Appendix B: Port Assignments

To maintain ease of configuration and setup, we have preassigned port numbers to fixed hardware arrangements. Ports with fixed assignments include all direct inputs and outputs, netbits, A/D converters, and D/A converters. There is no way to reassign port numbers, nor is there any way to reassign input/output assignments. Netbits on DIO-Links may be either inputs or outputs depending on whether the bits are read or written. All other ports are fixed as either input or output. The current state of all digital outputs may be tested within IF/IFA statememts.

Direct I/O Ports

The direct digital I/O ports are referenced using the Input and Output keywords in XPRESS.

Board	Address	I/O	Number	Connector	Board Labels
HCS180/	8000	In	0–7	J4	PA0–PA7
HCS2-DX	8001	In	8–15	J4	PB0–PB7
	8002	Out	0–7	J4	PC0–PC7
BUFIO/	A000	In	16–23	J1	IA0–IA7
BUF50	A001	In	24–31	J2	IB0–IB7
	A002	In	32–39	J3	IC0–IC7
	A010	Out	16–23	J4	OA0–OA7
	A011	Out	24–31	J5	OB0–OB7
	A012	Out	32–39	J6	OC0–OC7
	A020	In	184–191	J1	IA0–IA7
	A021	In	192–199	J2	IB0–IB7
	A022	In	200–207	J3	IC0–IC7
	A030	Out	184–191	J4	OA0–OA7
	A031	Out	192–199	J5	OB0–OB7
	A032	Out	200–207	J6	OC0–OC7
IND180	C800	In	40–47	J5	PA0–PA7
	C801	In	48–55	J5	PB0–PB7
	C802	In	56–63	J5	PC0–PC7
	C900	Out	40–47	J6	PA0–PA7
	C901	Out	48–55	J6	PB0–PB7
	C902	Out	56–63	J6	PC0–PC7
IND54	EB00/EF00	I/O	64–71	J4	4PA0–4PA7
	EB01/EF01	I/O	72–79	J4	4PB0–4PB7
	EB02/EF02	I/O	80–87	J4	4PC0–4PC7
	EA00/EE00	I/O	88–95	J3	3PA0–3PA7
	EA01/EE01	I/O	96–103	J3	3PB0–3PB7

	EA02/EE02	I/O	104–111	J3	3PC0–3PC7
	E900/ED00	I/O	112–119	J2	2PA0–2PA7
	E901/ED01	I/O	120–127	J2	2PB0–2PB7
	E902/ED02	I/O	128–135	J2	2PC0–2PC7
	E800/EC00	I/O	136–143	J1	1PA0–1PA7
	E801/EC01	I/O	144–151	J1	1PB0–1PB7
	E802/EC02	I/O	152–159	J1	1PC0–1PC7
SpectraSense	—	In	160–167	J8	—
	—	In	168–175	J9	—
	—	In	176–183	J10	—
	—	Out	160–167	J11	—
	—	Out	168–175	J12	—
	—	Out	176–183	J13	—

The SpectraSense 2000 board contains 10 LEDs. Most are controlled directly by devices on the board and are fixed in their function. However, three of them may be turned on and off under control of your XPRESS program. Reference Output(10) to control LED6 (as marked on the board), Output(11) for LED7, and Output(12) for LED8.

The HCS-DTMF telephone interface board also four LEDs, two of which may be controlled from your XPRESS program. Reference Output(8) to control LED3, and Output(9) to controle LED4.

The direction of the data flow of the ports on the IND54 expansion board is determined by the port address jumper settings on the board (as shown above). For example, to use the 24 bits on connector J1 as inputs 136–159, set the jumpers on the board to select a base address of E800 for J1. To use the bits as outputs 136–159, set the base address to EC00 instead.

Netbits

Netbits are digital I/O bits found on the DIO-Link, DIO+-Link, LCD-Link, MCIR-Link, and ADIO-Link modules. Up to eight DIO-Links, eight DIO+-Links, eight LCD-Links, and six ADIO-Links may be used on the same network. The Netbit XPRESS keyword is used to both set and read netbits.

DIO-Link netbits may be either inputs or outputs. To use a bit as an output, simply set the bit to either 1 or 0. To use the bit as an input, it must be set to a 1 on reset, then the bit may be read at any time and the current state of the input will be returned.

LCD-Link netbits are fixed as inputs. The LCD-Link returns only a change in the input's state from 0 to 1, so are best used with push buttons.

DIO+-Link and ADIO-Link netbits are fixed as either inputs or outputs.

Only the A and B outputs of the MCIR-Link are supported.

DIO0: 0–7
DIO1: 8–15
DIO2: 16–23
DIO3: 24–31
DIO4: 32–39
DIO5: 40–47
DIO6: 48–55
DIO7: 56–63

LCD0: 64–67
LCD1: 68–71
LCD2: 72–75
LCD3: 76–79
LCD4: 80–83
LCD5: 84–87
LCD6: 88–91
LCD7: 92–95

ADIO0:	96–111 (Input)	112–119 (Output)
ADIO1:	120–135 (Input)	136–143 (Output)
ADIO2:	144–159 (Input)	160–167 (Output)
ADIO3:	168–183 (Input)	184–191 (Output)
ADIO4:	192–207 (Input)	208–215 (Output)
ADIO5:	216–231 (Input)	232–239 (Output)

MCIR0: 240,241 (Output)
MCIR1: 242,243 (Output)
MCIR2: 244,245 (Output)
MCIR3: 246,247 (Output)
MCIR4: 248,249 (Output)
MCIR5: 250,251 (Output)
MCIR6: 252,253 (Output)
MCIR7: 254,255 (Output)

DIOP0:	256–259 (Input)	260–263 (Output)
DIOP1:	264–267 (Input)	268–271 (Output)
DIOP2:	272–275 (Input)	276–279 (Output)
DIOP3:	280–283 (Input)	284–287 (Output)
DIOP4:	288–291 (Input)	292–295 (Output)
DIOP5:	296–299 (Input)	300–303 (Output)
DIOP6:	304–307 (Input)	308–311 (Output)
DIOP7:	312–315 (Input)	316–319 (Output)

Netbytes

Netbytes are identical to netbits but are grouped by eight to allow bytewide testing and setting of network I/O bits. All of the following netbytes may be read, tested, and assigned to variables, but only the first eight (corresponding to the DIO-Links) may be set (changed).

Netbyte	Link	Netbits	Netbyte	Link	Netbits
0	DIO0	0–7	21	ADIO3	168–175
1	DIO1	8–15	22	ADIO3	176–183
2	DIO2	16–23	23	ADIO3	184–191
3	DIO3	24–31	24	ADIO4	192–199
4	DIO4	32–39	25	ADIO4	200–207
5	DIO5	40–47	26	ADIO4	208–215
6	DIO6	48–55	27	ADIO5	216–223
7	DIO7	56–63	28	ADIO5	224–231
8	LCD0,1	64–71	29	ADIO5	232–239
9	LCD2,3	72–79	30	MCIR0–3	240–247
10	LCD4,5	80–87	31	MCIR4–7	248–255
11	LCD6,7	88–95	32	DIOP0	256–263
12	ADIO0	96–103	33	DIOP1	264–271
13	ADIO0	104–111	34	DIOP2	272–279
14	ADIO0	112–119	35	DIOP3	280–287
15	ADIO1	120–127	36	DIOP4	288–295
16	ADIO1	128–135	37	DIOP5	296–303
17	ADIO1	136–143	38	DIOP6	304–311
18	ADIO2	144–151	39	DIOP7	312–319
19	ADIO2	152–159			
20	ADIO2	160–167			

A/D Converters

The system A/D converters accept analog voltages in and produce digital results, the range of the output values depending on the resolution of the A/D converter. The ADC XPRESS keyword is used to read the converter channels. The SC's ADC is continuously scanned, resulting in each channel being read several times per second. The network ADCs are read only every few seconds. The frequency depends on how many modules are on the network.

HCS180/HCS2-DX: 0–7

IND13: 8–15 IND30: 96–111

ADIO0: 16–23
ADIO1: 24–31
ADIO2: 32–39
ADIO3: 40–47
ADIO4: 48–55
ADIO5: 56–63
ADIO6: 64–71
ADIO7: 72–79

DIOP0: 112,113
DIOP1: 114,115
DIOP2: 116,117
DIOP3: 118,119
DIOP4: 120,121
DIOP5: 122,123
DIOP6: 124,125
DIOP7: 126,127

SpectraSense: 128–135

While a number is assigned to the optional second ADC channel on the DIO+-Link boards, only one 8-bit ADC channel per board is supported.

The IND13 should be addressed for 9000H and the IND30 should be addressed for 9800H. Only one ADC board (IND13 or IND30) may be installed in an industrial (IND) system.

D/A Converters

The only D/A converters in the system are on ADIO-Link modules. Any value from 0 to 255 may be sent to one of eight modules using the DAC XPRESS keyword, and the corresponding channel outputs a voltage from 0 to 5 volts.

ADIO0: 0–3
ADIO1: 4–7
ADIO2: 8–11
ADIO3: 12–15
ADIO4: 16–19
ADIO5: 20–23
ADIO6: 24–27
ADIO7: 28–31