



**PIEXX Co.**  
**13 Main Street**  
**PO Box 123**  
**Hillsboro, NH 03244**  
**(603) 464-5411**  
**www.piexx.com**

## **Syntor Revival**

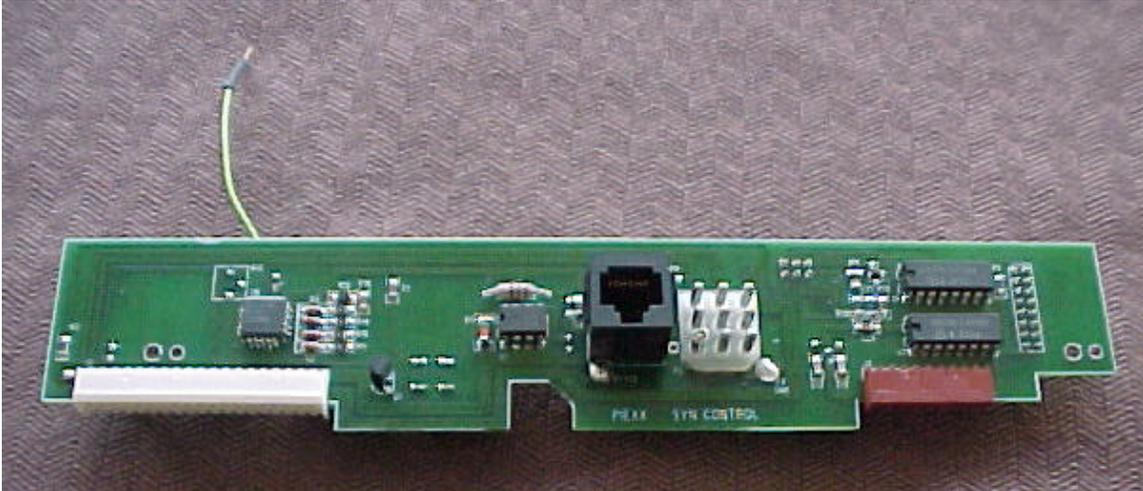
### **Features:**

- 1. Complete operation of the Syntor transceiver via a Personal Computer or optional control head.**
- 2. Easy upgrade, plug compatible replacement for the original Interconnect Board.**
- 3. 40 Memory Channels, as well as, discrete frequency selection in the 2 meter Amateur band.**
- 4. Channel scan / lockout functions.**
- 5. CTCSS Tone Encoder.**
- 6. Interfaces directly to a low cost computer style microphone**
- 7. Uses standard, off-the-shelf connectors for signal and power**
- 8. Radio can be remotely located from operating position, cable lengths of over 100' can be made using low cost networking cable / connectors.**
- 9. Versatile Windows based computer software allows easy control of transceiver via virtual control head.**
- 10. \$129 + \$6 shipping / handling**
- 11. Complete Systems available from \$229.**
- 12. Versatile control head / microphone option allows operation without the computer. \$69**



Syntor Transceiver with PIEXX SynControl Installed

The Motorola Syntor is an early 1980's two-way radio designed and manufactured to Motorola's traditionally high standards. It was intended to provide trouble free service in the public service, military, and commercial fleets, a goal that it easily met. The Syntor was one of the first transceivers to provide frequency synthesized 'programmable' operation. The frequency determining control element was a factory, or service center, programmed PROM chip that was specifically set up for a given customer. This was a great advantage over the more common technique of using custom made crystals, or channel elements, to set the transceivers frequencies. The Syntor design was a winner with Motorola's customers and many, many units were sold. Two decades later, the state of the art in 2-way radio communications has made great progress in the area of control electronics, specifically with the use of microprocessors in their design. Current generations of transceivers employ channel programming via computer / micro-controller software; custom programmed PROM chips are just too inflexible and are no longer used for this purpose. The Syntor, like some other great Motorola designs, has become obsolete. These radios are showing up at Hamfests and online auctions in large quantities at prices for pennies on the dollar. However, this obsolescence is due to the lack of control sophistication not the Syntors excellent RF design. In order to 'revive' this great transceiver we needed to come up with an easy way to replace the aging control design with a more modern, microprocessor based system. To this end, our SynControl System was born.



The PIEXX SynControl System evolved in two steps. Our original goal was to provide a system that would allow the replacement of the old bipolar PROM frequency controlling element with a computer downloadable uP based board. In the original design, a board was mounted inside the radio and connected to the PROM socket via a ribbon cable. The appropriate firmware was generated for the uP board to allow the selection of channel frequencies, and PL tones via a remote computer. Although this first generation design worked well, it became apparent that with a few more features we could really solve a big problem with the Syntor radios showing up in the surplus market, namely that there were a lot of radios showing up but hardly any control heads / cable sets. Our second generation SynControl design is a direct, plug in replacement for the original Interconnect Board. The new design takes over the functions of:

1. Frequency Control
2. Volume Control
3. Squelch Control
4. Push-to-Talk
5. Transmit Time-out Timer
6. CTCSS PL Encoder Tone Generation
7. Channel Scanning Facilities
8. Signal Level Meter
9. Radio Tuning Facilities
10. Direct interface with low cost PC style microphone

Because the SynControl Board replaces the original Interconnect Board, the custom Motorola power / signal connector is no longer used. The function of the old connector is replaced by a standard Molex style 9 pin connector for power and speaker connection, and a 8 pin modular jack that carries the signals for RS-232 communications, PTT, microphone and speaker audio. The SynControl Board is a direct plug in replacement for the original equipment, installation is very easy and involves very few hard wired interconnections. Since the transceiver can now be completely controlled through the 8 conductor RJ-45 cabling by way of an external PC, it is possible to remotely locate the Syntor from the control operator. Instead of running a long antenna cable to the radio, you can run a short antenna feed line to the radio and run a longer, inexpensive, control

cable to the operating position. The Win9x software package, provided with the SynControl System, allows all of the flexibility of a modern transceiver with the ease of use of an on-screen virtual control panel, The operator can set radio frequencies, offsets, PL tones, memory location (with names), scan channels, view the signal level, set volume and squelch all from a remote PC.

The standard SynControl package includes:

1. SynControl board.
2. Power / Speaker cable
3. RS-232 / Microphone Breakout board
4. Interconnecting cables
5. Computer style microphone
6. Win9x Software

An option LCD control / microphone board, available shortly, will allow the radio to be operated without an external computer once the channels have been set up.

## **Hardware Installation:**

### **NOTE:**

The SynControl Upgrade System is intended to be installed in Motorola Syntor Radios **Not Syntor X** Radios. We currently support VHF high band radios and the conversion is for the use of these radios on the 2 meter amateur radio bands. At the time of this writing, radios with VCOs in ranges 2 (HDL4036A), 3 (HDL4037A) and 4 (HDL4038A with jumper modification) are supported. I have never had a range 1 (HDL4035A) radio to try our conversion on, if we find one we will make the required firmware changes to support the range 1 VCO radios. Needless to say, range 1 VCO radios seem to be quite rare.

### **Required Tools:**

1. Phillips Screwdriver
2. Flat Blade Screw Driver
3. 7/32 Nut Driver
4. 9/32 Nut Driver
5. Soldering Iron / Solder

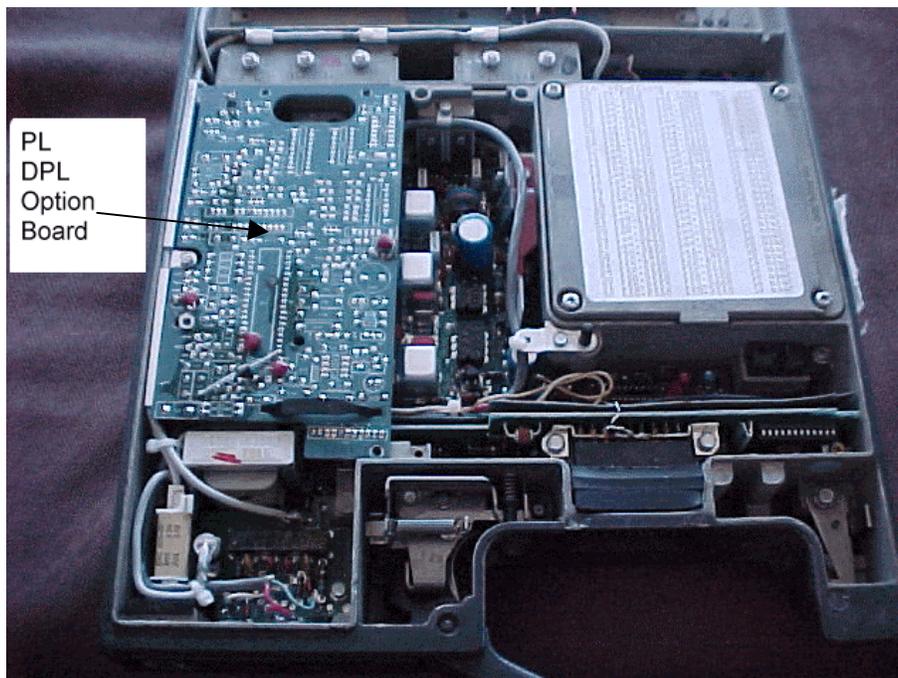
If available, a Signal generator and deviation meter will help with the installation

Please read and understand all of the installation instructions before starting the installation.

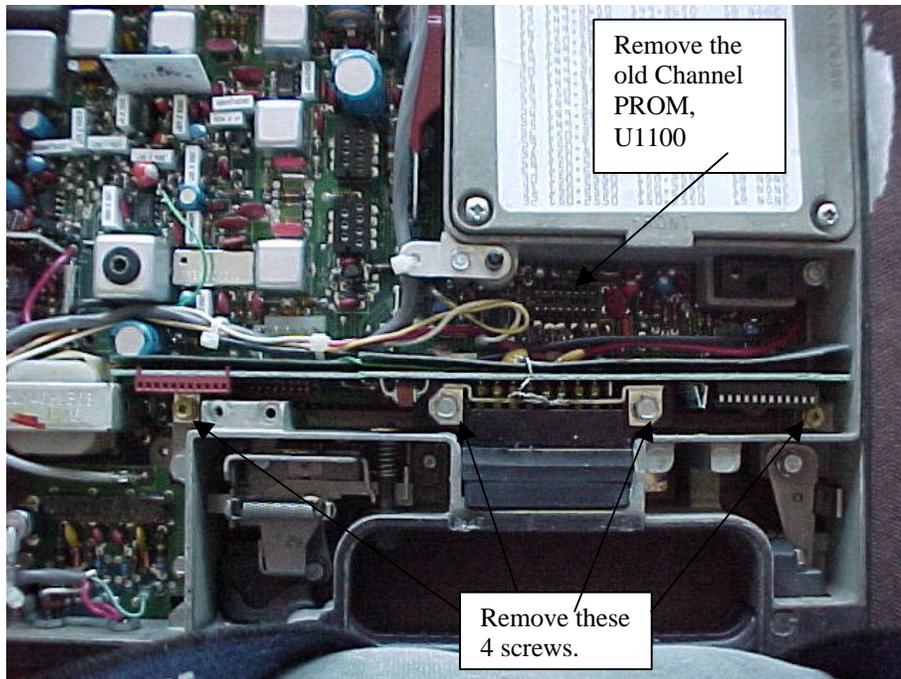
1. It is always a good idea to test your radio for proper operation before proceeding with the installation. In most cases, this will be impractical due to a lack of cables / control

head, the good news is that after modifying many radios I have yet to find a defective Syntor!.

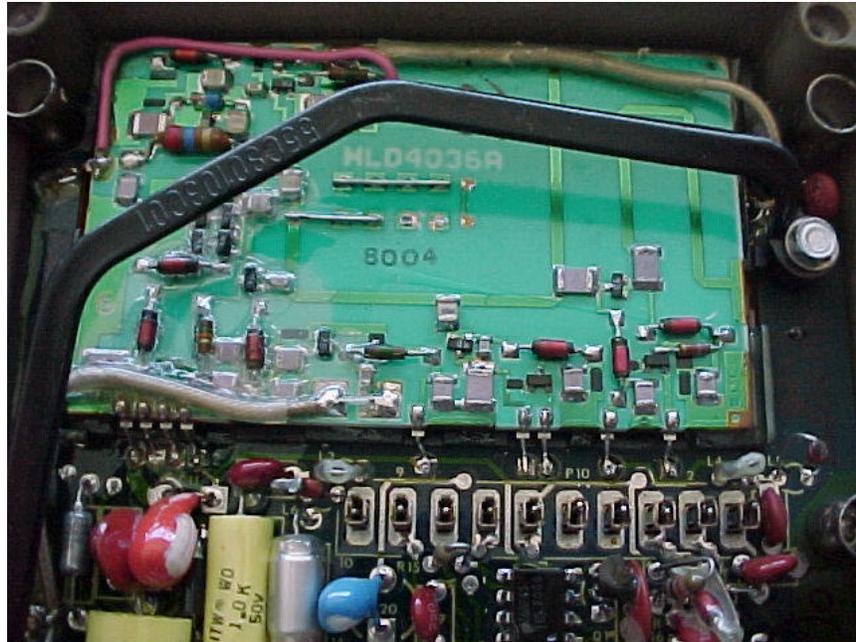
2. Open the top cover of the radio. This is done by unlocking the handle, and pulling it to the open position, depress the small button to the upper left of the main connector and lift the lid of the radio up.
3. If there are any PL / DPL option boards in your radio, this is the ~3" X 6" board mounted on the left side of the radio just behind the audio output transformer solder side up, remove it at this time. This board will not be reused. The board is held in by four, 7/32 hex head screws. It is a great idea to have a 7/32 nut driver for this task. Note: There is another similar screw, holding the coax channel , in a cut-out on the left hand side of this board. This screw should be left in place.



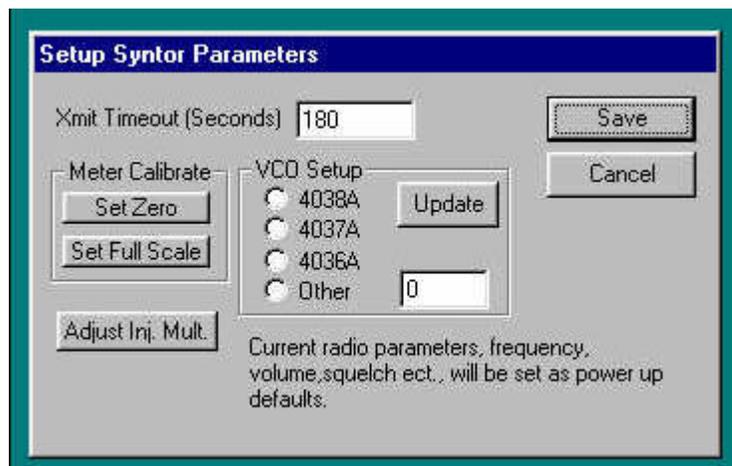
4. Remove the four screws holding the original Interconnect Board in place. Two of the screws hold the board in via right angle brackets and are located in the front left and right of the Interconnect Board. These screws have 7/32 heads. There are also two, 9/32 hex head screws that are just to the left and right of the main connector.



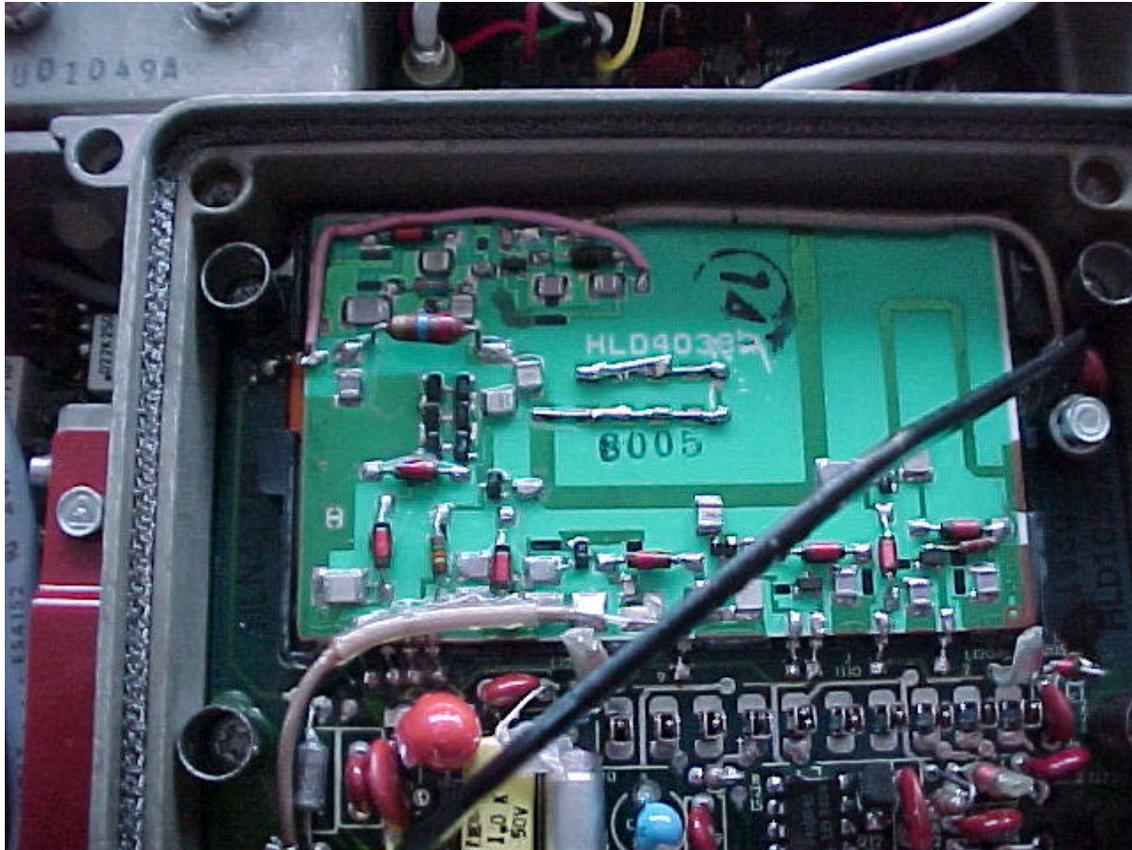
5. There may be 2 ceramic disk capacitors soldered from each of the high current power wires, plugged into the back of the Interconnect Board, to the metal bracket on the top back of the main interface connector. These capacitors should be removed.
6. Pull the old Interconnect Board straight up until the board unplugs from the two headers mounted to the main board. This task may require some force because the rubber grommet around the main interface connector really tries to hold this connector in place. I use a flat blade screw driver to pry up on the 2 large power pins from the front of the radio. Don't worry to much about the Interconnect Board, it will be discarded.
7. Slide the 2 high current power connector cables, on the rear of the Interconnect Board, off of their posts.
8. The Interconnect board should now be held in place by a single green wire that is soldered to the backside of the main interface connector. Unsolder this wire at the back of the Interface board, it will be reconnected later to the new SynControl Board.
9. Remove and discard the old fish paper insulator.
10. Remove the old channel selection PROM chip, U1100, from its socket.
11. Just in front of U1100's socket, and just behind header connector P1100, are 7 ¼ watt resistors. Gently bend the 4 rightmost resistors to the right and the 3 left most to the left. Also bend the right hand most pin of header P1100 over to the right. This will allow for extra vertical clearance between the tops of these resistors and the back of the new SynControl Board.



12. Remove the 4 screws that secure the cover of the VCO. Note and record the number printed on the VCO circuit board it will be HDL4036, HDL4037 or HDL4038. Based on the VCO model number, you will set up the VCO type information in the Setup Dialog when you install the software. The software will be installed later in this procedure.



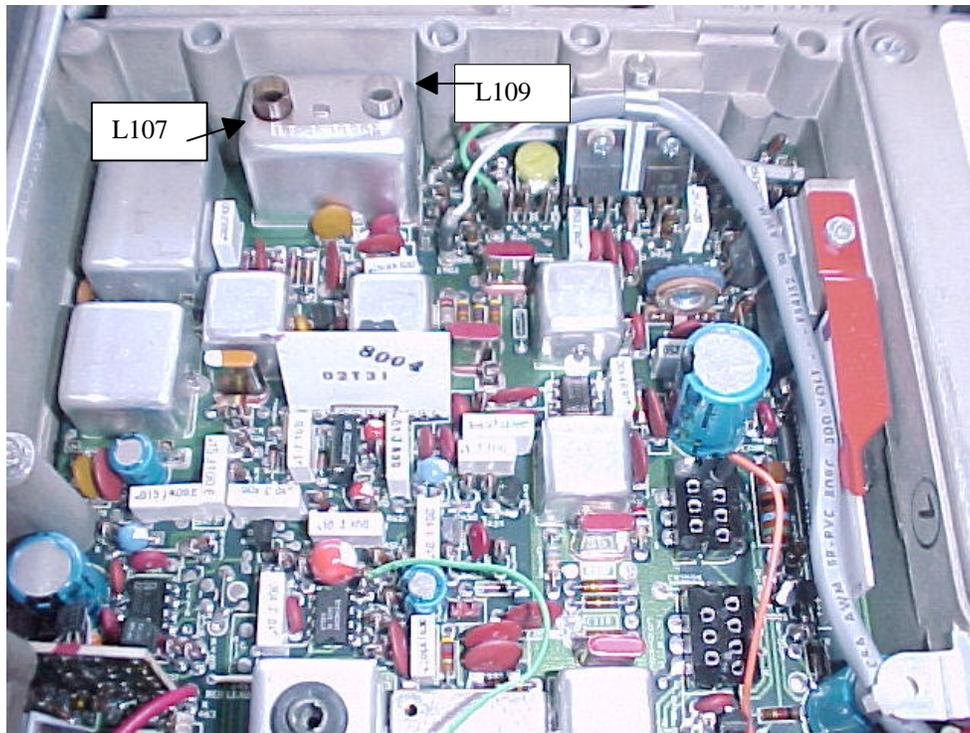
13. **ONLY** if your VFO is the highest frequency model, HDL4038, you will need to lower the frequency of the VFO to work in the 2 meter ham band in the transmit mode. This is accomplished by connecting all of the capacitor pads with a piece of bus wire as shown in the following photo. It takes quite a bit of heat to make this connection, an old style soldering gun is best suited for this task.



**HDL4038 VCO jumpered for use in the 2 meter Amateur band.**

14. Find the 16 pin DIP to 16 pin header cable that is supplied with the SynControl System. Plug the 16 pin dip side of this cable into the U1100 socket that you just removed the PROM from. This cable should be oriented so that the red stripe on the ribbon cable is plugged into the left (pin 1) side of the U1100 socket.
15. Locate J10 on the new SynControl Board. This plated through hole is in the back lower left side of the board. Solder the green wire, removed in step 8, to this pad. You will need to pull this green wire free of the second harness wire tie to allow enough lead length.
16. Plug the free end of the 16 pin ribbon cable, installed in step 12, into the 16 pin header socket on the rear right of the SynControl Board. The red stripe of the ribbon should be located to the top of this connector.
17. Install the high current red and black power connectors onto their post on the rear of the new SynControl Board.
18. Orient the pins on the main Syntor Board, so they align with the connectors on the bottom edge of the new SynControl Board and plug the two assemblies into each other. Note: There are 4 pins on the right hand most main board connector that do not plug into the shorter connector on the SynControl Board.
19. Remove the two screws(7/32 hex head) from the right angle brackets of the original Interconnect Board. Use these two screws to secure the right angle brackets of the SynControl Board to the system frame.

20. Locate the free end of the wire that is soldered into J11 on the SynControl Board. J11 is located just above the JP2 and JP# jumper pads. Plug this wire into the back right socket on the Syntor Main Board receiver metering connector. The receive metering connector is the back most of the two metering connectors mounted centrally to the main board. This is the signal level detector connector. During the injection filter calibration, this lead will be moved to pin 3 of the same socket, the injection filter metering point. Pin 3 is the 3<sup>rd</sup> socket down on the right side of the receiver metering connector.

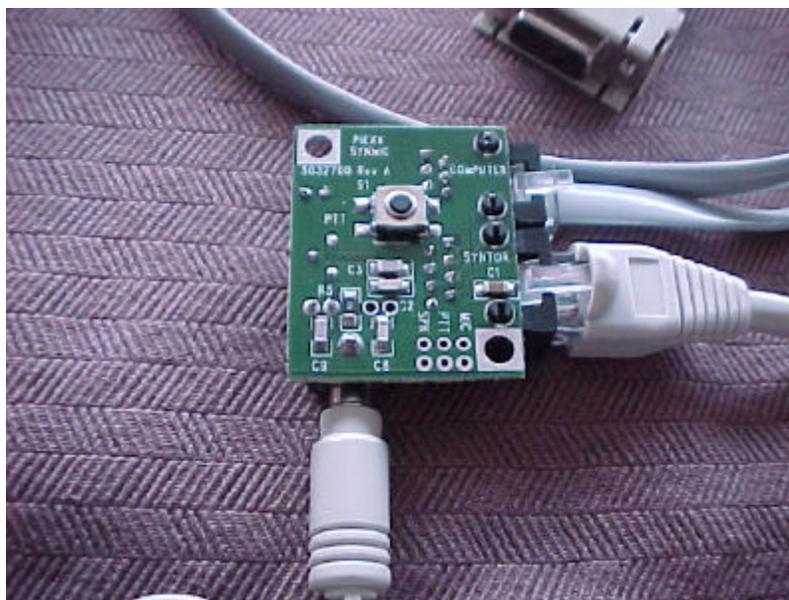


**Meter lead (orange wire) installed in Limiter / Detector pin of the receiver metering connector**

21. Install the provided 9 pin Molex style power cable into its mating socket from the front of the radio. Note: The connector is oriented with the 'points' facing down. This place the speaker leads at the top left, the fused +12VDC at the top right and the high current +12 VDC at the bottom. Connect the Red high current pigtail to a suitable source of +12 and the black high current pigtail lead to the power supplies return. The current draw for a 40 watt Syntor can be as high as 12 Amps, for a 110 watt radio the manual specifies the current draw as 27 Amps, but this seems a bit generous. Keep the power leads short and use a heavy gauge wire, especially for the 110 watt radios, to keep IR losses at a minimum. **Be certain that you observe the correct polarities!! Red connects to the positive terminal, black to the negative or return lead!!!**



22. Connect the 8 pin RJ-45 cable to its mating receptacle from the front of the transceiver. The other end of this RJ-45 cable will connect to the SYNMIC breakout board in the modular jack marked 'SYNTOR'



23. Connect the 6 pin modular cable to the SYNMIC board at the connector marked COMPUTER. The other end of this cable terminates in a modular to DB9 adapter and this adapter should be connected to the serial port connector of your computer. Be sure to note the comm port number of the port you select, you will need this information when you install the software. If your computer only has a 25 pin serial

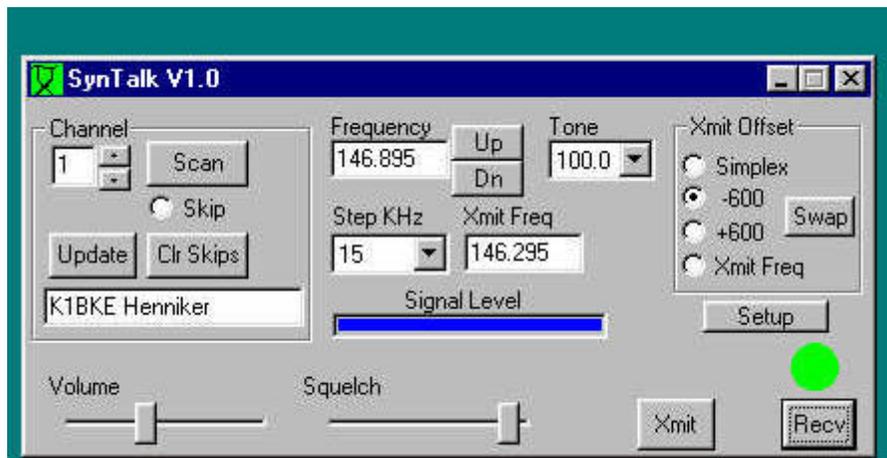
- port connector, (serial ports have male pins!! **Do not** use you parallel port connector that has female pins) you will need to obtain a 25 pin to 9 pin serial port adapter.
24. Plug the microphone into the 3.5mm stereo jack on the SYNMIC Board. The SYNMIC Board has the appropriate impedance matching circuitry to allow the use of the computer mic.

**Software Installation** The SynControl Software is intended for operation under the Windows 95 or Windows 98 operating system. Install the software by placing the provided CD in your CDRom drive, press the Start Icon (usually in the lower left of your desktop), proceed up to and press the Run selection of the pop-up menu. In the open dialog box type:

**D:Setup**

Where **D** is the drive designator for your CDRom drive After entering the command line press enter, and the system software will be loaded.

25. With power applied to the Syntor, start the SynTalk program executing by pressing the Start Icon and following the pop up menus to Programs, SynTalkPS and finally Shortcut to SynTalk. Click on Shortcut to SynTalk. If all is connected properly the SynTalk Dialog box will appear on you screen.



## If the SynTalk Dialog Box doesn't appear, read and perform the following tests...

If instead of the SynTalk dialog box, you get the error "Communications Error with the Syntor!!! Program Exiting.", then your computer is unable to establish serial communications with the SynControl System. Be certain that you are properly connected to the serial port specified when you installed the software, and that all cables are plugged in and that the transceiver has power applied. If you think you specified the wrong com

port, you can manually select a specific port by editing the SynTalk.ini file located in the Windows Directory. If you double click the SynTalk.ini file, in the following path:

- My Computer
- C:
- Program Files
- Piexx
- SynTalkPS
- Program
- SynTalk.ini

You will see the set-up parameters for the program. Under the category of [Communications] there is a line that reads Comm Port (1-8) =1, where the digit following the '=' sign is the comport that the radio must be connected to. You can manually change this digit if necessary. If this digit is 0 then Comm ports 1-8 will be scanned to see if the Syntor is on one of them.

If the radio fails to communicate with the program, after you are sure that you have selected the correct com port, you will need to perform a loop-back check on the specified com port. Start Hyperterminal:

- Start
- Programs
- Accessories
- Hyperterminal (click it)

Double click the Hypetrm.exe icon. This will open the New Connection Description dialog box. Type Syntor in the name field and press OK. Next, the Phone Number dialog box will appear, press the arrow to the right of the Connect using field. You may now select the appropriate Direct to Com for the port you are intending to use. Next press OK, the Comx Properties dialog box will appear. Select :

- 19200 Bits per second
- 8 Data bits
- Parity None
- 1 Stop Bit
- Flow Control None (this is very important!!)

With these selections made, press the OK button. You will see a blank window with the terminal cursor in the upper left corner of the screen. If you press the '?' key, with the SynControl system functioning properly, a string similar to:

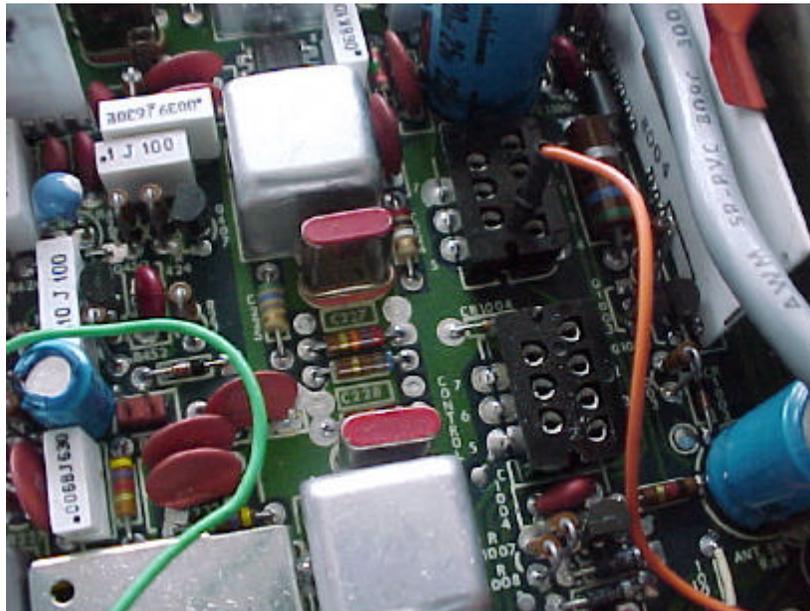
6520 6520 1 8 36 140 1 0 38 .

will appear; this is the Syntor reporting its various operating conditions. If the string does not appear, and it probably wont or the SynTalk dialog would have come up in the first place, you will need to check the com port by doing a loop-back test. In this test you will be connecting the computers RS-232 xmit and receive lines together to make sure that the port can transmit data to and receive data from itself. Install a jumper connection, a metallic paper clip or jumper wire, between pins 2 and 3 on the DB serial connector on the back of your computer (you obviously will need to remove the cable to the SynControl system before you do this). Now, with the jumper installed, any character you type on your computer should show up in the HyperTerminal screen. If this doesn't work, you will either need to have the serial port serviced or check the serial ports hardware

configuration. If the loop-back test does not work on the port that you specified as the SynTalk com port, the SynTalk program will not work!!! **Once you have completed tests with HyperTerminal, you must exit the HyperTerminal program before the SynTalk Program will work. Windows will not allow two programs to simultaneously access the same com port.**

## Radio Alignment

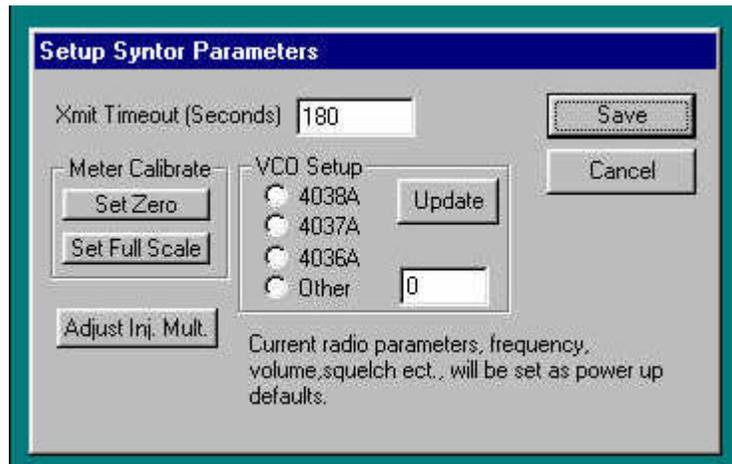
26. The first thing you will need to do is align the receiver injection filter. Refer to the figure shown at step 20. Move the meter wire from the signal level position, pin 1 as shown in the figure, to pin 3 of the same connector. Pin 3 is the 3<sup>rd</sup> socket down on the right hand side of the same connector. Pin 3 of the metering connector is the injection filter test point.



**Metering lead shown in the injection metering test point.**

27. At an earlier step in the installation you observed the VCO type of your transceiver. At this time you will setup the transceiver for the proper VCO type. Locate and press the Setup button, located below the Offset Group Box on the right side of the SynTalk Dialog box. This will show the Setup Syntor Parameters Dialog Box. Select the

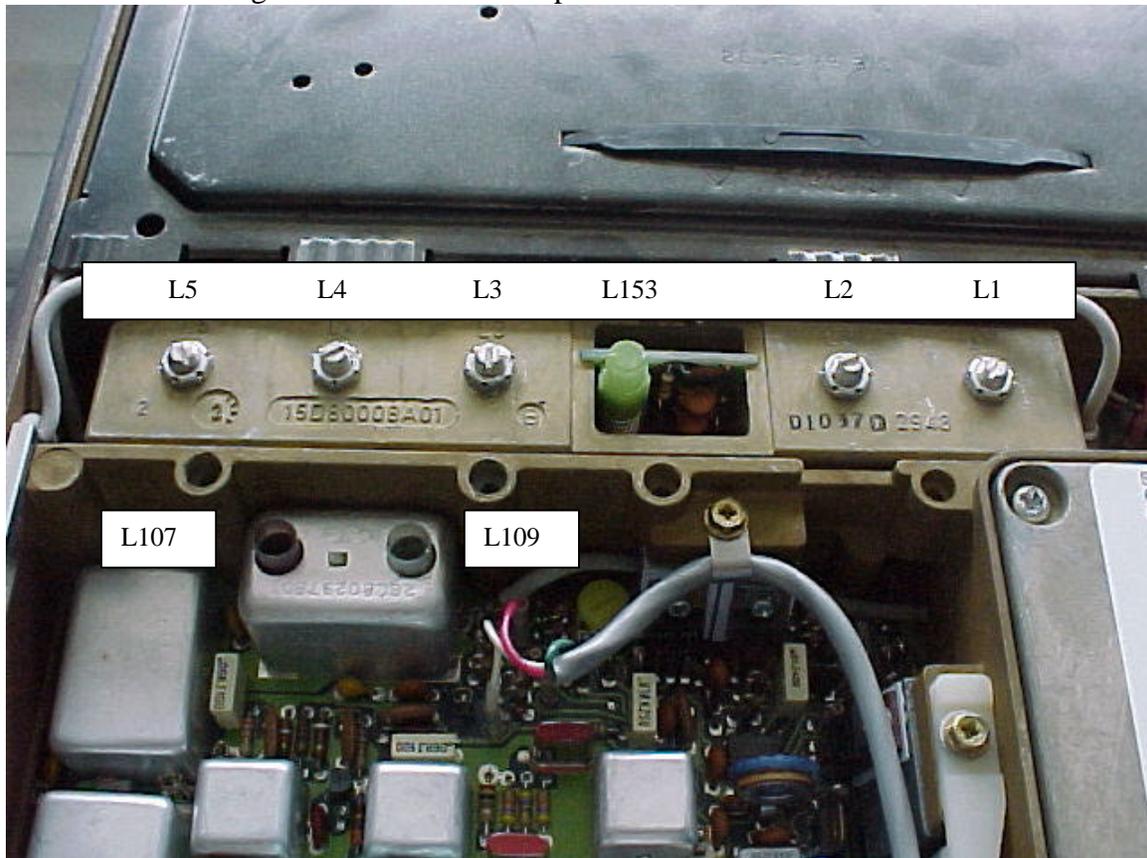
appropriate VCO type in the VCO Setup field and press the Update button. The information about your VCO is loaded into the transceivers non-volatile memory at the time you press the update button. The radio button marked other, and its data field located to the right of this button, is used to allow selection of non ham or special VCO types. Contact PIEXX for information on how to incorporate special VCO arrangements or non ham frequency allocations.



28. The SynTalk Program has provisions for aligning the injection filter. Locate and press the Setup button, located below the Offset Group Box on the right side of the SynTalk Dialog box. This will show the Setup Syntor Parameters Dialog Box. Press the "Adjust Inj. Mult." Button in this dialog. This operation will scale the Signal Level Meter, in the SynTalk Dialog, to the appropriate values to allow the alignment of the injection filter.
29. First adjust L109 (the right slug in the filter assembly) for a dip (most left hand reading) on the Signal Level Indicator. This dip is fairly dramatic, and on the radios I have aligned, appears with the slug near the bottom of its travel.
30. Adjust L107 (the left slug in the filter assembly) for a peak on the Signal Level Meter. This peak is not as obvious as the dip you saw in the previous step, but is still quite noticeable. Again, on the radios I have aligned, this peak appears with the slug near the bottom of its travel.
31. Press the Cancel button in the Setup Syntor Parameters Dialog Box. Move the metering lead back to pin 1 (top right pin) of the receiver metering connector.
32. RF alignment is performed by adjusting L1, L2, L153 (if you have the optional preamp), L4 and L5 for best sensitivity. The best way to do this is with a signal generator, a luxury item most folks will not have. I have successfully used an HT as the signal source to do the preliminary alignment, and then used a local repeater to fine tune the settings. This technique requires a bit more time to accomplish, but satisfactory results can be obtained with no other test gear. If you use the HT method, be sure to use unused frequencies and use a dummy load on the HT so as not to cause interference.

I have found that on most radios, the slugs on L1-L5 tend to end up in a position with 2 to 3 threads exposed above their jam nuts when the alignment is complete. This indicates that this would be a good position to start from when you attempt the alignment. Do not go wild screwing the adjusting screws all the way in or out during the alignment process. The front end of the Syntor was intended to have a maximum channel spacing of 2 MHz, although in practice you can get acceptable results with a bit wider spacing. I usually try to get my receiver aligned so that the best sensitivity is around the 147 MHz mark; sensitivity will fall off at the low end of 145 MHz but is still adequate.

33. Adjust L1-L5 (L153 also, if you have the optional preamp) for peak sensitivity at the high end of the frequency of desired operation. You can use the Signal Level Meter for this peaking operation, although the meter is not calibrated at this time. Remember to reduce the signal level from your generator, or move the HT farther away, as you improve the sensitivity. It is easier to make these adjustments if you can hear some background noise from the speaker.



34. Adjust L1-L5 (L153 also, if you have the optional preamp), in that order, **once** for peak sensitivity at the low end of the frequency of desired operation.
35. Retune L1, L2, L107 and L109 **once** for best quieting at the highest frequency of intended operation. Then adjust L3-L5 **once** for peak sensitivity at the low end of the frequency of desired operation.
36. Select the frequency, offset, tone, volume and squelch setting that you would like to use as the desired power on default state of the transceiver. Press the Setup button to activate the Setup Syntor Parameters Dialog Box. Remove all receive signal source

from the transceiver, disconnecting the antenna is a good way to do this. Press the Set Zero button in the Meter Calibrate group. Next apply a strong signal, full quieting +, to the transceiver. Press the Set Full Scale button in the Meter Calibrate group. Exit the Setup Syntor Parameters Dialog Box by pressing the Save button. These steps set the power up conditions of the transceiver as well as calibrating the signal level meter for full scale and zero position. The transmit time-out feature is also set to the value in the Xmit Timeout field. ***A value of zero, in the Xmit Timeout field, disables the transmit time-out timer and is strongly discouraged!!***

37. The only adjustments required for the transmitter is the setting of the microphone gain and PL tone levels. The mic gain control is located on the SYNMIC adapter board. Typically a setting of mid scale is adequate. This control does not specifically set the deviation, pot R518, in the front right corner of the Syntor Main Board, performs this task. If the mic gain control is too high, the ambient noise level that the microphone picks up will be excessive, if the gain is too low you will have to scream into the microphone to obtain full deviation. Pot R15, on the back right top of the SynControl Board sets the PL deviation level. PL deviation of .75 kHz is optimal. Turn on the PL by selecting a PL tone in the SynTalk Dialog and adjust pot R15 for a suitable deviation level with a Deviation Meter. If you don't have access to a Deviation Meter, set the PL tone for the highest frequency, 218.1 Hz, and listen to the transmitted tone in a 2 meter receiver. Set pot R15 so you can just hear the PL tone in the monitor receiver. If the Syntor fails to key repeaters with PL activated, you may have to increase the PL tone level slightly with R15
38. Replace all covers on the transceiver. Installation is complete.

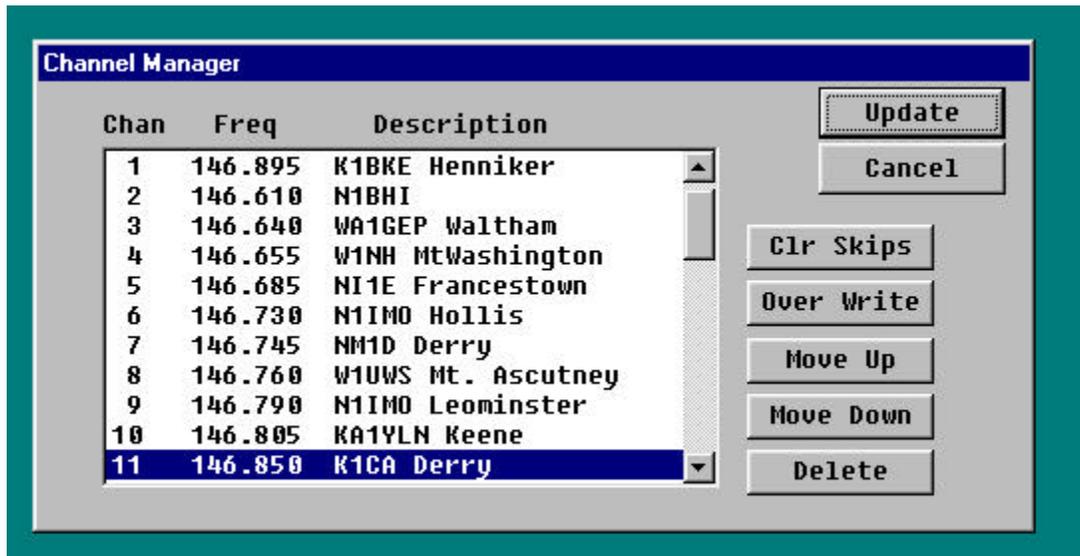
## Software operation

The operation of the SynTalk program is quite intuitive and we encourage you to experiment with its features. There are several points that need amplification as follows:

### Setting Memory Channel Data:

To set a memory channel parameter, use the main SynTalk Dialog Box to input the desired settings, frequency, PL tone, channel skip, desired offset and, in the box beneath the Update and Clr Skips buttons, any text comment you would like to attach to this memory. After setting these parameters press the Update button, this will bring up the Channel Manager Dialog. To change a specific channel to reflect those parameters previously set in the main SynTalk Dialog, select the channel by clicking on its line in the channel descriptor list box and then press the Over Write button. The memory channel will be updated with the parameters from the main SynTalk Dialog. You can move a specified memory locations parameters up or down to adjacent memory locations by highlighting the desired memories location and then pressing either the Move Up or Move Down buttons. Pressing the Delete button will clear the highlighted memory location to show a frequency of 146.52 and remove its text identifier label. Pressing the Clr Skips button will remove all channel skip information from the list of memory channels. If a memory channel has a skip flag marked, as indicated by the letter 'S' to the right of its channel number, this memory location will be skipped during scan operations.

There are two ways to exit the Channel Manager, by pressing the Update or Cancel buttons. If you exit by pressing the Cancel button, any changes that you have made will be ignored. If you exit by pressing the Update button, the changes will be written to both the radio and the channel file, by default named VHFfreq.fdt. It takes two or three seconds to update the radio and the file, so be patient.



### Scanning Memory Channels:

Scanning memory channels can be accomplished by pressing the Scan button. When the SynTalk Program is in the scan mode, a green indicator will appear above the scan button. The scanning mode may be terminated by pressing most of the functions within the SynTalk Dialog Box, in particular, a second press of the Scan button. While the scan mode is in operation, channels will be consecutively accessed, unless its Skip flag is set, until a channel with a carrier is reached. Scanning will stop on an active channel until either the carrier drops on the channel or a Scan Hold on Signal time out is reached. The Scan Hold on Signal Time is a parameter that is defined in the SynTalk.ini file and by default is set to 5 seconds. If the scan stops on a channel that you do not want to monitor, you may press the Skip button. This will lock this channel from further scan access and scanning will resume. By pressing the Clr Skips button, all channels will available for monitoring in the scan mode, that is all skip flags will be cleared. The skip flag status of any channel is temporary unless you enter the Update mode and save the channel information by exiting from the Channel Manager Dialog via the Update button. If the file data is not recorded by this technique, the original memory channel data, along with channel skip flags, will be retrieved the next time the SynTalk Program is started.

### Setup Screen:

The Setup button is used to enter the Setup Syntor Dialog. From this dialog you can setup the transmit timeout timer, the signal meter zero and full scale settings and the power up

default settings for frequency, volume squelch etc. You should have the parameters that you would like for the power up condition of the radio selected in the SynTalk main menu prior to pressing the Setup button. Once in the Setup Syntor Dialog, exiting by way of pressing the Save button will set the power up defaults of the transceiver to the current mode. If you wish to set the signal meter operating conditions, it is a good idea to set the zero value, by pressing the Set Zero button while in a no signal condition, before setting up full scale. To set full scale, input a signal that you wish to save as the full scale setting of the signal meter and press the Set Full Scale button. Good sources of this Full Scale signal would be a very strong local repeater or a signal generated by a nearby HT. The setup parameters will be saved in the SynControl boards non-volatile memory when you exit the Setup Syntor Dialog by pressing the Save button. If you exit by pressing the Cancel button, the parameters will not be saved but will be in effect until the next time the Syntors power is cycled.

## SynTalkPS

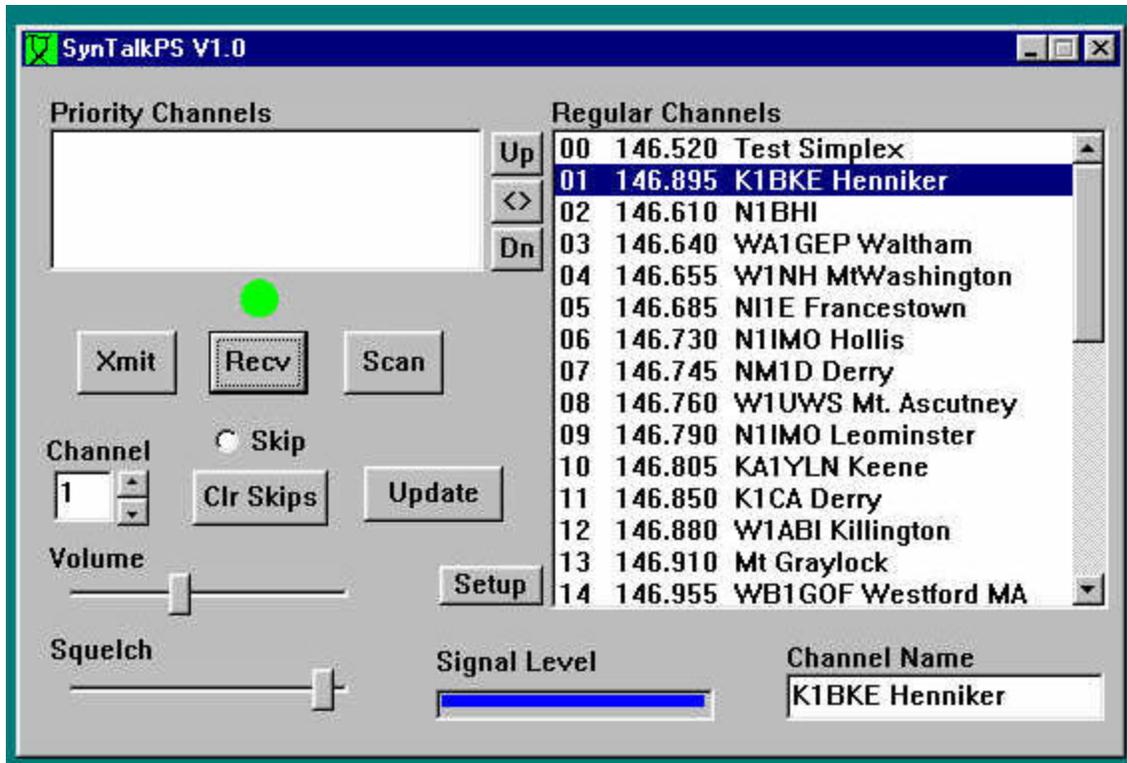
SynTalkPS is a second program distributed on the standard installation disk. This program is tailored for the Public Service users of the Syntalk system. This program has the same basic functionality as the SynTalk program, but is a bit more ‘Point and Shoot’ than the standard program. In addition the SynTalkPS program allows for priority channel scanning. In order for a memory channel to be considered a priority channel, its information must be moved from the Regular channel list to the priority channel list. Do this by highlighting the desired channel and then pressing the <> button.

The SynTalkPS has a different .ini file from the SynTalk program. It is located in the same directory as the SynTalk.INI file but is named SynTalkPS.ini.

**Note:** The Win98 list animation mode adversely affects the speed of scanning and should be turned off. Press:

Start  
Settings  
Control Panel  
Display Settings  
Effects Tab

Then make sure that the box marked “Animate windows, menus and lists” is not checked off.



## 8 Pin Modular Connector pin outs:

1. RXD Receive data into SynControl Board
2. TXD Transmit data from the SynControl Board
3. +12 VDC
4. Ground
5. Mic Audio
6. Speaker Audio Out
7. PTT (TTL level, ground for PTT)
8. XIO Do Not Connect

# SynTalk Control Head



The Syntalk Control Head / Microphone is intended to allow operation of the Syntalk converted Syntor transceiver without the use of a dedicated computer. Although the control head is primarily intended for channelized operation, it is capable of the following operations:

1. Channel Selection
2. Channel Scanning
3. Volume Adjustment
4. Squelch Adjustment
5. Frequency Selection

6. Tone encoder frequency selection
7. Transmit offset selection
8. Channel update
9. Input Mode, flipping of transmit and receive frequencies
10. Signal Strength viewing
11. Signal strength calibration
12. Download of channel information from computer to the control head and subsequently from the control head to the transceiver.

## **Installation:**

Installation of the SynTalk Control Head is very easy. There are two connectors on the bottom of the control head. The 1/8 mono jack is connected to the speaker circuit and you can use it for an extension speaker, although it is preferable to use the speaker connections on the 9 pin MOLEX connector on the SynTalk interface board. The 6 pin modular jack makes all other required connections. Use the provided cable, the 8 pin side goes to the SynTalk board, and the 6 pin side goes to the SynTalk Control head. Only the first 6 connections in the 8 pin connector need to be carried to the control head; keep this in mind if you decide to make your own modular cable.

## **Operation:**

Even though the SynTalk Control head has only 6 buttons and a 2 digit display, it is capable of performing quite a few operations. These operations are explained in the order of their importance. It makes sense to master those operations at the top of this list before tackling the more complicated features. It is useful to know that:

**Memory commands are numeric in both digits of the LCD display while VFO commands always have a letter in the LCDs left hand digit.**

Upon initial power application to the SynTalk Control Head, the LCD display will show two dashes followed by either:

1. The frequency, as designated by the left most LDC digit showing F and the frequency being sequentially displayed in the right hand digit.
2. An error message designated by the letter E in the left most LDC digit and the error number in the right hand LCD digit.

Obviously, the display will almost always show the operating frequency on initial power up. A frequency indication indicates that the SynTalk Control Head was able to communicate with the transceiver and determine its current operating parameters.

## **Mem / VFO Button:**

The MEM / VFO button toggles the Control Head from the VFO mode to the Memory mode. All Memory mode operations display numeric values in both of the LCD digits, while VFO operations always display a letter in the left most LCD digit. As previously stated, the display will be in the VFO mode initially after application of power. If you press the Mem / VFO button to enter the Memory mode the display will show two dashes indicating that the control head doesn't know which memory channel is currently selected.

## Memory Mode Operations:

Pressing the Mode key will move the Control Head to its various operating modes. The mode key is cyclic, multiple presses of the keys will cycle the Control Head through each of its various operations. In the Memory mode, the allowed operations are Channel Selection, Volume or Squelch.

1. You can step through the memory channels by pressing the Up or Down keys while in the Memory mode. Pressing the Up key increases the memory channel while the Down key reduce the selected memory channel. The display will wrap around in both directions, that is, if you are on the highest memory channel, channel 40, and you press the Up key, the display will wrap to channel 0. The Memory channel mode is indicated by both LCD digits showing numbers and neither decimal point showing.
2. Pressing the mode key once will move the control head to the Volume mode. The volume mode is indicated by both LCD digits showing numbers and the left decimal point, directly above the Vol label on the silk screen, showing. Pressing the Up key increases the volume while the Down key reduces the volume setting. The minimum volume is 00 and the maximum is 40. The volume mode does not wrap, that is pressing the Up key when you are at a volume level of 40 will cause no further action.
3. Pressing the mode key once more will move the control head to the Squelch mode. The squelch mode is indicated by both LCD digits showing numbers and the center decimal point, directly above the Squ label on the silk screen, showing. As with the volume mode, pressing the Up key increases the squelch setting, causing a higher level of muting, while the Down key reduces the squelch setting causing it to be more likely to open. The minimum squelch setting is 00 and the maximum is 40. The squelch mode does not wrap, that is pressing the Up key when you are at a squelch setting of 40 will cause no further action.

## VFO Mode Operations:

Again, pressing the Mode key will move the Control Head to its various operating modes. When you enter the VFO mode, by pressing the Mem / VFO key, the allowed operations are Frequency, Tone or Offset selection.

1. The Frequency mode is indicated by the LCDs left digit showing the letter F and the right digit sequentially displaying the current frequency. The frequency is displayed in kHz with the most significant digit, 1 for 146520 for example, omitted. As an example the frequency 146.520 MHz will be displayed as follows:

F4 F6 F5 F2 F0 F(blank)

This display will be continuously repeated, the F(blank) being the key to the start of the end of the displayed number. Although this may seem to be a bit clumsy, the display is very easy to read with just a small amount of adjustment time by the operator! Pressing the Up key increases the frequency in 5 kHz increments while the Down key reduces the frequency a like amount. It is not necessary to wait for the display between subsequent presses of the Up or Down key. That is, if you want to increase the frequency by 15 kHz, press the Up button 3 times, the display will begin showing the new frequency.

2. Pressing the Mode key will move the Syntor Control Head to the **Tone** mode. The Tone mode is indicated by the lower case letter t in the left LCD digit followed by the sequentially displayed transmit tone in the right digit. The tone value is indicated by 3 sequential digits, the fractional part of the tone frequency is left off. For example a transmit tone of 85.4 Hz will be displayed as follows:

t0 t8 t5 t(blank)

Pressing the Up or Down keys will change the transmit tone frequency. As with the frequency change command, you don't have to wait for the display between subsequent presses of the Up and Down keys.

3. Pressing the Mode key again will place the SynTalk Control Head in the **Offset** mode as indicated by the LCDs left digit showing a lower case o and the right digit showing the offset as follows:

o- Transmit is offset lower in frequency

oP Transmit is offset higher in frequency

o0 Transmit and receive are operating on the same frequency

oX Transmit and receive are on different frequencies but not a standard offset.

Pressing the Up or Down keys will cycle between the various offset modes. The only exception to this is that it is not possible to re-enter the oX mode.

**Changing a frequency, offset or tone is temporary.** If you leave the frequency mode and change to another channel and back you will be returned to the original channel settings. **You can permanently update a channels settings by performing the following steps:**

1. Enter the VFO mode and setup the frequency, offset and transmit tone to the desired values.
2. Return the display to the frequency display setting, that is the left LCD digit shows a F.
3. Simultaneously press, then release, the Scan and the Mem/VFO keys (notice the MemW silkscreen between these two keys). This causes the Control Head to 'remember' the current values of Frequency, Offset and Tone. The display will show uP and then change to the Memory mode showing the current channel number.
4. Select the memory channel that you wish to over write. It is ok to switch back and forth between the various modes to check the frequency ect. of the various channels, but you must end up in the Memory Channel mode on the channel that you wish to over write. The display shows the numeric value of the channel and both decimal points should be off.
5. Write the 'remebered' frequency, offset and tone data into the currently displayed channel by simultaneously pressing, then releasing, the Scan and the Mem/VFO keys again as in step 3. Again the display will show uP and the channel will be updated.

## Scan Operations:

The scan mode may be entered by pressing the scan button from either the VFO or Memory mode. When you enter the scan mode the SynTalk Control Head will enter the memory mode and begin scanning the memory channels sequentially until an active channel is located. When an active channel is located the scan mode will wait approximately 5 seconds and then begin scanning again. **The scanning sequence is terminated when any key is pressed, including the PTT key.** The key that is pressed to terminate the scan operation will be ignored, except to stop the scan operation. So, if you use the PTT key to terminate the scan operation, the transceiver will not enter the transmit mode until the PTT key is released and then pressed again.

## Displaying Signal Strength:

The signal strength mode may be entered at any time by pressing, the releasing, the Mem/VFO and Mode key simultaneously (notice the S between these two keys). When in the Signal Strength mode, the display will show values between 00 and 99 to indicate the

relative signal strength of the currently received signal. **The Signal Strength mode is terminated when any key is pressed, including the PTT key.** The key that is pressed to terminate the signal strength mode will be ignored. So, if you use the PTT key to terminate the signal strength mode, the transceiver will not enter the transmit mode until the PTT key is released and then pressed again.

## **Input Mode:**

You can swap the transmit and receive frequencies, as well as swapping the offset direction, by simultaneously pressing, then releasing, the Up and Down keys (notice the In silk screened between these two keys). This mode is handy to see if you can hear someone on the input of a repeater or to communicate with someone if the repeater goes down. Repeat the process to return back to the normal mode. The input mode switches the SynTalk Control Head to the VFO frequency display mode.

## **Transferring Channel Data From the Computer:**

The SynTalk Control Head may be used to transfer channel data between the computer and a remotely located computer. **In order for the computer to communicate with the SynTalk Control Head, the control head must be connected to the same serial port used to communicate with the Syntor transceiver with the optional serial / power adapter.**



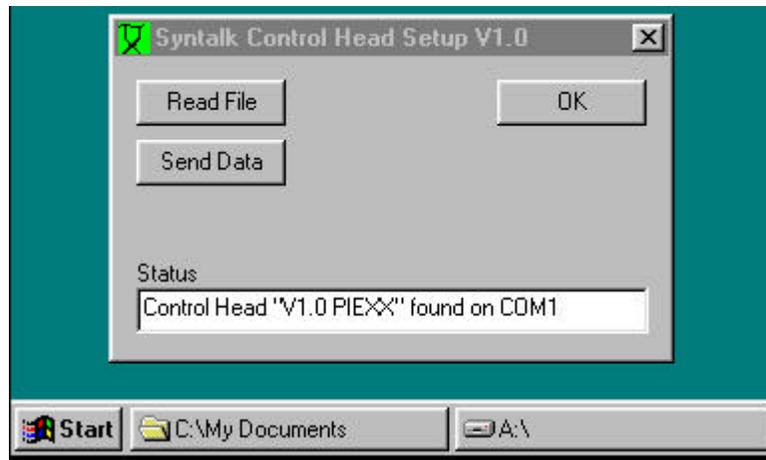
### **SynControl Head with optional Power Adapter**

This optional power adapter board is connected in series between the control head and the modular DB9 serial adapter plugged into your computers serial port. In addition, the power adapter must be connected to a suitable, supplied, wall transformer. Upon application of power to the SynTalk Control Head, you will first see two dashes on the display, followed by two error codes, and finally two dashes again. The error codes indicate that the control head can not communicate with the Syntor transceiver, and are normal with this connection.

You should use the SynTalkPS program version 1.01 or later, as previously described, to create / modify your channel list. If the SynTalkPS program doesn't see a Syntor radio on any of the computers serial ports it will respond with:



After you press the OK button, the program will continue in the Stand Alone mode. In the Stand Alone mode you are allowed to maintain the channel database in the normal fashion. You can transfer the channel information to the control head by pressing the 'Update' button followed by the 'Copy File to Radio' button in the Channel Editor Dialog. If the SynTalkPS program is in the Stand Alone mode, the Copy File to Radio routine knows to try to communicate with the control head instead of the Syntor transceiver. Alternatively, you can use the SynCtrlHd program to send .fdt channel database files to the control head.



During the download process, the SynTalk Control Head will briefly show **dL** on its display, followed by the numeric value 41. The 41 indicates that 41 memory channels have been loaded into the SynTalk Control Heads non-volatile memory. The control head may now be disconnected and moved to the transceiver site.

The upload process from the control head to the Syntor transceivers memory is accomplished by:

1. Connecting the SynTalk Control Head to the Syntor transceiver.

2. Simultaneously pressing, then releasing the Scan, Mem/VFO and Mode keys.

The SynTalk Control Head will respond with **uL** on the display to indicate that it is performing the transfer of data to the SynTalk equipped Syntor transceiver. After a few seconds, the display will revert to the Memory Channel mode indicating that the data transfer was successful.