User's Manual

DL7440/DL7480
FlexRay Signal Analyzer

YOKOGAWA
Yokogawa Electric Corporation

IM 701450-52E
1st Edition

Thank you for purchasing the DL7440/DL7480 Digital Oscilloscope with the FlexRay Bus Signal Analysis Function. This user's manual describes only the FlexRay bus analysis function. For information about other functions, operating procedures, and handling precautions of the DL7440/DL7480, see the following manuals.

Manual Title	Manual No.	Description
DL7440/DL7480 User's Manual	IM 701450-01E	Explains all functions and procedures of the DL7440/DL7480 excluding the communication functions.
DL7440/DL7480 Operation Guide	IM 701450-02E	Explains briefly the functions and basic operations.
DL7440/DL7480 Communication Interface User's Manual (CD-ROM)	IM 701450-17E	Describes the communication interface functions.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions. The figures given in this manual may differ from those that actually appear on your screen.
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- 1st Edition: March 2006

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Conventions Used in This Manual

Markings

The following markings are used in this manual.

Improper handling or use can lead to injury to the user or damage to the instrument. This symbol appears on the instrument to indicate that the user must refer to the users manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."

WARNING Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.

CAUTION Calls attentions to actions or conditions that could cause light injury to the user or damage to the instrument or userís data, and precautions that can be taken to prevent such occurrences.

Note Calls attention to information that is important for proper operation of the instrument.

Subheadings

On pages that describe operating procedures, the following symbols and displayed characters are used to distinguish the procedures from their explanations:

Procedure This subsection contains the operating procedure used to carry out the function described in the current chapter. All procedures are written with inexperienced users in mind; experienced users may not need to carry out all the steps.

Explanation This section describes the setup items and the limitations regarding the procedures.

Notations Used in Procedural Explanations

Panel Keys and Soft keys

Bold characters used in the procedural explanations indicate characters that are marked on the panel keys or the characters of the soft keys or menus displayed on the screen.

SHIFT+Key

SHIFT+key means you will press the SHIFT key to turn ON the green indicator that is located above the SHIFT key and then press the panel key. The setup menu marked in purple above the panel key that you pressed appears on the screen.

Jog Shuttle & SELECT

Jog shuttle & SELECT indicates selecting or setting parameters and entering values using the jog shuttle, the SELECT key, and other keys. For details on the procedure, see section 4.1 or 4.2 in the *DL7440/DL7480 Digital Oscilloscope User's Manual (IM701450-01E)*.

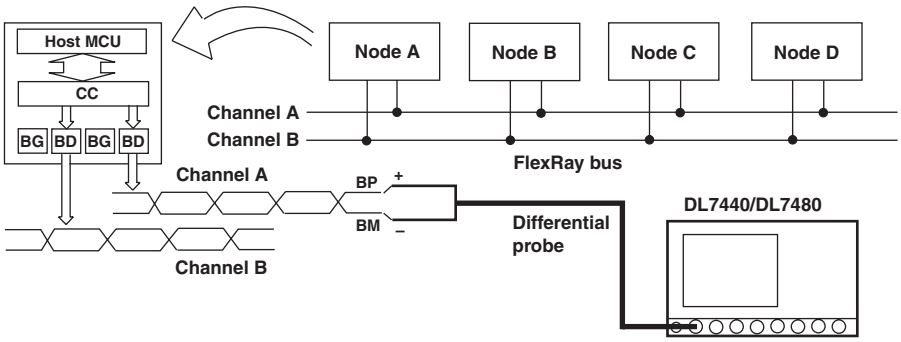
Unit

k	Denotes 1000. Example: 100 kS/s
K	Denotes 1024. Example: 459 KB (file data size)

Contents

Overview of the FlexRay Analysis Function

FlexRay is an in-car LAN protocol proposed by the FlexRay Consortium.
In communications that use FlexRay, analysis of the physical layer of the FlexRay bus is required when troubleshooting problems that occur due to noise caused by surge voltage, level fluctuations caused by excessive load after connection, etc.
Using this function allows protocol analysis to be carried out while displaying the waveform of the physical voltage signal (differential signal) of the FlexRay bus as analog waveforms. In addition, the data on the FlexRay bus can be monitored in sync with the analog waveform.



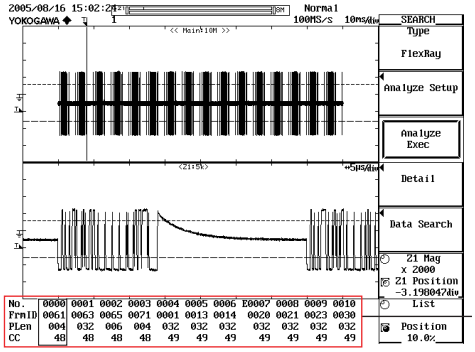
The FlexRay analysis function consists of the following six main functions.

Trigger Function <See page 10 for the operating procedure>

Acquires FlexRay bus signals using the defined frames and fields of the FlexRay bus as trigger conditions. There are two trigger types: Frame Value and CRC error. For the trigger conditions of Frame Value, you can specify frame start, various frame indicators, frame ID, cycle count, and payload segment data. Triggers can be activated using an AND condition, allowing trigger activation on frames with specific frame ID and data. Triggers can also be activated by combining the trigger conditions of the FlexRay bus signal and the parallel pattern of CH2 and CH4 to CH8 signals (CH2 and CH4 on the DL7440) (combination trigger).

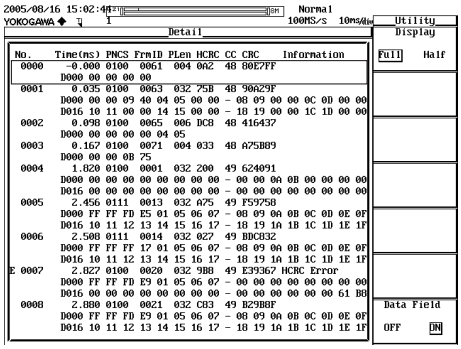
Analysis Function <See page 11 for the operating procedure>

This function analyzes the data of the acquired FlexRay bus signal and lists the frame ID, payload length, and cycle count values for each frame. By selecting a frame from this analysis results list, the waveform of the FlexRay bus signal for that frame can be automatically displayed zoomed.

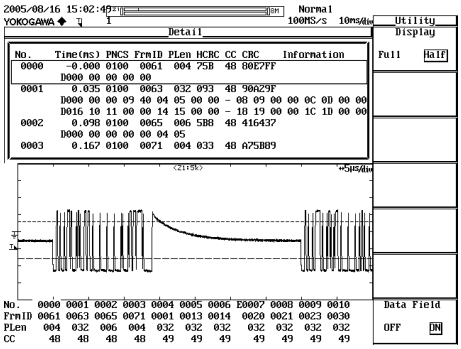


Analysis results list

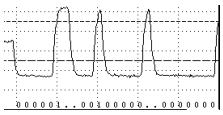
The details of the analysis results such as data series and error types can be viewed in a detailed analysis results list.



You can also select a frame on the detailed analysis results list and display the waveform of that frame zoomed.

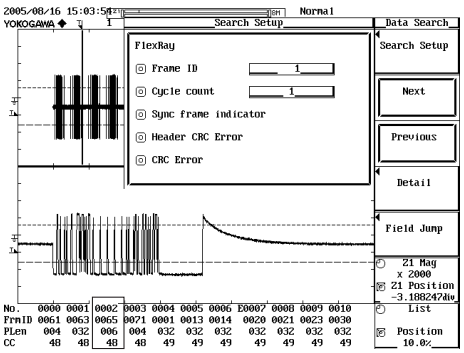


In addition, if the horizontal magnification is increased and the bit length becomes greater than or equal to 5 pixels in the horizontal direction on the screen, the bit values are displayed below the waveform with 0s and 1s. The two BSS bits are displayed as periods.



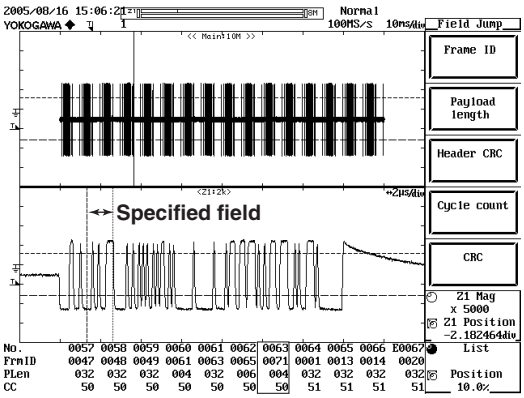
Search Function <See page 15 for the operating procedure>

After analyzing the data of the acquired FlexRay bus signal, this function searches the target frame according to the specified AND conditions of the frame ID, cycle count, sync frame indicator, header CRC error, and CRC error items and displays the waveform of the target frame zoomed.



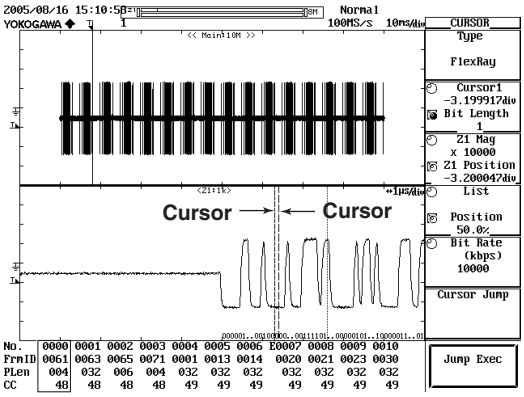
Field Jump Function <See page 17 for the operating procedure>

This function allows you to specify the frame ID, payload length, header CRC, cycle count, or CRC field on the displayed frame. The specified field is displayed with a cursor.



Cursor Function <See page 22 for the operating procedure>

This function displays two cursors at the specified bit length according to the bit rate. You can move the cursor in the specified bit length unit and check the bit value. In addition, a cursor jump function that automatically detects the frame ID, payload length, header CRC, cycle count, and CRC fields within a frame and displays this range with cursors is available.



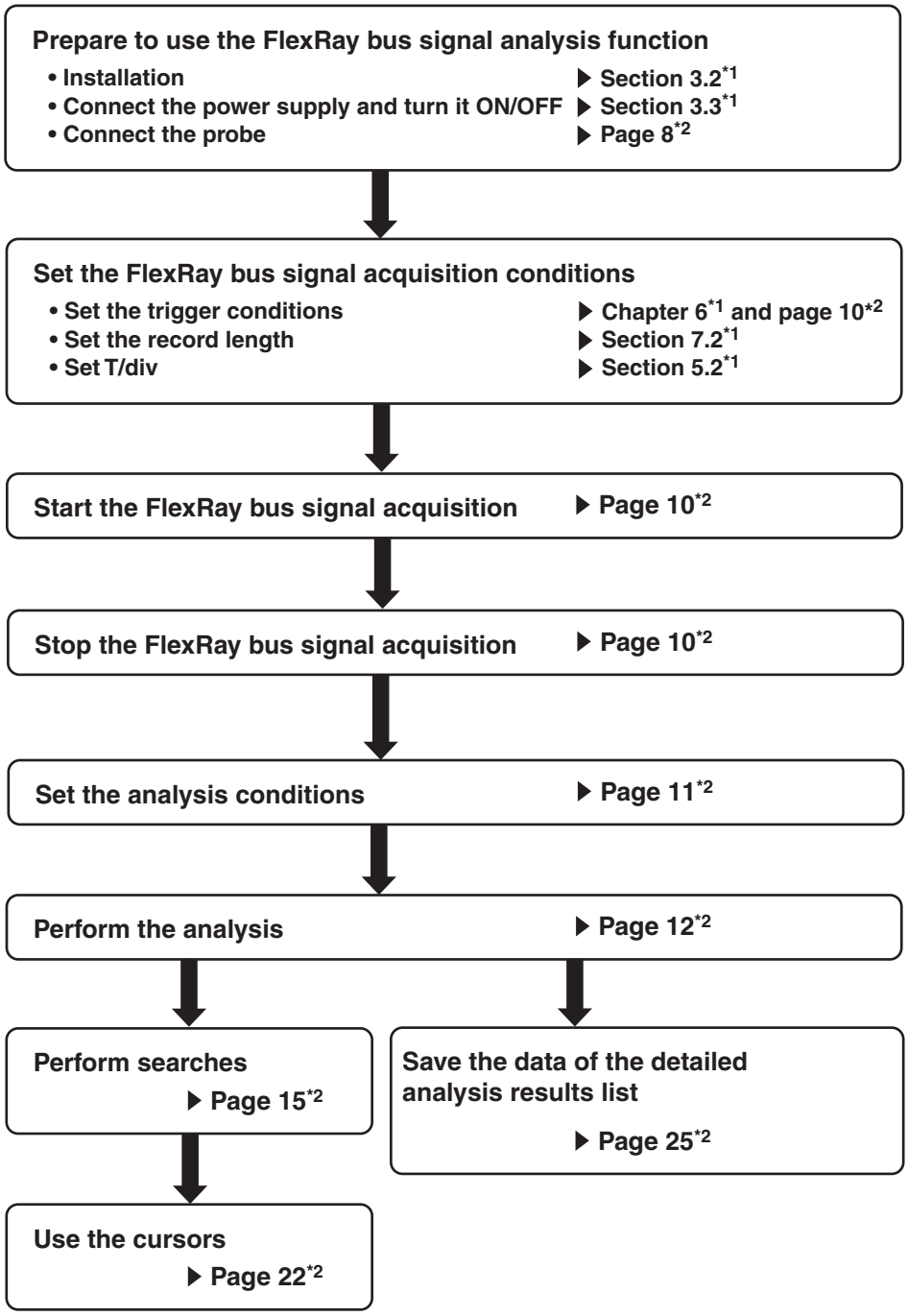
Detailed Analysis Results List Storage Function <See page 25 for the operating procedure>

The data of the detailed analysis results list can be saved to any storage medium in text format (.txt extension).

```
 No.    Time(ms) PNCS FrmID PLen HCRC CC CRC    Information
 -0055    -7.544 0111 0013  032  62C  47 1CC4FF
 -0054    -7.491 0111 0014  032  E93  47 45C0D9
E-0053    -7.173 0100 0020  032  1DB  47 C85EC4 HCRC Error
 -0052    -7.120 0100 0021  032  098  47 99562C
 -0051    -7.014 0100 0023  032  5EC  47 704E93
 -0050    -6.643 0100 0030  032  562  47 20F058
 -0049    -6.590 0100 0031  032  4E9  47 BB70D0
 -0048    -6.537 0100 0032  032  F05  47 232186
 -0047    -6.484 0100 0033  032  011  47 7FC1DB
 -0046    -6.431 0100 0034  032  062  47 A5F293
 -0045    -6.378 0100 0035  032  090  47 885006
```

Flow of Operation

The figure below provides an overview of the flow of operations when using the FlexRay bus signal analysis function. For details about specific items, see the referenced pages in this manual or the respective sections or chapters in the *DL7440/DL7480 Digital Oscilloscope User's Manual (IM701450-01E)*.



***1 Indicates reference sections or chapters from the DL7440/DL7480 User's Manual (IM701450-01E).**
***2 Indicates reference pages in this manual.**

Connecting the Probe

Probe to Be Used

A differential probe is used when measuring FlexRay bus signals.
Recommended model of differential probe (optional accessory by Yokogawa): 701920 or 701922

Signal Input Terminal

Connect the differential probe to an input terminal (a terminal marked as CH1 or CH3 on the DL7440 or a terminal marked as CH1, CH3, CH5, or CH7 on the DL7480) at the bottom section of the front panel. The input impedance is 1 MΩ ± 1.0%/approximately 20 pF or 50 Ω ± 1.0%.

CAUTION

- The maximum input voltage for 1-MΩ input is 400 V (DC + ACpeak) or 282 Vrms when the frequency is 1 kHz or less. Applying a voltage exceeding either of these voltages can damage the input section. If the frequency is above 1 kHz, the input section may be damaged even when the voltage is below the values specified above.
- The maximum input voltage for 50-Ω input is 5 Vrms or 10 Vpeak. Applying a voltage exceeding either of these voltages can damage the input section.

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Probe Power Supply

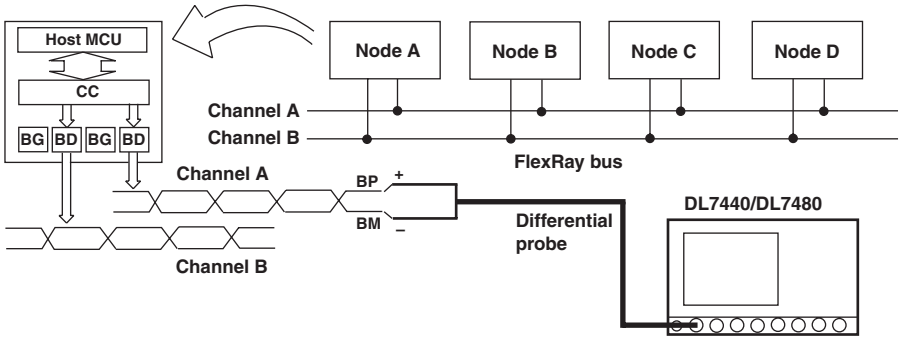
When using the differential probe, an optional accessory from Yokogawa (model 701920 or 701922), use the probe power supply (PROBE POWER) located on the rear panel of the instrument.
For more information about the probe power supply, see “When Using the FET Probe, Current Probe, or Differential Probe” in section 3.4, “Connecting the Probe” in the *DL7440/DL7480 user’s manual (IM701450-01E)*.

Precautions to Be Taken When Connecting the Probe

- When connecting a probe to the instrument for the first time, perform phase correction of the probe as described in section 3.5, “Compensating the Probe (Phase Correction)” in the *DL7440/DL7480 User’s Manual (IM 701450-01E)*. Failure to do so will cause unstable gain across different frequencies, thereby preventing correct measurement. Calibration must be performed for each channel to which the probe will be connected.
- Note that if the object being measured is directly connected to the instrument without using a probe, correct measurements may not be possible due to the loading effect.

Connection Method of the Differential Probe

Connect the negative and positive terminals of the differential probe to “BM” and “BP” of the FlexRay bus, respectively.



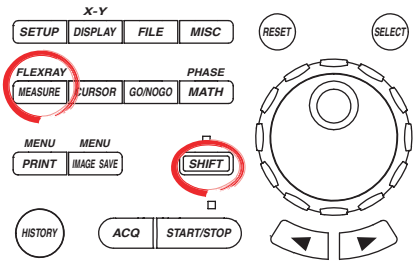
Channels on which FlexRay signals can be used as trigger sources are CH1 and CH3.
Channels on which FlexRay signals can be analyzed are CH1, CH3, CH5*, and CH7*.

* Only on the DL7480.

Activating the Trigger

Triggers can be activated on the combination of the CH1 and CH3 FlexRay bus signal inputs and the CH2 and CH4 to CH8 (CH2 and CH4 on the DL7440) parallel pattern inputs.

Procedure



- To exit the menu during operation, press ESC located above the soft keys.
- In the procedural explanation below, the term **jog shuttle & SELECT** refers to the operation of selecting/setting items and entering values using the jog shuttle, SELECT and RESET keys. For details on the operation using the jog shuttle, SELECT, and RESET, see sections 4.1 or 4.2 in the DL7440/DL7480 User's Manual.
- For a description of the operation using a USB keyboard or a USB mouse, see section 4.3 in the DL7440/DL7480 User's Manual.

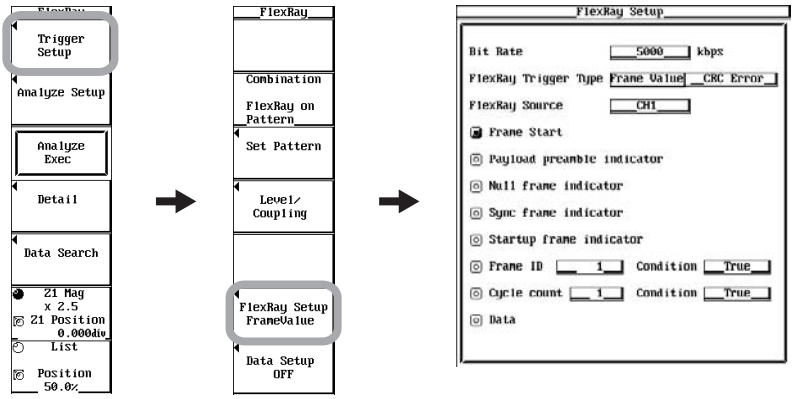
Setting the FlexRay Trigger Conditions

1. Press **SHIFT+MEASURE (FLEXRAY)** to display the FlexRay menu.

Note

When the FlexRay menu appears, Trigger Type switches to Enhanced, Enhanced Type switches to FlexRay, and Search Type switches to FlexRay.

2. Press the **Trigger Setup** soft key to display the Trigger Setup menu.
3. Press the **FlexRay Setup** soft key to display the FlexRay Setup dialog box.



Setting the Bit Rate

4. Use **jog shuttle & SELECT** to set the bit rate to 2500, 5000, or 10000 (kbps). Changing the bit rate also changes the channel analysis bit rate specified by FlexRay Source.

Setting the Trigger Type

5. Use **jog shuttle & SELECT** to FlexRay Trigger Type to Frame Value or CRC Error.

When Frame Value Is Selected

6. Use **jog shuttle & SELECT** to set FlexRay Source to CH1 or CH3.

Setting the Frame Value Used to Activate the Trigger

7. Use **jog shuttle & SELECT** to select an item. When selected the check box appears selected.

Note

Frame Start is always selected among the items.

Setting the Frame ID

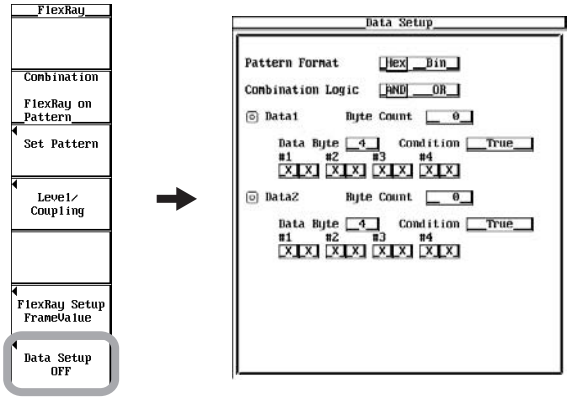
8. Use **jog shuttle & SELECT** to set the frame ID.
9. Use **jog shuttle & SELECT** to set Condition to True, False, Greater, or Less.

Setting the Cycle Count

10. Use **jog shuttle & SELECT** to set Cycle Count.
11. Use **jog shuttle & SELECT** to set Condition to True, False, Greater, or Less.

Setting the Data bit pattern.

12. Press the **Data Setup** soft key. The Data Setup dialog box opens.



Setting the Format

13. Use **jog shuttle & SELECT** to set Pattern Format to Hex or Bin.

Setting the Conditions for Comparison

14. Use **jog shuttle & SELECT** to set Combination Logic to AND or OR.

Selecting the Trigger Source Data

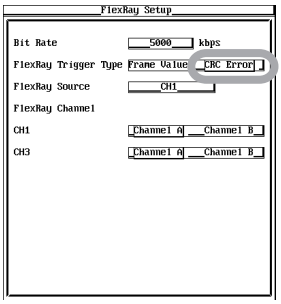
15. Use **jog shuttle & SELECT** to select Data1 or Data2. When selected the check box appears selected.

Setting the Bit Pattern

16. Use **jog shuttle & SELECT** to set Byte Count.
17. Use **jog shuttle & SELECT** to set Data Byte.
18. Use **jog shuttle & SELECT** to set Condition to True, False, Greater, or Less.
19. Use **jog shuttle & SELECT** to set the bit pattern.

When CRC Error Is Selected

20. Use **jog shuttle & SELECT** to set FlexRay Source to CH1, CH3, or “CH1 or CH3.”
21. Use **jog shuttle & SELECT** to set the FlexRay channel that is applied to each channel to Channel A or Channel B.



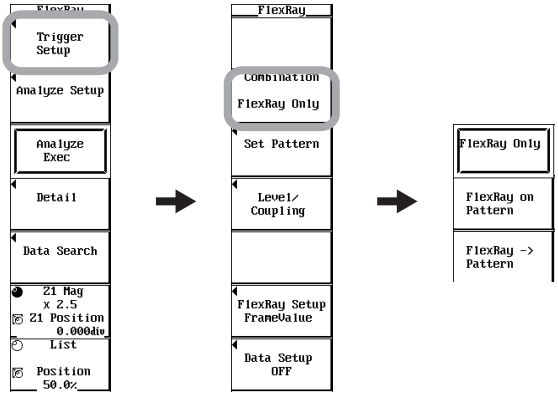
Setting the Trigger Combination

22. Press **SHIFT+MEASURE (FLEXRAY)** to display the FlexRay menu.

Note

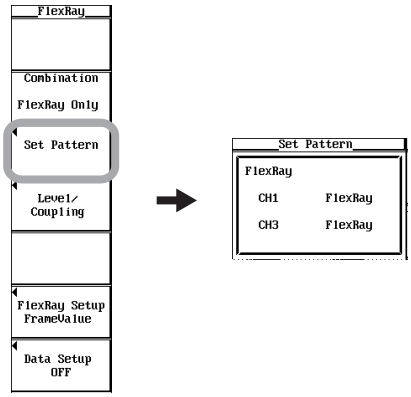
When the FlexRay menu appears, Trigger Type switches to Enhanced, Enhanced Type switches to FlexRay, and Search Type switches to FlexRay.

23. Press the **TriggerSetup** soft key to display the TriggerSetup menu.
24. Press the **Combination** soft key to display the Combination menu.
25. Press soft key corresponding to the desired combination.



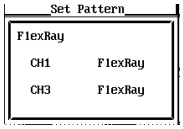
Setting the Pattern

26. Press the **Set Pattern** soft key to display the Set Pattern dialog box.



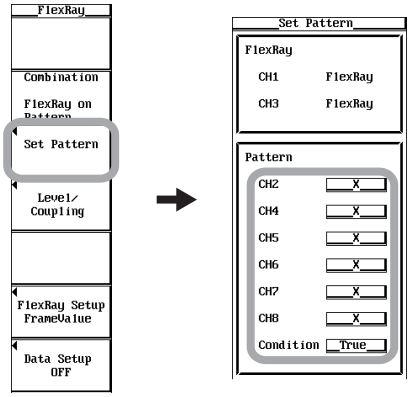
When the Trigger Combination Is Set to FlexRay Only

The assignment of the FlexRay bus signal is shown.



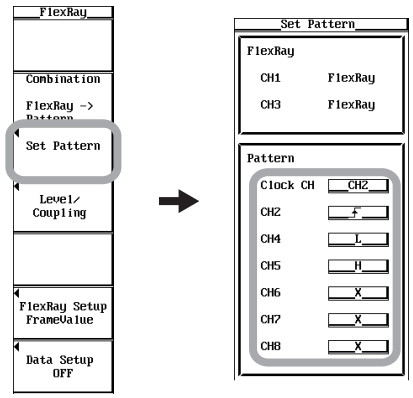
When the Trigger Combination Is Set to FlexRay on Pattern

27. Use **jog shuttle & SELECT** to set the status of each channel to H, L, or X.
28. Use **jog shuttle & SELECT** to set Pattern Condition to True or False.



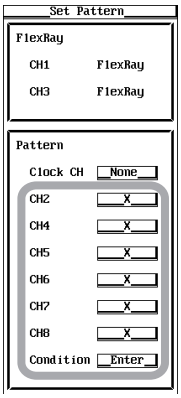
When the Trigger Combination Is Set to FlexRay → Pattern

27. Use **jog shuttle & SELECT** to select Clock CH from CH2, CH4 to CH8 (CH2 and CH4 on the DL7440) and None.



When Clock CH Is Set to None

28. Use **jog shuttle & SELECT** to set the status of each channel to H, L, or X.
29. Use **jog shuttle & SELECT** to set Pattern Condition to Enter or Exit.



When Clock CH Is Set to a Channel

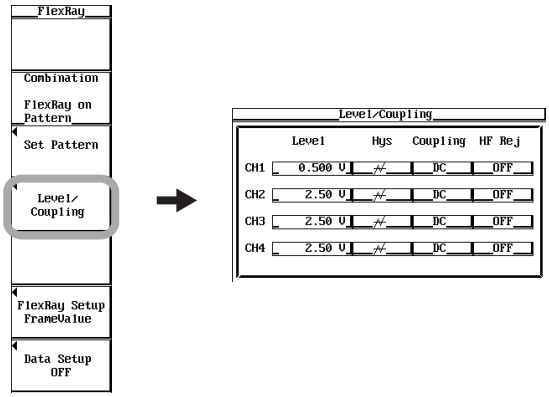
30. Use **jog shuttle & SELECT** to set the clock channel slope to ⍐ (rising edge) or ⍑ (falling edge).

Note

- When Clock CH is set to a channel, the trigger activation may be sluggish when the trigger mode is set to AUTO. If this happens, set the mode to Normal.
- When you select FlexRay trigger, CH1 and CH3 become FlexRay signal inputs regardless of whether FlexRay signals are applied to CH1 and CH3. They cannot be used as Pattern trigger sources.

Setting the Level, Hysteresis, Trigger Coupling, and HF Rejection

31. Press the **Level/Coupling** soft key to display the Level/Coupling dialog box.



32. Set the level, hysteresis, trigger coupling, and HF rejection of each channel. For the setup procedure, see steps 9 to 14 on page 6-16 in the *DL7440/DL7480 User's Manual (IM701450-01E)*.

Note

Set the trigger level of the FlexRay signal input channel to a level between the idle level and the Data_0 level.

Setting the Trigger Mode

33. Set the trigger mode according to the procedures given in section 6.1, "Setting the Trigger Mode" in the *DL7440/DL7480 User's Manual (IM701450-01E)*.

Setting the Record Length

34. Set the record length according to the procedures given in section 7.2, "Setting the Record Length" in the *DL7440/DL7480 User's Manual (IM701450-01E)*.

Setting T/div

35. Set T/div according to the procedure given in section 5.12, "Setting T/div" in the *DL7440/DL7480 User's Manual (IM701450-01E)*.
    Be sure to set T/div so that the sample rate displayed at the upper right of the screen is at least 10 times the bit rate of the FlexRay bus signal.
    For details on the relationship between the sample rate and T/div, see appendix 1, "Relationship between the Time Axis Setting, Sample Rate and Record Length" in the *DL7440/DL7480 User's Manual (IM701450-01E)*.

Starting/Stopping the FlexRay Bus Signal Acquisition

36. Press **START/STOP**. The FlexRay bus signal acquisition starts, and a trigger is activated on the specified trigger conditions.

Note

You can also carry out the procedure up to this point from the enhanced trigger menu by pressing Enhanced and setting TYPE to FlexRay.

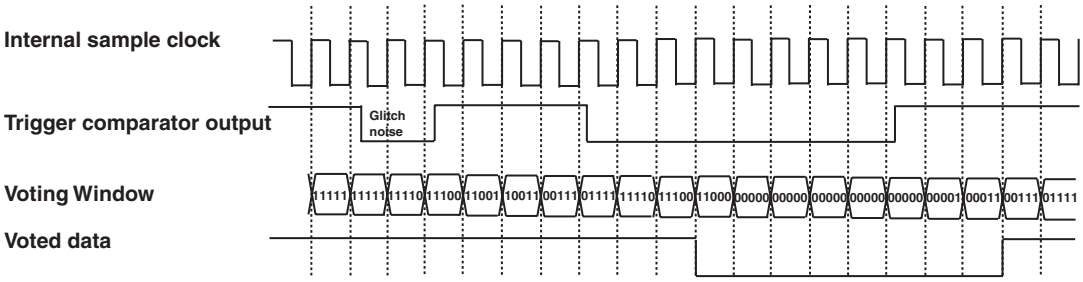
Explanation

Bit Sampling by the Trigger Circuit

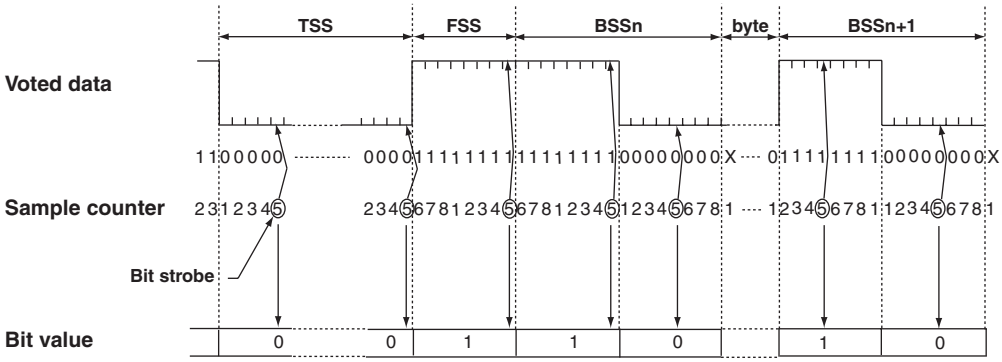
The FlexRay input signal is binarized by the trigger comparator and sampled using the internal sample clock of the trigger circuit. Then, the noise is eliminated by the majority filter in the voting window.

Note

In this case, the sample clock cycle is equal to the time corresponding to 1/8th the bit width at the specified bit rate.



One bit is eight sample clocks in length. The sampling counter is reset at the falling edge of BSS of voted data. The bit value is the voted data value when this counter is five, and the trigger condition is detected based on this value.



Setting the Trigger Conditions of the FlexRay Bus Signal (FlexRay Setup)

You can set the following conditions.

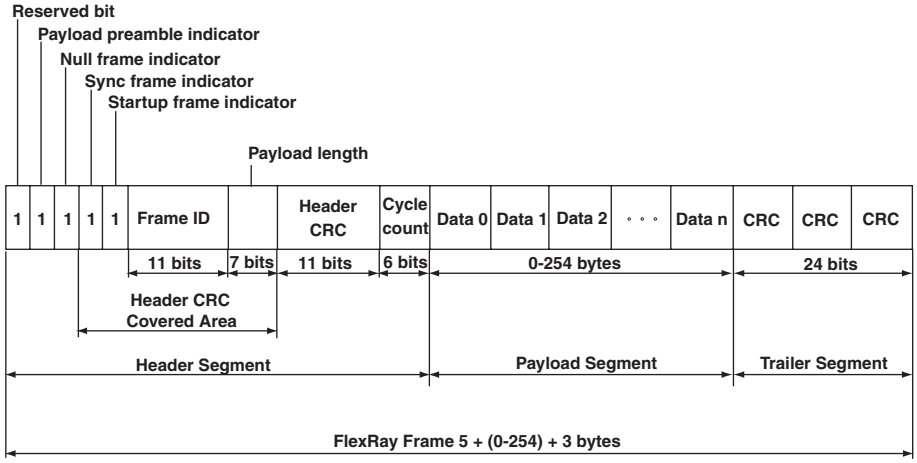
- **Bit Rate**
  Select the data transfer rate of the target FlexRay bus signal.
  2500, 5000, or 10000 [kbps]

- **Trigger Type**
  Select the trigger type from the following:

Frame Value	A trigger is activated when the specified pattern of the FlexRay bus signal frame is met.
CRC Error	A trigger is activated when an error is detected in the header CRC or frame CRC of the FlexRay bus signal.

If you set the trigger type to Frame Value, you can set the following items.

- **Trigger Source**
  Set the channel to apply the FlexRay bus signal used as the trigger source to CH1 or CH3. The figure below shows the frame format of the FlexRay bus signal.



- **Frame Start**
  A trigger is activated by detecting the start of the frame of the FlexRay bus signal.

Note

Frame Start is always selected.

- **Payload preamble indicator**
  In a communication system using static segments, the optional vector is network management information. In a communication system using dynamic segments, the optional vector is message ID information. A trigger is activated when the payload preamble indicator bit is 1.

Note

- **Static segment communication system (Fixed TDMA system)**
  Data of fixed length is sent at a given cycle.
- **Dynamic segment communication system (Flexible TDMA system)**
  Data of variable length can be sent.

- **Null Frame indicator**
  Indicates that invalid data is contained in the payload.
  A trigger is activated when the null frame indicator bit is 1.

- **Sync Frame indicator**
  Indicates whether the frame of the received data is a sync frame.
  A trigger is activated when the sync frame indicator bit is 1.

- **Startup frame indicator**
  Indicates that the node sending the frame is a startup node.
  A trigger is activated when the startup frame indicator bit is 1.

- **Frame ID**
  An 11-bit frame ID can be set.
  Selectable range: 0 to 2047
  Signals with the frame ID set to zero normally does not exist. However, zero can be specified as a trigger condition.
  - **Frame ID Condition**
    Compares with the specified frame ID and activates a trigger in the following conditions.

True	A trigger is activated when the data matches the specified value.
False	A trigger is activated when the data does not match the specified value.
Greater	A trigger is activated when the data is greater than the specified value.
Less	A trigger is activated when the data is less than the specified value.

- **Cycle Count**
  A 6-bit cycle count can be set.
  Selectable range: 0 to 63
  - **Cycle Count Condition**
    Compares with the specified cycle count and activates a trigger in the following conditions.

True	A trigger is activated when the data matches the specified value.
False	A trigger is activated when the data does not match the specified value.
Greater	A trigger is activated when the data is greater than the specified value.
Less	A trigger is activated when the data is less than the specified value.

- **Data**
  The data can be compared with two sets of data, Data1 and Data2.

- **Pattern Format**
  Select the Data1 and Data2 formats from the following:

Hex	Hexadecimal
Bin	Binary

- **Combination Logic**
  Select the combination condition of Data1 and Data2 from the following:

AND	A trigger is activated when both the Data1 and Data2 conditions are met.
OR	A trigger is activated when either the Data1 or Data2 condition is met.

Setting the Data1 or Data2 Pattern

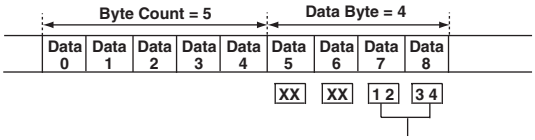
Byte Count

Set the byte count in the range of 0 to 253. The data after the specified number of bytes from the beginning of the payload segment is compared.

- **Data Byte**

  Set the number of bytes in the range of 1 to 4. This sets the length of the data to be compared.

  Example in which the byte count is set 5 and the number of data bytes is set to 4



  Example in which the lower 2 bytes are set to 1234 in a 4-byte data

- **Data Condition**

  Compares with the specified data pattern and activates a trigger in the following conditions.

True	A trigger is activated when the data matches the specified value.
False	A trigger is activated when the data does not match the specified value.
Greater	A trigger is activated when the data is greater than the specified value.
Less	A trigger is activated when the data is less than the specified value.

Note

Greater and Less can be specified only when the data is MSB first.

- **Setting the Data Pattern**

  Set the pattern for the number of bytes specified in the Data Byte box.

If the trigger type is set to CRC Error, the following items can be set.

- **Trigger Source**

  Select the trigger source from the following:

CH1	A trigger is activated when a CRC error is detected on CH1.
CH3	A trigger is activated when a CRC error is detected on CH3.
CH1 or CH3	A trigger is activated when a CRC error is detected on CH1 or CH3.

Note

A trigger is activated when an error is detected in the header CRC or frame CRC.

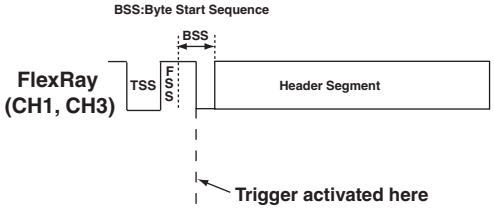
- **FlexRay Channel**

  Since the initial value of the CRC is different between channel A and B in the FlexRay bus signal, select the channel to use.

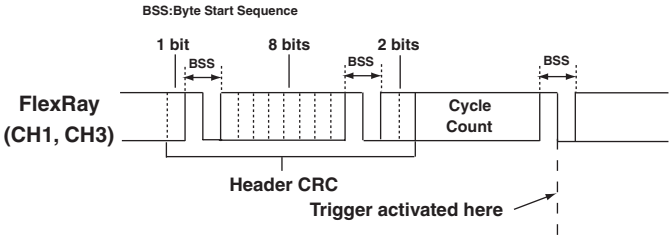
Trigger Point

The trigger point is near the falling edge of BSS immediately after all trigger conditions are met. However, When using the CRC error trigger and a CRC error is detected only in the frame (and not in the header) of the FlexRay bus signal, the trigger point is near the rising edge of FES.

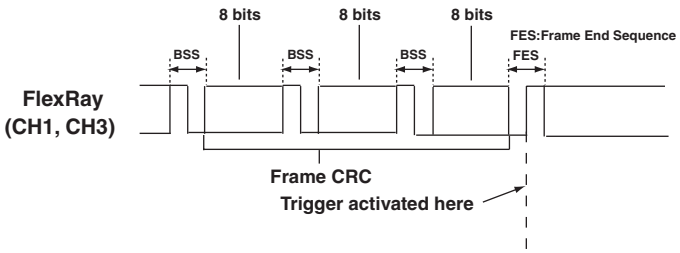
When Frame Value is selected and the trigger is activated only on frame start



When CRC Error is selected and there is a CRC error in the bus signal header



When CRC Error is selected and there is a CRC error in the bus signal frame



Note

The trigger point is set to the position corresponding to 10-bit width of the internal sample clock from the previous BSS rising edge before the trigger above. When activating the trigger using only frame start in Frame Value, the trigger point is set to the position corresponding to 2-bit width from the FSS rising edge. Therefore, the trigger point does not necessarily match with the BSS rising edge or FES rising edge. In addition, because sampling is performed using the internal sample clock, a trigger jitter of one sampling clock occurs. One cycle is the time corresponding to 1/8th the bit width at the specified bit rate. For example, the jitter is 25 ns for 5 Mbps.

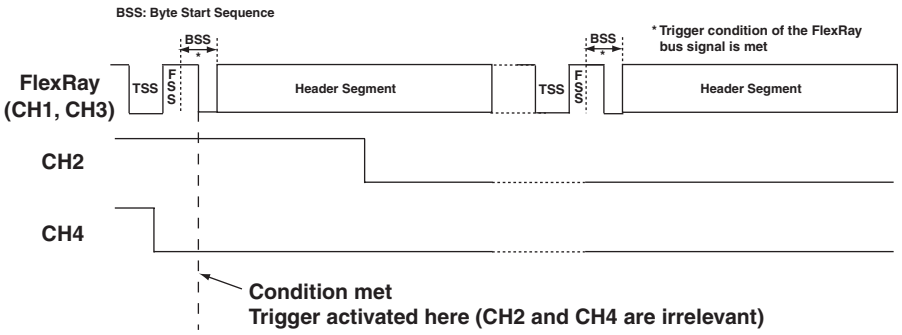
Setting the Combination Trigger

A trigger can be activated on the combination of the trigger conditions of the FlexRay bus signal and the trigger conditions of the parallel pattern. You can select from the following three types.

FlexRay Only

A trigger is activated only on the trigger conditions of the FlexRay bus signal.

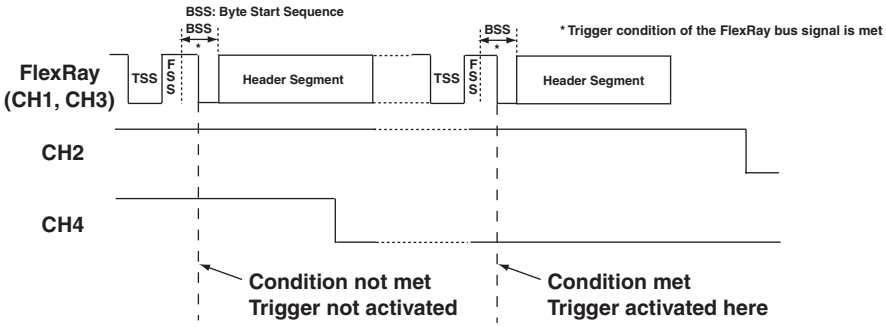
Activate a trigger on Frame Start



Parallel Pattern and FlexRay Bus Signal (FlexRay on Pattern)

A trigger is activated when the conditions of the FlexRay bus signal are met while the conditions of the parallel pattern are met.

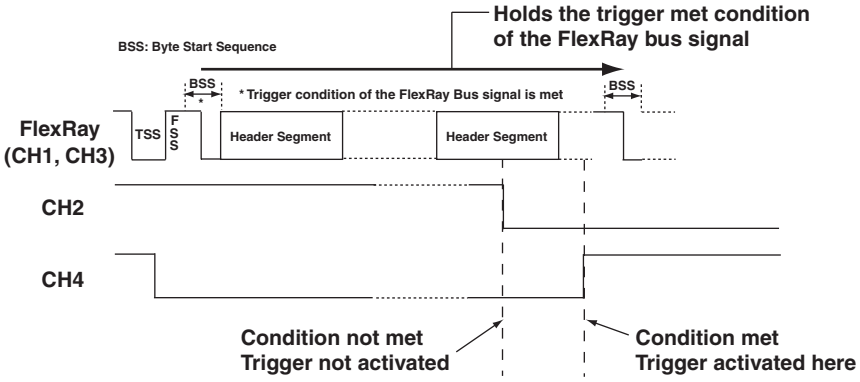
Activate a trigger on CH2 = H, CH4 = L, Condition = True, and Frame Start



FlexRay Bus Signal and Parallel Pattern (FlexRay → Pattern)

A trigger is activated when the conditions of the parallel pattern are met after the conditions of the FlexRay bus signal are met.

Activate a trigger on CH2 = L, CH4 = H, Condition = Enter, and Frame Start



If the combination is set to FlexRay on Pattern, the following items can be set.

- **Setting the Pattern**
  Select the status of each channel from the values below to set the pattern.

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.

- **Pattern Condition**

True	A trigger is activated when the trigger conditions of the FlexRay is met while the specified pattern on CH2 and CH4 to CH8 (CH2 and CH4 on the DL7440) is met.
False	A trigger is activated when the trigger conditions of the FlexRay is met while the specified pattern on CH2 and CH4 to CH8 (CH2 and CH4 on the DL7440) is not met.

If the combination is set to FlexRay → Pattern, the following items can be set.

- **Clock Channel**
  Set the clock channel from CH2 and CH4 to CH8 (CH2 and CH4 on the DL7440). If you do not want to set a clock channel, select None. You can select the trigger slope of the clock channel from the following:

⎍	Rising slope
⎎	Falling slope

- **Setting the Pattern**
  Select the status of each channel other than the clock channel from the values below to set the pattern.

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.

- **Pattern Condition**
  The pattern condition can be set only when a clock channel is not set. Select from the following:

Enter	A trigger is activated when the specified pattern of CH2 and CH4 to CH8 (CH2 and CH4 on the DL7440) is met.
Exit	A trigger is activated when the specified pattern of CH2 and CH4 to CH8 (CH2 and CH4 on the DL7440) is no longer met.

If the clock channel is selected from CH2 and CH4 to CH8 (CH2 and CH4 on the DL7440), the condition of the pattern is set to true (a trigger is activated on the rising or falling edge of the clock channel while the specified pattern is met).

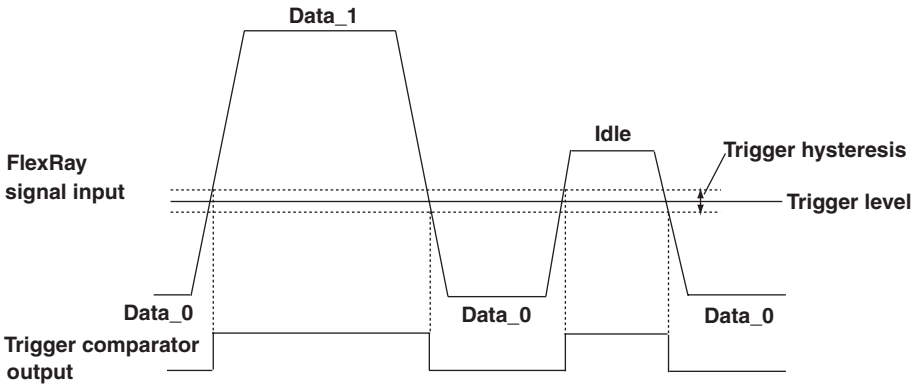
Note

When the clock channel is set to a channel, the trigger activation may be sluggish when the trigger mode is set to AUTO. If this happens, set the trigger mode to Normal.

Setting the Trigger Level, Trigger Coupling, Etc. (Level/Coupling)

Set the trigger level, hysteresis, trigger coupling, and HF rejection of each channel. For details on the trigger level, hysteresis, trigger coupling, and HF rejection, see page 6-17 in section 6.8, “Setting the A->B(N) Trigger (ENHANCED)” in the *DL7440/DL7480 User’s Manual (IM701450-01E)*.

Set the trigger level of the FlexRay signal input channel to a level between the idle level and the Data_0 level. In effect, the trigger circuit can detect Data_1 and Idle as high and Data_0 as low.



Setting the Acquisition Conditions of the FlexRay Bus Signal and Starting the Acquisition

For the procedure to set the record length, and T/div, see the respective sections in the *DL7440/DL7480 User's Manual (IM701450-01E)* as explained below.

Explanation

Setting the Record Length

Set the record length according to the description given in section 7.2, "Setting the Record Length" in the *DL7440/DL7480 User's Manual (IM701450-01E)*.
The maximum record length of the FlexRay bus signal that can be analyzed is as follows:
701460/701480: 8 M (when interleave mode is ON) or 4 M (when interleave mode is OFF)
701450/701470: 2 M (when interleave mode is ON) or 1 M (when interleave mode is OFF)

Setting T/div

Set T/div according to the description given in section 5.12, "Setting T/div" in the *DL7440/DL7480 User's Manual (IM701450-01E)*.
Be sure to set T/div so that the sample rate displayed at the upper right of the screen is at least 8 times the bit rate of the FlexRay bus signal.
For details on the relationship between the sample rate and T/div, see appendix 1, "Relationship between the Time Axis Setting, Sample Rate and Record Length" in the *DL7440/DL7480 User's Manual (IM701450-01E)*.

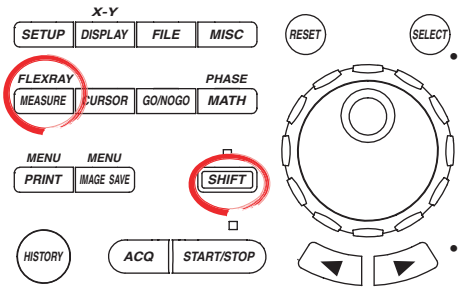
Starting/Stopping the Acquisition of the FlexRay Bus Signal

When you press START/STOP to start the FlexRay bus signal acquisition, triggers are activated on the specified trigger conditions.
To continue with the analysis after the acquisition of the FlexRay bus signal, press START/STOP to stop the signal acquisition.

Analyzing/Searching Data

You can set the data analysis conditions of the FlexRay bus signal stored in the acquisition memory and analyze the data by carrying out the procedure below. In addition, you can search a desired frame using the AND conditions of the frame ID, cycle count, sync frame, header CRC error, and CRC error. If a frame that matches the specified condition is found, the zoom position moves to the corresponding section, and the waveform of the frame that is found is displayed in the zoom waveform display frame.

Procedure



- To exit the menu during operation, press ESC located above the soft keys.
- In the procedural explanation below, the term **jog shuttle & SELECT** refers to the operation of selecting/setting items and entering values using the jog shuttle, SELECT and RESET keys. For details on the operation using the jog shuttle, SELECT, and RESET, see sections 4.1 or 4.2 in the DL7440/DL7480 User's Manual.
- For a description of the operation using a USB keyboard or a USB mouse, see section 4.3 in the DL7440/DL7480 User's Manual.

1. Press **FLEXRAY** to display the FlexRay menu.

Note

When the FlexRay menu appears, Trigger Type switches to Enhanced, Enhanced Type switches to FlexRay, and Search Type switches to FlexRay.

Setting Analysis Conditions

2. Press the **Analyze Setup** soft key to display the Analyze Setup dialog box.

Selecting the Analysis Source

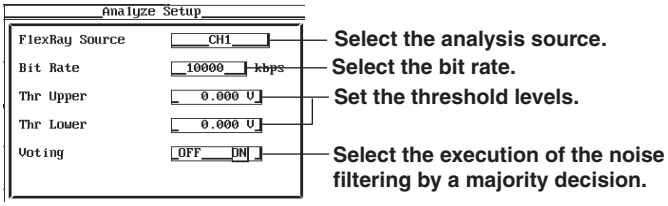
3. Use **jog shuttle & SELECT** to set the analysis source to CH1, CH3, CH5, or CH7 (CH1 or CH3 on the DL7440) in the FlexRay Source box.

Setting the Bit Rate

4. Use **jog shuttle & SELECT** to set the bit rate (Bit Rate box).

Setting the Threshold Level

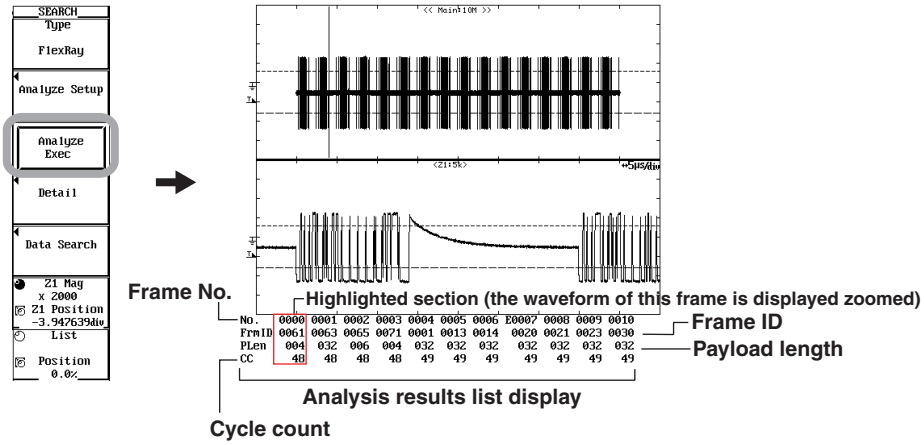
5. Use **jog shuttle & SELECT** to set the level used to determine a high level signal (Thr Upper box).
   The specified level is displayed using a cursor in the waveform display frame.
6. Likewise, use **jog shuttle & SELECT** to set the level used to determine a low level signal (Thr Lower box).
   The specified level is displayed using a cursor in the waveform display frame.



7. Press **ESC** to close the Analyze Setup dialog box.

Executing/Aborting the Analysis

8. Pressing the **Analyze Exec** soft key to execute the data analysis.
   The words Analyze Exec change to Analyze Abort, and a blinking asterisk is displayed to the upper left of the waveform display frame
   When the analysis is complete, an analysis results list is displayed at the bottom section of the waveform display frame. Asterisks are displayed in the data sections that could not be analyzed correctly.
   To abort the data analysis, press the **Analyze Abort** soft key. The data analysis is aborted, and the words Analyze Abort change to Analyze Exec.



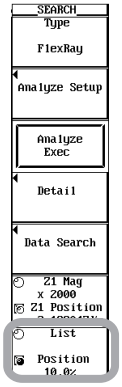
Selecting the Zoom Display Frame and Setting the Display Position

Selecting the Frame

9. Press the **List/Position** soft key to select List.
10. Turn the **jog shuttle** to select the frame to be displayed zoomed.
    The analysis data of up to 11 frames are listed at once in time series. The waveform of the frame whose data is highlighted in the list is displayed zoomed (see the figure of step 10 in the previous page). If the leftmost or rightmost frame is selected when you turn the **jog shuttle**, the list scrolls to the left or right.

Setting the Display Position of the Head of the Frame

11. Press the **List/Position** soft key to select Position.
12. Turn the **jog shuttle** to set the display position of the head of the frame (0 to 50%).
    The right edge and the center of the waveform display area are 100% and 50%, respectively.



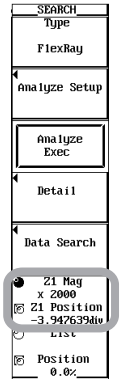
Setting the Zoom Ratio and Zoom Position

Setting the Zoom Ratio

13. Press the **Z1 Mag/Z1 Position** soft key to select Z1 Mag.
14. Turn the **jog shuttle** to set the zoom ratio.
    If you increase the zoom ratio and the bit length becomes greater than or equal to 5 pixels in the horizontal direction, the bit values are displayed using 0s and 1s, and the two BSS bits are displayed as periods below the waveform.

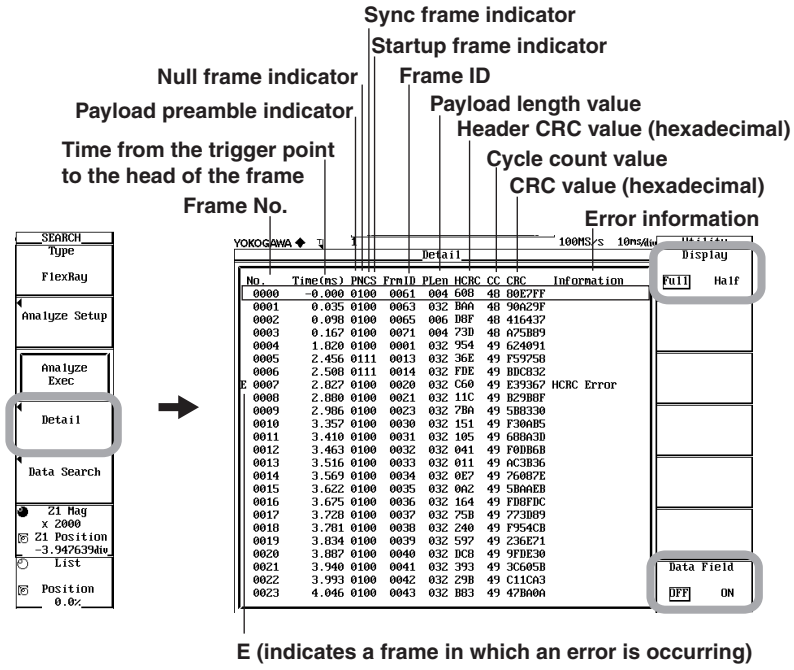
Setting the Zoom Position

15. Press the **Z1 Mag/Z1 Position** soft key to select Z1 Position.
16. Turn the **jog shuttle** to set the zoom position. When the center of the zoom box moves to the waveform corresponding to the analysis data on the list, the analysis data of the corresponding frame on the list is highlighted.



Viewing the Details of the Analysis Data

17. Press the **Detail** soft key to display the Detail dialog box. The analysis data of the same analysis number that is highlighted in the list in step 12 or step 18 is displayed highlighted.
18. Press the **Display** soft key to set the size of the Detail dialog box to Full or Half.
    If you select Half, the size of the Detail dialog box decreases to half of its original size allowing you to view the zoom waveform of the selected frame.
19. Press the **Data Field** soft key to select whether to display the data series.



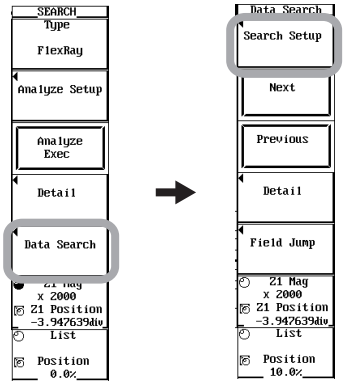
20. Press **ESC** to close the Detail dialog box.

Note

The detailed analysis list can be saved directly to an external storage medium in text format (.txt extension). For details, see “Saving the Data of the Detailed Analysis List.”

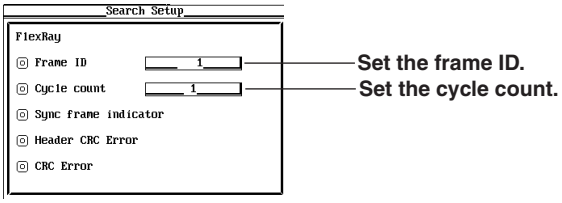
Setting the Search Conditions

21. Press the **Data Search** soft key to display the Data Search menu.
22. Press the **Search Setup** soft key to display the Search Setup dialog box.



23. Use **jog shuttle & SELECT** to select whether to use Frame ID, Cycle count, Sync frame indicator, Header CRC Error, or CRC Error as AND conditions of the search.
    Highlighting of the mark to the left of each item indicates that it is used as an AND condition of the search.

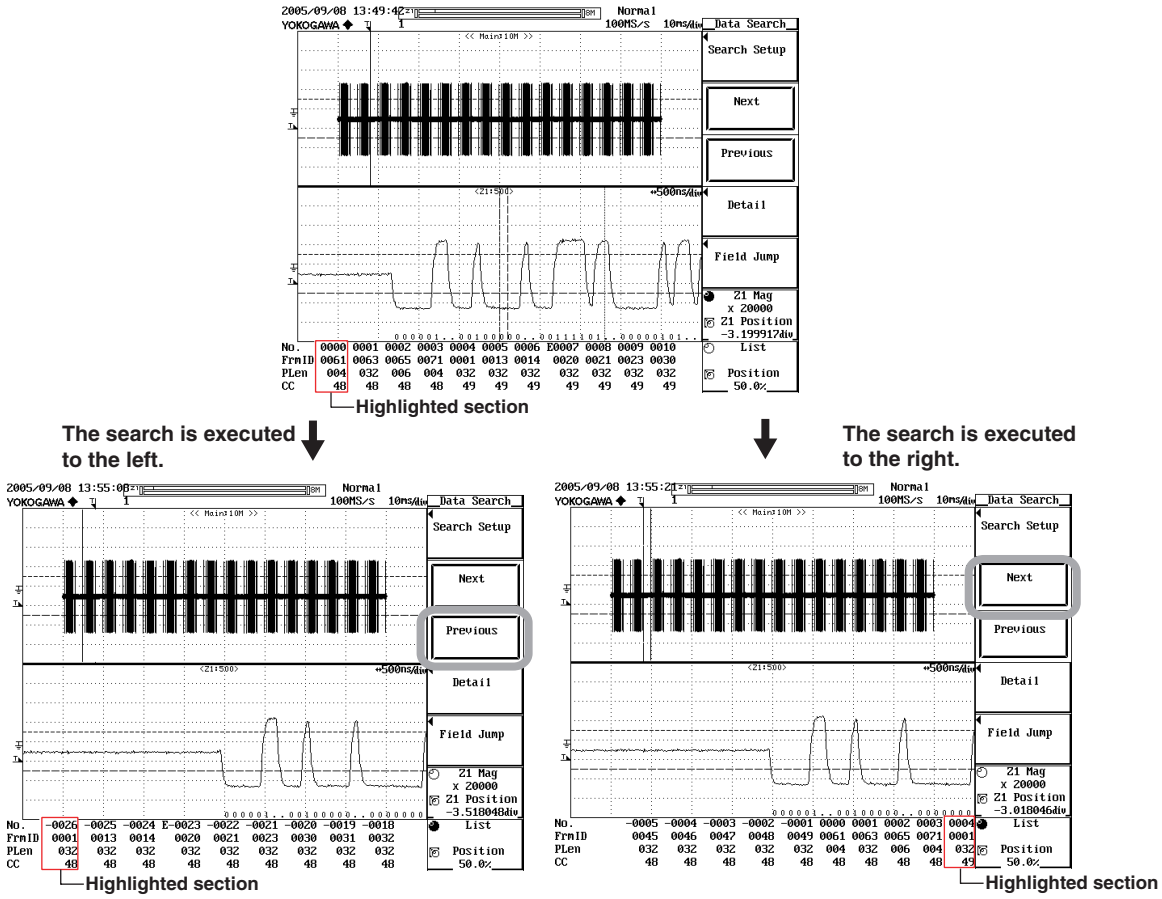
- **When Frame ID Is Selected**
  24. Use **jog shuttle & SELECT** to set the frame ID.
- **When Cycle Count Is Selected**
  25. Use **jog shuttle & SELECT** to set the cycle count.



26. Press **ESC** to close the Search Setup dialog box.

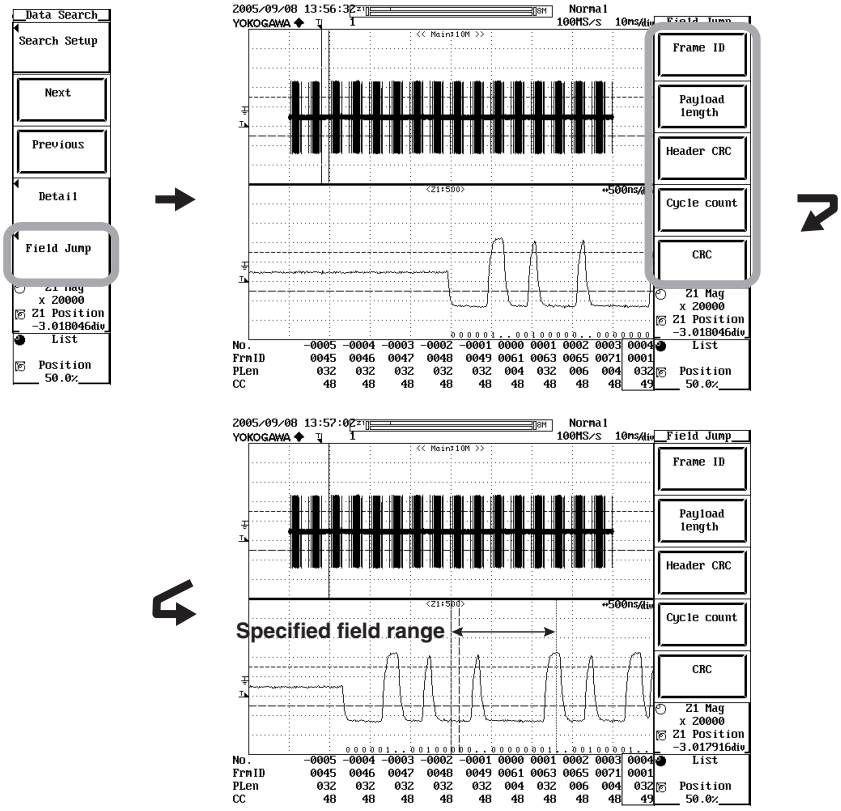
Executing the Search

27. Press the **Next** or **Previous** soft key to execute the search.
    - When the data matches the determination pattern, the data of the corresponding frame (frame that was found) is highlighted in the analysis data list at the bottom of the screen. The zoom box moves to the position so that the frame that was found is at the center, and the zoomed waveform of the frame that was found is displayed in the zoom waveform display area.
    - Pressing the Next soft key searches the frame after the highlighted frame (to the right) in the analysis data list at the bottom of the screen.
    - Pressing the Previous soft key searches the frame before the highlighted frame (to the left) in the analysis data list at the bottom of the screen.



Jumping to the Specified Field (Field Jump)

28. Press the **Field Jump** soft key to display the field selection menu.
29. Press the **Frame ID**, **Payload length**, **Header CRC**, **Cycle count**, or **CRC** soft key. The zoom position (Z1 Pos) moves to the head of the selected frame, and the range of that field is displayed using cursors.



The above example is for the case when the Frame ID soft key is pressed.

Note

You can also carry out the procedure up to this point by prssing SHIFT+ZOOM (SEARCH) and using the SEARCH menu.

Explanation

Setting the Analysis Conditions (Analysis Setup)

You can set the following conditions.

Channel to Be Used

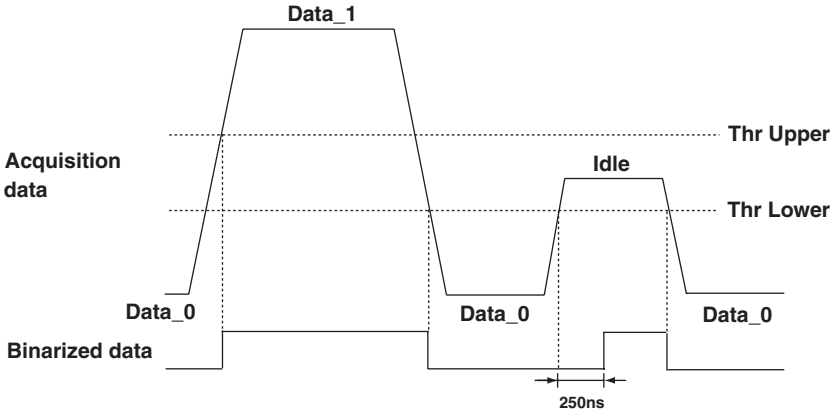
Select the FlexRay bus signal input channel from CH1, CH3, CH5, and CH7 (CH1 or CH3 on the DL7440).

Bit Rate

Select a data transfer rate for the FlexRay bus to be analyzed from the following.
2500, 5000, or 10000 [kbps]

Threshold Level (Thr Upper/Thr Lower)

Binarization into 0s and 1s is achieved by setting two threshold levels (Thr Upper and Thr Lower) and comparing against the acquisition data.



A hysteresis equal to (Thr Upper – Thr Lower) is applied in the binarization.
When acquisition data < Thr Lower: 0
When acquisition data > Thr Upper: 1
When Thr Lower ≤ acquisition data ≤ Thr Upper:
When a transition is made from acquisition data < Thr Lower: 0*
When a transition is made from acquisition data > Thr Upper: 1

* If the same state lasts longer than 250 ns, the value is set to 1.

Voting

Select whether to perform voting operation during the analysis.
Voting OFF: Not perform voting
Voting ON: Perform voting

The data that has been binarized according to the threshold level setting is resampled at 1/8th the interval of a bit cycle, and the value is held until the next resampling point (resampled data). If voting is not performed, this resampled data is used for the analysis. If voting is performed, the voting operation is performed based on this resampled data (voted data). In this case, the voted data is used for the analysis.
In either case, the sampling counter is reset on the rising edge of BSS. The bit value is the analyzed data value when this counter is five, and analysis is performed on this value.

Executing the Analysis (Analyze Exec)

Analysis is performed on 2000 frames before and after the trigger source frame (up to 4000 frames). If the trigger point is between frames, the frame immediately after the trigger point becomes the triggering frame. Analysis is not performed if TSS does not exist at the head of the frame. In addition, if an error is detected in a frame, the analysis on the frame ends at that point, and the next frame is analyzed.

Analysis Data List (Analysis Results List)

The following four items are displayed.

- **No.**
  The frame numbers are displayed as described below. The letter E is shown before the number for error frames.
  With the trigger source frame assigned the number 0000, negative numbers are assigned to frames before the trigger source frame as follows: –0001, –0002, etc. Positive numbers are assigned to frames after the trigger source frames as follows: 0001, 0002, etc. The frames are displayed in the range between –1999 and 2000..
- **FrmID**
  Displays the frame ID.
- **PLen**
  Displays the payload length (in bytes).
- **CC**
  Displays the cycle count.

Zooming on the Selected Frame

Selecting the Frame (List)

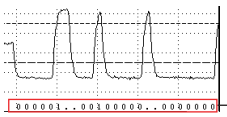
Frame number 0000 is automatically highlighted immediately after executing the analysis in the analysis results list. The waveform of the highlighted frame is displayed in the zoom box (see the figure of step 8 on page 25). Turn the jog shuttle to highlight an arbitrary frame.

Display Position of the Head of the Frame (Position)

The display position of the head of the selected frame moves horizontally by changing the value using the jog shuttle. The value are 50% and 100% at the center and the right edge of the waveform display frame, respectively. Setting the value to 50% centers the head position of the frame in the waveform display frame. The selectable range is 0 to 50%.

Zoom ratio: Z1 Mag

You can set the zoom ratio of the Z1 zoom box. The upper limit of the zoom ratio is determined from the display record length as follows:
(Zoom ratio upper limit) = (Display record length) ÷ 50 (or 40)
The displayed record length does not necessarily match the set record length. For details on the display record length, see appendix 1, “Relationship between the Time Axis Setting, Sample Rate and Record Length” in the DL7440/DL7480 User’s Manual (IM701450-01E).
If the horizontal magnification is increased and the bit length becomes greater than or equal to 5 pixels in the horizontal direction on the screen, the bit values are displayed below the waveform with 0s and 1s. The two BSS bits are displayed as periods.



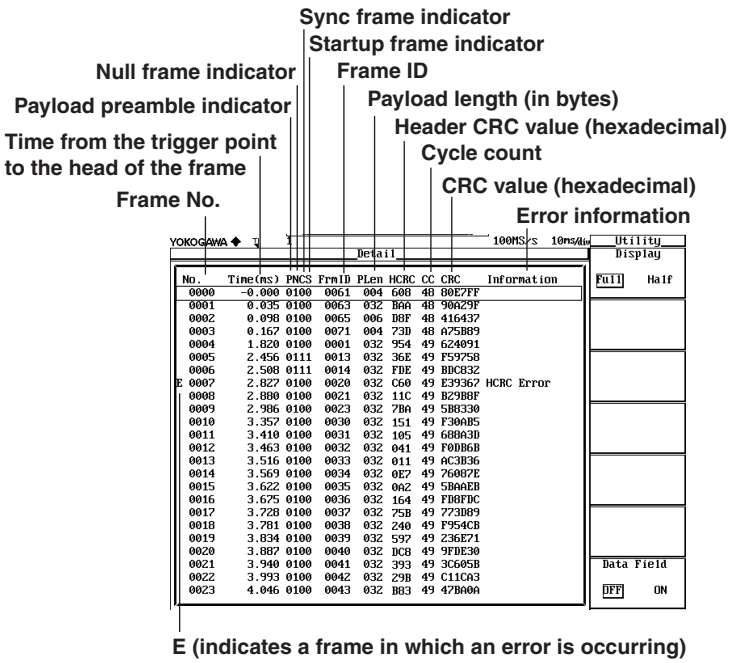
Zoom position (Z1 Position)

The zoom position can be set by specifying the zoom center position (center of the Z1 zoom box) in the range –5 to +5 divisions with the center of the waveform display frame set to 0 divisions. The resolution is as follows:
(Selectable steps of zoom position) = (T/div) × 10 ÷ (display record length)

Detailed List of the Analysis Data (Detailed Analysis Results List)

- **No.**
  With the trigger source frame assigned the number 0000, negative numbers are assigned to frames before the trigger source frame as follows: –0001, –0002, etc. Positive numbers are assigned to frames after the trigger source frames as follows: 0001, 0002, etc. The frames are displayed in the range between –1999 and 2000..
- **Time (ms)**
  Displays the time from the trigger point to the head of the frame.
- **P**
  Displays the payload preamble indicator using 0 or 1.
- **N**
  Displays the null frame indicator using 0 or 1.
- **C**
  Displays the sync frame indicator using 0 or 1.
- **S**
  Displays the startup frame indicator using 0 or 1.
- **FrmID**
  Displays the frame ID.
- **PLen**
  Displays the payload length (in bytes).
- **HCRC**
  Displays the header CRC value in hexadecimal notation.
- **CC**
  Displays the cycle count.
- **CRC**
  Displays the frame CRC value in hexadecimal notation.

- **Information**
  Displays error information.
  TSS Error: Unable to detect TSS.
  FSS Error: Unable to detect FSS.
  BSS Error: Unable to detect BSS.
  FES Error: Unable to detect FES.
  HCRC Error: The header CRC value is incorrect.
  CRC Error: The frame CRC value is incorrect.



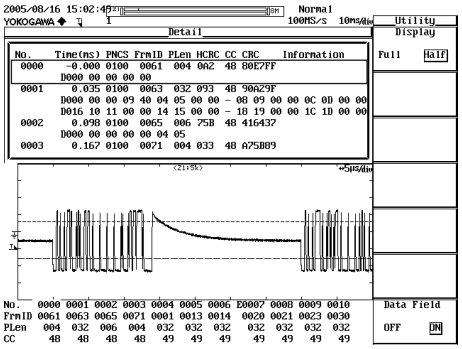
Immediately after analysis executes, frame number 0000 is automatically highlighted. The waveform of the frame that is highlighted is shown in the zoom box. Turn the jog shuttle to highlight an arbitrary frame. Display of the detailed analysis list and analysis results list are linked.

Note

The data of the detailed analysis results list can be saved in text format (.txt extension). For details, see “Saving the Data of the Detailed Analysis List.”

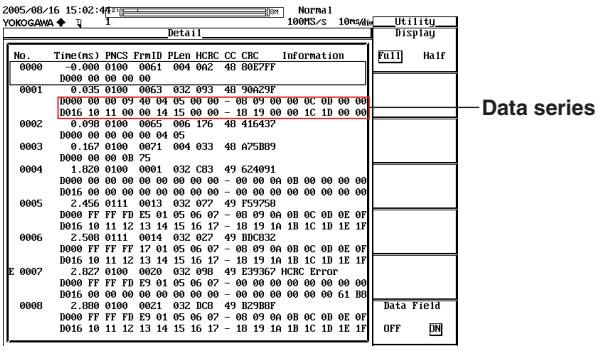
Selecting the Size of the List Display Frame (Detail Dialog Box)

You can select whether to set the size of the display frame of the detailed analysis results list to full screen or half screen. If you select half screen, a zoom box is displayed as shown below allowing you to view the waveform of the selected frame.



Turning the Data Series Display ON/OFF (Data Field)

You can select whether to display the data series of the payload segment of each frame below the field data as shown below.



Setting the Search Conditions (Search Setup)

Select the items to be included in the AND conditions of the search.

- Frame ID
  Set the frame ID if you wish to include the frame ID in the AND condition.
- Cycle count
  Set the cycle count if you wish to include the cycle count in the AND condition.
- Sync frame indicator
- Header CRC Error
- CRC Error

Executing the Search (Next or Prev)

Press the Next or Prev soft key to execute the search.

Next: Searches frames after (to the right of) the currently selected frame.

Prev: Searches frames before (to the left of) the currently selected frame.

Jumping to a Specified Field (Field Jump)

Moves the Zoom position (Z1 Pos) to the front of a particular field within the current frame. The applicable fields are of the following five types.

- Frame ID
- Payload length
- Header CRC
- Cycle count
- CRC

Binarized Waveform (Equivalent to Voted Data)

If you set Math Mode to Normal, MATH1 Display to ON in the MATH menu and execute Analyze Exec in the FlexRay menu, a binarized waveform is displayed for the threshold level (FlexRay Bin computation).

Note

The following functions cannot be used when using the FlexRay bus signal analysis function.

- Computation (Math1) function (excluding FlexRay Bin)
  Even if you specify a computation other than FlexRay Bin in Math1, it is automatically set to FlexRay Bin when FlexRay analysis is performed.
- Phase shift function
  Set the amount of shift to 0.
- You can clear the threshold level in the Cursor menu, if viewing is difficult due to the binarized waveform overlapping the threshold level.

Displaying the Binarized Waveform

If you execute Analyze Exec in the FlexRay menu after setting Math Mode to Normal and Math1 Display to ON in the MATH menu, a binarized waveform of the threshold level is displayed.

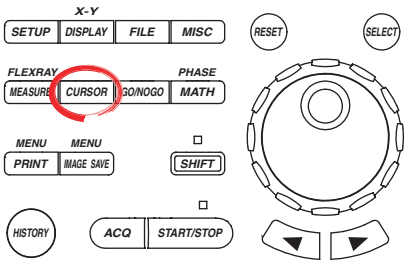
Note

The binarized waveform that is displayed varies depending on the voting setting.
Voting OFF: Waveform of the resampled data.
Voting ON: Waveform of the voted data.
For a description of voting, see “Bit Sampling by the Trigger Circuit” on page 16.

Using Cursors

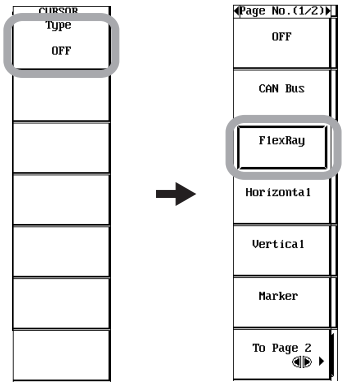
The cursors can be moved by the specified bit length while maintaining the spacing between Cursor1 and Cursor2 at the specified bit length of the FlexRay bus signal. When analyzing or searching, FlexRay Bus signal waveform fields can be checked while counting the number of bits.

Procedure

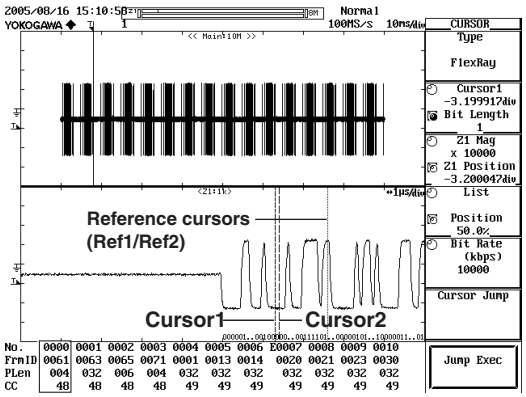


- To exit the menu during operation, press ESC located above the soft keys.
- In the procedural explanation below, the term **jog shuttle & SELECT** refers to the operation of selecting/setting items and entering values using the jog shuttle, SELECT and RESET keys. For details on the operation using the jog shuttle, SELECT, and RESET, see sections 4.1 or 4.2 in the DL7440/DL7480 User's Manual.
- For a description of the operation using a USB keyboard or a USB mouse, see section 4.3 in the DL7440/DL7480 User's Manual.

1. Press **CURSOR** to display the CURSOR menu.
2. Display the **Type** soft key to display the Type menu.
3. Press the **FlexRay** soft key.



If you select FlexRay, Cursor1 moves to the same position as when selecting Vertical cursor*, but Cursor2 moves the specified bit length after Cursor1. (See step 4 below to set the bit length.)
The positions of reference cursors Ref1 and Ref2 remain at their previous settings.



* For details on cursors other than the FlexRay analysis function cursors (such as the vertical cursor), see section 10.5, "Making Cursor Measurements" in the *DL7440/DL7480 User's Manual (IM701450-01E)*.

Setting the Bit Length

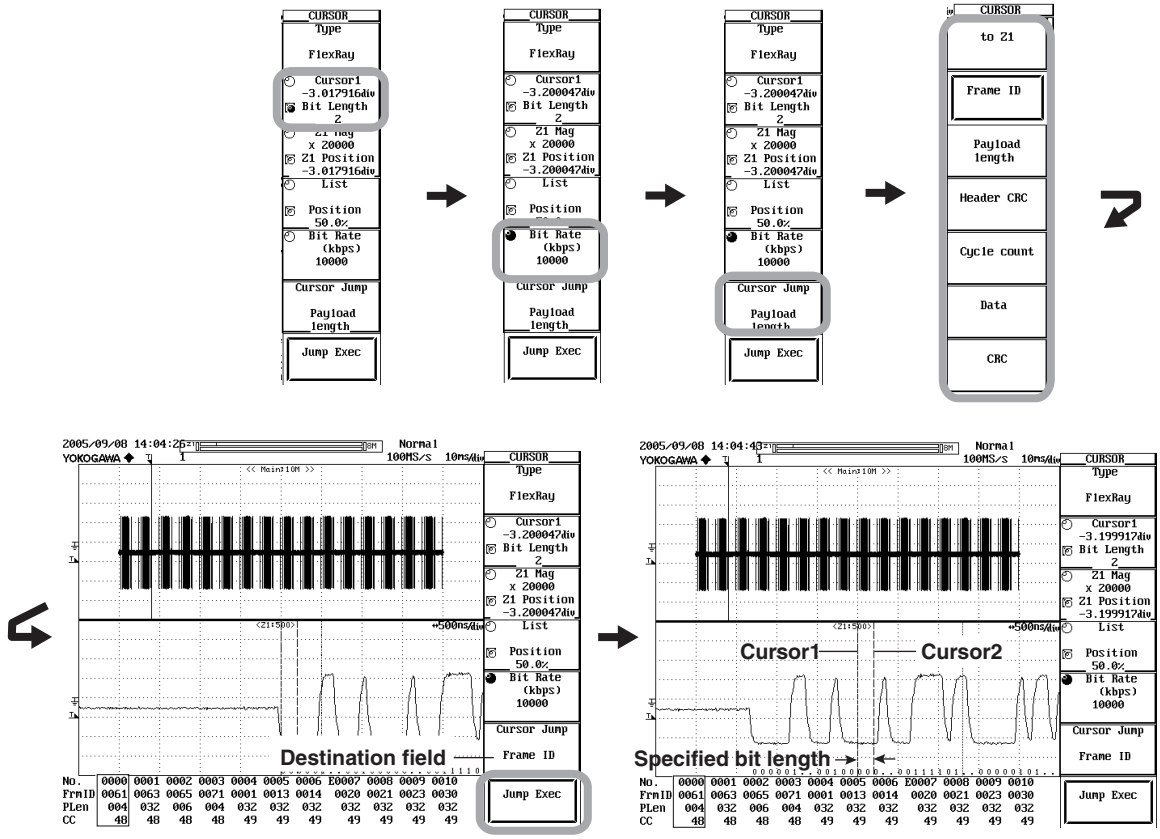
4. Select the **Cursor1/Bit Length** soft key to select Bit Length.
5. Use **jog shuttle & SELECT** to set the bit length.
   Changing the bit length causes Cursor2 to move the specified bit length after (to the right of) Cursor1.

Changing the Bit Rate

6. Select the **Bit Rate** soft key to select Bit Rate.
7. Turn the **jog shuttle** to set the bit rate.
   Changing the bit rate causes Cursor2 to move the specified bit length after (to the right of) Cursor1 according to the new bit rate.

Moving the Cursor to the Specified Field

8. Press the **Cursor Jump** soft key to display a menu for selecting the destination field.
9. Press the **to Z1**, **Frame ID**, **Payload Length**, **Header CRC**, **Cycle count**, **Data**, or **CRC** soft key.
10. Press the **Jump Exec** soft key. Cursor1 moves to the front of the field selected in step 9, and Cursor2 moves to the specified bit length after Cursor1.



Cursor1 moves to the beginning of the field selected as the destination.
Cursor2 moves the specified bit length after Cursor1.

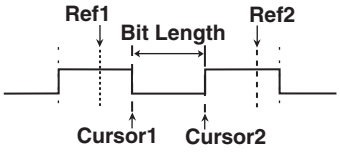
Note

If you press the Jump Exec soft key when there is no analysis data, the message “Analyzed data does not exist. Execute the analysis” (error code: 739) is displayed.

11. Select the **Cursor1/Bit Length** soft key to select Cursor1.
12. Turn the **jog shuttle** to move the cursor. The cursors move at one bit length at a time while maintaining the specified bit length of space between them.

Explanation

If you select FlexRay for the cursor type, Cursor1 moves to the same position as when you select Vertical cursors. Cursor2 moves the specified bit length after Cursor1. The positions of reference cursors Ref1 and Ref2 remain at their previous settings. The reference cursors indicate the range of the specified field.



Bit Length

Set the spacing between Cursor1 and Cursor2 to as a bit length.
Selectable range: 1 to 1000

Bit Rate

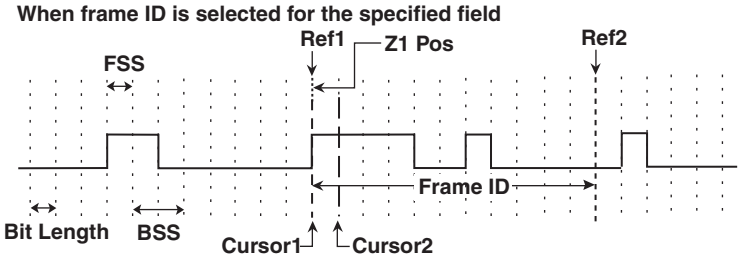
Select a data transfer rate for the FlexRay bus to be analyzed from the following.
2500, 5000, or 10000 [kbps]

Note

Changing the bit rate in the Analysis Setup dialog box causes this bit rate setting to change to the same value. However, changing this bit rate setting does not cause the bit rate setting in the Analysis Setup dialog box to change.

Moving the Cursor to the Specified Field (Cursor Jump)

Cursor1 is displayed at the head of the specified field (frame ID, payload length, header CRC, cycle count, data, or CRC). Cursor2 is displayed the specified bit length after Cursor1. The cursors move while maintaining the specified bit length of space between them. In addition, Z1 pos, Cursor1, and Ref1 are displayed at the head of the specified field and Ref2 at the end of the specified field. If Z1 is specified, Cursor1 is displayed at Z1 pos, and Cursor2 is displayed the specified bit width after Cursor1.



Note

When the FlexRay bus signal analysis is executed with the cursor type set to FlexRay, Cursor1 moves to the head of the source field. Cursor2 moves the specified bit length after Cursor1.

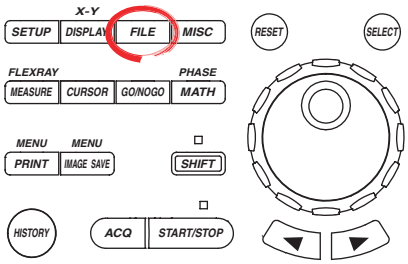
Saving the Data of the Detailed Analysis Results List

The data of the detailed analysis results list can be saved in text format (.txt extension).

CAUTION

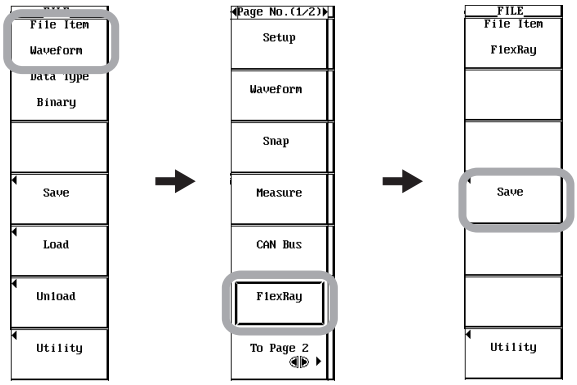
Do not remove the storage medium (disk) or turn OFF the power when the access indicator or icon of the storage medium is blinking. Doing so can damage the storage medium or destroy the data on the medium.

Procedure



- To exit the menu during operation, press ESC located above the soft keys.
- In the procedural explanation below, the term **jog shuttle & SELECT** refers to the operation of selecting/setting items and entering values using the jog shuttle, SELECT and RESET keys. For details on the operation using the jog shuttle, SELECT, and RESET, see sections 4.1 or 4.2 in the DL7440/DL7480 User's Manual.
- For a description of the operation using a USB keyboard or a USB mouse, see section 4.3 in the DL7440/DL7480 User's Manual.

1. Press **FILE** to display the FILE menu.
2. Press the **File Item** soft key to display the File Item menu.
3. Press the **FlexRay** soft key.
4. Press the **Save** soft key to display the Save menu.



Selecting Save Destination Medium and Directory

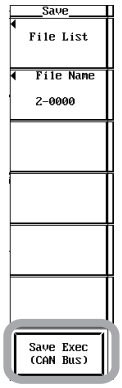
5. Carry out steps 13 to 15 on page 12-22 in the *DL7440/DL7480 Digital Oscilloscope User's Manual (IM701450-01E).*

Setting the File Name and Comment

6. Carry out steps 16 to 19 on page 12-22 in the *DL7440/DL7480 Digital Oscilloscope User's Manual (IM701450-01E).*

Executing the Save Operation

7. Press the **Save Exec** soft key. The data is saved to the directory indicated by Path=..... At the same time, the Save Exec soft key changes to the Abort soft key.



Aborting the Save Operation

8. Press the **Abort** soft key to abort the save operation. At the same time, the Abort soft key changes to the Save Exec soft key.

Specifying the Files to Be Displayed in the File List Window and Displaying Properties

9. Carry out steps 22 to 25 on page 12-23 in the *DL7440/DL7480 Digital Oscilloscope User's Manual (IM701450-01E)*.

Explanation

If you save the data, the data of the analysis results is saved to the specified destination in text format (.txt extension).

[Save example]

```
 No.    Time(ms) PNCS FrmID PLen HCRC CC CRC    Information
 -0055    -7.544 0111 0013  032  07C  47 1CC4FF
 -0054    -7.491 0111 0014  032  02C  47 45C0D9
E-0053    -7.173 0100 0020  032  095  47 C85EC4 HCRC Error
 -0052    -7.120 0100 0021  032  095  47 99562C
 -0051    -7.014 0100 0023  032  004  47 704E93
 -0050    -6.643 0100 0030  032  15F  47 20F058
 -0049    -6.590 0100 0031  032  107  47 BB70D0
 -0048    -6.537 0100 0032  032  042  47 232186
 -0047    -6.484 0100 0033  032  01C  47 7FC1DB
 -0046    -6.431 0100 0034  032  06F  47 A5F293
 -0045    -6.378 0100 0035  032  095  47 885006
```

Precautions to Be Taken When Saving the Data

- The maximum number of files that can be saved when the auto naming function is ON is 1150.
- If the total number of files and directories exceed 2500 in a single directory, the contents of the File List box are no longer displayed.

Error Messages

A message may appear on the screen during operation. This section describes the meanings of the messages and their corrective actions. This section lists only the error messages related to the FlexRay analysis function. There are other error messages related to the DL7400 and communications. These messages are described in the *DL7440/DL7480 User's Manual (IM 701450-01E)* and the *DL7440/DL7480 Communication Interface User's Manual (IM 701450-17E)*.
You can set the messages to be displayed in English or Japanese. For the procedure of setting the message language, see section 15.1, "Changing the Message Language and Turning ON/OFF the Click Sound" in the *DL7440/DL7480 User's Manual IM 701450-01E*.
If the corrective action requires servicing, contact your nearest YOKOGAWA dealer for repairs.

Code	Messages	Corrective Action	Page
27	Executed the search, but no record was found that matched the pattern.	–	15, 21
37	Aborted the analysis.	–	12
38	Data not detected. Execute again after changing the settings or reacquiring the waveform.	–	10, 11, 18
39	The corresponding field was not found.	–	17
704	Cannot be executed while running.	Stop the waveform acquisition.	Section 7.1 in IM701450-01E
730	Pattern is not specified.	Executed the search without setting search conditions. Set the search conditions.	15, 16
739	Analyzed data does not exist. Execute the analysis.	–	12, 19
851	Computation cannot be carried out at the current record length.	Shorten the record length.	Section 7.2 in IM701450-01E 10
877	Sample rate is necessary more than 8 times of a bit rate.	Set a sampling rate that is at least 8 times the bit rate.	10

Communication Commands

Command	Function
:SEARch:FLEXray?	Queries all settings related to the analysis.*
:SEARch:FLEXray:ANALyze?	Queries all settings related to the execution of the analysis.*
:SEARch:FLEXray:ANALyze:ABORt	Aborts the execution of the Analysis.*
:SEARch:FLEXray:ANALyze:EXECute	Executes the analysis.*
:SEARch:FLEXray:ANALyze:SETup?	Queries all settings related to the analysis* conditions.
:SEARch:FLEXray:ANALyze:SETup:BRATe	Sets the bit rate (data transfer rate) of the analysis* conditions or queries the current setting.
:SEARch:FLEXray:ANALyze:SETup:LEVel	Sets the threshold level of the analysis* conditions or queries the current setting.
:SEARch:FLEXray:ANALyze:SETup:SOURce	Sets the analysis* source channel or queries the current setting.
:SEARch:FLEXray:ANALyze:SETup:VOTing	Sets the voting operation of the analysis* conditions or queries the current setting.
:SEARch:FLEXray:DETail:DFIeld	Sets the data field display of the detail analysis result list or queries the current setting.
:SEARch:FLEXray:DETail:DISPlay	Sets the display size of the detail analysis result list or queries the current setting.
:SEARch:FLEXray:DETail:LIST?	Outputs one frame of analysis* result as a character string.
:SEARch:FLEXray:DETail:POSition	Sets the display position of one frame of the analysis* result or queries the current setting.
:SEARch:FLEXray:SEARch?	Queries all settings related to the analysis* result search.
:SEARch:FLEXray:SEARch:FJUMp:CCOunt	Executes the field jump to the cycle count field in the analysis* result.
:SEARch:FLEXray:SEARch:FJUMp:CRC	Executes the field jump to the CRC field in the analysis* result.
:SEARch:FLEXray:SEARch:FJUMp:FRAMeid	Executes the field jump to the frame ID field in the analysis* result.
:SEARch:FLEXray:SEARch:FJUMp:HCRC	Executes the field jump to the header CRC field in the analysis* result.
:SEARch:FLEXray:SEARch:FJUMp:PLEN	Executes the field jump to the payload length field in the analysis* result.
:SEARch:FLEXray:SEARch:NEXT?	Executes a Next search of the analysis* results (to the right) and queries the frame number found.
:SEARch:FLEXray:SEARch:PREVious?	Executes a Previous search of the analysis* results (to the left) and queries the frame number found.
:SEARch:FLEXray:SEARch:SETup?	Queries all settings related to the analysis* result search.
:SEARch:FLEXray:SEARch:SETup:CCOunt?	Queries all settings related to the cycle count in the analysis* result search.
:SEARch:FLEXray:SEARch:SETup:CCOunt:COUNt	Sets the cycle count in the analysis* result search or queries the current setting.
:SEARch:FLEXray:SEARch:SETup:CCOunt:MODE	Enables or disables the cycle count in the analysis* result search or queries the current setting.
:SEARch:FLEXray:SEARch:SETup:FRAMeid?	Queries all settings related to the frame ID in the analysis* result search.
:SEARch:FLEXray:SEARch:SETup:FRAMeid:ID	sets the frame ID value in the analysis* result search or queries the current setting.
:SEARch:FLEXray:SEARch:SETup:FRAMeid:MODE	Enables or disables the frame ID in the analysis* result search or queries the current setting.
:SEARch:FLEXray:SEARch:SETup:CRCError	Enables or disables the CRC error in the analysis* result search or queries the current setting.

Command	Function
:SEARch:FLEXray:SEARch:SETup:HCRC	Enables or disables the header CRC error in the analysis* result search or queries the current setting.
:SEARch:FLEXray:SEARch:SETup:SYNCframe	Enables or disables the sync frame in the analysis* result search or queries the current setting.
:SEARch:TYPE	Sets the search method or queries the current setting.
FLEXRAY Cursor Group	
:CURSor:TY:FLEXray?	Queries all settings related to the FLEXRAY cursor.*
:CURSor:TY:FLEXray:BLENgth	Sets the bit length of the FLEXRAY cursor* or queries the current setting.
:CURSor:TY:FLEXray:BRATe	Sets the bit rate (data transfer rate) of the FLEXRAY cursor or queries the current setting.
:CURSor:TY:FLEXray:JUMP	Executes the jumping of the FLEXRAY Cursor* to a specified field.
:CURSor:TY:FLEXray:POSition	Sets the position of the FLEXRAY cursor* or queries the current setting.
:CURSor:TY:TYPE	Sets the cursor type or queries the current setting.
FLEXRAY File Group	
:FILE:SAVE:FLEXray:ABORt	Aborts the saving of the data of the detailed analysis list of the analysis.*
:FILE:SAVE:FLEXray[:EXECute]	Executes the saving of the data of the detailed analysis list of the analysis* (overlap command).
FLEXRAY Trigger Group	
:TRIGger:FLEXray?	Queries all settings related to the trigger* function.
:TRIGger:FLEXray:BRATe	Sets the bit rate (data transfer rate) in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:CCOunt?	Queries all settings related to the cycle count in the trigger* conditions.
:TRIGger:FLEXray:CCOunt:CONDition	Sets the cycle count condition of the trigger* condition or queries the current setting.
:TRIGger:FLEXray:CCOunt:COUNt	Sets the cycle count value of the trigger* condition or queries the current setting.
:TRIGger:FLEXray:CCOunt:MODE	Enables or disables the cycle count in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:CERRor?	Queries all settings related to the CRC error trigger in the trigger* conditions.
:TRIGger:FLEXray:CERRor:SOURce	Sets the CRC error trigger in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:CHANnel<x>?	Queries all settings related to the channel bus type in the trigger* conditions.
:TRIGger:FLEXray:CHANnel<x>:BCHannel	Sets the channel bus type in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:COMBination	Sets the combination trigger* or queries the current setting.
:TRIGger:FLEXray:DATA?	Queries all settings related to the data field in the trigger* conditions.
:TRIGger:FLEXray:DATA:CLOGic	Sets the combination logic of the data field in the trigger*conditions or queries the current setting.
:TRIGger:FLEXray:DATA:DATA<x>?	Queries all settings related to the DATA<x> of the data field in the trigger* conditions.
:TRIGger:FLEXray:DATA:DATA<x>:BCOunt	Sets the DATA<x> of the data field in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:DATA:DATA<x>:CONDition	Sets the condition of DATA<x> of the data field in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:DATA:DATA<x>:DBYTe	Sets the pattern length of DATA<x> of the data field in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:DATA:DATA<x>:HEXa<y>	Sets the DATA<x> pattern of the data field of the trigger* condition in hexadecimal notation.

Command	Function
:TRIGger:FLEXray:DATA:DATA<x>:MODE	Enables/Disables the DATA<x> of Data Field in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:DATA:DATA<x>:PATTern<y>	Sets the pattern of DATA<x> of the data field in the trigger* conditions in binary notation or queries the current setting.
:TRIGger:FLEXray:DATA:MODE	Enables/Disables the data field in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:DATA:PFORmat	Sets the pattern format of the data field in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:FID?	Queries all settings related to the frame ID in the trigger* conditions.
:TRIGger:FLEXray:FID:CONDition	Sets the frame ID condition of the trigger* condition or queries the current setting.
:TRIGger:FLEXray:FID:ID	Sets the value of the frame ID in the trigger* condition or queries the current setting.
:TRIGger:FLEXray:FID:MODE	Enables or disables the frame ID in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:FVALue?	Queries all settings related to the frame value trigger in the trigger* conditions.
:TRIGger:FLEXray:FVALue:SOURce	Sets the frame value trigger in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:NFRame	Enables or disables the null frame in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:PATTern?	Queries all settings related the pattern setting of the combination trigger.*
:TRIGger:FLEXray:PATTern:CHANnel<x>	Sets the condition (pattern or slope) of each channel of the combination trigger* or queries the current setting.
:TRIGger:FLEXray:PATTern:CLOCk	Sets the clock channel of the combination trigger* or queries the current setting.
:TRIGger:FLEXray:PATTern:CONDition	Sets the pattern condition of the combination trigger* or queries the current setting.
:TRIGger:FLEXray:PPReamble	Enables or disables the payload preamble in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:STFRame	Enables or disables the start frame in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:SYFRame	Enables or disables the sync frame in the trigger* conditions or queries the current setting.
:TRIGger:FLEXray:TYPE	Sets the trigger type in the trigger* conditions or queries the current setting.
:TRIGger:TYPE	Sets the trigger type or queries the current setting.
MATH Group	
:MATH<x>:OPERation	Sets the analysis operator or queries the current setting.

In the description of the commands in this section, the following abbreviations are used.
Analysis refers to the analysis of the FlexRay bus signal analysis function.
Trigger refers to the trigger of the FlexRay bus signal analysis function.
FlexRay cursor refers to the cursor of the FlexRay bus signal analysis function.

:SEARch:FLEXray?

Function Queries all settings related to the analysis function.

Syntax :SEARch:FLEXray?

Example :SEARCH:FLEXRAY? -> :SEARCH:FLEXRAY:ANALYZE:SETUP:BRATE 10000;LEVEL 7.000000E+00,-8.500000E+00;SOURCE 1;VOTING 0;:SEARCH:FLEXRAY:DETAIL:DFIELD 1;DISPLAY FULL;POSITION 10.000;:SEARCH:FLEXRAY:SEARCH:SETUP:CCOUNT:MODE 0;COUNT 1;:SEARCH:FLEXRAY:SEARCH:SETUP:CRCERROR 0;FRAMEID:MODE 0;ID 1;:SEARCH:FLEXRAY:SEARCH:SETUP:HCRC 0;SYNCFRAME 0

:SEARch:FLEXRAY:ANALyze?

Function Queries all settings related to the execution of the analysis.

Syntax :SEARch:FLEXray:ANALyze?

Example :SEARCH:FLEXRAY:ANALYZE? -> :SEARCH:FLEXRAY:ANALYZE:SETUP:BRATE 10000;LEVEL 7.000000E+00,-8.500000E+00;SOURCE 1;VOTING 0

:SEARch:FLEXray:ANALyze:ABORt

Function Aborts the execution of the Analysis.

Syntax :SEARch:FLEXray:ANALyze:ABORt

Example :SEARCH:FLEXRAY:ANALYZE:ABORT

:SEARch:FLEXray:ANALyze:EXECute

Function Executes the analysis.

Syntax :SEARch:FLEXray:ANALyze:EXECute

Example :SEARCH:FLEXRAY:ANALYZE:EXECUTE

:SEARch:FLEXray:ANALyze:SETup?

Function Queries all settings related to the analysis conditions.

Syntax :SEARch:FLEXray:ANALyze:SETup?

Example :SEARCH:FLEXRAY:ANALYZE:SETUP? -> :SEARCH:FLEXRAY:ANALYZE:SETUP:BRATE 5000;LEVEL 0.0E+00,-1.000000E+00;SOURCE 3;VOTING 1

:SEARch:FLEXray:ANALyze:SETup:BRATe

Function Sets the bit rate (data transfer rate) of the analysis conditions or queries the current setting.

Syntax :SEARch:FLEXray:ANALyze:SETup:BRATe {<NRf>}
:SEARch:FLEXray:ANALyze:SETup:BRATe?
<NRf> = 2500, 5000, 10000 (in unit of kbps)

Example :SEARCH:FLEXRAY:ANALYZE:SETUP:BRATE 5000
:SEARCH:FLEXRAY:ANALYZE:SETUP:BRATE? -> :SEARCH:FLEXRAY:ANALYZE:SETUP:BRATE 5000

:SEARch:FLEXray:ANALyze:SETup:LEVel

Function Sets the threshold level of the analysis conditions or queries the current setting.

Syntax :SEARch:FLEXray:ANALyze:SETup:LEVel {<Voltage>,<Current>}
:SEARch:FLEXray:ANALyze:SETup:LEVel?
<Voltage> = 8 divisions within the screen (0.01 division steps).

Example :SEARCH:FLEXRAY:ANALYZE:SETUP:LEVEL 1.0,-1.0
:SEARCH:FLEXRAY:ANALYZE:SETUP:LEVEL? -> :SEARCH:FLEXRAY:ANALYZE:SETUP:LEVEL 1.000000E+00,-1.000000E+00

:SEARch:FLEXray:ANALyze:SETup:SOURce

Function Sets the analysis source channel or queries the current setting.

Syntax :SEARch:FLEXray:ANALyze:SETup:SOURce {<NRf>}
:SEARch:FLEXray:ANALyze:SETup:SOURce?
<NRf> = 1, 3, 5, 7

Example :SEARCH:FLEXRAY:ANALYZE:SETUP:SOURCE 3
:SEARCH:FLEXRAY:ANALYZE:SETUP:SOURCE? -> :SEARCH:FLEXRAY:ANALYZE:SETUP:SOURCE 3

:SEARch:FLEXray:ANALyze:SETup:VOTing

Function Sets the voting operation in the analysis conditions or queries the current setting.

Syntax :SEARch:FLEXray:ANALyze:SETup:VOTing {<Boolean>}
:SEARch:FLEXray:ANALyze:SETup:VOTing?

Example :SEARCH:FLEXRAY:ANALYZE:SETUP:VOTING 1
:SEARCH:FLEXRAY:ANALYZE:SETUP:VOTING? -> :SEARCH:FLEXRAY:ANALYZE:SETUP:VOTING 1

:SEARch:FLEXray:DETail:DFIeld

Function Sets the data field display of the detail analysis result list or queries the current setting.

Syntax
```
:SEARch:FLEXray:DETail:
DFIeld {<Boolean>}
:SEARch:FLEXray:DETail:DFIEld?
```

Example
```
:SEARCH:FLEXRAY:DETAIL:DFIELD 1
:SEARCH:FLEXRAY:DETAIL:DFIELD? ->
:SEARCH:FLEXRAY:DETAIL:DFIELD 1
```

:SEARch:FLEXray:DETail:DISPlay

Function Sets the display size of the detail analysis result list or queries the current setting.

Syntax
```
:SEARch:FLEXray:DETail:
DISPlay {FULL|HALF}
:SEARch:FLEXray:DETail:DISPlay?
```

Example
```
:SEARCH:FLEXRAY:DETAIL:DISPLAY HALF
:SEARCH:FLEXRAY:DETAIL:DISPLAY? ->
:SEARCH:FLEXRAY:DETAIL:DISPLAY HALF
```

:SEARch:FLEXray:DETail:LIST?

Function Outputs one frame of analysis result as a character string.

Syntax
```
:SEARch:FLEXray:DETail:LIST?
{<NRf>}
```
<NRf> = –2000 to 2000

Example
```
:SEARCH:FLEXRAY:DETAIL:LIST? 1 ->
"0001, 0.001, 1010, 0009, 004, 07A,
01, 480DBB, , 01, 02, 03, 04"
```

:SEARch:FLEXray:DETail:POSition

Function Sets the display position of one frame of the analysis result or queries the current setting.

Syntax
```
:SEARch:FLEXray:DETail:
POSition {<NRf>}
:SEARch:FLEXray:DETail:POSition?
```
<NRf> = 0 to 100

Example
```
:SEARCH:FLEXRAY:DETAIL:POSITION 20
:SEARCH:FLEXRAY:DETAIL:POSITION? ->
:SEARCH:FLEXRAY:DETAIL:
POSITION 20.000
```

:SEARch:FLEXray:SEARch?

Function Queries all settings related to the analysis result search.

Syntax
```
:SEARch:FLEXray:SEARch?
```

Example
```
:SEARCH:FLEXRAY:SEARCH? ->
:SEARCH:FLEXRAY:SEARCH:SETUP:CCOUNT:
MODE 0;COUNT 1;:SEARCH:FLEXRAY:
SEARCH:SETUP:CRCERROR 0;FRAMEID:
MODE 0;ID 1;:SEARCH:FLEXRAY:SEARCH:
SETUP:HCRC 0;SYNCFRAME 0
```

:SEARch:FLEXray:SEARch:FJUMp:CCOunt

Function Executes the field jump to the cycle count field in the analysis result.

Syntax
```
:SEARch:FLEXray:SEARch:FJUMp:CCOunt
```

Example
```
:SEARCH:FLEXRAY:SEARCH:FJUMP:CCOUNT
```

:SEARch:FLEXray:SEARch:FJUMp:CRC

Function Executes the field jump to the frame CRC field in the analysis result.

Syntax
```
:SEARch:FLEXray:SEARch:FJUMp:CRC
```

Example
```
:SEARCH:FLEXRAY:SEARCH:FJUMP:CRC
```

:SEARch:FLEXray:SEARch:FJUMp:FRAMeid

Function Executes the field jump to the frame ID in the analysis result.

Syntax
```
:SEARch:FLEXray:SEARch:FJUMp:
FRAMeid
```

Example
```
:SEARCH:FLEXRAY:SEARCH:FJUMP:
FRAMEID
```

:SEARch:FLEXray:SEARch:FJUMp:HCRC

Function Executes the field jump to the header CRC in the analysis result.

Syntax
```
:SEARch:FLEXray:SEARch:FJUMp:HCRC
```

Example
```
:SEARCH:FLEXRAY:SEARCH:FJUMP:HCRC
```

:SEARch:FLEXray:SEARch:FJUMp:PLEN

Function Executes the field jump to the payload length in the analysis result.

Syntax
```
:SEARch:FLEXray:SEARch:FJUMp:PLEN
```

Example
```
:SEARCH:FLEXRAY:SEARCH:FJUMP:PLEN
```

:SEARch:FLEXray:SEARch:NEXT?

Function Executes a Next search of the analysis results (to the right) and queries the frame number found.

Syntax
```
:SEARch:FLEXray:SEARch:NEXT?
```

Example
```
:SEARCH:FLEXRAY:SEARCH:NEXT? -> 1
```

Description If the search is successful, a value in the range of –2000 to 2000 is returned. If it fails, “NAN” is returned.

:SEARch:FLEXray:SEARch:PREVious?

Function Executes a Previous search of the analysis results (to the left) and queries the frame number found.

Syntax
```
:SEARch:FLEXray:SEARch:PREVious?
```

Example
```
:SEARCH:FLEXRAY:SEARCH:PREVIOUS? ->
1
```

Description If the search is successful, a value in the range of –2000 to 2000 is returned. If it fails, “NAN” is returned.

:SEARch:FLEXray:SEARch:SETup?

Function Queries all settings related to the analysis result search.

Syntax `:SEARch:FLEXray:SEARch:SETup?`

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP? ->
:SEARCH:FLEXRAY:SEARCH:SETUP:CCOUNT:
MODE 0;COUNT 1;:SEARCH:FLEXRAY:
SEARCH:SETUP:CRCERROR 0;FRAMEID:
MODE 0;ID 1;:SEARCH:FLEXRAY:SEARCH:
SETUP:HCRC 0;SYNCFRAME 0
```

:SEARch:FLEXray:SEARch:SETup:CCOunt?

Function Queries all cycle count setting values for pattern searches of the analysis results.

Syntax
```
:SEARch:FLEXray:SEARch:SETup:
CCOunt?
```

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP:
CCOUNT? -> :SEARCH:FLEXRAY:SEARCH:
SETUP:CCOUNT:MODE 0;COUNT 1
```

:SEARch:FLEXray:SEARch:SETup:CCOont:COUNt

Function Sets the cycle count of the pattern search of the analysis result or queries the current setting.

Syntax
```
:SEARch:FLEXray:SEARch:SETup:
CCOunt:COUNt {<NRf>}
:SEARch:FLEXray:SEARch:SETup:
CCOunt:COUNt?
```
<NRf> = 0 to 63

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP:
CCOUNT:COUNT 6
:SEARCH:FLEXRAY:SEARCH:SETUP:
CCOUNT:COUNT? -> :SEARCH:FLEXRAY:
SEARCH:SETUP:CCOUNT:COUNT 6
```

:SEARch:FLEXray:SEARch:SETup:CCOunt:MODE

Function Enables or disables the pattern search cycle count of the analysis result or queries the current setting.

Syntax
```
:SEARch:FLEXray:SEARch:SETup:
CCOunt:MODE {<Boolean>}
:SEARch:FLEXray:SEARch:SETup:
CCOunt:MODE?
```

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP:
CCOUNT:MODE 1
:SEARCH:FLEXRAY:SEARCH:SETUP:
CCOUNT:MODE? -> :SEARCH:FLEXRAY:
SEARCH:SETUP:CCOUNT:MODE 1
```

:SEARch:FLEXray:SEARch:SETup:FRAMeid?

Function Queries all frame ID setting values for pattern searches of the analysis results.

Syntax
```
:SEARch:FLEXray:SEARch:SETup:
FRAMEid?
```

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP:
FRAMEID? -> :SEARCH:FLEXRAY:SEARCH:
SETUP:FRAMEID:MODE 0;ID 1
```

:SEARch:FLEXray:SEARch:SETup:FRAMeid:ID

Function Sets the frame ID in the pattern search of the analysis result or queries the current setting.

Syntax
```
:SEARch:FLEXray:SEARch:SETup:
FRAMeid:ID {<NRf>}
:SEARch:FLEXray:SEARch:SETup:
FRAMeid:ID?
```
<NRf> = 0 to 2047

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP:
FRAMEID:ID 5
:SEARCH:FLEXRAY:SEARCH:SETUP:
FRAMEID:ID?  -> :SEARCH:FLEXRAY:
SEARCH:SETUP:FRAMEID:ID 5
```

:SEARch:FLEXray:SEARch:SETup:FRAMeid:MODE

Function Enables or disables the frame ID in the pattern search of the analysis result or queries the current setting.

Syntax
```
:SEARch:FLEXray:SEARch:SETup:
FRAMeid:MODE {<Boolean>}
:SEARch:FLEXray:SEARch:SETup:
FRAMeid:MODE?
```

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP:
FRAMEID:MODE 1
:SEARCH:FLEXRAY:SEARCH:SETUP:
FRAMEID:MODE? -> :SEARCH:FLEXRAY:
SEARCH:SETUP:FRAMEID:MODE 1
```

:SEARch:FLEXray:SEARch:SETup:CRCError

Function Enables or disables the frame CRC error in the pattern search of the analysis result or queries the current setting.

Syntax
```
:SEARch:FLEXray:SEARch:SETup:
CRCError {<Boolean>}
:SEARch:FLEXray:SEARch:SETup:
CRCError?
```

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP:
CRCERROR 1
:SEARCH:FLEXRAY:SEARCH:SETUP:
CRCERROR? -> :SEARCH:FLEXRAY:
SEARCH:SETUP:CRCERROR 1
```

:SEARch:FLEXray:SEARch:SETup:HCRC

Function Enables or disables the header CRC error in the pattern search of the analysis result or queries the current setting.

Syntax
```
:SEARch:FLEXray:SEARch:SETup:HCRC
{<Boolean>}
:SEARch:FLEXray:SEARch:SETup:HCRC?
```

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP:HCRC 1
:SEARCH:FLEXRAY:SEARCH:SETUP:HCRC?
-> :SEARCH:FLEXRAY:SEARCH:SETUP:
HCRC 1
```

:SEARch:FLEXray:SEARch:SETup:SYNCframe

Function Enables or disables the sync frame in the pattern search of the analysis result or queries the current setting.

Syntax
```
:SEARch:FLEXray:SEARch:SETup:SYNCframe{<Boolean>}
:SEARch:FLEXray:SEARch:SETup:SYNCframe?
```

Example
```
:SEARCH:FLEXRAY:SEARCH:SETUP:SYNCFRAME 1
:SEARCH:FLEXRAY:SEARCH:SETUP:SYNCFRAME? -> :SEARCH:FLEXRAY:SEARCH:SETUP:SYNCFRAME 1
```

:SEARch:TYPE

Function Sets the search type or queries the current setting.

Syntax
```
:SEARch:TYPE {SPATtern|WIDTh|EDGE|PPATtern|ASCRoll|SPIBus|FLEXray}
:SEARch:TYPE?
```

Example
```
:SEARCH:TYPE FLEXRAY
:SEARCH:TYPE? ->
:SEARCH:TYPE FLEXRAY
```

:CURSor:TY:FLEXray?

Function Queries all settings related to the FLEXRAY cursors.

Syntax
```
:CURSor:TY:FLEXray?
```

Example
```
:CURSOR:TY:FLEXRAY? -> :CURSOR:TY:FLEXRAY:POSITION 3.9632500;BRATE 5000;BLENGTH 3
```

:CURSor:TY:FLEXray:BLENgth

Function Sets the bit length of the FLEXRAY cursor or queries the current setting.

Syntax
```
:CURSor:TY:FLEXray:BLENgth {<NRf>}
:CURSor:TY:FLEXray:BLENgth?
```
<NRf> = 1 to 1000

Example
```
:CURSOR:TY:FLEXRAY:BLENGTH 10
:CURSOR:TY:FLEXRAY:BLENGTH? ->
:CURSOR:TY:FLEXRAY:BLENGTH 10
```

:CURSor:TY:FLEXray:BRATe

Function Sets the bit rate (data transfer rate) of the FLEXRAY Cursor or queries the current setting.

Syntax
```
:CURSor:TY:FLEXray:BRATe {<NRf>}
:CURSor:TY:FLEXray:BRATe?
```
<NRf> = 2500, 5000, 10000 (in unit of kbps)

Example
```
:CURSOR:TY:FLEXRAY:BRATE 5000
:CURSOR:TY:FLEXRAY:BRATE? ->
:CURSOR:TY:FLEXRAY:BRATE 5000
```

:CURSor:TY:FLEXray:JUMP

Function Executes the jumping of the FLEXRAY Cursor to a specified field.

Syntax
```
:CURSor:TY:FLEXray:JUMP {CCOUnt|CRC|DATA|FRAMeid|HCRC|PLEN|Z1}
```

Example
```
:CURSOR:TY:FLEXRAY:JUMP CRC
```

:CURSor:TY:FLEXray:POSition

Function Sets the FLEXRAY cursor position or queries the current setting.

Syntax
```
:CURSor:TY:FLEXray:POSition {<NRf>}
:CURSor:TY:FLEXray:POSition?
```
<NRf> = –5 to 5 (10 div/displayed record length steps)

Example
```
:CURSOR:TY:FLEXRAY:POSITION 4
:CURSOR:TY:FLEXRAY:POSITION? ->
:CURSOR:TY:FLEXRAY:POSITION 4.0000000
```

:CURSor:TY:TYPE

Function Sets the cursor type of the T-Y display or queries the current setting.

Syntax
```
:CURSor:TY:TYPE {OFF|HORizontal|VERTical|MARKer|DEGRee|CAN|FLEXray}
:CURSor:TY:TYPE?
```

Example
```
:CURSOR:TY:TYPE FLEXRAY
:CURSOR:TY:TYPE? ->
:CURSOR:TY:TYPE FLEXRAY
```

:FILE:SAVE:FLEXray:ABORt

Function Aborts the saving of the data of the detailed analysis list of the analysis in ASCII format.

Syntax
```
:FILE:SAVE:FLEXray:ABORt
```

Example
```
:FILE:SAVE:FLEXRAY:ABORT
```

:FILE:SAVE:FLEXray[:EXECute]

Function Executes the saving of the data of the detailed analysis list of the analysis in ASCII format. This is an overlap command.

Syntax
```
:FILE:SAVE:FLEXray:EXECute
```

Example
```
:FILE:SAVE:FLEXRAY:EXECUTE
```

:TRIGger:FLEXray?

Function Queries all settings related to the trigger function.

Syntax `:TRIGger:FLEXray?`

Example
```
:TRIGGER:FLEXRAY? -> :TRIGGER:
FLEXRAY:COMBINATION ONLY;
BRATE 5000;TYPE FVALUE;FVALUE:
SOURCE 1;:TRIGGER:FLEXRAY:CERROR:
SOURCE 1;:TRIGGER:FLEXRAY:CHANNEL1:
BCHANNEL A;:TRIGGER:FLEXRAY:
CHANNEL3:BCHANNEL A;:TRIGGER:
FLEXRAY:PPREAMBLE 0;NFRAME 0;
SYFRAME 0;STFRAME 0;FID:MODE 0;
CONDITION TRUE;ID 1;:TRIGGER:
FLEXRAY:CCOUNT:MODE 0;
CONDITION TRUE;COUNT 1;:TRIGGER:
FLEXRAY:DATA:MODE 0;PFORMAT HEXA;
CLOGIC AND;DATA1:MODE 0;BCOUNT 0;
DBYTE 4;CONDITION TRUE;
PATTERN1 “XXXXXXXX”;
PATTERN2 “XXXXXXXX”;
PATTERN3 “XXXXXXXX”;
PATTERN4 “XXXXXXXX”;:TRIGGER:
FLEXRAY:DATA:DATA2:MODE 0;BCOUNT 0;
DBYTE 4;CONDITION TRUE;
PATTERN1 “XXXXXXXX”;
PATTERN2 “XXXXXXXX”;
PATTERN3 “XXXXXXXX”;
PATTERN4 “XXXXXXXX”
```

:TRIGger:FLEXRAY:BRATe

Function Sets the bit rate (data transfer rate) in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:BRATe {<NRf>}
:TRIGger:FLEXray:BRATe?
```
<NRf> = 2500, 5000, 10000 (in unit of kbps)

Example
```
:TRIGGER:FLEXRAY:BRATE 5000
:TRIGGER:FLEXRAY:BRATE? ->
:TRIGGER:FLEXRAY:BRATE 5000
```

:TRIGger:FLEXray:CCOunt?

Function Queries all settings related to the cycle count in the trigger conditions.

Syntax `:TRIGger:FLEXray:CCOunt?`

Example
```
:TRIGGER:FLEXRAY:CCOUNT? ->
:TRIGGER:FLEXRAY:CCOUNT:MODE 0;
CONDITION TRUE;COUNT 1
```

:TRIGger:FLEXray:CCOunt:CONDition

Function Sets the cycle count condition in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:CCOunt:
CONDition {TRUE|FALSe|GREater|LESS}
:TRIGger:FLEXray:CCOunt:CONDition?
```

Example
```
:TRIGGER:FLEXRAY:CCOUNT:
CONDITION FALSE
:TRIGGER:FLEXRAY:CCOUNT:CONDITION?
-> :TRIGGER:FLEXRAY:CCOUNT:
CONDITION FALSE
```

:TRIGger:FLEXray:CCOunt:COUNt

Function Sets the cycle count in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:CCOunt:COUNt
{<NRf>}
:TRIGger:FLEXray:CCOunt:COUNt?
```
<NRf> = 0 to 63

Example
```
:TRIGGER:FLEXRAY:CCOUNT:COUNT 10
:TRIGGER:FLEXRAY:CCOUNT:COUNT? ->
:TRIGGER:FLEXRAY:CCOUNT:COUNT 10
```

:TRIGger:FLEXray:CCOunt:MODE

Function Enables or disables the cycle count in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:CCOunt:
MODE {<Boolean>}
:TRIGger:FLEXray:CCOunt:MODE?
```

Example
```
:TRIGGER:FLEXRAY:CCOUNT:MODE 1
:TRIGGER:FLEXRAY:CCOUNT:MODE? ->
:TRIGGER:FLEXRAY:CCOUNT:MODE 1
```

:TRIGger:FLEXray:CERRor?

Function Queries all settings related to the CRC error trigger in the trigger conditions.

Syntax `:TRIGger:FLEXray:CERRor?`

Example
```
:TRIGGER:FLEXRAY:CERROR? ->
:TRIGGER:FLEXRAY:CERROR:SOURCE 1
```

:TRIGger:FLEXray:CERRor:SOURce

Function Sets the CRC error trigger in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:CERRor:
SOURce {<NRf>|OR}
:TRIGger:FLEXray:CERRor:SOURce?
```
<NRf> = 1, 3

Example
```
:TRIGGER:FLEXRAY:CERROR:SOURCE 3
:TRIGGER:FLEXRAY:CERROR:SOURCE? ->
:TRIGGER:FLEXRAY:CERROR:SOURCE 3
```

:TRIGger:FLEXray:CHANnel<x>?

Function Queries all settings related to the CRC error trigger in the trigger conditions.

Syntax
```
:TRIGger:FLEXray:CHANnel<x>?
```
<x> = 1, 3

Example
```
:TRIGGER:FLEXRAY:CHANNEL? ->
:TRIGGER:FLEXRAY:CHANNEL1:
BCHANNEL A
```

:TRIGger:FLEXray:CHANnel<x>:BCHannel

Function Sets the CRC error trigger in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:CHANnel<x>:
BCHANNEL {A|B}
:TRIGger:FLEXray:CHANnel<x>:
BCHANNEL?
```
<x> = 1, 3

Example
```
:TRIGGER:FLEXRAY:CHANNEL3:
BCHANNEL B
:TRIGGER:FLEXRAY:CHANNEL3:
BCHANNEL? -> :TRIGGER:FLEXRAY:
CHANNEL3:BCHANNEL B
```

:TRIGger:FLEXray:COMBination

Function Sets the combination trigger or queries the current setting.

Syntax
```
:TRIGger:FLEXray:
COMBination {ONLY|ONPattern|
APATtern}
:TRIGger:FLEXray:COMBination?
```

Example
```
:TRIGGER:FLEXRAY:
COMBINATION ONPATTERN
:TRIGGER:FLEXRAY:COMBINATION? ->
:TRIGGER:FLEXRAY:
COMBINATION ONPATTERN
```

:TRIGger:FLEXray:DATA?

Function Queries all settings related to the data field in the trigger conditions.

Syntax
```
:TRIGger:FLEXray:DATA?
```

Example
```
:TRIGGER:FLEXRAY:DATA? ->
:TRIGGER:FLEXRAY:DATA:MODE 0;
PFORMAT HEXA;CLOGIC AND;DATA1:
MODE 0;BCOUNT 0;DBYTE 4;
CONDITION TRUE;PATTERN1 "XXXXXXXX";
PATTERN2 "XXXXXXXX";
PATTERN3 "XXXXXXXX";
PATTERN4 "XXXXXXXX";:TRIGGER:
FLEXRAY:DATA:DATA2:MODE 0;BCOUNT 0;
DBYTE 4;CONDITION TRUE;
PATTERN1 "XXXXXXXX";
PATTERN2 "XXXXXXXX";
PATTERN3 "XXXXXXXX";
PATTERN4 "XXXXXXXX"
```

:TRIGger:FLEXray:DATA:CLOGic

Function Sets the combination logic of the data field in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:DATA:CLOGic {AND|
OR}
:TRIGger:FLEXray:DATA:CLOGic?
```

Example
```
:TRIGGER:FLEXRAY:DATA:CLOGIC OR
:TRIGGER:FLEXRAY:DATA:CLOGIC? ->
:TRIGGER:FLEXRAY:DATA:CLOGIC OR
```

:TRIGger:FLEXray:DATA:DATA<x>?

Function Queries all settings related to the DATA<x> of the data field in the trigger conditions.

Syntax
```
:TRIGger:FLEXray:DATA:DATA<x>?
```

Example
```
:TRIGGER:FLEXRAY:DATA:DATA2? ->
:TRIGGER:FLEXRAY:DATA:DATA2:MODE 0;
BCOUNT 0;DBYTE 4;CONDITION TRUE;
PATTERN1 "XXXXXXXX";
PATTERN2 "XXXXXXXX";
PATTERN3 "XXXXXXXX";
PATTERN4 "XXXXXXXX"
```

:TRIGger:FLEXray:DATA:DATA<x>:BCOunt

Function Sets the DATA<x> of the data field in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:DATA:DATA<x>:
BCOunt {<NRf>}
:TRIGger:FLEXray:DATA:DATA<x>:
BCOunt?
```
<NRf> = 0 to 253
<x> = 1 or 2

Example
```
:TRIGGER:FLEXRAY:DATA:DATA2:
BCOUNT 123
:TRIGGER:FLEXRAY:DATA:DATA2:BCOUNT?
-> :TRIGGER:FLEXRAY:DATA:DATA2:
BCOUNT 123
```

:TRIGger:FLEXray:DATA:DATA<x>:CONDition

Function Sets the condition of DATA<x> of the data field in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:DATA:DATA<x>:
CONDition {TRUE|FALSe|GREater|LESS}
:TRIGger:FLEXray:DATA:DATA<x>:
CONDition?
```
<x> = 1 or 2

Example
```
:TRIGGER:FLEXRAY:DATA:DATA2:
CONDITION GREATER
:TRIGGER:FLEXRAY:DATA:DATA2:
CONDITION? -> :TRIGGER:FLEXRAY:
DATA:DATA2:CONDITION GREATER
```

:TRIGger:FLEXray:DATA:DATA<x>:DBYTe

Function Sets the DATA<x> of the data field in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:DATA:DATA<x>:
DBYTe {<NRf>}
:TRIGger:FLEXray:DATA:DATA<x>:
DBYTe?
```
<NRf> = 1 to 4
<x> = 1 or 2

Example
```
:TRIGGER:FLEXRAY:DATA:DATA2:DBYTE 3
:TRIGGER:FLEXRAY:DATA:DATA2:DBYTE?
-> :TRIGGER:FLEXRAY:DATA:DATA2:
DBYTE 3
```

:TRIGger:FLEXray:DATA:DATA<x>:HEXa<y>

Function Sets each byte of the Data Field patterns in the trigger conditions in hexadecimal.

Syntax
```
:TRIGger:FLEXray:DATA:DATA<x>:
HEXa<y> {<String>}
```
<String> = 2 characters by combining '0' to 'F' and 'X'
<x> = 1 or 2, <y> = 1 to 4

Example
```
:TRIGGER:FLEXRAY:DATA:DATA2:
HEXA2 "A5"
```

:TRIGger:FLEXray:DATA:DATA<x>:MODE

Function Sets whether a trigger activates on DATA<x> of the data field in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:DATA:DATA<x>:
MODE {<Boolean>}
:TRIGger:FLEXray:DATA:DATA<x>:MODE?
```
<x> = 1 or 2

Example
```
:TRIGGER:FLEXRAY:DATA:DATA2:MODE 1
:TRIGGER:FLEXRAY:DATA:DATA2:MODE?
-> :TRIGGER:FLEXRAY:DATA:DATA2:
MODE 1
```

:TRIGger:FLEXRAY:DATA:DATA<x>:PATTern<y>

Function Sets the data field pattern in the trigger conditions in binary or queries the current setting.

Syntax
```
:TRIGger:FLEXray:DATA:DATA<x>:
PATTern<y> {<String>}
:TRIGger:FLEXray:DATA:DATA<x>:
PATTern<y>?
```
<String> = 8 characters by combining '0,' '1,' and 'X'
<x> = 1 or 2, <y> = 1 to 4

Example
```
:TRIGGER:FLEXRAY:DATA:DATA2:
PATTERN1 "10X10X10"
:TRIGGER:FLEXRAY:DATA:DATA2:
PATTERN1? -> :TRIGGER:FLEXRAY:DATA:
DATA2:PATTERN1 "10X10X10"
```

:TRIGger:FLEXray:DATA:MODE

Function Sets whether a trigger activates on the data of the data field in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:DATA:
MODE {<Boolean>}
:TRIGger:FLEXray:DATA:MODE?
```

Example
```
:TRIGGER:FLEXRAY:DATA:MODE 1
:TRIGGER:FLEXRAY:DATA:MODE? ->
:TRIGGER:FLEXRAY:DATA:MODE 1
```

:TRIGger:FLEXray:DATA:PFORmat

Function Sets the pattern format in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:DATA:
PFORmat {BINary|HEXa}
:TRIGger:FLEXray:DATA:PFORmat?
```

Example
```
:TRIGGER:FLEXRAY:DATA:
PFORMAT BINARY
:TRIGGER:FLEXRAY:DATA:PFORMAT? ->
:TRIGGER:FLEXRAY:DATA:
PFORMAT BINARY
```

TRIGger:FLEXray:FID?

Function Queries all settings related to the frame ID in the trigger conditions.

Syntax
```
:TRIGger:FLEXray:FID?
```

Example
```
:TRIGGER:FLEXRAY:FID? ->
:TRIGGER:FLEXRAY:FID:MODE 0;
CONDITION LESS;ID 1
```

:TRIGger:FLEXray:FID:CONDition

Function Sets the frame ID condition in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:FID:
CONDition {TRUE|FALSe|GREater|LESS}
:TRIGger:FLEXray:FID:CONDition?
```

Example
```
:TRIGGER:FLEXRAY:FID:CONDITION LESS
:TRIGGER:FLEXRAY:FID:CONDITION? ->
:TRIGGER:FLEXRAY:FID:CONDITION LESS
```

:TRIGger:FLEXray:FID:ID

Function Sets the frame ID value in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:FID:ID {<NRf>}
:TRIGger:FLEXray:FID:ID?
```
<NRf> = 0 to 2047

Example
```
:TRIGGER:FLEXRAY:FID:ID 100
:TRIGGER:FLEXRAY:FID:ID? ->
:TRIGGER:FLEXRAY:FID:ID 100
```

:TRIGger:FLEXray:FID:MODE

Function Enables or disables the frame ID in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXRAY:FID:
MODE {<Boolean>}
```

Example
```
:TRIGGER:FLEXRAY:FID:MODE 1
:TRIGGER:FLEXRAY:FID:MODE? ->
:TRIGGER:FLEXRAY:FID:MODE 1
```

:TRIGger:FLEXray:FVALue?

Function Queries all settings related to the frame value trigger in the trigger conditions.

Syntax
```
:TRIGger:FLEXray:FVALue?
```

Example
```
:TRIGGER:FLEXRAY:FVALUE? ->
:TRIGGER:FLEXRAY:FVALUE:SOURCE 1
```

:TRIGger:FLEXray:FVALue:SOURce

Function Sets the frame value trigger in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:FVALue:
SOURce {<NRf>}
```
<NRf> = 1, 3

Example
```
:TRIGGER:FLEXRAY:FVALUE:SOURCE 1
:TRIGGER:FLEXRAY:FVALUE:SOURCE? ->
:TRIGGER:FLEXRAY:FVALUE:SOURCE 1
```

:TRIGger:FLEXray:NFRame

Function Enables or disables the null frame in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:NFRame {<Boolean>}
:TRIGger:FLEXray:NFRame?
```

Example
```
:TRIGGER:FLEXRAY:NFRAME 1
:TRIGGER:FLEXRAY:NFRAME? ->
:TRIGGER:FLEXRAY:NFRAME 1
```

:TRIGger:FLEXray:PATTern?

Function Queries all settings related the pattern setting of the combination trigger.

Syntax
```
:TRIGger:FLEXray:PATTern?
```

Example
```
:TRIGGER:FLEXRAY:PATTERN? ->
:TRIGGER:FLEXRAY:PATTERN:
CHANNEL2 DONTCARE;
CHANNEL4 DONTCARE;CONDITION TRUE
```

:TRIGger:FLEXray:PATTern:CHANnel<x>

Function Sets the condition (pattern or slope) of each channel of the combination trigger or queries the current setting.

Syntax
```
:TRIGger:FLEXray:PATTern:
CHANnel<x> {HIGH|LOW|DONTcare|RISE|
FALL}
:TRIGger:FLEXray:PATTern:
CHANnel<x>?
```
<x> = 2 and 4 to 8 (2 and 4 on the DL7440)

Example
```
:TRIGGER:FLEXRAY:PATTERN:
CHANNEL2 HIGH
:TRIGGER:FLEXRAY:PATTERN:CHANNEL2?
-> :TRIGGER:FLEXRAY:PATTERN:
CHANNEL2 HIGH
```

Description If the channel is a clock channel, select from {RISE|FALL}; otherwise, select from {HIGH|LOW|DONTCARE}.

:TRIGger:FLEXray:PATTern:CLOCk

Function Sets the clock channel of the combination trigger or queries the current setting.

Syntax
```
:TRIGger:FLEXray:PATTern:
CLOCk {<NRf>|NONE}
:TRIGger:FLEXray:PATTern:CLOCk?
```
<NRf> = 2 and 4 to 8 (2 or 4 on the DL7440)

Example
```
:TRIGGER:FLEXRAY:PATTERN:CLOCK 2
:TRIGGER:FLEXRAY:PATTERN:CLOCK? ->
:TRIGGER:FLEXRAY:PATTERN:CLOCK 2
```

Description The clock channel can be set or queried only when :TRIGger:FLEXray:COMBination is set to APATtern.

:TRIGger:FLEXray:PATTern:CONDition

Function Sets the pattern condition of the combination trigger or queries the current setting.

Syntax
```
:TRIGger:FLEXray:PATTern:
CONDition {ENTer|EXIT|TRUE|FALSe}
:TRIGger:FLEXray:PATTern:CONDition?
```

Example
```
:TRIGGER:FLEXRAY:PATTERN:
CONDITION ENTER
:TRIGGER:FLEXRAY:PATTERN:CONDITION?
-> :TRIGGER:FLEXRAY:PATTERN:
CONDITION ENTER
```

Description
- Select {TRUE|FALSe} when :TRIGger:FLEXray:COMBination is set to ONPattern.
- Select {ENTer|EXIT} when :TRIGger:FLEXray:COMBination is set to APATtern and :TRIGger:FLEXray:PATTern:CLOCk is set to NONE. For all other conditions, the setting is invalid.

:TRIGger:FLEXray:PPReamble

Function Enables or disables the payload preamble in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:
PPReamble {<Boolean>}
:TRIGger:FLEXray:PPReamble?
```

Example
```
:TRIGGER:FLEXRAY:PPREAMBLE 1
:TRIGGER:FLEXRAY:PPREAMBLE? ->
:TRIGGER:FLEXRAY:PPREAMBLE 1
```

:TRIGger:FLEXray:STFRame

Function Enables or disables the start frame in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:
STFRame {<Boolean>}
:TRIGger:FLEXray:STFRame?
```

Example
```
:TRIGGER:FLEXRAY:STFRAME 1
:TRIGGER:FLEXRAY:STFRAME? ->
:TRIGGER:FLEXRAY:STFRAME 1
```

:TRIGger:FLEXray:SYFRame

Function Enables or disables the sync frame in the trigger conditions or queries the current setting.

Syntax
```
:TRIGger:FLEXray:
SYFRame {<Boolean>}
:TRIGger:FLEXray:SYFRame?
```

Example
```
:TRIGGER:FLEXRAY:SYFRAME 1
:TRIGGER:FLEXRAY:SYFRAME? ->
:TRIGGER:FLEXRAY:SYFRAME 1
```

:TRIGger:FLEXray:TYPE

Function Sets the trigger type or queries the current setting.

Syntax
```
:TRIGger:FLEXray:TYPE {FVALue|
CERRor}
:TRIGger:FLEXray:TYPE?
```

Example
```
:TRIGGER:FLEXRAY:TYPE CERROR
:TRIGGER:FLEXRAY:TYPE? ->
:TRIGGER:FLEXRAY:TYPE CERROR
```

:TRIGger:TYPE

Function Sets the trigger type or queries the current setting.

Syntax
```
:TRIGger:TYPE {ABN|ADB|PATTern|
WIDTh|OR|TV|SIMPle|FLEXray}
:TRIGger:TYPE?
```

Example:
```
:TRIGGER:TYPE FLEXRAY
:TRIGGER:TYPE? ->
:TRIGGER:TYPE FLEXRAY
```

:MATH<x>:OPERation

Function Sets the analysis operator or queries the current setting.

Syntax
```
:MATH<x>:OPERation {FBIN}
:MATH<x>:OPERation?
```
<X> = 1

Example
```
:MATH1:OPERATION FBIN
:MATH1:OPERATION? ->
:MATH1:OPERATION FBIN
```

Specifications

Supported FlexRay bus

Item	Specifications
FlexRay bus	FlexRay Protocol version 2.1
Baud rate	10 Mbps, 5 Mbps, and 2.5 Mbps

Trigger Function

Item	Specifications
Trigger source	CH1 or CH3: FlexRay bus signal (Input BP and BM signals via differential probes.) CH2 and CH4 to CH8*: Analog signal input
FlexRay trigger	Select from the following two trigger types. • Frame Value: Compares against the specified frame data and triggers on the frame on which the conditions are met Select CH1 or CH3 for the trigger source. • CRC Error: Trigger on the frame on which a CRC error occurs. Select CH1, CH3, or “CH1 or CH3” for the trigger source. Set the FlexRay channels connected to CH1 and Ch3. The frame value trigger is activated on the combination of the eight items below (AND condition). Frame Start is always selected. Enable/Disable selectable on all other items. • Frame Start: A trigger is activated at frame start. • Payload preamble indicator: A trigger is activated when the payload preamble indicator is 1. • Null frame indicator: A trigger is activated when the null frame indicator is 1. • Sync frame indicator: A trigger is activated when the sync frame indicator is 1. • Startup frame indicator: A trigger is activated when the startup frame indicator is 1. • Frame ID: Compares the specified value to the frame ID. A trigger is activated when the true, false, greater, or less condition is met. • Cycle count: Compares the specified value to the cycle count. A trigger is activated when the true, false, greater, or less condition is met. • Data: Compares the specified value to the payload segment data. A trigger is activated when the true, false, greater, or less condition is met. Data1 and Data2 can be selected. When both are selected, specify the logic (AND/OR) applied to the two comparison results. The length of data that is compared is 1 to 4 bytes. Specify the byte count to set the number of bytes after the head of the payload segment to be compared. The byte count can be specified separately for Data1 and Data2.
Combination trigger	Triggers can be activated on the combination of the analog signals of CH2, CH4 to CH8* and the FlexRay bus signal (CH1 or CH3). • FlexRay Only: Activates a trigger only on the trigger conditions of the FlexRay bus signal. • FlexRay on Pattern: Activates a trigger when the trigger conditions of the FlexRay bus signal are met on the true or false condition of the CH2 and CH4 to CH8* parallel pattern. • FlexRay -> Pattern: Activates a trigger when the pattern trigger condition is met after the FlexRay trigger condition is met.

* CH2 and CH4 on the DL7440.

Analysis Function

Item	Specifications
Signal input	DL7480: Select CH1, CH3, CH5, or CH7. DL7440: Select CH1 or CH3.
Maximum record length that can be analyzed	4 MW memory model (701450 and 701470): 2 MW when interleave mode is ON 1 MW when interleave mode is OFF 16 MW memory model (701460 and 701480): 8 MW when interleave mode is ON 4 MW when interleave mode is OFF
Sample rates that can be analyzed	At least 8 times the FlexRay bit rate
Analysis data sampling	Samples the analysis data at 8 times the bit rate from the acquisition data. Uses the nearest point when the acquisition sample rate is not an integer multiple of the analysis sample rate.
Number of frames that can be analyzed	Up to 4000 frames (2000 frames before and after the trigger point)
Error detection	Header CRC and CRC errors Undetectable TSS/BSS/FES errors
Display of the analysis results	Displays the analysis results using the following two methods. • Waveform and the list of analysis results Simultaneously displays the waveform and the analysis results list (No. (frame number), FrmID (frame ID), PLen (payload length), and CC (cycle count)). • List of detailed analysis results Detailed analysis result list display. Displays the No. (frame number), the time from the trigger point to the head of the frame, P (payload preamble indicator, N (null frame indicator), C (sync frame indicator), S (startup frame indicator), FrmID (frame ID), PLen (payload length (in bytes)), HCRC (header CRC in hexadecimal notation), CC (cycle count), CRC (in hexadecimal notation), Information (error type), and the payload segment data series.
FlexRay binarization	Displays the binarized waveform of the channel that was analyzed on MATH1. If Voting in turned ON in the analysis setup menu, the binarized waveform after voting is displayed.
FlexRay cursors	Two cursors can be moved while maintaining the spacing (bit width) between the two. Cursors can be moved at the bit level (1-bit resolution) with respect to the falling edge of BSS. The spacing between the cursors can be set in the range of 1 to 1000 bits.

Search Function

Item	Specifications
Data search	Searches on the AND conditions of frame ID, cycle count, sync frame, header CRC error, and CRC error.
Field jump	Moves the zoom position (Z1 Pos) to the beginning of a certain field within the current frame. The applicable fields are frame ID, payload length, header CRC, cycle count, and CRC.

Analysis Results Storage Function

Item	Specifications
Saving of the data of the detailed analysis results list	Saves the list of detailed analysis results to a file in ASCII format (.txt extension).