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**Cherry Bomb:
x86 Flytrap User's Manual
(U)**

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1 (U) Introduction

1.1 (U) Purpose

(U) This document is the user's manual for the "x86 Flytrap" task. It discusses concept and detailed operation of the x86 Flytrap product. The x86 Flytrap documentation also includes an unclassified "Quick Start Guide" (see section 1.3).

1.2 (U) Points of Contact

(U) Points of contact for the Cherry Bomb project include:

- XXXXX – sponsor – COTR
- XXXXX – contractor – PM
- XXXXX Y. – contractor – Lead Engineer

1.3 (U) Applicable Documents

(U) The following table shows related documents:

- Cherry Bomb Contract – (contract # 2010*0529525*000)
- Quick Start Guide for x86 FT
- Cherry Bomb: Cherry Blossom User's Manual (CDRL 12)

2 (U) Background

(S) The Cherry Blossom (CB) project (part of the Cherry Bomb program) provides a means of monitoring the internet activity of and performing software exploits on targets of interest. In particular, CB is focused on compromising *wireless* networking devices, such as wireless routers and access points (APs), to achieve these goals.

(S) A comprised (or implanted) wireless networking device is referred to as a Flytrap. A Flytrap can be used to perform man-in-the-middle attacks, such as browser redirect (for example, to Windex), copying of network traffic, proxying of network connections, etc, on targets connected to the Flytrap.

(S) CB includes the CherryTree, a command-and-control server (with a graphical user interface referred to as CherryWeb) to which Flytraps beacon and receive tasking. A remote operator uses CherryWeb to task Flytraps to direct exploits at particular targets.

(S) This document discusses concept and detailed operation of an "x86 Flytrap" wherein the Flytrap implant is ported to run on an x86 platform (e.g. a laptop computer) to meet particular use cases of interest. Section 3 discusses the concept in more detail, section 4 details operational use cases, and section 5 details operation.

(U) For more information on Cherry Blossom, see the "Cherry Bomb: Cherry Blossom User's Manual (CDRL 12)".

3 (U) Concept

(S) The "x86 Flytrap" is straightforward in concept:

(S) Run the Flytrap implant on non-suspicion arousing hardware, in this case an x86 laptop, to simulate and overpower an access point (AP). Unwitting wireless clients associate with this "x86 Flytrap" instead of the original AP, thus becoming vulnerable to typical Flytrap exploitation. The "x86 Flytrap" may use the original AP for internet access, although other sources of internet connectivity could be used as well.

(S) Figure 1 illustrates the concept.

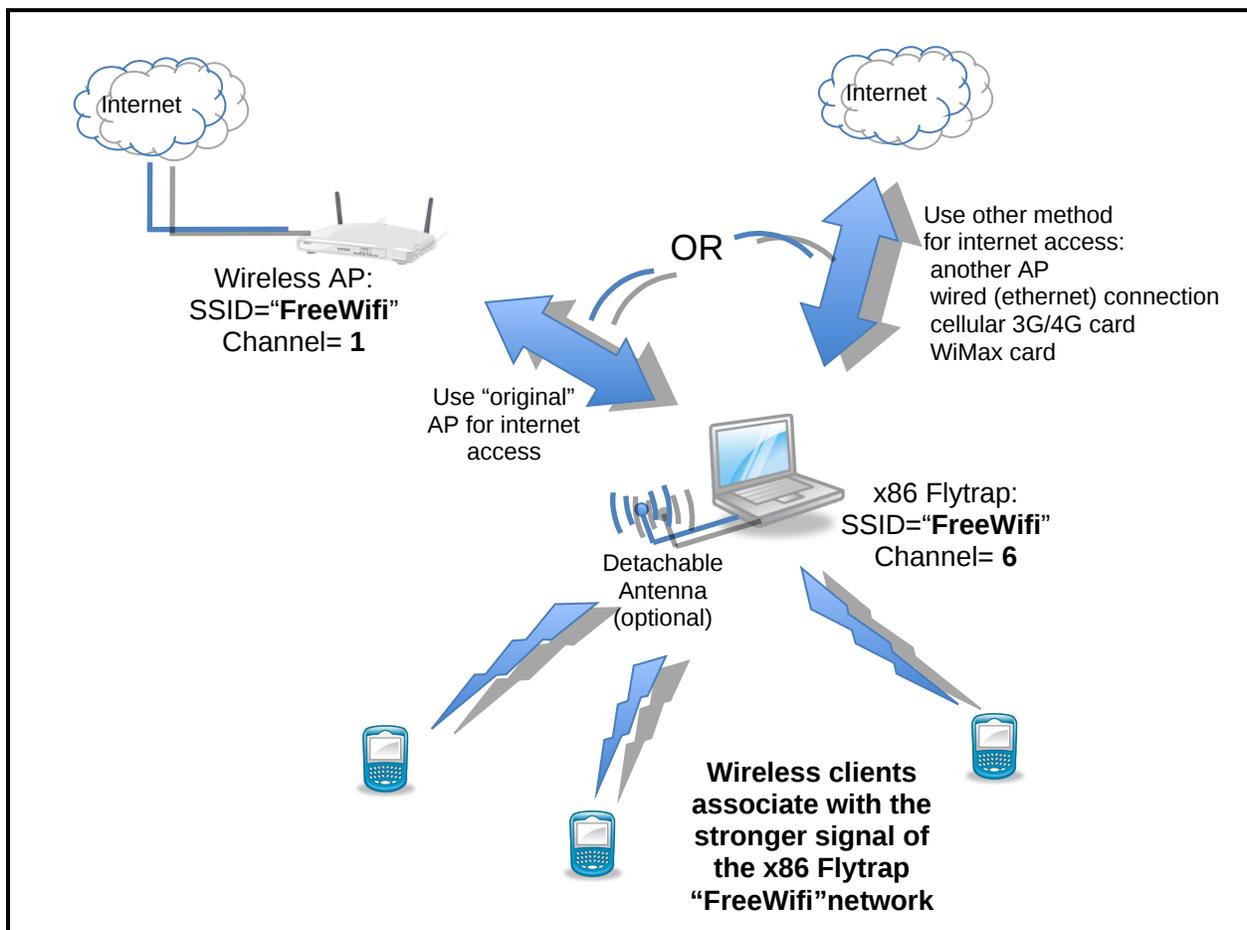


Figure 1 (S): x86 Flytrap Concept

4 (U) Use Cases

(U) This section discusses common use cases of the x86 Flytrap.

4.1 (S) Simulate an AP

(S) The primary use case of the x86 Flytrap is to simulate and overpower an AP in a region of interest. The x86 Flytrap platform minimizes suspicion because it is a COTS laptop computer with COTS 802.11 hardware. An operative locates the x86 Flytrap in close proximity to the AP. Optionally, the operative attaches an antenna to the x86 Flytrap to further overpower the AP. The operative configures the x86 Flytrap with the same SSID as the AP, but with a different channel^a. The stronger signal of the x86 Flytrap causes unwitting wireless clients to connect to the x86 Flytrap instead of the AP. While connected to the x86 Flytrap, the wireless clients are vulnerable to typical Flytrap exploitation. Figure 1 illustrates this use case.

(S) The x86 Flytrap needs a connection to the internet. In this use case, the x86 Flytrap could wirelessly connect to the original AP and use it for internet connection. The x86 Flytrap could support other internet connection options as well, including other open AP's in the area, the wired ethernet interface (through, for example, a DSL modem), a USB device (through, for example, a 3G/4G or WiMax USB stick), etc.

(U) For a detailed description of configuring and running the x86 Flytrap for this scenario, see the "Quick Start Guide for x86 FT", sections 4.1 (Wireless Repeater (Bridge)) and 4.2 (Wireless Repeater (Router)).

^a (S) In some situations it may be feasible to operate the x86 Flytrap on the same channel as the AP. Such a configuration is subject to interference and could cause significant degradation of the performance of the wireless network. However, if the x86 Flytrap can significantly overpower the AP, then interference problems may only exist in specific areas dependent on the relative locations and surrounding environment of the AP and the x86 Flytrap.

4.2 (U) Anonymous Wireless Internet Access

(S) A secondary use case of the x86 Flytrap is to offer anonymous wireless internet access, similar to a "honey pot". The x86 Flytrap platform minimizes suspicion because it is a COTS laptop computer with COTS 802.11 hardware. An operative locates the x86 Flytrap in a region of interest. Optionally, the operative attaches an antenna to the x86 Flytrap to improve the strength/range of the 802.11 signal. The operative configures the x86 Flytrap with an SSID fitting of the scenario and a channel that minimizes interference. Unwitting wireless clients connect to the x86 Flytrap and are hence vulnerable to typical Flytrap exploitation.

(S) The x86 Flytrap needs a connection to the internet. In this use case, the x86 Flytrap could use other open AP's in the area, the wired ethernet interface (through, for example, a DSL modem), a USB device (through, for example, a 3G/4G or WiMax USB stick), etc.

(U) For a detailed description of configuring and running the x86 Flytrap for this scenario, see the "Quick Start Guide for x86 FT", section 4.3 (Anonymous Open Wireless Network that Uses a Wired Network Connection for Internet Access).

5 (U) Operation

(U) For general operation in the most common scenarios, see the “Quick Start Guide x86 FT”.

5.1 (U) Prerequisites

(U) See section 2 (Prerequisites) of the “Quick Start Guide x86 FT”.

5.2 (U) Installation

(U) See section 3 (Installation) of the “Quick Start Guide x86 FT”.

5.3 (U) Common Use Cases

(U) See section 4 (Operation) of the “Quick Start Guide x86 FT”.

5.4 (U) Windows Look and Feel

(U) The x86 FT runs on Fedora Core 14 linux. However, a Windows Look and Feel package is provided with the x86 FT Software installation. See section 5 (Windows Look and Feel) of the “Quick Start Guide x86 FT”.

5.5 (U) ftlauncher.sh GUI Operation

(U) The x86 Flytrap includes a GUI for simplified configuration of the most common use cases of section 4.1. Operation is discussed in sections 4.1 (Wireless Repeater (Bridge)) and 4.2 (Wireless Repeater (Router)) of the “Quick Start Guide for x86 FT”. More detailed discussion of GUI operation is discussed herein.

(U) To run the ftlauncher.sh GUI, open a terminal (Applications -> System Tools -> Terminal), change to the proper directory, and launch the script:

```
cd ~ftuser/bin
./ftlauncher.sh
```

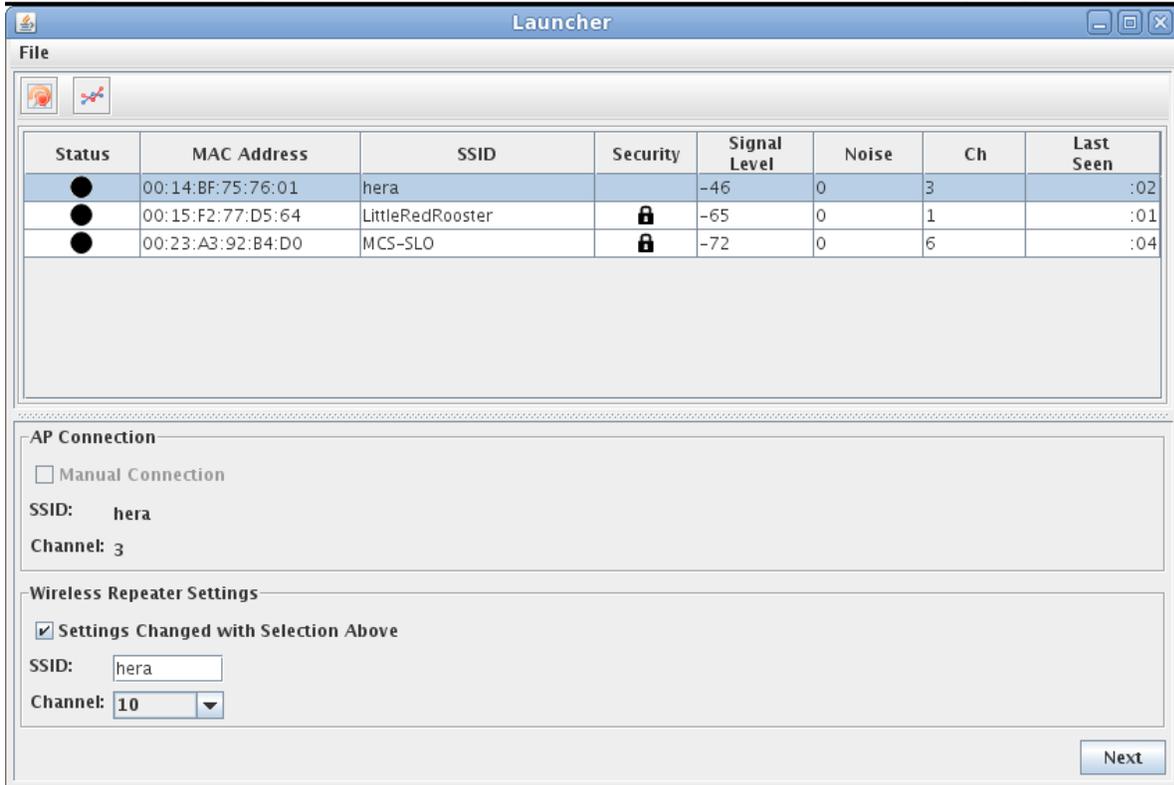
5.5.1 (U) Launcher Dialog

(U) Running `ftlauncher.sh` will display the "Launcher" dialog (shown below) with a list of wireless networks in the area (this list can take up to 10 seconds to populate). Typically, a user will select a wireless network SSID from the list at the top. The GUI then has two blocks below: the "AP Connection" block and the "Wireless Repeater Settings" block.

(U) The "AP Connection" block contains the information of the wireless network that the x86 will simulate *and* will use for its internet connection.

(U) The "Wireless Repeater Settings" block allow the user to configure the "repeater interface" – i.e., the "simulated AP" that the x86 Flytrap will create and manage.

(U) In the use case of 4.1, the user simply selects a wireless network from the list at the top (in this case "hera" has been selected). If, however, the user simply wants to use a wireless network for internet connectivity and wants to create a differently named wireless network, the user can de-select the "Setting Changed with Selection Above" checkbox and enter an arbitrary SSID. Note that the channel combo box will be auto-selected to be an off-channel from the original wireless network's channel. For example, if the original wireless network's channel is 7, the GUI will select a channel other-than 7. The user can select a different channel if desired, but typically the auto-select channel is the preferred choice. When finished, the user selects the "Next" button to move to the "Network Settings" dialog.



5.5.1 (U) Network Settings Dialog

(U) The “Network Settings” dialog (shown below) allows the user to configure the mode, beacon address, and network interfaces of the x86 Flytrap.

Network Settings

Mode

Bridge

Router

Beacon

Address:

Repeater Interface

SSID: hera

Channel: 10

Set Via DHCP

IP Address:

Netmask:

DHCP Range: to

Backhaul Interface

SSID: hera

Channel: 3

Backhaul Interface:

Set Via DHCP

IP Address:

Netmask:

Nameservers:

Gateway

Address:

(U) The user first selects the desired "Mode" – either "Bridge" or "Router". In bridge mode, the x86 FT operates as a layer 2 bridge. In router mode, the x86 FT operates as a layer 3 router.

(U) Bridge mode is more transparent to the wireless client (i.e. the x86 FT uses the original AP for DHCP), and is easier to configure. The down side is that some AP's do not support bridging. In this case, router mode must be used. Bridge mode also does not support the VPN Proxy action (but does support the VPN Link action).

(U) Router mode is more robust (i.e., does not require bridging support on the original AP). The down side is that the x86 FT is less transparent to the wireless client (i.e. the wireless client will be on a subnet that is different than the original AP's), and requires more configuration (i.e. DHCP information must be configured).

(U) In bridge mode, the user only has to set the "beacon address" to the desired value.

(S) To beacon through the Milan Point of Presence (PoP), the user enters either "www.hitmeterlive.com" or "208.178.94.148".) To beacon through the New York Point of Presence (PoP), the user enters either "www.statcounterpro.com" or "208.49.237.148".

(U) In router mode, the x86 Flytrap must host its own DHCP server (i.e., in bridge mode, the x86 Flytrap uses the original AP's DHCP service). As such, the user must also in the "Repeater Interface" block enter the IP address, netmask, and DHCP range. Suggested values (shown in the figure above) are:

IP Address = 10.127.254.1

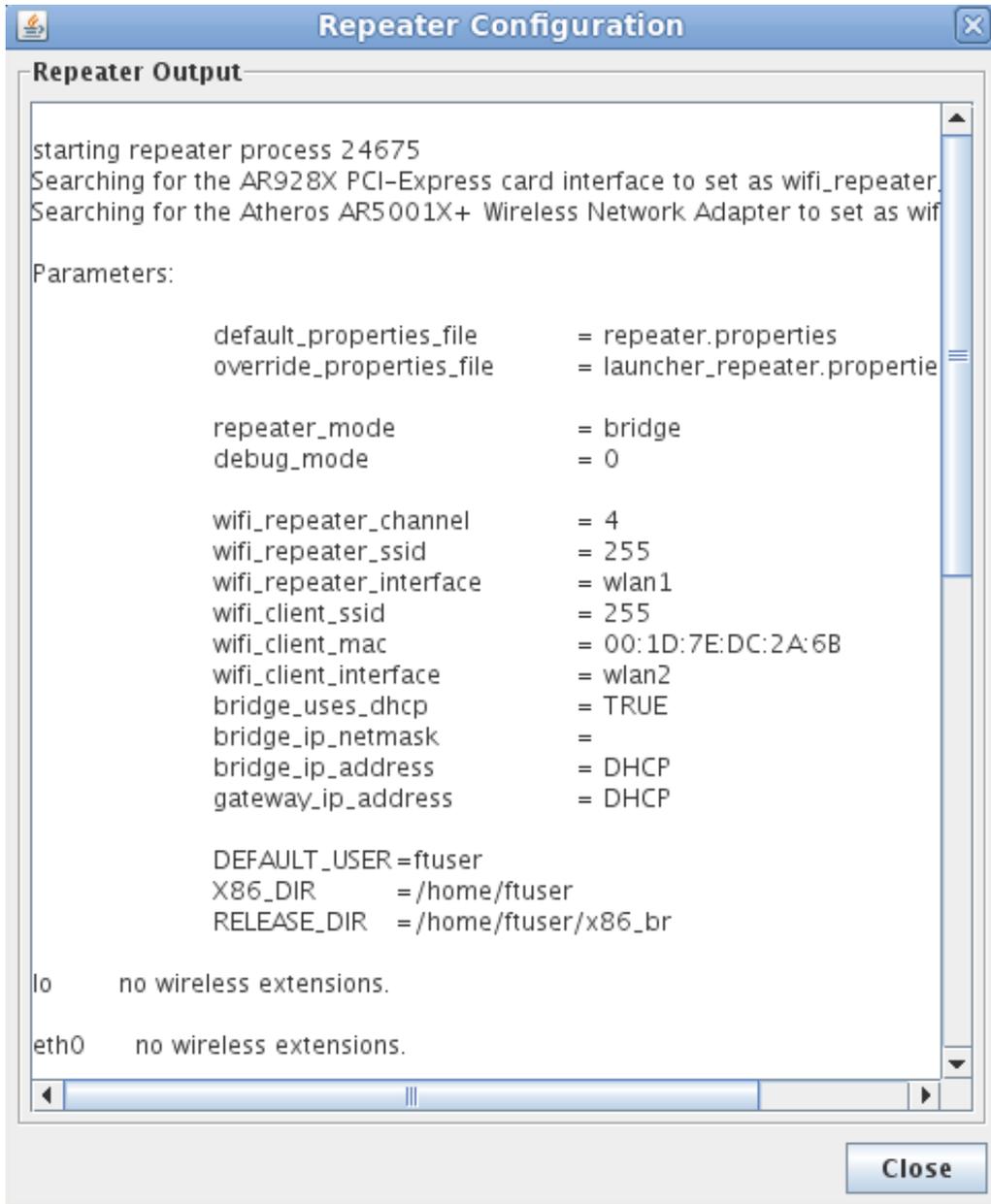
Netmask = 255.255.255.0

DHCP Range = 10.127.254.2 to 10.127.254.254

(U) In router mode, the user may also configure in the "Backhaul Interface" block (i.e., the interface used for internet connectivity) an IP address, Netmask, and Nameservers. Typically, this information should be retrieved via DHCP, but the user can if desired set static information here. In this case, the user must also set the "Address" field in the "Gateway" block to the IP address of the internet gateway.

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(U) When finished, the user starts the x86 Flytrap by clicking the “Start” button. This will display the “Repeater Configuration” dialog (shown below). Status and error messages will display in this dialog.



(U) For diagnostic and troubleshooting information, see section 6 (Diagnostics) in the “Quick Start Guide for x86 FT”.

(U) To stop the x86 Flytrap, click the “Stop” button on the “Network Settings” dialog of section 5.5.1. To close the GUI, click the ‘X’ in the upper right of the “Launcher” dialog of section 5.5.1.

5.6 (U) repeater.sh Operation

(U) For x86 Flytrap configuration for scenarios not supported by the ftlauncher.sh GUI of section 5.5, the x86 Flytrap can be manually configured by editing the "repeater.properties" file directly and running the "repeater.sh" script. The typical scenario that requires manual configuration is the use of a non-wireless interface for internet access.

(U) Section 4.3 (Use Case 3: Anonymous Open Wireless Network that Uses a Wired Network Connection for Internet Access) of the "Quick Start Guide for x86 FT" describes how to configure the x86 Flytrap for a scenario that uses a wired connection for internet access.

(U) The repeater.properties file (located in ~ftuser/bin) has the following fields:

- **repeater_mode** = "bridge" or "router" (see section 5.5.1)
- **debug_mode** = 0 (off) or 1 (on). Note that the debug x86 Flytrap packages must be installed as described in section 3 (Installation) of the "Quick Start Guide for x86 FT". In debug mode, more info is logged to the terminal.
- **wifi_repeater_interface** = name of the interface to use as the repeater (i.e., the interface on which the simulated AP will be created). With hardware inserted, the "lshw -c network" command can be used to map network hardware to interface name.
- **wifi_client_interface** = name of the interface to use for internet connectivity. Although the field has "wifi" in its name, this field can be set to any interface that can gain internet access. For example, set to "eth0" on most x86 platforms to use the wired ethernet interface for internet connectivity.
- **bridge_ip_address** = leave empty for all cases (bridge mode should always use DHCP to retrieve an IP address).
- **bridge_nameservers** = leave empty for all cases (bridge mode should always use DHCP to retrieve nameservers).
- **bridge_ip_netmask** = always set to 255.255.255.0.
- **gateway_ip_address** = IP address of the internet gateway. This value is irrelevant if using DHCP for the repeater interface.
- **lan_ip_address** = IP address assigned to the repeater interface in router mode. Suggested value is 10.127.254.1
- **lan_ip_netmask** = netmask assigned to the repeater interface in router mode. Suggested value is 255.255.255.0.
- **lan_dhcp_range** = DHCP IP address range the x86 Flytrap DHCP service will use for wireless clients in router mode. Suggested value is "10.127.254.2 10.127.254.254". NOTE: surrounding quotes are required.
- **DEFAULT_USER** = ftuser (do not change)
- **X86_DIR** = /home/\$DEFAULT_USER (do not change)
- **WPA_SUPPLICANT_CONF** = leave unset
- **MM_ARGS** = any additional arguments to pass to MissionManager can be configure here. Be sure to surround value with quotes.
- **beacon_address** = IP address or domain name to which x86 Flytrap will beacon

(U) Once repeater.properties has been configured, open a terminal (Applications -> System Tools -> Terminal), change to the proper directory, and launch the repeater.sh script:

```
cd ~ftuser/bin
sudo ./repeater.sh -s dummy -c <CHANNEL> -r <SSID>
```

(U) For example, to create the "FreePublicWifi" wireless network on channel 11, issue:

```
sudo ./repeater.sh -s dummy -c 11 -r FreePublicWifi
```

(U) Status and error messages will log to the terminal. For diagnostic and troubleshooting information, see section 6 (Diagnostics) in the "Quick Start Guide for x86 FT".

(U) To stop the x86 FT, open a new terminal (Applications -> System Tools -> Terminal), and issue:

```
sudo ./repeater.sh -d
```

6 (U) Diagnostics

(U) See section 6 (Diagnostics) of the "Quick Start Guide x86 FT".