J.D. Custom Electronics

J D CUSTOM FCC CONVERSION SYNTHESISER

Instruction sheet 1 - Uniden 9119 PCB

General Notes

This module is a self contained synthesiser to replace the Phase Locked Loop in Legal Radios employing the LC7137 or TC9119 PLL. A variant of the module is available to suit UPD2812 (Telecom, Grandstand etc,) radios and MC145106 (DNT) radios.

Fitting of this unit requires no special tools or test equipment although final setting up is much easier if you have access to a frequency counter, power meter and dummy load. This is not however essential.

Tools required are as follows:-

Sidecutters
Pliers
Soldering Iron - 15 watts maximum
Trim Tools (available from your dealer)
Modelling or Stanley Knife

Installation and alignment is not a job for the inexperienced amateur. At minimum the ability to solder well and to recognise the various types of electronic components is necessary. If this is not you, a complete fitting service is available through your dealer.

Ensure that your radio is functioning correctly before installation.

Each module is tested before despatch. If once installed it does not operate correctly you may assume that the fault lies in the installation. Go back and check every step again to confirm all is correct. If all else fails a de-bugging service is available through your dealer. This is chargeable at standard labour rates. No responsibility can be accepted by the dealer or ourselves for damage to the radio or module during installation.

NOTE: THERE ARE NO UNNECESARY INSTRUCTIONS GIVEN. ALL STEPS SHOULD BE COMPLETED EXACTLY AS WRITTEN.

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Instruction Sheet 1 - Uniden 9119 PCB's

1. Before starting confirm that you have received the following with these notes.

   (a) General notes
   (b) Module Componemt layout and Module wiring diagram
   (c) Uniden PCB Component Layout
   (d) Uniden PCB Track Layout
   (e) Selection of components.

   Select the following componemts for use: 2x18swg wire, 68R 1 watt, 18K ¼w, 100pF ceramic plate, 56Pf ceramic plate, 2n2 ceramic plate, 11 single wires 9 wire ribbon cable.

2. Check the radio to be modified carefully to ensure that it is working correctly. Any faults found should be corrected at this stage.

3. Remove both covers from the radio and, on mobile radios, disconnect speaker.

4. Locate and remove the 10.24 MHz crystal behind the PLL and to the right of L18. (use PCB layouts to locate all components mentioned.) Retain the crystal for use later.

5. Locate and remove C12 and C59.

6. Cut the following PCB tracks exactly as indicated on the layout drawing.

   (a) Pin 9 of PLL
   (b) Pin 4 of PLL

7. Scrape the solder resist from the track now isolated from pin 4 of the PLL. Tin the track and attach a small link wire from this track to pin 1 of the PLL.

8. Attach the 100Pf capacitor supplied across C62, as shown on the PCB layout. C62 is located immediately to the left of the VCO coil L17.

9. Replace C12, previously removed, with the 56Pf capacitor supplied.

10. Refer to the PCB layout drawing. Connect the 2n2 capacitor supplied from the junction of C12, R9 and TR3 emmiter to -Ve. Some versions of the Uniden PCB have slight track variations in this area but the circuit references are identical.

11. Cut and bend clear the unpainted front end of R52 which is located behind pin 8 of the PLL.

12. Locate R56, immediately behind R52. Scrape the paint on the front lead of this resistor and tin with solder.

13. Cut both ends of the 18K resistor supplied to approximately 6mm. Solder one end of this resistor to the junction of R40 and R41 behind, and to the right of the squelch and S meter presets. The other end is connected later.

14. Connect one end of the 68R resistor supplied to the switched side of the ON/OFF switch. Cut the other end to 6mm and ensure it is not in contact with any wires as it runs warm.

Contd.....

15. If an existing switch is to be used for band switching it should now be disabled. A single pole changeover is all that is required.

This completes preparation of the radio for conversion. The next step is to prepare the module for insertion.

16. Refer to the Module component layout drawing. Insert the crystal, previously removed from the radio, into the holes on the module and solder. Now strip and tin all the 11 single wires supplied. Keep the ends as short as possible. Connect these to the module as shown in the drawing taking extreme care not to overheat or bridge the tracks. Now prepare the ends of the 9 wire ribbon cable and solder to the module as indicated.

17. Separate the black and brown ribbon wires from the remaining 7 wires. Separate the Red ribbon wire from the other six wires. Solder the Red ribbon wire to the Pink single wire and insulate the joint.

The Module is now ready for installation. This is the next stage.

18. The module is secured in the radio using one or two pieces of the copper wire supplied, soldering to the casing of suitable transformers. These are then attached to the module using one or more of the three large copper tracks provided.
IMPORTANT When soldering these wires or positioning the module:

(a) Use the minimum heat possible
(b) Scrape the casing of the transformer to give a clean surface
(c) Pre tin the wire and the transformer casing
(d) Ensure no loose solder blobs are left in the radio
(e) Double check that the module will not foul the speaker
(f) When bending the copper wires the cans to which they are soldered must be supported to prevent damage.

Suggested mounting points are as follows:

Uniace 200/300, Audioline 341, Realistic 2000.

Supports soldered to the right hand side of L17 and left hand side of L5. The module is positioned component side down, ribbon wires to the left and sloping down from front to rear to clear the speaker on mobiles.

Audioline 340, Realistic 2001.

Rear face of L19 and L6. The module is positioned component side down, ribbon wires to the left and sloping down from front to rear to clear the speaker.

Uniace 100

This one is particularly tight. The only possible position, short of losing the speaker is immediately over the channel switch and slpoing from front to rear. The PCB for the two front panel switches will require cutting away or, better still, removal with the switch wires taken directly to the switches. Some care and perseverance is required but it will go in, honest!!!

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Alignment and Test

These instructions relate to all normal adjustments required after module fitting. Two methods will be described.

1. Simple method:- with no instrumentation.
2. Lab method:- with correct instruments.

Set up the following test conditions where applicable.

Radio switch	OFF
Mic/RF Gain	MAXIMUM
Squelch	MINIMUM
HI/LO Power Switch	HI
CB/PA	CB
Speaker	CONNECTED
Microphone	INSERTED

Simple Method

1. Connect Antenna Socket to a power meter and dummy load. If a power meter and load are not available - an SWR meter on Forward and an antenna with an SWR of less than 1.5 can be used to indicate power satisfactorily. In this case the calibrate control on the SWR meter is used to keep the reading obtained at less than full scale.

2. Switch on the radio. Select Legal Band Channel 40. A second CB will be required to confirm Tx and Rx on both bands. Briefly heat the wax on the VCO coil, L17, and insert a trim tool. Key the mic and rotate the VCO core/clockwise until Channel 40 transmit is obtained. Continue rotating the VCO core another 1/8th turn from this point clockwise. Remove the trim tool and confirm that Channel 40 Tx is still present. At this stage the frequency will not be correct but should be within 1.5 KHz of 27.99125.

3. Select FCC Band Channel 1. Confirm, using a second radio, that Channel 1 receive is present albeit slightly off frequency. If not, repeat step 2.

4. Select Legal Band, connect an aerial and pick a weak (S1-S3) signal being received on, or near to Channel 20. Using the correct tool, adjust the Legal frequency trimmer on the conversion module for best receive signal strength. Repeat this step on the FCC Band using the FCC frequency - adjust trimmer. Repeat step 4, 2 or 3 times until no further improvement can be obtained. The frequencies are now set.

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5. Select legal band channel 1. Key the mic and adjust L16, 15, 14 and 13 for maximum power. Repeat this step until no further improvement can be obta obtained. L12 and L10 should not require adjustment and in any event sh should not be adjusted without a dummy load.

6. Now select a weak receive signal on channel 1 of legals. Adjust L1, L2, L3, L4, L5 and L6 in that order for maximum signal reading on the signal meter.
Repeat this step until no further improvement can be obtained.

NOTE: L19 should not be disturbed.

This concludes installation and alignment of the module. Ensure finally that the module position will not cause interference with the Loudspeaker, Bracket Knobs, Cover screws or Main PCB components. If desired the track side of the module may be insulated with a suitable material. Refit the covers and retest on the air.

Lab Method

Refer to simple method.

1. A frequency counter should also be arranged to monitor Tx frequency.

2. As for simple method. Use a frequency counter to check for channel 40.

3. Confirm, with a signal generator, set to 26.9650 , 1.5KHz FM deviation, 100uV o/p that Channel 1 Rx is present.

4. Monitering Tx frequency, adjust for 27.79125 on legal, 27.20500 on FCC band.

5. As for Simple method.

6. Inject 27.60125 at 10uV to Antenna Socket. L19 is adjusted for best S curve symmetry at 1.5KHz deviation.

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Uniden 9119 PCB - Component Side Layout

Reference numbers relate to written instructions.

13. R40/41. Attach 18k.

5. C 12. Remove.

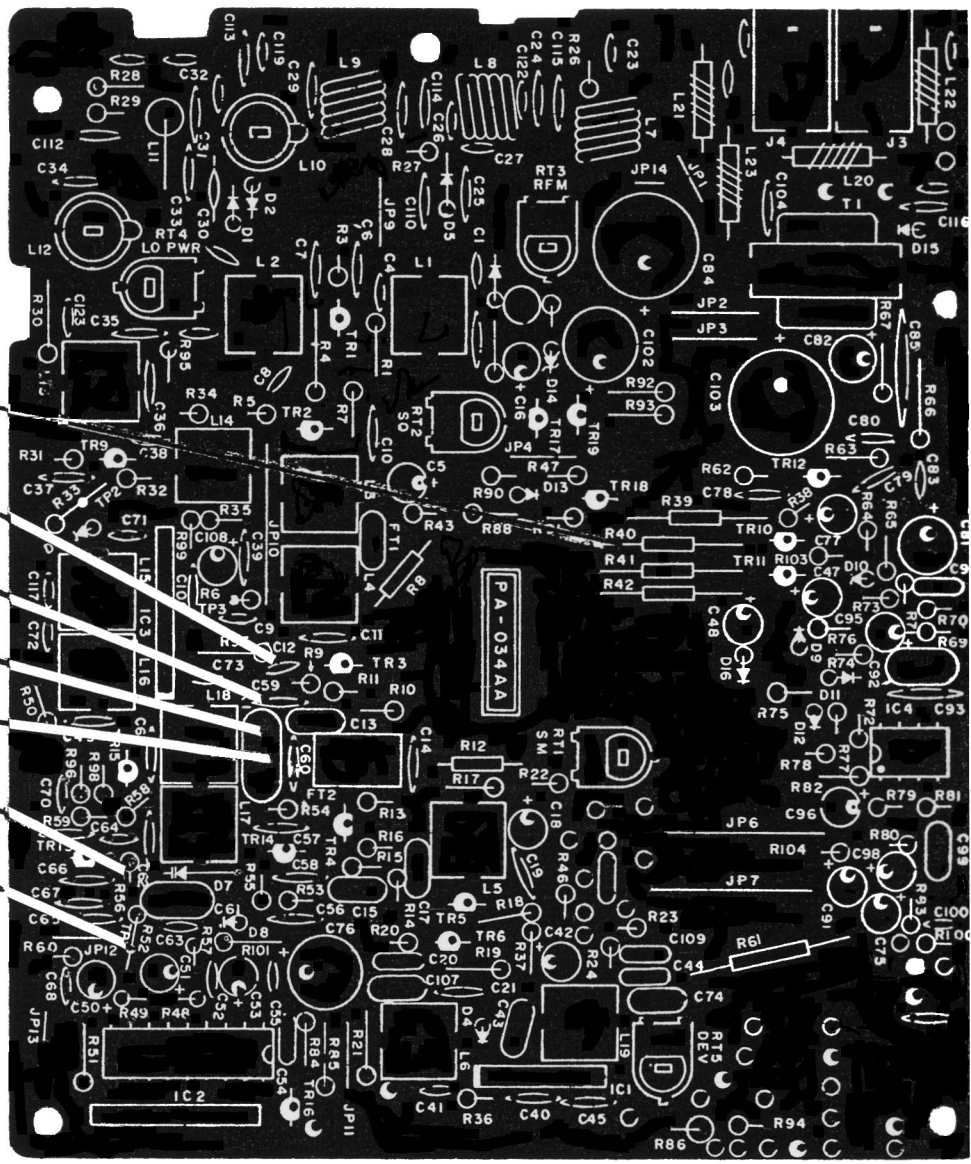
5. C 59. Remove.

19. Attach Yellow wire.

4. 10.24 Crystal, remove.

12./19. Tin, attach Orange.

11. R 52, cut front end.



NOTE: PA 096AA PCB is similar but not identical. All component numbers are however the same.

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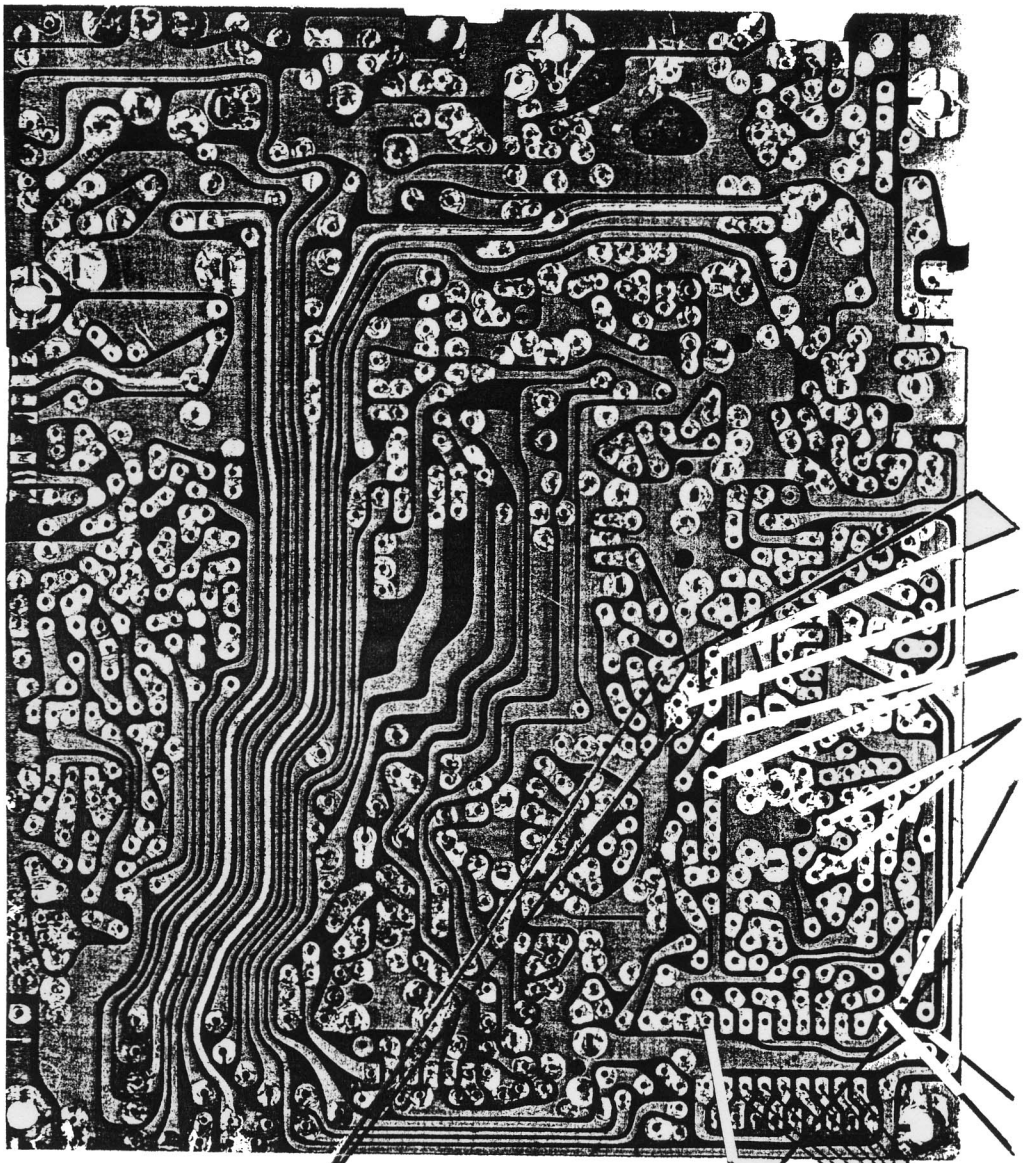
Uniden 9119 PCB - Track Side Layout

Reference numbers relate to written instructions.



5. C 12, change to 56 pf.

5. C 59, remove.

4. 10.24 crystal, remove.

8. C 62, attach 100 pf.

19. Attach White wire here.

6b. Cut Track here.

6a. Cut Track here.

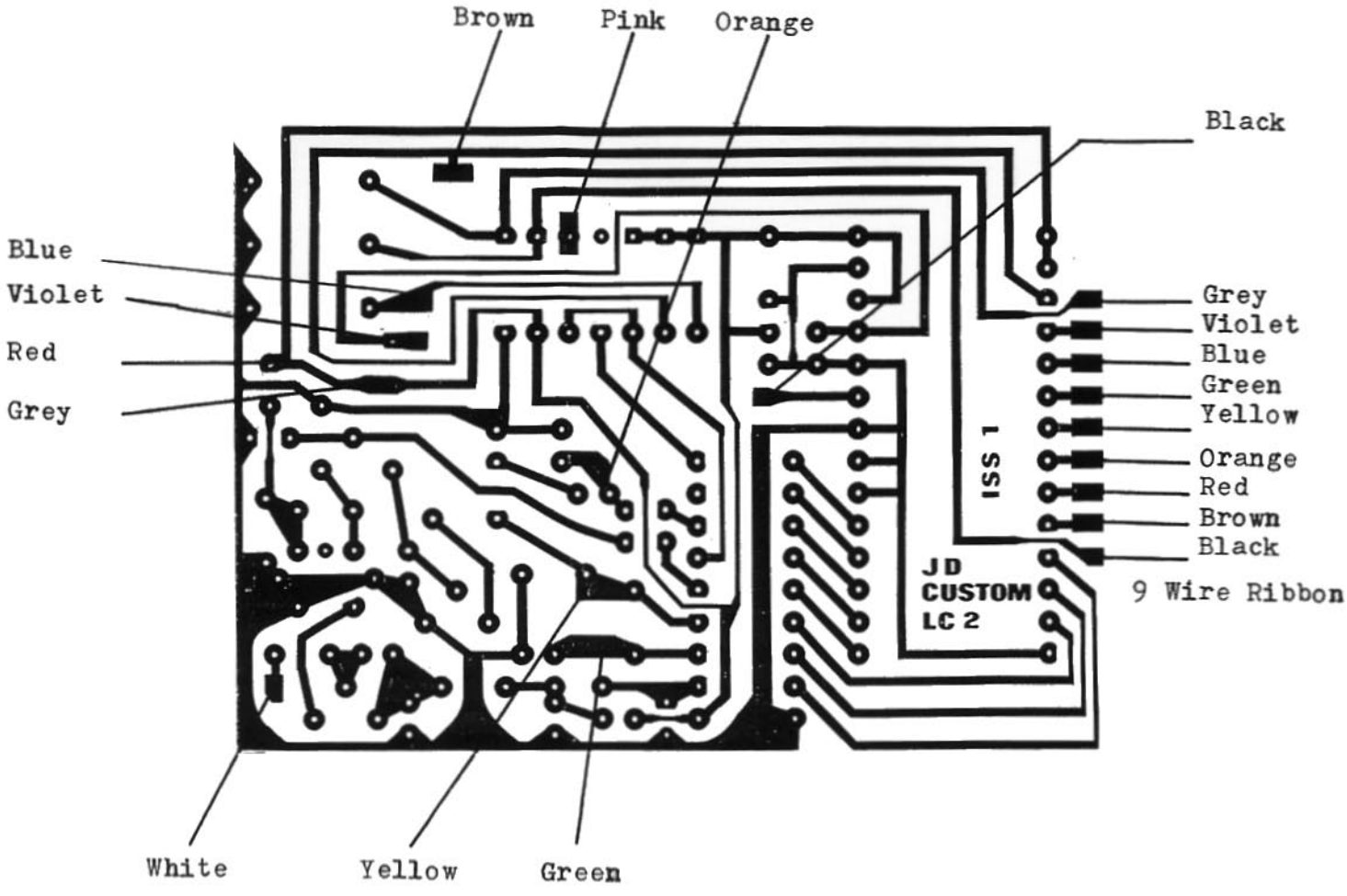
19. Attach Ribbon wires here.

10. Attach 2n2 here.

7. Attach Link here.

UNIDEN 9119/CYBERNET 7137 Radios

Module wiring diagram



Module Component Layout