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TECHNICAL INFORMATION   DA - 07 -rev.2

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== OSP5000 DNC (BTR) INTERFACE with RS-232-C ==

(for OSP5000L & OSP5000M)   ] rev.2

1) OUTLINE

In order to link OSP5000 to peripheral equipment such as
teletype writer,modem,puncher,printer, OKUMA has DNC Interface
with RS-232-C.

RS-232-C is the system specified in EIA standard, which
standarizes data transfer system for both hardware and software,
being often employed for data transfer between a computer and
peripheral equipment.

With the use of this DNC Interface, the part program can be
transfered from peripheral equipment to OSP5000, and also
the part program which is edited and confirmed at OSP operation
panel can be transfered to peripheral equipment.

This system is refered to as DNC in "BTR (Behind Tape Reader)"
system.

2) CHARACTERISTICS

Our DNC Interface is offering two system alternatively.

    a) 20mA Current Loop System
    b) DC24V System

But in case of DC24V System, the max. cable length between
OSP5000 and peripherel equipment is 15m .
For this reason, we recommend to adopt 20mA Current Loop System.

Characteristics of these system are followings.

    -- serial data transfer
    -- full duplex
    -- asynchronous transfer
    -- active transfer interface
    -- 8 bit character data (ISO/EIA selectable, see Note 1)
    -- non parity bit (odd/even parity bit selectable, see Note 2)
    -- 2 stop bit (1 stop bit selectable, see Note 3)
    -- baud rate (selectable, see Note 4)

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3) Data Transfer Signal from OSP to Peripheral Equipment

—— DC24V System ——

3-0) CTS (clear to send)   OSP ⟵—— peripheral equipment

As long as the peripheral equipment is ready to recieve
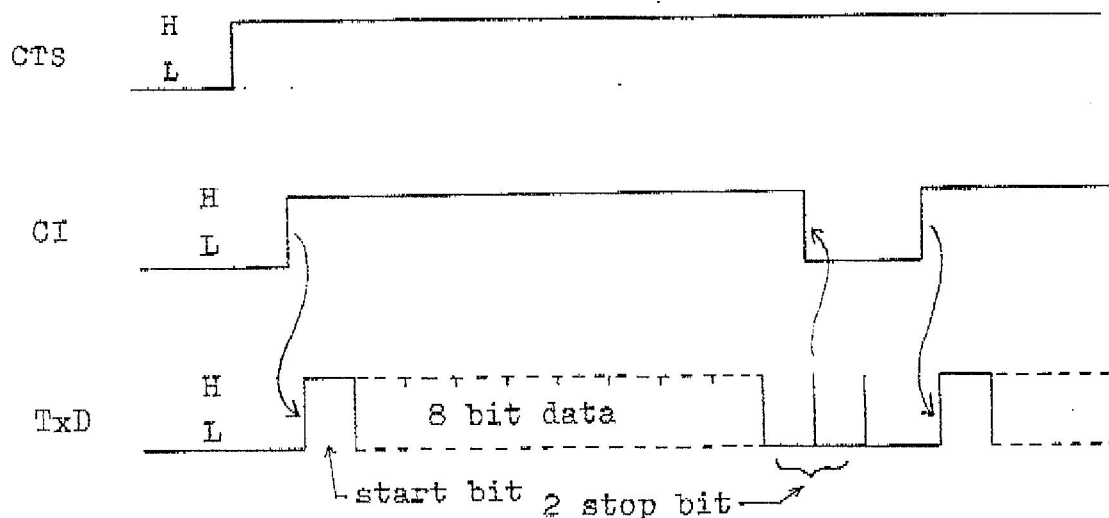the data from OSP, the peripheral equipment has to keep
this "CTS" signal "H" .

3-1) CI (data busy)   OSP ⟵—— peripheral equipment

At the each time when peripheral equipment is ready to
recieve one charactor data from OSP, peripheral equipment
has to make this "CI" signal "H" .
And after (or during) recieving one charactor data,
this signal "CI" should be made "L" .
This means, at the moment when this "CI" goes to "H",
one charactor data is transfered from OSP.

But, if peripheral equipment does not have such sort of
signal, this signal can be omitted by use of PARAMETER
setting. See Note 5 .

3-2) TxD (transmitted data)   OSP ——⟶ peripheral equipment

At the moment when the signal "CI" becomes "H", OSP sends
one charactor data "TxD" to peripheral equipment.

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3) Data Transfer Signal from OSP to Peripheral Equipment

---- DC24V System ----

3-0) CTS (clear to send)   OSP ←—— peripheral equipment

> As long as the peripheral equipment is ready to recieve
> the data from OSP, the peripheral equipment has to keep
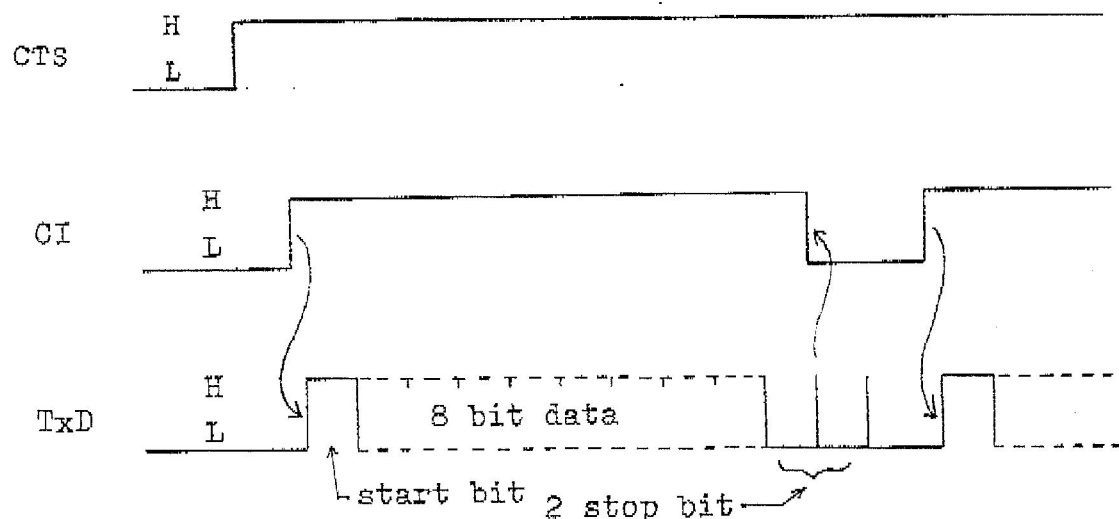> this "CTS" signal "H" .

3-1) CI (data busy)   OSP ←—— peripheral equipment

> At the each time when peripheral equipment is ready to
> recieve one charactor data from OSP, peripheral equipment
> has to make this "CI" signal "H" .
> And after (or during) recieving one charactor data,
> this signal "CI" should be made "L" .
> This means, at the moment when this "CI" goes to "H",
> one charactor data is transfered from OSP.
>
> But, if peripheral equipment does not have such sort of
> signal, this signal can be omitted by use of PARAMETER
> setting. See Note 5 .

3-2) TxD (transmitted data)   OSP ——→ peripheral equipment

> At the moment when the signal "CI" becomes "H", OSP sends
> one charactor data "TxD" to peripheral equipment.

CTS   H
       L

CI   H
       L

TxD   H
       L   8 bit data

start bit   2 stop bit

4) Data Transfer Signal from Peripheral Equipment to OSP

--- DC24V System ---

4-1) DSR (data set ready)   OSP <—— peripheral equipment
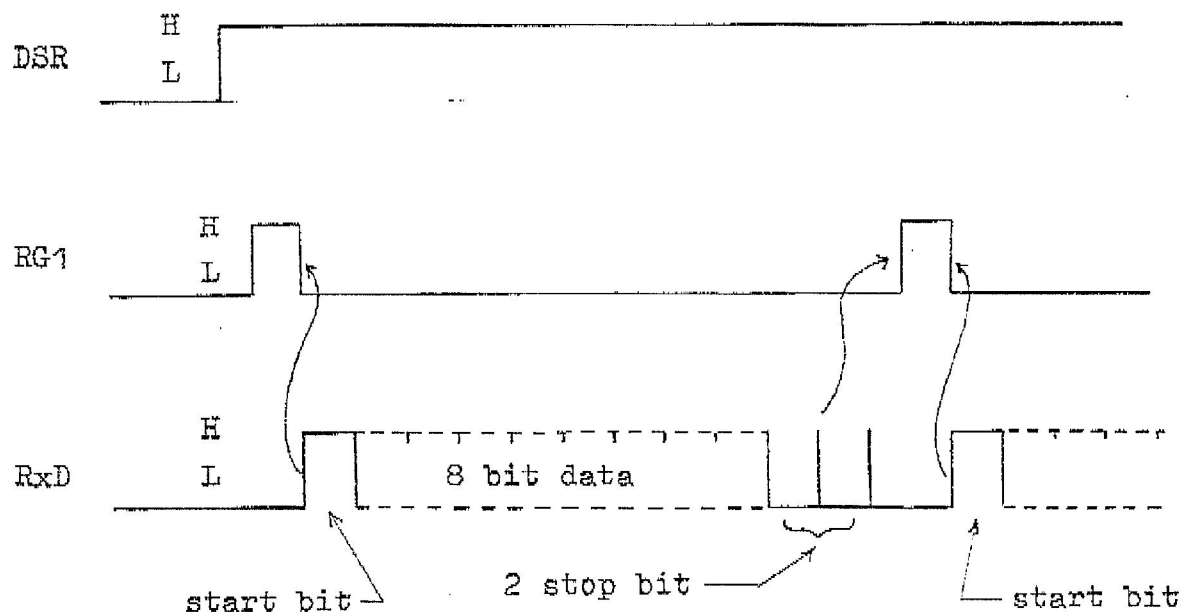
As long as peripheral equipment is ready to send the data
to OSP, peripheral equipment has to keep this "DSR" signal
"H" .

4-2) RG1 (register 1)   OSP ——> peripheral equipment

With this signal, OSP gives the command to peripheral
equipment to send one charactor data to OSP.
By start bit of one charactor data, this signal is made
"L".

4-3) RxD (recieved data)   OSP <—— peripheral equipment

After recieving the signal "RG1", peripheral equipment
has to send the data "RxD" to OSP .

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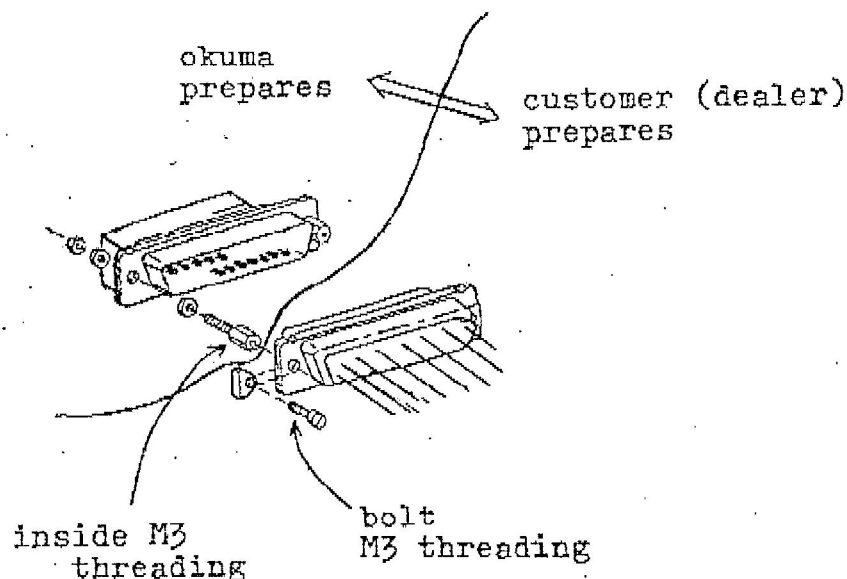NAGOYA JAPAN

5) CONNECTION

Connection wire cable between OSP and peripheral equipment should be prepared by customer.

Okuma prepares wires inside of OSP with connector.
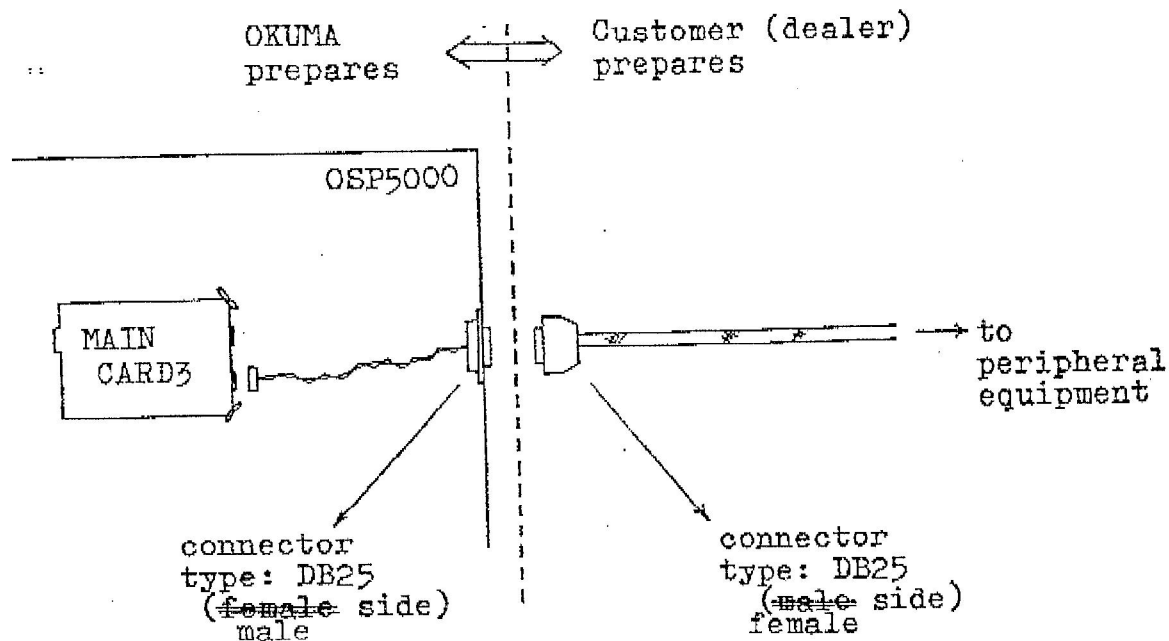
In order to clamp these connector (male and female) firmly, we prepare the bolt clamp type connector (~~female~~ male side) as below.

Customer has to prepare also same type (bolt clamp type).

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6) Connector (type: DB25) Pin Layout

pin no.	signal	DC24V		20mA current		refer
		transmit	recieve	transmit	recieve	
1	FG(protective ground)	O	O	O	O	
2	TxD(transmitted data)	O				3-2)
3	RxD(recieved data)		O			4-3)
4	RTS(request to send)					
5	CTS(clear to send)	O				
6	DSR(data set ready)		O			4-1)
7	0VC(signal ground)	O	O			
8	CD(carrier detector)					
9	RG1(register 1)		O			4-2)
10	RG2(register 2)					
11	0VC(signal ground)					
12	OVC(signal ground)					
13	OVC(signal ground)					
14	Tx + (transmitted data)			O		3-3)
15	Tx RET - (")			O		"
16	Rx + (recieved data)				O	4-5)
17	Rx RET - (")				O	"
18	RDCL + (reader control)				O	4-4)
19	RDCL RET - (")				O	"
20	DTR(data terminal ready)					
21						
22						
23	CI(data busy)	O				3-1)
24						
25						

O : the signal which has to be used.

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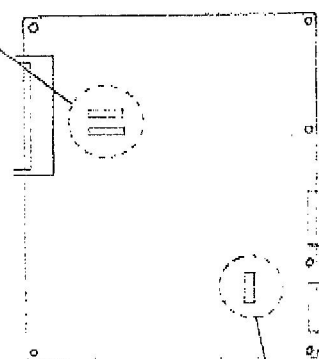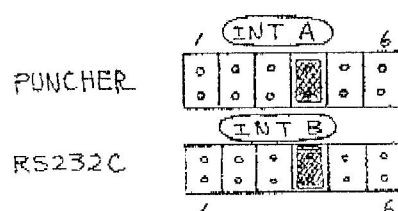
7) Switch Setting on MAIN CARD3
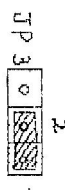
7-1) Interrupt Level Setting

If you have some trouble with this DNC (BTR) function, please check the switch setting of interrupt level as below.

7-2) Selection of DC24V System or 20mA Current Loop

When OSP5000 recieves the data from peripheral equipment, the system (DC24V or 20mA current loop) should be specifyed by switch setting.

If you use this DNC(BTR) function as only transmit function (punch out function), you do not need to pay attention on this switch setting.

—— for DC24V ——   —— for 20mA current loop ——

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Note 1) 8 bit character data

The transfer data and recieved data can be specifyed
in ISO code or EIA code by parameter setting.

But we recommend you to use ISO code, because a file name
can be used only in ISO code.

As a standard, ISO code (in below table, case A) has
been preset. If you want to change it, perform following
procedure.

== PARAMETER SETTING ==

a) Press [PARAMETER] key on the operation panel .

b) Select *OPTIONAL PARAMETER BIT* by pressing function
   key [F7](ITEM) .

c) Use the cursor control keys to locate   [↑] [↓]
   the cursor on NO.1 .   [←] [→]

d) Press function key [F1](SET) .

e) Key in the required new 8 bit data.
   ...here, Bit1 and Bit0 should be selected from this table.

	Bit 1	Bit 0	Operation Conditions
A	1	1	o In READ and VERIFY modes, parity check is automatically performed disregarding the tape code, whether ISO or EIA. o In PUNCH mode, ISO code is selected.
B	1	0	o In READ and VERIFY modes, parity check is automatically performed disregarding the tape code, whether ISO or EIA. o In PUNCH mode, EIA code is selected.
C	0	1	o The control selects ISO code for READ and VERIFY operation. o In PUNCH mode, ISO code is selected.
D	0	0	o The control selects EIA code for READ and VERIFY operation. o In PUNCH mode, EIA code is selected.

f) Press [WRITE/EXECUTION] key ,
   and confirm the old data is replaced with the newly
   entered data.

   Example   NO.1   0 1 0 1 0 0 1 1   old data
                          ⇓
                   0 1 0 1 0 0 1 0   newly entered data

              bit7   bit4   bit0

g) Make power off at operation panel, and then
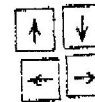   make power on again.

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Note 2) Parity bit

As a standard, non-parity bit has been preset.
If odd or even parity bit is required due to the
characteristics of peripheral equipment, perform
following procedure.

== PARAMETER SETTING ==

a) Press [PARAMETER] key on the operation panel .

b) Select *OPTIONAL PARAMETER BIT* by pressing function
key [F7](ITEM) .

c) Use the cursor control keys to locate
the cursor on NO.3 .(OSP5000M:NO.8)   ]rev.2

d) Press function key [F1](SET) .

e) Key-in the required new 8 bit data.

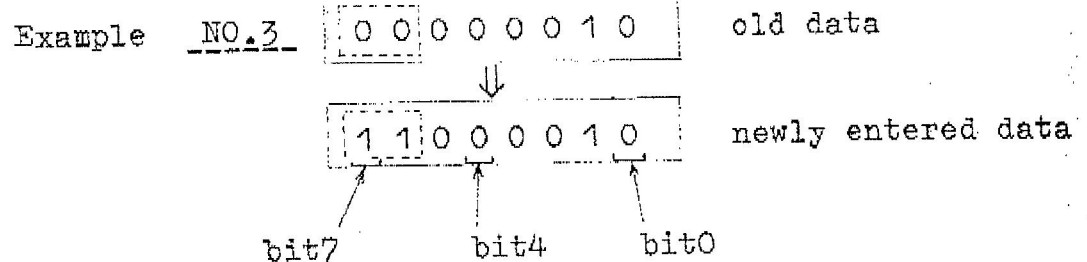...here, Bit7 and Bit6 should be selected from this table.

	Bit7	Bit6	condition
A	0	0	non-parity bit
B	1	1	even parity bit
C	0	1	odd parity bit

standard setting : A

f) Press [WRITE/EXECUTION] key,
and confirm the old data is replaced with the newly
entered data .

Example   NO.3 | 0 0 0 0 0 0 1 0 | old data

⇓

| 1 1 0 0 0 0 1 0 | newly entered data

bit7   bit4   bit0

g) Make power off at operation panel, and then
make power on again.

Without this operation (power off,on), the newly entered
data is not activated.

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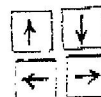
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Note 3)   2 stop bit

As a standard, 2 stop bit has been preset.
If 1 stop bit is required due to the characteristics
of peripheral equipment, perform following procedure.

== PARAMETER SETTING ==

a) Press [PARAMETER] key on the operation panel.

b) Select *OPTIONAL PARAMETER BIT* by pressing
   function key [F7](ITEM).

c) Use the cursor control keys to locate ⬆⬇   ]rev.2
   the cursor on _NO.3_ . (OSP5000M:NO.8) ⬅➡
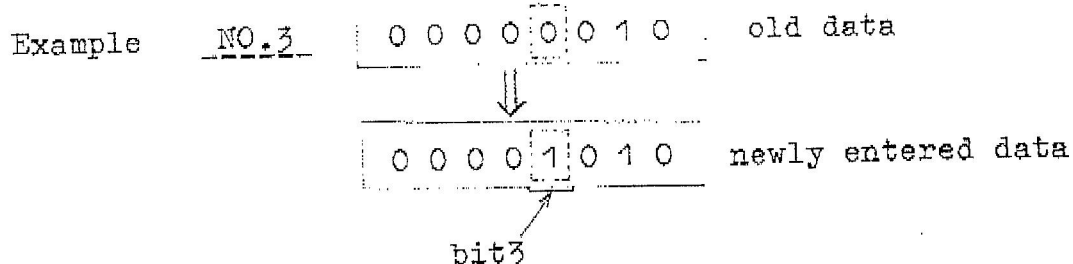
d) Press function key [F1](SET) .

e) Key-in the new 8 bit data with Bit3=1 .

	Bit3	condition
A	0	2 stop bit
B	1	1 stop bit

standard setting : A

f) Press [WRITE/EXECUTION] key,
   and confirm the old data is replaced with the newly
   entered data.

   Example   _NO.3_   0 0 0 0 0 0 1 0 . old data

                        ⇓

                      0 0 0 0 1 0 1 0   newly entered data

                              bit3

g) Make power off at operation panel, and then
   make power on again.
   Without this operation (power off, on), the newly entered
   data is not activated.

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Note 4) Baud rate

As a standard, baud rate 2.4K has been preset.

If you want to select another baud rate due to the charactaristics of peripheral equipment, perform following procedure.

== PARAMETER SETTING ==

a) Press [PARAMETER] key on the operation panel.

b) Select *OPTIONAL PARAMETER WORD* by pressing function key [F7](ITEM).

c) Use the cursor control keys to locate the cursor on NO.10 .(OSP5000M:NO.6)   [↑] [↓] [←] [→]   ] rev.2

d) Press function key [F1](SET).

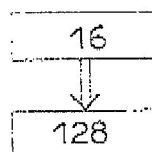e) Key-in the new Data for desired baud rate from this table.

baud rate	Data
110	350
150	256
300	128
600	64
1.2K	32
2.4K	16
4.8K	8
9.6K	4
19.2K	2

For example :
when you want 300 baud rate, key-in the data 128 .

f) Press [WRITE/EXECUTION] key,

and confirm the old data is replaced with the newly entered data.

Example   NO.10 | 16 | old data (2.4K baud rate)
↓
| 128 | newly entered data (300 baud rate)

g) Make power off at operation panel, and then make power on again.

Without this operation (power off, on), the newly entered data is not activated.

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Note 5) Signal "CI" omission

If peripheral equipment does not have the signal "CI" which is described at item 3-1), OSP5000 can transmit the data without this signal by setting of parameter. Perform following procedure.

== PARAMETER SETTING ==

a) Press [PARAMETER] key on the operation panel.

b) Select *OPTIONAL PARAMETER BIT* by pressing function key [F7](ITEM).

c) Use the cursor control keys to locate the cursor on NO.3 .(OSP5000M:NO.8)   ] rev.2

d) Press function key [F1](SET).

e) Key-in the new 8 bit data with Bit4=1 .

	Bit4	condition
A	0	with "CI" signal
B	1	without "CI" signal

standard setting : A

f) Press [WRITE/EXECUTION] key, and confirm
and confirm the old data is replaced with the newly entered data.

Example   NO.3   0 0 0 0 0 0 1 0   old data

                    ⇓

                    0 0 0 1 0 0 1 0   newly entered data

                    bit4

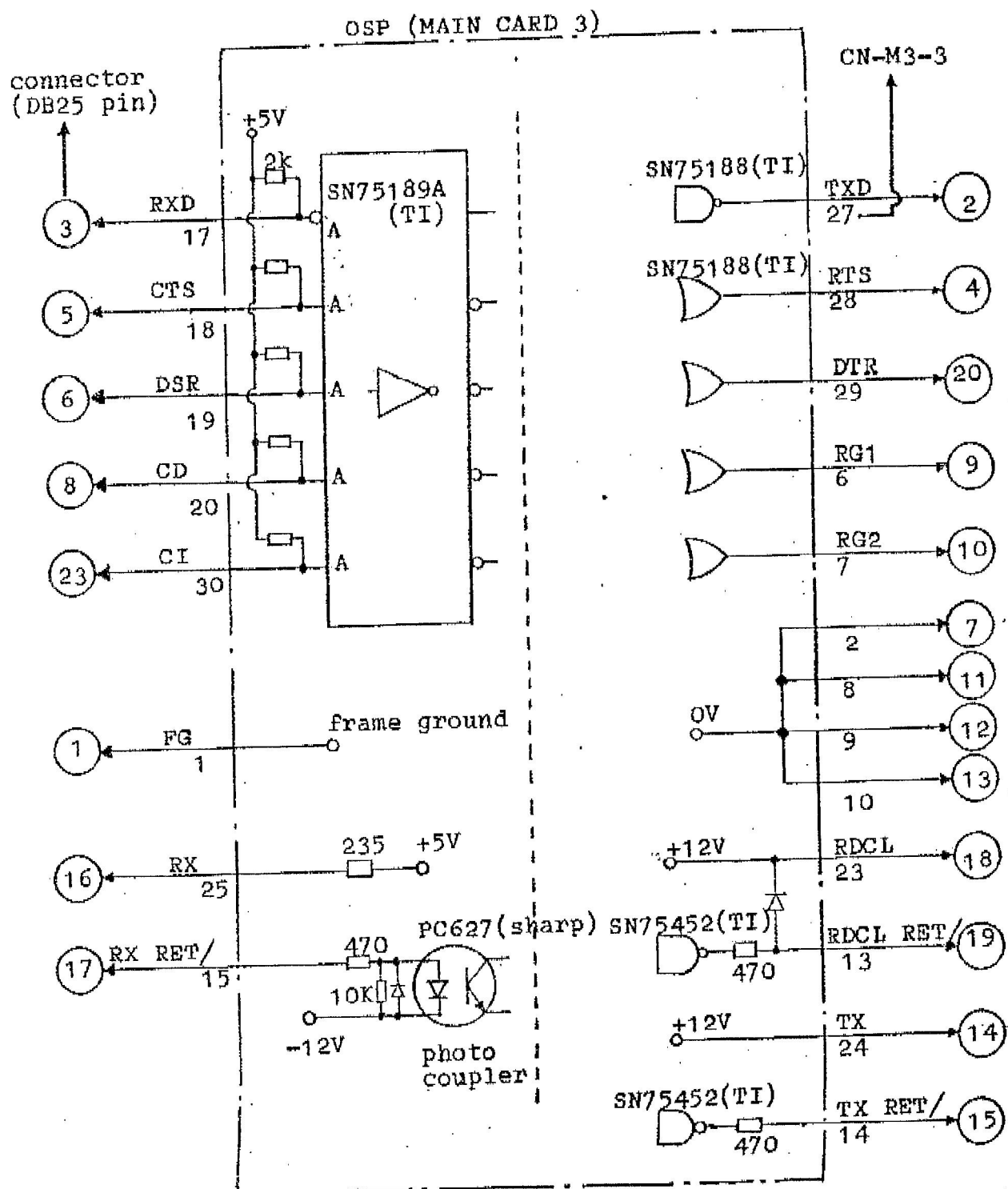g) Make power off at operation panel, and then make power on again.
Without this operation (power off, on), the newly entered data is not activated.

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Note 6)   Electrical circuit

Input and output signal are transfered like below drawing.

OSP (MAIN CARD 3)

l-5-2. Example RS232C Interface Connections and Timing Charts

Since the CNC machine and the host computer are likely to use different RS-232C interface lines, it is necessary to check the RS-232C interface lines used in the host computer system and use an appropriate, dedicated RS-232C cable.

(1) Start/Stop Synchronization Mode

· Sample Connection Diagram

NC machine			Host computer
Signal name	Pin No.		Signal name
FG	(1)	————	FG
TxD	(2)	———▷———	RD
RxD	(3)	———◁———	SD
RTS	(4)	⌐	
CTS	(5)	⌐	
DSR	(6)	———◁———	ER
SG	(7)	————	SG
RG1	(9)	———▷———	CS
DTR	(2Ø)	———▷———	DR
EX-INT	(23)	———◁———	RS