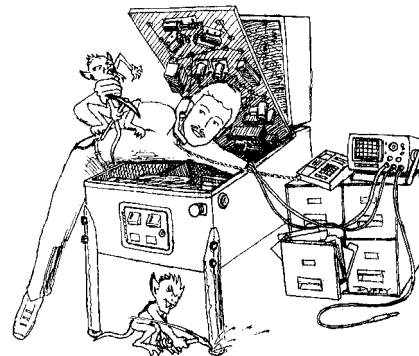


# Service Bulletin N° 92

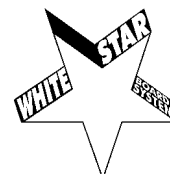


Joe Blackwell      Eric Winston      Ted Kilpin      Jay Alfer  
 Technical Support Manager      Technical Support Engineer      Technical Support Engineer      Tech. Doc. Administrator

**TO:**      Parts & Service Managers

**DATE:**      December 5, 1996

**SUBJ:**      **FYI: MOSFETs in the White Star Board System®**



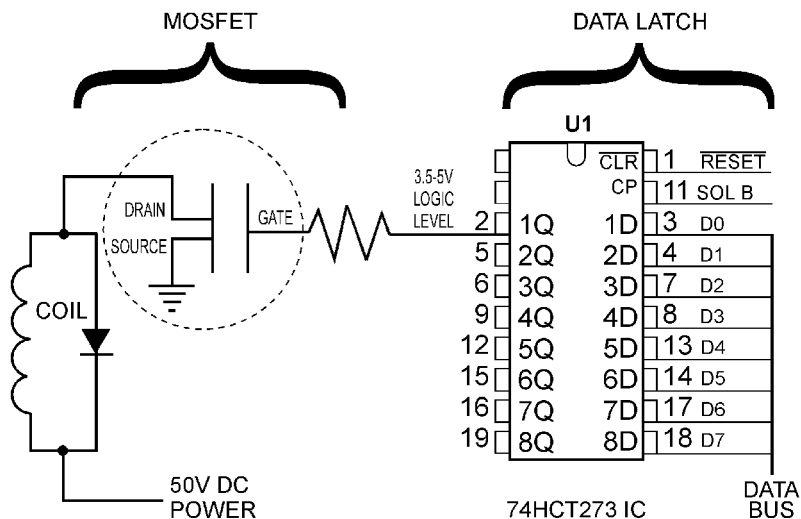
**MOSFET** Devices have been technology proven and are used widely in the field of electronics, automotive, computer, industrial and amusement. MOS Technology stands firmly alongside Bipolar Technology with the increased innovations in Silicon Technology. Also, a great deal of progress has been made in Power MOSFET Technology in recent years.

These **MOSFETs** Devices (manufactured by SGS Thomson) are used on our Sega Pinball White Star Board System®, specifically as a *Solenoid Driver / Lamp Return* on the I/O Power Driver Board.

Five (5) main advantages of a **MOSFET** are:

- 1-high current
- 2-high speed switching
- 3-reverse bias safety operation
- 4-very short delay time at turn-off
- 5-easy to drive:
  - A- voltage driven input to the gate
  - B- low drive power requirements
  - C- less components required in the drive circuit

The **MOSFET** Device "STP20N10L" is used as a High Power 50v DC Coil Driver (Q1 to Q16) & the **MOSFET** Device "STP19N06L" is used as a Lamp Return Driver (Q33 to Q42). These devices work very simple; meaning there are only three (3) leads to **MOSFET** Device: Gate, Drain and Source.



Operation of the **MOSFET** starts when the controlling element called a **GATE** receives a **3.5-5V LOGIC LEVEL** (Signal) directly from the **DATA LATCH**. One example of a **DATA LATCH** is the **74HCT273 IC** as used on the White Star I/O Power Driver Board. The **MOSFET** is then turned on thus completing the closure between the **SOURCE** and the **DRAIN**. The **SOURCE** (being Ground in this case) and the **DRAIN** (going to the device) completes the circuit, known as *Drain Current* then turns on a device such as a lamp or coil.

When ordering the **MOSFET** Devices from a local supply source, the correct Part N° must read **STP20N10L** or **STP19N06L**. Some confusion resulted when just "P20N10L" or "P19N06L" was requested (the mfg. SGS Thompson will only recognize the Part N° starting with "ST"). The Sega Pinball Part N° is **110-0106-00** (for STP20N10L) and **110-0088-00** (for STP19N06L).

