Introduction

The purpose of this troubleshooting guide is to provide fast solutions to problems that a bowling center may experience. Using this guide prior to contacting Brunswick's Customer Response Center will not only speed your troubleshooting efforts, but will give Brunswick's technicians valuable information should calling the Response Center be necessary.

Before attempting to troubleshoot any situation, obtain as much information relating to the malfunction as possible. This information can be obtained from bowlers, control desk operators or by simple observation. Make sure that the information provided to you from other sources is accurate. Many times the person providing the information will have a different perspective of the equipment than that of a mechanic or may use different terms to describe the situation. This leads to misunderstanding as to what the defect is. Inaccurate or misinterpreted information will cause delays, add cost by replacing good parts and eventually lead to frustration.

It is also important to not automatically assume that a board or cable is bad when a malfunction occurs. Many times an error occurs because of improper operations, improper setup, or a onetime event that causes a failure. Cycling power (turning power off, then on) will usually correct these situations.

If the failure seems to be caused by a bad circuit board, verify this by replacing the suspected board with one that is known to be functional. If the replacement board solves the problem, verify that the board removed is actually defective by installing it in another unit. Many times, failures are caused by a bad connection that is solved by replacing the board or by simply reseating it or checking it's connectors. Numerous circuit boards have been sent to Brunswick for repair even though there was nothing wrong with them. Again, this leads to unnecessary maintenance costs for the center.

This guide contains flowcharts to help the mechanic quickly solve common problems that may be encountered. It is assumed that the troubleshooter is familiar with the components and terminology used in the Frameworx system and the basic operation of a multimeter and cable testers. For additional information about these topics, consult the Scoring System Service Manual (57-900351-000) or the instruction manual that was sent with the multimeter or tester.

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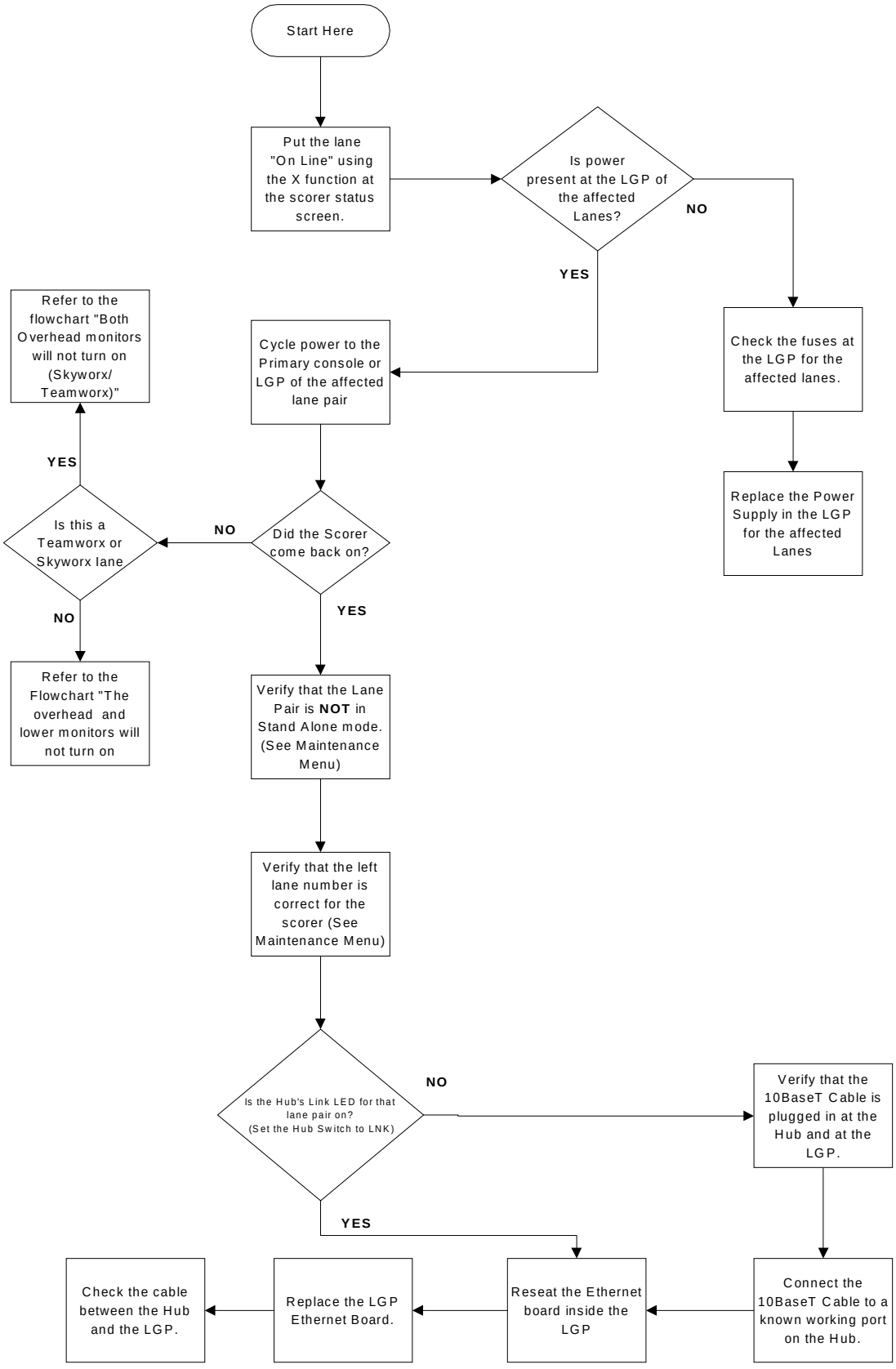
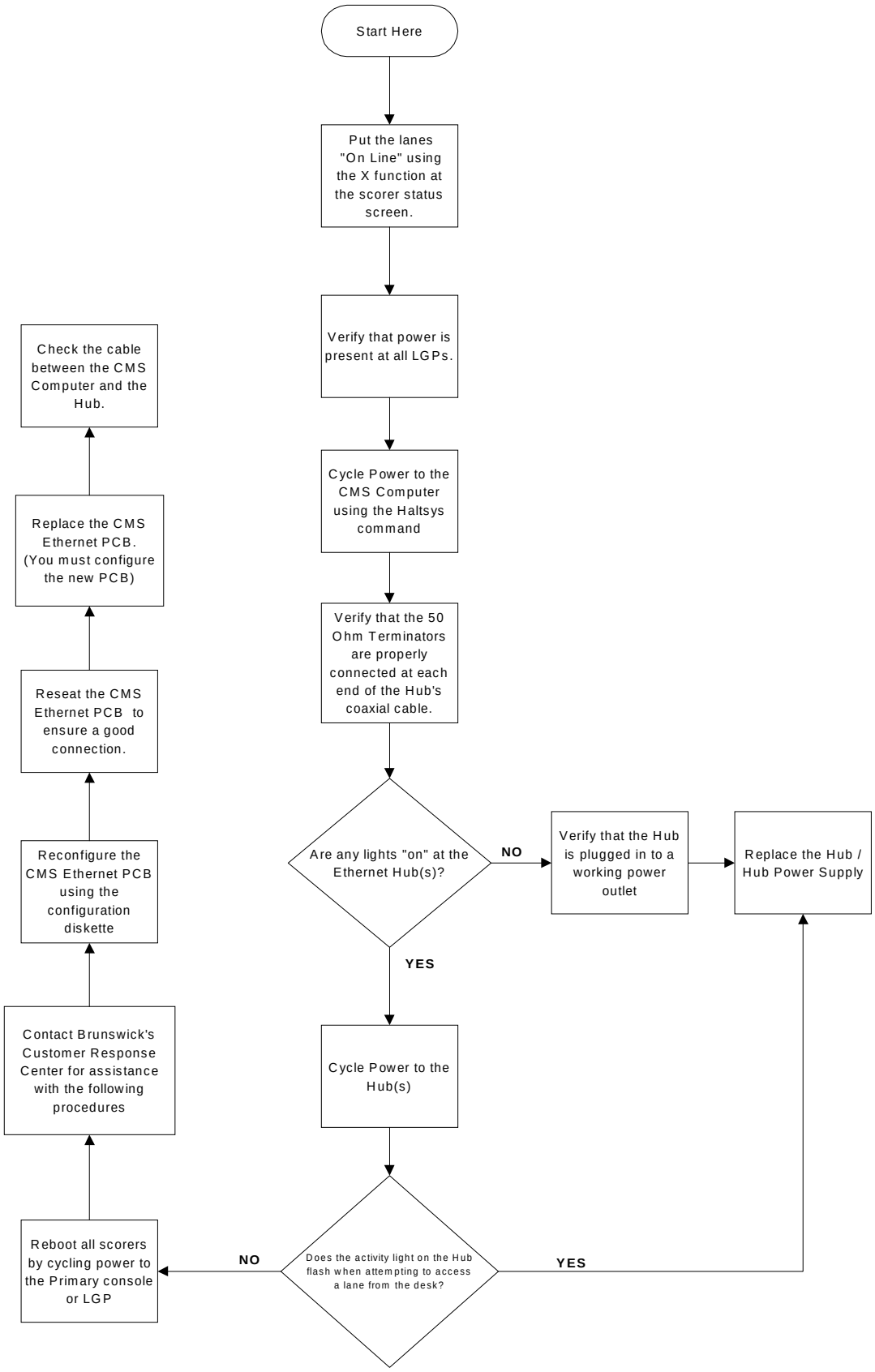
Communications Problems to the Lanes

One Lane Pair is "Offline" At The Control Desk

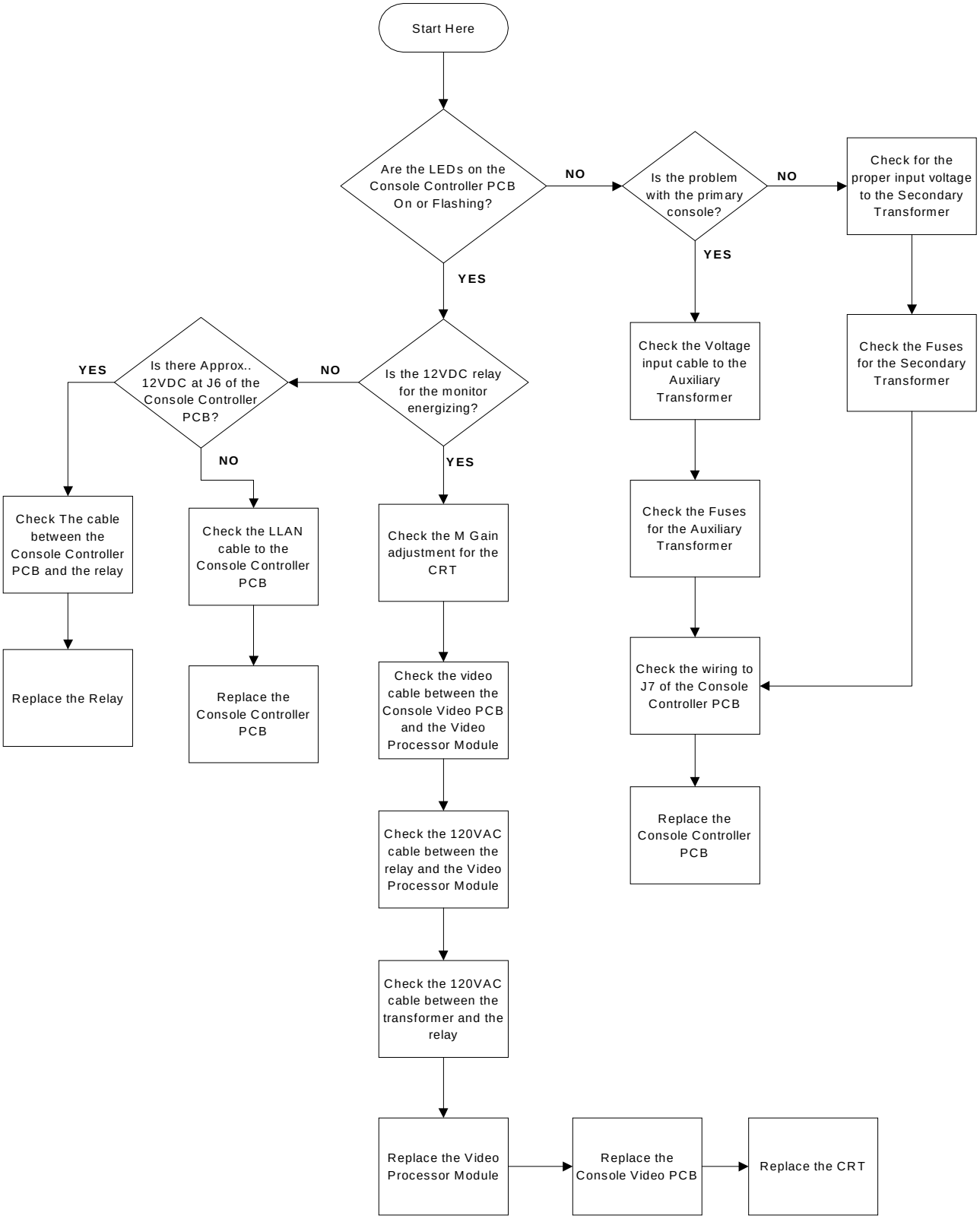


All Lanes Are "Offline" At The Control Desk

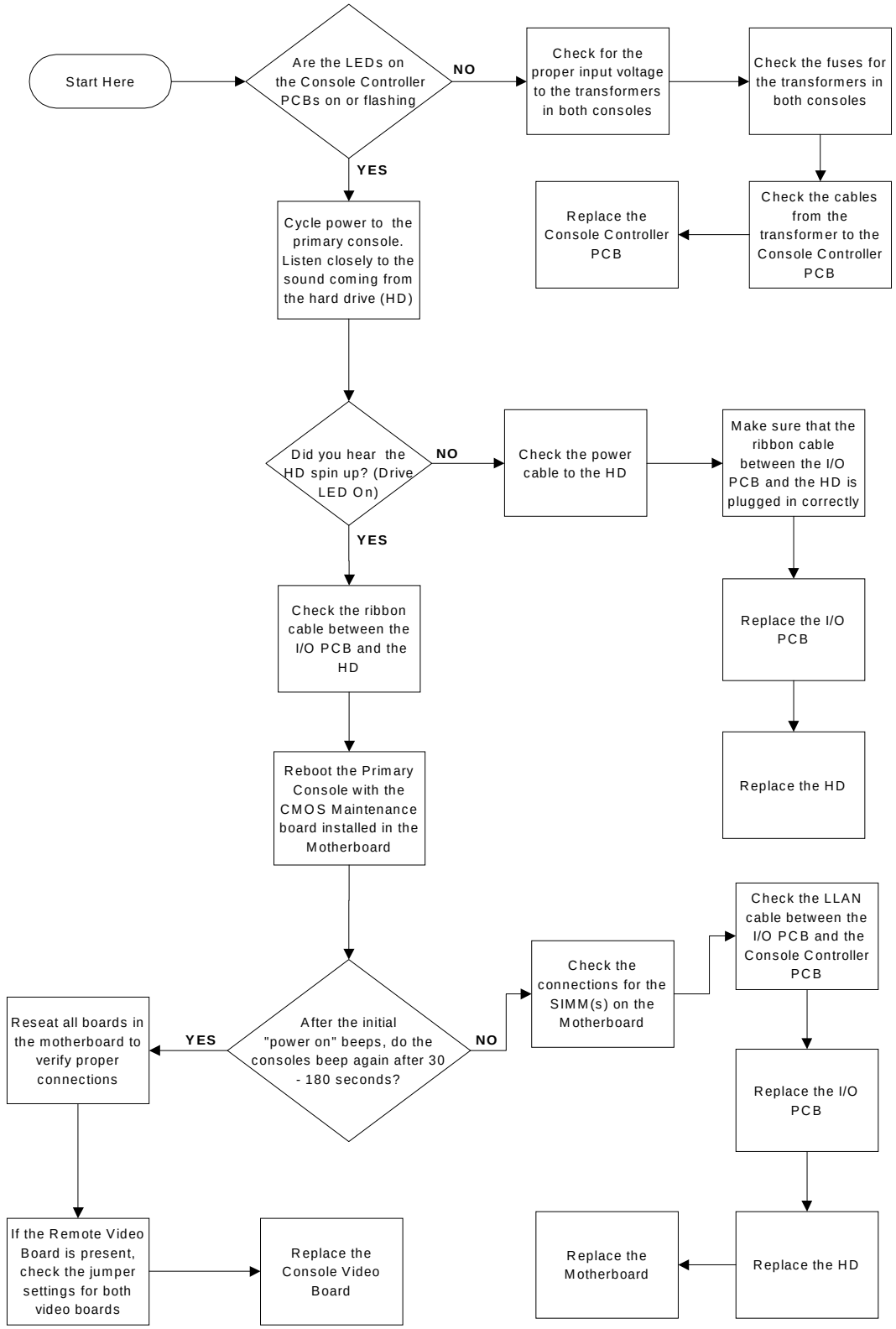


Console Monitor/Video Problems

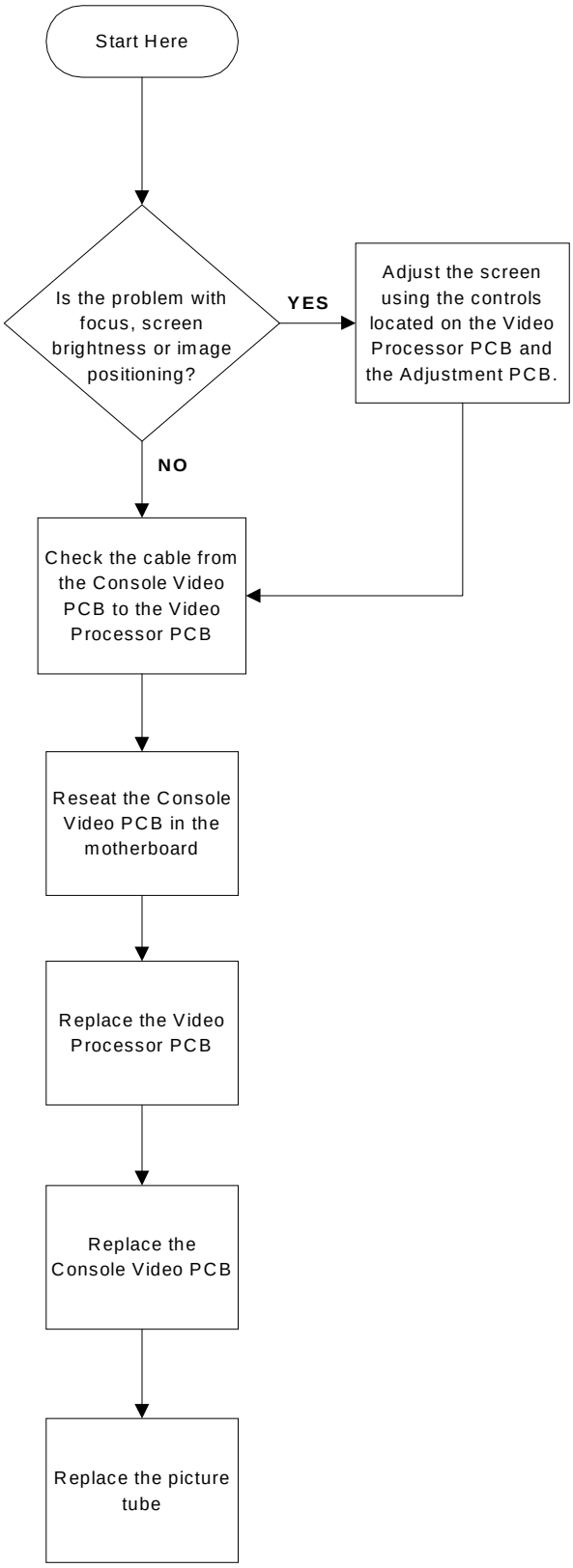
One Lower Monitor Will Not Turn On



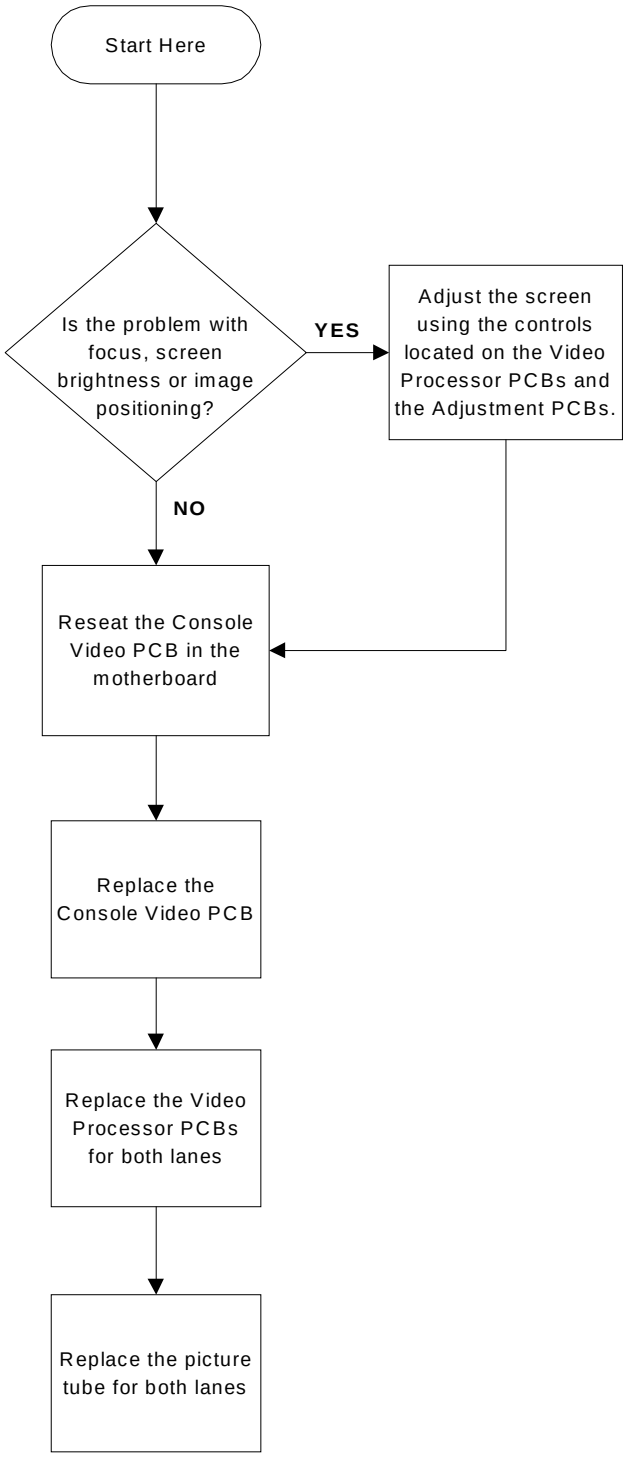
Both Lower Monitors Will Not Turn On



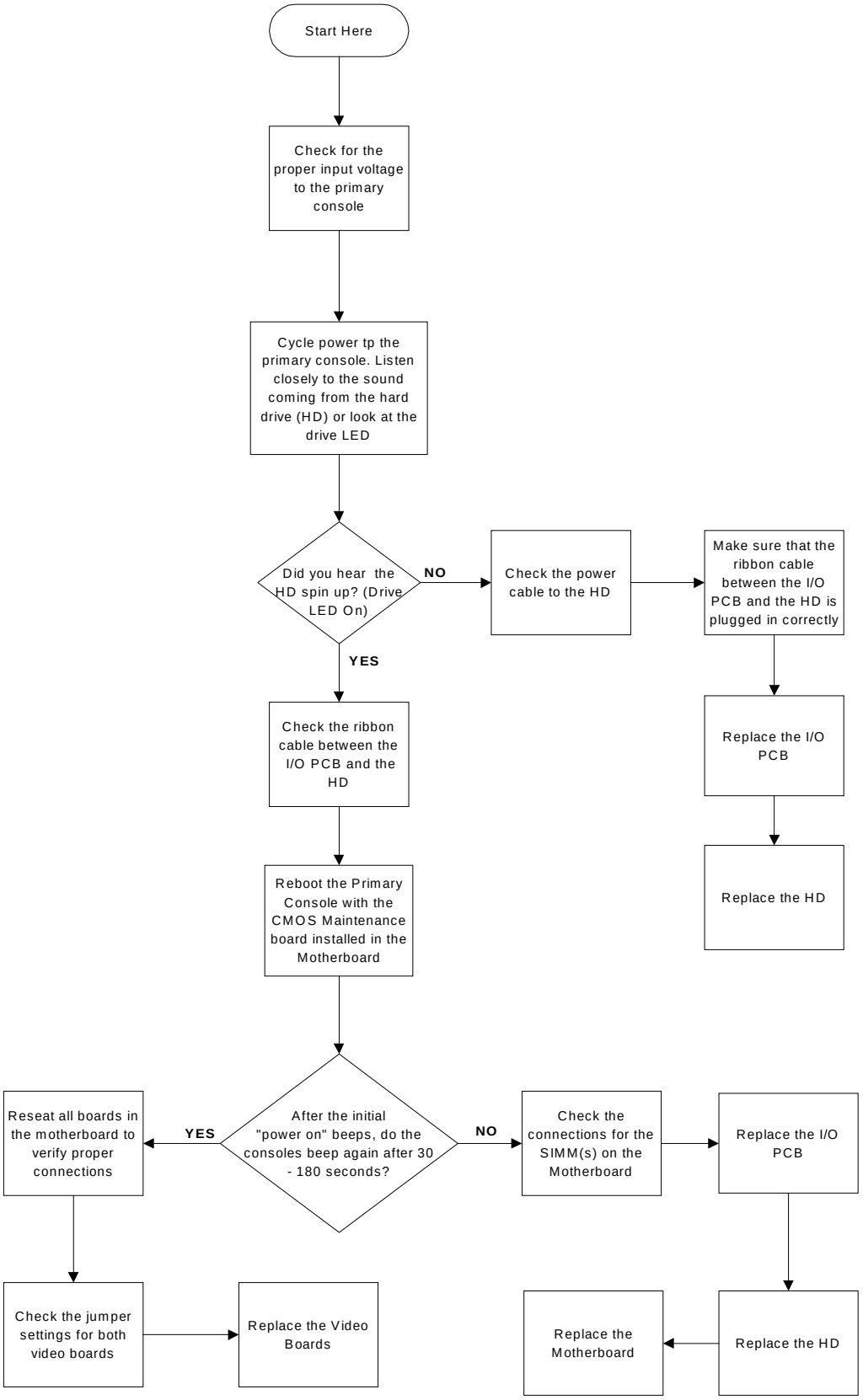
The Picture On One Lower Monitor Is Bad



The Picture On Both Lower Monitors Is Bad

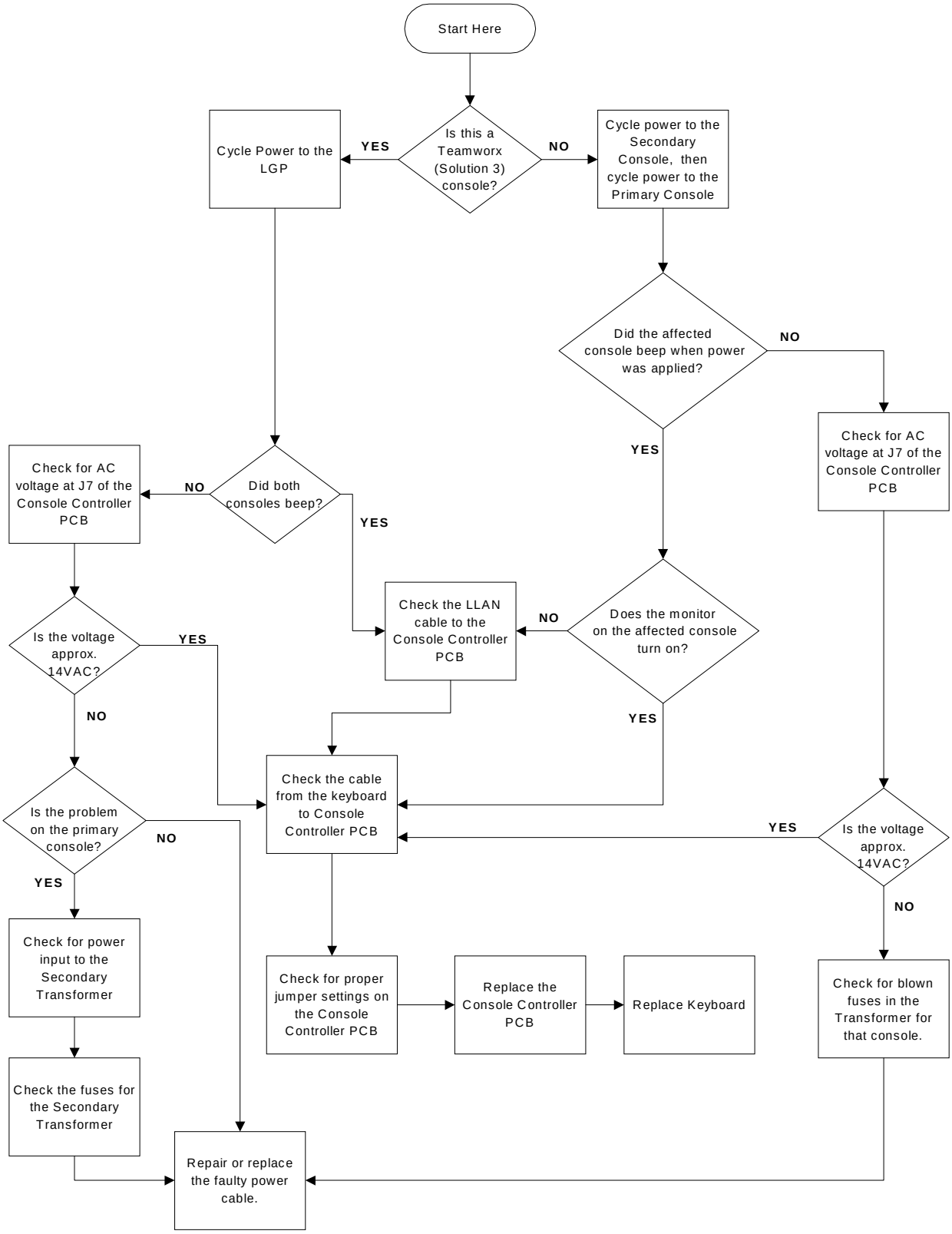


The Overheads And Lower Monitors Will Not Turn On

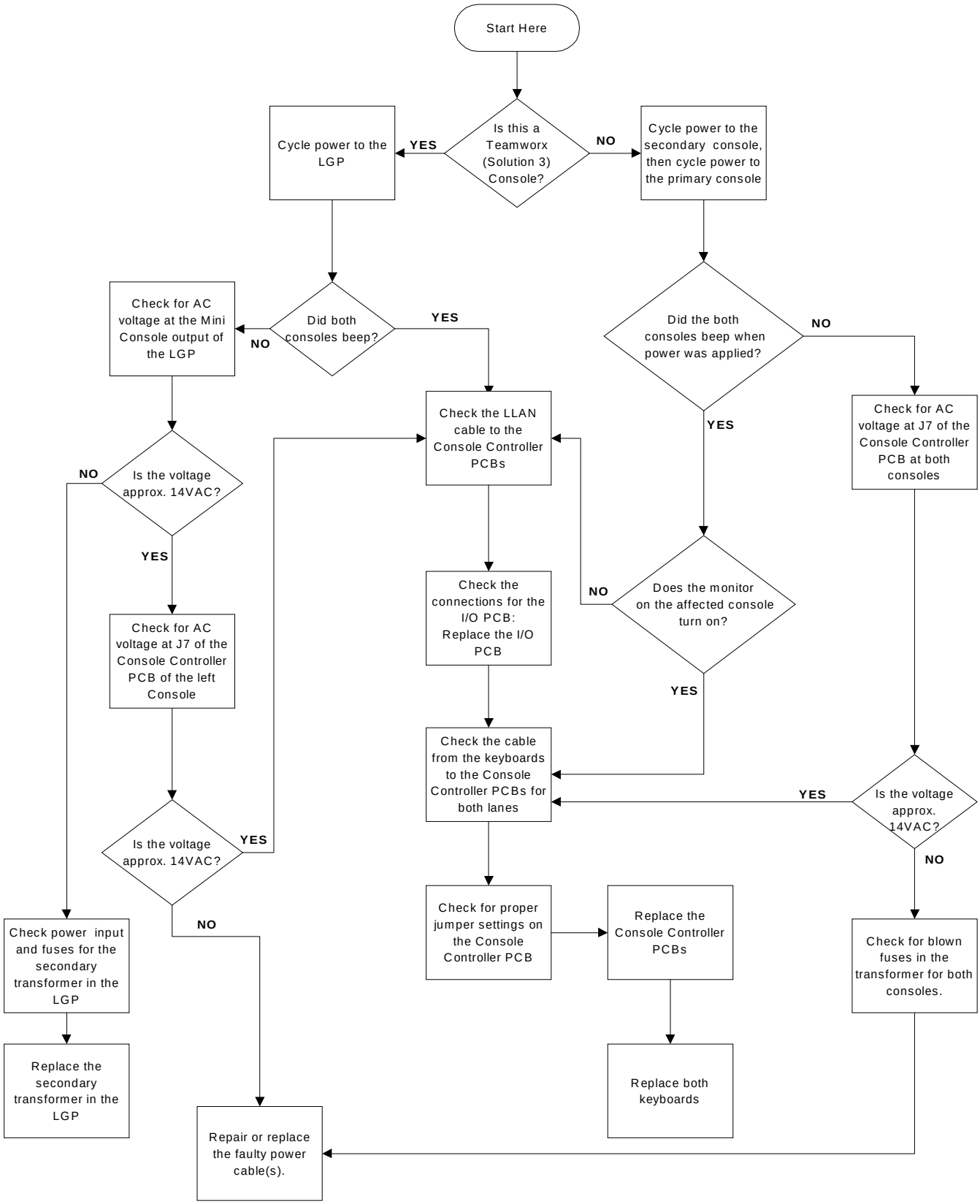


Console Input Problems

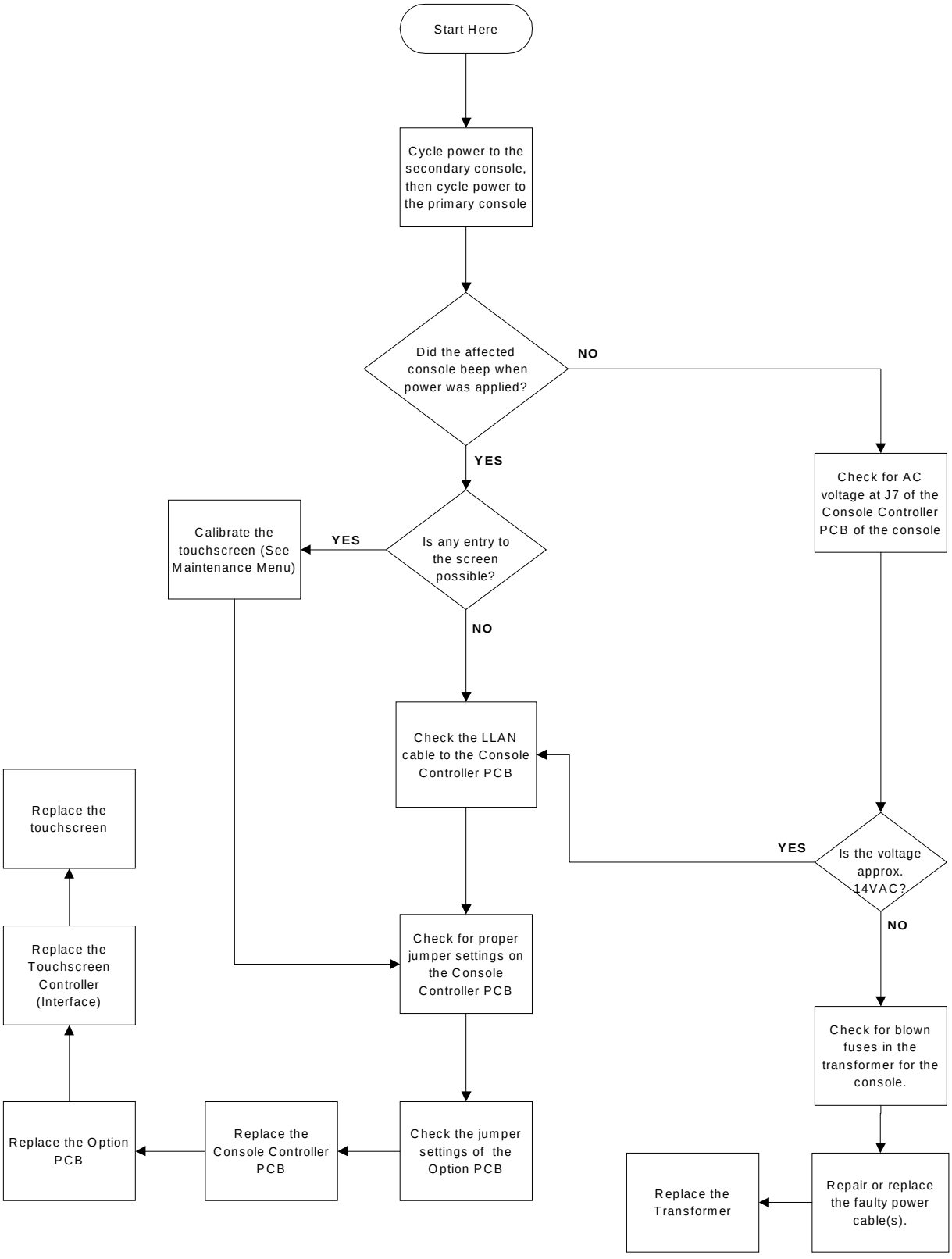
No Keyboard Operation For One Lane



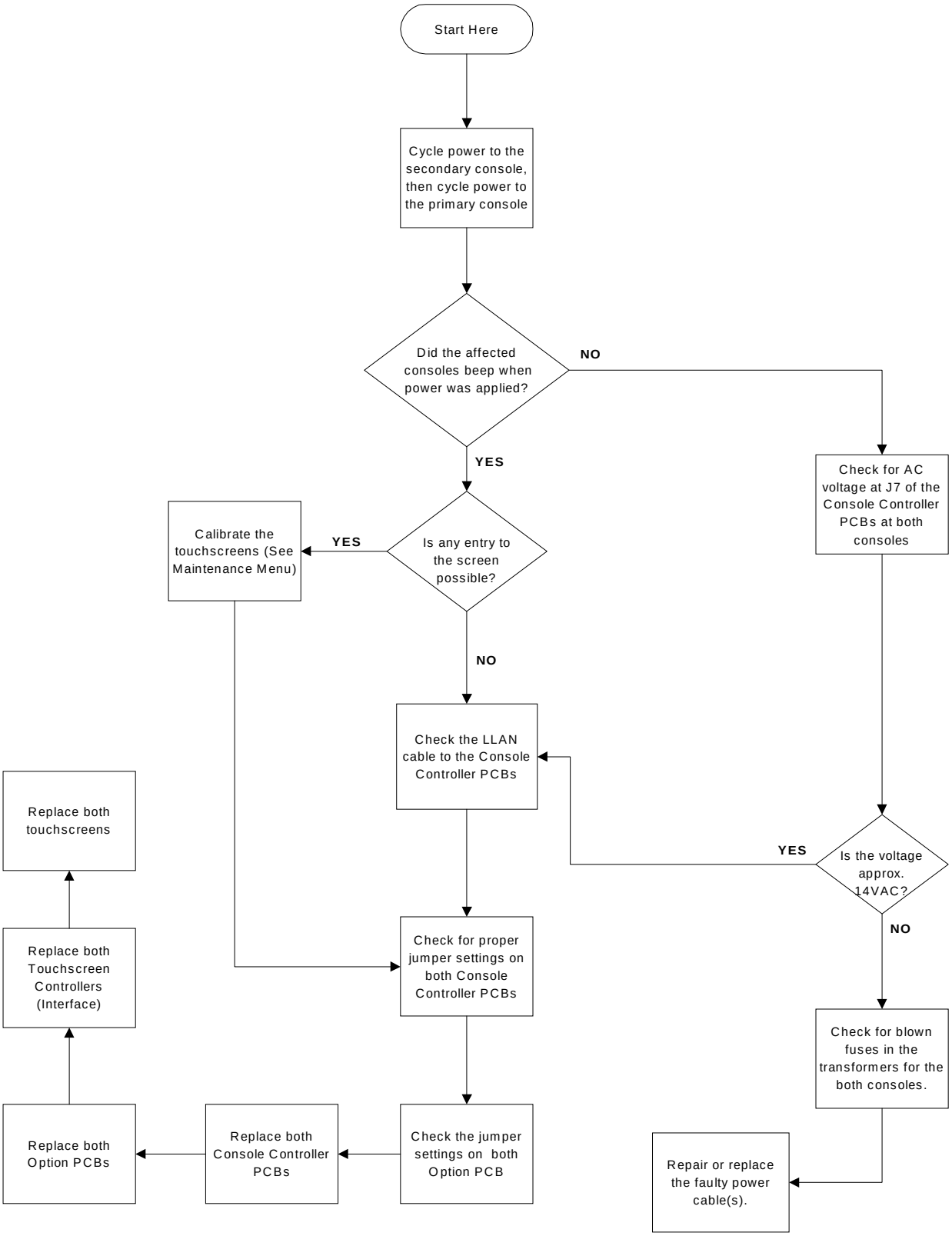
No Keyboard Operation For Either Lane



No Touchscreen Operation For One Lane

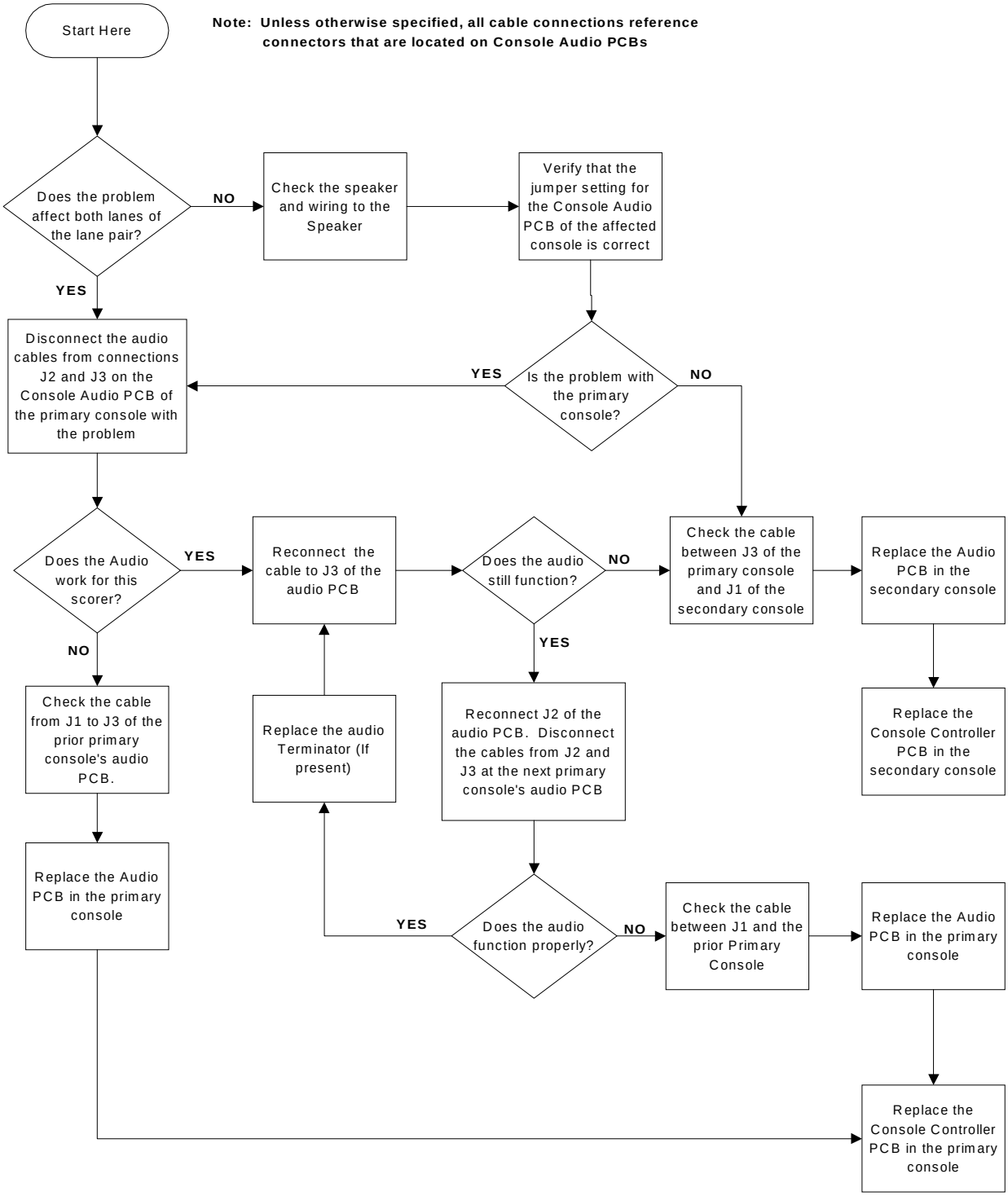


No Touchscreen Operation For Either Lane

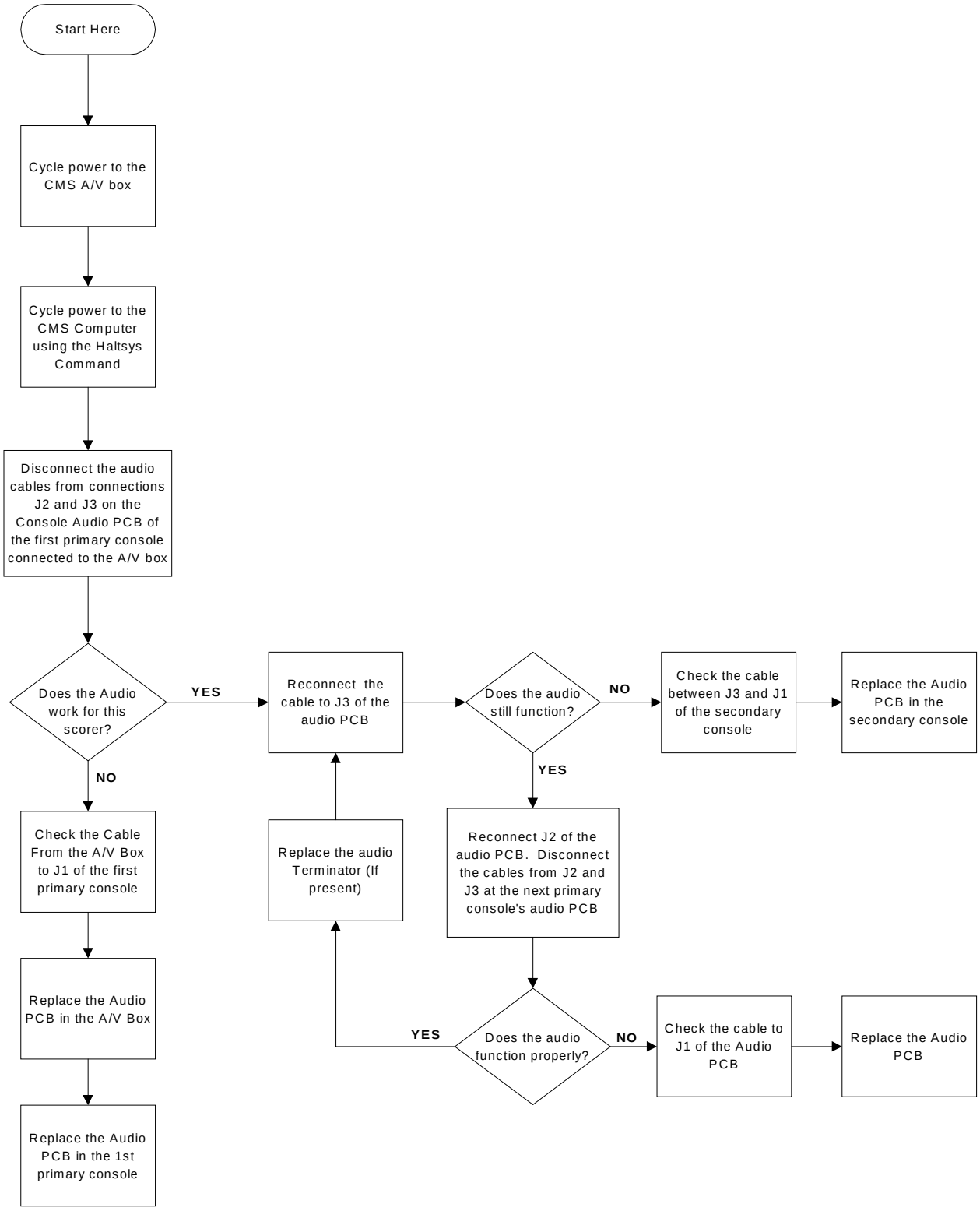


Audio Problems

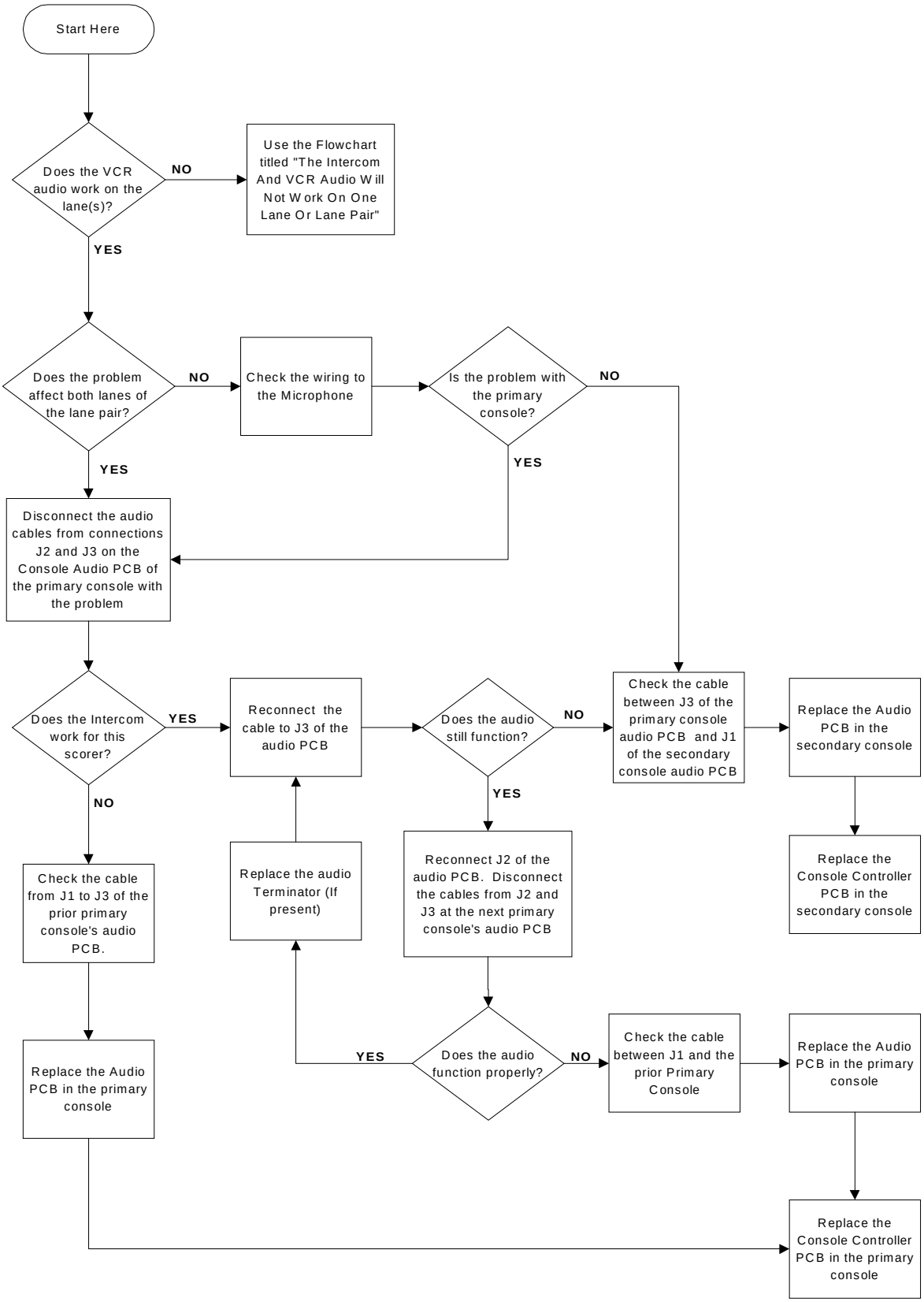
The Intercom And VCR Audio Will Not Work On One Lane Or Lane Pair



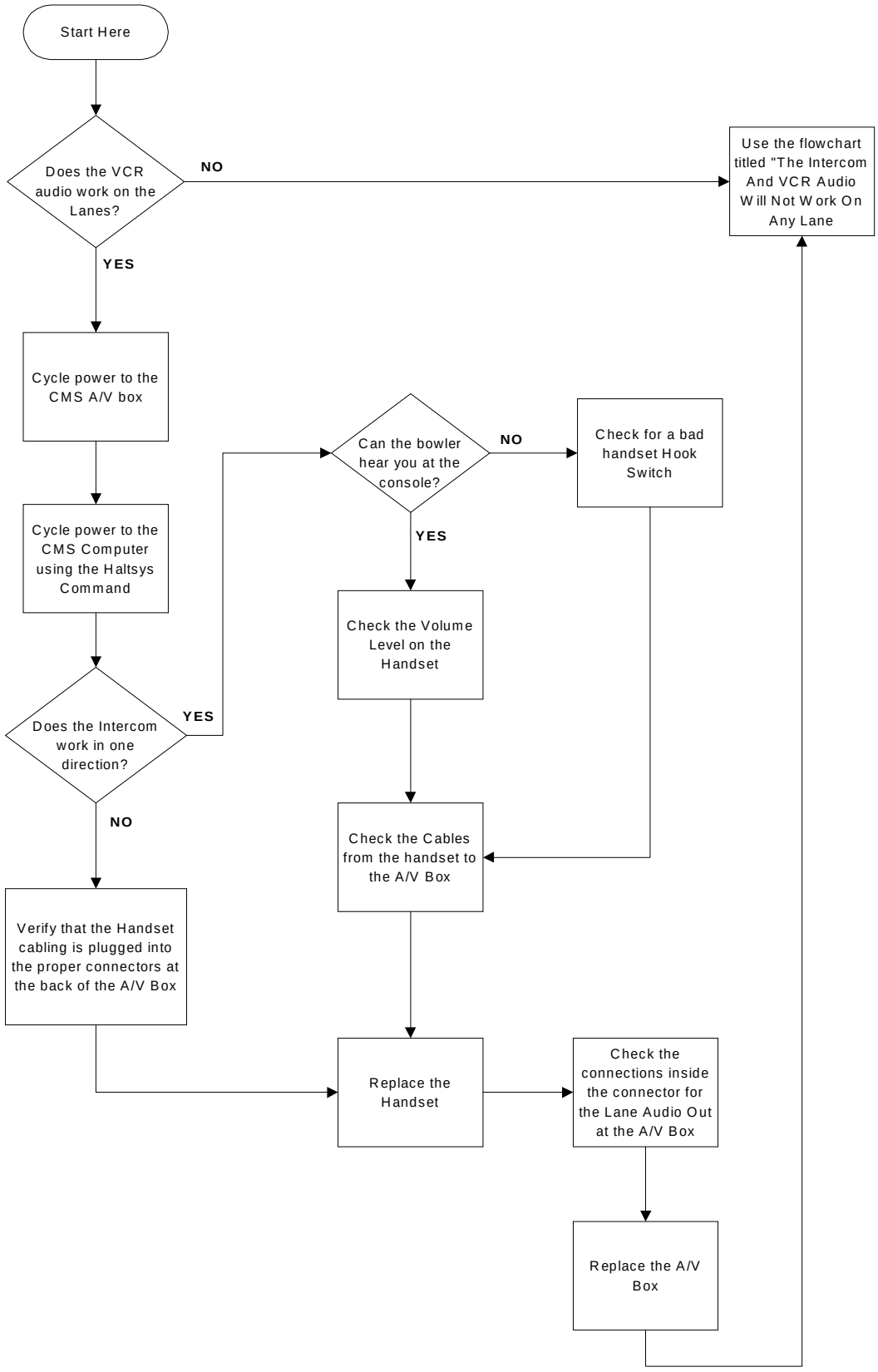
The Intercom And VCR Audio Will Not Work On Multiple Lanes



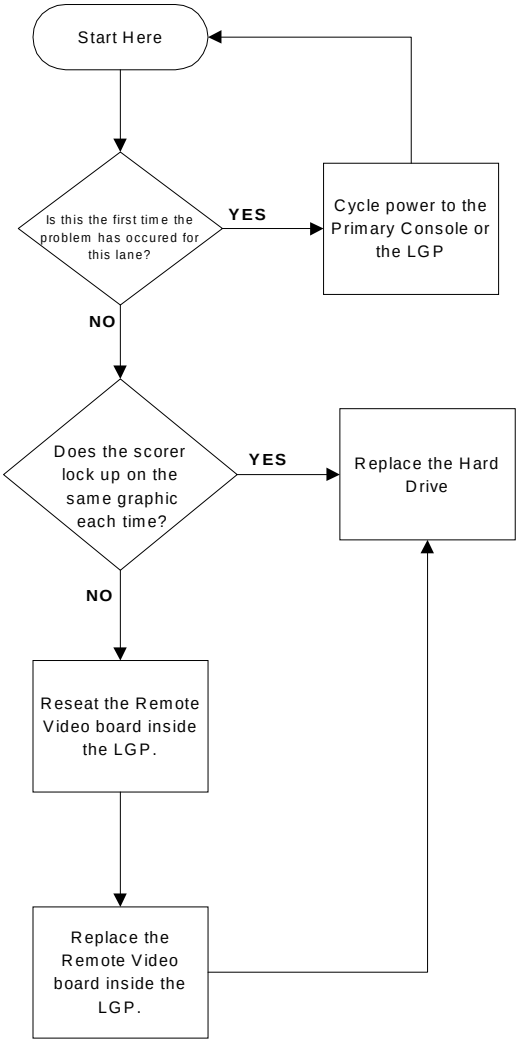
The Intercom Will Not Work On One Lane Or Lane Pair



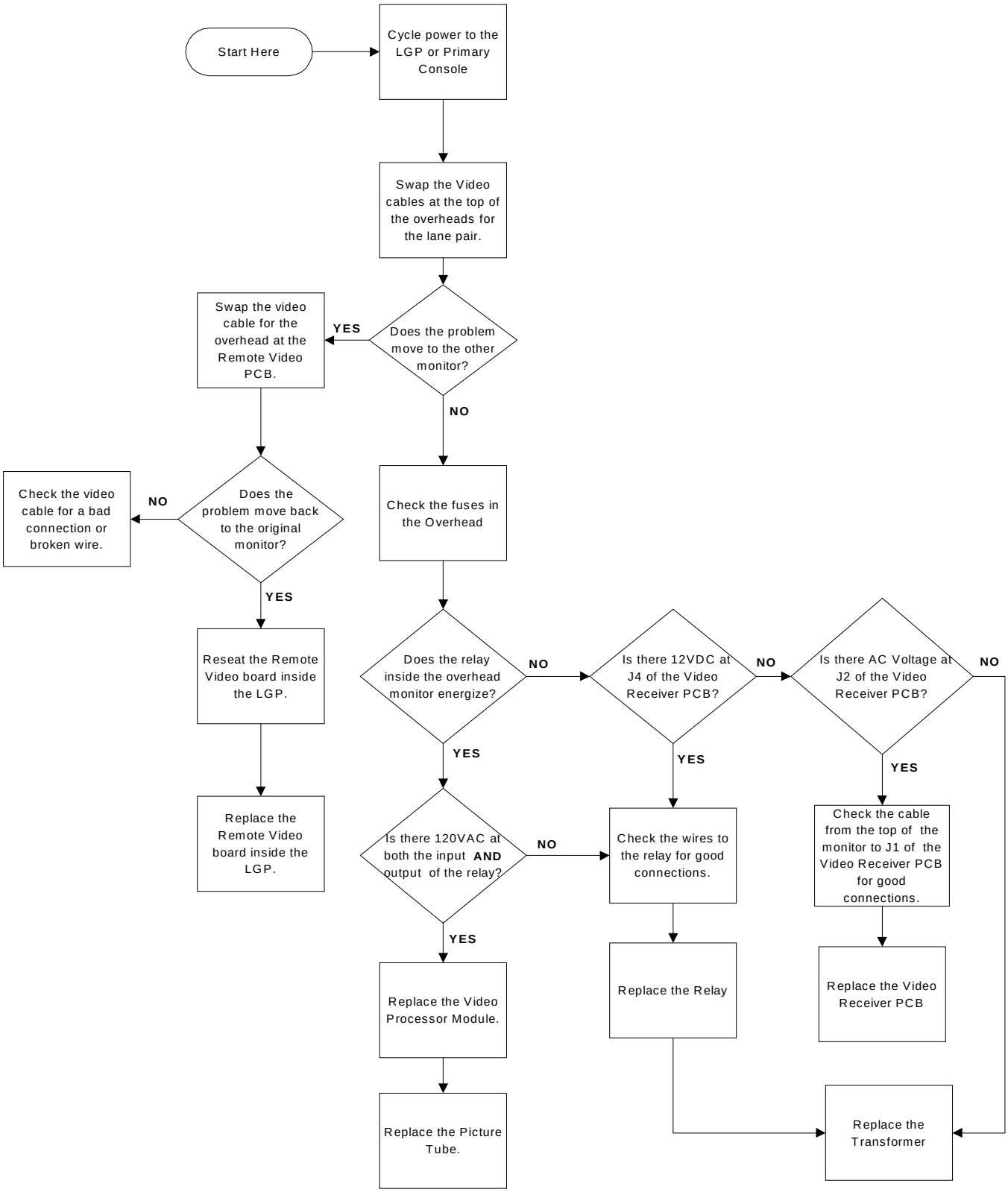
The Intercom Audio Will Not Work On Any Lane



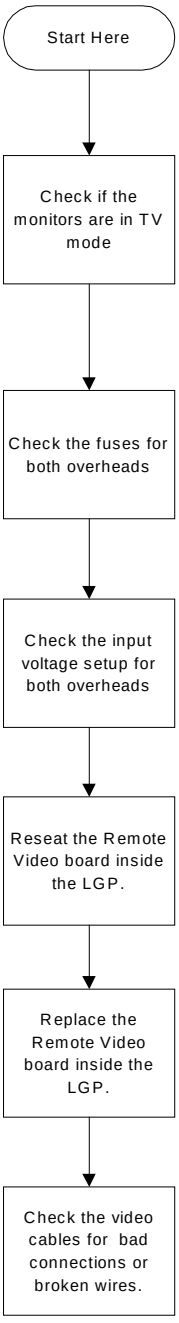
Scorer Locks Up When Displaying An Exciter Graphic



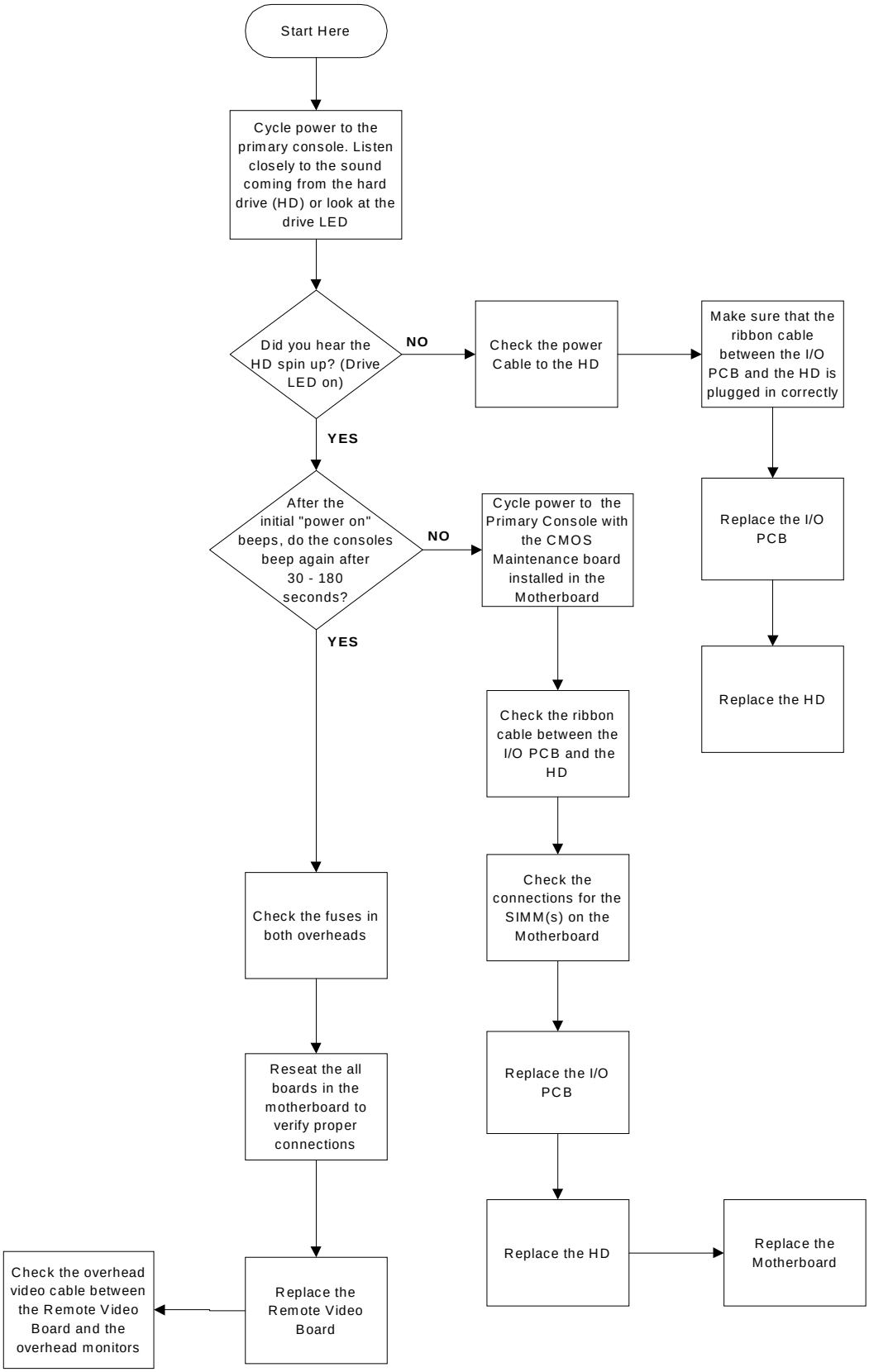
One Scorer Overhead Monitor Will Not Turn On



Both Overhead Monitors Will Not Turn On (Powerworx / Touchworx)

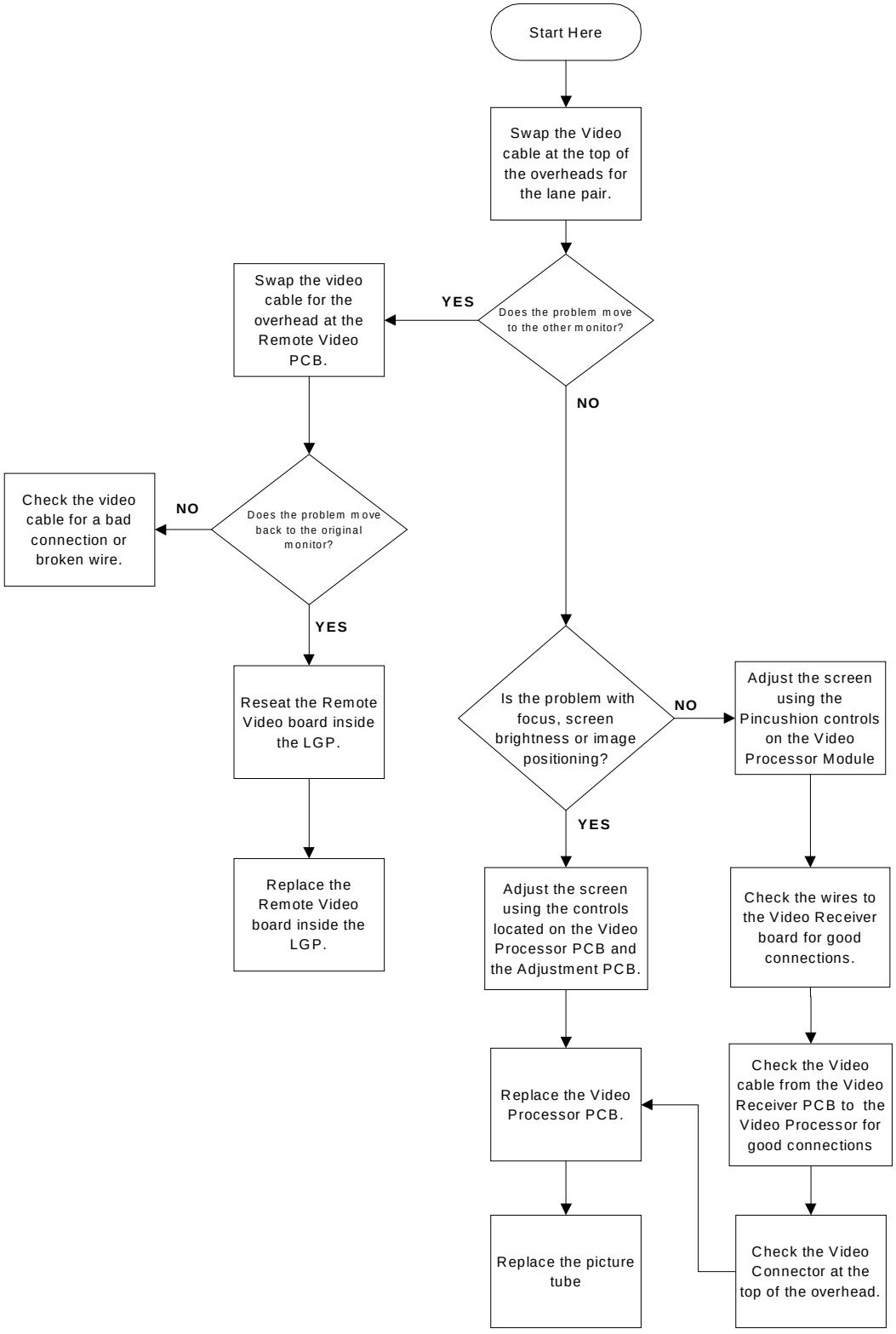


Both Overhead Monitors Will Not Turn On (Skyworx/Teamworx)

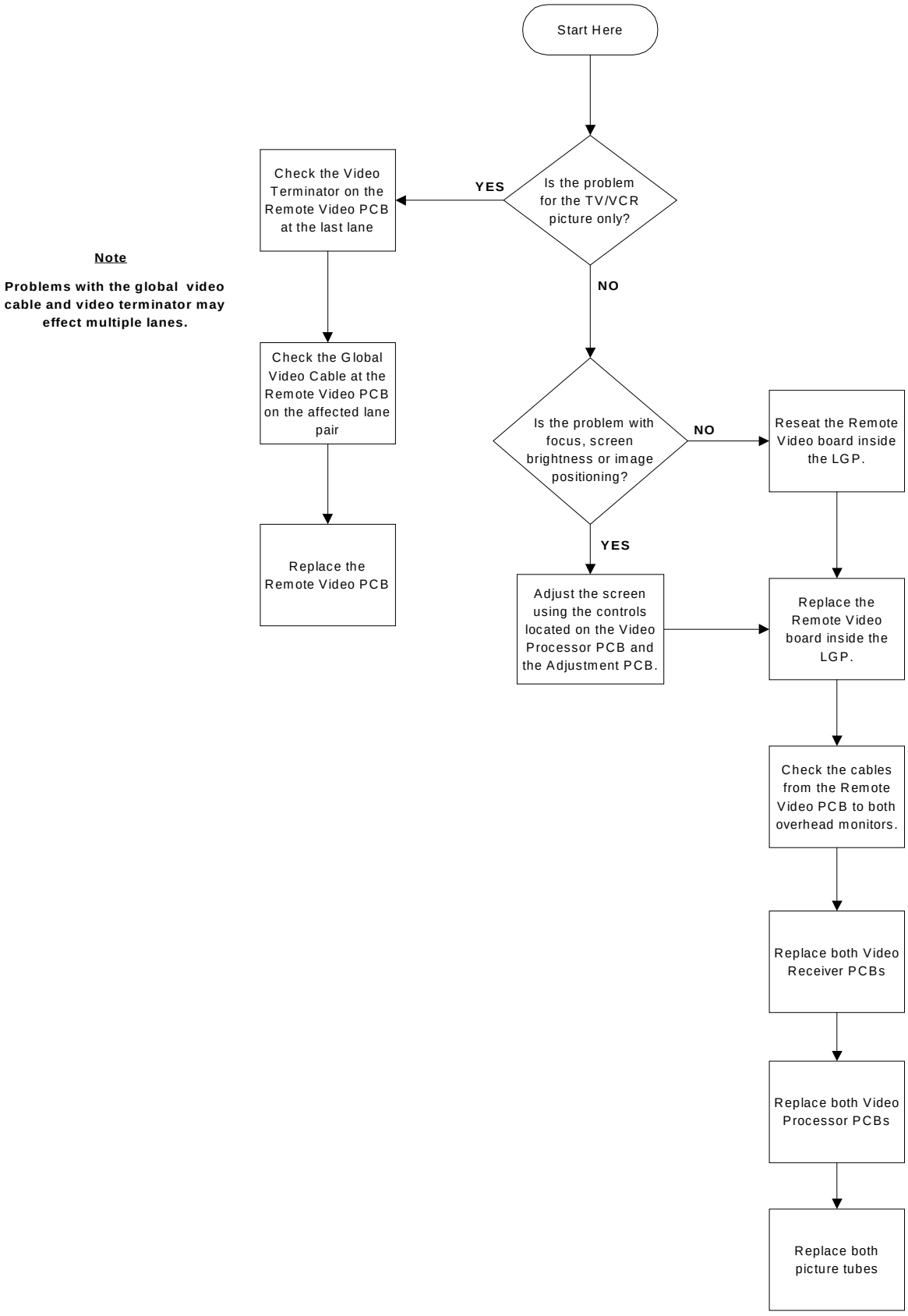


One TV-Only Monitor Will Not Turn On

The Picture On One Scorer Overhead Monitor Is Bad



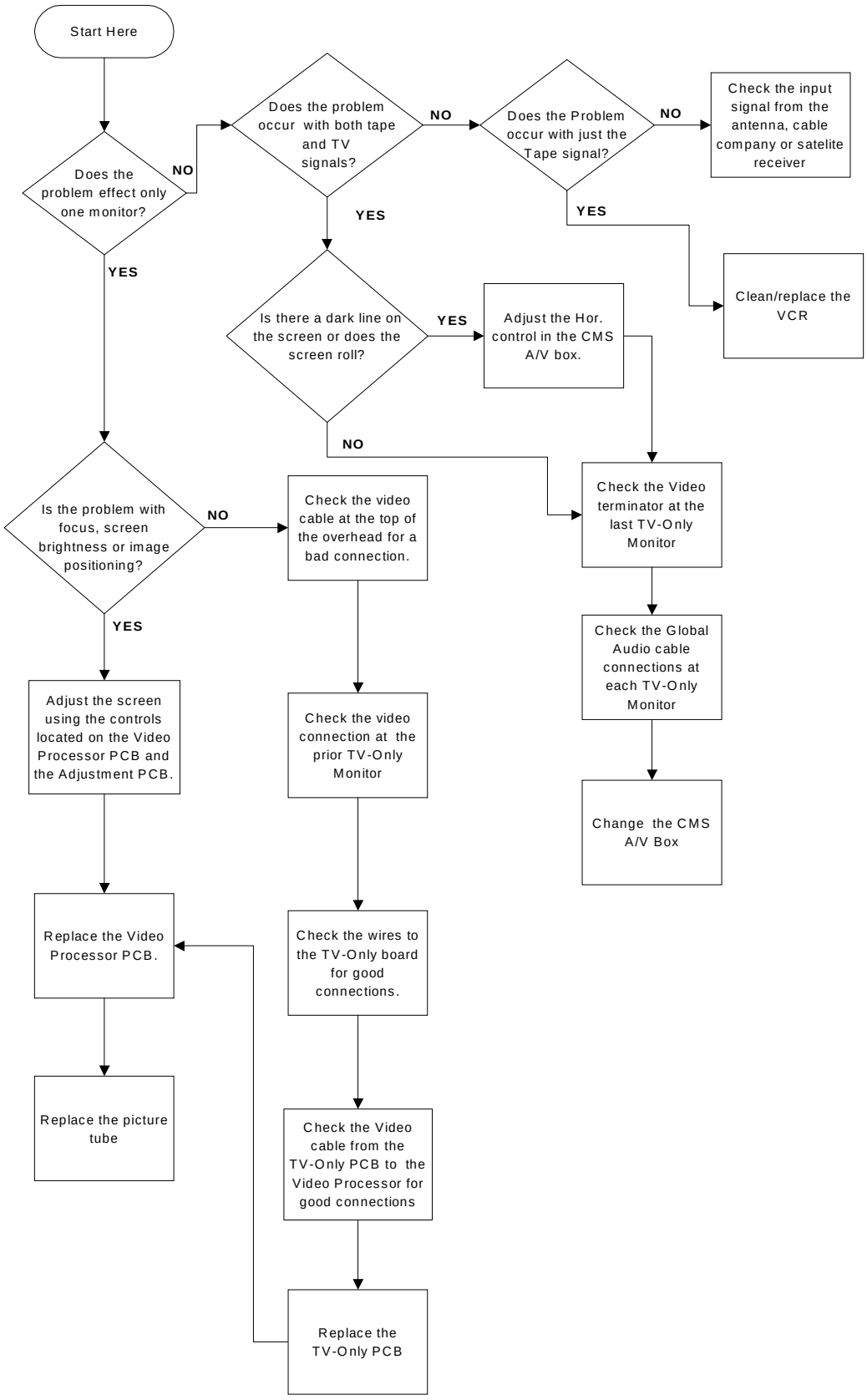
The Picture On Both Scorer Overhead Monitors Is Bad



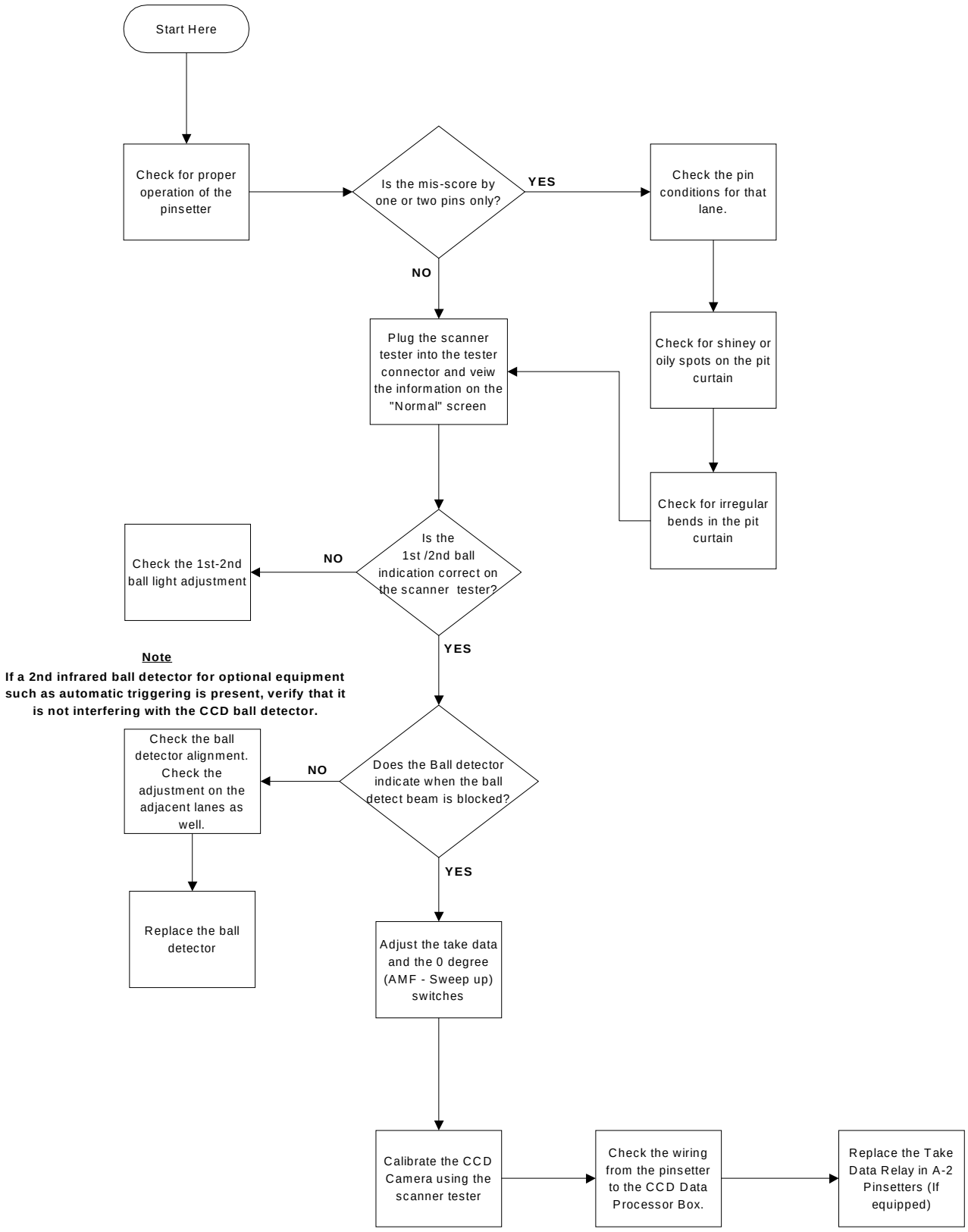
Note

Problems with the global video cable and video terminator may effect multiple lanes.

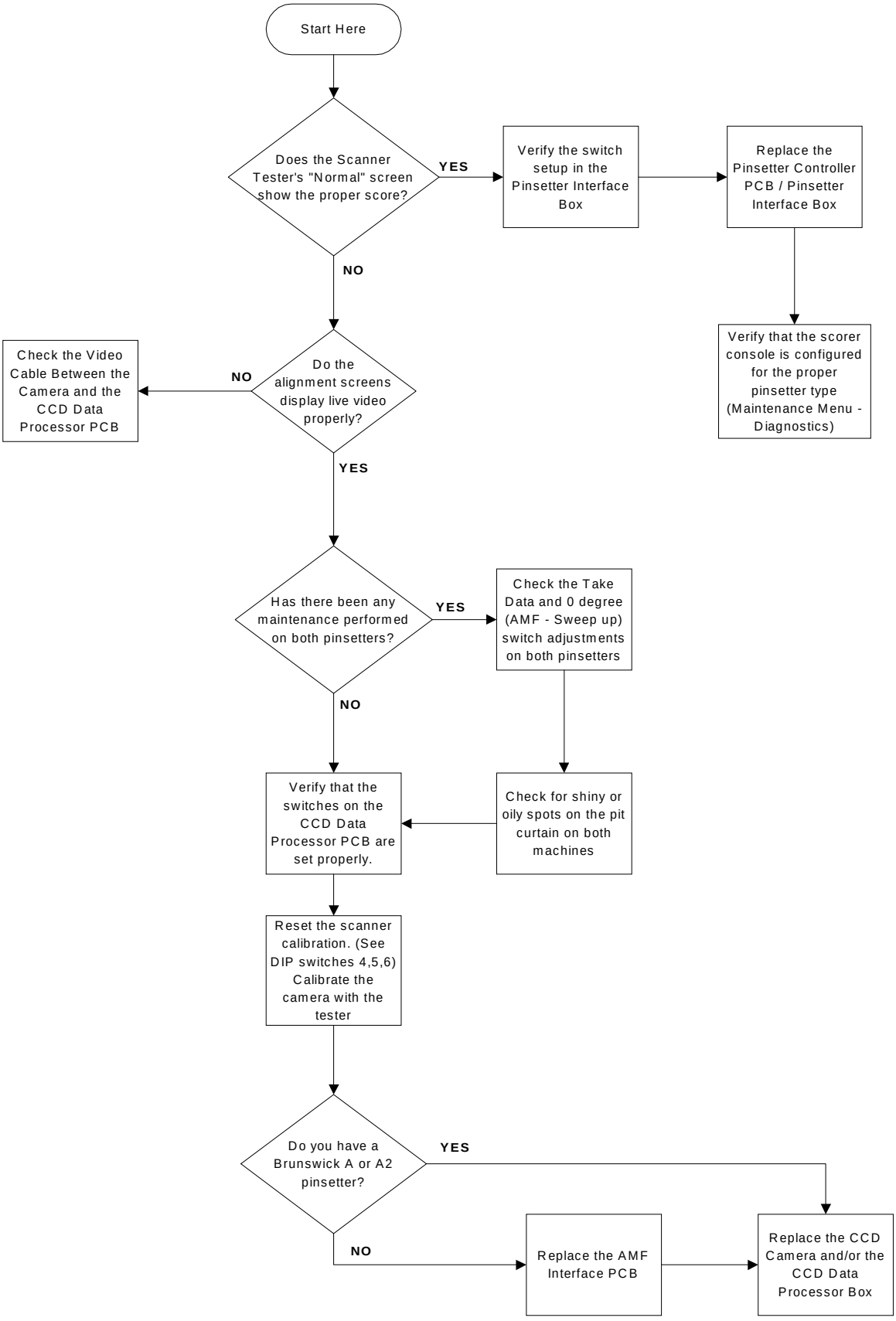
The Picture On One Or Multiple TV-Only Overhead Monitor(s) Is Bad



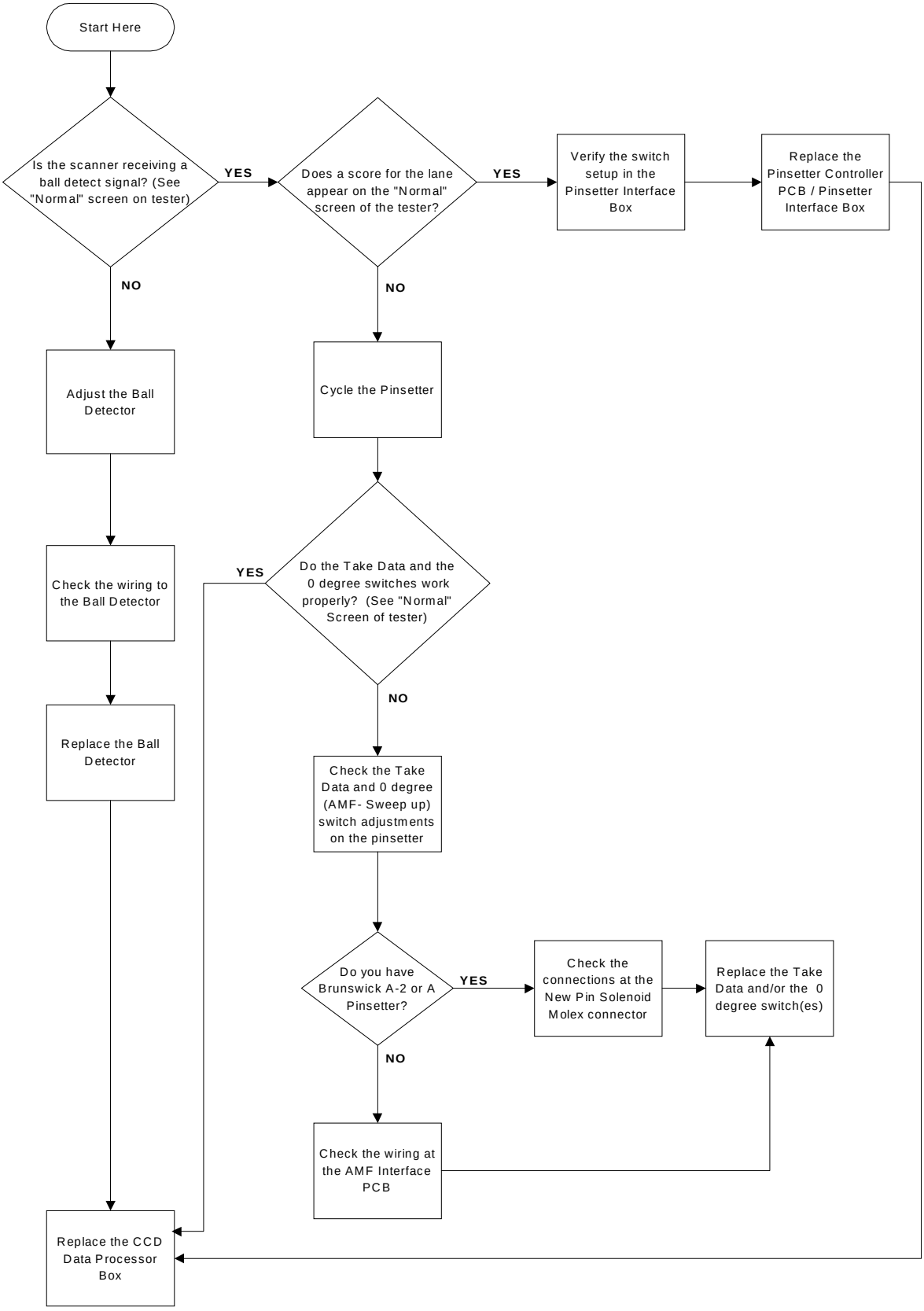
Mis-scoring On One Lane (CCD Scanners)



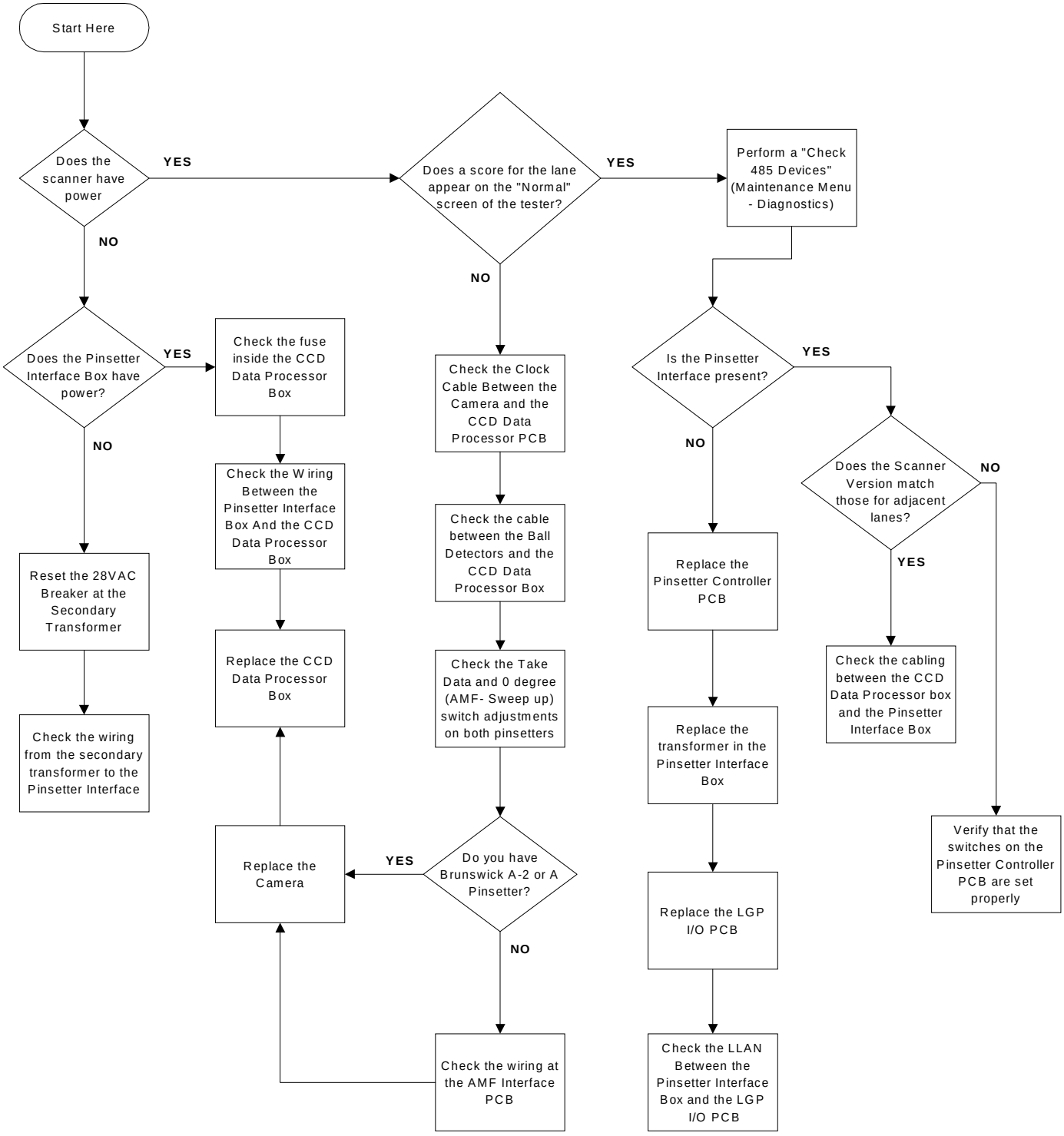
Mis-scoring On Both Lanes (CCD Scanner)



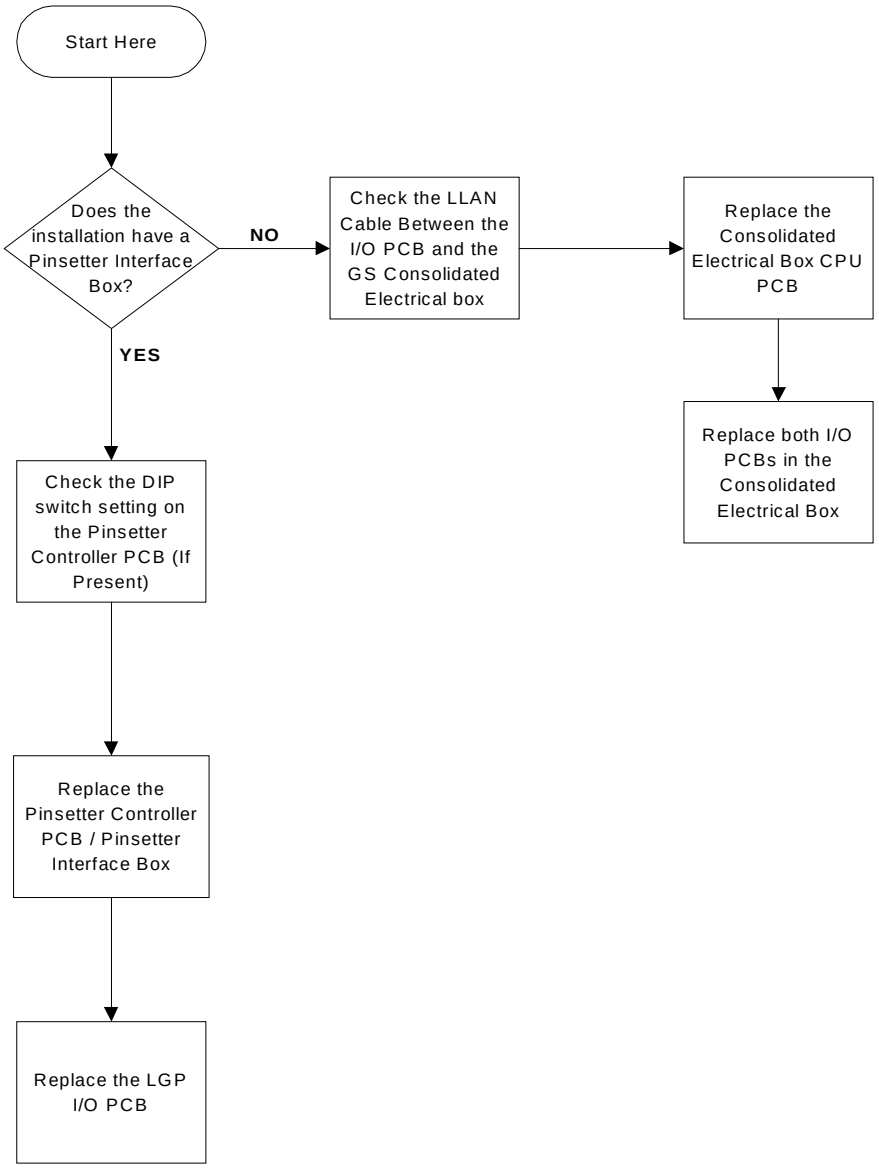
No Score For One Lane (CCD Scanners)



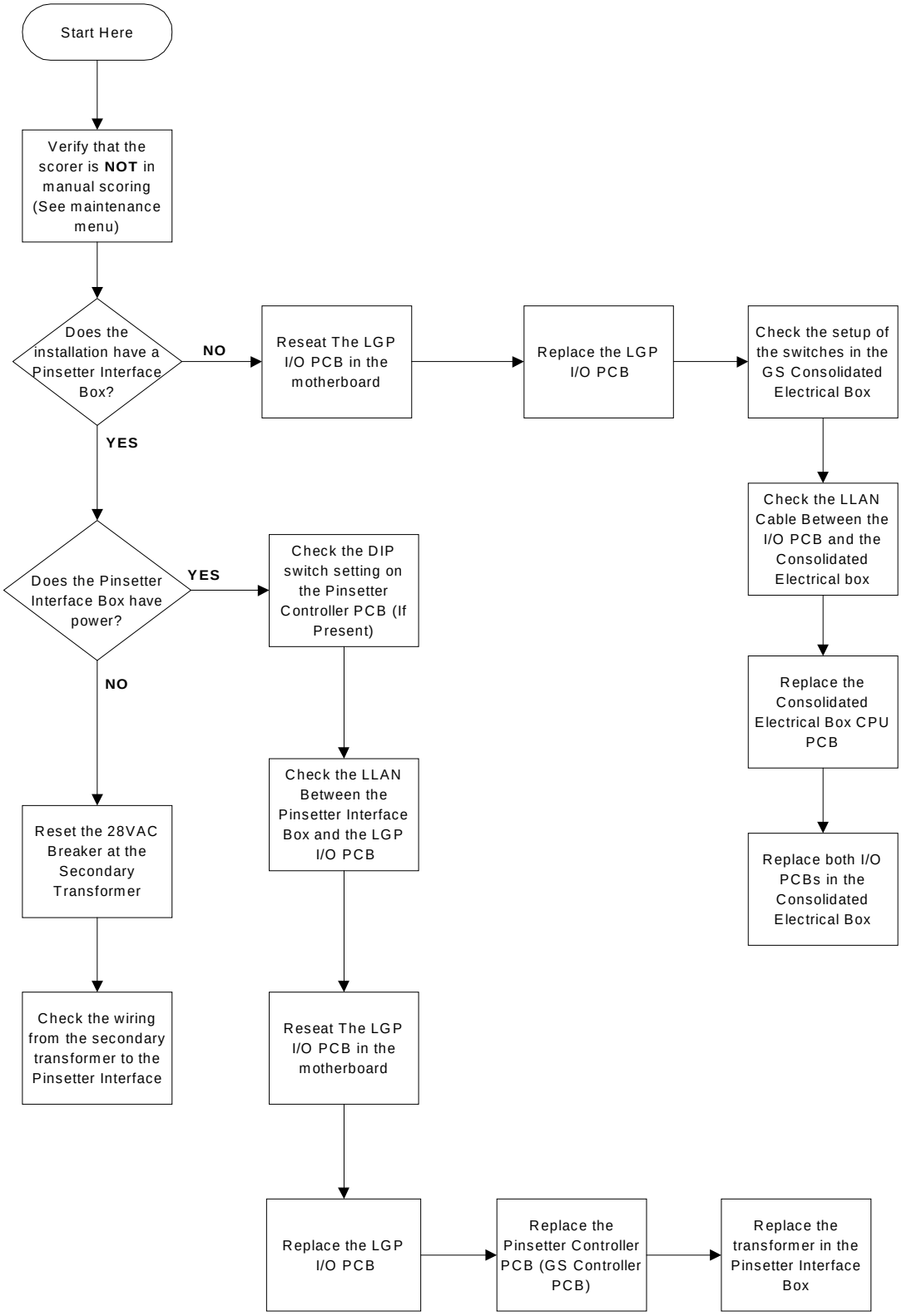
No Score For Either Lane (CCD Scanner)



Mis-Score On Both Lanes (GS Series Pinsetters)

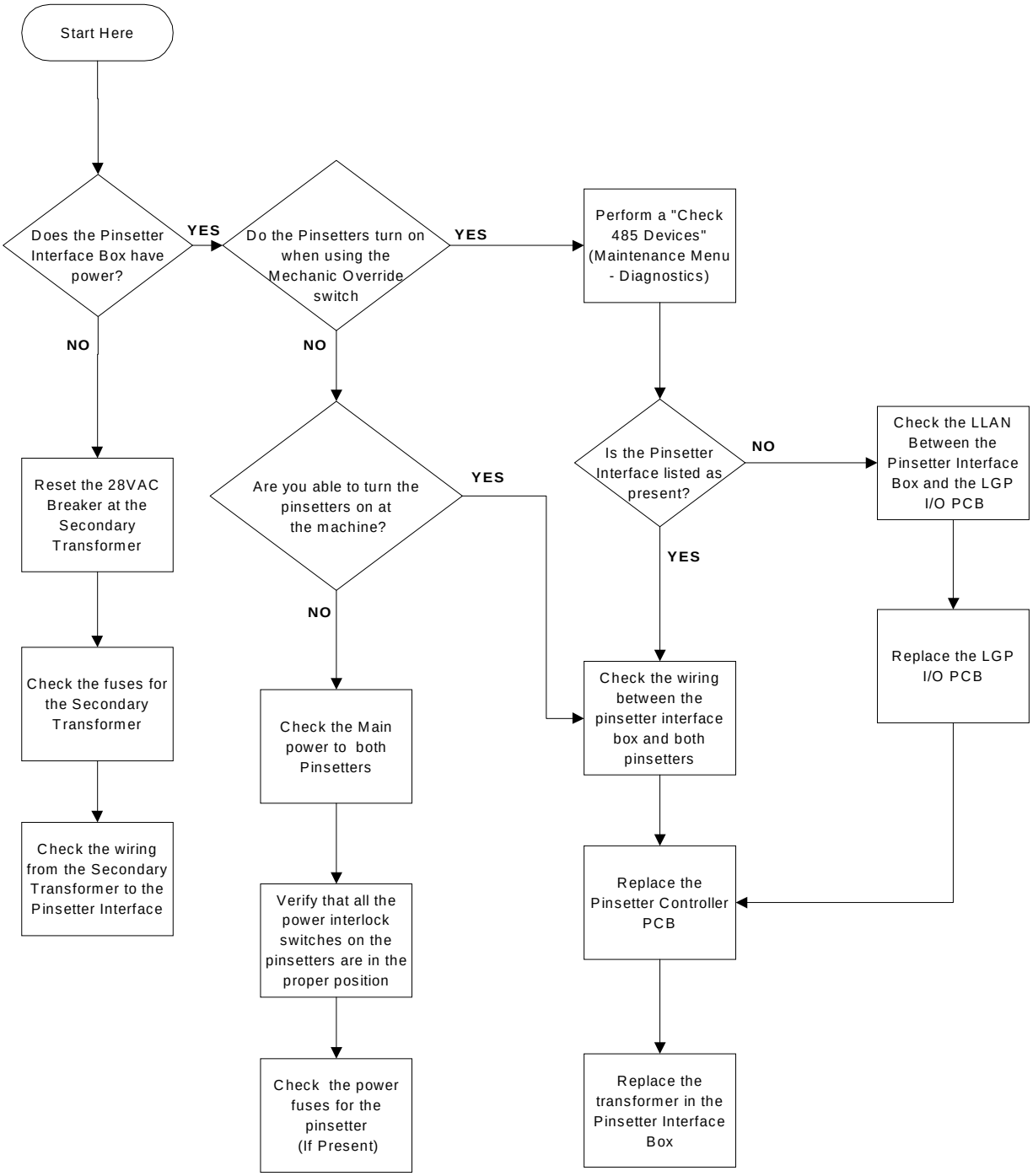


No Score For Either Lane (GS Series Pinsetters)

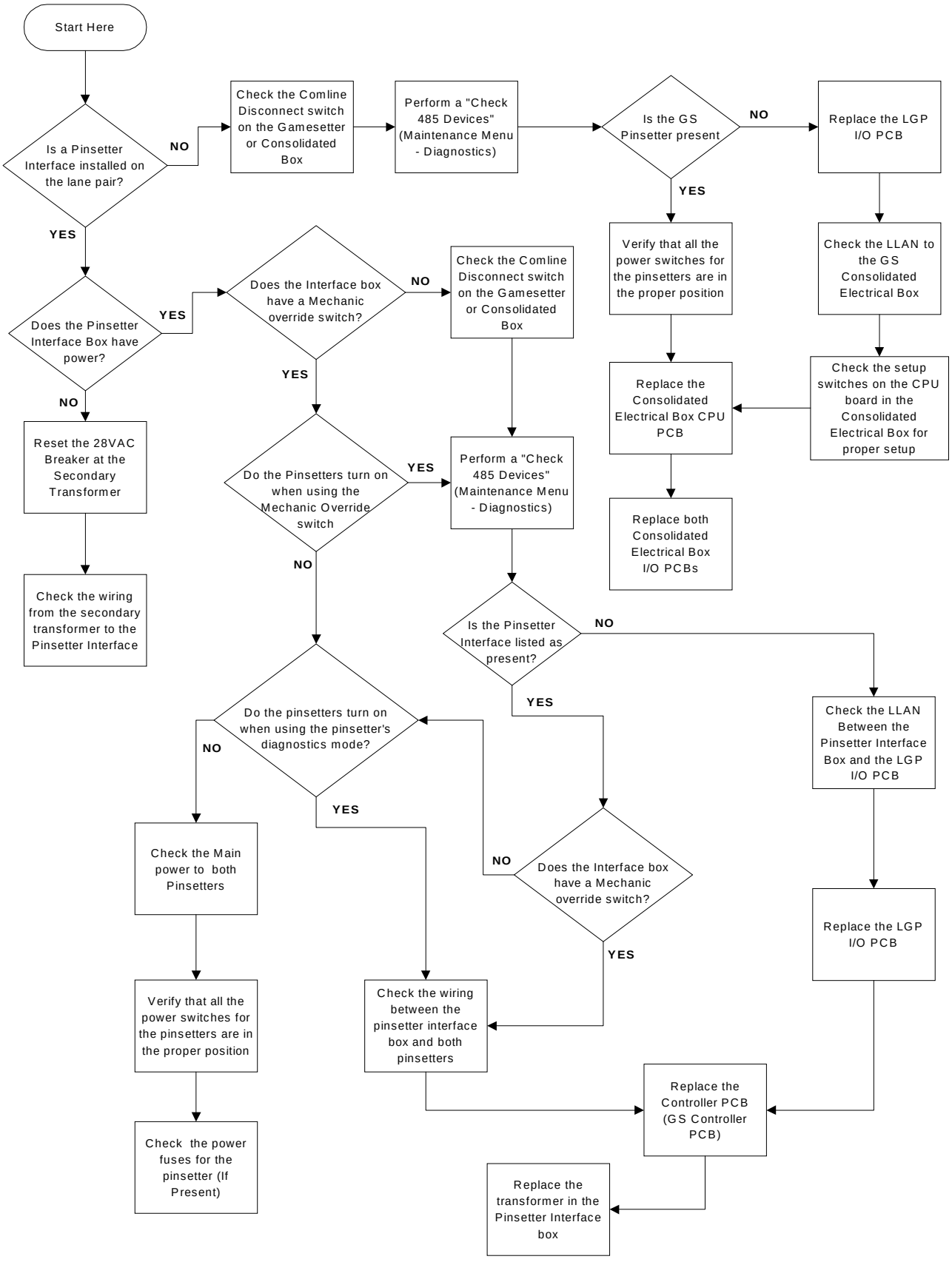


Pinsetter Problems

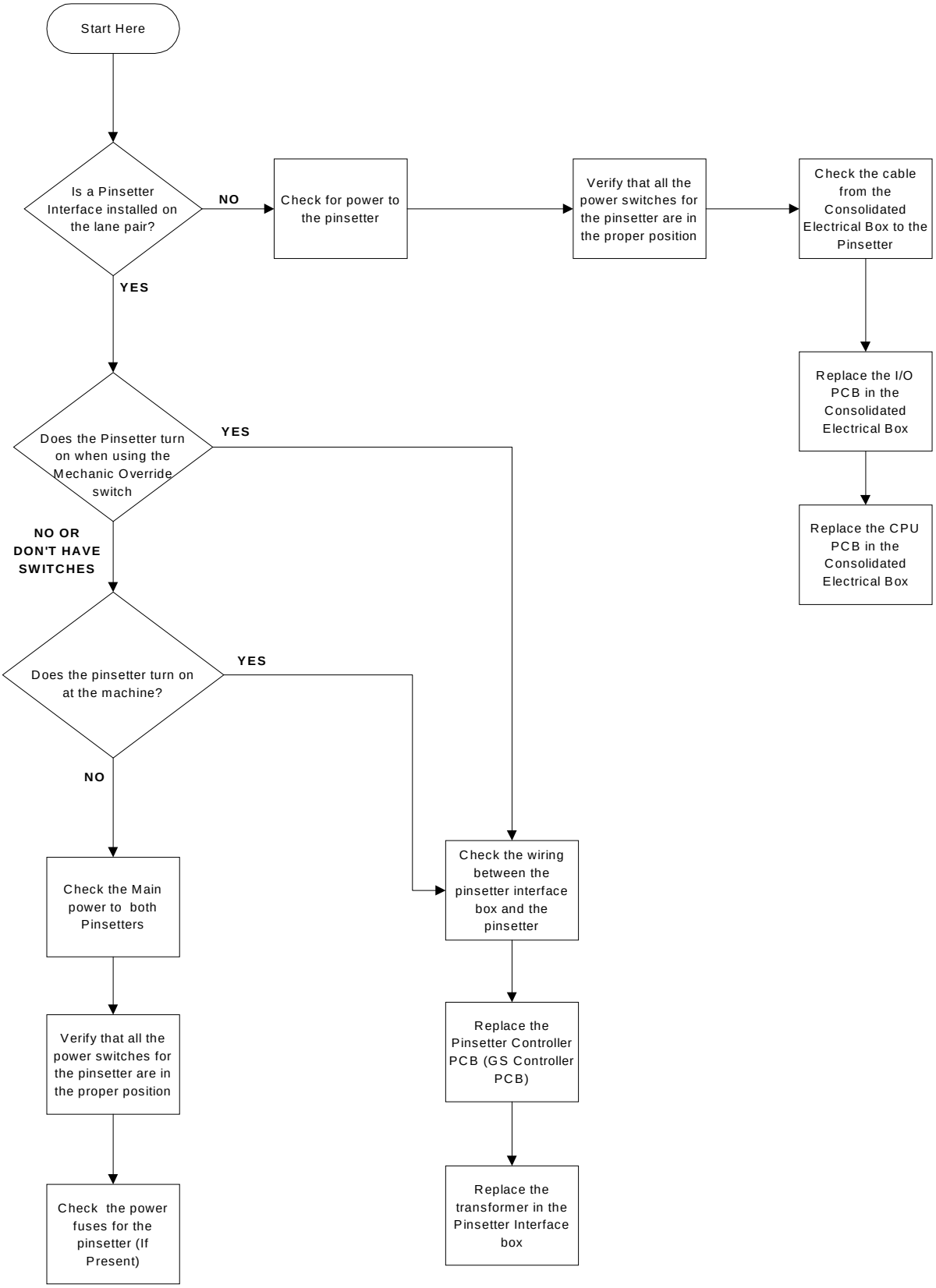
The Pinsetters For Both Lanes Will Not Turn On (Non GS Pinsetters)



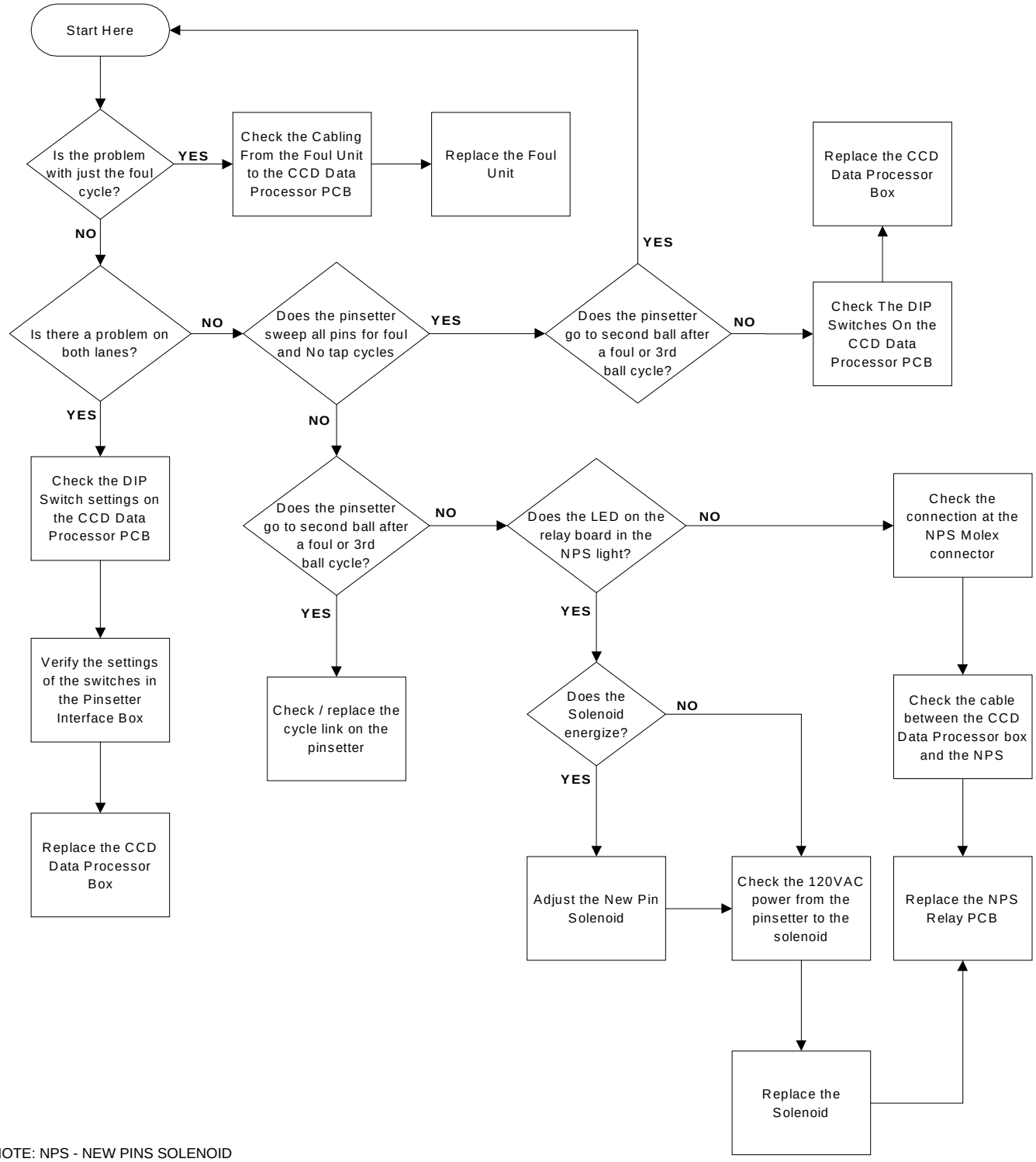
The Pinsetters For Both Lanes Will Not Turn On (GS Pinsetters)



The Pinsetter For One Lane Will Not Turn On (All Pinsetters)

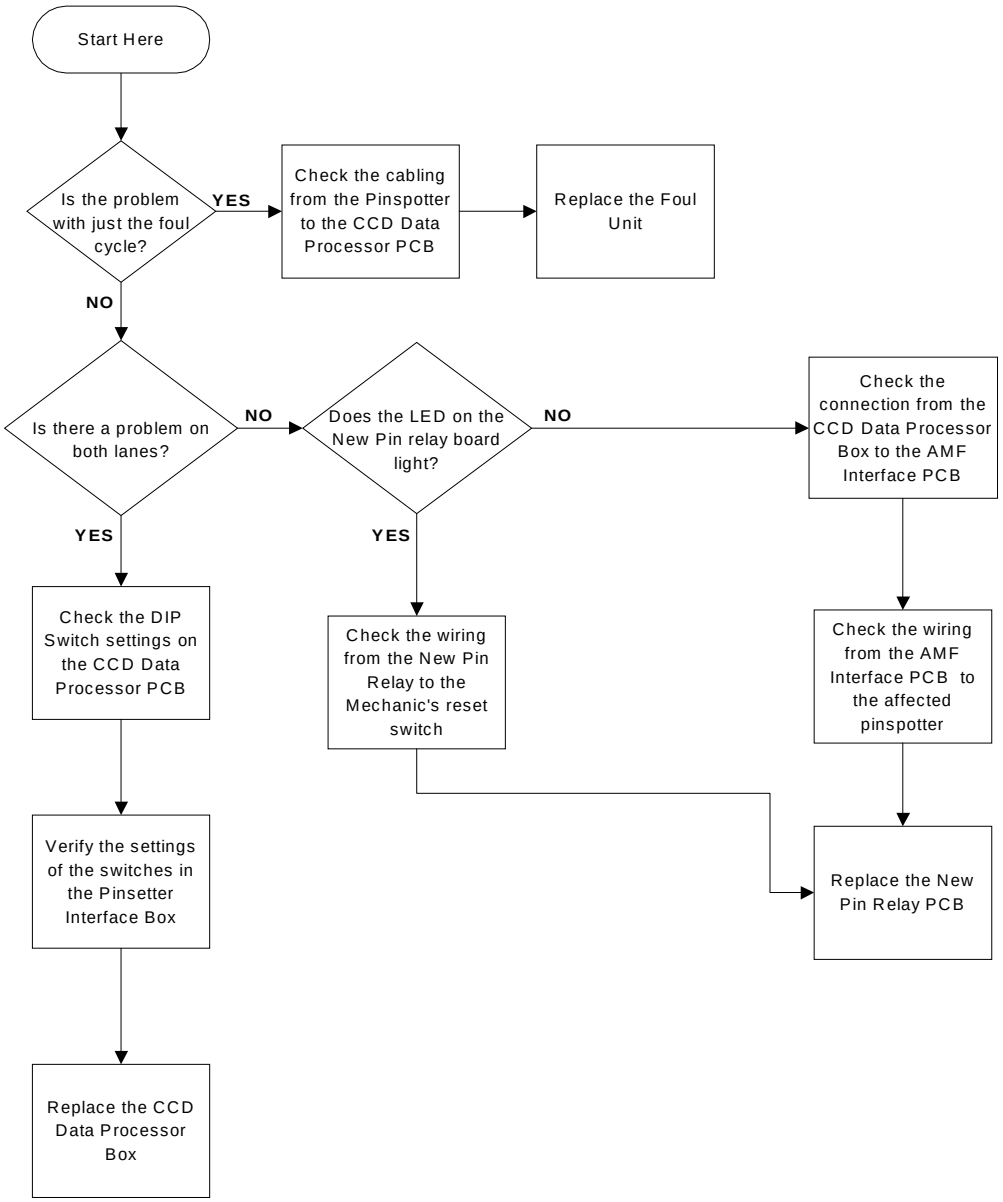


The A, A2 Pinsetter Does Not Cycle Properly for No Tap, Foul, or 3rd Ball 10th Frame (CCD Scanners)



NOTE: NPS - NEW PINS SOLENOID

The AMF Pinspotter Does Not Cycle Properly for No Tap, Foul, or 3rd Ball 10th Frame (CCD Scanners)



Glossary of Terms

10Base2 - The 50 ohm coaxial used in an Ethernet network. This cable is used to wire the office computer to the hubs located on the curtain wall.

10BaseT - A cable that consists of two wires twisted around one another to form what is referred to as a twisted pair. This is the type of cable that attaches the LGP to the Ethernet hubs.

Scorer Monitor - A monitor that is used to display the Scorer Console video. It can also display VCR video if needed.

A/P - Automatic Pinsetter.

Audio - Electronic name for sound.

Ball Detector - An optical device that sends a signal to the scanner or pinsensor to start the scoring process whenever is senses the delivery of a ball.

Bowler Entry Station - The keyboard pedestal used in Teamworx (Solution 3) that allows the bowler to enter all the information and selections as a Full scorer console but does not have the lower monitors.

CCD (Capacitor Charged Device) - A device that is kept in a constant state of electrical charge. When an outside force stimulates the device, i.e. light, electrical energy is released.

CMOS (Complementary Metal Oxide Semiconductor) chip - A type of memory chip that retains its data when power is turned off as long as it retains a trickle of power from a battery.

CMOS Maintenance Board - A circuit board that automatically sets up the LGP Motherboard to be compatible with the hard drive installed in the LGP.

Coaxial Cable - A 2-Conductor cable consisting of a single center wire surrounded by a tubular shield. Most coaxial cables use braided metal as the shield.

Console Video PCB - A circuit board located in the LGP that controls the video going to the lower monitors.

CPU (central processing unit) - A chip or circuit board that is the “brain” of the unit it resides in. The element that does the actual adding and subtracting of 0s and 1s and the manipulation and moving of data that is essential to computing. It is responsible for processing and logical decision making.

CRT (Cathode Ray Tube) - A video monitor or picture tube of a display.

DC (direct current) - Rectified AC or battery voltage. A type of current that is steady and free from all fluctuation.

Deflection Coil - An electrical coil that directs the electrons generated inside a CRT to a particular location on the screen.

Disk - A circular metal platter or Mylar diskette with magnetic material on both sides that stores programs and data. Disks are rotated continuously so that read/write heads mounted on movable or fixed arms can read/write heads mounted on movable or fixed arms can read or write programs or data to and from the disk. See also *floppy disk, hard disk.*

Disk Drive - The motor that actually rotates the disk, plus the read/write heads and associated mechanisms, usually in a mountable housing. Sometimes used synonymously to mean the entire disk subsystem.

Diskette - See *floppy disk.*

Download - To receive information from another modem and computer over the telephone lines. It is the opposite of upload.

DRAM (dynamic random-access memory) - The most commonly used type of memory, found on video boards as well as on PC system boards. DRAM is usually slower than VRAM (video random-access memory) since it has only a single access pathway.

Error - A computer generated message indicating a failure during operation.

Ethernet - A communication protocol used by a group of computers to share information and transfer information to one another.

Extractor - A tool used to remove a terminal from its housing.

File - A collection of related records treated as a unit. In a computer system, a file can exist on magnetic tape, disk, or as an accumulation of information in system memory. A file can contain data, programs, or both.

Floppy Disk - A removable, rotating, flexible magnetic storage disk. Floppy disks come in a variety of sizes, but 3-1/2 inch and 5-1/4 inch are the most popular. Storage capacity is usually between 360K and 1.44MB. Also called flexible disk or diskette. See also *disk, hard disk.*

Floppy Drive - A disk drive designed to read and write data to a floppy disk for transfer to and from a computer.

Fuse - A component that protects electrical assemblies from current overload.

Global Audio - The VCR/Intercom audio that originates at the CMS Audio/Video Box. It is called global audio because it is routed to all consoles.

Global Video - The VCR Video that comes from the CMS Audio/Video box in an RGBS format. It is called global video because is routed to all lanes and can be displayed on any overhead monitor.

Hard Disk - A mass storage device that transfers data between the computer's memory and the disk storage media. Hard disks are non-removable, rotating, rigid, magnetic storage disks. There are some types of hard disk with removable rigid media in the form of disk packs. See also *disk.*

Hertz - Cycles per second. The unit of measure for frequency.

Hub - A device used in the Frameworx system that changes the 10Base-2 Ethernet cabling to 10Base-T so that it can route to the LGPs. Each hub splits the signal so that it can connect to 16 LGP (32 lanes)

Hz (Hertz) - A unit of measurement. This used to be called cycles per second.

IDE (integrated drive electronics) - A disk drive with its own controller electronics built in to save space and money. Many laptops use IDE drives.

Interface - A device that connects two or more different devices together.

I/O (input/output) - Input is the data flowing into your computer. Output is the data flowing out. I/O can refer to the parallel and serial ports, keyboard, video display, and hard and floppy disks.

ISA (Industry Standard Architecture) - Computers using the same bus structure and add-in cards as the IBM PC, XT, and AT. Also called classic bus. It comes in an 8-bit and 16-bit version. Most references to ISA mean the 16-bit version. Many machines claiming ISA compatibility will have both 8- and 16-bit connectors on the motherboard.

ISA BUS - Industry Standard Architecture Bus. The type of connections used on the motherboard in the LGP that allows the other boards to connect to Motherboard.

Laneworx - A configuration of scorers that contains consoles with monitors but does not have overhead monitors. Formally known as Solution 4.

LED (Light Emitting Diode) - A diode that produces light when electricity is applied to it. Because of their low operating power, they are usually used in applications where limited power is available: such as computer chip outputs. LED's are used to indicate on/off, yes/no, or stop/go functions. They are available in several different sizes, shapes, and colors and can be packaged in rows, arrays, or 7 segment displays.

LGP - Lane Group Processor - The electronic circuit board assembly that allows operation of a lane pair. This chassis is located on the curtain wall in installations that do not include a scorer console. If the installation includes a scorer console the LGP is located in the Primary (left lane) console.

LLAN - Local Area Network - A term used to describe the communication used by the LGP to communicate to the Circuits boards within a lane pair. It is referred to as a local LAN because it is exclusive to a lane pair. Another name for the serial communication used in a lane pair. Also referred to as RS-485.

New Pin Solenoid - A box installed on A or A-2 Pinsetters that can switch the pinsetter to second ball. This feature is used to provide special cycles for 1st ball foul, no tap strikes, and 3rd ball, 10th frame situations.

Network Adapter Card - Circuit card required in the expansion bus of a LGP that allows it to connect a Local Area Network (LAN).

NPS - See New Pin Solenoid.

Open - Contacts in a switch or relay that are not connected; wire that is broken.

PCB - Printed Circuit Board.

Pincushion - A distortion of the screen of a CRT that causes the sides or top and bottom of picture to bend toward the center of the screen.

Powerworx - A configuration of scorers that contains consoles with monitors and overhead monitors. The consoles are equipped with traditional keyboards. Formally known as Solution 5.

Power Supply - An electrical assembly that converts ac voltage to a controlled DC voltage.

Primary Scorer Console - The console in solutions 4 and 5 that contains the LGP in addition to its own circuitry. This is usually the Console for the left pinsetter.

RAM Memory (Random Access Memory) - A short-term storage area for information in a computer. Most computers have this type of memory install on small circuit boards call SIMMs. Also known as read-write memory; the memory used to execute application programs. See also *memory.*

Receiver PCB - A circuit board located on the lower access panel in regular monitors that adapts the incoming video so that the Video processor PCB can use it. The PCB also determined when to turn the monitor on/off.

Relay - An electrically controlled switch**.**

Remote Video PCB - A circuit board located in the LGP that is controls the video going to the overhead monitors.

Scanner - An optical device that counts pins for a pair of pinsetters.

Secondary Scorer Console - The console in solutions 4 and 5 that contains limited circuitry for its own use. One that does not contain the LGP. See *Primary Console.*

SIMM (single in-line memory module) - A small circuit board that is designed to plug into special connectors on the motherboard in a computer to provide the system with RAM memory. SIMMs come in various memory sizes (1Meg, 2Meg, etc.) and operating speeds (60ns, 70ns etc). Additionally they come in 30 pin and 72 pin styles.

Skyworx - A configuration of scorers that contains only overhead monitors. Formally known as Solution 1.

Solution 1 - The original name for the configuration now known as Skyworx.

Solution 3 - The original name for the configuration now known as Teamworx.

Solution 4 - The original name for the configuration now known as Laneworx.

Solution 5 - The original name for the configuration now known as either Powerworx or Touchworx.

Sweep Switch - See Take Data Switch.

Sweep up Switch - See Zero degree switch.

Take Data - An electronic signal, supplied by the automatic pinsetter switch cluster that causes the scanner to score.

Take Data Switch - A switch mounted to the pinsetter that causes the scanner to score. Also referred to as the 44/144 degree switch for Brunswick A/A2 machines and the Sweep Switch in AMF machines.

Teamworx - A configuration of scorers that contains Bowler Entry Stations (Mini consoles) and Overhead monitors. Formally known as Solution 3.

Touchworx - A configuration of scorers that contains consoles with monitors and overhead monitors. The consoles are equipped with touchscreens rather than traditional keyboards. Formally known as Solution 5 with touchscreens.

Transformer - A device that changes the level of an incoming voltage to a more desirable level. It can either increase the voltage (step up transformer) or decrease it (step down transformer).

TV-Only Monitor - A Monitor that is used to display only the VCR video. This monitor cannot display scorer console information.

TV-Only PCB - A circuit board located on the lower access panel in the TV-only monitors that adapts the TV/VCR video so that the Video processor can use it. This PCB also determined when the turn the monitor on/off.

Twisted-Pair Wire - Two insulated wires twisted together so that each wire faces the same amount of interference from the environment.

Video Processor PCB - A circuit board located in the back of the monitor that adapts the video so that is can be displayed properly on the CRT. The Video Processor controls the Coils attached to the CRT and sends the video to the Video Output PCB so it can be shown on the picture tube.

Zero Degree Switch - A switch located on the pinsetter that signals the scanner that the pinsetter has returned to its home position. This signal allows the scanner to prepare for the next ball and accept another ball detect. In the AMF pinsetter this switch is referred to as the sweep up switch.

Frameworx Scorer Service Manual - Troubleshooting

Past Revisions: None

Reorder Part No. 57-900348-000

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Table of Contents

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