



## Bulletin 1203-GU6 / 1336-GM6

### Drive Synchronization using Peer I/O

APPLICATION NOTE

March 1, 1999

#### **Purpose**

The purpose of this document is to provide guidelines for wiring and control schemes for SCANport devices. This document is a suggestion only. Users must ensure that installations meet applicable codes and are suitable for the existing conditions.

#### **What This Note Contains**

This document contains information and an example ladder program that demonstrates how to use the Peer I/O function of the 1203-GU6 / 1336-GM6 Enhanced DeviceNet to SCANport module to control multiple slave drives from a master drive. This function can be used with or without a DeviceNet scanner present on the network.

#### **Intended Audience**

This application note should be used by personnel familiar with the hardware components and programming procedures necessary to operate SCANport devices. It is also assumed that the user has some familiarity with DeviceNet and DeviceNet scanners.

#### **Where It Is Used**

The diagrams, parameter settings and auxiliary hardware used in this application note are designed to address specific issues in many different applications. Some changes by the user may be necessary to apply the concepts of this document to a specific application.

#### **Application Considerations**

These examples are intended to be simple and clear. They may not perform all the required functions of a particular application. Consult the product manuals for more information.

As with any networked drive application, a hardwired stop circuit should be provided.

#### **Definitions**

Gx6	A 1203-GU6 or 1336-GM6 Enhanced DeviceNet to SCANport module. The GU6 includes a serial port that is not present on the GM6.
Peer I/O	A method provided in the Gx6 for sending and receiving I/O information between Gx6 modules.
Master Adapter	An adapter configured to send Peer I/O out onto DeviceNet. (Note that a Master Adapter can also be a Slave Adapter.)
Slave Adapter	An adapter configured to receive Peer I/O from a Master Adapter. (Note that a Slave Adapter can also be a Master Adapter.)



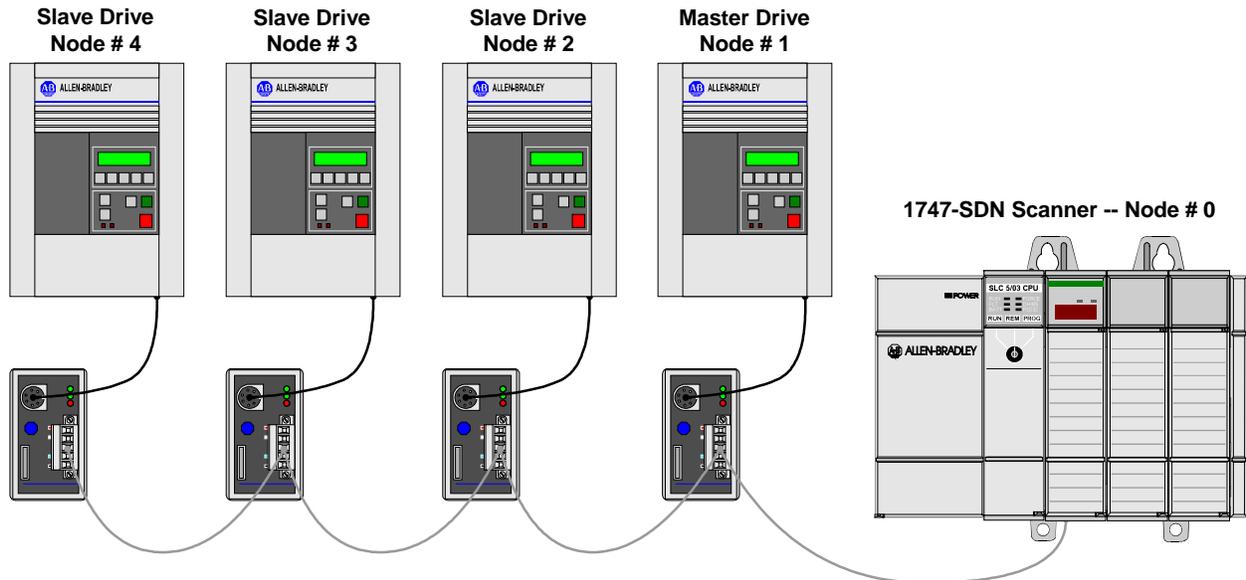
## EXAMPLES

### ***Network #1 – Peer I/O and a DeviceNet Scanner***

In this example, one drive is controlled by the SLC-5/03 via a 1747-SDN Scanner module. The adapter on that drive broadcasts the I/O information from the scanner to the other three drives. Those drives may optionally be configured to send their I/O status information to the scanner via the scanner's Cyclic, COS, or Polled I/O methods.

If each adapter received the Logic Command and Reference from the scanner individually, there would be a Polled I/O control message from the scanner to each adapter each scan cycle – a total of four messages in this example.

Using Peer I/O to broadcast the Logic Command and Reference to the slave drives results in two control I/O messages each scan cycle regardless of the number of drives. This synchronizes the drives more closely and uses less DeviceNet bandwidth. The slave adapters can independently scale the Reference to be from 0% to 200% of the Reference broadcast by the master.



### ***Master Adapter Configuration***

Configure the 1747-SDN to map the I/O of one drive as would normally be done. The adapter on that drive is then configured to broadcast the I/O over a Peer I/O connection to the other three adapters. The parameter list below shows the required configuration for the master adapter:

38	Peer A Output	Cmd/Ref	41	Peer Out Time	1.00 Sec
39	Peer B Output	Off	42	Peer Out Skip	1
40	Peer Out Enable	On			

This configuration sets up the master Gx6 to send the Logic Command and Reference it receives from the scanner back out onto the network at one second intervals on its Peer A Output connection. Faster (or slower) update times can be implemented by adjusting parameters 41 (Peer Out Time) and 42 (Peer Out Skip).



Parameter 38 (Peer A Output) is configured to broadcast the Logic Command and Reference from the scanner out over the Peer I/O channel A.

Parameter 39 (Peer B Output) is configured to disable Peer I/O channel B. This channel could be used to transfer parameter values using datalinks.

Parameter 40 (Peer Out Enable) is configured to enable Peer I/O. This parameter must be set to "Off" during configuration of the Peer I/O Output parameters. The parameter is then set to "On" to enable operation.

Parameters 41 (Peer Out Time) and 42 (Peer Out Skip) control how often the adapter will broadcast the peer output data.

### Slave Adapter Configuration

The slave adapters are configured to receive the data broadcast on Peer I/O channel A and use it as Logic Command and Reference. The parameter list below shows the configuration of the slave adapters that receive the Logic Command and Reference from the master adapter.

24	M-S Input	xxx0 0000	32	Peer Ref Adjust	100.00 %
25	M-S Output	xxx0 0001	33	Peer Flt Action	Fault
29	Peer A Input	Cmd/Ref	34	Peer Node to Inp	1
30	Peer B Input	Off	35	Peer Inp Timeout	10.00 Sec
31	Peer Cmd Mask	1111 1111 1111 1111	36	Peer Inp Enable	On

Parameter 24 (M-S Input) determines if the adapter expects to receive I/O data from a scanner. In this example, the value of 0 in Bit 0 indicates that the adapter will not receive the Logic Command and Reference from the scanner.

Parameter 25 (M-S Output) is set to enable the Logic Status and Feedback to the M-S Output so that it is available for use by the I/O method configured in the scanner. If the scanner will not be reading the status information from the product, the setting of this parameter is not important.

Parameter 29 (Peer A Input) controls the destination of the data received on the Peer A Input connection. In this example, the adapter will use this input for the Logic Command and Reference to the drive.

Parameter 30 (Peer B Input) is not used in this example. It could be used to transfer parameter values to the drive via datalinks.

Parameter 31 (Peer Cmd Mask) controls which bits from the master adapter are used as the Logic Command to the attached SCANport product (the drive in this example). If a bit in the Peer Cmd Mask is a one, the bit in the data from the master adapter will be used. If a bit in the Peer Cmd Mask is a zero, the bit in the Logic Command will be a zero.

Parameter 32 (Peer Ref Adjust) controls the scaling of the Reference from the master adapter. This scale factor can range from 0% to 200%.

Parameter 33 (Peer Flt Action) controls the action taken when the Peer I/O times out. In this example, a Peer I/O Timeout will cause the drive to fault.

Parameter 34 (Peer Node to Inp) sets the node address that the Gx6 will connect to for Peer I/O. In this example, the node acting as the master for Peer I/O is node address 1.

Parameter 35 (Peer Inp Timeout) controls how long the Gx6 will wait for a Peer I/O packet to be received before taking the action configured in Parameter 33 (Peer Fault Action). In this example, the Gx6 will wait for 10.00 seconds before faulting the drive.

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Parameter 36 (Peer Inp Enable) determines if the Gx6 will attempt to connect to receive Peer I/O. During configuration of the adapter, this parameter must be set to "Off". This parameter is set to "On" to enable Peer I/O operation.

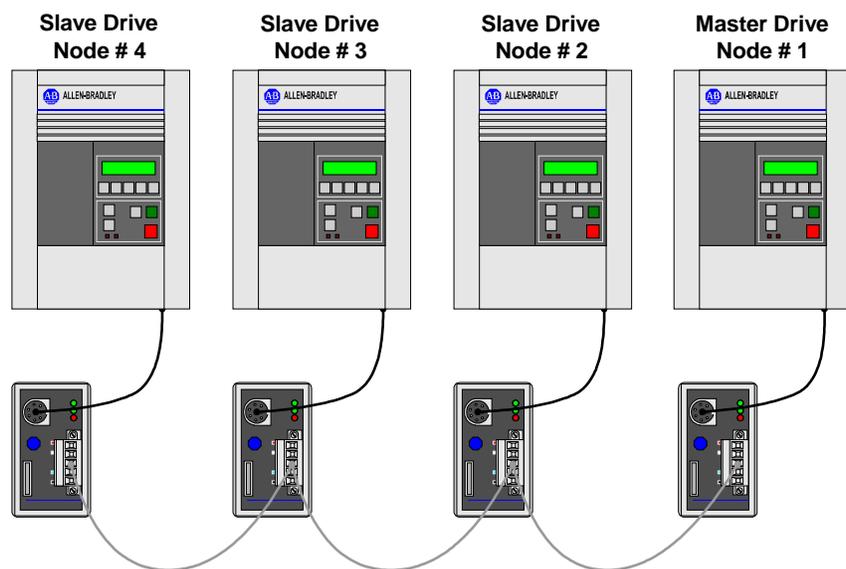
### Network #2 – Peer I/O Only

In this example, no scanner is used. A 1336 IMPACT drive acts as a master and the other drives act as slaves. The master adapter (on the 1336 IMPACT) is configured to send datalink parameter data from the 1336 IMPACT to the slave adapters. The slave adapters then use this data as the Logic Command and Reference inputs to their drives.

The 1336 IMPACT is the only drive that contains a parameter showing the final Logic Command that is derived from all logic inputs. As a result, the 1336 IMPACT is the only drive that can be used as a master in applications that require the master to provide the Logic Command to the slaves.

If the master drive is to send a reference only (Start / Stop control handled through hardware), nearly any SCANport drive can be used as most drives have a parameter containing the final speed or frequency reference to be applied.

In this example, the master drive will provide the Logic Command and Reference to the slave drives. The drive at node 1 is a 1336 IMPACT drive and the other three drives are 1336 PLUS drives.



### **Master Adapter Configuration**

The master adapter is configured to send parameter data from Datalink A over a Peer I/O connection to the three slave adapters. The parameter list below shows the required configuration:

38	Peer A Output	DL A Output	41	Peer Out Time	1.00 Sec
39	Peer B Output	Off	42	Peer Out Skip	1
40	Peer Out Enable	On			

This configuration sets up the Gx6 to send the parameter data it receives from the drive on Datalink A out onto the network at one second intervals on its Peer A Output.



The 1336 IMPACT drive must link parameter number 148 (Data Out A1) to parameter number 14 (Logic Input Sts) and parameter number 149 (Data Out A2) to parameter number 63 (Scaled Spd Fdbk). The master adapter will then send the values of these two parameters to the slave adapters on the Peer A Output.

If the slave drives were 1336 IMPACT drives, the reference could be obtained directly from parameter number 82 (Command Spd Sts). Because the slave drives in this example are 1336PLUS drives, parameter number 82 can not be used. Parameter number 82 in a 1336 IMPACT drive is scaled as 4096 equals motor base speed while the 1336 PLUS drives require a reference scaled as 32767 equals maximum motor speed. Using parameter number 63 (Scaled Spd Fdbk) allows the 1336 IMPACT drive to be configured to scale the value to be used as the reference to the slave drives. It also results in the slave drives following the actual speed of the motor instead of the reference to the master drive.

### **Slave Adapter Configuration**

The slave adapters are configured to receive the Peer I/O data from the master adapter and use it as Logic Command and Reference to their attached drives. The parameter list below shows the required configuration of the slave adapters:

24	M-S Input	xxx0 0000	32	Peer Ref Adjust	100.00 %
25	M-S Output	xxx0 0001	33	Peer Flt Action	Fault
29	Peer A Input	Cmd/Ref	34	Peer Node to Inp	1
30	Peer B Input	Off	35	Peer Inp Timeout	10.00 Sec
31	Peer Cmd Mask	0000 0000 0011 1011	36	Peer Inp Enable	On

Parameter 24 (M-S Input) is set to disable the Cmd/Ref from the Master-Slave Input so that the module can receive its Cmd/Ref from another module instead of the scanner.

Since there is no scanner on this network, the setting of parameter 25 (M-S Output) is not important.

Parameter 29 (Peer A Input) controls the destination of the data received on the Peer A Input connection. In this example, this input will be used as the Logic Command and Reference for the drive.

Parameter 30 (Peer B Input) is not used in this example. It could be used to transfer parameter values to the drive via datalinks.

Parameter 31 (Peer Cmd Mask) controls which bits from the other Gx6 module are used as the Logic Command to the attached SCANport product (the drive in this example). In this example, the mask is set to allow the 1336 IMPACT drive to control the Stop (Bit 0), Start (Bit 1), Clear Faults (Bit 3), Forward (Bit 4), and Reverse (Bit 5) functions of the slave drive.

Parameter 32 (Peer Ref Adjust) controls the scaling of the Reference from the other Gx6 module. In this example, the Reference value will pass through without being scaled.

Parameter 33 (Peer Flt Action) controls the action taken when the Peer I/O times out. In this example, a Peer I/O Timeout will cause the drive to fault.

Parameter 34 (Peer Node to Inp) sets the node address that the Gx6 will connect to for Peer I/O. In this example, the node acting as the master for Peer I/O is node address 2.

Parameter 35 (Peer Inp Timeout) controls how long the Gx6 will wait for a Peer I/O packet to be received before taking the action configured in Parameter 33 (Peer Fault Action). In this example, the Gx6 will wait for 10.00 seconds before taking the Peer Fault Action.

Parameter 36 (Peer Inp Enable) determines if the Gx6 will attempt to connect to receive Peer I/O. During configuration of the module, this parameter must be set to "Off". During operation, this parameter must be set to "On".

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