User's Manual

Notice of Alterations

DL9040/DL9140/DL9240 Series Digital Oscilloscope

Please make the following alterations to the User's Manual IM701310-01E.

Functions that have been added to products with firmware version 2.00 or later

■ Page ii

MODEL	SUFFIX	Specifications
Help language	-HJ	Japanese
	-HE	English
	-HC	Chinese
	-HK	Korea
Options	/B5	Built-in printer
	/P2	Probe power supply
	/C8*	Built-in hard disk drive and Ethernet interface
	/C10*	Ethernet interface
	/F5	I^2C + SPI bus analysis function
	/F7	CAN + SPI bus analysis function
	/F8	I^2C + CAN + SPI bus analysis function

■ Page 2-18

Action On Trigger <<For the operation procedure, see Section 7.8>>

When determining that a condition holds from the automated measurement of waveform parameters or from waveform passing zone condition, it is possible to carry out another action at the same time as waveform acquisition. The action to be carried out can be selected from a number of possibilities, including sounding an alarm, saving waveform data or a screen image, printing a screen image, or sending E-mail.

■ Add "Activating the Trigger on the CAN Bus Signal (ENHANCED)" to chapter 6

A trigger function for capturing CAN bus signals has been added.
By setting the ID bit pattern, DLC, Data, and ACK slot status of the CAN bus, a trigger can be activated on a specific data frame or remote frame.
CAN stands for Controller Area Network. It is a sereial communication protocol standardized internationally by the ISO (International Organization for Standardization).

Procedure

Setting the Trigger Conditions of the CAN Bus Signal

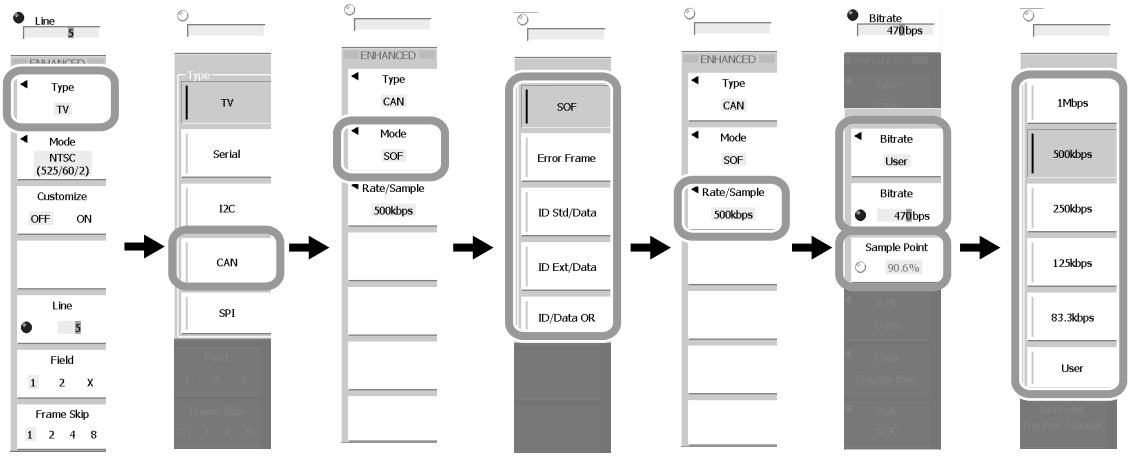
1. Press **ENHANCED**. The ENHANCED menu appears.
2. Press the **Type** soft key. The trigger type selection menu appears.
3. Press the **CAN** soft key.

Selecting the Trigger Mode

4. Press the **Mode** soft key. A menu used to select the trigger mode of the CAN bus signal appears.
5. Press the **SOF**, **Error Frame**, **ID Std/Data**, **ID Ext/Data**, or **ID/Data OR** soft key to set the trigger mode.

Setting the Bit Rate and Sample Point

6. Press the **Rate/Sample** soft key.
7. Press the **Bitrate** soft key. The bit rate selection menu appears.
8. Press the **1Mbps**, **500kbps**, **250kbps**, **125kbps**, **83.8kbps**, or **User** soft key to select the bit rate. If you select User, press the **Bitrate** soft key and turn the **rotary knob** to set an arbitrary value.
9. Press the **Sample Point** soft key.
10. Turn the **rotary knob** to set the sample point.



Proceed to the following pages depending on the trigger mode you selected in step 5.

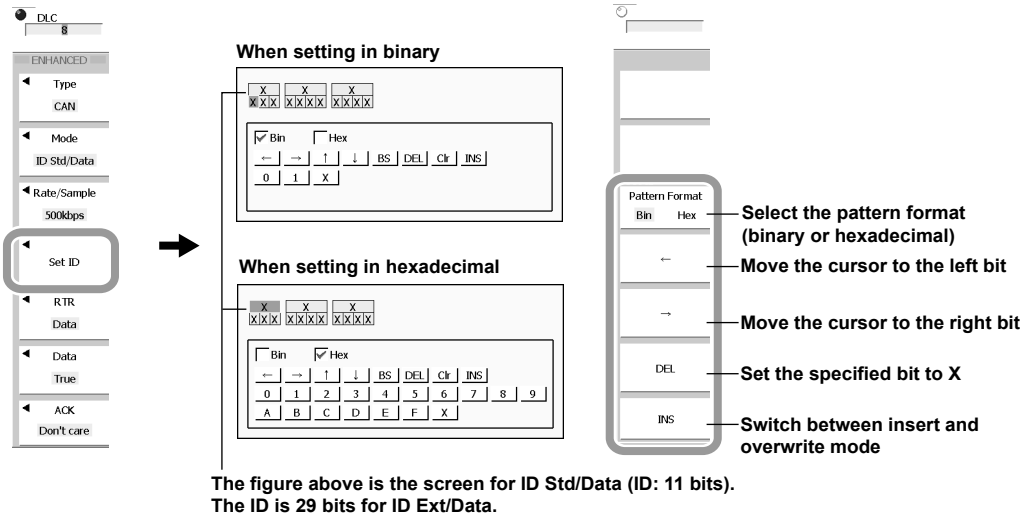
- SOF (trigger on the Start of Frame): You are done with the settings.
- Error Frame (trigger on an error frame): You are done with the settings.
- ID Std/Data (trigger on the data/remote frame (ID: standard format)): Step 11
- ID Ext/Data (trigger on the data/remote frame (ID: extended format)): Step 11
- ID/Data OR (trigger on the OR condition of multiple data/remote frames):Step 30

- **If You Selected ID Std/Data or ID Ext/Data in Step 5**

Setting the ID Bit Pattern

11. Press the **Set ID** soft key. The ID setup screen appears.
12. Use the **rotary knob**, **arrow** keys, and **SET** key to set the ID pattern.

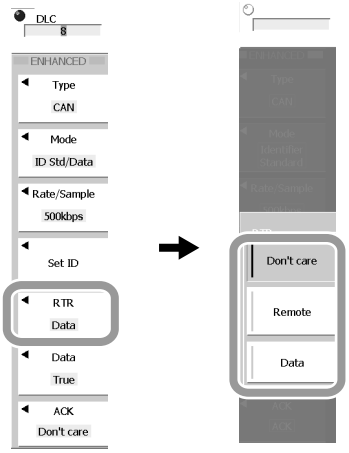
    You can use the soft keys to change the format to binary or hexadecimal, move between bits, or clear all the bits (X).
13. Press **ESC**.



The figure above is the screen for ID Std/Data (ID: 11 bits).
The ID is 29 bits for ID Ext/Data.

Setting the Remote Frame or Data Frame

14. Press the **RTR** soft key.
15. Press the **Don't care**, **Remote**, or **Data** soft key.
    - If you select Don't care, a trigger is activated on a remote frame or data frame. Proceed to step 28.
    - If you select Remote, a trigger is activated on a remote frame. Proceed to step 16.
    - If you select Data, a trigger is activated on a data frame. Proceed to step 16.



- **Setting the DLC**

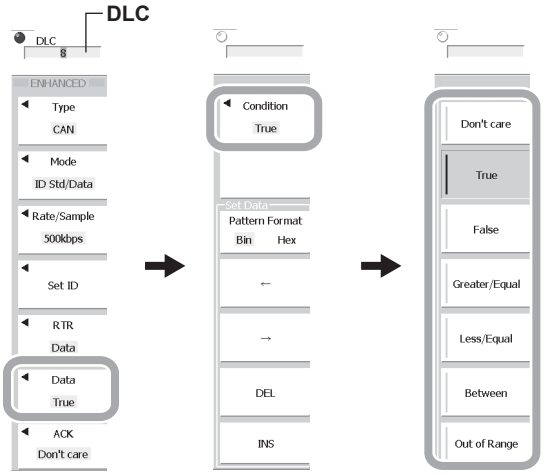
16. Turn the **rotary knob** to set the DLC (number of valid bytes).

- **Setting the Data Field Condition**

17. Press the **Data** soft key.
18. Press the **Condition** soft key.
19. Press the **Don't care**, **True**, **False**, **Greater/Equal**, **Less/Equal**, **Between**, or **Out of Range** soft key.
    - If you select Don't care, trigger is activated when the DLC matches. Proceed to step 28.
    - If you select True, a trigger is activated when Data in the data field matches the specified bit pattern. Proceed to step 20.
    - If you select False, a trigger is activated when Data in the data field does not match the specified bit pattern. Proceed to step 20.
    - If you select Greater/Equal, a trigger is activated when Data in the data field is greater than or equal to the specified comparison data. Proceed to step 22.
    - If you select Less/Equal, a trigger is activated when Data in the data field is less than or equal to the specified comparison data. Proceed to step 22.
    - If you select Between, a trigger is activated when Data in the data field is greater than or equal to the specified comparison data Data1, and less than or equal to the comparison data Data2. Proceed to step 22.
    - If you select Out of Range, a trigger is activated when Data in the data field is less than the specified comparison data Data1, or greater than the comparison data Data2. Proceed to step 22.

Note

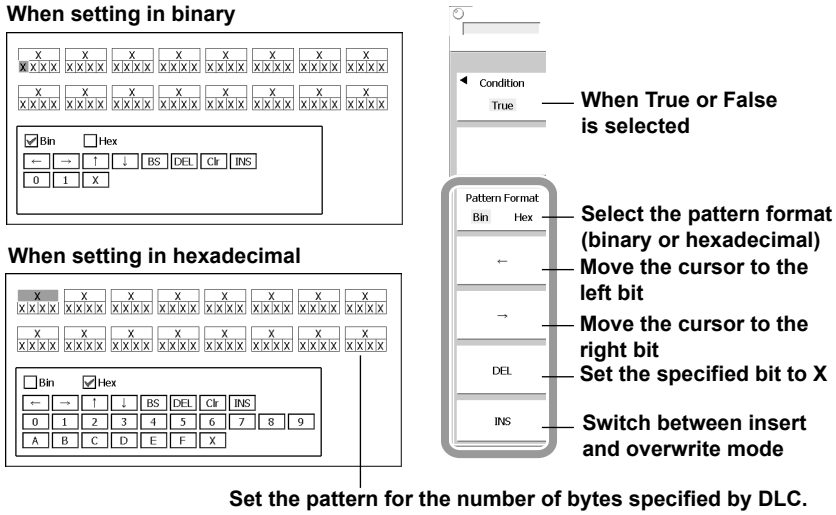
For details on the trigger point for each condition, see page 15.



• **Setting the Data Bit Pattern**

If you selected True or False in step 19, a screen used to set the Data bit pattern appears.

20. Use the **rotary knob**, **arrow** keys, and **SET** key to set the Data bit pattern. You can use the soft keys to change the format to binary or hexadecimal, move between bits, or clear all the bits (X).
21. Press **ESC**. Proceed to step 28.

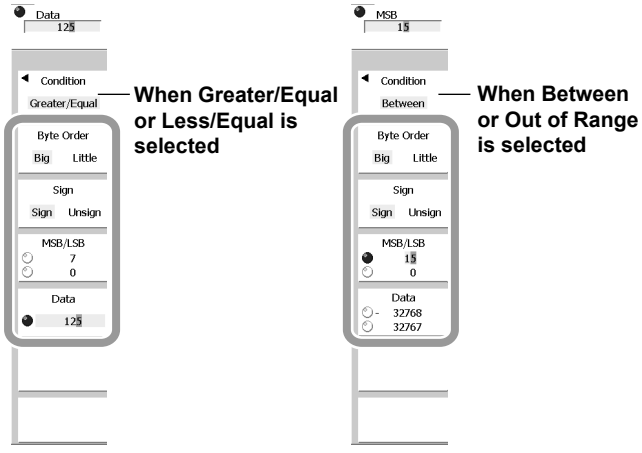


• **Setting the Comparison Data**

If you select Greater/Equal, Less/Equal, Between, or Out of Range in step 19, a menu used to set the comparison data appears.

22. Press the **Byte Order** soft key to set the Endian of the value to Big or Little.
23. Press the **Sign** soft key to set the sign of the value to Sign (with a sign) or Unsign (without a sign).
24. Press the **MSB/LSB** soft key to set the MSB and LSB positions of the comparison data.
25. Press the **Data** soft key.
26. Turn the **rotary knob** to set the comparison data (Data, Data1, and Data2) in decimal notation.

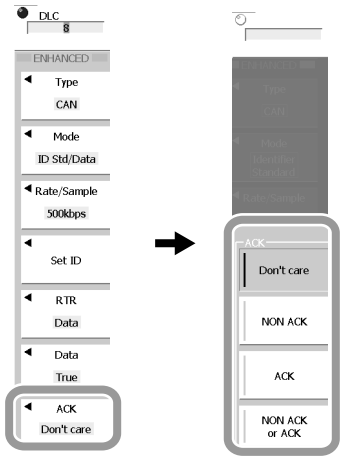
    If you select Greater/Equal or Less/Equal, set Data. If you select Between or Out of Range, set Data1 and Data2.
27. Press **ESC**. Proceed to step 28.



Setting the ACK Slot

28. Press the **ACK** soft key. The ACK slot setup menu appears.
29. Press the **Don't care**, **NON ACK**, **ACK**, or **NON ACK or ACK** soft key.
    - If you select Don't care, the bus level of the ACK slot is not used as a trigger condition.
    - If you select NON ACK, a trigger is activated when the bus level of the ACK slot is recessive.
    - If you select ACK, a trigger is activated when the bus level of the ACK slot is dominant.
    - If you select NON ACK or ACK, a trigger is activated when the ACK slot is recessive or dominant.

Proceed to step 33.



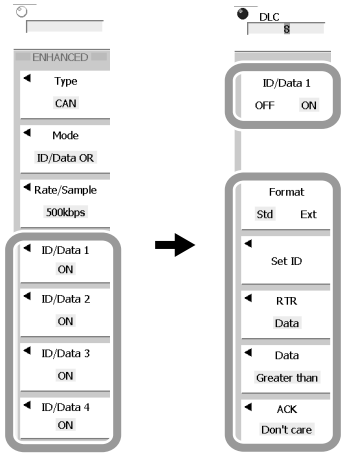
- **If You Selected ID/Data OR in Step 5**

Setting the ID/Data for the OR Condition

30. Press the **ID/Data 1**, **ID/Data 2**, **ID/Data 3**, or **ID/Data 4** soft key to select the **ID/Data** on which to set the OR condition.
31. Press the **ID/Data X** soft key (where X is a number between 1 and 4) to select ON (include in the OR condition) or OFF (not include in the OR condition).
32. Press the **Format** soft key to set the ID format to Std (standard format) or Ext (extended format).

The subsequent steps are the same as when you select ID Std/Data or ID Ext/Data in step 5. For the procedure, see steps 11 to 29 on page 3.
To activate a trigger on the OR condition of multiple ID/Data, repeat steps 30 to 32.

Proceed to step 33.



Setting the Source Channel

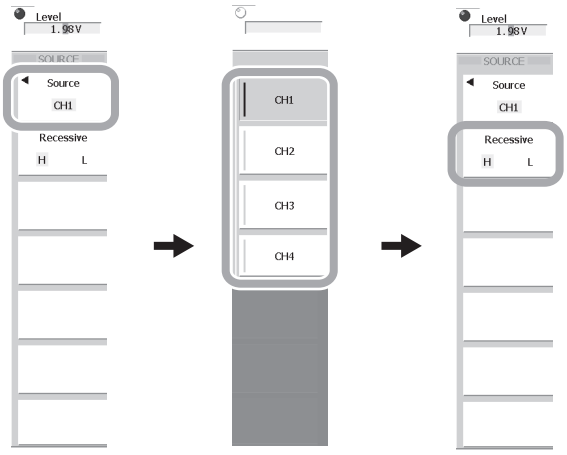
33. Press **SOURCE**. The SOURCE menu appears.

Selecting the Source Channel

34. Press the **Source** soft key. A menu used to select the source channel of the CAN bus signal appears.
35. Press any of the soft keys **CH1** to **CH4** to select the source channel.

Selecting the Bus Level

36. Press the **Recessive** soft key to select H (set the recessive electric potential higher than the dominant electric potential) or L (set the recessive electric potential less than the dominant electric potential).



Setting the Level, Coupling, HF Rejection, and Hysteresis

37. Press **LEVEL/COUPLING**. The LEVEL/COUPLING menu appears.

Selecting the Channel to Be Configured

38. Press the **CH** soft key. A menu used to select the channel appears.
39. Press any of the soft keys **CH1** to **CH4**.

Setting the Level

40. Turn the **rotary knob** to set the level used to determine high or low of the channel set in step 39.

Setting the Coupling

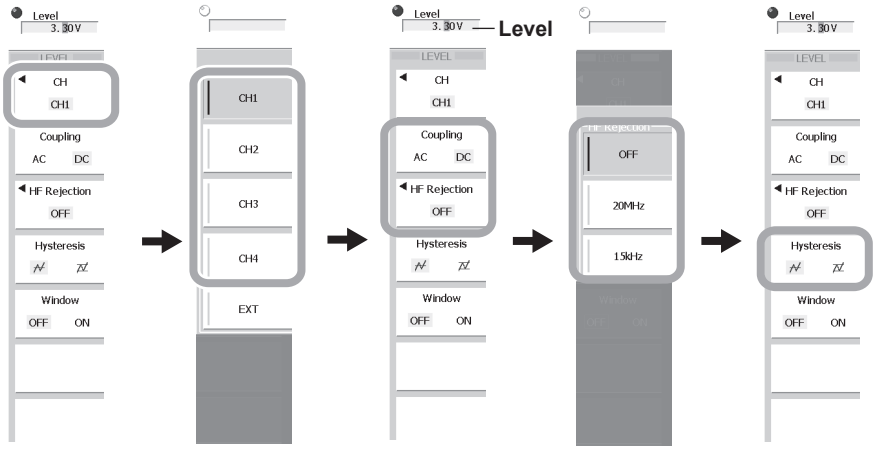
41. Press the **Coupling** soft key to set the input coupling to DC.

Setting the HF Rejection

42. Press the **HF Rejection** soft key. A menu used to select the HF rejection appears.
43. Press the **OFF**, **20MHz**, or **15kHz** soft key.

Setting the Hysteresis

44. Press the **Hysteresis** soft key to select the hysteresis.



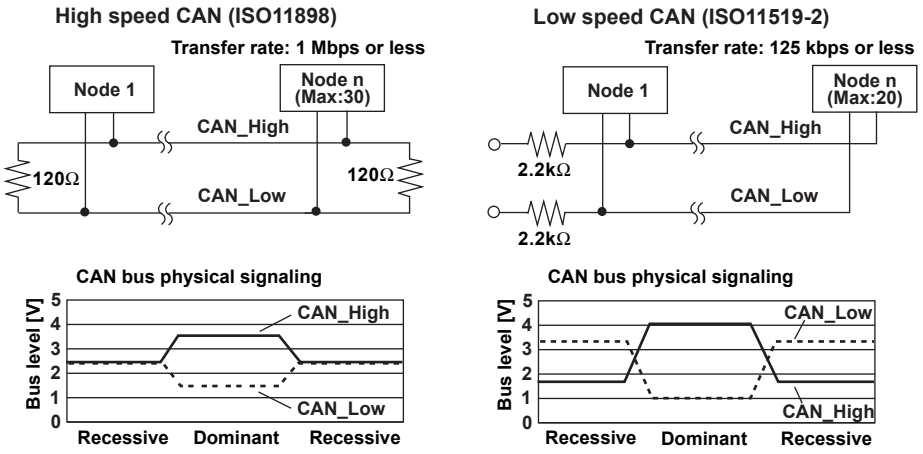
As necessary, repeat steps 38 to 44.

Explanation

High Speed CAN (ISO11898) and Low Speed CAN (ISO11519-2)

Two typical standards of the CAN physical layer are High speed CAN (ISO11898) and Low speed CAN (ISO11519-2).

In the figure below, the bus level is determined for both High and Low speed CAN according to the difference of potential between the CAN_High and CAN_Low busses.



Connecting the Probe

Probe to Be Used

A differential probe is used when measuring CAN bus signals.

Compatible differential probes: 701920 and 701922 by Yokogawa

Probe Connection Procedure

When displaying the recessive voltage level higher than the dominant voltage level (Recessive: H)

- **For a two wire system (differential)**
  Connect the differential probe negative (–) to CAN_High, and the probe positive (+) to CAN_Low.
- **For a one wire system (single-ended)**
  Connect the differential probe negative (–) to CAN_High, and probe positive (+) to GND (ground potential).

When displaying the recessive voltage level less than the dominant voltage level (Recessive: L)

- **For a two wire system (differential)**
  Connect the differential probe negative (–) to CAN_Low, and the probe positive (+) to CAN_High.
- **For a one wire system (single-ended)***
  Connect the differential probe negative (–) to GND (ground potential), and probe positive (+) to CAN_High.

* In this case, the passive probe (model 700988) can be connected to CAN_High.

Setting the Trigger Conditions of the CAN Bus Signal

Trigger Mode

The following trigger modes are available.

SDF	Activate a trigger on the Start of Frame (SOF).
Error Frame	Activate a trigger an error frame.
ID Std/Data	Activate a trigger on a data frame or remote frame (ID: standard format) that matches the specified conditions.
ID Ext/Data	Activate a trigger on a data frame or remote frame (ID: extended format) that matches the specified conditions.
ID/Data OR	Activate a trigger on the OR condition of four types of data frames or remote frames. You can select standard or extended format for each ID.

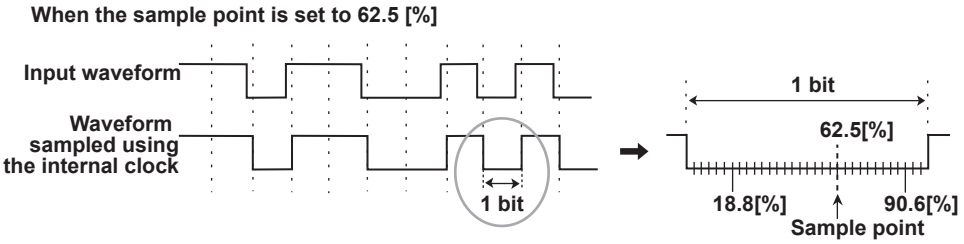
For details on the trigger point for each trigger mode, see page 15.

Bitrate

Select the transfer rate of the CAN bus signal from 1Mbps, 500kbps, 250kbps, 125kbps, 83.8kbps, and User. If you select User, you can set an arbitrary value in the range of 10k to 1M [bps] (0.1 kbps resolution).

Sample Point

Set the point used to judge the bus level (recessive or dominant) in the range of 18.8 to 90.6 [%].
In the trigger circuits of the instrument's CAN bus signal analysis function, the input CAN bus signal is sampled once per the internal clock, and the point of change from recessive to dominant is detected. The detected point is taken as 0%, and the point one bit time (the reciprocal of the specified bit rate) thereafter is taken as 100%, allowing expression of the sample point as a percentage.



- **When the Trigger Mode Is Set to ID Std/Data or ID Ext/Data**

ID Bit Pattern (Set ID)

Set an 11-bit ID pattern if you select ID Std/Data or a 29-bit pattern if you select ID Ext/Data. Binary bit patterns are set using 0, 1, and X. Hexadecimal bit patterns are set using 0 to 9, A-F, and X. Matching of the specified ID bit pattern is a trigger condition.

Note

- If an ID bit pattern is set to X, the condition is assumed to be met regardless of the status of the corresponding bit.
  Binary: Condition met on either 0 or 1
  Hexadecimal: Condition met on any value (0 to 9 and A to F)
- If there is at least one "X" bit in a group of four bits of the ID bit pattern in the binary display, the corresponding hexadecimal display will show a "$".

Remote Frame or Data Frame (RTR)

A trigger can be activated on the combination of remote frames or data frames and the ID bit pattern.

Don't care	Remote frames and data frames are used as trigger conditions.
Remote	Remote frames are used as trigger conditions.
Data	Data frames are used as trigger conditions.

The items below are set only when RTR is set to Data.

- **DLC**

  Set the DLC (number of valid bytes) of the data field in the range of 0 to 8 bytes. The default value is 8 bytes.

- **Data Field Condition**

  Select the data condition when using the data field as a trigger condition from the following:

Don't care	A trigger is activated when the DLC matches.
True	A trigger is activated when Data in the data field matches the specified bit pattern.
False	A trigger is activated when Data in the data field does not match the specified bit pattern.
Greater/Equal	A trigger is activated when Data in the data field is greater than or equal to the specified comparison data.
Less/Equal	A trigger is activated when Data in the data field is less than or equal to the specified comparison data.
Between	A trigger is activated when Data in the data field is greater than or equal to the specified comparison data Data1, and less than or equal to the comparison data Data2.
Out of Range	A trigger is activated when Data in the data field is less than the specified comparison data Data1, or greater than the comparison data Data2.

If Data1 is set equal to Data2 for Between, a trigger is activated when the data of the data field is equal to Data1 which is equal to Data2.

Data Bit Pattern (Set Data)

Set the bit pattern only when Condition is set to True or False.

Set the Data bit pattern. Binary bit patterns are set using 0, 1, and X. Hexadecimal bit patterns are set using 0 to 9, A-F, and X. The length of the bit pattern is the number of bytes set by DLC.

Note

- If an Data bit pattern is set to X, the condition is assumed to be met regardless of the status of the corresponding bit.
  Binary: Condition met on either 0 or 1
  Hexadecimal: Condition met on any value (0 to 9 and A to F)
- If there is at least one "X" bit in a group of four bits of the Data bit pattern in the binary display, the corresponding hexadecimal display will show a "$".

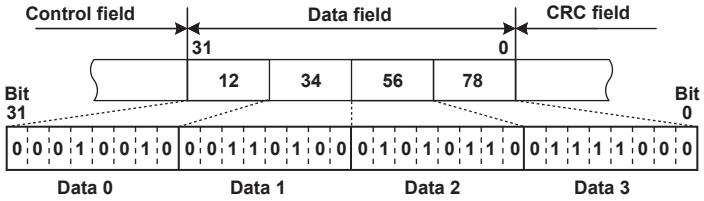
Comparison Data

Set the items below if Condition is set to Greater/Equal, Less/Equal, Between, or Out of Range.

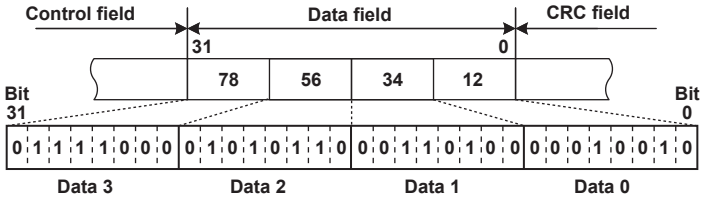
- **Data, Data1, and Data2**
  Set the value (Data, Data1, and Data2) that is compared against the Data in the data field in decimal notation. Set Data for Greater/Equal or Less/Equal. Set Data1 and Data2 for Between or Out of Range. For the selectable ranges of Data, Data1, and Data2, see “Sign” below.

- **Byte Order**
  Set the byte read order of the Data, Data1, and Data2 to Big Endian or Little Endian.
  For example, when a node transmits four-byte data (12345678: hexadecimal notation), the image of the frame on the bus is as shown in the following figure.

  • Big Endian



  • Little Endian



- **Sign**
  Select whether to make Data, Data1, and Data2 signed numbers.
  The selectable range of Data, Data1, and Data2 when you select Sign or Unsign is shown below.

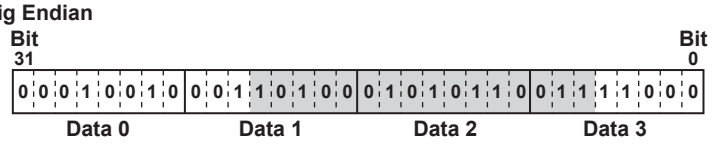
Sign	–9E+18 to 9E+18
Unsign	0 to 9E+18

The Data, Data1, and Data2 values are displayed using exponential notation when the values exceed seven digits (example: 1234567E+10).

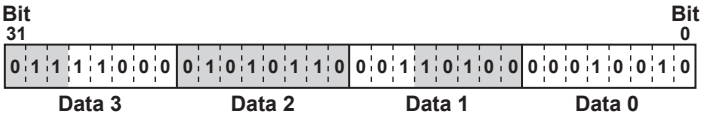
- **MSB/LSB**
  Set the bit positions of Data, Data1, and Data2 to be compared using MSB and LSB. The selectable range is 0 to 63 (the selectable range may be limited depending on the DLC setting).

  For example, to compare only bits 5 to 20 of the four-byte data (12345678: hexadecimal notation), set LSB to 5 and MSB to 20. The bits of the data field that are compared for this case are as shown in the figure below for the different byte order settings (Big Endian and Little Endian).

  • Big Endian



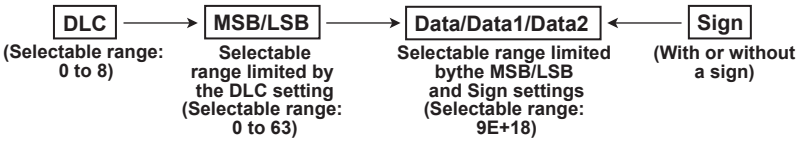
  • Little Endian



Note

Relationship between the DLC, MSB, LSB, Data, Data1, and Data2 values

The relationship between the DLC, MSB, LSB, Data, Data1, and Data2 values is shown below.



[Example] When DLC is set to 2 bytes

0 ≤ LSB ≤ MSB ≤ 15(equivalent to 2 bytes)

• Sign (signed number): – 32768 ≤ Data1 ≤ Data2 ≤ 32767

• Unsign (unsigned number): 0 ≤ Data1 ≤ Data2 ≤ 65535

ACK Slot

The bus level of the ACK slot (recessive or dominant) can be used as a trigger condition.

Don't care	The bus level of the ACK slot is not used as a trigger condition.
NON ACK	A trigger is activated when the bus level of the ACK slot is recessive.
ACK	A trigger is activated when the bus level of the ACK slot is dominant.
NON ACK or ACK	A trigger is activated when the bus level of the ACK slot is recessive or dominant.

Note

If you set the trigger mode to ID/Data OR and set the ACK slot to Don't care, set the ACK slot of all data frames or remote frames (ID/Data1 to ID/Data4) to Don't care.

The trigger may not be activated in the correct position, if you mix Don't care and other settings (NON ACK, ACK, NONACK or ACK).

- **When the Trigger Mode Is Set to ID/Data OR**

  IDs Take the OR Logic (Edit Condition)

  Set four trigger conditions (ID/Data1 to ID/Data4) of data frames or remote frames. You can enable or disable each ID/Data condition. You can select standard or extended format for each ID.

  ID Format

  Set the ID format to Std (standard format) or Ext (extended format).

  ID Bit Pattern (Set ID)

  The details are the same as when the trigger mode is set to ID Std/Data or ID Ext/Data.
  For details, see page 11.

  Remote Frame or Data Frame (RTR)

  The details are the same as when the trigger mode is set to ID Std/Data or ID Ext/Data.
  For details, see page 11.

  ACK Slot

  The details are the same as when the trigger mode is set to ID Std/Data or ID Ext/Data.
  For details, see page 13.

Source Channel

The source channel of the CAN bus signal is set using the SOURCE menu that appears when you press the SOURCE key. The menu used to set the source channel of the CAN bus signal appears only when Type is set to CAN in the ENHANCED menu.

Specifying the Source Channel

The source channel is specified using the SOURCE menu.

Bus Level (Recessive)

Select the bus level from either of the following: In either case, the logical value is: recessive = 1 and dominant = 0.

H	The recessive electric potential is set higher than the dominant electric potential.
L	The recessive electric potential is set lower than the dominant electric potential.

Trigger Level, Trigger Coupling, Etc.

Set the trigger level, trigger coupling, HF rejection, and hysteresis of each channel. For details on these items, see section 6.3.

Unification of the Trigger Setting of the CAN Bus Signal and the Setting of the CAN Bus Signal Analysis, Search and Stuff Bit Computation

The trigger settings of the CAN bus signal on the menu that is entered through the ENHANCED key and the settings of the CAN bus signal analysis, search, and stuff bit computation on the menu entered through the WINDOW1, ZOOM1, or M1 key are common. The CH1 to CH4 sources are the waveforms of which the settings are common.

Trigger settings of the CAN bus signal that are applied to the settings of analysis, search, and stuff bit computation

Level (trigger level), Hysteresis (trigger hysteresis), and Sample Point
(The settings of the CAN bus signal analysis, search, and stuff bit computation are not applied to the trigger settings.)

Items for which the trigger settings, analysis settings, search settings, and stuff bit computation settings of the CAN bus signal are applied mutually

Source, Bitrate, and Recessive

Note

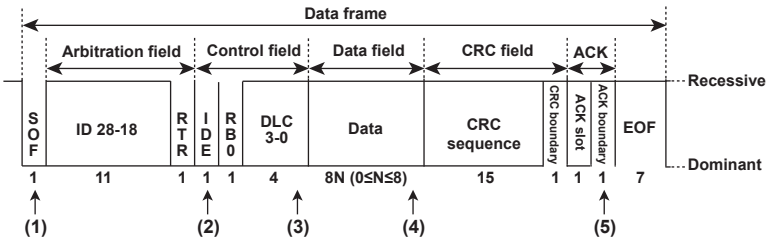
- The settings of the CAN bus signal analysis, search, and stuff bit computation on the menu entered through the WINDOW2, ZOOM2, and M2 to M4 keys are not made common. They are independent settings.
- If you change common items (excluding Level, Hys, and Sample Point) in the analysis, search, and stuff bit computation menus while the waveform acquisition is in progress and the trigger type is set to CAN, the waveform acquisition is restarted.
- Even if something other than CAN bus is selected in the analysis or search menu, the level and hysteresis settings of the analysis and search menus are set to the same value if the level or hysteresis setting is changed.
- If the trigger level or hysteresis is changed by executing auto setup, the level and hysteresis settings of the analysis and search are also set to the same new value. This also applies when the setup information is initialized.
- Trigger Hys  and  correspond to 0.6 division and 1.0 division, respectively, of the analysis, search, or stuff bit computation.

Frame Format and Trigger Point

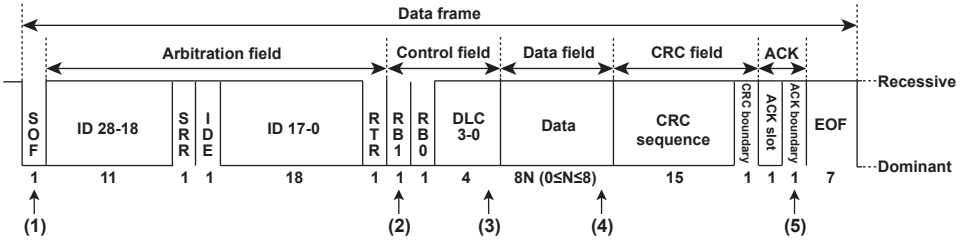
The following figure shows the format and trigger point of each frame.

Data Frame

• Standard format



• Extended format

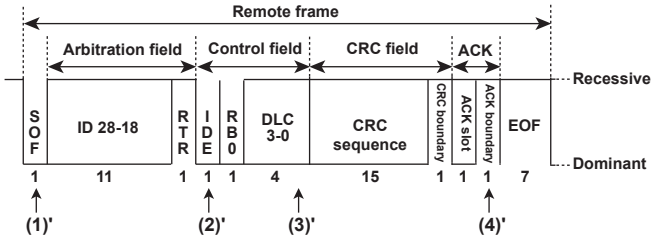


Items (1) to (5) above are the trigger points for the following conditions.
(1) Mode: SOF
(2) Mode: ID X*, RTR: Don't care, and ACK: Don't care
(3) Mode: ID X*, RTR: Data, Condition: Don't care, and ACK: Don't care
(4) Mode: ID X*, RTR: Data, Condition: Other than Don't care, ACK: Don't care
(5) ACK: Other than Don't care

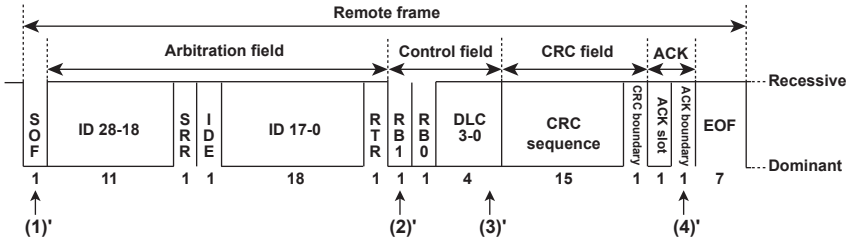
*** ID X: For ID Std/Data, ID Ext/Data, or ID/Data OR**

Remote Frame

• **Standard format**



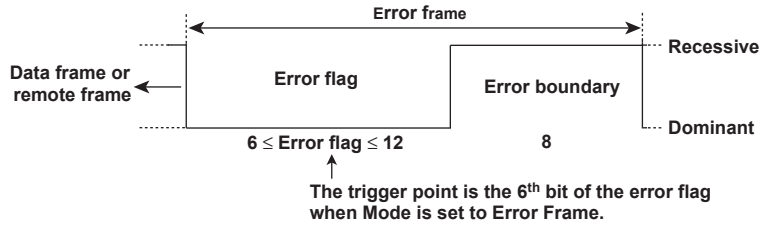
• **Extended format**



Items (1) to (5) above are the trigger points for the following conditions.
(1)' Mode: SOF
(2)' Mode: ID X*, RTR: Don't care, ACK: Don't care
(3)' Mode: ID X*, RTR: Remote, ACK: Don't care
(4)' ACK: Other than Don't care

*** ID X: For ID Std/Data, ID Ext/Data, or ID/Data OR**

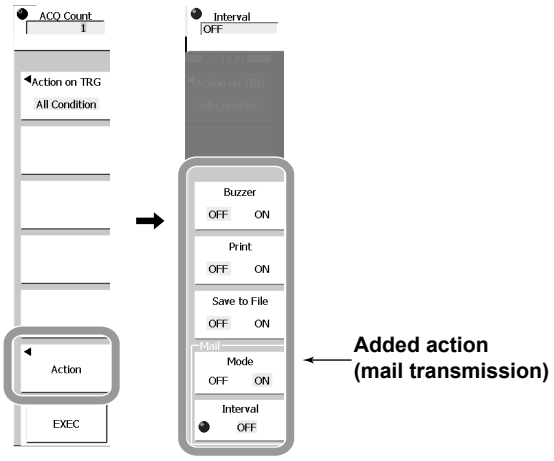
Error Frame



■ Page 7-12

Action When Trigger Activated

4. Press the **Action** soft key.
5. Press the soft key that corresponds to the desired item and select ON or OFF.
   If you set Mail-Mode to ON, turn the rotary knob to set the interval.
6. Press **ESC**. This returns to the Action on Trigger setting screen.



■ Add to Page 7-13 and 7-17

Action to Be Performed When the Trigger Condition Is Met

The specified action (of those below) is performed whenever a trigger is activated.

- **Beep Sound: Buzzer**
- **Print Screen Image: Print**
- **Save Waveform Data: Save to File**
- **Mail transmission: Mail-Mode/Interval**
  Sends a mail message to a specified address (when Ethernet interface option is installed).
  For the procedure to set the address, "Setting the Mail Transmission" in chapter 15.

Note

- ~~When the action-on-trigger is started with the Action Condition OFF, the specified action is performed when the trigger is activated in the normal mode regardless of the trigger mode setting.~~
- If you select mail transmission for the action to be taken when a trigger is activated, it is recommended that you place a limitation on the number mails to be sent to prevent overloading the mail server. You can set the upper limit of the number of mail transmissions using ACQ Count or Nogo Count (selectable only when using GoNogo determination).

■ Add to page 7-14 and 7-18

Mail Transmission Action

Turning Mail Transmission ON/OFF (Mode)

When the Mode is turned ON, mails are transmitted to the address specified by Network > E-Mail Setup > Address (To Address/From Address) in the SYSTEM menu.

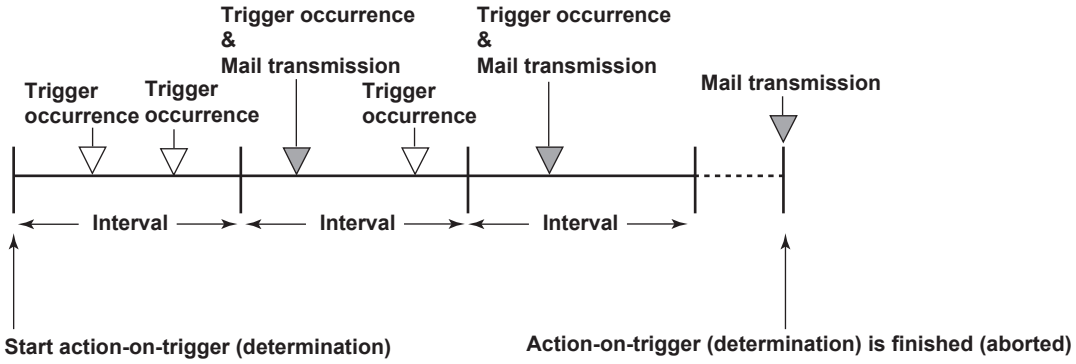
Interval

The mail is sent on the first occurrence of the trigger after the specified interval elapses. A mail is also sent when action-on-trigger (determination) is finished (or aborted).

The following mail transmission intervals are available. If you select OFF, a mail is sent each time a trigger is activated.

OFF to 1440 min (1 min steps)

- **Mail Transmission Example When Interval Is Specified**



■ Add to page 7-14

Contents of the Transmitted Mail

The contents that are sent vary depending on the selected action and the criteria. For the contents that are sent when the action is set to Nogo, see page 7-18.

- **When Action Is Set to All Condition**

<Subject>	The subject of the mail. It is shown as a subject or title depending on the mail client. The contents of the subject are shown below. The number inside the parentheses is the Nogo count. All Condition Triggered Report (No.) or All Condition Interval Report (No.)
[Comment]	Comment
[Trigger Date and Time]	Trigger time
[ACQ Count]	Number of acquisitions

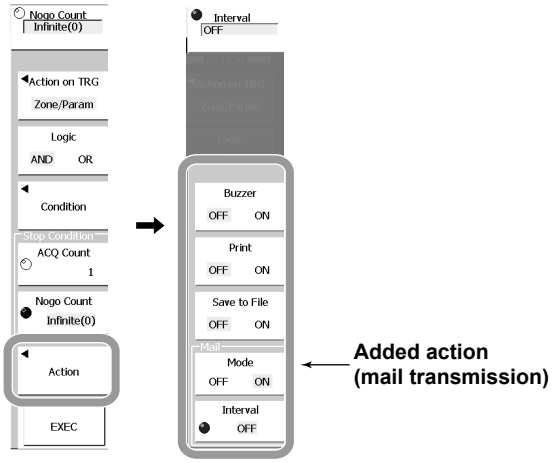
Transmission Example

<Subject>	All Condition Interval Report 2
----------Body of the message from here	
[Comment]	Sample-All Condition
[Trigger Date and Time]	2006/03/01 16:47:04
[ACQ Count]	1367

■ Add to Page 7-16

Selecting the Action After Determination

11. Press **ESC**.



■ Add to page 7-18

Contents of the Transmitted Mail

- **When Action Is Set to Nogo (Interval = OFF)**

<Subject>	The subject of the mail. The contents of the subject are shown below. The number inside the parentheses is the Nogo count. GoNogo Triggered Report (No.)
[Comment]	Comment
[Setup Information]	Contents of select 1 to 4 (criteria) (parameter and upper/lower limits) Logic (AND/OR) Stop Nogo/ACQ Count (number of Nogo determinations/number of waveform acquisitions)
[Trigger Date and Time]	Trigger time
[Nogo/Exec Count]	Nogo count/determination execution count
[Nogo Factor]	Details and measured value of the criteria that resulted in Nogo*

* Measured value sent only when performing GO/NO-GO determination of waveform parameters

- **When Action Is Set to Nogo (Interval Is Not OFF)**

<Subject>	The subject of the mail. The contents of the subject are shown below. The number inside the parentheses is the Nogo count. GoNogo Interval Report (No.)
[Comment]	Comment
[Setup Information]	Contents of select 1 to 4 (criteria) Logic (AND/OR) Stop Nogo/ACQ Count (number of Nogo determinations/number of waveform acquisitions)
[TimeRange]	Time from start to now
[Nogo/ExecCount]	Nogo count/determination execution count
[EachNogoCount]	Nogo count of each criteria up to now (when the logic is OR) Not included when the logic is AND.

Transmission Example

Subject GoNogo Triggered Report 23

----------Body of the message from here

[Comment] Sample-GoNogo

[Setup Information] Select1:Rect(C1,Main) (Left:-3.0000E+00,Right:-2.5000E+00,Upper: 500.00E-03,Lower:-500.00E-03,Condition:In)
Select2:Wave(C2,Z1) (Range1:-5.0000E+00,Range2: 5.0000E+00,Condition:Out)
Select3:Polygon(C3,Z2) (Condition:In)
Select4:Measure(Max(C4)) (Upper: 1.0000E+00,Lower:-1.0000E+00,Condition:Out)

Logic:OR
Stop Nogo/ACQ Count:100/100

[Trigger Date and Time] 2006/03/06 13:53:46

[Nogo/Exec Count] 23/56

[Nogo Factor] Select1:Rect(C1,Main)
Select2:Wave(C2,Z1)
Select3:Polygon(C3,Z2)

Note

The screen image can be attached only when the interval is set to OFF.

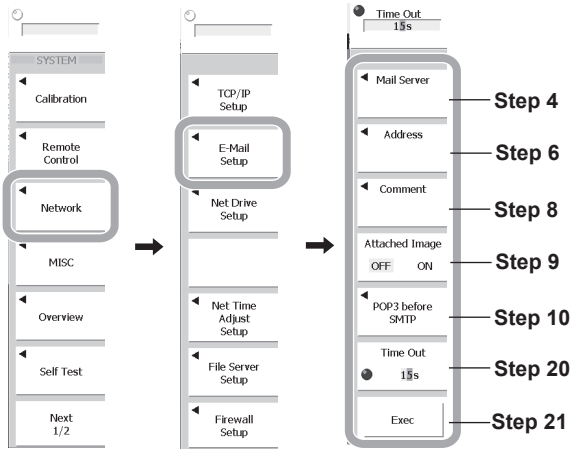
■ Add "Setting the Mail Transmission (SMTP Client Function)" to chapter 15

Procedure

1. Press **SYSTEM**.
2. Press the **Network** soft key.
3. Press the **E-mail Setup** soft key. The mail transmission setup menu appears.

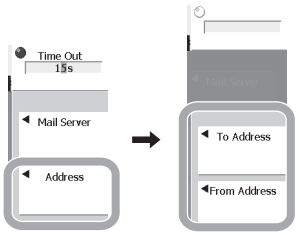
Setting the Mail Server

4. Press the **Mail Server** soft key.
5. Enter the host name or IP address of the mail server.



Setting the Mail Address

6. Press the **Address** soft key.
7. Press the **To Address** and **From Address** soft keys and enter the sender and recipients mail addresses.



Setting a Comment

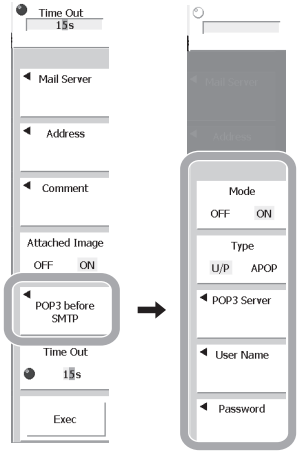
8. As necessary, press the **Comment** soft key and enter a comment.

Selecting Whether to Attach a Screen Image

9. Press the **Attached Image** soft key to select ON or OFF.

Setting the User Authentication

10. Press the **POP3 before SMTP** soft key. The user authentication setup menu appears.
11. Press the **Mode** soft key to select ON or OFF.
    If you select ON, proceed to step 12. If you select OFF, proceed to step 19.
12. Press the **Type** soft key to select U/P or APOP.
13. Press the **POP3 Server** soft key.
14. Enter the host name or IP address of the POP3 server.
15. Press the **User Name** soft key. A screen appears for you to enter the user name.
16. Enter the user name using up to 30 characters.
17. Press **Password** soft key. A screen appears for you to enter the password.
18. Enter the password corresponding to the user name using up to 30 characters.
19. Press the **ESC** to return to the previous screen.



Setting the Timeout Value

20. Turn the rotary knob to set the Time Out value.

Sending the Mail

21. Press the **Exec** soft key. The mail is sent to the specified address.

Explanation

Information such as the trigger time can be sent to a specified mail address on the network as an action of action-on-trigger or GO/NO-GO determination.

Mail Server

Specify the IP address of the network mail server. On networks supporting WINS/DNS, you can specify the name (NetBIOS name or domain name) instead of the IP address.

Address

To Address:	Set multiple recipients mail addresses using up to 100 characters. Separate each address with a comma.
From Address:	Set the sender address using up to 40 characters. If you do not specify the sender address, the recipient address is set.

Comment

The comment is written on the first line of the transmitted mail. Enter it as necessary. You can enter a comment using up to 100 characters.

Attached Image

The screen image shown at the time of mail transmission can be attached to the mail.

- File format: PNG
- File name: DL_image[date/time].png (example: DL_Image060202171158.png → data at 11 hour 58 minutes on February 17, 2006)
- Resolution: XGA (1024 × 768 dots)
- File size (estimate)
  - Normal screen: Approx. 50 KB
  - Maximum: Approx. 1.6 MB*
    * When there is a lot of color information

User Authentication (POP3 before SMTP)

POP3 user authentication is carried out before sending mail.

- **Mode**
  ON: Carry out user authentication before sending mail
  OFF: Do not carry out user authentication before sending mail
- **Encryption type**
  U/P: Send authentication data in plain text.
  APOP: Send authentication data by encrypting
- **POP3 Server**
  Enter the host name or IP address of the POP3 server using up to 30 characters.
- **User Name**
  Set the user name using up to 30 characters that is required when accessing the POP3 server from the DL9000.
- **Password**
  Set the password using up to 30 characters that is required when accessing the POP3 server from the DL9000.

Time Out

Set the transmission/reception timeout value. The selectable range is 1 to 60 s (default: 15 s, 1 s steps).

Sending the Mail (Exec)

Send the mail to the specified mail address. If Attached Image is ON, the screen image that was shown when the Exec was pressed is attached.

Note

- To use this function, you must configure TCP/IP according to the procedure given in section 15.2.
- The DL9000 supports two authentication methods as user authentication methods of the POP3 server: plain authentication (U/P) and encrypted authentication (APOP*).
  * APOP uses the MD5 algorithm (RSA Data Security, Inc. MD5 Message Digest Algorithm).

■ Page 17-1

Procedure

Selecting the Message Language

3. Press the **Message** soft key to display the Message menu.
4. Press the **ENG**, **JPN**, **CHN**, or **KOR** soft key to select the language.

Selecting the Menu Language

3. Press the **Menu** soft key to display the Menu menu.
4. Press the **ENG**, **CHN**, or **KOR** soft key to select the language.

■ Add to Page 18-5

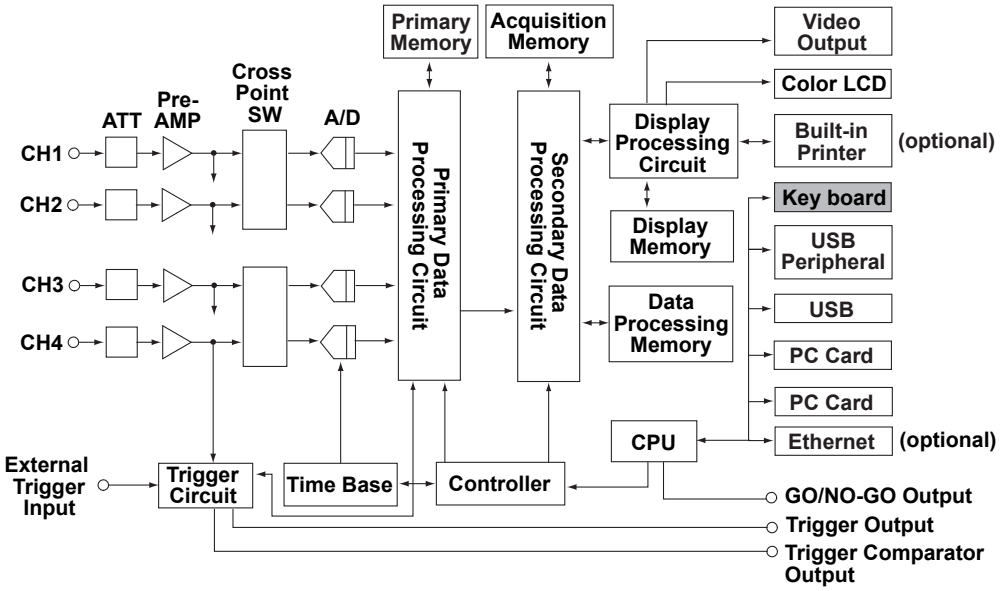
Code	Message and corrective action	Section
669	Sending E-Mail. Wait until it is completed.	

■ Add to Page 19-3

Item	Specifications	
Trigger Type	CAN:	Trigger on CAN bus signal
	Mode:	SOF, Error Frame, ID Std/Data, ID Ext/Data, ID/Data OR

Alterations by Page for User's Manual IM701310-01E

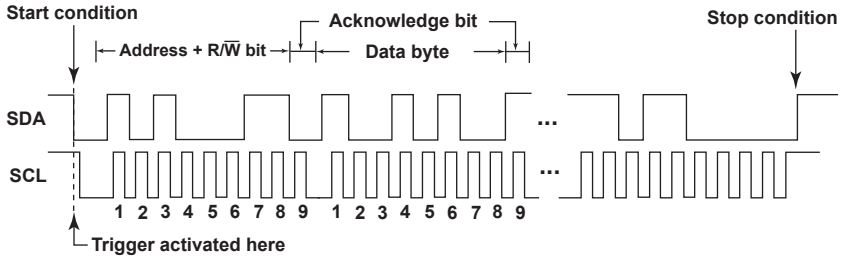
■ Page 2-1



■ Add to Page 6-80

Every Start Trigger

When the start condition is detected, a trigger is activated on the falling edge of the SDA signal.



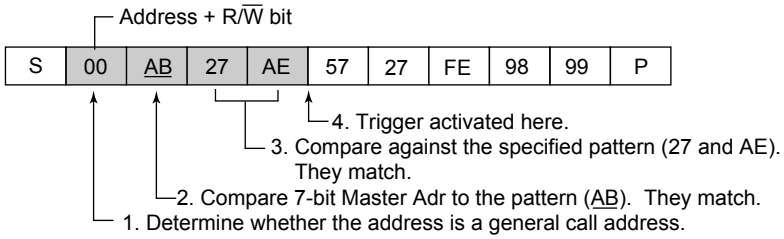
■ Page 6-82 and 6-83

- **Activating a Trigger on an Arbitrary Pattern on the Second and Subsequent Bytes**

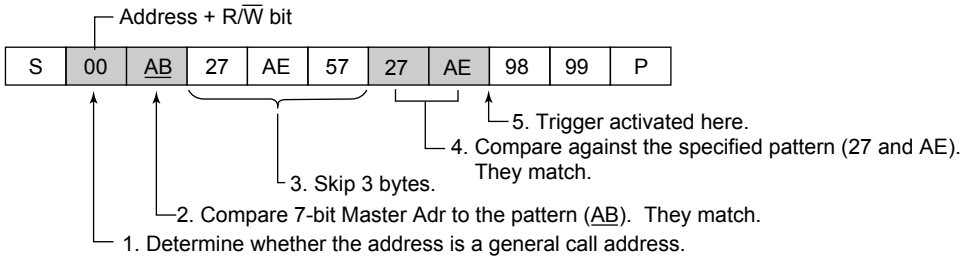
Trigger Conditions

Mode	General Call
Second Byte	7bit Master Adr (1010 1011)
Data	Data: On, Condition: True, Data Size: 2 bytes, Set Data: 27 and AE

<Data Position: X>



<Data Position: 3>



■ Page 6-84

~~**Combining with the Qualifications of Channels Excluding the SDA and SCL**~~

~~A trigger can be activated on the combination of the I^2C bus signal trigger condition and the qualifications of the channels other than the SDA and SCL.~~

~~To activate a trigger only on the SCL and SDA signals (trigger condition of the I^2C bus), set the status of the other channels to ignore (X).~~

Source Channel

The source channel of the I^2C bus signal is set using the SOURCE menu that appears when you press the SOURCE key. The menu used to set the source channel of the I^2C bus signal appears only when Type is set to I^2C in the ENHANCED menu.

Specifying the I^2C Bus Signal (SDA and SCL Signals)

The SDA and SCL signals are assigned to channels using the SOURCE menu.

Trigger Conditions of the Channels Other Than I^2C Bus Signal (Qualification)

A trigger can be activated on the combination of the trigger conditions of the I^2C bus signal (SDA/SCL signal) and the trigger conditions of the channels other than the I^2C bus signal. Select the trigger conditions of the channels other than the I^2C bus signal from the following:

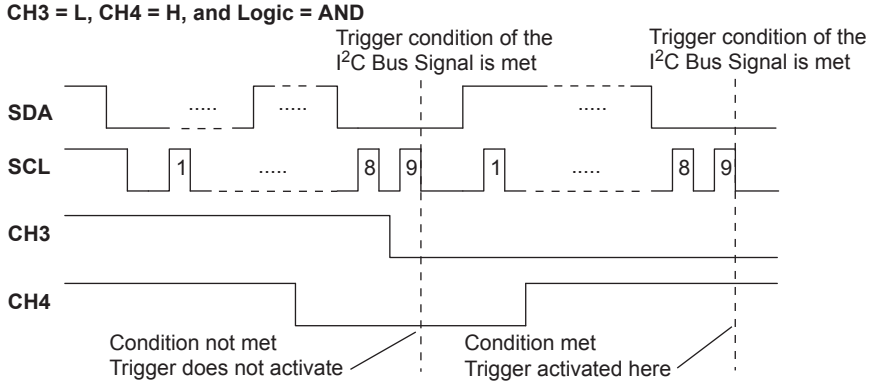
H	The trigger source level is above the preset trigger level.
L	The trigger source level is below the preset trigger level.
X	Not used as a trigger source.

Logic

If the trigger condition of a channel other than the SDA or SCL signal is set to H or L, a trigger is activated on the trigger conditions of the I^2C bus signal and the trigger conditions of the channels other than the SDA and SCL signals. Select the logic to used from the following:

AND	A trigger is activated when both the trigger conditions of the I^2C bus signal and the trigger conditions of the channels other than the I^2C bus signal are met.
OR	A trigger is activated when either the trigger conditions of the I^2C bus signal or the trigger conditions of the channels other than the I^2C bus signal are met.

CH3 = L, CH4 = H, and Logic = AND



Note

To activate a trigger only on the SCL and SDA signals (trigger condition of the I^2C bus), set the status of the other channels to ignore (X), and set the logic to AND.

■ Add to Page 7-37

Note

When the waveform parameter measurement is set to cycle statistical processing (PARAM > Mode = Cycle Statistics), the "Statistics" item appears in the soft key menu that is displayed in step 4 (when the Condition soft key is pressed). In addition, the Area soft key in step 12 does not appear.

Press the Statistics soft key and select the item on which to perform statistical processing.

Max (maximum value), Min (minimum value), Mean, σ (standard deviation)

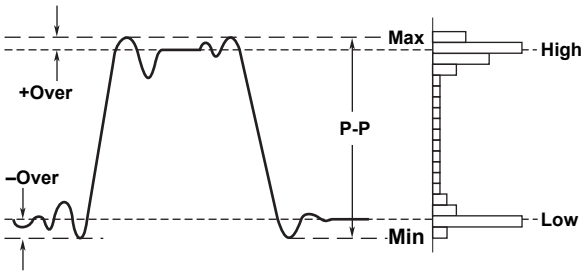
For a description of the cycle statistical processing, see section 10.3.

■ Page 10-25 and 10-26

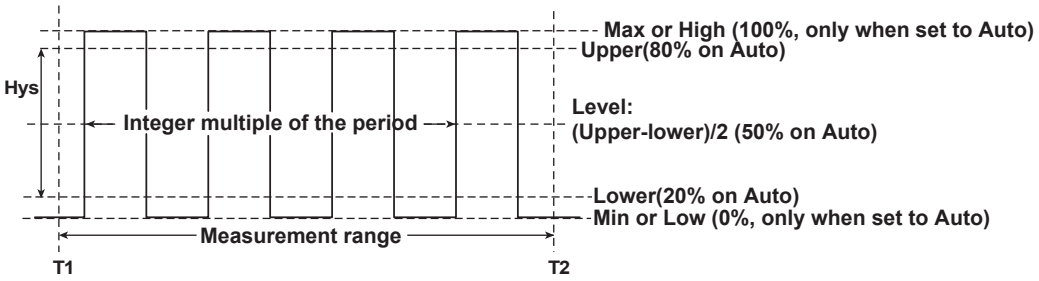
Replace the description of "Voltage-axis parameters," "Time-axis parameters," and "Other parameters" with the following:

• Measurement Items on the Voltage-Axis

Max (Max):	Max voltage [V]
Min (Min):	Min voltage [V]
High (High):	High voltage [V]
Low (Low):	Low voltage [V]
P-P (P-P):	P-P value (Max – Min) [V]
Hi-Low (Hi-Low):	High voltage – Low voltage [V]
+Over (+Over):	Amount of overshoot [%] (Max – High)/(High – Low) × 100
–Over (–Over):	Amount of undershoot [%] (Low – Min)/(High – Low) × 100
Rms (Rms):	RMS voltage [V] $(1/n)(\Sigma(xl^2)^{1/2}$
Mean (Mean):	Average voltage [V] $(1/n)\Sigma xl$
Sdev (Sdev):	Standard deviation [V] $((\Sigma xl^2 - (\Sigma xl)^2/n)/n)^{1/2}$
IntegTY (ITY):	Total area for both positive and negative amplitudes [Vs]



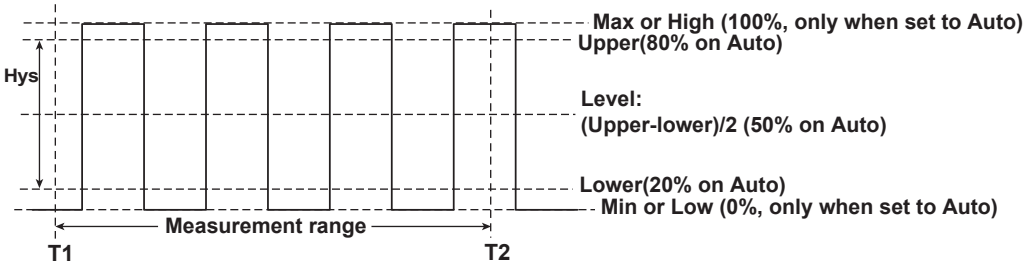
C.Rms(CRms) : Rms value over the largest integer multiple of the period within the measurement range [V]
C.Mean(CMean) : Average voltage over the largest integer multiple of the period within the measurement range [V]
C.Sdev(CSdev) : Standard deviation over the largest integer multiple of the period within the measurement range [V]
C.Integ(CITY) : Average of the positive and negative areas of the amplitude for each period [Vs]



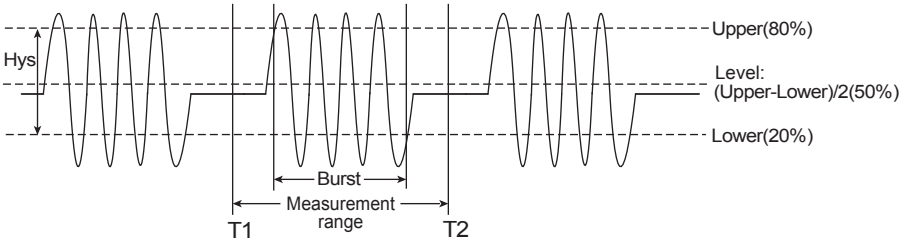
- **Measurement Items on the Time-Axis**

Freq(Freq) : Average frequency within the measurement range [Hz]
1/Freq : Average period within the measurement range [s]
Count : Edge count[No units]

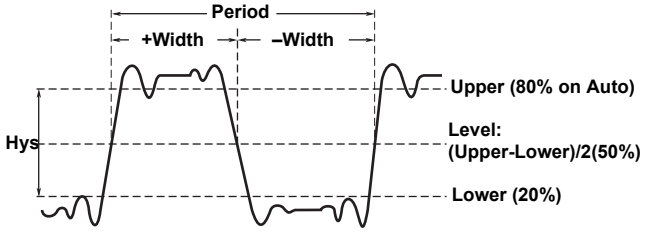
For Count = 4



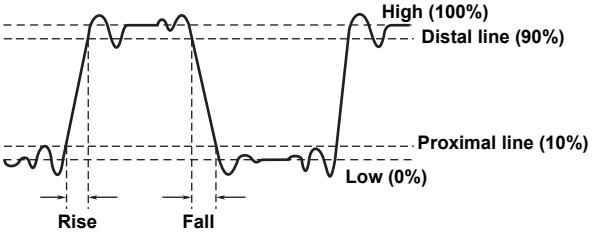
Burst: Burst width [s]
Set the measurement range (T-Range) according to the burst width you wish to measure.



+Width(+Width) : Time width above the reference line (Level) [s]
–Width(–Width) : Time width below the reference line (Level) [s]
Period(Period) : Period [s]
Duty(Duty) : Duty ratio (+Width / Period x 100) [%]



Rise(Rise) : Rise time [s]
Fall(Fall) : Fall time [s]

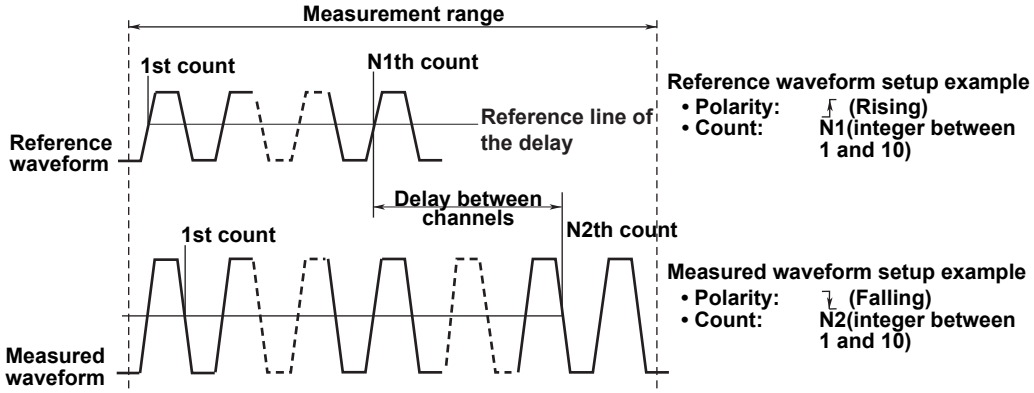


■ Page 10-27

Delay Setup

Measures the time difference between trace waveforms or the time difference from the trigger point to the rising or falling edge (delay between waveforms).

Below is an example for the rising edge (when Reference is set to Edge).



- The reference position of the delay measurement between waveforms varies on the Reference setting.
  Edge: An edge of the reference waveform
  Trig Pos: The trigger position
  .
  .
- Set which edge is to be the detection point (reference point or measurement point) using Count. The selectable range is an integer from 1 to 9. The default value is 1.
- The voltage level at the detection point is the reference line of the delay.
  - The reference line of the delay varies depending on the threshold setting as follows:
  - Auto: 50% of the P-P value or Hi-Lo value
  - Level/Hys: The specified threshold level
  - Upper/Lower: (Upper-Lower)/2
- When the measurement value is displayed, the measurement item name is Dly.

■ Page 11-4

The name of the History All soft key has been changed to History Mode on products with firmware version 1.60 or later.

Display mode :History Mode

■ Section 11.2

The name of the Search Quit soft key has been changed to Search Quit(Zone Clear) on products with firmware version 1.60 or later.

HISTORY > Search > Search Quit (Zone Clear) Soft Key

Clears the search zone and returns to the top menu of the HISTORY key.

■ Page 15-18

Enabling/Disabling the Firewall

- ON
- OFF

  Allows access regardless of the settings explained in the next subheading. The following ports are used.

List of Used Ports

Port	Service	Function Type [Client/Server]
21/tcp	File Transfer [Control]	Client, Server
25/tcp	Simple Mail Transfer	Client
53/udp	Domain Name Server	Client
67/udp	Bootstrap Protocol Server	Client
110/tcp	Post Office Protocol Version3	Client
123/udp	Network Time Protocol	Client
137/udp	NETBIOS Name Service	Client, Server
138/udp	NETBIOS Datagram Service	Client, Server
139/tcp	NETBIOS Session Service	Client
445/tcp	Microsoft-DS	Server
10001/tcp	Control Server	Server

Allowing/Blocking Various Functions

A firewall can be set up for each function used in the Ethernet communication.

- E-Mail

  Allow or block the DL9000 from accessing the SMTP or POP server.

Note

- ~~Limitation when Allow is selected for the Microsoft Network, FTP, and control functions~~
  ~~Clients can only access the DL9000 by directly specifying the IP address or by DNS name resolution. Clients cannot access the DL9000 by WINS or broadcast name resolution.~~
- Limitation when Allow is selected for the FTP function
  Clients cannot access the DL9000 using passive mode.
- ~~Limitation when Allow is selected for Net Time Adjust function~~
  ~~The DL9000 can only access the server by directly specifying the IP address. Servers cannot be accessed through DNS, WINS, or broadcast name resolution.~~

■ Page App-2 to App-13

*1 Maximum record length in high resolution mode is 1.25 MW with the DL9040/DL9140/DL9240 and 2.5 MW with the DL9040L/DL9140L/DL9240L.

■ Page App-6 to App-13

Repetitive sampling

Expanded normal mode (variable record length)

Bold: Expanded repetitive sampling (variable record length)