DLA
DEFENSE LOGISTICS AGENCY

The Nation's Combat Support Logistics Agency

DLA DMSMS Program
DLA Supply Chain Alliance Conference

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DLA DMSMS Overview

- The Defense Logistics Agency (DLA) Land and Maritime is the Lead DMSMS activity for DLA.
- DLA has over 31k items coded DMSMS NSNs. The majority (85%) of those items are electronic in nature, with Microcircuits and Semi-Conductors at the top.
- Top Weapons Platforms include F-18, Ticonderoga Class Cruisers, F-15, B-52, B1, Strategic Weapons, C-130, Minuteman, Ohio Class SSBN, among others.
- DLA DMSMS Program is funded through the Defense Capital Working Fund (DCWF).
- Generalized Emulation of Microcircuits (GEM) Program, which is a small batch, targeted technology, microcircuit production fabrication facility with a contracted industry partner is an invaluable resource in todays limited Microcircuit market.

AME GEM

Source: DLA Land and Maritime DMSMS Office
As of January 1, 2024

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Introduction to DLA/DMSMS Office

- **DLA Land & Maritime is the lead center for all DLA DMSMS issues, primarily:**
  1) Microcircuits
  2) Electronic Federal Supply Classes (FSCs 5961/5962)-***80-85% of our workload***
  3) Mechanical/Industrial-***15-20%***
- **DLA Land & Maritime's DMSMS Approach:**
  1) DMSMS situations are identified through industry or manufacturer notifications, Government Industry Data Exchange Program (GIDEP), and from a variety of other sources within the DoD, or a customer request.
  2) The best course of action is influenced by customer input and cost considerations. The military services have other options at their disposal, such as redesign and reclamation.
- **Substitute Items:**
  1) This involves using a similar device (upgrade, equivalent or downgrade) with continuing availability in place of the DMSMS part. An engineering deviation or waiver may be necessary
- **Life-of-Type (LOT) Buy:**
  1) A LOT buy is an acquisition for the estimated aggregate future demand of a DMSMS item. If other solutions are not available, and a LOT buy is required, customer input is critical. A LOT buy can provide a very cost-effective solution to a DMSMS problem, but only if the customers provide timely responses to our requirements inquiry messages.

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DLA Land and Maritime DMSMS Office

- DLA Lead Organization for DMSMS Management
  1. Process DMSMS cases
  2. Make life-of-type (LOT) buys when necessary
  3. Identify alternative solutions to DMSMS (LOT) buys
  4. Perform system analysis
  5. Work with US programs 1 on 1 to avoid redesigns
  6. Share Solutions with internal and external customers
  7. **Billion dollars in cost avoidance realized**

- Developed the Generalized and Advanced Microcircuit Emulation (GEM/AME) programs to provide long term solutions. Microcircuits are produced by a "trusted foundry".

- Member of the OSD DMSMS and Parts Management Working Groups: DLA Lead Member
  1. Promotes information sharing among its membership.
  2. Contributes DLA point of view to many special DoD level projects concerning the Supply Chain.

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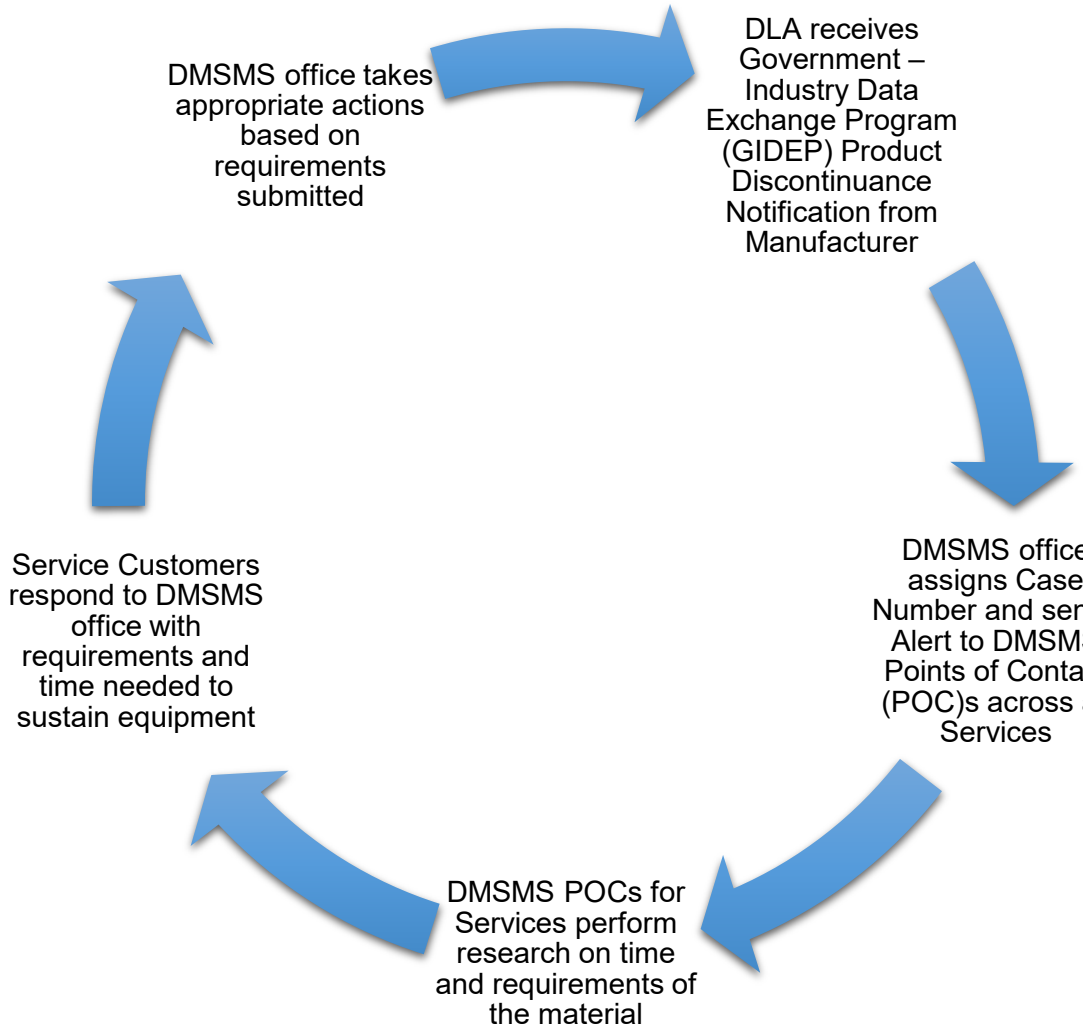
DMSMS Program Process



Source: DLA Land and Maritime DMSMS Office
As of January 1, 2024

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Checking for Discontinuance Notices

- **Check for notices**
  - Verify if there are any Government Industry Data Exchange Program (GIDEP). Notices will include data on defective parts, debarred sources, or last time buy notices or other information.

NOTE: If you determine that an OEM part is obsolete, go to the original manufacturer for residual assets. You may determine a base item is acceptable and can look for residual assets of the base item or any potentially acceptable parts. You can also look for aftermarket sources or partner with other programs to use a combination of possibilities. All alternatives must be approved by the cognizant engineering authority (ESA).

GOVERNMENT - INDUSTRY DATA EXCHANGE PROGRAM

DMSMS NOTICE

DIMINISHING MANUFACTURING SOURCES AND MATERIAL SHORTAGES

1. TITLE: Merrimac Industries, Inc. Product Discontinuance	2. DOCUMENT NUMBER: 6X-D-15-0001A 3. DATE (Year, Month, Day): 23 July 2015
4. MANUFACTURER NAME AND ADDRESS: Merrimac Industries, Inc. 41 Fairfield Place West Caldwell, NJ 07006-6206	5. MANUFACTURER POINT OF CONTACT (NAME): Richard Andre 6. MANUFACTURER POINT OF CONTACT TELEPHONE: [redacted]
7. CAGE CODE (FM): [redacted] 8. MANUFACTURER FINAL ORDER DATE: Not Available	9. MANUFACTURER PART NUMBER: See Document 10. BASE PART: Not Available
11. DOCUMENT ORIGINATOR: Merrimac Industries, Inc. 41 Fairfield Place West Caldwell, NJ 07006-6206	12. GOVERNMENT PART NUMBER: See Document 13. SPECIFICATION NUMBER: Not Available 14. TYPE DESIGNATOR: Not Available 15. MODEL NUMBER: Not Available 16. NATIONAL STOCK NUMBER (NSN): See Database 17. DRAWING NUMBER: Not Available

18. COMMENTS

This amendment contains additional information received from DLA Land and Maritime (DLA Case 2015-0859). Please notify DLA of your requirements by August 14, 2015. Page 1 through page 3 contain original document. Page 4 through page 5 contain amendment A. This document is complete.

Merrimac Industries, Inc. had announced the discontinuance of the listed part numbers. This notice was received after the discontinuation date and has been issued for your information only.

FOR GOVERNMENT AGENCIES USE ONLY

19. FEDERAL GOVERNMENT NAME AND ADDRESS: DLA Land and Maritime 3990 E. Broad St. Columbus, OH 43218-3990	20. FEDERAL GOVERNMENT POINT OF CONTACT NAME: Robert Peyton 21. FEDERAL GOVERNMENT POINT OF CONTACT TELEPHONE: (614) 692-5633
22. CASE NUMBER: 2015-0859 23. USER RESPONSE DEADLINE DATE: 14 August 2015 24. ROUTING IDENTIFIER CODE: Not Applicable	
25. SOLUTION STATUS CODE: Life of Type Buy	26. USERS: Not Applicable

GIDEP Form 97-4

Source: DLA Land and Maritime DMSMS Office
As of January 1, 2024

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DLA DMSMS Operations

- **Before and after initiation of the case the DMSMS Office will:**

- Determine that a case is warranted, initiate a DMSMS case in the Enterprise Business System (EBS) for the DLA enterprise and advises recorded users, GIDEP, FMS customers and DMSMS focal points within DoD.

- DMSMS IST Engineers, Product/Equipment Specialists, and Item Managers research the case items to find the most cost-effective alternative to maintain support for the customer
  - ✓ Are there other alternatives to the (LOT) buy?
    - Alternate sources
    - Approved Substitute
    - Aftermarket
    - Emulation
    - Other solution types
  - ✓ If so, are they acceptable to the recorded users? (DLA Form 339 process may be used here)

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DLA DMSMS Operations

- ***A procurement is generated only if there is No other acceptable means of support for the NSN***
- Coordinate the proposed solution with all affected, Services, Service Standardization or Engineering Support Activity (ESA)
- Determine quantity requirements for the solution part and notify other supply chains as applicable
- Advise Acquisition personnel of the approved solution and quantity changes
- Initiate or maintain cataloging and standardization actions for DMSMS items

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FMS and DMSMS Program

- FMS customers need a funded requisition at the time of the DMS Case for DLA to procure stock to satisfy their requirements.
- If DLA receives an FMS requirement after we close a DMSMS Case, we may not be able to support their requirement.
- FMS will only get stock on-hand if U.S. Services have adequate stock for their requirements.
- The DMSMS Office will try to find residual stock or an alternate solution for ***"ALL"*** DMS Cases, when a requirement is confirmed.

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DMSMS Program Stats

Lead Organization for DLA DMSMS Management

FY23

1,090 DMSMS Cases	1,1242 NSNs	687 recommended buys

Source: DLA Land and Maritime DMSMS Office
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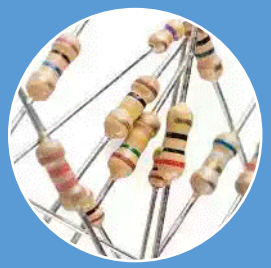
DMSMS Top 5

15k Items listed as DMS at L&M

12k Items have been Cancelled or Inactivated

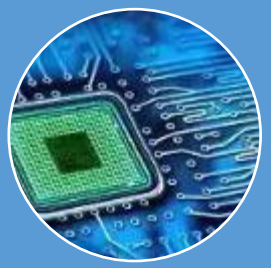
6k Items currently managed specifically by DMSMS Group

5962
Microcircuits



5905
Resistor

5910
Capacitor



5961
Semiconductor

5935
Connectors

Source: DLA Land and Maritime DMSMS Office
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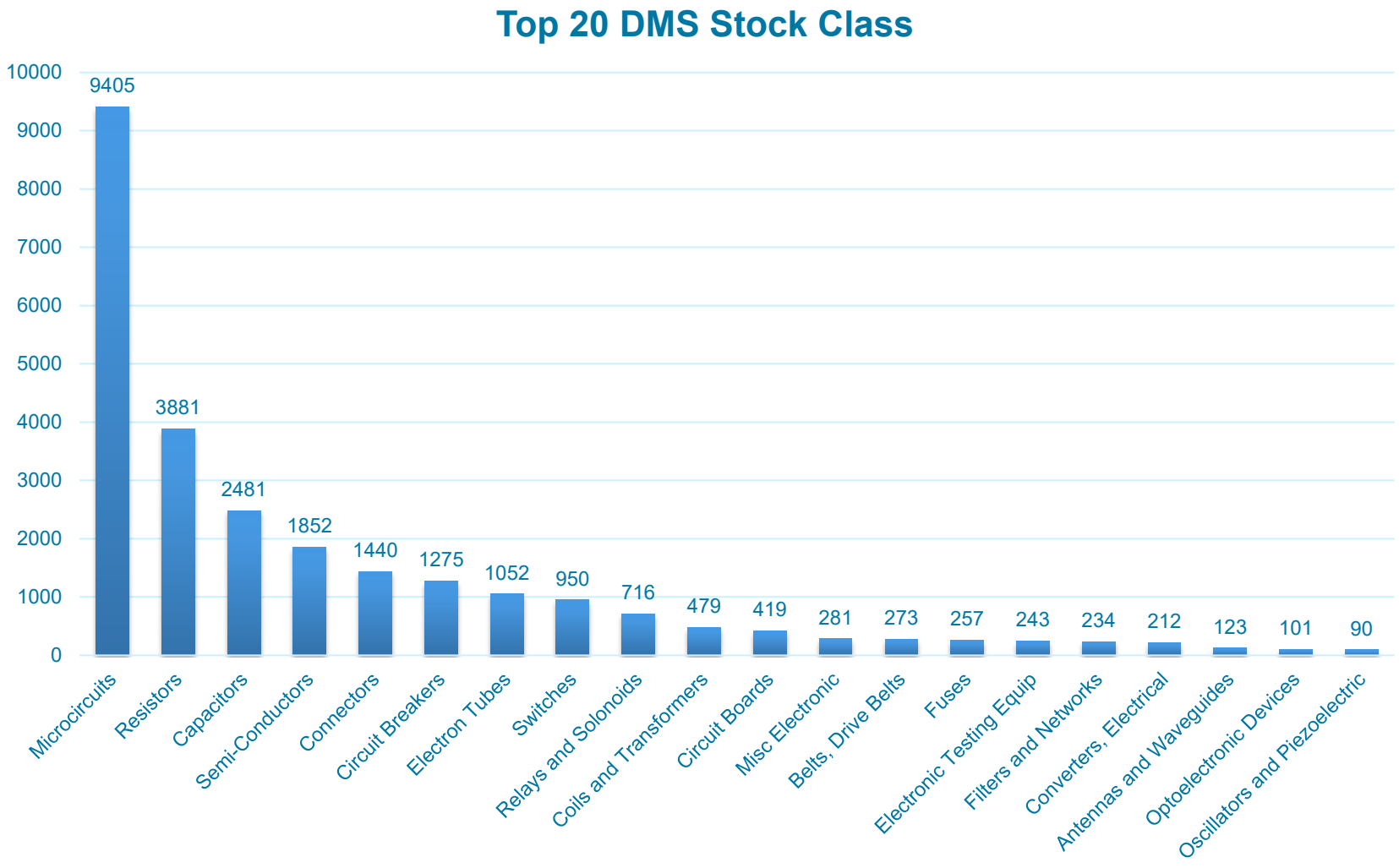
Top 20 FSCs Located in DMS Comparison



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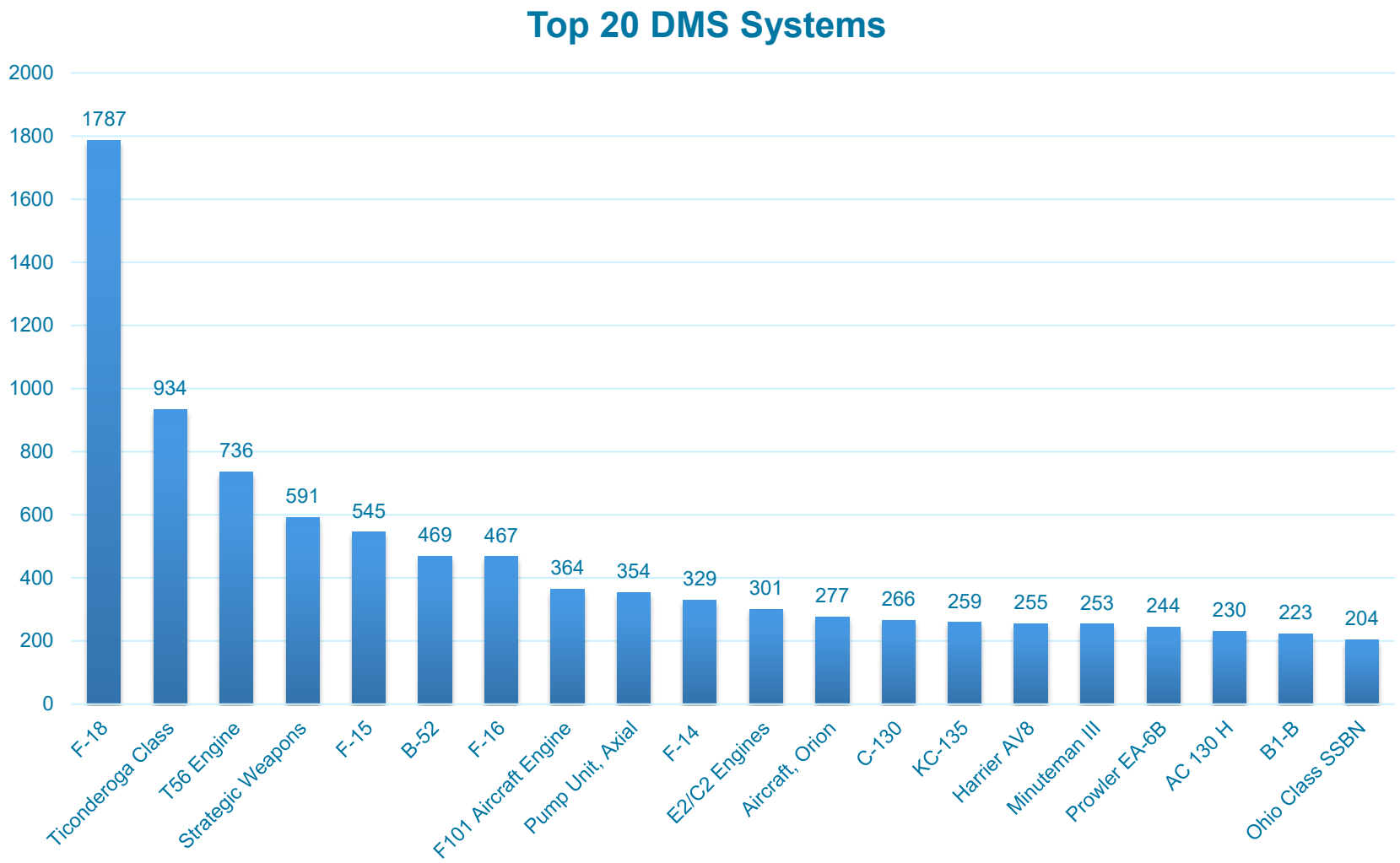
Top 20 Highest Priority WSDC Items



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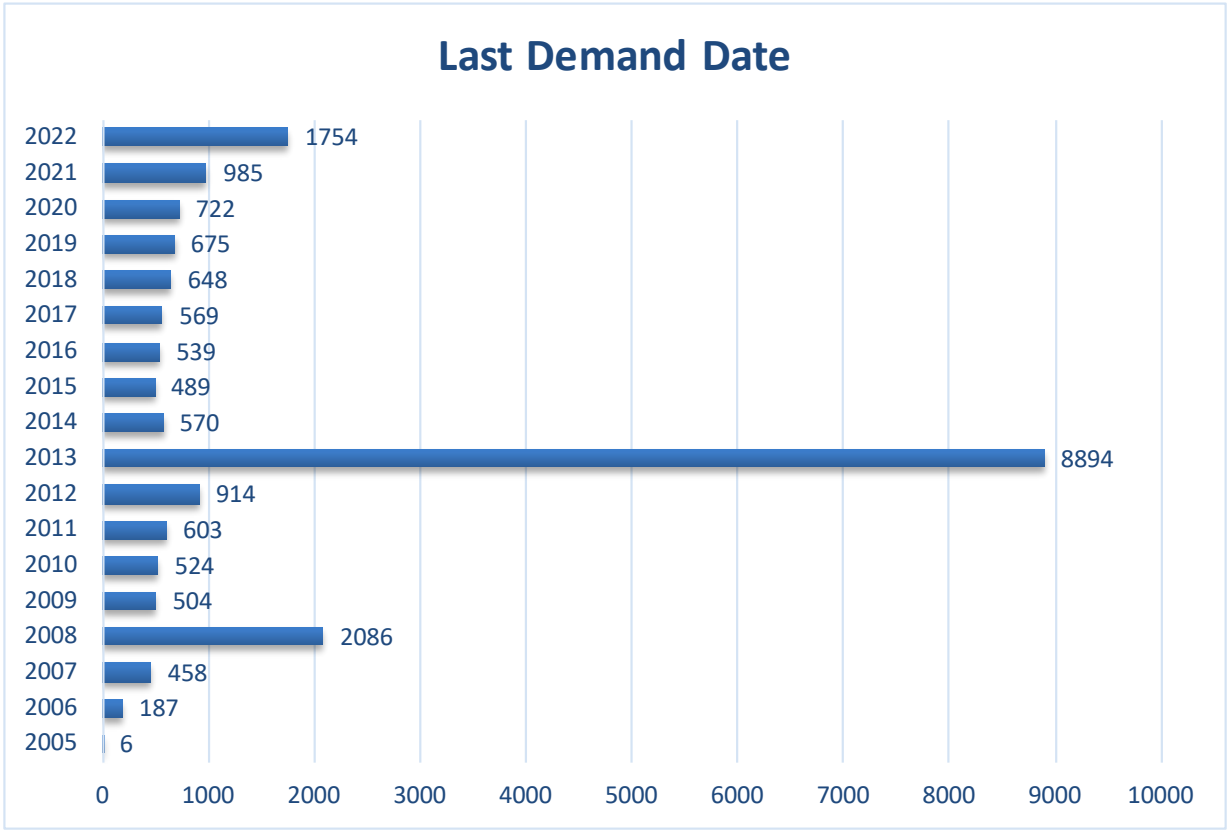
Last Demand Dates Grouped by Year

Last Demand	QTY
2005	6
2006	187
2007	458
2008	2086
2009	504
2010	524
2011	603
2012	914
2013	8894
2014	570
2015	489
2016	539
2017	569
2018	648
2019	675
2020	722
2021	985
2022	1754



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DMS RISK MATRIX
For Entry / Exit to DMSMS Management

Weapons System	Criticality & Stock Position Matrix		
Material Deemed Critical at the Directorate Level or Above New DMS Case being researched	Medium	High	High
Weapons Coded Systems	Low	Medium	High
Non-Weapons Coded Systems	Low	Low	Medium
Stock Impact Date Stock/Annual demand (5yr avg)	>5 years	3-4 years	< 2 year

Risk Matrix is built on 3 criteria:
- Weapon System / KID
- Stock Impact (Current Stock / Annual Demand)
- Last Demand

This Risk Matrix is the entry and exit for DMS items going into PC16. Before coding DMS, item will be vetted against the risk criteria determine COA. Items will be screened against criteria during monthly review process to determine when a change coding action should take place. Exit will occur as SOH and annual demand drop, placing material in less critical risk position.

Risk Matrix design from the International Institute of Obsolescence Management (IIOM) / DoD sponsored training. Specific risk criteria modified for L&M mission. International Obsolescence Standard IEC 62402:2019

This Risk Matrix is used once DMS office verifies that there is no longer manufacturing capability for the item. These are driven to the DMS office by GIDEP notifications and the floor

From CSP Matrix	Weapons System	DMS Management Matrix		
High	Criticality & Stock Position Matrix High	Medium	High	High
Medium	Criticality & Stock Position Matrix Med	Low	Medium	High
Low	Criticality & Stock Position Matrix Low	Low	Low	Medium
	Last Demand	>5 years	3-4 years	< 2 year

Solutions	
High	Keep in PC 16 to manually manage and monitor
Medium	Return to original profit center
Low	Return to original profit center or Return to Services if 0 balance, no demands

Source: DLA Land and Maritime DMSMS Office
As of January 1, 2024

WARFIGHTER ALWAYS

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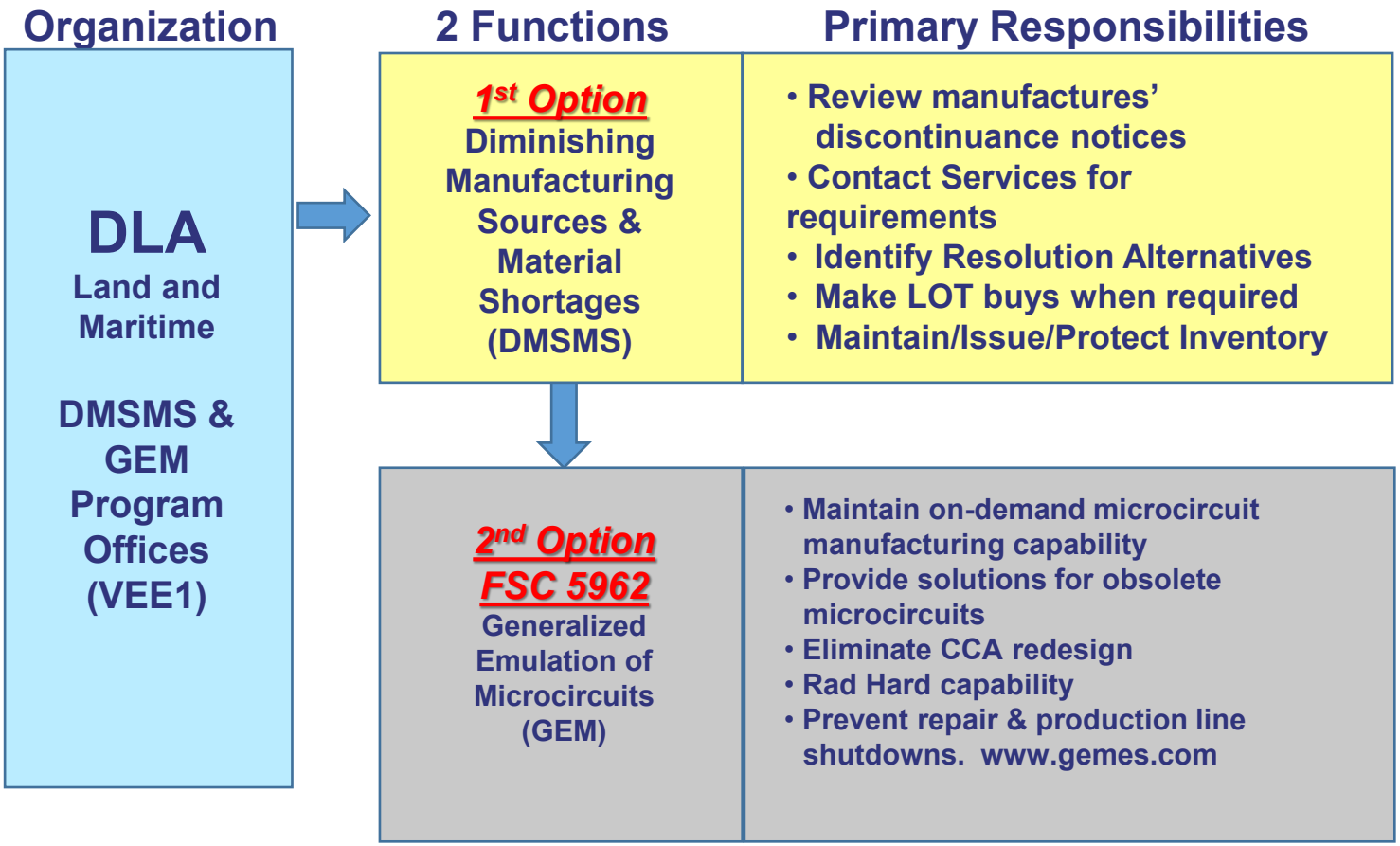
Generalized Emulation of Microcircuits



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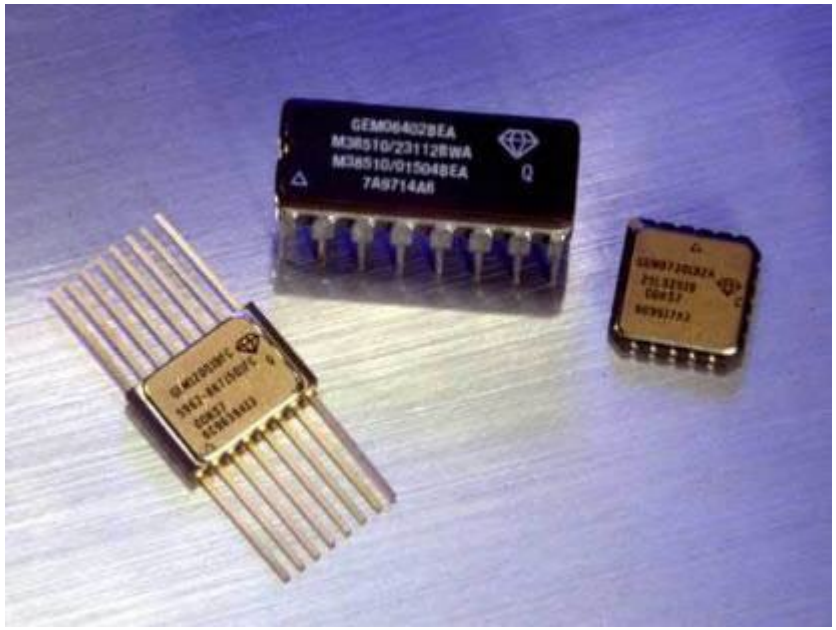
What is GEM?



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Defense Logistic Agency
GEM Program

Generalized
Emulation of
Microcircuits

DLA & SRI International

- GEM is a DLA Program providing military grade microcircuits
- SRI International (formerly Sarnoff Corp) is DLA's prime contractor for the GEM Program
- Design, manufacturing, and testing are performed by SRI's Microcircuit Emulation Center in Princeton, NJ
- GEM was created to fill a void; continue to supply microcircuits when the industrial community no longer will manufacture, and the aftermarket supply has dried up
- The GEM program does not compete with industry
- Program goal is to deliver a permanent solution to microcircuit obsolescence throughout the life of the weapon system

Maintain Capability to Produce Unavailable Microcircuits

Source: DLA Land and Maritime DMSMS Office
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Government Industry Partnership

Generalized Emulation of Microcircuits (GEM) & Advanced Microcircuit Emulation (AME) Programs

- **SRI International** - *Princeton, NJ*
  - GEM manufactures Emulation products
  - AME develops manufacturing capability per Land and Maritime requirements

For Over 35Years

- **DLA Land and Maritime DMSMS Program Office** - *Columbus, OH*
  - Manages the production efforts through the GEM Program
- **Defense Logistic Agency (DLA), Headquarters** -*Fort Belvoir, VA*
  - Manages the R&D efforts through the AME Program

Source: DLA Land and Maritime DMSMS Office
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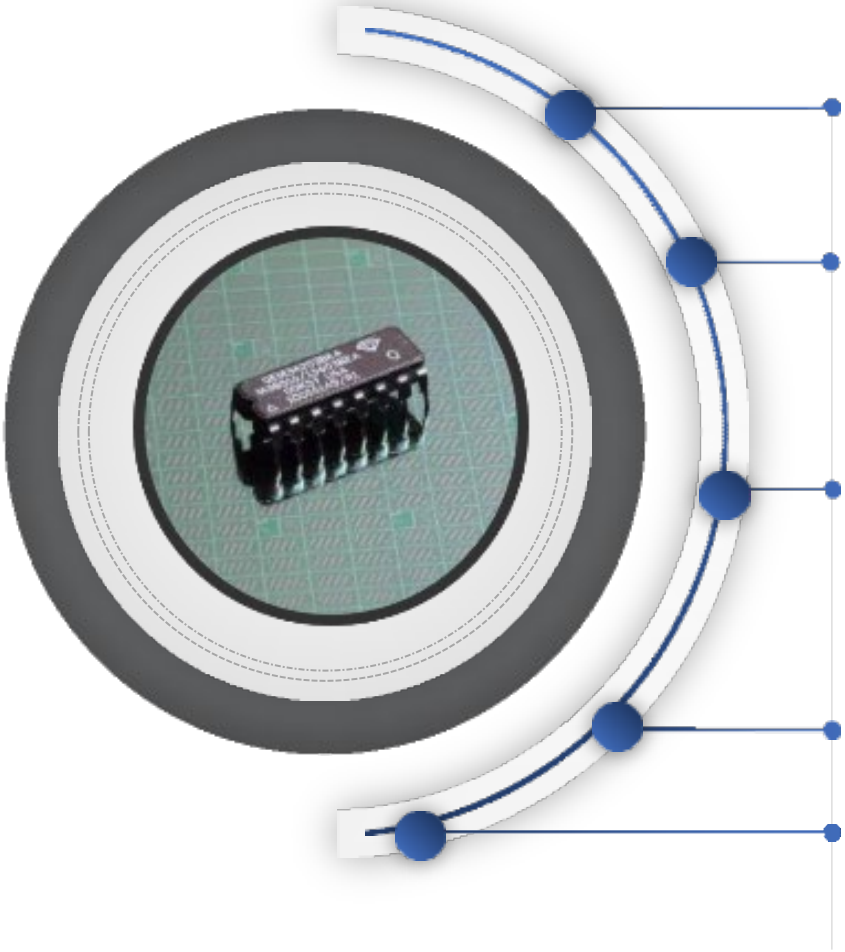
What is an Emulated Microcircuit?



A microcircuit designed and manufactured to be a Form/Fit/Function/Interface (F^3I) replacement

Manufactured on a captive, QML (MIL-PRF-38535) certified, DoD Trusted wafer fab and manufacturing line

Transparent to supply and logistic system:

- Same NSN, or part number
- Will include the GEM part number & CAGE code (0DKS7)

Designed to all types of specifications

Fully compliant and to electrical, mechanical, quality and reliability criteria

Source: DLA Land and Maritime DMSMS Office
As of January 1, 2024

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SRI Microcircuit Emulation Center

All Manufacturing at SRI International in Princeton, NJ

Reverse Engineering

- Technical data package analysis
- Electrical characterization of known good samples
- Imaging and delayering of silicon

Design and Layout

- Full-suite of state-of-the-art EDA tools
- Foundry capabilities modeled and integrated into design flow

Wafer Fabrication

- 12,000 ft^2 Clean Room, Class 10 & 100 (ISO 4 & 5)
- Government Trust Accreditation (Level 1A)
- SPC manufacturing process covering all process areas

QML Testing and Qualification

- Reliability and Functional ATE characterization
- QML Certified test flow (MIL-PRF-38535)
- Lab suitability Certified (MIL-STD-883)

Emulated Microcircuit

- Form, Fit, Function, & Interface replacement Class Q Microcircuits
- Shipped with Certificate of Conformance

Source: DLA Land and Maritime DMSMS Office
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WARFIGHTER ALWAYS

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Emulation Capabilities

U.S. Based Wafer Foundry

- No dependency on outside wafer foundry
- Allows for continuous on demand manufacturing

Technology Node	>3.0 µm	1.5µm	1.2 µm	0.8 µm	0.5 µm	0.35 µm
Process Technology	CMOS BiCMOS HV CMOS	CMOS BiCMOS HV CMOS	CMOS BiCMOS	CMOS Bipolar DTI Schottky	CMOS SOI	LV CMOS
Metal Layers	2 levels	2 levels	3 levels	3 levels	3 levels	5 levels




Source: DLA Land and Maritime DMSMS Office
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QML Testing and Qualifications

SRI is a QML manufacturer of MIL-PRF-38535 Class Q Microcircuits

Test Method 5004

- Wafer Lot Acceptance
- Internal Visual Inspection
- Constant Acceleration
- PDA calculation
- Fine/Gross Seal
- Non-destructive Bond Pull
- Temp Cycling
- Burn-in
- Over temp electrical test

Test Method 5005

- Quality Conformance Inspection
  Each device lot
  - Group A – Sample Electrical
  - Group B – Sample Mechanical/Package
- Every base wafer lot
  - Group C – life test with SEC device
- Periodic per package/die family
  - Group D – destructive package test

testing performed if required by the procurement specification.

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Permanent Solution Example

GEM Part No. GEM06001BAA

- Emulation of M38510/02601BAA
- NSN No. 5962-01-423-9501
- Generic part number 54L86 in a flat-pack package
  - Initially designed and manufactured in 1997
  - Multiple delivery orders during 1997 - 2004

DLA Purchase Order in February 2021

- Requested part no. M38510/02601BDA
- Same microcircuit in an alternate package
- Buyer requested expedited delivery schedule

Results

- New wafer lot was manufactured
- Package assembly used new alternate package
- Delivery was 17 weeks earlier than promised date
- Shipment was 24 years after first product shipment and 17 years since the last delivery to DLA

1997: Initial design and manufacture

24 years later

2021: New wafer lot manufactured assembled in an alternate package

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DLA's GEM Program COR Responsibilities

- Contracting Officer Representative (COR)
- Every request for a quote or a new Emulation is evaluated by COR. New Emulation involve NRE, the COR decides how much of the NRE is covered by the cost of the GEM Program.
- Verifies that there is no other source or viable solution available, including possible standardization to another NSN, acceptable alternate part proposed, etc.
- Looks at usage and future demands and number of Weapon Systems that the part is used on.
- The COR decide if is in the best interest Government to Emulate a microcircuit.

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Funding Options

- **Design / Prototype devices**
  - Funded by DLA
    - For standard Mil-Spec part with more than one active weapon system
    - SCDs are reviewed for Mil-Spec equivalents
    - Demonstration of new Emulation capability
  - Jointly funded NRE, DLA/weapon system
  - NRE paid completely by weapon system
    - Unique single application devices

- **Production devices**
  - Funded by weapon system program office or contractor

- **Insertion testing**
  - Funded by weapon system program office or contractor

Source: DLA Land and Maritime DMSMS Office
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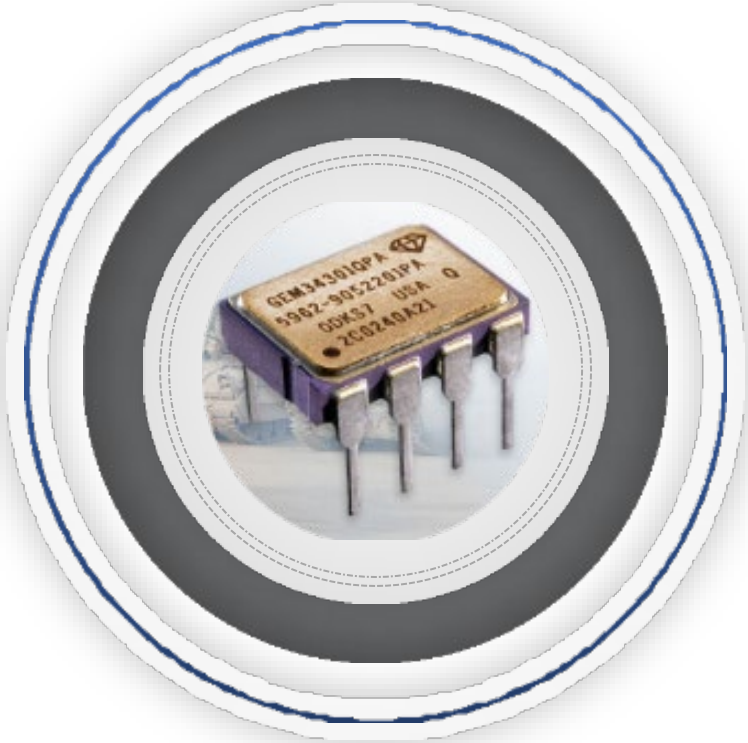
GEM: Proactively Breaks the Obsolescence Cycle

- Over $2B estimated cost avoidance
- Eliminate counterfeit concerns
- Avert MICAP & production shutdowns
- Maintain weapon system readiness levels
- Support the warfighter with a cost-effective, long-term solution



Source: DLA Land and Maritime DMSMS Office
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Important Notes

Important notes

- SRI can not emulate a microcircuit without approval from the GEM Program office
- No matter how the GEM program is approached. Everything is approved or disapproved by GEM program office
- The GEM program does not compete with industry
- SRI fully meets all the MIL-PRF-38535 requirements and is audited by Qualifying Activity and SMD parts numbers go through qualification and approval process to be listed on the Standard Microcircuit Cross Reference (SMCR).
- Program goal is to support the warfighter with a cost-effective, long-term solution for sustainment
- The GEM Program will never discontinue a microcircuit.

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Emulation Success Story
GEM provides cross platform solutions

Problem

Weapon Platform: Bradley M2A2
Part Number: SMD 5962-9052201PA
Generic: DS1632
Customer: Army, United Defense (Prime), Curtis Wright (subcontractor)
Issue:

- Army reported DMSMS part that was going to interrupt production and maintenance of Bradley M2A2 Fighting vehicle.
- Part used in Turret Distribution box, System Control box, and Gun Control unit

Solution

- Innovative GEM solution utilized a 1.5 µm, 100V BiCMOS process which the GEM program has developed and maintains
- Insertion testing completed by Curtis Wright Technologies, first pass success achieved
- Split level manufacturing capability, enables production ramp schedule to be met

Benefit

- Averted Bradley production and repair line shutdown
- Shipped over 13.6K parts
- Provides a solution for the life of the system
- Identified usage in F-15, F/A-18, F-22, C-17, and Trident

Contract Vehicle/Funding

<u>Design/Prototypes</u>
Demo device funded by DLA

<u>Production</u>
DLA

Source: DLA Land and Maritime DMSMS Office
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Emulation Success Story
GEM provides cross platform solutions

Problem

Weapon Platform: Patriot Missile
Part Number: x5 different FPLAs
5962-87682, un-programmed FPLA
Generic: Signetics/Philips
82S513/82S153A
Customer: Raytheon

Issue:

- Authenticated, certified QML parts required
- Timing critical, impending production shutdown
- Two legacy CCAs impacted

Solution

- GEM program develops five hardcoded ASICs utilizing Raytheon Boolean equations and fuse maps
- All devices meet electrical and mechanical specifications defined in SMD 5962-87682, device type 01, CERDIP 20 pin dual in line package
- Split level manufacturing capability, enables schedule requirements to be met

Benefit

- Avoid CCA redesign
- QML microcircuits provided
- Established a permanent source of supply
- Flexible, captive wafer foundry ensures just in time delivery
- ***Production shutdown averted***

Contract Vehicle/Funding

<u>Design/Prototypes</u>
Cost share between DLA and Raytheon

<u>Production</u>
Direct Contract OEM to SRI

Source: DLA Land and Maritime DMSMS Office
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Emulation Success Story
GEM provides cross platform solutions

Problem

Weapon Platform: Patriot Missile
Part Number: Customer proprietary SCD
Custom ASIC
NSN 5962-01-223-9083
Customer: Defense Logistics Agency
Issue:

- The United States Army procured devices until 2003, after which management was transferred to DLA
- SRI received order in 2018 when DLA determined there was no other means of support

Solution

- Innovative GEM solution utilized a 0.8 µm CMOS process which the GEM program has developed and maintains
- Custom package required (along with sockets, test fixtures and burn-in boards) to meet SCD specifications

Benefit

- The GEM Solution is transparent, DLA fulfilled backorder without disruption to customer
- Allowed for continued repair of Patriot modules at Letterkenny Army Depot
- Established a permanent source of supply
- SRI GEM cage code 0DKS7 added to NSN

Contract Vehicle/Funding

<u>Design/Prototypes</u>
Development funded by DLA

<u>Production</u>
Direct Contract DLA to SRI

Source: DLA Land and Maritime DMSMS Office
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GEM BOM Analysis Example for Proactive Mitigation

ManufacturersPN	Function	NSN	GEM Code	Notes
M38510/50404BRA	PLD	5962-01-198-2190	1	PLD, +5V (GEM to provide hard coded version)
5962-8984102LA	EEPLD	5962-01-434-3551	1	PLD, +5V (GEM to provide hard coded version)
5962-8984104LA	EEPLD	5962-01-464-3420	1	PLD, +5V (GEM to provide hard coded version)
MC74HC244ADWG	Buffer/Driver		2	OCTAL 3-STATE NONINVERTING Buffer/ line driver/receiver, 20 SOIC
MC74HC00ADG	NAND Gate		2	CMOS QUAD 2-INPUT NAND GATE, 14 pin SOIC
EPM7128AEFI100-7	EEPLD		3	3.3-V EEPROM- (5V tolerant I/O), EE PLD, 7.5ns, 128-Cell,CMOS, PBGA100
XC9572XL-10TQ100I	CPLD		3	+3.3V (5V tolerant I/O), .35µm, Flash PLD, 10ns, 72-Cell, CMOS, PQFP100
XC9572XL-10VQ64I	CPLD		3	+3.3V (5V tolerant I/O), .35µm, Flash PLD, 10ns, 72-Cell, CMOS, PQFP64
XCF32PFS48C	PROM		4	1.8V supply, Configuration Memory, 32MX1, Serial, CMOS, PBGA48
XC2C256-7VQ100I	CPLD		4	.18 µm, 1/8V, Flash PLD, 7.5ns, 256-Cell, CMOS, PQFP100
AT28C010E-12JU	EEPROM		4	Density and size of mem, 1-megabit (128K x 8) Paged Parallel EEPROM, +5V
S29JL064J70TFI000	Flash Memory		4	0.18-µm, 6-layer-metal-flash process, 64 Mb, 3.0 V
EPM1270F256I5	CPLD		4	PLD, 8Kb Flash, PBGA256, MultiVolt core either 3.3 V/2.5 V or 1.8 V
XCF02SVOG20C	PROM		4	3.3V Supply, I/O 1.8V to 3.3V, 2 Mb desnity, 20-pin TSSOP Package, Pb-free
BU-64843T8-102	Bus Interface		5	TotalACE, multichip module, includes x2 integrated transformers
BU-64843T8-E02	Bus Interface		5	TotalACE, multichip module, includes x2 integrated transformers

Emulation Codes	
1	Existing GEM Capability
2	AME development > 1-2 years technology available
3	Requires technology extensions > 2 years / Roadma
4	Requires New Technology development > 5 years
5	N/A or Need more information

- BOM analysis provided as a free service
- Information used to help drive future roadmap developments

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DMSMS and GEM Takeaways

- **Funding**
  - Working Capital Fund
  - DLA reaching out to Program offices to provide funded requisitions for PR generation
- **Collaboration**
  - Working closely with various service working groups calls to mitigate DMS issues and achieve better lead times for DMS processing
  - Earliest Notification possible. Time is of the Essence!
- **Outreach**
  - Attending and presenting to a wide array of service organizations to get our capabilities out. DMSMS program and especially the GEM program

AME GEM

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http://dmsms.org

http://www.gemes.com

http://www.dla.mil/Land-and-Maritime/Offers/Technical-Support/Logistics

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Questions?

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