TEN-TEC

OPERATOR'S MANUAL

PEGASUS

MODEL 550

PC CONTROLLED HF TRANSCEIVER

TABLE OF CONTENTS

SPECIFICATIONS

GENERAL

MODES	LSB, USB, CW, AFSK, FM, AM receive only
FREQUENCY RANGE	Receive: 100 kHz – 30 MHz. Transmit: all ham bands 160-10 meters.
DISPLAY	Provided by owner's personal computer
VFO	Dual VFO's with SPLIT option
OFFSET TUNING	+/- 10 kHz receive and transmit
MEMORIES	limited only by available RAM in PC, virtually any PC will store 1000s of memories
FREQUENCY ACCURACY	+/- 90 Hz at 25 degrees C at 30 MHz for 1 year
ANTENNA IMPEDANCE	50 ohms unbalanced
POWER REQUIRED	1A receive, 20A transmit @ 12-14 VDC
CONSTRUCTION	5 epoxy glass PC boards, molded front panel, aluminum chassis, textured painted steel cover
DIMENSIONS	HWD = 10.75" x 5.125" x 11.5" (27.3 x 13 x 29.2 cm.)
WEIGHT	9 lbs. (4.1 kg)

TRANSMITTER

RF OUTPUT	5 – 100 watts, ALC stabilized
DC INPUT	maximum 250 watts @ 14 VDC. 100% duty cycle for up to 20 minutes. Continuous duty with customer supplied air cooling of rear panel heat sink
MICROPHONE INPUT	200 ohms to 50K ohms. 4 pin, front panel connector accepts microphones with 5 mv (-67 dB) output. +4 VDC polarizing voltage provided for electrets.
T/R SWITCHING	PTT or VOX on SSB, QSK on CW

CW OFFSET	Programmable 400 to 900 Hz, DSP generated. Sidetone automatically matches offset.
FM DEVIATION	+/- 5 kHz
METERING	Switchable to FWD power, REF power or SWR
SSB GENERATION	DSP generated
CARRIER SUPPRESSION	> 50 dB
UNWANTED SIDEBAND SUPPRESSION	> 60 dB at 1.5 kHz tone
THIRD ORDER INTERMOD	25 dB below two tone @ 100 watts PEP
SPURIOUS OUTPUT	Better than 40 dB below peak power output

RECEIVER

SENSITIVITY	.35 uV typical for 10 dB S+N/N @ 3 kHz bandwidth, SSB mode
SELECTIVITY	34 filters built-in; 300 Hz, 330 Hz, 375-750 Hz in 75 Hz increments, 750 Hz-3 kHz in 150 Hz increments, 3 kHz – 6 kHz in 300 Hz increments, 8.0 kHz. All 1.5:1 shape factor or better.
DYNAMIC RANGE	90 dB @ 3 kHz bandwidth at 50 kHz spacing
THIRD ORDER INTERCEPT	+10 dBm
NOISE FLOOR	-126 dBm @ 3 kHz bandwidth
S-METER	Calibrated to 50 uv at S9
ATTENUATOR	-20 dB
PASSBAND TUNING	+/- 2 kHz
I-F FREQUENCIES	1st I-F 45 MHz, 2nd I-F 455 kHz, 3rd I-F 12 kHz
I-F REJECTION	> 60 dB typical

IMAGE REJECTION	> 60 dB typical
RECEIVE RECOVERY TIME	less than 20 ms, including SPLIT mode
AUDIO	Speaker: 2 watts @ 4 ohms. Line out: > 1 V p-p into 600 ohms

INTRODUCTION

The PEGASUS is the culmination of several years of engineering in HF DSP receivers for military, commercial, and amateur radio use.

The PEGASUS is designed around an Analog Devices™ AD2181 DSP processor chip. Digital signal processing (DSP) uses microprocessor technology in place of traditional analog circuitry. This revolutionary new technology has shifted the focus of design from hardware to software. New features and upgrades to DSP equipment can be added with lines of computer code rather than electronic components.

The PEGASUS features DSP processing at the I-F level. Software and firmware are instantly upgradeable via Internet downloads.

Unlike a traditional front panel transceiver, all features and functions of PEGASUS are visible on your computer screen and are controlled by the keyboard, mouse, or optional model 302 remote encoder/keypad.

The PEGASUS covers all amateur bands, 160 through 10 meters, using CW (full break-in), SSB (with adjustable DSP generated transmit bandwidth filtering), digital modes (AFSK), and FM. AM mode is provided on receive only. In addition to the HF amateur bands, the PEGASUS is equipped with a general coverage HF receiver with continuous coverage from 100 kHz to 30 MHz.

Chapter 1 of the manual is the PEGASUS installation guide. Chapter 2 are instructions for getting the PEGASUS operational once you have installed all needed hardware and software. Chapter 3 is a detailed operation guide that will allow you to take full advantage of the transceiver's capabilities. Chapter 4 is a glossary of terms. Chapter 5 is a troubleshooting guide should you have difficulty with transceiver operation.

We recommend that you refer to the glossary in chapter 4 of this manual if you come across an unfamiliar descriptive term.

SYSTEM REQUIRMENTS AND PERFORMANCE EXPECTATIONS

Windows 95/98™ has been the dominant operating system for PCs for several years. We recognize, however, that many hams are still operating Windows 3.1™ on older PCs. We wanted as many hams as possible to be able to run the Pegasus so we designed the software to operate on both 95/98 and 3.1. As you might expect, the Pegasus performs best when running on Windows 95/98™. It will work fine on a minimum system with a 486 processor running Windows 3.1. Windows 3.1 users may experience some compromise in performance. For example, the frequency display may take a moment to update as you change frequency.

UNPACKING

Examine your PEGASUS 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 your PEGASUS. Make sure that you have not overlooked anything.

Qty.	Part #	Description
1	#81871	3.5" program disk
1	#74366	User's manual
1	#74020	Warranty Card
1	#46171	Line-Out to Audio-In cable, to sound card
1	#46172	9-pin female to 9-pin male DB-9 cable, to serial port
1	#46176	5 pin DIN male to 4 separate phono female, ribbon cable
1	#86095	DC power cord
2	#41020	female terminal pins
1	#35165	2 pin power connector shell
1	#27074	25 amp blade-type fuse
1	#35263	3.5 mm stereo plug
1	#35003	male phono plug
1	#35057	4 pin mic connector

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

Repair Department	(423) 428-0364
Switchboard	(423) 453-7172
FAX	(423) 428-4483

NOTE: Area code will change to (865) on Nov. 1, 1999.

ACCESSORIES There are several station accessory items that are manufactured by Ten-Tec that are suitable for use with the PEGASUS. Contact the Ten-Tec sales department for pricing and availability information.

291 - 200 watt antenna tuner
302 - Remote tuning encoder/keypad
306 - 4 pin to 2 pin power supply cable adapter
607 - single paddle keyer assembly
701 - hand microphone
705 - desk microphone
962 - +13.8 VDC, 22 amp power supply
35057 - 4-pin microphone connector
80-573 - 2-pin DC connector with pins

CHAPTER 1

INSTALLATION

1-1 POWER SUPPLY

The PEGASUS requires a source of well-filtered and regulated DC voltage. The supply voltage can range from +12.0 to +15.0 VDC but an optimum of +13.8 VDC is recommended. The power source must be capable of 20 amps at 100% duty cycle if you wish to run the PEGASUS to its' full capability on digital modes.

The TEN-TEC model 962 power supply is specifically designed for this service. This supply has built-in overcurrent protection and all of the necessary RFI bypassing. For use with the PEGASUS, the model 962 requires TEN-TEC model 306 4-pin to 2-pin power supply plug adapter.

Note: the model 962 incorporates an external speaker that was designed for use with other TEN-TEC transceivers. The PEGASUS does not provide connection for an 8 ohm external speaker.

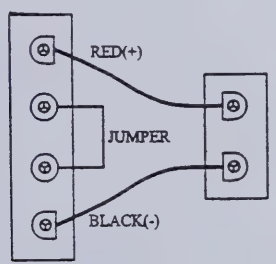

FIGURE 1-1. POWER SUPPLY ADAPTER CABLE (4 pin to 2 pin) View: Facing into plugs on cable ends

The 2-pin DC connector on the rear panel of the PEGASUS is polarized such that the mating plug will only attach in one direction. Determine the correct orientation and plug the power cable into the PEGASUS. If an alternate power source to the model 962 is to be used, we recommend that the pre-assembled DC power cord (#86095) be used. We have also included two spare connector pins (#41020) and a connector shell (#35165) for building your own cord. Be sure to use no less than 14 gauge stranded wire for these connections because of the high current demand during transmit.

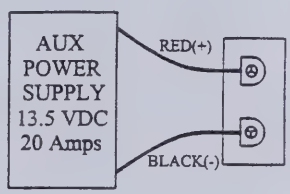

FIGURE 1-2. POWER SUPPLY CONNECTIONS (View from front of plug on end of cable)

NOTE: ALWAYS ENABLE THE POWER SOURCE FIRST, AND THEN THE TRANSCEIVER. IF THE DC SOURCE IS SUPPORTED BY A GENERATOR OR ALTERNATOR, ALWAYS TURN OFF THE TRANSCEIVER BEFORE THE EQUIPMENT IS STARTED OR SHUT OFF. THESE RECHARGING DEVICES CAN OFTEN GENERATE LARGE VOLTAGE SPIKES THAT CAN DAMAGE THE TRANSCEIVER.

1-2 ANTENNA The transmitter is protected against damage from load impedance mismatches ranging from a dead short to an open circuit. Operation at or near full power is possible with an unbalanced (coax feed) load impedance between 25 and 100 ohms (approximately 2:1 SWR). Antennas with higher SWR, or single wire and

balanced feedline types, will require the use of an external antenna tuner for best results.

The main antenna connection to the transceiver is through the rear panel SO-239 connector.

1-3 PERSONAL COMPUTER

Your personal computer is an integral part of the PEGASUS transceiver. The minimum system requirements for your PC to operate PEGASUS are a 486 processor running Windows™ 3.1. Connect the enclosed serial port cable (#46172) to the front panel connector on the PEGASUS marked SERIAL INTERFACE. The other end of the serial port cable is to be connected to an open 9 pin serial port connector on your PC.

USB interfaces: Many personal computers use USB interfaces for connectivity as a substitution for serial and parallel ports. We recommend the use of a USB to serial port converter for USB connection. The Beckin F5U003 or equivalent would be an acceptable device, commonly available through computer outlets.

1-4 SOFTWARE INSTALLATION

A 3.5" floppy disk (#81871) with the PEGASUS graphical user interface (GUI) software has been provided. After you have connected your power source to the PEGASUS and connected the transceiver to your PC, you are ready to install the operating software.

1-4.1 INSTALLATION SEQUENCE

This is a complete outline of the steps you will take in sections 1-4.2 or 1-4.3 to complete installation of the software. Before you start, review the following outline of the recommended sequence.

A) Be certain the PEGASUS front panel power switch is OFF.
B) Boot up computer
C) Follow instructions for your PC, whether Windows 3.1 or 95/98.
D) PEGASUS software defaults to COM 1 serial port. If you wish to use a different port, make appropriate changes under the SETTINGS: INTERFACE tool bar.
E) Exit PEGASUS software
F) Turn on PEGASUS front panel power switch. Note the four LED indicators. The ON light is lit and the RX light is flashing.
G) Launch the PEGASUS software. You should see the RADIO window on screen (looks like a conventional transceiver front panel) on screen and receiver should be active. You may need to adjust the AF slider control (volume) to a comfortable listening level and the S-meter should be active. Also note the RX LED is no longer flashing and is constantly lit.

IMPORTANT: If you did not get these results then it is virtually certain you have a COM port conflict on your PC that must be resolved.

1-4.2 WINDOWS 3.1 SOFTWARE INSTALLATION

Make sure the PEGASUS power is turned off. Turn on your PC. After the computer is finished booting up, insert the provided floppy disk in your A: floppy disk drive. From the tool bar, select FILE.

In the FILE menu, select RUN. You will now be provided with a command

line. Type A:INSTALL on the command line and click 'OK'.

There will be two information boxes that will pop up on the screen. After reading each, click 'NEXT>' with your mouse. The third information box begins the software installation process. You will be asked to enter a default directory on your hard drive for the operating software. The default directory is C:\PEGASUS. If you wish to use another directory, please enter it on the command line and click 'NEXT>' with your mouse. If you want the PEGASUS files on the indicated default directory, leave the command line as is and click 'NEXT>' with your mouse.

The installation program will now ask you for a program group to enter the files into. We recommend that you click 'Finish>' without making any changes unless you have a specific need to group the PEGASUS files with other software. Clicking 'Finish>' at this point (without making changes) will create an icon on your main Windows screen to allow easy access to PEGASUS.

Once the PEGASUS software has been successfully loaded onto your hard drive, Windows will open the PEGASUS directory and show you the files listed. If you are connecting the PEGASUS to a serial port other than COM 1, you will need to launch the program at this stage. If you are using COM 1 for the PEGASUS, close the directory listed and return to the main Windows icon screen on your PC. Skip the next paragraph of instructions.

There are 6 programs listed in the directory: Pegasus, Flash Loader, PC RADIO Help, Release Notes, Revision History, and UnInstall. Place the mouse pointer on 'Pegasus' and double left click. The Pegasus software will launch. When the radio screen appears, left click SETTINGS at the top of the screen. A menu of items will appear. Left click on INTERFACE and then click on the appropriate COM port. Exit the PEGASUS software by clicking 'Exit' at the top of the screen.

You are now at the main Windows icon screen on your PC. Now, turn on the power supply connected to your PEGASUS and switch the front panel PEGASUS power switch to ON. The green LED marked ON will be lit. The green LED marked RX will be flashing.

To launch the PEGASUS software, double click the 'Ten-Tec Pegasus' icon. All of the files in the 'Ten-Tec Pegasus' directory will now appear. Double click the 'Pegasus' icon to launch the software. You should see the main radio screen appear and the receiver should be active. If you did not get this result, it is likely you have a COM port conflict in your PC that must be resolved.

1-4.3 WINDOWS 95/98 SOFTWARE INSTALLATION

Make sure the PEGASUS power is turned off. Turn on your PC. After the computer is finished booting up, insert the provided floppy disk in your A: floppy disk drive. From the Windows main screen, click on the START command in the lower left hand corner. Select RUN from the list of commands. Windows will provide you with a command line and ask for a program, folder, or document. On the command line type A:INSTALL and click 'OK'.

There will be two information boxes that will pop up on the screen. After reading each, click 'NEXT>' with your mouse. The third information box begins the software installation process. You will be asked to enter a default

directory on your hard drive for the operating software. The default directory is C:\PEGASUS. If you wish to use another directory, please enter it on the command line and click 'NEXT>' with your mouse. If you want the PEGASUS files on the indicated default directory, leave the command line as is and click 'NEXT>' with your mouse.

The installation program will ask for file program group. We recommend that you click 'Finish>' without making any changes unless you have a specific need to group the PEGASUS files with other software. You will be provided with one more information screen at this point, click 'OK' when done reading.

Once the PEGASUS software has been successfully loaded onto your hard drive, Windows will open the PEGASUS directory and show you the files listed. If you are connecting the PEGASUS to a serial port other than COM 1, you will need to launch the program at this stage. If you are using COM 1 for the PEGASUS, close the directory listed and return to the main Windows icon screen on your PC. Skip the next paragraph of instructions.

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You are now at the main Windows icon screen on your PC. Now, turn on the power supply connected to your PEGASUS and switch the front panel PEGASUS power switch to ON. The green LED marked ON will be lit. The green LED marked RX will be flashing.

To launch the PEGASUS software, click 'START' in the lower left corner of your screen. Select 'Programs'. Select 'Ten-Tec Pegasus'. Select 'Pegasus'. You should see the main radio screen appear and the receiver should be active. If you did not get this result, it is likely you have a COM port conflict in your PC that must be resolved.

1-5 FRONT PANEL CONNECTIONS AND INDICATORS

There are several front panel jacks that are used for various functions of the transceiver. Four LED's also provide the operator with status information about the transceiver when in operation.

1-5.1 PHONES

This is a standard 8 ohm jack used for connecting headphones. Stereo or mono headphones may be connected. However, as dropping resistors are used across this jack, it will not provide sufficient audio level to drive an external speaker.

1-5.2 LINE OUT

This connector provides >1 volt peak-to-peak audio output into 600 ohms. This is typical of the drive level used to drive a computer sound card, and this jack is intended to be used for that purpose. We have provided a cable (#46171) for line out connection to your sound card. Please note that you may experience some "talk-back" while transmitting SSB that will be audible through your computer speakers. This is generally caused by the presence of a ground loop.

1-5.3 KEY

The KEY jack is used for the connection of a CW keying device. This jack is software configurable to accept either a "mono" input (like a straight key, bug, or external keyer), or a "stereo" input to use the PEGASUS internal keyer with a paddle. The default value in software is to accept a "mono" input.

Two methods are available for keying the transceiver in CW mode. The front panel KEY jack allows use of the PEGASUS internal iambic keyer with your favorite paddle or can be used with a straight key, bug, or external keyer. To use the internal keyer with your iambic or single lever paddle, refer to Figure 1-3 and use the provided 1/8" stereo plug (#35263) supplied in the packing kit.

Older Ten-Tec external keyers with a phono plug output can be adapted for use with the PEGASUS. RadioShack™ part #274-330 is a female phono plug to 1/8" mono male that will allow for direct connection to the KEY jack.

Note: The KEY jack is software configurable to accept either paddles for internal keyer use or a straight key, bug or external keyer. You must configure the jack, using the PEGASUS software, for the proper CW keying device attached to the radio. The default value for the KEY jack is to accept a straight key. To use paddles with the internal keyer, you must enable the internal keyer in software. See section 3-6.5 for detailed information.

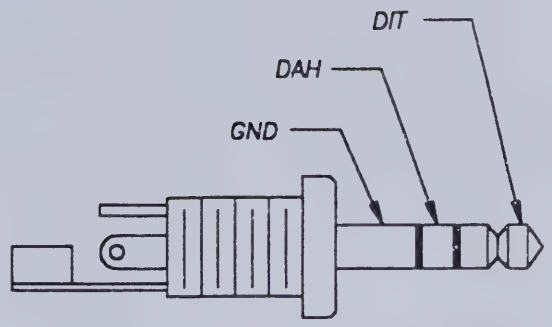


FIGURE 1-3 PADDLE WIRING FOR BUILT-IN ELECTRONIC KEYER

1-5.4 ACCESSORY

The ACCESSORY jack can be used for interfacing equipment requiring audio in/out connections, like a TNC or phone patch. There are connections provided for digital mode operation. For information on using the PEGASUS in digital modes, see section 2-6.6. Wiring information is shown in Figure 1-4, or use supplied cable (#46176) for accessory connection.

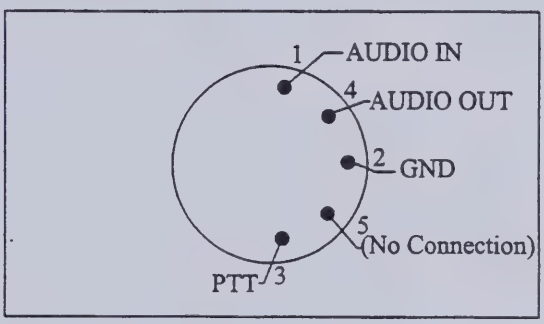


FIGURE 1-4 ACCESSORY JACK CONNECTIONS

1-5.5 REMOTE

The REMOTE jack is for connection of the optional model 302 remote encoder/keypad. Interconnecting cable is included with the 302.

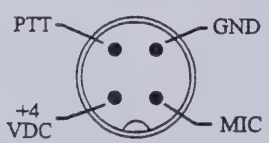
1-5.6 SERIAL INTERFACE

The SERIAL INTERFACE is provided for connection of the

PEGASUS to a COM port on your personal computer, via the supplied serial port cable (#46172).

1-5.7 MIC

This jack is provided for connection of a microphone. A polarizing voltage of +4 VDC is provided to power an electret element microphone. Connection is provided on the PEGASUS front panel for a low impedance microphone. Any TEN-TEC microphone, using our 4-pin connector, may be used without modification. Most dynamic, ceramic, crystal, or electret type microphones may also be used. When adapting another microphone for use with the PEGASUS, please refer to the wiring diagram in Figure 1-5. A spare 4-pin microphone plug (#35057) is included in the PEGASUS packing kit. Be sure to use shielded cable to prevent any RF interference. Electret type microphones and some with built-in preamplifiers will require the +4 VDC available at pin 4.



FRONT VIEW OF 550

FIGURE 1-5 MICROPHONE CONNECTION

1-5.8 ON

This green LED is lit when the PEGASUS power is turned on.

1-5.9 RX

This green LED is lit when the PEGASUS receiver is operational. When the PEGASUS power is ON, and the transceiver is not communicating with your PC, this light will flash (example: power on the PEGASUS is ON, but software is not yet loaded or the PC is turned off).

1-5.10 TX

This red LED is lit when the PEGASUS is transmitting.

1-5.11 ALC

This red LED lights when proper ALC level has been reached. Used for adjustment of MIC gain. Will light when the PEGASUS is transmitting and proper ALC level has been reached.

1-6 REAR PANEL CONNECTIONS

There are several rear panel connections on the PEGASUS, used for interfacing various other station equipment with the transceiver.

1-6.1 50 OHM ANTENNA

This SO-239 jack is used for connection of a suitable 50 ohm coax-fed antenna.

1-6.2 AUX +13.5V

These two phono connectors are used for connecting accessory equipment requiring 13.5 VDC power. These jacks are paralleled. The max current draw available for both jacks combined is 2 amps.

1-6.3 POWER

This 2 pin MOLEX connector is used for connection of a suitable 13.8 VDC 20 amp power supply. Please observe correct polarity when using this jack or damage will result.

1-6.4 25 AMP FUSE

The PEGASUS transceiver is equipped with a blade-type 25 amp fuse for protection of the transceiver. An

spare fuse (#27074) has been provided with the PEGASUS packing kit. These blade-style fuses are commonly available at automotive supply stores.

1-6.5 GND

In the interest of personal safety and to reduce the possibility of stray RF pickup on interconnecting cables, all station equipment should be well grounded to earth and to a supply line ground bus. This ground bus may then be tied to an external earth grounding rod. It is important to strap all equipment together with short heavy leads.

1-6.6 SPARE

This phono style connector has no connection as supplied from the factory.

1-6.7 TX EN / TX OUT

These phono jacks are the input (enable) and output for a full break-in linear amplifier keying loop. These jacks must be enabled in software to be operational. The connectors, labeled TX EN and TX OUT, can be connected to corresponding KEY IN and KEY OUT jacks on the rear panel of a TEN-TEC linear amplifier. Use shielded cables to connect the corresponding key lines of the amplifier. These connections are shown in Figure 1-6. These connections ensure that proper timing is maintained between the transceiver and amplifier during QSK operation.

Note: The default setting (in software) from the factory requires no connection between the TX EN and TX OUT jacks for "barefoot" operation of the PEGASUS. This is unlike other TEN-TEC transceivers that incorporate the use of this keying loop.

1-6.8 EXT T/R

This phono connector is an open collector output for keying a non Ten-Tec linear amplifier. Refer to Figure 1-7 for connections. This connection is not a relay similar to those found on many older transceivers. It is an "open collector" transistor switch rated to a maximum of 24 volts and 200 mA present on the keying line of your amplifier. The delay or "hang" time of the switch is adjustable for CW operation. This guards against hot switching your amplifier. The delay is adjustable under the SETTINGS: TRANSMITTER area of the PEGASUS software (see section 3-6.2).

Many older tube-type linear amplifiers like those manufactured by Collins, Drake, and Heathkit use keying voltages of 100 volts or higher. Also, some older amps key a negative voltage instead of positive. You cannot connect these directly to a PEGASUS. Please check your linear amplifier operator's manual before connecting this equipment to the PEGASUS. If your amplifier does use a keying voltage and/or current of a higher value than the PEGASUS can tolerate, you must incorporate the use of an isolation relay to use your linear amplifier with the PEGASUS.

(REAR VIEW)
Model 550 Pegasus

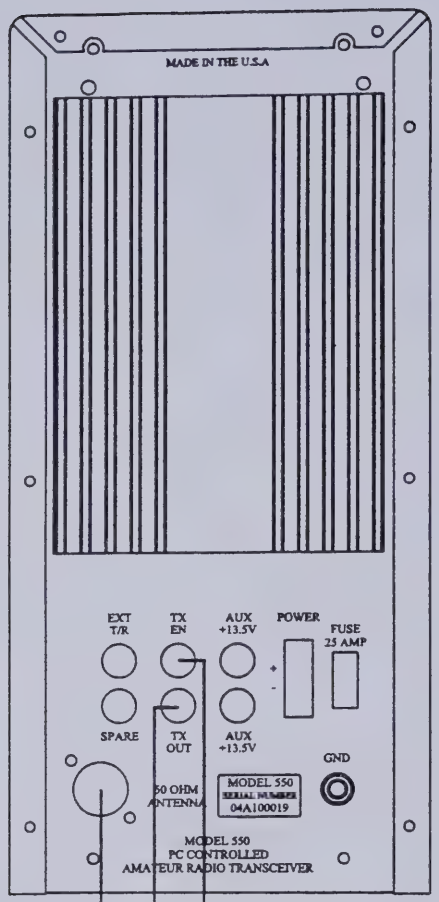
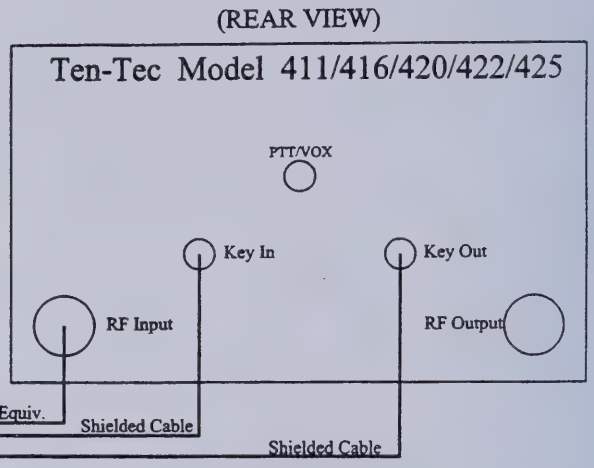


Figure 1-6.

Required Connections

Model 550	Ten-Tec Amp	Using
50 OHM ANTENNA	RF INPUT	RG-58/U or Equiv.
TX EN	KEY OUT	Shielded Cable
TX OUT	KEY IN	Shielded Cable



(REAR VIEW)
Model 550 Pegasus

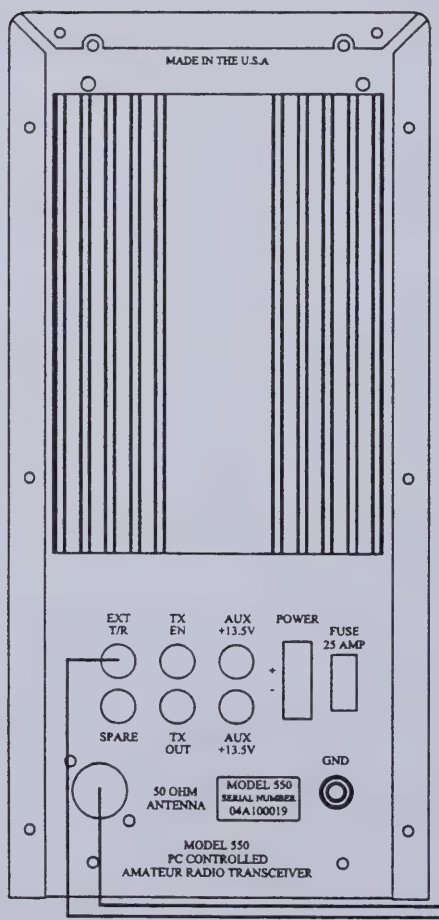
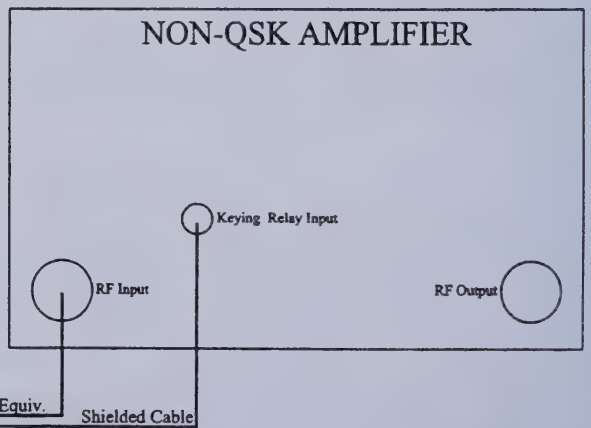


Figure 1-7.

Required Connections

Model 550	Amplifier	Using
50 OHM ANTENNA	RF INPUT	RG-58/U or Equiv.
EXT T/R	KEYING RELAY INPUT	Shielded Cable

Note: You must verify that the amplifier keying relay input requires only a low voltage DC connection to ground. See Section 1-6.8 of Model 550 manual regarding interfacing a linear amplifier.



CHAPTER 2

GETTING STARTED

2-1 INTRODUCTION

Like a traditional front panel transceiver, there are many operator controls on the PEGASUS that are consistently in use, and many that only need to be configured occasionally according to your operating preferences. The default settings listed below will allow you to get started with PEGASUS. You can customize the operation to more closely fit your preferences as you become familiar with the transceiver.

2-2 POWERING PEGASUS FOR THE FIRST TIME

Connect a suitable resonant antenna to the rear panel 50 OHM ANTENNA connector. Connect a suitable DC power source to the transceiver (see section 1-1). Turn on your power supply, then the PEGASUS.

Use the appropriate method described in section 1-4.2 or 1-4.3 (depending on your operating system) to load the software. After loading, you should see the radio interface screen come up on your monitor.

Note: If the screen comes up with only the PEGASUS tool bar at the top of the screen (tool bar reads RADIO, SWEEP, MEMORY, SETTINGS, MUTE, CALL, EXIT), and the rest of the screen black, click RADIO with your mouse. This will bring the radio interface to the screen.

2-3 OPERATION FUNDAMENTALS

The PEGASUS radio screen shares similar characteristics with a traditional front panel transceiver. Most functions on the transceiver are controllable by pointing, clicking, and/or "dragging" with your computer mouse. Keyboard control of several functions is possible.

2-4 INITIAL RADIO SETTINGS

As supplied from the factory, the PEGASUS software is shipped with a number of default settings to allow the operator to quickly start using the transceiver. Please note that we recommend reading ALL of the operation instructions prior to operating the transceiver.

2-5 RECEIVER OPERATION

Main frequency control of the transceiver is accomplished by using the mouse pointer to rotate the main tuning knob clockwise or counterclockwise, by pressing the up or down arrows on your PC keyboard, or via direct frequency entry.

Move the mouse pointer onto the main tuning knob. The mouse pointer will indicate the direction of rotation of the tuning knob. Click the left mouse button to change frequency.

Using the up and down arrows on your computer keyboard will move frequency up and down. Direct frequency entry is accomplished by typing numbers on the keyboard. Press ENTER after entering a direct frequency on the display.

In addition, specific HF amateur band selection can be made by clicking the AMATEUR BANDS tool bar under the main tuning knob. Left click the AMATEUR BANDS tool bar and then left click the appropriate band by using the mouse pointer.

2-5.1 MAIN TUNING STEP SIZE SELECTION

PEGASUS is equipped with 12 selectable step sizes for main tuning rate. Left click the STEP button on the radio screen and select desired main tuning rate. The step size menu can also be brought up by right clicking the mouse while the mouse pointer is on the main tuning knob.

2-5.2 MODE SELECTION

The PEGASUS is capable of transceive operation in CW, LSB, USB, FM, and AFSK modes within the 160 through 10 meter HF amateur bands. AM mode is provided on receive only. To select desired mode, point the mouse pointer to the desired mode and left click. Selected mode is shown on the main display to the left of frequency readout. Modes can also be selected by holding down the 'Alt-' key while simultaneously typing the first letter of the desired mode on the keyboard (i.e. Alt-C for CW).

2-5.3 VFO OPERATION

The PEGASUS is equipped with two VFO's. VFO "A" is the main frequency display. VFO "B" is the sub frequency display (smaller, with green digits). To switch VFO's, left click the A/B button on the radio screen. The sub and main displays will now switch places. To have both VFO's on the same frequency and mode, click A=B. The sub display will now read the same information as the main display. When transmitting, the active transmit VFO will change colors to show you where the radio is transmitting.

2-5.4 SPLIT AND REV

To operate the transceiver in SPLIT mode, left click the SPLIT button. You will be receiving on the main display frequency, and transmitting on the sub display frequency.

For example: a DX station is transmitting on 14.195 and listening for calls on 14.200. Tune the main display frequency to 14.200. Click A=B to equalize both VFO's at 14.200. Tune the main display to the receive frequency of 14.195. Click SPLIT. You will now be listening on the main display frequency of 14.195 and transmitting on the sub display frequency of 14.200.

To prevent confusion over which VFO is being used to transmit, the transmit VFO display will change color when transmitting.

The REV button will allow you to monitor and/or tune the sub VFO. Press and hold the mouse on the REV button. Use the arrow keys on the keyboard to move the sub VFO up or down in frequency. Release the REV button and the radio returns to the main VFO. This can also be controlled from the optional remote encoder/keypad, model 302. See section 3-6.6.

2-5.5 RECEIVE FILTER SELECTION

The PEGASUS is equipped with 34 available receive filtering options. Any 9 of these 34 may be present on the radio screen at one time. Place the mouse pointer on the desired filter bandwidth and left click to select. To change any filter button to another selectable filter, place the mouse pointer on the desired filter button and right click. This will bring the filter button assignments menu onto the screen. Select the desired filter by left clicking it and then left clicking

"OK". All receive filters are selectable independent of mode with the exception of FM, where the selectable filter system is disabled altogether.

2-5.6 PASSBAND TUNING (PBT)

This is perhaps the most useful of all of the receiver controls. It allows you to move the passband back and forth across the desired signal. It can be used to "drop" QRM out of one side or the other of the passband or it can simply be used to improve the quality and intelligibility of a signal. To enable the PBT, left click the PBT button on the radio screen. The button lettering will change from black to blue. There are three methods for implementing the PBT control on the PEGASUS.

For quick, large adjustment of PBT range, you can left click on the filter shape factor plot shown directly above the 9 receive filters. Left click, then holding the mouse button down, drag the filter from side to side. Note the PBT offset indicator on the right side of the transceiver tracking the movement of the PBT as you drag it.

You can also make large adjustments to the PBT by moving the mouse pointer into the grey range just above the PBT offset readout. Left click a spot in this range and the blue rectangular indicator will move to that position. Alternatively, you can left click, hold, and drag the blue indicator rectangle for larger, somewhat linear movements.

For smaller movement increments, you can left click, hold and drag on the PBT offset indicator.

To reset the PBT value to zero quickly, place the mouse pointer on the PBT offset indicator and right click.

2-5.7 RIT

"Receive Incremental Tuning" (RIT) allows tuning of the receiver off the main frequency displayed without moving your transmit frequency. To enable RIT, left click the RIT button. When enabled, the RIT lettering on the button changes from black (disabled) to blue (enabled). Tuning in large or small increments is done exactly the same as described in sections 2-5.6 for the PBT control. To reset the RIT value to zero quickly, place the mouse pointer on the RIT offset indicator and right click.

The RIT offset is also displayed as a green digit to the immediate right of the main frequency display.

2-5.8 XIT

"Transmit Incremental Tuning" (XIT) allows tuning of the transmitter off of the main frequency displayed without moving your receive frequency. Operationally the same as RIT.

The XIT offset is also displayed as a red digit to the immediate right of the main frequency display.

2-5.9 SIMULTANEOUS RIT/XIT OPERATION

Both functions can be activated simultaneously. When both are activated, you are operating receive and transmit on two separate frequencies. The RIT and XIT functions act independently and one does not track with the other if both are selected.

2-5.10 AUDIO (AF) and RF GAIN CONTROLS

Use the AF slider control on the right side of the radio screen to adjust audio level. Left or right click and hold the mouse button down to adjust the slider control.

The PEGASUS receiver is provided with good selectivity and dynamic range. Under normal conditions, RF gain is left full up. Should you experience receiver overload, the RF gain control can be used as variable attenuation to limit receiver distortion and/or overload in the presence of extremely strong signals. Left or right click and hold the mouse button down to adjust the RF slider control.

2-5.11 AUTOMATIC GAIN CONTROL (AGC)

The AGC button selects the decay time constant of the AGC circuit. It is selectable FAST, MEDIUM, or SLOW by left clicking the AGC button and then selecting desired setting. The selected AGC setting is shown just above and to the right of the main frequency readout.

2-5.12 DSP NOISE REDUCTION

The DSP noise reduction is activated by left clicking the noise reduction bar. This noise reduction system mathematically identifies desired signals and tracks them with a set of adaptive filters. Broadband noise is attenuated by as much as 15 dB depending upon conditions.

2-5.13 AUTOMATIC NOTCH

The automatic notch is implemented with a special digital algorithm in the DSP system. Left clicking the AUTOMATIC NOTCH bar enables this function. There is no frequency adjustment for the automatic notch. It will seek out and null all constant carriers in the receiver passband. This notch works well for SSB mode but is **not** useful in CW as it also tends to notch out the desired signal.

2-5.14 METER

In receive mode, the meter shown to the left of the frequency display will show received signal strength. Each S-unit is 6 dB. S9 is calibrated at 50 uV.

In receive mode, the meter has two indicators that are used for gauging signal strength. The red indicator bar on the S-meter is an instantaneous reading of signal strength. The green indicator bar on the S-meter is a peak and hold indication that updates approximately once a second.

In transmit mode, you have the option of metering forward power (FWD), reflected power (REF), or standing wave ratio (SWR). To select transmit metering, left click the button just above the VOX button to the left of the meter.

The meter reads with both an analog scale and has a small digital readout for accurate monitoring of power output.

2-5.15 SQUELCH This control is operational in all modes. To adjust, left or right click and hold mouse button to adjust the SQ slider control. To set properly, tune to a clear frequency and adjust the squelch control just into the threshold for receiver quieting.

2-5.16 MUTE

This button automatically mutes receiver audio. There are three ways to mute receiver audio.

(A) Left click the MUTE button on the far right side of the radio screen. When enabled, the MUTE button lettering will change from black (disabled) to blue (enabled).

(B) Left click the MUTE button on the radio screen tool bar. Note that the MUTE button lettering on the right side radio control changes color for enabled

or disabled, but the tool bar lettering does not change.

(C) The MUTE button can also be controlled from the keyboard by holding down the 'Alt-' key while simultaneously pressing the 'M' key.

2-5.17 –20 dB RECEIVER ATTENUATOR

Pushbutton receiver attenuation of –20 dB. To enable the attenuator, left click the ATTN button. When enabled, the ATTN button lettering will change from black (disabled) to blue (enabled).

2-5.18 LOCK

The LOCK function on the front panel will lock the main tuning knob and will not allow main tuning when enabled. If the optional model 302 has been added, it will also lock out the 302's tuning knob as well. Even with LOCK enabled, the operator will be able to use other PEGASUS functions, including direct frequency entry from the computer keyboard or model 302 keypad.

2-5.19 MEMORY STORE AND RECALL

Left clicking the 'Store' button on the lower left side of the radio screen will bring up the Station Information Sheet for storage of memory information.

To bring a given memory up to the main radio screen, click the 'Recall' button.

The storage and retrieval of memory information is described in detail in section 3-5.

2-5.20 WWV/CHU MONITORING

A provision has been made in the PEGASUS software for instant monitoring of WWV or CHU. On your Windows™ toolbar, click View.

Left click the 'UTC/Time' selection. You will given the choice of selecting WWV at 2.5, 5, 10, 15, or 20 MHz, or CHU at 3.330, 7.335, or 14.670 MHz. Left click the desired frequency. The radio will automatically switch to that frequency, AM mode, 8.0 kHz filter. When finished, you have the option of returning to the main radio screen at your previous filter and mode settings, or having the PEGASUS now be operational on the selected time frequency.

Note: When the 'UTC/Time' is selected, the PEGASUS immediately changes to AM mode, 8.0 kHz filter, even if you have not selected a time frequency to monitor. To return to the radio screen at your previous frequency and filter settings, left click the appropriate selector in the Time/UTC window.

2-6 TRANSMITTER AND TRANSCEIVE OPERATION

There are transceive functions on the PEGASUS that are intuitive. Embedded in the graphical user interface are a number of functions that affect transceive operation that you will need to be aware of prior to transmitting with the PEGASUS.

A provision has been made for proper monitoring of transmitting VFO. As you transmit, the active transmit VFO will change display color. This is especially useful in SPLIT mode to be sure where you are transmitting.

2-6.1 TUNE

The TUNE button keys the transmitter "key-down" in CW mode, regardless of the selected operating

mode. Left click the TUNE button to activate or deactivate. When activated, the TUNE button lettering will change to red, the S-meter reading will change to read forward power, reflected power, or SWR, and the red TX LED on the PEGASUS front panel will light.

2-6.2 T-X

Provided for new modes such as PSK31. With PEGASUS in LSB or USB mode, this button will place the radio in transmit but without carrier or power output. In CW mode it operates identical to TUNE feature.

2-6.3 CW OPERATION

Attach an appropriate CW keying device to the front panel KEY jack (see section 1-5.3). Select CW mode. The default value of the PEGASUS software is to accept input from a straight key, bug, or external keyer through the key jack. The CW keying of the PEGASUS is full break-in. When transmitting in CW mode, the red ALC and TX LED's on the PEGASUS front panel will light.

2-6.4 USB/LSB OPERATION

Select either USB or LSB and key the transceiver by pressing the microphone's PTT (push-to-talk) button. The red TX LED on the PEGASUS front panel will light to indicate you are now transmitting. While speaking into the microphone, advance the MIC GAIN control until the red ALC LED on the front panel of the PEGASUS begins to flash. The ALC LED indicates that the transceiver is generating full output power relative to the setting of the OUTPUT POWER control.

The MIC GAIN control is a slider control that can be dragged with your mouse. To adjust, left click 'Settings' on the tool bar. When the 'Settings' menu comes up, left click on 'SSB Settings'. This will bring up the MIC GAIN control. Left click, hold, and drag the slider bar to adjust.

There are 18 different DSP generated transmit bandwidths available for use. See section 3-6.4 for information.

2-6.5 MONITOR A provision has been made for monitoring SSB transmit audio. By left clicking the MON button on the upper right of the radio screen, you will be able to monitor your SSB transmit audio. See section 3-6.4 for additional information on monitor adjustments.

2-6.6 FM OPERATION

Select the FM mode on the radio screen. (NOTE: This mode is currently authorized by the FCC for use between 29.0 and 29.7 MHz only). Press the microphone PTT button to transmit. The receive filters and PBT control are disabled in FM mode. The MIC GAIN control acts as a deviation control in FM mode.

2-6.7 DIGITAL MODE OPERATION

Direct connection for digital mode operation has been provided for on the front panel ACCESSORY jack. The 5 pin DIN connector used on the PEGASUS has connections for audio in, audio out, PTT, and ground. The fifth pin on the ACCESSORY jack has been left unconnected for future assignment. You should be able to easily interface a TNC to the PEGASUS by using the supplied multi conductor ribbon cable, (#46176). See Figure 1-4 in chapter 2 for the proper DIN plug pin out. The cable ends are color coded as follows:

WHITE = AUDIO IN
YELLOW = AUDIO OUT
BLACK = PTT
RED = (future assignment)

Connect an appropriate TNC to the ACCESSORY jack using the #46176 cable provided. To accept input from the ACCESSORY jack, you must enable input to the jack in the SETTINGS: TRANSMITTER section of software. See section 3-6.3 for instructions.

CHAPTER 3

DETAILED OPERATING INSTRUCTIONS

3-1 INTRODUCTION

Many of the basic transmit and receive functions of the PEGASUS are described in chapter 2 of this manual. Chapter 3 provides detailed operating instructions to enable the operator to take full advantage of the transceiver's capabilities.

3-2 RADIO SCREEN TOOL BAR

Above the radio screen is a tool bar. There are 7 selectable tool bar choices: RADIO, SWEEP, MEMORY, SETTINGS, MUTE, CALL, and EXIT. You can have any, all, or none of these functions active at one time.

3-3 TOOL BAR: RADIO

This places or removes the main radio screen on your monitor. Left click the RADIO button on the tool bar to toggle between visible and non-visible.

NOTE: Even if the radio screen is not visible, all settings and operation functions are retained. You can continue to transmit, receive and tune the band with the model 302 optional remote tuning knob/keypad even if the radio screen is not visible.

3-4 TOOL BAR: SWEEP

The SWEEP tool bar is used to enable the SweepPanel window. This window provides a way to view active frequencies in a visual format. It can help locate activity (or inactivity) on a given range of frequencies.

To enable the SweepPanel window, left click SCREEN on the radio screen tool bar. You will now see the blank SweepPanel grid. To start a sweep across a given range of frequencies, left click the SWEEP button on the SweepPanel screen. Receiver audio is automatically muted during a sweep. You can over-ride the muting during a sweep by clicking the volume slider control while the sweep is in progress.

At the end of a sweep, you can tune the radio to a desired frequency on the SweepPanel by moving the mouse pointer onto the desired signal and left clicking. The radio screen will automatically move to where you have clicked with the mouse.

Unless specified, the center of the frequency range swept will be the last frequency the PEGASUS was tuned to prior to the SweepPanel window being enabled. You can specify an alternate center frequency if desired. Left click the down arrow under CENTER FREQUENCY, then left click on the frequency shown in the box to place the cursor. Backspace and then type your desired center frequency. When ready to sweep, left click SWEEP on the SweepPanel. After the sweep, PEGASUS will return to the last frequency shown on the main tuning display.

The RANGE setting is used to determine the amount of frequency coverage a given sweep will check for activity. There are 7 selectable sweep ranges.

The FILTER setting can be used to select a filter to be used only for the duration of the sweep. At the end of the sweep, the radio will return to the filter last selected on the main radio screen. The 'Auto' selection allows the PEGASUS to determine the most appropriate filter to be used, based on the RANGE setting.

The LOG and LINEAR scales are relative indicators of received signal strength (not actual signal strength). The LINEAR scale is a signal graph scale from 0 to 1. The LOG scale measures signal strength relative to other received signals and noise present on the frequency band you are receiving.

The STYLE setting will allow you to toggle between a solid line and single line display on the sweep graph.

3-5 TOOL BAR: MEMORY

The quantity of PEGASUS memories are only limited by the available RAM in your PC. A typical PC has enough RAM capability to allow for thousands of memories.

Left clicking the MEMORY button on the tool bar will bring up the Radio Memory window. To add a memory, left click the ADD button. The 'Station Information Sheet' window will come up. The 'Station Name or Identifier' command line is for the name of the station you want to put in memory (i.e. Radio Canada International). Use the TAB button on your computer keyboard to scroll through the different command lines on this window. Enter frequency in MHz (with decimal point). Select mode and filter. Enter country and language information (this is primarily for international shortwave broadcast use). You are not required to fill in all blanks; any can be left blank. 'Notes' is for use for any additional information you may want to store about a given memory.

There are three methods for sorting stored memories: alphabetically by country, alphabetically/numerically by station information, or numerically by frequency. To sort, left click the appropriate word at the bottom of the Radio Memory window. If station information begins with a number rather than a letter, these memories will be sorted by number and placed ahead of the alphabetical listings.

The TUNE button in the Radio Memory window transfers the memory you have selected onto the main radio screen. Left click a given memory to highlight it. Left click the TUNE button. The PEGASUS will now have moved frequency to your selected memory. You can also tune to a selected memory by double left clicking it with the mouse.

The EDIT command allows you to edit information stored in a previously entered memory. Left click the desired memory, then left click EDIT to change stored information.

The DELETE command allows removal of stored memories. Highlight the desired memory with the mouse, then left click DELETE to remove it.

The CLOSE command removes the Radio Memory window from the screen.

3-6 TOOL BAR: SETTINGS

The 'Settings' selection on the toolbar allows for detailed control of the PEGASUS transceiver. Most of these are 'set and forget'.

To bring up the Transceiver Settings menu, left click the 'Settings' button on the radio screen tool bar. You will be presented with seven options: PREFERENCES, TRANSMITTER, CW SETTINGS, SSB SETTINGS, VOX CONTROLS, REMOTE POD, and INTERFACE.

3-6.1 PREFERENCES

This window always appears when the 'Settings' button is selected on the radio screen tool bar. The "Local/UTC" correction allows you to display both local and UTC time on your computer,

providing you with the choice to have the master clock in your computer set to whichever you prefer.

The "Mute Radio On Exit" command will allow you to always mute the radio on exiting the software (default), never mute the radio on exiting, or to bring up a window to ask if you want the radio muted each time you exit the PEGASUS software.

If you exit the software without muting the radio, you can continue to monitor the last frequency and mode the radio was operating on when the software was closed. You will be unable to manipulate any of the radio settings and the optional model 302 remote encoder/tuning knob (if installed) is inoperable.

The "Ham Call Path" command line is to instruct the software to know where to look for the Buckmaster Publishing HamCall CD-ROM (if installed). If your CD-ROM is drive D: the correct path name to be inserted here is D:\HAM0\

3-6.2 TRANSMITTER

ENABLE KEYING LOOP: The PEGASUS transceiver is equipped with a full break-in keying loop to enable keying of a full break-in linear amplifier with proper T/R sequencing. The loop connectors on the PEGASUS rear panel are TX EN and TX OUT. This loop must be enabled to use a Ten-Tec (or similar) amplifier. You can connect these connectors to corresponding input and output jacks on a Ten-Tec linear amplifier or other linear amplifier employing a similar keying sequence. See Figure 1-6 for connection guide. To enable the keying loop, left click the Enable Keying Loop box.

ENABLE TRANSMITTER: The PEGASUS transmitter can be intentionally disabled in software to prevent accidental transmissions. To disable or enable the transmitter, left click the Enable Transmitter box.

MICROPHONE INPUT AND ACCESSORY INPUT: By selecting either of these, you are instructing the PEGASUS to accept transmit audio input from either the microphone jack or the ACCESSORY DIN connector located on the front panel of the radio.

TUNE: This is a duplicate of the TUNE button on the virtual front panel. Click TUNE to transmit "key-down" in CW mode. Additionally, a digital readout for RF power output will appear directly under the TUNE button when it is selected. This will allow easy setting of output power.

OUTPUT POWER: This slider is used to control the PEGASUS transmitter output power. Left click, hold and drag the slider control to adjust forward output power from approximately 5 to 100 watts. The control is somewhat linear.

EXT T/R HANG: This slider is used to control the hang time on the EXT T/R output, used for keying a non-QSK external linear amplifier.

3-6.3 CW SETTINGS

ENABLE KEYER: This button is used to accept direct connection of keyer paddles to the front panel KEY jack. The PEGASUS default value is to accept a 1/8" mono key input from a straight key, bug, or external keyer. To enable the internal keyer, left click the box by Enable Keyer. Proper wiring of keyer paddles for use with the internal keyer is shown in Figure 1-3 in chapter 1.

KEY SPD: This slider control is to control internal keyer speed (words per minute). Left click, hold and drag to adjust. The minimum value is approximately 7 WPM, maximum value is approximately 55 WPM.

SIDETONE (HZ): This determines both the audio pitch of the CW sidetone and the carrier transmit offset in CW mode. The default value is 700 Hz. The offset can be set anywhere between 400 and 990 Hz. To change the value, type the desired offset in the command window.

S.T. VOL: This slider control is for sidetone volume. Sidetone volume has a separate adjustment from the main radio volume control. These two controls do interact and as main radio volume is increased, sidetone volume will increase. Some experimentation will be required with sidetone volume vs. main volume to determine what sidetone volume is comfortable.

3-6.4 SSB SETTINGS

IMPORTANT: The PEGASUS transceiver is capable of transmitting in SSB mode with a variety of transmit bandwidths. The default value as shipped from the factory is 2.55 kHz. An operator of the PEGASUS should be aware of the implications of using wide SSB filtering while transmitting.

Audio fidelity generally improves with the use of wider SSB transmit filtering. Using a 3.0 kHz transmit bandwidth will have a more "well-rounded" audio response than a narrower bandwidth. As transmit bandwidth widens, so does the potential for interference with stations using adjacent frequencies. In practice, amateur radio transceivers typically utilize a SSB transmit bandwidth of between 2.4 and 2.8 kHz, and this range has come to be a de facto standard for a communications-grade SSB transmit signal.

Part 97 of the FCC regulations governing amateur radio operation does not specify a maximum transmit bandwidth usable by amateurs for SSB communication. However, FCC regulation 97.307(a) requires amateur stations to not occupy more bandwidth than is necessary for the emission type being transmitted in accordance with good amateur practice. Regulation 97.307(b) requires that emissions outside the necessary bandwidth must not cause splatter interference to operations on adjacent frequencies.

While these are broad regulations subject to interpretation, the responsibility for complying with the regulations rests with the operator. Using a SSB transmit bandwidth wider than necessary for communications and causing interference to adjacent stations while doing so is specifically what these regulations are addressing. In summary, what may be an acceptable bandwidth on a given band at a given time may not be on another band at another time.

TRANSMIT FILTER: SSB transmission on the PEGASUS is DSP generated. There are 18 available transmit bandwidth filters to suit your individual taste for transmit audio. In general, the wider the bandwidth audio, the more "well-rounded" the audio fidelity, though this will vary with microphone and individual voice characteristics. The default value, as supplied from the factory is 2.55 kHz.

MONITOR VOLUME: PEGASUS is equipped with a monitor for monitoring the sound of your transmitted SSB signal. To adjust the monitor volume (independent of the main radio

AF control) left click, hold, and drag the slider bar. The MON button on the virtual front panel must be activated to use this feature.

MIC GAIN: MIC gain is adjustable with this slider bar. While speaking into the microphone, advance the MIC GAIN slider bar until the ALC LED on the physical front panel of the PEGASUS begins to flash. The LED indicates that the transceiver is generating full output power relative to the setting of the OUTPUT POWER slider bar under TRANSMITTER SETTINGS.

This slider provides approximately 22 dB of adjustment which should accommodate most microphones. In the unlikely event your microphone requires more or less gain, there is a potentiometer on the logic board to provide further adjustment.

3-6.5 VOX CONTROLS

To use the VOX (voice activated transmit) mode, left click the VOX button. The lettering on the VOX button will change from black (disabled) to blue (enabled). To adjust the VOX GAIN, VOX DELAY, and ANTI VOX controls, select 'Settings' from the tool bar. In the 'Settings' menu, left click VOX CONTROLS. Adjust any of the three controls by left or right clicking, holding, and dragging the slider controls.

Adjust the VOX GAIN for desired transmitter action while speaking into the microphone. Once set, adjust VOX DELAY for desired transmitter hang time. Adjust ANTI VOX to a level where the receiver audio does not trip the transmitter.

3-6.6 REMOTE POD

The optional model 302 remote encoder/keypad is equipped with three function buttons (labeled F1, F2, F3) that can be assigned specific radio functions.

Each function button has a pull down menu with five available choices: Tuning Steps, Tuning Selections, Mode Selections, Split Reverse, and A/B Toggle.

To assign a specific function, left click the arrow on each command line and then click on the desired feature to be assigned to a particular function key.

"Tuning Steps" allows you to scroll through all the available main knob tuning rates. Pressing the function key will scroll through all available tuning rates.

"Tuning Selections" allows control of frequency-specific functions with the remote knob. In the radio screen tool bar area there is an indicator with a default value of Remote: VFO. By pressing the function button, you can assign tuning of VFO, PBT, RIT or XIT to the remote knob. Note that PBT, RIT and XIT can be tuned even if that particular control is not selected on the front panel. To use each, click each function with the mouse. If you think you may potentially use any or all of them while operating the radio, click RIT, XIT, and PBT when you begin to operate. You can then assign the knob to a tuning selection when needed and not have to turn them on and off on the radio screen.

"Mode Selections" is used to scroll through all available modes of operation.

"Split Reverse" is to allow monitoring and movement of the opposite VFO when in SPLIT mode. If one VFO is set at 14.195 for 'DX receive', and the other at 14.200 for 'your transmit' and SPLIT is enabled, you can press and hold this function button to instantly monitor your transmit frequency. While holding the function

button, you can also tune the transmit frequency VFO with the tuning knob. Release the function button and the radio returns to the 'DX receive' frequency.

"A/B Toggle" allows toggling between VFO A and VFO B.

3-6.7 INTERFACE

This is for assignment of the PEGASUS to a particular COM port on your PC.

3-7 TOOL BAR: MUTE

This tool bar button mutes receiver audio.

3-8 TOOL BAR: CALL

The PEGASUS software has an interface for use with the Buckmaster Publishing HamCall™ CD-ROM. You can look up callsign information with the CD-ROM while using the Pegasus.

Insert the provided HamCall™ CD into your PC's compact disc player. To look up callsign data, left click the 'Call' button on the tool bar. Place the mouse pointer in the callsign area and click. The cursor will now appear in the callsign window. Type the callsign you wish to look up and click 'Find'. Name and address information will be shown.

The Buckmaster HamCall CD-ROM has many additional functions that are not accessed from the Pegasus software.

3-9 TOOL BAR: EXIT

This tool bar button will exit you from the PEGASUS GUI. Depending upon the setting you have selected under TRANSCEIVER SETTINGS: PREFERENCES, the PEGASUS will either automatically mute receiver audio, will not mute audio, or will ask you to choose before exiting.

3-10 TOOL BAR: REMOTE

If the optional model 302 remote encoder is installed, this indicator tells the PEGASUS operator what tuning function the remote knob has been assigned to. See section 3-6.8.

CHAPTER 4

GLOSSARY

4-1 INTRODUCTION There are a number of "computer lingo" terms that are accepted in common language used in this manual. In case you may not be familiar with some or all of them, a glossary is provided to define some of the terms used.

DRAG, DRAGGING: Clicking a mouse button, holding it down, and moving the mouse while still keeping the button depressed (see HOLD, HOLDING)

FRONT PANEL: The physical front panel of the PEGASUS transceiver unit (not the operating software).

GRAPHICAL USER INTERFACE (GUI): The actual software used to control the PEGASUS transceiver, in its' entirety.

HOLD, HOLDING: As related to mouse clicking, "holding" is keeping the mouse button pressed down rather than momentarily clicking a mouse button.

LEFT CLICK, LEFT CLICKING: Press and release the left button on your computer mouse.

MOUSE POINTER: The arrow you see on your computer screen that moves in conjuction with movements of the mouse, to allow mouse selection of items on the screen.

RADIO SCREEN: The display of the "virtual front panel" of the PEGASUS transceiver on your computer monitor.

RIGHT CLICK, RIGHT CLICKING: Press and release the right button on your computer mouse.

TOOL BAR: A button or series of buttons that control single or multiple software functions.

CHAPTER 5

TROUBLESHOOTING GUIDE

Symptom	Suggested correction
PEGASUS will not power on	Power supply turned off. 25 amp fuse loose or missing or no connection between PEGASUS and power supply
On initial loading of software, screen comes up blank except for tool bar at top of screen	click RADIO button to bring up radio screen
No audio from receiver, frequency controls appear normal. S-meter appears to be reacting to received signals.	Receiver squelched with SQ slider or receiver muted; click MUTE AF slider turned down or external speakers too low if using sound card
No audio from receiver, frequency controls appear normal. No reaction on S-meter.	Radio not making contact with PC via serial port. Check COM port configuration on PC and in radio software. Check serial port cable.
Inserting keyer paddle into KEY jack gives no transmit on dit side, key down transmit on dah side.	Paddle input has not been enabled in software
No transmit output.	Keying loop enabled without appropriate connections or transmitter intentionally disabled. See section 3-6.2.

TEN-TEC, Inc.
1185 Dolly Parton Parkway
Sevierville, TN 37862

CUSTOMER SERVICE TELEPHONE
865-428-0364

LIMITED WARRANTY AND SERVICE POLICY, U.S.A.

TEN-TEC, Inc. warrants this product to be free from defects in material and workmanship for a period of one year from the date of purchase, under these conditions:

1. THIS WARRANTY APPLIES ONLY TO THE ORIGINAL OWNER. It is important that the warranty registration card be sent to us promptly to establish you as the owner of record. This will also insure that any bulletins pertaining to this equipment will be sent to you.

2. READ THE MANUAL THOROUGHLY. This warranty does not cover damage resulting from improper operation. Developing a thorough understanding of this equipment is your responsibility.

3. IF TROUBLE DEVELOPS we recommend that you contact our customer service group direct. The selling dealer is not obligated by us to perform service in or out of warranty. It has been our experience that factory direct service is expeditious and usually results in less down-time on the equipment. Some dealers do offer warranty service and of course, have our complete support.

4. WE ENCOURAGE SELF HELP. Taking the covers off does not void the warranty. In many cases our customer service technicians, with your help, can identify a faulty circuit board. In these cases we will send you a replacement board which you can change out. This will be shipped on a 30 day memo billing and when the defective board is returned, we will issue credit.

5. EQUIPMENT RETURNED TO THE FACTORY must be properly packaged, preferably in the original shipping carton. You pay the freight to us and we prepay surface freight back to you.

6. EXCLUSIONS. This warranty does not cover damage resulting from misuse, lightning, excess voltages, polarity errors or damage resulting from modifications not recommended or approved by Ten-Tec. In the event of transportation damage a claim must be filed with the carrier. Under no circumstances is Ten-Tec liable for consequential damages to persons or property caused by the use of this equipment.

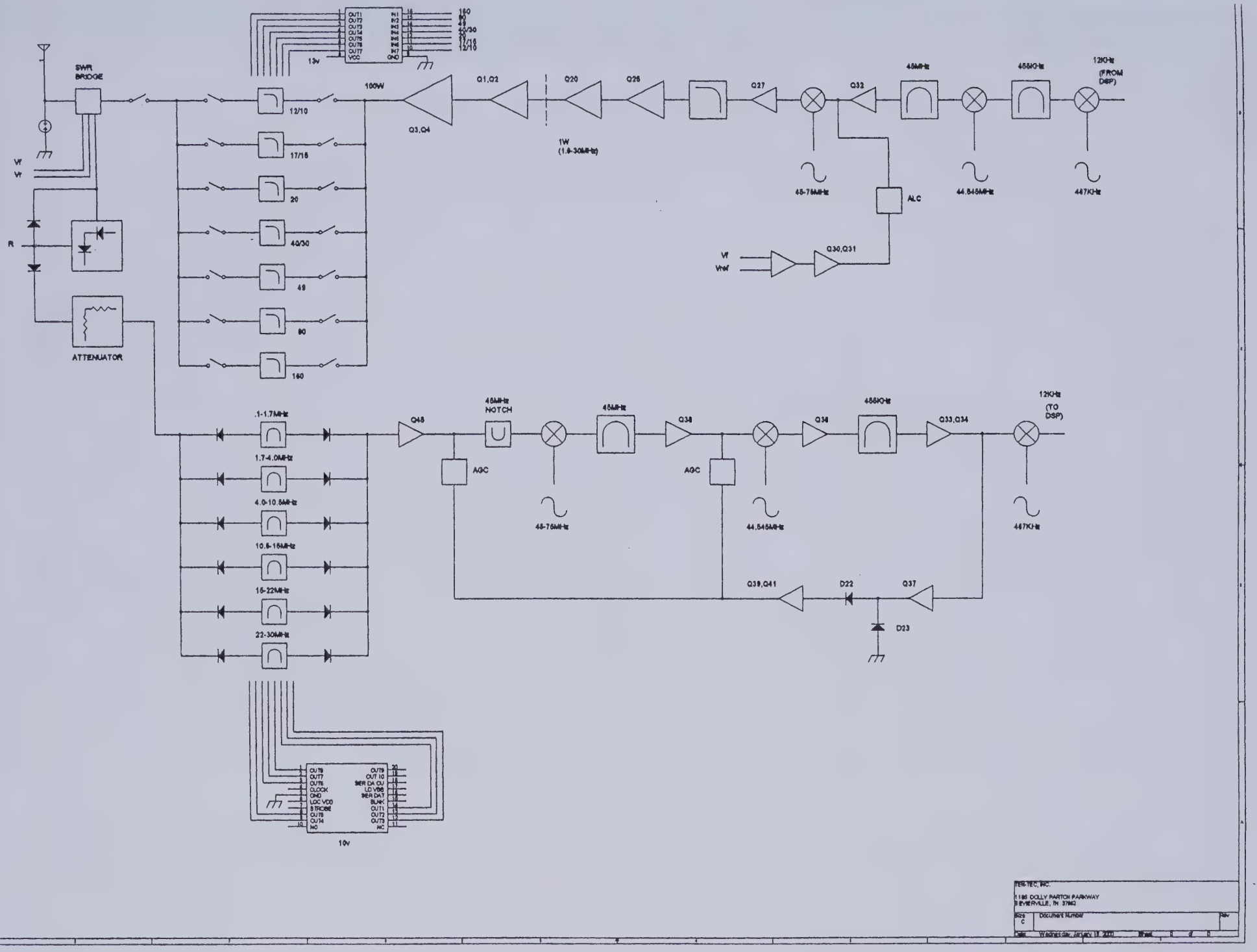
7. TEN-TEC RESERVES the right to make design changes without any obligation to modify equipment previously manufactured.

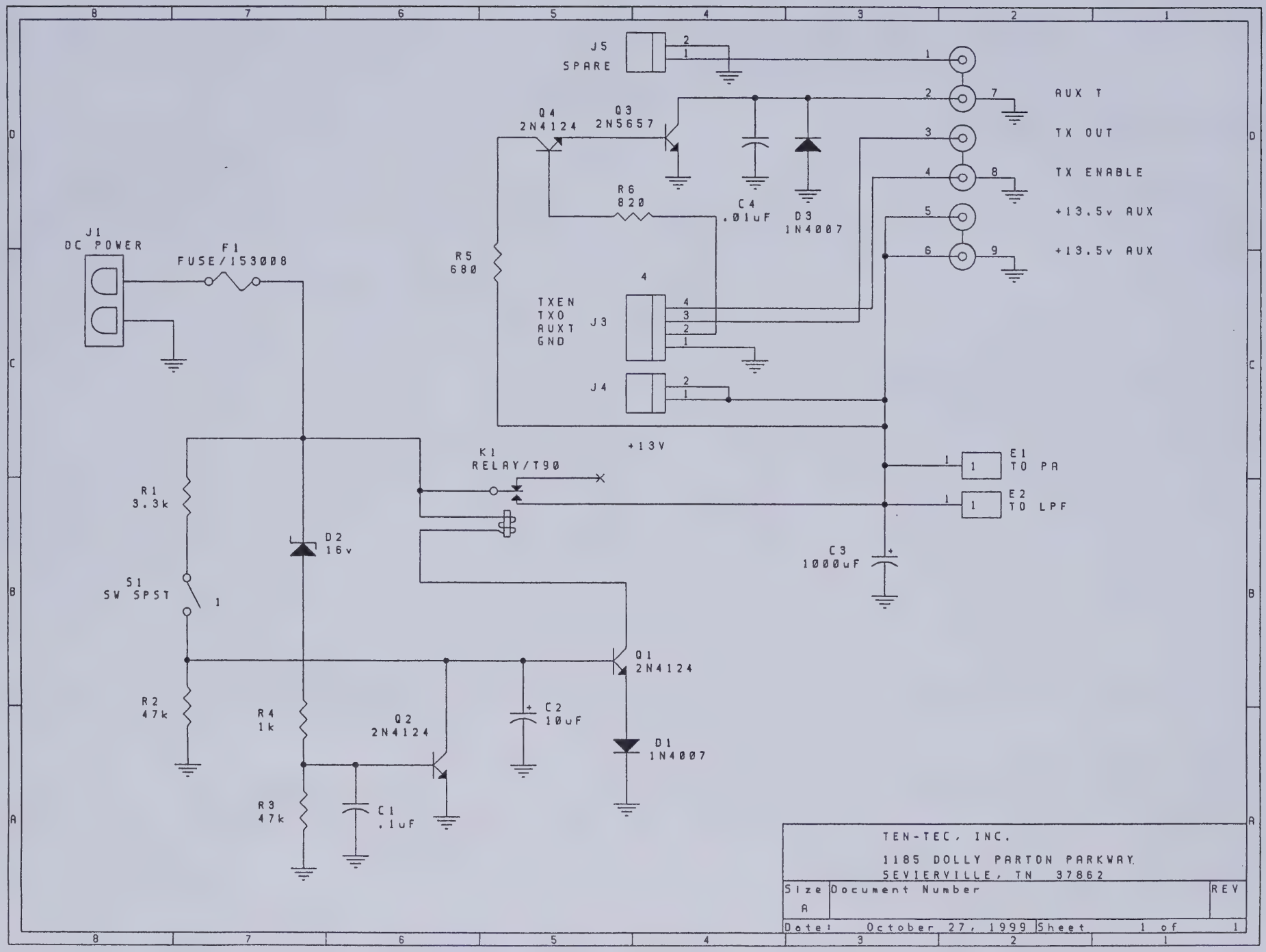
8. THIS WARRANTY is given in lieu of any other warranty, expressed or implied.

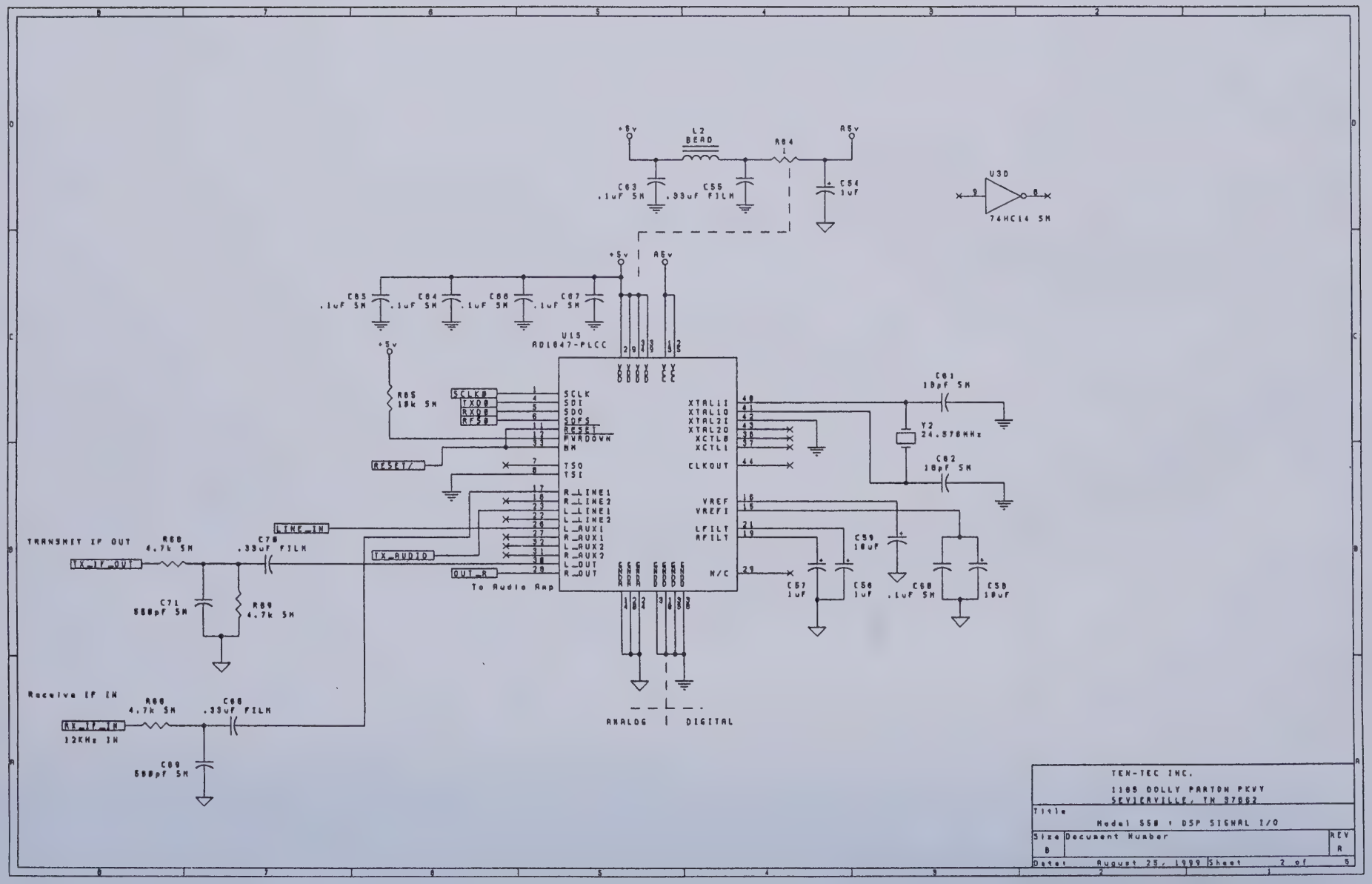
SERVICE OUTSIDE OF THE U.S.A.

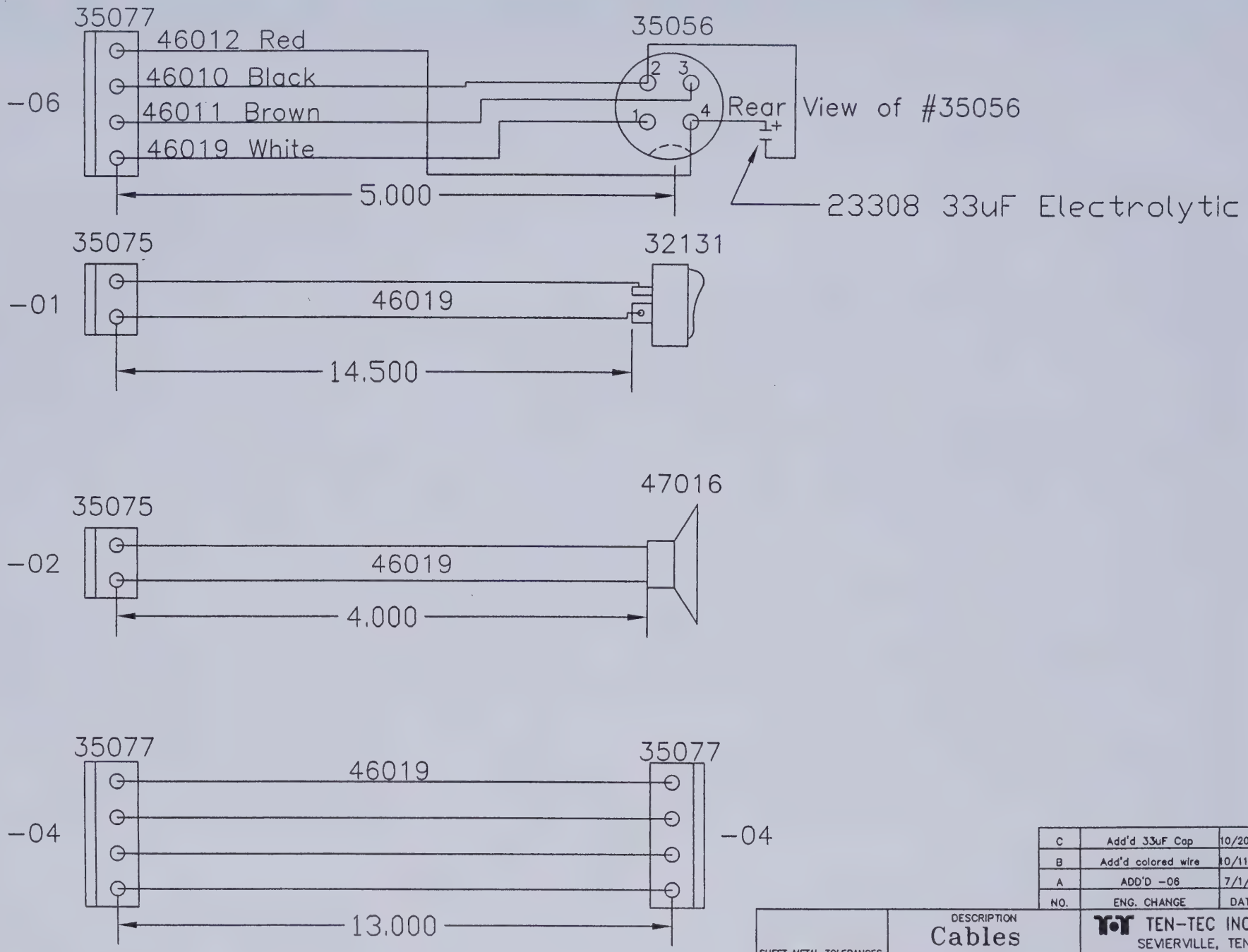
Many of our dealers provide warranty service on the equipment they sell. Many of them also provide out of warranty service on all equipment whether they sold it or not. If your dealer does not provide service or is not conveniently located, follow the procedure outlined above. Equipment returned to us will be given the same attention as domestic customers but all freight expense, customs and broker fees will be paid by you.

Part No. 74244


SWR BRIDGE
ATTENUATOR
12/10
17/15
20
40/30
49
80
160
100W
Q3,Q4
Q1,Q2
Q20
1W (1.8-30MHz)
Q26
Q27
Q32
45MHz
455KHz
12KHz (FROM DSP)
45-75MHz
44.545MHz
447KHz
ALC
Q30,Q31
.1-1.7MHz
1.7-4.0MHz
4.0-10.5MHz
10.5-15MHz
15-22MHz
22-30MHz
Q48
45MHz NOTCH
45MHz
Q38
Q36
Q33,Q34
12KHz (TO DSP)
AGC
AGC
Q39,Q41
D22
Q37
D23
13v
10v
TEN-TEC, INC.
1185 DOLLY PARTON PARKWAY
SEVIERVILLE, TN 37862


J5
SPARE
Q4
2N4124
Q3
2N5657
R6
820
C4
.01uF
D3
1N4007
AUX T
TX OUT
TX ENABLE
+13.5v AUX
+13.5v AUX
J1
DC POWER
F1
FUSE/153008
R5
680
TXEN
TXO
AUXT
GND
J3
J4
+13V
K1
RELAY/T90
E1
TO PA
E2
TO LPF
C3
1000uF
R1
3.3k
D2
16v
S1
SW SPST
Q1
2N4124
R2
47k
R4
1k
Q2
2N4124
C2
10uF
D1
1N4007
R3
47k
C1
.1uF
TEN-TEC, INC.
1185 DOLLY PARTON PARKWAY
SEVIERVILLE, TN 37862
Size
A
Document Number
REV
Date: October 27, 1999
Sheet 1 of 1


+5v
L2
BEAD
R84
A5v
C63
.1uF 5M
C55
.33uF FILM
C54
1uF
U3D
9
8
74HC14 5M
+5v
A5v
C83
.1uF 5M
C84
.1uF 5M
C86
.1uF 5M
C87
.1uF 5M
U15
AD1847-PLCC
+5v
R85
10k 5M
SCLK0
TXD0
RXD0
RFS0
RESET/
SCLK
SDI
SDO
SDFS
RESET
PWRDWN
MM
TSO
TSI
LINE_IN
TX_AUDIO
OUT_R
To Audio Amp
R_LINE1
R_LINE2
L_LINE1
L_LINE2
L_AUX1
R_AUX1
L_AUX2
R_AUX2
L_OUT
R_OUT
XTALI1
XTALI0
XTAL2I
XTAL2O
XCTL0
XCTL1
CLKOUT
VREF
VREFI
LFILT
RFILT
N/C
C81
18pF 5M
Y2
24.576MHz
C82
18pF 5M
C59
10uF
C57
1uF
C56
1uF
C60
.1uF 5M
C58
10uF
TRANSMIT IF OUT
R80
4.7k 5M
C78
.33uF FILM
TX_IF_OUT
C71
680pF 5M
R89
4.7k 5M
Receive IF IN
R88
4.7k 5M
C88
.33uF FILM
RX_IF_IN
12KHz IN
C89
680pF 5M
ANALOG
DIGITAL
TEN-TEC INC.
1185 DOLLY PARTON PKWY
SEVIERVILLE, TN 37862
Title
Model 550 : DSP SIGNAL I/O
Size
B
Document Number
REV
R
Date: August 25, 1999 Sheet 2 of 5



NO.	ENG. CHANGE	DATE
C	Add'd 33uF Cap	10/20/99
B	Add'd colored wire	10/11/99
A	ADD'D -06	7/1/99

SHEET METAL TOLERANCES
CENTER TO CENTER ±.005
CENTER TO EDGE ±.015
HOLE SIZE ±.003
SILKSCREEN DIM'S ±.015
BURRS .005 MAX.

DESCRIPTION: Cables

MATERIAL:

DRAWN: Jeff Parton 4/30/99

ENG.: Mike W.

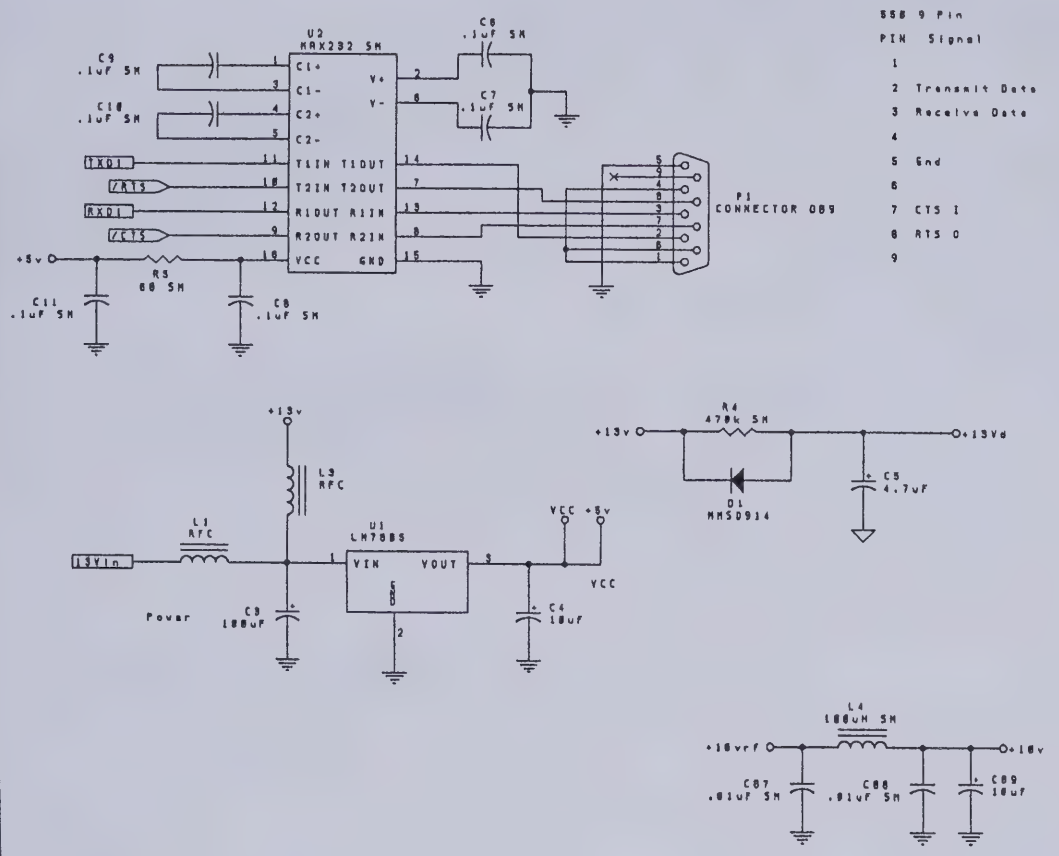
TEN-TEC INC. SEVIERVILLE, TENN.

END USE OR CUSTOMER: Model 550

SCALE: To Fit

T. T. PART NO.: 86094-M

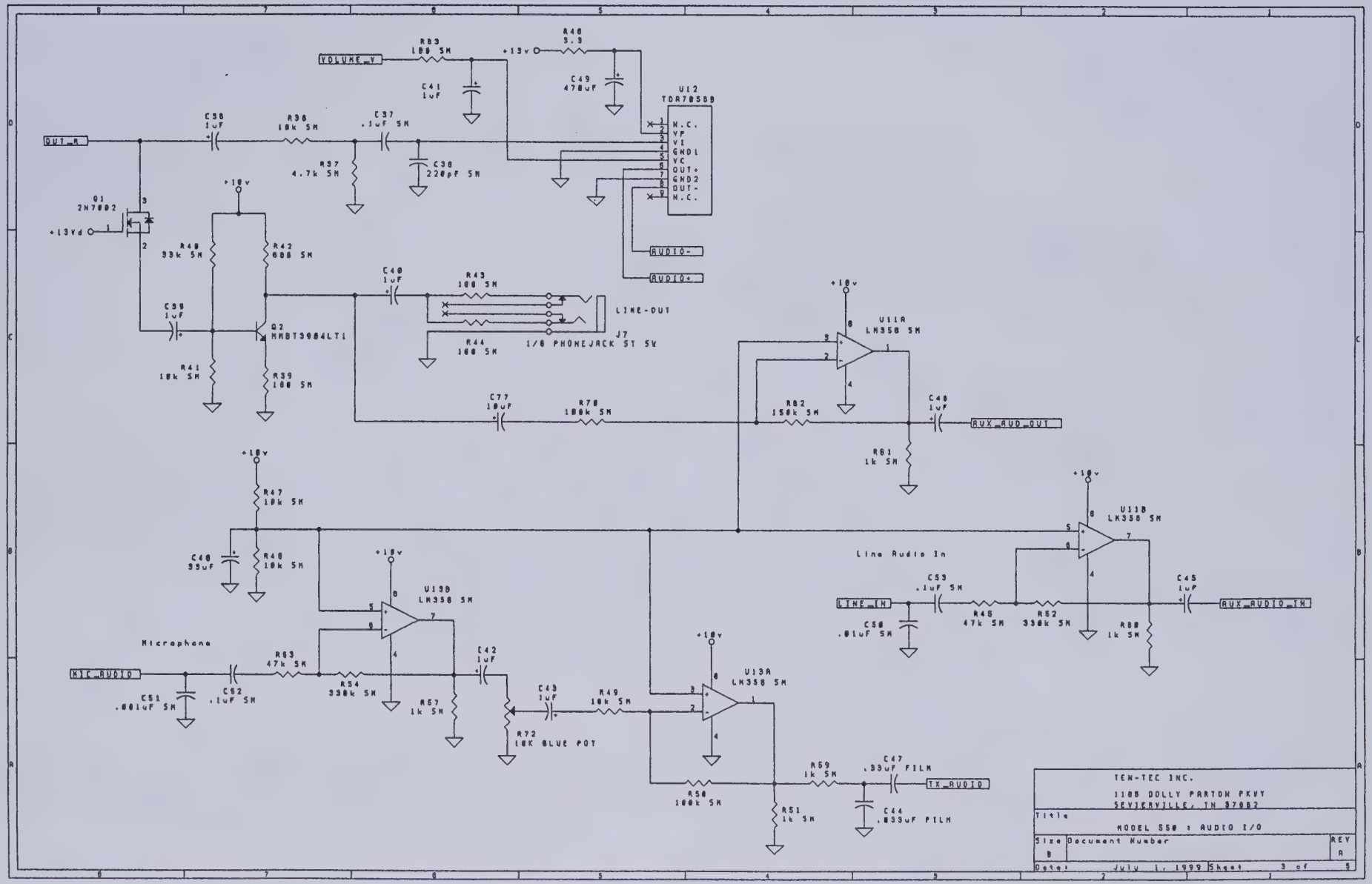
SHEET 1 OF 1

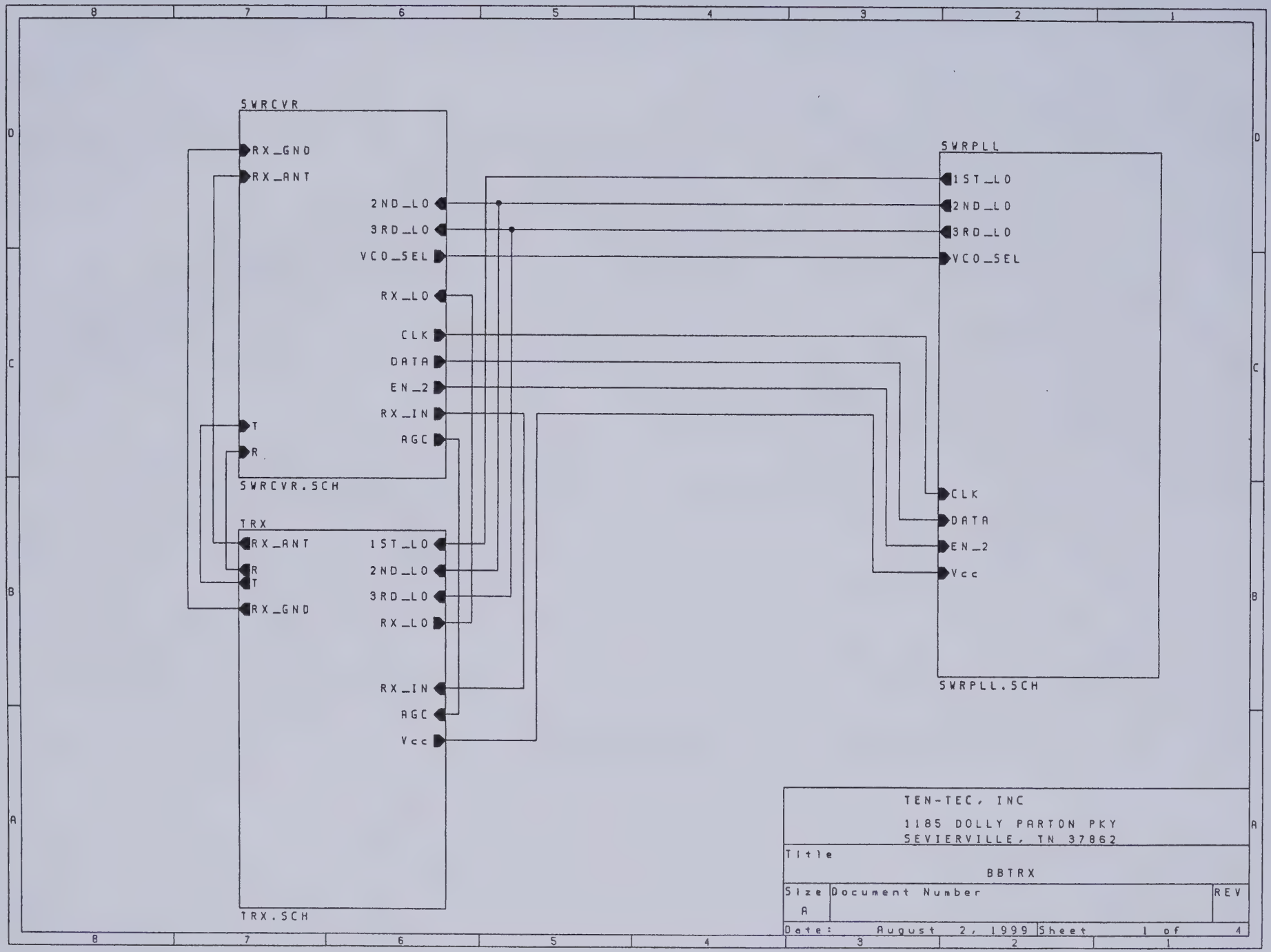


558 9 Pin	
PIN	Signal
1	
2	Transmit Data
3	Receive Data
4	
5	Gnd
6	
7	CTS I
8	RTS O
9	

PC 9 Pin		
PIN		
1	Data Carrier Detect	I
2	Receive Data	I
3	Transmit Data	O
4	Data Terminal Ready	O
5	Signal Gnd	
6	Data Set Ready	I
7	Request To Send	O
8	Clear To Send	I
9	Ring Indicator	I

TEN-TEC INC. 1100 DOLLY PARTON PKWY SEVIERVILLE, TN 37862		
Title: MODEL 558 : POWER/CONTROL		
Size: B	Document Number:	REV: A
Date: July 30, 1999	Sheet 8 of 8	


VOLUME_V
R83
100 SM
+13v
R46
3.3
C41
1uF
C49
470uF
U12
TDA7056B
N.C.
VP
VI
GND1
VC
OUT+
GND2
OUT-
N.C.
AUDIO-
AUDIO+
OUT_R
C38
1uF
R38
10k SM
C37
.1uF SM
R37
4.7k SM
C36
220pF SM
Q1
2N7002
+13V
+10v
R40
33k SM
R42
680 SM
C40
1uF
R43
100 SM
LINE-OUT
J7
1/8 PHONEJACK ST SW
R44
100 SM
C39
1uF
Q2
MMBT3904LT1
R41
10k SM
R39
100 SM
U11A
LM358 SM
C77
10uF
R78
100k SM
R82
150k SM
C48
1uF
AUX_AUD_OUT
R81
1k SM
R47
10k SM
C46
33uF
R48
10k SM
U11B
LM358 SM
Line Audio In
C53
.1uF SM
LINE_IN
C50
.01uF SM
R46
47k SM
R52
330k SM
C45
1uF
AUX_AUDIO_IN
R88
1k SM
U13B
LM358 SM
Microphone
MIC_AUDIO
C51
.001uF SM
C52
.1uF SM
R53
47k SM
R54
330k SM
R57
1k SM
C42
1uF
C43
1uF
R72
10K BLUE POT
R49
10k SM
U13A
LM358 SM
R59
1k SM
C47
.033uF FILM
TX_AUDIO
R50
100k SM
R51
1k SM
C44
.033uF FILM
TEN-TEC INC.
1185 DOLLY PARTON PKWY
SEVIERVILLE, TN 37862
Title
MODEL 550 : AUDIO I/O
Size
B
Document Number
REV
A
Date: July 1, 1999
Sheet 3 of 5


SWRCVR
RX_GND
RX_ANT
2ND_LO
3RD_LO
VCO_SEL
RX_LO
CLK
DATA
EN_2
RX_IN
AGC
T
R
SWRCVR.SCH
TRX
RX_ANT
R
T
RX_GND
1ST_LO
2ND_LO
3RD_LO
RX_LO
RX_IN
AGC
Vcc
TRX.SCH
SWRPLL
1ST_LO
2ND_LO
3RD_LO
VCO_SEL
CLK
DATA
EN_2
Vcc
SWRPLL.SCH
TEN-TEC, INC
1185 DOLLY PARTON PKY
SEVIERVILLE, TN 37862
Title
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Size A
Document Number
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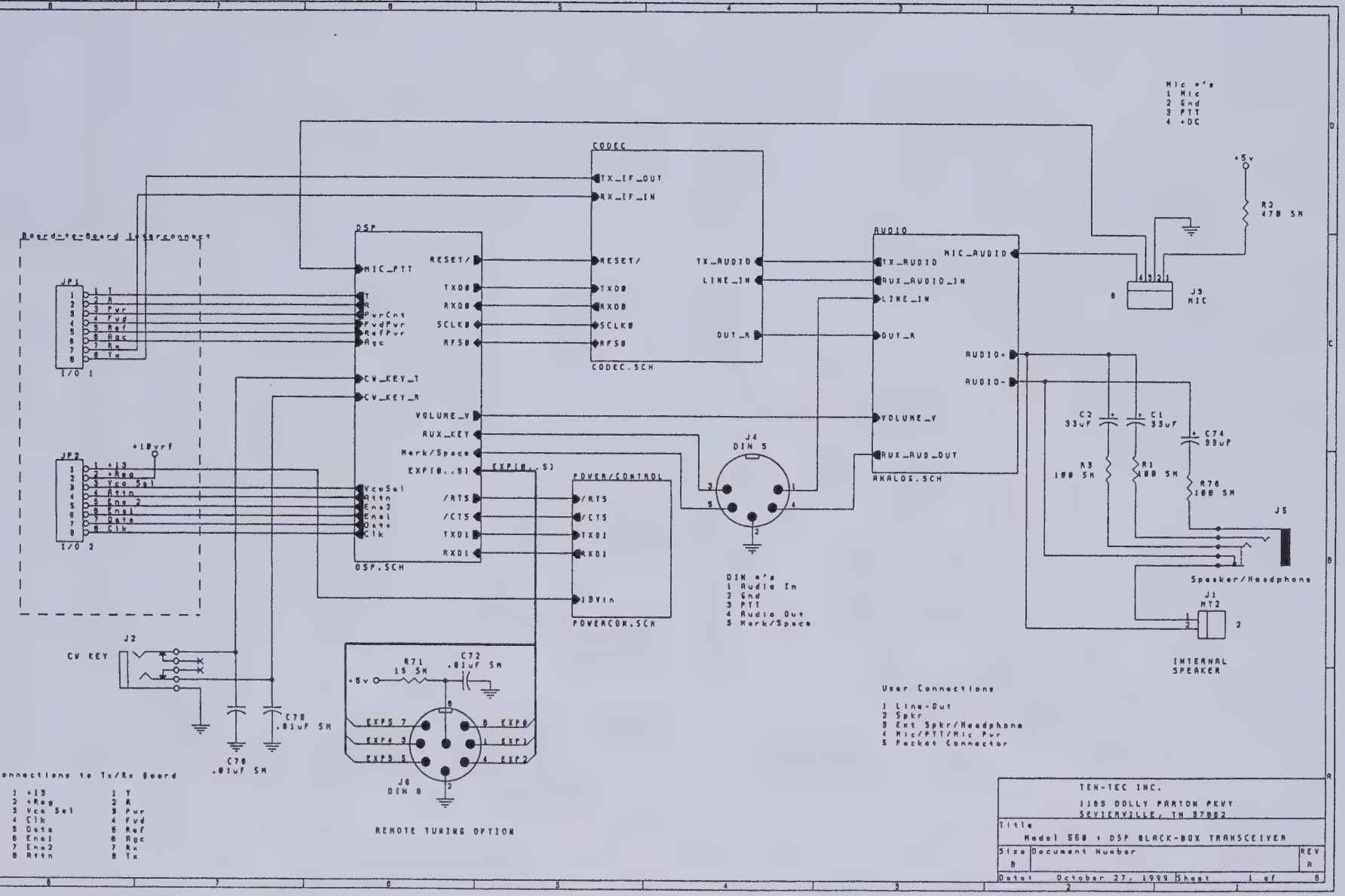
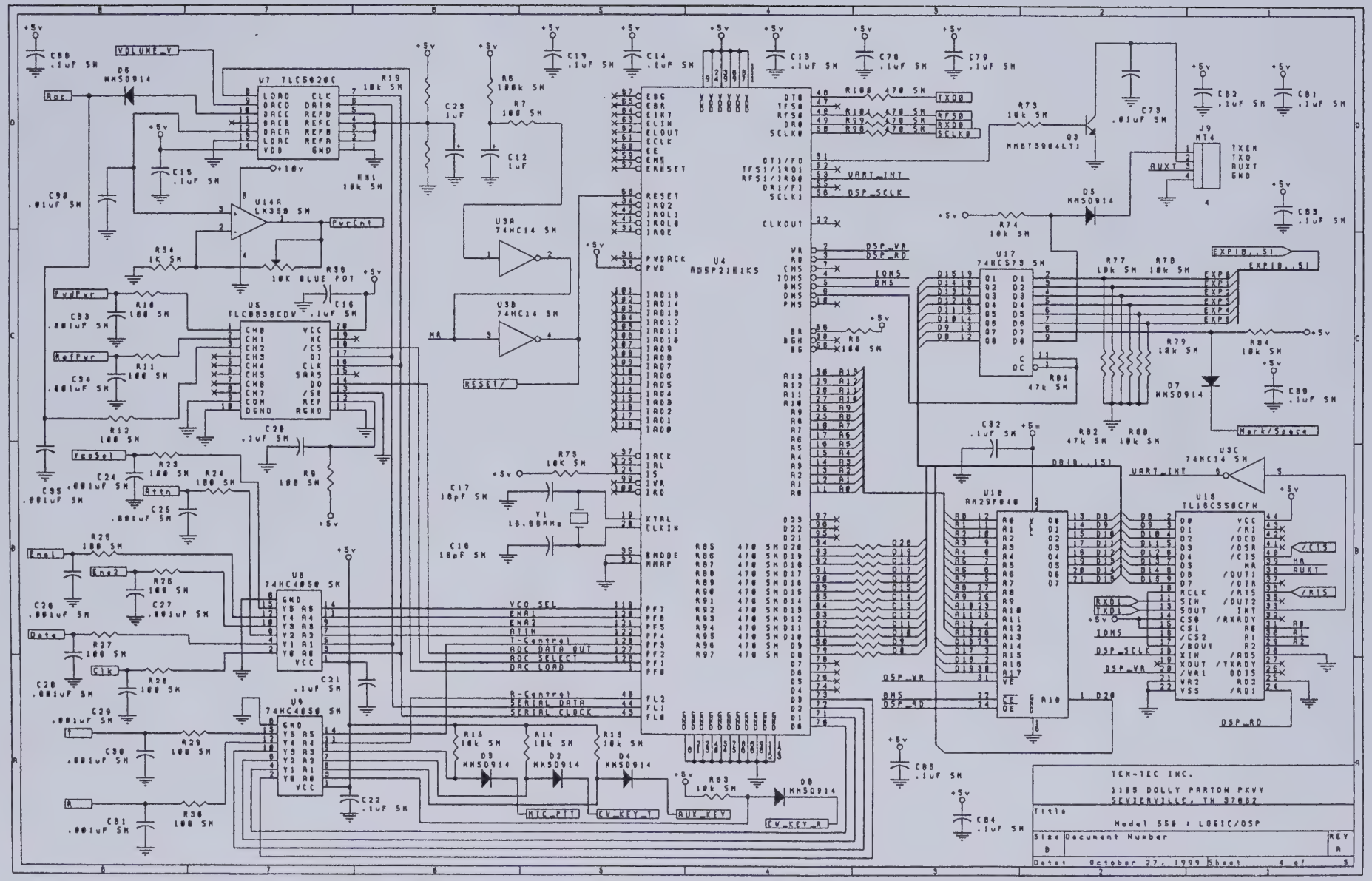
Sheet 1 of 4

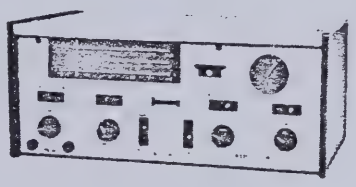

Board-to-Board Interconnect
JP1
I/O 1
JP2
I/O 2
CODEC
TX_IF_OUT
RX_IF_IN
RESET/
TXD0
RXD0
SCLK0
RFS0
TX_AUDIO
LINE_IN
OUT_R
CODEC.SCH
DSP
MIC_PTT
PwrCnt
FwdPwr
RefPwr
Agc
CW_KEY_T
CW_KEY_R
VOLUME_V
AUX_KEY
Mark/Space
EXP[0..8]
VcoSel
Attn
Ena2
Ena1
Data
Clk
/RTS
/CTS
TXD1
RXD1
DSP.SCH
POWER/CONTROL
18Vin
POWERCON.SCH
AUDIO
MIC_AUDIO
AUX_AUDIO_IN
AUX_AUD_OUT
ANALOG.SCH
Mic o's
1 Mic
2 Gnd
3 PTT
4 +DC
+5v
R2
470 5%
J3
MIC
AUDIO+
AUDIO-
C2
33uF
C1
33uF
C74
33uF
R9
100 5%
R1
100 5%
R76
100 5%
J5
Speaker/Headphone
J1
MT2
INTERNAL
SPEAKER
J4
DIN 5
DIN o's
1 Audio In
2 Gnd
3 PTT
4 Audio Out
5 Mark/Space
J2
CW KEY
C75
.01uF 5%
C76
.01uF 5%
R71
15 5%
C72
.01uF 5%
+8v
EXP5
EXP4
EXP3
EXP0
EXP1
EXP2
J6
DIN 8
REMOTE TUNING OPTION
User Connections
1 Line-Out
2 Spkr
3 Ext Spkr/Headphone
4 Mic/PTT/Mic Pwr
5 Pocket Connector
Connections to Tx/Rx Board
1 +18
2 +Reg
3 Vco Sel
4 Clk
5 Data
6 Enal
7 Ena2
8 Attn
1 T
2 R
3 Pwr
4 Fwd
5 Ref
6 Agc
7 Rx
8 Tx
TEN-TEC INC.
1185 DOLLY PARTON PKWY
SEVIERVILLE, TN 37862
Title
Model 560 - DSP BLACK-BOX TRANSCEIVER
Size
B
Document Number
REV
A
Date: October 27, 1999 Sheet 1 of 8


TEN-TEC INC.
1185 DOLLY PARTON PKWY
SEVIERVILLE, TN 37862
Title
Model 550 : LOGIC/DSP
Size
B
Document Number
REV
A
Date: October 27, 1999 Sheet 4 of 5

Recent Equipment

To acquaint you with the technical features of current amateur gear.

Ten Tec PM-2



HERE IS a piece of solid-state equipment that is practical and inexpensive as well as novel. The basic transceiver package provides for operation on 80 and 40 meters, VFO or crystal control. The transmitter section of the PM-2 also covers 15 meters, but the receiver portion of the equipment cannot function on 21 MHz without an accessory converter (which is available from Ten Tec). Other models of this equipment are available, permitting operation on 20 meters, in addition to one other band.[1]

The transmitter PA operates at approximately 2-watts dc input, and delivers between 1.5 and 1.75 watts rf output to a 50-or 75-ohm load. No provision is made for operating the transmitter into loads of other impedances, but a Transmatch would enable the operator to use an antenna whose impedance was other than the range specified by the manufacturer.

Modular construction is used in the PM-2. The transmitter is a separate assembly, as is the VFO, the product-detector (receiver front end), and the IC audio board. One may wish to purchase the basic kit of modules and assemble his own transceiver, or he can obtain the PM-2 assembled in its cabinet.

An operating voltage of plus 12 is required for the PM-2, and maximum current taken (during transmit) is approximately 200 mA. The manufacturer recommends that the equipment be operated from a good stiff battery pack, rather than from an ac-operated dc supply. An ac supply can introduce hum on the received signal, and may result in hum on the transmitted signal when the VFO is being used. Experiences while using regulated ac supply tend to bear this theory out.

[1] Other models of this equipment are available. The PM-2 and PM-1 are electrically identical, but the PM-1 is supplied without the cabinet. The PM-3 covers the 40- and 20-meter bands, but is otherwise the same as the PM-2. The PM-3A is identical to the PM-3 except that it features break-in keying.

The Receiver

The prospective buyer should not be misled by the apparent simplicity of the PM-2 receiver section. This is one of the "hottest" receivers of simple design that one can find. The direct-conversion technique is used here, meaning that the first stage of this unit consists of a tunable product detector whose BFO operates at the incoming signal frequency.[2] Fig. 1 shows the product-detector circuit. An RCA dual-gate MOSFET provides good cross-modulation and overload immunity, and assures good conversion gain and low noise figure. Two silicon diodes are cross-connected across the tap on the input tuned circuit to prevent damage to the 40604 MOSFET should excessive rf energy appear on the receiver antenna lead. BFO injection is supplied to gate 2, which is forward biased by the voltage developed across the source resistor of the detector. Forward bias is also applied to signal-gate 1, no doubt to increase the transconductance of the MOSFET. Gate 1 is tapped down on the tuned circuit, probably to aid the Q of the input tank. Selectivity for the receiver is established after the detector, by means of FL1, a potted inductor and three

[2] Another name for this receiving technique is "synchrodyne". For additional information see April and May 1969 *QST*.

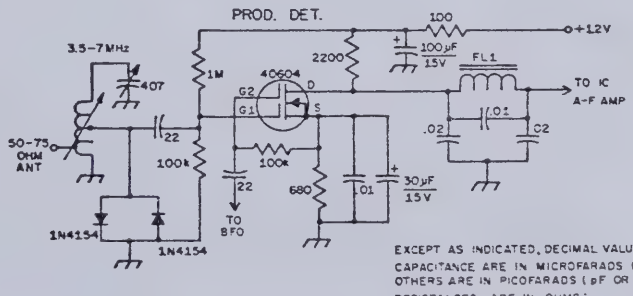
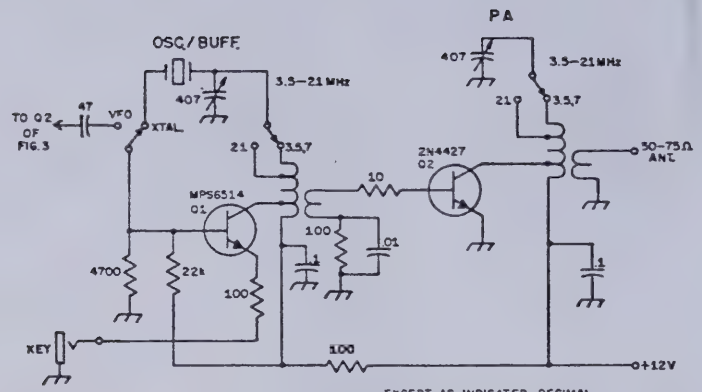


Fig. 1 — Circuit of the Ten Tec product detector and audio filter. A dual-gate MOSFET is used in this circuit. It is followed by a 2-kHz audio filter, FL1.



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μμF); RESISTANCES ARE IN OHMS; k=1000, M=1 000 000

Fig.2 — Circuit of the basic transmitter. Provision is made for crystal or VFO operation. The collector tanks of Q1 and Q2 use tapped toroidal inductors to permit operation on three bands, 3.5, 7, and 21 MHz. A fixed-impedance output link permits the use of antennas whose impedances are between 50 and 75 ohms.

associated resonating capacitors. Phone selectivity is used, and the filter provides a bandwidth of 2 kHz. Though this is ideal for ssb reception, it leaves a great deal to be desired when operating cw. However, since the audio channel has gain to spare, an outboard 900-Hz cw filter, active or passive, can be added for code reception.

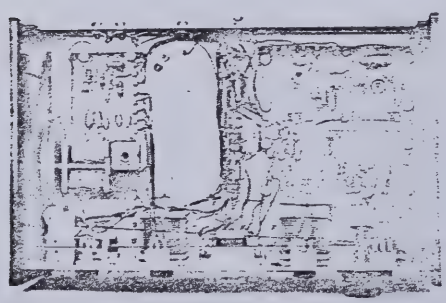
The filter is followed by a high-gain IC amplifier. It uses an RCA CA3035V1; this circuit operates with a gain of 100 dB. Provision is made for headphone output only, but it was discovered that a 1000-ohm to 4-ohm output transformer provided sufficent volume for loudspeaker operation on all but the weakest of signals. The transformer was added as an outboard accessory. Under normal conditions, while using a pair of 2000-ohm headphones, the signals were so loud that the audio-gain control was nearly at zero setting for comfortable listening.

Single-signal reception is not possible with this type of receiver, but all one has to do to reject an interfering cw signal is to tune to the opposite side of zero beat. The receiver can handle either upper- or lower-sideband signals if the operator tunes to the proper side of zero beat when tuning in the ssb signal. A-m signals can be received by tuning to exact zero beat, but the quality of a-m signals that are copied on a direct-conversion receiver is less than ideal.

Since the dynamic range of FETs is excellent, as compared to bipolar transistors and ICs, strong local broadcast and ham signals have little effect on this receiver. The writer lives but two blocks from an a-m station which operates in the high end of the broadcast band. No evidence of a-m detection or overload could be noted. This was not true, however, when testing other tube and transistorized receivers at the same location.

Transmitter Circuit

Fig. 2 shows the circuit of the two-stage transmitter. Bipolar transistors are used for both stages, and toroidal inductors are employed in the tuned circuits to achieve high Q and compactness. A switch provides for crystal or VFO operation. The VFO functions as a BFO during receive. It operates at the signal frequency, but much to the writer's amazement it proved to be relatively



Interior view of the Ten Tec PM-2. The VFO/BFO tuning capacitor is seen at the left-center of the photo, the remainder of the tuning capacitors are located along the bottom edge of the front panel. The VFO circuit board is at the far left. An open space is adjacent to the VFO module. The 15-meter receiving converter can be installed in that area. The product-detector board is visible at the upper right of the photo, and the two-stage transmitter module is directly below it. The audio-amplifier board is mounted on its edge at the center of the base plate, directly behind the panel meter. The input and output jacks, and the power receptacle, are located on the rear lip of the cabinet.

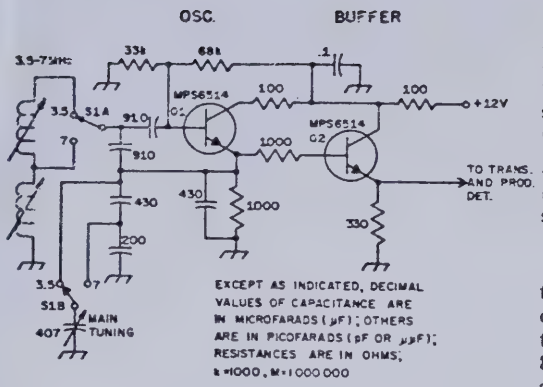


Fig.3 — Schematic diagram of the VFO portion of the transceiver. Transistors Q1 and Q2 are high-beta, high-fT types. The tank circuit uses a high value of parallel capacitance as an aid to stability. Main-tuning capacitor C1 is tapped down on the feedback network to provide bandspread. During receive, the VFO functions as the BFO for the product detector of Fig. 1. Q2 operates as an untuned emitter-follower buffer. S1 is the band switch.

chirp-free.[3] Here, again, a good stiff battery supply is important to good operation. A voltage that shifts as the load changes will cause a chirpy cw signal. Q1 is a high-beta transistor whose f_T rating is in the uhf spectrum. This type of device makes an excellent oscillator or amplifier, provided spurious oscillations can be suppressed. No evidence of instability was noted when testing the rig. The collector of Q1 is tapped down on its tuned circuit to provide an impedance match. A 407-pF broadcast variable tunes the toroidal inductor to resonance at 3.5, 7, and 21 MHz. A band switch selects the appropriate taps on the coil for the band of operation. Keying is done in the emitter return of Q1. Though no shaping is incorporated, the cw note is relatively clean and free of clicks. It would be an easy matter to add some shaping to the keying, and the operator may wish to do so.[4]

The PA stage, Q2, Fig. 2, uses a 2N4427 which operates essentially Class C. Its tank circuit is arranged in a like manner to that of Q1. Output is taken from a fixed link which is designed to look into a 50- or 75-ohm termination. A panel meter reads relative collector current of the PA. The oscillator is tuned for maximum meter reading. The PA is tuned for a dip in meter reading. The PA appears to be stable, because the dip in collector current coincides with maximum rf output. There are no protective measures to prevent damage to Q2 should the transmitter be keyed at a time when there is no load, or when a severe mismatch occurs.

The VFO

As outlined earlier, the VFO operates as a BFO during receive and is shown schematically in Fig. 3. Both transistors are high-beta, high-f_T types. By selecting a high-beta device for Q1 it is possible to use large amounts of *C* in the tuned circuit and still enable Q1 to sustain oscillation. The capacitance used is very high for 7-MHz operation, hence contributing to good stability. There is no evidence of oscillator "pulling" when the transmitter is keyed, or when the input of the detector is tuned to resonance during receive. The VFO tuning capacitor is tapped down on the feedback network to provide suitable bandspread. For operation on 80 meters an additional slug-tuned inductor is added to the circuit, but the shunt capacitance remains unchanged. Therefore, the vfo is not quite as "stiff" on 3.5 MHz.

Output from Q1 is taken across a 1000-ohm emitter resistor. Forward bias for Q2 is set by a second 1000-ohm resistor which connects to the base of Q2. This resistor also helps to isolate the VFO from its buffer, Q2. The buffer operates as an emitter-follower, and its output is taken across a 330-ohm resistor. No Zener diode is used to regulate the oscillator voltage. The manufacturer assumes that the equipment will be operated from a battery supply with ample current capacity to assure a steady operating voltage as the transmitter is keyed.

Operation

The transmitter has very low harmonic output, which is not always true of solid-state transmitters. All harmonics are down at least 25 dB from the fundamental, an acceptable figure when operating at QRP level. There was no evidence of TVI when the equipment was operated into an antenna which was only 10 feet from the writer's TV antenna.

Numerous contacts were made on 80 and 40 meters. The greatest distance covered was 1000 miles, and the signal report was RST 569. Many reports of RST 599 were received at distances up to 500 miles. Two series-connected 6-volt lantern batteries were used to power the transceiver, and after several hours of operation the batteries did not show any signs of depletion.

Final Comments

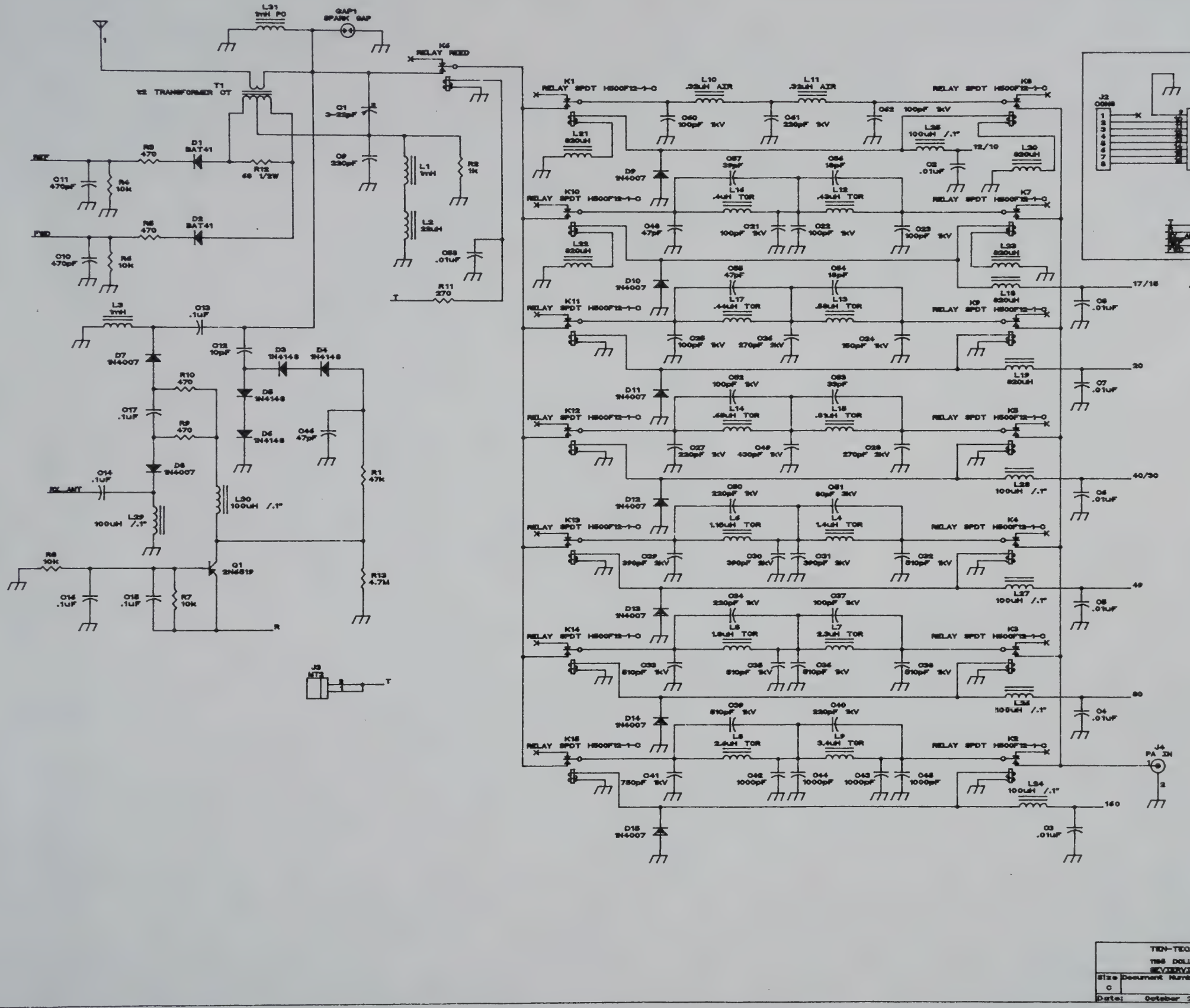
The manufacturer has a number of accessories which can be used with the PM-2. Among these units are a 15-meter receiving converter, a side-tone monitor, an antenna tuner, and an SWR indicator. A solid-state electronic keyer is available to those

Ten Tec PM-2 Transceiver

Height: 4 1/2 inches.
Width: 10 3/8 inches.
Depth: 6 5/8 inches.
Weight: 2 lb.
Price Class: $55
Power Requirements: 12 volts dc at 200 mA.
Manufacturer: Ten Tec, Inc. Sevierville, TN 37862

[3] Ordinarily it is quite difficult to obtain a chirp-free cw note when a VFO operates at the transmitter's output frequency. The difficulty is particularly troublesome when using transistorized equipment because of the poor isolation between the transistor's input and output ports.

[4] Information on shaped keying is given in the ARRL *Radio Amateur's Handbook*, 47th Edition.



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1186 DOLLY PARTON PARKWAY		
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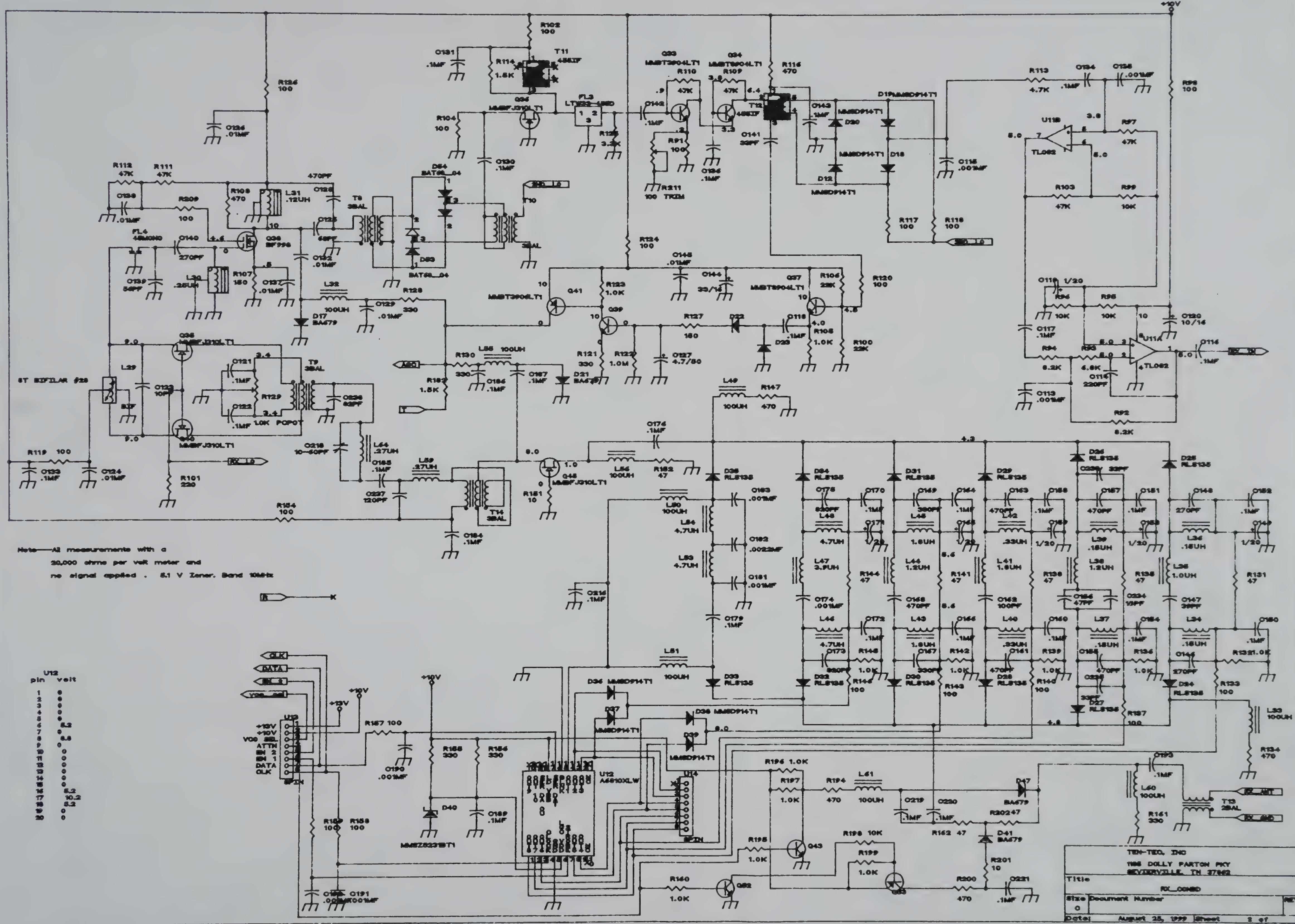

Note—All measurements with a
20,000 ohms per volt meter and
no signal applied . 5.1 V Zener. Band 10MHz

U12

pin	volt
1	0
2	0
3	0
4	0
5	0
6	5.2
7	0
8	5.8
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	5.2
17	10.2
18	5.2
19	0
20	0

TEN-TEC, INC
1185 DOLLY PARTON PKY
SEVIERVILLE, TN 37862

Title: RX_COMBO

Size: C | Document Number | REV

Date: August 25, 1999 | Sheet 2 of 4

Note——All measurements with a 20,000 ohms per volt meter.

U5

pin	volt
1	14
2	14
3	0
4	4.5
5	4.5
6	4.5
7	4.5
8	14

U6

pin	volt
1	14
2	14
3	0
4	4.5
5	4.5
6	4.5
7	4.5
8	14

U8

pin	volt
1	0
2	0
3	0
4	0
5	.1
6	4.4
7	8.8
8	10

U10

pin	volt
1	0
2	0
3	0
4	0
5	4.4
6	4.4
7	8.8
8	10

Note——Voltages on Q24,Q25,Q24,Q23, Q19 and Q20 shown in transmit

TEN-TEC, INC
1185 DOLLY PARTON PKY
SEVIERVILLE, TN 37862

Title: RX_COMBO

Size	Document Number	REV
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Date: August 23, 1999 Sheet 3 of 4

Note—all measurements with a 20,000 ohms per volt meter

U2 pin	volt
1	2.2
2	2.2
3	2.2
4	0
5	2.2
6	2.2
7	0
8	4.8
9	4.8
10	4.8
11	4.8
12	4.8
13	4.8
14	4.8
15	4.8
16	4.8

U14 pin	volt
1	2.2
2	2.2
3	2.2
4	0
5	2.2
6	2.2
7	0
8	4.8
9	4.8
10	4.8
11	4.8
12	4.8
13	4.8
14	4.8
15	4.8
16	4.8

TEN-TEC, INC	
1185 DOLLY PARTON PKY	
SEVIERVILLE, TN 37862	
Title	SWRPLL
Size C	Document Number
Date: July 27, 1999	Sheet 4 of 4