ConnectCheck™

Service Manual
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Baseline

ConnectCheck™
September 2023

Technology Training and Support Services
10 Memorial Boulevard, Providence, RI 02903 USA

IGT™

Warranty

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Chapter 1 Introduction

Overview

The ConnectCheck is a multipurpose terminal peripheral that functions as a customer ticket checker for physical and digital tickets, as well as a digital play device, also known as Connected Play. As a customer ticket checker, players may check their printed ticket for a winning status by placing the ticket in view of the barcode scanner to scan the barcode. As a Connected Play device, it facilitates paperless interactions and players can use a lottery app to create and use digital playslips and make cashless payments with their lottery eWallet.

The ConnectCheckconsists of an integrated barcode scanner and LCD touchscreen player display. It is installed in proximity to the retailer terminal and communicates through a wired connection to the terminal to the host system. Status messages are communicated from the host through the retailer terminal and to the ConnectCheck to be displayed to the player. Up to three (3) devices can be connected to each retailer counter-top terminal.

Figure 1-1 ConnectCheck with Optional Counter Mount

The ConnectCheck includes the following components:

- 2D Barcode Scanner (Zebra SE4107)
- 3.5" LCD Capacitive Touchscreen Display
- Controller Board
- Audio Indicator
- Wired Communications

Controller Board

The 51-XXXX-01E is the controller board for the ConnectCheck. The main chip is a Cortex-A7 @900 MHz RAM1Gb DDR3L.

3.5" LCD/Capacitive Touchscreen

The ConnectCheck utilizes a 5" backlit LCD/capacitive touchscreen. The display brightness is adjusted automatically depending on the environment.

Audio Indicator

The audio output in this device is generated by an audio transducer with a rated frequency of 2,000 Hz. The sound produced is a series of beeps and clicks which are controlled through software. The sound output is as follows:

Beep Setting	Sound Output (dB) @ 1 ft. distance	Sound Output (dB) @ 2 ft. distance
High	66	48
Low	59	42

2D Barcode Scanner

The ConnectCheck utilizes the Zebra SE4107 scan engine. This device is capable of scanning barcodes on tickets and smartphones including 1D, 2D, PDF, and QR codes. The scanner is motion activated and utlizes warm white LCD illumination and a green LED aimer.

Environmental Specification

The ConnectCheck adheres to the following environmental requirements:

Storage Environment	Temperature	-20°C to 60°C (-4°F to 140°F)
	Humidity	10% to 95%, non-condensing
Operating Environment	Temperature	0°C to 45°C (32°F to 113°F)
	Humidity	10% to 90%, non-condensing

Electrical Specification

The power adapter used to power the ConnectCheck is a Universal switchable pack adapter (5V 2A DC Jack) with power cable. An adapter for international use (EU/AU/UK) is available.

US Power

International Power Adapter

Communications Specification

The ConnectCheck communicates with the host via the retailer terminal either wired to the LAN port of a modem or rounter.

Mechanical Specification

Device dimensions are as follows.

Height	9.89" (251.1mm)
Width	4.55" (115.5mm)
Depth	5.73" (145.5mm)

External Ports

The external ports are physical connections on the back of the ConnectCheck.

1—Ethernet (RJ45)	2—USB-B	3—Power

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Chapter 2 Installation

This chapter details the procedure for installing a ConnectCheck device into a retailer location as a counter-top device with wire communications.

The configuration of the ConnectCheck needs to be performed prior to the physical installation.

For wired configurations:

- If there is only one (1) ConnectCheck being connected to one (1) retailer counter-top terminal, no configuration on either product needs to be configured.
- If there are more than one retailer counter-top terminal in one location using a wireless configuration, the counter-top terminal as well as the ConnectCheck need to be configured.

Refer to *Configuration* on page 23 for more information.

Before beginning the installation process for the ConnectCheck, verify that there is a fully functioning clerk-operated lottery terminal already operating at the site.

Please check with your site for the preferred and allowable installation options.

Counter-Mount Installation

1	Plug in the cables.
2	Route the Ethernet cable along the channel, if applicable.
3	Route the power cable along the channel.
4	Hook the lip on the top of the mount into top rear of the ConnectCheck.
5	Secure with two (2) screws.

The power cord and Ethernet cable (if applicable) for wired communications must be properly routed on the back of the device prior to attaching to the counter-top base.

The wired ethernet communication link supports up to five meters of cable distance from the host terminal. Due to the length of the power cord, the ConnectCheck must be installed within a distance of 7' 11" to a power outlet.

1. If using a counter-top base, insert the power and Ethernet cables through the base first.
2. Plug the power cord into the power port.
3. Plug the Ethernet cable into RJ45 port (if applicable).

4. Route and secure the cables down the cable retention guides on the back of the device as shown. Allow some slack for the cord to best be able to secure it into the guides.

5. Place the device onto the base by inserting the tab on the base into the slot opening on the top rear of the device.
6. Install the device onto the base by inserting the back of the bezel onto the tab on the base and gently sliding down.

7. Secure the ConnectCheck to the cover on the base with the two (2) screws provided.
8. Install the Ethernet cable to the LAN port of a modem or rounter, depending on the configuration.
9. Continue to *Configuration* on page 23, if necessary.

Once installed the ConnectCheck may be powered on.

It takes +/- 10 seconds from power up for the blue display screen to appear. The blue screen remains static for 3 seconds and then the IGT splash screen is displayed.

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Chapter 3 Diagnostics

Required Equipment for the USB Method

In order to perform the internal diagnostic test for the ConnectCheck, the following equipment is required:

- Fat-32 Formatted USB-named DEBUGPLUG (for dowloading firmware manually)
- Pre-printed Barcoded Ticket (for testing barcode scanner)
- USB Type B Male to Type A Female Adapter Data Extension Cable (required when using DEBUGPLUG)

Diagnostics Tests

There are two ways to enter the ConnectCheck Standalone Diagnostics:

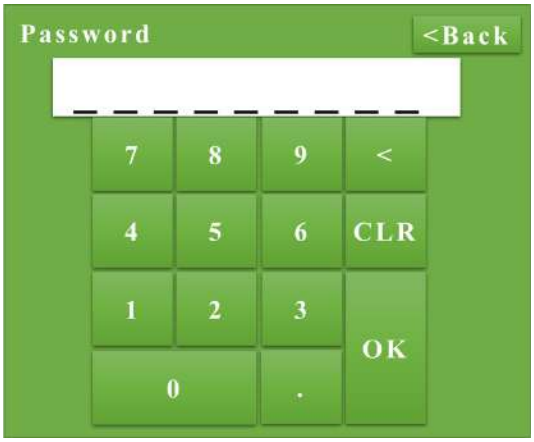
- **Option 1:** While the ConnectCheck is powering up and displaying the IGT logo splash screen (shown in the following image), touch the display panel at least once per second (for approximately 30 seconds).

- **Option 2:** Using an USB device.

This same USB Storage device may also be used to load the device with new firmware.

1. Insert the FAT32-formatted USB storage device labeled DEBUGPLUG into an extension cable and connect it to the ConnectCheck, as shown in the image that follows.

2. Power up the ConnectCheck. The *Password* screen appears.



3. Enter the password `2022101010` and touch **OK**.

4. The password is verified and the *Main Menu* appears.

The diagnostics tool *Main Menu* displays once in standalone diagnostics mode.

Menu options include:

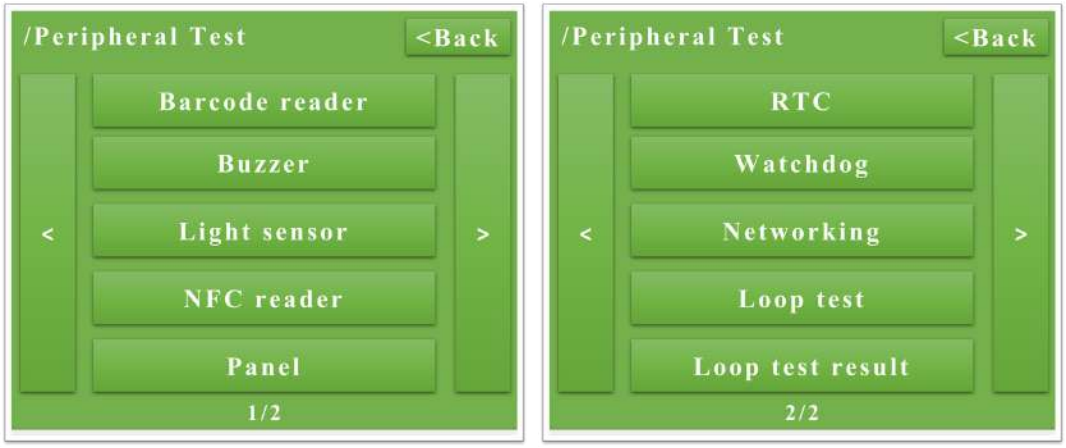
- *Device Information* on page 17
- *Peripheral Test* on page 17
- *Configuration* on page 18
- *Firmware update from USB* on page 19
- **** Reboot **** on page 20

Device Information

Touch **Device information** to view the device's firmware version, and eth0/wlan0 IP addresses. Touch **<BACK** to return to the *Main Menu*.

Peripheral Test

Touch **Peripheral test** to test device components. Touch **<BACK** to return to the *Main Menu*.

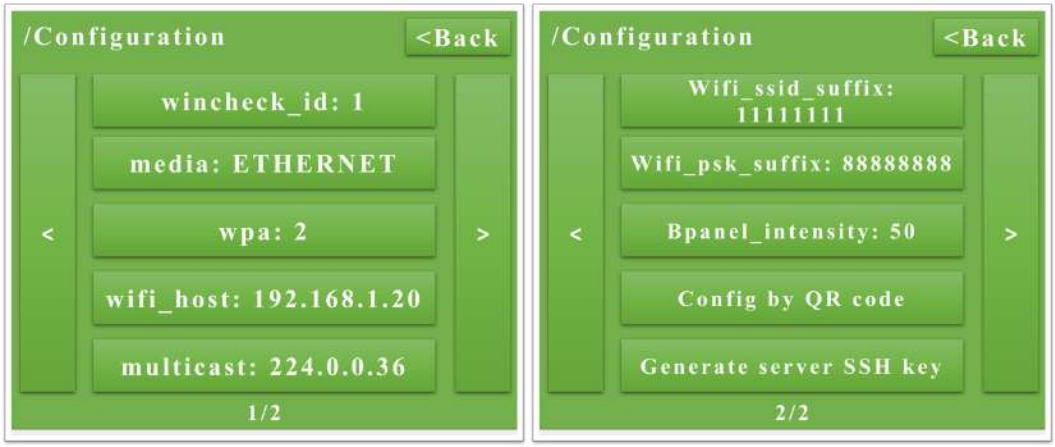


Tests include:

- *Barcode Reader—Get barcode.*
- *Buzzer—Confirm the device plays the buzzer audio. This is not used to change volume.*
- *Light sensor—Toggle between 8, 9 and 10 to test the light sensor.*
- *NFC reader—To test the NFC reader.*
- *Panel—Confirm the panel and displays multi-colored screens. This is also used to change the panel brightness.*
- *RTC—Real Time Clock.*
- *Watchdog—Watchdog.*
- *Networking—Networking settings.*
- *Loop test—Performs a loop test.*
- *Loop test results—Displays loop test results.*

Configuration

Touch **Configuration** to configure the device at installation/as needed. Touch **<BACK** to return to the *Main Menu*. Refer to *Configuration* on page 23 for more information.

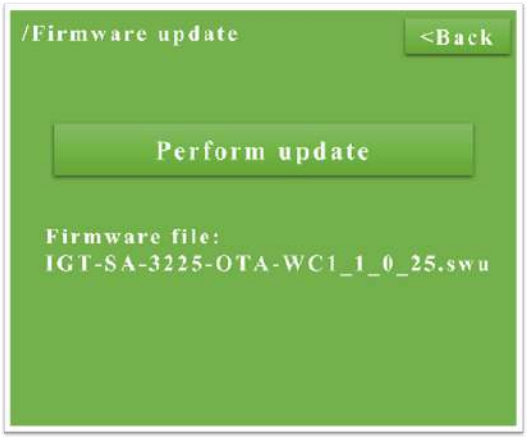


Firmware update from USB

The USB device named DEPLUGPLUG with the Firmware file on it, must be inserted into the ConnectCheck.

1. Touch **Firmware update from USB** to update the firmware loaded on the device.

- If the file is found, the screen below appears. Continue to step 2.



- If the file is not found, the screen below appears. Ensure that the USB device named DEPLUGPLUG has the updated firmware file on it, and that it is properly inserted into the ConnectCheck.

2. To perform the update, touch **Perform update**. The screen displays `[OTA is running ...please wait]`, note this process takes approximately two minutes.

3. When complete, the screen displays `[OTA is SUCCESS...reboot]` and the ConnectCheck automatically reboots.

4. The screen displays black, then blue, then black, then a tone of green, and the *Password Entry* screen appears.
5. If configuration is complete, remove the DEBUGPLUG and reboot the ConnectCheck.

*** Reboot ***

Touch ***__Reboot__*** to perform a device reboot.

Chapter 4 Download

The ConnectCheck downloads can be performed over the network, through the terminal or in standalone diagnostics.

Downloading ConnectCheck Firmware Using Terminal Diagnostics

Current document procedure to be tested.

1. Boot the counter-top terminal into diagnostics using a USB stick labeled DEBUGPLUG.
2. From the diagnostics *Main Menu*, select **Peripherals Menu** > **WINCHECKS2_1**
3. Menu **UP** to page 2 and select **ACTIVATE WATCHDOG**.
4. Wait for *De-activate "Complete"* to display at the bottom of the screen.

Deactivating the Watchdog results in a WinCheck S2 reboot.

5. Menu **DOWN** to select **WINCHECK FIRMWARE DOWNLOAD**. The download begins immediately upon selecting this option. This process takes 3-4 minutes to complete.
6. The screen displays a message such as *"File transfer in progress (IGT-SA-nnnn-OTA-WC_1_0_nn.swu.tgz)...*, followed by *Downloading IGT-SA-nnnn-OTA-WC_1_0_nn.swu.tgz.*
7. The ConnectCheck reboots automatically again.
8. After the device reboots completely, select **DEACTIVATE WATCHDOG** from the *WINCHECKS2_1 Menu* page 1.

Downloading ConnectCheck Firmware Using Standalone Diagnostics

1. Copy the firmware file, provided to you by you site, to the FAT32 formatted USB device labeled DEBUGPLUG.
2. Boot the WinCheck S2 into diagnostics using the USB stick labeled DEBUGPLUG with the firmware files on it.

3. From the diagnostics *Main Menu*, select **Firmware upgrade from USB**.
4. On the next screen select **Perform update**. The screen indicates the update is processing and the firmware file name.
5. When complete, the screen indicates *Success* and the ConnectCheck reboots automatically and the password screen appears.

Chapter 5 Configuration

After the ConnectCheck hardware has been installed per *Installation* on page 11, it must be configured. The ConnectCheck configuration procedure assigns a unique polling address to each device connected to the lottery terminal. The polling addresses allow the host lottery terminal to share data with the ConnectCheck.

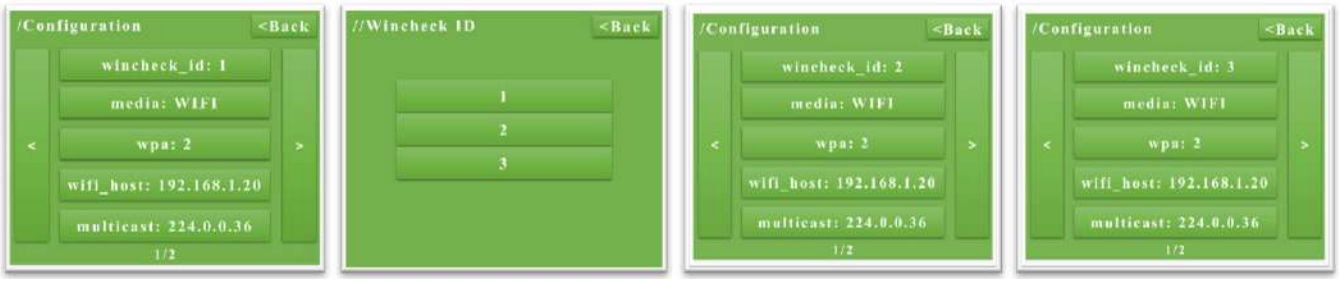
Multiple ConnectCheck devices connected to the same host lottery terminal must have different polling addresses. These addresses allow the lottery terminal to distinguish one ConnectCheck device from another. As many as three (3) devices may be connected in parallel to a single host lottery terminal.

Continue to:

- *Wired Configuration* on page 24

Wired Configuration

1. From the standalone diagnostics main page (Diagnostic tool) select **Configuration**.
2. On the *Configuration page 1* the first selection identifies the ConnectCheck.
   - To install only one ConnectCheck, the first selection remains as the default of **wincheck_id: 1** and no other configuration is needed.
   - To install the second ConnectCheck, select the box and select **wincheck_id: 2**. After the selection the screen returns to page 1 configuration.



   - To install the third ConnectCheck, select the box and select **wincheck_id: 3**. After the selection the screen returns to page 1 configuration.

A maximum of three ConnectChecks can be connected to one terminal.

3. On the *Configuration page 1* select **media: WIFI** (default).
4. On the next page select **ETHERNET**. After the selection the screen returns to page 1 configuration.

5. Physically, the Ethernet cable needs to be connected to the ConnectCheck and the modem or switch. For multiple ConnectChecks a switch will be necessary.

Chapter 6 Operation

The ConnectCheck does not have any direct communication with the host system, and because of this must send barcode and number data from the lottery tickets to a lottery terminal to the host. The associated online lottery terminal validates whether the ticket is a winner, not a winner, or is invalid, and sends a text message to the ConnectCheck, which displays the appropriate message on the ConnectCheck LCD.

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Chapter 7 Hardware

This chapter covers the disassembly of ConnectCheck.

Topics in this section include:

Required Tools

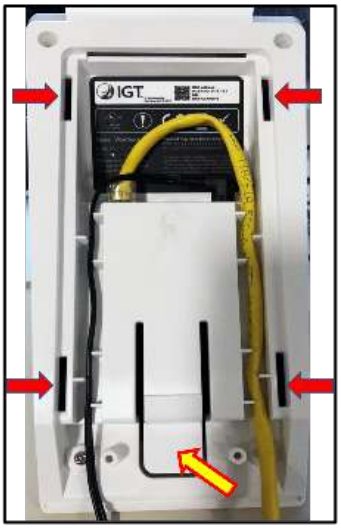
- #1 Phillips-head Screwdriver
- #0 Phillips-head Screwdriver

The screws into the plastic housing are self-tapping. Use caution when replacing. TIP: Insert the screw using the correct angle and turn the screw to the left first to verify thread alignment.

Removing the Main Controller Board

The following instructions are to remove the main board from the ConnectCheck.

A



B

1. If counter-mounted, remove the two (2) screws on the back of the base and lift the unit off of the counter-top base and disconnect.(image A)

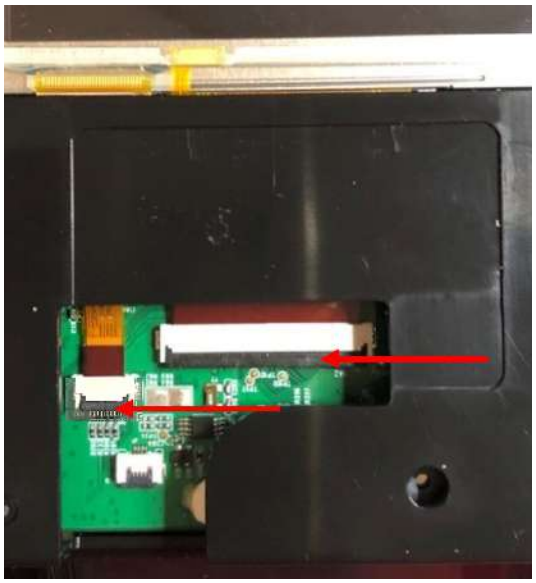
   If wall-mounted, press in the tab to disengage from wall mount.(image B)

2. Remove the four (4) screws from the back of the ConnectCheck.

3. Remove the four (4) screws tht secure the black bracket to the front and separate as shown.

4. Carefully lift the black release tab from barcode scanner connector (J14) and remove.
5. Remove the two (2) screws that secure the black metal scanner housing bracket.
6. Remove the bracket from controller board

7. Turn the unit over and disconnect the two (2) ribbon cables by carefully lifting the black connection locks .



8. Turn the unit back over and remove the four (4) screws that secure the board to the device.

Take note and use caution that the LCD is only pressed into the cavity where it resides.

If difficulty occurs when connecting the ribbons cables through the small opening in the front during re-assembly, remove the LCD screen. Refer to Removing the LCD Assembly on page 31 for more information. Connect the LCD ribbon cables first then insert the LCD screen through the opening and then secure the controller board and barcode scanner enclosure.

Removing the Barcode Scanner Engine

1. Remove the main controller board. Refer to *Removing the Main Controller Board* on page 28 for more information.

2. Using a #0 Phillips-head Screwdriver to remove the two (2) screws that secure the scanner engine to the housing.

3. Guide the engine and cable out of the housing and be sure to make note of the cable direction for re-assembly.

Removing the LCD Assembly

1. Remove the main controller board. Refer to *Removing the Main Controller Board* on page 28 for more information.
2. Turn the unit over to disconnect the LCD assembly ribbon cables. Disconnect the two (2) ribbon cables by carefully lifting the black connection locks.
3. Locate the opening in the back of the device above the controller board and carefully push from behind and guide the LCD screen out of its cavity.
4. Replace with new assembly. When reconnecting the LCD ribbon connection, verify they are inserted straight and completely and press down on the locking tabs.

   If difficulty occurs when connecting the ribbons cables through the small opening in the front, connect the LCD ribbon cables first then insert the LCD screen through the opening and then secure the main controller board and barcode scanner enclosure.

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Chapter 8 Troubleshooting

Troubleshooting Techniques—The Seven-Step Troubleshooting Method

The seven-step troubleshooting method is a constructive development tool for FSTs. The following procedures may assist in determining problems and finding solutions for issues with IGT machines. The seven steps include:

1. Verify the problem
2. Determine related symptoms
3. Analyze the symptoms
4. Isolate the problem
5. Correct the problem
6. Verify the correction
7. Document the process

Step One: Identify the Problem

When an issue is dispatched for an IGT machine, you should identify the problem, determine if a problem actually exists, and note if the existing problem is intermittent or continuous.

Identifying the Problem

The average retailer is likely not going to be technically oriented; therefore, it may often be difficult to understand their description of the problem on the dispatch request. Your knowledge of the machine functionality is important when comprehending the initial request. If the you are not familiar with the equipment, do the proper research and review reference material can significantly assist with the troubleshooting process.

Determining a Problem Exists

Sometimes what seems to be a problem may actually be a normal function of the machine. For example, the machine sound is not working. Before you look at the affected hardware components, it is good practice to check if the sound level may have been lowered on the previous shift in the management application.

There also could be instances where the customer notices a characteristic that differs between machines. These are not necessarily problems and the best way to address this type of issue is to make a comparison with a known good machine and note the differences, such as sounds, lights, and items initiating in the proper sequence.

Determining if a Problem is Intermittent or Continuous

Continuous problems are normally obvious when they occur; whereas, intermittent problems can be difficult to find and are often frustrating. When a problem is intermittent, you will need as much information as possible about the conditions that were present when the problem occurred.

For example:

- What was the customer/retailer doing at the time of the instance?
- What error message(s) appeared?

If the conditions are repeated and the problem does not re-occur, a thorough inspection of the connectors, and components may be required. Look for pinching, pulling, or other damage on the cables that could be causing the problem.

Never assume a problem fixed itself or mysteriously went away. More than likely, the problem will return in the future. If the problem occurs again, ask the retailer to place an "out of service" plaque on the machine and to leave it in the current state until a FST can return.

Step Two: Determine Related Symptoms

Once the problem has been identified, you should investigate the symptoms more thoroughly and perform machine diagnostics to determine if the problem is affecting any other peripherals. Performing diagnostics and an overall inspection may save time by finding additional problems that may hinder the repair.

The items to consider are:

- What other areas are impacted?
  - Verify proper voltages (AC and DC)?
    - A completely dead circuit may indicate a short, ground, bad fuse, or power supply.
  - Verify peripheral communications in diagnostics?
  - Shared switches or sensors?
- Can you identify additional problems by operating peripherals related or connected to the problem area.
- Could software or firmware be the source of the problem?

Step Three: Analyze the Symptoms

Analyzing the problem provides better understanding as to the nature of the information provided on the service call. Determining related symptoms may indicate that other areas may or may not be affected. At this point in the process, stop and combine / document the following information:

- The specific components and areas affected in the machine
  - Both the customer complaint and related symptoms
- What kind of problem exists?

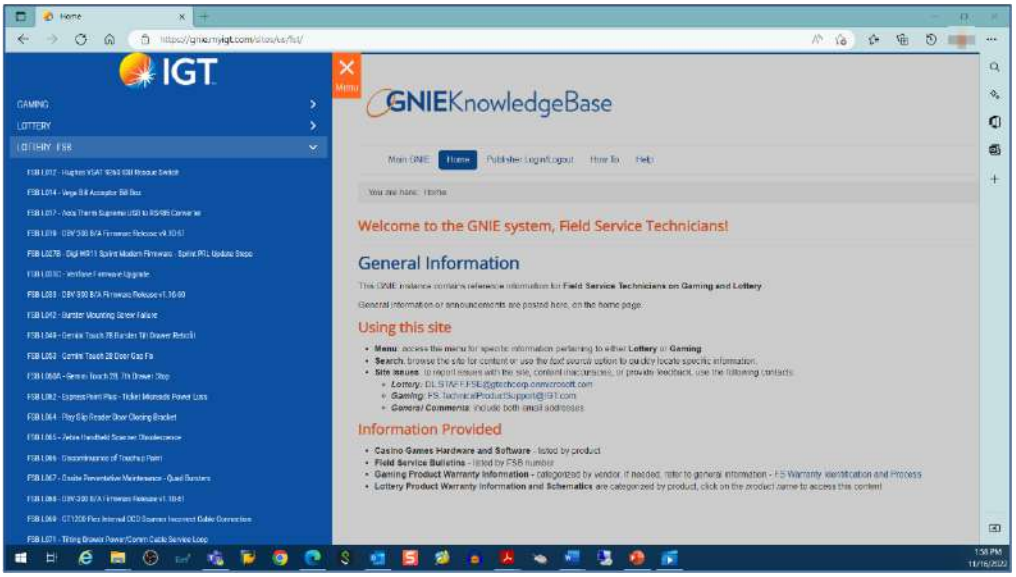
- Voltage deficiencies, grounds, software, firmware, etc.

- When does the problem occur?
- Is there a history of problems?
  - Cadence notes
  - Previous dispatch requests
  - Service Card

After combining the above information, create a checklist of the known good components and areas. Keeping track of all the affected areas of the machine that do not have to be checked will save time by reducing the amount of repetitive diagnostic tests.

Utilizing Available Resources

A number of resources are available for solving complex problems. For example, wiring diagrams can be used to trace out the affected board or take note of common connectors and components. Research FSBs and other specific information about the machine on GNIEDirect.



Depending on the nature of the problem, someone else may have also have expertise that may assist in the troubleshooting process.

Step Four: Isolate the Problem

To isolate the problem, find the possible problem area(s), determine where to make the initial checks, and perform inspections. Look for simple or obvious items before disassembling the machine; i.e. connector disconnected or a failed component.

By looking at the symptoms, you should make a plan for making the first two initial checks. If the first two initial checks do not find the faulty component or cause of the problem, they should at least lead you to making additional checks based on their findings.

Remember, the location of the problem will be in one of the areas ruled to be a problem board or component as determined from the previous steps. Looking or performing checks on known good circuits may cause frustration and delay the repair.

50/50 Isolation

The 50/50 rule may be highly effective in locating a problem component(s). For example, using the Combo Board, as the central point of distribution and isolating the suspected problem component(s) one at a time, will provide indicators of the problem area. If other components work in parallel or use the same power source on the affected component, the machine will partially recover the non-problem component(s) or the symptoms may change. This process of elimination will further provide clues to the problem.

Never remove or attach a module or connector with machine power on. Remove power from the terminal first.

Software and Firmware

If the software or firmware is suspected of causing the problem, ensure you have the latest and greatest software for the hardware.

Swaptronics

Swaptronics is the act of taking a known good part and testing it in a machine to verify it is operating correctly. This may quickly find a solution to a problem; however, this may also cause unwanted damage to an additional machine or a good part. Use caution.

Never hot swap any peripheral

Step Five: Correct the Problem

Correcting the trouble is a direct step in the overall process. Performing the repair will usually involve:

- Replacing a component
- Replacing a cable
- Servicing a connector
  - Repair and re-pin if possible
- Installing programs

Step Six: Verify the Correction

After making the repair, you must always verify that the problem was corrected. Operate and test the machine in the same fashion as the first three steps in the troubleshooting process. Performing these checks will not only inspect for additional damage that may have occurred during the repair, it will also help to ensure customer satisfaction.

Step Seven: Document the Process

Documenting and archiving the troubleshooting steps taken to resolve a problem is essential. Making the information available to co-workers could save time if the same problem occurs in the same or similar machine. Creating an archive of problems and their resolutions will assist all service technicians.

Troubleshooting Worksheet

Use the Troubleshooting Worksheet on the following page to make use of the Seven-Step Troubleshooting Method.

1. Verify the problem.
2. Determine related symptoms.
3. Analyze the symptoms.
4. Isolate the problem.
5. Correct the problem.
6. Verify the correction.
7. Document the process.

Troubleshooting Worksheet

Step 1: Verify the Problem

Identify the Initial Problem by listing the complaint, error messages, LEDs , or any other faulty symptoms.

Is the Problem: Intermittent Continuous?

Step 2: Determine Related Symptoms

Perform an inspection / diagnostics and list all components that are affected.

Step 3: Analyze the Symptoms

What type of problem exists?	
When does the problem occur? Is there a history of the problem?	
What areas are unaffected?	

Step 4: Isolate the Problem

List the initial two checks performed and use the space below to list the subsequent checks based on the findings:

1	
2	

Step 5: Correct the Problem

What was done to correct the problem?

Step 6: Verify the Correction

Were diagnostics and tests completed following the repair?

Step 7: Document and Archive

Print Name:	Date:

General Troubleshooting

When failed ConnectCheck units and power supplies are removed from the field, they are returned to a screening facility for a diagnostic test and evaluation.

When a failure occurs between the host lottery terminal and the ConnectCheck the most likely causes are:

- No power getting to the ConnectCheck.
- No communications occurring between the host lottery terminal and the ConnectCheck.

Both of these problems are addressed on the following pages. If the ConnectCheck cannot be fixed in the field, return the unit to an IGT repair depot.

Of course, the failure may not be between the lottery terminal and the ConnectCheck at all. The lottery terminal may be the cause of the failure (bad RS-485 drivers, for instance), or communications may have failed between the lottery terminal and Central.

If the troubleshooting methods in this chapter fail to solve the problem and if a known, good ConnectCheck does not work when you swap it for a different unit, the problem lies elsewhere. The troubleshooting procedures in this section are a general guide on how to isolate possible faults in the ConnectCheck at the screening facility.

Prior to performing the troubleshooting steps in this chapter, perform the following steps:

- Inspect the ConnectCheck for any physical damage, debris or disconnected/loose cables.
- Perform a Power Reset of the ConnectCheck by removing power, waiting 5 seconds and then reapplying power.

It takes 10 seconds from power up for the blue display screen to appear. The blue screen remains static for 3 seconds and then the IGT splash screen is displayed.

- Use the standalone diagnostics for the component you are troubleshooting to further diagnose the problem; this chapter assumes that diagnostic testing has been performed prior to performing the steps that follow.

After each step, check the ConnectCheck to determine if the fault has cleared. One the source of the problem is identified repair or replace per warranty.

A ConnectCheck with communication-related symptoms is a special case. If the Comm Diagnostics do not reveal any problems, the screening facility may have the ability to duplicate the site's communication environment in an effort to replicate the symptom. If the symptom cannot be replicated, label the ConnectCheck appropriately and return it to field.

Troubleshooting Guide—ConnectCheck

Module	Problem	Possible Causes
Display	Black Screen/White Screen Vertical Lines	• Faulty Power Supply • Faulty Ribbon cable connection • Faulty LCD Assembly • Faulty Main Controller Board

Module	Problem	Possible Causes
Resistive Touchscreen	Unresponsive to touch	• Dirty Touchscreen • Faulty Ribbon cable connection • Faulty LCD Assembly • Faulty Main Controller Board
Power *It takes 10 seconds from power up for the blue display screen to appear. The blue screen remains static for 3 seconds and then the IGT splash screen appears.*	No Power	• Faulty Power Supply • Faulty Main Controller Board
Terminal Load/Boot	Terminal Reset	Faulty Controller Board
Sound	None	• Wrong settings • Faulty Main Controller Board
Reader	Intermittent Reads/Not reading	• Scratched or dirty window • Faulty Ribbon cable connections • Faulty Barcode Scanner Engine • Faulty Main Controller Board
Scanner	No green light	• Faulty Power Supply • Faulty Ribbon cable connections • Faulty Barcode Scanner Engine • Faulty Main Controller Board
Communication - Wired	Will not communicate	• Incorrect settings • Faulty Ethernet switch • Faulty Main Controller Board
Communication - Wireless	Will not communicate	• Incorrect settings • Faulty Main Controller Board
Display	Green screen with no prompt for password when attempting to use standalone diagnostics	• A failed Barcode Sscanner • A disconnected or faulty Barcode Scanner. • Faulty Main Controller Board

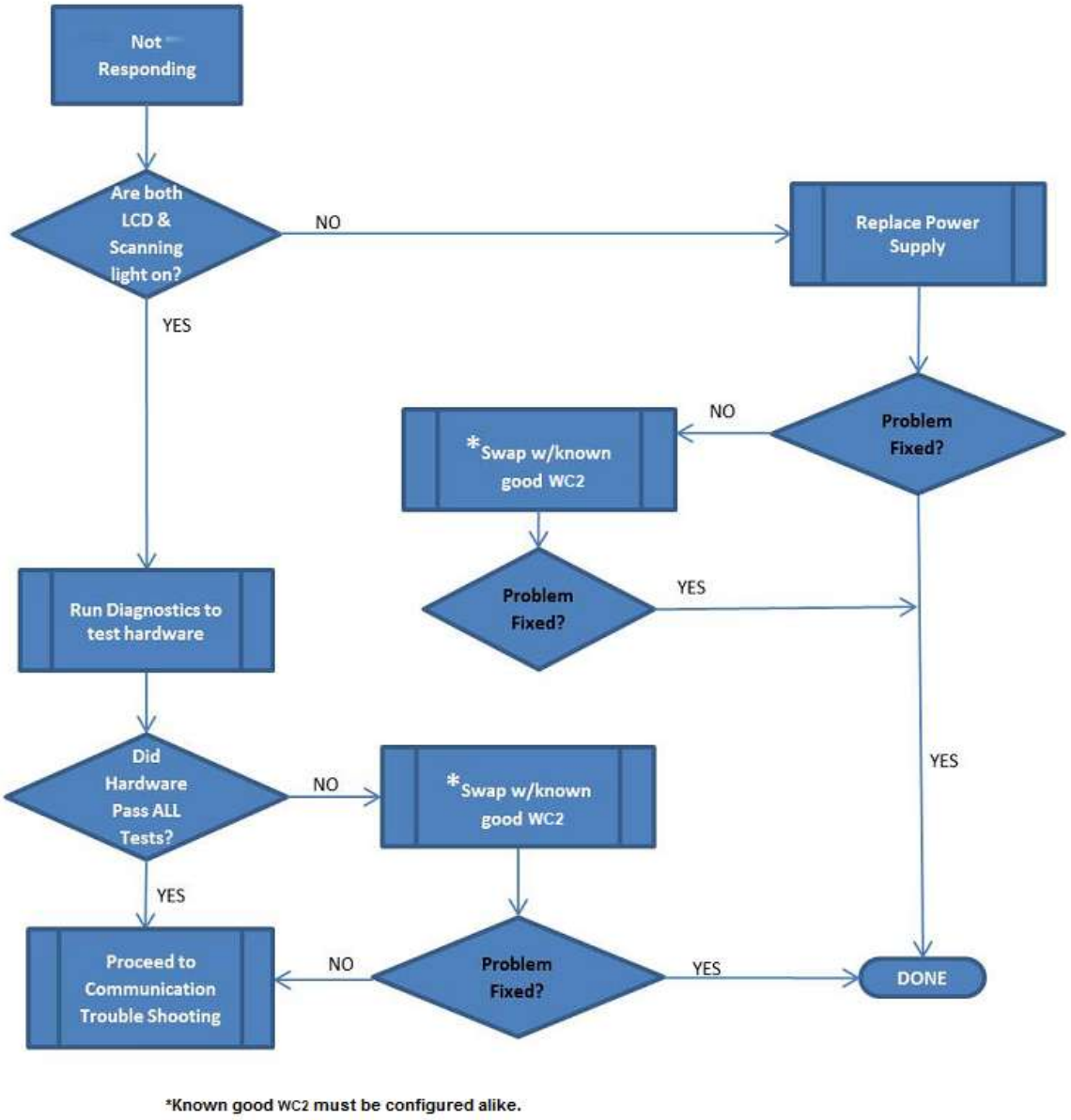


Figure 8-1 Troubleshooting Flow Chart - Initial Steps

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Chapter 9 Preventive Maintenance

The recommended frequency for the preventive maintenance procedures for the ConnectCheck is upon each visit to a retailer location unless otherwise stated in a jurisdiction-specific contract. FSTs should perform preventive maintenance during routine service calls that do not require a terminal swap.

Cleaning Materials

- All purpose cleaner (ammonia and vinegar free)
- Glass Cleaner (ammonia and vinegar free)
- Clean, lint-free cloth

The PM steps below are NOT in the order that the steps need to be performed. There is no specific recommended order. Power down the equipment before conducting any maintenance on the terminal and/or peripherals.

To maintain the ConnectCheck, check that all connections are properly seated and that the scanner area is clear of dust and debris. Take care not to scratch the protective film that covers the LCD.

External Cleaning

Do not, under any circumstances, spray cleaners directly onto the terminal or peripherals.

- *Terminal Exterior*—Wipe the case with a cloth dampened with all-purpose cleaner.
- *LCD*—Wipe with a non-ammonia, non-vinegar based cleaner, sprayed onto a clean, soft, lint-free cloth. NEVER spray cleaner directly onto the LCD.
- *Scanner Window*—Wipe with a non-ammonia, non-vinegar based cleaner, sprayed onto a clean, soft, lint-free cloth. NEVER spray cleaner directly onto the scanner window.

When You Are Finished

Power up the ConnectCheck *BEFORE* the powering up the retailer lottery terminal. Verify that the terminal and all peripherals are functioning properly.

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Chapter 10 Handling Precautions

This chapter explains the proper handling of Electrostatic Discharge (ESD) sensitive modules and devices, the proper transport of terminals and other parts, how terminals and devices should be packaged for returns to depots or retailers, and the proper storage of extra or backup devices and parts.

All Printed Circuit Boards (PCBs) are static-sensitive. In order to prevent damage to electronic components through ESD, please take the precautions presented in this chapter whenever:

- Performing any work on a PCBs and equipment containing PCBs
- Removing subassemblies or components

What is ESD?

Static is the electrical charge created by the friction of two dissimilar materials moving against each other. Electro Static Discharge, or ESD, is the unintended dissipation of that charge, typically by short circuiting the charge to another device or to ground.

Our bodies can create as much as 25,000 volts of static electricity across our 100 to 250 picofarads of capacitance to ground. In the worst case work environment, voltages on some objects could exceed 50,000 volts. This more than exceeds the static-tolerance threshold of most transistors, resistors, op-amps, and digital computer chips. Some MOS families, for instance, can be damaged by a charge as low as 150 volts.

Usually the damage is such that it goes undetected for some time but eventually creates either an intermittent or hard failure in the field. Insulators, or non-conductors of electricity, pose the greatest static discharge threat to electronic devices because of their inability to bleed their static charges.

Becoming “Static Safe”

Equipment or component failures that result from ESD can be difficult to identify but can be avoided at minimal cost with proper handling techniques.

A static electricity-safe workplace is an environment in which anything that can generate static charges is eliminated or is drained of its charge. Such a workplace employs conductive and static dissipative materials for its table tops, floor surfaces, clothing, and material handling bins, boxes and bags. Machines, tools and test fixtures should be properly grounded. Technicians or anyone handling electronic components should wear wrist straps and even ankle straps at all times when working on or near ESD sensitive electronic modules, PCBs and devices.

This chapter has been created to help you identify ESD failures and to implement correct handling procedures. Please read the following sections carefully.

ESD-Induced Failure Modes

Radiated Electromagnetic Fields

Radiated electromagnetic fields induce low-level voltages in unshielded signal conductors. These can cause intermittent unit halts from which the operator may recover. Older products are more sensitive to these fields. Products manufactured today are designed with covers and shielded external cables to protect them from most induced voltages.

Conducted Charges

Conducted charges (usually at points where the operator touches the unit) may transfer directly to components and result in either intermittent or permanent failures.

Typical Symptoms of ESD Damage

Hard failures such as blown semiconductor junctions, cracked oxide layers, fused metallization or bond wires can result from ESD, however, intermittent failures are the most common result of ESD. The device becomes temperature sensitive, input thresholds shift, output levels and drive ability degrade, etc.

Increased failure rates are also typical. Normal stresses such as temperature swings, power surges, or another “zap” could permanently disable a device previously exposed to ESD, even if no symptoms existed from the first exposure!

Common False Assumptions Concerning ESD

MYTH: Only MOS devices are ESD sensitive.
FACT: All semiconductor materials are sensitive to ESD. Some devices are just more sensitive than others.

MYTH: A component cannot be damaged once it is installed in a board.
FACT: It may be even more susceptible to induced fields due to the antenna effect of the etch or wire connected to it.

MYTH: If the device works after I replaced it, I got lucky and did not damage it.
FACT: Most failures are not catastrophic and only reveal themselves as intermittent or latent failures.

MYTH: A grounded metal table top is a good anti-static work surface.
FACT: A much better way to dissipate electrostatic fields is to use an anti-static mat and a 1-Megohm discharge current limiting resistor connected to earth ground so that the charge is drained in a controlled manner.

MYTH: Wrist straps present a personal shock hazard when working on live circuits because they ground your body.
FACT: As long as the 1-Megohm resistor is connected between the strap and the ground connection the wrist strap does not increase your risk of suffering a shock hazard. The 1-Megohm resistor limits the current to a safe value for low-voltage circuits.

MYTH: We don't take precautions and we don't have ESD problems at our depot.
FACT: You may not realize the damage that you are causing, but it is there. IGT Engineering can determine if hard and intermittent failures are due to ESD damage by examining individual components, but such damage is not something that a technician can readily identify.

MYTH: The terminal is not susceptible to static damage.
FACT: Our terminals can be damaged or destroyed by static discharge just like any other electronic device.

ESD Precautions Checklist

Recommended Devices

- Wrist straps at the bench
- Wrist strap tester
- Only tools or parts made out of conducting materials (i.e., no plastic solder vacuums, tweezers, etc.).
- 3M® anti-static vacuum cleaners
- Static-dissipative mats connected to earth ground for bench tops and flooring
- Static-dissipative bags, boxes, bins and/or totes for handling PCBs (bags and totes must remain closed during transport - no part of the item can "stick out" of the bag or the bag is ineffective)
- Static-free floor mats, static-dissipative shelving, and 3M black conductive PCB storage bags used at all times (stockroom)

Precautionary Practices

- Minimize handling of components.
- Keep parts in static-dissipative packaging until ready for use.
- Use ESD-protective containers for handling and transporting small components.
- Handle IC's by the body, not the leads.
- Do not slide static sensitive devices over any surface.
- Eliminate static generators from your work area, for example plastic, vinyl, styrofoam, etc.
- Use a static-free workstation whenever handling parts in the office, in the field or anywhere.

Recommended Handling - Example

A typical scenario for a technician at a bench to properly retrieve parts from a stock area is as follows:

- You, the technician, are seated at a bench, connected to electrical ground via a wrist strap.
- The bench surface has a clean, grounded, static-dissipative bench mat connected to earth ground. All tools are conductive.
- When rising from the bench to retrieve a PCB (for example), disconnect the wrist strap.
- Proceed to the storage location and back to the bench, keeping the board in the existing closed static-dissipative packaging.
- Re-attach the wrist strap, remove the board from the bag, and install it in the terminal, which is sitting on the static-dissipative mat.

After leaving and returning to the static-dissipative area, always reconnect to a static wrist strap connected to electrical ground before touching any static sensitive parts.

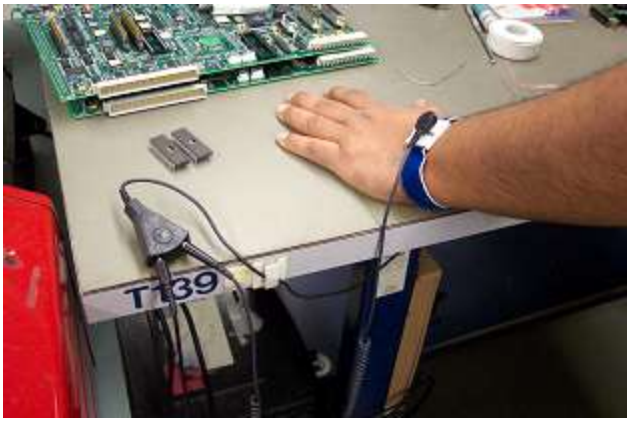
Proper Grounding Technique

RLTs and FSTs must follow proper ESD precautions. This includes the items mentioned throughout this section: wrist straps, anti-static mats, anti-static vacuum cleaners, and antistatic bags.

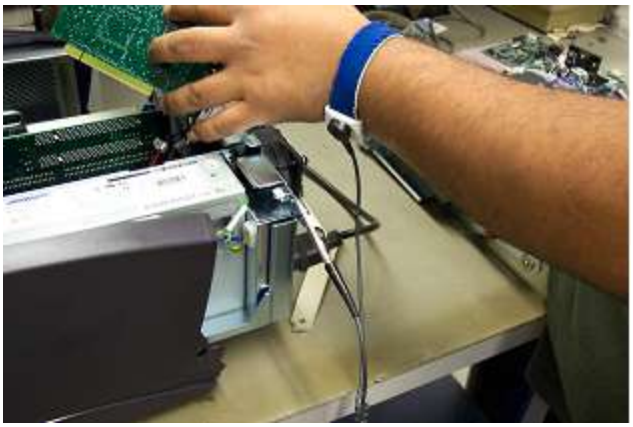
- FSTs in the field must be grounded by a wrist strap connected to the termina which in turn is connected to earth ground when servicing that terminal and all boards being transported must be stored enclosed within static-dissipative packaging.
- RLTs must work in a static-safe environment. The workbenches must have anti-static mats which are connected to earth ground and the RLT must observe proper ESD precautions, utilizing static wrists straps and proper anti-static packaging.

Vacuum cleaners are generators of static electricity. When purchasing a vacuum cleaner, choose one with an antistatic nozzle (such as the one recommended in the Spare Parts and Tools Chapter). If unable to purchase antistatic vacuum cleaners, the nozzle of the hose must be wrapped with antistatic (conductive) tape from the nozzle to the handle.

The picture below shows a properly grounded technician. Notice that the technician is grounded to the anti-static mat and the mat is grounded to earth ground at the AC outlet.



When servicing the terminal in the field, FSTs first must ground themselves to the terminal chassis which is powered off and connected to earth ground, as shown in the picture below.



IGT Manufacturing Specification

IGT (prior GTECH) assemblies comply with IEC 61000-4-2 recommendations for severity typically in excess of level three. IEC stands for International Electrotechnical Commission. The specification is for Electromagnetic Compatibility for Industrial Process Measurement and Control Equipment.

Part two specifies electrostatic discharge requirements and states that our equipment must withstand 15KV air discharges and 8KV contact discharges. Both positive and negative polarity discharges must comply.

Packaging

General Packaging Procedures

Package and ship all modules or devices in the packaging in which they were received from the manufacturer, whenever possible. Make sure that the packaging is in good condition and not damaged from previous shipping or handling.

- Circuit boards offer special problems and should be inspected for delicate components and sharp objects. Contact Manufacturing Engineering for assistance, if needed.
- All precautions must be made to insure that product that is shipped is not deformed or altered due to packaging used. Consideration must be given to the fragileness of the product that is shipped for total coverage of protective materials.
- Appropriate sized labels, elastic bands, or ESD tape must be used for securing ESD bags. Staples cannot be used.
- Multiple Circuit Card Assemblies' must be placed in a single static shielding bag only if they are mechanically separated with conductive or anti-static foam. No movement between assemblies can occur.
- As a priority, Circuit Card Assemblies' must be transported in slotted, conductive totes, with dividers spaced for tight capture. If boards are very short, anti-static bubble wrap or anti-static foam is used to prevent movement from slotting during handling. When conductive totes/dividers are not available, static shielding bags protect Circuit Card Assemblies'. Separation of Circuit Card Assemblies' by means of anti-static bubble or thin

polyethylene foam sheeting is required. Fragile parts must be cushioned from one board to another and no ‘puncturing’ of ESD protection is allowed.

- All IC’s must be placed in anti-static tube holders that are cut to size; then, placed in static shielding bags for transit in kit or sales orders. Shielding bags must be fully closed and sealed. Static shielding bags may be replaced by conductive DIP tube shippers or bin boxes.
- IC’s that will not fit an IC tube must be placed in conductive foam. All IC legs are inserted in foam without deforming; then, placed in static shielding bags for transport in kit or sales orders. Shielding bags must be carefully closed and sealed properly.
- IC's must not be placed loose in bags.
- Parts which mark or scratch easily must use supplier packaging or must be separated by thin foam, polybag material or corrugated in a similar fashion to the original supplier packaging.

Chapter 11 Diagrams

The following page includes the block diagram for the ConnectCheck. Please contact FSE Engineering, should you need additional information.

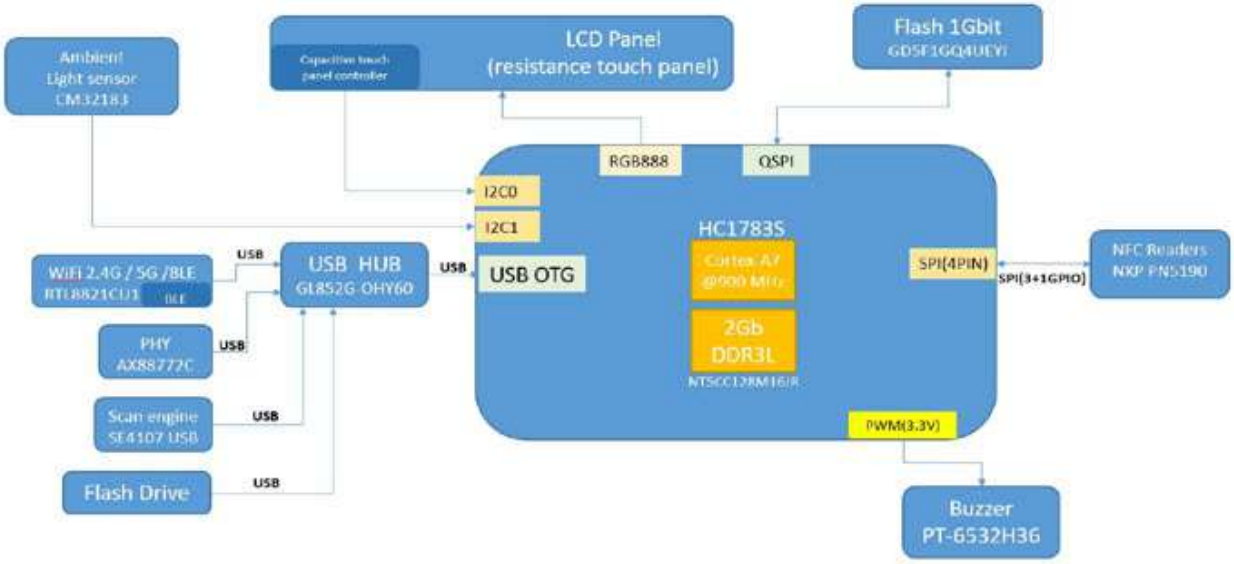


Figure 11-1 ConnectCheck Block Diagram

Chapter 12 Spare Parts and Tools

Contact #FSE@IGT.com to get correct Spare Parts Lists for specific components.

You may refer to the latest warranty information in the FSE Warranty Information folder in the Field Service Engineering folder in SharePoint. For information on locating this information please refer to:

- To access by phone outside the IGT network: Outside IGT Network
- To access on the IGT Network: Inside IGT Network

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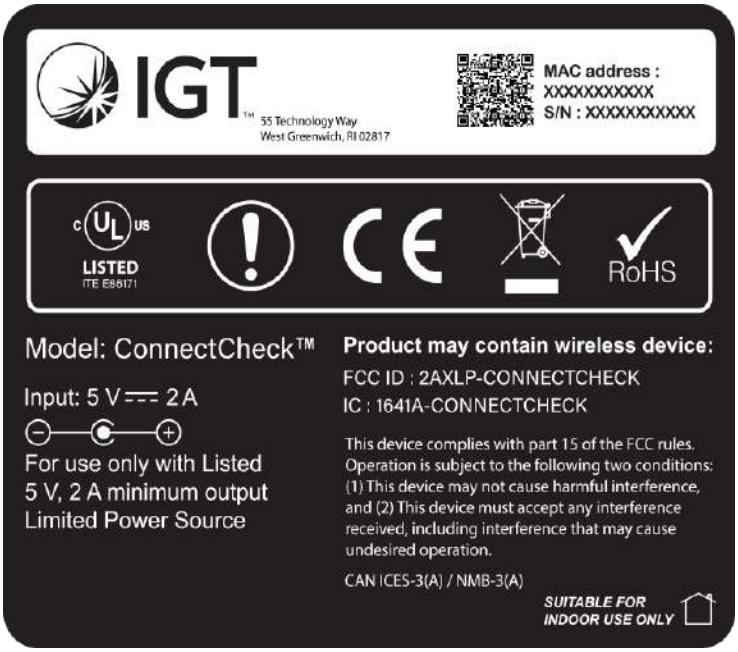
Chapter 13 Product Safety & Approvals

Safety Instructions

- The device may only be installed by qualified, trained personnel.
- Field Service Manuals and Retailer Reference Guides related to the device are provided at the time of training.
- If the device was stored in a cold environment, condensation can occur. In order to prevent condensation, wait for the device to acclimate to the temperature for 3 to 4 hours before opening the package.
- Verify that the nominal voltage matches the voltage of the local line to which it is being installed.
- This device is equipped with a safety-tested power cable and may only be connected to a grounded power outlet.
- Ensure that the power outlet to which the device is being connected is freely accessible.
- Always grip the cable plugs to remove them from outlet, never pull the power or data cables from the sockets by the cables.
- Lay leads and cables so that no one can stand on or trip over them.
- Data transmission lines must not be connected or disconnected during a thunderstorm.
- Ensure that no objects (e.g. jewelry, paper clips, etc.) are allowed to drop inside the terminal.
- In the case of an emergency (e.g. damaged housing, operating elements or power cable, entry of moisture or objects), switch off the device, pull out the power cable and contact the responsible customer support department.
- Repairs or modifications to the device may only be carried out by qualified, trained personnel.
- Unauthorized opening of the device and repairs may result in considerable danger, as well as jeopardize the warranty coverage.

Model Rating Label



FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Industry Canada

This device complies with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

European Union

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Document Modification History

Date	Version	Description of Change
September 2023	00	Draft Release