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Macromodular Computer Design, Part 2, Volume 07, Faceplate Specifications

Computer Systems Laboratory, Washington University

MACROMODULAR COMPUTER DESIGN PART 2 MANUFACTURING DESCRIPTION

VOLUME VII

FACEPLATE SPECIFICATIONS

Technical Report No. 36

FINAL REPORT - FEBRUARY, 1974
CONTRACT SD-302 (ARPA)

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR COMPUTER DESIGN

FINAL REPORT - CONTRACT SD-302

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PART 2 - MANUFACTURING DESCRIPTION -

VOL. VII-FACEPLATE SPECIFICATIONS

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ABSTRACT

Specifications for the construction of Macromodular Faceplate Box assemblies are contained in this report. Also included are all electrical and mechanical specifications for common subassemblies. Certain general assembly techniques are specified.

INDEX

GENERAL FACEPLATE SPECIFICATIONS

CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	0047	10–8–70	RCJ	E	0249	1–24–72	[illegible]				
A	0056	10–15–70	RCJ	F	0256	2–22–72	WAG				
B	0059	10–20–70	WAG	G	0277	12–7–72	RCJ				
C	0136	12–29–70	RCJ								
D	0235	12–13–71	[illegible]								

GENERAL SPECIFICATIONS FOR MANUFACTURE OF MACROMODULAR FACEPLATE BOXES

I. Introduction:

The Macromodular Faceplate Box is a connector and wire harness assembly encased in a mechanically functional shell. The shell supports the connectors and protects the wiring, while providing a modular quick-connect-disconnect facility. The wiring harness serves to interconnect a set of general, system wide connectors to a set of connectors which are specific to the function being performed.

The complete manufacturing specifications are contained in a system of documents as outlined on the next page.

II. The 300.0 Document

This document contains general information concerning workmanship, standards, and explanations of notation used in the various manufacturing descriptions.

On many drawings, specific components are called out by name--such as V-Bus Connector. These names are correlated with specific manufacturers, part numbers, and/or drawings in a table on page 300.0-4.

Other relevant specifications (such as CAS-5) are contained in document 010 (General Standards).

OUTLINE OF FACEPLATE DOCUMENTATION

DOCUMENT	SUBJECT
300.0	General Specifications
300.1	Single Height Shell
300.2	Double Height Shell
300.3	Triple Height Shell
300.4	Quadruple Height Shell
300.5	Faceplate Box Viscera Parts
300.6	V-Bus Subassembly
300.7	Code Switch Subassembly
-	
-	Other general sub-assemblies to be
-	added as they are designed.
301	Type One Faceplate Box
302	Type Two Faceplate Box
303	Type Three Faceplate Box
304	Type Four Faceplate Box
305	Type Five Faceplate Box
-	
-	Other specific faceplate boxes to
-	be added as they are designed.
-	

ISSUE B 0047 10-8-70 0059 10-20-70

MANUFACTURERS AND PART NUMBERS

CSL NAME	IDENTIFICATION
FPB Rear Connector	AMP 3-202844-5 Box Contact Connector (AMP 750 Series) 90 Pin
V-Bus Connector	AMP 1-202844-1 Box Contact Connector (AMP 750 Series) 90 Pin
Coaxicon Ferrule	AMP 329055 Twin Standard Coaxicon AMP 329056 Shield Ferrule for Twin Std. Coaxicon
Code Switch	Honeywell Microswitch 3SX1-T
ASTRO 348 Rear Nut ASTRO 348 Contact Retention Disc ASTRO 348 Interfacial Seal ASTRO 348 Receptacle shell	Amphenol Connector Division ASTRO 348-20E14-37P1 (201)
ASTRO 348 Male Contact	Amphenol ASTRO 348-100-5000P-02
Retention Grommet	Amphenol 169-254 Viton O-ring.
Vlier Spring Plunger	Vlier NS51N Spring Plunger Vlier Manuf. 8900 Santa Monica,L.A.Calif.
R6	130 OHM 5% 1/8Watt Carbon Composition Resistor Allen Bradley Type BB

ISSUE	0047	10-8-70	RCJ
B	0059	10-20-70	WAG
D	0235	12-13-71	TMK

GENERAL FACEPLATE BOX WIRING SPECIFICATION

I. Introduction

This document describes specifications and techniques which are common to the several types of faceplate box wiring subassemblies.

II. Workmanship

These assemblies use sub-miniature connectors, small gauge wire, and small hardware. Some care is therefore necessary to protect the individual parts as they pass from one assembly operation to the next.

Soldering technique must be carefully supervised. All connections are to be made with a temperature controlled iron (600° F) such as the Weller W-TCP. The solder used shall have a nominal composition of 60% Tin and 40% Lead. All flux residues must be removed, and the residues from Chlorinated Hydrocarbon cleaners must also be removed to prevent corrosion of the connector contacts.

Other areas of workmanship standards will be covered in later sections of this specification.

III. Wiring Lists

The connections in a faceplate box wiring subassembly are detailed by a point to point wiring list. The wiring lists have symbols which separate individual copper paths and delimit pairs of copper paths which are to be wired with a single twisted pair.

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A	0056	10-15-70	DCJ

Component pin numbers are represented in the following manner:

(Pin Number) (Component Type) (Component Number)

Example: 31A3 is pin 31 of connector A3, connector A is an AMP Box Connector and it is in position three. The various component types will be individually explained in later sections.

The symbol # appearing in the margin identifies a copper path. All connection points between two (#) symbols are to be connected together.

Example:

```
#
    1A3
    3G7  [Blue
    3G8  [Blue
#
```

The example represents a single blue wire which is connected from pin 1 of connector A3 to pin 3 of Connector G7. In addition a single blue wire is connected from 1A3 to 3G8. The three connection points and two wires represent one copper path.

Much of the wiring is in the form of color-coded twisted pairs. Two copper paths appearing between the row of symbols (>>>>>>>>>>>) are wired with one pair.

Example:

```
>>>>>>>>>>>>>>>>
#
  3A3
  24D1  [Orange
#
  4A3
  23D1  [Red
#
>>>>>>>>>>>>>>>>
```

This example directs the use of an orange-red twisted pair (see CAS-5). The orange wire connects pin 3 of connector A3 to pin 24 of connector D1. The red wire is similarly routed from 4A3 to 23D1. Two copper paths have been connected by one twisted pair.

Succeeding sections of this specification will describe the individual components to be interconnected.

IV. Wire Preparation

Two types of wire are used in the wiring subassembly. The first type is a single conductor #30 AWG Kynar insulated wirewrap wire (Brand Rex T-360). This wire will be crimped and soldered and is used in three colors: Red, Blue and Yellow.

The second type of wire is a twisted pair of two #30 AWG Polyethylene insulated wires which is used in 17 color

combinations. This wire was made by Brand Rex and is described in CSL document CAS-5.

All wires used in the wiring subassembly shall be 6.500 ± .250 inches long before stripping and termination. The stripping dimensions for any given wire or pair are given for each individual type of termination in later sections of this document.

All wires shall be stripped with an automatic mechanical stripper. The stripped wire shall be smooth, straight, and free from nicks, scratches or mechanical deformation.

It is important that the twisted pairs remain twisted with the original lay length. For the long lay pairs such as (Yellow-Slate) it is permissible to give the ends of the pair an extra twist to prevent unravelling.

V. Resistors

Resistors are considered to have two leads, and a unique number is assigned to each lead. The resistors are numbered as follows:

Example:

1R601

2R601

1. First numeral -- indicates lead one or lead two of one resistor.
2. Letter R ------- indicates that component is a resistor.
3. Single numeral (6) -- Indicate type of resistor. (6) represents a 130 ohm 1/8 watt 5% carbon composition resistor.

4. Two digit number (01) -- Sequence number of component, may run from 01 to 99.

The following sequence from a wiring list will serve as an example:

```
>>>>>>>>>>>>>>>>
1D1   Red
1R601
#
2D1   Slate
2R601
#
>>>>>>>>>>>>>>>>
```

This directs that the first 130 ohm resistor (R601) be connected from pin 1 of connector D1 to pin 2 of connector D1. The color code may be ignored, and teflon sleeving shall be used to insulate the exposed leads.

VI. Rear Connectors

The components designated by an A on the wiring lists (A3, A4) are AMP 750 SERIES BOX CONTACT CONNECTORS, AMP Catalog 941.

Wires which are terminated to the AMP 3-202844-5 are to be stripped .125 ± .031 inches. The bare end of the wire is to be fed into the terminal tail and bent over 180° with the insulation resting in the U shape of the terminal. The wire is to be soldered, and no solder shall wick into the contact.

The solder meniscus shall not extend past the square perforation nearest the connector body. The solder joint shall be visually inspected before the following step is executed.

The joint shall be cleaned and covered by a tight fitting peice of polyolefin shrink tubing. The shrink tubing shall be .300 to .350 inches long.

The pin numbering stencilled on the connector block must be IGNORED. The pin numbers are defined on Drawing 300.0-15.

VII. ASTRO 348 Connectors

The connectors identified with a D on the wiring lists are members of the Amphenol ASTRO-348 family. The 14-37 configuration shown in this document is a special version with some of the environmental sealing parts left out. In the future, a standard version of this connector will probably be used, so the differences are noted here to avoid obsolescence of the documentation. The standard bulkhead connector has the part number 348-40E14-37P1.

The standard connector can be installed by following the instructions in the Amphenol ASTRO-348 Technical Manual. The special connector documented here [Amphenol ASTRO 348-20E14-37P1 (201) Mod.] has a clear chromate finish instead of the standard olive drab. The modified connector has an unswaged rear nut and contact retention disk, so all parts are handled

CHG.	E.C.O.	DATE	APPR.
F	0256	2-22-72	WAT

separately as shown later in document 300.0. The modified connector does not have the silicone rubber insert in the rear nut, so the pin numbers must be read from the front.

The modified connector shall be assembled in the following sequence:

1. Mount the receptacle shell on the faceplate with the standoffs (Dwg. 300.5-4) and fillister head 2-56 screws.
2. Crimp the contacts per instructions given below, and insert the contacts into the contact retention disc, using a simple holding fixture to support the disc.
3. Apply an interfacial seal, insert the disc assembly into the receptacle shell, and hand tighten the rear nut. A picture on a later page identifies the individual parts.

Wires for these connectors shall be stripped 0.125--0.150 inches. The tight stripping tolerance is necessary to insure that the insulation will tuck into the rear sleeve of the contact for mechanical support. The wires are crimped into the ASTRO-348 contacts using a Buchanan No. 612596 hand tool with contact locator Buchanan No. 613381. Equivalent automatic tooling is preferable. Crimp settings of (2) have proved satisfactory with two hand tools, but tool variability requires that some tests be made before a production setting is adopted. The test criterion is that the crimped joint shall have 70% of the tensile strength of the wire being crimped.

The yellow wire to pin 5 of the D connectors and the green wire to pin 29 may be combined into a yellow-green twisted pair. If this is not done, a single blue wire should be used on pin 29.

CHG.	E.C.O.	DATE	APPR.
F	0256	2-22-72	WAS
G	0277	12-7-72	BCJ

VIII. Amp Coaxicon Connectors

The connectors identified by a G in the wiring list are versions of the Amp Twin Standard Coaxicon. The pins are 1, 2, and 3 as follows:

Pin 1 Opposite Small Port - I on Plastic Insert

Pin 2 Opposite Large Port - II on Plastic Insert

Pin 3 Wire inserted under shield ferrule

All wires for this connector are stripped 0.250 inches ± .031 inches. The wires are crimped using Amp crimp die 69231-2 in hand tool 45707-2 or pneumatic tool 69365-2. The wires must be carefully held during the crimp cycle to prevent slippage. These connectors are press fit with an arbor press after crimping.

The orientation of these connectors is important, and is noted on each faceplate, see 301-9 for example.

IX. Code Switches

The Honeywell Microswitches (indicated by an S in the wiring lists) are wired with single Kynar-insulated wires which are stripped 0.250 ± .031 inches. The wires are wrapped around the turret terminals of ths switches and soldered. All solder flux must be removed and this assembly must be handled carefully to prevent breakage of the fine wires.

The switch orientations and pin numbering are shown in document 300.7.

[illegible]	E.C.O.	DATE	APPR.
E	0249	1-25-72	NTK.

X. Electrical Testing

After the wiring subassembly has been fully assembled into the metal shell, suitable adapting connectors shall be mated with the appropriate front and rear connectors of the faceplate box and the following electrical tests shall be performed.

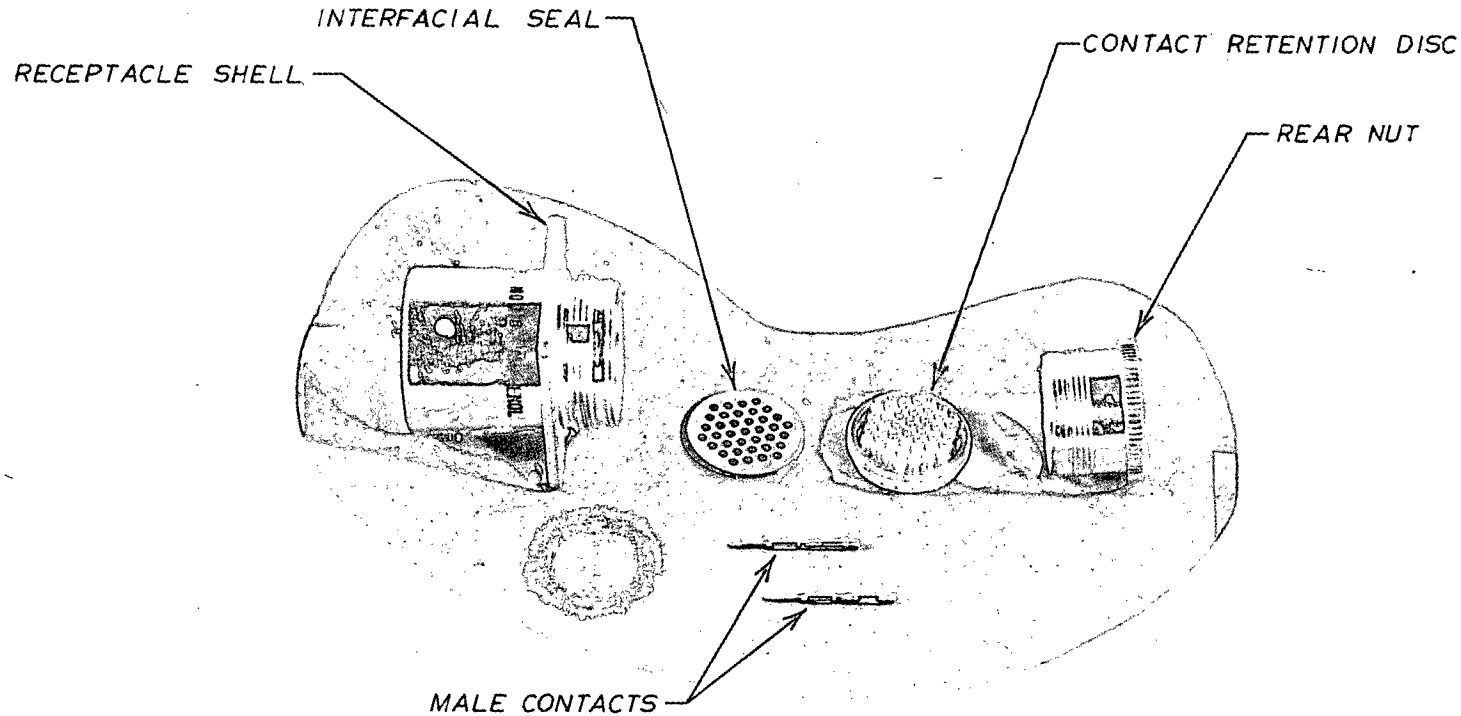
1. Continuity:

All copper paths called out on the wiring list for the type under test shall be verified to have a resistance of less than one-half ohm.

2. Shorts:

Each copper path shall be isolated from all other copper paths by a resistance greater than one megohm. Ground wires are an exception to this requirement since they are not grouped into an explicit copper path. Therefore, all wires to pin 3 of the AMP Coaxicon, and the 6 inch wires with ground lugs will be common to each other and the metal shell.

CHG.	E.C.O.	DATE	APPR.
ISSUE	0047	10-8-70	
C	0136	12-29-70	



CONNECTOR
348 20E14-37PI (201) SPECIAL

CHANGE NO.	DATE	DESCRIPTION
F	2/22/72	E.C.O. 0256 JAC
ISSUE	10-8-70	E.C.O. 0047 GCJ

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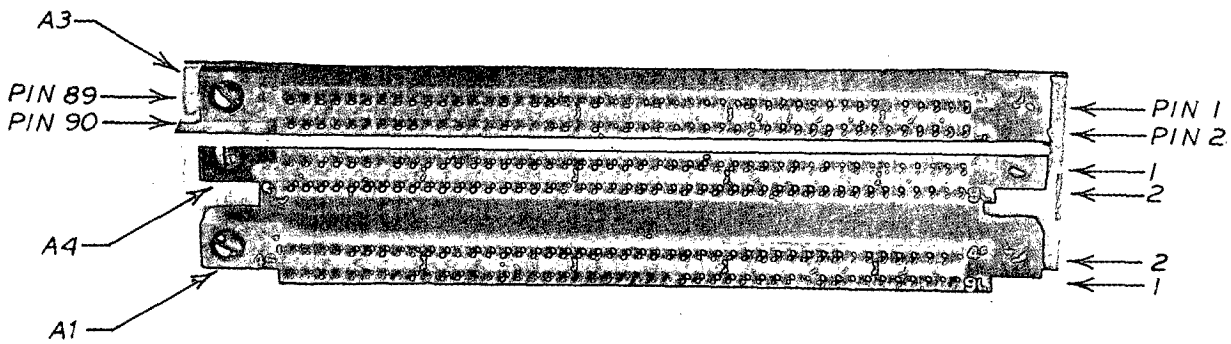
MACROMODULAR PROJECT

TITLE
ASTRO 348 COMPONENT IDENTIFICATION

APPROVED BY	FOR	DATE
GCJ	PROD	5-23-70

ENG. GCJ
DRAWN BY PLL
CHECKED GCJ

DRAWING NO. 300.0-14
DATE 5-22-70



CHANGE NO.	DATE	DESCRIPTION
ISSUE	10-8-70	E.C.O. 0047 GCJ

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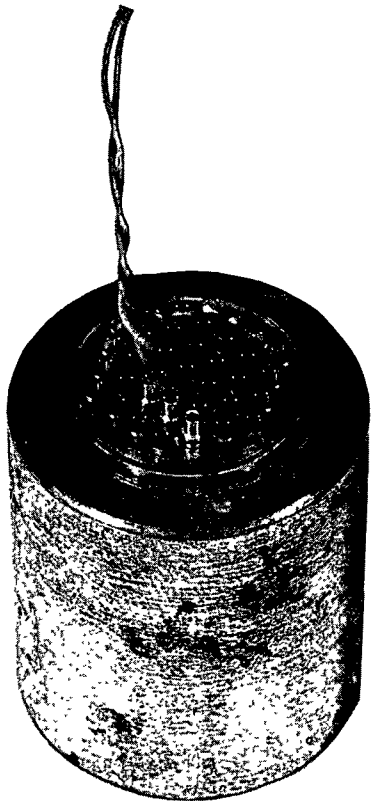
MACROMODULAR PROJECT

TITLE: REAR CONNECTOR ORIENTATION AND PIN NUMBERING

APPROVED BY	FOR	DATE
GCJ	PROD.	5-23-70

ENG. GCJ
DRAWN BY PJ
CHECKED GCJ

DRAWING NO. 300.0-15
DATE 5 22 70



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MACROMODULAR PROJECT

TITLE

CONTACT INSERTION FIXTURE

CHANGE NO	DATE	DESCRIPTION
ISSUE	10-8-70	E.C.O. 0047 GCJ

APPROVED BY	FOR	DATE
GCJ	PROD.	10-7-70

ENG GCJ
DRAWN BY DHO
CHECKED GCJ

DRAWING NO 300.0-16
DATE 10-8-70

1-CELL FPB SHELL

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	0065	10-23-70	RJA	E	0163	3-16-71	RJA				
A	0069	10-26-70	RJA	F	0236	12-11-71	RJA				
B	0073	10-30-70	RJA	G	0239	12-21-71	RJA				
C	0084	11-18-70	RJA	H	0283	1-12-73	RJA				
D	0145	1-7-71	RJA								

1-CELL FPB SHELL
PARTS LIST

QTY.	C.S.L. DOC.	PART
2	—	VLIER #NS-51N SPRING PLUNGER
4	—	3/32 X 1/4 CADMIUM PLATED ROLL PIN
14	—	2-56 X 1/4 FLATHEAD SOCKET CAP SS SCREW
2	300.1-5	1 CELL EAR
1	300.1-6	STRUT PAIR
1	300.1-7	COVER PLATE PAIR
2	300.1-8	OVERLAY CLIP
2	300.1-9	CLIP REINFORCEMENT BAR
2	300.1-10	PIVOT BRACKET
2	300.1-11	RAIL SLIDE
2	300.1-12	RAIL SLIDE SPRING
2	300.1-13	EAR SPRING

CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	0055	10-23-70	RJA								
A	0057	10-26-70	RJA								

ONE CELL FACEPLATE BOX
MANUFACTURE AND SPECIFICATIONS

The intent of this document (300.1) is to set forth manufacturing and assembly specifications for parts relating to the faceplate box (FPB). In addition, options are presented for fabrication techniques employed in component manufacture. To this end, the following has been broken into two sections--section one deals with individual components of the faceplate box, while section two treats assembly specifications that must be met for acceptable units. Sections one and two are related by the fact that adherence to component tolerance specifications should result in acceptable assemblies. The manufacturer must assure himself of this by analysis of component and assembly documentation, his tooling and characteristics of his production processes.

Component Manufacture

From experience gained in limited production of faceplate components, certain parts have identified themselves as candidates for alternative manufacturing processes.

One of the most critical parts in the faceplate box assembly is the cell ear. This part serves the function of retaining the faceplate box in a frame cell while forces are applied that tend to push it out. In order that this function be served, the 75° angle of the ear fingers must be carefully controlled in manufacture. Two methods of fabrication have been indicated on drawing no. 300.1-5. Option 1 involves a bending process to change by 15° a machined right angle corner. Option 2 employs a machining process that generates the desired 75° angle. Either method is acceptable as long as the specified tolerances are maintained.

Drawing no. 300.1-7 is the cover plate pair. These covers are formed from .090 thick aluminum stock. The 90° angles at the corners indicate zero radius bends. This restriction may be relaxed somewhat as long as this corner does not interfere with the .015 break on the strut pair corners (drawing no. 300.1-6). In addition, the countersink for the 2-56 flat head screws on the covers must be deep enough to completely recess the heads if the outside bend radius is increased.

Assembly Specifications

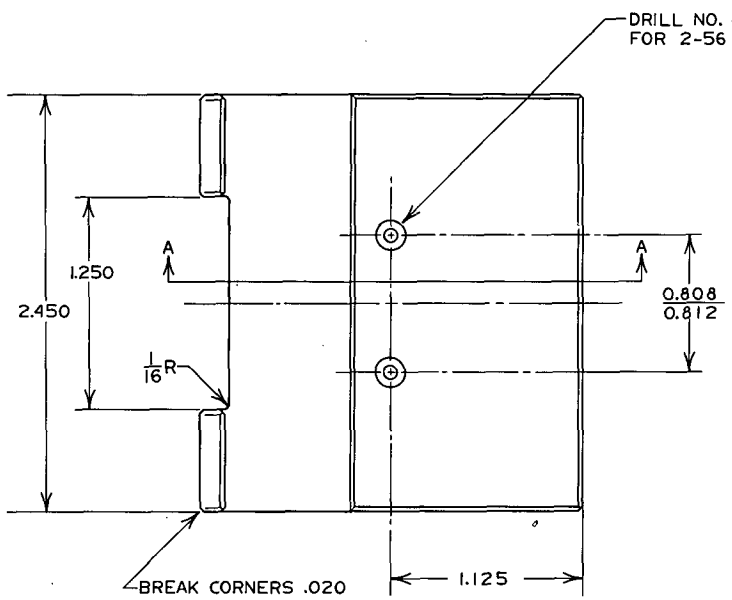
Drawings 300.1-15, 300.1-16, 300.1-17, and 300.1-18 are various views of assembled faceplate box components. These drawings indicate maximum and minimum finished dimensions as well as assembly techniques to be applied in manufacture.

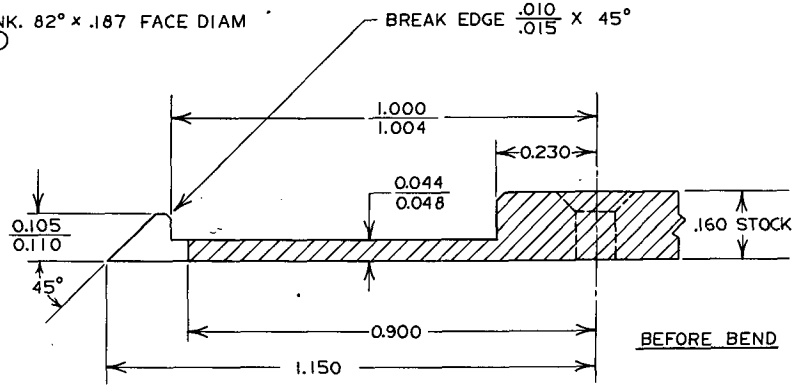
Drawing 300.1-18 is the rear view of the strut pair and cover plate pair assembled. The slot width formed by the space between upper and lower covers should be inspected at the connector end of the box due to the fact that this slot tapers somewhat toward the overlay clip which is retained by the covers.

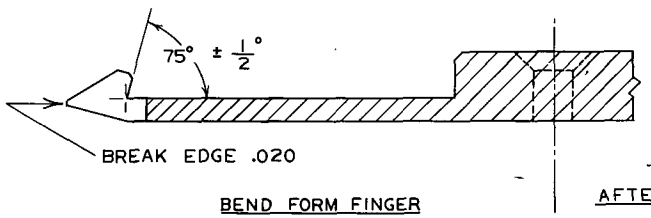
A section through the front of a complete box appears in drawing 300.1-17. This drawing indicates assembled dimensions of the overlay clip with respect to the strut end.

The ear placement on the finished box is critical to the proper functioning of the box. It is therefore necessary to insure finished ear placement dimensions and tolerance. Drawing 300.1-16 shows the required spacing between ears on a completed box. This dimension may be controlled by the addition of brass shims between the pivot bracket and ear. Shim size is indicated on this same drawing.

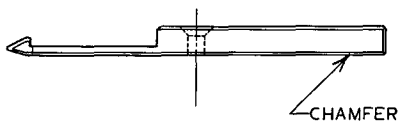
ISSUE	0065	10-23-70	RJA



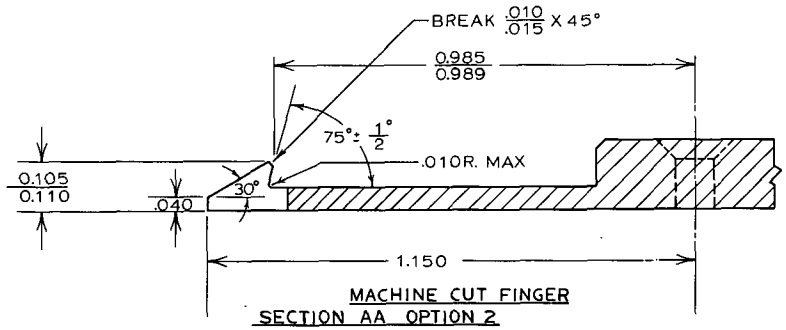




BEND FORM FINGER
SECTION AA OPTION 1



CHAMFER EDGES .020 X 45°



MACHINE CUT FINGER
SECTION AA OPTION 2

MATERIAL: .160 ALUM. 2024-T351

DIMENSIONS: ± .005 U.O.N.

FINISH: CSL SPEC. MF1

CHANGE NO.	DATE	DESCRIPTION
G	12-21-71	E.C.O. 0239 RJA
ISSUE	10-22-70	E.C.O. 0065 RJA

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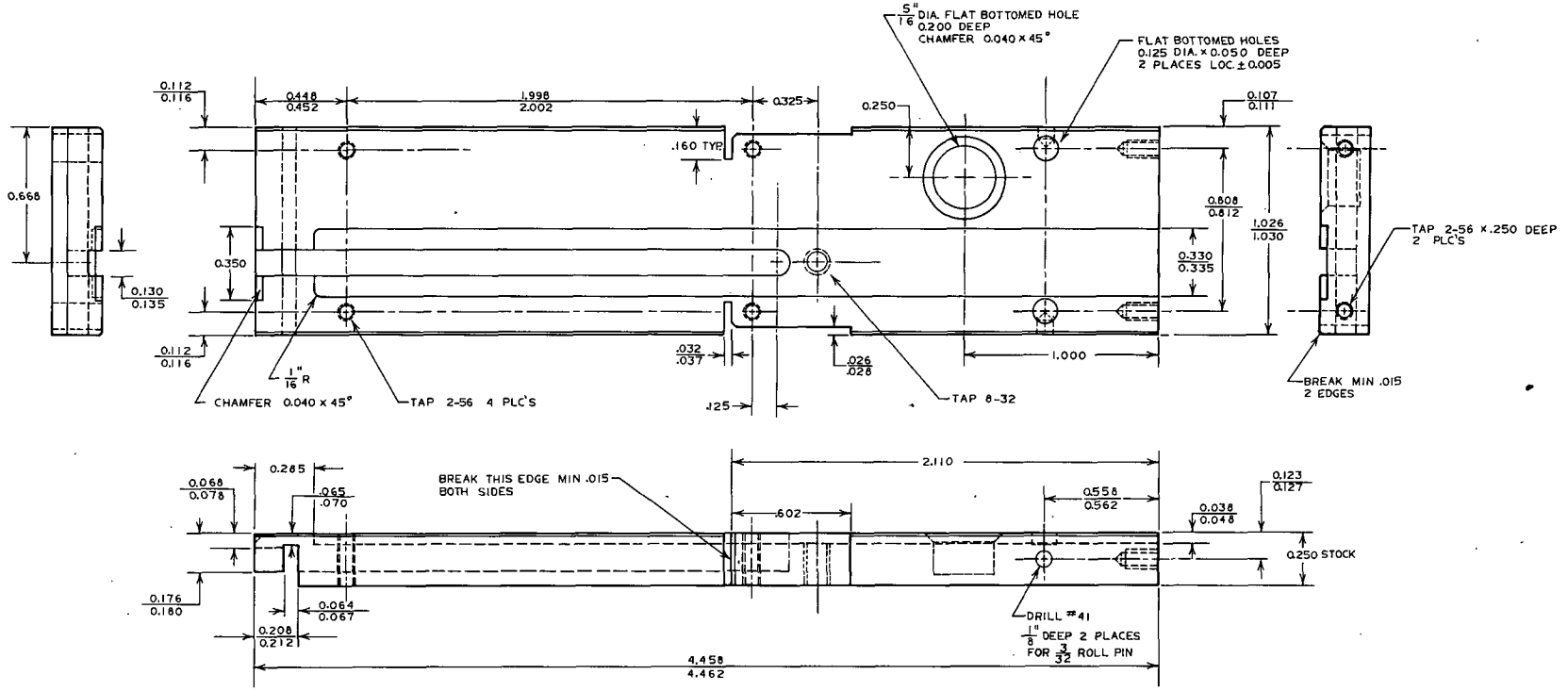
MACROMODULAR PROJECT

TITLE: 1-CELL EAR

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
BCJ	PROD	6-5-70	WAC	300.1-5
			DRAWN BY PLL	
			CHECKED WAC	DATE 5-8-70



0.250 ALUMINUM - 6061-T6
1 LEFT HAND REQ'D.
1 RIGHT HAND REQ'D.

ALL DIMENSIONS ± .005 U.O.N.
FINISH: CSL SPEC. MF 1

CHANGE NO.	DATE	DESCRIPTION
B	10-30-70	E.C.O. 0073 RJA
ISSUE	10-22-70	E.C.O. 0065 RJA

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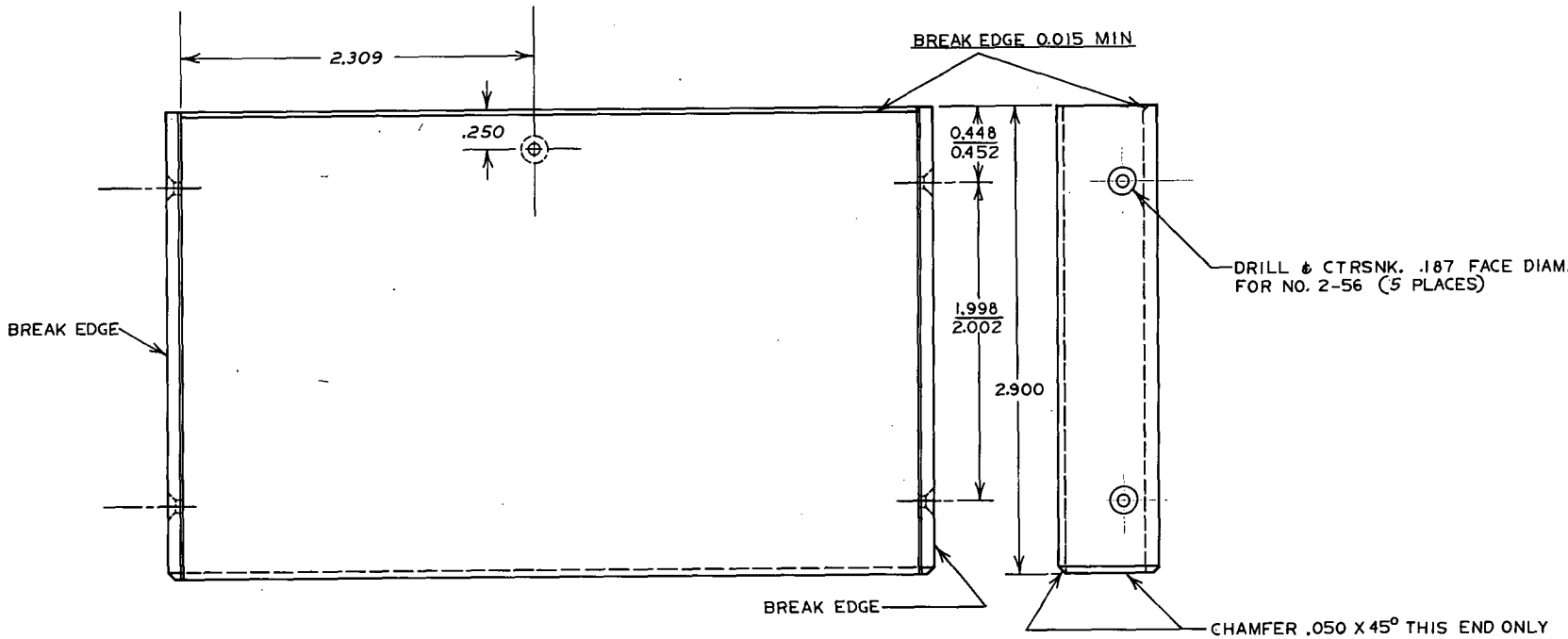
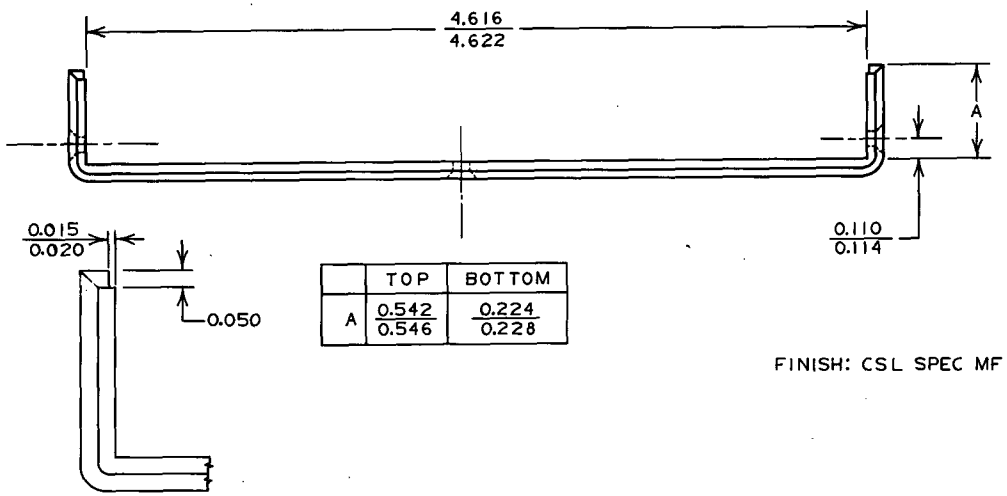
MACROMODULAR PROJECT

TITLE: STRUT PAIR

APPROVED			DRAWN BY	DRAWING NO.
BY	FOR	DATE	WAC	300.1-6
Dept	PROD	6-5-70	CHECKED BY PLL	
			WAC	DATE 12-5-69





	TOP	BOTTOM
A	0.542 / 0.546	0.224 / 0.228

FINISH: CSL SPEC MF1

0.090 ALUMINUM - 3003-H14

1 TOP PLATE REQ'D.
1 BOTTOM PLATE REQ'D.

CHANGE NO.	DATE	DESCRIPTION
ISSUE	10-22-70	E.C.O. 0065 RJA

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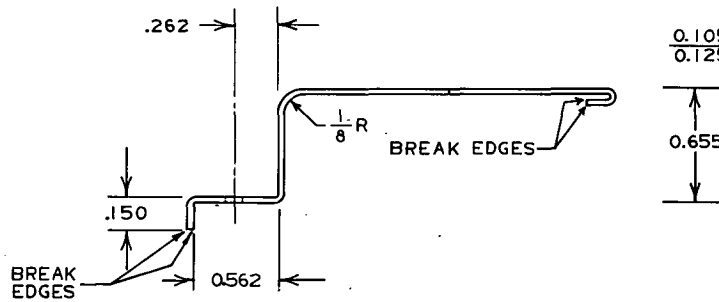
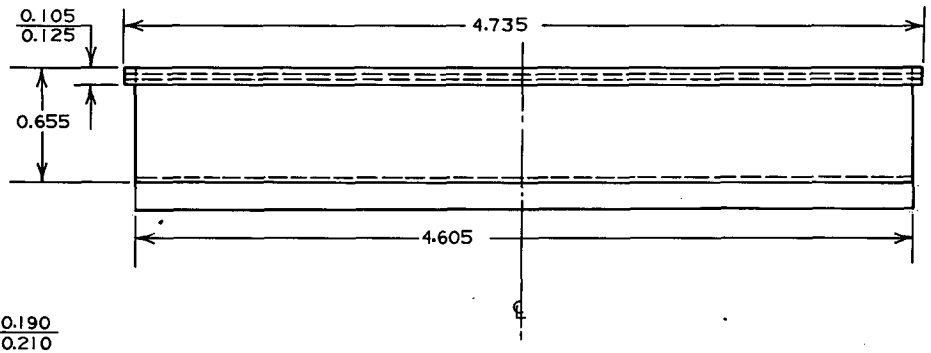
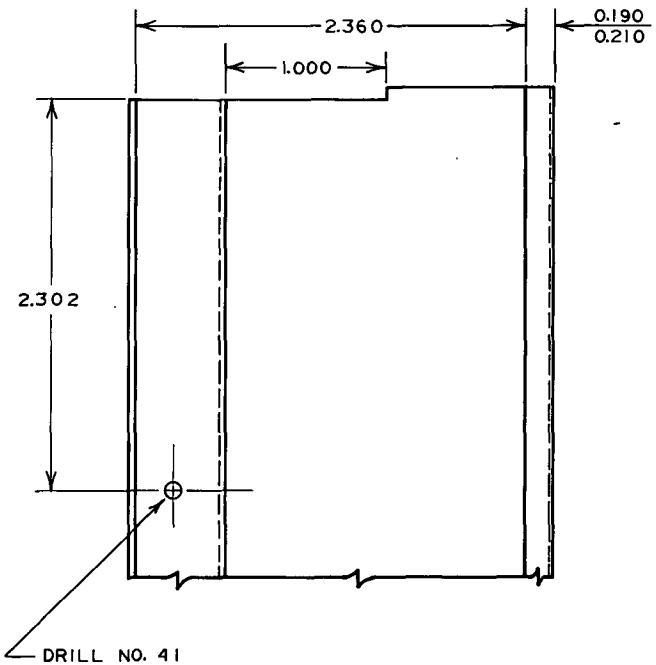
MACROMODULAR PROJECT

TITLE: COVER PLATE PAIR

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG	DRAWING NO.
			WAC	
gcf	PROD	6-5-70	DRAWN BY PLL	300.1-7
			CHECKED WAC	DATE 12-5-69







0.030 ALUMINUM - 3003 - H14
ALL DIMENSIONS ±.005 U.O.N.
FINISH: CSL SPEC MF1

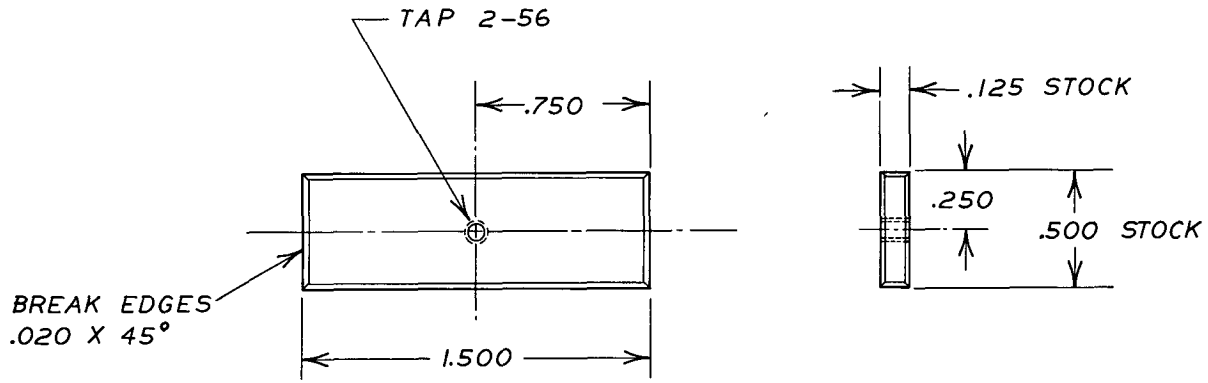
CHANGE NO.	DATE	DESCRIPTION
H	1-12-73	E.C.O. 0283 RJA
ISSUE	10-22-70	E.C.O. 0065 RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: OVERLAY CLIP

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG	DRAWING NO.
			WAC	300.1-8
JCJ	PROD.	6-5-70	DRAWN BY PLL	
			CHECKED WAC	DATE 12-6-69



2 REQUIRED
MATERIAL: 6061-T6 ALUM
DIMENSIONS: ±.005 U.O.N.

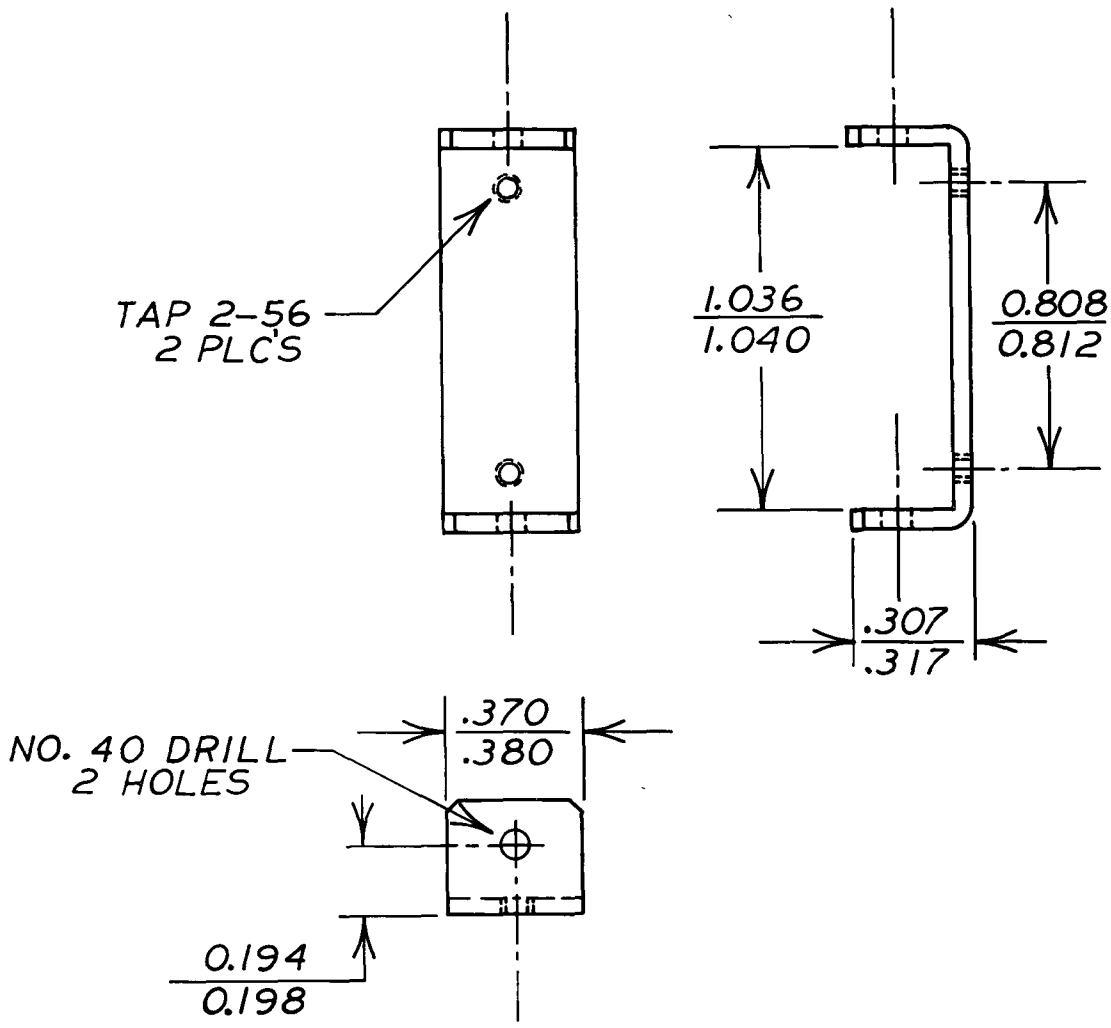
CHANGE NO	DATE	DESCRIPTION
ISSUE	10-22-70	ECO 0065 RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
CLIP REINFORCEMENT BAR

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG	DRAWING NO
			RJA	300.1-9
			DRAWN BY PLL	
			CHECKED RJA	DATE 10-21-70



MAT'L: .040 S.S. – 304
BREAK CORNERS .050

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST LOUIS, MISSOURI

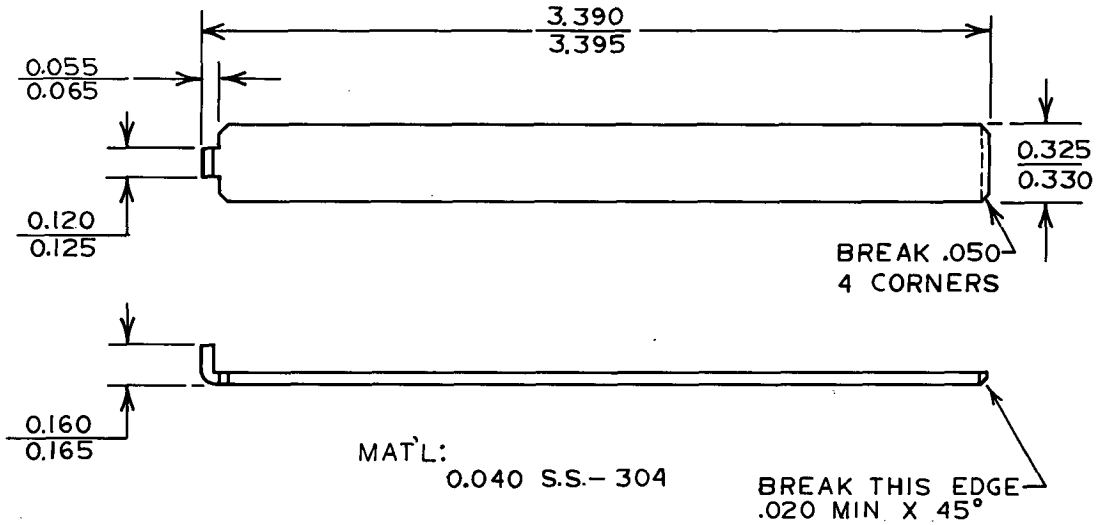
MACROMODULAR PROJECT

TITLE: PIVOT BRACKET

CHANGE NO	DATE	DESCRIPTION
ISSUE	10-22-70	E.C.O. 0065 RJA

APPROVED BY	FOR	DATE
BCJ	PROD	6-16-70

ENG: WAC
DRAWN BY: PLL
CHECKED: WAC
DRAWING NO: 300.1-10
DATE: 12-6-69



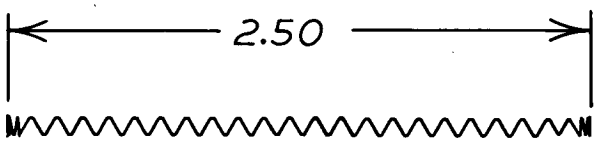
CHANGE NO.	DATE	DESCRIPTION
D	1-8-71	E.C.O. 0145 RJA
ISSUE	10-22-70	E.C.O. 0065 RJA

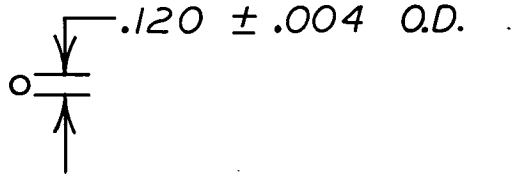
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
RAIL SLIDE

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
			WAC	300.1-11
RCJ	PROD	6-5-70	DRAWN BY PLL	
			CHECKED WAC	DATE 12-6-69





LOAD = 2 POUNDS ± 10% AT 1.5 INCHES
COMPRESSED LENGTH.
(.016 MUSIC WIRE - APPROX.
40 ACTIVE COILS)

NOTE:
SPRING ENDS SHALL BE
SQUARED AND GROUND.
(APPROX $1\frac{1}{2}$ INACTIVE COILS)

COMPUTER SYSTEMS LABORATORY
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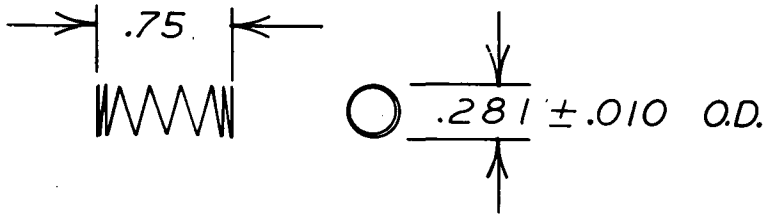
MACROMODULAR PROJECT

TITLE
RAIL SLIDE SPRING

CHANGE NO.	DATE	DESCRIPTION
A	10-26-70	E.C.O. 0067 RJA
ISSUE	10-22-70	E.C.O. 0065 RJA

APPROVED BY	FOR	DATE
JCJ	PROD	6-16-70

ENG WAC
DRAWN BY PLL
CHECKED WAC
DRAWING NO. 300.1-12
DATE 4-2-70



LOAD = 1 POUND ± 10% AT .140 INCH
COMPRESSED LENGTH
(.028 MUSIC WIRE - APPROX.
4 ACTIVE COILS)

NOTE:
SPRING ENDS SHALL
BE SQUARED AND
GROUND.
(APPROX. 1 1/2 INACTIVE COILS)

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

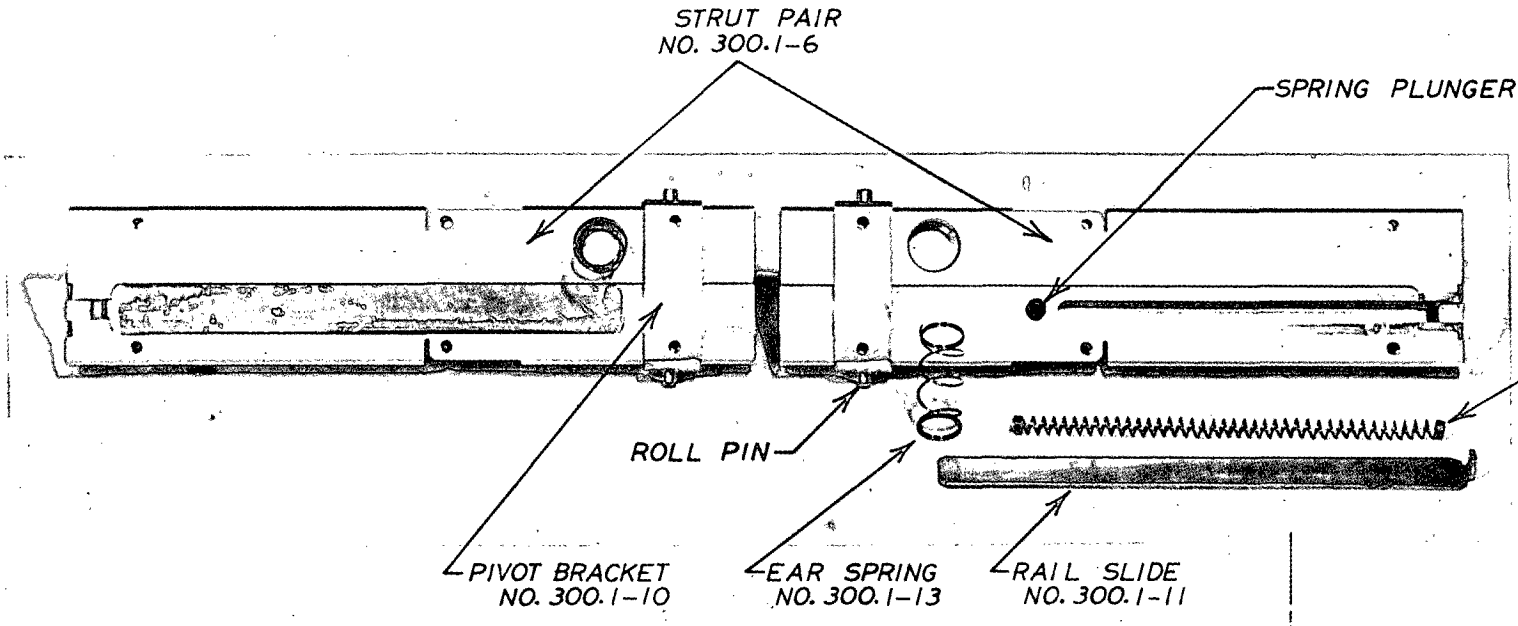
MACROMODULAR PROJECT

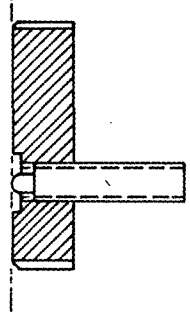
TITLE: EAR SPRING

CHANGE NO.	DATE	DESCRIPTION
E	3-16-71	E.C.O. 0163 RJA
A	10-26-70	E.C.O. 0067 RJA
ISSUE	10-22-70	E.C.O. 0065 RJA

APPROVED BY	FOR	DATE
DCJ	PROD	6-16-70

ENG: WAC
DRAWN BY: PLL
CHECKED:
DRAWING NO.: 300.1-13
DATE: 6-5-70





SPRING PLUNGER
INSTALLATION
DETAIL

CHANGE NO.	DATE	DESCRIPTION
F	12-14-71	E.C.O. 0236 nTK
ISSUE	10-22-70	E.C.O. 0065 RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
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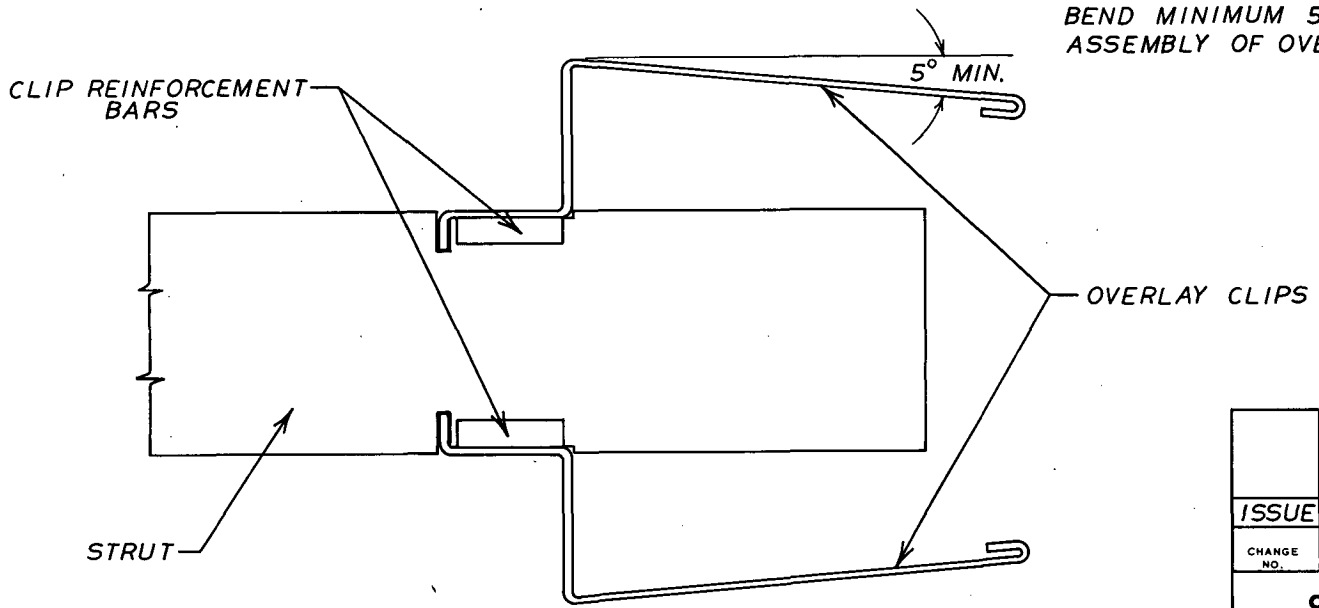
MACROMODULAR PROJECT

TITLE
STRUT PAIR SUBASSEMBLY

APPROVED BY	FOR	DATE
DCJ	PROD.	6-5-70

ENG. WAC
DRAWN BY PLL
CHECKED WAC

DRAWING NO. 300.1-14
DATE 6-5-70



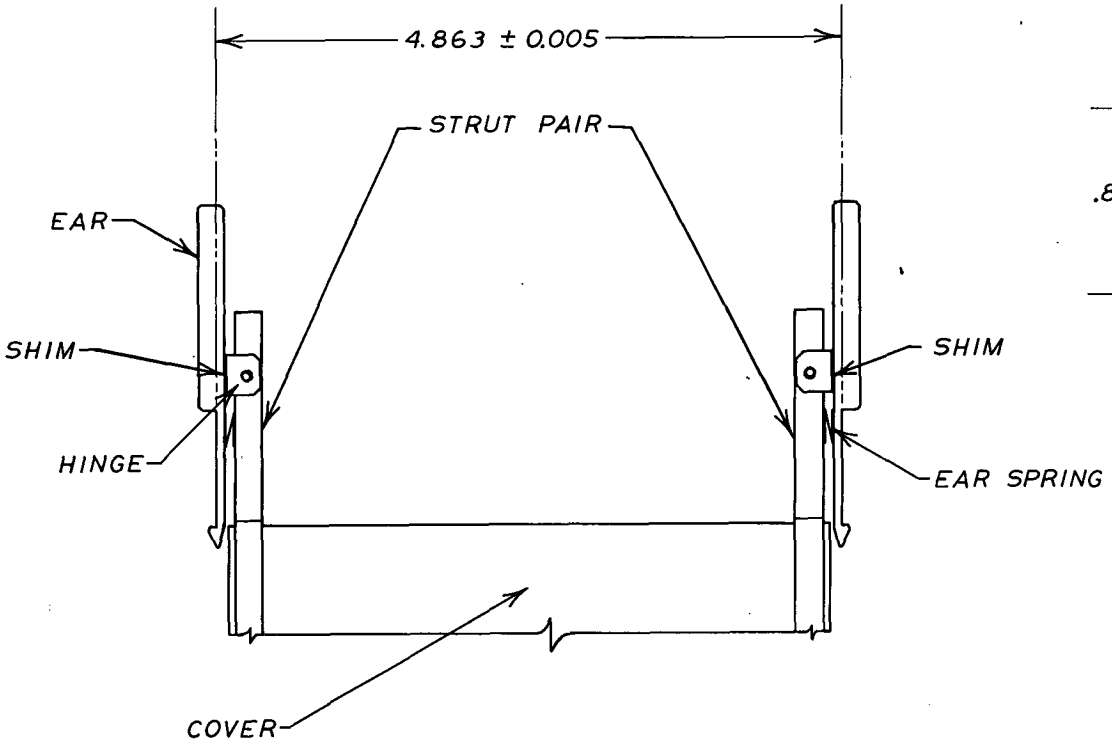
CHANGE NO.	DATE	DESCRIPTION
ISSUE	10-22-70	E.C.O. 0065 RJA

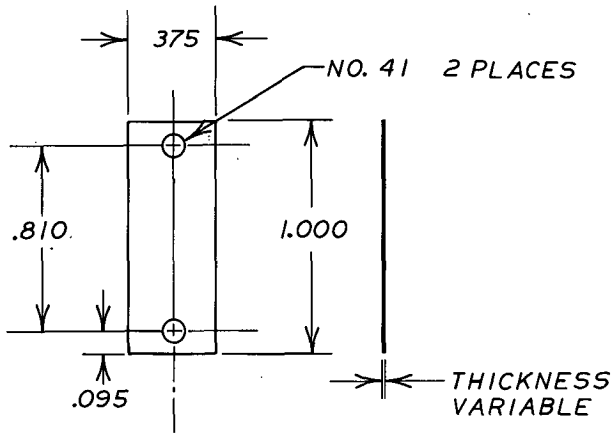
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
ASSEMBLY-INSPECTION DWG.
OVERLAY CLIP BEND AT ASSEMBLY

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
	PROD.	10-23-70	RJA	300.1-15
			DRAWN BY PLL	
			CHECKED RJA	DATE 10-22-70





SHIM

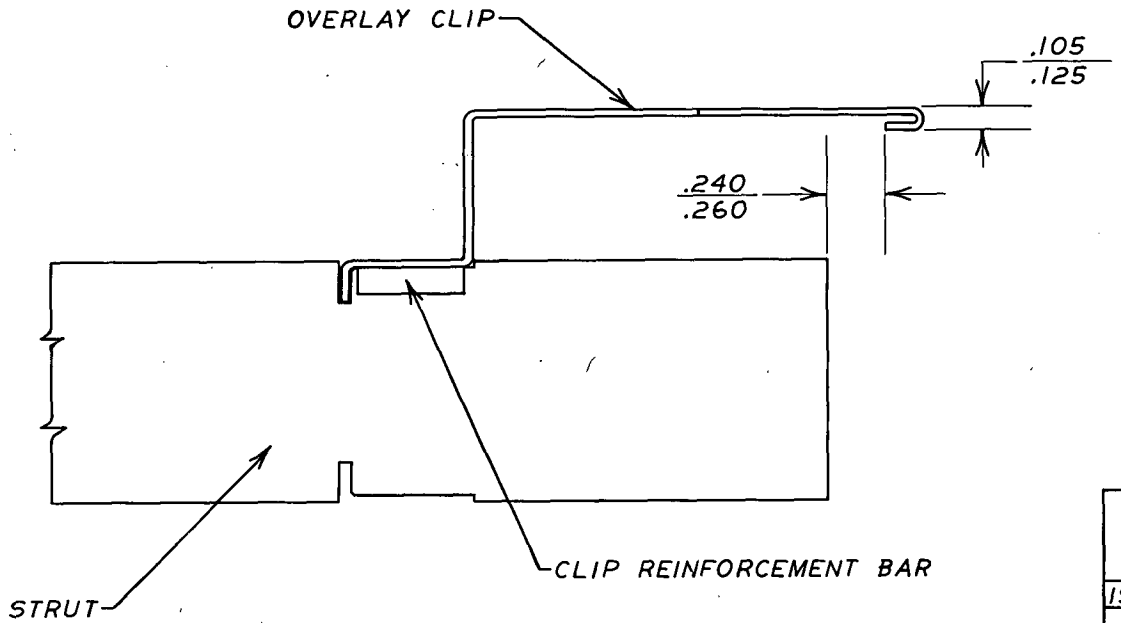
CHANGE NO.	DATE	DESCRIPTION
ISSUE	10-22-70	E.C.O. 0065 RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
ASSEMBLY-INSPECTION DWG.
EAR & SHIM PLACEMENT

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
	PROD.	10-23-70	RJA	300.1-16
			DRAWN BY PLL	
			CHECKED RJA	DATE 10-21-70



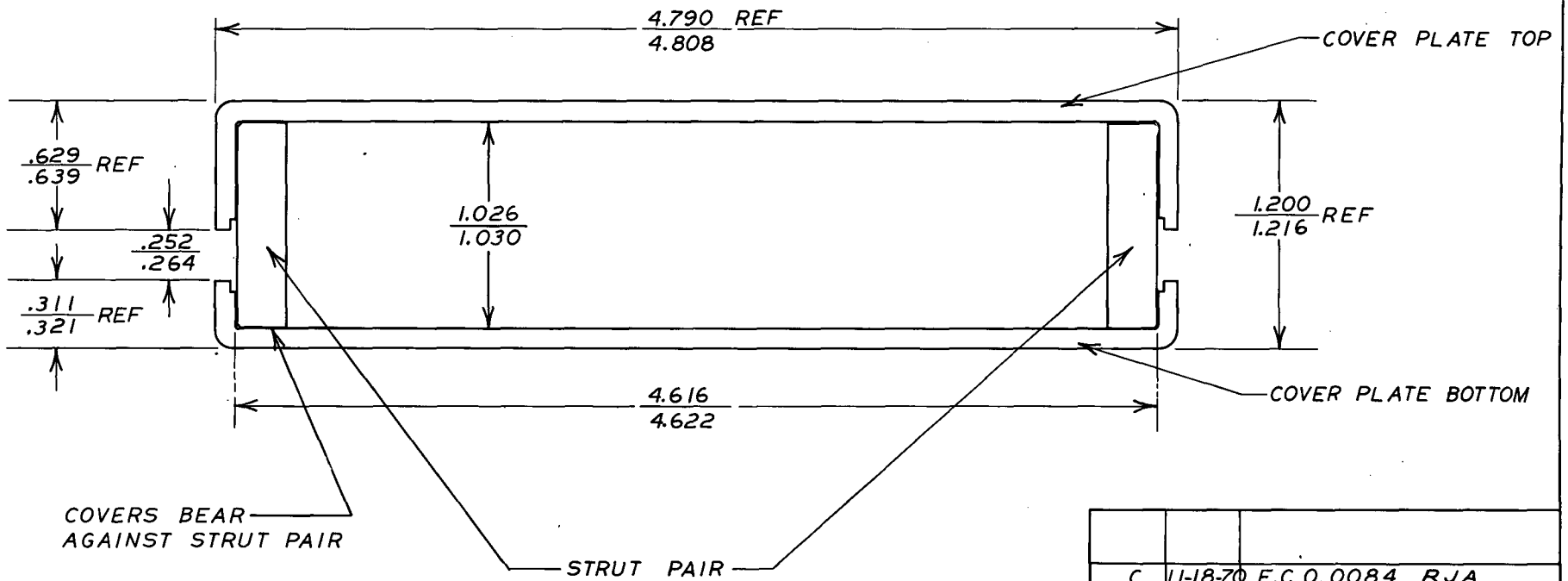
CHANGE NO.	DATE	DESCRIPTION
ISSUE	10-22-70	E.C.O. 0065 RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
ASSEMBLY-INSPECTION DWG.
OVERLAY CLIP ASSEMBLY

APPROVED			ENG.	DRAWING NO.
BY	FOR	DATE	RJA	300.1-17
[illegible]	PROD.	10-23-70	DRAWN BY PLL	
			CHECKED RJA	DATE 10-22-70



BOX DIMENSIONS

MAT'L. TOLERANCES: ± 0.003 REF

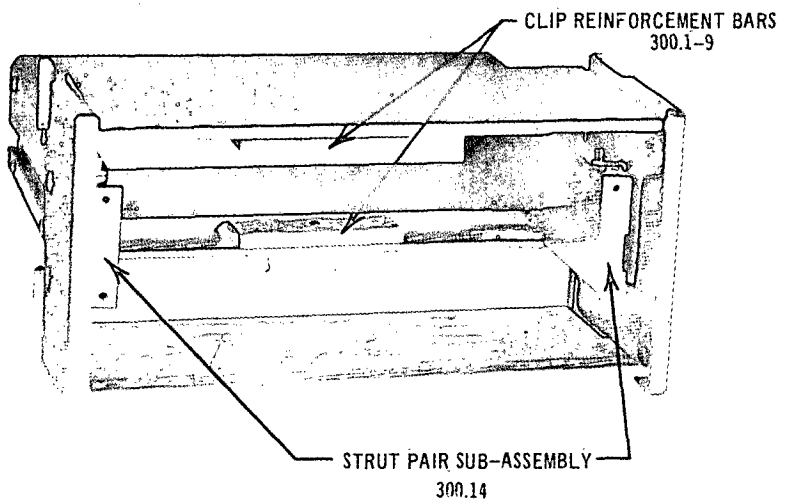
CHANGE NO.	DATE	DESCRIPTION
C	11-18-70	E.C.O. 0084 RJA
ISSUE	10-22-70	E.C.O. 0065 RJA

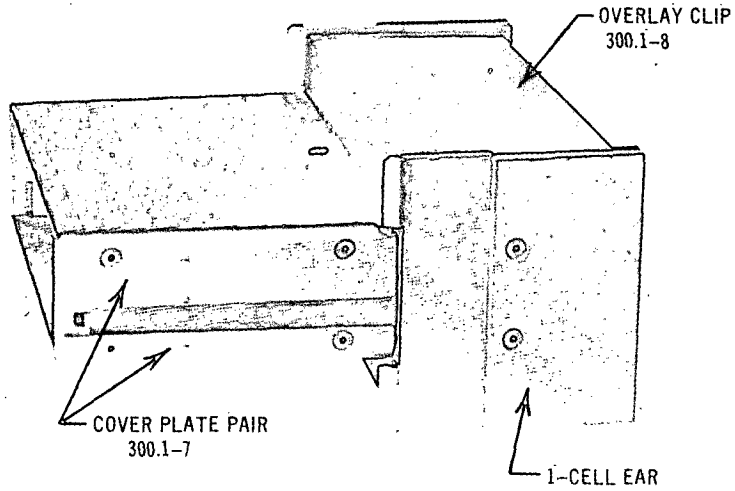
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

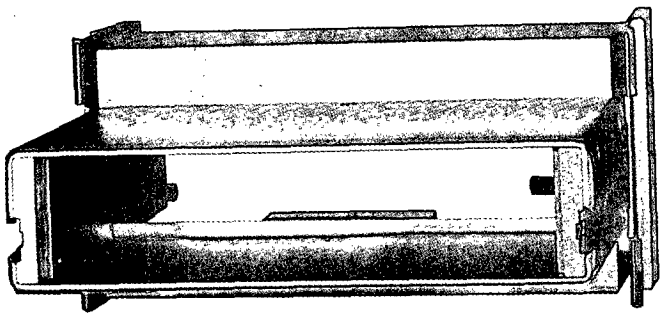
MACROMODULAR PROJECT

TITLE
ASSEMBLY-INSPECTION DWG
STRUT & COVER PLATE ASSEMBLY

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
	PROD.	10-23-70	RJA	300.1-18
			DRAWN BY PLL	
			CHECKED RJA	DATE 10-22-70







CHANGE NO.	DATE	DESCRIPTION
G	12-21-71	E.C.O. 0239 RJA
ISSUE	10-23-70	E.C.O. 0065 RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
I-CELL FPB SHELL ASSEMBLY

APPROVED BY	FOR	DATE
[illegible]	PROD	6-5-70

ENG. WAC
DRAWN BY MBP
CHECKED RJA
DRAWING NO. 300.1-19
DATE 10-23-70

2-CELL FPB SHELL

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	-	1-24-72	RJA								
A	0260	4-4-72	RJA								

2-CELL FPB SHELL
PARTS LIST

QTY.	C.S.L. DOC.	PART
4	–	VLIER #NS-51N SPRING PLUNGER
8	–	3/32 x 1/4 CADMIUM PLATED ROLL PIN
28	–	2-56 x 1/4 FLATHEAD SOCKET CAPP S.S SCREW
2	300.2-5	TWO CELL EAR
1	300.2-6	TWO HIGH FACEPLATE
1	300.2-7	MULTI HEIGHT FACEPLATE BOX WIRING GUARD
2	300.1-6	STRUT PAIR
2	300.1-7	COVER PLATE PAIR
2	300.1-8	OVERLAY CLIP
2	300.1-9	CLIP REINFORCEMENT BAR
4	300.1-10	PIVOT BRACKET
4	300.1-11	RAIL SLIDE
4	300.1-12	RAIL SLIDE SPRING
4	300.1-13	EAR SPRING

CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	–	1-24-72	RJA								
A	0260	4-4-72	RJA								

TWO CELL FACEPLATE BOX

MANUFACTURE AND SPECIFICATIONS

The intent of this document (300.2) is to set forth manufacturing and assembly specifications for parts relating to the 2-cell faceplate box (FPB). In addition, options are presented for fabrication techniques employed in component manufacture. To this end, the following has been broken into two sections--section one deals with individual components of the faceplate box, while section two treats assembly specifications that must be met for acceptable units. Sections one and two are related by the fact that adherence to component tolerance specifications should result in acceptable assemblies. The manufacturer must assure himself of this by analysis of component and assembly documentation, his tooling and characteristics of his production processes.

Component Manufacturer

From experience gained in limited production of faceplate components, certain parts have identified themselves as candidates for alternative manufacturing processes.

One of the most critical parts in the faceplate box assembly is the cell ear. This part serves the function of retaining the faceplate box in a frame cell while forces are applied that tend to push it out. In order that this function be served, the 75^{o} angle of the ear fingers must be carefully controlled in manufacture. Two methods of fabrication have been indicated on drawing no. 300.1-5. Option 1 involves a bending process to change by 15^{o} a machined right angle corner. Option 2 employs a machining process that generates the desired 75^{o} angle. Either method is acceptable as long as the specified tolerances are maintained.

REV.	ECN.	DATE	APPR.
ISSUE	-	1-24-72	RJA

Drawing no. 300.1-7 is the cover plate pair. These covers are formed from .090 thick aluminum stock. The 90° angles at the corners indicate zero radius bends. This restriction may be relaxed somewhat as long as this corner does not interfere with the .015 break on the strut pair corners (drawing no. 300.1-6). In addition, the countersink for the 2-56 flat head screws on the covers must be deep enough to completely recess the heads if the outside bend radius is increased.

Assembly Specifications

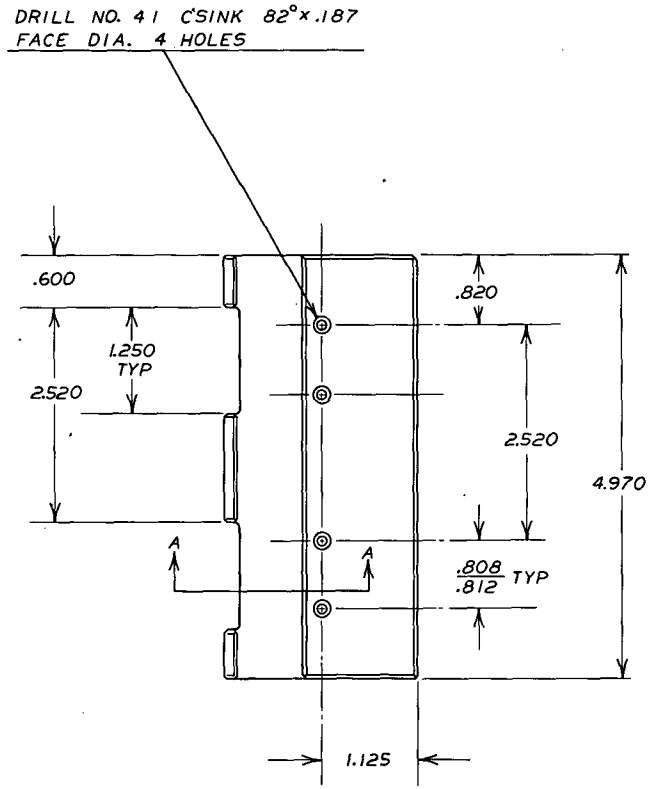
Drawings 300.1-15, 300.1-16, 300.1-17, and 300.1-18 are various views of assembled faceplate box components. These drawings indicate maximum and minimum finished dimensions as well as assembly techniques to be applied in manufacture.

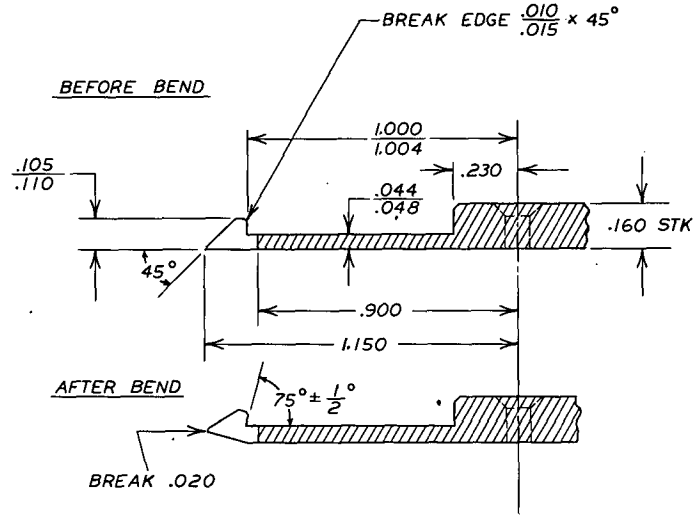
Drawing 300.1-18 is the rear view of a strut pair and cover plate pair assembled. The slot width formed by the space between upper and lower covers should be inspected at the connector end of the box due to the fact that this slot tapers somewhat toward the overlay clip which is retained by the covers.

A partial section through the front of a box appears in drawing 300.1-17. This drawing indicates assembled dimensions of the overlay clip with respect to the strut end.

The ear placement on the finished box is critical to the proper functioning of the box. It is therefore necessary to insure finished ear placement dimensions and tolerance. Drawing 300.1-16 shows the required spacing between ears on a completed box. This dimension may be controlled by the addition of brass shims between the pivot bracket and ear. Shim size is indicated on this same drawing.

CHG.	E.C.O.	DATE	APPR.
ISSUE	-	1-24-72	RJA





SECTION AA

OPTION 1 BEND FORM FINGER
SEE DWG. 300.1-5 FOR OPTION 2
MACHINE CUT FINGER

MAT'L: ALUM 2024-T351

FINISH: CSL SPEC MF 1

TOLERANCE U.O.N.

.XXX ±.005
.XX ±.010
X/X ±1/64

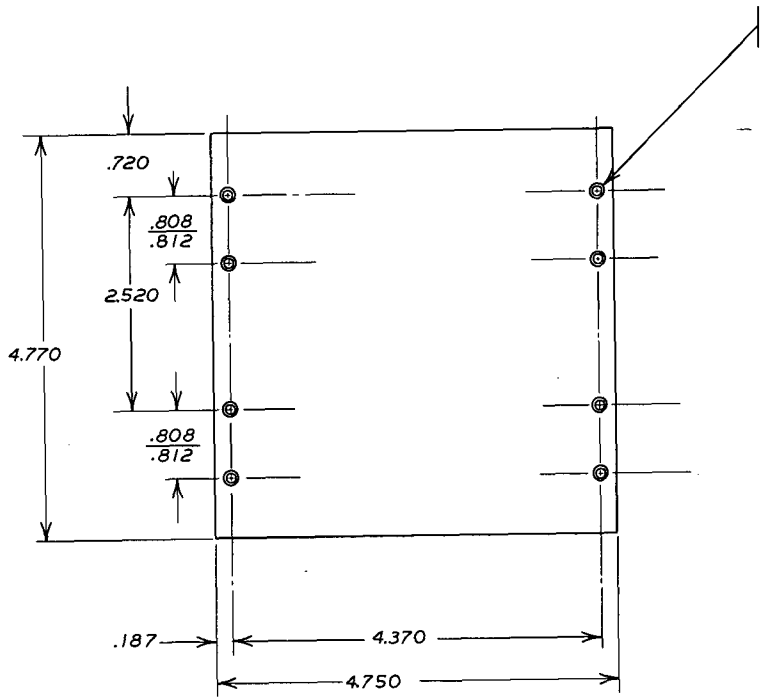
CHANGE NO.	DATE	DESCRIPTION
ISSUE	1-20-72	RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: TWO CELL EAR

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
RJA	PROD	1-31-72	RJA	300.2-5
			DRAWN BY PLL	
			CHECKED RJA	DATE 12-21-71



MAT'L .187 ALUM 6061-T6

FINISH: CSL SPEC MF 1

TOLERANCE U.O.N.

.XXX ± .005

.XX ± .010

$\frac{X}{X} \pm \frac{1}{64}$

CHANGE NO.	DATE	DESCRIPTION
ISSUE	1-20-72	RJA

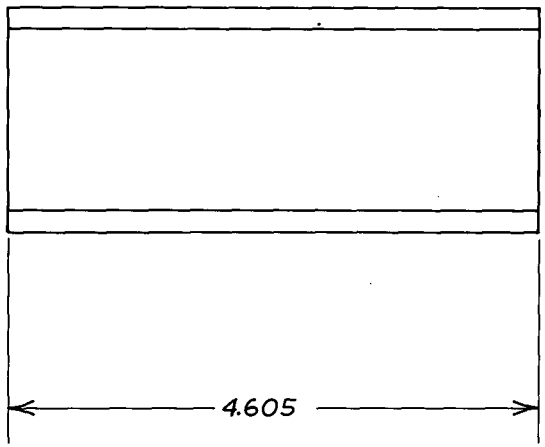
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

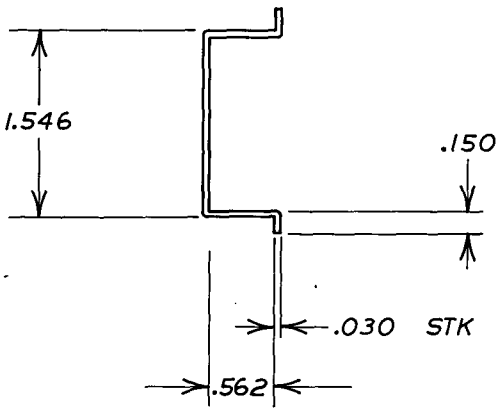
MACROMODULAR PROJECT

TITLE: TWO HIGH FACEPLATE

APPROVED BY	FOR	DATE
RJA	PROD	1-31-72

ENG. RJA
DRAWN BY PLL
CHECKED GM
DRAWING NO. 300.2-6
DATE 12-20-71





MAT'L: .030 ALUM 3003-H14

FINISH: CSL SPEC MF 1

TOLERANCE U.O.N.

.XXX ± .005

.XX ± .010

$\frac{X}{X} \pm \frac{1}{64}$

ISSUE	1-20-72	RJA
CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY

WASHINGTON UNIVERSITY

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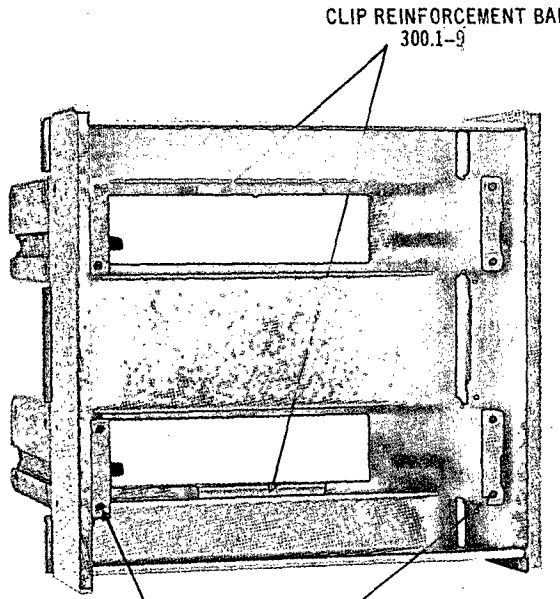
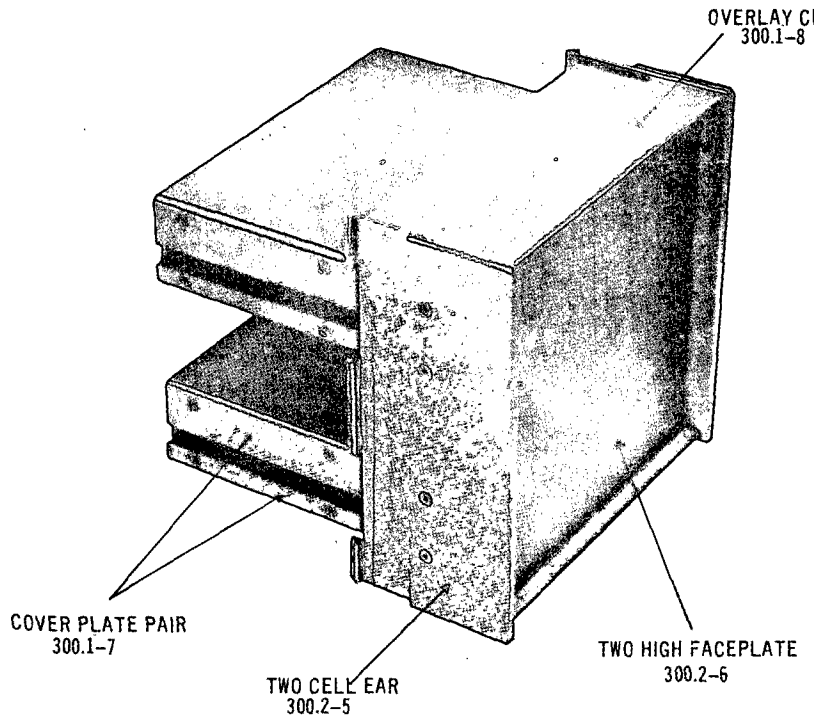
MACROMODULAR PROJECT

TITLE

MULTI HEIGHT FACEPLATE
BOX WIRING GUARD

APPROVED			ENG.	DRAWING NO.
BY	FOR	DATE	RJA	300.2-7
RJA	PROD	1-31-72	DRAWN BY PLL	
			CHECKED GM	DATE 12-20-71





ISSUE	–	1-24-72 RJA
CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: 2-CELL FPB SHELL ASSEMBLY

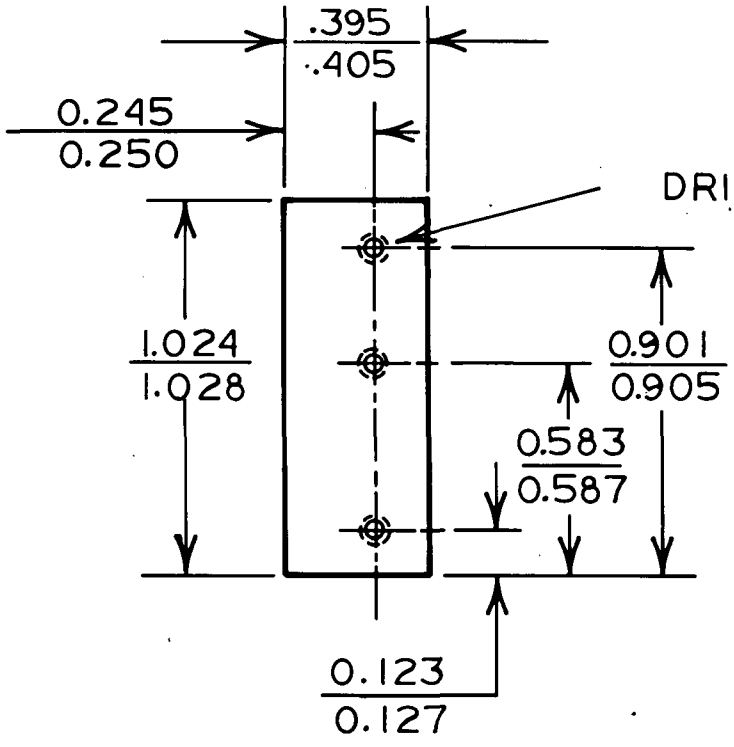
APPROVED BY	FOR	DATE
RJA	PROD.	1-31-72

ENG. RJA
DRAWN BY MBP
CHECKED GM

DRAWING NO. 300.2–8
DATE 1-24-72

FACEPLATE BOX VISCERA
PARTS

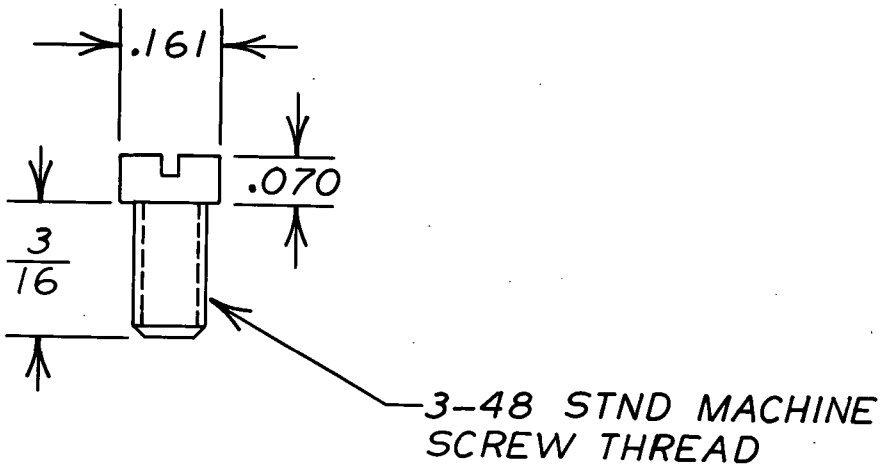
CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	0036	9-23-70	RCJ	E	0255	2-8-72	[illegible]	J	0292	6-13-73	RJA
A	0052	10-11-70	RCJ	F	0257	3-1-72	RJA	K	0300	11-7-73	
B	0059	10-20-70	[illegible]	G	0259	4-4-72	RJA				
C	0066	10-23-70	RJA	H	0280	1-8-73	RJA				
D	0229	11-1-71	RJA	I	0290	5-24-73	RJA				



CONNECTOR BRACKET
0.062 S.S.-304

BREAK CORNERS

COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			**MACROMODULAR PROJECT**
			TITLE FPB CONNECTOR BRACKET
			APPROVED: BY: BCJ; FOR: Prod.; DATE: 9-23-70
			ENG: WAC; DRAWN BY: PLL; CHECKED: BCJ
			DRAWING NO.: 300.5-2; DATE: 9-14-70
ISSUE	9-23-70	E.C.O. 0036 BCJ	
CHANGE NO.	DATE	DESCRIPTION	



DIM: ±.005

MATERIAL: SS

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

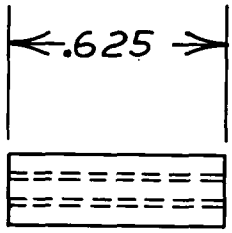
TITLE: FPB CONNECTOR BRACKET SCREW

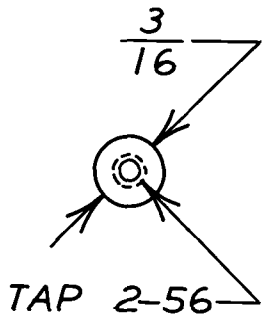
CHANGE NO.	DATE	DESCRIPTION
ISSUE	9-23-70	E.C.O. 0036 WCJ

APPROVED BY	FOR	DATE
WCJ	Prod.	9-23-70

ENG: WAC
DRAWN BY: PLL
CHECKED: WCJ

DRAWING NO.: 300.5-3
DATE: 9-14-70





MATERIAL: ALUM 6062-T651
DIMENSIONS: ± .005
SCREW MACHINE STOCK

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MACROMODULAR PROJECT

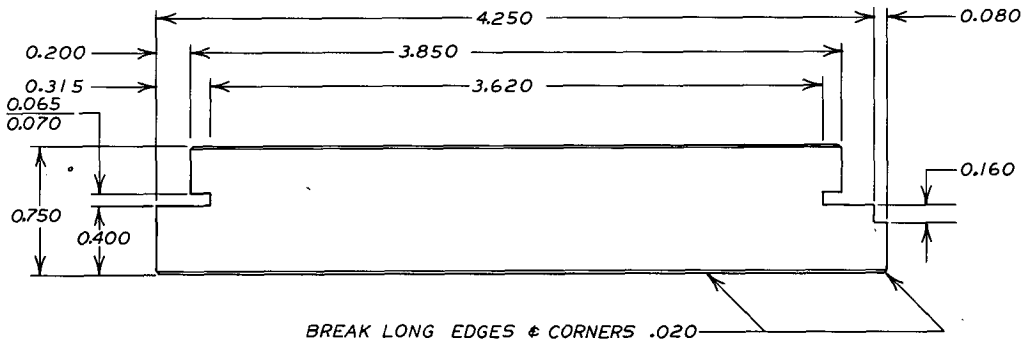
TITLE
ASTRO STAND-OFF

CHANGE NO.	DATE	DESCRIPTION
ISSUE	9-23-70	E.C.O. 0036 RCJ

APPROVED BY	FOR	DATE
RCJ	Prod.	9-23-70

ENG WAC
DRAWN BY PLL
CHECKED RCJ

DRAWING NO. 300.5-4
DATE 9-14-70



MATERIAL: .062 ALUM 2024-T3
DIMENSIONS: ±005 U.O.N
FINISH: CSL SPEC MF 1

CHANGE NO.	DATE	DESCRIPTION
ISSUE	9-23-70	CHG. E.C.O. 0036 BCJ

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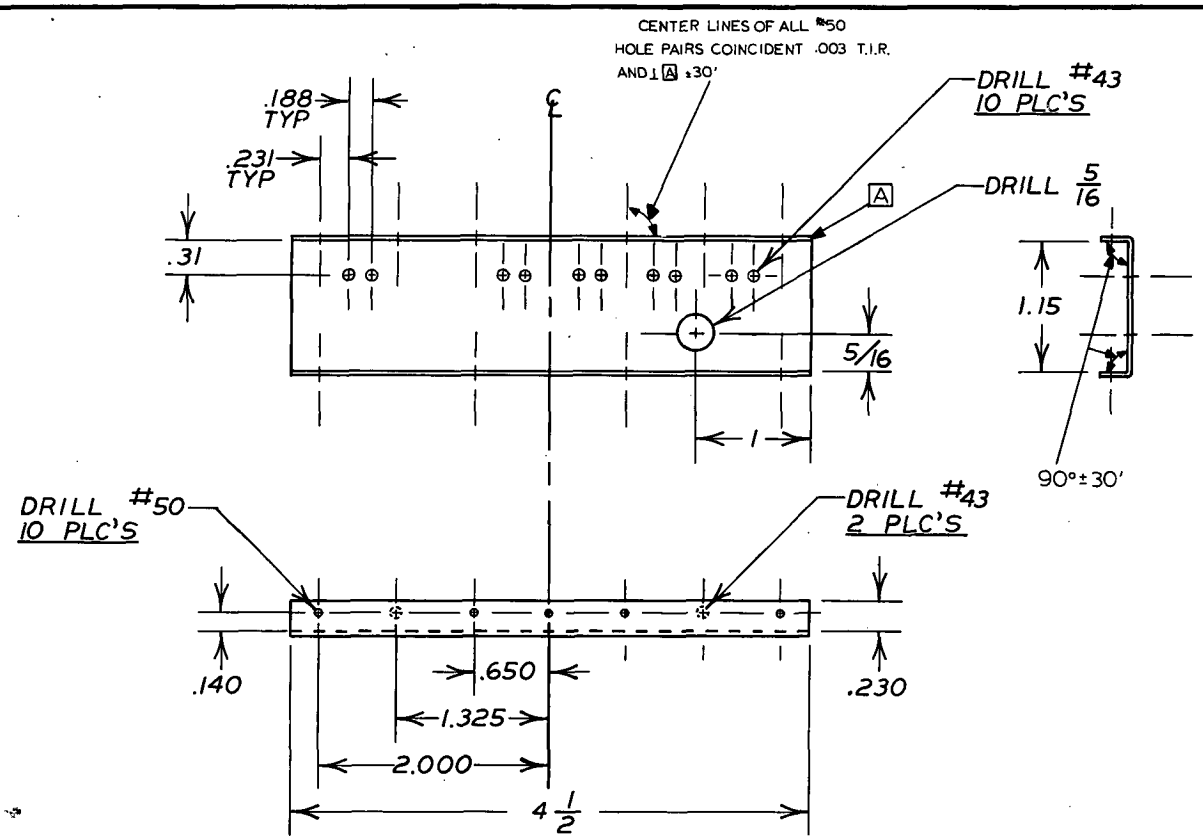
MACROMODULAR PROJECT

TITLE: FPB-KEY

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
BCJ	PROD	5-23-70	WAC	300.5-5
			DRAWN BY PLL	
			CHECKED WAC	DATE 5-19-70



TOLERANCE U.O.N.

.XXX	±.005
.XX	±.01
X/X	± 1/64

MAT'L: 3003-H14 ALUM .040 THICK
FINISH: ALODINE
REQ'D: 1

CHANGE NO.	DATE	DESCRIPTION
H	1-8-73	E.C.O. 0280 RJA
G	4-4-72	E.C.O. 0259 RJA
D	10-27-71	E.C.O. 0229 MTK

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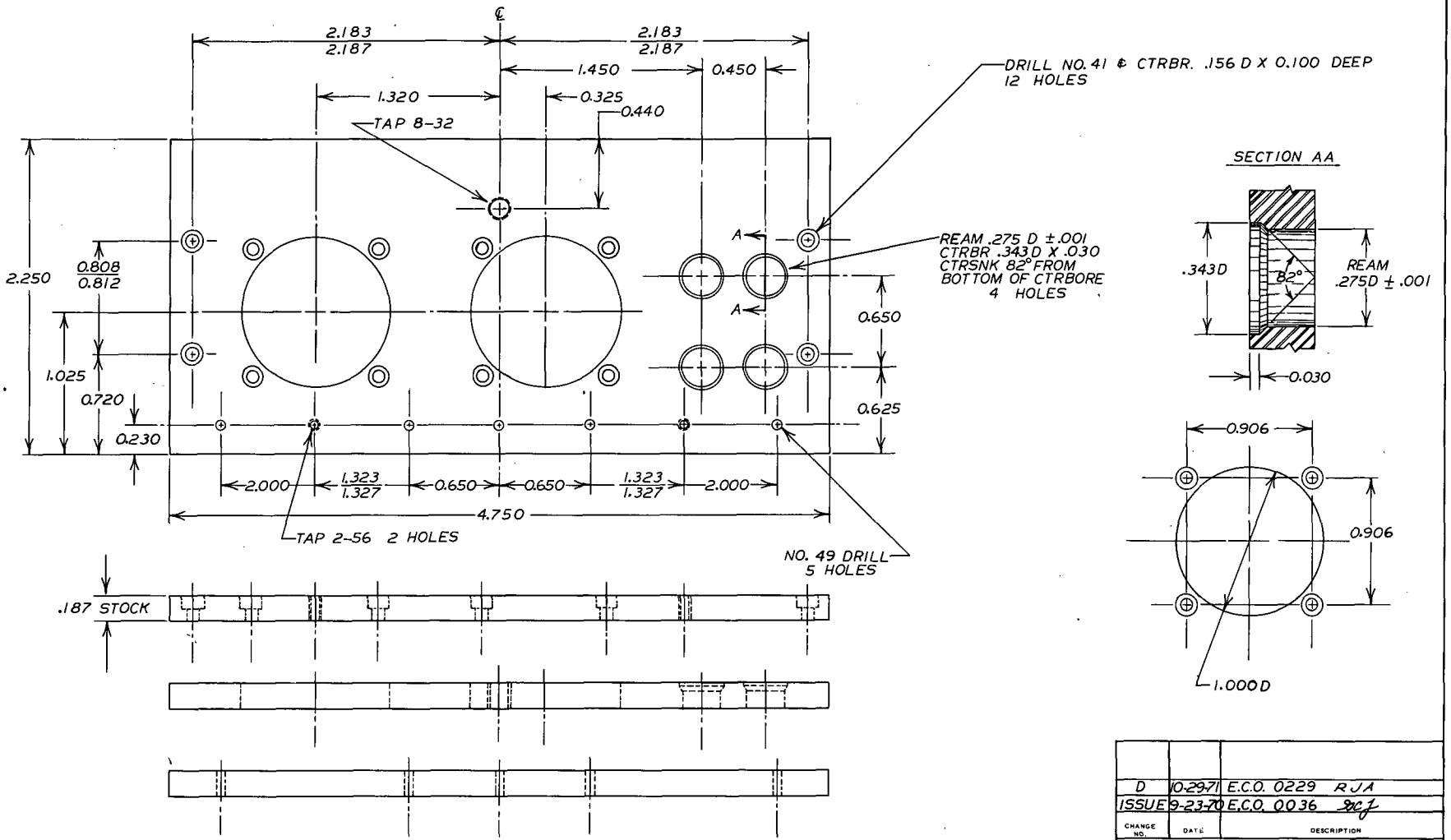
MACROMODULAR PROJECT

TITLE
FUNCTION CODE SWITCH BRACKET

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
	PROD	10-25	RJA	300.5-6
			DRAWN BY DHO	
			CHECKED	DATE 9-29-71



MATERIAL: .187 ALUMINUM 6061 - T6
DIMENSIONS: ± .005 U.O.N.
FINISH: CSL SPEC. MF 1

CHANGE NO.	DATE	DESCRIPTION
D	10-29-71	E.C.O. 0229 RJA
ISSUE	9-23-70	E.C.O. 0036 WCJ

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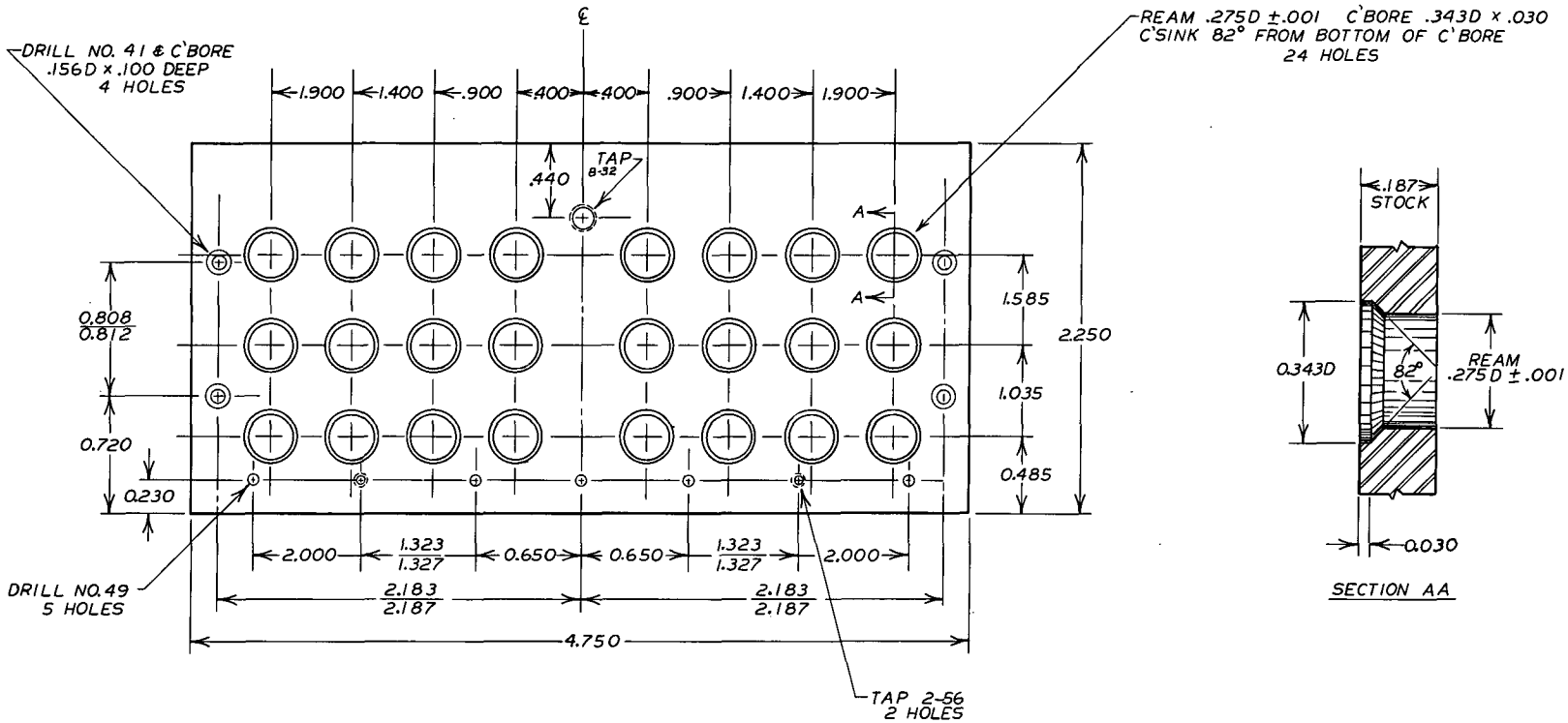
MACROMODULAR PROJECT

TITLE: TYPE 1 FACEPLATE

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
WCJ	PROD.	6-24-70	WAC	300.5-7
			DRAWN BY PLL	
			CHECKED WAC	DATE 5-19-70



SECTION AA

MAT'L: .187 ALUM 6061-T6
DIM: ±.005 U.O.N.
FINISH: CSL SPEC MF 1

CHANGE NO.	DATE	DESCRIPTION
D	10-29-71	E.C.O. 0229 RJA
C	10-23-70	E.C.O. 0066 RJA
ISSUE	9-23-70	E.C.O. 0036

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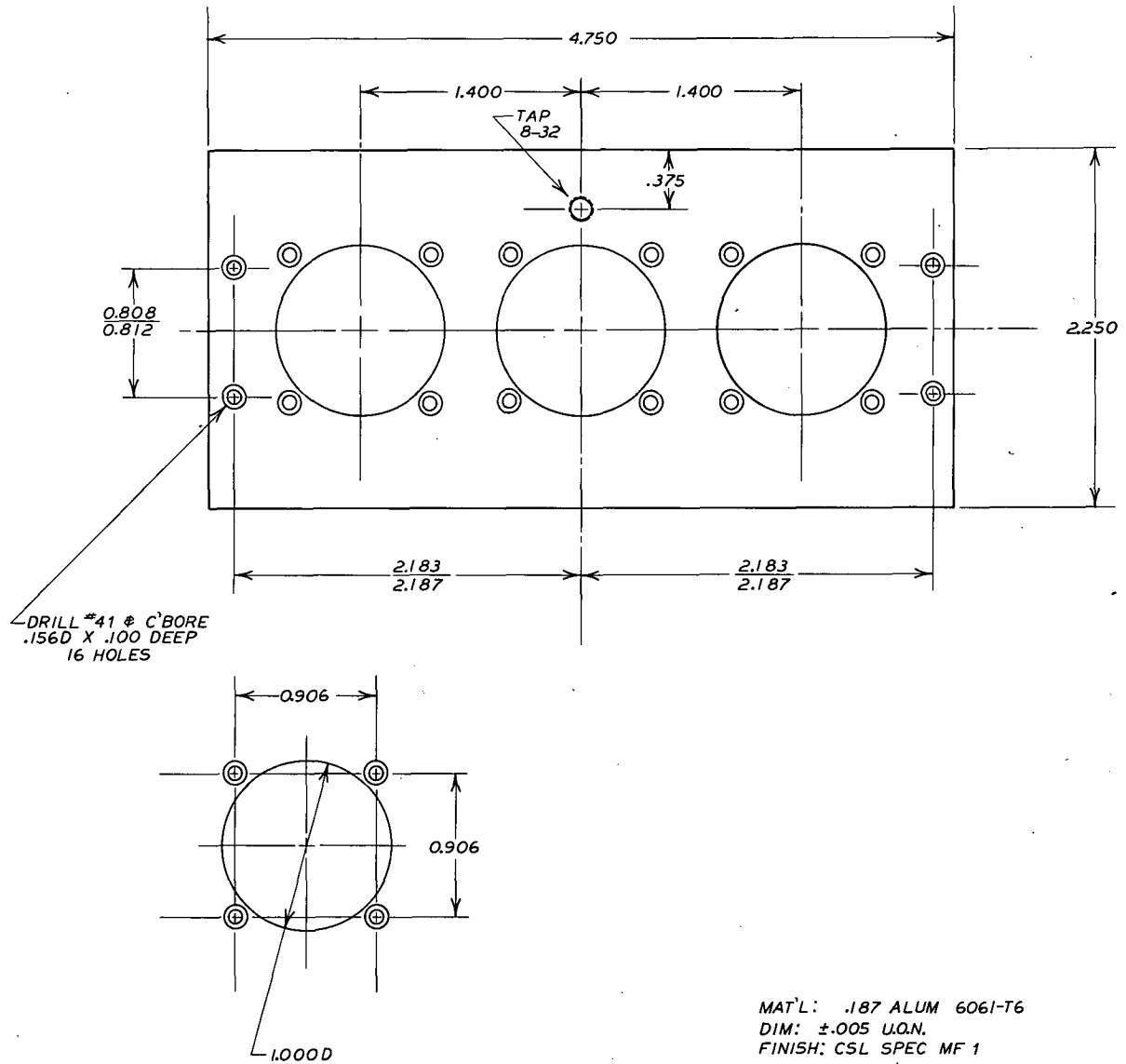
MACROMODULAR PROJECT

TITLE
TYPE 2 FACEPLATE

APPROVED BY	APPROVED FOR	DATE	ENG.	DRAWING NO.
	PROD.	7-24-70	WAC	300.5-8
			DRAWN BY PLL	
			CHECKED	DATE 5-27-70



MAT'L: .187 ALUM 6061-T6
DIM: ±.005 U.O.N.
FINISH: CSL SPEC MF 1

CHANGE NO.	DATE	DESCRIPTION
ISSUE	9-23-70	E.C.O. 0036 WCJ

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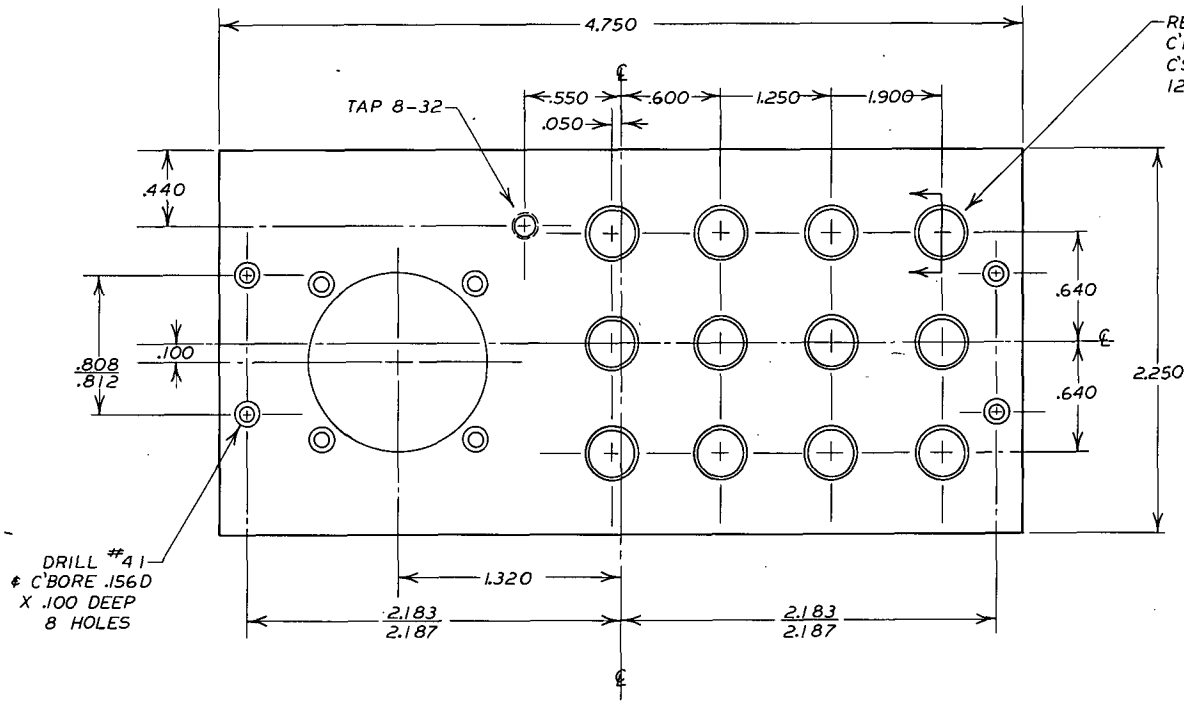
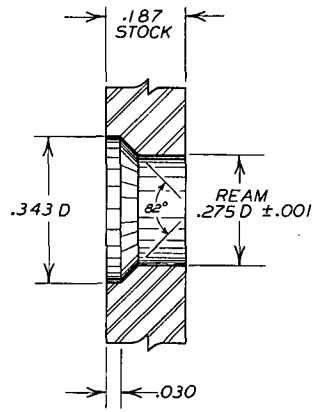
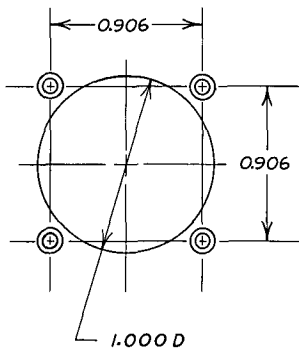
MACROMODULAR PROJECT

TITLE
TYPE 3 FACEPLATE

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
WCJ	PROD	7-24-70	WAC	300.5-9
			DRAWN BY PJL	
			CHECKED WAC	DATE 7-9-70







MAT'L: .187 ALUM 6061-T6
DIM: ± .005 U.O.N.
FINISH: CSL SPEC MF 1

CHANGE NO.	DATE	DESCRIPTION
		ISSUE 9-23-70 E.C.O. 0036 BCJ

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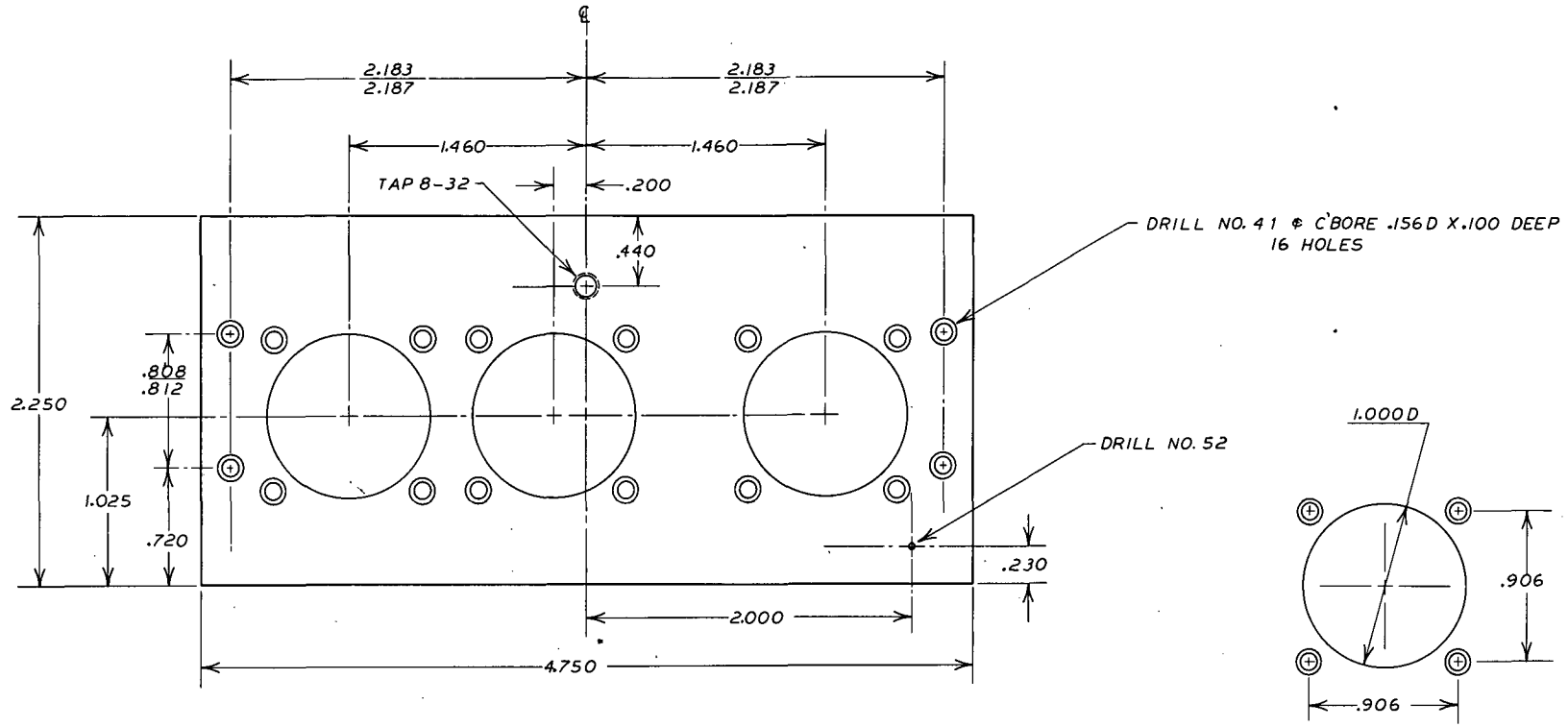
MACROMODULAR PROJECT

TITLE: TYPE 4 FACEPLATE

APPROVED BY	FOR	DATE	ENG. WAC	DRAWING NO. 300.5-10
BCJ	PROD.	7-24-70	DRAWN BY PLL	
			CHECKED WAC	DATE 7-9-70



MATERIAL: .187 ALUM 6061-T6
DIMENSIONS: ± .005 U.O.N.
FINISH: CSL SPEC MF-1

CHANGE NO.	DATE	DESCRIPTION
A	10-11-70	E.C.O. 0052 GCJ
ISSUE	9-23-70	E.C.O. 0036 GCJ

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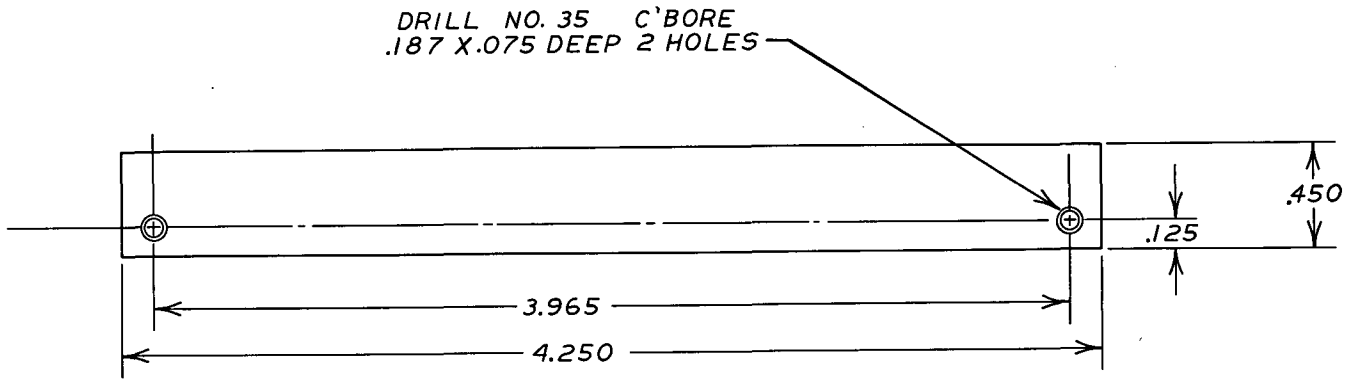
MACROMODULAR PROJECT

TITLE
TYPE 5 FACEPLATE

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
GCJ	PROD	9-23-70	GCJ	300.5-11
			DRAWN BY PLL	
			CHECKED GCJ	DATE 8-27-70



MATERIAL: .125 2326 BLUE, TRANSLUCENT PLEXIGLASS
TOLERANCES: ± 0.005 U.O.N.

CHANGE NO.	DATE	DESCRIPTION
B	10-20-70	E.C.O. 0059

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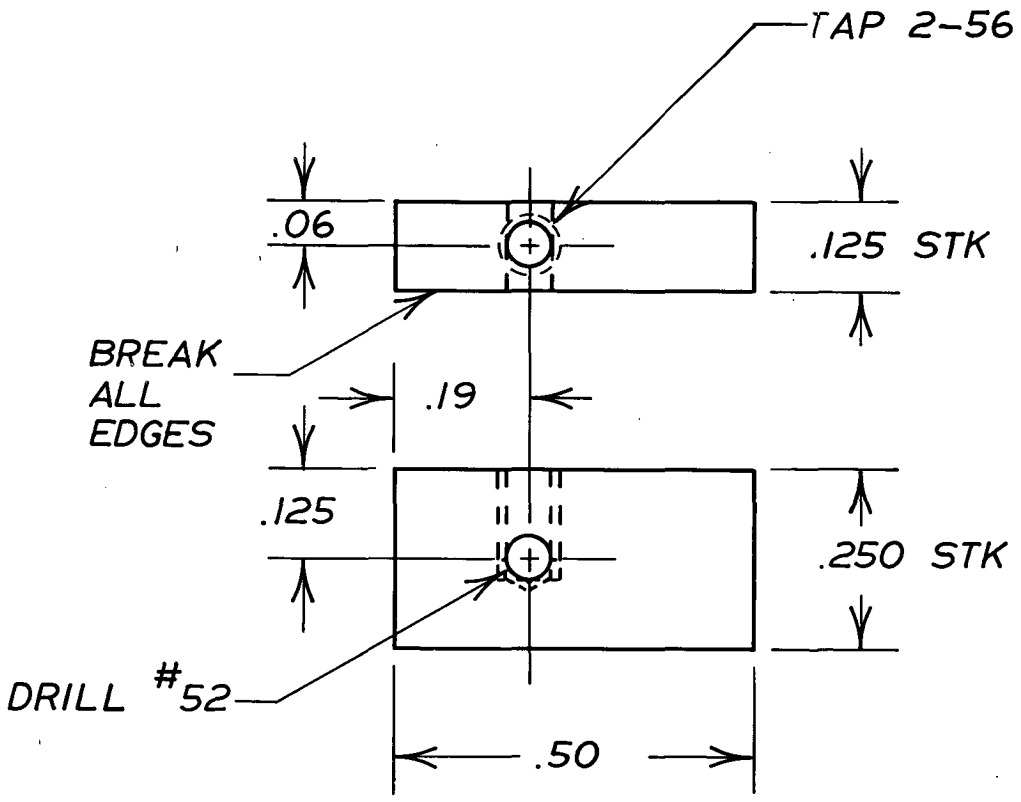
MACROMODULAR PROJECT

TITLE
FPB REAR CONNECTOR
FILLER STRIP

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
			NTK	300.5-12
WAS	PROD.	10/20/70	DRAWN BY PLL	
			CHECKED RJA	DATE 10-19-70



TOLERANCE U.O.N.

.XXX	±.005
.XX	±.01
X/X	±1/64

MAT'L: 6061-T6 ALUM
FINISH: ALODINE
REQ'D: 5 FOR TYPE 1 FPB
3 FOR TYPE 2 FPB

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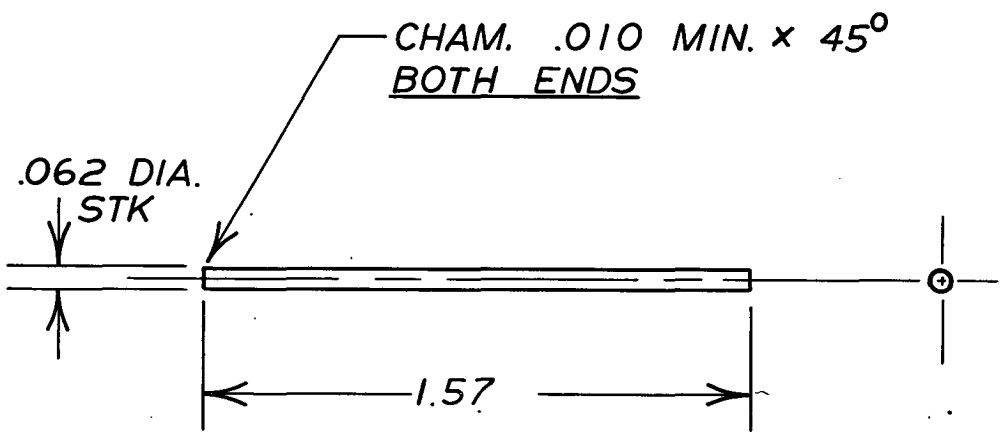
MACROMODULAR PROJECT

TITLE: TRIP BLOCK

CHANGE NO.	DATE	DESCRIPTION

APPROVED BY	FOR	DATE
	PROD	

ENG RJA
DRAWN BY DHO
CHECKED
DRAWING NO. 300.5-13
DATE 9-28-71



TOLERANCE U.O.N.

.XXX	±.005
.XX	±.01

MAT'L: .062 DIA. S.S. ROD
FINISH: AS MACHINED
REQ'D: 5 FOR TYPE 1 FPB
3 FOR TYPE 2 FPB

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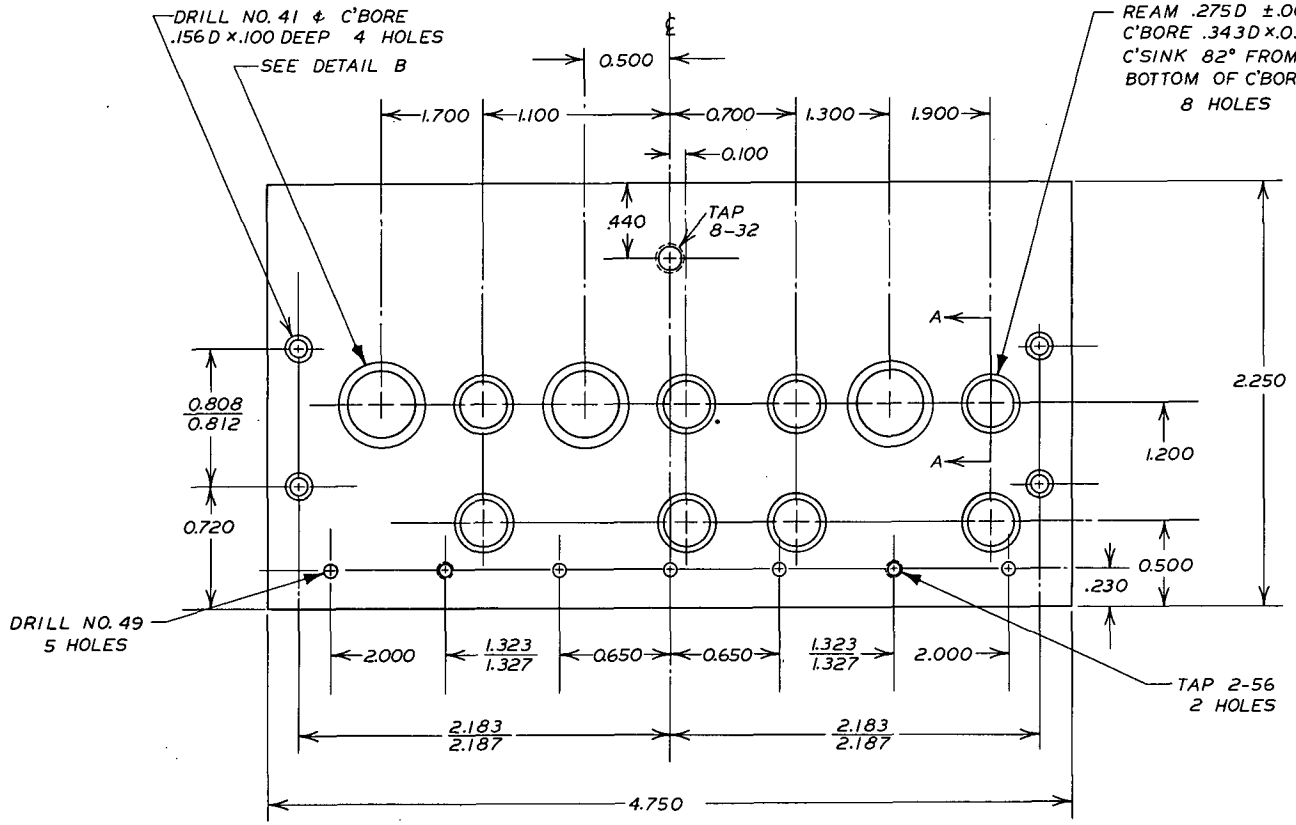
MACROMODULAR PROJECT

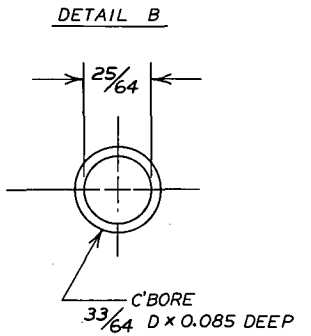
TITLE: SENSE PIN

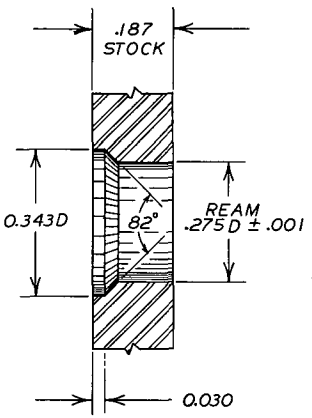
CHANGE NO.	DATE	DESCRIPTION

APPROVED BY	FOR	DATE
	PROD	

ENG: RJA
DRAWN BY: DHO
CHECKED:
DRAWING NO.: 300.5-14
DATE: 9-28-71







MAT'L: .187 ALUM 6061-T6

DIMENSIONS: ±.005 U.O.N.

FINISH: CSL SPEC MF 1

CHANGE NO.	DATE	DESCRIPTION
E	2-8-72	E.C.O. 0255

COMPUTER SYSTEMS LABORATORY
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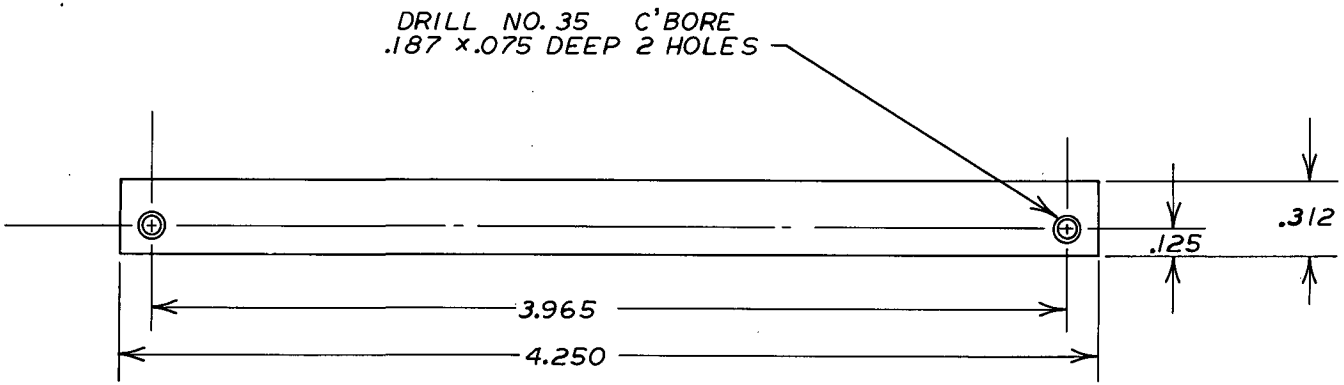
MACROMODULAR PROJECT

TITLE: TYPE 6 FACEPLATE

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
Clm	PROD	15 Feb 72	FUR	300.5-15
			DRAWN BY PLL	
			CHECKED RJA	DATE 11-1-71



MAT'L: .125 2326 BLUE TRANSLUCENT PLEXIGLASS
TOLERANCES: ±.005 U.O.N.

CHANGE NO.	DATE	DESCRIPTION
F	3-2-72	E.C.O. 0257 RJA

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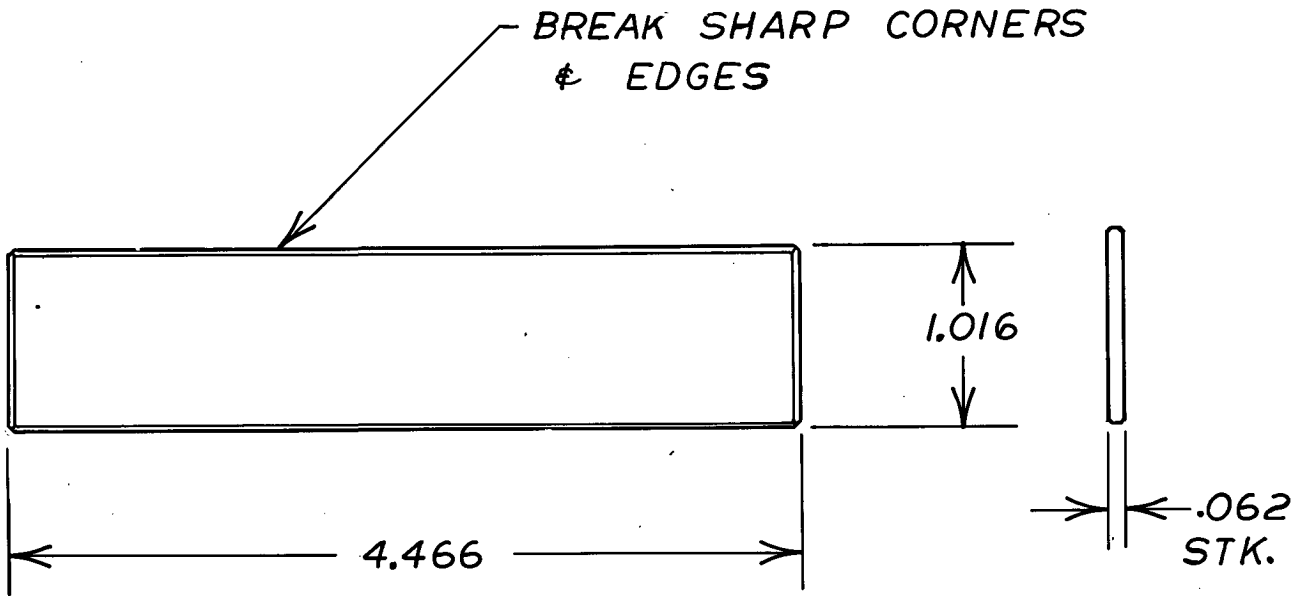
MACROMODULAR PROJECT

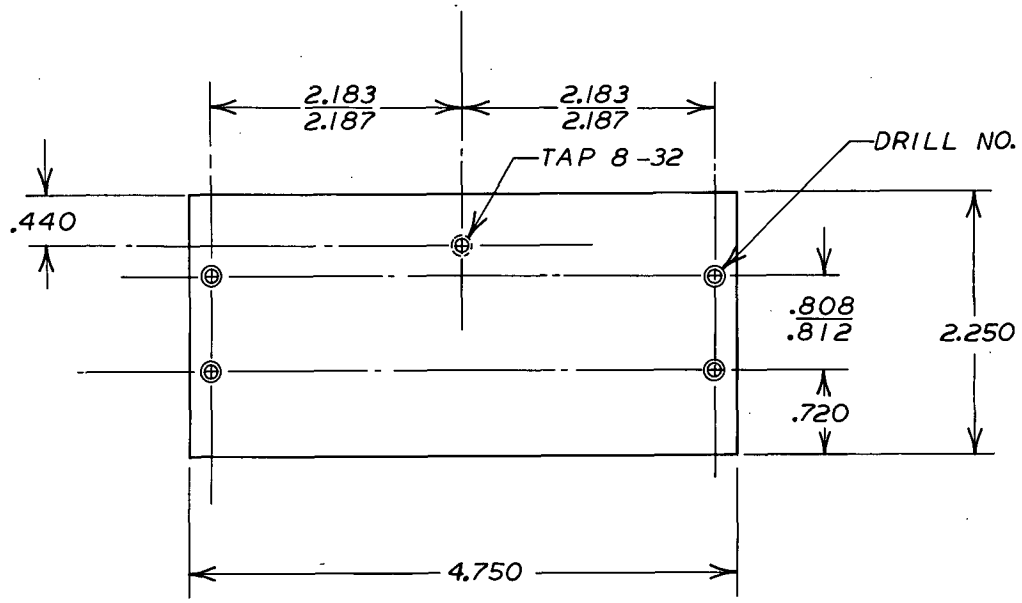
TITLE
TYPE 7 FPB REAR CONNECTOR
FILLER STRIP

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
RJA	PROD	3-2-72	RJA	300.5-16
			DRAWN BY PLL	
			CHECKED RJA	DATE 2-16-72



MAT'L: .062 ALUM 2024-T6
FINISH: CLEAR ANODIZE
TOLERANCES: ± .010 U.O.N.

COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			MACROMODULAR PROJECT				
			TITLE: TYPE 8 FPB FILLER				
			APPROVED			ENG RJA	DRAWING NO. 300.5-17
			BY	FOR	DATE	DRAWN BY PLL	
F	3-2-72	E.C.O. 0257 RJA	RJA	PROD	3-2-72	CHECKED	DATE 2-16-72
CHANGE NO.	DATE	DESCRIPTION					



MAT'L: .187 ALUM 6061-T6
DIMENSIONS: ± .005 U.O.N.
FINISH: CSL SPEC MF-1

CHANGE NO.	DATE	DESCRIPTION
F	3-2-72	E.C.O. 0257 RJA

COMPUTER SYSTEMS LABORATORY
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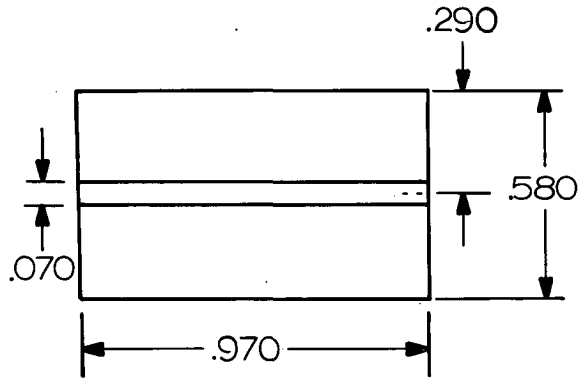
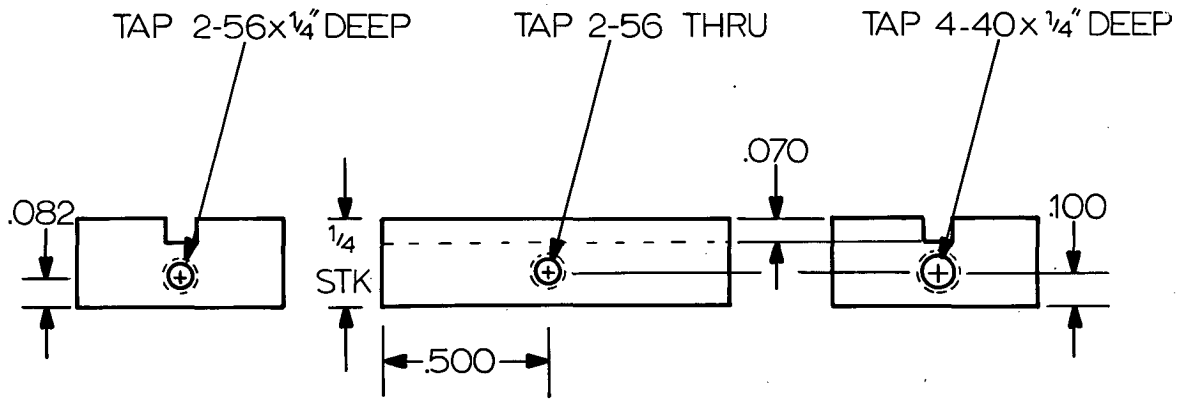
MACROMODULAR PROJECT

TITLE
ONE HIGH FACEPLATE
FOR TYPE 7 ¢ 8 FPB

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
RJA	PROD	3-2-72	RJA	300.5-18
			DRAWN BY PLL	
			CHECKED	DATE 2-17-72





MATERIAL: ALUMINUM BAR STOCK 2024-T3

FINISH: ANODIZE

BREAK ALL EDGES .010 min

TOLERANCES U.O.N.	
.XXX	±.005
.XX	±.010
X/X	±1/64

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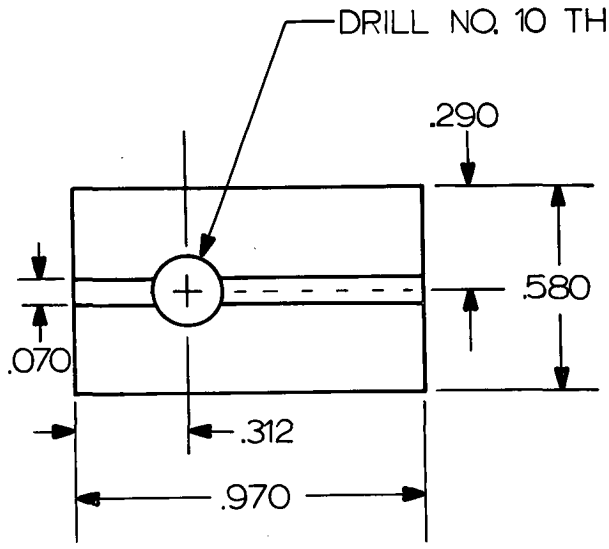
MACROMODULAR PROJECT

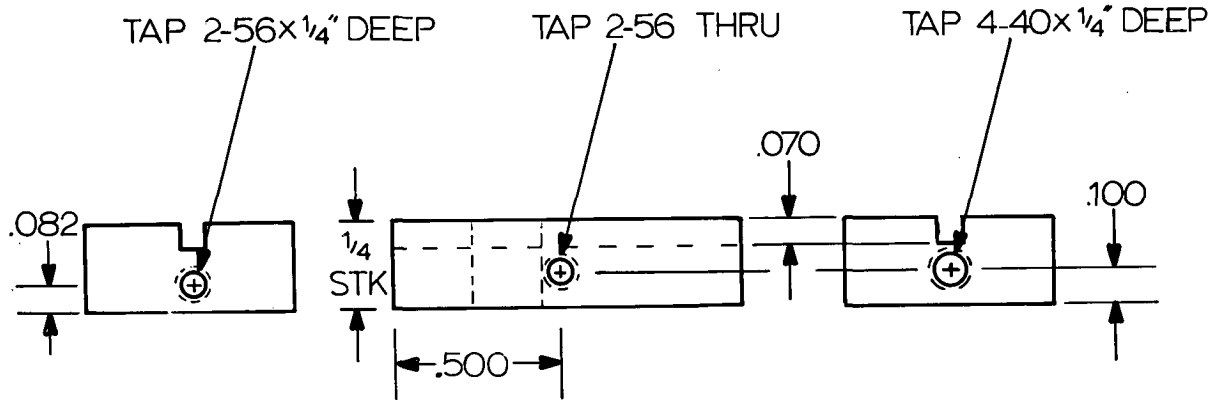
TITLE: CONNECTOR STRUT - TYPE 1

CHANGE NO.	DATE	DESCRIPTION
I	5-25-73	ECO 290 RJA

APPROVED BY	APPROVED FOR	APPROVED DATE
RJA	PROD	5-31-73

ENG: RJA
DRAWN BY: MAC
CHECKED: RJA
DRAWING NO.: 300.5-19
DATE: 5-25-73





MATERIAL: ALUMINUM BAR STOCK 2024-T3

FINISH: ANODIZE

BREAK ALL EDGES .010 min

TOLERANCES U.O.N.

.XXX	±.005
.XX	±.010
X/X	± 1/64

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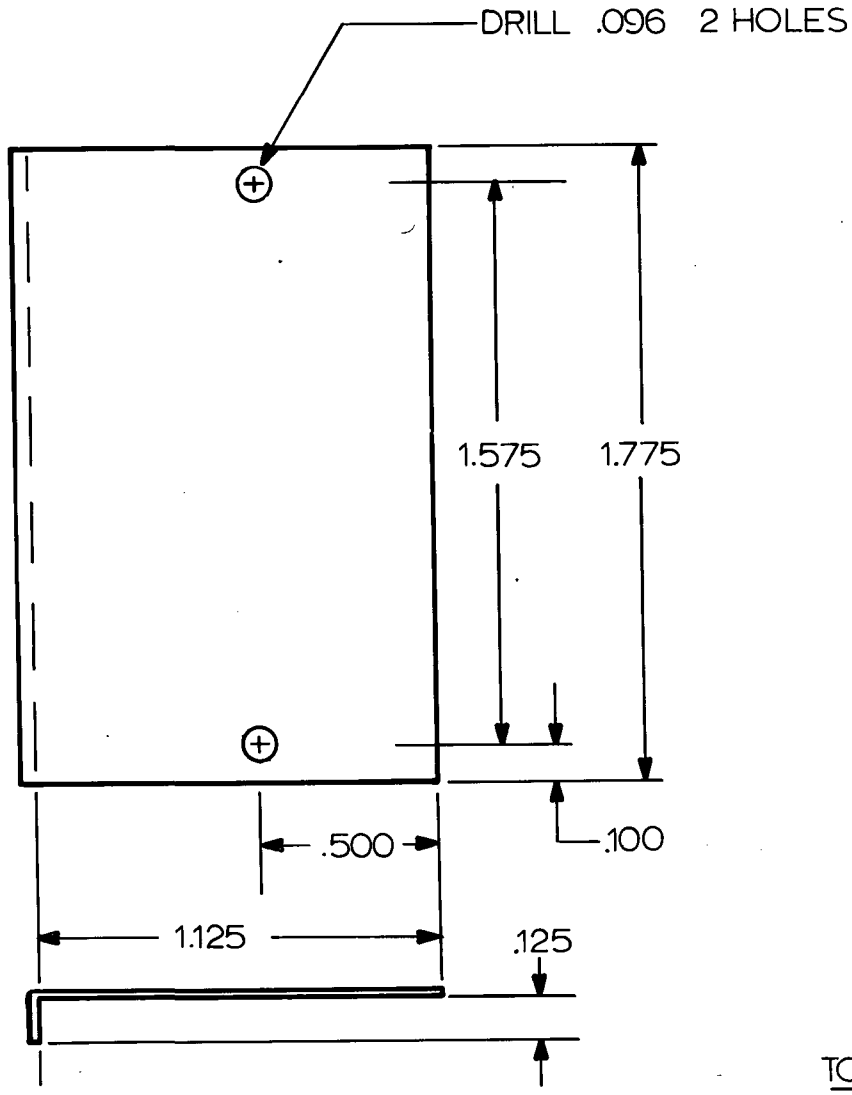
MACROMODULAR PROJECT

TITLE: CONNECTOR STRUT – TYPE 2

CHANGE NO.	DATE	DESCRIPTION
I	5-25-73	ECO 290 RJA

APPROVED BY	FOR	DATE
RJA	PROD	5-31-73

ENG: RJA
DRAWN BY: MAC
CHECKED: RJA
DRAWING NO.: 300.5-20
DATE: 5-25-73



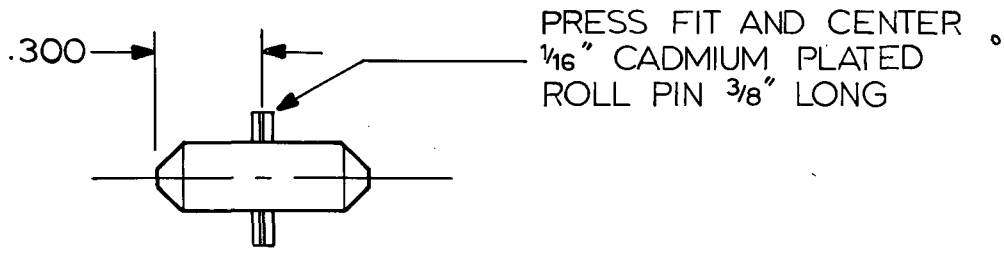
MATERIAL: .030 ALUMINUM 3003 H14
FINISH: ANODIZE

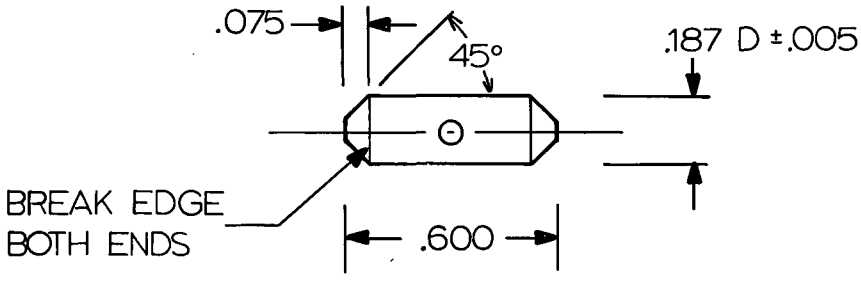
TOLERANCES U.O.N.

.XXX	±.005
.XX	±.010
X/X	± 1/64

COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI		MACROMODULAR PROJECT
		TITLE: STRUT COVER
I	5-24-73	ECO 290 RJA
CHANGE NO.	DATE	DESCRIPTION

APPROVED BY	FOR	DATE	ENG	DRAWING NO.
RJA	PROD	5-31-73	RJA	300.5-21
			DRAWN BY: MAC	
			CHECKED: RJA	DATE: 5-24-73

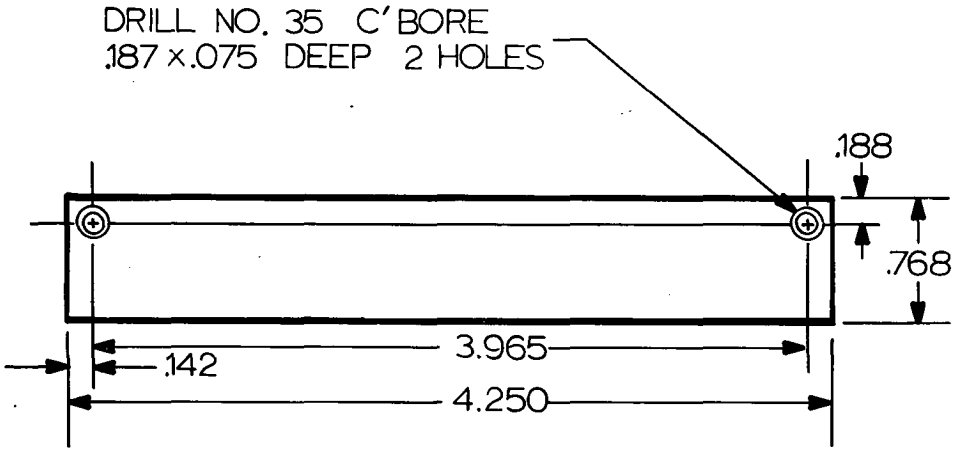




MATERIAL: STAINLESS STEEL .187 Dia.

TOLERANCES
± .010 U.O.N.

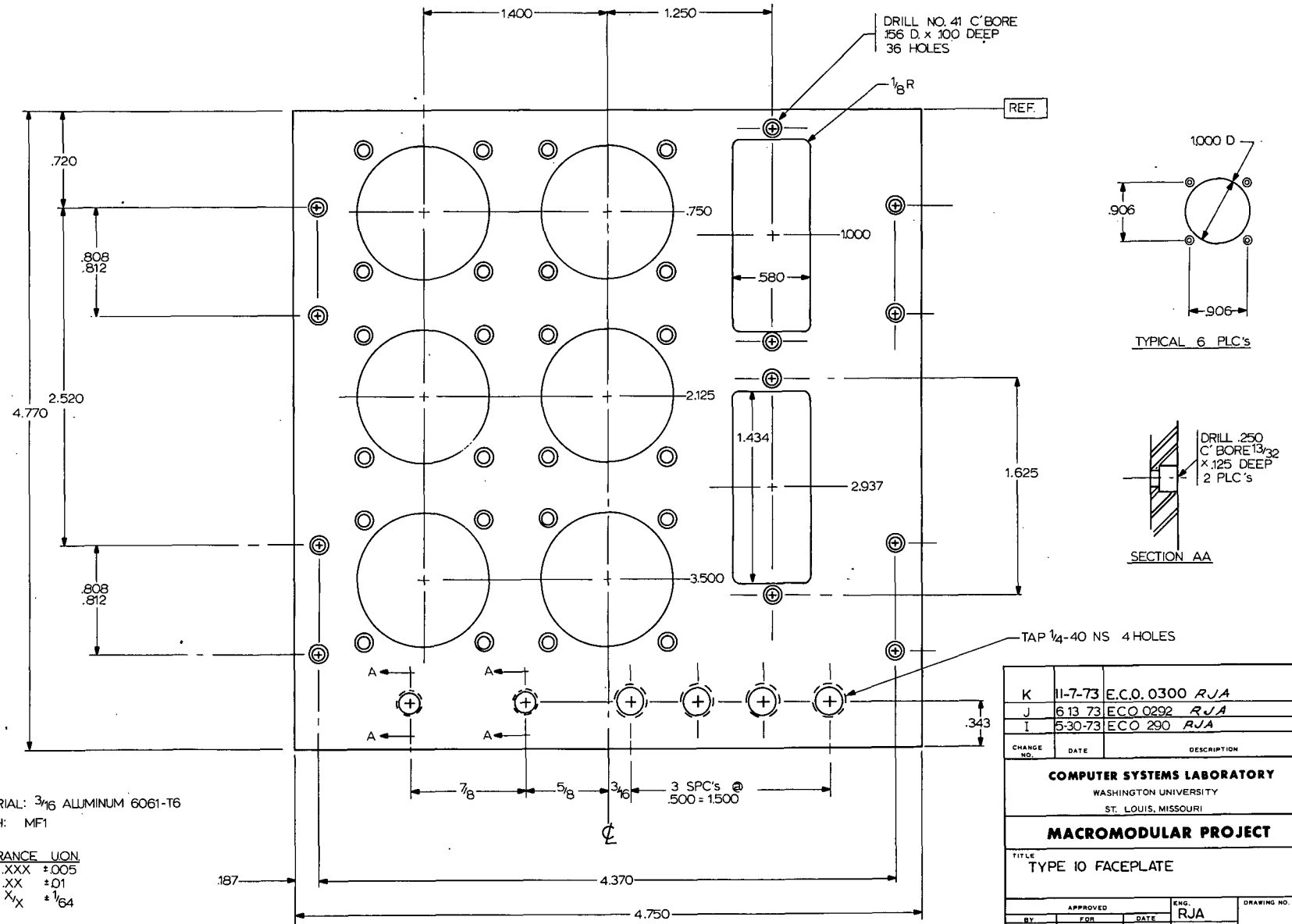
COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			MACROMODULAR PROJECT		
			TITLE: INTERLOCK PIN		
			APPROVED BY: RJA / FOR: PROD / DATE: 5-31-73	ENG: RJA	DRAWING NO.: 300.5-22
				DRAWN BY: MAC	
I	5-25-73	ECO 290 RJA		CHECKED: RJA	DATE: 5-25-73
CHANGE NO.	DATE	DESCRIPTION			



MATERIAL: .125 BLACK PLEXIGLASS

TOLERANCES: ± .005 U.O.N.

COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			MACROMODULAR PROJECT				
			TITLE: TYPE 10 FPB FILLER STRIP				
			APPROVED			ENG: RJA	DRAWING NO.
J	6-13-73	ECO 0292	BY: RJA	FOR: PROD	DATE: 5-31-73	DRAWN BY: MAC	300.5-23
I	5-24-73	ECO 290 RJA				CHECKED: RRA	DATE: 5-24-73
CHANGE NO.	DATE	DESCRIPTION					



MATERIAL: 3/16 ALUMINUM 6061-T6
FINISH: MF1

TOLERANCE	UON
.XXX	±.005
.XX	±.01
X/X	±1/64

CHANGE NO.	DATE	DESCRIPTION
K	11-7-73	E.C.O. 0300 RJA
J	6 13 73	ECO 0292 RJA
I	5-30-73	ECO 290 RJA

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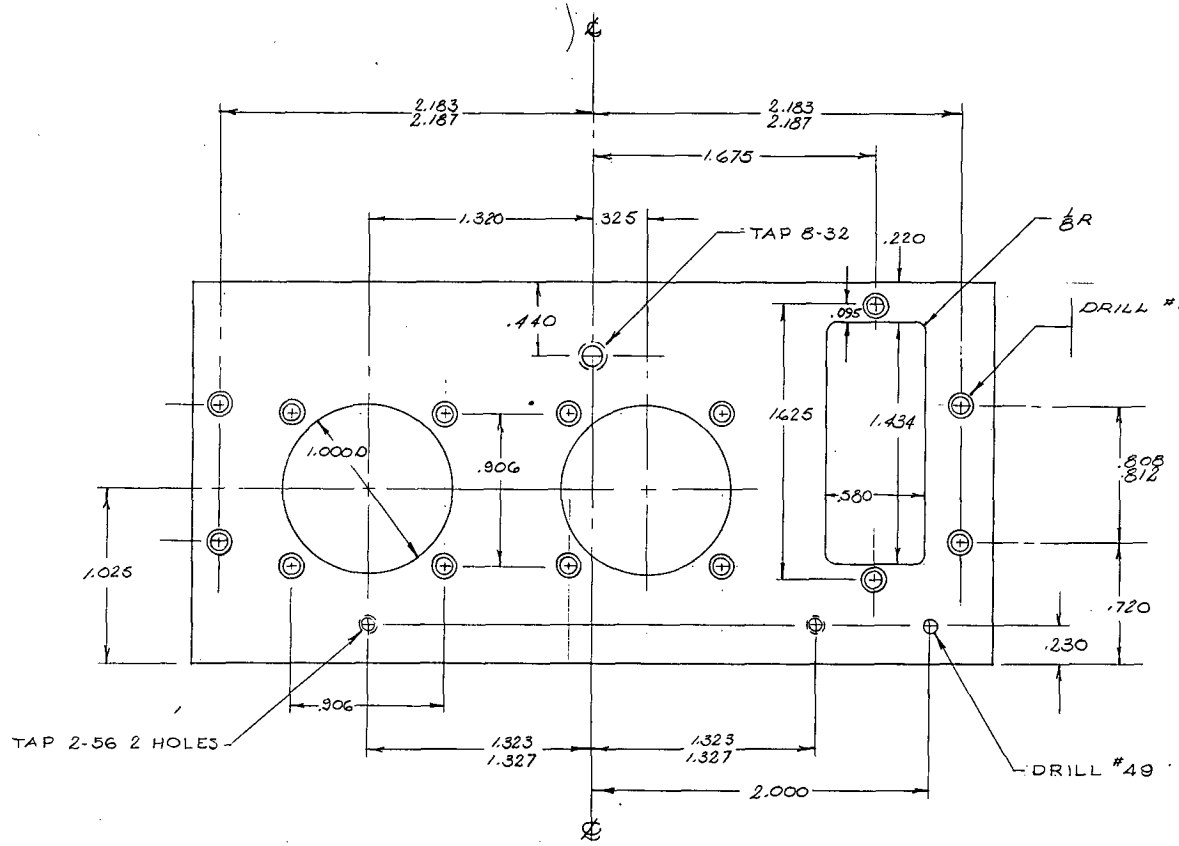
MACROMODULAR PROJECT

TITLE
TYPE 10 FACEPLATE

APPROVED BY	APPROVED FOR	DATE	ENG.	DRAWING NO.
RJA	PROD	5-31-73	RJA	300.5-24
			DRAWN BY MAC	
			CHECKED RJA	DATE 5-30-73



MAT'L .187 ALUM. 6061-T6
DIMENSIONS UON ±.005
FINISH : CSL SPEC MF1

CHANGE NO.	DATE	DESCRIPTION
K	11-7-73	E.C.O. 0300 RJA
J	6-13-73	E.C.O. 0292 RJA

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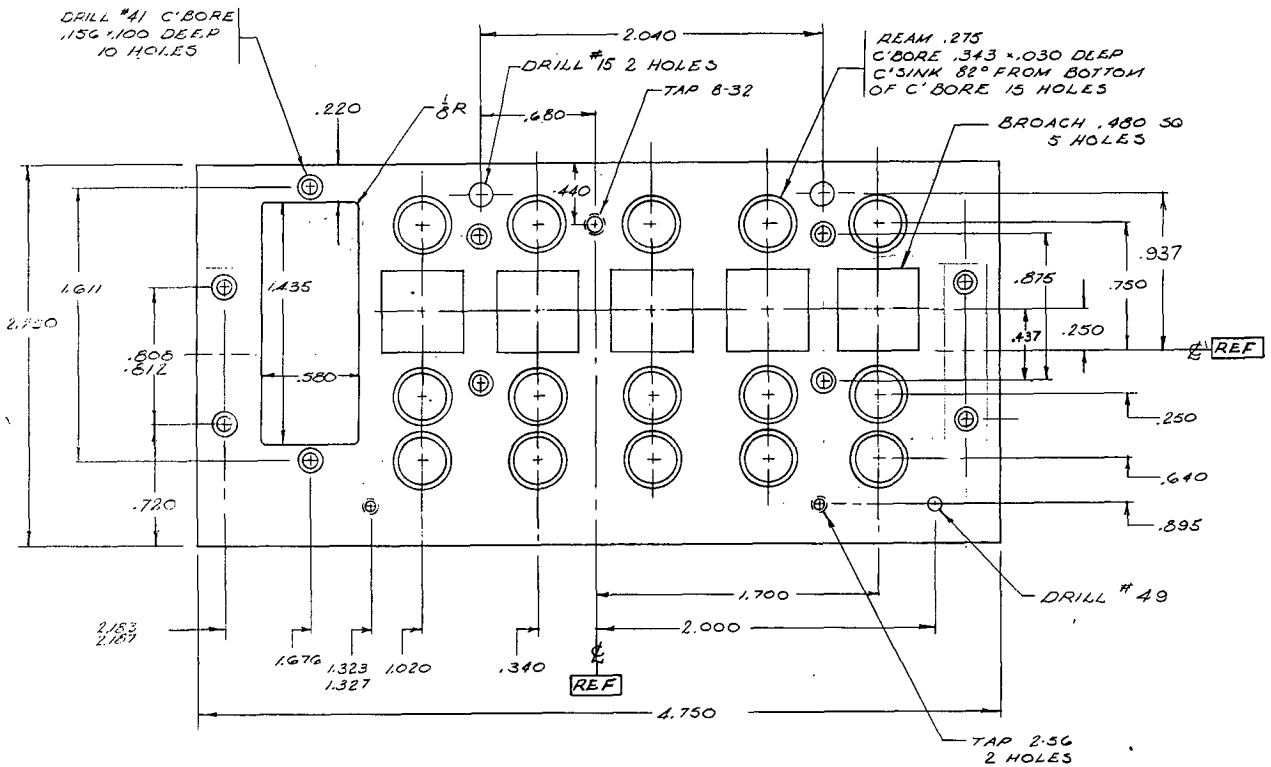
TITLE TYPE 1A FACEPLATE

APPROVED BY	FOR	DATE
RJA	PROD	6-13-73

ENG RJA
DRAWN BY RJA
CHECKED GM

DRAWING NO. 300.5-25
DATE 2-6-73



MAT'L 6061-T6 ALUM (.187)

CHANGE NO.	DATE	DESCRIPTION
K	11-7-73	E.C.O. 0300 RJA
J	6-13-73	ECO 0292 RJA

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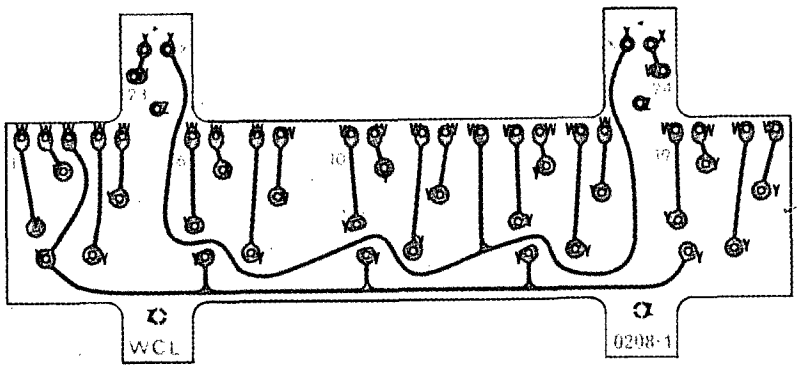
TITLE: TYPE 9 FACEPLATE

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG	DRAWING NO.
RJA	PROD	6-13-73	RJA	300.5-26
			DRAWN BY: RJA	
			CHECKED: GM	DATE: 7-27-72

HOLE SIZES:

HOLES MARKED WITH A "W" USE A NO. 72 DRILL (24 HOLES)
HOLES MARKED WITH A "X" USE A NO. 60 DRILL (4 HOLES)
HOLES MARKED WITH A "Y" USE A NO. 55 DRILL (25 HOLES)
HOLES MARKED WITH A "Z" USE A NO. 42 DRILL (4 HOLES)



CHANGE NO.	DATE	DESCRIPTION
K ISSUE	11-7-73	ECO 0300 RJA
	6-13-73	ECO 0292 RJA

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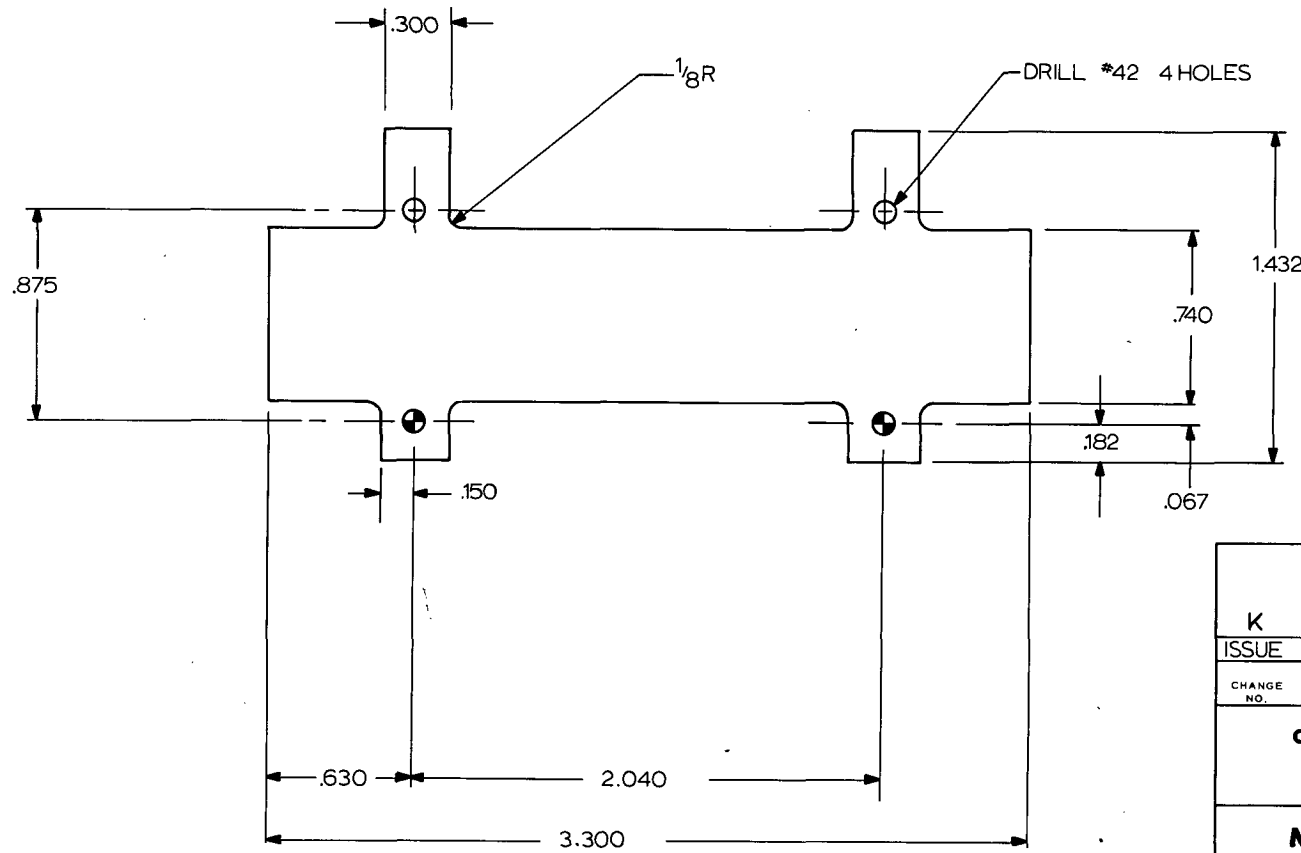
MACROMODULAR PROJECT

TITLE: TYPE 9 FPB P.C. BOARD

APPROVED BY	FOR	DATE
RJA	PROD	6-18-73

ENG. MLP
DRAWN BY PLL
CHECKED MKY
DRAWING NO. 300.5-27
DATE 6-13-73



MATERIAL: 1/16 PC STOCK (SINGLE SIDED)

CHANGE NO.	DATE	DESCRIPTION
K	11-7-73	ECO 0300 RJA
ISSUE	6-13-73	ECO 0292 RJA

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MACROMODULAR PROJECT

TITLE
TYPE 9 P.C. BOARD ROUTING OUTLINE

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
RJA	PROD	6-13-73	RJA	
			DRAWN BY MAC	300.5-28
			CHECKED MKP	DATE 3-15-73

V-BUS SUBASSEMBLY

CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	0046	10-7-70	RCJ								

V-BUS SUBASSEMBLY

Assembly Specification

I. Introduction

The V-Bus subassembly consists of two connectors, a printed circuit board, and two support brackets as shown on the overall view (Dwg. 300.6-3). The printed circuit board is defined by drawing 300.6-4 and the support brackets by drawing 300.5-2. The special connector bracket screws are shown on drawing 300.5-3. Refer to document 300.0 for identification of the V-Bus connectors.

II. Assembly Procedure

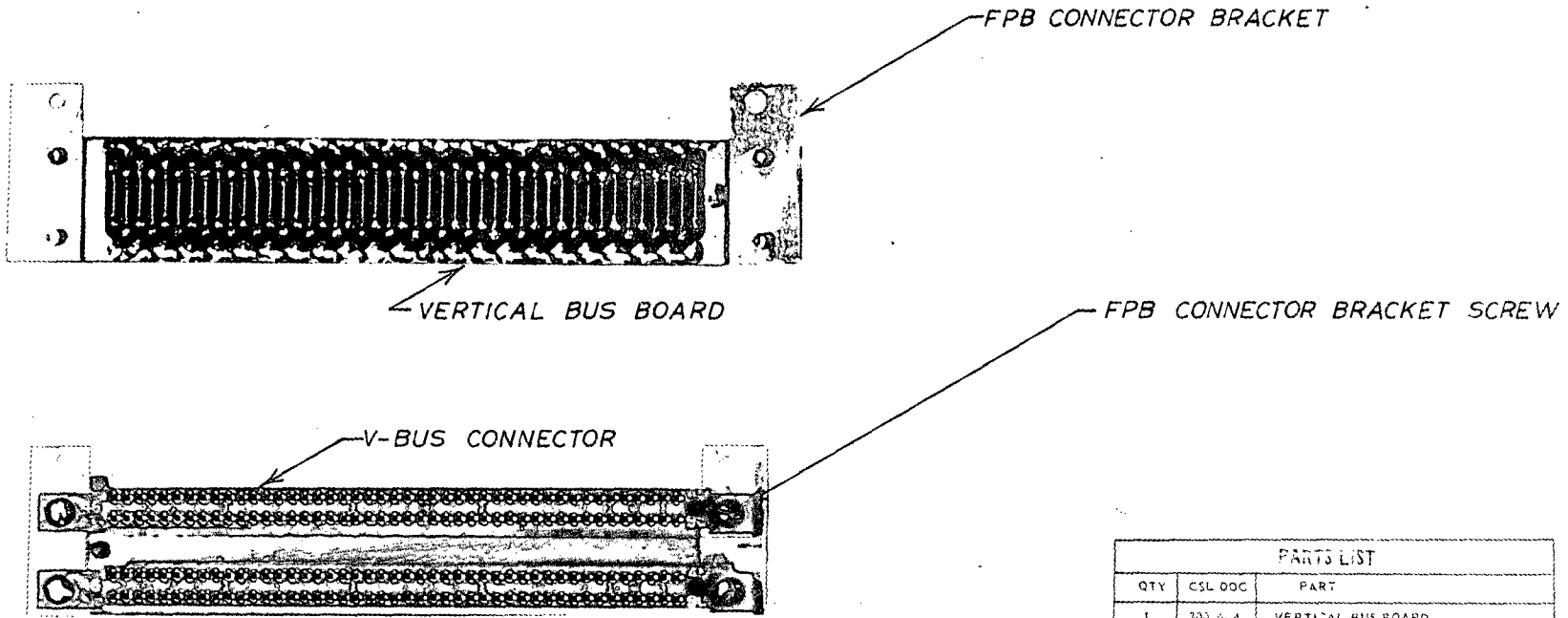
The two connectors shall be applied to the circuit board, and held in place by masking tape, or other suitable means. The two support brackets are then to be attached to the connectors with the special screws called out in the parts list. The assembly may now be soldered.

III. Soldering

The assembly may be hand soldered or wave soldered. Hand soldering shall be done only with a temperature controlled soldering iron (Weller W-TCP iron with a 600 degree Fahrenheit tip or equivalent). In the case of wave soldering, care should be exercised to preserve the alignment and seating position of the circuit board.

The connectors must be flush with the surface of the circuit board at the three points of contact on each connector block. The distance between any one of these contact points and the circuit board shall be less than 0.010 inch after assembly. The solder used shall be of nominally 60% tin and 40% lead. Any convenient flux may be used provided that all flux residues are removed from the finished assembly. No flux shall be allowed to enter the connectors, and the flux cleaning process shall leave no residue on the connector block or gold contact pins.

CHG.	E.C.O.	DATE	APPR.
ISSUE	0046	10-7-70	JCJ



PARTS LIST		
QTY	CSL DOC	PART
1	300.0-4	VERTICAL BUS BOARD
2	300.0	V-BUS CONNECTOR
2	300.0-2	FPB CONNECTOR BRACKET
4	300.0-3	FPB CONNECTOR BRACKET SCREW

CHANGE NO.	DATE	DESCRIPTION
ISSUE	10-7-70	E.C.O. 0046 JCJ

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TITLE: V-BUS SUB-ASSEMBLY AND PARTS LIST

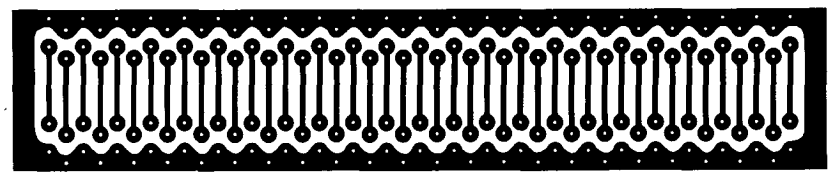
APPROVED BY	FOR	DATE
JCJ	PROD.	5-23-70

ENG. WAC
DRAWN BY PLL
CHECKED
DRAWING NO. 300 S-3
DATE 10 7 70

PTS0082-1

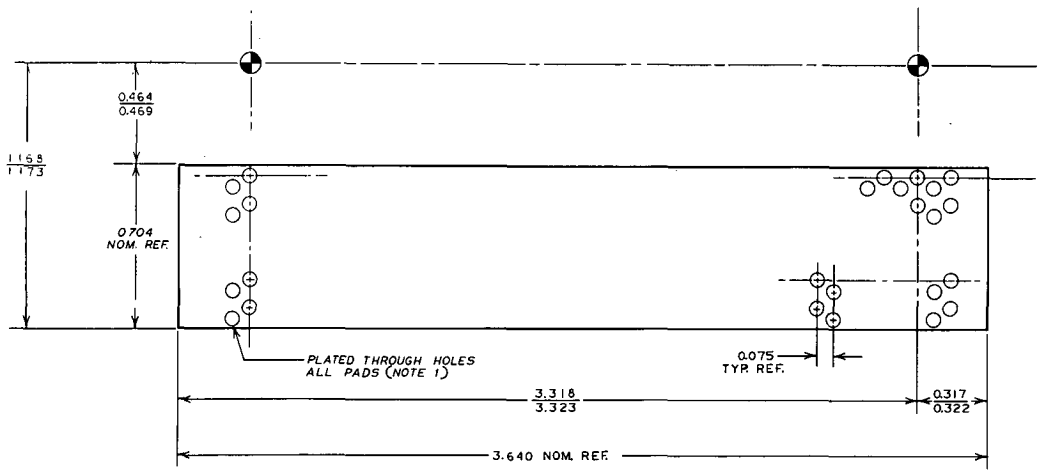
SIDE FACING CONNECTOR

NOTE: ARTWORK SUPPLIED AS 4:1 CRONAFLEX PRINT



EXPOSED SIDE

BOARD BLANK DIMENSIONS



NOTE 1: 180 HOLES PLATED THROUGH TYPE 'B'

NOTE 2: REFER TO CSL SPECIFICATION PC-1

ISSUE	10/7/70	E.C.O. 0046	BCJ
CHANGE NO.	DATE	DESCRIPTION	

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TITLE: *VERTICAL BUS BOARD ARTWORK AND BLANKING DIMENSIONS*

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
BCJ	PROD	10-6-70	NTK	300.6-4
			DRAWN BY PL'L	
			CHECKED BCJ	DATE 10-2-70

FUNCTION CODE SWITCH SUBASSEMBLIES

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
re-iss	0229	11-11-71	RJA								
A	0247	1-13-72	RJA								
B	0292	6-13-73									

Function Code Switch Subassemblies

Assembly Procedure

This document (300.7) describes the Function Code Switch Subassemblies of all types. To assemble a specified type, the procedure to be followed for each switch position required by the subassembly is:

1) Rivet microswitches to bracket with shallow head rivets being careful not to damage the switch and making sure that they are placed in the proper orientation.

2) At each switch location thread a sense pin through the bracket, a trip block and a spring as indicated on 300.7-3 & 300.7-4.

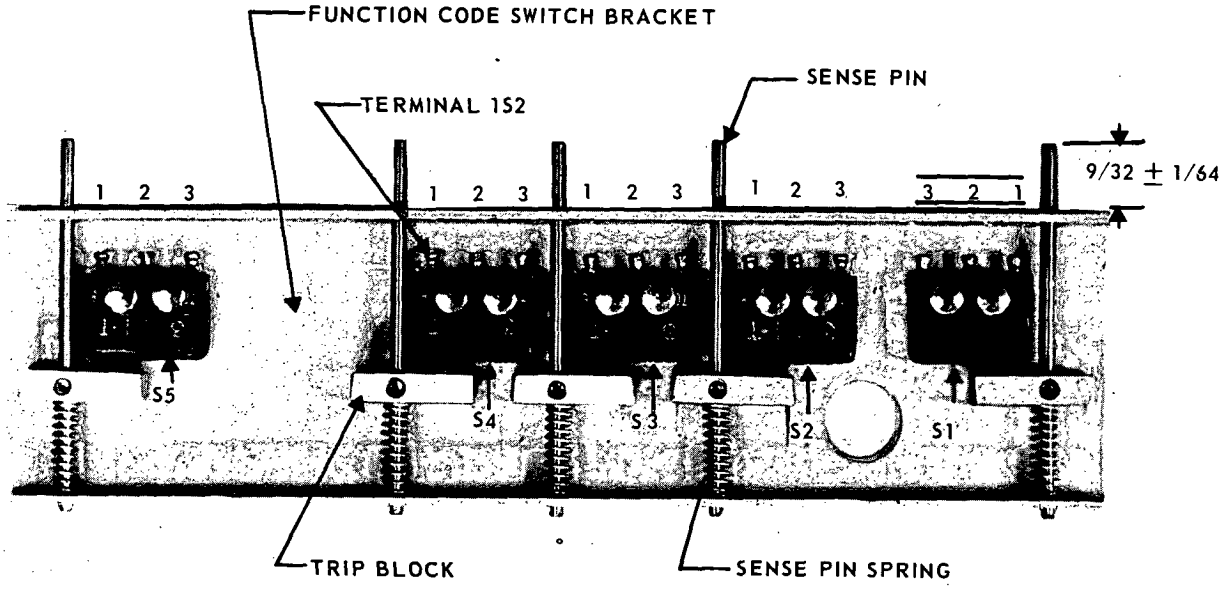
3) Adjust the sense pin extension from the front surface of the bracket to 9/32 $\pm$ 1/64 in.

4) Secure the sense pin to the trip block by firmly tightening the set screw in the trip block.

5) After all switches and activating mechanisms have been assembled and adjusted verify proper on/off operation of each switch.

CHG.	E.C.O.	DATE	APPR
re-iss	0229	11-11-71	RJA

NOTE ORIENTATION



PARTS LIST		
QTY	CSL DOC.	PART
1	300.5-6	FUNCTION CODE SWITCH BRACKET
5	—	MICRO SWITCH NO. 3SX1-T
5	—	SENSE PIN SPRING .120 OD, .016 WIRE DIA, ½ in. FREE LENGTH, 8½ POUNDS PER INCH
5	300.5-13	TRIP BLOCK
5	300.5-14	SENSE PIN
5	—	2-56 x 1/16 LG CUP POINT SOCKET HEAD SET SCREW CADMIUM PLATED
10	—	.086 BODY DIA x 9/32 LG SHALLOW OVAL HEAD NICKEL PLATED STEEL SEMI-TUBULAR RIVETS

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MACROMODULAR PROJECT

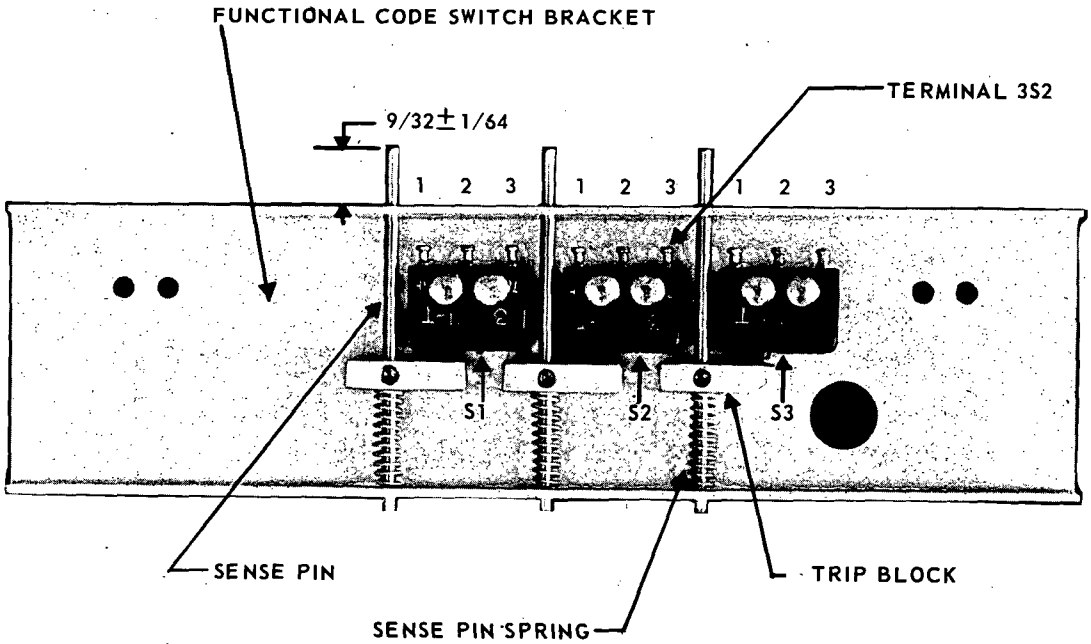
TITLE: TYPE 1 FUNCTION CODE SWITCH SUBASSEMBLY

CHANGE NO.	DATE	DESCRIPTION
A	1-13-72	E.C.O. 0247 RJA
re-iss	11-11-71	E.C.O. 0229 RJA

APPROVED BY	FOR	DATE
DCJ	PROD.	11-12-71

ENG: RJA
DRAWN BY: MBP
CHECKED: DCJ
DATE: 11-11-71
DRAWING NO.: 300.7-3

NOTE ORIENTATION



PARTS LIST		
QTY	CSL DOC.	PARTS
1	300.5-6	FUNCTION CODE SWITCH BRACKET
3	—	MICRO SWITCH NO. 3SX1-T
3	—	SENSE PIN SPRING .120 OD, .016 WIRE DIA, ½ in. FREE LENGTH, 8½ POUNDS PER INCH
3	300.5-13	TRIP BLOCK
3	300.5-14	SENSE PIN
3	—	2-56 x 1/16 LG CUP POINT SOCKET HEAD SET SCREW CADMIUM PLATED
6	—	.086 BODY DIA. x 9/32 LG SHALLOW OVAL HEAD NICKEL PLATED STEEL SEMI-TUBULAR RIVETS

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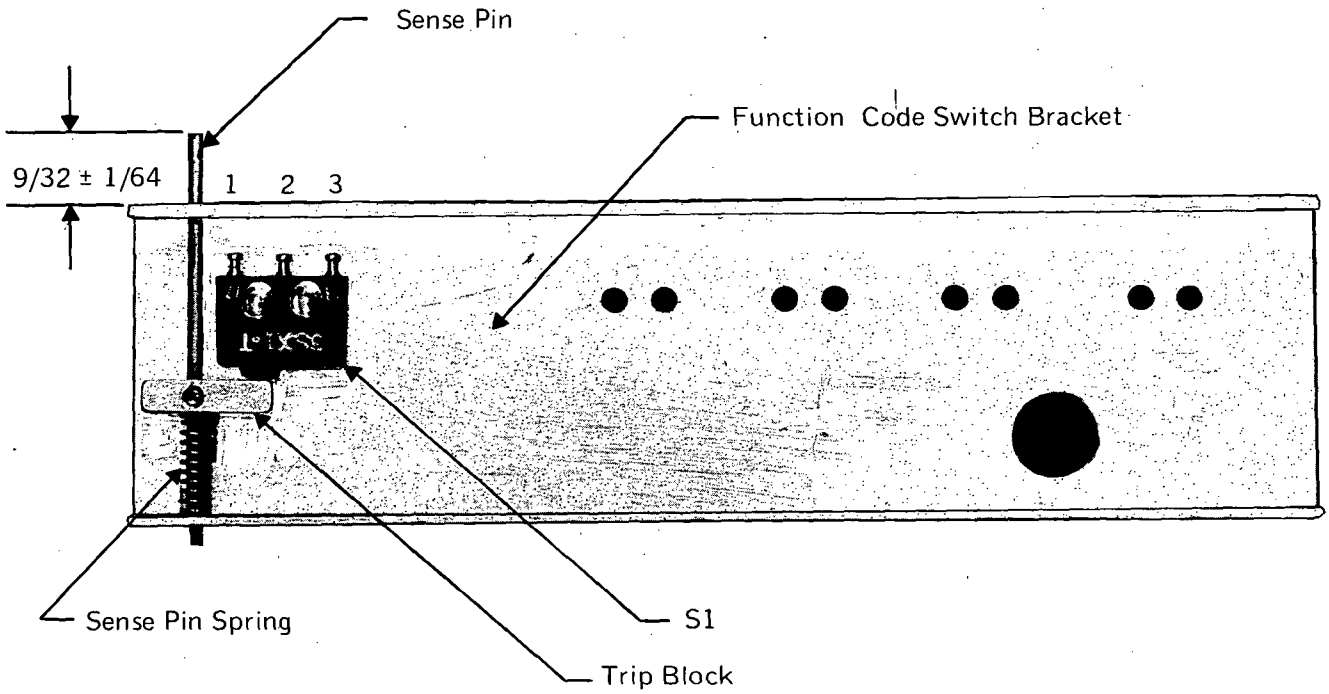
MACROMODULAR PROJECT

TITLE: TYPE 2 FUNCTION CODE SWITCH SUBASSEMBLY

CHANGE NO.	DATE	DESCRIPTION
re-iss	11-11-71	E.C.O. 0229 RJA

APPROVED BY	APPROVED FOR	APPROVED DATE
DCJ	PROD.	11-12-71

ENG: RJA
DRAWN BY: MBP
CHECKED: DCJ
DRAWING NO.: 300.7-4
DATE: 11-11-71



PARTS LIST		
QTY.	CSL DOC.	PART
1	300.5-6	Function Code Switch Bracket
1	----------	Micro Switch No. 3SX1-T
1	----------	Sense Pin Spring .120 OD, .016 wire dia. ½ in. free length, 8½ lbs. per inch.
1	300.5-13	Trip Block
1	300.5-14	Sense Pin
1	----------	2-56 x 1/16 lg Cup Point Socket Head Set Screw Cadium Plated
2	----------	.086 Body Dia. x 9/32 lg Shallow Oval Head Nickel Plated Steel Semi-tubular Rivets.

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TITLE: Type 3 Function Code Switch Subassembly

CHANGE NO.	DATE	DESCRIPTION
B	6-13-73	E.C.O. 0292 RJA

APPROVED BY	APPROVED FOR	APPROVED DATE
RJA	Prod	6-27-73

ENG: RJA
DRAWN BY: DLS
CHECKED: MLP
DRAWING NO.: 300.7-5
DATE: 6-13-73

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13. ABSTRACT

Specifications for the construction of Macromodular Faceplate Box assemblies are contained in this report. Also included are all electrical and mechanical specifications for common subassemblies. Certain general assembly techniques are specified.

DD FORM 1 NOV 68 1473 REPLACES DD FORM 1473, 1 JAN 64, WHICH IS OBSOLETE FOR ARMY USE.

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Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Macromodule Faceplate						
Macromodule Code Switch						


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