HAPP CONTROLS INDUSTRIAL DIVISION

Capability Case

Case Number 106

Industrial Control Components and Systems

Happ Controls Engineering Saves Pinball Game Mfg. 80% on Manufacturing Costs with New Control Component

Happ Solution Retrofits New and 25 Year Old Equipment

The Situation

- Manufacturer of arcade amusement rides and games is facing high costs using older technology parts in its new pinball machines.
- Field service organizations are complaining of complexities of repair/replacement of old design.

Happ Design Replaces

The Problem

- Present pinball components are a high cost item.
- Technology of assembly/ materials is 25 years old.
- Older machines, important revenue generators for owners –stores, taverns, and arcades– are breaking down frequently. Lost revenue is hundreds of dollars each week.
- Fatigue, normal customer abuse, and dirt major failure factors.
- Wiring / soldering is complex at factory, even more so in field.

25 Year Old Technology

The Customer Request

- Design a field replacement for the stock pinball electromechanical 'target' being used in thousands of machines worldwide.
  - Must be shielded from normal dirt buildup or buildup must not affect contact closure.
  - Must be backward compatible–from present generations back 35 years.
  - Must be universal – replace two target types (front & back) with one type.
  - Must improve on the delicate soldering operation so route field technicians can repair more machines each day.

Background

A pinball machine target is simply a target attached to a momentary contact closure single pole single throw switch. Depending on the

(Continued on page 2)

Happ Controls Corporate Headquarters • 106 Garlisch Drive, Elk Grove, IL 60007 • Toll Free Phone: 888-BUY-HAPP (289-4277) • Phone: 847-593-6130
Toll Free Fax: 800-593-HAPP (4277) Fax: 847-593-6137 • e-mail: info@happcontrols.com • website: www.happcontrols.com Reorder No. C106-0997

position of the target on the playfield, when the target 'makes' a counter adds the appropriate points to the player's score.

Those familiar with pinball games know the target locations that score high points for the user. In competitive situations, these targets are highly valued. Players complain in strong language whenever a target fails, especially in the middle of a game.

Key Issue – How to design a replacement part going into equipment that is 25 years old. The replacement must use modern materials and manufacturing techniques and yet be compatible with sockets from the original model.

The Happ Controls Solution

Happ Controls engineers designed a one-piece molded plastic assembly:

- Part count dropped from 13 to just 4.
- No soldering is necessary.
- A quick disconnect device was developed.
- A PC board encased in the assembly provides logic to cause a signal to the counter.
- The leaf switch has been eliminated. No longer a need for field tuning the 'action' of the target.
- Material cost is slightly more than the old design. However, the ease of installation and durability of the new system offset this cost.

Easy assembly with new Happ Controls Device:

In the original design, the following 5 steps were required to install the target:

1. Clamp into socket with 2 screws
2. Solder diode
3. Solder wire 1
4. Solder wire 2
5. 'Tune' the target action with a screwdriver.

Tools required:
Screwdriver
Soldering gun

In the new Happ Controls design the following steps are required to install the target:

1. Insert and tighten the assembly with 2 screws
2. Snap the connector in place.

Soldering-not required
Tuning-not required

Tools required:
Screw driver

Review

We want to solve your control problems. Our capabilities include:

- **Broad range of existing control device platforms** available to save development costs.
- **SolidWorks™** software used to make design decisions faster, easier.
- **Engineering, testing, and solid modeling departments** at Happ Controls consistently deliver a prototype within required deadline.

Happ Controls combines a cost-effective high capacity manufacturing arm and a quick response engineering team to generate custom solutions.

Call us to find how Happ Controls can solve your control components and system requirements.

Happ Controls Corporate Headquarters • 106 Garlisch Drive, Elk Grove, IL 60007 • Toll Free Phone: 888-BUY-HAPP (289-4277) • Phone: 847-593-6130
Toll Free Fax: 800-593-HAPP (4277) Fax: 847-593-6137 • e-mail: info@happcontrols.com • website: www.happcontrols.com Reorder No. C106-0997