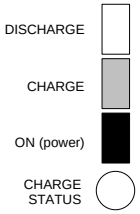
CHARGE PENDING



The Charge LED will flash very slowly (on 1/8th sec. off 1 3/8th sec). This occurs if the terminal voltage of the battery is lower than that which the Pulse charger considers safe to charge. In this mode the Pulse charger applies a very gentle charge to the battery to see if it can bring the terminal voltage up to a safe level. This mode will continue indefinitely until either the battery is removed or the terminal voltage rises sufficiently, at which point normal charge will automatically be engaged.

How do I know when charge is complete?
Normal charge is indicated by both the "Charge" LED and the "Charge Status" LED being continuously illuminated. When normal charge is complete the Charge LED will start to flash whilst the Charge Status LED stays illuminated indicating that Pulse charge is now being applied. Pulse charge is applied for 3 hours following the end of normal charge. When Pulse charge is complete the charge Status LED will go out and the Charge LED will continue to flash at the same rate, indicating that a very gentle "keep full" holding charge is now being applied to the battery.

If you are pushed for time you can remove and use the battery as soon as the normal charge cycle is complete -for it will be at least as fully charged as it would be on the mains charger supplied with the camcorder.

SPECIFICATION

SUPPLY VOLTAGE:	2-15v DC
SUPPLY CURRENT:	860mA minimum
CHARGE TIME FOR 1000mAh BATTERY:	75mins from discharged state
DISCHARGE TIME:	3-4 hours typical
DISCHARGE VOLTAGE THRESHOLD	5. 0v +/-1 % (4. 0v for 4. 8v models)
OVER VOLTAGE THRESHOLD	8.7v (7.0v for 4.8v models)
CHARGE CURRENT:	1.2A constant
FULL CHARGE DETECT:	negative delta v with over voltage & time backup protection.

Please note, Keene Electronics reserve the right to alter this specification without giving prior notification.

KEENE
ELECTRONICS
Unit 9 Old Hall Mills Business Road Little Eaton Derbyshire DE21 5DN
Telephone (01332) 830550 Fax (01332) 830551
http://www.keene.co.uk

uses a special IC together with switch mode technology to deliver a highly efficient charge with the minimum of wasted heat. It has a number of built in safety features to ensure that your batteries are always treated correctly.

Your battery contains a number of cells. Over time, the electrolyte inside these cells can crystallise or "fur up", a bit like the element on a kettle. When this happens the capacity of the pack is reduced and its voltage may be lowered. The pulse charge applied by this unit helps to get rid of this problem by returning the electrolyte to its normal state and rebalancing the cells.

INSTRUCTIONS FOR USE
Connect the unit to a suitable supply. This can be either via the Car cigar lighter lead (supplied) or by the optional mains adapter. (note -the unit requires 13.8v DC at a minimum current of 850mA. It will very quickly ruin any supply rated at less than this!). The "Power" LED should now be illuminated. If you place a battery onto the unit, it will default to the charge mode, with both the "charge" LED and the "charge status" LED being illuminated if you wish, you can select the discharge mode by depressing the switch with the tip of a pencil or biro. If selected, the charge LED will start to flash & the discharge LED will illuminate. Discharge will continue until the correct critical voltage is reached, and then the unit will automatically revert back to the charge mode. Normal charge will continue until the unit detects full charge on the battery and it will then go into a "pulse charge" mode for a further 3 hours. During this period the battery is pulsed with a 4 second burst of charge once every 30 seconds. It is this unique feature which ensures that all of the cells are at their maximum possible potential. The charge status LED will Illuminate as the pulse charge is applied.

HINTS AND TIPS
The delta v and over voltage charge detect circuitry is deliberately disabled for the first 10 minutes of each charge cycle. This is to prevent the false tripping off that can sometimes occur on other chargers when a battery is being charged for the first time. During this time delay period, you may find that the charge light stays on for a while even if you remove the battery.

If you remove the battery and then replace it very quickly, the unit can get conflicting messages about whether the terminal voltage is actually falling or rising. If this happens, then as a safety feature it will go into the "charge pending mode" whilst it further monitors the voltage. (see LED ref. grid). if left, this mode will continue for about 5 minutes before the normal charge process engages. If you want to reset the unit before this time simply remove both the battery and the supply cable for about 30 seconds.

As a safety feature, the charge pending mode will also be engaged if the terminal voltage of the battery that you wish to charge is already lower than the critical discharge level. This means that a high current charge will not be supplied to a battery that may have one or more cells short circuit. During the charge pending cycle, a very gentle charge is applied to the battery to see if the terminal voltage can be lifted to the required level. If successful, the unit will then automatically go into the normal charge mode.

If Discharge is engaged whilst the battery is charging, the Charge Status LED will remain

The Charge status LED is provided to let you know when the unit is actually delivering charge to the battery. This will usually be on constantly until the pulse charge cycle is complete.

The unit is designed to charge camcorder packs with a capacity of between 1000mAh and 3300mAh. It is possible to charge a 4500mAh capacity pack by letting it complete one normal charge, and then removing it and replacing it again for another period of charge.

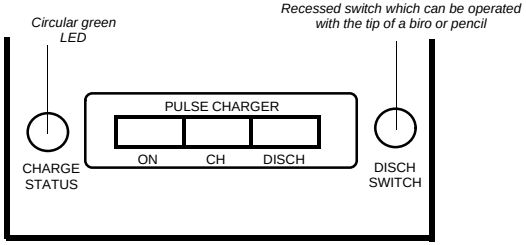
The Pulse Charger can also be used as a Discharger only, by simply placing a battery onto it without power connected. When the Discharge LED is no longer illuminated, the battery will be discharged down to the correct level. It will stop discharging at this point so the battery can be safely left to discharge overnight.

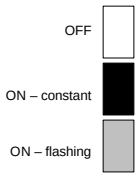
Over voltage is a safety detection feature which disengages charge if the battery terminal voltage climbs above 8.7v during the normal charge cycle. If engaged, it will monitor to see if the terminal voltage lowers again and then resume charge. If this happens repeatedly it is best to discharge the battery again before charging. (Note -the over voltage detect circuit is deliberately disabled for the first 10 minutes of the charge cycle).

If you have a battery that is performing particularly badly, then charge it and discharge it two or three times in succession. This should help to restore its full capacity.

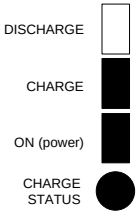
It is normal for both the battery and the casing of the unit to become warm during operation.

UNDERSTANDING THE DISPLAY



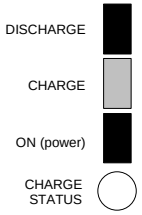


NORMAL CHARGE



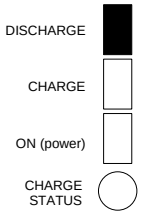
Both LED's are constantly illuminated. A constant charge current will be applied to the battery until full charge is detected. This is the default situation that occurs when a battery is first placed upon the unit.

DISCHARGE (with power)



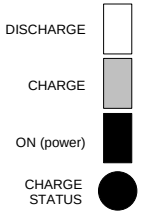
This mode is selected by briefly depressing the discharge button with the tip of a biro or pencil. The Discharge LED is constantly illuminated and the Charge LED flashes (On 1 3/8th sec. off 1/8th sec). Once the battery has been discharged down to the correct critical voltage the unit will automatically revert to normal charge.

DISCHARGE (no power connected)



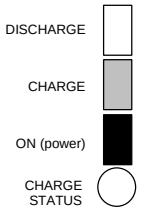
This allows you to use the Pulse charger as a stand-alone Discharger, enabling easy discharge without the automatic recharge. The discharge LED will be illuminated until the battery is discharged down to its correct critical voltage. When the LED has gone out the battery will have been correctly discharged and unit will automatically stop drawing current at this point.

PULSE CHARGE



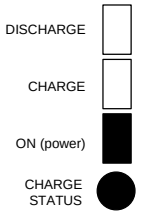
Pulse charge is applied for a further 3 hours after normal charge has completed. The Charge LED will flash (On 1/8th sec, off 1/8th sec) and the charge status LED will be illuminated constantly.

CHARGE COMPLETE



When the Pulse charge is finished, the Charge LED will continue to flash (on 1/8th sec, off 1/8th sec) but the charge status LED will no longer illuminate. This mode will continue indefinitely until either the battery is removed or a new charge cycle is started. A very gentle holding charge is applied during this time to ensure that the battery is kept at its optimum potential prior to use.

OVER VOLTAGE



The Charge status LED will be constantly illuminated, but the charge LED will not. This situation will only occur during the first 10 minute "hold off period" of normal charge. It is an indication that the terminal voltage of the battery on charge will have exceeded that which the Pulse Charger considers to be correct for normal charge. It will continue to monitor the voltage and, if it is still too high at the end of the hold off period, it will terminate charge and revert to the charge complete status. If this happens repeatedly it is better to engage discharge and restart the whole