



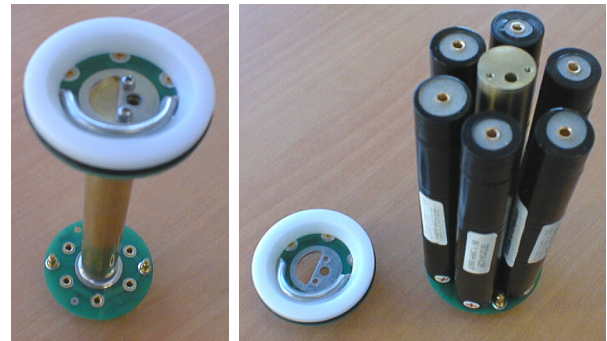
MicroCAT and SBE 44 Change Notice – 2008 (revised November 2011)

Two important design changes were implemented in SBE 37 MicroCATs and SBE 44s in 2008, bringing significant benefits and some minor changes without increasing the prices for new instruments. The original battery pack was replaced with a retrofit battery pack, and the electronics were redesigned in new SBE 37 SM/SMP and SI/SIP MicroCATs (firmware version 3.0 and higher). The details of these changes follow:

1. Original MicroCAT Batteries (used in SBE 37-IM/IMP, SM/SMP, and SBE 44 Underwater Inductive Modems) were discontinued (2008).

The custom-built 9-volt battery made from three Panasonic BR-2/3A lithium cells were not available after approximately September 2008. Six of these batteries, sold as a set (part number 50243.1), were installed in a battery holder forming a battery pack as shown in the photos below.

Because the 9-volt batteries are obsolete, the old battery holder is also obsolete and must be replaced. **Sea-Bird designed a retrofit battery holder that uses 12 individual AA lithium cells.** AA lithium cells eliminate the need for a custom battery, are available commercially world-wide, and deliver **more useable capacity** than the old battery pack. Customers are no longer dependent on Sea-Bird as the sole source of a custom battery, and 12 AA lithium cells are less expensive than the six-battery set (50243.1). **The replacement battery holder became available in July 2008.**



Old MicroCAT battery holder

PN 50243 6-battery set in holder

Details of New battery design and procurement:

Based on original discharge tests we performed on the Panasonic battery pack (unpumped MicroCAT), the usable capacity was reduced from the Panasonic factory specification of 7.2 Ah (1.2 Ah x 6 in parallel) to 5 Ah.

The retrofit battery pack for SBE 37s and 44s consists of a battery holder that is a plug-in replacement for the old battery holder, and twelve (12) 3.6-volt AA lithium cells (a list of recommended and alternate cells follows). The retrofit holder (PN 801797) connects two cells in series and each series string in parallel forming a 7.2 volt battery having a *Sea-Bird factory rating* of 10.6 Amp-hours (Ah) using Saft LS 14500 cells. This is lower than the Saft factory capacity rating (2.45 Ah x 6 = 14.7 Ah) because the new holder includes voltage up-conversion circuitry necessary to provide an operating voltage of 8.5 volts. The voltage up-conversion consumes some battery capacity.



Retrofit MicroCAT battery holder

12 AA lithium cells

Accounting for the instrument's current consumption patterns and environmental conditions affecting battery performance, the usable capacity is less than 10.6 Ah. For planning purposes, **Sea-Bird recommends using a conservative value:**

- Non-pumped MicroCATs (SM, IM), and SBE 44s **not** providing power to the RS-232 sensor – 8.8 Amp-hours; **75% more useable capacity** than the old pack (0.75 = [8.8 Amp-hours – 5 Amp-hours]/5 Amp-hours)
- Pumped MicroCATs (SMP, IMP) and SBE 44s providing power to the RS-232 sensor - 5.7 Amp-hours; **14% more useable capacity** than the old pack (0.14 = [5.7 Amp-hours – 5 Amp-hours]/5 Amp-hours).

See *Field Service Bulletin 23: SBE 37 Pumped MicroCATs with Batteries (SMP, IMP) and SBE 44 Underwater Inductive Modems.*

The retrofit battery holder is also easier to use. The design uses only one captured screw to fasten the battery pack into the instrument battery compartment (no more small loose screws to remove and replace).

Sea-Bird is absorbing some of the cost for the retrofit battery holder by providing a one-time reduced price on the purchase of the holder and the first set of 12 cells. Even though replacing the old battery holder requires a one-time purchase of a retrofit holder, the savings on future battery purchases plus shipping costs from Sea-Bird, and the convenience of local supply of standard AA lithium cells, offsets the cost of the retrofit holder after 2 sets of AA cells have been purchased.

Saft LS 14500 cells are available from Sea-Bird. They are packaged to comply with shipping regulations under PN 50441 as a set of 12 cells. The price for this set of 12 is substantially lower than the price of the old pack. Additionally, customers are likely to find lower prices locally for Saft LS 14500 cells (or alternates) and save money on shipping costs compared to purchasing batteries from Sea-Bird.

Only AA **lithium** batteries can be used; alkaline, Ni-Cad, and other batteries will not work. Sea-Bird stocks and supplies AA Lithium batteries, but customers are encouraged to obtain batteries from other commercial vendors when practical.

Sea-Bird recommends Saft LS 14500, 3.6 V/cell, 2.45 Ah (nominal Saft specification at 1 ma) - www.saftbatteries.com.

Alternative cells can be substituted:

- Tadiran, TL-5903, 3.6V per cell, 2.4 Ah - www.tadiran.com
- Electrochem PN 3B64/BCX85 (AA) 3.9 V per cell, 2.0 Ah (lower factory rating, but usable estimated capacity is equivalent to others) - www.electrochemsolutions.com

Notes:

- The retrofit battery holder does not fit in the earliest MicroCATs, manufactured in 1996 - 1997 (corresponding *approximately* to serial numbers < 150). Contact Sea-Bird if you own one of these instruments and need new batteries.
- Pumped MicroCATs (SBE 37-SMP, -IMP) were redesigned again in 2011 (firmware version ≥ 4.0); the redesigned MicroCATs use a different, yellow-cover battery pack.

2. Details of 37-SI, SIP, SM, SMP, IM, IMP Electronics Re-design (2008):

Semiconductor parts obsolescence forced a redesign necessary to continue production of new MicroCATs and support of older versions. New microprocessor and memory chips increase power efficiency and include 8 MB of memory (vs 2MB previously). The new memory holds three times as many samples as the old 2 MB memory (data are stored with more bytes per sample). MicroCAT deployment durations have always been limited by battery capacity, not memory capacity. Though this is still true, the new battery pack provides enough capacity for more samples than previously. Filling the entire memory requires external power.

Sampling current and measurement acquisition time were both reduced. For SBE 37-SMP and IMP (pumped) MicroCATs, that energy savings made it possible to pump longer per sample (1 second vs 0.5) without reducing the possible deployment duration, and thereby produce more accurate salinity data.

SBE 37-SM and SMP both now include external power capability, with a standard 4-pin data I/O connector (vs 3-pin previously). A 3-pin bulkhead connector (or 3- to 4-pin adapter) can be special-ordered for backward compatibility.

SBE 37-SI and SIP now use the same board set as the SM/SMP, and therefore include 8 MB memory. Older SI/SIP models had no memory.

Some new commands invoke new formats for displaying instrument status and configuration data and support XML output formats. These are used by the newer terminal program, SeatermV2. Old DS and DC commands are retained for compatibility with Seaterm.

The new board sets can be installed in all 37-SI, SIP, SM, SMP, IM, and IMP MicroCATs built to date (2008).

Note: Pumped MicroCATs (SBE 37-SMP, -IMP) were redesigned again in 2011 (firmware version ≥ 4.0); the redesigned MicroCATs use a different, yellow-cover battery pack.