Module Overview

The AMCI NX3A1P module is a single resolver input programmable limit switch module that is programmed by and communicates on Profibus. The functionality of the NX3A1P is similar to the AMCI SLC 500 based 8513 module with the following exceptions.

1. This module has a total of 16 real outputs. The 16 virtual outputs are not present.
2. The default mode of operation is independent mode, not group mode.
3. The NX3A1P does not have any interrupt functionality.
4. Transducer Fault Latch has been added to the functionality.
5. Resolver Type, either AMCI or Autotech, has been added to the functionality.
6. Group mode 6 has been added.
7. The offset value has been removed from the setup parameters. Since this module stores its parameters on power down, this parameter is not necessary to maintain absolute position through power down.
8. A programmable feature allows the outputs to either be disabled, or to remain enabled, if the network connection is removed. Forced outputs are always disabled when the network connection is removed.
9. The outputs are always disabled if the unit is in transducer fault. However, the outputs are not disabled when the PLC is in program mode.
10. Up to 16 timed outputs can be programmed into the NX3A1P module.

This unit has sixteen I/O points. Eight of outputs and all sixteen inputs are located on the Nexus module itself, and the remaining eight outputs can be located on an external relay board.

The inputs can be programmed to be used either high true or low true, and provide ANDing functions and group control. The inputs are divided into two groups of eight, and can be used as either sinking or sourcing inputs. The status of the 16 inputs is reported to the PLC over Profibus.

Each of the outputs has 8 On/Off setpoints, and can be programmed to operate in normal, timed, or pulse mode. The outputs can be ANDed with an input or with a motion detector, and can also be forced ON or OFF from the PLC. The outputs will turn off when there is a transducer fault condition, even if it is a clearable transducer fault. The status of the 16 outputs is reported to the PLC over Profibus. **Outputs should not be programmed on the fly.** The outputs can either be used independently or grouped together in up to six groups. The groups can be programmed to operate in 1 of 6 modes.

Mode 0: Outputs operating in Mode 0 function normally and are not affected by the input terminal or group channel.

Mode 1: Outputs operating in Mode 1 are always enabled to turn on at their programmed setpoints. When the group input is activated, the group's position is preset to the group's preset value. The input is ignored until the group control position is reached. The input must transition from 0 to 1 after the group control position is reached.

Mode 2: Outputs operating in Mode 2 are disabled until the group input is activated, at which time the group's position is preset to the preset value. The outputs will be active until the group control position is reached. The input is ignored until the group control position is reached. The input must transition from 0 to 1 after the group control position is reached.

Mode 3: Outputs operating in Mode 3 can be active only when the group control input is active. The group channel On/Off points are not used in mode 3.

Mode 4: Outputs operating in Mode 4 will be active for one cycle only when the group's input transitions from 0 to 1 between the group channel's On and Off points. The cycle ends when either the group channel On or Off point is reached, at which point the outputs turn off.

Mode 5: Outputs operating in Mode 5 will be active for one cycle only when the group's input is active in the range between the group channel's On and Off points. The outputs will be active only when the resolver's shaft is turning, or if the first cycle input is active. The outputs will turn off after there is no change in position for either 504ms or 120ms, depending on how the tachometer response parameter is set. The cycle ends when either the group channel On or Off setpoint is reached, at which point the outputs turn off.

Mode 6: Mode 6 is similar to mode 5 except that the outputs will be disabled when the group's position data passes through zero.

Note 1: There are two force functions, Force On and Force Off. When a Force On bit is set, the output it represents will be activated, regardless of the output state. When a Force Off bit is set, the output is represents will be turned off, regardless of the output state. The Force Off bit takes priority over the Force On bit.

Note 2: The module can be programmed to operate two ways, either in Independent or Group mode. When used in independent mode, the outputs will only fire when its corresponding input is active. That is, input 1 will control output 1, input 2 will control output 2, etc. To use independent mode without inputs, set the input state to be active low. Also, when in independent mode, the outputs can only be motion ANDed, they cannot be enable ANDed. When group mode is used, the inputs control the groups.

Note 3: The inputs to the NX3A1P have a debounce time of 0ms, and are scanned every 1ms.

Note 4: In group mode, inputs will be acted on only if the position data is scanned between the programmed group channel's On and Off points. If the resolver position data passes through the group channel in less than 1 ms, the input may not be detected.

Note 5: The module contains non-volatile memory. The setup data and On/Off setpoints will be saved on power down. The offset values and On/Off setpoints are stored in a battery backed RAM, so they can be changed often without damaging the module.

Input Registers

The NX3A1P module reports the resolver position and velocity data, as well as module status and programming errors to the PLC using 20 input registers. These registers will go to zero if the Nexus unit loses power or if the network connection is lost. The input registers have the following function.

Word(s)	Function
0	Module status
1 to 4	Position, velocity, output status, and input status
5	Module setup programming errors
6 to 13	Group programming errors and group positions
14 to 16	Output programming errors
17 to 19	Reserved, equal to zero

A detailed description of each of the input register's function is shown below.

Word 0: Module Status

Bit 0: set when setup data is invalid (see input register 5 for a detailed description of the error)

Bit 1: set when group data is invalid (see input registers 6 and 7 for a detailed description of the error)

Bit 2: set when Limit Switch data is invalid (see input registers 14 to 16 for a detailed description of the error)

Bit 3: set when Increment / Decrement Output Number is invalid (range 1 to 16). Also set if any of the unused bits are set in the control word are set, if neither the increment or decrement setpoint bits are selected, or if you try to increment or decrement an output that has not yet been programmed.

Bit 4: set when the Increment / Decrement Setpoint Number is invalid (range 1 to 9, 9 programs all of the on/off setpoints), if you try to increment an on setpoint past the off setpoint or vice versa, or if you try to increment or decrement a setpoint that has not been programmed.

Bit 5: set when Message Ignored Error, generated by trying to program the module when a programming error exists, or by sending the Apply Preset command when there is a transducer fault.

Bit 6: set when Module Fault (generated if the NX3A1P fails its power up test) This bit will also be set if there is no reference voltage present.

Bit 7: set when Transducer Fault. If the fault is clearable, the position data will be updated, the velocity data will be zero, and the outputs will be disabled.

Bit 8: MD1 bit, set when the transducer's velocity in RPM is within the range programmed into Motion Detector 1.

Bit 9: MD2 bit, set when the transducer's velocity in RPM is within the range programmed into Motion Detector 2.

Bit 10: Tachometer Overflow, set when the scaled tachometer value in input register 2 exceeds 32,767.

Bit 11: Set when the output registers are being used to force the outputs and inputs on and off.

Bit 12: Command Error. Set when more than one of the Command bits 1 to 4 are set, if reserved bits 5 to 12 are set during a programming cycle, or if you try to program

groups when the module is operating in independent mode. A command error will also be generated if the Transmit bit is set without any other command bits.
Bit 13: reserved, always equal to zero
Bit 14: mode status bit, 0 = independent mode, 1 = group mode
Bit 15: Acknowledge bit. Set when the NX3A1P module sees that the Transmit bit in output register 0 is set.

Word 1: Machine Position (The position data is reported if there is a clearable transducer fault)
Word 2: Scaled Resolver Velocity Data (The velocity data will be zero if there is a clearable transducer fault.
Word 3: Limit Switch Output Status (bit 0 = output 1, bit 1 = output 2 … bit 15 = output 16)
Word 4: Input Status (bit 0 = input 1, bit 1 = input 2 … bit 15 = input 16) (If the input is configured to be active high, than these bits will be on when the input is receiving power. If the input is configured to be active low, than these bits will be on when the input is not receiving power.)
Word 5: Setup Programming Errors
Bit 0: Scale Factor Error. Set if the Scale Factor is outside of the range of 2 to 8192.
Bit 1: Preset Value Error. Set if the Preset Value is outside of the range of 0 to (SF-1).
Bit 2: reserved, will always be zero.
Bit 3: Motion Detect 1 Error. Set if one or both Motion Detector 1 setpoints are outside the range of 0 to 32,767, or if the setpoints are equal but not zero.
Bit 4: Motion Detect 2 Error. Set if one or both Motion Detector 2 setpoints are outside the range of 0 to 32,767, or if the setpoints are equal but not zero.
Bit 5: Tachometer Scalars Errors. Set if the Tachometer Multiplier, Tachometer Divisor, or Tachometer Decimal Point parameters are outside of their programmable ranges.
Bits 6 to 14: Reserved, will always set to zero.
Bit 15: Setup Command Word Error. Set if one or more of the reserved bits in the setup command word are set to "1" during a setup programming cycle.
Word 6: Group Programming Errors
Bit 0: Group Offset/Preset Error. Set if the Group Offset/Preset value is outside of the range of 0 to (SF-1)
Bit 1: Group Programming Error. Set if the output quantity or operating mode parameter is invalid.
Bit 2: Group Channel Setpoint Error. Set when one or both of the group channel setpoints are outside of the range of 0 to (SF-1) of both setpoints are equal but not zero.
Bits 3 to 14: Reserved, will always be set to zero.
Bit 15: Group Command Word Error. Set when one or more of the reserved bits in the group command word are set to "1" during a group programming cycle.
Word 7: Group Number with error. If any of the bits 0 to 2 are set in input register 6, than this word will indicate which group, 1 to 6, has the programming error.
Word 8: Group 1 position data
Word 9: Group 2 position data
Word 10: Group 3 position data
Word 11: Group 4 position data
Word 12: Group 5 position data
Word 13: Group 6 position data

Word 14: Output Programming Errors

Bit 0: On Setpoint Error. Set when a Limit Switch ON Setpoint is outside of the range of 0 to (SF – 1). Input registers 15 and 16 will report which output and setpoint have the error.

Bit 1: Off Setpoint Error. Set when a Limit Switch OFF Setpoint is outside of the range of 0 to (SF – 1) or if the on and off setpoints are equal but not zero. Input registers 15 and 16 will report which output and setpoint have the error.

Bit 2: Advance Error. Set when either the On or Off advance values are outside of the range of ±999. Input register 16 will report which output has the error.

Bit 3: Timed Output Error. Set when a timed output range is outside of the range of (1 to 9999) or if the on/off setpoints of a timed output are outside of the range of 0 to (SF-1).

Bit 4: Reserved, will always be equal to zero.

Bit 5: Pulsed Output Error. Set if there is an error with one or more of the pulsed output parameter. The difference between the leading and trailing edge setpoints must be less than ((Pulse Quantity * On count) + (Pulse Quantity – 1)). This bit will also be set if the on/off setpoints of the pulsed outputs are outside of the range of 0 to (SF-1).

Bit 6: Output Quantity Programming Error. This bit will be set if you try to program more than two outputs at a time in Output Programming Block word 1, if no outputs are selected in word 1, or if you try to program outputs not assigned to a group.

Bit 7: Reserved, will always be equal to zero.

Bit 8: Limit Switch Disabled. Set to "1" when the outputs are disabled because the outputs have not been programmed, if there is a transducer fault, or if the outputs have been disabled by the disable output command. The outputs will also be disabled, and this bit set when either the Setup or Group data has been programmed.

Bits 9 to 14: Reserved, will always be equal to zero.

Bit 15: Limit Switch Command Word Error. Set under the following three conditions

1. Set when one or more of the reserved bits in the output command word are set to "1" during a group programming cycle.
2. Set if you try to use both motion detect ANDing on a single output.
3. When the module is used in group mode, this bit is set if you attempt to program a limit switch that has not been assigned to a group.

Word 15: Output Number where output programming error occurred, range of 1 to 16.

Word 16: Setpoint Number where output programming error occurred, range of 1 to 8

Words 17 to 19: Reserved, set to zero

Output Registers

The NX3A1P module is programmed through 40 output registers. Because of the amount of data that is be required to totally program the module, and to limit the number of words transferred over Profibus, five different programming blocks are used to program the module. Output register 0 always has the same function, and the function of registers 1 to 39 will vary depending on the data contained in word 0. Because of this programming method, a maximum of 10 programming cycles will be required to completely program the module. The following table outlines the five programming blocks.

Programming Block	Function
Setup	Count Direction, Tachometer Response, Module type, Transducer Fault Latch, Transducer Input Type, Scale Factor, Preset Value, Motion Detect Values, and Input Active State.
Group	Number of outputs assigned to group, group mode, group channel on and off setpoints, group preset/offset value. All six groups are programmed with one cycle.
Output	Limit switch type, ANDing type, on/off advances, 8 on/off setpoints. Two outputs can be programmed with each programming cycle, requiring 8 programming cycles to program all 16 outputs.
Increment / Decrement	Select increment/decrement type, limit switch to be adjusted, and setpoint to be adjusted. Only one output can be changed with each programming cycle.
Force	Force outputs and inputs on or off. Sending this programming block places the module in a "Force Mode" in which any changes to the appropriate output registers will be acted on without a programming cycle.

Word 0: Control Word (This Command word will be used to program all of the programming blocks. Setting more than one of the bits 0 to 4, or setting bits 5 to 12 during a programming cycle will generate a command error, Input register 0, bit 12)

Bit 0: Apply Preset Value to Machine Position
Bit 1: Program Setup
Bit 2: Program Groups
Bit 3: Program Outputs
Bit 4: Program Increment / Decrement Function
Bit 5: Place Output Registers in Force mode
Bits 6 to 12: Reserved, must be equal to zero
Bit 13: Set to disable all outputs, reset to enable all outputs (This parameter is not saved on power down, and can be set with other command bits.)
Bit 14: Clear Errors
Bit 15: Transmit Bit (When programming the NX3A1P, the Transmit Bit must be set when sending the Control Word to the unit. Do not send the Control Word in one rung or branch and set the transmit bit in another.)

Note: If the PLC is powered, and the transmit bit is set when the Nexus unit is powered up, then the Nexus unit will act on any valid data contained in the output registers. If the PLC is powered up with the transmit bit on, then the Nexus unit will ignore any valid data in the output registers.

Setup Programming Block, Words 1 to 39

Note: Programming the Setup Data clears both the Group and Output Programming.

Word 1: Bit level Setup Functions
- Bit 0: Count Direction (0 = increasing CW, 1 = increasing CCW)
- Bit 1: Tachometer Response (0 = 504ms, 1 =120ms update time. The update time applies to the tachometer data reported over Profibus, and the ON/OFF status of the motion detectors.)
- Bit 2: Module Type (0 = Independent Mode, 1 = Group Mode)
- Bit 3: Reserved, must be set to zero.
- Bit 4: Transducer fault latch (0 = fault latched, 1 = fault cleared. Default value is latched)
- Bit 5: Resolver Type (0 = AMCI, 1 = Autotech, default is AMCI)
- Bit 6: Reserved, must be set to zero.
- Bit 7: Reset to disable the outputs when there is no network connection. Set to have the outputs remain enabled when there is no network connection. If set, the outputs will turn on and off based on the resolver's position. Please note that forced outputs are always disabled when the network connection is removed, regardless of the state of this bit.
- Bits 8 to 15: Reserved, must be equal to zero

Word 2: Scale Factor (2 to 8192)
Word 3: Preset Value (0 to (SF-1))
Word 4: Motion Detect 1 Low RPM (0 to 32,767)
Word 5: Motion Detect 1 High RPM (0 to 32,767)
Word 6: Motion Detect 2 Low RPM (0 to 32,767)
Word 7: Motion Detect 2 High RPM (0 to 32,767)
Word 8: Real Input Active State. Reset if the input is active low, set if the input is active high. (bit 0 = input 1, bit 1 = input 2, … bit 15 = input 3)
Word 9: Tachometer Multiplier (0 to 1100)
Word 10: Tachometer Divisor (0 to 63, 0 only if Tachometer Multiplier is 0)
Word 11: Tachometer Decimal Point (0 to 3)
Word 12: Reference Voltage Setting Word. This word is valid only when both a test MS-8 connector is present and a jumper strap is installed on JP3 and at power up. The default value is about 7000, which will produce a reference voltage of about 3.09Vrms. This word has a range of 4640 to 8190.
Words 13 to 39: Not used. These words should be "don't cares."

Group Programming Block, Words 1 to 39

Note: Programming the Group Setup clears the output programming

The setup programming bits of all six groups has the following layout:

Bit(s)	Function
0 to 5	The number of limit switch outputs in the group, range of 1 to 16
6 and 7	Reserved, must be reset to zero
8 to 10	The mode used in the group, range of 0 to 6
11 to 14	Reserved, must be reset to zero
15	set when the group is to be used, reset if the group is to be disabled

Word 1: Group 1setup programming bits
Word 2: Group 1 Channel On Point
Word 3: Group 1 Channel Off Point
Word 4: Group 1 Offset or Preset Value (mode dependent)
Word 5: Group 2 setup programming bits
Word 6: Group 2 Channel On Point
Word 7: Group 2 Channel Off Point
Word 8: Group 2 Offset or Preset Value (mode dependent)
Word 9: Group 3 setup programming bits
Word 10: Group 3 Channel On Point
Word 11: Group 3 Channel Off Point
Word 12: Group 3 Offset or Preset Value (mode dependent)
Word 13: Group 4 setup programming bits
Word 14: Group 4 Channel On Point
Word 15: Group 4 Channel Off Point
Word 16: Group 4 Offset or Preset Value (mode dependent)
Word 17: Group 5 setup programming bits
Word 18: Group 5 Channel On Point
Word 19: Group 5 Channel Off Point
Word 20: Group 5 Offset or Preset Value (mode dependent)
Word 21: Group 6 setup programming bits
Word 22: Group 6 Channel On Point
Word 23: Group 6 Channel Off Point
Word 24: Group 6 Offset or Preset Value (mode dependent)
Words 25 to 39: Not used. These words should be “don’t cares.”

Output Programming Block, Words 1 to 39

Word 1: Outputs programmed. This word controls which two outputs are programmed in output registers 2 to 39. Each bit in this word corresponds to an output, that is bit 0 = output 1, bit 1 = output 2, … bit 15 = output 16. Any two bits can be set during an output programming cycle. The output assigned to the least significant bit of the two will be programmed in words 2 through 20. The most significant bit of the two will be programmed in words 21 through 39. If only one bit is set, only registers 2 through 20 will be used, and the data in words 21 through 39 will be ignored. Setting more than two bits will generate an Output Quantity Error, which is indicated by input word 14, bit 6. Any errors in the output programming data will cause even valid changes to be ignored.

The two output setup words have the following format:

bits 0 → 1: output type

Bit 1	Bit 0	Function
0	0	Output not used
0	1	Pulse Output
1	0	Timed Output (Starts timing only after the input is active. This does not include the group mode enable bit.)
1	1	Normal Output

bits 2 → 12: not used
bits 13 → 14: motion ANDing control bits

Bit 14	Bit 13	Function
0	0	No Motion ANDing
0	1	Motion ANDing 1
1	0	Motion ANDing 2
1	1	Reserved for future use

Note: The operation of motion ANDing function includes the Low Value setpoint, but not the High Value setpoint. That is, an output that is motion ANDed will turn on at the Low Value, and off when the High Value setpoint is reached.

bit 15: In group mode only, this bit is set for Output Enable ANDing (by input) and reset for no ANDing. In group mode, enable ANDed timed outputs start timing regardless of the state of the enable input. This bit is a "don't care" in independent mode.

Word 2: Lower output setup bits
Word 3: Lower output ON advance/retard value, entered in 0.1ms increments. Range of ±99.9ms.
Word 4: Lower output OFF advance/retard value, entered in 0.1ms increments. Range of ±99.9ms.

Word 5: Lower Output, Normal Output On setpoint 1
Timed Output On Setpoint 1
Pulsed Output On position of leading edge of first pulse
Word 6: Lower Output, Normal Output Off setpoint 1
Timed Output Off setpoint 1
Pulsed Output Off position of trailing edge of final pulse
Word 7: Lower Output, Normal Output On setpoint 2
Timed Output, length of time in ms, range of 1 to 9999ms
Pulsed Output, total number of pulses
Word 8: Lower Output, Normal Output, Output 1 Off setpoint 2
Pulsed Output, the duration of each pulse (the ON time)
Word 9: Lower Output, On setpoint 3
Word 10: Lower Output, Off setpoint 3
Word 11: Lower Output, On setpoint 4
Word 12: Lower Output, Off setpoint 4
Word 13: Lower Output, On setpoint 5
Word 14: Lower Output, Off setpoint 5
Word 15: Lower Output, On setpoint 6
Word 16: Lower Output, Off setpoint 6
Word 17: Lower Output, On setpoint 7
Word 18: Lower Output, Off setpoint 7
Word 19: Lower Output, On setpoint 8
Word 20: Lower Output, Off setpoint 8
Word 21: Upper output setup bits
Word 22: Upper output ON advance/retard value, entered in 0.1ms increments. Range of ±99.9ms.
Word 23: Upper output OFF advance/retard value, entered in 0.1ms increments. Range of ±99.9ms.
Word 24: Upper Output, Normal Output On setpoint 1
Timed Output On Setpoint 1
Pulsed Output On position of leading edge of first pulse
Word 25: Upper Output, Normal Output Off setpoint 1
Timed Output Off setpoint 1
Pulsed Output Off position of trailing edge of final pulse
Word 26: Upper Output, Normal Output On setpoint 2
Timed Output, length of time in ms, range of 1 to 9999ms
Pulsed Output, total number of pulses
Word 27: Upper Output, Normal Output, Output 1 Off setpoint 2
Pulsed Output, the duration of each pulse (the ON time)
Word 28: Upper Output, On setpoint 3
Word 29: Upper Output, Off setpoint 3
Word 30: Upper Output, On setpoint 4
Word 31: Upper Output, Off setpoint 4
Word 32: Upper Output, On setpoint 5
Word 33: Upper Output, Off setpoint 5
Word 34: Upper Output, On setpoint 6
Word 35: Upper Output, Off setpoint 6
Word 36: Upper Output, On setpoint 7
Word 37: Upper Output, Off setpoint 7
Word 38: Upper Output, On setpoint 8

Word 39: Upper Output, Off setpoint 8

Note 1: Output words 8 to 39 are "don't cares" if the output is being programmed as a timed output.
Note 2: Output words 9 to 39 are "don't cares" if the output is being programmed as a pulsed output.
Note 3: Unused normal on/off setpoints should be set to zero.

Increment / Decrement Programming Block, Words 1 to 39

Word 1: control bits
Bit 0: set to change on setpoint
Bit 1: set to change off setpoint
Bit 2: reset to increment setpoint, set to decrement setpoint
Bits 3 to 15: reserved, must be reset to zero
Word 2: Increment/Decrement Limit Switch Number (range 1 to 16)
Word 3: Increment/Decrement Setpoint Number (range 1 to 9) (if the value equals 9, than all of the on/off setpoints will be incremented or decremented.)
Words 4 to 39: Not used. These words should be "don't cares.

Note: The Increment/Decrement function cannot be used on outputs that have not been programmed.

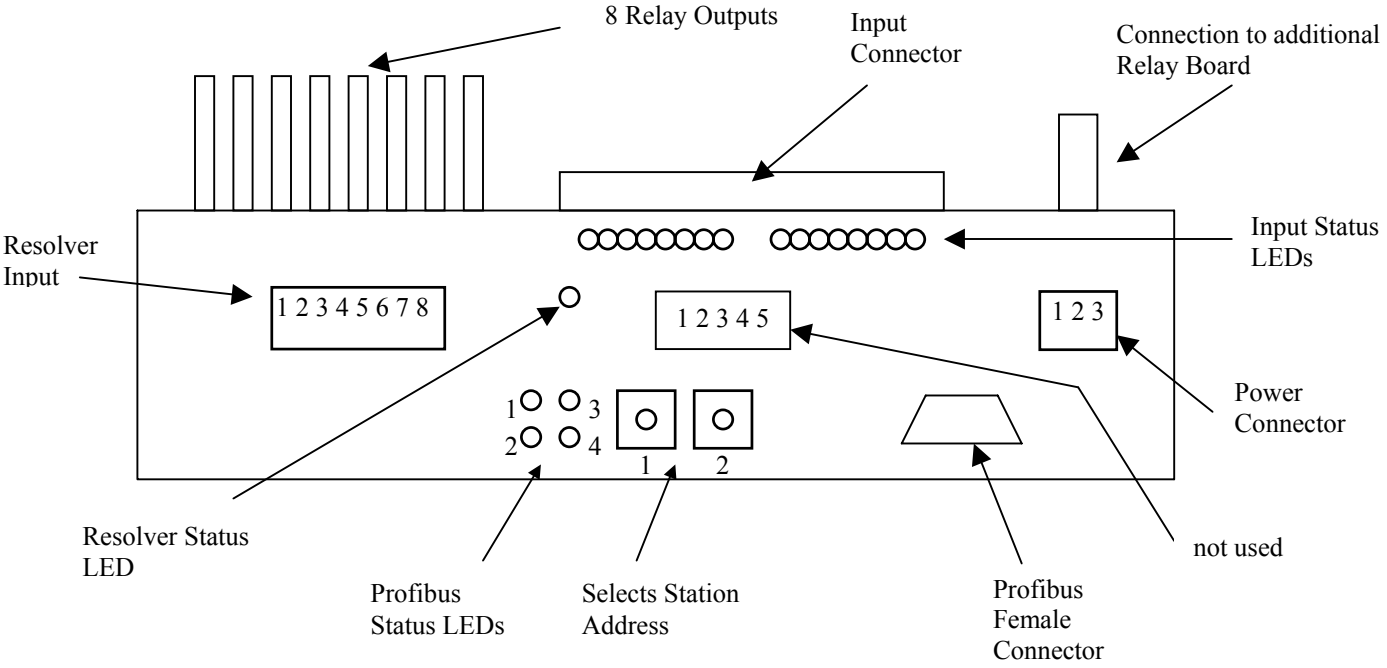
Force Function Programming Block, Words 1 to 39

The force function works differently than the other programming blocks. Once the output registers are in force mode, any changes to the data will be acted on immediately. That is it will not be necessary to use a programming cycle to change the force values. Input register 0, bit 11 will be set to indicate that the module is in force mode.

Word 1: Force Outputs On
Word 2: Force Outputs Off
Word 3: Force Inputs On
Word 4: Force Inputs Off
Words 5 to 39: Not used, should be considered "don't cares."

Note 1: Force Off takes priority over Force On.
Note 2: It is not necessary to program the outputs before the force will take affect.
Note 3: Cycling power to the unit takes the module out of force mode.
Note 4: Transmitting any of the other programming blocks to the Nexus takes the unit out of force mode.
Note 5: Outputs that have been forced on will remain on even if the unit is in transducer fault.

Nexus Hardware Overview



Dimension: Length = 10 inches
Width = 4.5 inches
Height = 4.75 inches (including relays)

Notes:

1. The ribbon cable from the NX3A1P must be plugged into the CN2 connector of the additional relay board.
2. The additional relay board does not require any external power connections
3. If they exist, the inputs on the relay board do not have any function.

Resolver Connectors

Pin Number	Single Turn Function
1	R1
2	R2
3	Shields
4	S1 & S2
5	S4
6	S3
7	no connection
8	no connection

Resolver Status LED

LED Pattern	Function
solid green	Resolver OK
flashing green	Clearable Transducer Fault
flashing red	Non Clearable Transducer Fault
solid red	Module Fault
Alternating Red and Green	Nexus is not communicating with network interface card

Input Status LEDs

The Nexus unit has 16 inputs that are divided into two groups, each with its own common. Depending on what is connected to the common, the inputs can be either sinking or sourcing.

Common Connection	Input Type	LED color when input active
Ground	sinking	Red
+DC voltage	sourcing	Green

Input Function

In Independent Mode, each input is anded with each output. That is, input 1is anded with output 1, input 2 is anded with output 2 … input 16 is anded with output 16. In group mode, the inputs have the following functions.

Input	Function
1	Group 1 Control
2	Group 2 Control
3	Group 3 Control
4	Group 4 Control
5	Group 5 Control
6	Group 6 Control
7	Limit Switch Enable Input
8	First Cycle Input
9 to 16	not used in group mode

Power Requirements

Power Connector

Pin	Function
1	10 to 30Vdc
2	DC Common
3	Chassis Ground

The Nexus Module requires exactly 200mA @24Vdc to operate. If the reference voltage pins are shorted together, the unit will draw 300mA @24Vdc.

The Chassis Ground pin is connected to the NX3A1P's body and must be connected to your Earth Ground bus for proper module operation.

Even though the unit will operate within a voltage range of 10 to 30Vdc, it is recommended that the unit be powered with a supply that is within the operating range of the relays. The Opto 22 ODC24 relays have an operating range of 18 to 30Vdc.

Profibus Connector

The Nexus module uses a 9 pin female D-sub connector to communicate with the Profibus network.

Station Address Selection

The Nexus module has two rotary switches used to set the module's address on the network. Any station from 0 to 99 can be selected. Switch 1 sets the one digit and switch 2 sets the 10s digit of the address. For example, if the Nexus is to be installed at station 46, switch 1 would be set to 6, and switch 2 would be set to 4. Note, changing the station address only takes affect at power up. Changing the address while power is applied to the Nexus module will generate a minor fault.

Profibus Status LEDs

The following table describes the function of the four network status LEDs.

LED Number	LED Pattern	Function
1	Red Off	Module is Offline and no data exchange is possible The module is Online
2	Green Off	Module is Online and data exchange is possible The module is Off line
3	Flashing Red 1Hz Flashing Red 2Hz Flashing Red 4Hz Off	Error in configuration: IN and/or OUT length set during initialization of the module is not equal to the length set during the configuration of the network Error in User Parameter data: The length/contents of the user parameter data set during initialization of the module is not equal to the length/contents set during configuration of the network. Error in initialization of the Profibus communication ASIC. No diagnostic present
4	Off	Not Used

Throughput Time

The NX3A1P has a typical throughput time of 100µs from input to output. The maximum throughput time from input to output is 200µs. Also, the minimum on and off time for an output is 200µs.

Network Baud Rate

The NX3A1P supports the following network baud rates

9.6 kbits/sec, 19.2 kbits/sec, 93.75 kbits/sec, 187.5 kbits/sec, 500 kbits/sec, 1.5 Mbits/sec, 3 Mbits/sec, 6 Mbits/sec, and 12 Mbits/sec

Revision History

Version 0.0 was released on 9/17/01 and was the initial release of the specifications.

Quick Start Guide
AMCI Nexus to SST-PFB-SLC Profibus interface module

1. If it is not already present, install the SST-PFB-SLC module in the SLC rack and configure the rack (the ID code is 13635) for the module.
2. Place the PLC in program mode.
3. Connect a serial cable from the computer's COM port to the RS232 port of the SST-PFB-SLC module.
4. With the power off, use the rotary switches on the Nexus unit to select the desired station address. The left switch sets the 1s digit and the right switch sets the 10s digit of the station address.
5. Attach the Nexus unit to the Profibus network.
6. Apply power to the Nexus unit.
7. Start the SST Profibus Configuration software. (Current Version 1.9)
8. Either create a new or open an existing network.
9. If it has not already present, register the Nexus units GSD file.

   Click on Library in the toolbar and then select Add GSD file. Choose the directory where the GSD file is located, and then select the AnyBPRfB file.

   When registered this module will appear under Slaves as:

   HMS Fieldbus Systems AB
   ANYBUS-S PDP

10. If SST-PBF-SLC module is not already present, click on Masters. Click and drag the Master (Rev 1.4) into the network. Right click on it and configure it according to your system's requirements.
11. Under slaves, click and drag the ANYBUS-S PDP module into the network. The setup window will appear.

    - Under the **General** tab, set the station number to match the station number set by the rotary switches on the Nexus unit.
    - Click on the **Modules** tab and then click on Add. The NX3A1C must be set for 20 input words and 40 output words. If a different number of words is programmed, Network LED 3 will flash indicating an Error in Configuration. The input words can be located in either the Input Image table or in the M1 file, however, all 20 input

words must be located in one file. The 40 output words must be located in the M0 file.
- Click on Input 32 Byte (16 word) and then on OK.
- Click on the **SLC Address** tab and then select the Input Type, either I or M1, and the offset value, that is where in the I or M1 table the data begins. It is important not to leave gaps between an existing Profibus module and the data used by the Nexus unit.
- Again click on the **Modules** tab and click on Add.
- Click on Input 8 Byte (4 word) and then on OK.
- Click on the **SLC Address** tab and then select the Input Type to be the same as was selected above. Set the offset value to the value assigned to the value assigned above plus 16.
- Again click on the **Modules** tab and click on Add.
- Click on Output 64 Byte (32 word) and then on OK.
- Click on the **SLC Address** tab and then select the Output Type to be M0 and then select an offset value. As before, it is important not to leave gaps between an existing Profibus module and the data used by the Nexus unit.
- Again click on the **Modules** tab and click on Add.
- Click on Output 16 Byte (8 word) and then on OK.
- Click on the **SLC Address** tab and then select the Output Type to be M0. Set the offset value to the value assigned to the 64 Byte plus 32.
- Click on OK to accept.

12. Save the network file.
13. Right click on the Master Module and select Connect from the menu that appears.
14. Click on Yes if asked to retain the configuration.
15. Again right click on the Master Module and then select Load Configuration from the menu that appears.
16. Place the PLC in Run mode.

File: nx3a1p_rev_0.1
Date: 4/1/04