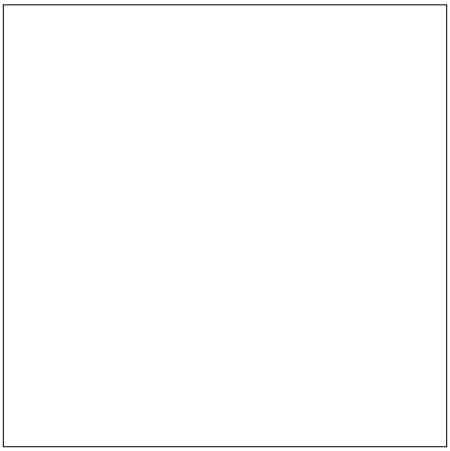
80C31 Communications Microcontroller SNAP 651™



Features

- ✓ Small, low power 8051-family controller
- ✓ Three full RS232 serial ports
- ✓ RS485 support option
- ✓ 32 parallel I/O lines
- ✓ 32K CMOS RAM included
- ✓ Accepts up to 64K RAM, 64K EPROM
- ✓ Battery-backed clock option
- ✓ On-board BASIC option
- ✓ C and BASIC languages available
- ✓ Interrupt-driven C async comm library

The SNAP 651 Communications Microcontroller provides a complete, ready-to-use 8051-family controller on a 3" x 7" circuit board. With 3 full serial ports, the controller is optimized for serial communication applications. It is ideal for embedding into OEM equipment, for implementing small to medium sized end applications, and as a platform for prototyping communication-intensive 8051-family designs.

The standard SNAP 651 comes with the 80C31 CPU, a ROMless, CMOS versions of the popular 8051 processor. Alternative processors available include the 80C32 with an additional timer and interrupt, and the 8052 with a built-in BASIC interpreter.

CMOS logic is used throughout the SNAP 651 for low power consumption and cooler operating temperatures. Reliability is enhanced with provisions for battery-backing on-board CMOS RAM, power-fail interrupt capability, and a watchdog timer system to monitor proper system operation. An optional real-time clock provides clock and calendar functions.

Software Support

Comm library, CommBLOK-51
PID loop library, PidBLOK-51
C compilers
BASIC interpreter, compilers
[Items above in Section 6]

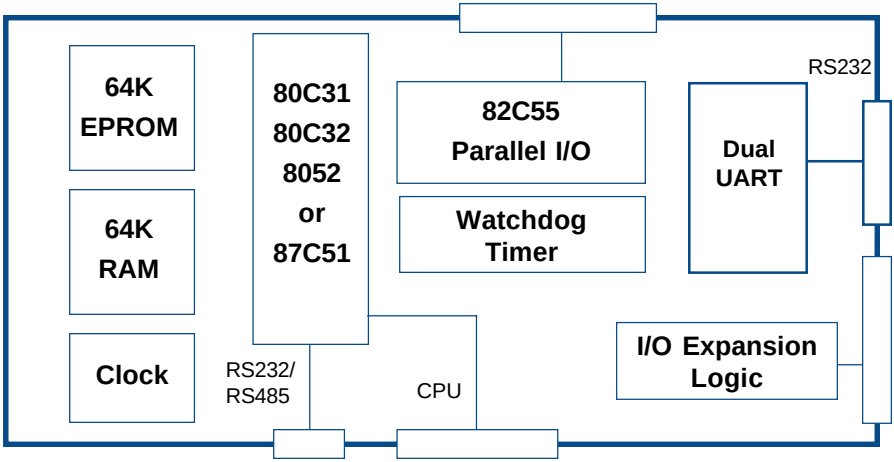
Compatible Hardware

LCD and keypad, LCDKBD1
RS485 comm, TB1485
[Items above in Section 4]
Power system, PS1000
[Item above in Section 5]
Custom

Mounting/Packaging

Standoffs, Snaptrack™,
DIN rails
[Items above in Section 5]
Custom

Micro/sys 3730 Park Place, Montrose, CA 91020 (818)244-4600 Fax (818)244-4246
email: info@embeddedsys.com



Technical Details:

SNAP 651 is available with a choice of 3 CPU devices, 80C31, 80C32, or 8052 with built-in BASIC interpreter.

Serial communication and control is fully supported with 3 independent serial ports. The 80C31 internal UART is fully supported in RS232 mode. RS485 support can be added as an option. Two 80C31 I/O pins can be used to implement CTS/RTS modem control lines for this port in RS232 mode. The RTS line can alternatively be used to enable/disable the RS485 transmitter for multi-drop operation. The second and third serial ports support full sets of RS232 modem control lines. A C language library is available for simplified, interrupt-driven, buffered communication on all 3 channels. Another RS232 serial output can be configured for printer output if the 8052 BASIC option is used.

SNAP 651 80C31 processor ports are available at a 26-pin connector. An optional 34-pin connector implements an I/O expansion bus with 80C31 address/data ports and “off-board” read and write signals, interrupts, and timer signals. An 82C55 device is included to add 24 parallel lines which are available at a 26-pin I/O connector.

Two 32-pin memory sockets are included on the SNAP 651. The first supports up to 64K of EPROM or flash EPROM, the second supports up to 64K of CMOS static RAM, which can be battery-backed. On-board programming of flash EPROMs is supported, allowing simple field program updates without removing any memory devices. The SNAP 651 ships with 32K CMOS RAM memory installed, additional memory is optional.

Program development can be done in on-board BASIC, compiled BASIC, compiled C, or 8051 assembly language. Micro/sys supplies many development aids for the SNAP 651, including compilers, assemblers, software libraries, and hardware mounting kits.

Specifications:

Mechanical:
- ❑ 3.0" x 7.0" x 0.6"
- ❑ Mounting holes (0.13" dia.) in four corners
- ❑ Mount on standoffs, Snaptrack, or DIN rail

Power Requirements:
- ❑ +5V ± 5% at 120mA
- ❑ On-board programming of flash EPROM requires +12V ± 5% at 30mA
- ❑ Off-board battery (optional) 6V at 50µA, can be common PC type battery pack

Environmental:
- ❑ 0° - 70°C operating
- ❑ -40° - 85°C storage
- ❑ 5%-95% relative humidity, non-condensing

Processor:
- ❑ 80C31, 11MHz clock standard
- ❑ Six interrupts (2 hardware), 2 counter/ timers, 8-bit I/O port, expansion ports
- ❑ 16MHz option for higher performance
- ❑ 80C32 option adds timer and interrupt
- ❑ 8052 option includes built-in BASIC interpreter, RS232 printer output

Memory:
- ❑ 32K CMOS RAM installed
- ❑ Socket for program code accepts 27C256 for 32K, or 27C512 for 64K EPROM
- ❑ Contact factory for current flash EPROM device support
- ❑ RAM socket can accept 128K RAM (64K usable) and can be battery backed

Serial Ports:
- ❑ 80C31 serial port plus 2692 dual UART, RS232 interfaces on-board
- ❑ Baud rates from 110 - 19,200
- ❑ RTS/CTS supported
- ❑ RS485 option on 8031 serial port, RTS can be used to enable transmitter
- ❑ 8052 BASIC model has RS232 printer out

Parallel I/O:
- ❑ 32 lines total, some have alternate uses as interrupt or timer signals
- ❑ 24 lines from 82C55 - sink 2.4mA, source 2.4mA
- ❑ 8 lines from 80C31 - sink 1.6mA, source 0.08mA

CPU Signal Connector

Signal	Pin	Pin	Signal
P1.7	1	2	P1.6
P1.5	3	4	P1.4
P1.3	5	6	P1.2
P1.1	7	8	P2.7
P2.6	9	10	P2.5
P2.4	11	12	P2.3
P2.2	13	14	P2.1
P2.0	15	16	P3.1
P3.0	17	18	BASIC RS232 LPT
GND	19	20	
GND	21	22	
GND	23	24	
GND	25	26	

Parallel I/O Connector

Signal	Pin	Pin	Signal
VCC	1	2	PIO_A4
PIO_A3	3	4	PIO_A5
PIO_A2	5	6	PIO_A6
PIO_A1	7	8	PIO_A7
PIO_A0	9	10	PIO_C7
PIO-C6	11	12	PIO_C5
PIO_C4	13	14	PIO_C0
PIO_C1	15	16	PIO_C2
PIO-C3	17	18	PIO_B7
PIO-B6	19	20	PIO_B5
PIO_B4	21	22	PIO_B3
PIO_B2	23	24	PIO_B1
PIO_B0	25	26	GND

CPU Serial Port Connector		
Pin	Directi	Signal
1		
2		
3	I	RXD
4	O	RTS
5	O	TXD
6	I	CTS
7		
8		
9	---	GND
10		

Watchdog Timer:

- ❑ Program must strobe watchdog every 1.6 seconds or reset will be issued
- ❑ Enable/disable jumper

Real-time Clock Option:

- ❑ Uses 3 parallel port lines of 80C31
- ❑ Provides hours, minutes, seconds, day of week, date, month, and year
- ❑ Can use off-board battery or on-board battery option

External Connections:

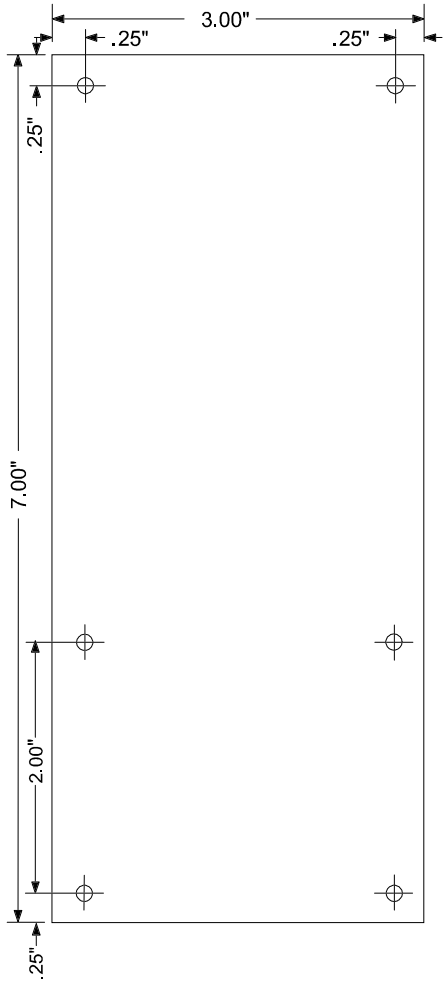
- ❑ Power: 7-pin header, mating cable supplied

Dual Serial I/O Connector					
Direction	Signal	Pin	Pin	Signal	Direction
	GND	1	2	RI1	I
O	DTR1	3	4	CTS1	I
O	TX1	5	6	RTS1	O
I	RX1	7	8	DSR1	I
I	DCD	9	10	GND	
I	RI2	11	12	DTR2	O
I	CTS2	13	14	TX2	O
O	RTS2	15	16	RX2	I
I	DSR2	17	18	DCD2	I
	X	19	20	X	

Power Connector		
Pin	Direction	Signal
1	I	VCC
2	I	V_BATT
3	--	GND
4	I	+12V
5	I	*PB_RESET
6	O	*FLASH_EN
7		

- ❑ CPU serial port: 10-pin header, mating connector Ansley 609-1001M
- ❑ Second, third serial ports: combined on single 20-pin header, mating connector Ansley 609-2001M
- ❑ Parallel ports: 26-pin header, mating connector Ansley 609-2601M
- ❑ CPU signals: 26-pin header, mating connector Ansley 609-2601M
- ❑ I/O expansion: 34-pin header (if 651OPT4 ordered), mating connector Ansley 609-3401M

Expansion Connector					
Direction	Signal	Pin	Pin	Signal	Direction
	VCC	1	2	VCC	
O	A6	3	4	A5	O
O	A4	5	6	A3	O
O	A2	7	8	A1	O
O	A0	9	10	GND	
	GND	11	12	AD7	I/O
I/O	AD6	13	14	AD5	I/O
I/O	AD4	15	16	AD3	I/O
I/O	AD2	17	18	AD1	I/O
I/O	AD0	19	20	*RESET	O
I	T0	21	22	T1	I
I	*INT0	23	24	*INT1	I
I/O	USER2	25	26	USER3	I/O
I/O	USER0	27	28	USER1	I/O
	GND	29	30	*OFFB	O
O	*RD	31	32	*WR	O
	GND	33	34	T2	I



Ordering Information:

Microcontroller:

SNAP 651-1 80C31 Communications Microcontroller, 11MHz
SNAP 651-2 80C32 Communications Microcontroller, 11MHz
SNAP 651-3 8052 BASIC Language Communications Microcomputer, 11MHz
SNAP 651-4 87C51 Communications Microcontroller, 11MHz

Options:

651OPT1-X	16MHz operation option (X must be same as SNAP651-X)
651OPT2	Real-time clock option
651OPT3	On-board battery option
651OPT4	Expansion connector installed
651OPT10	Total 64K CMOS RAM installed
651OPT11	Autorun BASIC program from battery-backed CMOS RAM (SNAP651-3 only)

LCDKBD1-51	LCD and keypad interface
TB1485-2	RS485 terminator board
TB5001	50-terminal breakout board
CA4020	RS232 cable, CPU port to 9-pin male D (PC-AT pinout)
CA4028	RS232 cable, to dual 9-pin male D (PC-AT pinout)
CA5045	Cable to TB5001 from parallel I/O or CPU connector (26-cond)
CA5046	Cable to TB5001 from expansion connector (34-cond)
CA5051	Cable to LCDKBD1-51
CA5052	Cable to TB1485-2
EPROM64	Blank 64K EPROM (27C512)
STDOFF01	Mounting kit, 4 nylon standoffs and screws
SNAP3-7	Mounting kit, 7" Snaptrack
SNAP3-7D	Mounting kit, adapts SNAP 651 to 7" length of DIN rail

Software:

CommBLOK-51	Async comm C library
PidBLOK-51	PID control loop C library
MC/C51	MCC 8051 C
MD/BASIKIT	MDL 8052 BASIC IDE
SY/B52MAN	BASIC-52 User's Manual
SY/BCI51	Systronix BASIC compiler

SNAP 651 trademark Micro/sys
CommBLOK-51, PidBLOK-51 trademark Drumlin
Snaptrack trademark Augat