new technology extensions to satisfy higher absolute supply voltages and more complex analog functions.

Technology: BiCMOS on SOI
Voltage: +20 V
Target: Operational Amplifiers



BENEFITS

The DLA Microcircuit Emulation programs provide a cost effective, permanent solution to microcircuit obsolescence. All manufacturing is performed in the U.S. and the programs provide total life cycle support for weapon systems, averting mission-impaired-capability-awaiting-parts (MICAP) incidents and production shutdowns. The Emulation capability enables the DLA and its DMSMS customer base to support U.S. military weapon systems readiness.

Our Story

In the late 1980s, DLA recognized that microcircuit obsolescence threatened the readiness of many American defense systems. Numerous systems in the armed forces were designed and developed in the 1960s and 1970s. For example, the U.S. Air Force began flying the F-15 Eagle tactical fighter in 1972, and the U.S. Navy first tested the AEGIS phased-array radar at sea in 1973. Because of continued advancements in semiconductor technology, the original suppliers stopped manufacturing the microelectronic components used in these and other systems. In 1987, DLA contracted with SRI to begin research and development on how to best replace obsolete microcircuits with standardized, modern integrated circuits (IC). DLA and SRI collaborated to develop the GEM Program. Using its on-site Trusted semiconductor foundry and deep knowledge of IC design/development, SRI produces on-demand, Class Q microcircuits matching the Form-Fit-Function-Interface (F3I) criteria of the required microcircuit. DLA is developing the next generation of F3I microcircuit Emulation capability through the AME Program to further alleviate growing IC obsolescence issues caused by the continued rapid advancements in technology. The new capabilities developed by AME are utilized by the GEM Program to ensure the Emulation Programs continue to meet weapons systems wide-ranging requirements. SRI's semiconductor foundry is accredited as a Department of War (DOW) Trusted Foundry supplier, and our manufacturing processes are qualified to MIL-PRF-38535.

