VHF/AM SINGLE CHANNEL
RECEIVER Model TiL-92-SC

92-SC RECEIVER P/N 931040-1
(ITEM NO. TSR-4100)

Installation and
Operating Instructions

TiL Document No. 93RE125
Rev. F

JULY 2012

REVISION HISTORY [93RE125]				
REV	SECTION - PAGE -	DESCRIPTION	DATE	Edited by
n/c		Original Document		
A-D				
E	Global	New Document Template (new file format) Title page changed, Headers/Footers added Added Revision page, Added Warranty page		
	2-5	Added note to §2.3 Channel Freq. Selection referring to units built after Jan 2012 with a USB port and added Appendix A (TDP-90 for USB AM units) with Installation and Operating Instructions.	FEB 2012	FM
F	iii	Updated FCC information including antenna and FCC labeling instructions. Simplify description under "Warning"		
	2-5 Appendix A	Updated para 2.3 Updated TDP-90 to REV A	JULY 2012	FM

WARNING

Do not make physical contact with antenna when transmitter is on.

CAUTION ! STATIC SENSITIVE !

This unit contains static sensitive devices. Wear a grounded wrist strap and/or conductive gloves when handling printed circuit boards.

FCC COMPLIANCE INFORMATION

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING: For compliance with FCC RF Exposure Requirements the transmitter antenna installation shall comply with the following two conditions:

1. *The transmitter antenna gain shall not exceed 3 dBi.*
2. The transmitter antenna is required to be located outside of a vehicle and kept at a separation distance of 90 cm or more between the transmitter antenna of this device and person(s) during operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

FCC LABELING INFORMATION: When this device is permanently mounted in an enclosure where the FCC ID label can not be seen, another label must be placed on the outside of the enclosure stating 'contains FCC ID: IMA90-6R'.

WARRANTY INFORMATION

The Model 92-SC series, Single Channel rack mounted receiver, is under warranty for one year from date of purchase. Failed units caused by defective parts, or workmanship should be returned to:

Technisonic Industries Limited
240 Traders Boulevard
Mississauga, Ontario L4Z 1W7

Tel: (905) 890-2113
Fax: (905) 890-5338

TECHNISONIC INDUSTRIES LIMITED
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SECTION 1 - GENERAL DESCRIPTION

1.1   INTRODUCTION

This publication provides general information on the VHF/AM Single Channel Receiver Model TiL-92-SC, Part No. 931040-1, manufactured by Technisonic Industries Limited. This unit is also referred to by Item No. TSR-4100.

The Model TiL-92-SC, Receiver is a single channel, fixed frequency receiver operating over the frequency range of 117.975 MHz to 138.000 MHz. This unit is intended for base station operation in an air traffic environment. The unit can operate from AC power or external DC power in local and remote operating modes.

1.2   DESCRIPTION

The 92-SC rack mounted receiver configuration is based on the Model 90-6R pre-programmable transceiver module. This module, as modified for receiver only capability utilizes similar circuitry as the 90-6R with appropriate deletion of transmitter functions. In addition to this modified transceiver module, the receiver consists of a Power Supply Module, Mother Board, and Remote Audio Board.

An optional RF Crystal Filter which provides higher receiver selectivity is available. These filters can be ordered to provide either an additional 20dB (4 dB loss sensitivity) or 40dB (7 dB loss) of selectivity.

An Optional Module A6 which is a DC to DC power supply is available in the 90-6R Receiver unit. This optional power supply will allow the 92-SC Receiver to operate with a 24 Vdc input as opposed to the standard 12 Vdc input. When the units are operating in the AC mode and external batteries are connected a DC charging circuit will automatically trickle charge the batteries and the unit will switch to DC operation should the AC mains fail.
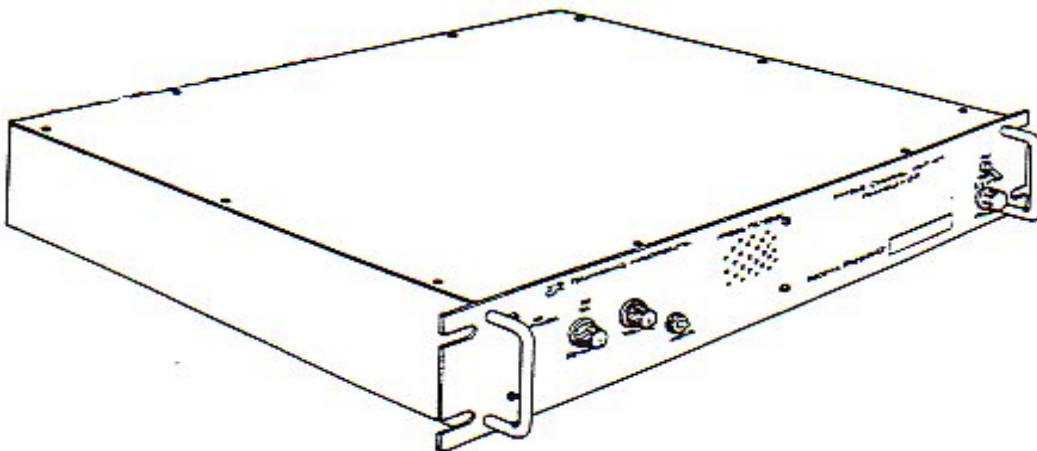

Figure 1.1 VHF/AM Single Channel Receiver

1.2   DESCRIPTION (continued)

To improve the rejection of interfering signals, dual conversion receiver technology has been incorporated on the Receiver (Module A1) board used in Technisonic VHF/AM base stations. The second IF is 455 kHz using a ceramic filter, which is immune to high energy ringing. The dual conversion module also has a second local oscillator, second mixer and ceramic filter. The first local oscillator is the original VCO.

The dual conversion receiver board, P/N 003494-3 was implemented into TSR series base stations starting in January 2001. An option label on the chassis will indicate OPTION 94 if the dual conversion board is installed. It is possible to retro-fit the dual conversion receiver board into older TSR series base station employing the single conversion board. Please contact Technisonic for availability of an exchange board.

NOTE: If a new A1 Module has been retrofitted the squelch circuit must be aligned for the receiver squelch to operate correctly.

The dual conversion receiver's squelch knob must be rotated significantly more clockwise (4 o'clock position) to obtain the same squelch setting (3uV) as a single conversion receiver's squelch knob set to the 12 o'clock (straight up) position.

If the dual conversion receiver's squelch knob is set to the 12 o'clock position, signals with a level greater than 0.5uV will open the squelch. At most airports this will not be an adequate level of squelch. Please be aware of this squelch knob adjustment variance when setting and/or comparing squelch levels of dual conversion vs. single conversion base stations.

1.2.1   Receiver Module

The Single Channel Receiver is based on Transceiver Model 90-6R. The transceiver module is modified for receive only, on one pre-programmable synthesized frequency, with 25 kHz channel spacing in the frequency range 117.975 MHz to 138.000 MHz. The single channel memory set board, module A5A1 is mounted external to the receiver internal module to facilitate ease of frequency programming. *Refer to above paragraph for details on new dual conversion receiver A1module.*

1.2.2   Power Supply Modules - Model SPG-007

The Power Supply Module, Model SPG-007 provides the DC supply voltage to the receiver and houses a battery charger which can provide charging and trickle charging to an external rechargeable 12 Vdc battery, if utilized.

1.2.3   Mother Board

The Mother Board provides all interconnection between the two external remote control connectors, Power Supply, Remote Audio Board, and Receiver module. The Remote Audio Board, Optional Crystal Filter and all internal fuses are mounted on the Mother Board.

1.2.4   Remote Audio Board

1.   Line Interface Board P/N 923060-1

NOTE This board is supplied modified for the 92-SC, Receiver without transmitter keying functions. Provides remote receiver audio monitoring over 2 wire 600 ohm audio lines.

1.2.5   Crystal Filter Board Assembly P/N 923069-1 (Option 1)

The Crystal Filter is a 25 kHz bandpass filter which provides additional selectivity during receive operation. The filter provides 5 dB (MAX) attenuation of RF signals ± 7.5 kHz from the receive frequency and 20 dB (MIN) attenuation of RF signals ± 50.0 kHz from the receive carrier frequency. This item is interchangeable in the field. Refer to Paragraph 2.2.5 for replacement instructions. If no crystal filter option is ordered, jumper board assembly P/N 923074-1 is installed. P/N 923069-2 will provide 40dB attenuation of RF signals ± 50.0 kHz from the receive carrier frequency with a 7 dB loss in sensitivity as opposed to a 4 dB loss for the 20 dB filter.

1.3   MODES OF OPERATION

1.3.1   Local/Remote Operation

The Single Channel receiver can be operated in Local or Remote modes.

NOTE: Local operation is not disabled when operating in Remote mode and Remote operation is not disabled when operating in Local mode. The two operating modes operate in parallel.

1.   **LOCAL OPERATION** - In local operation, receive audio is routed to the internal loudspeaker and phone jack located on the front panel.

2.   **REMOTE OPERATION** - In Remote operation, receive audio functions are routed over land lines to the 600 ohm remote inputs. Receive audio is routed to the internal loudspeaker and is adjustable by the volume control.

1.3.2   AC and DC Operation

The unit can be operated by external 120/220 VAC or external 13.7 Vdc (24 Vdc Optional).

1.   **AC OPERATION** - During AC operation, the unit can charge and trickle charge external batteries via the external connectors mounted on the rear panel of the unit. Refer to Table 1.2 for details.

       DC OPERATION - The unit can be operated from an external DC supply within the range of 11.5 Vdc to 15.0 Vdc. Note: If optional Module A6 is ordered the unit can be operated within the supply range of 21.7 to 30.0 Vdc.

1.4   TECHNICAL SUMMARY
A summary of electrical, operational, mechanical and physical characteristics of the Single Channel Receiver are provided in Table 1.1.

TABLE 1.1 LEADING PARTICULARS

POWER REQUIREMENTS:

AC Input Voltage/Current …………………………….…..………. 100 to 132 VAC @ 1.0 Amp (nominal)
AC Input Voltage/Current (selectable by jumper) …….…………... 190 to 250 VAC @ 0.7 Amp (nominal)
DC Input Voltage/Current ………………………………..…….. 11.5 VDC to 15 VDC @ 3.5 Amp (nominal)
If Optional Module A6 ordered ………………………….…... 21.7 VDC to 30 VDC @ 2.0 Amp (nominal)

Battery Charger Voltage & Current ……………………………………………. 13.75 Vdc, 3.5 Amps MAX
If Optional Module A6 Ordered ………………………………………….….. 27.5 Vdc, 2.0 Amps MAX

Remote RX Audio:

Range ………………………………………………………. +10 dBm to -15 dBm (Factory set to -10dBm)
Impedance ………………………………………………………... 600 Ω floating with respect to ground
RX Interface Signals:
Squelch Signal …………………………………………………………. Ground, Open circuit for Mute
AGC Signal Output ……………………………………………………………….…… Linear 0 to +6 Vdc

Temperature & Humidity:

Operating Temperature Range …………………………………………... -25°C(-13°F) to +55°C(+131°F)
Storage Temperature Range ……………………………………………... -55°C(-67°F) to +65°C(+149°F)
Relative Humidity (non-condensing) ……………………………………………………………... 100%

Dimensions & Weight (Single Channel Receiver Chassis):

Width …………………………………………………………………………….. 483 mm (19.0 in) MAX
Height …………………………………………………………………………….… 89 mm (3.5 in) MAX
Depth ……………………………………………………………………………. 432 mm (17.0 in) MAX
Weight …………………………………………………………………………… 5.5 Kg (12 lbs) MAX

90-6R RECEIVER INTERNAL MODULE:

Dimensions & Weight:

Width ………………………………………………………………………….... 216 mm (8.5 in) MAX
Height …………………………………………………………………………….. 70 mm (2.75 in) MAX
Depth ……………………………………………………………………….…… 260 mm (10.25 in) MAX
Weight …………………………………………………………………………. 1.8 Kg (3 lb 15 oz) MAX

TABLE 1.1 LEADING PARTICULARS (Continued)

RECEIVER PERFORMANCE SPECIFICATIONS:

RF Input Impedance ……………………………………………………….... 50 Ω , VSWR 2:1 MAX

Sensitivity (12 dB SINAD) @ 1 KHz 30% Mod …………………………………………... 1.5 µvolts

Selectivity, 25 KHz Channel Spacing:
6 dB Bandwidth ……………………………………………………….. Greater Than 14 kHz
80 dB Bandwidth ……………………………………………………………….... Less Than 50 kHz

Adjacent Channel Selectivity …………………………………………….... Greater Than 85 dB

Spurious Response Attenuation ……………………………………………... Greater than 95 dB

Frequency Stability (-40°C to +55°C) …………………………………….…… ±1,000 Hz MAX
RF AGC (5 µvolts to 1 volt) ………………………………………….. Audio Level of less than 3 dB

Intermodulation:
Ultimate Sensitivity ……………………………………………………….…… 70 dB
30 µvolts ………………………………………………………………………….…. 45 dB
300 µvolts …………………………………………………………………………… 30 dB

Unwanted Radiation …………………………………………….. Less than 80 µvolts into 50 Ohms

Hum & Noise @ 1mV RF 30% MOD ……………………………………….…… 40 dB

Loudspeaker Output ………………………………………………………… 3 W MAX
Phone Output ……………………………………………………….. 100 mW into 600 Ohms
Audio Distortion 1mV RF Input, 30% MOD …………………………………………... 3% MAX

Audio Distortion 1mV RF Input, 90% MOD …………………………………………... 5% MAX

Audio Output Limiting ……………………………………….. Less than 1 dB @30 to 100% MOD

Audio Frequency Response 300 Hz-2500 Hz …………………………………………….. +1, -3 dB

Audio Acquisition Time …………………………………………………….…… Less than 50 msecs

Audio Squelch Characteristics:
Squelch Type …………………………………………………………. Noise and Carrier Operated

Carrier Operated Squelch ……………………………………………. Adjustable 2 to 15 µvolts

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SECTION 2 – PREPARATION FOR USE AND STORAGE

2.1 INTRODUCTION

This section provides the information required for custom configuration and storage of the Single Channel Receiver. Custom system configuration includes adjusting receive audio board functions, and Receive frequency selection.

2.2 DISASSEMBLY/ASSEMBLY (Refer to Figure 2.1)

2.2.1 Remove/Replace Top Dust Cover Assembly

REMOVAL

(1)   Remove and retain twelve screws securing top dust cover to the 19" rack chassis.

(2)   Please note the location of the three longer screws which travel through the heatsink shims riveted to the inside of the top cover.

(3)   Lift cover clear of chassis to expose internal view of receiver as shown in Figure 2.1.

REPLACEMENT

(1)   Position top cover on chassis.

(2)   Position one screw in each corner of the top cover mounting holes. Place the three longer screws into their correct holes located over the internal receiver module.

(3)   Secure cover to chassis with remaining screws.

2.2.2 Remove/Replace Receiver Module

REMOVAL

(1)   Remove dust cover as described in paragraph 2.2.1.

(2)   Disconnect RF and DC connectors from rear of receiver module.

(3)   Remove and retain the screws securing the top cover of the internal receiver module.

(4)   Remove and retain two screws and two washers securing flat cable to the side of the receiver module and disconnect the flat cable. Disconnect the flat cable running out of the receiver module at the connector on the external memory set board.

(5)   Remove and Retain four countersunk screws securing receiver module to front panel.

(6)   Move the receiver module slightly back from the front panel and disconnect the flat cable connecting the front panel assembly to the transceiver module, audio interface board A3. The connector is located on the A3 board.
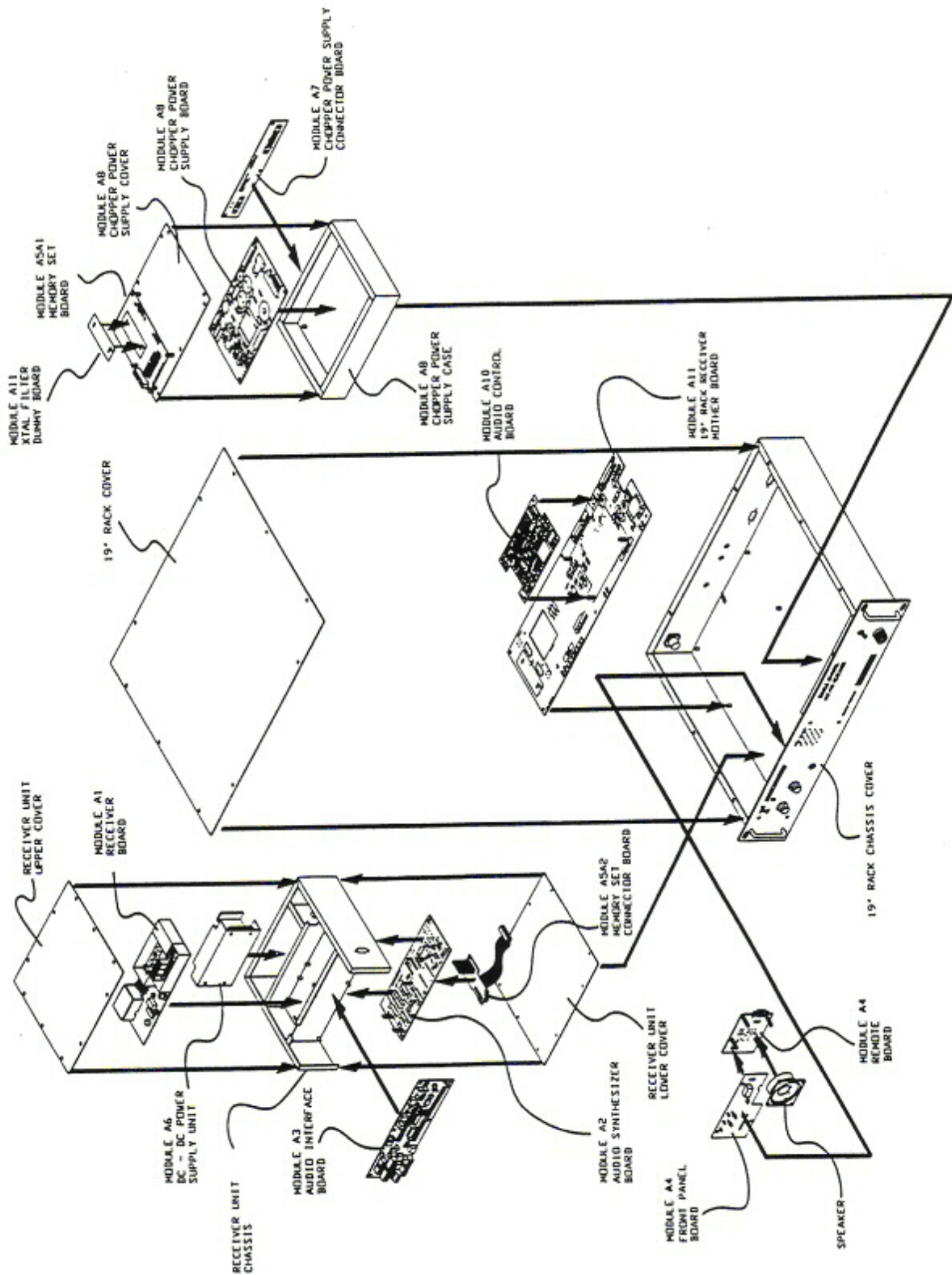
(7)   Lift receiver module clear of chassis.

Figure 2.1 Single Channel Receiver - Internal View

REPLACEMENT

(1)   Position the receiver module into the chassis. While holding the receiver module slightly back from the front panel, re-connect the flat cable from the front panel to the A3 board in the receiver module.

(2)   Position and secure receiver module to front panel with four countersunk screws.

(3)   Connect flat cable to receiver module. Secure flat cable to receiver module with two screws and two washers. Connect flat cable running out of the receiver module to the external memory set board.

(4)   Connect DC and RF connectors to rear of receiver module.

(5)   Replace and secure the top cover of the receiver module with the screws removed in step (3) of the REMOVAL instructions.

(6)   Replace top dust cover as described in paragraph 2.2.1.

2.2.3   Remove Replace External Single Channel Memory Set Module A5A1

REMOVAL

(1)   Remove dust cover as described in paragraph 2.2.1.

(2)   Remove and retain four screws securing Memory Set Board, Module A5A1 "piggy back" to the standoffs on the power supply cover. (See Figure 2.1 for location)

REPLACEMENT

(3)   Secure the Memory Set Module to the stand-offs located on the power supply cover by the four screws.

2.2.4   Remove/Replace Audio Board

REMOVAL

(1)   Remove dust cover as described in paragraph 2.2.1.

   CAUTION: Care must be taken when removing or replacing Control Board to avoid damage to Motherboard Connector Pins.

(2)   Remove and retain four screws securing Audio Board "piggy back" to the Mother Board standoffs. Remove Audio Board from Mother Board.

REPLACEMENT

(1)   Align the two female connectors on the control board with the male connectors on the Mother Board using the four mounting holes and standoffs as a guide. Secure control board to the Mother Board standoffs with four screws and washers.

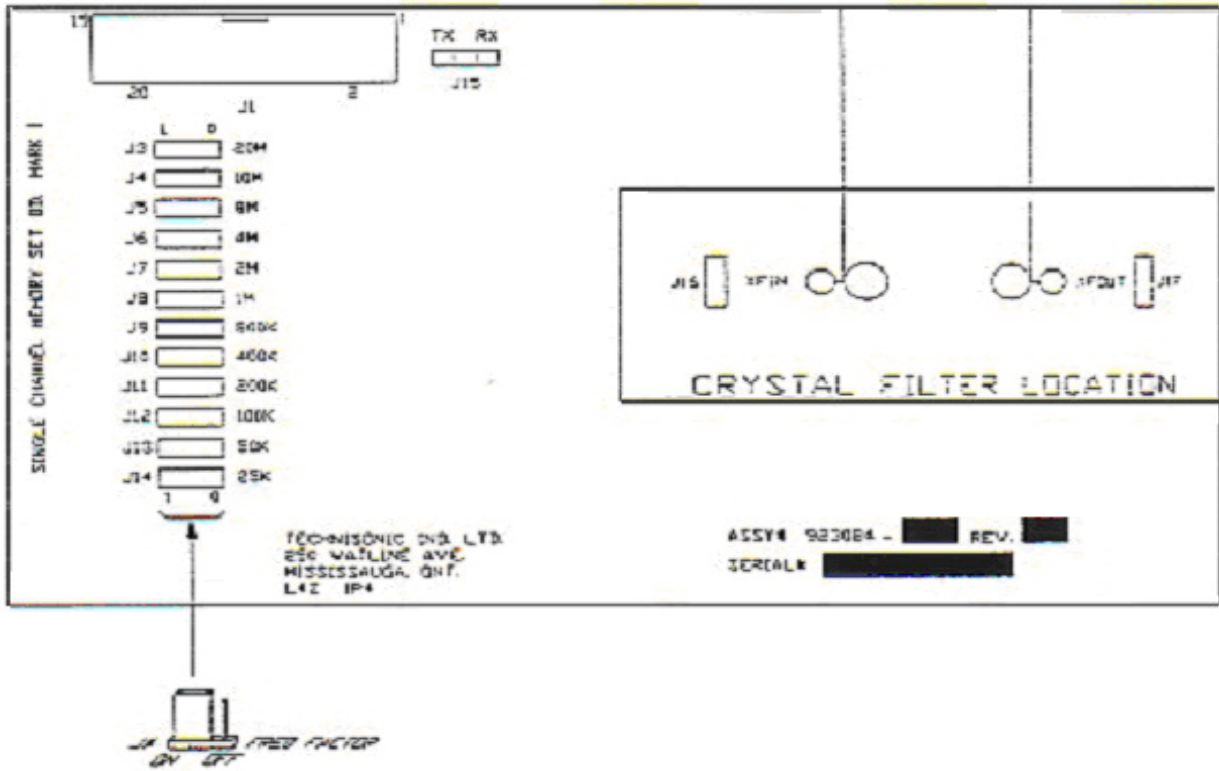(2)   Replace dust cover as described in paragraph 2.2.1.

Figure 2.2 Single Channel Memory Set Board Module A5A1

2.2.5   Remove/Replace Crystal Filter Board

REMOVAL

(1)   Remove dust cover of unit as described in Paragraph 2.2.1.

(2)   Remove and retain the four screws securing the crystal filter board assembly, P/N 923069-1 to the standoffs on the Frequency-Set Memory Board. Pull the crystal filter board assembly straight up to avoid damaging the Frequency-Set Memory Board connector pins.

REPLACEMENT

(1)   Align the pins on the bottom of the crystal filter board with their sockets on the Mother Board. Push the crystal filter board straight down until it rests on the Mother Board standoffs.

(2)   Secure the crystal filter board to the standoffs with the four mounting screws.

NOTE: Make certain that the memory set board, module A5A1 is programmed to the same operating frequency as the crystal filter board assembly. If no crystal filter board assembly (option) is installed, jumper board assembly P/N 923074-1 must be installed.

2.3   CHANNEL FREQUENCY SELECTION

Early radios have their frequencies programmed by a diode matrix as described in Section 2.3.3. For radio units shipped after July 2012 and equipped with a USB port, please refer to Appendix A (TiL TDP-90 Programming Software User's Guide for USB Programmable AM Series Transceivers) - Document 11RE439.

2.3.1   Introduction

Before programming a new operating frequency, perform an operational check, as outlined in Section 3. If there is any operational deficiency or equipment malfunction, return receiver to the manufacturer. Before use it is necessary to pre-program the operating frequency.

2.3.2   Frequency Range

The operating frequency may be programmed over the frequency range 117.975 MHz to 138.000 MHz with 25 kHz channel spacing.

2.3.3   Pre-programming Channel Frequency

FREQUENCY SELECTION MHz.

Refer to Table 2.1 Frequency Selection MHz. Using the OPERATING FREQUENCY (MHz) column, find the desired frequency in MHz. Cross-refer to the JUMPER LOCATION column, and install the jumper as required.

FREQUENCY SELECTION KHz

Refer to Table 2.2, Frequency Selection kHz. Using the OPERATING FREQUENCY kHz column, find the portion of the desired frequency in kHz. Cross-refer to the JUMPER LOCATION column, and install the jumpers in the locations as required.

2.3.4   Offset Frequency Set

(A)   Jumper J15, located on the single channel memory set board, module A5A1 selects the frequency offset as follows:

      (1)   If J15 is not installed, frequency offset is inhibited.

      (2)   If J15 is installed in the Rx position, the receive frequency will be offset low.

      (3)   If J15 is installed in the Tx position, the receive frequency will be offset high.

(B)   Trim capacitors C16 and C37, accessible from the bottom of the unit (see Figure 2.6), are used to accurately adjust the receive frequency.

OPERATING FREQUENCY (MHz)	JUMPER LOCATION					
	20 MHz	10 MHz	8 MHz	4 MHz	2 MHz	1 MHz
117	0	1	0	1	1	1
118	0	1	1	0	0	0
119	0	1	1	0	0	1
120	1	0	0	0	0	0
121	1	0	0	0	0	1
122	1	0	0	0	1	0
123	1	0	0	0	1	1
124	1	0	0	1	0	0
125	1	0	0	1	0	1
126	1	0	0	1	1	0
127	1	0	0	1	1	1
128	1	0	1	0	0	0
129	1	0	1	0	0	1
130	1	1	0	0	0	0
131	1	1	0	0	0	1
132	1	1	0	0	1	0
133	1	1	0	0	1	1
134	1	1	0	1	0	0
135	1	1	0	1	0	1
136	1	1	0	1	1	0
137	1	1	0	1	1	1
138	1	1	0	0	0	0

TABLE 2.1 FREQUENCY SELECTION MHz

LEGEND:
0 = JUMPER BETWEEN CENTRE AND 0   1 = JUMPER BETWEEN CENTRE AND 1

TABLE 2.2 FREQUENCY SELECTION kHz						
OPERATING FREQUENCY (kHz)	DIODE LOCATION					
	800 kHz	400 kHz	200 kHz	100 kHz	50 kHz	25 kHz
000	0	0	0	0	0	0
025	0	0	0	0	0	1
050	0	0	0	0	1	0
075	0	0	0	0	1	1
100	0	0	0	1	0	0
125	0	0	0	1	0	1
150	0	0	0	1	1	0
175	0	0	0	1	1	1
200	0	0	1	0	0	0
225	0	0	1	0	0	1
250	0	0	1	0	1	0
275	0	0	1	0	1	1
300	0	0	1	1	0	0
325	0	0	1	1	0	1
350	0	0	1	1	1	0
375	0	0	1	1	1	1
400	0	1	0	0	0	0
425	0	1	0	0	0	1
450	0	1	0	0	1	0
475	0	1	0	0	1	1
500	0	1	0	1	0	0
525	0	1	0	1	0	1
550	0	1	0	1	1	0
575	0	1	0	1	1	1
600	0	1	1	0	0	0
625	0	1	1	0	0	1
650	0	1	1	0	1	0
675	0	1	1	0	1	1
700	0	1	1	1	0	0
725	0	1	1	1	0	1
750	0	1	1	1	1	0
775	0	1	1	1	1	1
800	1	0	0	0	0	0
825	1	0	0	0	0	1
850	1	0	0	0	1	0
875	1	0	0	0	1	1
900	1	0	0	1	0	0
925	1	0	0	1	0	1
950	1	0	0	1	1	0
975	1	0	0	1	1	1

LEGEND:
0 = JUMPER BETWEEN CENTRE AND 0   1 = JUMPER BETWEEN CENTRE AND 1

2.4   REMOTE OPERATION SETUP

The Procedures listed below enable the user to custom configure the unit for external remote audio monitoring hardware or a remote consoles. Refer to Table 2.3 for connector pin details on Remote Control D Connector located at rear of Single Channel Receiver. Refer to Figure 2.3 for board location. Verify remote audio control/operation in accordance with manufacturers instructions.

CAUTION

This unit contains static sensitive devices. Wear a ground strap and/or conductive gloves when handling printed circuit boards.

TWO WIRE SETUP - In two wire operation, a single balanced 600 ohm pair is provided for transmit and receive audio. The transmitter can be keyed on the same pair or externally.

TABLE 2.3 REMOTE CONNECTOR FUNCTIONS		
9 PIN NO	**25 PIN NO**	**Connector Pin Functions**
A,B	9,21	2 Wire Rx Audio Line (600 O)
C,D	10,22	Not Connected
H	12,24	External DC In (+12 Vdc) or 24Vdc if module A6 ordered.
N/A	8	AGC
K	13	Not Connected
J	1,2,14,15	Ground
N/A	25	Squelch
E(-),F(+)	23(-),11(+)	Not Connected
N/A	20	Not Connected
N/A	3,4,5,6,7,16,17,18,19	Not Connected, allocated for future functions

2.4.1   Remote Audio Board P/N 923060-1

There is one board in this family, which is used for both receiver and transmitter applications. This board provides remote audio monitoring of receiver operation on 2 wire 600 ohm lines.

Figure 2.3 illustrates P/N 923060-1. R18 Sets Rx Audio OUT Level (Range -15 dBm to +10 dBm) and all other variable resistors and jumpers are not utilized for receiver application. ie/ Variable resistors R12 and R32 along with Jumpers J1, J2 and J3 (all of which control TX functions) are located on the 923060-1 board but will not have any function when used in the TSR-4100 receiver.
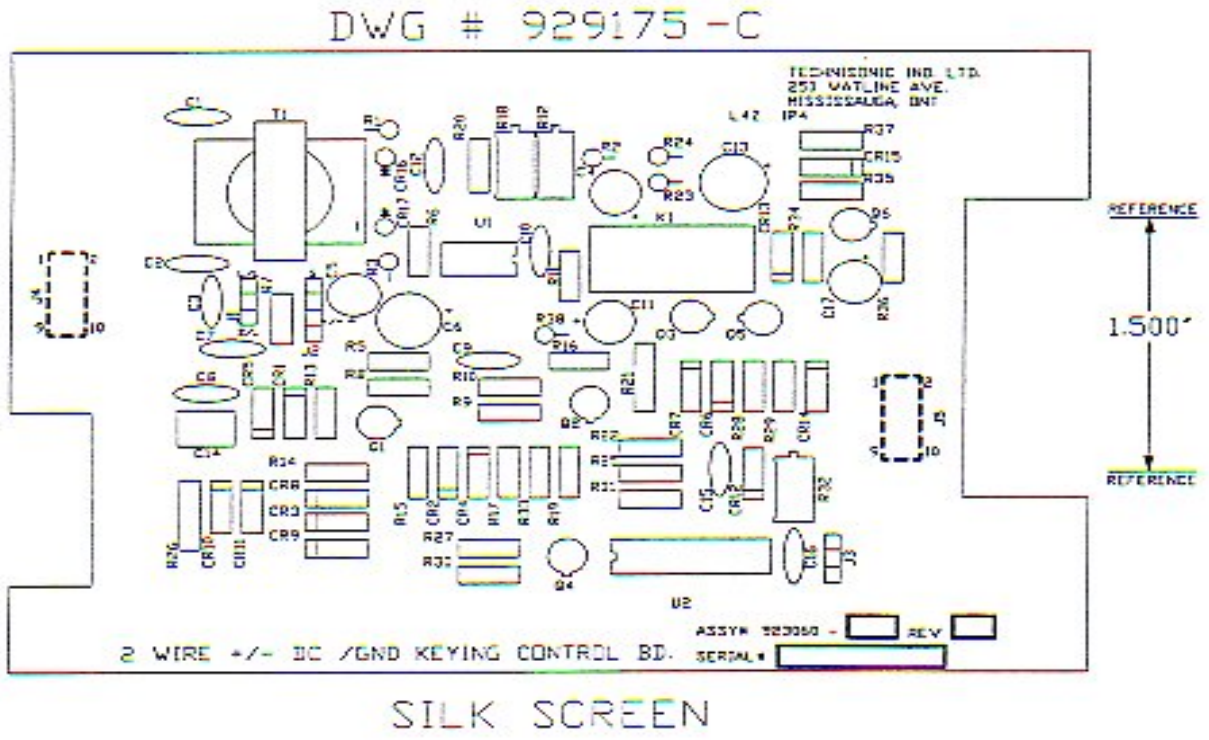
Figure 2.3 Remote Audio Board P/N 923060-1

2.5 OPTIONAL LOUDSPEAKER, HEADPHONE INSTALLATION

Provision is made for connection of an external loudspeaker or headphone to the SPEAKER/PHONE jack of the receiver, as shown in Figure 3.1.

2.5.1 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). Insert the external loudspeaker connector into the SPEAKER/PHONE jack located on the front panel of the transceiver. When the external loudspeaker is connected to the transceiver SPEAKER/PHONE jack, the internal loudspeaker is automatically disconnected.

2.5.2 Headset

Headset impedance should be 150 to 600 ohms. The headset cable must terminate in a 1/4 in. 3-pole telephone plug (male), to mate with the SPEAKER/PHONE jack located on the front panel of the receiver. The internal loudspeaker is automatically disconnected. Connect the headset as indicated below for receiver audio.

(1)   **HEADSET WITHOUT TRANSMIT AUDIO** - When receiver audio only without transmit audio is required, the headset should be connected between the tip and sleeve (ground) of the telephone plug.

2.6 TRANSCEIVER ADJUSTMENTS AND SETTINGS

The locations at which certain receiver settings and adjustments can be performed are shown in Figure 2.6. The top dust cover of the receiver must be removed as described in paragraph 2.2.1 to access the AGC, and Squelch settings. The plastic plugs must be removed prior to adjustment of the remaining settings which are accessed from the bottom of the receiver chassis. If alignment procedures for these settings are required please consult the manufacturer.

2.7 OPERATIONAL CHECK

Perform an operational check of the receiver after all adjustments. Ensure that the receiver operates using the Operating Instructions given in Section 3 of this document and the appropriate specified operating procedures for use with a Remote Audio Monitoring Unit.

2.8 STORAGE

To store for an extended period, store unit in a dry place, in the original shipping container.
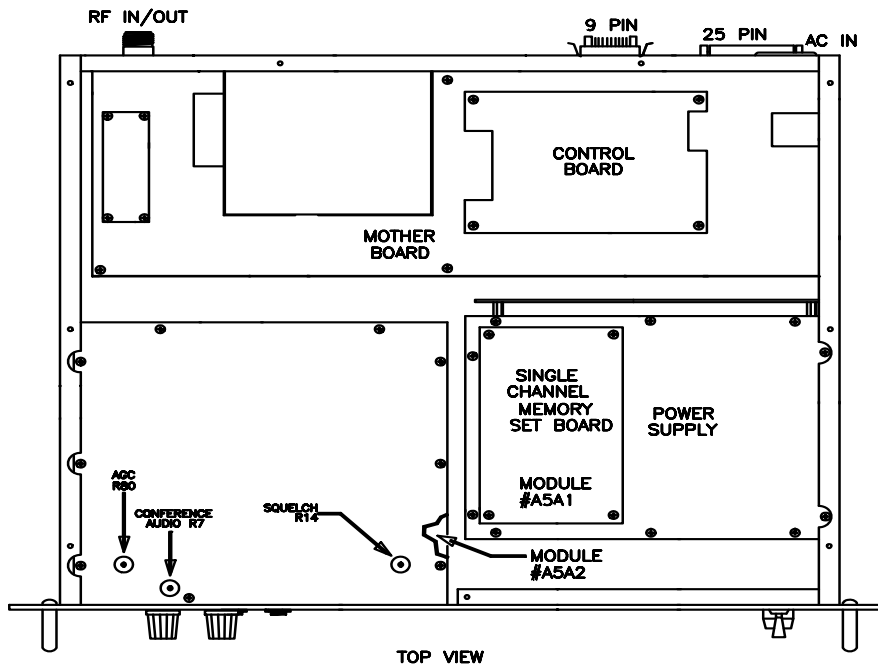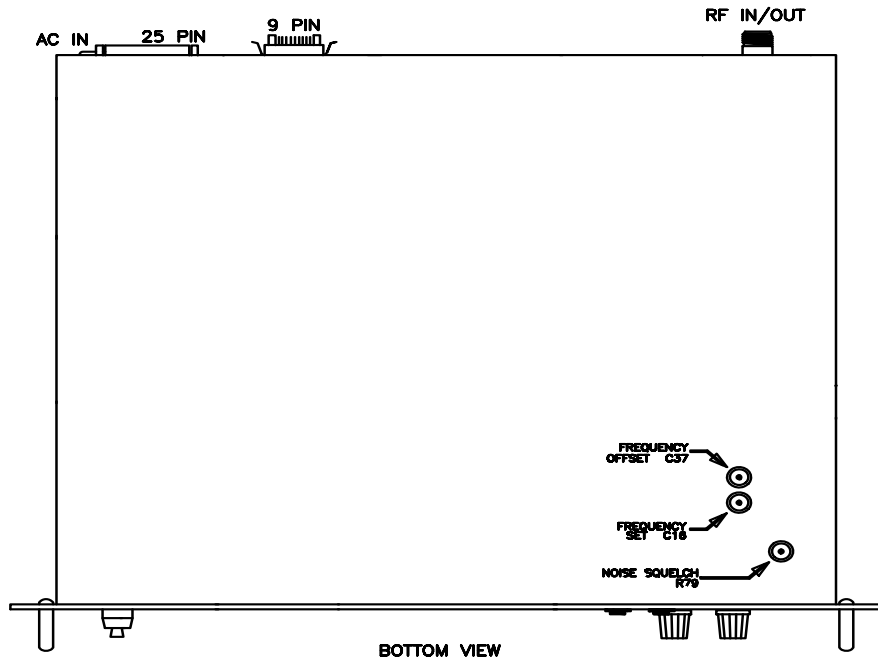
Figure 2.4 Receiver Settings and Adjustments

SECTION 3 – OPERATING INSTRUCTIONS

3.1   INTRODUCTION

This section includes a functional description of each switch, control, indicator and connector located on the front and rear panels of the Single Channel Receiver.

3.2   INSTALLATION

The Single Channel Receiver is designed for mounting in a 19 inch rack. An AC Line cord P/N 927002-1 is supplied for connection to AC Power. A 9 Pin connector (mates with Positronic GM9MSCG000VL or equivalent) and a 25 Pin Connector (mates with Amphenol 17D-B-25S or equivalent) are provided for connection with external DC and 2 Wire 600 ohm dedicated lines. A 50 ohm "N" Type connector is provided for connection to an external antenna. Refer to Section 2 for frequency selection and remote audio setup details.

(1)   Mount Receiver in 19 inch rack with 4 screws.
(2)   Ensure that Receiver POWER ON/OFF switch is set to OFF.
(3)   Install AC line cord in AC chassis connector on rear panel.
(4)   Install Remote Control connector to 9 Pin or 25 Pin connector as required. (Refer to Figure 3.1 for connector pin outs.)
(5)   Connect antenna connector to rear panel chassis N Type connector.

3.3   OPERATOR'S SWITCHES, CONTROLS AND INDICATORS

A view of the front and rear panel is given in Figure 3.1. A functional description of each of the operator's switches, controls and indicators are given in Table 3.1, Operator's Switches, Controls and Indicators.
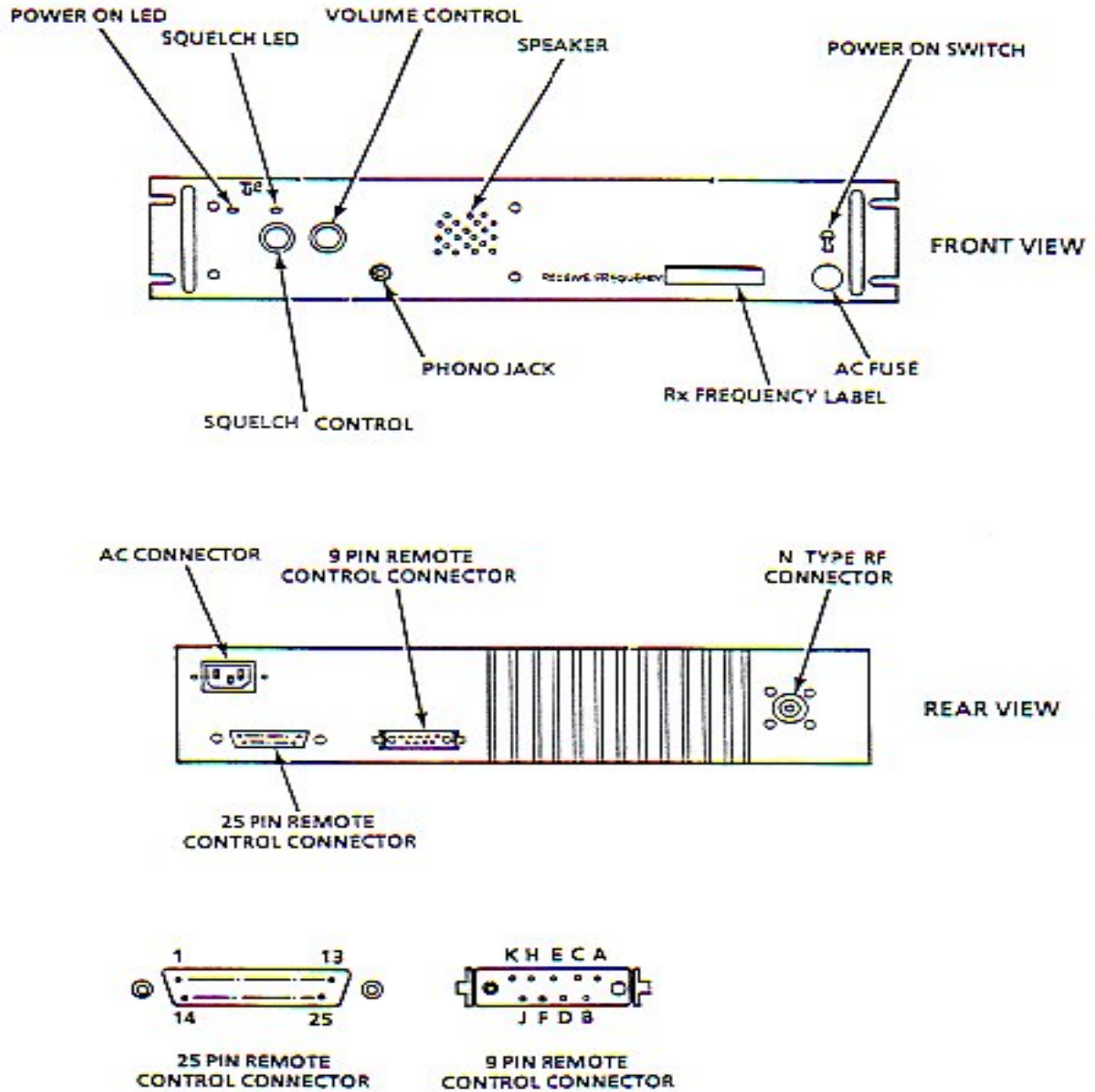
Figure 3.1 Single Channel Receiver Controls and Indicators

	TABLE 3.1 OPERATORS SWITCHES, CONTROLS AND INDICATORS	
Item No.	SWITCHES CONTROLS	FUNCTIONAL DESCRIPTION (* Denotes items located on rear panel)
1	POWER ON/OFF SWITCH	A toggle switch applies the AC power to the power supply and the DC 13.7 (27.5 with optional A6 module) volts nominal power to the receiver. The receiver is switched to ON in the toggle UP position the receiver is switched OFF in the toggle DOWN position.
2	POWER ON LED INDICATOR	A GREEN LED Indicates when the POWER ON/OFF switch is set to ON and voltage is applied to the receiver.
3	SQUELCH CONTROL	A linear potentiometer determines the squelch threshold level. When the SQUELCH CONTROL is rotated in the counter-clockwise direction, the SQUELCH GREEN LED indicates that the squelch is connecting demodulated audio to the VOLUME control.
4	SQUELCH INDICATOR	A GREEN LED indicates the squelch circuit is connecting demodulated audio signal to the VOLUME control.
5	VOLUME CONTROL	A logarithmic potentiometer determines the audio level applied to the internal speaker when the receiver is operated in the receive mode. When the SPEAKER/PHONE connector is in use the internal loudspeaker is disconnected and the VOLUME CONTROL sets the audio level applied to the external speaker or headphone.
6	RX LABEL	Indicates the frequency programmed for receive.
7	LOUDSPEAKER	An 8-ohm internal speaker reproduces the receiver audio output. The audio line is disconnected from the internal loudspeaker when when the SPEAKER/PHONE connector is in use.
8	SPEAKER/PHONE CONNECTOR	A 3-pole connector provides interconnection to either an external loudspeaker or headphone. When in use, the internal speaker is disconnected and the VOLUME control sets the audio level applied to the external speaker or headphone.
9	AC FUSE	A 2.5 Amp fuse protects the Base Station power supply from power supply internal short circuit or transceiver short circuit.
10	* "N" TYPE RF CONNECTOR	A 50 ohm co-axial connector provides connection to external antenna.
11	*AC POWER CONNECTOR	3 Prong AC Connector for use with AC Power Cord P/N 927002-1.
12	*9 PIN REMOTE CONNECTOR	9 Pin "D" type connector provides connections required for remote operation. Refer to Table 2.3 for connector details.
13	*25 PIN REMOTE CONNECTOR	25 Pin "D" type connector provides connections required for remote operation. Refer to Table 2.3 for connector details.

3.4 OPERATING INSTRUCTIONS

NOTE

Refer to appropriate Operating Instructions for use with Remote Audio Monitoring Unit.

NOTE

The following operating procedures are intended specifically for Local Operation.

(1)   Set the SQUELCH control in the fully counter-clockwise (CCW) position.

(2)   Set the VOLUME control in the 12 o'clock centre position.

(3)   Set the POWER ON/OFF switch to "ON".

(4)   Verify that the FUSE BLOWN red LED is OFF.

(5)   Verify that the POWER ON green LED is ON.

(6)   Proceed to operate in the receive mode, paragraph 3.4.1 as required.

3.4.1 Receiver Operation (Local Mode)

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

(1)   Verify that the correct operating frequency is indicated on the front panel. Refer to Section 2 for Channel/Frequency selection.

(2)   Adjust the SQUELCH control to suit local reception conditions. When the SQUELCH control is rotated in the counter-clockwise direction, the SQUELCH indicator green LED will switch to 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.

IMPORTANT NOTE

The dual conversion receiver's squelch knob must be rotated significantly more clockwise (4 o'clock position) to obtain the same squelch setting (3uV) as a single conversion receiver's squelch knob set to the 12 o'clock (straight up) position.

If the dual conversion receiver's squelch knob is set to the 12 o'clock position, signals with a level greater than 0.5uV will open the squelch. At most airports this will not be an adequate level of squelch.

Recommended procedure:
The squelch taper on a dual conversion receiver looks as follows:

Squelch knob position	Squelch setting
12 o'clock	0.5uV
3 o'clock	1.2uV
3:30 position	2.5uV
4 o'clock	3uV
Fully clockwise	9uV

It is recommended that the squelch be set to at least 2.5uV (3:30 knob position) at busy airport locations. If ACARS signals are present on adjacent or nearby channels the squelch level should be at least 3uV (4 o'clock) to prevent ACARS bleed through.

(3)   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 receiver, the internal loudspeaker is automatically disconnected. The VOLUME control will now control the audio level applied to the external loudspeaker or headset, as applicable.

3.4.3   Switching OFF

To switch off the receiver:

(1)   Set the POWER ON/OFF on transceiver to switch to OFF.

(2)   Verify that all indicator LED's on the front panel are OFF.

NOTE

When the receiver is switched OFF there is no current drain from external DC.

3.4.4   EXTERNAL DC OPERATION

(1)   Set AC ON/OFF switch to OFF.

(2)   Refer to Table 2-3 for pin numbers and Figure 3.1 for pin locations to hook up external DC Power.

NOTE

Ensure that the DC source voltage is within the range of 11.5 Vdc to 15 Vdc, unless optional A6 Module is ordered to allow operation with an input supply from 21.7 Vdc to 30 Vdc.

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IMPORTANT
WARRANTY

All communication equipment manufactured by Technisonic Industries Limited is warranted to be free of defects in Material or Workmanship under normal use for a period of one year from Date of Purchase by the end user.

Warranty will only apply to equipment installed by a factory approved and/or authorized facility in accordance with Technisonic published installation instructions. Equipment falling under the following is not covered by warranty:
- equipment that has been repaired or altered in any way as to affect performance,
- equipment that has been subject to improper installation,
- equipment that has been used for purposes other than intended,
- equipment that has been involved in any accident, fire, flood, immersion or subject to any other abuse.

Expressly excluded from this warranty are changes or charges relating to the removal and re-installation of equipment from the aircraft. Technisonic will repair or replace (at Technisonic's discretion) any defective transceiver (or part thereof) found to be faulty during the Warranty Period.

Faulty equipment must be returned to Technisonic (or its authorized Warranty Depot) with transportation charges prepaid. Repaired (or replacement) equipment will be returned to the customer with collect freight charges. If the failure of a transceiver occurs within the first 30 days of service, Technisonic will return the repaired or replacement equipment prepaid.

Technisonic reserves the right to make changes in design, or additions to, or improvements in its products without obligation to install such additions and improvements in equipment previously manufactured. This Warranty is in lieu of any and all other warranties express or implied, including any warranty of merchantability or fitness, and of all other obligations or liabilities on the part of Technisonic.

This Warranty shall not be transferable or assignable to any other persons, firms or corporations.

For warranty registration please complete the on-line
Warranty Registration Form found at www.til.ca.

TiL TDP-90
Programming Software
User's Guide

for USB Programmable
AM Series Transceivers

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INTRODUCTION

This document contains instructions for proper installation and operation of the TDP 90 software for USB programmable Technisonic AM series transceivers and details the various elements of the Graphical User Interface (GUI).

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

The TDP-90 programming software can be found under the "Programming Software" link at
http://www.til.ca/

SOFTWARE INSTALLATION

Note: The USB driver must be installed before attempting to use the TDP-90 software.

USB Driver

The USB hardware in your Technisonic AM transceiver is configured as a Virtual Com Port ("VCP") which emulates a serial COM. This driver is available for free distribution from Future Technology Devices International ("FTDI"). Download and install the latest release of the VCP driver for Windows per the instructions on the web page located at this link:
http://www.ftdichip.com/Drivers/VCP.htm

TDP Software

Download and install the latest release of the TDP-90 software for Windows from the web page located at this link:
http://til.ca/content.php?page=programming-software-tdp90

Once completed there will be a "TDP90" icon on your computer desktop.

TRANSCEIVER TO COMPUTER CONNECTION

Connect the transceiver to the computer USB port using a standard USB-A male to USB-B male cable. The USB port is located on the rear panel of mobile and base station transceivers and on the front panel of rack mount transceivers.

GETTING STARTED

To start the TDP 90 program, double click the TDP90 icon on the desktop. The following Graphical User Interface will appear. The current version number is shown in square brackets on the title bar.
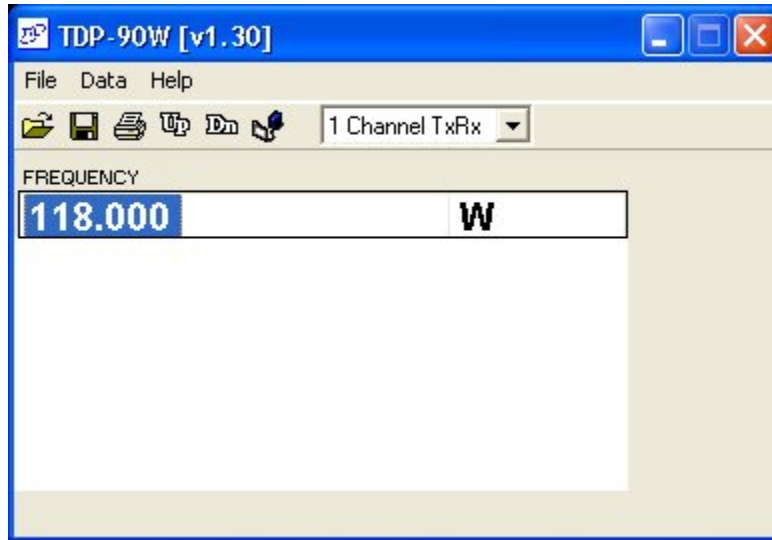
MAIN GRAPHICAL USER INTERFACE

Figure 1

ICONS AND PULL DOWN MENUS

The *icons and pull-down menus* provide the set-up and operating functions. The *Channels* pull-down tab provides selection for single or six channel transceivers (use the 6 channel window for 4 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.
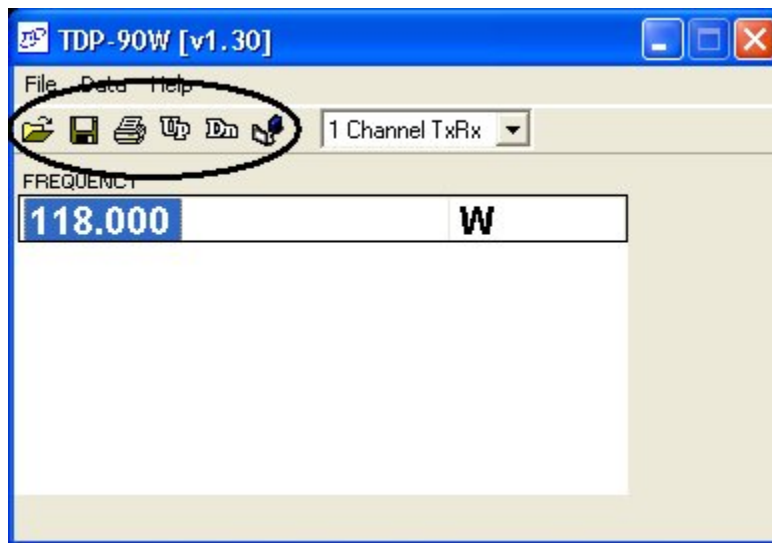
ICONS

Figure 2

The icons provide single-click access to the features in the pull down menus. Details of these features are explained in the Pull Down Menu descriptions that follow.
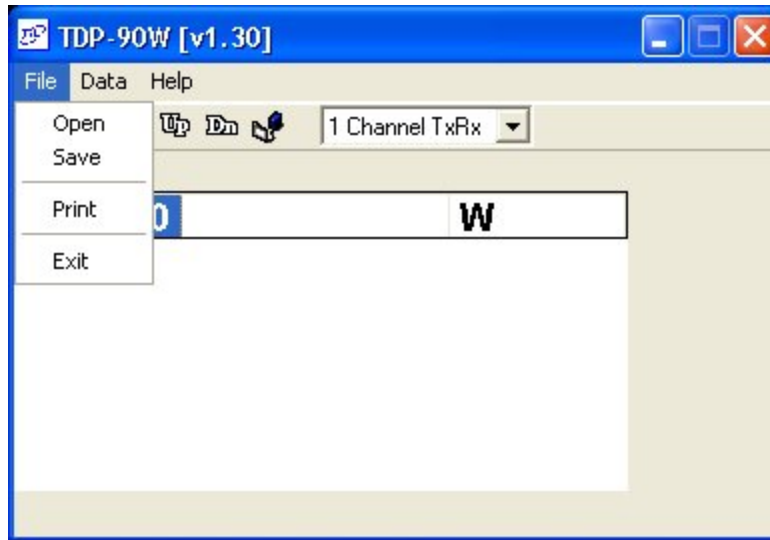
FILE MENU

Figure 3

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 program will automatically append the .90 suffix to the filename. 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.

DATA MENU
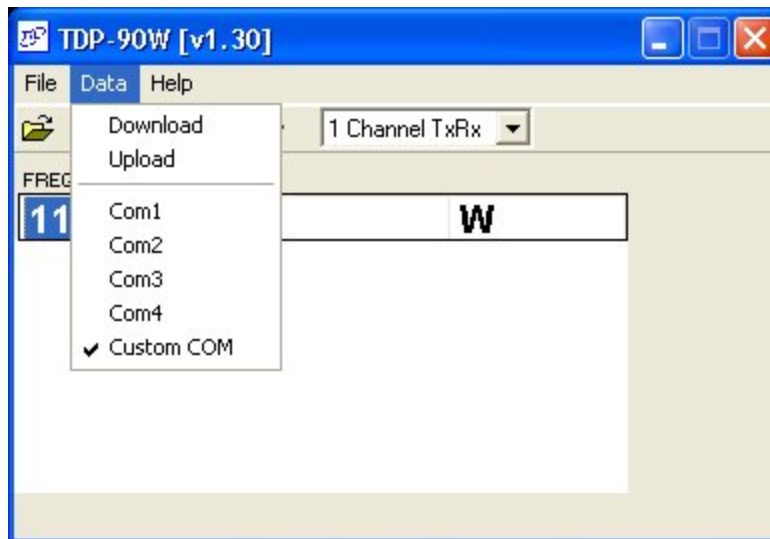
Figure 4

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

Com1 (2,3,4, Custom COM) allows you to select the COM port on your computer to which the transceiver is connected. The computer may assign a random unused COM port number to the Virtual Com Port (VCP) when the USB driver is installed so "Custom COM" can be selected when it is beyond the normal range of COM1-4. The assigned VCP can be determined by accessing the Device Manager (access in WinXP by right-clicking on "My Computer – Properties – Hardware – Device Manager – Port (COM & LPT)). Note the COM number that was assigned to USB Serial Port. The Port (5th) icon provides the same function in a single mouse click.

HELP MENU
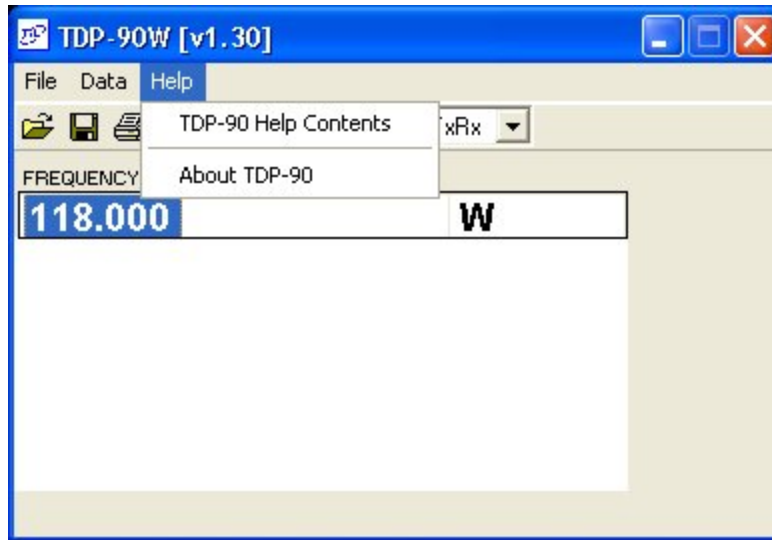
Figure 5

TDP-90 Help Contents opens 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 Frequently Asked Questions.

About selection displays Technisonic company and contact information as well as the revision number of the TDP software in the "Terminal window" screen.
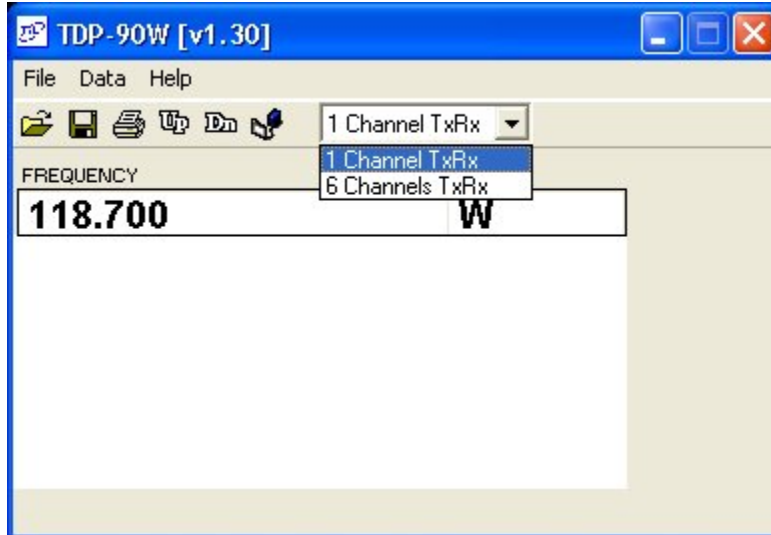
CHANNEL SELECTION PULLDOWN

1 CHANNEL TRANSCEIVER

Figure 6

6 CHANNEL TRANSCEIVER

Figure 7

The **x Channel(s)** pull-down tab allows you to select for single or six channel AM transceiver use. The frequency editing window changes accordingly. The "W" indicates that the channels are 25kHz (**W**ide) channel spacing and as such, only channels in 25kHz increments are accepted. Be sure to set the channel pulldown appropriately for your transceiver otherwise frequency programming may be unpredictable. For 4 channel transceivers use the first 4 entries in the 6 channel window.

SAMPLE UPLOAD AND DOWNLOAD

(1)   Connect the transceiver to the computer USB port using a standard USB-A male to USB-B male cable. The USB port is located on the rear panel of mobile and base station transceivers and on the front panel of rack mount transceivers. Turn on the power to the transceiver.

(2)   Assuming that the USB driver is already installed, determine which Virtual Com Port has been assigned by accessing the Device Manager (accessed in WinXP by right-clicking on "My Computer – Properties – Hardware – Device Manager – Ports (COM & LPT). Note the COM number that was assigned to USB Serial Port.

(3)   Run the TDP-90 program on the computer.

(4)   Click on the **Data** pull-down list and select the serial port to which the transceiver is connected. Select Custom COM and enter the assigned port number if it is outside the normal range of Com1-4.

(5)   Set the program for 1 or 6 channels as applicable using the channel pulldown list.

(6)   Click on the **Up** icon to retrieve the frequencies from the radio. "UPLOADING" will appear at the bottom of the window as data is being transferred.

(7)   Edit the frequencies as desired. (The program only accepts 25 kHz spaced frequencies.)

(8)   Click on the **Dn** icon to copy the frequencies to the transceiver. "DOWNLOADING" will appear at the bottom of the window as data is being transferred.

(9)   Click on the **diskette** icon to save the file. Hint: Use the transceiver serial number or some other unique filename to identify the specific transceiver. The program will automatically append the .90 suffix to the filename.

(10)   Click on the **printer** icon to print a hard-copy of the frequencies.