


## 6. Maintenance

### 6.1 Introduction


This section contains information necessary to disassemble, assemble, maintain, calibrate and troubleshoot the LeCroy WaveSurfer 400.

#### 6.1.1 Safety Precautions



The  symbol used in this manual indicates dangers that could result in personal injury.



The  symbol used in this manual identifies conditions or practices that could damage the instrument.



The following servicing instructions are for use by qualified personnel only. Do not perform any servicing other than contained in service instructions. Refer to procedures prior to performing any service.



Exercise extreme safety when testing high energy power circuits. Always turn the power OFF, disconnect the power cord and discharge all capacitors before disassembling the instrument.

#### 6.1.2 Anti-static Precautions



Any static charge that builds on your person or clothing may be sufficient to destroy CMOS components, integrated circuits, Gate array's.....etc.

In order to avoid possible damage, the usual precautions against static electricity are required.

- Handle the boards in anti-static boxes or containers with foam specially designed to prevent static build-up.
- Ground yourself with a suitable wrist strap.
- Disassemble the instrument at a properly grounded work station equipped with anti-static mat.
- When handling the boards, do not touch the pins.
- Stock the boards in anti-static bags.

### 6.3 Software Update Procedure



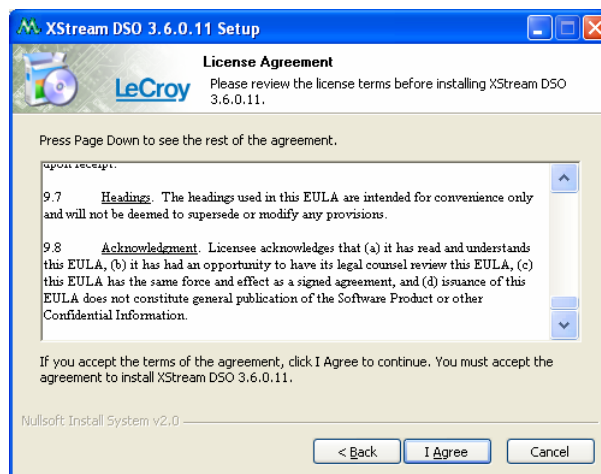
### 6.3.1 Installing New X-Stream DSO Application Software

In order to load new X-Stream DSO software the system must be capable of booting up to the Windows desktop.

- If the XStream application is running, exit it through the File, Exit menu option.
- Connect an external USB-CD ROM or USB Memory Stick containing the version to be installed into the CD ROM drive.
- From the windows desktop, select My Computer, then select the storage device.
- Launch XStreamDSOInstallerx.x.x.x.exe (where x.x.x.x is the version number) application.



- Press Next, You will be prompted to read and accept the software license agreement.



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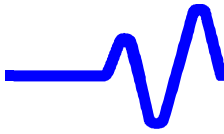
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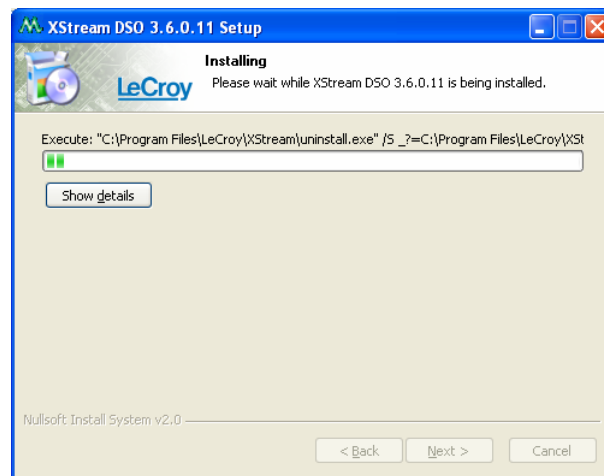
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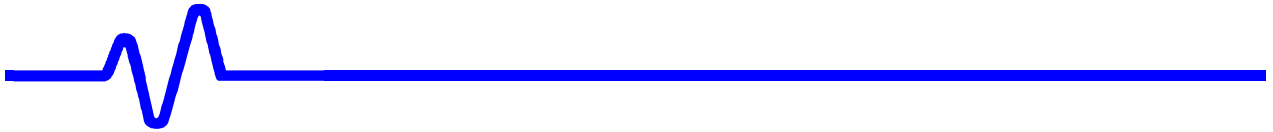
- Accept the agreement and press Next. The software installation process will begin and a progress bar will be displayed. Wait until completion.



- At the completion on the software installation you will receive a dialog box as shown below:



- The check box should be checked to install the Windows device drivers and to upgrade the Microcode in the instrument.

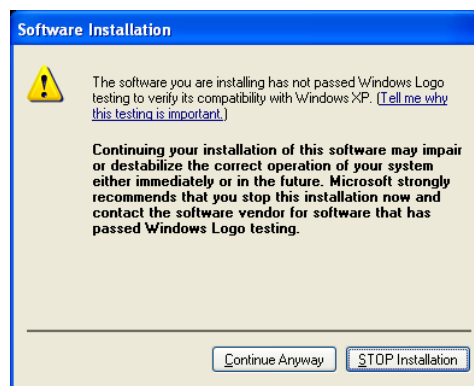


### 6.3.3 Installing Device Drivers

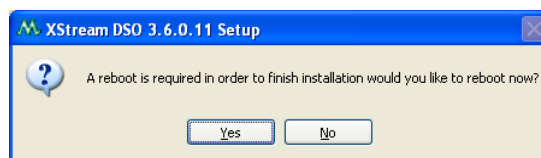
- Pressing finish will first install the device drivers. Displayed will be a dialog box as shown below:



- Press Install, an error message box may appear as shown below:



- Press Continue Anyway, you may receive several more of the same dialog boxes, accept each one.
- After this is complete you may be prompted to reboot:



- The XStream DSO application should automatically begin after power has been restored and after Windows has finished booting up. As the XstreamDSO application is launching the screen will appear as:





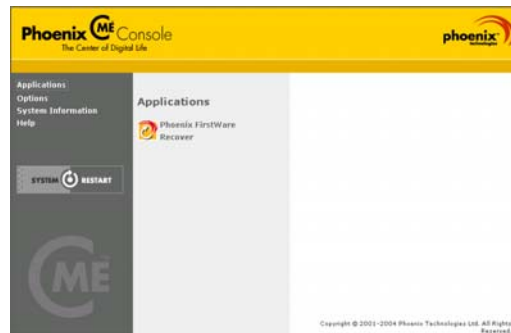
#### 6.3.4 Restoring the Operating System

Your WaveSurfer oscilloscope was designed to operate very reliably for many years. However, the application software does run on an internal hard drive. In the event of a hard disk problem, you may need to recover the application software on drive "C:" and/or the user data on drive "D:". Since WaveSurfer does not have an installed CD-ROM drive, LeCroy has provided a recovery application program that will allow you to recover the application software and user data by accessing a partition on the hard drive. This is very easy to do, if necessary. Instructions are as follows:

1. Connect a keyboard and a mouse to the WaveSurfer.
2. Power the WaveSurfer ON.
3. As soon as anything (logo, graphic, text) appears on the screen after boot-up, press and hold down the **F4** key.
4. The FirstWare cME console splash screen displays. Wait about 10 seconds.
5. The cME console End User License Agreement displays. There are [Accept] and [Decline] buttons at the end of this License Agreement. Click the [Accept] button.



6. Phoenix cME Console main page displays. Click “Applications”.
7. Click Phoenix FirstWare Recover. (If you click “SYSTEM RESTART” button, WaveSurfer will reboot.)



8. Click the LAUNCH button.



9. The First Ware Recover splash screen displays.



10. Read the license agreement and click [Accept] to proceed.



11. The Select Recover Type screen displays. Select recover option, as defined below:

**[Recover Boot Partition]** Recovers drive "C:" only. Drive "C:" is the drive that the WaveSurfer application software is stored on. Drive "D:" is not recovered. (Drive "D:" is the USERDATA area of the hard disk.)

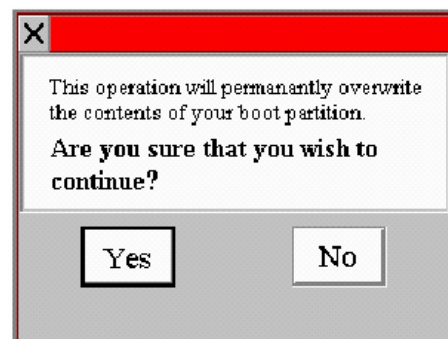
**[Recover Entire Drive]** Select this button if you want to recover both the "C:" and "D:" drives of the hard disk (Note: Any USERDATA will be erased if this option is selected)



12. Read the license agreement and click [Accept] to proceed.

13. The following dialog box will be displayed. Click the [Yes] button.

- When you select [Recover Boot Partition], the dialog message is "This operation will permanently overwrite the contents of your boot partition. Are you sure that wish to continue?"
- When you select [Recover Entire Drive], the dialog message is "This operation will permanently overwrite the contents of your entire drive. Are you sure that wish to continue?"



14. The recovery starts, and the FirstWare Progress screen displays. No further selections are required. The recovery takes about 10 minutes.



15. When the recovery is completed, Windows will start automatically. No message or dialog box will display.
16. If you selected [Recover Entire Drive] in step 11, CheckDisk will run after the Windows splash screen.
17. After the "Welcome" screen, the FBReaseal dialog box will display. Click the [OK] button. Windows will restart automatically.



### 6.3.5 Software Options

There are many software options available, new ones are being developed all of the time, refer to the LeCroy website for the latest selection of options available.

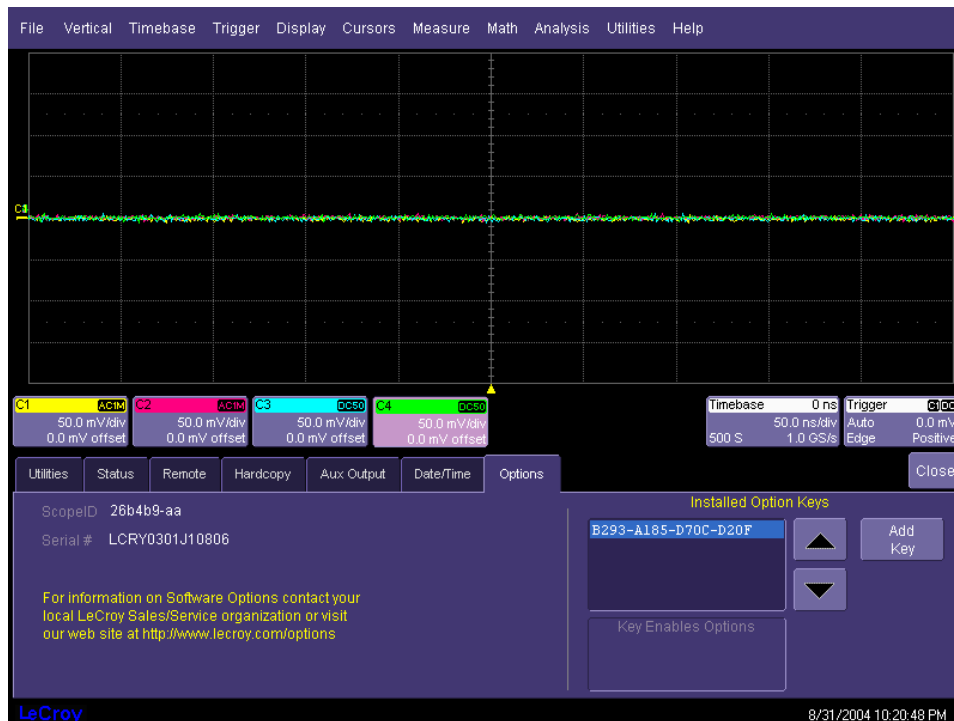
#### 6.3.5.1 Changing Software Option Key

##### a. Scope ID, Scope Serial Number

The scope ID and scope s/n: are used to request a Software Option Key

- Enter the scope's Software Options menu (located under Utilities, Options)

.Note the **SCOPE ID**, i.e.: 12c5c6-a4 and **Scope s/n**: LCRY0601P10241 that are found on that menu.



##### b. Entering Option Key in the DSO

- Enter the scope's Software Options menu ( **Utilities, Options** menu ).
- Press the **ADD KEY** button on the DSO touch screen
- Enter the new option key, i.e.: **5F4F-3184-2C81-8EF8**
- Press **O.K.** to add the key
- The XStream application will need to be exited and restarted for any new option key to take effect.

## 6.4 Board Exchange Procedure

### 6.4.1 PCI Board Exchange Procedure



The WaveSurfer uses option keys to identify the correct model number, memory size and software options. These option keys must be re-installed if the PCI board is exchanged..

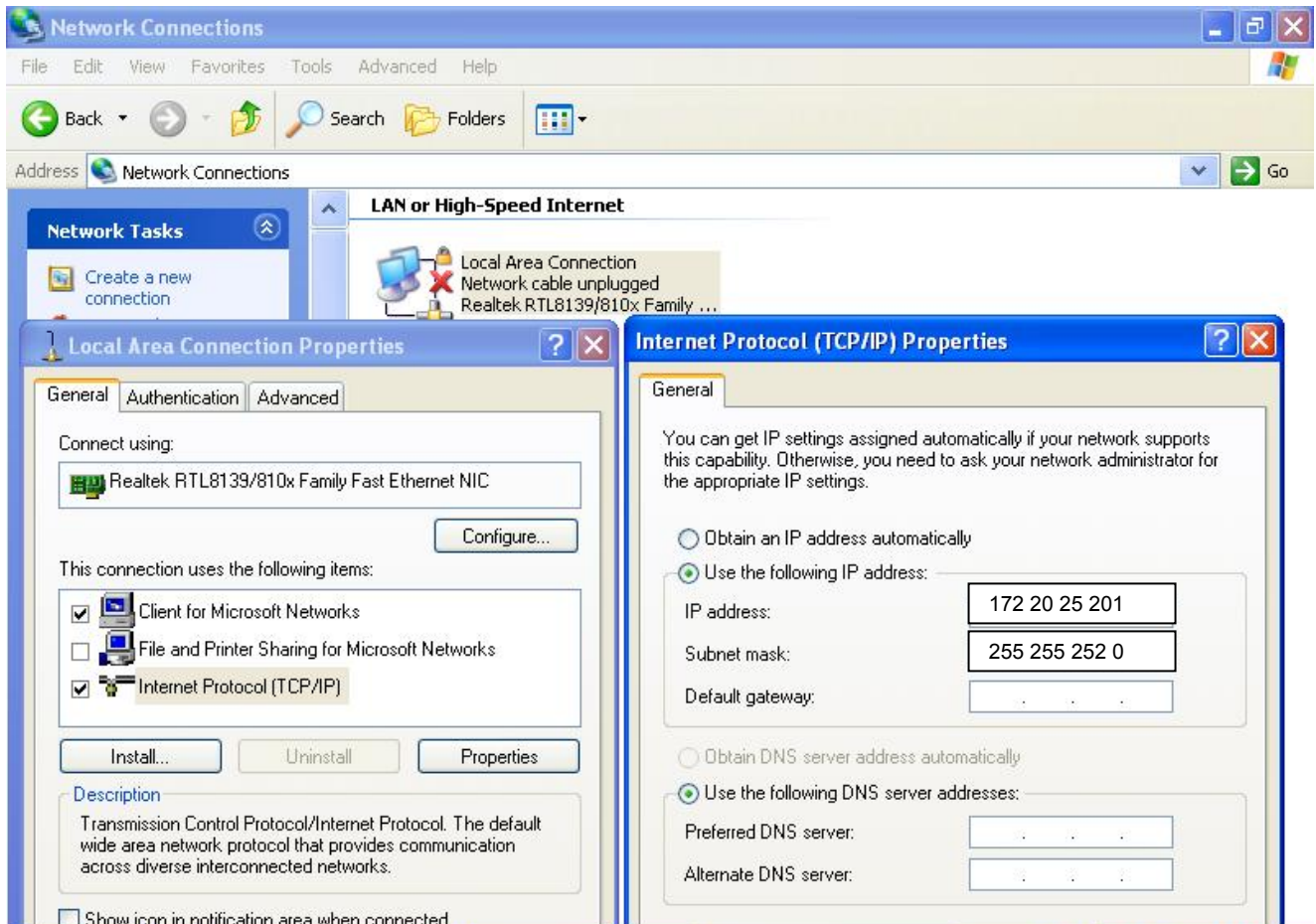
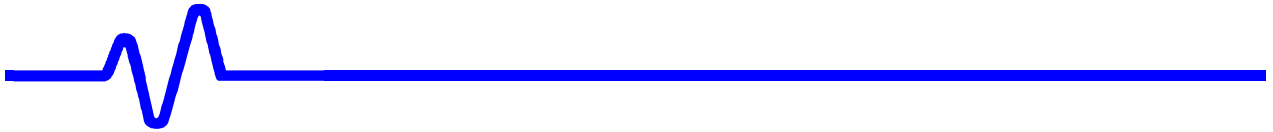
### 6.4.2 Hard Drive Replacement Procedure

#### 6.4.2.1 Required items

- (a) PC (DVD-ROM drive and network interface card required; OS: Windows 2000 or XP)
- (b) Network cable
- (c) USB floppy disk drive
- (d) Master DVD labeled as "WS400 Series Control Program (for loading on the hard disk)"
- (e) Floppy disk labeled as "Startup Disk for WS400 Series Control Program" (will be created during this procedure, using Master DVD (item d))
- (f) PS/2 keyboard

#### 6.4.2.2 Preparation of host machine

- (1) Select Start → Settings → Control Panel.
- (2) Double-click the Network icon in the Control Panel. A network dialog box similar to this one appears
- (3) If the TCP/IP protocol is not listed, you will have to add it. Follow your operating system user guide to add the TCP/IP protocol and bind it to the Ethernet adapter
- (4) Double-click the  TCP/IP -> line. A dialog box similar to the one below appears. Select  Specify an IP address: and enter the default IP address as shown below:



**Note:**

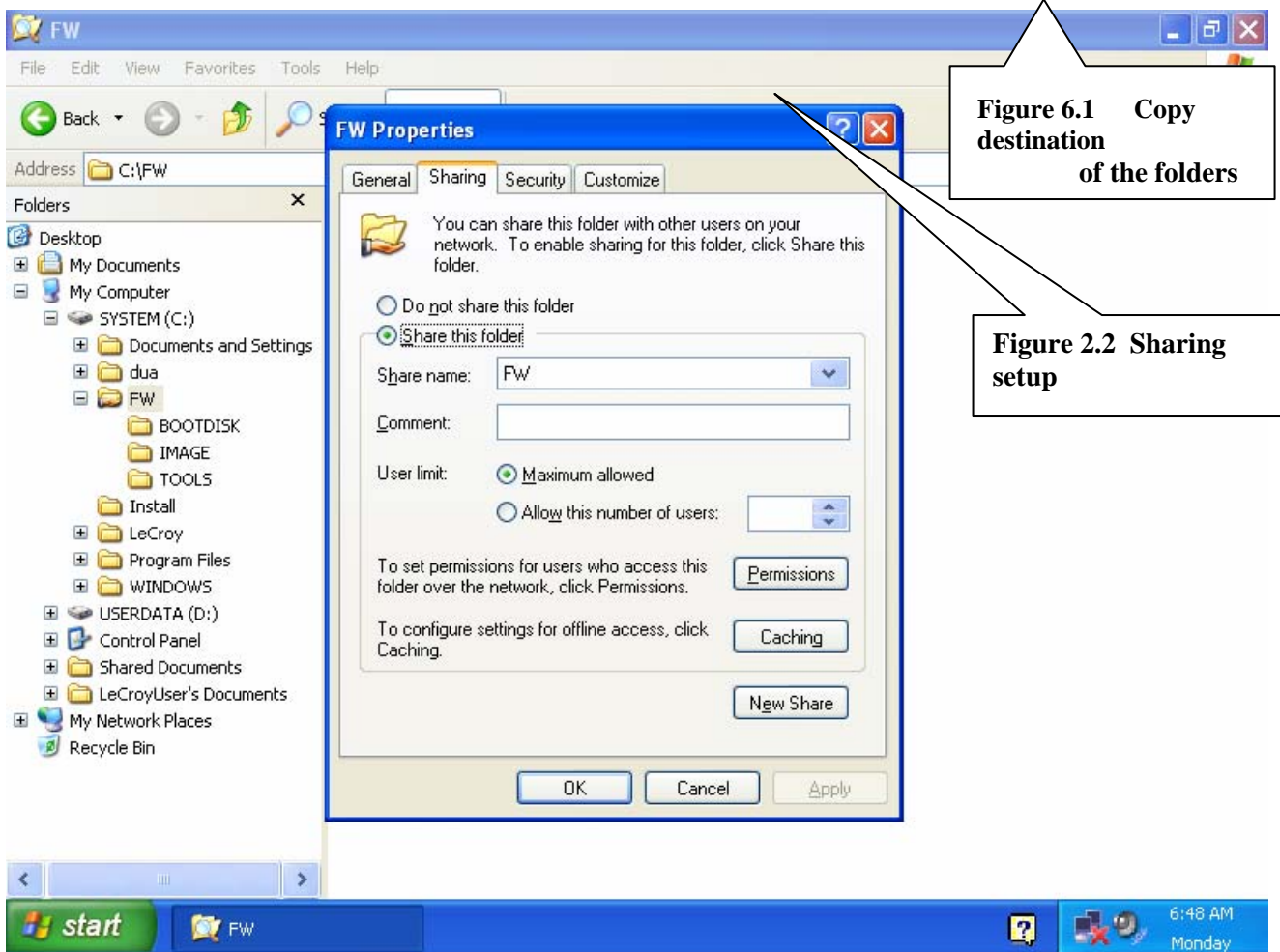
- There must be a user account on the host computer which has local rights to the machine. If the host is used as part of a domain and that user does not have local rights then a local user account must be created.
- Confirm the host PC's name (visible in control panel/system/computer name), log in name, log in password, IPAddress and SubNetMask.

### 6.4.2.3 Copying necessary files to the PC to share them through a network

- (1) Create a folder named "FW" in the C drive of the host PC.
- (2) Copy TOOLS and IMAGE folders in the DVD-ROM drive of the PC to C:\FW. (See Figure 6.1 & 6.2) Take note that the size of the folders is about 1.2 GB.



- (3) Configure so that others can access the folder C:\FW over the network with the share name "FW". (If you use Windows XP, right-click the FW folder icon to call up the FW Properties dialog box and configure the settings as shown on Figure 6.2)



#### 6.4.2.4 Creating a network-ready startup disk

##### <Required items>

1. WS400 Series Control Program (DVD-R for loading on the hard disk)
2. PC with Windows running on it
3. DVD-ROM drive (irrespective of built-in type or external type)
4. Floppy disk drive (irrespective of built-in type or external type)
5. An empty floppy disk. A floppy disk label (Inscribe "Startup Disk for WS400 Series Control Program" on it.)
6. Master DVD labeled as "WS400 Series Control Program (DVD-R for loading on the hard disk)"



- (1) Insert the DVD-R labeled as "WS400 Series Control Program (DVD-R for loading on the hard disk)" in the DVD-ROM drive of the PC.
- (2) Insert an empty floppy disk in the floppy disk drive. (Prior to insertion, affix a label inscribed with "Startup Disk for WS400 Series Control Program" to the disk.)
- (3) Using Windows Explorer or My Computer, double-click on BOOTDISK\NETBOOT\MAKEFD.BAT in the DVD-R.
- (4) A command prompt screen appears to indicate the progress of floppy creation by %. At the completion, the command prompt screen automatically closes.
- (5) Open A:\Autoexec.bat in the floppy disk by a text editor. Search for the description "FSERVER=PCNAME" and replace PCNAME with the "name of the PC" connected to the WaveSurfer. (See Figure 6.2.)

```
@ECHO OFF
::-----
:: Server name
set FSERVER=PCNAME
::↑ Replace the underlined part with the PC name of the server.
::-----

REM [Autoexec.bat : Created by ClientBuilder
PATH = a:;\a:\Net\
prompt $p$g
cd net
net initialize /dynamic
netbind.com
tcptr.exe
tinyrfc.exe
net start basic
net use Z: \\\FSERVER%\FW
    echo off
    PATH
    %PATH%;Z:\TOOLS\BUILDER;Z:\TOOLS\DISK;Z:\TOOLS\REC
    OVER\
    cd ..\
    @ECHO
    =====
    @ECHO waveSurfer hard disk update program version 1.0.0
    @ECHO (Using network connection)
    @ECHO
    =====
    @ECHO Menu
    @ECHO  1. Updates both drives (C: and D:) and recovery area.
    @ECHO  0. Exit
PROMPT Select number:
```

Figure 6.2 Autoexec.bat

- (6) Open A:\NET\Protocol.ini in the floppy disk by a text editor. Delete "DisableDHCP=0" and add the following three lines as shown in Figure below. "IPAddress0" is the IP address to be assigned to the WaveSurfer. This must be different from that for the PC.

DisableDHCP=1  
SubNetMask0=255 255 252 0  
IPAddress0=172 20 25 1

```
[network.setup]
version=0x3110
netcard=ms$REALTEK,1,MS$REALTEK,1
transport=tcpip,TCPIP
lana0=ms$REALTEK,1,tcpip

[ms$REALTEK]
drivename = RTSND$

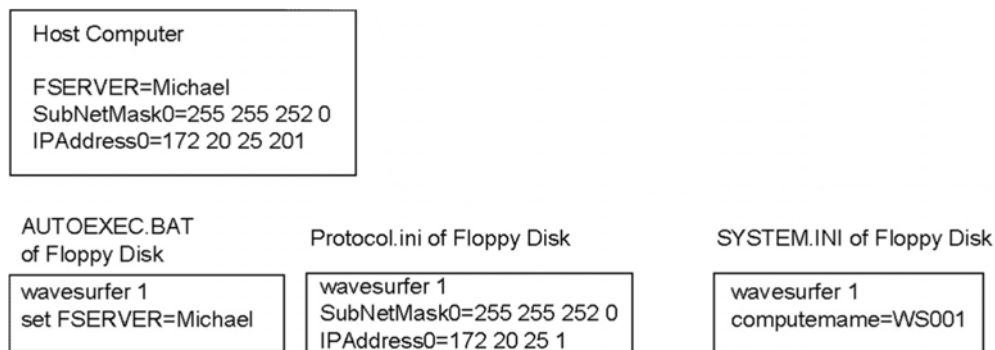
[protman]
drivename = PROTMAN$
priority = MS$NDISLHP

[tcpip]
NBSessions=6
DefaultGateway0=
DisableDHCP=1
SubNetMask0=255 255 252 0 :: The same address as server
IPAddress0=172 20 25 1 :: (172 20 25) is the same address as the
                        server.
:: ↑ IP address subnet mask to be assigned to the waveSurfer
DriverName=TCPIP$
Bindings=ms$REALTEK
LanaBase=0
```

Figure 6.3 Protocol.ini

- (7) Save the Protocol.ini file.

### Example of Startup disk





#### 6.4.2.5 Updating the hard disk (through a network)

##### <Required items>

1. PC (DVD-ROM drive and network interface card required; OS: Windows 2000 or XP)
  2. Network cable
  3. USB floppy disk drive
  4. Floppy disk labeled as "Startup Disk for WS400 Series Control Program"
  5. Master DVD labeled as "WS400 Series Control Program (for loading on the hard disk)"
  6. WaveSurfer
  7. PS/2 keyboard & mouse
- (1) Connect the USB floppy disk drive, PS/2 keyboard & mouse, and the network cable to the waveSurfer. (See Figure 6.4)

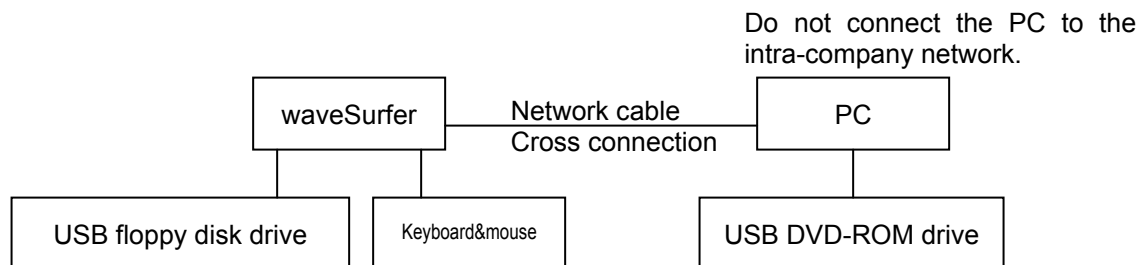
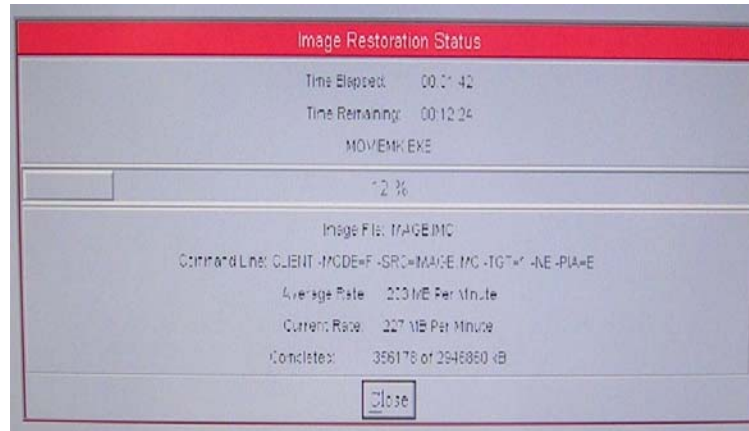


Figure 6.4 Connecting waveSurfer with PC

- (2) Insert the "Startup Disk for WS400 Series Control Program" to the USB floppy disk drive.
- (3) Turn on the power to the waveSurfer.
- (4) If the following message appears on the screen, enter the user name to log in to the PC.  
Type your user name, or press ENTER if it is WS002:
- (5) If the following message appears, enter the password to log in to the PC.  
Type your password:
- (6) If the following message appears, enter "N". \*\*\*\*\* stands for the user name entered in Step (4) above.  
There is no password-list for \*\*\*\*\*  
Do you want to create one? (Y/N) [N]: |
- (7) If the following menu appears, choose 1.  
Menu

1. Updates both drives (C: and D:) and recovery area.
  2. Exit
- (8) The process to update the hard disk will start. It takes about 30 minutes to complete it.



Display "Image Restoration Status" message.

- (9) At the completion, the following message will appear  
: Success: The operation completed without error.

```
=====
cME Install is complete
=====
Z: \_ \TOOLS\DISK>
```

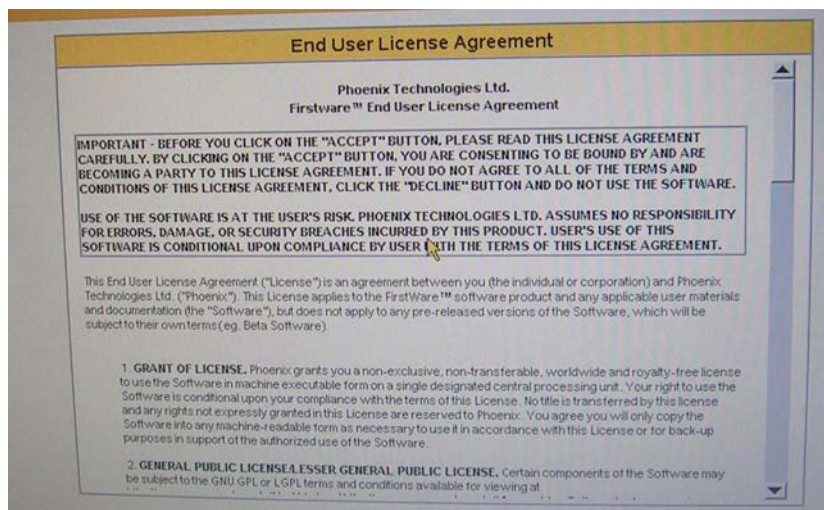
- (10) Remove the floppy disk from the floppy disk drive  
(11) Press the Delete key while pushing Ctrl and Alt key.



#### 6.4.2.6 Setup at the first startup

(Make sure to perform the following procedure after updating the hard disk.)

- (1) Turn on the power to the waveSurfer.
- (2) Wait until the LeCroy's logo **LeCroy** fills the screen, then press [F4] until the Phoenix will appear. (Hold it down for a while.)
- (3) A message "Please Standby ..." will appear. Wait until the next screen appears. (If this message does not appear, reboot Windows, then restart the waveSurfer and perform Step (2) again. If the message does not appear even then, perform the hard disk copying operation again.)
- (4) If "End User License Agreement" appears on the screen, scroll down to the end with the mouse and press the [Decline] button. (**NEVER press the [Accept] button! If you press the [Accept] button, you are forced to return to Section 4 to update the hard disk again.**)



- (5) The screen is blackened for a while. Then the Windows startup screen appears.
- (6) The following message appears informing you that the check of D drive now starts. No operation is necessary. If there is no problem, the operation automatically completes.  
Checking file system on D:
- (7) First [Welcome], then the [FBReseat] dialog box appears. If you are sure that the dialog box contains the message "Machine Resealed! Click OK to reboot.", press the [OK] button. Windows will automatically reboots itself.

- (8) The following message appears informing you that the check of D drive now starts. No operation is necessary. If there is no problem, the operation automatically completes. After completion, Windows will automatically reboots itself.

Please wait while windows preparing to start ...

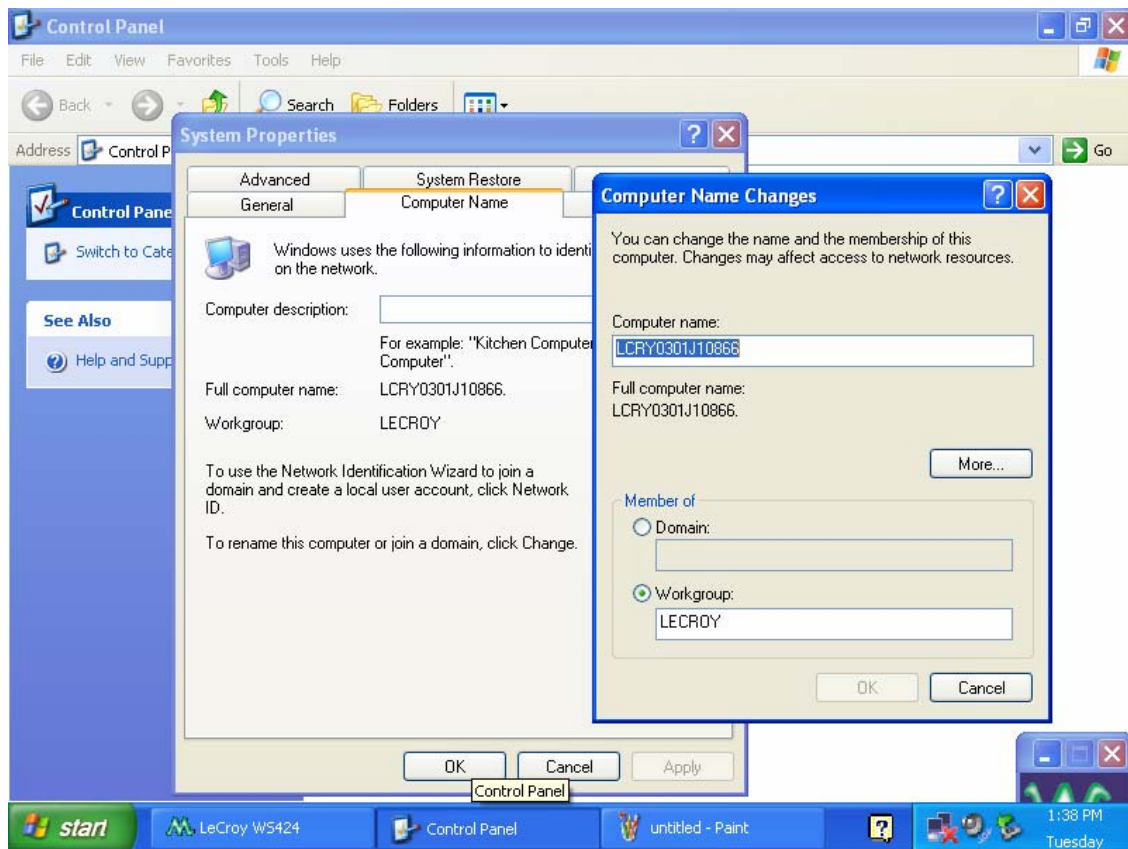
Exit the XStreamDSO application

- (9) If XStreamDSO has started up, choose "Minimize or Exit " from the "File" menu.

From "Start" menu of Windows, start "Control Panel".

- (10) Double-click the "System" icon.

- (11) Open the "Computer Name" tab and press the "Change" button.



- (12) The "Computer Name Changes" dialog box will appear. Enter the main unit serial number "LCRY0301Jxxxxxx" for LeCroy, then press the "OK" button. (xxxxxx stands for the serial number.)

- (13) Reboot Windows following the instruction given on the dialog box.





Windows will automatically reboot itself.

- (14) If XStreamDSO has started up, choose "Utilities Setup ..." from the "Utilities" menu.
- (15) Open the "Status" tab and check to make sure that the "Firmware Version" is identical to the "3.6.0.11"(build 61005).
- (16) Open the "Remote" tab and check to make sure that the main unit serial number has been set as the "Host Name".

#### **6.4.2.7 Validating the software**

1. Turn on the power to the WaveSurfer.
  - (A) After the power is turned on, music shall be played when the OS (Windows XP) starts up.
  - (B) "WaveSurfer" shall be displayed on the screen. If "WaveMaster" appears, the system may fail to recognize the hardware.
  - (C) Make each channel active by pressing the corresponding channel button (1, 2, ...). Then press the AUTO button and check to make sure that each waveform is displayed correctly.
2. Adjusting the touch screen
  - (A) Click "Utilities Setup..." in "Utilities" on the top menu bar.
  - (B) From the "Utilities" menu, click "Touch-Screen Calibration".
  - (C) Correctly click the four X marks on the screen with a thin stick or the like.
  - (D) Check to make sure that the cursor moves to the actually clicked point.

Important!      Use caution not to damage the touch screen.

#### **6.4.2.8 Initialization of panel setup**

- (1) Click "Recall Setup." of a top menu bar "File".
- (2) Click "Recall Default Setup" of "Recall Setup" menu.



### 6.4.2.9 BIOS setting

If the system does not boot up on the start-up floppy disk, please confirm “First Boot Device” in the “Advanced BIOS Features” of the BIOS setting. Turn on the power while pushing the Delete Key.

#### STANDARD CMOS Features

Date (mm: dd: yy):

Time (hh: mm: ss):

IDE Primary Master	None
IDE Primary Access Mode	Auto
IDE Primary Slave	None
IDE Primary Slave Access Mode	Auto
IDE Secondary Master	None
IDE Secondary Master Access Mode	Auto
IDE Secondary Slave	None
IDE Secondary Slave Access Mode	Auto

Drive A : None

Drive B : None

Video : EGA/VGA

Halt On : All, But keyboard

#### Advanced BIOS Features

CPU Internal Cache	: Enabled
External Cache	: Enabled
CPU L2 Cache ECC Checking	: Enabled
Processor Number Feature	: Enabled
Quick Power on Self Test	: Enabled
Boot Sequence	
First Boot Device	: USB-FDD
Second Boot Device	: USB-CDROM
Third Boot Device	: HDD-O
Boot Other Device	: Enabled

Swap Floppy Drive	: Disabled
Boot Up Floppy Seek	: Disabled
Boot Up Numlock Status	: On
Gate A20 Option	: Fast
Typematic Rate Setting	: Disabled
Typematic Rate(Chars/Sec)	: 6
Typematic Delay (Msec)	: 250
Security Option	: Setup
OS Select For DRAM>64Mb	: Non-OS2
Video BIOS Shadow	: Enabled
Small Logo (EPA) Show	: Disabled

#### Advanced Chipset Features

DRAM Clock/Drive Control



DRAM Clock	: By SPD
DRAM Timing	: By SPD
DRAM Command Rate	: 2T Command
AGP & P2P Bridge Control	
AGP Aperture Size	: 64M
AGP Driving Control	: Auto
AGP Fast Write	: Disabled
AGP Master 1WS Write	: Disabled
AGP Master 1WS Read	: Disabled
CPU & PCI Bus Control	
CPU & PCI Write Buffer	: Enabled
PCI Master 0WS Write	: Enabled
PCI Delay Transaction	: Disabled
System BIOS Cacheable	: Disabled
Video RAM Cacheable	: Disabled
Video Share Memory size	: 16M
Select Display Device	: CRT+LCD
Panel Type	: 01
Panel Outport Port	: DIO
Panel Clock Mode	: Single
Panel Bus Width	: 24 Bits
Memory Parity/ECC Check	: Disabled
INTERGRATED PERIPHERALS	
VIA OnChip IDE Device	
IDE DMA Transfer access	: Enabled
IDDE Prefetch Mode	: Enabled
IDE HDD Block Mode	: Enabled
Onchip IDE Channel0	: Enabled
IDE Primary Master PIO	: Auto
IDE Primary Slave PIO	: Auto
IDE Primary Master UDMA	: Auto
IDE Primary Slave UDMA	: Auto
Onchip IDE Channel 1	: Enabled
IDE Secondary Master PIO	: Auto
IDE Secondary Master UDMA	: Auto
IDE Secondary Slave UDMA	: Auto
VIA Onchip PCI Device	
Realtek ALC650	: Enabled
Onchip USB Controller	: Enabled
USB2.0 Controller	: Enabled
USB Keyboard Support	: Disabled
Super IO Device	
Onboard FDC Controller	: Disabled
Onboard Serial Port 1	: 3F8/IRQ4
Onboard Serial Port 2	: Disabled
UART Mode Select	: Normal
Onboard Parallel Port	: 378/IRQ7
Parallel Port Mode	: SPP
Init Display First	: PCI Slot

## POWER MANAGEMENT SETUP

ACPI function	: Enabled
ACPI Suspend Type`	: S1(POS)
Power Management Option	: User Define
HDD Power Down	: Disabled
Suspend Mode	: Disabled
Video Off Option	: Suspend ->Off
Video Off Method	: V/H SYNC+Blank
MODEM Use IRQ	: 3
Sort-Off by PWRBTN	: <u>Instant-Off</u>
Run VGABIOS if S3 Resume	: Auto
Ac Loss Auto Restart	: OFF
Power-On by Ring	: Disabled
Wake Up on Lan	: Disabled

### IRQ/Event Activity Detect

VGA	:Off
LPT&COM	:LPT/COM
HDD&FDD	:On
PCI Master	:Off
PowerOn By PCI Card	:Disabled
Wake Up On LAN/RING	:Disabled
RTC Alarm Resume	:Disabled

### IRQ's Activity Monitoring

Primary INTR	ON
IRQ3 (COM2)	Enabled
IRQ4 (COM 1)	Enabled
IRQ5 (LPT 2)	Enabled
IRQ6 (Floppy Disk)	Enabled
IRQ7 (LPT 1)	Enabled
IRQ8 (RTC Alarm)	Disabled
IRQ9 (IRQ 2 Redir)	Disabled
IRQ10 (Resaved)	Disabled
IRQ11 (Resaved)	Disabled
IRQ12 (PS/2Mouse)	Enabled
IRQ13 (Coprocessor)	Enabled
IRQ14 (Hard Disk)	Enabled
IRQ15 (Reserved)	Disabled

## PNP/PCI Configurations

PNP OS Installed	: No
Reset Configuration Data	: Disabled
Resources Controlled By	: AUTO(ESCD)
PCI/VGA Palette Snoop	: Disabled
Assign IRQ For NGA	: Enabled
Assign IRQ For USB	: Enabled

## PC Health Status

Shutdown Temperature	: 75°C
----------------------	--------

## Frequency/Voltage Control

AutoDetect DIMM/PCI CLK	: Enabled
Spread Spectrum	: Enabled

CPU Clock : 100



## 6.5 Battery Exchange Procedure

### Exchange Battery

Setting BIOS

- (1) Turn on the power while pushing the Delete key
- (2) Load Optimized Defaults
- (3) Standard CMOS Features → Set Date and Time
- (4) Save and Exit Setup

**Note:**

If the Wavesurfer was set to the old BIOS setting, after "Load optimized Defaults" does, each setting becomes initial as a general PC.

**For instance,**

Standard CMOS Features → Drive A : 1.44MB,3.5 in.

Correctness is "None".

In this case, update the new BIOS.

## 6.6 Update BIOS

- (1) Expand "BIOSCHK.ZIP" to Pc's hard disk.
- (2) Start to make the BIOS update floppy disk.
- (3) Boot the WS and connect USB-FDD to WS.
- (4) Double-click BIOSCHK.VBS in Windows Explorer and verify the version.  
If the release date is not 20040309, please proceed to the next step.
- (5) Boot the WS with the BIOS update floppy disk.  
If you get a message "You don't have to update BIOS", the BIOS is updated correctly.

**Note:**

Please never turn off the power while updating BIOS.

Battery: Part Number is IWDES011171, description is CR2032

## 6.7 Equipment and Spare Parts Recommended for Service

### 6.7.1 Test Equipment Required

See Table 5-1 in section 5.2.

### 6.7.2 WaveSurfer Spare Parts

LeCroy P/N	Assembly	Adjustments	Performance Tests
IW211857900	WS4-Processor RB80526RY	None	None
IW211857902	WS4-LCD CIRCUIT	None	None
IW211857903	WS454 PANEL BOARD	None	None
IW211857904	WS4X4 KEY BOARD	None	None
IW211857905	WS4X2 KEY BOARD	None	None
IW211857918	WS454 FE/ACQ BOARD	None	Chapter 5
IW211857921	WS452 FE/ACQ BOARD	None	Chapter 5
IW211857923	WS422 FE/ACQ BOARD	None	Chapter 5
IW211857920	WS424 FE/ACQ BOARD	None	Chapter 5
IW211857922	WS432 FE/ACQ BOARD	None	Chapter 5
IW211857919	WS434 FE/ACQ BOARD	None	Chapter 5
IW211857914	WS454 MAIN POWER UNIT	None	None
IW211857915	WS454 PFC CIRCUIT	None	None
IW211857916	WS454 INLET CIRCUIT	None	None
IWDZB100221	Hard disk MHT2030AT	HDD Update	None
IW211857901	WS PCI BRIDGE	Add Keycodes	Verify Model
IWKAS159811	WS4 TFT TOUCHSCREEN ASSY	Touchscreen	None

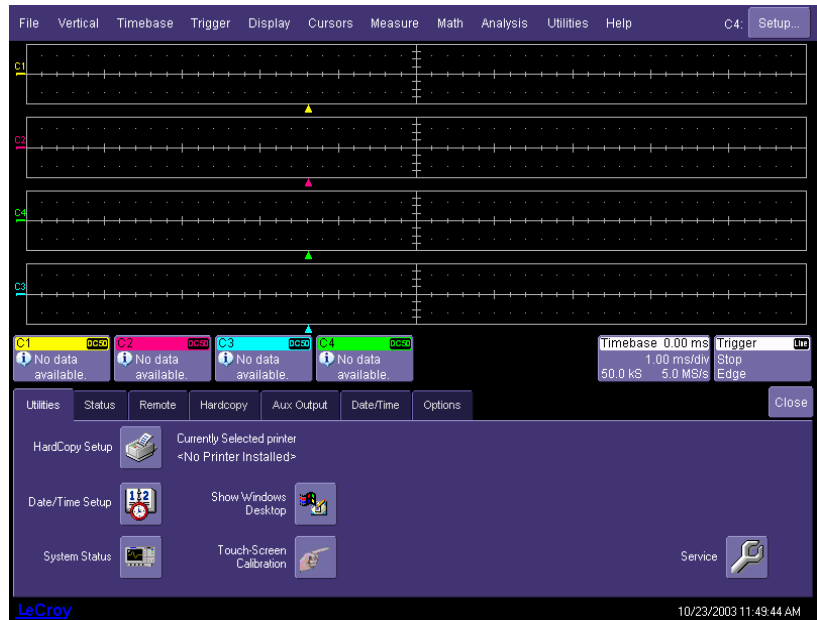
See chapter 7 for mechanical replaceable parts.



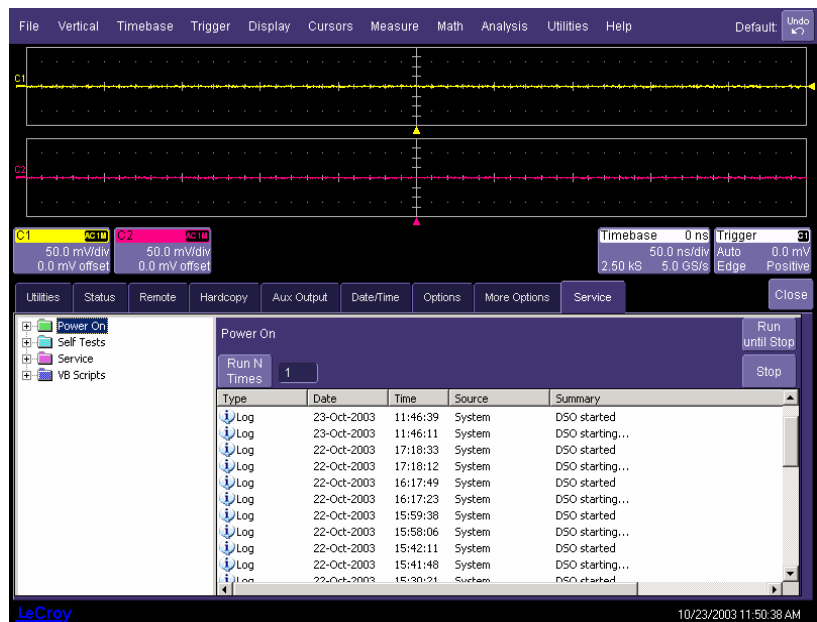
# 6.8 Service Menu

## 6.8.1 Accessing Service Menu

The service menu is accessed by pressing Utilities, Utilities Setup.



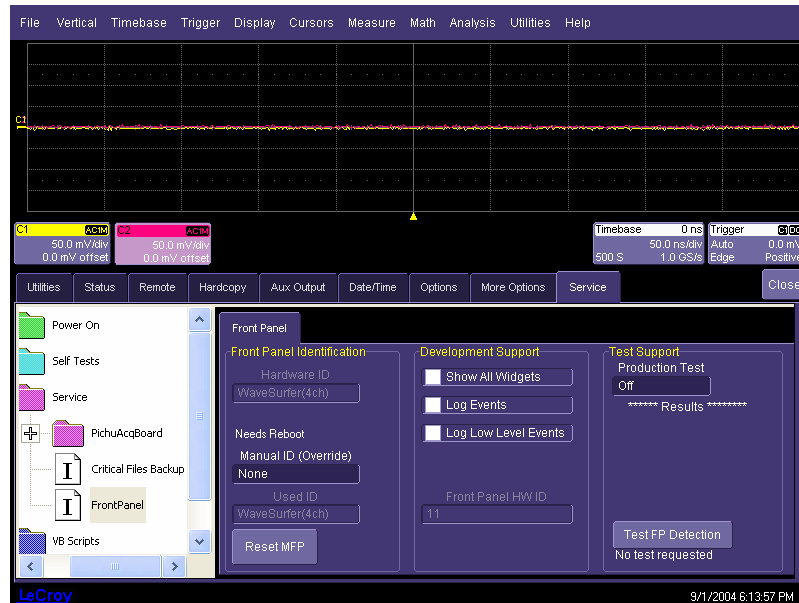
Press the service button in the lower right corner, you will be prompted with a password dialog box. Enter password 9472. You will be granted service center access.



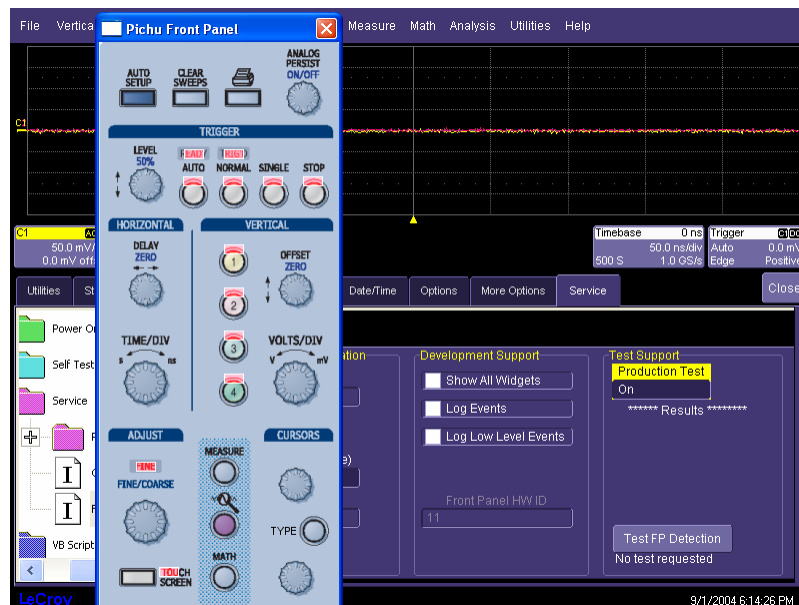
## 6.8.2 Mainframe Tests

### 6.8.2.1 Front Panel Test

From the service menu select Front Panel

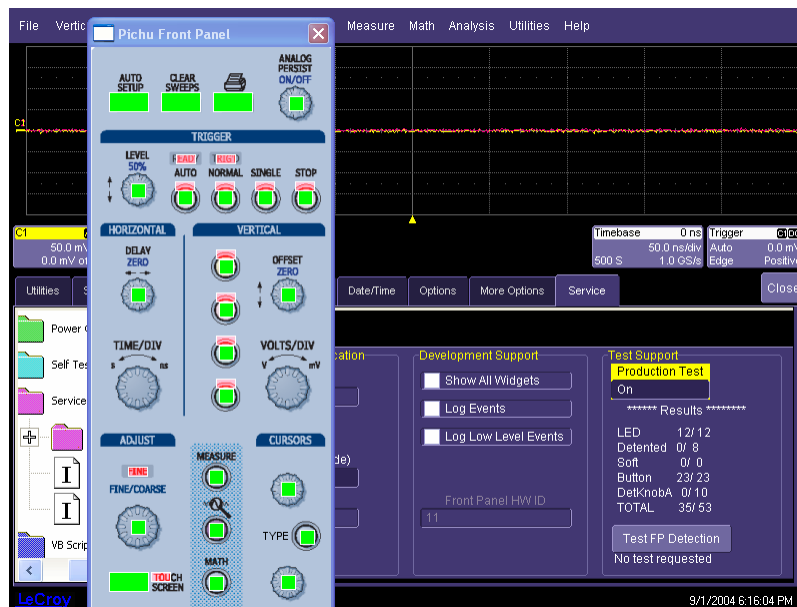
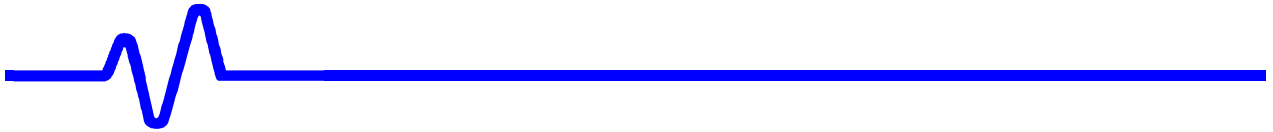


Next select Production Test. Select On. A picture of the front panel will appear on the screen as shown below:



Verify that all LED's are illuminated.

Press each button in turn, each push knob and turn each knob in both directions, they will change color as shown below:



Continue until all buttons and knobs have been tested, the total should indicate that all needed items were pressed or turned. .



Select Production test and then off to turn off the test. The front panel LED's will be left in an abnormal state. This will be corrected when either the functions are used or when the application is restarted.



## 6.9 Calibration Procedures

The following section includes the manual adjustments that can be made in the WaveSurfer system.

### 6.9.1 System Power Supply Calibration Procedure



CAUTION: Risk of electric shock

- Measure the power supply voltages as shown in the table below. If any are found to be outside of their specifications proceed with the remainder of this procedure to adjust them.
- To adjust the power supply output voltages, the unit will need slight disassembly. The front panel and hard drive assy will need to be dismounted and the power supply unscrewed and reversed inside out so the printed circuit assy is facing outward.
- The system should not be operated for more than 10 minutes outside of the unit powered up without forced air passing through the power supply and acquisition assembly.
- After reversing the power supply in the unit, plug AC power into the rear panel AC receptacle.
- Turn on using the front panel power switch. Measure each voltage as shown in the table below and adjust the potentiometers accessible through the top cover as shown until each voltage is within its specified range.

The following table lists the nominal, min and max voltages for the outputs from the main power supply. Verify them at the locations listed.

Nominal Output Voltage (Vset)	Tolerance	Min (V)	Max (V)	Measurement Location
+3.3 V	5%	3.14	3.47	CN6 pin 1
+5 V <sub>DIG</sub>	5%	4.75	5.25	CN6 pin 4
+5 V <sub>A</sub>	1.5%	4.93	5.08	CN2 pin 1
-5 V	1.5%	-4.93	-5.08	CN2 pin 4
+2.5 V	5%	2.38	2.63	CN2 pin 8
+12 V	2%	11.76	12.24	CN3 pin 1
+9 V	2%	8.82	9.18	CN3 pin 3
-12 V	2%	-12.24	-11.76	CN3 pin 5

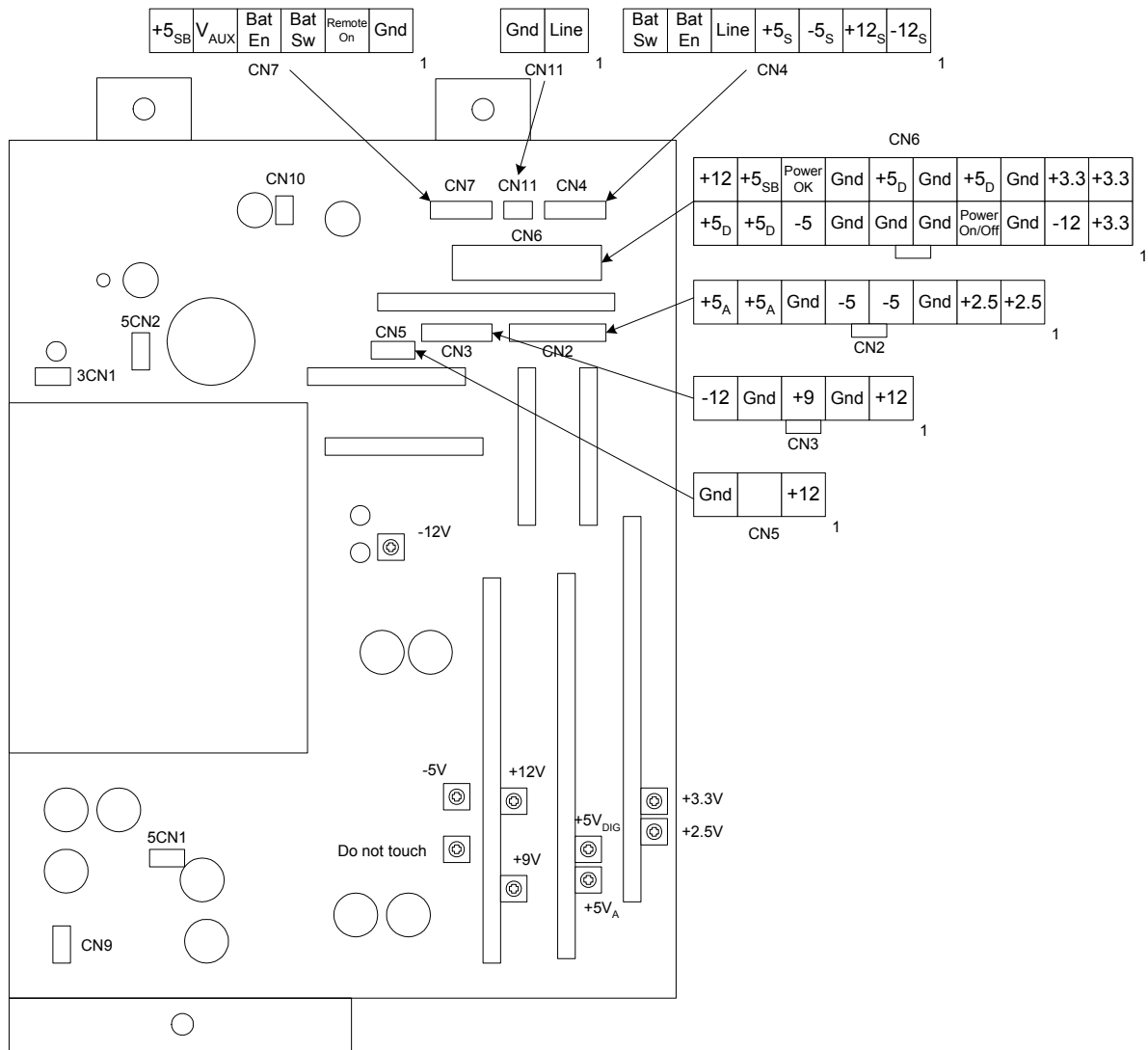


Figure 6-5: View of the power supply adjustment locations

## 6.9.2 Touch Screen Calibration Procedure

The touch screen must be calibrated based on the users vantage point to the screen, the size of their finger and their visual alignment with the tip of their finger to the screen. The calibration procedure can be invoked through the Utilities menu, Utilities tab. Press the touch screen button called “Touch Screen Calibration”.

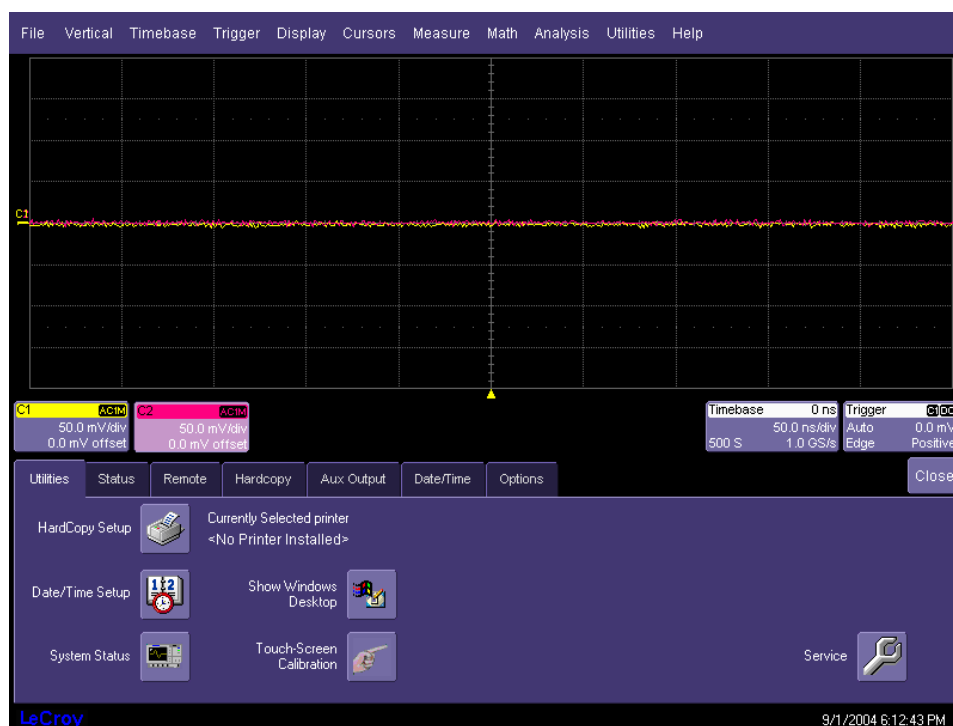
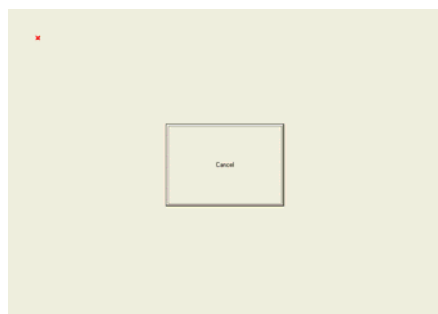
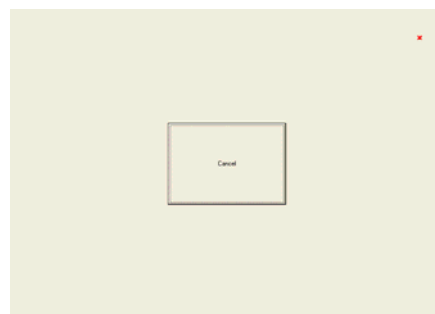


Figure 6-6 Touch Screen Calibration Menu

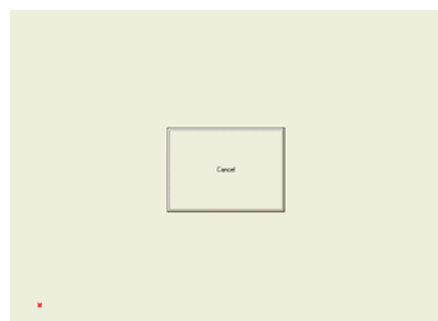
The user will be prompted with 4 locations on the screen for them to touch. They will appear one at a time and after touching each one, a new spot will appear. After all four spots have been touched, the touch screen is calibrated. It is important that you have the same vantage point to the screen that you will when the scope is in operation to have the easiest use of the touch screen.



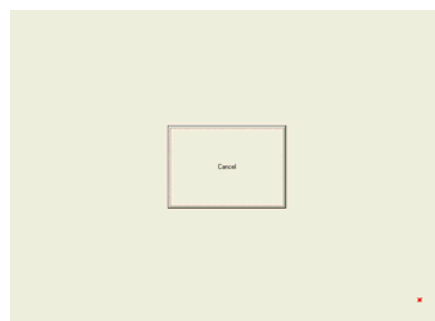
Point 1



Point 2



Point 3



Point 4

After the last point is pressed, then the calibration constants are applied.

## 6.9.3 Front/ACQ System Adjustments

### 6.9.3.1 Internal reference voltage adjustment

#### 6.9.3.1.1 Adjustment of reference voltage for automatic calibration

Adjusts the internal reference voltage used for automatic calibration to be within the range from -600mV to +600mV.

Adjustment standard  $\pm 0.02\%$

Adjustment method

- (1) Open the "Maintenance2" menu and set "DAC and Calout - CalOut" to "+600mV."
- (2) Measure the CAL OUT pin with a multimeter and adjust the reference voltage such that the pin's voltage becomes +600 mV.
- (3) Set "CalOut" to "-600 mV."
- (4) Measure the CAL OUT pin with a multimeter and adjust the reference voltage such that the pin's voltage becomes -600 mV.
- (5) Click "Save To HW" to save to the EEPROM.

Note: If the "+600mV" and "-600mV" adjusting sequence is reversed, repeated adjustments will be necessary.

#### 6.9.3.1.2 Adjustment of reference voltage for CAL signal

Adjusts the CAL signal output voltage to be within the range from +1.0V to -1.0V.

Adjustment standard  $\pm 0.1\%$

Adjustment method

- (1) Open the "Maintenance2" menu and set "CalOut" to "+1V."
- (2) Measure the CAL OUT pin with a multimeter and adjust the reference voltage such that the pin's voltage becomes  $+1V \pm 0.1\%$ .
- (3) Set "CalOut" to "-1V."
- (4) Measure the CAL OUT pin with a multimeter and adjust the reference voltage such that the pin's voltage becomes  $-1V \pm 0.1\%$ .
- (5) Click "Save To HW" to save to the EEPROM.

#### 6.9.3.1.3 Measurement of overload detection reference level

Measures automatically the reference level for 50 $\Omega$  overload detection (when there is no signal).

Adjustment method

- (1) With no connections made to the channels, perform a "heat run" for at least 5 minutes.
- (2) Open the "Maintenance1" menu and click "Automatic Adjustment - Overload" to measure the reference voltage.
- (3) Click "Save To HW" to save to the EEPROM.

Note: The heat run shall not be omitted since reference values cannot be measured accurately immediately after use with 50 $\Omega$  coupling.



## 6.9.3.2 Front end adjustment

### 6.9.3.2.1 Coarse adjustment of channel offset

Setting CHx  $\Rightarrow$  DC 1M $\Omega$ , 20mV/div, 0V offset, BWL=20MHz

Timebase  $\Rightarrow$  1ms/div

Adjustment method

- (1) Open the "Production\PichuAcqBoard\Calibration" menu within the "Service" menu.
- (2) Select "FE offsetA" from the "Curves" menu, click "Auto cal," remove the check mark and click "Reset current."
- (3) Select "FE gain->offsetA" from the "Curves" menu, click "Auto cal," remove the check mark and click "Reset current."
- (4) Adjust "Channel Offset Adjustment" in the "Maintenance2" menu so that all channel traces appear in the center of the display screen.
- (5) Press "Save To HW" to save to the EEPROM.
- (6) Re-enter the "Calibration" menu.
- (7) Select "FE offsetA" from the "Curves" menu, click "Auto cal" and add a check mark.
- (8) Select "FE gain->offsetA" from the "Curves" menu, click "Auto cal" and add a check mark.

Note: The auto adjust function will not operate unless the "Auto cal" setting is restored.

### 6.9.3.2.2 DC gain adjustment

Adjustment standard Overshoot: 0.1% or less

Rounding: none

Setting CHx  $\Rightarrow$  DC 50 $\Omega$ , 5mV/div, BWL=20MHz

Timebase  $\Rightarrow$  2ms/div

Adjustment method Input a 500mV, 100Hz square-wave signal from the PG-506.

Adjust the smoothing of the square-wave.

Adjustment locations

	CH1	CH2	CH3	CH4
Gain adj.	2R104	3R104	4R104	5R104

#### 6.9.3.2.3 Attenuator phase adjustment

Adjustment standard    Overshoot: 0.5% or less  
                                 Rounding: 0.5% or less

Setting    CHx  $\Rightarrow$  DC 1M $\Omega$ , 50mV/div, 500mV/div

Adjustment method    Input a 15kHz square-wave signal and adjust the attenuator phase.

Adjustment locations

	CH1	CH2	CH3	CH4
50mV/div	2C44	3C44	4C44	5C44
500mV/div	2C45	3C45	4C45	5C45

After adjusting the input capacitance, again verify the 50 mV/div attenuator phase and readjust if necessary.

#### 6.9.3.2.4 Input capacitance adjustment

Adjustment standard    16pF  $\pm$  1.5pF at 50mV/div  
                                 Difference between 20mV/div and 50mV/div:  $\pm$ 0.5pF or less  
                                 Difference between EXT and EXT10:  $\pm$ 0.5pF or less

Adjustment method    CH1 to CH4(2)    Verify the input capacitance at 50 mV/div.  
                                 Change to 20mV/div and adjust so that the difference with the 50mV/div scale is within the standard range.

EXT    Set “Edge Trigger” and verify the input capacitance at “Trigger on – Ext” and “Impedance – DC1M $\Omega$ .”  
                                 Change to “Trigger on – Ext/10” and adjust so that the difference with “Trigger on – Ext” is within the standard range.

Adjustment locations

	CH1	CH2	CH3	CH4	EXT
Input C adj.	2C22	3C22	4C22	5C22	6C22

#### 6.9.3.2.5 EXT10 phase adjustment

Adjustment standard    Difference between 1 kHz and 1 MHz trigger points:  $\pm$ 0.1 div or less

Setting    CH1  $\Rightarrow$  1V/div, DC 1M $\Omega$ , offset 0V  
                 Trigger  $\Rightarrow$  Trigger on: Ext/10, Imp: 1M $\Omega$ , Coupling: DC, Slope: Positive, Level: 3V

Adjustment method    Using a T-branch, input an approximate 10Vp-p, 1KHz sine wave signal to CH1 and EXT.  
                                 Verify that the location of the trigger point is +3div  $\pm$  0.3div.  
                                 Next, change the frequency to 1MHz and adjust 6C6 such that the shift in the trigger point is minimized for 1KHz.



### 6.9.3.2.6 High-speed waveform adjustment

#### Adjustment standard

WS45x	
DC 50Ω, 10mV/div	Overshoot / ringing 7% or less
DC 50Ω, 500mV/div	Overshoot / ringing 12% or less (PSPL4050) 9% or less (PSPL2600)
WS43x	
DC 50Ω, 10mV/div	Overshoot / ringing 5% or less
DC 50Ω, 500mV/div	Overshoot / ringing 9% or less (PSPL4050) 7% or less (PSPL2600)
WS42x	
DC 50Ω, 10mV/div	Overshoot / ringing 3% or less
DC 50Ω, 500mV/div	Overshoot / ringing 7% or less (PSPL4050) 6% or less (PSPL2600)

Setting	Reference waveform PSPL TD-1107B + 16dB ATT (DC 50Ω, 10mV/div)
	Reference waveform PSPL 4050 (4500) + 6dB ATT (DC 50Ω, 500mV/div)

#### Adjustment method

- (1) At 10mV/div and an amplitude of approximately 4.0div, adjust the waveform. Set the frequency response to the range of 4.7 to 4.9 / 6.0div.
- (2) At 500mV/div and an amplitude of approximately 6.0div, adjust the waveform so that overshoot is within the standard range.
- (3) Adjust the frequency response (500MHz) to be in the range of 3.7 to 3.9 / 5.0div.

#### Adjustment locations

	CH1	CH2	CH3	CH4
10mV/div	2R28	3R28	4R28	5R28
500mV/div	2C38	3C38	4C38	5C38



### 6.9.3.3 TDC adjustment

#### 6.9.3.3.1 Auto-adjustment

Adjusts the TDC (verifies time axis during RIS mode operation) automatically.

Adjustment method

- (1) Without inputting any signal, run “Automatic Adjustment – TDC” in the “Maintenance1” menu.
- (2) After adjustment is completed, click "Save to HW" to save to the EEPROM.

#### 6.9.3.3.2 Manual adjustment

In the “Maintenance1” menu, verify that “Other Adjustment – TdcGain “ has a default value of 135.

#### 6.9.3.4 Trigger delay adjustment

Adjustment standard                       $\pm 100\text{ps}$  (pre-trigger)

Setting    CHx  $\Rightarrow$  DC 50 $\Omega$  10mV/div  
              Timebase  $\Rightarrow$  RIS, 1ns/div, Delay: 0ns (center of display screen)

Adjustment method

- (1) Input a signal from the SG-503 and set the trigger level to roughly the midpoint of the amplitude.
- (2) With PERSIST ON, adjust “TrigDelay” of the “Maintenance2” menu such that the actual trigger point (portion of the observed waveform that forms the pivot point) coincides with the trigger delay indicator when the signal frequency is varied within the range of approximately 10MHz to 150MHz.
- (3) Click “Save to HW” to save to the EEPROM.

Note: The trigger delay indicator is an arrow displayed at the bottom border of the grid. The trigger delay indicator differs from and should not be confused with the trigger level indicators that are displayed at the right and left borders of the grid.



### 6.9.3.5 Trigger hysteresis adjustment

#### 6.9.3.5.1 Auto-adjustment

Adjustment standard    Trigger hysteresis:  $0.3 \pm 0.01$  div

Adjustment method

- (1) Without inputting any signal, run “Automatic Adjustment - Trig Hyst” in the “Maintenance1” menu.
- (2) Trigger hysteresis is adjusted automatically to become 0.3div.
- (3) After the auto-adjustment is completed, click “Save to HW” to save to the EEPROM.

#### 6.9.3.5.2 Manual adjustment

In the “Maintenance1” menu, verify that “Channel Adjustment Value – Hyst “ has a default value of 128.

### 6.9.3.6 Event trigger delay adjustment

#### 6.9.3.6.1 Auto-adjustment

Adjustment standard    Delay of  $\pm 100$ ps or less for an Edge trigger (holdoff by: Events) or a Qualify trigger (Qualify by: Events) trigger point when the trigger point is Edge trigger (holdoff: OFF)

Adjustment method

- (1) Run “Automatic Adjustment - Edge & Qual TrigDelay” in the “Maintenance1” menu.  
Trigger point correction between Edge trigger holdoff OFF and Evts, and trigger point correction for Qlfy Events between Qualified trigger wait OFF and Evts are adjusted automatically.
- (2) After the auto-adjustment is completed, click “Save to HW” to save to the EEPROM

#### 6.9.3.6.2 Manual adjustment

Method for adjusting edge event trigger delay

Setting    Timebase  $\Rightarrow$  1ns/div, RIS

- (1) Input a high-speed pulse signal and set the trigger level to roughly the midpoint of the amplitude.
- (2) In the “Measure” menu, set “Delay – C1.” Click ”Statistics” to turn “On” this function.
- (3) In the “Trigger” menu, select “Edge Trigger” and switch “Holdoff by” to “None” and Events 1#.” In the “Maintenance1” menu, adjust “Other Adjustment – DelayEdge” such that the “mean” difference for each measured value becomes  $\pm 100$ ps or less.
- (4) Click “Save to HW” to save to the EEPROM.

Method for adjusting qualified event trigger delay

Setting Timebase  $\Rightarrow$  1ns/div, RIS

- (1) Input a high-speed pulse signal to CH1 and input an approximate 1kHz signal to CH2.
- (2) In the “Measure” menu, set “Delay – C1.” Click “Statistics” to turn “On” this function.
- (1) In the “Trigger” menu, select “Edge Trigger” and set “Trigger on – C1” and “Holdoff by – None.”
- (2) In the “Trigger” menu, select “Smart Trigger - Qualify” and set “After – C2” and “Holdoff by – Events 1#.”
- (3) In the “Trigger” menu, switch “Edge Trigger” and “Smart Trigger.” In the “Maintenance1” menu, adjust “Other Adjustment – DelayQual” such that the “mean” difference for each measured value becomes  $\pm 100\text{ps}$  or less.
- (4) Click “Save to HW” to save to the EEPROM.

### 6.9.3.7 Odd path adjustment

#### 6.9.3.7.1 Auto-adjustment

Adjustment method

- (1) Run “Automatic Adjustment - OddPathCorrection” in the “Maintenance1” menu.
- (2) After the auto-adjustment is completed, click “Save to HW” to save to the EEPROM.

#### 6.9.3.7.2 Manual adjustment

Adjustment standard Delay sdev 7ps

Setting CH1  $\Rightarrow$  DC 50 $\Omega$  10mV/div  
Timebase  $\Rightarrow$  RIS, 1ns/div  
Trigger  $\Rightarrow$  Delay: 0ns (center of display screen)

Adjustment method

- (1) Input a high-speed pulse signal and set the trigger level to roughly the midpoint of the amplitude.
- (2) In the “Measure” menu, select “Delay.”
- (3) In the “Maintenance1” menu, adjust “OddPath” such that the measured value “sdev” is minimized.
- (4) After the adjustment is completed, click “Save to HW” to save to the EEPROM.



### 6.9.3.8 Trigger analog time adjustment

For “holdoff by time” or a trigger mode based on a SMART trigger time setting, the time accuracy is adjusted for time settings of 100ns or less.

*(In the case of a time setting longer than 100ns, the time will be accurate since it will be calculated using a 500MHz internal reference clock.)*

#### 6.9.3.8.1 Automatic / semiautomatic adjustment

Adjustment standard     $W \leq 10\text{ns}$ :  $\pm 0.3\text{ns}$   
                                  $10\text{ns} < W \leq 100\text{ns}$ :  $\pm (1.5\% + 0.6\text{ns})$

Setting    Trigger  $\Rightarrow$  Glitch at end of : Pos (when the output from the PSPL2600 is a positive pulse)  
                                 LEVEL : Midpoint of amplitude

Adjustment method

- (1) Without inputting any signal, Open the “Maintenance1” menu and click “64ns/32ns AnalogTime” in the “Automatic Adjustment” menu. When the auto-adjustment is completed, save to EEPROM. “AnalogTime Adjustment value for Interval” and “AnalogTime Adjustment value for Pulse” are adjusted automatically. (64ns Ref4, 64nsRef3, 32nsRef4, 32nsRef4)
- (2) Set the output pulse width (half-value width) of the PSPL2600 to  $4.0\text{ns} \pm 0.1\text{ns}$ , input this signal to CH1 and then click “Pulse 4ns” in the “Half Adjustment” menu. When the auto-adjustment is completed, save to EEPROM. The “4nsRef4, 4nsRef3” setting in “AnalogTime Adjustment value for Pulse” is adjusted automatically.
- (3) Set the output pulse width (half-value width) of the PSPL2600 to  $8.0\text{ns} \pm 0.1\text{ns}$ , input this signal to CH1 and then click “Pulse 8ns” in the “Half Adjustment” menu. When the auto-adjustment is completed, save to EEPROM. The “8nsRef4, 8nsRef3” setting in “AnalogTime Adjustment value for Pulse” is adjusted automatically.
- (4) Set the output frequency of the SG-503 to 250MHz ( $4.0\text{ns} \pm 0.1\text{ns}$  cycle), input this signal to CH1 and then click “Interval 4ns” in the “Half Adjustment” menu. When the auto-adjustment is completed, save to EEPROM. The “4nsRef4, 4nsRef3” setting in “AnalogTime Adjustment value for Interval” is adjusted automatically.
- (5) Set the output frequency of the SG-503 to 125MHz ( $8.0\text{ns} \pm 0.1\text{ns}$  cycle), input this signal to CH1 and then click “Interval 8ns” in the “Half Adjustment” menu. When the auto-adjustment is completed, save to EEPROM. The “8nsRef4, 8nsRef3” setting in “AnalogTime Adjustment value for Interval” is adjusted automatically.

Notes: (1) Pulse width is defined as the time width at 50% of the pulse amplitude, and therefore unless the trigger level has been set to 50% of the pulse amplitude, adjustments will be unsuccessful.

- (2) “Pulse 4ns” and (3) “Pulse 8ns” auto-adjustments will fail if the Glitch trigger has been set with the wrong polarity.

### Precautions when using a trigger analog time adjustment jig

When using a trigger analog time adjustment jig instead of the PSPL2600 or SG-503, connect a –10dB attenuator to the output of the adjustment jig, and with CH1 set to 50Ω input and a 20mV/div range, verify that the output amplitude is approximately 7 div before making adjustments.

Set the CH1 OFFSET to 0.0000V and the trigger level to DC0.0mV.

The relationship between "Adjust item" and output frequency of the adjustment jig is listed below.

- "Pulse 4ns" → Set output frequency to 125MHz and adjust automatically.
- "Pulse 8ns" → Set output frequency to 62.5MHz and adjust automatically.
- "Interval 4ns" → Set output frequency to 250MHz and adjust automatically.
- "Interval 8ns" → Set output frequency to 125MHz and adjust automatically.

### 6.9.3.8.2 Manual adjustment

#### Glitch trigger time

Adjustment standard  $\pm (0.5\% + 0.5\text{ns})$

Setting    Trigger    Ref4 at time of adjustment: Smart Trigger - Width - Greater Than  
Ref3 at time of adjustment: Smart Trigger - Width - In Range – Limits  
Slope : Positive (when the output from the PSPL2600 is a positive pulse)  
LEVEL : Midpoint of amplitude

Adjustment method    Set the amplitude of the signal source to approximately 6.0div. Open the "Maintenance1" menu and adjust as indicated below, using PSPL2600 as the signal source.

After the adjustment is complete, click "Save To HW" to save to the EEPROM.

Adjustment item	Time setting	Adjustment method
4ns Ref4	Lower Limit 4.0ns	Adjust to achieve sync with a pulse width of 4.0 ns or more.
8ns Ref4	Lower Limit 8.0ns	Adjust to achieve sync with a pulse width of 8.0 ns or more.
32ns Ref4	Lower Limit 32ns	Adjust to achieve sync with a pulse width of 32 ns or more.
64ns Ref4	Lower Limit 64ns	Adjust to achieve sync with a pulse width of 64 ns or more.
4ns Rref3	$2.0\text{ns} \leq W \leq 4.0\text{ns}$	Adjust to achieve sync with a pulse width of 4.0 ns or less.
8ns Ref3	$2.0\text{ns} \leq W \leq 8.0\text{ns}$	Adjust to achieve sync with a pulse width of 8.0 ns or less.
32ns Ref3	$2.0\text{ns} \leq W \leq 32\text{ns}$	Adjust to achieve sync with a pulse width of 32 ns or less.
64ns Ref3	$2.0\text{ns} \leq W \leq 64\text{ns}$	Adjust to achieve sync with a pulse width of 64 ns or less.

Notes: Pulse width is defined as the time width at 50% of the pulse amplitude, and therefore unless the trigger level has been set to 50% of the pulse amplitude, adjustments will be unsuccessful. When adjusting Ref3 and Rref4, adjust Ref4 first. (If Rref4 has not already been adjusted, Rref3 may be difficult to adjust in some cases.)



### Interval trigger time

Adjustment standard	$\pm (0.5\% + 0.5\text{ns})$	
Setting	Trigger	Ref4 at time of adjustment: Smart Trigger - Interval - Greater Than Ref3 at time of adjustment: Smart Trigger - Interval - In Range –
Limits	Slope: Positive LEVEL: Midpoint of amplitude	
Adjustment method	Set the amplitude of the signal source to approximately 6.0div. Open the “Maintenance1” menu and adjust as indicated below, using SG-503 as the signal source. After the adj is complete, click ”Save To HW” to save to the EEPROM.	

Note: Prior to adjustment, click “Special Mode” in the “Maintenance1” menu (to enable the interval trigger).

Adjustment item	Time setting	Adjustment method
4ns Ref4	Lower Limit 4.0ns	Adjust to achieve sync with a freq of 250MHZ or lower.
8ns Ref4	Lower Limit 8.0ns	Adjust to achieve sync with a freq of 125MHZ or lower.
32ns Ref4	Lower Limit 32ns	Adjust to achieve sync with a freq of 31.25MHZ or lower.
64ns Ref4	Lower Limit 64ns	Adjust to achieve sync with a freq of 15.625MHz or lower.
4ns Rref3	$2.0\text{ns} \leq W \leq 4.0\text{ns}$	Adjust to achieve sync with a freq of 250MHZ or higher.
8ns Ref3	$2.0\text{ns} \leq W \leq 8.0\text{ns}$	Adjust to achieve sync with a freq of 125MHZ or higher.
32ns Ref3	$2.0\text{ns} \leq W \leq 32\text{ns}$	Adjust to achieve sync with a freq of 31.25MHZ or higher.
64ns Ref3	$2.0\text{ns} \leq W \leq 64\text{ns}$	Adjust to achieve sync with a freq of 15.625MHz or higher.

### 6.9.3.9 Adjustment of time difference between channels

Adjustment standard  $\pm 20\text{ps}$  or less (10mV/div) for CH1

Setting All CHs  $\Rightarrow$  DC 50 $\Omega$  10mV/div  
Timebase  $\Rightarrow$  RIS 1ns/div or more  
Trigger  $\Rightarrow$  Delay: 0ns (center of display screen)

Adjustment method

- (1) Input a high-speed pulse signal (or an approximate 200MHz sine wave signal) through a divider to CH1 and CHX.
- (2) Open the “Maintenance1” menu, and using the “Skew” parameter measurement, adjust the Channel Adjustment Value of “Delay CHX” so that the rising (and falling) portions of CH1 and CHX become aligned.  
Note: CH1 is a reference and is therefore fixed at ” 511.”
- (3) Click ”Save To HW” to save to the EEPROM.

#### 6.9.3.10 Speaker volume adjustment

Adjustment method Fully turn R18 on the PCI Board so that the volume becomes a maximum. Adjust the speaker volume using the startup sound emitted when the OS (WindowsXPe) starts up, or by opening the “Control Panel” and using “Sounds and Audio Devices – Sounds” or the like.

### 6.10 Troubleshooting and Flow Charts

#### 6.10.1 Introduction



The troubleshooting information contained in this section is intended for use by qualified personnel having a basic understanding of electronics (analog and digital). In order to simplify servicing and minimize downtime, the following list of possible symptoms, likely causes, and troubleshooting steps have been prepared. The first step in troubleshooting is to check for obvious items like blown fuses. The power supply is the next item to check before proceeding to more detailed troubleshooting, since noise or low power supply voltages can cause a variety of digital and analog problems.

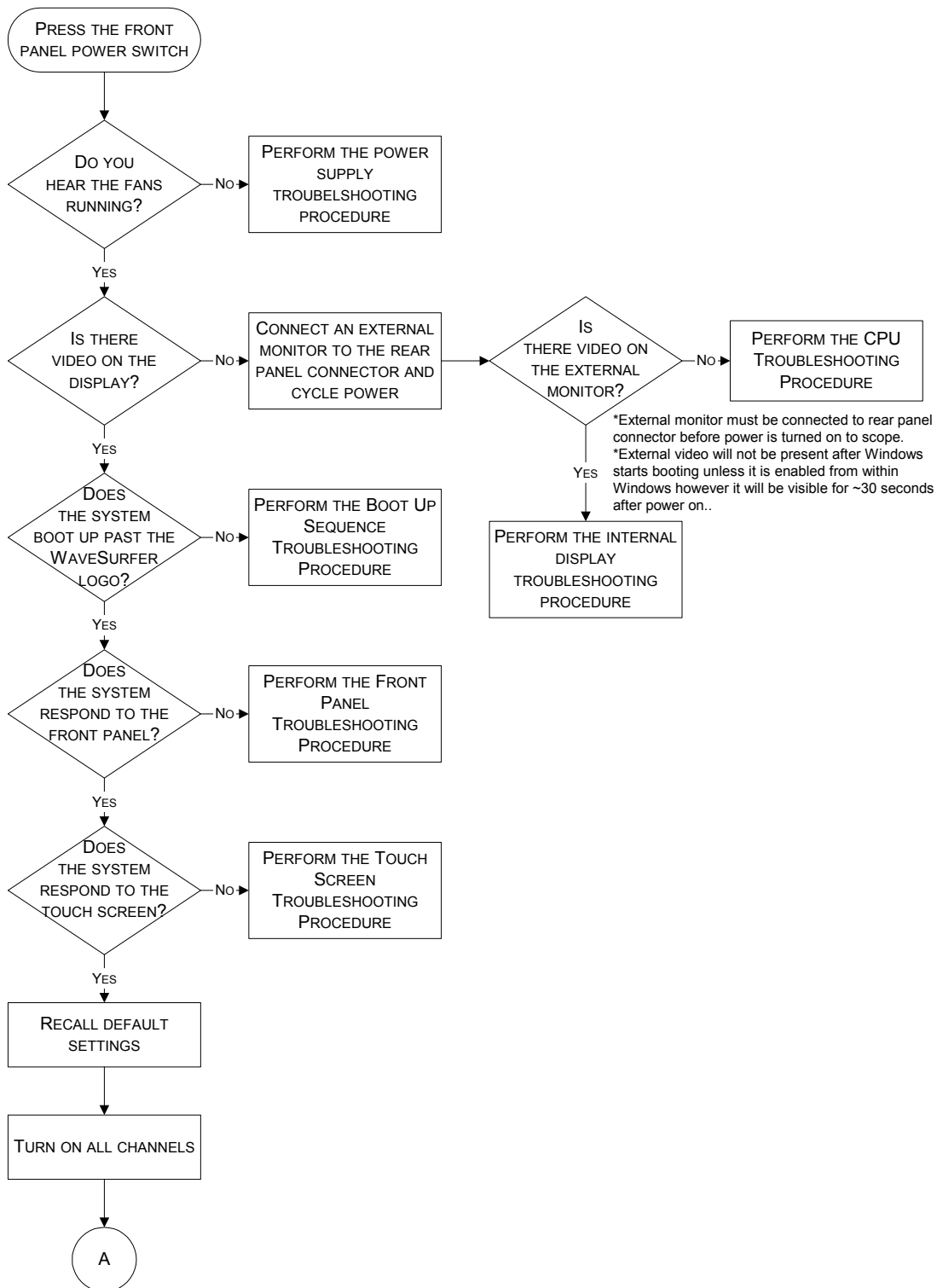
#### 6.10.2 Repair Level

Most procedures in this section will allow troubleshooting down to the **BOARD LEVEL.**

Defective circuit boards will be repaired or exchanged by the regional LeCroy service office or the local representative.

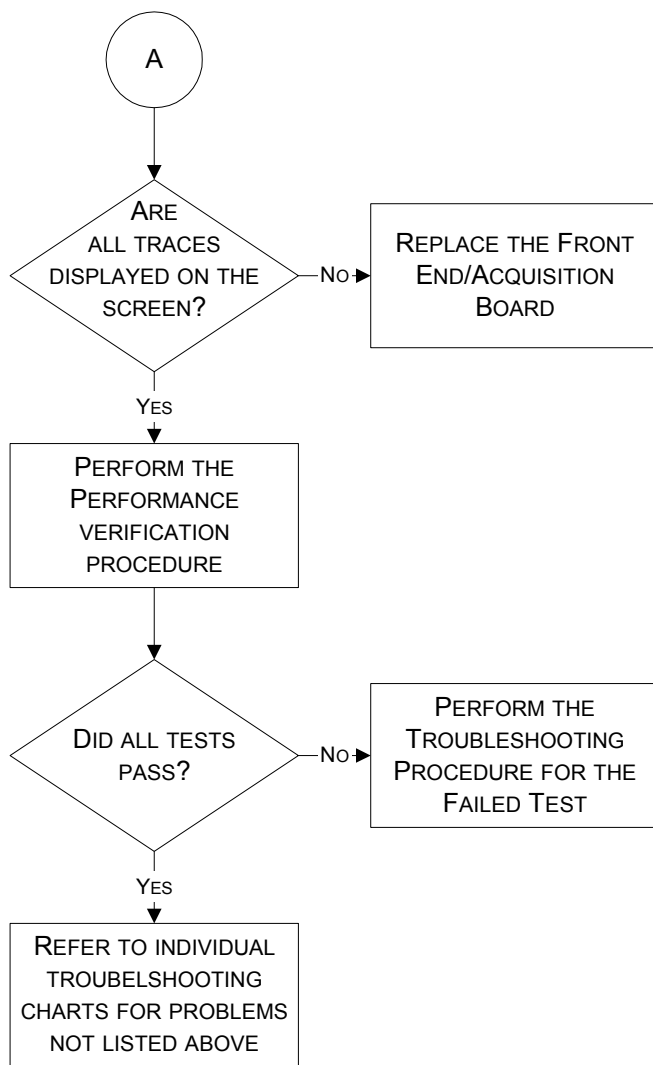


### 6.10.3 Initial Troubleshooting



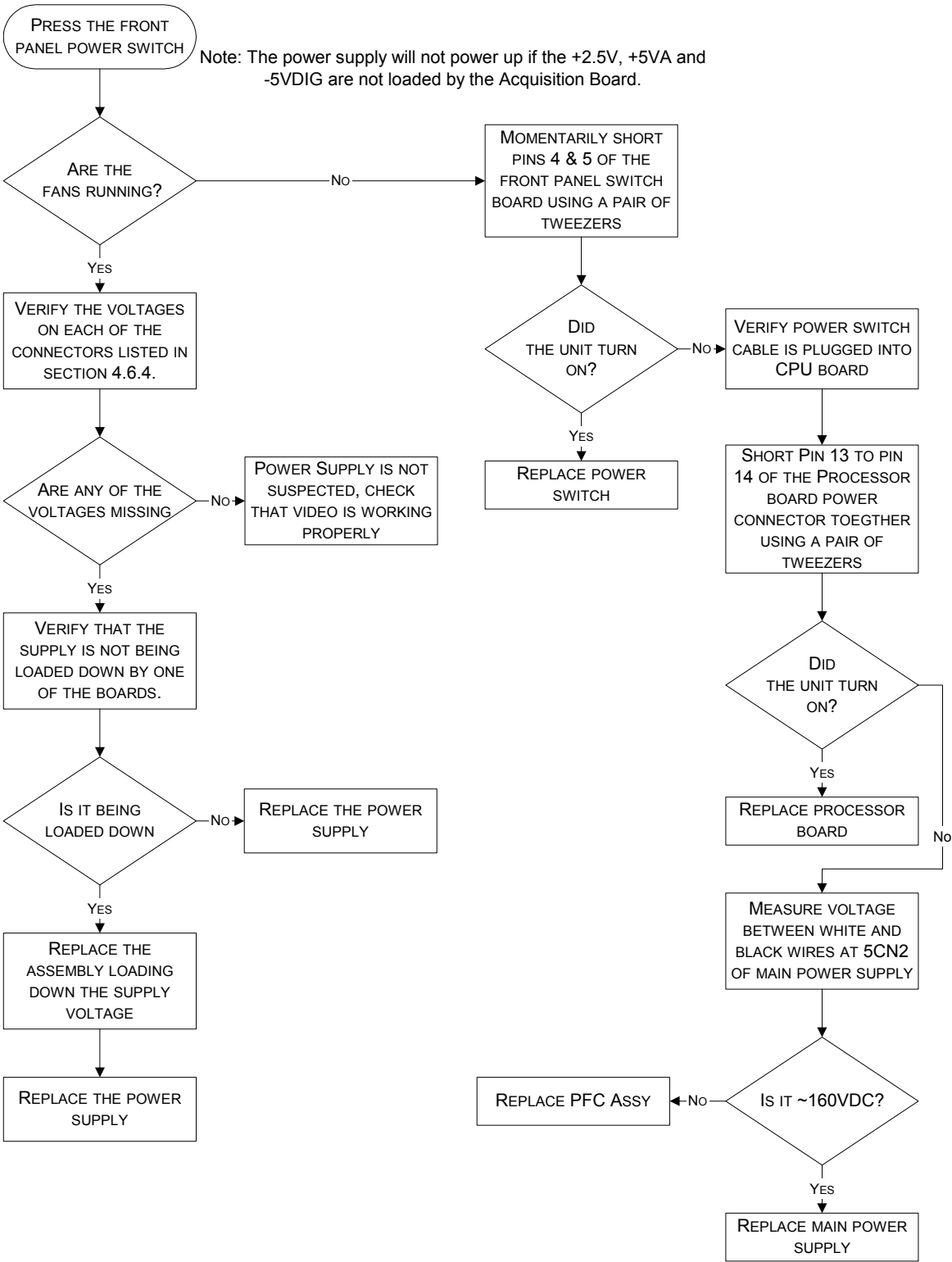


## Initial Troubleshooting (continued)





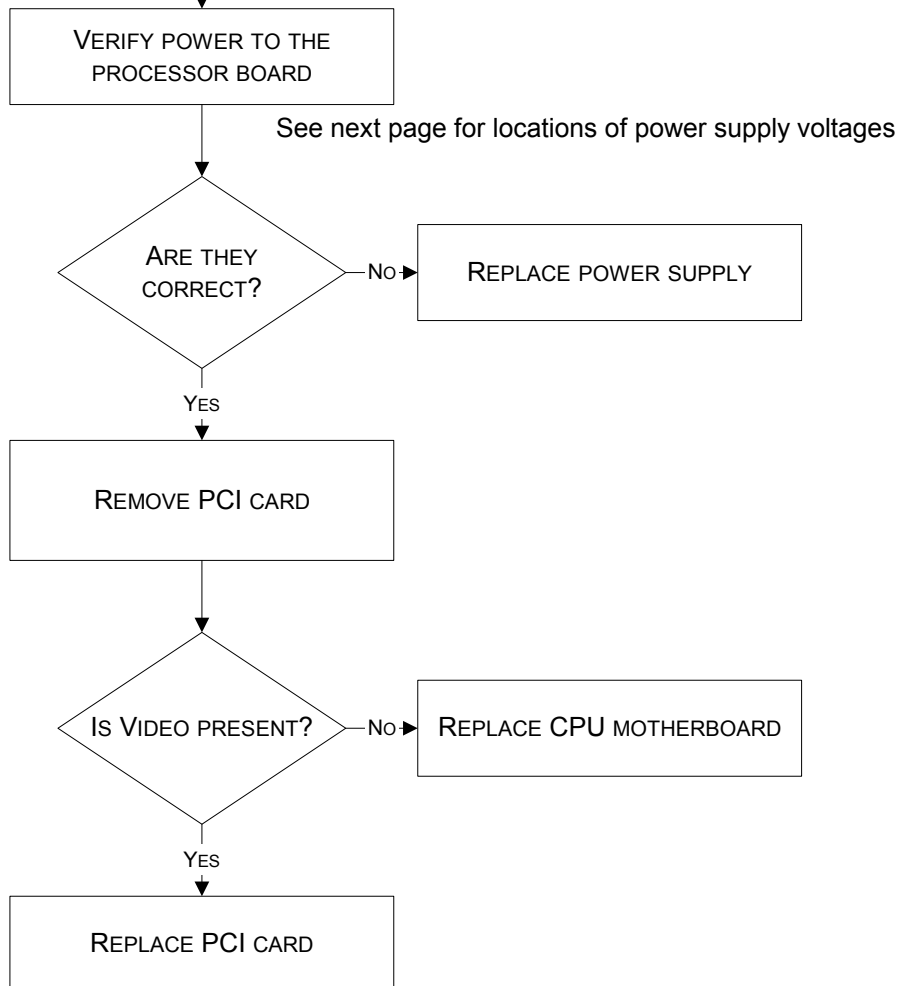
6.10.4 Power Supply Problem



### 6.10.5 No Display (Internal or External)

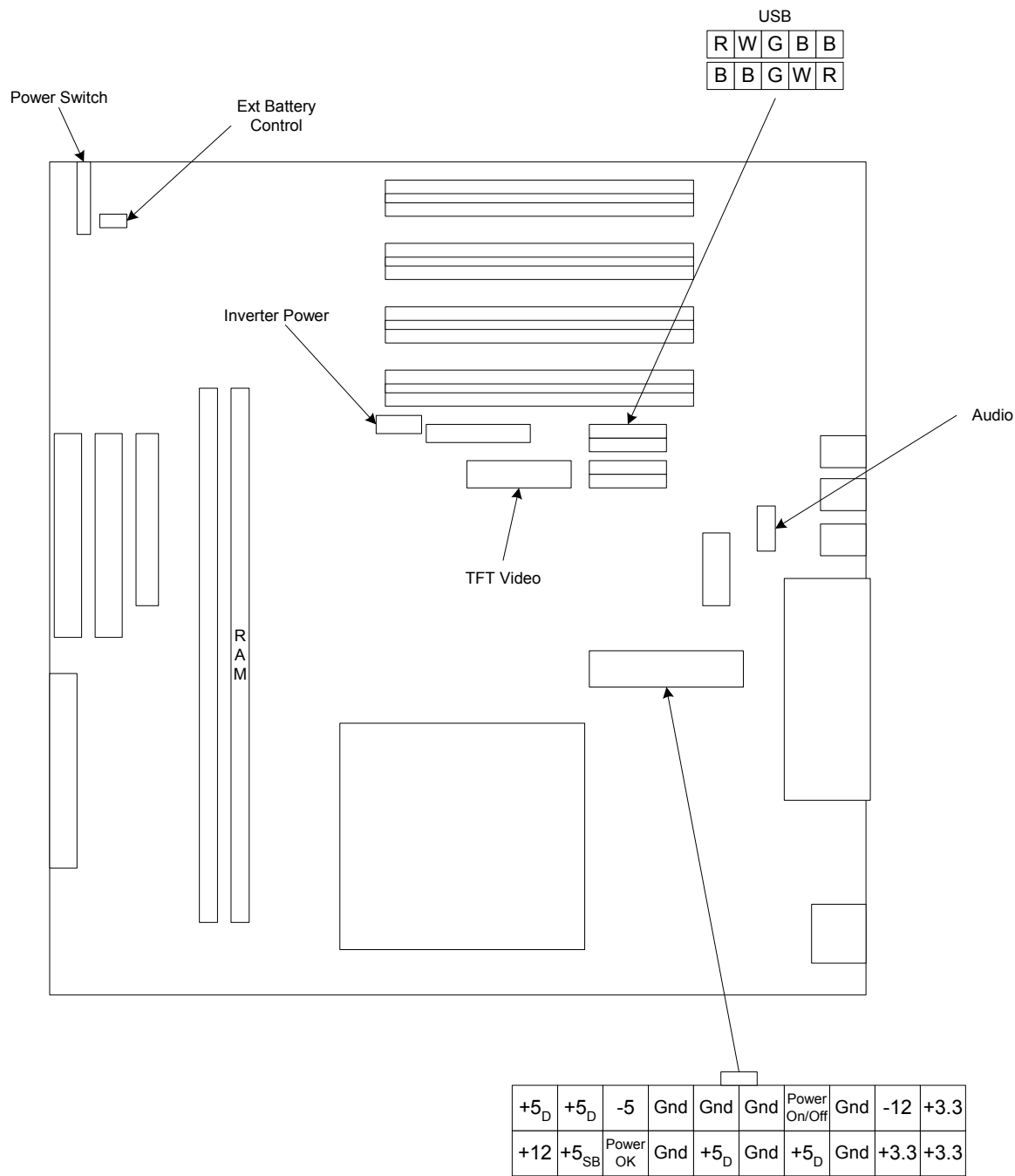
THIS PROCEDURE ASSUMES THAT VIDEO IS NOT PRESENT ON AN EXTERNAL MONITOR\* CONNECTED TO THE REAR PANEL AND THAT THE INTERNAL SCOPE COOLING FANS ARE OPERATIONAL

\*External monitor must be connected to rear panel connector before power is turned on to scope.  
\*External video will not be present after Windows starts booting unless it is enabled from within Windows however it will be visible for ~30 seconds after power on..

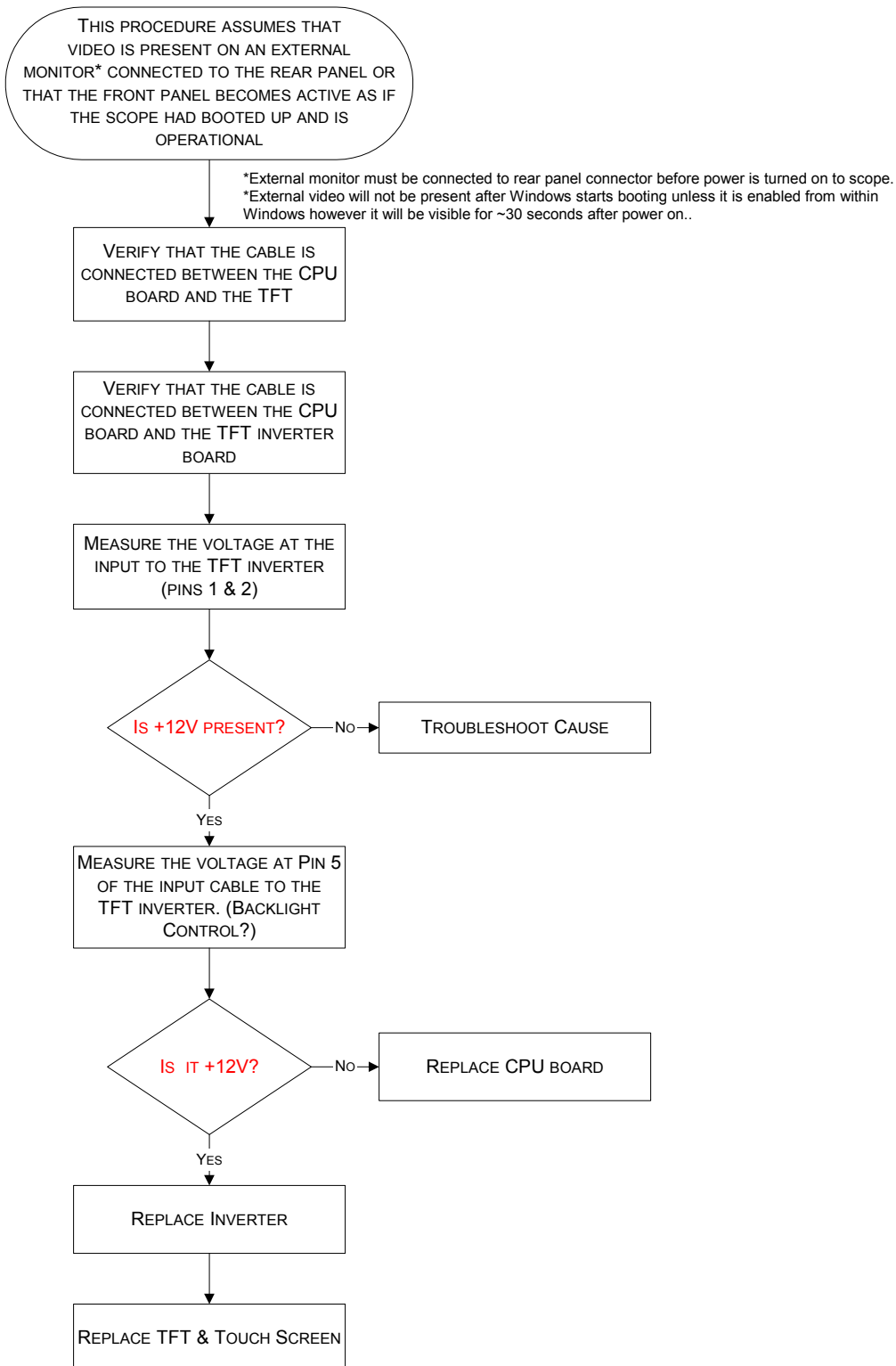




No Display (Internal or External) (continued)

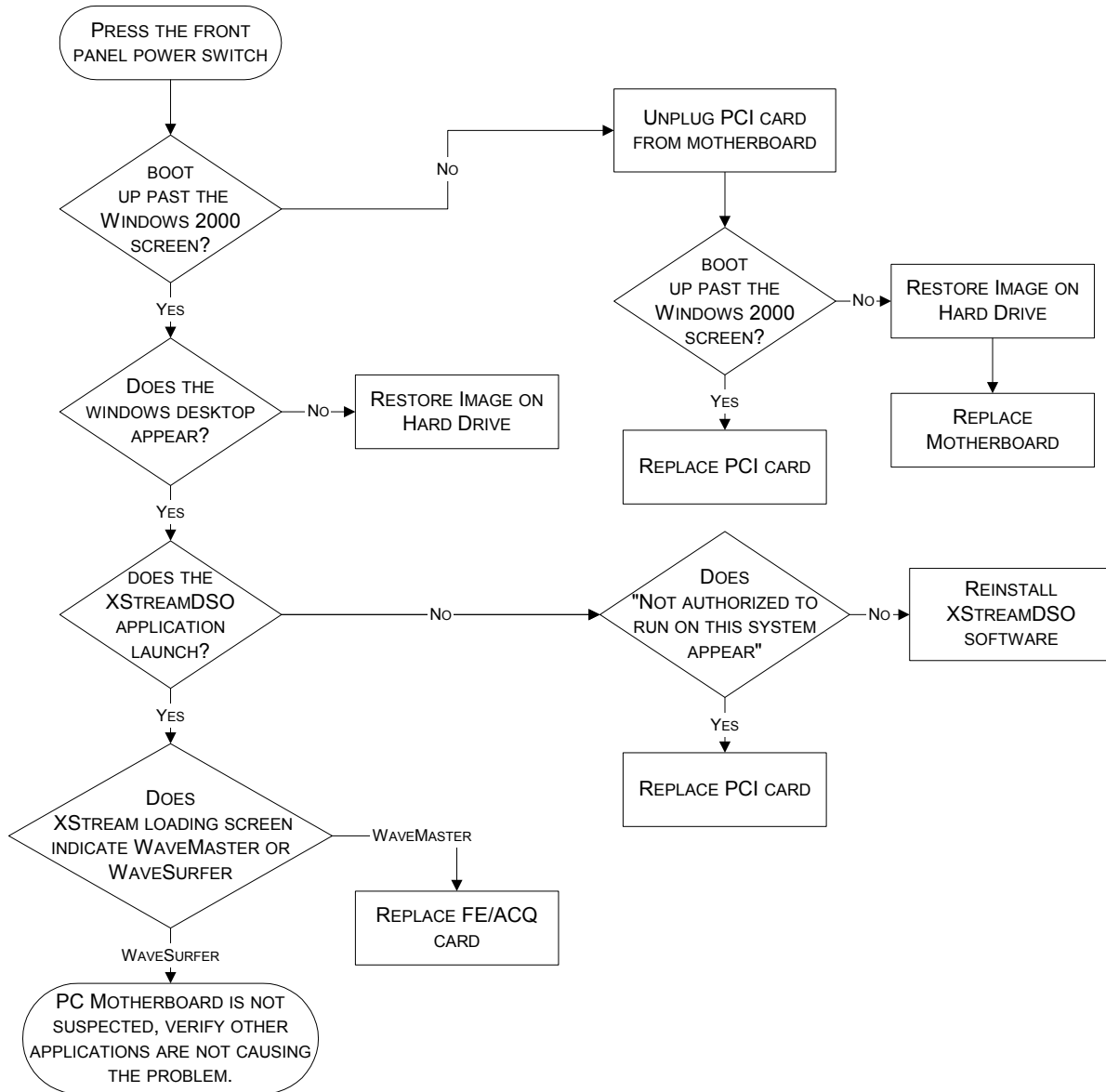


## 6.10.6 Internal Display Problem

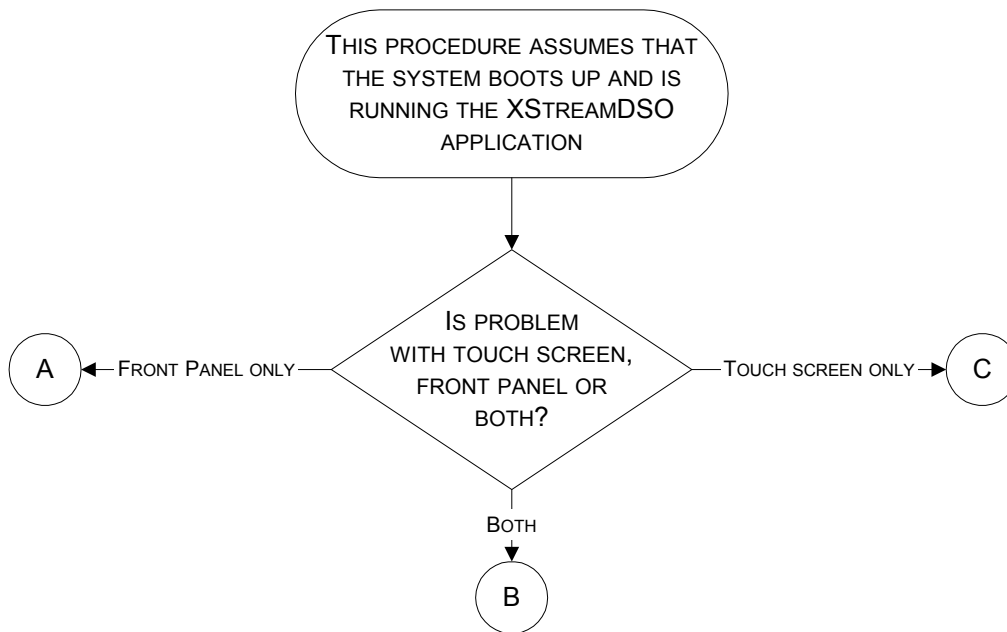




## 6.10.7 Boot Up Sequence

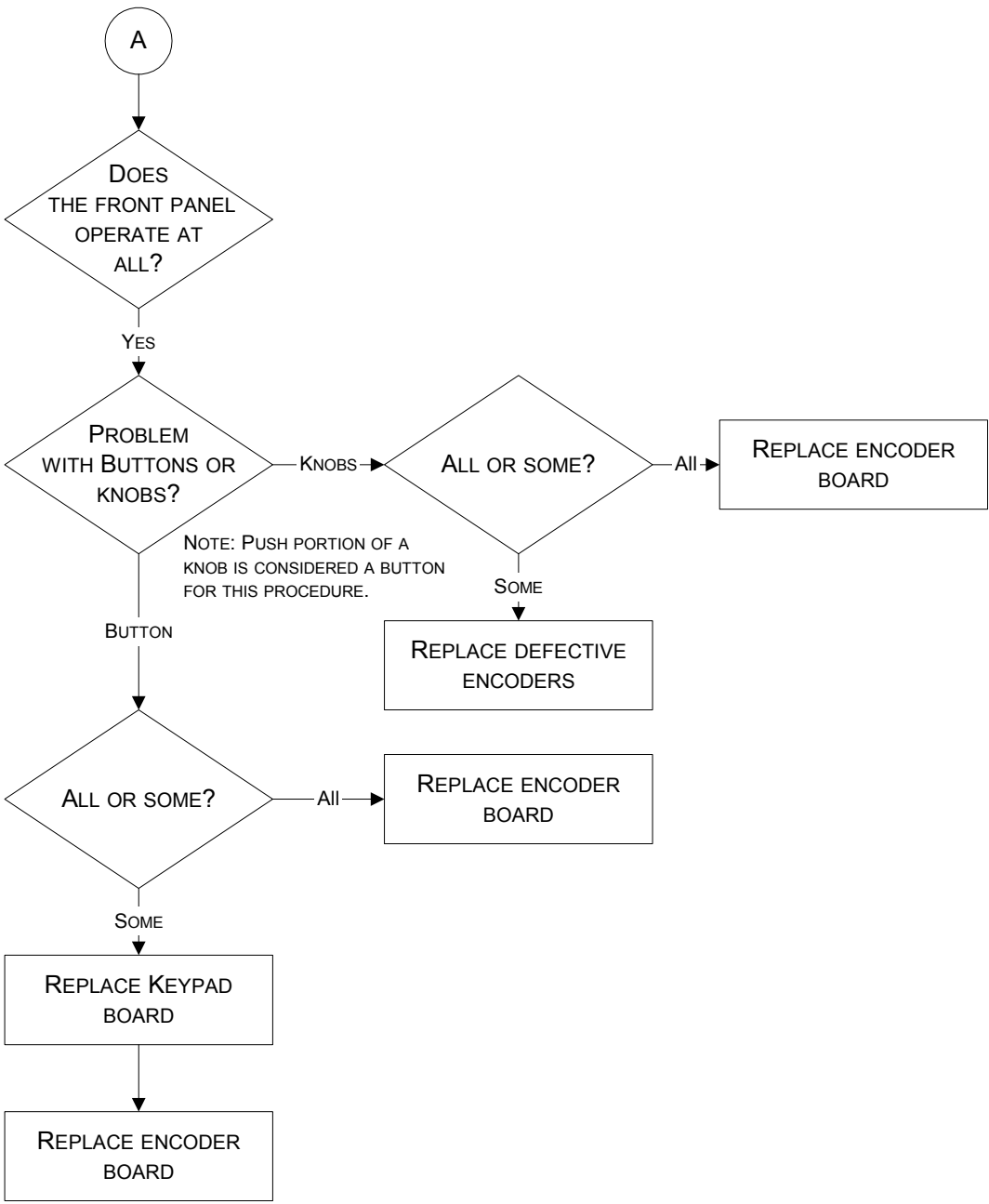


### 6.10.8 Front Panel Controls or Touch Screen Does not Operate



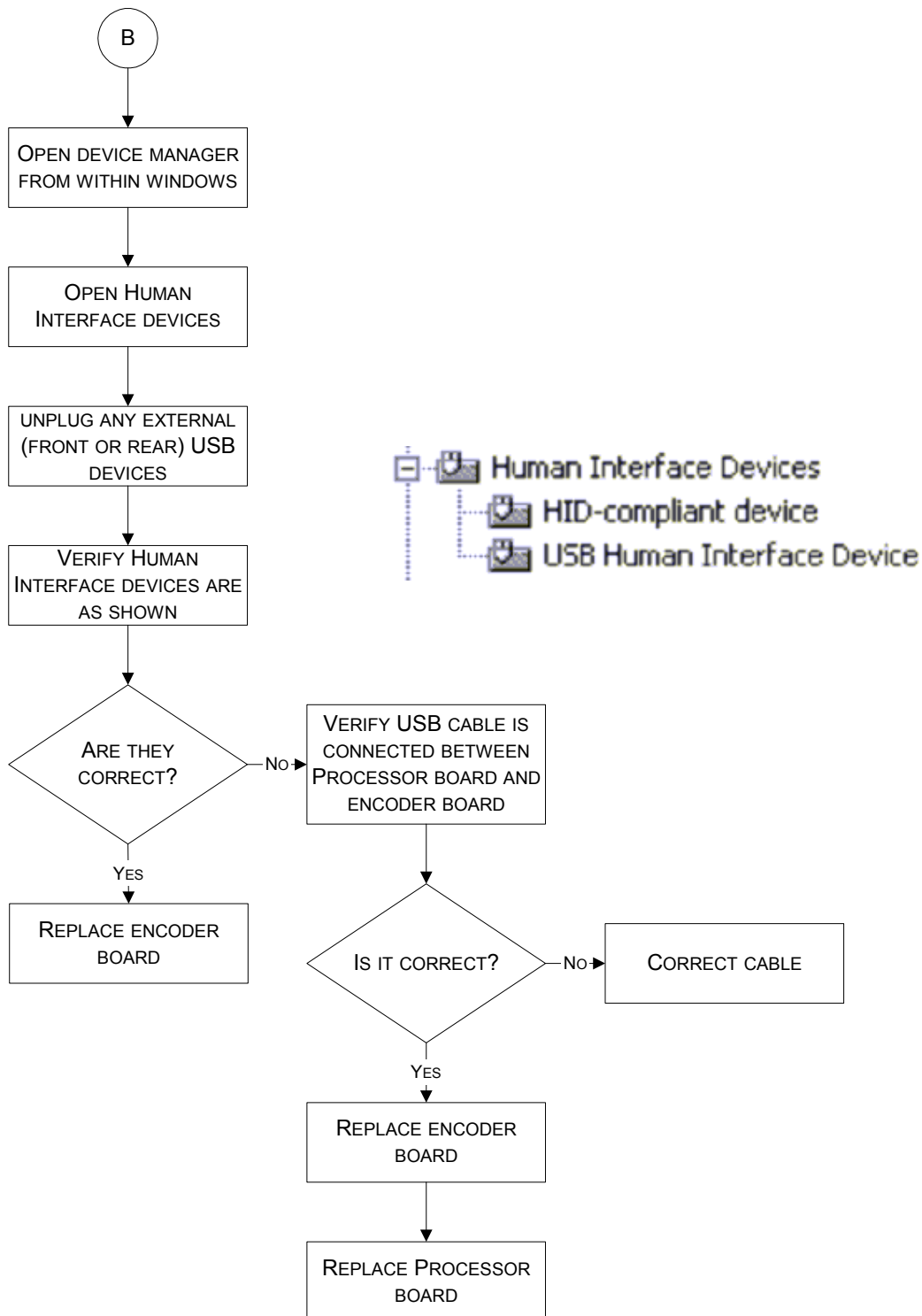


**Front Panel Controls or Touch Screen Does not Operate (continued)**



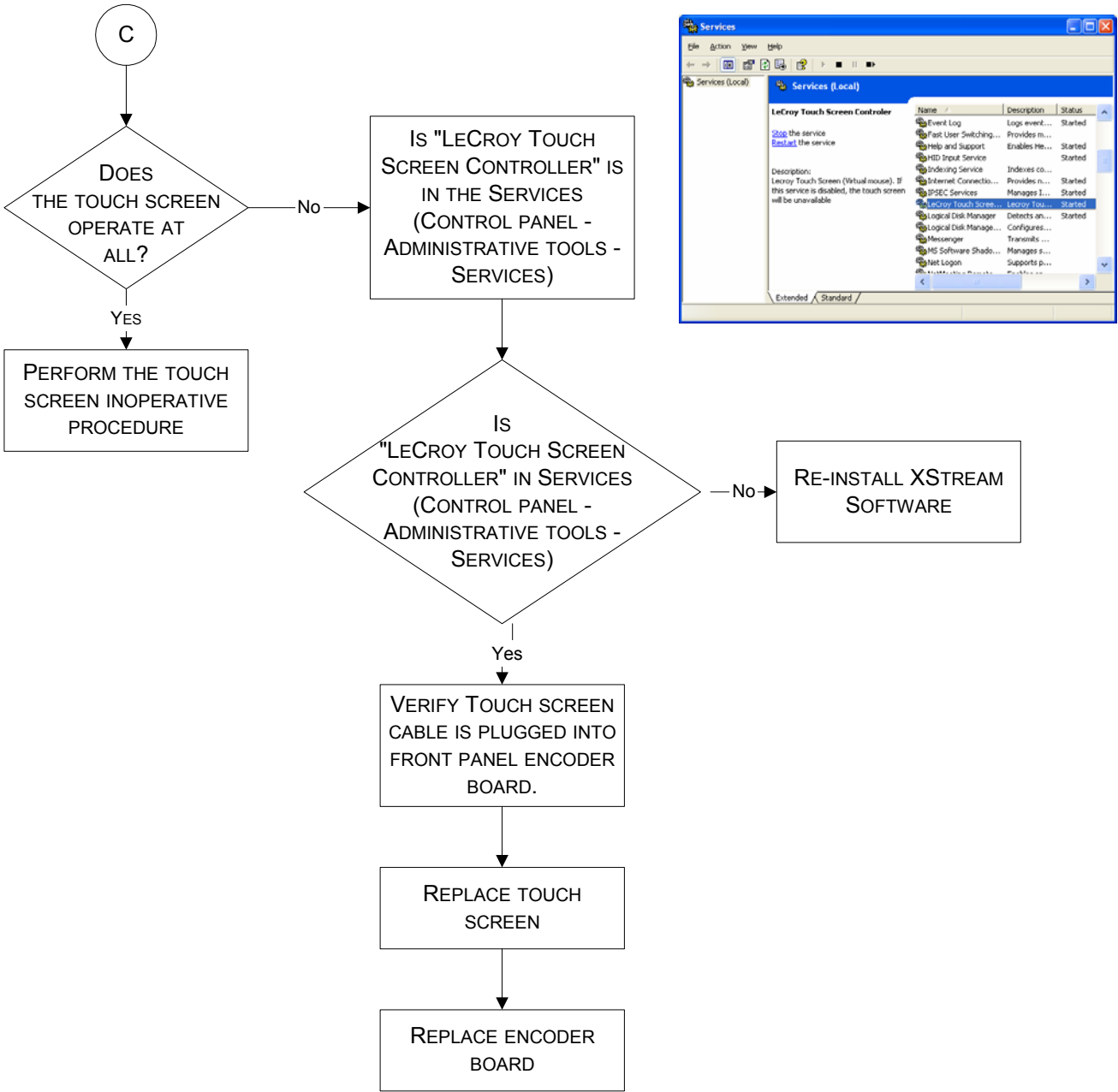


## Front Panel Controls or Touch Screen Does not Operate (continued)

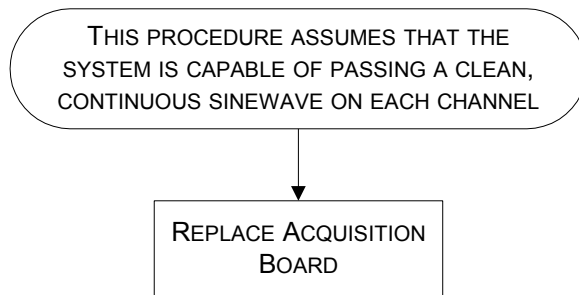




**Front Panel Controls or Touch Screen Does not Operate (continued)**

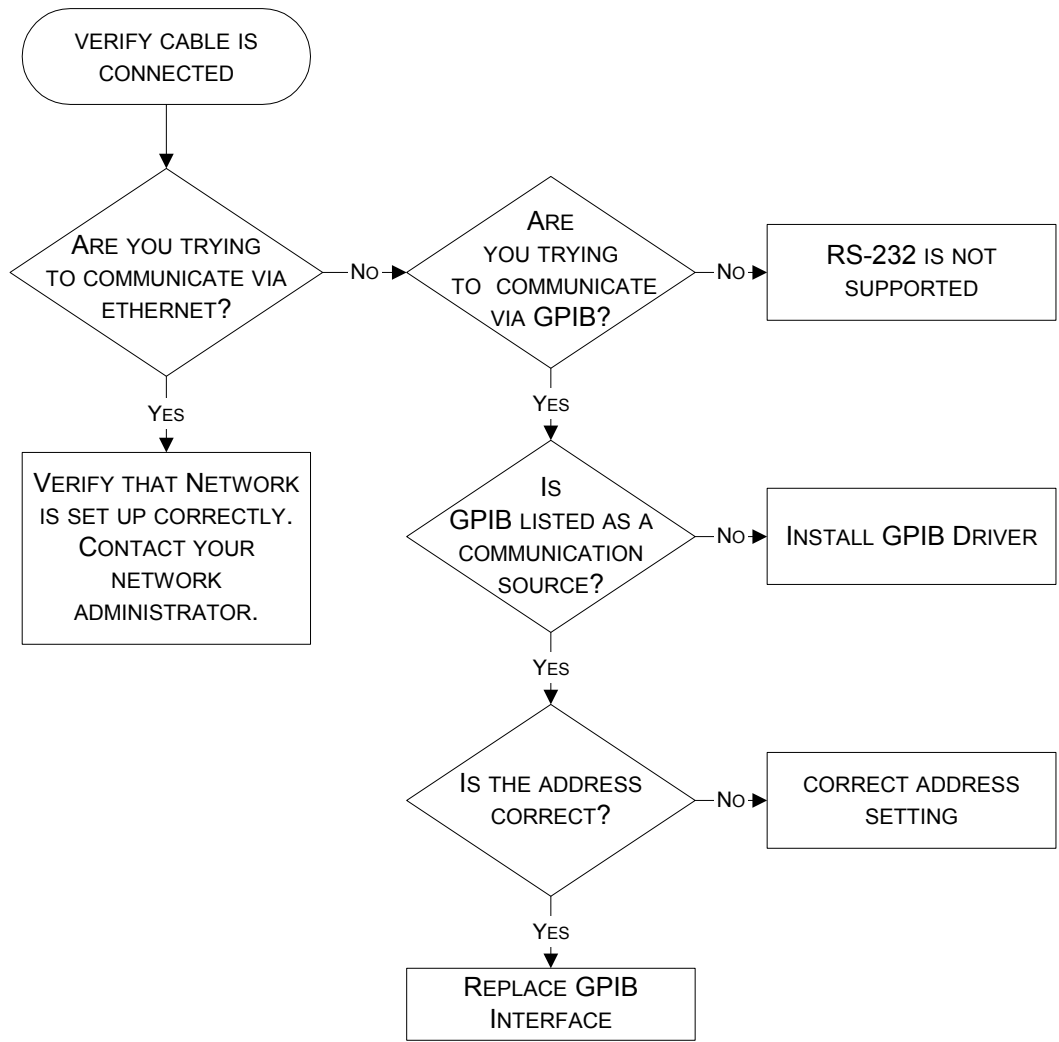


### 6.10.9 Timebase Problem

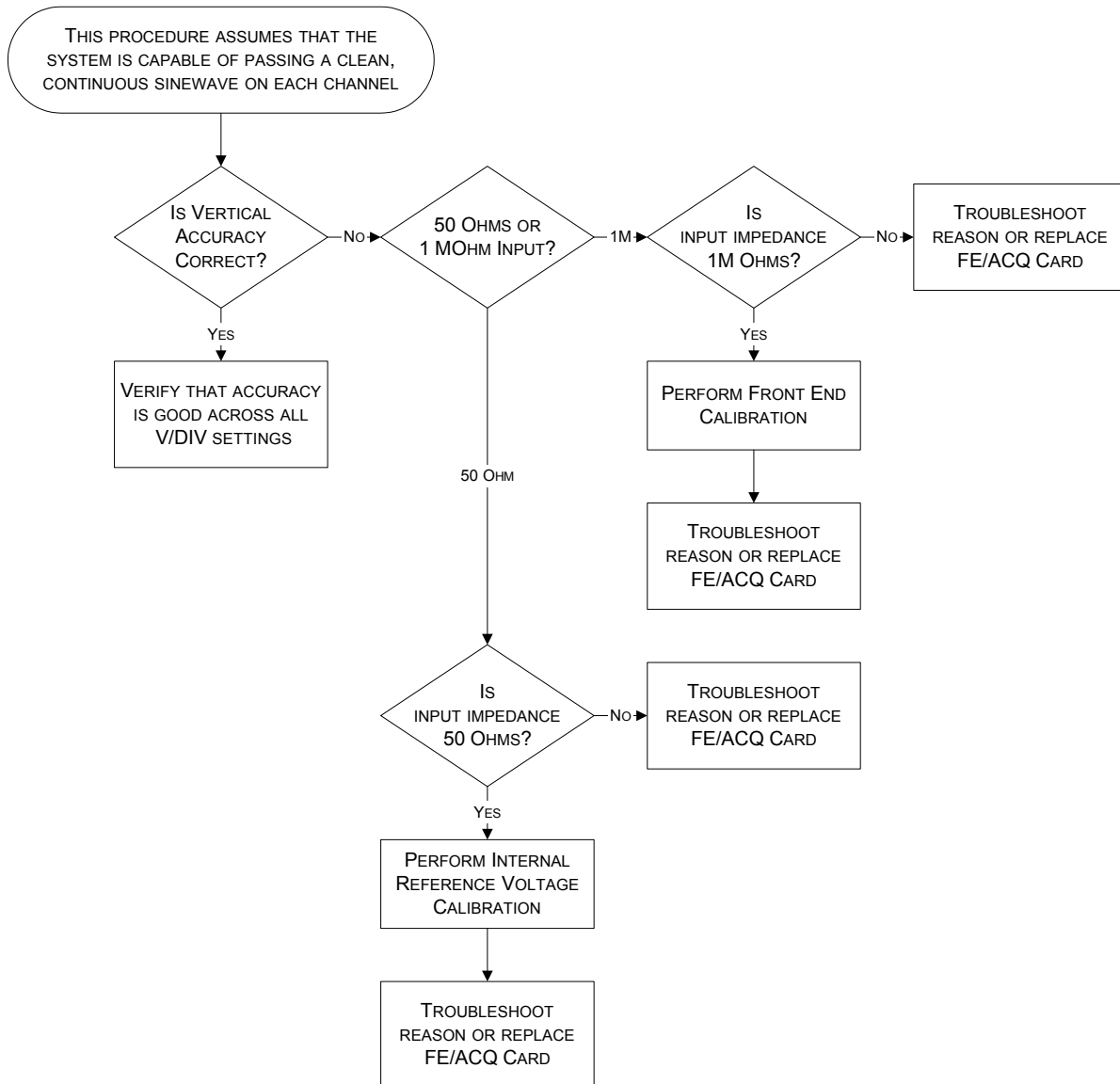




**6.10.10 Remote Control Problem**

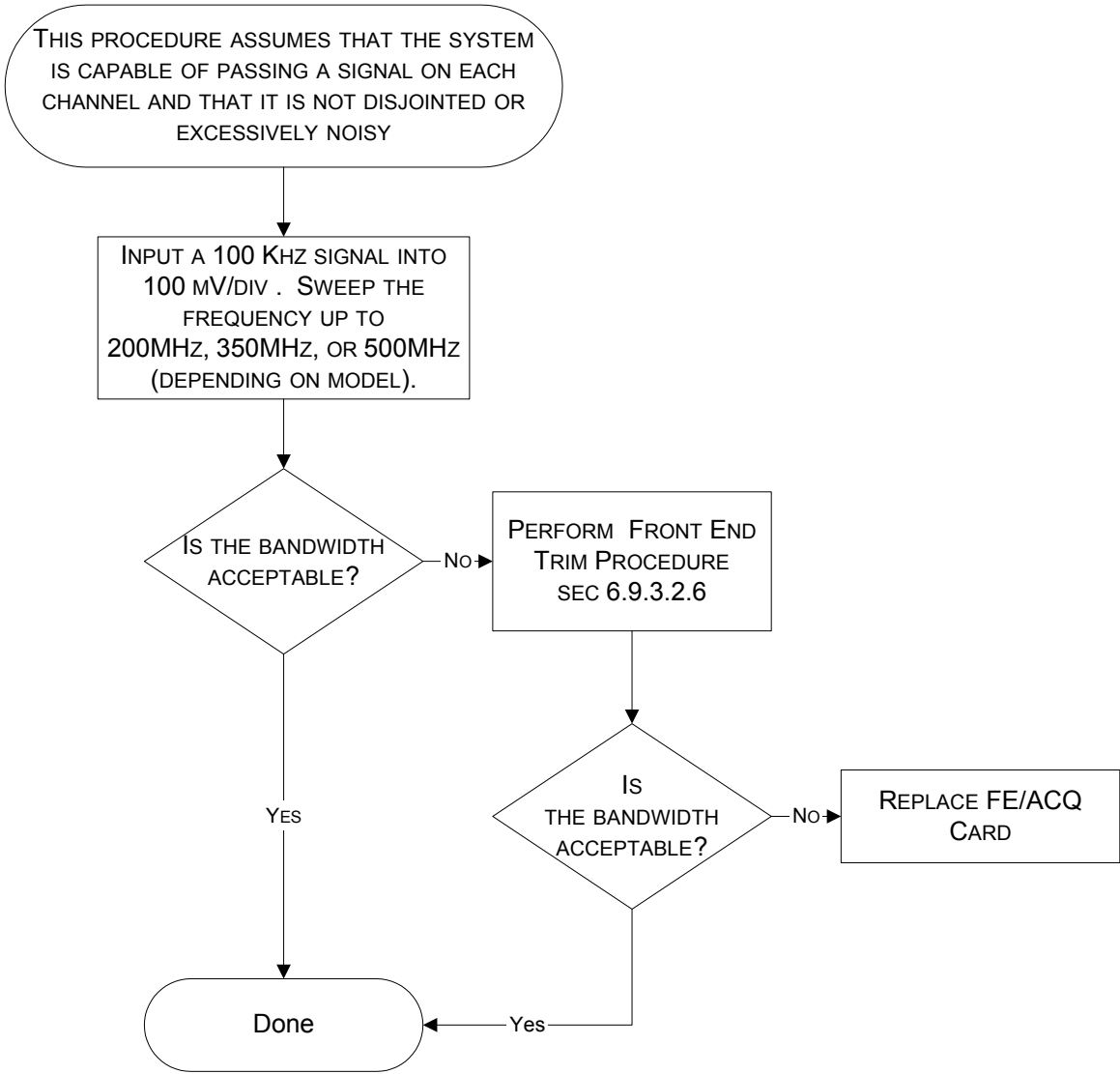


### 6.10.11 Vertical Accuracy Problem

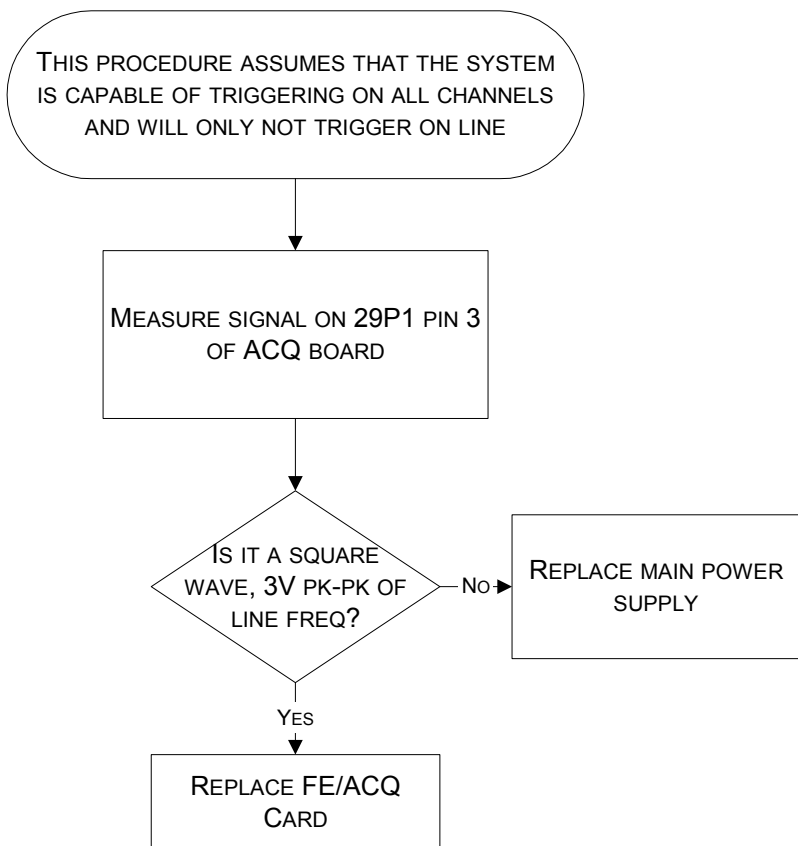




**6.10.12 Bandwidth Problem**



### 6.10.13 Line Trigger Problem





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