INTERNAL SERIAL SLOT DESIGNER'S GUIDE

This chapter provides you with the information that you need to design additional functionality for the N2's internal Serial Slot. Both the hardware and firmware design considerations are described in detail.

Internal Serial Slot Overview

The N2 device's Main Logic Board has a internal 32 pin header, providing 3 serial ports, power sources, power management and control signals. Two of the serial ports, Serial Port 0 and Serial Port 3 are shared with the Newton Interconnect Port. Serial Port 0 interface provides complete hardware handshake signals plus control signal, used by the Newton OS to select between the internal slot and Newton Interconnect connection, Serial Port 2 provides Receive Data and Transmit Data only and Serial Port 3 provides complete handshake, plus Ring Indicator, sound in and port enable signal. All serial port signals are at XX Volt XXX levels.

A general purpose I/O signal is also provided on this connector to be used as needed in the design.

Power Management is accomplished with a single signal to indicate whether the system is awake or asleep.

The connector provides 3 power supply voltages: 3.3 volts, 5 volts and 12 Volts. The connector also provides unfused battery voltage that can be used to create any other needed power supply. Additionally, a control signal is provided to allow an external power source to charge the internal battery through this connector.

Serial Channels

The three serial channels that are available on the Internal Serial Slot have different characteristics described below

Serial Channel 0

Serial Channel 3 is a high speed programmable Serial Channel that supports Asynchronous, SDLC and LocalTalk protocols. The Channel supports both internal and external clocking. Without external clocking, Serial Channel 0 supports data rates up to 230.4 Kbits per second. By supplying an external clock, Serial Channel 0 can support data rates up to 2 Mbits per second. Independant data rates for the transmit and receive channels are supported.

The following are Serial Channel 0's Asynchronous capabilities
- 5, 6, 7 or 8 bits per character
- 1, 1.5 or 2 stop bits
- Odd, Even or No parity

Serial Channel 2

Serial Channel 2 is a low speed programmable Asynchronous Channel with no hardware handshake. The channel supports data rates up to 19.2Kbits per second. The data rates must be the same for both the receive channel and the transmit channel. Serial Channel 2's Tx output is NRZ encoded and NRZ encoded data must be presented to Serial Channel 2 on the Rx input.

The following are Serial Channel 2's Asynchronous capabilities
- 5,6,7 or 8bits per character
- 1, 1.5, or 2 stop bits
- Odd, Even or No Parity

Serial Channel 3

Serial Channel 3 is a higher speed programmable Asynchronous Channel with hardware modem and handshake controls. The Channel supports data rates up to 38.4K bits per second. The data rates mustbe the same for both the receive and transmit channel. Serial Channel 2's Tx output is NRZ encoded and NRZ encoded data must be presented to Serial Channel 3 on the Rx

input.

The following are Serial Channel 3's Asynchronous capabilities
- 5,6,7 or 8bits per character
- 1, 1.5, or 2 stop bits
- Odd, Even or No Parity

Unfused Vin Signals

The Internal Serial Slot provides a direct, unfused connection to the batteries in the N2 device. These signals can be used to either supply raw battery voltage to a power supply for voltages not present on the internal serial slot or can be used to charge the batteries.

Power Adapter

A power adapter can be provided to charge a rechargeable battery if it installed in the N2 device.

The power adapter is connected to the four UnfusedPSVin signals and the four GND signals on the N2's Internal Serial Slot. At the same time, the power adapter voltage mustbe applied to the psAdptIn signal with a current limiting resistor to limit the current to 10ma.

Besides charging the internal rechargeable batteries if they are installed in the unit, a power adaptor can will also power the Main Logic Board. Specifications for design of a Power Adaptor that can source power to the N2 device is described in the chapter N2 Power Adaptor Designer's Guide.

Electrical Specifications

Power Requirements

The Internal Serial Slot Card shares power supplies with other add-on devices in the N2 system, so the total power requirement for the entire system should be calculated. This calculation is described in the Chapter "N2 Power Supply" which describes how the power supplies function on the N2 Device.

Internal Serial Slot Board Signal Descriptions

The signal descriptions are listed in the following tables. The I/O direction is referenced from the Internal Serial Slot Board's view. A "O" specifies that the signal is a output from a card connected to the Internal Serial Slot. A "I" specifies that the signal is a input into a card connected to the Internal Serial Slot. A "B" specifies that the signal is Bi Directional.

Serial Port 0 Signals

Signal Name	Pin	I/O	Description
SCCTX0	2	I	Transmit Data for Serial Port 0
SCCNotDTR	3	I	Data Terminal Ready for Serial Port 0
SCCNotRTS	4	I	Request To Send for Serial Port 0
SCCNotDCD	5	O	Data Carrier Detect for Serial Port 0
SCCNotCTS	6	O	Clear To Send for Serial Port 0
SCCRX0	7	O	Receive Data for Serial Port 0

Serial Port 2 Signals

Signal Name	Pin	IO	Description

Signal Name	Pin	IO	Description
KeyBdTX	24	I	Transmit Data for Serial Port 2
KeyBdRX	25	O	Receive Data for Serial Port 2

Serial Port 3 Signals

Signal Name	Pin	IO	Description
ModemRI	17	O	Ring Indicator for Serial Port 3
ModemTx	18	I	Transmit Data for Serial Port 3
ModemRx	19	O	Receive Data for Serial Port 3
ModemNotRTS	20	I	Request To Send for Serial Port 3
ModemNotCTS	21	O	Clear To Send for Serial Port 3
ModemNotDTR	22	I	Data Terminal Ready for Serial Port 3
ModemNotDCD	23	O	Data Carrier Detect for Serial Port 3

Audio Signals

Signal Name	Pin	IO	Description
SoundIn	28	O	Audio Output from the Internal Serial Slot Peripheral.

Control Signals

Signal Name	Pin	IO	Description
PortSelect	1	I	This is the control signal to select between a peripheral in the internal Serial Slot and the Newton Interconnect Port. When this signal is low, the Newton Interconnect Port may drive the Serial Port 3 signals. When this signal is high, the Internal Serial Slot Peripheral may drive the Serial Port 3 signals.
gpSerPortSel	8	I	This signal controls the LTC 1323 line driver for Serial Port 0 that drives the 26 pin Newton Interconnect Port. When Low the Newton Interconnect Port can drive Serial Port 0. When high, the internal Serial Device can drive serial port 0 on the 32 pin connector.
PowerEnable	9	I	When low, the N2 system is in the sleep state, when high, the system is in either the run state or the idle state.
General Purpose I/O	26	B	General Purpose I/O can be configured as an Input or Output

Power & Gnd

Signal Name	Pin	IO	Description
DVCC	12	I	Digital 3.3 Volt VCC Supply
D5VCC	11	I	Digital 5 Volt Supply
D12VCC	27	I	12 Volt VCC
PsAdptIn	10	O	Signal to indicate to the system that a Power Adapter is present on UnFusedPsVin to charge the batteries.
UnFusedPSVin	13	B	Direct Connection to the Battery can be used as supply or to

			charge the batteries.
UnFusedPSVin	14	B	Direct Connection to the Battery can be used as supply or to charge the batteries.
UnFusedPSVin	15	B	Direct Connection to the Battery can be used as supply or to charge the batteries.
UnFusedPSVin	16	B	Direct Connection to the Battery can be used as supply or to charge the batteries.
GND	29	O	Ground
GND	30	O	Ground
GND	31	O	Ground
GND	32	O	Ground

Internal Serial Slot Connector Pinout

Pin	Description
1	Internal/External Serial Port 3 Select
2	Serial Port 0 TXD (Transmit Data)
3	Serial Port 0 DTR (Data Terminal Ready)
4	Serial Port 0 RTS (Request to Send)
5	Serial Port 0 DCD (Data Carrier Detect)
6	Serial Port 0 CTS (Clear to Send)
7	Serial Port 0 RXD (Recieve Data)
8	Internal/External Serial 0 Select
9	PowerEnable
10	Power Adapter Installed
11	5 Volt Supply
12	3.3 Volt Supply
13	Unfused Battery Positive
14	Unfused Battery Positive
15	Unfused Battery Positive
16	Unfused Battery Positive
17	Serial Port 3 Ring Indicator
18	Serial Port 3 TXd
19	Serial Port 3 RXd
20	Serial Port 3 RTS
21	Serial Port 3 CTS
22	Serial Port 3 DTR
23	Serial Port 3 DCD
24	Serial Port 2 TXD
25	Serial Port 2 RXD
26	General Purpose I/O
27	12 Volt Supply
28	Sound In
29	Ground
30	Ground
31	Ground
32	Ground

DC Absolute Maximum Ratings

Signal	I/O Voltage

	Min	Max	Units
Any Signal	GND - 0.3	DVCC+ 0.5	Volts

DC Signal Operating Voltages

Signal	Input High Voltage		Input Low Voltage		
	Min	Max	Min	Max	Units
XXX	.9*DVCC	DVCC	0.0	.1*DVCC	Volts

| Signal	Output High Voltage		Output Low Voltage		
	Min	Max	Min	Max	Units
XXXX	.8DVCC	DVCC	0.0	.2*DVCC	Volts

DC Characteristics

Loading Specifications
This section specifies the amount of capacitive load that the is present on Output signals from the board. This section also specifies the maximum capacitive loading that can be present on Input signals to the Internal Serial Board to ensure that the timing will be met. Both specifications are listed for Bidirectional signals.

Output Current Current
This section specifies the output current supplied from the drivers of the signals from the Main Logic Board into the Internal Serial Board.

AC Timing for SCC Channel 0
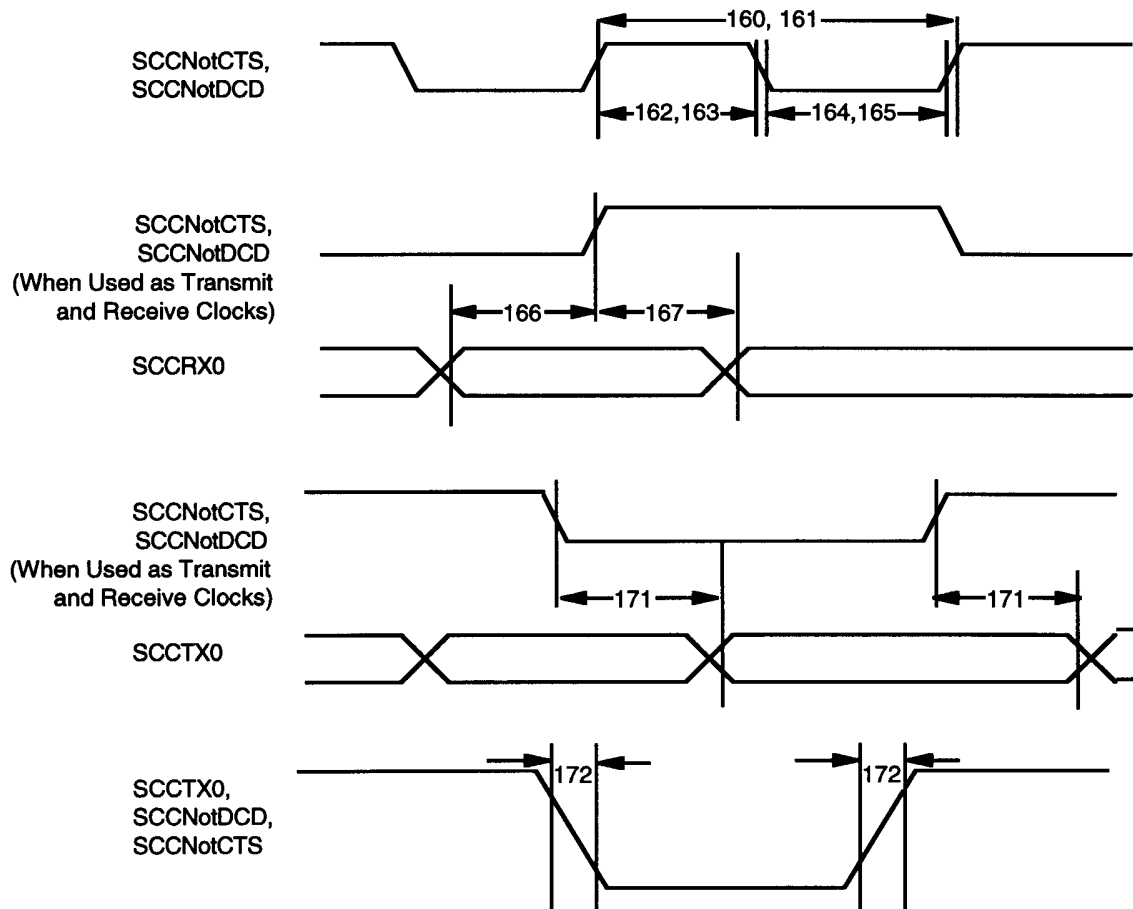
Number	Description	Min	Max	Units	Notes
160	SCCNotDCD, SCCNotCTS CycleTime	500			a
161	SCCNotDCD, SCCNotCTS Cycle Time	54			b
162	SCCNotDCD, SCCNotCTS High Width	120			a
163	SCCNotDCD, SCCNotCTS High Width	25			b
164	SCCNotDCD, SCCNotCTS Low Width	120			a
165	SCCNotDCD, SCCNotCTS Low Width	25			b
166	SCCRX0 Setup to SCCNotDCD, SCCNotCTS	0			c
167	SCCRX0 Hold to SCCNotDCD, SCCNotCTS	45			c
170	SCCNotDCD, SCCNotCTS to SCCTX0 delay		70		c
171	SCCNotDCD, SCCNotCTS to SCCTx0 delay		70		c
172	SCCNotDCD, SCCNotCTS, SCCTx0 rise/fall time		15		

a. SCCNotDCD or SCCNotCTS pin used to supply receive and transmit clocks in 1x Mode.
b. SCCNotDCD or SCCNotCTS pin used to supply receive and transmit baud rate sync clock.
c. SCCNotDCD or SCCNotCTS, which ever is supplying receive or transmit clock.

MECHANICAL SPECIFICATIONS

This section provides mechanical requirements for the design of the Internal Serial Slot Board. These mechanical specifications are also available in computer format.

Internal Serial Slot Mechanical Drawing
This section provides information of the Mechanical specifications for the Internal Serial Slot Board. The specifications provided assume that the card will be placed into a completed N2 system. Some of the dimmensions may change if the card is to be placed in a unit with a different enclosure case.

Internal Serial Slot Mechanical Header Specification
The Internal Serial Slot Main Logic Board header connection specifications are provided below:

Connector Type: JAE 32pin SMD header, part no. IL-WX-32S-VF-A1-B
Operating Life: TBD
Max. Rated Voltage: 250V AC(12V DC operating)
Max. Rated Current: 1A/pin
Rated Resistance: 40mΩ