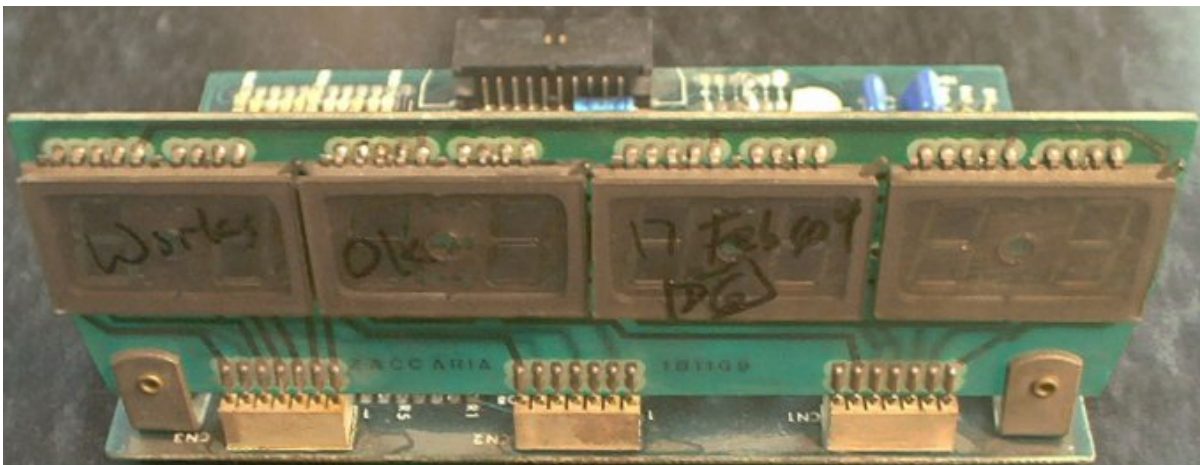


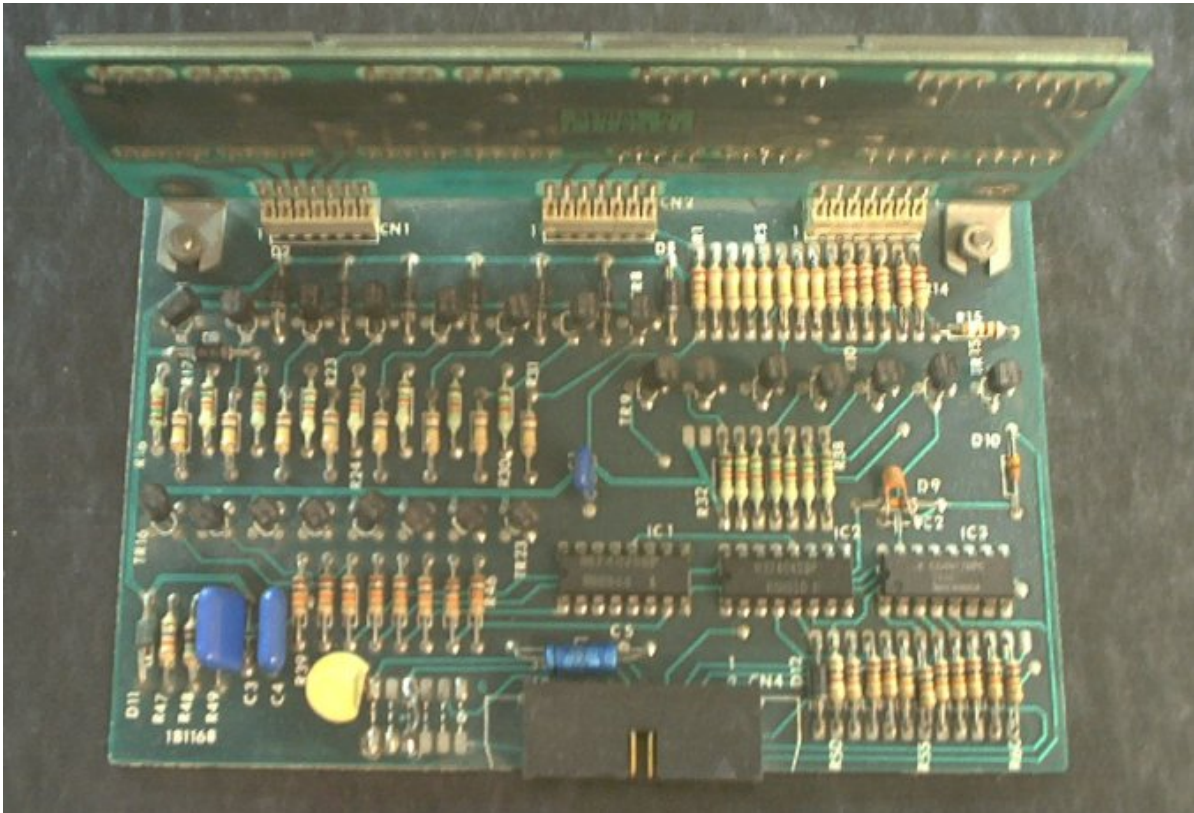
2nd Generation Displays

Like most other manufacturers, Zaccaria games use high voltage gas discharge display tubes. There are three variations in the actual display boards. The earliest games (Soccer Kings, Pinball Champ) use a 4 x 2-digit display for each player, allowing the game to show 8-digit scores. Farfalla, Devil Riders, and Time Machine use a single 7-digit display for each player. Magic Castle and the games that came after it use a single 8-digit display glass for each player. All 2nd generation Zaccaria games use five displays, one for each player, and one that shows the high score to date, current ball in play, and/or the "game time bonus" currently accumulated by the player. Internally, all of the games work with eight digit scoring, with the 7-digit games using the rightmost digit (the 1s place) to show the ten-millions digit when necessary. All three of these designs use a similar display board, with a set of jumpers to configure the board, and a ribbon cable connection carrying display data and the 170VDC power for the gas discharge tube.

Electronically, all three display boards are similar. The 7-digit board is a variation from the earlier 8-digit board, with a few unneeded components deleted.

The 8-digit and 2-digit display tubes have been out of production for many years and are essentially unobtainable. Worse, the 2-digit display glasses are reported to have a high failure rate due to their age and original manufacture quality. The 7-digit display glasses appear to be standard Beckman (at least on my game) 7-digit displays as used on Williams games like Jungle Lord.

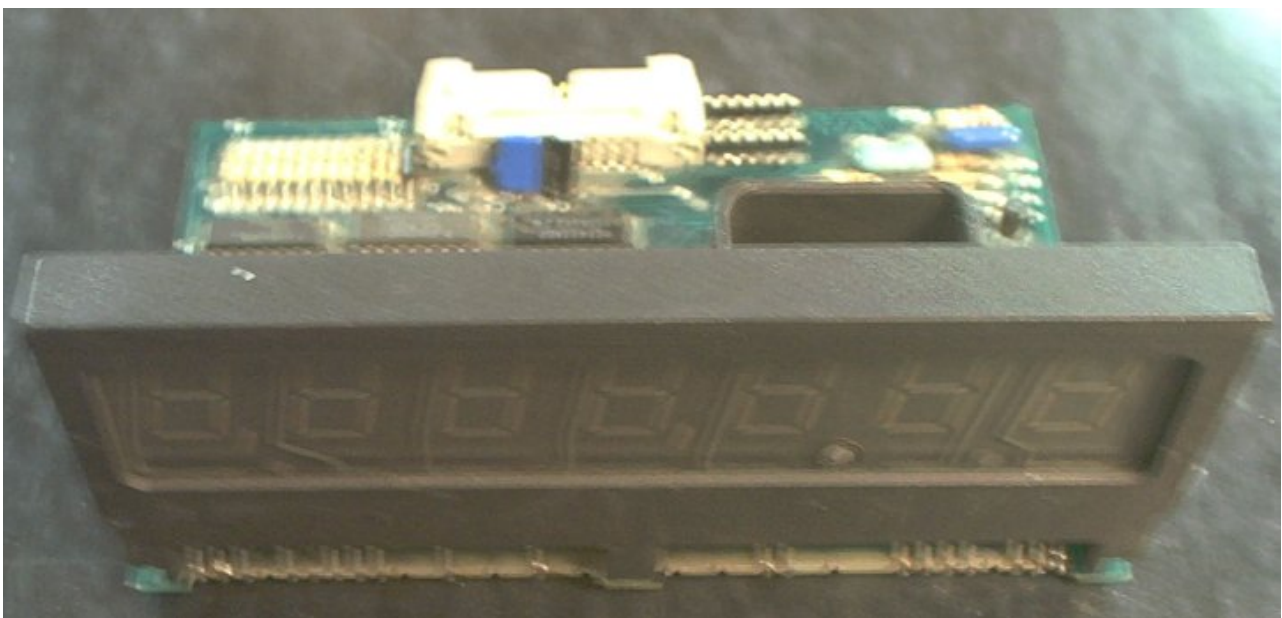


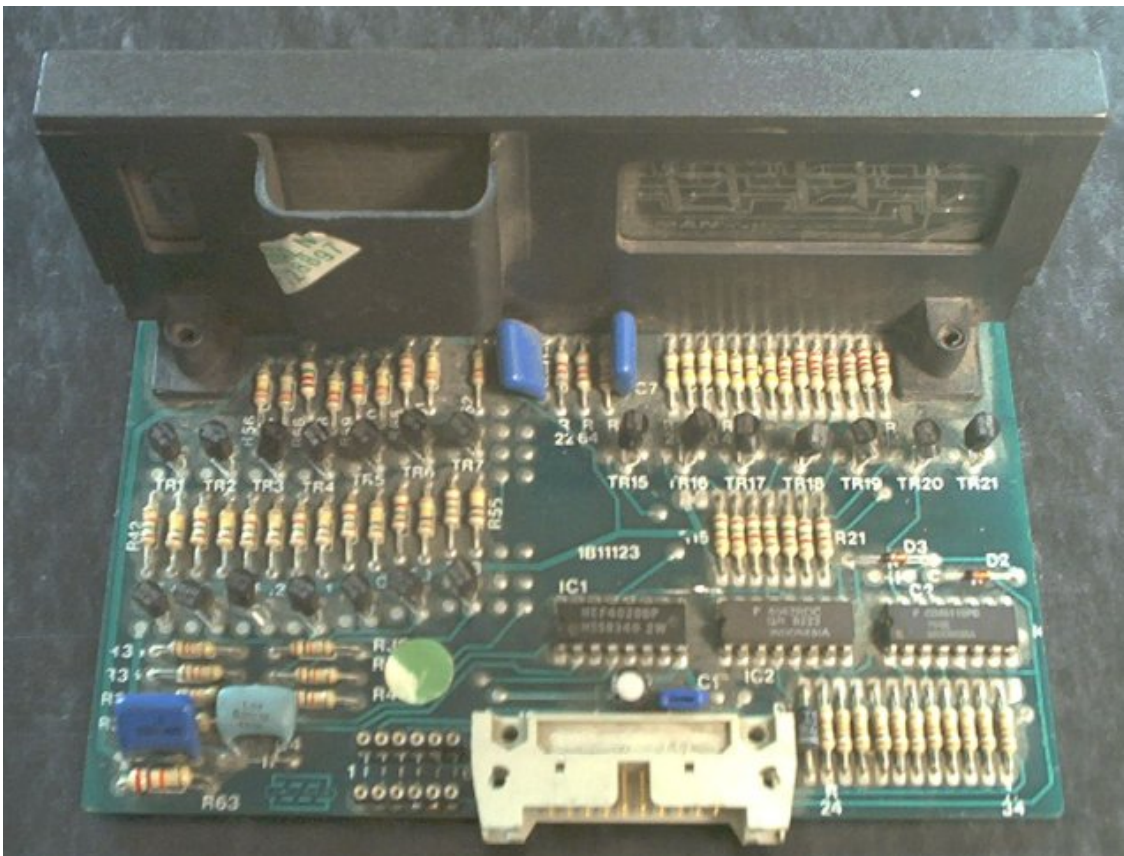


The 1B1168 eight digit display, with four x two-digit glasses.

A common failure item on these displays is IC2. This is a 4042BP Quad Clocked D, which crosses to NTE4042B. If you have at least one working display, compare IC2 on both boards with a DMM. Any difference found, replace the chip.

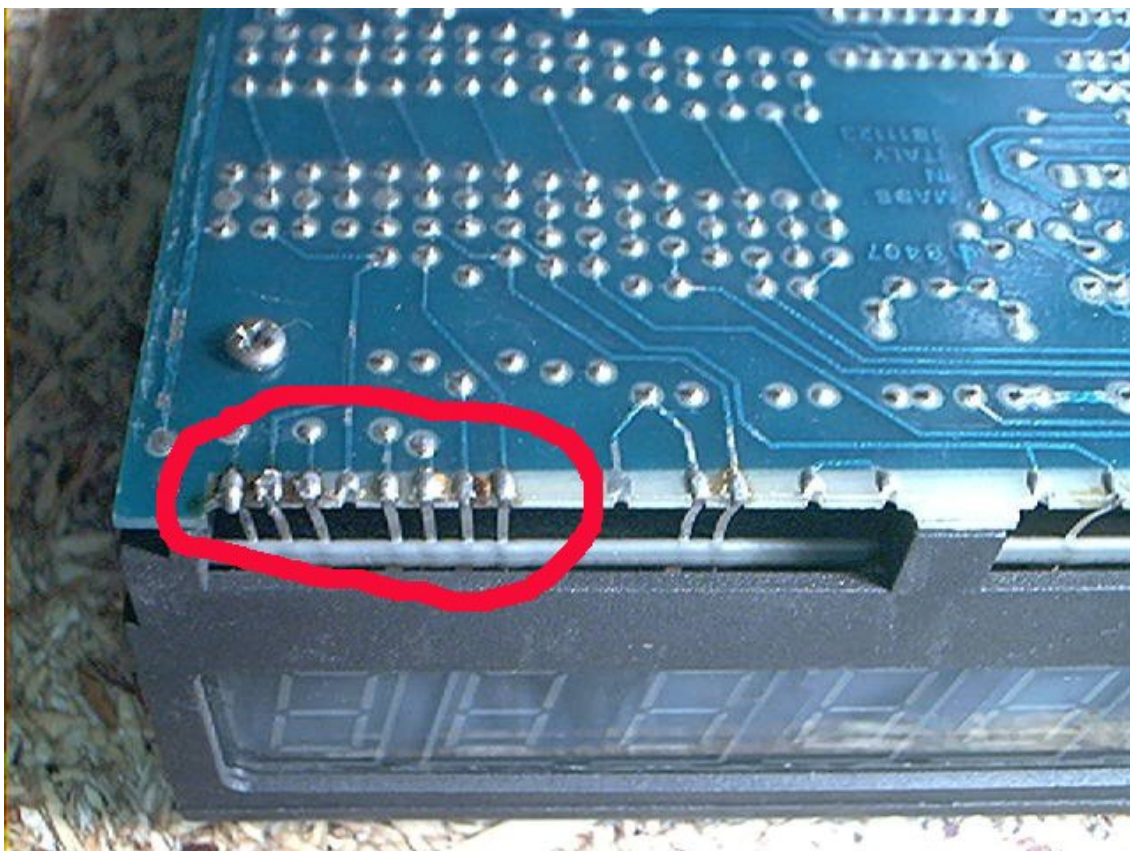
The 2-digit glasses used on these displays are the ZM1550 made by Valvo. Some information on them is available here: <http://www.tube-tester.com/sites/nixie/data/ZM1550/zm1550.htm>.





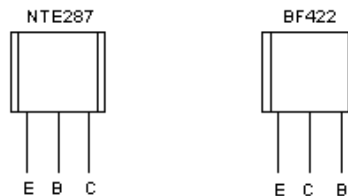
The 1B13123 seven digit display.

For some reason, probably simplified manufacturing, Zaccaria made a very strange looking circuit board for the 7-digit displays

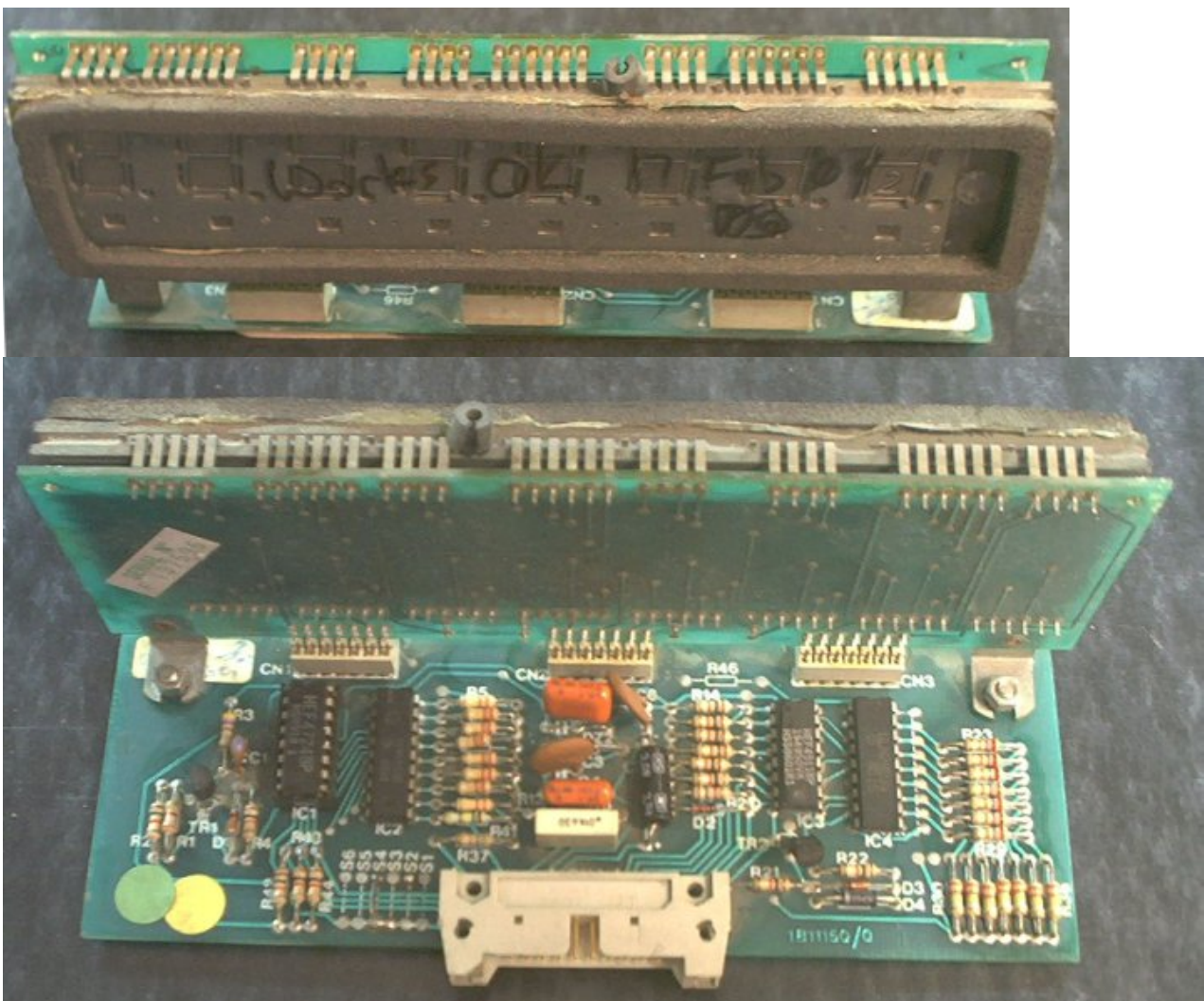


where the plated holes that the display glass should be soldered to have been cut away from the edge of the board. This weakens the joint, and every display I have seen has had cracked solder joints in this area. Check here first for any display that has bad digits, missing segments, or other display problems; the glass probably is not connected! Resolder the joint and the display should work normally again.

The only common display failure I have seen on these displays is a failed BF422 SCR that controls a digit segment. This SCR is no longer available, but was a common part at one time. The cross reference books say that an [ECG287](#) is a direct replacement, but they are wrong. The specifications on the part match, but the pinout is wrong.

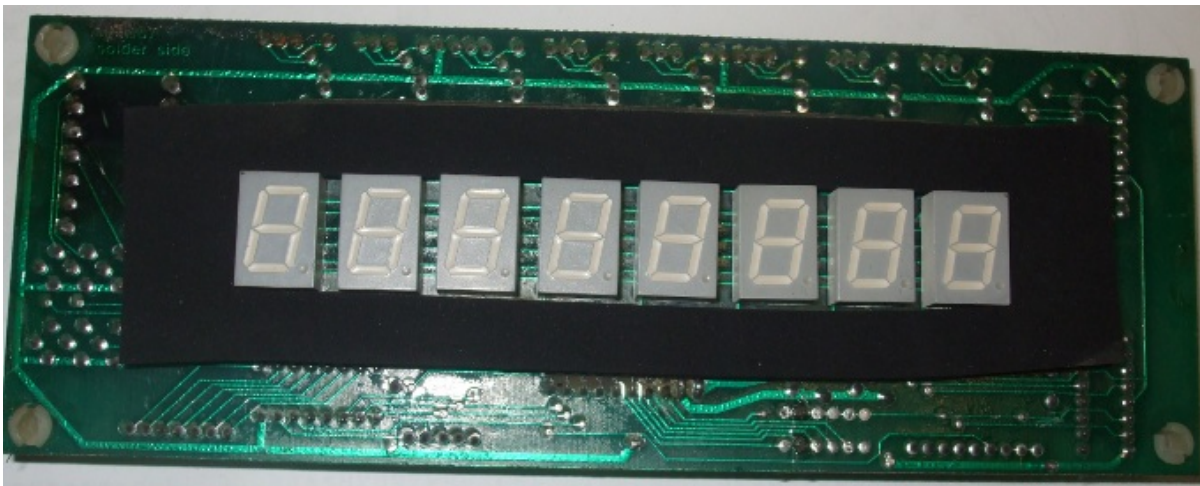


You can use ECG287 to replace a failed BF422 on a Zaccaria display, but you have to turn the piece 90 degrees and bend the legs to meet up with the holes. Install it so that C goes to R5/R10, E goes to R16, and B goes to the drive chip (HEF4511BP / FSS8301 / 1W).



The 1B11150/0 eight digit display.

These displays use two ICs that are obsolete. IC2 (UDN6510) can be replaced with a Dionics DI510B. IC4 (ULN2823A) has no known replacement substitution at this time.



Picture by Laszlo



Picture by Laszlo
The 1B11187 eight digit LED display.

These LED based displays are unique to New Stars Phoenix. They appear to have returned to the same basic logic used on the 1B1168 (Pinball Champ, Soccer Kings) displays, but have condensed to a single board, and changed from high voltage gas displays to LEDs. It appears that that the same 6 selection jumpers are present.

Jumpers

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