

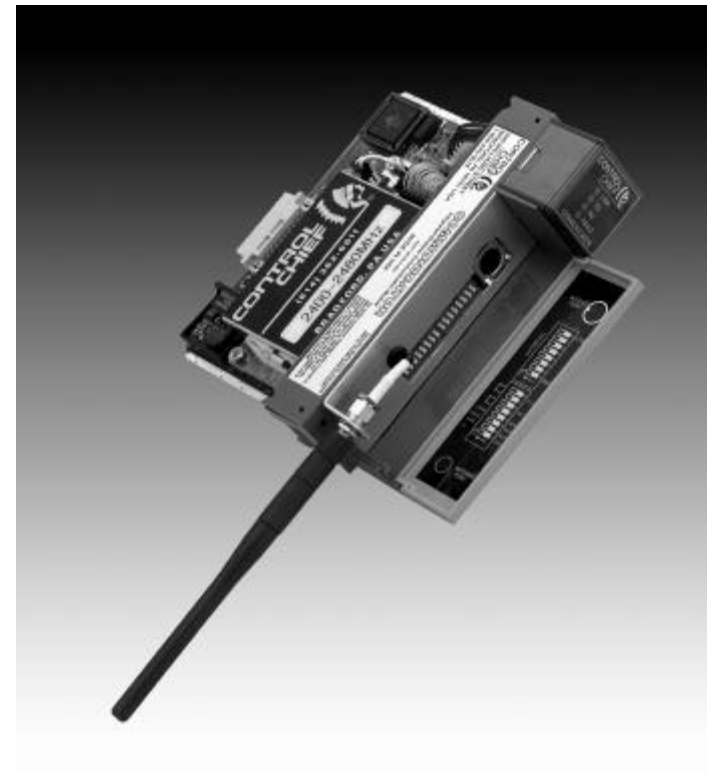


The Communicator

Model 2400

Integrated wireless communication module

User's guide



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95-00-0-011 Rev. C

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Appendix C- I/O Configuration Table

Product ID	CPU/ 01	NORM/ DIAG	REM/ BASE	HPWR / LPWR	NET	NET	CFG	CFG	NUMBER OF WORDS INPUT/
SWITCH NUMBER	1	2	3	4	5	6	7	8	
3535	/01 ON	NORM OFF	X	X	X	X	OFF	OFF	8/8
13135	CPU	NORM	REM	X	X	X	ON	ON	8/8
13235	CPU	NORM	REM	X	X	X	ON	OFF	10/10
13435	CPU	NORM	REM	X	X	X	OFF	ON	16/16
13635	CPU	NORM	REM	X	X	X	OFF	OFF	32/32
13635	CPU	NORM	BASE	X	X	X	X	X	32/32

X - DENOTES SWITCH CAN BE IN EITHER POSITION

1. OVERVIEW

The Communicator Module is designed to communicate wireless data between SLC 500 processors. Any of the modular designed SLC processors can be integrated with the Communicator Module (SLC 5/01 through 5/05). The Communicator Module uses up to 64 words (32 input and 32 output words) of discrete I/O to accomplish this. The Communicator also allows the programmer the use of the M0 and M1 files allowing additional data to be sent between SLC 500 processors (this functionality is **not** available in firmware revisions prior to 2.20.xx). The Communicator is also capable of running interrupt commands to the SLC 500 processor which enables complete control of the processor scan based on data input to the Communicator.

Unlike conventional serially connected RF devices that communicate with PLC processors, the Communicator is easy to configure and does not use a serial port to establish data exchange with the SLC CPU. With no serial port limitations, the radio can take full advantage of its available bandwidth. The radio link communication with the CPU is seamless, and therefore needs no user intervention to become established. No other traditional modem arrangement can make this claim.

Whether the application is a SCADA environment where large amounts of data are being transmitted, or a control environment where data latency is critical, The Communicator Module from Control Chief Corporation is the preferred RF choice of experienced SLC 500 programmers.

Installation



ATTENTION: Never insert or remove modules with power applied to rack !

The Communicator Module can reside in any slot in the SLC 500 chassis with the exception of the first slot (this slot is reserved for the processor or the ASB Module).

- 1) Remove and lock out power to the SLC chassis.
- 2) Align the printed circuit card edges with the guides in the SLC rack.
- 3) Slide the Communicator Module in until the tabs on top and bottom of the plastic card housing lock into the rack.
- 4) Attach one end of the 3m antenna extension cable to the module by threading it onto the antenna connector. (See page 8)
- 5) Attach opposite end of cable through pre-drilled 3/8" hole in enclosure and secure with lockwasher and nut provided.
- 6) Attach 2 dB dipole antenna to threaded portion of cable connector extending to exterior of enclosure.
- 7) Cover all unused slot positions with Card Slot Filler, Catalog # 1746-n2 (Available at your local Allen-Bradley Distributor).

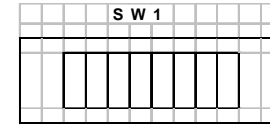
I/O Configuration

- 1) Open I/O Configuration Table through RS Logix 500 Software. (Consult your Allen-Bradley distributor for assistance with this product).
- 2) Select "other" from the list of available modules on the right.
- 3) Enter appropriate code as determined from chart in appendix C. (page 22)
- 4) Enter 60 in box for "G-File Size" (even if the

Appendix B- Dip Switch Settings

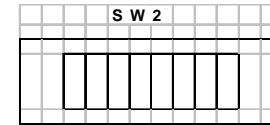
Located on the front of the Communicator Module are two banks of dip switches. Each bank consists of eight switches. These switches are labeled as SW1 and SW2 and there settings are as follows:

SW1 Module Address Dip Switch



All remotes must have unique address

SW2 Module Configuration Dip Switch



Switch 1 – Selects 5/01 CPU or 5/02 CPU and larger
Switch 2 - Diagnostic switch (must be in normal position)

Switch 3 – Selects module as remote or base

Switch 4 – Selects high or low power output for radio

Switch 5,6 –

Allows for selection of up to 4 separate network addresses. All remotes that will connect with that base must have switches 5 and 6 set the same as the base.

Switch 7,8 –

7 and 8 off – one base, one remote

7 off 8 on – one base, two remotes

7 on 8 off – one base, three remotes

7 and 8 on – one base, four remotes

Appendix A - Programming Examples

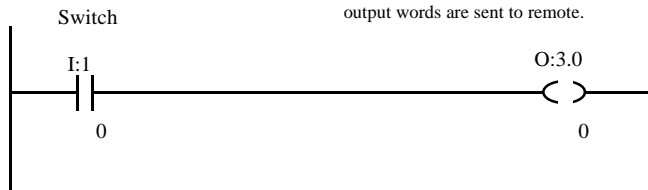
Discrete programming

In the following example, the base Communicator module is located in rack "A" in slot 3 and the remote Communicator module is located in rack "B" in slot 3. Rack "A" also has an input module in slot 1 and rack "B" contains an output module in slot 1.

The objective will be to initiate a command by turning on a switch wired to rack "A" input module, pass the bit through the wireless link provided by the Communicator base to the Communicator remote, and energize a bell wired to rack "B" output module.

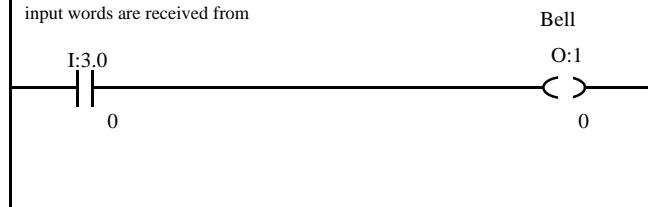
RACK A PROGRAM

First bit in first output word of base Communicator module. All output words are sent to remote.



RACK B PROGRAM

First bit in first input word of remote Communicator module. All input words are received from



Module Networking

Base/Remote Topology

The WIT 2400 Communicator Module utilizes base/remote topology in its communication scheme. One module, configured as the base, initiates all communication with all remote modules. Remote modules can only communicate with the base, and only after acquiring the signal from the base module. A remote module can only gain data from another remote if the information is passed through the base module. Through the advent of spread spectrum technology, a total of 16 base modules can operate simultaneously in the same geographical environment, even within the same rack. Each base can communicate with up to 254 remote modules. There are certain limitations involved with each of these arrangements, and each will be discussed in more detail later

Point to Point

When the module is used in a point to point scenario, the base will share 64 words of I/O with the remote module. Each SLC 500 CPU in this configuration can have up to 32 words of input and 32 words of output set aside in its I/O data table for the Communicator module. The output data table from the base module's PLC will be sent through the base module, to the remote module. The remote module will communicate these words to its PLC and store them in the remote's input image table. In turn, the output image table from the remote's PLC will be sent to the base unit. The base unit's PLC will store those 32 words in its input image table. In a point to point scheme such as this, this procedure could take as little as 50 ms.

Module Networking Cont.

1 Base to up to 254 Remotes

The base Communicator module can network with up to 254 remote Communicator modules. This network does have some practical limitations though. As data is sent to one remote at a time, the more remote units which communicate with the base, the more time it will take for the base to complete the communication cycle with all remote units.

I/O Allocation

As stated earlier, each module can allocate up to 32 input words and 32 output words from the local CPU. The base shares these words of scanned I/O with the remote units. The base unit can be configured to determine how many words of I/O to allocate to each remote unit. In a point to point scenario (one base, one remote), as many as all 32 input words and all 32 output words, or as few as 2 input words and 2 output words can be shared between base and remote. In a multiple remote network scenario (from 2 to 16 remotes), the base must divide the 32 input and output words with the remotes. At least 2 words must be shared with each remote in the network.

M0 / M1 File Usage

In the event that the application exceeds 16 remote units, or the requirement for data sharing exceeds the total available scanned I/O allocation capabilities for a particular remote, the M0 and M1 files can be used to share data be-

- When bit 15 in word 4 is "1" (8000h), bits 0-7 indicate address (valid values are 8001h to 80FFh)
- When bit 15 in word 5 is "1" (8000h), G-file settings override dip switch settings for words 6-23 & 31
- When bit 15 in word 5 is "1" (8000h), bits 0-7 of word 6 set network channel (Valid values are 8000h -800Fh)
- When bit 15 in word 5 is "1" (8000h), lower byte of word 7 sets number of remotes using scanned I/O

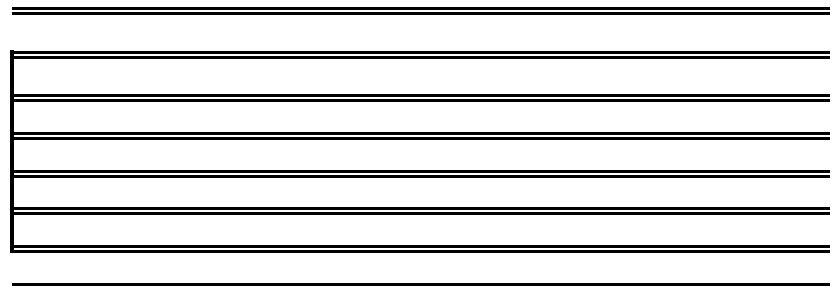
(Valid values are 8001h -8010h)

When unit is configured as a base, upper byte of each word (8-23) establishes number of scanned I/O words transmitted to **and** received by each slave. Lower byte holds address of that slave. **(Lower byte must match what was entered in lower byte "G-file" word 4 of the remote processor!!!)**

If unit is configured as a remote, only word 8 is used. Lower byte of word 8 must match lower byte of word 4.

All unused words should contain 0's (zero's).

There can be no gaps, use consecutive words in this section and place zero's in remainder of words through word 23.

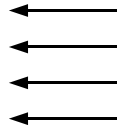


→ Zero for 100 mW, Non-Zero for 10 mW

G FILE STRUCTURE

08.26.1999

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word 0	Reserved															
Word 1	System ID Always Hex A55A															
Word 2	Reserved															
Word 3	Reserved															
Word 4	Station Address															
Word 5	Dip Switch Disable															
Word 6	Network Address															
Word 7	Number of Remotes Using Scanned I/O															
Word 8	Number of scanned I/O words								Address of remote (#1)							
Word 9	Number of scanned I/O words								Address of remote (#2)							
Word 10	Number of scanned I/O words								Address of remote (#3)							
Word 11	Number of scanned I/O words								Address of remote (#4)							
Word 12	Number of scanned I/O words								Address of remote (#5)							
Word 13	Number of scanned I/O words								Address of remote (#6)							
Word 14	Number of scanned I/O words								Address of remote (#7)							
Word 15	Number of scanned I/O words								Address of remote (#8)							
Word 16	Number of scanned I/O words								Address of remote (#9)							
Word 17	Number of scanned I/O words								Address of remote (#10)							
Word 18	Number of scanned I/O words								Address of remote (#11)							
Word 19	Number of scanned I/O words								Address of remote (#12)							
Word 20	Number of scanned I/O words								Address of remote (#13)							
Word 21	Number of scanned I/O words								Address of remote (#14)							
Word 22	Number of scanned I/O words								Address of remote (#15)							
Word 23	Number of scanned I/O words								Address of remote (#16)							
Word 24	Output Scan Time (1ms units)															
Word 25	Input Scan Time-out															
Word 26	Reserved															
Word 27	Reserved															
Word 28	Reserved															
Word 29	Reserved															
Word 30	Reserved															
Word 31	Transmit power															

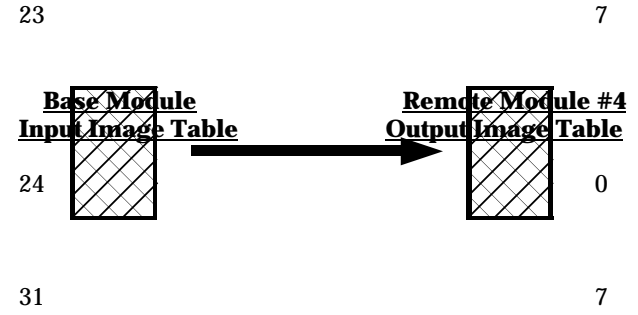
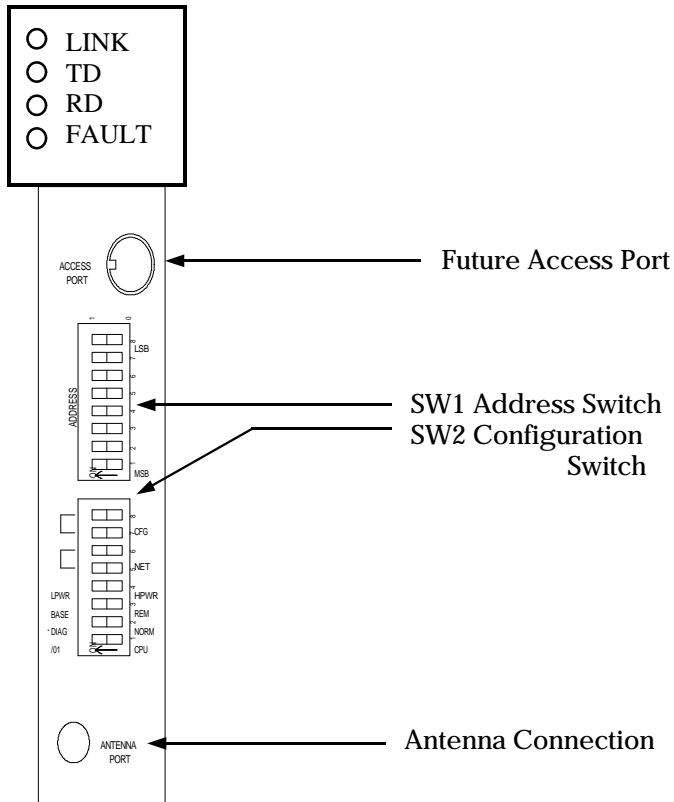


Module Networking Cont.

tween modules. The PLC programmer can copy files to the M0 file in the base module and that data can be read from the M1 file in the appropriate remote CPU. Data can also be sent in the opposite direction (this functionality is ***not*** available in modules with firmware revisions prior to 2.20.xx and earlier).

Specifications

LED INDICATORS	
LINK STATUS	Module has established
TRANSMIT DATA	Module sending data
RECEIVE DATA	Module receiving data
MODULE FAULT	Indicates internal



CONFIGURATION Cont.

23

7



31

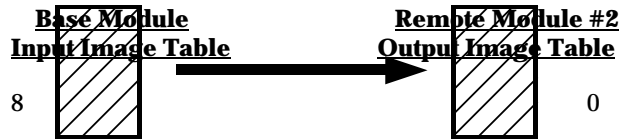
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Base to remotes communication



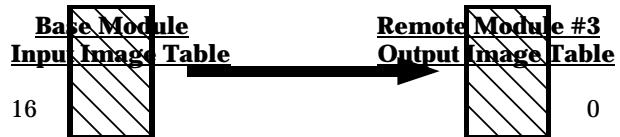
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7



15

7



CONFIGURATION

Configuring with dip switches :

CPU Switch 1

Switch 1 selects which CPU style is in the rack. If the CPU is a 5/01 (1747-L511 or 1747-L514) then switch 1 must be set on. If any other processor is used, switch 1 must be set off.

Diag/Norm Switch 2

Switch 2 is always set off (normal mode).

Base/Remote Switch 3

Switch 3 is set on if module is to act as a base radio or off if module is to act as a remote radio.

Power Switch 4

Switch 4 is set on for low radio transmission power (10 mw) or off for high radio transmission power (100 mw).

Network Switches 5 + 6

Network switches 5 + 6 are set the same for a particular base and all remotes that will communicate with that base. Remotes will only communicate with one base, and only with the base whose switches 5 + 6 are set the same as switches 5 + 6 on the remote.

Configuration Switches 7 + 8

When using the SW2 dip switch on the front of the module for configuration, these switches must be set the same on the base and all remotes within the network. The configuration switches on the base determine the number of remotes the base will access within the network (up to four) as shown below:

CONFIGURATION Cont.

Number of Remotes	7	8
1	off	off
2	off	on
3	on	off
4	on	on

When setting configuration switches 7 and 8 on the remote module, the switches determine the number of I/O words the remote module sends to the base module (see table below).

I/O Words per Remote	7	8
32	off	off
16	off	on
10	on	off
8	on	on

These words are distributed from the remotes into the 32 words of the base module as described below:

1 Remote

All 32 words from the remote are directly mapped to the base. The address dip switch on the base (SW1) must be set to a value other than all on or all off. The address dip switch (SW1) on the remote must be set identical to that of the base.

On the following page you will find a graphical representation of the movement of data between SLC processors.

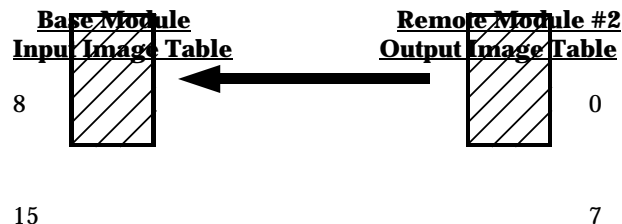
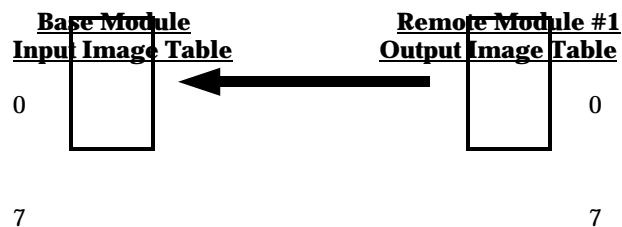
Remote to base communication

CONFIGURATION Cont.

4 Remotes

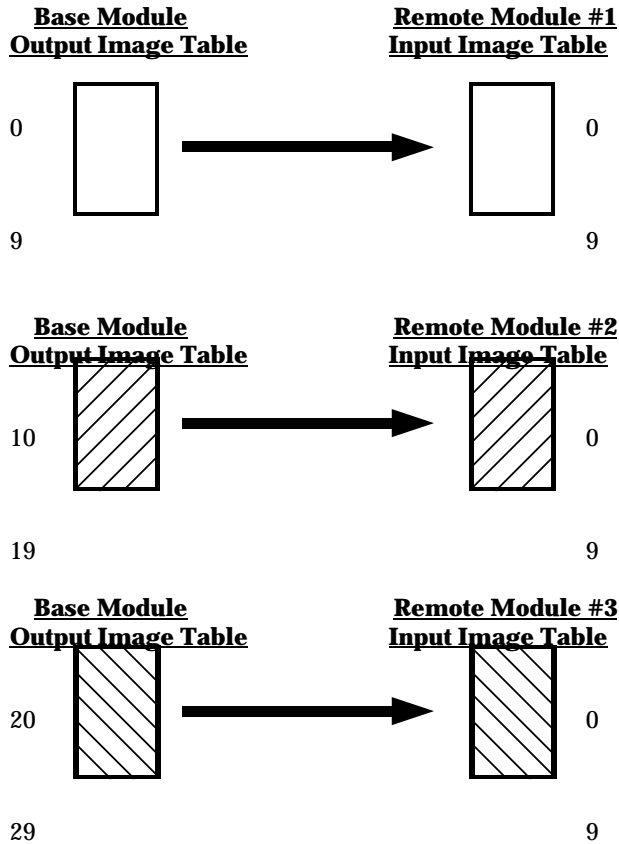
With a network comprising a base and four remotes, each remote communicates 8 words into and out of the base. The base address switch will again be set to address 0 (all off), remote #1 will be set at address one, remote #2 will be set at address two, remote #3 will be set at address three, and remote #4 will be set at address four. This mapping is represented graphically on the following pages.

Remotes to base communication



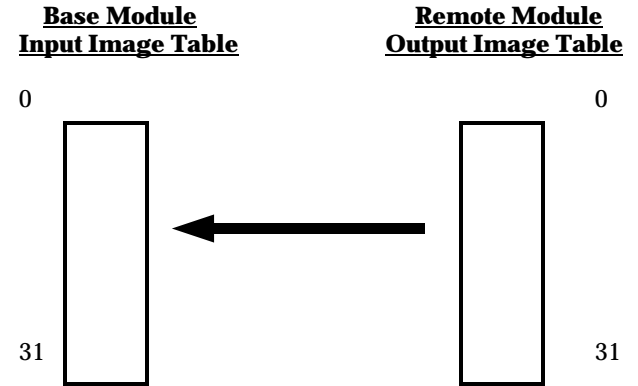
CONFIGURATION Cont.

Base to remotes communication

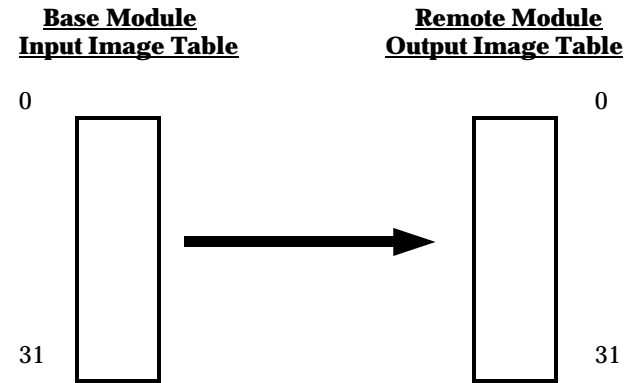


NOTE : Words 30 and 31 in the base data tables are not used with three remotes!!!

CONFIGURATION Cont.



Base to remote communication

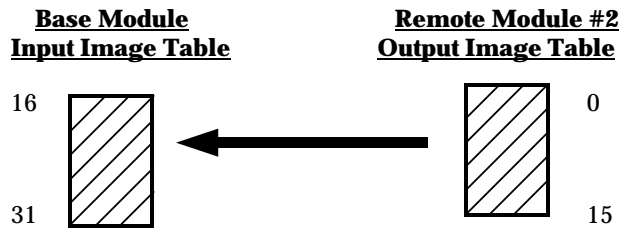
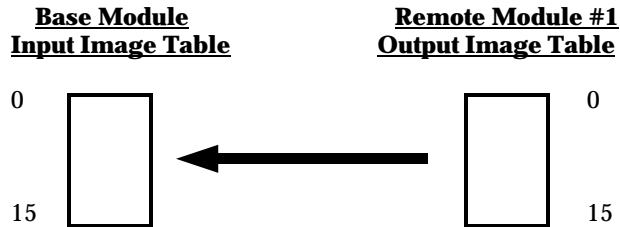


2 Remotes

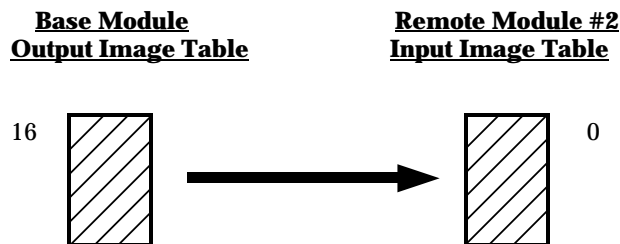
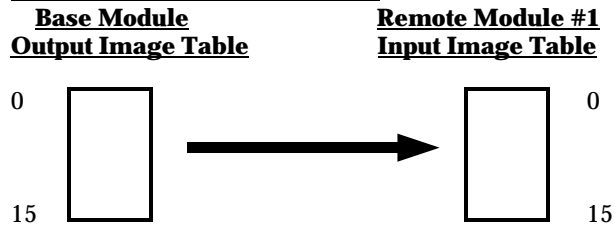
With a network comprising a base and two remotes, each remote communicates 16 words into and out of the base. The base address switch will be set to address 0 (all off), remote #1 will be set at address one, and remote #2 will be set at address two. This mapping is represented graphically on the following page.

CONFIGURATION Cont.

Remotes to base communication



Base to remotes communication



CONFIGURATION Cont.

31

15

3 Remotes

With a network comprising a base and three remotes, each remote communicates 10 words into and out of the base. The base address switch will again be set to address 0 (all off), remote #1 will be set at address one, remote #2 will be set at address two, and remote #3 will be set at address three. This mapping is represented graphically on the following pages.

Remotes to base communication

