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Ge Series Six 6

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In Stock! Remote I/O Receiver Module IC600Y IC600YB

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MODULE SPECIFICATIONS

- Dimensions:
  Circuit Board: 8.15 x 11.0 (inches)
  208 x 280 (mm)
  Faceplate: 12.46 x 1.175 (inches)
  317 x 30 (mm)
- Humidity: 5% - 95% (non-condensing)
- Storage Temperature: 0^{o} to 70^{o}C
- Power Requirements:

  Twisted-Pair Interface +5 Vdc, 2A
  (supplied by Standard I/O Rack P.S.)

  Modem Interface, +5 Vdc, +12 Vdc, -12 Vdc
  (supplied by High-Capacity I/O Rack P.S.)
- Operating Temperature: 0^{o} to 60^{o}C (outside rack)

TWISTED-PAIR CABLE SPECIFICATIONS

- Length, Maximum - 10,000 feet (3 kilometers)
- Two Individual Shielded, Twisted Pairs
- 22 AWG, Minimum
- 15 pf/foot, Maximum } Maximum signal loss of 20 db (total) at 100 KHz.
- Cable Type - National Electric Cable Co. 22P1SLCBT or equivalent
- Connector (Driver and Receiver End) - D-Subminiature Type, Cannon DBC25P with 207908-7 Hood or Equivalent (Standard RS-232C Connector)

RS-232C (MODEM) CABLE SPECIFICATIONS

- Length, Maximum - 50 feet (15 meters)
- Overall Shield
- 24 AWG, Minimum
- Connector, Driver or Receiver End - D-Subminiature Type, Cannon DBC25P with 207908-7 Hood or Equivalent (Standard RS-232C Connector)
- Connector, Modem - User Selected

NOTE ON MODEM SELECTION

When selecting a modem, be sure to specify one that is compatible with the Series Six Remote I/O.

Modems must be truly asynchronous at the desired baud rate. (Some modems are claimed to be asynchronous but in actuality place restrictions on data flow.)

The following RS-232-C signals are used:

PIN	SIGNAL
1	Chassis Ground (modem side only)
2	Tx Data
3	Rx Data
7	Signal Ground

In order to utilize auto-synchronization, some modems need to be configured according to the data format used. With Remote I/O, transmission can be in any of the following formats (user-selectable):

110 Baud, 12 bits/char. with either parity
110 Baud, 12 bits/char. with no parity*
300, 1200, 2400, 9600, 19.2K, 57.6K Baud, { 11 bits/char. with either parity; 11 bits/char. with no parity }

(Factory setting is 57.6K baud, 11 bits/char. ODD parity.)

*When no parity is selected, verticle checksum error-checking is still in place.

At 1200 baud, Racal-Vadic 3450 Series modems work well when configured for 11 bit characters.

Modems which require at least one character time delay between messages (not truly asynchronous operation) may not function in Remote I/O systems.

FIGURE 1. SPECIFICATIONS

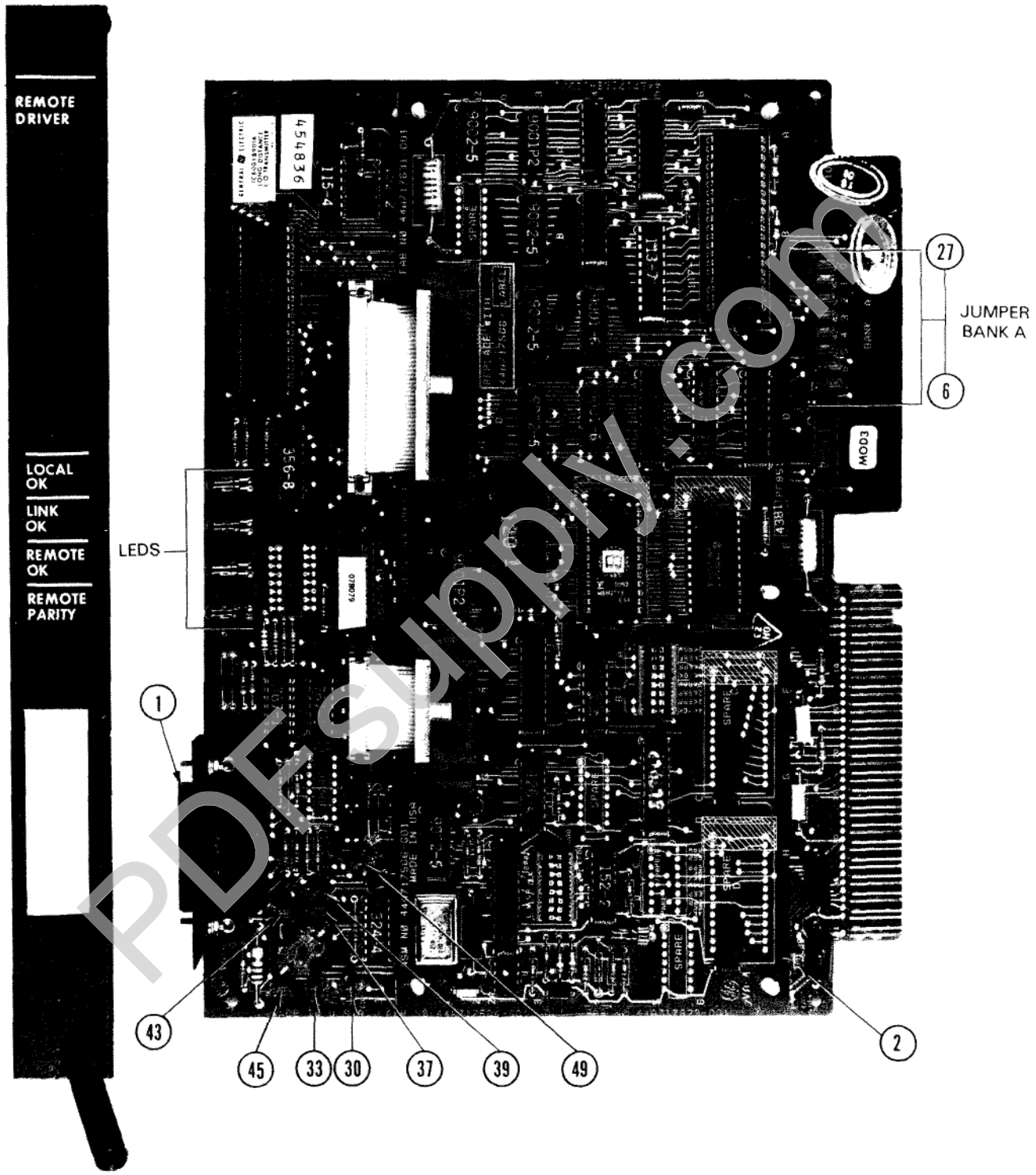

FIGURE 2. REMOTE I/O DRIVER USER ITEMS (Part 1 of 2)

① J3 Connector: Communications interface cable connector (For link to Remote I/O Receiver or Modem).

JUMPER	FUNCTION	FACTORY SETTING		ALTERNATE SETTING	
②	Quantity of I/O	1-2	(120)	2-4	(248)
BANK A ⑥	Remote Parity Error Effect[1]	6-7	(Halt)	5-6	(Run)
⑨	Comm. Failure Effect[1]	9-10	(Halt)	8-9	(Run)
⑫	Odd/Even	12-13	(Odd)	11-12	(Even)
⑮	Parity	15-16	(Yes)	14-15	(No)
⑱	Factory Set	18-19		None	
㉑	Baud Rate	21-22	(MSB)	20-21	
㉔		24-25		23-24	
㉗		27-28	(LSB)	26-27	
㉚	Carrier Detect	30-50	(No)	29-30	(Yes)
㉝	Clear-To-Send	33-51	(No)	32-33	(Yes)
㉗	Output Mode	36-37	(Tw. Pair)	35-37	(RS-232C)
㉙		38-39		39-40	
㊸	Input Mode	42-43	(Tw. Pair)	41-43	(RS-232C)
㊺		44-45		45-46	
㊾	Sensitivity	48-49	(Med)	47-49	(Min)

LED INDICATORS

LED	DESCRIPTION
LOCAL OK	ON - Remote I/O Driver module operating normally. OFF - Fault in Remote I/O Driver.
LINK OK	ON - Communications link between this module and Remote Receiver good. OFF - Communications error between this module and Remote Receiver.
REMOTE OK	ON - Remote system is operating normally. OFF - Fault exists in Remote I/O system. (Power supply failure, cable loose, module not seated properly, etc.).
REMOTE PARITY	ON - Remote system has no parity errors, operation normal. OFF - Parity error detected in Remote I/O system, CPU will stop unless option jumper on this module set for CPU to RUN when error detected.

FIGURE 2. REMOTE I/O DRIVER (Part 2 of 2)

1. The Hold Last State and the Remote Parity Error Effect or Communications Failure Effect functions are available with Remote Driver/Remote Receiver modules revision C (P/N IC600BF901C/IC600BF801C or IC600YB901C/IC600YB801C, respectively). These functions do not operate properly with earlier revisions. If you require use of these functions on earlier modules, please contact the GE Fanuc Field Service Group at 804-978-5624 for assistance.

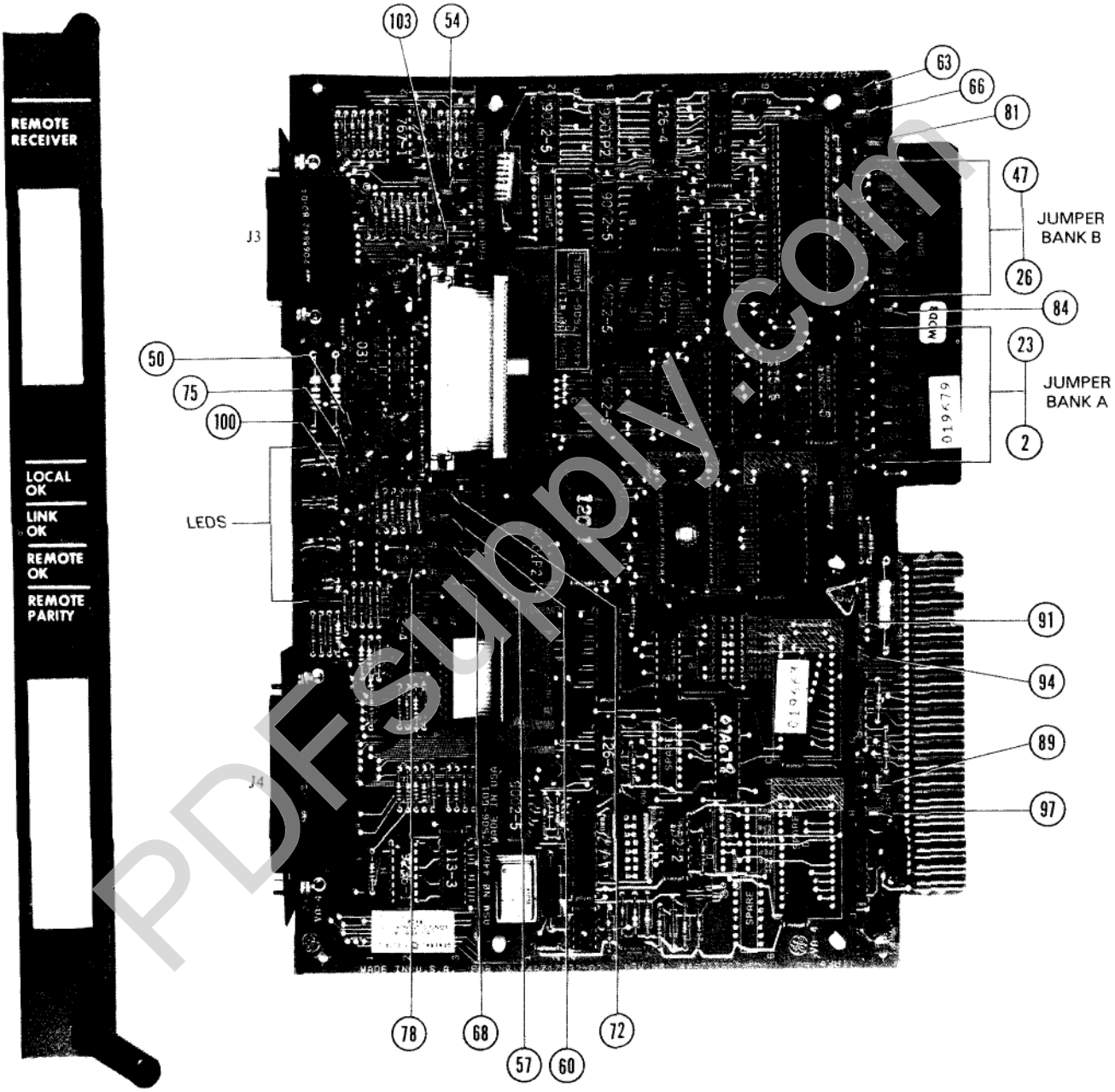

FIGURE 3. REMOTE I/O RECEIVER USER ITEMS (Part 1 of 3)

① J3 Connector: Communications interface cable connector (For link to Remote I/O Receiver or Modem).

③ J4 Connector: Connector for cable link to other I/O racks in Remote I/O station.

	JUMPER	FUNCTION	FACTORY SETTING		ALTERNATE SETTING	
BANK A	②	Factory Set	1-2		None	
	⑤	Comm. Failure Effect[1]	4-5	(Out.OFF)	5-6	(Out.Hold)
	⑧	Odd/Even	7-8	(Odd)	8-9	(Even)
	⑪	Parity	10-11	(Yes)	11-12	(No)
	⑭	Factory Set	13-14		None	
	⑰	Baud Rate	16-17	(MSB)	17-18	
	⑳		19-20		20-21	
	㉓		22-23	(LSB)	23-24	
BANK B	㉖	Factory Set	25-26		None	
	㉙	Factory Set	28-29		None	
	㉜	Factory Set	31-32		None	
	㉟	Factory Set	34-35		None	
	㊳	Factory Set	37-38		None	
	㊶	Factory Set	40-41		None	
	㊹	Factory Set	43-44		None	
	㊼	Factory Set	46-47		None	
	㊹	Sensitivity	53-54	(Med.)	52-54	(Min.)
	㊼	Carrier Detect	57-0V	(No)	56-57	(Yes)
	㊿	Clear-To-Send	60-0V	(No)	59-60	(Yes)
	㊸	Output Mode	63-64	(Tw. Pair)	62-63	(RS-232C)
	㊻		65-66		66-67	
	㊿	Input Mode	49-50	(Tw. Pair)	50-51	(RS-232C)
	㉓		102-103		103-104	
	㊽	Factory Set	68-0V		None	
	㉒	Factory Set	72-0V		None	
	㉕	Factory Set	74-75		None	
	㉘	Factory Set	78-79		None	
	㉙ SET	Second Rack Present	88-89	(Yes)	87-89	(No)
	㉛ THESE	Second Rack Present	91-92	(Yes)	90-91	(No)
	㉞ THREE	Second Rack Present	94-95	(Yes)	93-94	(No)
	㉑	Factory Set	81-82		None	
	㉚	Factory Set	99-100		None	
	㉗	Factory Set	96-97		None	

1. The Hold Last State and the Remote Parity Error Effect or Communications Failure Effect functions are available with Remote Driver/Remote Receiver modules revision C (P/N IC600BF901C/IC600BF801C or IC600YB901C/IC600YB801C, respectively). These functions do not operate properly with earlier revisions. If you require use of these functions on earlier modules, please contact the GE Fanuc Field Service Group at 804-978-5624 for assistance.

FIGURE 3. REMOTE I/O RECEIVER USER ITEMS (Part 2 of 3)

LED INDICATORS

LED	DESCRIPTION
LOCAL OK	ON - Remote I/O Receiver module operating normally. OFF - Communications failure due to timeout or successive transmission errors.
LINK OK	ON - Communications link between this module and Remote I/O Driver established and valid. OFF - Communications error between this module and Remote I/O Driver.
REMOTE OK	ON Remote system is operating normally. OFF - Fault in Remote I/O system (illegal address block, loose connection, power supply failure).
REMOTE PARITY	ON - Remote system operating normally with no parity errors. OFF - Parity error detected in Remote I/O system.

FIGURE 3. REMOTE I/O RECEIVER (Part 3 of 3)

INSTALLATION

Before installing the Remote I/O modules, review Table 2 to determine if the factory-set configurations are suitable for the Remote I/O application. Optional configurations are also indicated in Table 2. Step-by-step considerations are described in this section.

Modems being used must be compatible with Remote I/O, see specifications (pages 2 and 3).

TABLE 2. THINGS TO CONSIDER BEFORE INSTALLING MODULES

STEP	CONSIDERATION	FACTORY CONFIGURATION	OPTIONAL CONFIGURATION
1	Block Size	120 Inputs/120 Outputs	248 Inputs/248 Outputs
2	Block Address Switches	8 Blocks of 240 I/O References to choose from	4 Blocks of 496 I/O References to choose from
3	Number of I/O Racks in Remote I/O Station	2 or more I/O Racks in Remote Station	1 I/O Rack (Containing Receiver) in Remote Station
4	Communications Interface	Twisted-Pair up to 10,000 ft (3 km)	RS-232 (Modem) a s link (Requires High-Capacity I/O Rack)
5	Communications Failure: CPU Status	STOP CPU	Allow CPU to Run
6	Communications Failure: Remote I/O Status	Turn all outputs OFF	Hold all outputs at last state
7	Remote I/O Parity Error	STOP CPU	Allow CPU to Run

Step 1 - Block Size

To obtain the Remote I/O modules for a block size of 496 inputs/outputs, set jumper 2 on the Driver module to position 2-4 (Refer to Figure 2, User Item 2)

Step 2 - Address Switches

If the block size equals 240, the user can select one of eight blocks of I/O References; the selection is made at the I/O Rack where the Driver is to be installed. Adjacent to the module slot on the rack backplane where the Driver is to be installed is a DIP-switch package whose possible block address settings are described in Figure 4.

The Driver DIP-switches, 1-4, are used to select which of 16 possible addresses in the block is to be reserved for the remote I/O status information. (If 1-4 were depressed to the left, the last address of I/O references would be selected e.g. 0121 - 0128).

If the block size is to equal 496, the user can select one of four blocks of I/O references; (the DIP-switch rockers 1-5, in this case, select one of 32 possible addresses for status) the selection is made at the I/O Rack where the Driver is to be installed. Refer to Figure 5 for possible selections.

I/O References In Remote Location	User I/O Quantity	Rack Address Switches (7 =Bottom) 5	6	7
0001-0128	120/120	R	R	R
0129-0256	120/120	L	R	R
0257-0384	120/120	R	L	R
0385-0512	120/120	L	L	R
0513-0640	120/120	R	R	L
0641-0768	120/120	L	R	L
0769-0896	120/120	R	L	L
0897-1000	96/96	L	L	L

Note: L = Depressed to Left (Open)
R = Depressed to Right (Closed)

FIGURE 4. I/O RACK DIP-SWITCH SETTINGS FOR 240 I/O BLOCKS

I/O References	User I/O	Rack Address Switches 7	6
0001-0256	248/248	R	R
0257-0512	248/248	R	L
0513-0768	248/248	L	R
0769-1000	224/224	L	L

Note: L = Depressed to Left (Open)
R = Depressed to Right (Closed)

FIGURE 5. I/O RACK DIP-SWITCH SETTINGS FOR 496 I/O BLOCKS

NOTE

All I/O modules in the remote end must utilize addresses within the range established by the Driver. Inputs not used at the remote end can be used elsewhere in the system (local or remote locations). Outputs can be duplicated if needed.

Step 3 - Number of I/O Racks

At the Receiver, if there are no other racks in the Remote I/O Station containing the receiver, reposition the jumpers to the right to properly terminate the I/O communications:

At Receiver - For Single Rack Operation	
Jumper 89	87 - 89
Jumper 91	90 - 91
Jumper 94	93 - 94

Step 4 - Communications Interface

If the twisted-pair interface (differential) is to be utilized, verify the jumper settings indicated below for both the Driver and Receiver modules.

TWISTED PAIR (DIFFERENTIAL) JUMPERS

At Driver		Setting	Function
Jumper 27	Bank A	27-28	
Jumper 24		24-25	57.6Kb
Jumper 21		21-22	
Jumper 15		15-16	
Jumper 12		12-13	Odd Parity
Jumper 30		30-50	Carrier Detect
Jumper 33		33-51	Clear to Send
Jumper 37		36-37	Differential
39		38-39	Mode
43		42-43	
45		44-45	
Jumper 49		48-49	Sensitivity

At Receiver		Setting	Function
Jumper 23	Bank A	22-23	
Jumper 20		19-20	57.6Kb
Jumper 17		16-17	
Jumper 14		13-14	
Jumper 11		10-11	Odd Parity
Jumper 63		63-64	Differential
66		65-66	Mode
50		49-50	
103		102-103	
Jumper 54		53-54	Sensitivity
Jumper 57		57-0V	Carrier Detect
Jumper 60		60-0V	Clear to Send

Step 4 - Communications Interface (continued)

If the Modem, RS-232, option is selected, the following jumpers must be reset, (all jumpers must be changed to have a functional system).

NOTE

Both the Remote Driver and the Remote Receiver must be placed in high capacity I/O racks to operate with RS-232 devices; any I/O rack will function when using twisted pair.

RS-232C JUMPERS

At Driver	Settings			Function
Bank A Select Desired Baud Rate	21-22	24-25	27-28	57.6K
	21-22	24-25	26-27	19.2K
	21-22	23-24	27-28	9.6K
	21-22	23-24	26-27	2.4K
	20-21	24-25	27-28	1.2K
	20-21	24-25	26-27	300
	21-22	23-24	27-28	110
Jumper 15		15-16		Parity
		14-15		No Parity
Jumper 12		12-13		Odd Parity
		11-12		Even Parity
Jumper 37		35-37		RS-232C
39		39-40		Mode
43		41-43		
45		45-46		
Jumper 49		47-49		Sensitivity

At Receiver	Settings			Function
Bank A Select Desired Baud Rate (Same as Driver)	16-17	19-20	22-23	57.6K
	16-17	19-20	23-24	19.2K
	16-17	20-21	22-23	9.6K
	16-17	20-21	23-24	2.4K
	17-18	19-20	22-23	1.2K
	17-18	19-20	23-24	300
	17-18	20-21	22-23	110
Jumper 11		10-11		Parity
		11-12		No Parity
Jumper 8		7-8		Odd Parity
		8-9		Even Parity
Jumper 63		62-63		RS-232C
66		66-67		Mode
50		50-51		
103		103-104		
Jumper 54		54-55		Sensitivity

Step 5 - Communications Failure - CPU Status[1]

If an error is detected between the Driver and Receiver, what should the CPU do?

At Driver	(Factory Setting) Halt CPU	(Optional Setting) CPU RUN
Jumper 9	9-10	8-9

Step 6 - Communications Failure Remote I/O Status[1]

If an error is detected between the Driver and Receiver, what should the Remote I/O do?

At Receiver	(Factory Setting) Turn All Outputs OFF	(Optional Setting) Hold LAST STATE
Jumper 5	4-5	5-6

Step 7 - Remote I/O Error

If an error is detected in the parity checking at the Remote Station within its I/O modules and/or racks, what should the CPU do?

At Driver	(Factory Setting) Halt CPU	(Optional Setting) CPU RUN
Jumper 6	6-7	5-6

1. The Hold Last State and the Remote Parity Error Effect or Communications Failure Effect functions are available with Remote Driver: Remote Receiver modules revision C (P/N IC6OOBF901C, IC600BF801C, or IC600YB901C, IC600YB801C, respectively). These functions do not operate properly with earlier revisions. If you require use of these functions On earlier modules, please contact the GE Fanuc Field Service Group at 804-978-5624 for assistance.

WIRE CONNECTIONS

Use the insertion/extraction tool packaged with the Series Six CPU to insert the Remote I/O Driver and Receiver modules into their respective I/O racks. Position the faceplates over the cable connector(s) on the circuit boards; then secure the faceplate to the rack using the thumbscrews at the top and bottom.

If wiring the twisted-pair interface, refer to Figure 6. Use National Electric Cable, 22P15LCBT, or equivalent; the Receiver module can be located up to 10,000 feet (3 Km) from the Driver. The twisted-pair cable specifications are described in Figure 1.

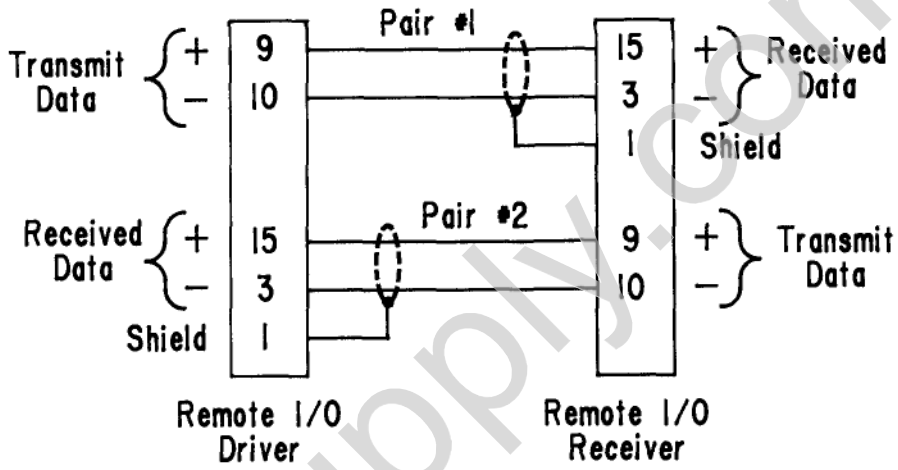

FIGURE 6. TWISTED-PAIR WIRE CONNECTIONS

If wiring the RS-232-C interface for communications through a modem, refer to Figure 7. The modem can be located up to 50 feet (15 meters) from the associated Driver or Receiver module. The RS-232-C cable specifications are described in Figure 1.

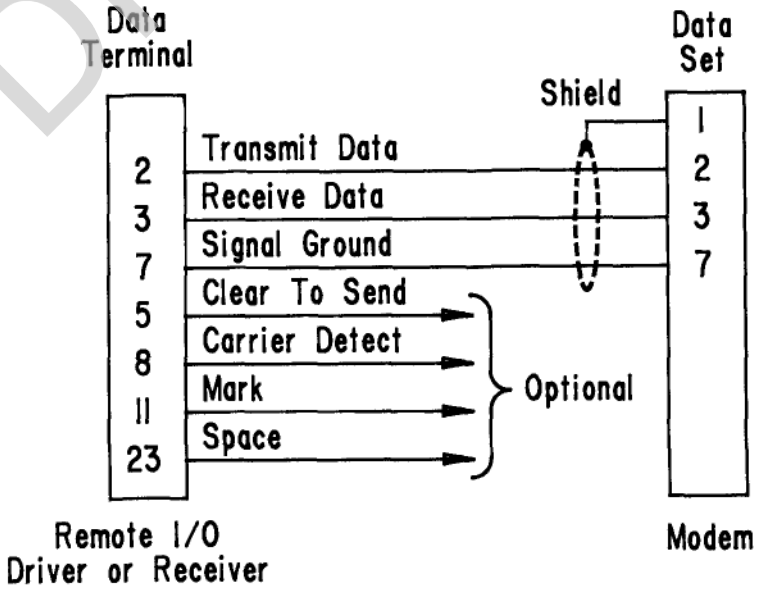

FIGURE 7. MODEM WIRE CONNECTIONS

SYSTEM DELAY TIMES

The following may be used to calculate worst-case delay times for an output to reach the Remote I/O in the absence of noise (link failure) (all results are in milliseconds).

PULSE WIDTHS:
Minimum pulse duration to assure output gets to the Remote I/O and/or inputs gets to CPU:

$$\text{Minimum Pulse Width:} = 2.5 + \left[\frac{600}{\text{K Baud Rate}}\right] + \text{1 Sweep (for 120 I/O)}$$

$$= 5.0 + \left[\frac{1188}{\text{K Baud Rate}}\right] + \text{1 Sweep (for 248 I/O)}$$

OUTPUT DELAY:
Worst case time for CPU to affect a remote output compared to if it were in a local I/O chain:

$$\text{Maximum Delay Time:} = 5.0 + \left[\frac{902}{\text{K Baud Rate}}\right] + \text{1 Sweep (for 120 I/O)}$$

$$= 10.0 + \left[\frac{1606}{\text{K Baud Rate}}\right] + \text{1 Sweep (for 248 I/O)}$$

INPUT DELAY:
Worst case time for input at remote station to reach CPU (not including input filters on boards):

$$\text{Maximum Delay Time:} = 5.0 + \left[\frac{1078}{\text{K Baud Rate}}\right] + \text{3 Sweeps* (for 120 I/O)}$$

$$= 10.0 + \left[\frac{1958}{\text{K Baud Rate}}\right] + \text{3 Sweeps* (for 248 I/O)}$$

* 3 Sweeps can be reduced to 2 Sweeps if DO I/O instruction is used before logic using Remote I/O.

NOTES

1. For 110 baud with parity 12-bit characters are used, so multiply number in brackets by 1.09.
2. If NO PARITY is selected (user option) 10-bit characters are used, multiply number in brackets by 0.91 (except for 110 baud, multiply by 1.0).
3. To take into account the allowance to a transmission error (which does not cause system to halt) add the bracketed amount again.

EXAMPLES:

1. Factory Settings:
   (57.6K baud, ODD parity), 120 I/O: with 10 millisecond CPU Sweep:

   a. Minimum Detectable Pulse Width:

   $$= 2.5 + \left[\frac{660}{57.6}\right] + 10$$

   $$= 24 \text{ milliseconds}$$

EXAMPLES (Continued):

b. Worst case delay time from CPU to Remote Output:

$$= 5.0 + \left[\frac{902}{57.6}\right] + 10 = 15 + [15.7]$$

$$= 31 \text{ milliseconds}$$

c. Worst case delay time for input to reach CPU with DO I/O instruction:

$$= 5.0 + \left[\frac{1078}{57.6}\right] + 10(2) = 25 + [18.7]$$

$$= 44 \text{ milliseconds}$$

d. Worst case input delay including one bad message:

$$= 44 + [18.7]$$
$$= 63 \text{ milliseconds}$$

2. 1200 Baud Modem operation, no parity, 120 I/O. with 10 millisecond sweep:

a. Minimum Detectable Pulse Width:

$$= 2.5 + \left[\frac{660}{1.2} \times 0.91\right] + 10$$

No Parity = 10 bit frame

$$= 12.5 + [500.5]$$
$$= 513 \text{ milliseconds}$$

b. Worst Case Output Delay:

$$= 5.0 + \left[\frac{902}{1.2} \times 0.91\right] + 10$$

$$= 15 + [684]$$
$$= 699 \text{ milliseconds}$$

c. Worst Case Input Delay (without DO I/O instruction):

$$= 5.0 + \left[\frac{1078}{1.2} \times 0.91\right] + 10(3)$$

$$= 35 + [817]$$
$$= 852 \text{ milliseconds}$$

d. Worst Case Output Delay allowing a transmission error:

$$= 699 + [684]$$
$$= 1383 \text{ milliseconds}$$
$$= 1.4 \text{ seconds}$$

e. Worst Case Input Delay allowing a transmission error:

$$= 852 + [817]$$
$$= 1649 \text{ milliseconds}$$
$$= 1.7 \text{ seconds}$$

REMOTE I/O STATUS BYTE

The Remote Driver utilizes 8 input references and 8 output references as selected by the I/O rack address switches (refer to step 2). The outputs are reserved for future use; the inputs provide the user with information as summarized below. The example references assume the Driver is using references, 0121 · 0128 (DIP switches l-4 set to left, 5-7 set to right).

Input Number	Example	Function
1	10121	Data Hand Shake
2	10122	Reserved
3	IO123	Reserved
4	IO124	Remote Parity
5	10125	Remote OK
6	IO126	Link OK
7	10127	Local OK
8	10128	Heartbeat

Input No.

Input 1 toggles to indicate occurance of data handshake between Driver and Receiver.

2-3 Reserved.

4. If a parity error is detected in the communications between the Remote Receiver and other Remote racks, the 4th input is a zero (OFF). Otherwise, it is a one (ON).

5, If any fault is found with the Remote I/O such as power supply failure or parity error, the 5th input is a zero (OFF) ; otherwise, it is a one (ON).

6. If any error is detected in the communications system between the Driver and the Receiver the, 6th input is a zero (OFF), Errors include failure of LRC, parity error, broken cable, faulty modem, etc. Otherwise, it is a one (ON).

7. If any fault is found with the driver installed in the Local I/O, the 7th input is a zero (OFF); otherwise, it is a one (ON).

8. The 8th input cycles, OFF/ON/OFF/ON/OFF, one change each scan, indicating that the remote I/O system is properly functioning. If any of the four inputs (4-7) are set to zero, this input stops cycling and will hold an OFF or ON state, whichever was the last valid data.

ORDERING INFORMATION

	Circuit Board & Faceplate	Circuit Board	Faceplate
I/O Remote Receiver	IC600BF80lC	IC600YB801C	IC600FP801A
I/O Remote Driver	IC600BF901C	IC600YB901C	IC600FP901A

CATALOG NUMBER REVISION SUFFIX

The equipment listed above having the catalog numbers shown and the same equipment having a higher alpha suffix is designed for listing by UL for use as auxiliary control devices. The equipment is a direct replacement for equipment having the same catalog number but a lower alpha suffix.

The UL symbol on the nameplate means the product is listed by Underwriters Laboratories Inc. (UL Standard No. 508, Industrial Control Equipment, subsection Electronic, Power Conversion Equipment.)

For further information, contact your local GE Fanuc sales office.

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