

## 12 VOLT GEL CELL CHARGER

Recently, a fellow amateur was looking for a gel cell charger which would first charge at a fixed rate and then later switch to a trickle charge when the cell was fully charged. After reviewing several catalogs and web sites, the MAX712 IC was discovered. This IC meets all the requirements for almost any type of battery charging system. The circuit in Figure 1 was designed specifically for 12 volt gel cells.

When a discharged gel cell is connected, the charger goes into a fast charge mode at a fixed rate of 400 ma. After the chip detects the voltage leveling off or when 4 ½ hours has elapsed. (which ever happens first.) the fast charge will stop. After the fast charge has ended, the IC goes into a trickle charge rate of about 50 ma. This trickle charge continues until 13.8 volts is reached which will stop all charging current since the cell is now fully charged. If the cell voltage should drop for any reason, either a fast charge or trickle charge (IC will detect what is needed) will start again.

When constructing this circuit, be sure to attach a small heat sink to Q1. Apply a DC (partially filtered) voltage of at **least** 15.3 volts. The voltage must never go below this level even under load conditions. Many of the DC wall transformers available will work just fine as long as they meet the minimum voltage requirement. The input voltage can be as high as 24 volts. If the input voltage must be in the 30 volt range, increase R1 to about 820 ohms.

The output voltage must be aligned prior to use. Disconnect the battery from the circuit and apply power. Connect a digital volt meter or other accurate volt meter to pin 2 (positive lead) and to pin 12 (negative lead). Adjust R7 until exactly 13.8 volts is read.

Because this circuit will not overcharge a gel cell, the battery can be connected indefinitely. This circuit is designed primarily as a 12 backup system and can be connected to the load provided the device to be powered only draws current during power line interruptions. Use a diode from the battery to load if needed. This circuit makes an excellent battery backup to an amateur transceiver.

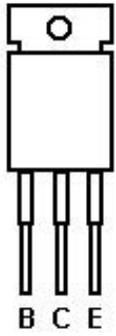
The MAX712 IC and the .62 ohm resistor are available from Digi-Key, 701 Brooks Ave, Thief River Falls, MN 56701 (1-800-344-4539). Order part numbers MAX712CPE-ND and 0.62W-1-ND respectively. All other parts are available at Radio Shack.

DE N1HFX

### PARTS LIST

|           |  |
|-----------|--|
| IC1       | MAX712 Battery Fast-Charge Controller IC (Cost is \$6.27 from Digi-Key)    |
| R1        | 680 ohm ½ watt resistor (Blue Gray Brown)                                  |
| R2        | 150 ohm resistor (Brown Green Brown)                                       |
| R3        | 68K resistor (Blue Gray Orange)  |
| R4        | 22K resistor (Red Red Orange)  |
| R5        | .62 ohm 1 watt resistor (Blue Red Silver) (Cost is 27 cents from Digi-Key) |
| R6        | 1.8K resistor (Brown Gray Red)   |
| R7        | 10K PCB trimmer resistor (103)   |
| R8        | 470 ohm resistor (Yellow Violet Brown)                                     |
| C1        | 1 microfarad tantalum capacitor (observe polarity)                         |
| C2,C4     | .01 microfarad capacitor (103)   |
| C3,C5     | 10 microfarad electrolytic capacitor (observe polarity)                    |
| Q1        | TIP42 PNP transistor or similar (attach heat sink)                         |
| D1        | 1N4001 Diode (observe polarity)  |
| LED1,LED2 | 2 volt standard LED (observe polarity)                                     |

TIP42  
Pin Out



Heat Sink  
Down

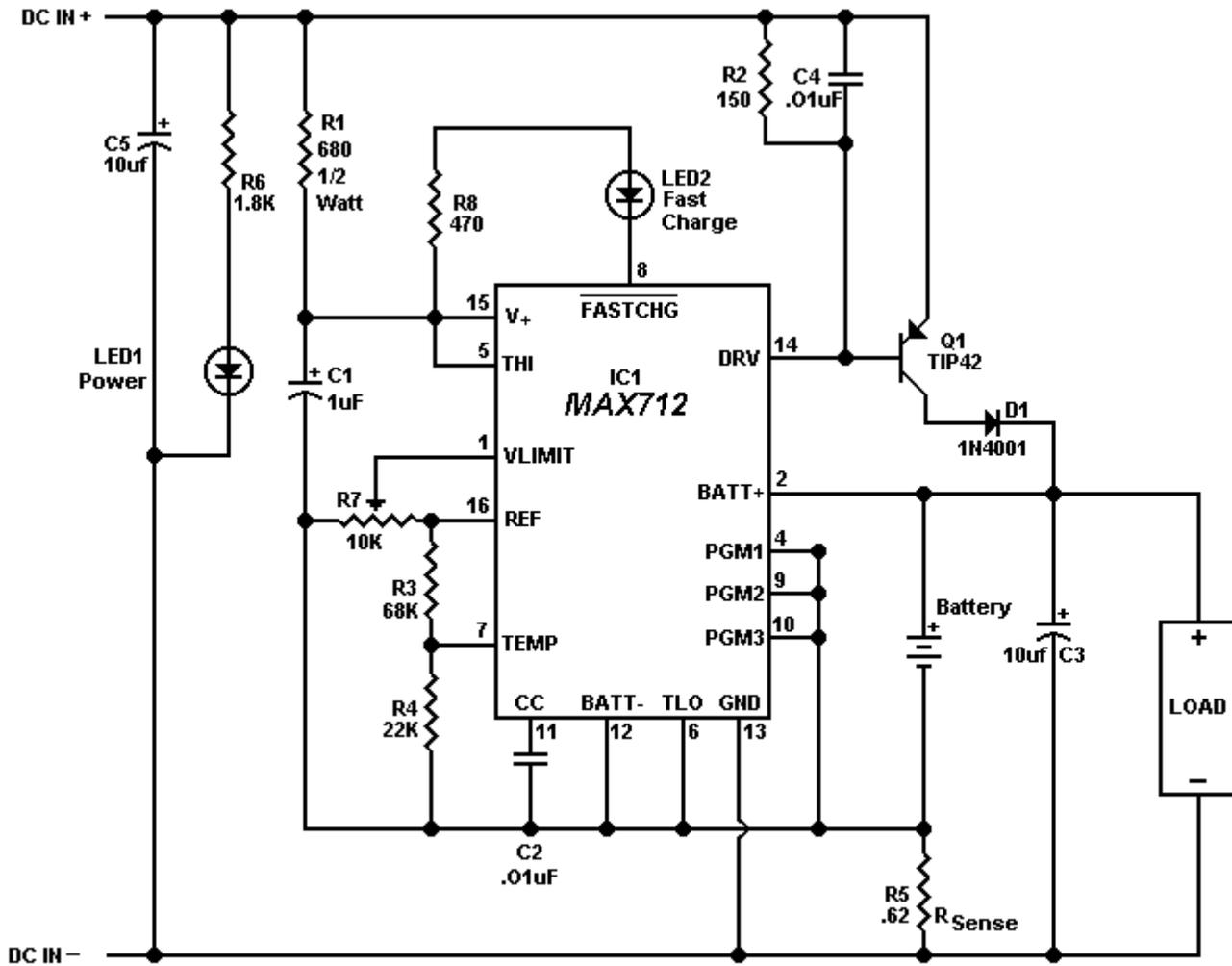
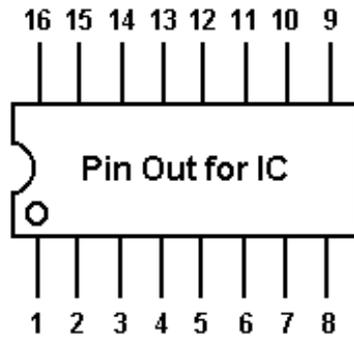


Figure 1