NX 1500 Remote IO

Applies to NX1500 firmware versions **3.24** or greater.

Registers

S140 Local IO Inputs. Read Only. (0, 32, 128, 160)
S141 Local IO Outputs. (0-255)
S155 GPS/Remote IO enable. (**0 – disabled**, 1 - enabled)
S156 GPS/Remote IO base address Fleet (ff)
S157 GPS/Remote IO base address Group (gg)
S158 GPS/Remote IO base address User (uu)
S159 GPS/Remote IO Group address response hold-off (**0 = variable**, 1 – 999 fixed delay in 100's of ms)
S162 GPS/Remote IO Pin Code **(0 = don't care**, 1 – 65535 pin number) (write only)

Future: Auto reporting based on input state change
Future: Com 3 used for third party IO board including analog IO inputs

Commands

For use at the remote end with IO devices attached:
AT%IIS - immediate report back to base ATS140 inputs
AT%IOS - immediate report back to base ATS141 outputs

Broadcast commands for use at the base end (from where we wish to query remote units):
AT%IIRtt,ff,gg,uu1,uu2... - broadcast read remote inputs
AT%IORtt,ff,gg,uu1,uu2... - broadcast read remote outputs
AT%IOWnn,ff,gg,uu1,uu2... - broadcast write remote outputs

Description

The Remote IO interface controls a total of 4 digital inputs and 8 digital outputs. Two inputs and two outputs are in use, leaving two inputs and six outputs available for general use. Some configuration registers are shared with the GPS interface (pin number, base address, enable, hold off). If s155 is 0, then a remote modem will ignore any broadcast request for information about its inputs/outputs. Issuing a IIS or IOS command from the remote, will report information immediately back to the base whose address is specified in s156 – a158. S162 is the write only pin number register. Reading this register with an AT&V or with an ATS162? will always return 000. If s162 has been preset to a non zero number, then the base unit must also have s162 set to the same number before the remote IO command will be accepted and responded to.

Writing to s141 sets the Remote IO outputs. The table below shows the values to write to s140 for each bit. The bit values are additive. For example, to switch on both DO3 and DO1, add 4 to 32 and write 36 to s141. The bottom 2 bits (affected by adding 1 or 2 to the s141 register value) are ignored as these two pins are set continuously by the NX1000 software. Reading s141 reports the status of the Remote IO outputs.

Name	In Use	S141 value	Connector	Connector-Pin Number
Digital Out 1	No	32	HDDB26	26-4
Digital Out 2	No	128	HDDB26	26-15
Digital Out 3	No	4	HDDB15	15-5
Digital Out 4	No	16	HDDB15	15-7
Digital Out 5	YES PTT OUT	1	HDDB15	15-9
Digital Out 6	YES DATA MUTE	2	HDDB15	15-10
Digital Out 7	No	64	HDDB15	15-15
Digital Out 8	No	8	HDDB15	15-14

NX1500 Remote IO Output Pins

S140 is the read only Remote IO Inputs register. The following table below shows the values to read for the two available inputs. The bit values are additive. For example, if both programmable inputs were on, s140 would be read as 32 + 128 = 160.

Name	In Use	S140 value	Connector	Connector-Pin Number
Digital Input 1	No	32	HDDB26	26-5
Digital Input 2	No	128	HDDB26	26-17
Digital Input 3	YES BUSY	0	HDDB15	15-8
Digital Input 4	YES LOCAL PTT IN	0	HDDB15	15-13

NX1500 Remote IO Input Pins

Broadcast Commands

These commands are issued from the base modem, in order to query the remote IO status of the remote modem(s). These commands share a similar format to the GPS broadcast commands. A single command can target multiple devices provided they have the same fleet and group numbers. The multiple recipient format specifies fleet, group, then a list of users. For example if the remote IO command ended with the following addressing: 1,2,7,3,5,4,6 then it would be responded to by all of the following modems: {1,2,7} {1,2,3} {1,2,5} {1,2,4} {1,2,6}. There is also one more parameter included in the command before the remote unit address list. In the case of Remote IO reading commands (AT%IIR and AT%IOR), this extra number is the response window time slot width in 10s of milliseconds. It is used by the remote modem, to determine how soon after receiving the broadcast Remote IO request to respond. It is only used if s159 is set to zero (if s159 is non-zero, then the response time for the remote unit is manually fixed to s159 * 100ms). As a complete example, consider the command AT%IIR25,1,2,4,6,5. This command will be responded to by units {1,2,4}, {1,2,6} and {1,2,5}. Lets assume all units have s159 set to 0. Then, {1,2,4} will respond immediately, {1,2,6} will respond after 250ms and {1,2,5} will respond after 500ms. In the case of the Remote IO writing command (AT%IOW) the extra parameter prior to the address list is the value which the remote unit will use to s141. For example if the base issues the broadcast command AT%IOW255,1,2,4,6,5 then units {1,2,4}, {1,2,6} and {1,2,5} will all set s141 to 255.