



OPTIMOD-AM DC "THUMP" MODIFICATION

Because Optimod-AM can pass subsonic frequencies and because some transmitters are destabilized by such LF energy, some users have reported difficulty in making full use of the transmitter Tilt Equalizer feature.\*

Under certain conditions (during heavy limiting), a subsonic control voltage leaks into the output of IC 907. The bass boost applied by use of the Tilt Equalizer control amplifies this voltage. In certain transmitters this results in wild excursions of modulator plate current, often causing severe power supply bounce. Reduction of Tilt EQ will alleviate the problem, but the simple modification described below will allow full use of the Tilt EQ by nulling the subsonic control voltage so it does not appear at the transmitter input.

This modification has been installed at the factory starting with  
Serial Number 173513.

If this document is not accompanied by a kit of parts to make the modification, the kit may be requested (at no charge) or the parts may be obtained locally.

INSTRUCTIONS

Installation of the modification and readjustment can be done in about one hour.

The parts needed are:

<u>Qty</u>	<u>Orban P/N</u>	<u>Description</u>	<u>Vendor P/N</u>
1	20515-350-00	Trimpot, 3/8", 50K	Beckman 91A R50K or Bourns 3352T-1-503
1	20001-447-00	Resistor, 1/4W, 5%, 470K	Any carbon resistor mfr'r
2	---	3/4" length, #22 Ga Teflon tubing	
1	---	1/2" square of plastic electrical tape (not supplied in kit)	Scotch #33 or equal

\*All units with Serial Number 165451 and higher include the Tilt EQ feature. Earlier units may have had the retrofit kit (RET-2) installed. If so, it will be evident by a long vertical slot in the hidden subpanel behind which will be six trimmers. Two are marked Tilt EQ, Day/Night. If you wish this feature, order the RET-2 retrofit kit: it involves only the swapping of the #8 Card with a new version.

Even if the Tilt EQ feature is not installed, we recommend you install this modification to bring your unit to current design specifications and to make future installation of the RET-2 kit more convenient.

) The tools and equipment needed are:

- Optimod-AM Instruction Manual (with Supplement Manual)
  - A .062" allen wrench to open the front panel (one was supplied with your unit)
  - A 3/16" flat blade screwdriver
  - A low wattage soldering iron with a small tip for P.C. work
  - Rosin core solder
  - Small diagonal cutters
  - Chain(needle)-nose pliers
  - A short clip-lead with miniature clips
  - A piece of electrical tape (see above parts list)
  - A DC-coupled scope or sensitive DC voltmeter
  - A square-wave generator (if Tilt EQ is to be readjusted afterwards)
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#### PROCEDURE

NOTE: You will need program feed to perform the adjustment.

- 1) Refer to the enclosed schematic and pictorial drawing for a brief glimpse as to the nature of the change. Read through this document entirely before starting.
- 2) If you are not skilled in the repair of printed circuit boards, one technique is described in Section 4, part 5 of the Manual.  
If you do not feel confident about making this modification, the board can be returned to the factory. But, please call us first for authorization.
- 3) By following the access instructions in Manual Section 4, part 4, remove the #9 Card from the card file. Remove the metal shield cover from the underside.
- 4) Referring to the pictorial diagram for position, apply the ½" piece of electrical tape to the board beneath the location of the new trimmer. This tape is to prevent the wiper lead from shorting other components.
- 5) If you have the factory-supplied kit, the parts are pre-assembled for your convenience. Insert the clockwise (CW) lead of the trimmer into the hole in the circuit board going to ground. This hole was previously vacant. Don't solder just yet.
- 6) Using needle-nose pliers, form the CCW lead of the trimmer to make a 'foot' which will rest on the pad to which C929 is connected. Don't solder yet.
- 7) Going back to the CW lead, solder it so that the 'foot' you formed in step 6 is positioned neatly on the pad.
- 8) Now, tack-solder the CCW lead to the pad.
- 9) The wiper lead must be carefully bent around as shown. The 470K resistor should be sleeved with teflon tubing (about 3/4" on both ends). Solder one end to the wiper lead.
- 10) Form the other end into another 'foot' and position it to rest on the pad at the furthest end of R920 (at the junction of R921). Tack-solder it there.

- 11) That's it. Carefully inspect to make sure you've got the right circuit points. Replace the shield cover. Center the trimmer, roughly. Don't replace the card yet.

The heat of soldering may have blistered the protective moisture coating on the board. This will not cause problems even though it doesn't look good.

Due to the low mass of the resistor, the tack-soldering technique, if carefully done, should not result in a future fracture of the solder joint under normal use.

#### ADJUSTMENT

This adjustment nulls the control voltage leaking into the audio in VCA2. There are two methods: one requires a scope or DC voltmeter (this method is more precise), and one doesn't require instruments. If you do not have the #8 Card with the Tilt EQ adjustment, you must use the instrument method.

##### Instrument Method

- 1) With AC power off and in an environment relatively free of strong RF fields, insert the card extender (normally stowed at the leftmost card slot) into the #9 Card slot. Insert #9 Card into it.
- 2) Turn on power and apply normal program audio to the input (you cannot use a tone). Adjust the Optimod-AM so that it is operating normally, with the Smart Clipper meter indicating near the red-green junction.
- 3) Suppress the audio coming from the #7 Card by shorting the junction of R901 and R902 to ground with a small clip lead.
- 4) Connect the DC-coupled scope (or DC voltmeter) to the output of IC909B (which is readily available at the end of R933 nearest the square trimpot).
- 5) Adjust the scope so that the subsonic signal is readily visible.
- 6) Adjust the new trimpot so that the subsonic signal is minimized.

##### Alternate Method

- 1) Perform steps 1) through 3) as above, then . . .
  - 2) Make a note of the rotational position of the DAY TILT EQ trimmer on the #8 Card. Then, turn this trimmer fully clockwise (making sure that the DAY lamp is lit).
  - 3) Make a note of the position of the OUTPUT ATTEN control. Then turn it CW to 99.
  - 4) Set the rotary switch on the front panel to SYSTEM OUTPUT. The subsonic signal should be clearly visible on the VU meter.
  - 5) Adjust the new trimpot for minimum VU-meter indication.
  - 6) Restore the DAY TILT EQ and OUTPUT ATTEN controls to their original position
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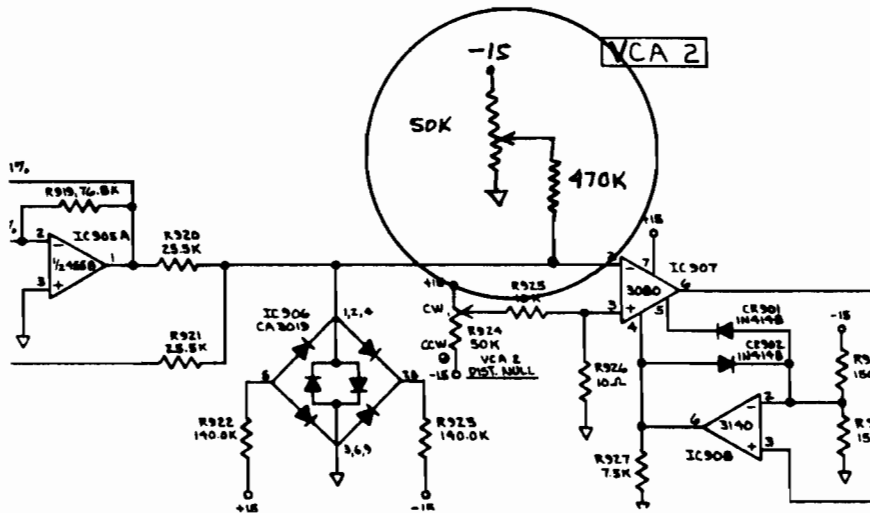
This concludes the adjustment. Power down. Remove the #9 Card and remove and stow the card extender. Replace the #9 Card in its slot. Install the subpanel cover. Close and fasten the front panel.

For future reference, it would be wise at this point to mark your Manual schematic with the change noting the Modification Number (B7), the date and the name of the person installing. File this Bulletin with the Manual.

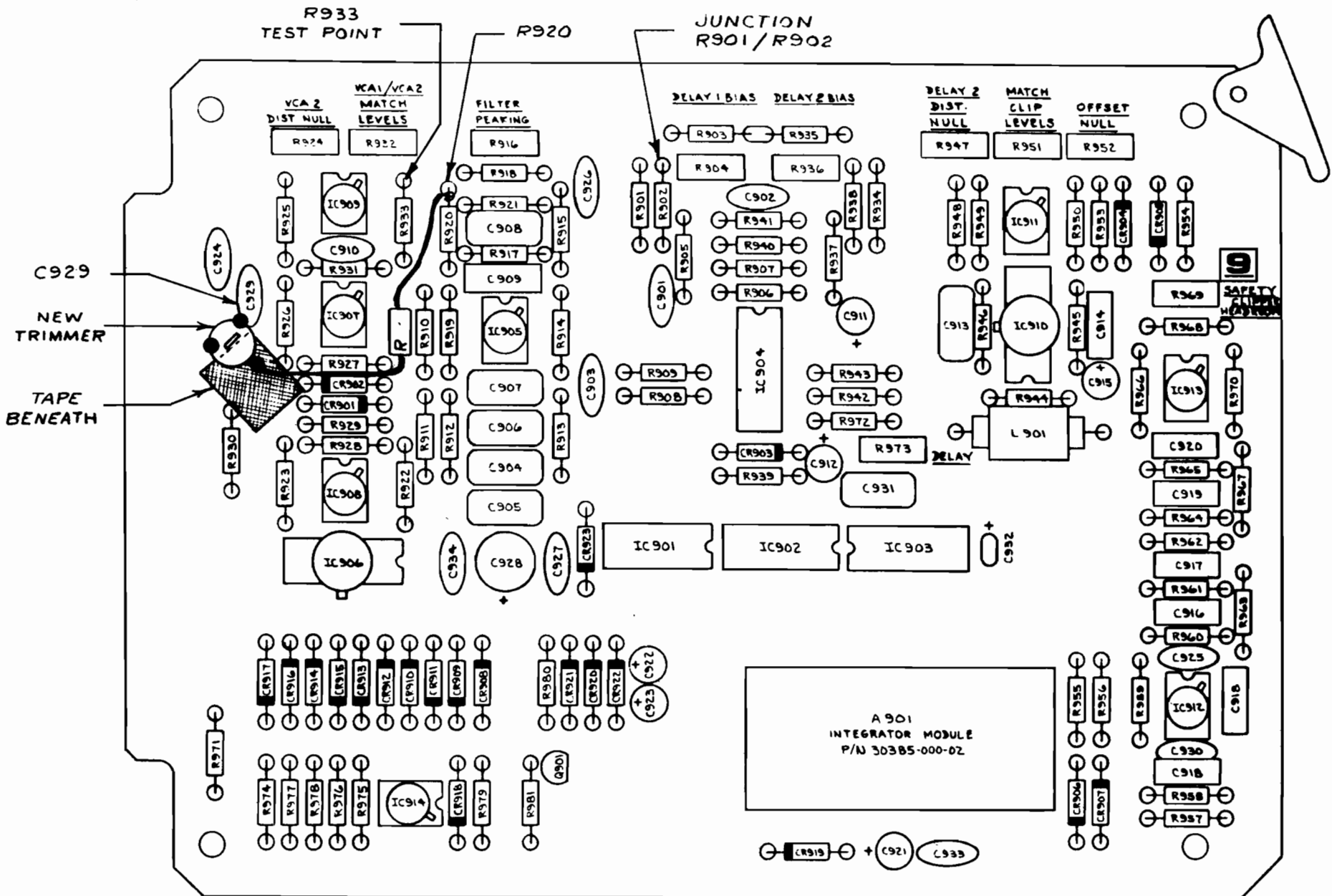
If you have problems or other questions, contact Orban Customer Service at the factory by telephone, letter or telex.

If you had originally observed that you couldn't use the full theoretical Tilt EQ (as determined by the low-frequency square wave test) without causing transmitter misbehavior, you should now repeat the Tilt EQ setup procedure described in your Supplement Manual. You will probably find that you can use more Tilt EQ than before -- possibly even the full theoretical amount. Depending on circumstances, this may result in a perceptible increase in loudness.

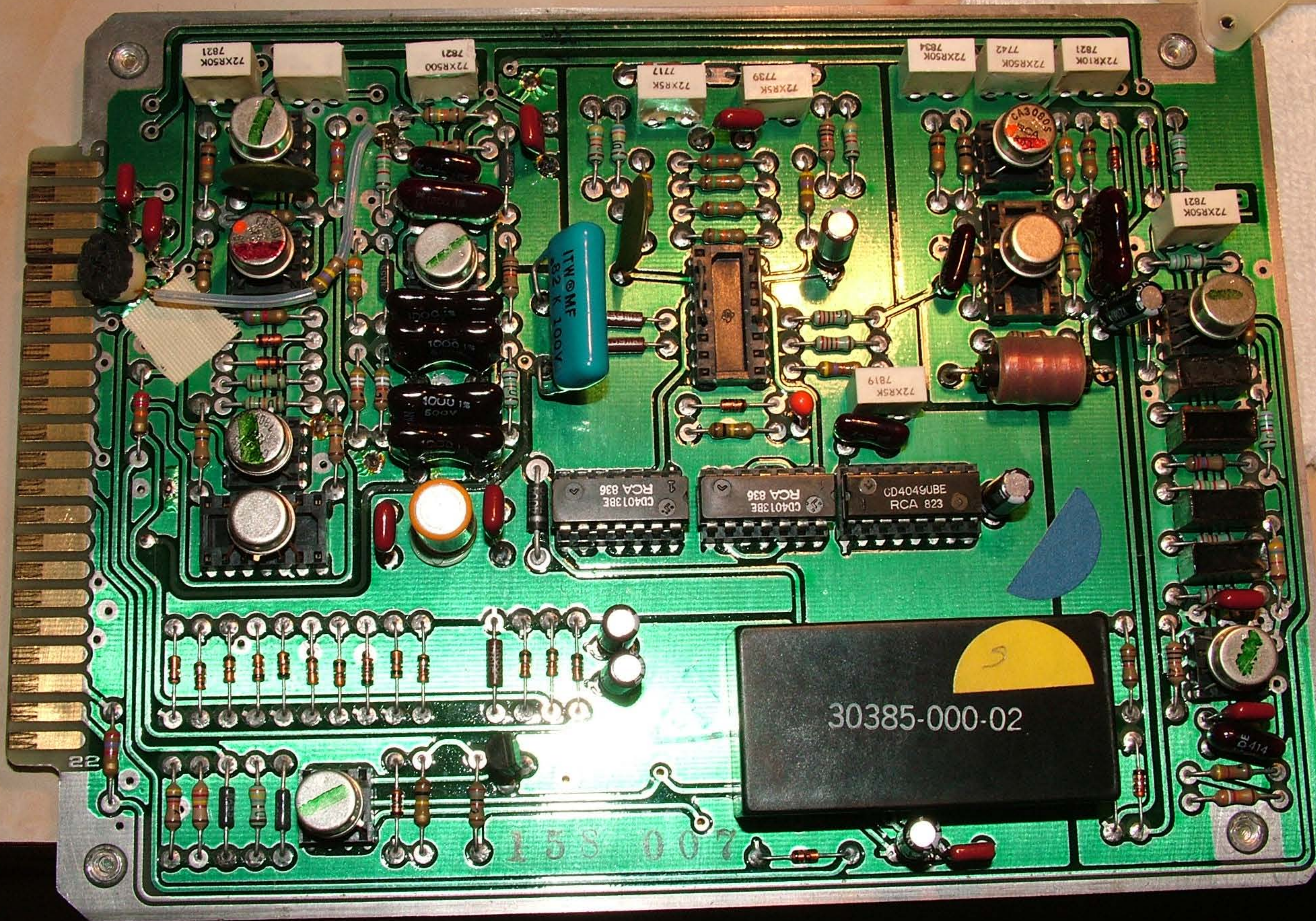
Sector of Schematic of #9 card  
showing new components.  
Dwg #60029-000-03



ORBAN ASSOCIATES INC.  
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