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## Syntor X 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 Personality Board.
3. 80 Memory Channels, as well as, discrete frequency selection VHF High band and UHF 2 / 3/4 meter Amateur bands.
4. Broad bandwidth receiver allows operation in the Ham as well as public service bands.
5. Channel scan / lockout functions.
6. CTCSS Tone Encoder / Decoder.
7. CTCSS Tone Detect Mode.
8. Interfaces directly to a low cost computer style microphone
9. Uses standard, off-the-shelf connectors for signal and power

10. Radio can be remotely located from operating position, cable lengths of over 100' can be made using low cost networking cable / connectors.
11. Versatile Windows based computer software allows easy control of transceiver via virtual control head.
12. Front end alignment tools (\$29 option) available, alignment firmware built in.
13. Easy Installation, no solder connections required.
14. \$169 + \$8 shipping / handling
15. Complete Systems available from \$269.
16. Versatile control head / microphone option allows operation without the computer. \$69



Syntor X Transceiver with PIEXX SynControl Installed

The Motorola Syntor X is the mid 1980s upgrade to the earlier Syntor transceiver. The Syntor X added the capability of broad bandwidth receive; channel spacing of greater than 20 MHz on the VHF high band is possible. This allows the Syntor X to operate effectively as both a Ham radio transceiver and general purpose scanner. The Syntor X 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 EPROM chips are just too inflexible and

are no longer used for this purpose. The Syntor X, 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 Syntor X's 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 for the Syntor X transceiver is a extension to the system we developed for the Syntor transceiver. The new design takes over the functions of:

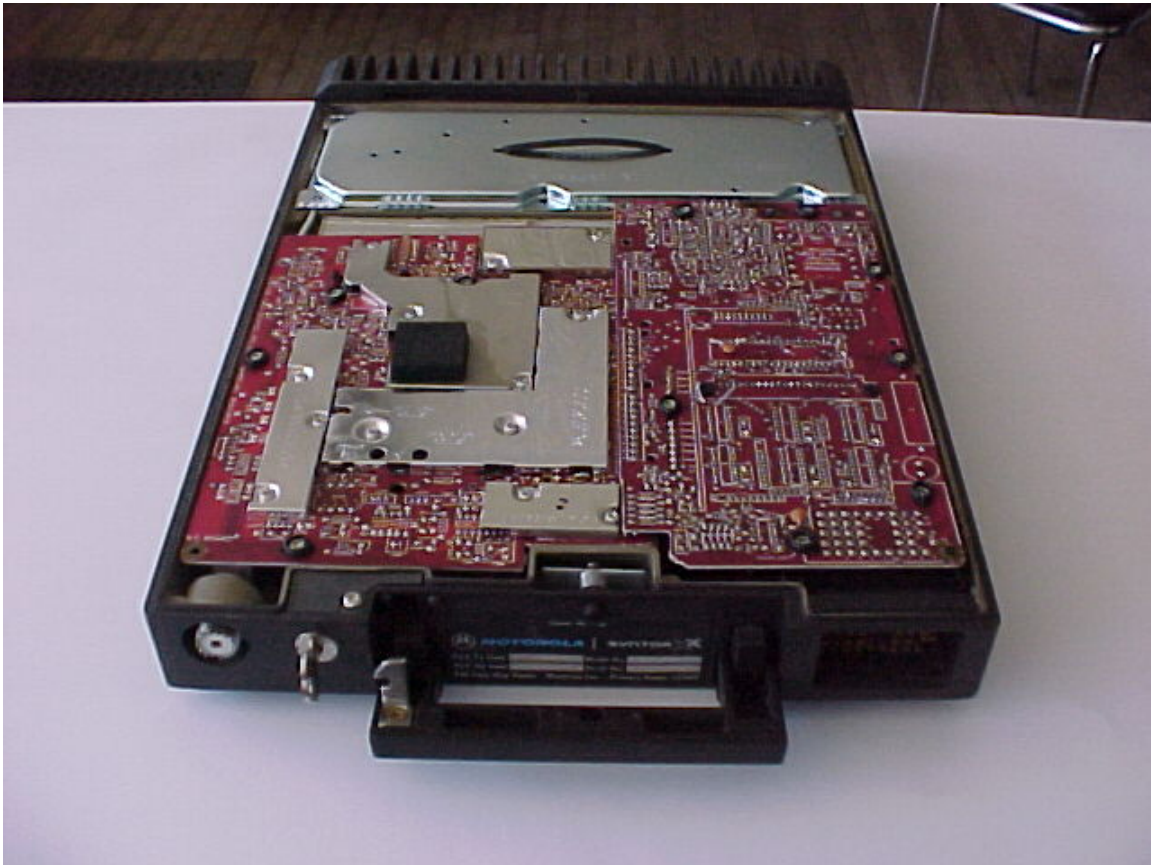
1. Frequency Control
2. Volume Control
3. Squelch Control
4. Push-to-Talk
5. Transmit Time-out Timer
6. CTCSS PL Encoder Tone Generation
7. CTCSS PL Tone Decoder
8. CTCSS Tone Detect
9. Channel Scanning Facilities
10. Signal Level Meter
11. Radio Tuning Facilities, including the capabilities to retune the broad bandwidth rf front end.
12. Direct interface with low cost PC style microphone

Because the SynXControl Board replaces the original Personality 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 SynXControl Board is a direct plug in replacement for the original equipment, installation is very easy and involves no 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. If you wish to use the SynControl without a PC, we have developed a channalized control head to take its place. Control head details appear at the end of this document.

The standard SynControl package, for the Syntor X transceiver, includes:

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

## Hardware Installation:



SyntorX Transceiver, Before Installation of SynXControl

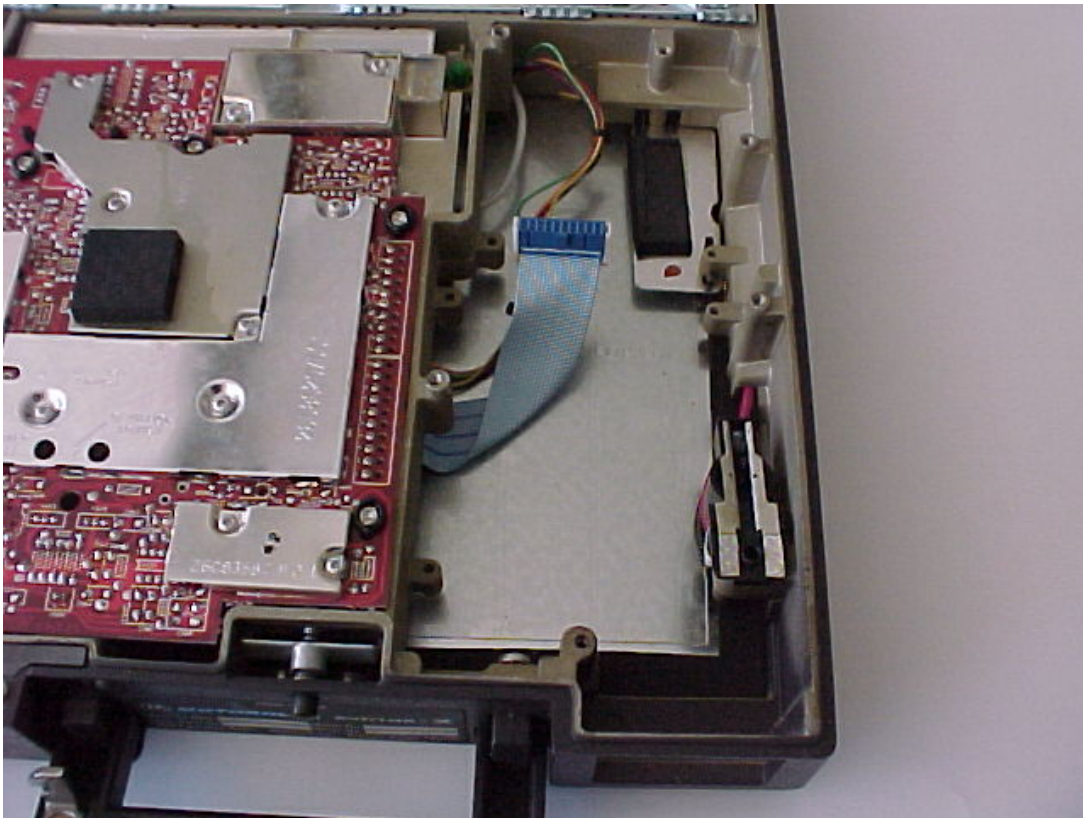
### Required Tools:

1. Phillips Screwdriver
2. Flat Blade Screw Driver
3. 9/64 Allen wrench
4. 7/64 Allen wrench
5. 5/16 Nut driver

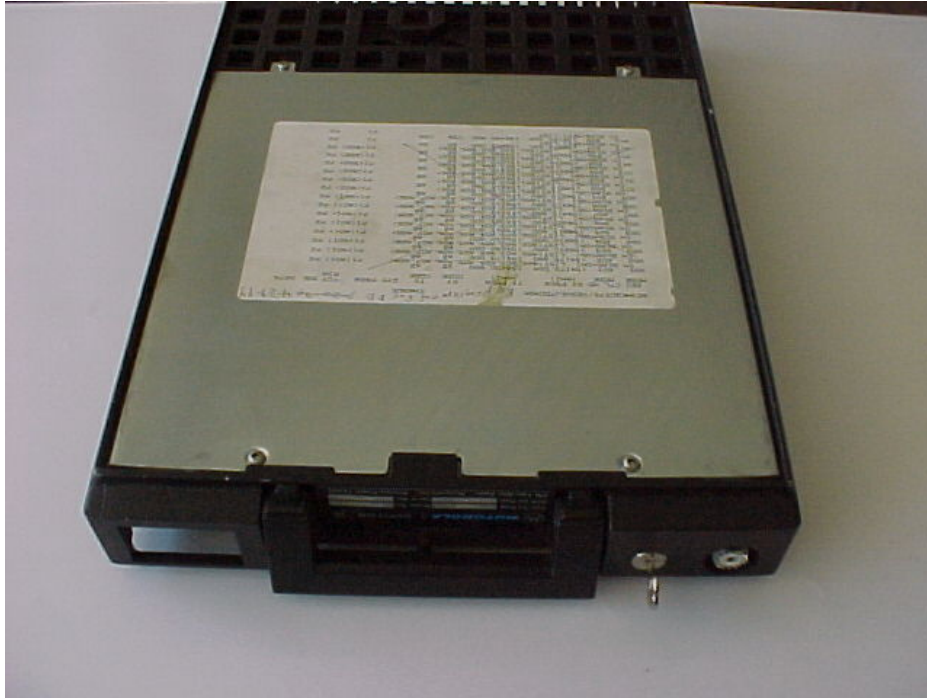
If you are going to do an alignment of the rf section of the receiver, you will need the optional mixer board (\$29), some rf cables, and a signal generator capable of generating a variable signal strength unmodulated carrier at 53.9 mHz.

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

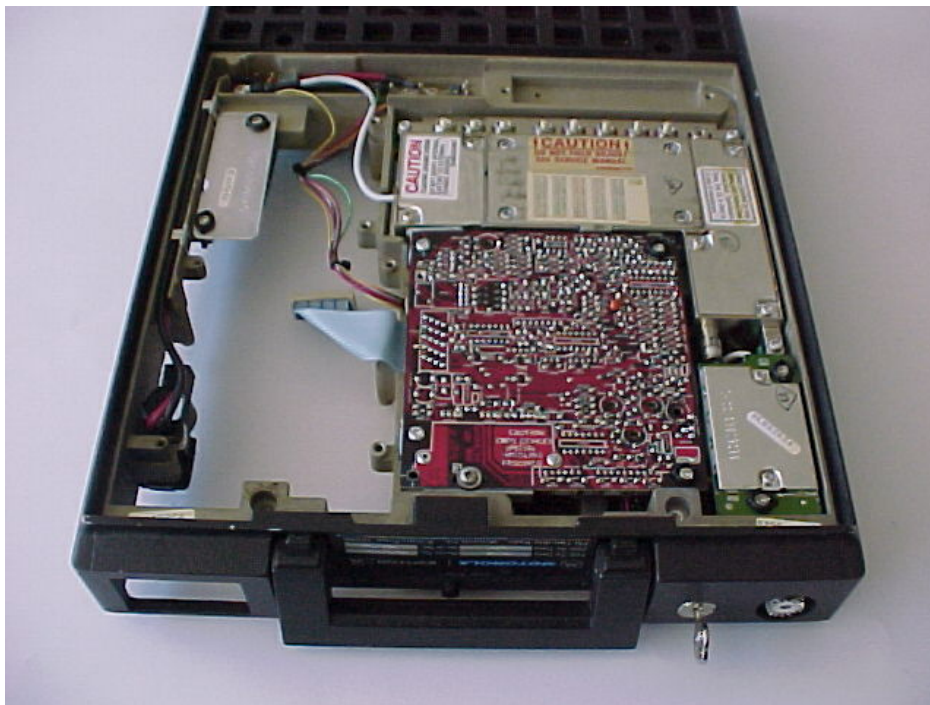
1. It is always a good idea to test your radio for proper operation before proceeding with the installation. In most cases, this will be impractical due to a lack of cables / control head, the good news is that the failure rate for SyntorX radios is very low.
2. Open the top cover of the radio. This is done by unlocking the handle, and pulling it to the open position, depress the small button, marked "Cover Release" and lift the lid of the radio up and off.
3. As viewed from the front of the radio, the Personality board is on the right side of the radio. The Personality board is also distinguished by the large multi-pinned (soon to be gone!) connector mounted on it. Loosen the 7 mounting screws that mount the Personality board. Lift the Personality board straight up and out of the transceiver casting approximately 2 inches. You will need to reach under the board and remove the 20-pin ribbon cable plugged into the ejector latch type IDC connector on the Personality board. After this cable is unplugged, you can completely remove the Personality board.



4. Turn the transceiver over and remove the bottom mounting plate. There are 4 screws holding this plate on.

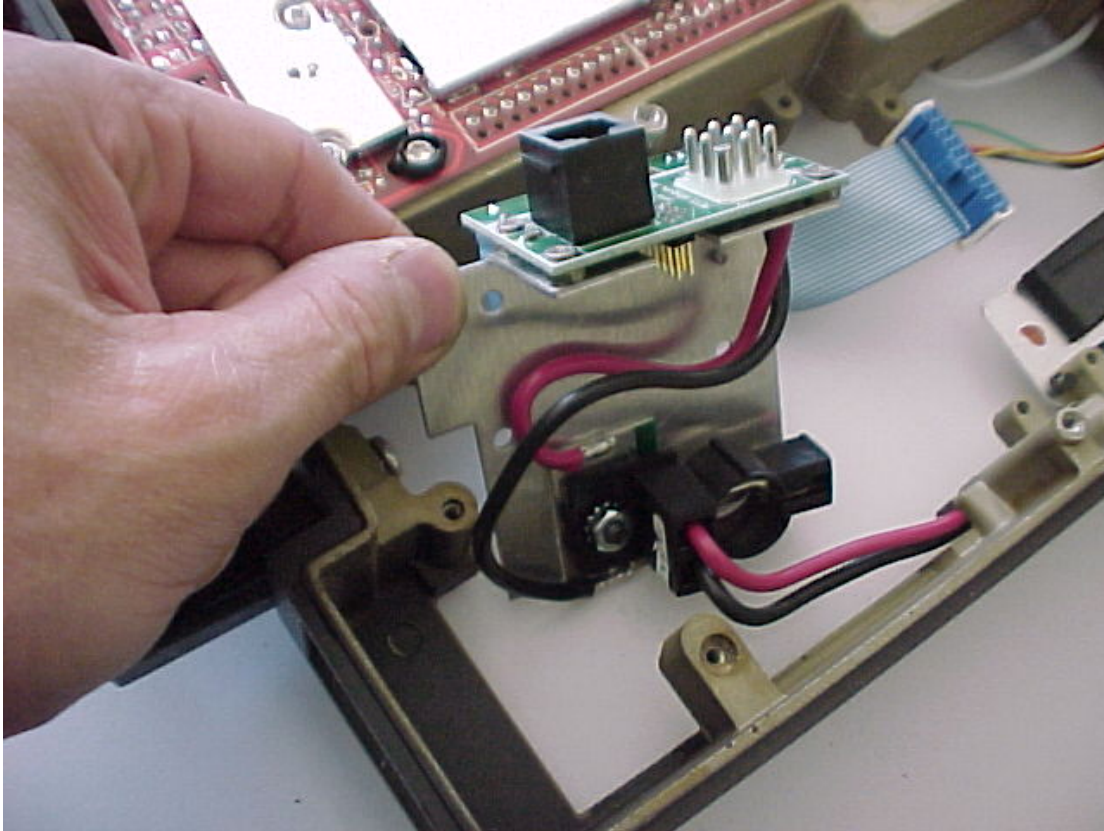


Bottom of SyntorX before removing the bottom cover



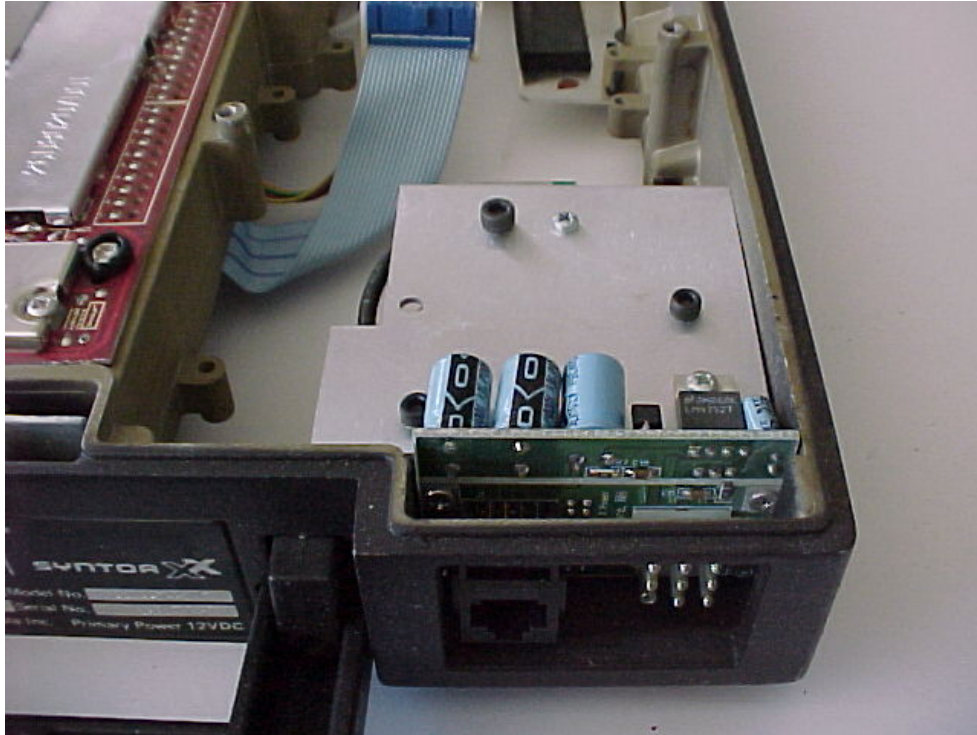
Bottom of SyntorX after removing the bottom cover

5. Using the supplied 8-32 x 1" screw and nut, mount the SyntorX A supply power assembly to the power connection board mounted beneath the SynXControl amplifier assembly. Use the 9/64 Allen wrench and a 5/16 nut driver to tighten the hardware. Refer to the photo below for proper orientation of the components

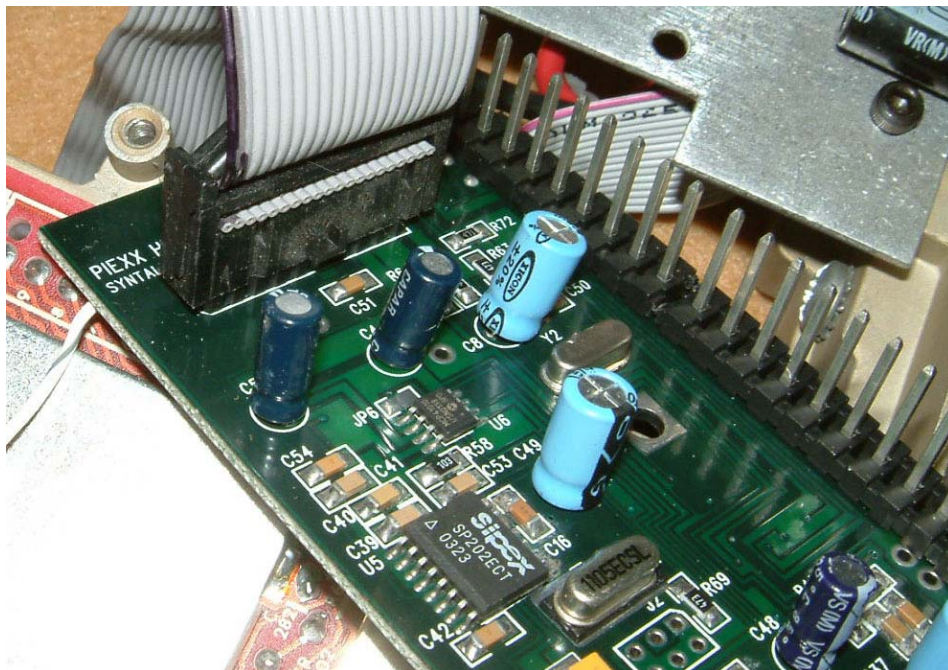


SyntorX A Power Assembly mounted to the SynXControl Amplifier

6. Mount the SynXControl amplifier assembly into the transceiver casting as shown below. Use the 2 6-32 cap screws to fasten the assembly in place. You may need to hold the left most 1000 uF electrolytic capacitor to the right while tightening the screw nearest it.



SynXControl Amplifier Assembly Mounted in the Casting

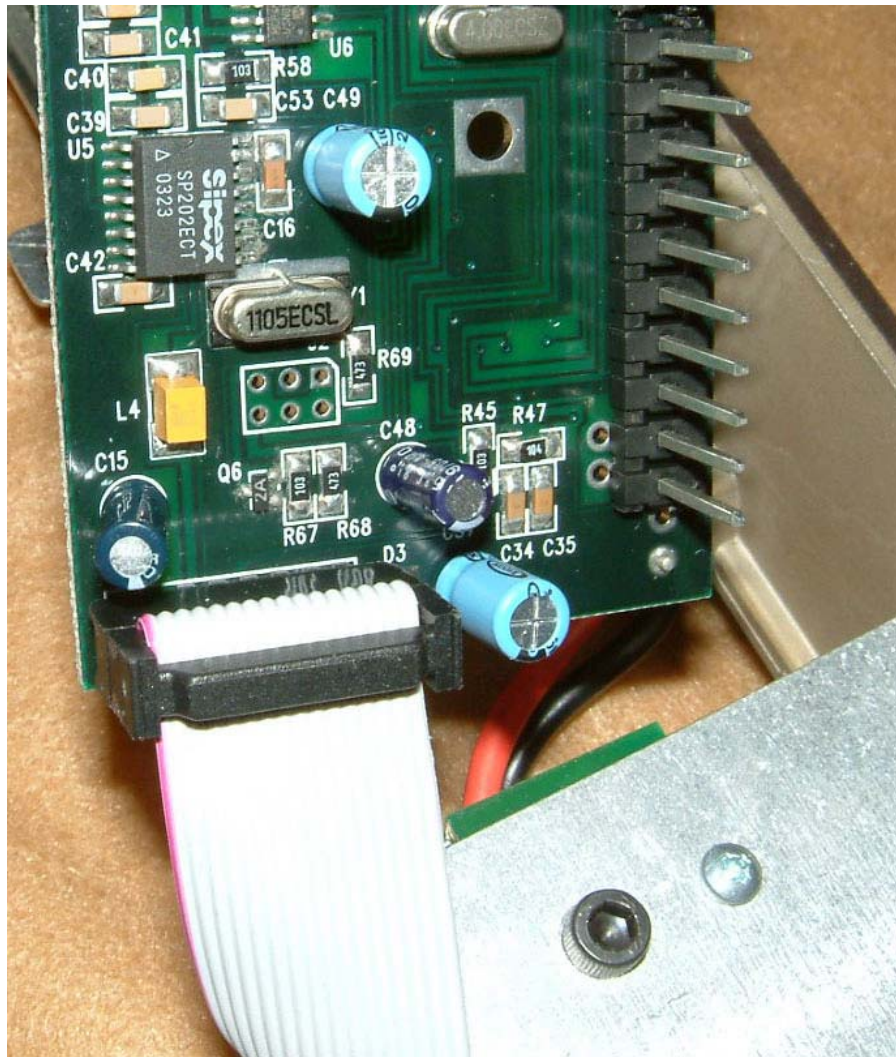


J5 Cable Alignment

7. Install the 20-pin ribbon cable, coming from the SyntorX common board, on header plug J5 on the SynTalk X controller board. Be sure to align the plug so that all 20 pins are inserted into the header socket. Also, make sure that the pin 1 alignment

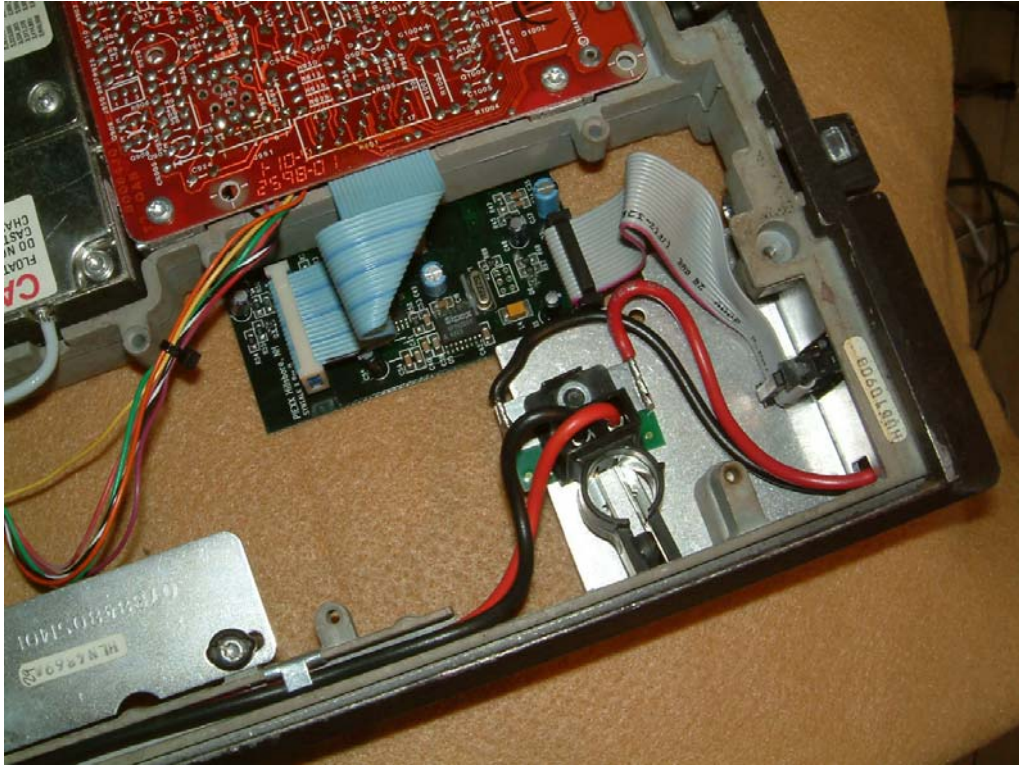


mark on the ribbon cable connector is closest to the edge of the circuit board and directly below the “SYNTALK X Rev D” silkscreen marking on the circuit board as indicate in the above photograph.

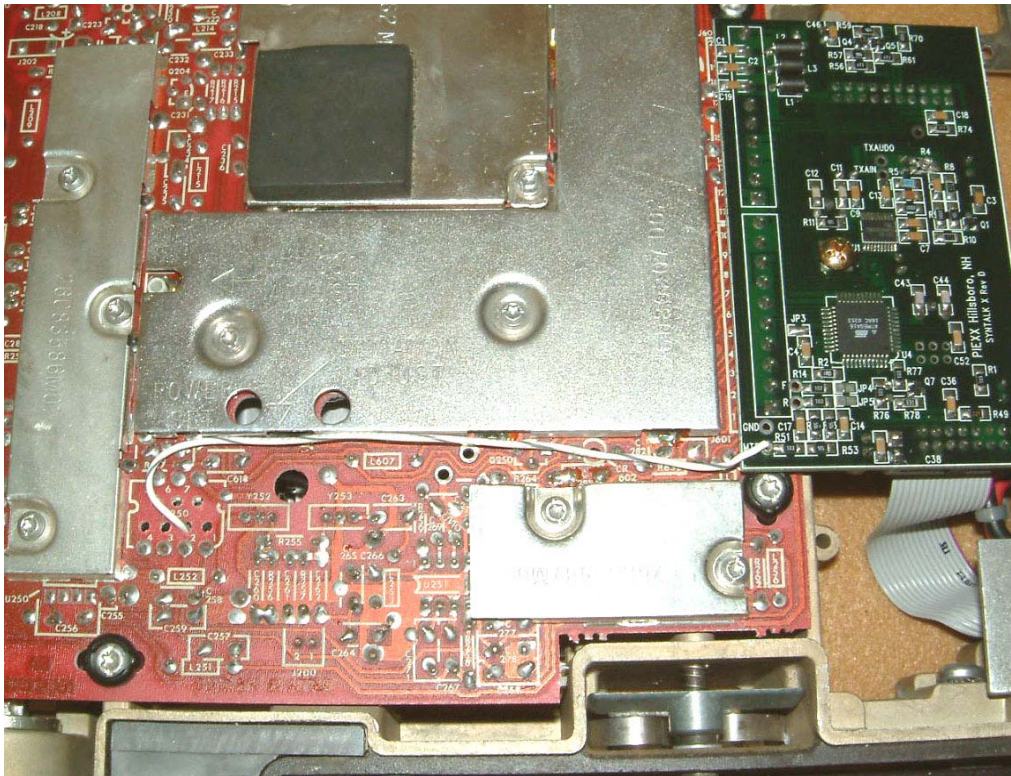


J1 Ribbon Cable Alignment, from Amplifier Board

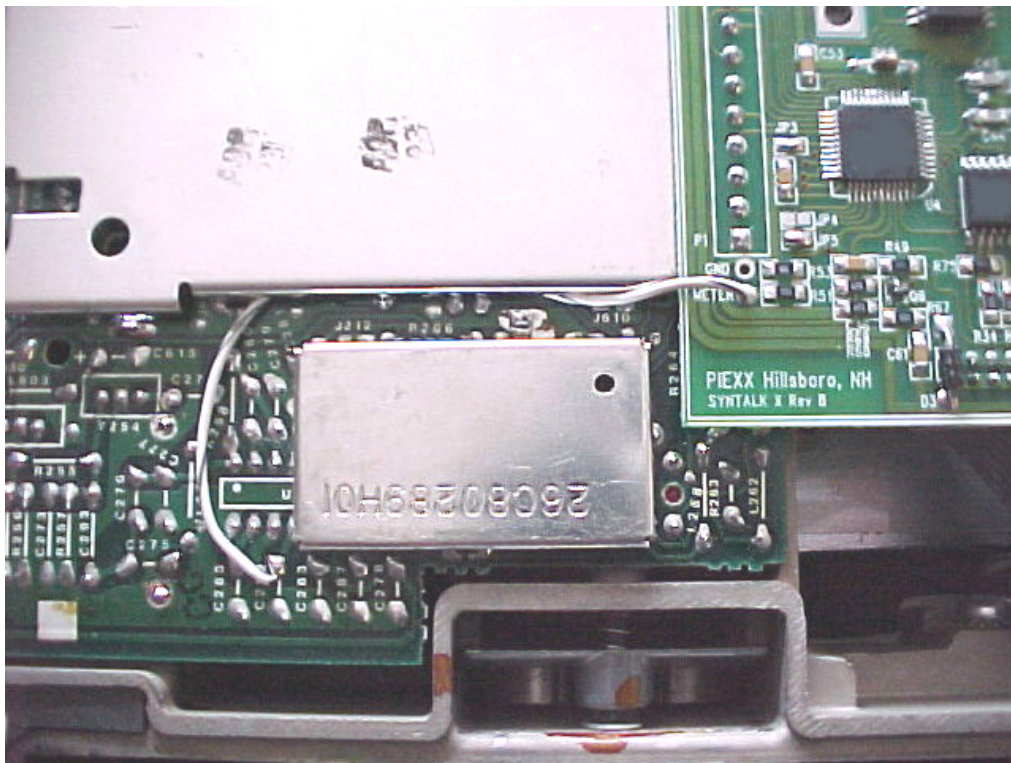
8. Install the free end of the 16-pin ribbon cable, coming from the amplifier board, to header connector J1 on the SynTalk X controller board. The red stripe, pin 1 side, of the cable should be closest to the bottom left edge of the circuit board. Alignment of pin 1, on the amplifier side of the cable is, is with the red stripe towards the bend line of the amplifier bracket.



9. Align the 20 pins, on the left side of the SynTalk X controller board, with the 20 sockets on the right side of the SyntorX rf board. Press the SynTalk X controller board into place. You may need to slightly align the 3 electrolytic capacitors on the top edge of the SynTalk X controller board so that they don't impede the installation of the board into the casting. With the board in place, install a 6-32 1/4" screw in the square-mounting hole located on the SynTalk X controller board roughly in the center of the board.
10. On VHF and UHF Syntor X models, install a 5" wire lead from the meter connector in the lower left corner of the SynTalk X controller board to pin 2 of meter socket M250 on the Syntor rf board. On the Low band radio there is no metering socket so you will need to solder the 5" wire lead to the limiter output on the SyntorX's RF board as shown in the following picture.

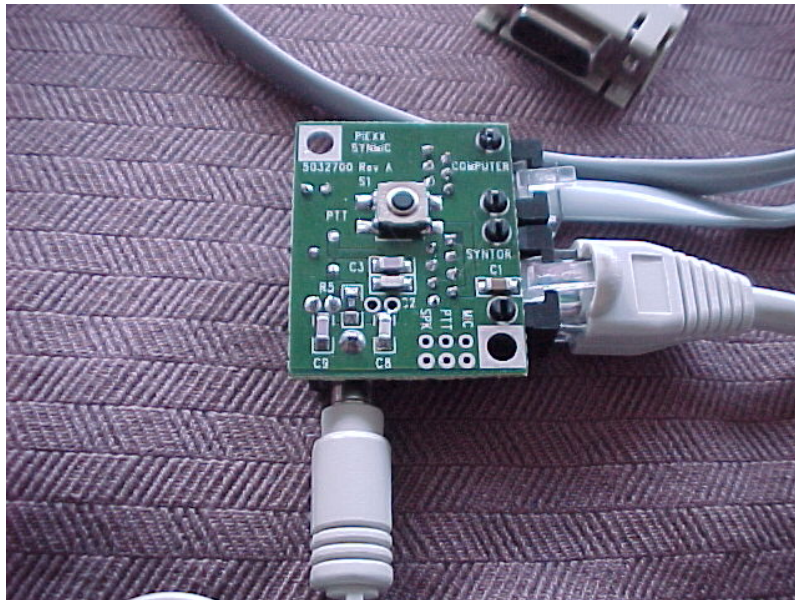


Meter Lead Installation, VHF and UHF models



Meter Lead Installation, Low Band model

11. 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 110 watt radio may be as high 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!!!**
12. 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'



13. 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.
14. 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.

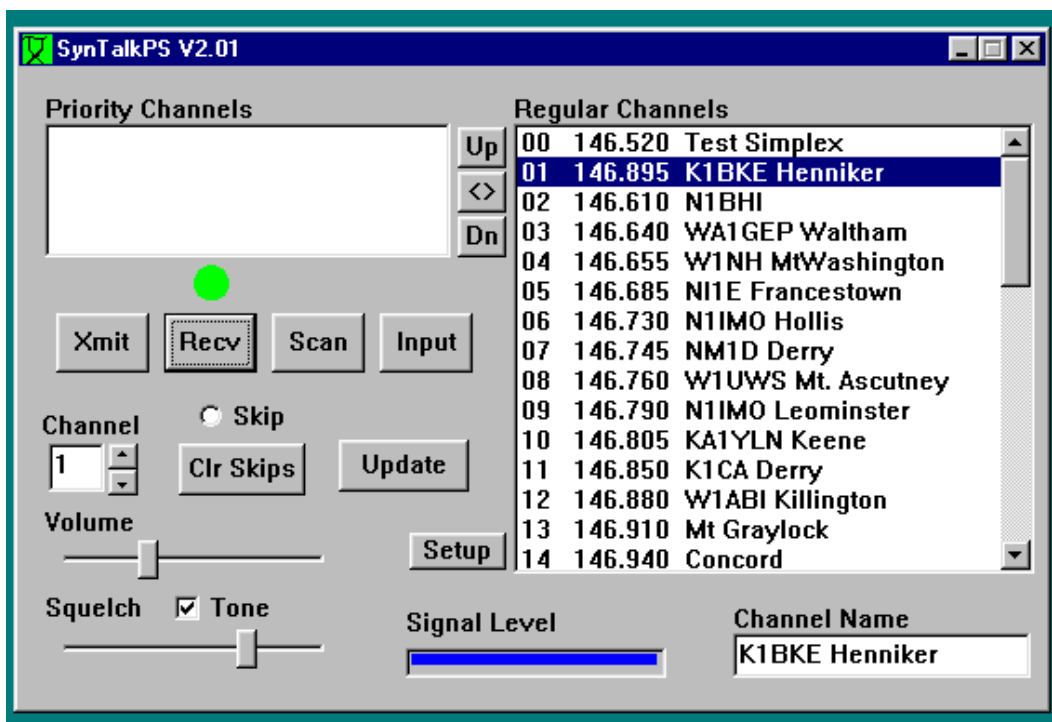
**Software Installation** The SynControl Software is intended for operation under the Windows 95/98 or Windows ME operating system. Install the software by placing

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:\SynTalk\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.

15. 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 SynTalkPS. Click on Shortcut to SynTalkPS. If all is connected properly the SynTalk Dialog box will appear on you screen.



## If the SynTalkPS 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 SynTalkPS.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  
SynTalkPS.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) =0, where the digit following the '=' sign is the com port 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 SyntorX 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 00 .

will appear; this is the Syntor reporting its various operating conditions. If the string does not appear, and it probably won't or the SynTalkPS 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 SynTalkPS com port, the SynTalkPS 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**

16. The first order of business in setting up the SyntorX transceiver is to select the VCO parameters. Selection of VCO operating parameters are made in the SyntorX Setup dialog which is entered by pressing the Setup button in the SynTalkPS dialog. There are 3 bits associated with the receive VCO, V0, V1 and Inj. Hi, and 2 bits associated with xmit vco operations, V0 and V1. The operation of the V0 / V1 bits is different for different band SyntorX transceivers:

VHF Low Band- The V0 / V1 bits select 1 of 4 different VCO ranges

VHF High Band- V0 unchecked = receive VCO, checked = xmit VCO

In receive: V1 unchecked is low freq range, checked is high freq range

In Xmit: V1 checked is low freq range, unchecked is high freq range

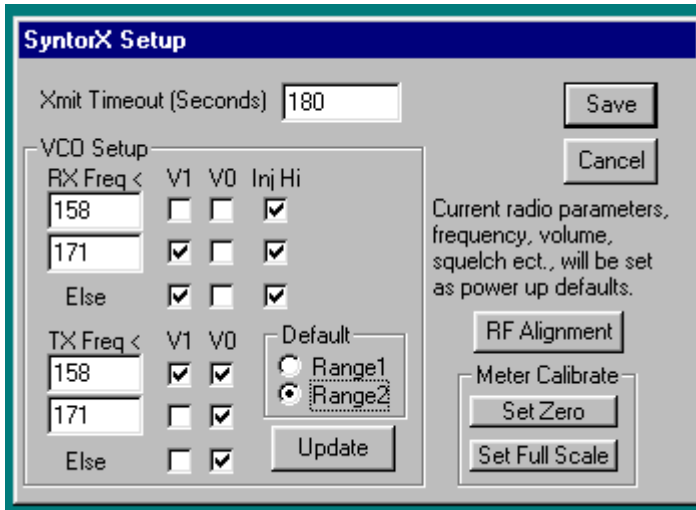
UHF- V0 unchecked = receive VCO, checked = xmit VCO

V1 checked is low freq range, unchecked is high freq range

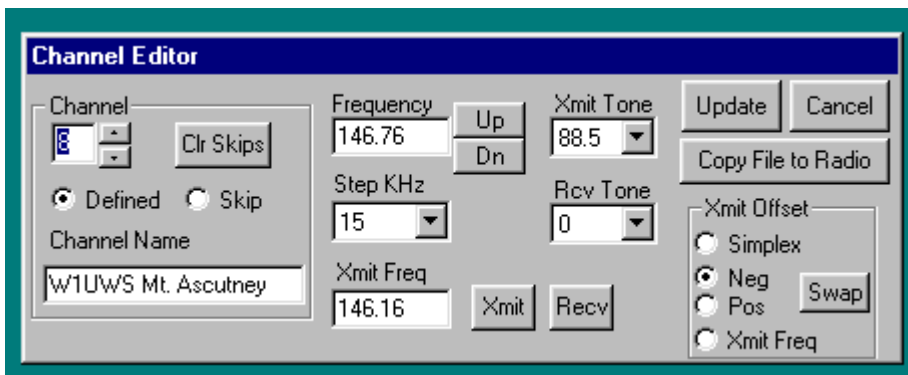
For all radios, the Inj. Hi bit, if checked, indicates that a high side RX injection frequency should be used. That is, the local oscillator is offset in frequency higher than the receive frequency by the 1<sup>st</sup> IF frequency, 53.9 mHz for VHF high band and UHF and 75.7 mHz for VHF low band transceivers.

The selection of these VCO parameters is allowed to vary over 3 frequency segments as selected by entering 2 discrete frequencies in the TX and RX section of the VCO Setup. Selecting the appropriate Range radio button in the Default group will automatically enter default values for these parameters. You may modify these default values manually before sending the data to the transceiver. The VCO parameters do not take effect until you press the Update button in the SyntorX Setup.

Select the appropriate VCO parameters for your transceiver and press the update button.



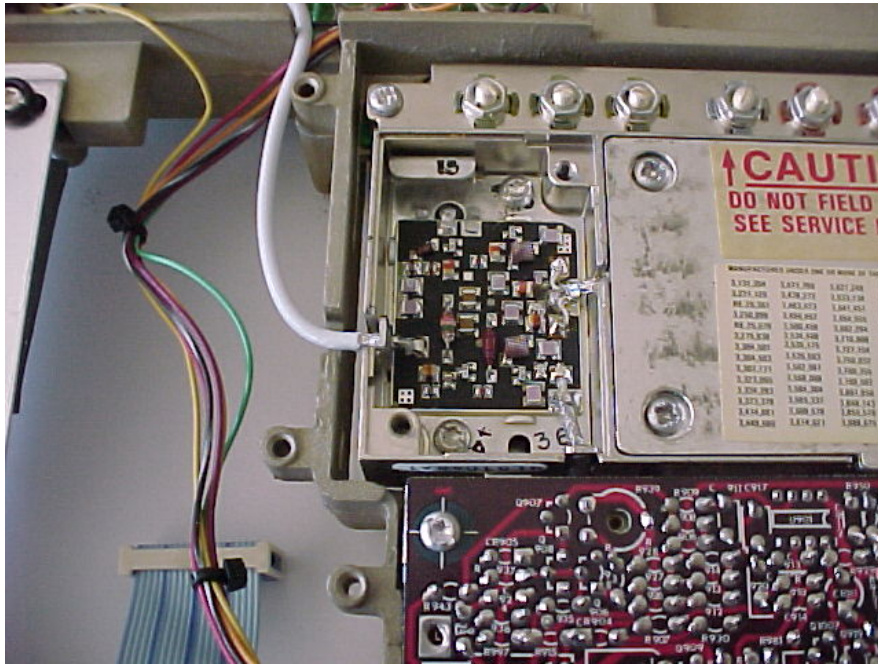
17. Enter the Channel Editor dialog by pressing the Update button while in the SynTalkPS dialog. Select a frequency that will afford you with a strong local signal, or use a signal generator to provide the signal. Press Update to exit the dialog.



18. **S-Meter setup.** Enter the SyntorX Setup dialog by pressing the Setup button while in the SynTalkPS dialog. Remove the 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.

It is often unnecessary to align the front end of SyntorX transceivers. As received, most of the VHF high band radios that I have received perform well in the 2 meter ham bands. However, I have come across some high band transceivers whose sensitivity falls off rapidly below 150 MHz. Try your transceiver before attempting a front end alignment, if the sensitivity is adequate in the 2 meter ham band, leave the front end alignment alone! If, however, the sensitivity falls off in the 2 meter band perform the following steps.



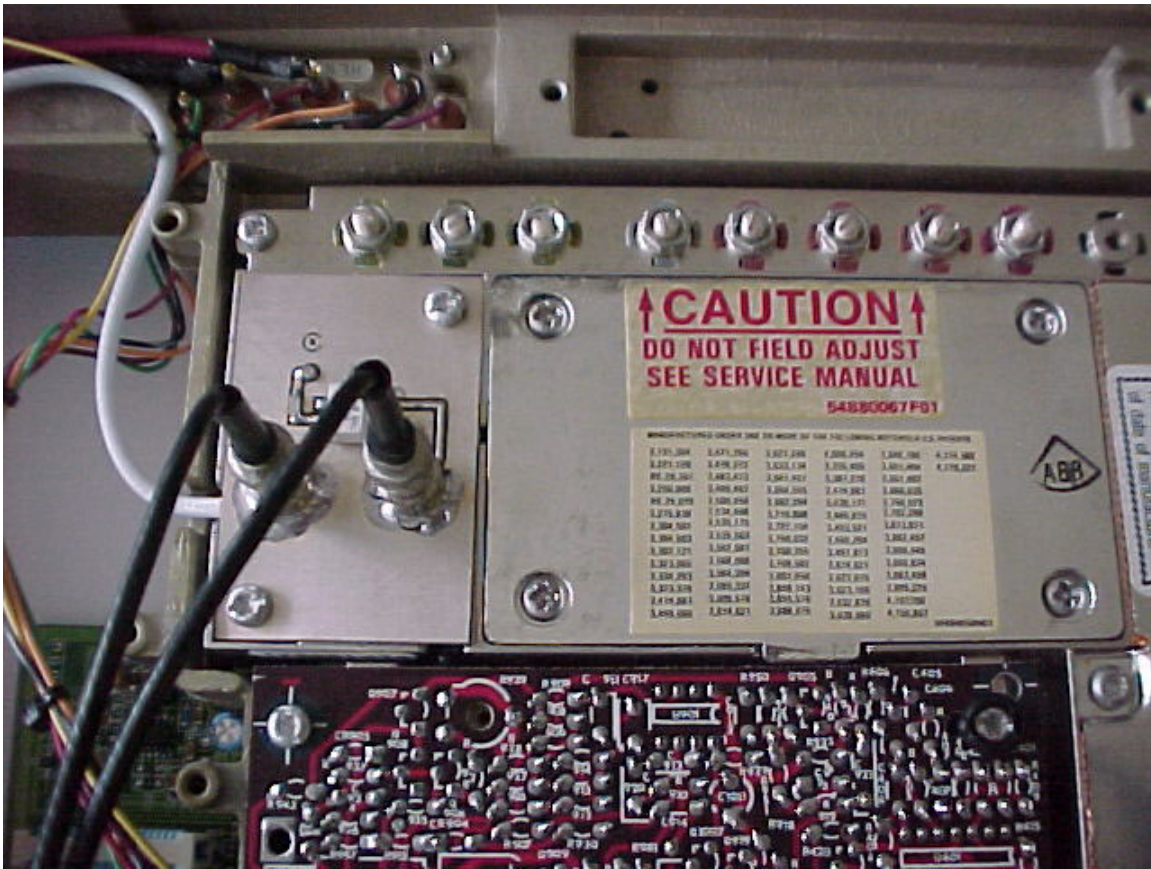


VCO Buffer Board with its Cover Removed

19. Remove the VCO buffer amplifier cover plate located on the bottom of the SyntorX.
20. Locate the alignment mixer board. The purple Z shaped wire should be aligned as shown in the following photograph. Install the mixer board in place of the VCO buffer cover. ***Do not over tighten the mounting screws!*** The shielded Z shaped wire will press against the collector, center lead, of transistor Q1461.

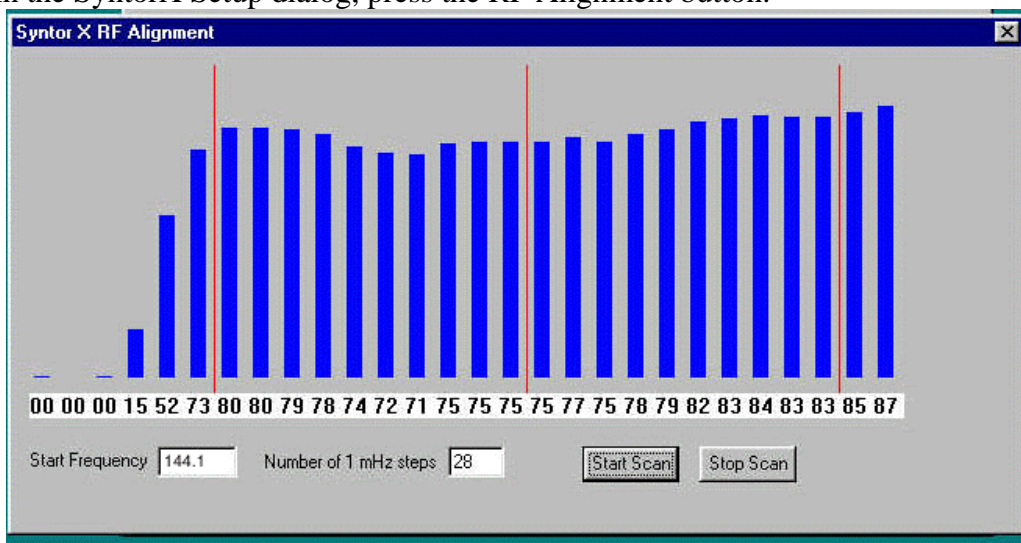


Alignment Mixer Board



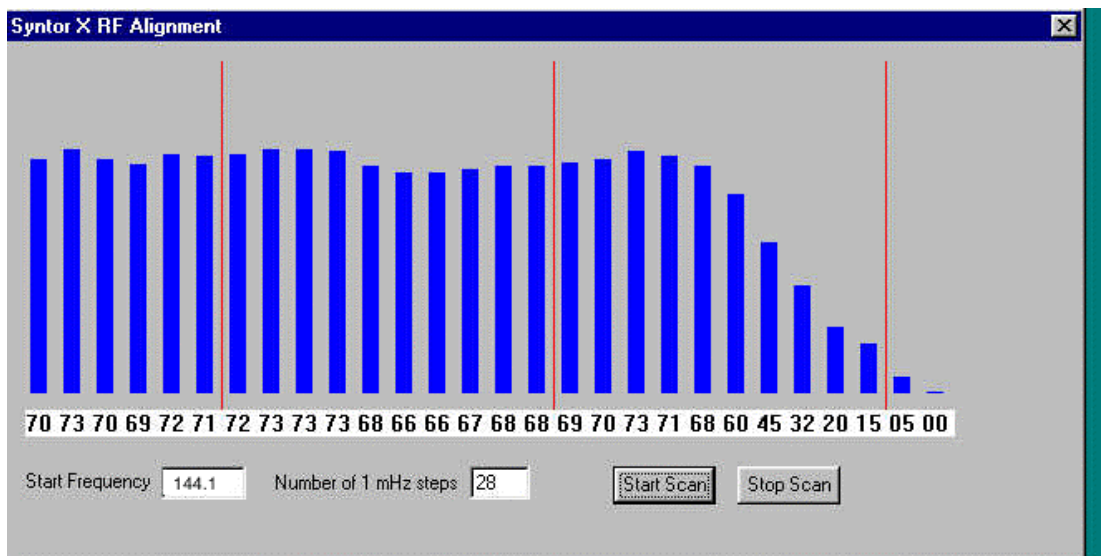
Alignment Mixer installed in the Radio

21. Install a cable from the right hand RCA connector to the antenna input connector located on the front of the SyntorX. Install a second cable from the left hand RCA connector to your signal generator set at 53.9 mHz.
22. In the SyntorX Setup dialog, press the RF Alignment button.



Spectral Display before Alignment

The Syntor X RF Alignment routine scans a band of frequencies from the start frequency for a specified number of 1 mHz steps. After each step, the S-Meter is read and its value is displayed in a bar graph mode. The red vertical bars on the display indicate 10 mHz boundaries. If you look at the preceding display, showing the receiver performance before alignment, it will be apparent that the sensitivity below 150 mHz is rather poor. RF alignment is accomplished by adjusting the 5 variable capacitor slugs in the preselector and the 3 variable capacitor slugs in the injection filter so that the passband covers the frequencies of interest and is flat. Below is a view of the spectrum after re-alignment of the receiver. As a starting point for alignment, the 7 rightmost adjustment screws tend to be adjusted to the bottom of their travel and the left most screw is approximately mid range.



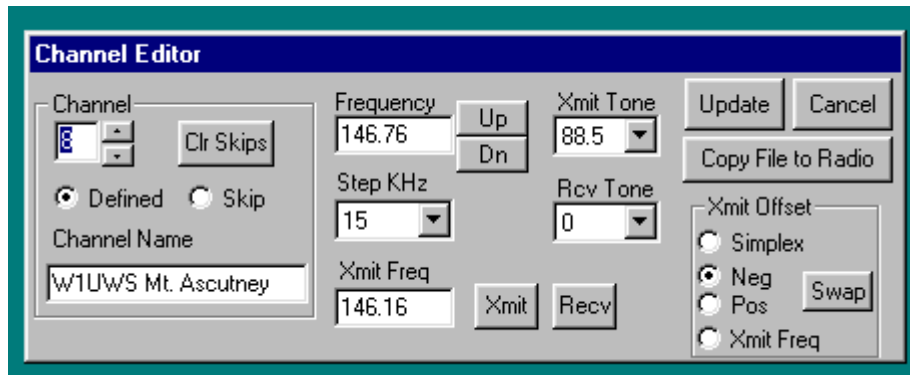
Spectral Display after Alignment

## Software operation

The operation of the SynTalkPS 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, either press the Update button, while in the main SynTalkPS dialog, or double click the desired channel in the Regular Channels list box. This will open the channel editor dialog.



Input the desired settings, frequency, PL tone, channel skip , desired offset and, in the channel name, any text comment you would like to attach to this memory. After setting these parameters press the Update button, this will save the parameters for the specified memory channel. There are two ways to exit the Channel Editor, 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 VHHFreq.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 SynTalkPS 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 SynTalkPS 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 SynTalkPS.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 be made 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. In addition the SynTalkPS program also 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.

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

Start

Settings

Control Panel

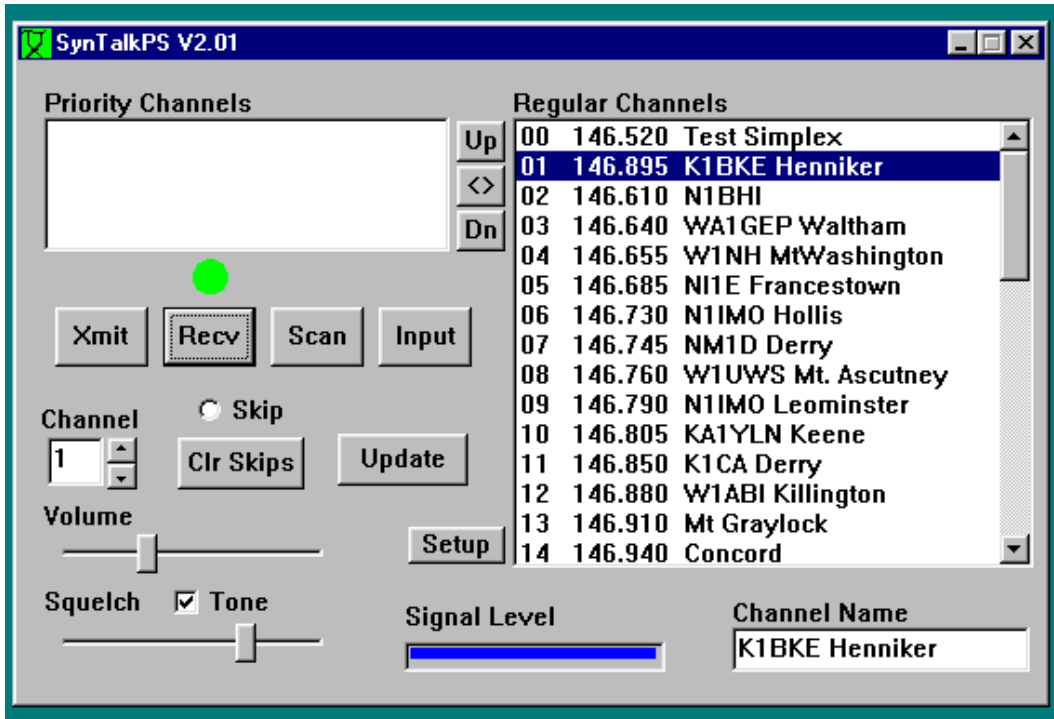
Display Settings

Effects Tab

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

## **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 SynTalkPS 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 you cycle the power to the SyntorX transceiver.



## Band Select Jumpers:

JP4 and JP5 are used to select the desired operating band for the SynTalk upgrade. These jumpers are located near the meter connection terminal in the lower left corner of the SynTalk control board.

<b>VHF</b>	<b>JP4-Out</b>	<b>JP5-Out</b>
<b>Low Band</b>	<b>JP4-Out</b>	<b>JP5-In</b>
<b>UHF</b>	<b>JP4-In</b>	<b>JP5-Out</b>

Out indicates jumper pads cleared, In indicates jumper pads shorted.

## 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 Xmit **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 will move the Syntor Control Head to the receive **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:

r0 r8 r5 t(blank)

Pressing the Up or Down keys will change the receive 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.

4. 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.

## Links:

[PIEXX Order Page](#)

[Syntor \(non X version\) Revival Product](#)

