

# Renard Diagnostic Firmware Instructions

## Purpose:

The Renard Diagnostic Firmware has been developed in an effort to provide the user with a troubleshooting tool to help isolate problems on Renard based controllers. This firmware will help in finding some problems but it isn't guaranteed to find all possible problems.

These Instructions were written geared toward the Renard SS boards. However, these instructions are easily applied to any Renard based controller.

## Features:

- Performs a Channel Output Test
- Performs Renard Health Monitoring
- Performs a simple Communication Test

## Diagnostic Indicators:

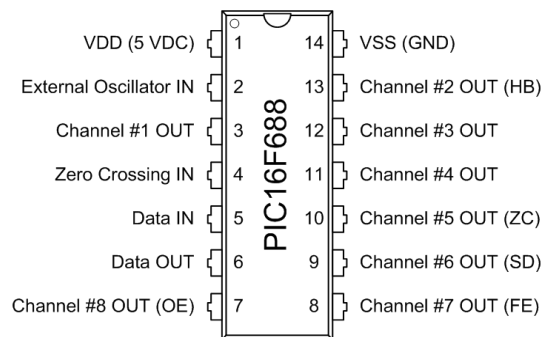
**HB LED (Channel #2)** – Blinks to indicate that the PIC is operating correctly.

**ZC LED (Channel #5)** – Blinks to indicate that the PIC is sensing the Zero Crossing (ZC) signal.

**SD LED (Channel #6)** – ON steady while VIXEN data is being received correctly.

**FE LED (Channel #7)** – ON when the PIC detects a Framing Error (FE) while receiving VIXEN data.

**OE LED (Channel #8)** – ON when the PIC detects an Overrun Error (OE) while receiving VIXEN data.



PIC16F688 Pin Assignments

## Description of tests performed:

### 1. Channel Output Test

This test exercises the PICs ability to turn ON/OFF the outputs.

This test is performed before the PIC starts testing for the Zero Cross signal, so is independent from the ZC signal.

The test sequence is as follows:

- All channels ON for approx. 2 seconds
- All channels OFF for approx. 2 seconds
- Channel 1 turns ON for approx. 1 second then turns OFF
- Channel 2 turns ON for approx. 1 second then turns OFF
- Channel 3 turns ON for approx. 1 second then turns OFF
- Channel 4 turns ON for approx. 1 second then turns OFF
- Channel 5 turns ON for approx. 1 second then turns OFF
- Channel 6 turns ON for approx. 1 second then turns OFF
- Channel 7 turns ON for approx. 1 second then turns OFF
- Channel 8 turns ON for approx. 1 second then turns OFF

(The above test sequence repeats three times)

Why is this test useful?

- Occurs before testing for the Zero Cross
- Verifies operation of on-board LEDs
- Verifies operation of channel outputs

### 2. Renard Health Monitoring Routine

This routine is the “meat” of the diagnostic firmware. This routine checks for a good Zero Crossing (ZC) signal and shows a general health status indication by blinking a Heart Beat (HB). The HB simply shows that the PIC is operating correctly, good power and a good clock signal.

Test Indications are as follows:

- **HB LED** (Channel #2) blinks to indicate that the PIC is operating correctly.
- **ZC LED** (Channel #5) blinks to indicate that the PIC is sensing the Zero Crossing (ZC) signal.

Why is this test useful?

- Blinking HB indicates that the PIC has good power and a usable clock signal
- Blinking ZC indicates a usable ZC signal present at the PIC

### 3. Simple Communication Test

This routine checks to see if the PIC is receiving valid Renard data from the computer.

This test requires you to run a VIXEN sequence. To be able to get good results with this test, you need a sequence that has many changes occurring; a long dimming ramp works great. Do not expect any other indications except those listed below, the sequence data is not passed to any other chips (if installed).

Test Indications are as follows:

When no VIXEN data is being sent to the PIC:

**SD LED** (Channel #6) is OFF

**FE LED** (Channel #7) is OFF

**OE LED** (Channel #8) is OFF

When VIXEN data is sent to the PIC:

**SD LED** (Channel #6) comes on steady while error-free VIXEN data is being received.

**FE LED** (Channel #7) comes on if the PIC detects a Framing Error (FE) while receiving VIXEN data.

**OE LED** (Channel #8) comes on if the PIC detects an Overrun Error (OE) while receiving VIXEN data.

Why is this test useful?

- When properly performed, the data check will confirm that VIXEN data is getting to the PIC correctly

## How to use the Diagnostic Firmware:

1. Re-flash a PIC16F688 with the diagnostic firmware.

If you need help with this step, check the info in this thread:

<http://www.doityourselfchristmas.com/forums/showthread.php?t=490>

2. Make sure power is removed from the Renard SS board being checked
3. Insert the diagnostic PIC into the first PIC position, U6 on Renard SS boards.
4. Hook up the data cable coming from the computer running VIXEN to the board under test. Either J2 or JDP1 can be used for data input. **Do not run a sequence yet.**
5. Install a jumper on JP3
6. Make sure JP1 and JP2 are correctly configured for the type of data coming from the computer. If the board has a RS232 jumper, put it in the correct position for the type of data coming from the computer.
  - RS-232 = JP1 Installed, JP2 Not installed
  - RS-485 = JP1 Not installed, JP2 Installed
7. Power up the Renard board
8. The Channel Output Test will run automatically and the following should happen:
  - All channels ON for approx. 2 seconds
  - All channels OFF for approx. 2 seconds
  - Channel 1 turns ON for approx. 1 second then turns OFF
  - Channel 2 turns ON (**HB LED**) for approx. 1 second then turns OFF
  - Channel 3 turns ON for approx. 1 second then turns OFF
  - Channel 4 turns ON for approx. 1 second then turns OFF
  - Channel 5 turns ON (**ZC LED**) for approx. 1 second then turns OFF
  - Channel 6 turns ON (**SD LED**) for approx. 1 second then turns OFF
  - Channel 7 turns ON (**FE LED**) for approx. 1 second then turns OFF
  - Channel 8 turns ON (**OE LED**) for approx. 1 second then turns OFF

(The above sequence repeats three times)

9. After the Channel Output Test, the Renard Health Monitoring routine starts running,
  - Channel 2 (**HB LED**) starts blinking (no defined interval)
    - If you got this far then there should be no reason for the **HB LED** not to be working
  - Channel 5 (**ZC LED**) should also be blinking (if not the ZC signal is missing or incorrect)
    - If the **ZC LED** is not blinking then you need to troubleshoot the problem before proceeding

*If you have gotten to this point then your Renard SS board is working well and there is only one thing left to check. You'll need to run a VIXEN sequence and see if the board will respond correctly. To get good results, the VIXEN sequence should have many changes occurring since VIXEN only sends data when a change occurs in the sequence.*

10. Start a VIXEN sequence

- Channel 6 (**SD LED**) should come on steady when VIXEN data is received by the PIC.
- Channel 7 (**FE LED**) and Channel 8 (**OE LED**) should remain off.

**If the diagnostics responded correctly then you are done with the diagnostics.**

**If not, then you need to start troubleshooting. Good Luck!**

## Simplified troubleshooting with the Diagnostic firmware:

### 1. Channel Output Test Fails:

- If only Channel #1 comes ON and stays ON
  - Common indication that the PIC is blank, re-flash the PIC
- If no on-board LEDs or output channels respond correctly
  - Check PIC power and/or programming
  - External Oscillator may be bad, try running the diagnostics using internal oscillator
- If on-board LEDs don't respond correctly but the output channels do
  - On-board LEDs might be installed backwards
  - Resistor network RN1 may be installed backwards
  - Check the solder joints for on-board LEDs and the resistor network
- If on-board LEDs respond correctly but output channels do not
  - Check AC power connections
  - Check optos for correct installation
  - Check solder joints for optos/resistors/triacs/terminals

### 2. Renard Health Monitoring Routine Fails:

- If only Channel #1 comes ON and stays ON
  - Common indication that the PIC is blank, re-flash the PIC
- If **HB LED** (channel 2) is not blinking
  - Check PIC power and/or programming
  - External Oscillator may be bad, try running the diagnostics using internal oscillator
- If **ZC LED** (channel 5) is not blinking
  - Check the Zero Crossing circuitry

### 3. Simple Communications Test Fails:

- If **SD LED** (channel 6), **FE LED** (channel 7) and **OE LED** (channel 8) do not come ON when VIXEN sequence ran, indicates that no data is reaching the PIC.
  - Check data cables
  - Check/replace RS485 chip
  - Check solder joints on input connector, RS485 chips and associated components
- If either **FE LED** (channel 7) or **OE LED** (channel 8) come ON, indicates data is reaching the PIC but is also causing errors. Try the following:
  - Check your VIXEN settings, they should be:
    - Protocol Version: 1
    - COM1 (or whichever COM port you are connected to)
    - Baud: 57600
    - Parity: None
    - Data bits: 8
    - Stop bits: One
    - Hold port open during the duration of the sequence execution: Checked
  - Check data cables ([http://www.doityourselfchristmas.com/wiki/index.php?title=Renard\\_Data\\_Cables](http://www.doityourselfchristmas.com/wiki/index.php?title=Renard_Data_Cables))
  - Check/replace RS485 chip