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TSUR-400 RECEIVER/MONITOR
OPERATION and PROGRAMMING
MANUAL
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TSUR-400

The TSUR-400 is a continuous frequency band PSK uplink receiver/monitor which can receive, decode, analyze, display, and store digital messages from the Argos Platform Terminal Transmitters (PTTs). The software within the TSUR-400 accommodates the latest Argos data formats and the full frequency band of PTTs.

Scope

This manual is designed to assist in configuring the TSUR-400 and to guide the user through the programming features. The TSUR-400 displays various screens, which enable the user to easily learn and operate the unit.

General Functional Guidelines

Before commencing operation, make sure the battery is charged and properly attached. Using the battery charger provided, the battery can be charged individually by inserting the spacer, or it can be charged while attached to the TSUR-400. Make sure the antenna is properly attached.

Four keys labeled FN (P0), DN (P1), UP (P2), and PWR (P3) are used to control and set all functions. Each key is variable dependant upon the current screen displayed on the TSUR-400. Please refer to Appendix C, TSUR-400 Menu Flow Chart at the back of this manual.

FN (P0) Key
The FN key operates as a Function Key and is used to access the various menus, advance or accept setup parameters, and toggle menu items On or Off. The FN key is also used to exit from the Message screen or to enter the Menu system.

DN (P1) Key
The DN key is a scroll down key used for scroll down menu options. The DN key also decreases a value or field when in a Level 1 or 2 menu option. Pressing the DN key when in the Main screen will take the user to the Message screen.

UP (P2) Key
Depressing the UP key will scroll upwards in a menu, or increase a value or field when in a Level 1 or 2 menu option. When in the Main screen, pressing the UP key will display the Splash screen for 3 seconds. Pressing the Up key in the Message screen will display the Main screen.

PWR (P3) Key
The PWR key turns the unit's power or display backlight ON or OFF. Depressing the key for 3 seconds when the TSUR-400 is Off will turn the unit ON. Depressing and holding the key again for 3 seconds minimum will turn the TSUR-400 OFF. When the unit is ON, sitting at the main message screen waiting for a message, briefly depressing the key will enable the display's backlight for the configured time period. Momentarily depressing the PWR key again before the backlight time-out will deactivate the backlight. Depressing any other key when the backlight is ON will restart the backlight time-out period. When the user is in either Menu Level 1 or Menu Level 2 screens the P3 key may be used as a quick escape key to return to the main screen.

TSUR-400 Screen Display Types

The TSUR-400 has five different types of screens that may be displayed on the liquid crystal display (LCD).

Power-up/Splash Screen

This is an informational screen which displays the TSUR-400 product model number, serial number, software version and software revision date. This screen is displayed for 3 seconds upon power-up or accessed by depressing the UP key when on the Main Screen. This screen cannot be modified. An audible beep will be heard (if speaker is configured On) upon power-up.

Key	Action
FN	To Main screen
DN	To Main screen
UP	N/A

Display

Line 1 TSUR-400	Product Model Number
Line 2 S/N	Unit Serial Number
Line 3 Ver x.xx	Software Version
Line 4 yyyy.mm.dd	Software revision date

Main Screen

Three seconds after the above depicted Power Up screen, the display changes to the Main screen which displays the current date and time, number of stored messages, selected <u>group</u> or **all** ID codes, data bytes **split** or decimal, and diagnostics (**dg**) on or off. Changes or modifications to these parameters are initiated through menu screens.

Display Icons

A number of icons are used to depict various modes of receiver operation.

   a) Cursor position is indicated by alternating the character of the line selected from a black character on white background to a solid black block.
   b) An antenna icon flashes on the left side of the screen signifying that the receiver is operating and ready to receive messages.
   c) Next to the antenna icon is a series of increasing length vertical lines which depict received signal strength when a signal is present.
   d) In the middle of the screen an envelope is shown when there are received messages that have not been reviewed. After the user reviews all of the messages this icon is turned off.
   e) A telephone handset icon is turned on when the Audio mode is selected.

f) When the Beep mode is turned off a speaker with a slash through it appears just to the left of the battery display.
g) At the right top of the screen a battery icon will be displayed with capacity shown as three dots within the outline of the battery. As battery capacity is reduced through use, the three dots will become two dots then a single dot. The unit should be re-charged or the batteries replaced when the display indicates 0 dots. For additional information on the battery please refer to Appendix B.

The reception modes displayed are All or Selected ID codes, split or decimal data display and diagnostic mode ON or OFF.

Key	Action
FN	Displays Menu screen
DN	Displays Message screen
UP	Displays Power-up/Splash screen

Display

Line 1 Telonics Inc *Line 2* yyyy.mm.dd *Line 3* xx:xx #mxx *Line 4* all split dg

Date
24 hour time format / Number of stored messages
Displayed as configured

Message Screen

When Update mode is ON the Message screen is accessed automatically whenever a new message is received or manually by pressing the DN key at the Main screen.   The information displayed is the date and time of the most recent message, current message number in list, the ID Code of the message, the frequency on which the message was received, and the first data byte received. The latest information is displayed until acknowledged by pressing the FN, DN, or UP key or when it is replaced by reception of a new message. The antenna icon continues to flash on this screen and the envelope icon appears, to alert the user of a new message until acknowledged. The beep tone will activate as configured each time a new message is received.   Once all received messages are acknowledged by depressing the DN or UP key, the display returns to the Main screen and the envelope icon is extinguished. As long as there are previously received messages in the stored message memory they may be viewed by pressing the DN key. Messages are stored in a "circular" buffer memory. When the maximum number of messages has been received, receipt of the next message will cause the oldest message to be overwritten.

Key	Action
FN	Acknowledges messages and displays Main screen
DN	Review MSG/Scroll Dn – to Main screen at bottom, also acknowledges messages
UP	Review MSG/Scroll Up – to Main screen at top

Display 1

Line 1 15:46:22 #xx *Line 2* ? ID xxxxxx *Line 3* 401.650 ddd *Line 4* ddd ddd ddd	Message Time of Reception (24 hour format) and message number. Decimal Argos ID Code. Frequency in MHz of received message / First Data Byte. Next three data bytes.

Additional screens of data are viewed by using the DN key. When the last data screen of a message is displayed, additional pressing of the DN key will allow the user to display the previous message. Additional pressing of the DN key will then review the data screens of the previous message followed by the next previous message. By pressing the DN key all stored messages may be reviewed by the user. By pressing the UP key the user will move back up through the displayed messages, displaying only the first screen of multi-screen messages. Message review is scrolled using the DN and UP keys, one message at a time with the most recent message displayed first. The scroll speed increases when the UP or Dn key is depressed for more than 2 seconds. When the last message is scrolled, a message indicating end of messages is displayed.

The screen may be exited by three methods.
1) Pressing the FN key returns to the Main Screen at anytime in Message screen.
2) Pressing the UP key until the newest message is displayed then returns to Main Screen.
3) From the "End of MSGS" screen, pressing the DN key again will return to the Main Screen.

When Update mode is off and the user is looking at data screens other than the first received message screen, and a new message is received, the receiver will "beep" indicating a new message was received, but the display will remain unchanged. The user must depress the FN key to leave the current data display.

Key	Action
FN	Displays Main screen
DN	Scrolls to next older message – exits to Main Screen when pressed displaying End of MSGS screen
UP	Scrolls to next newer message – exits to Main Screen when pressed displaying newest message

Display 2

Line 1 End of MSGS	No additional stored messages
Line 2	
Line 3 Press FN or	Press either FN or DN key to return to main screen
Line 4 DN to exit	Press UP to go back through stored messages

(Also, see Message Export and Message Delete on Menu Level I Screen.)

Menu Level 1 Screen

From the Main Screen, pressing the FN key will display the Menu Level 1 screen. This screen allows the user to adjust operational parameters of the TSUR-400 receiver. These operational parameters include volume of the audio, Diagnostics mode, Data split mode, Update mode, Beep mode, RF Power Mode, Edit 28 ID's Table, Audio mode, ID filter, message export, stored message delete and access to Setup Menu Level 2. The UP and DN keys are used to highlight the desired feature. (Highlighting is accomplished by alternating the first character of the line selected from black character on white background with a black block.) Pressing the FN key allows the selected function to be modified. Exiting back to the Main Screen is accomplished by selecting EXIT using the UP or DN keys and pressing the FN key or momentarily pressing the PWR key.

Key	Action
FN	Displays Main Menu Level 1 screen; selects the highlighted feature
DN	Scrolls to next item on the menu screen
UP	Scrolls to previous item on the menu screen
PWR	Momentarily pressing exits to Main Screen

Note that this menu wraps around, going from Exit to Setup when scrolling UP, and from Setup to Exit when scrolling DN.

Line 1 Exit	
Line 2 Volume #	First four items displayed. Highlight will initially be on the Volume selection. Highlight is always on Line 2.
Line 3 Diag	
Line 4 Split	
Update	
Beep	
Audio	Additional items to be displayed using UP or DN keys
ID Fltr	
RF Pwr	
Msg Export	
Msg Delete	
Setup (Menu Level 2 Entry)	

A. Volume

The Volume allows for adjustment of the beep and/or audio. When this item is highlighted and the FN key pressed, the following display appears:

Line 1 Volume #
Line 2 UP Increase
Line 3 DN Decrease
Line 4 FN to Set

Volume selection is accomplished by using the UP/DN keys to select the desired volume. Choices are 0 to 9. 0 is the quietest and 9 is the loudest setting. After each adjustment the receiver will provide a short beep representative of the volume level selected if beep is enabled. Note: The values do not wrap around from 9 to 0 or 0 to 9. When the desired volume is reached, pressing the FN key will program this value in the receiver and return the user to the Main Screen.

B. Diagnostics

The Diagnostics mode provides the display of diagnostic information. This information is contained in additional screens that are appended to the end of the standard display screens. Information contained in the diagnostics is as follows:

1) Carrier time (measured time of the 160 ms pure carrier transmitted at the beginning of the transmission.)
2) Frequency of the received transmission in Megahertz.
3) Power measurement of the received signal in db in the receive mode and dbm or watts when in the power measure mode. The power in dbm or watts is only meaningful when the PTT unit is directly connected/wired to the TSUR-400. Be sure to put the TSUR-400 in **RF Pwr** mode before directly connecting it to a transmitter. You may damage the TSUR-400 if you directly connect a transmitter while it is in receive mode.
4) Comparison of the number of data groups the message should contain with the number actually received.
5) HEX display of the first seven data bytes transmitted. (These bytes contain sync, format, initialization, data groups and parity information.) When this feature is highlighted and the FN key pressed, the Diagnostics are toggled between 'ON" or "OFF". When Diagnostics is selected "DG" appears on the right side of the bottom line on the main screen.

C. Split

Please see Split Setup under the Menu Level 2 setup for additional explanations. The "Split" feature is selected through this operational parameter. When the FN key is pressed, the "split" function is toggled between "ON" and "OFF". When "split" is programmed "ON" the main screen Level 1 will display "SPLIT" in the middle of the bottom line.

D. Update

The "Update" feature is selected through this operational parameter. When the FN key is pressed, the "update" function is toggled between "ON" and "OFF". When "update" is "ON", the receiver will update the main screen with the new data being received. If the user is viewing previous received messages with "update ON" and a new message is received, the screen will change to display the new received message. If update is "OFF" then the main screen is not updated when a new message is received, and if the user is viewing previous received messages the screen will continue to display the pages being viewed.

E. Beep

The "Beep" feature is selected through this operational parameter. When the FN key is pressed, the Beep is toggled between "ON" and "OFF". If "ON" is selected/displayed the receiver will provide a "Beep" every time a new message is received.   If OFF is selected/displayed the speaker is muted and no "Beep" will be heard when a message is received. If OFF is selected, the speaker icon with a slash through it will appear on the display. This selection only turns the Beep ON or OFF. Volume of the tone is adjusted in the volume screen defined above, and the type of "beep" is selected in the Beep Tone menu item located in Setup Menu Level 2. Headphone output is not affected. When using headphones, you will receive beep tone regardless of "Beep" being ON or OFF.

F. Audio

Audio is actuated by selecting this feature and pressing the FN key. Every time the FN key is pressed, Audio is toggled between either "ON" or "OFF". If "ON" is selected, a telephone handset icon appears on the display and the receiver will provide the received audio signal to the speaker. When an Argos message is received the user will hear a "raspy tearing sound" for the duration of the received message. This feature must be set using the squelch adjustment located under Setup Menu Level 2 "Squelch".

G. Id Fltr

The "Id Fltr" feature is selected through this operational parameter. When the FN key is pressed, the "Id Fltr" function is toggled between "On" and "Off". When "Id Fltr" is "Off", the receiver will display information every time a new message is received for all ID's. When Id Fltr is "Off", "All" is displayed on the left side of the bottom line of the display. When "Id Fltr" is "On", the receiver will display information only when a new message is received for an ID that is in the GRouP of programmed ID's under "Edit Id Fltr". In this mode "GRP" is displayed on the left side of the bottom line of the display. For information on "Edit Id Fltr" please see the section under Menu Level 2, page 12 of this manual.

H. RF Pwr

The "RF Pwr" feature is selected through this operational parameter. When the FN key is pressed, the RF Pwr function is toggled between "ON" and "OFF". When "RF Pwr" is "ON" the receiver is in the mode to have the output of the transmitter of interest connected via cable, directly into the antenna connector on the top of the TSUR-400 case. This will allow the receiver to measure the output power of the transmitter. Note that this feature is limited to transmitters of one watt or less, output power. When "RF Pwr" is "OFF", the receiver has its own antenna installed and is ready to receive signals that are transmitted through the air to it. It will display a power reading, however this is a relative number and dramatically influenced by a variety of external factors such as distance from the transmitter, interfering objects, etc.
Be sure to set "**RF Pwr**" to "ON" **before** directly connecting a transmitter. Be sure to disconnect the transmitter before setting "RF Pwr" to "Off". You may damage the TSUR-400 if it is directly connected to a transmitter while "Rf Pwr" is "Off".

I. Msg Export

Message Export (Msg Export) is used to send stored messages to an external device such as a printer or computer. Msg Export is accessed by selecting this feature and pressing the FN key. The following display appears:

Line 1 xxx Messages
Line 2 xxx Selected
Line 3 UP/DN Select
Line 4 FN to Begin

Total number of messages currently stored in receiver is displayed on line 1.
Line 2 displays the number of messages selected to be exported. Exported messages always start with the most recent message and go back in time from that point.

The receiver stores the last 99 messages received in non-volatile memory. After connecting the receiver via the AUX connector located on the top of the receiver to the desired device (printer or computer), the user selects the number of messages to download using the UP/DN keys. Pressing and holding the UP/DN key longer than 2 seconds will result in the number selected rolling at an increased speed. After the quantity to be exported is selected, the FN key is pressed to begin the process. Press the FN key to return to the Main Screen.

When exporting messages the following parameters define how the information is sent:

RS-232
9600 Baud
8 Bits
No Parity
1 Stop Bit

See Comm Port Data Description for a description of the information exported.

J. Msg Delete
Message Delete (Msg Delete) is used to clear the receiver's memory of previously received messages. This feature is accessed by selecting "Msg Delete" and pressing the FN key. The following display appears:

Line 1 Msg Delete
Line 2 XXXX
Line 3 UP/DN Select
Line 4 FN Accepts

The three choices are to delete "ALL" stored messages, "NONE" or only the "LAST" message received.

Following selection, pressing the FN key will execute the command and return the user to the Main Screen.

K. Setup
The Setup selection provides the path to the next menu level. This is accomplished by highlighting "Setup" and pressing the FN key. The next screen appearing will be the Menu Level 2 Screen.

Setup (Menu Level 2 Screen)

This screen allows the user to adjust additional parameters of the TSUR-400 receiver.

At this screen the UP and DN keys are used to highlight the desired feature. Pressing the FN key allows for the selected function to be modified. Exiting back to the Main Screen is accomplished by selecting EXIT using the UP or DN keys pressing the FN key or pressing the P3 key.

Key	Action
FN	Selects the highlighted feature
DN	Scrolls to next item on the menu screen
UP	Scrolls to previous item on the menu screen

Display 1: Note that this menu wraps around going from Exit to PC Connect when scrolling UP and from PC Connect to Exit when scrolling DN.

Line 1 Exit
Line 2 28bit Id Tbl
Line 3 Edit Id Fltr
Line 4 Split setup

Beep Tone
Lite On Time
Set Time
Set Date
SW Closure
Squelch
Fact Default
RF Pwr Dsply
PC connect

First four items displayed. Highlight will initially be on the "Beep Tone". Highlight will always be on Line 2.

Additional items to be displayed using UP or DN key

The configuration/setup parameters include the following:

A. 28bit Id Tbl
The 28bit Id Tbl's function allows the user to input the necessary information for the receiver to correctly decode the assigned decimal Argos ID codes. The user must input the Argos provided decimal Argos ID and HEX Argos ID for each PTT to be received. If this is not done the receiver will decode the old 20 bit decimal Argos ID's correctly but will decode the "new" 28 bit decimal Argos ID's incorrectly. 28bit Id Tbl is selected by highlighting the feature and pressing the FN key. The following display appears:

Line 1 28bit Id Tbl
Line 2 Exit
Line 3 UP/DN Select
Line 4 FN Advances

Choices for line 2 are "Exit", "Erase All" or "Edit or Add"
If "Exit" is selected and the FN key pressed, the unit returns to Menu Level 2. If "Erase All" is selected and the FN key pressed then all data entered into the Table is erased and the unit returns to Menu Level 2.

If "Edit or Add" is selected and the FN key pressed the following is displayed:

```
Line 1  ID#nn xxxxxx
Line 2  Hex xxxxxxxx
Line 3  UP/DN Select
Line 4  FN Advances
```

When this screen is entered, the cursor will be flashing on the "nn" field which represents which of the possible 00-99 Argos ID's is to be edited. The UP and DN keys are used to select which of the 99 possible ID places is to be edited. After selection, pressing the FN key will advance the highlight to the first "x" position. This position is for the first number of the Argos assigned ID number. (Leading "0" must be entered.) The UP and DN keys are used to change this number between 0 and 9. Pressing the FN key will advance the cursor to the next "x" position. Continue in this manner until the decimal Argos ID number is input. Pressing the FN key will take the cursor to the first "x" of the Hex line. The Hex ID Code as assigned by Argos is input into the HEX fields using the UP and DN keys to change the number between 0 and F. The FN key is used to advance to the next position. After the last position is input, pressing the FN key will return the user to the "Edit 28 ID's" position of the Menu Level 1 screen. The same steps are followed to input additional ID codes (assigning them subsequent "nn" ID place numbers) or "Exit" is selected to return to Menu Level 2.

B. Edit Id Fltr

The ID Filter allows the user to select whether the receiver should receive and display all incoming messages or just selected messages (maximum of 9). "Edit Id Fltr" is selected by highlighting the feature and pressing the FN key. The following display appears:

```
Line 1  Edit Id Fltr
Line 2  XXX
Line 3  UP/DN Toggle
Line 4   FN to Set
```

Choices are Exit, Erase All, or Edit or Add.

If the user selects "Exit" it takes you back to the Main Level 2 screen.
If the user selects "Erase All", it erases all Id's from the filter table and returns you to the main screen.
If the user selects "Edit or Add", then it takes you to the following Edit Id TaBLe screen:

```
Line 1  ID #x
Line 2  xxxxxx
Line 3 UP/DN Change
Line 4  FN Advances
```

ID#x is which ID code is being edited.
Xxxxxx is the decimal Argos ID Code.
UP/DN keys advance the highlighted number between 0 and 9
FN Advances to the next position.

The highlight starts with the "x" immediately following the ID#. Using the UP and DN keys select which of 9 possible ID's will be filtered for. Pressing the FN key advances the highlight to the first "x" of the second line. This line is where the ID Code of interest is entered using the UP and DN keys to adjust the digit and the FN key to advance to the next place. The ID Codes that are entered define which numbers the receiver will receive and process. For example if ID#1 is 2345 and ID#2 is 34567, then only transmissions with one of these ID numbers will be displayed. All other ID codes will be received and ignored. After advancing to the final x, an additional press of the FN key accepts the numbers and returns to the "Edit Id Fltr" page. Select the "Exit" choice and press the FN key to return to the Menu Level 2 screen.

C. Split Setup
Split Setup allows for selective splitting of the data received into groups of a user selected number of bits. When this feature is selected by pressing the FN key, the following screen is displayed:

Line 1 Bit Splt xxx *Line 2* xx bits long *Line 3* UP/DN Select *Line 4* FN to Set

Bit Split xxx indicates which group is being defined.
"xx" is the number of bits that comprise this group.

This feature allows the user to determine how data transmitted from the transmitter is displayed. Normally the data is displayed with each byte of data represented by one decimal number from 000 to 255.   Many times the sensor data contained in the data stream is not limited to 1 byte. For example a transmitter may transmit 4 bytes (32 bits) of data which are comprised of 2 bits of low battery, 6 bits of zero's, 8 bits of temperature, 6 bits of 1 minute activity, and 10 bits of long term activity. The Split setup allows the user to specify that the first group of numbers displayed will comprise 2 bits, the second group displayed comprises 6 bits, the third group displayed comprises 8 bits, the fourth group comprises 6 bits, and the fifth group comprises 10 bits. The receiver will split the data into these groups and display them as a decimal number with one group per line in the display. After the final number is entered, pressing FN returns to "Split setup" of Menu Level 2.

D. Beep Tone
Beep Tone allows for choice of what sound is generated when a beep occurs. When this feature is selected and the FN key pressed, the following appears:

Line 1 Beep Tone *Line 2* tone x *Line 3* UP/DN Select *Line 4* FN to Set

Choices are 1 to 9 with each number corresponding to a different tone. Each time a new number is selected by pressing the UP or DN key a short sample of the selected tone is generated. This only selects the type of tone. The volume of the tone is adjusted under Volume in Main Menu Level 1. After the desired tone is selected, pressing the FN key accepts the selection and returns to the Setup Menu Level 2 display screen. The tones are audible only if the speaker is enabled. Tones are always audible over the headphones.

E. Lite On Time
Lite On Time selects the amount of time that the backlight stays on when it is activated. When this feature is selected by pressing the FN key, the following display appears:

Line 1 Lite On Time *Line 2* xxx Seconds *Line 3* UP/DN Select *Line 4* FN to Set

 Choices are OFF, 1 thru 99 seconds, and ON. If OFF is selected, the backlight never comes on. 1 thru 99 seconds is the amount of time the light stays on when activated. After this time expires, the light turns OFF. If ON is selected, the backlight stays on continuously when activated by the PWR (P3) switch. See PWR (P3) switch operation at the beginning of this document for instructions on turning the backlight on/off. After the time is selected, pressing the FN key accepts the selection and returns to the Setup Menu Level 2 display screen. Battery life is dramatically reduced when the backlight is ON. Set this value to a minimum to maximize battery life.

F. Set Time
Set Time allows the user to set the current time in the receiver. All time is entered in 24 hour format. When this feature is selected by pressing the FN key, the following display appears:

Line 1 Set Time
Line 2 HH:MM
Line 3 UP/DN Select
Line 4 FN Advances

When this screen is displayed, the highlight will be on the hours digits (HH). Pressing the UP/DN keys changes the selection between 00 to 23. (Holding down either key will allow the numbers to increment/decrement at an increasing rate.)   When the correct number is displayed, pressing the FN key advances the highlight to the minutes selection (MM). Pressing the UP/DN keys changes the selection between 00 to 59. (Holding down either key will allow the numbers to increment or decrement at an increasing rate.)   When the FN key is pressed following the selection in minutes, the receiver is programmed with the time shown and the screen reverts back to the Setup Menu Level 2 display screen.

G. Set Date
Set Date allows the user to set the current date in the receiver. Dates are in the following format: yyyy.mm.dd. When this feature is selected by pressing the FN key, the following display appears:

Line 1 Set Date
Line 2 yyyy.mm.dd
Line 3 UP/DN Select
Line 4 FN Advances

When this screen is displayed, the highlight will be on the year position (yyyy). Pressing the UP/DN keys changes the selection between 2000 and 2050. (Holding down either key will allow the numbers to increment or decrement at an increasing rate.). When the correct number is displayed the FN key advances the highlight to the month selection (mm). Selection between 01 and 12 is accomplished using the UP/DN keys. When the correct number is displayed the FN key advances the highlight to the day selection (dd). Selection between 01 and 31 is accomplished using the UP/DN keys. When the FN key is pressed following the selection of day, the receiver is programmed with that date and the screen reverts back to the Setup Menu Level 2 display screen.

H. Sw Closure
Switch Closure (Sw Closure) allows for programming the amount of time the output switch is held closed following the receipt of a new message. This switch closure is a transistor "open" drain switch and is brought out of the receiver through the auxiliary connector located on the top of the receiver. When this feature is selected by pressing the FN key, the following display appears:

Line 1 Sw Closure
Line 2 xx.x Seconds
Line 3 UP/DN Select
Line 4 FN Set

When this screen is displayed pressing the UP/DN keys changes the selection between 00.0 and 99.9 seconds in 0.1 second increments. (Holding down either key will allow the numbers to increment or decrement at an increasing rate.) When the desired number is displayed, pressing the FN key programs the receiver and the screen reverts back to the Setup Menu Level 2 display screen. This feature is sometimes used to trigger an external device such as a camera or alarm when a message is received.

I. Squelch
Squelch allows the user to adjust the squelch. The operation of the squelch is similar to standard narrow band FM receivers. When this feature is selected by pressing the FN key, the following display appears:

<table>
<tr><td>*Line 1* Squelch
Line 2 x
Line 3 UP/DN Select
Line 4 FN to Set</td></tr>
</table>

When this screen is displayed, pressing the UP/DN keys changes the selection between 0 and 9. (Holding down either key will allow the numbers to increment or decrement at an increasing rate.) Changing the numbers in the direction of 0 "tightens" the squelch while changing in the direction of 9 "opens" the squelch. Proper adjustment is accomplished by tightening the squelch until "noise" is heard, then slowly backing off until the "noise" stops and must be accomplished with the audio enabled. This adjustment will have to be performed any time there is a change in background noise being received. When the desired setting is accomplished, pressing the FN key programs the receiver and the screen reverts back to the Setup Menu Level 2 display screen.

J. Fact Default
Warning: Implementing this function will erase ID codes the user may have programmed into the TSUR-400.

This feature is used to return the unit to the factory defaults that were originally programmed into the unit. This feature returns the following items to the following values:

Parameter	Value
Volume level	5
Squelch level	7
Beep Tone Select	1
LCD backlight time	15 seconds
Switch close time	1.0 seconds
Flags:	
Beep Mode	ON
Split Bit Mode	Off
Diag Mode	Off
ID Filter	Off
Update Mode	ON
Audio	Off
RF Pwr Mode	Off
28-bit ID list	All fields cleared
ID filter list	All fields cleared
Split bit fields	All fields cleared

This feature is useful to quickly return the unit to the configuration it left the factory.

K. RF Pwr Dsply
This feature toggles between "dbm" and "Watts". This allows the selection of what units are displayed when measuring transmitter power. This only adjusts the units. The function of RF Pwr measurement is toggled "On" or "Off" in Menu Level 1.

L. PC Connect

PC Connect puts the receiver in a serial communication mode that allows a PC with appropriate software to perform several maintenance functions. These functions include the reading/programming of user parameters and reading/clearing of stored messages.

Note: When the receiver is in this mode, the RF section is disabled, precluding reception of messages.

When this feature is selected, the message "PC Connect / In Process / FN to exit" is displayed. To exit PC Connect mode and return the receiver to normal service, press the FN (Po) key.

Appendix A: Message Export Description

This describes the format of the message being exported from the receiver through the connector located on the top of the receiver to another device such as a serial printer or a computer. There are four choices: Normal Mode, Normal Mode with Split Bits, Diagnostic Mode, and Diagnostic Mode with Split Bits. All Formats are in the COMMA Delimited form. If you intend to use Telonics Data Converter (TDC) to log or convert your messages, do not enable Split Bits. TDC supports only a) Normal Mode or c) Diagnostics Mode.

a) Normal Mode.

"Comma delimited" field information as follows
<LF>yyyy,MM,dd,hh,mm,ss,(?)iiiiii,fff.fff,ddd,ddd…eee..<CR>

where: <LF> = ASCII Line Feed code (0x0A)
   y = year (decimal, 2001, 2002, etc.)
   M = month (decimal, 1-12)
   d = day of month (decimal, 1-31)
   h = hour (decimal, 0 - 23)
   m = minute (decimal, 0 - 59)
   s = second (decimal, 0 - 59)
   ? = Output error if detected
   i = unit ID (decimal, 0 - 999999)
   f = Frequency (MHz)
  ddd = data bytes (decimal, 0 - 255)
  eeee = error messages
  <CR> = ASCII Carriage Return code (0x0D)

b) Normal Mode with Split Bits

<LF>yyyy,MM,dd,hh,mm,ss,(?)iiiiii,fff.fff,ddd,ddd…eee..<CR>

where: <LF> = ASCII Line Feed code (0x0A)
   y = year (decimal, 2001, 2002, etc.)
   M = month (decimal, 1-12)
   d = day of month (decimal, 1-31)
   h = hour (decimal, 0 - 23)
   m = minute (decimal, 0 - 59)
   s = second (decimal, 0 - 59)
   ? = Outputted if error detected
   i = unit ID (decimal, 0 - 999999)
   f = Frequency (MHz)
  ddd = data bytes (decimal,) data broken up as directed in split bit screen.
  eee = error message
  <CR> = ASCII Carriage Return code (0x0D)

Appendix A: Message Export Description

      c) Diagnostics Mode:

"COMMA delimited" field information as follows:

<LF>yyyy,MM,dd,hh,mm,ss,(?)iiiiii,fff.fff,CCC,pp.pp,ff,ff,ff,ff,ff,ff,ff,dd,dd …eeee…<CR>

where: <LF> = ASCII Line Feed code (0x0A)
       y = year (decimal, 2001, 2002, etc.)
      M = month (decimal, 1-12)
      d = day of month (decimal, 1-31)
      h = hour (decimal, 0 - 23)
      m = minute (decimal, 0 - 59)
      s = second (decimal, 0 - 59)
      ? = Outputted if error detected
      i = unit ID (decimal, 0 - 999999)
      f = Frequency (MHz)
      C = Carrier time (decimal, 0 – 999 ms)
      p = Power (watts or dB) (decimal, 0 – 99.9)
      ff = First seven data bytes transmitted (HEX, 00 – FF)*
      ddd = data bytes (HEX, 00 - FF)
      eeee = error messages**(Alpha letters)
      <CR> = ASCII Carriage Return code (0x0D)

      d) Diagnostics Mode with Split Bits:

"COMMA delimited" field information as follows:

<LF>yyyy,MM,dd,hh,mm,ss,(?)iiiiii,fff.fff,CCC,pp.pp,ff,ff,ff,ff,ff,ff,ff,dd,dd …eeee…<CR>

where: <LF> = ASCII Line Feed code (0x0A)
      y = year (decimal, 2001, 2002, etc.)
      M = month (decimal, 1-12)
      d = day of month (decimal, 1-31)
      h = hour (decimal, 0 - 23)
      m = minute (decimal, 0 - 59)
      s = second (decimal, 0 - 59)
      ? = Outputted if error detected
      i = unit ID (decimal, 0 - 999999)
      f = Frequency (MHz)
      C = Carrier time (decimal, 0 – 999 ms)
      p = Power (watts or dB) (decimal, 0 – 99.9)
      ff = First seven data bytes transmitted (HEX, 00 – FF)*
      ddd = data bytes (decimal) data broken up as directed in split bit screen
      eeee = error messages**(Alpha letters)
      <CR> = ASCII Carriage Return code (0x0D)

Appendix A: Message Export Description

*ff = These data bytes include the following:
15 bits of Bit sync (1111 1111 1111 111)
8 bits of Format sync (0 0010 111)
1 bit of Initialization (1)
3 bits of Number of Groups (xxx)
1 bit of Even or Odd Parity on Groups (x)

** The three error messages are as follows:
a. "**Length err**or"   This indicates that the length of the actual message received was longer or shorter than the message length indicated by the three bit message length indicator which was transmitted.

b. "**Len**gth **Pa**r**ity Err**or"   Indicates that the three bit message length parity bit had an error.

c. "**ID CRC Err**or"   Indicates one or more errors was detected in the analysis of the ID code, as a result of the use of the error correcting code, transmitted with the message. In such an event, the ID code displayed (If an ID was displayed), is highly likely to be in error and should not be believed.

SPECIFICATIONS

TSUR-400 ARGOS Uplink Receiver

ELECTRICAL

Type: PSK

Operating Frequency : 401.618 to 401.680 MHz

Receiver Sensitivity: 0.7 uV rms @ 12 dB Sinad (typ.)
Operating Voltage: 6 to 15 Vdc
Operating Current: 23 mA typical, 25mA max
                         @ 9.6 Vdc (with display light off)

Operating Temperature: -20° C to + 70° C

Power Source: NiMH pack – Standard
                     optional NiCad pack, or
                     optional AA alkaline holder-pack

External Power: 9 to 48 Vdc (with power adapter pack)

Power Measurement: 0.01 to 1 watt (0 to 30 dBm)
    For measuring power levels exceeding 1.0 watt
    (30 dBm) appropriate external attenuators are
    required.

    NOTE: Any measurement errors associated with
    external cables, connectors and attenuators, are
    additive to the error of the TSUR-400.

USER INTERFACE

4 Button Keypad

Visual Display: 4 row by 12 column backlit temperature
compensated Liquid Crystal Display (LCD)

SMA Antenna/RF power Connector, 50 ohm impedance

Mini-DIN Female Connector:
Connection to PC using TSC-5A USB cable or
legacy serial data-transfer cable (RS-232),
serial printer export, programming, headphones and N.O. FET
contact switch

Audio Alarm

MECHANICAL

Size: 5.5" x 2.3" x 1.8" (13.9 x 5.8 x 4.6 cm)

Weight: 16 oz. (450 g)

Case Construction: Injection Molded Lexan

Removable
Antenna/
RF test
input port

Interface/
programming
Port

Waterproof
Speaker Vents

Received
audio ON/OFF
(shown ON)

Antenna Icon
(indicates receiver
is active when
flashing)

Stored messages
(unreviewed)

Alarm sound
ON/OFF(muted)
(shown OFF)

Current
UTC Time

Battery status

ID code of last
PTT received

Number of
messages
in memory

07:06:51 101
ID 016078
401.651 000
000 000 000a

Frequency of
last PTT received

Long message
length indicator
(when displayed,
indicates additional
data bytes on next
screen or screens)

Data bytes from
last message
received

P0   P1   P2   P3
FN   DN   UP   PWR

Input Keys

Appendix C: Battery Charging

Battery charging is accomplished using the MasterCharger 1a provided with the receiver. Instructions for the MasterCharger la are as follows:
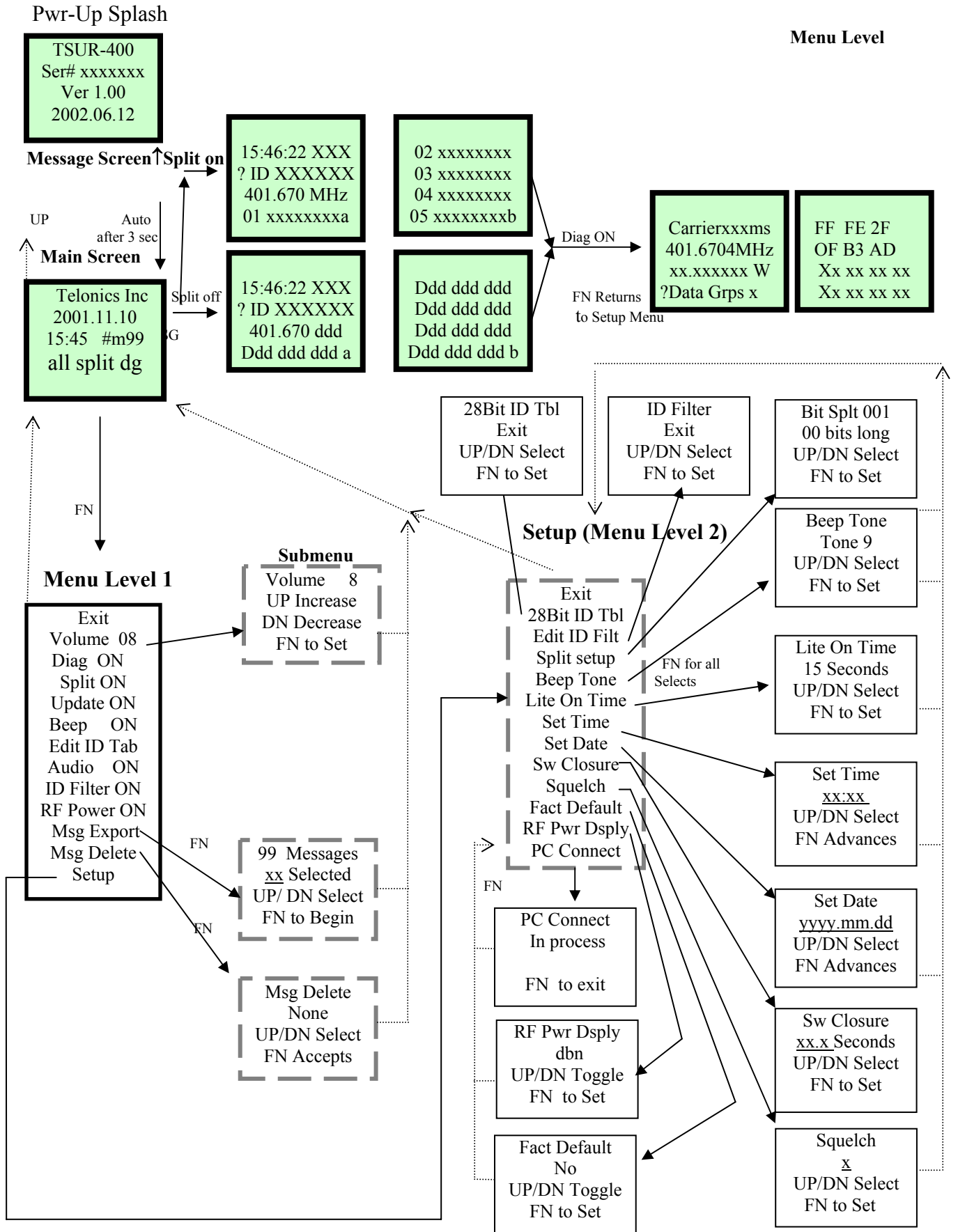
<u>OPERATING INSTRUCTIONS FOR THE MASTERCHARGER la</u>

Plug wall power source into a 110 – 120 vac wall outlet. Plug the 2.1 mm plug into the MasterCharger la. Only use supplied power source! Place the battery to be charged into the charging pocket with the contacts of the battery facing the contacts of the charger. The L.E.D. will illuminate GREEN for a moment. If the battery voltage is too low the L.E.D. will illuminate ORANGE and will remain ORANGE for two to three minutes until the charger brings the battery to the correct voltage level. It will then turn RED to indicate that the charger is in the rapid charge state. The L.E.D. will turn GREEN when the battery is ready for use and is in the trickle charge state. At this point the battery might be warm; this is normal.

After the battery has been fully charged and removed from the charger, wait 15 seconds before charging another battery. If the battery is NiCd or NiMH and new, it may be necessary to charge and use it two or three times before full capacity is realized.

WARNING: *Do not expose the charger to water.
                     *Do not place the charger near any combustible materials while
                       charging batteries.
                     *Charge batteries in well ventilated area.
                     *Radio should be OFF when charging battery.

Appendix D: TSUR-400 Menu Flow Chart

Pwr-Up Splash

```
TSUR-400
Ser# xxxxxxx
Ver 1.00
2002.06.12
```

Message Screen↑Split on

```
15:46:22 XXX
? ID XXXXXX
401.670 MHz
01 xxxxxxxxa
```

```
02 xxxxxxxx
03 xxxxxxxx
04 xxxxxxxx
05 xxxxxxxb
```

```
Carrierxxxms
401.6704MHz
xx.xxxxxx W
?Data Grps x
```

```
FF  FE 2F
OF B3 AD
Xx xx xx xx
Xx xx xx xx
```

UP   Auto
         after 3 sec

Main Screen

Diag ON

FN Returns
to Setup Menu

```
Telonics Inc
2001.11.10
15:45  #m99
all split dg
```

Split off

```
15:46:22 XXX
? ID XXXXXX
401.670 ddd
Ddd ddd ddd a
```

```
Ddd ddd ddd
Ddd ddd ddd
Ddd ddd ddd
Ddd ddd ddd b
```

```
28Bit ID Tbl
Exit
UP/DN Select
FN to Set
```

```
ID Filter
Exit
UP/DN Select
FN to Set
```

```
Bit Splt 001
00 bits long
UP/DN Select
FN to Set
```

Setup (Menu Level 2)

```
Beep Tone
Tone 9
UP/DN Select
FN to Set
```

FN

Submenu

```
Volume   8
UP Increase
DN Decrease
FN to Set
```

```
Exit
28Bit ID Tbl
Edit ID Filt
Split setup
Beep Tone
Lite On Time
Set Time
Set Date
Sw Closure
Squelch
Fact Default
RF Pwr Dsply
PC Connect
```

FN for all
Selects

```
Lite On Time
15 Seconds
UP/DN Select
FN to Set
```

Menu Level 1

```
Exit
Volume  08
Diag  ON
Split ON
Update ON
Beep   ON
Edit ID Tab
Audio   ON
ID Filter ON
RF Power ON
Msg Export
Msg Delete
Setup
```

```
Set Time
xx:xx
UP/DN Select
FN Advances
```

FN

```
99  Messages
xx Selected
UP/ DN Select
FN to Begin
```

FN

```
PC Connect
In process

FN  to exit
```

FN

```
Set Date
yyyy.mm.dd
UP/DN Select
FN Advances
```

FN

```
Msg Delete
None
UP/DN Select
FN Accepts
```

```
RF Pwr Dsply
dbn
UP/DN Toggle
FN  to Set
```

```
Sw Closure
xx.x Seconds
UP/DN Select
FN to Set
```

```
Fact Default
No
UP/DN Toggle
FN to Set
```

```
Squelch
x
UP/DN Select
FN to Set
```

Appendix E: Viewing, Saving, and Converting Received Data on Your PC

The TSUR-400 Uplink Receiver exports messages over its Mini-DIN connector. The uplink receiver automatically exports each new message when it is received and manually exports 1-99 stored messages if you use the "Msg Export" feature. To store these messages on your PC, you will need to use a TSC-5A USB Cable or a serial data transfer cable (WI007325-001) to connect your PC to the Mini-DIN connector on your TSUR-400.

The TSC-5A USB cable is typically used with Telonics Data Converter (TDC) to view, save, and convert messages on your PC. TDC contains a proprietary driver for the TSC-5A requiring no further driver installation as long as the TSC-5A is used with TDC. If, however, you wish to use the TSC-5A with programs other than TDC (e.g. HyperTerminal or other terminal emulation programs) to capture data from the TSUR-400, you may install the TSC-5A Virtual COM Port Driver, which will enable TSC-5A use with those programs. TDC and the Virtual COM Port Driver are available for download from the Telonics website.

The serial data transfer cable (WI007325-001) that Telonics previously sold will also allow you to connect a TSUR-400 uplink receiver to your PC. If your PC doesn't have an available COM port, you will need to purchase a USB-to-Serial adapter or switch to a new TSC-5A USB cable. The serial data transfer cable also works with Telonics Data Converter and terminal programs.

Using Telonics Data Converter (TDC)

TDC is available for download on the Telonics website and will save TSUR-400 messages to a text file free of charge. You will have to purchase an authorization code if you want TDC to convert uplink messages.

Using HyperTerminal or Other Terminal Applications

HyperTerminal is typically installed and available as part of WindowsXP. The instructions below describe how to configure and use HyperTerminal on Windows XP. The TSUR-400 Uplink Receiver will work with many other terminal programs that can be downloaded or purchased online. You may need to follow similar configuration steps if use another terminal program or operating system.

START MENU – PROGRAMS – ACCESSORIES – COMMUNICATIONS- and select **HYPERTERMINAL.** Other terminal programs can be used for this application if the user has a preference for a specific alternative.

Click on **HYPERTERMINAL** to start the program and proceed to configure the terminal program for the TSUR-400 uplink receiver by using the following sequence of steps.

Step 1**. Connection Description** Dialogue Box **… New Connection:** Provide a **Name** for the configuration i.e. TSUR-400. Next select and assign an appropriate **ICON**. Select **OK**

Step 2. **Connect To:** Dialogue Box: The first three option fields (**Country/Region, Area Code, Phone number**) are not used for the TSUR-400 and can remain as defaults. The fourth option field **Connect using:** This field should be filled in by picking the correct COM port on your computer -- the COM port that you have selected to attach the serial data transfer cable and TSUR-400. Finding the

Appendix E: Using Hyperterminal to View and Save Received Data

right COM port can be difficult if you are using a virtual com port (TSC-5A or USB-to-serial adapter). Select **OK.**

Step 3**. COM X Properties** Dialogue Box **Port Settings Tab**   Five option fields exist They should be filled in as follows: 9600, 8, None, 1, Hardware.

Step 4. If HyperTerminal is configured properly, the data transfer cable connected and the uplink is turned on and receiving Argos uplink messages, data will appear in the HyperTerminal window as collected. If data do not appear after transmissions are received by the uplink, recheck the selection of the COM port. Selection of the wrong COM port is a common problem. To change the COM port, select the icon for DISCONNECT. Go to PROPERTIES and change the COM port setting to the correct COM port. Use the CALL icon to reconnect and check for received data from the uplink on the next transmission.

Step 5. When you are certain the configuration is correct and you see the data transfer to the HyperTerminal window is occurring, go to the task bar and select FILE, then SAVE or SAVE AS to save the proper configuration of HyperTerminal for future use with the TSUR-400. Select **SAVE.** This selection does not save the received uplink data but saves the configuration of HyperTerminal for future use.

Step 6. To start the creation of a text file to save Argos uplink data, go to **TRANSFER** then **CAPTURE TEXT**. A dialogue box will ask you for the directory and file name where the data will be saved. After supplying the file name, data are collected from that point forward. To stop data collection, go to TRANSFER then CAPTURE TEXT then STOP and data collection to the text file will be terminated.