AFCTN Test Report
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Transfer of Air Force Technical Procurement Bid Set Data to Small Businesses, Using CALS and EDI

Test Report

15 August 1994

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TRADEMARKS

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Abstract

This report documents a test transfer of three Air Force technical procurement bid sets to one large and twelve small businesses, using the Department of Defense (DoD) Continuous Acquisition and Life-cycle Support (CALS) and ANSI ASC X12 Electronic Data Interchange (EDI) standards. The main goal of the test was to evaluate the effectiveness of using CALS technical data within the context of the DoD's EDI-based standard approach to electronic commerce in procurement, with particular emphasis on receipt and use of the data by small contractors. Air Force procurement data was provided by the Sacramento Air Logistics Center at McClellan Air Force Base; the manufacturing participants were selected from among McClellan's "Blue Ribbon" contractors, located throughout the United States. The test was sponsored by the Air Force CALS Test Network, headquartered at Wright-Patterson Air Force Base.

The test successfully demonstrated the technical feasibility of including CALS MIL-R-28002 (Raster) engineering data in an EDI Specification/Technical Information transaction set (ANSI ASC X12 841) when issuing electronic requests for quotation to small businesses. In many cases, the data was complete enough for the contractor participant to feel comfortable generating a quote. Lessons learned from the test are being fed back to the CALS and EDI standards organizations, and to future implementors of CALS-EDI based acquisition or contracting systems, which require the transfer of technical information, such as engineering data, manufacturing process data, quality test data, and other product or process data, in the form of a CALS or other digital datafile.

This work was performed under the auspices of USDOE by LLNL under contract no. W-7405-Eng-48.

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Executive Summary

This test has demonstrated that Continuous Acquisition and Life-cycle Support (CALS) and Electronic Data Interchange (EDI) can be successfully combined to provide an electronic Request for Quotation (RFQ) capability in military acquisition and/or contracting operations, when acquiring technical parts, or replenishing LRUs (Lowest Replacement Units), from small manufacturing contractors. The test also identified several issues, summarized below, that need to be addressed when developing a production CALS and EDI based implementation.

This test, properly called a "demonstration" or "validation," tracked the transfer of actual Air Force Technical Procurement RFQ data from McClellan Air Force Base to one large and twelve small manufacturing businesses located throughout the United States. The test was limited to bid sets for procurement actions of less than $25,000. Engineering drawings in CALS raster format were retrieved from the Sacramento Air Logistics Center's Engineering Data Computer Assisted Retrieval System (EDCARS), located at McClellan AFB, California, inserted into EDI transaction sets, and transferred via commercial telecommunications value-added networks (VANs) to the thirteen participating businesses. The businesses received the RFQ technical data, using modems and their existing phone lines, and viewed it on their local micro computers, generating images generally clear enough to permit a response to the RFQ. The businesses represented diverse manufacturing capabilities such as milling, sheet metal working, electromechanical assembly, motor construction, and plastics molding for windows and cockpits.

The major observations and accompanying recommendations from the test are:

1. The current contracting process could be streamlined by creating a direct electronic connection among the relevant on-base computer systems.

2. The test included Ethernet TCP/IP transfer of technical data between EDCARS and procurement computational resources. This activity indicated that direct access between these entities requires reconciliation between the ongoing EDCARS production activity and SM-ALC LAN loading/routing strategies, and the availability of procurement digital storage resources.
   [Editor's note: It is anticipated that DoD engineering repository migration to JEDMICS will address many of these issues.]

3. The DoD Implementation Conventions for the ANSI ASC X12 840 and 841 transactions sets, and ANSI ASC X12 itself, if necessary, should be modified to allow mutual pointers, breaking up of large multi-file technical solicitations, transfer of engineering data lists, and requests for specific engineering drawings.
   [Editor's note: Modifications to the DoD Implementation Conventions, and to the ANSI ASC X12 standards have been made to support these recommendations.]

4. Transmission times were lengthy, primarily due to large data set sizes. Therefore, until technology advances sufficiently to ensure feasibility of larger transmissions, data transmission should occur at 9600 baud or faster, and data sets larger than 5 megabytes should be transferred on other media (e.g., tapes, floppies, optical) instead of over an EDI VAN.

5. Contractor participants were unable to selectively download messages from the VANs. As a result, the VANs used in this test have now implemented a capability which gives the user flexibility and control over the data download process.

6. Contractors should perform a business process analysis as they implement electronic contracting, in order to plan for the changes CALS and EDI will have on their daily business activities.

7. Depending on the hardware, software, and configuration parameters used, some contractors were more successful than others in assimilating the electronic messages and utilizing the digital CALS images. Further evaluation of contractor business processes, engineering processes, and the computational resources available in the commercial market, is necessary.

8. The information handling knowledge and experience of the contractor also affected the ease with which the contractor could integrate the electronic RFQs into his daily business. Further evaluation of the education, checklists, and implementation aids and tools that are needed for a small business to more easily and effectively use electronic contracting is necessary. Integrated CALS-EDI training products and services also must be developed specifically for small contractors.

1 Purpose, Objectives, and Background

1.1 Purpose

The purpose of this test was to evaluate the effectiveness of using Continuous Acquisition and Life-cycle Support (CALS) data within the context of the Department of Defense's (DoD's) standard approach to electronic commerce (EC) in procurement. This approach is based on the American National Standards Institute (ANSI) Accredited Standards Committee (ASC) X12 Standard for Electronic Data Interchange (EDI). A significant aspect of the test was its emphasis on procurement actions involving small businesses. Experience gained from the test will be used to support a subsequent pilot implementation of an electronic procurement system at Sacramento Air Logistics Center, McClellan Air Force Base, California, which will employ the CALS and EDI standards.

1.2 Objectives

The primary objective of the test was to demonstrate that, for the purpose of soliciting a request for quotation (RFQ), EDI can be used to successfully transmit CALS data to small businesses. Another objective was to demonstrate to small businesses the usefulness of receiving and using digital images in a CALS format.

To organize execution of the test, and to support these objectives, the following were demonstrated and evaluated:

1. Direct electronic extraction of procurement-related CALS data from the Engineering Data Computer Assisted Retrieval System (EDCARS);
2. Electronic transfer of the technical data portion of an RFQ, namely the X12 Specification/Technical Information (841) transaction set, to the Air Force CALS Test Network at Lawrence Livermore National Laboratory (LLNL) for CALS evaluation;
3. Distribution of the package to selected small businesses, including a small business co-op center, using EDI over commercial VANs; and
4. Capture and display of the RFQ's CALS data by the contractor participants.

1.3 Background

1.3.1 Summary of Air Force CALS Test Network CALS-EDI Testing

This is the third test involving the exchange of CALS data via EDI transaction sets which the Air Force CALS Test Network (AFCTN) Test Bed at LLNL has conducted. The first test, performed in the fall of 1990, was a demonstration of the basic compatibility of CALS and EDI. It showed that CALS data could be packaged in an EDI transaction set, sent over ISDN or DDN lines, and arrive intact and usable on the other end. It also showed that the time to transmit an engineering drawing over DDN, even during a "heavy use" time of day, was well under ten minutes.

The second test, performed in the fall of 1991, successfully demonstrated a paperless Air Force technical procurement transaction. Engineering drawings from an actual solicitation bid set were extracted in CALS raster format from the McClellan AFB CA EDCARS system, sent electronically using STX software from Supply Tech to a temporary VAN hub distribution point, then forwarded to a prospective contractor. The EDI-experienced contractor, TRW, successfully received the transactions using the same EDI software, and displayed the CALS raster images using HiJaak software from Inset Systems, Inc. This demonstrated an ability to send RFQs electronically using CALS and EDI.

This third test, a demonstration/validation, was actually a modification of the previous Air Force procurement test. This activity differs from the previous test in that specific recipients were targeted. The RFQ and technical data were sent to a representative sample of mostly small manufacturing contractors, who had various levels of exposure to CALS and EDI. Two VAN-based routes were used to transfer the procurement data to the contractors: (1) directly to contractors, and (2) to contractors through a central contractor co-op. The co-op transfer is reported in Appendix F.

1.3.2 Nature of the Test

This test is best described as a "demonstration/validation." Although not a strict business case analysis, it does address usability, quality, and convenience of electronic dissemination of technical solicitations. Comparisons are made between conventional data transfers (aperture cards delivered through the U.S. mail) and electronic transfers (CALS digital images delivered by commercial VANs). The VAN costs described in this report are best guess estimates. Much of the hardware and software anticipated as necessary for the test was provided to the participants without charge; there were no metrics to determine the optimization of the various system/software/hardware integrations.

The test demonstrated that the CALS standards can be used effectively in an actual government EDI procurement environment. Problems encountered during the test have been identified, and solutions recommended.

1.3.3 Testing Strategy

The approach taken by the Air Force CALS Test Network in executing complicated tests such as this is to write a test plan describing the ideal procedure, execute the test using prudence and reasonable backup strategies, then report what actually happened in the test, including any deviations from the original plan. The plan used for this test is found in Appendix A of this report.

Since this test depended upon availability of several capabilities that were beyond the control of the AFCTN, the strategy taken was to execute the test over an extended period of time, with sufficient flexibility to incorporate capabilities as they became available. In the event the capabilities never became available during the test, "fallbacks" and "workarounds" were used to accommodate the test plan.

1.3.4 Testing Procedures

The testing procedures or steps followed during the test are detailed in the Test Plan. In general, they involved bringing bid set data (business data and engineering drawings) to an Intelligent Gateway Processor (IGP) located at the originator's site, inserting the data into X12 840 and 841 transaction sets, and forwarding them to a VAN. The contractors would access their VAN "mail boxes" to see that the transaction sets had been delivered, download them to their PCs, and decompress and view the files. A diagram of the steps involved in the testing procedures is found in Appendix A of the Test Plan.

1.3.5 Standards and Specifications Tested

The test used actual solicitation bid sets for RFQs. These packages contained numerical and textual data, in ASCII format, from the McClellan Air Force Base CA Sacramento Air Logistics Center (SM-ALC) Automated Contract Preparation System (ACPS). Along with the text were supporting engineering drawings and specifications in CALS raster format from the SM-ALC EDCARS system.

The specific standards utilized or evaluated were:

a. DoD MIL-STD-1840A - Automated Interchange of Technical Information

b. DoD MIL-R-28002A - Raster Graphic Representation in Binary Format, Requirements for

c. ANSI ASC X12 Request for Quotation (840) transaction set, Version 3022

d. ANSI ASC X12 Specification/Technical Information (841) transaction set, Version 3022

e. ANSI ASC X12 Functional Acknowledgment (997) transaction set, Version 3010

f. X.400 Open System Interconnection (OSI) Message Handling System (An International Consultative Committee on Telegraphy and Telephony [CCITT] Standard)

1.3.6 Test Schedule

Every major deadline in the test plan schedule was met. Details of the schedule are found in the Test Plan.

1.4 Structure of This Report

This report is structured to follow the flow of the bid set data. The next three sections describe the participants, with their respective hardware and software platforms, and the necessary pre-test preparation. Sections 5 through 10 contain descriptions and observations of the data flow to the site IGP, to the VANs, and finally to the small business contractors. The final section summarizes the successes, problems, and recommendations that came from the test. Contained in the appendices are images of the actual bid set data, along with other pertinent test-related documents.

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2 Participants and Platforms

The test was a joint effort between Aircraft Contracting at SM-ALC and the Air Force CALS Test Network Test Bed at LLNL. SM-ALC provided most of the management and coordination; AFCTN assisted, wrote the Test Plan, provided CALS-specific technical expertise, and coordinated, edited, and produced this report. Funding was provided by the Air Force CALS Program Office. The SM-ALC Aircraft Contracting Division, which supports the F-111, A-7, and A-10 aircraft, collected the technical data from its engineering technical data repository, EDCARS, and packaged the data into electronic solicitations or "bid sets." Thirteen contracting vendors, who received solicitation data, participated in this test. A contracting vendor co-op, located at Brigham Young University (BYU), acted as go-between for those contractors who did not have access to a VAN.

Platforms used for the test ranged from DOS/Intel-based microcomputers (PCs) and Apple Macintoshes to Data General and IBM-like mainframes, and included UNIX workstations and mid-range systems. VANs were used to transport the solicitations; workstation and micro-based EDI translation software were used to build and interpret the transaction sets.

2.1 Philosophy of Test

Working within the established objectives, guidelines, and strategies for the test, the testing team utilized multiple differing hardware and software solutions, so that figures and statistics suitable for comparison and education would surface. Commercial off the shelf (COTS) software and hardware was utilized wherever possible, e.g., the PC systems and CALS conversion and viewing software used by the contractor participants, and the EDI software used by all participants. The co-op at BYU used a Macintosh system and third-party EDI software to receive the solicitations. For transmission of the solicitations, the intent was to connect directly to multiple VANs, as well as the proposed DoD distribution point architecture, so that capabilities, performance, and cost could be compared and contrasted. Three solicitations with varying numbers of technical drawings were identified (see section 4.2.3.1) so that solicitation size statistics could be gathered. The different sized solicitations also provided useful statistics on the relationships between size and transmission time, and the time required to gather and send 35mm aperture cards compared with that of sending electronic files.

2.2 Use of COTS Hardware and Software

The testing team considered it a requirement to use easily obtainable commercial products. It was agreed that execution of the test using COTS components would be critical to the interest in, and acceptance of, these test results, particularly to the small business contractor. This section outlines the COTS hardware and software used.

2.2.1 Hardware

A microprocessor (PC-compatible or Macintosh) computer was used by each contractor to run the EDI software. These computers had 2 megabytes or more of RAM memory, and sufficient hard disk space to store the largest expected compressed solicitation, approximately 8.6 megabytes. Optionally, contractors may have elected to keep enough hard disk space to store the restored (decompressed) file, which could be 40-50 times larger than the incoming compressed file. The hardware platform used at SM-ALC to run the EDI translator software which packaged and sent the solicitations to the contractors was an existing UNIX-based AT&T 3B2 computer.

Modems used, including Hayes, Zenith, Datatrek, U.S. Robotics, and MultiTech models, could operate at transfer rates of up to 9600 baud. During the test, 2400 and 9600 baud transfer rates were used.

2.2.2 Software

EDI translator software is necessary to receive and send EDI messages and transactions. There are numerous EDI translator software packages available on the commercial market which function on most processors, such as IBM PC compatible, Macintosh, and UNIX desktops, most engineering workstations, and mainframe computers. Table 2.1 lists the EDI translator software used for the test. These had demonstrated, before 1991, the ability to handle binary files of technical data via the X12 841 transaction set (additional commercial software is now also available from a few vendors):

Hardware Platform	EDI Translator	Manufacturer
PC and compatibles	STX	Supply Tech, Inc.
Macintosh	MacEDI	Digit Software
AT&T 3B2(UNIX)	Datatran	St. Paul Software

Table 2.1 EDI translator software packages used for test.

Display software is necessary for examining raster technical data transferred by EDI. Table 2.2 lists the decompression, reformatting, and display software packages which were used during the test:

Software	Decompress CALS Raster	Display	Rotate & Zoom, etc.	Convert & Reformat
HiJaak for Windows	X	X	X	X
Myriad	X	X	X	---
Paintbrush	---	X	X	---

Table 2.2 Raster decompression and display software packages used for test.

There are other comprehensive software applications which perform all the functions in the above table. For example, a CAD software application which can handle incoming compressed CALS technical data should be capable of performing all the necessary functions for displaying and manipulating the files.

Some organizations may choose to route the received binary data files, via either LAN or floppy, to an in-house computer that has engineering design and/or publishing software installed. This software can then process the received files as it would normally handle technical data. In this way, the designer or technical publisher can import the technical data received via EDI directly into his or her business environment, where it can be handled like any other data.

2.3 Selection of Participating Contractors

The contractors who participated in this test were selected based on criteria established by the Air Force. SM-ALC, as the primary government organization seeking to implement the electronic transmission of binary data via the X12 841 transaction set, determined that a number of small businesses should be invited, at no cost to them or to the government, to participate in this test. SM-ALC utilized its Blue Ribbon Contractors, who are exceptional contractors selected from the over 6,200 contractors SM-ALC contracted with in the previous fiscal year.

The Air Force Materiel Command (AFMC) Blue Ribbon Contractor program allows the Air Force to award not only at the lowest price, but to consider the contractor's historical quality and delivery performance along with the price. The Blue Ribbon Program applies within this command to any negotiated, firm fixed-price type contract for replenishment spares. For these contractors to be

considered Blue Ribbon, they must have been awarded and/or delivered items on at least three of SM-ALC's line items in a given Federal Stock Class (FSC) with a combined value of $50,000 or more during the previous 36 months. Each contractor must have demonstrated a 90 percent or better on-time delivery performance in a given FSC during the previous 12 months at SM-ALC. A Blue Ribbon Contractor must maintain a stringent 99 percent minimum quality rate on the Air Logistics Center's (ALC's) contracts in the same FSC during the previous 12 months. The contractor must have had no in-plant quality system problems, and no other negative information regarding their overall performance or current status. Of the thirteen Blue Ribbon contractors named by SM-ALC at the time of this test, eight chose to participate.

2.4 List of Test Participants

Air Force Contracting contacts

Aircraft Contracting Division
Sacramento Air Logistics Center (SM-ALC/PK)
3237 Peacekeeper Way, Suite 17
McClellan AFB, CA 95652-1059
916-643-5448 and 916-643-2885 FAX
edi@smcdm02.sm.aflc.af.mil

Sacramento Air Logistics Center Test Project:

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Mike Patterson, Lead Buyer — 916-643-6200
patterso@smcdm03.sm.aflc.af.mil

Implementation Project:

Major Ken Richardson, Chief for EDI Implementation — 916-643-6200
richards@smcdm02.sm.aflc.af.mil

Cynthia Slife, EDI Project Training Manager — 916-643-6200
slife@smcdm01.sm.aflc.af.mil

SM-ALC CALS Program Office contacts

NOTE: These contacts establish the linkage to CALS at SM-ALC and did not actively participate in the test.

CALS Program Office
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McClellan AFB, CA 95652-5609
916-643-6272 FAX

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mast.mike%a1.allin1.umc@c3po.sm-alc.af.mil

LLNL Electronic Commerce (EC) contacts

NOTE: These contacts were used only for advice on EC and X.400, and did not actively participate in the test.

Electronic Commerce through EDI Project
Technology Information Systems Program
Lawrence Livermore National Laboratory
P.O. Box 808, L-542
Livermore, CA 94551
510-424-5054 FAX

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Judy Payne, Deputy PCIP Project Leader 703-734-1996
jpayne@tis.llnl.gov 703-734-2363 FAX

Ted Cole, ANSI ASC X12 DoD Conventions Specialist 510-422-6907
cole@tis.llnl.gov

Charles McGregor, Electronic Commerce Senior Architect 510-423-9883
ckm@llnl.gov

SM-ALC Contractor Affiliates with EDI experience

Allied-Signal Airesearch
19201 Susana Road
Rancho Dominquez, CA 90221
310-608-6205 FAX

Wayne Smith 310-608-6414

SM-ALC Contractor Affiliates without EDI experience

American Electronics
1600 East Valencia Drive
Fullerton, CA 92631
714-871-1403 FAX

Susan Method 714-871-3020

Inspirnetics
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Rancho Cucamonga, CA 91730
714-941-8303 FAX

Lucille Seibel 714-941-2004
Ted Seibel, Technical Point of Contact

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900 Fifth Avenue
Mansfield, TX 76063-2727
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Steve Geist, Technical Point of Contact

Llamas Plastics Inc.
12970 Bradley Avenue
Sylmar, CA 91342
818-362-9780 FAX

Cindy Roberts 818-362-0371
Rick Llamas, Technical Point of Contact

Micro Systems, Inc.
65 Hill Avenue
Fort Walton Beach, FL 32548
904-243-1378 FAX

Cort Proctor 904-244-2332

Moda Magnetics Corp.
84 Rome Street
Farmingdale, NY 11735
516-249-2792 FAX

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Jerry Gross, Technical Point of Contact

Precision Manufacturing of San Antonio, Texas
4546 Sinclair Road
San Antonio, TX 78222
210-648-7401 FAX

Mary J. Hicks, General Manager	210-648-3170
Rick Hicks, Technical Point of Contact	210-690-5574

Participating VAN contacts

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Tampa, FL 33607
800-284-5849
813-878-5298 FAX

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Thomas P. Taylor, Technical Point of Contact	800-284-5849
Frank W. Gagliano	800-284-5849
James R. Russell	813-878-3235
Ronald D. Robins	800-284-5849

AT&T
1921 Gallows Rd/TIP-6
Vienna, VA 22066
703-883-3405 FAX

Kevin Maher	703-883-3472

EDI Software Vendor contacts

Digit Software
P. O. Box 1425
Silver Spring, MD 20915
301-593-8952
301-593-2201 FAX

Todd A. Ross
Hedy J. Ross

St. Paul Software
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612-641-0609 FAX

Eric Christenson
Roger Anderson

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313-998-4099 FAX

Ken W. Schmenk, Senior Account Executive 313-998-4056
Joan M. Ugljesa, Consultant

TRW CALS-EDI Information Systems contact

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One Space Park
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Bud Orlando, Manager 310-764-6636
491-4688@mcimail.com

X12 841 DoD Implementation Convention contact

Logistics Management Institute
2000 Corporate Ridge
McLean, VA 22102-7805

Stephen Luster, Research Fellow 703-917-9800

CALS Software Vendor contact

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71 Commerce Drive
Brookfield, CT 06804-3405
203-775-5634 FAX

Beverly Bernard, Government Market Manager 203-740-2400

Air Force CALS Test Network contacts

AFCTN Test Bed
Automated Interchange of Technical Information Project
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2.5 Hardware and Software of Each Participant

Sacramento Air Logistics Center (SM-ALC), McClellan AFB, CA

SM-ALC Site IGP

Hardware:	AT&T 3B2 600G 24 MHz processor, dual processor enhancements
Operating System:	System V Release 3.2.2 UNIX
Software:	Wollongong WIN3B TCP/IP, RFS, Ascent 2.0, St. Paul Software's Datatran
Communications:	10base5 Ethernet, eport & fxm asynchronous ports
Other Information:	64 Mbyte memory, 1.2 Gbyte disk

EDCARS System

Hardware:	IPL Systems Inc. Model 4460 (IBM plug compatible)
Operating System:	MVS
Software:	EDCARS System
Communications:	COM10 (TCP/IP, Arcnet, X.25)

ACPS System

Hardware:	Data General MV-9500
Operating System:	AOS/VS.2
Software:	ACPS, WordPerfect
Communications:	Ethernet, TCP/IP (SMTP not fully implemented)
Other Information:	Tape interface to Xerox 9700 printer

LMS System

Hardware:	IBM 3090 - 200
Operating System:	MVS
Software:	Logistics Modernization Systems (LMS), Stock Control and Distribution (SC&D), Contract Data Management System (CDMS)
Communications:	Serial Kermit, Open Link TCP/IP on COM10 F.E.P.

EC VAN Hub, LLNL

Sun 4

Hardware:	Sun 4 SPARCstation IPC
Operating System:	SunOS Version 4.1, Release 4.1.1 (UNIX)
Software:	LLNL HubWare
Communications:	Ethernet

Hewlett-Packard

Hardware:	HP Vectra (386)
Operating System:	Interactive UNIX
Software:	Retix X.400 Open Server
Communications:	Ethernet, X.25

AFCTN Test Bed, LLNL

Sun 4

Hardware:	Sun 4 SPARCstation IPC 24 Mbyte memory, 2 Gbyte hard disk
Operating System:	SunOS Version 4.1, Release 4.1.1 (UNIX)
Software:	AFCTN Tapetool, MIL-STD-1840A evaluation software Open Windows
Communications:	Internet

Sun 3

Hardware:	Sun 3/60, 4 Mbyte memory, 500 Mbyte hard disk
Operating System:	SunOS Version 4.1.3
Software:	CALSTB.350, Paintbrush
Communications:	Internet

IBM PC

Hardware:	IBM PS/2 model 60, 2 Mbyte memory, 30 Mbyte hard disk
Operating System:	MS-DOS 3.3
Software:	ValidG4, HiJaak, Viewer, Myriad, DecompG4
Communications:	Internet
Graphics:	CGA

Allied-Signal Airesearch (Large Business)

Hardware:	AST Bravo 386, 100+ Mbyte hard disk with 10+ Mbyte available
Operating System:	MS-DOS 5.0 with Windows 3.0
Software:	STX, HiJaak for Windows
Communications:	9600 baud Modem
Graphics:	VGA

American Electronics (Small Business)

Hardware:	IBM XT (386), 80 Mbyte hard disk with 10 Mbyte available
Operating System:	MS-DOS 3.3 with Windows
Software:	STX
Communications:	Hayes 1200 baud Modem
Graphics:	EGA

Inspirnetics (Small Business)

Hardware:	486DX-25 MHz IBM compatible, 120 Mbyte hard disk with 10+ Mbyte available
Operating System:	MS-DOS 5.0 with Windows 3.1
Software:	HiJaak for Windows Version 1.0, STX Version 2.5
Communications:	Hayes ULTRA 96 Modem
Graphics:	Super VGA

Kent Associates, Inc. (Small Business)

Hardware:	Leading Technology 386 SX-16, 180 Mbyte hard disk with 20+ Mbyte available
Operating System:	MS-DOS 3.3 with Windows 3.1
Software:	HiJaak for Windows 1.0, STX Version 2.5
Communications:	Hayes 9600 baud Modem
Graphics:	VGA

Llamas Plastics Inc. (Small Business)

Hardware:	286 IBM compatible, 80 Mbyte hard disk with 20+ Mbyte available
Operating System:	MS-DOS 5.0
Software:	STX
Communications:	Practical 2400

Micro Systems, Inc. (Small Business)

Hardware:	Hewlett-Packard 386, 80 Mbyte hard disk with 10+ Mbyte available, and 486 IBM compatible, 200 Mbyte hard disk
Operating System:	MS-DOS 5.0 with Windows 3.0
Software:	HiJaak for Windows Version 1.0, STX Version 2.5, AT&T Easylink, Interface Version 1.2
Communications:	Hayes 2400 baud Modem, MultiTech 9600 baud Modem (on loan from LLNL)
Graphics:	EGA

Moda Magnetics Corp. (Small Business)

Hardware:	Gateway 2000 486 DX/33, 80 Mbyte with 10+ Mbyte available
Operating System:	MS-DOS 5.0 with Windows 3.1
Software:	HiJaak for Windows, STX
Communications:	MultiTech 9600 baud Modem (on loan from LLNL)
Graphics:	VGA (available)

Precision Manufacturing of San Antonio, Texas (Small Business)

Hardware:	486 IBM compatible, 10+ Mbyte available on hard disk
Operating System:	MS-DOS 5.1 with Windows 3.0
Software:	HiJaak for Windows, STX
Communications:	Hayes 2400 baud Modem

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3 Preparation and Setup of Contractor Participants

3.1 Visits to Contractors

Each of eight participating contractors were personally visited by a pre-test briefing team made up of representatives from SM-ALC Contracting Management and Information Systems, the Air Force CALS Test Network Test Bed at LLNL, the TRW Systems Integration Group, and Supply Tech, Inc. VAN and other EDI software vendor representatives also took part in some of these visits. The objective of these visits was to inform each contractor of 1) the test objectives, and 2) how these efforts were part of the larger on-going movement in both industry and government to use recently evolved and commercially available digital information exchange technologies. As part of these visits, each contractor was also briefed on how this test fit into the government's overall CALS and EDI initiatives and, more specifically, the functions and responsibilities of the Air Force CALS Test Network. Additionally, the briefing team explained how these technologies are anticipated to eventually 1) become part of any future normal business environment, supporting business transactions with both government and industry, and 2) support and seamlessly integrate with all types of business transactions, including but not limited to purchase activities. The test was depicted as a first step toward electronically facilitating most, if not all, of any small business' information exchange needs. As a result of these visits, the briefing team perceived within each business an eagerness to participate, which stemmed from the understanding that 1) this was an opportunity to learn in their own plant environment, 2) when the government and all their other trading partners implement EC/EDI, their business support costs could be reduced due to fewer telephone inquiries and overnight express packages, and 3) this capability could become a competitive business advantage when fully implemented.

The visits included explanations of the specific hardware and software being provided for the test, the VAN services that would be used, and the types of computers, applications software, phone connections and peripherals that were needed. In all cases, the test environment appeared to fit into each small business' available equipment and software without difficulty; most businesses operated the test independent of their applications, with only a few planning to integrate testing activities with their other applications and operating environment. The details of the test were discussed including the types, sizes, and other characteristics of the data to be transferred, the check lists to be completed, and both the normal and unusual observations to be made. The final items of discussion centered around the test scheduling and the detailed mechanics of each individual segment of the test. Every effort was made to schedule and perform the test so as to not interfere with each contractor's normal business activities.

3.2 Checklist

In an effort to help test participants to execute the test, and also to aid the collection of statistics about the test, the test team devised a checklist document. This document, which was patterned after the *CALS Test Network Transfer Test Procedures Checklist*, was divided into sections that were designed to lead the test participant through the steps necessary to execute the test. Each section of the checklist document contained questions pertinent to a specific aspect of the test. These questions were ordered and phrased so as to lead the test participant to the next step to be performed. The titles of the sections indicated whom was expected to complete that section. The document's introduction also provided guidance for completion of the checklist, which was broken down into the sections shown in table 3.1.

1. Introduction	6. Specifics about Raster Data Files
2. Administrative Information	7. Evaluation
3. Sender	8. Co-op
4. Receiver	9. VAN
5. End User	10. Concluding Comments

Table 3.1 Major sections of the checklist document.

This checklist document was distributed to the manufacturing participants soon after they had been visited by the testing team. The participants were instructed to make photocopies of pertinent sections of the checklist, and make a new entry for each transmission they received.

Some test participants found the questions in the checklist difficult to respond to, perhaps due to awkward or unfamiliar wording. The AFCTN has plans to refine and make available the checklist as part of a CALS-EDI test packet, which will be designed to help businesses become familiar with and prepare themselves for using EDI and CALS data in procurement actions. A copy of the checklist used during the test is found in Appendix D. Checklists filled in by test participants are located in Appendix E.

3.3 Modems and Software Sent to Participants

Commercial vendors loaned 9600 baud modems to many of the contractor participants who did not already have such equipment. Two contractor participants borrowed MultiTech 9600 baud modems from the test team at LLNL. These modems were tested and configured at LLNL with the appropriate cables and switch settings before they were shipped to the contractors.

Each contractor participant received on loan a copy of STX12, an EDI translation software package from Supply Tech, Inc., and a copy of HiJaak for Windows, a raster image decompression and display tool from Inset Systems Inc.

3.4 Setting up VAN User Accounts for Participants

Supply Tech, the EDI translation software vendor who provided EDI software to the contractor participants, arranged for the establishment of user accounts for each of the participants on the appropriate VAN. Four contractor participants, Allied-Signal Airesearch, American Electronics, Inspirnetics, and Llamas Plastics Inc., were provided with mailboxes on the Advantis VAN, while the other participants, Micro Systems, Inc., Precision Manufacturing of San Antonio, Texas, Kent Associates, Inc., and Moda Magnetics Corp., utilized mailboxes on the AT&T VAN.

For each of these participants, Supply Tech contacted the appropriate VAN, which provided a mailbox account number and password, then accessed each mailbox to make sure that its trading partner relationships were set correctly, then loaded each contractor's mailbox with a test 841 transaction. Next, they contacted each participant to give instructions for using the mailbox, and had each one download the test 841. This downloading procedure caused the Supply Tech STX12 EDI translation software at the contractor's site to automatically respond with a Functional Acknowledgment transaction (X12 997). Subsequently, Supply Tech verified with each contractor that the downloaded test 841 was consistent with the data that had been loaded into the mailbox.

4 Preparation and Setup of SM-ALC Systems and Processes

4.1 Solicitation Preparation

The business data for the test included three Requests for Quote (RFQs) and their associated Engineering Data Lists (EDLs) (see Appendix B). The RFQ text identifies the specific item being procured (part number, noun, next higher assembly, etc.), the government's needed delivery date, and any specific terms and conditions of the request. In the paper process, a Letter Request for Quote provides this information to potential customers.

Base contracting computer systems and base engineering data computer archives were the sources of the data used in this test. This section describes the systems and processes utilized to support the business aspects of aircraft contracting. Section 4.2 describes the systems and processes utilized to support the engineering data that is essential to Air Force technical data procurement.

4.1.1 Descriptions of Base Contracting Systems

4.1.1.1 ACPS

The RFQ is created in the Automated Contract Preparation System (ACPS). ACPS is the contract writing system used at the five Air Logistics Centers (ALCs) in the Air Force Materiel Command (AFMC) and various other sites. The five ALCs are Inventory Control Points (ICPs) which support acquisition of major weapon systems for spare parts and modification programs.

ACPS runs on a Data General MV-9500. The users (contract negotiators, officers, administrators and operators) access ACPS through a LAN to create any needed contractual documentation (RFQ, purchase order, contract, amendment and modification). ACPS contains the logic of the Federal Acquisition Regulation (FAR), its supplements, and supporting regulations, to ensure that correct and current clauses, formats, and other regulatory requirements are incorporated into documents.

ACPS is a compilation of FAR-based systems developed to automate and standardize selected facets of the AFMC contract writing process. These include but are not limited to a manufacturer data base, contracting officer data base, buyer data base, administration/pay office data base, and fund citation data base. The AFMC Headquarters' Contract Development Laboratory, located at Hill AFB, Utah, is assigned the responsibility for implementing contracting policy and program development of ACPS.

J041, the Acquisition and Due-in system, and J023, the Automated Purchase Request system, generate purchase request (PR) requirements such as part number, noun, national stock number (NSN), quantity, etc. This data is used in the creation of contractual documents. The PR information is transferred from J041 and J023 to ACPS daily, using standard 9-track tapes. Electronic transfer methods are being implemented. Award information is in return sent from ACPS to the J041 Due-in system, which tracks when assets are due to be received and transmits that information to over 15 other systems.

ACPS has several other programs for additional business processes used in the acquisition pre-award process.

4.1.1.2 SC&D and CDMS

The Stock Control and Distribution (SC&D) system, which runs on an IBM 3090, provides on-line requisition processing, provides status information of asset inventories, and furnishes both part usage and current status of asset balances to the Requirements Data Bank (RDB). The RDB returns to the

SC&D stock level information so that SC&D can control asset distribution. The RDB also interacts with all AFMC core logistics functions to calculate requirements. Data produced from the RDB appears as "buy" quantities for procurement actions to satisfy Air Force requirements. The Contract Data Management System (CDMS), which runs on the same IBM 3090, interfaces with SC&D and generates the EDL. This EDL is used by the technical data repository to create the solicitation technical data package.

4.1.2 Role of the Engineering Data List (EDL)

The EDL is a product of CDMS and is generated as often as necessary in the requirements cycle. It is a listing of all engineering, technical, or specification data applicable to the item. In the paper process, the RFQ has a statement such as the one found on page 2 of 9 of each RFQ in Appendix B:

> C-6X. **SPECIFICATIONS, STANDARDS AND/OR ATTACHMENTS**
> In accordance with aperture cards and data list(s) furnished herein.

The applicable EDL is generated and refined interactively until it meets the requirements of the proposed purchase. The final EDL, as were all previous editions, is printed out and then attached to the pages of the RFQ and the aperture cards, which were generated by the EDCARS system for the solicitation. Section 4.2.2 discusses the role of the EDL in the EDCARS environment.

The EDL file is a data file that feeds a PC print station. At the print station, the data is fed into a prepared form file to produce the actual EDL. Actual EDLs are shown in Appendix B. However, a partial EDL data file follows to illustrate the basic structure of the file.

```
@! EDL    1 02/10/92 10:14:42 PMDDA1   CE  EWD C
@~1
@\ 07FEB92
@\ CE
@\ PMDDA1
@\
@\ F16CD
@\    1
@\    2
@\ 81755
@\ GENERAL DYNAMICS  INC.
@\ 16VE064-116
@\ CABLE ASSEMBLY,RADI
@\ 5995012350977WF
@\ 81755
@\ 16VE064 W/PL                    /
@\
@\ 0000
@\ 0000
@\ S
@\
@\ CABLE ASSY
@\
0@\ 81755
@\ C2065                           /
@\
@\ 0000
@\ 0000
@\ R
@\
@\ SHIELD BRAID
@\
TO BE FURNISHED WITH 16PR145
@\ 81755
```

Figure 4.1 Encoded engineering data list data file.

4.1.3 Description of Current Business Process

In the current paper process, the user verifies the EDL and aperture cards, then creates the RFQ. Using a PC, the user accesses ACPS via LAN connectivity, then by responding to prompts and menu selections on the specifics of the RFQ, the user references the PR. By referencing the PR, many entries are completed automatically and can be edited if needed. When the RFQ is completed, the user requests a printed copy to mail, with the EDL and aperture cards, to interested contractors.

4.1.4 Preparation of the Electronic RFQ (X12 840)

During the test, the preparation of the X12 840 transactions (electronic RFQs) was mostly a manual process, which was later fully automated. The test team chose a manual approach for generating the 840s primarily because no automated products that produced an 840 transaction set, which could be logically associated with an 841 transaction, were available. This is largely due to the lack of a formally defined mechanism in X12 to reference an 841 from within an 840 at the time of the test, a shortcoming that was subsequently accommodated by X12.

The process of preparing an X12 840 transaction consisted of obtaining a sample transaction and editing specific fields, by hand, which described the buyer, sender, and product information, as well as adding a field which could be used by a contractor to associate a specific 840 transaction with a specific 841 transaction. The only available sample 840 transactions came from the AFMC Contract Development Laboratory. One 840 transaction was created for each of the three data sets. Subsequently, test RFQ documents could be created on the ACPS system, which could be output as 840 transactions.

The Contract Development Laboratory, located at Hill AFB in Ogden, Utah, has developed additional capabilities for the EDI process. When the RFQ is complete, the user accesses the EDI program from a menu selection, enters the RFQ number, and makes the selection to create an X12 840 transaction set. This selection translates the RFQ into an X12 840 for transmission to the site IGP. This completes the contracting community user's portion of the EDI process. He or she does not review the actual 840. The 840 is automatically transferred from ACPS to the site IGP using FTP (File Transfer Protocol) and TCP-IP over Ethernet.

4.1.5 Verifying Business Data / Analysis of Manual Entry

The contents of the manually generated 840 transactions were compared line by line with the original contract by a Procurement Contracting Officer, representing the SM-ALC Contracting Policy function, to ensure accuracy of the electronic RFQ. One aspect of the solicitation packages, that of the enclosure of the appropriate referenced engineering data, could not be verified for this test, due to the shortcoming in 840 identified above.

Later, when electronic RFQs were received from ACPS by the automated process, several were again examined and compared with printed contracts, and the contents of the 840 were confirmed to accurately reflect the printed contract.

4.1.6 Observations and Comments

The intent of this preparation and the process that was chosen is to provide the procurement activity with as much integration as possible without affecting the current procurement procedures. Software to support the EDI technology and the digital CALS data capability can relieve procurement personnel of repetitive, redundant, labor intensive functions associated with gathering the necessary information for a solicitation.

4.2 Engineering Data Preparation

Including technical data with an electronic bid means that the data must be located in the archive, retrieved in a digital form, then transferred to the procurement environment for incorporation into the electronic solicitation. The data used in the test consisted of three released engineering documentation sets, obtained from SM-ALC's EDCARS system. Most EDCARS data has been captured by scanning microfilm or paper images of the original documents. The process of capturing the documents, the content, and the quality of EDCARS documents are representative of the technical data found in most commercial engineering record management systems currently applying the same technology.

4.2.1 Description of Base Engineering Data Repository -- EDCARS

The EDCARS system was the exclusive source of the engineering data transferred during the test. The basic functionality of the EDCARS system is to provide a virtual aperture card storage facility that precludes the costly manual process of filing and retrieving microfilm records. EDCARS is limited to managing bitonal digital raster image data. Engineering data is entered into the system by scanning paper and microfilm documents to produce bitonal digital raster images, which are compressed and stored on optical disks.

The SM-ALC EDCARS system host is a main-frame IPL Systems Inc. Model 4460 computer, running the MVS operating system. The engineering images are housed in several banks of optical disk jukeboxes. All images are written to optical disk in a "ghost mode," where a duplicate image is written to an identical disk in a separate jukebox. This process is intended to provide both a backup and higher throughput capability when simultaneous read requests are made to the same disk. A database of the stored images is maintained to facilitate image access and control. In addition to being used to generate aperture cards and full size paper drawings, images may be displayed on EDCARS VDTs, copied to magnetic media, or transferred via DDN to five other EDCARS sites around the country.

Most engineering documentation deposited in EDCARS is received as part of a procurement. Digital images are stored in a large database, each image having a unique identification number. Document revision levels are recorded but not controlled by EDCARS. While the EDCARS repository is intended to archive released engineering documents, the engineering release process is the domain of the engineering organizations which are responsible for maintaining the hierarchical relationship of the data that EDCARS stores. Although such relationships are generally specified within the content of the engineering data, they are not explicitly supported by the EDCARS database structure.

Images maintained by EDCARS are provided exclusively for human consumption. The machine intelligent data residing on the engineering systems that deliver data to EDCARS is currently not associated with or accessible to EDCARS processes.

4.2.2 Description of Current Engineering Data Retrieval Process

The mechanism that currently produces technical data to accompany an RFQ is predominantly manual, labor intensive, and elongates processing times.

The EDL, generated by CDMS (see section 4.1.2), identifies the drawings associated with the solicitation by specifying the drawing numbers. A printed hardcopy of the EDL is routed to EDCARS operators, who re-enter the data into an EDCARS system request for technical data. From this image retrieval request, EDCARS produces a deck of aperture cards which represents all the drawings identified on the EDL.

The EDCARS image retrieval process invokes the Data List Manager (DLM) to generate a retrieval list, which is stored on EDCARS and can be applied at any time to automatically retrieve the same set of

images. An existing DLM retrieval list may be modified or reused in its current state. Together, the EDL and DLM retrieval list identify each image as belonging to one or more set(s) of engineering records that define a solicitation. However, neither the EDL nor the DLM retrieval list have an explicit tie to the engineering data management systems that originate the data, release the revisions, and maintain hierarchical and effective relationships. This necessitates continued re-evaluation and authentication of the EDL by screeners.

The aperture card deck is provided to contracting where it is once again audited for completeness and applicability to the procurement. Anomalies encountered due to missing or inappropriate cards are cycled back through the system for resolution. Once the master deck of aperture cards has been accepted, it is used to duplicate copies for distribution with each RFQ. The distribution decks are returned to contracting for incorporation into the bid packets which are sent out for solicitation.

For conventional CALS interchanges, EDCARS files are post-processed into the CALS MIL-R-28002 Type-I data format instead of aperture cards. This processing requires nontrivial systems resources in terms of both disk space and CPU cycles, and is therefore scheduled at night. The converted data may be stored either on disk or magnetic tape at a staging area where it will be available for review before being incorporated into EDI transactions.

4.2.3 Data Preparation for EDI Transaction Set (X12 841)

4.2.3.1 Selection of Bid Sets and Representative Sizes

The test team placed more significance on the sizes (in bytes) of the solicitations to be electronically transmitted than on their content. In order to determine appropriate sizes, a sample of actual SM-ALC technical solicitations from May 1992 was taken. The size of each solicitation in the sample was determined by examining the EDL, and obtaining from EDCARS the file size information for each drawing on the EDL. The sizes of the image files for each solicitation were summed to produce the total solicitation size.

Three solicitations were selected for testing, which represent the average small, average medium, and one of the largest solicitations appearing in the sample. The sizes of these solicitations, as reported by EDCARS, were approximately .65, 1.84, and 13.8 megabytes respectively.

PR#	PART #	NSN	#APERTURE CARDS	EDCARS SIZE (Mbyte)
92-60678	12W7646-7(REV A)	3040009580974BJ	5	0.65
92-60676	160D121105-5(REV G)	1560011259447FJ	10	1.84
92-60135	12E2211-877(REV AY)	680010839218BR	75	13.8

Table 4.1 Solicitations used, number of aperture cards, and size of each solicitation.

4.2.3.2 Collecting Image Files for 841 Generation

Using the EDL, the appropriate data files were selected from the available repository files. Figure 4.2 shows a simplified representation of the EDL for the small solicitation. Complete EDLs used for the test are located in Appendix B.

ENGINEERING DATA LIST

Date:	Data Tech:	Organization:	Application:	Page:	of:
07FEB92	MP	LAK	F111	1	1

Cage:	Manufacturer:	Reference:	Noun:
81755	GENERAL DYNAMICS INC.	12W7646-7	SUPPOR

NSN:
3040009580974BJ

Cage	Drawing Number	Rev	NR Sheets	Furn Code	Noun
81755	12W7646	B	0000	S	SUPPORT
81755	LM12W7646	D	0000	S	LIST OF MATERIAL
81755	12Z001	J	0000	S	INTERPRETATION DRAWING
81755	89C0610	-	0000	S	ECO
81755	LM12Z001	B	0000	S	LIST OF MATERIAL

VENDOR NOTED: VENDOR DRAWINGS ARE NOT FURNISHED AS PART OF THIS PACKAGE.

Figure 4.2 Content of engineering data list.

The first, third, and fourth drawings listed above were identified on EDCARS as 12W7646, 12Z001, and 89C0610 respectively. However, for these specific drawings, EDCARS delivered CALS compliant files with file names d001r018, d001r022, and d001r023, respectively. Since these CALS compliant file names are not used anywhere in the solicitation to identify the drawings, verification that the appropriate drawings had been delivered by EDCARS required some investigation, which is described in section 5.2.

4.2.4 CALS Raster Image Data Evaluation

Prior to incorporating CALS image data into an EDI transaction, the test team evaluated a subset of the digital data prepared by EDCARS to ensure that each file constituted a valid CALS file. Additionally, the legibility, quality, and quantity of the data was noted.

Digital images from the three data sets retrieved from the SM-ALC EDCARS system were assembled and electronically transferred to LLNL for image and CCITT encoding evaluation. SM-ALC also provided LLNL with a reference deck of aperture cards, generated by EDCARS, providing microfilm copies of the complete technical data for each solicitation, from which were drawn the digital images to be distributed.

The focus of the data analysis of these digital images was primarily to determine their usefulness as representative engineering information. All the images were displayed on a Sun 3/60 using the AFCTN tool CALSTB.350. Selected files were passed to an IBM PS/2 model 60, running DOS 3.3, where the CALS images were evaluated with the AFCTN tool ValidG4, and displayed using the commercial software tools Myriad and HiJaak. Evaluation of several files using the AFCTN tool DecompG4, indicated that the CCITT Group-4 compression algorithm had been appropriately applied.

4.2.4.1 Compliance with MIL-STD-1840

During the development of the initial test plan, the test team elected to not use a MIL-STD-1840 declaration file because 1) the X12 EDI standard was assumed to provide the logical links and relationships between the files, and 2) no procedures had been developed to routinely export CALS data from the SM-ALC EDCARS system. Exclusion of declaration files demonstrated that difficulties can be encountered in organizing quantities of digital data, even for simple image analysis.

All the image file names from the small and medium size solicitations, and some from the large solicitation, began with the same literal string of characters (d001), indicating they belonged to the same CALS data set. The names of the image files in the large solicitation were divided, some starting with the characters d001 and some starting with the characters d002, which would indicate that the large solicitation is comprised of two separate CALS data sets (set d001 and set d002). A more thoughtful application of MIL-STD-1840 file naming conventions and the inclusion of the appropriate declaration files would facilitate better identification of the three data sets. The files names of the small set could start with the characters d001, the file names of the medium size set could start with the characters d002, and the filenames of the large data set could start with the characters d003.

Also, the numbering sequence of the files designated for a given solicitation was not contiguous, as is required by MIL-STD-1840. This caused difficulty in ascertaining the completeness of each data set, and in identifying and associating image files to solicitations during the evaluation. In fact, the same identical filename was used in more than one data set, in several instances. Bear in mind, however, that MIL-STD-1840 alone does not prevent such an occurrence, but that a well thought-out contractual agreement between buyer and contractor should take steps to avoid it.

All CALS MIL-STD-1840A datafile headers encountered were properly structured with the appropriate (128 byte, fixed length) ASCII header records. Most of the header content is application based (image identification, classification, related documents, etc.). Those attributes required to display the image were present and applicable.

All images were correctly identified in the CALS header as MIL-R-28002A Type-I images. The validity of the image orientation parameters in the CALS file header was not evaluated since the EDCARS system does not currently support the CALS image orientation parameter. EDCARS populates the CALS orientation record, `rorient:`, with a set value of (090,270) during the CALS export process.

The CALS pel density record (`rpelcnt:`) values, which effect the scale of the image, were also not evaluated. Since original paper copies of the images were not available, and since scanned images had previously been accepted by the EDCARS quality assurance process, no dimensional stability evaluations were conducted.

4.2.4.2 Image Characteristics

The scanning accuracy (with respect to overscan) varied greatly from image to image. Some images were closely cropped to the target format, while others had several inches of excessive border. No appreciable scanning distortion was evident, either in orthogonality, aspect ratio, or linearity. No images demonstrated any excessive skew.

The volume of data transmitted during the test is a function of the size of the transmitted image files in each of the three solicitations. The size of a file, however, does not necessarily correlate with the size of the image as it might appear on paper. A more relevant indicator of data volume than the dimension of each image is the compressibility of the image content. The relevant measure of image compressibility (or compression ratio) is based on the number of transitions between foreground and background (black

to white). A "busy" image, with many black-to-white transitions, will not compress as well as a "simple" image, with large black or white areas. As a rule, images consisting of text do not compress as well as images of line drawings, and larger drawings generally have more blank white space, yielding superior compressibility.

The following three tables show compression data of images evaluated by AFCTN LLNL.

The first column lists the CALS file name generated by the EDCARS system for each image.

The second column lists the size of the CALS file in bytes, including the 2048 bytes of CALS header information.

The third column lists two numbers separated by a comma. The first number indicates the number of pels in a scan line, the second shows the number of scan lines in the image.

The fourth column describes the image content. The primary categories were text and engineering drawings (abbreviated Dwg.).

The fifth column lists the initial size of the subject image and the format which it was scanned from.

The last column is the calculated compression of the file, including an adjustment for the 2048 byte ASCII header, which is not compressed.

CALS FILENAME	Size (bytes)	Bit-map	Image Type	Format	Compression Ratio
d001r018	94592	3824,5100	Dwg.	C	26:1
d001r019	108288	3824,5100	Text	A 3-up	23:1
d001r022	358656	6880,8800	Dwg./Text	D	21:1
d001r023	35584	1696,2221	Text	A	14:1

Table 4.2 Breakdown of small bid set data, combined size ~ 600 Kbytes.

CALS FILENAME	Size (bytes)	Bit-map	Image Type	Format	Compression Ratio
d001r026	68608	7072,9300	Dwg.	J frame	123:1
d001r027	97152	7072,9300	Dwg.	J frame	86:1
d001r028	242048	7072,9300	Dwg.	J frame	34:1
d001r029	16512	7072,9300	Dwg.	J frame	568:1
d001r030	25856	7072,9300	Dwg.	J frame	345:1
d001r031	57856	7072,9300	Dwg.	J frame	147:1
d001r032	87168	3776,5155	Text	A 1-up	32:1
d001r033	436096	7040,9150	Dwg.	D	19:1
d001r034	186624	6240,8960	Dwg.	D	38:1
d001r075	289664	7040,9150	Dwg.	D	28:1

Table 4.3 Breakdown of medium bit set data, combined size ~ 1.5 Mbytes.

CALS FILENAME	Size (bytes)	Bit-map	Image Type	Format	Compression Ratio
d001r002	32896	3680,5008	Dwg.	A 1-up	74:1
d001r003	66688	2240,2340	Dwg.	A 1-up	10:1
d001r004	30464	680,5008	Dwg.	A 1-up	81:1
d001r005	81152	4176,5250	Dwg.	A 2-up	34:1
d001r006	33536	1696,2219	Text	A	15:1
d001r009	36736	4176,5250	Dwg.	A 1-up	79:1
d001r010	74496	4176,5150	Text	A 2-up	38:1
d001r011	201728	4176,5250	Text	A 4-up	14:1
d001r012	70016	4176,5250	Text	A 1-up	40:1
d001r015	39296	3776,5100	Text	A 3-up	65:1
d001r016	407040	3776,5100	Text	A 4-up	6:1
d001r017	429312	3776,5100	Text	A 4-up	6:1
d001r018	422656	3776,5099	Text	A 4-up	6:1
d001r019	465792	3776,5100	Text	A 4-up	6:1
d001r021	203904	5632,8640	Dwg.	D	30:1
d001r023	35584	1696,2221	Text	A	14:1
d001r024	275456	5728,8800	Dwg.	D	23:1
d001r025	375552	5728,8800	Dwg.	D	17:1
d001r057	241920	3775,5155	Text	A 4-up	10:1
d001r058	242588	3775,5155	Text	A 4-up	10:1
d001r140	60160	1904,2432	Text	A	10:1
d001r141	75264	1904,2432	Text	A	8:1
d001r142	534272	7040,9150	Dwg.	J-frame	15:1
d001r143	294144	7184,9150	Dwg.	E	28:1
d001r144	471680	7040,9150	Dwg.	J-frame	17:1
d001r145	347136	7040,9150	Dwg.	J-frame	23:1
d001r146	46080	3504,3504	Dwg.	B	35:1
d001r147	37760	2544,3936	Text	A	35:1
d001r148	33280	2544,3936	Text	A	40:1
d001r149	418560	7040,9150	Dwg.	E	19:1
d001r150	548480	7040,9150	Dwg.	E	15:1
d002r001	176512	7040,9150	Dwg.	J-frame	46:1
d002r002	173312	3824,5100	Text	A 1-4p	14:1
d002r006	183936	7072,9300	Dwg.	J-frame	45:1
d002r007	184448	7072,9300	Dwg.	J-frame	45:1
d002r009	185856	7072,9300	Dwg.	J-frame	45:1
d002r085	114304	3776,5100	Text	A 4-up	21:1
d002r087	109056	4064,5200	Text	A 4-up	25:1
d002r100	134272	3776,4800	Text	A 4-up	17:1

Table 4.4 Breakdown of large bid set data, combined size ~ 8 Mbytes.

Without deeper investigation and analysis of image quality and density, any raw statistics relating file size, format, and compression from tables such as these are generally meaningless. The tables suggest that a median compression ratio for these sets of images is nominally 50:1. Although this figure agrees with many of the published statistics about the Huffman encoding algorithm, it is somewhat misleading. A closer look at the tables indicates that there are significant extremes in both the low and the high compression yields (ranging between 5:1 and 500:1). Removing the extremes (those files with compression ratios under 10:1 and over 100:1), a more reasonable median compression ratio is 30:1.

In a digital environment, image quality can have a significant affect on electronic image archival and transmission. High quality images are not only easier to read, they also have a better compression ratio,

supporting more efficient storage and transmission of the data. While the data provided for this test was representative of the range of document types and quality found in engineering archives everywhere, a significant amount of the digital data transferred (in terms of the number of bytes) could have been eliminated through development of robust QA procedures that would allow the cleanup of shadows, dirt and overscanning. The images stored on EDCARS and used in this test are shown in Appendix B.

4.2.5 Observations and Comments

In terms of the technical data available to the procurement process, the test made evident the benefit of hierarchically organizing the files by assembly, sub-assembly, and detail information. Such organization could support partial delivery or data access, whereby contractors could selectively access the level or amount of data required to support their individual bidding process requirements.

While the procurement process, and the storage, maintenance, and delivery of engineering data are supported by digital applications, the two ALC computer systems that host these applications are only procedurally related. Although both systems have networking capability and are accessible through a LAN, the processes to interchange information between them are currently manual.

To assess the impact of a digital procurement scenario, the current EDCARS production process must be examined carefully. EDCARS retrieval and distribution of technical information for procurements, in both physical (aperture card) and digital (CALS) forms, must be precisely synchronized, and verification of the accuracy and completeness of the digital data delivered must be ensured. A procurement that goes out in both digital and manual forms must provide identical technical content.

EDLs can be generated by CDMS and processed by EDCARS as much as several months before an RFQ is developed, and there may be no electronic key available to assemble and retrieve the technical data set when an RFQ is finally introduced to the system. It is anticipated that JEDMICS, the DoD migration system for engineering data slated to follow EDCARS, will address RFQ and technical data coordination issues in the future.

Although equipped with a number of remote display devices, and able to allow limited access to other EDCARS sites, EDCARS has only limited TCP/IP network access. The non trivial amount of image data involved in the procurement process has caused some concern regarding the overloading of the existing SM-ALC base network infrastructure in an electronic procurement environment.

4.2.6 Proposed Digital Process

The proposed solution for preparing digital image data for inclusion in an EDI process is expected to, where practicable, automate the manual procedures currently required to identify, extract, and convert existing EDCARS engineering images to groups of related CALS files, and to organize those images into logical data sets which correspond to specific procurement actions. It is intended that digital engineering data shall migrate from EDCARS, through the site IGP, to a VAN for the ultimate delivery to the recipients.

The current EDCARS engineering repository uses internally stored digital images to generate paper and microfilm for procurement distribution. The proposed process shall convert EDCARS digital images into the widely accepted CALS MIL-R-28002 Type-I format. The resulting CALS data will be distributed as digital images, using EDI transactions, to vendors for display or printing.

The digital process must accommodate retrieval of the data from EDCARS, conversion of images from native EDCARS format to CALS MIL-R-28002A Type-I image format, and incorporation of that engineering data into an EDI 841 transaction. The proposed system is targeted at automating the

processes associated with handling image data, without circumventing existing procedures such as QA and engineering record management.

The digital EDL, which is used to identify the engineering information related to a particular product, should be transmitted electronically to EDCARS, and EDCARS processes enhanced to utilize a digital EDL, which would benefit the DLM image retrieval process. The retrieved images would then be converted to CALS format, and organized into sets of CALS image files, logically linked to appropriate MIL-STD-1840 declaration files. The nontrivial systems resources required for CALS conversion suggests operational adjustments and scheduling, with operator-initiated batch processing to accommodate technical data preparation for bid packets. These complete digital bid packets would be transferred out of EDCARS for verification and later dissemination of the solicitation. The strategies developed to incorporate this transfer must not negatively impact the existing EDCARS production process, in the light of current EDCARS system resource constraints.

A longer range goal will be to provide in the solicitation design data which is intended for machine interpretation. Although EDCARS systems currently store and process released engineering data in an image form, future systems are being developed to include the storage and retrieval of machine interpretable data, such as CAD geometry and tool path instructions. Providing a contractor with this type of data could drive down procurement costs in the long term. However, EDCARS systems must be restructured to interface with, or be superseded by, engineering data management systems which support both released machine interpretable data and existing legacy images. The DoD JEDMICS program is defining such replacement systems, that will provide a much more open architecture to accommodate the various engineering design environments. It is anticipated that EDCARS process and procedural issues will be resolved by adopting this new technology, allowing a much more seamless integration of the engineering data and other environments.

4.3 841 Convention Meeting and Guide

As with previous tests, the test team intended to use the ANSI ASC X12 Specification/Technical Information (841) transaction set to transport the binary technical data to the recipients. However, at the time of the test, DoD had not yet formulated a formal method or convention for use of that transaction set. The test team invited Logistics Management Institute (LMI) to help define a draft implementation convention for 841, which would be used for the test, and which could serve as the basis for the implementation convention for 841 throughout DoD. LMI's participation in this activity was funded by the Defense Logistics Agency (DLA).

LMI facilitated a series of meetings held at SM-ALC to discuss the use of 841, which were attended by test team members from SM-ALC, LLNL, and TRW, along with representatives from Tobyhanna Army Depot, who were preparing to undertake a similar demonstration, from the Contract Development Laboratory at Hill AFB, and from participating EDI software vendors and VANs. The background of most of the test team required that they be introduced to issues pertinent to the use of X12 and 841 during the course of the meetings. Also, a briefing was given on the function and intent of the test for the benefit of those attendees unfamiliar with it. Once a level of mutual understanding was reached, attendees examined in detail the various sections and capabilities of the transaction set, and agreed on the way it would be populated for use with the demonstration. This agreement led to the first DoD draft implementation convention for 841, published by LMI in September, 1992. Based on this convention, the EDI software vendor participants wrote or modified translators to produce the X12 841 transactions that were transmitted via the VANs, and to process those same transactions received by the participating contractors.

During the course of the demonstration, the test team discovered other potentially beneficial uses of the 841 transaction set, and felt these applications of 841 should be reflected in the DoD implementation

conventions. A meeting was held in January, 1993 at SM-ALC, attended by many of the same organizations that attended the first series of meetings, and by representatives of all DoD Services and DLA. At this meeting, these additional applications were presented, and support was obtained for modification of the DoD implementation convention for 841, and of the X12 841 transaction itself, to accommodate these applications.

These applications are:

1. **Solicitation Technical Documentation** - provides for transmission of technical documentation to accompany an 840, as was done in this test. (AD - A272232)
2. **Reference** - permits the user to reference technical documentation that is part of an 840 without actually transmitting this data. (AD - A272109)
3. **Request** - allows a solicitation recipient to use 841 to request technical documentation. It can also be used as a follow-up when a response to a request has not been received. (AD - A272108)
4. **Response** - used to transmit technical documentation in response to a request. Also, to provide limited status to the originator of a follow-up request. Can indicate that requested data may be sent by means other than in the BIN segment of 841. (AD - A272231)
5. **Furnish** - can transmit technical documentation which is not necessarily associated within an 840. E.g. contractor transmits drawings associated with an engineering change proposal or bid; DoD transmits technical documentation to a data repository. (AD - A272107)

At this same meeting, improvements of the capability of the X12 840 transaction set were also discussed and were subsequently pursued. The proposed modifications to X12 841 have been successfully proposed to the appropriate X12 organization. The resulting five applications of the DoD implementation convention for 841 were published by LMI and released in August 1993. Copies of the *Draft DoD Implementation Convention for X12 841* can be obtained from the Defense Technical Information Center at (703)274-6871, or the National Technical Information Service at (703)487-4650. Reference the appropriate accession number (AD-A272nnn) noted above.

4.4 Site IGP

The Site Intelligent Gateway Processor (IGP) is computer hardware and software designed to serve as the single resource needed to integrate local computers and networks to allow communications with other enterprises. It supplements local system capabilities by providing the additional capabilities needed for electronic commerce. The site IGP may interface to local systems, users, or both.

4.4.1 Hardware

The site IGP at SM-ALC was an AT&T 3B2 minicomputer. This computer is a standard configuration available from the AF Standard Multi-user Small Computer Requirements Contract (SMSCRC). Configuration of the site IGP is described in section 2.5.

The system used the WE32000 processor and ran UNIX System V Release 3.2.2. Resources included 1.2 gigabytes of disk storage, and 48 megabytes of memory. There were 32 internal E-ports (Enhanced serial ports) and 32 external FXM (Fiber Expansion Module) ports. The machine had an 802.3 Ethernet connection to the McClellan AFB base network.

4.4.2 Software

Communication software included Wollongong Integrated Networking suite (TCP/IP) for the 3B (WIN3B); Basic Networking Utilities, based on UNIX to UNIX copy (UUCP); and RETIX OSI networking facilities. In addition, St. Paul Software's Datatran 2.7 EDI translation software was installed on the site IGP.

4.4.3 Network

Sacramento ALC has a large Integrated Network facility including FDDI (fiber optical), Ethernet, and asynchronous Local Area Networks (LANs). The site IGP was connected to both the asynchronous LAN and to the Ethernet LAN.

The Ethernet has services which use two common modes, 10base5 and 10base2, as well as the less common 10broad36. By routing, the entire Ethernet has been interconnected and has access to the Defense Data Network (DDN). The site IGP is one 'hop' away from the DDN, and no more than two 'hops' from any other Ethernet node on base.

An additional networking resource, an existing, standard phone line was utilized to enable connection to one of the VANs. For communication with the AT&T VAN, the site IGP directly connected to this telephone line using UUCP networking. For communication with the Advantis VAN, the site IGP used Ethernet to connect to a PC that was on the same telephone line, and used IBM's Expedite software for VAN access. In both cases, multiple modems, listed below, were used.

Make	Model
Hayes	V-series ULTRA Smartmodem 9600
Zenith	ZM-2401
Datatrek	12/2400

Table 4.5 Modems used by SM-ALC to access VANs.

The PC which handled the Advantis VAN connection was an 80486, 33 MHz, running MS-DOS 5.0. It used a standard COM1: interface and cabling.

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5 Transferring Engineering Data from EDCARS to Site IGP

For this demonstration, EDCARS was directed to output CALS raster image files to 9-track tape, rather than generate aperture cards. These image files were read from the tape onto the SM-ALC site IGP. Using File Transfer Protocol (FTP), file transfers were successfully tested between EDCARS and the site IGP. However, this process was not used throughout the test because by the time the physical network connection was completed, a tape containing the files was on hand, and was a more convenient medium for accessing the test files. The FTP Ethernet file transfers were performed only to prove a capability, not to establish a primary path.

5.1 Ethernet Transfer Tests

Forty-two transfer tests were conducted with a single set of three files. Network interface statistics were gathered before and after each transfer. The transfers were executed at various times of day, and on various days of the week, between similar hosts on broad band and baseband media.

The results were analyzed according to media. They indicate that the transfer speed is more than 50% slower when using 46 kbs baseband Ethernet than when using 30 kbs broad band Ethernet.

		Baseband to Broadband Ethernet Transfer		Broadband to Broadband Ethernet Transfer	
	File Size (bytes)	transfer time (seconds)	effective ave. throughput (kbytes/second)	transfer time (seconds)	effective ave. throughput (kbytes/second)
File 1	742,661	18.52	39.15	12.23	59.32
File 2	1,976,143	67.42	28.62	62.39	30.93
File 3	5,226,998	196.58	25.97	138.38	36.89
3 files together	7,945,802	252.44	30.74	167.85	46.23

Table 5.1 Performance of data transfer between EDCARS and site IGP.

5.2 Accepting Data at Site IGP

In preparation for reading a tape containing CALS files, a utility was used that read through an entire tape to verify that the contents were properly readable and without errors. This utility also reported the total number of files contained on the tape. A small script was developed to use the total number of files reported by the tape checking utility and create a read script that would read in each file, placing the files in a staging directory on the site IGP.

Once the files were read, they were associated with the desired drawings as identified by the EDL. This was done in the process of staging. Staging consisted of making a list of required drawings and comparing that with the files read off the tape. The difficulty of this process can be illustrated by examining three files from the small solicitation, d001r018, d001r022, and d001r023.

A simple UNIX file viewer called `less` was used to view the CALS headers of these files. This method quickly associated file d001r018 with drawing 12W7646 on the EDL, as the drawing number was the first character string encountered in the `srcdocid:` field of the CALS header. However, identifying the drawing number by reading the CALS header is less straightforward for the other two files, because the `srcdocid:` field in both files begins with the value 12Z001. It quickly became evident that a procedure more complicated than that used to identify the first file would be required for the general case. For this test, the entire `srcdocid:` field of each file was visually examined and compared with the drawing numbers specified on the EDL. Then the file was placed into the appropriate staging directory on the site IGP, one directory for each solicitation.

Figure 5.1 shows the CALS headers of these three drawing files.

```
d001r018:
srcdocid:   12W7646        81755 B          8Z  00010001USBCHN
        001
dstdocid: 1840A group 4 site
txtfilid: NONE
figid: NONE
srcgph: NONE
doccls: NONE
rtype: 1
rorient: 090,270
rpelcnt: 003824,005100
rdensty: 0200
notes: EDCARS to 1840 group 4 conversion image

d001r022:
srcdocid:   12Z001         81755 J          8Z  00010001USBEHN
dstdocid: 1840A group 4 site
txtfilid: NONE
figid: NONE
srcgph: NONE
doccls: NONE
rtype: 1
rorient: 090,270
rpelcnt: 006880,008800
rdensty: 0200
notes: EDCARS to 1840 group 4 conversion image

d001r023:
srcdocid:   12Z001         81755  1N89C0610 8Z  00010001USBAHN
dstdocid: 1840A group 4 site
txtfilid: NONE
figid: NONE
srcgph: NONE
doccls: NONE
rtype: 1
rorient: 090,270
rpelcnt: 001696,002221
rdensty: 0200
notes: EDCARS to 1840 group 4 conversion image
```

Figure 5.1 Listing of CALS MIL-STD-1840A data file header records for 3 bid set image files.

St. Paul Software created three scripts,[1] which were executed on the site IGP, to process the drawing files for the electronic solicitations. One script cleared each of the three 841 staging directories, and placed in each directory the technical datafiles for one of the three solicitations. Another script directed the EDI translator, Datatran, on the site IGP to access a specific staging directory and assemble an X12 841 transaction from any files located there. This script contained all associated information about the buyer, sender, trading partner, referenced RFQ, and other administrative information required for the 841 transaction. In a fully automated electronic procurement environment, this information would be available from the procurement system, rather than hard-coded into a script.

[1]All UNIX scripts created on the site IGP used the AT&T Bourne shell "/bin/sh"

A third script executed the EDI translator and moved the translator's output to the VAN connection by using a special sendmail utility, provided by St. Paul Software, that allowed binary data to be transmitted via UNIX to UNIX Copy (UUCP) on the site IGP. Actual transmission of the EDI transactions was done either automatically using this script, or manually using the UNIX command line, depending on the timing and convenience of the transmission schedule.

Once identified, drawings were moved into an appropriately named sub-directory of the system storage area. The sub-directories were named according to the size of the test solicitation to which they belonged. In a production system, this name would likely be associated with the part number from the EDL, or similar key. The partial directory structure shown in figure 5.2 illustrates this.

```
/usr2/edi/cals.files/750kb        (small solicitation)
        d001r018
        d001r019
        d001r022
        d001r023

/usr2/edi/cals.files/2mb          (medium solicitation)
        d001r026
        d001r027
        d001r031
        d001r034
        d001r075

/usr2/edi/cals.files/13mb         (large solicitation)
        d001r002
        d001r003
        d001r141
        d001r142
        d002r085
        d002r100
```

Figure 5.2 Directory structure used by SM-ALC to organize and separate the 3 solicitations.

5.3 Checking Data on Site IGP

The images could not be checked on the site IGP as it had no display capability. However, the transfer process onto the site IGP does check for errors in the transfer.

The data was checked after being located on the site IGP by further transferring it to a PC with display capability. On the PC, the FTP (TCP/IP File Transfer Protocol) program transferred the technical data, which was displayed using the HiJaak for Windows program. Additionally, files were transferred to LLNL for further analysis and verification (see section 4.2.4).

5.4 Data Transfer Options

Depending on the size of the data and the procurement requirements, the data set should be delivered to the EDI processor via either magnetic tape or a network utility. The issue of transferring and staging CALS data for inclusion into electronic requisitions will have to be reconciled with the availability of network and storage resources.

Tape transfers have many advantages over networks, such as the low cost of tape as a storage media versus disk, avoidance of additional traffic or load on limited existing network resources, and in the EDCARS environment, prior existence of mechanisms to generate 9-track tape output; parallel mechanisms currently do not exist for network transfers. Since there is a long period of time between availability and actual use of the technical data in solicitations, storage capacity may be a serious system issue, where tape storage is likely to be the preferred alternative. However, state-of-the-art system installations are rapidly moving away from 9-track tape as a storage or transfer medium in favor of magnetic or optical disk and network solutions.

While network transfer may provide a more elegant solution for on-base data interchange, the volume of image data that must be moved to accomplish technical data procurements poses a potentially significant increase in network traffic, which may exceed current capacity. New procedural and technical mechanisms would need to be introduced in many departments to support this kind of network activity.

A prudent approach might be to apply both tape and network technology, each where it is most appropriate. Redundant processes can be designed to utilize both tape and network where backup procedures are desirable.

6 Transferring RFQ Data to Site IGP

6.1 Description of Electronic Process

The electronic RFQs were transferred from the ACPS system to the site IGP by an automated FTP process. Transactions generated automatically on ACPS were validated for consistency with the original sample files from the Contract Development Laboratory, Hill AFB.

Throughout the course of the test, several iterations of the automated FTP process were executed, and each attempt was totally successful. As part of their coursework, ACPS trainees exercised the automated FTP process by creating test documents and FTPing them on McClellan's base network. While the contents of these documents were not associated with the test, the sizes of the documents were typical, and transfer times, reliability, and accuracy were very typical of Ethernet transfers on the base. This information was used to assess the impact of automated X12 840 transfers on McClellan's base network.

Using TCP/IP over Ethernet, an EDL can be moved from the IBM 3090 to the site IGP using FTP or as an automated electronic mail message. In addition, asynchronous transfers using the Kermit error checking/correction protocol are available. During the test, the EDLs were transferred from the IBM 3090, using Kermit, to a PC. From the PC, a diskette containing EDLs was transferred to another PC, which then uploaded the EDLs via network connection to the site IGP.

6.2 Observations and Comments

The EDLs were circuitously routed (IBM 3090 to PC to diskette to PC to site IGP) rather than transferred directly due to complicated organizational permissions and procedures which were beyond the scope of this demonstration. These base organizational issues would be addressed and resolved in a production environment.

6.2.1 Suggestions for Improvements

In a production system it is suggested the information from ACPS be automatically transmitted to the site IGP via direct electronic connection. The Contract Development Laboratory at Hill AFB has many plans to expand the EDI capabilities for implementation, including, among others, modifications to the manufacturing data base to automatically include EDI addresses.

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7 Merging Technical (CALS) and Business (RFQ) Data

7.1 Background

In the paper-based solicitation environment, an RFQ and its technical data are associated due to their co-location in the same physical envelope. In an electronic process, the same type of relationship must somehow be maintained without the use of the physical envelope.

7.1.1 List of Required Hardware and Software Capabilities

To gather the CALS and RFQ data, the following capabilities are needed:

1. Access to RFQ data. For this test, RFQ data was extracted from the ACPS system. See section 4.1.1.1 for a description of ACPS.
2. Access to technical data. For this test, technical data was extracted from the EDCARS system. See section 4.2.1 for a description of EDCARS.
3. Media for transferring files. FTP over Ethernet was used to do network transfers, and nine-track tape was used to transfer data to non-networked systems at SM-ALC.
4. Site data staging machine. For this test, the site IGP was used to stage data prior to its transmission via the VAN. See section 4.4 for a description of the site IGP.

Arrangements were made with the system administrators of each of the systems mentioned above to receive the required data in a format and at a time agreeable to all parties.

7.1.1.1 Compatibility with Conventions

The CALS data from EDCARS complied with MIL-STD-1840A. At the time of the test, no DoD convention existed for the application of the X12 841 transaction set. This led the testing team to develop initial draft conventions for application of 841 to technical data accompanying an RFQ (see section 4.3). A workable compatibility between 841 and MIL-STD-1840 was established and applied to the technical data transmitted.

The format of the RFQ data generated by the ACPS system is set by ACPS. The data in this format was transferred by hand to the appropriate fields of the X12 840 and 841 transactions. The appropriate fields of the 840 and their usage followed the convention for use of 840 set forth by the Contracting Laboratory at Hill AFB, Utah. These conventions were chosen because 1) they were more compatible with ACPS data and data format than the DoD convention for 840, and 2) the DoD convention for 840 did not at the time of the test contain provision for referencing technical data.

7.1.1.2 Transaction Set Creation

The RFQ identifies the drawing numbers required by referencing an associated Engineering Data List (EDL). To determine which CALS files were called out by each RFQ, each CALS file header was visually inspected to determine the drawing number associated with each file. This process is also detailed in section 5.2.

7.1.2 Merging Process

Merging the files which contained the RFQ information (840) with the files which contained the technical information (841) involved creating two unique identifiers for each solicitation: one for the RFQ data, and one for the technical data. The identifier string for the RFQ data was placed into each file that contained the corresponding technical data, and vice versa, before the files of a given solicitation were submitted to the translation process. During the test there was no available automated mechanism for mapping ACPS RFQ information into an 840 which acceptably referenced any pertinent 841(s). Therefore the 'translation' of the 840 was a process of editing, by hand, a file that closely approximated a valid 840, and manually adding the necessary reference to 841. The precision of the 840 was not deemed to be an issue, as it was approximately and sufficiently correct for test purposes.

7.1.3 Fields and Values Used

Figure 7.1 shows a listing of one of the 841s used during this test, as generated by Datatran. The actual binary information that would be included in this 841 has been removed for brevity and clarity.

```
ISA*00*          *00*          *ZZ*DEMO-841       *ZZ*DEMO-841       *921015*144
2*U*00201*000001038*1*P*}
GS*SP*DEMO-841*DEMO-841*921015*1442*1039*X*003020
ST*841*10390001
SPI*90*KS*F4260092Q31328****00
N1*BY*DIRECTORATE OF CONTRACTING
N1*SE*DEMO-841
HL*1*1*I
EFI*90*12w76467.edl****B*MIL-R-28002
BIN*6901*[first technical data file goes here, 6901 bytes of data]
EFI*90*12w76467.txt****B*MIL-R-28002
BIN*803*[second technical data file goes here, 803 bytes of data]
EFI*90*d001r018****B*MIL-R-28002
BIN*94592*[third technical data file goes here, 94592 bytes of data]
EFI*90*d001r019****B*MIL-R-28002
BIN*108288*[fourth technical data file goes here, 108288 bytes of data]
EFI*90*d001r022****B*MIL-R-28002
BIN*358656*[fifth technical data file goes here, 358656 bytes of data]
EFI*90*d001r023****B*MIL-R-28002
BIN*35584*[sixth technical data file goes here, 35584 bytes of data]
SE*18*10390001
GE*1*1039
IEA*1*000001038
```

Figure 7.1 Example X12 841 transaction

7.2 Observations and Comments

7.2.1 Pointers Between 840 and 841

When full document tracking audit trails are required, the relationship between any specific 840 transaction and associated transmitted 841 transaction(s) must be maintained. It may be difficult to schedule the pasting of the reference to other transaction(s) within each transaction , because each must have been created and assigned a unique identifier in order to populate the appropriate referencing segments, and each 840 and 841 must contain a reference to one or more of the other transactions in the solicitation. This can lead to a situation in which no transaction can be completed until it contains the 'completed' transaction code of the other.

This synchronization issue is magnified if the transactions for the solicitations are created on separate computer systems, e.g., the 840 (RFQ) is generated on system A, and the 841(s) (technical data) is/are generated on system B. Foreseeably, system B cannot complete the transaction(s) it is creating until it receives from system A the appropriate reference information to be included in system B's transaction(s). Additionally, system A cannot complete its transactions until it receives from system B the appropriate reference information. For this test, the original scenario was for the ACPS system (system A) to create a completed 840 transaction, and the site IGP (system B) to create the 841 transaction, then receive the ACPS 840, and commit the two transactions to the EDI sub-system, which was also resident on the site IGP.

A recommended solution is to separate the function of gathering and committing business data from the function of creating and tracking specific X12 transactions. For an ALC configuration, it is recommended that the site IGP receive the business information associated with both the contract and the technical data, assemble that information into a business transaction, which is forwarded to a process in which translation, tracking, audit trails, and similar functions are accomplished. This recommended solution also has the benefit of reducing the intrusion of EDI related processes into the existing hardware and software of ALC systems (and vice versa), as well as making EDI appear transparent to contracting users.

7.2.2 Multiple 841s

The pointers between 840 and 841 must make unique identification of a given transaction possible. In the case of more than one 841 being associated with a given 840, it is important that each 841 point to the appropriate 840 and that each 841 have the capability of being identified as "m of n" (for instance, 2 of 5), where 'm' is the current sequence number and 'n' is the total number in the sequence. Each 841's reference to the 840 will identify the 841 as a member of a particular solicitation, and the "m of n" identification will facilitate determination of the completeness of the solicitation.

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8 Transmitting Solicitations to Contractors

8.1 Background

8.1.1 List of Required Hardware and Software Capabilities

All data transmissions were performed by the SM-ALC site IGP. Sections 2.5 and 4.4 describe the hardware and software configuration of this system.

8.1.1.1 Modem Capabilities

For the site IGP, modem speed is not as critical as for the EDI recipient. It is important that the modem be fast enough to complete the required transmissions in a reasonable amount of time. All of our transmissions were, or could have been, background processes on a multi-user computer or a PC emulating that purpose.

The modems shown in table 4.5 were used at speeds varying between 1200 baud and 9600 baud to verify accessibility of the two VANs at different rates. Both VANs exhibited adequate performance at all speeds tested. The rate used for actual transmission of the solicitation data was 9600 baud.

8.1.1.2 Local Access to VAN Lines

For the test, SM-ALC used a toll free number for all access to the AT&T VAN circuits, and used both a toll free number (2400 baud) and a long distance number (9600 baud) for access to the Advantis VAN.

8.1.2 Two VANs Used

The two VANs used for the test were the AT&T Global Messaging Service (GMS) and the Advantis Information Network. This selection was based first upon each network being able to satisfactorily demonstrate the exchange of binary technical data in the form of X12 841 transaction set(s), and second upon the network volunteering to be a participant.

The selection of two VANs permitted the same data to be routed over two separate and distinct telecommunication paths to different small business destinations. Test statistics indicated that both VANs demonstrated essentially the same satisfactory delivery and performance. Even though it did not become necessary, the existence of two VANs in the test provided an automatic backup routing capability should it have been needed during the test.

These two VANs (GMS and Advantis) were also selected because they use two different backbone transport technologies. AT&T uses X.400 technology, while Advantis uses ISO 80223 technology. This gave both the government and the small business user communities an opportunity to identify any appreciable differences, and any characteristics that were more or less favorable to either the government or small business in an operational electronic contracting test environment. Both technologies performed as expected; none of the users noted any differences.

8.1.3 Differing VAN Approaches

Of the commercially available VANs, some offer only EDI transfer capabilities while others are "full service" electronic commerce VANs. Almost all EDI VANs offer the basic services of protocol conversion, access control, network security and electronic-message/transaction-set mail boxes. Full service includes additional functional capabilities integrated with EDI messaging to handle electronic mail, fax, telex and

even postal delivery, if electronic services are unavailable in remote destinations. In this test both VANs were full service, yet one utilized a real-time or on demand transfer approach, while the other utilized a batch scheduling method. During the test both transfer approaches yielded satisfactory performance.

8.2 Observations and Comments

The data transmission technologies used were very reliable and performed very close to the transfer rates expected in simple calculations. Neither the UUCP logs nor the expedite reports showed any unaccounted failures, slow downs, or other anomalies.

8.2.1 Transmission Observations

For the test, both 2400 and 9600 baud modems were used with equal success and reliability.

The single most glaring difficulty encountered with transmission of these solicitations was the inability to successfully transmit the large solicitation end-to-end. This solicitation, which was over 8 Mbytes in size, was successfully moved from SM-ALC's site IGP to the Advantis VAN, and to a contractor participant's mailbox. However, that contractor was unable, due to unavailability of higher speed local Advantis telephone access, to download any data from his mailbox at speeds faster than 2400 baud. The contractor attempted to download the large solicitation for over 24 consecutive hours before finally aborting the process. The contractor was unable to ultimately identify the content of this transmission.

Although SM-ALC made several attempts to transmit the large solicitation to participating contractors using the AT&T VAN, these transmissions never materialized in the recipients' mailboxes. The AT&T VAN had a nominal 2 Mbyte message size limit, which could be modified by AT&T. AT&T apparently attempted to lift this size limit to accommodate SM-ALC's several transmission attempts, but the success of these transmissions was never verified, and the cause of the difficulty was never determined.

8.2.2 Projected Cost of VAN Use

As a typical example, in January 1994, the cost to transfer a kilobyte (Kbyte) of data is approximately five (5) cents, which equates to approximately $50 per megabyte (Mbyte). Therefore, a typical "business form" document of 4 Kbytes can be transferred within seconds for 20 cents. This is less than a 29 cent letter which takes days. A 300 Kbyte message of technical data, or changes to a specification, or changes to a CAD drawing, can be transferred within minutes for approximately $15, which is about the same cost as an overnight express package, but with EDI and the VAN, the data is loaded into the destination mailbox one day sooner. Therefore, in a time critical operation, such as a test procedure change, or a configuration revision order which affects the cut-in effectiveness into a production line, or a configuration correction, same-day delivery could allow a quality assurance buy-off of an item. And, shipping it the same night could gain at least one production day, at no additional cost.

In a Just-In-Time (JIT) multi-enterprise delivery environment, EDI can make the difference between an on-time and a late shipment, and respectively, a satisfied and an angry customer. In the case where a customer can use EDI to send out a bid package and the supplier can respond via EDI with a quotation on the same day, this supplier has beat his competitors by 2 days, assuming they still use overnight express delivery in both directions. These are some of the benefits the DoD anticipates that its small business suppliers will experience.

9 Observations on Data Receipt

This section covers the issues surrounding the contractors' receipt of the electronically delivered solicitation. The intended scope of this section includes the use of the EDI software to access the VAN, downloading the data from the VAN to the user's local system, and navigating the received messages on the user's local system. Selected comments from the contractor participants are included in this section. One contractor remarked that "EDI is the best thing to happen to Government contracting."

9.1 Background

The eight Blue-Ribbon SM-ALC contractor participants and the BYU Co-op each had computer systems which they used to receive and process the data. Each of the eight Blue-Ribbon SM-ALC contractor participants used an IBM Personal Computer or IBM-compatible computer for this processing. The Co-op at BYU used Macintoshes and PCs to download and process the data. Commercial EDI software was provided for each hardware platform that was used to receive transactions from the VAN to each receiver's local system.

9.1.1 Necessary Hardware and Software Capabilities for Data Receipt

The actual hardware and software used in the test to receive the data was discussed previously in sections 2.2 and 2.5 of this report.

9.1.1.1 Ability to Download on Command

The user should be able to view a summary description of the messages in his mailbox, then initiate a download command to retrieve all or some of the available messages (see section 9.1.1.2). While typical business transactions of a few Kbytes of data take only seconds for the destination to download from the VAN, and small data packages of a few hundred Kbytes take only minutes, a large technical document package of more than a few megabytes could take several hours to download. The ability to view a summary of the available messages, including the amount of data, would allow the user to determine whether to download the messages immediately, or to defer the download processes to a later time, perhaps after working hours.

9.1.1.2 Ability to Download Selected Messages

The user should be able to select from the messages in his or her mailbox those specific messages that are to be retrieved to the user's local system. For example, when the mailbox is accessed, the user could be presented with or request a list of the messages available in the mailbox, with a brief description of each message (e.g., "841 from SM-ALC" including date and size of the message). From this list, the user could select those particular messages he would like to download. Then, by issuing a download command as described in section 9.1.1.1, the user could initiate the process to download the selected messages. Such a feature would give the user control over the sequence of message retrieval, and allow him or her to optimize procedures for processing incoming messages.

9.1.1.3 Operate with a Variety of Input Formats, Including Binary

Because this test required the transfer of CALS raster images, which are binary encoded files, along with ASCII RFQ information, VANs and EDI software included in the test necessarily supported the transfer of ASCII encoded messages and binary encoded messages.

Because historically, EDI messages were exclusively ASCII and message sizes were small, several VANs have not modernized their networks since X12 authorized binary file transfer of technical data in October 1990. The result is that these VANs now cannot handle binary files as provided for in some X12 transactions. Some others cannot handle a mix of binary and ASCII. Only a few VANs, generally those that are X.400 or ISO 80223 backbone based networks, can handle all these combinations of file types. It is anticipated that increased volumes of CALS and other binary data traffic, and competitive business pressures from the few VANs who now have the functionality, will initiate a trend towards support of binary and mixed capability.

9.1.2 Mailbox Concepts

The mailbox concept allows a user to be identified by an address on the VAN. Having a mailbox on a VAN is not unlike having a Post Office Box at the Post Office. Just as one must physically go to the Post Office to pick up one's mail from the P. O. Box, in order to retrieve mail from the VAN, one must access his VAN mailbox to retrieve messages. In contrast to electronic mail, where the mail messages are delivered to a mailbox on the user's local system, the VAN mailbox is physically located on a system that is controlled by the VAN and remote to the user.

VAN electronic mailboxes can operate differently. Some VANs are basic "store-and-forward," where the information being sent is retained in the sender's mailbox until the VAN decides to service it. With store-and-forward, or "batch" processing, an outgoing transaction can be delayed by minutes or hours before it is transferred from the sender's mailbox to the destination mailbox. Other VANs, especially those operating on X.400 backbones, appear to the user as "virtual forward-and-store." This means that an EDI transaction is forwarded to the destination immediately after it is loaded into the sender's mailbox. This is significant to a user if the delivery of the message is time critical, i.e., if time saved translates to money saved, or cost avoidance, or breakage prevention.

9.1.3 Current VAN Mailbox Environment

Currently when a "destination" contractor or government agency logs onto an EDI VAN to receive the incoming EDI messages, the VAN will output the messages to the user's mailbox in the order they were received.

In years past this practice was acceptable because the recipient wanted all data with equal priority, and all messages were only a few kilobytes in size. Therefore, downloading each message only took a few minutes, and since the volume of EDI traffic was low, only a few messages would be in the recipient's mailbox at any one time. All messages could be read within a few minutes, even when the contractor only imported the messages once or twice a day. This architecture worked very well for low traffic volume and small message sizes.

9.1.4 Software to Download and Translate EDI Messages

For the IBM PC and compatible platforms, Supply Tech, Inc. provided STX EDI software. On the Macintosh, BYU used MacEDI from Digit Software.

For each VAN user, the EDI software provided access to his or her mailbox on the VAN, via a dial-up modem, for the purpose of retrieving the contents of the mailbox. The two VANs used, GMS and Advantis, had slightly differing philosophies regarding the functions of their mailboxes, as described in section 9.2.3. Once the mailbox was accessed, the EDI software would automatically download the un-retrieved messages to the user's local system. The EDI software provided some cataloging and organization of the incoming transactions. The STX software also separated each incoming 841

transaction into its constituent parts: one file containing the non-binary portion, and a separate file for each of the binary (BIN) segments in the 841.

9.2 Observations and Comments

The following observations and issues were considered worthy of special mention in this report. These observations were contributed by all test participants, including contractors, Air Force CALS Test Network, and the SM-ALC testing team.

9.2.1 No Flow Control

The VAN mailbox user had no control over the process of downloading messages from his mailbox. It is unclear whether this shortcoming is a function of the mailbox or of the EDI software. When the user accessed his mailbox via the EDI software, the software would immediately and automatically begin downloading all unread messages in the mailbox. The user was not given the option to just "look" in the mailbox to see if there were any new messages. Such a capability would be beneficial, allowing the user to determine whether and when to initiate the downloading process. Lacking such control during the test, the user would be "surprised" to either retrieve or not retrieve any new messages. In addition, two contractor participants expressed the desire to know message sizes (in bytes) and approximate download times for each message before the download process was initiated, so that appropriate disk space and computer resources would be available at download time. (See Editor's note, section 9.2.2.)

9.2.2 Cannot Select Messages

Closely related to the inability to determine the "fullness" of the mailbox is the inability to ascertain the contents of the mailbox. During the test, the user would have to wait until the download process was complete before he could query his local system to determine what he actually received. The capability to learn the contents of the mailbox, along with the ability to select which messages to retrieve from it, would be helpful to the user who wants to prioritize the retrieval and processing of his messages. The user should be given the option to only retrieve those messages he selects. Without this option, he must wait, perhaps several hours, for all the messages to be downloaded to his system before he may begin prioritizing the processing of the transactions. Such unnecessary and lengthy delays can be detrimental to a small business.

The destination contractor's receiving organization has a critical need (higher priority) for some data over other data. For example, an engineering change can be critical to get into factory production planning quickly. Timely introduction of changes can minimize or eliminate production item rework, re-test, waste, breakage, and can avoid "stop work" or "stop production" orders. In practice, the most time-critical information for a production factory is a test procedure change or quality assurance/inspection change. Such information should be given the highest send and receive priorities because it can reduce production and distribution costs. Alternatively, shipping, transportation, and shipment authorization information may be the highest priority information for both the contractor and the customer if that particular item is on either organization's "red-line critical path" schedule. In another scenario, payment status or "Remittance Advice" electronic funds transfer information may be the highest priority information, especially to a small business with immediate payroll or bill paying needs.

To properly satisfy this new environment, the recipient needs the capability to specify which file he wants to read first, and the VAN needs to provide the capability for the recipient to select and download a specific file first. In technical terms, the VANs should provide the users with a data flow control capability to satisfy the download business needs.
[Editor's note: As this report is being written, the VANs used in this test have indicated that they now provide a new "selective download" capability which provides all of the functional capabilities discussed

in sections 9.2.1 and 9.2.2. This new capability was already being provided in their synchronous operational mode and therefore was available to be quickly added to the asynchronous modem dial-up operational mode, which was used for the test, and is the preferred telecommunications connect method for small businesses.]

9.2.3 Automatic Removal of Messages from Mailbox

For the test participants who had an Advantis mailbox, messages in the mailbox remained there, apparently indefinitely. Once a message was retrieved by the mailbox user, it would be marked as retrieved, so that future mailbox accesses would not attempt to re-retrieve the same message again.

For the test participants who had a mailbox on the AT&T VAN, the messages would arrive in the user's mailbox and be held there for five days, after which the message would be deleted from the mailbox, whether it had been retrieved or not. If the user did not access the mailbox during that five-day period, the message would be lost, and the sender would have to re-send the message to the recipient. This happened frequently during the test, because often the message would be sent on a Friday, and for various reasons (user not notified in time, user too busy to check mailbox, hardware/communications problems, etc.) the recipient would not access his mailbox until after the message had been removed the following week. As with the Advantis mailbox, once a message was retrieved by the user, it would be marked as retrieved, so that future mailbox accesses would not attempt to re-retrieve the same message.

It would seem preferable to give the user some control over deletion of messages in the mailbox, and in fact, at least one test participant expressed a desire to be able to delete the messages himself. Limiting the lifetime of messages in the mailbox is a good back-up strategy to protect the VAN from overfilling its storage capacity, but a longer time limit, such as two weeks to 30 days, might be more appropriate.

9.2.4 Business Computer Tied Up for Long Periods

At 9600 baud, downloading large amounts of data was too slow to be considered a viable speed for production retrieval of bids. Most of the small businesses owned only one IBM compatible system, which would be taken over by the EDI retrieval process, sometimes for hours. This rendered the system unusable for the other functions it normally performed during the course of the business day, significantly impacting and sometimes paralyzing the small business' normal operations. Those who used an Advantis VANmailbox were limited to transmission speeds of 2400 baud, which proved to be an unacceptable download speed. As the recipients became more familiar with the downloading process, most of them elected to wait until the end of the business day to check their mailboxes. One contractor participant commented, "[I] do not believe small business can compete with EDI 841 transactions due to cost of time required." And another noted that for their particular situation, they would have to purchase a personal computer solely dedicated to EDI in order to use EDI regularly.

9.2.4.1 Download Times and Other Factors

Recipients observed a wide range of download times, due to several factors, such as their system configuration, the baud rate of the transmission, and the integrity of the telephone connection obtained when they dialed up their VAN mailboxes. General comments provided by the contractor participants indicate that the excessive download times are a big load on their limited computer resources. Some note that a 386 is an inadequate engine for EDI 841 processing and that a higher-end system is required, with a large disk capacity. Another noted that having only 10 Mbytes free on the hard disk prevented the successful retrieval of messages from the mailbox. Another contractor participant experienced temporary download problems when the telephone connection was repeatedly severed unexpectedly.

Some quantitative comments on download performance include:

"...at 2400 baud, download of [3] files required 2 hours."

"...downloaded files successfully in 2.5 hours." [21 files at 9600 baud].

transfer times very quick (60 seconds).

"Transmission...was in its 24th hour before terminating communication session." After 18 hours 5 Mbytes had been received, after 23 hours, 7 Mbytes. [8.6 Mbyte transmission at 2400 baud to a 386 processor].

4 Mbytes took 2 hours at 9600 baud.

1 hour to download 0.5 Mbytes at 2400 baud -- "too long."

The complete text of the comments submitted as part of the test checklist can be found in Appendix E.

9.2.4.2 Use of Modems

At least one contractor participant indicated that the use of the 9600 baud modem, which he received on loan for the test, was somewhat problematic, due to 1) the fact that it was external, rather than internally installed in his system unit, and 2) an apparent limitation in the STX software that prohibited use of auxiliary COM ports for the modem. This particular contractor found it necessary to disconnect the modem from his computer system unit in order to utilize his printer. This inconvenience might have been eliminated had STX supported a modem connection on COM3 or COM4. This same participant felt that the STX commands to configure the modem could be made more straightforward.
[Editor's note: According to Supply Tech, STX supports Auxiliary COM ports for the modem. The vendor could have used an A/B switch box if there were problems with his printer. The software comes with the modem command in the Log-on, there are no commands to configure the modem.]

9.2.5 Access to Faster Transmission Rates

Surprisingly, those users who had an Advantis mailbox, who were all located in the greater Los Angeles area, were required to access their mailboxes at a speed no faster than 2400 baud, unless they elected to make a long distance phone call to download the transmissions. The only known 9600 baud phone line in California was in the San Francisco Bay Area, some 400+ miles to the north. Due to the large solicitations and long transmission times, the cost of such a long distance phone call, even at 9600 baud, was quite prohibitive. This possible limitation in service availability should influence a potential user's selection of a VAN.

9.2.6 Organization of Files on Local System

Once STX retrieved the messages from the VAN mailbox, it placed all resulting files into a single directory, placing each binary raster image into a separate file, ensuring that each file had a unique filename. With all files of all received messages co-located in one directory, the user found it difficult to determine which files belonged to each message. One contractor participant commented, "The location of new transactions were difficult to locate." For each 841 transaction retrieved from the mailbox, STX created a file which summarized the non-binary portion of the 841, and a separate file for each included binary segment. For the small solicitation, this generated six files, and for the medium sized solicitation, ten files. The image files received were given sequentially ordered filenames, with the first file received named `BIN00001.DAT`, the second named `BIN00002.DAT`, and so on. STX recorded the names of each of

the binary files in the 841 summary file, but the user found it necessary to print out the summary files in order to determine which binary files went with each solicitation, a somewhat tedious process. Perhaps a more helpful file organization, with each 841 transaction in its own uniquely identified directory, would be more appropriate. Then, the software could use the filenames that are recorded in the transaction itself, which are guaranteed under appropriate application of MIL-STD-1840 to be unique for each transfer, rather than generating new filenames. By using the filenames that are provided in the 841 transaction, the user is saved from mentally translating from the original filename to a new, contrived one. Most contractor participants mentioned that they found the sequential image filenames meaningless, and would greatly benefit from more descriptive filenames, such as a drawing number, list of materials number, or engineering data list number.

9.2.7 Telephone Lines

Most of the small businesses who participated in the test had only one incoming phone line, on which it relied for all its external communication. During the downloading process, this line would be monopolized by the modem, thus blocking all other external communication. Small businesses considering entrance into the EDI world should strongly consider adding a second phone line dedicated to data transmission. One should also consider the type of telephone system used in the business. Some allow a single incoming line, which may be "split" so that multiple telephone conversations may occur simultaneously. One such system, Merlin, requires that an additional adapter be connected to the system to allow uninterrupted data communication. One of the small business participants reported that the cost of this adapter was $250.

9.3 Tips for VAN Selection

The costs of using third party VAN services is dependent upon three variables:

1. The amount of actual use. Almost all VANs charge by the amount of data or number of bytes actually transferred. A few VANs charge by the length, in minutes, of connect time.
2. The quality, performance, capacity, throughput, and functionality of the services offered, including some billable optional features which can vary the cost considerably.
3. The dynamics of the competitive commercial marketplace, plus the decreasing cost of technology, VAN implementation, and operations.

All three of these factors affect potential VAN costs. Several paradoxes have been identified across the multitude of commercially available VANs. For example, high performance does not necessarily imply high cost. Also, guaranteed delivery within a specified time period and during prime time may not imply additional cost.

These factors encourage close examination and comparison of VAN functional capabilities, performance, services offered, and pricing structure. A contractor who is considering subscribing to a VAN, and who will be sending or receiving technical information, should investigate whether the VAN is capable of transferring binary files with full integrity and without data alteration. Second, it may be a significant cost advantage to choose a VAN that will deliver the data within a few minutes and at no additional price over one which may wait, perhaps until overnight, for batch processing.

Third, the contractor should compare VAN fee schedules. VAN pricing structures are different for each EDI VAN service provider. In general, the more items a VAN charges for (e.g., number of bytes, reports, connect fees, time of day, total number of messages, etc.), the lower the charge for each item, and vice versa. Most VANs charge a minimum monthly account fee, which can vary from $3 on one VAN to $150 on another. Most VANs also charge a fee for the amount of data transferred, which can vary from 50 cents for 10 Kbytes (about 8 pages of alpha-numeric data) on one VAN, to many times this amount on

another. Some VANs also have a per message and/or per connect charge, while others do not. Even though the choices and decisions appear complex, a contractor can change VANs easily. Since changing EDI VANs is no more complicated than switching to a new long distance telephone company, the initial VAN selection decision need not be seen as irreversible.

9.4 Additional Useful Capabilities

For a small business or contractor to receive technical information in an operational environment, a few additional capabilities of the EDI translator software would be beneficial, but not mandatory. These capabilities include "unattended operations" and "overlay generation" options.

An unattended operations capability allows the translation package to operate in an unattended EDI server mode, so that incoming messages can be imported directly into the recipient's business environment immediately upon arrival at the business' mailbox on the network. This can save valuable time in the bidding and other normal business processes. The converse is equally true. With an unattended operations option, any outbound message can be formatted, packed, and issued with few, if any, operator keystrokes. Without this option, some software packages necessitate numerous time-consuming (and sometimes error prone) data entry functions.

The optional overlay generation capability enables the user to generate EDI message templates, or "overlays," for additional EDI transactions as he or she expands the variety of EDI messages used. A new EDI user typically utilizes only six or fewer of the over 250 currently available messages. Over the years, he could easily expand his EDI messaging capability if he has the capability to generate the overlays needed for new messages. Alternatively, the user must ask and perhaps pay his EDI translator vendor to add new messages to the user's installation. The overlay generation capability is financially beneficial to larger EDI operations and businesses with readily available or resident information systems software personnel, who are available and have the necessary skills to develop overlays. However, for a smaller business without such resources, especially initially, it may be more cost effective to have the translator software vendor provide an overlay generation service. Unlike the unattended operations option, which should be part of each initial EDI implementation, overlay generation can be added months or years later when the business' technical proficiency is increased, with no impact on the implementation or translator product already in place.

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10 Observations on Data Usability

This section covers the issues encountered by the recipients of the electronic images while they attempted to view and share the data. The scope of this section includes manipulation of the received data files, displaying and printing the images, and general preparation of the received items for analysis and bidding.

The CALS strategy asserts that a digital image environment, in the aggregate, is more cost effective than the equivalent paper or microfilm methods. Certainly the processes associated with the generation, filing, and retrieval of digital documents have advantages, such as fewer lost documents, improved accountability, reduced material costs, and greater accuracy of copies.

10.1 Background

The eight Blue-Ribbon SM-ALC contractor participants and the BYU Co-op were each loaned decompression and display software capable of processing CALS MIL-R-28002 Raster Type I compressed binary files. The software was compatible with the computer systems used to download the transactions from the VANs. On the DOS-based systems, HiJaak software, which has the capability to both decompress and display the raster images, was provided to the contractor participants by Inset Systems Inc. In addition to HiJaak, Myriad, produced by Informative Graphics Inc., was used by the Air Force CALS Test Network and SM-ALC during the test.

Although there is a wide range of technology available for both character recognition and raster-to-vector conversions, the scope this test limited image application to displaying and printing.

10.1.1 Necessary Hardware and Software Capabilities for Data Display

While with tangible documents, the user may be limited to receive and use poor quality copies of original documents, in a digital data interchange scenario, the user has access to an exact duplicate of the archival data that exists in the sender's image repository. This scenario simply requires that the user have access to digital capabilities which parallel the optical viewing process, a basic requirement for the successful implementation of digital image technology.

Most computer owners prefer that any new software or hardware that provides a new capability be compatible with and easily integrated with their existing computer system environment. Many businesses entering the world of digital engineering drawings would also like to migrate from aperture cards or mylar to this new paradigm smoothly and gradually, with little or no perturbation to the business' existing daily operations. A business process evaluation and perhaps re-engineering exercise may aid such a business' manager in making this transition.

The technical solution should be low cost, readily available, reliable, flexible, expandable, and easily tailored to meet a business' current and future needs. The computer system hardware must be capable of supporting image display requirements, and the software must provide the appropriate decompression and display functions. The context of the application will determine the size and volume of the data being transferred. The content of the data (line drawing, text, etc.), and the way it is applied by the user will determine the functional requirements and will dictate the necessary hardware and software. The specifics of the hardware and software used by the data recipients in this test are outlined in sections 2.2 and 2.5.

A system used to receive EDCARS source data must provide 8 Mbytes of bit-map storage resources to display the largest allowable EDCARS image. Storage resources may be provided as Random Access

Memory (RAM) or as disk space. Image retrieval, for display, occurs much more rapidly from memory than from disk. However, image decompression performance is generally a function of disk access, optimization of the decompression utility, and perhaps most importantly, processor speed. Application process issues will dictate the number of images to which the user requires continuous access. The speed and number of drawings required will have direct bearing on the hardware and software requirements. Optimal software setup, during and after installation, is also a very important part of a successful integration of a digital image application.

10.1.1.1 Ability to Process CALS Files

The ability to access CALS formatted image files, interpret the CALS file headers, and display the encoded images is a basic requirement in a CALS digital image environment.

The structure of the CALS raster image files used in this demonstration provides two types of data: attribute and content. The procedural and image attributes are supplied at the beginning of the file, in an ASCII header. The image attributes required to correctly decompress and display the encoded data are located in this header. The image content, a CCITT Group-4 binary compression of the full sized bitmap, is appended directly to the header.

All artifacts incorporated in the image content must be viewable by the user, and the attributes, available in the CALS header (document name, classification, related documents, revision, etc.), must be accessible by the user. Decompression of the encoded binary image into a bitonal bit-map is required before any other display function can be undertaken.

The perception of digital image performance is virtually always linked to decompression speed, as compared to working with tangible documents. The decompression time of an image is a function of its density (number of characters, lines, and image artifacts) and does not necessarily correlate with the size of the image (see section 4.2.4.2). To successfully decompress and display CALS raster images, an image processing tool must parse the ASCII header, locate the scan line length record in the CALS header (labeled `rpelcnt:`), read the record parameters, and convert them to binary values for use in the decompression process.

10.1.1.2 Ability to Display

The viability of applying image technology to technical data distributed by the DoD also hinges on the performance of the display capability. Displaying a digital image must be accomplished as easily and accurately as possible, at a minimum paralleling the functionality provided by paper documents.

More robust engineering applications provide their own unique requirements. However, in any application, an *intuitive* viewing capability is highly desirable. The user should be free to concentrate on viewing the image rather than on manipulating the display tool. Although a display tool may have a wide range of comprehensive functions, without an intuitive operational strategy, the display process may very well obscure the basic application.

The act of viewing the images requires something of a paradigm shift with respect to the user's existing methods for viewing engineering data. The analog nature of a complete paper image, constantly in the viewer's vision range and providing a global context reference, is difficult to recreate within the confines of the typical Video Display Terminal (VDT). On the other hand, the magnification capabilities, accuracy of copies, mark-up flexibility, accessibility, and the ease of handling large formats through a digital display device, are exploitable advantages offered by the digital technology.

10.1.1.3 Ability to Rotate and Zoom

Most available display software provides adequate rotation and zoom capability, at acceptable speeds, when working against files in formats native to the particular display packages.

10.1.1.4 Printing Images

An image displayed on a computer screen is generally a representation of the bit-map image stored in memory. The resolution at which the data is presented is a function of the desired magnification, the system's video hardware, and the operating system's presentation interface. .

Several mechanisms may be applied to extract image data from the computer for printing on paper; all will have some restrictions on the amount of data, the page size, and the quality of the image being printed.

The resolution of a printed representation is a function of the printer and how the data was provided to the printer. The greater the number of pixels that are available to cover a given paper format, the better the resolution or sharpness of the printed image. Typically, the resolution of a decompressed bit-map image is adequate for printing the image. Data transferred directly from the bit-map to the paper will normally give a usable image, while VDT image transfers are perceived as less than optimum.

10.1.2 Details about the Decompression Software Used

Although display software exists in any number of configurations, and can service a wide range of data formats, those packages not capable of processing CALS files require an image conversion process before the image can be displayed. The display software used was capable of converting and displaying CALS MIL-R-28002 Type-I raster images.

Both HiJaak and Myriad were tested against the Air Force CALS Test Network Raster Test Suite (CTN Report 91-042) to determine their ability to recognize all the Huffman run-length codes published in the CCITT T.6 documentation. The test suite consists of three CALS MIL-R-28002A Type-I files containing black and white run-lengths defined in the CCITT T.6 tables. The test results indicated that both HiJaak and Myriad were able to recognize all the required Huffman encoded run-lengths.

10.1.3 Details about the Display Software Used

The display software used was capable of magnifying and reducing the digital images through a "zoom" function, which facilitated displaying images in a wide range of sizes and resolutions, from shrinking the entire image down to the size of the display area, to enlarging the smallest artifact to fill the computer screen. This type of capability is far superior to that afforded by conventional optical enlargement systems for tangible media such as paper or aperture cards, which limit selection to one or two optical paths (lenses), providing only an incremental enlargement capability.

10.2 Observations

From the perspective of the solicitation recipient, viewing the enclosed images proved to be a very frustrating and time-consuming process associated with electronic bidding. There were several factors involved, which are outlined in the following sections. It was clear that a range of raster data display and printing capabilities exist, exhibiting a range of functionality. As the CALS data formats become more prevalent, an increasing number of hardware and software display products are being made available, and rapid, dramatic improvements in software and hardware performance has greatly benefited these products, the industry, and the user community. In addition to the quality and

accessibility of the images, observations on the usability and completeness of the data content are included.

In general, the test team attempted to execute every procedure required of the contractor participants. Notable observations are addressed in the following sections.

10.2.1 Renaming Files

Being unaware of one of HiJaak's setup options, which allows the user to specify any or no file extension to be used to identify CALS raster files, the raster file recipients manually changed the file extension of each raster file received to .CAL. .CAL is the default file extension which HiJaak uses to recognize input files as CALS files. The test team became aware of this setup option, which would have obviated manual renaming, after the testing was concluded.

10.2.2 Decompression of CALS Files

One of HiJaak's primary capabilities is conversion of image files from one type to another. At the user's option, HiJaak could be commanded to convert a CALS raster file into a more familiar file format, such as PCX, which could then be processed by readily available display programs, such as Paintbrush for Windows. Many of the test participants with PC platforms were too unfamiliar with alternative file formats and other specialized features of their computer systems to be comfortable exploring this option. They instead chose to use HiJaak to display and print the images, as well as decompress them.

10.2.2.1 Observations on Performance

A number of mechanisms may be used to ascertain performance in the digital environment. These can include "user perceptions," hand held stop-watch tests, and computer timed benchmark utilities. No benchmark performance tests were introduced in this analysis, which hampered the evaluation of the timing tests. In the absence of any objective benchmark strategies, and because of significant impact associated with variations in the test participants' platform configurations, the test team can make no definitive statements on performance. The test team acknowledges that a wide range of performance results can be derived from the products that are available to display image data. Product recommendations are not within the scope of this report. The test team notes that differences exist, and encourages users to investigate the functionality and performance required for their individual applications. These performance figures, taken in late '92 and early '93, should not be used directly when considering the performance of such products available today. Many prominent CALS product vendors, such as Inset Systems, recognize the need to keep up with and lead the highly competitive market of short life-cycle PC software, and have made dramatic improvements in performance, in some cases as much as a factor of 20.

All the participants (LLNL, SM-ALC, and the contractors) applied some form of timing evaluation, delivering a range of decompression timing results. The decompression/display times vary widely, from 1 to 4 minutes using a 486/25DX processor, to 10 and 15 minutes on a 386/16 MHz CPU. Some test participants with slower times found displaying and printing the images too time consuming to perform on every image they received. The extremes in the results are attributed to differences in system configurations, installation parameters, hardware speeds, and software versions. Many other parameters, such as memory access and buffer sizes, play a key role in determining decompression performance on any computer platform. Obviously, CPU speed and decompression algorithms have the greatest effect. An optimum configuration which utilizes a more recent version of either HiJaak or Myriad should provide decompression times between 15 seconds and 1 minute 20 seconds or faster. One contractor participant experienced swapfile space limitations on his 386 system with an 80 Mbyte disk drive and 4M of memory. When he moved the application to a 486 with a 200 Mbyte disk and 8M of

memory, this problem was solved and he was able to view the images, but he felt that the processing speed was still very slow.

Users converting from the CALS Type-I raster format to an intermediate format (such as PCX) for displaying, printing, and editing, will experience longer decompression times. In a number of cases, the contractor participants indicated that their decompression performance was too slow to be useful in a production environment.

10.2.2.2 Performance Statistics

Timing tests on SM-ALC and LLNL platforms substantiated the performance differential associated with a range of hardware and software solutions. The LLNL AFCTN test bed and SM-ALC both used PC configurations that would decompress and display an image in the 15 second to 1.75 minute range.

CPU	Speed	Memory	Disk
IBM PS/2 Model 60	25 MHz	2 Mbytes	33 Mbytes

Table 10.1 LLNL test platform configuration.

OS	CPU	Speed	Memory
MS-DOS 5.0	80386	25 MHz	7 MBytes
MS-DOS 5.0	80386	40 MHz	4 MBytes
MS-DOS 5.0	80486	33 MHz	7 MBytes
MS-DOS 5.0	80486	50 MHz	10 MBytes

Table 10.2 Configurations of SM-ALC image test platforms.

Indicative of the performance variations are the results of a stop-watch test conducted by LLNL, which targeted four images. Each image was decompressed twice on the same system, once with the source files located on floppy disk, and once with them on the system hard disk. The following variations in decompression performance were observed:

File Name	Floppy disk (in seconds)	Hard disk (in seconds)
d001r141	15	13
d001r142	105	90
d001r143	85	74
d001r144	89	75

Table 10.3 Decompression performance of test images at LLNL.

10.2.2.3 Analysis Of Decompressed Files

The following table shows the relative image density, file sizes, and compression ratios of two of the CALS raster image files used in this test:

	FILE #1	FILE #2
AREA (pels x scan lines)	3824x5100	6880x8800
Height*Width/8 (pixels)	2,437,800	7,568,000
FILE SIZE (bytes)		
CALS	108288	358656
PCX	506130	2246435
COMPRESSION RATIO		
CALS	22.5 : 1	21.1 : 1
PCX	4.8 : 1	3.4 : 1

Table 10.4 Example compression statistics comparing CALS raster to PCX.

While other compressed raster file formats besides PCX are available, the above table compares CALS raster with only PCX, since PCX is generally the most popular image file type on DOS platforms. Comparisons with other compressed raster file formats yielded results similar to those shown above, indicating that CALS raster compression is the most effective compression algorithm, resulting in the smallest file sizes, thus making the most efficient use of disk space.

However, there is increased overhead associated with the CALS raster compression algorithm. When images were converted to PCX, BMP, or other types, they were usually displayed virtually immediately, whereas images in CALS raster format required 45 seconds to 2 minutes or more to decompress for display.

10.2.3 Displaying, Rotation, Zooming

The display functions available in HiJaak allowed the LLNL AFCTN test bed to display and print the images used in this test.

SM-ALC used HiJaak for Windows (v. 1.0) to manipulate CALS files, and was successful in displaying files on a variety of machines, such as those shown in table 10.2. In every case, all machines could display all files. Directly displaying the CALS files, and converting them from CALS to other displayable or printable formats, was also successful on all LLNL and SM-ALC machines.

On the LLNL and SM-ALC platforms, once the images were decompressed, manipulations such as pan, zoom, and rotate were virtually instantaneous. However, the test team's perception of performance requirements to sustain an application were based on familiarity with the technology, and may perhaps differ from how another user might interact with a digital display system.

Those contractor participants who used HiJaak to convert the CALS files to PCX format, and then used some other PC/Windows-resident package, such as Paintbrush for Windows, for displaying, found that the quality and clarity of the images as displayed on the screen far surpassed that of the same images taken from aperture cards. One contractor described the resulting images as "surprisingly high quality, superb." Another described them as very readable, sharp.

Those contractors who did not use a different display package experienced very slow performance when attempting to display the CALS raster images. In some cases, attempts to modify the view of the image as it appeared on the screen resulted in delays of between 5 and 10 minutes; sometimes the system would hang up or crash. One contractor noted that when manipulating a rather small 50-100 Kbyte image, any interaction that resulted in an update of the display led to a 2 minute wait. Considering a production environment, where hundreds of images could be received in a day, these speeds are unacceptable. However, the performance improvements made since the time of this test should lead to a more robust production environment. One contractor suggested that a "55 or 66 MHz 32 bit bus system with a 32 bit video card" might be a good system configuration for image manipulation. These performance limitations severely hindered the usefulness of the electronic image. A few contractors who used Myriad to manipulate the images were more satisfied with the performance.

HiJaak can display dozens of file types and sizes. For this reason, it can zoom both in and out on any graphic. As delivered, HiJaak's initial zoom setting was such that the image would be enlarged to the point that a user might be viewing an unrecognizable small area of the data. This was overcome by modifying HiJaak's initial display parameters. Perhaps due to system hardware limitations, contractors were not always effective at utilizing HiJaak's pan and zoom features.

One contractor participant noted that each image, when initially displayed on the screen, was rotated clockwise 90 degrees. The initial version of HiJaak, as provided to the contractor participants, was unable in many cases to rotate a graphic. Any given graphic may be readable in either portrait or landscape mode, so rotation will be required of some graphics. Inset Systems delivered a corrected version before the test was complete. Its usefulness was tested and confirmed by the testing team.

10.2.4 Printing

Additional difficulties were experienced when trying to generate hardcopies of the images. Using the conversion/viewing package that was provided for the test, only those users with Epson-compatible dot-matrix printers could print the entire image on a single 8-1/2 x 11 inch sheet of paper. These paper plots were of a fairly high resolution and were quite readable. Most users had Hewlett-Packard or other types of laser printers, which could not be successfully driven by the software. Users without Epson-type printers could only print the portion of the image that was visible when displaying the image on the screen.

HiJaak was not intended to print multi-page output of graphics; it was unable to print, for instance, an E size drawing onto four 8-1/2 x 11 inch sheets. The contractor participants found this inconvenient, and Inset Systems said this could be changed in the future, if required. Printing performance was generally found to be similar to display performance. One contractor noted that printing an 80 Kbyte image file took 5 minutes 30 seconds. Another noted that attempting to print large image files would crash the system print queue.

Some contractors successfully converted the CALS files to PCX files, and printed them using other software, such as Paintbrush for Windows. These contractors were able to print the entire image, or a portion of the image, by performing a "screen dump" of the window containing the view of the image. This solution was also problematic, in that the resolution of these screen dumps was generally poor, rendering the image unreadable. The user could enlarge a portion of the full image, and using pan and print capability, generate multiple 8-1/2 x 11 inch sub-plots, which could then be pasted together to render the full image on paper. Such a business practice, however, can be labor intensive, tedious, time consuming, and inaccurate.

Another possible solution might be to try printing on a large format plotter. While a few of the contractor participants owned large format plotters, attempting to print the test images on them was not a requirement for the test.

10.2.5 Bidding from Electronic Data

The small business contractor participants who needed to internally distribute incoming solicitations in order to formulate a bid, found manipulating electronic drawings to be somewhat cumbersome. Due to the test environment, many contractors had only one computer system capable of displaying the images. This made electronic distribution of the images difficult at best, and required all persons who normally participate in bidding to access a common workstation, rather than working at their desks. Most of these contractor participants normally distribute or route hardcopy plots (e.g., blue prints) of the drawings so they can be evaluated for bidding. Due to the difficulties with obtaining legible, useful hardcopies of the electronic images, as outlined in section 10.2.4, distribution of reasonable paper drawings was not an available option. One contractor who was unable to generate any legible hardcopies of the drawings concluded that, for his company, all bidding must be accomplished by viewing the image on the computer screen. Many contractor participants concluded that without faster and more powerful display and/or plotting capability, attempting to bid using only electronic images would make their internal analysis and bidding processes more cumbersome than their current, aperture card-based processes.

About half of the contractors who submitted completed checklists indicated that they could have formulated a valid bid from the data they received. The variation in responses is likely due to differences in internal processing at each contractor's site. Verification of the completeness of the received data was difficult, perhaps due to inconsistent delivery of a parts list or drawing list. Some of the images received were considered unnecessary for transmission, since most contractors who have been supporting SM-ALC already have most images on file from previous solicitations. One contractor indicated that they would like to be able to selectively request drawings on an as-needed basis when responding to specific solicitations. Including an encoded version of the EDL was also considered unnecessary, since the contractors have no facility for decoding it.

11 Summary and Recommendations

This test demonstrated that CALS and EDI can be used together to electronically deliver military RFQs that specify technical parts to small manufacturing contractors. It also identified several problem areas that need to be addressed when developing a production CALS- and EDI-based implementation. Observations, including the most significant successes of the test, along with problems and recommended solutions, are described in the following sections.

11.1 Significant Successes

This test used the CALS and EDI standards and commercial VANs to bring about the first electronic transfer of Air Force technical bid set data to multiple manufacturing contractors, including small businesses. One contractor, upon receiving one of the bid sets commented, "This is the best thing to happen to Government contracting."

The Implementation Conventions for the ANSI ASC X12 841 transaction set, that were developed and used for this test, were accepted by each of the DoD services.

The most impressive success observed was the ability to accomplish the entire test with a variety of COTS hardware and software.

11.2 Observations and Recommendations

A summary of the observations and accompanying recommendations from the test follow. The observations are all summarized from the respective chapters dealing with the subjects indicated.

11.2.1 Engineering Data from EDCARS to the Site IGP

Observations:

1. EDCARS does not operate from an electronic engineering data list (EDL).
2. The Ethernet connection to EDCARS was not viable for use during the test.
3. Using 9-track magnetic tapes to move the data was adequate, but required that they be hand-carried to achieve data transmission.
4. Multiple tapes were not necessary for even the largest(<$25,000) procurement actions.
5. The engineering drawings from EDCARS were evaluated and found to be consistent with the prescribed CALS raster format (MIL-R-28002 Type-I).
6. There was no simple, automated way to determine which CALS raster image files should be packaged into the appropriate solicitations.
7. The "typical" bid set contained about 10 engineering drawings, requiring less than 2 megabytes of storage.

Recommendations:

1. For issues pertinent to EDCARS capability, any of the following options would be effective:
   a. EDCARS could be modified to operate off an electronic engineering data list. This would greatly facilitate the contracting business process.
   b. An add-on front-end system could be introduced to stage data identified on an electronic EDL.
   c. EDCARS could be replaced with a more modern, robust solution, e.g. JEDMICS.
2. EDCARS should deliver, along with CALS raster files, a table that shows the CALS filename associated with each solicitation aperture card or drawing, to facilitate packaging of the electronic solicitation(s).

3. It is imperative that the direct electronic connection between EDCARS and the site IGP be used to transfer engineering data. This may require software on both systems to automate two-way file transfer.

11.2.2 Business Data from ACPS to the Site IGP

Observations:

1. Electronic RFQs (X12 840s) had to be generated and verified by hand since, at the time of the test, there was no mechanism for converting ACPS contract information into an 840.
2. Not all of the business data was available on ACPS; it was gathered from several sources.
3. Central contracting buyers are unaccustomed to the format and fields required in the ANSI X12 transaction set 840.
4. The entire process of electronically issuing RFQs is a change for the contracting people. However, the test has indicated that automation is feasible.

Recommendations:

1. ACPS and any other computer systems containing relevant business records should be enhanced to accommodate X12 840, and should be electronically connected to the site IGP. This would facilitate electronic contracting and eliminate error-causing and time-consuming re-entry of data.
2. Such an automated system that electronically issues RFQs should be tailored to the buyer, and not require the user to have detailed knowledge of X12.
3. For the purpose of implementation, knowledgeable contracting people should be included in a team that takes a total look at redesigning the current business process.

[Editor's note: It appears that the DoD EC in Contracting Process Action Team Report addresses many such issues.]

11.2.3 Merging 840 and 841

Observations:

1. There was no way to specify in an 840 that 841(s) are associated with that 840.
2. A given solicitation consisting of multiple raster images may be larger (in terms of bytes) than a reasonable transmission size. The file organization on EDCARS does not facilitate intelligent sub-division of the solicitation images into coherent groups for transmission.
3. Since many RFQs deal with re-procurement, most qualified bidders already have most of the engineering drawings on file. Bidders only need the RFQ with an accompanying engineering data list (EDL), so they can request those drawings, if any, which have been revised since the last procurement action. There was no standard way to include an EDL in either an 840 or 841.
4. There was no obvious EDI transaction set designed for requesting specific engineering drawings.
5. The DoD Implementation Conventions for 840 and 841 did not support all test needs.

Recommendations:

1. The X12 840 Transaction Set should be modified to meet the needs of the Air Force RFQ process involving technical data. Government conventions and the ANSI standards themselves should be modified, if necessary to meet these needs.
   [Editor's note: Appropriate modifications to X12 840 have been made to support this recommendation.]
2. Allow an engineering data list to be sent in an RFQ, in place of the complete engineering package.

3. The X12 841 should be modified to accommodate EDLs and requests for technical data. [Editor's note: The X12 841 transaction set, along with the DoD Implementation Conventions for 841, have been modified according to these recommendations.]

11.2.4 Transmission (VAN to Contractor)

Observations:

1. Some VANs have a programmable upper limit to the size of transaction it will let pass to its customer.
2. In areas of the country where phone lines are exposed, rain, frost, wind, and lightening can affect the reliability of transmission.
3. Some VANs do not have 9600 baud service in all areas, requiring a long distance call in some locations to achieve speeds greater than 2400 baud. 2400 baud was considered too slow for doing business.

Recommendations:

1. VANs should examine their transaction size upper limits to accommodate larger technical data transfers.
2. Engineering data sets larger than the VAN's upper limit should be broken down into several smaller files (841s), and very large sets (e.g. >5 megabytes), should be mailed on physical media (e.g. floppies) until higher upper limits are generally available.
3. Contractors wishing to do business routinely via telecommunications lines should require the lines to be weatherproof. They should avoid transmission during lightening storms.
4. VANs should move quickly to install higher speed capability to every part of the country involved with electronic contracting for parts requiring engineering technical data.

11.2.5 Data Receipt (Contractor)

Observations:

1. Some engineering drawing sets were simply too large to reasonably download at 2400 or 9600 baud.
2. The receiving businesses must have a computer, a modem, and a phone line.
3. From the point of view of the small business, accessing a VAN mailbox was very easy -- it took only a phone call.
4. When accessing the VAN mail box, there was no way to control data transmission. Everything in the box was downloaded.
5. There was no apparent organization of messages (transactions) in the mail boxes, and no index.
6. There was no way to select specific transaction(s) to download.
7. The actual download can tie up the receiving computer for a very long period of time. This prohibits the use of the computer for other company business until the download is complete. In a significant percentage of cases, even the "typical" size bid set (10 drawings) took over an hour to download at 9600 baud.
8. Large files can take hours to download. Connectivity was frequently lost during the download operation, and the process had to be restarted from the beginning. Sometimes, this required the message originator to re-send the message.
9. The largest solicitation was not successfully downloaded by any of the test participants.

Recommendations:

1. Contractors should execute data transfers at 9600 baud or faster.
2. VANs and EDI translation software vendors should provide the capability for a receiver to scan the mailbox contents (with access to information such as file sizes, creation dates,

transmission dates, sender names, etc.), and to control the sequence in which the files are downloaded.
[Editor's note: Some VANs are addressing many of these capabilities]

3. Contractors should carefully consider the impact of download time on their business, and should be careful to not download files during peak computer usage.
4. An internal Local Area Network (LAN) can be useful. If the receiving company already has separate desktop microprocessors and/or workstations for engineering, management, manufacturing, transportation, publication, quality control, and/or administration (including order entry, project scheduling, shipping, accounts payable & receivable), it can be useful to interconnect several of these functional areas by LAN equipment, enabling each functional area to share information.

11.2.6 Data Usability

Observations:

1. Upon opening the 841s with the EDI software, the data files were found to be valid CALS raster files, as sent.
2. Displaying the CALS files was slow, in some cases as long as 15 minutes per image.
3. Only a few display software packages can read and display a CALS raster file.
4. Once a CALS file was translated into the native format of the display software, it took a long time to do routine actions such as pan.
5. Initial configuration parameters of display software can affect apparent usability of data. One display package had the initial zoom parameter set so close, the image was not visible. [Editor's note: This has since been corrected by the software vendor.]
6. Print capability and supported hardcopy devices must be evaluated against the contractor's available hardware.
7. Users not familiar with computers required a great deal of guidance and instruction.

Recommendations:

1. Testing with small contractors should continue, paying particular attention to evaluation of translation packages, display packages, and printing capability. Evaluations should be performed with the goal of publishing capabilities and results of timing tests for several software packages.
2. A user manual, with video tapes, should be available to first-time contractors by a third-party commercial educational business. The strategic implementation of CALS Shared Resource Centers and other outreach activities should be applied.
3. A more comprehensive evaluation of engineering document applications, imaging technology, and how that technology is most effectively applied should be done. Developing a better understanding of image applications, requirements, and advantages would help the user institute process change, and help vendors optimize the products that constitute current image technology.

11.2.7 Recommendations to DoD Program Office

We recommend considering adoption of the philosophy shown in section 11.2.8, Recommendations to Future Implementors.

We recommend that the practice of making technical data electronically 'available' be implemented. One test participant suggested, after the test was concluded, that certain non-sensitive, high volume technical data, such as design activity specifications, could be made electronically available, e.g. through an EDI-accessible database, with the thought that this would provide a mechanism for both small business and DoD to ease into EDI-based contracting.

We recommend that funding be provided to execute the evaluations and education activities outlined in the preceding sections.

We recommend that EDCARS be upgraded or replaced soon to address the issues identified in 11.2.1. [Editor's note: It is anticipated that the DoD engineering data migration system, JEDMICS, will address many of these issues in the future.]

11.2.8 Recommendations to Future Implementors

Do not implement technology for technology's sake. For instance, in transferring the technical data from EDCARS to the site IGP, Ethernet was assumed to be the only acceptable method of transfer, yet there was a very good business case for using 9-track tape. Each analysis decision should be based upon sound business practices.

Translation, archiving, delivery networks, etc. are very costly parts of an EC/EDI implementation. We recommend a scheme where these services are separated from any one business application (e.g. contracting), in order to make each one more readily available to an entire business community. For instance, see figure 11.1.

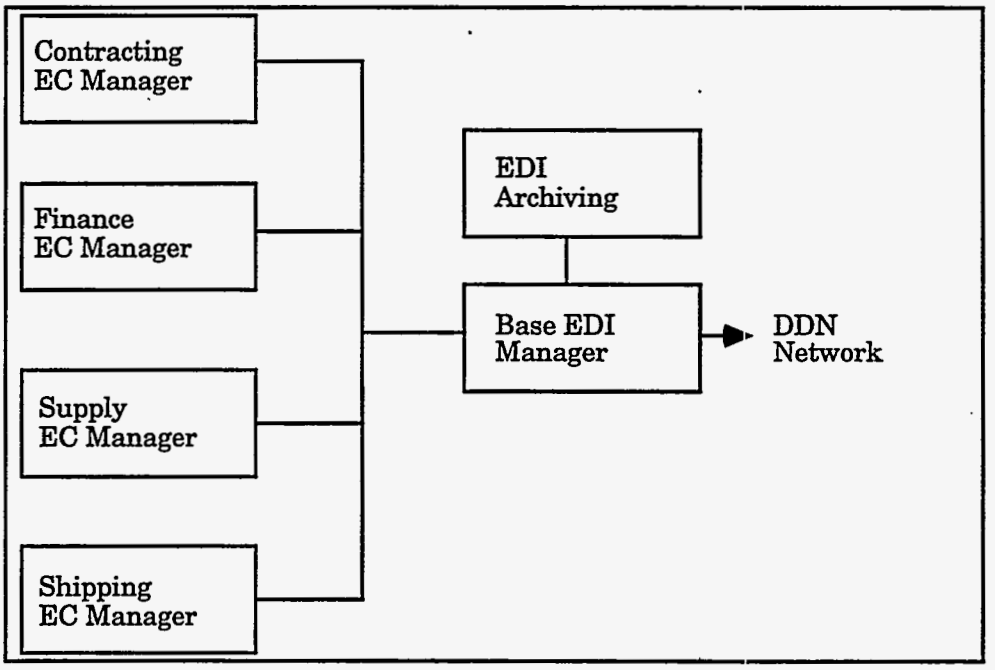

Figure 11.1 Functional block diagram of a hypothetical base-wide EDI implementation.

In this case, the different functional areas, contracting, finance, shipping, and supply have quite different existing systems and business practices. If EDI is built around any *one* of these, then the others may incur additional expenses in adopting EC practices, but if the functions are isolated as shown, each can be left to its own EC implementation. This approach should result in cost effective, phased implementations.

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APPENDIX A Test Plan

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DRAFT

CTN Test Plan Number CTN92-ED-01

TRANSFER OF AIR FORCE TECHNICAL PROCUREMENT BID SET DATA TO SMALL BUSINESSES, USING CALS AND EDI

01 February 1993

----- Rev. L -----

1. INTRODUCTION AND BACKGROUND

The CALS Test Network Office (CTNO) Test Bed is conducting its third test involving the exchange of Electronic Data Interchange (EDI) transaction sets containing Computer-aided Acquisition and Logistic Support (CALS) technical data, that is, technical data formatted in accordance with (IAW) the CALS standards. The first test, performed in the fall of 1990, demonstrated the compatibility of the CALS and EDI standards. The test showed that CALS data could be packaged in an EDI transaction set, sent over Integrated Services Digital Network (ISDN) or Defense Data Network (DDN) lines, and arrive intact and usable on the other end. The test also showed that the time to transmit an engineering drawing over DDN, even during a "heavy use" time of day, was well under ten minutes.

The second test, performed in the fall of 1991, was a successful concept demonstration of one leg of a paperless Air Force procurement transaction. Engineering drawings from an actual solicitation bid set were extracted in CALS format from an Air Force Engineering Data Computer-Assisted Retrieval System (EDCARS) located at McClellan Air Force Base, sent electronically to the Lawrence Livermore National Laboratory (LLNL) Value Added Network (VAN) Hub (actually to a temporary "hub" -- a PC running Supply Tech software was used because the LLNL VAN Hub was not then available), and then forwarded in EDI "envelopes" to a prospective vendor. The vendor was TRW, a large aerospace company that is very familiar with both CALS and EDI formats. TRW received the EDCARS-stored CALS data in good condition and displayed the images. The second test demonstrated the feasibility of electronic procurement with CALS data contained in EDI transaction sets. Lessons learned regarding procedural and technical limitations were fed back to the participating procurement center, at McClellan Air Force Base, and to the LLNL Electronic Commerce through EDI (EC/EDI) Procurement, Contracting, and Industrial Preparedness (PCIP) Project, which is the Department of Defense (DoD) engineering agent for installing a pilot electronic procurement system.

This third test is actually "phase two" of the previous Air Force procurement demonstration. This phase differs from the second test (phase one) in that the technical data (digitized engineering drawings in CALS format) in support of a procurement will be taken from EDCARS via telecommunication lines rather than via magnetic tape, and will be sent, via commercial VANs using EDI, to a representative sample of McClellan's Blue Ribbon contractors having varied exposure to CALS and EDI. Two methods for transferring procurement data will be tested: (1) transfer from SMALC to the contractor through the LLNL Site Hub via VAN connections, and (2) transfer from SMALC to the contractor via a VAN direct connection. The contractors will receive the procurement data by three methods: (1) through LLNL Site Hub via VAN connection, (2) through VAN direct connection, (3) forwarded by a central contractor co-op, who received via one of the two transfer methods above. The co-op, located at Brigham Young University (BYU), will act as a central clearing house and distribution point that "brokers" electronically available procurement information to businesses that cannot afford to hire or train a person to monitor appropriate bid opportunities. This phase will also be conducted within the context of DoD's standard approach to electronic commerce, now being developed by LLNL for pilot-testing at Wright-Patterson Contracting Center (WPCC).

2. OBJECTIVE

The objective of this test is to evaluate the effectiveness of using CALS data within the context of the DoD's EDI-based standard approach to electronic commerce in procurement. The focus of this phase of the test will be on automating Air Force CALS-specified procurement activities with DoD contractors. Areas to be examined include:

1. Extraction of procurement-related CALS data from EDCARS via telecommunication lines;

2. EDI transfer to the LLNL VAN hub of a complete procurement package using the ANSI X12 840 transaction set (Request for Quotation) and the 841 transaction set (Specifications/Technical Information);

3. Distribution of the package to selected contractors, including a small business co-op center (BYU), (a) via commercial VANs through the LLNL VAN hub, and (b) via direct VAN connection;

4. Capture and display of the Request for Quotation (RFQ), including the CALS data, by the contractor participants;

5. Acknowledgment of the receipt of the ANSI X12 840 and 841 transaction sets using the ANSI X12 997 transaction set (Functional Acknowledgment); and

6. EDI response to the RFQ using the ANSI X12 843 transaction set (Response to RFQ).

DoD standard mappings and conventions for ANSI X12 will be utilized throughout the test. If it becomes necessary to execute portions of the test prior to the availability of requisite components within the DoD standard approach, reasonable "fallbacks" and "workarounds" will be used.

3. PARTICIPANTS

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patterso@smcdm03.sm.aflc.af.mil

Implementation Project:
Major Ken Richardson, Chief for EDI Implementation — 916-643-6200
richards@smcdm02.sm.aflc.af.mil

Cynthia Slife, EDI Project Training Manager — 916-643-6200
slife@smcdm01.sm.aflc.af.mil

SMALC CALS Program Office contacts

CALS Program Office
Sacramento Air Logistics Center (SMALC/TIEAB)
McClellan AFB, CA 95652-5609
916-643-6272 FAX

Grace Talbot, CALS Program Manager — 916-643-2991
talbot.grace%a1.allin1.umc@c3po.sm-alc.af.mil

Michael Mast, CALS Program Manager — 916-643-2991
mast.mike%a1.allin1.umc@c3po.sm-alc.af.mil

LLNL Electronic Commerce (EC) contacts

NOTE: Due to funding restrictions, these contacts are being used only for advice on the context of DoD's standard approach to EC and are not actively participating in the test.

Electronic Commerce through EDI Project
Technology Information Systems Program
Lawrence Livermore National Laboratory
P.O. Box 808, L-542
Livermore, CA 94551
510-294-5054 FAX

John Rhodes, PCIP Subproject Leader — 510-422-6550
jrhodes@wiz-link.tis.llnl.gov

Judy Payne, Deputy PCIP Subproject Leader — 703-734-1996
jpayne@wiz-link.tis.llnl.gov — 703-734-2363 FAX

Ted Cole, ANSI X12 DoD Conventions Specialist — 510-422-6907
cole@tis.llnl.gov

Charles McGregor, Electronic Commerce Senior Architect — 510-423-9883
ckm@llnl.gov

Small Business Co-op Center contacts

BYU CALS Shared Resource Center
265 Crabtree Technology Building
Brigham Young University
Provo, Utah 84602
801-378-7575 FAX

Dr. Dell K. Allen, Director — 801-378-3895
allend@bones.caedm.byu.edu

Dr. Barry Lunt, Research Associate — 303-538-2696

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CTN Test Plan Number CTN92-ED-01 AITI/1288

Co-op Center Small Business Affiliates

Viking Systems, Inc.
232 West 1250 North
American Fork, UT 84003

Rob Cook, President 801-765-5307

Bill's Metals
P. O. Box 859
8141 Airport Road
Huntington, UT 84528

Bill Huntington, President 801-653-2425

The Cannon Group
7515 Wayzata Blvd., Suite 201
Minneapolis, MN 55426

Reuben Bjerke, Contract Rep for Small Businesses 612-545-7001

Industry West Electronics
279 North Geneva Road
Orem, UT 84057
801-226-3268 FAX

Darold P. Francis, President 801-226-1000

Kitco Inc.
1625 Mountain Spring Parkway
Springville, UT 84663

Randy Findlay 801-489-3627
Mike Nester 801-489-3627

SMALC Contractor Affiliates with EDI experience

Allied-Signal Airesearch
19201 Susana Road
Rancho Dominguez, CA 90221
310-608-6205 FAX

Wayne Smith 310-608-6414

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CTN Test Plan Number CTN92-ED-01 AITI/1288

SMALC Contractor Affiliates without EDI experience

American Electronics
1600 East Valencia Drive
Fullerton, CA 92631
714-871-1403 FAX

Susan Method 714-871-3020

Micro Systems, Inc.
65 Hill Avenue
Fort Walton Beach, FL 32548
904-243-1378 FAX

Cort Proctor 904-244-2332

Precision Manufacturing of San Antonio, Texas
4546 Sinclair Road
San Antonio, TX 78222
210-648-7401 FAX

Mary J. Hicks, General Manager 210-648-3170
Rick Hicks, Technical Point of Contact 210-690-5574

Inspirnetics
9330 7th Street, Unit E
Rancho Cucamonga, CA 91730
714-941-8303 FAX

Lucille Seibel 714-941-2004
Ted Seibel, Technical Point of Contact

Kent Associates, Inc.
900 Fifth Avenue
Mansfield, TX 76063-2727
817-473-6705 FAX

Richard Geist 817-473-2855
Steve Geist, Technical Point of Contact

Llamas Plastics Inc.
12970 Bradley Avenue
Sylmar, CA 91342
818-362-9780 FAX

Cindy Roberts 818-362-0371
Rick Llamas, Technical Point of Contact

Moda Magnetics Corp.
84 Rome Street
Farmingdale, NY 11735
516-249-2792 FAX

Martin Gross — 516-249-2766
Jerry Gross, Technical Point of Contact

Participating VAN contacts

a. AT&T
3221 McKelvey Road, Suite 201
Bridgeton, MO 63044
314-770-3210
314-770-3224 FAX

John Reat — 314-770-3210
James Anderson — 314-770-3206

b. IBM
3405 West Martin Luther King Blvd.
Tampa, FL 33607
800-284-5849
813-878-5298 FAX

R. David Bolan (main point of contact) — 813-878-5462
Thomas P. Taylor — 800-284-5849
Frank W. Gagliano — 800-284-5849
James R. Russell — 813-878-3235
Ronald D. Robins — 800-284-5849

EDI Software Vendor contacts

a. Digit Software
P. O. Box 1425
Silver Spring, MD 20915
301-593-8952
301-593-2201 FAX

Todd A. Ross
Hedy J. Ross

b. St. Paul Software
754 Transfer Road
St. Paul, MN 55114-1404
612-641-0963
612-641-0609 FAX
Eric Christenson
Roger Anderson

c. Supply Tech, Inc.
1000 Campus Drive
Ann Arbor, MI 48104-6700
313-998-4000
313-998-4099 FAX

Ken W. Schmenk, Senior Account Executive 313-998-4056
Joan M. Ugljesa 714-582-9080
714-582-8831 FAX

TRW CALS/EDI Information Systems contact

TRW Space & Defense Sector
E1-4029
One Space Park
Redondo Beach, CA 90278
310-814-5175 FAX

Bud Orlando, Manager 310-812-4997
491-4688@mcimail.com

CALS Test Network contacts

CTNO Test Bed
Automated Interchange of Technical Information Project (AITI)
Lawrence Livermore National Laboratory
Technology Information Systems Program (TISP)
P.O. Box 808, L-542
Livermore, CA 94551
510-294-5054 FAX

Donald L. Vickers, Manager and Project Leader 510-422-4231
vickers@lance.tis.llnl.gov
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Nick Mitschkowetz, Raster Lead Analyst 510-422-0582
mitsch@lance.tis.llnl.gov
Bruce Garner, CGM Lead Analyst 510-422-8730
garner@lance.tis.llnl.gov
Christy Chivers, Administrative Ass't. 510-423-9888
chivers@lance.tis.llnl.gov

4. STANDARDS AND SPECIFICATIONS

The test files will be actual solicitation bid sets or RFQs. These packages will contain numerical and textual data from the SMALC Automated Contract Preparation System (ACPS) in ASCII format. Along with the text will be supporting engineering drawings and specifications in CALS raster format from the SMALC EDCARS system.

The specific standards being evaluated are:

a. MIL-STD-1840A Automated Interchange of Technical Information

b. MIL-R-28002A (Raster)

c. American National Standards Institute (ANSI) EDI X12 Transaction Set 840 (Request for Quotation), Version 3022

d. ANSI EDI X12 Transaction Set 841 (Specifications/Technical Information), Version 3022 as implemented in the DoD manual

e. ANSI EDI X12 Transaction Set 843 (Response to RFQ), Version 3010 as implemented in the DoD manual

f. ANSI EDI X12 Transaction Set 997 (Functional Acknowledgment), version 3010

g. X.400 Open System Interconnection (OSI) Message Handling System (An International Consultative Committee on Telegraphy and Telephony [CCITT] Standard)

5. **PROCEDURES (See Appendix A, Test Plan Diagram)**

The testing strategy is to perform the CALS/EDI evaluations over an extended period of time. This will increase the coupling between the test and the development of capabilities occurring both at SMALC and within the LLNL PCIP Project. Evaluations (field tests) will occur as each capability is completed. For instance, evaluation of electronic extraction of engineering drawing data from the SMALC EDCARS will occur after that link has been firmly established and tested by its implementors. Evaluators may use "fallbacks" or "workarounds" for uncompleted components of the "ideal" solicitation bid set transfer path until those components are available.

The "ideal" testing strategy is amplified in the steps below; again, fallbacks may be substituted as necessary. The sequence shown for these steps represents data flow and not necessarily the order in which the testing will be performed. Testing with the various VANs, software vendors, and contractors will be staged to avoid "overload" on limited resources.

When practical, data will be examined at each "checkpoint" (each end of an operation or transfer). The CALS data will be examined by the CTNO Test Bed at LLNL; the EDI data will be examined by TRW CALS/EDI Information Systems, with advisory input from the LLNL EC contacts, as available.

a. The Aircraft Contracting Division of SMALC will initiate a requirement and begin to process three (3) Purchase Requests (PRs). Activities b through q, listed below, will occur relative to each PR.

The three solicitation packages will be of varying sizes, depending upon the number and sizes of the accompanying engineering drawings. The following table summarizes the sizes of the three solicitation packages.

Solicitation Size	Number of Drawings
~ 0.75 MB	4
~2.0 MB	13
~13.0 MB	75

b. SMALC will extract the accompanying engineering data from their EDCARS in CALS format and send it electronically to the SMALC site Intelligent Gateway Processor (IGP).

c. The SMALC contracting participants will extract RFQ data from their ACPS system, create an 840 transaction set, and send it electronically [method TBD by SMALC] to the AT&T 3B2 PCIP IGP located at SMALC (the SMALC site IGP).

d. SMALC will review the complete solicitation bid set on the site IGP and will forward reference copies in both electronic and hardcopy form to BYU, LLNL, and TRW.

e. SMALC will use PCIP-supplied software to format and to place the CALS data into the 841 transaction set. As a fallback, SMALC will use EDI software supplied by St. Paul Software to generate the 841 transaction set on the AT&T 3B2.

f. SMALC will send the transaction set via the DDN connection at SMALC through Internet to the LLNL VAN Hub using the CCITT X.400 OSI Message Handling System.

g. Checkpoint examinations will be made of the EDI transaction sets as received at the LLNL VAN Hub and observations recorded.

h. The CTNO Test Bed participants at LLNL will display and evaluate the CALS engineering data and record observations.

i. The LLNL VAN Hub will electronically mail the transaction sets to the participating VANs who will distribute them to the contractors and co-op.

j. TRW, the CTNO Test Bed, the VANs, and the software vendors will help the contractors and small business co-op center download the solicitation bid set using their respective commercial VANs. For purposes of comparison, two VANs and three commercial-off-the-shelf (COTS) EDI software packages will be used in the test. Eight DoD contractors (one large and seven small) will be asked to receive the data, one that has EDI experience and seven that do not. The co-op center will supply the transaction set data to five small businesses with no EDI experience.

k. Each contractor participant with direct VAN accounts to receive the transaction sets will display and/or print the bid set data at their respective sites. The co-op center will display and/or print the bid set data, then forward it digitally [method TBD] to its affiliated small businesses. The manner of digital communication from the co-op center to the businesses will be compatible with CALS and EDI as far as the capabilities of the businesses allow.

l. All thirteen recipients, upon receipt of each transaction set, will issue [method TBD] a corresponding 997 (Functional Acknowledgment) transaction set.

m. All thirteen recipients will examine the bid set data and determine their desire to quote. (For the purpose of the test, it is assumed that all thirteen will desire to quote.) They will then send [method TBD] an X12 843 transaction set (Response to RFQ) back to SMALC through the VANs and the LLNL VAN Hub. In the case of the co-op affiliates, they will send their quotes to the co-op center where they will be converted into the 843 transaction set and sent to SMALC through the LLNL VAN Hub.

n. If necessary, the LLNL VAN Hub point of contact will intervene to forward the replies to the SMALC Site IGP.

o. All contractors will send hardcopies (e.g. computer plot or photograph of the screen, via US mail or FAX) of the contents of the received 840 and 841 transaction sets to the CTNO Test Bed for visual evaluation. If they have the capability, they will also send copies of the CALS and procurement data in digital form (e.g. magnetic tape or floppy disks).

p. All participants will keep records of their observations, the equipment and software used, time intervals and times of day, weather conditions, etc. and will write very brief summaries of the results at the conclusion of each step. The CTNO Test Bed will furnish a draft checklist to each participant to facilitate this record keeping process. These completed checklists will be forwarded to the CTNO Test Bed at LLNL.

q. The CTNO Test Bed will collect the summaries, hardcopies, and digital data and will prepare a final report summarizing the entire test, including comments and recommendations to the Office of the Assistant Secretary of Defense (OASD) regarding the robustness and interoperability of the CALS, EDI, and OSI standards. A draft of the report will be updated as input is received at the conclusion of each step.

6. FACILITIES AND EQUIPMENT

a. Sacramento Air Logistics Center (SMALC), McClellan AFB, CA

SMALC Site IGP

Hardware:	AT&T 3B2 600G 24 MHz processor, dual processor enhancements
Operating System:	Sys V Rel 3.2.2 UNIX
Software:	Wollongong WIN3B TCP/IP, RFS, Ascent 2.0
Communications:	10base5 Ethernet, eport & fxm asynchronous ports
Graphics:	
Other Information:	64 MByte memory, 1.2 GByte disk

EDCARS System

Hardware:	IPL Systems Inc. Model 4460 (IBM plug compatible)
Operating System:	MVS
Software:	EDCARS System
Communications:	COMten (TCP/IP, Arcnet, X.25)
Graphics:	
Other Information:	

ACPS System

Hardware:	Data General MV-9500
Operating System:	AOS/VS.2
Software:	ACPS, Word Perfect
Communications:	Ethernet, TCP/IP (SMTP not fully implemented)
Graphics:	
Other Information:	Tape interface to Xerox 9700 printer

SC&D System

Hardware:	IBM 3090 - 200
Operating System:	MVS
Software:	Logistics Modernization Systems (LMS)
Communications:	Serial Kermit, Open Link TCP/IP on Comten F.E.P.
Graphics:	
Other Information:	

b. EC VAN Hub, LLNL

Sun 4

Hardware:	Sun 4 SPARCstation IPC
Operating System:	SunOS 4.1.1
Software:	LLNL HubWare
Communications:	Ethernet
Graphics:	
Other Information:	

Hewlett-Packard

Hardware:	HP Vectra (386)
Operating System:	Interactive UNIX
Software:	Retix X.400 Open Server
Communications:	Ethernet, X25
Graphics:	
Other Information:	

c. CTNO Test Bed, LLNL

Sun 4

Hardware:	Sun 4 SPARCstation IPC 24 MByte memory, 600 MByte hard disk
Operating System:	Sun/UNIX Ver. 4.1, Rel 4.1.1
Software:	CTN TAPETOOL, MIL-STD-1840A tape evaluation software Open Windows Sun C compiler and run-time library
Communications:	Internet
Graphics:	
Other Information:	

IBM PC

Hardware:	IBM PC/AT, 640 KByte memory, 30 MByte hard disk
Operating System:	MS-DOS 3.2
Software:	ValidG4, Hijaak, Viewer
Communications:	Internet
Graphics:	CGA
Other Information:	

d. Small Business Co-op, BYU

Apple

Hardware:	Macintosh IIci
Operating System:	Mac OS
Software:	MacEDI, Canvas 3.0, Hijaak, AutoCad 10.0
Communications:	Hayes Ultra96 modem
Graphics:	
Other Information:	

IBM

Hardware:	IBM PS/2 Model 90
Operating System:	OS/2, MS Windows, MS-DOS 5.1
Software:	Envision It, Hijaak, Supply Tech STX12
Communications:	Hayes Ultra96 modem
Graphics:	
Other Information:	

e. Allied-Signal Airesearch (Large Business)

Hardware:	Epson 386 and 486, 100+ MByte hard disk with 10+ MByte available
Operating System:	MS-DOS 5.0 with Windows 3.0
Software:	
Communications:	2400 baud Modem
Graphics:	VGA
Other Information:	

f. American Electronics (Small Business)

Hardware:	IBM XT, 10 MByte available on hard disk
Operating System:	MS-DOS 3.3
Software:	
Communications:	Hayes 1200 baud Modem
Graphics:	EGA
Other Information:	

g. Micro Systems, Inc. (Small Business)

Hardware:	386 and 486 IBM clones, 100+ MByte hard disk with 10+ MByte available
Operating System:	MS-DOS 5.0 with Windows 3.0
Software:	
Communications:	PROCOMM 2400 baud Modem
Graphics:	EGA
Other Information:	

h. Precision Manufacturing of San Antonio, Texas (Small Business)

Hardware:	486 IBM clone, 10+ MByte available on hard disk
Operating System:	MS-DOS 5.1 with Windows 3.0
Software:	
Communications:	Hayes 2400 baud Modem
Graphics:	VGA (vendor is unsure)
Other Information:	

i. Viking Systems, Inc. (Small Business)

Hardware:	IBM 386 compatible, 4 MByte memory, 120 MByte hard disk
Operating System:	MS-DOS 5.0
Software:	Windows 3.1, PCX viewers
Communications:	2400 baud modem (will use Hayes Ultra 96 for test)
Graphics:	VGA+
Other Information:	Dot-matrix printer

j. Bill's Metals (Small Business)

Hardware:	IBM-XT, 560 KByte memory, 10 MByte hard disk
Operating System:	MS-DOS 3.1
Software:	(will use PCX viewer)
Communications:	(will use Hayes Ultra 96 for test)
Graphics:	CGA - monochrome
Other Information:	Dot-matrix printer

k. Defense Electronic Systems (Small Business)

Hardware:	286 IBM compatible, 1 MByte memory, 20 MByte hard disk
Operating System:	MS-DOS 3.3
Software:	PCX Graphics
Communications:	2400 baud modem (will use Hayes Ultra 96 for test)
Graphics:	EGA
Other Information:	HP LazerJet Series II

l. Industry West Electronics (Small Business)

Hardware:	386SX IBM compatible, 1 MByte memory, 20 MByte hard disk
Operating System:	MS-DOS 3.3
Software:	(will use PCX viewer)
Communications:	2400 baud modem (will use Hayes Ultra 96 for test)
Graphics:	EGA
Other Information:	HP LazerJet Series II

m. Kitco Inc. (Small Business)

Hardware:	386 IBM compatible, 1 MByte memory, 20 MByte hard disk
Operating System:	MS-DOS 5.1
Software:	(will use PCX viewer)
Communications:	2400 baud modem (will use Hayes Ultra 96 for test), X-crosstalk, ProCom
Graphics:	VGA
Other Information:	HP LazerJet Series IId

n. Inspirnetics (Small Business)

Hardware:	486 IBM compatible, 120 MByte hard disk with 10+ MByte available
Operating System:	MS-DOS 5.0 with Windows 3.1
Software:	
Communications:	Hayes 2400 Comp.
Graphics:	Super VGA
Other Information:	

o. Kent Associates, Inc. (Small Business)

Hardware:	IBM PC/XT, 286 and 386 IBM compatibles, 180 MByte hard disk with 20+ MByte available on 386
Operating System:	MS-DOS 3.3 with Windows 3.1
Software:	
Communications:	Hayes 2400
Graphics:	VGA
Other Information:	

p. Llamas Plastics Inc. (Small Business)

Hardware:	286 IBM compatible, 80 MByte hard disk with 20+ MByte available
Operating System:	MS-DOS 5.0
Software:	
Communications:	Practical 2400
Graphics:	VGA (vendor is unsure)
Other Information:	

q. Moda Magnetics Corp. (Small Business)

Hardware:	Gateway 2000 486 DX/33, 80 MByte with 10+ MByte available
Operating System:	MS-DOS 5.0 with Windows 3.1
Software:	
Communications:	none
Graphics:	VGA (available)
Other Information:	

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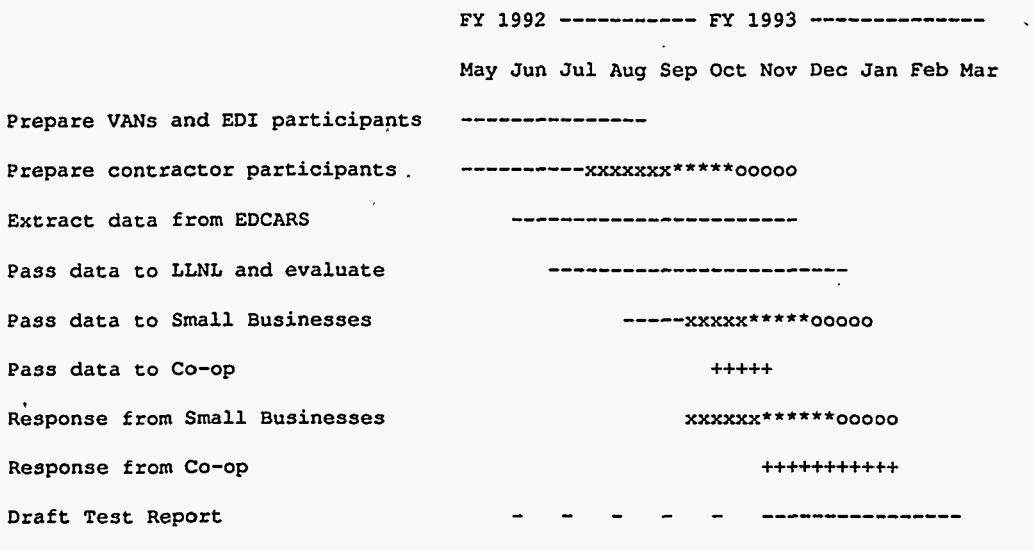
CTN Test Plan Number CTN92-ED-01 AITI/1288

7. DELIVERABLES

A detailed test report will be written as the test progresses and delivered after the test is completed. Presentations on work in progress will be given at CALS Expo '92 and elsewhere, as necessary.

8. SCHEDULE



Legend:
- \- SMALC/LLNL CTNO activity
- x Activity involving contractors in Texas
- * Activity involving contractors in California
- o Activity involving contractors on the East Coast
- \+ Activity involving Co-op

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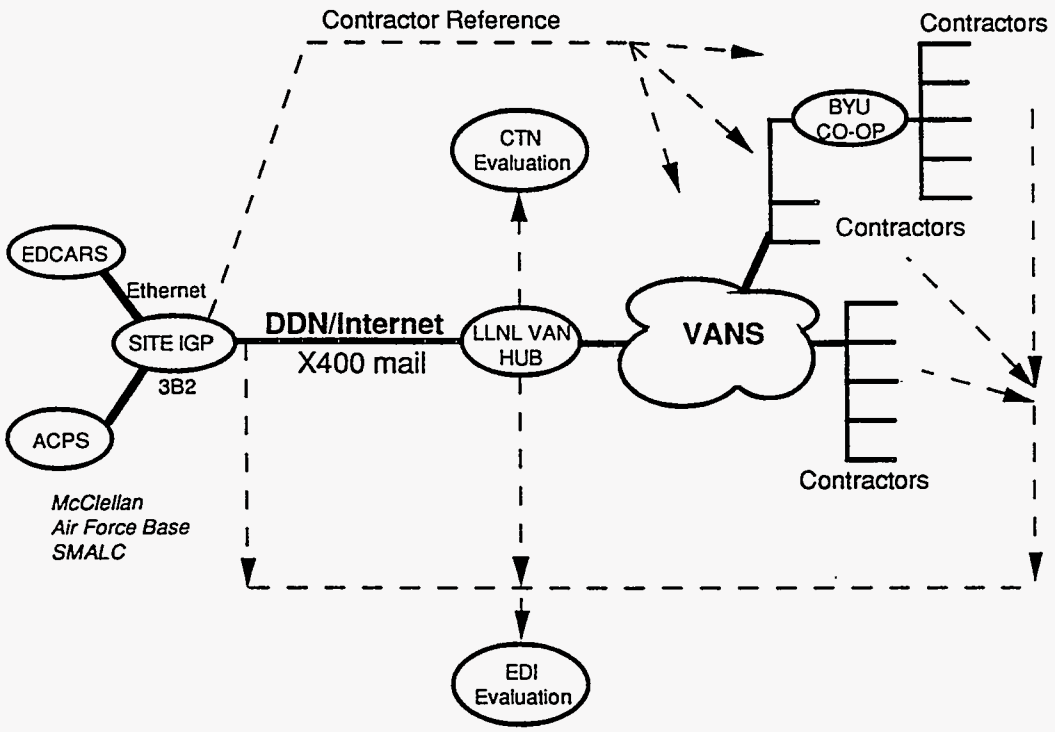
APPENDIX A – TEST PLAN DIAGRAM



LETTER REQUEST FOR QUOTATION IVEY

REQUEST #: F04606-99-0-76543 DATE ISSUED: 92 SEP 30

RETURN REQUEST FOR QUOTATION BY: 92 OCT 30

CERTIFIED FOR NATIONAL DEFENSE UNDER DMS REG 1 RATING: DO A1

ISSUED BY: DEPARTMENT OF THE AIR FORCE
SACRAMENTO ALC/PKXO
3237 PEACEKEEPER WAY/SUITE 17
MC CLELLAN AIR FORCE BASE CA 95652-1059
BUYER: PATTERSON.4JJ/LAKFA/916-643-0803

SCD CODE: C

To qualify as a small business concern, number of employees shall not exceed 1000 employees (or annual receipts shall not exceed ____ millions of dollars), including affiliates. This size standard is based on Standard Classification Code (SIC) 3728.

CAUTION If handscribed, please use black ink. Enter quotation prices in schedule.

BUSINESS CLASSIFICATION (Check appropriate box(es))

( ) SMALL ( ) OTHER THAN SMALL ( ) DISADVANTAGED ( ) WOMEN-OWNED

SEE SCHEDULE FOR DELIVERY AND FOB POINTS

DISCOUNT TERMS _____

NAME AND ADDRESS OF QUOTER QUOTED PRICES FIRM FOR _____ DAYS

_____

_____

_____

_____

COMMERCIAL and GOVERNMENT ENTITY (CAGE) CODE _____

FACILITY CODE _____

CONTRACTOR ESTABLISHMENT CODE (CEC) _____

NAME AND TITLE OF PERSON TO CONTACT (Type or print)

_____

_____

TELEPHONE NUMBER (Include area code) _____

DATE OF QUOTATION _____

GOVERNMENT PROPERTY: Contractor desiring to use Government production/research property in his possession shall obtain concurrence of the Contracting Officer having cognizance of such property and attach the approval to the response.

BASIC ORDERING AGREEMENT: Quote may be made subject to terms and conditions of quoter's BOA. BOA NR. _____. Contractor affirms that all required certifications are current and applicable.

COMMERCIAL ITEM(S): (complete - whether or not commercial - if catalog or price list exists)

a. Effective date, number of catalog price list and page on which item is listed _____.

b. Copy of price list.

c. PERCENT of sales to Government: _____.
PERCENT of commercial sales: _____.

ECONOMIC QUANTITY: Request you provide additional minimal economic quantity quote if out of production, and quantity break for discount purposes.

Specifications and Drawings are attached hereto.

NOTICE OF SMALL BUSINESS - SMALL PURCHASE SET-ASIDE (AUG 1988) FAR 52.219-4 (IAW FAR 19.508(a))

APPROVED SOURCES ARE:

81755 GENERAL DYNAMICS CORP

PAGE 1 OF 9
SOLICITATION NUMBER FO4606-99-0-76543

ITEM	SUPPLIES/SERVICES	QTY	UNIT	UNIT PRICE	AMOUNT
0001	3040-00-958-0974BJ SUPPORT P/N: 12W7646/7 APPL: F111 PR NR: FD2040-92-60678 IM CODE: DCS PR LI: 0001 FOB: ORIGIN QUANTITY VARIATION: 0% OVER 0% UNDER ACRN: AA POA/INSP SITE: ORIGIN ACCEPTANCE: ORIGIN	20	EA	$_____	$_____

(A) GOVERNMENT'S REQUIRED DELIVERY SCHEDULE:

QTY	U/I	DELIVERY	SHIP TO	REQUISITION NR	PRI
20	EA	30-APR-93	FB2049	NON-MILSTRIP	--

(B) PROPOSED DELIVERY SCHEDULE:

QTY	U/I	DELIVERY	SHIP TO	REQUISITION NR	PRI
20	EA	_____	FB2049	NON-MILSTRIP	--

(Applicable to Item(s) 0001)
SHIP TO/MARK FOR

FB2049
MC CLELLAN AIR FORCE BASE, CA 95652
MARK/FOR: FB2049/ACCT 09/TP-3
Contract: SEE PAGE 1

REQUISITION NR: SEE EACH ITEM IN SCHEDULE

MATERIAL INSPECTION AND RECEIVING REPORT

(a) The DD Form 250 shall be forwarded to the following addresses:

(1) Forward the purchasing office copy, per DFARS Appendix F, Table 1, to:
Department of the Air Force
Sacramento Air Logistics Center/LAKM
5120 Dudley Blvd/Suite 3
McClellan Air Force Base CA 95652-1354

(2) For shipments involving Foreign Military Sales (FMS) requirements, an additional copy shall be sent under separate cover to:
SM-ALC/FMFSA
3230 Peacekeeper Way/Suite 2
McClellan AFB CA 95652-1041

(b) When the contract requires delivery of FMS supplies to foreign destinations, the copies of the DD Form 250 designated by DFARS Appendix F, Table 2, shall be forwarded to the "ship to" address designated for delivery of the supplies. If the "ship to" address is not in the contract, it shall be provided by the ACO when shipment is ready.

(c) A copy of the bill of lading or other transportation receipt will be attached to the DD Form 250 or the information will be provided in Block 4 of the DD Form 250 and sent to the addressees listed in (a)(2) above.
(SMPKC 0792)

C-6X. **SPECIFICATIONS, STANDARDS AND/OR ATTACHMENTS**

In accordance with aperture cards and data list(s) furnished herein.

C-381. **NEW MANUFACTURED MATERIAL-SURPLUS NOT ACCEPTABLE** (JUL 1992)
AFMC FAR SUP 5352.291-9001

Only new manufactured material, as defined in Part 5391.101 of the AFMC FAR Supplement, will be acceptable in satisfaction of the requirement as set forth herein. It has been determined that surplus material is not acceptable and surplus offers will not be considered for award. This statement applies to Contract Line Item(s) 0001.
(IAW AFMC FAR SUP 5391.302(a)(2))

D-4XN. **PRESERVATION/PACKAGING - PACKING - PACKAGE/CONTAINER MARKING**

PRESERVATION/PACKAGING. Level A shall be accomplished in accordance with MIL-P-116 and MIL-STD-2073-1. Coded requirements shall be interpreted in accordance with MIL-STD-2073-1 and MIL-STD-2073-2. Level C shall be accomplished in accordance with MIL-STD-2073-1. Requirements of specification or Transportation Packaging Order (TPO) or special packaging instructions (SPI) shall be complied with, as stipulated and the following special instructions:

OUP 1 LEVEL A SPI NONE

PACKING. Levels shall be interpreted and accomplished in accordance with MIL-STD-2073-1 and the specification, or TPO/SPI as stipulated and additional instructions:

LEVEL C SPI/SPECIFICATION NONE

Hazardous materials shall be prepared for shipment in accordance with applicable modal regulations, i.e., Title 49 Code of Federal Regulations, Parts 170-179; Joint Regulation AFR 71-4 (Military Air); or International Air Transportation Association (IATA), Dangerous Goods Regulation (Commercial Air).

Unless otherwise stipulated as part of a particular Amended Shipping Instruction (ASI), item shipped in response to ASIs will be preserved, packaged, and packed in accordance with MIL-STD-2073-1, and TPO/SPI as applicable, to comply with the following:

a. Level C/C for items indicated for immediate use within the CONUS when more economical and expedient.
b. Level A/C for Air Force stock with the CONUS.
c. Level A/A for items being shipped overseas by surface transportation.
d. All overseas shipments in support of FMS or MAP will be preserved Level A and packed Levels A or B.

All specifications, standards bulletins, and publications necessary to accomplish preservation, packaging, packing requirements will be of the issue in effect on the date of the solicitation.

NOTE 1: If there is a conflict between MIL-STD-2073-1 and a TPO/SPI or coded data regarding the level of packing provided by a fiberboard container, the requirement of MIL-STD-2073-1 applies. A container meeting the requirements of MIL-STD-2073-1 for the specified level shall be used.

D-6X. **ITEM IDENTIFICATION MARKING AND SHELF LIFE ITEM PROVISIONS**

1. MIL-STD-129 and 130

2. SHELF LIFE ITEMS - not applicable.

a. MARKING

(1) Shelf life items shall be marked in accordance with MIL-STD-129.
(2) Mark items controlled in MIL-STD-1523, or in specifications furnished as a part of the contract or purchase order, with the cure or assembly dates specified therein.

b. DELIVERY. Unless specified otherwise in the contract, shelf life items shall have a minimum of 90% of the "storage period" remaining at the time of delivery to the Government.

NOTE 1: When the contract, or any of the contract line items established therein, requires technical order (TO) certification, inner and outer packaging container tags or labels shall be annotated to indicate compliance with the applicable technical order for each item of the contract so affected.

NOTE 2: Items designed prior to issuance of the latest revision of MIL-STD-130 as of the date of the award and not proposed for use in any new design equipment systems may be marked in accordance with the existing design drawing for the items provided the identification marking on the delivered item meets requirements of previous revisions of MIL-STD-130. Existing items used in newly designed equipment or systems shall be marked in accordance with the latest revision of MIL-STD-130 as of the date of the award.

NOTE 3: The contractor shall mark in accordance with MIL-STD-130 and ASTM D-3951 those items for which commercial packaging and packing are authorized in contract/order.

D-7X. BAR CODE MARKINGS

Bar Code markings with the National Stock Number (NSN) and contract/order number data is required on this contract, except when specifically exempted in the schedule. Bar coding does not apply to FMS items.

E-1. INSPECTION OF SUPPLIES--FIXED-PRICE (JUL 1985) FAR 52.246-2
(IAW FAR 46.302)

E-15. HIGHER-LEVEL CONTRACT QUALITY REQUIREMENT (GOVERNMENT SPECIFICATION) (APR 1984) FAR 52.246-11

For the purposes of this clause the blank(s) are completed as follows:

(b) MIL-I-45208A INSPECTION SYSTEM
(IAW FAR 46.311)

E-22. RESPONSIBILITY FOR SUPPLIES (APR 1984) FAR 52.246-16
(IAW FAR 46.316)

F-23. VARIATION IN QUANTITY (APR 1984) FAR 52.212-9

See schedule for percentage of increase or decrease.
(IAW FAR 12.403(a))

F-24. DELIVERY OF EXCESS QUANTITIES (SEP 1989) FAR 52.212-10
(IAW FAR 12.403(b))

F-30. F.O.B. ORIGIN (JUN 1988) FAR 52.247-29
(IAW FAR 47.303-1(c))

F-33C. F.O.B. ORIGIN, PREPAID FREIGHT--SMALL PACKAGE SHIPMENTS (JAN 1991) FAR 52.247-65

(a) When authorized by the Contracting Officer, f.o.b. origin freight shipments which do not have a security classification shall move on prepaid commercial bills of lading or other shipping documents to domestic destinations, including air and water terminals. Weight of individual shipments shall be governed by carrier restrictions but shall not exceed 150 pounds by any form of commercial air or 1,000 pounds by other commercial carriers. The Government will reimburse the Contractor for reasonable freight charges.

(b) The Contractor shall annotate the commercial bill of lading as required by the clause of this contract entitled "Commercial Bill of Lading Notations."

(c) The Contractor shall consolidate prepaid shipments in accordance with procedures established by the cognizant transportation office. The Contractor is authorized to combine Government prepaid shipments with the Contractor's commercial shipments for delivery to one or more consignees and the Government will reimburse its pro rata share of the total freight costs. The Contractor shall provide a copy of the commercial bill of lading promptly to each consignee. Quantities shall not be divided into mailable lots for the purpose of avoiding movement by other modes of transportation.

(d) Transportation charges will be billed as a separate item on the invoice for each shipment made. A copy of the pertinent bill of lading, shipment receipt, or freight bill shall accompany the invoice unless otherwise specified in the contract.

(e) Loss and damage claims will be processed by the Government.
(IAW FAR 47.303-17(f))

F-35. **F.O.B. ORIGIN**

Any supply item applicable to this document shall be delivered:
(1) F.O.B. carrier's equipment at the plant or plants at

_____. _____. _____.
(street address) (city) (state)

_____
(zip code)

or

(2) F.O.B. _____.

_____. _____, which is the nearest point that carrier service is available to the plant or plants at which final inspection and acceptance are to be accomplished.
(IAW FAR 47.305(b))

FOR SHIP TO AND DELIVERY (IF APPLICABLE): SEE SECTION B

F-69. **TRANSPORTATION TRANSIT PRIVILEGE CREDITS** (APR 1984) FAR 52.247-57

(a) If the offeror has established with regulated common carriers transit privileges that can be applied to the supplies when shipped from the original source, the offeror is invited to propose to use these credits for shipping the supplies to the designated Government destinations. The offeror will ship these supplies under commercial bills of lading, paying all remaining transportation charges connected with the shipment, subject to reimbursement by the Government in an amount equal to the remaining charges but not exceeding the amount quoted by the offeror.

(b) After loading on the carrier's equipment and acceptance by the carrier, these shipments under paid commercial bills of lading will move for the account of and at the risk of the Government (unless, pursuant to the Changes clause, the office administering the contract directs use of Government bills of lading).

(c) The amount quoted below by the offeror represents the transportation costs in cents per 100 pounds (freight rate) for full carload/truckload shipments of the supplies from offeror's original source, via offeror's transit plant or point, to the Government destination(s) including the carrier's transit privilege charge, less the applicable transit credit (i.e., the amount (rate) initially paid to the carrier for shipment from original source to offeror's transit plant or point).

(d) The rate per CWT quoted will be used by the Government to evaluate the offered f.o.b. origin price unless a lower rate is applicable on the date of bid opening (or closing date specified for receipt of offers). To have the offer evaluated on this basis, the offeror must insert below the remaining transportation charges that the offeror agrees to pay, including any transit charges, subject to reimbursement by the Government, as explained in this clause, to destinations listed in the Schedule as follows:

RATE PER CWT IN CENTS .....
TO DESTINATION.....
(IAW FAR 47.305-13(B)(4))

F-74 **F.O.B. ORIGIN-MINIMUM SIZE OF SHIPMENTS** (APR 1984) FAR 52.247-61
(IAW FAR 47.305-16(c))

G-1X **ACCOUNTING AND APPROPRIATION DATA**

AA:97X4930.FCOH 6H2 6305 FD2040 01N000 00000 000000 503200 F0320F
$_____

FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE JUN 1988

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.
(IAW FAR 52.107(b))

NO	FAR PARA	CLAUSE TITLE	DATE
I-18.	52.203-1	OFFICIALS NOT TO BENEFIT (IAW FAR 3.102-2)	APR 1984
I-19.	52.203-3	GRATUITIES (IAW FAR 3.202)	APR 1984
I-22.	52.203-7	ANTI-KICKBACK PROCEDURES (IAW FAR 3.502-3)	OCT 1988
I-83.	52.210-5	NEW MATERIAL (IAW FAR 10.011(e))	APR 1984
I-84.	52.210-7	USED OR RECONDITIONED MATERIAL, RESIDUAL INVENTORY, AND FORMER GOVERNMENT SURPLUS PROPERTY (IAW FAR 10.011(g))	APR 1984
I-102.	52.212-8	DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS (IAW FAR 12.304(b))	SEP 1990
I-263.	52.222-20	WALSH-HEALEY PUBLIC CONTRACTS ACT (IAW FAR 22.610(b))	APR 1984
I-264.	52.222-26	EQUAL OPPORTUNITY (IAW FAR 22.810(e))	APR 1984
I-274.	52.222-35	AFFIRMATIVE ACTION FOR SPECIAL DISABLED AND VIETNAM ERA VETERANS (IAW FAR 22.1308)	APR 1984
I-276.	52.222-36	AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS (IAW FAR 22.1408)	APR 1984
I-278.	52.222-37	EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (IAW FAR 22.1308(b))	JAN 1988
I-306.	52.225-3	BUY AMERICAN ACT-SUPPLIES (IAW FAR 25.109(d))	JAN 1989
I-312.	52.225-11	RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (IAW FAR 25.704)	MAY 1992
I-383.	52.232-1	PAYMENTS (IAW FAR 32.111(a)(1))	APR 1984
I-391.	52.232-8	DISCOUNTS FOR PROMPT PAYMENT (IAW FAR 32.111(c)(1))	APR 1989
I-410.	52.232-22	Alternate I (IAW FAR 32.801 and 32.803(d))	APR 1984
I-412.	52.232-25	PROMPT PAYMENT (a)(6)(i) For the purposes of this clause, Government acceptance shall be deemed to have occurred constructively on the 7th day after the Contractor delivered the supplies or performed the services. (b)(2) For the purposes of this clause, contract financing payments shall be made on the 7th day after receipt of a proper contract financing request by the designated billing office. (IAW FAR 32.908(c))	APR 1989
I-416.	52.232-28	ELECTRONIC FUNDS TRANSFER PAYMENT METHODS (IAW FAR 32.908(d))	APR 1989
I-417.	52.233-1	DISPUTES (IAW FAR 33.215)	DEC 1991
I-419.	52.233-3	PROTEST AFTER AWARD (IAW FAR 33.106(b))	AUG 1989
I-538.	52.242-10	F.O.B. ORIGIN--GOVERNMENT BILLS OF LADING OR PREPAID POSTAGE (IAW FAR 42.1404-2(a))	APR 1984
I-636.	52.247-1	COMMERCIAL BILL OF LADING NOTATIONS (IAW FAR 47.104-4(a))	APR 1984
IA-33.	252.204-7003	CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (IAW DFARS 204.404-70(b))	APR 1992
IA-422.	252.232-7006	REDUCTION OR SUSPENSION OF CONTRACT PAYMENTS UPON FINDING OF FRAUD (IAW DFARS 232.111-70)	JAN 1992
IA-634C.	252.242-7003	APPLICATION FOR U.S. GOVERNMENTS SHIPPING DOCUMENTATION/INSTRUCTIONS (IAW DFARS 242.1404-2-70(b))	DEC 1991

IA-679. 252.246-7000 MATERIAL INSPECTION AND RECEIVING REPORT (IAW DFARS 246.370) DEC 1991

LIST OF ATTACHMENTS

FORM NR	TITLE	DATE	NR OF PAGES	
	Engineering Data List	22 APR 92	1	†F2†

REQUEST FOR QUOTATION

The following clause(s) and/or provision(s), are applicable to the Request for Quotation only:

K-12. SMALL BUSINESS CONCERN REPRESENTATION (JAN 1991) FAR 52.219-1

(a) **Representation.** The offeror represents and certifies as part of its offer that it [ ] is, [ ] is not a small business concern and that [ ] all, [ ] not all end items to be furnished will be manufactured or produced by a small business concern in the United States, its territories or possessions, Puerto Rico or the Trust Territory of the Pacific Islands.

(b) **Definition.** "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in this solicitation.

(c) **Notice.** Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to sections 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

(1) Be punished by imposition of a fine, imprisonment, or both;
(2) Be subject to administrative remedies, including suspension and debarment; and
(3) Be ineligible for participation in programs conducted under the authority of the Act.

(IAW FAR 19.304(a))

K-15. WALSH-HEALEY PUBLIC CONTRACTS ACT REPRESENTATION (APR 1984) FAR 52.222-19

The offeror represents as a part of this offer that the offeror is ( ) or is not ( ) a regular dealer in, or is ( ) or is not ( ) a manufacturer of, the supplies offered.
(IAW FAR 22.610(a))

K-16. CERTIFICATION OF NONSEGREGATED FACILITIES (APR 1984) FAR 52.222-21
(IAW FAR 22.810(a)(1) and 52.222-26)

K-17. PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984) FAR 52.222-22

The offeror represents that-

(a) It ( ) has, ( ) has not participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114;
(b) It ( ) has, ( ) has not, filed all required compliance reports; and
(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(IAW FAR 22.810(a)(2))

K-18. AFFIRMATIVE ACTION COMPLIANCE (APR 1984) FAR 52.222-25

The offeror represents that

(a) it ( ) has developed and has on file, ( ) has not developed and does not have on file, at each establishment, affirmative action programs required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or
(b) it ( ) has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(IAW FAR 22.810(d) and 52.222-26)

K-29. TAXPAYER IDENTIFICATION (SEP 1989) FAR 52.204-3

(a) Definitions.

"Common parent," as used in this solicitation provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Corporate status," as used in this solicitation provision, means a designation as to whether the offeror is a corporate entity, an unincorporated entity (e.g., sole proprietorship or partnership), or a corporation providing medical and health care services.

"Taxpayer Identification Number (TIN)," as used in this solicitation provision, means the number required by the IRS to be used by the offeror in reporting income tax and other returns.

(b) The offeror is required to submit the information required in paragraphs (c) through (e) of this solicitation provision in order to comply with reporting requirements of 26 U.S.C. 6041, 6041A and 6050M and implementing regulations issued by the Internal Revenue Service (IRS). If the resulting contract is subject to reporting requirements described in 4.902(a), the failure or refusal by the offeror to furnish the information may result in a 20 percent reduction of payments otherwise due under the contract.

(c) Taxpayer Identification Number (TIN).

[ ] TIN: _____
[ ] TIN has been applied for.
[ ] TIN is not required because:
  [ ] Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the U.S. and does not have an office or place of business or a fiscal paying agent in the U.S.;
  [ ] Offeror is an agency or instrumentality of a foreign government;
  [ ] Offeror is an agency or instrumentality of a Federal, state, or local government;
  [ ] Other. State basis. _____

(d) Corporate Status.

[ ] Corporation providing medical and health care services, or engaged in the billing and collecting of payments for such services;
[ ] Other corporate entity;
[ ] Not a corporate entity;
  [ ] Sole proprietorship
  [ ] Partnership
  [ ] Hospital or extended care facility described in 26 CFR 501(c)(3) that is exempt from taxation under 26 CFR 501(a).

(e) Common Parent.
[ ] Offeror is not owned or controlled by common parent as defined in paragraph (a) of this clause.
[ ] Name and TIN of common parent:

Name _____
TIN _____

(IAW FAR 4.904)

K-30. ECONOMIC PURCHASE QUANTITY--SUPPLIES (AUG 1987) FAR 52.207-4

(a) Offerors are invited to state an opinion on whether the quantity(ies) of supplies on which bids, proposals or quotes are requested in this solicitation is (are) economically advantageous to the Government.

_____
_____
_____
_____
_____

(b) Each offeror who believes that acquisitions in different quantities would be more advantageous is invited to recommend an economic purchase quantity. If different quantities are recommended, a total and a unit price must be quoted for applicable items. An economic purchase quantity is that quantity at which a significant price break occurs. If there are significant price breaks at different quantity points, this information is desired as well.

OFFEROR RECOMMENDATIONS

ITEM	QUANTITY	PRICE QUOTATION	TOTAL

(c) The information requested in this provision is being solicited to avoid acquisitions in disadvantageous quantities and to assist the Government in developing a data base for future acquisitions of these items. However, the Government reserves the right to amend or cancel the solicitation and resolicit with respect to any individual item in the event quotations received and the Government's requirements indicate that different quantities should be acquired. (IAW FAR 7.203)

L-7. LISTING OF USED OR RECONDITIONED MATERIAL, RESIDUAL INVENTORY AND FORMER GOVERNMENT SURPLUS PROPERTY (APR 1984) FAR 52.210-6
(IAW FAR 10.011(f)(1))

L-8. NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990) FAR 52.212-7

For the purposes of this provision, the blanks are completed on the cover sheet. (IAW FAR 12.304(a))

L-57. SHIPPING POINT(S) USED IN EVALUATION OF F.O.B. ORIGIN OFFERS (APR 1984) FAR 52.247-46
(IAW FAR 47.305-3(b)(4)(ii))

M-1C. EVALUATION-F.O.B. ORIGIN (APR 1984) FAR 52.247-47
(IAW FAR 47.305-3(f)(2))

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DATA LIST

PREPARING ACTIVITY	DESIGN ACTIVITY	CODE IDENT		REV
98749		81755	12W7646-7	A
DATE 22APR92	REVISED		SHEET 1 OF 1 SHEETS	

	SPECIFICATION	TYPE, MODEL, SERIES	ITEM NOMENCLATURE
GOVERNMENT			3040-00-958-0974BJ
CONTRACTOR			SUPPORT
CONTRACT NO.			

DWG SIZE	CODE IDENT	DOCUMENT IDENTIFICATION NO.	REV	DOCUMENT NOMENCLATURE
		12W7646	B	SUPPORT
		LM12W7646	D	LIST OF MATERIAL
		12Z001	J	INTREPRETATION DRAWING
		89C0610	-	ECO
		LM12Z001	E	LIST OF MATERIAL
		FPS-1006	C	GD SPEC
		FPS-1043 W/AMD 1	A	GD SPEC
		M001	U	GD STD
		FQML-C-5541	-	QUALIFIED MATERIAL LIST
		FQML-L-81352-2	-	QUALIFIED MATERIAL LIST
		FQML-P-23377-6	-	QUALIFIED MATERIAL LIST

*CONTRACTOR SPECIFICATION AND STANDARDS MARKED WITH AN ASTERISK ARE INCLUDED IN THE BID SET. IF SPECIFICATIONS AND/OR STANDARDS ARE REQUIRED AND HAVE NOT BEEN PROVIDED PER THE DATA LIST (AF FORM 1659), THE CONTRACTOR IS TO CONTACT PMXOA (916) 643-2389. (COLLECT CALLS NOT ACCEPTED). THE CONTRACTOR MUST PROVIDE THE PR NUMBER/SOLICITION NUMBER AND THE EXACT DOCUMENT AND REVISION LETTER SHOWN ON THE DATA LIST. CONTRACTORS ARE CAUTIONED TO CHECK THE STATED REVISION LETTER SHOWN ON THE DATA LIST AGAINST ANY IN-HOUSE DATA TO ASSURE THE CORRECT REVISION IS IN THEIR POSSESSION.

VENDOR NOTED: VENDOR DRAWINGS ARE NOT FURNISHED AS PART OF THIS PACKAGE.

QC 4-27-92

AF FORM 1659 DEC 81 REPLACES AF FORM 1302, DEC 57, WHICH IS OBSOLETE

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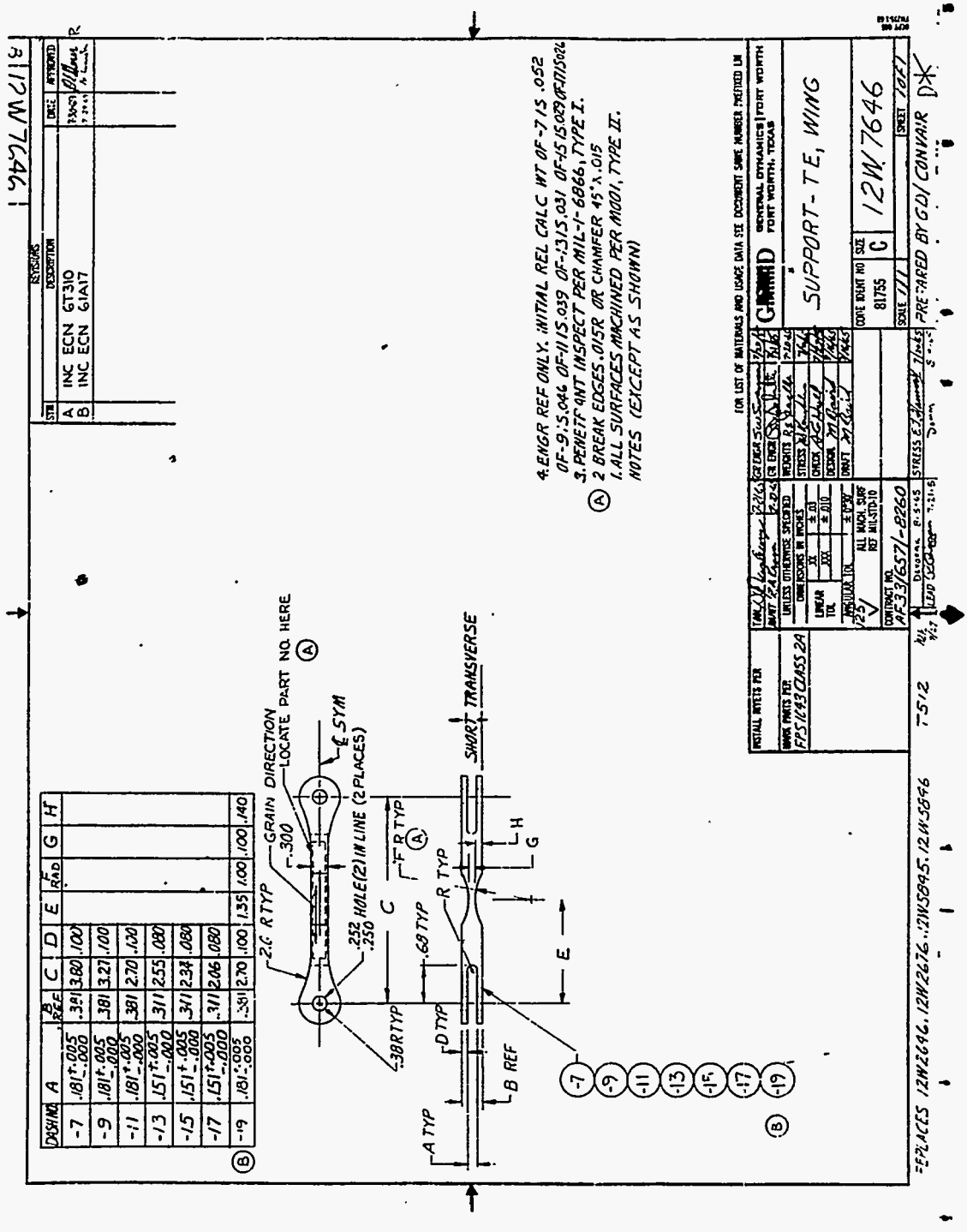
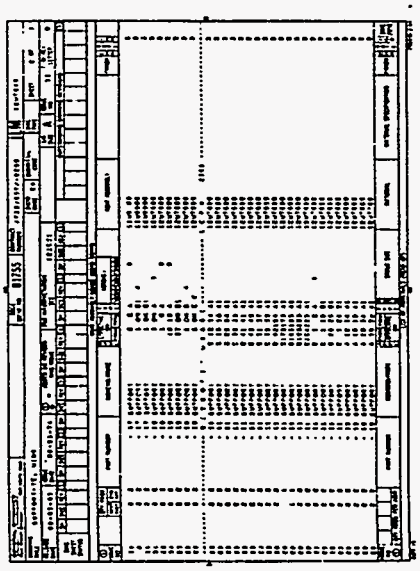
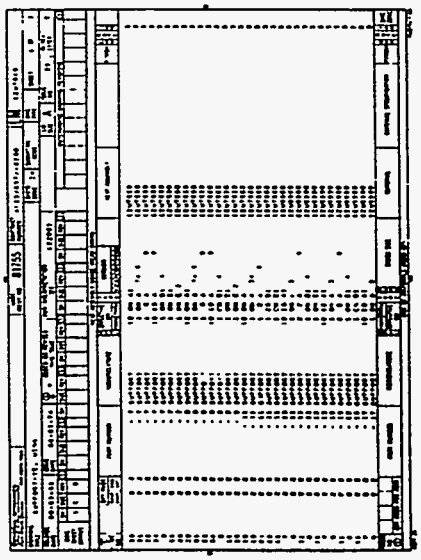
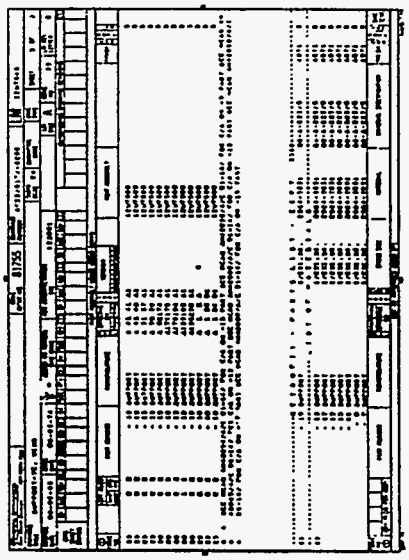
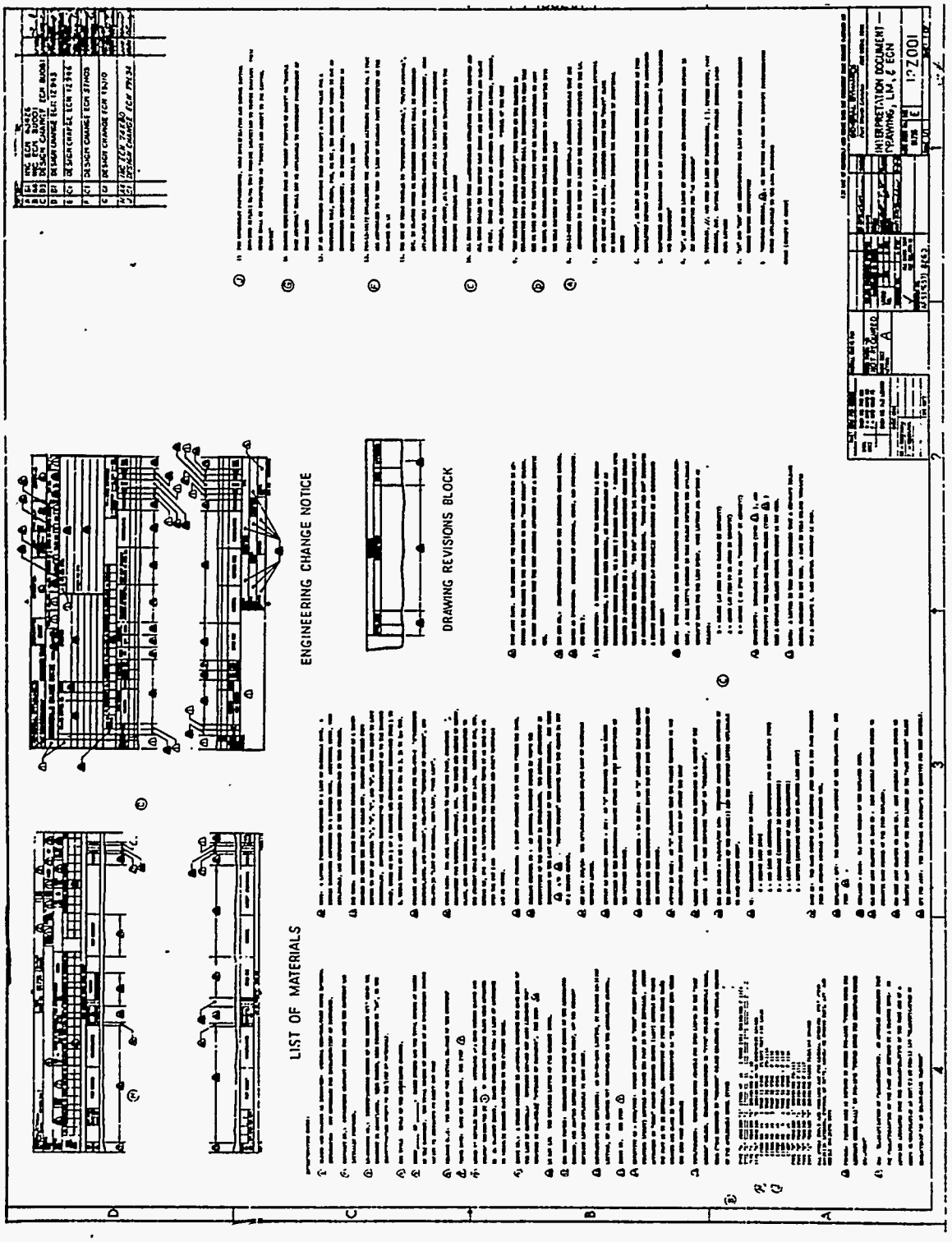
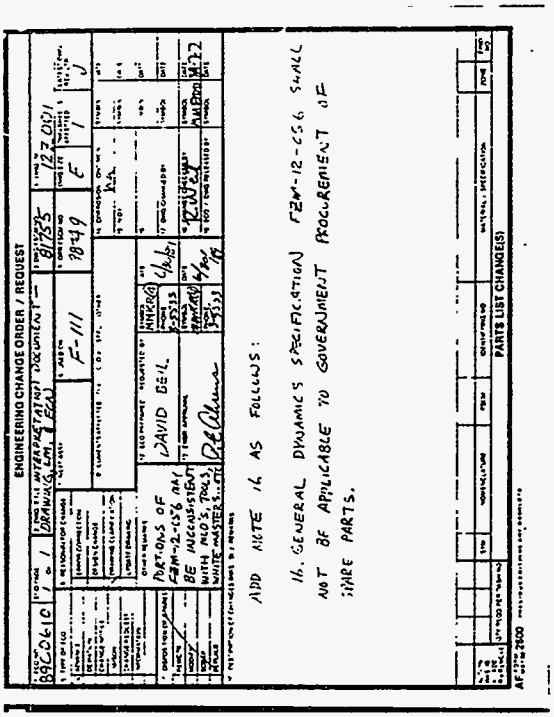

12W7646
REVISIONS
DESCRIPTION
A INC ECN GT310
B INC ECN 61A17
4. ENGR REF ONLY. INITIAL REL CALC WT OF-7 IS .052 OF-9 IS .046 OF-11 IS .039 OF-13 IS .031 OF-15 IS .029 OF-17 IS .026
3. PENETRANT INSPECT PER MIL-I-6866, TYPE I.
2 BREAK EDGES .01 SR OR CHAMFER 45° X .015
1. ALL SURFACES MACHINED PER M001, TYPE II.
NOTES (EXCEPT AS SHOWN)
DASH NO. A B REF C D E F RAD G H
-7 .181 +.005 -.000 .381 3.80 .100 .100 .140
-9 .181 +.005 -.000 .381 3.27 .100
-11 .181 +.005 -.000 .381 2.70 .100
-13 .151 +.005 -.000 .311 2.55 .080
-15 .151 +.005 -.000 .311 2.34 .080
-17 .151 +.005 -.000 .311 2.06 .080
-19 .181 +.005 -.000 .381 2.70 .100 1.35 1.00 .100 .140
GRAIN DIRECTION
LOCATE PART NO. HERE
2.0 R TYP
.300
.252
.250 HOLE (2) IN LINE (2 PLACES)
℄ SYM
.38 R TYP
C
F R TYP
.68 TYP
R TYP
D TYP
A TYP
B REF
SHORT TRANSVERSE
H
G
E
-7 -9 -11 -13 -15 -17 -19
FOR LIST OF MATERIALS AND USAGE DATA SEE DOCUMENT SHT. NUMBER PRINTED LN
INSTALL NOTES PER
SHIP PARTS PER: FPS1493 CLASS 2A
UNLESS OTHERWISE SPECIFIED
DIMENSIONS IN INCHES
LINEAR .XX ± .03
TOL .XXX ± .010
ANGULAR TOL ± 1°30'
125
ALL MACH. SURF REF MIL-STD-10
CONTRACT NO. AF33(657)-8260
GENERAL DYNAMICS | FORT WORTH
FORT WORTH, TEXAS
SUPPORT-TE, WING
CODE IDENT NO 81755
SIZE C
12W7646
SCALE 1/1
SHEET 2 OF 2
PREPARED BY GD/CONVAIR
REPLACES 12W2696, 12W2676, 12W5895, 12W5896
7512








ENGINEERING CHANGE NOTICE
DRAWING REVISIONS BLOCK
LIST OF MATERIALS

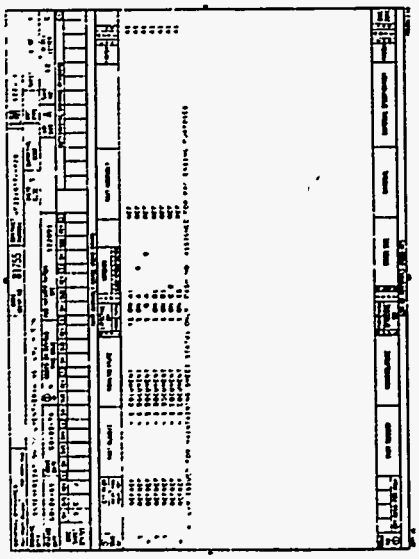


ENGINEERING CHANGE ORDER / REQUEST

ADD NOTE 16 AS FOLLOWS:

16. GENERAL DYNAMICS SPECIFICATION FZM-12-6516 SHALL NOT BE APPLICABLE TO GOVERNMENT PROCUREMENT OF SPARE PARTS.

PARTS LIST CHANGE(S)



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The following pages contain the actual solicitation information that comprises the complete medium solicitation used in this demonstration.

The medium solicitation was for quotation on a Cover assembly for the A-10.

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LETTER REQUEST FOR QUOTATION IVEY

REQUEST #: F04606-99-Q-98765 DATE ISSUED: 92 SEP 30

RETURN REQUEST FOR QUOTATION BY: 92 OCT 31

CERTIFIED FOR NATIONAL DEFENSE UNDER DMS REG 1 RATING: DO A1

ISSUED BY: DEPARTMENT OF THE AIR FORCE
SACRAMENTO ALC/PKXO
3237 PEACEKEEPER WAY/SUITE 17
MC CLELLAN AIR FORCE BASE CA 95652-1059
BUYER: TEST DOCUMENT/LAK/916-643-5272

SCD CODE: C

To qualify as a small business concern, number of employees shall not exceed 1000 employees (or annual receipts shall not exceed ____ millions of dollars), including affiliates. This size standard is based on Standard Classification Code (SIC) 3728.

CAUTION If handscribed, please use black ink. Enter quotation prices in schedule.

BUSINESS CLASSIFICATION (Check appropriate box(es))

( ) SMALL ( ) OTHER THAN SMALL ( ) DISADVANTAGED ( ) WOMEN-OWNED

SEE SCHEDULE FOR DELIVERY AND FOB POINTS

DISCOUNT TERMS _____

NAME AND ADDRESS OF QUOTER QUOTED PRICES FIRM FOR ____ DAYS

_____

_____

_____

_____

COMMERCIAL and GOVERNMENT ENTITY (CAGE) CODE _____

FACILITY CODE _____

CONTRACTOR ESTABLISHMENT CODE (CEC) _____

NAME AND TITLE OF PERSON TO CONTACT (Type or print)

_____

_____

TELEPHONE NUMBER (Include area code) _____

DATE OF QUOTATION _____

GOVERNMENT PROPERTY: Contractor desiring to use Government production/research property in his possession shall obtain concurrence of the Contracting Officer having cognizance of such property and attach the approval to the response.

BASIC ORDERING AGREEMENT: Quote may be made subject to terms and conditions of quoter's BOA. BOA NR. _____. Contractor affirms that all required certifications are current and applicable.

COMMERCIAL ITEM(S): (complete - whether or not commercial - if catalog or price list exists)

a. Effective date, number of catalog price list and page on which item is listed _____.

b. Copy of price list.

c. PERCENT of sales to Government: _____.
PERCENT of commercial sales: _____.

ECONOMIC QUANTITY: Request you provide additional minimal economic quantity quote if out of production, and quantity break for discount purposes.

Specifications and Drawings are attached hereto.

NOTICE OF SMALL BUSINESS - SMALL PURCHASE SET-ASIDE (AUG 1988) FAR 52.219-4 (IAW FAR 19.508(a))

APPROVED SOURCES ARE:

26512 GRUMMAN AEROSPACE CORP

PAGE 1 OF 9
SOLICITATION NUMBER FO4606-99-0-98765

ITEM	SUPPLIES/SERVICES	QTY	UNIT	UNIT PRICE	AMOUNT
0001	1560-01-125-9447FJ COVER ASSY P/N: 160D121105-5 REV G APPL: AO1OA PR NR: FD2040-92-60676 PR LI: 0001 FOB: ORIGIN QUANTITY VARIATION: 0% OVER 0% UNDER ACRN: AA POA/INSP SITE: ORIGIN	20	EA	$_____	$_____ IM CODE: XXX ACCEPTANCE: ORIGIN

(A) GOVERNMENT'S REQUIRED DELIVERY SCHEDULE:

QTY	U/I	DELIVERY	SHIP TO	REQUISITION NR	PRI
20	EA	30-APR-93	FB2049	NON-MILSTRIP	--

(B) PROPOSED DELIVERY SCHEDULE:

QTY	U/I	DELIVERY	SHIP TO	REQUISITION NR	PRI
20	EA	_____	FB2049	NON-MILSTRIP	--

(Applicable to Item(s) 0001)
SHIP TO/MARK FOR

FB2049
MC CLELLAN AIR FORCE BASE, CA 95652
MARK/FOR: FB2049/ACCT 09/TP-3
Contract: SEE PAGE 1

REQUISITION NR: SEE EACH ITEM IN SCHEDULE

MATERIAL INSPECTION AND RECEIVING REPORT

(a) The DD Form 250 shall be forwarded to the following addresses:

(1) Forward the purchasing office copy, per DFARS Appendix F, Table 1, to:
Department of the Air Force
Sacramento Air Logistics Center/LAKM
5120 Dudley Blvd/Suite 3
McClellan Air Force Base CA 95652-1354

(2) For shipments involving Foreign Military Sales (FMS) requirements, an additional copy shall be sent under separate cover to:
SM-ALC/FMFSA
3230 Peacekeeper Way/Suite 2
McClellan AFB CA 95652-1041

(b) When the contract requires delivery of FMS supplies to foreign destinations, the copies of the DD Form 250 designated by DFARS Appendix F, Table 2, shall be forwarded to the "ship to" address designated for delivery of the supplies. If the "ship to" address is not in the contract, it shall be provided by the ACO when shipment is ready.

(c) A copy of the bill of lading or other transportation receipt will be attached to the DD Form 250 or the information will be provided in Block 4 of the DD Form 250 and sent to the addressees listed in (a)(2) above.
(SMPKC 0792)

C-6X. **SPECIFICATIONS, STANDARDS AND/OR ATTACHMENTS**

In accordance with aperture cards and data list(s) furnished herein.

C-381. **NEW MANUFACTURED MATERIAL-SURPLUS NOT ACCEPTABLE (JUL 1992)**
AFMC FAR SUP 5352.291-9001

Only new manufactured material, as defined in Part 5391.101 of the AFMC FAR Supplement, will be acceptable in satisfaction of the requirement as set forth herein. It has been determined that surplus material is not acceptable and surplus offers will not be considered for award. This statement applies to Contract Line Item(s) 0001.
(IAW AFMC FAR SUP 5391.302(a)(2))

D-3XN. **PRESERVATION/PACKAGING - PACKING - PACKAGE/CONTAINER MARKING**

PRESERVATION. Level A shall be accomplished in accordance with MIL-P-116 and MIL-STD-2073-1. Coded requirements shall be interpreted in accordance with MIL-STD-2073-1 and MIL-STD-2073-2. Level C shall be accomplished in accordance with MIL-STD-2073-1. Requirements of specification or Transportation Packaging Order (TPO) or special packaging instructions (SPI) shall be complied with, as stipulated and the following special instructions:

H M	OUP OUP	OUP ICQ	PRES MET	C D	PRES MTL	WRAP MTL	CUSH DUNN	C I	UNIT CONT	D P	INT CONT	U C L	SPEC MKG	UNIT PACK WGT	UNIT PACK SIZE LGTH	WDTH	DPTH	UNIT PACK CUBE WH CUB	1000TH	O P I
N	001	YYY	3G	100		00	NA	X	E1		AYY	C	99	00082	0022	0010	0005	0000	637	0

PACKING. Levels shall be interpreted and accomplished in accordance with MIL-STD-2073-1 and the specification, or TPO/SPI as stipulated and additional instructions:

LEVEL C

Hazardous materials shall be prepared for shipment in accordance with applicable modal regulations, i.e., Title 49 Code of Federal Regulations, Parts 170-179; Joint Regulation AFR 71-4 (Military Air); or International Air Transportation Association (IATA), Dangerous Goods Regulation (Commercial Air).

Unless otherwise stipulated as part of a particular Amended Shipping Instruction (ASI), item shipped in response to ASIs will be preserved, packaged, and packed in accordance with MIL-STD-2073-1, and TPO/SPI as applicable, to comply with the following:

a. Level C/C for items indicated for immediate use within the CONUS when more economical and expedient.
b. Level A/C for Air Force stock with the CONUS.
c. Level A/A for items being shipped overseas by surface transportation.
d. All overseas shipments in support of FMS or MAP will be preserved Level A and packed Levels A or B.

All specifications, standards bulletins, and publications necessary to accomplish preservation, packaging, packing requirements will be of the issue in effect on the date of the solicitation.

NOTE 1: If there is a conflict between MIL-STD-2073-1 and a TPO/SPI or coded data regarding the level of packing provided by a fiberboard container, the requirement of MIL-STD-2073-1 applies. A container meeting the requirements of MIL-STD-2073-1 for the specified level shall be used.

D-6X. ITEM IDENTIFICATION MARKING AND SHELF LIFE ITEM PROVISIONS

1. MIL-STD-129 and 130

2. SHELF LIFE ITEMS - not applicable.

a. MARKING

(1) Shelf life items shall be marked in accordance with MIL-STD-129.
(2) Mark items controlled in MIL-STD-1523, or in specifications furnished as a part of the contract or purchase order, with the cure or assembly dates specified therein.

b. DELIVERY. Unless specified otherwise in the contract, shelf life items shall have a minimum of 50% of the "storage period" remaining at the time of delivery to the Government.

NOTE 1: When the contract, or any of the contract line items established therein, requires technical order (TO) certification, inner and outer packaging container tags or labels shall be annotated to indicate compliance with the applicable technical order for each item of the contract so affected.

NOTE 2: Items designed prior to issuance of the latest revision of MIL-STD-130 as of the date of the award and not proposed for use in any new design equipment systems may be marked in accordance with the existing design drawing for the items provided the identification marking on the delivered item meets requirements of previous revisions of MIL-STD-130. Existing items used in newly designed equipment or systems shall be marked in accordance with the latest revision of MIL-STD-130 as of the date of the award.

NOTE 3: The contractor shall mark in accordance with MIL-STD-130 and ASTM D-3951 those items for which commercial packaging and packing are authorized in contract/order.

D-7X. BAR CODE MARKINGS

Bar Code markings with the National Stock Number (NSN) and contract/order number data is required on this contract, except when specifically exempted in the schedule. Bar coding does not apply to FMS items.

E-1. INSPECTION OF SUPPLIES--FIXED-PRICE (JUL 1985) FAR 52.246-2
(IAW FAR 46.302)

E-15. HIGHER-LEVEL CONTRACT QUALITY REQUIREMENT (GOVERNMENT SPECIFICATION) (APR 1984) FAR 52.246-11

For the purposes of this clause the blank(s) are completed as follows:

(b) MIL-I-45208A INSPECTION SYSTEM
(IAW FAR 46.311)

E-22. RESPONSIBILITY FOR SUPPLIES (APR 1984) FAR 52.246-16
(IAW FAR 46.316)

F-23. VARIATION IN QUANTITY (APR 1984) FAR 52.212-9

See schedule for percentage of increase or decrease.
(IAW FAR 12.403(a))

F-24. DELIVERY OF EXCESS QUANTITIES (SEP 1989) FAR 52.212-10
(IAW FAR 12.403(b))

F-30. F.O.B. ORIGIN (JUN 1988) FAR 52.247-29
(IAW FAR 47.303-1(c))

F-33C. F.O.B. ORIGIN, PREPAID FREIGHT--SMALL PACKAGE SHIPMENTS (JAN 1991) FAR 52.247-65

(a) When authorized by the Contracting Officer, f.o.b. origin freight shipments which do not have a security classification shall move on prepaid commercial bills of lading or other shipping documents to domestic destinations, including air and water terminals. Weight of individual shipments shall be governed by carrier restrictions but shall not exceed 150 pounds by any form of commercial air or 1,000 pounds by other commercial carriers. The Government will reimburse the Contractor for reasonable freight charges.

(b) The Contractor shall annotate the commercial bill of lading as required by the clause of this contract entitled "Commercial Bill of Lading Notations."

(c) The Contractor shall consolidate prepaid shipments in accordance with procedures established by the cognizant transportation office. The Contractor is authorized to combine Government prepaid shipments with the Contractor's commercial shipments for delivery to one or more consignees and the Government will reimburse its pro rata share of the total freight costs. The Contractor shall provide a copy of the commercial bill of lading promptly to each consignee. Quantities shall not be divided into mailable lots for the purpose of avoiding movement by other modes of transportation.

(d) Transportation charges will be billed as a separate item on the invoice for each shipment made. A copy of the pertinent bill of lading, shipment receipt, or freight bill shall accompany the invoice unless otherwise specified in the contract.

(e) Loss and damage claims will be processed by the Government.
(IAW FAR 47.303-17(f))

F-35. F.O.B. ORIGIN

Any supply item applicable to this document shall be delivered:
(1) F.O.B. carrier's equipment at the plant or plants at

_____. _____. _____.
(street address) (city) (state)

_____.
(zip code)

or

(2) F.O.B _____.

_____. _____, which is the nearest point that carrier service is available to the plant or plants at which final inspection and acceptance are to be accomplished.
(IAW FAR 47.305(b))

FOR SHIP TO AND DELIVERY (IF APPLICABLE): SEE SECTION B

F-69. TRANSPORTATION TRANSIT PRIVILEGE CREDITS (APR 1984) FAR 52.247-57

(a) If the offeror has established with regulated common carriers transit privileges that can be applied to the supplies when shipped from the original source, the offeror is invited to propose to use these credits for shipping the supplies to the designated Government destinations. The offeror will ship these supplies under commercial bills of lading, paying all remaining transportation charges connected with the shipment, subject to reimbursement by the Government in an amount equal to the remaining charges but not exceeding the amount quoted by the offeror

(b) After loading on the carrier's equipment and acceptance by the carrier, these shipments under paid commercial bills of lading will move for the account of and at the risk of the Government (unless, pursuant to the Changes clause, the office administering the contract directs use of Government bills of lading).

(c) The amount quoted below by the offeror represents the transportation costs in cents per 100 pounds (freight rate) for full carload/truckload shipments of the supplies from offeror's original source, via offeror's transit plant or point, to the Government destination(s) including the carrier's transit privilege charge, less the applicable transit credit (i.e., the amount (rate) initially paid to the carrier for shipment from original source to offeror's transit plant or point).

(d) The rate per CWT quoted will be used by the Government to evaluate the offered f.o.b. origin price unless a lower rate is applicable on the date of bid opening (or closing date specified for receipt of offers). To have the offer evaluated on this basis, the offeror must insert below the remaining transportation charges that the offeror agrees to pay, including any transit charges, subject to reimbursement by the Government, as explained in this clause, to destinations listed in the Schedule as follows:

RATE PER CWT IN CENTS .....
TO DESTINATION.....
(IAW FAR 47.305-13(B)(4))

F-74. F.O.B. ORIGIN-MINIMUM SIZE OF SHIPMENTS (APR 1984) FAR 52.247-61
(IAW FAR 47.305-16(c))

G-1X. ACCOUNTING AND APPROPRIATION DATA

AA:97X4930.FC0H 6H2 6305 FD2040 01N000 00000 000000 503200 F0320F
$_____

FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE JUN 1988

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.
(IAW FAR 52.107(b))

NO	FAR PARA	CLAUSE TITLE	DATE
I-18.	52.203-1	OFFICIALS NOT TO BENEFIT (IAW FAR 3.102-2)	APR 1984
I-19.	52.203-3	GRATUITIES (IAW FAR 3.202)	APR 1984
I-22.	52.203-7	ANTI-KICKBACK PROCEDURES (IAW FAR 3.502-3)	OCT 1988
I-83.	52.210-5	NEW MATERIAL (IAW FAR 10.011(e))	APR 1984
I-84.	52.210-7	USED OR RECONDITIONED MATERIAL, RESIDUAL INVENTORY, AND FORMER GOVERNMENT SURPLUS PROPERTY (IAW FAR 10.011(g))	APR 1984
I-102.	52.212-8	DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS (IAW FAR 12.304(b))	SEP 1990
I-247.	52.222-3	CONVICT LABOR (IAW FAR 22.202)	APR 1984
I-264.	52.222-26	EQUAL OPPORTUNITY (IAW FAR 22.810(e))	APR 1984
I-276.	52.222-36	AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS (IAW FAR 22.1408)	APR 1984
I-306.	52.225-3	BUY AMERICAN ACT-SUPPLIES (IAW FAR 25.109(d))	JAN 1989
I-312.	52.225-11	RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (IAW FAR 25.704)	MAY 1992
I-383.	52.232-1	PAYMENTS (IAW FAR 32.111(a)(1))	APR 1984
I-391.	52.232-8	DISCOUNTS FOR PROMPT PAYMENT (IAW FAR 32.111(c)(1))	APR 1989
I-410.	52.232-23	Alternate I (IAW FAR 32.801 and 32.803(d))	APR 1984
I-412.	52.232-25	PROMPT PAYMENT (a)(6)(i) For the purposes of this clause, Government acceptance shall be deemed to have occurred constructively on the 7th day after the Contractor delivered the supplies or performed the services. (b)(2) For the purposes of this clause, contract financing payments shall be made on the 7th day after receipt of a proper contract financing request by the designated billing office. (IAW FAR 32.908(c))	APR 1989
I-416.	52.232-28	ELECTRONIC FUNDS TRANSFER PAYMENT METHODS (IAW FAR 32.908(d))	APR 1989
I-417.	52.233-1	DISPUTES (IAW FAR 33.215)	DEC 1991
I-419.	52.233-3	PROTEST AFTER AWARD (IAW FAR 33.106(b))	AUG 1989
I-538.	52.242-10	F.O.B. ORIGIN--GOVERNMENT BILLS OF LADING OR PREPAID POSTAGE (IAW FAR 42.1404-2(a))	APR 1984
I-636.	52.247-1	COMMERCIAL BILL OF LADING NOTATIONS (IAW FAR 47.104-4(a))	APR 1984
IA-33.	252.204-7003	CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (IAW DFARS 204.404-70(b))	APR 1992
IA-422.	252.232-7006	REDUCTION OR SUSPENSION OF CONTRACT PAYMENTS UPON FINDING OF FRAUD (IAW DFARS 232.111-70)	JAN 1992
IA-634C.	252.242-7003	APPLICATION FOR U.S. GOVERNMENTS SHIPPING DOCUMENTATION/INSTRUCTIONS (IAW DFARS 242.1404-2-70(b))	DEC 1991

IA-679. 252.246-7000 MATERIAL INSPECTION AND RECEIVING REPORT DEC 1991
(IAW DFARS 246.370)

LIST OF ATTACHMENTS

FORM NR	TITLE	DATE	NR OF PAGES
	ENGINEERING DATA LIST	22 JAN 92	1

REQUEST FOR QUOTATION

The following clause(s) and/or provision(s), are applicable to the Request for Quotation only:

K-12. SMALL BUSINESS CONCERN REPRESENTATION (JAN 1991) FAR 52.219-1

(a) **Representation.** The offeror represents and certifies as part of its offer that it: [ ] is, [ ] is not a small business concern and that [ ] all, [ ] not all end items to be furnished will be manufactured or produced by a small business concern in the United States, its territories or possessions, Puerto Rico or the Trust Territory of the Pacific Islands.

(b) **Definition.** "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in this solicitation.

(c) **Notice.** Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to sections 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

(1) Be punished by imposition of a fine, imprisonment, or both;
(2) Be subject to administrative remedies, including suspension and debarment; and
(3) Be ineligible for participation in programs conducted under the authority of the Act.

(IAW FAR 19.304(a))

K-17. PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984) FAR 52.222-22

The offeror represents that-

(a) It ( ) has, ( ) has not participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114;
(b) It ( ) has, ( ) has not, filed all required compliance reports; and
(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(IAW FAR 22.810(a)(2))

K-18. AFFIRMATIVE ACTION COMPLIANCE (APR 1984) FAR 52.222-25

The offeror represents that

(a) it ( ) has developed and has on file, ( ) has not developed and does not have on file, at each establishment, affirmative action programs required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or
(b) it ( ) has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(IAW FAR 22.810(d) and 52.222-26)

K-29. TAXPAYER IDENTIFICATION (SEP 1989) FAR 52.204-3

(a) **Definitions.**

"Common parent," as used in this solicitation provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Corporate status," as used in this solicitation provision, means a designation as to whether the offeror is a corporate entity, an unincorporated entity (e.g., sole proprietorship or partnership), or a corporation providing medical and health care services.

"Taxpayer Identification Number (TIN)," as used in this solicitation provision, means the number required by the IRS to be used by the offeror in reporting income tax and other returns.

(b) The offeror is required to submit the information required in paragraphs (c) through (e) of this solicitation provision in order to comply with reporting requirements of 26 U.S.C. 6041, 6041A and 6050M and implementing regulations issued by the Internal Revenue Service (IRS). If the resulting contract is subject to reporting requirements described in 4.902(a), the failure or refusal by the offeror to furnish the information may result in a 20 percent reduction of payments otherwise due under the contract.

(c) Taxpayer Identification Number (TIN).

[ ] TIN: _____
[ ] TIN has been applied for.
[ ] TIN is not required because:
  [ ] Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the U.S. and does not have an office or place of business or a fiscal paying agent in the U.S.;
  [ ] Offeror is an agency or instrumentality of a foreign government;
  [ ] Offeror is an agency or instrumentality of a Federal, state, or local government;
  [ ] Other. State basis. _____

(d) Corporate Status.

[ ] Corporation providing medical and health care services, or engaged in the billing and collecting of payments for such services;
[ ] Other corporate entity;
[ ] Not a corporate entity:
  [ ] Sole proprietorship
  [ ] Partnership
  [ ] Hospital or extended care facility described in 26 CFR 501(c)(3) that is exempt from taxation under 26 CFR 501(a).

(e) Common Parent.
[ ] Offeror is not owned or controlled by common parent as defined in paragraph (a) of this clause.
[ ] Name and TIN of common parent:

Name _____
TIN _____

(IAW FAR 4.904)

K-30. ECONOMIC PURCHASE QUANTITY--SUPPLIES (AUG 1987) FAR 52.207-4

(a) Offerors are invited to state an opinion on whether the quantity(ies) of supplies on which bids, proposals or quotes are requested in this solicitation is (are) economically advantageous to the Government.

_____
_____
_____
_____
_____

(b) Each offeror who believes that acquisitions in different quantities would be more advantageous is invited to recommend an economic purchase quantity. If different quantities are recommended, a total and a unit price must be quoted for applicable items. An economic purchase quantity is that quantity at which a significant price break occurs. If there are significant price breaks at different quantity points, this information is desired as well.

OFFEROR RECOMMENDATIONS

ITEM	QUANTITY	PRICE QUOTATION	TOTAL

(c) The information requested in this provision is being solicited to avoid acquisitions in disadvantageous quantities and to assist the Government in developing a data base for future acquisitions of these items. However, the Government reserves the right to amend or cancel the solicitation and resolicit with respect to any individual item in the event quotations received and the Government's requirements indicate that different quantities should be acquired. (IAW FAR 7.203)

L-7. LISTING OF USED OR RECONDITIONED MATERIAL, RESIDUAL INVENTORY AND FORMER GOVERNMENT SURPLUS PROPERTY (APR 1984) FAR 52.210-6
(IAW FAR 10.011(f)(1))

L-8. NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990) FAR 52.212-7

For the purposes of this provision, the blanks are completed on the cover sheet. (IAW FAR 12.304(a))

L-57. SHIPPING POINT(S) USED IN EVALUATION OF F.O.B. ORIGIN OFFERS (APR 1984) FAR 52.247-46
(IAW FAR 47.305-3(b)(4)(ii))

M-10. EVALUATION-F.O.B. ORIGIN (APR 1984) FAR 52.247-47
(IAW FAR 47.305-3(f)(2))

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92-6067P

ENGINEERING DATA LIST (HISTORY)

REVISION: 01

SIZE:	DATA TECH:	ORIGN SYMBOL:	LACD	PR NR:	APPLICATION:	PAGE 1 OF 1
A12	22JAN92	FA			A10A	

SIZE	MANUFACTURER NAME:	REFERENCE NR:	NOUN:	NSN:
A12	GRUMMAN AEROSPACE CORP.	160D12110-5	COVER ASSEMBLY	5340011259M7FD

SEQ.	DRAWING NUMBER	REV	RR SHEETS	IR CARDS	FURN CODE	DIST CODE	NOUN	REQUIREMENTS
001	160D12110S	G	0002	0000	S		COVER ASSY	
002	85C3078	/	0001	0000	S		ECO	
003	160D92010B	/	0001	0000	S		DECAL	
004	06C4113	/	0002	0000	S		ECO	
005	S1101	/	0000	0000	S		SPEC	
006	G-F101 W/ANB 1	/	0000	0000	R		SPEC	
007	G-F503	/	C 0000	0000	R		SPEC	
008	Z-R01	/	B 0000	0000	R		SPEC	
009	Z-R901 W/ATTX 1	/	D 0000	0090	R		SPEC	
010								
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012								
013								
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017								
018								
019								
020								

STANDARD ENGINEERING TEXT

CONTRACTOR SPECIFICATIONS AND STANDARDS MARKED WITH DOCUMENT FURNISHED CODE OF S ARE INCLUDED IN THE BID SET. IF SPECIFICATION AND STANDARDS ARE REQUIRED AND HAVE NOT BEEN FROVIDED, THE CONTRACTOR IS TO CONTACT FKXO (916) 443-2399. (COLLECT CALLS NOT ACCEPTED.) THE CONTRACTOR MUST PROVIDE THE FR NUMBER/SOLICITATION NUMBER AND THE EXACT DOCUMENT AND REVISION LETTER SHOWN ON THE DATA LIST. CONTRACTORS ARE CAUTIONED TO CHECK THE STATED REVISION LETTER ON THE DATA LIST AGAINST ANY IN-HOUSE DATA TO ASSURE THE CORRECT REVISION IS IN THEIR FOSSESSION. VENDOR DRAWINGS ARE NOT FURNISHED AS FART OF THIS FACKAGE.

ENGINEERING DATA LIST REMARKS

THE FOLLOWING DRAWING HAV HAVE 072251 OR 026512 CAGE NUMBER.
THIS DATA LIST ATTELLAS TO ATLC FORM 761,WITH THE CORRELATION DATE 22JAN92.

FURNISHED IDENTIFICATION CODE LEGEND:

C - CLASSIFIED DOCUMENT.
S - FURNISHED WITH SOLICITATION.
N - STABLE DATE DRAWING REQUIRED.
F - FARTIAL DOCUMENT FURNISHED.
V - VENDOR DRAWING.
FURNISHED WITH CONTRACT AWARD.
X - DATA SUFFLIED (NOT IN EDCARS).
R - FURNISHED BY FCD UFON REQUEST.
P - FARTIAL DOCUMENT FURNISHED.
(NOT FROVIDED).
G - GOV'T DOCUMENT.
O - OTHERS, CONTRACTOR MUST ACQUIRE.
A - DATA NOT AVAILABLE.

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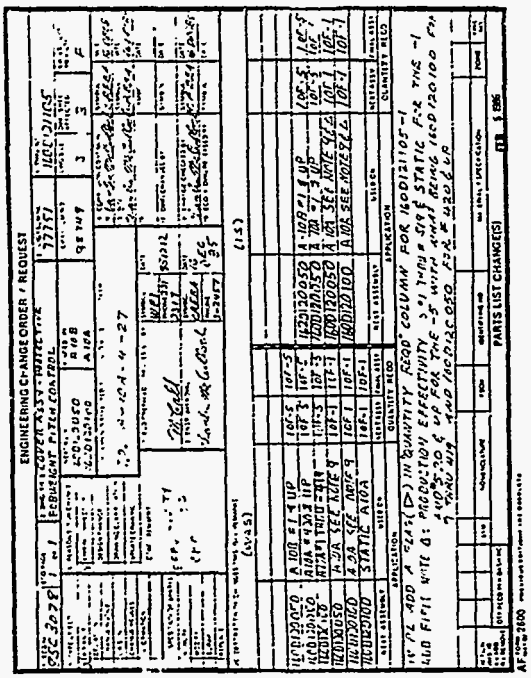
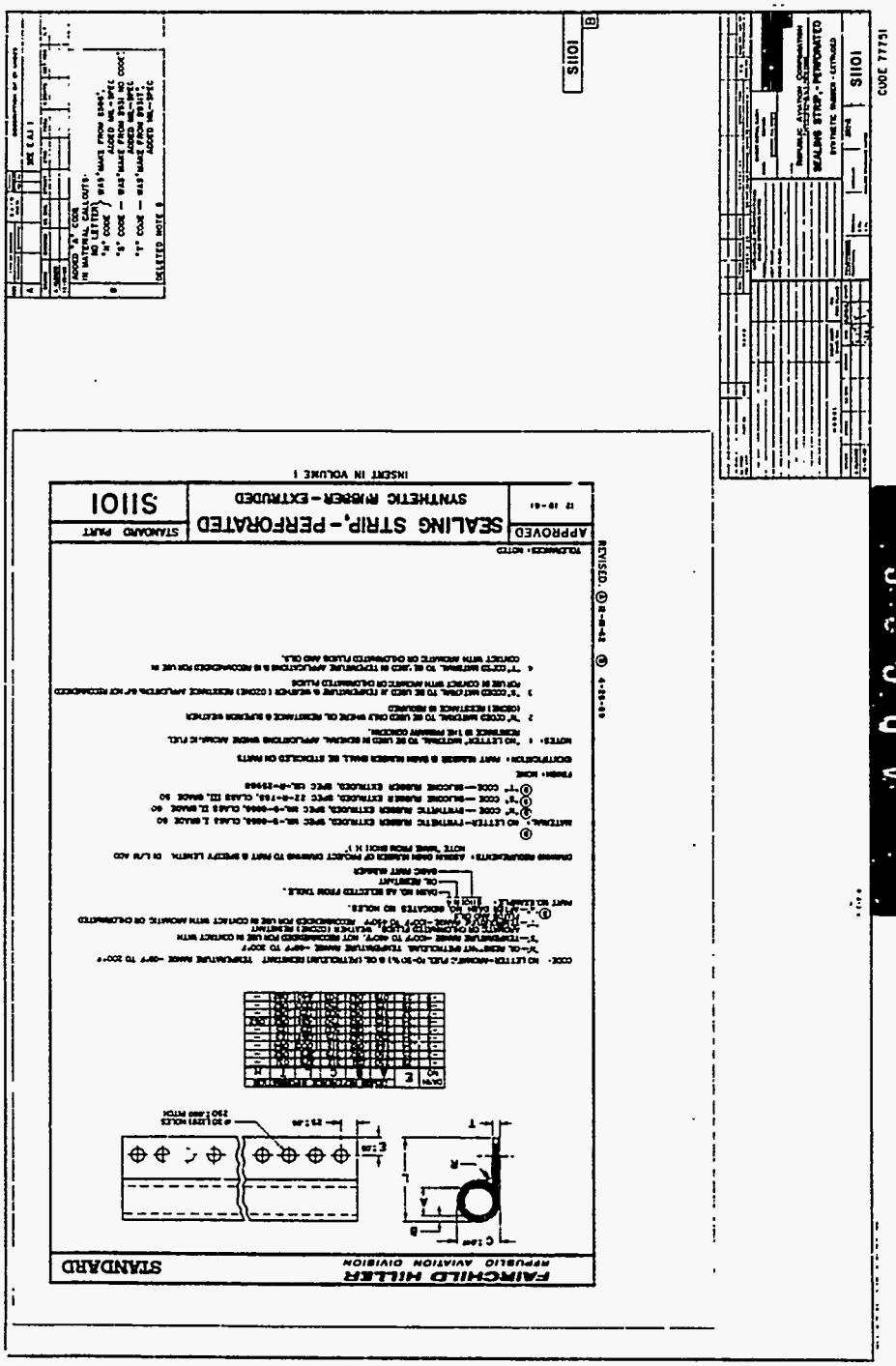
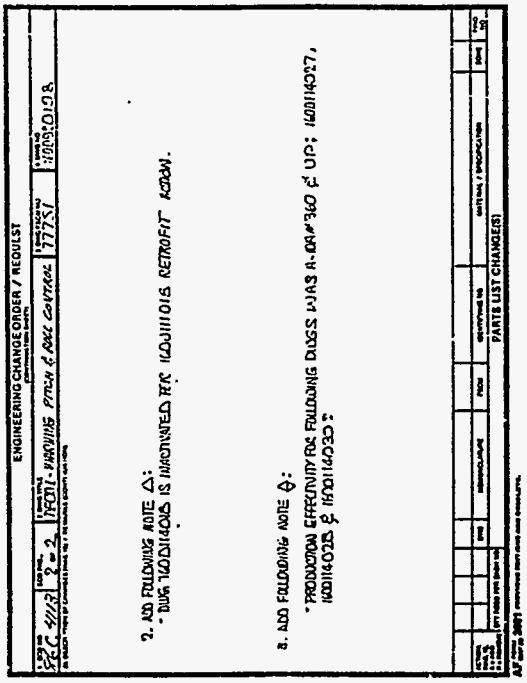
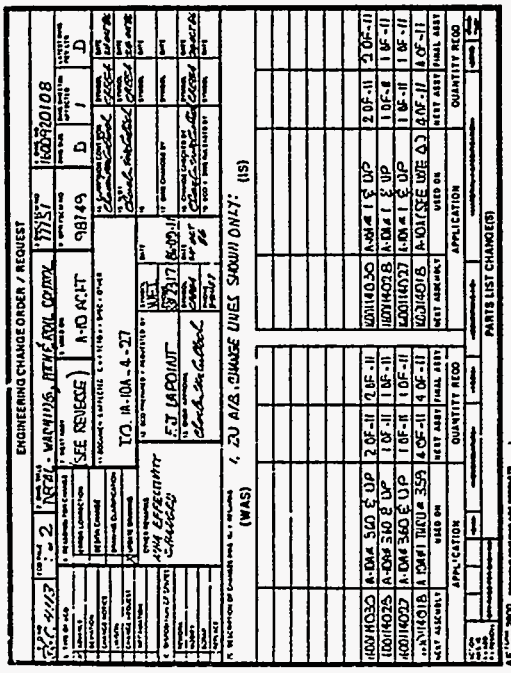
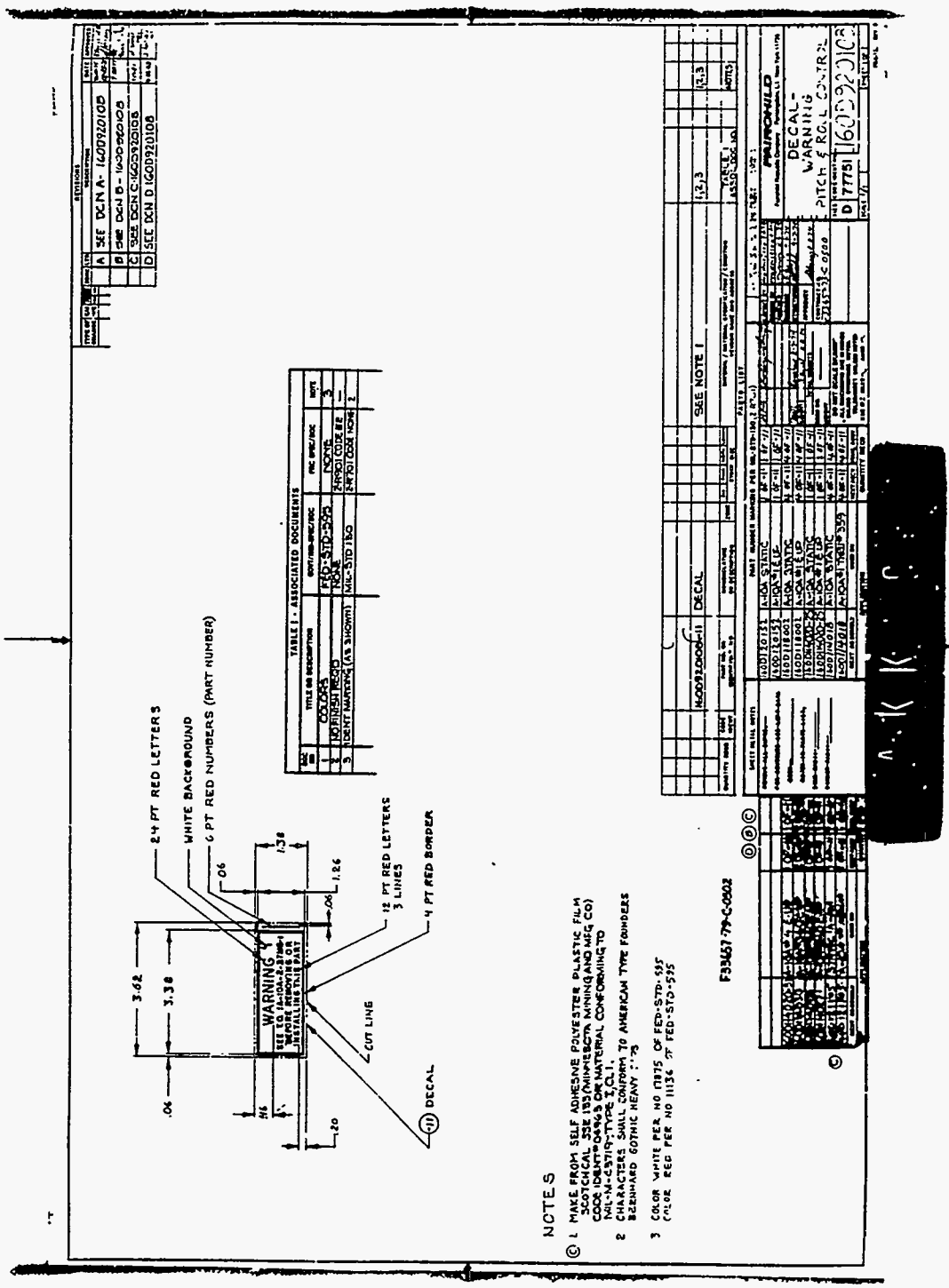
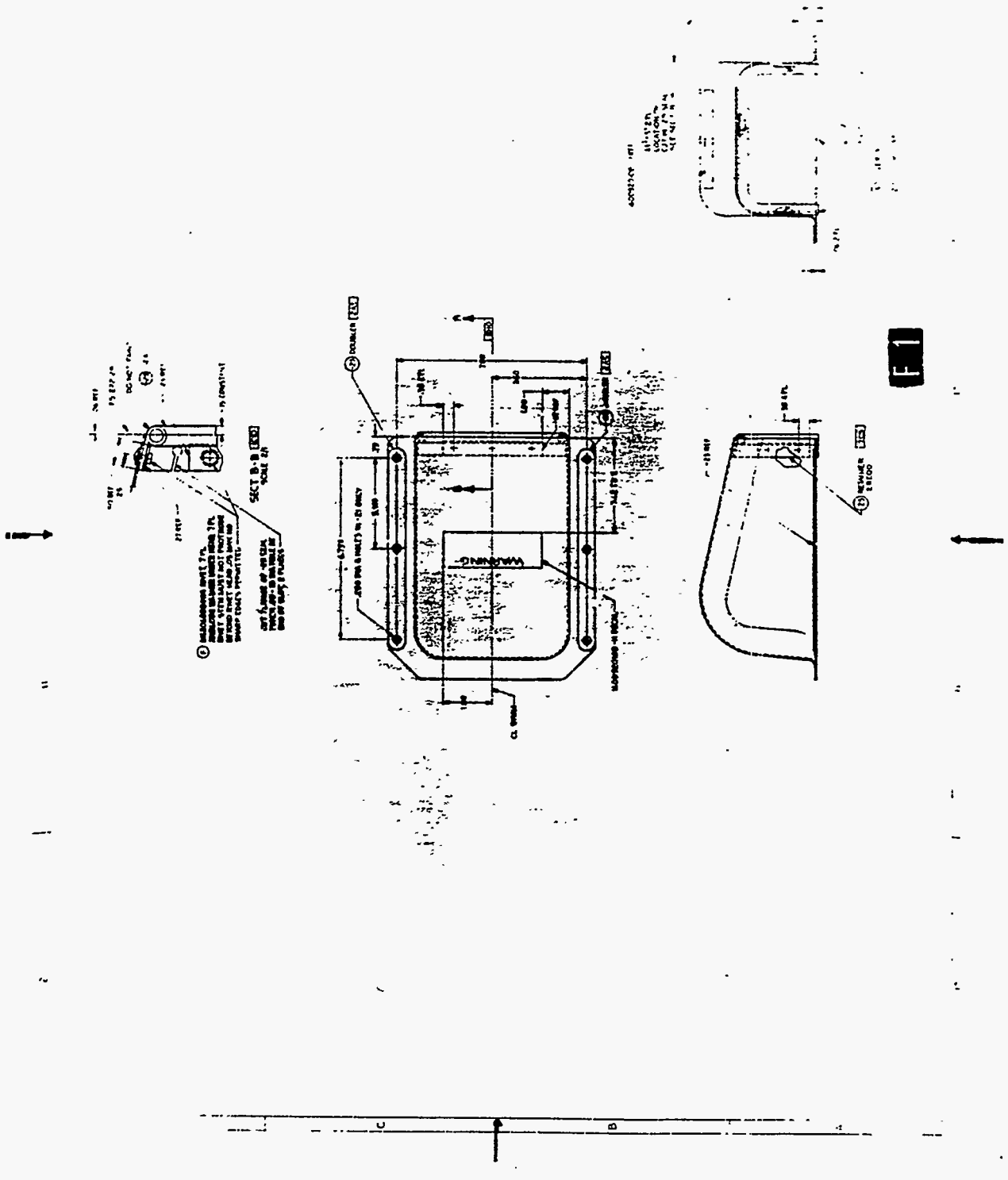


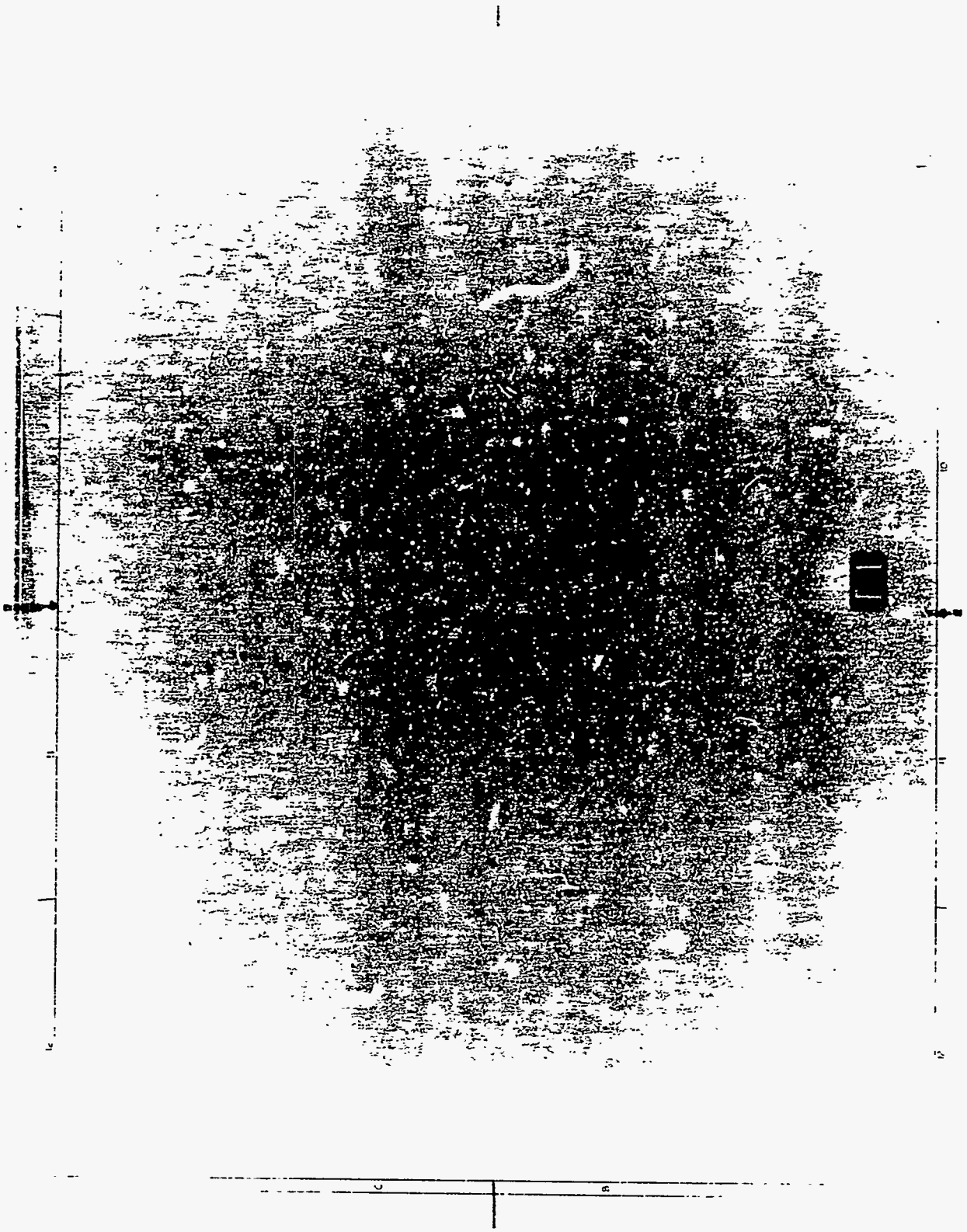


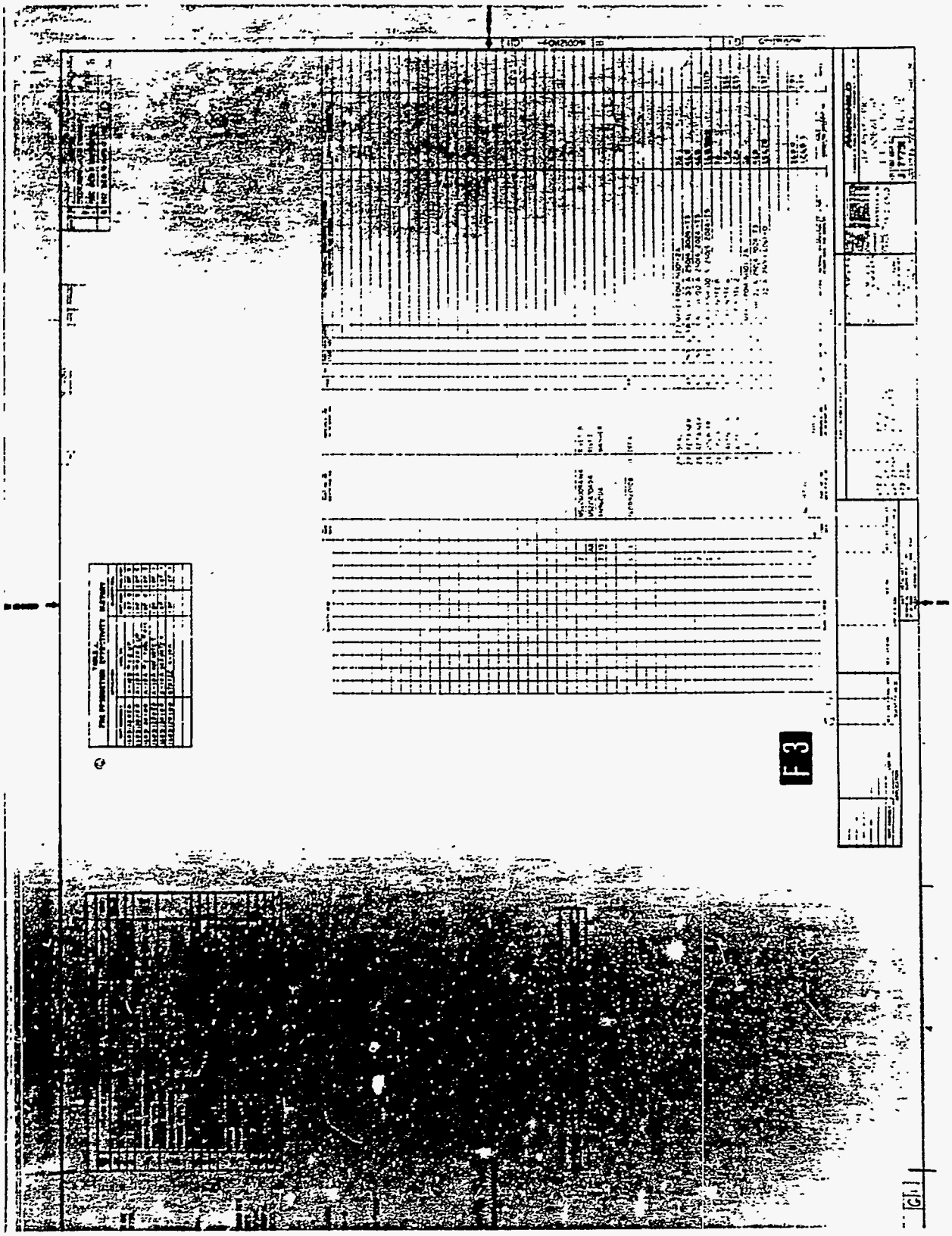

ENGINEERING CHANGE ORDER / REQUEST
2. ADD FOLLOWING NOTE Δ:
- DUAL MODIFICATIONS IS INCORPORATED FOR MODIFICATIONS RETROFIT AGAIN.
3. ADD FOLLOWING NOTE Φ:
- PRODUCTION EFFECTIVITY FOR FOLLOWING DASS WAS A-004#360 & UP: 1400114027, 1400114028 & 1400114030:
PARTS LIST CHANGE(S)

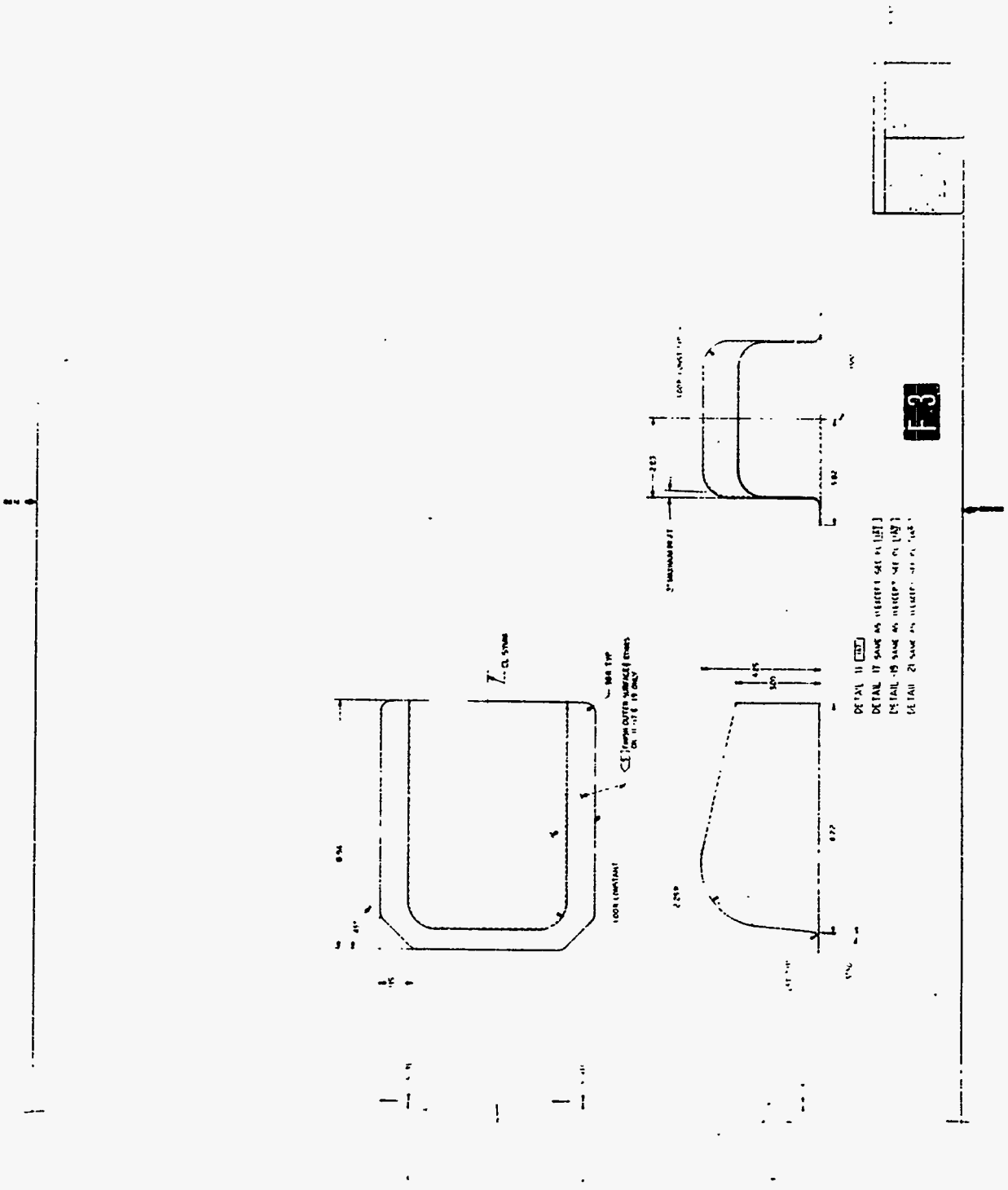

ENGINEERING CHANGE ORDER / REQUEST
4. ADD A/B CHANGE LINES SHOWN ONLY: (IS)
(WAS)
PARTS LIST CHANGE(S)

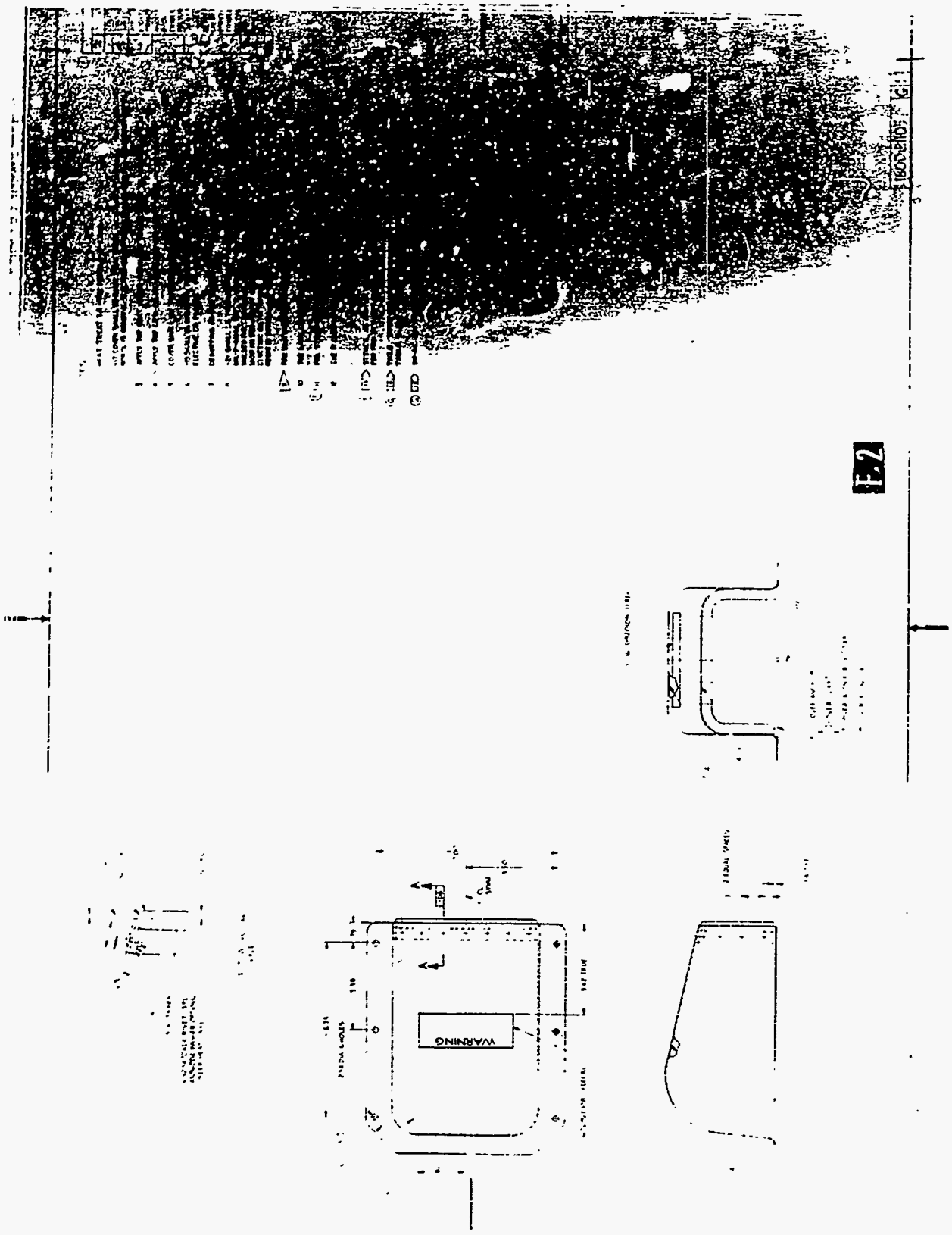

24 PT RED LETTERS
WHITE BACKGROUND
6 PT RED NUMBERS (PART NUMBER)
12 PT RED LETTERS 3 LINES
4 PT RED BORDER
CUT LINE
DECAL
WARNING
NOTES
1 MAKE FROM SELF ADHESIVE POLYESTER PLASTIC FILM SCOTCHCAL 33E 1133 (MINNESOTA MINING AND MFG CO) COLOR IDENTIFICATION NO 13538 OR NATURAL CONFORMING TO MIL-M-43719-TYPE I, CL 1.
2 CHARACTERS SHALL CONFORM TO AMERICAN TYPE FOUNDERS BERNHARD GOTHIC HEAVY
3 COLOR WHITE PER NO 17875 OF FED-STD-595
COLOR RED PER NO 11136 OF FED-STD-595
F33657-79-C-0502
DECAL-
WARNING
PITCH & ROLL CONTROL
D 77751

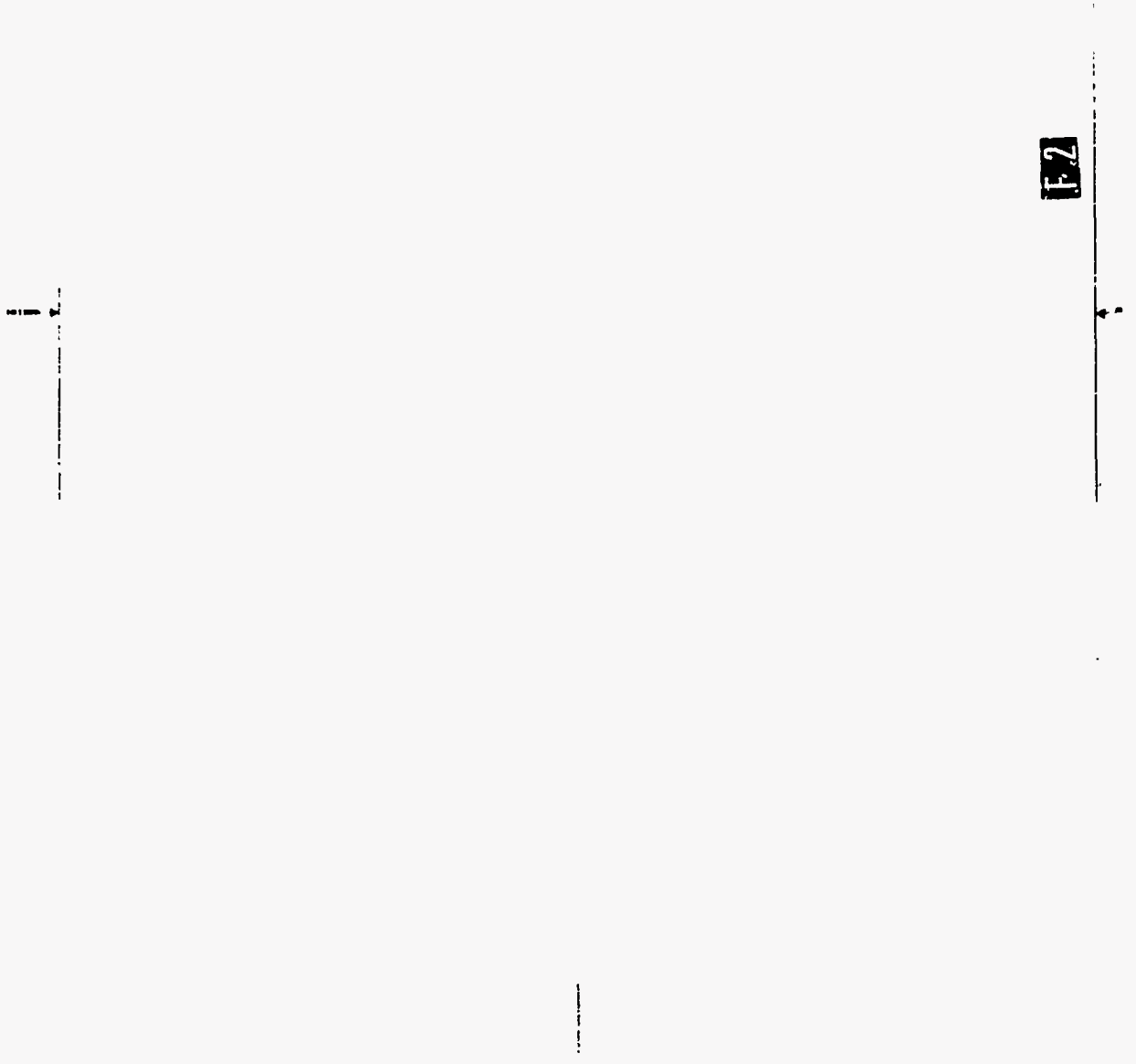





F3


F-3


WARNING


F.2

The following pages contain the actual solicitation information that comprises the complete large solicitation used in this demonstration.

The large solicitation was for quotation on a Ground Check Panel for the F-111.

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LETTER REQUEST FOR QUOTATION IVEY

REQUEST #: F04606-99-Q-87654 DATE ISSUED: 92 SEP 30

RETURN REQUEST FOR QUOTATION BY: 92 OCT 30

CERTIFIED FOR NATIONAL DEFENSE UNDER DMS REG 1 RATING: DO A1

ISSUED BY: DEPARTMENT OF THE AIR FORCE
SACRAMENTO ALC/PKXO
3237 PEACEKEEPER WAY/SUITE 17
MC CLELLAN AIR FORCE BASE CA 95652-1059
BUYER: TEST DOCUMENT/LAK/916-643-5272

SCD CODE: C

To qualify as a small business concern, number of employees shall not exceed 1000 employees (or annual receipts shall not exceed ____ millions of dollars), including affiliates. This size standard is based on Standard Classification Code (SIC) 3728.

CAUTION If handscribed, please use black ink. Enter quotation prices in schedule.

BUSINESS CLASSIFICATION (Check appropriate box(es))

( ) SMALL ( ) OTHER THAN SMALL ( ) DISADVANTAGED ( ) WOMEN-OWNED

SEE SCHEDULE FOR DELIVERY AND FOB POINTS

DISCOUNT TERMS _____

NAME AND ADDRESS OF QUOTER QUOTED PRICES FIRM FOR ____ DAYS

_____

_____

_____

_____

COMMERCIAL and GOVERNMENT ENTITY (CAGE) CODE _____

FACILITY CODE _____

CONTRACTOR ESTABLISHMENT CODE (CEC) _____

NAME AND TITLE OF PERSON TO CONTACT (Type or print)

_____

_____

TELEPHONE NUMBER (Include area code) _____

DATE OF QUOTATION _____

GOVERNMENT PROPERTY: Contractor desiring to use Government production/research property in his possession shall obtain concurrence of the Contracting Officer having cognizance of such property and attach the approval to the response.

BASIC ORDERING AGREEMENT: Quote may be made subject to terms and conditions of quoter's BOA. BOA NR. _____. Contractor affirms that all required certifications are current and applicable.

COMMERCIAL ITEM(s): (complete - whether or not commercial - if catalog or price list exists)

a. Effective date, number of catalog price list and page on which item is listed _____

b Copy of price list.

c. PERCENT of sales to Government: _____.
PERCENT of commercial sales: _____.

ECONOMIC QUANTITY: Request you provide additional minimal economic quantity quote if out of production, and quantity break for discount purposes.

Specifications and Drawings are attached hereto.

NOTICE OF SMALL BUSINESS - SMALL PURCHASE SET-ASIDE (AUG 1988) FAR 52.219-4 (IAW FAR 19.508(a))

APPROVED SOURCES ARE:

81755 GENERAL DYNAMICS CORP

ITEM	SUPPLIES/SERVICES	QTY	UNIT	UNIT PRICE	AMOUNT
0001	1680-01-083-9218BR PANEL,GR CK DWG REV AY F111 P/N: 12E2211-877 APPL: FB111A PR NR: FD2040-92-60135 PR LI: 0001 FOB: ORIGIN QUANTITY VARIATION: 0% OVER 0% UNDER ACRN: AA POA/INSP SITE: ORIGIN	1	EA	$_____ IM CODE: XDX ACCEPTANCE: ORIGIN	$_____

(A) GOVERNMENT'S REQUIRED DELIVERY SCHEDULE:

QTY	U/I	DELIVERY	SHIP TO	REQUISITION NR	PRI
1	EA	30-APR-93	FB2049	NON-MILSTRIP	--

(B) PROPOSED DELIVERY SCHEDULE:

QTY	U/I	DELIVERY	SHIP TO	REQUISITION NR	PRI
1	EA	_____	FB2049	NON-MILSTRIP	--

(Applicable to Item(s) 0001)
SHIP TO/MARK FOR

FB2049
MC CLELLAN AIR FORCE BASE, CA 95652
MARK/FOR: FB2049/ACCT 09/TP-3
Contract: SEE PAGE 1

REQUISITION NR: SEE EACH ITEM IN SCHEDULE

MATERIAL INSPECTION AND RECEIVING REPORT

(a) The DD Form 250 shall be forwarded to the following addresses:

(1) Forward the purchasing office copy, per DFARS Appendix F, Table 1, to:
Department of the Air Force
Sacramento Air Logistics Center/LAKM
5120 Dudley Blvd/Suite 3
McClellan Air Force Base CA 95652-1354

(2) For shipments involving Foreign Military Sales (FMS) requirements, an additional copy shall be sent under separate cover to:
SM-ALC/FMFSA
3230 Peacekeeper Way/Suite 2
McClellan AFB CA 95652-1041

(b) When the contract requires delivery of FMS supplies to foreign destinations, the copies of the DD Form 250 designated by DFARS Appendix F, Table 2, shall be forwarded to the "ship to" address designated for delivery of the supplies. If the "ship to" address is not in the contract, it shall be provided by the ACO when shipment is ready.

(c) A copy of the bill of lading or other transportation receipt will be attached to the DD Form 250 or the information will be provided in Block 4 of the DD Form 250 and sent to the addressees listed in (a)(2) above.
(SMPKC 0792)

C-6X. **SPECIFICATIONS, STANDARDS AND/OR ATTACHMENTS**

In accordance with aperture cards and data list(s) furnished herein.

C-381. **NEW MANUFACTURED MATERIAL-SURPLUS NOT ACCEPTABLE** (JUL 1992)
AFMC FAR SUP 5352.291-9001

Only new manufactured material, as defined in Part 5391.101 of the AFMC FAR Supplement, will be acceptable in satisfaction of the requirement as set forth herein. It has been determined that surplus material is not acceptable and surplus offers will not be considered for award. This statement applies to Contract Line Item(s) 0001.
(IAW AFMC FAR SUP 5391.302(a)(2))

D-4XN **PRESERVATION/PACKAGING - PACKING - PACKAGE/CONTAINER MARKING**

PRESERVATION/PACKAGING Level A shall be accomplished in accordance with MIL-P-116 and MIL-STD-2073-1 Coded requirements shall be interpreted in accordance with MIL-STD-2073-1 and MIL-STD-2073-2. Level C shall be accomplished in accordance with MIL-STD-2073-1. Requirements of specification or Transportation Packaging Order (TPO) or special packaging instructions (SPI) shall be complied with, as stipulated and the following special instructions:

OUP 1 LEVEL A SPI NONE

PACKING Levels shall be interpreted and accomplished in accordance with MIL-STD-2073-1 and the specification, or TPO/SPI as stipulated and additional instructions:

LEVEL C SPI/SPECIFICATION NONE

Hazardous materials shall be prepared for shipment in accordance with applicable modal regulations, i.e., Title 49 Code of Federal Regulations, Parts 170-179; Joint Regulation AFR 71-4 (Military Air); or International Air Transportation Association (IATA), Dangerous Goods Regulation (Commercial Air)

Unless otherwise stipulated as part of a particular Amended Shipping Instruction (ASI), item shipped in response to ASIs will be preserved, packaged, and packed in accordance with MIL-STD-2073-1, and TPO/SPI as applicable, to comply with the following:

a. Level C/C for items indicated for immediate use within the CONUS when more economical and expedient.
b. Level A/C for Air Force stock with the CONUS.
c. Level A/A for items being shipped overseas by surface transportation
d. All overseas shipments in support of FMS or MAP will be preserved Level A and packed Levels A or B.

All specifications, standards bulletins, and publications necessary to accomplish preservation, packaging, packing requirements will be of the issue in effect on the date of the solicitation.

NOTE 1: If there is a conflict between MIL-STD-2073-1 and a TPO/SPI or coded data regarding the level of packing provided by a fiberboard container, the requirement of MIL-STD-2073-1 applies. A container meeting the requirements of MIL-STD-2073-1 for the specified level shall be used.

D-6X. **ITEM IDENTIFICATION MARKING AND SHELF LIFE ITEM PROVISIONS**

1 MIL-STD-129 and 130

2. SHELF LIFE ITEMS - not applicable.

a. MARKING

(1) Shelf life items shall be marked in accordance with **MIL-STD-129**
(2) Mark items controlled in **MIL-STD-1523**, or in specifications furnished as a part of the contract or purchase order, with the cure or assembly dates specified therein.

b. DELIVERY. Unless specified otherwise in the contract, shelf life items shall have a minimum of 90% of the "storage period" remaining at the time of delivery to the Government.

NOTE 1: When the contract, or any of the contract line items established therein, requires technical order (TO) certification, inner and outer packaging container tags or labels shall be annotated to indicate compliance with the applicable technical order for each item of the contract so affected.

NOTE 2: Items designed prior to issuance of the latest revision of MIL-STD-130 as of the date of the award and not proposed for use in any new design equipment systems may be marked in accordance with the existing design drawing for the items provided the identification marking on the delivered item meets requirements of previous revisions of MIL-STD-130. Existing items used in newly designed equipment or systems shall be marked in accordance with the latest revision of MIL-STD-130 as of the date of the award.

NOTE 3: The contractor shall mark in accordance with MIL-STD-130 and ASTM D-3951 those items for which commercial packaging and packing are authorized in contract/order.

D-7X. **BAR CODE MARKINGS**

Bar Code markings with the National Stock Number (NSN) and contract/order number data is required on this contract, except when specifically exempted in the schedule. **Bar coding does not apply to FMS items.**

E-1 **INSPECTION OF SUPPLIES--FIXED-PRICE** (JUL 1985) FAR 52.246-2
(IAW FAR 46.302)

E-15. **HIGHER-LEVEL CONTRACT QUALITY REQUIREMENT (GOVERNMENT SPECIFICATION)** (APR 1984) FAR 52.246-11

For the purposes of this clause the blank(s) are completed as follows:

(b) **MIL-I-45208A INSPECTION SYSTEM**
(IAW FAR 46.311)

E-22. **RESPONSIBILITY FOR SUPPLIES** (APR 1984) FAR 52.246-16
(IAW FAR 46.316)

F-23 **VARIATION IN QUANTITY** (APR 1984) FAR 52.212-9

See schedule for percentage of increase or decrease.
(IAW FAR 12.403(a))

F-24. **DELIVERY OF EXCESS QUANTITIES** (SEP 1989) FAR 52.212-10
(IAW FAR 12.403(b))

F-30. **F.O.B. ORIGIN** (JUN 1988) FAR 52.247-29
(IAW FAR 47.303-1(c))

F-33C **F.O.B. ORIGIN, PREPAID FREIGHT--SMALL PACKAGE SHIPMENTS** (JAN 1991) FAR 52.247-65

(a) When authorized by the Contracting Officer, f.o.b. origin freight shipments which do not have a security classification shall move on prepaid commercial bills of lading or other shipping documents to domestic destinations, including air and water terminals. Weight of individual shipments shall be governed by carrier restrictions but shall not exceed 150 pounds by any form of commercial air or 1,000 pounds by other commercial carriers. The Government will reimburse the Contractor for reasonable freight charges.

(b) The Contractor shall annotate the commercial bill of lading as required by the clause of this contract entitled "Commercial Bill of Lading Notations."

(c) The Contractor shall consolidate prepaid shipments in accordance with procedures established by the cognizant transportation office. The Contractor is authorized to combine Government prepaid shipments with the Contractor's commercial shipments for delivery to one or more consignees and the Government will reimburse its pro rata share of the total freight costs. The Contractor shall provide a copy of the commercial bill of lading promptly to each consignee. Quantities shall not be divided into mailable lots for the purpose of avoiding movement by other modes of transportation.

(d) Transportation charges will be billed as a separate item on the invoice for each shipment made. A copy of the pertinent bill of lading, shipment receipt, or freight bill shall accompany the invoice unless otherwise specified in the contract.

(e) Loss and damage claims will be processed by the Government.
(IAW FAR 47.303-17(f))

F-35. **F.O.B. ORIGIN**

Any supply item applicable to this document shall be delivered:
(1) F.O.B. carrier's equipment at the plant or plants at

_____. _____. _____.
(street address) (city) (state)

_____.
(zip code)

or

(2 F.O.B. _____.

_____. _____, which is the nearest point that carrier service is available to the plant or plants at which final inspection and acceptance are to be accomplished
(IAW FAR 47.305(b))

FOR SHIP TO AND DELIVERY (IF APPLICABLE) SEE SECTION B

F-69 **TRANSPORTATION TRANSIT PRIVILEGE CREDITS** (APR 1984) FAR 52.247-57

(a) If the offeror has established with regulated common carriers transit privileges that can be applied to the supplies when shipped from the original source, the offeror is invited to propose to use these credits for shipping the supplies to the designated Government destinations. The offeror will ship these supplies under commercial bills of lading, paying all remaining transportation charges connected with the shipment, subject to reimbursement by the Government in an amount equal to the remaining charges but not exceeding the amount quoted by the offeror

(b) After loading on the carrier's equipment and acceptance by the carrier, these shipments under paid commercial bills of lading will move for the account of and at the risk of the Government (unless, pursuant to the Changes clause, the office administering the contract directs use of Government bills of lading)

(c) The amount quoted below by the offeror represents the transportation costs in cents per 100 pounds (freight rate) for full carload/truckload shipments of the supplies from offeror's original source, via offeror's transit plant or point, to the Government destination(s) including the carrier's transit privilege charge, less the applicable transit credit (i.e., the amount (rate) initially paid to the carrier for shipment from original source to offeror's transit plant or point)

(d) The rate per CWT quoted will be used by the Government to evaluate the offered f.o.b. origin price unless a lower rate is applicable on the date of bid opening (or closing date specified for receipt of offers) To have the offer evaluated on this basis, the offeror must insert below the remaining transportation charges that the offeror agrees to pay, including any transit charges, subject to reimbursement by the Government, as explained in this clause, to destinations listed in the Schedule as follows:

RATE PER CWT IN CENTS .....
TO DESTINATION.....
(IAW FAR 47.305-13(B)(4))

F-74 **F.O.B. ORIGIN-MINIMUM SIZE OF SHIPMENTS** (APR 1984) FAR 52.247-61
(IAW FAR 47.305-16(c))

G-1A **ACCOUNTING AND APPROPRIATION DATA**

AA.97X4930.FC0H 6H2 6305 FD2040 01N000 00000 000000 503200 F0320F
$_____

FAR 52.252-2 **CLAUSES INCORPORATED BY REFERENCE** JUN 1988

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.
(IAW FAR 52.107(b))

NO	FAR PARA	CLAUSE TITLE	DATE
I-18.	52.203-1	**OFFICIALS NOT TO BENEFIT** (IAW FAR 3.102-2)	APR 1984
I-19.	52.203-3	**GRATUITIES** (IAW FAR 3.202)	APR 1984
I-22.	52.203-7	**ANTI-KICKBACK PROCEDURES** (IAW FAR 3.502-3)	OCT 1988
I-83.	52.210-5	**NEW MATERIAL** (IAW FAR 10.011(e))	APR 1984
I-84.	52.210-7	**USED OR RECONDITIONED MATERIAL, RESIDUAL INVENTORY, AND FORMER GOVERNMENT SURPLUS PROPERTY** (IAW FAR 10.011(g))	APR 1984
I-102.	52.212-8	**DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS** (IAW FAR 12.304(b))	SEP 1990
I-263.	52.222-20	**WALSH-HEALEY PUBLIC CONTRACTS ACT** (IAW FAR 22.610(b))	APR 1984
I-264.	52.222-26	**EQUAL OPPORTUNITY** (IAW FAR 22.810(e))	APR 1984
I-274.	52.222-35	**AFFIRMATIVE ACTION FOR SPECIAL DISABLED AND VIETNAM ERA VETERANS** (IAW FAR 22.1308)	APR 1984
I-276.	52.222-36	**AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS** (IAW FAR 22.1408)	APR 1984
I-278.	52.222-37	**EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA** (IAW FAR 22.1308(b))	JAN 1988
I-306.	52.225-3	**BUY AMERICAN ACT-SUPPLIES** (IAW FAR 25.109(d))	JAN 1989
I-312.	52.225-11	**RESTRICTIONS ON CERTAIN FOREIGN PURCHASES** (IAW FAR 25.704)	MAY 1992
I-382	52.232-1	**PAYMENTS** (IAW FAR 32.111(a)(1))	APR 1984
I-391	52.232-8	**DISCOUNTS FOR PROMPT PAYMENT** (IAW FAR 32.111(c)(1))	APR 1989
I-410.	52.232-23	**Alternate I** (IAW FAR 32.801 and 32.803(d))	APR 1984
I-412.	52.232-25	**PROMPT PAYMENT** (a)(6)(i) For the purposes of this clause, Government acceptance shall be deemed to have occurred constructively on the 7th day after the Contractor delivered the supplies or performed the services. (b)(2) For the purposes of this clause, contract financing payments shall be made on the 7th day after receipt of a proper contract financing request by the designated billing office. (IAW FAR 32.908(c))	APR 1989
I-416.	52.232-28	**ELECTRONIC FUNDS TRANSFER PAYMENT METHODS** (IAW FAR 32.908(d))	APR 1989
I-417.	52.233-1	**DISPUTES** (IAW FAR 33.215)	DEC 1991
I-419.	52.233-3	**PROTEST AFTER AWARD** (IAW FAR 33.106(b))	AUG 1989
I-538.	52.242-10	**F.O.B. ORIGIN--GOVERNMENT BILLS OF LADING OR PREPAID POSTAGE** (IAW FAR 42.1404-2(a))	APR 1984
I-636.	52.247-1	**COMMERCIAL BILL OF LADING NOTATIONS** (IAW FAR 47.104-4(a))	APR 1984
IA-33.	252.204-7003	**CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT** (IAW DFARS 204.404-70(b))	APR 1992
IA-422.	252.232-7006	**REDUCTION OR SUSPENSION OF CONTRACT PAYMENTS UPON FINDING OF FRAUD** (IAW DFARS 232.111-70)	JAN 1992
IA-634C.	252.242-7003	**APPLICATION FOR U.S. GOVERNMENTS SHIPPING DOCUMENTATION/INSTRUCTIONS** (IAW DFARS 242.1404-2-70(b))	DEC 1991

IA-679. 252.246-7000 **MATERIAL INSPECTION AND RECEIVING REPORT** DEC 1991
(IAW DFARS 246.370)

LIST OF ATTACHMENTS

FORM NR	TITLE	DATE	NR OF PAGES
	Engineering Data List	10 MAY 91	2

REQUEST FOR QUOTATION

The following clause(s) and/or provision(s), are applicable to the Request for Quotation only:

K-12. **SMALL BUSINESS CONCERN REPRESENTATION** (JAN 1991) FAR 52.219-1

(a) **Representation.** The offeror represents and certifies as part of its offer that it [ ] is, [ ] is not a small business concern and that [ ] all, [ ] not all end items to be furnished will be manufactured or produced by a small business concern in the United States, its territories or possessions, Puerto Rico or the Trust Territory of the Pacific Islands.

(b) **Definition.** "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in this solicitation.

(c) **Notice.** Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to sections 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

(1) Be punished by imposition of a fine, imprisonment, or both;
(2) Be subject to administrative remedies, including suspension and debarment; and
(3) Be ineligible for participation in programs conducted under the authority of the Act.

(IAW FAR 19.304(a))

K-15. **WALSH-HEALEY PUBLIC CONTRACTS ACT REPRESENTATION** (APR 1984) FAR 52.222-19

The offeror represents as a part of this offer that the offeror is ( ) or is not ( ) a regular dealer in, or is ( ) or is not ( ) a manufacturer of, the supplies offered.
(IAW FAR 22.610(a))

K-16. **CERTIFICATION OF NONSEGREGATED FACILITIES** (APR 1984) FAR 52.222-21
(IAW FAR 22.810(a)(1) and 52.222-26)

K-17. **PREVIOUS CONTRACTS AND COMPLIANCE REPORTS** (APR 1984) FAR 52.222-22

The offeror represents that-

(a) It ( ) has, ( ) has not participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114;
(b) It ( ) has, ( ) has not, filed all required compliance reports; and
(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(IAW FAR 22.810(a)(2))

K-18. **AFFIRMATIVE ACTION COMPLIANCE** (APR 1984) FAR 52.222-25

The offeror represents that

(a) it ( ) has developed and has on file, ( ) has not developed and does not have on file, at each establishment, affirmative action programs required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or
(b) it ( ) has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(IAW FAR 22.810(d) and 52.222-26)

K-29. **TAXPAYER IDENTIFICATION** (SEP 1989) FAR 52.204-3

(a) **Definitions.**

"Common parent," as used in this solicitation provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Corporate status," as used in this solicitation provision, means a designation as to whether the offeror is a corporate entity, an unincorporated entity (e.g., sole proprietorship or partnership), or a corporation providing medical and health care services.

"Taxpayer Identification Number (TIN)," as used in this solicitation provision, means the number required by the IRS to be used by the offeror in reporting income tax and other returns.

(b) The offeror is required to submit the information required in paragraphs (c) through (e) of this solicitation provision in order to comply with reporting requirements of 26 U.S.C. 6041, 6041A and 6050M and implementing regulations issued by the Internal Revenue Service (IRS). If the resulting contract is subject to reporting requirements described in 4.902(a), the failure or refusal by the offeror to furnish the information may result in a 20 percent reduction of payments otherwise due under the contract.

(c) Taxpayer Identification Number (TIN).

[ ] TIN: _____
[ ] TIN has been applied for.
[ ] TIN is not required because:
  [ ] Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the U.S. and does not have an office or place of business or a fiscal paying agent in the U.S.;
  [ ] Offeror is an agency or instrumentality of a foreign government;
  [ ] Offeror is an agency or instrumentality of a Federal, state, or local government;
  [ ] Other State basis _____

(d) Corporate Status

[ ] Corporation providing medical and health care services, or engaged in the billing and collecting of payments for such services;
[ ] Other corporate entity;
[ ] Not a corporate entity;
  [ ] Sole proprietorship
  [ ] Partnership
  [ ] Hospital or extended care facility described in 26 CFR 501(c)(3) that is exempt from taxation under 26 CFR 501(a)

(e) Common Parent
[ ] Offeror is not owned or controlled by common parent as defined in paragraph (a) of this clause
[ ] Name and TIN of common parent:

Name _____
TIN _____

(IAW FAR 4.904)

K-30 **ECONOMIC PURCHASE QUANTITY--SUPPLIES** (AUG 1987) FAR 52.207-4

(a) Offerors are invited to state an opinion on whether the quantity(ies) of supplies on which bids, proposals or quotes are requested in this solicitation is (are) economically advantageous to the Government.

_____
_____
_____
_____
_____

(b) Each offeror who believes that acquisitions in different quantities would be more advantageous is invited to recommend an economic purchase quantity. If different quantities are recommended, a total and a unit price must be quoted for applicable items. An economic purchase quantity is that quantity at which a significant price break occurs. If there are significant price breaks at different quantity points, this information is desired as well.

OFFEROR RECOMMENDATIONS

ITEM	QUANTITY	PRICE QUOTATION	TOTAL

(c) The information requested in this provision is being solicited to avoid acquisitions in disadvantageous quantities and to assist the Government in developing a data base for future acquisitions of these items. However, the Government reserves the right to amend or cancel the solicitation and resolicit with respect to any individual item in the event quotations received and the Government's requirements indicate that different quantities should be acquired (IAW FAR 7.203)

L-7. **LISTING OF USED OR RECONDITIONED MATERIAL, RESIDUAL INVENTORY AND FORMER GOVERNMENT SURPLUS PROPERTY** (APR 1984) FAR 52.210-6
(IAW FAR 10.011(f)(1))

L-8. **NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE** (SEP 1990) FAR 52.212-7

For the purposes of this provision, the blanks are completed on the cover sheet.
(IAW FAR 12.304(a))

L-57 **SHIPPING POINT(S) USED IN EVALUATION OF F.O.B. ORIGIN OFFERS** (APR 1984) FAR 52.247-46
(IAW FAR 47.305-3(b)(2)(ii))

M-10 **EVALUATION-F.O.B. ORIGIN** (APR 1984) FAR 52.247-47
(IAW FAR 47.305-3(f)(2))

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ENGINEERING DATA LIST (HISTORY)

DATE:	DATA TECH:	ORGN SYMBOL:	PR NR:	APPLICATION:	PAGE
10MAY91	FI	LACD		FBIIA	1 OF 2

CAGE:	MANUFACTURER NAME:	REFERENCE NR:	NOUN:	NSN:
081755	GENERAL DYNAMICS	12E2211-877	PANEL,GROUND-CHECK	1680010839218DR

CAGE	DRAWING NUMBER	REV	NR SHEETS	FURN CODE	NOUN	REMARKS
081755	12E2211	AY	0000	S	PANEL ASSY	
081755	LM12E2211	DV	0000	S	LIST OF MATERIALS	
081755	12E2212	AJ	0000	S	PLATE MOUNTING,ASSY	
081755	LM12E2212	AH	0000	S	LIST OF MATERIALS	
081755	12E2215	B	0000	S	COVER PANEL	
081755	LM12E2215	F	0000	S	LIST OF MATERIALS	
081755	12F5031	H	0000	S	MARKING PANEL	
081755	LM12F5031	J	0000	S	LIST OF MATERIALS	
081755	12E858	EY	0000	S	BRACKET	
081755	LM12E858	GG	0000	S	LIST OF MATERIALS	
081755	12Z001	J	0000	S	INTERPRETATION DRAWING	89C0610 H/R
081755	LM12Z001	E	0000	S	LIST OF MATERIALS	
081755	H12D408-30	A	0000	S	WIRING HARNESS	
081755	12Z002	C	0000	S	INTERPRETATION DRAWING	
081755	LM12Z002	B	0000	S	LIST OF MATERIALS	
081755	C094	D	0000	S	GD STD	
081755	C095	E	0000	S	GD STD	
081755	C096	D	0000	S	GD STD	
081755	C113	C	0000	S	GD STD	
081755	07C0678		0000	S	ECO	
081755	C163	F	0000	S	GD STD	
081755	C167	G	0000	S	GD STD	
081755	C194	B	0000	S	GD STD	
081755	C5028	F	0000	S	GD STD	
081755	H019	D	0000	S	GD STD	
081755	F5269	H	0000	S	GD STD	
081755	C060	J	0000	R	GD STD	
081755	C166	G	0000	R	GD STD	
081755	FMS-1072	A	0000	R	GD SPEC	
081755	FQML-1072		0000	R	QUALIFIED MATERIAL LIST	

92-6013S

ENGINEERING DATA LIST

DATE:	DATA TECH:	ORGN SYMBOL:	PR NR:	APPLICATION:	PAGE
10MAY91	FJ	LACD		FBIIA	2 OF 2

CAGE:	MANUFACTURER NAME:	REFERENCE NR	NOUN:	NSN:
081755	GENERAL DYNAMICS	12[illegible]77	PANEL,GROUND CHECK	1680010839218HR

CAGE	DRAWING NUMBER	REV	NR SHEETS	TURN CODE	NOUN	REMARKS
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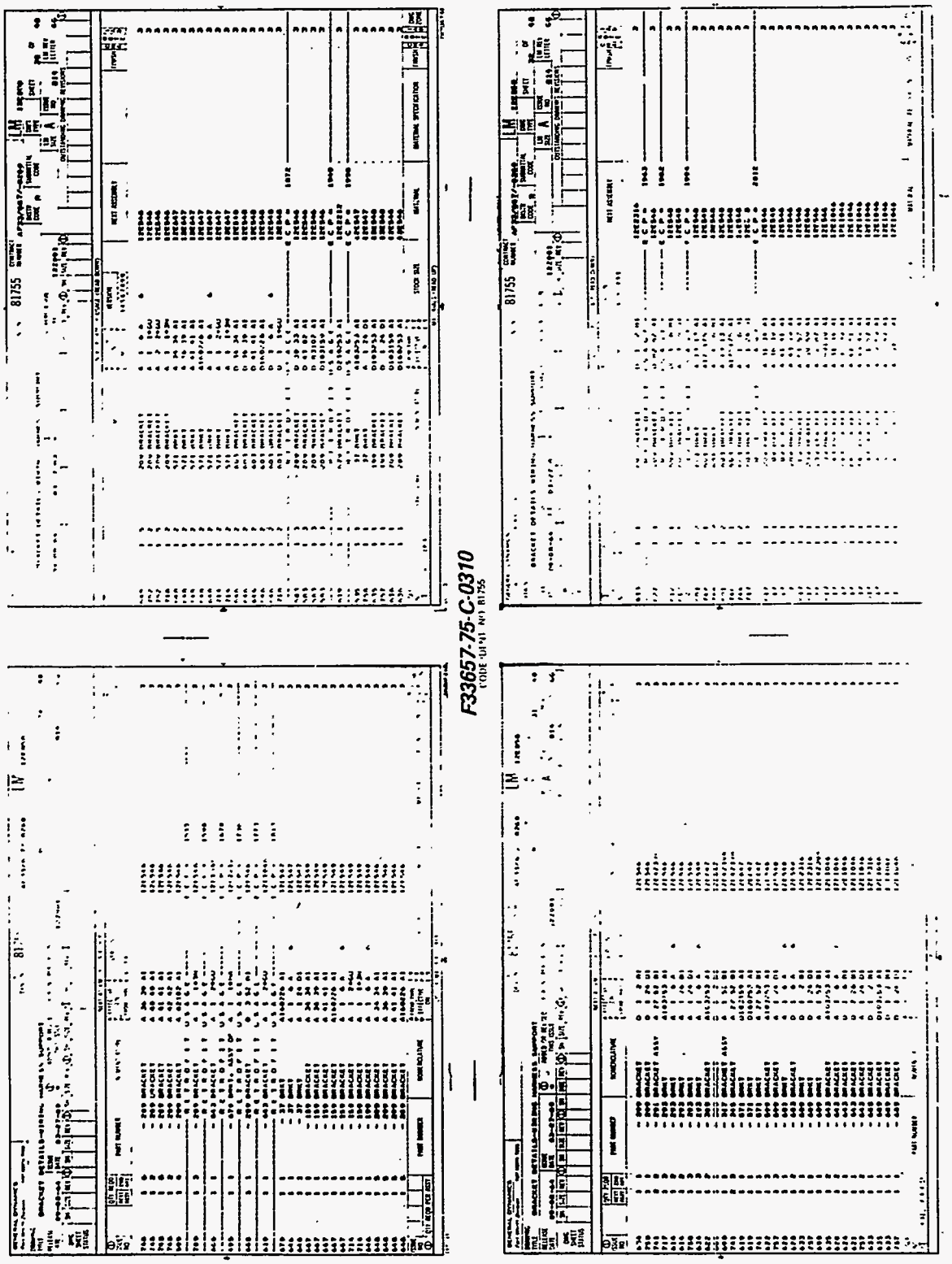
081755	FPS-1006	C	0000	R	GD SPEC	90C0523 H/R
081755	FPS-1018	B	0000	R	GD SPEC	
081755	FPS-1043 W/AMD1	A	0000	R	GD SPEC	
081755	K10	Y	0000	R	GD STD	
081755	M100	W	0000	R	GD STD	
081755	FZE-12-009 W/AMD1	B	0000	R	GD SPEC	
081755	FZE-12-015	D	0000	R	GD SPEC	
081755	FQML-C-5541		0000	R	QUALIFIED MATERIAL LIST	
081755	FQML-P-22808-1		0000	R	QUALIFIED MATERIAL LIST	
081755	FQML-P-23377-6		0000	R	QUALIFIED MATERIAL LIST	
081755	MLO 12F5031	M	0000	M	MLO	6 SHEETS

STANDARD ENGINEERING TEXT

CONTRACTOR SPECIFICATIONS AND STANDARDS MARKED WITH DOCUMENT FURNISHED CODE OF S ARE INCLUDED IN THE BID SET. IF SPECIFICATIONS AND STANDARDS ARE REQUIRED AND HAVE NOT BEEN PROVIDED, THE CONTRACTOR IS TO CONTACT MXOA (916) 643-2389. (COLLECT CALLS NOT ACCEPTED.) THE CONTRACTOR MUST PROVIDE THE PR NUMBER/SOLICITATION NUMBER AND THE EXACT DOCUMENT AND REVISION LETTER SHOWN ON THE DATA LIST. CONTRACTORS ARE CAUTIONED TO CHECK THE STATED REVISION LETTER ON THE DATA LIST AGAINST ANY IN-HOUSE DATA TO ASSURE THE CORRECT REVISION IS IN THEIR POSSESSION VENDOR DRAWINGS ARE NOT FURNISHED AS PART OF THIS PACKAGE.

ENGINEERING DATA LIST REMARKS

FIRST ARTICLE REQUIRED
STABLE BASE MATERIAL WILL BE SUPPLIED TO SUCCESFUL BIDDER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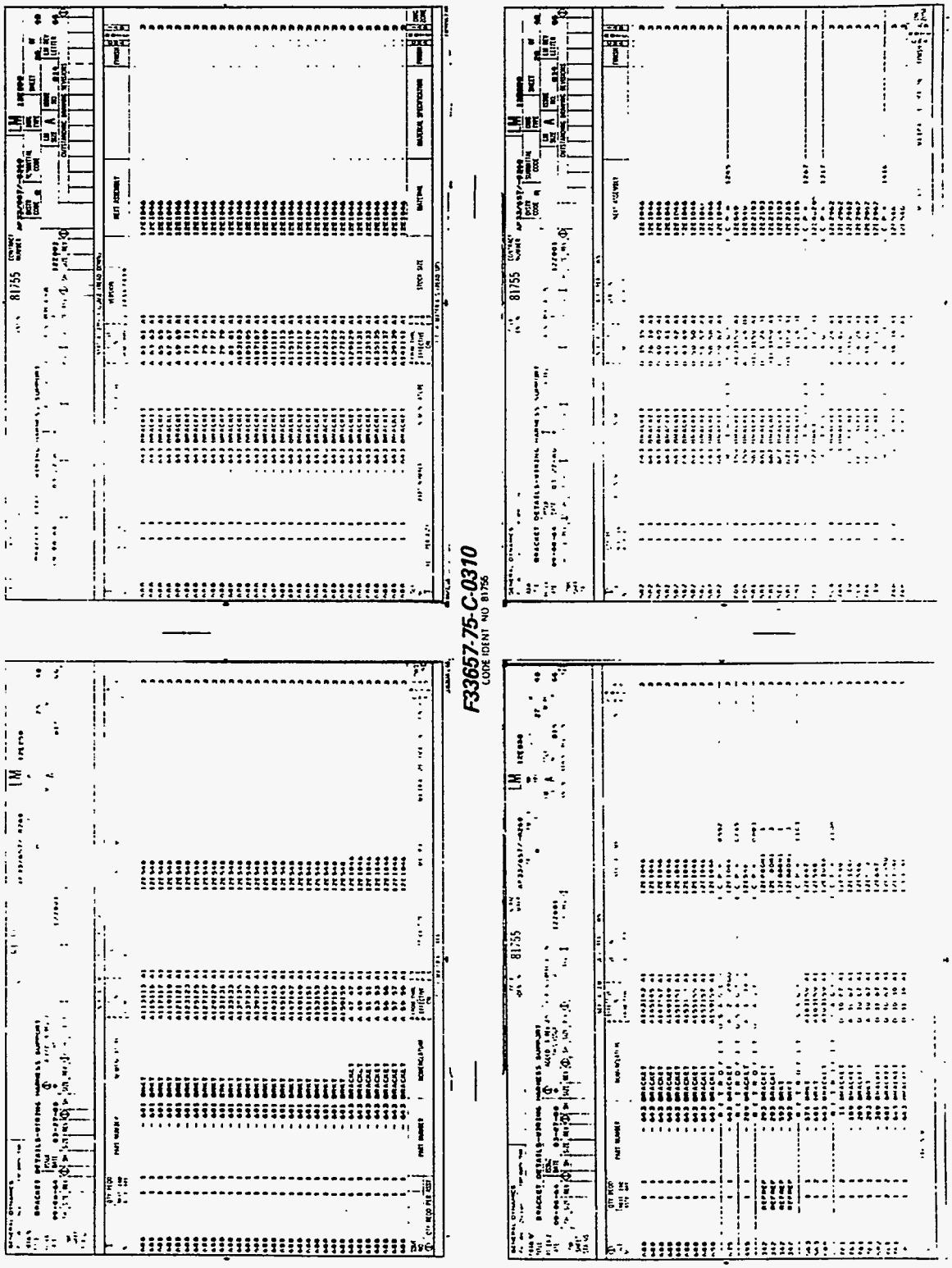
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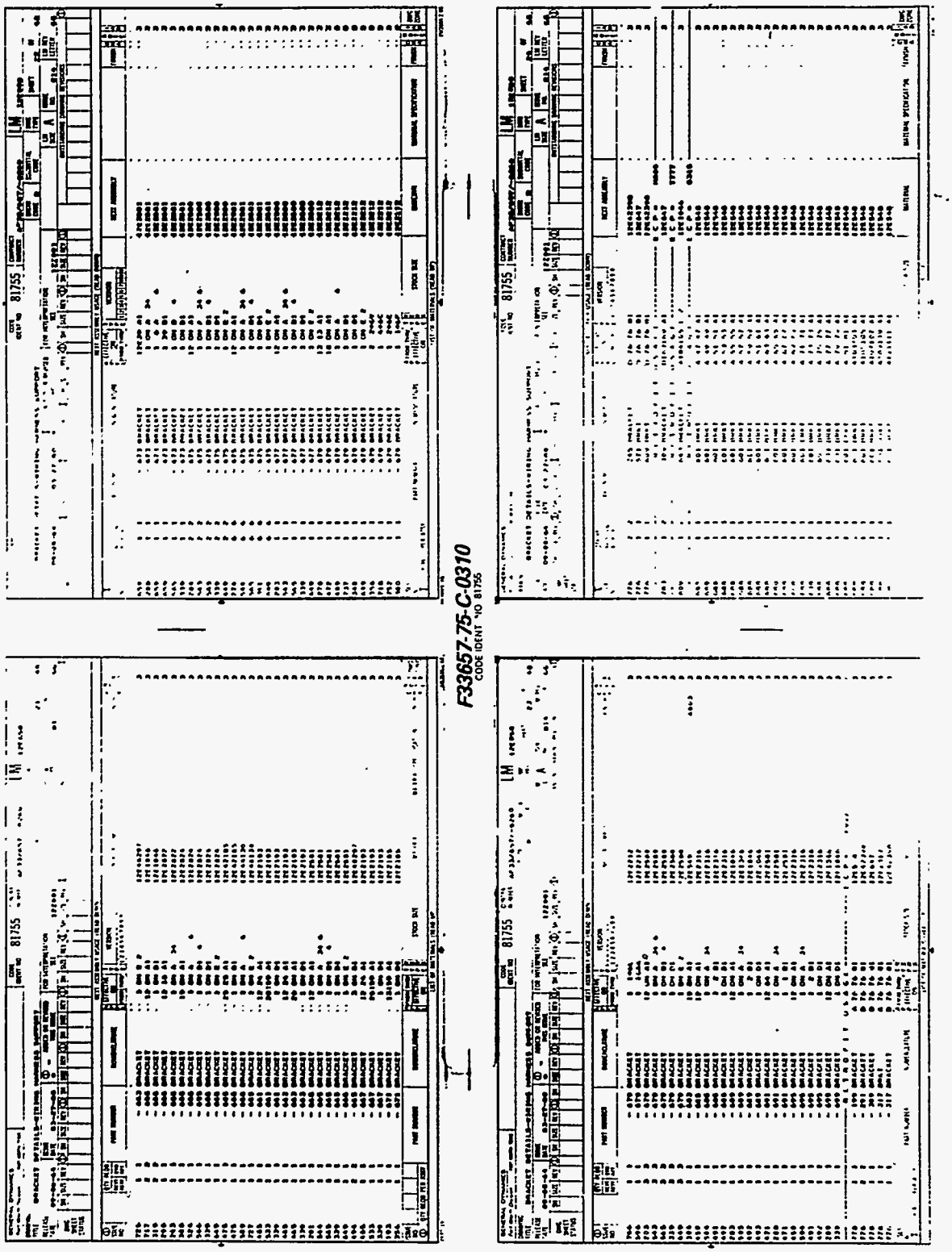
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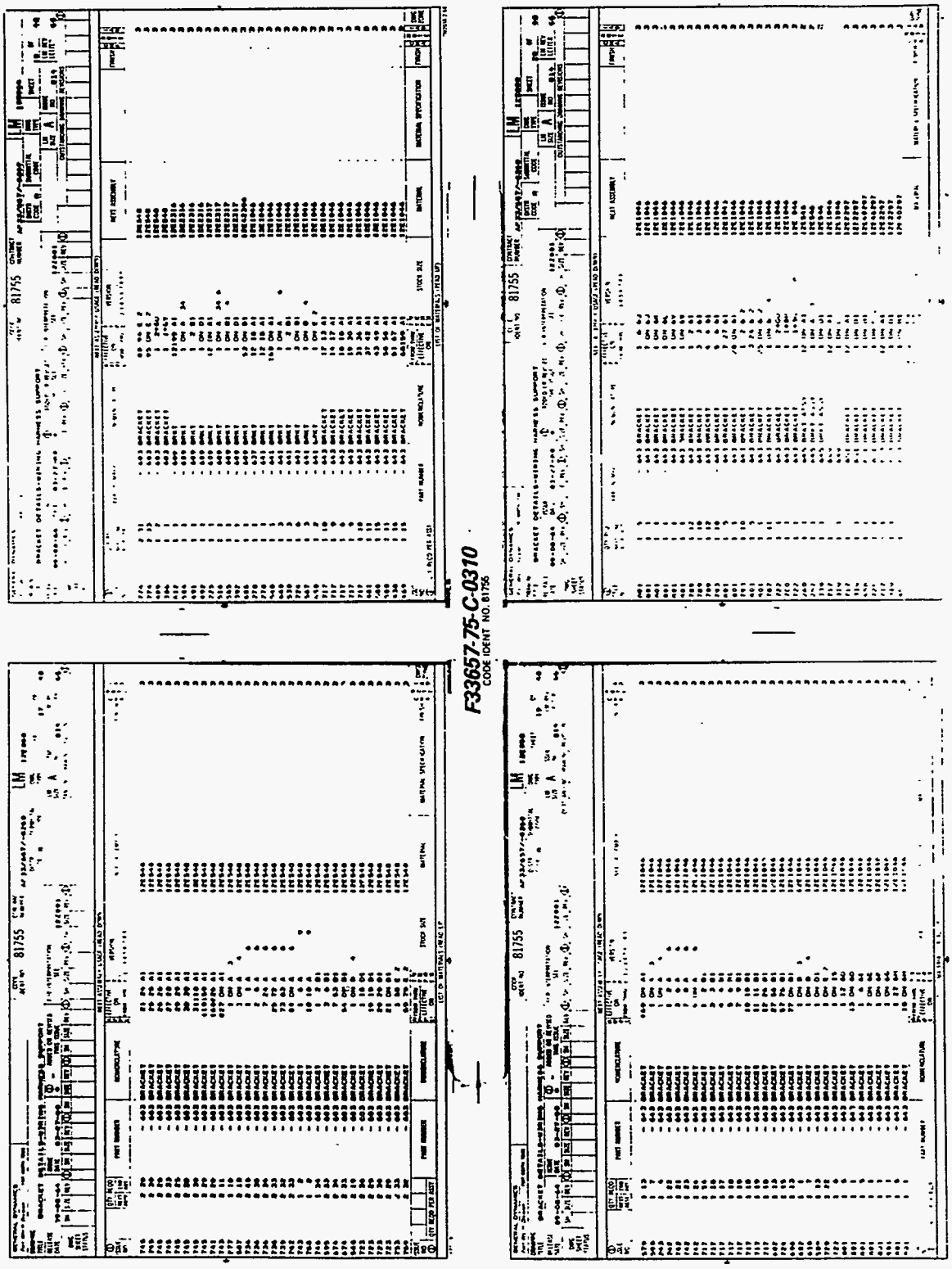
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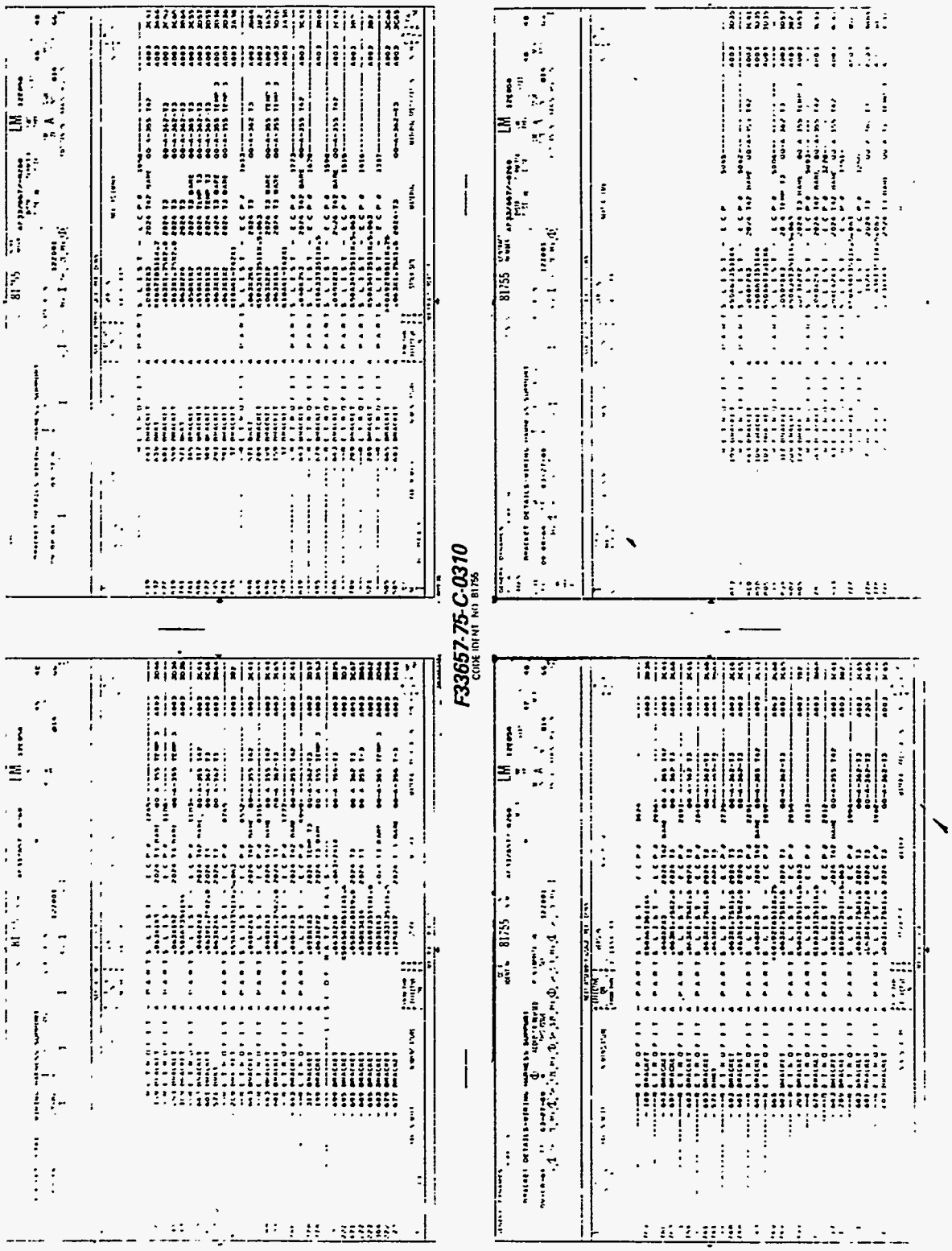
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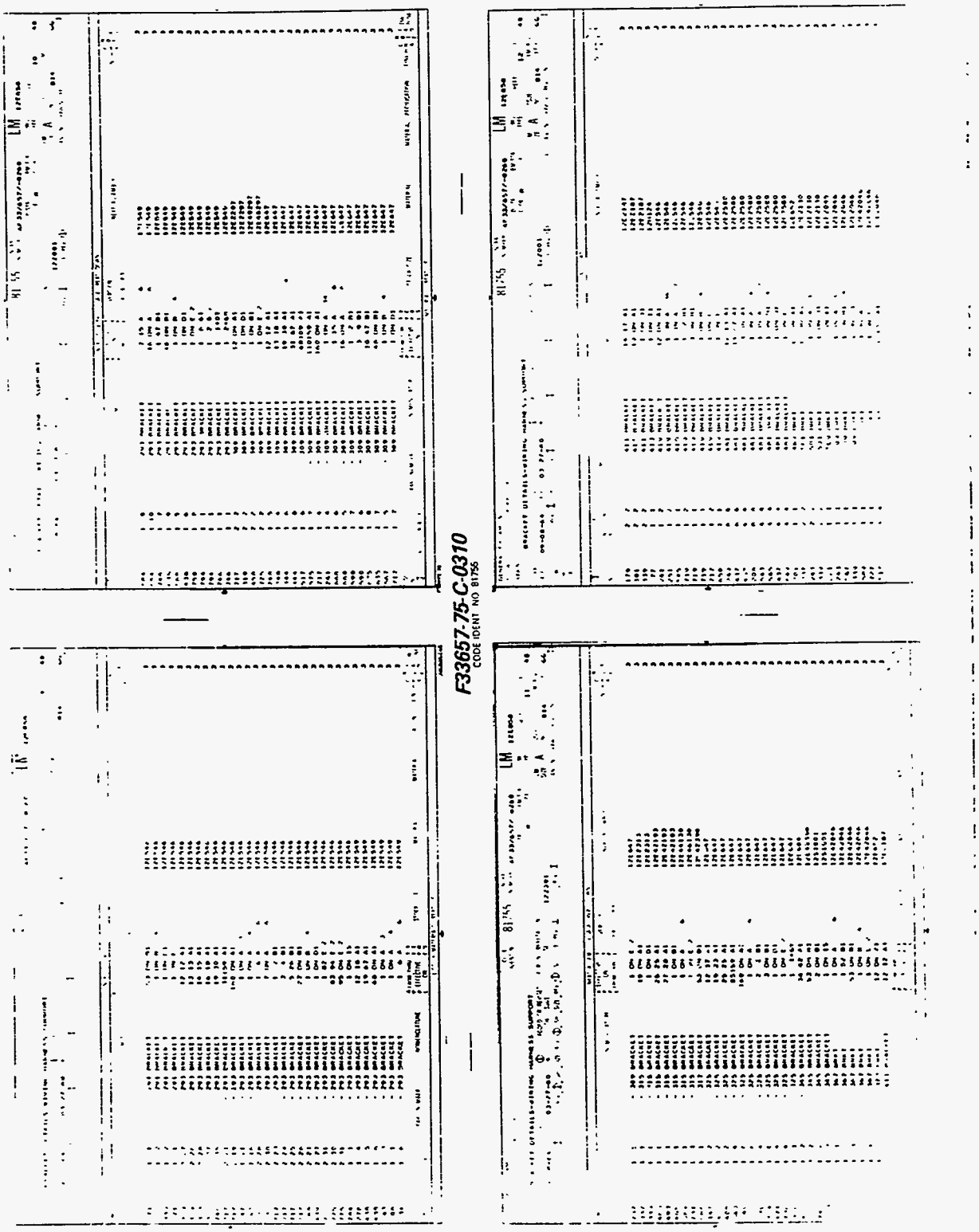
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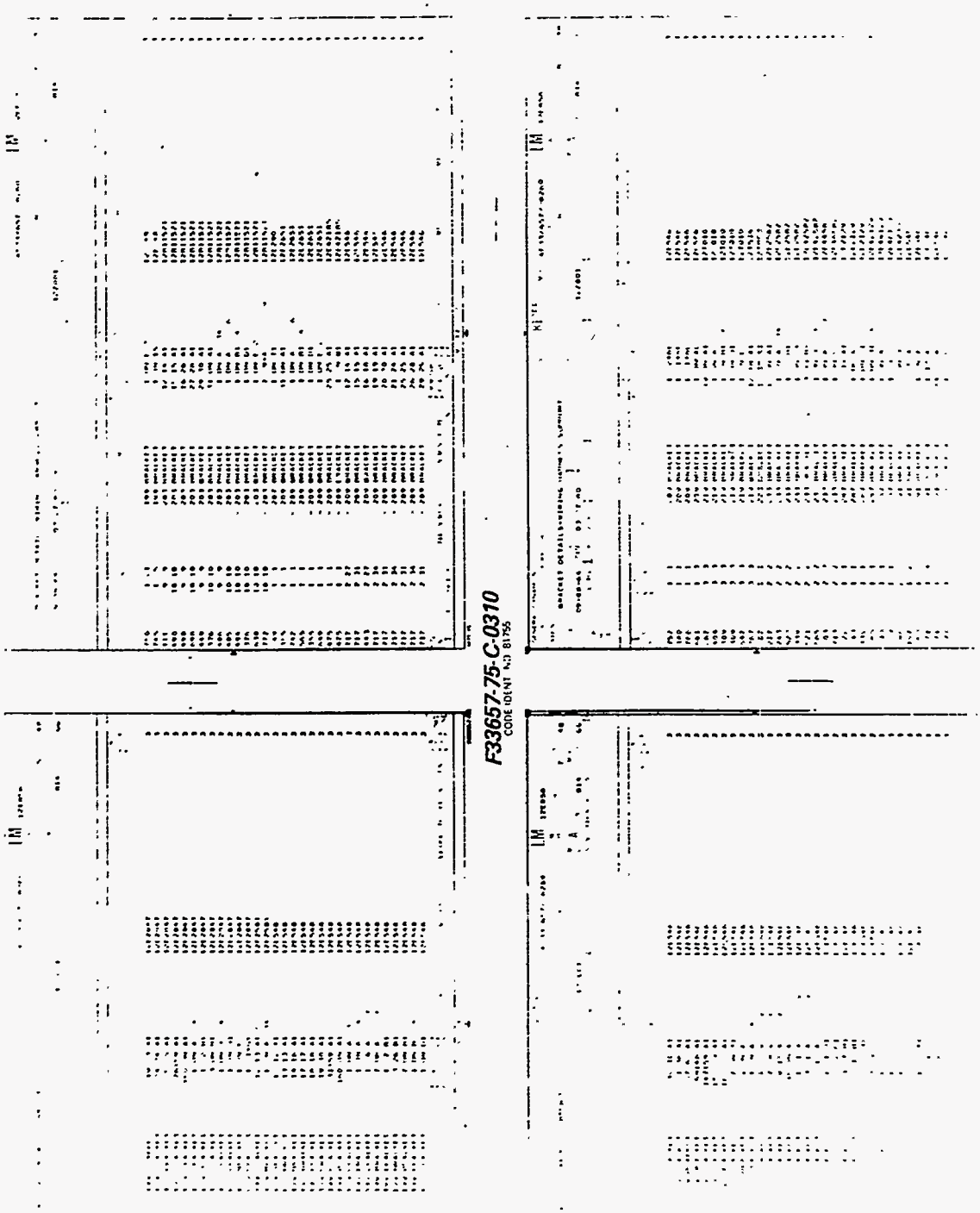
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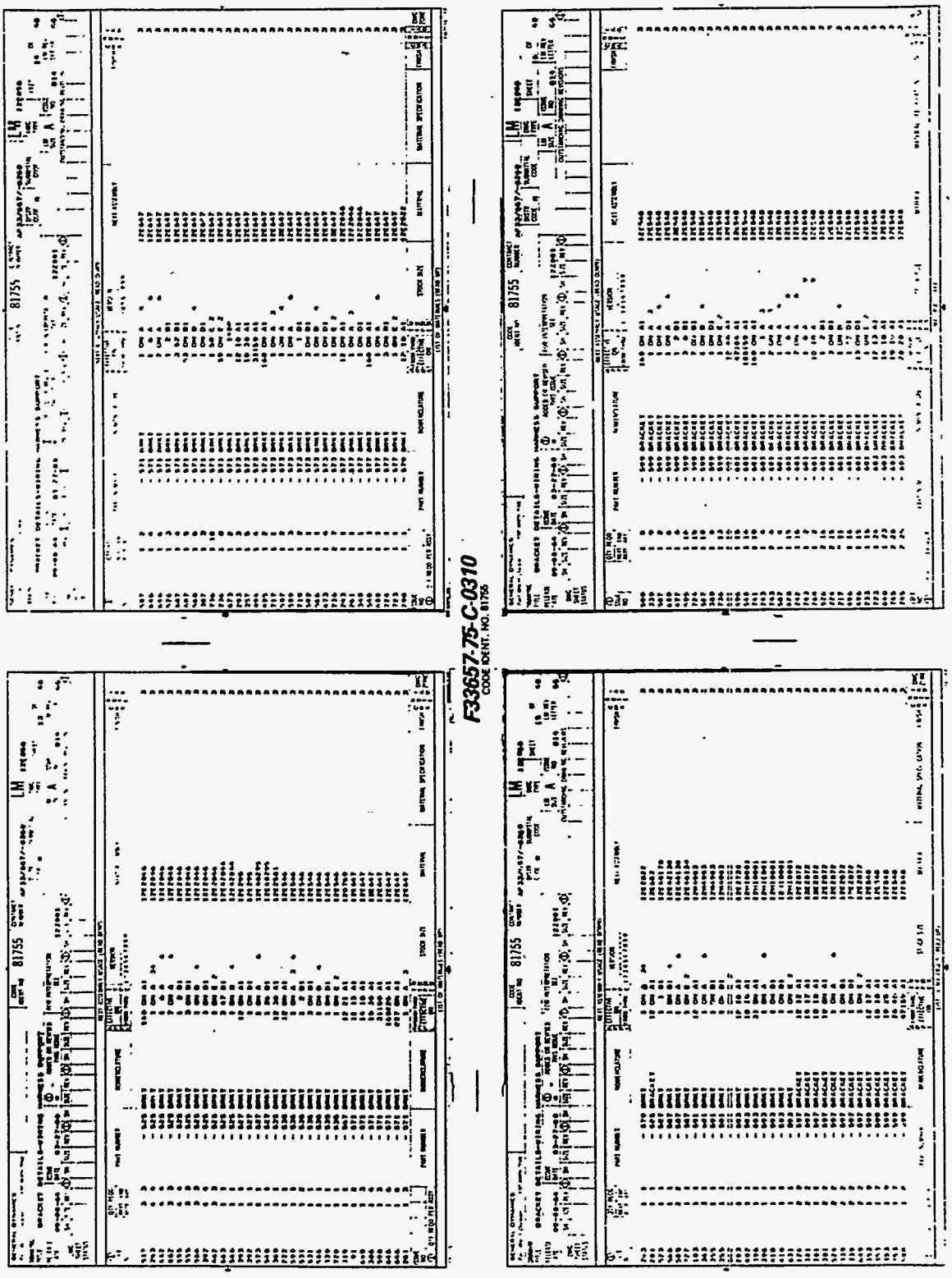
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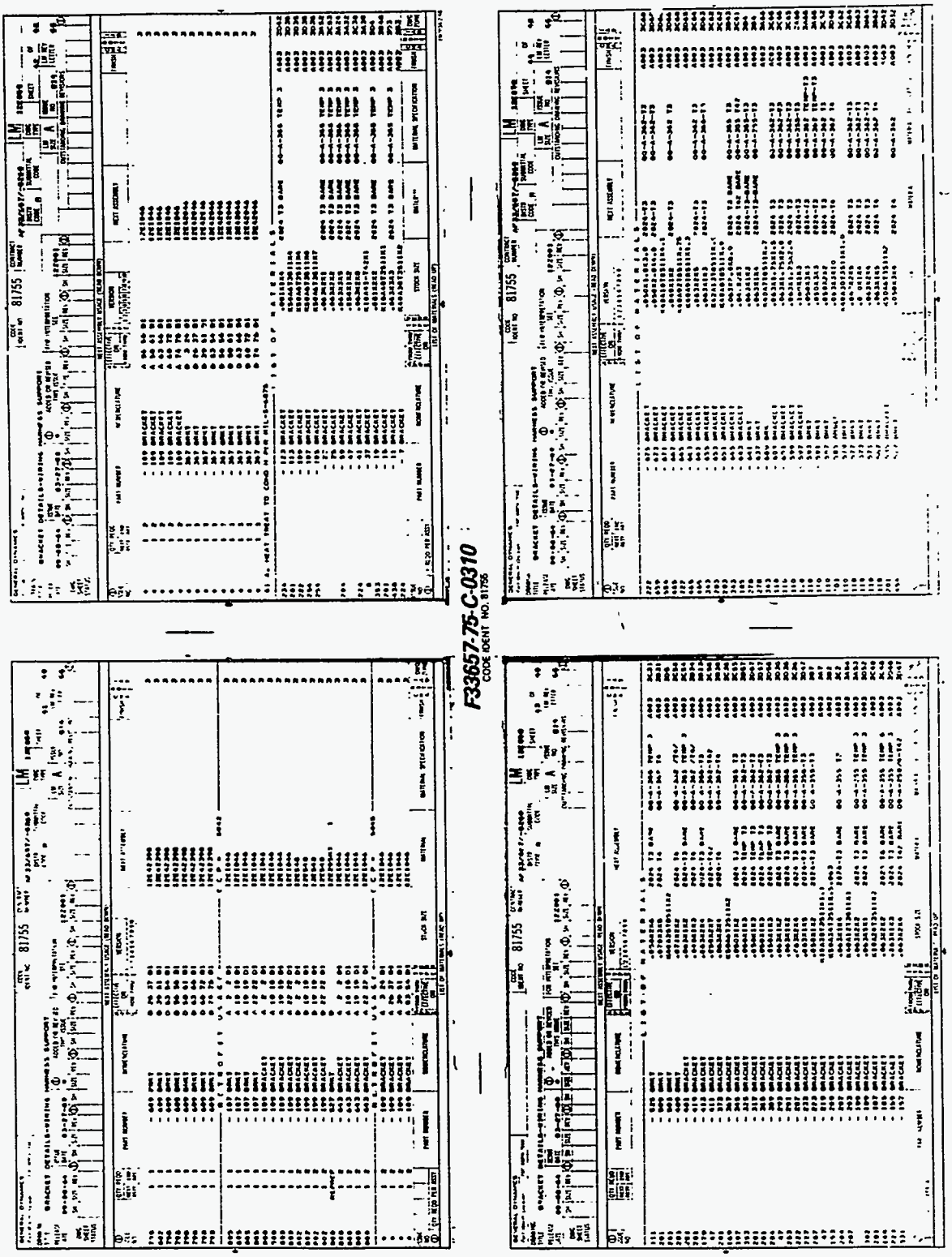

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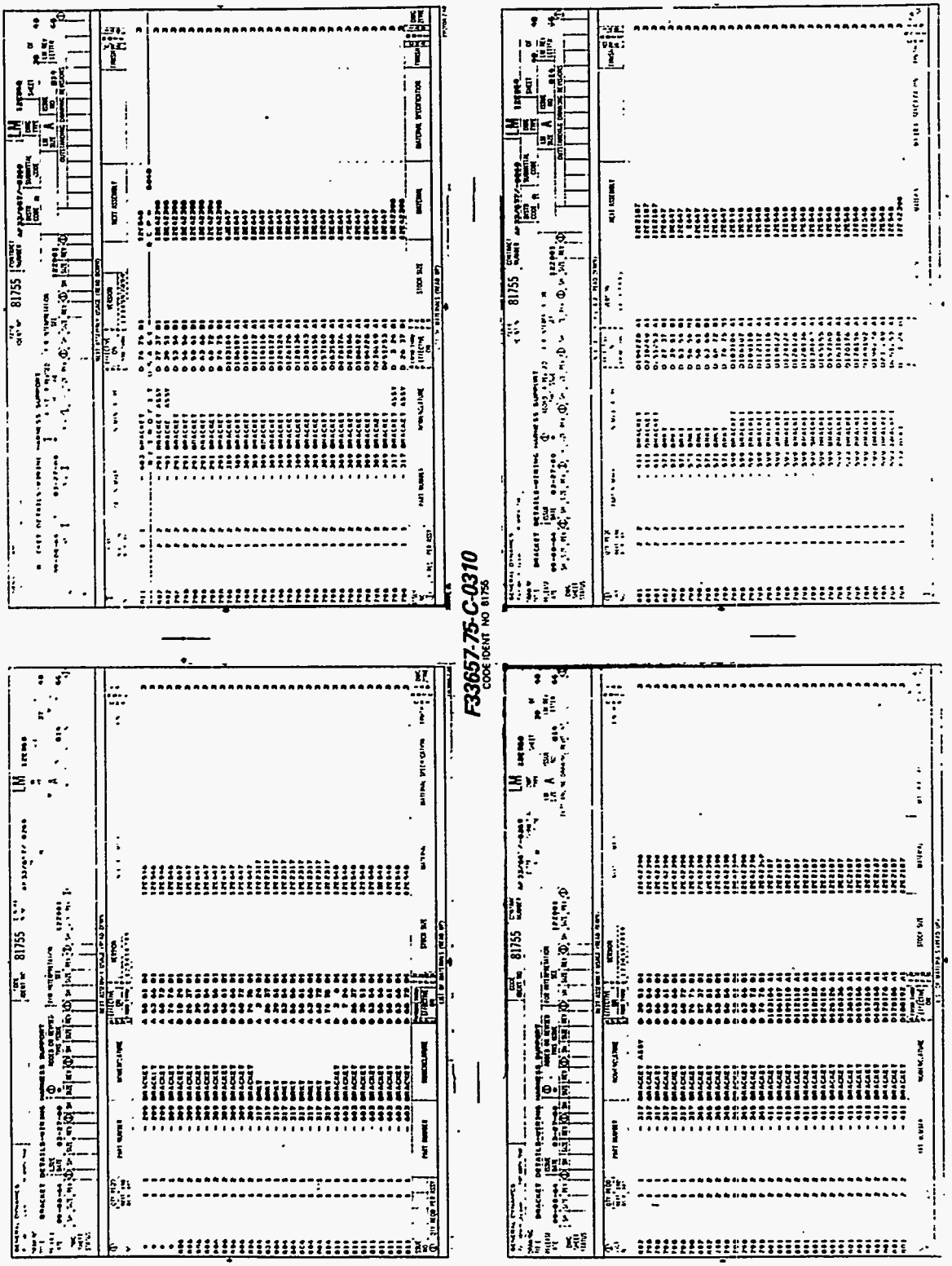
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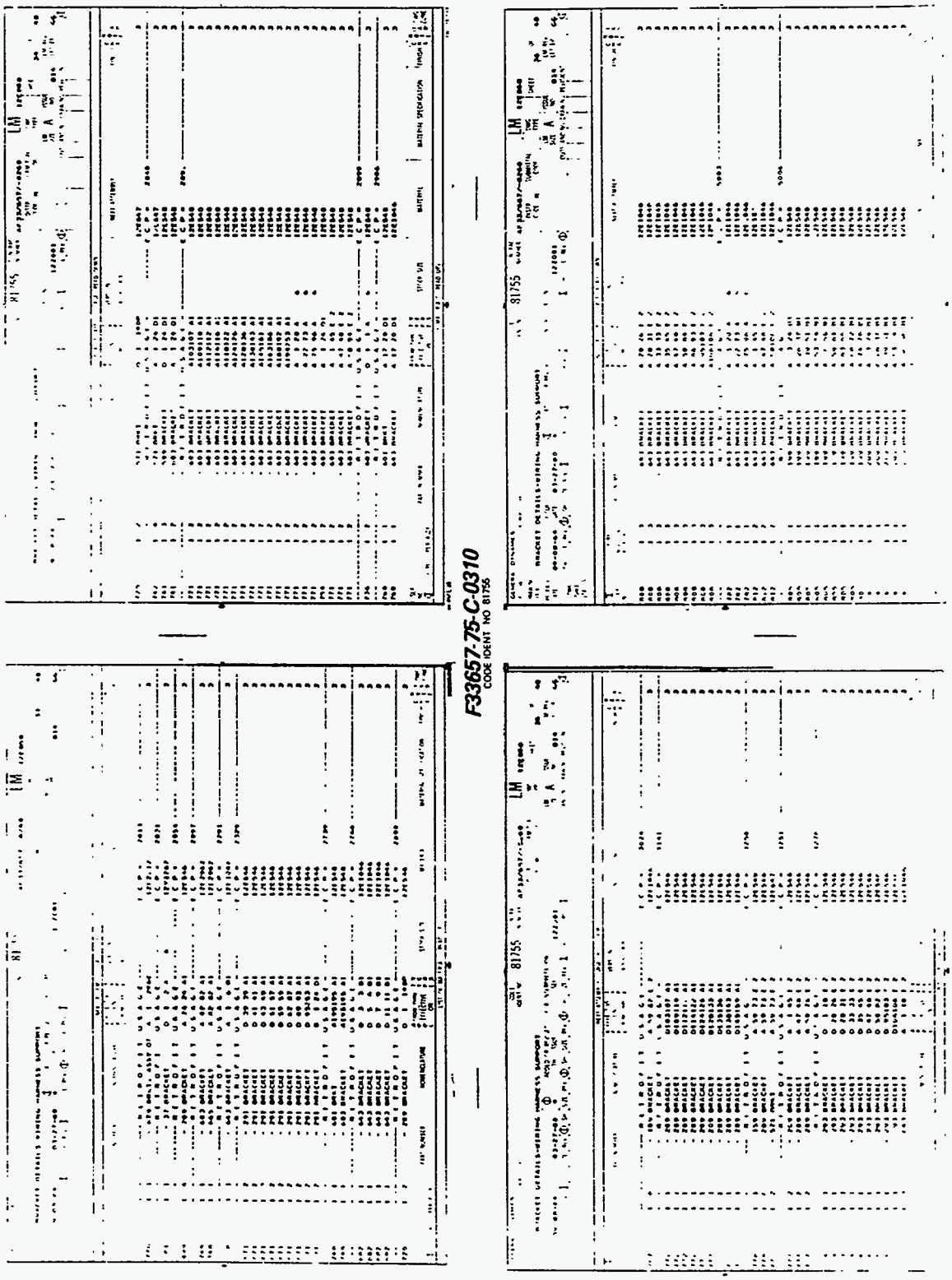
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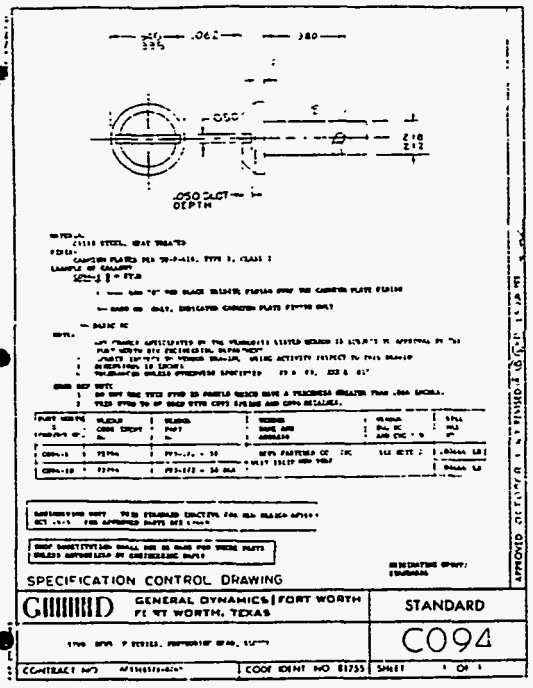


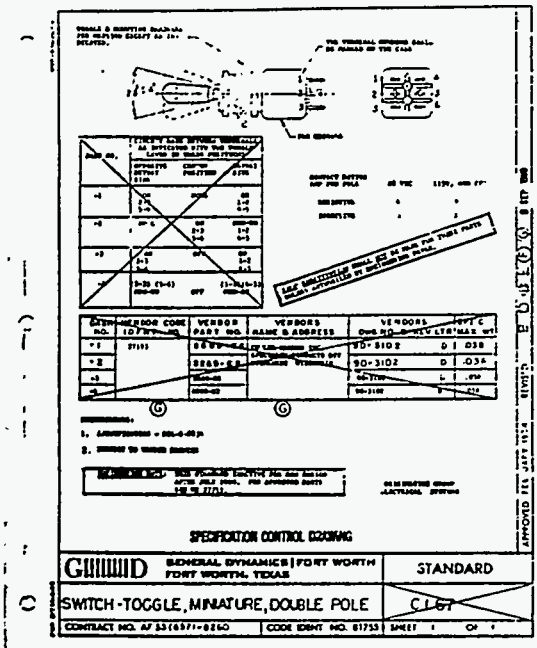
SPECIFICATION CONTROL DRAWING

GENERAL DYNAMICS | FORT WORTH
FT WORTH, TEXAS

STANDARD

C094

CONTRACT NO | CODE IDENT NO 81755 | SHEET 1 OF 1



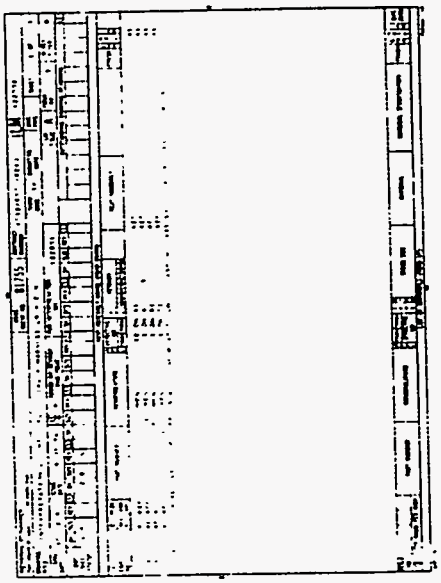
SPECIFICATION CONTROL DRAWING

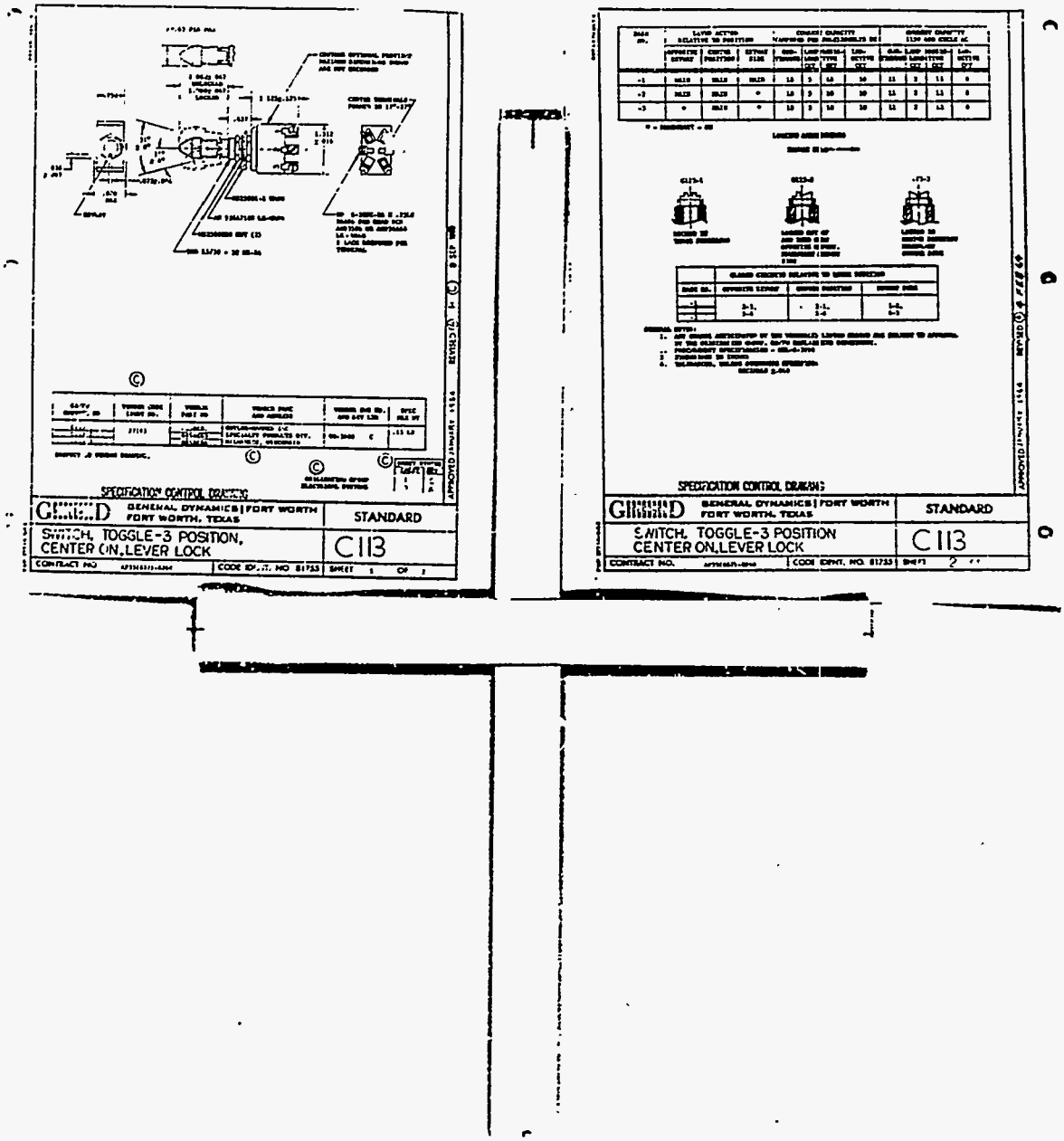
GENERAL DYNAMICS | FORT WORTH
FORT WORTH, TEXAS

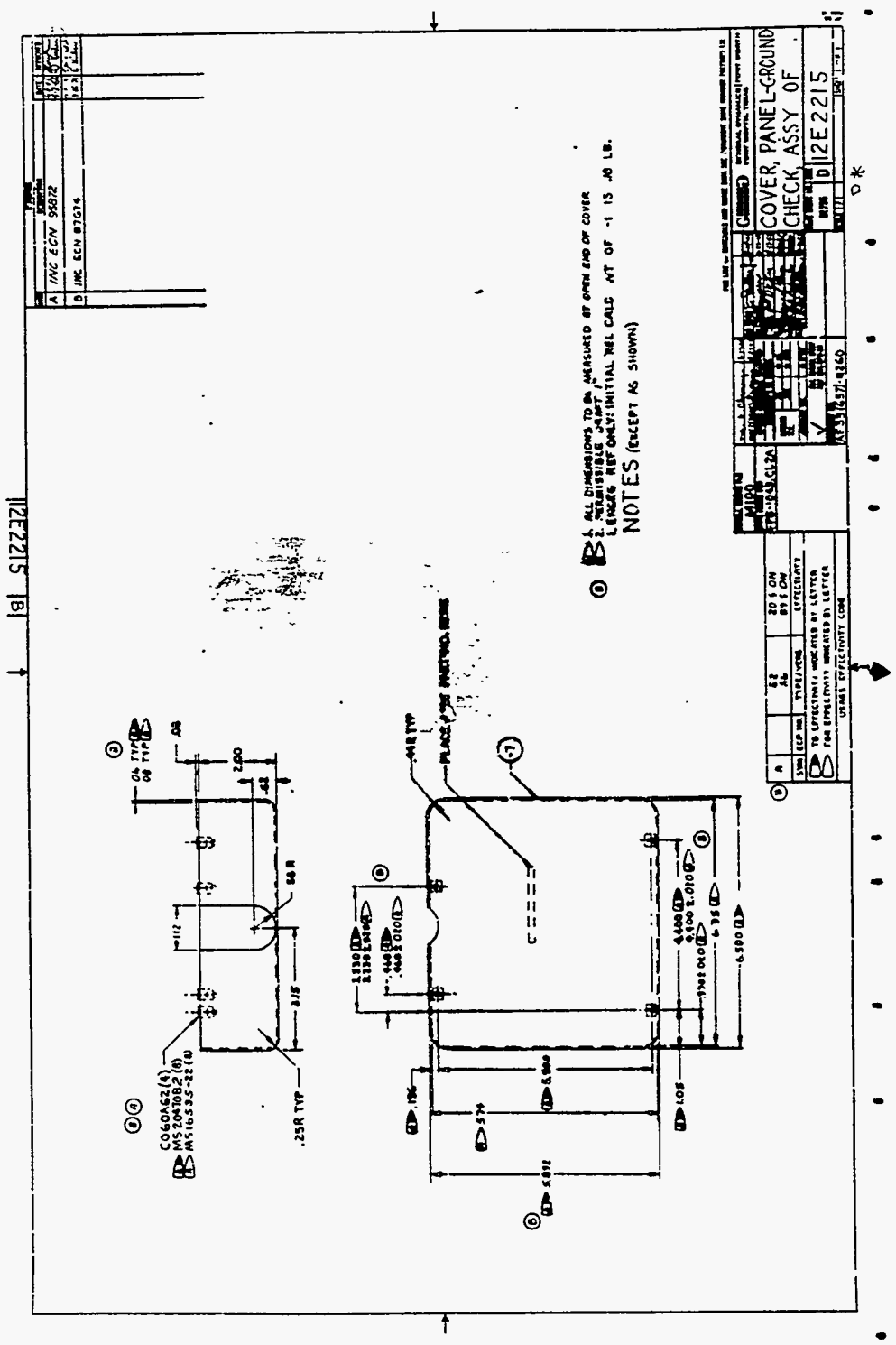
STANDARD

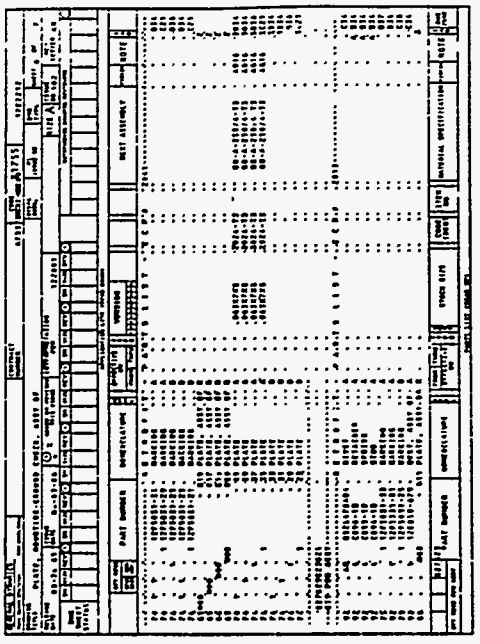
SWITCH-TOGGLE, MINATURE, DOUBLE POLE

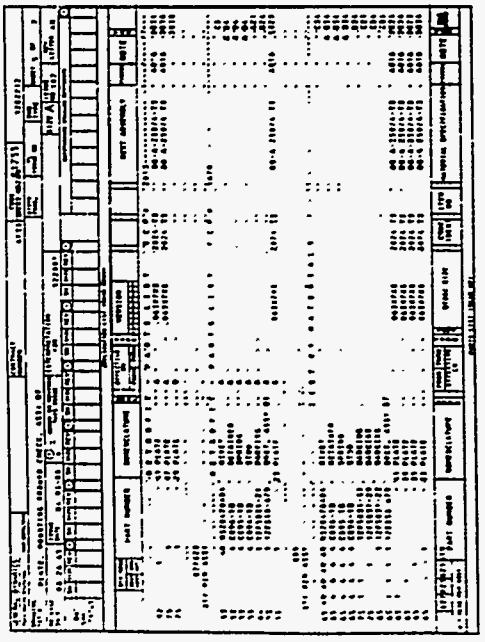
C L 67

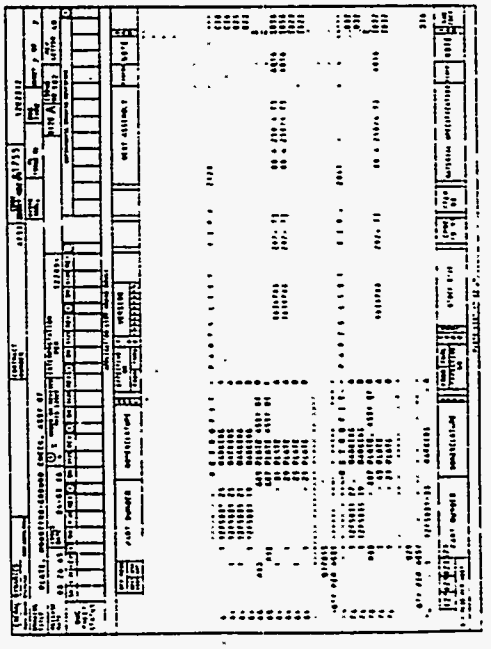


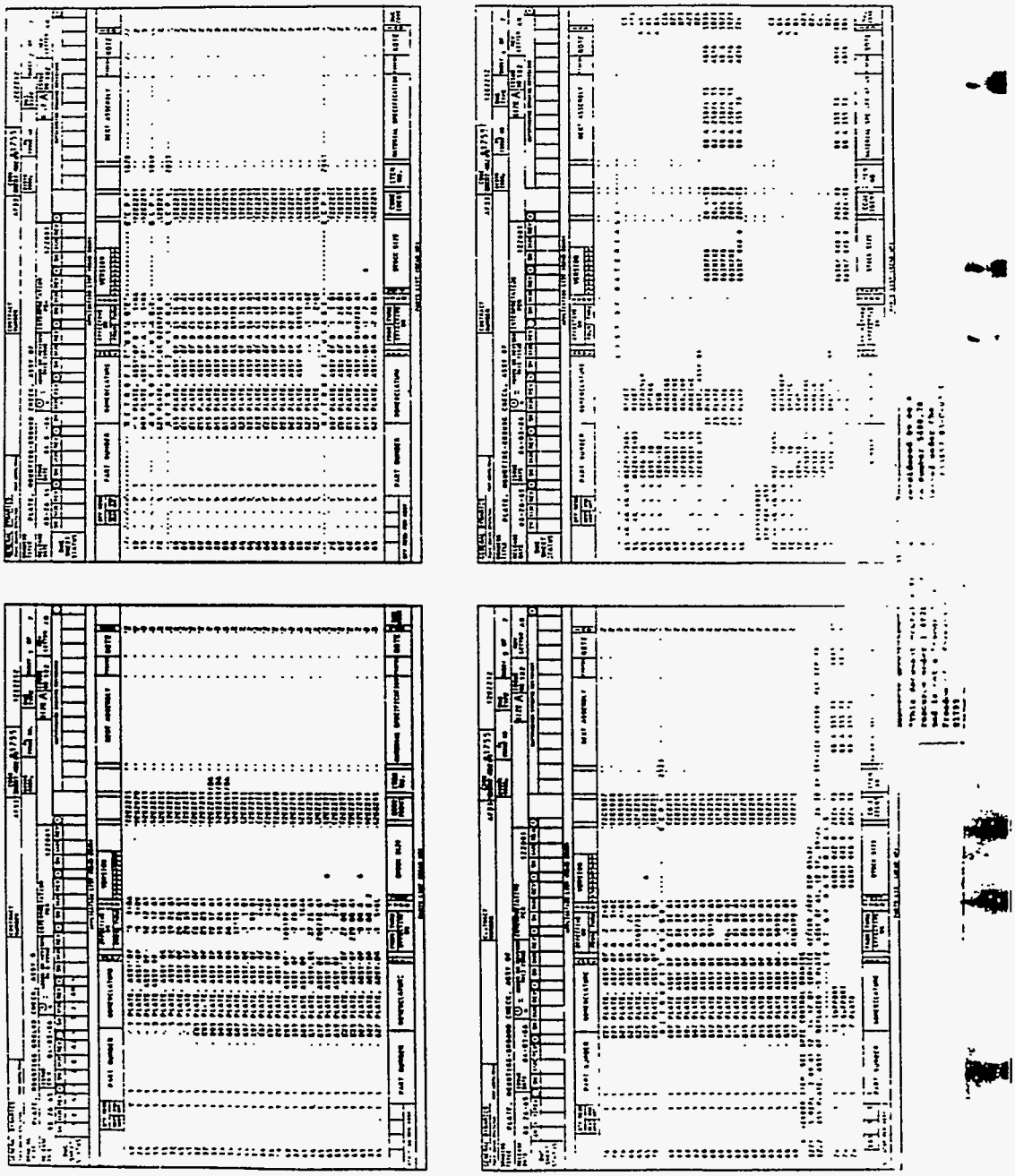

SPECIFICATION CONTROL DRAWING
GENERAL DYNAMICS | FORT WORTH
FORT WORTH, TEXAS
STANDARD
SWITCH, TOGGLE-3 POSITION,
CENTER ON, LEVER LOCK
C113
SPECIFICATION CONTROL DRAWING
GENERAL DYNAMICS | FORT WORTH
FORT WORTH, TEXAS
STANDARD
SWITCH, TOGGLE-3 POSITION
CENTER ON, LEVER LOCK
C113

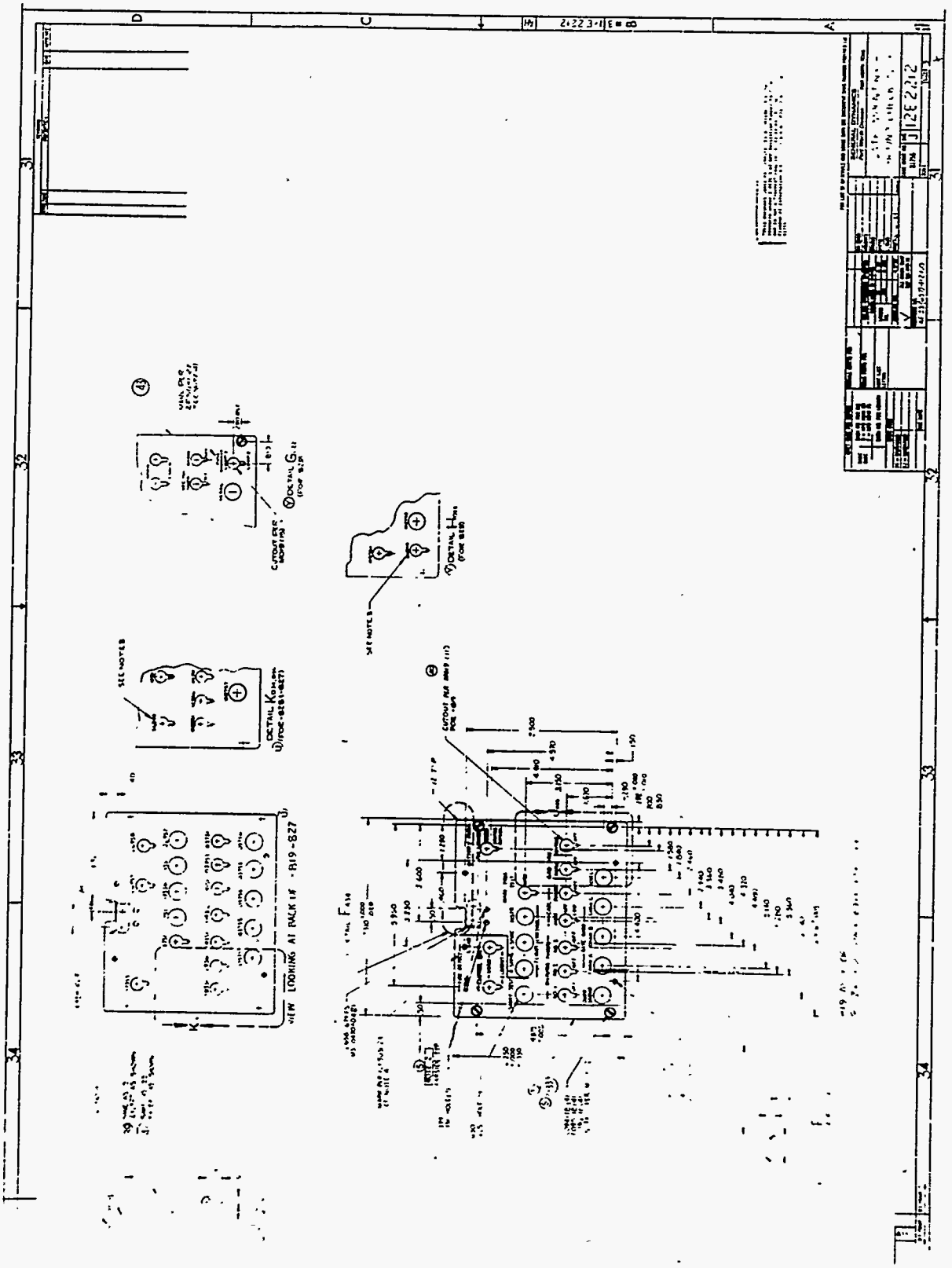

COVER, PANEL-GROUND
CHECK, ASSY OF
12E2215
NOTES (EXCEPT AS SHOWN)

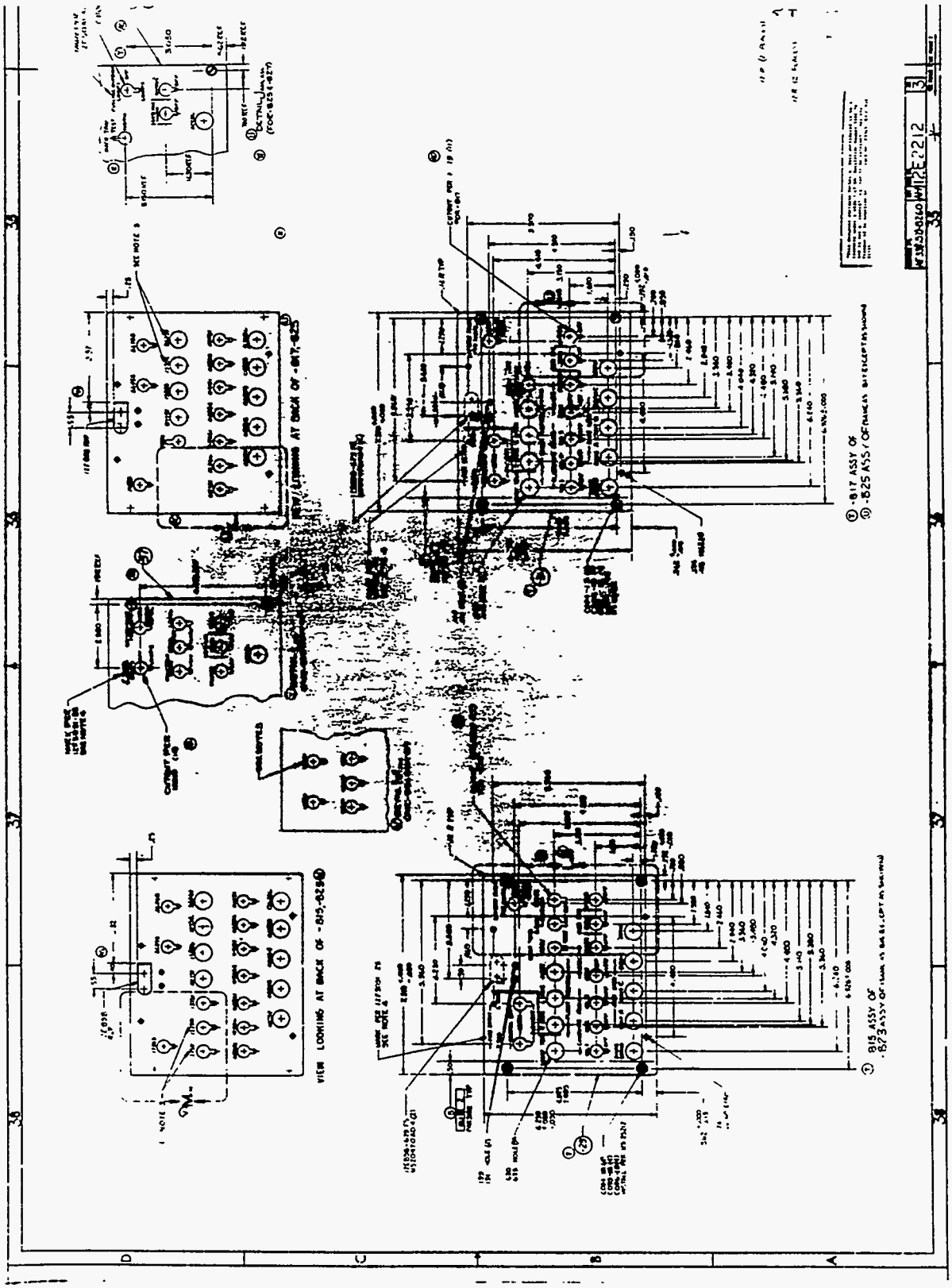


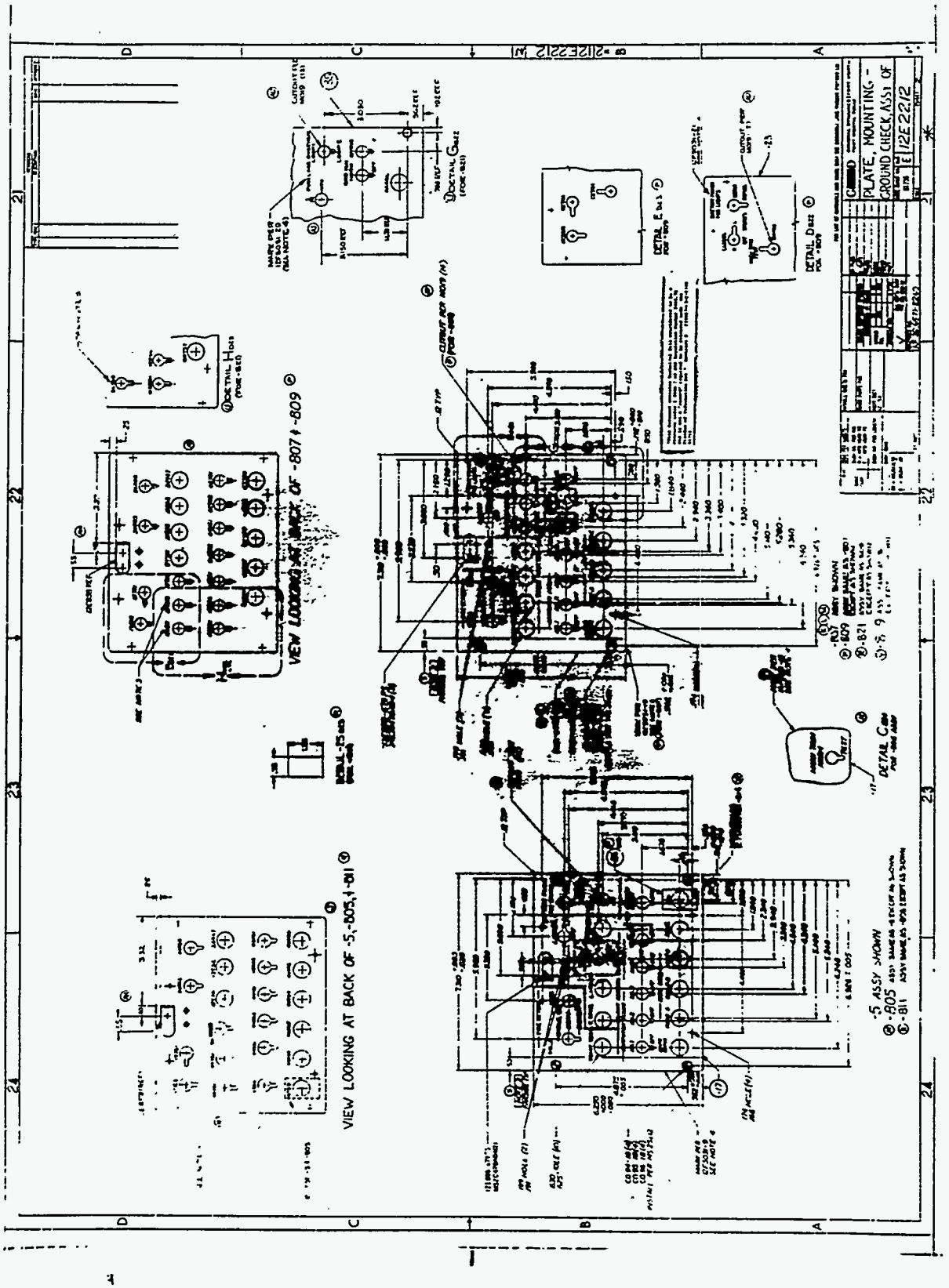


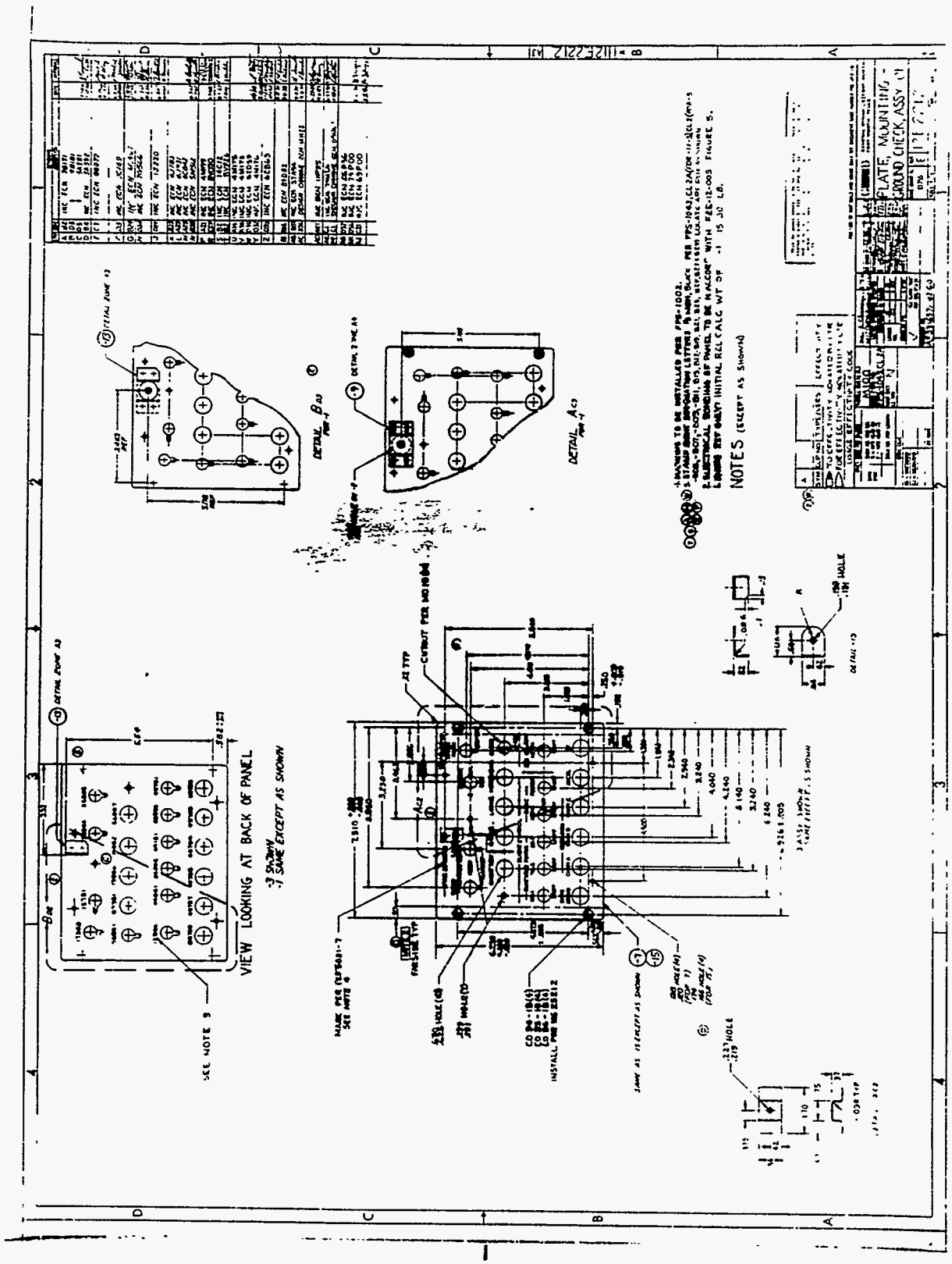


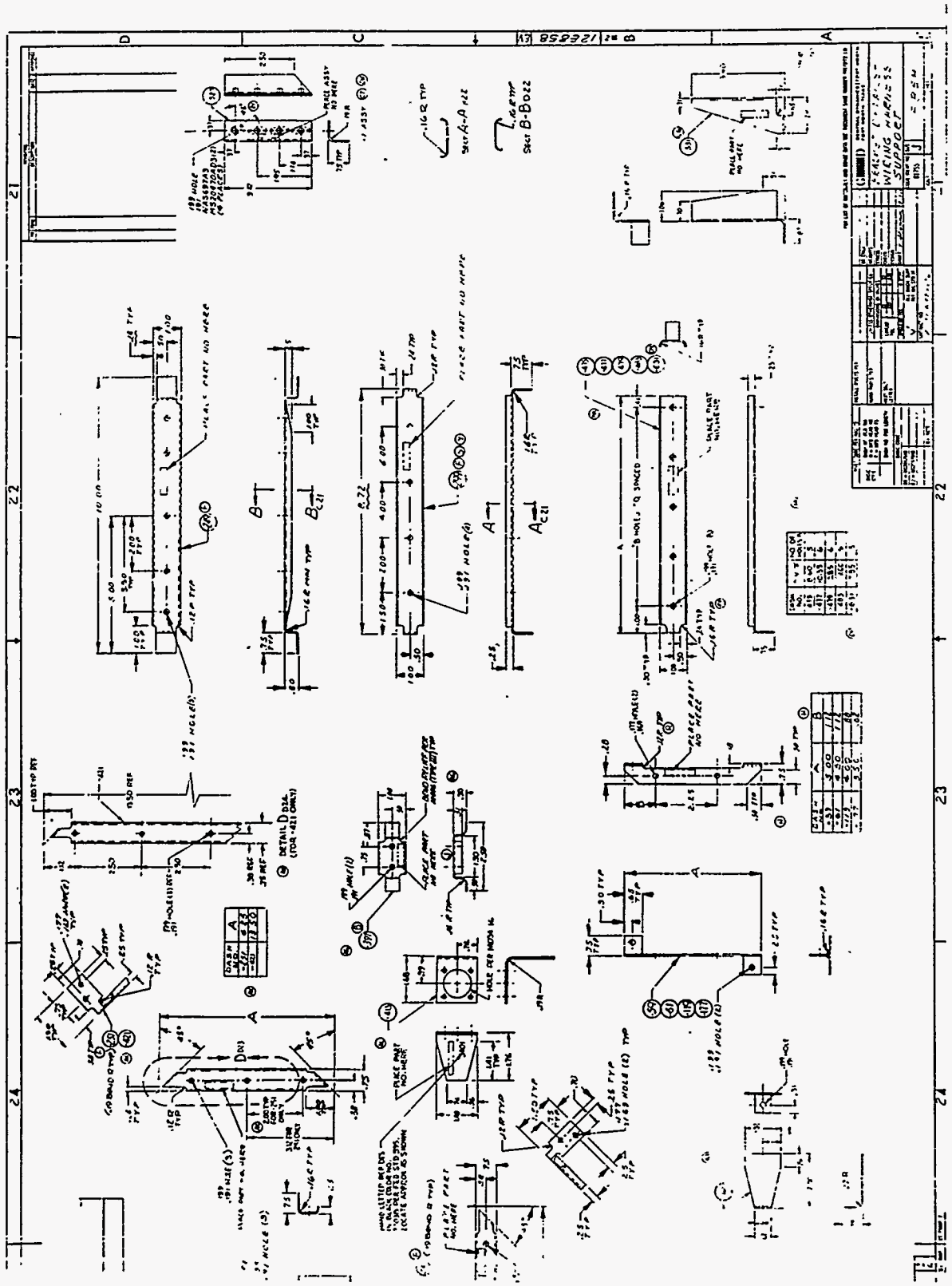


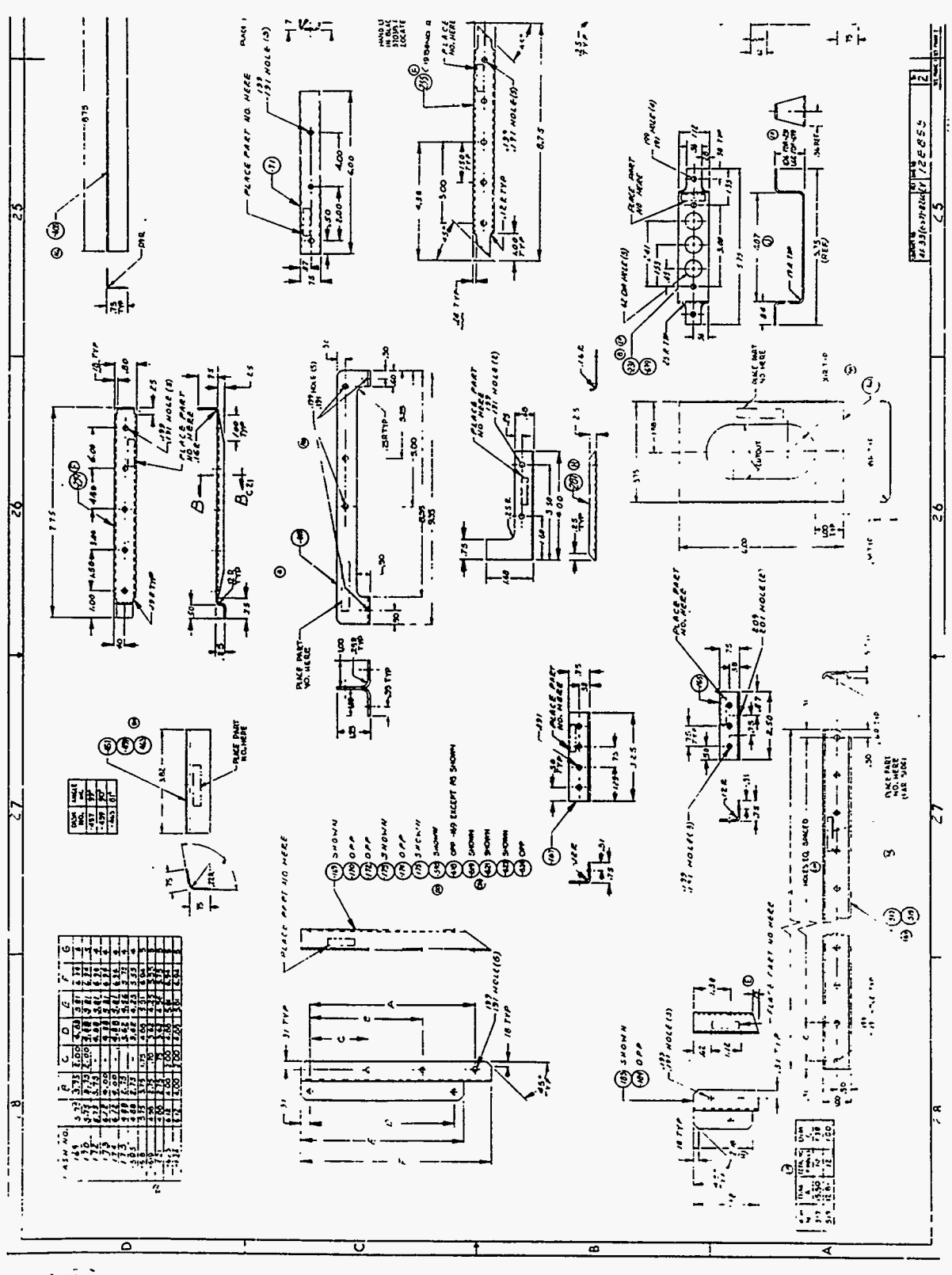


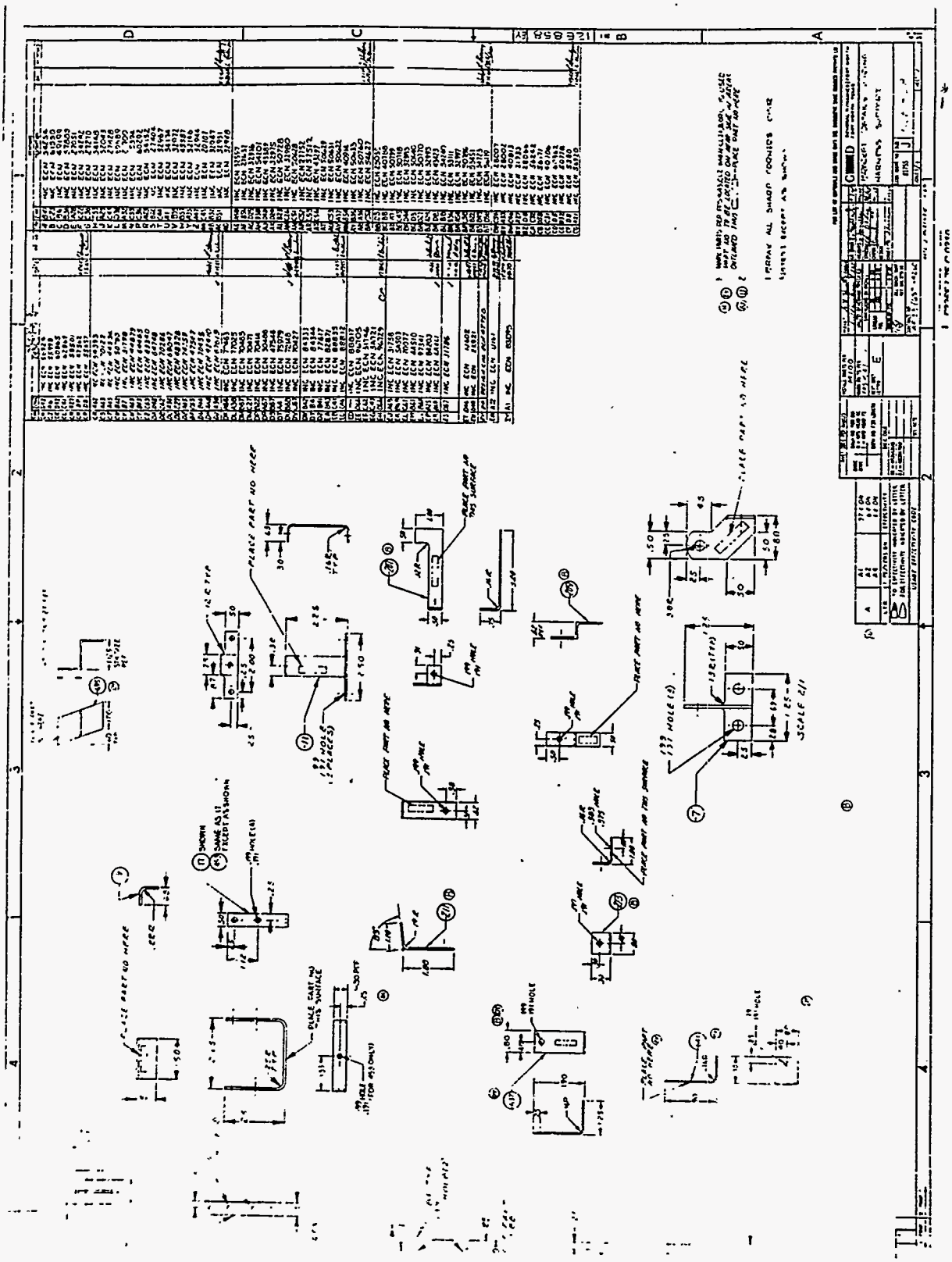


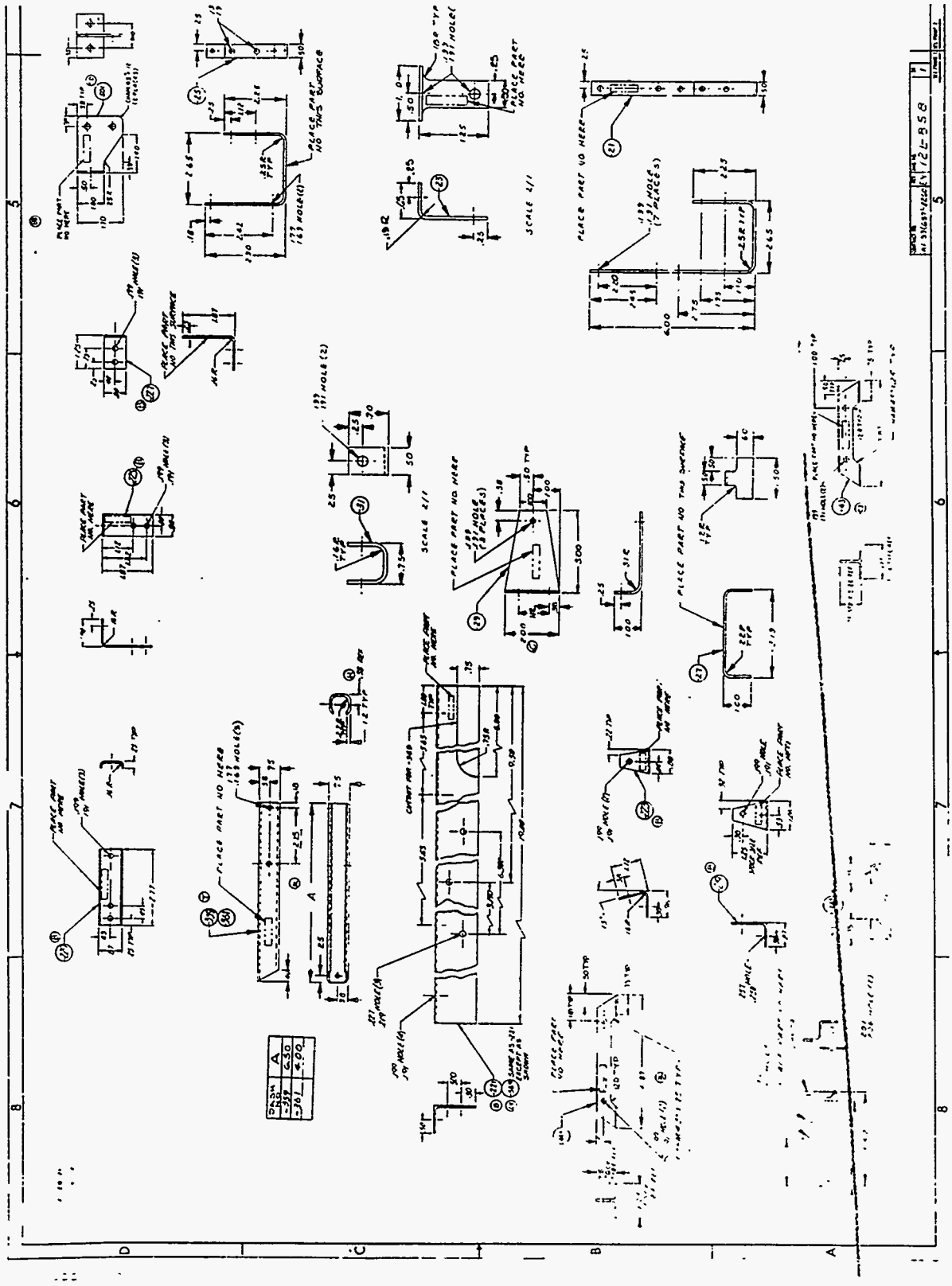

PLATE, MOUNTING - GROUND CHECK ASSY OF
VIEW LOOKING AT BACK OF -807 & -809
VIEW LOOKING AT BACK OF -5, -805, & -811
DETAIL C
-5 ASSY SHOWN
-805
-811

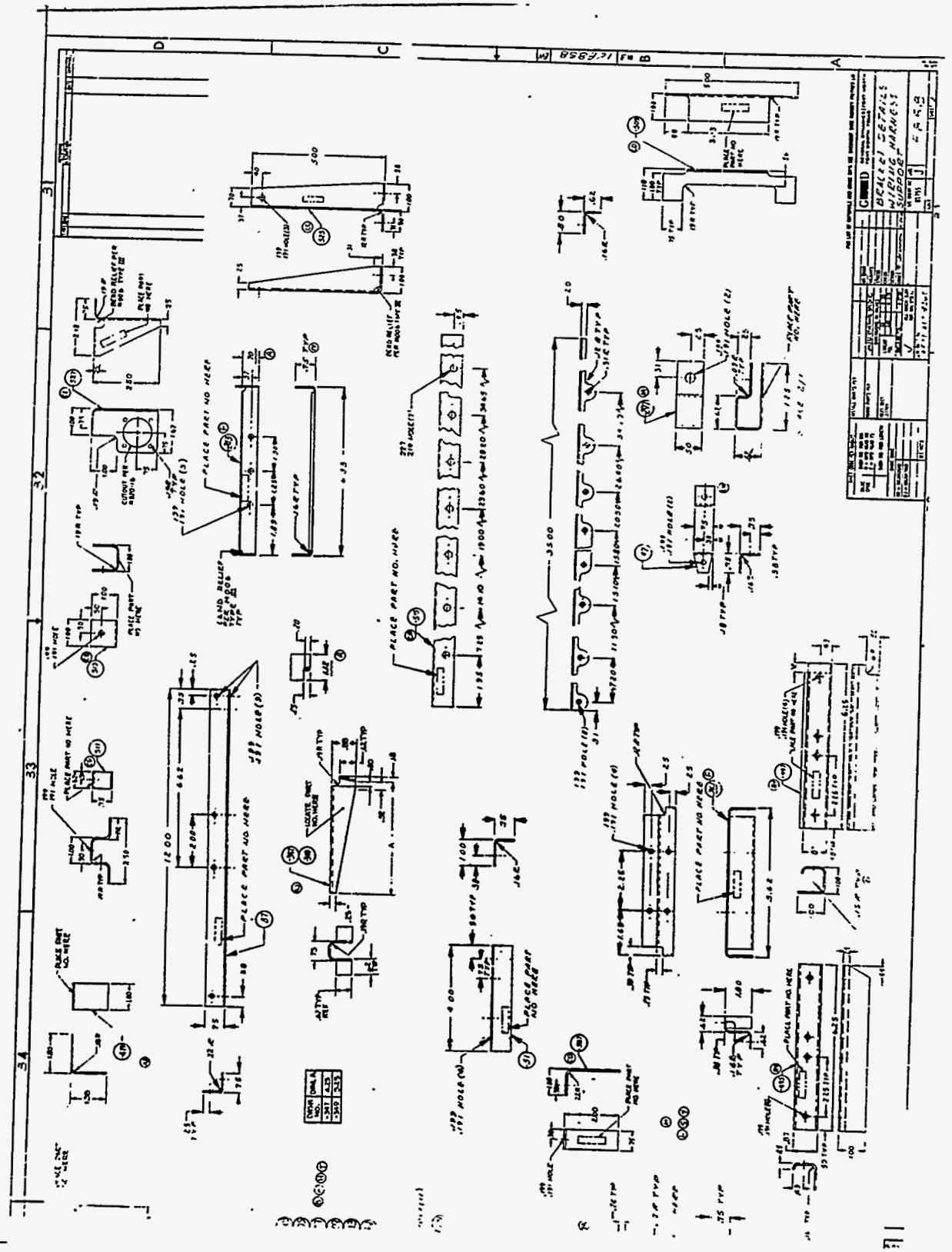

NOTES (EXCEPT AS SHOWN)
VIEW LOOKING AT BACK OF PANEL
SEE NOTE 9
PLATE, MOUNTING -
GROUND CHECK ASSY

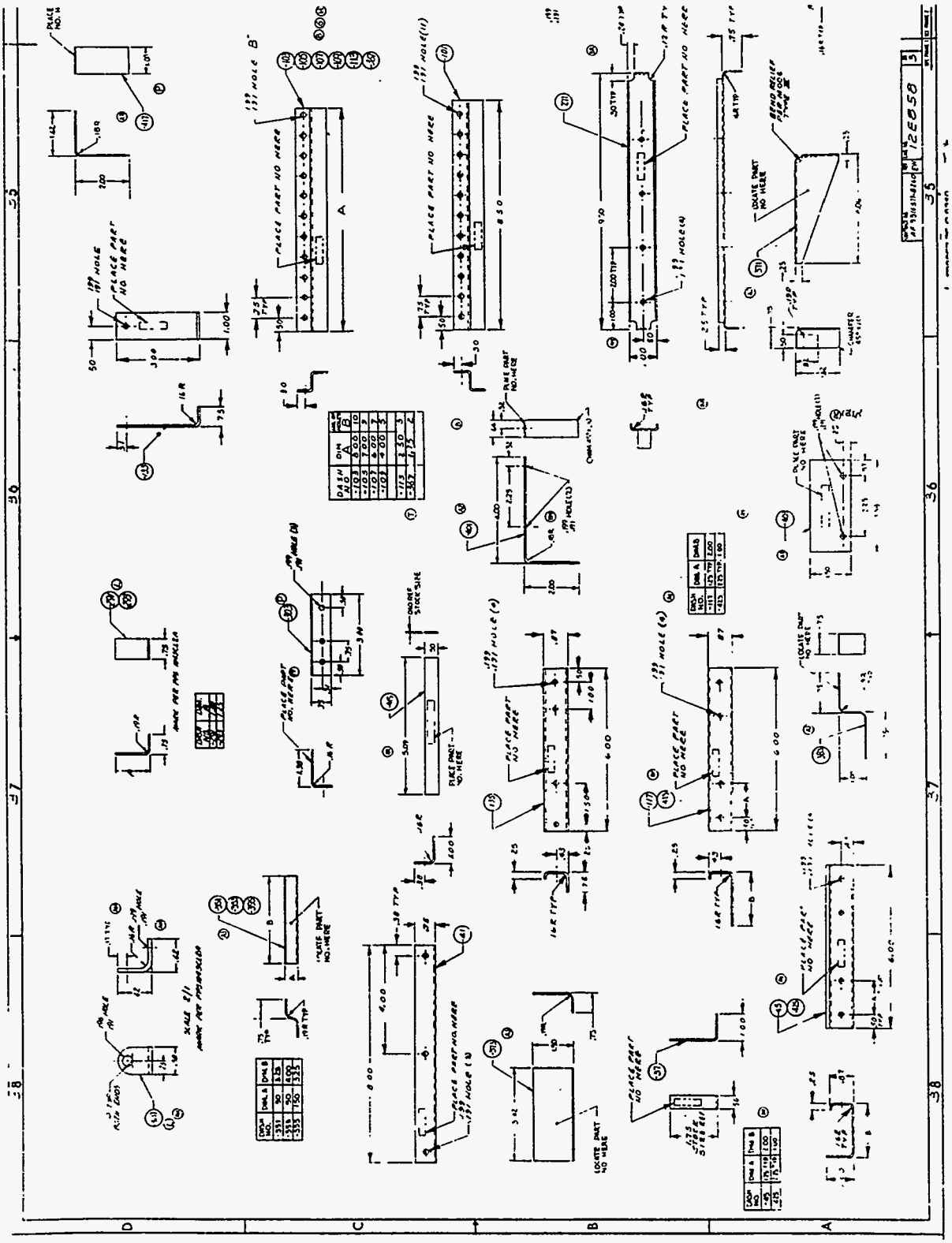


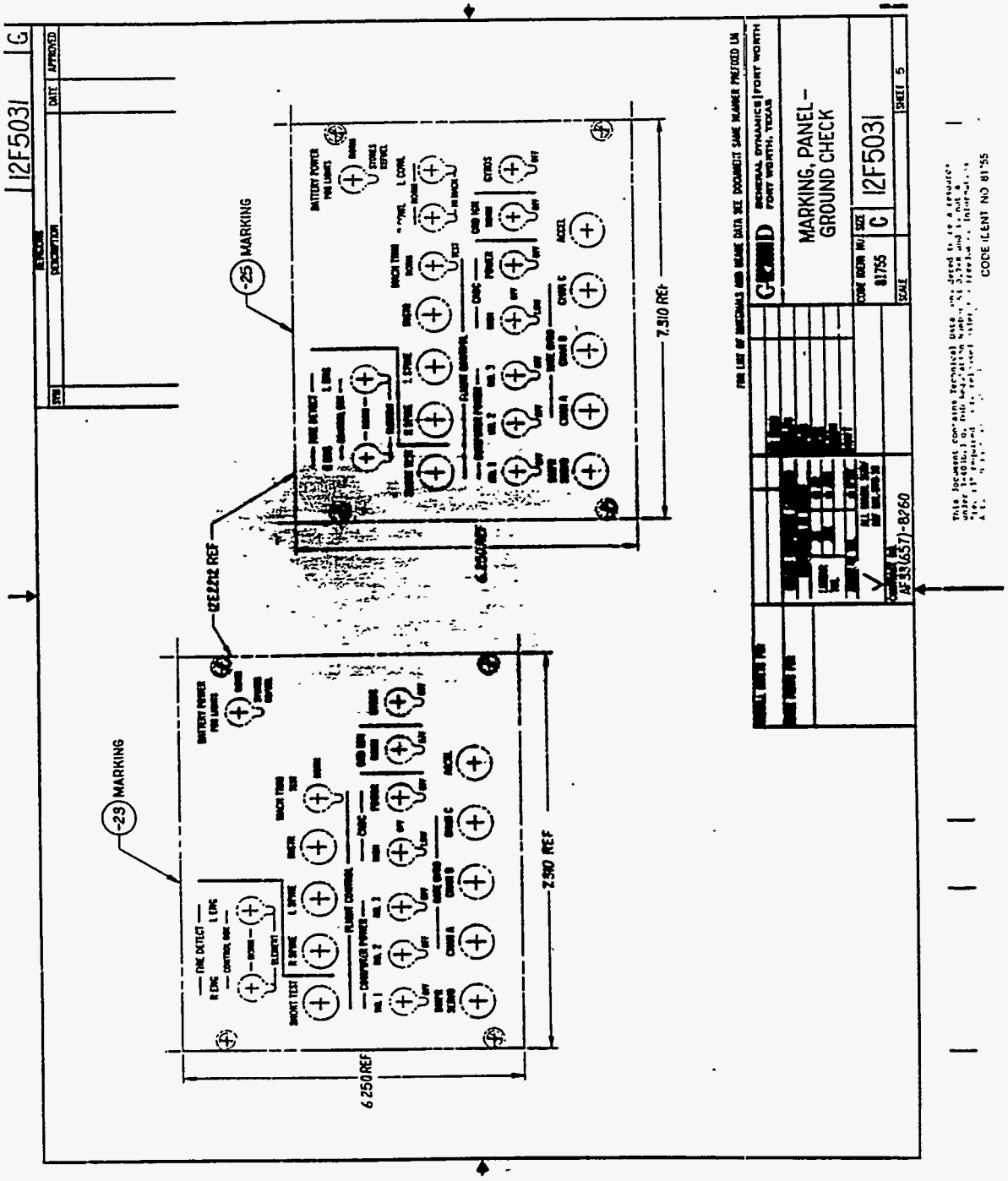


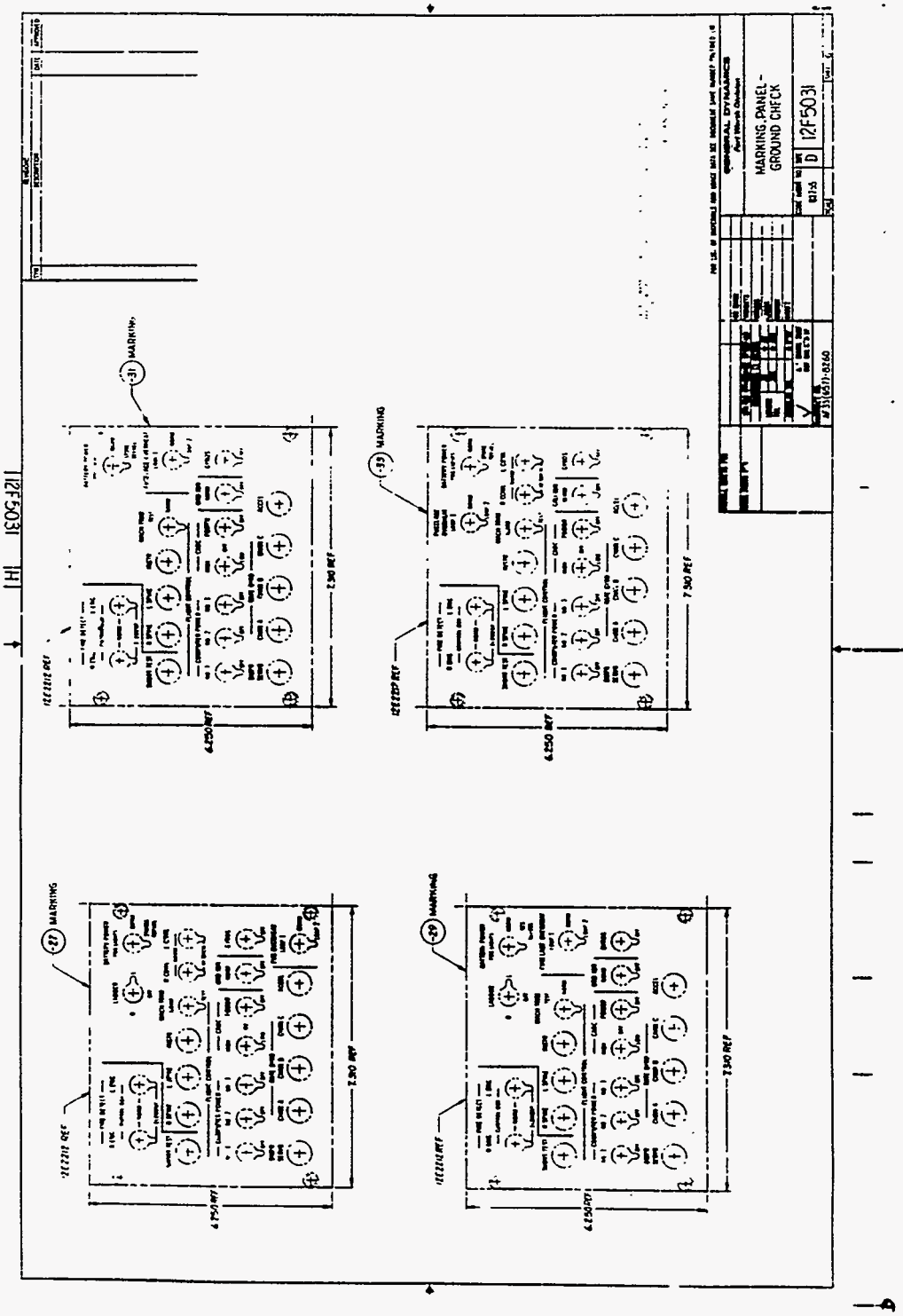









MARKING, PANEL - GROUND CHECK
12F5031
-25 MARKING
-23 MARKING
7.310 REF
7.590 REF
6.250 REF
FREEZE REF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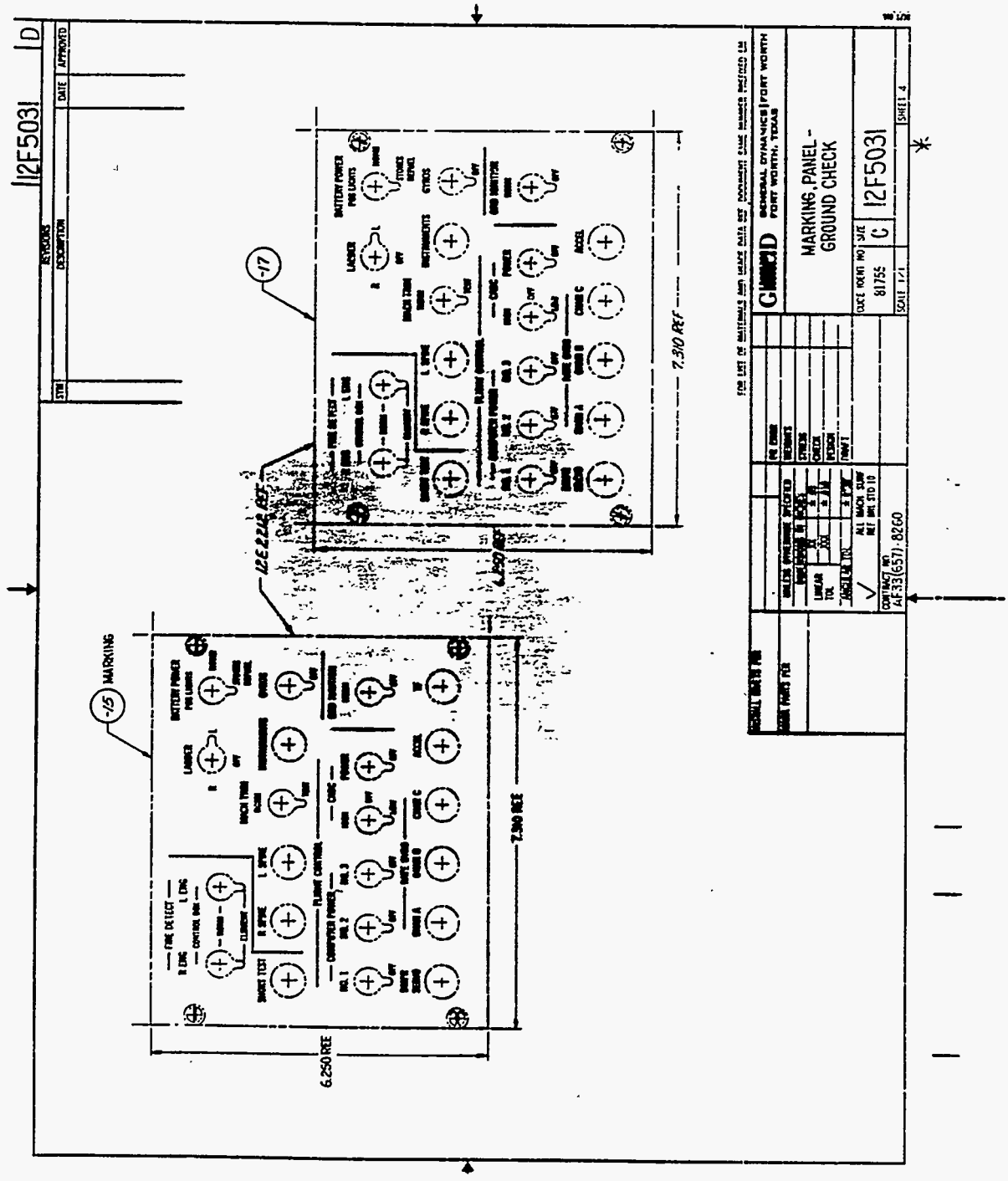
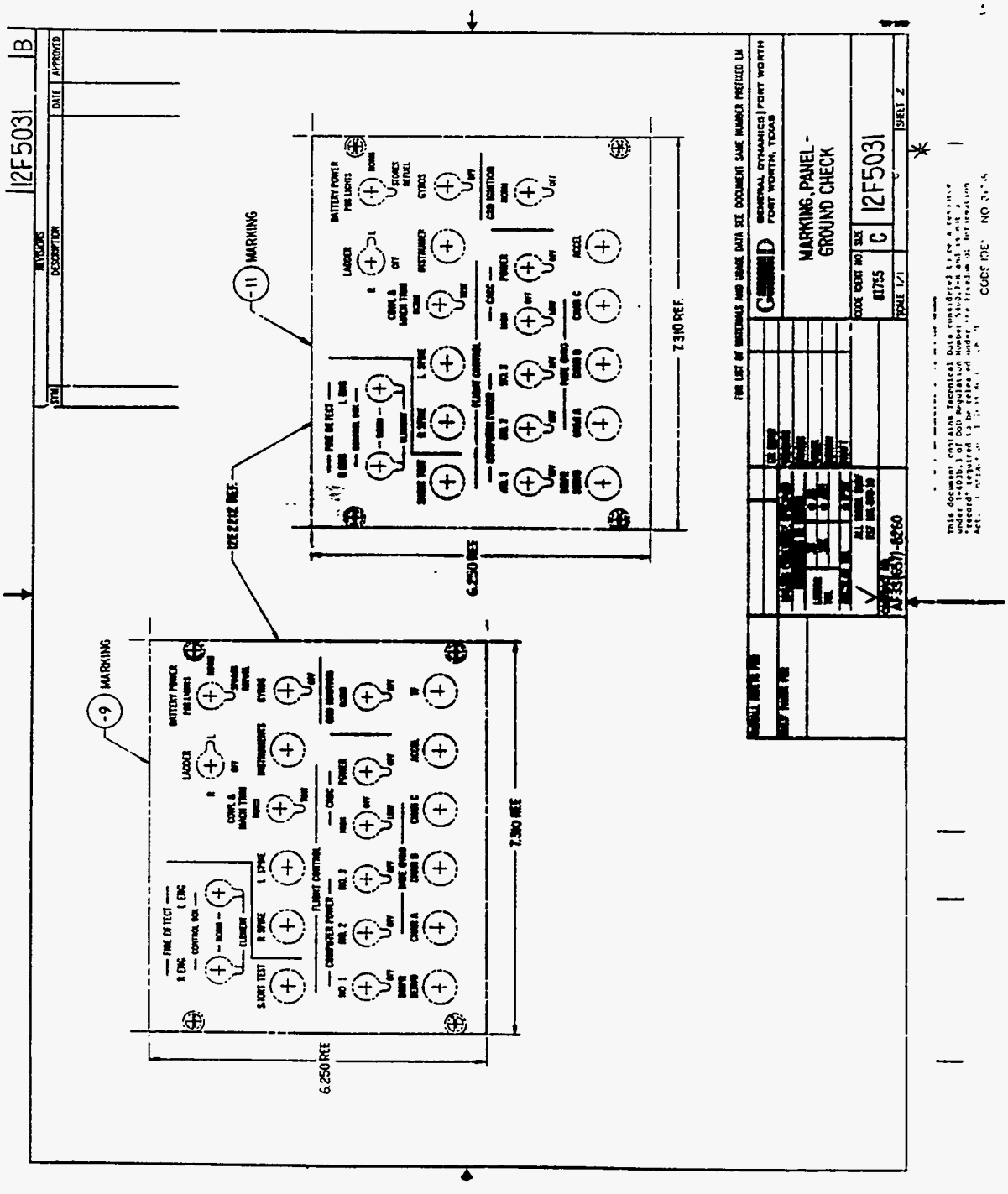
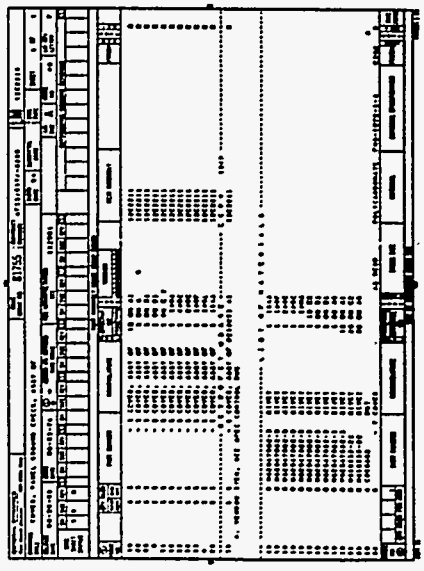
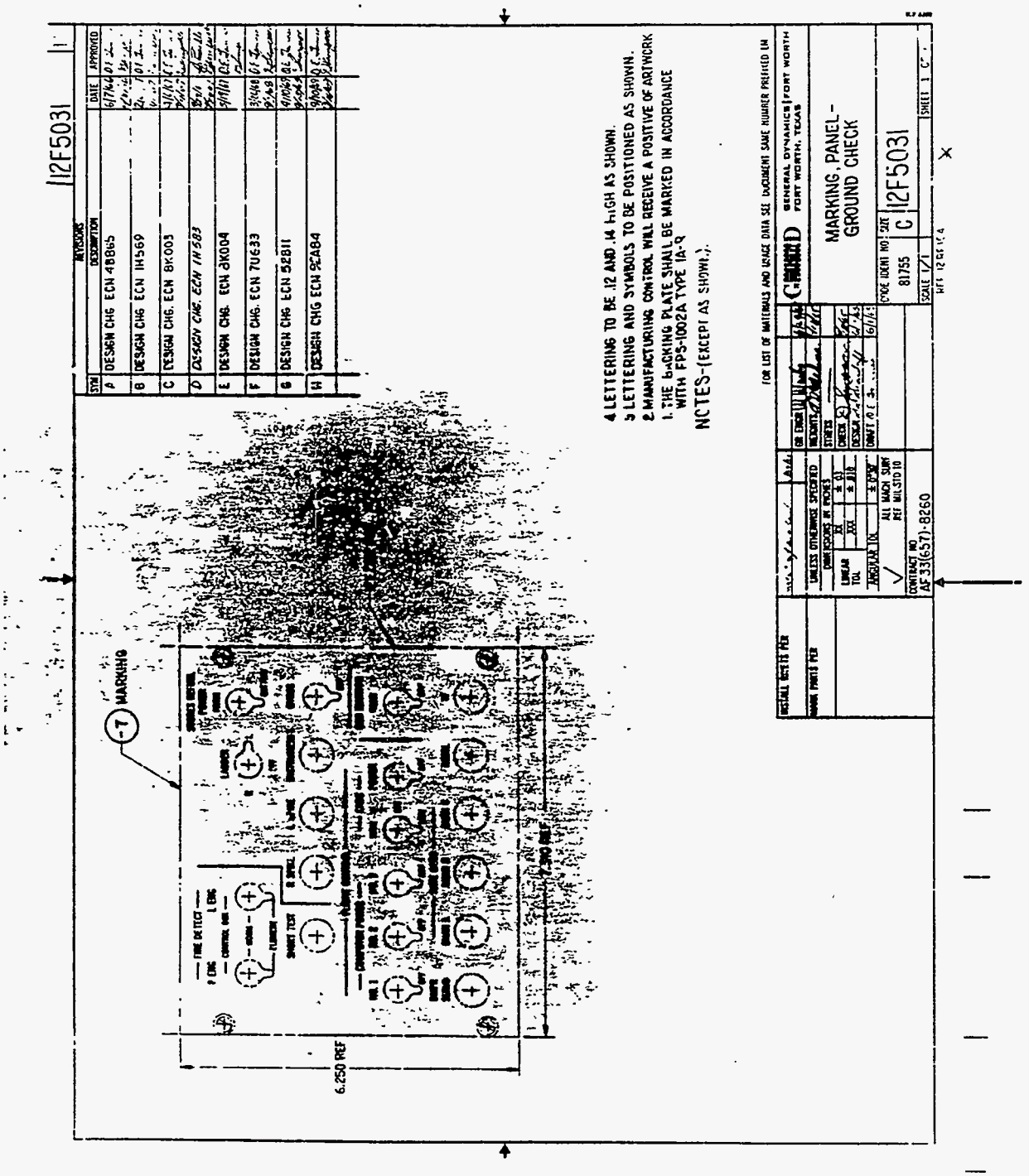
12F5031
D
12F5031
MARKING
MARKING
MARKING
MARKING


12F5031
D
REVISIONS
DESCRIPTION
DATE
APPROVED
MARKING, PANEL - GROUND CHECK
GENERAL DYNAMICS FORT WORTH
FORT WORTH, TEXAS
12F5031
SIZE C
SHEET 4
81755
-17
-15
MARKING
7.310 REF
7.310 REF
7.310 REF
6.250 REF
7.360 REF
BATTERY POWER
FIRE DETECT
L ENG
R ENG
CONTROL SW
ELEVON
L SPINE
R SPINE
FLIGHT CONTROL
OBOGS
CMDC
ACCEL
LAUNCH
BACK TRIM
INSTRUMENTS
GYROS
CONTINGENCY NO AF33(657)-8260


12F5031
MARKING, PANEL - GROUND CHECK
12F5031
-11 MARKING
-9 MARKING
7.310 REF.
7.380 REF.
6.250 REF.
6.250 REF.

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REVISIONS
DESCRIPTION
DATE
APPROVED
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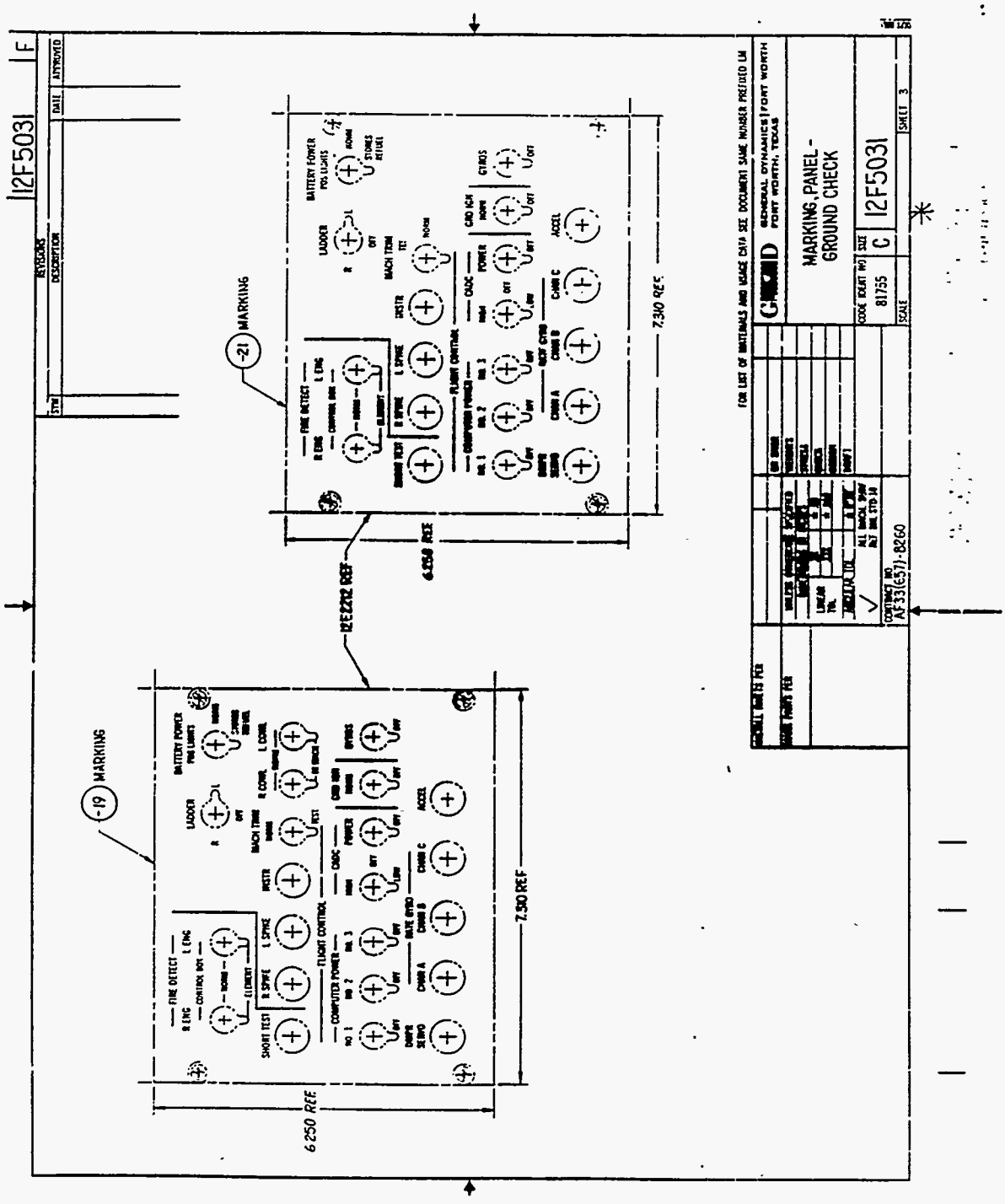
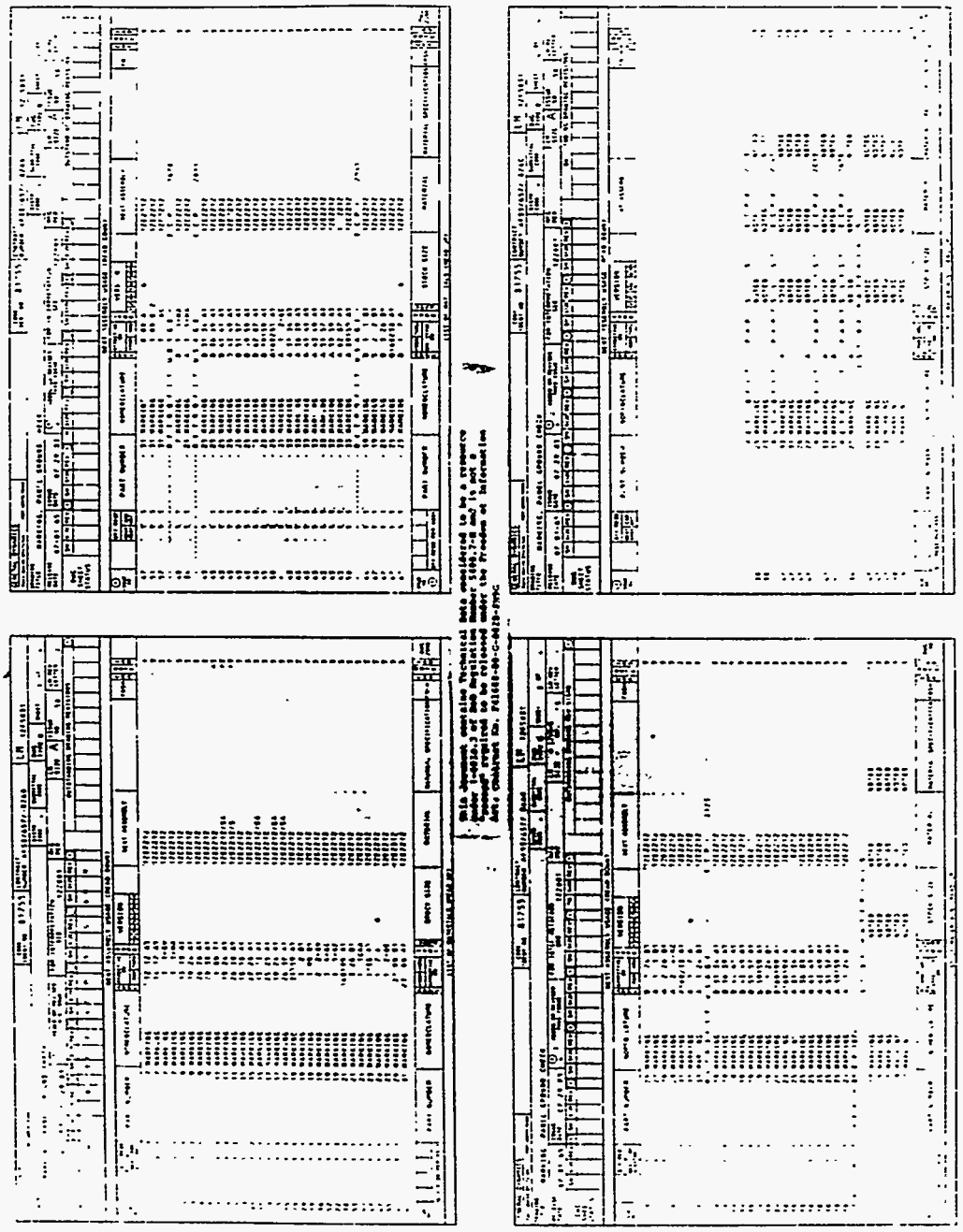
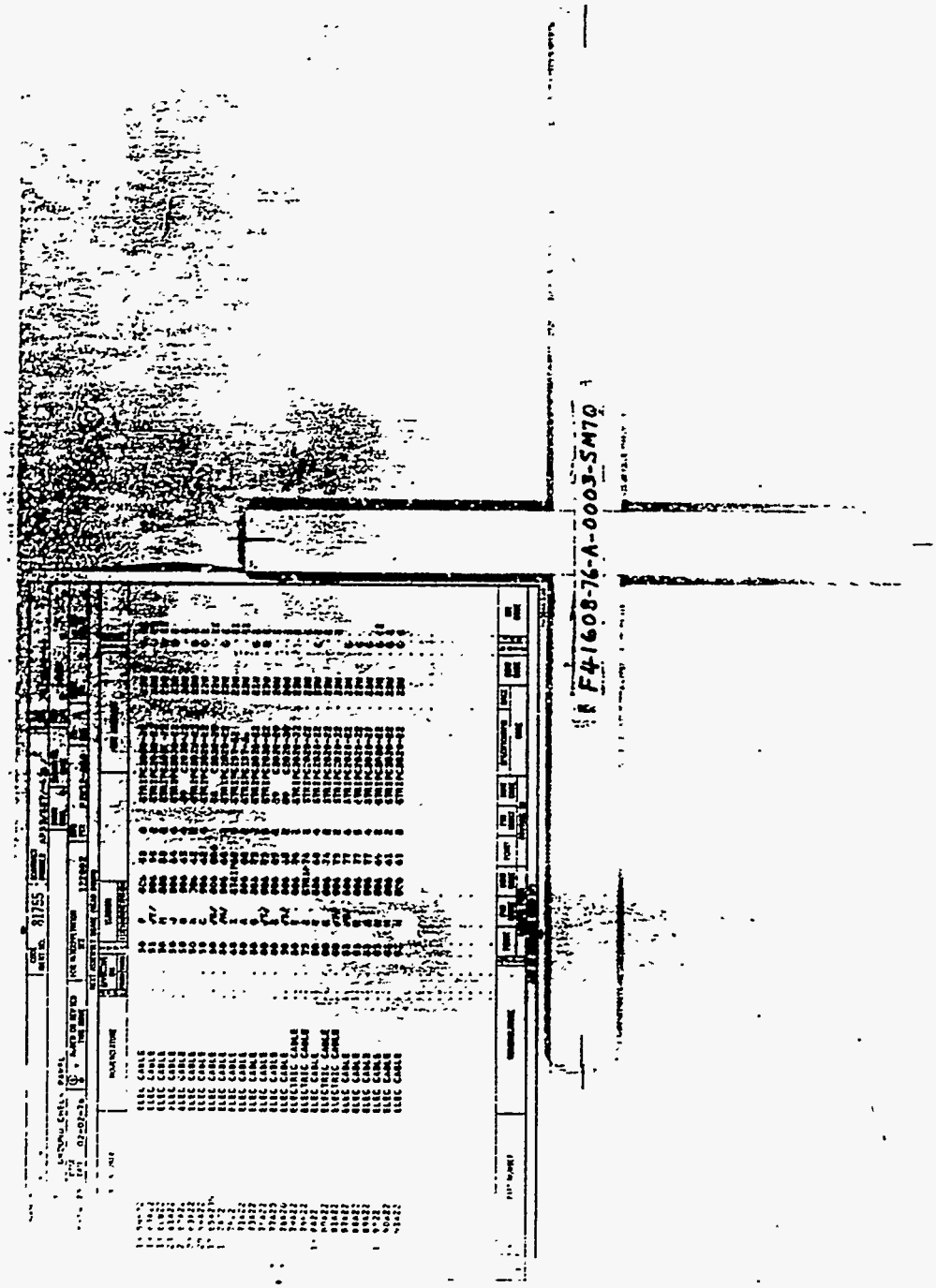
DESIGN CHG ECN 1H569
DESIGN CHG. ECN 8K003
DESIGN CHG. ECN 1H583
DESIGN CHG. ECN 3K004
DESIGN CHG. ECN 7U633
DESIGN CHG ECN 52811
DESIGN CHG ECN 9C484
NOTES-(EXCEPT AS SHOWN.)
1. THE BACKING PLATE SHALL BE MARKED IN ACCORDANCE WITH FPS-1002A TYPE IA-9
2. MANUFACTURING CONTROL WILL RECEIVE A POSITIVE OF ARTWORK
3. LETTERING AND SYMBOLS TO BE POSITIONED AS SHOWN.
4. LETTERING TO BE .12 AND .14 HIGH AS SHOWN.
MARKING
6.250 REF
GENERAL DYNAMICS | FORT WORTH
FORT WORTH, TEXAS
MARKING, PANEL-
GROUND CHECK
CODE IDENT NO
81755
SIZE
C
12F5031
SCALE 1/1
SHEET 1


12F5031
MARKING
-21
-19
7.390 REF
6.250 REF
MARKING, PANEL -
GROUND CHECK
12F5031
SIZE C
SHEET 3
81755
AF33(657)-8260

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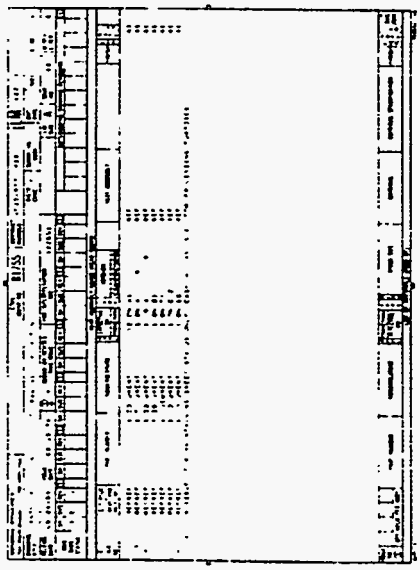

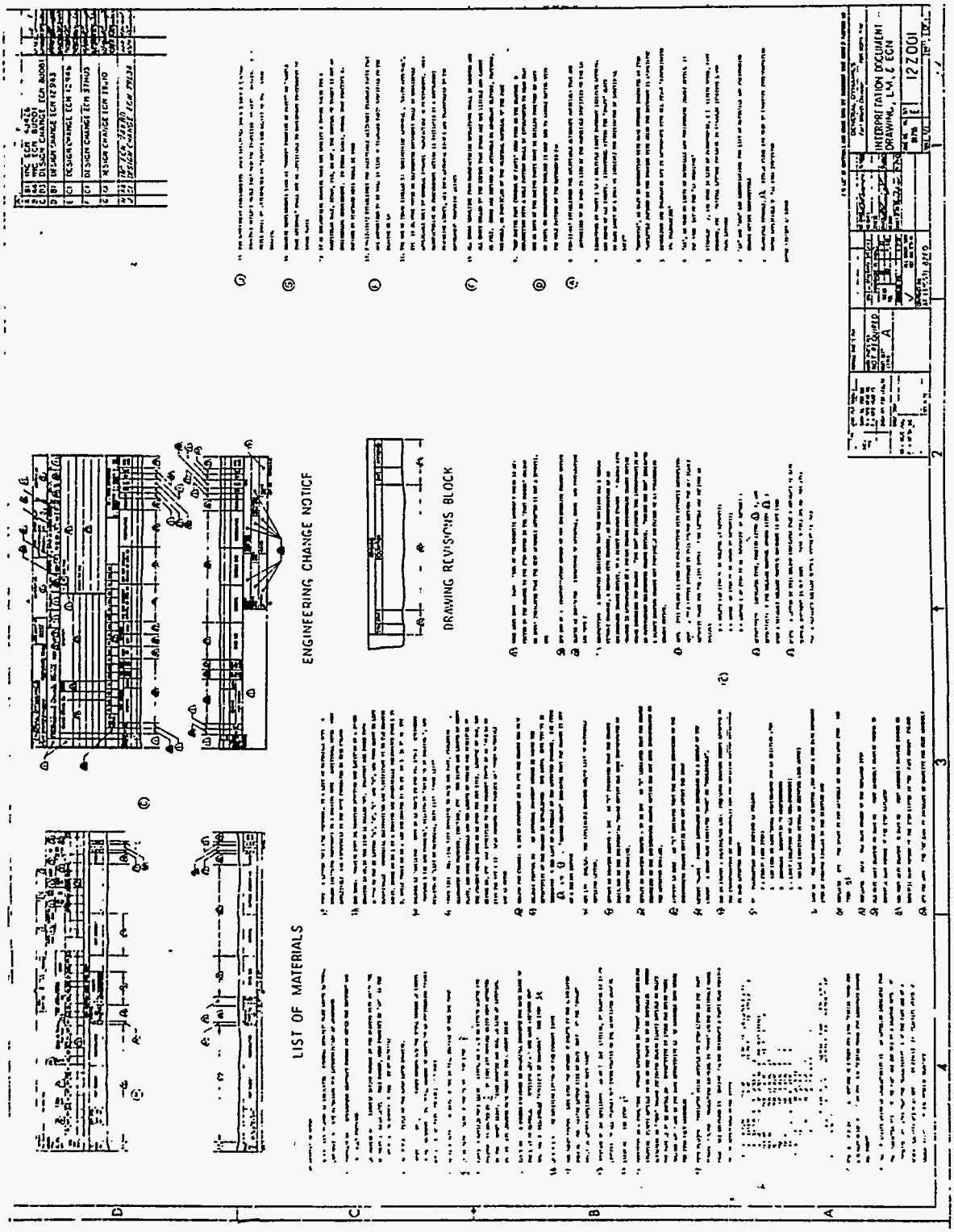
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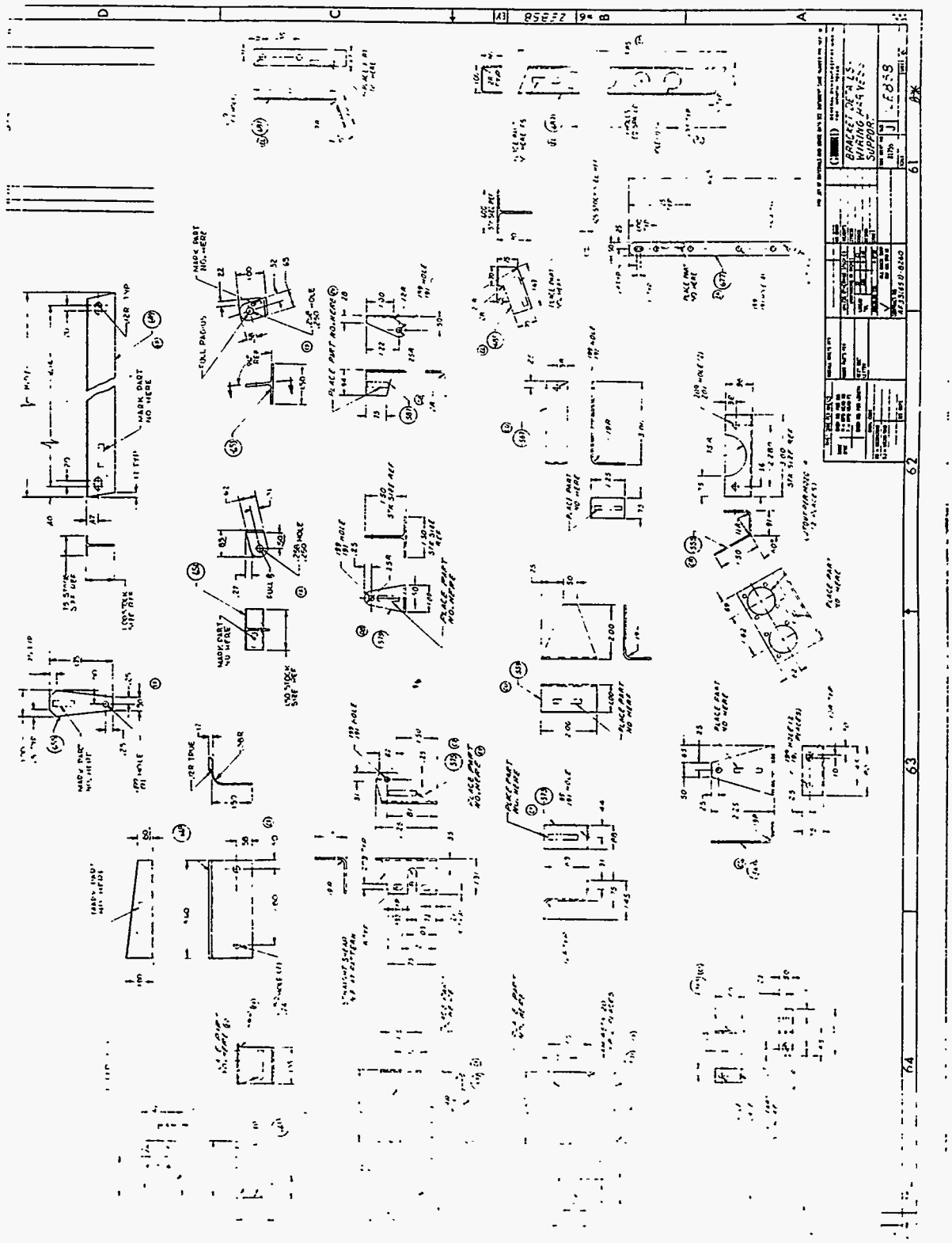
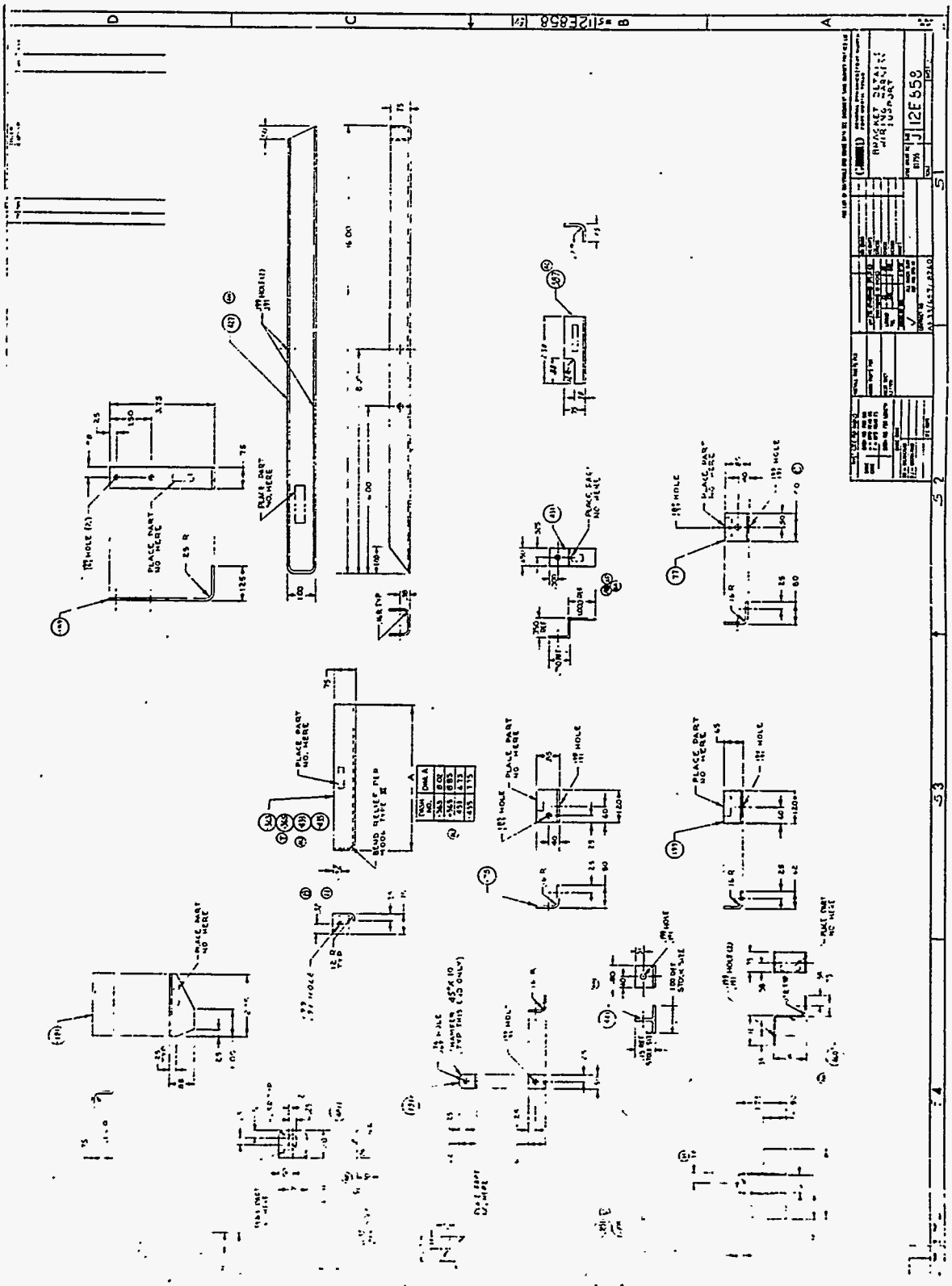
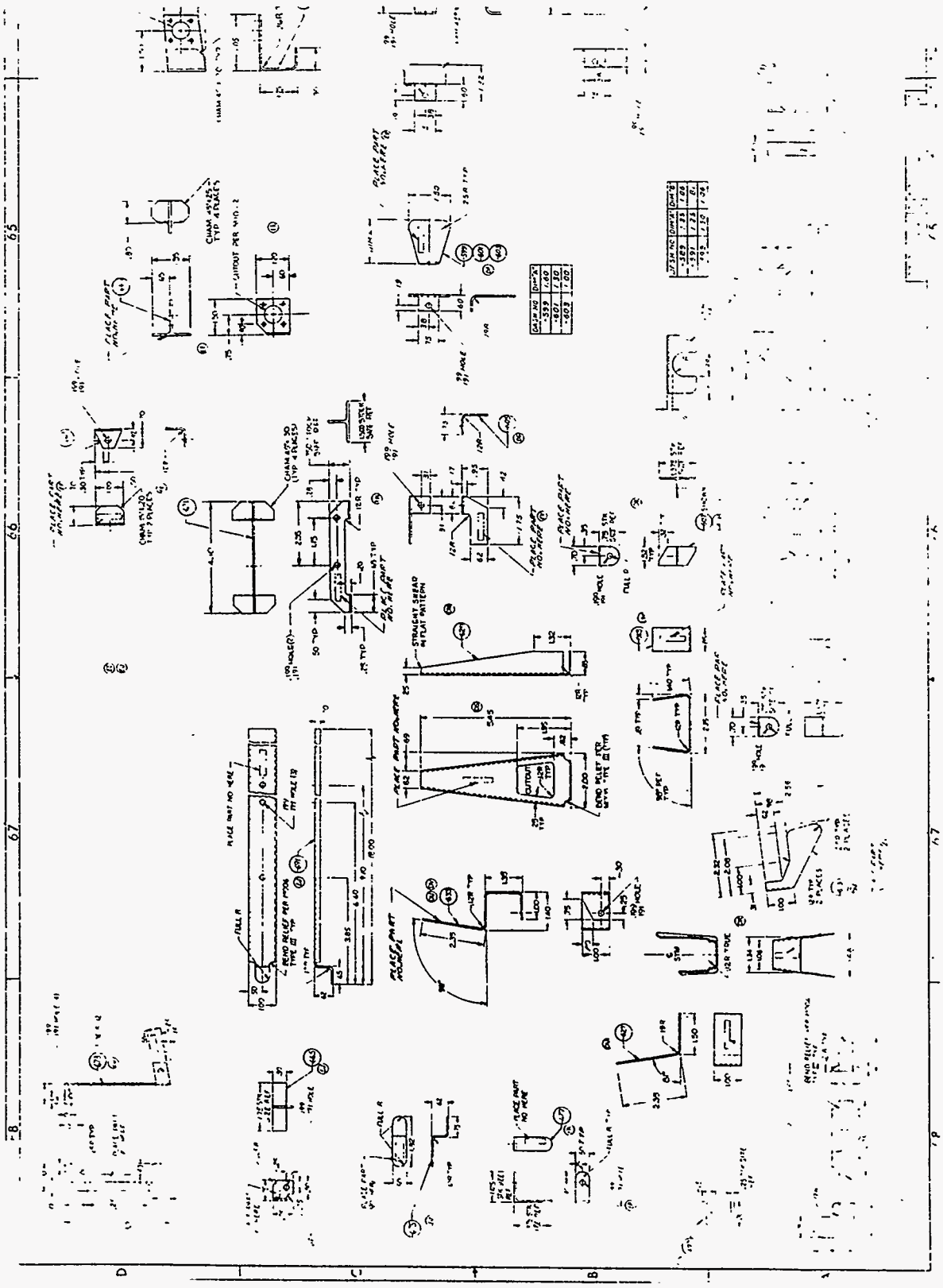
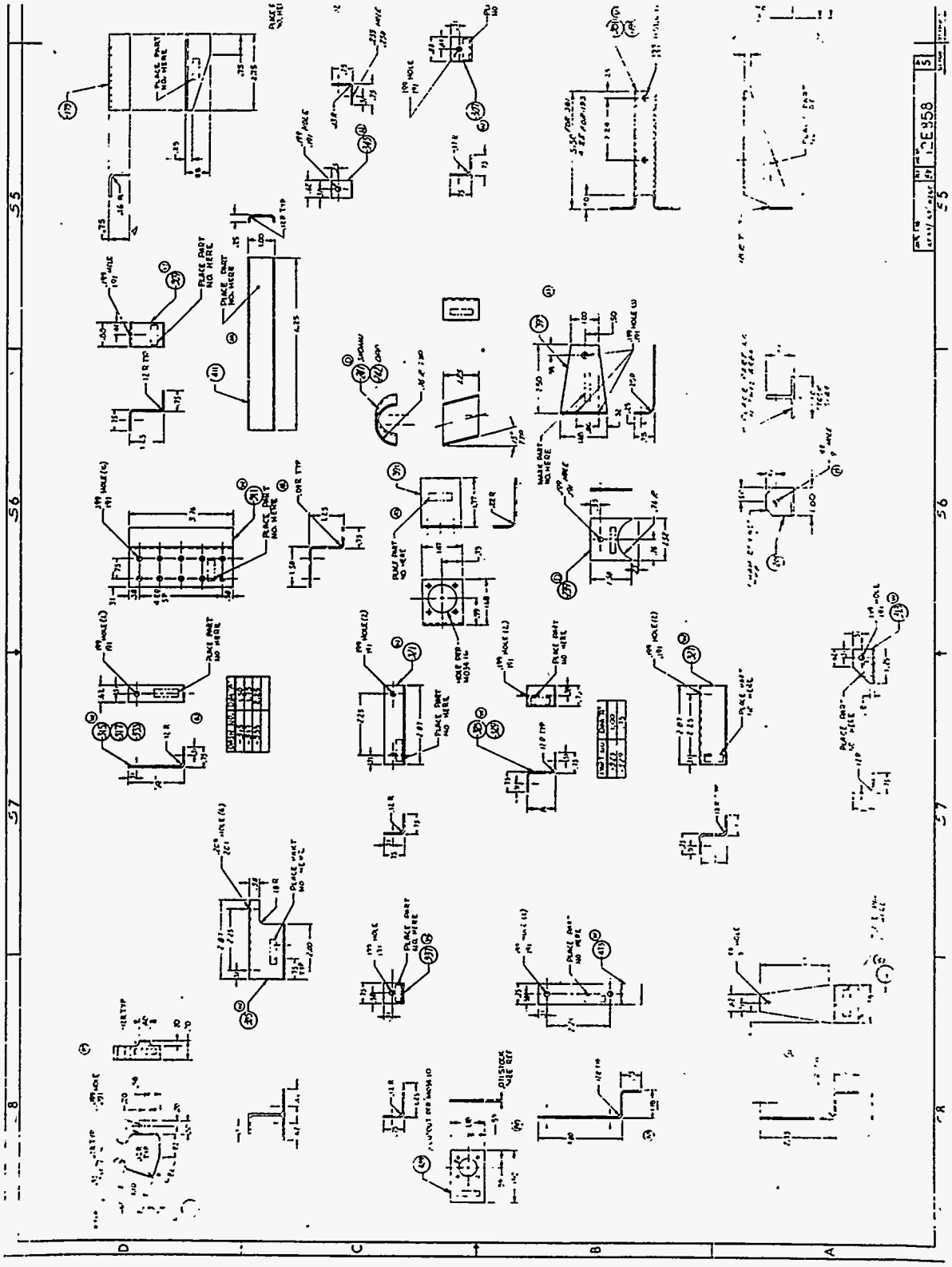
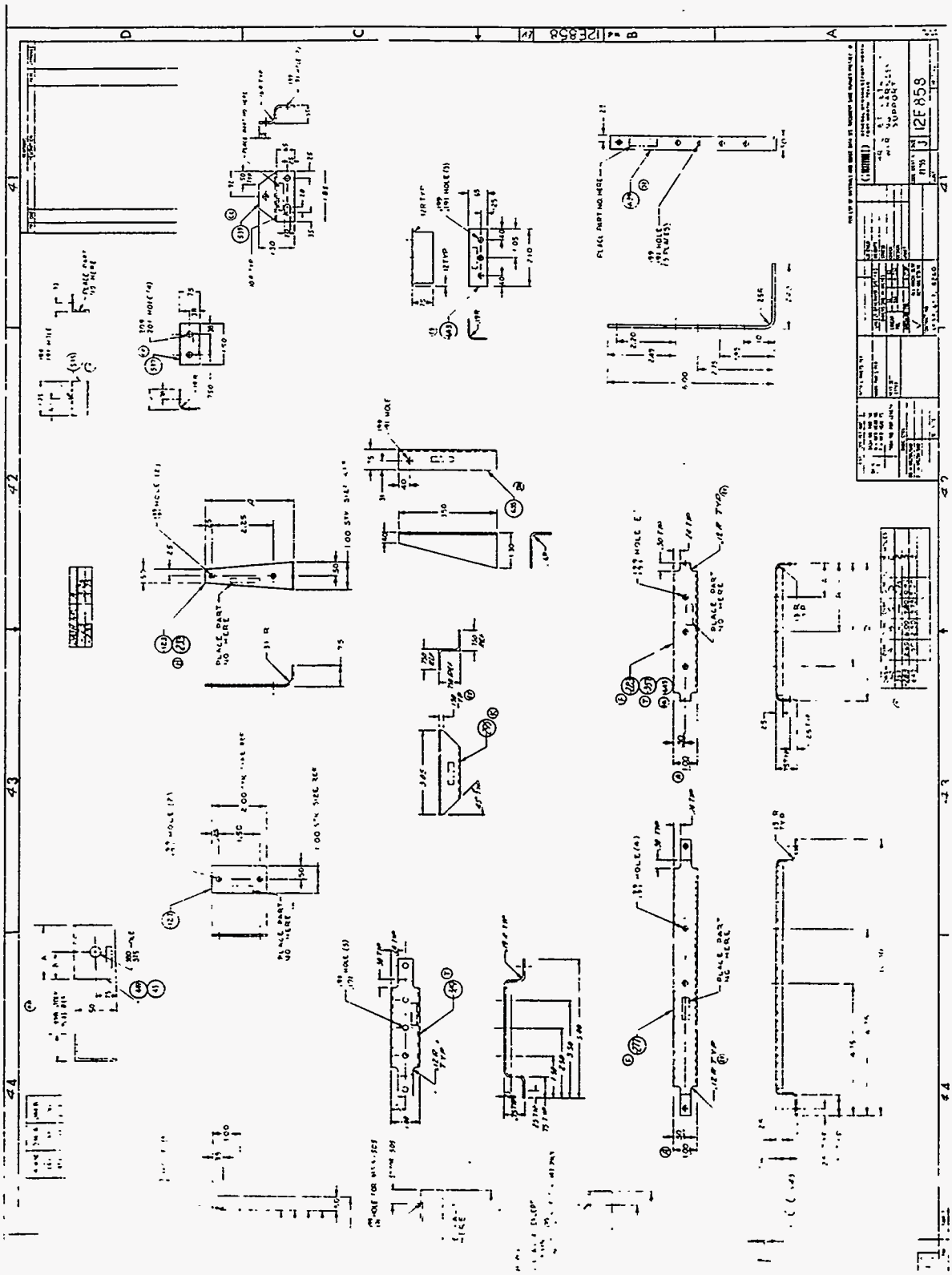
DRAWING REVISIONS BLOCK
INTERPRETATION DOCUMENT
DRAWING, LAY, & ECN
122001

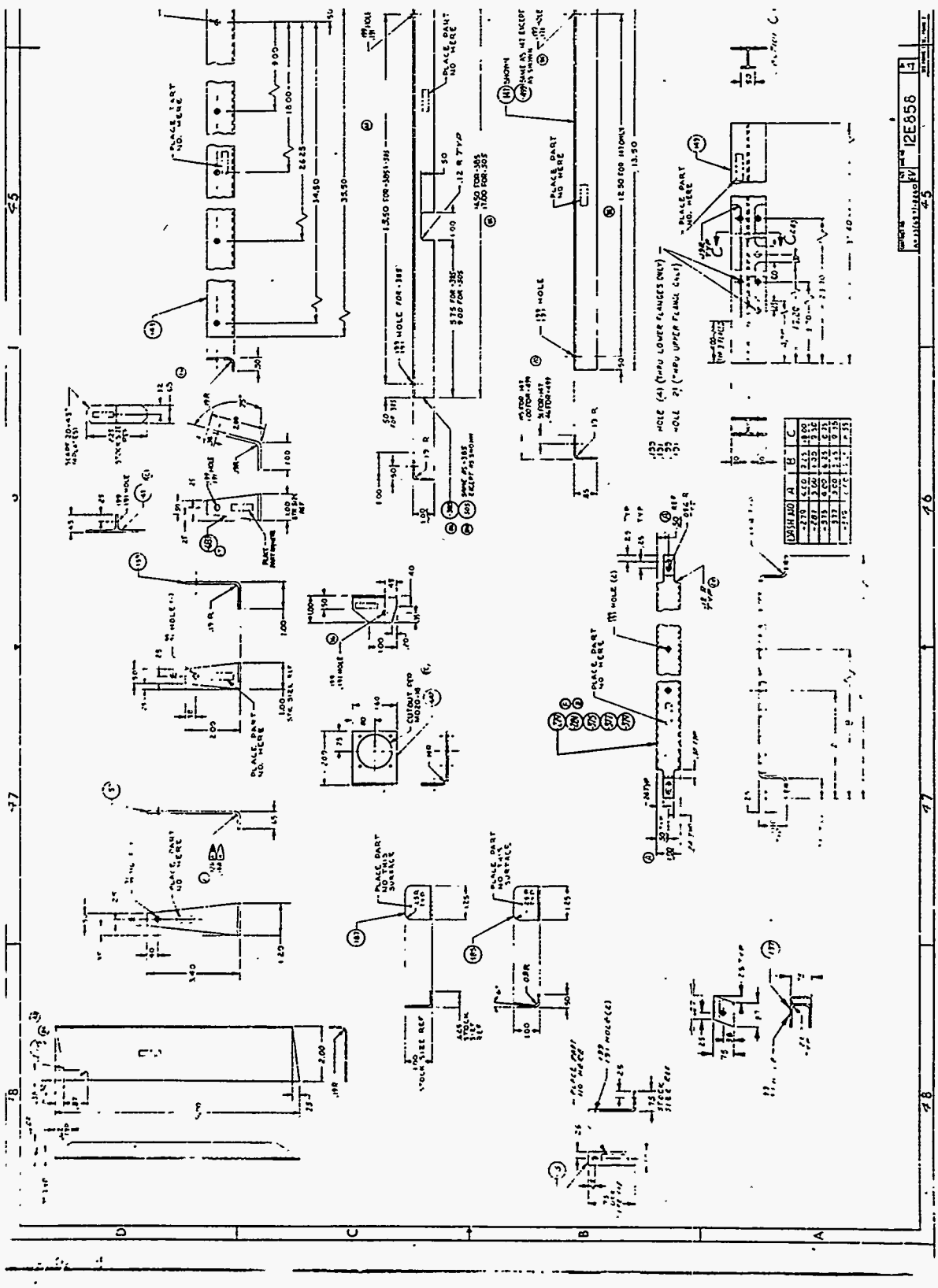


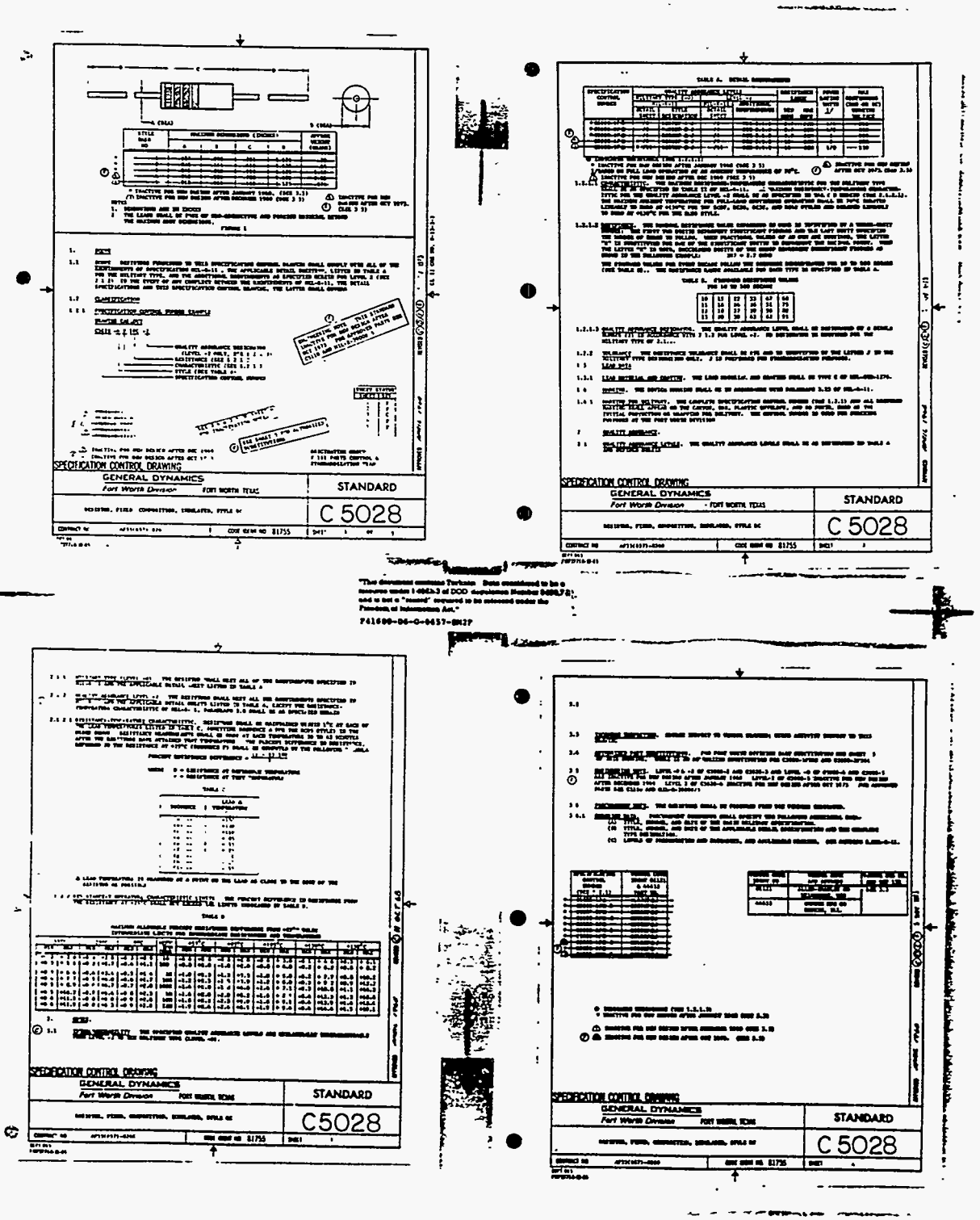








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GENERAL DYNAMICS
Fort Worth Division
FORT WORTH, TEXAS
STANDARD
C 5028
CODE IDENT NO 81755
SPECIFICATION CONTROL DRAWING
GENERAL DYNAMICS
Fort Worth Division
FORT WORTH, TEXAS
STANDARD
C 5028
CODE IDENT NO 81755
SPECIFICATION CONTROL DRAWING
GENERAL DYNAMICS
Fort Worth Division
FORT WORTH, TEXAS
STANDARD
C5028
CODE IDENT NO 81755
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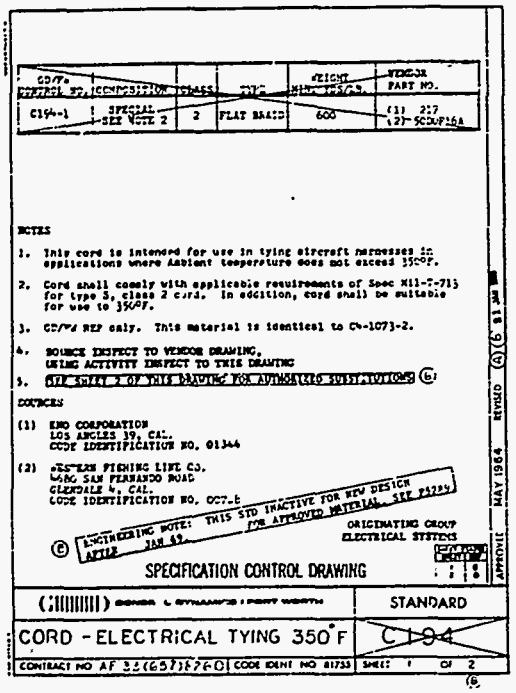
Fort Worth Division
FORT WORTH, TEXAS
STANDARD
C 5028
CODE IDENT NO 81755



CD/Fo CONTROL NO.	IDENTIFICATION	CLASS	SIZE	WEIGHT MAX. LBS/C.D.	VENDOR PART NO.
C194-1	SPECIAL SEE NOTE 2	2	FLAT BRAID	600	(1) 217 (2) SCDUF16A

NOTES

1. This cord is intended for use in tying aircraft harnesses in applications where Ambient temperature does not exceed 350°F.
2. Cord shall comply with applicable requirements of Spec MIL-T-713 for type 3, class 2 cord. In addition, cord shall be suitable for use to 350°F.
3. CD/Fo REF only. This material is identical to C4-1073-2.
4. SOURCE INSPECT TO VENDOR DRAWING, USING ACTIVITY INSPECT TO THIS DRAWING
5. SEE SHEET 2 OF THIS DRAWING FOR AUTHORIZED SUBSTITUTIONS (B)

SOURCES

(1) END CORPORATION
LOS ANGELES 39, CAL.
CODE IDENTIFICATION NO. 01344

(2) WESTERN FISHING LINE CO.
1440 SAN FERNANDO ROAD
GLENDALE 4, CAL.
CODE IDENTIFICATION NO. 0CT-E

(C) ENGINEERING NOTE: THIS STD INACTIVE FOR NEW DESIGN AFTER JAN 63 FOR APPROVED MATERIAL, SEE P5289-1

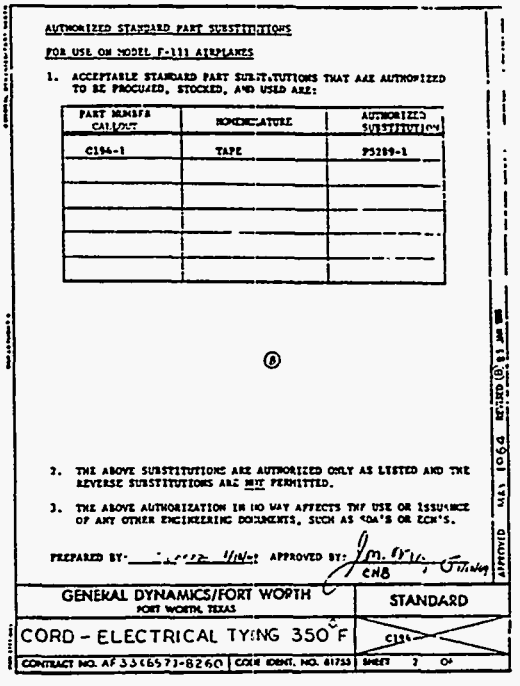
ORIGINATING GROUP
ELECTRICAL SYSTEMS

SPECIFICATION CONTROL DRAWING

	STANDARD
CORD - ELECTRICAL TYING 350°F	C194
CONTRACT NO. AF 33(657)8260 CODE IDENT NO. 81755	SHEET 1 OF 2

(6)

REVISED (4) MAY 1964 (6) 31 JAN 63 APPROVED



AUTHORIZED STANDARD PART SUBSTITUTIONS

FOR USE ON MODEL F-111 AIRPLANES

1. ACCEPTABLE STANDARD PART SUBSTITUTIONS THAT ARE AUTHORIZED TO BE PROCURED, STOCKED, AND USED ARE:

PART NUMBER CALLOUT	NOMENCLATURE	AUTHORIZED SUBSTITUTION
C194-1	TAPE	P5289-1

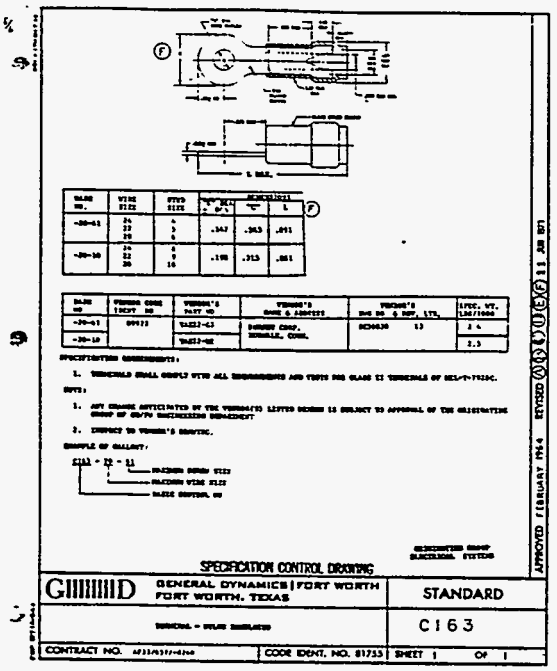
(B)

2. THE ABOVE SUBSTITUTIONS ARE AUTHORIZED ONLY AS LISTED AND THE REVERSE SUBSTITUTIONS ARE NOT PERMITTED.
3. THE ABOVE AUTHORIZATION IN NO WAY AFFECTS THE USE OR ISSUANCE OF ANY OTHER ENGINEERING DOCUMENTS, SUCH AS SDA'S OR ECN'S.

PREPARED BY: [illegible] 4/14/64 APPROVED BY: [signature] ENG

GENERAL DYNAMICS/FORT WORTH FORT WORTH, TEXAS	STANDARD
CORD - ELECTRICAL TYING 350°F	C194
CONTRACT NO. AF 33(657)-8260 CODE IDENT. NO. 81755	SHEET 2 OF

REVISED (B) 31 JAN 63 MAY 1964 APPROVED



SPECIFICATION CONTROL DRAWING

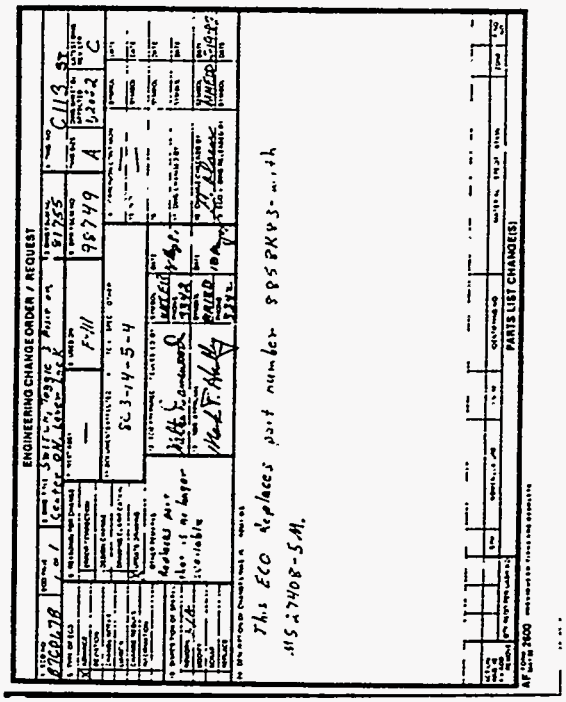
GENERAL DYNAMICS | FORT WORTH
FORT WORTH, TEXAS

STANDARD

C163

CONTRACT NO. | CODE IDENT. NO. 81755 | SHEET 1 OF 1

APPROVED FEBRUARY 1964 REVISED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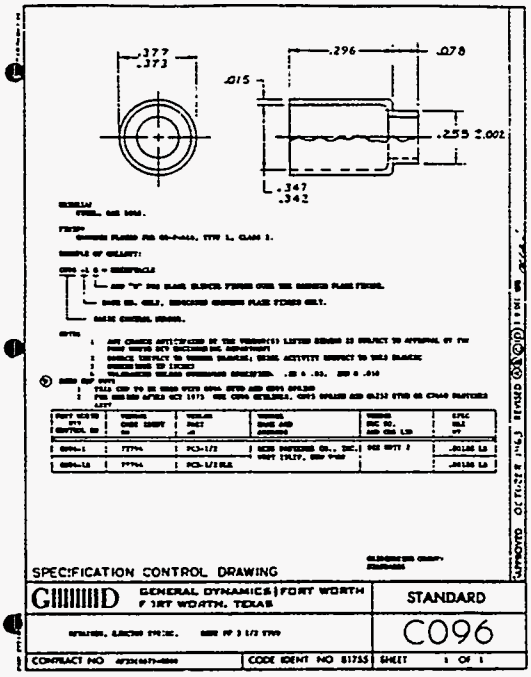
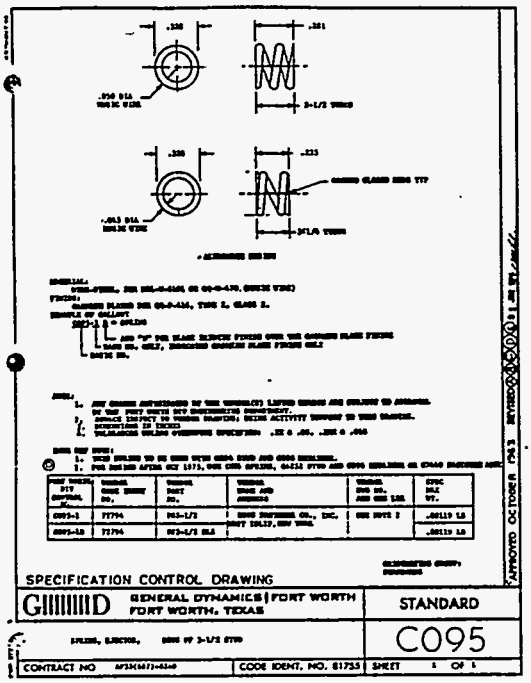
This ECO replaces part number 895PKV3-xxxx
with 27408-SM.
PARTS LIST CHANGE(S)





SPECIFICATION CONTROL DRAWING

GENERAL DYNAMICS | FORT WORTH
FORT WORTH, TEXAS

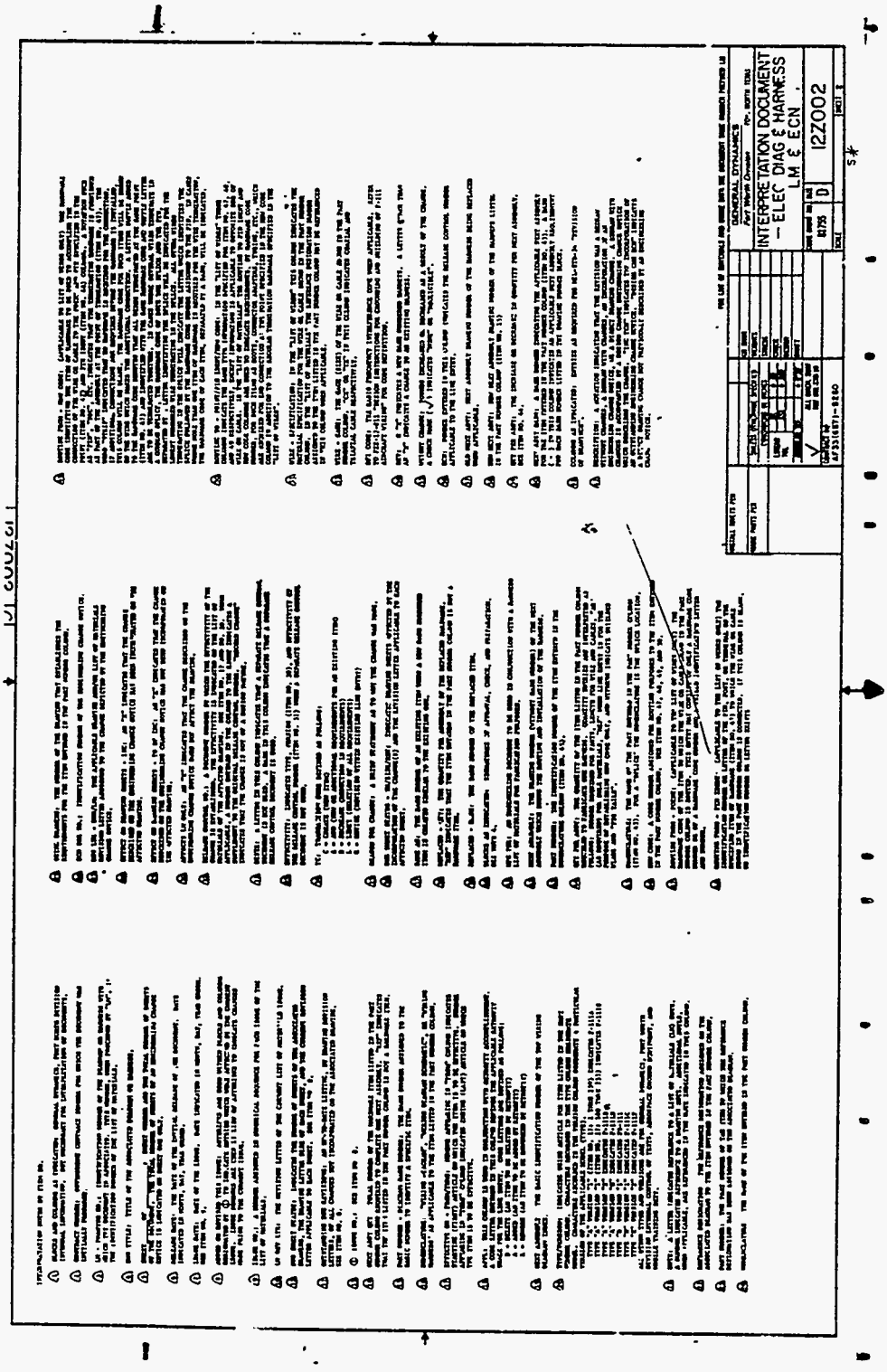
STANDARD

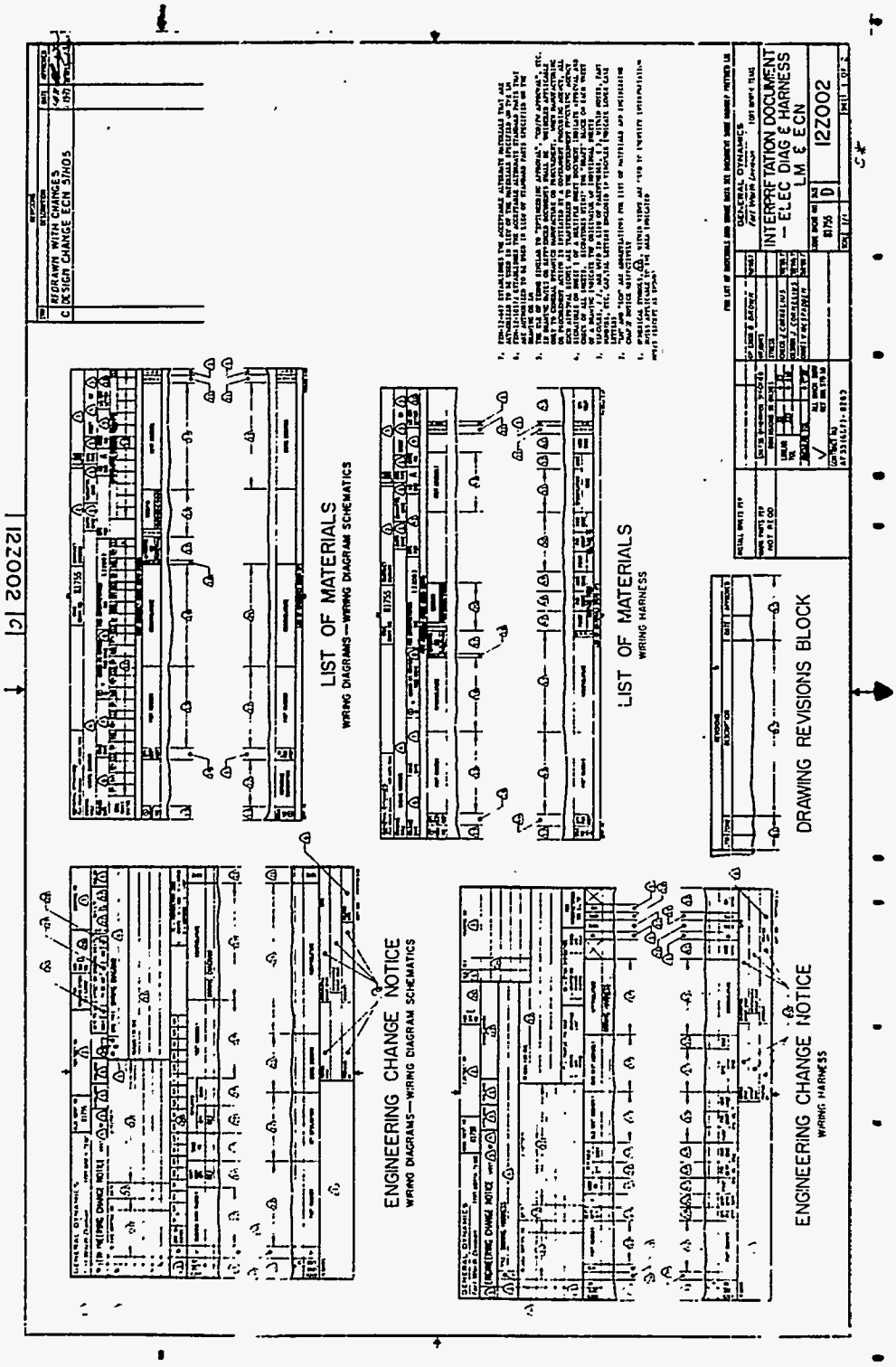
C095

CONTRACT NO

CODE IDENT. NO. 81755

SHEET 1 OF 1

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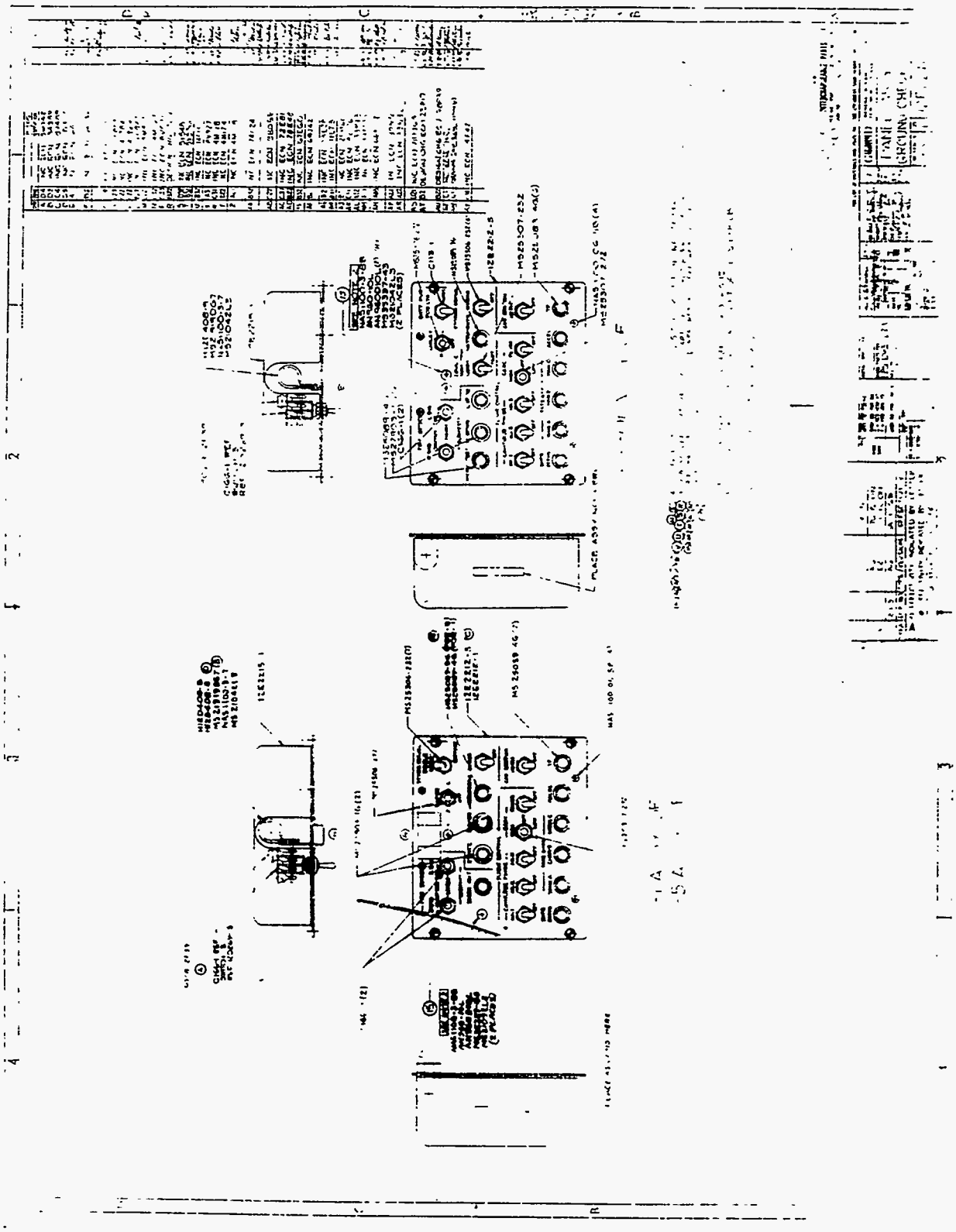
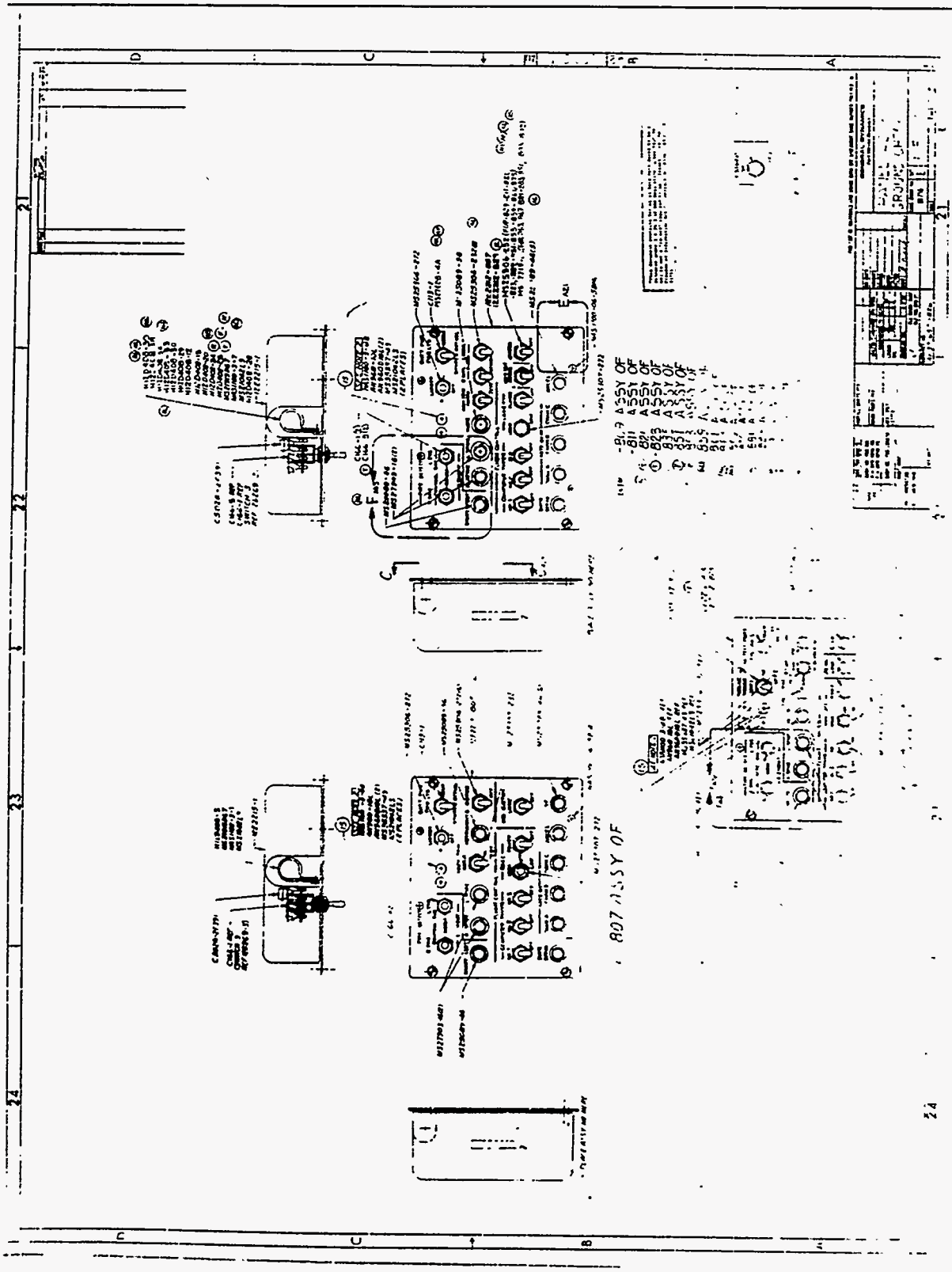
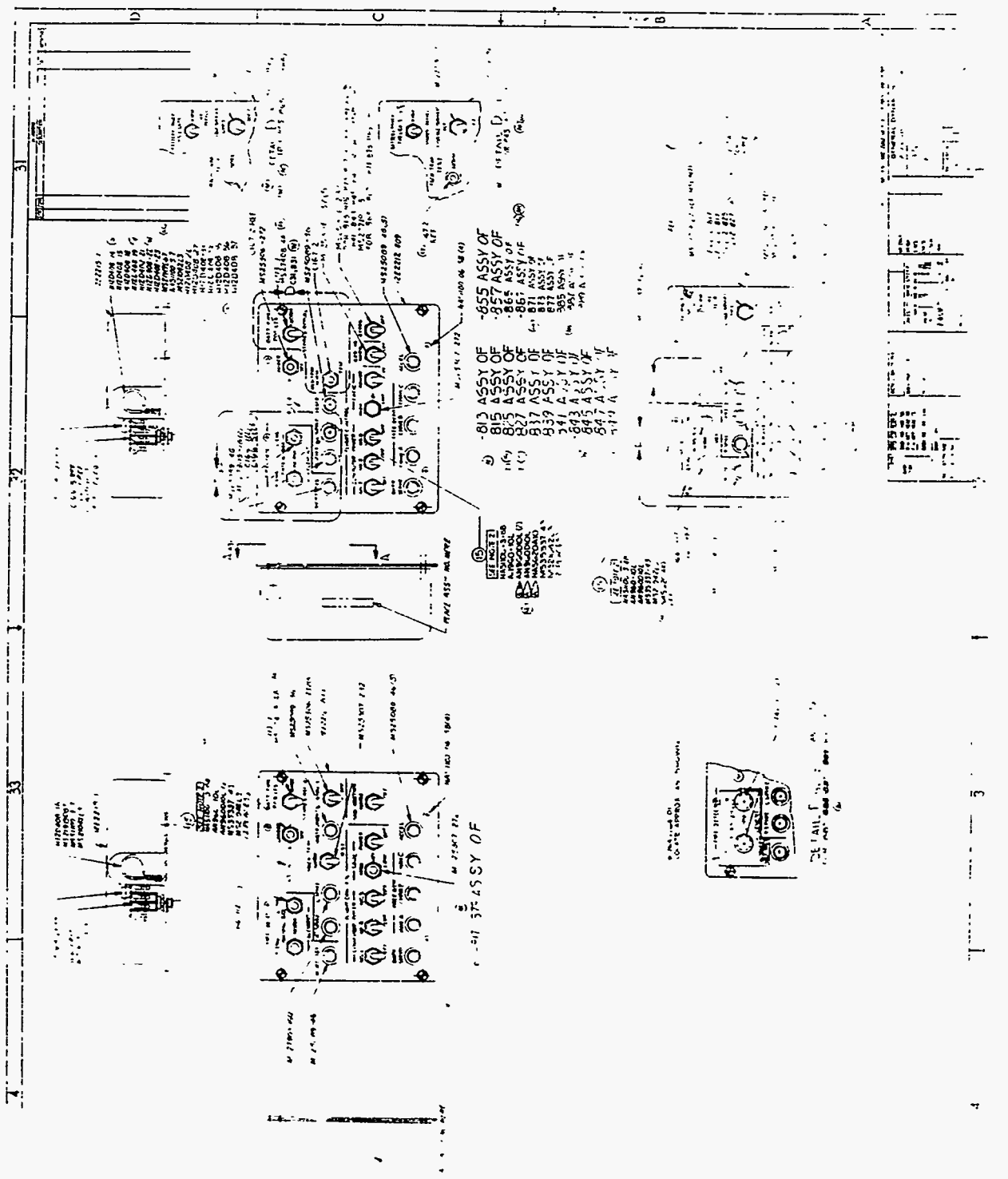
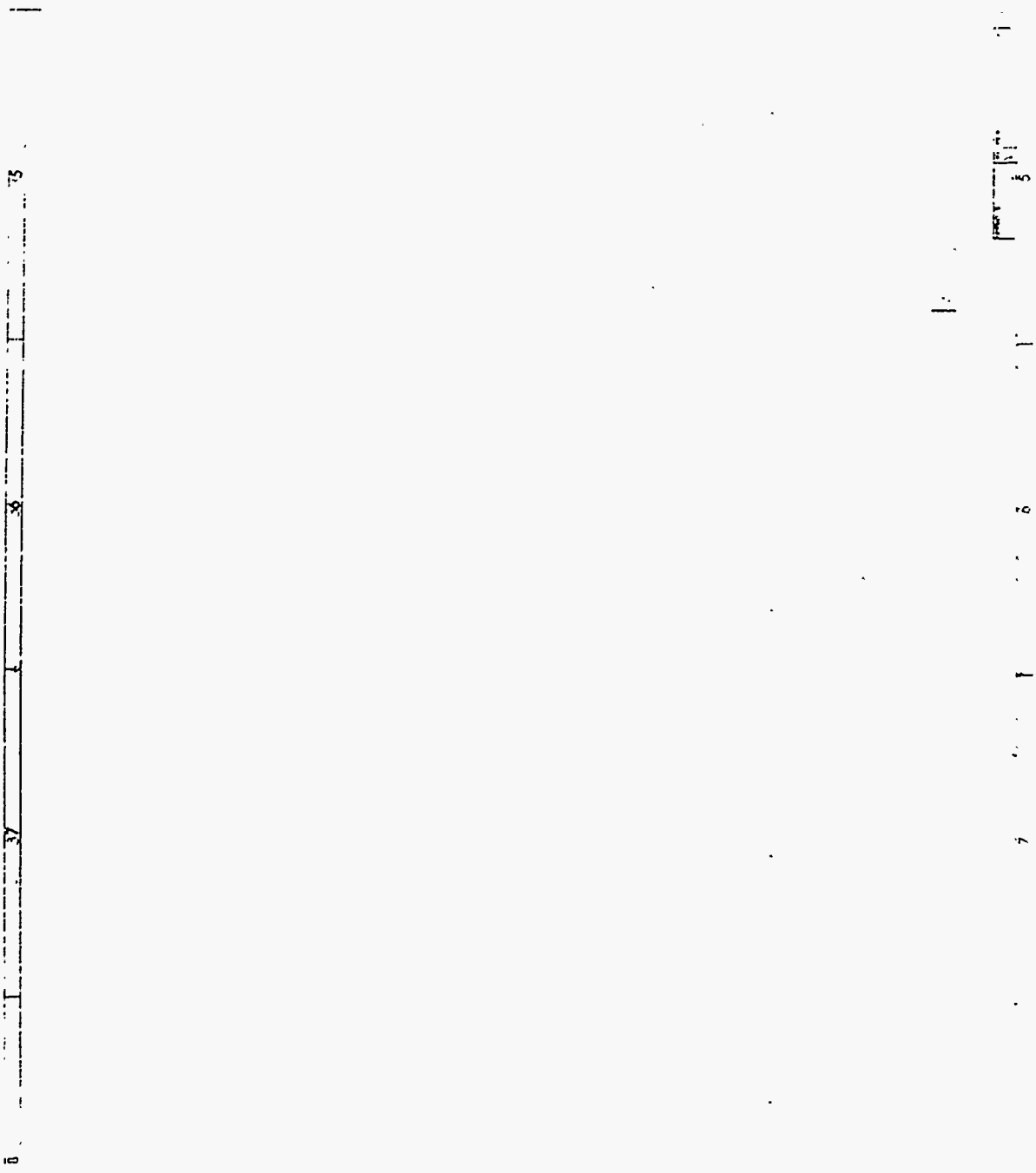
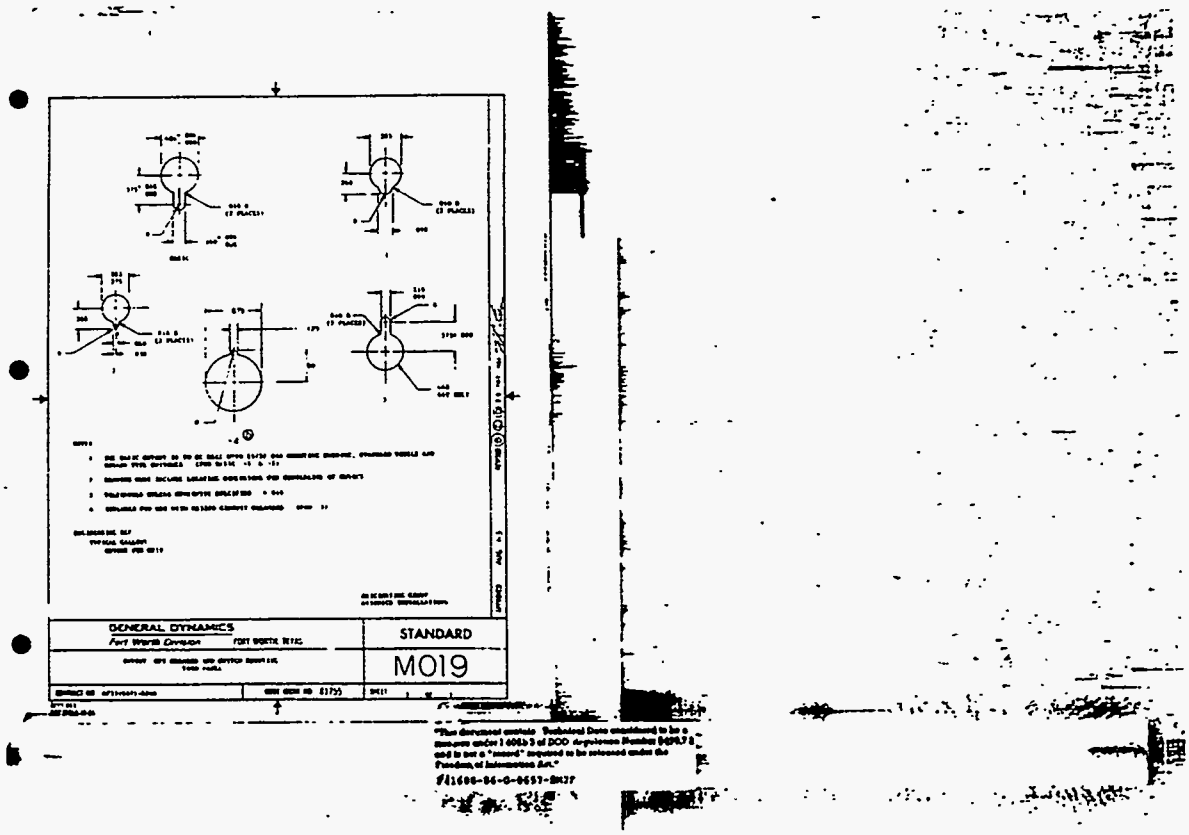
WIRING DIAGRAMS—WIRING DIAGRAM SCHEMATICS
LIST OF MATERIALS
WIRING HARNESS
ENGINEERING CHANGE NOTICE
WIRING DIAGRAMS—WIRING DIAGRAM SCHEMATICS
ENGINEERING CHANGE NOTICE
WIRING HARNESS
DRAWING REVISIONS BLOCK
INTERPRETATION DOCUMENT
— ELEC DIAG & HARNESS
LM & ECN
12Z002

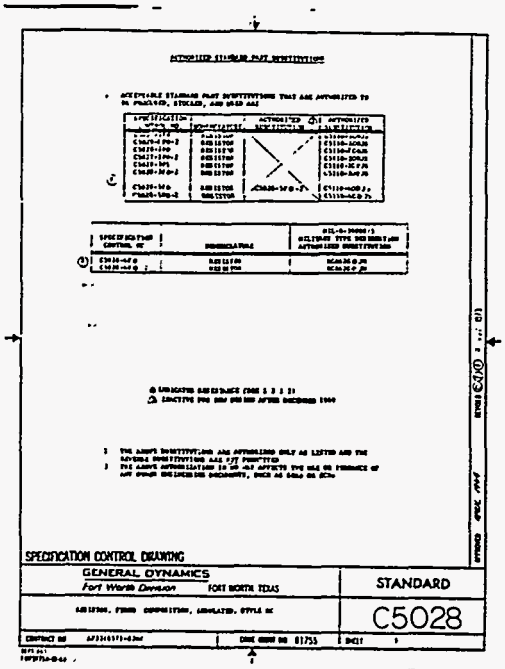









GENERAL DYNAMICS
Fort Worth Division
STANDARD
M019

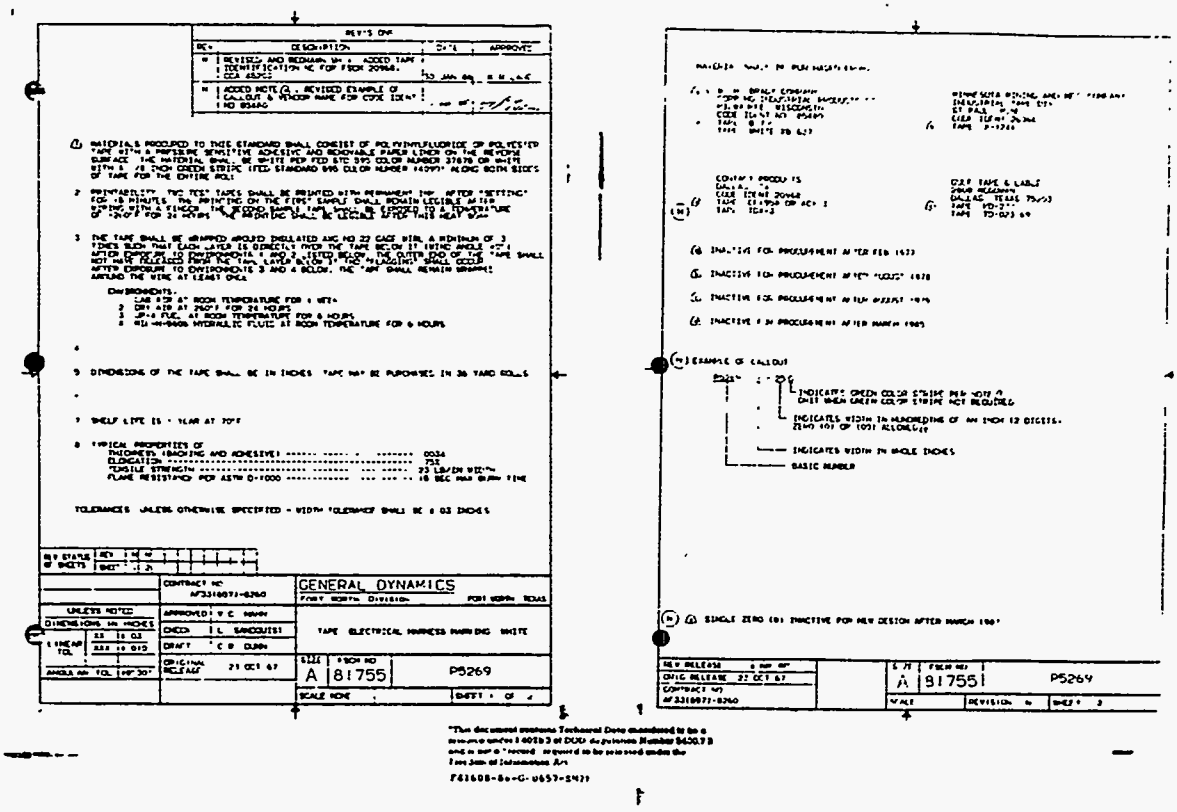


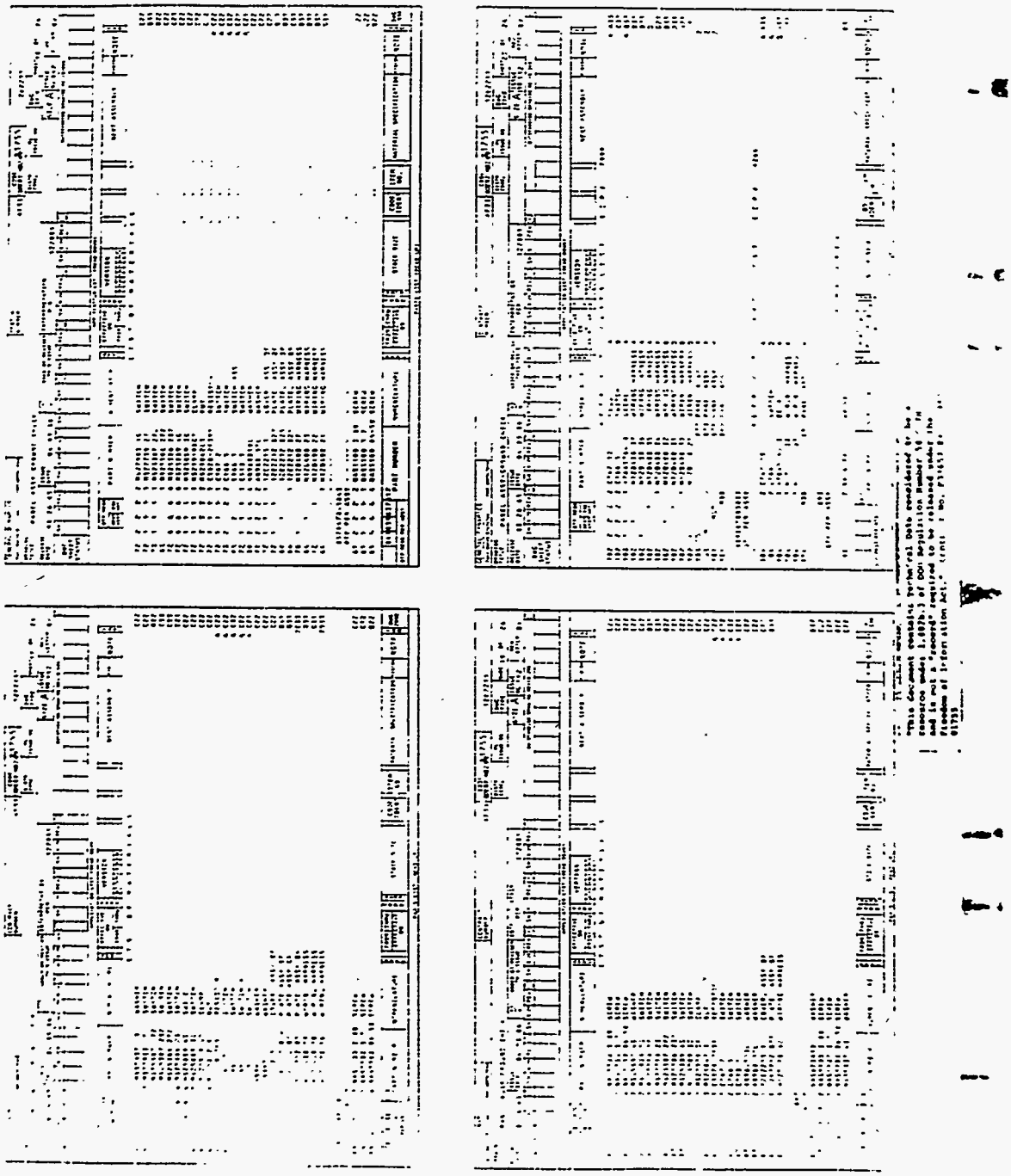
SPECIFICATION CONTROL DRAWING

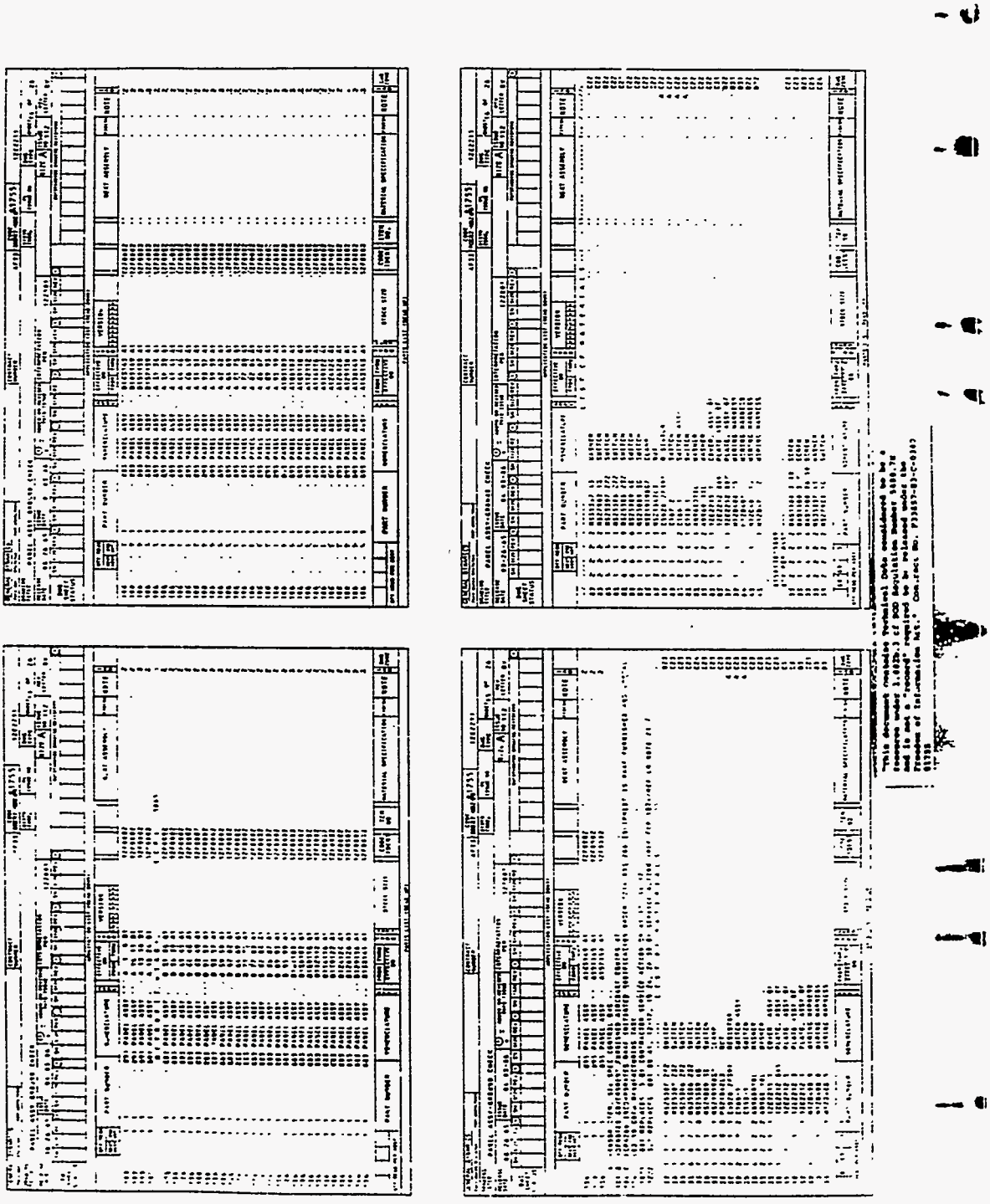
GENERAL DYNAMICS
Fort Worth Division FORT WORTH, TEXAS

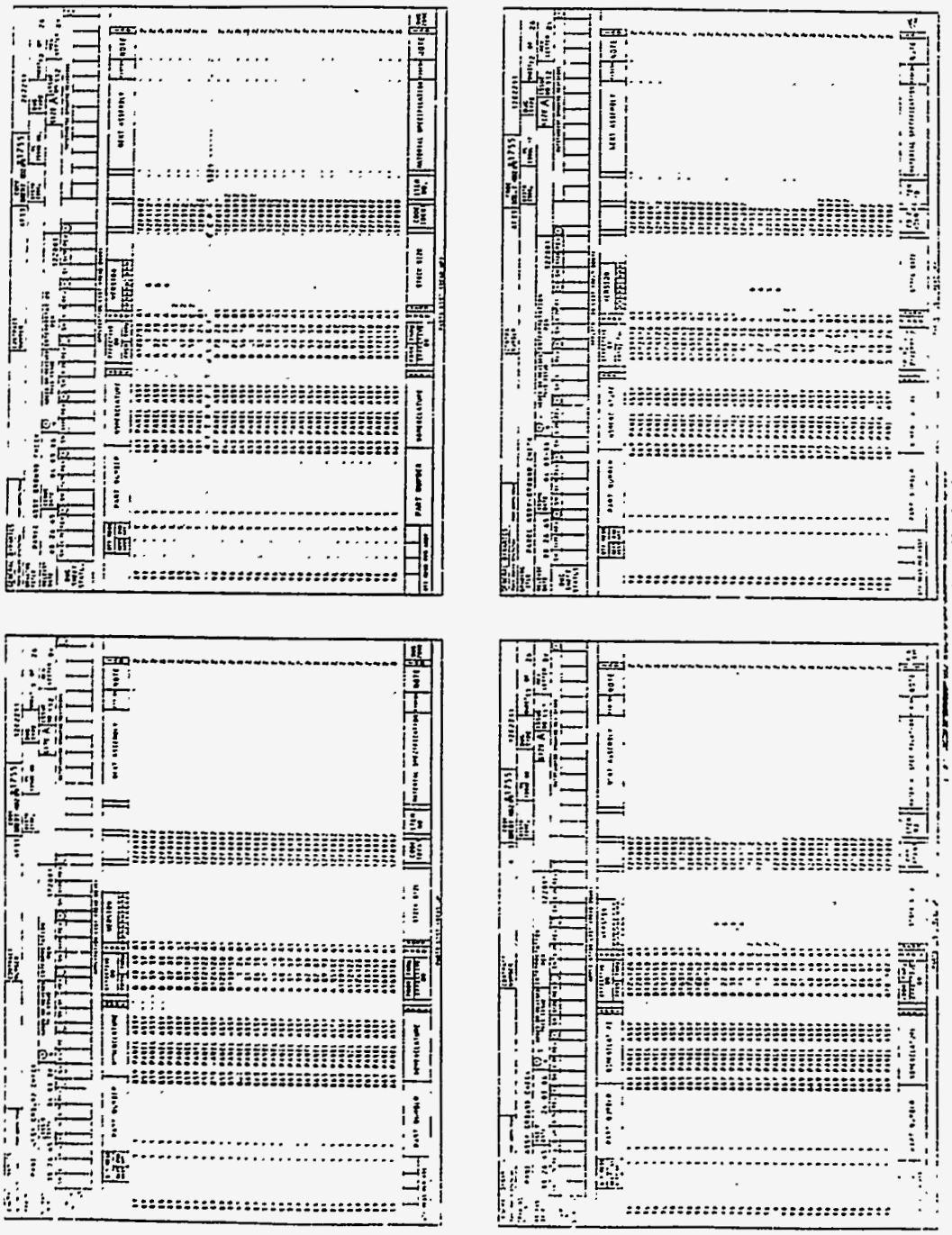
STANDARD

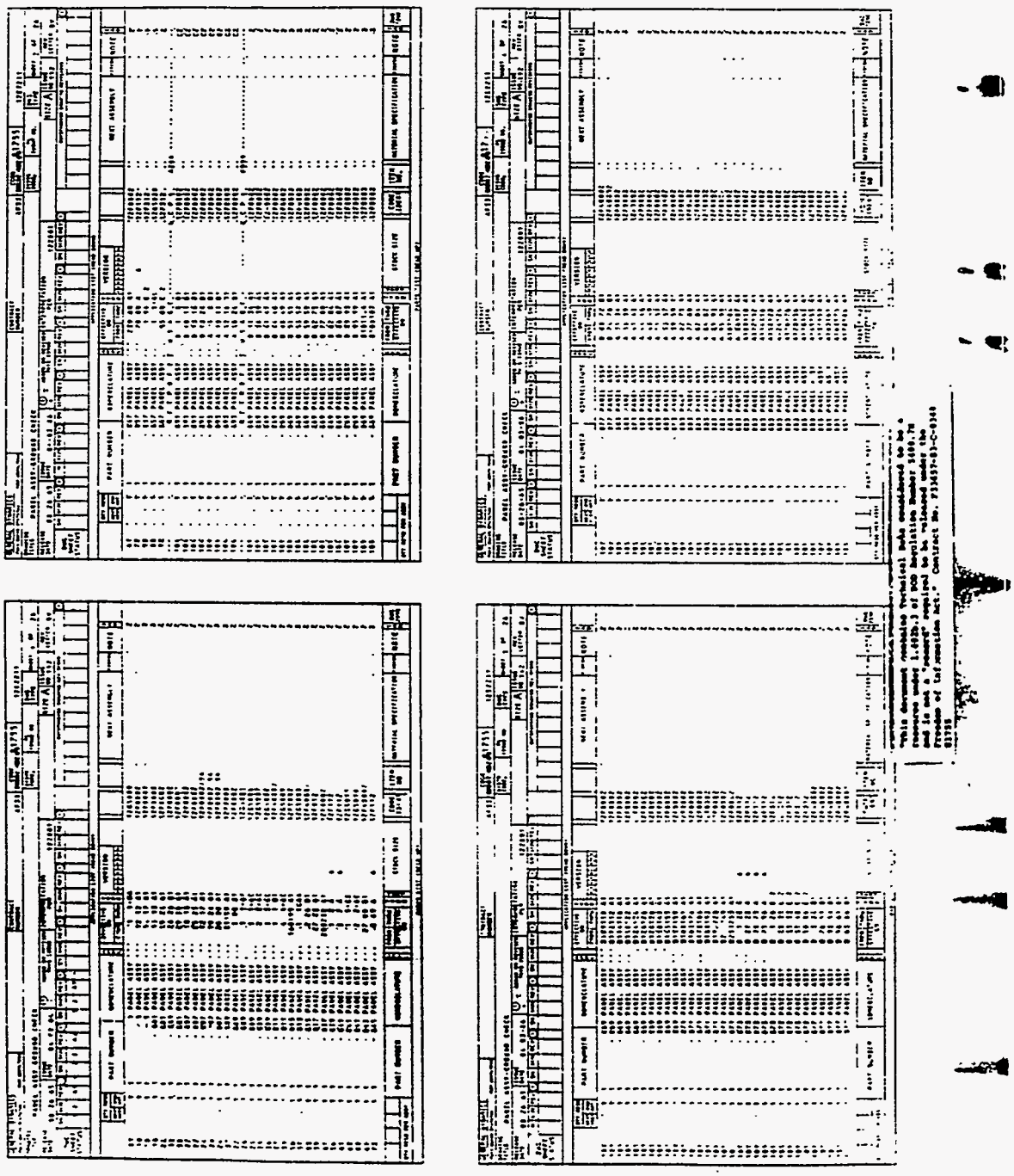
C5028

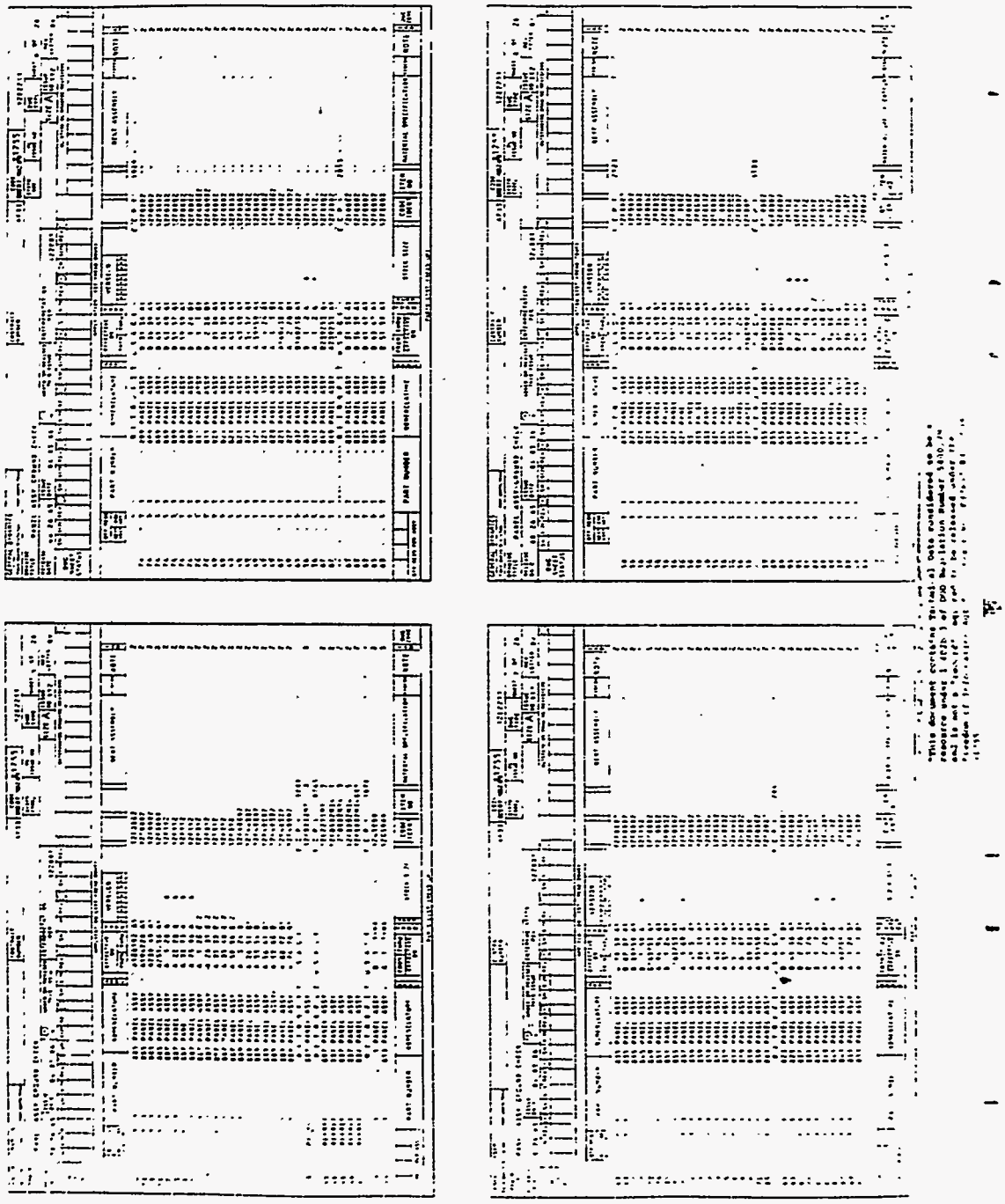


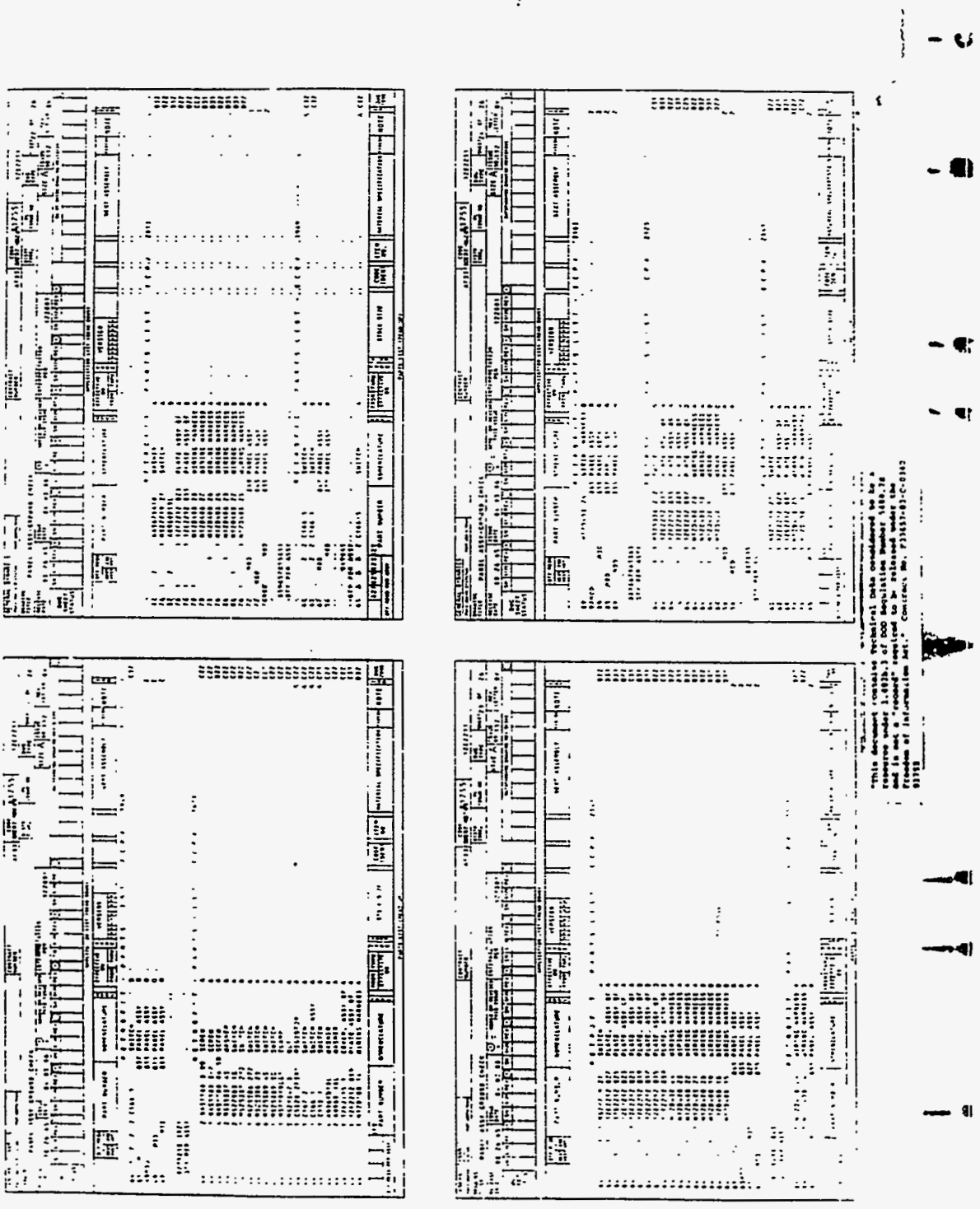


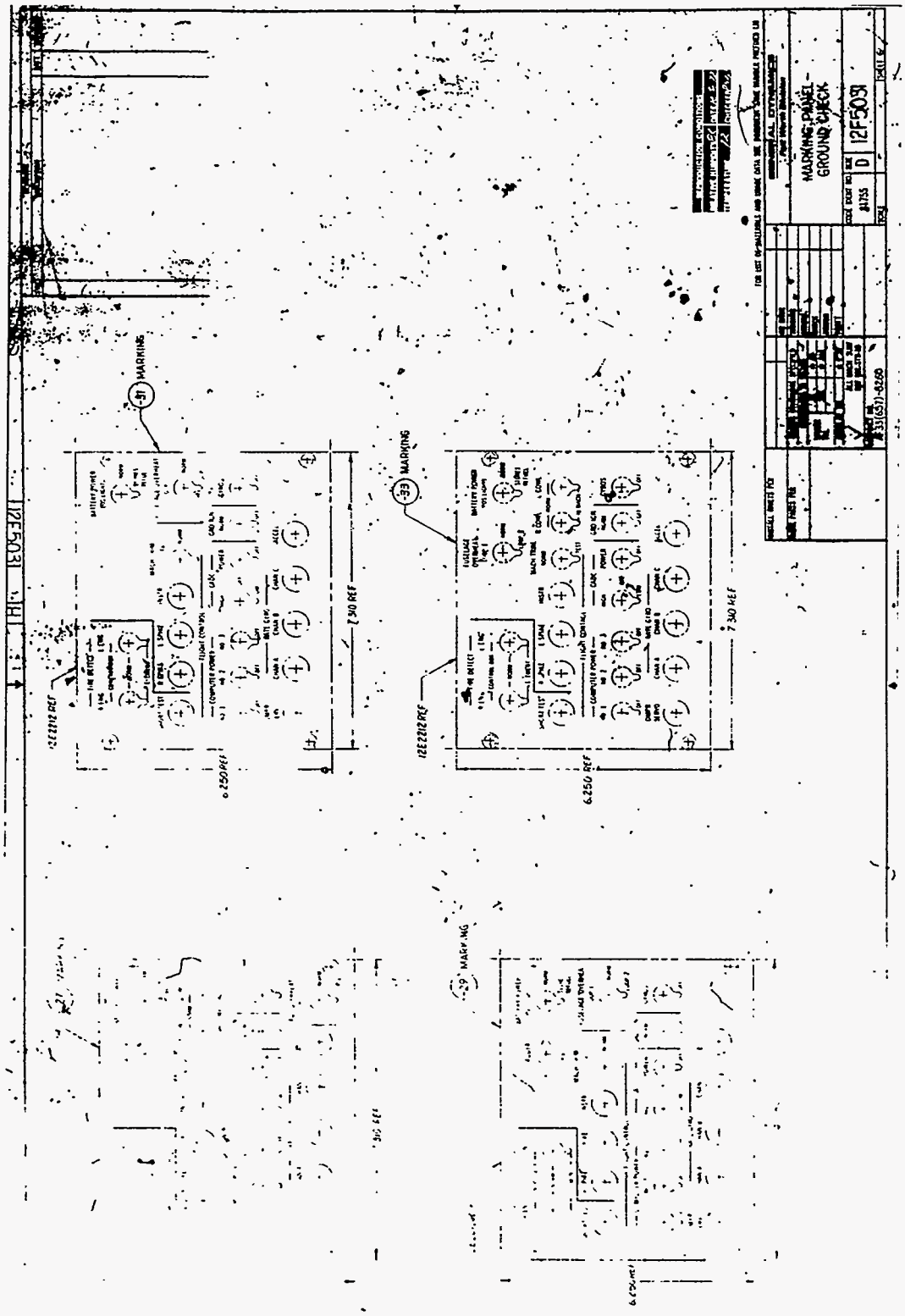








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MARKING
MARKING
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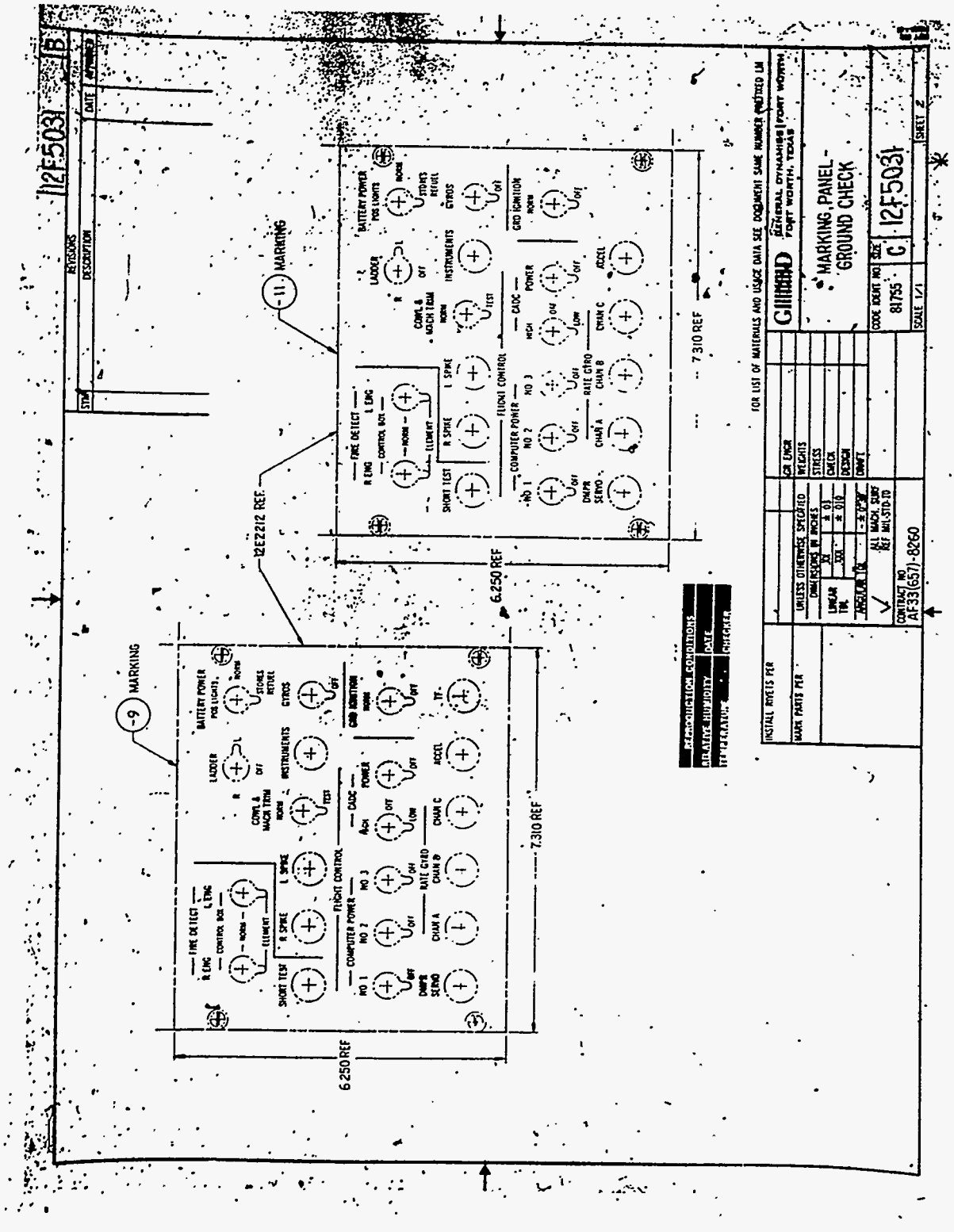
7.30 REF
6.250 REF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GROUND CHECK
12F5031
C
81755
CONTRACT NO
AF33(657)-8260
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-9- MARKING
12E2212 REF
6.250 REF
7.310 REF
BATTERY POWER
POS LIGHTS
STORES RETUEL
GYROS
LADDER
INSTRUMENTS
GRD IGNITION
HORN
CONT & MACH TRIM
FIRE DETECT
R ENG
L ENG
CONTROL BOX
ELEMENT
R SPIKE
L SPIKE
SHORT TEST
FLIGHT CONTROL
COMPUTER POWER
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NO 2
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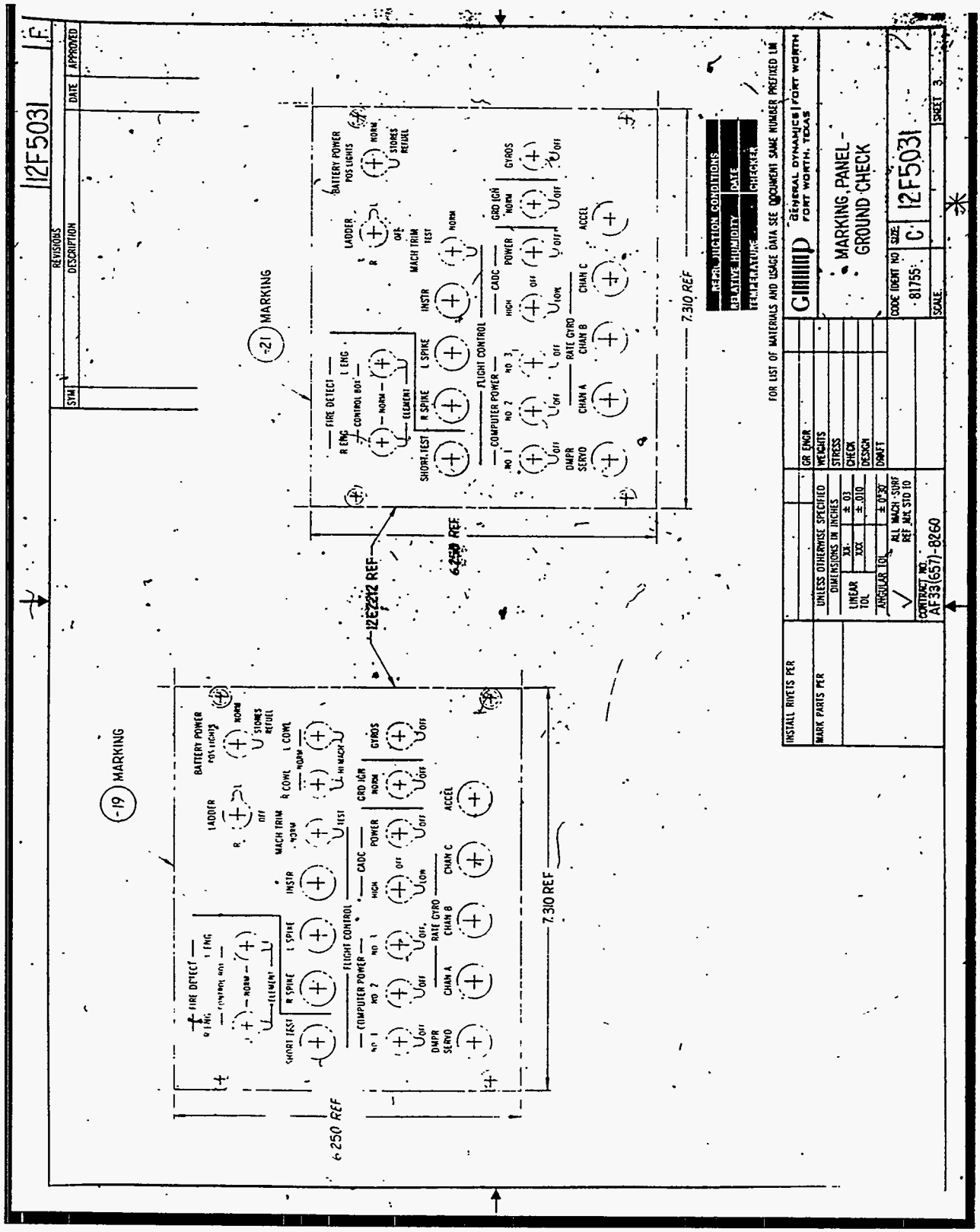
CHAN A
CHAN B
CHAN C
ACCEL
DMPR SERVO
GENERAL DYNAMICS
FORT WORTH, TEXAS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GENERAL DYNAMICS
FORT WORTH, TEXAS
CODE IDENT NO 81755
SIZE C
12F5031
SCALE
SHEET 3
CONTRACT NO. AF33(657)-8260
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES
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ANGULAR TOL
ALL MACH SURF REF MIL STD 10
INSTALL RIVETS PER
MARK PARTS PER
FOR LIST OF MATERIALS AND USAGE DATA SEE DOCUMENT SAME NUMBER PREFIXED LM
MACH. FRICTION CONDITIONS
RELATIVE HUMIDITY
TEMPERATURE
DATE
CHECKER
GR ENGR
WEIGHTS
STRESS
CHECK
DESIGN
DRAFT
FIRE DETECT
L ENG
R ENG
CONTROL BOX
NORM
ELEMENT
SHORT TEST
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L SPINE
FLIGHT CONTROL
COMPUTER POWER
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LOW
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CHAN A
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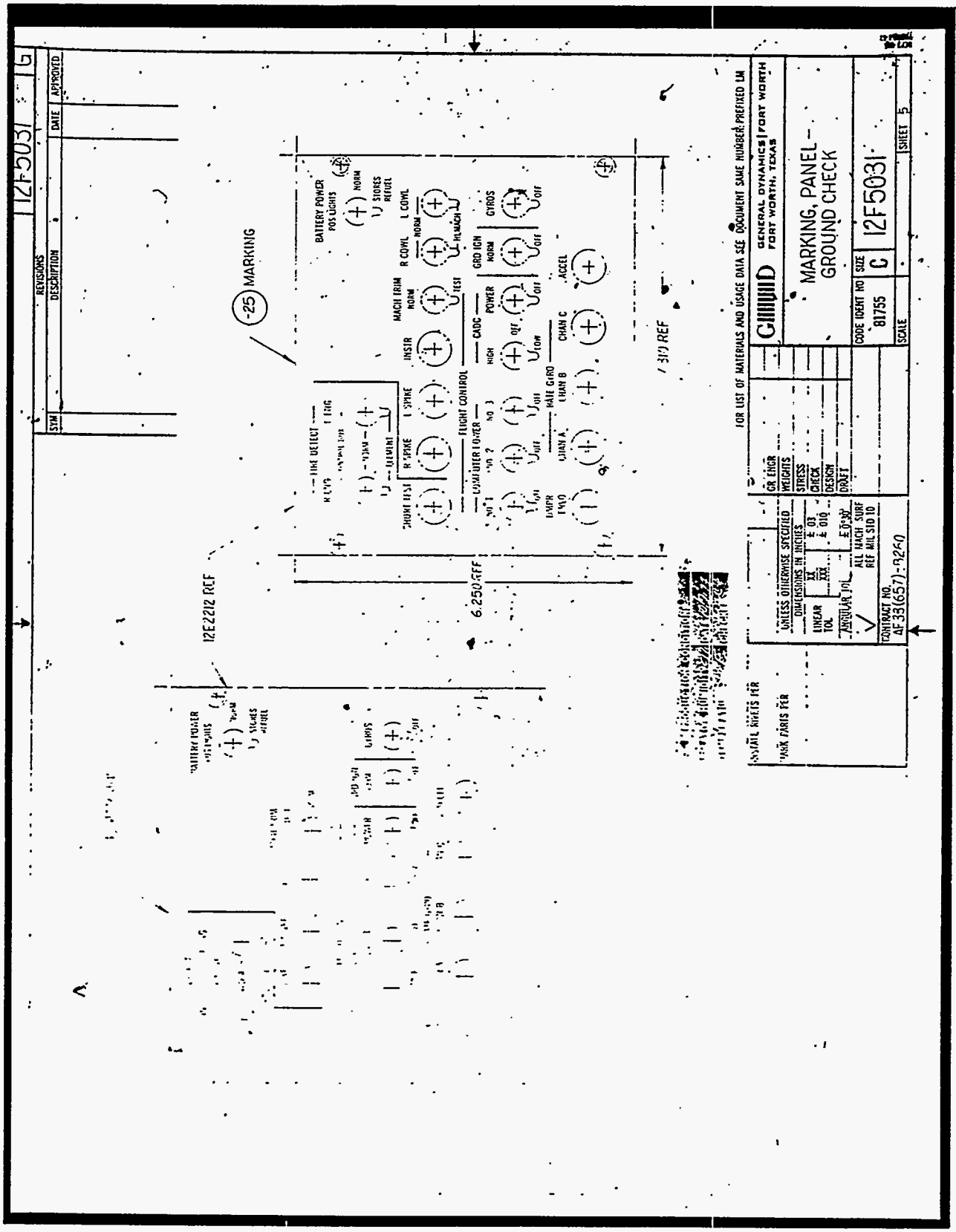
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FORT WORTH, TEXAS
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FOR LIST OF MATERIALS AND USAGE DATA SEE DOCUMENT SAME NUMBER PREFIXED LM
GR ENGR
WEIGHTS
STRESS
CHECK
DESIGN
DRAFT
BATTERY POWER POSITIONS
STORES REFUEL
FIRE DETECT
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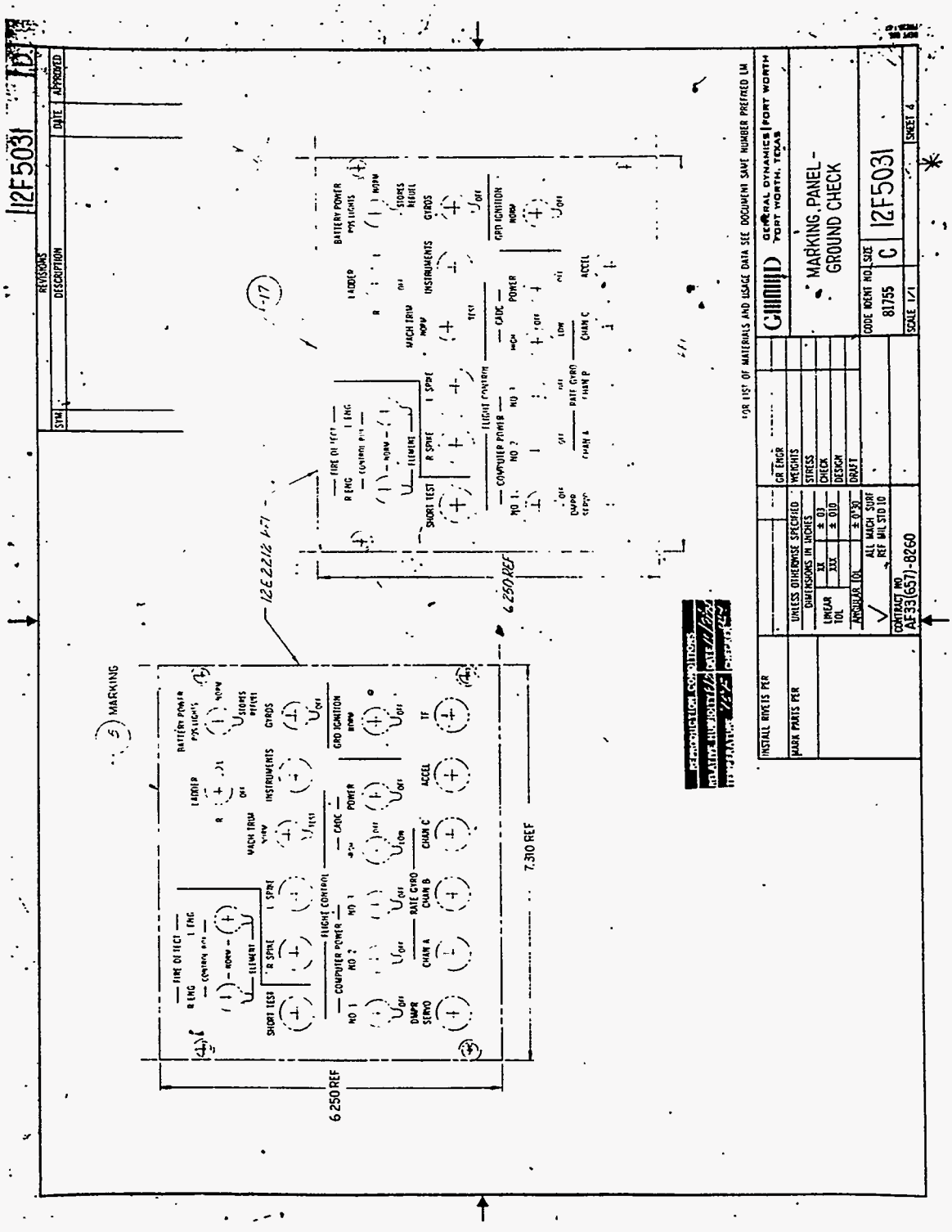
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GENERAL DYNAMICS
FORT WORTH, TEXAS
CODE IDENT NO
81755
SIZE
C
SCALE 1/1
SHEET 4
CONTRACT NO
AF33(657)-8260
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MARK PARTS PER
UNLESS OTHERWISE SPECIFIED
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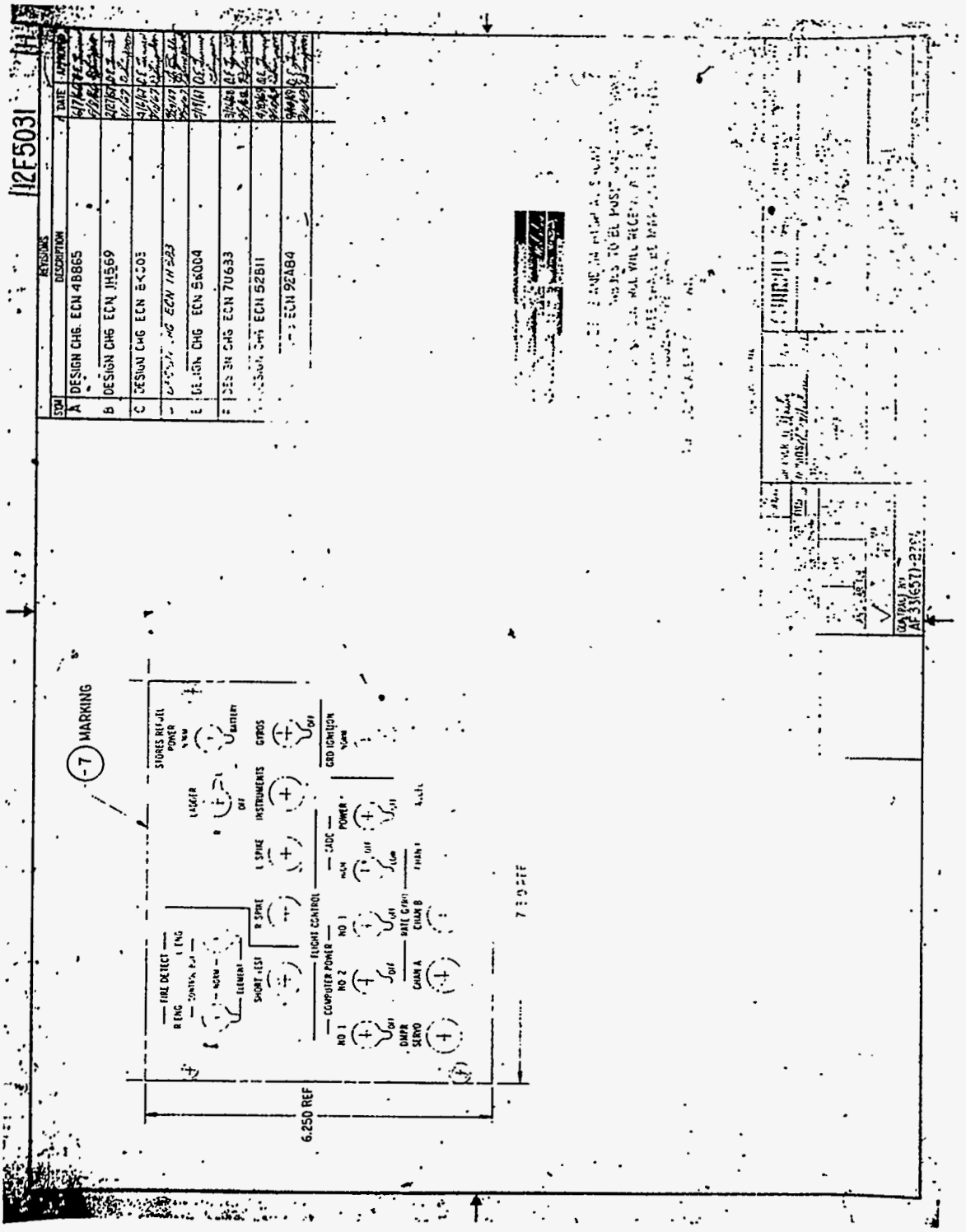
GR ENGR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FLIGHT CONTROL
COMPUTER POWER
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DUMP SERVO
RATE GYRO
CHAN A
CHAN B
R SPOIL
L SPOIL
INSTRUMENTS
GYROS
STORES RELEASE POWER
GRD IGNITION
CADC
MAIN POWER
NO 1
NO 2
CHAN 1
CHAN 2
LASER
BATTERY

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APPENDIX C Briefing to Participating Contractors

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EDI, CALS, and Testing

Donald L. Vickers
Manager, CTNO Test Bed

TechDoc/TIM '92
EDI Workshop
Fairmont Hotel
San Francisco, California
24 August 1992

Lawrence Livermore National Laboratory
Technology Information Systems Program
Automated Interchange of Technical Information Project
7000 East Avenue, Building 4377, Room 115
Livermore, CA 94550
or
P.O. Box 808, L-542
Livermore CA 94550
Phone: (510) 422-4231
Fax: (510) 294-5054
Internet: vickers@lance.tis.llnl.gov

Presentation Outline

- EDI
- CALS
- CALS Test Network
- CTN Testing of EDI and CALS

Presentation Outline

- **EDI**
- CALS
- CALS Test Network
- CTN Testing of EDI and CALS

What is EDI?

Electronic Data Interchange:

The electronic exchange of formatted business transactions between one organization's computer and another's

Electronic Business Transactions

What is the role of EDI in the DoD?

EDI is one of the enablers required for DoD to shift from a paper-based approach to "electronic commerce," as the way of doing business with over 300,000 vendors

One enabler for Electronic Commerce

How committed is DoD to EDI?

In May 1988, the Deputy Secretary of Defense issued a policy directive that EDI was to become the "way of doing business" for the Department of Defense.

DoD's way of doing business

What standards are part of DoD's EDI?

1 - ANSI X12	-	Message standard
2 - CCITT X.400	-	Electronic mail standard "envelope" for EDI messages
3 - CCITT X.500	-	Electronic directories "addresses" for EDI trading partners
4 - OSI Reference Model	-	ISO framework for open computer communication

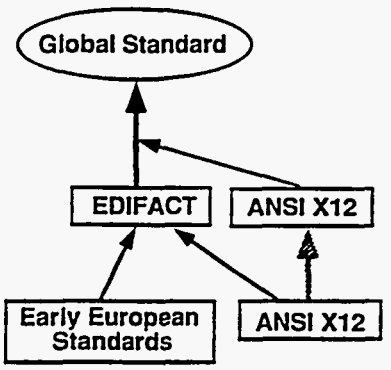
How does X12 compare to EDIFACT?

X12	EDIFACT
A message structure standard based on ANSI X12	A message structure standard based on UN standards work
Uses numerical designators "840" means "RFQ"	Uses name designators "REQUOTE" means "RFQ"
More mature	Less developed
Strong U.S. use	Broad worldwide endorsement
Supported by ANSI	Supported by ISO

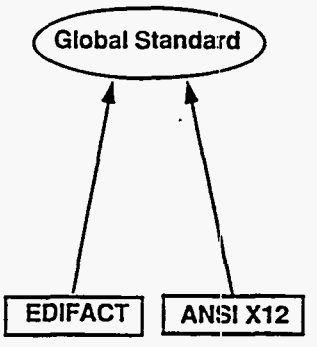
Will X12 and EDIFACT merge?

- EDIFACT was a compromise between ANSI X12 and existing European standards
- ANSI X12 representatives helped define EDIFACT
- A federal information processing Standard (FIPS) allows federal agencies to use either X12 or EDIFACT
- There is concern that both X12 and EDIFACT both mimic paper and are too focused only on trade, to the exclusion of design, manufacturing, distribution, and product support
  - Placement of EDI within the DoD CALS Office addresses this concern
- The use of only one global EDI message standard within even 10 years is unlikely

Alternate views of the road to a global standard



European Perspective



U.S. Perspective

What are today's concerns about EDI?

- *Paving cow paths* - developers must use business information modeling techniques
- *Broader definition of EDI* - go beyond trade to include design, manufacture, distribution and product support (including telediagnostics and on-line manuals)
- *Interactive EDI* - requires new techniques and transaction sets
- *Legal issues* - includes electronic signatures
- *Small business access* - EDI must reach everyone, to be truly effective; cost is important
- *Security* - includes encryption, defense against "traffic analysis"

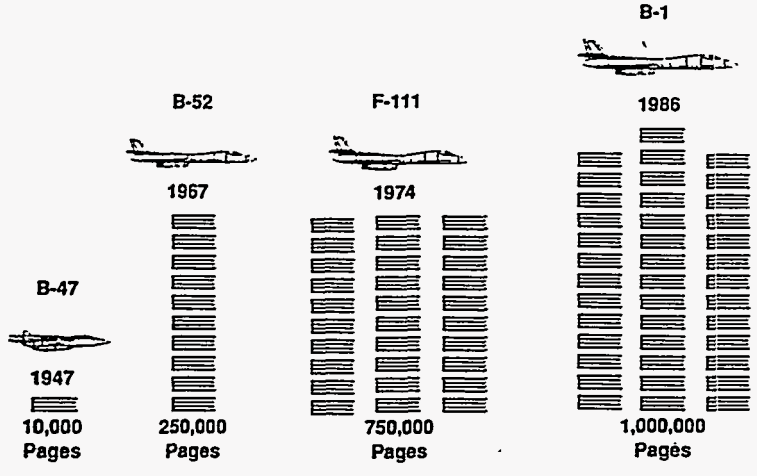
What should we do with EDI today?

- EDI today is neither perfect nor complete
- Two options
  1 - Wait for the perfect system
  2 - Get involved and use what we have
- Around 10,000 U.S. businesses currently use EDI
- Join the CALS Test Network and be informed of the testing being done

Presentation Outline

- EDI
- **CALS**
- CALS Test Network
- CTN Testing of EDI and CALS

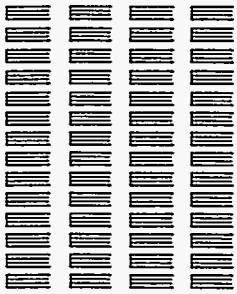
The Department of Defense is drowning in its"paper-based" weapon system data



Total Air Force technical manual inventory in 1986 (20 million pages)

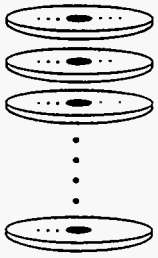
One solution is to require delivery of technical data in digital format

Air Force technical manual inventory in 1986 (20 million pages)



If conversion to digital format in 1986

2.4 gigabytes



Only 25 optical disks (60 gigabytes)

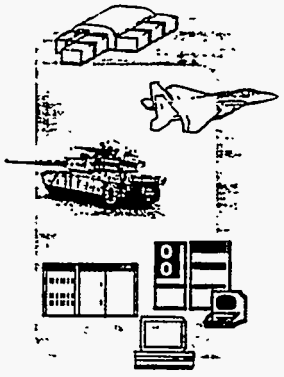
The DoD CALS program provides standards — critical for improving the fielding of weapon systems

Military effectiveness & industrial competition

Reduce lead time

Reduce cost

Improve quality

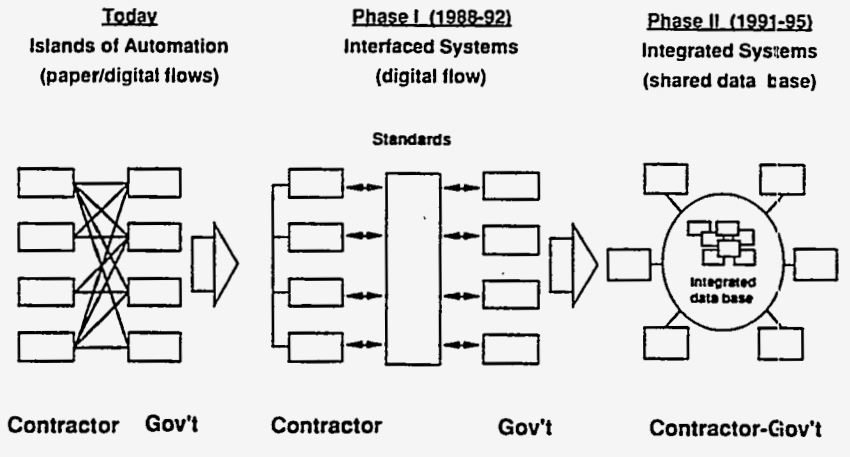


For example, CALS could save $6-12 billion per year on purchasing and maintaining for new weapon systems

Begin with...	Given...	Could save...
OSD cost savings estimate = 10-20%	$60 billion/year for new weapon systems	$6-12 billion/year

- Spares procurement (22%)
- Authoring (30-40%)
- Printing (30%)
- Design (30%)
- Accuracy (35%)

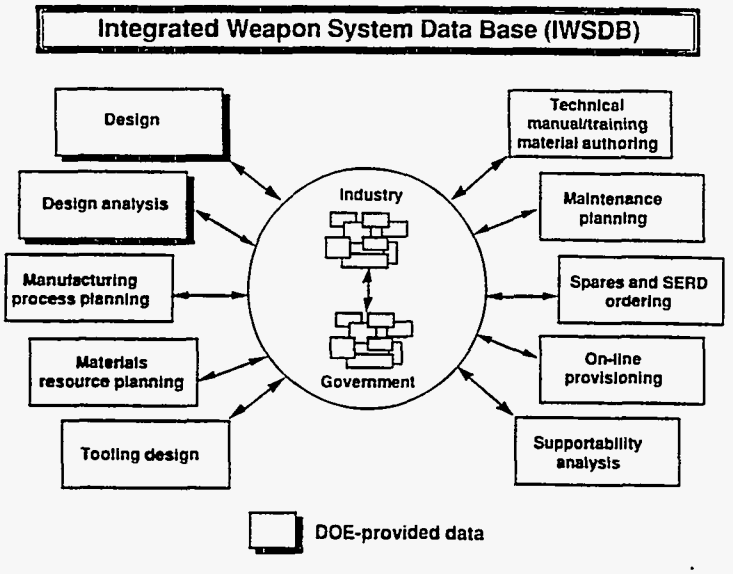
The Computer-aided Acquisition and Logistic Support (CALS) Program has a phased development approach



Present CALS standards are for technical publications and engineering data

DoD Standards	Date	Nat'l/Int'l Standard	Applications
MIL-STD-1840A	Dec 87	ANSI X3.27	• Data interchange file management
MIL-D-28000A	Feb 92	IGES 4.0	• CAD, vector graphics - Engineering drawings - TM illustrations (optional)
MIL-M-28001A	Jul 90	SGML ISO 8879	• Automated publishing - Tech manuals
MIL-R-28002A	Nov 90	Raster Grp 4 ISO 8613	• Raster scanned images - Engineering drawings - Tech manual illustrations
MIL-D-28003	Dec 88	CGM ISO 8632 ANSI X3.122	• Vector graphics - TM illustrations (preferred)
MIL-HDBK-59A	Sep 90	--	• Implementation guide - Model SOWs, CDRLs
MIL-STD-CITIS	Draft	--	• Contractor Intregrated Technical Information Service

Eventually the IWSDB will be a distributed data base containing all useful information about a weapon system



Future standards will address added categories for using digital data

Today	Future
• Tech pubs	-
• Engineering data	• Product Data Exchange Specification (PDES)
	• Data protection and security
	• Data base systems (LSAR)
	• Data configuration control
	• Data acceptance

Here are some important points about CALS

- Current standards are for data DELIVERY, with minimal impact on local business practices
- CALS standards were defined with strong industry support
- DoD gives preference to bids using CALS
- The suite of CALS standards will expand
- There are well over 70 CALS contracts now in place

How is EDI related to CALS?

EDI	CALS
Standards for electronic interchange of business transactions	Standards for electronic interchange of technical data
Based on ANSI X12 standards	Based on ANSI and ISO standards
In use for 2 decades	New and emerging standards

Can CALS and EDI work together?
— CALS/EDI testing with SM-ALC

Together, they open the door for Electronic Commerce

How will CALS and EDI work together?

- For procurements using EDI
  - RFQ (citing a FOSI and DTD), Response
  - PO, Electronic funds transfer
- For large technical documents
  - CALS via tape or disk
  - EDI transaction set for "it's in the mail"
  - EDI transaction set for "it just arrived"
  - CALS via EDI?
    Maybe, with gigabit lines
    Maybe never
- For very small documents and change pages
  - CALS via EDI (transaction set 841)
  - "Let us see the table of contents"
  - "Here's a revision of figure 58"

Presentation Outline

- EDI
- CALS
- **CALS Test Network**
- CTN Testing of EDI and CALS

CALS TEST NETWORK

The CALS Test Network

CTN is an informal confederation of

INDUSTRY, DoD/GOVERNMENT,

the SERVICES, and NATIONAL LABORATORIES

directed at testing CALS STANDARDS.

(An Organizational Network)

CTN Goal

Demonstrate the Complete Process

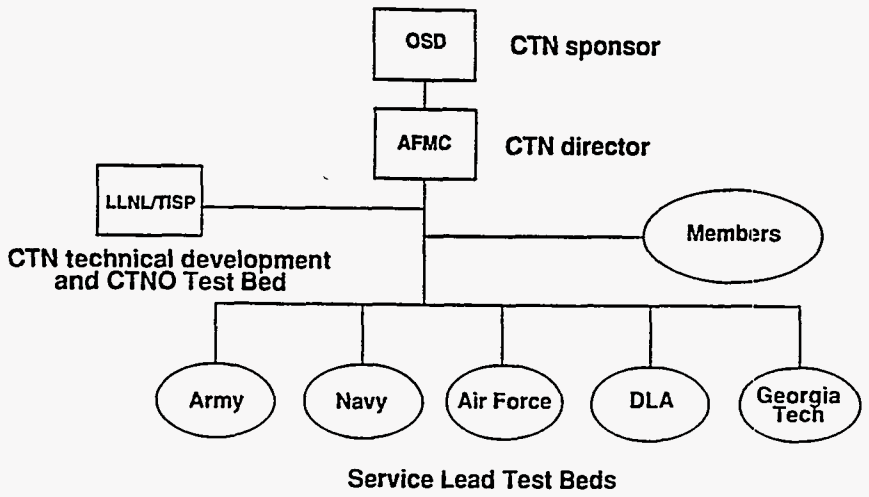
of Digital Data Delivery

and Test the CALS Standards

Within this Framework

(Field Testing)

The CALS Test Network Office (CTNO) directs the testing of standards



CTN Members - Industry August 1992

ABI Enterprises
Accent Systems Corp.
Access Corp.
Advanced Sciences, Inc.
Advanced Technology, Inc.
AEL Defense Corporation
Aerojet Electronic Systems Division
Aerospace Technology Group, Inc.
AGFA Compugraphics
AIL Systems, Inc.
Airborne Express/ABX Air, Inc.
Aircraft Technical Publishers
Albert Consulting Group
Albuquerque Operations Office
Alcoa
Alliant Techsystems
Allied Signal Aerospace Company
Allied Signal Aerospace Company
Alpharel
Analysis & Technology, Inc.
Apple Computer
Applied Technology Center
Apunix Computer Services
Aquidneck Data Corp.
ArborText, Inc.
ARC Professional Services Group
Architect of the Capital
Aspen Systems Corp.
Aspen Technical Publications
Assurance Manufacturing
AT&T Federal Systems
Auto-Trol Technology
Auto-Trol Technology
AutoDesk, Inc.
Auxco
Avalanche Development Company
AVTEC Systems, Inc.
AZTEK
Baham Corp.
Battelle
Battelle Human Affairs Resource Center
Bechtel, Inc.
Bill Loye & Assoc.
Boeing Computer Services
Boeing Computer Services
Boeing Computer Services
Boeing Computer Services
Boeing Computer Services
Boeing Computer Services
Boeing Computer Services

CTN Members - Industry August 1992

Boeing Military Aircraft Division
Boeing - TMIS Project
Booz-Allen & Hamilton, Inc.
Boston Software Works, Inc.
BOW Industries, Inc.
Brodan Information Services, Inc.
C Isigraph Corp.
C-TAD Systems, Inc.
CAD/CAM Engineering Systems
CADKEY, Inc.
Caley Enterprises
CALS Conectivity Center
CALS Shared Resource Center
Carberry Technology
CAS, Inc.
Casde Corp.
Casterline Computer Consulting
CBIS Federal Inc.
CE-Engineering Automation
CENTEC H
CERC
Chipcom Corp.
CIMAGE Corp.
CIMLINC, Inc.
Cincom Systems, Inc.
Cleveland Advanced Manfacturing
Computer Assoiates
Computer Sciences Corp.
Computer Sciences Corp.
Computer Sciences Corp.
Computer Sciences Corp.
Computer Sciences Corp.
Computer Technology Management
Concept Develop Technologies, Inc.
Concurrent Technologies Corp.
Control Data Corp.
Cubic Defense Systems
Cummins Engine Company
Data Conversion Laboratory
Data Devleopment, Inc.
Datalogics
Datalogics
Datalogics
Digital Equipment Corp.
Digital Equipment Corp.
Digital Equipment Corp.
Digital Equipment Corp.
Douglas Aircraft Company
Draper Laboratory
Eastman Kodak

CTN Members - Industry August 1992

Eaton Corp.
EDS Unigraphics
EG&G Dynatrend, Inc.
Electronic Book Technologies
Electronic Commerce Executive Forum
Electronic Data Systems
Electronic Data Systems
Electronic Data Systems
Electronic Data Systems
Electronic Data Systems
Electronic Data Systems
Electronics & Space Corp.
Enginetics Corp.
FileNet
FMC
FMC
Foreign Broadcast Information Services
Frame Technology
General Atomics
General Dynamics
General Dynamics
General Dynamics Advanced
General Dynamics Data Systems
General Dynamics Electric Boat
General Dynamics Electronics
General Electric Aircraft Engines
General Electric Automated System
General Electric Corp. Engineering
Gillette Company
Giordano Assoc., Inc.
Graphics Communications Assoc.
Grumman Data Systems
Grumman Data Systems
GSC Associated, Inc.
GTE Government Systems Corp.
GTX Corp.
Harris Corp.
Harris Corp.
Henderson Software
Hercules Corp.
Hewlett Packard
Hewlett Packard
Hewlett Packard
Hewlett Packard
Hilton Systems Inc.
Honeywell
Honeywell Air Transport Systems Division
Honeywell Military Avionics Divsion
Honeywell Ordinance Division
Horizons Technology, Inc.

CTN Members - Industry August 1992

Hughes Aircraft
Hughes Aircraft Company
Hughes Aircraft Company
Hughes Aircraft/Tucson Support Systems
Hughes Ground Systems Group
Hughes Training, Inc.
I-NET, Inc.
IBM
IBM
IBM
IBM
IBM
IBM
IBM
IBM
ICM, Inc.
IDEAL Scanner Division, Inc.
IGES Data Analysis Corp.
Image Memory Systems, Inc.
Image Systems Technology, Inc.
Industry West Electronics
Information Spectrum Inc.
Ingalls Shipbuilding, Inc.
Input, Inc.
Inset Systems, Inc.
InterCap Graphics Systems
Interconsult, Inc.
Intergraph
Intergraph
Interleaf
Interleaf
Interleaf
InterLinear Technology
InterLinear Technology
International Computer & Telecom.
International TechneGroup Inc.
IOMEGA
ITT-A/CD
J.D. Kiser & Assoc.
Joint Committee on Printing
Kennedy Space Center
Kent Assoc.
Knowledge Base Int'l.
Kruse Indsutries, Inc.
Litton Computer SErvices
Litton/ITEK Optical Systems
Lockheed
Lockheed Aeronautical Systems
Lockheed Aeronautical Systems

CTN Members - Industry August 1992

Lockheed Aeronautical Systems
Lockheed California
Lockheed Integrated Solutions
Lockheed Missiles & Space
Lockheed Sanders, Inc.
Logicon - Ultrasystems
Logistic Services International Inc.
Logistics Systems Architects
Loral Aerospace company
Loral Aerospace Company
Loral Defense Sysem - Akron
Loral Western Development Lab.
LTV Aerospace and Defense Co.
Magnavox
Magnavox
ManTech Services Company
Martin Marietta Astronautics
Martin Marietta Data Systems
Martin Marietta Energy Systems
Martin Marietta Missile Systems
Maxima Corp.
Maxima Corp.
McDonnell Douglas
McDonnell Douglas Missile Systems
McDonnell Douglas Telecom Department
McDonnellDouglas Space Systems
Mentor Graphics Corp.
Meridian Data Inc.
MICAH Systems, Inc.
Micrographic Technology Corp.
Microsystems Engineering Corp.
Minigraph
MITRE Corp.
MITRE Corp.
Moore Quality Tooling, Inc.
Motorola, Inc. GEG
National Library of Medicine
Newport News Shipbuilding
NMT Corp.
Northrop
Novell, Inc.
O'Neil & Assoc., Inc.
Optigraphics
Oracle Federal Group
Oracle Multimedia
Oster & Assoc., Inc.
Owl Int'l., Inc.
Pratt & Whitney
Pratt & Whitney
Pratt & Whitney

CTN Members - Industry August 1992

PRC, Inc.
Precision Manufacturing
Publishing Technology Management
Raytheon Company – Publication
Raytheon Service Company
REDCON
Resource Strategies, Inc.
RLT Assoc.
Rockwell International
Rockwell International
Rockwell International
Rockwell International
Rockwell International
Rockwell International
Rockwell International
Rockwell International
Rockwell International Space Trans.
Rockwell Space Operations Company
Rosetta Technologies
Rosetta Technologies
SAIC
Scan-Graphics, Inc.
Schlumberger Technologies
Scientific Software Corp.
Scilab, Inc.
SEMCO
Serox Imaging Systems
Shaw Industries, Inc.
Sikorsky Aircraft
Simmonds Precision
Smiths Industries
SofTech, Inc.
Software Publishing Corp.
South Carolina Research Authority
Southwest Research Institute
SSC Laboratory
St. Paul Software
Structural Dynamics Research Corp.
STS Information Systems, Inc.
Sun Microsystems Federal, Inc.
Sun Microsystems Federal, Inc.
Sundstrand Aerospace
Supply Tech, Inc.
SYSCON Corp.
SYSCON Corp.
Systems Engineering Design Lab.
TAMSCO
Technology Management Corp.
Teledyne Power Systems
Teleprint Corp.

CTN Members - Industry August 1992

Texas Instruments
Texas Instruments
Textron Defense Systems
Textron - Lycoming
Titan Applications Group
Tracor, Inc.
TRW
TRW
TRW - ACA
TRW Federal Systems
TRW SEDD
UNISYS
UNISYS
UNISYS
UNISYS
UNISYS
UNISYS CAD/CAM
UNISYS Corp.
United States Video Corp.
US Lynx, Inc.
Vere Smith, Inc.
Visual Engineering
Vitro Corp.
Volt Group
Volt Group
VSE Corp.
Wang Laboratories
Wang Laboratories, FSD
WESCO
Williams Int'l.
Winchester Data Products, Inc.
Wing Corp.
Wiz Worx
Woodside Summitt Group, Inc.
Wordperfect Corp.
WRDC-MTI
Xerox Corp.
Xerox Corp.
Xerox Corp.
Xerox Corp.
Xerox Corp.
Yard Software Systems
Young Minds, Inc.
Zenographics, Inc.

CTN Members - Government August 1992

AF AFMC Aeronautical Systems Center
AF AFMC Electronic Systems Center
AF AFMC Ogden ALC
AF AFMC Oklahoma ALC
AF AFMC Rome Development Center
AF AFMC Sacramento ALC
AF AFMC San Antonio ALC
AF AFMC Warner-Robins ALC
AF ASC/SCNO
AF CALS Shared Resource Center
AF EDCARS Program
AF F-22
AF HQ AFMC/ENC
AF HQ USAF/LE-I
Army, AMC, AMCCOM, ARDEC
Army AMCCOM
Army Foreign Science & Tech Center
Army Information Systems
Army Material Command
Army Munitions & Chemical Command
Army PM CALS
DCMO Rochester, DoD Office
Defense Logistics Agency
Department of Transportation
Government Printing Office
HQDA SFIS-FAV-F
LLNL AITI Project/TIS Project
LLNL Mechnical Engineering Department
LLNL Technical Information Department
Los Alamos National Laboratory
Navy Naval Air Technical Service
Navy Naval Aviation Depot
Navy Naval Aviation Depot
Navy Naval Aviation Depot
Navy Naval Ocean Systems Center
Navy Naval Ordinance Station
Navy Naval Publishing & Printing Services
Navy Naval Research Laboratory
Navy Naval Sea Combat Systems
Navy Naval Sea Systems Command
Navy Naval Supply Systems Command
Navy Naval Undersea Warfare Eng.
Navy Naval Underwater Systems Center
Navy Naval Weapons Center
Navy NavSea Systems Command
Navy NSWC Carderock David Taylor
Neutronix, Inc.
NIST
OSD CALS Policy Office
Sandia National Laboratories

CTN Members - Educational August 1992

Brigham Young University
Georgia Institute of Technolgoy
Industrial Technology Institute
John Hopkins University
University of California
USC

CTN Members - International August 1992

Air Force Department of Defence
CAE Electronics Ltd.
Depart of National Defence
Department of National Defense
Exoterica Corp.
Grig S.A.
Hewlett Packard
InContext
InfoDesign Corp.
IRPL/ENSTA
MBB Deursche Aerospace
Micro-Data, Ltd.
OMI Logistics
Rolls Royce PLC
Royal Australian Air Force
SoftQuad, Inc.
Swedish Defence Materiel Admin.
Swedish Institute of Production En
Sydney Communications Ltd.

Implementation of CALS requires three types of testing

Standards Testing

- Development Testing (NIST)
- User Application Testing (CTN)

Product Testing

- Product Conformance Testing (NIST)

System and Data (Implementation) Testing

- System Acceptance Testing (CTN)
- Data Acceptance Testing (CTN)

8812

LLNL is analogous to NIST

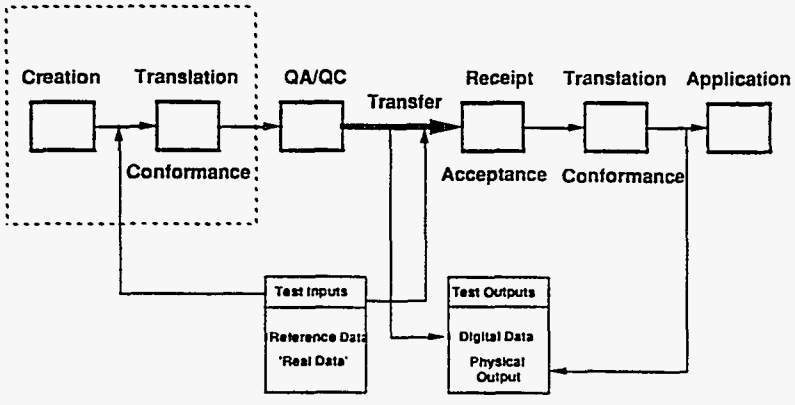
NIST	LLNL
DOC - operated	DOE - operated
Develops Standards	Tests Standards

- Both are "neutral" government R&D laboratories
- Their involvement helps broaden the CALS base beyond DoD
- There is good collaboration among technical experts

CTN Testing Process

1. Study/stabilize the standard
2. Formulate a testing strategy
3. Select/develop evaluation tools
4. Test the evaluation tools
5. Develop reference test data
6. Write instructions (test packets)
7. Test the test packet
8. Plan transfer tests
9. Perform tests
10. Evaluate results
11. Publish test reports
12. Broaden testing base
    - Industry
    - Services/Repositories
    - Foreign
13. Pilot projects

Digital Data Interchange

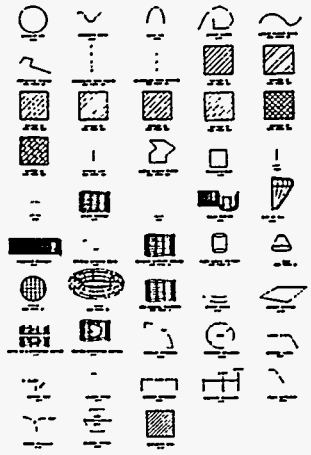


Examples of reference data (drawings) for testing MIL-D-28000 (IGES)

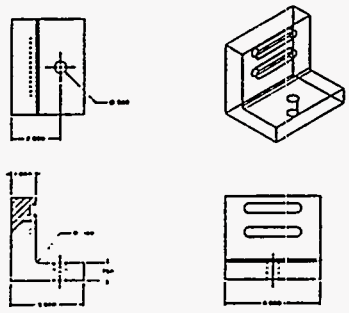
Five reference drawings planned:

- Class I - Technical Illustrations
- Class II - Engineering Drawings
- Class III - Electrical/Electronic Applications
- Class IV - Numerical Control Manufacturing
- Class V - Piping and Tubing

Together the L-bracket and N-entity reference drawings will fully test the MIL-D-28000 Class II subset.

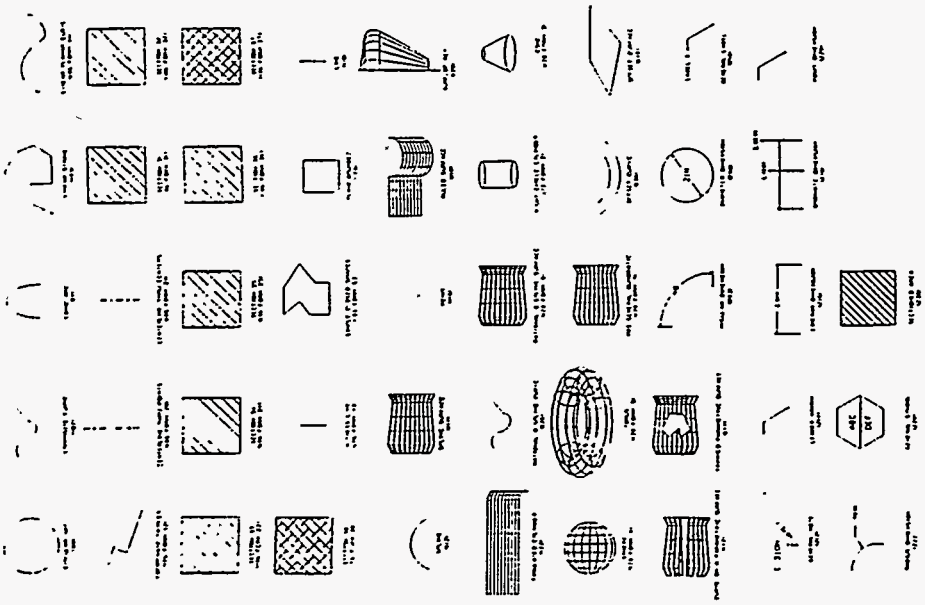


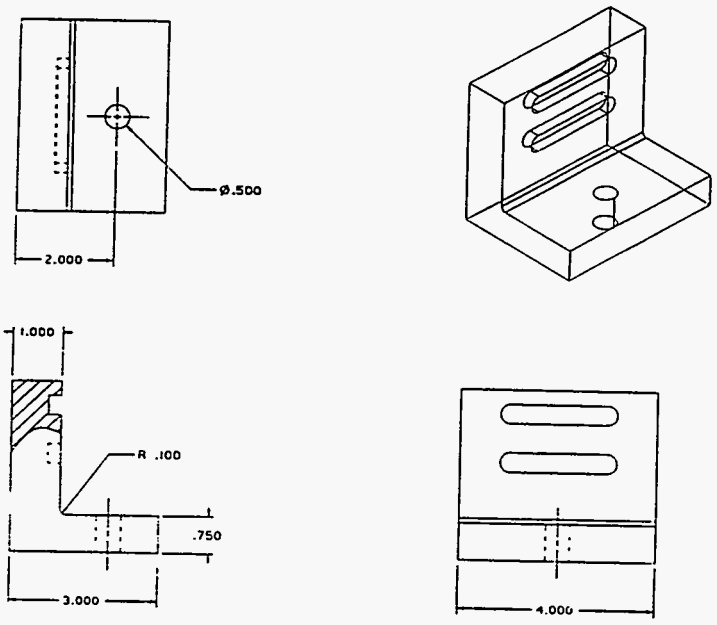
Tests all geometric and annotation entities (100 thru 230).



Tests all structure entities (304 thru 410).

AITI/1263odw17





Technical Publications Testing

- Reference document development
  - -- CTN-REF-TXT - Actual TO from ATOS
  - -- CTN-REF-TXT-A - Revised to parse with 28001A
  - -- CTN-REF-SHT - Short form
  - -- CTN-REF-MIN - Minimized tag set
  - -- CTN-REF-IGS - Document with IGES illustrations
  - -- CTN-REF-RAS - Raster illustrations
  - -- CTN-REF-CGM01 - CGM illustrations
  - -- CTN-REF-CGM02 - All CGM graphical primitives
  - -- CTN-REF-MTH - Mathematical symbols
  - -- CTN-REF-TAB - Tables
  - -- CTN-REF-LIS - Lists and footnotes
  - -- CTN-REF-FRT - Front matter only
  - -- CTN-REF-REA - Rear matter only

Presentation Outline

- EDI
- CALS
- CALS Test Network
- **CTN Testing of EDI and CALS**

CTN is Currently Testing

- MIL-STD-1840B
- MIL-R-28002B
- MIL-D 28003A
- CALS & EDI - Procurement - Phase II

Field testing before release of standard

Why Execute a CALS-EDI Transfer?

- Merging of business (EDI) with technical (CALS)
- Explore concerns
  - Compatibility
  - File Sizes
- Co-location of technical arms at LLNL
  - EDI Expertise
  - CALS Testing Experience

AITI/1263pdw15

Summary of CTN - EDI Testing

Fall 1990 - CALS-EDI Test #1

- CALS/EDI via ISDN VAN, and back
- CALS/EDI via DDN, LLNL to SM-ALC
- Raster & IGES data
- Qualified success - great learning experience

Mean time - Small Procurement Pilot Project

- Automate small procurements
- Include procurements using CALS
- DLA, WPAFB, SM-ALC, LLNL

Fall 1991 - CALS-EDI Test #2

- Extend our understanding of CALS & EDI
- Set stage for Pilot Project

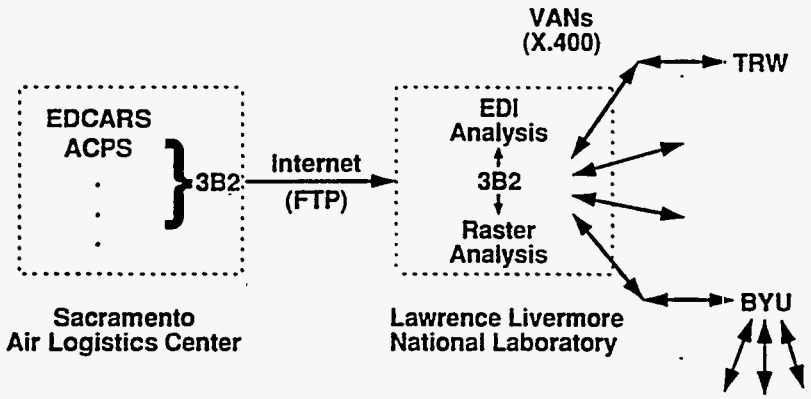
AITI/1183pdw2

Objectives of CALS/EDI Test #2

- Use actual "bid set" data
- Test 840 with 841
- Get "snapshot" of current procedures
- Try several sizes of sets (3, 20, 200 dwgs)
- Test multiple VANs
- Test vendor response

AITI/1153pdw3

Diagram of CALS/EDI Test #2



AITI/1153pdw4

Status of CALS/EDI Test #2

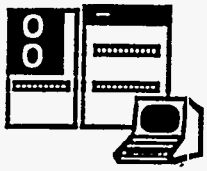
- Phase 1 of the test completed
- CALS data to SM-ALC 3B2
- Wrapped in EDI envelope
- Sent to LLNL
- Analyzed engineering drawings
- Forwarded to temporary VAN hub
- Received in good shape at TRW

Phase 2 of CALS/EDI Test #2

- Procurement data from ACPS
- CALS data from EDCARS electronically
- EDI to small businesses (EDI literate)
- EDI to small businesses co-op
- Test is in process

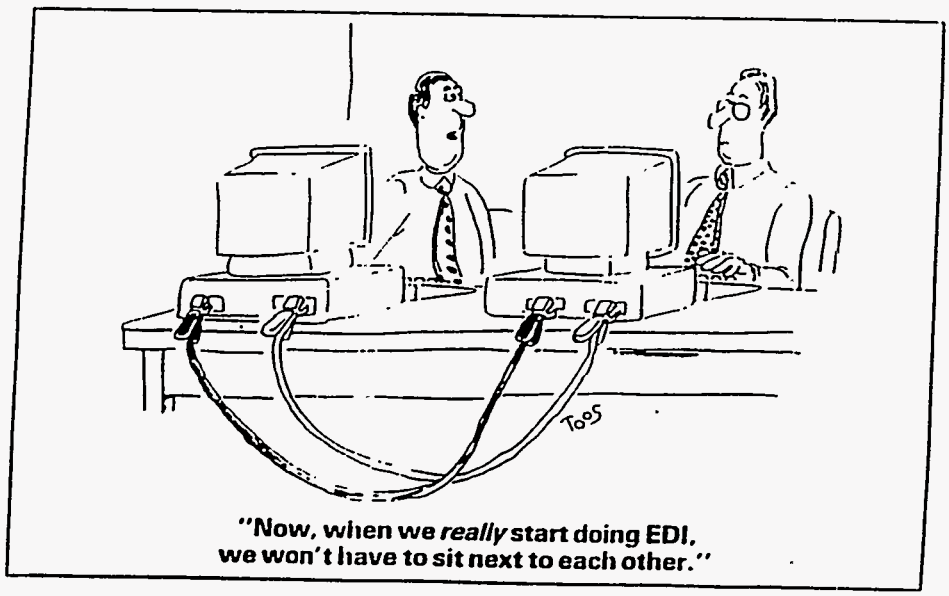
As a Result of testing, the CTN is able to recommend improvements

- To Military Standards
- To National Standards
- To Vendors' Products
- To Users' Procedures



Improved Standards
Demonstrated Standards
Educated People

AITI1263pdw18



"Now, when we *really* start doing EDI, we won't have to sit next to each other."

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AFMC

EC / EDI PROJECT

SACRAMENTO AIR LOGISTICS CENTER

ANSI X12 (841) TRANSACTION SET
TECHNICAL DATA

McClellan AFB CA
Air Force Materiel Command

Dee Smith
(916) 643-6150

AFMC

CONTENT

- BACKGROUND
- PHASE I TEST
- PHASE II TEST
- SM-ALC IMPLEMENTATION
- SUMMARY

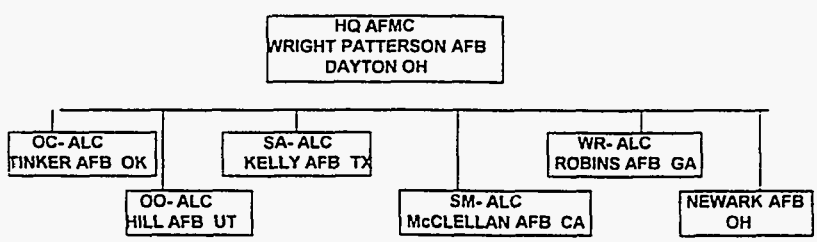
AFMC

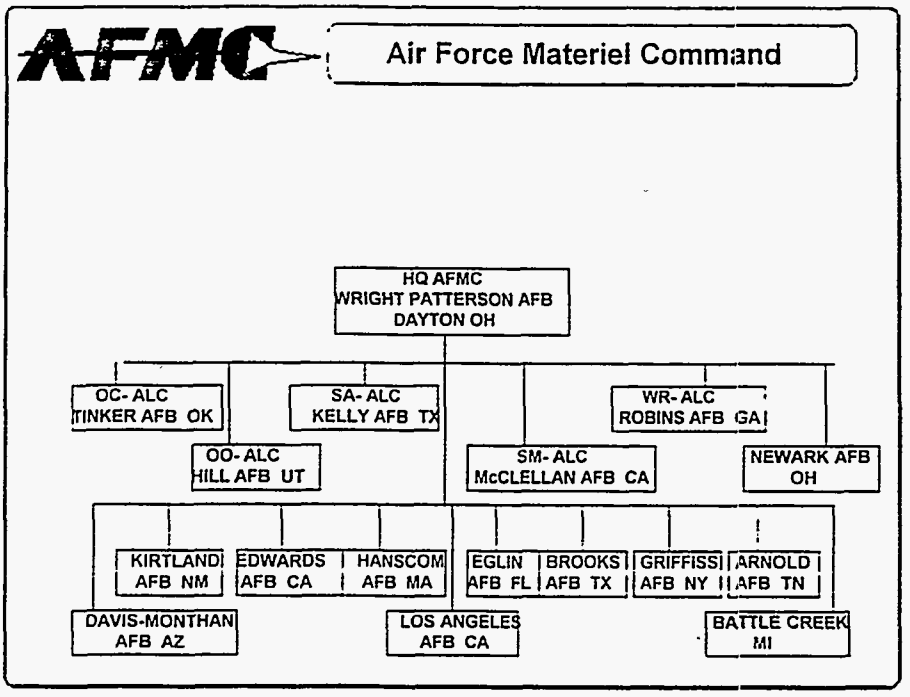
BACKGROUND

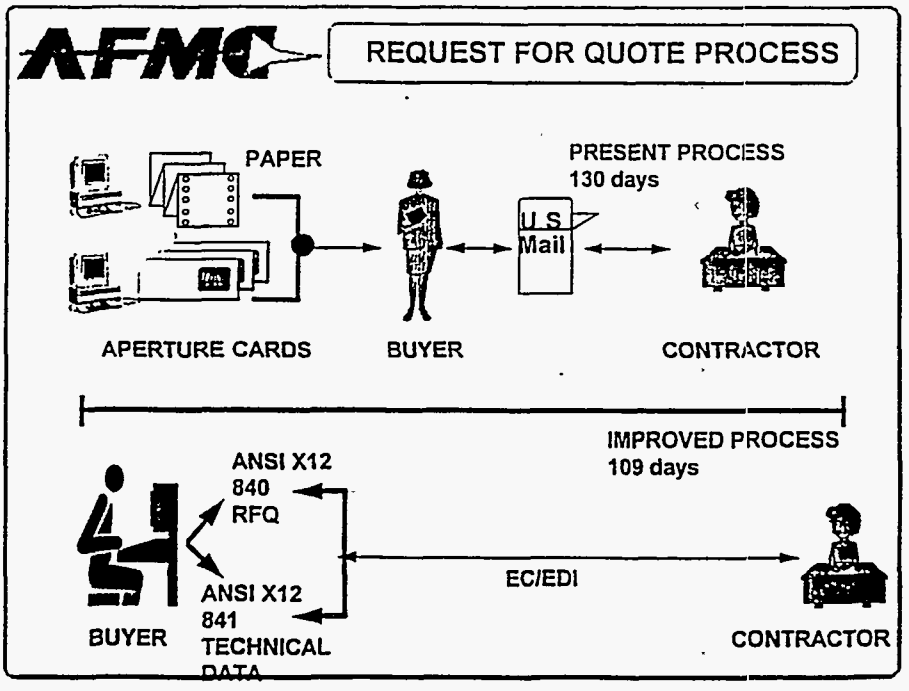
- DEP SEC DEF ENDORSES USE OF EDI (MEMO, 24 MAY 88)
- DMRD 941 MANDATED EDI IN DOD (12 NOV 90)
- WPCC RFQ/ORDERS
- SM-ALC TECH DATA/APERTURE CARDS

AFMC

Air Force Materiel Command




AFMC
Air Force Materiel Command
HQ AFMC
WRIGHT PATTERSON AFB
DAYTON OH
OC- ALC
TINKER AFB OK
SA- ALC
KELLY AFB TX
WR- ALC
ROBINS AFB GA
OO- ALC
HILL AFB UT
SM- ALC
McCLELLAN AFB CA
NEWARK AFB
OH
KIRTLAND
AFB NM
EDWARDS
AFB CA
HANSCOM
AFB MA
EGLIN
AFB FL
BROOKS
AFB TX
GRIFFISS
AFB NY
ARNOLD
AFB TN
DAVIS-MONTHAN
AFB AZ
LOS ANGELES
AFB CA
BATTLE CREEK
MI


AFMC
REQUEST FOR QUOTE PROCESS
PAPER
PRESENT PROCESS
130 days
U S
Mail
APERTURE CARDS
BUYER
CONTRACTOR
IMPROVED PROCESS
109 days
ANSI X12
840
RFQ
ANSI X12
841
TECHNICAL
DATA
EC/EDI
BUYER
CONTRACTOR

AFMC

PHASE I TEST

PURPOSE

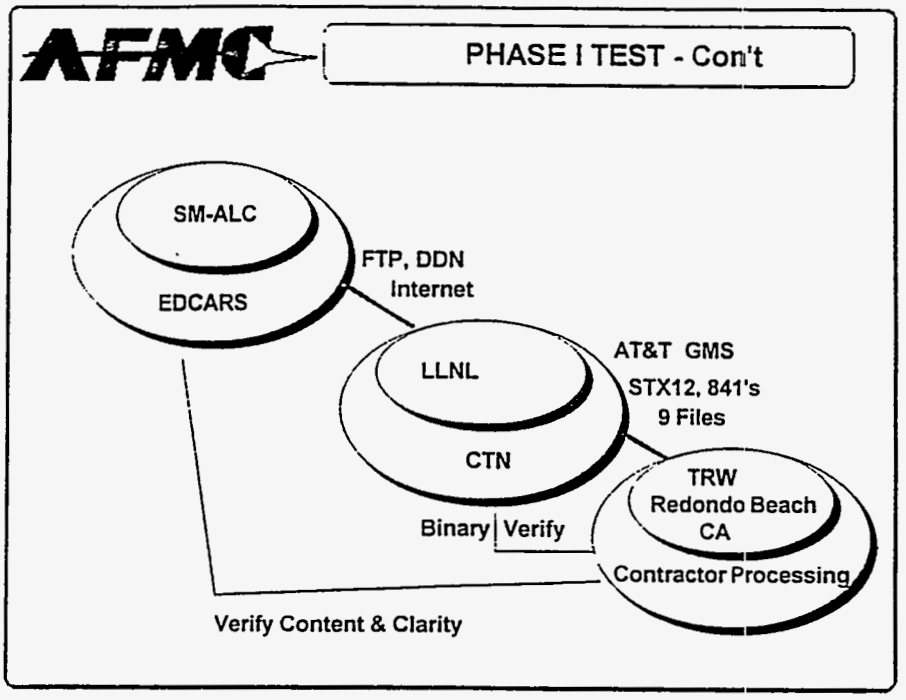
- FIRST POTENTIAL BUSINESS APPLICATION OF CALS
- PROOF OF CONCEPT TEST (841)
  - VALIDATION OF STANDARDS
    - MIL- STD-1840
    - MIL-R-28002
- DETERMINE FEASIBILITY FOR DEM/VAL TEST

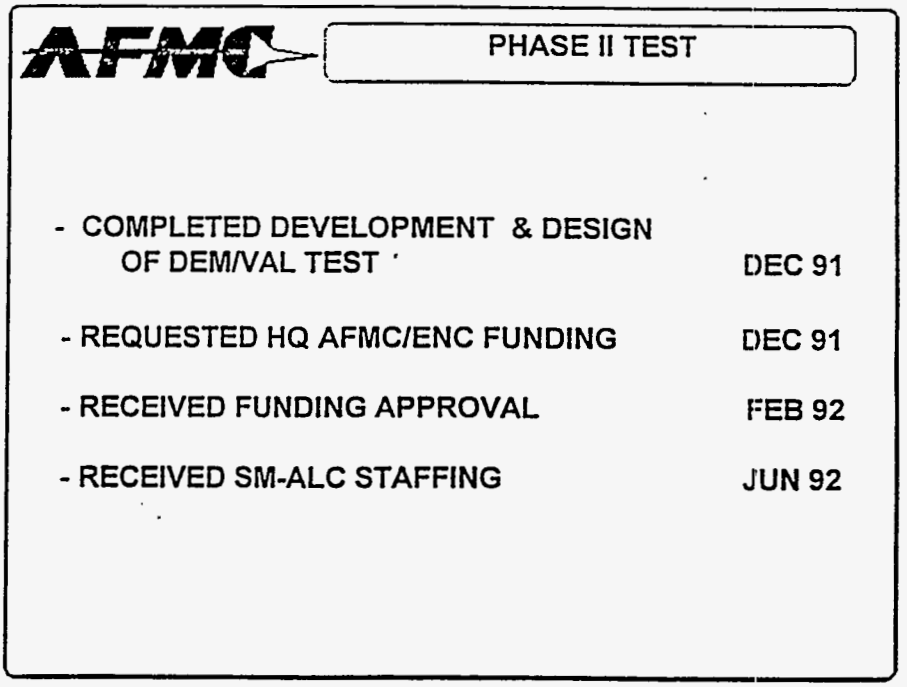
AFMC

PHASE I TEST - Con't

TEST TEAM

MEL LAMMERS	DIRECTOR CTN	HQ AFMC/ENC
SMALC		
CALS TEST NETWORK		LLNL
TRW		
AT&T		
SUPPLY TECH, INC		


AFMC
PHASE I TEST - Con't
SM-ALC
EDCARS
FTP, DDN
Internet
LLNL
CTN
AT&T GMS
STX12, 841's
9 Files
TRW
Redondo Beach
CA
Contractor Processing
Binary
Verify
Verify Content & Clarity


AFMC
PHASE II TEST
- COMPLETED DEVELOPMENT & DESIGN OF DEM/VAL TEST DEC 91
- REQUESTED HQ AFMC/ENC FUNDING DEC 91
- RECEIVED FUNDING APPROVAL FEB 92
- RECEIVED SM-ALC STAFFING JUN 92

AFMC

PHASE II TEST - Con't

TEST TEAM

MEL LAMMERS	DIRECTOR CTN	HQ AFMC/ENC
SM-ALC		
CTNO TEST BED		LLNL
CONTRACTORS		

AFMC

AIR LOGISTICS CENTER
SMALL PURCHASES <$25,000

	FY 90			FY 91		
	TOTAL ACTIONS	$ MILS	% OF ACTIONS	TOTAL ACTIONS	$ MILS	% OF ACTIONS
OC-ALC	11,014	60.5	90	8,490	52.8	89
OO-ALC	6,838	35.7	77	6,240	31.5	79
SA-ALC	12,718	64.1	82	10,594	59.6	81
SM-ALC	6,965	29.3	73	4,287	24.8	79
WR-ALC	7,692	41.7	65	6,477	37.4	70
TOTALS	45,227	231.3	78	36,088	206.1	80

SOURCE:SAF-AQC(M&Q) 7201, PART VI-J001

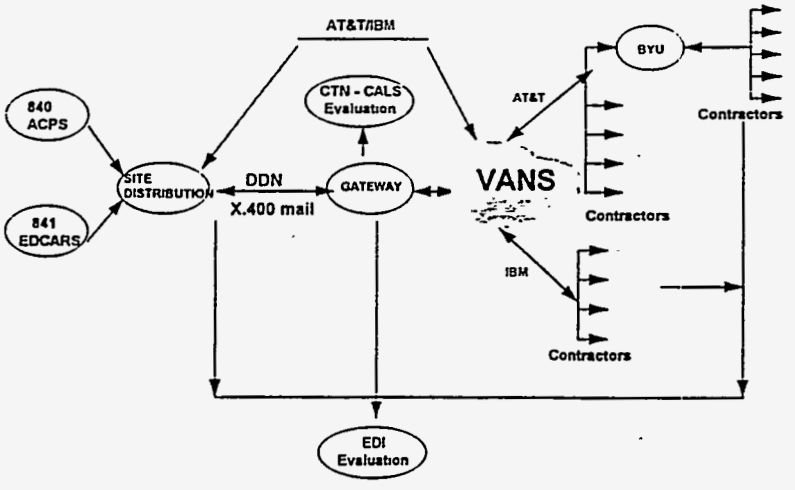
AFMC

COST OF ENGINEERING DATA

	QTY	DOLLARS
APERTURE COST	EA	$ 1.00
AVERAGE SET SIZE	30	$ 30.00
AVERAGE REPRODUCTION QTY	20	$ 600.00
NUMBER OF SETS <$25,000	36K	$ 21.6M

AFMC

PHASE II TEST - Con't



AFMC

PHASE II TEST - Con't

TEST CRITERIA

- SM-ALC NETWORK
  - ENGINEERING DATA REPOSITORY
- ARCHITECTURE
  - DoD, DLA
  - POINT TO MULTI POINT

AFMC

PHASE II TEST - Con't

- PERSONAL COMPUTERs (PCs)
  - DOS
  - UNIX
  - MACINTOSH
- SOFTWARE TRANSLATORS
  - SUPPLY TECH INC (DOS)
  - ST PAUL SOFTWARE (UNIX)
  - DIGIT SOFTWARE (MACINTOSH)
- COMPRESSION/DECOMPRESSION VIEW SOFTWARE
  - INSET SYSTEMS

AFMC

PHASE II TEST - Con't

- VALUE ADDED NETWORKS (VANS)
  - AT&T
  - IBM
- COMMUNICATION HARDWARE
  - HAYES
  - DATA TREK
  - US ROBOTICS
- THIRTEEN SMALL/LARGE CONTRACTORS
  - EIGHT BLUE RIBBON
  - FIVE BRIGHAM YOUNG UNIVERSITY (BYU)

AFMC

AFMC BLUE RIBBON PROGRAM

QUALIFICATION CRITERIA

-- 90% ON-TIME DELIVERY RATE (single stock class)

-- QUALITY ITEMS

-- 85% DELIVERY IN ALL STOCK CLASSES WITHIN 12 MONTHS

AWARD PREFERENCE

-- UP TO 20% ABOVE LOW OFFERER

AFMC

PHASE II TEST - Con't

SM-ALC BLUE RIBBON CONTRACTORS

KENT ASSOCIATES	MANSFIELD TX
PRECISION MFG OF SAN ANTONIO	SAN ANTONIO TX
INSPIRNETICS INC	RANCHO CUCAMONGA CA
AMERICAN ELECTRONICS	FULLERTON CA
LLAMAS PLASTICS INC	SYLMAR CA
AIRESEARCH - ALLIED SIGNAL	RANCHO DOMINGUEZ CA
MICRO SYSTEMS INC	FT WALTON BEACH FL
MODA MAGNETICS	FARMINGDALE NY

AFMC

PHASE II TEST - Con't

BYU CONTRACTORS

KITCO INC	SPRINGVILLE UT
BILL'S METAL PRODUCTS	HUNTINGTON UT
INDUSTRY WEST ELECTRONICS	OREM UT
VIKING SYSTEMS INC	AMERICAN FORK UT
THE CANNON GROUP	MINNEAPOLIS MN

AFMC

MILESTONES

SMALC --> LLNL/CTN	JUL '92
LLNL/CTN --> AT&T --> BYU	AUG '92
LLNL/CTN --> IBM	NOV '92
LLNL /CTN--> AT&T	DEC '92
CALS EXPO	DEC '92
TEST COMPLETE	JAN '93
FINAL REPORT	MAR '93

AFMC

PHASE II TEST - Con't

TEST PRODUCTS

- ANSI X12 841 GOVERNMENT APPLICATION — AUG 92
- CTN REPORT 93-ED-01 — MAR 93
  - ESTABLISH BASELINE CAPABILITIES
  - RECORD STRENGTHS/WEAKNESSES
  - PROVIDE FOCUSED GUIDANCE

AFMC

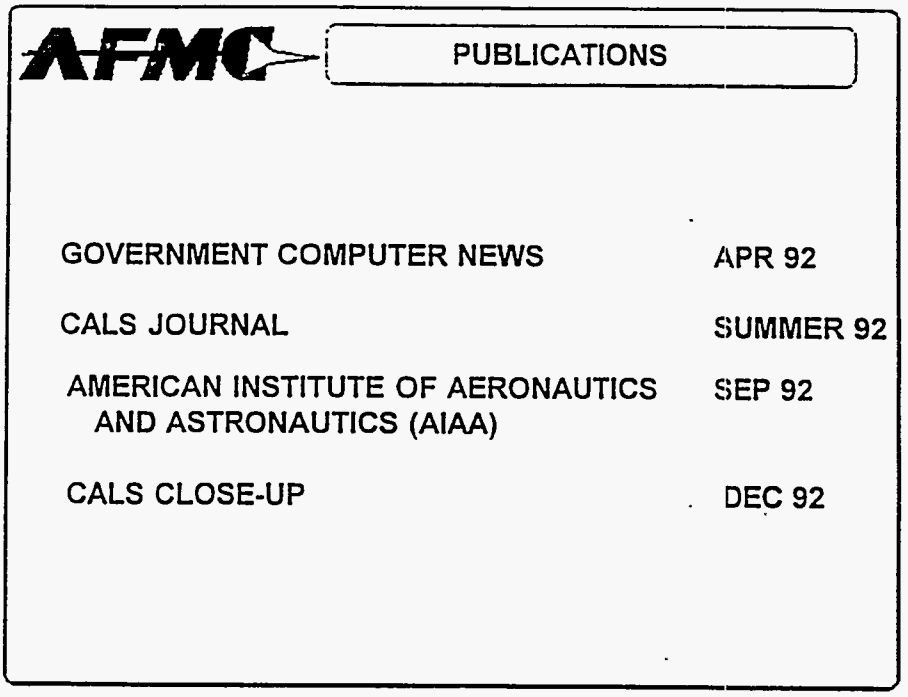
SM-ALC IMPLEMENTATION

- IDENTIFIED FUNCTIONAL RESPONSIBILITIES
- UPGRADED BUYER'S PCs
- SYSTEMS BUYER TRAINING COMPLETED
- DRAFTED IMPLEMENTATION STRATEGY

AFMC

SUMMARY

- PROVED ANSI X12 841 CONCEPT
- DEM/VAL IN PROGRESS
- SM-ALC PLANNING FOR IMPLEMENTATION


AFMC
PUBLICATIONS
GOVERNMENT COMPUTER NEWS
APR 92
CALS JOURNAL
SUMMER 92
AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS (AIAA)
SEP 92
CALS CLOSE-UP
DEC 92

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Electronic Data Interchange (EDI) in a CALS Environment; A Standards View

Bud Orlando
TRW Space & Defense
Redondo Beach, CA 90278
(310) 812-4997

EDI Standards

ANSI X12

UN/EDIFACT

CCITT X435

EDI Is:

- A method of interchanging data electronically
- An industry initiative to encourage electronic data transfer
- A set of standards developed by ANSI X12
- A DoD directive since May 1988
- A way of doing business more efficiently

Background

- DoD directives

May 1988	EDI per ANSI X12
August 1988	CALS per MIL-STD-1840

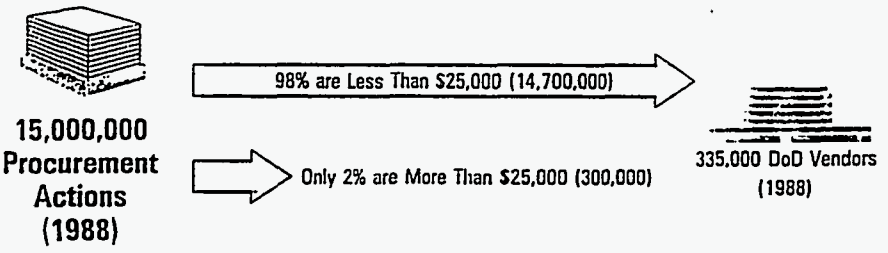
- CALS MIL-HDBK-59, December 1988

  ". . . CALS will use EDI transaction sets for accessing and ordering . . . and for exchanging technical data . . ."

Product Cost Facts

- 85 - 15 rule
  - 85% gain fixing the process
  - 15% gain fixing the product
- 80 - 20 rules
  - 80% of your business is with 20% of your suppliers/customers
  - 80% of your paper is with 20% of your business volume
    (in DoD it is 87% in 9% of the defense budget)
  - 80% of your product costs come from 20% of your processes

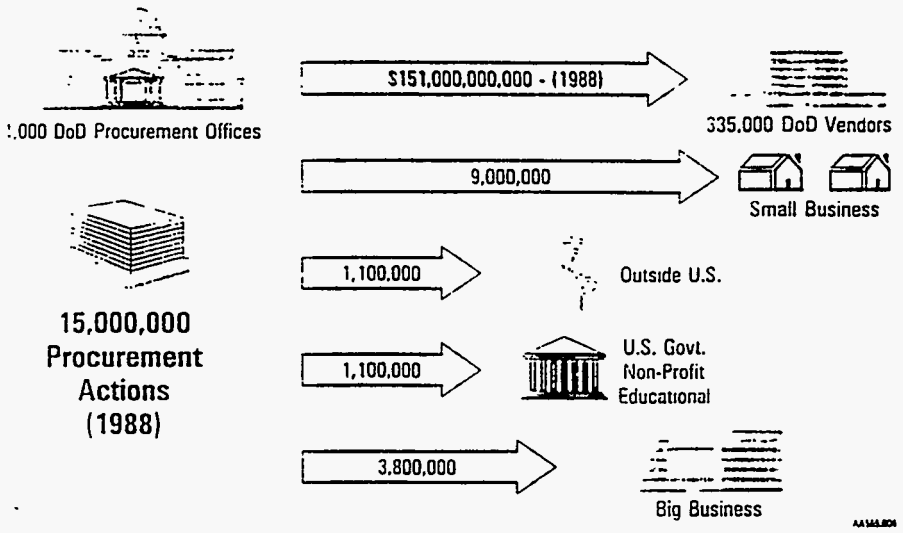
Most DoD Procurements are Low in Value



Goal: 300,000 DoD Suppliers Doing EC/EDI by End of CY 1997

Estimate $1M Annual Cost Avoidance at WPCC With $50M Air Force Wide

Large Volume of DoD Procurement Actions



Implementation View

- Total DoD view . . . "Think in different terms"
  - Food, shelter, clothing
  - Payroll, payments
  - Petroleum, replacement vehicles
  - Cleaning, maintenance, repair
  - Health care, medicines, hazardous material control
  - Spares, T.O.s, training
  - System retrofits and enhancements
  - New system acquisitions

EDI

CALS

Recent Events

• May 1990	DLA designated executive agent for DoD's EDI implementation and maintenance
• July 1990	ASD Colin Mc Millan letter "Both industry and DoD to respond to CALS and EDI with single integrated system (approach)" "DoD pursuing common technical solutions for interchanging CALS and EDI information" "DoD supporting provisions for including CALS data within EDI transactions" "DoD committed to use of EDI transactions in CALS wherever appropriate"
• May 1991	FIPS #161 issued by DoC, effective Sept. 3, 1991 all U.S. government agencies will use ANSI X12 or EDIFACT wherever EDI implemented
• Dec 1991	U.S. Comptroller General decision ". . . agencies of U.S. government can create valid obligations using properly secured EDI systems."

High Initial Payback Areas

Technical Data Exchange

Project Management

Status

Technical Data Exchange Examples Using X12 EDI

- Specifications (engineering, quality, test, etc.)
- Requirements allocations
- Design analysis
- Interface documents
  (electrical, mechanical, functional, etc.)
- Test plans, procedures, test data
- Technical support package
- Technical proposals (being defined)
- Design review packages*
- Product definition data*
- Technical orders and manuals*

*Currently use dedicated delivery (UPS, Fed. Exp., etc.) if large files.

X12 Infrastructure

- Data set identification (SGML, CGM, Raster, etc.)
- Sender's control number
- Start and end validation
- Time and date stamp
- Exchange message count
- CALS version and release (28001X, 28002Y, 28003Z, etc.)
- Sender's and receiver's name, I.D. and address
- Sub-addressing
- Separators and terminators
- Integrity checking
- Telecommunications interfaces to all protocols
- Commercially available applications software
- Competitively priced value-added networks

X12 Transaction Set 841 (Specifications/Technical Information)

"Provides the format . . . for exchanging the technical description of a product, process service, etc., . . . over the same path as any other EDI transaction."

- Header area for administrative information
- Detail area for technical information
- Summary area for transaction closure

841 Header Area (Administrative Information)

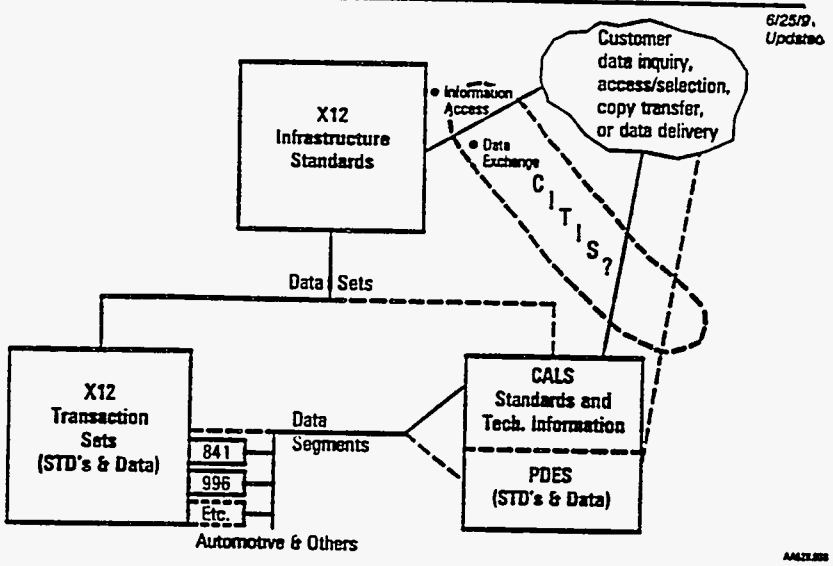
- Specification/Technical Information Identifiers
  - Security Code - Company unrestricted, internal use only, confidential, personal, etc.
  - U.S. Government unclassified, confidential, secret, not for export, special, etc.
  - Assigned document number*
  - Reference document numbers
  - Revision level; Date & time of origination
- Notes/special instructions
- Export, import, customs information
- CALS 1840 record definitions/declaration file information; other GOV identifiers
- Reference to other X12 numbers, documents, etc.
- Reference date/time
- Administrative contact, address, etc.
- Data purpose

*Only mandatory data element; all others are optional

841 Detail Area (Technical Information)

- Item ID detail, name, message
- Product, process, service item description
- Packaging description (network name, exchange codes, tape, disc, floppy, etc.)
- Quantity (files, pages, sheets, cords, tapes, discs, floppies, etc.)
- Location and names of original(s)
- Marking, packing, loading information
- Measurements/reference numbers
- Electronic Format ID (EFI)
  - Security access information
  - Security techniques (MAC, DES, PKE, etc.)
  - Free-form message text
  - Program and version identifiers
  - Interchange format identifiers
  - Compression techniques (name & version)
  - Drawing sheet size code
  - File name, block, record type and length
- Government identifiers (GOV)
  - CALS 1840 agency, file, record, format qualifiers
  - EPA, IRS, DoE, DoC, DoT, Treasury identifiers
- Binary Data (BIN)
  - Length (K bytes)
  - Binary bits (up to 1 million gigabits)
- Unit detail, test method, sample description, sequence, frequency, etc.
- Measurements, statistics, sampling parameters
- Message (re: cross section/enlargement detailed area)
  - Repeat Item ID, Measurements/reference, EFI, GOV and BIN for detailed area

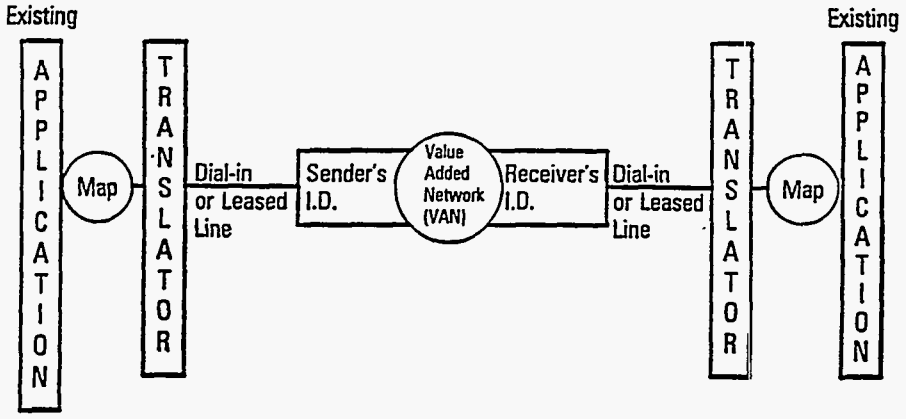
CALS/EDI X12 Standards Relationships



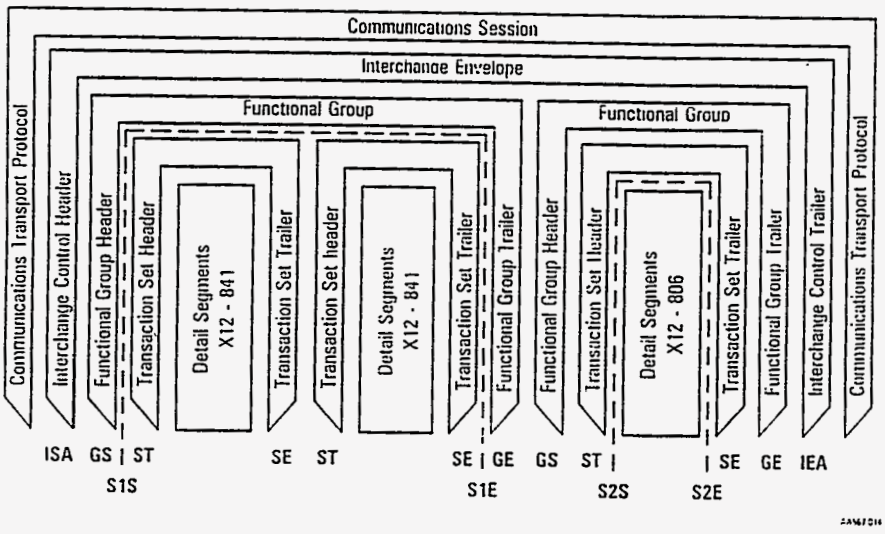
Technology

- Technologies exist
  - Technical data can be exchanged today - <$20 in '90; <$.20 in '94
- Technical challenges
  - Integration . . . A single integrated CALS/EDI system approach
    . . . value of integrated technical and business data as process change enabler (metrics)
    . . . pragmatic data protection
  - Retrofit onto existing programs
    . . . Legacy data
    . . . Existing applications software
    . . . Existing operational environments
- X12 - EDIFACT standards alignment
  - Need mapping software (minimum)
  - Legacy . . . large installed X12 base; rich X12 functionality
  - Ascension of one standard not mandatory; does require technically synchronized
  - standards (version control)

The EDI Pieces



Structure of an EDI X12 Transmission



EDI Assurances

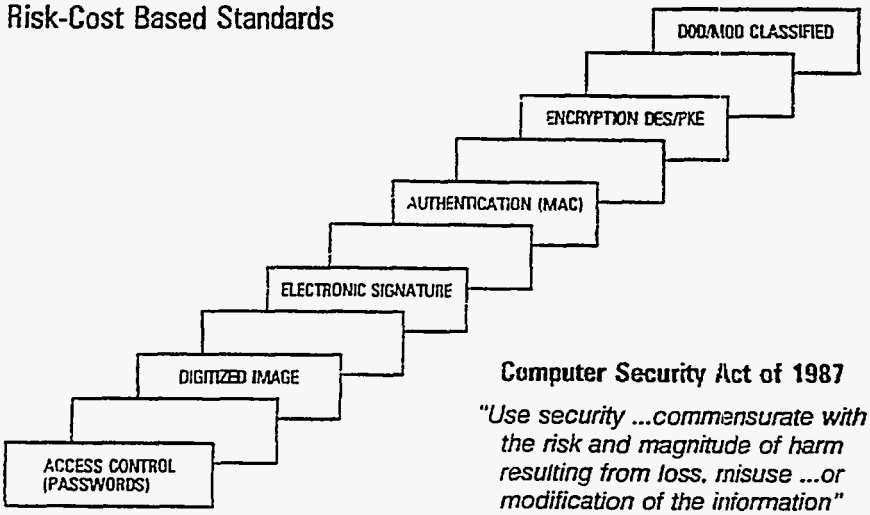
Access Security

Authentication

Confidentiality

Security Continuum

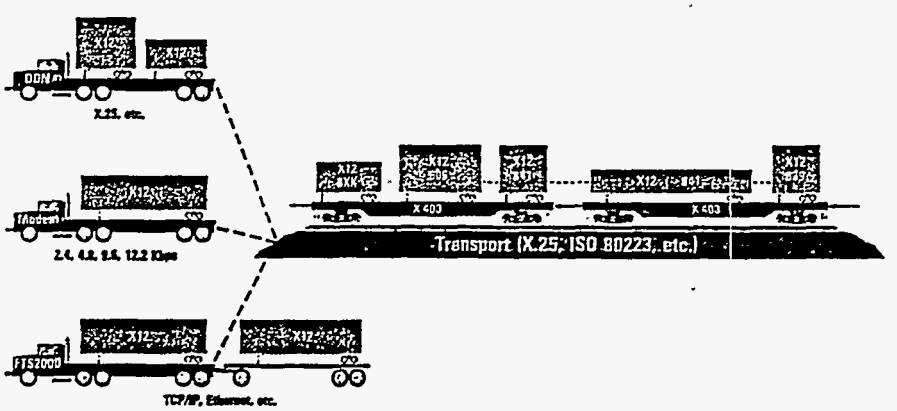
Risk-Cost Based Standards



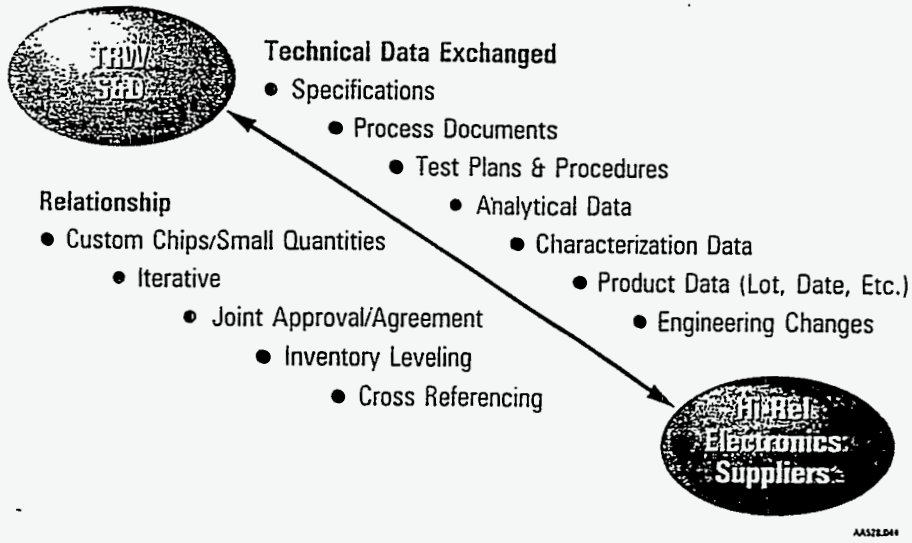
Computer Security Act of 1987

"Use security ...commensurate with the risk and magnitude of harm resulting from loss, misuse ...or modification of the information"

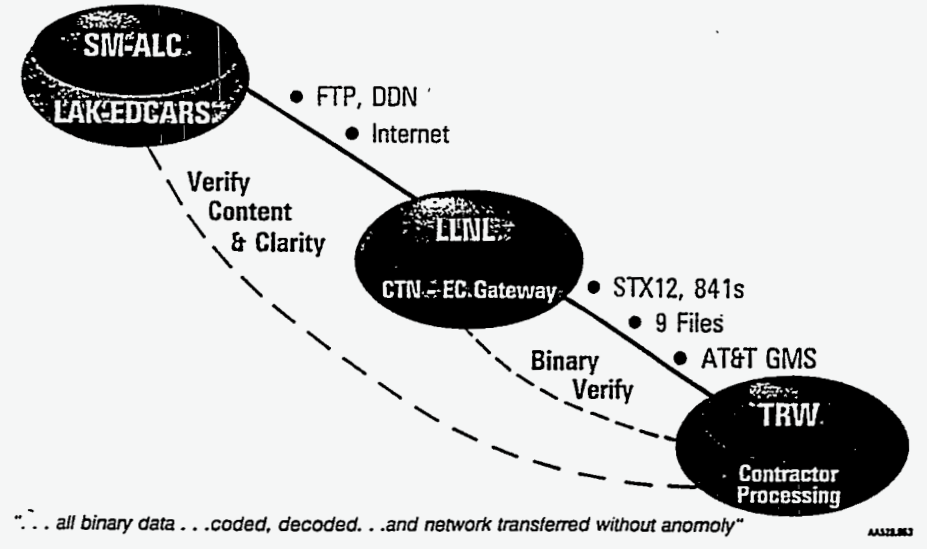
X12 EDI Is Communications Protocol Independent



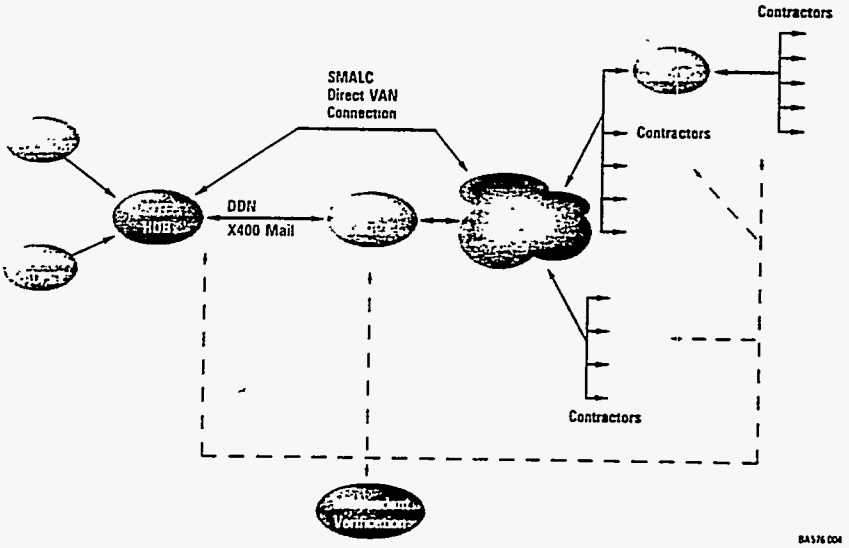
TRW S&D Hi-Rel Electronics EDI Business Case (Pilot)



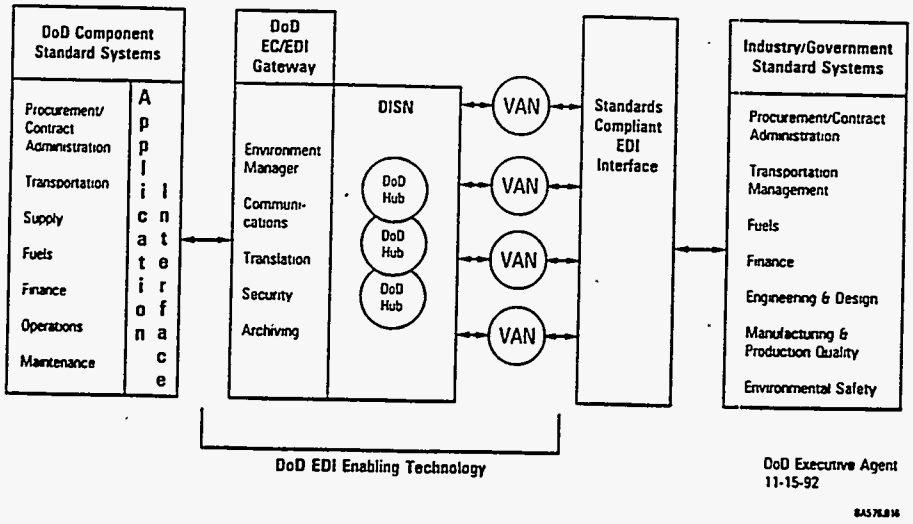
CALS Test Network (CTN) CALS/EDI (1840/X12) Test



SMALC/CTN Test - 1992



DoD EC/EDI Architecture



EDI Operational Concept

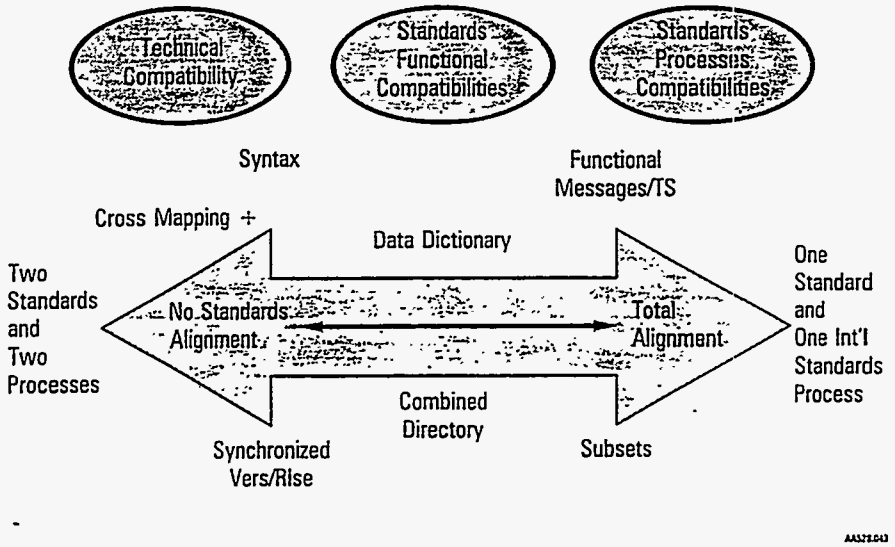
- Applications to applications between companies/agencies
- Forms and reports digitally exchanged (Save labor and time)
- Technical data and binary files on line (Accessability and time)
- Schedules on-line (Time; Eliminate stale data)
- Cost reports digitally exchanged (Labor; Re-keying & reconcilliations)
- Official filings with EPA, IRS, Benefits carriers, Courts (Soon)

X12/EDIFACT Alignment

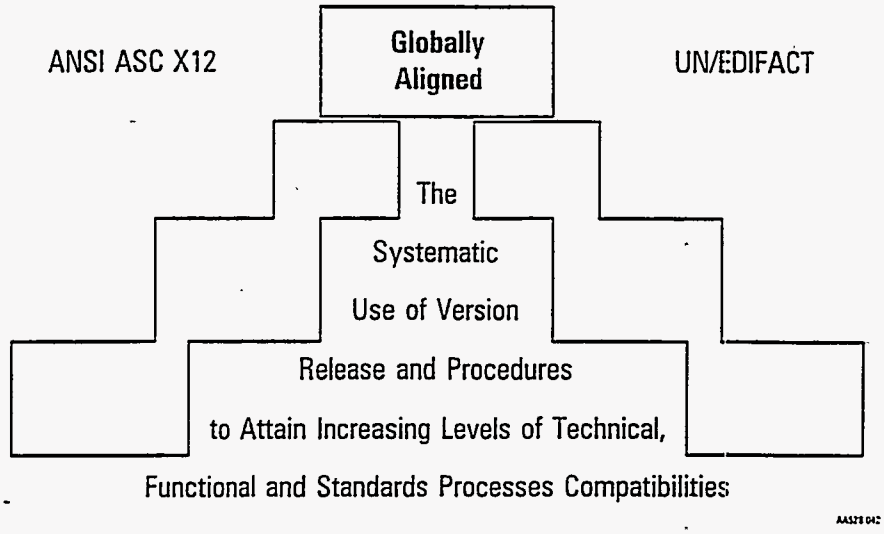
Alignment Categories

- Technical
  - Syntax - directories - transaction set/messages
  - Implementation rules - Technical Assessment Rules
  - Gateway to other standards
- Version/release
  - Timing - frequency - content - compatibility - components
- Procedures
  - Development - coordination/communication - publication
  - Maintenance - organizational responsibilities
  - User/industry/national interfaces - ownership
  - Levels/status - balloting/trial use - registration
  - Technical assessment - short/interim/final
- Public relations/implementation
  - Security/legal - version/release rules - compliance
  - "Help" centers - guidelines - "Big Picture" - education
  - Industry activities - guidelines - data bases
  - Plan and benefits
- Long term plans
  - Coordination - Global "Steering" Committee - growth

X12/EDIFACT Standards Alignment Continuum



Standards Alignment

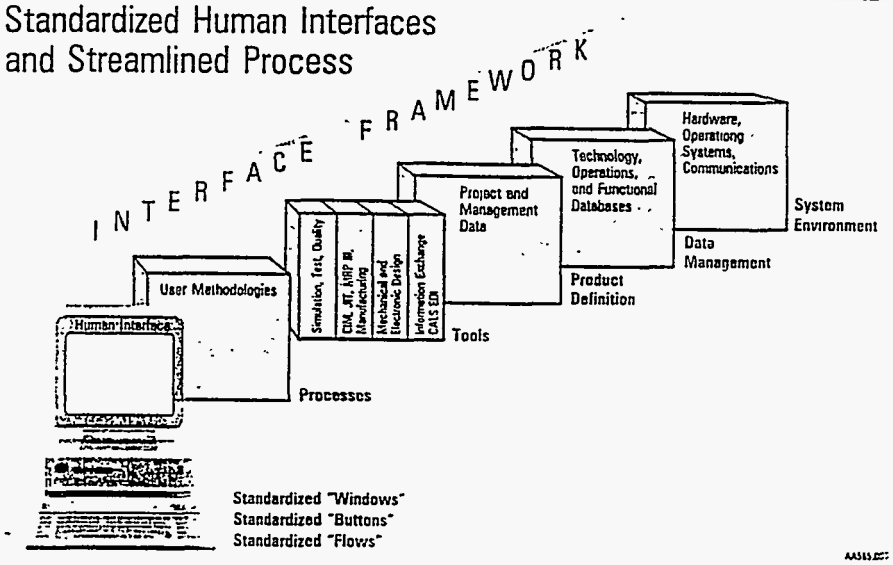


EDI Futures

- Binary file option for every message
- Applications which include EDI input/out processing
- Eliminate trading partner agreements (open EDI)
- Process Improvement disciplines
- Transition Management methodology
- Greater use of available "assurances"
- Common user interface for all EDI standards and enveloping mechanisms (X12, EDIFACT, X435, etc.)

Focus

Standardized Human Interfaces
and Streamlined Process



Obtaining EDI Benefits

- Integrate with internal applications; both ends
- Commense true process change (simplify, consolidate, eliminate)
- Maximize/get all transactions computerized
- Increase service values without adding costs (accurate information available to customers)
- Greatest satisfaction/success when both parties benefit equally
- Most important to educate and *help peers*

Processes (Streamline, Consolidate, Eliminate)

We are in "Permanent Transition"...

We are always moving from where we are... to where we ought to be...

Mr. John P. Bartley
Office of Assistant Secretary of Defense
U. S. Department of Defense, Pentagon

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APPENDIX D Sample AFCTN CALS/EDI Checklist

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CALS Test Network
CALS/EDI
Transfer Test
Procedure Checklist

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DRAFT

CALS/EDI Checklist January 14, 1993

Table of Contents

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1 Introduction

The DoD Computer-aided Acquisition and Logistic Support (CALS) Test Network (CTN) together with the Inventory Control Point at McClellan Air Force Base (SMALC) is conducting a test of the viability of electronically requesting quotations for work from vendors which require the transmission of technical data. The vehicle for these electronic transactions will be the ANSI X12 standards for electronic data interchange. The test encompasses several aspects of Electronic Data Interchange (EDI), including creation and use of X12 transaction sets, transmission of technical data in CALS Raster format using the X12 transaction set 841 (Specifications/Technical Information), use of Value Added Networks (VANs), EDI software, network/system load and response time, impact of large data transmissions, and more. The objective of this test is to demonstrate and evaluate these aspects of electronic data interchange using CALS. This document is a vehicle to capture the experiences of each of the test participants.

The format of this document is a checklist that can be used both as an itemized procedure for conducting this CALS/EDI test, and as a vehicle for recording the results of the test. It contains detailed, step-by-step directions on what to look for during the test, and provides blanks for entry of pertinent data. The checklist contains questions concerning sending, receiving, using, and evaluating the data identified for this test, and the compliance of the data transmission with the applicable standards, including ANSI X12 840 and 841, and the CALS standard MIL-R-28002 (Raster).

Since the test makes use of several solicitation packages, and each test participant may handle more than one solicitation package, you may be required to fill in several sections of the checklist, multiple times. *Please feel free to copy this checklist as many times as necessary.* Additional copies can be requested from the CTN office; the address and phone number are listed at the back of this document.

The itemized procedures in the checklist serve as a guide to those unfamiliar with the CALS/EDI testing process. A similar checklist has also proven to be a valuable reminder to those who are familiar with testing. This checklist has been divided into several sections to help you. The first section, **Administrative Information**, should be filled in by everyone for the transmission of each solicitation package. The second section, **Sender**, should be filled in by the organization that originates and transmits the solicitation packages. The third section, **Receiver**, should be filled in by any test participant who receives the solicitation package, whether that be the end user, a VAN, the CTN, or an evaluator. Begin to fill in this section when you are alerted that a solicitation package is on its way to you. The fourth section, **End User**, should be filled in by the contractor receiving the electronic solicitation package, or the Co-op, if the contractor targeted for this transmission does not receive the transmission directly. The fifth section, **Raster**, should be filled out by the end user who manipulates the electronic raster files for the purpose of providing a quote (again this could be the Co-op), or the CTN, who would evaluate the quality of the CALS files. The sixth section, **Evaluator**, is intended for the organization that will evaluate the use of the ANSI X12 transaction sets. The seventh section, **Co-op**,

should be filled in by the CALS Shared Resource Center (CSRC) at Brigham Young University (BYU), who should also fill in the End User and Raster sections for each solicitation package received, and for each end user who is to receive the package. The eighth section, **VAN**, is to be filled in by the VAN who is routing the transmissions to the contractor or Co-op. The ninth section, **Concluding Comments**, should be filled in by all test participants. In addition to filling in the checklist, the sender should collect and maintain hard copies of the original data. All test participants should record observations on the checklist and make copies of error reports from any evaluation software used. Receivers should also, record all related administrative information and procedures used to receive the data, and prepare hard copies of the data as received and displayed on the receiving system.

Upon completion of the appropriate section(s), submit the checklist along with pertinent hard copy, to the CTN at the address listed at the back of this checklist.

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2 Administrative Information

2.1 General

2.1.1 Date of transfer test._____

2.1.2 Purpose of transfer test._____

2.2 Sending organization

2.2.1 Organization name._____

2.2.2 Address._____

2.2.3 Contact name and telephone._____

2.2.4 Computer hardware used. Include manufacturer and machine name.

2.2.5 Computer software used. (I.e., data repository system, 840 and 841 software, transmission software, etc.). Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support utility programs.

2.2.6 Briefly record procedures used to prepare the data.

2.3 Receiving organization

2.3.1 Organization name._____

2.3.2 Address._____

_____

_____

2.3.3 Contact name and telephone.

_____

2.3.4 Computer hardware used. Include manufacturer and machine name._____

_____

2.3.5 Computer software used. (I.e., VAN system, EDI software, display software, etc.) Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support programs.

_____

_____

2.3.6 Briefly record procedures used to receive the data.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

2.4 Additional Comments

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

4

3 Sender

"Sender" is identified as the persons/organization responsible for building and initiating the transmission of procurement packets and transaction sets. For this test, the sender will most likely be SMALC, and this section would be filled in by person(s) from that organization.

3.1 SC&D

The Stock Control and Distribution (SC&D) system, which runs on an IBM 3090, provides on-line requisition processing, provides status information of asset inventories and furnishes the Requirements Data Bank (RDB) part usage and current status of asset balances while RDB returns stock levels to control asset distribution. RDB interacts with all AFMC core logistics functions to calculate requirements. Data produced from RDB appears as buy quantities for procurement action to satisfy Air Force requirements. The Engineering Data List (EDL) is produced as part of this process. The EDL is used by the technical data repository to create the solicitation technical data package.

3.1.1 Describe the process of extracting the business data required by 840 from the IBM 3090 and transferring it to ACPS:

_____
_____
_____
_____
_____

3.1.2 Was all business data required by 840 available from the IBM 3090:

	Yes	No
Nomenclature (name)	_____	_____
Part Number	_____	_____
National Stock Number (NSN)	_____	_____
Quantity	_____	_____
Shipping Instructions	_____	_____
Packaging Instructions	_____	_____
Delivery Requirements	_____	_____
Engineering Data List	_____	_____
(Others?)		

3.1.3 Describe the process of extracting the engineering data list (EDL) which is required by 841 from the IBM 3090 and transferring it to the site IGP (3B2):

_____
_____
_____
_____
_____

3.1.4 Describe any problems you experienced extracting or transferring data from the IBM 3090:

_____
_____
_____
_____
_____

3.2 ACPS

The Automated Contract Preparation System (ACPS) Data General MV9500 is the Air Force procurement system that provides the solicitation/contract for Inventory Control Points (ICPs) in support of Air Force spare parts and modification programs.

3.2.1 Describe the process of extracting and transferring data required by 840 from ACPS to the 3B2:

_____
_____
_____
_____
_____

3.2.2 Was all business data required by 840 available from ACPS?

	Yes	No
Nomenclature (name)	____	____
Part Number	____	____
National Stock Number (NSN)	____	____
Quantity	____	____
Shipping Instructions	____	____
Packaging Instructions	____	____
Delivery Requirements	____	____
Applicable Clauses	____	____
Reference to Engineering Data List	____	____
(Others?)		

3.2.3 How long did it take to build the 840 transaction set?

_____

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3.2.4 Describe any difficulties building the 840:

3.2.5 Describe any additional observations:

3.3 EDCARS

Engineering Data Computer Assisted Retrieval System (EDCARS) is the Air Force repository of engineering technical drawings/data.

3.3.1 Describe the process of extracting engineering data from EDCARS:

3.3.1.1 How long did it take to get the necessary data set from EDCARS?

3.3.1.2 Was the EDCARS data set complete?

3.3.2 Describe any additional observations you made while extracting data from EDCARS:

3.4 3B2

The AT&T 3B2 is the Air Force contracting system utilized for the staging of the request for quote in the 840 envelope and the storage of the engineering data associated with the 840.

3.4.1 Describe the hardware and software configuration of the 3B2:

3.4.2 How long did it take to modify the 840 transaction set?

3.4.3 Describe any difficulties modifying the 840:

3.4.4 How long did it take to build the 841 transaction set?

3.4.5 How many engineering drawings (aperture cards) are in this procurement package?

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3.4.6 Did you put all engineering drawings in a single 841?

3.4.6.1 If not, how many 841s did you use for this procurement package?

3.4.6.2 List the file sizes and number of engineering drawings in each 841:

	Size (KBytes)	Num. drawings
1st 841		
2nd 841		
3rd 841		
4th 841		
5th 841		
6th 841		
7th 841		
8th 841		
9th 841		
10th 841		

(continue on separate sheet if necessary)

3.4.7 Describe your rationale for choosing this distribution scheme:

3.4.8 Who is the recipient of these X12 packets?

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3.4.9 How did you transfer the packets?

Medium		Protocol		Distribution	
Wire	_____	X.400	_____	DDN	_____
		VAN	_____		
		FTP	_____	Internet	_____
		Kermit	_____	Phone	_____
Floppy	_____			UPS	_____
Tape	_____			US Mail	_____
				FedEx	_____

3.4.9.1 If a VAN was used, name the VAN:

_____

3.4.10 How many attempts did it take before successfully transferring this packet?

_____

3.4.11 For each attempt, give the following:

Attempt #	Transfer Time (HH:MM:SS)	Date and Time (Local Time)	Weather Conditions
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3.4.12 Was a 997 (Functional Acknowledgment) received?

_____

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3.4.13 Please comment on any other issues related to this transfer: (Disk full, line dropped, etc.)

4 Receiver

"Receiver" is identified as the contractor (end user), evaluator, co-op, or VAN. Each recipient of a transmission will record observations in the "Receiver" section, and the "End User," "Evaluator," "Co-op," or "VAN" section below, depending on whether the recipient is acting as a contractor, evaluator, co-op, or VAN for this test.

4.1 How were you notified that this procurement package was coming? (Give name of person/entity who notified you and method [e.g. phone, e-mail] of notification)

_____

4.2 What preparations did you make to receive the data?

_____
_____
_____
_____
_____

4.3 Describe your local hardware and software configuration that you used to receive the data (if different from the test plan):

_____
_____
_____
_____
_____

4.4 How did you receive the data?

Medium		Protocol		Distribution	
Wire	_____	X.400	_____	DDN	_____
		VAN	_____		
		FTP	_____	Internet	_____
		Kermit	_____	Phone	_____
Floppy	_____			UPS	_____
Tape	_____			US Mail	_____
				FedEx	_____

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4.5 For each transmission received, give the following:

Transmission #	Transfer Time (HH:MM:SS)	Date and Time (Local Time)	Weather Conditions

4.6 Please comment on any other issues related to each transmission: (Disk full, line dropped, power failure, weather condition, etc.)

4.7 How did you verify the completeness of each solicitation package (840 and 841(s))?

4.8 What is your application (role) with this data?

End User ____
Evaluator ____
Co-op ____
VAN ____

4.9 Were the files in each transmission adequately identified?

4.10 Did you issue a 997 transaction ("Functional Acknowledgment") to the sender for each transmission you received?

13

5 End User

"End User" is usually the contractor or other entity who will be quoting on the procurement package. Be sure you have also filled in the "Receiver" section of this checklist.

End User: Name_____

Company_____

5.1 840

5.1.1 What software did you use to open and display the 840 transaction set?

_____

5.1.2 Were the contents of the 840 complete, understandable, and usable?

_____

5.1.2.1 If not, why not?

_____
_____
_____
_____
_____

5.1.3 Could you identify the drawing list?

_____

5.1.4 Did you find the information useful; that is, could you act on this information? What information did you find unnecessary? What additional information do you think should have been included? Why?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

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5.2 841

5.2.1 What software did you use to open and display the 841 transaction set(s)?

5.2.2 If this procurement package consisted of more than one 841, were the relationships between the several 841s obvious? Were the relationships between each 841 and the 840 obvious? Describe any difficulties.

5.2.3 What impact did these 841s have on your system platform and operations? (E.g. Adequate disk space, processing time, convenience of software, were engineering drawings appropriately separated?)

5.2.4 Could you identify the drawing list?

5.3 Drawings

5.3.1 Was there any incompatibility with CALS file naming conventions and your CALS viewer? If yes, explain:

5.3.2 Please also fill out the "Raster" section.

5.3.3 Comment on the usability of the raster images:

5.3.3.1 Was there enough information present to make a valid quote?

5.3.3.2 Could you work with the raster image display, or did you feel the need to generate hardcopies of the raster images?

5.4 Additional Comments

6 Specifics about Raster data files

Be sure you have also filled in the "Receiver" section of this checklist.

6.1 General

6.1.1 List the number of MIL-R-28002 (Raster) data files._____

6.1.2 Give the dimensions of the largest image._____

6.1.3 Give the scanning resolution (pixels per inch)._____

6.2 MIL-STD-1840A and MIL-R-28002 evaluation

Identification conventions

6.2.1 Are all of the files properly identified as raster files (named D001R001, D001R002, etc.)?_____

File header

6.2.2 Does a dump of the first 2048 byte block of each raster file show the appropriate header data specified by paragraph 5.1.4.4 of MIL-STD-1840A?

_____

6.2.3 What type of raster data is specified, Type I or Type II?

_____

Group-4 decompression

6.2.4 Can an appropriate utility decompress and display each MIL-R-28002 raster file, presenting unimpaired images?_____

6.2.5 Name the decompression utility used. Include the name, source, date, revision or version number, and if used as received or modified.

_____

_____

6.3 Orthographic alignment

Axial alignment

6.3.1 Does the image appear to have been rotated or skewed with respect to the horizontal and vertical axis of the presentation format?_____

Aspect ratio

6.3.2 Does the proportionality of the orthogonal dimensions provide an image that is too "thin" or too "fat" (e.g., circles turned elliptical, etc.)?

Linearity

6.3.3 Is the image "straight", without distortion due to nonlinear or converging representations of parallel lines?

6.4 Image cropping

Excessive border (overscan)

6.4.1 Is the image centered and without unnecessary "white space" between the image and the edge of the format?

Excessive clipping (underscan)

6.4.2 Does the image run off the edge of the format?_____

6.5 Image continuity

Scan strip alignment

6.5.1 Do full format horizontal or vertical lines (e.g., drawing borders) fit together correctly or have successive scan strips been misaligned?

Scanner drop out

6.5.2 Does the absence of scanned data (scan lines or scan strips) leave any part of an image missing?

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6.6 Image readability

Contrast

6.6.1 Is image detail being lost because of "drop out" (faint lines) or "bloom" (fat lines)?_____

Cleanliness

6.6.2 Is the image clean and presentable, absent of random pixel noise?

_____

Resolution

6.6.3 Do the reduction ratio, image capturing techniques, and presentation format successfully combine to provide an image acceptable for its intended use?

_____
_____
_____

6.7 Image orientation

Right-reading

6.7.1 Is the image rendered right-reading?_____

6.8 Summary and recommendations

6.8.1 Explain any interesting problems or discoveries.

_____
_____
_____

6.8.2 Give any recommendations for revisions to MIL-R-28002.

_____
_____
_____

6.9 Additional Comments

7 Evaluator

The "Evaluators" for this test are those parties who are using their expertise to inspect and evaluate the CALS and EDI aspects of this test. The CALS evaluator will use the "Raster" section to record observations, and the EDI evaluator will use this section. Be sure you have also filled in the "Receiver" section of this checklist.

7.1 840

7.1.1 What software did you use to open and display the contents of the 840 transaction set?

_____

7.1.2 Was the transaction set complete? Describe any anomalies:

_____
_____
_____
_____
_____

7.1.3 Did each field contain valid data (logically correct)? Describe any anomalies:

_____
_____
_____
_____
_____

7.1.4 Attach any supporting documentation, if available.

7.2 841

7.2.1 What software did you use to open and display the contents of the 841 transaction set? (This does not refer to the contents of the BIN segment.)

7.2.2 Did the 841 use the appropriate segments and elements in accordance with the 841 Implementation Conventions for this test? Describe any anomalies:

7.2.3 Did the 841 contain valid data values in accordance with the 841 Implementation Conventions for this test? Describe any anomalies:

7.2.4 Were the linkages within and between the 841s and between the 841s and the 840 correct? Describe any anomalies:

7.2.5 Could you reassemble the solicitation package?

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8 Co-op

The "Co-op" for this test is the BYU CALS Shared Resource Center. Fill out the following information for each solicitation package sent to contractor participant. Be sure you have also filled in the "Receiver" section of this checklist.

8.1 End User:
Name _____
Address _____
_____
_____
Phone _____
Transfer Mechanism _____
_____
Time to transfer data _____
Date, Time of transfer _____
Weather Conditions _____

8.2 How did you present the procurement package to each end user? Describe in detail the steps you took to convey the package to each end user:

_____
_____
_____
_____
_____

8.3 Please fill the "End User" section once for each end user.

9 VAN

Be sure you have also filled in the "Receiver" section of this checklist.

9.1 What is your value-added strategy?

Public Bulletin Board System _____
Store and Forward Mail _____
Other _____

9.2 Please describe any specifics:

9.3 Describe the message routing mechanism used (E.g. UUCP, X.400):

9.4 Describe any unique required hardware and software:

9.5 How did the end user obtain the transaction sets from you?

9.6 What methods did you use to verify data integrity?

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9.7 How did you verify that the end user received the intended transmissions?

9.8 Provide a sample billing and services document for each user.

10 Concluding comments

10.1 Transfer test

10.1.1 Give overall comments about the transfer test.

_____
_____
_____
_____
_____

10.2 Checklist

10.2.1 Give comments about this checklist.

_____
_____
_____
_____
_____

10.3 Documentation and transmittal

10.3.1 Please attach a copy of the documents and drawings as sent and as received.

10.3.2 Please send this completed checklist and/or address comments or questions to:

CTN Office Test Bed Director
Lawrence Livermore National Laboratory
P.O. Box 808, L-542
Livermore, CA 94551
510/422-4231

APPENDIX E Completed AFCTN CALS/EDI Checklists from Test Participants

Note: Only those pages of the checklist that reflect comments submitted by the test participants have been included here, along with additional pages of data provided by the participants.

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CALS Test Network CALS/EDI Transfer Test Procedure Checklist

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2 Administrative Information

2.1 General

2.1.1 Date of transfer test. 1-12-93 - 1-27-93

2.1.2 Purpose of transfer test. TECH DATA

2.2 Sending organization

2.2.1 Organization name. SM-ALC/LAK

2.2.2 Address. MCCLELLAN AFB 5120 DUDLEY BLVD, SUITE 3

2.2.3 Contact name and telephone.

2.2.4 Computer hardware used. Include manufacturer and machine name.
AST BRAVO 5/6

2.2.5 Computer software used. (I.e., data repository system, 840 and 841 software, transmission software, etc.). Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support utility programs.

2.2.6 Briefly record procedures used to prepare the data.

2.3 Receiving organization

2.3.1 Organization name. ALLIED-SIGNAL AEROSPACE SYSTEMS & EQUIPMENT

2.3.2 Address. 19201 SUSANA ROAD RANCHO DOMINQUEZ, CA 90221

2.3.3 Contact name and telephone. WAYNE SMITH (310) 608-6414

2.3.4 Computer hardware used. Include manufacturer and machine name. AST BRAVO 386

2.3.5 Computer software used. (I.e., VAN system, EDI software, display software, etc.) Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support programs.

SUPPLY TECH, INC STX

2.3.6 Briefly record procedures used to receive the data.

1. ADMIN ASST ESTABLISHES CONNECTION WITH VAN AFTER BUSINESS HOURS.
2. ADMIN ASST CHECKS FOR TRANSACTIONS THE FOLLOWING MORNING.
3. IF TRANSACTIONS ARE FOUND, ADMIN ASST USES HIJACK FOR WINDOWS TO ONE-PAGE TECHNICAL DATA AND PRINTS IT.

2.4 Additional Comments

THE LOCATION OF NEW TRANSACTIONS WERE DIFFICULT TO LOCATE.

4 Receiver

"Receiver" is identified as the contractor (end user), evaluator, co-op, or VAN. Each recipient of a transmission will record observations in the "Receiver" section, and the "End User," "Evaluator," "Co-op," or "VAN" section below, depending on whether the recipient is acting as a contractor, evaluator, co-op, or VAN for this test.

4.1 How were you notified that this procurement package was coming? (Give name of person/entity who notified you and method [e.g. phone, e-mail] of notification)

CAROLYNN Wingate (510) 423-3522

4.2 What preparations did you make to receive the data?

EXECUTED STX SOFTWARE

4.3 Describe your local hardware and software configuration that you used to receive the data (if different from the test plan):

AST BRAVO 386 USING STX SOFTWARE, HI JACK FOR WINDOWS, 9600 BAUD MODEM.

4.4 How did you receive the data?

Medium		Protocol		Distribution	
Wire	X	X.400		DDN	
		VAN	X		
		FTP		Internet	
		Kermit		Phone	X
Floppy				UPS	
Tape				US Mail	
				FedEx	

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4.5 For each transmission received, give the following:

Transmission #	Transfer Time (HH:MM:SS)	Date and Time (Local Time)	Weather Conditions
1	23:20:15	~~0900~~ 1-12-93 0900	RAIN
2	08:00:00	0900 1-13-93	CLEAN
3	24+hrs.	0900 1-14-93	CLEAN
4	01:00:00	0900 1-26-93	CLEAN
5	02:02:00	0900 1-27-93	CLEAN
			~~CLEAN~~

4.6 Please comment on any other issues related to each transmission: (Disk full, line dropped, power failure, weather condition, etc.)

TRANSMISSION #2 WAS IN IT'S 24TH HOUR BEFORE TERMINATING COMMUNICATION SESSION.

4.7 How did you verify the completeness of each solicitation package (840 and 841(s))?

STX MESSAGE & PRINTOUT OF DRAWING

4.8 What is your application (role) with this data?

End User	X
Evaluator	X
Co-op	
VAN	

4.9 Were the files in each transmission adequately identified?

NO.

4.10 Did you issue a 997 transaction ("Functional Acknowledgment") to the sender for each transmission you received?

YES.

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5 End User

"End User" is usually the contractor or other entity who will be quoting on the procurement package. Be sure you have also filled in the "Receiver" section of this checklist.

End User: Name WAYNE SMITH

Company ALLIEDSIGNAL AEROSPACE SYSTEMS & EQUIPMENT

5.1 840

5.1.1 What software did you use to open and display the 840 transaction set?

HI TALK FOR WINDOWS

5.1.2 Were the contents of the 840 complete, understandable, and usable?

YES

5.1.2.1 If not, why not?

5.1.3 Could you identify the drawing list?

YES

5.1.4 Did you find the information useful; that is, could you act on this information? What information did you find unnecessary? What additional information do you think should have been included? Why?

NO. THE DRAWING IS UNNECESSARY. THE CONTRACTS GROUP FOLKS IF WE NEED A DRAWING; THEY WOULD REQUEST IT.

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CALS/EDI Checklist January 14, 1993

5.2 841

5.2.1 What software did you use to open and display the 841 transaction set(s)?

SAME AS 5.1.1

5.2.2 If this procurement package consisted of more than one 841, were the relationships between the several 841s obvious? Were the relationships between each 841 and the 840 obvious? Describe any difficulties.

5.2.3 What impact did these 841s have on your system platform and operations? (E.g. Adequate disk space, processing time, convenience of software, were engineering drawings appropriately separated?)

PROCESSING WAS TOO LONG FOR A 386.

5.2.4 Could you identify the drawing list?

YES

5.3 Drawings

5.3.1 Was there any incompatibility with CALS file naming conventions and your CALS viewer? If yes, explain:

YES. UNCLEAR AS TO WHICH FILE TO OPEN.

5.3.2 Please also fill out the "Raster" section.

5.3.3 Comment on the usability of the raster images:

5.3.3.1 Was there enough information present to make a valid quote?

No

5.3.3.2 Could you work with the raster image display, or did you feel the need to generate hardcopies of the raster images?

No.

5.4 Additional Comments

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6 Specifics about Raster data files

Be sure you have also filled in the "Receiver" section of this checklist.

6.1 General

6.1.1 List the number of MIL-R-28002 (Raster) data files. 5

6.1.2 Give the dimensions of the largest image._____

6.1.3 Give the scanning resolution (pixels per inch)._____

6.2 MIL-STD-1840A and MIL-R-28002 evaluation

Identification conventions

6.2.1 Are all of the files properly identified as raster files (named D001R001, D001R002, etc.)? No.

File header

6.2.2 Does a dump of the first 2048 byte block of each raster file show the appropriate header data specified by paragraph 5.1.4.4 of MIL-STD-1840A?

6.2.3 What type of raster data is specified, Type I or Type II?

Group-4 decompression

6.2.4 Can an appropriate utility decompress and display each MIL-R-28002 raster file, presenting unimpaired images?

6.2.5 Name the decompression utility used. Include the name, source, date, revision or version number, and if used as received or modified.

6.3 Orthographic alignment

Axial alignment

6.3.1 Does the image appear to have been rotated or skewed with respect to the horizontal and vertical axis of the presentation format? No

Aspect ratio

6.3.2 Does the proportionality of the orthogonal dimensions provide an image that is too "thin" or too "fat" (e.g., circles turned elliptical, etc.)?

No.

Linearity

6.3.3 Is the image "straight", without distortion due to nonlinear or converging representations of parallel lines? Yes

6.4 Image cropping

Excessive border (overscan)

6.4.1 Is the image centered and without unnecessary "white space" between the image and the edge of the format?

Yes

Excessive clipping (underscan)

6.4.2 Does the image run off the edge of the format? No

6.5 Image continuity

Scan strip alignment

6.5.1 Do full format horizontal or vertical lines (e.g., drawing borders) fit together correctly or have successive scan strips been misaligned?

Scanner drop out

6.5.2 Does the absence of scanned data (scan lines or scan strips) leave any part of an image missing?

6.6 Image readability

Contrast

6.6.1 Is image detail being lost because of "drop out" (faint lines) or "bloom" (fat lines)? N/A

Cleanliness

6.6.2 Is the image clean and presentable, absent of random pixel noise?

YES

Resolution

6.6.3 Do the reduction ratio, image capturing techniques, and presentation format successfully combine to provide an image acceptable for its intended use?

YES.

6.7 Image orientation

Right-reading

6.7.1 Is the image rendered right-reading? YES

6.8 Summary and recommendations

6.8.1 Explain any interesting problems or discoveries.

6.8.2 Give any recommendations for revisions to MIL-R-28002.

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CALS Test Network
CALS/EDI
Transfer Test
Procedure Checklist

2 Administrative Information

2.1 General

2.1.1 Date of transfer test. 10-26-92

2.1.2 Purpose of transfer test. SYSTEMS CHECK

2.2 Sending organization

2.2.1 Organization name.

2.2.2 Address.

2.2.3 Contact name and telephone.

2.2.4 Computer hardware used. Include manufacturer and machine name.

2.2.5 Computer software used. (I.e., data repository system, 840 and 841 software, transmission software, etc.). Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support utility programs.

2.2.6 Briefly record procedures used to prepare the data.

10/01/92 08:38 SMALC LAK 007

SEP-30-1992 14:04 FROM Tech Info Systems Program TO 919166435767 P.007/029

DRAFT

September 30, 1992 CALS/EDI Checklist

2.3 Receiving organization

2.3.1 Organization name: KEITH ASSOC. INC

2.3.2 Address: 400 Fifth Ave MANSFIELD TX 76063

2.3.3 Contact name and telephone. STEVE GEIS (817) 473-2255

2.3.4 Computer hardware used. Include manufacturer and machine name. LEADING TECHNOLOGY 386SX-1- HAYES 9600 WAIS MODEM

2.3.5 Computer software used. (I.e., VAN system, EDI software, display software, etc.) Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support programs.

STI 2.5 FROM STX USED AS RECEIVE. HIJAAK 1.0 FROM SMALC, USED AS EDITOR.

2.3.6 Briefly record procedures used to receive the data.

BOOTED UP, SWITCHED MODEM ON PROMPT TO STX, MADE APPROPRIATE MENU SELECTIONS WAITED FOR DOWNLOAD.

2.4 Additional Comments

4

4 Receiver

"Receiver" is identified as the contractor (end user), evaluator, co-op, or VAN. Each recipient of a transmission will record observations in the "Receiver" section, and the "End User," "Evaluator," "Co-op," or "VAN" section below, depending on whether the recipient is acting as a contractor, evaluator, co-op, or VAN for this test.

4.1 How were you notified that this procurement package was coming? (Give name of person/entity who notified you and method [e.g. phone, e-mail] of notification)

PHONE - JIM BURDICK, EDI TEST PROJECT (910) 643-6200

4.2 What preparations did you make to receive the data?

SET-UP PROCOMM FOR WIN SOFTWARE
ADD 125 MB EXT. DRIVE FOR VISTAR
SET-UP WINDOWS & WORD FOR WINTALK

4.3 Describe your local hardware and software configuration that you used to receive the data (if different from the test plan):

INSTALLED WINTALK AND WINDOWS
VISTAR STX COMMUNICATIONS

4.4 How did you receive the data?

Medium		Protocol		Distribution	
Wire	✓	X.400		DDN	
		VAN	✓		
		FTP		Internet	
		Kermit		Phone	✓
Floppy				UPS	
Tape				US Mail	
				FedEx	

10/01/92 09:49 SMALC LAK 006

SEP-30-1992 14:08 FROM Tech Info Systems Program TO 919166435767 P.016/029

DRAFT

CALS/EDI Checklist September 30, 1992

4.5 For each transmission received, give the following:

Transmission #	Transfer Time (HH:MM:SS)	Date and Time (Local Time)	Weather Conditions
1	60 sec(?)	10-29-92 1:43 PM	FAIR
2	60 sec(?)	1-15-93 8:25 AM	COLD
3		2-10-93 10:14 AM	WET & COLD

4.6 Please comment on any other issues related to each transmission: (Disk full, line dropped, power failure, weather condition, etc.)

SEVERAL ATTEMPTS WERE INVOLVED BEFORE 1ST DOWNLOAD WAS completed, AFTERWARDS, EACH TRANSMISSION WENT SMOOTHLY.

4.7 How did you verify the completeness of each solicitation package (840 and 841(s))?

BY VIEWING EACH PKG.

4.8 What is your application (role) with this data?

End User	✓
Evaluator	
Co op	
VAN	

4.9 Were the files in each transmission adequately identified?

YES

4.10 Did you issue a 997 transaction ("Functional Acknowledgment") to the sender for each transmission you received?

NO

13

5 End User

"End User" is usually the contractor or other entity who will be quoting on the procurement package. Be sure you have also filled in the "Receiver" section of this checklist.

End User: Name STEVE GEIST

Company KENT ASSOC. INC.

5.1 840

5.1.1 What software did you use to open and display the 840 transaction set?

IVJAAV

5.1.2 Were the contents of the 840 complete, understandable, and usable?

YES

5.1.2.1 If not, why not?

5.1.3 Could you identify the drawing list?

YES

5.1.4 Did you find the information useful; that is, could you act on this information? What information did you find unnecessary? What additional information do you think should have been included? Why?

YES,
SOME DATA WAS ALREADY IN HOUSE, HOWEVER, THIS HAS BEEN GOING ON FOREVER (ORIGINATING ACTIVITY IS AWARE OF THIS).

A BETTER BIN FILE DEFINITION WOULD HAVE EXPEDIATED VIEWING. I.E. SOME PKGS. WE SIMPLY VIEW DRAWING AND QUANTITIES AND ELIMINATE BID PROPOSAL IF UNDESIRABLE FOR MFG. AT OUR PLANT.

14

5.2 841

5.2.1 What software did you use to open and display the 841 transaction set(s)?

HIJAAK

5.2.2 If this procurement package consisted of more than one 841, were the relationships between the several 841s obvious? Were the relationships between each 841 and the 840 obvious? Describe any difficulties.

NO

5.2.3 What impact did these 841s have on your system platform and operations? (E.g. Adequate disk space, processing time, convenience of software, were engineering drawings appropriately separated?)

10 MB

5.2.4 Could you identify the drawing list?

NO

5.3 Drawings

5.3.1 Was there any incompatibility with CALS file naming conventions and your CALS viewer? If yes, explain:

YES

HIJAAK IS TOO SLOW TO OPEN ACE FILE TO VIEW AS PRINT.

5.3.2 Please also fill out the "Raster" section.

5.3.3 Comment on the usability of the raster images:
QUICK ACCESS & Resolution with MVRIAD PROGRAM

5.3.3.1 Was there enough information present to make a valid quote? YES

5.3.3.2 Could you work with the raster image display, or did you feel the need to generate hardcopies of the raster images?
VIEW FIRST THEN HARDCOPIES WHEN NECESSARY

5.4 Additional Comments

6 Specifics about Raster data files

Be sure you have also filled in the "Receiver" section of this checklist.

6.1 General

6.1.1 List the number of MIL-R-28002 (Raster) data files. 2

6.1.2 Give the dimensions of the largest image. 36" x 36"

6.1.3 Give the scanning resolution (pixels per inch). GOOD

6.2 MIL-STD-1840A and MIL-R-28002 evaluation

Identification conventions

6.2.1 Are all of the files properly identified as raster files (named D001R001, D001R002, etc.)? Yes

File header

6.2.2 Does a dump of the first 2048 byte block of each raster file show the appropriate header data specified by paragraph 5.1.4.4 of MIL-STD-1840A?

6.2.3 What type of raster data is specified, Type I or Type II?

Group-4 decompression

6.2.4 Can an appropriate utility decompress and display each MIL-R-28002 raster file, presenting unimpaired images? Yes

6.2.5 Name the decompression utility used. Include the name, source, date, revision or version number, and if used as received or modified.

ZIP from Stupendous SD200 as rcvd

6.3 Orthographic alignment

Axial alignment

6.3.1 Does the image appear to have been rotated or skewed with respect to the horizontal and vertical axis of the presentation format? NO

Aspect ratio

6.3.2 Does the proportionality of the orthogonal dimensions provide an image that is too "thin" or too "fat" (e.g., circles turned elliptical, etc.)? NO

Linearity

6.3.3 Is the image "straight", without distortion due to nonlinear or converging representations of parallel lines? yes

6.4 Image cropping

Excessive border (overscan)

6.4.1 Is the image centered and without unnecessary "white space" between the image and the edge of the format? NO

Excessive clipping (underscan)

6.4.2 Does the image run off the edge of the format? NO

6.5 Image continuity

Scan strip alignment

6.5.1 Do full format horizontal or vertical lines (e.g., drawing borders) fit together correctly or have successive scan strips been misaligned? FIT CORRECTLY

Scanner drop out

6.5.2 Does the absence of scanned data (scan lines or scan strips) leave any part of an image missing? NO

6.6 Image readability

Contrast

6.6.1 Is image detail being lost because of "drop out" (faint lines) or "bloom" (fat lines)? NO

Cleanliness

6.6.2 Is the image clean and presentable, absent of random pixel noise? YES

Resolution

6.6.3 Do the reduction ratio, image capturing techniques, and presentation format successfully combine to provide an image acceptable for its intended use? YES

6.7 Image orientation

Right-reading

6.7.1 Is the image rendered right-reading? YES AFTER TRIAL & ERROR

6.8 Summary and recommendations

6.8.1 Explain any interesting problems or discoveries. FOR VIEWING, MYRIAD WAS BEST PROGRAM, BUT WAS NEVER USED FOR PRINTING.

6.8.2 Give any recommendations for revisions to MIL-R-28002.

@! EDL 1 02/10/92 10:14:42 PMDDA1 CE EWD C
@~1

ENGINEERING DATA LIST

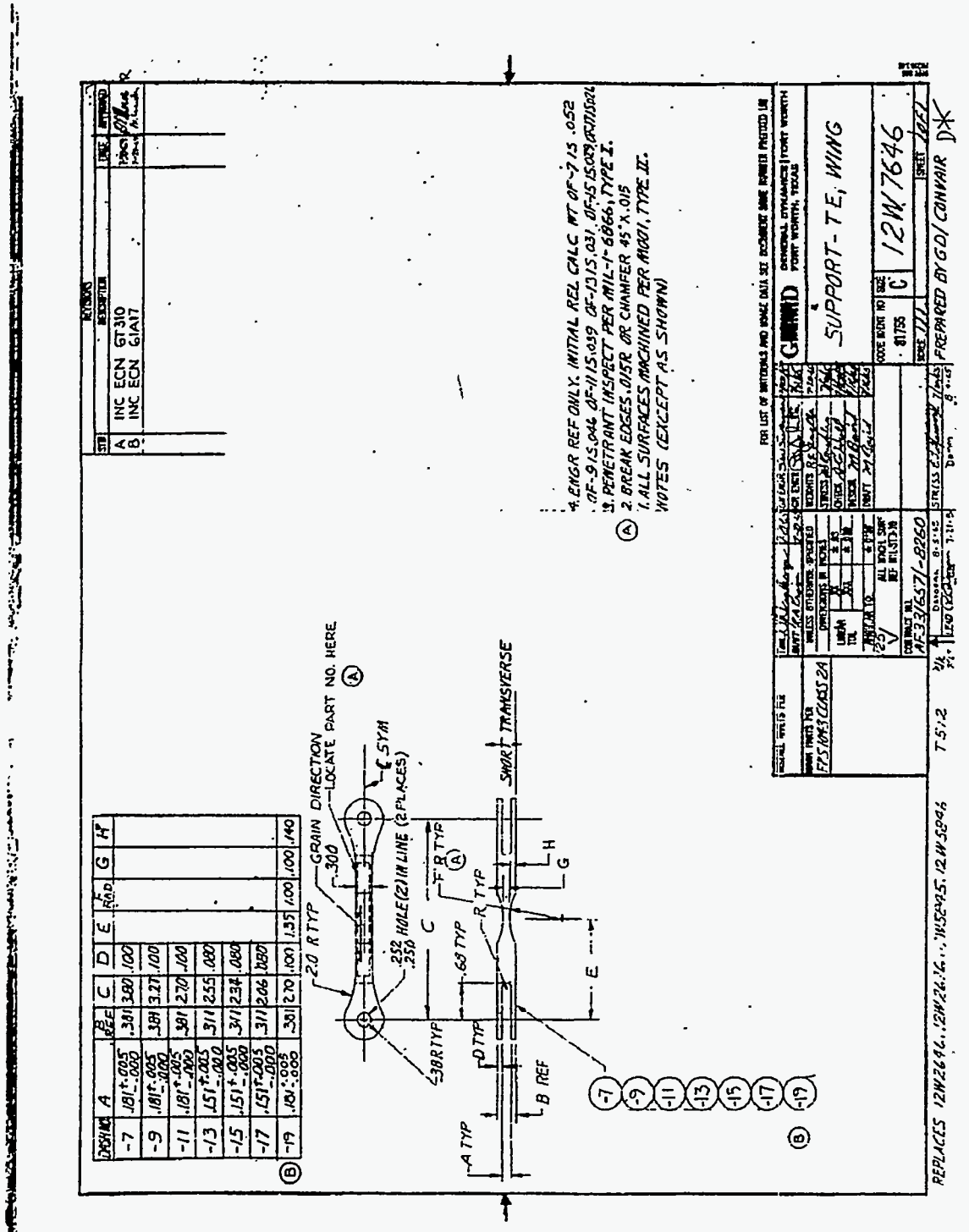
Date:	Data Tech:	Organization:	Application:	Page: of:
07FEB92	MP	LAK	F111	1 1

Cage:	Manufacturer:	Reference:	Noun:
81755	GENERAL DYNAMICS INC.	12W7646-7	SUPPOR

NSN:
5040009580974BJ

81755 12W7646 / B 0000 0000 S SUPPORT
81755 LM12W7646 / D 0000 0000 S LIST OF MATERIAL
81755 12Z001 / J 0000 0000 S INTERPRETATION DRAWING
81755 89C0610 / - 0000 0000 S ECO
81755 LM12Z001 / B 0000 0000 S LIST OF MATERIAL

VENDOR NOTED: VENDOR DRAWINGS ARE NOT FURNISHED AS PART OF THIS PACKAGE.



DASH NO	A	B REF	C	D	E	F R.D.	G	H
-7	.181 +.005 -.000	.381	3.80	.100				
-9	.181 +.005 -.000	.381	3.27	.100				
-11	.181 +.005 -.000	.381	2.70	.100				
-13	.151 +.005 -.000	.311	2.55	.080				
-15	.151 +.005 -.000	.311	2.34	.080				
-17	.151 +.005 -.000	.311	2.06	.080				
-19	.101 +.005 -.000	.331	2.70	.100	1.35	.100	1.000	1.140

STA	DESCRIPTION	DATE	APPROVED
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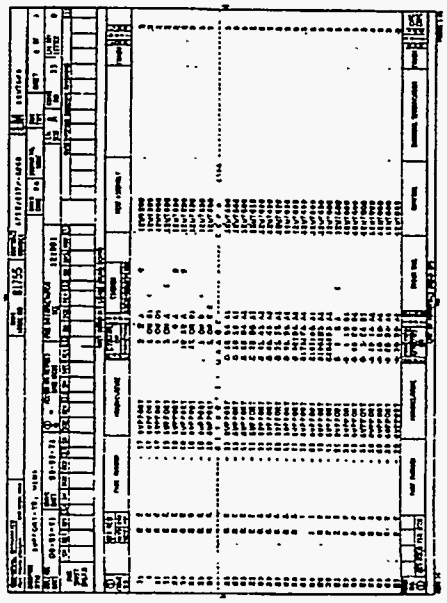
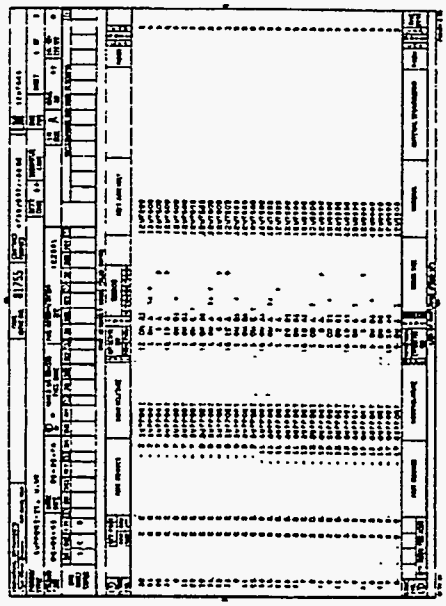
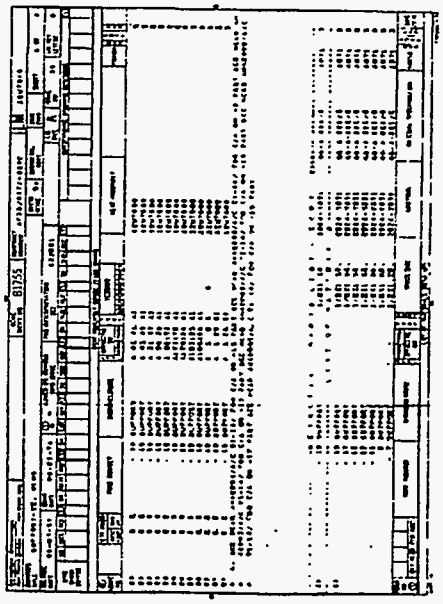
B	INC ECN G1A17		







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@! EDL 1 02/10/92 10:14:42 PMDDA1 CE EWD C
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ENGINEERING DATA LIST

Date:	Data Tech:	Organization:	Application:	Page: of:
07FEB92	MP	LAK	F111	1 1

Cage:	Manufacturer:	Reference:	Noun:
81755	GENERAL DYNAMICS INC.	12W7646-7	SUPPOR

NSN:
5040009580974BJ

81755 12W7646 / B 0000 0000 S SUPPORT
81755 LM12W7646 / D 0000 0000 S LIST OF MATERIAL
81755 12Z001 / J 0000 0000 S INTERPRETATION DRAWING
81755 89C0610 / - 0000 0000 S ECO
81755 LM12Z001 / B 0000 0000 S LIST OF MATERIAL

VENDOR NOTED: VENDOR DRAWINGS ARE NOT FURNISHED AS PART OF THIS PACKAGE.

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KENT ASSOCIATES. INC.
SPECIFICATIONS/TECHNICAL INFORMATION (UNKNOWN-0001 - 921029-12595750)
Date: 10/29/92     Time: 13:03
Page:   1


NOTE: This is a default printout using the dictionary.  Assign an overlay to
      create a customized report.

SPI SECURITY LEVEL CODE                  90      - Government Non-Classified
    REFERENCE NUMBER QUALIFIER           KS      - Solicitation Number
    REFERENCE NUMBER                     F4260092Q31328
    TRANSACTION SET PURPOSE              00      - Original
N1  ORGANIZATION IDENTIFIER              BY      - Buying party (Purchaser)
    NAME                                 DIRECTORATE OF CONTRACTING
N1  ORGANIZATION IDENTIFIER              SE      - Selling Party
    NAME                                 DEMO-841
HL  HIERARCHICAL IDENTIFICATION NUMBER   1
    HIERARCHICAL PARENT IDENTIFICATION N1
    HIERARCHICAL LEVEL CODE              I       - Item
EFI SECURITY LEVEL CODE                  90      - Government Non-Classified
    FREE FORM MESSAGE TEXT               12w76467.edl
    VERSION IDENTIFIER                   B
    INTERCHANGE FORMAT                   MIL-R-28002
BIN LENGTH OF BINARY DATA                6901
    BINARY DATA                          BIN00001.DAT
EFI SECURITY LEVEL CODE                  90      - Government Non-Classified
    FREE FORM MESSAGE TEXT               12w76467.txt
    VERSION IDENTIFIER                   B
    INTERCHANGE FORMAT                   MIL-R-28002
BIN LENGTH OF BINARY DATA                803
    BINARY DATA                          BIN00002.DAT
EFI SECURITY LEVEL CODE                  90      - Government Non-Classified
    FREE FORM MESSAGE TEXT               d001r018
    VERSION IDENTIFIER                   B
    INTERCHANGE FORMAT                   MIL-R-28002
BIN LENGTH OF BINARY DATA                94592
    BINARY DATA                          BIN00003.DAT
EFI SECURITY LEVEL CODE                  90      - Government Non-Classified
    FREE FORM MESSAGE TEXT               d001r019
    VERSION IDENTIFIER                   B
    INTERCHANGE FORMAT                   MIL-R-28002
BIN LENGTH OF BINARY DATA                108288
    BINARY DATA                          BIN00004.DAT
EFI SECURITY LEVEL CODE                  90      - Government Non-Classified
    FREE FORM MESSAGE TEXT               d001r022
    VERSION IDENTIFIER                   B
    INTERCHANGE FORMAT                   MIL-R-28002
BIN LENGTH OF BINARY DATA                358656
    BINARY DATA                          BIN00005.DAT
EFI SECURITY LEVEL CODE                  90      - Government Non-Classified
    FREE FORM MESSAGE TEXT               d001r023
    VERSION IDENTIFIER                   B
    INTERCHANGE FORMAT                   MIL-R-28002
BIN LENGTH OF BINARY DATA                35584
    BINARY DATA                          BIN00006.DAT


*** END OF REPORT ***
```

KENT ASSOCIATES. INC.
ALL LOG-ONs
Date: 01/19/93 Time: 08:25
Page: 1

LOG-ON TOP CODE	TERM ITS	ASYNC I.D.	LOG-ON NAME PROTOCOL	PHONE NUMBER	ASYNC	BAUD RATE	PARITY	DATA BITS	S B
ATT			AT&T EASYLINK	18ϕϕ6245ϕ16	A	096ϕϕ	N	8	1

Interchange control header starts a new: 3 (FILE) Error reject level: 1 (TRANSMISSION)
Override segment terminator: None

VALUE	DESCRIPTION
KENTASSOC	ID
DUNARIKE	PASSWORD
D:\STX	PATH TO ACCESS
	CARRIER SERVICE
+ATZ	MODEM 1
ATHEQV1X4	MODEM 2
	SECONDARY PASSWD
	PDN ID
	PDN PASSWORD

LOG-ON TOP CODE	TERM ITS	ASYNC I.D.	LOG-ON NAME PROTOCOL	PHONE NUMBER	ASYNC	BAUD RATE	PARITY	DATA BITS	S B
IIC	A		IBM ASYNC 1 (NONE)		A	ϕ12ϕϕ	N	8	1

Interchange control header starts a new: 3 (FILE) Error reject level: 1 (TRANSMISSION)
Override segment terminator: None

VALUE	DESCRIPTION
	IBM ACCOUNT.ID
	IBM PASSWORD
	IBM NEW PASSWORD
	IE ACCOUNT.ID
	IE PASSWORD
	IE NEW PASSWORD
EST	TIME ZONE
ATHEQV1X4	MODEM 1
C:\STX\EXPEDITE	EXPEDITE PATH
	CARRIER SERVICE
	SERVICE ACCOUNT

*** END OF REPORT ***

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DRAFT

CALS/EDI Checklist January 14, 1993

CALS Test Network
CALS/EDI
Transfer Test
Procedure Checklist

DRAFT

2 Administrative Information

2.1 General

2.1.1 Date of transfer test. 16 JAN 93

2.1.2 Purpose of transfer test. REVIEW SM-ALC SOLICITATION PACKAGE FOR POSSIBLE BID.

2.2 Sending organization

2.2.1 Organization name.

2.2.2 Address.

2.2.3 Contact name and telephone.

2.2.4 Computer hardware used. Include manufacturer and machine name.

2.2.5 Computer software used. (I.e., data repository system, 840 and 841 software, transmission software, etc.). Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support utility programs.

2.2.6 Briefly record procedures used to prepare the data.

2.3 Receiving organization

2.3.1 Organization name. INSPIRNETICS

2.3.2 Address. 9330 7TH ST., UNIT E
RANCHO CUCAMONGA CA 91730

2.3.3 Contact name and telephone.
TED SEIBEL 909-941-2004

2.3.4 Computer hardware used. Include manufacturer and machine name. SEE ATTACHMENT A

2.3.5 Computer software used. (I.e., VAN system, EDI software, display software, etc.) Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support programs.
SEE ATTACHMENT A

2.3.6 Briefly record procedures used to receive the data.
INSTALL STX SOFTWARE & CONFIGURE TO RECEIVE DATA THRU IBM VAN VIA MODEM. FOLLOW STX MENUS TO DOWNLOAD DATA FILES.

2.4 Additional Comments

4 Receiver

"Receiver" is identified as the contractor (end user), evaluator, co-op, or VAN. Each recipient of a transmission will record observations in the "Receiver" section, and the "End User," "Evaluator," "Co-op," or "VAN" section below, depending on whether the recipient is acting as a contractor, evaluator, co-op, or VAN for this test.

4.1 How were you notified that this procurement package was coming? (Give name of person/entity who notified you and method [e.g. phone, e-mail] of notification)

CAROLYN WIMPLE - LLNL VIA PHONE

4.2 What preparations did you make to receive the data?

MADE SPACE AVAILABLE ON HARD DRIVE.
DEFRAGMENTED HARD DRIVE.
INSTALLED HAYES MODEM & SOFTWARE (STX & HIJAAK)

4.3 Describe your local hardware and software configuration that you used to receive the data (if different from the test plan):

SEE ATTACHMENT A

4.4 How did you receive the data?

Medium		Protocol		Distribution	
Wire	✓	X.400		DDN	
		VAN	✓		
		FTP		Internet	
		Kermit		Phone	✓
Floppy				UPS	
Tape				US Mail	
				FedEx	

DRAFT

CALS/EDI Checklist — January 14, 1993

4.5 For each transmission received, give the following:

Transmission #	Transfer Time (HH:MM:SS)	Date and Time (Local Time)	Weather Conditions
1	SEE ATTACHMENT B		

4.6 Please comment on any other issues related to each transmission: (Disk full, line dropped, power failure, weather condition, etc.)

ABORTED TRANSMISSION #1 AT 3 HR 47 MIN DUE TO FACTORS NOT INVOLVED IN THIS TEST. CAROLYN WIMPLE (VIA PHONE) CONFIRMED ALL FILES WERE DOWNLOADED COMPLETE.

4.7 How did you verify the completeness of each solicitation package (840 and 841(s))?

DID NOT RECEIVE 840.
DID NOT VERIFY 841.

4.8 What is your application (role) with this data?

End User ✓
Evaluator
Co-op
VAN

4.9 Were the files in each transmission adequately identified?

NO. SEQUENTIAL FILE NO.'S HAVE NO MEANING

4.10 Did you issue a 997 transaction ("Functional Acknowledgment") to the sender for each transmission you received?

DON'T KNOW

13

5 End User

"End User" is usually the contractor or other entity who will be quoting on the procurement package. Be sure you have also filled in the "Receiver" section of this checklist.

End User: Name TED SEIBEL

Company INSPIRNETICS

5.1 840

5.1.1 What software did you use to open and display the 840 transaction set?
DID NOT RECEIVE 840

5.1.2 Were the contents of the 840 complete, understandable, and usable?

5.1.2.1 If not, why not?

5.1.3 Could you identify the drawing list?
ONLY FOR P/N 12W7647-7

5.1.4 Did you find the information useful; that is, could you act on this information? What information did you find unnecessary? What additional information do you think should have been included? Why?

FILE BIN00001.DAT WAS UNNECESSARY.
COULD SUBMIT FOR P/N 12W7647-7 IF SOLICITATION WAS RECEIVED.
COULD NOT SUBMIT BID FOR P/N 160D121105-(?) DUE TO INSUFFICIENT DATA AND NO SOLICITATION RECEIVED.

BID

DRAFT

CALS/EDI Checklist January 14, 1993

5.2 841

5.2.1 What software did you use to open and display the 841 transaction set(s)?
HIJAAK FOR WINDOWS VER 3.1

5.2.2 If this procurement package consisted of more than one 841, were the relationships between the several 841s obvious? Were the relationships between each 841 and the 840 obvious? Describe any difficulties.
RELATIONSHIPS BETWEEN 841s WERE OBVIOUS.
DID NOT RECEIVE 840s.

5.2.3 What impact did these 841s have on your system platform and operations? (E.g. Adequate disk space, processing time, convenience of software, were engineering drawings appropriately separated?)
HAD TO INCREASE WINDOWS PERMANENT SWAP FILE 6000KB.
PROCESSING TIME WITH HIJAAK FOR WINDOWS WAS EXTREMELY SLOW.

5.2.4 Could you identify the drawing list?
ONLY FOR P/N 12W7646-7.

5.3 Drawings

5.3.1 Was there any incompatibility with CALS file naming conventions and your CALS viewer? If yes, explain:
HAD TO CHANGE FILE SUFFIX OF SOME FILES FROM 'DAT' TO 'CAL'. THIS WAS EASY.

5.3.2 Please also fill out the "Raster" section.

5.3.3 Comment on the usability of the raster images:
ASIDE FROM HIJAAK BEING EXTREMELY SLOW, ALL IMAGES WERE USABLE.

5.3.3.1 Was there enough information present to make a valid quote?
NO

5.3.3.2 Could you work with the raster image display, or did you feel the need to generate hardcopies of the raster images?
HARDCOPIES ARE A 'MUST' WHEN REVIEWING WITH CO-WORKERS OR SENDING TO VENDORS FOR QUOTES.

5.4 Additional Comments

COULD NOT FIND A WAY TO PRINT ENTIRE IMAGE FROM HIJAAK ON LASER PRINTER. SPENT MANY HOURS TRYING THIS. COULD ONLY PRINT PORTRAIT OF UPPER LEFT CORNER.

6 Specifics about Raster data files

Be sure you have also filled in the "Receiver" section of this checklist.

6.1 General

6.1.1 List the number of MIL-R-28002 (Raster) data files. 16

6.1.2 Give the dimensions of the largest image. ?

6.1.3 Give the scanning resolution (pixels per inch). ?

6.2 MIL-STD-1840A and MIL-R-28002 evaluation

Identification conventions

6.2.1 Are all of the files properly identified as raster files (named D001R001, D001R002, etc.)? ?

File header

6.2.2 Does a dump of the first 2048 byte block of each raster file show the appropriate header data specified by paragraph 5.1.4.4 of MIL-STD-1840A?
DO NOT HAVE MIL-STD-1840A

6.2.3 What type of raster data is specified, Type I or Type II?
?

Group-4 decompression

6.2.4 Can an appropriate utility decompress and display each MIL-R-28002 raster file, presenting unimpaired images? DON'T KNOW WHAT THIS IS.

6.2.5 Name the decompression utility used. Include the name, source, date, revision or version number, and if used as received or modified.
DON'T KNOW

6.3 **Orthographic alignment**

Axial alignment

6.3.1 Does the image appear to have been rotated or skewed with respect to the horizontal and vertical axis of the presentation format? NO

Aspect ratio

6.3.2 Does the proportionality of the orthogonal dimensions provide an image that is too "thin" or too "fat" (e.g., circles turned elliptical, etc.)?
NO

Linearity

6.3.3 Is the image "straight", without distortion due to nonlinear or converging representations of parallel lines? YES

6.4 **Image cropping**

Excessive border (overscan)

6.4.1 Is the image centered and without unnecessary "white space" between the image and the edge of the format?
YES

Excessive clipping (underscan)

6.4.2 Does the image run off the edge of the format? YES

6.5 **Image continuity**

Scan strip alignment

6.5.1 Do full format horizontal or vertical lines (e.g., drawing borders) fit together correctly or have successive scan strips been misaligned?
DID NOT EXPERIMENT WITH THIS

Scanner drop out

6.5.2 Does the absence of scanned data (scan lines or scan strips) leave any part of an image missing?
NO

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CALS/EDI Checklist January 14, 1993

6.6 Image readability

Contrast

6.6.1 Is image detail being lost because of "drop out" (faint lines) or "bloom" (fat lines)? NO

Cleanliness

6.6.2 Is the image clean and presentable, absent of random pixel noise?
YES

Resolution

6.6.3 Do the reduction ratio, image capturing techniques, and presentation format successfully combine to provide an image acceptable for its intended use?
YES

6.7 Image orientation

Right-reading

6.7.1 Is the image rendered right-reading? NO

6.8 Summary and recommendations

6.8.1 Explain any interesting problems or discoveries.
ALL RASTER IMAGES WERE ROTATED 90° CW FROM PROPER VIEWING.

6.8.2 Give any recommendations for revisions to MIL-R-28002.

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DRAFT

6.9 Additional Comments

THE IMAGES RECEIVED WERE SURPRISINGLY HIGH QUALITY.

10 Concluding comments

10.1 Transfer test

10.1.1 Give overall comments about the transfer test.

DID NOT SEEM ORGANIZED ENOUGH. DO NOT BELIEVE SMALL BUSINESS CAN COMPETE WITH EDI 841 TRANSACTIONS DUE TO COST OF TIME REQUIRED. BESIDES FROM HIJAAK BEING SLOW & WITH FAULTS, THE IMAGES WERE SUPERB.

10.2 Checklist

10.2.1 Give comments about this checklist.

IT WOULD HAVE BEEN HELPFULL TO EXPLAIN TERMINOLOGY, I.E., 840, 841, 997, ETC., SOME QUESTIONS COULD HAVE BEEN BETTER EXPLAINED AS TO WHAT KIND OF ANSWER IS REQUIRED. IT SEEMS IT WAS ASSUMED WE WERE NOT NOVICES.

10.3 Documentation and transmittal

10.3.1 Please attach a copy of the documents and drawings as sent and as received.

10.3.2 Please send this completed checklist and/or address comments or questions to:

CTN Office Test Bed Director
Lawrence Livermore National Laboratory
P.O. Box 808, L-542
Livermore, CA 94551
510/422-4231

INSPIRNETICS
9330 7th St. • Unit E
Rancho Cucamonga, CA 91730
909-941-2004 • FAX 909-941-8303
P.O.C. Ted Seibel

Subject: **CALS/ EDI Test** **ATTACHMENT A**

Hardware:

IBM compatable computer:
- 486DX - 25 MHz (Intel)
  - Integrated Math Coprocessor
  - 8K Internal Cache Ram
- 8 MB Ram
- 128K External Cache Ram
- 120 MB 16 ms Avg Seek Hard Drive
  - Defragmented before test
- 1.2 MB & 1.44 MB Floppy Drives
- 16 Bit SVGA Video Card w/ 1Mb Ram
- 14" SVGA 1024 x 768 Color Monitor .28 dp
- Available Memory
  - 613.8K Conventional
  - 7,168K Extended
- Misc: Buffers = 30
  - Files = 99
  - Stacks = 9,256

Hayes ULTRA 96 Modem

Epson Action Laser II Printer w/ 2.5MB Ram (8 1/2 x 11)
- Emulating HP Laserjet IIP

Software:

MS-DOS Ver 5.0
STX (Supply Tech) Ver 2.5
Windows (Microsoft) Ver 3.1
- 386 Enhanced Mode
- 14,994KB Permanent Swap File

HiJaak for Windows (Inset Systems) Ver 1.0

INSPIRNETICS

Subject: **CALS/EDI Test** **ATTACHMENT B**

Transmission #1:
Download Info
(All 16 Files)

Date: SAT 16 JAN 93
Start: 11:15 AM PST
Stop: 3:02 PM PST
Total Time: 3 Hr 47 Min

Modem: Hayes ULTRA 96 @ 2400 bps
Software: STX (Supply Tech) Ver 2.5
VAN: IBM (1-800-288-8797) 2400 bps

Conditions:

Temperature: 68 Deg F - Indoors
59 Deg F - Outdoors

Humidity: 60% - Indoors
90%- Outdoors

Weather: Rain - Light to very heavy

File Name:		Length: Bytes	Document:	* Time: Min	Sec.
BIN000	01.DAT	6,901	???		
	02.DAT	94,592	Eng Data List		
	03.CAL	94,592	12W7646		50
	04.CAL	108,288	LM12W7646		45
	05.CAL	356,656	12Z001	4	0
	06.CAL	35,584	ECO 89C0610		18
	07.CAL	68,608	160D121105 Sh 1	2	40
	08.CAL	97,152	160D121105 Sh 1	2	50
	09.CAL	242,048	160D121105 Sh 1	4	5
	10.CAL	16,512	160D121105 Sh 2	2	25
	11.CAL	25,856	160D121105 Sh 2	2	30
	12.CAL	57,856	160D121105 Sh 2	2	40
	13.CAL	87,168	ECO 85C3078		45
	14.CAL	436,096	160D920108	3	45
	15.CAL	186,624	160D920108	3	0
	16.CAL	289,664	S1101	3	20

* Open file & view on screen using HiJaak for Windows.

INSPIRNETICS

ADDITIONAL COMMENTS

SECTION	
4.8	In lieu of sequential file numbers, a drawing number, list of materials number or engineering data list number would have been more informative.
5.2.3	When rotating or enlarging an image, HiJaak became frustratingly slow. A computer running at 50 or 66 MHz with a 32 bit local bus and a 32 bit video card would have improved processing time immensely.

```
@! EDL    1 02/10/92 10:14:42 PMDDA1   CE  EWD C
@-1
@\ 07FEB92
@\ CE
@\ PMDDA1
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@\ F16CD
@\    1
@\    2
@\ 81755
@\ GENERAL DYNAMICS  INC.
@\ 16VE064-116
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BIN00001.DAT (9 Pgs)

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@! EDL    1 02/10/92 10:14:42 PMDDA1   CE  EWD C
@-1
                E N G I N E E R I N G   D A T A   L I S T

Date:          Data Tech:      Organization:   Application:    Page: of:
07FEB92        MP              LAK             F111            1     1

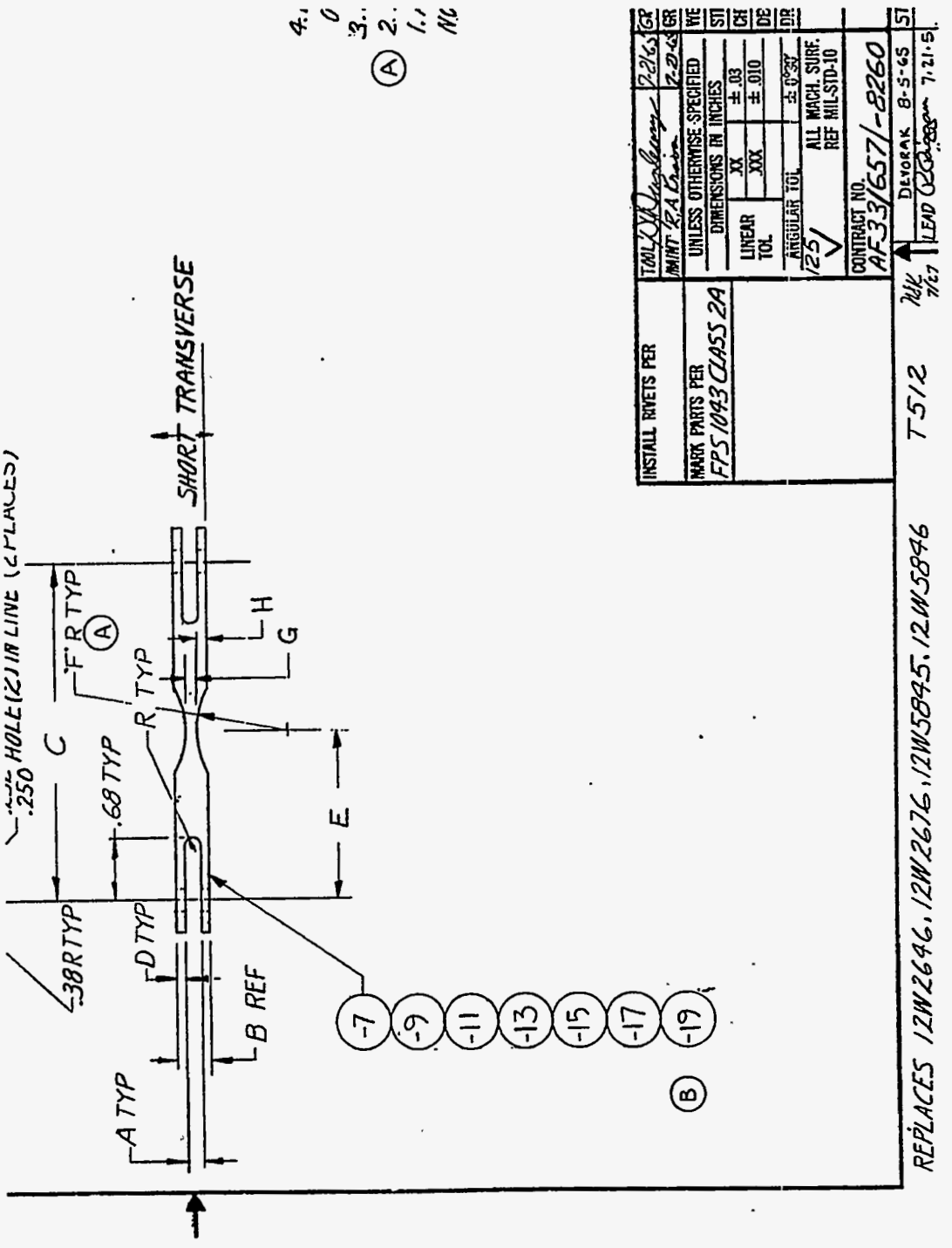
Cage:  Manufacturer:                 Reference:      Noun:
81755  GENERAL DYNAMICS  INC.        12W7646-7       SUPPOR

NSN:
5040009580974BJ

81755  12W7646                    /  B 0000  0000  S  SUPPORT
81755  LM12W7646                  /  D 0000  0000  S  LIST OF MATERIAL
81755  12Z001                     /  J 0000  0000  S  INTERPRETATION DRAWING
81755   89C0610                   /  - 0000  0000  S  ECO
81755  LM12Z001                   /  B 0000  0000  S  LIST OF MATERIAL

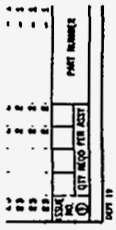
VENDOR NOTED:  VENDOR DRAWINGS ARE NOT FURNISHED AS PART OF THIS
PACKAGE.
```

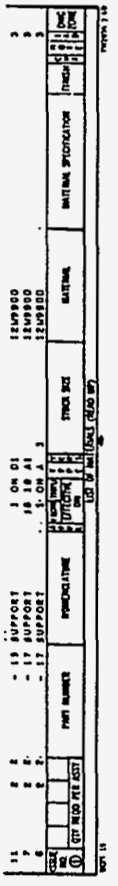
BIN00002.DAT

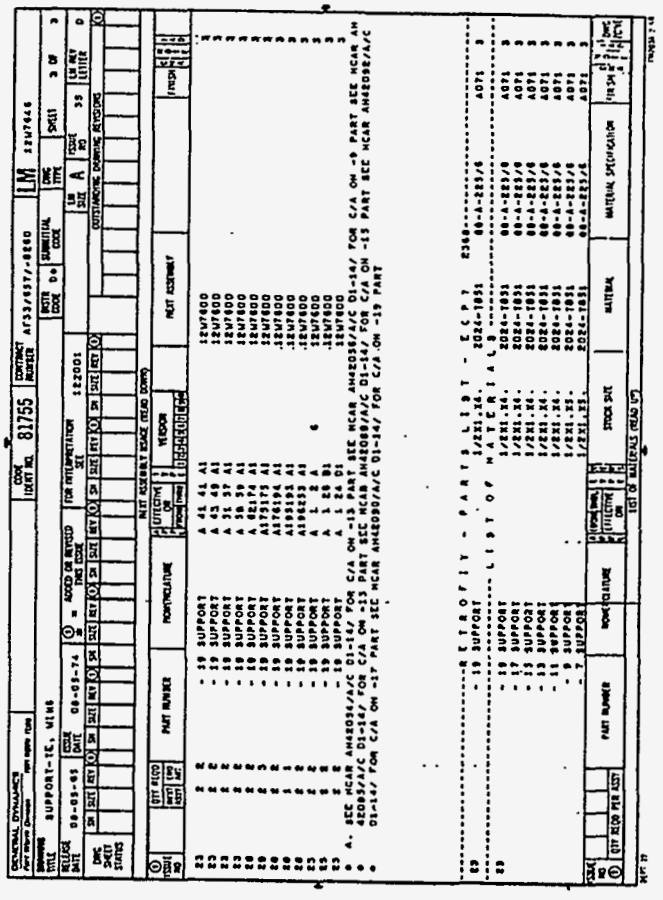


BIN00003.CAL

12W7646







BIN00004.CAL

LM12W7646 Pg 1-3

BINCCCC5.CAL

12Z001

(14) EFFECTIVE ON - FROM/THRU: NUMBER APPEARING IN "FROM" COLUMN INDICATES STARTING (FIRST) ARTICLE ON WHICH THE PART IS TO BE INSTALLED. NUMBER APPEARING IN "THRU" COLUMN INDICATES ENDING (LAST) ARTICLE ON WHICH THE PART IS TO BE INSTALLED. EFFECTIVITY OF ITEMS FOR WHICH THESE COLUMNS ARE BLANK IS THE SAME EFFECTIVITY AS THE ASSEMBLY INTO WHICH THE ITEM NEXT ASSEMBLES.

(15) TYPE/VERSION: INDICATES USING ARTICLE FOR ITEM LISTED IN THE "PART NUMBER" COLUMN. CHARACTERS RECORDED IN "TYPE" COLUMN DESIGNATE MODEL. CHARACTERS RECORDED IN "VERSION" COLUMN DESIGNATE A PARTICULAR VERSION OF THE APPLICABLE MODEL (TYPE).

TYPE "A" VERSION "1" (ITEM NO. 14: 1 THRU 159) INDICATES F-111A
TYPE "A" VERSION "1" (ITEM NO. 14: 160 THRU 253) INDICATES F-111E
TYPE "A" VERSION "6" INDICATES F-111D
TYPE "A" VERSION "9" INDICATES MAJOR COMPONENT SPARES
(ITEM NO. 14: 1 THRU 1) WING - FLIGHT TEST AIR LOADS
(ITEM NO. 14: 2 THRU 2) WING - FB-111A
(ITEM NO. 14: 3 THRU 3) WING - F-111E
(ITEM NO. 14: 4 THRU 4) WING - F-111D
(ITEM NO. 14: 5 THRU 5) WING - F-111F
(ITEM NO. 14: 6 THRU 6) WING - F-111A
TYPE "B" VERSION "1" INDICATES FB-111
TYPE "D" VERSION "1" INDICATES F-111C
TYPE "E" VERSION "2" INDICATES F-111F
TYPE "1" VERSION "S" INDICATES MINOR PECULIAR SPARES

ALL OTHER TYPES AND VERSIONS ARE FOR GENERAL DYNAMICS, FORT WORTH DIVISION INTERNAL CONTROL OF TESTS, AEROSPACE GROUND EQUIPMENT, AND MOBILE TRAINING SETS.

(16) FINISH: FINISH CODE AS DEFINED BY EITHER FPS-1006 "FINISH CODES FOR AIRCRAFT MODEL F-111" OR FPS-1036 "FINISH CODES FOR AEROSPACE GROUND EQUIPMENT".

(17) CHA: CLASSIFICATION OF CHARACTERISTICS. AN ASTERISK INDICATES THAT THE CHARACTERISTICS OF THE PART ARE DEFINED BY A DRAWING NOTE: NO ASTERISK INDICATES THAT THE CHARACTERISTICS OF THE PART ARE OF A MINOR CLASSIFICATION AS DEFINED BY FZM-12-129 "CLASSIFICATION OF CHARACTERISTICS ON ENGINEERING DRAWINGS".

(26) EFFECT ON DRAWING SHEETS - TO BE INC
DESCRIBED ON THE ENGINEERING CHANGE :
THE AFFECTED DRAWING.

(27) AFFECTS LN ONLY: AN "X" INDICATES T
ENGINEERING CHANGE NOTICE DOES NOT A

(28) WEIGHT CHANGE: POUNDS INCREASED OR
CHANGE. A CHECK MARK INDICATES "NON

(29) DWG SH STATUS - SH/SIZE/REV LTR: IN
THE INCORPORATION OF THE CHANGE(S) A
TO EACH AFFECTED SHEET.

(30) TC: TRANSACTION CODE DEFINED AS FOL
C - CREATE (NEW ITEM)
A - ADD (NEW OR ADDITIONAL REQU
D - DECREASE (REDUCTION IN REQU
L - LIMIT (DELETION OF ALL REQU
R - REVISE (REVISION WITHIN AN

(31) SAME AS: THE DASH NUMBER OF AN EXIS
ITEM IS CREATED SIMILAR TO THE EXIST

(32) REPLACED - QTY: THE QUANTITY PER AS
ITEM (33) .

(33) REPLACED - DASH: THE DASH NUMBER OF

(34) OLD NEXT ASSY DRAWING OR DASH NO.:
DOMESTIC DASH NUMBER OF THE ITEM REP

(35) NEW NEXT ASSY DRAWING OR DASH NO.:
DOMESTIC DASH NUMBER OF THE ITEM LIS

(36) QTY PER ASSY: THE INCREASE OR DECRE

BIN 000006.CAL

ENGINEERING CHANGE ORDER / REQUEST

1. ECO NO	ECO PAGE	2. DWG TITLE	3 DWG FSCM NO	4. DWG NO
89C0610	1 OF 1	INTERPRETATION DOCUMENT — DRAWING, LM, & ECN	81755	127001

5. TYPE OF ECO	6 REASON(S) FOR CHANGE	7. NEXT ASSY	8. USED ON	9 OPR FSCM NO	DWG SIZE	DWG SHEET(S) AFFECTED	LATEST DWG REV LTR
[X] ADVANCE	[ ] ERROR CORRECTION		F-111	98749	E	1	J
[ ] DEVIATION	[ ] DESIGN CHANGE						
[ ] CHANGE NOTICE	[X] DRAWING CLARIFICATION						
[ ] LIAISON	[ ] UPDATE DRAWING						
[ ] CHANGE REQUEST							
[ ] INFORMATION							

11. DOCUMENTS AFFECTED: TO # / TCTO # / SPEC / OTHER

		SYMBOL	DATE
14. CORROSION CONT MON	ha		
15. NDI			
16.			
17. DWG CHANGED BY			
18. CHANGE CHECKED BY	K. Wert	MMDDD	89-7-7
19. ECO / DWG RELEASED BY			

OTHER REMARKS: PORTIONS OF FZM-12-056 MAY BE INCONSISTENT WITH MLO'S, TOOLS, WHITE MASTERS.. ETC

10. DISPOSITION OF SPARES
- [ ] REWORK
- [ ] MODIFY
- [ ] SCRAP
- [ ] REPLACE

12. ECO PREPARED / REQUESTED BY: DAVID BEIL — SYMBOL MMKR(4) — PHONE 3-5533 — DATE 6/30/89

13. ENGR APPROVAL: R E Ahrens — SYMBOL MMKR(4) — PHONE 3-5533 — DATE 6/30/89

20. DESCRIPTION OF CHANGES (WAS, IS) / REMARKS

ADD NOTE 16 AS FOLLOWS:

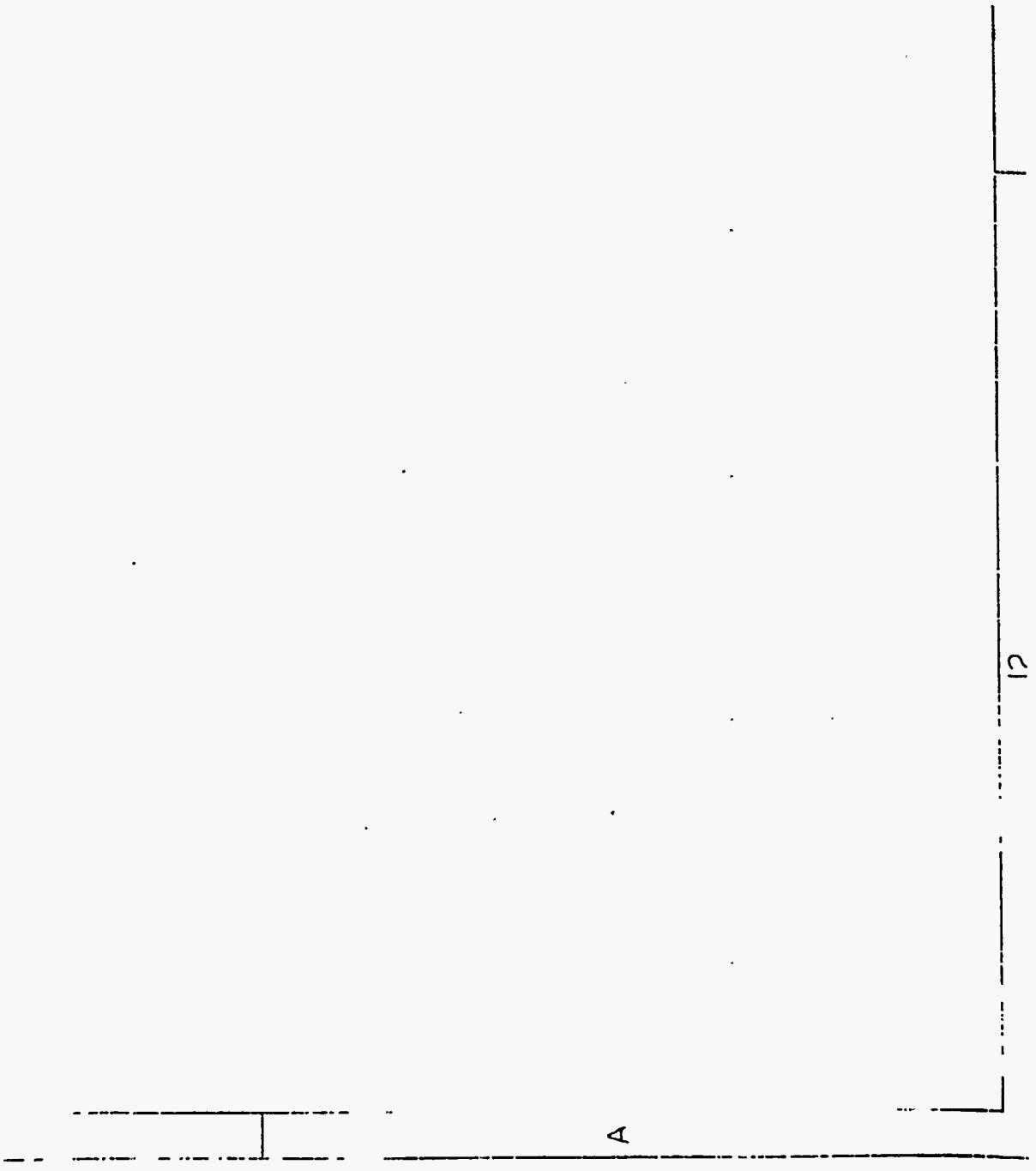
16. GENERAL DYNAMICS SPECIFICATION FZM-12-056 SHALL NOT BE APPLICABLE TO GOVERNMENT PROCUREMENT OF SPARE PARTS.

ACTION: WAS, IS A = ADD R = REMOVE	QTY REQD PER DASH NO	SYM	NOMENCLATURE	FSCM	IDENTIFYING NO	MATERIAL / SPECIFICATION	ZONE	FIND NO

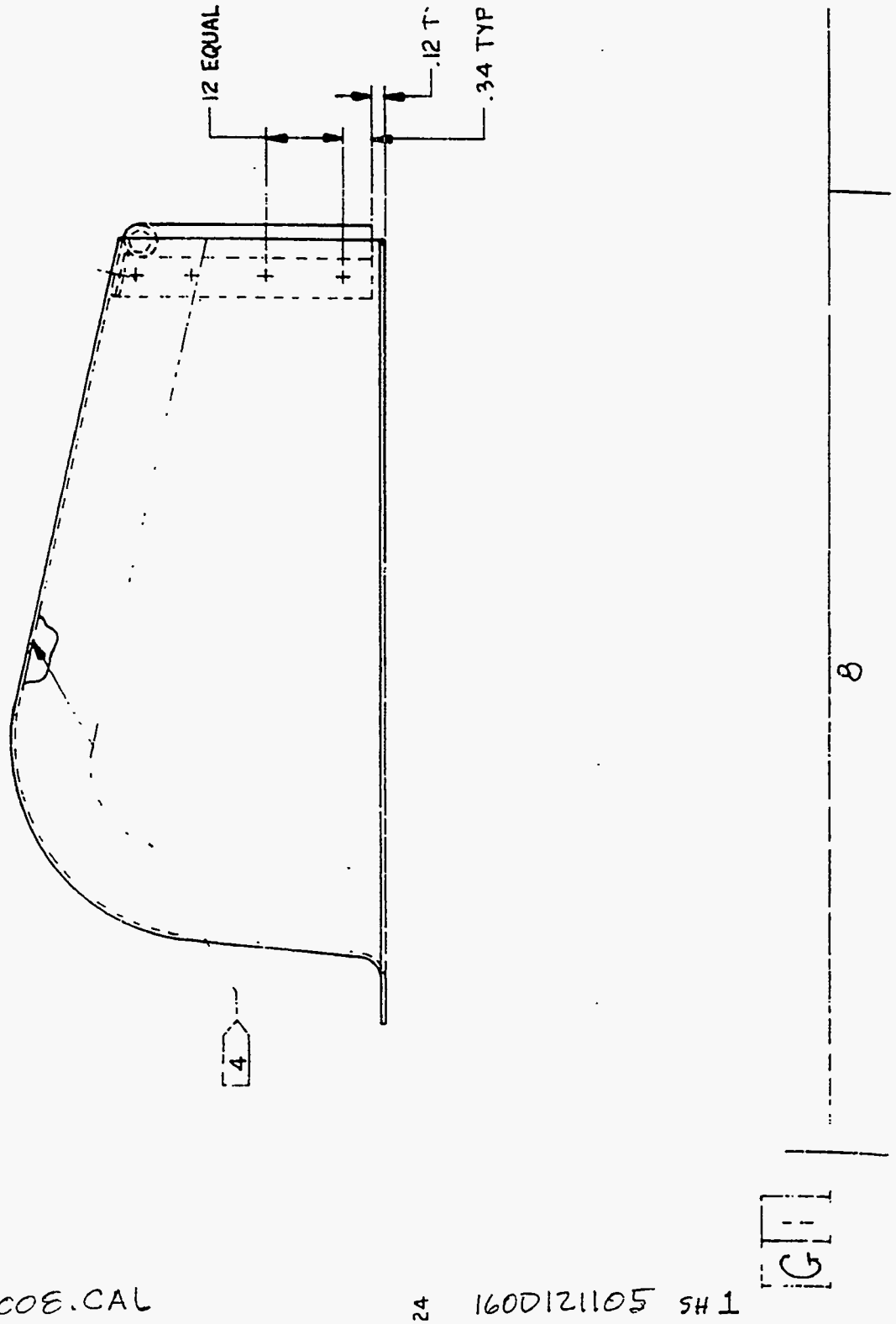
PARTS LIST CHANGE(S)

AF FORM MAY 80 2600 PREVIOUS EDITIONS ARE OBSOLETE.

ECO 89C0610



BIN00007.CAL 160D121105 SH 1


12 EQUAL
.12 T
.34 TYP
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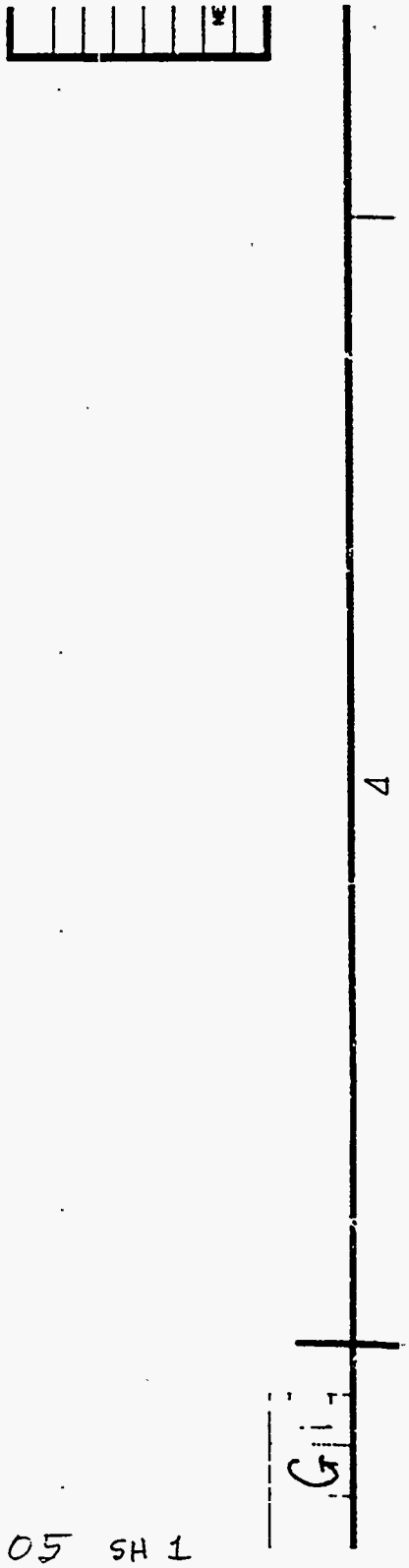
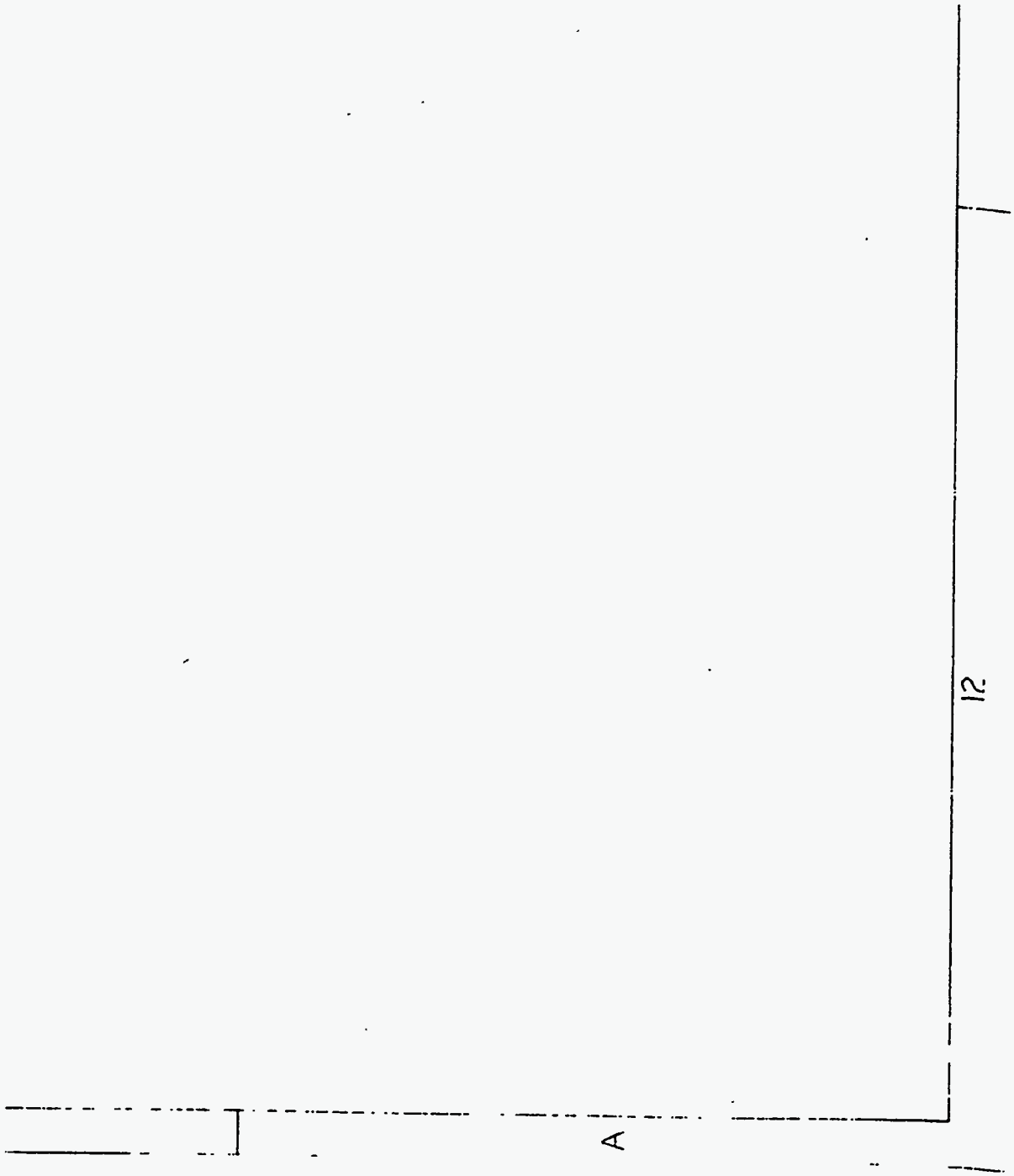
BINOCCOE.CAL
24 1600121105 SH 1

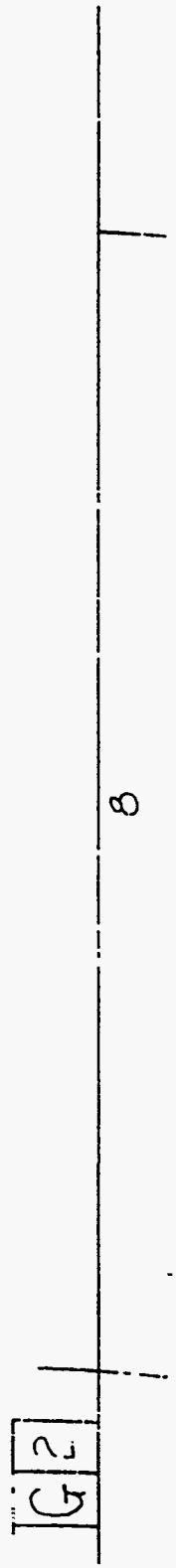


BIN00009.CAL

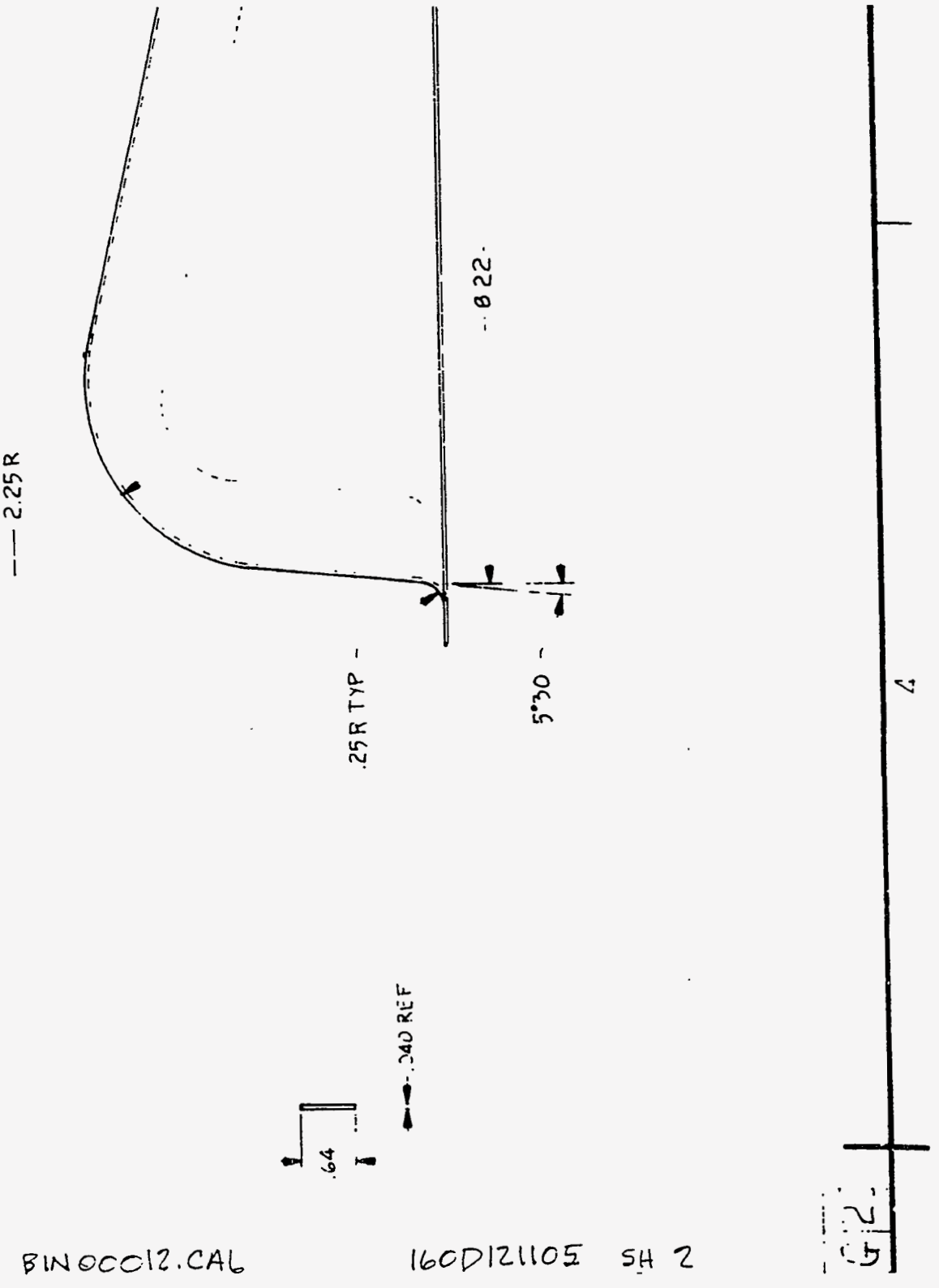
160D121105 SH 1



BINGGO1C.CAL 160D121105 SH 2



BINOCC11.CAL 160D121105 SH 2


2.25R
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.25R TYP
5°30
.340 REF
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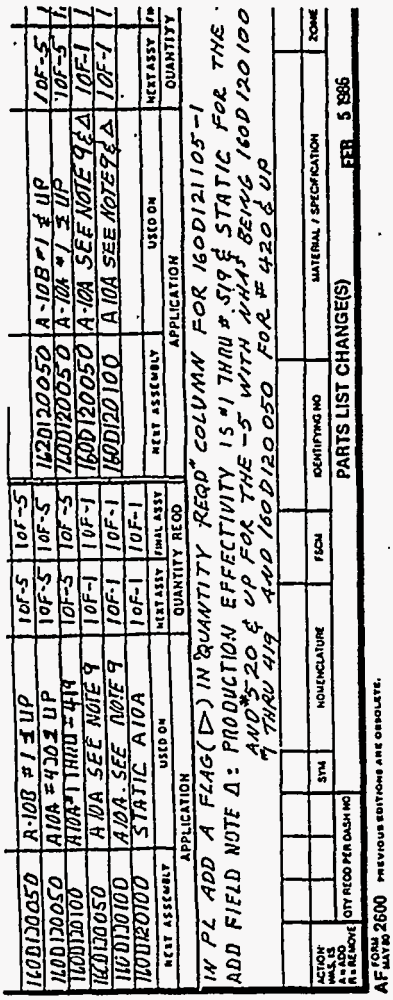
BIN0CC12.CAL
160D121105 SH 2



160D130050	A-10B #1 ≤ UP	10F-5	10F-5	162D120050	A-10B #1 ≤ UP	10F-5	1
160D130050	A10A #4305 UP	10F-5	10F-5	162D120050	A-10A #1 ≤ UP	10F-5	1
160D130100	A10A* THRU #419	10F-3	10F-3	160D120050	A-10A SEE NOTE 9 ¢ Δ	10F-1	1
160D130050	A10A SEE NOTE 9	10F-1	10F-1	160D120050	A-10A SEE NOTE 9 ¢ Δ	10F-1	1
160D130100	A10A SEE NOTE 9	10F-1	10F-1	160D120100	A10A SEE NOTE 9 ¢ Δ	10F-1	1
160D120100	STATIC A10A	10F-1	10F-1				
NEXT ASSEMBLY		NEXT ASSY	FINAL ASSY	NEXT ASSEMBLY		NEXT ASSY	FIG
USED ON		QUANTITY REQD		USED ON		QUANTITY	
APPLICATION				APPLICATION			

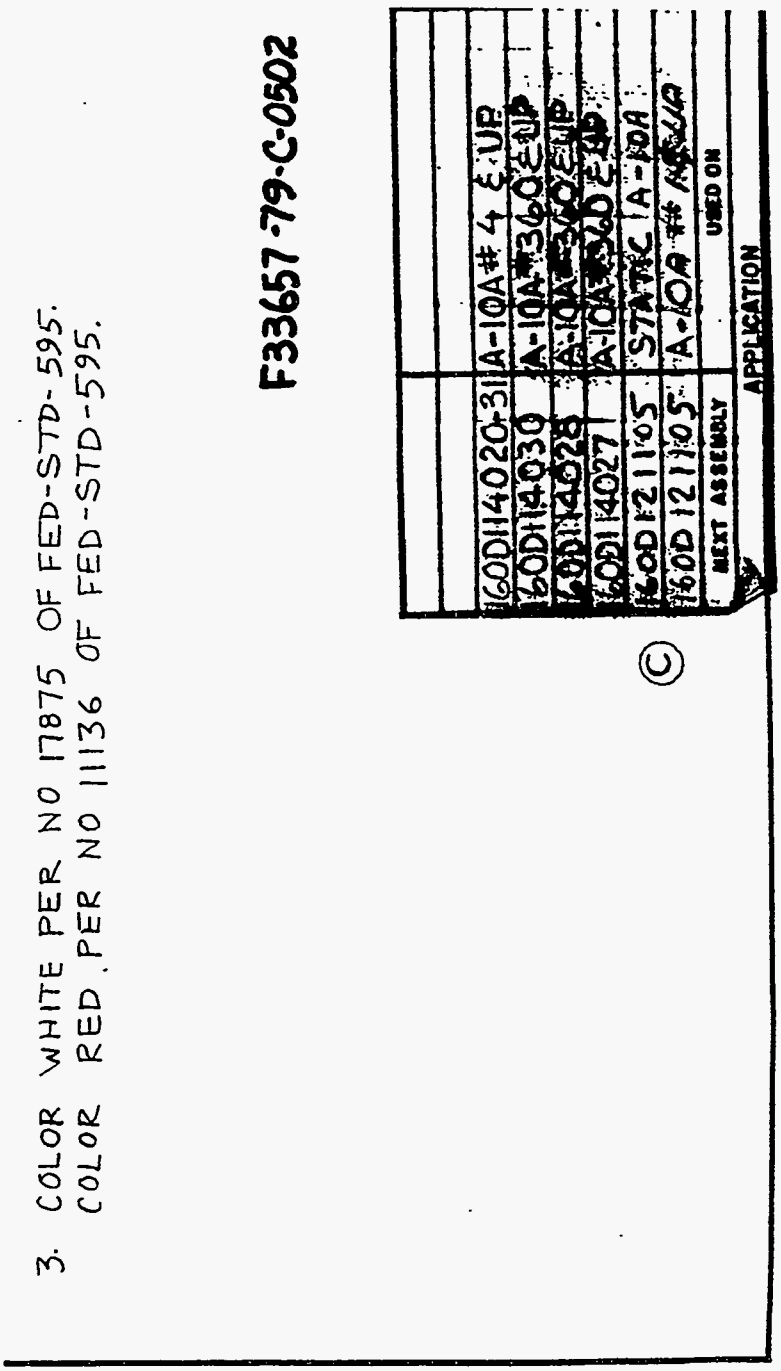
1W PL ADD A FLAG (▷) IN "QUANTITY REQD" COLUMN FOR 160D121105-1
ADD FIELD NOTE Δ: PRODUCTION EFFECTIVITY IS #1 THRU #.519 & STATIC FOR THE AND*S 20 & UP FOR THE -5 WITH AMAS BEING 160D120100 THRU 419 AND 160D120050 FOR #420 & UP

ACTION: M = CHANGE A = ADD R = REMOVE	QTY REQD PER DASH NO	STA	NOMENCLATURE	FSCM	IDENTIFYING NO	MATERIAL / SPECIFICATION	ZONE
			PARTS LIST CHANGE(S)			FEB 5 1996	

AF FORM 2600 MAY 90 2600 PREVIOUS EDITIONS ARE OBSOLETE.

BIN 00013.CAL

ECO 85C3078



3. COLOR WHITE PER NO 17875 OF FED-STD-595.
COLOR RED PER NO 11136 OF FED-STD-595.

BIN00014.CAL

160D920108

NOTES:

© 1. MAKE FROM SELF ADHESIVE POLYESTER PLASTIC FILM SCOTCHCAL SSE 133 (MINNESOTA MINING AND MFG CO) CODE IDENT#04963 OR MATERIAL CONFORMING TO MIL-M-43719, TYPE I, CL 1.

2. CHARACTERS SHALL CONFORM TO AMERICAN TYPE FOUNDERS BERNHARD GOTHIC HEAVY CAPS.

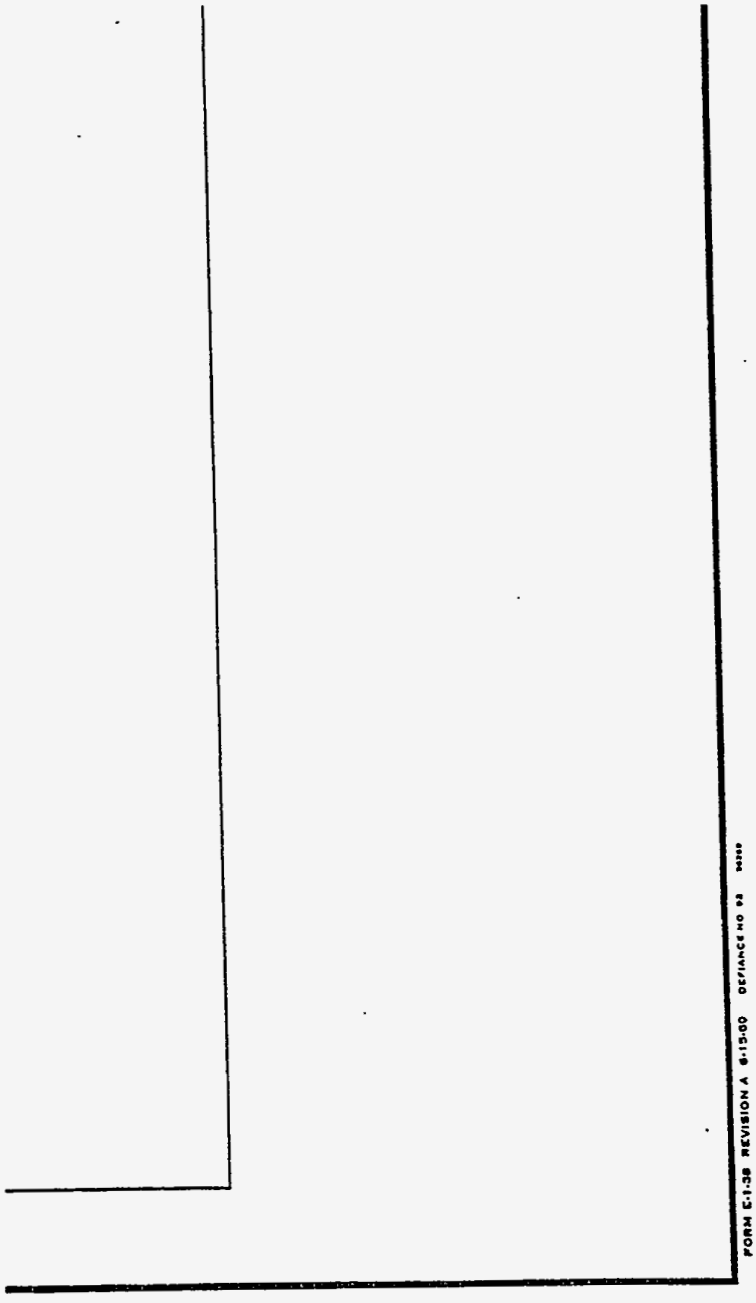
3. COLOR WHITE PER NO 17875 OF FED-STD-595.
COLOR RED PER NO 11136 OF FED-STD-595.

F33657-79-C-0502

NEXT ASSEMBLY	USED ON	QUANTITY REQ
APPLICATION		FINAL A
160D121105	A-10A ## INSTALLED	1 OF -11
160D114027	STATIC A-10A	1 OF -11
160D114028	A-10A #360 & UP	1 OF -11
160D114030	A-10A #360 & UP	1 OF -11
160D114020-31	A-10A # 4 & UP	1 OF -11

BIN00015.CAL

160D920108



BIN00016.CAL

S1101

BN00001.DAT
02.
03.

DRAFT

CALS/EDI Checklist

October 2. 1992

CALS Test Network
CALS/EDI
Transfer Test
Procedure Checklist

DRAFT

2 Administrative Information

2.1 General

2.1.1 Date of transfer test._____

2.1.2 Purpose of transfer test._____

2.2 Sending organization

2.2.1 Organization name. SMALC

2.2.2 Address._____

2.2.3 Contact name and telephone._____

2.2.4 Computer hardware used. Include manufacturer and machine name.

2.2.5 Computer software used. (I.e., data repository system, 840 and 841 software, transmission software, etc.). Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support utility programs.

2.2.6 Briefly record procedures used to prepare the data.

DRAFT

October 2, 1992 CALS/EDI Checklist

2.3 Receiving organization

2.3.1 Organization name. MICRO SYSTEMS, INC

2.3.2 Address. 65 HILL AVE,
FT WALTON BEACH, FL 32548-3858

2.3.3 Contact name and telephone.
CORT PROCTOR, (904) 244-2332

2.3.4 Computer hardware used. Include manufacturer and machine name. HP 386, 80 MEG HD (40 MEG BUT RUNNING STACKER).

2.3.5 Computer software used. (I.e., VAN system, EDI software, display software, etc.) Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support programs.
AT&T EASYLINK; SUPPLY TECH STX VER 2.5.11.8, INTERFACE VERSION 1.2.

2.3.6 Briefly record procedures used to receive the data.
LOGGED IN TO AT&T EASYLINK VIA SUPPLY TECH (STX) SOFTWARE. STX DETECTED FILES WERE AWAITING DOWNLOAD AND DATA TRANSFER BEGAN AUTOMATICALLY. SINCE DOWNLOAD WAS AT 2400 BAUD, DOWNLOAD OF BIN000001.DAT, 2.DAT, 3.DAT FILES REQUIRED 2 HOURS. USING WINDOWS PROGRAM MANAGER, .DAT FILES WERE RENAMED TO .CAL FILES. OPENED HIJACK AND READ BIN00000003.DAT (.CAL) WITH NO DIFFICULTY. ABLE TO ZOOM IN SO GRAPHICS COULD BE READ. PRINTER (HP LASER JET III) APPEARED TO ONLY PRINT HALF PAGE.

2.4 Additional Comments

1) STX SOFTWARE SHOULD INFORM OF FILE SIZE AND APPROXIMATE DOWNLOAD SIZE.
2) SOFTWARE SHOULD SUPPORT MODEM ON COM 3 OR 4.

4 Receiver

"Receiver" is identified as the contractor (end user), evaluator, co-op, or VAN. Each recipient of a transmission will record observations in the "Receiver" section, and the "End User," "Evaluator," "Co-op," or "VAN" section below, depending on whether the recipient is acting as a contractor, evaluator, co-op, or VAN for this test.

4.1 How were you notified that this procurement package was coming? (Give name of person/entity who notified you and method [e.g. phone, e-mail] of notification)

PHONE DURING DISCUSSION W/ SUPPLY TECH (MELLON)

4.2 What preparations did you make to receive the data?

NONE

4.3 Describe your local hardware and software configuration that you used to receive the data (if different from the test plan):

AT&T EASYLINK, SUPPLY TECH (STX). HP386 W/ 40 MEG HARD DRIVE STACKED TO 80 MEG, 2400 BAUD HAYES MODEM.

4.4 How did you receive the data?

Medium		Protocol		Distribution	
Wire	X	X.400		DDN	
		VAN	X		
		FTP		Internet	
		Kermit		Phone	X
Floppy				UPS	
Tape				US Mail	
				FedEx	

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CALS/EDI Checklist October 2. 1992

4.5 For each transmission received, give the following:

Transmission #	Transfer Time (HH:MM:SS)	Date and Time (Local Time)	Weather Conditions
1	2 HOURS	1500-1700	GOOD

4.6 Please comment on any other issues related to each transmission: (Disk full, line dropped, power failure, weather condition, etc.)

NO PROBLEMS W XFER.

4.7 How did you verify the completeness of each solicitation package (840 and 841(s))?

DIDN'T. SEEMED LIKE COMPLETE PACKAGE.

4.8 What is your application (role) with this data?

End User Y
Evaluator
Co-op
VAN

4.9 Were the files in each transmission adequately identified?

ONCE I UNDERSTOOD THE FILE CONVENTION, YES.

4.10 Did you issue a 997 transaction ("Functional Acknowledgment") to the sender for each transmission you received?

NO.

13

5 End User

"End User" is usually the contractor or other entity who will be quoting on the procurement package. Be sure you have also filled in the "Receiver" section of this checklist.

End User: Name CORT PROCTOR

Company MICRO SYSTEMS, INC.

5.1 840

5.1.1 What software did you use to open and display the 840 transaction set?

HIJACK & STX USED FOR ALL PORTIONS OF TEST.

5.1.2 Were the contents of the 840 complete, understandable, and usable?

YES.

5.1.2.1 If not, why not?

5.1.3 Could you identify the drawing list?

YES.

5.1.4 Did you find the information useful; that is, could you act on this information? What information did you find unnecessary? What additional information do you think should have been included? Why?

SYSTEM IS SLOW TO READ CALS FILES. & IT IS DIFFICULT (IMPOSSIBLE?) TO ~~READ~~ (PRINT) LARGE DRAWINGS AT ONE TIME.

5.2 841

5.2.1 What software did you use to open and display the 841 transaction set(s)?

HIJACK

5.2.2 If this procurement package consisted of more than one 841, were the relationships between the several 841s obvious? Were the relationships between each 841 and the 840 obvious? Describe any difficulties.

5.2.3 What impact did these 841s have on your system platform and operations? (E.g. Adequate disk space, processing time, convenience of software, were engineering drawings appropriately separated?)

PROCESSING TIME TO OPEN & PROCESSING TIME TO PRINT ARE SLOW. ALSO, ANYTIME YOU DO ANY THING TO SCREEN, TAKES A LONG TIME TO REDRAW.

5.2.4 Could you identify the drawing list?

YES.

5.3 Drawings

5.3.1 Was there any incompatibility with CALS file naming conventions and your CALS viewer? If yes, explain:

NO, ONCE I FIGURED OUT THE CONVENTION.

5.3.2 Please also fill out the "Raster" section.

5.3.3 Comment on the usability of the raster images:

ADEQUATE.

5.3.3.1 Was there enough information present to make a valid quote?

PROBABLY

5.3.3.2 Could you work with the raster image display, or did you feel the need to generate hardcopies of the raster images?

ALWAYS NEED HARD COPY TO CIRCULATE (ENG, PROCUREMENT ETC).

5.4 Additional Comments

ATTACHED DRAWINGS WERE PRINTED ON HP LASERJET III. AND ~~EP~~ ACTION PRINTER 5000, 24 PIN LQ DOT MATRIX. WITH RELATIVELY SMALL DRAWINGS, I GUESS ONE COULD USE 'CUT & PASTE" TO GET A FULL DRAWING.

6 Specifics about Raster data files

Be sure you have also filled in the "Receiver" section of this checklist.

6.1 General

6.1.1 List the number of MIL-R-28002 (Raster) data files. ?

6.1.2 Give the dimensions of the largest image. ?

6.1.3 Give the scanning resolution (pixels per inch). ?

6.2 MIL-STD-1840A and MIL-R-28002 evaluation

Identification conventions

6.2.1 Are all of the files properly identified as raster files (named D001R001, D001R002, etc.)? YES

File header

6.2.2 Does a dump of the first 2048 byte block of each raster file show the appropriate header data specified by paragraph 5.1.4.4 of MIL-STD-1840A? ?

6.2.3 What type of raster data is specified, Type I or Type II? ?

Group-4 decompression

6.2.4 Can an appropriate utility decompress and display each MIL-R-28002 raster file, presenting unimpaired images? YES

6.2.5 Name the decompression utility used. Include the name, source, date, revision or version number, and if used as received or modified.

HIJACK FOR WINDOWS V. 1.0

6.3 Orthographic alignment

Axial alignment

6.3.1 Does the image appear to have been rotated or skewed with respect to the horizontal and vertical axis of the presentation format? No

Aspect ratio

6.3.2 Does the proportionality of the orthogonal dimensions provide an image that is too "thin" or too "fat" (e.g., circles turned elliptical, etc.)? No

Linearity

6.3.3 Is the image "straight", without distortion due to nonlinear or converging representations of parallel lines? Yes

6.4 Image cropping

Excessive border (overscan)

6.4.1 Is the image centered and without unnecessary "white space" between the image and the edge of the format? Yes

Excessive clipping (underscan)

6.4.2 Does the image run off the edge of the format? No

6.5 Image continuity

Scan strip alignment

6.5.1 Do full format horizontal or vertical lines (e.g., drawing borders) fit together correctly or have successive scan strips been misaligned? Yes,

Scanner drop out

6.5.2 Does the absence of scanned data (scan lines or scan strips) leave any part of an image missing? No

DRAFT

CALS/EDI Checklist October 2, 1992

6.6 Image readability

Contrast

6.6.1 Is image detail being lost because of "drop out" (faint lines) or "bloom" (fat lines)? ADEQUATE

Cleanliness

6.6.2 Is the image clean and presentable, absent of random pixel noise?
ADEQUATE

Resolution

6.6.3 Do the reduction ratio, image-capturing techniques, and presentation format successfully combine to provide an image acceptable for its intended use?
ADEQUATE

6.7 Image orientation

Right-reading

6.7.1 Is the image rendered right-reading? YES

6.8 Summary and recommendations

6.8.1 Explain any interesting problems or discoveries.
UNABLE TO PRINT FULL IMAGES ON 8X11 LASER OR DOT MATRIX PRINTERS. MUST FIRST DO IMAGE/SCREEN CAPTURE. RESOLUTION INADEQUATE USING THIS TECHNIQUE.

6.8.2 Give any recommendations for revisions to MIL-R-28002.

DRAFT

October 2, 1992 CALS/EDI Checklist

6.9 Additional Comments

SUPPLY TECH SOFTWARE SHOULD TELL YOU SIZE OF FILE TO BE DOWNLOADED & APPROXIMATE DOWNLOAD TIME. SINCE IT REQUIRES OVER TWO HOURS TO DOWNLOAD SOME FILES, I NEED TO KNOW IF COMPUTER/PHONE CAN BE DEDICATED FOR THIS LENGTH OF TIME OR WHETHER DOWNLOAD SHOULD BE PLANNED AFTER HOURS.

10 Concluding comments

10.1 Transfer test

10.1.1 Give overall comments about the transfer test.

APPEARS THAT CONVERSION SOFTWARE NEEDS WORK. WILL ALSO NEED TO SPECIFY A FAIRLY CAPABLE COMPUTER SYSTEM (486) WITH LARGE HARD DRIVE. NEED TO HAVE CAPABILITY TO GENERATE HARD COPY.

10.2 Checklist

10.2.1 Give comments about this checklist.

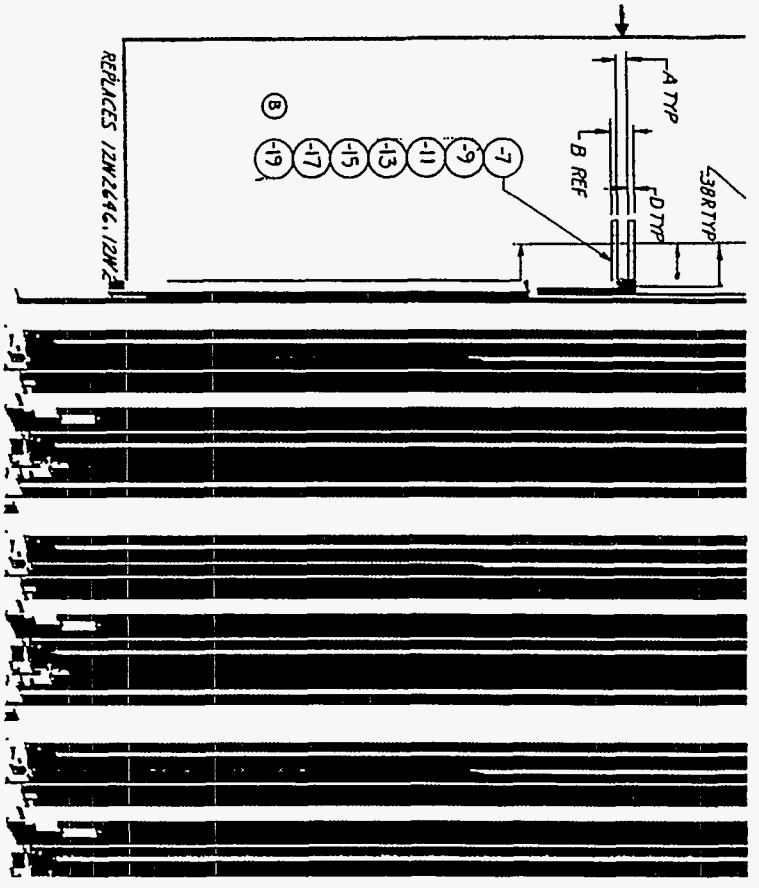
10.3 Documentation and transmittal

10.3.1 Please attach a copy of the documents and drawings as sent and as received.

10.3.2 Please send this completed checklist and/or address comments or questions to:

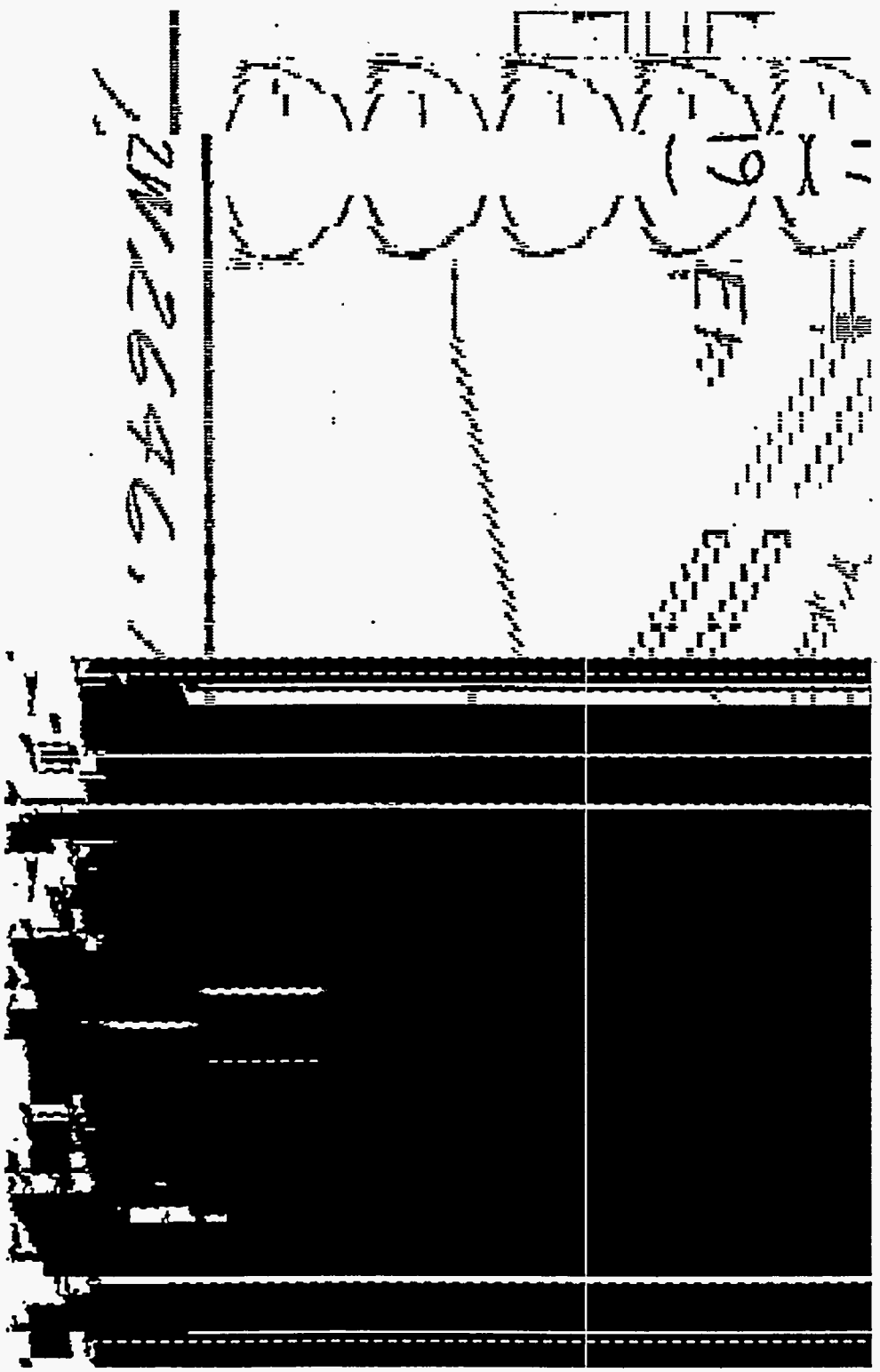
CALS Office Test Bed Director
Lawrence Livermore National Laboratory
P.O. Box 808, L-542
Livermore, CA 94551
510/422-4231

HP LT III


REPLACES 12W2696, 12W2
⑧
-19
-17
-15
-13
-11
-9
-7
A TYP
B REF
D TYP
.38R TYP

24 PIN DOT MATRIX

p ½



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CALS Test Network
CALS/EDI
Transfer Test
Procedure Checklist

DRAFT

CALS/EDI Checklist October 2, 1992

2 Administrative Information

2.1 General

2.1.1 Date of transfer test._____

2.1.2 Purpose of transfer test._____

2.2 Sending organization

2.2.1 Organization name. SMALC

2.2.2 Address._____

2.2.3 Contact name and telephone._____

2.2.4 Computer hardware used. Include manufacturer and machine name.

2.2.5 Computer software used. (I.e., data repository system, 840 and 841 software, transmission software, etc.). Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support utility programs.

2.2.6 Briefly record procedures used to prepare the data.

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October 2. 1992 CALS/EDI Checklist

2.3 Receiving organization

2.3.1 Organization name. MICRO SYSTEMS, INC

2.3.2 Address. 65 HILL AVE, FT WALTON BEACH, FL 32548-3858

2.3.3 Contact name and telephone. CORT PROCTOR, (904) 244-2332

2.3.4 Computer hardware used. Include manufacturer and machine name. HP 386, 80 MEG HD (40 MEG RUNNING STACKER V. 2.0)

2.3.5 Computer software used. (I.e., VAN system, EDI software, display software, etc.) Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support programs.

AT&T EASYLINK; SUPPLY TECH STX VER 2.5.11.8, INTERFACE VERSION 1.2.

2.3.6 Briefly record procedures used to receive the data.

LOGGED INTO AT&T EASYLINK VIA SUPPLY TECH (STX) SOFTWARE. STX DETECTED FILES WERE READY FOR DOWNLOAD & DATA TRANSFER BEGAN. DOWN LOAD ON 21 JAN REQUIRED IN EXCESS OF 2 HOURS. AFTER DOWNLOAD WHEN ATTEMPTING TO READ HAD STATEMENT "2 FILES AUDITED, SOME EDI TRANSACTIONS WERE IN ERROR." UNABLE TO OPEN FILES.

2.4 Additional Comments

DISCUSSED SITUATION WITH SUPPLY TECH. FILES WERE RELOADED. ALSO HAD RECEIVED 9600 RAVL MODEM FROM LAWRENCE LIVERMORE. EXPECTED BAUD RATE TO BE UNDER "PERFORM SYSTEM ADMIN/UPDATE CONFIG" BUT WAS TOLD IT HAD TO BE SET UNDER "PERFORM SYSTEM ADMIN/ UPDATE LOG-ONS, SCREEN 2). ON 25 JAN DOWNLOADED FILES SUCCESSFULLY IN 2.5 HOURS (BIN 00001.DAT THRU BIN 00021.VAT). FILES BIN00007.DAT THRU BIN 00082.DAT WERE RETRANSMISSIONS)

4

4 Receiver

"Receiver" is identified as the contractor (end user), evaluator, co-op, or VAN. Each recipient of a transmission will record observations in the "Receiver" section, and the "End User," "Evaluator," "Co-op," or "VAN" section below, depending on whether the recipient is acting as a contractor, evaluator, co-op, or VAN for this test.

4.1 How were you notified that this procurement package was coming? (Give name of person/entity who notified you and method [e.g. phone, e-mail] of notification)

PHONE FROM CAROLE AT LAWRENCE-LIVERMORE.

4.2 What preparations did you make to receive the data?

SEE 2.3.6 & 2.4

4.3 Describe your local hardware and software configuration that you used to receive the data (if different from the test plan):

SEE 2.3.4 & 2.3.5.

4.4 How did you receive the data?

Medium		Protocol		Distribution	
Wire	✓	X.400		DDN	
		VAN	✓		
		FTP		Internet	
		Kermit		Phone	✓
Floppy				UPS	
Tape				US Mail	
				FedEx	

DRAFT

CALS/EDI Checklist October 2, 1992

4.5 For each transmission received, give the following:

Transmission #	Transfer Time (HH:MM:SS)	Date and Time (Local Time)	Weather Conditions
1.	2+ HOURS	1500-1700 (25 JAN)	GOOD
2	2.5 HOURS	25 JAN 1500-1700	RAIN

4.6 Please comment on any other issues related to each transmission: (Disk full, line dropped, power failure, weather condition, etc.)

SEE 2.3.5 & 2.4.

4.7 How did you verify the completeness of each solicitation package (840 and 841(s))?

DIDN'T

4.8 What is your application (role) with this data?

End User X
Evaluator
Co-op
VAN

4.9 Were the files in each transmission adequately identified?

YES

4.10 Did you issue a 997 transaction ("Functional Acknowledgment") to the sender for each transmission you received?

NO.

5 End User

"End User" is usually the contractor or other entity who will be quoting on the procurement package. Be sure you have also filled in the "Receiver" section of this checklist.

End User: Name CORT PROCTOR

Company MICRO SYSTEMS, INC.

5.1 840

5.1.1 What software did you use to open and display the 840 transaction set?

STX & HIJACK USED FOR TEST.

5.1.2 Were the contents of the 840 complete, understandable, and usable?

YES BUT SEE 5.4.

5.1.2.1 If not, why not?

5.1.3 Could you identify the drawing list?

YES

5.1.4 Did you find the information useful; that is, could you act on this information? What information did you find unnecessary? What additional information do you think should have been included? Why?

UNABLE TO GET ADEQUATE HARD COPY FROM LASER / DOT MATRIX PRINTERS

5.2 841

5.2.1 What software did you use to open and display the 841 transaction set(s)?

HIJACK

5.2.2 If this procurement package consisted of more than one 841, were the relationships between the several 841s obvious? Were the relationships between each 841 and the 840 obvious? Describe any difficulties.

NOT SURE DUE TO LENGTH OF TIME TO OPEN EACH FILE AND INABILITY TO PRINT HARD COPY TO SEE RELATION SHIPS.

5.2.3 What impact did these 841s have on your system platform and operations? (E.g. Adequate disk space, processing time, convenience of software, were engineering drawings appropriately separated?)

WITH BIN00005 AND GREATER FILES UNABLE TO OPEN ON 40 MEG HARD DISK RUNNING STACKER V.2.0 TO YEILD 80 MEG. I OFFLOADED ALL EXTRANEOUS FILES BUT KEPT VITAL PROGRAMS (DOS, CBD ON DISK, HIJACK FOR WINDOWS, STX, PROCOMM, WINDOWS, WINPMJ, WP51). STILL RECEIVED "INSUFFICIENT DISK SPACE" (CONT ON 5.4).

5.2.4 Could you identify the drawing list?

YES

5.3 Drawings

5.3.1 Was there any incompatibility with CALS file naming conventions and your CALS viewer? If yes, explain:

NO

5.3.2 Please also fill out the "Raster" section.

5.3.3 Comment on the usability of the raster images:
OK ON SCREEN, NO ON HARD COPY.

5.3.3.1 Was there enough information present to make a valid quote?
YES

5.3.3.2 Could you work with the raster image display, or did you feel the need to generate hardcopies of the raster images?
NEED HARD COPY TO CIRCULATE TO PURCHASING, ENGINEERING, DATA.

5.4 Additional Comments

(CONT. FROM 5.2.3)
AND "OUT OF SNAP FILE SPACE". DOWNLOADED FILES TO FLOPPY AND RAN ON ENGINEERING COMPUTER WITH 200 MEG HARD DRIVE, NOT RUNNING STACKER. EVEN THOUGH THIS WAS A 486 MACHINE, IT STILL REQUIRED APPROXIMATELY 4 MINUTES TO PROCESS FILE AND AN ADDITIONAL 2-4 MINUTES TO PRINT USING IMAGE CAPTURE, HARD COPIES ARE ATTACHED.

DRAFT

CALS/EDI Checklist October 2, 1992

6 Specifics about Raster data files

Be sure you have also filled in the "Receiver" section of this checklist.

6.1 General

6.1.1 List the number of MIL-R-28002 (Raster) data files. ?

6.1.2 Give the dimensions of the largest image. ?

6.1.3 Give the scanning resolution (pixels per inch). ?

6.2 MIL-STD-1840A and MIL-R-28002 evaluation

Identification conventions

6.2.1 Are all of the files properly identified as raster files (named D001R001, D001R002, etc.)? YES

File header

6.2.2 Does a dump of the first 2048 byte block of each raster file show the appropriate header data specified by paragraph 5.1.4.4 of MIL-STD-1840A? ?

6.2.3 What type of raster data is specified, Type I or Type II? ?

Group-4 decompression

6.2.4 Can an appropriate utility decompress and display each MIL-R-28002 raster file, presenting unimpaired images? YES

6.2.5 Name the decompression utility used. Include the name, source, date, revision or version number, and if used as received or modified.

HIJACK FOR WINDOWS V 1.0.

6.3 Orthographic alignment

Axial alignment

6.3.1 Does the image appear to have been rotated or skewed with respect to the horizontal and vertical axis of the presentation format? No

Aspect ratio

6.3.2 Does the proportionality of the orthogonal dimensions provide an image that is too "thin" or too "fat" (e.g., circles turned elliptical, etc.)? No

Linearity

6.3.3 Is the image "straight", without distortion due to nonlinear or converging representations of parallel lines? YES

6.4 Image cropping

Excessive border (overscan)

6.4.1 Is the image centered and without unnecessary "white space" between the image and the edge of the format? YES

Excessive clipping (underscan)

6.4.2 Does the image run off the edge of the format? No

6.5 Image continuity

Scan strip alignment

6.5.1 Do full format horizontal or vertical lines (e.g., drawing borders) fit together correctly or have successive scan strips been misaligned? YES

Scanner drop out

6.5.2 Does the absence of scanned data (scan lines or scan strips) leave any part of an image missing? No

DRAFT

CALS/EDI Checklist October 2, 1992

6.6 Image readability

Contrast

6.6.1 Is image detail being lost because of "drop out" (faint lines) or "bloom" (fat lines)? SOMEWHAT BUT ADEQUATE

Cleanliness

6.6.2 Is the image clean and presentable, absent of random pixel noise?
ADEQUATE

Resolution

6.6.3 Do the reduction ratio, image capturing techniques, and presentation format successfully combine to provide an image acceptable for its intended use?
ADEQUATE

6.7 Image orientation

Right-reading

6.7.1 Is the image rendered right-reading? YES

6.8 Summary and recommendations

6.8.1 Explain any interesting problems or discoveries.
UNABLE TO PRINT FULL IMAGES ON HP LASERJET III.. BY USING IMAGE/SCREEN CAPTURE COULD GET FULL IMAGE ON VGT MATRIX, HOWEVER RESOLUTION INADEQUATE.

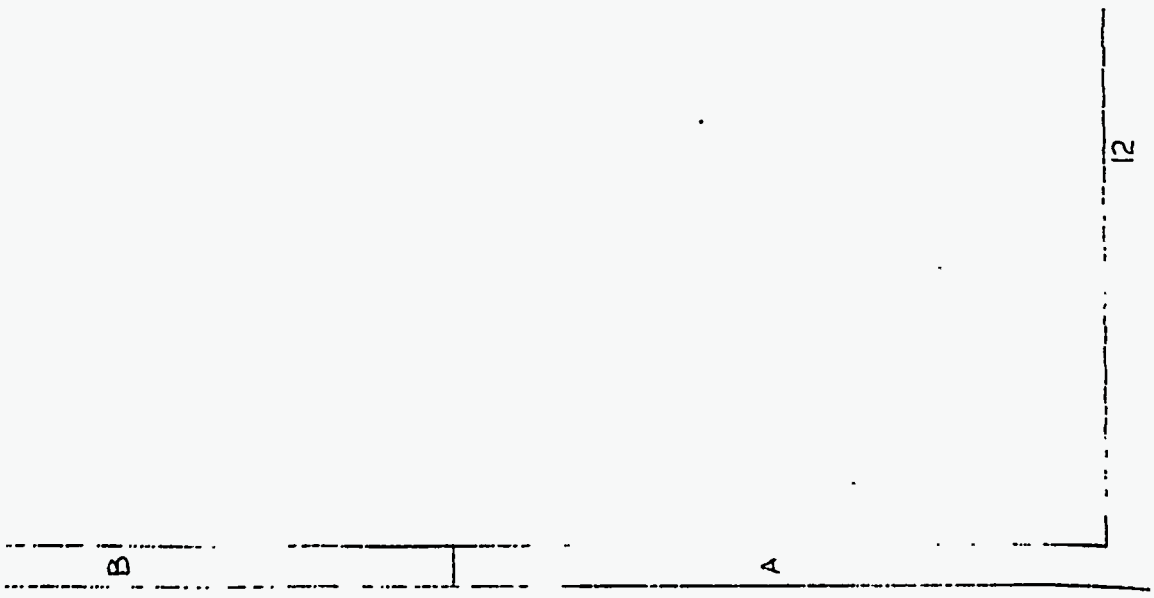
6.8.2 Give any recommendations for revisions to MIL-R-28002.

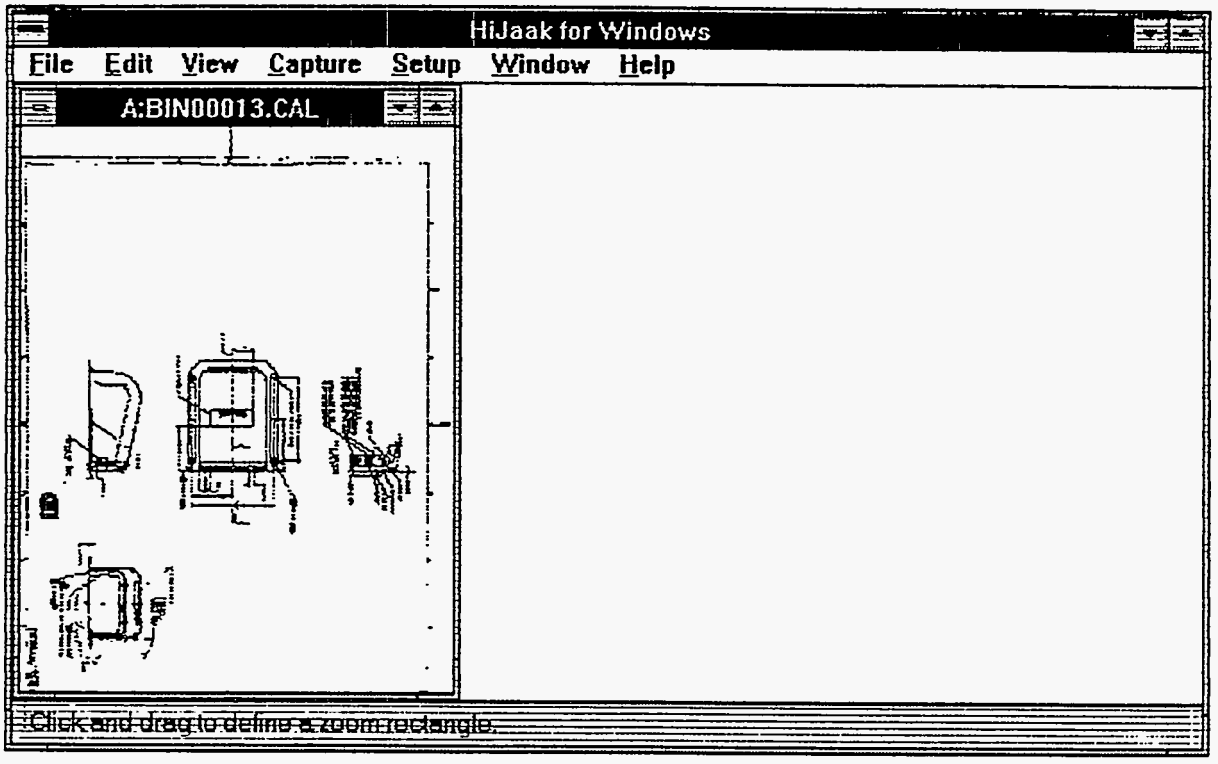
DRAFT

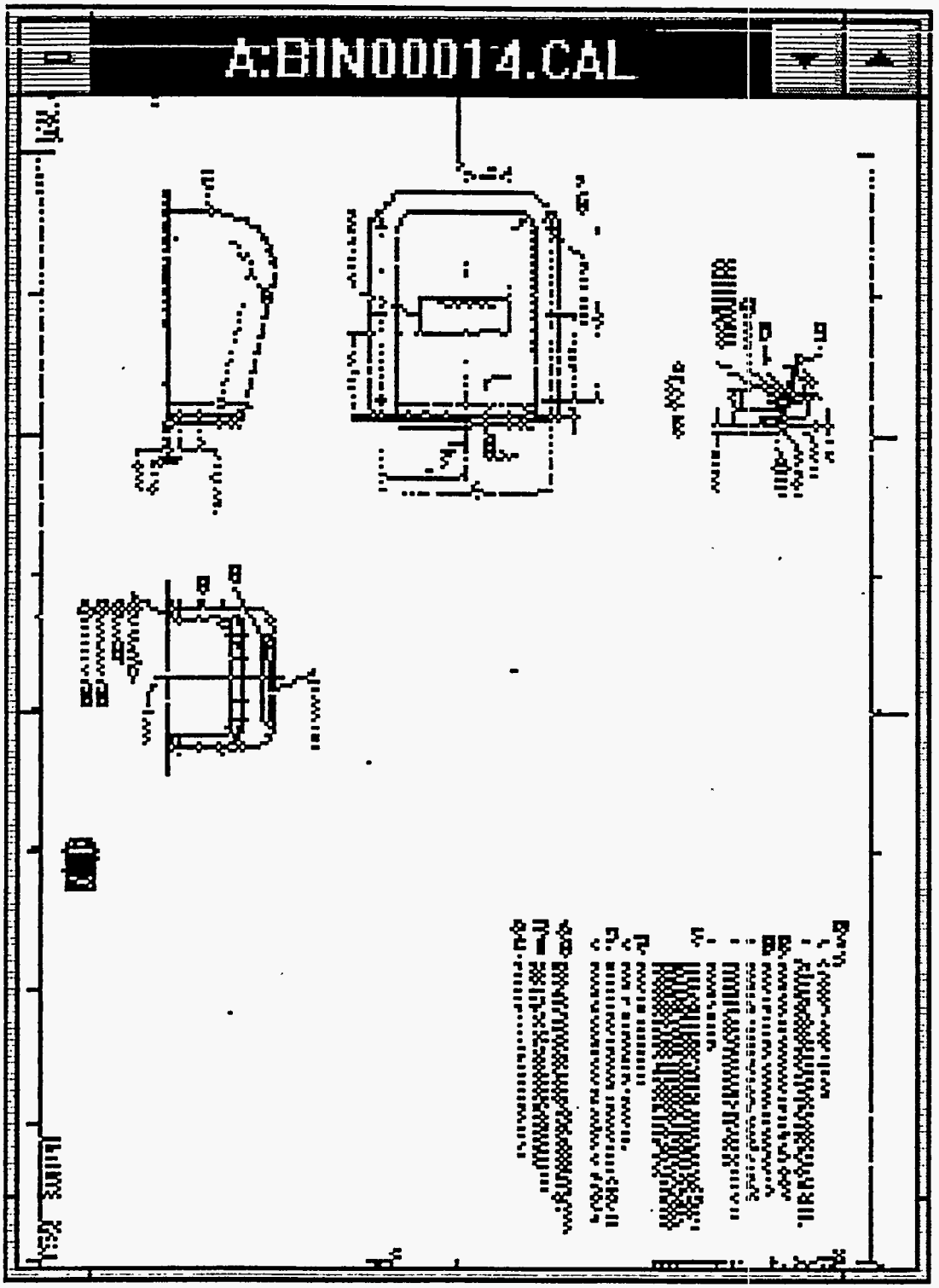
October 2, 1992 CALS/EDI Checklist

6.9 Additional Comments

MY UNIQUE SETUP WAS A 368 MACHINE, 40 MEG HARD DRIVE (80 MEG WITH STACKER), HOOKED TO HP LASERJET PRINTER. COULDN'T GET FILES TO LOAD WITH THIS SET UP (LARGE FILES, THAT IS, ANYTHING AFTER BIN000004.CAL). USED ENGINEERING COMPUTER, 486, 200 MEG DRIVE WITHOUT STACKER, HOOKED TO DOT MATRIX PRINTER. ABLE TO PRINT FILES BUT RESOLUTION UNSAT. DUE TO WORKING TWO BID PROPOSALS ($15-50MIL) UNABLE TO DEVOTE TIME TO SWITCH SETUP AND EXPERIMENT WITH OTHER COMBINATIONS. MAY BE ABLE TO MID-LATE FEB.


12
B
A


HiJaak for Windows
File Edit View Capture Setup Window Help
A:BIN00013.CAL
Click and drag to define a zoom rectangle.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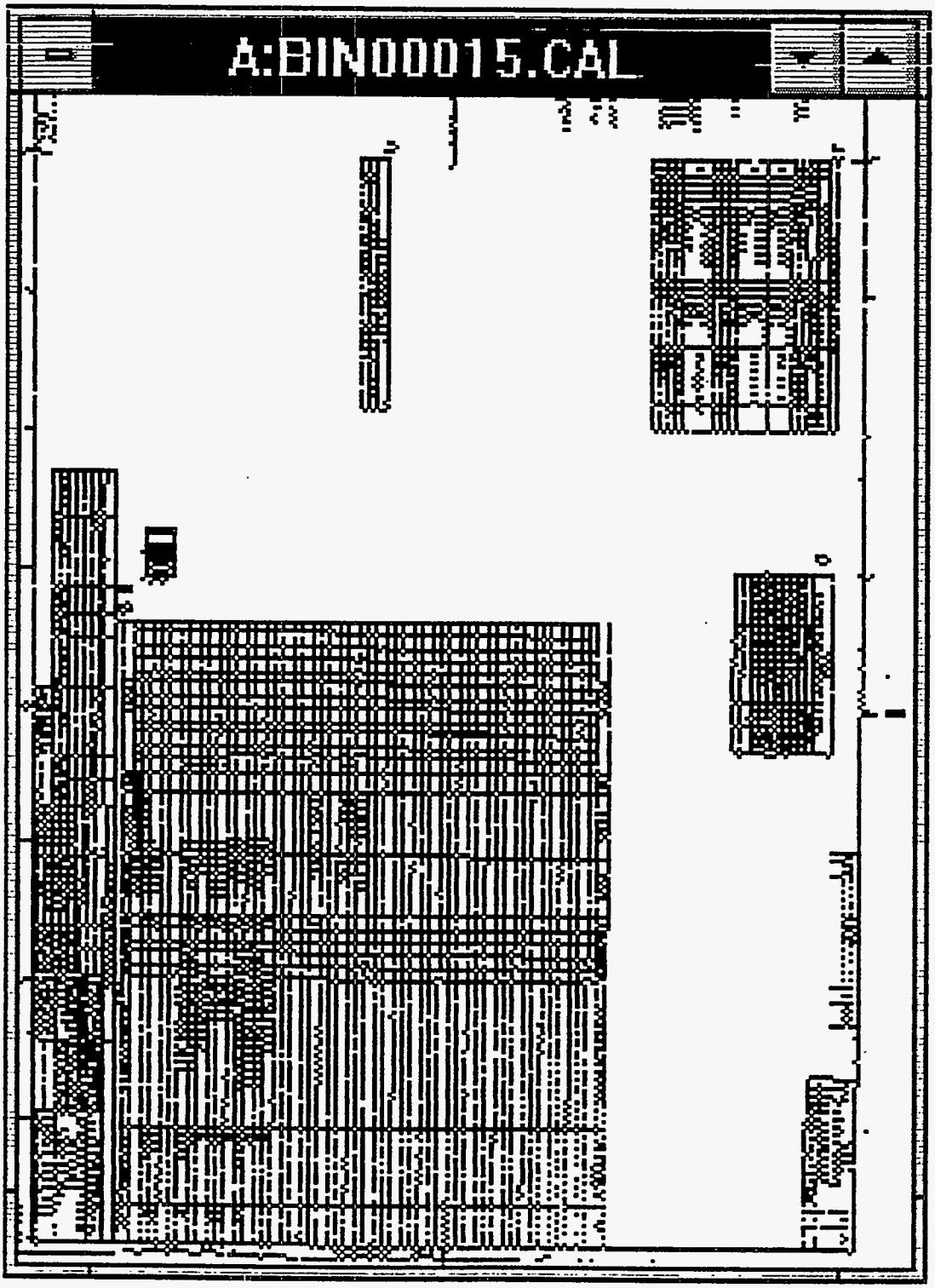
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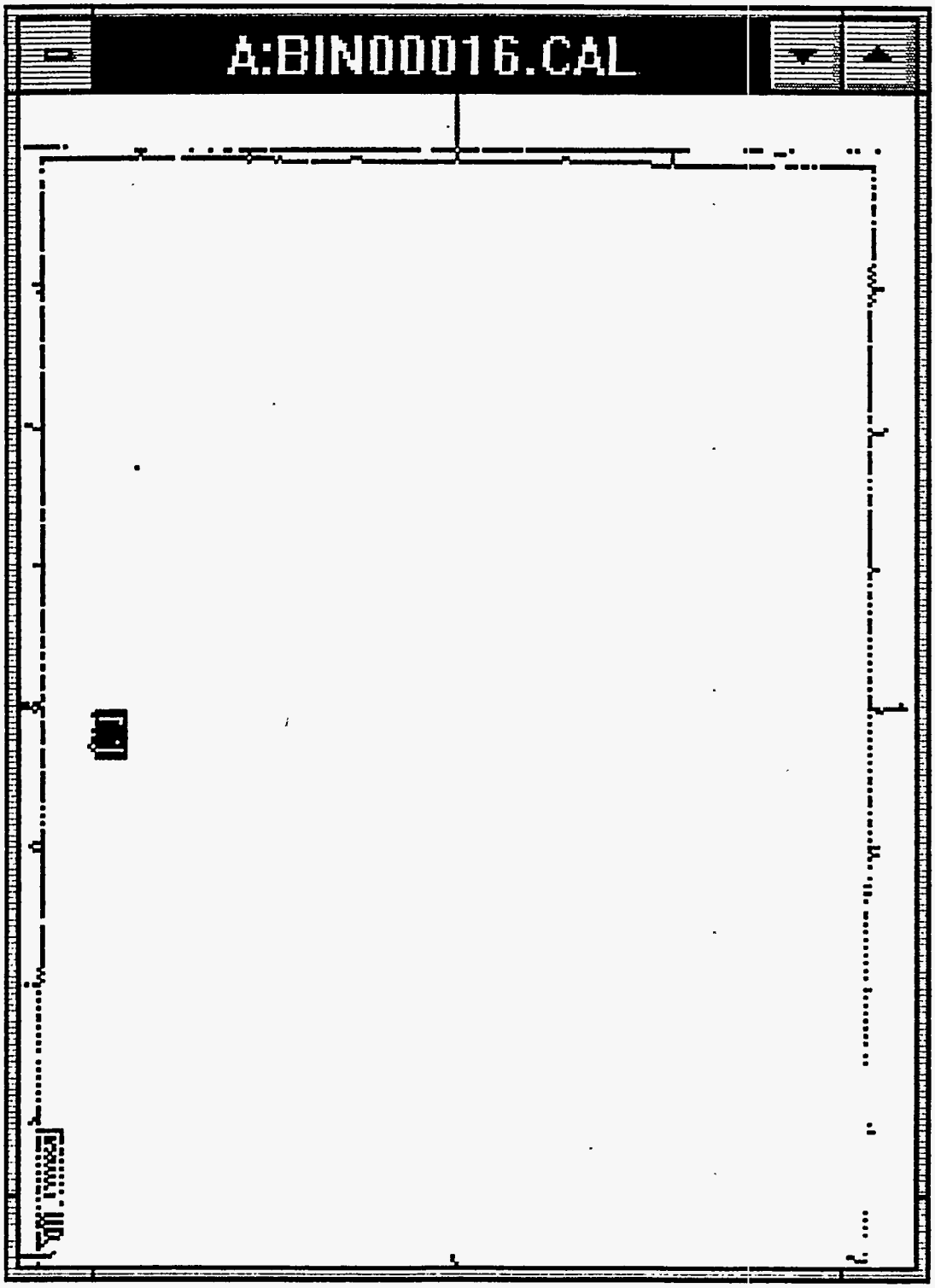
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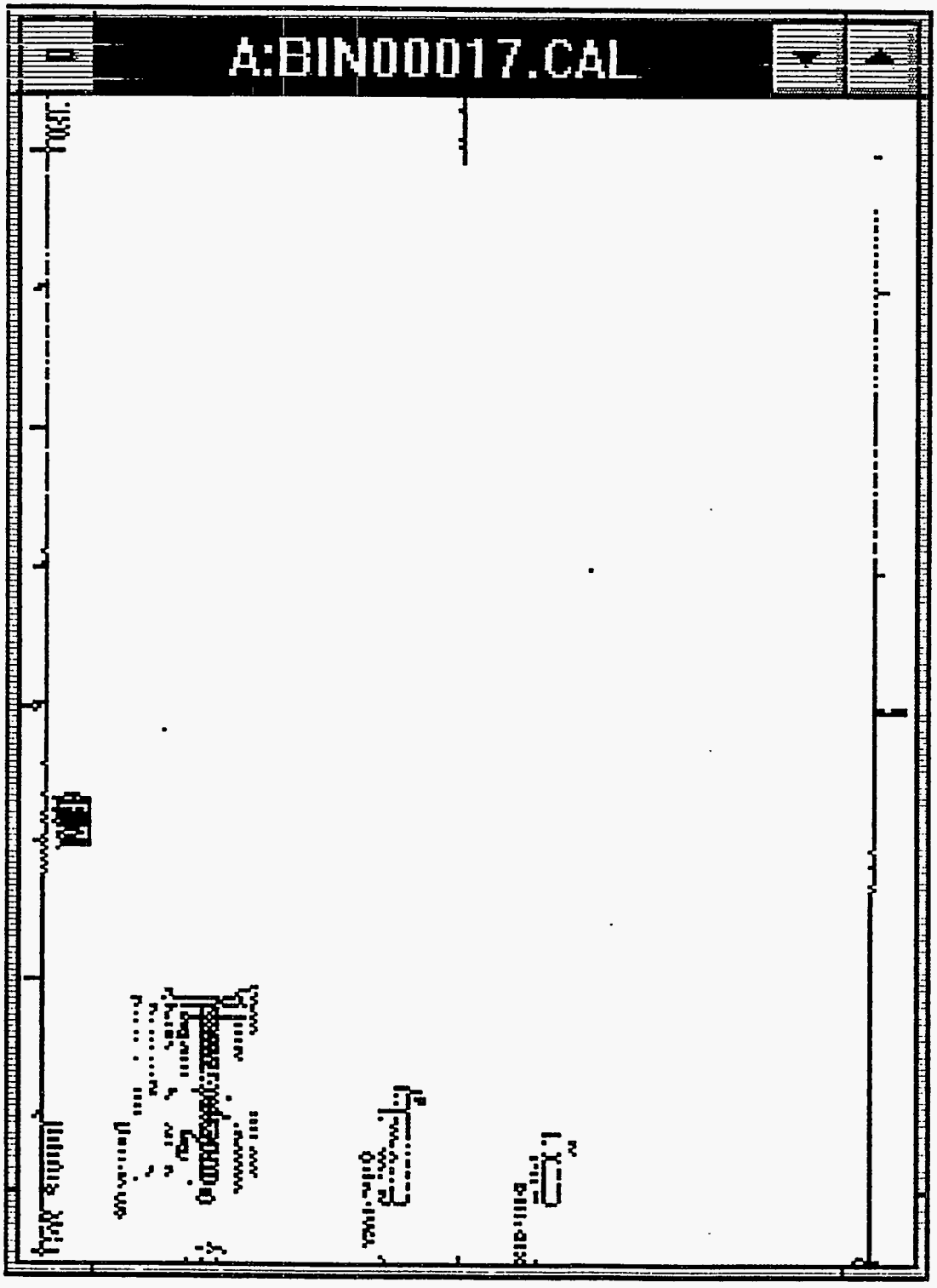
A:BIN00017.CAL

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2 Administrative Information

2.1 General

2.1.1 Date of transfer test._____

2.1.2 Purpose of transfer test._____

2.2 Sending organization

2.2.1 Organization name._____

2.2.2 Address._____

2.2.3 Contact name and telephone._____

2.2.4 TOM TAYLOR 813 878 3705
Computer hardware used. Include manufacturer and machine name.

2.2.5 Computer software used. (I.e., data repository system, 840 and 841 software, transmission software, etc.). Include software name, source, date, revision or version number, and if used as received or modified. Do not list operating systems or other support utility programs.

2.2.6 Briefly record procedures used to prepare the data.

4 Receiver

"Receiver" is identified as the contractor (end user), evaluator, co-op, or VAN. Each recipient of a transmission will record observations in the "Receiver" section, and the "End User," "Evaluator," "Co-op," or "VAN" section below, depending on whether the recipient is acting as a contractor, evaluator, co-op, or VAN for this test.

4.1 How were you notified that this procurement package was coming? (Give name of person/entity who notified you and method [e.g. phone, e-mail] of notification)

NONE

4.2 What preparations did you make to receive the data?

NONE

4.3 Describe your local hardware and software configuration that you used to receive the data (if different from the test plan):

4.4 How did you receive the data?

Medium		Protocol		Distribution	
Wire	✓	X.400		DDN	
DIAL		VAN	✓		
		FTP		Internet	
		Kermit		Phone	
Floppy				UPS	
Tape				US Mail	
				FedEx	

MAY-10-1993 11:27 FROM Tech Info Systems Program TO 81813785298 P.016/020

DRAFT

CALS/EDI Checklist May 10, 1993

4.5 For each transmission received, give the following:

Transmission #	Transfer Time (HH:MM:SS)	Date and Time (Local Time)	Weather Conditions

NOT RECORDED

4.6 Please comment on any other issues related to each transmission: (Disk full, line dropped, power failure, weather condition, etc.)

NONE

4.7 How did you verify the completeness of each solicitation package (840 and 841(s))?

N/A

4.8 What is your application (role) with this data?

End User ____
Evaluator ____
Co-op ____
VAN ✓

4.9 Were the files in each transmission adequately identified?

YES

4.10 Did you issue a 997 transaction ("Functional Acknowledgment") to the sender for each transmission you received?

NO

13

9 VAN

Be sure you have also filled in the "Receiver" section of this checklist.

9.1 What is your value-added strategy?

Public Bulletin Board System	
Store and Forward Mail	✓
Other	

9.2 Please describe any specifics:

ATTACHED

9.3 Describe the message routing mechanism used (E.g. UUCP, X.400):

SNA

9.4 Describe any unique required hardware and software:

9.5 How did the end user obtain the transaction sets from you?

DIAL

9.6 What methods did you use to verify data integrity?

SNA + ~~X.25~~ ASYNC CHECKING PROTOCOL

9.7 How did you verify that the end user received the intended transmissions?

ASYNCH CHECKING PROTOCOL

9.8 Provide a sample billing and services document for each user.

NA

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DRAFT

CALS/EDI Checklist January 14, 1993

CALS Test Network CALS/EDI Transfer Test Procedure Checklist

4 Receiver

"Receiver" is identified as the contractor (end user), evaluator, co-op, or VAN. Each recipient of a transmission will record observations in the "Receiver" section, and the "End User," "Evaluator," "Co-op," or "VAN" section below, depending on whether the recipient is acting as a contractor, evaluator, co-op, or VAN for this test.

4.1 How were you notified that this procurement package was coming? (Give name of person/entity who notified you and method [e.g. phone, e-mail] of notification)

Jim Burdick -- McClellan AFB via phone.

4.2 What preparations did you make to receive the data?

Loaded Supply Tech software, with the assistance of Tom Mellen. Dialed network and received the file that was in AEI's Mail Box.

4.3 Describe your local hardware and software configuration that you used to receive the data (if different from the test plan):

HARDWARE: 386 IBM P.C., 2 mega bytes RAM, 80 mega bytes hard disk. (Note: The hard disk only had 10 mega bytes available)

SOFTWARE: Supply Tech's Test Plan Software. Microsoft Window Software.

4.4 How did you receive the data?

Medium		Protocol		Distribution	
Wire		X.400		DDN	
		VAN	XX		
		FTP		Internet	
		Kermit		Phone	
Floppy				UPS	
Tape				US Mail	
				FedEx	

DRAFT

CALS/EDI Checklist January 14, 1993

4.5 For each transmission received, give the following:

SEE ATTACHED SHEET FOR RESPONSE TO 4.5.....

Transmission #	Transfer Time (HH:MM:SS)	Date and Time (Local Time)	Weather Conditions

SEE ATTACHED SHEET FOR RESPONSE TO 4.6.....

4.6 Please comment on any other issues related to each transmission: (Disk full, line dropped, power failure, weather condition, etc.)

4.7 How did you verify the completeness of each solicitation package (840 and 841(s))?

Does not apply. See comments.
Final acceptance was verified by Tom Mellen.

4.8 What is your application (role) with this data?

End User	XX (Thru VAN for Test)
Evaluator	
Co-op	
VAN	

4.9 Were the files in each transmission adequately identified?

4.10 Did you issue a 997 transaction ("Functional Acknowledgment") to the sender for each transmission you received?

AEI did not. Assume Tom Mellen did this task.

13

CALS Test Network CALS/EDI
Transfer Test Procedure Checklist

4.5.....AEI did not successfully receive transmission records as originally set up in the mail box. The unsuccessful transaction was caused by the fact AEI only had 10 megabyte storage available. The files in the mail box were greater than AEI's available storage capacity.

Four (4) attempts were made trying to retrieve the mail box data. Each time, AEI would receive up to a point and then the program would indicate an error.

On February 4, 1993, Tom Mellen contacted Jim Burdick and asked him to create a small file and send to AEI's mail box for test purposes. The sample file was approximately 2 megabytes as indicated on the Supply Tech software. REF: #F4260092Q31328 --- Demo 841

AEI was successful in receiving the small file. The file was not printed as our printer was not set up to read graphics.

The small file was not formated to transmit information back to McClellan; therefore, AEI did not complete the "send" poriton of the test plan.

AEI contacted Tom Mellen for functional acknowledgment. Based on the fact AEI received the small file, Tom considered AEI's transaction as a functional acknowledgment.

In order to effectively participate in EDI, AEI is considering purchasing a personal computer that will be solely dedicated to EDI.

CALS Test Network CALS/EDI
Transfer Test Procedure Checklist

4.6.....AEI tried unsuccessfully four (4) times to receive data through VAN before it was determined there was not enough storage available on our hard disk.

Approximately twelve (12) hours communication telephone time was incurred.

AEI would like to suggest a procedure that would allow the user to know the file size before opening the communication line. We realize this is not feasible from a software standpoint; but having a general idea of the file size would have been helpful during the test stage.

```
DOD/McCLELLAN AFB TECH INF v3022 921028 (MCCLELLAN - 930202-09221776)
Date: 02/04/93     Time: 09:03
Page:    1

Warning: Transaction and Overlay versions do not match.

      SECURITY LEVEL CODE: 90:Government Non-Classified
      TRANSACTION PURPOSE: 00:Original

   REFERENCE # TYPE                                  REFERENCE #
   KS:KS                                             F4260092031328

                    ------------------------------------
                    DIRECTORATE OF CONTRACTING
                    ------------------------------------
                    DEMO-841

          VERSION IDENTIFIER: B
SPECIFICATION # or DESCRITION: MIL-R-28002

FILE REMARKS
 12w76467.edl

                          FILE SIZE     BINARY DATA
                    ----------------    ------------------------------
                                6901    BIN00001.DAT

          VERSION IDENTIFIER: B
SPECIFICATION # or DESCRITION: MIL-R-28002

FILE REMARKS
  12w76467.txt

                          FILE SIZE     BINARY DATA
                    ----------------    ------------------------------
                                 803    BIN00002.DAT

          VERSION IDENTIFIER: B
SPECIFICATION # or DESCRITION: MIL-R-28002

FILE REMARKS
  g001r018.
           'CAL  <- rename
                          FILE SIZE     BINARY DATA
                    ----------------    ------------------------------
                               94592    BIN00003.DAT

          VERSION IDENTIFIER: B
SPECIFICATION # or DESCRITION: MIL-R-28002

FILE REMARKS
  g001r019.CAL
```

```
AMERICAN ELECTRONICS INC:
DoD/McCLELLAN AFB TECH INF v3022 921028 (MCCLELLAN - 930202-09221776)
Date: 02/04/93   Time: 09:03
Page:  2

                        FILE SIZE    BINARY DATA
                       ------------  ------------------------------
                           108288    BIN00004.DAT

          VERSION IDENTIFIER: B
SPECIFICATION # or DESCRITION: MIL-R-28002

FILE REMARKS
  c001r022.CAL

                        FILE SIZE    BINARY DATA
                       ------------  ------------------------------
                           358656    BIN0C005.DAT

          VERSION IDENTIFIER: B
SPECIFICATION # or DESCRITION: MIL-R-28002

FILE REMARKS
  c001r023.CAL  <-- Rename

                        FILE SIZE    BINARY DATA
                       ------------  ------------------------------
                            35584    BIN00006.DAT


*** END OF REPORT ***
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APPENDIX F Report of Small Business Co-op CALS-EDI Test Activity

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CALS/EDI TEST WITH SMALL BUSINESSES

Services rendered by Small Business Coop Center in transfer of air force technical procurement bid set data to small businesses using CALS and EDI

10 May 1993

Submitted to
Lawrence Livermore National Laboratory
Livermore, California

Submitted by

CALS Shared Resource Center
Brigham Young University
Provo, Utah

CALS/EDI TEST WITH SMALL BUSINESSES

Report of services rendered by Small Business Coop Center in transfer of air force technical procurement bid set data to small businesses using CALS and EDI

10 May 1993

1. INTRODUCTION AND BACKGROUND

This report describes the role of the CALS Shared Resource Center (CSRC) at Brigham Young University (BYU) along with LLNL, and SMALC in conducting a full-scale test to transfer Air Force technical procurement bid set data to small businesses using CALS and EDI technology and standards.

In this test, CSRC performed the function of a Small Business Coop Center to serve and assist small businesses. In this role, CSRC monitored and received CALS transaction sets from LLNL and SMALC using a Value Added Network (VAN), performed "value-adding and brokering" services of process planning, cost estimating, and production scheduling, and then passed the transaction set to small businesses who have production capabilities and capacity to respond to the procurement requirements.

CSRC researchers have a history of CALS involvement. They have been tracking CALS for a number of years and are familiar with IGES, PDES, and with DoD sponsored programs that predate CALS, such as AF-CAM, I-CAM, and PDDI. CSRC has been a member of the CALS Test Network since June 1989.

Previously the CSRC has developed and demonstrated a Parts-on Demand System (PODS) Focused Factory concept that serves as a prototype model for distributed manufacturing. Each cell of the Focused Factory (one for sheet metal, turning, prismatic parts, etc.) can be thought of as representing a specialized "small business" manufacturer. CSRC has successfully passed product data (including design data, manufacturing data, job orders, parts lists, etc.) among its operative cells using its own CIM Information System (CIS).

Dr. Dell K. Allen, Director of CSRC and of the BYU CIM Center of Excellence, has assisted in the creation of small businesses which in turn helped in the development of the PODS concept. A cooperative has also been formed (the Manufacturers Industrial Cooperative - MIC) comprising about 10 small factories in Eastern Utah to demonstrate the distributed mode of the PODS Focused Factory concept in rural communities. These small factories represent the 370,000 U.S. manufacturing firms with fewer than 100 employees. It is estimated that utilization of small firms as distributed nodes of a PODS Focused Factory will cut the delivery price for parts to about half the cost of parts produced by traditional U.S. manufacturing methods.

CSRC has now taken the next step by transferring procurement data to small firms as part of the current CALS/EDI test. This report describes the results of that effort.

2. OBJECTIVE

The objective of this test was to evaluate the effectiveness of using CALS data within the context of the DoD's EDI-based standard approach to electronic commerce in procurement. The focus of this phase of the test was on automating Air Force CALS-specified procurement activities with small businesses. Specific areas in which CSRC was involved were:

1. Receive from electronic mailbox a complete procurement package using ANSI X.12 transaction sets 840 (Request for Quotation) and 841(Specifications/Technical Information) from SMALC via the LLNL VAN hub

2. Download transaction sets from mailbox using Macs and IBMs. Convert graphic files using Hijack 3.1 on a PC. View and print information in hard-copy for evaluation and documentation purposes.

3. Perform in small business coop center such value-adding processes as cost estimating, production scheduling, and creating a process plan. Create a transaction set and upload to electronic mailbox.

4. Visit each of the small businesses and assist them by:
   a. Explaining the purpose of the test.
   b. Installing software and configure it.
   c. Downloading information to the small business from an electronic mailbox.
   d. Converting and viewing the information, making appropriate decisions about bidding, and if the decision is affirmative, respond with an appropriate quotation

3. PARTICIPANTS

a. CAM Software Research Center
   265 Crabtree Technology Building
   Brigham Young University
   Provo, Utah 84602
   Contact: Dr. Dell K. Allen, Director
   (801)378-3895 office
   FAX: 801-378-7575

   Hardware: IBM PS/2 model 35, running IBM Dos 5.0 with 8 Mbytes memory, 80 Mbyte hard disk, 3-1/2" floppy drive, dual platter 90 Mbyte Bernoulli drive, Hayes ultra 9600 baud modem
   MAC II, 5 Mbytes memory, 40 Mbyte hard drive, 3-1/2" HD floppy drive
   Software: Supply Tech STX, MS Windows 3.1, Hijaak 3.1, MacEDI

b. Small manufacturing firm #1
   Viking systems, Inc.
   232 West 1250 North
   American Fork, UT 84003

Contact: Rob Cook
(801)756-5307 or 649-1211 office

Hardware: IBM clone 386, running MS-DOS 5.0, with 4 Mbytes RAM, 80 Mbyte hard disc, VGA monitor

c. Small manufacturing firm #2
Bills Sheet Metal
8141 Airport Rd.
Huntington, UT 84528
Contact: Bill Huntington
(801)653-2425 office

Hardware: IBM PS/2 model 35, running IBM DOS 5, with 8 Mbytes RAM, 80 Mbyte hard disc, 3-1/2" HD floppy disc, SVGA monitor

Note: The original hardware of this company was an 8088 with 256 Kbytes Ram, no COM or LPT ports and an EGA monitor; this was found to be completely insufficient for the test and therefore a P/S2 from the CSRC Coop was used at this site during the test.

d. Small manufacturing firm #3
Industry West Electronics, Inc.
270 N. Geneva Road
Orem, UT 84057
Contact: Darold Francis
(801)226-1000 office
(801)226-3268 fax

Hardware: IBM clone 486, running MS-DOS 5.0, 4 Mbytes RAM, 40 Mbyte hard disk 3-1/2" HD floppy disc, VGA monitor

e. Small manufacturing firm #4
Kitco, Inc.
1625 N. Mountain Spring Parkway
Springville, UT. 84663
Contact: Randy Finley
(801)489-3627 ext. 2036 office

Hardware: IBM clone 386, running MS-DOS 5.0, with 4 Mbytes RAM, 120 Mbyte hard disc, Hayes ultra 9600 baud modem, SVGA monitor

Software at all of the sites was the same as that used at the CSRC Coop Center. This software was installed on a 90 Mbyte Bernoulli cartridge and attached to the specific hardware at each site using a 90 Mbyte portable Bernoulli Drive. This configuration reduced setup and installation time considerably and provided for faster demonstration and testing of the EDI transaction.

4. TEST PROCEDURE AT CAM SOFTWARE RESEARCH CENTER

The first step in the test was to download the transaction from the SMALC via the LLNL VAN hub. The VAN hub was not effective in the test so it was decided that SMALC would send the information directly through an AT&T electronic mailbox.

The transaction sets were downloaded using the MAC/EDI software for the MAC and STX for the IBM PC. The graphic files from the transaction sets were converted from CALS to PCX format using Hijaak 3.1 and they could then be viewed using a PCX viewer, like PC Paintbrush in MS Windows. The files, both text and graphic, were then printed in hard-copy format. Copies of the printed files are provided in Appendix.
The hard copy files were reviewed and used for cost estimating, production scheduling and for creating a process plan. These new files were entered into the computer and made part of an new transaction set with the CALS drawings and the text files.

The new transaction set was uploaded to another AT&T electronic mailbox to be downloaded by the small manufacturing firms. When uploading the transaction sets the STX software had to be used. We could not create our own transaction set using the MAC/EDI software.

5. TEST PROCEDURE AT THE SMALL BUSINESSES.

The four tests with small businesses located in rural communities were carried out over a three-week period.

The first test was at Viking Systems, Inc., located in American Fork, Utah. We met with Rob Cook and explained the purpose of the test. The drivers for the portable Bernoulli drive were loaded and his system was configured to receive the data. The AT&T mailbox was accessed and the files were downloaded. The data was received in 251 byte blocks which took 1.5 hours using Mr. Cook's 2400 baud modem. Just when the data had finished translating, the STX software crashed and we were unable to recover the data that was downloaded. It was later realized that the files and buffer limits were not set right in the config.sys file. Files must be set to 99 and buffers must be set to 30 or STX is unable to parse the incoming transaction set. Because of this error we were unable to view the transaction set, even though it was successfully downloaded, but was used as a learning experience for the future test sites.

The second test was conducted at Bill's sheet metal on December 5, 1992, in Huntington, Utah, a small rural community about a 2-hour drive from BYU. We arrived at the test site and explained the purpose of the test to Mr. Huntington and his wife. As we tried to install the Bernoulli drive we realized that the IBM 8088 PC system Mr. Huntington had was insufficient to complete the test since it had no COM or LPT ports in which we could connect the modem. Also, the EGA monitor would not support the PCX viewer. Instead of aborting this test, we used one of the CSRC's computers we had brought along as a back-up. The transaction set was downloaded successfully using the CSRC's 9600 baud modem. The files were converted to PCX format using Hijaak 3.1 and then viewed using PC Paintbrush. The total length of this test was 4.25 hours.

The third test was with Industry West Electronics, Inc., located in Orem, Utah. Upon arrival at the test site we explain the purpose of the test. We then proceeded to install the

Bernoulli drive and connect the modem. There was a problem connecting the modem because their phone system has three lines and only their phone could access the different lines. The problem was corrected by removing the handset from the base and connecting the modem into the handset jack. The phone line was then selected from the base when the modem needed to be used. The transaction set was then downloaded successfully, the CALS files were converted to PCX files, and the graphics and text files were viewed.

The final test was conducted with Kitco, Inc. This test was conducted on December 8, 1992. Upon arrival the purpose of the test was explained to Randy Finley, Matt Ward, Michael Nestor and arrangements made to conduct the test. The computer used was a PC386, running MS-DOS 5.0, with 4 Mbytes RAM, 120 Mbyte hard disc, SVGA monitor. The drivers for the portable Bernoulli drive were loaded and his system was configured to receive the data. The AT&T mailbox was accessed and the files in the 841 transaction set were downloaded. The data was received in 251 byte blocks which took 36 minutes using the Hayes ultra 9600 baud modem. The data was successfully down-loaded and viewed. Parsing of the data required 1:44 min., conversion of BIN files to PCX drawing format for viewing required 1:30 min., and bringing the files up in Windows with Paintbrush for viewing required 1:31 min.

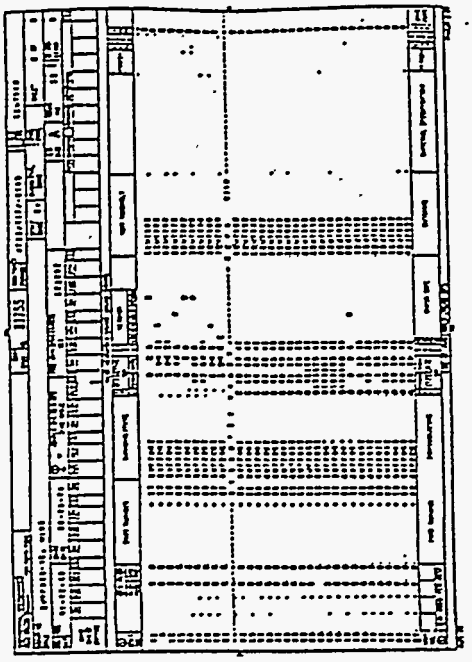
6. CONCLUSIONS AND SUGGESTIONS

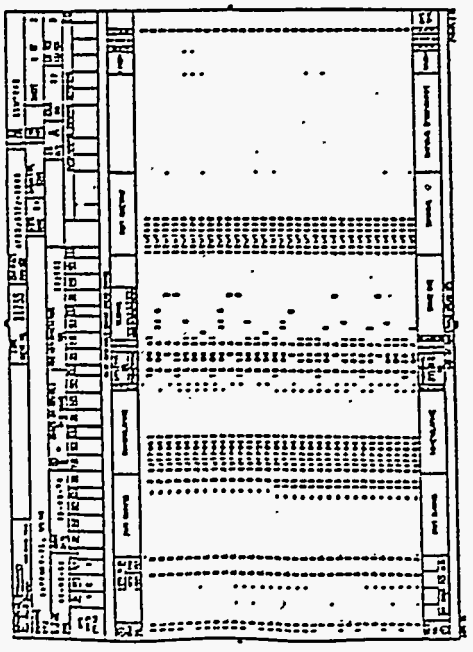
The general conclusions from the CALS/EDI test with small businesses can be summarized as both promising and positive. Small businesses were very willing to take time from their busy schedules to participate in the tests. Likewise suppliers of hardware and software used for the test were very helpful in all respects.

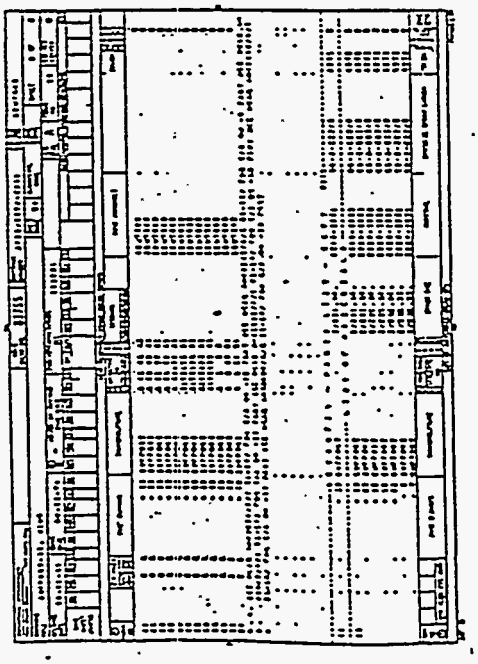
This test proved that technical data from the EDCARS data base located at McClellan AFB in Sacramento California could be readily accessed by small businesses in rural communities using available CALS/EDI technology. Relatively small files were used in the test, and with larger files, it would probably be necessary to transfer files at night to avoid tying up small business computer resources during the daytime.

For very large files, three suggestions are offered: (1) use removable magnetic media or CD-ROM for transferring large graphic and technical files by express mail, (2) install higher speed electronic communication lines and modems, or (3) investigate the use of side bands on microwave or satellite TV transmission systems. We found Internet, which runs at 56kb/sec. to be a useful backbone system that could be connected via high-speed lines with central hubs and thence to small businesses using conditioned lines.

APPENDIX







A1

ENGINEERING CHANGE ORDER / REQUEST

1. ECO NO	ECO PAGE	2. DWG TITLE	3. DWG FSCM NO	4. DWG NO
B9C0610	1 OF 1	INTERPRETATION DOCUMENT — DRAWING, LM, & ECA	81755	127001

5. TYPE OF ECO	6. REASON(S) FOR CHANGE	7. NEXT ASSY	8. USED ON	9. OPR FSCM NO	DWG SIZE	DWG SHEET(S) AFFECTED	LATEST DWG REV LTR
[X] ADVANCE	[ ] ERROR CORRECTION		F-111	98749	E	1	J
[ ] DEVIATION	[ ] DESIGN CHANGE						
[ ] CHANGE NOTICE	[X] DRAWING CLARIFICATION						
[ ] LIAISON	[ ] UPDATE DRAWING						
[ ] CHANGE REQUEST							
[ ] INFORMATION							

11. DOCUMENTS AFFECTED, TD # / TCTO # / SPEC / OTHER	14. CORROSION CONT MON	SYMBOL	DATE
	NA		
	15. NDI	SYMBOL	DATE
	16	SYMBOL	DATE
	17. DWG CHANGED BY	SYMBOL	DATE
	18. CHANGE CHECKED BY	SYMBOL	DATE
	19. ECO / DWG RELEASED BY	SYMBOL	DATE

10. DISPOSITION OF SPARES	OTHER REMARKS	12. ECO PREPARED / REQUESTED BY	SYMBOL	DATE	13. ENGR APPROVAL	SYMBOL	DATE
[ ] REWORK	PORTIONS OF FZM-12-056 MAY BE INCONSISTENT WITH NLO'S, TOOLS, WHITE MASTERS.. ETC	DAVID BEIL	MMKR(4)	6/30/89	R E Ahrens	MMKR(4)	6/30/89
[ ] MODIFY			PHONE 8-5533			PHONE 3-7533	
[ ] SCRAP							
[ ] REPLACE							

20. DESCRIPTION OF CHANGES (WAS, IS) / REMARKS

ADD NOTE 16 AS FOLLOWS:

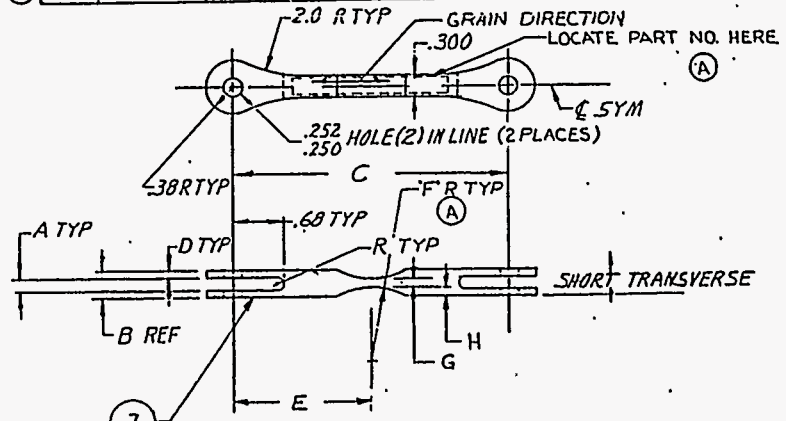
16. GENERAL DYNAMICS SPECIFICATION FZM-12-056 SHALL NOT BE APPLICABLE TO GOVERNMENT PROCUREMENT OF SPARE PARTS.

ACTION: WAS, IS A = ADD R = REMOVE	QTY REQD PER DASH NO	SYM	NOMENCLATURE	FSCM	IDENTIFYING NO	MATERIAL / SPECIFICATION	ZONE	FIND NO
			PARTS LIST CHANGE(S)					

AF FORM MAY 80 2600 PREVIOUS EDITIONS ARE OBSOLETE.

CW

DASH NO	A	B REF	C	D	E	F RAD	G	H
-7	.181 +.005 -.000	.381	3.80	.100				
-9	.181 +.005 -.000	.381	3.27	.100				
-11	.181 +.005 -.000	.381	2.70	.100				
-13	.151 +.005 -.000	.311	2.55	.080				
-15	.151 +.005 -.000	.341	2.34	.080				
-17	.151 +.005 -.000	.311	2.06	.080				
(B) -19	.181 +.005 -.000	.381	2.70	.100	1.35	1.00	.100	.140



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
A	INC ECN 6T310	7-20-65	
B	INC ECN 6 1A17	7-21-65	

4. ENGR REF ONLY. INITIAL REL CALC WT OF-715 .052 OF-915.046 OF-1115.039 OF-1315.031 OF-1515.029 OF-1715.026
3. PENETRANT INSPECT PER MIL-I-6866, TYPE I.
(A) 2. BREAK EDGES .015R OR CHAMFER 45° X .015
1. ALL SURFACES MACHINED PER M001, TYPE II.
NOTES (EXCEPT AS SHOWN)

FOR LIST OF MATERIALS AND USAGE DATA SEE DOCUMENT SAME NUMBER PREFIXED LH

INSTALL RIVETS PER

MARK PARTS PER FPS 1043 CLASS 2A

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES
LINEAR TOL XX ± .03, XXX ± .010
ANGULAR TOL ± 0°30'
125 ALL MACH. SURF. REF MIL-STD-10
CONTRACT NO. AF 33/657/-8260

TOOL		7-21-65
PAINT	F.A. Crain	7-21-65
GR ENGR	S.W. Simpson	7/20/65
GR ENGR		7/21/65
WEIGHTS	R.S. Sadler	7-20-65
STRESS		7/21/65
CHECK	J.G. Hull	7/21/65
DESIGN	M. Baird	7/21/65
DRAFT	M. Baird	7/21/65
STRESS	E.J. Hammond	7/21/65
	Donm	8-4-65

DELORAK 8-5-65
LEAD 7-21-65

GD GENERAL DYNAMICS | FORT WORTH
FORT WORTH, TEXAS

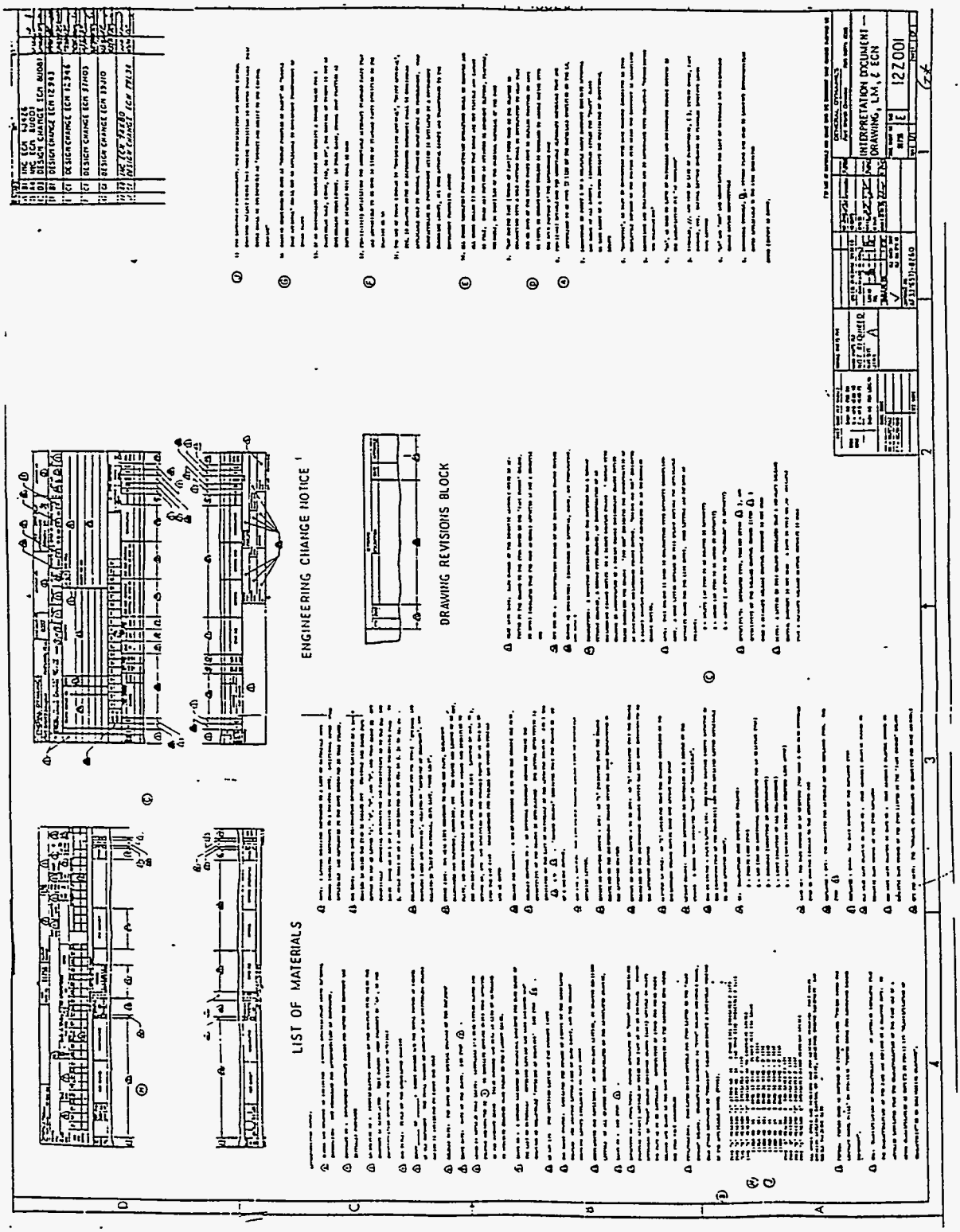
SUPPORT-TE, WING

CODE IDENT NO	SIZE	
81755	C	12W7646
SCALE 1/1		SHEET 1 OF 1

REPLACES 12W2646, 12W2676, 12W5895, 12W5896 T512

PREPARED BY GD/CONVAIR

A3


ENGINEERING CHANGE NOTICE
DRAWING REVISIONS BLOCK
LIST OF MATERIALS
INTERPRETATION DOCUMENT — DRAWING, L.M. & ECN
122001

A4

APPENDIX G Log of Travel, Meetings, and Briefings

DATE			LOCATION	PURPOSE
7	May	92	LLNL	Test Plan
11	May	92	Brigham Young University	Test Plan - Coordination
12	Jun.	92	LLNL	Test Plan
*22	Jun.	92	Washington DC	EC/EDI Conference
1	Jul.	92	SM-ALC	ANSI X12 841
13	Jul.	92	Kent Associates, Precision Manufacturing of San Antonio	Participating Contractors
*11	Aug.	92	Los Angeles, CA	SCCIG
*23	Aug.	92	San Francisco, CA	TechDoc/TM '92 Conference
*16	Sept.	92	Los Angeles, CA	SCCIG
19	Oct.	92	Airesearch, American Electronics, Inspirnetics, Llamas Plastics	Participating Contractors
*26	Oct.	92	WPAFB, OH	Briefing
2	Nov.	92	Moda Magnetics, Micro Systems	Participating Contractors
*16	Nov.	92	Denver, CO	AF EC/EDI Focal Point Meeting
6	Dec.	92	San Diego, CA	CALS EXPO
* 5	Jan.	93	Charlotte, SC	NAVY EC/EDI Focal Point Meeting
*21	Feb.	93	Washington DC	Contracting Exec Seminar
3	Mar.	93	LLNL	Test Report
* 8	Mar.	93	Scott AFB, IL	HQ AMC
*16	Mar.	93	Scott AFB, IL	AF EC/EDI Focal Point Meeting
* 3	May	93	Hanscom AFB, MA	CALS Focal Point Meeting

* indicates briefings requested or required, but not directly associated with the test itself

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APPENDIX H Copies of SM-ALC Newsletters

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CALS/EDI Pilot Test of Technical Data Transmission at SM-ALC

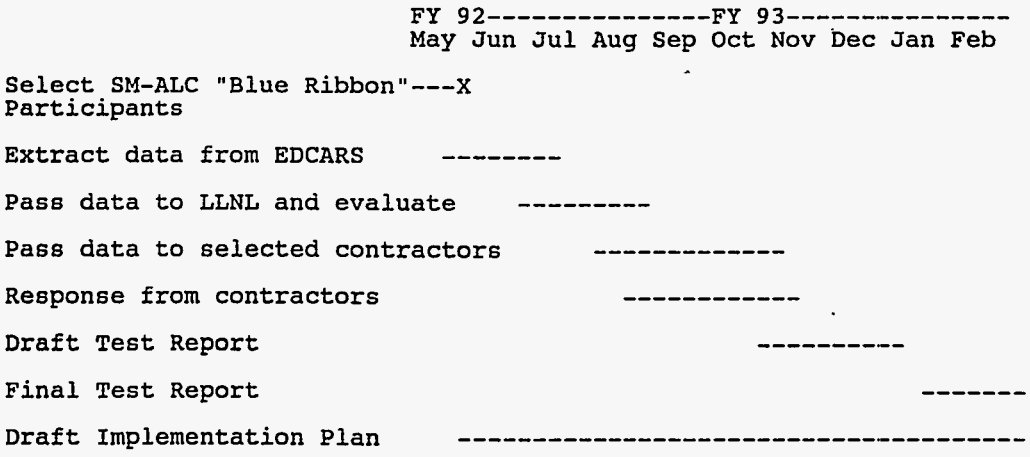
PROJECT NEWSLETTER AND STATUS UPDATE **4 JUN 92**

DLA designated the Air Force as the test bed for implementation of EC/EDI within DOD. SM-ALC is the lead pilot organization for implementation and test of the ANSI X.12 841 transaction set, which allows digital transmission of technical drawings from one site to another.

In Oct-Nov 91 the first phase of the test was performed here at Mcclellan AFB. We successfully transmitted digital data from SM-ALC via Lawrence Livermore National Laboratory, Livermore, CA (LLNL), which acted as an Intelligent Gateway Processor (IGP), to an AT&T facility in New Jersey, which acted as a Value Added Network (VAN) information processor, and ultimately to TRW (the contractor) in Redondo Beach CA.

Phase two of the test began in May 92 and should be completed by Dec 92. This test will expand upon the phase one test to include three VANs and eight SM-ALC "Blue Ribbon" contractors, plus a small business co-op located at BYU with five additional small business contractors. Areas to be examined include: (1) direct electronic extraction of procurement-related Computer-aided Acquisition Logistics Support (CALS) formatted data from EDCARS at SM-ALC; (2) Electronic Data Interchange (EDI) transfer of a complete procurement package to the LLNL IGP; (3) EDI distribution from the VANs to selected contractors, including the small business co-op center; (4) capture and display of the procurement package by the contractors; and (5) an EDI response by the contractors back to SM-ALC.

Our proposed schedule for completion of phase two of the test follows:



MILESTONE STATUS

7 May 92 - Letters sent to SM-ALC "Blue Ribbon" contractors requesting participation
7 May 92 - EDI Translator Software vendors selected: Supply Tech, Inc (PC-DOS), Digit Software (Macintosh), and St Paul (UNIX)
27 May 92- Eight SM-ALC "Blue Ribbon" contractors selected: Kent Associates, Inspirnetics, Micro Systems Inc, Moda Magnetics Corp, Allied Signal Airresearch, American Electronics, Precision Mfg of S.A., Llamas plastics Inc,

Five BYU co-op contractors selected: Kitco Inc, Bill's Metal Products, Industry West Electronics, Aerotran, Defense Electronic Systems
3 Jun 92 - Three VANs selected: AT&T, IBM, and MCI

UPCOMING EVENTS

12 Jun 92 - VAN/Software contractor meeting at LLNL to review test plan
25 Jun 92 - Scheduled to brief test program at EC/EDI Conference, Washington DC

ITEMS OF INTEREST

Government Computer News, 27 April 1992, "Tests Show EDI Works With CALS [at SM-ALC]"
Cals Journal, June 1992, "EDI with Technical Data - A Full Scale Test [at SM-ALC]"
Contract Management, June 1992, "Implementing DOD's Standard Approach to Electronic Commerce in Procurement"

POINTS OF CONTACT

Dee Smith - Project Manager
Maj Ken Richardson - SM-ALC EDI Implementation Program Manager
Jim Burdick - Lead Systems Technician
Mike Patterson - Lead Buyer

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Sacramento Air Logistics Center - SM-ALC
McClellan AFB CA
CALS/EC/EDI Test - Transmission of Technical Data
ANSI X.12 (841) Transaction Set

AUGUST '92 NEWSLETTER

Since our initial release, a change has occurred pertaining to the Value Added Networks (VANs) participating in our test. The present VAN participants will be AT&T and IBM.

14-15 Jul 92 SM-ALC project team met with Precision Manufacturing, 4546 Sinclair Road, San Antonio TX 78222 and Kent Associates Inc, 900 Fifth Ave, Mansfield TX 76063. The purpose of the meeting was the preliminary preparation to begin their tests scheduled for Aug 92.

23-24 Jul 92 SM-ALC hosted the ANSI X12 841 transaction set mapping requirements. Attendees were government and contractor personnel representing HQ AFMC/PKS, HQ AFMC/PKL, SM-ALC/PK, LLNL/CTN, LLNL/EC/EDI, IBM, Supply Tech Software, St. Paul Software, TRW, and Logistics Management Institute (LMI). The result of the meeting provided the draft of the 841 mapping requirements to be proposed for utilization within DoD. Finalization of the draft will be circulated to DoD agencies for coordination, and submitted to the ANSI board for approval.

The technical engineering test data from the SM-ALC EDCARS repositories will represent three bid sets. Our statistical analysis generated the size of these bid sets to be .75, 2, and 13 mega-bytes respectively. These bid sets will be consistently utilized through all phases of future tests.

31 Jul 92 Bid sets were successfully compiled in EDCARS and transmitted to the SM-ALC Site Hub (AT&T 3B2) and subsequently will be transmitted to LLNL, and Brigham Young University (BYU).

SM-ALC PROJECT TEST

Dee Smith - Project Manager
Charlene Ivey - Test Program Manager
Jim Burdick - Lead Systems Technician
Michael Patterson - Lead Buyer

SM-ALC FUTURE IMPLEMENTATION

Maj Ken Richardson - Implementation Program Manger
Cynthia Slife - Training Manager

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Sacramento Air Logistics Center - SM-ALC
McClellan AFB CA
CALS/EC/EDI Test - Transmission of Technical Data
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SEPTEMBER '92 NEWSLETTER

In August the technical engineering data extracted from the EDCARS repository were placed on the SM-ALC site hub (AT&T 3b2). These CALS drawings were put into a 841 transaction set and transferred by the DDN (Internet) from SM-ALC to LLNL with the purpose of measuring network and system performance. These files were also transferred to the BYU co-op.

The Supply Tech software was installed and tested at Kent Associates, Inc. in Mansfield, Tx and at Precision Manufacturing in San Antonio, Tx by Supply Tech, Inc. Ann Arbor, Mi. Test drawings were sent from Supply Tech to both test contractors.

AT&T VAN accounts were established and tested between SM-ALC and the VAN as well as between the VAN and these first two test contractors and the BYU co-op. There have been intergration problems between the SM-ALC site hub and the Hayes 9600 baud modems. Resolutions are being worked.

The first printed draft of the DoD EDI Convention ASC X12 Transaction Set 841 Specifications/Technical Information baseline 19 August 1992 was reviewed 31 Aug - 1 Sep by government and contractor staff. This draft with handscribed changes will be used by all four software companies for mapping the 841 transaction set used during the test. Any changes necessary as a result of the test will be incorporated into the final DoD EDI Convention.

The Logistic Management Institute (LMI) provided the DoD EDI Conventions for the 840 Request for Quotation transaction set as well as both the 997 Functional Acknowledgment transaction set and the 824 Application Advice transaction set for use on the test. These last two transaction sets are system generated to acknowledge receipt or advice of errors encountered during a EDI transmission.

SM-ALC Project Test
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Jim Burdick - Lead Systems Technician
Michael Patterson - Lead Buyer

SM-ALC Future Implementation
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All newsletters on the status of this test can also be viewed through one of 1500 SBA site's on-line GEnie system. They are located in the AFSB3 Software Library: Computer Aided Logistics Support (File is # 134 and 135 or look for MCCLELLAN JUN EDI NEWS and MCCLELLAN AUG EDI NEWS.

Sacramento Air Logistics Center - SM-ALC
McClellan AFB CA
CALS/EC/EDI Test - Transmission of Technical Data
ANSI X12 (841) Transaction Set

OCTOBER '92 NEWSLETTER

The Air Force contracting test contacts from McClellan AFB met with the CALS Test Network contacts to analyze the progress of the test on 23-25 September 1992. This group reviewed the lessons learned and began writing the CTN test report covering the discoveries with the first phase testing. Plans were developed for incorporating these lessons learned into the second phase of testing with the next four contractors.

A comprehensive CALS Test Network Procedure Checklist was finalized and distributed to test participants. The checklist serves as a guide to the CALS/EDI testing process. This document is a vehicle to capture the experiences of each of the test participants. It contains detailed, step-by-step directions on what to look for during the test, and provides blanks for entry of pertinent data. The checklist contains questions concerning sending, receiving, using, and evaluating the data identified for this test, and the compliance of the data transmission with the applicable standards, including ANSI X12 840 and 841, and the CALS standards MIL-STD-1840A and MIL-R-28002 (Raster).

The test team is working in conjunction with HQ AFMC Contracting Data Systems Development Laboratory located at Hill AFB, Utah to evaluate EDI programs under development for the Automated Contract Preparation System (ACPS) hosted on a Data General MV9500. ACPS is the procurement system used at SM-ALC which provides the contractual documents for Inventory Control Points (ICPs) in support of Air Force Materiel Command's spare parts and modification programs.

The SM-ALC test team will meet with the next four contractors to prepare for their tests scheduled for Oct-Nov 92. American Electronics of Fullerton, Ca; AiResearch-Allied Signal of Rancho Dominguez, Ca; Llamas Plastics, Inc. of Sylmar, Ca; and Inspirnetics of Rancho Cucamonga, Ca will be visited between Oct 20 and Oct 23.

SM-ALC Project Test
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Sacramento Air Logistics Center (SM-ALC)
McClellan AFB CA
CALS/EC/EDI Test - Transmission of Technical Data
ANSI X12 (841) Transaction Set

NOVEMBER '92 NEWSLETTER

The SM-ALC project team met 20-23 Oct with the next four contractors for the preliminary preparation for their CALS/EDI testing. This next phase include tests with: AiResearch-Allied Signal, Rancho Dominguez, CA; American Electronics, Fullerton, CA; Llamas Plastics, Inc., Sylmar, CA; and Inspirnetics, Rancho Cucamonga, CA. Testing is planned to begin in mid-November once software and modems are in place.

VAN accounts have been established with IBM, Tampa, FL for the test contractors to use during this phase of the test. Four additional 9600 baud modems on loan from Hayes Microcomputer Products, Inc. were sent to the next test contractors, as well as, Supply Tech's software (STX12) used for the contractor's translation of the ANSI X12 840 and 841 transaction sets (RFQ and Technical Data respectively).

Kent Associates, Inc. and Precision Manufacturing of San Antonio have received two solicitation transactions with engineering data sized approximately .75 and 2 mega-bytes during October.

The Draft DoD Electronic Data Interchange (EDI) Convention for the ASC X12 Transaction Set 841, Specification/Technical Information dated October 1992 have been distributed to all attendees of the meetings hosted by SM-ALC in July and August 1992.

Dee Smith briefed the status of the test to HQ AFMC/PK, ENC, PKS, and WPCC on 28 Oct 92.

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CALS/EC/EDI Test - Transmission of Technical Data
ANSI X12 (841) Transaction Set

DECEMBER '92 NEWSLETTER

The SM-ALC project team met 3-5 Nov with Moda Magnetics Corp, Farmington, NY and Mircro Systems, Inc., Fort Walton Beach, FL to discuss their preparation for receipt of CALS data via the ANSI X12 841 transaction set for technical data. These contractors will be using AT&T VAN accounts for this phase of the test.

The McClellan AFB CALS-EC/EDI test of transmitting engineering technical data was briefed to the DoD EC/EDI Executive Agent Program Office, Defense Logistics Agency, Cameron Station, VA on November 9. The test program was also briefed to SAF/AQCP at the Pentagon on November 10.

The test program was asked to present a briefing to the Air Force Materiel Command (AFMC) Integrated Weapon System Management (IWSM) SE/CM Process Action Team (PAT) Technical Information, Sub-PAT, Engineering Data Working Group and Technical Orders Working Group which met at Lowry AFB, Denver, CO November 17. The objective of this group is to develop a fully integrated, standardized and improved IWSM process flow for technical information (i.e., technical orders and engineering data).

CALS Expo '92 "Catalyst for Competitiveness" was held December 7-10 in San Diego, CA. The McClellan test program was presented as part of the Technical Session on Electronic Data Interchange (EDI) for Technical Data Transfer on December 10.

Dee Smith was asked to participate in a second Technical Session at CALS Expo entitled "Impact of Electronic Commerce on Small Business". She discussed Electronic Commerce, DoD Policies and the Small Business Market.

The Sacramento/Gold Rush Chapter of the National Contract Management association (NCMA) will be the host of the West Coast Winter Regional Conference. The program will be Changing Times: Government and Industry in Transition. There will be an EDI session presented on Friday, Feb. 12. CAPT Bruce Bennett, USN, the DoD EC/EDI Joint Program Office Program Manager will speak on "DoD EC/EDI Goals and Objectives". Linda Adams, Air Force EDI Manager, Office of Administrative Assistant, Secretary of The Air Force, The Pentagon will discuss "AF EC/EDI Pilot Site Programs". "The AFMC EC/EDI Command Initiatives" will be presented by Karl Bird, Chief, Directorate of Contracting Automation, HQ AFMC. The last presentation in this session will be the presentation of the SM-ALC EC/EDI Spare Parts Acquisition Implementation.

There are separate registration fees ($95.00) for those interested in attending the EDI session only. Registration can be mailed to NCMA West Coast Regional Educational Conference, c/o Bill Teeple, 8705 Green Ash Ct., Citrus Heights, CA 95610. For additional information contact Bill Teeple at (916) 643-5916.

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Sacramento Air Logistics Center (SM-ALC)
McClellan AFB CA
CALS/EC/EDI Test - Transmission of Technical Data
ANSI X12 (841) Transaction Set

JANUARY '93 NEWSLETTER

On 6-7 January, the SM-ALC EC/EDI Test Project was briefed at the "Electronic Data Interchange (EDI) Workshop for the Transmission of Specification/Technical Information" held at the Naval Supply Center, Charleston, SC. The purpose of the workshop was to educate Navy functional managers, Naval field activities and Naval system designers about the SM-ALC efforts and the structure of the ANSI X12 EDI transaction set for Specification/Technical Information (841).

The test team met on 12 January to strategize preparations for the final weeks of the point to multipoint test. Both the AT&T and IBM VANs have been transferring engineering technical data from the SM-ALC EDCARS data repository. IBM has carried a sample text message and the 750KB bidset to the four contractors located in Southern California. AT&T has carried both the two smaller sized bid sets (750KB & 2M) to all contractors. Preparation is planned to test sending the larger sized solicitation package (13M) during the next week to all participating test contractors through both VANs.

Thursday, 21 January, the Air Force Small Business will hold a Real Time Conference (RTC) to provide a basic overview and answer your questions on the electronic contracting initiatives at Wright-Patterson Contracting Center in Dayton, OH and at the Sacramento Air Logistics Center. Representatives from both Air Force activities will be on-line to answer questions. This RTC is scheduled for 6 pm PST and is open to the public. Contact your AF Small Business office concerning accessing the GEine RTC.

SM-ALC will host a meeting to review the DoD ANSI X12 840 (Request for Quotation) and 841 (Specification/Technical Information) on 10 Feb 93. Representatives from the Air Force Materiel Command, Navy, and Defense Logistics Agency have been invited to attend along with those industry and SM-ALC representatives involved in the SM-ALC EC/EDI Test Project. The objective is to have a coordinated review of the DoD ANSI X12 840/841 by all attendees.

The Sacramento/Gold Rush Chapter of the National Contract Management Association (NCMA) will be the host of the West Coast Winter Regional Conference. The program will be Changing Times: Government and Industry in Transition. There will be an EDI session presented on Friday, Feb. 12. CAPT Bruce Bennett, USN, the DoD EC/EDI Joint Program Office Program Manager will speak on "DoD EC/EDI Goals and Objectives". Linda Adams, Air Force EDI Manager, Office of Administrative Assistant, Secretary of The Air Force, The Pentagon will discuss "AF EC/EDI Pilot Site Programs". Lt. Col Andrew Gilmore, HQ USAF/AQCP will also be speaking. "The AFMC EC/EDI Command Initiatives" will be presented by Karl Bird, Chief, Directorate of

Contracting Automation, HQ AFMC. The last presentation in this session will be the presentation of the SM-ALC EC/EDI Spare Parts Acquisition Implementation.

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APPENDIX I Related Publications

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Standards & Testing

EDI with Technical Data– A Full Scale Test

Background and details of a planned test of EDI using digitally transmitted data between a government facility and various contractors.

by Delores (Dee) Smith

Total quality management and process improvement in DoD contracting, military preparation of solicitation, and awards! What a novel idea to change the existing practice of solicitation and award of defense-related contracts from a manual processing of solicitations, reproduced together with supporting technical data and submitted in accordance with Public Law 95-507 dated 1983, to a more efficient electronic solicitation method.

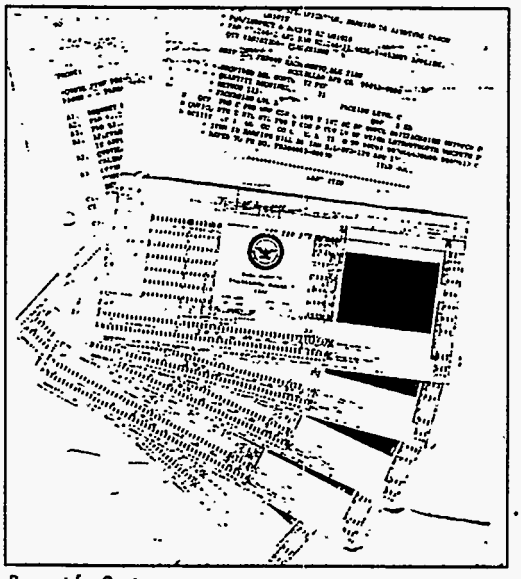
Public Law 95-507 required that all solicitations be furnished to contractors upon request within the 30-day solicitation period. It inundated the DoD procurement process and contributed to the extensions of procurement lead times. Due to the large volume of solicitations prepared in contracting facilities, we have experienced significant costs to produce, reproduce, and to mail these solicitations to interested contractors. The process became redundant and inefficient over time.

DOD ADOPTION OF EDI

A memorandum from the Deputy Secretary of Defense, dated May 88, directed the following:

- Maximum use of Electronic Data Interchange and Electronic Commerce (EDI/EC) throughout DoD.
- A common approach to EC throughout DoD.
- A single face to industry from all of DoD.
- A phased implementation, beginning immediately, to set the standardization and digitization of procurement processes into motion.

Delores (Dee) Smith
is the Chief, Aircraft Contracting Division, at Sacramento Air Logistics Center, McClellan AFB, CA. For the past 20 years she has been working for the Air Force in various contracting specialties.



Request for Quote

The Defense Management Review Directive (DMRD) 941 EC/EDI, Implementation in the Procurement Process, dated Nov 90, directed a very aggressive implementation schedule: 80% of DoD to be operational by end of FY94. It also reconfirmed the "standard systems" approach. The DMRD 941 directives included an investment of $85M for five years, beginning FY92: implementation of "Electronic Commerce" as a standard approach within DoD and a single face to private industry; mandated a direct cost reduction of $548M by FY99; and called for the implementation of the end-to-end, all electronic standard system, assigning priority to procurement under $25K. This process change would typically provide the electronic transmission of digitized data from existing automated contracting systems, which basically duplicate the Federal Acquisition Regulation (FAR) clauses that are germane to the individual solicitation and subsequent contract award.

For the past ten years industry has had the ability to transmit this digitized information through the American National Standards Institute (ANSI) X.12 standards for various transaction sets, such as an 840 Request for Quote (RFQ) or an 850 Purchase Order (PO). Industry has been utilizing these transaction sets over the last ten years with trading partners, but without the ability to

transmit technical data electronically. The transaction set for transferring digitized technical information wasn't developed and accepted as a standard until October 1990, and wasn't published by ANSI until December 1990. With the approval of the ANSI X.12 841 transaction set, and the issuance of FIPS 161 effective September 1991, contracting personnel are now able to incorporate the technical data with the request for quote in a Computer-aided Acquisition Logistic Support (CALS) format in accordance with MIL-STD-1840. This breakthrough for DoD is the main effort that enables the "first" opportunity to transmit electronically to contractors the request for quote under the formal 840 transaction, along with the 841 transaction set, which is CALS-compliant for technical and engineering data.

TESTING BACKGROUND

In May 1990, the Assistant Secretary of Defense (Production and Logistics) designated the Defense Logistics Agency (DLA) as Executive Agent for EC/EDI. The engineering agent designated to develop and design the architecture is Lawrence Livermore National Laboratory (LLNL) located at Livermore, CA. DLA, in conjunction with LLNL, has designated the Air Force as the test bed for implementation, to provide the capability and knowledge as to the processing of RFQs along with technical data to a contractor and the subsequent return in a standard ANSI X.12 format. Sacramento Air Logistic Center, McClellan AFB, CA, is the designated lead pilot organization for implementation and test of the ANSI X.12 841 technical and engineering requirement.

In October 1991, a successful technical data transmission was completed which entailed primarily the downloading of technical information from the Engineering Data Computer Assisted Retrieval System (EDCARS), the data repository for all Air Force technical and engineering drawings, to an AT&T 3B2 computer located in the procurement office. The information was then transmitted to the integrated Gateway Processor (IGP) located at LLNL using Supply Tech, Inc. STX12 software. At this point, the information was transferred directly to a Value Added Network (VAN) AT&T system located in New Jersey. The VAN subsequently transferred the information to TRW in Redondo Beach, CA, where the information was received, translated, displayed on screen, and printed out for content and clarity verification. This entire process entailed approximately nine aperture cards (35mm fiche), which contained 30 to 35 pages of technical information, including technical drawings and their related supporting documents. The test results were published in CTN report #92-007.

COST REDUCTION ESTIMATE

The current processing of paper/aperture card and normal mail distribution at McClellan AFB is estimated at $75 per issuance of solicitation. On an average, this center

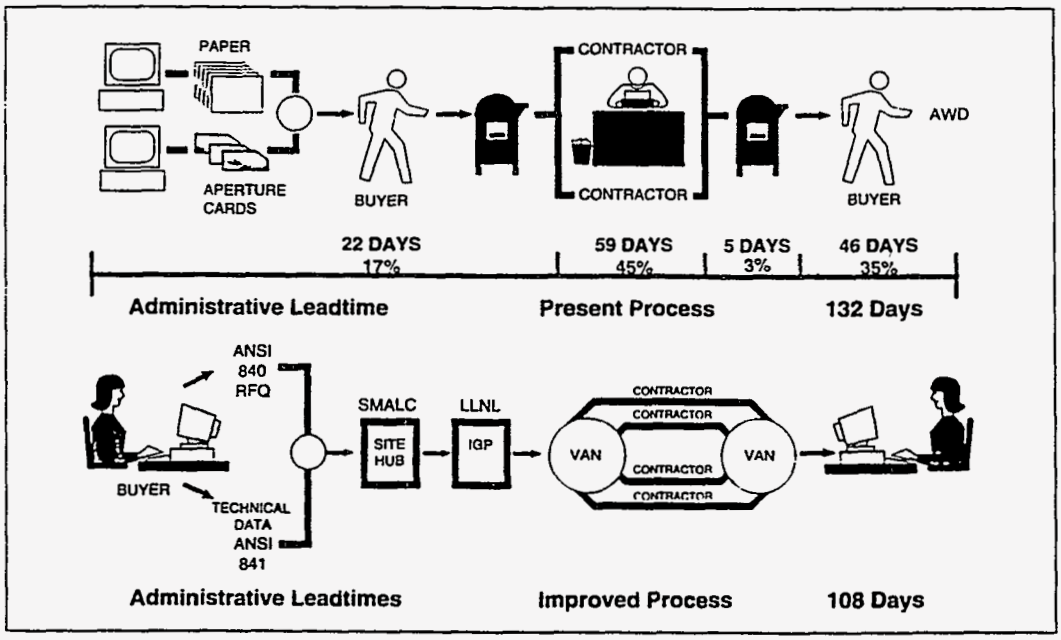


Figure 1. Purchase Request Process.

Standards & Testing

produces a minimum of 15 bid sets (aperture cards) per solicitation, plus any additional bid sets requested pursuant to Public Law 95-507. The intended purpose of the new, improved process of transmitting digitized data in an EC/EDI format is to provide all contracting and supporting technical information with one iteration for all prospective bidders, so that multiple VANs could receive this information and provide their services to all interested contractors for solicitation request and bidding. EC EDI, in itself, eliminates the redundancy built into the old paper process of requiring repetitive reproduction. At the same time, the new digitized process provides the government with a cost avoidance at today's estimated value of $1,125 per required bid solicitation ($75 x 15). The actual cost of the process is approximately $40 per solicitation utilizing the electronic data interchange concept from beginning to end. Upon an initial look at the corresponding cost avoidance of the digitized solicitation process, the government can realize a cost avoidance of $35 for solicitation processing.

The intended purpose of the new digitized contracting process would be to have total implementation, in accordance with Deputy Secretary of Defense Memorandum, May 88, to thousands of contractors, thereby lowering the per unit costs of VAN services to a cost projected at $.04 cents per solicitation when the system is at the 80% implementation point at the end of FY 94. In addition, the actual time involved with communicating this information would be reduced from the old procurement mail time of 3 to 7 days to just minutes or hours using electronic transmission. It has been estimated that for each day of procurement administrative lead time reduced, the government would realize a potential cost avoidance of $3 million dollars. Digitized contracting obviously provides a significant reduction in DoD's present procurement processing time, a reduction in the procurement administrative lead time, and an opportunity to fulfill the DMRD 981, which directs the reduction of existing government inventory levels.

PLANNED TEST WITH SPARE PARTS CONTRACTORS

Due to this successful test, Sacramento Air Logistic Center was approved by the Air Force CALS Technical Center of the Air Force Materiel Command (AFMC(I)/ENCT) to continue testing software and hardware, as well as performing additional tests during FY92/93 with multiple contractors who currently do business with McClellan. The test plan is being prepared and will be available for military and public distribution in 2nd Quarter CY92. The tests will entail primarily the same techniques and digitized process as were used in October, but with the spare parts contractors who presently contract with McClellan and who are considered "Blue Ribbon" contractors to DoD. A Blue Ribbon contractor is one that demonstrates total quality management (TQM). These TQM efforts include delivering the item on time, at a specific level of quality, and at the lowest possible price to the government. Three categories of contractors will be tested: (1) Contractors who have no knowledge of EDI but are interested in participating in the test, (2) contractors who currently have EDI capability but do not utilize it extensively, and (3) contractors who currently have EDI capability and use it extensively, including the technical data transfer capabilities with present subcontractors or prime contractors.

In addition to the McClellan AFB test, a test will be run in parallel with Brigham Young University (BYU), Utah. BYU performed a previous test (CTN 91-047, dated 1 Nov 91) with 18 small business, rural contractors in Utah. The purpose of this parallel test is to also ascertain the problems that will be encountered in electronic transmission with small business contractors located in rural areas. In addition, these BYU contractors are not typically major DoD contractors but can become a potential future increase in the industrial preparedness base.

SUMMARY

The McClellan AFB and BYU tests will provide the overall CTN test with valuable experience and ensure that all areas of concern from large and small contractors will be reviewed before the proposed full scale implementation within DoD. These tests will address the technical and engineering data requirements in CALS formats necessary to support an RFQ and a quote response from the contractor. The test period will be from April 1992 through final completion, projected for November-December 1992. Upon completion of the test, a CTN report will be filed with the HQ AFMC(I)/ENCT organization for military and public distribution. ■

To receive copies of any CTN reports or documents, please contact:
Cathy Murphy
AFMC/ENCT
4027 Colonel Glenn Hwy, Suite 200
Dayton, OH 45431-1601
(513) 257-3085, (513) 257-5881 Fax

For additional information about the subject test, please contact:
Dee Smith, Chief, Aircraft Contracting Division
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McClellan Air Force Base, CA 95662 SMALC/LAK
(916) 643-6150, DSN 633-6150, email: edi@smcedm02.sm.afic.af.mil

Donald Vickers, CTNO Test Bed Manager
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Lawerence Livermore National Laboratory
P.O. Box 808, L-512
Livermore, CA 94551
(510) 422-4231 (Vickers), (510) 422-0582 (Mitschkowetz)

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Brigham Young University
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(810) 378-3895

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Air Force Moving Forward in CALS and EDI

by Delores (Dee) Smith and Vince Wheeler

Technology is moving us ahead in quantum leaps. Nowhere is this more evident than at McClellan Air Force Base, home of the Sacramento Air Logistics Center (SM-ALC) where testing of CALS (Computer-aided Acquisition and Logistics Support) and EDI (Electronic Data Interchange) is rapidly progressing.

CALS is a DoD strategy for transforming the weapon system acquisition and support process from being primarily paper based to an all digital information system termed Electronic Commerce. The Air Force Material Command (HQ-AFMC/ ENC) needs Electronic Commerce today more than ever to support exchanging massive amounts of technical and business information on a global basis.

SM-ALC is making great strides in using Electronic commerce for digitally integrating technical and business information. Actually doing Electronic Commerce involves implementing a computing and communications infrastructure providing portability, scalability and interoperability between all of the many different brands of computer systems.

EDI is an essential ingredient of the Electronic Commerce (EC) infrastructure. EC EDI is also known as ANSI X.12 which is the standard for computer-to-computer electronic exchange of business documents. SM-ALC tests are showing that readily available Commercial Off The Shelf (COTS) CALS and EDI software coupled with existing Value Added Networks (VANS) really makes EC work!

McClellan is using the HQAFMC "Blue Ribbon" contractor program to select their testing participants. A "Blue Ribbon" contractor is one who demonstrates commitment of Total Quality Management (TQM) principles. TQM principles involve:

- On time deliveries,
- at the specified levels of quality, and
- at the least overall cost to the government.

The tests involve digitally interoperating 3 EDI documents types, also referred to as transaction sets, between "Blue Ribbon" participants. The transaction sets being tested are:

- Request For Quotes (RFQs) the ANSI X.12 - 840 transaction set,
- related engineering data exchanged via the ANSI X.12 - 841 transaction set, and
- subsequent return of a quotation via the ANSI X.12 - 843 transaction set.

continued next column

The following contractors are participating in the tests:

July and August testing included:
- Kent Associates, Mansfield, TX (Small Business)
- Precision Manufacturing of San Antonio, San Antonio, TX (Small Business)

October and November testing will include:
- Inspimetics Inc., Rancho Cucamonga, CA (Small Business)
- American Electronics, Fullerton, CA (Small Business)
- Llamas Plastics Inc., Sylmar, CA (Small Business)
- AiResearch, Rancho Dominguez, CA

December and January testing will include:
- Moda Magnetics, Farmingdale, NY
- Micro Systems, Inc., Ft. Walton Beach, FL

The tests are being run in parallel with Brigham Young University (BYU) to see if any specific issues arise from electronic transmissions directed to small businesses in rural areas. BYU small business contractors participating in the tests are:

- Kitco Inc., Springfield, UT
- Bill's Metal Productions, Huntington, UT
- Industry West Electronics, Orem, UT
- Defense Electronic Systems, Minneapolis, MN

The tests focus on interoperability among three distinctly different hardware, software and communications infrastructures. The infrastructures being tested include three hardware platforms, three software packages, and two communications Value Added Networks (VANs). Three hardware platforms are being tested. UNIX workstations, DOS based PCs and Apple Macintosh computers are the three hardware platforms being tested. UNIX workstation software, developed by St. Paul Software, St. Paul, MN; DOS-based PC software, developed by Supply Tech, Inc., Ann Arbor, MI; and Software for Macintosh computers, developed by Digit Software of Silverspring, MD, will be tested as well. Two VANs are being tested. AT&T's Global Messaging Service and

continued on page 7

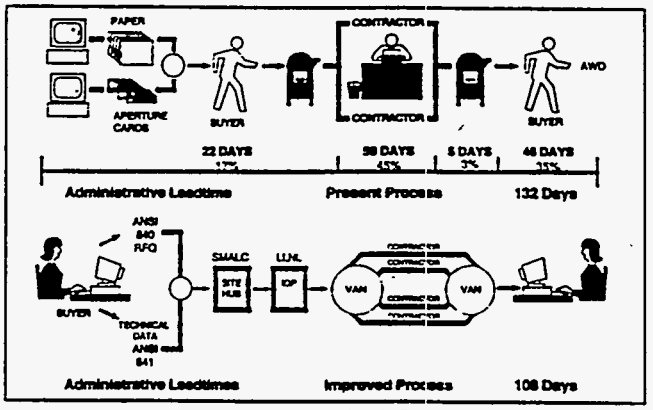

Fig. 1 Purchase Request Process

continued from page 6
IBM's Information Network are each being tested with every hardware/software infrastructure combination.

Lawrence Livermore National Laboratories (LLNL), home of the CALS Test Network (CTN), plays a major role in the testing activities. After engineering data is extracted from a government operated repository, each as the Engineering Data Computer Assisted Retrieval System (EDCARS), it is forwarded to LLNL's Intelligent Gateway Processor (IGP). LLNL's IGP is interconnected to multiple VANs including IBM and AT&T. The data is then forwarded over the VANs to the contractors participating in the tests and subsequently returned via the same connectivity path. LLNL is the DoD's engineering agent for CALS, EDI and EC activities, and, as such, works very closely with the Defense Logistics Agency (DLA). DLA is DoD's executive agent for CALS, EDI and EC activities.

Working jointly, the testing activity of McClellan AFB and CTN is providing a "Business Application of CALS Data." CTN is documenting the tests and thereby providing technical details of the essential implementation agreements prior to full scale Government cut over. The implementation agreements specifically define all technical details pertinent to automating the RFQ portion of the DoD's procurement process. The final CTN report was filed with HQ AFMC/ENC for military and public distribution approximately March 1992.

To receive copies of any CTN reports or documents, please contact:

Cathy Murphy
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(513)257-3085
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For additional information about the tests, please contact:

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Tests show EDI works with CALS

BY KAREN D. SCHWARTZ
GCN Staff

Pilot tests to see how well Computer-Aided Acquisition and Logistics Support and electronic data interchange work together have been largely positive so far, said speakers at an April CALS-EDI conference in Washington.

A recent series of tests conducted in California by Lawrence Livermore National Laboratory's CALS Test Network Office and the Sacramento Air Logistics Center (SMALC) at McClellan Air Force Base have shown the two standards are compatible, said Don L. Vickers. He is CALS project leader at Livermore and manager of the test bed.

Vickers and Delores J. Smith, chief of SMALC's Aircraft Contracting Division, said the tests, which are continuing, show that the two standards can handle each other's individuality.

Both CALS and EDI deal with formatted technical documents. However, CALS applies mainly to technical data on weapons systems built by contractors, whereas EDI applies mainly to communication of commercial information such as purchase orders and invoices.

The first test, which began last fall, involved putting into EDI format a CALS engineering drawing under the Initial Graphics Ex-

See CALS Page 81

EDI, CALS prove compatible

CALS from Page 1

change Specification and a small technical publication with raster images. The two EDI-formatted items were sent over Integrated Services Digital Network circuits to a Livermore site that has a packet-switching network. The files came through intact, Vickers said.

The Livermore group then sent the same data over the Defense Data Network to SMALC at 3 p.m., DDN's busiest time of day. The transmission, which took two minutes, "got there mostly intact except that the technical publication couldn't get brought up on SMALC's system because it was only set up for magnetic tape," Vickers said.

A second test involved sending several sets of technical data in several sizes over multiple networks to a vendor site. Some of the sets had just a few images, others contained large engineering drawings.

The technical data was sent over the Internet from SMALC's Engineering Data Computer-Assisted Retrieval System (EDCARS) to an AT&T Co. 3B2 minicomputer running Unix at Livermore.

After Livermore confirmed the information was intact, it was repackaged in EDI format and sent to TRW Inc. in Torrance, Calif.

TRW employees transmitted a facsimile of the test data back to Livermore to prove it had come through without a hitch.

But the pilot testing was not without problems. Vickers called it a "rocky road" because SMALC's infrastructure was not geared to shipping data electronically. "We had to do a lot of jury-rigging," including hand-carrying tapes from the EDCARS system, he said.

And somewhere between SMALC and Livermore, a few network nodes failed out of the dozens through which the data had to pass. "We learned a lot," he said.

Plans for the third and most ambitious test are being finalized, Vickers said. It will take place this summer, concluding in November.

This test will send CALS data from an Amdahl Corp. computer at SMALC over the Internet without using EDI format. Then the data will go out to EDI-literate small businesses. "We want to see if small businesses can handle this," Vickers said.

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CALS Close-Up

The Bimonthly Air Force Journal of CALS Serving DOD and Industry

Vol. I No. 2 *NOV/DEC '92*

Table of Contents

CALS/EDI Business Application in Acquisition

The Chief of the Aircraft Contracting Division at SM-ALC describes current testing for EC/EDI ANSI X.12, which will elevate small business capabilities to an enhanced, and previously unprecedented, level of competitiveness.

by Delores (Dee) Smith

Background

CALS is the DOD strategy for transforming primarily paper-based weapon systems acquisition information to a digital information system. Electronics Data Interchange (EDI) is the standard for computer-to-computer electronic exchange of business documents. Both CALS and EDI are essential ingredients of the Electronic Commerce (EC) infrastructure.

The Air Force needs EC today more than ever to support the exchange of massive amounts of technical and business information world-wide. Sacramento Air Logistics Center (SM-ALC), McClellan AFB, California, is rapidly progressing in the testing of CALS/EDI concepts in support of Inventory Control Point (ICP) procurement requirements. SM-ALC has made great strides in utilizing Electronic Commerce for digitally integrating technical and business information. The on-going extensive design and testing at SM-ALC will facilitate the successful implementation of EC through the development of a communicator and computing infrastructure that will provide possibility, scalability, and interoperability between the numerous types of computer systems.

Blue Ribbon Participants

The AF CALS Test Network approved SM-ALC testing of the Request for Quote (RFQ) (ANSI X.12 (840)), the required technical and engineering data in CALS compliant format (ANSI X.12 (841)), and subsequent contractor return of a quote (ANSI X.12 (843)) in June, 1992. McClellan AFB developed multiple decision criteria throughout the test period, including the contractor test criteria, where HQ AFMC "Blue Ribbon" contractors were selected. A Blue Ribbon contractor is one that demonstrates Total Quality Management (TQM) which includes delivering the item on time, at a specific level of quality, and at the lowest price to the government.

The contractors participating in the test are as follows:

July Testing

- Kent Associates, Mansfield, Texas (small business)
- Precision Manufacturing of San Antonio, San Antonio, Texas (small business)

November Testing

- Inspirnetics Incorporated, Rancho Cucamonga, California (small business)
- American Electronics, Fullerton, California (small business)
- Llamas Plastics Incorporated, Sylmar, California (small business)
- AiResearch, Rancho Dominguez, California (large business)

Prior to CALS EXPO '92, tests will continue November 2-7 with two additional small business contractors:

- Moda Magnetics, Farmingdale, New York (small business)
- Micro Systems Incorporated, Fort Walton Beach, Florida (small business)

Rural Small Business

The test will be run in parallel with Brigham Young University (BYU), located in Provo, Utah. The inclusion of BYU is to determine issues that would be encountered in electronic transmissions with small business located in rural areas with the requirement to receive CALS-compliant data (technical drawings) for proposal purposes.

BYU's small business contractor participants are as follows:

- Kitco Incorporated, Springville, Utah
- Bill's Metal Productions, Huntington, Utah
- Industry West Electronic, Orem, Utah
- Viking Systems Incorporated, American Fork, Utah
- Defense Electronic Systems, Minneapolis, Minnesota

Platform Interoperability

The SM-ALC CALS EC/EDI Project ANSI X.12 (841) Transaction Set for technical data is designed to test three hardware platforms: DOS, UNIX, and Macintosh. Three distinct translators are being tested as platform test sites: Supply Tech Incorporated, Ann Arbor, Michigan (DOS); St Paul Software, St Paul, Minnesota (UNIX); and Digit Software, Silverspring, Maryland (Macintosh).

Testing Architectures

Two discrete architectures will be utilized during the test process. The first, Lawrence Livermore National Laboratories (LLNL) architecture involves the extraction of engineering data in a CALS-compliant format from a government repository. The LLNL process will transmit data, e.g. Engineering Data Computer Assisted Retrieval System (EDCARS) to a government site hub via INTERNET/DDN to the LLNL Intelligent Gateway Processor (IGP), to multiple Value-Added Networks (VANS) who have a trading partner agreement, for distribution to contractors and eventual return to the requesting government agency (Figure 1).

In May, 1990, the assistant secretary of defense (Production & Logistics) designated the Defense Logistics Agency (DLA) as executive agent for Electronic Commerce/Electronic Data Interchange (EC/EDI). Lawrence Livermore was designated at this time as the engineering agent to develop and design this architecture for DOD. LLNL EC/EDI is located at Livermore, California, as is the LLNL/CALS Test Network (CTN), which supports McClellan's full scale testing.

The McClellan AFB test will be one of the first business applications of CALS data. The CTN test report, when finalized, will provide information to government and industry for review prior to the full scale implementation at SM-ALC of ANSI X.12 transaction sets in CALS format for the electronic processing of RFQs. The test, which addresses the technical and engineering requirements in CALS formats necessary to support an RFQ, and the contractor's quote, began in June, 1992 and is projected to be completed by December, 1992.

Upon completion of the test, the CTN final report will be filed with HQ AFMC/ENC, Air Force CALS Program Office and OASD for review prior to release and wide-spread distribution to government and industry, approximately March, 1993.

EXPO Training Session

For those of you planning on attending CALS EXPO '92, be sure to schedule your agenda to attend Session 3A, "Electronic Data Interchange (EDI) for Technical Data Transfer." This presentation will be Thursday, December 10, from 8:30 A.M. to noon. This particular session will allow you to hear first hand the status of the testing, discuss potential issues/concerns, and learn how it will affect the business case of the future.

To receive copies of any CTN reports or documents, please contact:

- Cathy Murphy, HQ AFMC/ENCT, 4027 Col Glenn Highway, Suite 200, Dayton, OH 45431-1601, (513) 257-3085, FAX: (513) 257-5881

For additional information about the subject testing and potential business case applications, please contact:

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- Donald Vickers, CTNO Test Bed Manager, and Nick Mitschkowetz, Raster Lead Analyst, Automated Interchange of Technical Information Project, Lawrence Livermore National Laboratory, PO Box 808, L-542, Livermore, CA 94551, (510) 422-4231 (Vickers), (510) 422-0582 (Mitschkowetz).
- Dell K. Allen, Director, CAM Software Research Center, 265 Crabtree Technology Building, Brigham Young University, Provo, UT 84602, (801) 378-3895. ♦

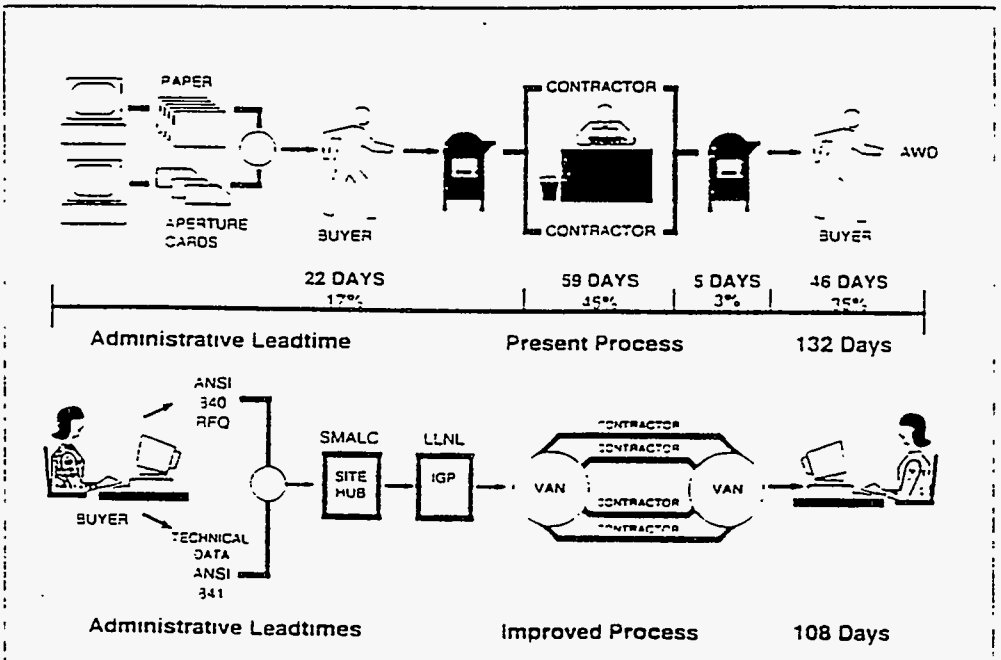

Figure 1. Purchase Request Process

APPENDIX J Related Correspondence

Status Report for February '93 ANSI X12 Standards Meeting

The following is a summary of the accomplishments achieved during the February '93 ANSI X12 Standards Meeting relative to CALS technical data exchange:

a. The 841 technical Information exchange transaction set can officially be used bi-directional; i.e. for both "requesting" technical data as well as " transfer/transmitting" technical data. This can be accomplished without any data element or data code changes or additions. The Product Data Committee will change the Purpose and Scope of X12-841 by adding the words "transfer or request" and "transmit or request" to officially recognize this bi-directional use of this transaction set.

b. The discussion of a new "Request for Information" transaction set or RFI message was discussed and tabled without any action being taken because it is only possible to define a "computer processable" transaction set to accomplish this after the requesting business case is first well defined and documented. In the interim, either X12-864 (text message) or 996 (file transfer) should be used since they can be sent over the same path as all other EDI messages and can be used similar to E-mail.

c. Major steps were taken to educate and start the efforts necessary to address the data elements and data code changes and additions needed by the X12-840, Request for Quotation, transaction set when 841 technical data is to be attached. This effort will continue for approximately the next 2 to 4 X12 meetings (approximately a year) before all the necessary changes can be incorporated and approved by the X12 voting members. During this time the changes and additions to 843 (Quotation) and other associated transaction sets will also be added.

These were the highlights of the February '93 X12 Meeting as related to exchanging CALS technical data using ANSI X12 EDI.

Status Report for June '93 ANSI X12 Standards Meeting

The following is a summary of the accomplishments achieved during the June '93 ANSI X12 Standards Meeting relative to the implementation of 840-841 technical data exchange at SM-ALC in support of Electronic Contracting for aircraft parts acquisition and the replenishment of LRUs.

a. The revised DoD 841 convention guide which incorporates the results the SM-ALC test was presented to the X12 Product Data Subcommittee and accepted. LMI plans to officially publish this latest revision in early July. It therefore, will be available to be appended to the official SM-ALC test report being prepared by the CALS Test Network (CTN) at LLNL.

b. Considerable effort was devoted to getting the product and process technical data transfer capabilities of 841 into a functionally equivalent EDIFACT capability. We believe a major breakthrough agreement has been achieved (in principle) Here is the basis of the agreement:

(1) A project proposal for a new EDIFACT capability, called BINARY or BINARY ENVELOPE, will be submitted. This capability will contain only the equivalent of the BGM, REF, EFI and BIN (both BIN1 and BIN2) data segments and will be the functionally equivalent of these 841 segments.

(2) This EDIFACT Binary capability will meet applicable "body parts" criteria.

(3) An EDIFACT message which is currently in Status O development, called CONDRA, and which is currently limited to CAD files for between construction (building) architects and civil engineers, will be expanded to carry all the administrative data of X12 841 Table 1 and Table 2 (excluding the EFI and BIN which are in BINARY, and discussed in 1 above).

(4) The EDIFACT message CONDRO, also is status O development will also be expanded to be capability of defining (or requesting) the software application functional capabilities of any trading partners involved in the exchange of technical information and/or binary files (including but not limited to construction drawings files).

Now comes the 1 to 2 year process of getting these intentions and agreements all the way through BOTH the X12 and EDIFACT standards bodies; Perhaps our European friends can help us - we would certainly welcome their assistance.

These were the highlights of the June '93 X12 Meeting as related to exchanging 841 technical data using ANSI X12 EDI.

APPENDIX K Acronym List

ACPS - Automated Contract Preparation System

AF - Air Force

AFB - Air Force Base

AFCTN - Air Force CALS Test Network

AFMC - Air Force Materiel Command

AITI - Automated Interchange of Technical Information

ALC - Air Logistics Center

ANSI - American National Standards Institute

ASC - Accredited Standards Committee

BMP - Bit Map Plotter image format

BYU - Brigham Young University

CAD - Computer-Aided Design

CALS - Continuous Acquisition and Life-cycle Support

CCITT - International Consultative Committee on Telegraphy and Telephony

CDMS - Contract Data Management System

CGA - Color Graphics Adapter

CONDRA - EDIFACT message

CONDRO - EDIFACT message

COTS - Commercial Off The Shelf

DDN - Defense Data Network

DLA - Defense Logistics Agency

DLM - Data List Manager

EC - Electronic Commerce

ECO - Engineering Change Order

EDCARS - Engineering Data Computer Assisted Retrieval System

EDI -Electronic Data Interchange

EDIFACT - Electronic Data Interchange for Administration, Commerce and Transportation

EDL - Engineering Data List

EGA - Enhanced Graphics Array

FAR - Federal Acquisition Regulation

FDDI - Fiber Distributed Data Interface

FSC - Federal Stock Class

FTP - File Transfer Protocol

FXM - Fiber Expansion Module

GMS - Global Messaging Service

IBM - International Business Machines

ICP - Inventory Control Point

IGP - Intelligent Gateway Processor

ISDN - Integrated Services Digital Network

ISO - International Organization for Standardization

JEDMICS - Joint Electronic Data Management Information and Control System

Kbs - Kilobytes per second

LAN - Local Area Network

LMI - Logistics Management Institute

LRU - Lowest Replacement Unit

MHz - megaHertz

mm - millimeter

NSN - National Stock Number

OSI - Open System Interconnect

PC - Personal Computer

PR - Purchase Request

QA - Quality Assurance

RAM - Random Access Memory

RDB - Requirements Data Bank

RFI - Request for Information

RFQ - Request for Quotation

SC&D - Stock Control and Distribution

SCCIG - Southern California CALS Interest Group

SM-ALC - Sacramento Air Logistics Center

SMSCRC - Standard Multi-user Small Computer Requirements Contract

SMTP - Simple Mail Transfer Protocol

UUCP - UNIXto UNIX Copy

VAN - Value-added network

VDT - Video Display Terminal

VGA - Video Graphics Array

APPENDIX L Glossary

ANSI ASC X12 (840) - Request for Quotation transaction set

ANSI ASC X12 (841) - Specification/Technical Information transaction set

ANSI ASC X12 (997) - Functional Acknowledgment transaction set

AOS - Data General operating system

BIN - binary data segment in 841

BGM - data segment

CALSTB.350 - AFCTN raster tool

COM1 - the number 1 communications port on a PC

DecompG4 - AFCTN raster tool

DoD MIL-STD-1840A - Automated Interchange of Technical Information

DoD MIL-R-28002A - Raster Graphics Representation in Binary Format, Representation for

Dwg - drawing

EFI - data segment used in 841

F.E.P. - LMS system (communications)

Gbyte - gigabyte

J023 - Automated Purchase Request system

J041 - Acquisition and Due-in system

Kbyte - kilobyte

Mbyte - megabyte

NR - Number and Revision

PCX - raster graphic type

Pel - The smallest graphic element that can be individually addressed within a picture

Pixel - picture element

PK - SM-ALC(PK)-Aircraft Contracting

REF - data segment used in X12 transactions

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APPENDIX M Index

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