AnaCom Hand-Held Terminal
**(Includes Control for 1+1 Redundancy Systems)**

This document describes how to use the AnaCom Hand-Held Terminal (HHT) to monitor and control an AnaCom Transceiver (ODU) and AnaCom 1+1 Redundancy Systems. Hints on using other hand-held devices to monitor and control an ODU are provided as well.

AnaCom Hand-Held Terminal
Quick-Start Guide

Quick-Start Guide for 1+1 Redundancy Control

1. Connect AnaCom equipment as shown in AnaCom Drawing 30908 (or Drawing 30909 for systems with external HPAs.)

2. Connect the AnaCom Handheld Terminal to the center 18-pin connector on the Protection Switch. This port is labeled "SWITCH M&C."

3. Once the AnaCom Handheld Terminal is plugged in, it will automatically start its booting sequence. When it finishes, a dumb-terminal connection will exist with the equipment it is directly connected to. Press F5 (blue 2nd key then 5.) The AnaCom Handheld Terminal will then find the two ODUs automatically.

4. Now you can switch between the PS and ODUs by using F1, F2 and F3. Note that the PS is automatically assigned to F2. Once you switch to the unit for which you want to monitor or control, you can use your normal ODU or Protection Switch commands at the command line prompt shown on the display screen.

5. Pressing the Enter key (without a command) will generate a status display for the active unit.
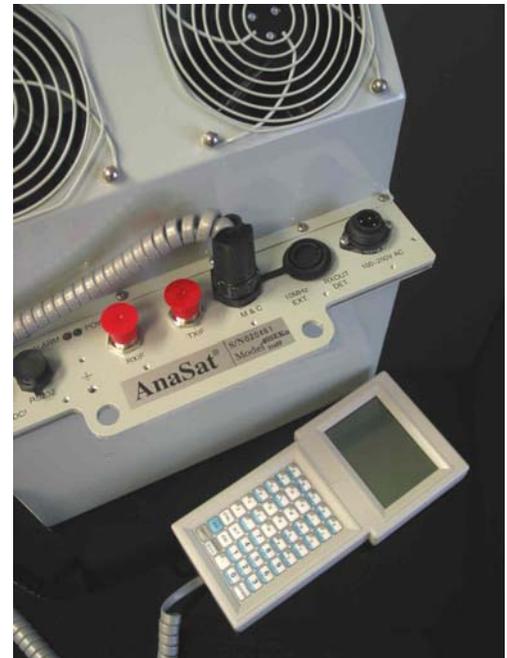
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INTRODUCTION

The AnaCom Hand-Held Terminal works nearly the same as a standard PC or lap-top running the AnaCom DT application. The software that comes loaded in the AnaSat series of VSAT transceivers is capable of being operated from any standard ASCII "dumb terminal" (or a PC running terminal-emulation software such as DT.) The AnaCom Hand-Held Terminal (HHT) is specifically designed for operation from the palm of your hand. The terminal obtains its power directly from the AnaSat transceiver or protection switch so there are no batteries to worry about. Simply plug the Hand-Held Terminal into the transceiver M&C connector and begin using it.

Note: The cable that comes with the HHT is not intended to be left outdoors permanently. When finished using the HHT, it and its connecting cable should be stored in a place protected from the environment.

Beginning with AnaCom hand-held terminals running Revision 25, the terminal is capable of connecting to a protection switch and two ODUs configured in a 1+1 setup. A 1+1 system can be wired together using an RS-232 or RS-485 cable set – it does not matter. See the section titled: **Controlling 1+1 Redundant Systems**.

KEYPAD

The AnaCom Hand-Held Terminal keypad contains all the characters found on a conventional "QWERTY" computer keyboard, but its compact size dictates they be laid out in a special, condensed form.

DISPLAY

The AnaCom Hand-Held Terminal LCD display works with the same text screens (80 x 25 characters) as a conventional PC monitor. The display's compact size limits the view to a portion of the full screen image at any given time. Special keystrokes and cursor tracking features are provided to move the viewing area within this "Virtual Screen".

NAVIGATING THE ANACOM HAND-HELD TERMINAL SCREEN

The terminal's screen is a 24 x 16 character LCD display, which shows a part of the normal PC 80 x 25 characters "Virtual Screen". Several navigation features are provided to allow you to view any part of the PC screen you desire. Most transceiver commands can be sent without having to move around in the Virtual Screen. However, to see a complete transceiver diagnostic display, the viewable "window" must be moved about as described below.

To directly control the position of the viewable window within the Virtual Screen, simply press the gray **SHIFT** key (located in the lower left-hand corner of the terminal's face) and then press one of the four designated numeric keys:

> **"4"** for moving left
> **"6"** for moving right
> **"8"** for moving up
> **"2"** for moving down

Note that these keys comprise a diamond pattern corresponding to the assigned movement directions. These keys have gray symbols (such as ">>") on them to signify which way the viewable window will be moved.

FIND CURSOR

To manually move the window to the current cursor position, wherever it may be, press the **Shift** key and then press the **"5"** key, which carries the gray **"FC"** (**F**ind **C**ursor) legend.

AUTOPAN

To have the window automatically track and follow cursor motion, press the **Shift** key then press the **"0"** key, which on the keypad carries a gray **"AP"** (**A**uto **P**an) legend. The **AP** function is turned off whenever the window is moved to an area of the screen where the cursor cannot be seen. **Shift "0"** moves the window back to the cursor and enables the Auto Pan.

CONTRAST+ / CONTRAST –

To change the screen contrast, which may be helpful in different lighting conditions, the blue key labeled 2nd, found just above the SHIFT key, then press the **X** key to increase contrast, or **Y** key to decrease contrast.

<u>KEYPAD CONVENTIONS</u>

In order to provide the functionality of a full-sized keyboard with only 45 keytops, the Hand-Held Terminal keypad must depart significantly from PC-style key assignment conventions. Below are key assignments that allow the Hand-Held Terminal keyboard to send any keystroke that a full-size keyboard is capable of generating.

The **Shift** and 2nd modifier keys have a latching and "auto-cancel" action to facilitate one-handed operation. They take effect when first pressed and remain in effect until the key to be modified is pressed or the same modifier key is pressed a second time to cancel.

SHIFT KEY

The Hand-Held Terminal **Shift** modifier key has an entirely different function from the **Shift** keys found on conventional PC keyboards -- rather than shift alphabetic keys to upper-case, it

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shifts these keys, (plus a few others,) to generate punctuation characters and special purpose outputs such as arrow keys, END, and Virtual Screen navigation functions described in the previous section. By default, **Shift** has an auto-cancel action like CTRL and ALT. **Shift**ed key definitions are shaded in gray on the key caps where they apply.

2nd KEY

The Hand-Held Terminal **2nd** modifier key is unique to this terminal and is not found on a standard PC keyboard. **2nd** shifts the numeric keys to emulate the corresponding function keys (**F1**, **F2**, ... **F10**) on conventional PC keyboards. It also shifts other keys for punctuation. In addition, **2nd** engages a number of functions with no equivalent on conventional PCs including display contrast (viewing angel) adjustments and invocation of the System Setup menu. **2nd** functions are shaded in blue.

CAPS LOCK

The Caps Lock key is engaged as the **2nd** definition of the first key in the second row ("F") of the keypad. It operates in the same manner as the equivalent key on a conventional PC keyboard, causing all alphabetic keys to generate upper case output. **Caps Lock** has no effect on non-alphabetic keys. Unlike other Hand-Held Terminal modifier keys, **Caps Lock** has a "toggle" or "push-on/push-off" action by default and stays in effect until pressed a second time. Note that ODU equipment does not care if the commands typed are upper case or lower case.

OPERATION

The Hand-Held Terminal will automatically power up and boot when connected to any AnaSat Transceiver M&C port or AnaSat Protection Switch M&C port. There is no need for any user actions during this time. The display will show the events as they occur.

INITIAL BOOT SEQUENCE

Upon plugging the unit into the M&C connector, the initial boot screen will display copyright information, and execute a RAM check of main memory. This will take a few seconds to complete.

After the RAM check is completed, the unit will momentarily display a few lines of internal set-up information that should include

> **KEYPAD SIZE 45**
> **RS232 INTERFACE**
> **LINE POWERED**

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DT - THE APPLICATIONS PROGRAM

The Hand-Held Terminal software is a special version of the AnaSat DT (Dumb Terminal) program for DOS/PC computers. After the boot sequence is completed the HHT will automatically load and run this version of DT. The display will clear itself and show:

> **Supervisor Jr. Hand Held**
> **(c) AnaCom Inc., 2003**
> **Attempting Connection**

The unit will then clear the communications channel and open the COM port. This may take several seconds. The HHT will first establish an ASCII connection to the transceiver or protection switch at 1200 baud and then raise that automatically to 9600 baud. After this has been done, a command prompt with a cursor will be shown at the bottom of the display screen:

> **COMMAND>** _

If for some reason the transceiver did not respond to the Hand-Held Terminal during this routine, the Terminal will reset itself and start over. Only in unusual circumstances will the Terminal not establish communications with the transceiver on the first try.

At this point, the Terminal is ready to accept commands from the keypad. All commands that can then be used with the transceiver are listed in the Operating Manual that accompanies the transceiver, although the basic commands are also listed in the section "Basic ODU Commands" later in this document.

CONTROLLING 1+1 REDUNDANT SYSTEMS

If the Hand-Held Terminal has been connected to a protection switch, (using the center 18-pin connector on the PS,) which itself is connected to two ODUs, then the HHT can be used to communicate with all three devices.

Initially the Terminal will be configured to communicate with only the protection switch using ASCII. It can then be switched into packet mode enabling it to communicate with all three devices by hitting the **F5** key (blue **2nd** then **5** key.) The HHT proceeds to find and connect to the 1+1 redundancy system. Alternatively the **F6** key causes the HHT to ask for explicit serial numbers of the devices to connect to. This is useful when attempting to connect to old ODU and PS equipment, which does not support the auto-connection feature.

Since the various pieces of hardware can be used at different baud rates, if equipment is being shuffled around between different sites, the HHT may need to reset all the connected equipment to the same baud rate (it uses 19.2K baud as default.)

AUTO-CONNECTION (F5 Function Key)

Assuming the Terminal is being used with ODU hardware running firmware revision 36 or later, and the protection switch hardware is running firmware revision 9 or later, then pressing the **F5**

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function key, (blue **2nd** key then the **5** key,) will prompt the Terminal to auto-connect with whatever equipment is present.

During the auto-connect process, information as to what hardware is found will be displayed on the screen.

Up to three devices will be mapped to the function keys **F1**, **F2**, and **F3**. The protection switch is always mapped to **F2**. The two ODUs are mapped respectively to **F1** and **F3**. To get status displays or send commands to any one of the connected devices, press the function key associated with that device after the connection process is complete.

At the end of the connection process, this mapping will be shown on the display, example:

```
1+1 MODE RUNNING
F1 -> ODU 001246
F2 -> PS  006470
F3 -> ODU 004011
Switching to PS Now:
```

In the above example, **F1** has been mapped to ODU with serial number 001246, **F2** mapped to the protection switch, and **F3** was mapped to ODU with serial number 004011.

A mapping of the three function keys to the three connected devices will be shown and permanently fixed at the bottom of the Terminal display, example:

```
1 001246  2  PS    3 004011
```

Important to note: when using the auto-connect feature, the ODU with the lower serial number will always be mapped to **F1**, and the ODU with the higher serial number will be mapped to **F3**.

At the end of the connection process, the cursor will be at a command prompt for the protection switch, example:

```
1+1 PS  >
```

Pressing the Enter key will causes a status display to be generated. In the case of the protection switch, this display will look like:

```
1+1 PS: CLEAR
ODU A : CLEAR
ODU B : CLEAR
TX: ODU B ONLINE, AUTO.
RX: ODU A ONLINE, MAN.
```

In the above case there are no alarms on the protection switch or either ODU. This status display also indicates which ODU is online for TX and which is online for RX, and whether these

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choices were made by the user, or can be changed by the protection switch automatically should an alarm occur. When the protection switch is the Terminal's active device, the usual commands listed in the Protection Switch Operating Manual can be typed and sent for a response.

The Terminal can be returned to conventional duty as a dumb ASCII terminal by pressing the **F5** key again. If auto-connect fails, see section below titled **MANUAL CONNECTION**.

F1, F2, F3 keys

These keys are used to switch between various connected devices. **F1** and **F3** map to the two ODUs respectively, and **F2** to the protection switch. If the active device is the ODU attached to **F1**, and the user switches to the second ODU by pressing **F3**, then the command prompt will change accordingly, example:

```
ODU 001246>
F3: Connecting to…
ODU S/N 004011

ODU 004011>
```

Note: when running in packet mode, it is not actually necessary to press the blue-colored **2nd** key before pressing the function key. Pressing the keys numbered **1**, **2**, or **3** alone will accomplish the same thing.

While attached to any one of the three possible devices, pressing the **Enter** key without typing a command will return a status display. Example for an ODU:

```
ALARM CLEAR
TXC: 200    TXF: 6320   Temp: 36.6   TXPLL:  5.70   PA1: 9
TXG: 60     TXout: 30   P12V: 13.2                  PA2: 9.23
TXin: -30   TXpk   16   P5V:   5.1   RXPLL:  5.76   PA3: 10.1
RXC: 401    RXF: 4100   N5V:  -5.5   OSLPLL: 7.23   PA4: 10
RXG: 100    RXout -11   XTAL: NORMAL                PA5: 0
TXREQ ON    TX ON AIR   last reset: 2959753         PA6: 0
```

The entire display can be viewed by panning the small HHT display to the right using the **>>** key (**Shift then 6.**) Use the **<<** key to pan the display back to the left-hand margin (**Shift then 4**.)

Note concerning ODUs running firmware Revision 46: If the HHT is attached to an ODU running firmware revision 46 or later, then the status display will default to one comprising just the first two columns of the output shown above. A larger and more comprehensive status display can be generated by typing **LD** then the **Enter Key**. The **SD** command will return output status to the smaller format.

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MANUAL CONNECTION (F6 Function Key)

If the ODU or PS devices being connected predate the firmware revisions listed above, or if there are problems connecting, then it possible to give the HHT the serial numbers of the equipment being connected. Upon pressing the **F6** function key, (blue **2**nd key then **6** key,) the HHT will ask the user for three serial numbers, and then will connect to those three devices. It will ask for the serial number for ODU-A first, the PS next, and ODU-B last. After the connection process has been completed, the unit with serial number entered for ODU-A will be mapped to **F1**, the PS mapped to **F2**, and that given for ODU-B mapped to **F3**. Note: some entries can be left blank.

SET HHT BAUD RATE (F8 Key, rarely used)

The normal baud rate used by the HHT is 19.2K baud. The F8 key can be used to drop that back to 1200 baud.

SCAN BAUD RATES (F9 Key, rarely used)

The Hand-Held Terminal assumes that all attached hardware is running at 19.2K baud. During the initialization process, the HHT will scan all baud rates automatically if it has trouble finding a piece of equipment; however, this function can also be run manually anytime if desired. If an ODU is put into the system that is running at some rate other than 19.2K, it can be recovered easily with this function key. It is necessary that a protection switch be connected to the HHT before running this function.

Restart Program (F10 Key, rarely used)

The user can restart the program with the **F10** function key. This will work in both ASCII and in packet mode. This can be used to clear the serial port if something untoward has taken place!

BASIC ODU COMMANDS

There are only a few essential operational commands for monitoring and controlling an AnaCom transceiver. Each command or query must be finished by pressing the ENTER key.

ALARMS

This command prints a list of any active alarms. More recent ODUs will accept the single letter **A** as an alternative.

TX [ON/OFF]

TX ON will turn on the transmitter. **TX OFF** will turn off the transmitter. Entering **TX** by itself will cause the transceiver to respond with the present state of the transmitter; either **ON** or **OFF**.

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TXG [value]

This will set the transmitter to the value entered, in dB. Any value can be entered. If the value is above, or below the transmitter will be set to either the maximum or minimum allowed gain. This will depend on the power level of the transceiver. The value of **INC** or **DEC** can also be accepted to increase gain or decrease gain by one minimal step. This gain setting is the over-all gain of the transmitter from the IF input to the RF output. Normally gain values are given in 1 dB increments. However, the entered value may include tenths of a dB. For example: 67.5 In this case, the transmitter will attempt to provide 67.5 dB of gain. If **TXG** is entered without a value, the transceiver will respond with the present gain value.

TXC [value]

This will set the transmitter frequency to the channel number given by the value. The center frequency of the radio can be found in the transceiver manual appendix.

TXF [value]

Use this command to set the transmitter to a specific frequency. Only integer values of frequency or channel may be entered since the transmitting synthesizer has 1 MHz step size. Entering **TXC** or **TXF** without a value will return the present channel number or frequency.

RXG [value]

This command will set the receiver gain to the value entered, in dB. Acceptable values are from 82 to 104. The value of **INC** or **DEC** can also be accepted to increase gain or decrease gain by one minimal step. Any value outside of this range will set the receive gain to either the maximum or minimum gain. If **RXG** is entered without a value, the present value of receive gain will be shown.

RXC [value]

This command will set the receive frequency to the channel number given by the value. The center frequency of the radio can be found in the transceiver manual appendix.

RXF [value]

This command is used to set the receiver to a specific frequency. Only integer values of frequency or channel may be entered since the receive synthesizer has 1 MHz step size. Entering **RXC** or **RXF** without a value will return the present channel number or frequency.

All other commands listed in the transceiver manual will function from the Hand-Held Terminal.

Note that changing the baudrate with the **BAUDRATE [value]** command will cause the Hand-Held Terminal to reset and re-initialize, therefore, it should not be used.

BASIC PROTECTION SWITCH COMMANDS

TXA, TXB

These commands tell the protection switch to choose ODU-A or ODU-B for the transmit channel. If used, these commands will also leave the TX side of the PS in manual mode.

RXA, RXB

These commands tell the protection switch to choose ODU-A or ODU-B for the receive channel. If used, these commands will also leave the RX side of the PS in manual mode.

AUTO

This command returns the protection switch to full automatic mode.

SHORTCUT KEY ASSIGNMENTS

There are a few special key assignments programmed on the HHT to make its use a bit more convenient:

Up-Arrow Key ↑ (Shift Key then B Key)
This key is a shortcut for "TXG INC<Enter>" and increases TX Gain by 0.5 dB.

Up-Arrow Key ↓ (Shift Key then D Key)
This key is a shortcut for "TXG DEC<Enter>" and decreases TX Gain by 0.5 dB.

ALT-B   (ALT Key then B Key)
This key scrolls backwards through the commands that have been entered since the HHT was last activated.

ALT-F   (ALT Key then F Key)
This key scrolls forwards through the commands that have been entered since the HHT was last activated. This is useful in conjunction with **ALT-B**.

ALT-R   (ALT Key then R Key)
This key resends the last command sent out.

ALT-H   (ALT Key then H Key)
A list of the above shortcuts and function-key mappings is displayed on the HHT screen for reference.

APPENDIX A: HHT CONNECTOR CABLE

There is only one connector on the Hand-Held Terminal, which is used for both power and the RS-232 serial port. The connector is a 6-contact RJ11 female receptacle located on the lower side of the Hand-Held Terminal near the "**.**" key. The functions assigned are listed in the following table. Pin 1 is towards the left side, or nearest the **Shift** key. Note that power is obtained from the transceiver or protection switch M&C port which is a circular 18-pin connector.

Important: The cable that comes with the HHT is not intended to be left outdoors permanently. When finished using the HHT, it and its connecting cable should be stored in a place protected from the environment.

RJ11 Pin	Circular 18-pin	Function
1	7	+Power (12 VDC)
2	-	CTS (not used)
3	-	RTS (not used)
4	17	Data IN
5	16	Data OUT
6	18	Ground
-	8	Jumper to Pin 10 (RS-485 TX+ to RX+)
-	9	Jumper to Pin 11 (RS-485 TX- to RX-)

AnaCom HHT connecting cable pin-definition Table (cable P/N 31023)

Although the RJ11 jack looks similar to a telephone cord, it is not. Only the provided coiled cord with the 18-pin circular connector attached to one end should be used. Use of any other cable will likely cause permanent damage to the Hand-Held Terminal and void the warranty.

The cable provides an RS-232 connection between the HHT and whatever device it is connected to. When the HHT is connected to a 1+1 Redundancy System, it is actually connected to an RS-232 port on the protection switch. The PS then repeats packets coming from the HHT out through its RS-485 port to the two connected ODUs. The two jumpers (pin #8 to #10 and pin #9 to #11 in the cable turn what is normally a full-duplex RS-485 connection between the ODUs and PS into a half-duplex circuit. This enables the ODUs to hear and respond to packets being sent from the PS.

APPENDIX B: SPECIAL COMMANDS FOR SMALL DISPLAYS

Listed below are commands whose output has been optimized for hand-held devices with small screens, such as the AnaCom Hand-Held Terminal or a PDA. These commands are useful when monitoring an ODU in ASCII mode.

SD

This command was introduced in **ODU firmware revision 34**. It prints a small display that will fit entirely within the AnaCom HHT screen. An example of its usage is given below:

```
COMMAND> sd
ALARM CLEAR
TXC:  10  TXF:14009.0
TXG:24.0 TXout 40
TXin -49   TXpk  40
RXC: 901 RXF:11850.0
RXG: 95  RXout -7
TX ON > _
```

Note that the cursor is left on the last status line in the display, indicating whether the transmitter is ON of OFF. The status information presented here includes the following:

1. **Alarm status**, any active alarms will be printed,
2. **TX Channel, TX Frequency** in MHz,
3. **TX Gain** in dB, **TX Output** in dBm,
4. **TX Input** in dBm. **TX Peak Output** in dBm,
5. **RX Channel, RX Frequency** in MHz,
6. **RX Gain** in dB, **RX IF Output** in dBm,
7. **PA Status, On or OFF, Command Prompt**

SDT

This command will print only Up-link or Transmit information in a 4-line display, and can be used with very small displays on terminals that have smaller screens than the AnaCom HHT or typical PDA devices. Support for this command is present in **ODU firmware revision 36** and upward. Sample output is given below:

```
TXC: 256 TXF: 6180.0
TXG: 56.0 TXout 40
TXin –30 TXpk 41
TX ON > _
```

SDR

This command will print only Down-Link or Receiver information in a 3-line display, and is supported in **ODU firmware revision 36** hand upward. Sample output is given below:

```
RXC: 256 RXF:3955.0
RXG: 95  RXout -7
TX  ON > _
```

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APPENDIX C: ANACOM DRAWING 30908

ANACOM 1 + 1 Redundancy Protection Switch Cabling Diagram