User's Manual

Model 704610
TA220 Digital Jitter Meter
Option Function

Foreword

Thank you for purchasing the YOKOGAWA TA220 Digital Jitter Meter. This user's manual provides information on the instrument's option function only. To ensure correct use, please read this manual thoroughly before beginning operation. For information about the standard functions of the instrument, see the TA220 Digital Jitter Meter user's manual (IM704610-01E). Please keep this manual in a convenient location in case questions arise during operation.

Notes

- The contents of this manual are subject to change without prior notice as a result of improvements in the instrument's performance and functions. Display contents illustrated in this manual may differ slightly from what actually appears on your screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA representative, dealer, or sales office.
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Conventions Used in This Manual

Safety Markings

The following safety 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 user's 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 Describes precautions that should be observed to prevent serious injury or death to the user.

CAUTION Describes precautions that should be observed to prevent minor or moderate injury, or damage to the instrument.

Note Provides important information for the proper operation of the instrument.

Headings Used for Descriptions of Operations

The following symbols are used to distinguish procedural instructions from other information.

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 subsection describes the setup parameters and the limitations on the procedures. It does not provide details on the functions of the instrument themselves. For details about functions, see section 1.

Terms Used in Explanations of Procedures

Keys and Rotary Knob

Bold characters used in the Procedure sections indicate the keys or rotary knob on the panel used to execute the operation being described.

SHIFT+Panel 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 functions marked in purple above the panel keys are activated when the SHIFT key is pressed.

Contents

1. Explanation of the Option Function

The TA220 has a limit equalizer option (suffix code /LEQ). The following gives an overview of the differences between the standard TA, and the TA with the option installed.
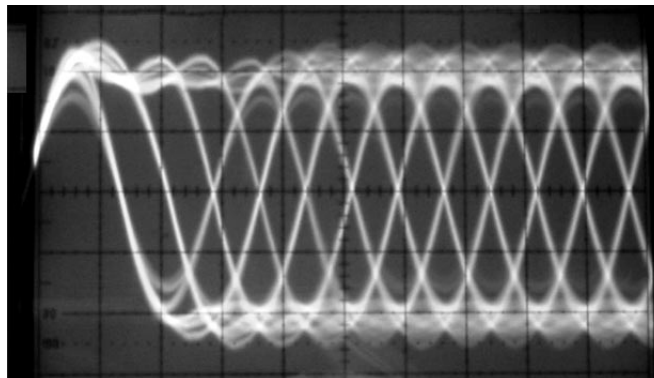
Limit Equalizer

The limit equalizer is an equalizer circuit having the characteristics defined by the Blue-ray Disc Standard, Part 1, Version 1.02. The equalizer limits the signal amplitude in the low frequency range, and amplifies it in the high frequency range. This allows you obtain signals with more highly equalized amplitude from low to high frequencies than the optical pickup frequency characteristics. It is also superior to the standard model's conventional equalizer in that it suppresses jitter in the time axis direction while equalizing the signal's amplitude.

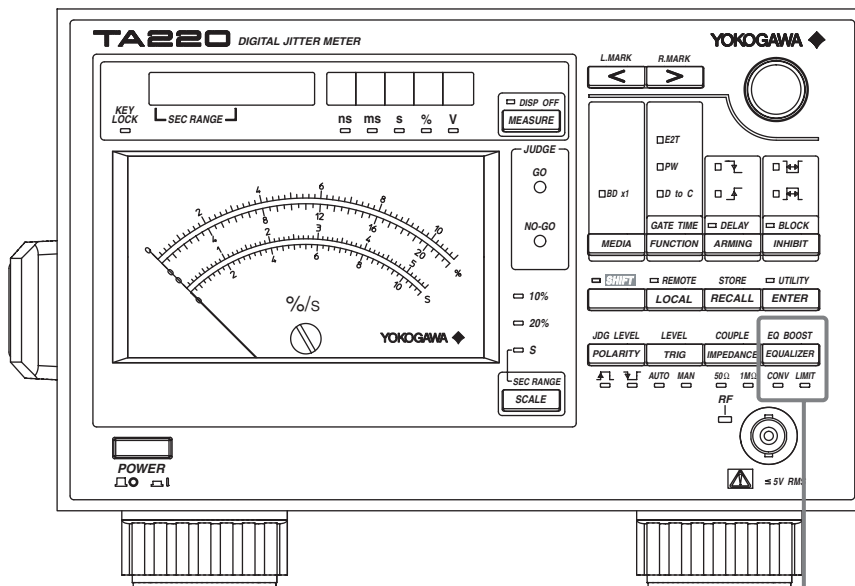**Signal waveform equalized by the conventional equalizer**
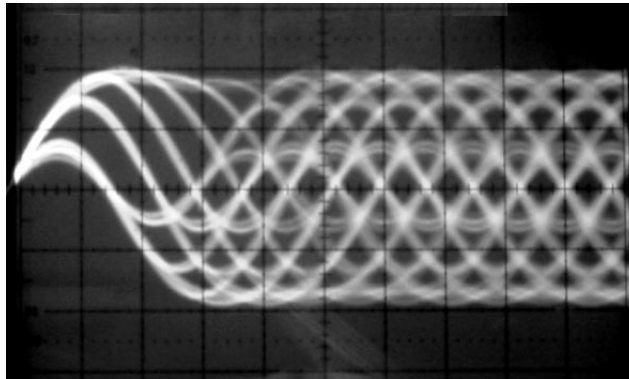
Signal waveform equalized by the limit equalizer

Front Panel

Parts that differ from the standard model are indicated below.

EQUALIZER Key
Selects the equalizer (CONV or LIMIT).
The CONV is the conventional equalizer
of the standard model, and LIMIT is
equalizer of the option function.

SHIFT+EQUALIZER (EQ BOOST) Key
Lets you set the boost amount for the
limit and conventional equalizer.

Backed Up Setup Information

When the option is installed, the following setup item is held in memory with a lithium
battery. All other setup items are the same as those of the standard model.

Limit Equalizer

Item	
Measurement conditions*	Equalizer selection (OFF, CONV, or LIMIT)
	Equalizer boost amount (stores the setting for both CONV and LIMIT)

* The number of setup information backed up is [no. of measurement media] x [no. of measurement functions].

Initializing Settings

When the option is installed, the following settings can be restored to their factory default
settings. All other settings are the same as those of the standard model.

Limit Equalizer

Item	Factory Default Setting
Measurement conditions	
Equalizer OFF, CONV, or LIMIT	OFF
Equalizer boost amount	CONV: 5.8 dB, LIMIT: preset for 23 GB

2. Limit Equalizer Settings

Display 2   Display 1
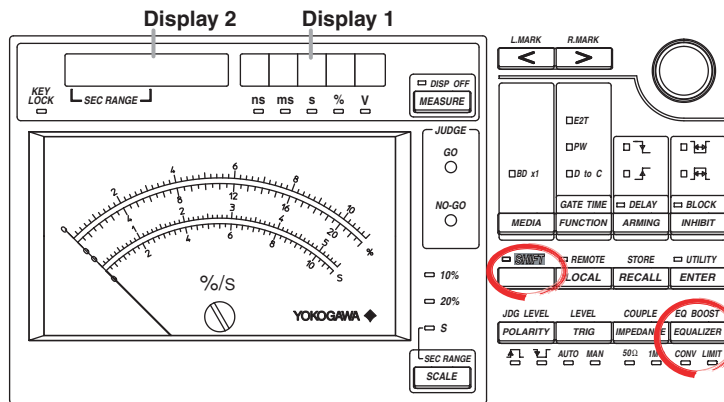
The phrase, "**rotary knob & <>**" is used in the following explanation to instruct the user to enter numerical setting values using the knob and arrow keys. For details on this procedure, see section 3.7 of user's manual IM704610-01E.

Turning the Limit Equalizer ON, and Setting the Boost Amount

(For information about the standard model's conventional equalizer, see IM704610-01E.)

1. Press **EQUALIZER**, then select LIMIT. The LIMIT indicator illuminates.
2. Press **SHIFT+EQUALIZER (EQ BOOST)**. "LmtBoost" appears in Display 2, and the setting value appears in Display 1.
3. Set the boost amount using the **rotary knob**.

Turning the Equalizer OFF

Press **EQUALIZER**. The indicator goes out.

The limit equalizer is an equalizer circuit having the characteristics defined by the Blue-ray Disc Standard, Part 1, Version 1.02. This allows you obtain signals with more highly equalized amplitude from the low to high frequency range than optical pickup frequency characteristics.

Limit Equalizer Boost (Amplification) Amount

When LIMIT is selected for the equalizer, you can set the pre-equalizer boost value included in the limit equalizer to one of the following.

Settings: Presets for 23 GB, 25 GB, or 27 GB, or in the range from 3.0 to 9.0 dB (in steps of 0.2 dB).

Preset measurement boost amounts for disks of capacity 23 GB, 25 GB, and 27 GB can be selected. Or, the boost amount can be set in units of dB in the range from 3.0 to 9.0 dB.

Note

- When the standard conventional equalizer is selected, the boost amount can be displayed or set in display 2 (see procedure B of section 4.3 of user's manual IM704610-01E), but when the limit equalizer is selected, the boost amount cannot be displayed or set in display 2.
- When the limit equalizer (LIMIT) is selected, the trigger mode is forcibly set to AUTO. If the equalizer is then returned to OFF or CONV, the trigger mode does not return to its original setting. For information on trigger modes, see user's manual IM704610-01E.

3. Communication Commands

With the addition of the option function, the following communication commands are added or changed relative to the standard model.

Limit Equalizer Commands

Added or changed commands/parameters
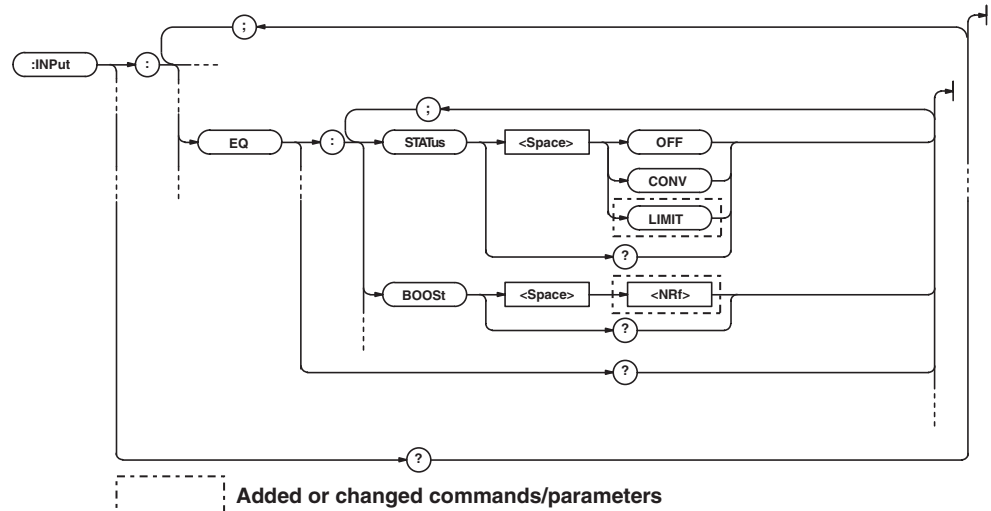
:INPut:EQ:STATus

Function	Sets the equalizer status or queries the current setting.
Syntax	:INPut:EQ:STATus {OFF|CONV|LIMit}
	:INPut:EQ:STATus?
Example	:INPUT:EQ:STATUS LIMIT
	:INPUT:EQ:STATUS?
	-> :INPUT:EQ:STATUS LIMIT
Explanation	• When the function is PulseWidth, AGC is OFF, and EQ:STATus is turned OFF, the trigger mode switches to manual trigger.
	• When the limit equalizer (LIMIT) is selected, the trigger mode is forcibly set to AUTO. If the equalizer is then returned to OFF or CONV, the trigger mode does not return to its original setting. For information on trigger modes, see user's manual IM704610-01E.

:INPut:EQ:BOOSt

Function	Sets the equalizer boost amount or queries the current setting.
Syntax	:INPut:EQ:BOOSt {<NRf>}
	:INPut:EQ:BOOSt?
	For the conventional equalizer: <NRf> = 3.0 to 9.0
	For the limit equalizer: <NRf> = 23, 25, 27, or 3.0 to 9.0
	The units of 23, 25, and 27 are GB, and the units for 3.0 to 9.0 are dB.
Example	:INPUT:EQ:BOOST 23
	:INPUT:EQ:BOOST?
	-> :INPUT:EQ:BOOST 23.0E+00
Explanation	Cannot set/query when :INPut:EQ:STATus is OFF.

4. Specifications

The following lists differences in the specifications of this model from the standard model. All other specifications are the same as those of the standard model.

Limit Equalizer

Item	Specification
RF input	
Input range	0.1 Vp-p to 2.0 Vp-p
Trigger	Trigger mode
	Fixed at AUTO mode
Limit equalizer (complies with Blue-ray Disc standard part 1, version 1.02)	
	Pre-equalizer frequency characteristics[1]
	16.5 MHz: 5.8 dB ± 0.3 dB (gain with 100 kHz as a reference)
	Low range cutoff frequency
	10 kHz
	Pre-equalizer boost amount setting range
	• Select a preset value of 23 GB, 25 GB, or 27 GB (disk capacity)
	• 3.0 to 9.0 dB: setting resolution: 0.2 dB
	Group delay characteristics
	Max. group delay deviation: 2 nsp-p (Typical value[2]), range: 3.0 MHz ≤ f ≤ 22 MHz

[1] The measured value at the standard operating conditions outlined in the general specifications in user's manual IM704610-01E, after warmup.

[2] The typical value is a representative or average value. It is not strictly warranted.