FISCE Test Plan:

1. Programming and Initial Circuit Verification

The FISCE instrument panel is designed to be fully operable via a 6-pin flexible flat cable (FFC) during initial programming and board level testing.

1.1 Test Setup and Powering FISCE

- Mount the PCB securely in a test stand with the components facing up.
- Connect a computer to an ICD3 in-circuit programmer/debugger with a USB cable.
- Connect the ICD3 output to the Pumpkin RJ25/FFC adapter board.
- Connect a serial-to-TTL device to the serial port of the computer.
- Use hookup wire to connect the TTL OUT, TTL IN, and GND terminals on the serial-to-TTL device to EGSE_RX (pin 6), PGED_TX (pin 4), and GND (pin 3), respectively, on the RJ25/FFC adapter board breakout pins. **NOTE:** Pin 4 may need to be left disconnected during programming to avoid interference with the ICD3 (pending further testing).
- Use mini-grabber banana cables to connect a +3.3V/100mA power supply to 3V3_FISCE (pin 2) and GND (pin 3) on the RJ25/FFC adapter board breakout pins. **NOTE:** 3V3_FISCE may need to be temporarily wired to VCCSYS on the harness connector (H11.4) in order for the load control circuits to receive power during an I-V curve (pending further testing).
- Make sure all cables and wires are out of high traffic areas before proceeding.
- Connect the RJ25/FFC adapter board to H13 on the FISCE panel with a 6-pin FFC. The contacts should mate with the top side of the connector at both ends.
- Turn the power supply ON, note the current draw:____________________ (TBD expected).
- Use a multimeter to probe the following voltages referenced to GND:

Table 1.1 Initial test point voltages

Signal	Pin	Expected	Measured
SA+	H11.1	0V	
SA-	H11.2	0V	
VBATT	H11.3	0V	
VCCSYS	H11.4	0V (3.3V w/ jumper)	
3V3_FISCE	M21.7/8	3.3V	
3V3_LOAD	M21.5/6	0V	
M31 Gate	M31.4	0V	
SA_IN	TP31.1	0V	

1.2 Programming the Microcontroller

- On the computer, open MPLAB and connect to the ICD3 in-circuit programmer.
- Open the FISCE software file and ensure that it is configured to operate in EGSE/Calibration mode by default.
- Load the FISCE software onto the PIC24 microcontroller.

- Verify that the programmer compiled successfully.

1.3 3V3_LOAD Switch and Timer Verification

- On the computer, open the FISCE command interface terminal.
- Command FISCE to execute a standard 30 point I-V curve periodically, with a TBD cadence. **NOTE:** There should be no power input to the variable load at this point.
- Use an oscilloscope to probe the following pins referenced to GND:

Table 1.2 Switch and timer signal observations

Signal	Pin	Expected	Measured
LOAD_ARM	R214.2	3.3Vp-p rectangular wave, repeats with TBD period	
LOAD_TRG	R219.1	3.3Vp-p pulse wave, 10ms HIGH/TBD LOW, 30 cycles, repeats with TBD period	
555 Threshold	C206.1	1.33Vpeak RC rise time triangular wave, pulsed at TBD interval, repeats with TBD period	
LOAD_EN	R206.1	3.3Vp-p rectangular wave, repeats with TBD period	
M21-B Gate	M21.4	3.3V HIGH/1.65V LOW rectangular wave, repeats with TBD period	
3V3_LOAD	M21.5/6	3.3Vp-p rectangular wave, 5-10ms rise/fall time, repeats with TBD period	

1.4 DAC Output Verification

- With the same I-V curve still running, use an oscilloscope to probe the DAC output, pin U33.1. Expect to see a waveform stepping through 30 voltages starting at 0V, up to 3.3V max, and back to 0V. This waveform should repeat with a TBD period.
- Now, command FISCE to initiate a calibration I-V curve. **NOTE:** There should be no power input to the variable load at this point.
- Again, probe pin U33.1 on the oscilloscope. Expect to see a gradually rising and falling waveform as the DAC is stepped through all 255 possible values between 0V and 3.3V max.
- Power OFF the FISCE board when these test points and waveforms have been verified.

2. Load Circuit and I-V Measurement Verification

The goal of this test is to connect a DC input to the FISCE load circuit to verify that the current and voltage of the load are being measured correctly and reported in telemetry while the DAC sweeps through its full-scale output range.