2-1974

Macromodular Computer Design, Part 2, Volume 06, Printed Circuit Board Outlines and Electronic Package Mechanical Drawings

Computer Systems Laboratory, Washington University

MACROMODULAR COMPUTER DESIGN PART 2 MANUFACTURING DESCRIPTION

VOLUME VI

PRINTED CIRCUIT BOARD OUTLINES AND ELECTRONIC PACKAGE MECHANICAL DRAWINGS

Technical Report No. 35

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

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR COMPUTER DESIGN

FINAL REPORT - CONTRACT SD-302

FEBRUARY, 1974

Technical Report No. 35

PART 2 - MANUFACTURING DESCRIPTION

VOL. VI-PRINTED CIRCUIT BOARD OUTLINES AND ELECTRONIC PACKAGE MECHANICAL DRAWINGS

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The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the Advanced Research Projects Agency or the U.S. Government.

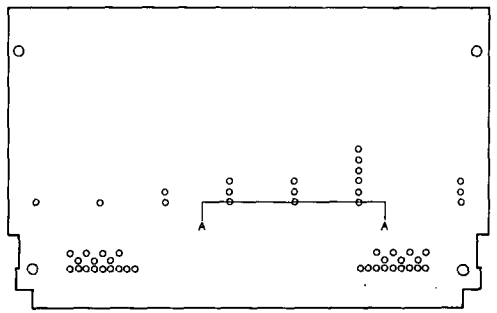
Computer Systems Laboratory
Washington University
St. Louis, Missouri

ABSTRACT

Complete mechanical drawings regarding the manufacture of components and assembly specifications for the macromodular electronic cases and printed circuit board routing dimensions for macromodular electronic assemblies are given.

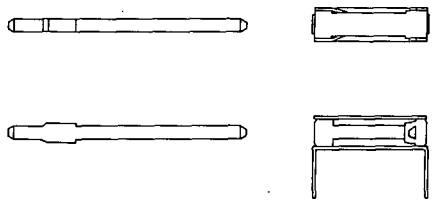
INDEX

MOTHERBOARD MALE PIN ALIGNMENT

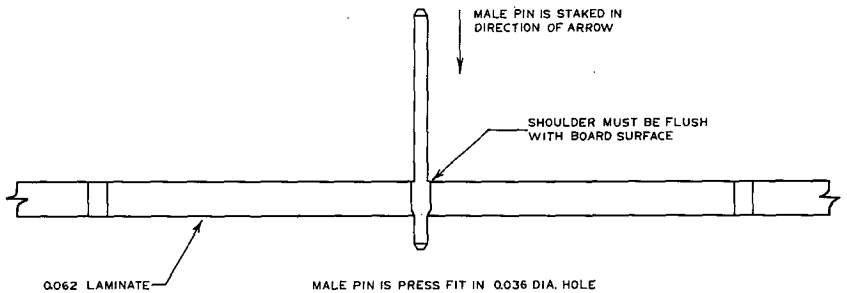


GENERAL ALIGNMENT—
MALE HAS TWO SMOOTH SURFACES AND MUST MATE WITH FEMALE AS SHOWN

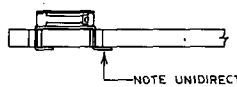
MALE 85931-5 FEMALE 85863-4

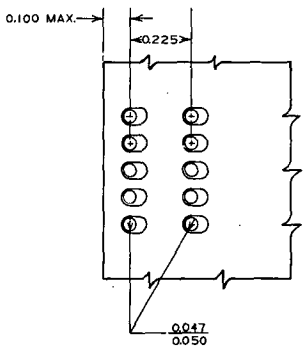


SECTION "A-A"



VERTICAL BOARD FEMALE INSTALLATION





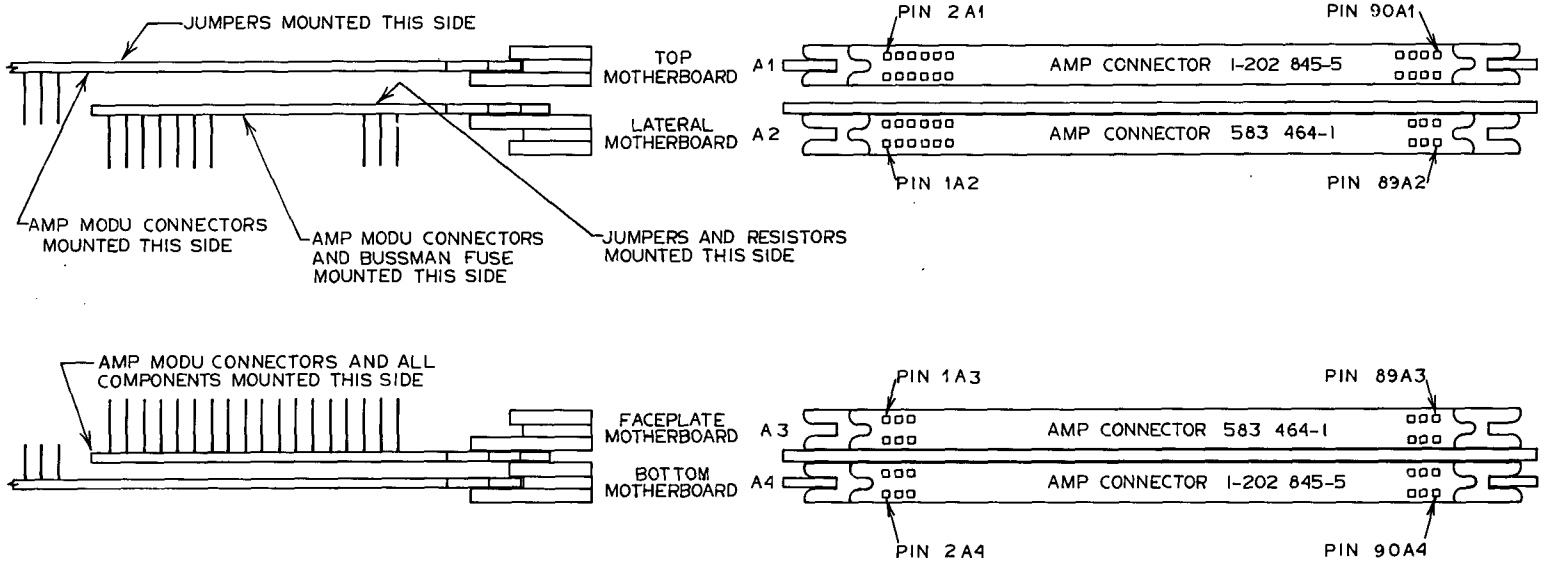
CHANGE NO.	DATE	DESCRIPTION
2	3-27-70	NEW DWG. NO.
1	1-19-70	REDRAWN - ADDED TOP VIEWS & LABELING

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: AMP-MODU CONNECTOR MOUNTING INFORMATION

APPROVED BY	FOR	DATE	DRAWN	DRAWING NO.
			GCJ	200.5002
			DESIGNED BY PLL	
			CHECKED GCJ	DATE 6-18-69



CHANGE NO.	DATE	DESCRIPTION
2	8-4-70	NEW TITLE ADDED MIL #'s E.C.O. 23
1	4-7-70	ADDED LABELS NEW DWG.NO.

COMPUTER SYSTEMS LABORATORY
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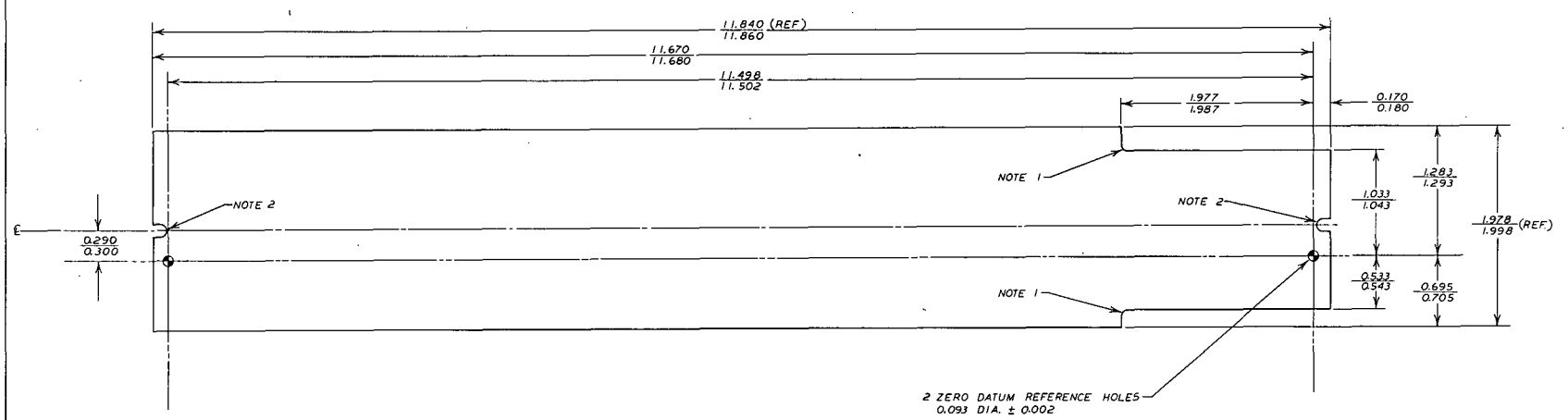
MACROMODULAR PROJECT

TITLE MOTHERBOARD CONNECTOR ORIENTATION, NUMBERING AND COMPONENT MOUNTING INFORMATION

APPROVED BY	FOR	DATE	ENG	DRAWING NO.
			GCJ	200.50D3
		4/9	DRAWN BY PLL	
			CHECKED GCJ	DATE 1-21-70



NOTES:

1. ROUNDED FILLETS CUT WITH 0.125 DIA. ROUTING CUTTER.
2. CUT TWO NOTCHES 0.150 ± 0.010 DEEP WITH 0.125 DIA. ROUTING CUTTER.

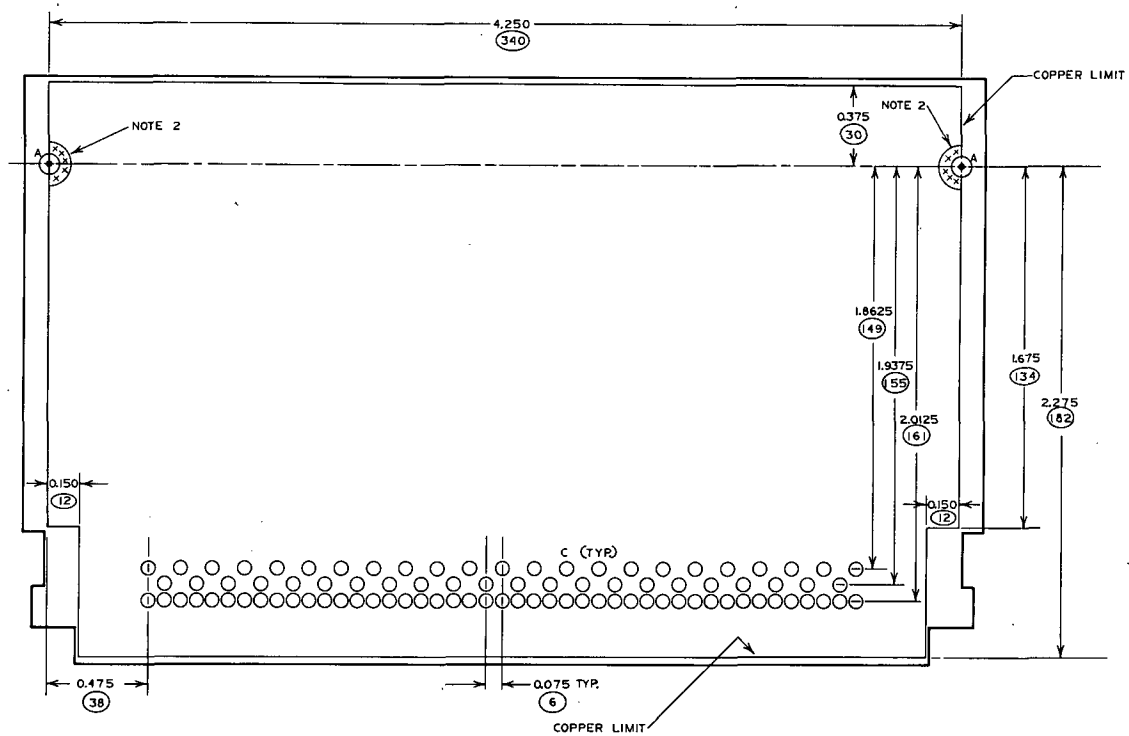
CHANGE NO.	DATE	DESCRIPTION
2	6-16-70	REDRAWN - TITLE CHNG ADD NOTE 2-CTR LINE

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: SINGLE HEIGHT VERTICAL BOARD OUTLINE FOR ROUTING

APPROVED BY	FOR	DATE	DRAWN BY	DRAWING NO.
Chm.	PROJ	8/4/70	CEM	200.5005
			PLL	
			CHECKED	DATE 1-29-70



PAD SIZES FOR 4:1 ARTWORK
A. TARGET
C. 0.250 D.

NOTE:
1. CIRCLED NUMBERS (182) REFER TO NUMBER OF SPACES ON, 0.050 GRID FOR 4=1 LAYOUT MASTERS.
2. NO SIGNAL OR POWER PATHS WITHIN 0.100 OF TARGET CENTERS. (8)

CHANGE NO.	DATE	DESCRIPTION
4	6-16-70	ADDED DIMS-MINOR CHNGS.

COMPUTER SYSTEMS LABORATORY
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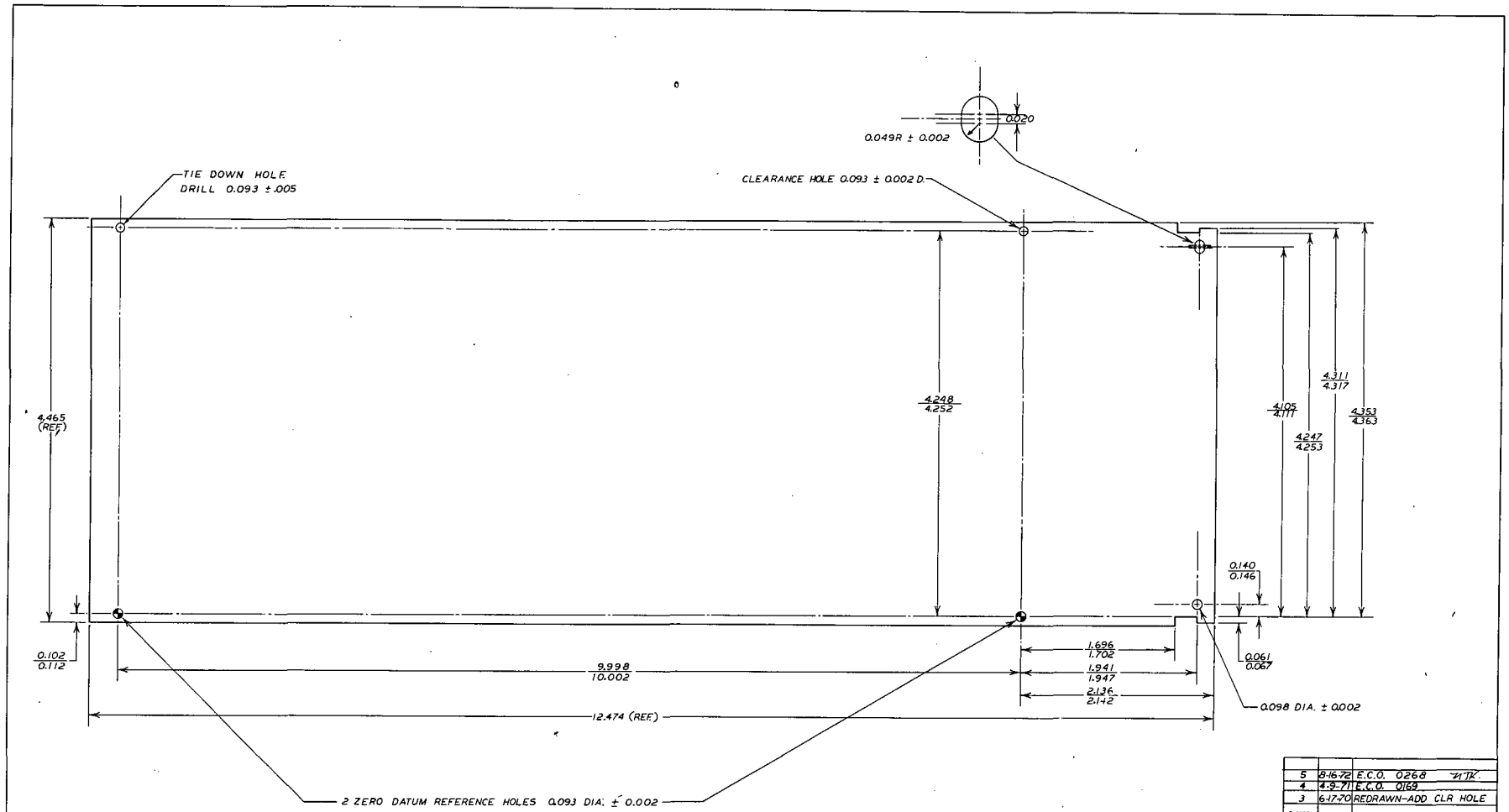
MACROMODULAR PROJECT

TITLE
PAD LAYOUT—SHORT MOTHERBOARD

APPROVED BY	FOR	DATE	ENG	DRAWING NO.
			GCJ	200.5006
CGM	PROD.	6-23-70	DRAWN BY PLL	
			CHECKED	DATE 6-16-69



CHANGE NO.	DATE	DESCRIPTION
5	8-16-72	E.C.O. 0268 -TJK
4	4-9-71	E.C.O. 0169
3	6-17-70	REDRAWN-ADD CLR HOLE

COMPUTER SYSTEMS LABORATORY
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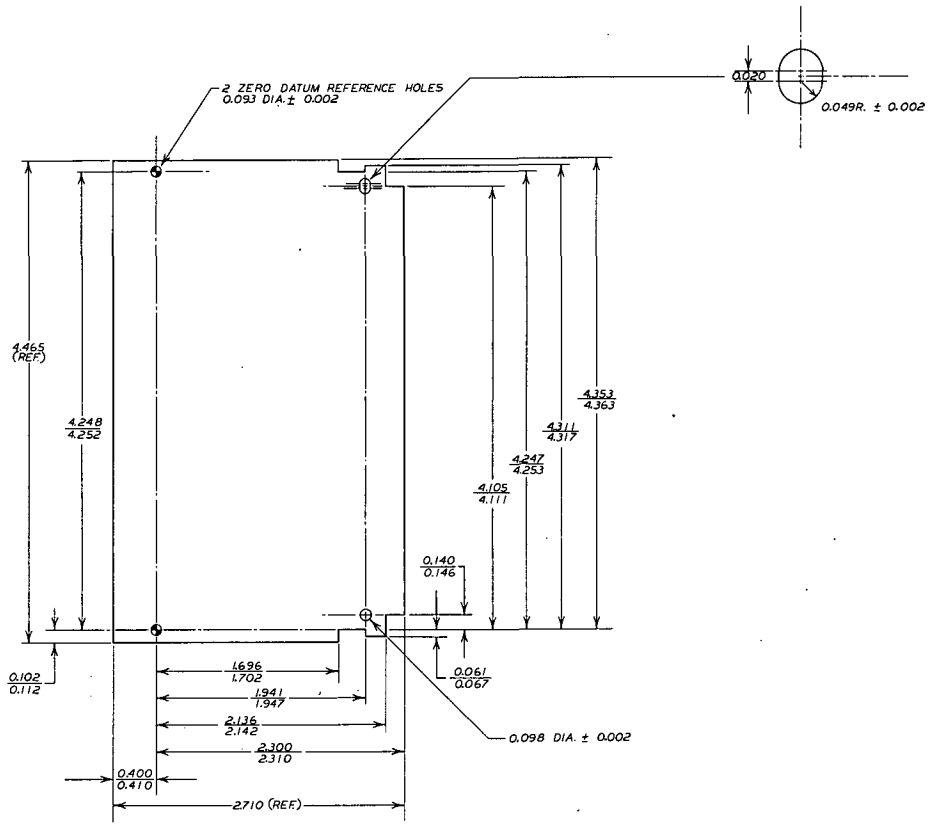
MACROMODULAR PROJECT

TITLE: LONG MOTHERBOARD BLANK OUTLINE

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
C.	J.R.D.	6-17-70	DLS	2005008
			DRAWN BY PLL	
			CHECKED TJK	DATE 5-30-69



CHANGE NO.	DATE	DESCRIPTION
4	4-9-71	E.C.O. 0170
3	6-17-70	REDRAWN

COMPUTER SYSTEMS LABORATORY
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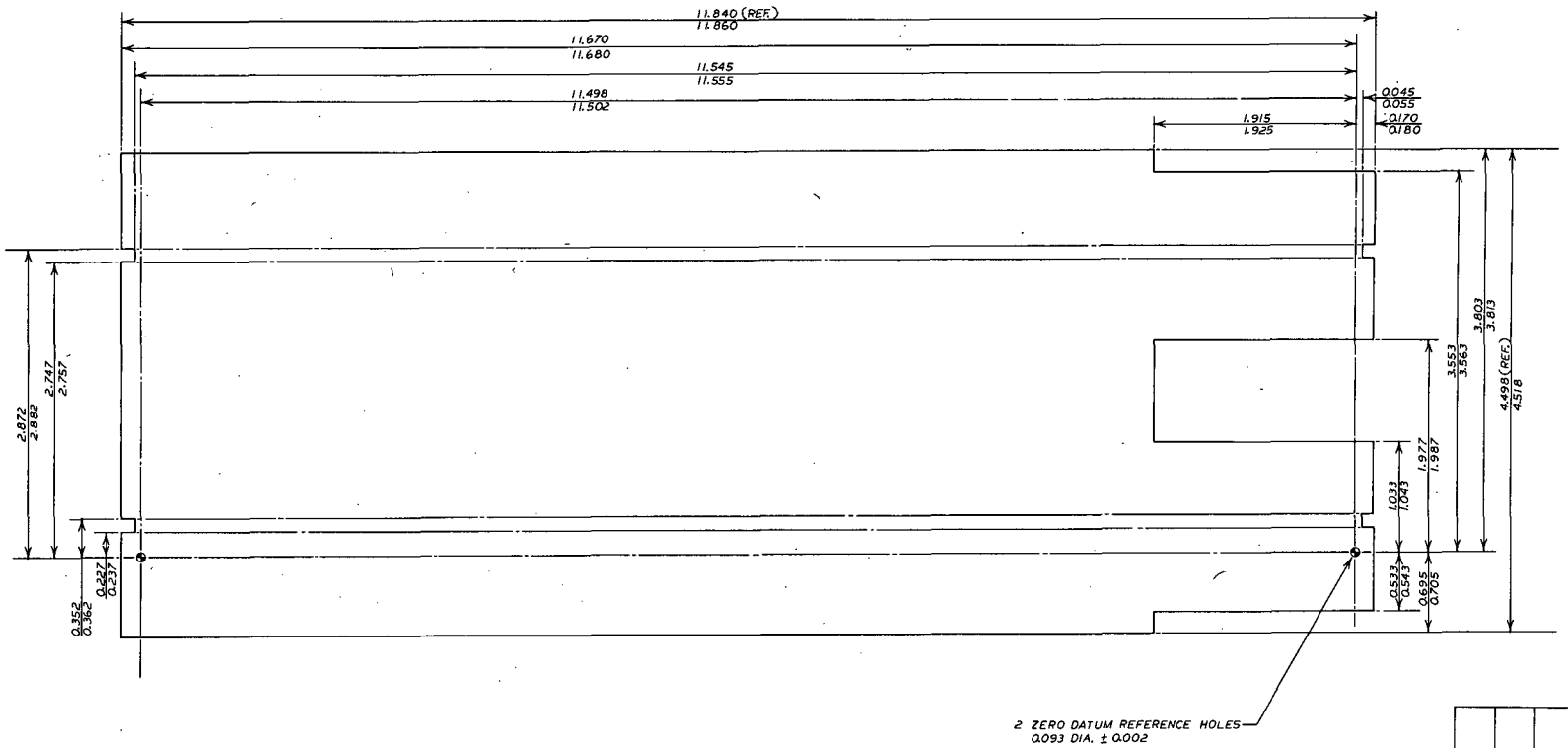
MACROMODULAR PROJECT

TITLE
SHORT MOTHERBOARD BLANK OUTLINE

APPROVED BY	FOR	DATE
Conn	MANUF.	6/10/70

ENG. DLS
DRAWN PLL
CHECKED
DRAWING NO. 200.5009
DATE 5-28-69



CHANGE NO.	DATE	DESCRIPTION

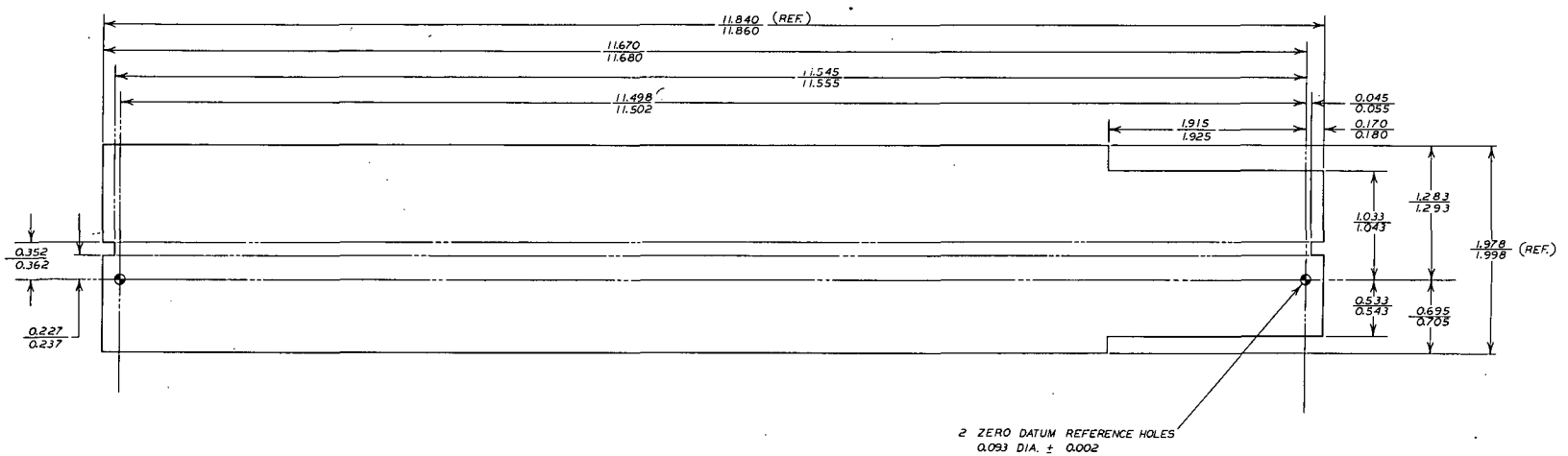
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: VERTICAL BOARD DOUBLE HEIGHT DOUBLE PANHANDLE BLANK OUTLINE

APPROVED BY	FOR	DATE
Cam	Tooling	2/4/70

ENG. DLS
DRAWN BY PLL
CHECKED TJR
DRAWING NO. 2005D013
DATE 4-10-70



CHANGE NO.	DATE	DESCRIPTION
6	6-16-70	REDRAWN

COMPUTER SYSTEMS LABORATORY
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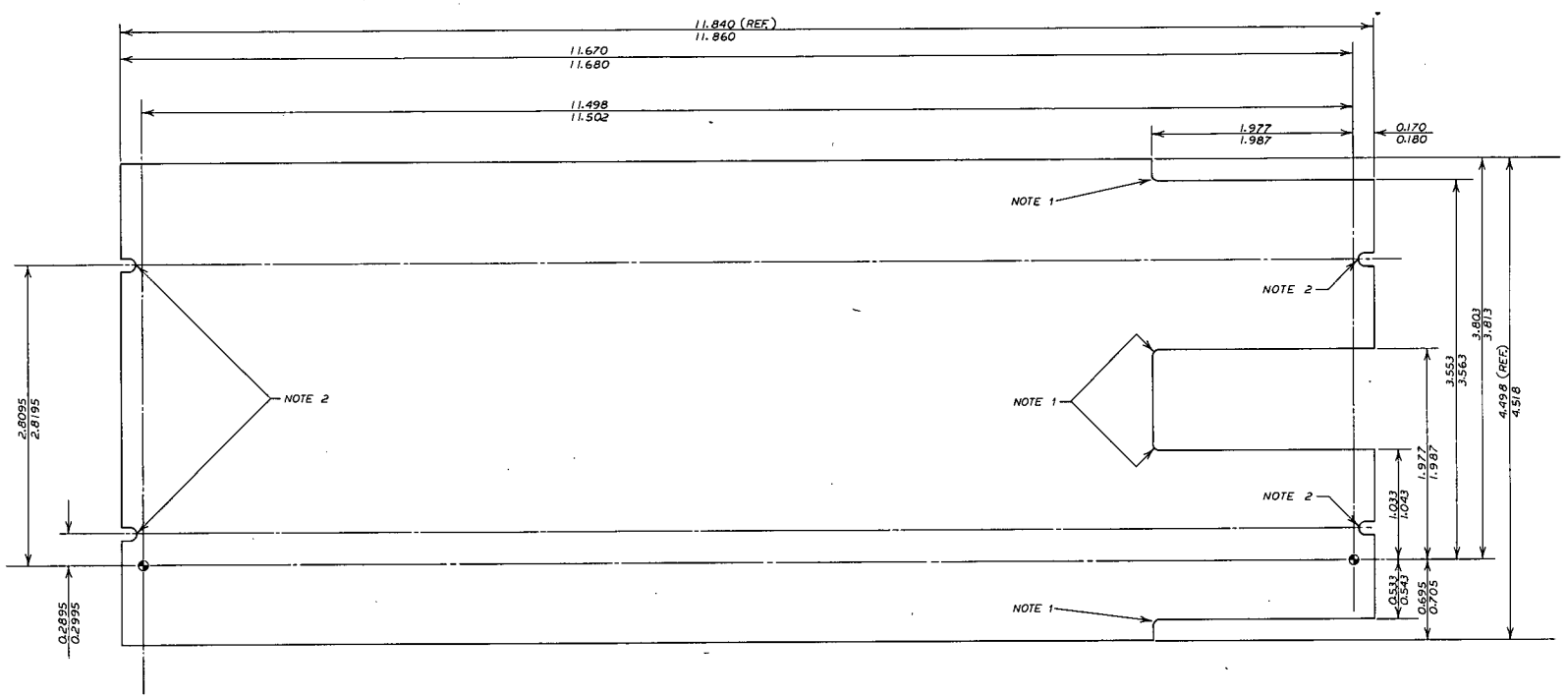
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: SINGLE HEIGHT VERTICAL BOARD OUTLINE FOR BLANKING

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
CEM	Prof.	8/1/70	CEM	200.5D015
			DRAWN BY PLL	
			CHECKED WK	DATE 8-17-68



2 ZERO DATUM REFERENCE HOLES
0.093 DIA. ± 0.002

NOTES:

1. ROUNDED FILLETS CUT WITH 0.125 DIA. ROUTING CUTTER.
2. CUT FOUR NOTCHES 0.150 ±0.010 DEEP WITH 0.125 DIA. ROUTING CUTTER.

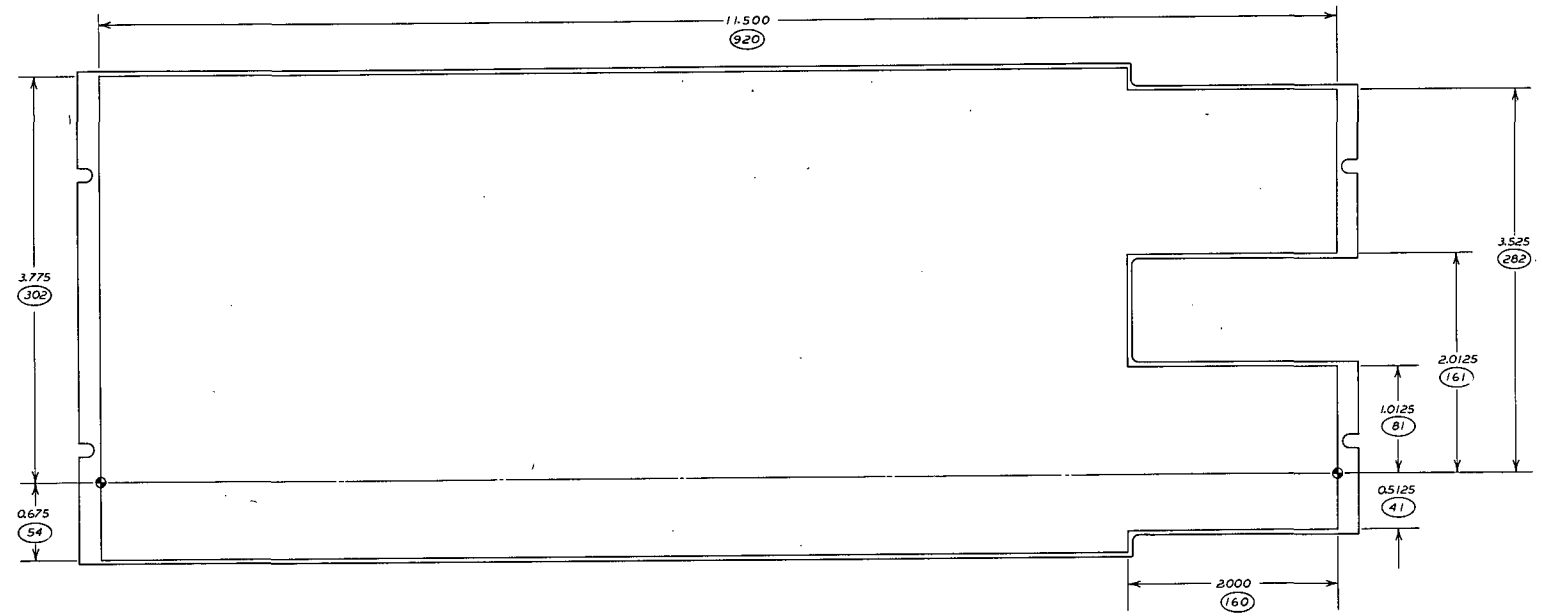
CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: VERTICAL BOARD DOUBLE HEIGHT DOUBLE PANHANDLE OUTLINE FOR ROUTING

APPROVED BY	FOR	DATE	ENG. CEM	DRAWING NO.
	TOOLING	7/6/70	DRAWN BY PLL	200.50D17
			CHECKED	DATE 7-1-70



NOTES:

1. CIRCLED NUMBERS (160) REFER TO NUMBER OF SPACES ON 0.050 GRID FOR 4:1 LAYOUT MASTERS.
2. COPPER LIMITS APPLY TO BOTH BLANKED AND ROUTED BOARDS.
3. TARGETS ARE REGISTRATION MARKS DEFINED BY DRAWINGS 200.5D15 OR 200.5D5.

CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
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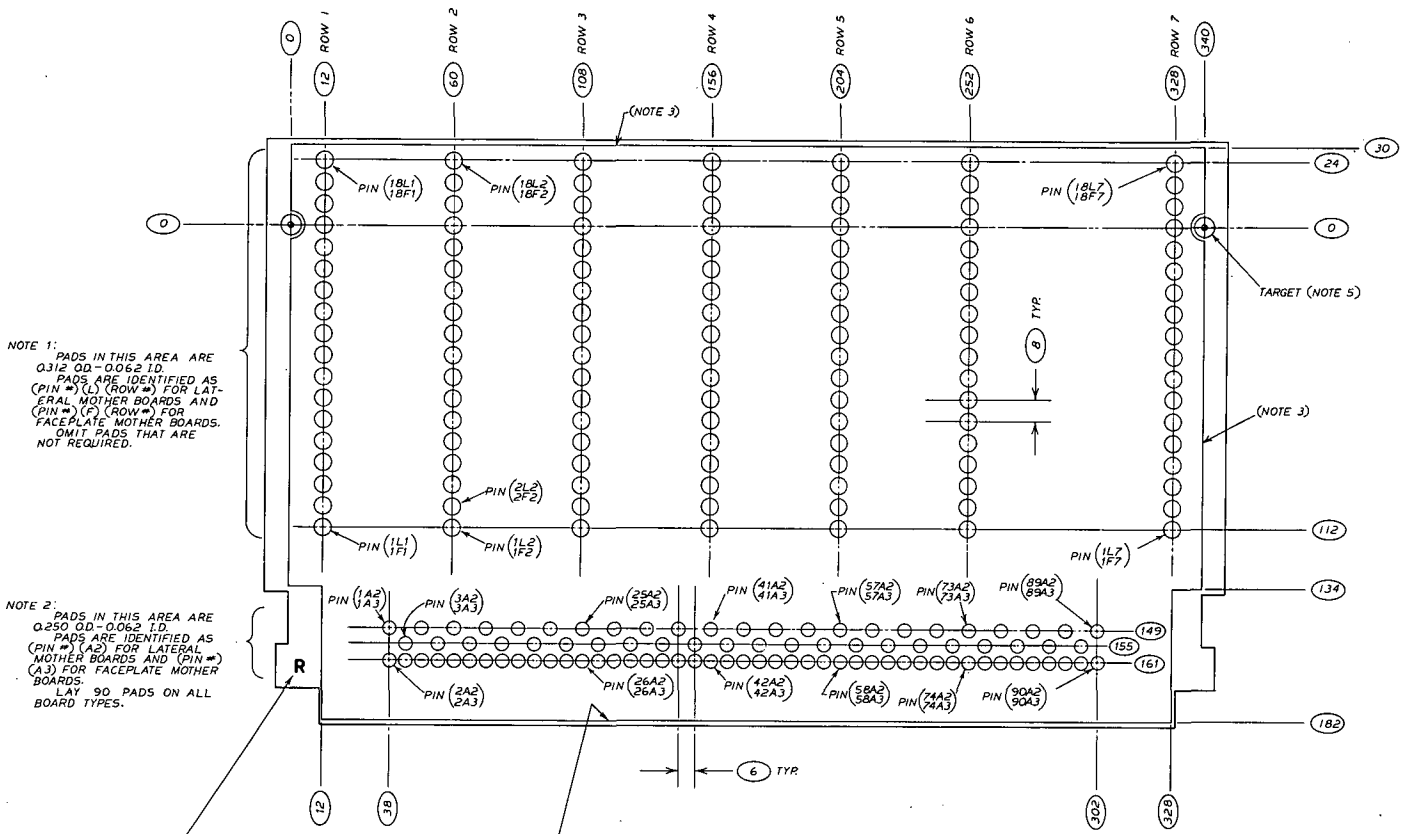
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
VERTICAL BOARD DOUBLE HEIGHT
DOUBLE PANHANDLE COPPER LIMITS

BY	APPROVED FOR	DATE
CEM	Tooling	7/6/70

ENG. CEM
DRAWN BY PLL
CHECKED DLO
DRAWING NO. 200.5D018
DATE 7-2-70



NOTE 1:
PADS IN THIS AREA ARE 0.312 O.D.-0.062 I.D. PADS ARE IDENTIFIED AS (PIN ##) (L) (ROW ##) FOR LATERAL MOTHER BOARDS AND (PIN ##) (F) (ROW ##) FOR FACEPLATE MOTHER BOARDS. OMIT PADS THAT ARE NOT REQUIRED.

NOTE 2:
PADS IN THIS AREA ARE 0.250 O.D.-0.062 I.D. PADS ARE IDENTIFIED AS (PIN ##) (A2) FOR LATERAL MOTHER BOARDS AND (PIN ##) (A3) FOR FACEPLATE MOTHER BOARDS. LAY 90 PADS ON ALL BOARD TYPES.

NOTE 3:
LINE DESIGNATES OUTERMOST EXTENT OF TAPING (COPPER LIMIT). TARGETS AND ORIENTATION MARK MAY BE OUTSIDE THIS LINE.

NOTE 4:
ORIENTATION MARK. 24-POINT BLOCK LETTER R DESIGNATES CORNER OF BOARD WITH ROUND CONNECTOR MOUNTING HOLE.

NOTE 5:
TARGET DETAIL

USE CHART-PAK RDAV-111 OR EQUIVALENT. TWO TARGETS PER LAYOUT.

NOTE 6:
USE 0.312 O.D.-0.062 I.D. PADS FOR COMPONENTS AND JUMPERS IF SPACE ALLOWS. OTHERWISE USE 0.250 O.D.-0.062 I.D. PADS. ALL PADS TO BE DRILLED FOR TYPE 'B' HOLES. SEE DWG ( ) TWO TARGETS TO BE DRILLED 0.093 ± 0.002 FOR BLANKING REGISTRATION (SEE DWG 200.5009).

NOTE 7:
DIMENSIONS ARE SHOWN AS "(112)". NUMBER REFERS TO THE DISTANCE FROM ZERO REFERENCE LINE IN UNITS OF 0.050 INCH REFERENCE GRID. TO CONVERT TO NOMINAL DIMENSION INCHES ON 4:1 LAYOUT, MULTIPLY BY 0.050. TO CONVERT TO NOMINAL REDUCED DIMENSION ON 1:1, MULTIPLY BY 0.0125.

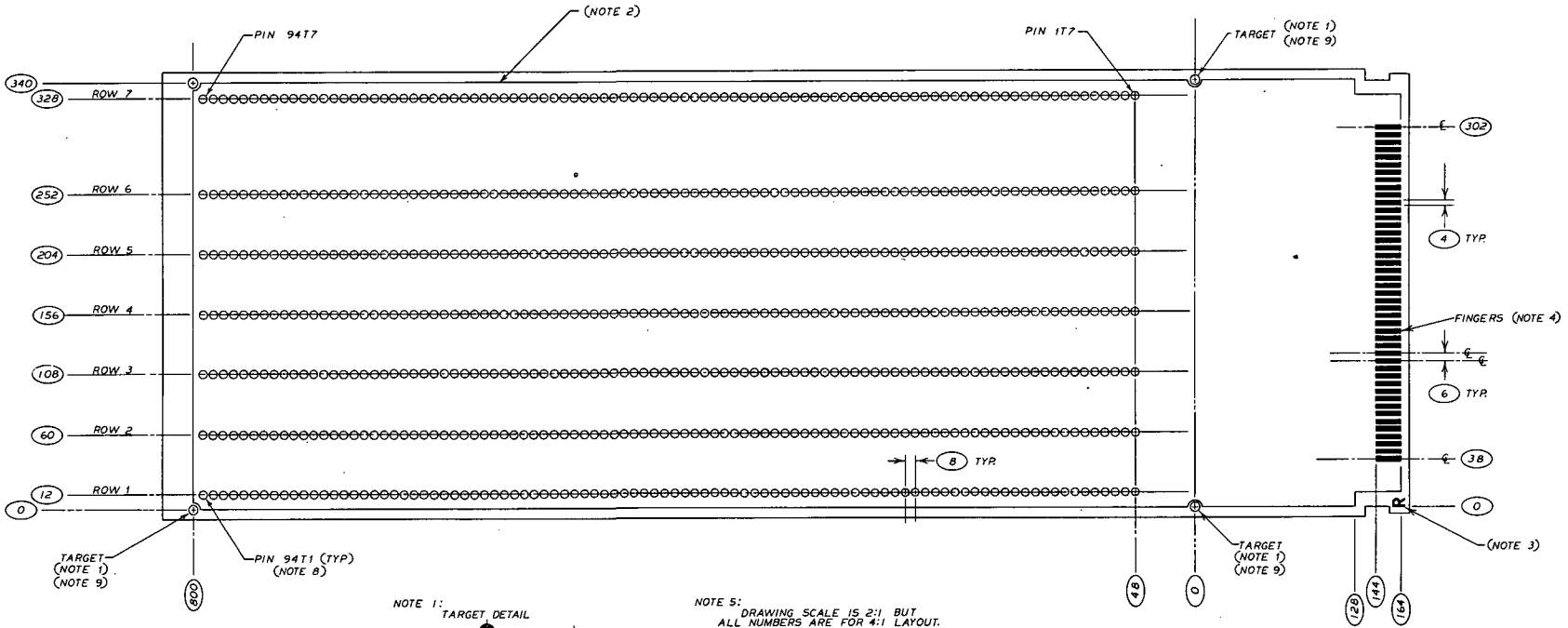
CHANGE NO	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
LAYOUT GUIDE SHORT MOTHERBOARD

APPROVED BY	FOR	DATE	DSN	DRAWING NO
C...	LAYOUT	8/4/70	CEM	200.50D19
			DRAWN BY PLL	
			CHECKED KEO	DATE 7-21-70



NOTE 1:
TARGET DETAIL

USE CHART-PAK RDAV-111 OR EQUIVALENT. THREE TARGETS PER LAYOUT.

NOTE 2:
LINE DESIGNATES OUTERMOST EXTENT OF TAPING (COPPER LIMITS). TARGETS AND ORIENTATION MARK MAY BE OUTSIDE THIS LINE.

NOTE 3:
ORIENTATION MARK. 24-POINT BLOCK LETTER R DESIGNATES CORNER OF BOARD WITH ROUND CONNECTOR MOUNTING HOLE.

NOTE 4:
45 FINGERS
USE 0.200 TAPE 1.000 LONG.

NOTE 5:
DRAWING SCALE IS 2:1 BUT ALL NUMBERS ARE FOR 4:1 LAYOUT.

NOTE 6:
PADS USED ON THIS BOARD ARE 0.312 O.D.- 0.062 I.D. OMIT PADS THAT ARE NOT REQUIRED.
ALL PADS TO BE DRILLED FOR TYPE B HOLES. (SEE DWG.

NOTE 7:
DIMENSIONS ARE SHOWN AS (48). NUMBER REFERS TO DISTANCE FROM ZERO REFERENCE LINE IN UNITS OF 0.050 INCH REFERENCE GRID.
TO CONVERT TO NOMINAL DIMENSION ON 4:1 LAYOUT MULTIPLY BY 0.050. TO CONVERT TO NOMINAL REDUCED DIMENSION ON 1:1 MULTIPLY BY 0.0125.

NOTE 8:
TERM FOR PIN LOCATION IS PAD NUMBER (94) MOTHERBOARD DESIGNATION LETTER (T, B) AND VERTICAL ROW NUMBERS (1-7).
EG: 1T7 IS PIN ONE ON TOP MOTHERBOARD IN ROW SEVEN.

NOTE 9:
THREE TARGETS TO BE DRILLED 0.093 ± 0.002.

CHANGE NO.	DATE	DESCRIPTION
1	8-16-72	E.C.O. 0268 MTK

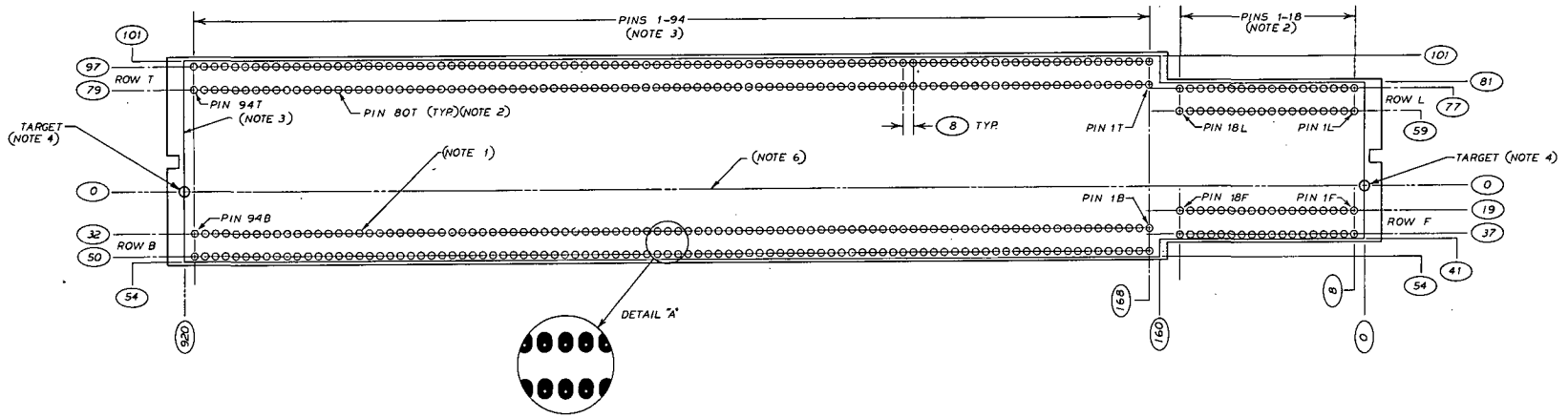
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: LAYOUT GUIDE — LONG MOTHERBOARD

APPROVED BY	FOR	DATE
Cam	LAYOUT	8/4/72

ENG. NTK
DRAWN BY PLL
CHECKED KEO
DATE 7-23-70
DRAWING NO. 200500020



NOTE 1:
OVAL PADS USED FOR EDGE CONNECTOR PINS ARE BY-BUK NO. 72B-1 OR EQUIVALENT.

PAD SIZE 0.300 O.D.×0.062 I.D. × 0.400 L
PADS PLACED AS SHOWN WITH LONG END TOWARD CENTER OF BOARD. OMIT PADS NOT REQUIRED. DRILL FOR TYPE "A" HOLES.

NOTE 2:
PAIRS OF PADS FOR EDGE CONNECTOR PINS ARE DESIGNATED BY (PIN NUMBER) (LETTER), WHERE THE PIN NUMBER SPECIFIES LOCATION FROM RIGHT TO LEFT AND THE LETTER (T, L, F OR B) SPECIFIES THE ROW. E.G. PIN 80T IS IN THE 80th. POSITION FROM THE RIGHT IN ROW T.

NOTE 3:
LINE DESIGNATES OUTERMOST EXTENT OF TAPING (COPPER LIMITS).
TARGETS MAY BE OUTSIDE THIS LINE.

NOTE 4:
TARGET DETAIL

USE CHART PAK RDAV-111 OR EQUIVALENT. TWO TARGETS PER LAYOUT.
TWO TARGETS TO BE DRILLED 0.093 ± 0.002 FOR BLANKING REGISTRATION (SEE DWG. 200.50D9)

NOTE 5:
DIMENSIONS ARE SHOWN AS (54). NUMBER REFERS TO THE DISTANCE FROM ZERO REFERENCE LINE IN UNITS OF 0.050 INCH REFERENCE GRID.
TO CONVERT TO NOMINAL DIMENSION INCHES ON 4:1 LAYOUT, MULTIPLY BY 0.050. TO CONVERT TO NOMINAL REDUCED DIMENSION ON 1:1, MULTIPLY BY 0.0125.

NOTE 6:
PADS FOR DUEL IN-LINE PACKAGES GENERALLY PLACED WITH PINS 7 & 8 ON ZERO DATUM LINE.

NOTE 7:
ROUND PADS USED FOR DUAL IN-LINE PACKAGES AND OTHER COMPONENTS ARE 0.250 O.D.–0.062 I.D.
ALL ROUND PADS TO BE DRILLED FOR TYPE "B" HOLES. (SEE DWG.

CHANGE NO.	DATE	DESCRIPTION

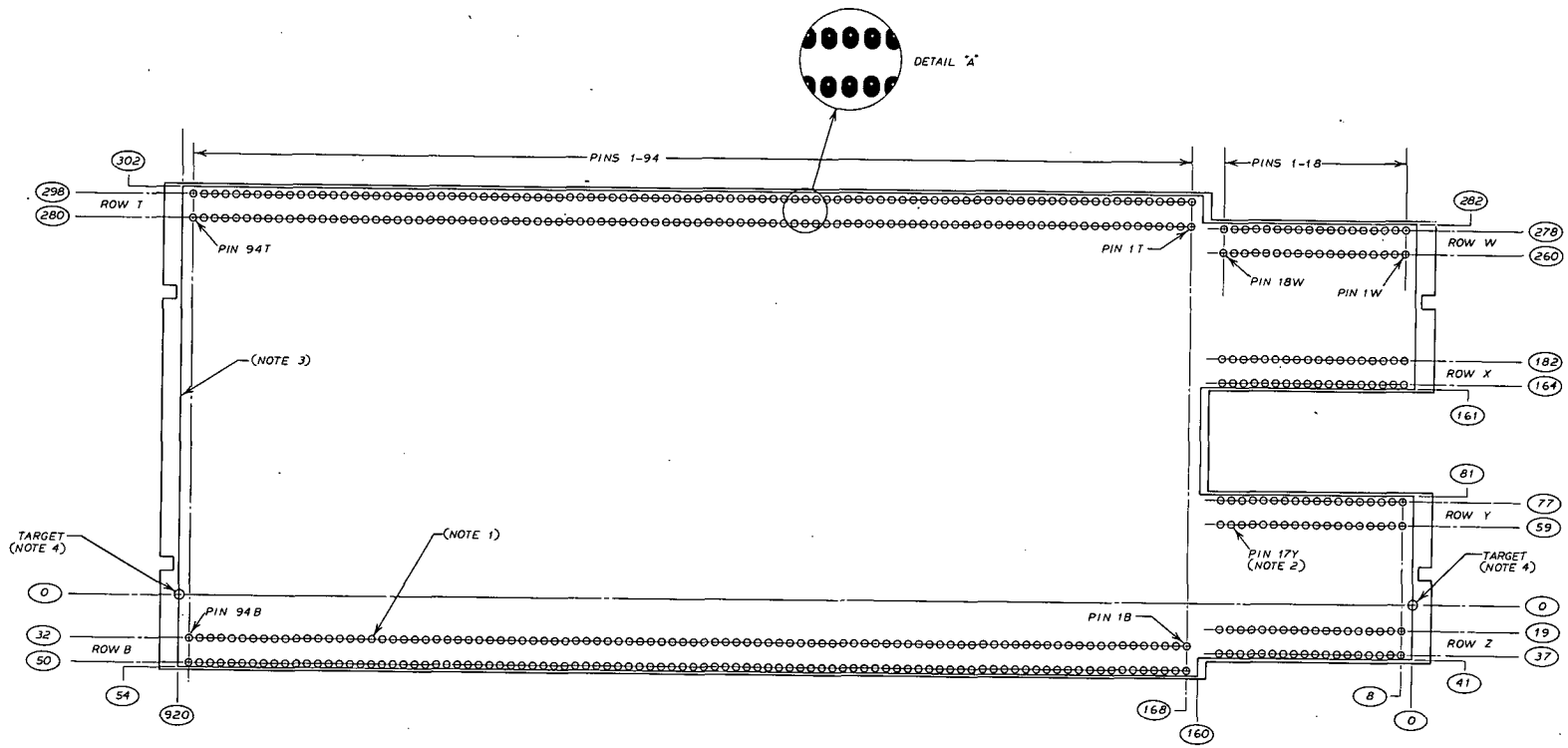
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
LAYOUT GUIDE - VERTICAL BOARD

BY	APPROVED FOR	DATE
CAM	LAYOUT	9/4/70

DES.	N T K
DRAWN BY	P L L
CHECKED	K E O
DATE	7-24-70
DRAWING NO.	200.50 D21



NOTE 1: OVAL PADS USED FOR EDGE CONNECTOR PINS ARE BY-BUK NO. 728-1 OR EQUIVALENT.

PAD SIZE 0.300 O.D. X 0.062 I.D. X 0.400 L PADS PLACED AS SHOWN WITH LONG END AWAY FROM EDGE OF BOARD. OMIT PADS NOT REQUIRED. DRILL FOR TYPE "A" HOLES.

NOTE 2: PAIRS OF PADS FOR EDGE CONNECTOR PINS ARE DESIGNED BY (PIN NUMBER)(LETTER), WHERE THE PIN NUMBER SPECIFIES LOCATION FROM RIGHT TO LEFT AND THE LETTER (T, W, X, Y, Z, B) SPECIFIES THE ROW. E.G.: PIN 17Y IS IN THE 17th POSITION FROM THE RIGHT IN ROW "Y."

NOTE 3: LINE DESIGNATES OUTERMOST EXTENT OF TAPING. TARGETS MAY BE OUTSIDE THIS LINE.

NOTE 4: TARGET DETAIL

USE CHART-PAK RDAV-111 OR EQUIVALENT. TWO TARGETS PER LAYOUT. TWO TARGETS TO BE DRILLED 0.093 ± 0.002 FOR BLANKING REGISTRATION. (SEE DWG. 200.5009)

NOTE 5: DIMENSIONS ARE SHOWN AS (160). NUMBER REFERS TO THE DISTANCE FROM ZERO REFERENCE LINE IN UNITS OF 0.050 INCH REFERENCE GRID. TO CONVERT TO NOMINAL DIMENSION INCHES ON 4:1 LAYOUT, MULTIPLY BY 0.050. TO CONVERT TO NOMINAL REDUCED DIMENSION ON 1:1, MULTIPLY BY 0.0125.

NOTE 6 ROUND PADS USED FOR DUAL IN LINE-PACKAGES AND OTHER COMPONENTS ARE 0.250 O.D. - 0.062 I.D. ALL ROUND HOLES TO BE DRILLED FOR TYPE "B" HOLES. (SEE DWG.)

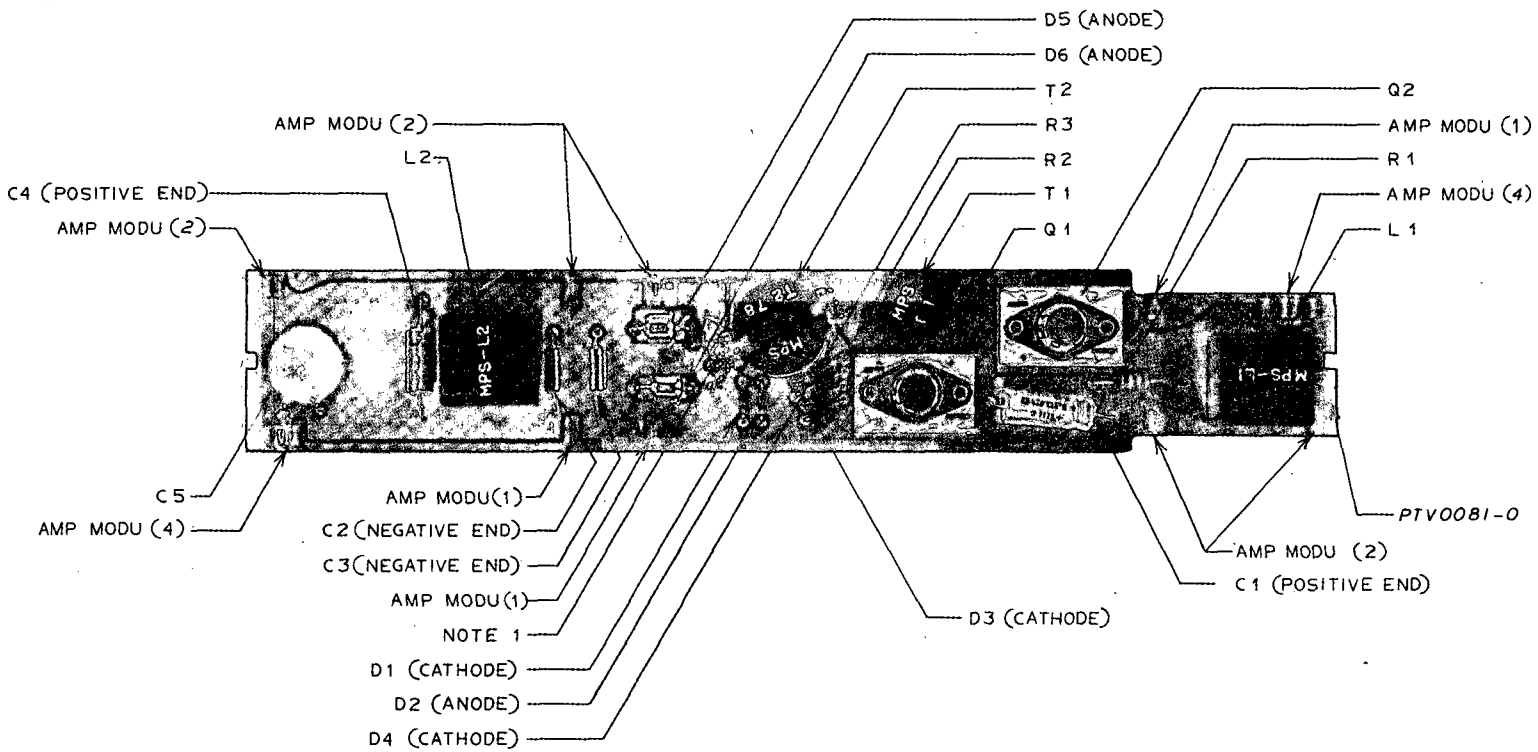
CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: LAYOUT GUIDE - VERTICAL BOARD DOUBLE HEIGHT - DOUBLE PANHANDLE

APPROVED BY	APPROVED FOR	DATE	DRAWN BY	DRAWING NO.
Conn	LAYOUT	8/4/70	NTK PLL	200.5002
			CHECKED KEO	DATE 7-29-70



NOTES:

1. TWO OF THE WIRES COMING OUT OF T2 WILL BE TWISTED TOGETHER. THESE TWO WIRES ARE INSERTED INTO THE TWO HOLES MARKED "8". THE OTHER TWO WIRES ARE INSERTED INTO THE HOLES MARKED "7" AND "9" IN ANY ORDER.
2. L1, L2, AND T2 ARE MOUNTED WITH RTV SILICONE RUBBER BETWEEN THE PACKAGE AND THE PRINTED CIRCUIT BOARD.
3. L2 IS MOUNTED TO PROVIDE MAXIMUM SPACING BETWEEN L2 AND C2.

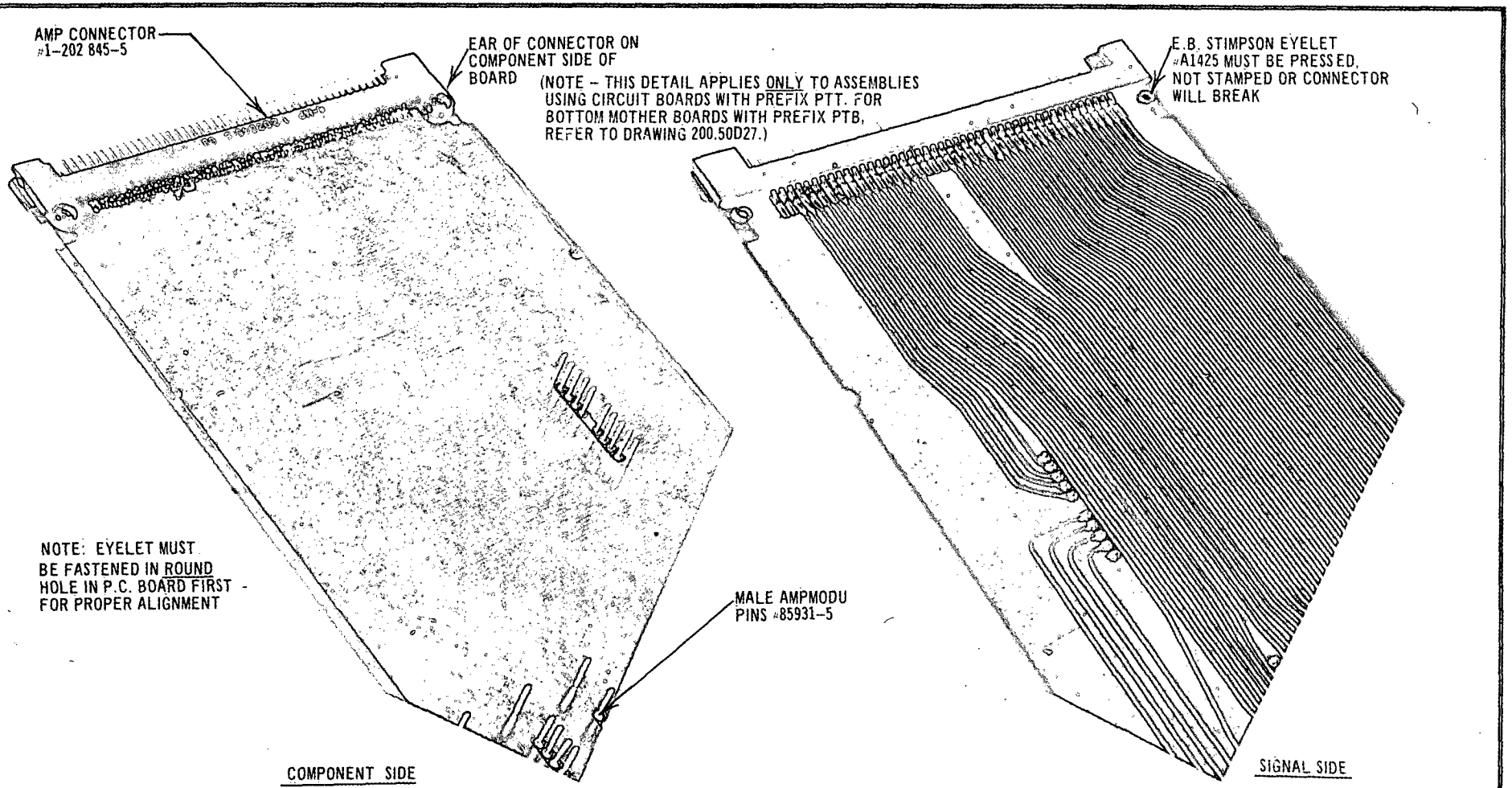
CHANGE NO.	DATE	DESCRIPTION
1	2-11-70	REDRAWN, ADDED NOTES 2 & 3

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: 15 WATT DC-DC CONVERTER FINAL ASSEMBLY

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
			TJC	200.50D25
			DRAWN BY PLL	
			CHECKED TJC	DATE 9-24-70



CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

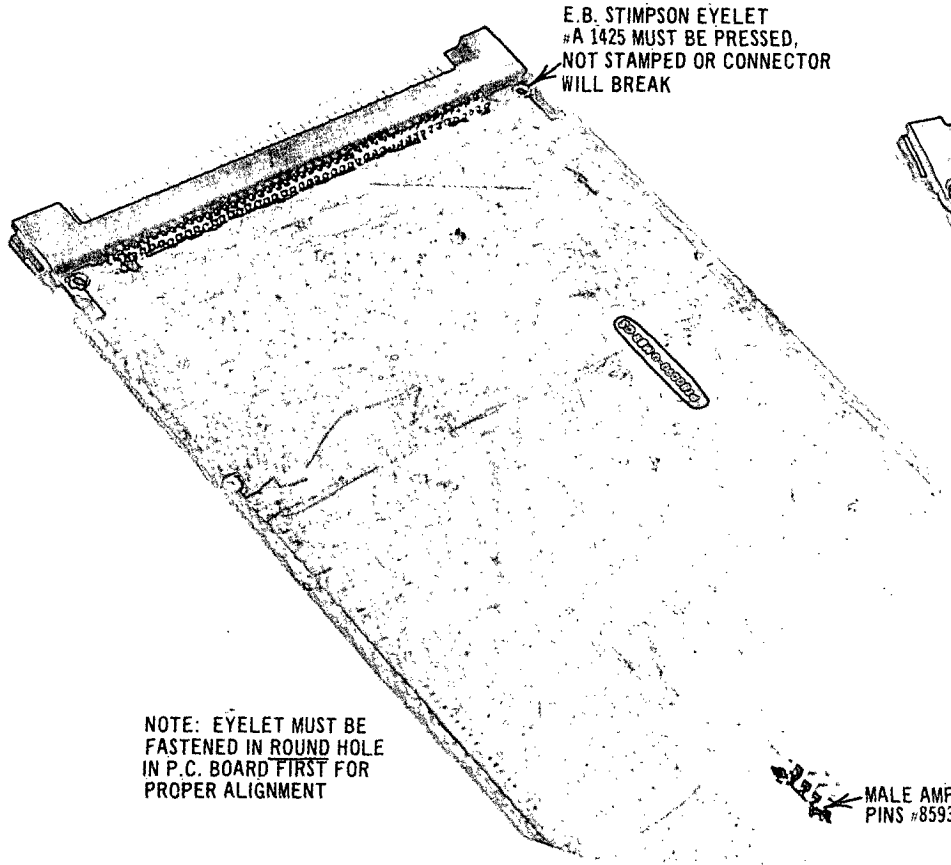
TITLE: TOP MOTHERBOARD CONNECTOR ORIENTATION

APPROVED BY	FOR	DATE

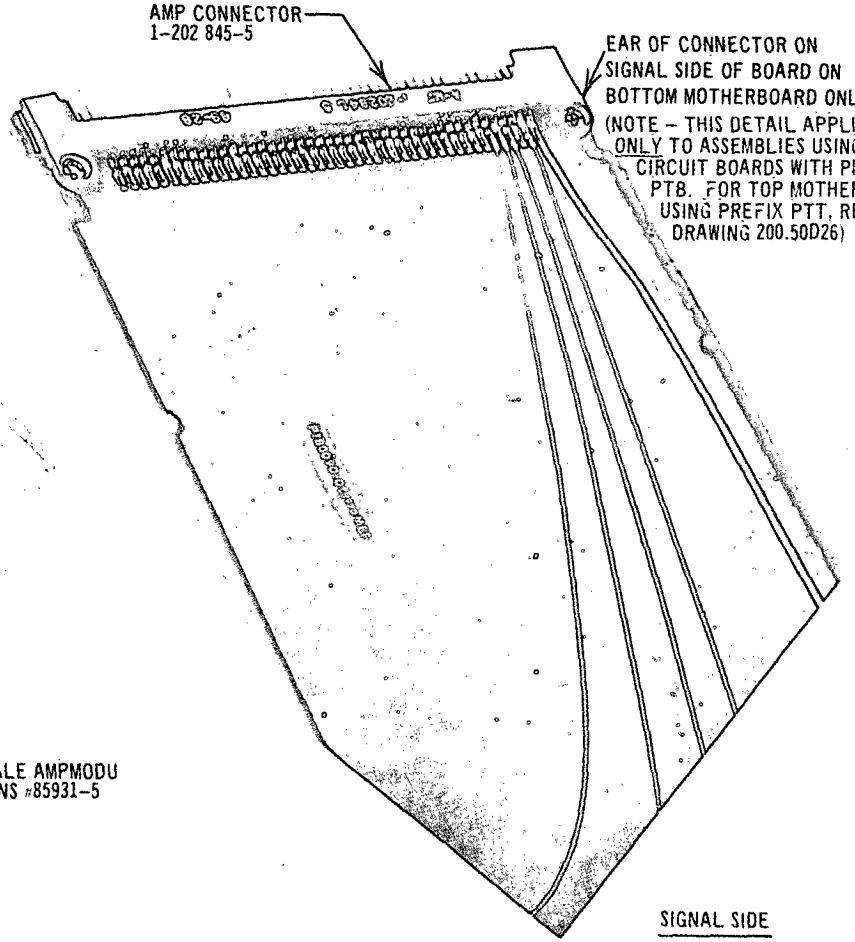
ENG.
DRAWN BY
CHECKED MK.

DRAWING NO. 200.50D26

DATE 8/9/70



COMPONENT SIDE



SIGNAL SIDE

CHANGE NO	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: BOTTOM MOTHERBOARD CONNECTOR ORIENTATION

APPROVED BY	FOR	DATE

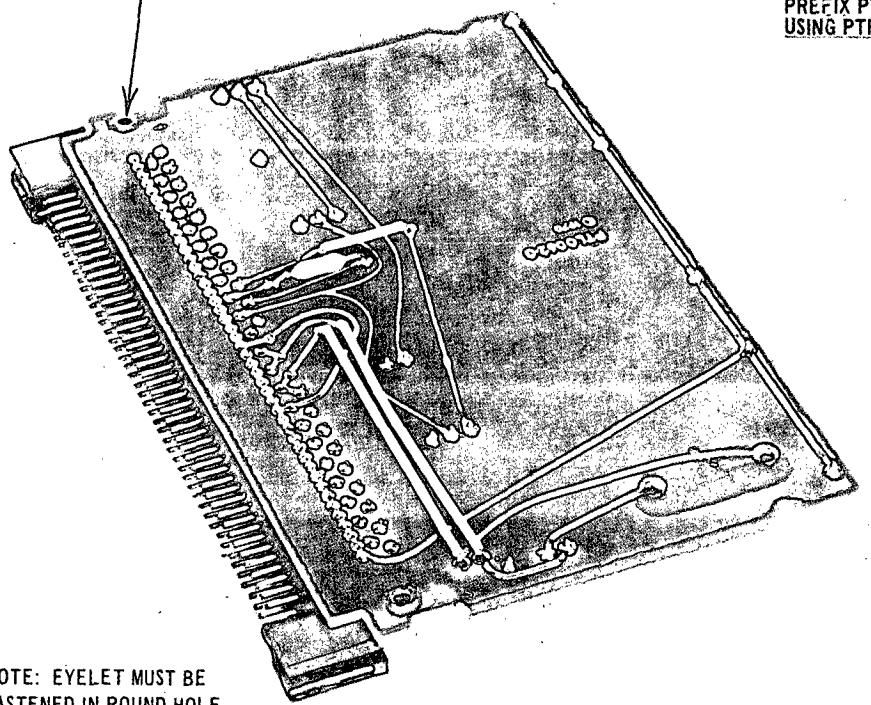
ENG.

DRAWN BY

CHECKED MTK.

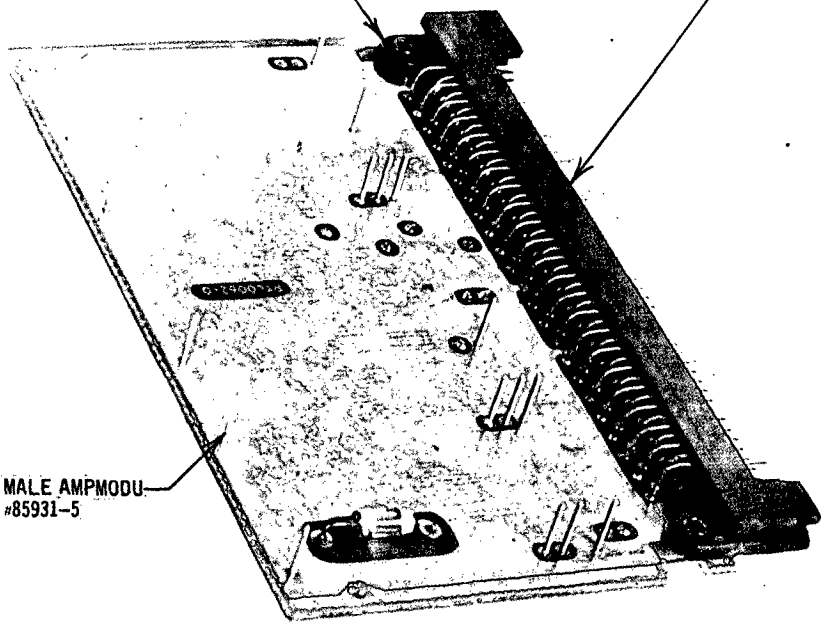
DRAWING NO. 200.50D27

DATE 8/9/70



NOTE: EYELET MUST BE FASTENED IN ROUND HOLE IN P.C. BOARD FIRST FOR PROPER ALIGNMENT

SIGNAL SIDE



COMPONENT SIDE

CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

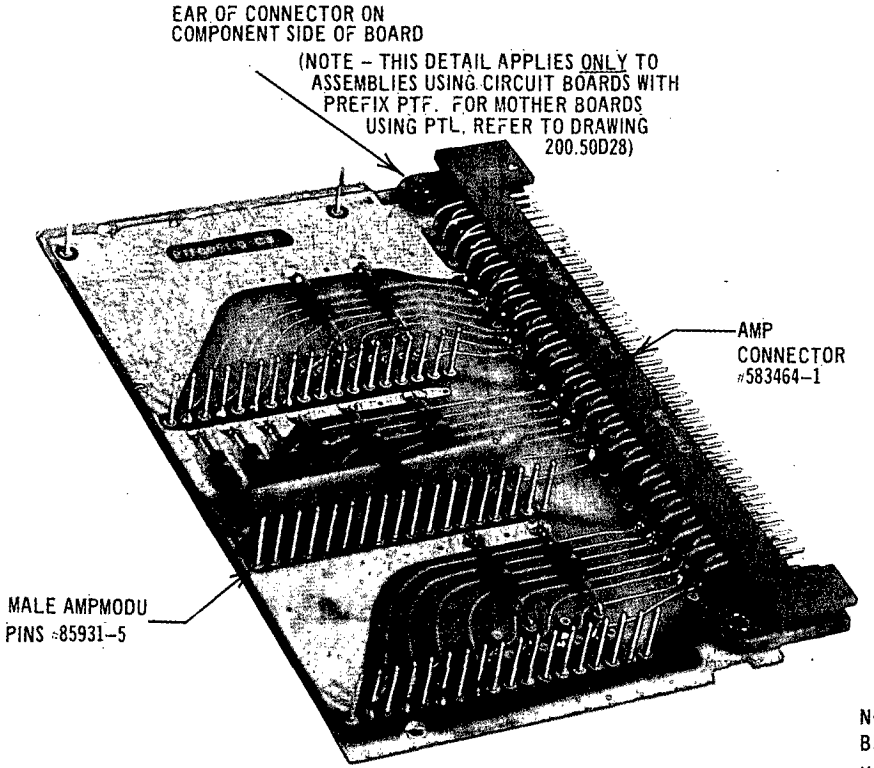
TITLE: LATERAL MOTHERBOARD CONNECTOR ORIENTATION

APPROVED BY	FOR	DATE

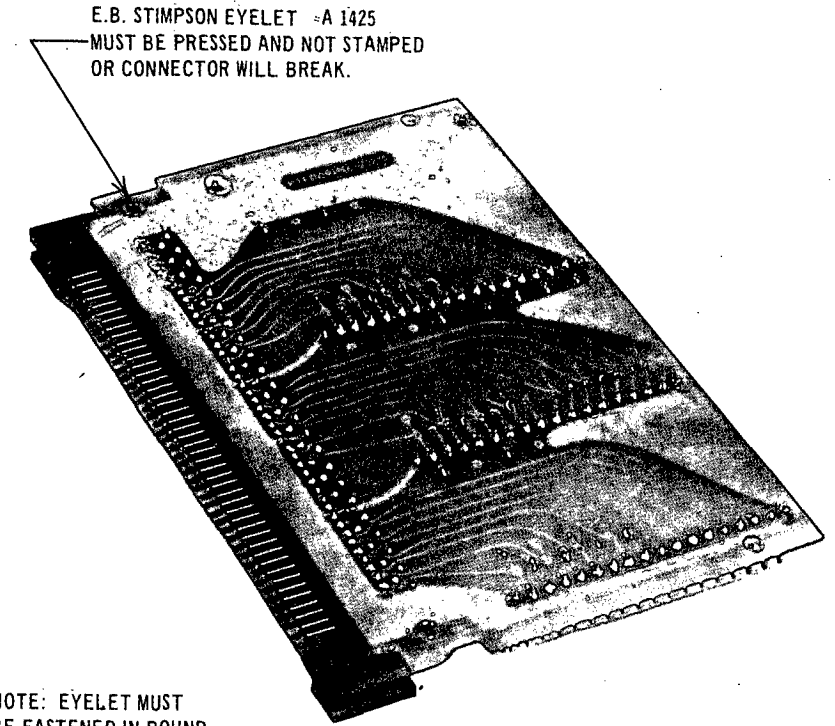
ENG.
DRAWN BY
CHECKED WTR

DRAWING NO. 200.50D28

DATE 8-9-70



COMPONENT SIDE



NOTE: EYELET MUST
BE FASTENED IN ROUND
HOLE IN P.C. BOARD
FIRST FOR PROPER
ALIGNMENT.

SIGNAL SIDE

CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

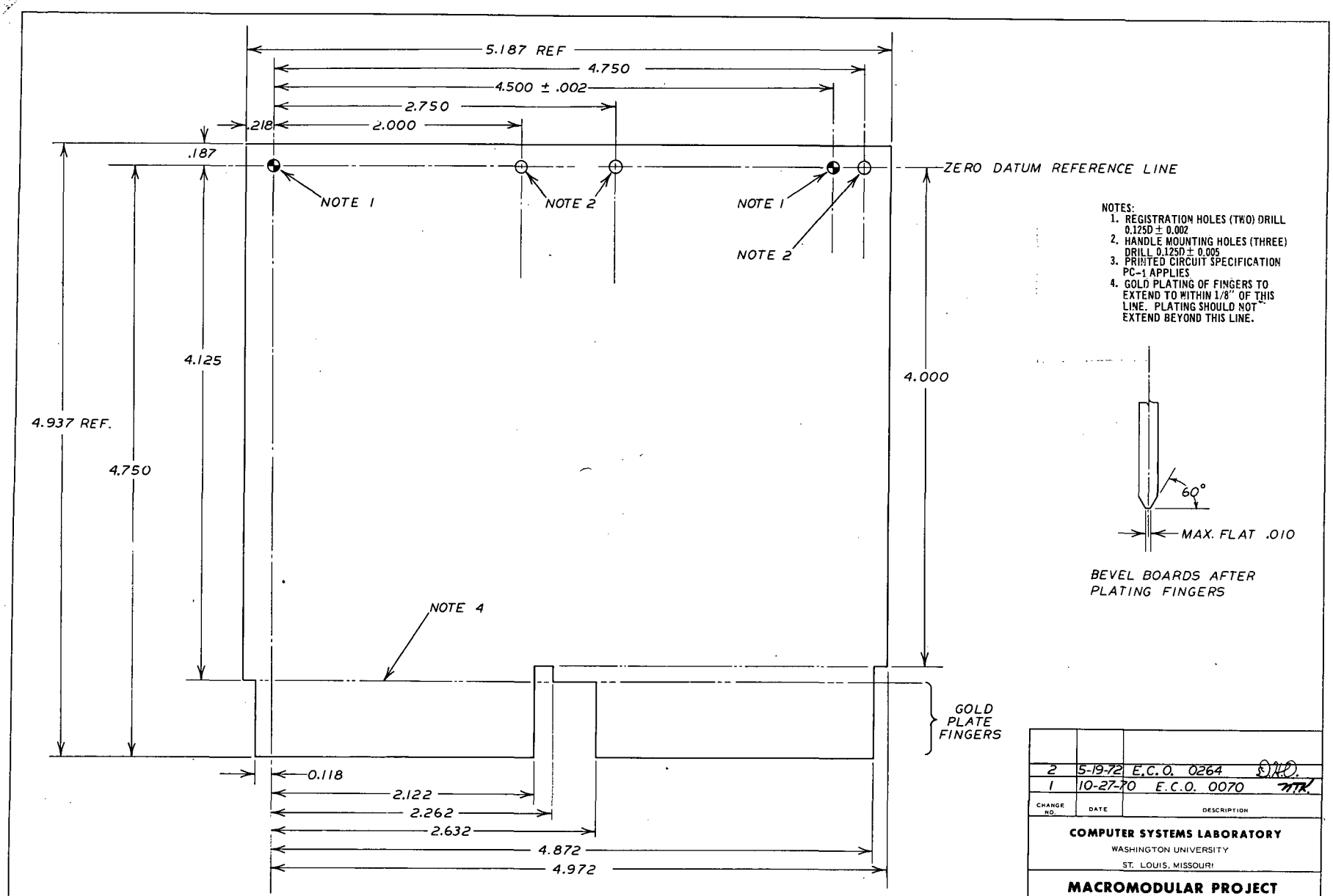
TITLE: FACEPLATE MOTHERBOARD CONNECTOR ORIENTATION

APPROVED BY	FOR	DATE

ENG.
DRAWN BY
CHECKED MTK

DRAWING NO. 200.50D29

DATE 8/9/70



DIMENSIONS: ± .005 U.O.N.

NOTES:
1. REGISTRATION HOLES (TWO) DRILL 0.125D ± 0.002
2. HANDLE MOUNTING HOLES (THREE) DRILL 0.125D ± 0.005
3. PRINTED CIRCUIT SPECIFICATION PC-1 APPLIES
4. GOLD PLATING OF FINGERS TO EXTEND TO WITHIN 1/8" OF THIS LINE. PLATING SHOULD NOT EXTEND BEYOND THIS LINE.

BEVEL BOARDS AFTER PLATING FINGERS

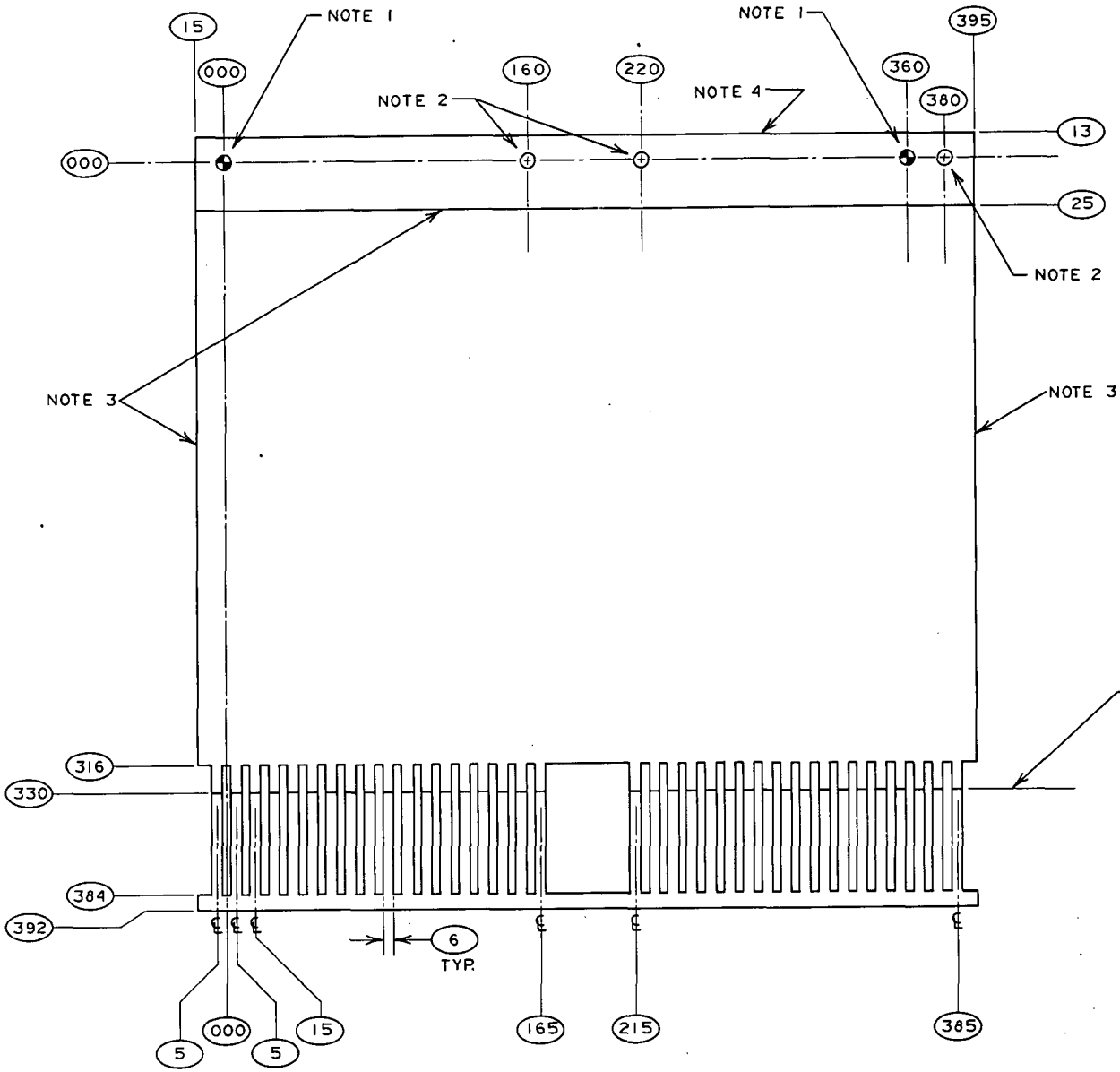
CHANGE NO.	DATE	DESCRIPTION
2	5-19-72	E.C.O. 0264
1	10-27-70	E.C.O. 0070

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: DOUBLE HEIGHT PLUG IN BOARD BLANK OUTLINE

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
			NTK	200.50D30
			DRAWN BY PLL	
			CHECKED REO.	DATE 10-2-70



NOTES:
1. REGISTRATION TARGET

   USE CHART-PAK RDAV-111 OR EQUIVALENT (TWO PLACES)
2. HANDLE MOUNTING HOLE LOCATIONS (THREE PLACES)
3. COPPER LIMITS FOR TAPING
4. COPPER LIMIT FOR BLANK BOARD OR SPECIAL CIRCUMSTANCES
5. CIRCUIT BOARD SHOWN FROM ETCH SIDE. COMPONENTS MOUNT FROM REVERSE SIDE.
6. DIMENSIONS ARE SHOWN AS (25) NUMBER REFERS TO THE DISTANCE FROM THE ZERO REFERENCE LINE IN UNITS OF 0.050 INCH REFERENCE GRID.

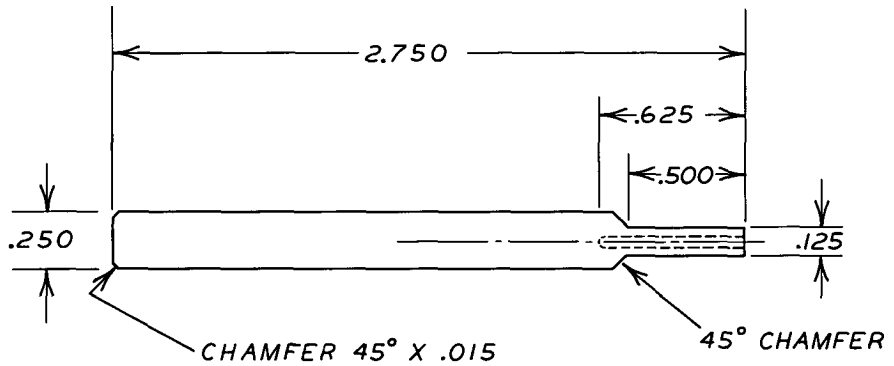
CHANGE NO.	DATE	DESCRIPTION
1	10-30-70	SEE E.C.O. 0071

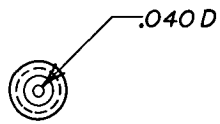
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
LAYOUT GUIDE FOR PLUG-IN BOARD

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
CDrn	MANUF.	5 Nov. 70	NTK	200.50D31
			DRAWN BY PLL	
			CHECKED	DATE 10-5-70





MATERIAL: .250 DELRIN
DIMENSIONS: ±.005

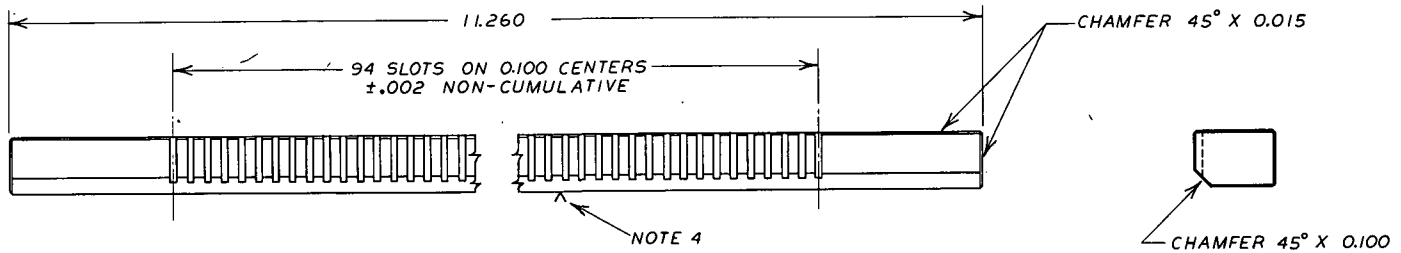
CHANGE NO.	DATE	DESCRIPTION

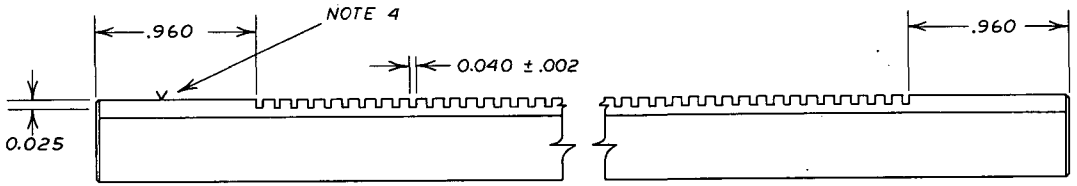
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
MALE PIN STRAIGHTENER
TOOL #002

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
Cam.	USE	19 Oct 70	GM	200.50D32
			DRAWN BY PLL	
			CHECKED MTK	DATE 10-9-70





NOTES:

1. DO NOT SCALE FROM PRINT.
2. MATERIAL IS T2024-T3 ALUM
3. TOLERANCES ± .005 U.O.N.
4. MARKED SURFACES TO BE MILLED FLAT.
5. EDGES ARE TO BE FREE OF BURRS.

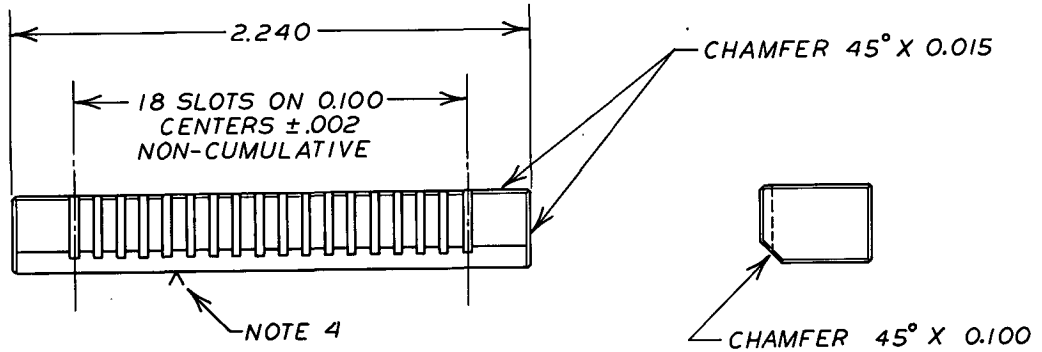
CHANGE NO.	DATE	DESCRIPTION

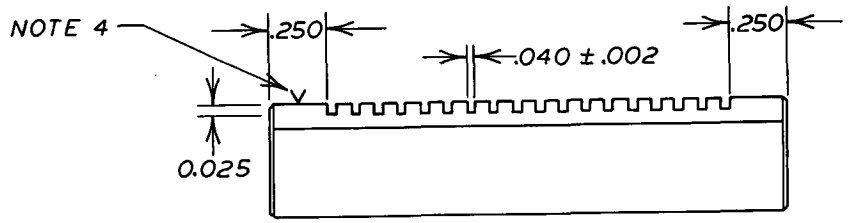
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
PIN ALIGNMENT TOOL #001

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
Chm	USE	10/13/70	GM	200.50D33
			DRAWN BY PLL	
			CHECKED	DATE 10-9-70





NOTES

1. DO NOT SCALE FROM PRINT.
2. MATERIAL IS T2024-T3 ALUM.
3. TOLERANCES ±.005 U.O.N.
4. MARKED SURFACES TO BE MILLED FLAT.
5. EDGES ARE TO BE FREE OF BURRS.

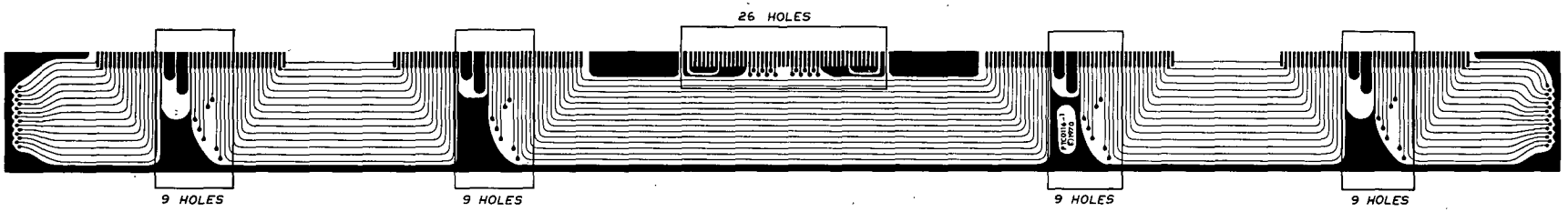
CHANGE NO.	DATE	DESCRIPTION

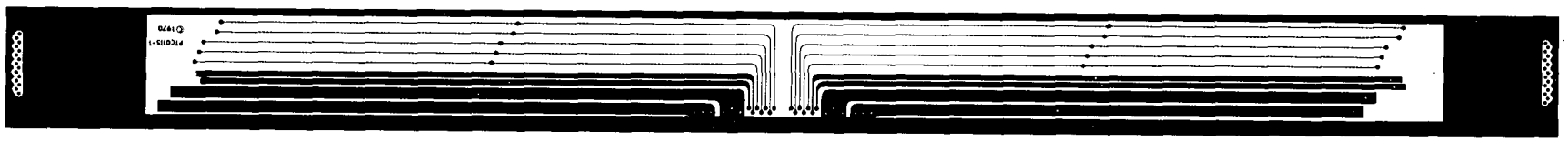
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
PIN ALIGNMENT TOOL #003

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
Cem	USE	10/13/70	GM	200.50D34
			DRAWN BY PLL	
			CHECKED	DATE 10-13-70





NOTE:
DRILL 62 HOLES 0.033"D. IN LOCATIONS MARKED AFTER BONDING. BONDING MATERIAL SHALL NOT EXTEND MORE THAN 1/32" BEYOND EDGE OF PTC0115-1 BOARD OR ABOVE THE ETCHED SURFACE OF PTC0115-1.

CHANGE NO	DATE	DESCRIPTION

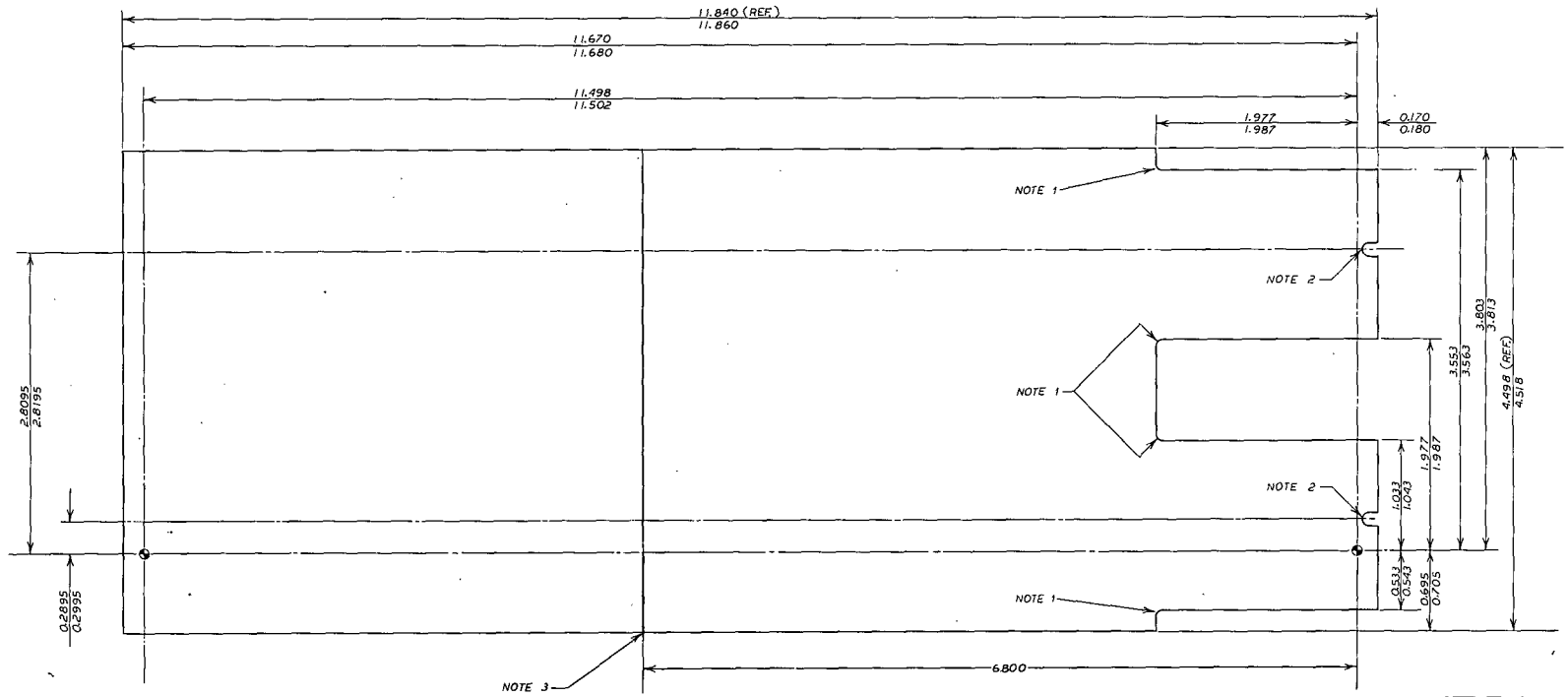
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: CHANNEL INTERCONNECTION CIRCUIT BOARD ASSEMBLY

APPROVED BY	FOR	DATE

ENG. DLS
DRAWN BY PLL
CHECKED MTK
DRAWING NO. 200.5037
DATE 11-21-70



2 ZERO DATUM REFERENCE HOLES
0.093 DIA. ± 0.002

NOTES:

1. ROUNDED FILLETS CUT WITH 0.125 DIA. ROUTING CUTTER.
2. CUT TWO NOTCHES 0.150 ±0.010 DEEP WITH 0.125 DIA. ROUTING CUTTER.
3. CUT OFF MEMORY DATA REGISTER & SENSE AMP BOARD PART NO. 211.5 6.300 INCHES FROM RIGHT HAND TARGET AFTER ROUTING.

CHANGE NO	DATE	DESCRIPTION

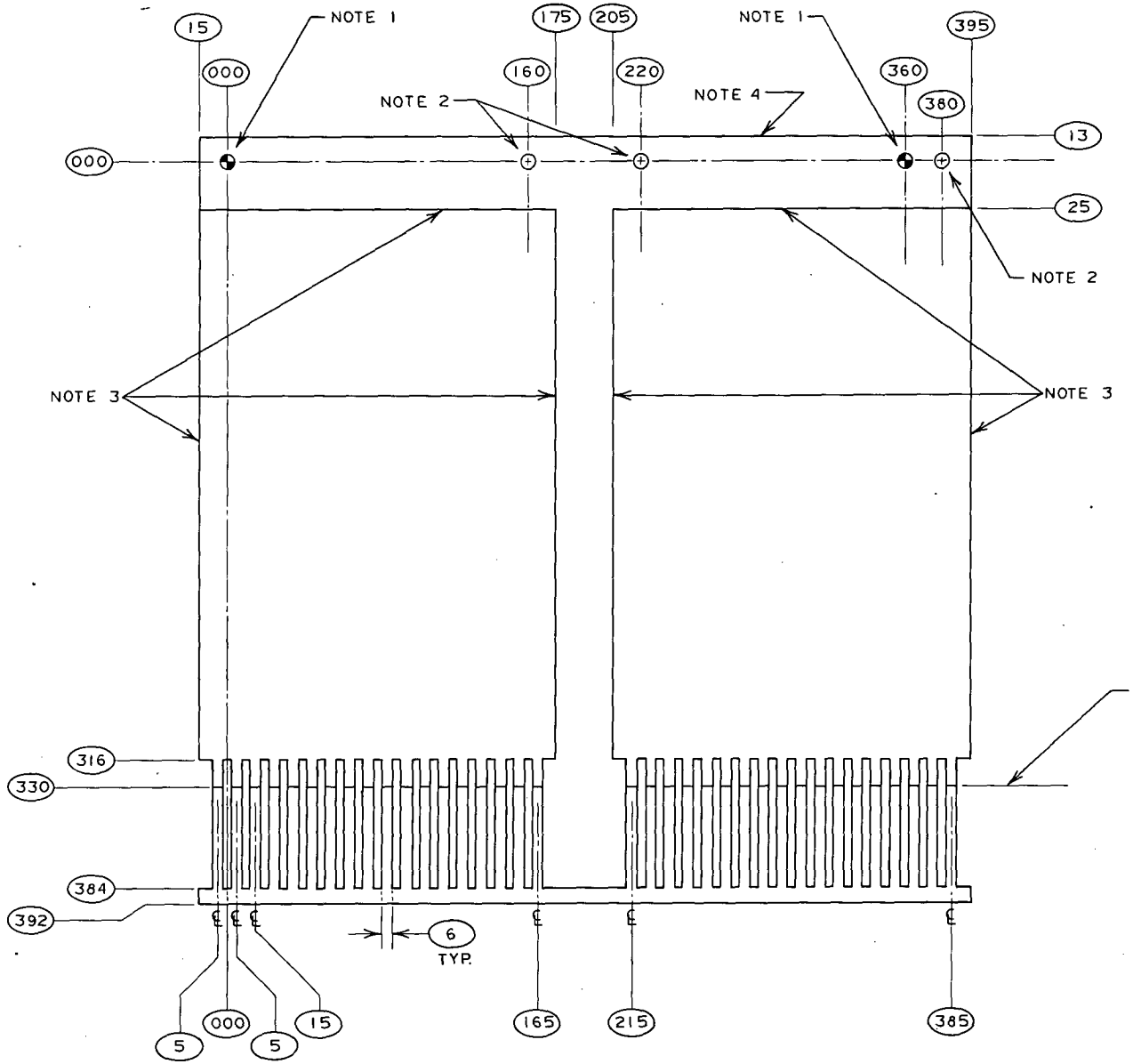
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: VERTICAL BOARD DOUBLE HEIGHT DOUBLE PANHANDLE OUTLINE FOR ROUTING (MODIFIED)

APPROVED BY	FOR	DATE

ENG. CEM
DRAWN BY PLL
CHECKED MK
DRAWING NO 200.50038
DATE 2-16-71



NOTES:
1. REGISTRATION TARGET

   USE CHART-PAK RDAV-111 OR EQUIVALENT (TWO PLACES)
2. HANDLE MOUNTING HOLE LOCATIONS (THREE PLACES)
3. COPPER LIMITS FOR TAPING
4. COPPER LIMIT FOR BLANK BOARD OR SPECIAL CIRCUMSTANCES
5. CIRCUIT BOARD SHOWN FROM ETCH SIDE. COMPONENTS MOUNT FROM REVERSE SIDE.
6. DIMENSIONS ARE SHOWN AS (25). NUMBER REFERS TO THE DISTANCE FROM THE ZERO REFERENCE LINE IN UNITS OF 0.050 INCH REFERENCE GRID.

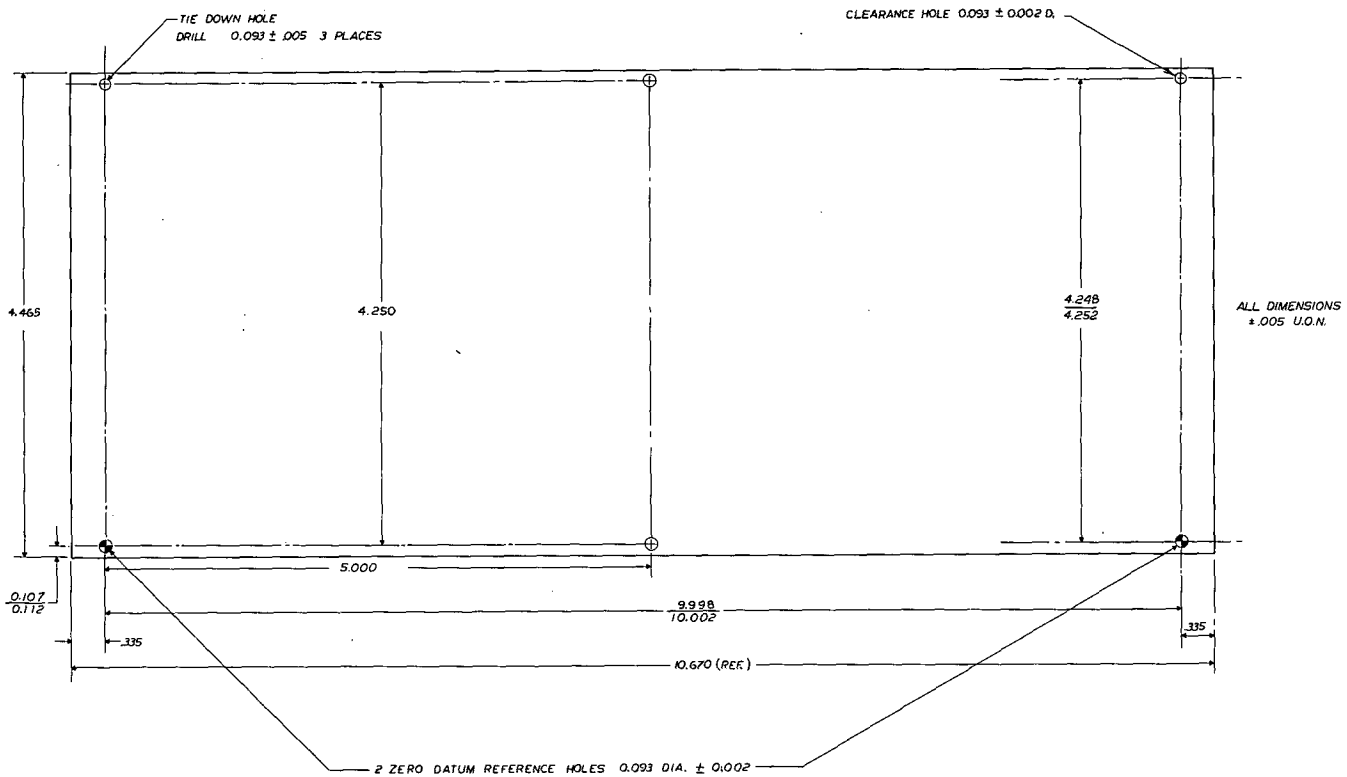
CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: LAYOUT GUIDE FOR SINGLE HEIGHT PLUG IN BOARD USING DOUBLE HEIGHT BOARD BLANK

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
			NTK	200.50040
			DRAWN BY: PLL	
			CHECKED	DATE: 1-21-72



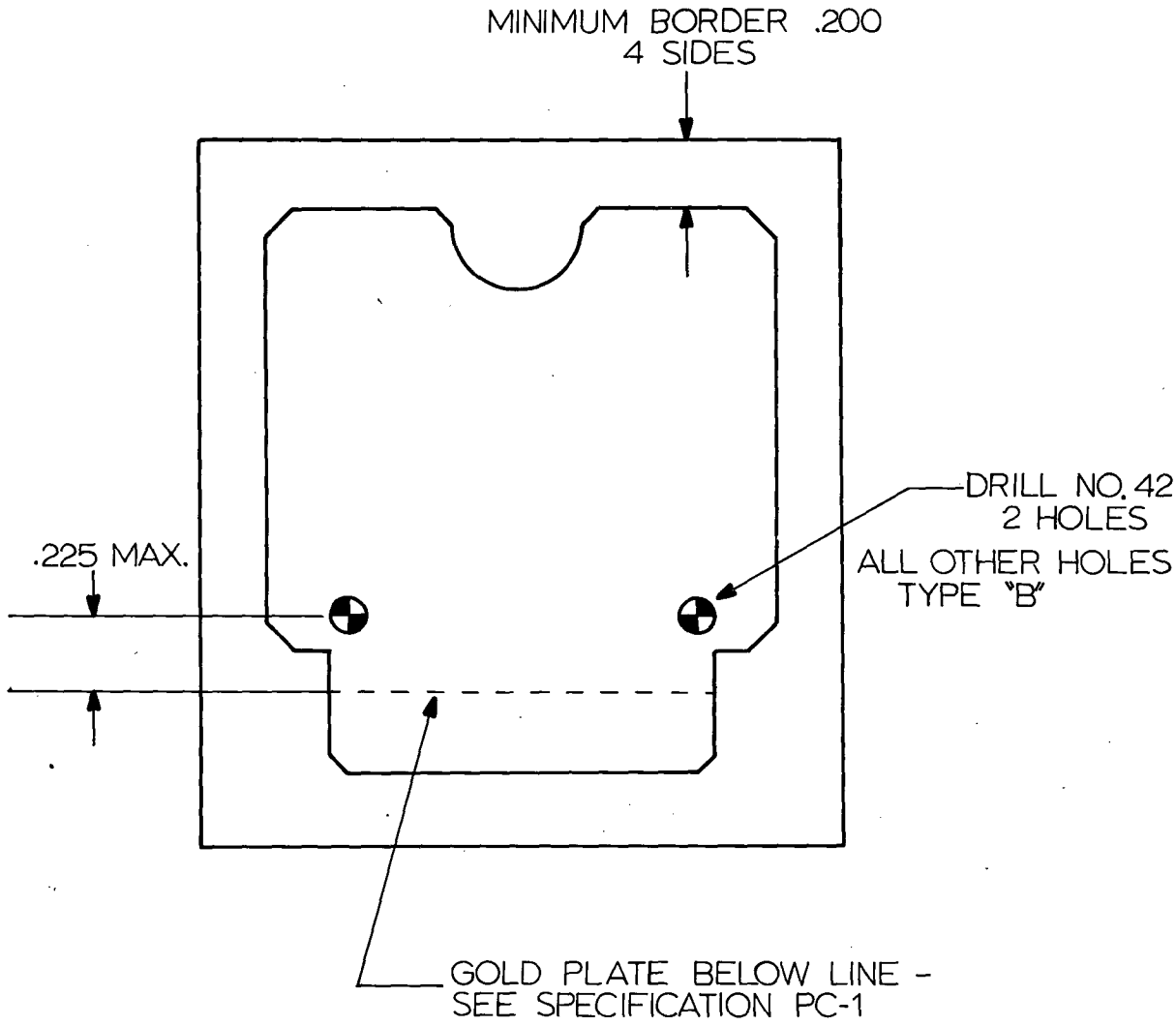
CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

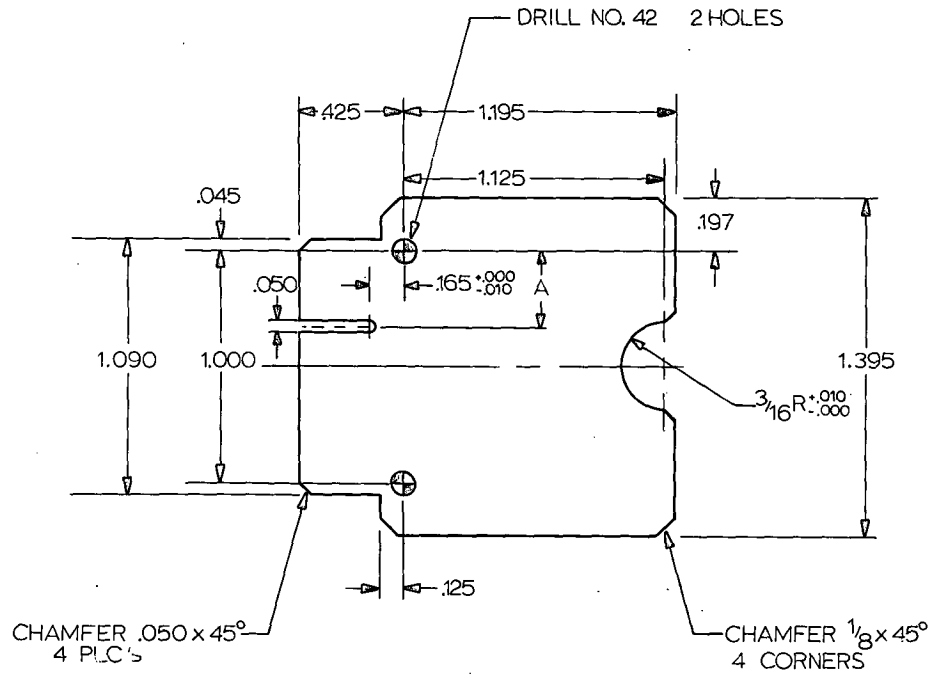
MACROMODULAR PROJECT

TITLE: INTERLOCK:
TOP MOTHER-BOARD
BLANK OUTLINE

APPROVED BY	FOR	DATE	ENG. MLP	DRAWING NO. 200.50D4G
			DRAWN BY MAC	
			CHECKED RJA	DATE 3-15-73



COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			MACROMODULAR PROJECT				
			TITLE FUNCTION CALLER CABLE PC BOARD PRODUCTION GUIDE				
			APPROVED			ENG MLP	DRAWING NO. 200.50D47
			BY	FOR	DATE		
		RJA	RJA	PROD	7-3-73	DRAWN BY MAC	
CHANGE NO.	DATE	DESCRIPTION				CHECKED RJA	DATE 7-3-73



DIMENSION A	BOARD NUMBER
.200	WCL0211
.400	WCL0213

MATERIAL: 1/16 DOUBLE SIDED P.C. STOCK

ALL DIMENSIONS ± .005 U.O.N.

CHANGE NO.	DATE	DESCRIPTION
		RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
FUNCTION CALLER CABLE
P.C. BOARD - ROUTING DIMENSIONS

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
RJA	PROD	7-3-73	RJA	200.50D48
			DRAWN BY MAC	
			CHECKED MKP	DATE 7-3-73

SINGLE CELL ELECTRONICS CASE

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	—	4–1–71	RJA								
A	0181	5–19–71	DJO								

SINGLE CELL ELECTRONICS CASE
PARTS LIST

QTY.	C.S.L. DOC.	PART
2	200.12-4	COVER PLATE
1	200.12-5	GUIDE PLATE PAIR
1	200.12-6	PLUG BRACKET PAIR
1	200.10	GRILL SUB ASSEMBLY
1	200.11	SHROUD SUB ASSEMBLY
12	–	1/8 x .086 DIA SHALLOW OVAL HEAD NICKEL PLATED STEEL RIVETS
2	–	#2-56 x 3/16 FLATHEAD SOCKET CAP SCREWS
4	–	#5-40 x 1/4 FLATHEAD SOCKET CAP SCREWS

CHG	E.C.O	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	—	4-1'-71	RJA								

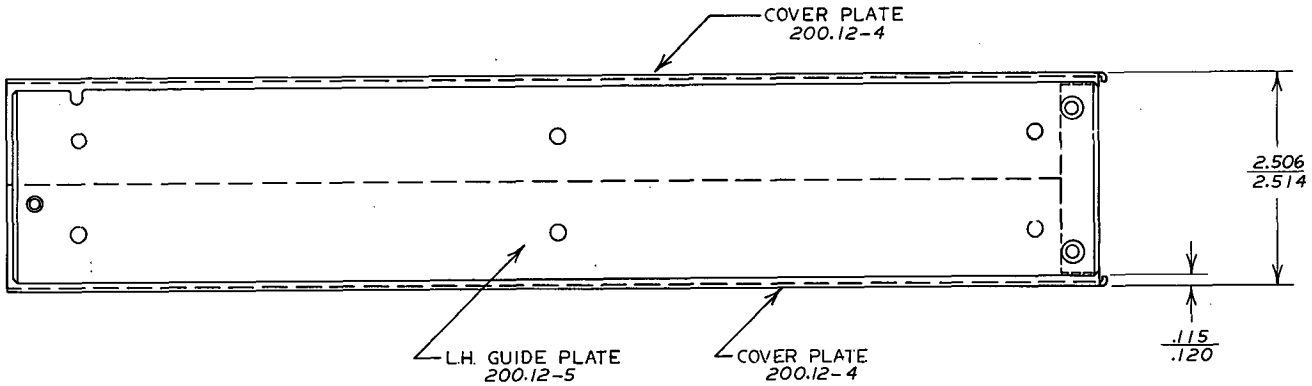
SINGLE CELL ELECTRONICS CASE - DESCRIPTION

The single cell electronics case is a protective metal shell that houses printed circuit boards and associated components and provides mechanical alignment for engagement of electrical connectors. In addition, the geometry of the case serves as ducting to allow air flow over electronic components housed therein.

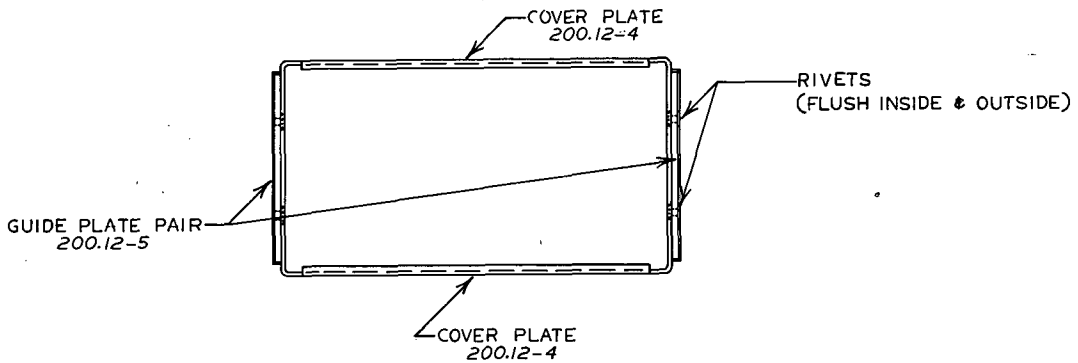
The single cell case is made from four sub-assemblies - the cover, grill, shroud, and bracket pair. The cover and grill are assembled together prior to insertion of printed circuit boards while the shroud and bracket pair are assembled with the boards being loaded into the case.

Page no's. 200.1-4 and 200.1-5 are a set of mechanical drawings and illustrations describing components and assembly of the single cell electronics case. All tolerances and specifications relating to the case must be adhered to in order to produce acceptable assemblies. The manufacturer must assure himself that these requirements can be met by analyzing component and assembly documentation, his tooling, and characteristics of his production processes.

CHG	E C O	DATE	APPR
ISSUE	—	4-6-71	RJA
A	0181	5-19-71	DPW



SIDE VIEW



FRONT END VIEW

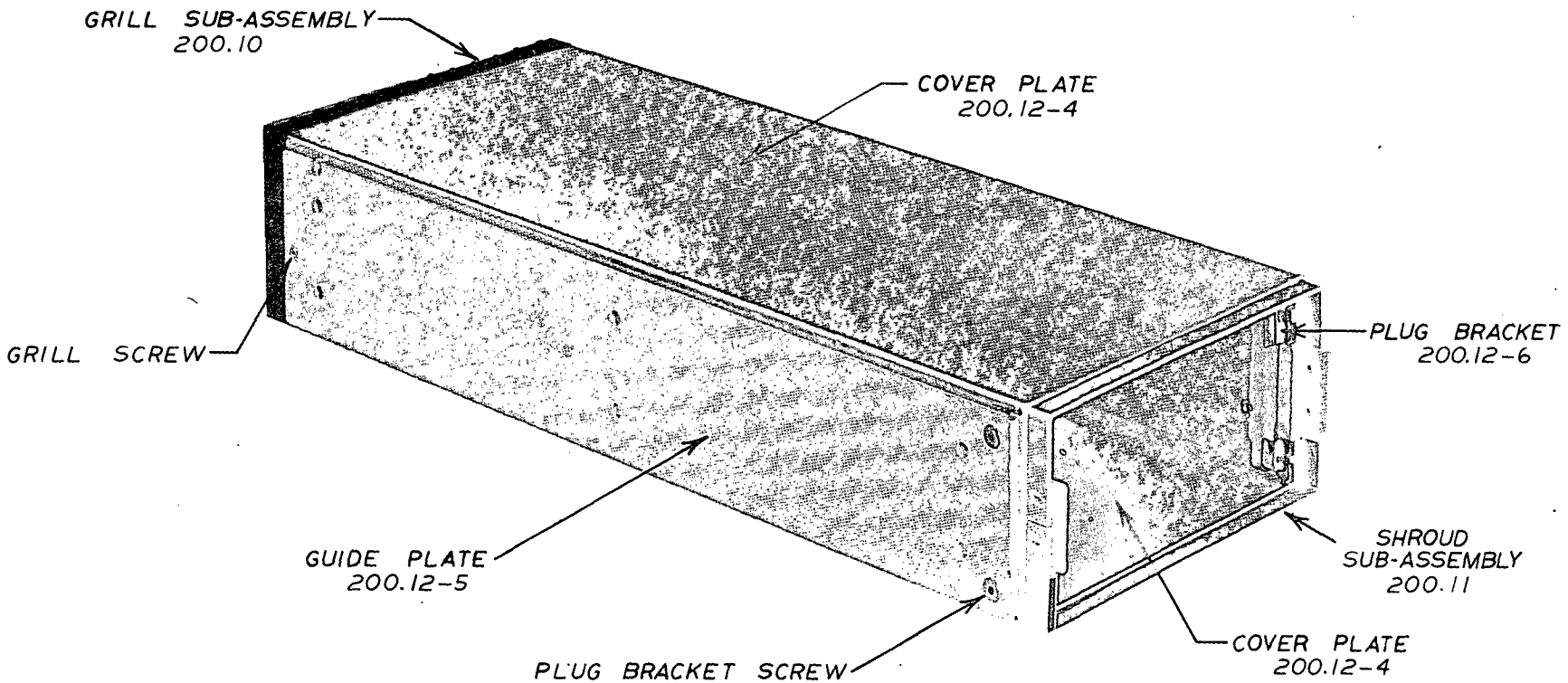
ISSUE	3-31-71	R J A
CHANGE NO.	DATE	DESCRIPTION

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: SINGLE-CELL CASE SUB-ASSEMBLY

APPROVED BY	FOR	DATE	ENG	DRAWING NO.
WAC	PROD.	4-7-71	WAC	200.1-4
			DRAWN BY PLL	
			CHECKED R J A	DATE 9-11-69



CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: SINGLE CELL CASE ASSEMBLY

APPROVED BY	FOR	DATE
WAB	PROD.	4-7-71

ENG. RJA
DRAWN BY DHO
CHECKED RJA
DRAWING NO. 200.1-5
DATE 3-31-71

DOUBLE CELL ELECTRONICS CASE

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	—	4–1–71	RJA								—
A	0182	5–19–71	DTO								

DOUBLE CELL ELECTRONICS CASE
PARTS LIST

QTY.	C.S.L. DOC.	PART
2	200.12–4	COVER PLATE
2	200.12–5	GUIDE PLATE PAIR
1	200.12–7	DOUBLE CELL FILLER STRIP PAIR
2	200.12–6	PLUG BRACKET PAIR
2	200.10	GRILL SUB ASSEMBLY
2	200.11	SHROUD SUB ASSEMBLY
24	–	1/8 x .086 DIA SHALLOW OVAL HEAD NICKEL PLATED STEEL RIVETS
4	–	#2–56 x 3/16 FLATHEAD SOCKET CAP SCREWS
8	–	#5–40 x 1/4 FLATHEAD SOCKET CAP SCREWS

CHG	E.C.O	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	—	4–1–71	RJA								

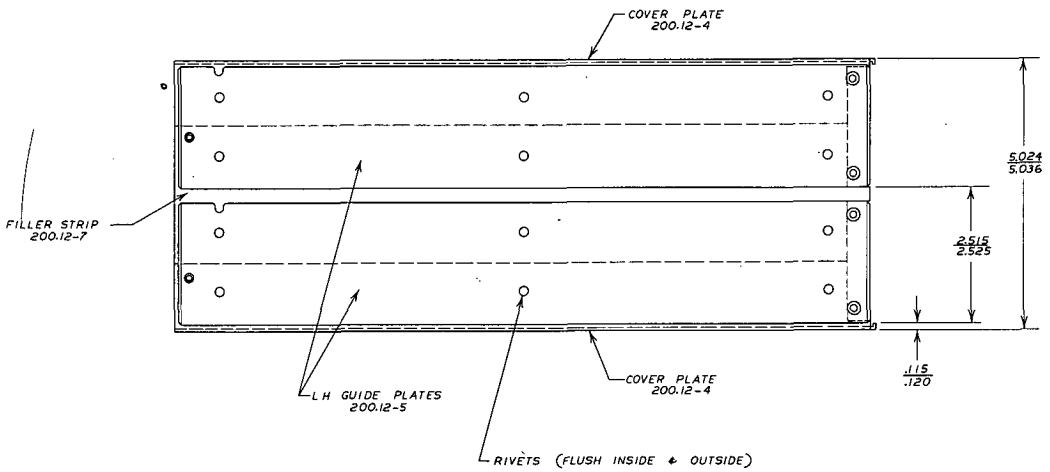
DOUBLE CELL ELECTRONICS CASE - DESCRIPTION

The double cell electronics case is a protective metal shell that houses printed circuit boards and associated components and provides mechanical alignment for engagement of electrical connectors. In addition, the geometry of the case serves as ducting to allow air flow over electronic components housed therein.

The double cell case is made from four sub-assemblies - the cover, grill, shroud, and bracket pair. The cover and grill are assembled together prior to insertion of printed circuit boards while the shroud and bracket pair are assembled with the boards being loaded into the case.

Page no's. 200.2-4 and 200.2-5 are a set of mechanical drawings and illustrations describing components and assembly of the double cell electronics case. All tolerances and specifications relating to the case must be adhered to in order to produce acceptable assemblies. The manufacturer must assure himself that these requirements can be met by analyzing component and assembly documentation, his tooling, and characteristics of his production processes.

ISSUE	—	4-6-71	RJA
A	0182	5-19-71	DNO



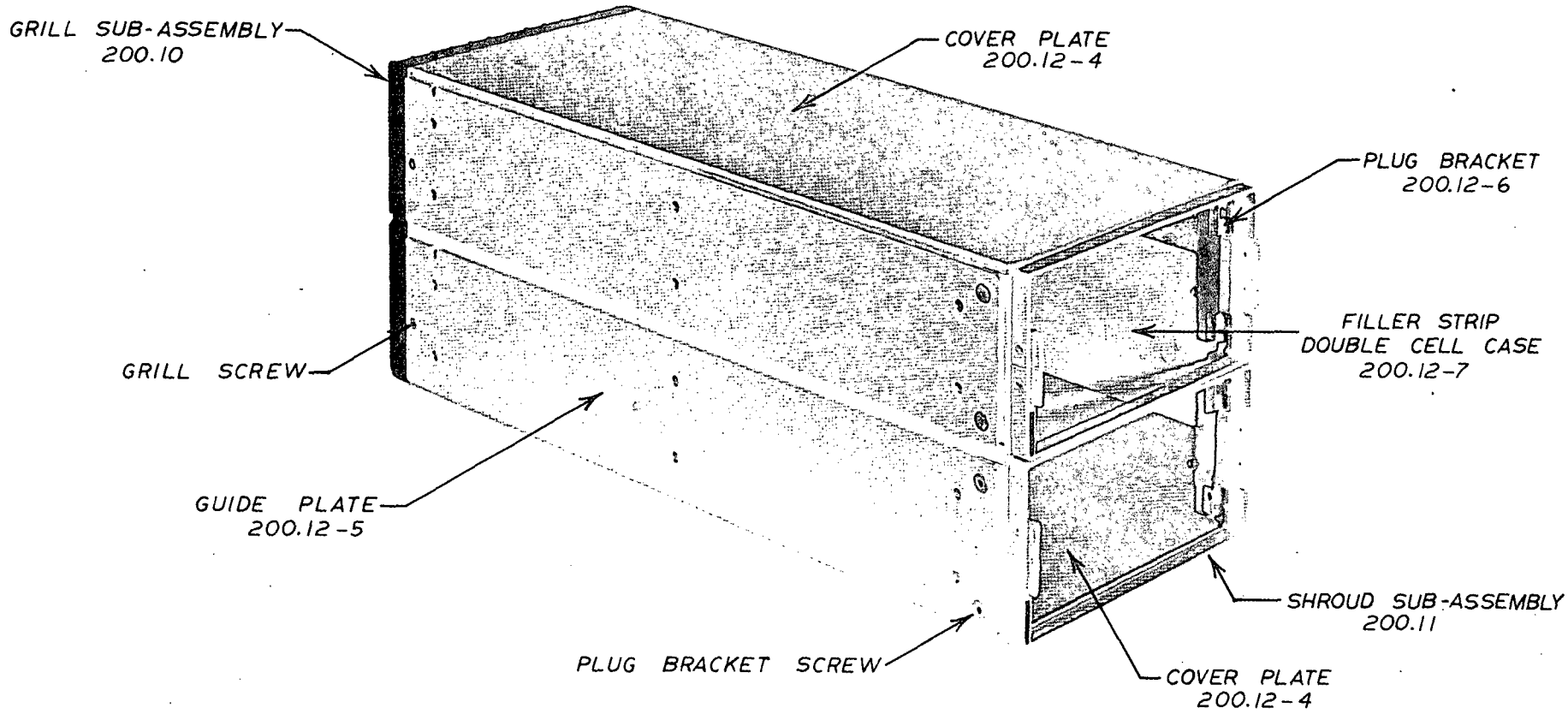
CHANGE NO.	DATE	DESCRIPTION
	ISSUE 3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: DOUBLE-CELL CASE SUB-ASSEMBLY

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
[illegible]	PROD.	4-7-71	R J A	200.2-4
			DRAWN BY P L L	
			CHECKED R J A	DATE 3-29-71



CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: DOUBLE-CELL CASE ASSEMBLY

APPROVED BY	FOR	DATE
GAB	PROD.	4-7-71

ENG. RJA
DRAWN BY DHO
CHECKED RJA

DRAWING NO. 200.2-5
DATE 3-31-71

TRIPLE CELL ELECTRONICS CASE

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	——	4–1–71	RJA								
A	0183	5–19–71	DNO								

TRIPLE CELL ELECTRONICS CASE
PARTS LIST

QTY.	C.S.L. DOC.	PART
2	200.12-4	COVER PLATE
3	200.12-5	GUIDE PLATE PAIR
1	200.12-8	TRIPLE CELL FILLER STRIP PAIR
3	200.12-6	PLUG BRACKET PAIR
3	200.10	GRILL SUB ASSEMBLY
3	200.11	SHROUD SUB ASSEMBLY
36	–	1/8 x .086 DIA SHALLOW OVAL HEAD NICKEL PLATED STEEL RIVETS
6	–	#2-56 x 3/16 FLATHEAD SOCKET CAP SCREWS
12	–	#5-40 x 1/4 FLATHEAD SOCKET CAP SCREWS

CHG	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR	CHG.	E.C.O	DATE	APPR
ISSUE	—	4-1-71	RJA								

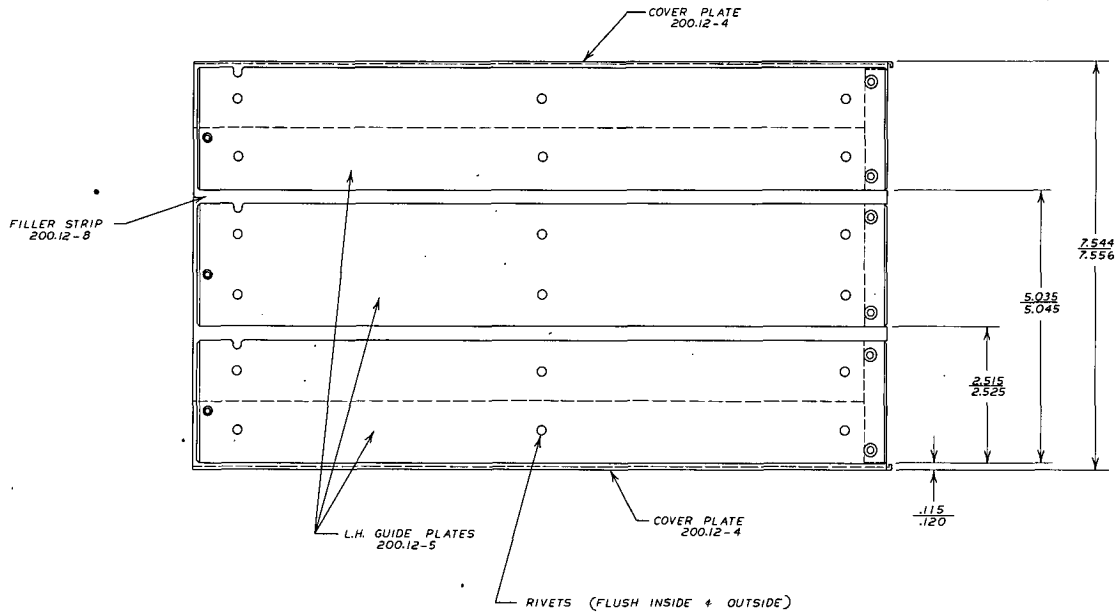
TRIPLE CELL ELECTRONICS CASE - DESCRIPTION

The triple cell electronics case is a protective metal shell that houses printed circuit boards and associated components and provides mechanical alignment for engagement of electrical connectors. In addition, the geometry of the case serves as ducting to allow air flow over electronic components housed therein.

The triple cell case is made from four sub-assemblies - the cover, grill, shroud, and bracket pair. The cover and grill are assembled together prior to insertion of printed circuit boards while the shroud and bracket pair are assembled with the boards being loaded into the case.

Page no's. 200.3-4 and 200.3-5 are a set of mechanical drawings and illustrations describing components and assembly of the triple cell electronics case. All tolerances and specifications relating to the case must be adhered to in order to produce acceptable assemblies. The manufacturer must assure himself that these requirements can be met by analyzing component and assembly documentation, his tooling, and characteristics of his production processes.

	ECO	DATE	
ISSUE	—	4-6-71	RJA
A	0183	5-19-71	DJO



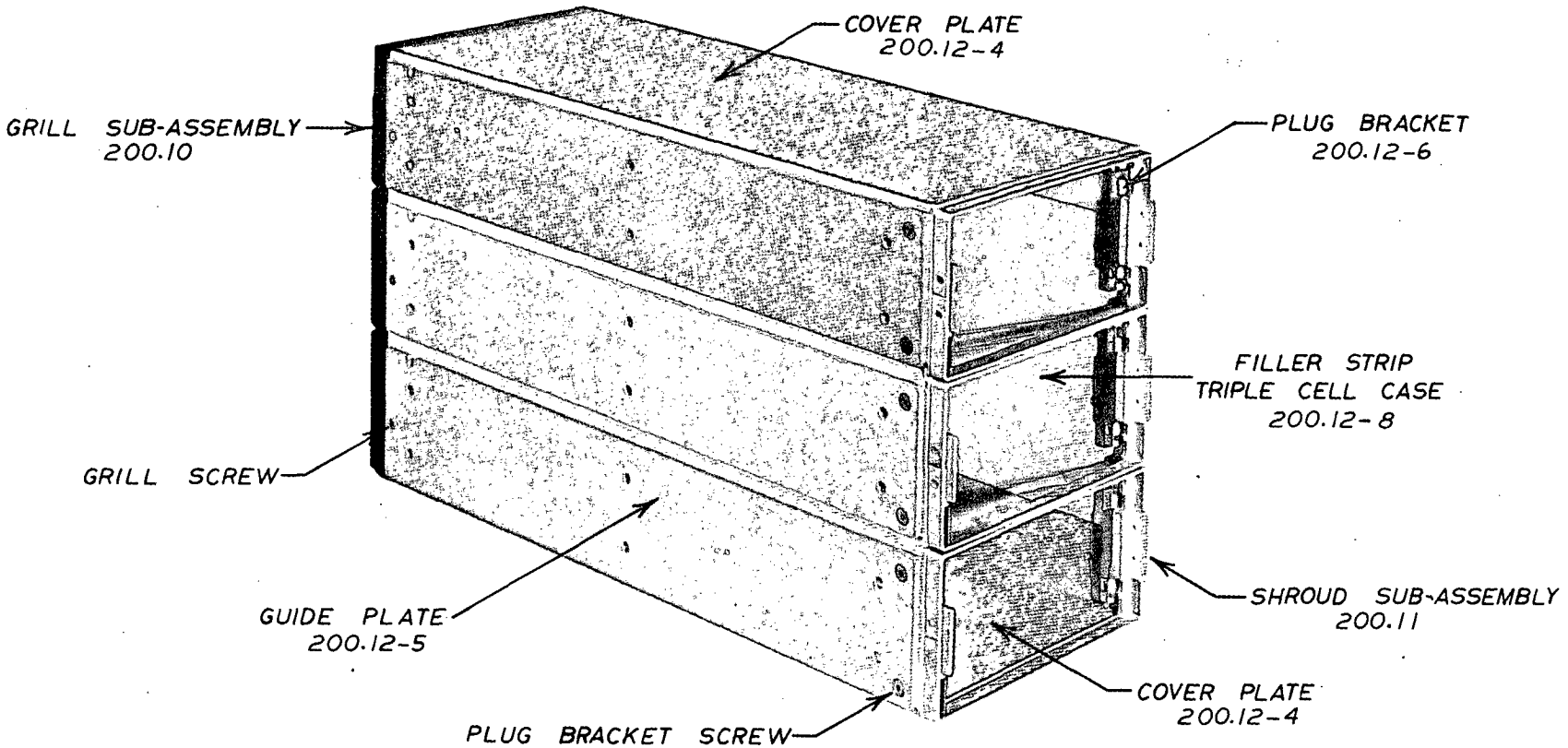
CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: TRIPLE-CELL CASE SUB-ASSEMBLY

APPROVED BY	APPROVED FOR	DATE	ENG.	DRAWING NO.
GRC	PROD.	4-7-71	R J A	200.3-4
			DRAWN BY P L L	
			CHECKED R J A	DATE 3-29-71



CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: TRIPLE CELL CASE ASSEMBLY

APPROVED BY	FOR	DATE
WAG	PROD.	4-7-71

ENG. RJA
DRAWN BY DHO
CHECKED RJA
DRAWING NO. 200.3-5
DATE 3-31-71

FOUR CELL ELECTRONICS CASE

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	—	4–1–71	RJA								
A	0184	5–19–71	D.H.O.								

FOUR CELL ELECTRONICS CASE
PARTS LIST

QTY.	C.S.L. DOC.	PART
2	200.12-4	COVER PLATE
4	200.12-5	GUIDE PLATE PAIR
1	200.12-9	FOUR CELL FILLER STRIP PAIR
4	200.12-6	PLUG BRACKET PAIR
4	200.10	GRILL SUBASSEMBLY
4	200.11	SHROUD SUB ASSEMBLY
48	–	1/8 x .086 DIA. SHALLOW OVAL HEAD NICKEL PLATED STEEL RIVETS
8	–	#2-56 x 3/16 FLATHEAD SOCKET CAP SCREWS
16	–	#5-40 x 1/4 FLATHEAD SOCKET CAP SCREWS

CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	——	4-1-71	RJA								

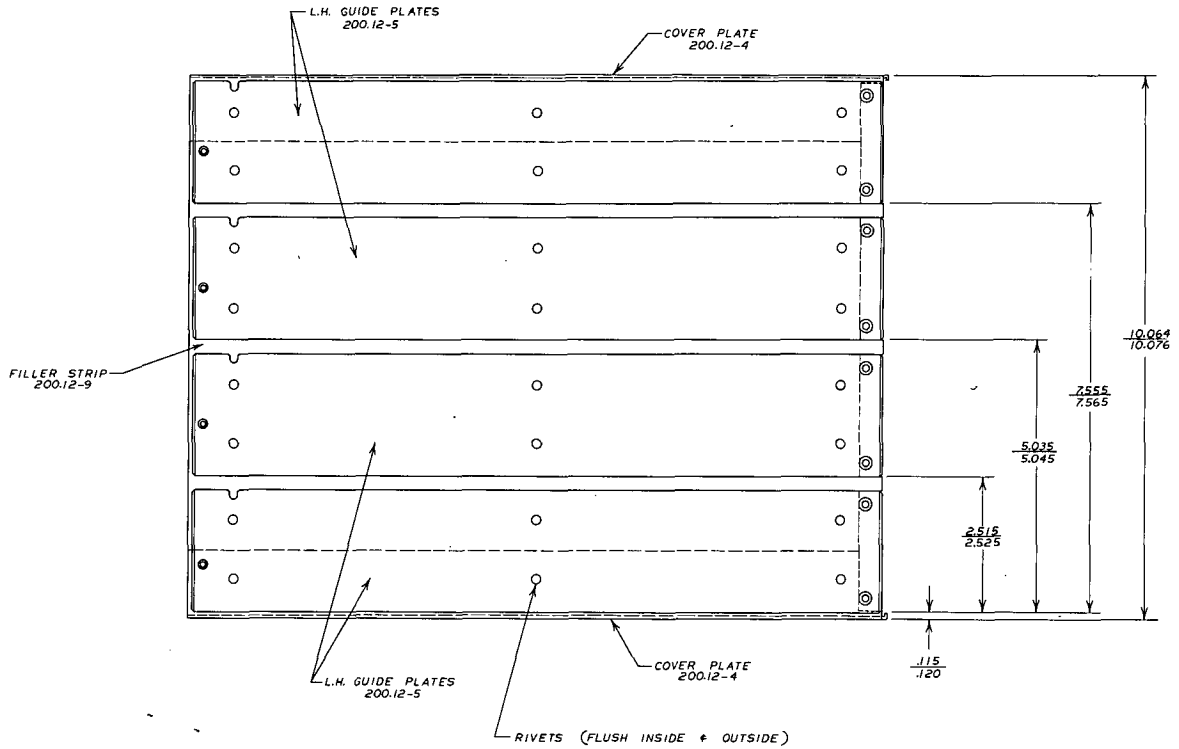
FOUR CELL ELECTRONICS CASE - DESCRIPTION

The four cell electronics case is a protective metal shell that houses printed circuit boards and associated components and provides mechanical alignment for engagement of electrical connectors. In addition, the geometry of the case serves as ducting to allow for air flow over electronic components housed therein.

The four cell case is made from four sub-assemblies - the cover, grill, shroud, and bracket pair. The cover and grill are assembled together prior to insertion of printed circuit boards while the shroud and bracket pair are assembled with the boards being loaded into the case.

Page no's. 200.4-4 and 200.4-5 are a set of mechanical drawings and illustrations describing components and assembly of the four cell electronics case. All tolerances and specifications relating to the case must be adhered to in order to produce acceptable assemblies. The manufacturer must assure himself that these requirements can be met by analyzing component and assembly documentation, his tooling, and characteristics of his production processes.

ISSUE A	—— 0184	4-6-71 5-19-71	RJA D.N.O.



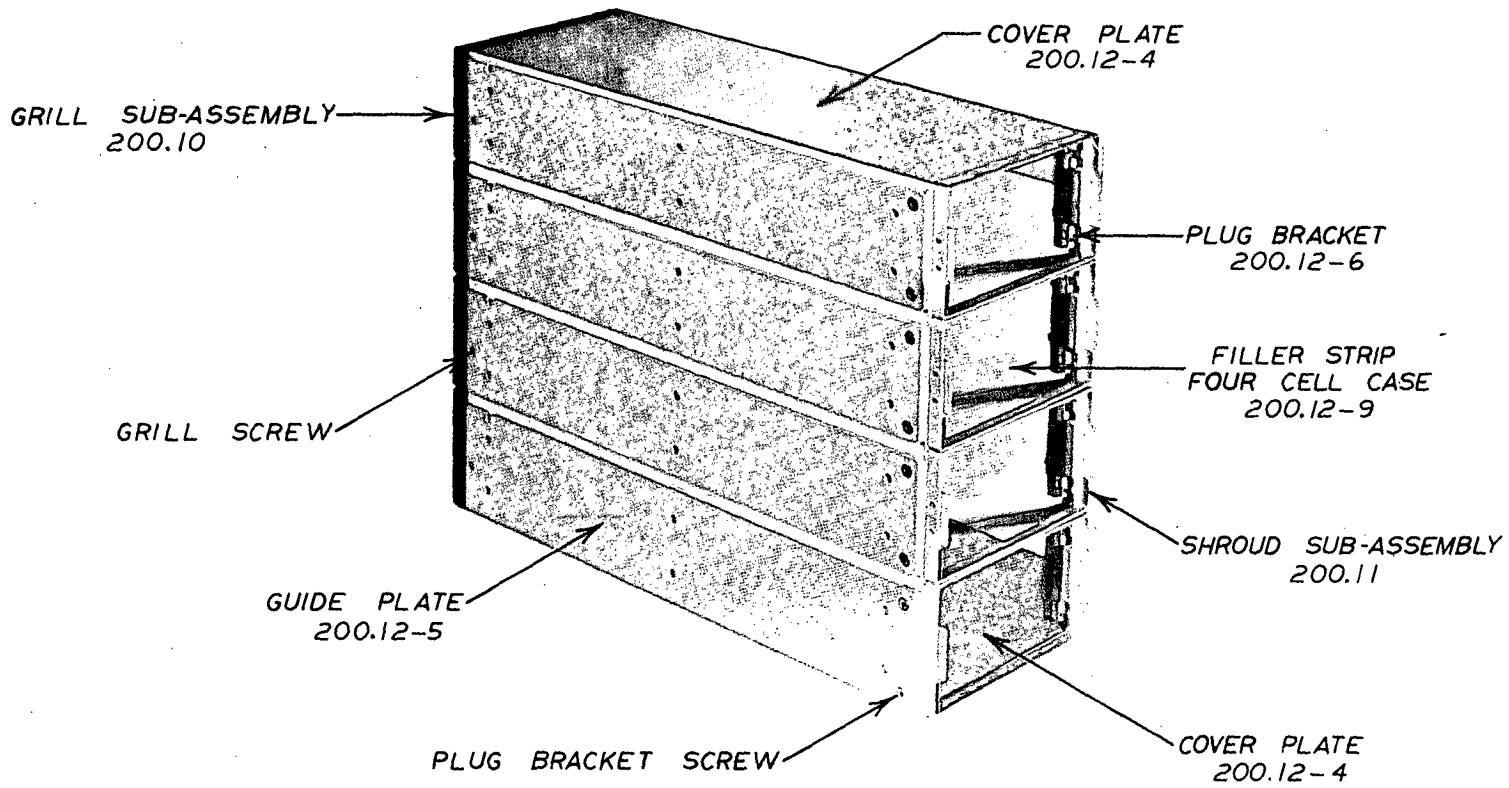
CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: FOUR-CELL CASE SUB-ASSEMBLY

APPROVED	FOR	DATE	ENG.	DRAWING NO.
PLL	PROD.	4-7-71	RJA	200.4-4
			DRAWN BY PLL	
			CHECKED RJA	DATE 3-29-71



CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: FOUR-CELL CASE ASSEMBLY

APPROVED BY	FOR	DATE
WAB	PROD.	4-7-71

ENG. RJA
DRAWN BY DHO
CHECKED R J A
DRAWING NO. 200.4-5
DATE 3-31-71

GRILL SUBASSEMBLY

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	—	3–31–71	RJA								
A	0248	1–24–72	RJA								
B	0251	2–1–72	RJA								

GRILL SUBASSEMBLY
PARTS LIST

QTY.	C.S.L. DOC.	PART
11	200.10-5	VERTICAL FIN
2	200.10-6	END FIN
7	200.10-7	HORIZONTAL FIN
2	200.10-8	TIE BRACKET
2	200.10-9	TRIM STRIP
2	200.10-10	LOCK STRIP
4	–	3/32 DIA. x 9/32 FLATHEAD BLACK ANODIZED ALUMINUM RIVETS
4	–	3/32 DIA. x 5/32 FLATHEAD BLACK ANODIZED ALUMINUM RIVETS

CHG	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	—	3-31-71	RJA								
B	0251	2-1-72	RJA								

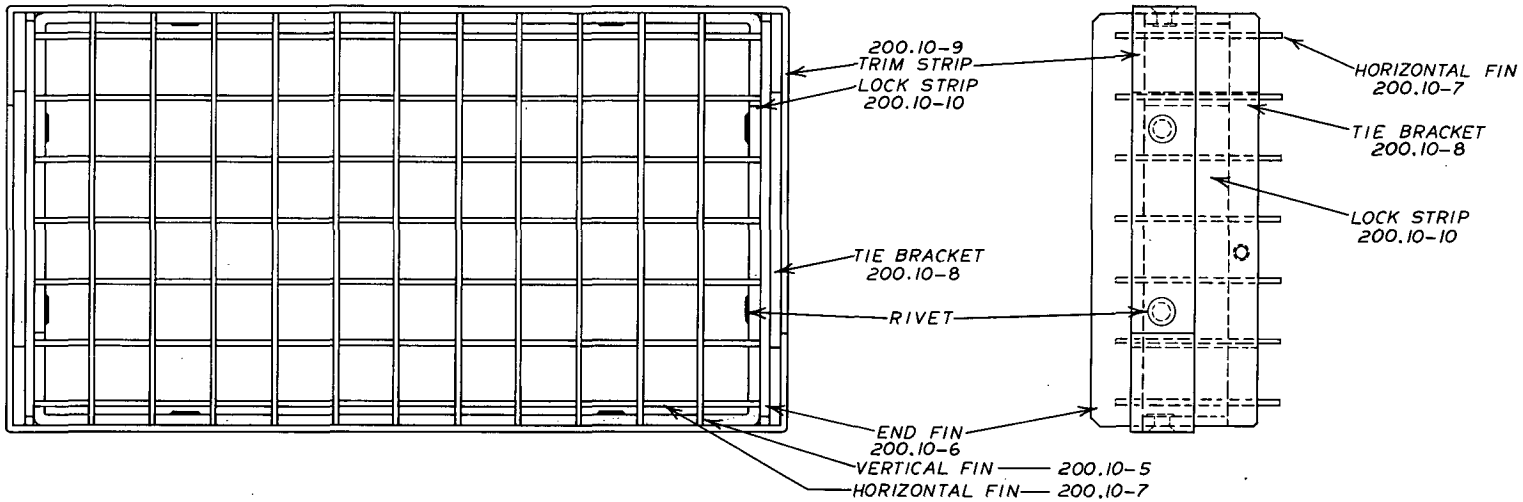
GRILL SUB-ASSEMBLY - DESCRIPTION

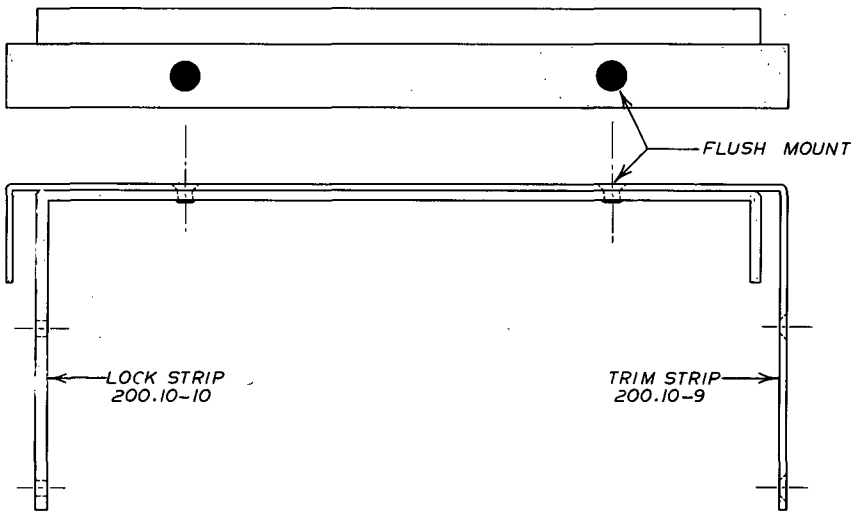
The grill sub-assembly described in this document is used in various numbers, in the assembly of the four types of electronics cases. The number of grills required for a particular case is equal to the name of the case type i.e. a single cell case would require one grill sub-assembly while a four cell case would require four grills.

The grill serves three main functions - it provides mechanical protection and support for circuit boards housed within an electronics case and allows air flow through the case to convectively cool electronic components.

Page no's. 200.10-4 through 200.10-10 are a complete set of mechanical drawings and illustrations fully describing components and assembly of the grill. Each drawing contains tolerance specifications relating to the various parts. All tolerances and specifications contained herein must be adhered to in order to produce acceptable assemblies. The manufacturer must assure himself that these requirements can be met by analyzing components and assembly documentation, his tooling and characteristics of his production processes.

ISSUE	—	4-6-71	RJA





FINISH: CSL SPEC. MF 3

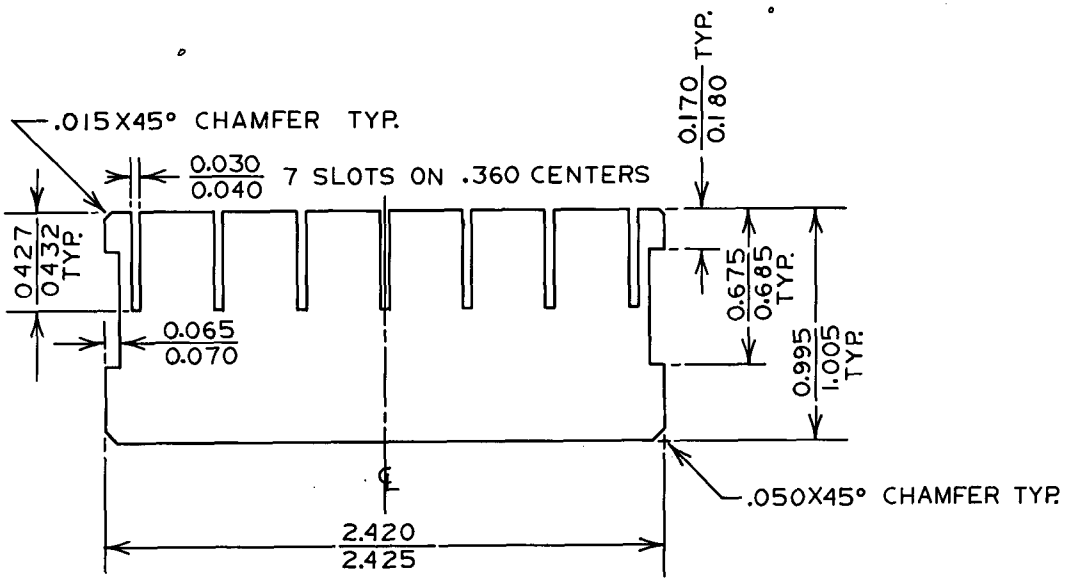
CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: GRILL SUB-ASSEMBLY

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
WAC	PROD.	4-7-71	WAC	200.10-4
			DRAWN BY: PLL	
			CHECKED: R J A	DATE: 9-28-68



VERTICAL FIN
MAT'L: .030 ALUM.-6061
FINISH: CSL SPEC MF 2

SCALE 2:1

CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

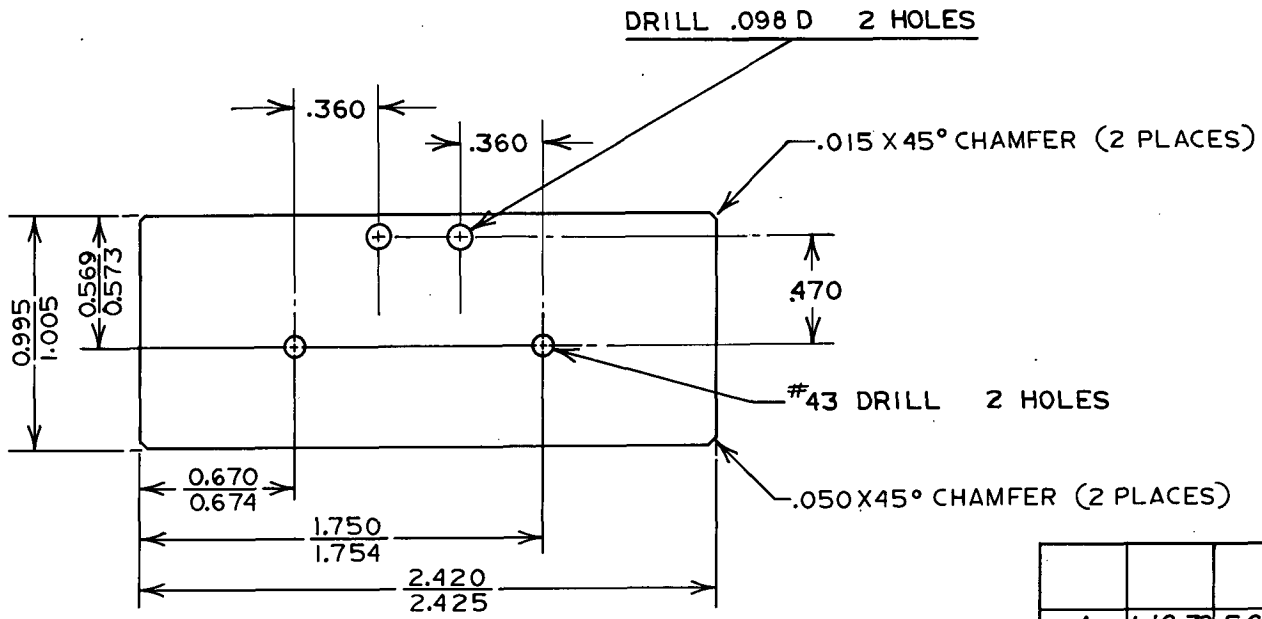
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE

VERTICAL FIN

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
WAC	PROD.	4-7-71	WAC	200.10-5
			DRAWN BY PLL	
			CHECKED R J A	DATE 8-31-68



END FIN
.062 ALUM.-6061
FINISH: CSL SPEC. MF2
SCALE 2:1

CHANGE NO.	DATE	DESCRIPTION
A	1-18-72	E.C.O. 0248 RJA
ISSUE	3-31-71	RJA

COMPUTER SYSTEMS LABORATORY
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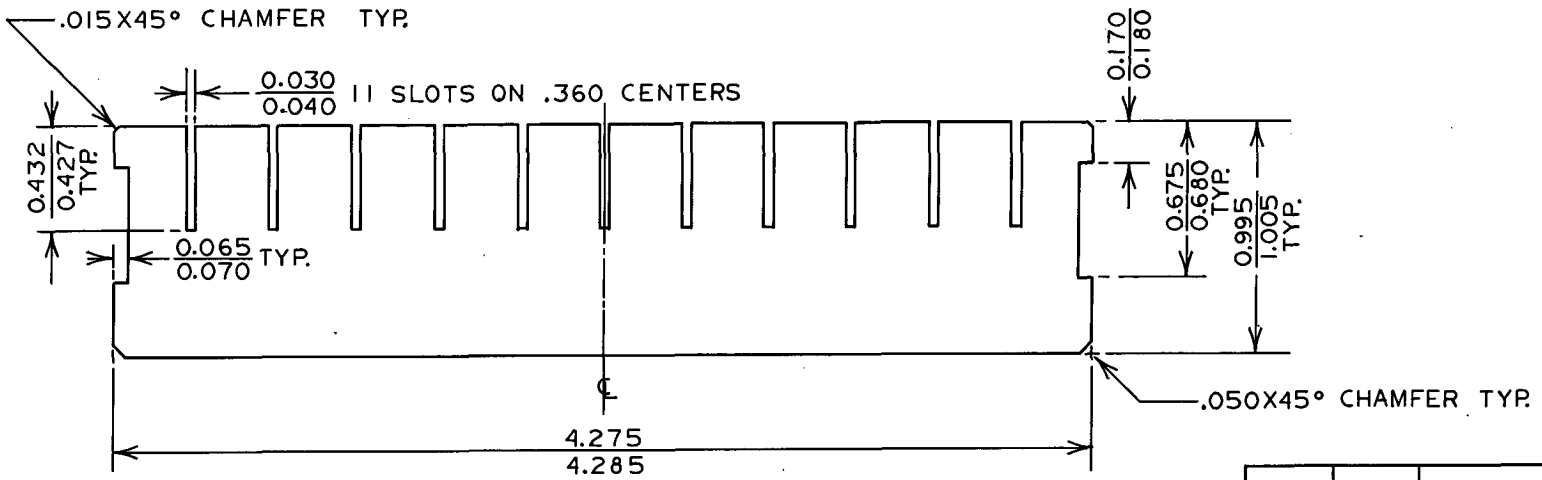
MACROMODULAR PROJECT

TITLE

END FIN

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
WAC	PROD.	4-7-71	WAC	200.10-6
			DRAWN BY PLL	
			CHECKED RJA	DATE 9-7-68



HORIZONTAL FIN
MAT'L: .030 ALUM.- 6064
FINISH: CSL SPEC. MF 2

SCALE 2:1

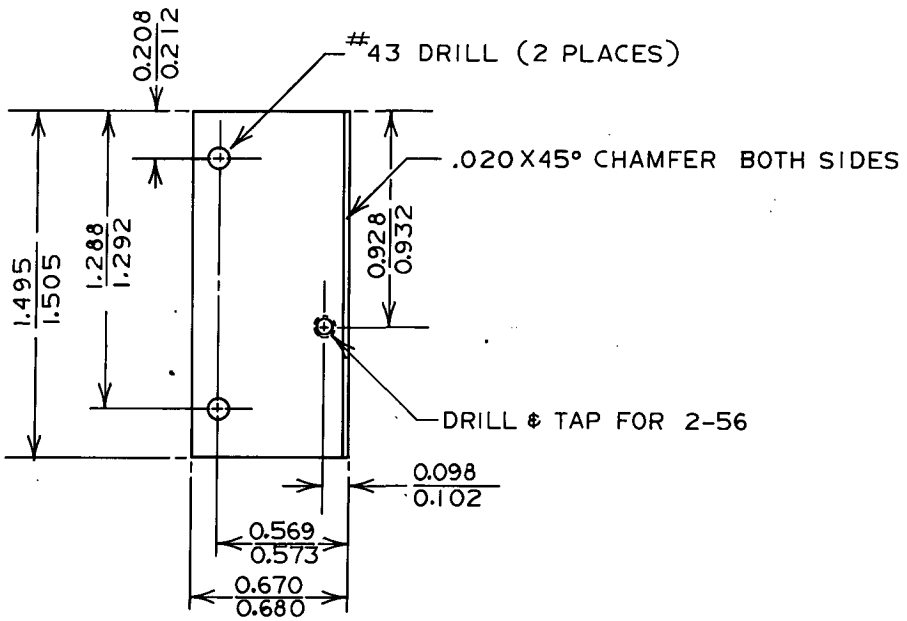
CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: HORIZONTAL FIN

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
wac	PROD.	4-7-71	WAC	200 10-7
			DRAWN BY PLL	
			CHECKED R J A	DATE 8-31-68



TIE BRACKET -
.062 ALUM.-6061
FINISH CSL SPEC MF 2
SCALE 2:1

CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

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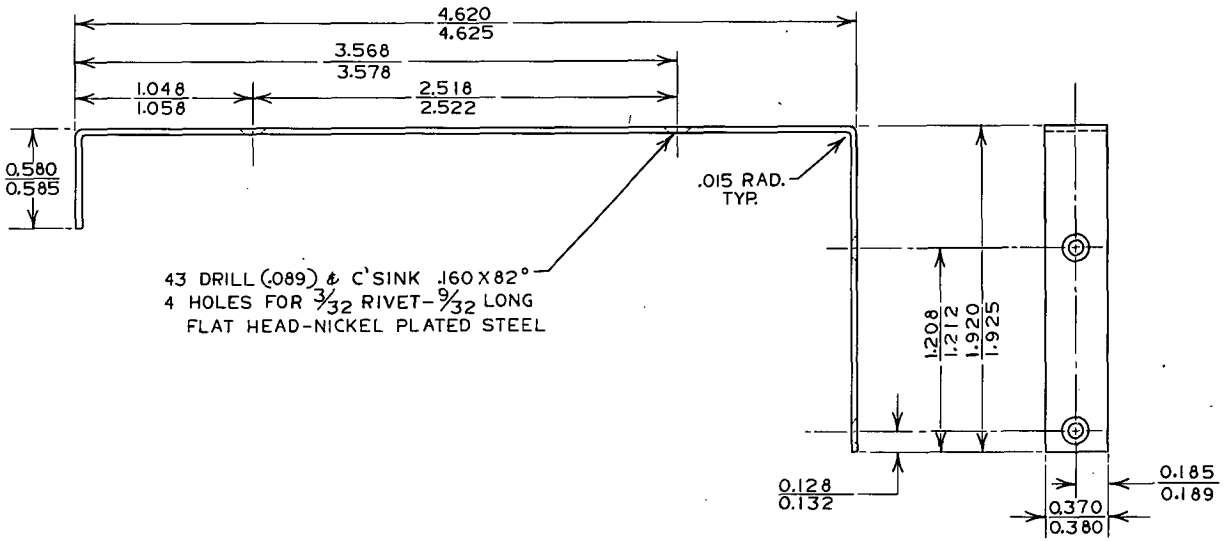
MACROMODULAR PROJECT

TITLE

TIE BRACKET

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
WAC	PROD.	4-7-71	WAC	200.10-8
			DRAWN BY PLL	
			CHECKED R J A	DATE 9-7-68



TRIM STRIP
.040 - 6061 ALUM.
FINISH: CSL SPEC. MF 2
SCALE 2:1

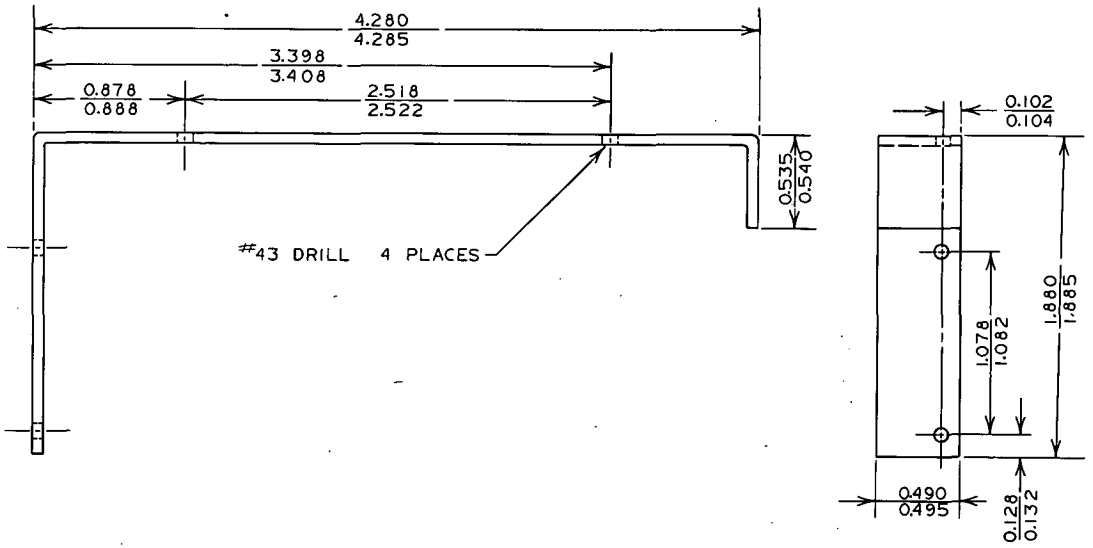
CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: TRIM STRIP

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
WAC	PROD.	4-7-71	WAC	200.10-9
			DRAWN BY PLL	
			CHECKED R J A	DATE 9-7-68



LOCK STRIP
MAT'L: .062 ALUM.-6061
FINISH: CSL SPEC. MF 2

SCALE 2:1

CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE

LOCK STRIP

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
WAC	PROD.	4-7-71	WAC	200.10-10
			DRAWN BY PLL	
			CHECKED RJA	DATE 9-14-68

SHROUD SUBASSEMBLY

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	0167	3-31-71	RJA								

SHROUD SUBASSEMBLY
PARTS LIST

QTY.	C.S.L. DOC.	PART
2	200.11-5	SHROUD COLLAR
1	200.11-6	SLIDE PAIR
1	200.11-7	KEY STOP
2	–	.086 DIA. x .125 GRIP SHALLOW OVAL HEAD ALUMINUM RIVETS
2	–	.086 DIA. x .165 GRIP SHALLOW OVAL HEAD ALUMINUM RIVETS

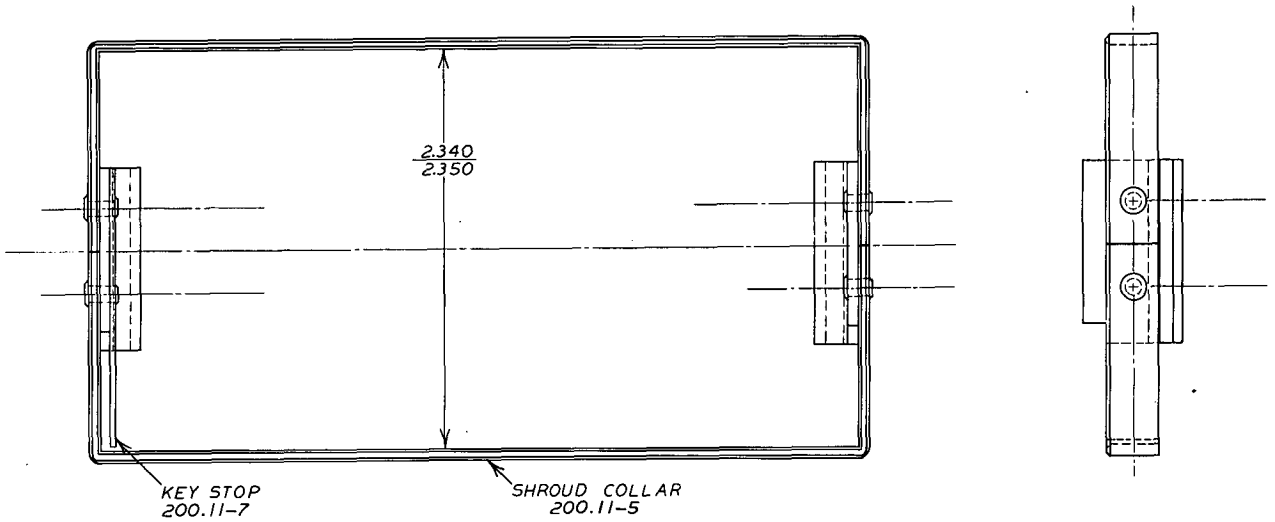
CHG	E C O	DATE	APPR.	CHG.	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	0167	3-31-71	RJA								

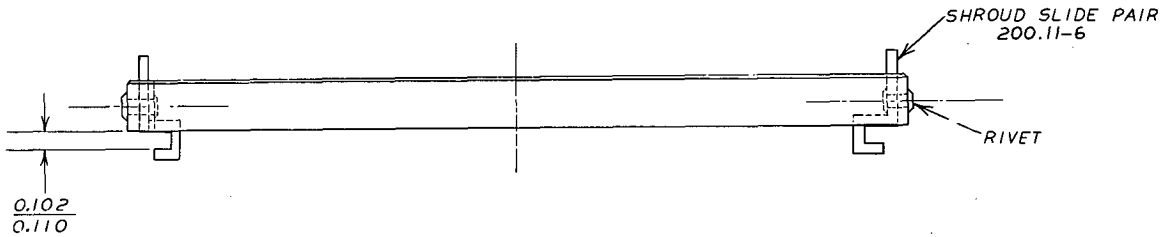
SHROUD SUB-ASSEMBLY - DESCRIPTION

The shroud sub-assembly described in this document is used in conjunction with the four basic types of electronic cases and serves two primary functions - it provides mechanical protection for connector pins and acts as a keying mechanism to prevent insertion of connector pins into incompatible electrical mating with other macromodular elements. Shroud sub-assemblies may be either left handed or right handed, depending upon the position of the key. (See photo's illustrating these two types on page 200.11-8).

Page no's. 200.11-4 through 200.11-7 are a complete set of mechanical drawings and illustrations fully describing components and assembly of the shroud. Each drawing contains tolerance specifications relating to the various parts. All tolerances and specifications contained herein must be adhered to in order to produce acceptable assemblies. The manufacturer must assure himself that these requirements can be met by analyzing component and assembly documentation, his tooling and characteristics of his production processes.

ISSUE 0167 4-6-71 RJA





LEFT HAND ASSEMBLY SHOWN

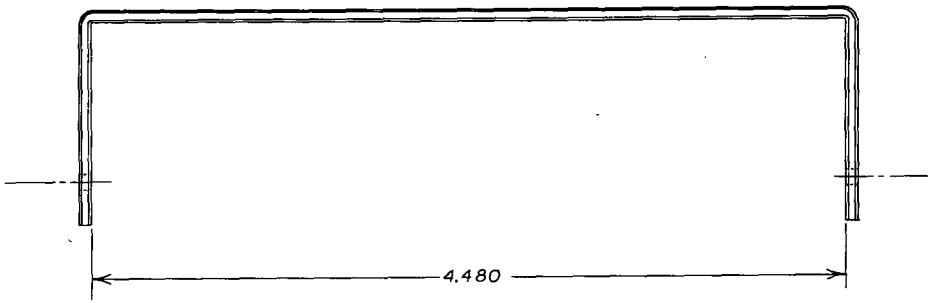
CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	E.C.O. 0167 RJA

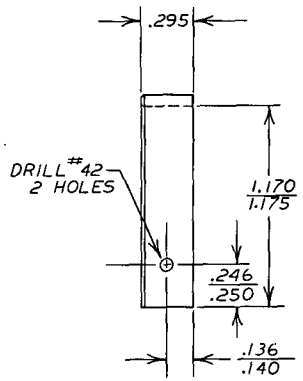
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

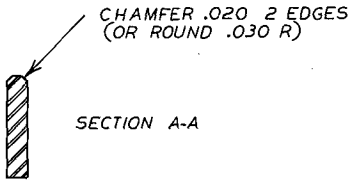
MACROMODULAR PROJECT

TITLE
SHROUD SUB-ASSEMBLY

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG.	DRAWING NO.
WAB	Prod	10/6/70	WAC	200.11-4
			DRAWN BY PLL	
			CHECKED RJA	DATE 9-9-69







MAT'L: 3003-H14 ALUM .062 STOCK
FINISH: CSL SPEC MF1
DIMENSIONS: ±.005 U.O.N.

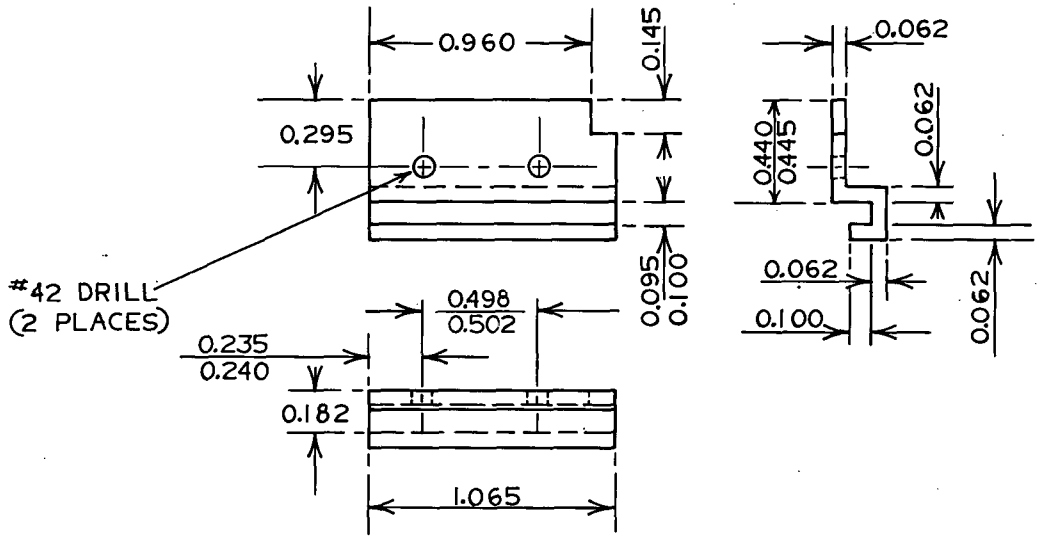
CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	E.C.O. 0167 RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: SHROUD COLLAR

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
WAC	Prod	10/8/70	WAC	200.11-5
			DRAWN BY PLL	
			CHECKED RJA	DATE 6-16-70



MAT'L. 6061-T6 ALUMINUM
TWO REQ'D.—
ONE RIGHT HAND
ONE LEFT HAND
TOLERANCES ± 0.005 UNLESS OTHERWISE SPECIFIED
FINISH-CSL SPEC. MF1

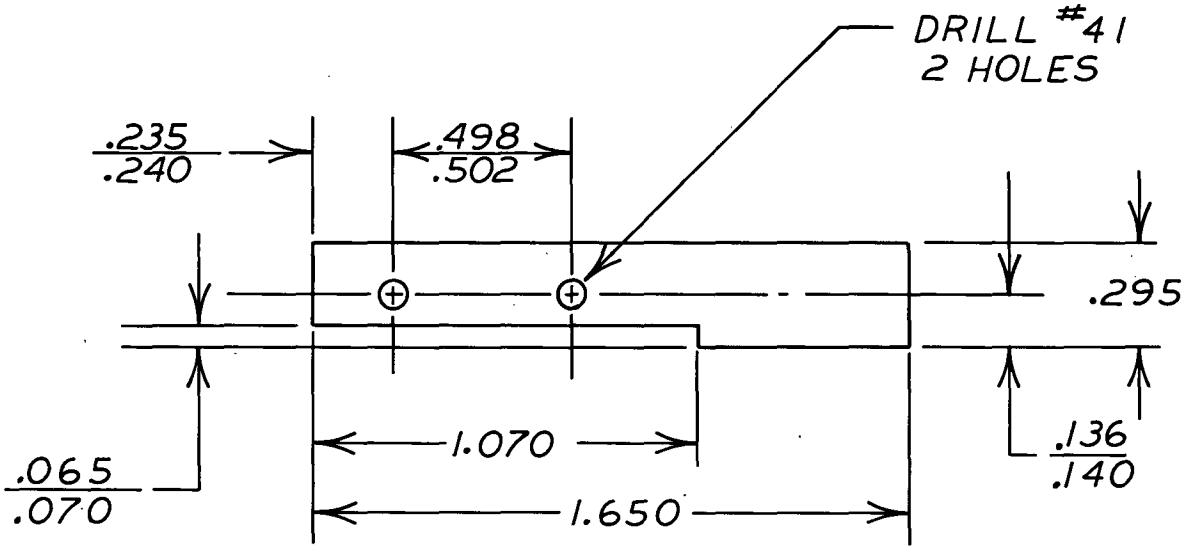
CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	E.C.O. 0167 RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
SHROUD SLIDE PAIR

APPROVED BY	APPROVED FOR	APPROVED DATE	ENG	DRAWING NO.
			WAC	200.11-6
WAC	Prod	10/8/70	DRAWN BY PLL	
			CHECKED RJA	DATE 9-12-69



MAT'L: .040 SS
DIMENSIONS: ±.005 U.O.N.

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE

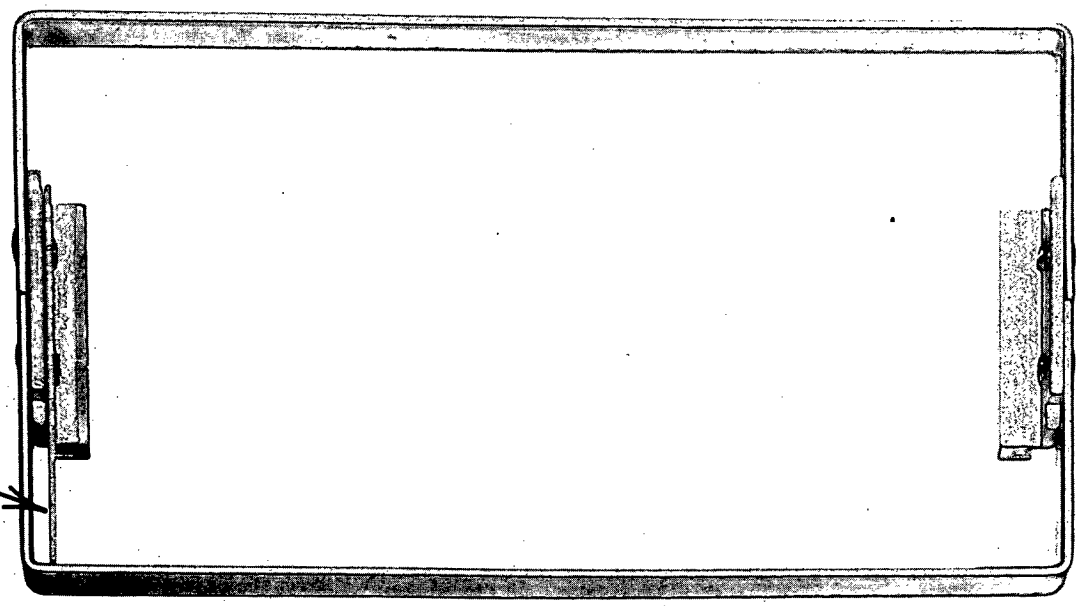
KEY STOP

CHANGE NO.	DATE	DESCRIPTION
ISSUE 3	31-71	E.C.O. 0167 RJA

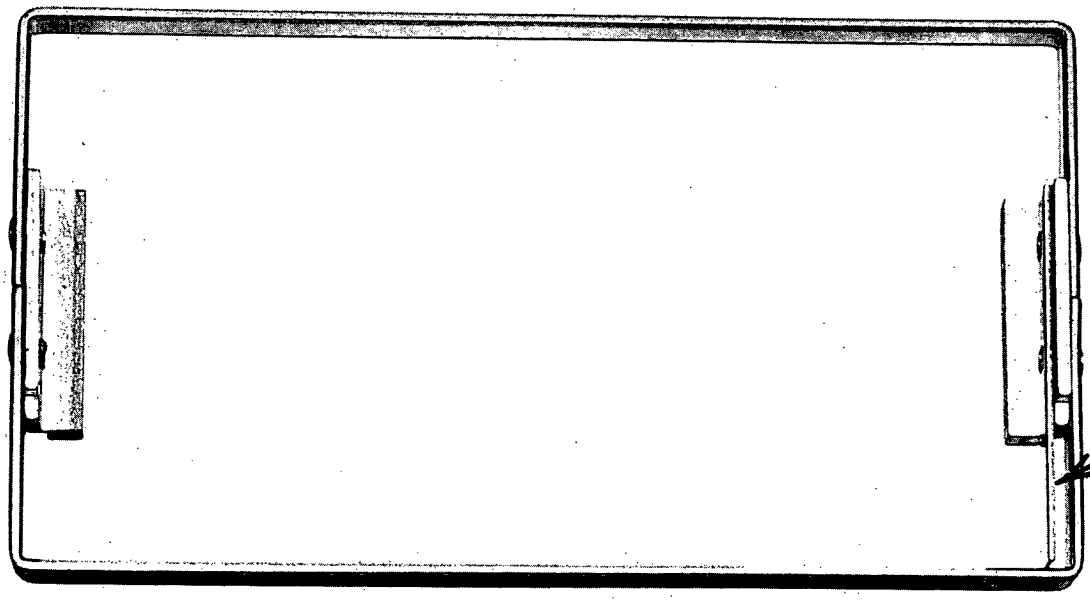
APPROVED BY	APPROVED FOR	APPROVED DATE
WAC	Prod	10/8/70

ENG WAC
DRAWN BY PLL
CHECKED RJA

DRAWING NO. 200.11-7
DATE 6-16-70



LEFT HAND SHROUD SUB-ASSEMBLY



RIGHT HAND SHROUD SUB-ASSEMBLY

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE: LEFT AND RIGHT HANDED SHROUD SUB-ASSEMBLY

CHANGE NO.	DATE	DESCRIPTION
ISSUE	4-5-71	R J A

APPROVED BY	FOR	DATE
cbc	PROD.	4-7-71

ENG RJA | DRAWING NO. 200.11-8
DRAWN BY DHO
CHECKED RJA | DATE 4-5-71

ELECTRONIC CASE
METAL PARTS

CHG.	E.C.O.	DATE	APPR	CHG	E.C.O.	DATE	APPR	CHG.	E.C.O.	DATE	APPR.
ISSUE	—	3–31–71	RJA								

ELECTRONIC CASE
METAL PARTS
PARTS LIST

QTY.	C.S.L. DOC.	PART
	200.12-4	COVER PLATE
	200.12-5	GUIDE PLATE PAIR
	200.12-6	PLUG BRACKET PAIR
	200.12-7	DOUBLE CELL FILLER STRIP PAIR
	200.12-8	TRIPLE CELL FILLER STRIP PAIR
	200.12-9	FOUR CELL FILLER STRIP PAIR

CHG	E.C.O	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	——	3-31-71	RJA								

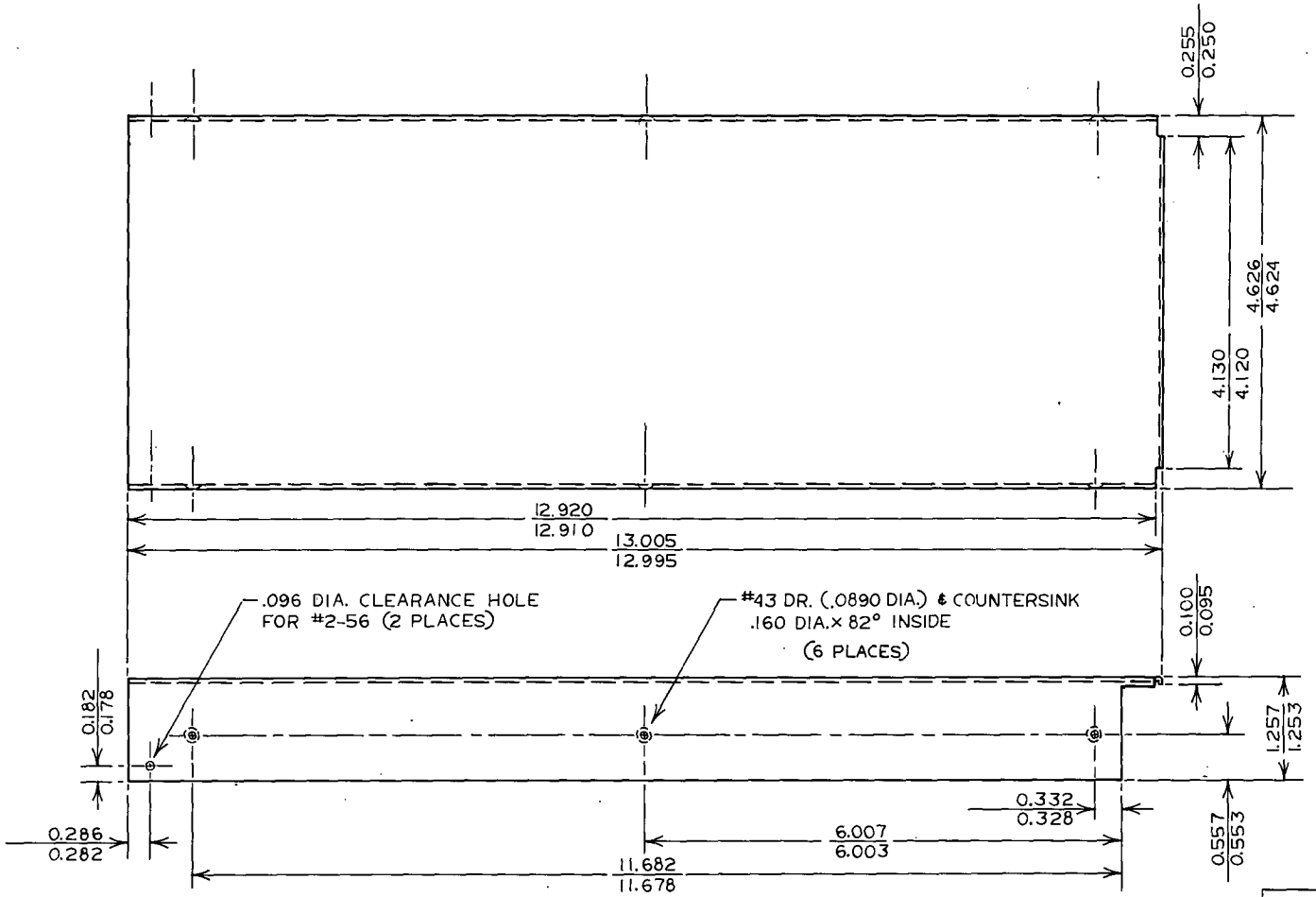
ELECTRONICS CASE METAL PARTS - DESCRIPTION

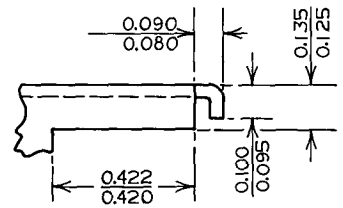
The metal parts described in this document relate to the electronics cases. These parts are common to all the case types but may differ in quantity between the types. In the assembly of any case two cover plates and one filler strip pair are required. These parts form the top, bottom and sides of a case. The guide plate and plug bracket pair, on the otherhand, are required in numbers equal to the name of the case type i.e. a single cell unit would require one guide plate and plug bracket while a four cell case would require four pair of each.

The function of the guide plate, as its name would imply, is to provide alignment for engagement of electrical connectors contained in the plug bracket pair when the case and associated electronics is brought into mating with compatible macro-modular elements.

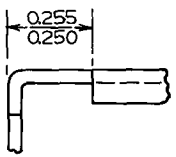
Page no's. 200.12-4 through 200.12-9 are a complete set of mechanical drawings and illustrations fully describing the electronics case metal parts. Each drawing contains tolerance specifications relating to the various parts. All tolerances and specifications contained herein must be adhered to in order to produce acceptable assemblies. The manufacturer must assure himself that these requirements can be met by analyzing component and assembly of documentation, his tooling and characteristics of his production processes.

		DATE	
ISSUE	—	4-6-71	RJA





SIDE VIEW: CORNER DETAIL



END VIEW: CORNER DETAIL

MAT'L:
.040 ALUM.-6061

FINISH:
CSL SPEC. MF1

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COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
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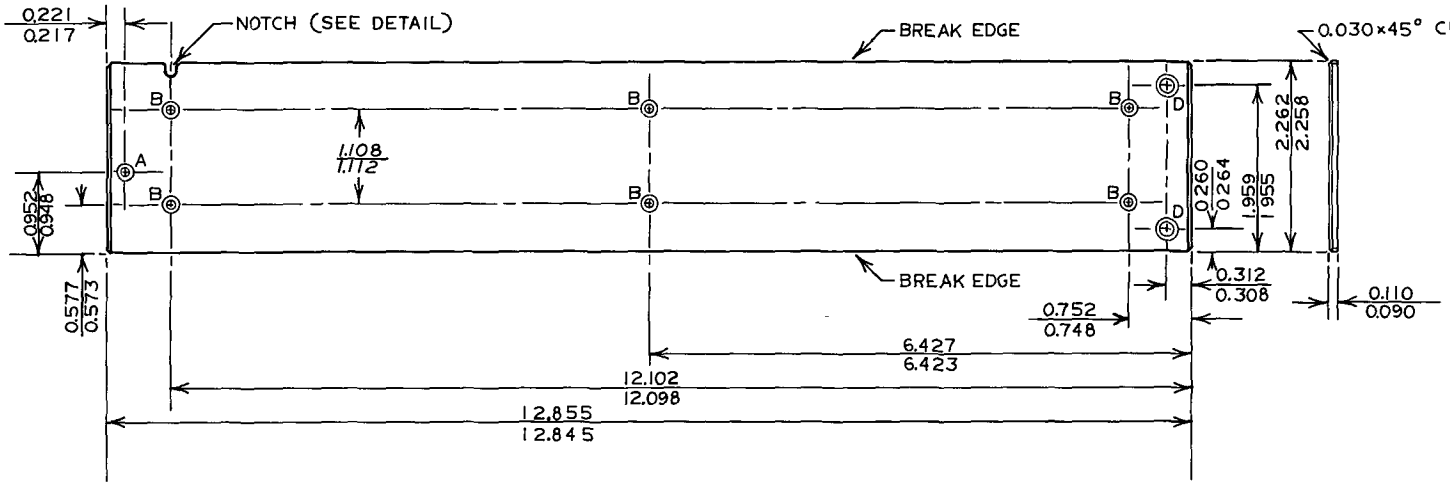
MACROMODULAR PROJECT

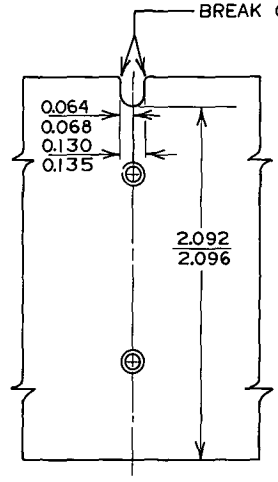
TITLE
COVER PLATE

APPROVED BY	FOR	DATE	ENG	DRAWING NO.
			WAC	200.12-4
	PROD.	4-7-71	DRAWN BY PLL	
			CHECKED R J A	DATE 8-30-68



GUIDE PLATE
ONE RIGHT HAND ¢
ONE LEFT HAND REQ'D.
MAT'L. 0.100 "6061-T6 ALUM.
FINISH: CSL SPEC. MF1

HOLE SCHEDULE
"A" DRILL ¢ COUNTERSINK FOR "2-56
"B" #42 DRILL ¢ COUNTERBORE 0.166 DIA. x 0.040 DEEP
"D" DRILL ¢ COUNTERSINK FOR "5-40



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CHANGE NO	DATE	DESCRIPTION

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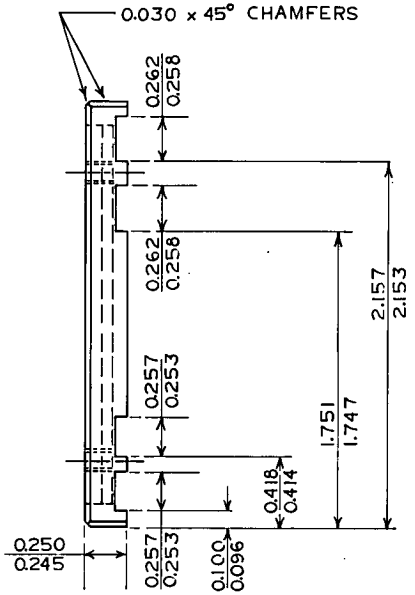
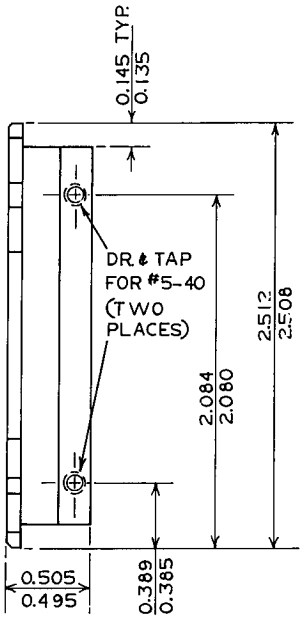
MACROMODULAR PROJECT

TITLE: GUIDE PLATE PAIR

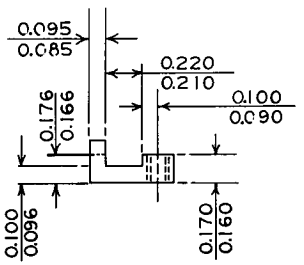
APPROVED BY	FOR	DATE	ENG	DRAWING NO
JAE	PROD.	4-7-71	WAC	200.12-5
			DRAWN BY PLL	
			CHECKED R J A	DATE 8-31-68





PLUG SUPPORT BRACKET

TWO REQ'D. -ONE RIGHT HAND
-ONE LEFT HAND
MAT'L: 0.250 x 0.500 STOCK
6061-T6 ALUMINUM
FINISH: CSL SPEC. MF I



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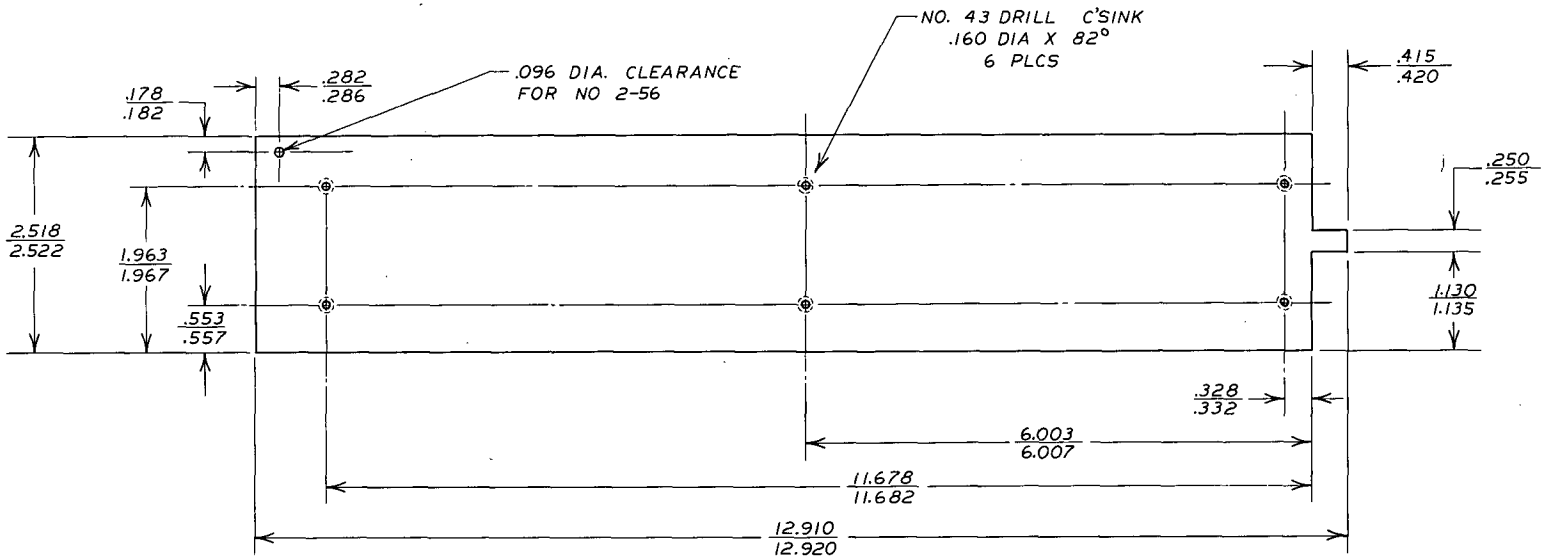
MACROMODULAR PROJECT

TITLE: PLUG BRACKET PAIR

APPROVED BY	FOR	DATE	ENG	DRAWING NO.
WJC	PROD.	4-7-71	WAC	200.12-6
			DRAWN BY PLL	
			CHECKED RJA	DATE 6-5-69



MAT'L: .040 ALUM 6061-T6
FINISH: CSL SPEC MF1
1 L.H. & 1 R.H. REQ'D. PER CASE

CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	R J A

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
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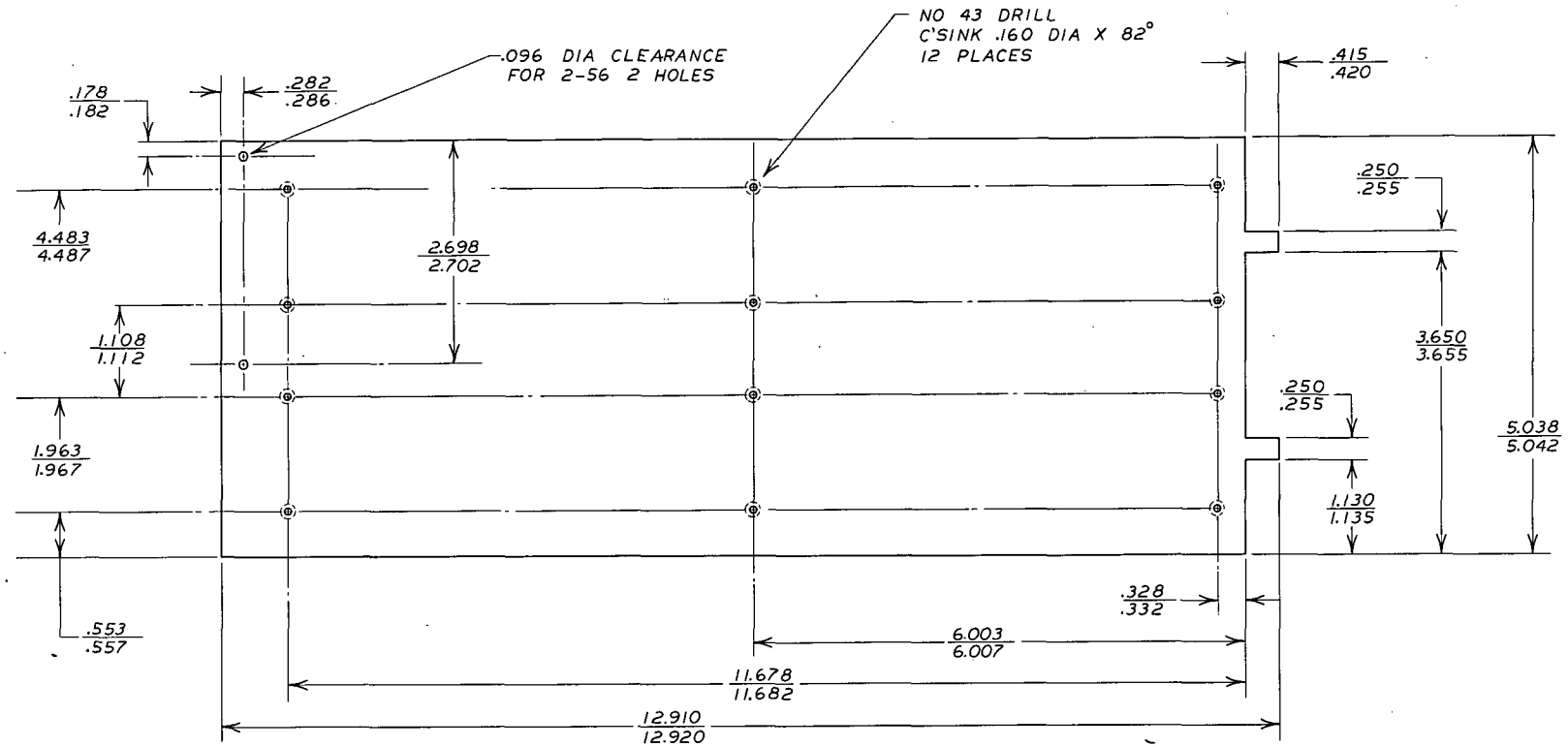
MACROMODULAR PROJECT

TITLE
FILLER STRIP PAIR
DOUBLE CELL CASE

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
WAC	PROD.	4-7-71	R J A	200.12-7
			DRAWN BY P L L	
			CHECKED R J A	DATE 3-23-71



MAT'L: .040 ALUM 6061-T6
FINISH: CSL SPEC MF1
1 L.H. & 1 R.H. REQ'D. PER CASE

CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	RJA

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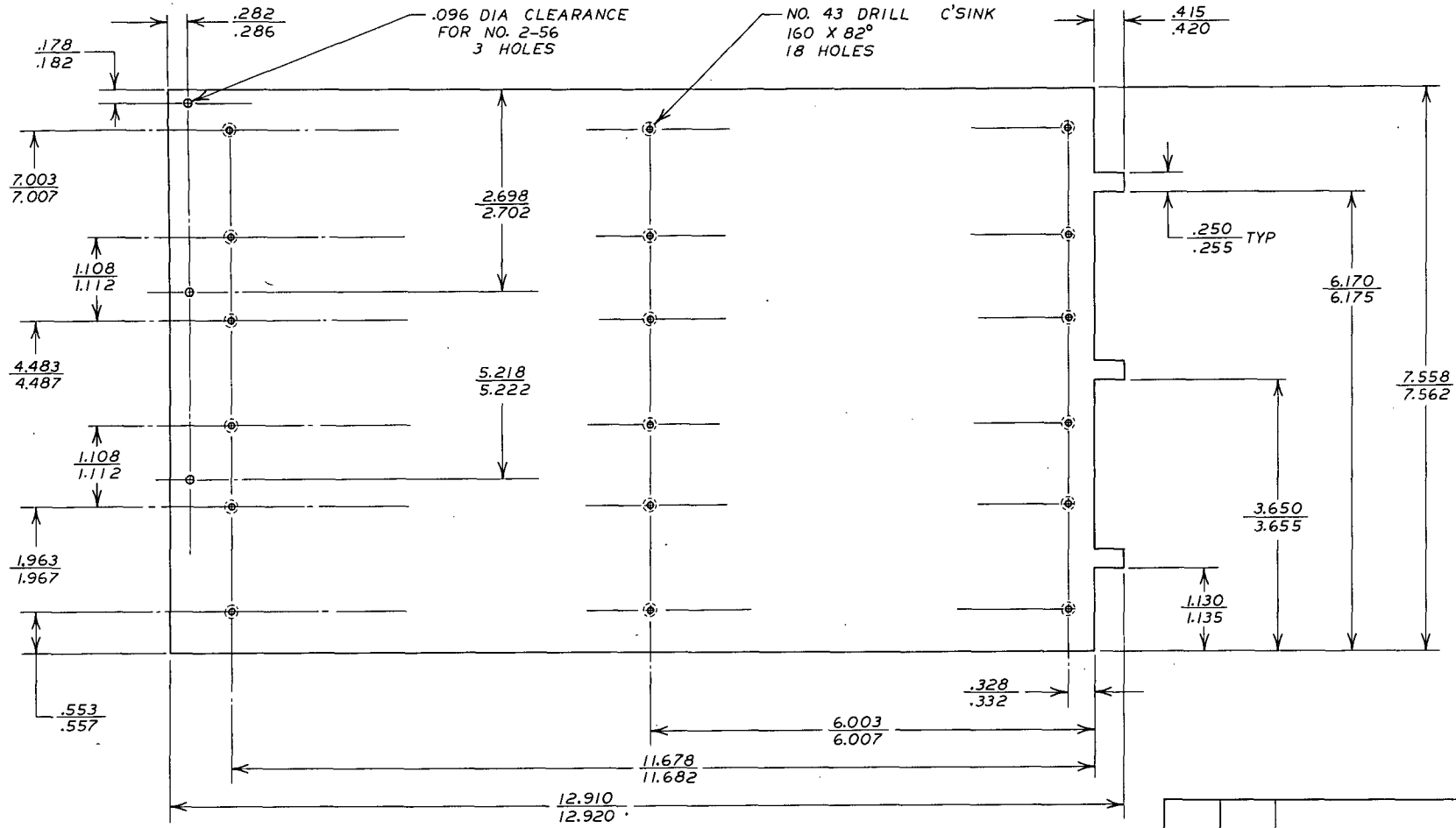
MACROMODULAR PROJECT

TITLE: FILLER STRIP PAIR
THREE CELL CASE

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
	PROD.	4-7-71	RJA	200.12-8
			DRAWN BY: PLL	
			CHECKED: RJA	DATE: 3-23-71



MAT'L: .040 ALUM 6061-T6
FINISH: CSL SPEC MF1
1 L.H. & R.H. REQ'D. PER CASE

CHANGE NO.	DATE	DESCRIPTION
ISSUE	3-31-71	RJA

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
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MACROMODULAR PROJECT

TITLE
FILLER STRIP PAIR
FOUR CELL CASE

APPROVED BY	FOR	DATE	ENG.	DRAWING NO.
WAB	PROD.	4-7-71	RJA	200.12-9
			DRAWN BY PLL	
			CHECKED RJA	DATE 3-23-71

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13. ABSTRACT

Complete mechanical drawings regarding the manufacture of components and assembly specifications for the macromodular electronic cases and printed circuit board routing dimensions for macromodular electronic assemblies are given.

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

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14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Macromodule Printed Circuit Boards						
Macromodule Electronics Case						
Macromodule Circuit Board Outline						


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