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**Ten-Tec's service department can repair and service virtually everything we have built going back to our first transceivers in the late 1960's. It is our ability to continue offering service on these rigs that has led to their re-sale value remaining high and has made a major contribution to our legendary service reputation.**

**Printed and bound copies of all manuals are available for purchase through our service department if you would prefer not to use this copy as your transceiver manual.**

**We can repair or service your Ten-Tec equipment at our facility in Sevierville, TN. We also offer support via telephone for all products via during usual business hours of 8 a.m. to 5 p.m. USA Eastern time, Monday through Friday. We have a large supply of parts for obsolete products. Repairing a transceiver or amplifier yourself? Contact us for parts pricing information.**

**Service department direct line: (865) 428-0364  
Ten-Tec office line: (865) 453-7172  
Service department email: [service@tentec.com](mailto:service@tentec.com)  
Address: 1185 Dolly Parton Parkway, Sevierville, TN 37862 USA**

**We have found it is most effective for us to help you troubleshoot or repair equipment with a consultation via telephone rather than by email.**

**Suggested contact methods are:**

**Troubleshooting or repairing equipment – call (865) 428-0364  
Other inquiries – call (865) 428-0364 or email [service@tentec.com](mailto:service@tentec.com)**

**THANK YOU AND 73 FROM ALL OF US AT TEN-TEC**

**TEN-TEC**

**OPERATOR'S  
MANUAL**

**“6N2”**

**MODEL 526**

**MULTI-MODE  
VHF TRANSCEIVER**

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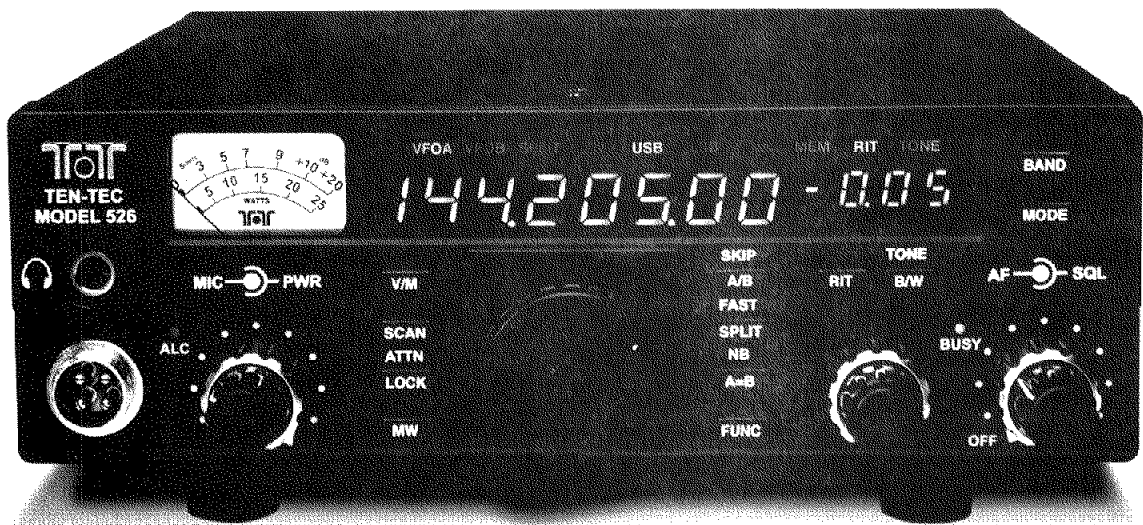
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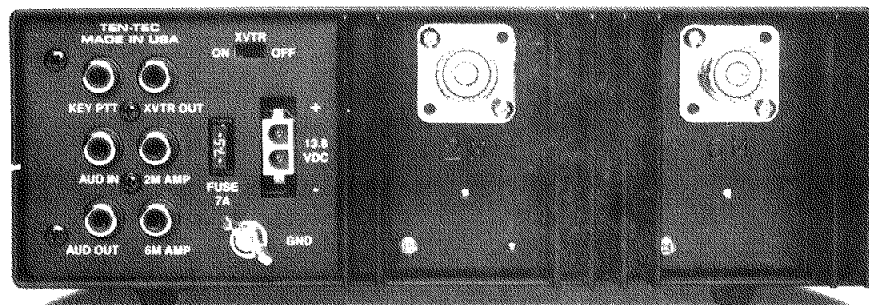
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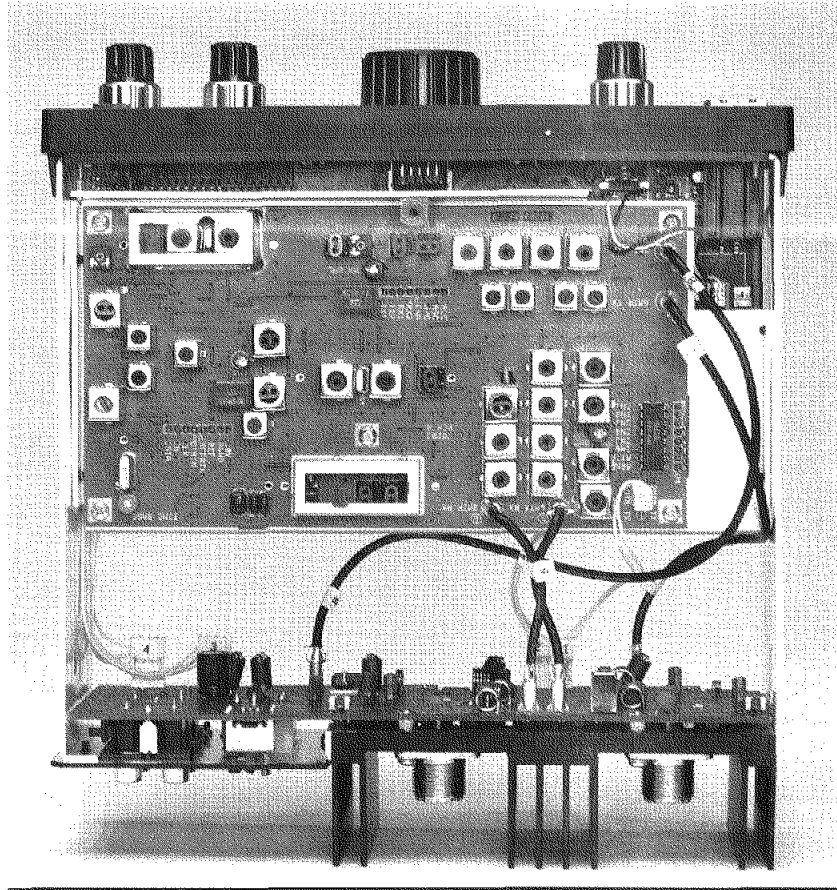
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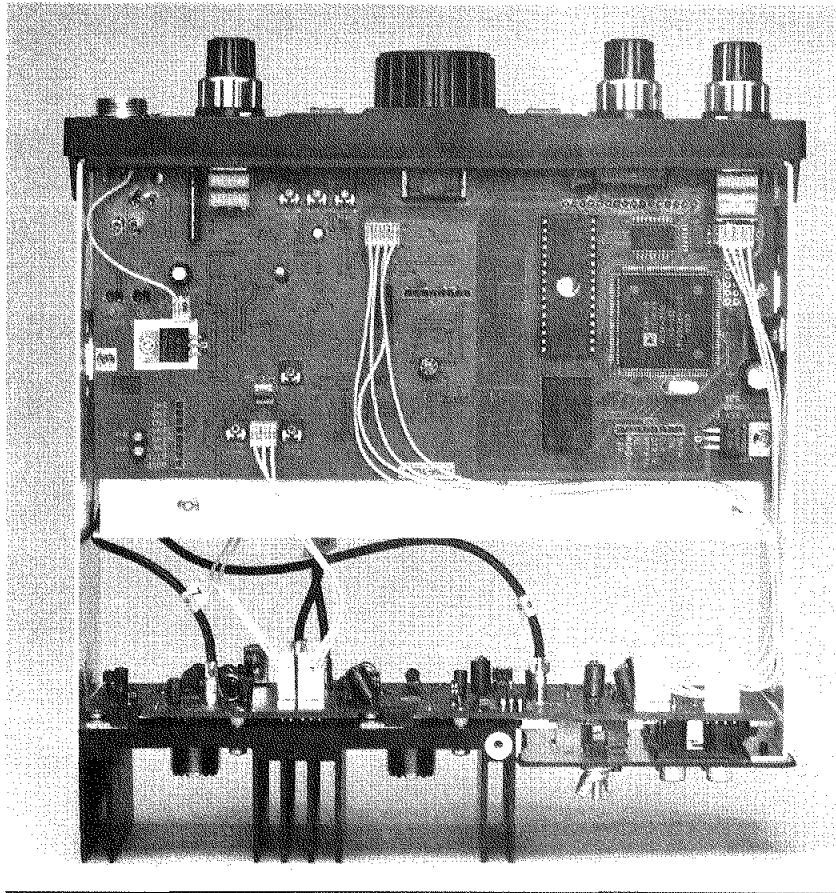
MODEL 526 FRONT VIEW



MODEL 526 REAR VIEW



**MODEL 526TOP VIEW**



**MODEL 526 BOTTOM VIEW**

Part No. 74265  
1<sup>st</sup> Printing, May 2001  
Printed in U.S.A.

## MODEL 526 SPECIFICATIONS

**MODES:** CW, FM, LSB, USB

**FREQUENCY RANGE:** 50-54 and 144-148 MHz transceive. 136-174 MHz receive.

**DISPLAY:** 7 segment LED's for main and secondary

**DUAL VFOs** with SPLIT mode

**TUNING STEPS:** selectable 10 Hz or 1 kHz SSB and CW, 2.5 or 10 kHz FM.

**OFFSET TUNING:** +/- 10 kHz receive, (SSB and CW modes)

**FM REPEATER OFFSETS:** standard for 6m and 2m. Programmable for odd splits.

**CTCSS:** built-in, encode only.

**MEMORIES:** 100

**ANTENNA:** 50 ohms unbalanced, separate SO-239 output connectors for 6m and 2m

**POWER REQUIRED:** 400 mA receive (no signal), 6A transmit @ 12-14 VDC

**CONSTRUCTION:** 4 epoxy glass PC boards, molded front panel, aluminum chassis, texture painted steel top and bottom.

**DIMENSIONS:** HWD 2.75" x 8.5" x 8.75" (7 x 21.6 x 22.2 cm)

**WEIGHT:** 4.5 pounds (2.05 kg.)

### TRANSMITTER

**RF OUTPUT:** 1-20 watts, ALC stabilized

**MICROPHONE INPUT:** 200 to 50k ohms, 4 pin, front panel connector accepts microphones with 5 mv (-67 dB) output. Voltage provided at mic jack for polarizing electrets.

**T/R SWITCHING:** PTT on SSB and FM, QSK on CW.

**METERING:** forward power

**SSB GENERATION:** DSP

### RECEIVER

**SENSITIVITY:** .20 uv typical for 10 dB S+N/N @ 2.4 kHz bandwidth, SSB mode.

**SELECTIVITY:** 35 filters built-in; 200-1000 Hz in 50 Hz steps, 1000-2800 Hz in 100 Hz steps.

**S-METER:** Calibrated to 50 uv at S-9

**I-F FREQUENCIES:** 1<sup>st</sup> I-F 45 MHz, 2<sup>nd</sup> I-F 450 kHz, 3<sup>rd</sup> I-F 14.5 kHz

all specifications subject to change without notice.



## CHAPTER ONE

### YOUR 526 MULTI-MODE VHF TRANSCEIVER

#### 1-1 INTRODUCTION

Ten-Tec's Model 526 is a "multi-mode" VHF transceiver with modern and versatile digital signal processing technology (IF-DSP). Its transmitter operates on the amateur six and two meter bands, and there is extended receive coverage from 136 to 174 MHz. Digitizing the transmitter and receiver IFs allows the "6N2" to provide FM, LSB, USB, and CW modes with multiple IF bandwidths and mode-specific tuning rates in a compact economical package.

The 526 has built in capability to use standard and non-standard frequency offsets for FM repeater operation with selectable EIA tone encoding. The transceiver features two VFO registers and 100 memories, which store frequency and mode. Features for the SSB/CW operators include Receiver Incremental Tuning, an adjustable noise-blanker, CW sidetone settings, and a tuning lock on the front panel. There are distinct fast and slow tuning rates for the SSB/CW modes and for FM. The squelch works in all modes and Ten-Tec's renowned QSK CW is standard.

Operating frequency, to 10-hertz resolution, appears on a large, bright LED numeric display and a smaller display conveys mode-dependent settings for bandwidth, encoder tone frequency, noise blanker setting, and offset tuning. The tuning knob has an electronic lock to prevent inadvertent frequency changes. The "6N2" provides band scanning by either channel memory or tunable frequency limits. The channel-scanning mode allows the operator to exclude selected channels

from the scan without removing them from memory. Band-scan with all-mode squelch makes searching for activity simple and quite convenient.

The rear panel has connections for an audio modem or similar equipment, and provides separate keying lines for external RF power amplifiers. Two-meters is popular as an IF exciter for UHF or microwave transverters, so Model 526 includes a switch and connector to supply low-level RF to a transverter. Separate antenna connectors for each band simplify band hopping and station hookup.

**1-2 UNPACKING** Examine the model 526 for signs of shipping damage. Should any damage be apparent, notify the delivering carrier immediately, stating the full extent of the damage.

Retain all damaged cartons. Liability for shipping damage rests with the carrier. It is recommended you keep the shipping carton and fillers in the event that storage, moving or re-shipment becomes necessary.

The following hardware and accessories are packed with the model 526. Make sure that you have not overlooked anything.

Qty.	Part #	Description
1	#74265	User's manual
1	#74020	warranty card
1	#86067	DC power cord
2	#41020	female terminal pins
1	#35165	2 pin power connector shell
1	#38040	.050 hex allen wrench
1	#701	hand-held microphone

Replacements for the 7.5-ampere blade fuse are readily available in stores that sell automotive parts. The 7.5 ampere fuse is brown to distinguish it from other values.

If any of the previous items are missing, contact the repair department at Ten-Tec for replacements:

Repair Department	(865) 428-0364
Switchboard	(865) 453-7172
FAX	(865) 428-4483

1-3 ACCESSORIES There are several station accessory items available from

Ten-Tec and suitable for use with the model 526. Contact the Ten-Tec sales department for pricing and availability information.

- 306 - 4 pin to 2 pin power supply cable adapter
- 705 - desk microphone
- 937 - +13.8 VDC, 11 amp power supply
- 35057 - 4-pin microphone connector
- 80-573 - 2-pin DC connector with pins

## CHAPTER 2

### TRANSCIVER OPERATION

#### 2-1 POWERING UP FOR THE FIRST TIME

The model 526 transceiver requires a stable DC power source for operation. Optimally 13.8 VDC, operational from 12-14 VDC. Maximum power drain on full power transmit is 6 amperes.

*DO NOT CONNECT THE MODEL 526 DIRECTLY TO AC MAINS! DAMAGE WILL RESULT!*

Use the provided power cable (Ten-Tec p/n 86067) to connect the DC power source to the 526. Observe correct polarity. While the model 526 is fuse and diode protected on the DC input, damage may be caused by reversed polarity connection to the radio and is not covered by warranty.

Ten-Tec's model 937 13.8 VDC 11 amp power supply is recommended to power the unit from standard 120 VAC.

After the power supply has been connected to the 526, turn on the power supply. Rotate the black knob at far right to turn the transceiver power on. Always enable the power supply first, then turn on the 526.

**2-2 MASTER RESET** On rare occasions you may find the transceiver will not accept commands properly or it is operating in an erratic manner. Spikes or surges on the power supply line or an unforeseen set of circumstances may confuse the microprocessor. This technology has improved dramatically in recent years but it is still possible to have an occasional 'glitch' or lock-up. If turning the power on and off does not resolve the problem, a MASTER RESET may be performed. To reset, turn transceiver power off. Press and hold

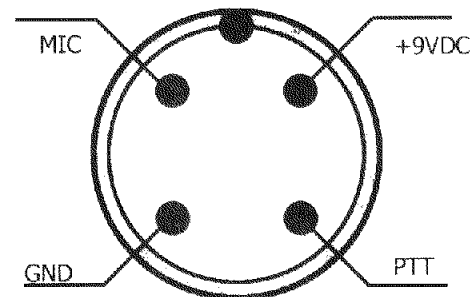
the FUNC button. Turn transceiver power on while continuing to hold the FUNC button for 5 seconds. Release the FUNC button. Performing a master reset will also erase all programmed memories.

#### 2-3 FRONT PANEL CONNECTORS

There are two front panel connectors on the left side of the transceiver for connection of a microphone and for connection of headphones. The headphone jack is usable with either stereo or mono headphones.

The front panel microphone jack is for a standard 4 pin mic connector. The included model 701 hand microphone is pre-wired for use with the 526.

See Figure 1-1 for pin-out of front panel microphone jack.



Front View of 526

**Fig. 1-1. 4 pin mic connection. Front view of transceiver.**

**2-4 REAR PANEL** There are several connectors, one switch, and one fuse accessible on the 526 rear panel.

#### 2-4.1 ANTENNA CONNECTIONS

Two SO-239 style antenna connectors are provided. Stamped on the rear heat sink are the band connections for each. The 2 meter antenna can be connected to

the SO-239 in the center of the radio. The 6 meter antenna can be connected to the SO-239 on the right rear (as seen from the rear). There is no antenna switch on the 526. The radio will automatically use the appropriate antenna connector for output depending upon which band has been selected.

Both connections are for a typical 50 ohm unbalanced coax fed antenna. The load impedance capability of the 526 is 25 to 100 ohms (i.e. up to a 2:1 SWR). Do not exceed an SWR of 2:1.

**2-4.2 REAR ACCESSORY CONNECTORS** Six "RCA-style" phono connectors have been provided for connection of accessory equipment.

**2-4.3 KEY PTT** This phono jack is for connection of a key for CW operation or for a PTT connection to key the radio in SSB or FM mode.

**2-4.4 AUD IN** Audio input. For connection of external equipment like a terminal node controller.

**2-4.5 AUD OUT** Audio output. This is a fixed line level output, 150 mv p-p at 600 ohms. Level is fixed and independent from front panel AF control.

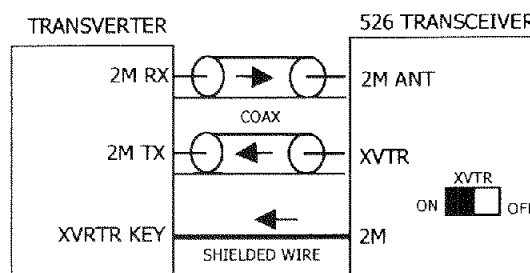
**2-4.6 2M AMP** Connections are provided for keying amplifiers for 2 meters and 6 meters separately. If a 2 meter amplifier is placed into use with the 526, connect the linear amplifier keying relay to this jack. Maximum voltage and current that may be present from the amplifier at this jack is 13.8 VDC and 100 mA.

**2-4.7 6M AMP** If a 6 meter amplifier is placed into use with the 526, connect

the linear amplifier keying relay to this jack. Maximum voltage and current that may be present from the amplifier at this jack is 13.8 VDC and 100 mA.

**2-4.8 XVTR OUT** The 526 XVTR OUT jack supplies a low level 144 MHz output designed to drive transverters at +5 dBm. Setting the XVTR switch on the rear panel to ON with BAND set to 2 meters will disable the 20 watt P.A. and connect the driver amplifier output to the jack. Use the diagram shown in Figure 2-1 as a guide to connecting the transceiver. 6 meter operation is not affected. The receive and transmit IF signals must run in coaxial cable between the transverter and the 526. We advise shielded wire for the keyline to the transverter.

Please note the following **important** precaution: Be certain that the XVTR switch remains ON whenever the transverter IF cables are connected to your transceiver. This will avoid damaging the transverter by applying full power 2 meter output.



Connecting a Transverter to Model 526

**Figure 2-1**

**2-4.9 XVTR SWITCH** This switch is used for turning the transverter output jack on and off for 144 MHz output.

# OMNI-VII

"I was struck by how clean, natural and quiet the receiver sounded in comparison to some DSP based radios. I found the Omni-VII a real pleasure to listen to - in any mode." - W1ZR, in the ARRL Product Review, QST July 2007

"What a neat little package! I'm having more fun with this thing!" - K1SA

"In 40+ years and many receivers, the Omni-VII is the most sensitive, most QRM proof and most pleasant to operate I have enjoyed. The noise blanker and noise reduction systems really help me in dealing my sometimes noisy location." - K6LE

"High quality manufacturing...overall a very impressive transceiver" - W9AC

"As an avid CW operator, it is like listening to your favorite music while operating." - N1SW

"I can say that in my 30+ years of operating I've never enjoyed a rig more than the Omni-VII. The audio is superb as is the QSK, ergonomics, receiver characteristics and on and on." - W7TEA

"Close-in dynamic range unsurpassed by any other general coverage radio." - Radio Society of Great Britain RadCom review, September 2007

"Once again, Ten-Tec has produced a superb transceiver, with great SSB audio and their famous QSK." - K4SQR

"My Dad, KB2LAU, in Florida has become active again using my Omni-VII in Vermont. He is enjoying daily contacts [via Internet remote control]. Being a ham with limited to no antenna options, this has been a great opportunity." - W1ZN

## Are you next?

Find out what they found out about the new Ten-Tec Omni-VII. Nothing in its price category matches it for receiver performance, ease of use, remote control capability or features! Contact us for complete information today - or see the Omni-VII demo video at [www.tentec.com](http://www.tentec.com)

1185 Dolly Parton Pkwy., Sevierville, TN 37862 **Sales: 800-833-7373**

We accept Visa, MC, American Express and Discover. Office (865) 453-7172. FAX (865) 428-4483.

Sales: Mon-Fri 8:00-5:30 Eastern [sales@tentec.com](mailto:sales@tentec.com). Service: Mon-Fri 8:00-5:00 Eastern [service@tentec.com](mailto:service@tentec.com) (865) 428-0364.



Connect a suitable transverter open TX line to the XVTR OUT jack. When the XVTR SWITCH is in the ON position, output power through the final amplifier to the 2 meter antenna is disabled and a low level signal at 144 MHz appears at the XVTR OUT jack. When this slider switch is in the OFF position, 144 MHz output is through the final amplifier to the 2 meter antenna, and no output is present at the XVTR OUT jack.

It will be necessary to connect the RX side of your transverter to the 2M SO-239 antenna jack when a transverter is placed into use. Only the 144 MHz low level TX signal is present through XVTR OUT jack.

**2-4.10 FUSE 7A** This is an automotive-style blade fuse, 13.8 VDC at 7.5 amperes, connected in series with the + line of the DC power connector.

**2-4.11 GND** This wingnut connector is used for connection to station grounding.

**2-5 FRONT PANEL KNOBS** There are four knobs on the front panel of the 526 transceiver.

**2-5.1 MAIN TUNING** The largest knob, in the center of the radio's front panel, is the main frequency tuning knob. This knob is used for no other purposes. This knob can be electrically 'locked' with the LOCK function described in section 2-6.9 of this manual.

**2-5.2 MIC/PWR** One of the front panel knobs is a concentric potentiometer marked MIC/PWR. The outer silver ring is for varying RF power output. The meter above the knob measures forward power output. To adjust power output, place the radio in CW mode by using the MODE button at the far right

of the front panel. Press and hold the PTT button on the hand microphone or ground the rear panel KEY PTT jack. The radio is now transmitting in CW mode. Adjust the RF power control for the desired output level. Output power is adjustable from 1 to 20 watts, ALC-controlled.

The black inner knob is used to adjust mic gain in SSB mode, or FM deviation in FM mode. To set, proper mic gain in LSB or USB mode, speak into the microphone until the ALC light (just to the left of the mic gain control) flashes on voice peaks. To set proper FM deviation, adjust the mic gain control just until the meter begins to show an indication of power output on voice peaks.

**2-5.3 AF/SQL** This concentric potentiometer is located at the far right side of the transceiver. The silver outer knob is used for receiver squelch. Rotate the silver ring clockwise to increase squelch threshold. Squelch is usable in all modes.

The black inner knob functions as both the power on/off switch and the audio gain (volume) control. To turn the 526 on or off, turn the knob clockwise. To increase receiver volume, rotate the knob clockwise.

**2-5.4 MULTI** To the immediate left of the AF/SQL knob is an unlabeled knob. This knob is used for adjustment of multiple transceiver functions. Individual uses for this knob are as described in relevant sections of this manual.

## **2-6 FRONT PANEL BUTTONS**

There are 12 buttons on the front panel of the 526 that control most operation functions. Additionally, some buttons

have more than one function. Main function for each particular button is printed on the button. 'Subfunctions' are printed on the front panel above each button and are accessible by using the FUNC button. There are also three subfunctions, accessible with the FUNC button, that are not printed on the front panel. These unlisted subfunctions are sidetone level, memory clear and master reset, and are described elsewhere in this manual.

Unless otherwise noted, 'press' means 'press and release' when this manual refers to front panel buttons on the 526.

**2-6.1 FUNC** To the lower right of the main tuning knob is the FUNC button. This button is used for accessing 'subfunctions' for several buttons. Pressing FUNC will cause the sub-display to indicate 'Func'. Press the desired button to activate a sub-function. Example: To operate the noise blanker, press FUNC, then the A=B button (sub-function is NB, printed above the button). The sub-display will change to read the noise blanker value.

**2-6.2 BAND** In the upper right corner is the band selector button. Use to select the desired band.

**2-6.3 MODE** The 526 will operate CW, USB, LSB, and FM modes. To select a mode, press the MODE button. An annunciator indicating the selected mode will appear above the main frequency display. Press the MODE button to rotate through the four mode options.

**2-6.4 B/W (subfunction TONE)** This button is used to adjust receiver bandwidth filtering in LSB, USB, and CW modes. Press the B/W button. The

sub-display will indicate receive filter value. Rotate the knob directly under the B/W button to adjust. In SSB modes, B/W is selectable from 1500-2800 Hz. In CW mode, B/W is selectable 200-2800 Hz.

In CW mode, the TONE subfunction is used to select CW offset and sidetone pitch (these two are autotracking). Adjustment is in 20 Hz steps from 400-1000 Hz (1000 Hz is displayed as 999 Hz on the sub-display). To adjust, press FUNC then the B/W button in CW mode. The sidetone will now be audible. Rotate the knob to adjust. When complete, press the B/W button again.

In FM mode, the TONE subfunction is used to select CTCSS tone encode. It is not necessary to press FUNC beforehand in FM mode to access. In FM mode, press the B/W button. The sub-display will now display the selected value, in Hz, for CTCSS tone. The TONE annunciator above the main display will light to indicate that a CTCSS tone is now being used on transmit. Rotate the knob below the B/W button to adjust.

**2-6.5 RIT** RIT is for receive incremental tuning. RIT is disabled in FM mode. To operate, press RIT. The 'RIT' annunciator above the sub-display will light. Use the knob directly below the RIT button to adjust value. The sub-display will show the RIT value in tens of Hz. Example 0.05 on the display indicates 50 Hz. The RIT range is +/- 10 kHz.

In FM mode, the RIT button can be used to bring up and adjust repeater offsets on the subdisplay. When switching to FM mode, the subdisplay will automatically change to read a repeater offset value. On the 2 meter

band, -0.60 is -600 kHz, 0.60 is + 600 kHz, 0.00 is zero offset for simplex operation. Turn the knob directly below the RIT button to adjust the value. On the 6 meter band, -1.0 is -1 MHz, -0.50 is -500 kHz, 0.50 is +500 kHz, 1.0 is 1 MHz, and 0.00 is zero offset for simplex. Turn the knob directly below the RIT button to adjust the value.

If the subdisplay is used for another function (like setting CTCSS tone), you can bring the repeater offset information back to the subdisplay by pressing the RIT button.

**2-6.6 A=B (subfunction NB)** The 526 is equipped with two VFO's, VFO A and VFO B. These VFO's are independent of band setting. Both VFO's can be on a single band, or the VFO's can be on opposite bands. To equalize the frequency and mode information in each VFO, press A=B. Whichever VFO is active at the time the button is pressed will have information transferred to the non-active VFO.

The subfunction for the A=B button is NB (noise blanker). The noise blanker has been designed for pulse-type noise suppression. Press FUNC and then the A=B button. The subdisplay will change and read a noise blanker value between '0' and '9'. Turn the knob located to the right of the A=B button to adjust.

**2-6.7 SPLIT (subfunction FAST)** Should split frequency operation using the two VFO's be desired, press SPLIT. When transmitting, the main frequency display will change to read transmit frequency.

The SPLIT function can be used in FM mode for odd repeater splits. The 526 is equipped for 'standard' FM repeater splits of - or + 600 kHz on the 2 meter band, and - 1 MHz, -500 kHz,

+500 kHz or + 1 MHz on the 6 meter band. To set up an odd repeater split, tune the 526 to the receive (output) frequency of the repeater. Press A=B. Then tune the active VFO to the transmit (input) frequency of the repeater. Press A/B to return to the receive (output) frequency, and then press SPLIT. You are now ready to operate with an odd repeater split. Odd repeater splits can be saved in memories - see the manual section on memory storage, retrieval and scanning for more information.

The 526 is equipped with two main tuning rates, than can be toggled using the FAST subfunction on the SPLIT button.

Press FUNC, then press SPLIT. 'Func' will appear in the sub-display, followed by either 'SLO' or 'FAS'. In CW, LSB, and USB, the fast tuning rate is 1 kHz steps, slow tuning is 10 Hz steps. In FM mode, slow tuning is 2.5 kHz steps, fast tuning is 10 kHz steps.

**2-6.8 A/B (subfunction SKIP)** A/B is used to toggle back and forth between VFO A and VFO B. The appropriate annunciator for VFO A or VFO B will light above the main frequency display.

The subfunction for the A/B button is SKIP. This allows 'memory lockout' to skip over constantly busy channels when scanning memories. See section 2-8 of this manual for a complete description of memory and memory scanning functions.

**2-6.9 LOCK (subfunction ATTN)** The LOCK function locks out the main tuning knob and will not allow frequency changes. All other functions on the transceiver will continue to be operable. Note: there is no LOCK annunciator or indicator L.E.D. on the model 526. The only way to tell that the



LOCK function is operating is if no frequency change can be made with the main tuning knob.

The subfunction for the LOCK button is ATTN. The 526 is equipped with a – 20 dB attenuator. In the unlikely event that receiver overload should occur, press FUNC followed by LOCK to enable the attenuator. Like the LOCK function, no annunciator or L.E.D. is present on the front panel to indicate if the attenuator is on or off. With an antenna connected, there should be a marked audio increase or decrease when the attenuator is switched in or out of line.

**2-7 MEMORY FUNCTIONS** The 526 is equipped with 100 memories. There are not separate banks of memories for each band – all memories are grouped into one location. Memories utilizing different modes and/or bands can be entered and/or scanned. Memories will retain frequency, mode, SPLIT, repeater offsets and CTCSS tones.

**2-7.1 MW** The MW ('memory write') button controls input and output among the memories and the VFO's.

To store the displayed frequency into a memory, press MW. Turn the knob below the RIT button to select a memory location. Memory locations with no information stored will be listed with the main frequency display showing a series of dashed lines like ---.---.--, the MEM annunciator will be lit, and the subdisplay will indicate the memory channel number (from 00 to 99). To write to an empty location, press MW again and the memory will be entered.

Memory locations that have a memory currently installed will show the

memory number on the subdisplay, and the memory frequency on the main display. To overwrite a memory, press MW. The displayed information will be overwritten with that in the current VFO.

MW is also used 'in reverse' to write a currently saved memory to the active VFO. To 'load' an already saved memory into the active VFO, press MW. The memory information will be transferred to the VFO without any changes to the memory itself being made.

To clear (as opposed to 'overwrite') a memory, place the radio in memory mode. Use the knob below the RIT and B/W buttons to scroll to the memory channel you want to clear. Press FUNC and then press MW. The memory channel will return to a series of dashed lines ---.---.-- and the channel number, indicating no memory is saved at that location.

**2-7.2 V/M** This button controls toggling back and forth between VFO and memory mode. To enter memory mode, press V/M. The MEM annunciator will light, and the active memory channel number will appear on the subdisplay. To tune through the memories, use the small knob located just below the RIT button. Memories will be shown in numerical order from 00 to 99. Blank memory locations will be indicated by a series of dashed lines.

The V/M button also has a subfunction not shown on the front panel. In CW mode, press FUNC then press V/M to adjust sidetone volume for CW transmit. The sub-display will give a value of 0 to 9 for sidetone level, adjustable by using the knob under the RIT and B/W buttons. To set, first adjust the receiver volume control to approximately the level you will operate

the radio at in CW mode. Then, adjust the sidetone level to a comfortable setting.

**2-8 SCAN FUNCTIONS** The 526 has the capability of scanning either the bank of memories or a range of frequencies on either 2 or 6 meters.

**2-8.1 BAND SCANNING** The 526 can be set up to scan a range of frequencies on the same band.

For band scanning, set VFO A to the desired scan start frequency, and VFO B to the desired scan end frequency. Return the radio to VFO A, squelch the receiver using the SQL knob, and press SCAN. The radio will begin scanning from the VFO A frequency towards the VFO B frequency. Band scan will momentarily pause when a received signal breaks the squelch threshold, and will resume when the signal disappears below the squelch.

When the scan reaches the 'end' frequency of the desired range, it will return to the beginning scan frequency and will re-start scanning towards the end frequency automatically.

A scan can also be started from VFO B towards VFO A by starting the scan from VFO B rather than VFO A.

Scan direction can be reversed in the middle of a band scan. While the 526 is scanning, rotate the knob that is located under the B/W and RIT buttons. The 526 will change scanning directions.

There are two methods for stopping a band scan. Depending on what you want the radio to do when a scan is ended, press either SCAN or V/M to stop a band scan.

Using V/M to stop a band scan will enter the frequency that the scan was stopped on into the active VFO, and put the radio immediately in VFO mode to

allow the operator to tune around the band.

Using SCAN to stop a band scan will put the radio in VFO mode on the frequency from where the band scan was started.

The mode the radio is placed in and the main tuning knob rate selected for the radio will affect the step size and rate of the band scan.

In FM mode, the radio will band scan in 2.5 or 10 kHz increments, depending on whether fast or slow tuning rate was selected at the time the scan was started.

In SSB and CW modes, the radio will band scan at either 10 Hz or 1 kHz steps depending on tuning selection at the time the scan is started.

**2-8.2 MEMORY SCANNING** The bank of memories can be scanned, independent of frequency or mode that is present in each memory channel. A memory scan will scan all programmed memories, unless they have been 'locked out' using the SKIP function.

To start a memory scan, squelch the receiver using the SQL knob, then press SCAN to start the scan. The 526 will begin scanning through the memories, and will continue to scan until a received signal breaks the squelch threshold. When a signal breaks the squelch threshold, the scan will pause until the signal disappears back under the squelch. The scan will then resume.

To stop a memory scan, press the SCAN button. The radio will now be operating in memory mode, on the memory channel where the scan was stopped.

**2-8.3 MEMORY LOCKOUT** You may find it useful to be able to 'lock out' one or more specific memory channels while in memory scan. Some memories

(like weather information in the 162 MHz band) may constantly stop a scan in progress. The operator can tell the 526 to skip a given memory location while scanning.

Put the 526 in memory mode and use the knob located below the RIT and B/W buttons to tune through the memories. When you have tuned the radio to the memory that you want to lock out, then press FUNC and then press the A/B button (subfunction SKIP). A "minus sign" will appear in the sub-display next to the locked out memory channel number. Press SCAN to start your memory scan. Any memory marked with a "minus sign" will be automatically skipped during a memory scan.

## CHAPTER 3

### TECHNICAL DATA

#### 3-1 THEORY OF OPERATION

The Functional Block Diagram shows the signal paths of the 526 transceiver without regard to which subassembly each inhabits.

The architecture exploits the relation between the amateur 50 MHz and 144 MHz bands which allows a single half-octave range frequency synthesizer to serve as First Local Oscillator for both, while providing desirable receiver coverage for the VHF Hi-Band.

The Model 526 transceiver comprises four printed circuit board assemblies:

- 78203 RF Board;
- 78178 Logic Board;
- 78177 Amplifier Board; and
- 78149 Display Board.

Schematic diagrams for each of the circuit boards are in the rear of this manual. The Functional Block Diagram provides an overview of the transceiver's electronic design and the Board Interconnection Diagram shows how signals travel among the circuit board assemblies. Refer to them as necessary for the following discussion.

##### 3-1.1 RECEIVER FRONT-END

Refer to the RF Board schematic. The 526 receiver has three preamplifiers: Q10 for 6-meters; Q11 for two meters; and Q12 for the extended VHF Highband coverage. The selected band and actual tuned frequency cause the processor to automatically select the appropriate circuit. Following the preamps, two field-effect transistors, Q20 & Q21 on sheet 4, in a balanced

first mixer accept local oscillator (LO) injection from Q19. High-side injection converts the 6-meter frequencies to the 45 MHz first IF, and low-side injection converts two-meter frequencies to the same IF. A monolithic crystal filter, FL1, establishes the 15-kilohertz bandwidth for the receiver, followed by a gain-controlled amplifier, Q11.

##### 3-1.2 IF STAGES

The 14.85 MHz reference crystal oscillator, Y2 & U18 on sheet 2 of the RF Board schematic, drives a frequency-tripler stage, Q10, to develop the second LO frequency of 44.55 MHz. This enables a double-balanced diode mixer, D5, & D6, to convert received signals from the first IF to the second IF at 450 kilohertz. A grounded-gate amplifier and tuned autotransformer, Q15 & T8, provide an impedance-match to a 450 kHz ceramic IF filter, FL3, with 15 kHz bandwidth. Next, amplifier, Q28 – Q30, drives a balanced IF transformer to feed both the third mixer and the automatic gain control detector/amplifier, Q17, Q18, D17 & D18.

##### 3-1.3 CONVERSION TO DSP

Refer to the 78178 Logic Board schematic. The 74HC74, U14, divides a DSP clock by 4 to produce the third LO at approximately 464 kHz. This LO drives an analog switch mixer, U13, to convert the second IF signals to the 14 kHz third IF. The IF signal goes directly to an AD73311AR CODEC IC, U19, that samples and digitizes the IF at approximately 58 kilosamples per second. An Analog Devices ADSP2181 Digital Signal Processor (DSP), U1 on sheet 1, handles all receiver filtering, fine tuning, and demodulation in the digital domain and

also interfaces with the front panel controls and indicators.

For example, the DSP counts pulses from the tuning knob encoder and translates them into phase locked loop control numbers to tune the first LO. The tuning rate depends on the operator-selected rate (FAS or SLO) and mode (CW/SSB or FM). The first LO tunes in 2.5 kHz steps, and the DSP accomplishes the fine-tuning required for effective CW and SSB operation. A 128-kilobyte EPROM, U2, and an 8-KB battery-backed RAM, U3, support the processor with program and data memory. The digital bit stream representing received audio drives the digital-to-analog section of the first codec, U19, which converts it back to analog for the audio power amplifier IC, U16, and the speaker. Associated circuitry combines analog and digital gain control signals to drive the receiver's S-meter and SQUELCH functions.

The front panel VOLUME control applies a DC level to a pin on U16 to set the audio level in the speaker or headphones.

### 3-1.4 LOCAL OSCILLATORS

Three local oscillators provide the transmitter and receiver circuits with the signals to effect triple-conversion between amateur frequencies and the three intermediate frequencies. Sheet 2 (78203SCH2) of the RF Board schematic diagram shows the phase locked loop first local oscillator. Y1 is the transceiver time-base, providing the reference for the first and second LOs. U1 provides the oscillator support for the crystal, and trimmer capacitor, C1, is the frequency adjustment. Field effect transistor Q5 and associated components form a voltage-controlled oscillator

(VCO) in the 91 to 129 MHz range tuned primarily by D1 & L1. U1 supplies the reference oscillator to the Logic board via buffer Q27, and to frequency tripler Q9 to develop the second LO at 44.550 MHz. U1 receives frequency steering information from the Logic board via clock, serial data, and enable lines and sends frequency/phase error pulses to the charge pump formed by Q1, D2, Q3, & Q6. C20, C18, & R16 form the loop filter and supply tuning voltage to the VCO. U16 compares the divided-down VCO frequency with that of the divided-down reference frequency to generate the error pulses and lock the loop. Q2, Q4, Q7, & Q8 buffer the VCO signal to isolate it from its loads.

### 3-1.5 TRANSMITTER AND MODULATION

The transmit process begins on sheet 2 of the Logic board with microphone audio amplifiers, U17A & B, which feed the analog-to-digital section of a second codec IC, U20, for conversion to digital. Circuitry associated with U28 & U28 combines analog and digital gain control signals to drive the receiver's S-meter and SQUELCH functions.

For CW operation the operator's key actually generates a digital signal which goes directly to the DSP. Depending on the mode selected the DSP generates, filters, and modulates (or keys) a carrier, and applies fine-tuning as necessary. The result is a digital representation of the CW, SSB, or FM signal at the first IF (approximately 14kHz). The digital data returns to the second codec, U20, which converts it to an analog 3<sup>rd</sup> IF signal.

### 3-1.6 TRANSMITTER I-F STAGES

Like the receiver third mixer, the first mixer encountered in the transmitter is an analog switch IC, U12, driven by the previously mentioned U14. This mixer converts the 14 kHz signals to the 450 kHz second IF. U29A is a buffer amplifier, biased by U29B, and feeds the third IF signal back to the RF Board (sheet 4) where a tuned IF transformer, T12, and a 450 kHz ceramic filter, FL4, with 15 kHz bandwidth remove unwanted mixer products. The second mixer is an MC1496 IC, U9, which accepts the second LO signal and the second IF signal to produce a 45 MHz IF signal. A tuned transformer, T3, at the mixer output feeds a monolithic crystal filter, FL3, which drives the first mixer, a double-balanced diode ring, D13 & D14. R87 and C113 provide critical mixer balance adjustments for use with a spectrum analyzer. The first local oscillator signal from the VHF PLL enables the mixer to produce both sum and difference frequency products. The sum product is at two meters and the difference is at six meters.

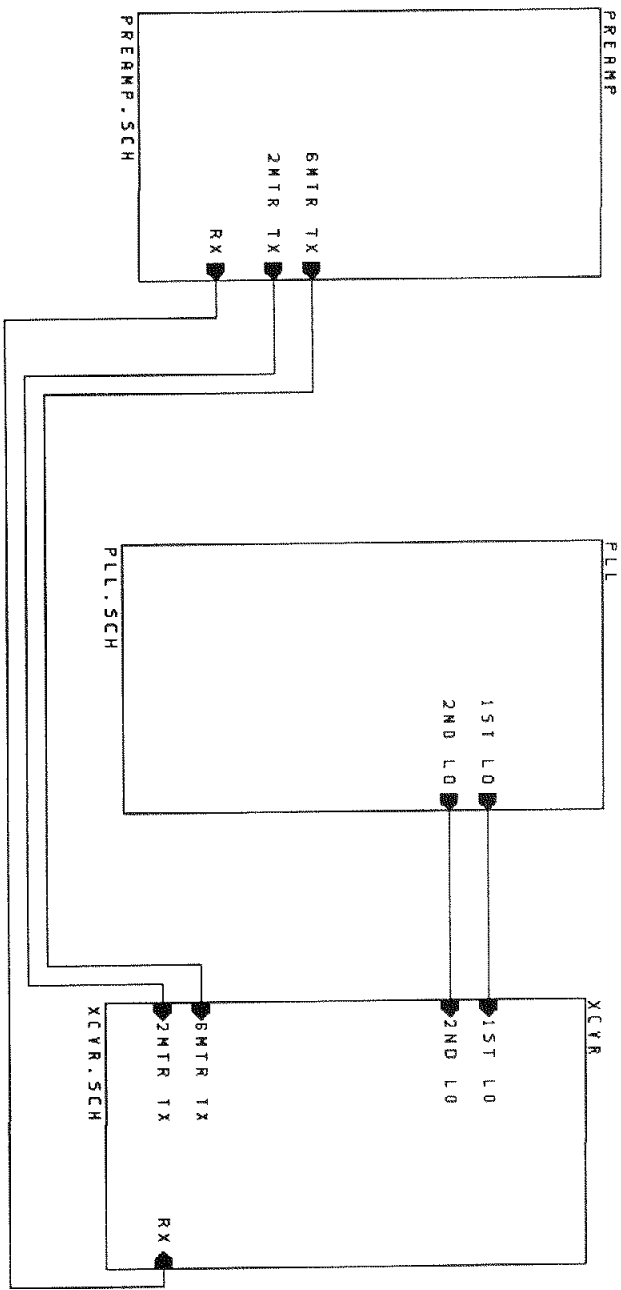
### 3-1.7 LOW LEVEL DRIVERS

Separate low-level driver amplifiers for each band, Q14, Q16, & Q26 for 50 MHz, Q15, Q13 & Q29 for 144 MHz, accept the mixer output, but lines from the processor activate only one, based on the BAND selection from the front panel. Starting with these amplifiers the transceiver has separate paths for the two bands. Each driver amplifier feeds through its own two-stage 20-watt power amplifier (schematic 78177) to an SO-239 antenna jack for each band.

### 3-1.8 FINAL AMPLIFIERS

Refer to the 526 AMPLIFIER schematic for the following: Q19, Q4, & Q6 form the 2-meter power amplifier chain. Q9 & Q11 form the 6-meter PA chain. Q5, D3, D4, and associated circuitry are an active bias regulator, adjusted by R12, for the 2-meter PA. Q10 and surrounding circuitry serve that function for the 6-meter section. R42, U1, & Q15 develop a control voltage proportional to collector current in the active amplifier and feed it back to Automatic Level Control (ALC) circuitry on the RF board. U2a and U2B amplify RF detectors on 2-meters and 6-meters respectively. On each band, a quarter-wave filter separates the diodes to ensure that the power reading is valid for any load phase. This ALC feedback, combined with the POWER control setting, adjusts the bias in the driver amplifiers to maintain the transmitter output at a safe and controllable level. The ALC signal also drives the POWER meter in transmit.

A positive voltage on the 2TX line at J12 switches D9 and D12 on during 2-meter transmit periods to enable the transmit RF path and short the receiver input. There are corresponding parts on the board for 6-meters. S1, Q18, R1 – R3, and associated circuitry supplies a +5dBm 2-meter RF signal for driving transverters. The receive signal from the transverter connects to the normal e-meter antenna jack. Be certain that the XVTR switch is set to ON before connecting any transverter.



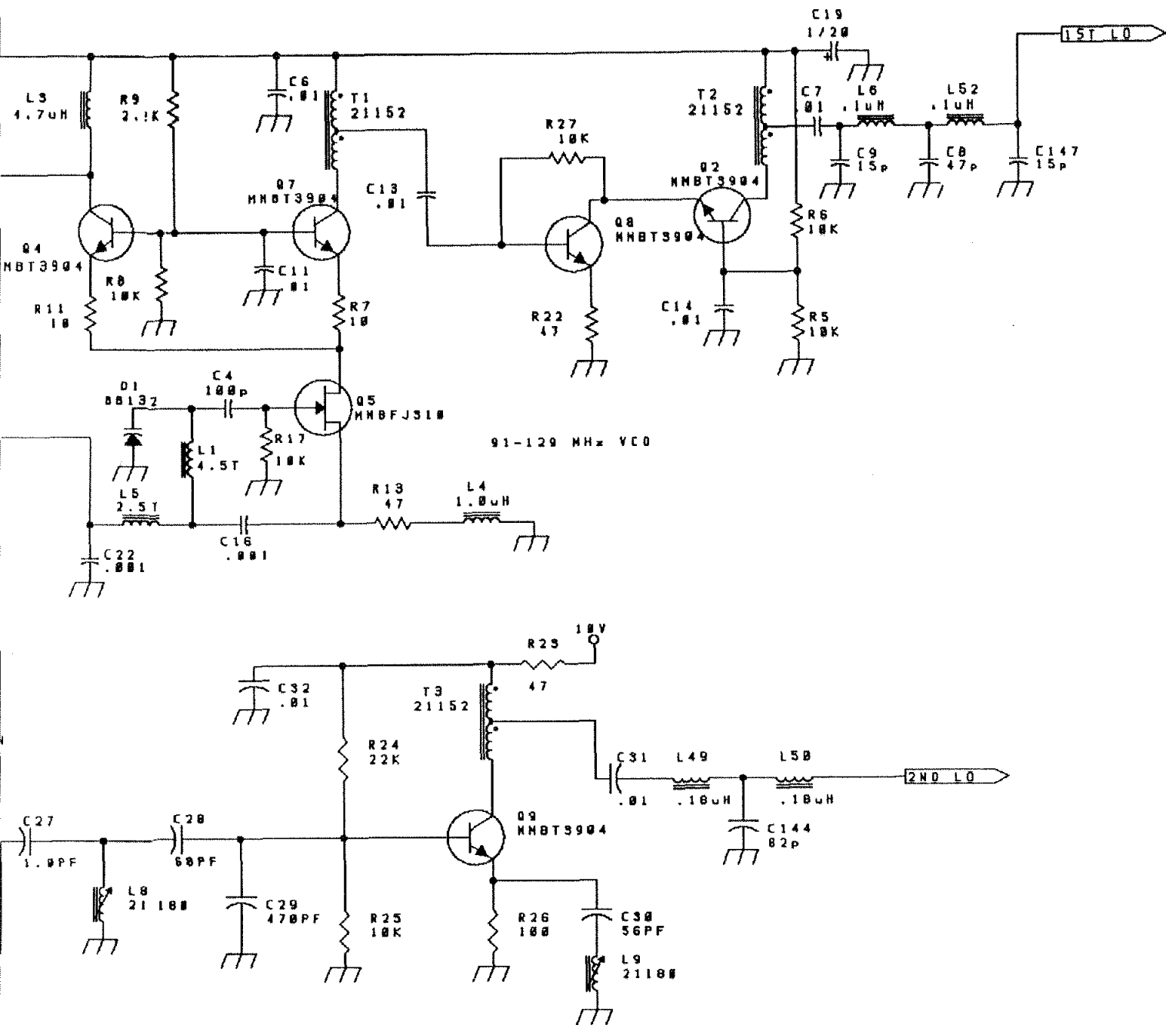
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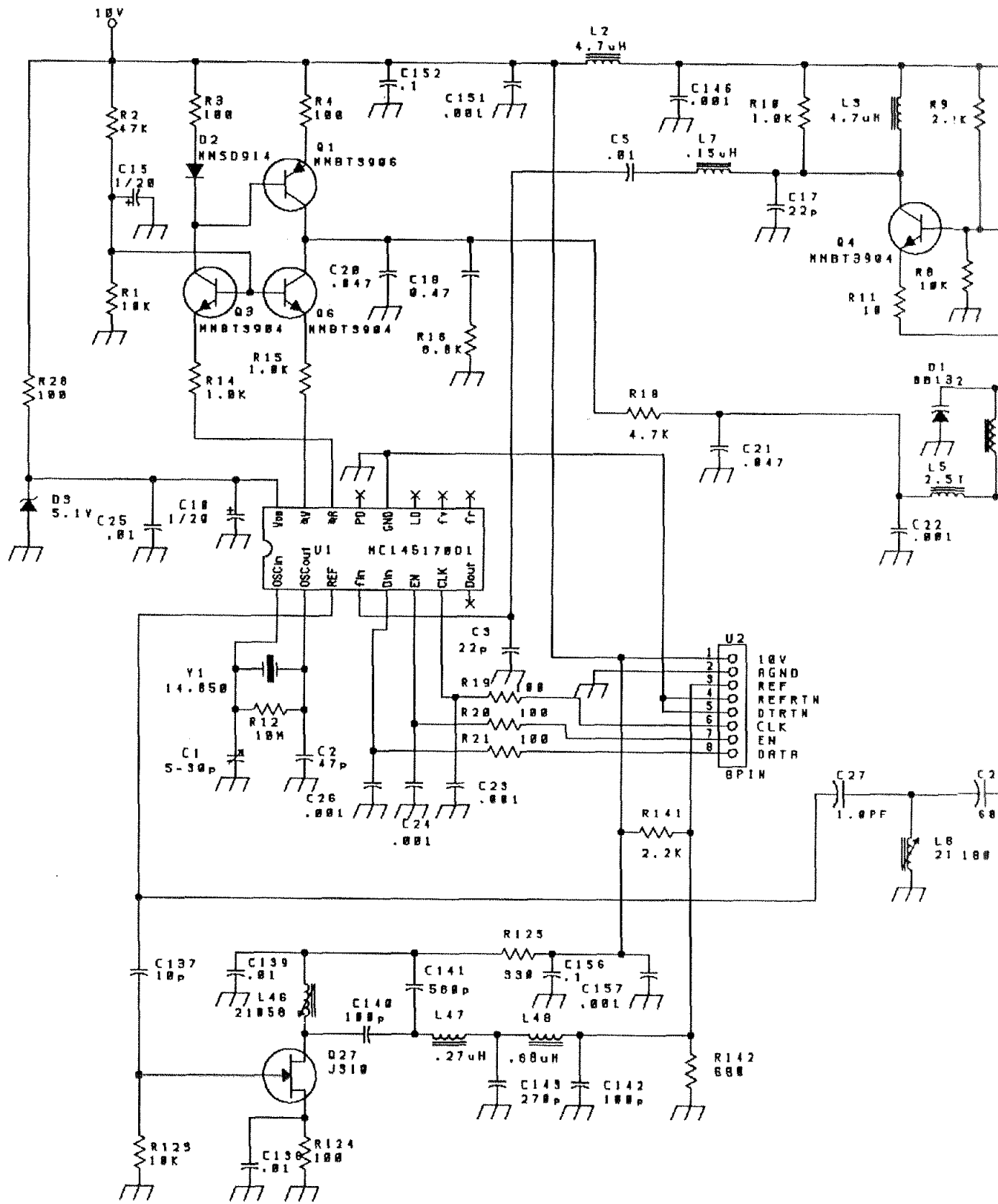
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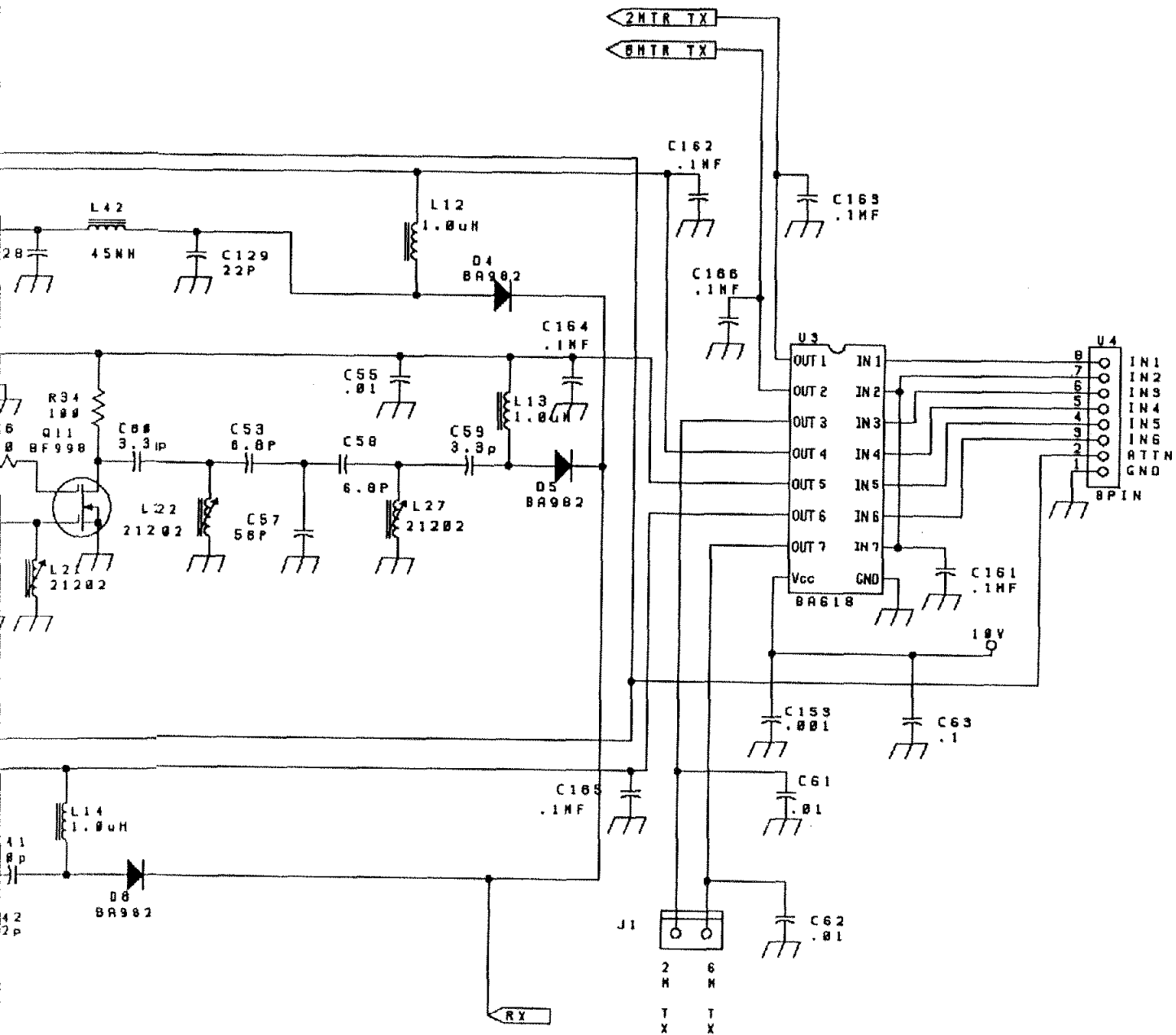
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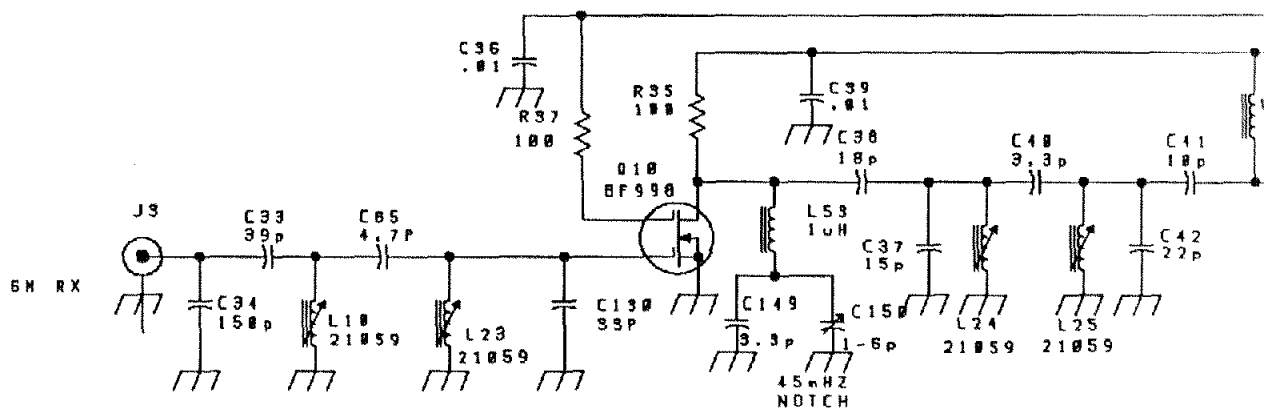
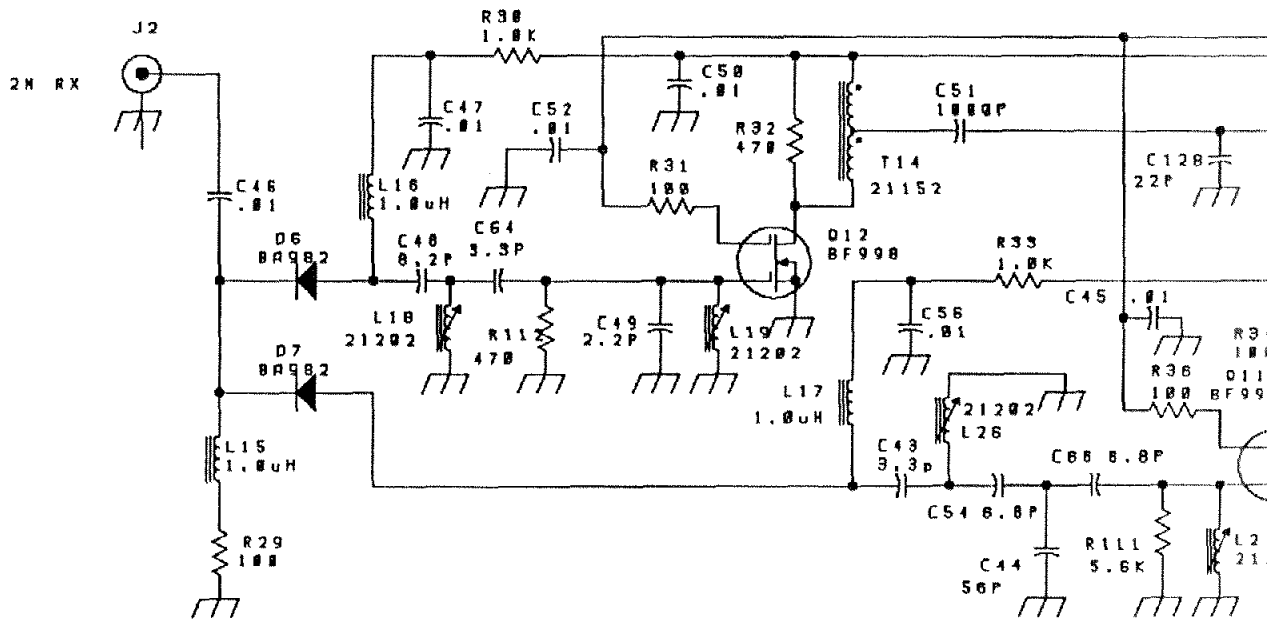
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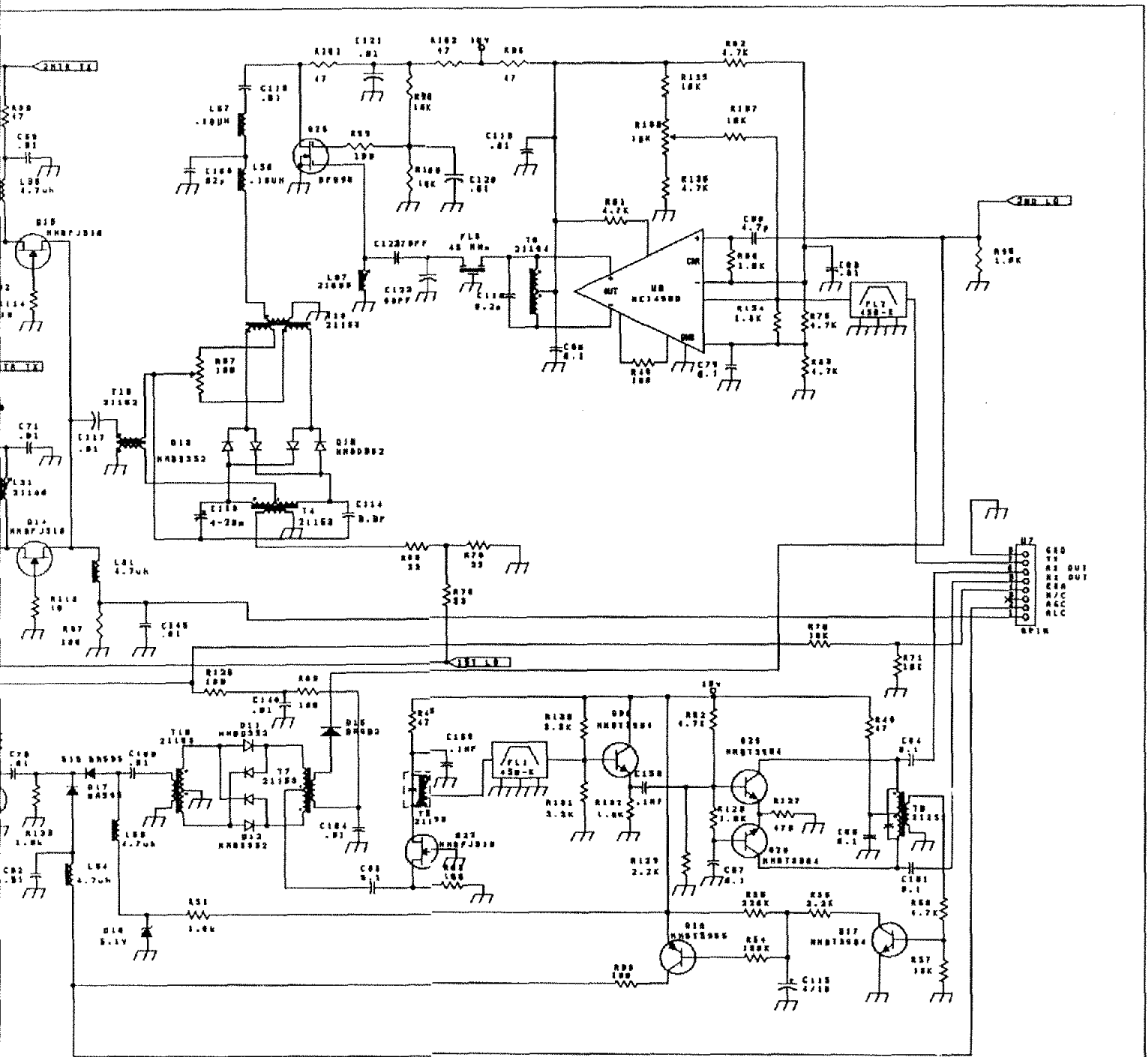
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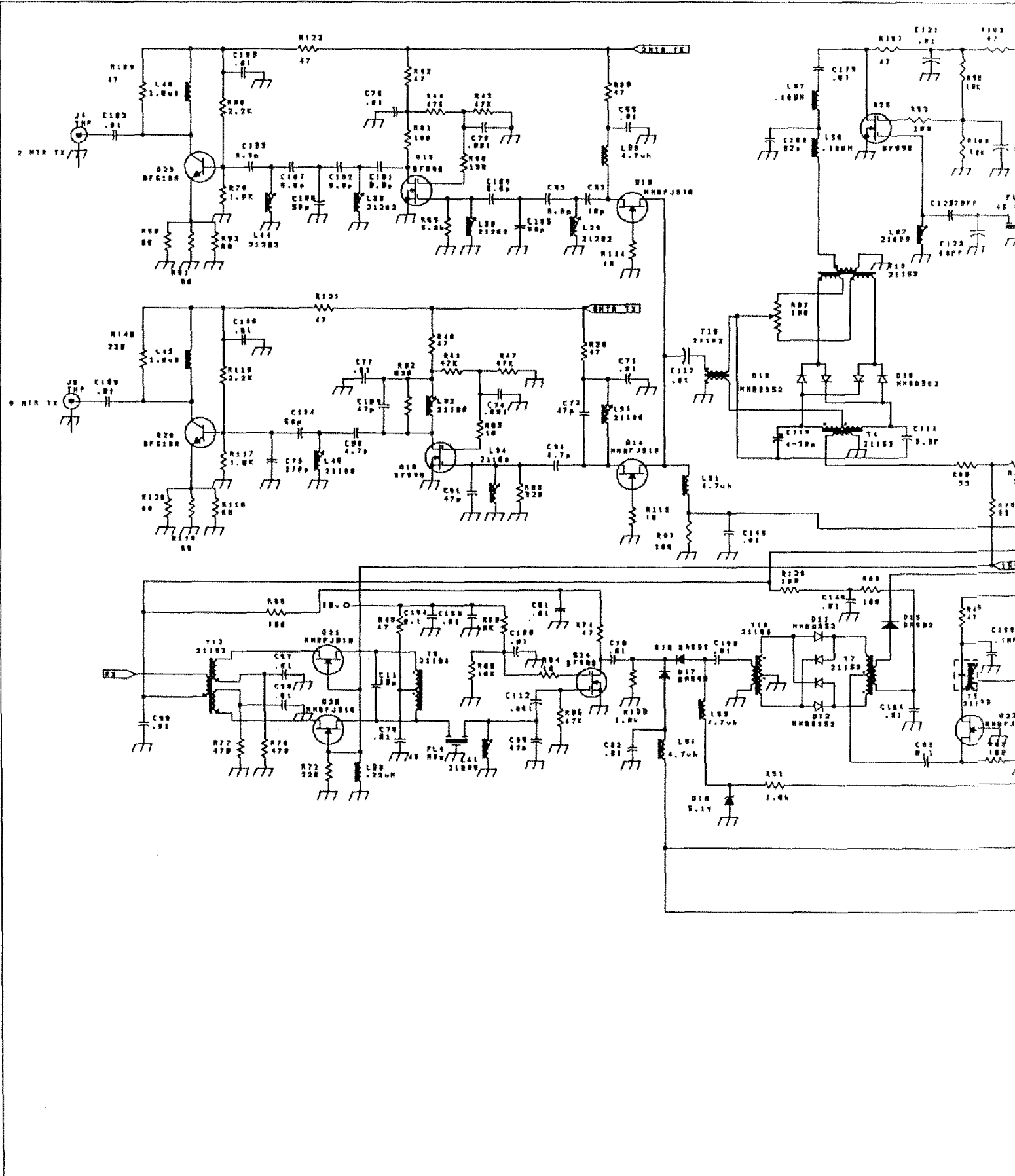


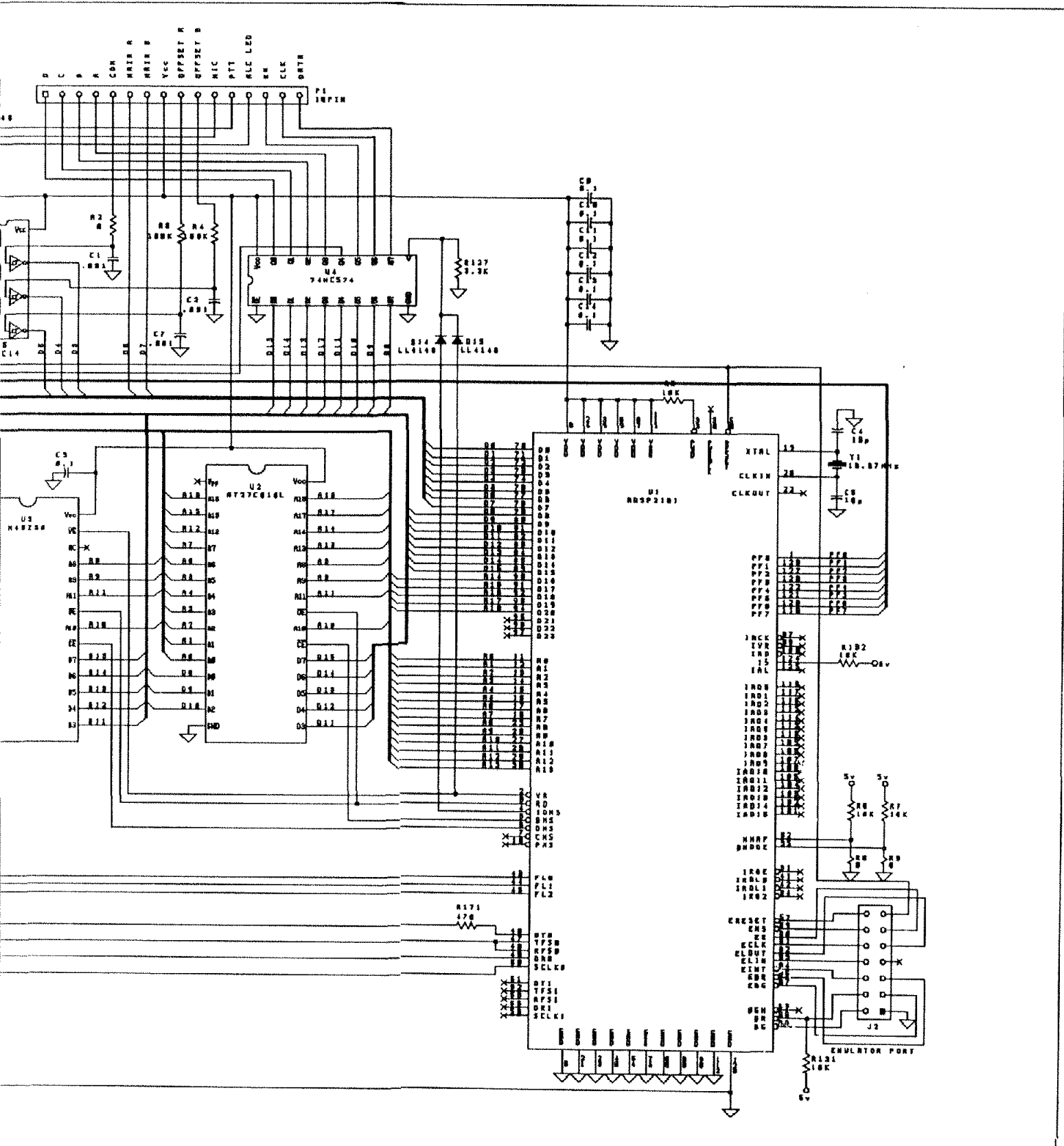
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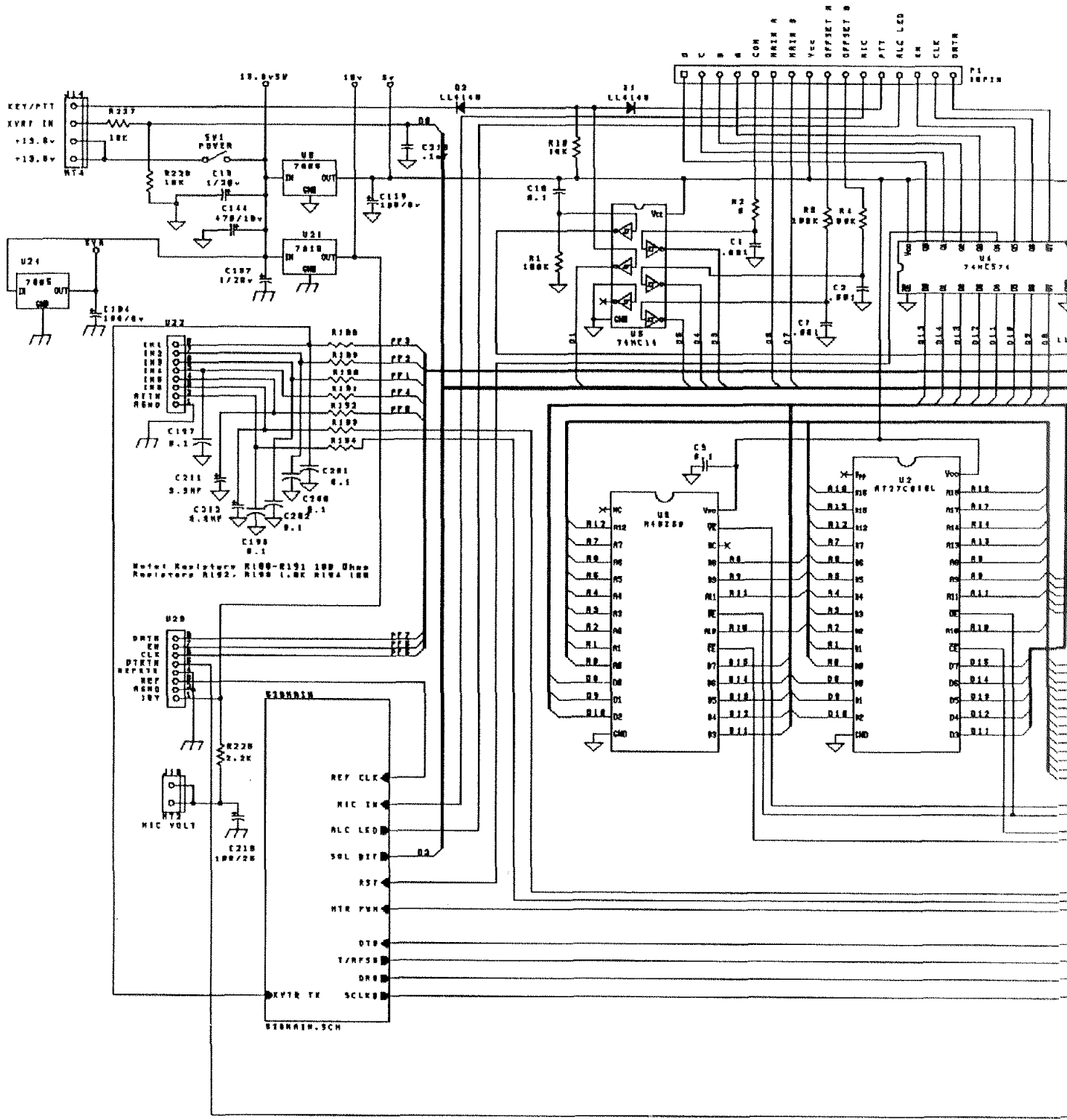


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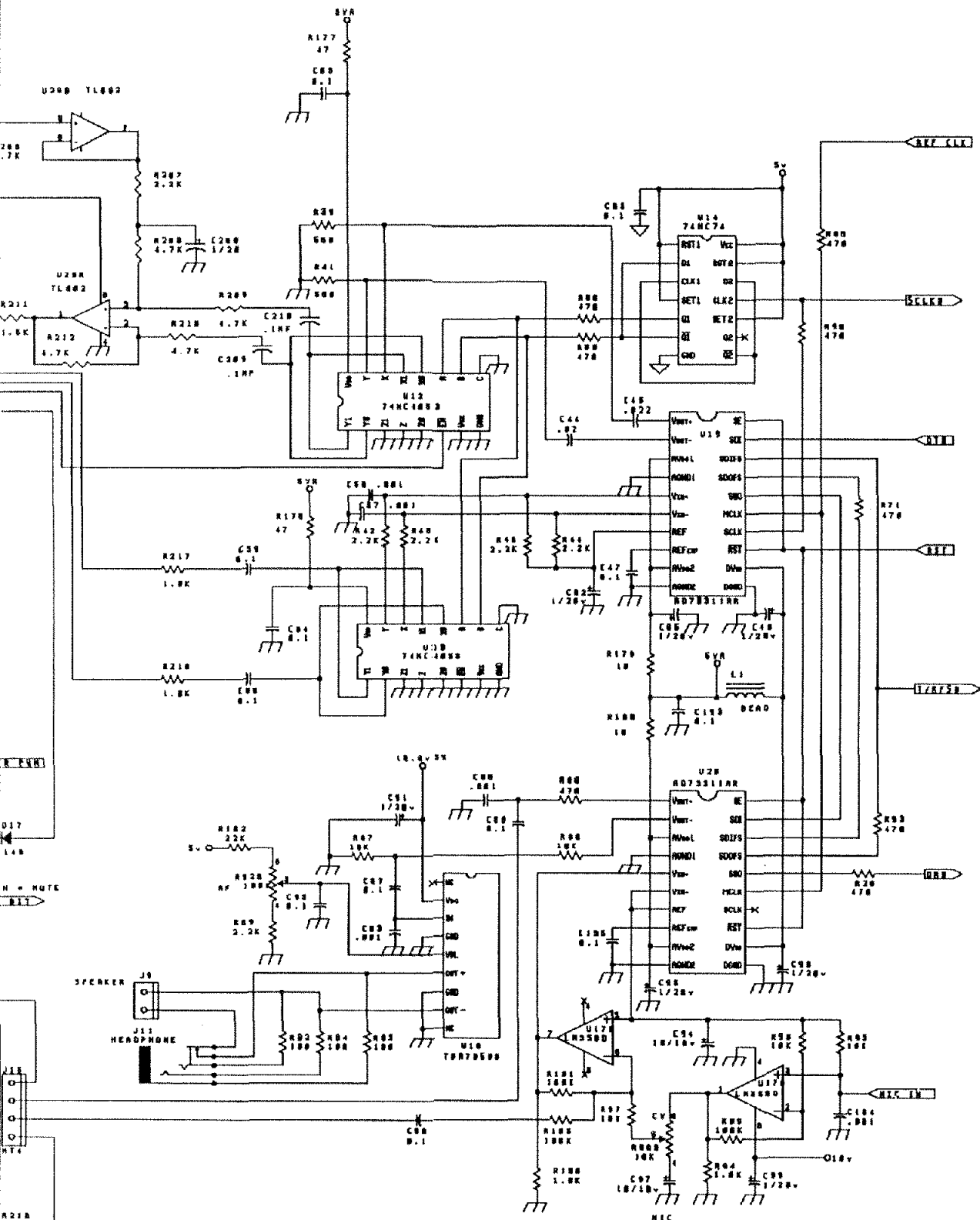


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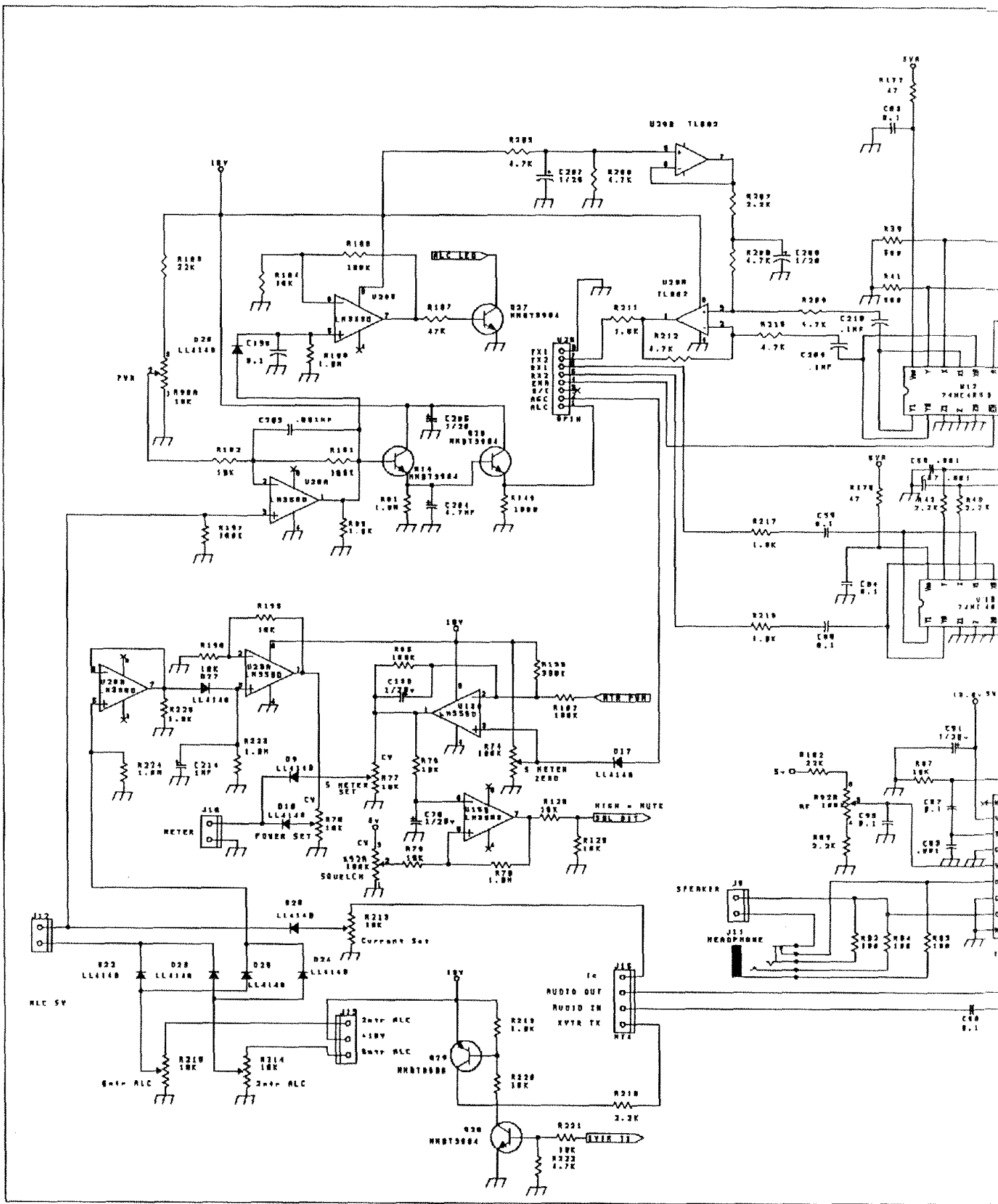


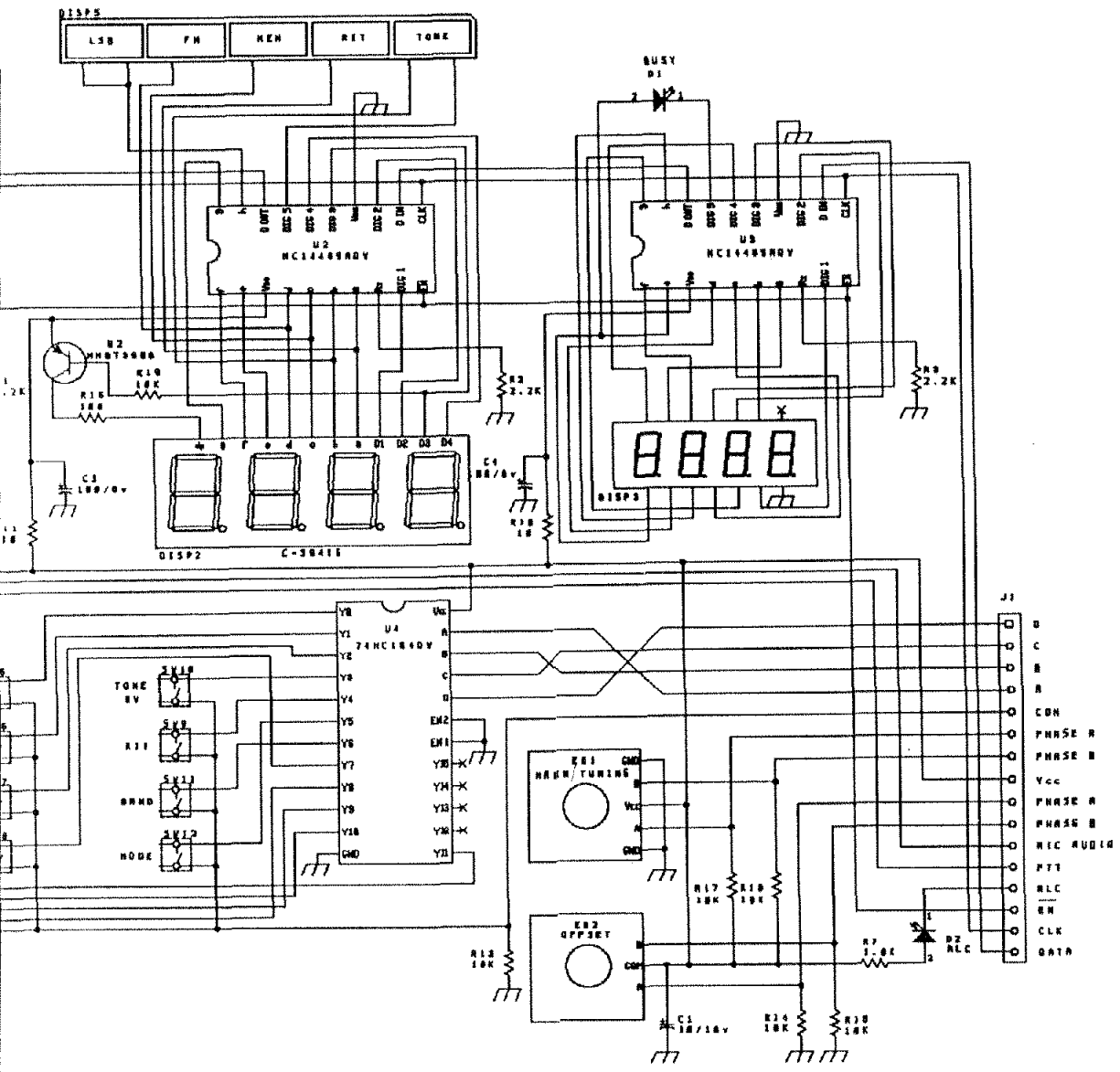
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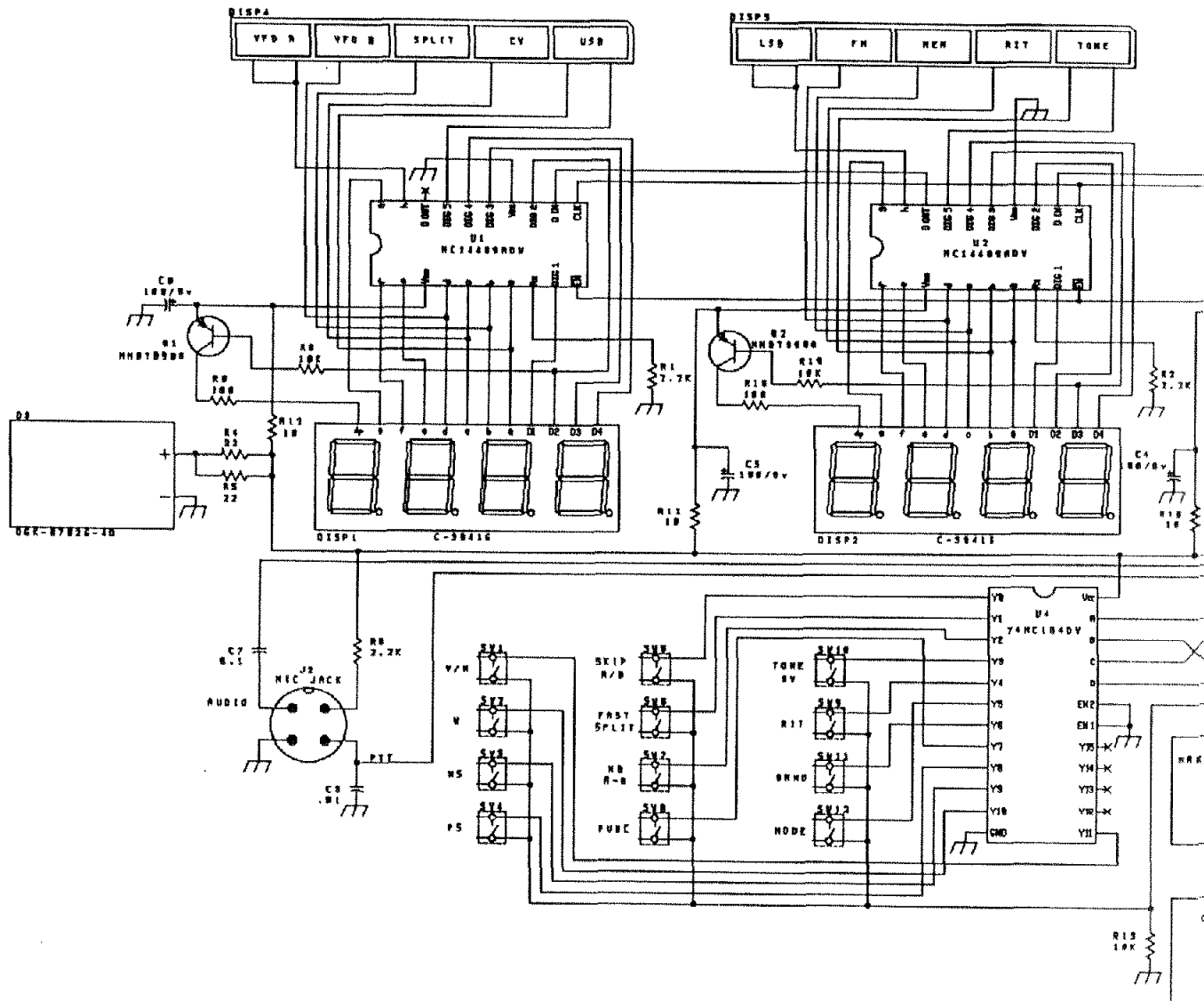
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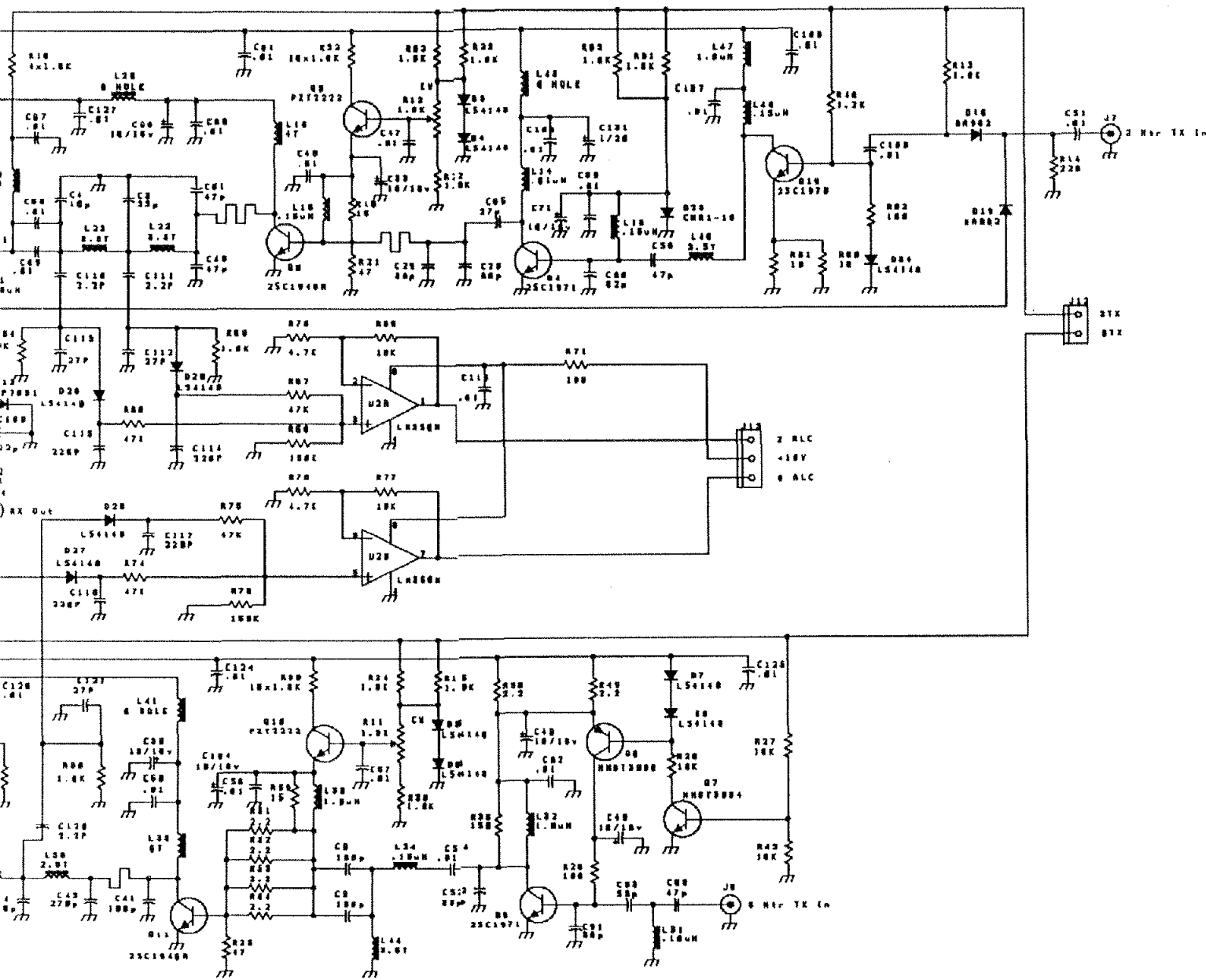
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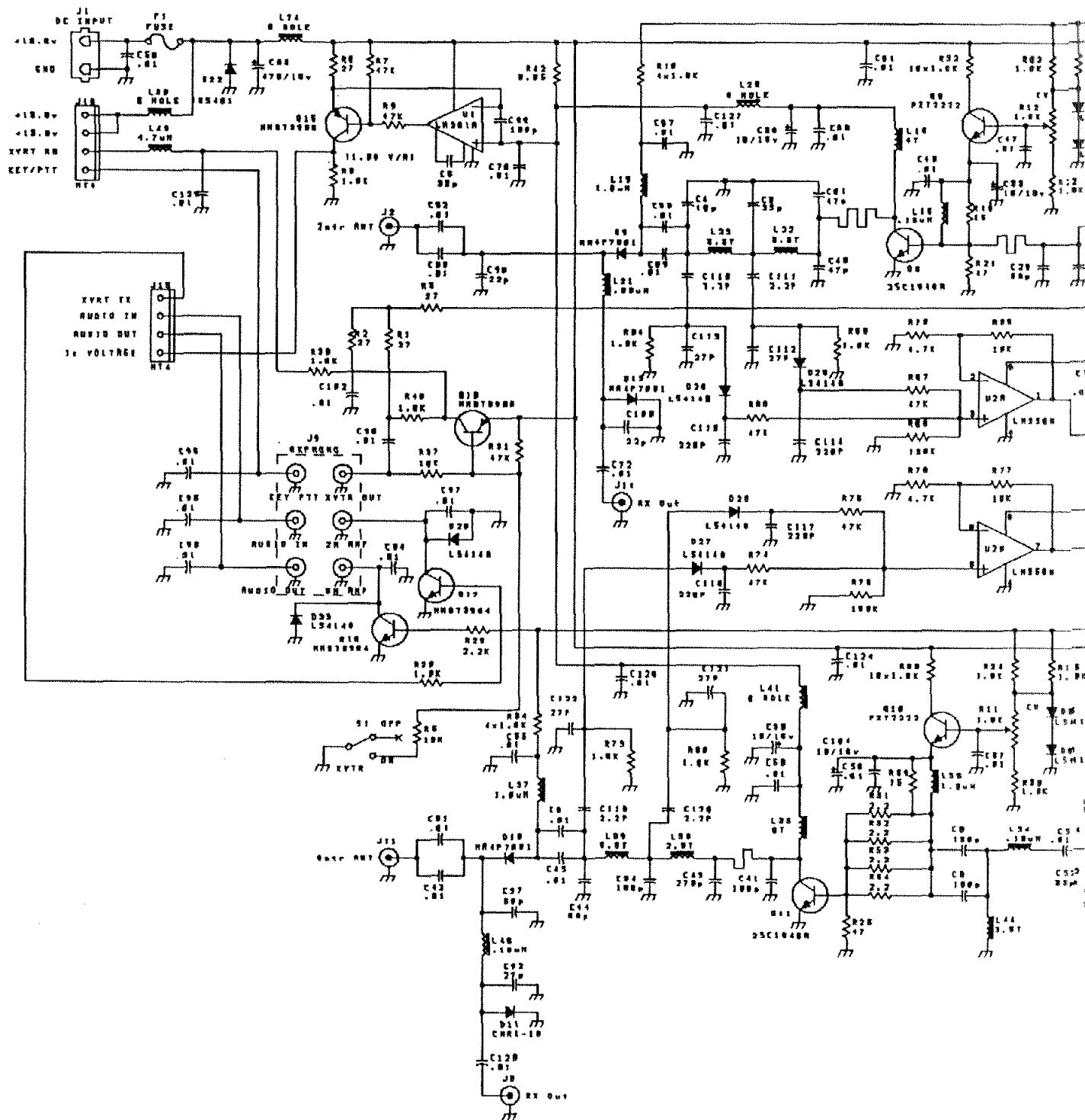


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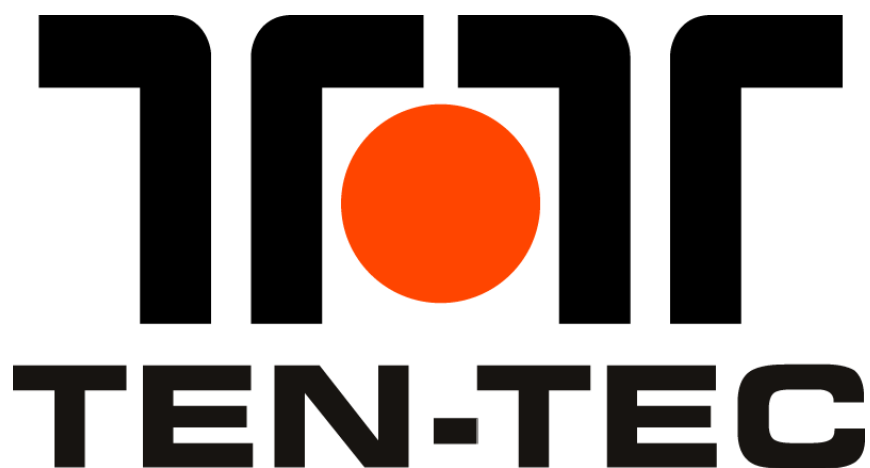
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