8CH COUNTER/TIMER

CT08-01B

USER'S MANUAL

3092,3114 (rev 3) 2013.5.13

TSUJICON APPLICATION OF ELECTRONIC DEVICES

TSUJI ELECTRONICS CO.,LTD

3739 Kandatsu-machi Tsuchiura-city
Ibaraki-Pre 300-0013 Japan
Phone +81-(0)29-832-3031
Fax +81-(0)29-832-2662
URL http://www.tsujicon.co.jp
E-mail info2@tsuji-denshi.co.jp

CT08－01B Command List (Available LAN, USB)

The command that is written by blue is available for V1.02 or later version.

See the section 5. Firmware Update regarding firmware update.

COMMAND	FUNCTION	DETAIL
ALM？	alarm read	read out the cause of overflow
CLAL	clear all	clear timer and 8 channel counters
CLPC	clear preset counter	clear preset counter (CH7)
CLTM	clear timer	clear timer
CLCTxx	clear counter xx	clear counter channel xx　　xx:00-07
CLCTxxyy	clear counter xx to yy	clear counter channel xx to yy　　xx,yy:00-07
CPR？	counter preset data read	read out preset counter data Reply: 8 digits in decimal number (Kcts unit) (example:00010000)
CPRF？	counter preset data read	read out preset counter data Reply: 8 digits in decimal number (cts unit) (example：00010000)
CTR？xx	counter xx read	read out channel xx counter　　xx：00-07 Reply: 10 digits in decimal number
CTRH?xx	counter xx read	read out channel xx counter　　xx：00-07 Reply:　8 digits in hex
CTR？xxyy	counter xx to yy read	read out channel xx counter　　xx,yy：00-07 Reply: 10 digits in dec (separated by space)
CTRH?xxyy	counter xx to yy read xx,yy：00-07	read out from channel xx to yy counter Reply:　8 digits in hex (separated by space)
DSAS	disable auto stop	disable automatic stop until using STOP command
ENCS	enable counter stop	enable counter stop
ENTS	enable timer stop	enable timer stop
MOD？	mode read	read out counter mode
RDAL？	read all counter and timer	read out all counter and timer Reply: 10 digits in dec
RDALH?	read all counter and timer	read out all counter and timer Reply:　8 digits in hex
SCPRdddd・・・・	set counter preset data	set preset data to counter (Kcts unit)
SCPRFdddd・・・・	set counter preset data	set preset data to counter (cts unit)
TPR？	timer preset data read	read out preset timer data (ms unit)
TPRF？	timer preset data read	read out preset timer data (μs unit)
STOP	stop counter	deactivate counting action
STPRdddd・・・・	set preset counter to dddd・・・・	set preset timer value (ms unit)
STPRFdddd・・・・	set preset counter to dddd・・・・	set preset timer value (μs unit)
STRT	start counter	start counting action
TMR？	timer read	read out timer value　Reply: 10 digits in dec
TMRH?	timer read	read out timer value　Reply: 10 digits in hex
VER？	version information read	read out software version information
VERH?	hardware version information	read out hardware version information
REST	reset and start	set the unit restart (It's same as power on sequence)
FROM?	using rom number read	read out program ROM number inside
FROM0, FROM1	choose rom	set program ROM number to activate
FLG?x	read internal flag	read out internal state flag inside

(Available for firmware V1.04 or later.)

Command for All reply mode

ALL_REP?	read all reply mode setting	Confirm "all reply mode" is active or not.
ALL_REP_EN	All reply mode enable	Reply is "OK" or "NG" even if the command doesn't require a reply.
ALL_REP_DS	All reply mode disable	No reply, if the command doesn't require a reply. (the same as before)

Store data commands for synchronous gate signal and timer clock

Preparation of data acquisition commands

CLGSDN	Clear Gate Synchronous Data Number	clear current data acquisition address (set data address to zero)
CLGSAL	Clear Gate Synchronous acquired All data	clear current data address and all memory data (set data address to zero, clear all memory data)
GSDNddd・・・	Gate Synchronous Data acquisition data Number set	input gate synchronous data acquisition data address
GSDN?	Gate Synchronous Data acquisition data Number read	read out gate synchronous data acquisition data address reply : 0 ～ 9999
GSEDddd・・・	Gate Synchronous acquisition End data Number set	input gate synchronous data acquisition end data address. (after end address, acquisition stop.)
GSED?	Gate Synchronous acquisition End data Number read	read gate synchronous data end address reply : 0 ～ 9999

Synchronous GATE signal data acquisition commands

GSTRT	Gate synchronous data acquisition START	start gate synchronous data acquisition (just after turn on power, it's stop condition)
GESTRT	Gate Edge synchronous data acquisition STaRT	start gate edge synchronous data acquisition (just after turn on power, it's stop condition)

Synchronous internal clock data acquisition commands

GTRUNddd・・・	Gate Timer synchronous RUN time	input synchronous timer data RUN time (μs units)
GTRUN？	Gate Timer synchronous RUN time read	read out synchronous timer data RUN time
GTOFFddd・・・	Gate Timer synchronous OFF time	input synchronous timer data OFF time (μs units)
GTOFF？	Gate Timer synchronous OFF time read	read out synchronous timer data OFF time
GTSTRT	Gate Timer synchronous data acquisition START	start internal clock synchronous data acquisition (Just after turn on power, it's stop condition)

Synchronous data acquisition common commands

STOP	gate synchronous data acquisition STOP	stop gate synchronous data acquisition
GSTS?	Gate synchronous data acquisition Status read	read out the status of gate synchronous data acquisition
GSDAL?	Gate synchronous data acquisition all data read	read out all gate synchronous data
GSDALH?	Gate synchronous data acquisition all data read	read out all gate synchronous data Reply: 8 digits in hex
GSDRD?xxxxyyyy	Gate synchronous data read from xxxx to yyyy	read gate synchronous data from xxxx to yyyy (xxxx,yyyy:0000～9999)
GSDRDH?xxxxyyyy	Gate synchronous data read from xxxx to yyyy	read gate synchronous data from xxxx to yyyy (xxxx,yyyy:0000～9999) Reply: 8 digits in hex
GSCRD? uvwxxxxyyyy	Gate synchronous data read from xxxx to yyyy at ch u to v	read gate synchronous data from xxxx to yyyy at ch u to v w:1 with timer Reply: dec
GSDRDH? uvwxxxxyyyy	Gate synchronous data read from xxxx to yyyy at ch u to v	read gate synchronous data from xxxx to yyyy at ch u to v w:1 with timer Reply: hex

CONTENTS

User's manual

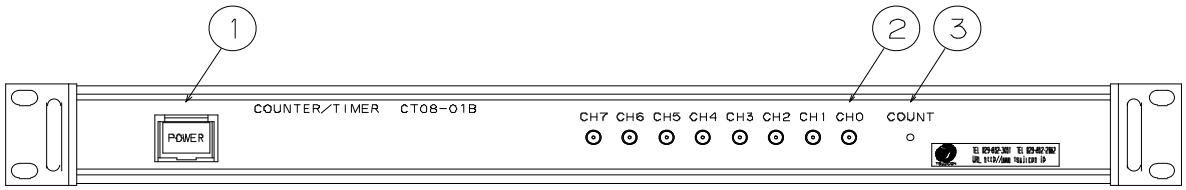
1. Specifications

1－1. Abstract

This unit has 8 channel counters and one timer. Each counter has 32 bits count data.
It counts during timer set interval or until the limited set count value.
Setting interval for count is 1 μ s to 1,000,000s. Setting limited count value is 1cts to 4,294,967Kcts.
This one has EIA 1 unit case. Connecting several units by RUN-GATE connection, total count channels are increased to 8×n channels.
Using LAN or USB communication, you can able to use remote control.
It's possible to store counting data which synchronized with ON/OFF of GATE IN signal or inner clock up to 10,000 memory address. (clock can preset ON time and OFF)

1－2. Appearance

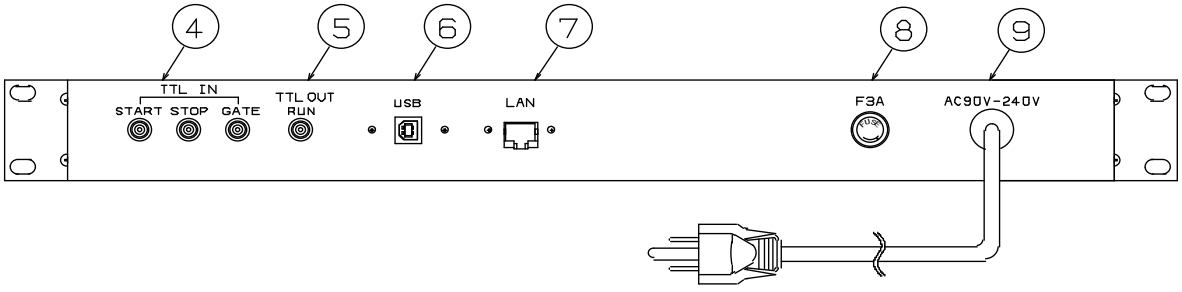
Front panel layout



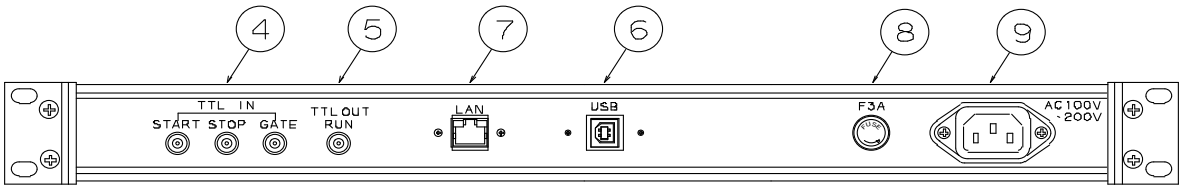
① Power switch
The lamp of the switch is on when the power is on.

② Input connectors for the counters. There are CH0 to CH7. (INPUT)
It's possible to set preset value only for CH7.

③ It shows the beginning of count action. LED "ON" means the counter gate open.



From Feb., 2012.



④ Connect TTL level signal (3.3 - 5V) from external unit.

START: When upward edge signal is "ON" ("H"), it starts counting. (INPUT)
Normally (not connected) START signal is "L".
When count mode is selected to "Counter 07 stop" or "Timer stop" and count value or timer value goes on limit, START can't become true.

STOP: When upward edge signal is "ON" ("H"), counting action stopped. (INPUT)
Normally (not connected) STOP signal is "L".

GATE: When GATE signal goes "L", count action stopped during this level. (INPUT)
When it goes "H", count action starts again.
Normally (not connected) GATE signal is "H".

⑤ TTL (5V) output connector while counter is operating.
You can sy When it goes "H", count action starts again.
other modu Normally (not connected) GATE signal is "H".
With inner DIP switches, you can invert logic level on START, STOP, GATE, and RUN signals.
Default setting is "ON" ("H"). If you change corresponding DSW2 switches on printed-circuit board ON to OFF, they changes "OFF" ("L").

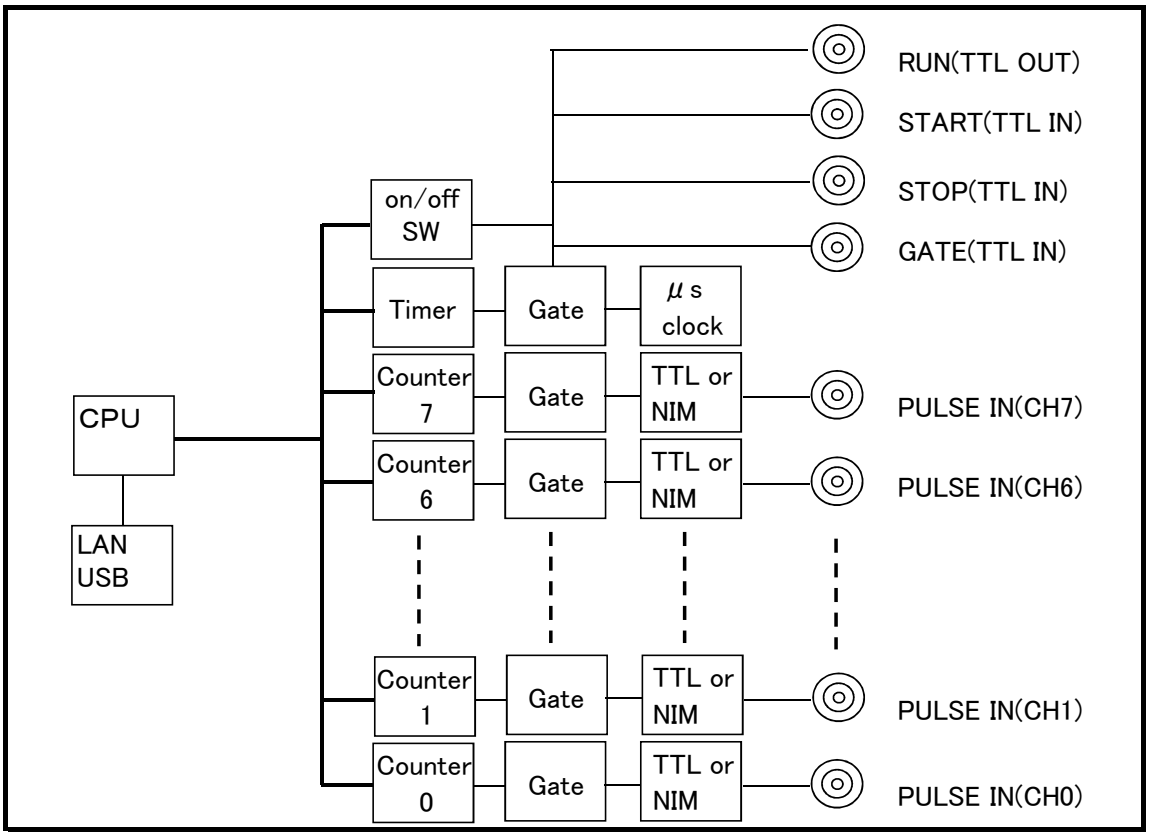
⑥ This one is USB port.

⑦ This one is ETHERNET(LAN)connection port. It's adapted to 10BASE-T,100BASE-T communication.

⑧ Fuse holder 3A mini fuse available.

⑨ AC90V to 240V power supply cable.

1－3. Block diagram



2. Before using

2－1. Select input signal level for count

CT08-01B can select count input signal from TTL or NIM on each channels.
Default setting is TTL. If you are going to change input signal settings,
remove the four screws that hold the left cover in place and then remove the left cover.
Select input signals with slide switches near the input connector on front panel.
Set slide switches according to letters side of slide switches.

2－2. Setting LAN communication

2－2－1. Preparation for setting

To control this one by LAN communication, it's need to some setting items by 10Base-T/100Base-T communication cable. Setting protocol is telnet protocol by TCP/IP connection.
To connect network by this one, IP address, subnet mask, and Port NO must be set to this unit.
Factory default is "IP address is 192.168.1.55", "sub net mask is 255.255.255.0" and
"Port NO is 7777 "
When connecting PC directly, it's need to use cross cable. Otherwise using HUB module, it's no need to use cross cable.
The way of connecting PC directly is as follows.
It's need to set IP address and subnet mask to your PC.
Set IP address to 192.168.1.10, and subnet mask to 255.255.255.0, for example.
About the way of setting address to your PC, see your PC manual.

Select MS-DOS prompt and access command "ping" in MS-DOS prompt.

```
C:¥Windows>ping 192.168.1.55

    Pinging 192.168.1.55 with 32 bytes of data:

    Reply from 192.168.1.55: bytes=32 time=2ms TTL=255
    Reply from 192.168.1.55: bytes=32 time=1ms TTL=255
    Reply from 192.168.1.55: bytes=32 time=1ms TTL=255
    Reply from 192.168.1.55: bytes=32 time=1ms TTL=255

C:¥Windows>
```

If replies are listed above, physical connection is correct.
If physical connection is not correct, communication replies are these.

C:¥Windows>ping 192.168.1.55

Pinging 192.168.1.55 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

C:¥Windows>

In this case please retry the connection again after confirming the cable connection.

2－2－2. Changing setting condition for net-work

Once you check connection is correct, enter new IP address and new telnet port NO of CT08-01.
(If default NO is OK, you don't have to do this operation.)
Default IP address is 192.168.1.55, and default port NO is 7777.
IP address must to be changed according to your network system.
If there is no need to change port NO, you may use NO 7777.
If you need to change port NO, the recommended port is NO. 10000 to 10999.

In Windows screen display
START → Specify the file name and run, file name is
telnet 192.168.1.55 9999
No. 9999 is port set number of CT08-01.
Click OK button and screen changed to telnet mode immediately.
MAC address 00204A80F1B6 ← It depends on the type of unit.
Software version 01.5(031003)XPTE ← It depends on the type of unit.

Press Enter to go into Setup Mode

Push Return button in 3sec.
More than 3 sec, this connection is automatically cut off. Then try again from beginning.
Next,

・・・・・・

Change Setup:
0 Server configuration
1 Channel 1 configuration
3 E-mail settings
5 Expert settings
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choise ?

Then select 0

IP Address : (192) 192.(168) 168.(001) 1.(55) 50
Set Gateway IP Address (N) N
Netmask: Number of Bits for Host Part (0=default) (0)
Change telnet config password (N) N

Set IP address as above(Above is the sample for setting 192.168.1.50)
Set Gateway IP address if you need.
Netmask is to be set 24(255.0.0.0), 16(255.255.0.0), 8(255,255.255.0) etc.
In case of displaying command twice, select terminal→settings, and remove the checkbox at local echo.

Again

・・・・・・

Change Setup:
0 Server configuration
1 Channel 1 configuration
3 E-mail settings
5 Expert settings
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choice ?

Then select 1.

Baudrate(38400)? ・・・・・ push return.
I/F Mode(4C)? ・・・・・ push return.
Flow(00)? ・・・・・ push return.
Port No(7777)? ・・・・・enter port address of telnet, then push return
(7777 is default,if you change, recommend to set 10000~10999)
ConnectMode(C0)? ・・・・・ push return.
Remote IP Address:(000).(000).(000).(000) ・・・・・ push return three times.
Remote Port (0)? ・・・・・ push return.
DisConnMode(00)? ・・・・・ push return.
FlushuMode (80)? ・・・・・ push return.
Pack Cntrl (10)? ・・・・・ push return.
DisConnTime(00:00)? ・・・・・automatically power down set time when in no connection.
(default data 00:00 means 5999s = 99min 59sec
SendChar 1 (0D) ・・・・・ push return.
SendChar 2 (0A) ・・・・・ push return.

Select 9, then finished setting works

Change Setup:
0 Server configuration
1 Channel 1 configuration
3 E-mail settings
5 Expert settings
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choise ?

In these setting items, only IP address must be set. Other items may be no change to set.
If you enter wrong number by mistake, you'd better to restore above data.

2－2－3. Turn back PC set data

If you change setting data of PC, turn back PC data to initial condition.

2－2－4. Connecting test

Let's try connecting test by optional Windows software such as "telnet".
Example test data is "telnet 192.168.1.55 7777" in MS-DOS prompt screen.
(IP address number must to be set number preliminary.)
When in telnet operation, send data "VER?" which are expected reply data.
If reply data is like "1.00 05-07-07", then communication line is right.
"Telnet" function contains hardware and software function, when disconnect line, line must be cut off by "telnet" software operation before hardware disconnection.

2－3. Setting USB communication

2－3－1. Preparations for setting

Driver software for USB (Universal Serial Bus) operation is downloaded from our web server.
By installing this software, connecting is done like a COM port connection.
Switch on a CT08-01, connect USB cable, then there will be message box that shows "New hardware device was found". According to PC directions, specify the folders of downloaded driver software.

When the driver software installs are done, open the "Control Panel" (START → Control Panel), click the "System" icon. Then property display of system appears. Select the "Device Manager".
Confirm the USB Serial Port (Com*) number in the tree between Port display.
Select the USB Serial Port (Com*), click Advanced in Port Setting display. It's possible to change COM Port number. Click the check box Disable PNP ☐ , it's possible to short operation time in connecting USB cable again.

2－3－2. Connecting test

Launch RS-232C communication software such as hyper-terminal including PC.
Set COM port number which is known in previous item, it's need to check communication line is available or not. In this case It's no need to set baud rate. Send the command data such as "VER?", then get the reply "1.00 04-09-03", there is no problem for communication

2－4. Connect signal cables

2－4－1. Connect communication cables

Connect the communication cable to USB port or LAN port on rear panel.
There is no need to connect both side, but there will be no problem even if connect both side.
If connected both side, latest command will be valid to the unit.

2－4－2. Connect count signal

Connect count signal cable to CH0 to CH7 LEMO connector which are on front panel.
It' s possible to count maximum 8 channel signals.
Before connecting the cable it's need to set signal change switch (TTL side or NIM side), according to input signal. (See the section 2-1)

2－4－3. Start signal (TTL positive logic)

TTL positive logic signal starts counting action.
The width of start signal pulse must be more than 100ns.
It's possible to check the count start status by LED lamp on front panel.
It counts from start signal "ON" to stop signal "ON".
When this signal is not useful, it's possible to start by software commands.

2－4－4. Stop signal (TTL positive logic)

TTL positive logic signal quits counting action.
The width of stop signal pulse must be more than 100ns.
It's possible to check the count stop status by LED lamp on front panel.
It counts from start signal "ON" to stop signal "ON".
When this signal is not useful, it's possible to quit counting by software commands.

2－4－5. Gate signal (TTL positive logic)

Gate signal is TTL positive logic signal.
When gate signal goes "L" counting action stopped during "L" period.
When gate signal goes "L" LED lamp is "OFF" during this period.
LED lamp goes "ON" during gate signal is "H" when counter starts.
When gate signal is no connection, gate signal is equal to logic "H".
While gate signal is "ON", the count data are stored in memory on synchronous gate data acquisition mode. Data can be stored up to 10,000 memory address.

2－4－6. Monitor out signal (In counting, TTL positive logic

Run signal goes "H" when counting action is valid. It means count start and "Gate signal" are in "H" logic, and LED goes "ON".
It's useful to use more than two counter units. Connecting this line to "Gate signal input" of another unit, another units go active counting action. Of course another units must be active in count mode before Run signal go "H".

3. Communication commands

3－1. Communication commands

Command characters are ASCII data.

The delimiter of communication command is CR+LF in transmit and receive case.

From firmware V1.04, "all reply modes" have been added to answer for "OK" or "NG", even if the command doesn't require a reply. Please see the section 3-7.

3－2. Read-out commands for counter set and the status of setting

3－2－1. Stop enable by count value

Type of command

ENCS — Enable to stop count by counter(CH7).
When count value of preset channel (CH7) reach to preset value, count action automatically stopped.

3－2－2. Stop enable by timer value

Type of command

ENTS — Enable to stop count by timer.
When timer value reach to preset timer value, count action automatically stopped.
On synchronous gate data acquisition mode, this command will be ignored.

3－2－3. Stop disable by counter timer

Type of command

DSAS — Disable to stop count by counter (CH7) or timer.
Counter doesn't stop automatically.
To quit counter action, it's valid for "STOP" command or "STOP" input signal (TTL Level) or meet the condition of stopping GATE data acquisition mode.

3－2－4. Inquiry of action mode

Type of command

MOD? — The latest counter mode is read.

Reply

R_SN_T_O

R: remote mode (fixed)
SN: single mode (fixed)

T: T/timer stop mode, C/counter stop mode, N/not stop mode
(When power switch on, the last mode is memorized)
O: O/counter On, F/counter off
(When power switch on, count function is "OFF".)

3－2－5. Setting and readout of preset counter

Type of command

SCPRdddd・・・・	To set preset value dddd・・・・・ in decimal to preset counter. Unit is Kcts. Maximum value is 4,294,967 Kcts.
SCPRFdddd・・・・	To set preset value dddd・・・・・ in decimal to preset counter. Unit is cts. Maximum value is 4,294,967,295 cts.

Inquiry command format

CPR？	To read out preset count value.
Reply	
00654321	Reply data is 8 digit decimal value. (Kcts unit)
CPRF？	To read out preset count value.
Reply	
00010000	Reply data is 8 digit decimal value. (cts unit) (If reply data is over 8 digit, the digit is as the count digit.)

3－2－6. Setting and readout of preset timer

Type of command

STPRdddd・・・・	To set preset value dddd・・・・・ in decimal to timer. (ms unit) Maximum timer set value is 1,099,511,627 ms.
STPRFdddd・・・・	To set preset value dddd・・・・・ in decimal to timer.(μs unit) Maximum timer set value is 1,099,511,627,776 μs.

Inquiry command format

TPR？	To read out preset timer value.
Reply	
00123456	Reply data is 8 digit decimal value. (ms unit)
TPRF？	To read out preset count value.
Reply	
00123456	Reply data is 8 digit decimal value.(μs unit)
4294967000	(If reply data is over 8 digit, the digit is as the timer digit.)

3－3. Commands of counter operation

3－3－1. Counter start

Type of command

STRT	Enable counter start.

3－3－2. Counter stop

Type of command

STOP	Enable counter stop.

3－4. Read-out and clear commands for counter and timer

3－4－1. Read-out and clear commands for all counter and timer

Type of command

RDAL？　　To read all counter channels and timer

Reply

1234567890 2345678901 3456789012 ····· 0123456789

These data are 10 digit number in decimal.

The data order is CH0 CH1 CH2 ····· CH7 timer.

Unit is cts for counter and μs for timer.

Type of command

RDALH？　　To read all counter channels and timer in hexadecimal.

Reply

1DC2829F 07C38528 0451EEC3 106D8230 ····· 00FFE101 000161C602

These data are 8 digit in hexadecimal.

The data order is CH0 CH1 CH2 ····· CH7 timer.

Units of counter is cts and timer is μs.

Type of command

CLAL？　　To clear all counter channels and timer

3－4－2. Read-out and clear commands for all counter

Type of command

CTR？xx　　To read count value of channel number xx.

CTR？xxyy　　To read count value from channel number xx to channel number yy.

Example

1234567890　Reply data is 10 digit data in decimal. Unit is cts.

1234567890 2345678901 3456789012 ····· 0123456789

Reply data is 10 digit data in decimal in order. Unit is cts.

Type of command

CTRH？xx　　To read count value of channel number xx in hexadecimal.

CTRH？xxyy　　To read count value from channel number xx to channel number yy in hexadecimal.

Example

1DC2829F　Reply data is 8 digit in hexadecimal. Unit is cts.

1DC2829F 07C38528 0451EEC3 106D8230 ····· 00FFE101 000161C602

Reply data is 8 digit in hexadecimal in order. Unit is cts.

Type of command

CLCTxx　　To clear the count value of counter channel xx.

CLCTxxyy　　To clear the count value from counter channel xx to channel yy.

CLPC　　To clear the count value of preset counter channel 07.

3－4－3. Read-out and clear commands for timer

Type of command

TMR？　　To read timer value.

Example

1234567890

Reply data is 10 digit data in decimal. Unit is μs.

Type of command

TMRH？　　To read timer value in hexadecimal.

Example

000161C602

Reply data is 8 digit in hexadecimal. Unit is μs.

Type of command

CLTM　　To clear timer value.

3－5. Inquiry of over-flow count data

Type of command

ALM？　　To inquiry about data overflow timer and count data

Reply example

overXXXX－－　　Timer is in normal.

overXXXXTM　　Timer is overflow.

XXXX means overflow counter channel. XXXX is 4 digit hex data.

(Example)

over0001－－	It means counter CH0 is overflow.	[0000 0001]
over0009－－	It means counter CH0 and CH3 are overflow.	[0000 1001]
over0039－－	It means counter CH0,CH3, CH4 and CH5 are overflow.	[0011 1001]
over000ATM	It means counter CH1,CH3 and timer are overflow.	[0000 1010]
over0000－－	It means no overflow.	[0000 0000]

3－6. Inquiry of software version information

Type of command

VER？　　To inquiry about software version information

Reply example

1.00 10-06-25 CT08-01B

Reply is in order, version number, date and type of the unit.

(The same firmware is used in NCT08-01B.)

Type of command

VERH？　　To inquiry about hardware version information

Example

HD-VER 1　　Reply is in order, "HD-VER", version number.

3－7. Other commands

(a) Type of command

FLG？0　FLG？1　FLG？2

Each command show the contents of unit.

Reply for command "FLG?0"

b7:
b6:
b5:
b4:
b3: Counter number 3 overflow
b2: Counter number 2 overflow
b1: Counter number 1 overflow
b0: Counter number 0 overflow

Reply data "04" mean "Counter number 2 overflow".

Reply for command "FLG?1"

b7:
b6:
b5:
b4:
b3:
b2: Counter number 6 overflow
b1: Counter number 5 overflow
b0: Counter number 4 overflow

Reply data "04" mean "Counter number 6 overflow".

Reply for command "FLG?2"

b7:
b6: RUN OUT
b5: COUNTER ON
b4: Timer overflow
b3: Counter number 7 overflow
b2: TTL GATE
b1: TTL STOP
b0: TTL START

Reply for command "FLG?3"

b7:
b6:
b5:
b4:
b3:
b2: Gate Edge mode ON
b1: Timer Gate mode ON
b0: Gate mode ON

(b) Type of command

FROM？　To check flash ROM number which includes active firmware software.
Refer to details see item 5.「Firmware Version Upgrade」

Reply example

FROM0
FROM1

(c) Type of command

FROM0　Select flash ROM number which includes active firmware software.
FROM1　Refer to details see item 5.「Firmware Version Upgrade」

(d) All reply mode (available for V1.04 or later)

Regarding "all reply mode", CT08-01B's reply is "OK" if the command has been processed.
On the other hand, CT08-01B's reply is "NG" if the command haven't been processed.
Regarding the case of "OK", it shows that the processing has been advanced.
And, this is not the evidence that the command is working correctly or not.
Please use this mode for "debug" of the communications (LAN, USB).

Type of command

ALL_REP?	Read "all reply mode" setting. The mode is active, if the answer is "EN". The mode is not active, if the answer is "DS".
ALL_REP_EN	All reply mode enable Right after "all reply mode" has been activated, the reply is "OK" or "NG" even if the command doesn't require a reply.
ALL_REP_DS	All reply mode disable There is not reply, if the command doesn't require a reply. This is the same function as V1.03 (or older).

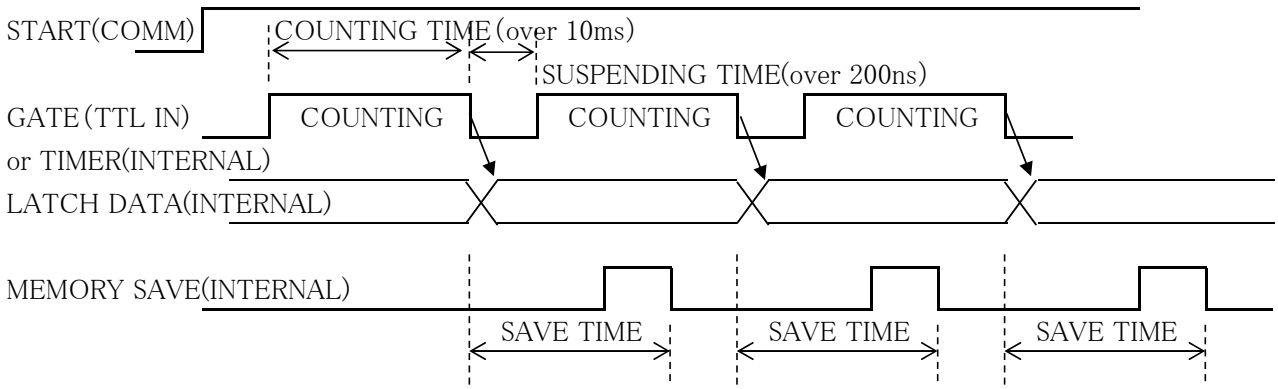
4. Counter data acquisition commands

4－1. About counter data acquisition commands

These commands help you to store the count data changing from moment to moment.
There are two timings of storing counter data, one is through GATE signal, the other is internal TIMER.
As the following figure shows, the data which increased input pulse in count time are stored sequentially in memory.

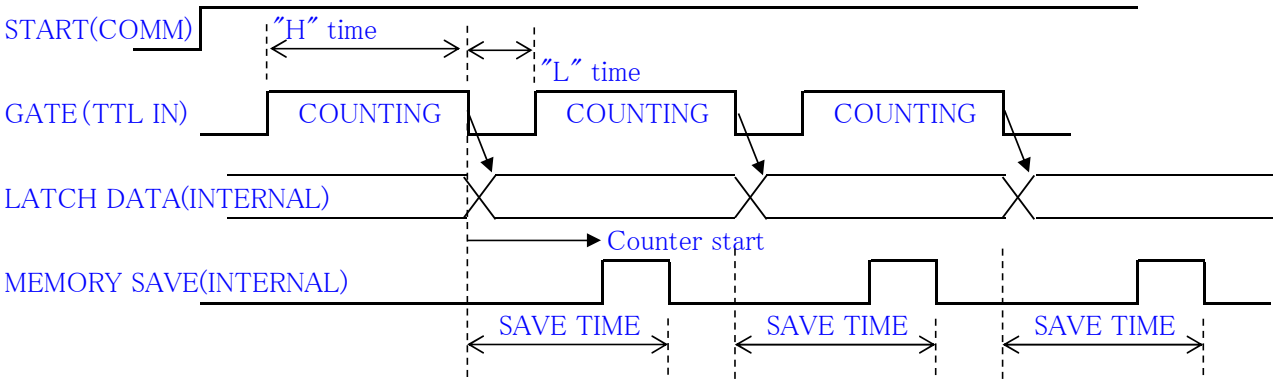
(GATE MODE)

Counts while GATE signal is H, and count data is stored on the memory at falling edge.



To meet the condition of SAVE TIME >= 10ms,
please input COUNTING TIME + SUSPENDING TIME >= 10ms.

(GATE EDGE MODE) This mode is available for hardware version 1～ (HD-VER 1～).
Count data is stored on the memory at the falling edge of GATE signal.
Counter starts at the first falling edge of GATE signal after STRT command.



To meet the condition of SAVE TIME >= 10ms,
please input COUNTING TIME + SUSPENDING TIME >= 10ms.

4－2. Preparation for data acquisition commands

Data are stored on memory(Address:0～9999).
You can set up acquisition starting data address and end.
Data acquisition stops automatically if current data address reach the acquisition end data address.
You can read current data acquisition address.

4－2－1. Clear current data address

Type of command

CLGSDN	Clear current data address. Set data acquisition starting address to zero.

4－2－2. Clear current data address and all stored data

Type of command

CLGSAL	Clear current data address and all memory data. Set data acquisition start address to zero and clear all memory data.

4－2－3. Set and read gate synchronous data acquisition current data address

Type of command

GSDNddd･･･	Set current data address with a decimal value. ddd･･･ : 0 ～ 9999

Type of command

GSDN？	Read out current data address.

Reply
0 ～ 9999

4－2－4. Set and read gate synchronous data acquisition end data address

Type of command

GSEDddd･･･ Set acquisition end data address

Data acquisition stop automatically if current data address reach end address.

Type of command

GSED？ Read data acquisition end address.

Reply

0 ～ 9999 Reply on a decimal value.

4－3 Synchronous GATE signal data acquisition commands

Type of command

GSTRT Start to store gate synchronous data.

(Just after turn on power, it's stop condition)

Entering this command after preparation of section 4-2,

CT08-01B starts data acquisition synchronized gate signal.

It stores signal data from current data address to end data address

synchronized by Gate signal.

Inputting "STOP" command, data acquisition stops immediately.

Type of command

GESTRT Start to store gate edge synchronous data.

(Just after turn on power, it's stop condition)

Entering this command after preparation of section 4-2,

counter gate opens at the first falling edge of gate signal,

CT08-01B starts synchronous falling edge of gate signal data acquisition.

It stores signal data from current data address to end data address

synchronized by falling edge of Gate signal.

Inputting "STOP" command, data acquisition stops immediately.

4－4 Synchronous internal clock data acquisition commands

In this mode, data acquisition is synchronized by clock generated by CT08-01B.

It's necessary to preset the value of clock ON time and clock OFF.

External gate input signal works gate signal during data acquisition operation.

If you're going to store data synchronized clock gate signal only, please set gate signal to ON.

(GATE ON = input OPEN:positive /Default setting is positive.)

4－4－1 Set and read synchronous Timer RUN time

Type of command

GTRUNddd･･･ Set synchronous timer data RUN time

(1μs～1,099,511,627,776μs : μs units.)

To make sure of time enough to store data, it's recommended that

the sum of gate RUN time and STOP is over 10,000(=10ms).

Type of command

GTRUN？	Read synchronous timer data RUN time
Reply	
20000	Read by μs units.　Ex. 20,000 = 20ms

4－4－2　Set and read synchronous timer OFF time

Type of command

GTOFFddd･･･	Set timer synchronous data STOP time (1μs～1,099,511,627,776μs：μs units. If you input 0, set about 200ns.) To make sure of time enough to store data, it's recommended that the sum of gate RUN time and STOP is over 10,000(10ms).

Type of command

GTOFF？	Read the timer synchronous data STOP time
Reply	
20000	Read μs units.　Ex. 20,000 = 20ms

4－4－3　Start synchronous timer clock data acquisition

Type of command

GTSTRT	Start to store clock synchronous data. (Just after turn on power, it's stop condition) Entering this command after preparation of section 4-2-1～3 and 4-3-1～2, CT08-01B starts synchronous clock signal data acquisition. It stores signal data from current data address to end data address synchronized by clock signal. Inputting "STOP" command, data acquisition stops immediately.

4－5 Common commands on synchronous data acquisition

These are common commands both in GATE synchronous data acquisition and in inner TIMER.

4－5－1. Counter stop

Type of command

STOP	Stop counting immediately. Data acquisition for synchronous GATE signal and internal timer also stops.

4－5－2. Read out the status of synchronous gate data acquisition

Type of command

GSTS？	Read out the data acquisition status.

Reply

Gate mode ON	Data acquisition on gate mode.
Timer Gate mode ON	Data acquisition on timer gate mode.
Gate Edge mode ON	Data acquisition on gate edge mode.
Gate mode OFF	Gate mode is not active.

4－5－3. Read out all stored data(0～current data address)

Type of command

GSDAL？　　Read out all stored data from 0 to current data address.
Current data address is set the next address to end data address
just after data acquisition.

ch0　ch1　ch2 ・・・・　ch7　timer

Reply example:

```
00123, 00456, 07890, ・・・・・ , 01234, 234567   ← Data of No.0
00123, 00456, 07890, ・・・・・ , 01234, 234567   ← Data of No.1
   ・・・・・・・・・・・・・・・・・・・・・・・・・・・・
00123, 00456, 07890, ・・・・・ , 01234, 234567   ← Data of No.n(n:acquisition end)
```

Data are output in order counter ch0 to ch7 and timer on one line.
Each data is output at 5 digits added 0 on head if the number of digit is below 5.
If over 5, each data is output at maximum digits of them.

Type of command

GSDALH？　　Read out in hexadecimal.
Read out all stored data from 0 to current data address.
Current data address is set the next address to end data address
just after data acquisition.

ch0　ch1 ・・・・　ch7　timer

Reply example:

```
1DC2829F,07C38528,・・・ 00FFE101,000161C602   ← Data of No.0
1DC2829F,07C38528,・・・ 00FFE101,000161C602   ← Data of No.1
   ・・・・・・・・・・・・・・・・・・・・・・・・・・・・
1DC2829F,07C38528,・・・ 00FFE101,000161C602   ← Data of No.n(n:acquisition end)
```

Data are output in order counter ch0 to ch7 and timer on one line.
Counter data is 8 digit output, and timer is 10 digit output.

4－5－4. Read out stored data of specific range

Type of command

GSDRD？xxxxyyyy　　Display acquired data from data address of xxxx to yyyy

xxxx, yyyy :When you input below 3 digits number, please put 0 on head and 4 digits.

Ex.　GSDRD？01234567

This is an example of reading out data address from 123 to 4567.

ch0　ch1　ch2 ・・・・　ch7　timer

Reply

```
02123, 00456, 07890, ・・・・・ , 01234, 234567   ← Data of No.123
03123, 00456, 07890, ・・・・・ , 01234, 234567   ← Data of No.124
   ・・・・・・・・・・・・・・・・・・・・・・・・・・・・
04123, 00456, 07890, ・・・・・ , 01234, 234567   ← Data of No.4567
```

Data are output in order counter ch0 to ch7 and timer on one line.
Each data is output at 5 digits added 0 on head if the number of digit is below 5.
If over 5, each data is output at maximum digits of them.

Type of command

GSDRDH？xxxxyyyy　Read out stored data from data address of xxxx to yyyy in hexadecimal.

Type of command

GSCRD？uvwxxxxyyyy　Read out stored data from data address of xxxx to yyyy.

u:read out start channel　v:end channnel　w: if 1,read out timer data, if 0, don't read.

xxxx, yyyy :When you input below 3 digits number, please put 0 on head and 4 digits.

Ex.　GSCRD？24101234567

This is an example of reading out data address from 123 to 4567 of ch2 to 4, and timer.

	ch2	ch3	ch4	timer	
Reply	02123,	00456,	07890,	234567	← Data of No.123
	02123,	00456,	07890,	234567	← Data of No.124
	・・・・・・・・・・・・・・・・・・・・・・・・・・・・				
	04123,	00456,	07890,	234567	← Data of No.4567

Data are output in order required counter (ch0 to ch7) and timer on one line.

Each data is output at 5 digits added 0 on head if the number of digit is below 5.

If over 5, each data is output at maximum digits of them.

Type of command

GSCRDH？uvwxxxxyyyy　Read out acquired data from data address of xxxx to yyyy in hexadecimal.

4－5－5. Amount of time for data downloading

CT08-01B uses serial communication (38400BAUD) for LAN interface.

The data download speed via LAN is about 3,800 characters (3.8KB) per second.

Decimal data download may be slower because of converting hexadecimal value into decimal.

Hexadecimal data download can ignore that delay for convert.

The data download speed via USB is 3 - 5 times as fast as via LAN because of 8 bit parallel communication for USB interface. For this reason, in the case of downloading so much count data, you can download faster if you request hexadecimal data via USB, and ignore not using counter data.

Download speed(from data address 0 to 999)

	Dec	Hex
LAN	19sec.	23sec.
USB	16sec.	7sec.

Timer and ch 7 have data, the others have all zero data

	Dec	Hex
LAN	32sec.	25sec.
USB	30sec.	7sec.

Timer and all channel have data

5. Firmware update

For CT08-01B it's possible to upgrade firmware via communication tools.

Here is an overview of operation.

It's possible to use USB and LAN communication.

You can download software for update and its user's manual from following URL.

http://www.tsuji-denshi.co.jp/download_file/lan_rs_file_send.EXE software for update

http://www.tsuji-denshi.co.jp/manual_pdf/pm16c_04xd_vup_soft.pdf user's manual

This is an example to install software by free soft "Tera Term" using LAN.

① Fist download the version upgrade software by Internet then unzip the file.

② Run "Tera Term" software.

In case of LAN mode, select "TCP/IP" enter IP address and port NO. of CT08-01.

In case of USB mode, select "SERIAL" and click PORT number (COMX) which is assigned to USB port.

Operate "SETUP" to "Terminal", set "New-line" is CR+LF with Receive and Transmit usage.

Put check mark into Local echo, then select "OK".

Try put into command "VER?", then if there is reply, connection will be no problem.

③ By "Tera Term", select "file" and then click "send file".

Opening "File Selection Window", specify the file name which is already installed procedure ①.

Then it begins the download.

④ it's possible to check download program file by PC.

When receiving data, the "COUNT" LED lamp of unit CT08-01 turns on and off slowly.

⑤ After receiving data for about 20s, the "COUNT" LED lamp goes to fast on and off mode then ROM writing session begins. After 5s, "COUNT" LED lamp turns off then this session will be done.

⑥ Stop "Tera Term" then cut off the line TCP/IP or USB, turn off power line of CT08-01.

Turn on power of CT08-01 again, the firmware version will be new.

Without turning off power line, it gets start by "RESET" command.

There are two pieces of flash ROM(FROM) loaded inside, new firmware is installed to one piece which is not used at now. After finishing writing a session, new one (written just now) is activated.

So after this session, by power on mode and "RESET" command, new program will start.

It is possible to check the version of working FROM by the command "FROM?"

Reply data is like these,"FROM0", "FROM1".

It is possible to specify the version of working FROM by the command "FROM0" or "FROM1".

After specifying FROM version, turn on power action or "RESET" command will start again by specified FROM version. It is useful to compare old and new firmware version.

If you miss the download work and program doesn't work, it's possible to recover initial version firmware by the ROM print board inside.

This is the procedure of recover the program to initial state.

1. Cut off power line, open the left-side cover panel. Slide the dipswitch 2 "ON" side.
   Dipswitch 1 keep "OFF" side.
2. Put on power line while shortening "GATE" input signal, "COUNT" LED turn on and off for about 15s.
   After that "COUNT" LED turn off and session will be done.
3. Put off power line again, then slide the dipswitch 2 "OFF" side. Dipswitch 1 keep "OFF" side.
4. Put on power line again then program starts by initial version.

From now the latest file must be installed by procedure ① to ⑥.

6. Synchronous drive of multi units

It's possible to operate multi units synchronously.

Then CT08-01 contains 8 CH counters, it's possible to count more than 9 channels at synchronous mode using multi units.

Here are procedures of this usage.

Connect the RUN signal (TTL OUT) of first unit to the GATE signal (TTL IN) port of second unit.

It's the same way to the third unit.

Send "DSAS" command to latter unit. The latter units don't stop counting automatically.

Send "START" command to latter unit. The latter units start counting action.

Depend on your usage, put on "GATE" signal to first unit.

Depend on your usage, preset timer stop command to first unit. ("CLTM","ENTS","STPRdddd")

Depend on your usage, preset counter stop command to first unit. ("CLPC","ENCS","SCPRdddd")

Activate count mode of first unit by the command "START".

This procedure activate more than one unit at the same timing chart.

Similarly, if you use several CT08-01B,you will acquire 8n channel data with gate signal data acquisition.

7. Regulations and guidelines

Regarding CT08-01B when it receives data read command, it stops count and timer action for 120 ns.

This stopping period is essential to get latest data to latch 32 bits count data.

If you read out count data 20 times/sec, total stopping period of counter is 120ns×20 = 2.4 μ s/sec.

Even if you read one or all counter at once, all counter and timer stops simultaneously, and stopping period is always 120ns. Therefore, you may read data by minimum commands.

On timer stop mode or counter stop mode, there is no error measurement caused by counter stop on reading.

When in counting pulse during "GATE" signal which comes from outside, you'll notice that counting period is shorter than read out period.

When in timer stop mode or counter stop mode, there is no dead time to read out count values.

(b) Notes when multiple counter units at simultaneous control

(See 6. Synchronous operation by multi counter units.)

In case of using multiple counter units at simultaneous control, if you read count in progress data of each units, only units which are read count data stop count operation in 120ns.

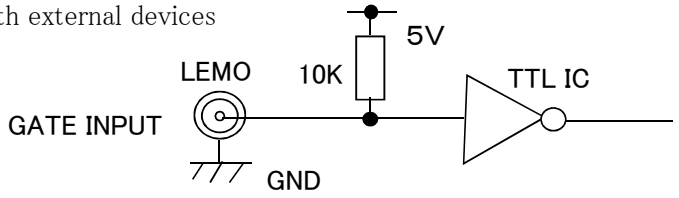
Therefore, note that it occurs some errors among count data of modules because of condition of count pulse, timing of reading, and dispersion of times of reading.

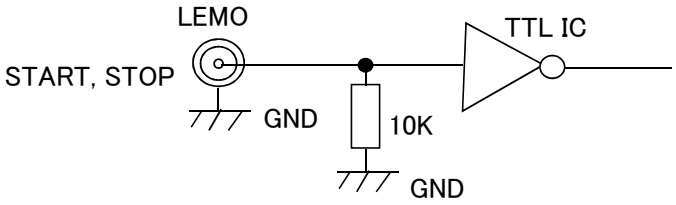
Example: Case of reading 20 times a second to one module only

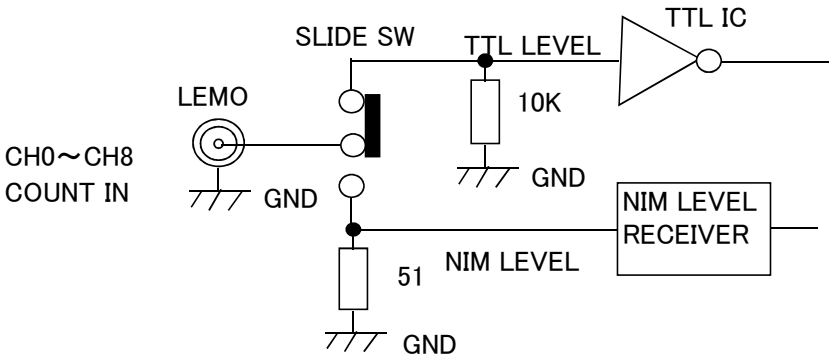
This module have 120ns * 20 = 2.4 μ s delay in every seconds.

Count error occurs by 2.4 μ s/s(0.00024%)

8. Interface with external devices







9. Performance and specifications

POWER	AC90～240V	
Counter	TTL Input level (3.3V～5V)	Voltage level 3.3V or 5V Zin = 10KΩ Count frequency more 150MHz
	NIM Input level	Current level -12mA～-36mA:"1" -4mA～+20mA:"0" Zin = 50Ω Count frequency more 300MHz
	Input Connector	LEMO ERA00250CTL
	Channels	0～7Channels (CH7 is preset counter)
	Overflow digit	When counter overflowed, reply "over"
	digit of count	32 bits(0～4,294,967,295)
Timer	Number of ch.	1 channel 40bit 1～1,099,511,627,775μs
	Resolution	0.000001sec(1μs)
	Accuracy	0.005%
	Preset time	1～1,099,511,627,775μs or ms
fixed counter	Number of ch.	1 channel CH7 Fixed
	Preset count	1cts ～ 4,294,967 Kcts or cts
Count mode	single mode	By start trigger or "STRT" command, CT08-01B counts input pulse once within preset time or count. Count stops immediately by stop trigger or "STOP" command. If you prohibit preset timer stop and count, count operation never stop unless using stop trigger or "STOP" command.
Count data acquisition mode	synchronous gate mode	Store total data automatically up to 10,000 times on the timing of turning OFF synchronous gate signal. Over 10ms the total time of gate ON and OFF requires.
	synchronous clock mode	Store total data automatically up to 10,000 times on the timing of turning OFF synchronous clock signal. Over 10ms the total time of clock RUN and OFF requires.
Gate in TTL	TTL Gate input enables count mode control with all channels and timer. Open or "H" level is count mode. You can invert logic level by inner switches. Used as a synchronous signal on gate synchronous data acquisition mode.	
LED in counting	In count mode LED turn on "green"	
Signal out in counting	TTL output shows counter is now operating. If you use some modules, you can activate them simultaneously by the highest module to connect between "TTL output" and "TTL gate in" on another module. You can invert logic level by inner switches.	
Control input	Count start input (by TTL rising edge), count stop input (by TTL rising edge) You can invert logic level by inner switches.	
Communication	LAN, USB	
Version upgrade	upgrade firmware software by communication	
Case	EIA1U (H44×W482. 6×D320)	

For the further information, feel free to ask us.

Tsuji-Electronics Co.,Ltd

TEL: +81-(0)29-832-3031 FAX: +81-(0)29-832-2662

E-mail : info2@tsuji-denshi.co.jp

URL : http://www.tsujicon.jp

3739, Kandatsu-machi, Tsuchiura-city, Ibaraki 300-0013, Japan