

P R E L I M I N A R Y   D E V I C E   S P E C I F I C A T I O N

TYPE COMMERCIAL : SAA1501t

**STATE-OF-CHARGE MONITOR IC FOR  
INTELLIGENT NiCd AND NiMH BATTERY PACKS**

**1. Market introduction : End 1993.**

This information applies to a product under development. Its specification and characteristics are subject to changes without notice.

**2. Features**

- drive signals for a LED bargraph or LCD; 5-level indication of battery charge, 20%, 40%, 60%, 80% and 100%.
- direct drive for LEDs ('battery low' and 'batteries under charge') and buzzer.
- large dynamic range of charge and discharge currents.
- accurate sensing charge/discharge currents due to BICMOS process technology.
- independent setting of charge and discharge efficiency.
- automatic switch-over between charge/discharge and selfdischarge mode.
- charge current regulation drive signals.
- temperature compensated self-discharge account.
- temperature protection via adjustable Tabsolute.
- large operating temperature range.
- low standby current drain to allow integration in batterypack.

**3. Applications**

Intelligent battery packs / Intelligent battery powered applications.

**4. General description**

The SAA1501t is intended to be used as a battery monitor and control circuit in rechargeable systems for NiCd and NiMH batteries. The primary function is to provide a readout of instantaneous charge in the battery. Secondary function is to control the external current source via charge current regulation drive signals.

The SAA1501t accurately determine the state-of-charge (remaining energy) of a battery at any instant by keeping account of the charge/discharge time and the charge/discharge current, - via the analogue V/I convertors with large dynamic range -, in a 'coulomb' counter.

This information is used to drive a LED bargraph or liquid crystal 'remaining energy' display and to regulate the external current source.

	<b>SAA1501t</b>		
930607			
NAME A. Moberg	SUPERS	4	191 - - 1 010 A4
CHECK	DATE 920903	(c) Nederlandse Philips bedrijven B.V.	

## 5. Pinning

The pin numbering is according to the standard numbering of pins of the package S(mall)  
O(utline) 24L(arge) SO24L.

Pinnumber	Pin Name	Description
1	Vcc	Supply voltage
2	EN	Enable
3	Cd	Duty cycle capacitor
4	Ccnt	Charge counter capacitor
5	Rmax	Maximum average charge current setting
6	Rref	Current reference resistor
7	Rd	Discharge current conversion resistor
8	Rc	Charge current conversion resistor
9	GNDs	Charge sense input
10	Rsd	Discharge sense input
11	TEMP1	Temperature sensing resistor
12	TEMP2	Temperature setting resistor
13	Co	Oscillator capacitor
14	BUZ	Buzzer
15	FULL	Full battery indication
16	100	100% segment indication
17	80	80% segment indication
18	60	60% segment indication
19	40	40% segment indication
20	20	20% segment indication
21	BP	LCD back plane drive
22	BLI	Battery Low Indication LED
23	PO	Power On LED
24	GNDp	Power ground

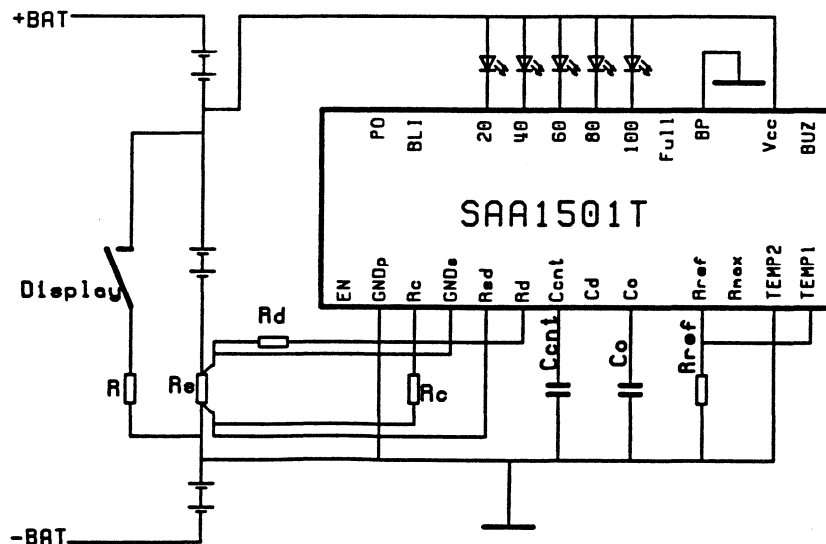
		<b>SAA1501t</b>			
930607					
NAME A.Mobers	SUPERS	4	191 -	-	2 010
CHECK	DATE 920903	(c) Nederlandse Philips bedrijven B.V.			
					A4

## 6. Quick reference data

Parameter	Min	Typ	Max	Unit
Supply voltage range	2.0		4.5	V
Supply current		0.5		mA
Stand by current			100	uA
V/I converter range	2mV		V <sub>cc</sub> -1.6V	
V/I linearity @ 3mV	-33	1.8	37	%
@ 10mV	-11	0	11	%
@ 30mV	-4.5	-0.5	3.5	%
@ 100mV	-2	-0.5	1	%
@ 300mV	-2	-1.0	0	%

## 7. Application- information

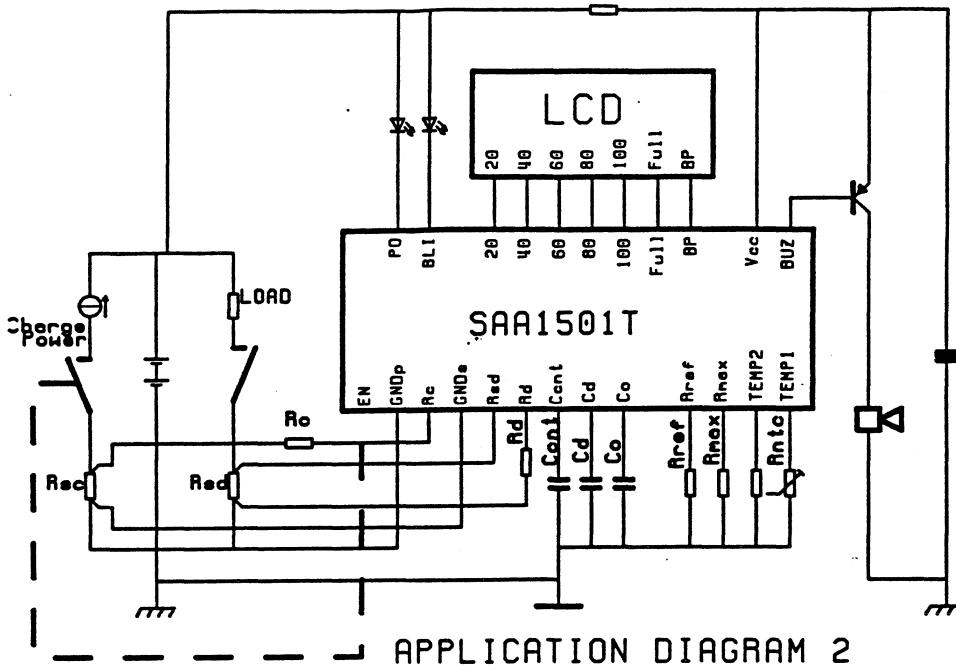
### A. Intelligent battery pack.



APPLICATION DIAGRAM 1

		SAA1501t			
930607					
NAME A. Moberg		SUPERS		4 191 - - 3 010 A4	
CHECK		DATE 920903		(c) Nederlandse Philips bedrijven B.V.	

B. Intelligent battery pack controlling external current source.



		SAA1501t					
930607							
NAME A.Mobers	SUPERS	4	191 -	-	4	010	A4
CHECK	DATE 920903	(c) Nederlandse Philips bedrijven B.V.					