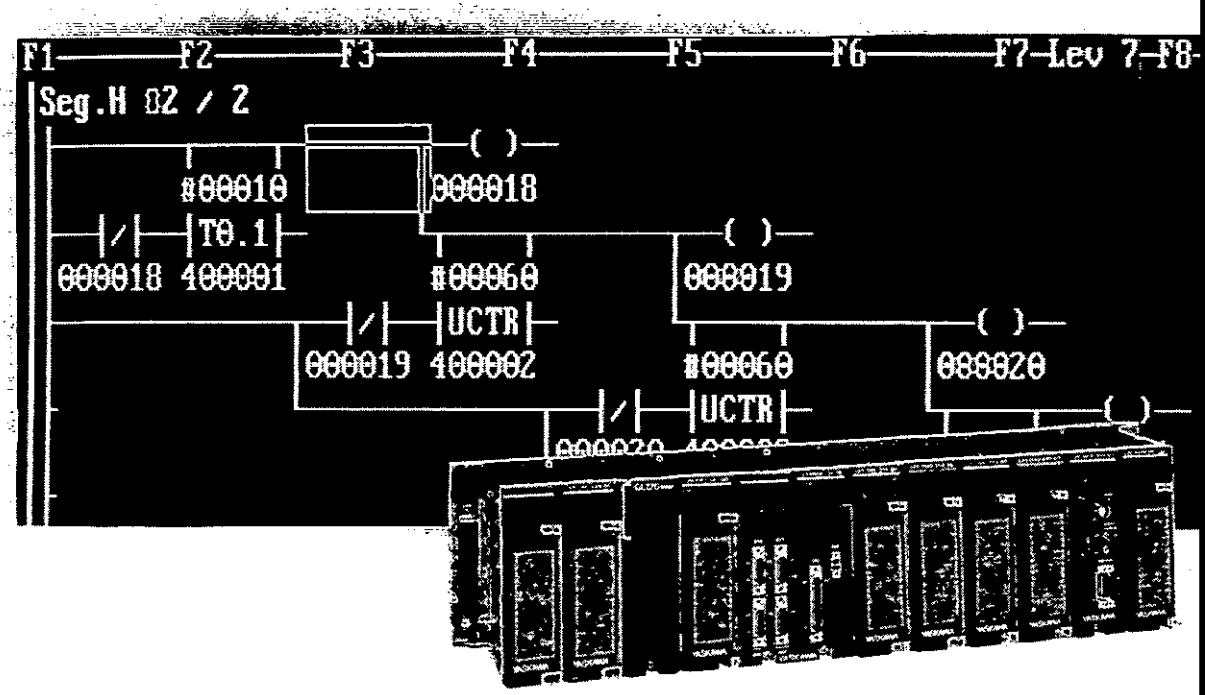
MEMOCON GL120,GL130

YENET 1600-D MODULE

USER'S MANUAL



YASKAWA

MANUAL NO. SIEZ-C825-70.20

Manual Contents

This manual describes specifications and applications of the YENET 1600-D Module for use with GL120 and GL130 PLCs.

Please read this manual carefully and be sure you understand the information provided before attempting to install or use the YENET 1600-D Module.

Visual Aids

The following aids are used to indicate certain types of information for easier reference.

Indicates references for additional information.

IMPORTANT — Indicates important information that should be memorized.

◀EXAMPLE▶ — Indicates application examples.

Indicates supplemental information.

◗SUMMARY — Indicates a summary of the important points of explanations.

Note — Indicates inputs, operations, and other information required for correct operation but that will not cause damage to the device.

Indicates definitions of terms used in the manual.

NOTICE

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in injury to people or damage to the products.

⚠**WARNING** Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.

⚠**Caution** Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

CONTENTS

CONTENTS

Introduction and Precautions

This chapter introduces general information, including basic information and precautions for the use of this manual and the YENET 1600-D Module. **You must read this chapter before attempting to read the rest of the manual or using the product.**

I.1 Overview

- This manual describes the functions and specifications of the YENET 1600-D Module used with the MEMOCON GL120 and GL130 PLCs.

- Read this manual carefully to ensure the proper use of the YENET 1600-D Module. Also, keep this manual in a safe place so that it can be referred to whenever necessary.

- Refer to the following manuals for related Peripheral Devices and Modules.

Manual	Manual number	Contents
MEMOCON GL120, GL130 Hardware User's Manual	SIEZ-C825-20.1	Describes the system configuration, system components, functions, specifications, installation, wiring, and external appearance of the GL120 and GL130.
MEMOCON GL120, GL130 Software User's Manual, Volume 1	SIEZ-C825-20.11	Describes the operating principles, I/O allocations, programming instructions, processing times, and other basic software information for the GL120 and GL130.
MEMOCON Micro, GL120, GL130 MEMOSOFT for DOS User's Manual	SIEZ-C825-60.10	Describes the features and operating procedures of the DOS version of MEMOSOFT.

- Thoroughly check the specifications and conditions, or restrictions of the product before use.

I.2 Precautions

This section outlines general precautions that apply to using this manual and the product.
You must read this section first before reading the remainder of the manual.

I.2.1 Safety Precautions

- The GL120 and GL130 were not designed or manufactured for use in devices or systems directly related to human life. Users who intend to use the product described in this manual for special purposes such as devices or systems relating to transportation, medical, space aviation, atomic power control, or underwater use must contact Yaskawa Electric Corporation beforehand.

- This product has been manufactured under strict quality control guidelines. However, if this product is to be installed in any location in which the failure of GL120 and GL130 involves a life and death situation or in a facility where failure may cause a serious accident, safety devices MUST be installed to minimize the likelihood of any accident.

- Any illustrations, photographs, or examples used in this manual are provided as examples only and may not apply to all products to which this manual is applicable.

- The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual. A new version of the manual will be released under a revised manual number when any changes are made.

- Contact your Yaskawa representative or a Yaskawa office listed on the back of this manual to order a new manual whenever this manual is damaged or lost. Please provide the manual number listed on the front cover of this manual when ordering.

- Contact your Yaskawa representative or a Yaskawa office listed on the back of this manual to order new nameplates whenever a nameplate becomes worn or damaged.

- Yaskawa cannot guarantee the quality of any products which have been modified. Yaskawa assumes no responsibility for any injury or damage caused by a modified product.

I.2.2 Installation Precautions

Abide by the following precautions when installing GL120 and GL130 systems.

⚠ **Caution** The installation environment must meet the environmental conditions given in the product catalog and manuals. Using the GL120, GL130, and YENET 1600-D Module in environments subject to high temperatures, high humidity, excessive dust, corrosive gases, vibration, or shock can lead to electrical shock, fire, or malfunction. Do not use the GL120, GL130, or YENET 1600-D Module in the following locations. See *1.1 YENET 1600-D Specifications.*

- Locations subject to direct sunlight, or ambient temperatures not between 0°C and 60°C.
- Locations subject to relative humidity in excess of 95%, or condensation due to rapid changes in temperature.
- Locations subject to corrosive or flammable gas.
- Locations that would subject the GL120 or GL130 to direct vibration or shock.
- Locations subject to contact with water, oil, chemicals, etc.

⚠ **Caution** Do not remove the covers of the connectors on the Mounting Base that are used for installing the Module.

Any foreign material that enters the connectors can cause a malfunction in the GL120 and GL130 PLCs.

I.2.3 Wiring Precautions

⚠ **Caution** Wiring must be performed by qualified personnel.

Incorrect wiring can cause fires, product failure, or malfunctions.

⚠ **Caution** Always connect a communications power supply that meets the given specifications.

Connecting an inappropriate communications power supply can cause damage and fires. The YENET 1600-D Module requires a communications power supply with a voltage of 22.8 to 26.4 VDC.

⚠ **Caution** Always make sure to use a transmission distance that meets the given specifications.

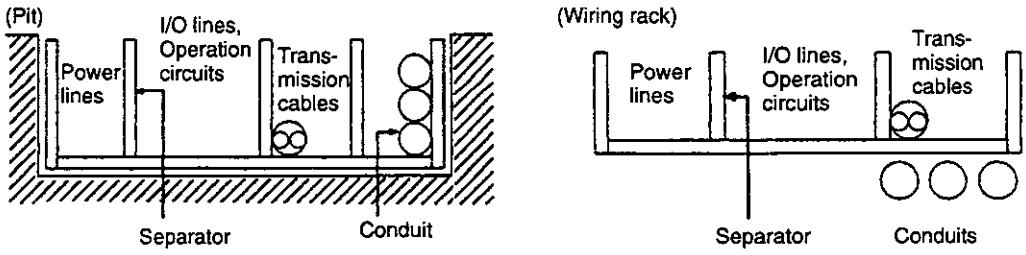
The transmission distance for the YENET 1600-D communications system is determined by the baud rate. A mistake in the system configuration can cause a malfunction in the YENET 1600-D communications system.

⚠ **Caution** Care must be taken not to let foreign matter, such as cable chips into the YENET 1600-D Module.

Foreign matter in the Module can cause fires, product failure, or malfunctions.

Select, Separate, and Lay External Cables Correctly

Transmission cables must be separated from power lines and high-voltage cables to minimize the effects of noise. Faulty operation may result if transmission cables are not sufficiently separated from power lines.



Control Electrical Noise

If noise is transmitted from the external power supply, install an isolation transformer or noise filter to prevent noise interference. Insufficient noise control for the power supply may result in the GL120 or GL130, or the personal computer, malfunctioning.

Never house the GL120/GL130 component devices on the same panel as high-voltage heavy-current circuits that have a voltage of more than 600 VAC or 750 VDC, or an amperage of more than 800 A.

If housing the GL120/GL130 component devices on the same panel as low-voltage main circuits, be sure to keep the devices and cables for low-voltage main circuits at a distance of at least 200 mm from the GL120/GL130 component devices and cables. Low-voltage main circuits have a voltage of less than 600 VAC or 750 VDC, and an amperage of more than 20 A.

The cables for the GL120/GL130 must not be bundled with the cables for general control circuits that have a voltage of 600 VAC or 750 VDC, and an amperage of less than 20 A.

I.2.4 Application Precautions

External Interlocks for the GL120 and GL130

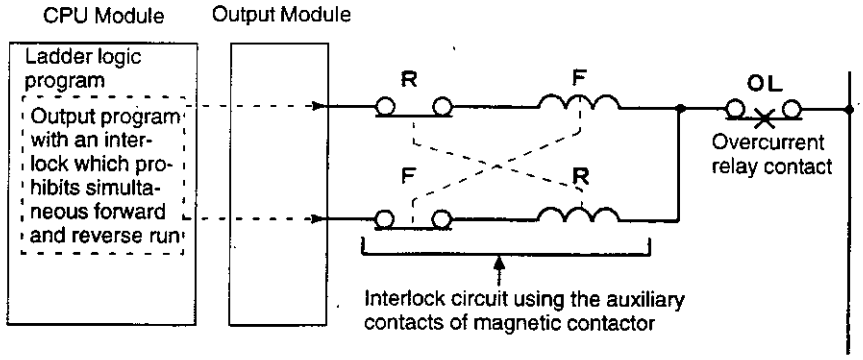
Externally connect an interlock to the GL120, GL130 or YENET 1600-D communications system if there is any chance that GL120, GL130, or YENET 1600-D communications system failure could result in bodily harm, or equipment and accessory damage.

⚠ **WARNING** Do not touch any Module terminals when the system power is ON.

There is a risk of electrical shock.

⚠ **WARNING** Externally connect an emergency stop circuit, interlock circuits, and other safety switches to the GL120, GL130, and YENET 1600-D communications system.

Otherwise, the GL120, or YENET 1600-D communications system can malfunction, thereby damaging the equipment or causing an accident.



⚠ **Caution** Operations such as RUN, STOP, forced output, program change, and hot-swapping during operation must be carried out with care.

Operational errors can damage the machine or cause accidents.

⚠ **Caution** The YENET 1600-D Module can be used only if the CPU Module and the MEMOSOFT used for the MEMOCON GL120, GL130 are of the versions shown in the following table.

Using the wrong versions may result in failure or malfunction.

Name	Description	Model	Applicable Version	Location of Version Indication
CPU Module (8 kW)	CPU10	DDSCR-120CPU14200	□□A01 or later	Nameplate of the Module (see note.)
CPU Module (16 kW)	CPU20	DDSCR-120CPU34100	□□B05 or later	
CPU Module (16 kW)	CPU21	DDSCR-120CPU34110	□□A01 or later	
CPU Module (32 kW)	CPU30	DDSCR-130CPU54100	□□B05 or later	
CPU Module (40 kW)	CPU35	DDSCR-130CPU54110	□□A01 or later	
Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR13100	□□A09 or later	
MEMOSOFT		FMSGL-AT3 (for DOS)	1.50□ or later	Bottom center of MEMOSOFT startup screen
		FMSGL-PP3E (for P120)		

Note The nameplate is attached to the right side of the Module.

I.2.5 Maintenance

⚠ **Caution** Removing the YENET 1600-D Module with the power ON will not damage the Module; however, the following points must be observed when removing the Module.

If the YENET 1600-D Module is removed from the Mounting Base while the power is still ON, the YENET 1600-D communications system will shut down immediately. Depending on the types of Output Units and their settings, the outputs from each Output Unit will be either maintained at the status before the communications system shut down, or will be cleared (OFF output).

⚠ **Caution** Do not attempt to disassemble or modify the YENET 1600-D Module, the Mounting Base, or any other fixtures in any way.

Doing so can cause fires, product failure, or malfunctions.

I.3 Using this Manual

- This manual is written for those who already have a basic knowledge of MEMOCON PLC systems. We recommend reading the *MEMOCON GL120, GL130 Hardware User's Manual* before attempting to read this manual.

- **Basic Abbreviations**

  In this manual, the following terms are defined as follows:

  - **PLC = Programmable (Logic) Controller**
  - **PP = Programming Panel**
  - **GL120, GL130 =**
    MEMOCON GL120 and/or MEMOCON GL130 Programmable Controller
  - **I/O = Input/Output**

- **Technical Terms**

  The bold technical terms in this manual are briefly explained in the **Glossary** provided at the bottom of the page. An example is shown below.

Glossary

The following types of terms are described.

- Specific sequence control terms required for explanation of functions.
- Terms that are specific to Programmable Controllers and electronic devices.

Hardware Specifications

1

1.1 YENET 1600-D Specifications

This section describes the general specifications of the YENET 1600-D Module.

1.1.1 General Specifications

Table 1.1 General Specifications

Item		Specifications
Environmental Conditions	Ambient Operating Temperature	0 to 60°C
	Storage Temperature	–25 to 85°C
	Ambient Operating Humidity	30% to 95% RH (with no condensation)
	Storage Humidity	5% to 95% RH (with no condensation)
	Pollution Level	Pollution level 1 according to JIS B 3501
	Corrosive Gas	No corrosive gas
	Altitude	Less than 2,000 m above sea level
Mechanical Operating Conditions	Vibration Resistance	Conforms to JIS B 3502: Single amplitude of 0.075 mm at 10 to 57 Hz and a constant acceleration of 9.8 m/s^2 (1 G) at 57 to 150 Hz for 10 sweep times each in the X, Y, and Z directions at the rate of 1 octave per min
	Shock Resistance	Conforms to JIS B 3502: Peak acceleration value of 147 m/s^2 (15 G) for 11 ms twice each in the ± X, ± Y, and ± Z directions
Electrical Operating Conditions	Noise Resistance	Conforms to JIS B 3502: 1,500 Vp-p in either normal or common mode with pulse widths of 100 ns/1 µs and rise time of 1 ns (with impulse noise simulator)
Dielectric Strength		Between all I/O terminals and internal circuit and between each I/O common: 1,500 VAC (1 min), 1,800 VAC (1 s)
Insulation Resistance		Between all I/O terminals and ground: 100 MΩ min. via 500-VDC insulation resistance meter (at room temperature and humidity)
Installation Requirements	Ground	Ground to 100 Ω or less
	Configuration	Building-block: Wall-mounted or DIN track-mounted
	Cooling Method	Natural cooling

1.1.2 Module Specifications

Table 1.2 Module Specifications

Item	Specifications
Name	YENET 1600-D Module
Model	JAMSC-120NDN31110
Internal Power Supply Voltage	5 VDC ± 5%
Communications Connectors	Terminal block with flange (manufactured by Phoenix Contact)
Indicators	6 indicators
Switches	DIP switch (One switch, four pins; sets baud rate) Rotary switch (One; sets node address) Reset switch (One)
Module Color Code	Yellow
Hot Swapping	Possible
Expansion Rack	Local or remote station
Number of Slots Occupied	1
Number of Mountable Units	Possible within range of I/O allocations

1.1.3 Communications Specifications

Table 1.3 Communications Specifications

Item	Specifications			
Connection Method	Multi-drop, T-branch (1:N)			
Baud Rate	500, 250, or 125 Kbps (selectable)			
Communications Medium	Special 5-wire cable (2 signal lines, 2 power lines, 1 shield), or 3-wire cable (separate power cable required)			
Communications Distance	Baud Rate	Network Length (Max.)	Drop Line Length (Max.)	Total Drop Line Length (Max.)
	500 Kbps	100 m	6 m	39 m
	250 Kbps	250 m	6 m	78 m
	125 Kbps	500 m	6 m	156 m
Communications Power Supply Voltage	24 VDC (supplied from the communications connector)			
Power Consumption	Communications: 25 mA max. at 24 VDC Internal circuits: 250 mA max at 5 VDC			
Node Address	0 to 15			
Maximum Number of Units Connected	63			
Status Information	Can be monitored in Monitor Mode			
Error Control	CRC errors, duplicate node address check			

1.1.4 I/O Specifications

1) The YENET 1600-D Module operates in Master Mode or Slave Mode according to settings made from the MEMOSOFT.

1) Master Mode

Table 1.4 I/O Specifications in Master Mode

Item	Specification
Maximum I/O Point Allocations	Inputs: 512 points, Outputs: 512 points (total of both digital and register allocations)
Minimum Unit of I/O Allocation per Slave	4 points for both inputs and outputs
Maximum I/O Allocation per Slave	Inputs: 256 Outputs: 256
Maximum Number of Slaves Connected	63
Connectable Slaves	Slaves conforming to DeviceNet

2) Slave Mode

Table 1.5 I/O Specifications in Slave Mode

Item	Specification
Maximum I/O Point Allocations	Inputs: 64 Outputs: 64
Minimum Unit of I/O Allocation	4 points for both inputs and outputs

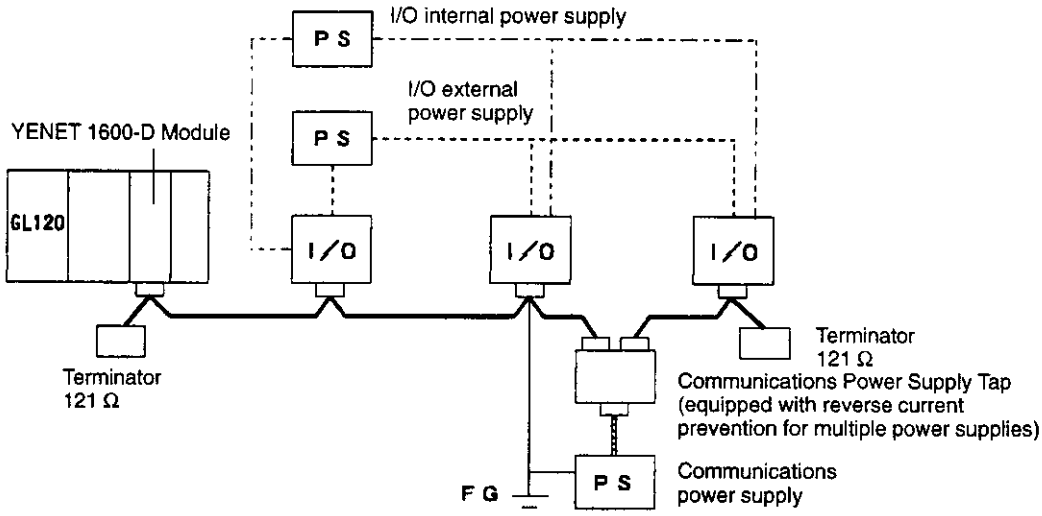
1.2 System Configuration

This section describes the system configuration of the YENET 1600-D Module.

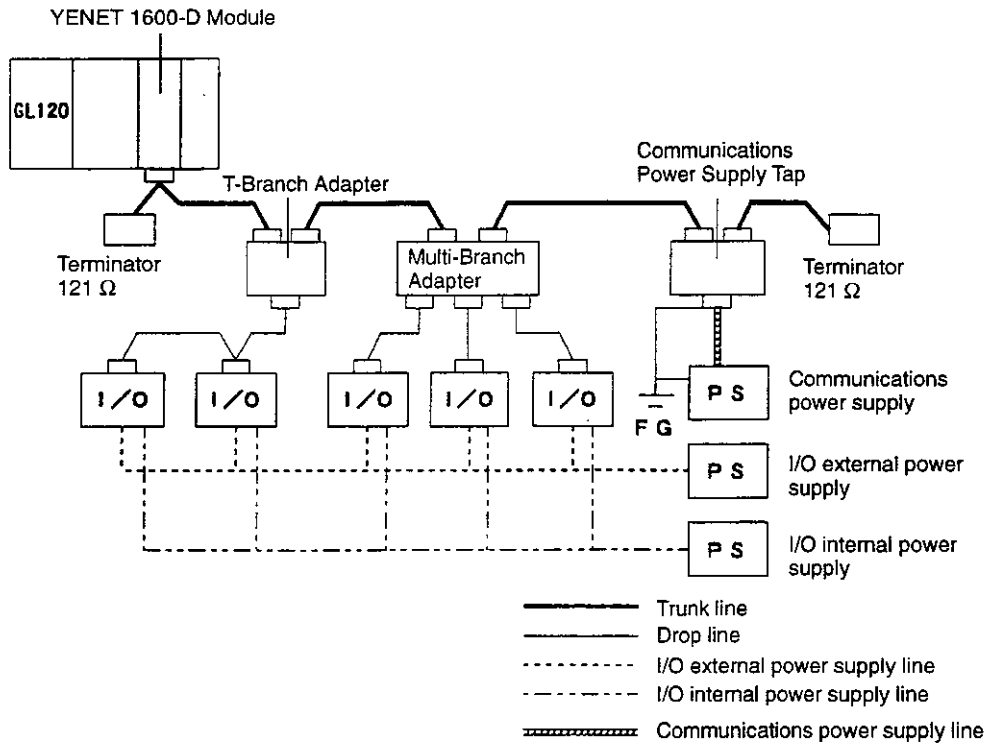
1.2.1 Master Mode

There are two types of system configuration possible in Master Mode.

1) Multi-drop Configuration

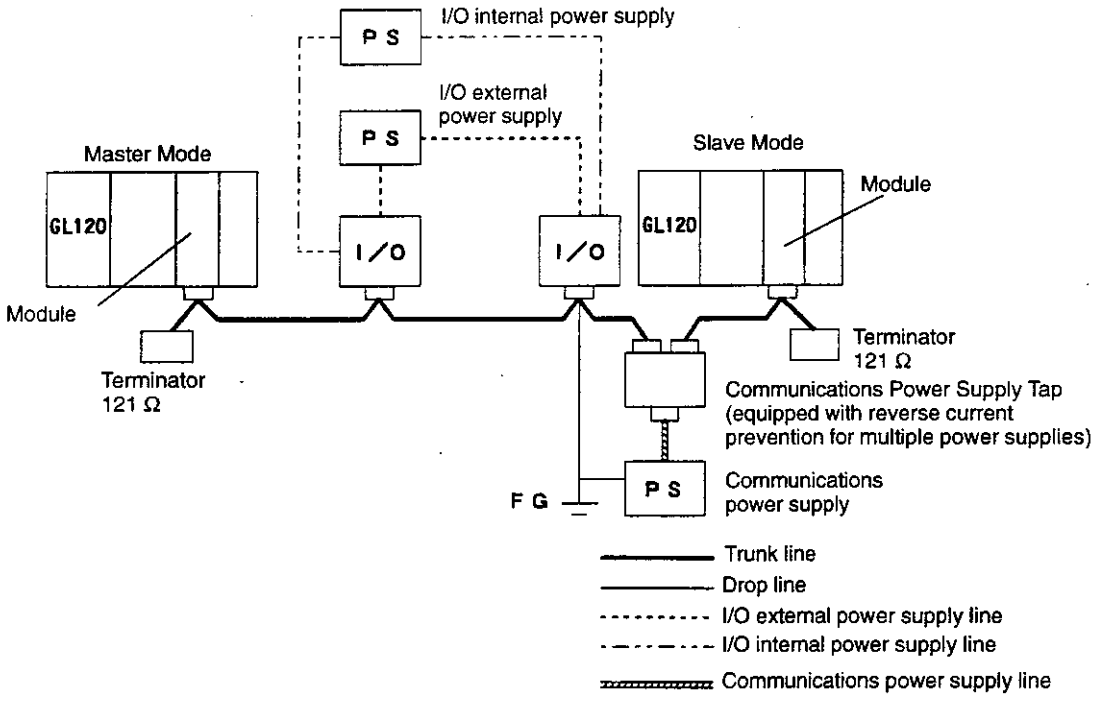


2) T-branch, Multi-branch, and Drop Line Branch Configuration



1.2.2 Slave Mode

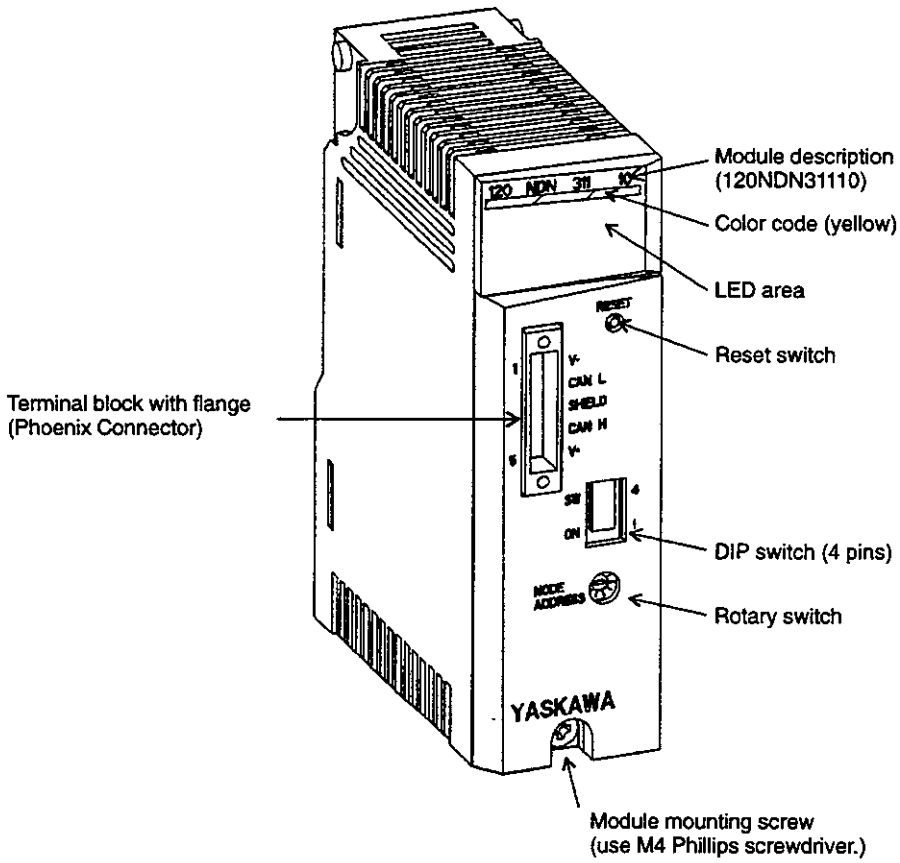
The following system configuration is used in Slave Mode.



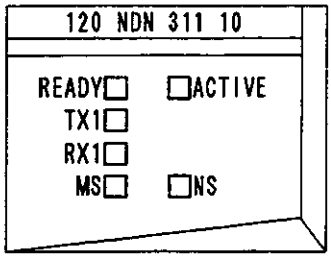
1.3 Module Appearance and Switch Settings

This section describes the appearance of the YENET 1600-D Module and how to set the switches.

1.3.1 Module Appearance



LED Area



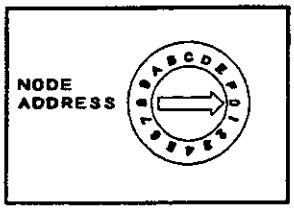
LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is processing I/O.
TX1	Green	Module is sending data along the communications line.
RX1	Green	Module is receiving data from the communications line.
MS	Green	Module is operating normally.
	Red	Error has occurred in Module
NS	Green	Network is operating normally.
	Red	Error has occurred in Network.

See *Section 6.1 Alarm Display* for details on error indications

Figure 1.1 Module Appearance

1.3.2 Setting the Node Address

1) Node address can be set using the rotary switch on the front panel of the Module. Set the node address to between 0 and 15 (0 to F in hexadecimal).



1.3.3 Setting the Baud Rate

1) The baud rate can be set using the DIP switch on the front panel of the Module.

Pin 1	Pin 2	Baud Rate
OFF	OFF	125 Kbps
ON	OFF	250 Kbps
OFF	ON	500 Kbps
Always set pin 4 to OFF.		

Note In YENET 1600-D communications, the same node address cannot be used more than once on the same communications line. Make sure that the node address of the Master Module is different from the node addresses of the Slaves being connected.

1.3.4 Setting the Communications Mode

1) Automatic recovery can be set in case of a communications error or a communications power failure. Use the DIP switch on the front panel of the Module to set Automatic Recovery Mode.

Pin 3	Communications Mode
OFF	Manual Recovery Mode
ON	Automatic Recovery Mode

Note When using Manual Recovery Mode, make sure that the YENET 1600-D Module is in Monitor Mode. If the Monitor Mode is disabled, the only way to recover after a communications error is to reset the YENET 1600-D Module.

Network Specifications

2

2.1 Summary of Network Configuration

This section provides a summary of the network configuration for the YENET 1600-D Module.

2.1.1 Elements of Network Configuration

1) The following diagram shows an example of network connections.

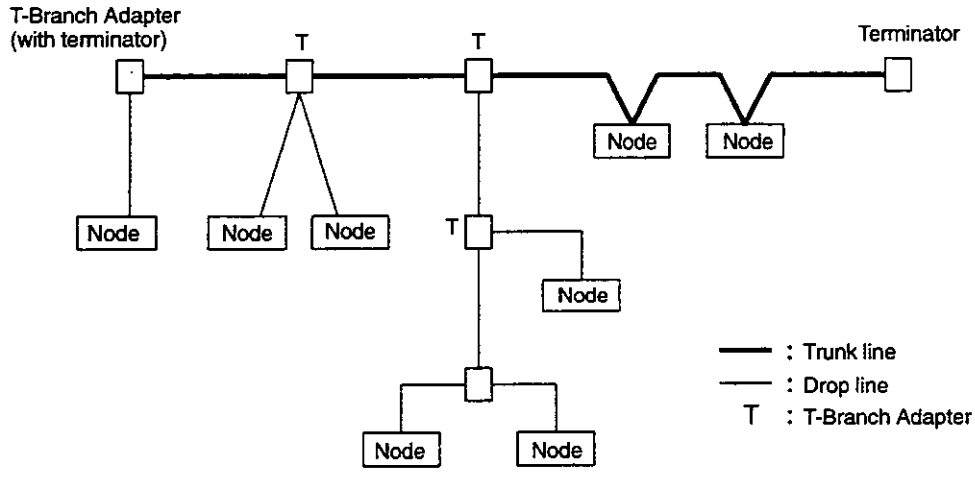


Figure 2.1 Network Connections

2) The network consists of the following elements.

a) Node

A node is either a slave that connects to external I/O or the Master that manages the I/O of the slaves. There are no restrictions on the location of the Master or slaves. Any node in *Figure 2.1* can be the Master or a slave.

b) Trunk Line and Drop Lines

Both ends of the trunk line must connect to a terminator. Any cable branching from the trunk line is a drop line.

c) Connection Methods

A node is connected using the T-branch method or multi-drop method. A T-Branch Adapter is used to connect a node with the T-branch method. A node is directly con-

nected to the trunk line or a drop line with the multi-drop method. Both T-branch and multi-drop methods can be used together in the same network, as shown in *Figure 2.1.*

d) Terminatior

Both ends of the trunk line must connect to terminating resistance to decrease signal reflection and ensure stable network communications.

e) Communications Power Supply

The communications connector of each node must be provided with a communications power supply through the trunk line for YENET 1600-D communications. A separate power supply must be used for each of the following on the network: Communications power supply, internal circuit power supply, and I/O power supply.

Note (1) The transmission cable must be a special DeviceNet cable.

(2) Both ends of the trunk line must connect to a terminator.

(3) Only YENET 1600-D Modules or DeviceNet devices can be connected to the network. Do not connect any other devices, such as a lighting arrester.

3) Branching from the Trunk Line

There are three methods that can be used to branch from the trunk line.

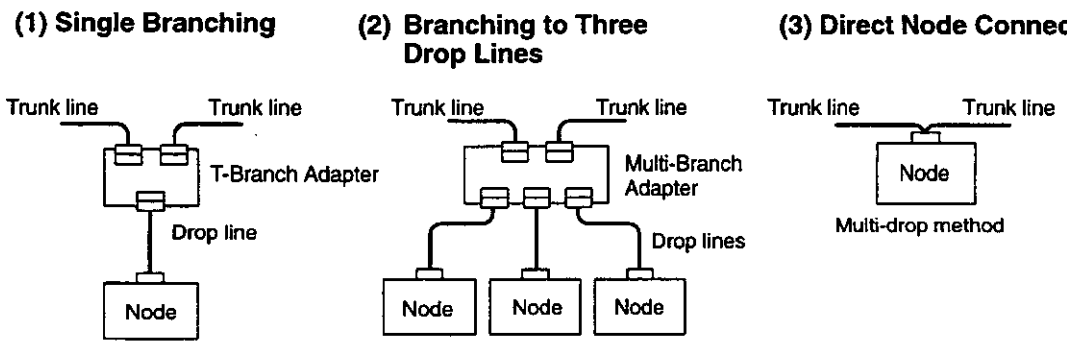
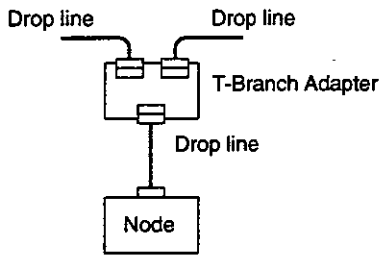


Figure 2.2 Branching from the Trunk Line

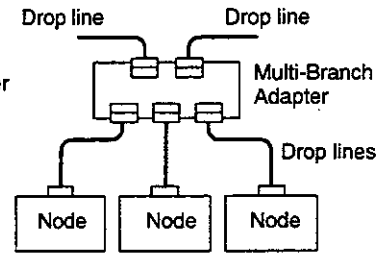
4) Branching from Drop Lines

There are three methods that can be used to branch from drop lines.

(1) Single Branching



(2) Branching to Three Drop Lines



(3) Direct Node Connection

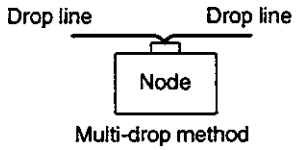
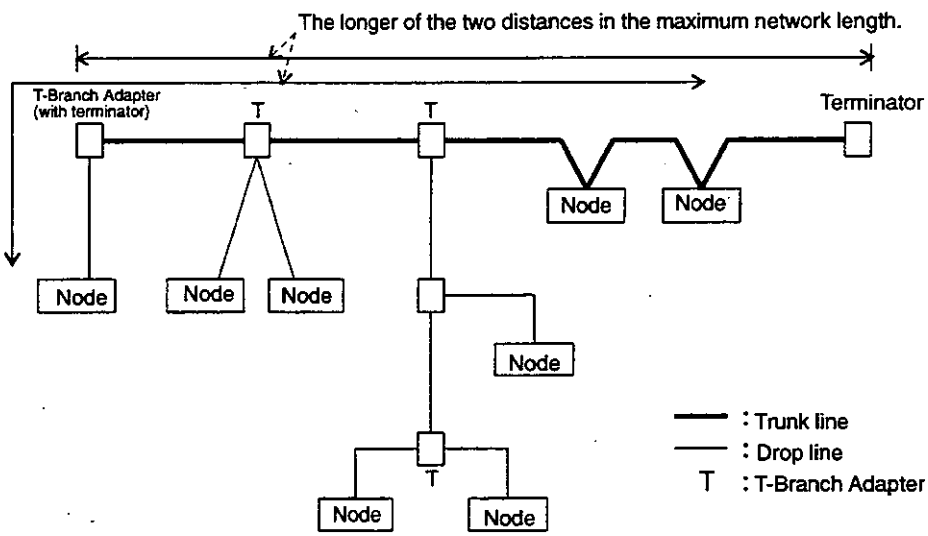


Figure 2.3 Branching from Drop Lines

2.1.2 Restrictions on Network Configuration

1) Maximum Network Length

The maximum network length is either the line length between two nodes located farthest from each other or the line length between the terminators on the ends of the trunk line, whichever is longer.



The thick cable or thin cable can be used for the trunk line or drop lines. The thick cable is available for long-distance communications with only a little signal attenuation. The thick cable, however, cannot be bent easily because it is not very flexible.

The thin cable is not suitable for long-distance communications because the thin cable attenuates transmission signals. The thin cable, however, is flexible enough to be easily bent.

The maximum network length is determined by the type of cable, as shown in the following table.

Baud rate (Kbps)	Maximum network length	
	Thick cable	Thin cable
500	100	100
250	250	100
125	500	100

• Using Thick Cable and Thin Cable Together

The line connecting two nodes located farthest from each other can use both thick and thin cables provided that the length of each cable satisfies the conditions in the following table.

Baud rate (Kbps)	Maximum network length
500	$L_{THICK} + L_{THIN} \leqq 100$ m
250	$L_{THICK} + 2.5 \times L_{THIN} \leqq 250$ m
125	$L_{THICK} + 5.0 \times L_{THIN} \leqq 500$ m

Note L_{THICK}: Thick cable length L_{THIN}: Thin cable length

The possible length between the nodes connected through both thick cable and thin cable is shorter than that between the nodes connected through thick cable only.

2) Drop Line Length

The drop line length is the line length between a branch point on the trunk line to the farthest node that is located on the drop line. The maximum drop line length is 6 m. A drop line can be branched out into other drop lines.

3) Total Drop Line Length

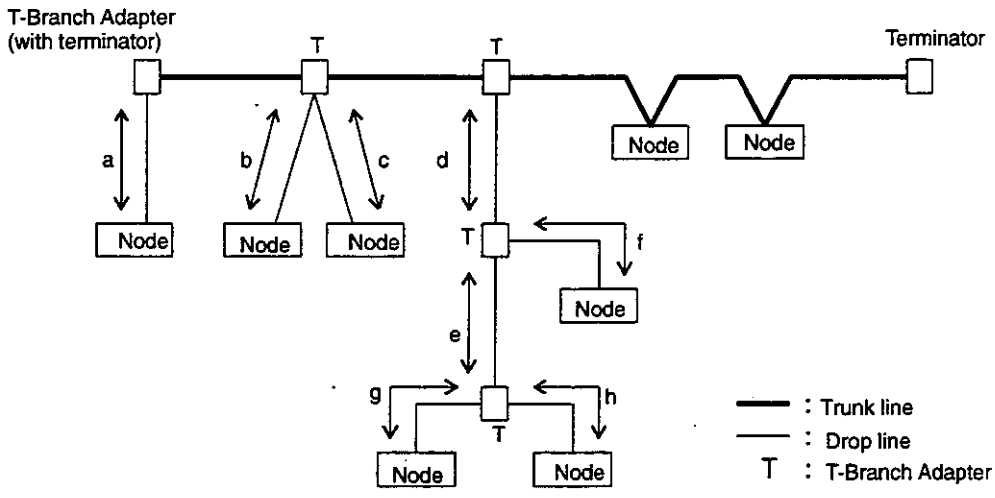
The total drop line length is a total of all drop line lengths. The total drop line length must be within the permissible ranges shown in the following table. The total drop line length must within the permissible range and even then, each drop line must be 6 m or less.

The permissible range of total drop line length varies with the baud rate.

Baud rate (Kbps)	Total drop line length
500	39 m max.
250	78 m max.
125	156 m max.

◀EXAMPLE▶ Configuration Example

The following example is for a baud rate of 500 Kps.



The above example must satisfy the following conditions.

a ≦ 6 m, b ≦ 6 m, c ≦ 6 m, d ≦ 6 m, d+f ≦ 6 m, d+e+g ≦ 6 m, d+e+h ≦ 6 m

The total drop line length must satisfy the following condition.

Total drop line length = a+b+c+d+e+f+g+h ≦ 39 m

Operation in Master Mode

3

3.1 Basic Operation Procedure

This chapter describes procedures for the basic operation of the YENET 1600-D Module in Master Mode.

3.1.1 Master Mode

1) The YENET 1600-D Module in Master Mode makes it possible for the CPU Module to exchange I/O data automatically with one or more DeviceNet slave devices.

2) The following figure is a conceptual diagram operation in Master Mode.

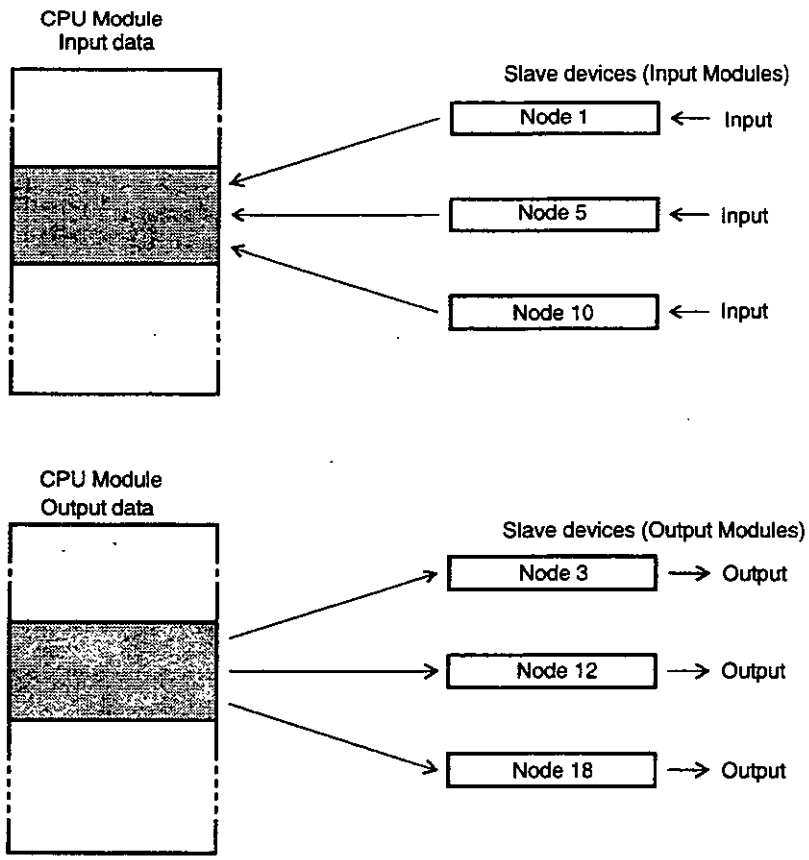
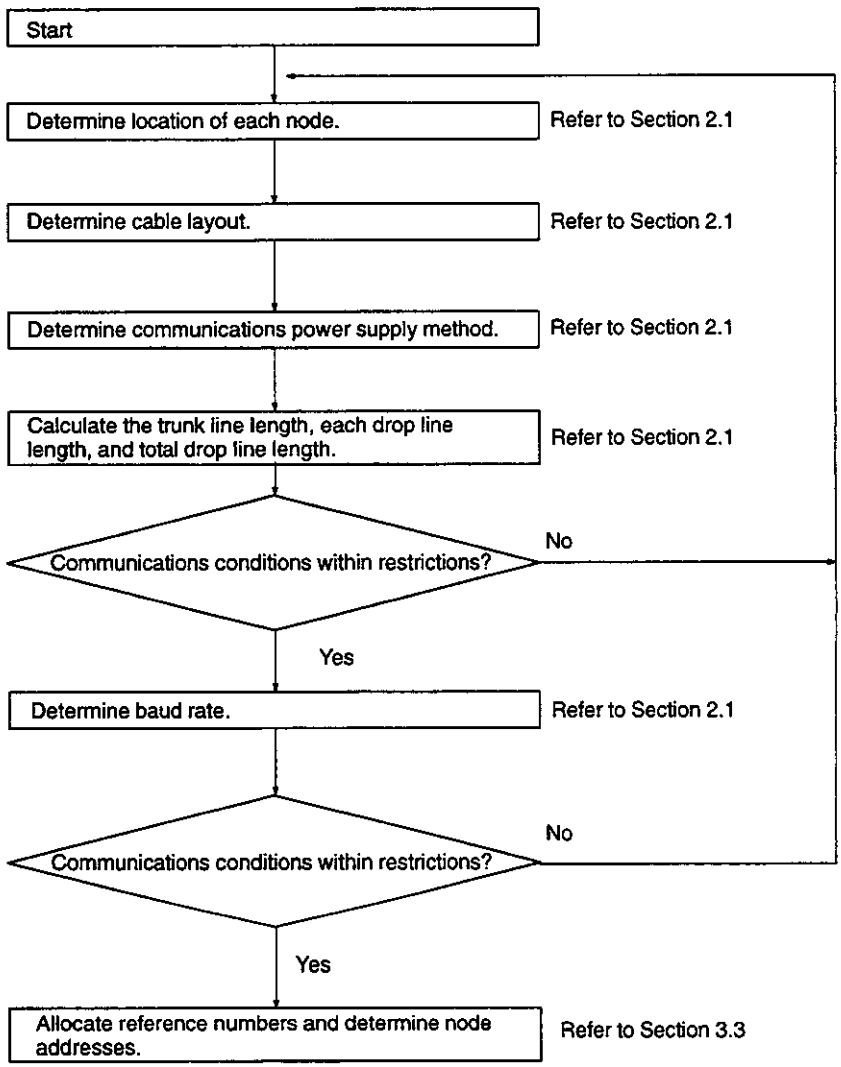


Figure 3.1 Conceptual Diagram of Master Mode

3.1.2 Basic System Design Procedure

1) There are some restrictions on the maximum network length and baud rate in YENET 1600-D communications. The system must be designed by taking these restrictions into consideration. Refer to *Chapter 2 Network Specifications* for the details on these restrictions.

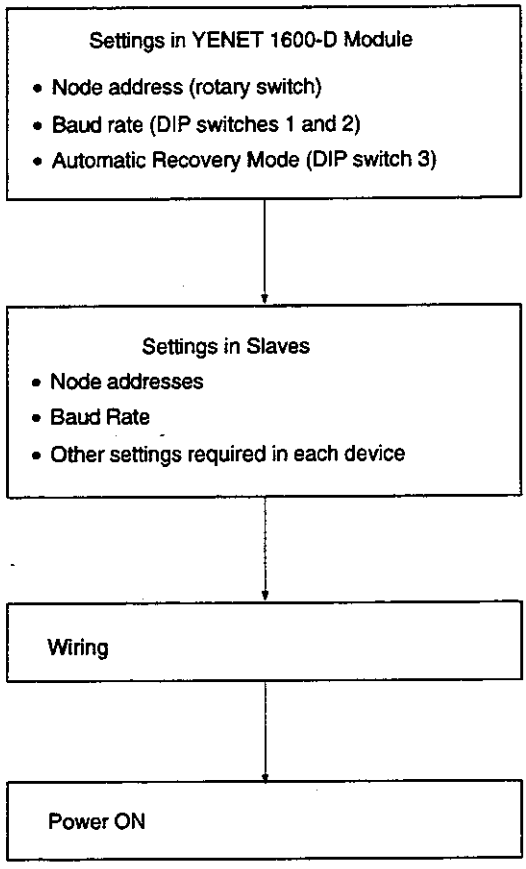
2) The following diagram shows the procedure for designing a basic system using YENET 1600-D communications.



3.1.3 Device Setting Procedure

1) Before providing power to the system, make the necessary settings in the YENET 1600-D Module and Slaves.

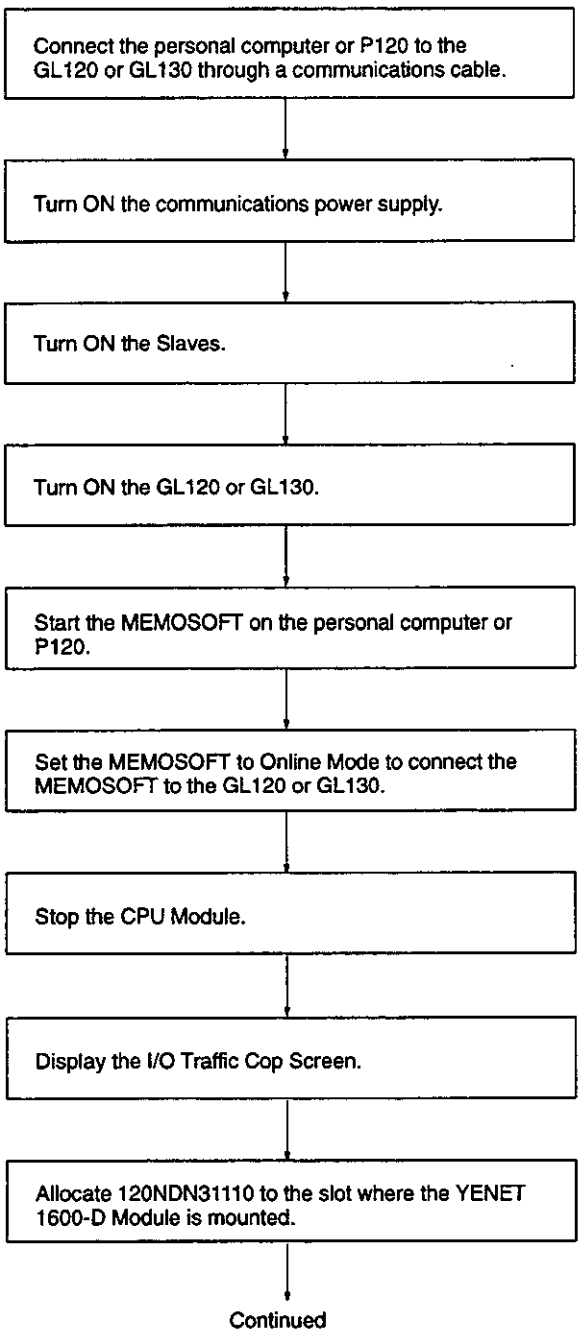
2) The following is an example of the setting procedure.



3.1.4 I/O Allocations

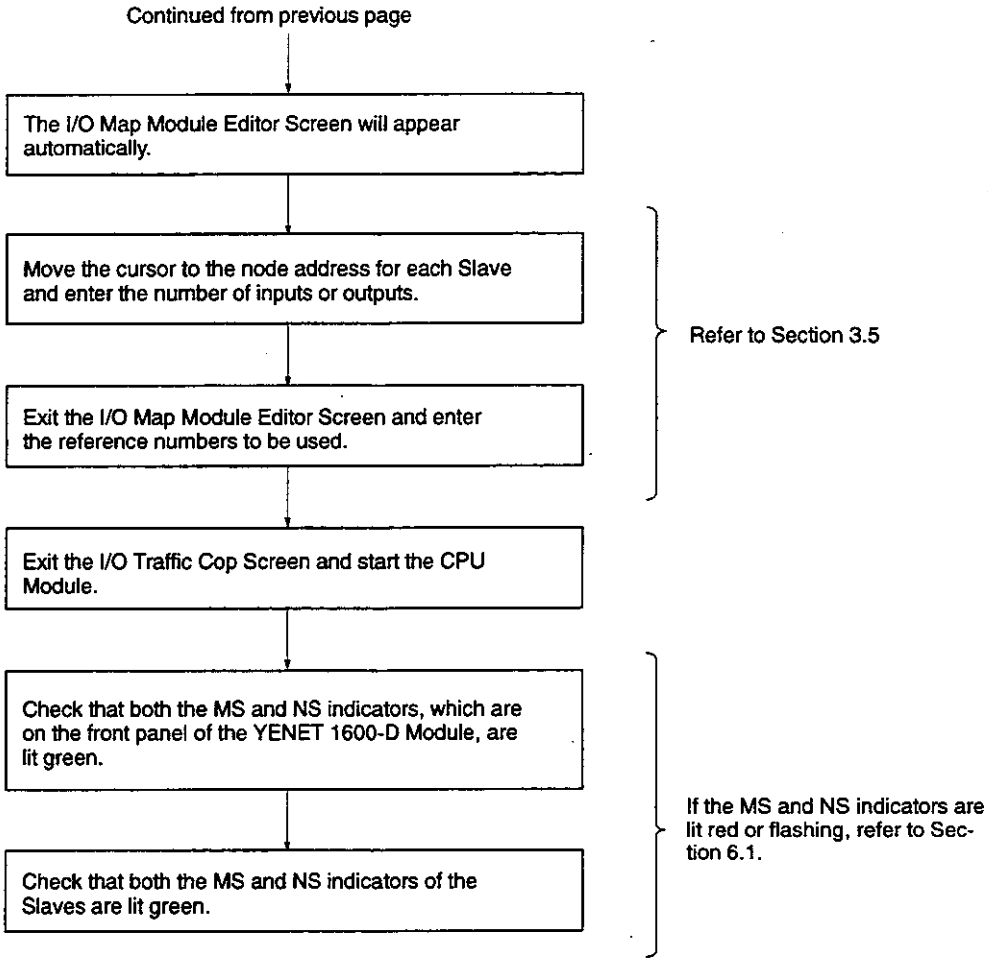
1) After setting the devices and wiring cables, I/O allocations are required to start YENET 1600-D communications.

2) The following diagram provides an example of the basic setting procedure using the MEMOSOFT in Online Mode. Refer to *3.5 Making Settings Using the MEMOSOFT* for details. Refer to the MEMOSOFT manuals for information on the basic operation of the MEMOSOFT.



The power can be turned ON simultaneously.

Refer to the MEMOSOFT manual.


Continued from previous page
The I/O Map Module Editor Screen will appear automatically.
Move the cursor to the node address for each Slave and enter the number of inputs or outputs.
Exit the I/O Map Module Editor Screen and enter the reference numbers to be used.
Refer to Section 3.5
Exit the I/O Traffic Cop Screen and start the CPU Module.
Check that both the MS and NS indicators, which are on the front panel of the YENET 1600-D Module, are lit green.
Check that both the MS and NS indicators of the Slaves are lit green.
If the MS and NS indicators are lit red or flashing, refer to Section 6.1.

3.2 Outline of I/O Allocations

This section gives an outline of allocations for the YENET 1600-D Module using the MEMOSOFT.

3.2.1 I/O Traffic Cop Screen

1) The YENET 1600-D Module can be connected to up to 63 slaves. Allocate reference numbers to the Slaves in order of node addresses.

2) The following illustration shows an example of the I/O Traffic Cop Screen.

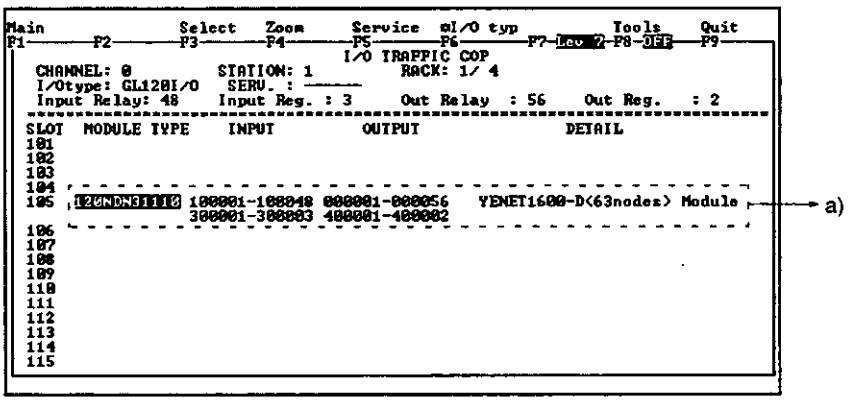


Figure 3.2 MEMOSOFT I/O Traffic Cop Screen

a) Set all the reference numbers used by the YENET 1600-D Module on the I/O Traffic Cop Screen.

3.2.2 I/O Map Module Editor Screen

1) The I/O Map Module Editor will appear automatically after finishing allocations for the YE-NET 1600-D Module on the I/O Traffic Cop Screen.

2) The following illustration shows an example of the I/O Map Module Editor Screen.

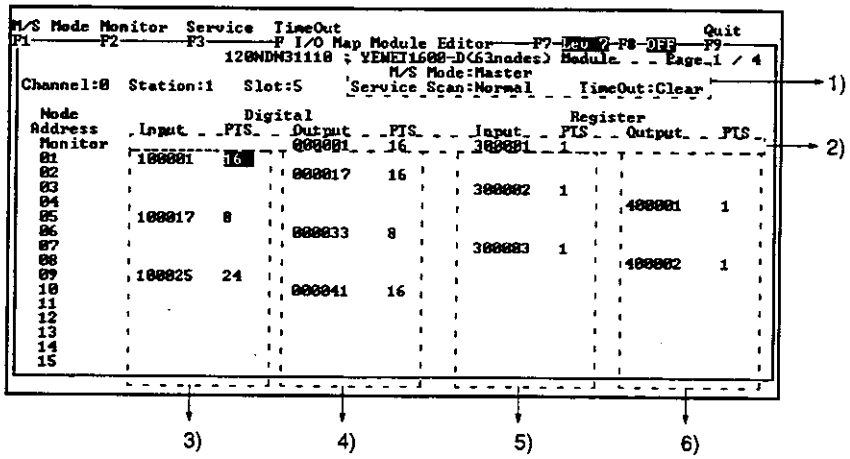


Figure 3.3 I/O Map Module Editor Screen

1) Settings

Set the following three modes.

a) M/S Mode

Set the YENET 1600-D Module to Master Mode or Slave Mode. The YENET 1600-D Module is set to Master Mode by default.

b) Service Scan

The service scan specifies whether the normal scan cycle or the high-speed scan cycle is used to update I/O data. The service scan is set to the normal scan cycle by default.

c) TimeOut (Timeout Output)

The timeout output specifies whether the last data received by the slaves will be retained or cleared if the CPU Module stops or if data in the YENET 1600-D Module cannot be updated due to an error in the remote communications line. The timeout output item is set to CLEAR by default.

2) Monitor and Node Reset

Settings are displayed for the YENET 1600-D communications monitoring function and the node reset function. Settings are made by selecting the monitor settings from the menu.

3) Digital Input Points

The digital input points column shows the number of input points set for a slave that is an input device receiving digital data.

4) Digital Output Points

The digital output points column shows the number of output points set for a slave that is an output device with digital data outputs for other devices.

5) Input Registers

The input registers column shows the number of input registers set for a Slave that is used as an input device for receiving register data.

6) Output Registers

The output registers column shows the number of output registers set for a Slave that is used as an output device for register data output to other devices.

INFO

1) It is possible to set either digital I/O points or registers for a slave, but not both. For example, an output device as a slave cannot output both digital data and register data together.

2) If a slave device has both input and output ports, the input and output ports can be set independently for receiving digital and register inputs.

3) When the I/O Map Module Editor Screen is displayed again after finishing with I/O allocations for the YENET 1600-D Module, the first reference number per node for each Slave will appear.

3.2.3 Monitor Screen

1) Press the F2 Key and select the monitor settings on the I/O Map Module Editor Screen, to display the Monitor/Node Reset Setting for Master Mode Screen so that settings for the Node Reset Function or Monitor Function can be set.

2) The following is an example of the Monitor/Node Reset Setting for Master Mode Screen.

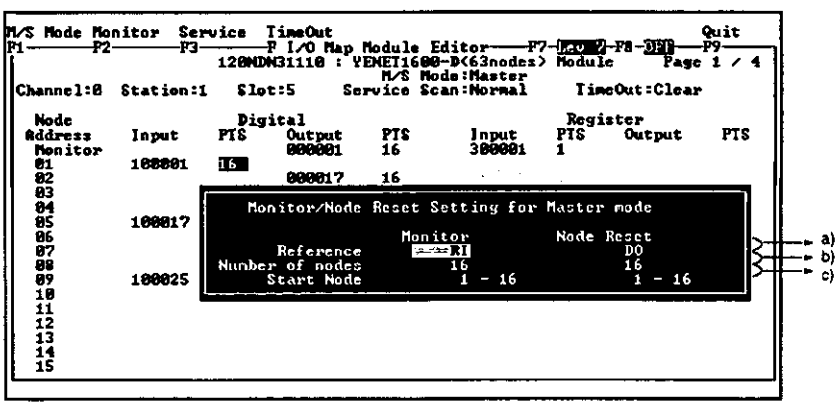


Figure 3.4 Monitor/Node Reset Setting for Master Mode Screen

a) Reference

The reference settings determine the types of reference used in the Monitor Function and Node Reset Function. The Monitor Function can be set to ***DI*** (digital input), ***RI*** (register input), or ***Unused***. The Node Reset Function can be set to ***DO*** (digital output), ***RO*** (register output), or ***Unused***.

b) Number of Nodes

The number of nodes settings specify the number of nodes in the Monitor Function and in Node Reset Function. If the reference item is set to DI or DO, the number of nodes is selectable in units of 8 nodes. If the reference item is set to RI or RO, the number of nodes is selectable in units of 16 nodes. The setting is selected from a window.

c) Start Node

The start node settings determine the leading node addresses in the Monitor Function and Node Reset Function. The same setting is used for both the Monitor Function and Node Reset Function. The start node can be set to 1, 9, 17, 25, 33, 41, 49, or 57. If RI or RO is specified for the Monitor Function or Node Reset Function, 57 cannot be set.

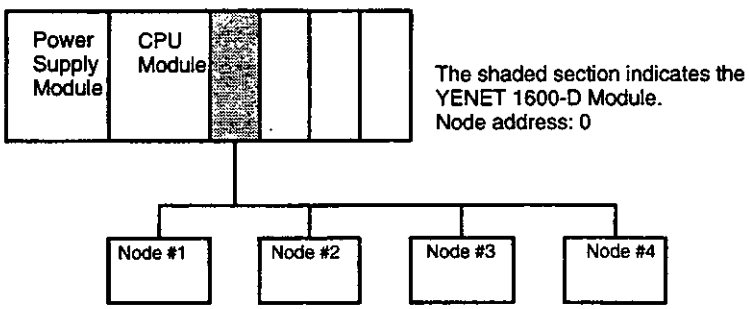
3.3 I/O Allocations and Slave Devices

This section describes the relationship between I/O allocations and slave devices provides several examples.

3.3.1 Digital Reference Allocations

1) This section describes the relationship between I/O allocations and slave devices that have digital references. It is assumed that the Monitor Function is not be used by any slave. Refer to *3.4 Monitoring YENET 1600-D Communications* for details on the Monitor Function.

2) The I/O allocations for the following system configuration will be described.



Node Address	Slave Type	References To Be Used
1	Digital input (8 points)	100001 to 100008
2	Digital input (8 points)	100009 to 100016
3	Digital output (8 points)	000001 to 000008
4	Digital output (8 points)	000009 to 000016

Figure 3.5 System Configuration

3) All the references used by the YENET 1600-D Module are set on the I/O Traffic Cop Screen. In this example, there are 16 digital input points and 16 digital output points. Ref-

erences are allocated in order of the node addresses. Therefore, if a slave needs a lower reference number, the Slave must be set to a lower node address.

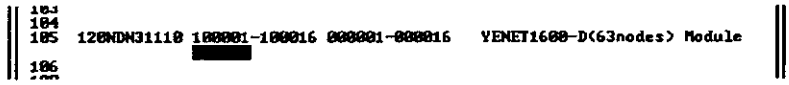


Figure 3.6 I/O Traffic Cop Screen

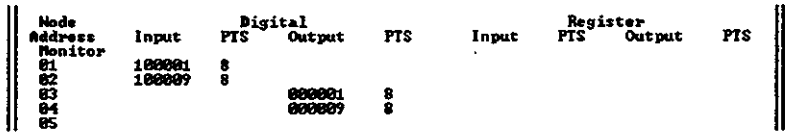


Figure 3.7 I/O Map Module Editor Screen

4) The relationship between contacts and references for the slaves is shown below.

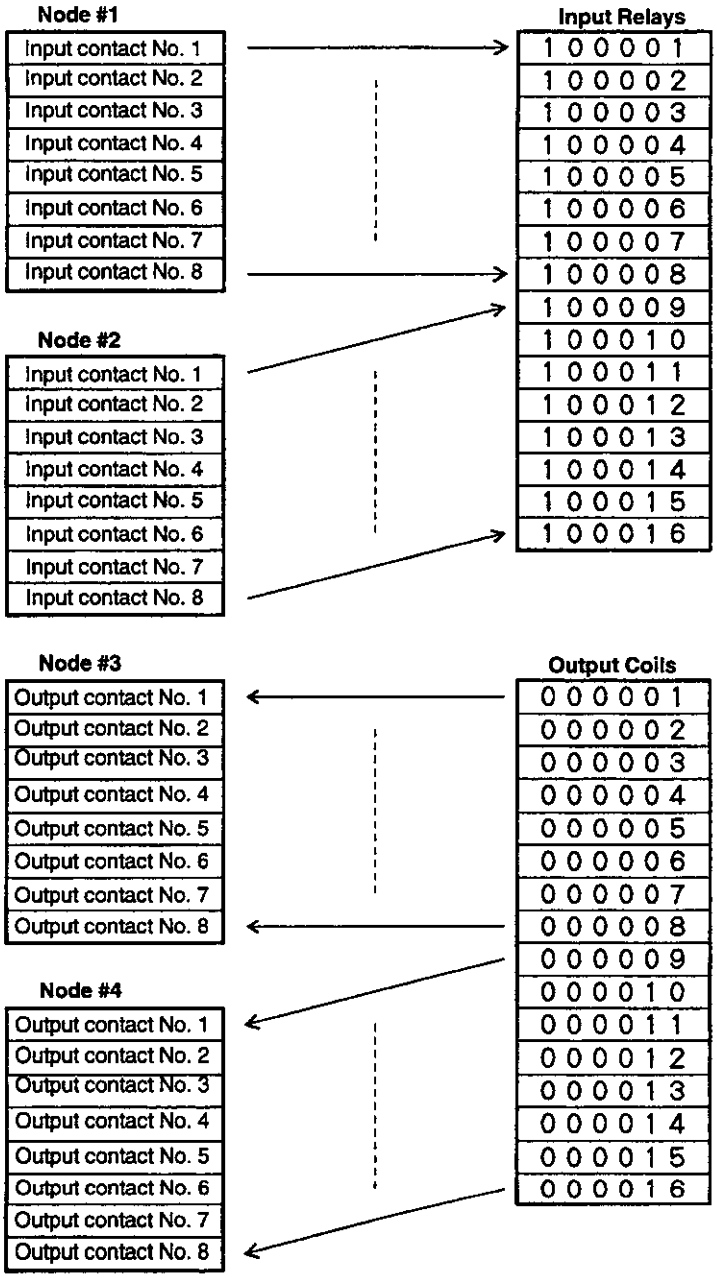


Figure 3.8 Relationship between Slave Contacts and References

3.3.2 Allocating both Digital and Register References

1) Using the same system configuration as example 1, consider the following slave configuration.

Table 3.1 System Configuration

Node Address	Slave Type	References To Be Used
1	Digital input (8 points) Digital output (8 points)	100001 to 100008 000001 to 000008
2	Digital input (8 points)	100009 to 100016
3	Register input (1 register) Register output (1 register)	300001 400001
4	Digital output (8 points)	000009 to 000016

2) All the references used by the YENET 1600-D Module are set in the I/O Traffic Cop Screen. In this example, there are 16 digital output points, 16 digital output points, one input register, and one output register. Settings in the I/O Map Module Editor Screen must be input in order of the node addresses because references are used in order from the lowest node address.

3) The I/O Traffic Cop Screen and the I/O Map Module Editor Screen are shown below.

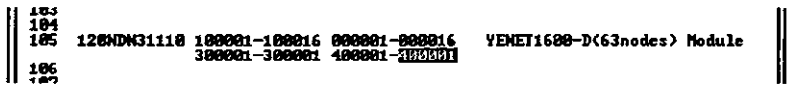


Figure 3.9 I/O Traffic Cop Screen

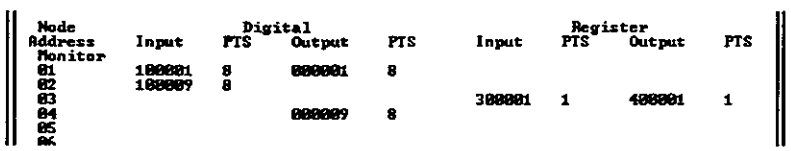


Figure 3.10 I/O Map Module Editor Screen

4) The relationship between contacts and references for the slaves is shown below.

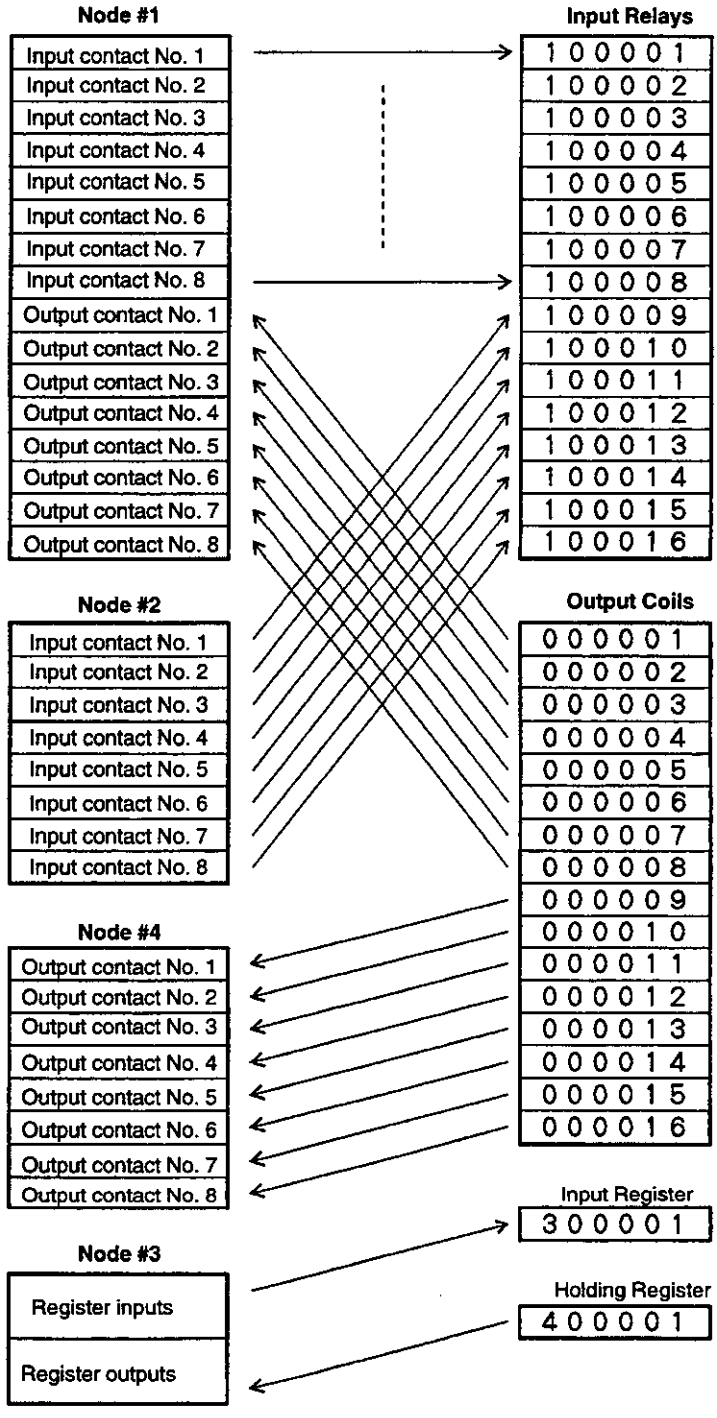


Figure 3.11 Relationship between Slave Contacts and References

3.3.3 Special Allocations

1) It is possible to allocate I/O points to the YENET 1600-D Module in units of 4 points. This saves the number of references used.

2) If only 12 input points are required by the 16-point Input Module, the number of allocated inputs can be set to 12 points to reduce the number of references used. Consider the following configuration, for example.

Table 3.2 System Configuration

Node Address	Slave Type	References To Be Used
1	Digital input (8 points) (No. of points used: 4)	100001 to 100004
2	Digital input (8 points) (No. of points used: 8)	100005 to 100012
3	Digital output (8 points) (No. of points used: 8)	000001 to 000008
4	Digital output (8 points) (No. of points used: 4)	000009 to 000012

3) Allocate the above I/O points on the I/O Traffic Cop Screen and the I/O Map Module Editor Screen as shown below.

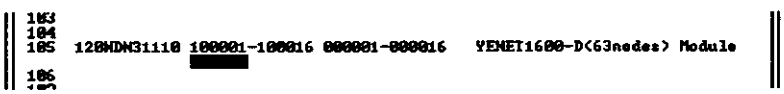


Figure 3.12 I/O Allocation Screen

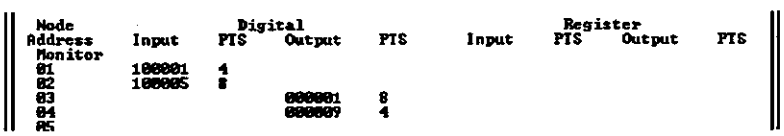


Figure 3.13 I/O Map Module Editor Screen

4) The relationship between contacts and references for the slaves is shown below.

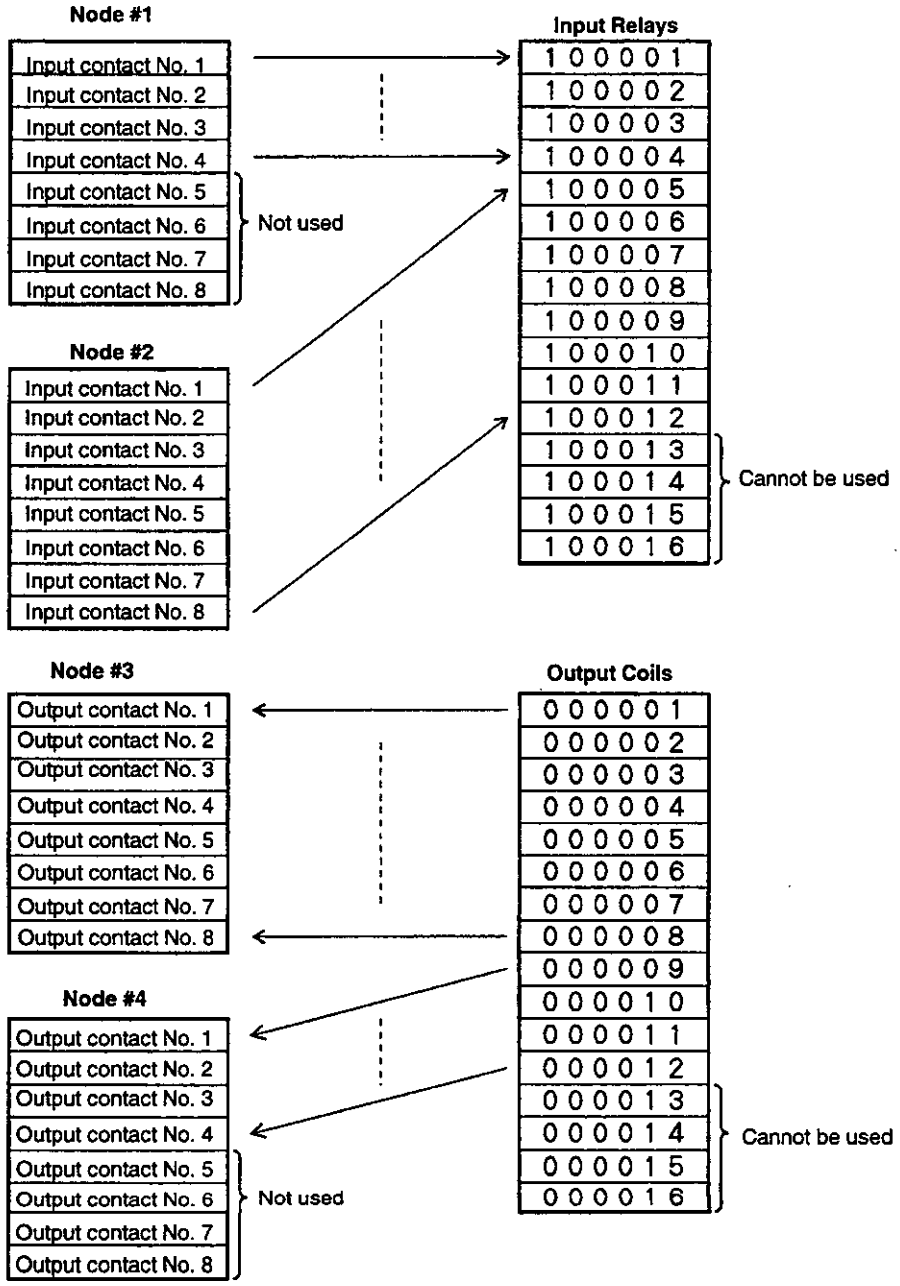


Figure 3.14 Relationship between Slave Contacts and References

INFO

1) If 4 points remains after completing all I/O allocations for the Modules, these four points cannot be used.

2) You can reduce the I/O allocations to Modules by a maximum of 4 points per Module, I/O allocation errors will occur if this limit is exceeded. For example, an I/O allocation error will occur if only 8 points are allocated to a 16-point Module.

3.4 Monitoring YENET 1600-D Communications

This section describes the Monitor and Node Reset Functions that are used when communications errors occur in YENET 1600-D communications.

3.4.1 Outline of Communications Monitoring

1) The YENET 1600-D Module has the following two functions for YENET 1600-D communications. These functions are operated by making Monitor Function settings on the I/O Map Module Editor Screen.

a) Monitor Function

This function is used to monitor the YENET 1600-D communications status at each slave and transmit this information to the CPU Module.

b) Node Reset Function

This function resets YENET 1600-D communications for each slave according to a command from the CPU Module. It is performed automatically when the DIP switch on the front panel of the YENET 1600-D Module is set to Automatic Recovery Mode.

2) When these two functions are used, the following references are required. The number of references available for I/O will decrease by the number used here.

Function	Reference	Remarks
Monitor Function	Input relays	Used in units of 8 points for the number of nodes to be monitored.
	Input registers	One register is used for every 16 nodes to be monitored.
Node Reset Function	Output coils	Used in units of 8 points for to the number of nodes to be reset.
	Output registers	One register is used for every 16 nodes to be reset.

3.4.2 Monitor Function

1) The Monitor Function is used to monitor whether or not the YENET 1600-D communications are operating normally and transmit the communications status information to the CPU Module. The communications status at each slave is transmitted using individual bits of the input register.

2) When the CPU Module switches from Stop to Start State, it takes approximately five seconds before the YENET 1600-D Module begins communicating normally. During this

time, the input relay and input register values will not necessarily correspond with the status of the connected Slaves. These bits are not set to 1 until communications are correctly established, so the validity of input data can be determined by checking these bits.

3) When these bits are set to 0, one of the following three conditions exists.

   a) The corresponding node is not set as a connected slave.

   b) Communications have not initiated correctly after the CPU Module started.

   c) Communications with the node are not established due to a communications error.

4) The first input reference (i.e., input relays or registers) in the I/O allocation is used for monitoring. When the Monitor Function is changed from Unused to another setting, the input reference allocation for each slave will be shifted. Refer to the example for details.

◀EXAMPLE▶ **a) Using Input Relays**

In the following example, communications with the slaves with node addresses 1 through 8 are monitored. The leading reference number for I/O allocation is 100001.

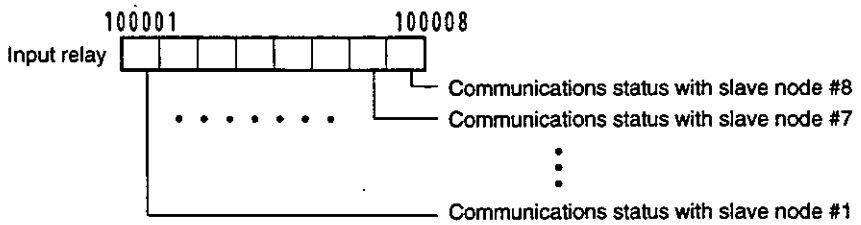


Figure 3.15 Input Relays for Monitoring

Each input relay is ON when the communications status with the corresponding Slave is normal.

◀EXAMPLE▶ **b) Using Input Registers**

In the following example, communications with the slaves with node addresses 1 through 16 are monitored. The leading reference number for I/O allocation is 300001.

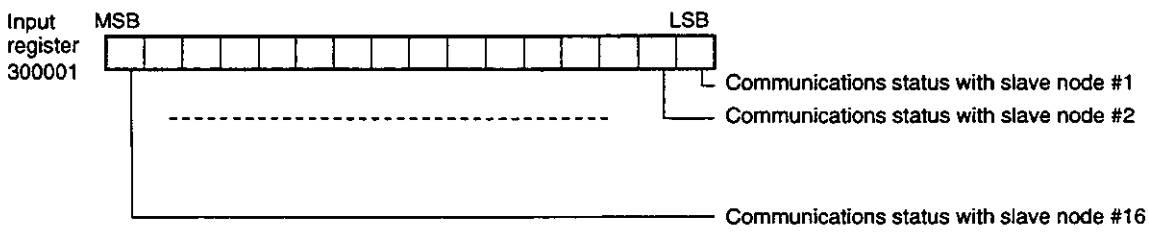


Figure 3.16 Input Register for Monitoring

Each bit of the input register is set to 1 when the communications status with the corresponding Slave is normal.

3.4.3 Node Reset Function

1) The Node Reset Function resets communications with each slave by means of an output coil or output register when the CPU Module is monitoring the communications status using the Monitor Function and determines that the communications status is BUS OFF. The YENET 1600-D Module ignores any reset commands issued for the connection with slaves during normal communications. The reset function will be executed automatically as long as the DIP switch on the front panel of the YENET 1600-D Module is set to Automatic Recovery Mode.

2) The output coils or output register used for resetting communications uses the first reference number in the I/O allocation. When the Monitor Function is changed from Unused to another or the number of reset nodes is changed, the reference number used for output to each slave will be shifted. Refer to the example for details.

◀EXAMPLE▶ **a) Using Output Coils**

In the following example, communications with the slaves with node addresses 1 through 16 will be reset. The leading reference number for I/O allocation is 00001.

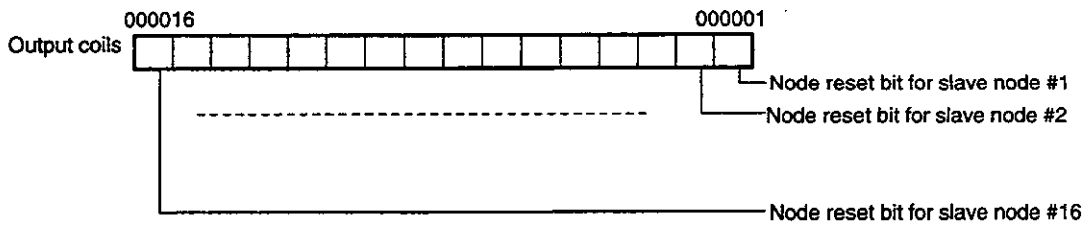


Figure 3.17 Node Reset Output Coils

If a Slave has a communications error, by turning ON the output coil corresponding to the node address of the Slave, communications with the Slave are reset.

◀EXAMPLE▶ **b) Using Output Registers**

In the following example, communications with the slaves with node addresses 1 through 16 will be reset. The leading reference number for I/O allocation is 400001.

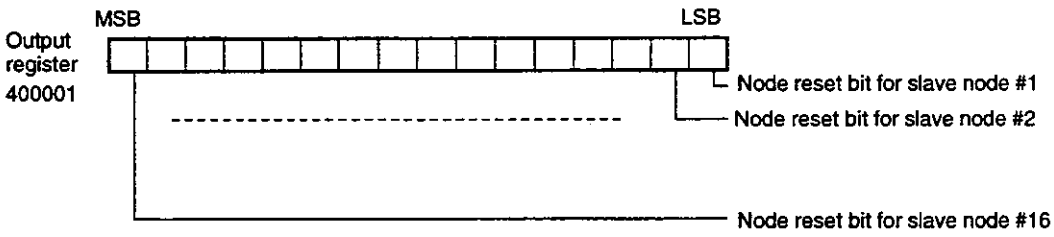
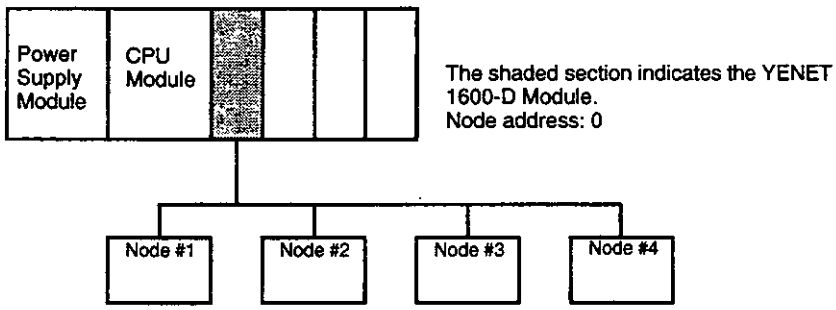


Figure 3.18 Node Reset Output Register

Communications with a slave are reset when the slave has a communications error by setting the bit of the output register corresponding the node address of the Slave to 1.

3.4.4 Application Example

1) The system configuration below shows a system in which the Monitor Function and Node Reset Function are used.



Function	References Used	Node	Reference No.
Monitor Function	Input register	1 to 16	300001
Node Reset Function	Output coils	1 to 8	000001 to 000008

Node Address	Slave Type	Reference No.
1	Digital input (8 points)	100001 to 100008
2	Digital input (8 points)	100009 to 100016
3	Digital output (8 points)	000009 to 000018
4	Digital output (8 points)	000019 to 000024

Figure 3.19 System Configuration

2) The leading reference for input registers and the eight points in the leading reference for output coils are set for the Monitor Function and Node Reset Function. Allocate all the references used for the YENET 1600-D Module.

3) In this example, there are 16 digital input points, 16 digital output points, 8 points for resetting, and one input register for monitoring.

4) The following screens show the settings in the I/O Traffic Cop Screen and I/O Map Module Editor Screen. The references are used in order from the lowest node address in the I/O Map Module Editor Screen.

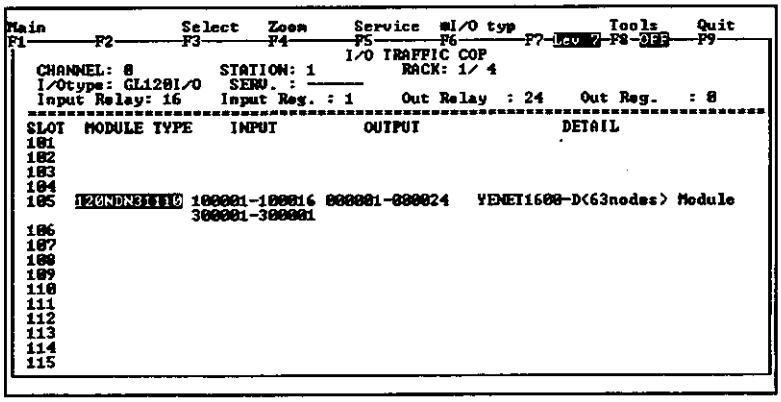


Figure 3.20 I/O Traffic Cop Screen

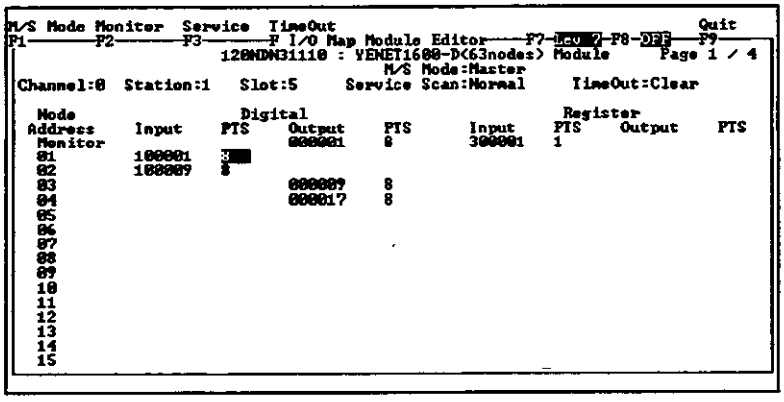
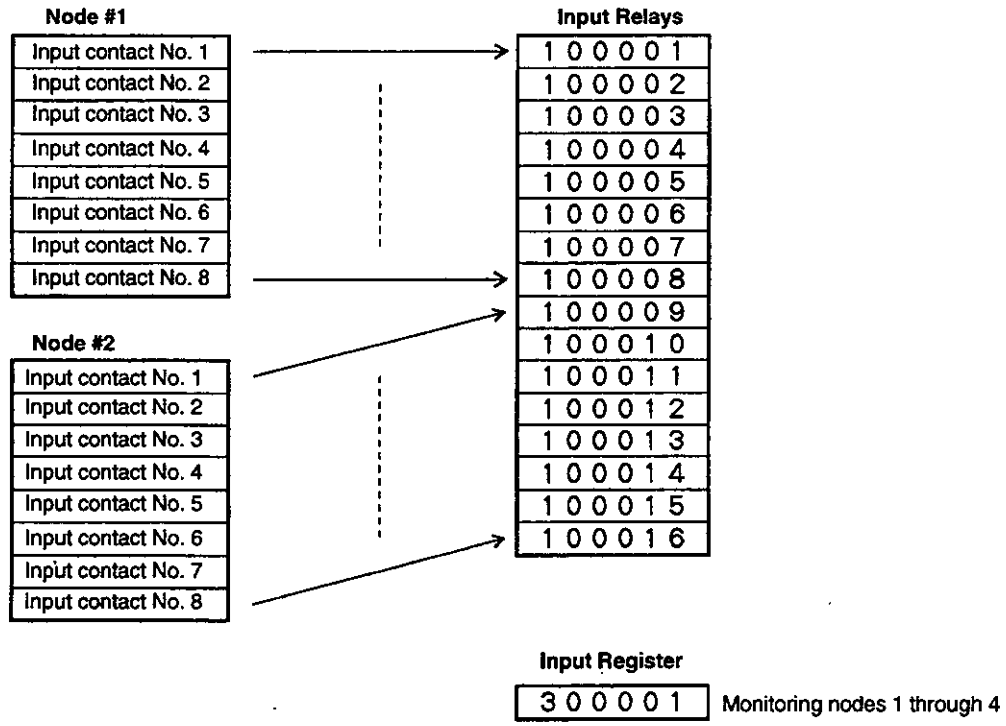


Figure 3.21 I/O Map Module Editor Screen

5) The relationship between contacts and references for the slaves is shown below.



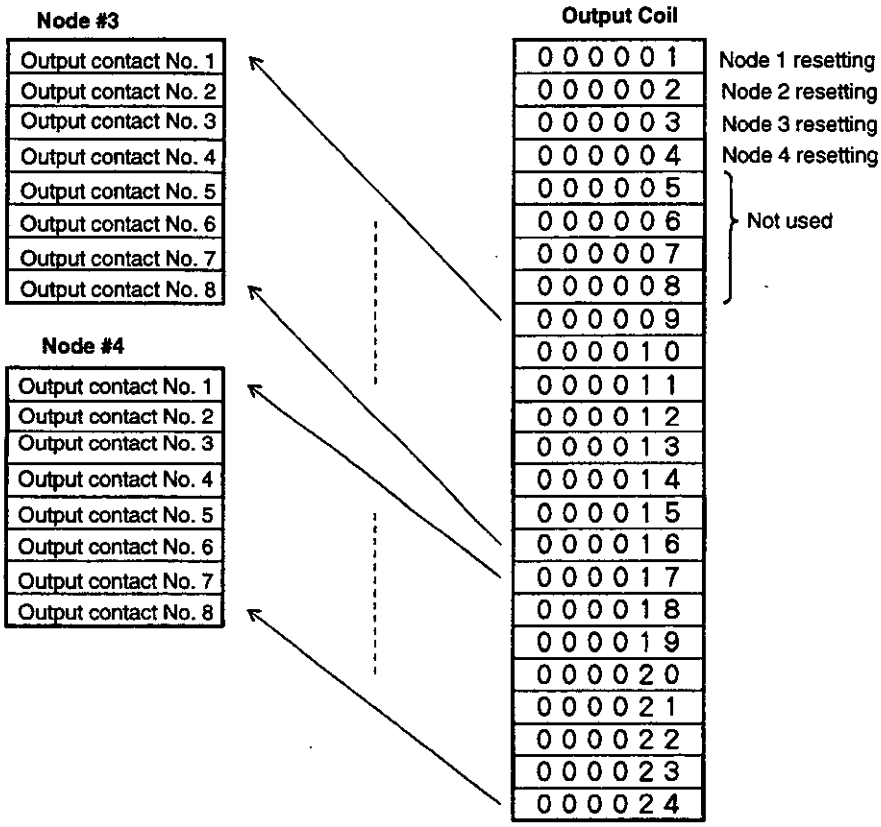


Figure 3.22 Relationship between Slave Contacts and References

3.5 Making Settings Using the MEMOSOFT

This section describes how to make settings in MEMOSOFT to use the YENET 1600-D Module.

3.5.1 Module Allocations

⚠ **Caution** The YENET 1600-D Module can be used only if the CPU Module and the MEMOSOFT used for the MEMOCON GL120, GL130 are of the versions shown in the following table.

Using the wrong versions may result in failure or malfunction.

Name	Description	Model	Applicable Version	Location of Version Indication
CPU Module (8 kW)	CPU10	DDSCR-120CPU14200	□□A01 or later	Nameplate of the Module (see note.)
CPU Module (16 kW)	CPU20	DDSCR-120CPU34100	□□B05 or later	
CPU Module (16 kW)	CPU21	DDSCR-120CPU34110	□□A01 or later	
CPU Module (32 kW)	CPU30	DDSCR-130CPU54100	□□B05 or later	
CPU Module (40 kW)	CPU35	DDSCR-130CPU54110	□□A01 or later	
Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR13100	□□A09 or later	
MEMOSOFT		FMSGL-AT3 (for DOS)	1.50□ or later	Bottom center of MEMOSOFT startup screen
		FMSGL-PP3E (for P120)		

Note The nameplate is attached to the right side of the Module.

1) The following examples can be used to made the following settings.

M/S Mode: Master Mode
Service Scan: NORMAL
Timeout Output: CLEAR

Function	References Used	Node Addresses Set
Monitor Function	Input register	1 to 16
Node Reset Function	Not used	---

Node Address	Slave Type	References Used
1	Register input (1 register) Register output (1 register)	300002 400001
2	Digital input (16 points) Digital output (16 points)	100001 to 100016 000001 to 000016

2) Move the cursor to the installation slot for the YENET 1600-D Module. You can either enter the model number (120NDN31110) directly, or enter **?** to display a list of Modules and then select the desired Module.

3) Although I/O references must be set for other Modules after the YENET 1600-D Module is selected, the I/O Map Module Editor Screen will be displayed automatically when the YENET 1600-D Module is set.

Move the cursor to the installation slot for the Module.

↓

Enter the model number, or enter ? to display a list of Modules and then select the desired Module.

↓

The I/O Map Module Editor Screen will be automatically displayed.

```
Main          Select   Zoom     Service  ⊕I/O typ          Tools    Quit
F1-------F2-------F3-------F4-------F5-------F6-------F7-[Key ?]-F8-[OFF]-F9-
                                  I/O TRAFFIC COP
 CHANNEL: 0          STATION: 1          RACK: 1/ 4
 I/Otype: GL120I/O   SERV. : ------
 Input Relay: 0      Input Reg. : 0      Out Relay  : 0      Out Reg.   : 0
 ==========================================================================
 SLOT  MODULE TYPE     INPUT          OUTPUT                DETAIL
 101
 102
 103
 104
 105   120NDN31110
 106
 107
 108
 109
 110
 111
 112
 113
 114
 115
 116
```

3.5.2 Slave Allocations

1) The cursor on the I/O Map Module Editor Screen can be moved up, down, left, and right using the Cursor Keys.

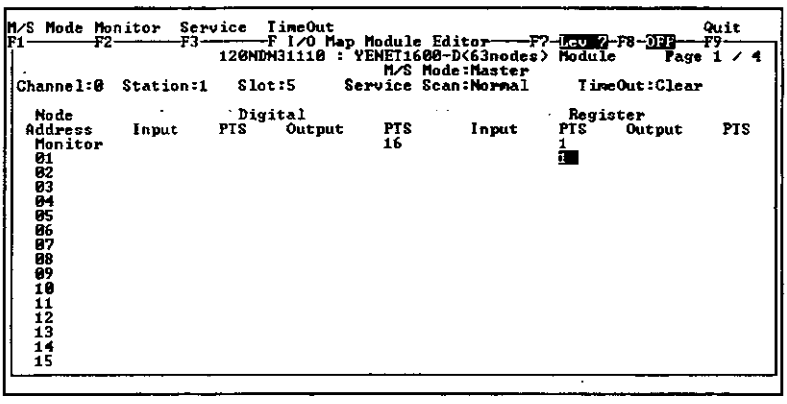
2) On the I/O Map Module Editor Screen of YENET 1600-D Module, enter numerical values directly for the number of I/O points. When setting digital references, enter in units of 4 points, and when setting register references, enter in units of 1 register.

Move the cursor to the number of registers for node address #1.

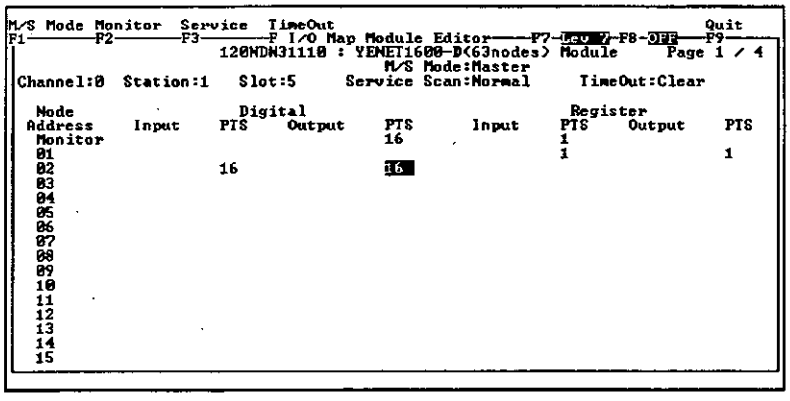
↓

In this example, enter *1* and press the **Enter** Key.

↓



Enter the number of output registers and the digital input and output settings for node #2 in the same manner.



3.5.3 Other Settings

1) Service Scan Setting

By pressing the F3 (Service) Key, either NORMAL or HIGH SPEED can be selected for the service scan setting. The default setting is NORMAL. Therefore, there is no need to change this setting in this example.

2) Timeout Output Setting

By pressing the F4 (TimeOut) Key, either OUTPUT HOLD or CLEAR can be selected for the timeout output setting. The default setting is CLEAR. Therefore, there is no need to change this setting in this example.

3) Monitor Function and Node Reset Function

By pressing the F2 (Monitor) Key, the Monitor/Node Reset Setting for Master Mode Screen appears and settings can be made for the Monitor Function and Node Reset Function.

Press the **F2** Key to display the Monitor/Node Reset Setting for Master Mode Screen.

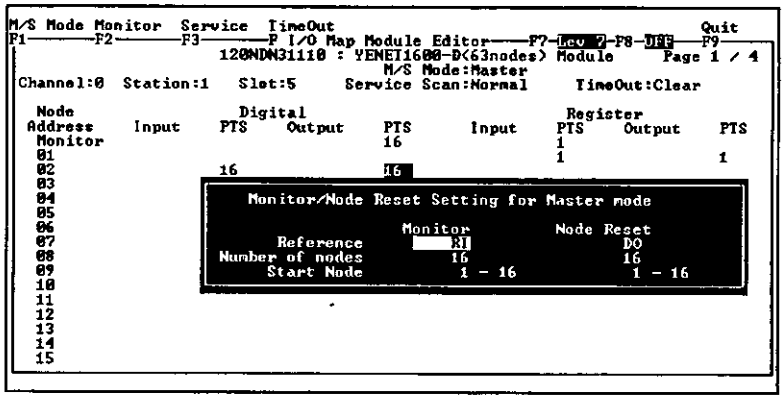
↓

Move the cursor to ***Node Reset***.

↓

Press the **Enter** Key.

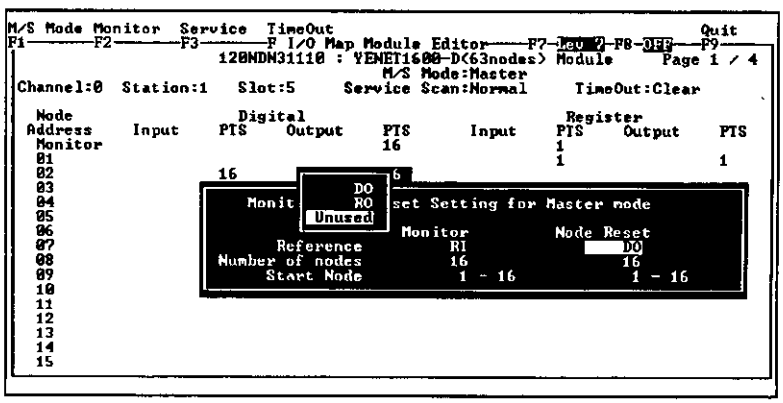
↓



Select ***Unused*** when DO, RO, and Unused appear.

↓

Press the **Esc** Key and close the screen.



3.5.4 I/O Reference Settings

1) When settings in the I/O Map Module Editor Screen have been completed, set the reference numbers to be used.

Exit the I/O Map Module Editor Screen.

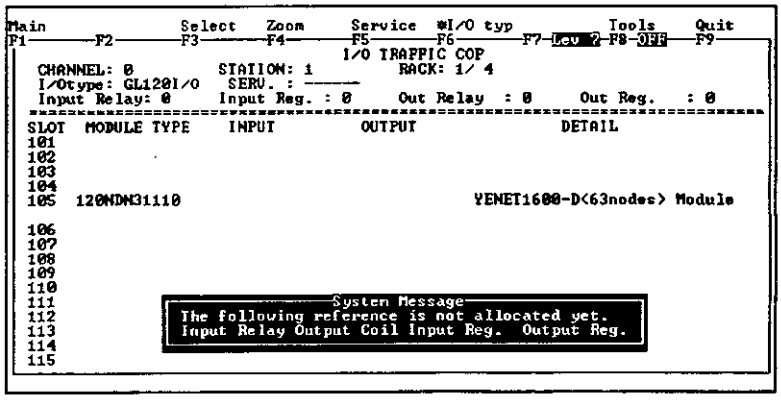
↓

Types of references that need setting will appear on screen.

↓

Press any key so that the message will disappear.

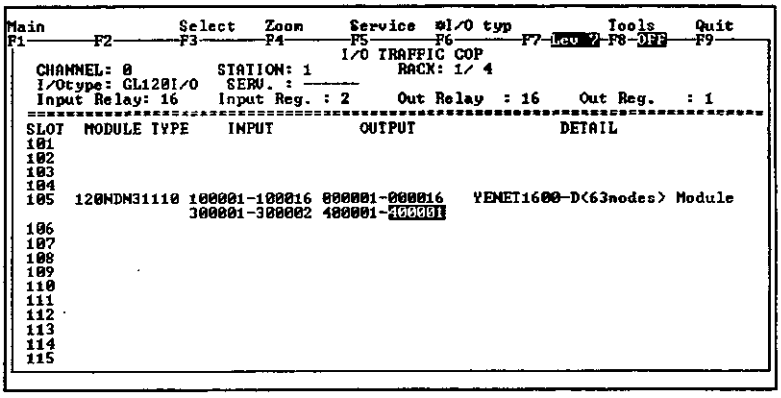
↓



Input the leading reference number of the references to be used.

↓

Make settings for all the references to be used.



INFO

1) When the I/O Map Module Editor Screen is displayed again after finishing the settings, the leading reference number for each slave node will appear.

2) The setup screen for nodes addresses 1 through 15 are available when the I/O Map Module Editor Screen is opened. By pressing the Page Up or Page Down Key, the page with node addresses 1 through 15, 16 through 32, 33 through 48, or 49 through 63 can be selected.

Operation in Slave Mode

4

4.1 Basic Operation Procedure

This section describes procedures for the basic operation of the YENET 1600-D Module in Slave Mode.

4.1.1 Slave Mode

1) The YENET 1600-D Module in Slave Mode can exchange I/O data automatically with the master device with no special programming for the CPU Module. The master device must be a YENET 1600-D Module mounted to another GL120 or GL130, or another DeviceNet master device.

2) The following figure is a conceptual diagram of operation in Slave Mode, where data is exchanged with the CPU of the Master without using a PC link.

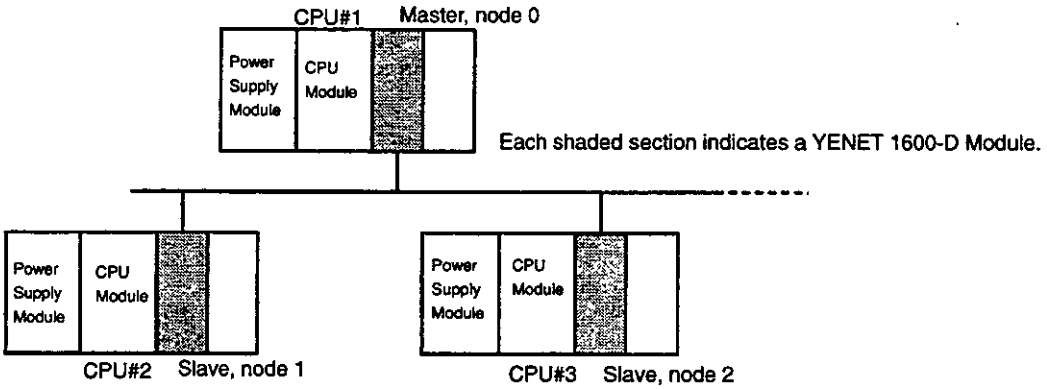


Figure 4.1 System Configuration

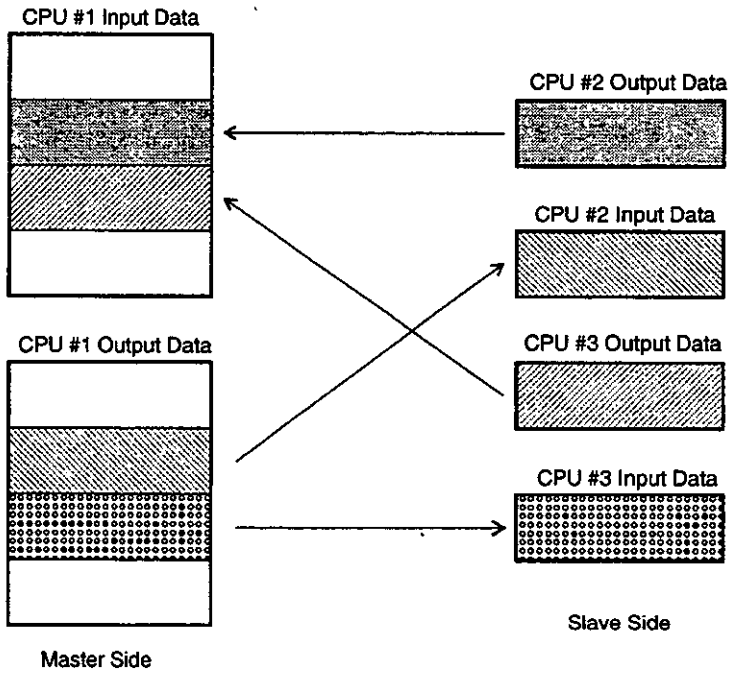
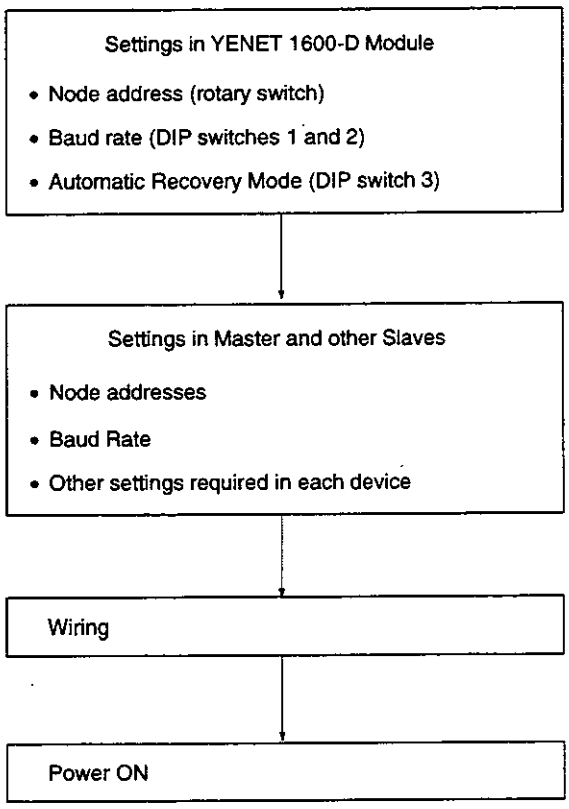


Figure 4.2 I/O Data

4.1.2 Device Setting Procedure

1) Before providing power to the system, make the necessary settings in the YENET 1600-D Module and Master.

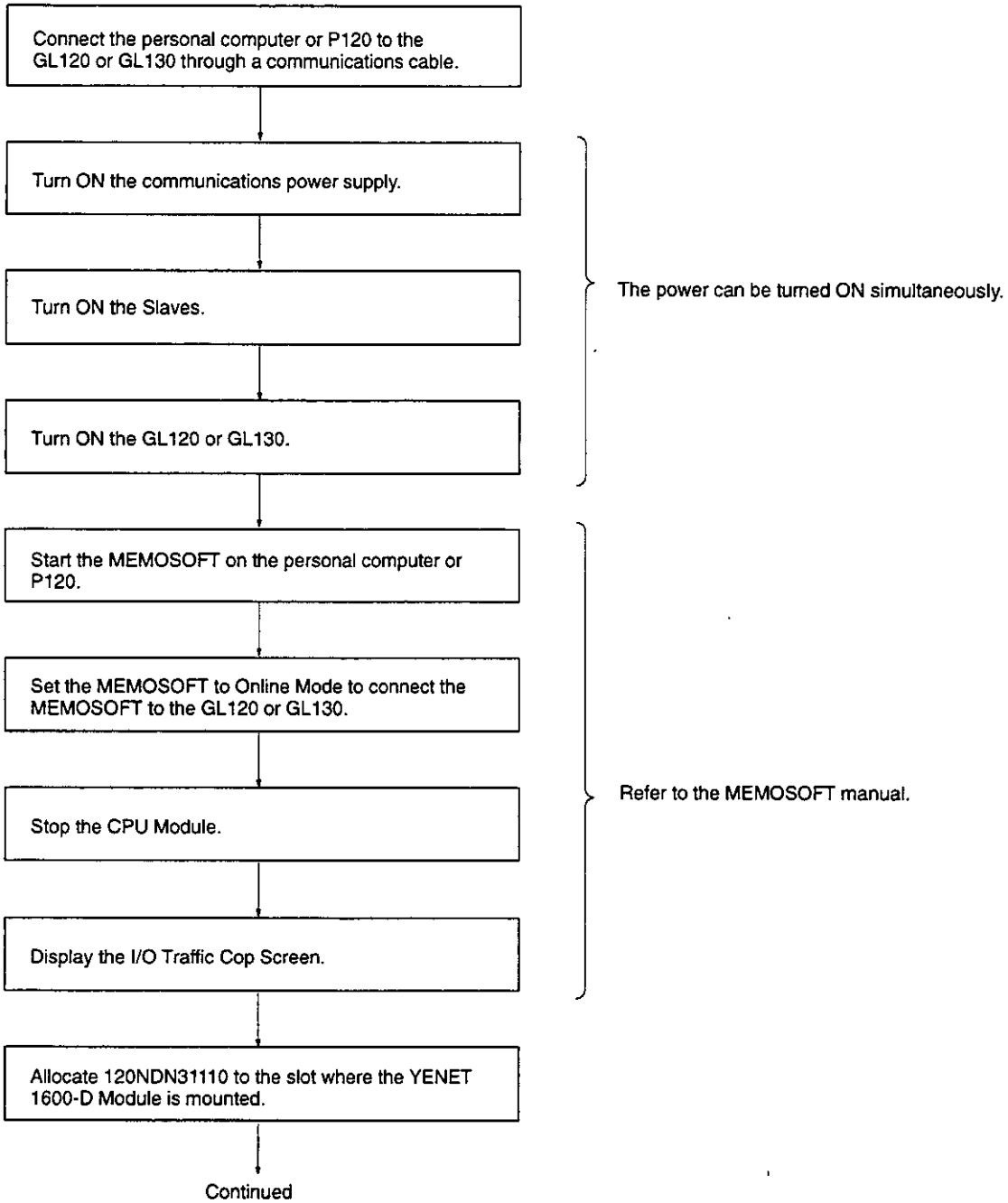
2) The following is an example of the setting procedure.

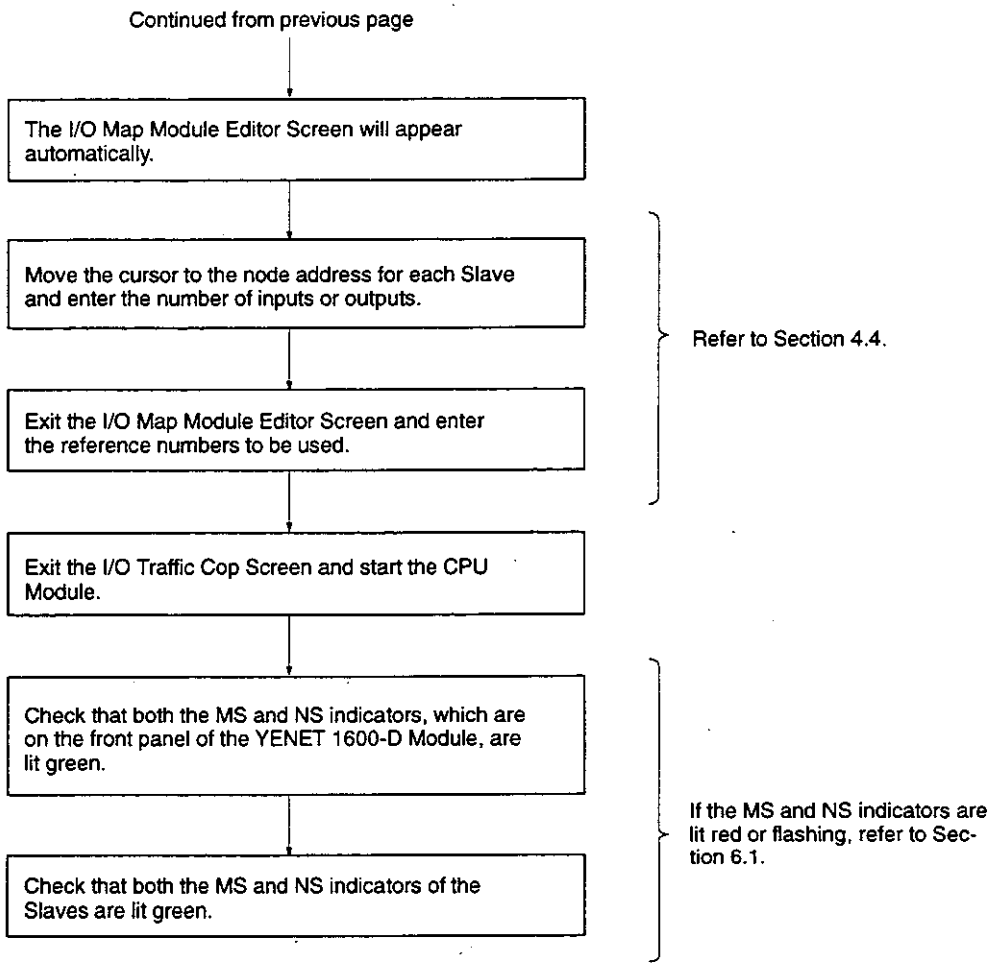


4.1.3 I/O Allocations

1) After setting the devices and wiring cables, I/O allocations are required to start YENET 1600-D communications.

2) The following diagram provides an example of the basic setting procedure using the MEMOSOFT in Online Mode. Refer to *4.4 Making Settings Using the MEMOSOFT* for details. Refer to the MEMOSOFT manuals for information on the basic operation of the MEMOSOFT.


Connect the personal computer or P120 to the GL120 or GL130 through a communications cable.
Turn ON the communications power supply.
Turn ON the Slaves.
Turn ON the GL120 or GL130.
The power can be turned ON simultaneously.
Start the MEMOSOFT on the personal computer or P120.
Set the MEMOSOFT to Online Mode to connect the MEMOSOFT to the GL120 or GL130.
Stop the CPU Module.
Display the I/O Traffic Cop Screen.
Refer to the MEMOSOFT manual.
Allocate 120NDN31110 to the slot where the YENET 1600-D Module is mounted.
Continued


Continued from previous page
The I/O Map Module Editor Screen will appear automatically.
Move the cursor to the node address for each Slave and enter the number of inputs or outputs.
Exit the I/O Map Module Editor Screen and enter the reference numbers to be used.
Refer to Section 4.4.
Exit the I/O Traffic Cop Screen and start the CPU Module.
Check that both the MS and NS indicators, which are on the front panel of the YENET 1600-D Module, are lit green.
Check that both the MS and NS indicators of the Slaves are lit green.
If the MS and NS indicators are lit red or flashing, refer to Section 6.1.

4.2 Outline of I/O Allocations

This section gives an outline of allocations for the YENET 1600-D Module using the MEMOSOFT.

4.2.1 I/O Traffic Cop Screen

1) The YENET 1600-D Module in Slave Mode can exchange I/O data automatically with the master device without any special programming in the CPU Module. The master device must be a YENET 1600-D Module mounted to another GL120 or GL130 or another DeviceNet master devices.

2) The following screen shows an example of the I/O Traffic Cop Screen.

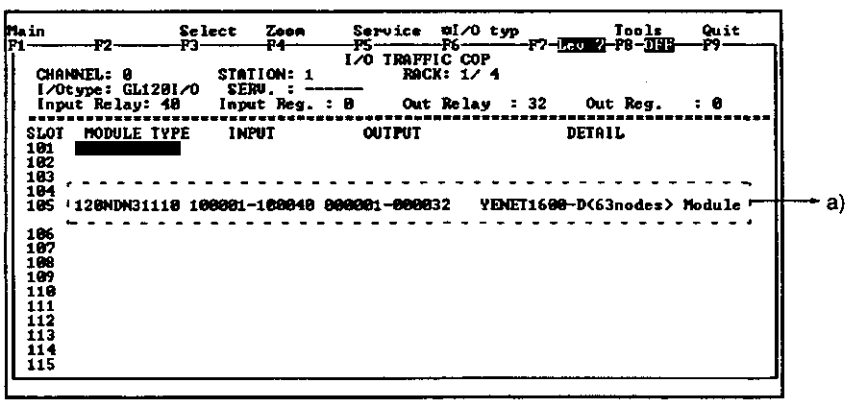


Figure 4.3 MEMOSOFT I/O Traffic Cop Screen

a) Set all the reference numbers used by the YENET 1600-D Module on the I/O Traffic Cop Screen.

4.2.2 I/O Map Module Editor Screen

1) The I/O Map Module Editor will appear automatically after finishing allocations for the YE-NET 1600-D Module on the I/O Traffic Cop Screen.

2) The following screen shows an example of the I/O Map Module Editor Screen in Slave Mode.

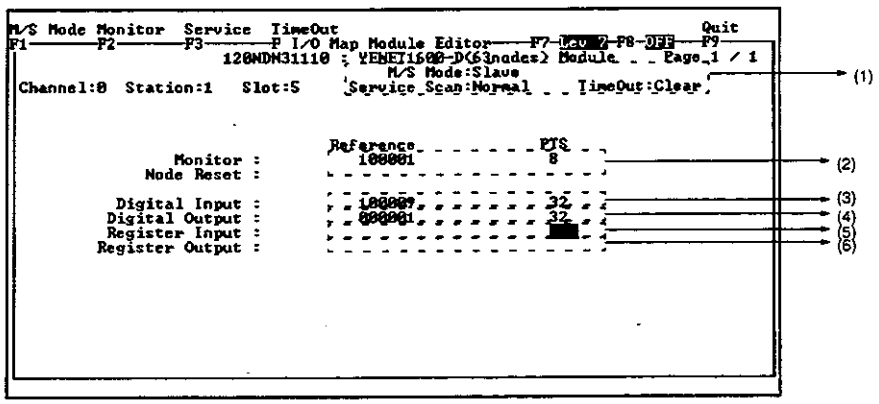


Figure 4.4 I/O Map Module Editor Screen in Slave Mode

1) Settings

Set the following three modes.

a) M/S Mode

Set the YENET 1600-D Module to Master Mode or Slave Mode. The YENET 1600-D Module is set to Master Mode by default. Change it to Slave Mode.

b) Service Scan

The service scan specifies whether the normal scan cycle or the high-speed scan cycle is used to refresh I/O data. The service scan is set to the normal scan cycle by default.

c) TimeOut (Timeout Output)

The timeout output specifies whether the last data received by the Slaves will be retained or cleared if the CPU Module stops or if data in the YENET 1600-D Module cannot be refreshed due to an error in the remote communications line. The timeout output item is set to CLEAR by default.

2) Monitor and Node Reset

Settings are displayed for the YENET 1600-D communications monitoring function and the node reset function. Settings are made by selecting the monitor settings from the menu.

3) Digital Input Points

The digital input points column shows the number of input points set for the YENET 1600-D Module as a slave receiving digital data from the master.

4) Digital Output Points

The digital output points column shows the number of output points set for the YENET 1600-D Module as a slave with digital data outputs to the master.

5) Input Registers

The input registers column shows the number of input registers set for the YENET 1600-D Module as a slave for receiving register data from the master.

6) Output Registers

The output registers column shows the number of output registers set for the YENET 1600-D Module with register data outputs to the master.

INFO

1) It is possible to set either digital I/O points or registers for a YENET 1600-D Module, but not both. For example, the YENET 1600-D Module as a slave cannot output both digital data and register data together.

2) The input and output ports can be set independently for receiving digital and register inputs.

3) When the I/O Map Module Editor Screen is displayed again after finishing with I/O allocations for the YENET 1600-D Module, the first reference number per node for each Slave will appear.

4

4.2.3 Monitor Screen

1) Press the F2 Key and select the monitor settings on the I/O Map Module Editor Screen, to display the Monitor Setting Screen so that settings for the Node Reset Function or Monitor Function can be set.

2) The following is an example of the Monitor/Node Reset Setting for Slave Mode Screen.

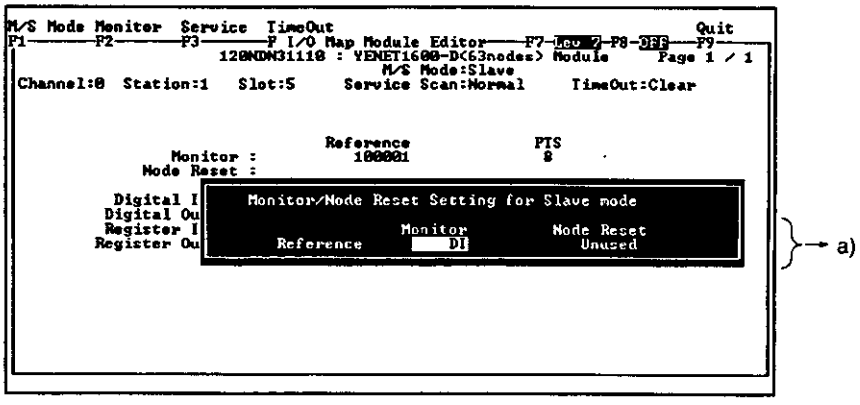


Figure 4.5 Monitor/Node Reset Setting for Slave Mode Screen

a) Reference

The reference settings determine the types of reference used in the Monitor Function and Node Reset Function. The Monitor Function can be set to ***DI*** (digital input), ***RI*** (register input), or ***Unused***. The Node Reset Function can be set to ***DO*** (digital output), ***RO*** (register output), or ***Unused***.

4.3 Monitoring YENET 1600-D Communications

This section describes the Monitor and Node Reset Functions that are used when communications errors occur in YENET 1600-D communications.

4.3.1 Outline of Communications Monitoring

1) The YENET 1600-D Module has the following two functions related to YENET 1600-D communications. These functions are operated by making Monitor Function settings on the I/O Map Module Editor Screen.

a) Monitor Function

This function is used to monitor the YENET 1600-D communications status and transmit this information to the CPU Module.

b) Node Reset Function

This function resets YENET 1600-D communications according to a command from the CPU Module.

2) When these two functions are used, the following references are required. Unlike the YENET 1600-D Module in Master Mode, a maximum of 64 input/output points is used regardless of whether the YENET 1600-D Module uses the Monitor or Node Reset Function.

Function	Reference	Remarks
Monitor Function	Input relays	Eight points are used.
	Input registers	One register is used.
Node Reset Function	Output coils	Eight points are used.
	Output registers	One register is used.

4.3.2 Monitor Function

1) The Monitor Function is used to monitor whether or not YENET 1600-D communications are operating normally and transmit the communications status information to the CPU Module. The communications status is transmitted using the rightmost bit of the input relays or the input register.

2) When the CPU Module switches from Stop to Start State, it takes approximately five seconds before the YENET 1600-D Module begins communicating normally. During this time, the input relay and input register values will not necessarily correspond with the status of the master. These bits are not set to 1 until communications are correctly established, so the validity of input data can be determined by checking these bits.

3) When these bits are set to 0, one of the following two conditions exists.

   a) The Master is not ready to communicate normally.

   b) There is a communications error between the YENET 1600-D Module and the Master.

4) The references are used in order from the lowest node address. When the Monitor Function is changed from Unused to another setting, the input reference allocation for each slave will be shifted. Refer to the example for details.

◀EXAMPLE▶ **a) Using Input Relays**

The input relay is ON when the YENET 1600-D Module is in normal communication with the Master.

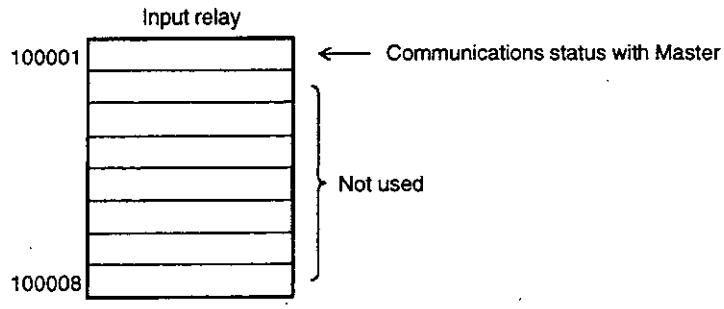


Figure 4.6 Input Relays for Monitoring

◀EXAMPLE▶ **b) Using Input Registers**

The rightmost bit of the input register is set to 1 when the YENET 1600-D Module is in normal communications with the Master.

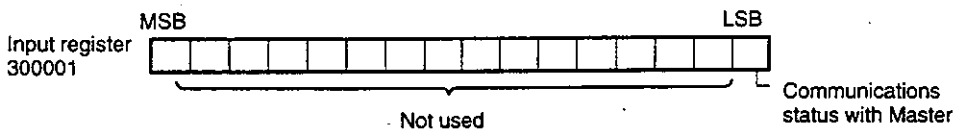


Figure 4.7 Input Register for Monitoring

4.3.3 Node Reset Function

1) This function resets communications with the master by means of an output coil or output register when the CPU Module is monitoring the communications status using the Monitor Function and determines that the communications status is BUS OFF. The YENET 1600-D Module ignores any reset commands issued for the connection with the master during normal communications. The Reset Function will be executed automatically as long as the DIP switch on the front panel of the YENET 1600-D Module is set to Automatic Recovery Mode.

2) The output coil or output register used for resetting communications uses the first reference number in the I/O allocation. When the Monitor Function is changed from Unused to another or the number of reset nodes is changed, the reference number used for output to each slave will be shifted. Refer to the example for details.

◀EXAMPLE▶ **a) Using Output Coils**

In the following example, communications with the slave are reset by turning ON the output coil corresponding to the node address of the Slave that has a communications error.

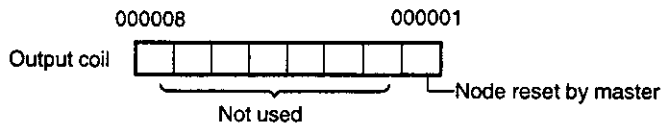


Figure 4.8 Node Reset Output Coils

◀EXAMPLE▶ **b) Using Output Registers**

In the following example, communications with the slave are reset by turning ON the output coil corresponding to the node address of the Slave that has a communications error.

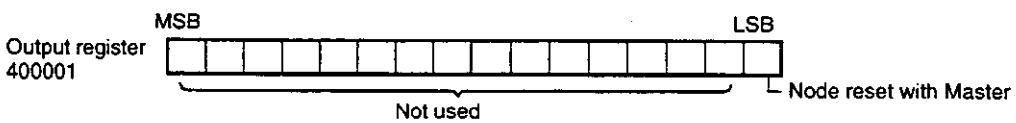
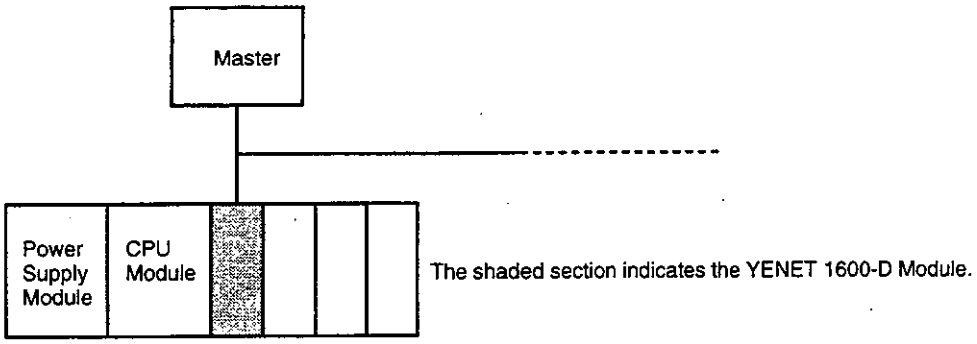


Figure 4.9 Node Reset Output Register

4.3.4 Application Example

1) The system configuration below shows a system in which the Monitor Function and Node Reset Function are used.



Function	References Used	Reference number
Monitor Function	Input register	300001
Node Reset Function	Output coils	000001 to 000008

I/O	Reference Type	Reference Number
Inputs	Register input (2 registers)	300002, 300003
Outputs	Register output (2 registers)	400002, 400003

Figure 4.10 System Configuration

2) The leading reference for input registers and the eight points in the leading reference for output coils are set for the Monitor Function and Node Reset Function. Allocate all the references used for the YENET 1600-D Module.

3) In this example, there are 8 digital input points, 2 digital output points, 3 input registers (one for monitor use plus two more), and 2 output registers. The following screens show the settings in the I/O Traffic Cop Screen and I/O Map Module Editor Screen.

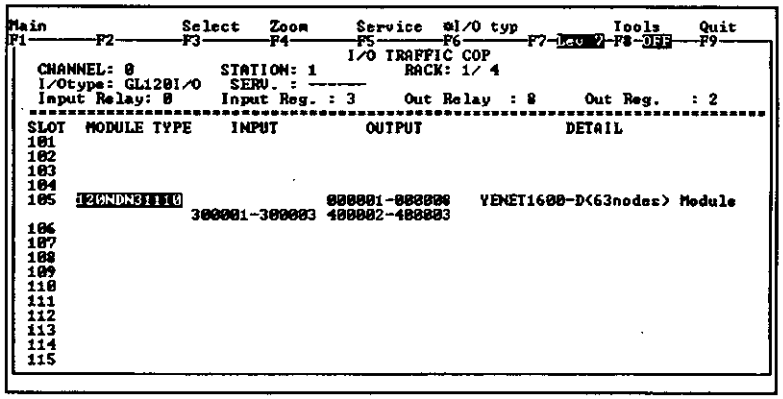


Figure 4.11 I/O Traffic Cop Screen

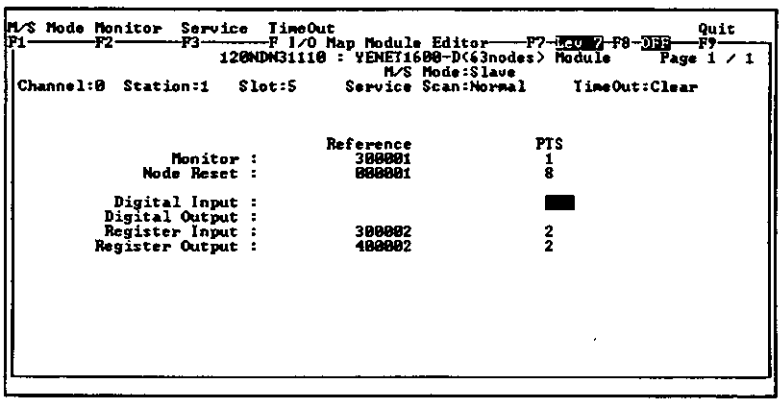


Figure 4.12 I/O Map Module Editor Screen

4) The relationship between contacts and references with the Master is shown below.

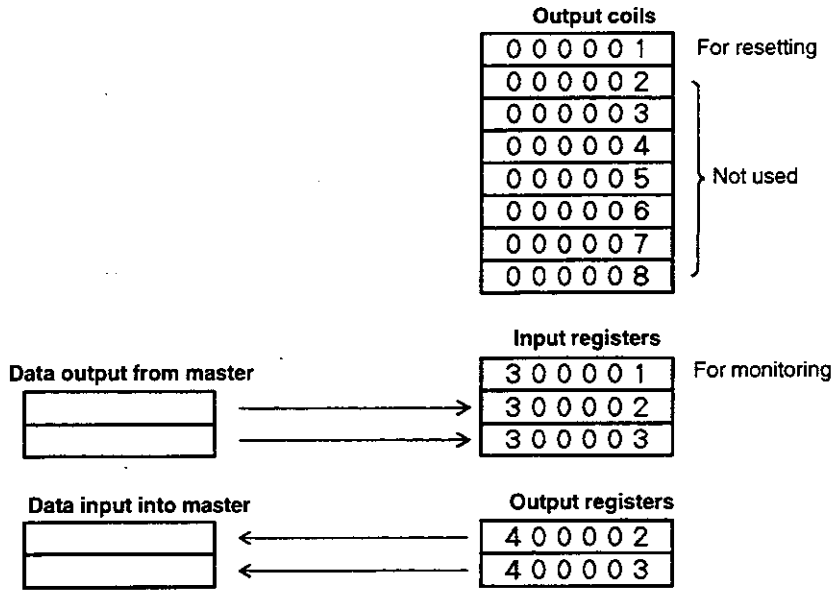


Figure 4.13 Relationship between Contacts and References with Master

4.4 Making Settings Using the MEMOSOFT

This section describes how to make settings in MEMOSOFT to use the YENET 1600-D Module.

4.4.1 Module Allocations

⚠ Caution The YENET 1600-D Module can be used only if the CPU Module and the MEMOSOFT used for the MEMOCON GL120, GL130 are of the versions shown in the following table.

Using the wrong versions may result in failure or malfunction.

Name	Description	Model	Applicable Version	Location of Version Indication
CPU Module (8 kW)	CPU10	DDSCR-120CPU14200	□□A01 or later	Nameplate of the Module (see note.)
CPU Module (16 kW)	CPU20	DDSCR-120CPU34100	□□B05 or later	
CPU Module (16 kW)	CPU21	DDSCR-120CPU34110	□□A01 or later	
CPU Module (32 kW)	CPU30	DDSCR-130CPU54100	□□B05 or later	
CPU Module (40 kW)	CPU35	DDSCR-130CPU54110	□□A01 or later	
Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR13100	□□A09 or later	
MEMOSOFT		FMSGL-AT3 (for DOS)	1.50□ or later	Bottom center of MEMOSOFT startup screen
		FMSGL-PP3E (for P120)		

Note The nameplate is attached to the right side of the Module.

1) The following examples can be used to made the following settings.

M/S Mode: Slave Mode
Service Scan: NORMAL
Timeout Output: CLEAR

Function	References Used
Monitor Function	Input relays
Node Reset Function	Not used

I/O	Reference Type	References Used
Input	Digital input (32 points)	000009 to 000040
Output	Digital output (32 points)	000001 to 000032

2) Move the cursor to the installation slot for the YENET 1600-D Module. You can either enter the model number (120NDN31110) directly, or enter **?** to display a list of Modules and then select the desired Module.

3) Although I/O references must be set for other Modules after the YENET 1600-D Module is selected, the I/O Map Module Editor Screen will be displayed automatically when the YENET 1600-D Module is set.

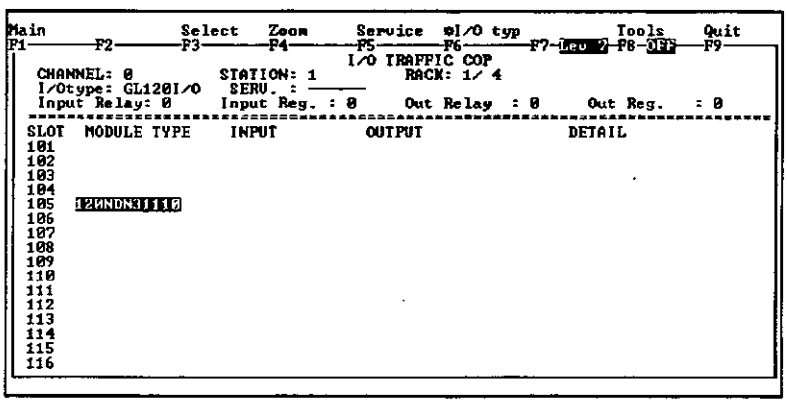
Move the cursor to the installation slot for the Module.

↓

Enter the model number, or enter ? to display a list of Modules and then select the desired Module.

↓

The I/O Map Module Editor Screen will be automatically displayed.



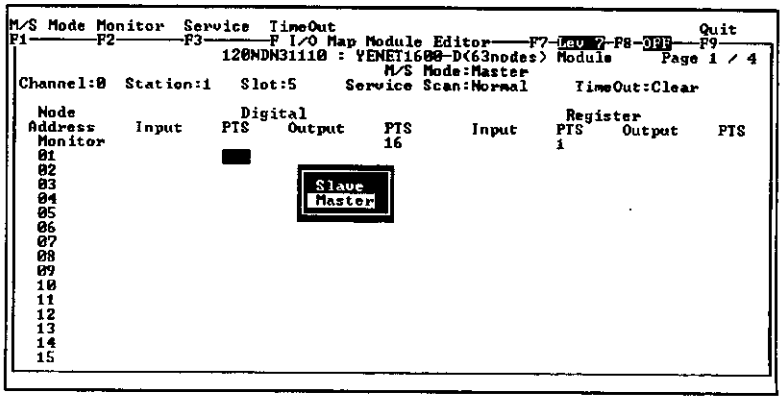
4.4.2 Outline of I/O Allocations

1) The cursor on the I/O Map Module Editor Screen can be moved up and down using the Cursor Keys like the cursor on the screens of any other I/O Module.

2) The YENET 1600-D Module is set to Master Mode by default. Therefore, it is necessary to set the YENET 1600-D Module to Slave Mode first.

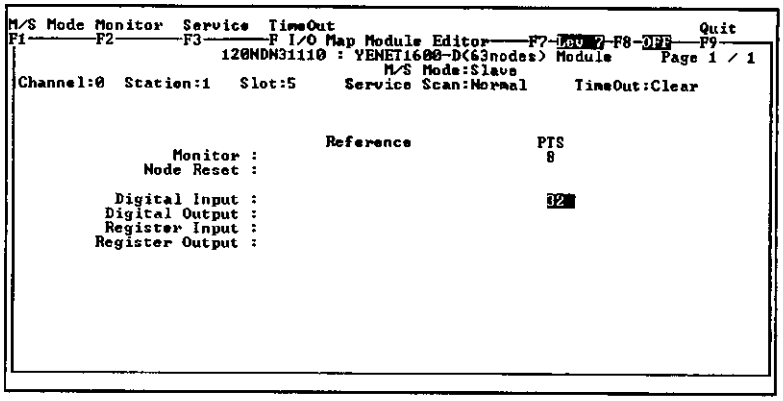
3) On the I/O Map Module Editor Screen of YENET 1600-D Module, enter numerical values directly for the number of I/O points. When setting digital references, enter in units of 4 points and when setting register references, enter in units of 1 register.

The default Master Mode window will appear. Press the F1 **(M/S Mode)** Key.



The Master/Slave Selection Window will appear. Select ***Slave***.

The Slave Mode Setup Screen will appear.



Move the cursor to digital input position, enter ***32*** and press the **Enter** Key.

Set the digital output points in the same manner.

4.4.3 Other Settings

1) Service Scan Setting

By pressing the F3 (Service) Key, either NORMAL or HIGH SPEED can be selected for the service scan setting. The default setting is NORMAL. Therefore, there is no need to change this setting in this example.

2) Timeout Output Setting

By pressing the F4 (Timeout) Key, either OUTPUT HOLD or CLEAR can be selected for the timeout output setting. The default setting is CLEAR. Therefore, there is no need to change this setting in this example.

3) Monitor Function and Node Reset Function

By pressing the F2 (Monitor) Key, the Monitor Setup Screen appears and settings can be made for the Monitor Function and Node Reset Function in the same manner as those made in Master Mode. Refer to *3.5.3 Other Settings* for details.

4.4.4 Setting I/O References

1) When settings in the I/O Map Module Editor Screen have been completed, set the reference numbers to be used.

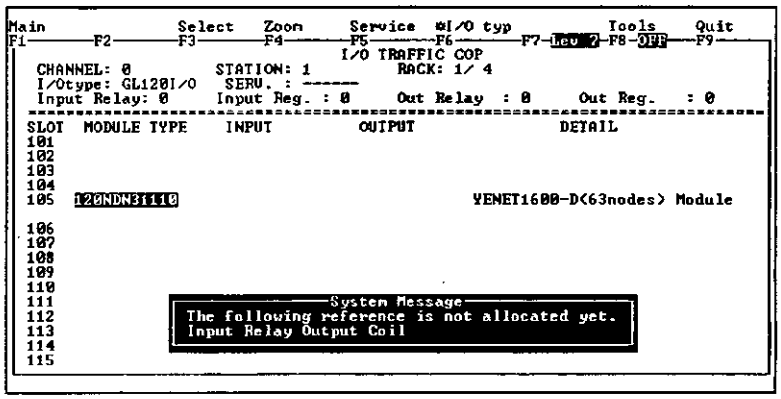
Exit the I/O Map Module Editor Screen.

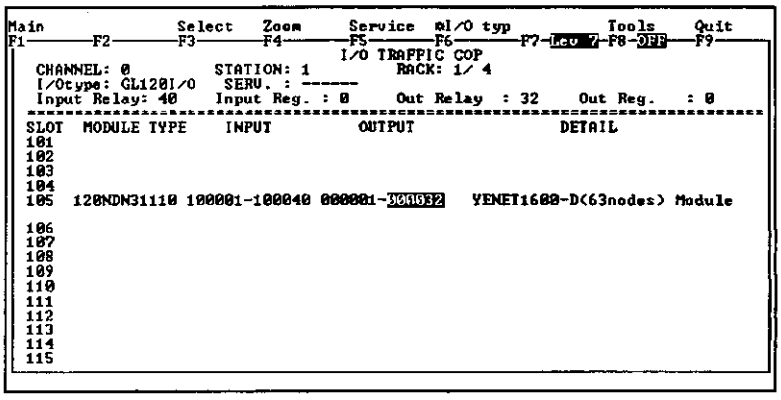
The types of references that need setting will appear on screen.

Press any key so that the message will disappear.

Input the leading reference number of the references to be used.

Make settings for all the references to be used.





INFO When the I/O Map Module Editor Screen is displayed again after finishing the settings, the leading reference number for each slave node will appear.

Wiring

5

5.1 Location of Communications Power Supply

This section describes the installation of the communications power supply and the calculations for the location of the power supply.

5.1.1 Basic Precautions

1) The communications power supplied to the network must be 24 VDC.

2) The communications power supply must have a sufficient margin in the capacity.

3) Connect the communications power supply to the trunk line.

4) If many nodes are provided with power from a single power supply, locate the power supply as close as possible to the middle of the trunk line.

5) The permissible current flow in a Thick Cable is 8 A and that in a Thin Cable is 3 A.

6) The power supply capacity for a drop line varies with the drop line length. The longer a drop line is, the lower the maximum current capacity of the drop line will be regardless of the thickness of the drop line. Obtain the permissible current (I) of the drop line (i.e., the permissible current consumption of the drop line and devices connected to it) from the following equation.

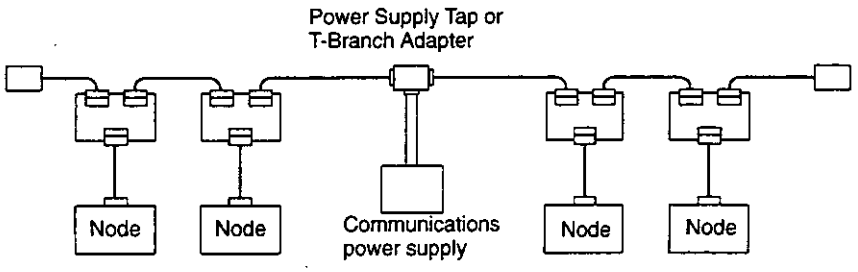
$I=4.57/L$ I: Permissible current (A)
L: Drop line length (m)

7) If the communications power supply is turned OFF while the network is operating, errors may occurs in the nodes that are communicating at that time.

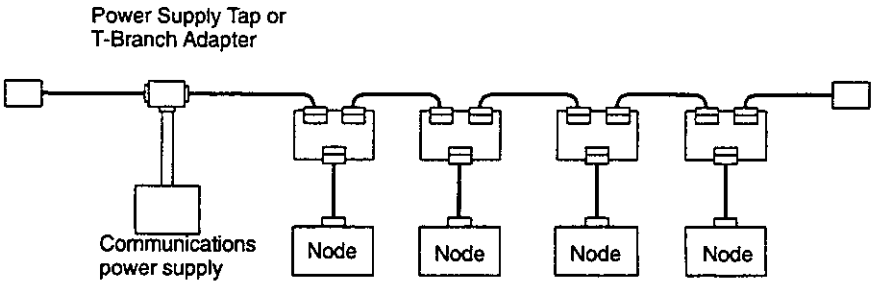
5.1.2 Location of Power Supply

The following two types of configuration are possible for the location of the power supply.

1. Nodes on Both Sides of the Power Supply



2. Nodes on One Side of the Power Supply



Note Method (1.) is recommendable if a single power supply is connected to many nodes.

5.1.3 Determining the Power Supply Location

1) The current required by each node and the line drop on the power supply cable will determine whether or not each node is provided with the proper current. First, calculate the following values.

   • Current required by each node

   • Distance from the power supply

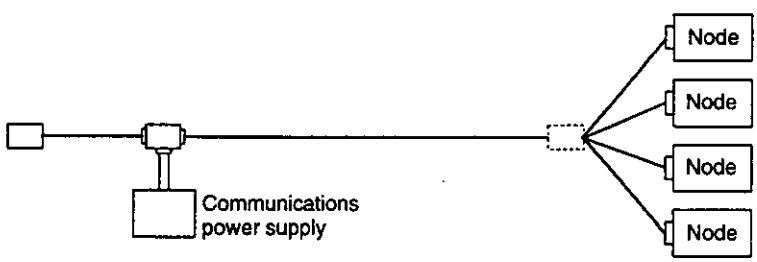
2) The following two methods are available to calculate the power supply for the trunk line.

   a) Simply Read Values from a Graph

   b) Calculate values using equations (Calculate the line drop from the transmission cable resistance and current consumption.)

      Make sure that each drop line satisfies the condition provided at item 6) under *5.1.1 Basic Precautions.*

   • The graph was prepared for the worst possible conditions, i.e., those that would create the maximum line drop as shown in the following configuration. Therefore, if the power supply satisfies the values obtained from the graph, the nodes will operate normally.



- If the power supply does not satisfy the values obtained from the graph, check whether the power supply satisfies the values obtained from the equation. If the power supply satisfies the equation, the nodes will operate normally.

Note (1) Separate power supplies should be used for the communications power supply and the internal circuit power supply.

(2) If a single power supply is used for both the communications and internal-circuit power supply, the graph cannot be used. Use the equations to obtain the proper values.

3) Read Values from a Graph

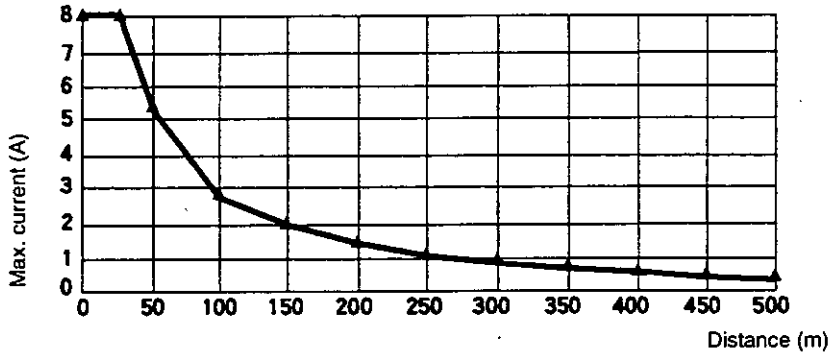
The communications power supply to each node must be 11 VDC minimum for the nodes to communicate stably.

A line drop occurs when a current flows through the transmission cable. The longer the cable or the larger the current is, the larger the line drop will be.

The following tables and graphs give the maximum current flow required to supply all nodes with sufficient voltage for Thin Cables and Thick Cables.

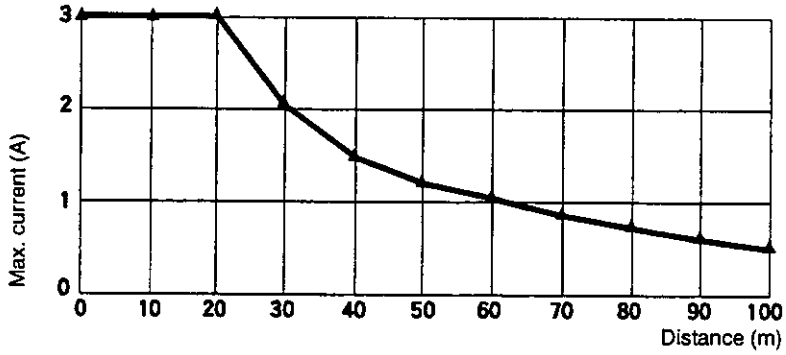
a) Thick Cable

Distance (m)	0	25	50	100	150	200	250	300	350	400	450	500
Max. current (A)	8.00	8.00	5.42	2.93	2.01	1.53	1.23	1.03	0.89	0.78	0.69	0.63



b) Thin Cable

Distance (m)	0	10	20	30	40	50	60	70	80	90	100
Max. current (A)	3.00	3.00	3.00	2.06	1.57	1.26	1.06	0.91	0.80	0.71	0.64



(1) Checking the Power Supply

The following checks must be made on each node located in the same direction from the power supply. If nodes connected to the network are located on both sides of the power supply, make the checks on each node in the both directions. The graph to be used varies with the type of trunk line (i.e., a trunk line using Thick Cable or Thin Cable).

(1) Calculate the total current consumption (A) of all the nodes in the same direction.

(2) Calculate the maximum current flow (B) of the trunk line based on the type of trunk line and the total distance of the trunk line from the power supply.

(3) All nodes will be provided with proper power if A ≦ B.

(4) If nodes are connected to the network on both sides of the power supply, check the power supply to the nodes in the other direction as well by repeating steps 1 through 3, above.

(2) Countermeasures

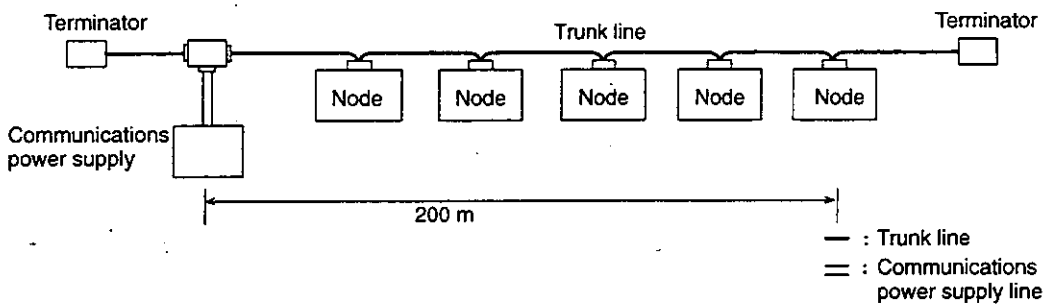
If A > B as a result of the above check, take the following countermeasures.

- Relocate the power supply toward the middle of the trunk line so that nodes are connected to the network on both sides of the power supply.
- If nodes are already connected to the network on both sides of the power supply, relocate the power supply towards the side that requires the higher power supply capacity.
- If Thin Cable is used, replace it with Thick Cable.

If the result does not change in spite of the above countermeasures, use the equations to calculate the values by taking the actual location of each node into consideration.

◀EXAMPLE▶ **(1) Power Supply Located at One End of Network**

In the following example, a communications power supply is located at an end of a trunk line that has a total length of 200 m using Thick Cable.



Total length of power supply line: 200 m

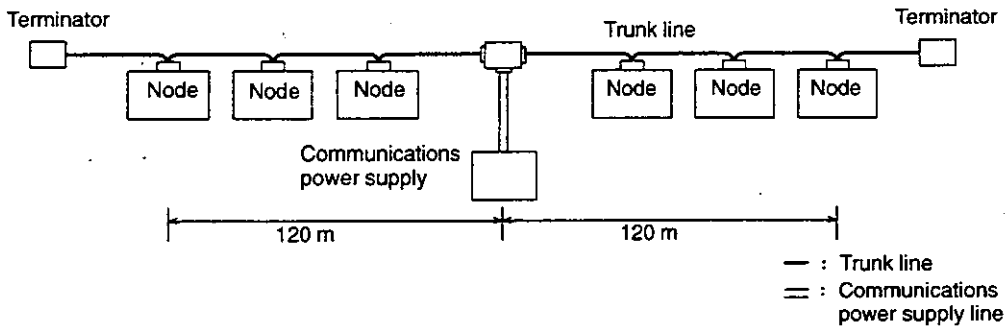
Total current consumption: 0.2 A + 0.1 A + 0.05 A + 0.2 A + 0.15 A = 0.7 A

Max. current obtained from graph: 1.53 A

The maximum current is larger than the total current consumption. Therefore, all nodes will be provided with the proper power supply.

◀EXAMPLE▶ **(2) Power Supply Located in Middle of Trunk Line**

In the following example, a communications power supply is located in the middle of a trunk line that has a total length of 200 m using Thick Cable.



Total length of power supply line on left side = Total length of power supply line on right side = 120 m

Total current consumption on left side: 0.2 A + 0.3 A + 0.1 A = 0.6 A

Total current consumption on right side: 0.25 A + 0.15 A + 0.1 A = 0.5 A

Max. current on left side obtained from graph: Approx. 2.5 A

Max. current on right side obtained from graph: Approx. 2.5 A

The maximum current on the left side is larger than the total current consumption on the left side. The maximum current on the right side is larger than the total current consumption on the right side. Therefore, all nodes will be provided with the proper power supply.

4) Using Equations

If the power supply does not satisfy the values obtained from the graph, check whether the power supply satisfies the values obtained from the equations.

a) Equations

(1) Separate Power Supplies for Communications and Internal Circuits

Check the distance between the power supply and each node and the current consumption of the communications section of each node. If they satisfy the following equation, all nodes will be provided with the proper power supply. Make sure that maximum current capacity of the trunk line using a Thick Cable does not exceed 8 A and that of the trunk line using a Thin Cable does not exceed 3 A.

Equation: Σ (Ln x Rc + Nt x 0.005) x In $\leqq$ 4.65 V

Ln: Distance between power supply and node (drop line length excluded)

Rc: Max. cable resistance (Thick Cable: 0.015 Ω/m; Thin Cable: 0.069 Ω/m)

Nt: No. of Adapters between power supply and node

In: Required current consumption of communications section at node

0.005 Ω: Contact resistance of Adapter

(2) Single Power Supply for both Communications and Internal Circuits

The permissible voltage range is different for the communications and internal circuit power supplies, as given below. Never use a single power supply for communications and internal circuits unless absolutely unavoidable.

Permissible voltage for communications power supply: 11 to 25 VDC
Permissible voltage for internal circuit power supply: 24 VDC +10%/–15%

Check the distance between the power supply and each node and the current consumption of the communications section of each node. If they satisfy the following equation, all nodes will be provided with the proper power supply. Make sure that maximum current capacity of the trunk line using a Thick Cable does not exceed 8 A and that of the trunk line using a Thin Cable does not exceed 3 A.

Equation: $\Sigma [(Ln \times Rc + Nt \times 0.005) \times In] \leqq 0.65$ V

Ln: Distance between power supply and node (drop line length excluded)

Rc: Max. cable resistance (Thick Cable: 0.015 Ω/m; Thin Cable: 0.069 Ω/m)

Nt: No. of Adapters between power supply and node

In: Required total current consumption of communications and internal-circuit power supply sections of node

0.005 Ω: Contact resistance of Adapter

b) Countermeasures

If the required equation is not satisfied, take the following countermeasures.

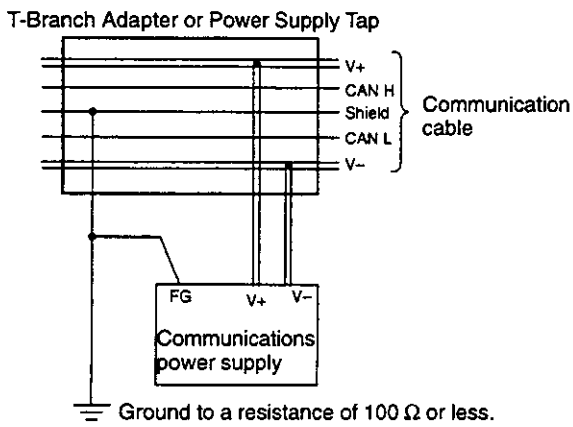
- Relocate all nodes with high current consumption closer to the power supply.
- Relocate the power supply towards the middle of the trunk line so that nodes are connected to the network on both sides of the power supply.
- If nodes are already connected to the network on both sides of the power supply, relocate the power supply towards the side that requires higher power supply capacity.
- If Thin Cable is used, replace it with Thick Cable.

5.2 Grounding Network

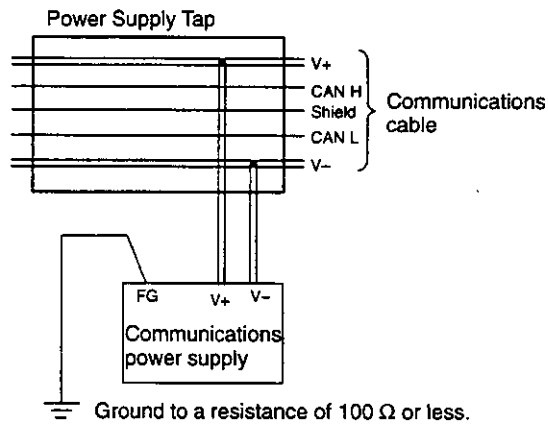
This section provides information on the grounding of the network.

5.2.1 Grounding

1) Ground the network at a single point so that there will be no ground loop while the network is in YENET 1600-D communications. The ground point on the network must be as close as possible to the middle of the network. As shown below, connect the shield wire of the cable to the FG terminal of the communications power supply and ground the shield wire to a resistance of 100 Ω or less.



Power Supply with Single-point Ground



Power Supply without Ground

2) If more than one communications power supply is used, ground only the power supply that is located closest to the middle of the network through the shield wire. Do not ground the power supply through the shield wire at any other point. If more than one communications power supply is connected to the network, connect them using a Power Supply Tap each. Power supplies are counted as nodes.

Note (1) Ground the network to a resistance of 100 Ω or less.

(2) Do not ground the network together with servodrivers or inverters.

(3) Do not ground the network at more than one point; ground at at a single point only.

Troubleshooting

6

6.1 Alarm Displays

This section described the LED indicators that light when an error occurs in the Module. The indicators on the front panel of the Module indicate the type of error that has occurred.

6.1.1 READY Indicator

The READY indicator indicate the startup status of the Module.

READY Indicator	Module Status	Condition/Action
Not lit	Power not supplied.	Check the power supply to the Module.
Flashing	Waiting for I/O allocations	There are no I/O allocations to the Module. Check if the MS and NS indicators. If neither the MS nor the NS indicator is red, the CPU Module has not been in a RUN state since power was turned ON.
Lit	Normal	---

6.1.2 MS Indicator

The MS indicator indicates the status of the Module.

MS Indicator		Module Status	Condition/Action
Green	Red		
Not lit	Not lit	Power not supplied.	Check the power supply to the Module.
Lit	Not lit	Normal	---
Not lit	Lit	Module error	A timeout error or ROM/RAM check error has occurred. Replace the Module.
Not lit	Flashing	DIP switch setting error (cyclic flashing)	The DIP switch settings are incorrect. Check the setting on the DIP switch on the front panel.
		Data error (flashes 3 times)	The I/O allocation data is incorrect. Check the following. • Has I/O been allocated for all of the Slaves that are connected? • Has I/O been allocated to the node address assigned to the Master? (Nothing should be allocated to the node address of the Master.)

6.1.3 NS Indicator

The NS Indicator indicates the YENET 1600-D communications status.

NS Indicator		Module Status	Condition/Action
Green	Red		
Not lit	Not lit	Offline	Check the power supply to the Module. If the power supply is normal, the YENET 1600-D has not started communications processing.
Flashing	Not lit	Communications not established.	The network is in normal operation but YENET 1600-D communications have not been established.
Lit	Not lit	Normal	YENET 1600-D communications are in normal operation.
Not lit	Lit	Fatal error	The same node address has been used twice or a BUS OFF error has occurred in YENET 1600-D communications. 1) Make sure that each node address is used only once. 2) Check that both ends of the network are connected to a terminator and that there is no noise interference. Also check the power supply to the Slaves.
Not lit	Flashing	Timeout (cyclic flashing)	A timeout error has occurred in communications with one of the Slaves. Check the power supply to the Slaves. Check with the MEMOSOFT that the number of devices connected agrees with the I/O allocations.
Not lit		Communications power supply error (flashes 3 times)	An error has occurred in the communications power supply. Check to be sure that the communications power supply is ON.

MEMOCON GL120,GL130
YENET 1600-D MODULE
USER'S MANUAL

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YASKAWA ELECTRIC CORPORATION

YASKAWA

MANUAL NO. SIEZ-C825-70.20

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for ongoing product modifications and improvements.