Opamp Inverting Amplifier

PART NUMBER	04A-005
GROUP NAME	Opamp Amplifiers (04A)
CIRCUIT NAME	Inverting Amplifier
VARIANT DESCRIPTION	Single supply, DC Bias Trimmer
BOARD DESIGN	PCB50-A-05
PRODUCT DESCRIPTION	Panel of #04A-005 miniPCBs, v-scored (1 Panel = 4 Pieces)

Theory of Operation

This circuit amplifies a small voltage signal.

Panel Board

TOP VIEW

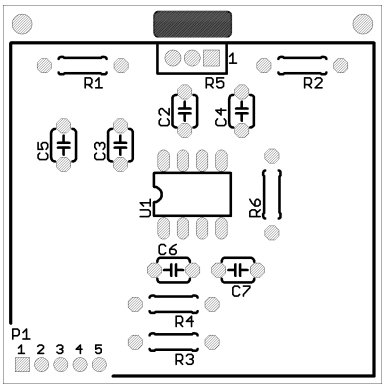
BOTTOM VIEW

Single Board

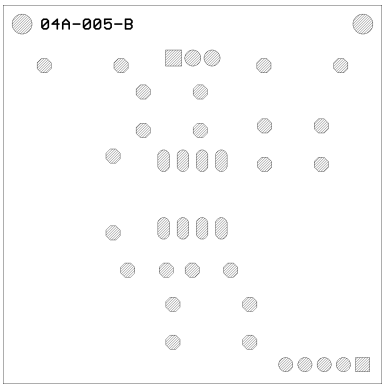
TOP VIEW

BOTTOM VIEW

Part Locations

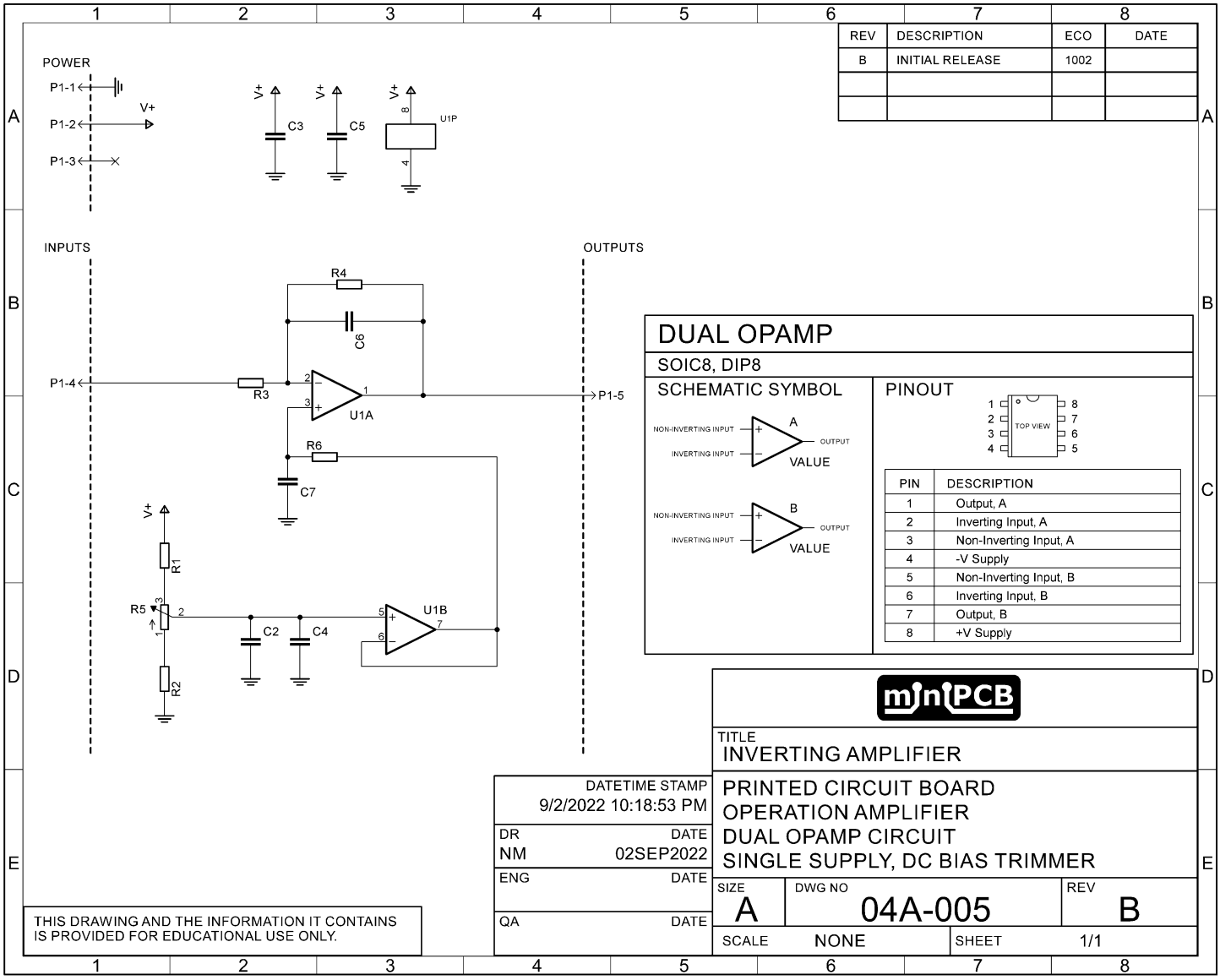


TOP VIEW



BOTTOM VIEW

Schematic


REV | DESCRIPTION | ECO | DATE
B | INITIAL RELEASE | 1002
POWER
P1-1
P1-2
P1-3
V+
C3
C5
U1P
INPUTS
OUTPUTS
R4
C6
P1-4
R3
U1A
P1-5
R6
C7
R1
R5
R2
C2
C4
U1B
DUAL OPAMP
SOIC8, DIP8
SCHEMATIC SYMBOL
NON-INVERTING INPUT
INVERTING INPUT
OUTPUT
VALUE
PINOUT
TOP VIEW
PIN | DESCRIPTION
1 | Output, A
2 | Inverting Input, A
3 | Non-Inverting Input, A
4 | -V Supply
5 | Non-Inverting Input, B
6 | Inverting Input, B
7 | Output, B
8 | +V Supply
TITLE
INVERTING AMPLIFIER
DATETIME STAMP
9/2/2022 10:18:53 PM
DR
NM
DATE
02SEP2022
ENG
QA
PRINTED CIRCUIT BOARD
OPERATION AMPLIFIER
DUAL OPAMP CIRCUIT
SINGLE SUPPLY, DC BIAS TRIMMER
SIZE
A
DWG NO
04A-005
REV
B
SCALE
NONE
SHEET
1/1
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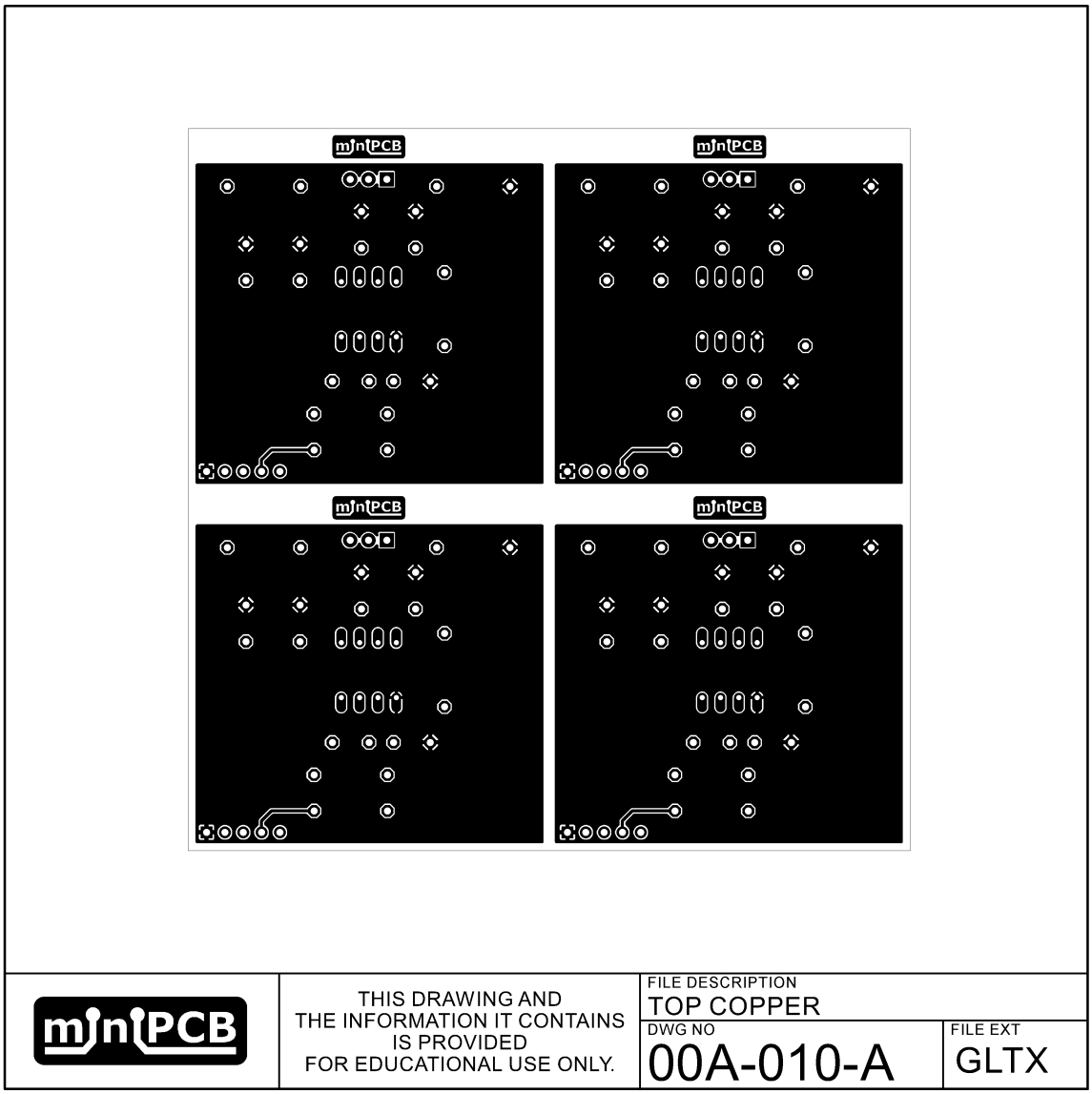
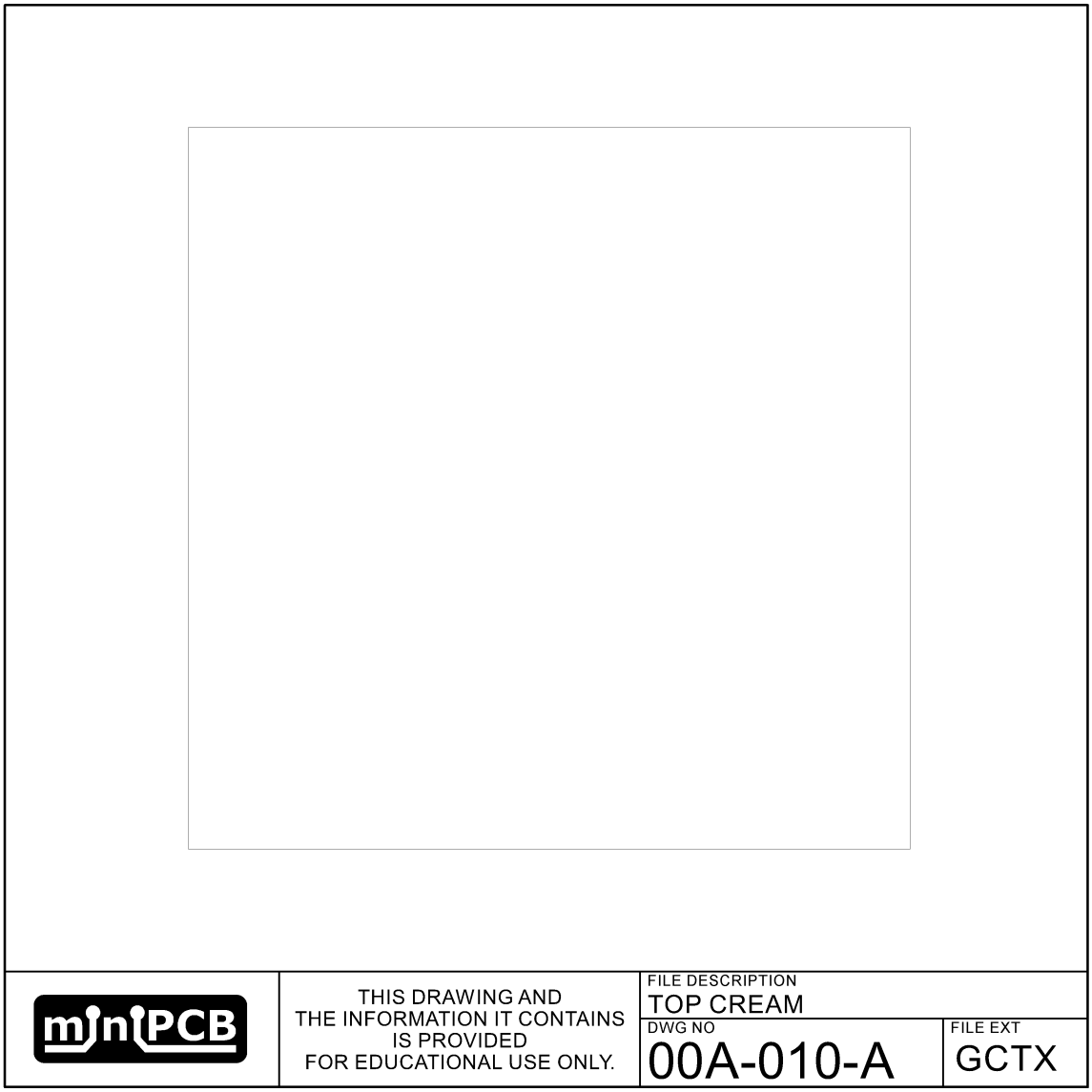
Gerber Files

This section contains images of the layers included in each Gerber file.

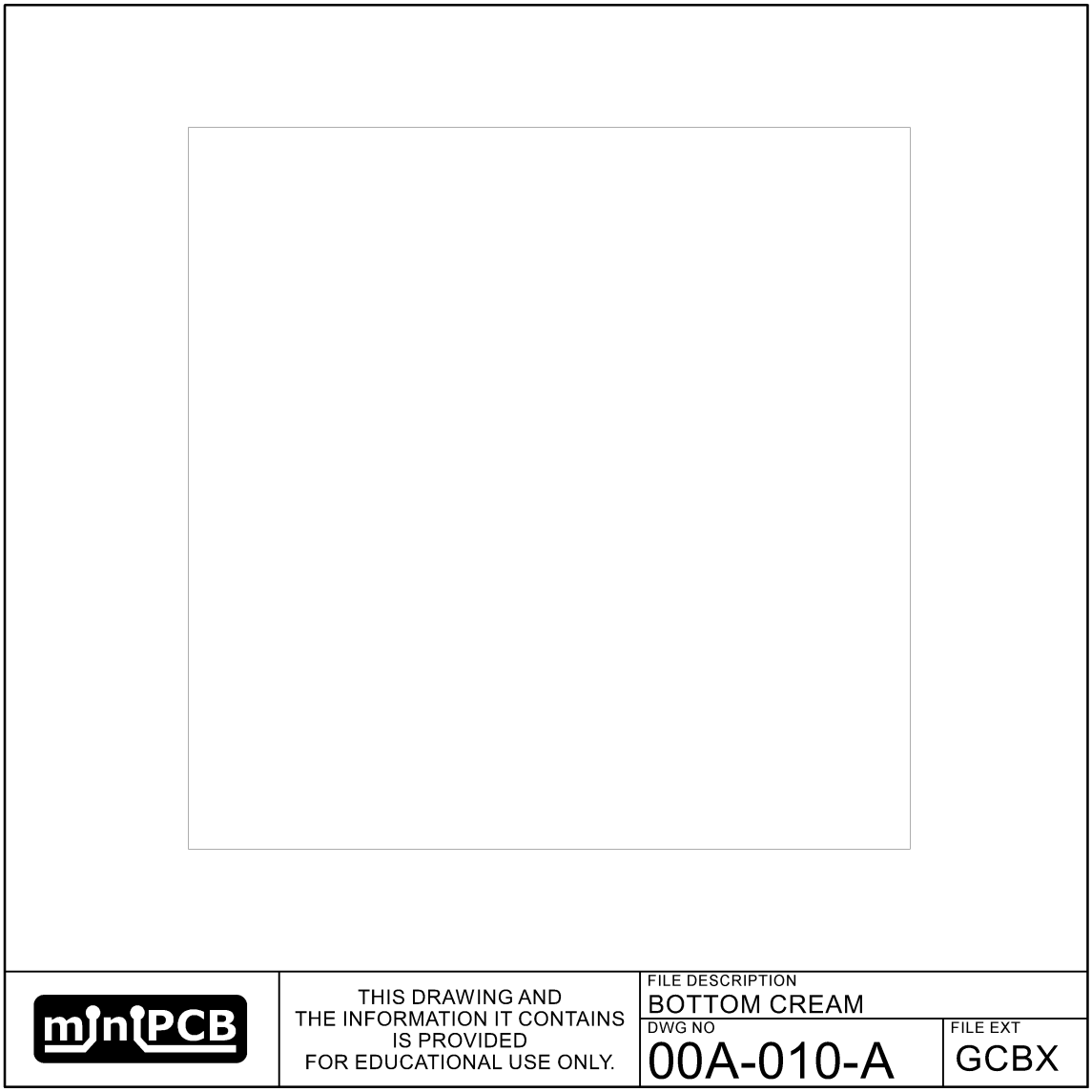
TOP COPPER (GLTX)



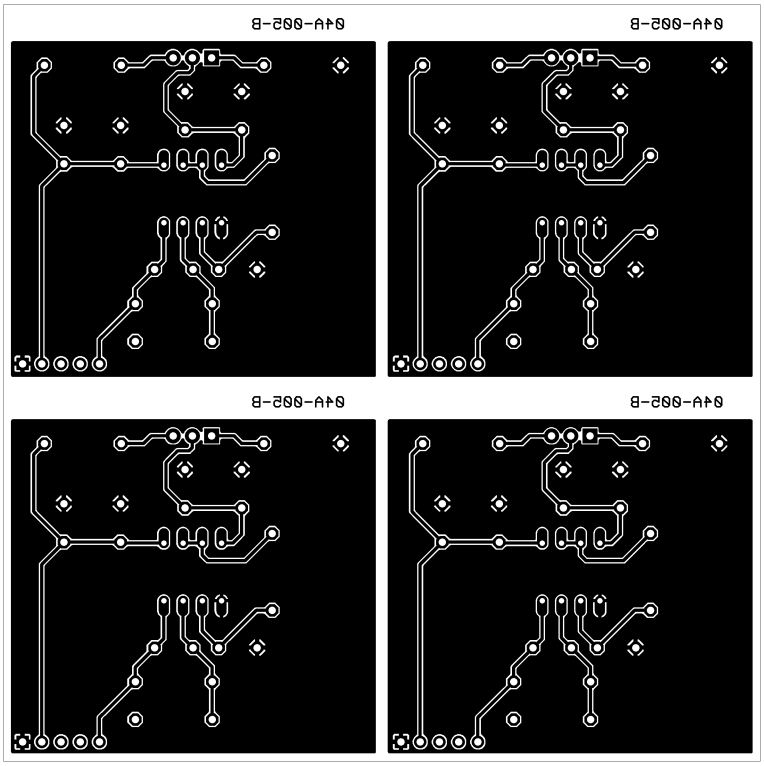
TOP CREAM (GCTX)



BOTTOM CREAM (GCBX)



BOTTOM COPPER (GLBX)



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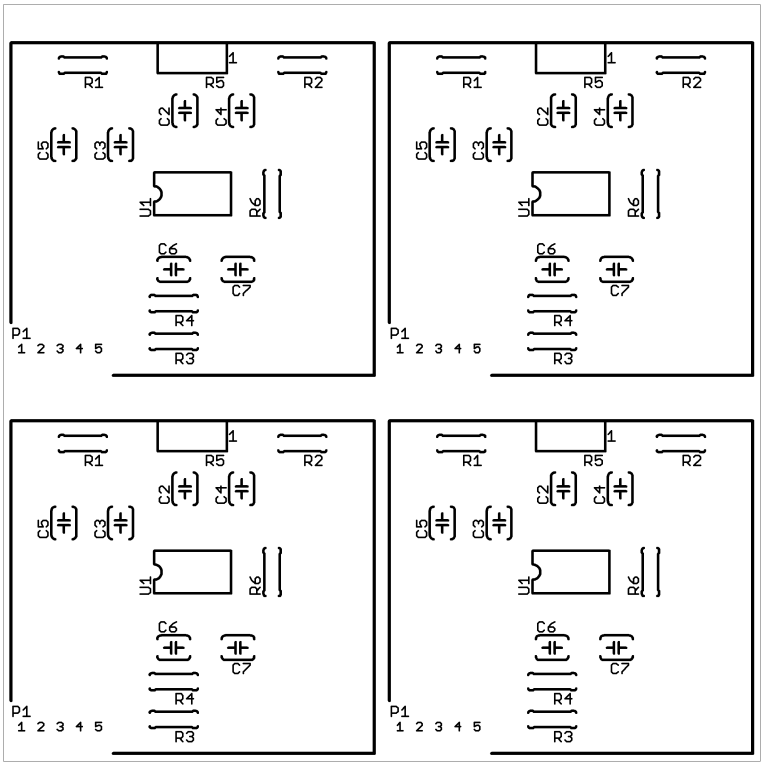
		DWG NO: 00A-010-A	FILE EXT: GLBX

TOP SILKSCREEN (GOTX)



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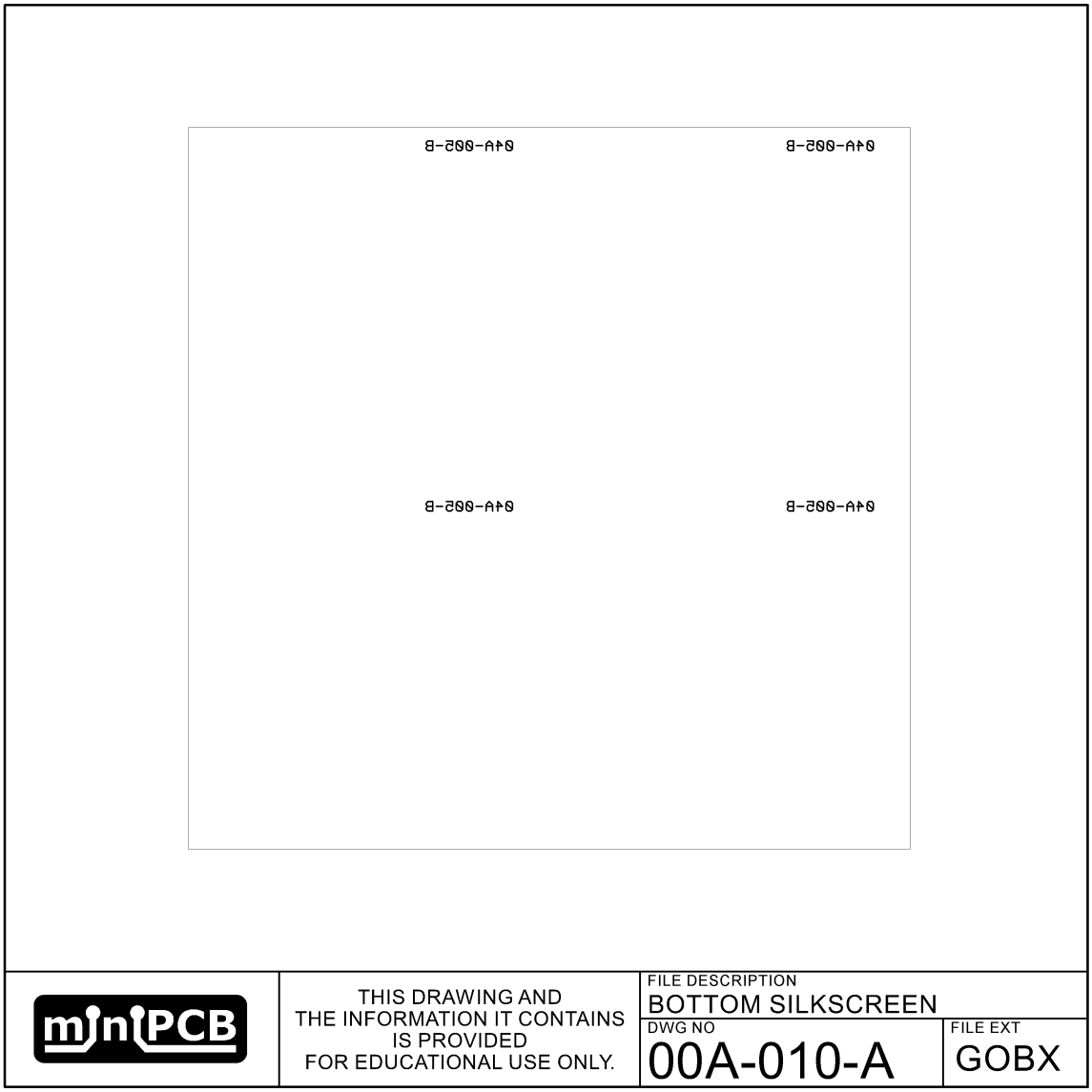
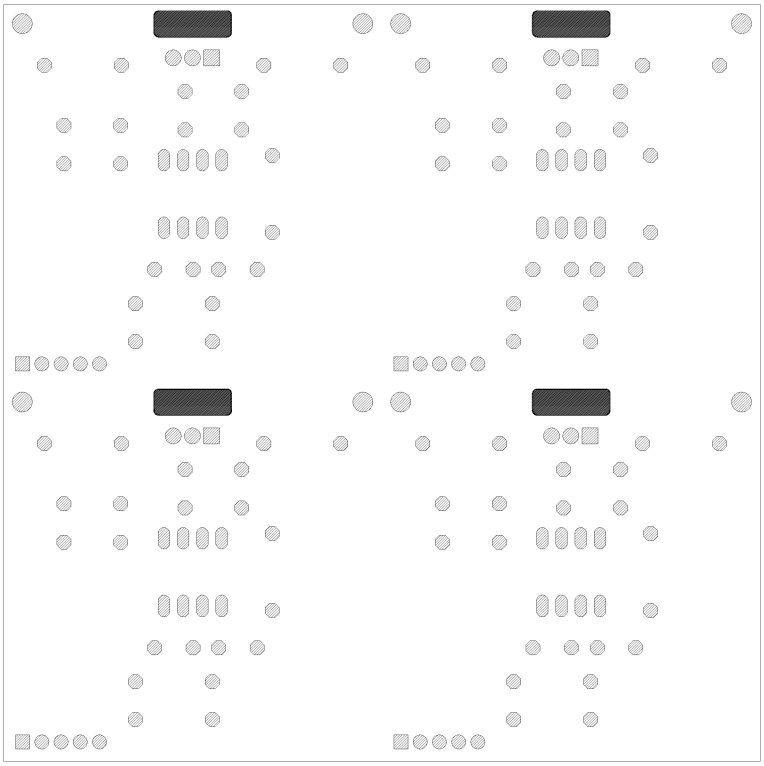
		DWG NO: 00A-010-A	FILE EXT: GOTX

BOTTOM SILKSCREEN (GOBX)

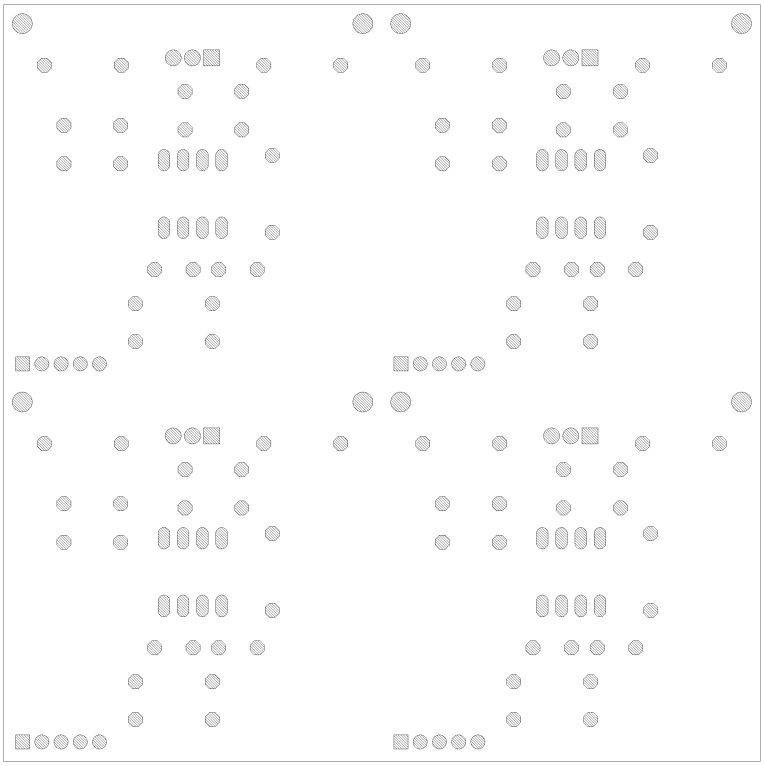


TOP SOLDERMASK (GSTX)



miniPCB	THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.	FILE DESCRIPTION: TOP SOLDERMASK	
		DWG NO: 00A-010-A	FILE EXT: GSTX

BOTTOM SOLDER MASK (GSBX)



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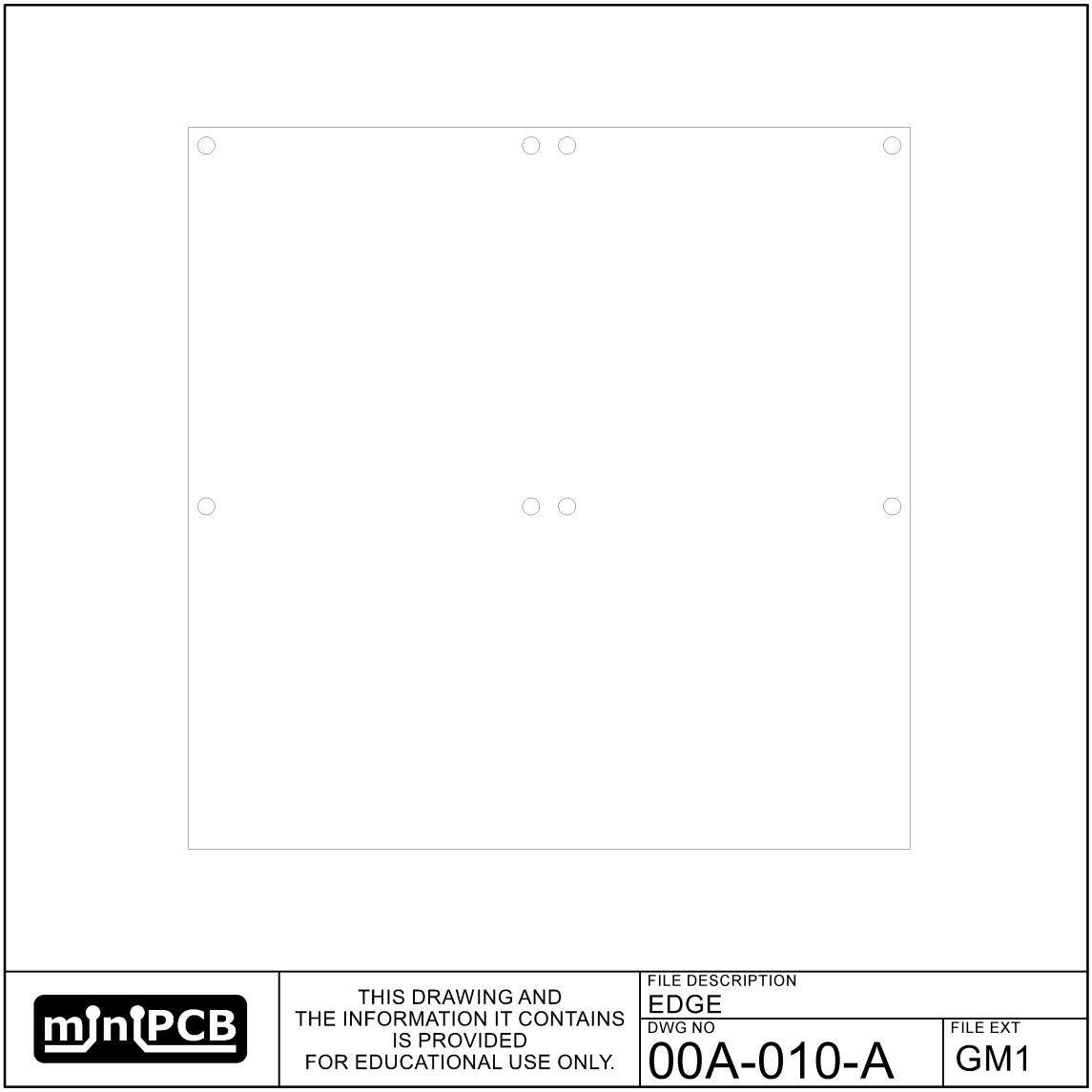
		DWG NO: 00A-010-A	FILE EXT: GSBX

EDGE (GM1)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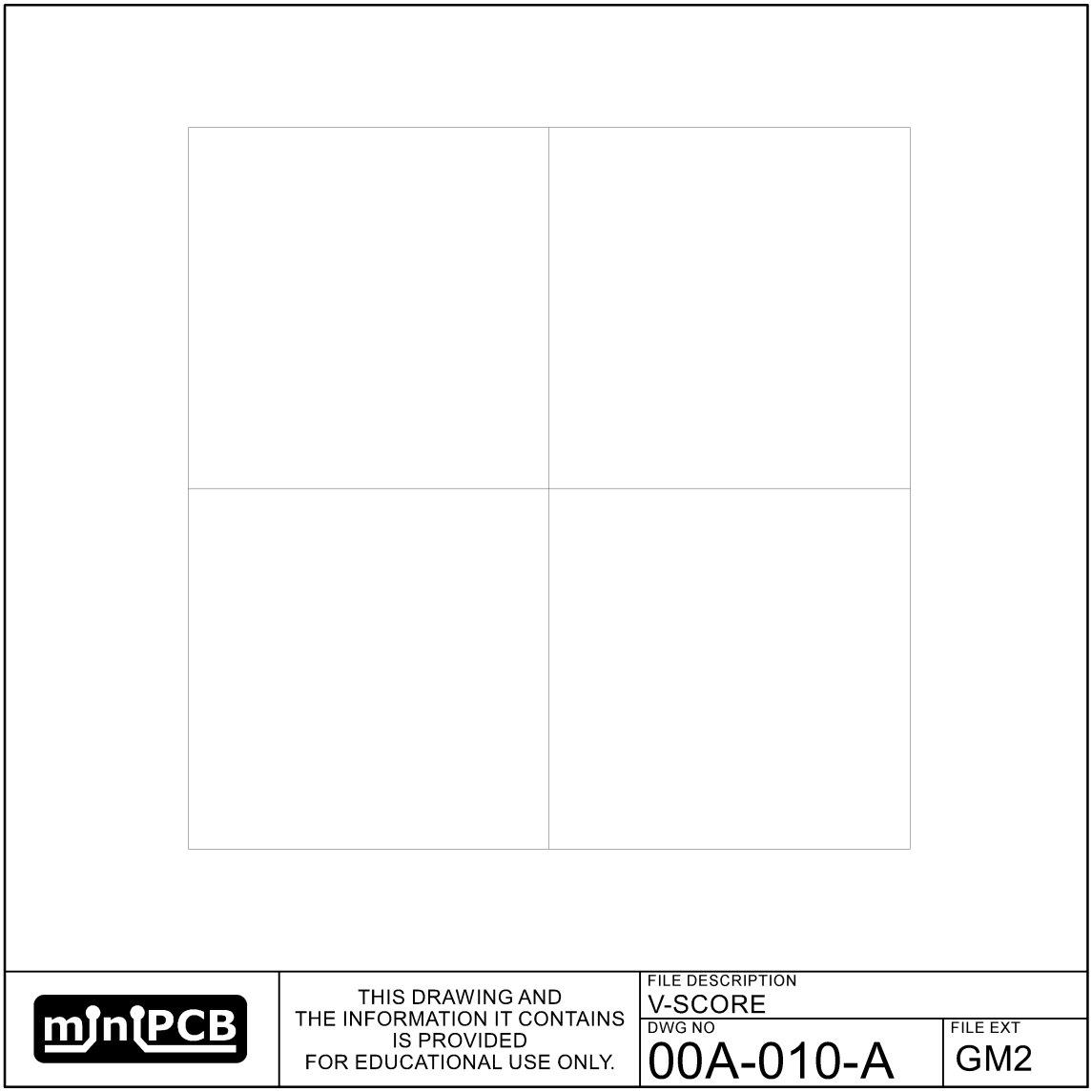
EDGE
DWG NO
00A-010-A
FILE EXT
GM1

VSCORE (GM2)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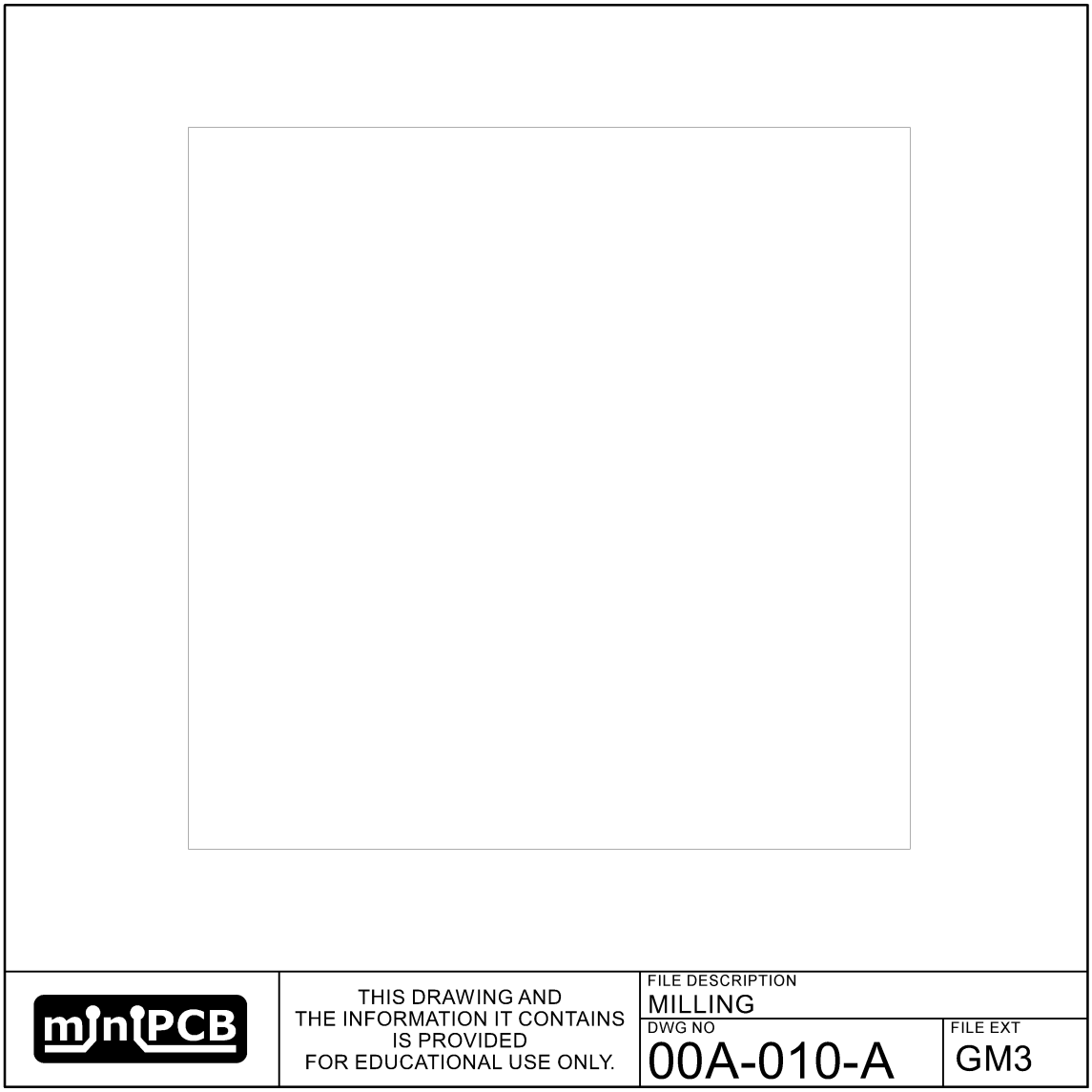
V-SCORE
DWG NO
00A-010-A
FILE EXT
GM2

MILLING (GM3)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FILE DESCRIPTION
MILLING
DWG NO
00A-010-A
FILE EXT
GM3

Design Inputs

Design Requirements Form

POWER REQUIREMENTS

PARAMETER NAME	SYMBOL	UNITS	LOWER LIMIT	TARGET VALUE	UPPER LIMIT
Postive DC Supply	+V	V			
Negative DC Supply	-V	V			

STIMULI REQUIREMENTS

PARAMETER NAME	SYMBOL	UNITS	LOWER LIMIT	TARGET VALUE	UPPER LIMIT
Signal Voltage, Peak to Peak	V_s	V			
Signal Frequency	f_s	Hz			
Common Mode	V_{cm}	V			
Source Impedance	R_s	Ω			

PERFORMANCE CHARACTERISTICS

PARAMETER NAME	SYMBOL	UNITS	LOWER LIMIT	TARGET VALUE	UPPER LIMIT
Quiescient Current	I_q	A			
Voltage Gain	A_v	V/V			
Current Gain	A_i	A/A			
Power Gain	A_p	P/P			
Input Impedance	R_i	Ω			
Output Impedance	R_i	Ω			

Design Outputs

Parts List Form

REF DES	PART TYPE	MFG PART NUMBER	PART DESCRIPTION	FIND
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11

Testing Plans

Developmental Testing

1. Plan each calibration and service test.
2. Predict expected values for each test measurement.
3. Determine if expected values satisfy design requirements.
4. Assemble a prototype that is representative of what might be the final design.
5. Perform the calibration and service testing plans.
6. Determine if the design outputs satisfy design requirements.

Calibration and Service Testing

1. With power off, measure resistances between each pin.
2. If measured resistances are not as expected, end testing fail, components need to be replaced.
3. With power on, measure voltages at each pin.
4. If measured voltages are not as expected, end testing fail, components need to be replaced.
5. With power on, adjust potentiometer PX such that the voltage at test point TPX is ##.
6. If measured voltages cannot be adjusted to an expected value, end testing fail, components need to be replaced.
7. With power on, apply stimuli and measure outputs.
8. If measured output signals are not as expected, end testing fail, components need to be replaced.
9. If measured output signals are as expected, end testing pass.-

Design Example

Design Inputs

POWER REQUIREMENTS

PARAMETER NAME	SYMBOL	UNITS	LOWER LIMIT	TARGET VALUE	UPPER LIMIT
Postive DC Supply	+V	V	4.9	5	5.1
Negative DC Supply	-V	V			

STIMULI REQUIREMENTS

PARAMETER NAME	SYMBOL	UNITS	LOWER LIMIT	TARGET VALUE	UPPER LIMIT
Signal Voltage, Peak to Peak	V_s	V	0.015	0.02	0.025
Signal Frequency	f_s	Hz			
Common Mode	V_{cm}	V			
Source Impedance	R_s	Ω			

PERFORMANCE CHARACTERISTICS

PARAMETER NAME	SYMBOL	UNITS	LOWER LIMIT	TARGET VALUE	UPPER LIMIT
Quiescient Current	I_q	A			
Voltage Gain	A_v	V/V			
Current Gain	A_i	A/A			
Power Gain	A_p	P/P			
Input Impedance	R_i	Ω			
Output Impedance	R_i	Ω			

Design Outputs

PARTS LIST

QTY REQ	REFERENCE DESIGNATORS	MFG PART NUMBER	PART DESCRIPTION	FIND
3	R1, R2, R5		RESISTOR, 1.5K, 1/4W, 1%	1
2	R3, R4		100	2
1	Q1		2N2222	3
1	C1		10u	4
1	C2		1u	5
1	C3		0.1u	6

Developmental Tests per Example

Test Report per Example

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Revision History

REV	DESCRIPTION	ECO	DATE
A	Initial Release		