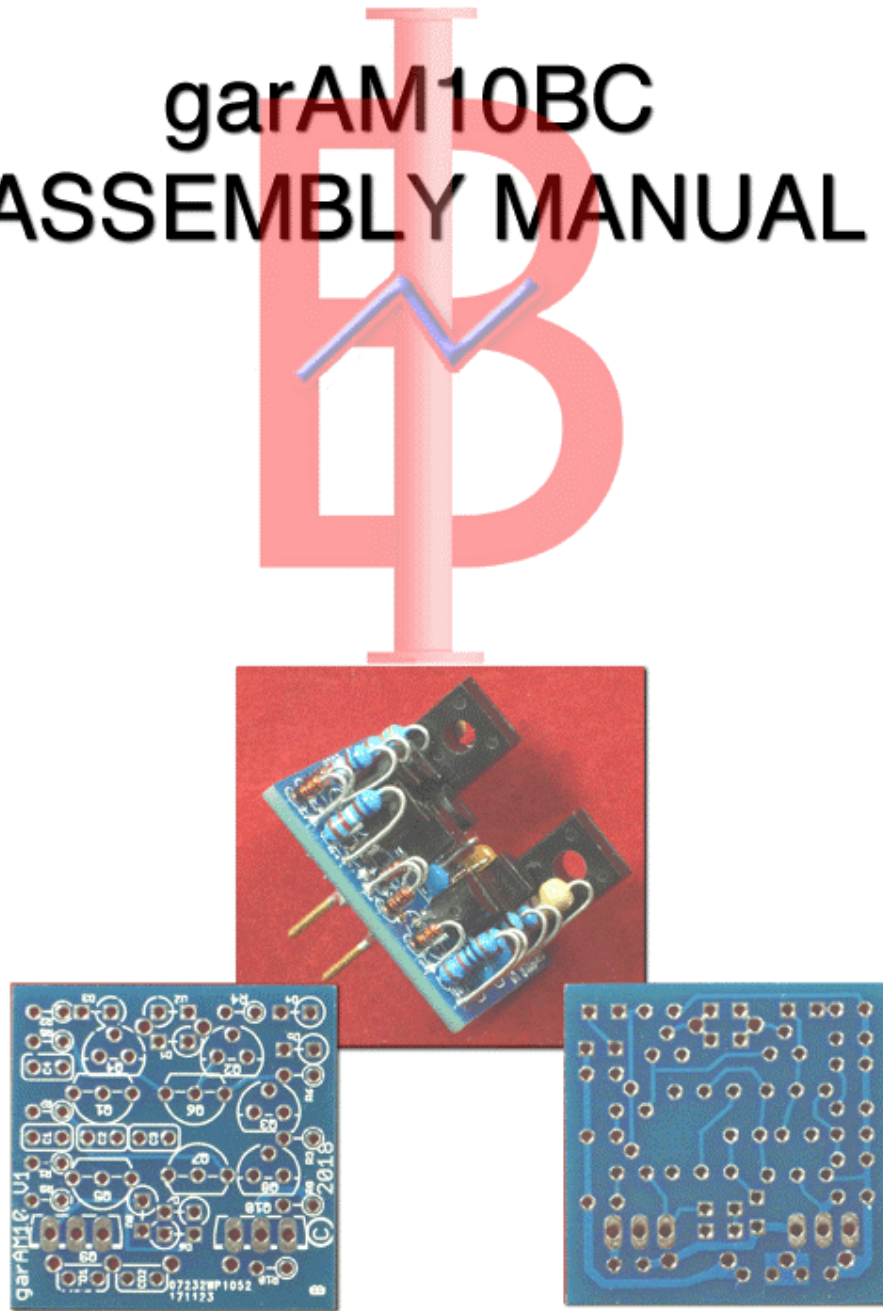


garAM10BC ASSEMBLY MANUAL



Recommended Tools for Assembly:

Small conical tip iron... the smaller the better.

Recommended... Hakko FX 888-D

https://www.hakko.com/english/products/hakko_fx888d.html

For best results use Kester 44 63/37 .031 or small solder.

A Panavise or small bench vice for holding the PCB while soldering.

A magnifying light.

A sharp pair of small dykes. Recommended...CHP170

<http://www.all-spec.com/products/CHP-170.html>

WARNING: WEAR EYE PROTECTION WHEN CLIPPING WIRE ENDS !!

Solder wick or Soldapullt or

Recommended.. The Hakko 808 or FR300 Desoldering Station
Once you try one you will never go back to wick etc.

VOM Meter for checking Resistor values

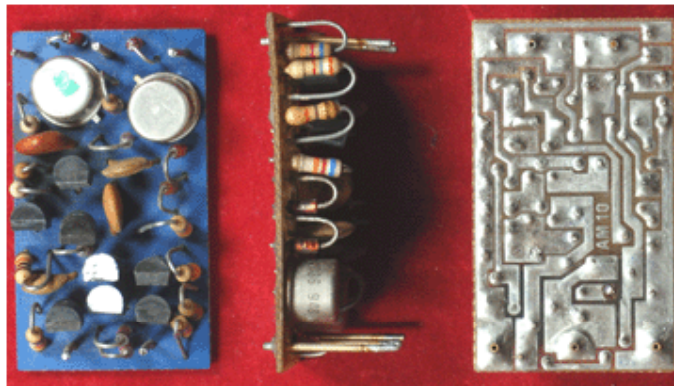
A small screwdriver shaft or meter probe

For bending Resistor and Diode leads



ABOUT THE garAM10BC DOA

The original AM10 was an old 1970s op-amp. It was built on an oversized proprietary PCB with its own proprietary pinout. The PCB is single sided and the parts hung upside down.



The garAM10BC is a 2520 pinout modern version. It uses 5% Murata Caps and 1% metal film resistors. The Transistors are all current production BC550C/BC560C TO92 small signal transistors and BD139-16/BD140-16 output transistors.

Rail voltage compatibility..

It is just as happy on VPR standard voltage rails as well as 24v rails used in 51x modules.

This DOA is yet another vintage color for the Audio tool box.

ASSEMBLY TIPS

Note that the OUTPUT transistors are NOT the same. One is a NPN and the other is a PNP. Make sure that they are in the correct positions and facing the correct direction

Note the BLUE Murata caps are all different values. Make sure you got the correct cap in the correct positions.

Note that the DIODES are polarized. Make sure that the black band on the diode is in the hole with the circle. Note the diode pads on the PCB are square shaped. They are the ONLY square pads on the PCB.

All BC560C transistors are on tape. The pads on the PCB are in a straight line for the BC560Cs and only these so that they will not be confused with the BC550C pads. Make sure they are facing the correct way as shown on the silkscreen.

All BC550Cs transistors are in little bags. One of the bags is for the MATCHED input pair and this bag will also include the Millmax pins. Do not remove the transistors from this bag until installing them so they do not get mixed up with the other BC550C transistors in the kit. All BC550C pads on the pcb are in a triangle formation so as not to be confused with the straight line BC560C pads. Make sure they are facing the correct way as shown on the silkscreen.

Measure all RESISTOR values at instillation and install according to this manual. In general, be careful when measuring values above 100k so you will not be including your skin resistance in the measurement.

Note on part substitutions in kits.....

Occasionally the parts listed in the BOM of each kit maybe temporarily unavailable from my parts supplier. A substitution part will be included in the kit. These parts will be of the same value, tolerance and quality of the part listed in the BOM.

For you folks sourcing your own parts For your builds....,

All the ¼ watt resistors use any major brand 1% metal film.

The ½ watt resistors can be any major brand carbon film or metal film 5% or better.

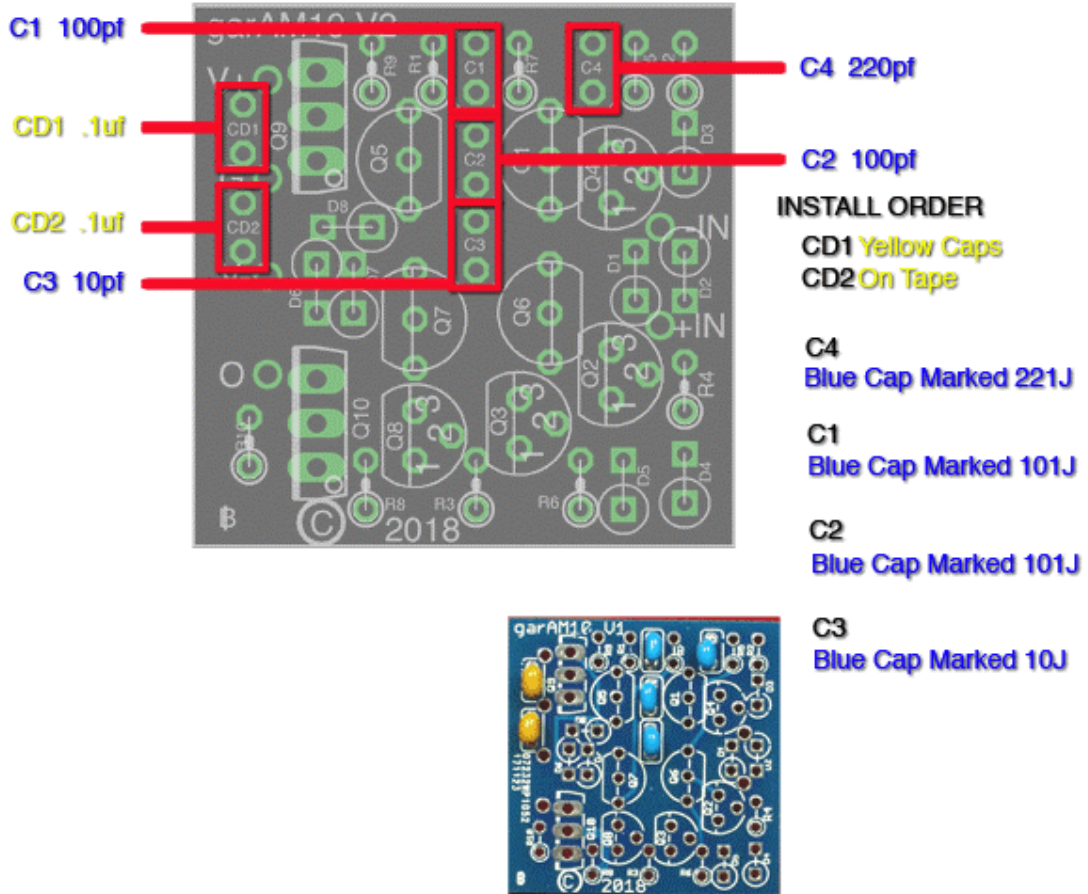
The Murata caps can be 50v or 100v 5%. Any major brand npo/cog 5% with the lead spacing of .1" or 2.5mm can be used if necessary..

Output transistors can be ON semi, Fairchild or ST micro transistors.

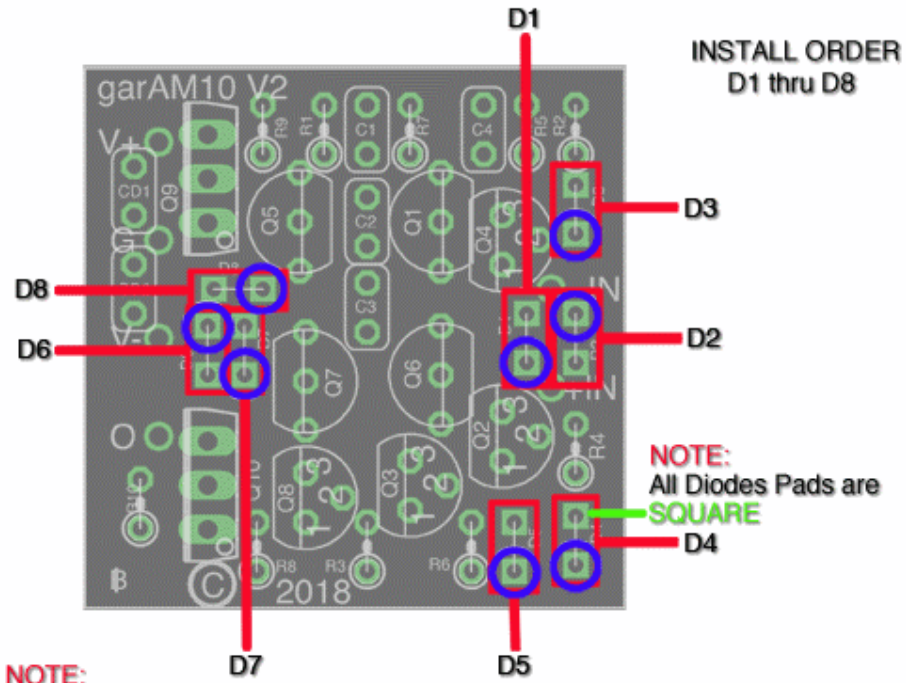
Note that the ST micro transistors have a slightly different

Package but will drop right in the PCB just fine.

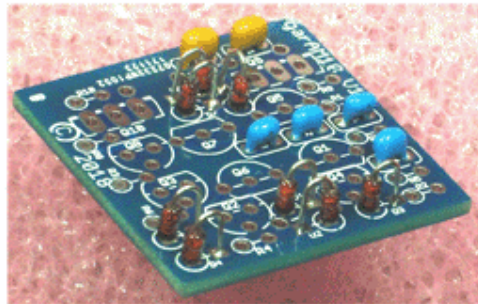
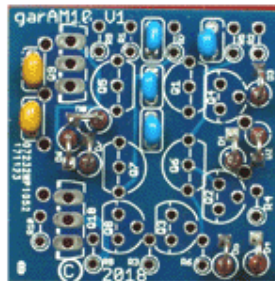
CAPS



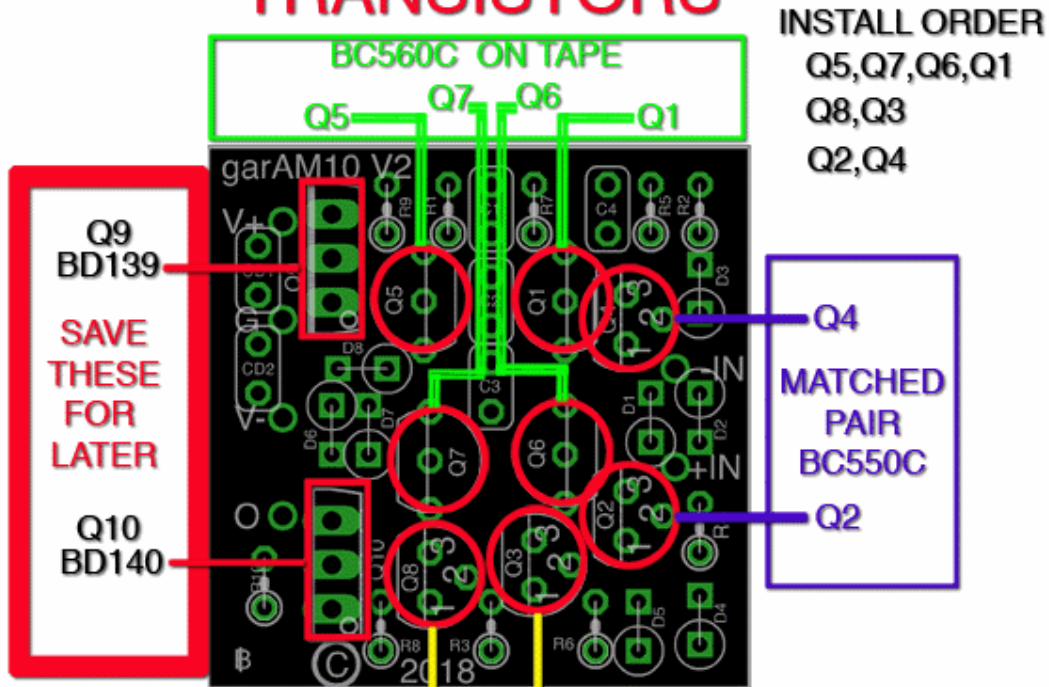
DIODES



The Black Band on the Diode Goes in the Round Circle on the Silk Screen as Noted by the **BLUE CIRCLES**

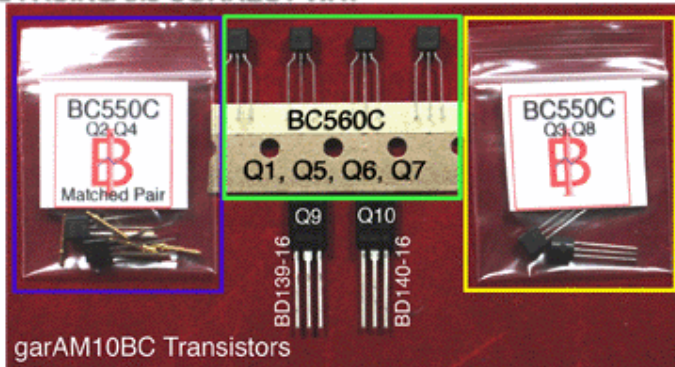
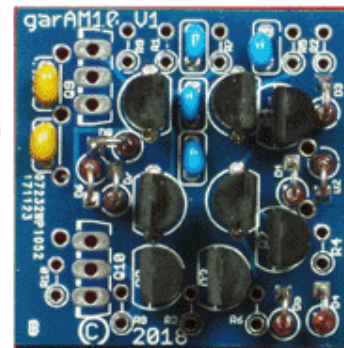


TRANSISTORS

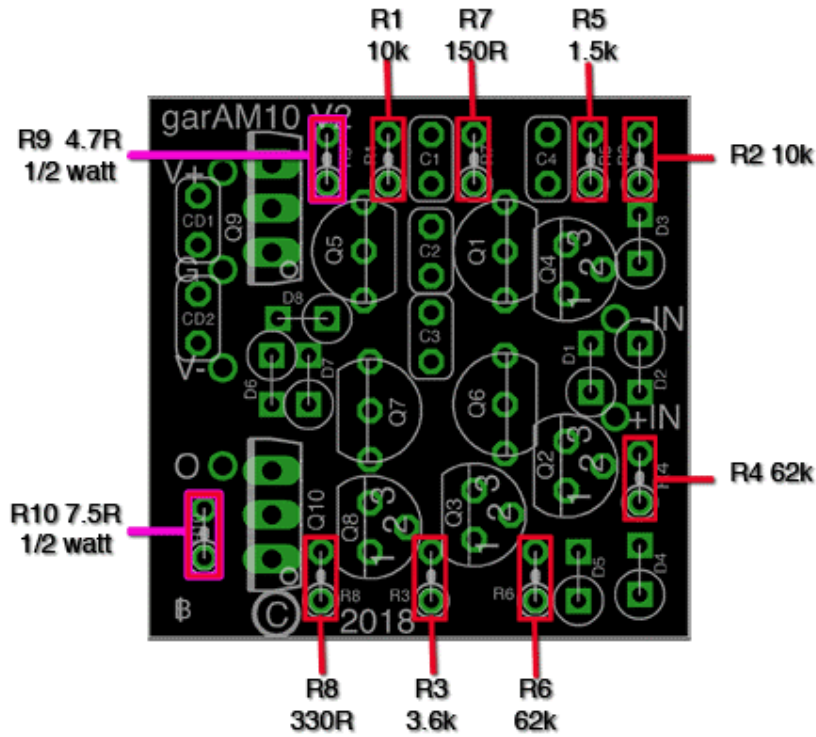


NOTE:

BC560C Pads are **IN-LINE**
 BC550C Pads are **TRIANGLES**
MAKE SURE the TRANSISTORS are in the **CORRECT HOLES**
 and **FACING** the **CORRECT WAY**



RESISTORS



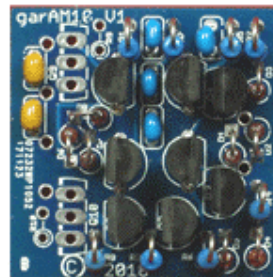
INSTALL ORDER

1/4 WATT

- R1) 10k
- R2) 10k
- R7) 150R
- R5) 1.5k
- R4) 62k
- R6) 62k
- R3) 3.6k
- R8) 330R

1/2 WATT

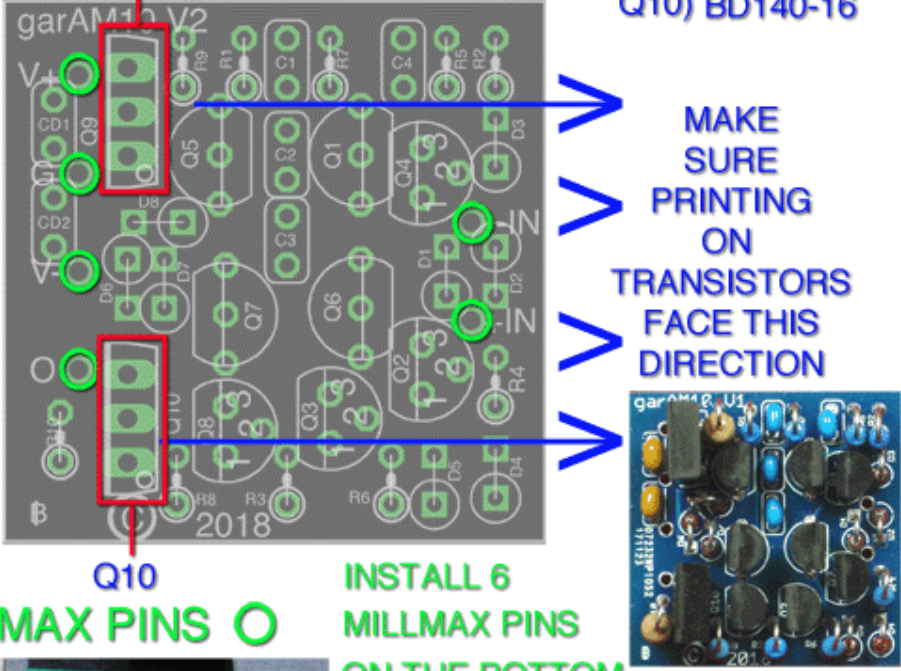
- R9) 4.7R
- R10) 7.5R



OUTPUTS & PINS

INSTALL ORDER
Q9) BD139-16
Q10) BD140-16

MAKE SURE PRINTING ON TRANSISTORS FACE THIS DIRECTION

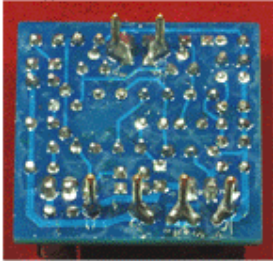
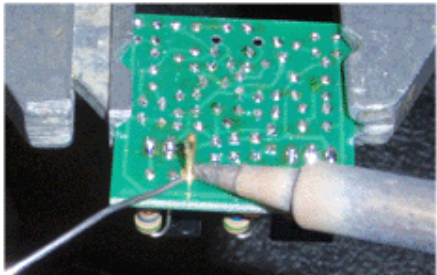


Q9

Q10

MILLMAX PINS ○

INSTALL 6 MILLMAX PINS ON THE BOTTOM OF THE PCB



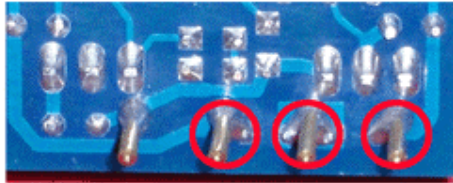
Hold the PCB level in a vice. Solder the pins at the Base of the Pin. Don't let the Solder get on the pin more than an 1/8" above the PCB.

FINAL CHECKS

Check for solder bridges. There should be none EXCEPT the bridges below in the RED circles are fine and even preferred.



NOTE: The input pins are solderbridged to the Diode connections
These bridges are optional but will help anchor the Millmax pins



The Power and Ground Pins are solderbridged to CD1 and CD2
Make sure there is no bridges to the output transistor

Make sure that no component leads on the component side of the PCB are touching each other.

----- INSTALLATION

DO NOT insert by pushing down on the electronic parts. Use the sides of the circuit board and push evenly straight down and not at an angle. When removing, pull straight up evenly also not at an angle.

When installing or removing any DOA from a circuit make sure that **THE POWER IS OFF !**

garAM10bc BOM

Part #	Value	Mouser	INFO
RESISTORS			
R1	10k	271-10k-RC	
R2	10k	271-10k-RC	
R3	3.6k	271-3.6k-RC	
R4	62k	271-62k-RC	
R5	1.5k	271-1.5k-RC	
R6	62k	271-62k-RC	
R7	150R	271-150-RC	
R8	330R	271-330-RC	
R9	4.7R	291-4.7-RC	
R10	7.5R	291-7.5-RC	
CAPS			
C1	100p	81-RCE5C1H101J0A2H3B	
C2	100p	81-RCE5C1H101J0A2H3B	
C3	10p	81-RCE5C1H100J0A2H3B	
C4	220p	81-RCE5C1H221J0A2H3B	
CD1	.1u	594-K104K15X7RF5TL2	
CD2	.1u	594-K104K15X7RF5TL2	
TRANSISTORS			
Q1	BC560C	512-BC560CTA	PNP
Q2	BC550C	512-BC550CBU	NPN Match
Q3	BC550C	512-BC550CBU	NPN
Q4	BC550C	512-BC550CBU	NPN Match
Q5	BC560C	512-BC560CTA	PNP
Q6	BC560C	512-BC560CTA	PNP
Q7	BC560C	512-BC560CTA	PNP
Q8	BC550C	512-BC550CBU	NPN
Q9	BD139-16	512-BD13916STU	NPN
Q10	BD140-16	512-BD14016STU	PNP
DIODES			
D1-8	1N4148	512-1N4148	or 1N914

Disclaimer time....

USE COMMON SENSE WHEN USING TOOLS !

If you burn yourself, burn down your house when soldering or put your eye out clipping wire ends... DON'T COME TO US !!

YOU HAVE BEEN DULY WARNED !!

This assembly manual, including but not limited to all text, photographs and diagrams, is the intellectual property of Barnett Ind. Reproduction or re-publication by any means whatsoever, whether electronic, mechanical or electromechanical, is strictly prohibited under International Copyright laws. The sole purpose for this document is to aid in the Assembly of the garAM10BC Discrete Op-amp offered by Barnett Ind and sold exclusively By Classic Audio Products of Inc. Commercial use is prohibited. Logos are Trade Marks of their respective companies.

