

# **VHF/AM MOBILE TRANSCEIVER MODEL TiL-90-6R/8.33**

**7 WATT MOBILE SYSTEM NO 860605 (Opt. 8.33)  
(TMS-100, Opt. 8.33)**

## **Installation and Operating Instructions**

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**Technisonic Industries Limited**

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# SECTION 1

## GENERAL DESCRIPTION

### 1.1 INTRODUCTION

VHF/AM Mobile Transceiver System 860605 (Opt.8.33), manufactured by Technisonic Industries Limited, is a low power VHF/AM Transceiver, complete with Mounting Bracket, Power Input Cable, Microphone and Antenna.

#### 1.1.1 PURPOSE OF THE SYSTEM

- (1) Intended Purpose and Use - The system is intended for installation in airport service vehicles, such as cars, snowploughs, and grass cutters, to allow ground control over such vehicles while they are negotiating aircraft manoeuvring areas.
- (2) Brief Description of System Units - VHF/AM Mobile Transceiver System 860605, Opt.8.33 consists of the following items:
  - (a) Transceiver Model 90-6R/8.33, Part Number 861605-2 with Opt. 8.33, is a low power VHF/AM transceiver which operates in simplex on six pre-programmable frequency synthesized channels, with 25kHz or 8.33kHz channel spacing in the frequency range 117.975MHz to 138.000MHz. The transceiver operates from a 12 volts dc nominal vehicle power supply (negative ground only). An optional internal dc to dc power convertor, P/N 863118-1 is available to allow operation from 10.8-30.0 Vdc. A general view of the transceiver is given in Figure 1-1. The transceiver is normally located under the dashboard of a vehicle using a mounting bracket and mounting hardware.
  - (b) Mounting Bracket, Part Number 913053-1, is a U-shaped aluminum alloy bracket which, together with items of hardware included in Mounting Hardware Kit P/N 869024-1, is used to mount the transceiver under the dashboard of a vehicle. A view of the transceiver with mounting bracket is given in Figure 1-2.
  - (c) Power Input Cable Assembly, Part Number 863701, is a three-metre length of two- core cable terminated at one end by a two-pin, female contacts, connector, which mates with the two-pin, male contacts, connector located at the left-rear of the transceiver. The unterminated end of the cable is connected to the 12Vdc vehicle power supply negative-ground during installation. A view of the cable assembly is given in Figure 1-3.
  - (d) Microphone Assembly, Part Number 961070-1, consists of a Microphone and a mounting bracket, P/N RK6MB.

A general view of the microphone assembly is given in Figure 1-4.

The microphone is a rugged hand-held microphone housed in a high impact plastic case which includes a rear case hang-up button for storage on the mounting bracket. The dynamic microphone is a noise cancelling type with a preamplifier, press-to-talk switch, and a retractable three-cord cable terminated by a three-pin male contacts, connector which mates with the MIC/PTT connector located on the front panel of the transceiver.

The microphone dc supply for the microphone is supplied by the transceiver. The mounting bracket, provided with the microphone, should be mounted in a convenient location near the transceiver. A small screwdriver which can be used for releasing the modular plug located in the microphone head is supplied with the microphone.

A replacement plug-in microphone cord, P/N 963299-1 is available for this microphone. This cord is supplied with a modular microphone plug on one end and a three-pin DIN connector on the other to mate with the Model 90-6R/8.33 Transceiver.

- (e) Antenna Assembly, Part Number 861910-1, is supplied complete as a kit which includes the following items: Antenna Base, which includes a mounting pad, together with a pad, braid nut, sleeve and clamp for termination of the antenna RF cable. The Antenna Rod is supplied with an Allen Wrench for adjustment of its set screws. The Antenna RF Cable is a ten-metre length RG58/U coaxial cable terminated at one end by an UHF, male contact, connector which mates with the UHF, female contact, antenna connector located at the right-rear of the transceiver. The antenna may be mounted on any flat surface, roof, cowl, fender or rear deck of a vehicle, however, rooftop mounting is recommended for best performance. A general view of the antenna assembly is given in Figure 1-5.
- (f) A programming cable, TiL Part No. 013508-1 is included. This cable must be temporarily connected from header jack J4 inside the radio to the serial port of a computer in order to program frequency information into the transceiver. See Section 2 of this document for frequency programming details.

#### 1.1.2 **MODES OF OPERATION**

The transceiver may be operated in either of two modes; transmit or receive, as selected by the Press-to-Talk (PTT) switch on the microphone:

- (1) Transmit Mode - When the PTT switch on the microphone is depressed, the transceiver will operate in the transmit mode. The PTT signal line is grounded by the microphone switch via the microphone lead and the MIC/PTT connector to the transceiver. The Tx ON yellow LED will go ON, indicating that the transmitter is activated.

Transmission will occur on one of the six preset channel frequencies, determined by the setting of the CHANNEL SWITCH. The appropriate CHANNEL INDICATOR green LED 1, 2, 3, 4, 5 or 6, will be ON, indicating the channel selected.

- (2) Receive Mode - When the PTT switch on the microphone is released, the transceiver will operate in the receive mode. The Tx ON yellow LED will go OFF, indicating that the transmitter is de-activated. Reception on one of the six preset channel frequencies, as selected by the CHANNEL SWITCH will occur.

The appropriate CHANNEL INDICATOR green LED 1, 2, 3, 4, 5, or 6, will be ON, indicating the channel selected. The setting of the SQUELCH CONTROL determines the squelch threshold level. When the SQUELCH CONTROL is adjusted in the counter-clockwise direction, the SQUELCH INDICATOR green LED will go ON, indicating that the squelch circuit is connecting the demodulated audio to the VOLUME CONTROL. The setting of the VOLUME CONTROL determines the audio level produced from the internal loudspeaker. When the VOLUME CONTROL is adjusted in the clockwise direction, the audio level will increase.

**NOTE:**

**In certain installations, either an external loudspeaker or headphone may be fitted and connected to the SPEAKER/PHONE jack of the transceiver.**

When the connector of the external loudspeaker or headphone is connected to the transceiver SPEAKER/PHONE jack, the internal loudspeaker is disconnected and the VOLUME CONTROL will control the audio level applied to the external loudspeaker or headphone, as applicable.

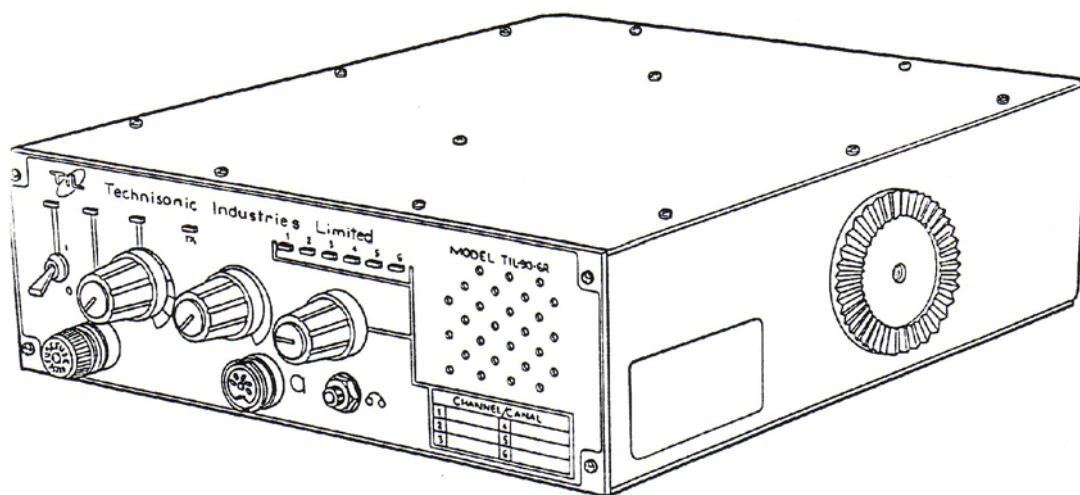


Figure 1-1 Transceiver - General View

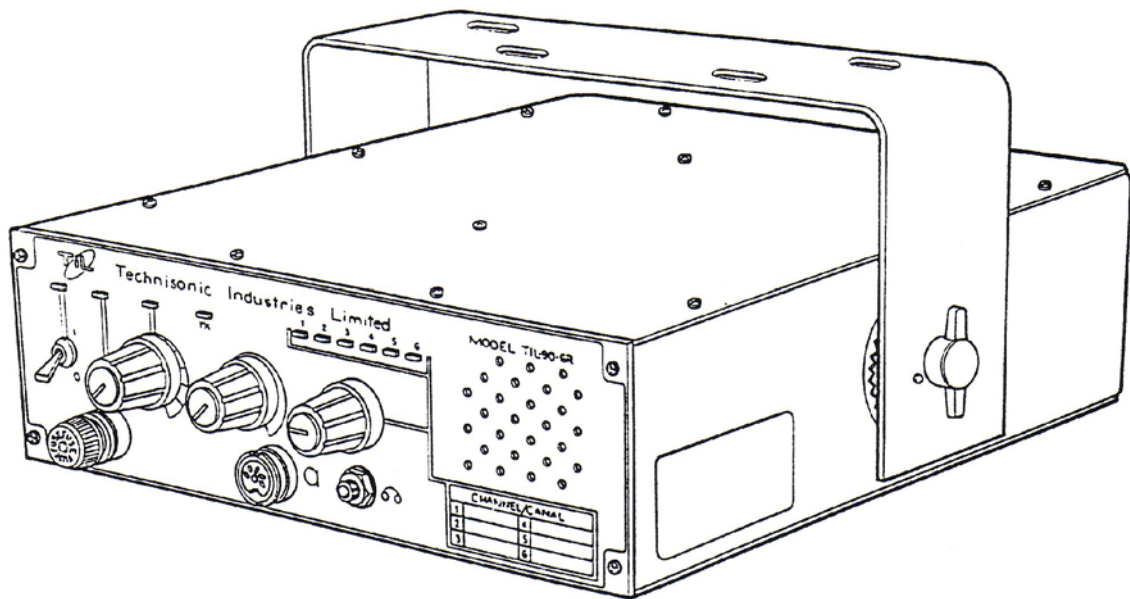


Figure 1-2 Transceiver with Mounting Bracket - General View



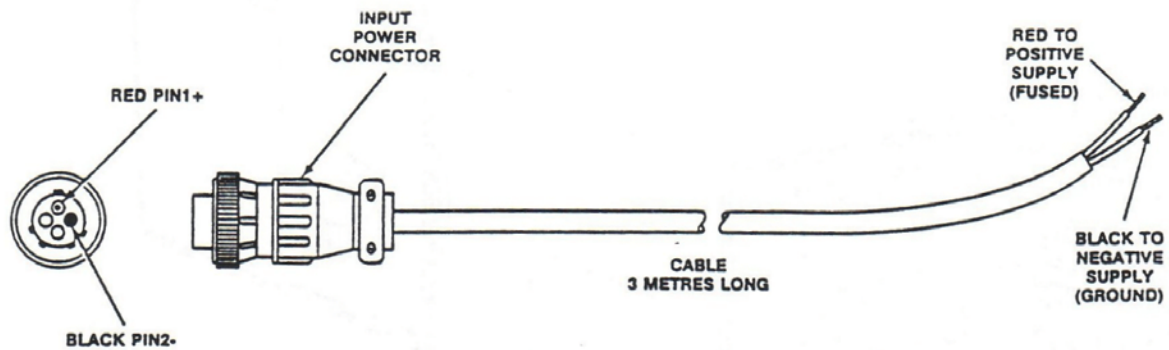


Figure 1-3 Power Input Cable Assembly - General View

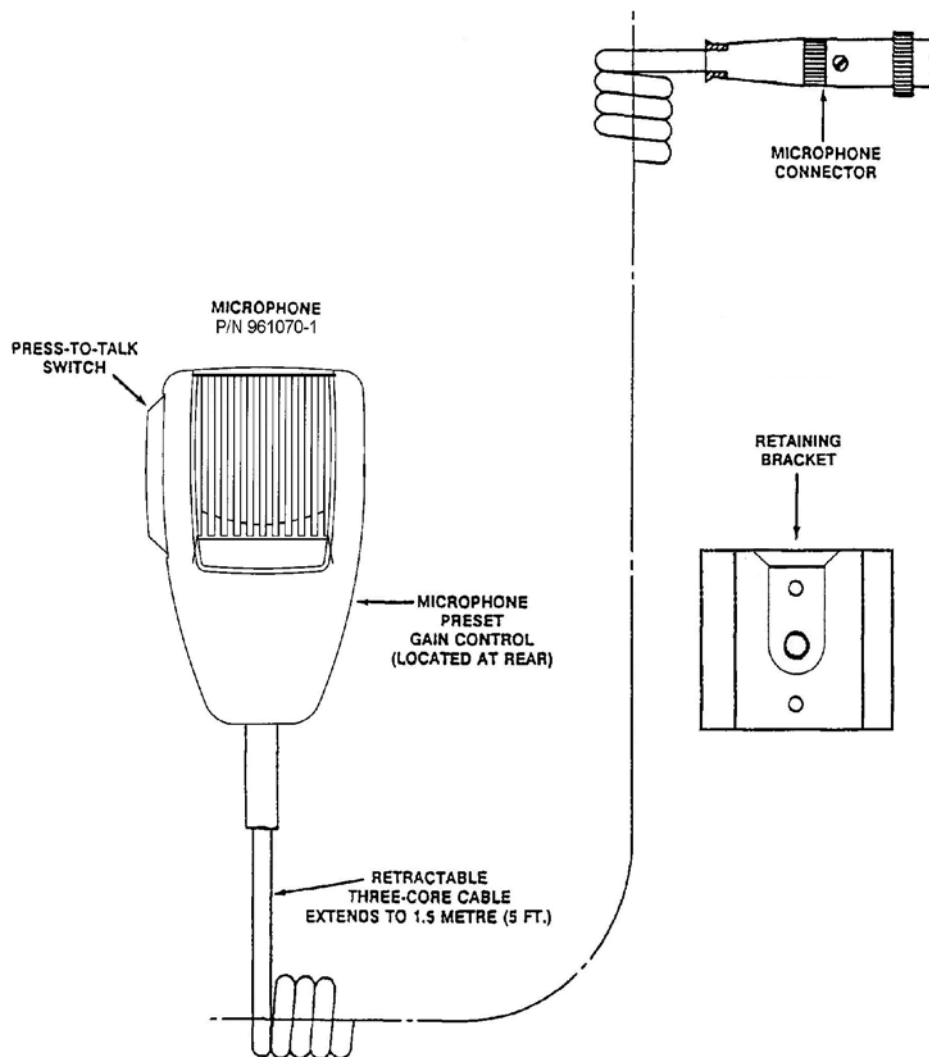


Figure 1-4 Microphone Assembly - General View

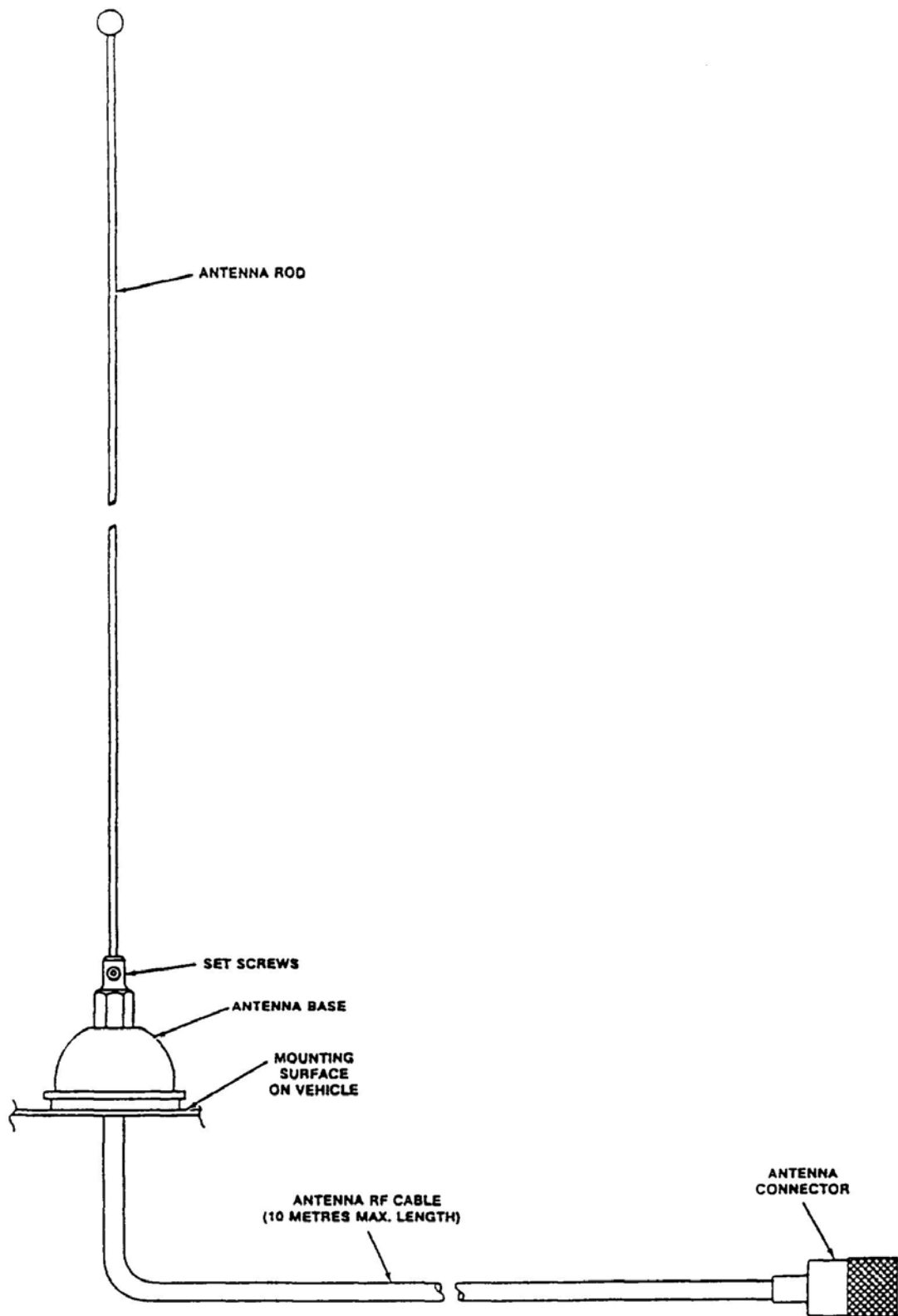


Figure 1-5 Antenna Assembly, P/N 861910-1 - General View

## 1.2 TECHNICAL SUMMARY

A summary of the relevant electrical, operational, mechanical and physical characteristics of the transceiver are given in Table 1-1, Specifications.

TABLE 1-1 SPECIFICATIONS

### TRANSCEIVER MODEL 90-6R/8.33:

#### Power Source Requirements:

DC Voltage (Negative Ground)..... 13.75Vdc Nominal

#### Input Current:

Transmit Mode..... 5.0A maximum

Receive Mode..... 1.5A maximum

Frequency Range..... 117.975MHz to 138.000MHz

#### Channel Spacing:

Narrowband..... 8.33kHz

Wideband ..... 25kHz

Frequency Selection..... Six Preset Channels

Duty Cycle..... One Minute Transmit/Four Minutes Receive

### TRANSMITTER CHARACTERISTICS:

Power Output..... 5 to 10 Watts

Output Power Stability After One Minute.....  $\pm 1$  Watt

VSWR..... 4:1

Carrier Stability (-40EC to +55EC).....  $\pm 1,000$ Hz maximum

Incidental FM and PM Due to Modulation.....  $\pm 100$ Hz max.

Rise Time to 90% of Rated Power..... 100milliseconds max.

Audio Input..... 50millivolts to 2Vrms

Speech Processor Dynamic Range..... 35dB minimum

Modulation Capability..... Up to 95%

Audio Distortion (with 90% modulation)..... 10% maximum

Audio Frequency Response..... 300Hz to 2,500Hz, +1,-3dB

Spurious Emissions..... 60dB below carrier

Hum and Noise Level..... 45dB below modulated carrier

### RECEIVER CHARACTERISTICS:

RF Input Circuit: .....50-ohms unbalanced, VSWR 2:1 maximum

Sensitivity (12dB SINAD) 1kHz, 30% modulation..... 1.8microvolts

#### Selectivity, 25kHz Channel Spacing:

Bandwidth at 6dB Points..... More than 15kHz( $\pm 7.5$ kHz)

Bandwidth at 60dB Points..... Less than 22kHz( $\pm 11.0$ kHz)

#### Selectivity, 8.33kHz Channel Spacing Option:

Bandwidth at 6dB Points..... More than 10kHz( $\pm 5$ kHz)

Bandwidth at 60dB Points..... Less than 15kHz( $\pm 7.5$ kHz)

Adjacent Channel Selectivity (25kHz and 8.33kHz)..... At least 80dB

Pass Band Symmetry..... 15% maximum

IF Band Pass Ripple Between -6dB Points..... 2dB maximum

Spurious Response Attenuation..... At least 90dB

Frequency Stability (-40EC to +55EC).....  $\pm 1,000$ Hz max.

#### AGC Characteristics With RF Input Signal

5 microvolts to 1 volt..... Audio Level:  $\pm 3$ dB

TABLE 1-1 LEADING PARTICULARS (CONTINUED)

**RECEIVER CHARACTERISTICS (Continued)**

Intermodulation: Levels of Interference Signals

Are Shown To Produce Resulting SINAD of Not Less Than 6dB:

Ultimate Sensitivity (12dB) SINAD)..... 67dB

30microvolts, Input Signal..... 45dB

300microvolts, Input Signal..... 30dB

Unwanted Radiation..... Less Than 80microvolts into 50-ohms

Hum and Noise With 1mV RF Signal, 30% modulation at 1kHz:

Ratio of Rx Audio Output to Residual Output with 0% modulation..... At least 40dB

Interference Suppression..... SINAD 6dB minimum

Audio Output Power and Distortion:

Loudspeaker Output..... At least 3 Watts

Speaker Phone Output..... 100mW into 600-ohms Distortion

with RF Input, 1mV, 30% modulation..... Less than 5%

Distortion with RF Input, 1mV, 90% modulation..... Less than 10%

Audio Output Limiting..... Less than 1dB, 30 to 100% modulation

Audio Frequency Response 300Hz to 2,500Hz..... +1,-3dB Audio

Acquisition Time..... Within 100milliseconds

Audio Squelch Characteristic:

Squelch Type..... Carrier Operated

Carrier Operated Squelch..... Adjustable from 2 to 15microvolts

**ENVIRONMENTAL AND SERVICE CONDITIONS:**

Operating Temperature Range:

Full Performance..... -40EC(-40EF) to +55EC(+131EF)

Slightly Degraded Performance..... -41EC(-41.8EF) to -55EC(-67EF)

Storage Temperature Range..... -55EC(-67EF) to +65EC(+149EF)

Ambient Relative Humidity..... Up to 100%

## SECTION 2

### CHANNEL FREQUENCY SELECTION AND PROGRAMMING

#### 2.1 INTRODUCTION

Transceiver Model 90-6R/8.33, Part Number 861605-2 Option 8.33, as shipped from the factory, is preprogrammed with test frequencies. Before programming any other frequencies, perform an operational check on Channel 1, as outlined in paragraph 2.6. If there is any operational deficiency or equipment malfunction, the transceiver is to be returned to the manufacturer, Technisonic Industries Limited, under warranty. Before installation in a vehicle, it is necessary to pre-program the desired operating frequencies for each channel to be used at the particular airport.

#### 2.2 FREQUENCY RANGE

The transceiver may be programmed for up to six frequencies over the frequency range 117.9750MHz to 138.000MHz with 8.33kHz or 25kHz channel spacing.

#### 2.3 PREPARATION

A personal computer is required to program frequencies into the transceiver channel memories. Refer to document 01RE291 (Section 3, Addendum A) for detailed instructions on TDP-90 software installation and operation.

A programming cable, TiL Part No. 013508-1, must be temporarily connected from header jack J4 inside the radio to the computer serial port. To gain access to J4, perform the following:

- (1) Place the transceiver on a bench with the top cover of the transceiver located on the bench and the bottom cover exposed.
- (2) Remove and retain twelve Philips Pan Hd Screws 4-40 X 1/4in. Ig and No.4 Lockwashers securing the bottom cover to the main chassis of the transceiver.
- (3) Remove and retain the bottom cover.
- (4) Locate J4 on the Programmable Frequency Set Board.
- (5) Connect the 10 pin (female) block connector of the supplied Data Cable (TiL Part No. 013508-1) to J4. Plug the 9 pin (female) D connector end of the cable to an available Serial (COM) Port on your PC. A 9 pin serial extension cable may be required if the transceiver is more than a few feet away from the computer.

## 2.4 FREQUENCY SELECTION

Determine the number of channels to be used and the specific frequency of each channel for the particular transceiver being worked on. Prepare a list of channel number and frequencies to be preprogrammed.

The transceiver is capable of 25 kHz spacing (wide band) and 8.33 kHz spacing (narrow band) channels. The frequency entered will determine whether the channel will be wide or narrow mode, based on the Combined 8.33 kHz/25 kHz ICAO Frequency-Channel Pairing Plan. For example if you program 118.000 into a memory, the transceiver will operate on 118.000 MHz in wide band mode. If you program 118.005 into a memory, the transceiver will operate on 118.000 MHz in narrow band mode. For the most part, this will be transparent to the user since a frequency will be issued in the ICAO format and the radio will select wide or narrow mode. Refer to the chart below.

COMBINED 8.33/25 kHz ICAO FREQUENCY CHANNEL PAIRING PLAN

Frequency Entered (MHz)	Actual Operating Frequency	Channel Spacing (kHz)
<i>118.000</i>	<i>118.0000</i>	25
118.005	118.0000	8.33
118.010	118.0083	8.33
118.015	118.0166	8.33
<i>118.025</i>	<i>118.0250</i>	25
118.030	118.0250	8.33
118.035	118.0333	8.33
118.040	118.0416	8.33
<i>118.050</i>	<i>118.0500</i>	25
118.055	118.0500	8.33
118.060	118.0583	8.33
118.065	118.0666	8.33
<i>118.075</i>	<i>118.0750</i>	25
118.080	118.0750	8.33
118.085	118.0833	8.33
118.090	118.0916	8.33
<i>118.100</i>	<i>118.1000</i>	25
118.105	118.1000	8.33
etc	etc	etc

Table 2-1

#### 2.4.1 PROGRAMMING CHANNEL FREQUENCIES

Having ascertained the desired operating frequencies for each channel, continue as follows:

- (1) Run the TDP-90 program on the computer.
- (2) Click on the **Data** pull-down list and select the serial port to which the transceiver is connected.
- (3) Set the program for 1 or 6 channels as applicable.
- (4) Turn on power to the transceiver.
- (5) Click on the **Up** icon to retrieve the frequencies from the radio. You will see activity in the Terminal window as data is being transferred.
- (6) Edit the frequencies as desired.
- (7) Click on the **Dn** icon to copy the frequencies to the transceiver. You will see activity in the Terminal window as data is being transferred.
- (8) Click on the **diskette** icon to save the file.
- (9) Click on the **printer** icon to print a hard-copy of the frequencies.
- (10) Turn off power to the transceiver.



## 2.5 RE-ASSEMBLY

After frequency programming has been completed, remove the programming cable from J4 and reassemble the transceiver as follows:

- (1) Disconnect the power cable to the transceiver..
- (2) Install the bottom cover on the main chassis of the transceiver utilizing screws and lock washers retained during disassembly. Tighten Screws.
- (3) On the front panel label of the transceiver, mark the channel designation label with the appropriate frequency against each channel preprogrammed.

## 2.6 OPERATIONAL CHECK

Connect the transceiver to a test bench, and perform an operational check of the transceiver in both transmit and receive modes of operation, checking each channel in use.

## 2.7 INSTALLATION - INTRODUCTION

This section gives the basic installation information for units of VHF/AM Mobile Transceiver System 860605 in a typical airport service vehicle. As there are many types of vehicles in use, some may require "tailor made" installation information.

## 2.8 TRANSCEIVER LOCATION

The first consideration when planning an installation in a vehicle is the location of the transceiver. The transceiver is normally located under the dashboard of a vehicle with the transceiver supported under the mounting bracket, as shown in Figure 1-2. Where space under the dashboard is limited, the transceiver could be supported above the mounting bracket, the reverse of Figure 1-2.

Consideration should also be given to allowing sufficient space behind the transceiver for the length of the antenna connector and the power supply connector when they are mated to the transceiver connectors.

## 2.9 VEHICLE POWER SUPPLY

Having determined the location of the transceiver, the point of connection to the vehicle power supply may be chosen. The transceiver will operate from a 12 or 24 volts dc nominal power supply with negative ground, which must be taken from a fused power source with a minimum of 5-ampere fuse in circuit. The transceiver will tolerate an input voltage over the range 11.0 to 15.0 Vdc.

## 2.10 **POWER INPUT CABLE ASSEMBLY**

Using Power Input Cable Assembly, Part Number 863701, as shown in Figure 1-3, route the unterminated end of the cable from the transceiver location to the point of connection to the fused vehicle power supply. The three-metre cable may be cut to length as required. Coiling of excess cable is NOT recommended. Strip the outer covering from the end of the cable, prepare the individual wire ends, and fit suitable terminals. Connect the red wire to the positive supply (fused), and connect the black wire to the negative supply ground.

## 2.11 **ANTENNA ASSEMBLY**

Antenna Assembly, Part Number 861910-1, is supplied as a kit which includes an installation leaflet. The antenna is shown assembled in Figure 1-5.

### 2.12.1 **ANTENNA LOCATION**

The antenna location is a very important factor in determining the performance of the system. The antenna may be mounted on any flat surface, roof, cowl, fender or rear deck of the vehicle, however, rooftop mounting is recommended for best performance.

### 2.12.2 **ANTENNA INSTALLATION**

Having determined the location of the antenna, route the unterminated end of the antenna RF cable from the transceiver location. Using the antenna installation leaflet, follow the step-by-step instructions, and install the antenna. Any excess length of antenna RF cable should be cut-off before connection to the antenna.

## 2.13 **MOUNTING BRACKET INSTALLATION**

Mounting Bracket, Part Number 913053-1, should be installed in the transceiver location using Qty 4 Screws, Self-Tapping, Hex Hd with slot and shoulder No. 12 x3/4in. included in Mounting Hardware Kit, Part Number 869024-1. Refer to Figure 1-2 for a view of the transceiver with mounting bracket.

Using the mounting bracket as a template; on the mounting surface, mark the centre of each of the four slotted mounting holes, and drill a pilot hole using a No. 19 drill or equivalent (actual pilot hole size depends on the thickness of metal of mounting surface). Locate mounting bracket in position, and secure using the screws provided.

## 2.14 **TRANSCEIVER INSTALLATION**

Locate the transceiver in its approximate position, connect the antenna connector, and power cable connector to the appropriate connectors located at the rear of the transceiver. Locate the transceiver into mounting bracket, and screw to bracket using two wing screws and nylon washers included in Mounting Hardware Kit, Part Number 869024-1. Adjust angle of transceiver as required, before tightening the two wing screws.

## 2.15 **MICROPHONE INSTALLATION**

Refer to Figure 1-4 for a general view of the microphone and retaining bracket. Determine a suitable and convenient location for Retaining Bracket and secure it using appropriate hardware (not provided). Connect the connector of Microphone, Part Number 961070-1 to the MIC/PTT connector located on the front panel of the transceiver.

## 2.16 **OPTIONAL EXTERNAL LOUDSPEAKER OR HEADPHONE**

Provision is made for connection of either an external loudspeaker or headphone to the SPEAKER/PHONE jack of the transceiver, as shown in Figure 4-1.

### 2.16.1 **EXTERNAL LOUDSPEAKER**

When an external loudspeaker is to be installed, an 8-ohm nominal impedance loudspeaker should be used. The loudspeaker cable should be terminated by a 1/4 in., 3-pole telephone plug (male), with the loudspeaker connected between tip and sleeve (ground). The External loudspeaker connector should be connected to the SPEAKER/PHONE jack located on the front panel of the transceiver. When the external loudspeaker connector is connected to the transceiver SPEAKER/PHONE jack, the internal loudspeaker is automatically disconnected.

### 2.16.2 **HEADSET**

When a headset is to be used, the headset impedance should be 150- to 600-ohms. The headset cable must be terminated by a 1/4in., 3-pole telephone plug (male), which mates with the SPEAKER/PHONE jack located on the front panel of the transceiver. When connected, the internal loudspeaker is automatically disconnected. The headset may be connected as detailed in (1) for receiver audio with no transmit sidetone audio, or (2) for receiver audio with transmit sidetone audio.

#### (1) HEADSET WITH NO TRANSMIT SIDETONE AUDIO

When receiver audio only with no transmit sidetone audio is required, the headset should be connected between the tip and sleeve (ground) of the telephone plug.

#### (2) HEADSET WITH SIDETONE AUDIO

When receiver audio with transmit sidetone is required, the headset should be connected between the tip and sleeve (ground) with a resistor (located inside the plug) connected between the tip and ring of the telephone plug. The function of the resistor is to reduce the transmit sidetone audio level to a suitable listening level. The value of the resistor is determined by the headset impedance and desired listening level. When a 600-ohm impedance headset is used, the value of the resistor should be approximately 10 kilohms. For headsets with lower impedance the resistor value may be different but must not be less than 240-ohms.

## 2.17 **OPERATIONAL CHECK**

Perform an operational check of the transceiver, checking each channel in use in both the transmit and receive modes of operation, using the Operating instructions given in Section 3 of this document and the appropriate specified operating procedures during transmission.

## SECTION 3

### OPERATING INSTRUCTIONS

#### 3.1 INTRODUCTION

This section includes a functional description of each switch, control, indicator and connector located on the front panel of the transceiver, together with the PRESS-TO-TALK switch included on the microphone, together with operating instructions.

#### 3.2 OPERATOR'S SWITCHES, CONTROLS AND INDICATORS

A view of the transceiver front panel is given in Figure 3-1. Front panel controls are identified by pictograms. Each pictogram shows the function performed by the control. These pictograms are translated into words by the annotations of the illustration.

A functional description of each of the operator's switches, controls and indicators, together with the microphone PRESS-TO-TALK switch, is given in Table 3-1, Operator's Switches, Controls and Indicators.

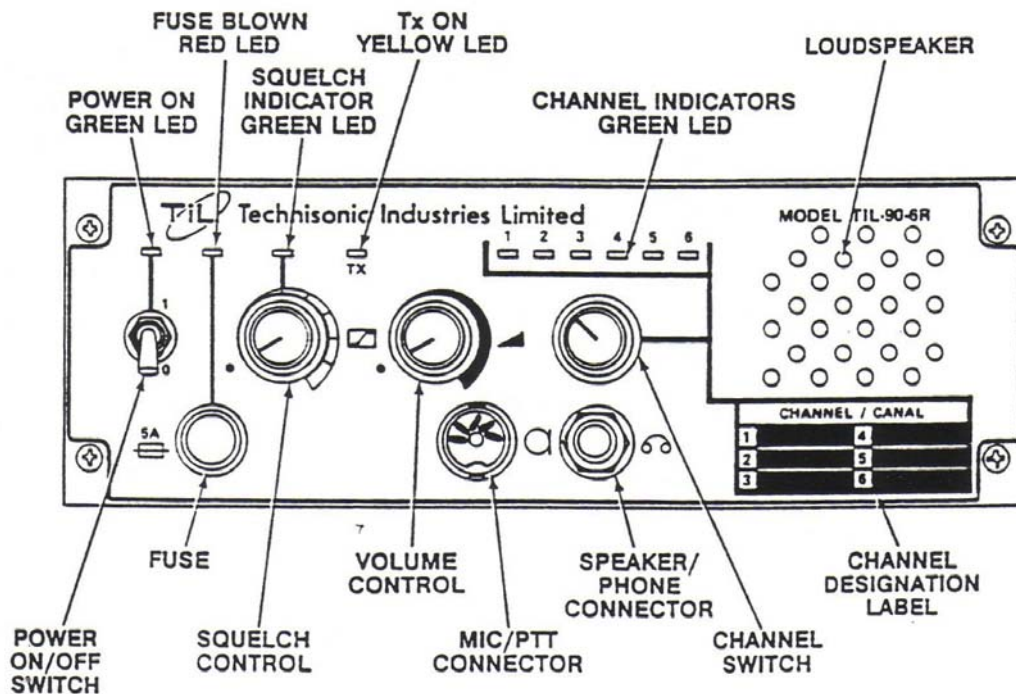


Figure 3-1 Transceiver Front Panel Layout

TABLE 3-1 OPERATOR'S SWITCHES, CONTROLS AND INDICATORS	
SWITCHES, CONTROLS AND INDICATORS	FUNCTIONAL DESCRIPTION
POWER ON/OFF SWITCH	<p>A two-position toggle switch which controls the application of the 12/24 volts nominal power supply to the transceiver.</p> <p>Position 1, toggle UP, the transceiver is switched ON.</p> <p>Position 0, toggle DOWN, the transceiver is switched OFF.</p>
POWER ON LED INDICATOR	A green LED which is ON when the POWER ON/OFF switch is set to Position 1, and the vehicle power supply is applied to the transceiver.
FUSE	A 5-ampere fuse which protects the 12/24 volts nominal power supply line. As part of reverse polarity protection, the fuse will "blow" when polarity of the vehicle supply line is reversed.
FUSE BLOWN RED LED INDICATOR	A red LED which is ON when the 5-ampere fuse is "blown", and the vehicle power supply is applied to the transceiver.
SQUELCH CONTROL	A linear potentiometer, which is operative when the transceiver is operated in the receive mode, determines the squelch threshold level. When the SQUELCH CONTROL is adjusted in the counter-clockwise direction, the SQUELCH green LED indicator will go ON, indicating that the squelch circuit is connecting the demodulated audio to the VOLUME control.
SQUELCH INDICATOR GREEN LED	A green LED which is ON when the squelch circuit is connecting the demodulated audio to the VOLUME control.
Tx ON YELLOW LED INDICATOR	A yellow LED which is ON when the microphone PRESS-TO-TALK (PTT) switch is depressed, and the transceiver is operated in the transmit mode. When the microphone PTT switch is released, the Tx ON yellow LED goes OFF, and the transceiver is operated in the receive mode.
VOLUME CONTROL	<p>A logarithmic potentiometer, which is operative when the transceiver is in the receive mode, determines the audio level applied to the internal loudspeaker.</p> <p>When the SPEAKER/PHONE connector is in use the VOLUME CONTROL determines the audio level applied to the external loudspeaker or headphone, as appropriate, and the internal loudspeaker is disconnected.</p>

TABLE 3-1 OPERATOR'S SWITCHES, CONTROLS AND INDICATORS (Continued)	
SWITCHES, CONTROLS AND INDICATORS	FUNCTIONAL DESCRIPTION
MIC/PTT CONNECTOR	<p>A 5-pin connector which performs two functions, one as the microphone/PTT connector, secondly as a test connector.</p> <p>(1) It accepts the 3-pin connector of the microphone carrying the following:</p> <p>Pin 1 - PTT Signal Line Pin 2 - Microphone Signal Ground Pin 3 - Microphone Signal and Microphone DC Supply Line</p> <p>(2) It accepts a 5-pin test connector, for use during bench testing. The additional pins provide the following test points:</p> <p>Pin 4 - AGC test voltage Pin 5 - Squelch test voltage</p>
MICROPHONE PRESS-TO-TALK SWITCH	<p>When connected via the MIC/PTT CONNECTOR to the transceiver, the PRESS-TO-TALK (PTT) switch determines the operating mode of the transceiver.</p> <p>When the PTT switch is depressed, the transceiver will operate in the transmit mode.</p> <p>When the PTT switch is release, the transceiver will operate in the receive mode.</p>
CHANNEL SWITCH	<p>A 6-position rotary switch which is used in both the transmit and receive modes to determine which one of the 6 preselected channels is in use.</p>
CHANNEL INDICATORS GREEN LED	<p>Six green LED's identified 1 through 6. The appropriate LED goes ON, indicating which channel has been selected by the CHANNEL SWITCH.</p>
CHANNEL DESIGNATION LABEL	<p>The CHANNEL DESIGNATION LABEL is used to record the operating frequency that was preselected for each channel during frequency selection, performed before installation of the transceiver.</p>
LOUDSPEAKER	<p>An 8-ohm internal loudspeaker, which is operative in the receive mode, reproduces the audio line output. The audio line is disconnected from the internal loudspeaker when the transceiver is operated in the transmit mode.</p> <p>The audio line is also disconnected from the internal loudspeaker when the SPEAKER/PHONE connector is in use.</p>

TABLE 3-1 OPERATOR'S SWITCHES, CONTROLS AND INDICATORS (Continued)	
SWITCHES, CONTROLS AND INDICATORS	FUNCTIONAL DESCRIPTION
SPEAKER/PHONE CONNECTOR	<p>A 3-pole connector which may be used in certain installations to provide interconnection to either an external loudspeaker or headphone.</p> <p>When used, the internal loudspeaker is disconnected, and the VOLUME control will control the audio level applied to the external loudspeaker or headphone, as applicable.</p>



### 3.3 **PREPARATION FOR USE**

To prepare the transceiver for use:

- (1) Remove the microphone from its mounting bracket, and ensure that the microphone connector is connected to the MIC/PTT connector of the transceiver.
- (2) Set the SQUELCH control in the fully counter-clockwise (CCW) position.
- (3) Set the VOLUME control in the 12 o'clock centre position.
- (4) Set the POWER ON/OFF switch to position 1, toggle-up "ON" position.
- (5) Verify that the FUSE BLOWN red LED is OFF.
- (6) Verify that the POWER ON green LED is ON.
- (7) Set the CHANNEL switch to the desired operating channel 1 through 6.
- (8) Verify that the appropriate CHANNEL INDICATOR green LED is ON.
- (9) Proceed to operation in the transmit mode, paragraph 3.4, or operation in the receive mode, paragraph 3.5, as appropriate.

### 3.4 **OPERATION IN THE TRANSMIT MODE**

To operate in the transceiver transmit mode, proceed as follows:

- (1) Hold the microphone in one hand, with the upper edge of the microphone as close as possible to the upper lip.  
This technique is necessary because the noise cancelling feature of the microphone favours sound close to the microphone and discriminates against sounds only 1/2 inch (12.7mm) or more away from the microphone.
- (2) Depress and hold the PRESS-TO-TALK switch of the microphone during transmission.
- (3) Ensure that the Tx ON yellow LED is ON.
- (4) Speak slowly and distinctly into the microphone using specified operating procedures during transmission.
- (5) When the message is ended, release the PRESS-TO-TALK switch of the microphone.
- (6) The transceiver is now operating in the receive mode.
- (7) Verify that the Tx ON yellow LED is OFF.

### 3.5 OPERATION IN THE RECEIVE MODE

To operate the transceiver in the receive mode, proceed as follows:

- (1) Ensure that the PRESS-TO-TALK switch on the microphone is NOT depressed, and verify that the Tx ON yellow LED is OFF.
- (2) Verify that the CHANNEL switch is set to the desired operating channel 1 through 6, and verify that the appropriate CHANNEL INDICATOR green LED is ON.
- (3) Adjust the SQUELCH control to suit location reception conditions. When the SQUELCH control is rotated in the clockwise direction, the SQUELCH indicator green LED will go ON, indicating that the squelch circuit is connecting the demodulated audio output to the VOLUME control.

Further adjustment of the SQUELCH control determines the squelch setting.

- (4) The VOLUME control can then be adjusted in a clockwise direction to increase the audio level, or in a counter-clockwise direction to decrease the audio level which can be heard on the internal loudspeaker.

#### NOTE:

When an external loudspeaker or headset is connected to the SPEAKER/PHONE jack of the transceiver, the internal loudspeaker is automatically disconnected. The VOLUME control will now control the audio level applied to the external loudspeaker or headset, as applicable.

- (5) To change the operating channel, set the CHANNEL switch to the desired channel 1 through 6, and verify that the appropriate CHANNEL INDICATOR green LED is ON.

### 3.6 SWITCHING OFF

To switch off the transceiver:

- (1) Set the POWER ON/OFF switch to position 0, toggle down OFF position.
- (2) Verify that all indicator LED's on the front panel are OFF.

# Section 3

## Addendum A

Til Document No.  
01RE291

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# **TiL TDP-90 Data Programming Software for 8.33 AM Series Transceivers**

## **Installation and Operating Instructions**

**TiL Document No.  
01RE291  
Rev. n/c**

**August 2001**



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## SECTION 1

### GENERAL DESCRIPTION

#### 1.1 INTRODUCTION

This publication provides operating and installation information on the TiL TDP-90 Programming Software for 8.33 kHz AM series transceivers. The TDP software allows a standard PC to retrieve data from a connected 8.33kHz AM series transceiver, for editing, storing, and sharing with other 8.33 kHz AM series transceivers. With the TDP software, you can create, save and print archives of your 8.33 kHz AM series transceiver channel settings.

#### 1.2 DESCRIPTION

The TiL TDP-90 software is a 32 bit Windows application that will work under Windows 95, Windows 98 and Windows NT 4.0. There are no known issues preventing the TDP-90 from working under Windows 2000. Please see section 2 for details on your particular installation.

#### 1.3 MINIMUM SYSTEM REQUIREMENTS

##### Windows 95

- Intel 486 or compatible based PC
- Windows 95 with the latest Service Releases/Packs installed  
(Installation of Microsoft Internet Explorer 5.0 or any Microsoft application more recent than mid 1998, will have automatically updated the required system files.)
- Mouse
- 5 MB free Hard-Disk space
- One available properly configured RS-232 serial (COM) port

##### or Windows 98 / Windows 2000

- Intel or compatible Pentium class PC
- Windows 98 or Windows 2000 with the latest Service Releases/Packs installed
- Mouse
- 5 MB free Hard-Disk space
- One available properly configured RS-232 serial (COM) port

##### or Windows NT 4.0

- Intel or compatible Pentium class PC
- Windows NT 4.0 with at least Service Pack 4 installed  
(Installation of Microsoft Internet Explorer 5.0 or any Microsoft application more recent than mid 1998, will have automatically updated the required system files.)
- Mouse
- 5 MB free Hard-Disk space
- One available properly configured RS-232 serial (COM) port



## SECTION 2

### INSTALLATION INSTRUCTIONS

#### 2.1 SOFTWARE INSTALLATION

Before the TDP software can be installed, all of the minimum computer system requirements outlined in the previous section must be met, otherwise difficulty may be encountered during installation or operation the software.

The installation procedures outlined in this document assume some basic working knowledge of at least one of Microsoft's Windows 95/98/NT/2000 operating systems.

**NOTE:** At any point during installation, if any Dialog Boxes pop up exclaiming that newer system files are about to be overwritten by older files, click on NO to skip overwriting newer files.

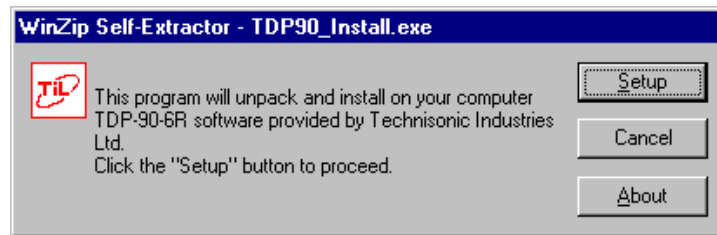
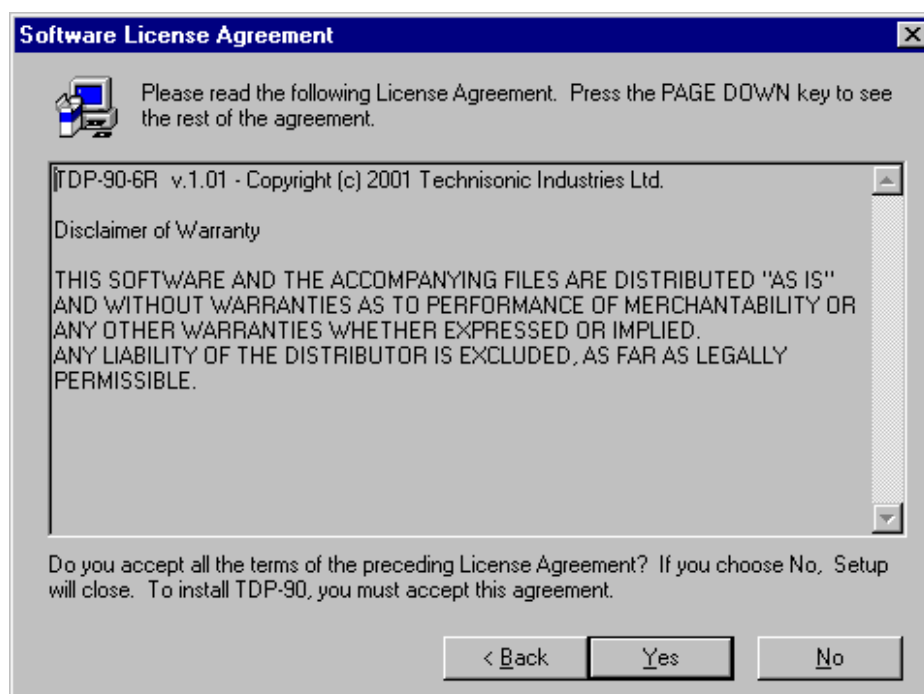


Figure 2.1.1 - Setup Extraction Dialog



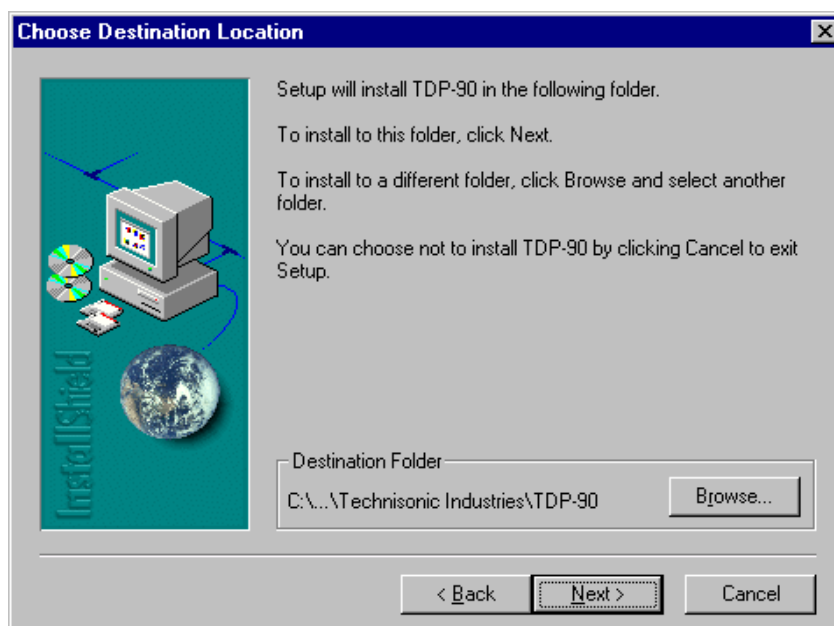
Figure 2.1.2 - Welcome Dialog

This is a standard Welcome dialog box. To continue installation click on **Next>**. In any one of the dialog boxes, program installation can be stopped at any time by clicking the **Cancel** button.



**Figure 2.1.3 - License Agreement**

In order to Install the TDP-90 Software onto your computer, you must agree to the terms of the license agreement, and confirm so by clicking on OK in the License dialog box.



**Figure 2.1.4 - Program Installation Dialog**

### 2.1.1 Windows 95

If your computer does not have Microsoft Internet Explorer 5.0 or any other Microsoft application, no later than mid 1998 installed, then it is possible that certain essential system files are outdated. If these system files are outdated your system will not meet the minimum requirements for installing and operating a large variety of new software including the TDP software.

If your computer DOES meet the minimum requirements, you may proceed to step 3.

1. To update Windows 95, you will need to install an update available on Microsoft's website, called DCOM95 (dcom95.exe). To download DCOM95, just enter this current (as of the release date of this manual) Internet URL for the file in your 'location bar' in your Internet Browser.

**<http://download.microsoft.com/msdownload/dcom/95/x86/en/dcom95.exe>**

Your Browser will invoke a SAVE AS dialog box for you to save the file. Keep track of where you place it, as you will be required to locate it and RUN it. Conveniently, the file will fit on a regular IBM Formatted 3½" 1.44MB floppy disk, for easy transport and distribution.

If you have the DCOM95.EXE update file on a floppy disk, copy/place it in a temporary location on your Hard-disk.

2. RUN DCOM95 by locating and double-clicking on it in Windows Explorer. Any System files on your computer that are OLDER than the ones contained in the DCOM95 update, will be replaced. You will be asked to restart your computer. Do so, and when the computer has finished booting, you will have an updated Operating System that will meet the requirements of the TDP software.
3. To install the TDP software, locate the TDP90\_Install.exe file on the CD-ROM using Windows Explorer. When you have located it, double-click it to start the setup process.

You will see the first Setup dialog (Figure 2.1.1). Click on the Setup button to continue installation. The Setup will unpack the necessary components. After it completes, you will see a Welcome dialog box. Click **Next>** to continue. Before you can continue, you will have to agree to the terms of the License Agreement by clicking **OK** (Figure 2.1.3).

The setup wizard may or may not ask to reboot the computer, depending on which components your system required from the installation package. If so, let the computer restart and run setup again to complete the installation process. No further reboots will be required.

4. After setup finishes unpacking the software, a dialog box will pop up with the option to continue (by clicking on the **Next>** button see Figure 2.1.4), exit the setup, or at this time you may choose an alternate location for the installation. If you have no objections to the default location just click on the **Next>** button to continue the installation.
5. The TDP installation will ask what START menu Program Group you want the TDP software shortcut installed. Click **FINISH** if the default Program Group name is adequate.

The Data Programming Software is now installed and ready to use with an 8.3 kHz AM series Transceiver.

### 2.1.2 Windows 98 / Windows 2000

Windows 98 comes pre installed with Internet Explorer 5.0 embedded into the operating system. As a result, the operating system as a whole meets the requirements for the installation and operation of the TDP software.

1. To install the TDP software, locate the TDP90\_Install.exe file on the CD-ROM using Windows Explorer. When you have located it, double-click it to start the setup process.

You will see the first Setup dialog (Figure 2.1.1). Click on the Setup button to continue installation. The Setup will unpack the necessary components. After it completes, you will see a Welcome dialog box. Click **Next>** to continue. Before you can continue, you will have to agree to the terms of the License Agreement by clicking **OK** (Figure 2.1.3).

The setup wizard may or may not ask to reboot the computer, depending on which components your system required from the installation package. If so, let the computer restart and run setup again to complete the installation process. No further reboots will be required.

2. After setup finishes unpacking the software, a dialog box will pop up with the option to continue (by clicking on the **Next>** button see Figure 2.1.4), exit the setup, or at this time you may choose an alternate location for the installation. If you have no objections to the default location just click on the **Next>** button to continue the installation.
3. The TDP installation will ask what START menu Program Group you want the TDP software shortcut installed. Click **FINISH** if the default Program Group name is adequate.

The Data Programming Software is now installed and ready to use with an 8.33 kHz AM series Transceiver.

### 2.1.3 Windows NT 4.0

For a Windows NT 4.0 installation, a minimum of Service Pack 4 must be installed. If you do not have at least Service Pack 4, contact Microsoft for the most current Service Pack.

1. To install the TDP software, locate the TDP90\_Install.exe file on the CD-ROM using Windows Explorer. When you have located it, double-click it to start the setup process.

You will see the first Setup dialog (Figure 2.1.1). Click on the Setup button to continue installation. The Setup will unpack the necessary components. After it completes, you will see a Welcome dialog box. Click **Next>** to continue. Before you can continue, you will have to agree to the terms of the License Agreement by clicking **OK** (Figure 2.1.3).

The setup wizard may or may not ask to reboot the computer, depending on which components your system required from the installation package. If so, let the computer restart and run setup again to complete the installation process. No further reboots will be required.

2. After setup finishes unpacking the software, a dialog box will pop up with the option to continue (by clicking on the **Next>** button see Figure 2.1.4), exit the setup, or at this time you may choose an alternate location for the installation. If you have no objections to the default location just click on the **Next>** button to continue the installation.
3. The TDP installation will ask what START menu Program Group you want the TDP software shortcut installed. Click **FINISH** if the default Program Group name is adequate.

The Data Programming Software is now installed and ready to use with an 8.33 kHz AM series Transceiver.

## 2.2 HARDWARE INSTALLATION

### Mobile transceivers:

Remove the bottom cover from the transceiver chassis and locate J4 on the Programmable Frequency Set Board. Connect the 10 pin (female) block connector of the supplied Data Cable (TiL Part No. 013508-1) to J4. Plug the 9 pin (female) D connector end of the cable to an available Serial (COM) Port on your PC. A 9 pin serial extension cable may be required if the transceiver is more than two feet away from the computer. Apply +13.8 VDC, (minimum 1 Amp) to the mobile transceiver and turn the unit on.

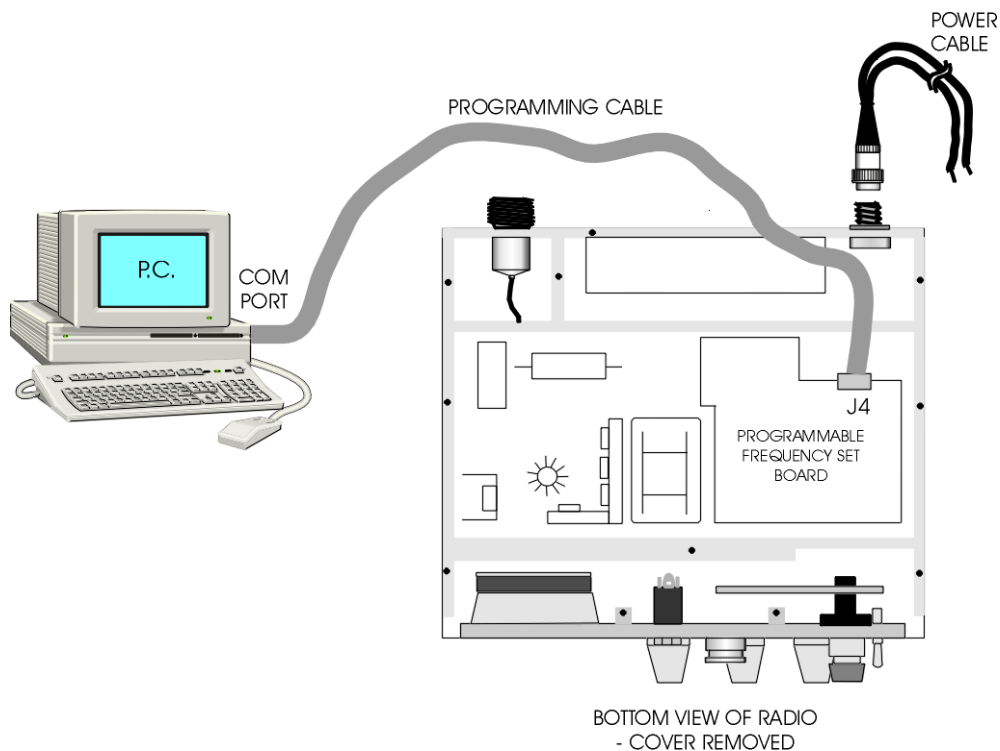


FIGURE 2.2.1

## Base Station and Rack Mount Transceivers:

Remove the top cover from the transceiver and plug the female end of a 9 pin serial cable into the 9 pin D connector on the right side of the unit marked "Serial port". Connect the other end of the serial cable to an available Serial (COM) Port on your PC. Plug the transceiver into 120VAC and turn the unit on.

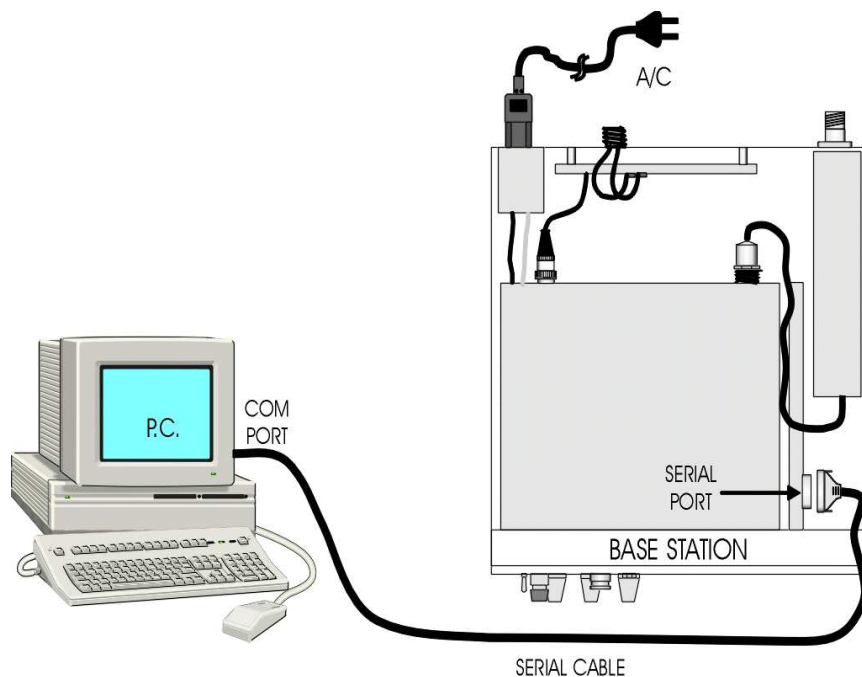


FIGURE 2.2.2

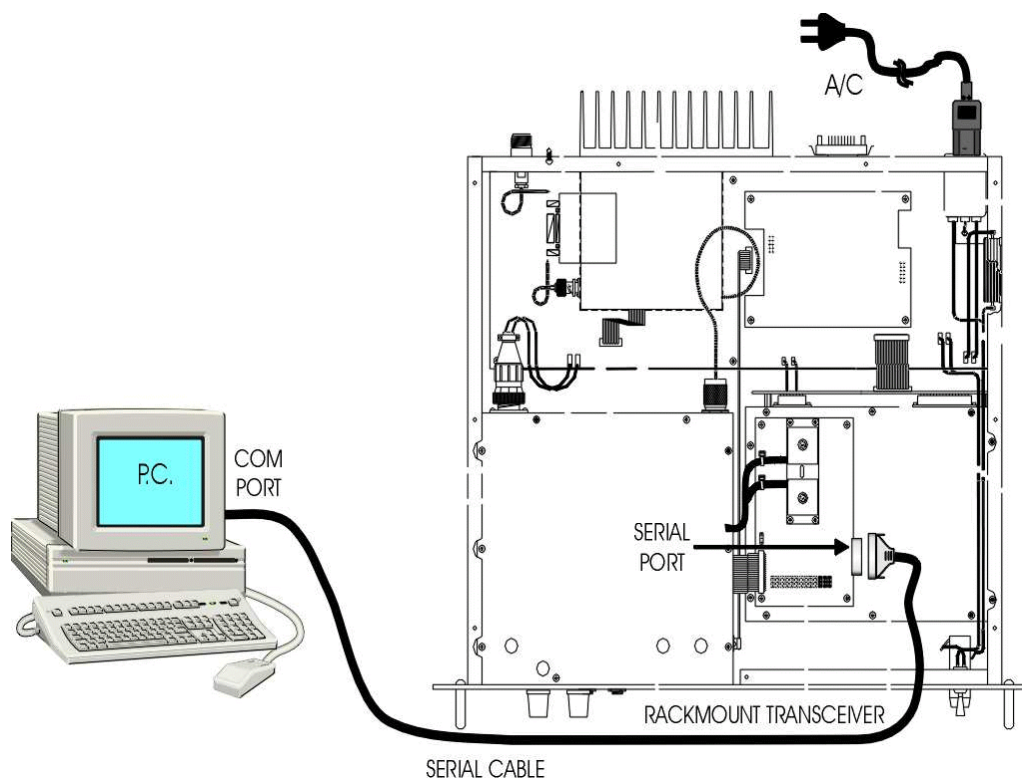


FIGURE 2.2.3

## SECTION 3

### OPERATING INSTRUCTIONS

#### 3.1 GENERAL

This section contains instructions for proper operation of the TDP-90 software and explains the various elements of the Graphical User Interface (GUI).

**NOTE:** The following images are examples only, and may not reflect your particular data settings, or current TDP software version.

#### 3.2 GETTING STARTED

To start the TDP-90 in Windows, simply click the Start menu > Programs > TiL Transceiver Data Programmer > TDP-90. The program will start, and the following Graphical User Interface (GUI) will appear. The current **version number** is shown in square brackets on the title bar. The **pull-down menus** and **icons** provide the set-up and operating functions. The **Terminal window** displays communication activity as it occurs. The **Channels** pull-down tab provides selection for single or six channel transceivers. The number of channels in the **Frequency editing window** changes accordingly. The frequency of each channel, as displayed in the **Frequency editing window**, can be changed by clicking on the desired channel window and entering the frequency.

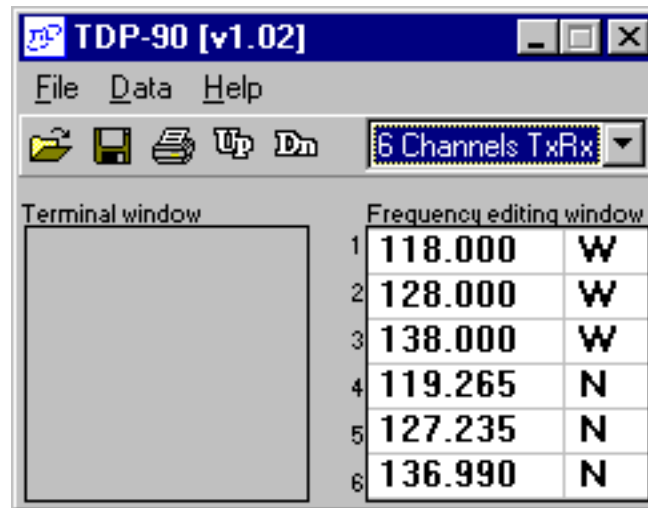


Figure 3.3.1 - Main Graphical User Interface

**Note:** \*\* Use of a mouse is highly recommended! \*\* It is possible however, to use the TDP software without a mouse by using the [Tab], [Shift]+[Tab] and 'cursor' keys to navigate through the program interface. You will note that all menu items and buttons have an underlined letter. By pressing the [Alt] key and the underlined letter in the menu bar or button, you can pull down that menu item. eg: [Alt]+F, would pull down the file menu. You could then cursor down to the desired function, or press the underlined letter for the corresponding function.



### 3.3 PULL DOWN MENUS

The TDP-90 program has several functions available through the use of pull-down menus. Through these menus, you can invoke file functions, print the channel list, initiate communications with a connected TFM-90 and quit the TDP software.

#### 3.3.1 File Menu

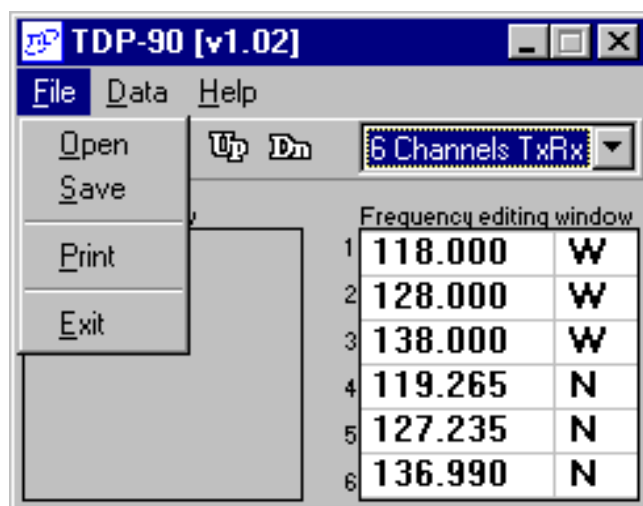


Figure 3.3.1 - File Menu

**Open** will allow you to select and load an existing file that was previously saved on disk. The yellow folder icon provides the same function in a single mouse click.

**Save** will allow you to save the current data into a file with a name of your choice. The filename may be any length up to 64 characters. The diskette icon provides the same function in a single mouse click.

**Print** will create a text file of the channel list, as presented in the Frequency List window. Once the **Print** function is invoked, you will be prompted to enter the serial number of the currently connected transceiver. The printout will append a header to the top of the page that includes the serial number of the transceiver as well as the time and date. The printout can be filed as a record of the frequencies that are programmed into that particular transceiver. The printer icon provides the same function in a single mouse click.

**Exit** will quit the TDP-90 program. If you have not saved your data, or if any changes were made to your data set since your last save, the TDP will warn you of this, and allow you to do so before quitting.

### 3.3.2 Data Transfer Menu

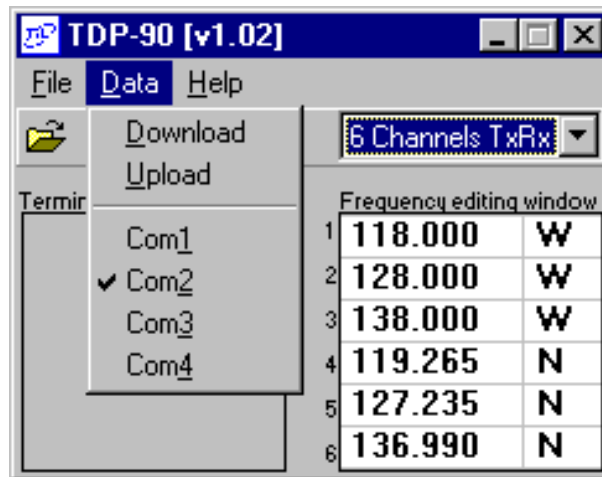


Figure 3.3.2 - Data Menu

**Download (to Radio)** instructs the TDP-90 software to transfer the frequency data in the list to the memory channels in the connected 8.33 kHz AM transceiver. The Dn icon provides the same function in a single mouse click.

**Upload (from Radio)** instructs the TDP-90 program to wait for and read the channel data from the memory channels in the connected 8.33 kHz AM transceiver. The Up icon provides the same function in a single mouse click.

**Com1 (2,3,4)** selects the COM (RS-232 Serial COMmunications) port on your computer, to which the transceiver is connected. On computers manufactured after 1990, COM 1 is typically a 9 pin male "D" connector. COM 2 may be either a 9 pin male or 25 pin male "D" connector. COM 3 and COM 4 are available in the TDP-90 software as a valid option, although they typically exist only in a computer with a third party serial communications card installed.

The COM port setting is automatically saved. The next time the TDP-90 software is executed, the previously selected COM port will be used.

**NOTE: \*\* The TDP-90 software assumes you have an available and properly configured COM port, and assumes that an 8.33 AM transceiver is connected. \*\***

### 3.3.3 Help Menu

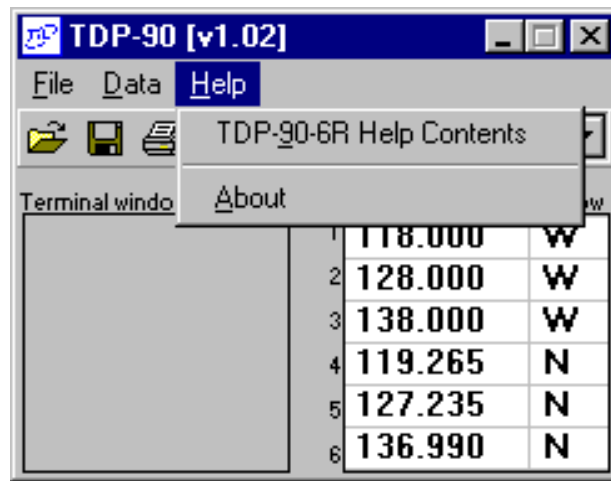


Figure 3.3.3 - Help Menu

**TDP-90-6R Help Contents** will start the Windows Help dialog for the TDP-90 software. Here, you will find hardware connection and operating information as well as troubleshooting tips and answers to some Erequently Asked Questions.

**About** displays Technisonic company and contact information as well as the revision number of the TDP software in the “Terminal window” screen.

### 3.3.4 Channel Selection

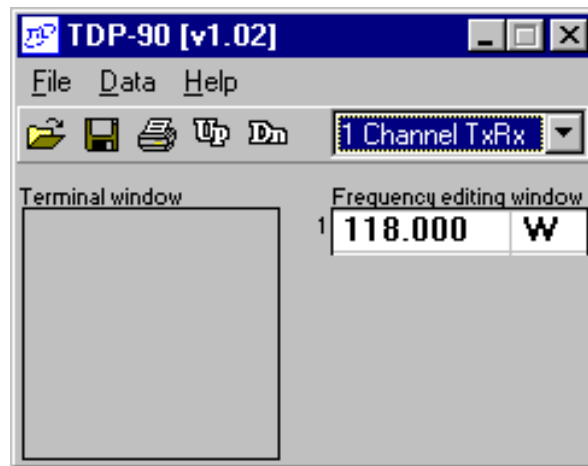


Figure 3.3.4.1 - Single channel

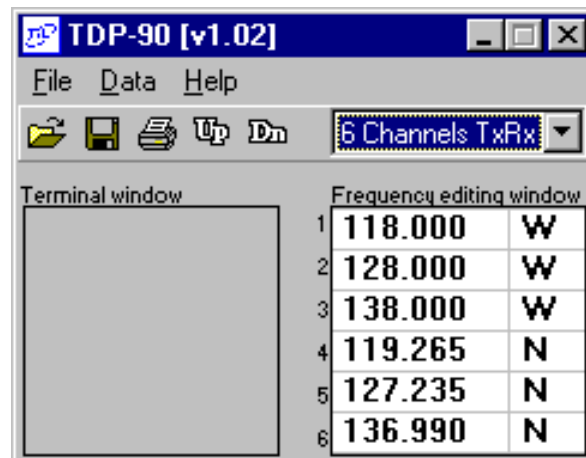


Figure 3.3.4.2 - Six channels

The **x Channel(s)** pull-down tab allows you to select for single or six channel 8.33 kHz AM transceiver use. The frequency editing window changes accordingly.

### 3.4 SAMPLE UPLOAD AND DOWNLOAD

1. Connect the computer to the transceiver and apply power as described in section 2.2.
2. Run the TDP-90 program on the computer.
3. Click on the **Data** pull-down list and select the serial port to which the transceiver is connected.
4. Set the program for 1 or 6 channels as applicable.
5. Turn on power to the transceiver.
6. Click on the **Up** icon to retrieve the frequencies from the radio. You will see activity in the Terminal window as data is being transferred.
7. Edit the frequencies as desired.
8. Click on the **Dn** icon to copy the frequencies to the transceiver. You will see activity in the Terminal window as data is being transferred.
9. Click on the **diskette** icon to save the file.
10. Click on the **printer** icon to print a hard-copy of the frequencies.

### **3.5 RS-232 SERIAL TECHNICAL DATA**

The TDP-90 communicates with a connected 8.33 kHz AM transceiver at 9600 Baud, 8 Data bits, no Parity and 1 Stop bit. The TDP software sets these communications parameters upon startup, independent of the Windows default settings for the COM port you are using. These communications parameters are not user configurable.

