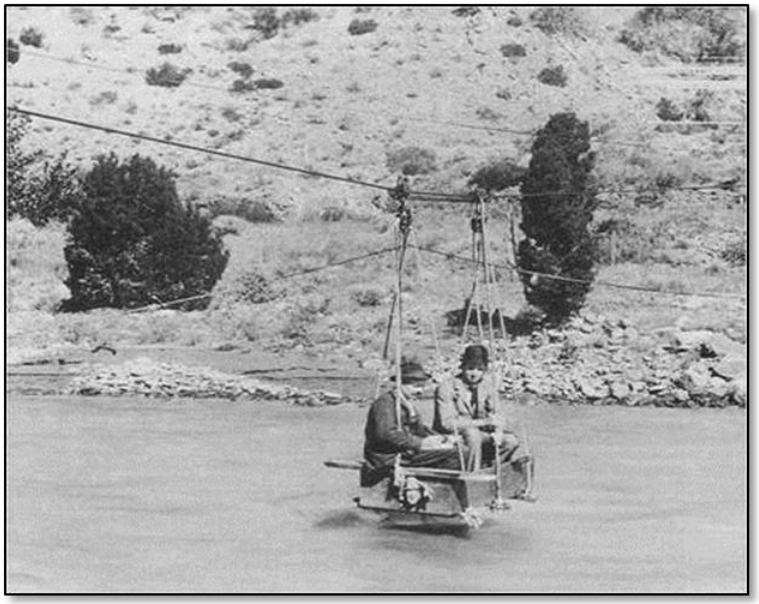
Stage Discharge Recorder (SDR)

SDR Introduction

Are you required to...

Monitor discharge in canals & ditches for regulatory reasons?

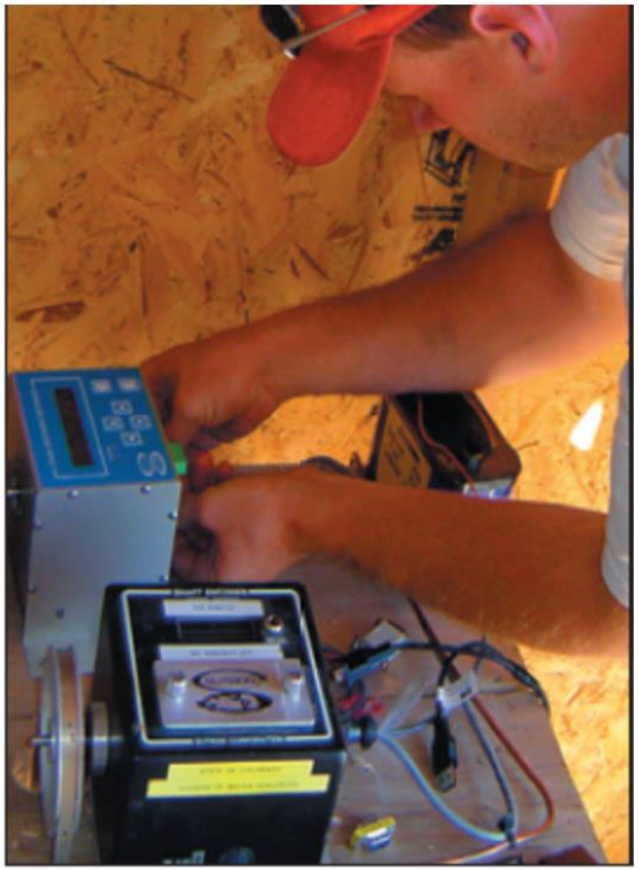
Provide daily, weekly, or monthly reports on water usage?



SDR Advantages

Would you like to be able to...

- Immediately see STAGE/ DISCHARGE at flume/weir sites?
- Download up to 6 MONTHS OF DATA to Pocket PC or Laptop?
- Have DATA IN SPREADSHEET-FORM for easy processing?
- Have a RECORD SHOWING WHEN A SITE WAS VISITED & WHAT CHANGED?
- Buy REPLACEMENT BATTERIES at a HARDWARE STORE?
- Have NO FEAR OF LOSING DATA if the battery does go dead?



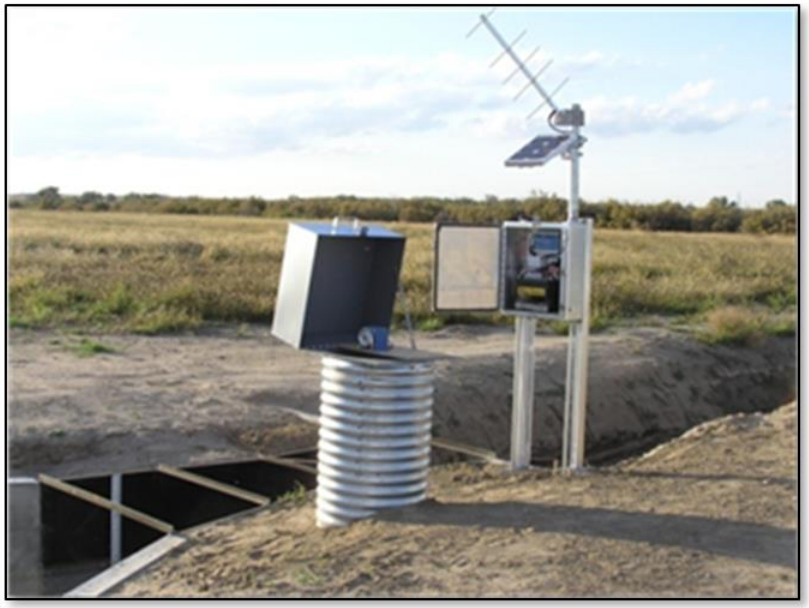
Introduction

- The Stage-Discharge Recorder (SDR) is an easy to use device programmed to measure and record water levels and flows.
- The SDR can be completely setup using the front panel keys and display.
- Once operational, the SDR will record data at a user set interval with sufficient space to store over two years of data recorded at 15-min.intervals.
- The display/keys can be used to review any of the logged data as well as real-time operating conditions.
- The SDR can also be fully programmed and operated by a PC/PDA.
- Recorded data can be easily transferred to the PC/PDA in spreadsheet-compatible format.

Stage Discharge Recorder

What is the SDR?

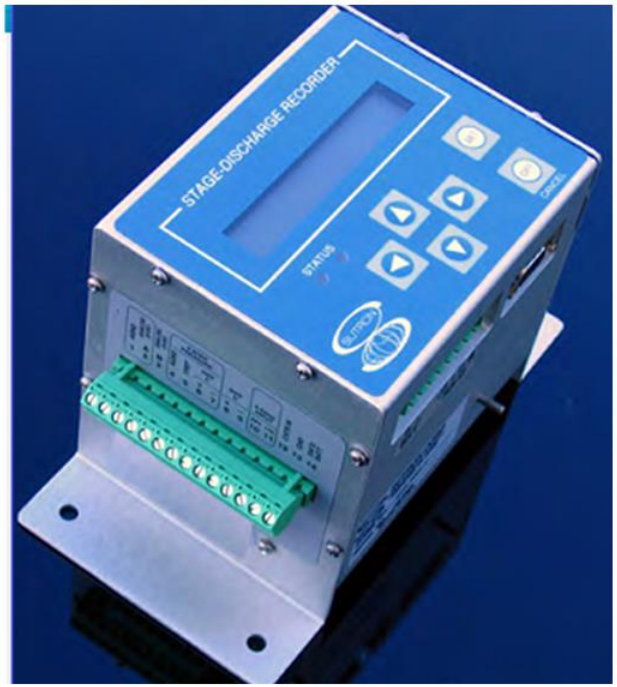
- Logging Shaft Encoder
- Enter Flume Equation
- Logs Stage, Calculates Flow, Logs Total Daily Discharge
- Log File is Excel format
- No Solar Panel, Runs on Lantern Batteries
- Direct replacement for Stevens Chart/Strip recorders with no record workup



Models

SDR is available in the following models:

SDR-0001-1	Stage Discharge Recorder Unit, with Shaft Encoder only, Battery Cable Included.
SDR-0001-1SD	SDR-0001-1 with SD Card option
SDR-0001-3	SDR w/Analog Input & 4-20mA outputs.
SDR-0001-3SD	SDR-0001-3 with SD Card option.
SDR-0001-4	SDR w/Analog Input, 4-20mA Outputs, & Shaft Encoder.
SDR-0001-4SD	SDR-0001-4 with SD Card Option



SDR Features

All models have the following standard features:

- Measure stage and compute discharge at user set interval.
- Use standard flume and weir equations for computing discharge.
- Record/log data into ultra-reliable flash memory
- No backup batteries needed.

Technical Specifications

STAGE RANGE	+/- 80 ft of the set value
ENCODER	400 count/revolution optical encoder 5.5 rev./sec. MAX
CLOCK	Internal real-time clock with battery backup (coin cell w/5+ year life). ±2 min. a month (0 to +50°C
RECORDING INTERVALS	15-min. default, 1, 5, & 10 min. user selectable. 30 & 60 min.intervals also available.
DISCHARGE CALCULATION	Parshall Flume & Broad Crested Weir Equations plus general purpose equation w/user-selectable constants
VOLUME TOTAL	Daily volume calculation and logging
DAILY AVERAGE STAGE/VOLUME	Computes & logs the average daily stage and volume at midnight daily

Specifications

OPERATOR INTERFACE	6-button front panel with two-line display and status lights. Buttons select menu options.
AVAILABLE DATA	Station name, date/time, current stage, current discharge, current total, battery voltage & logged values of the stage & discharge, daily average stage, average discharge & total discharge.
CALIBRATION	The user can use the front panel/PC/PDA to adjust the current stage to match a staff reading (optional password protection)
SETUP DATA	All setup stored in non-volatile flash memory
PASSWORD	Can be configured to require a password for setup changes and stage adjustments
LOG CAPACITY	Over one (1) year of 15-min. stage data with accompanying daily average of discharge and midnight battery voltage
LOG WRAPPING	PERMANENT LOG wraps when full (oldest data replaced by newest data). There is NO mechanism to erase the log.
DATA DOWNLOADS	Compatible with Pocket PC , PDA or laptop/desktop Windows PC

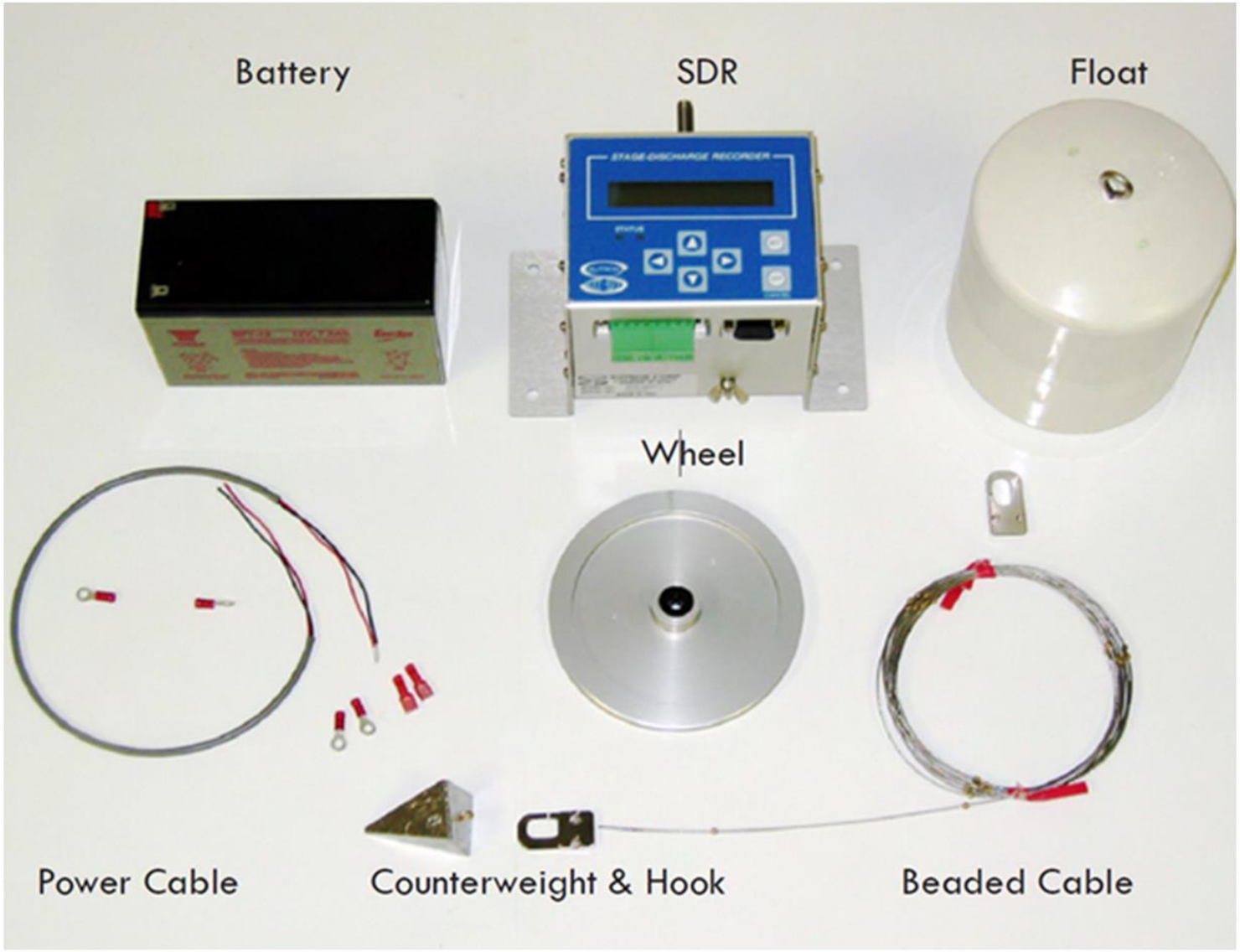
SDR Specifications

EVENT LOG	Any stage or setup changes are written to the event log.
DOWNLOAD TIME	Less than 6 min., even for a 6-month log
DOWNLOAD	Comma Separated Variable (CSV)
GRAPHING DATA	PDA & laptop utilities provide data graphing
STATUS LIGHTS	2 on front panel show “heartbeat” & run/error status
DRIVE SHAFT	5/16” dia. with 1: threaded & milled flat for set screw. Shaft is 2.5” above base.
SEALING	NEMA rated enclosure resists dripping water & spray.
MODBUS	Supports MODBUS slave protocol with user-set address & baud rate
FLOAT WHEELS	Operates with circumferences of 18 inch, 375 mm, 1 foot.
OPERATING TEMP.	-40^{o} to $+60^{o}$C. The LCD operates to -10^{o}C.
DATA CONNECTION	DB9 (female) for direct connection to PC/PDA DB9 provides +5V on pin 9 w/capacity of 71 mA. Provides a means to power external devices, such as BlueTooth

SDR Specifications

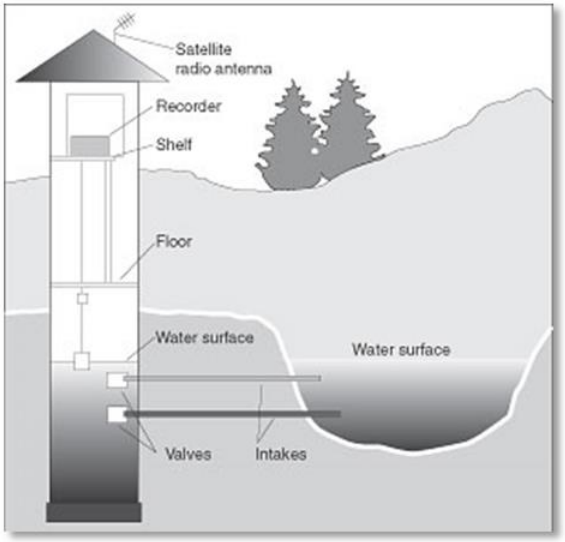
SDI -12	One set of connections for SDI-12 on a terminal strip (act as sensor or to measure SDI-12 level of sensor.)
BATTERY CONNECTION	Terminal strip w/dual battery connections & appropriate circuitry allow new battery to be installed before removing old battery.
BATTERY LIFE	Operates on 5.5 to 16 vdc . 3 to 9 months on standard gel cells (7 ah to 24 ah) 9 to 15 months on various alkaline cell configurations.
POWER CONSUMPTION	< 2.5 mA @ 12 VDC
BATTERY VOLT. LOG	Battery voltage logged each day at midnight. Battery life indicator available in display.
CLOCK BACKUP	A coin cell backs up the internal real-time clock. battery

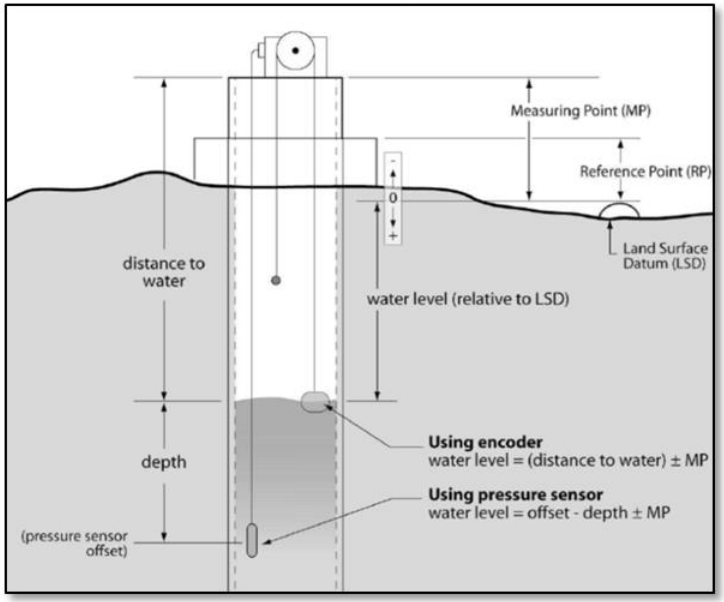
Accessories



Installation

- Stilling well with minimum 8” diameter
- 5/16” shaft float wheel/pulley with circumference of 12”, 18”, & 375mm. If the float wheel does not have an insulating hub, a PVC float must be used.
- Beaded wire/tape compatible with the float wheel.
- Float/ counterweights.
- 12-volt alkaline battery with capacity of at least 20 amp-hrs.





Typical Installations

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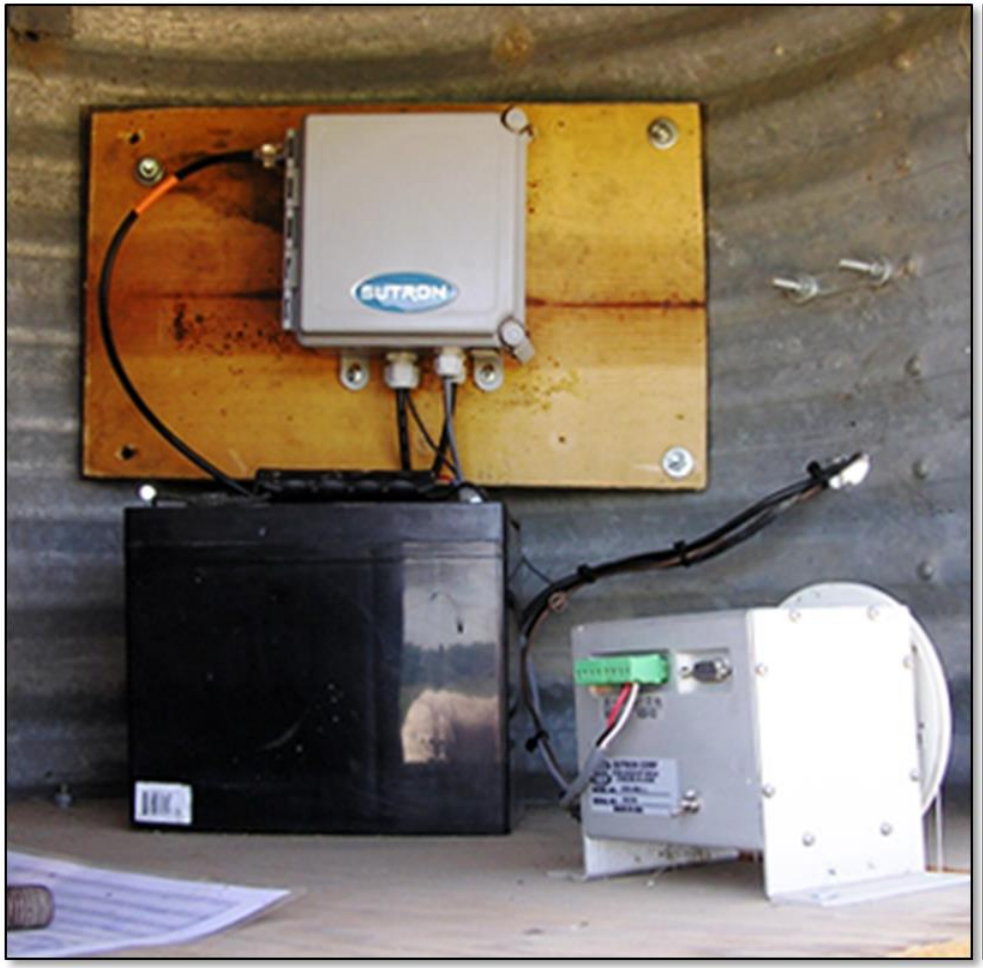
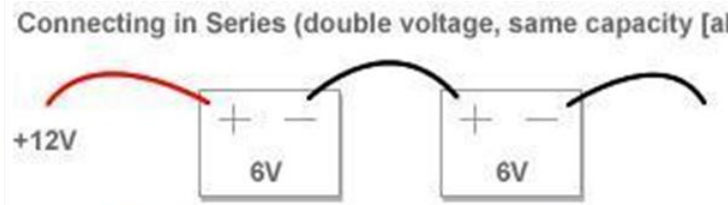


Typical Battery Configuration



Two 6Volt Alkaline Lantern Battery

Typical Installations

Case Study – Colorado DWR

Colorado Division of Water Resources

- Colorado DWR requested a product they could use to replace the old Chart Recorder with a digital record. Based on their request we designed the SDR.
- Colorado DWR has deployed over 250 SDR's for management of their water resources
- All Water Commissioners are equipped with handheld PC's with SDRCom to download Data.
- We created the **'Colorado Package'** :
  - SDR-0000-1 – Basic Data Logger
  - 5100-0118 – Float Wheel, 375mm/revolution
  - 5100-0581 – Cable, Beaded Chain 12.5 cm Center
  - 5100-0530-2 – Float, 6" PVC
  - 5100-0550 – Counterweight, 8 oz
  - 5100-0620-1 – End Hook Set

(References available upon request)

Complete Solution

Collect Data with SDR

Transmit data from station with either GPRS-Link (Cell Network) or Iridium-Link (Satellite for remote sites)

View that data over the Web with SutronWIN.

Combined with the Sutron X-Link modems and SutronWIN web hosting, you have a real time water level monitoring system.

Why Sutron SDR's?

- Sutron's ultra-reliable SDI-12 optical encoder fused with logger technology to create an encoder that never forgets.
- Using proven float-tape-counterweight technology, the STAGE-DISCHARGE RECORDER is a "plug compatible" replacement for a Stevens strip chart or punched-tape recorder.
- The STAGE-DISCHARGE RECORDER saves your data in ultra-reliable Flash memory. This means that there are NO BACKUP BATTERIES for the memory and you NEVER lose your data.

Sutron Stage Discharge Recorder

- SDR's incorporate standard flume & weir equations & display flume/weir stage.
- SDR's compute, log & display discharge totals.
- The Built-In Event Log tracks each time anyone views or downloads data or makes changes to the setup.
- The STAGE-DISCHARGE RECORDER will run up to one year on an industrial alkaline battery.
- Data delivered in easily-read CSV files that can be opened with *any* spreadsheet program.
- All setup can be done from the front panel of the encoder, & download utilities are available for Pocket PC, compatible PDAs & Windows laptops.