MX370103A
1xEVDO IQproducer™
Operation Manual

Eighth Edition

- **For safety and warning information, please read this manual before attempting to use the equipment.**
- **Additional safety and warning information is provided within the MG3700A Vector Signal Generator Operation Manual (Mainframe), or MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe). Please also refer to either of these documents before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Document No.: M-W2505AE-8.0

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

Symbols used in manual

⚠ DANGER This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

⚠ WARNING This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

⚠ CAUTION This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.

This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in the box.

These indicate that the marked part should be recycled.

MX370103A
1xEVDO IQproducer™
Operation Manual

1 November 2004 (First Edition)
23 October 2012 (Eighth Edition)

Equipment Certificate

Anritsu Corporation guarantees that this equipment was inspected at shipment and meets the published specifications.

Anritsu Warranty

- During the warranty period, Anritsu Corporation will repair or exchange this software free-of-charge if it proves defective when used as described in the operation manual.
- The warranty period is 6 months from the purchase date.
- The warranty period after repair or exchange will remain 6 months from the original purchase date, or 30 days from the date of repair or exchange, depending on whichever is longer.
- This warranty does not cover damage to this software caused by Acts of God, natural disasters, and misuse or mishandling by the customer.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation shall assume no liability for injury or financial loss of the customer due to the use of or a failure to be able to use this equipment.

Anritsu Corporation Contact

In the event that this equipment malfunctions, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the CD version.

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Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.

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   ii) If this Software is used in conjunction with other non-Anritsu-approved software.
   iii) Recovery of lost or damaged data.
   iv) If this Software or the Equipment has been modified, repaired, or otherwise altered without Anritsu's prior approval.
   v) For any other reasons out of Anritsu's direct control and responsibility, such as but not limited to, natural disasters, software virus infections, etc.

b. Expenses incurred for transport, hotel, daily allowance, etc., for on-site repairs by Anritsu engineers necessitated by the above faults shall be borne by you.

c. The warranty period for faults listed in article 3a above covered by this EULA shall be either 6 months from the date of purchase of this Software or 30 days after the date of repair, whichever is longer.

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You may not use or otherwise export or re-export directly or indirectly this Software except as authorized by Japanese and United States law. In particular, this software may not be exported or re-exported (a) into any Japanese or US embargoed countries or (b) to anyone on the Japanese or US Treasury Department's list of Specially Designated Nationals or the US Department of Commerce Denied Persons List or Entity List. By using this Software, you warrant that you are not located in any such country or on any such list. You also agree that you will not use this Software for any purposes prohibited by Japanese and US law, including, without limitation, the development, design and manufacture or production of missiles or nuclear, chemical or biological weapons of mass destruction.

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Anritsu shall deem this EULA terminated if you violate any conditions described herein. This EULA shall also be terminated if the conditions herein cannot be continued for any good reason, such as violation of copyrights, patents, or other laws and ordinances.

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If Anritsu suffers any loss, financial or otherwise, due to your violation of the terms of this EULA, Anritsu shall have the right to seek proportional damages from you.

7. Responsibility after Termination

Upon termination of this EULA in accordance with item 5, you shall cease all use of this Software immediately and shall as directed by Anritsu either destroy or return this Software and any backup copies, full or partial, to Anritsu.

8. Dispute Resolution

If matters of dispute or items not covered by this EULA arise, they shall be resolved by negotiations in good faith between you and Anritsu.

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This EULA shall be interpreted in accordance with Japanese law and any disputes that cannot be resolved by negotiation described in Article 8 shall be settled by the Japanese courts.

Cautions against computer virus infection

- Copying files and data
  Only files that have been provided directly from Anritsu or generated using Anritsu equipment should be copied to the instrument.
  All other required files should be transferred by means of USB or CompactFlash media after undergoing a thorough virus check.
- Adding software
  Do not download or install software that has not been specifically recommended or licensed by Anritsu.
- Network connections
  Ensure that the network has sufficient anti-virus security protection in place.

CE Conformity Marking

Anritsu affixes the CE conformity marking on the following product(s) in accordance with the Council Directive 93/68/EEC to indicate that they conform to the EMC and LVD directive of the European Union (EU).

CE marking

1. Product Model

Software: MX370103A 1xEVDO IQproducer™

2. Applied Directive and Standards

When the MX370103A 1xEVDO IQproducer™ is installed in the MG3710A, the applied directive and standards of this software conform to those of the MG3710A main frame.

PS: About main frame
Please contact Anritsu for the latest information on the main frame types that MX370103A can be used with.

C-tick Conformity Marking

Anritsu affixes the C-tick mark on the following product(s) in accordance with the regulation to indicate that they conform to the EMC framework of Australia/New Zealand.

C-tick marking

1. Product Model

Software: MX370103A 1xEVDO IQproducer™

2. Applied Directive and Standards

When the MX370103A 1xEVDO IQproducer™ is installed in the MG3710A, the applied directive and standards of this software conform to those of the MG3710A main frame.

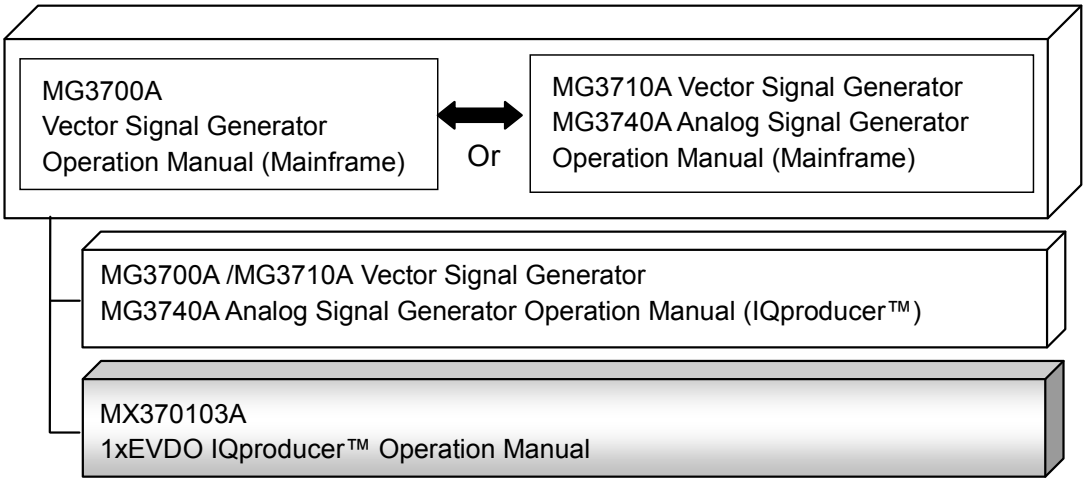
PS: About main frame
Please contact Anritsu for the latest information on the main frame types that MX370103A can be used with.

About This Manual

■Associated Documents

The operation manual configuration of the MX370103A 1xEVDO IQproducer™ is shown below.

■If using MG3700A or MG3710A:



- MG3700A Vector Signal Generator Operation Manual (Mainframe)

This describes basic operations, maintenance procedure, and remote functions of the MG3700A Vector Signal Generator.

Or

- MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)

This describes basic operations, maintenance procedure, and remote functions of the MG3710A Vector Signal Generator and the MG3740A Analog Signal Generator .

- MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)

This describes the functions and how to use the IQproducer, which is Windows software for the Vector Signal Generator and the Analog Signal Generator .

- 1xEVDO IQproducer™ Operation Manual (This document)

This describes basic operations and functions of the 1xEVDO IQproducer™.

Table of Contents

IV.

Chapter 1 Overview

This chapter provides an overview of the MX370103A 1xEVDO IQproducer™

1.1 Product overview

MX370103A 1xEVDO IQproducer™ (hereinafter referred to as “this software”) is software used to generate waveform patterns conforming to the CDMA2000 1xEV-DO (1xEV-DO forward and 1xEV-DO reverse) specifications.

This software requires either of the following environment:

- MG3710A Vector Signal Generator
- Personal computer (hereinafter, “PC”)

This software generates waveform patterns that support the specifications of 1xEV-DO with various characteristics. This is made possible by the editing/customizing of parameters according to its use.

A waveform pattern created by this software can be output using an RF signal after being downloaded into the MG3700A Vector Signal Generator ,or MG3710A Vector Signal Generator (collectively referred to as “mainframe”, or “this equipment”).

1.2 Product Composition

The following table lists the model name and specifications of this software according to the equipment.

Table 1.2-1 Restrictions

Mainframe / Restrictions	MG3700A	MG3710A
Software name	MX370103A	
Maximum Size of Waveform Patterns	256 M sample 512 M sample*1	64 M sample 128 M sample*3 256 M sample*4 512 M sample*5
Transmission method of Waveform Patterns	LAN, CompactFlash Card	External device such as LAN, USB memory*2
Installation of this software to this equipment	N/A	Possible

*1: The ARB memory expansion 512M sample (optional) must be installed into the MG3700A to use waveform patterns that exceed 256 M samples.

*2: Transferring waveform patterns is not required if the waveform patterns are created on the equipment using this software.

*3: The Combination of Baseband Signal (optional) must be installed into the MG3710A to use waveform patterns of maximum 128 M samples.

*4: The ARB memory expansion 256M sample (optional) must be installed into the MG3710A to use waveform patterns of maximum 256 M samples.

*5: To use waveform patterns of maximum 512 M samples, either of the following must be installed into MG3710A:

- ARB memory expansion 1024 M sample (optional)
- ARB memory expansion 256 M (optional) and Combination of Baseband Signal (optional)

■Notes on waveform pattern conversion

The waveform patterns generated with this software varies according to the main unit type. If using the waveform pattern to the different main unit, you need to convert the waveform pattern.

For details about how to convert a waveform pattern, see Section 4.5 “File Conversion on Convert Screen” in the MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™).

Chapter 2 Preparation

This chapter describes the operating environment for this software.

2.1 Operating Environment

The following environment is required for operating this software.

(1) PC that meets the following conditions

OS	Windows XP/Windows Vista/Windows 7
CPU	Pentium III 1 GHz equivalent or faster
Memory	512 MB or more
Hard disk space	5 GB or more free space in the drive where this software is to be installed. The free hard disk space necessary to create waveform pattern varies depending on the waveform pattern size. The free disk space of 27 GB or greater is required to create four maximum (512 Msample) waveform patterns.

(2) If viewing on PC, displays with a resolution of 1024 × 768 pixels are best viewed using a small font setting.

2.2 Installation/Uninstallation

This software is included in the IQproducer™ installer. It is automatically installed by installing the IQproducer™ that is supplied with this equipment or this software. When using a waveform pattern created using this software in the equipment, the license file must be installed in advance.

■Installing/Uninstalling IQproducer™

Refer to section 2 “Installation/Uninstallation” in the MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™).

■Installing/Uninstalling IQproducer™ license file

For how to install license file to MG3700A/MG3710A, refer to the following manual:

- MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)
  5.1 “Installing License File”

For how to uninstall license file from MG3700A/MG3710A, refer to each one of the following manuals:

- MG3700A Vector Signal Generator Operation Manual (Mainframe)
  3.10.10 “Install”
- MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)
  9.4.4 “Install”

2.3 Starting up and exiting the software

This section explains how to start and stop this software.

Note:

The following explanation assumes the use of Windows XP. The screen image may differ slightly if not using Windows XP.

2.3.1 Starting Software: When installed on PC

Start this software using the following procedure.
The example assumes that it is a PC operation.

<Procedure>

1. Click **Start** on the task bar, and point to **All Programs**. Next, point to **Anritsu Corporation**, point to **IQproducer**, and then click **IQproducer**.

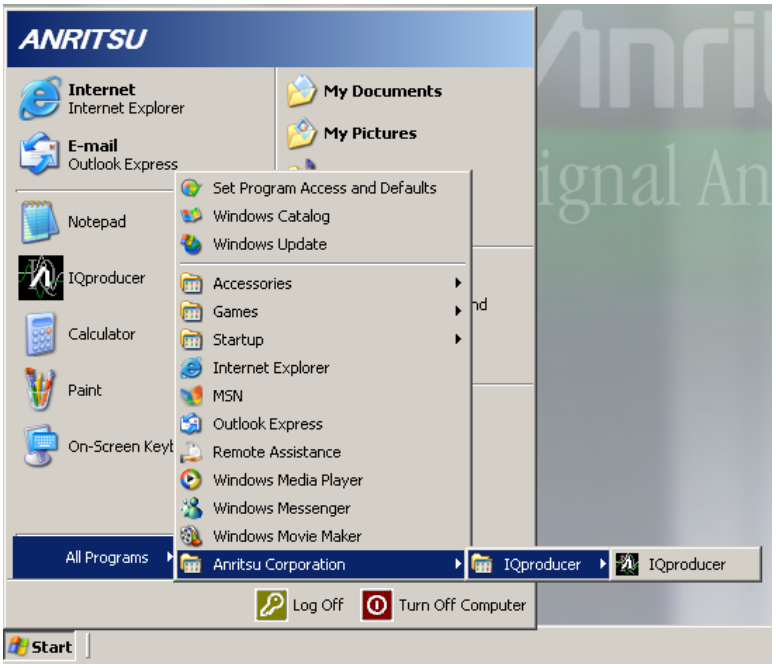


Figure 2.3.1-1 Program selection screen

2. When IQproducer™ starts, the **Select instrument** screen is displayed.

   This **Select instrument** screen is used to select either MG3700A or MG3710A. This following explanation assumes that you have selected **MG3700**.

Figure 2.3.1-2 Select Instrument Screen

Notes:

- This software does not support MS269xA, MS2830A, and MG3740A.
- To hide this screen and to start with the selected mainframe's screen from the next time, select the **Don't show this window next time** check box.

3. The common platform screen is displayed when **OK** is clicked in the **Select instrument** screen.

   The common platform screen is a screen used to select each function of the IQproducer™.

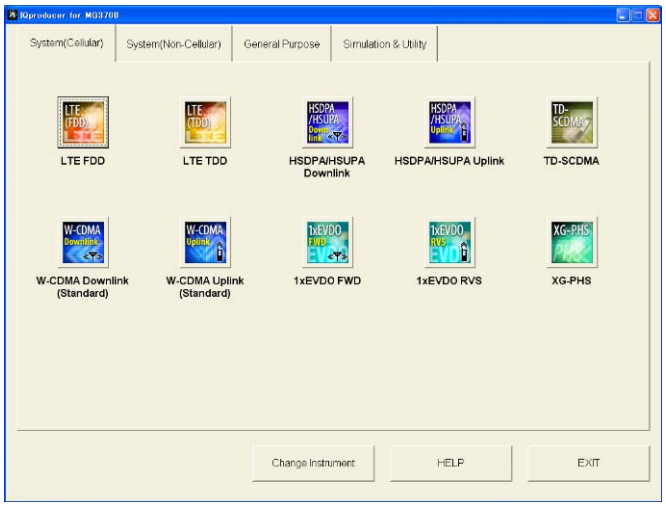


Figure 2.3.1-3 Common Platform Screen

4. Click the **System (Cellular)** tab on the common platform screen, to show the **System (Cellular)** selection screen that supports each telecommunication system.

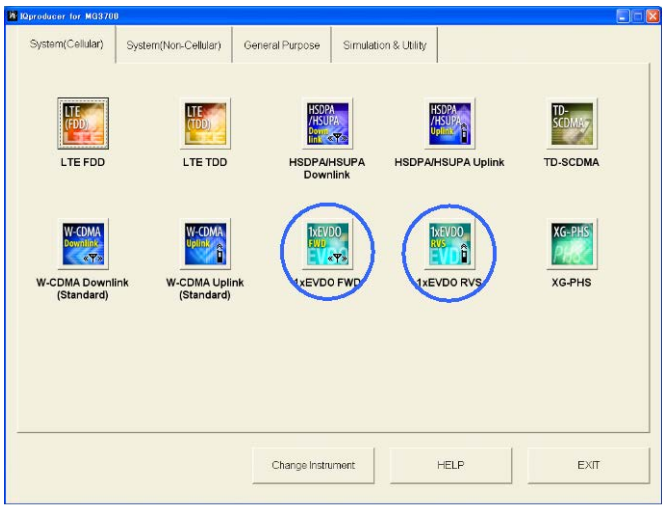


Figure 2.3.1-4 System (Cellular) Selection Screen

5. Click **1xEV-DO FWD or 1xEV-DO RVS** to display the main screen. For details of the main screen, refer to Chapter 3 "Detailed Description of Functions".

Note:

If **Change Instrument** is clicked, the **Select instrument** screen will appear each time the software is loaded.

2.3.2 Starting Software: When installed on MG3710A

Start this software using the following procedure.

<Procedure>

1. Press IQpro on the MG3710A front panel to display the common platform screen.

   The common platform screen is a screen used to select each function of the IQproducer™.

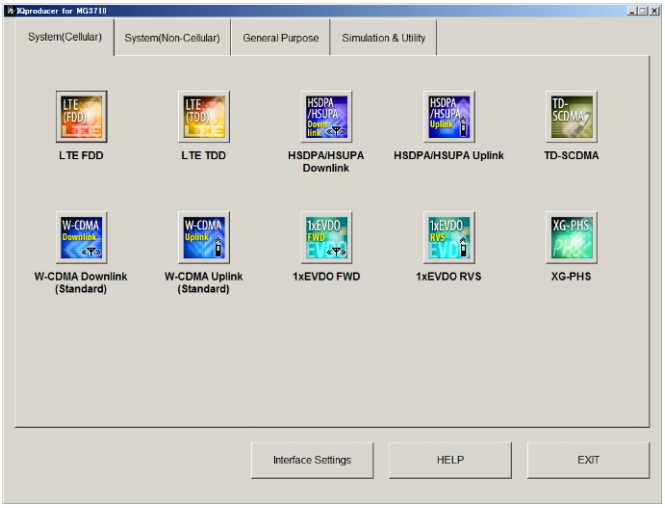


Figure 2.3.2-1 Common Platform Screen

2. Click the **System (Cellular)** tab on the common platform screen, to show the **System (Cellular)** selection screen that supports each telecommunication system.

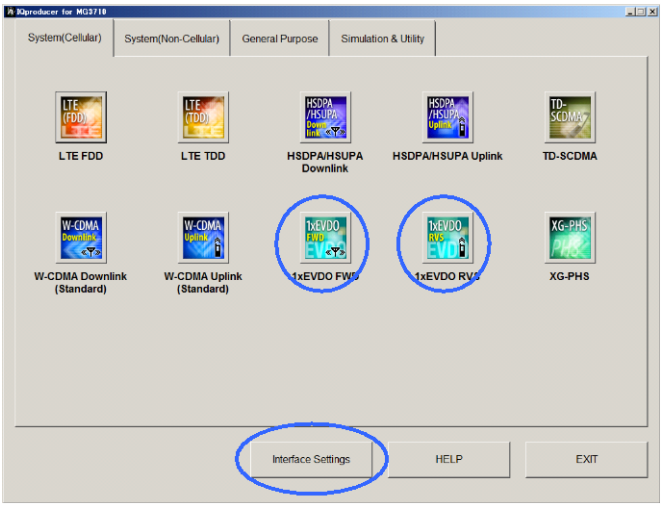


Figure 2.3.2-2 System (Cellular) Selection Screen

3. Click **1xEV-DO FWD or 1xEV-DO RVS** to display the main screen. For details of the main screen, refer to Chapter 3 "Detailed Description of Functions".

Note:

When this software is installed on MG3710A, Change Instrument displays instead of Interface Settings. Clicking Interface Settings displays the Interface Setting dialog box.

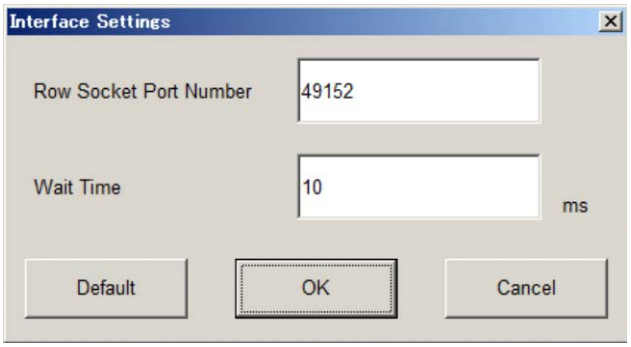


Figure 2.3.2-3 Interface Settings Dialog Box

Here, you can configure interface-related settings of IQproducer and MG3710A. To return to factory defaults, click **Default**.

- Row Socket Port Number

  Sets Row Socket port number. Set the same value as that for MG3710A.

- Wait Time

  Sets the wait time between commands.

2.3.3 Exiting Software

Stop this software using the following procedure.

■When exiting only this software

Perform the following steps in order to exit this software only, without closing the common platform screen or other IQproducer™ tools.

- 1xEV-DO FWD IQproducer
  Click the **Exit** button.

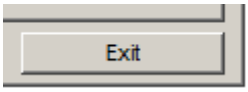


Figure 2.3.3-1 Exiting Software

- 1xEV-DO RVS IQproducer
  1. Click the Exit button ( ) on the tool bar.
  2. Select Exit from the File menu.
  3. Click the ☒ button on the upper right screen.

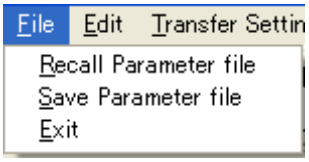


Figure 2.3.3-2 Exiting Software

The operation of the three screen buttons is explained below.

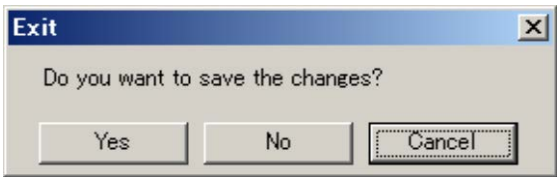


Figure 2.3.3-3 Exit Confirmation Window

- **Yes** Saves current parameters to file and stops this software.
- **No** Stops this software without saving current parameters to file.
- **Cancel** or ☒ Cancels the process and returns to the main screen.

When stopping this software using the **Yes** button, the saved parameters are read at the next start and reset for each parameter.

■When exiting entire IQproducer™ application

To exit all tools of IQproducer™ that are running, select **Exit** on the Common Platform Screen. In this case, a dialog is displayed to confirm stopping of each running tool.

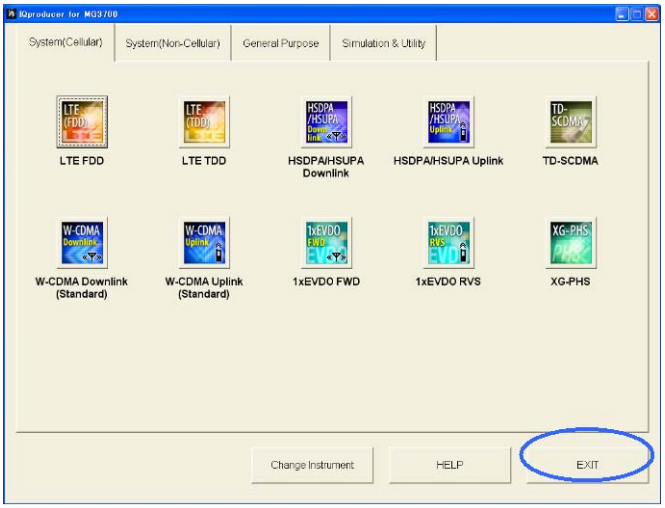


Figure 2.3.3-4 Exiting IQproducer™

Chapter 3 Detailed Description of Functions

This chapter provides detailed descriptions of this software.

Notes:

- The examples and screens used throughout this chapter are based on the assumption that the IQproducer™ is activated with the MG3700A.
- The MG3710A functions are described as notes in each item.

3.1 Detailed Description of 1xEV-DO Forward IQproducer™ Function

3.1.1 Waveform pattern parameter setting screen

3.1.1.1 Carrier Edit sheet

Modulation parameters of a single carrier with carrier number 1 to 9, which is a component of a multicarrier, are set in the Carrier Edit sheet. This section describes the setting items and modulation parameters in the Carrier Edit sheet. Refer to Appendix B "Initial Value List" for the initial value of each setting item.

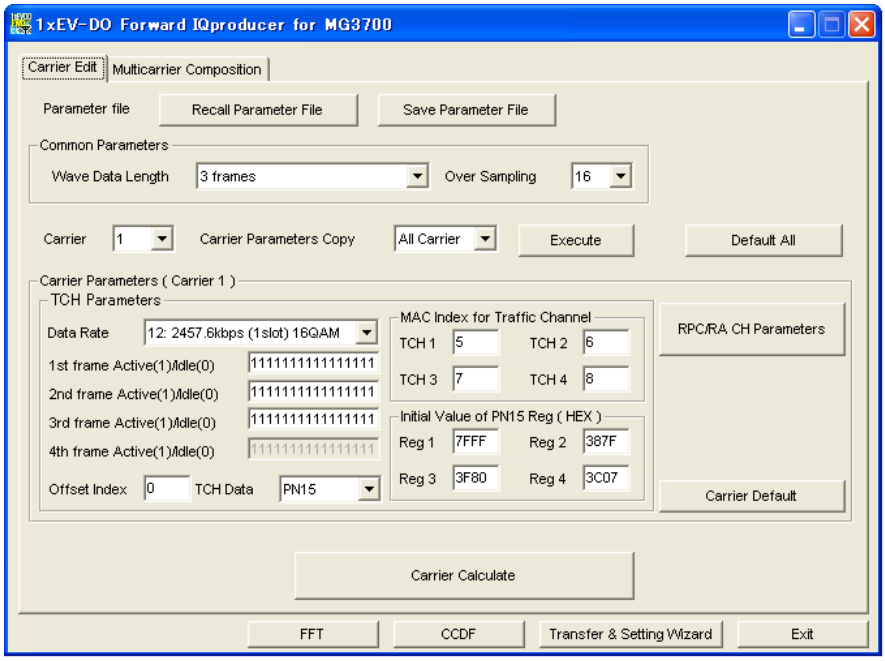


Figure 3.1.1.1-1 Carrier Edit sheet

(1) Save Parameter File
Clicking this button saves the settings on the Carrier Edit sheet, RPC/RA CH Parameters screen, and Multicarrier Composition sheet in a parameter file with the extension ".prm".

(2) Recall Parameter File
Clicking this button reads the parameter file for setting the items in the Carrier Edit sheet, RPC/RA CH Parameters screen, and Multicarrier Composition sheet.

(3) Wave Data Length
The number of frames for the waveform pattern to be generated can be specified up to 4 frames. Specify 3 frames when generating a multicarrier.

(4) Over Sampling
The over sampling rate for the waveform pattern can be specified from 4, 8, and 16.

(5) Default All
Clicking this button restores the setting values of all the single carriers to the initial value.

(6) Carrier
A single carrier to be edited can be selected. The carrier number of the single carrier for which setting is carried out in the Carrier Edit sheet is displayed here. Set a value from 1 to 9.

(7) Carrier Parameters Copy
The settings of the single carrier that is currently being set can be copied to other single carriers. The copy destination (single carrier) can be specified here, from Carrier 1 to 9 or ALL Carrier. After setting the copy destination, click the **[Execute]** button on the right to start copying.

All Carrier: The settings of the current single carrier (indicated by the carrier number in Carrier) are copied to all the single carriers.

Carrier 1 to 9: The settings of the current single carrier (indicated by the carrier number in Carrier) are copied to the single carrier having the carrier number specified here.

(8) Execute
Clicking this button copies the settings of the current single carrier (indicated by the carrier number in Carrier) to the copy destination specified by Carrier Parameters Copy. The settings on the RPC/RA CH Parameters screen are also copied.

(9) Data Rate
The data rate and transmission slot for the single carrier to be generated can be specified. Set one of the following:

1: 38.4kbps (16 slots) QPSK

2: 76.8kbps (8 slots) QPSK

3: 153.6kbps (4 slots) QPSK

4: 307.2kbps (2 slots) QPSK

5: 614.4kbps (1 slot) QPSK

6: 307.2kbps (4 slots) QPSK

7: 614.4kbps (2 slots) QPSK

8: 1228.8kbps (1 slot) QPSK

9: 921.6kbps (2 slots) 8-PSK

10: 1843.2kbps (1 slot) 8-PSK

11: 1228.8kbps (2 slots) 16QAM

12: 2457.6kbps (1 slot) 16QAM

13: Idle Slot

When Data Rate is set to other than "13: Idle Slot", Active/Idle for each slot of the target single carrier is automatically set according to the settings in 1st frame Active(1)/Idle(0) to 4th frame Active(1)/idle(0) (see (10) below).
When Data Rate is set to "13: Idle Slot", all the slots of the target single carrier are set to idle slots.

(10) 1st frame Active(1)/Idle(0) to 4th frame Active(1)/Idle(0)
Traffic channel active/idle can be set for each slot in binary. There are four frames from 1st frame to 4th frame, and each frame contains 16 slots. The MSB (leftmost bit) in each frame indicates the first slot in that frame, and each bit corresponds to the slot sequentially. When 0 is set, the corresponding slot is set to an idle slot, and is set to an active slot when 1 is set. When Data Rate is set to "13: Idle Slot", all the slots of the target single carrier are set to idle slots.

(11) TCH Data
The payload data of the traffic channel can be set here.

All '0': The payload data is set to all 0.

All '1': The payload data is set to all 1.

PN15: The payload data is set to non-continuous PN15.
Note that PN15 is continuous within each frame.

(12) Offset Index
PN Offset Index of the single carrier to be generated can be specified here from 0 to 511.

(13) TCH1 to THC4
MAC Index, which is used for scrambling sequence of the traffic channel and for Walsh cover of the preamble, can be specified here by an integer number from 5 to 63.

(14) Reg 1 to Reg 4
The initial values of the linear feedback shift registers for PN15 sequence generation when TCH Data is set to PN15 can be specified here by a hexadecimal number from 0000 to 7FFF. An offset can be added to the PN15 sequence of each TCH by changing these initial values.

(15) Carrier Default

Clicking this button restores the settings of the current single carrier (indicated by the carrier number in Carrier) in the Carrier Parameters field to the initial values.

The control in the Carrier Parameter frame becomes the set value for single carrier.

(16) RPC/RA CH Parameters

Clicking this button opens the RPC/RA CH Parameters screen, in which the parameters for RPC and RA channels can be set.

☞ Refer to Section3.1.1.2 “RPC/RA CH Parameters screen.”

(17) Carrier Calculate

Clicking this button starts waveform pattern generation for 9 single carriers. The Execute and Result screen is displayed when this button is clicked. When “Complete” is displayed on the Execute and Result screen, the setting operations on the Carrier Edit sheet are completed. Click the **[Multicarrier Composition]** tab to open the Multicarrier Composition sheet, and proceed with multicarrier generation.

(18) FFT

Clicking this button opens the FFT graph display screen. In this screen, the FFT-processed spectrum of the generated waveform pattern is displayed in a graph.

(19) CCDF

Clicking this button opens the CCDF graph display screen. In this screen, the CCDF of the generated waveform pattern is displayed in a graph.

(20) Transfer & Setting Wizard

Clicking this button opens the Transfer & Setting Wizard screen. In this screen, a series of operations including connection between a PC and the MG3700A/MG3710A, waveform pattern transfer to the MG3700A/MG3710A internal hard disk, waveform pattern loading from the hard disk to the waveform memory and output waveform pattern selection are operated.

(21) Exit

Clicking this button exit this software.

3.1.1.2 RPC/RA CH Parameters screen

This section describes the modulation parameters that can be set by controlling the items in the RPC/RA CH Parameters screen. To open the RPC/RA CH Parameters screen, click the **[RPC/RA CH Parameters]** button on the Carrier Edit sheet while the carrier number of the single carrier to be set is displayed in Carrier. Refer to Appendix B "Initial Value List" for the initial value of each setting item.

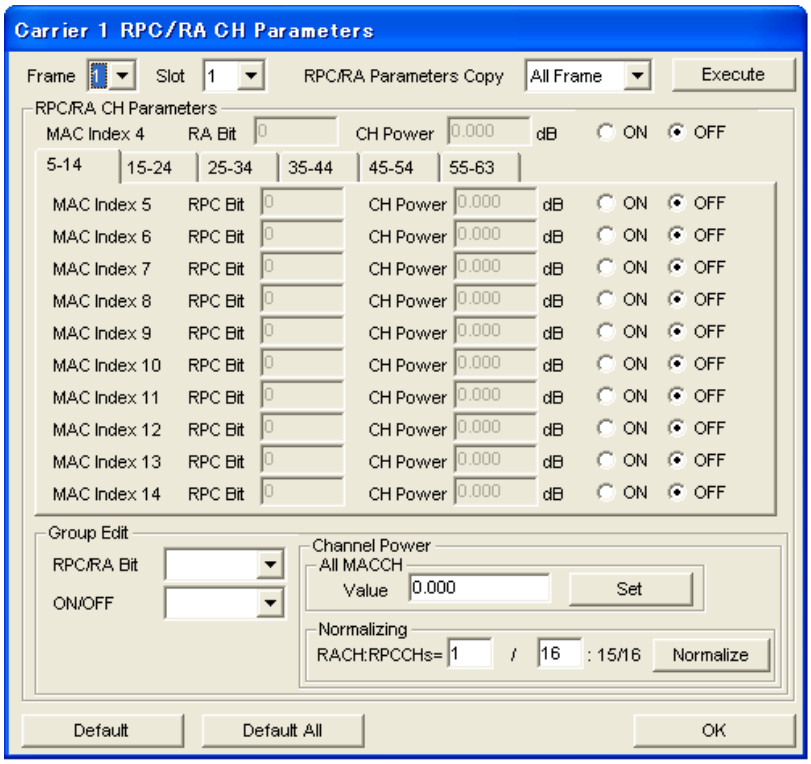


Figure 3.1.1.2-1 RPC/RA CH Parameters screen

(1) Frame

A frame for which RPC and RA channels should be edited can be selected. The number of the frame for which setting is carried out in the RPC/RA CH Parameters screen is displayed here.

(2) Slot

A slot for which RPC and RA channels should be edited can be selected. The number of the slot for which setting is carried out in the RPC/RA CH Parameters screen is displayed here.

(3) RPC/RA Parameters Copy

The RPC/RA channel parameter settings of the current slot can be copied to other slots. The copy destination slot can be specified here, from Slot 1 to 16, ALL Slot, or All Frame.

All Frame: When the **[Execute]** button is clicked, the RPC/RA channel parameter settings of the current slot (indicated by the frame number in Frame and the slot number in Slot) are copied to all the slots within the single carrier.

All Slot: When the **[Execute]** button is clicked, the RPC/RA channel parameter settings of the current slot (indicated by the frame number in Frame and the slot number in Slot) are copied to all the slots within the frame. No data is copied to other frames.

Slots 1 to 16: When the **[Execute]** button is clicked, the RPC/RA channel parameter settings of the current slot (indicated by the frame number in Frame and the slot number in Slot) are copied to the slot having the slot number specified here. No data is copied to other frames.

(4) Execute

Clicking this button copies the RPC/RA channel settings of the current slot (indicated by the frame number in Frame and the slot number in Slot) to the copy destination specified by RPC/RA Parameters Copy.

(5) RA Bit

The RA bit of the RA channel can be set to 0 or 1.

(6) CH Power

The channel gain (value relative to the pilot channel) of the MAC channel can be set to a value from –40 to +40 dB.

(7) RPC Bit

The RPC bit of the RPC channel can be set to 0 or 1.

(8) ON/OFF

Each MAC channel can be set to ON or OFF.

(9) RPC/RA Bit (Group Edit)

All the RPC bits in the current slot can be set to 0 or 1.

All '0': All the RPC bits in the current slot are set to 0.

All '1': All the RPC bits in the current slot are set to 1.

(10) Channel Power (Group Edit)

The channel gains (value relative to pilot channel) of all the MAC channels in the current slot can be set at once. Enter a channel gain value in the Value text box and then click the **[Execute]** button.

(11) ON/OFF (Group Edit)

All the MAC channels in the current slot can be set to ON/OFF at once.

All 'off': All the MAC channels in the current slot are set to OFF.

All 'on': All the MAC channels in the current slot are set to ON.

(12) Default

Clicking this button restores the current slot to the initial state.

(13) Default All

Clicking this button restores the RPC/RA CH Parameters settings of the current single carrier to the initial values.

(14) Normalize

When this button is clicked, the channel gains of the RA and RCH channels of the current slot are collectively set based on the ratio indicated by fractions. Specify the ratio in the text boxes on the left of this button. The numerator of the RA channel ratio can be set from 1 to "denominator – 1", while the denominator can be set from 2 to 99.

☞ Refer to Section 3.1.1.5 "Normalize function for RRC/RA channels."

3.1.1.3 Multicarrier Composition sheet

In the Multicarrier Composition sheet, a multicarrier (or single carrier) waveform pattern can be generated from the single carrier waveform patterns generated on the Multicarrier Composition sheet. This section describes the setting items in the Multicarrier Composition sheet, as well as the correspondence with the multicarrier parameters and waveform pattern information file. Refer to Appendix B "Initial Value List" for the initial value of each setting item.

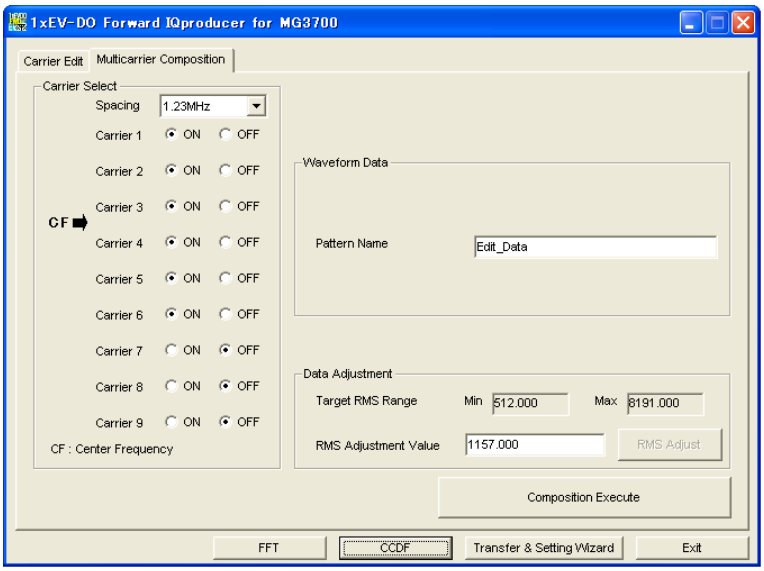


Figure 3.1.1.3-1 Multicarrier Composition sheet (When running on PC)

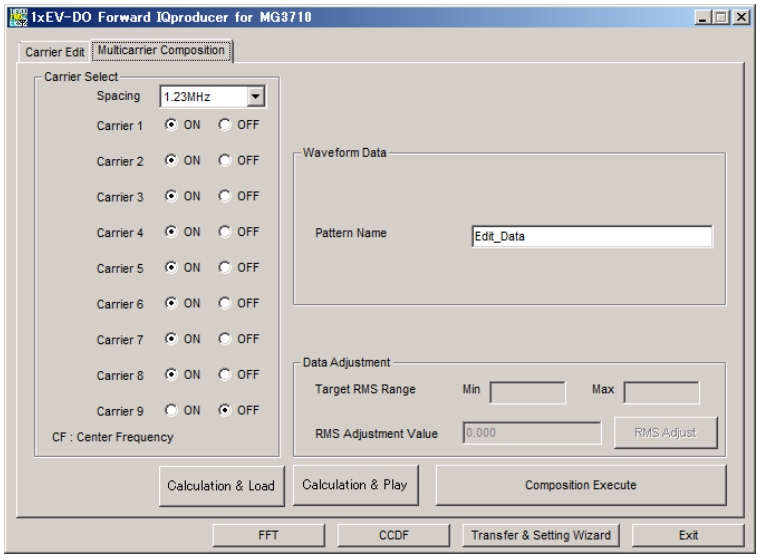


Figure 3.1.1.3-2 Multicarrier Composition sheet (When running on MG3710A)

(1) Spacing

The frequency spacing between the carriers that have adjacent carrier numbers can be set from 1.20 MHz, 1.23 MHz, 1.25 MHz or 1.35 MHz. The frequency spacing specified here is applied to all carriers.

(2) Carrier Select

Whether to use the single carrier generated in the Carrier Edit sheet for multicarrier generation can be set by specifying ON (use) or OFF (not use). When only one single carrier is set to ON and the others are set to OFF, a single carrier is generated, not multicarrier. A single carrier with smaller carrier number is located lower on an actual frequency axis, and a single carrier with greater carrier number is located upper. The center frequency is centered between the single carrier that is set to ON and has the greatest carrier number and the single carrier that is set to ON and has the smallest carrier number. The position of the center frequency in the multicarrier is indicated by "CF" on the screen that is displayed when the **[Composition Execute]** button is clicked.

(3) Target RMS Range

The setting range of RMS can be set here. "RMS" indicates the RMS value of the waveform pattern in this event. "Max" indicates the maximum RMS value and "Min" indicates the minimum RMS value for waveform pattern RMS adjustment. RMS Adjustment Value must be set within this range (between "Max" and "Min").

(4) RMS Adjustment Value

The RMS value of the multicarrier (or single carrier) waveform pattern can be set within the range between Max and Min set by Target RMS Range. Generally, the greater the waveform pattern RMS value becomes, the more output modulated signal is distorted, but the floor noise is reduced. The smaller the waveform pattern RMS value becomes, on the other hand, the less output modulated signal is distorted, but the floor noise is increased.

(5) RMS Adjust

This button is enabled when the value in RMS Adjustment Value has been changed once or more by executing Composition Execute after starting up this software.

Clicking this button converts the waveform pattern generated by clicking the **[Composition Execute]** to a waveform pattern that has an RMS value close to the value set in RMS Adjustment Value. The RMS value of the waveform pattern generated by executing Composition Execute is 1157. Execute RMS Adjust if the RMS value needs to be changed from 1157. Note that the RF output level accuracy of the MG3700A/MG3710A is not guaranteed if the waveform pattern RMS value is out of the range between 1157 and 1634. Refer to the MG3700A Vector Signal Generator Operation Manual (Mainframe) or the MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe) for details of the RF output level accuracy.

(6) Pattern Name

The pattern file name can be set within twenty 1-byte characters. Alphanumeric and the following symbols can be used for a file name:

! % & ( ) + = ` { } _ - ^ @ [ ]

The extension ".wvi" (for waveform pattern information file) or ".wvd" (for waveform pattern data file) is affixed to the pattern file name specified here.

(7) Composition Execute

Clicking this button generates a waveform pattern. Two waveform pattern files are generated for one waveform pattern: waveform pattern information file (".wvi") and waveform pattern data file (".wvd"). The RMS value of the generated waveform pattern is initially set to 1157. When changing this value, enter an RMS value to the RMS Adjustment Value text box in the Data Adjustment field, and then click the **[RMS Adjust]** button.

(8) Calculation & Load

Note:

This function is available only when this software is used on MG3710A.

After waveform generation is finished, the created waveform pattern is loaded into the MG3710A waveform memory.

(9) Calculation & Play

Note:

This function is available only when this software is used on MG3710A.

After waveform generation is finished, the created waveform pattern is loaded and selected at the MG3710A waveform memory.

3.1.1.4 Execution and Result screen

When the **[Carrier Calculate]** button on the carrier Edit sheet or the **[Composition Execute]** button on the Multicarrier Composition sheet is clicked, waveform pattern calculation is started and the Execution and Result screen is displayed. This screen displays the waveform pattern calculation status and results, and these displayed contents are recorded to the log.dat file saved in the folder where the currently-executed IQproducer_1xEVDO.exe file is stored. Clicking the **[Cancel]** button during calculation interrupts the calculation. The calculation is completed when "Complete" is displayed on the screen. Click the **[OK]** button to close the Execution and Result screen.

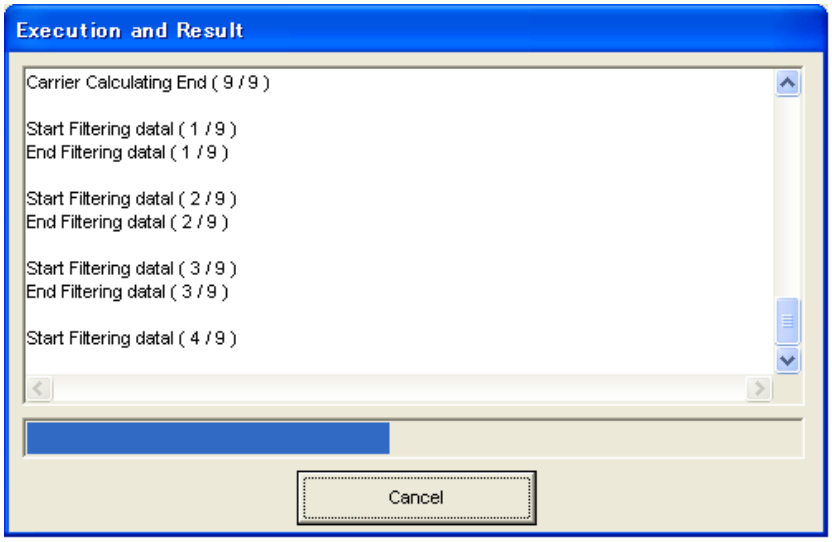


Figure 3.1.1.4-1 Execution and Result screen

3.1.1.5 Normalize function for RPC/RA channels

When the **[Normalize]** button on the RPC/RA CH Parameters screen is clicked, the channel gains of the RA and RPC channels of the slot currently set are collectively set based on the specified ratio. When the channel gain of the RA channel is set by a fraction as shown in Figure 3.1.1.5-1 below, the channel gain of the RCH channel is automatically set to the value obtained by dividing the 1-RACH ratio by the number of RPC channels that are set to ON. Click the **[Normalize]** button to set the channel gains of the RPC and RA channels to the specified values.

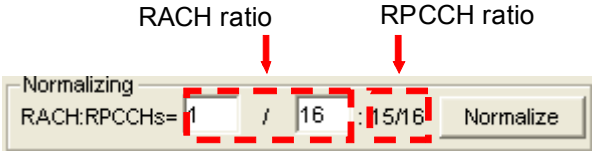


Figure 3.1.1.5-1 Setting Normalizing

3.1.2 Waveform pattern generation procedure

This section provides a general procedure for generating a 1xEV-DO forward type waveform pattern using this software.

<Procedure>

1. Start up this software. The Carrier Edit sheet is displayed.
2. The parameters when this software is started up are those saved last time, except for the case when starting up this software for the first time.
   When reading a parameter file, click the **[Recall Parameter File]** button and select a parameter file for setting the parameters. To restore the parameters to the initial settings, click the **[Default All]** button.
3. Set the parameters of each single carrier, which is a component of a multicarrier.
   If it is not necessary to set the parameters of the single carrier, proceed with Step 4. Setting is not required for single carriers that are not to be multiplexed to a multicarrier.
   When changing the MAC channel parameters, click the **[RPC/RA CH Parameters]** button while the carrier number of the target single carrier is displayed in Carrier on the Carrier Edit sheet. Then set the MAC Channel parameters on the RPC/RA CH Parameters screen. After setting the MAC Channel parameters, click the **[OK]** button to display the Carrier Edit sheet.
4. Click the **[Carrier Calculate]** button to generate a single carrier waveform pattern data as an intermediate file. When "Complete" is displayed on the Execute and Result screen, click the **[OK]** button to close the Execute and Result screen.
5. Click the **[Multicarrier Composition]** tab to open the Multicarrier Composition sheet.
6. Select ON/OFF for Carrier 1 through Carrier 9 in the Carrier Select field, and enter a waveform pattern file name in the Pattern Name text box.

7. Click the **[Composition Execute]** button. A multicarrier waveform pattern is generated based on the waveform pattern data of the single carriers generated in the Carrier Edit sheet. The waveform pattern files are generated in the Data folder, which is in the folder that stores the 1xEVDO_FWD.exe file. The waveform pattern information file name is "Name specified in Pattern Name + .wvi", and the waveform pattern data file name is "Name specified in Pattern Name + .wvd".

   Skip Step 8 when not changing the waveform pattern RMS value.

8. Enter the RMS value of the multicarrier waveform pattern in RMS Adjustment Value, and click the [RMS Adjust] button. The waveform pattern files are generated in the Data folder, which is in the folder that stores the IQproducer_1xEVDO.exe file. The waveform pattern files are named in the same manner as described in Step 7 above.

9. When generating another waveform pattern, repeat the procedure from Step 2.
   When setting single carrier ON/OFF for multicarrier generation or changing the waveform pattern file name in Pattern Name, repeat the procedure from Step 6. In this event, the single carrier waveform pattern data generated in Step 4 is used as is.
   When changing the RMS value, perform Step 8.

3.1.3 Saving/reading parameters

With this software, all the set parameters can be saved in a parameter file (extension: .prm), and the settings at the time when saving the parameter file can be restored anytime as required by reading this parameter file.

3.1.3.1 Saving parameter file

When running on PC

1. Click the **[Save Parameter File]** button in Carrier Edit sheet to display the parameter file saving screen.

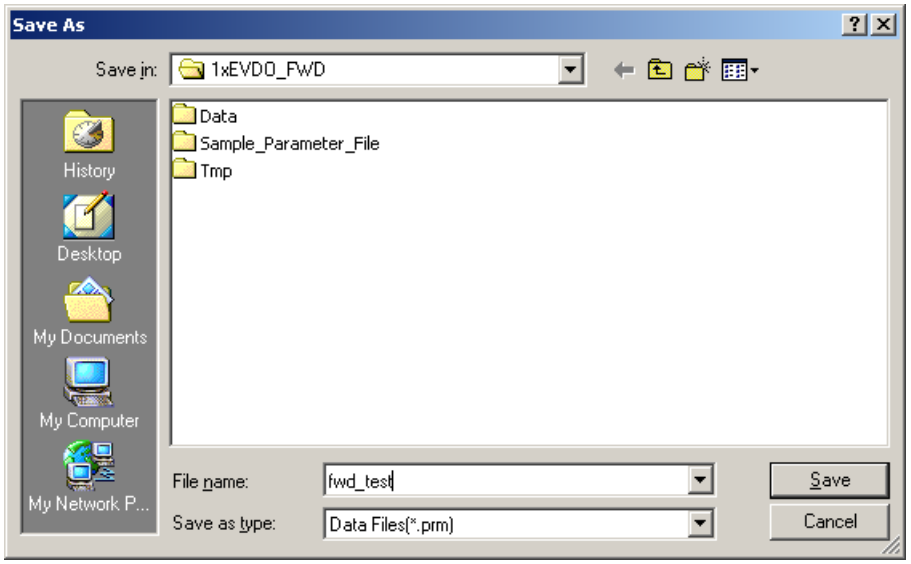


Figure 3.1.3.1-1 Parameter file saving screen

2. Enter a file name in the **[File name]** text box and click the **[Save]** button to save the parameter file.
   When the save destination is not changed in the **[Save in]** box, the parameter file is saved in the following directory with the entered file name:
   X:\IQproducer\1xEVDO_FWD*Entered file name*.prm
   ("X:\IQproducer" indicates the folder where the IQproducer™ is installed.)

When running on MG3710A

1. Click the **[Save Parameter File]** button in **[File]** menu or click the  button to display the parameter file saving screen.

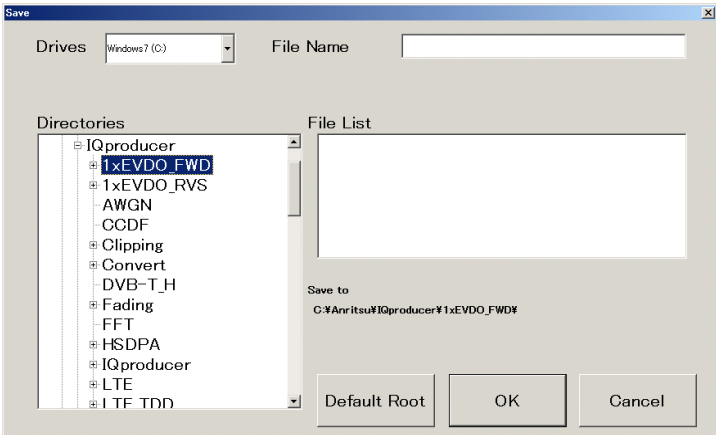


Figure 3.1.3.1-2 Parameter File Saving Screen (MG3710A)

2. Select the folder to store the file in the **[Directories]** field, and then enter the name of the file using the **[File Name]** box. Click **[OK]** to save the parameter file. To initialize the setting in the **[Directories]** field, click the **[Default Root]** button.

3.1.3.2 Reading parameter file

When running on PC

1. Click the **[Recall Parameter File]** button in Carrier Edit sheet to display the parameter file saving screen.

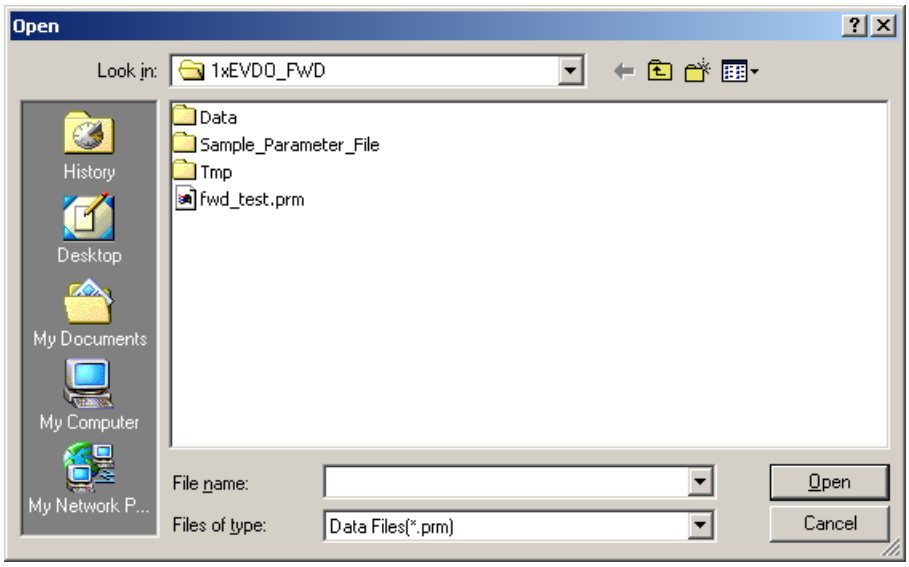


Figure 3.1.3.2-1 Parameter file reading screen

2. Select a parameter file to be read from the file list, and then click the **[Open]** button to read the selected parameter file.

When running on MG3710A

1. Select **[Recall Parameter File]** from the **[File]** menu or click the  tool button to display the parameter file reading screen.

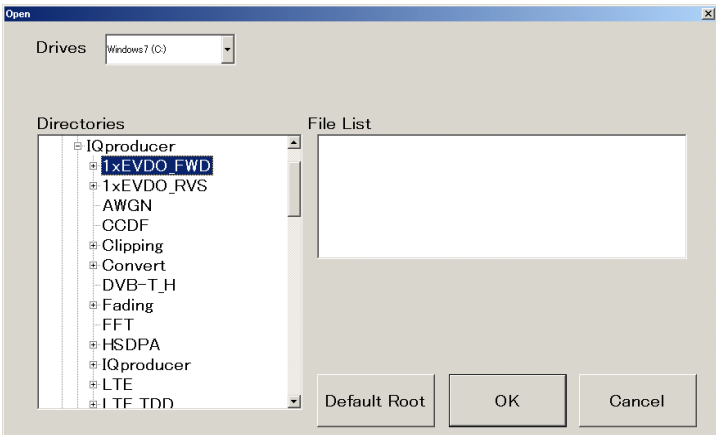


Figure 3.1.3-2 Parameter File Reading Screen (MG3710A)

2. Select the directory where the files to be loaded is stored in the **[Directories]** field. Click the desired file from the **[File List]**, and click **[OK]**. To initialize the setting in the **[Directories]** field, click the **[Default Root]** button.

3.1.4 Displaying graph

The generated waveform pattern can be displayed in a CCDF or FFT graph by using this software.

Displaying CCDF graph

1. Generate a multicarrier waveform pattern by executing "Composition Execute."
2. Click the **[CCDF]** button. The CCDF Graph Monitor screen shown in Figure 3.1.4-1 is displayed with the trace of the generated waveform pattern.

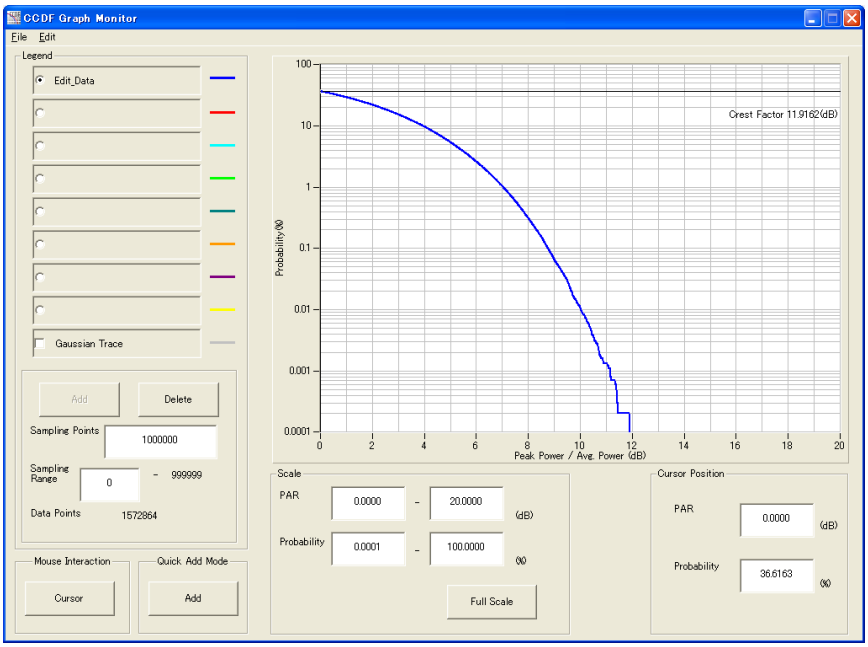


Figure 3.1.4-1 CCDF Graph Monitor screen

When a waveform pattern is generated by changing parameters and executing "Composition Execute" while other traces are displayed in the CCDF Graph Monitor screen, the trace of the waveform pattern newly generated can be displayed in either of the following two methods:

- Displaying the new trace in the same screen with the previous traces
- Deleting the previous traces to display the new trace

Note:

A CCDF graph and an FFT graph cannot be generated at the same time. When displaying a CCDF graph while an FFT graph is displayed, execute the CCDF graph generation after FFT graph generation is completed.

■ When displaying a new trace in the same screen with the previous traces:

1. Set **[Add]** for **[Quick Add Mode]** on the lower-left of the CCDF Graph Monitor screen.
2. Click the **[CCDF]** button. The trace of the waveform pattern newly generated is additionally displayed in the CCDF Graph Monitor screen.
   Up to eight traces can be displayed by repeating this procedure.

■ When deleting the previous traces to display a new trace:

1. Set **[Clear]** for **[Quick Add Mode]** on the lower-left of the CCDF Graph Monitor screen.
2. Click the **[CCDF]** button. The confirmation message shown in Figure 3.1.4-2 below appears:

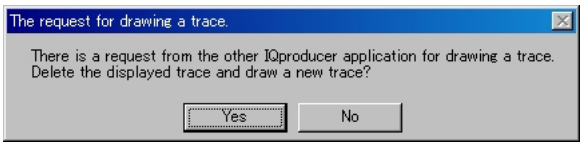


Figure 3.1.4-2 Confirmation message

Click the **[Yes]** button. The previous traces are deleted from the CCDF Graph Monitor screen, and the trace of the waveform pattern newly generated is displayed.

Displaying FFT graph

1. Generate a multicarrier waveform pattern by executing "Composition Execute."
2. Click the **[FFT]** button. The FFT Graph Monitor screen shown in Figure 3.1.4-3 is displayed with the trace of the generated waveform pattern.

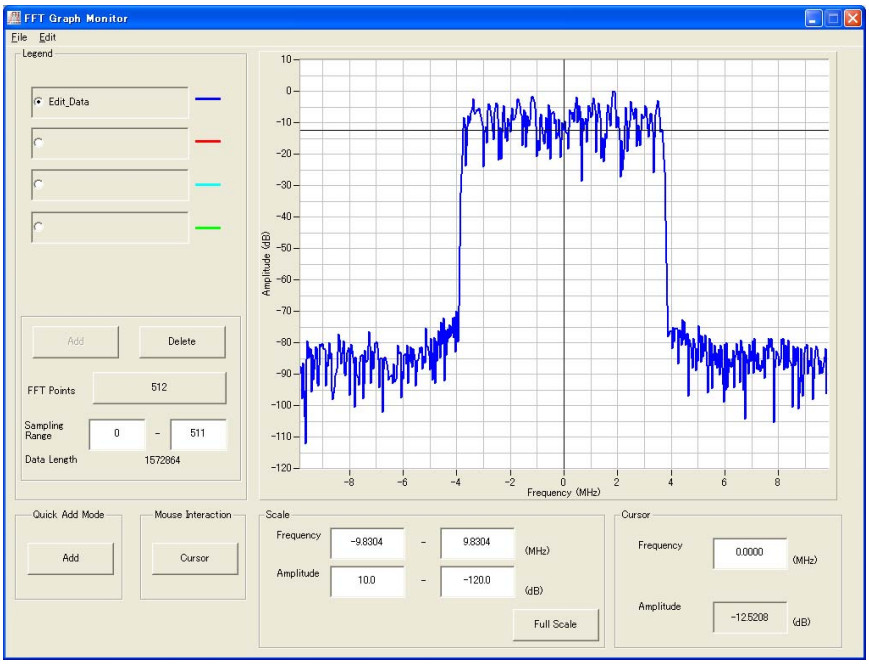


Figure 3.1.4-3 FFT Graph Monitor screen

When a waveform pattern is generated by changing parameters and executing "Composition Execute" while other traces are displayed in the FFT Graph Monitor screen, the trace of the waveform pattern newly generated can be displayed in either of the following two methods:

- Displaying the new trace in the same screen with the previous traces
- Deleting the previous traces to display the new trace

Note:

A CCDF graph and an FFT graph cannot be generated at the same time. When displaying an FFT graph while a CCDF graph is displayed, execute the FFT graph generation after CCDF graph generation is completed.

■ When displaying a new trace in the same screen with the previous traces:

1. Set **[Add]** for **[Quick Add Mode]** on the lower-left of the FFT Graph Monitor screen.
2. Click the **[FFT]** button. The trace of the waveform pattern newly generated is additionally displayed in the FFT Graph Monitor screen.
   Up to four traces can be displayed by repeating this procedure.

■ When deleting the previous traces to display a new trace:

1. Set **[Clear]** for **[Quick Add Mode]** on the lower-left of the FFT Graph Monitor screen.
2. Click the **[FFT]** button. The confirmation message shown in Figure 3.1.4-4 below appears:

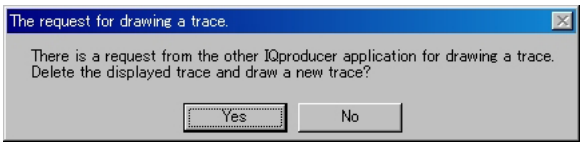


Figure 3.1.4-4 Confirmation message

Click the **[Yes]** button. The previous traces are deleted from the FFT Graph Monitor screen, and the trace of the waveform pattern newly generated is displayed.

3.1.5 Detailed description of modulation parameter

3.1.5.1 Single carrier

This section describes the single carrier, which is a component of the multicarrier.

Active Slot

A waveform pattern of a single carrier for which Data Rate on the Carrier Edit sheet is set to other than "13: Idle Slot" is generated by time-division multiplexing the traffic channel data and MAC Channel, Preamble, and Pilot Channel according to 3GPP2 C.S0024.
The traffic channel data consists of a PN15 sequence of the length corresponding to Wave Data Length and all-0 or all-1 payload data for which channel coding and IQ mapping have been executed.

On a traffic channel that requires two or more transmission slots, traffic channel data is transmitted in every four transmission slots and traffic channel data of other packets are transmitted in the transmission slots between them, so that coded data of four packets are transmitted consecutively. The initial values of the MAC Indexes and the linear feedback shift register for PN15 sequence generation can be set separately by using the this software.
Active/idle can be set for each slot in the single carrier by setting binary numbers to 1st frame Active(1)/Idle(0) to 4th frame Active(1)/Idle(0), unless Data Rate is not set to "13: Idle Slot" for that single carrier. In this event, however, note that the data in a slot that is set as an idle slot is not transmitted, since the data field in an idle slot is a non-transmission field. The data in an active slot is transmitted.

The MAC channel to be multiplexed, values of RPC bit and RA bit, and channel gain can be set for each slot in a frame. It is also possible to set PN Offset Index.
Figure 3.1.5.1-1 shows the forward packet format before coding and Figure 3.1.5.1-2 shows the block diagram of a 1xEV-DO forward active slot.
Table 3.1.5.1-1 lists the active traffic channel parameters.
Figure 3.1.5.1-3 shows an image of single carrier waveform pattern repetition and Figure 3.1.5.1-4 shows the 1xEV-DO forward active slot format after time-division multiplexing (TDM).

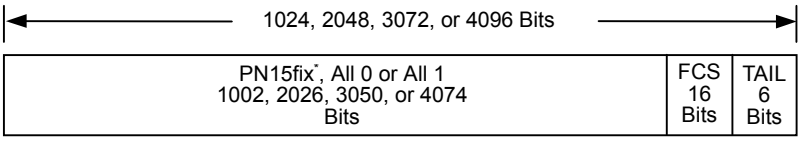


Figure 3.1.5.1-1 Forward packet format before coding

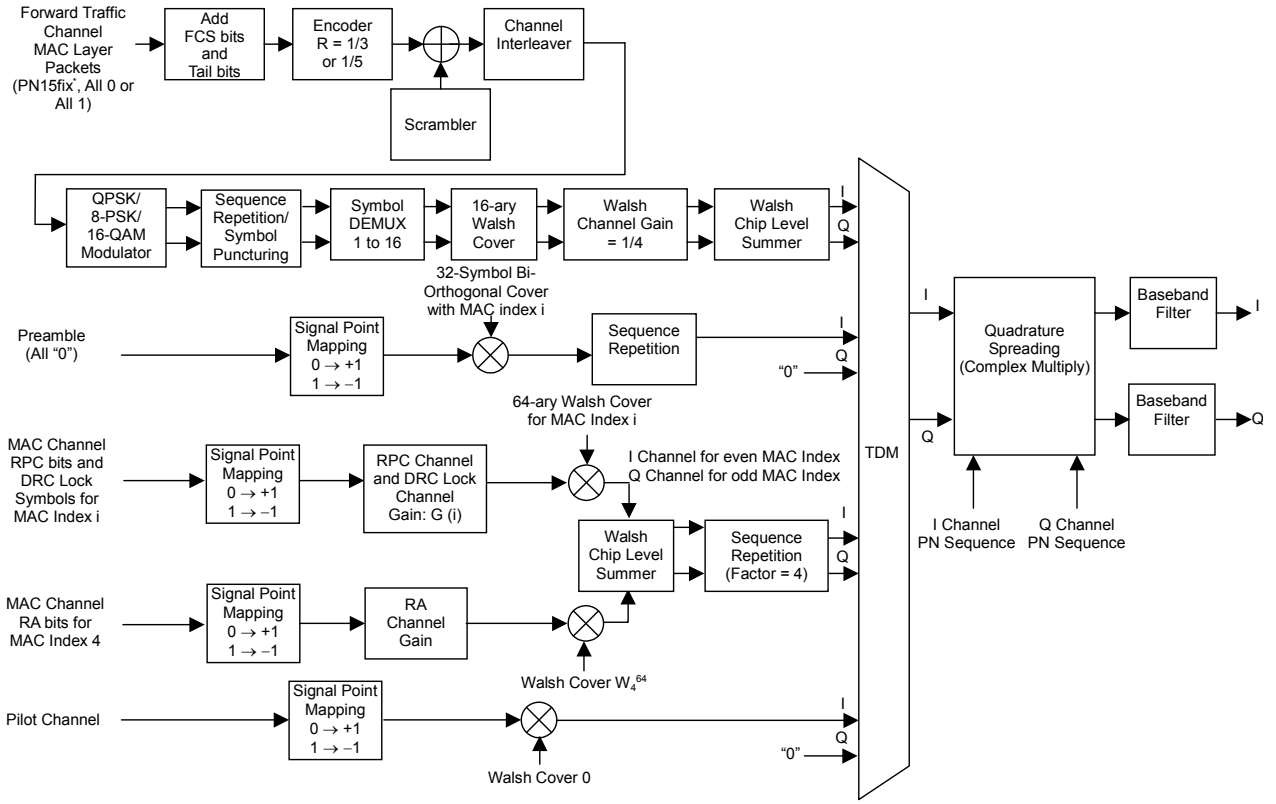


Figure 3.1.5.1-2 Block diagram of 1xEV-DO forward active slot

Table 3.1.5.1-1 List of active traffic channel parameters

No.	1xEV-DO Modulation Signal	Data Rate (kbps)	Transmission Slots	Packet (Bit)	Preamble (Chip)	Modulation Type
1	38.4 kbps (16slots) QPSK	38.4	16	1024	1024	QPSK
2	76.8 kbps (8slots) QPSK	76.8	8	1024	512	QPSK
3	153.6 kbps (4slots) QPSK	153.6	4	1024	256	QPSK
4	307.2 kbps (2slots) QPSK	307.2	2	1024	128	QPSK
5	614.4 kbps (1slot) QPSK	614.4	1	1024	64	QPSK
6	307.2 kbps (4slots) QPSK	307.2	4	2048	128	QPSK
7	614.4 kbps (2slots) QPSK	614.4	2	2048	64	QPSK
8	1228.8 kbps (1slot) QPSK	1228.8	1	2048	64	QPSK
9	921.6 kbps (2slots) 8-PSK	921.6	2	3072	64	8-PSK
10	1843.2 kbps (1slot) 8-PSK	1843.2	1	3072	64	8-PSK
11	1228.8 kbps (2slots) 16QAM	1228.8	2	4096	64	16QAM
12	2457.6 kbps (1slot) 16QAM	2457.6	1	4096	64	16QAM

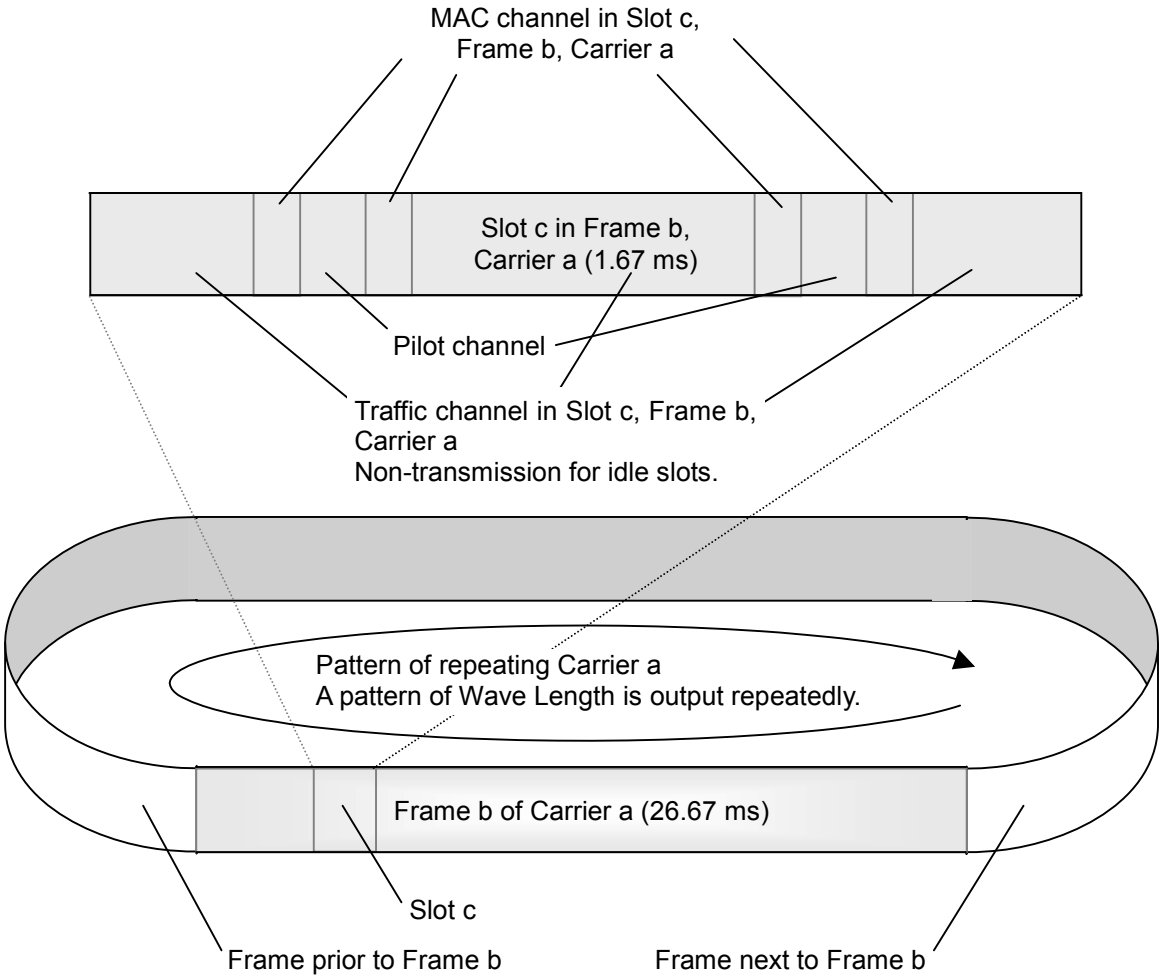


Figure 3.1.5.1-3 Image of 1xEV-DO forward single carrier waveform pattern repetition

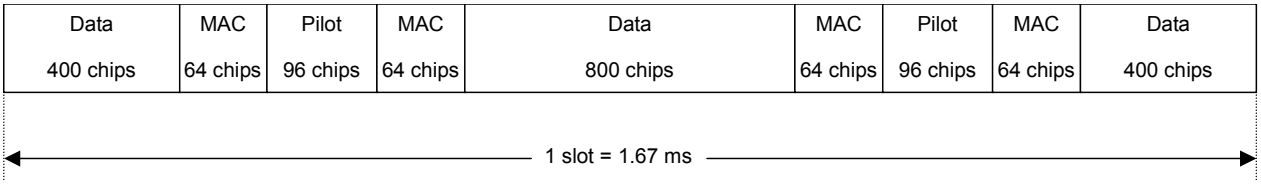


Figure 3.1.5.1-4 1xEV-DO forward active slot format after TDM

Idle Slot

A waveform pattern of a single carrier for which Data Rate on the Carrier Edit sheet is set to "13: Idle Slot" is generated by time-division multiplexing the MAC Channel and Pilot Channel.

When Data Rate is set to "13: Idle Slot", all the slots of that single carrier become idle slots.

The MAC channel to be multiplexed, values of RPC bit and RA bit, and channel gain can be set for each slot in a frame.
Figure 3.1.5.1-5 shows the block diagram of a 1xEV-DO forward idle slot and Figure 3.1.5.1-6 shows the 1xEV-DO forward idle slot format after time-division multiplexing (TDM). Figure 3.1.5.1-3 shows an image of single carrier waveform pattern repetition.

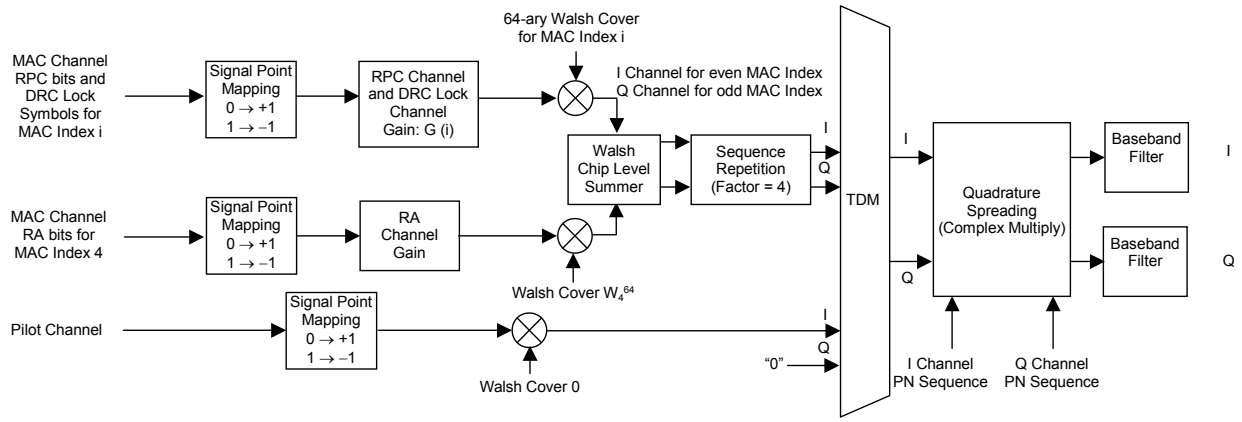


Figure 3.1.5.1-5 Block diagram of 1xEV-DO forward idle slot

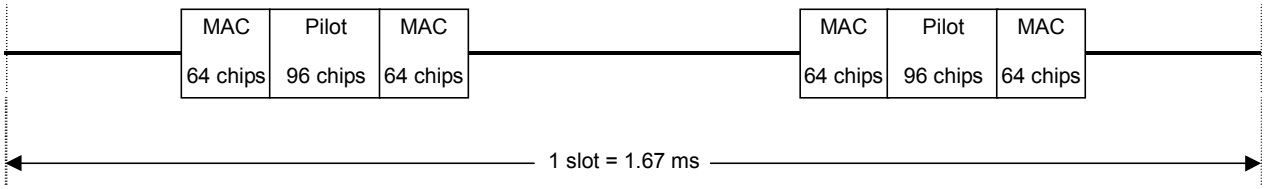


Figure 3.1.5.1-6 1xEV-DO forward idle slot format after TDM

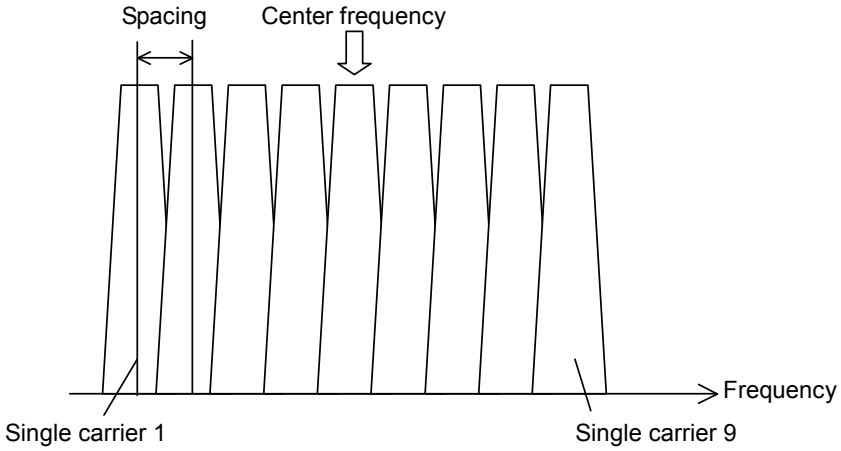
3.1.5.2 Multicarrier

A multicarrier consists of single carriers for which Carrier Select is set to ON in the Multicarrier Composition sheet. When only one single carrier is set to ON for Carrier Select, a multicarrier waveform pattern is not generated but a single carrier waveform pattern. A single carrier with smaller carrier number is located lower on an actual frequency axis, and a single carrier with greater carrier number is located upper.

The frequency offset between adjacent single carriers is the value specified in Spacing in the Multicarrier Composition sheet. When outputting a multicarrier from the MG3700A/MG3710A, the center frequency corresponds to the frequency centered between the single carrier that is set to ON and has the greatest carrier number and the single carrier that is set to ON and has the smallest carrier number.

Figure 3.1.5.2-1 shows multicarrier examples.

(Example 1) When all the single carriers are set to ON



(Example 2) When the single carriers 1, 3, 4, and 6 are set to ON

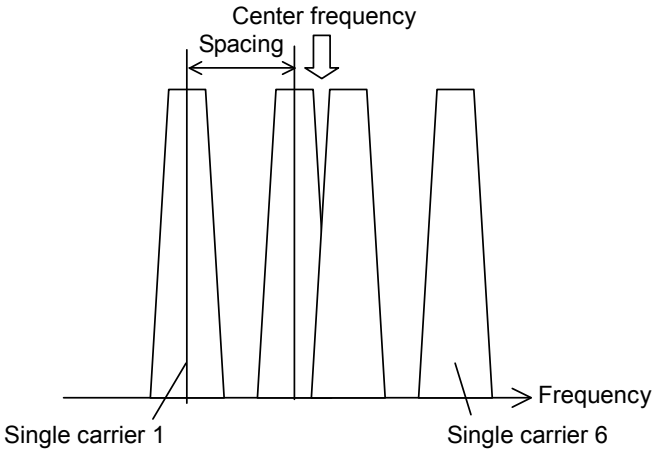


Figure 3.1.5.2-1 Multicarrier examples

3.1.6 Clipping

This software executes clipping for data that exceeds the maximum value during waveform pattern generation in respect to both I and Q phases. When clipping is executed, a dialog box is displayed to notify that clipping was executed.

3.1.7 Sample parameter file

Sample parameter files are saved in the folder where the 1xEVDO_FWD.exe file is stored after installing the IQproducer™. The parameters can be automatically set for generating a waveform pattern of the signal that conforms to the 3GPP2 test specification by reading a sample parameter file with the parameter file reading function available from the 1xEV-DO forward Carrier Edit sheet. Refer to Table 3.1.7-1 for details of the settings in each sample parameter file.

Table 3.1.7-1 Settings in sample parameter files

No.	Sample Parameter File	Data Rate (kbps)	Slots	Modulation Type	MAC Channel	No. of carriers
0	FWD_38_4 kbps_16slot.prm	38.4	16	QPSK	RABit = Random, RAChannel Gain = –12.04 dB *, RPCBit = Random, RPC ChannelGain = –11.42 dB (*	Single carrier
1	FWD_76_8 kbps_8slot.prm	76.8	8	QPSK		
2	FWD_153_6 kbps_4slot.prm	153.6	4	QPSK		
3	FWD_307_2 kbps_2slot.prm	307.2	2	QPSK		
4	FWD_614_4 kbps_1slot.prm	614.4	1	QPSK		
5	FWD_307_2 kbps_4slot.prm	307.2	4	QPSK		
6	FWD_614_4 kbps_2slot.prm	614.4	2	QPSK		
7	FWD_1228_8 kbps_1slot.prm	1228.8	1	QPSK		
8	FWD_921_6 kbps_2slot.prm	921.6	2	8-PSK		
9	FWD_1843_2 kbps_1slot.prm	1843.2	1	8-PSK		
10	FWD_1228_8 kbps_2slot.prm	1228.8	2	16QAM		
11	FWD_2457_6 kbps_1slot.prm	2457.6	1	16QAM		
12	FWD_Idle.prm	Idle Slot	–	–		
13	FWD_2457_6 kbps_x4.prm	2457.6	1	16QAM		Four multicarriers
14	FWD_Idle_x4.prm	Idle Slot	–	–		

*: A value relative to pilot channel

3.1.8 Auxiliary signal output

Select a waveform pattern generated by the CDMA2000 1xEV-DO IQproducer™ on the MG3700A/MG3710A to output the marker that is synchronized with the RF signal as an auxiliary signal from the AUX Input/Output on the rear panel of the MG3700A/MG3710A. Frame Trigger (Connector 1), Slot Trigger (Connector 2) and Symbol Clock (Connector 3) are output.

- Frame Trigger
  A 26.67-ms cycle pulse that is synchronized with the symbol at the beginning of the frame is output from Connector 1. Change Polarity for Marker 1 to change the signal polarity.

- RF Gate
  Shows burst ON/OFF status of MG3700A/MG3710A RF output when a burst wave is used as the waveform pattern. The correspondences between burst status and output signal status are as follows.
  Burst ON: High level
  Burst OFF: Low level
  The correspondences shown above apply when Polarity for Marker 2 is set to Positive. These correspondences are reversed when Polarity is set to Negative.

- Symbol Clock
  A 0.814-ms cycle symbol clock that is synchronized with the symbol is output from Connector 3. Change Polarity for Marker 3 to change the signal polarity.

3.2 Detailed Description of 1xEV-DO Reverse IQproducer™ Function

3.2.1 Waveform pattern parameter setting screen

3.2.1.1 Main screen

On common platform screen, click the **System (Cellular)** tab, and then click **1xEVDO RVS** to display the main screen.

The main screen comes with the menu and tool buttons used to open function screens. When a function item is selected from the menu or a tool button is clicked, the corresponding function screen is displayed. The over sampling rate, the number of active carriers, and the pattern name of the waveform pattern to be generated are displayed in the main screen, as well as a graph showing the parameter settings.

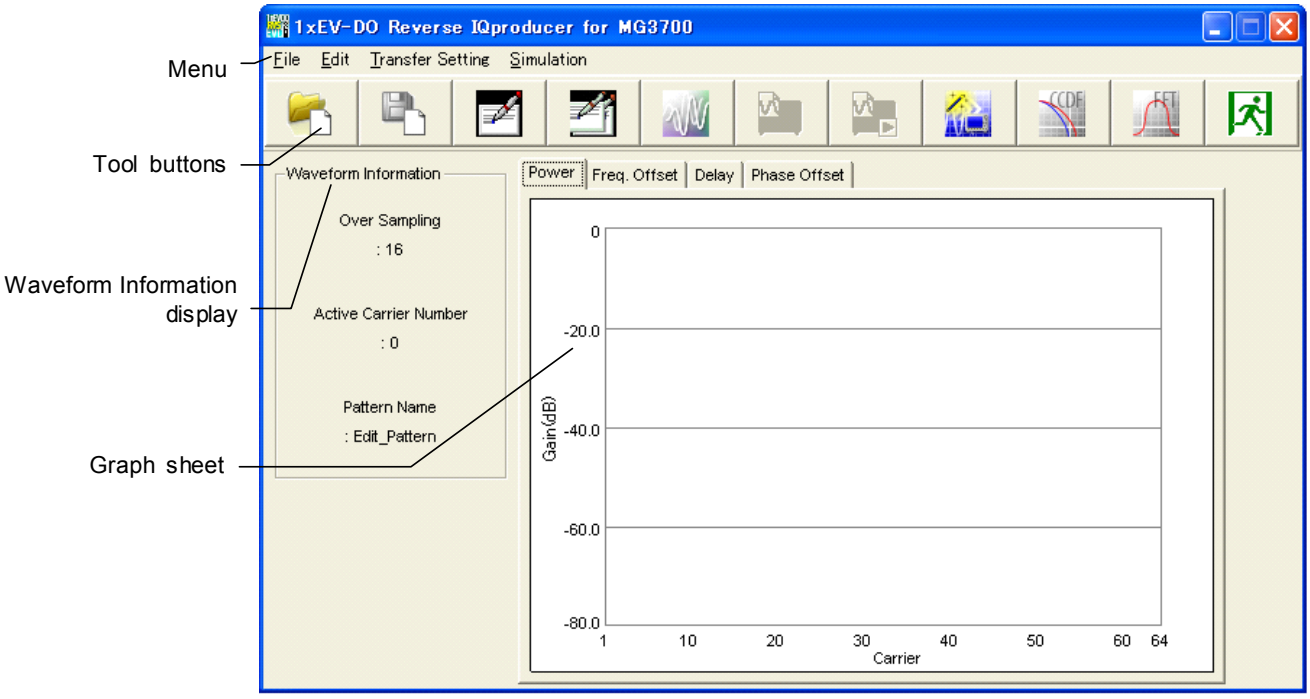


Figure 3.2.1.1-1 1xEV-DO Reverse IQproducer main screen

(1) [File] menu

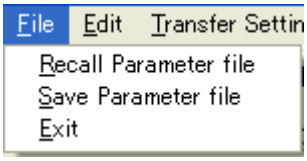


Figure 3.2.1.1-2 Screen when File is selected

- **Recall Parameter File**
  Loads the parameter files saved by Save Parameter File. Setting can be facilitated by using the loaded parameters.

- **Save Parameter File**
  Saves the setting parameters to a file.

- **Exit**
  Exits this Software.

(2) [Edit] menu

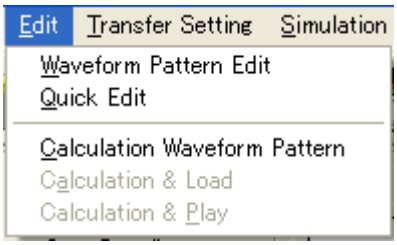


Figure 3.2.1.1-3 Screen when Edit is selected

- **Waveform Pattern Edit**
  Displays Waveform Pattern Edit screen. For details, refer to 3.2.1.2 “Waveform Pattern Edit screen”.

- **Quick Edit**
  Displays Quick Edit screen. For details, refer to 3.2.1.3 “Quick Edit screen”.

- **Calculation Waveform Pattern**
  Starts waveform pattern generation after parameter setting. This is the same operation with clicking the Calculation button on a parameter setting sheet.

- **Calculation & Load**

  Note:

  This function is available only when this software is used on MG3710A.

  After waveform generation is finished, the created waveform pattern is loaded into the MG3710A waveform memory.

- **Calculation & Play**

  Note:

  This function is available only when this software is used on MG3710A.

  After waveform generation is finished, the created waveform pattern is loaded and selected at the MG3710A waveform memory.

(3) [Transfer Setting] menu

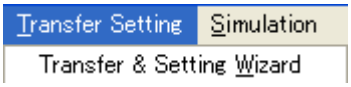


Figure 3.2.1.1-4 Screen when Transfer Setting is selected

Displays the Transfer & Setting Wizard screen. Every operation ranging from connecting the PC and MG3700A or MG3710A and transferring the waveform pattern to the MG3700A or MG3710A, to loading the waveform pattern into the MG3700A or MG3710A ARB memory is performed at this screen.

(4) [Simulation] menu

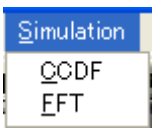


Figure 3.2.1.1-5 Screen when Simulation is selected

- **CCDF**
  Displays the CCDF graph display screen. In this screen, the CCDF of the generated waveform pattern is displayed in a graph.

- **FFT**
  Displays the FFT graph display screen. In this screen, the FFT-processed spectrum of the generated waveform pattern is displayed in a graph.

(5) Recall Parameter File button

[Overview] Clicking this button displays the dialog box for reading a parameter file.

Refer to Section 3.2.3.2 "Reading parameter file."

(6) Save Parameter File button

[Overview] Clicking this button displays the dialog box for saving a parameter file.

Refer to Section 3.2.3.1 "Saving parameter file."

(7) Waveform Pattern Edit button

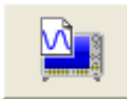
[Overview] Clicking this button displays the Waveform Pattern Edit screen for setting each carrier.

(8) Quick Edit button

[Overview] Clicking this button displays the Quick Edit screen for setting each carrier.

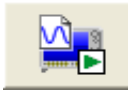
(9) Calculate Waveform Pattern button

[Overview] Clicking button starts waveform pattern generation based on the parameter settings.



(10) Calculation & Load button

[Overview] After waveform generation is finished, the created waveform pattern is loaded into the MG3710A waveform memory.



(11) Calculation & Play button

[Overview] After waveform generation is finished, the created waveform pattern is loaded and selected at the MG3710A waveform memory.

(12) Transfer & Setting Wizard button

[Overview] Clicking this button opens the waveform pattern transfer wizard "Transfer & Setting Wizard."

(13) CCDF Simulation button

[Overview] Clicking this button displays the trace of the last-generated waveform pattern on the CCDF Graph Monitor screen.
When the CCDF Graph Monitor screen is not displayed before this button is clicked, clicking this button opens the CCDF Graph Monitor screen first and then displays the trace.

(14) FFT Simulation button

[Overview] Clicking this button displays the trace of the last-generated waveform pattern on the FFT Graph Monitor screen.
When the FFT Graph Monitor screen is not displayed before this button is clicked, clicking this button opens the FFT Graph Monitor screen first and then displays the trace.

(15) Exit button

[Overview] Clicking this button exits the 1xEV-DO Reverse IQproducer™.

(16) Waveform Information display field

[Overview] The over sampling rate (Over Sampling), the number of active carriers (Active Carrier Number), and the pattern name of the waveform pattern (Pattern Name) to be generated are displayed. Active Carrier Number shows the total number of carriers that are set to ON.

(17) Power graph

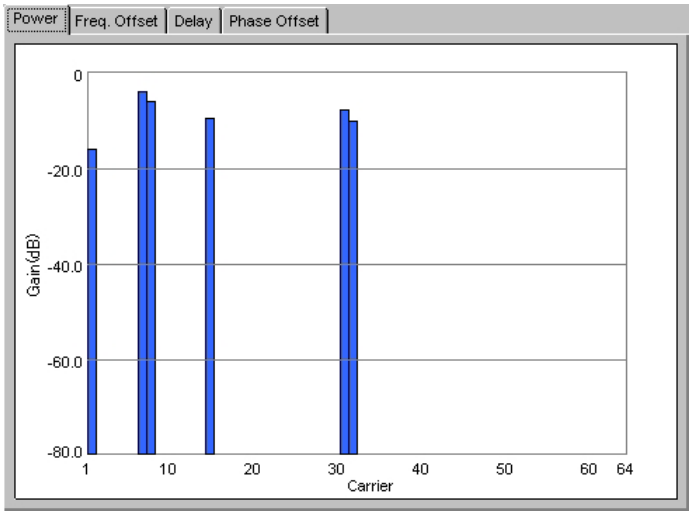


Figure 3.2.1.1-6 Power graph

[Overview] The powers of the carriers that are set to ON are displayed. The gains are displayed on the vertical axis in dB units based on the total power of all the carriers that are set to ON. The powers of the carriers that are set to OFF are not displayed.

(18) Freq. Offset graph

Figure 3.2.1.1-7 Freq. Offset graph

[Overview] The frequency offsets of the carriers that are set to ON are displayed. The frequency offsets of the carriers that are set to OFF are not displayed.

(19) Delay graph

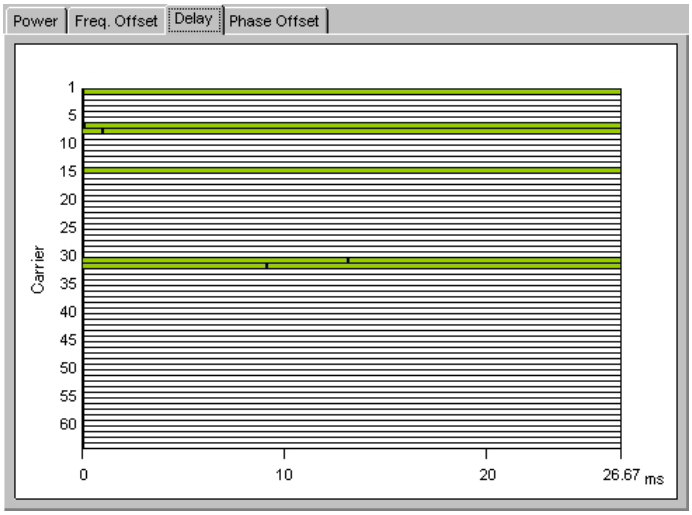


Figure 3.2.1.1-8 Delay graph

[Overview] The delays of the carriers that are set to ON are displayed in green.
In this case, "delay" is the output timing delay of the frame head of the carrier from a frame trigger output from the rear panel of the MG3700A/MG3710A.

(20) Phase Offset graph

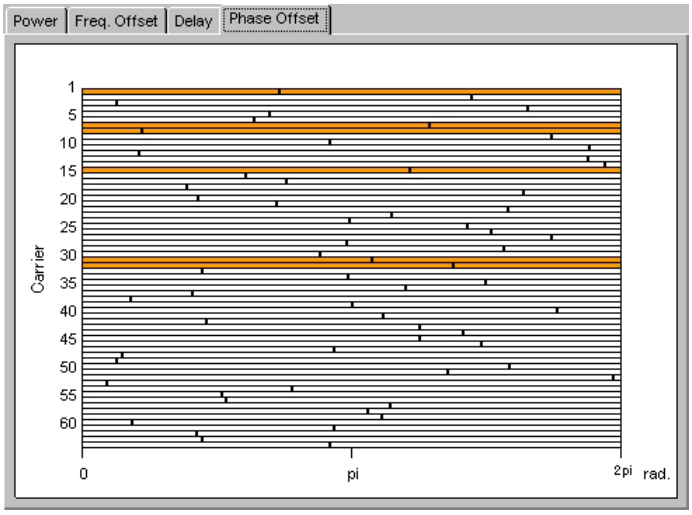


Figure 3.2.1.1-9 Phase Offset graph

[Overview] The phase offsets of the carriers that are set to ON are displayed in orange.
In this case, "phase offset" is a phase displacement relative to other carriers.

3.2.1.2 Waveform Pattern Edit screen

When **[Waveform Pattern Edit]** is selected from the **[Edit]** menu or the  tool button is clicked on the main screen, the Waveform Pattern Edit screen is displayed. The modulation parameters for each carrier can be set in this screen. The carrier number of the displayed carrier is displayed on the left of the screen, and all the carriers can be viewed by moving the scroll bar on the right of the screen for setting their parameters.

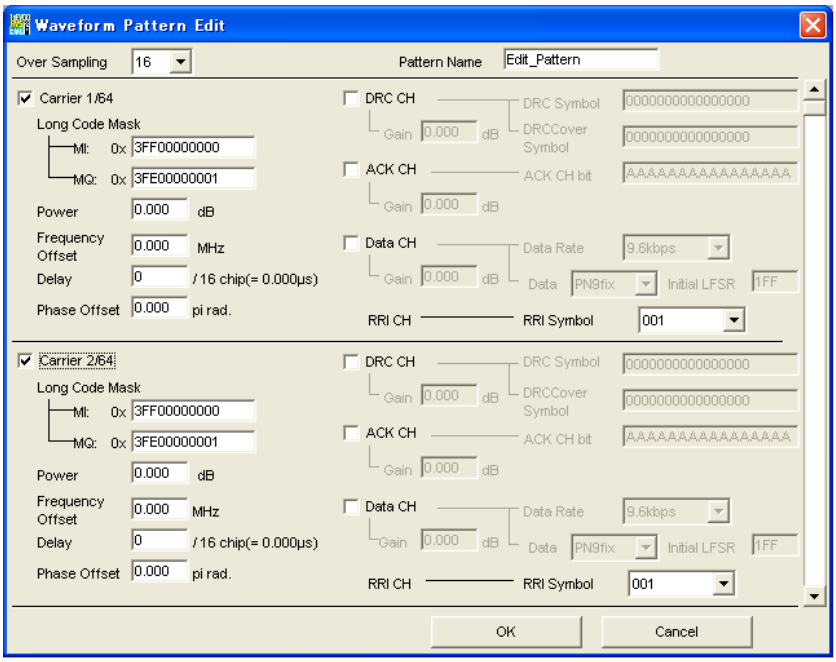


Figure 3.2.1.2-1 Waveform Parameter Edit screen

(1) Over Sampling

[Overview] The over sampling rate can be set. Over sampling rate is the ratio of the sampling rate and chip rate of the waveform pattern.

[Initial value] 16

[Setting range] 4, 8, 16

(2) Pattern Name

[Overview] The waveform pattern file name can be set.
A waveform pattern generated by selecting **[Calculate Waveform Pattern]** from the **[Edit]** menu or by clicking the  tool button consists of two waveform pattern files: waveform pattern information file and waveform pattern data file.
The waveform pattern file name consists of the character string set here and the extension ".wvi" (for waveform pattern information file) or ".wvd" (for waveform pattern data file).

[Initial value] None

[Setting range] Within 20 characters
Alphanumeric characters and the following symbols can be used for a file name:
! % & ( ) + = ` { } _ - ^ @ [ ]

(3) Carrier On/Off checkbox

[Overview] Used to set each carrier On (checked) or Off (left blank).

[Initial value] Off

[Setting range] On, Off

(4) Long Code Mask

[Overview] The I and Q long code masks can be set. MQ is automatically set when MI is set. It is also possible to MQ manually.

[Initial value] MI = 0x3FF00000000, MQ = 0x3FE00000001

[Setting range] 0x0 to 0x3FFFFFFFFF (for both MI and MQ)

(5) Power

[Overview] The power of the carrier can be set.
The power difference between the carriers becomes close to this value. This value is a relative value, not an absolute one.
This value may not match the value on the Power graph in the main screen, since the power on the vertical axis of the Power graph is based on the total of all the carriers.

[Initial value] 0.000 dB

[Setting range] –80.000 to 0.000 dB

(6) Frequency Offset

[Overview] The frequency offset of the carrier can be set.
In this case, "frequency offset" is an offset of the carrier frequency from the center frequency set in the MG3700A/MG3710A.

[Initial value] 0.000 MHz

[Setting range] –5.000 to 5.000 MHz

(7) Delay

[Overview] The delay of the carrier can be set.
In this case, "delay" is the output timing delay of the frame head of the carrier from a frame trigger output from the rear panel of the MG3700A/MG3710A.

[Initial value] 0/16 chips

[Setting range] 0/16 chips to 524287/16 chips

(8) Phase Offset

[Overview] The phase offset of the carrier can be set.
In this case, "phase offset" is a phase displacement relative to other carriers.

[Initial value] 0.000 πrad.

[Setting range] 0.000 to 2.000 πrad.

(9) DRC CH On/Off check box

[Overview] Used to set the DRC channel On (checked) or Off (left blank).

[Initial value] Off

[Setting range] On, Off

(10) DRC CH Gain

[Overview] The DRC channel gain can be set. This is a value relative to the pilot channel.

[Initial value] 0.000 dB

[Setting range] –80.000 to 20.000 dB

(11) DRC Symbol

[Overview] The DRC channel symbol data can be set in hexadecimal. The leftmost value indicates the DRC channel symbol data of the first slot, and each digit corresponds to the DRC channel symbol data of each slot sequentially.
When a value less than 16 digits is set, "0"s are added to complement the data.

[Initial value] 0000000000000000 (HEX)

[Setting range] 0000000000000000 to FFFFFFFFFFFFFFFF (HEX)

(12) DRC Cover Symbol

[Overview] The DRC cover symbol data can be set in octal. The leftmost value indicates the DRC cover symbol data of the first slot, and each digit corresponds to the DRC cover symbol data of each slot sequentially.
When a value less than 16 digits is set, "0"s are added to complement the data.

[Initial value] 0000000000000000 (OCT)

[Setting range] 0000000000000000 to 7777777777777777 (OCT)

(13) ACK CH On/Off check box

[Overview] Used to set the ACK channel On (checked) or Off (left blank).

[Initial value] Off

[Setting range] On, Off

(14) ACK CH Gain

[Overview] The ACK channel gain can be set. This is a value relative to the pilot channel.

[Initial value] 0.000 dB

[Setting range] –80.000 to 20.000 dB

(15) ACK CH bit

[Overview] The ACK channel bit can be set. The leftmost value indicates the ACK channel bit of the first slot, and each digit corresponds to the ACK channel bit of each slot sequentially.
'1 (ACK)' is transmitted in the slot for which A is set. '0 (NACK)' is transmitted in the slot for which N is set. The slot for which X is set is DTX.
When a value less than 16 digits is set, "X"s are added to complement the data.

[Initial value] AAAAAAAAAAAAAAAA

[Setting range] A (ACK), N (NACK), X (DTX)

(16) Data CH On/Off check box

[Overview] Used to set the Data channel On (checked) or Off (left blank).

[Initial value] Off

[Setting range] On, Off

(17) Data CH Gain

[Overview] The Data channel gain can be set. This is a value relative to the pilot channel.

[Initial value] 0.000 dB

[Setting range] –80.000 to 20.000 dB

(18) Data Rate

[Overview] The Data channel data rate can be set.

[Initial value] 9.6 kbps

[Setting range] 9.6, 19.2, 38.4, 76.8, 153.6 kbps

(19) Data

[Overview] The payload data of the Data channel can be set.
PN9fix indicates a non-continuous PN9 coding sequence.

[Initial value] PN9fix

[Setting range] PN9fix, All '0', All '1'

(20) Initial LFSR

[Overview] The initial value of the shift register for PN9 generation can be set in hexadecimal when PN9fix is set for Data.

[Initial value] 1FF

[Setting range] 0 to 1FF (HEX)

(21) RRI Symbol Rate

[Overview] The RRI symbol can be set in binary.
When Data Rate is set, the RRI symbol is automatically set to the value corresponding to Data Rate. It is also possible to set the RRI symbol manually.

[Initial value] 001

[Setting range] 000 to 101 (BIN)

(22) [OK] button

[Overview] Clicking this button closes the Waveform Pattern Edit screen, saving the current settings in the screen.

(23) [Cancel] button

[Overview] Clicking this button closes the Waveform Pattern Edit screen, without saving the current settings in the screen.

3.2.1.3 Quick Edit screen

When **[Quick Edit]** is selected from the **[Edit]** menu or the  tool button is clicked on the main screen, the Quick Edit screen is displayed. There are two sheets on the Quick Edit screen: Uniformly Edit sheet and Random Edit sheet. On the Uniformly Edit sheet, parameters of two or more specified carriers can be set at the same time. On the Random Edit sheet, parameters of two or more specified carriers can be set to random values at the same time.

(1) [OK] button

[Overview] Clicking this button closes the Quick Edit screen, saving the current settings in the screen.

(2) [Cancel] button

[Overview] Clicking this button closes the Quick Edit screen, without saving the current settings in the screen.

Uniformly Edit sheet

In the Uniformly Edit sheet, settings can be carried out collectively for the carriers specified in Edit Range. When carrying out collective settings in the Uniformly Edit sheet, select the parameters to be set by checking their checkbox (on the left) in the Parameter Selection field, specify the target carriers in the Edit Range field, and then click the **[Apply]** button. The setting method, initial value, and setting range of each control (parameter) in the Parameter Selection field are the same with those in the Waveform Pattern Edit screen.

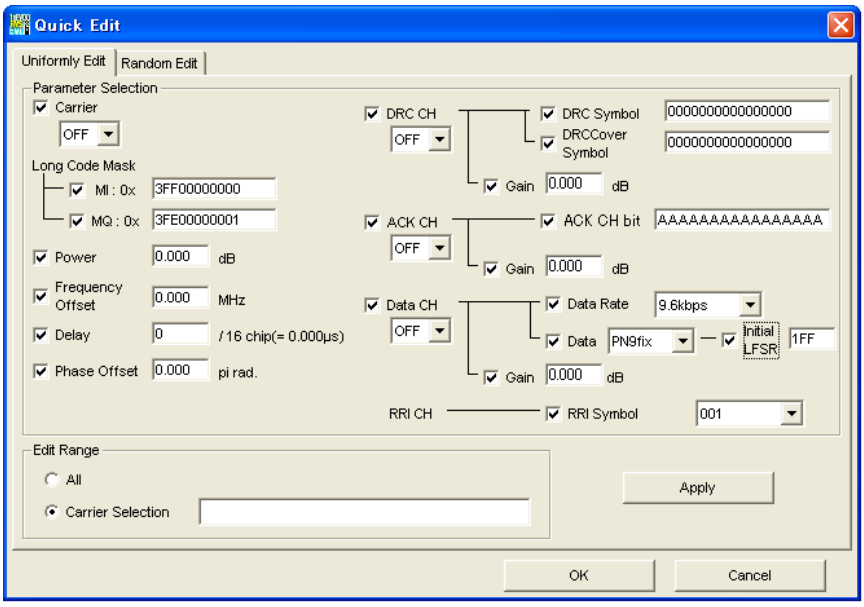


Figure 3.2.1.3-1 Uniformly Edit sheet

(1) Edit Range

[Overview] The target range of carriers for Uniformly Edit can be specified.

When the **[All]** radio button is checked and the **[Apply]** button is clicked, the settings are applied to all the carriers.

When the **[Carrier Selection]** radio button is checked and the **[Apply]** button is clicked, the settings are applied to the carriers that meet the conditions specified in the edition box on the right of the **[Carrier Selection]** radio button. The target carriers can be specified in the edition box by the following method:

1. Specify the carriers by entering their carrier number.
2. Two or more successive carriers can be specified by using a hyphen (-) as follows:
   (First carrier number of successive carrier numbers)+'-'+(Last carrier number of successive carrier numbers)
3. Several specification items described in 1. and 2. above can be entered by delimiting with a comma (,).

Example: 1-5,10,13,64

(2) Apply button

[Overview] Clicking this button applies the settings of the parameters for which the checkbox is checked in the Parameter Selection field to the carriers specified in the Edit Range field.

Random Edit sheet

In the Random Edit sheet, settings can be carried out collectively for the carriers specified in Edit Range. When carrying out collective settings in the Random Edit sheet, select the parameters to be set to a random value by checking their checkbox (on the left) in the Parameter Selection field, specify the target carriers in the Edit Range field, and then click the **[Apply]** button.

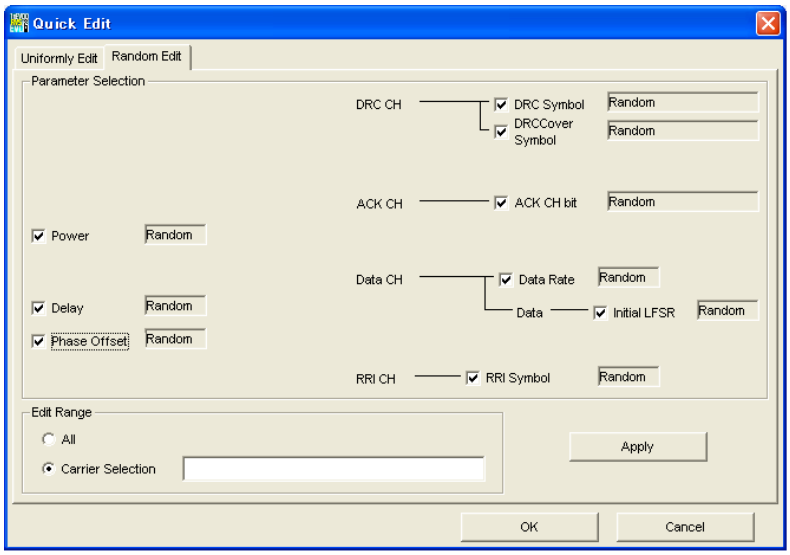


Figure 3.2.1.3-2 Random Edit sheet

(1) Edit Range

[Overview] The target range of carriers for Random Edit can be specified.

When the **[All]** radio button is checked and the **[Apply]** button is clicked, the settings are applied to all the carriers.

When the **[Carrier Selection]** radio button is checked and the **[Apply]** button is clicked, the settings are applied to the carriers that meet the conditions specified in the edition box on the right of the **[Carrier Selection]** radio button. The target carriers can be specified in the edition box by the following method:

1. Specify the carriers by entering their carrier number.
2. Two or more successive carriers can be specified by using a hyphen (-) as follows:
   (First carrier number of successive carrier numbers)+'-'+(Last carrier number of successive carrier numbers)
3. Several specification items described in 1. and 2. above can be entered by delimiting with a comma (,).

Example: 1-5,10,13,64

(2) Apply button

[Overview] Clicking this button applies the settings of the parameters for which the checkbox is checked in the Parameter Selection field to the carriers specified in the Edit Range field.

3.2.1.4 Execution and Result screen

When **[Calculate Waveform Pattern]** is selected from the **[Edit]** menu or the  tool button is clicked on the main screen, waveform pattern calculation is started and the Execution and Result screen is displayed. This screen displays the waveform pattern calculation status with character strings and the progress bar. A button is provided on the lower of the Execution and Result screen. This button is the **[Cancel]** button during calculation, used to interrupt the calculation. And this button is the **[OK]** button after the calculation is completed, used to close the Execution and Result screen.

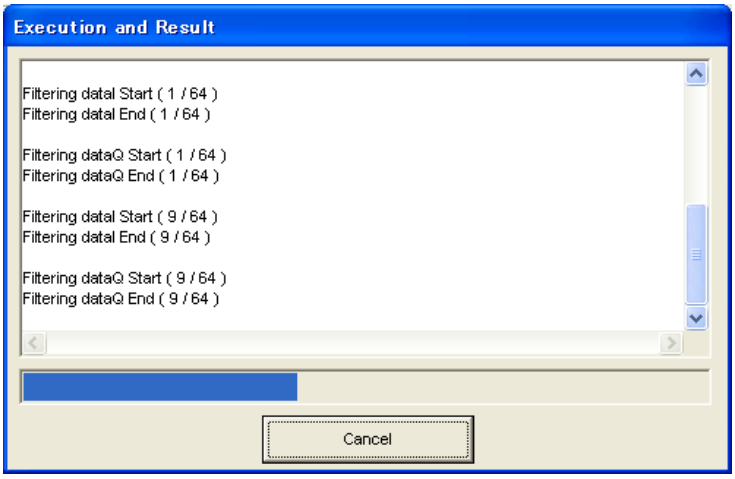


Figure 3.2.1.4-1 Execution and Result screen

3.2.1.5 Calculation & Load

Note:

This function is available only when this software is used on MG3710A.

When **Calculation & Load** is selected, the Load Setting screen will display after waveform generation.

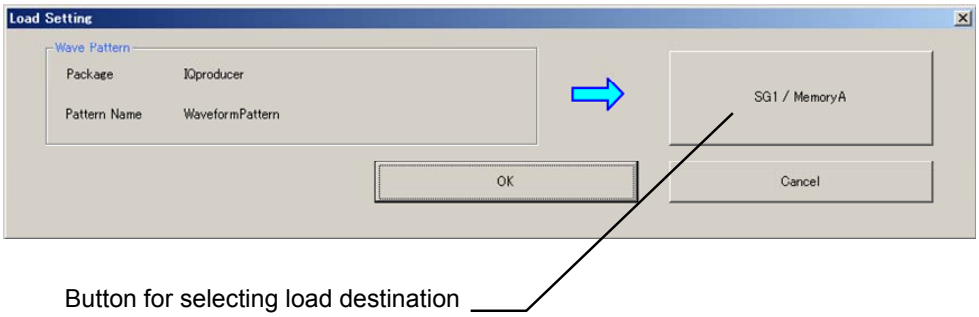


Figure 3.2.1.5-1 Load Setting Screen

The Select Memory screen will display after clicking the load destination in the Load Setting screen.

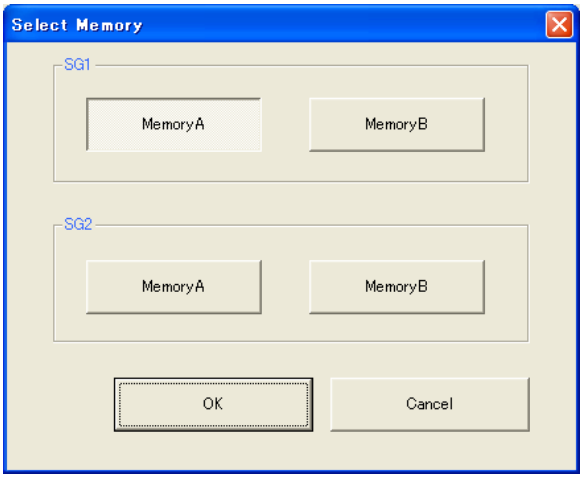


Figure 3.2.1.5-2 Select Memory Screen

After selecting the load destination of generated waveform in the Select Memory screen and clicking the **OK** button, the Load Setting screen will be shown again. Click the **OK** button in the Load Setting screen, and then the loading of waveform starts.

Note:

To exit this screen without loading the waveform pattern, click the **Cancel** button in the Load Setting screen.

3.2.1.6 Calculation & Play

Note:

This function is available only when this software is used on MG3710A.

When **Calculation & Play** is selected, after waveform creation is completed, the created waveform is loaded into memory, selected and output.

When the 2nd Vector Signal Generator (option) is installed, the Select SG screen is displayed before the start of waveform generation. This screen is used to select the signal generator for outputting the created waveform pattern.

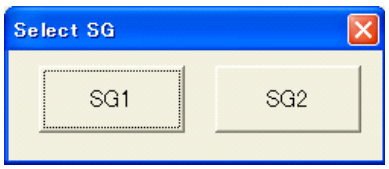


Figure 3.2.1.6-1 Select SG Screen

3.2.2 Waveform pattern generation procedure

This section provides a general procedure for generating a 1xEV-DO Reverse type waveform pattern using this software.

<Procedure>

1. Start up this software. The main screen is displayed.
2. Set the parameters by reading a parameter file and editing parameters in the Waveform Pattern Edit screen and/or Quick Edit screen.
3. After setting the parameters, select **[Calculate Waveform Pattern]** from the **[Edit]** menu or click the  tool button on the main screen. The waveform pattern generation is started.
4. The calculation is completed when "Complete" is displayed on the Execute and Result screen. Click the **[OK]** button to close the Execution and Result screen.
5. If necessary, transfer the generated waveform pattern to the MG3700A/MG3710A or analyze the generated waveform pattern in the CCDF/FFT Graph Monitor screen.

3.2.3 Saving/reading parameters

With this software, all the set parameters can be saved in a parameter file (extension: .prm), and the settings at the time when saving the parameter file can be restored anytime as required by reading this parameter file.

3.2.3.1 Saving parameter file

When running on PC

1. Click the **[Save Parameter File]** button in **[File]** menu or click the  button to display the parameter file saving screen.

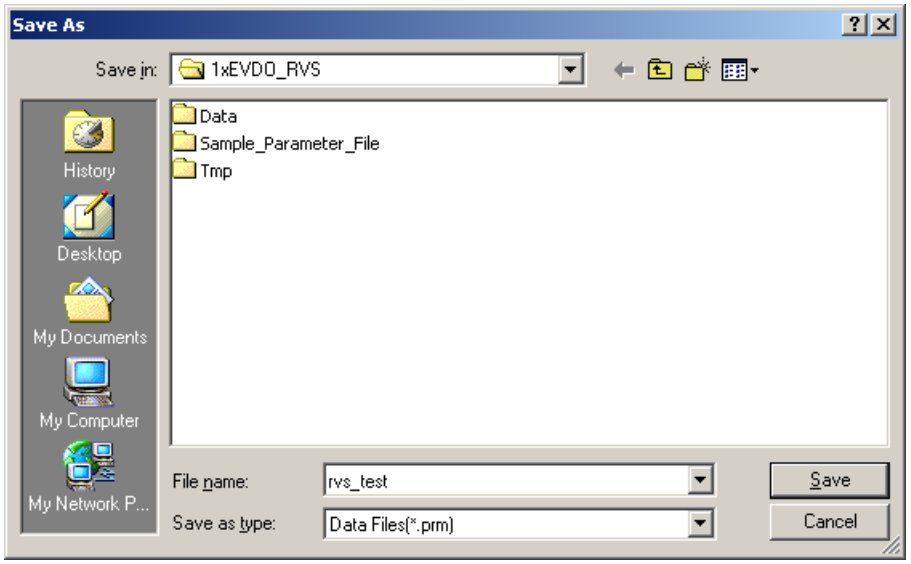


Figure 3.2.3.1-1 Parameter file saving screen

2. Enter a file name in the **[File name]** text box and click the **[Save]** button to save the parameter file.
   When the save destination is not changed in the **[Save in]** box, the parameter file is saved in the following directory with the entered file name:
   X:\IQproducer\1xEVDO_REV*Entered file name*.prm
   ("X:\IQproducer" indicates the folder where the IQproducer™ is installed.)

When running on MG3710A

1. Click the **[Save Parameter File]** button in **[File]** menu or click the  button to display the parameter file saving screen.

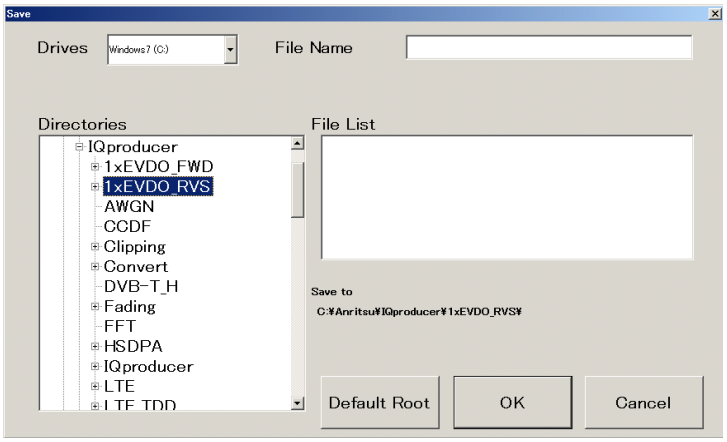


Figure 3.2.3.1-2 Parameter File Saving Screen (MG3710A)

2. Select the folder to store the file in the **[Directories]** field, and then enter the name of the file using the **[File Name]** box. Click **[OK]** to save the parameter file.
   To initialize the setting in the **[Directories]** field, click the **[Default Root]** button.

3.2.3.2 Reading parameter file

When running on PC

1. Select **[Recall Parameter File]** from the **[File]** menu or click the  tool button to display the parameter file reading screen.

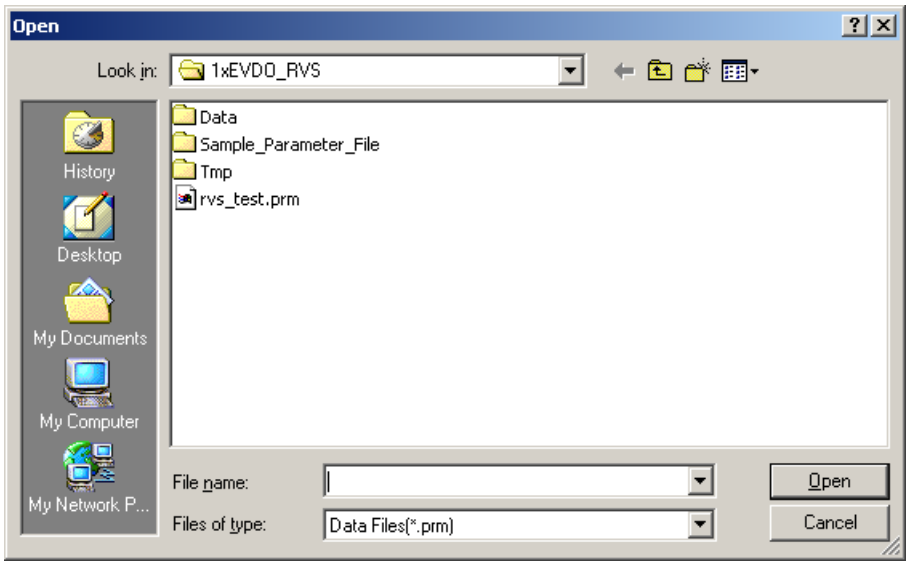


Figure 3.2.3.2-1 Parameter file reading screen

2. Select a parameter file to be read from the file list, and then click the **[Open]** button to read the selected parameter file.

When running on MG3710A

1. Select **[Recall Parameter File]** from the **[File]** menu or click the  tool button to display the parameter file reading screen.

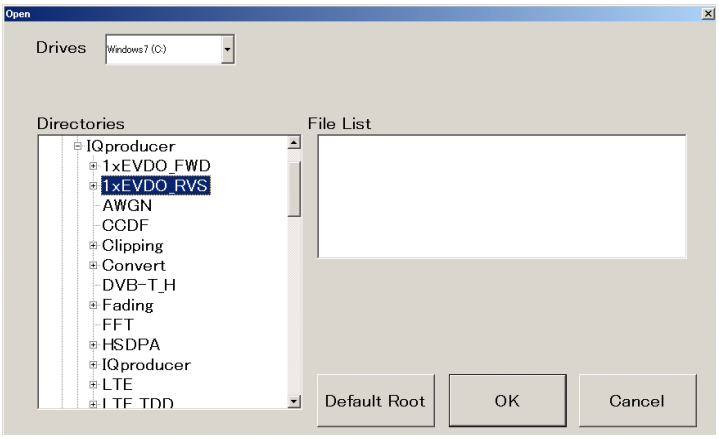


Figure 3.2.3.2-2 Parameter File Reading Screen (MG3710A)

2. Select the directory where the files to be loaded is stored in the **[Directories]** field. Click the desired file from the **[File List]**, and click **OK**. To initialize the setting in the **[Directories]** field, click the **[Default Root]** button.

3.2.4 Displaying graph

The generated waveform pattern can be displayed in a CCDF or FFT graph by using this software.

Displaying CCDF graph

1. Generate a waveform pattern by executing "Calculate Waveform Pattern" (waveform pattern calculation).
2. Select **[CCDF]** from the **[Simulation]** menu or click the  tool button. The CCDF Graph Monitor screen shown in Figure 3.2.4-1 is displayed with the trace of the generated waveform pattern.

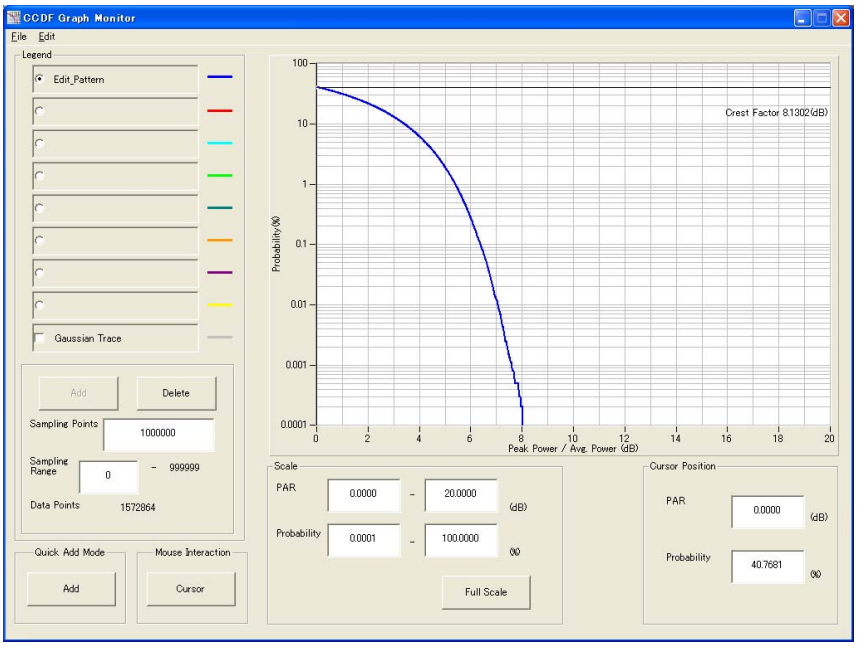


Figure 3.2.4-1 CCDF Graph Monitor screen

When a waveform pattern is generated by changing parameters and executing "Calculate Waveform Pattern" while other traces are displayed in the CCDF Graph Monitor screen, the trace of the waveform pattern newly generated can be displayed in either of the following two methods:

- Displaying the new trace in the same screen with the previous traces
- Deleting the previous traces to display the new trace

Note:

A CCDF graph and an FFT graph cannot be generated at the same time. When displaying a CCDF graph while an FFT graph is displayed, execute the CCDF graph generation after FFT graph generation is completed.

■ When displaying a new trace in the same screen with the previous traces:

1. Set **[Add]** for **[Quick Add Mode]** on the lower-left of the CCDF Graph Monitor screen.
2. Select **[CCDF]** from the **[Simulation]** menu or click the  tool button. The trace of the waveform pattern newly generated is additionally displayed in the CCDF Graph Monitor screen.
   Up to eight traces can be displayed by repeating this procedure.

■ When deleting the previous traces to display a new trace:

1. Set **[Clear]** for **[Quick Add Mode]** on the lower-left of the CCDF Graph Monitor screen.
2. Select **[CCDF]** from the **[Simulation]** menu or click the  tool button. The confirmation message shown in Figure 3.2.4-2 below appears:

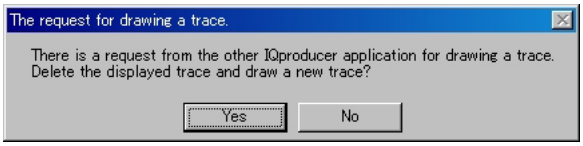


Figure 3.2.4-2 Confirmation message

Click the **[Yes]** button. The previous traces are deleted from the CCDF Graph Monitor screen, and the trace of the waveform pattern newly generated is displayed.

Displaying FFT graph

1. Generate a waveform pattern by executing "Calculate Waveform Pattern" (waveform pattern calculation).
2. Select **[FFT]** from the **[Simulation]** menu or click the  tool button. The FFT Graph Monitor screen shown in Figure 3.2.4-3 is displayed with the trace of the generated waveform pattern.

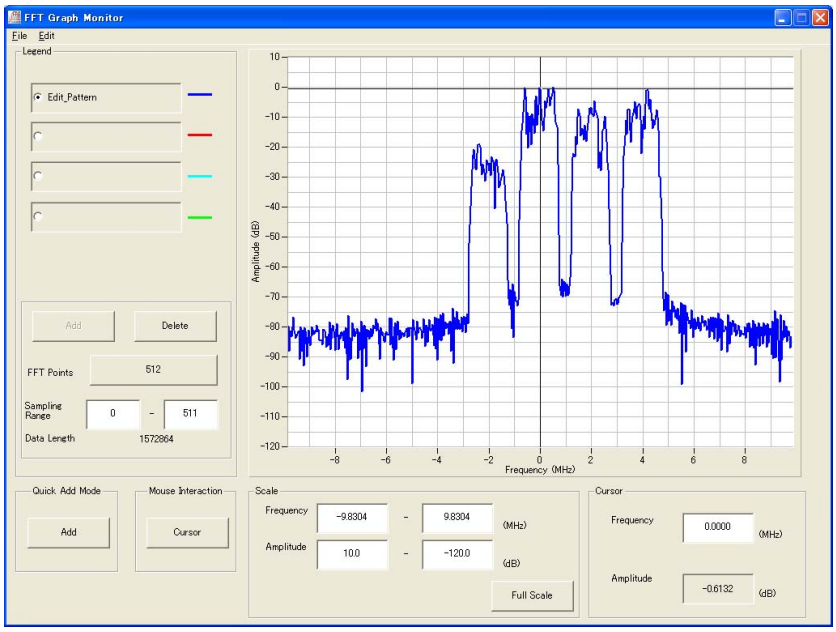


Figure 3.2.4-3 FFT Graph Monitor screen

When a waveform pattern is generated by changing parameters and executing "Calculate Waveform Pattern" while other traces are displayed in the FFT Graph Monitor screen, the trace of the waveform pattern newly generated can be displayed in either of the following two methods:

- Displaying the new trace in the same screen with the previous traces
- Deleting the previous traces to display the new trace

Note:

A CCDF graph and an FFT graph cannot be generated at the same time. When displaying an FFT graph while a CCDF graph is displayed, execute the FFT graph generation after CCDF graph generation is completed.

■ When displaying a new trace in the same screen with the previous traces:

1. Set **[Add]** for **[Quick Add Mode]** on the lower-left of the FFT Graph Monitor screen.
2. Select **[FFT]** from the **[Simulation]** menu or click the  tool button. The trace of the waveform pattern newly generated is additionally displayed in the FFT Graph Monitor screen.
   Up to four traces can be displayed by repeating this procedure.

■ When deleting the previous traces to display a new trace:

1. Set **[Clear]** for **[Quick Add Mode]** on the lower-left of the FFT Graph Monitor screen.
2. Select **[FFT]** from the **[Simulation]** menu or click the  tool button. The confirmation message shown in Figure 3.2.4-4 below appears:

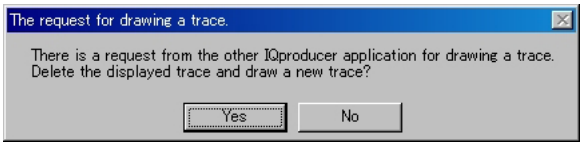


Figure 3.2.4-4 Confirmation message

Click the **[Yes]** button. The previous traces are deleted from the FFT Graph Monitor screen, and the trace of the waveform pattern newly generated is displayed.

3.2.5 Detailed description of modulation parameter

3.2.5.1 Modulation parameter for each carrier

1xEV-DO Reverse type waveforms that conform to 3GPP2 C.S0024 can be generated by using this application. Waveform pattern generation is carried out based on the modulation type specified in 3GPP2 C.S0024. The value set in [Data] (hereafter, a character string enclosed by brackets [ ] indicates a control of the 1xEV-DO Reverse IQproducer™) of the Waveform Pattern Edit screen or the Quick Edit screen is mapped to the payload data field as shown in Figure 3.2.5.1-1. The CRC bit and tail bit are mapped to the FCS and TAIL fields in a packet, respectively. This packet is mapped to Data Channel MAC Layer Packet shown in the block diagram of Figure 3.2.5.1-2. In this block diagram, the Pilot Channel data is set to all '0', RRI symbol is set to the value in [RRI Symbol], the ACK Channel data is set to the value in [ACK CH Bit], the DRC Symbols data is set to the value in [DRC Symbol], and the Walsh Cover Symbol data is set to the value in [DRC Cover Symbol]. Note that the DRC channel is output behind the Data and ACK channel by half slots (= 0.833 ms). Only the channels for which [On/Off check box for each channel] is set to ON (checked) are multiplexed.

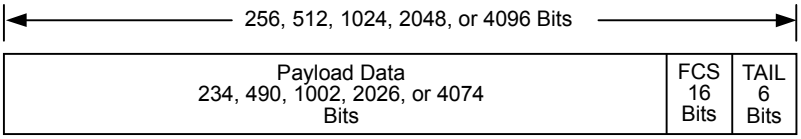


Figure 3.2.5.1-1 Reverse packet format

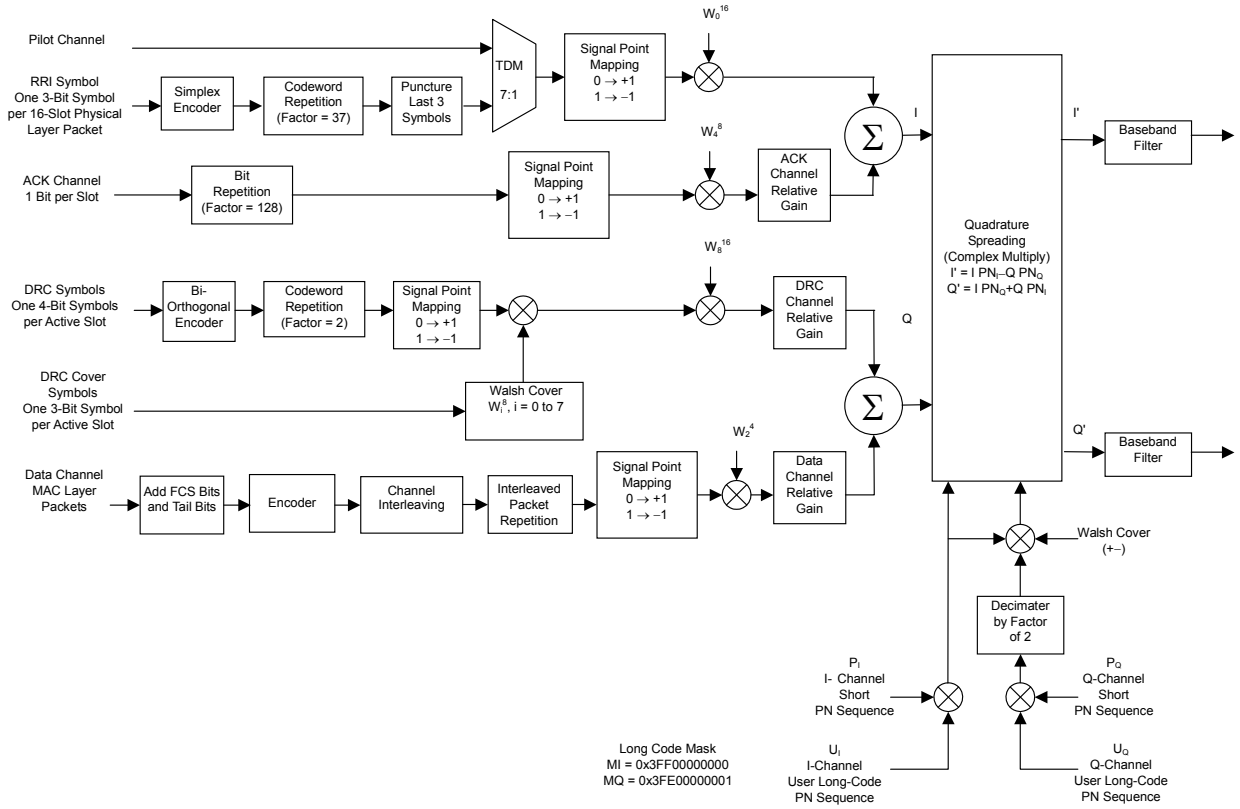


Figure 3.2.5.1-2 Block diagram of 1xEV-DO Reverse

3.2.5.2 Multicarrier

Al the carriers that are set to On in the Waveform Pattern Edit and/or Quick Edit screen are targeted to be multiplexed to generate a multicarrier. A multicarrier is generated so as to meet the following conditions:

- The gain difference from that of another carrier is equal to the value set in [Power].
- The frequency offset from the center frequency of the MG3700A/MG3710A is equal to the value set in [Frequency Offset].
- During RF output, the frame head is output behind a frame trigger output from the rear panel of the MG3700A/MG3710A by the delay time set in [Delay].
- The phase offset from that of another carrier is equal to the value set in [Phase Offset].

3.2.6 Clipping

This software executes clipping for data that exceeds the maximum value during waveform pattern generation in respect to both I and Q phases. When clipping is executed, a dialog box is displayed to notify that clipping was executed.

3.2.7 Sample parameter file

Sample parameter files are saved in the folder where the 1xEVDO_RVS.exe file is stored after installing the IQproducer™. The parameters can be automatically set for generating a waveform pattern of the signal that conforms to the 3GPP2 test specification by reading a sample parameter file with the parameter file reading function available from the 1xEV-DO Reverse main screen. Refer to Tables 3.2.7-1 and 3.2.7-2 for details of the settings in each sample parameter file.

Table 3.2.7-1 Settings in sample parameter files (1)

No.	Sample Parameter File	Data Rate (kbps)	RRI Symbol	DRC Value	DRC Cover	ACK ChannelBit	Long Code Mask
0	RVS_9_6 kbps_TX.prm	9.6	001	0x01	W_0^8	0	MI = 0x3FF00000000 MQ = 0x3FE00000001
1	RVS_19_2 kbps_TX.prm	19.2	010	0x01	W_0^8	0	
2	RVS_38_4 kbps_TX.prm	38.4	011	0x01	W_0^8	0	
3	RVS_76_8 kbps_TX.prm	76.8	100	0x01	W_0^8	0	
4	RVS_153_6 kbps_TX.prm	153.6	101	0x01	W_0^8	0	
5	RVS_9_6 kbps_RX.prm	9.6	001	0x01	W_0^8	0	
6	RVS_19_2 kbps_RX.prm	19.2	010	0x01	W_0^8	0	
7	RVS_38_4 kbps_RX.prm	38.4	011	0x01	W_0^8	0	
8	RVS_76_8 kbps_RX.prm	76.8	100	0x01	W_0^8	0	
9	RVS_153_6 kbps_RX.prm	153.6	101	0x01	W_0^8	0	

Table 3.2.7-2 Settings in sample parameter files (2)

No.	Sample Parameter File	Data Rate (kbps)	Data/Pilot	RRI/Pilot	DRC/Pilot	ACK/Pilot
0	RVS_9_6 kbps_TX.prm	9.6	3.75 dB	0 dB	3.0 dB	3.0 dB
1	RVS_19_2 kbps_TX.prm	19.2	6.75 dB	0 dB	3.0 dB	3.0 dB
2	RVS_38_4 kbps_TX.prm	38.4	9.75 dB	0 dB	3.0 dB	3.0 dB
3	RVS_76_8 kbps_TX.prm	76.8	13.25 dB	0 dB	3.0 dB	3.0 dB
4	RVS_153_6 kbps_TX.prm	153.6	18.50 dB	0 dB	3.0 dB	3.0 dB
5	RVS_9_6 kbps_RX.prm	9.6	3.75 dB	0 dB	3.0 dB	0 dB
6	RVS_19_2 kbps_RX.prm	19.2	6.75 dB	0 dB	3.0 dB	0 dB
7	RVS_38_4 kbps_RX.prm	38.4	9.75 dB	0 dB	3.0 dB	0 dB
8	RVS_76_8 kbps_RX.prm	76.8	13.25 dB	0 dB	3.0 dB	0 dB
9	RVS_153_6 kbps_RX.prm	153.6	18.50 dB	0 dB	3.0 dB	0 dB

3.2.8 Auxiliary signal output

Select a waveform pattern generated by the CDMA2000 1xEV-DO IQproducer™ on the MG3700A/MG3710A to output the marker that is synchronized with the RF signal as an auxiliary signal from the AUX Input/Output on the rear panel of the MG3700A/MG3710A. Frame Trigger (Connector 1), Slot Trigger (Connector 2) and Symbol Clock (Connector 3) are output.

- Frame Trigger
  A 26.67-ms cycle pulse that is synchronized with the symbol at the beginning of the frame is output from Connector 1. Change Polarity for Marker 1 to change the signal polarity.

- RF Gate
  Shows burst ON/OFF status of MG3700A/MG3710A RF output when a burst wave is used as the waveform pattern. The correspondences between burst status and output signal status are as follows.
  Burst ON: High level
  Burst OFF: Low level
  The correspondences shown above apply when Polarity for Marker 2 is set to Positive. These correspondences are reversed when Polarity is set to Negative.

- Symbol Clock
  A 0.814-μs cycle symbol clock that is synchronized with the symbol is output from Connector 3. Change Polarity for Marker 3 to change the signal polarity.

Chapter 4 How to Use Waveform Patterns

The following operations are required to output a modulated signal from this equipment using the waveform pattern generated by this software:

- Transferring waveform pattern to internal hard disk
- Loading waveform patterns from the hard disk to the waveform memory
- Selecting a waveform pattern to be output from this equipment

This chapter explains the details of these operations.

4.1 For MG3700A or MG3710A

This section describes how to download a waveform pattern created for the MG3700A/MG3710A to the hard disk of the MG3700A/MG3710A and output the pattern.

4.1.1 Transferring waveform pattern to internal hard disk

The waveform pattern created with this software can be transferred to the internal hard disk in the following ways:

Note:

This operation is not necessary if you are using MG3710A and have generated waveform patterns on MG3710A.

For MG3700A

- LAN
- CompactFlash Card

For MG3710A

- LAN
- External device such as USB Memory

■Transferring from PC via LAN (MG3700A, MG3710A)

Two IQproducer™ tools can be used to transfer a waveform pattern to the MG3700A/MG3710A via a LAN.

- Transfer & Setting Wizard
  Start this wizard by clicking the **Transfer & Setting Wizard** button of this software or by selecting **Simulation & Utility** tab → **Transfer & Setting Wizard** from the IQproducer™ after creating a waveform pattern. For details, refer to Section 4.7 “File Transfer and Loading to Memory Using Transfer & Setting Wizard” in the MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™).
  Transferring a waveform pattern to the internal hard disk of the MG3700A/MG3710A, loading the waveform from the hard disk to the waveform memory, and then outputting the waveform pattern can be done using this wizard.

- Transfer & Setting Panel
  This function is loaded by selecting **Transfer & Setting Panel** in the **Simulation & Utility** tab of the IQproducer™. For details, refer to Section 5.2 "Transferring Waveform Pattern" in the MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual IQproducer™.
  Specify the folder that contains the waveform pattern to transfer to the MG3700A/MG3710A in the PC-side tree of **Transfer & Setting Panel**.

■Transferring using a CF card (MG3700A)

Copy the waveform pattern (***.wvi and ***.wvd files) to be downloaded to the MG3700A to the root directory of a CF card.

Insert the CF card into the card slot on the front panel of the MG3700A, and then copy the file to the hard disk. For details about how to use a CF card to transfer a waveform pattern, refer to (1) Loading waveform file in memory in Section 3.5.2 of the MG3700A Vector Signal Generator Operation Manual (Mainframe).

■Transferring via external device such as USB memory (MG3710A)

For details about how to transfer a waveform pattern created using this software to the hard disk of the MG3710A, refer to Section 7.3.6 "Copying external waveform pattern: Copy" in the "MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)".

4.1.2 Loading to Waveform Memory

To output a modulated signal using a waveform pattern, it is necessary to load the waveform pattern that was transferred to the internal hard disk of the MG3700A/MG3710A (described in Section 4.1.1 "Transferring waveform pattern to internal hard disk") to the waveform memory. A waveform pattern can be loaded into the waveform memory in the following two ways.

■Configuring using the mainframe

A waveform pattern can be loaded into the waveform memory by using the instruction panel of the MG3700A/MG3710A or by using a remote command.

For operation using the front panel, refer below:

- Section 3.5.2 (1) "Loading waveform file in memory" in the MG3700A Vector Signal Generator Operation Manual (Mainframe)
- Section 7.3.4 "Loading waveform pattern: Load" in the MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)

For operation using remote commands, refer below:

- Chapter 4 "Remote Control" in the MG3700A Vector Signal Generator Operation Manual (Mainframe)
- Section 7.3.4 "Loading waveform pattern: Load" in the MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)

■Using Transfer & Setting Panel of IQproducer™

A waveform pattern can be loaded from the LAN-connected PC to the memory by using **Transfer & Setting Panel**, which can be opened from the **Simulation & Utility** tab. For details, refer to Section 4.6 "File Transfer and Loading to Memory Using Transfer & Setting Panel" in the MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™).

4.1.3 Selecting Waveform Pattern

Select a waveform pattern to use for modulation from the waveform patterns loaded into the waveform memory of the MG3700A/MG3710A according to Section 4.1.2 “Loading to waveform memory”. A waveform pattern can be selected in the following two ways.

■Configuring using the MG3700A/MG3710A

Waveform patterns to be used for modulation can be selected by operating the equipment panel or by using a remote command.

For operation using the front panel, refer below:

- Section 3.5.2 (4) “Outputting pattern loaded in Memory A for modulation in Edit mode” in the MG3700A Vector Signal Generator Operation Manual (Mainframe)
- Section 7.3.5 “Selecting output waveform pattern: Select” in the MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)

For operation using remote commands, refer below:

- Chapter 4 “Remote Control” in the MG3700A Vector Signal Generator Operation Manual (Mainframe)
- Section 7.3.5 “Selecting output waveform pattern: Select” in the MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)

■ Using Transfer & Setting Panel of IQproducer™

A waveform pattern can be loaded from the LAN-connected PC to the memory, and also selected for modulation. This is done by using **Transfer & Setting Panel**, which can be opened from the **Simulation & Utility** tab. For details, refer to Section 4.6 “File Transfer and Loading to Memory Using Transfer & Setting Panel” in the MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™).

Appendix

Appendix A Error Messages

A list of error messages is shown below. In an error message, n_1 and n_2 indicate a numeric value, and *s* indicates a character string.

Table A-1 Error messages

Error Message	Description
Can not open file	The file cannot be opened.
Can not open file ("*s*")	The file *s* cannot be opened.
Can not read file	Reading from the file is disabled.
Can not write file	Writing to the file is disabled.
Directory not found ("*s*")	The folder *s* cannot be found.
Disk full ("*s*")	The disk capacity becomes full while creating the file *s*.
Division by zero:	0 division was executed.
Division by zero: NO RPC CH turned ON	Normalization was performed when all RPC Ch are OFF.
File not found. ("*s*")	The file *s* cannot be found.
Invalid file format ("*s*")	The format of the file *s* is invalid.
Invalid Frame Length.	Composition Execute was performed when Frame Length is not set to 3.
Out of range: *s* (n_1 – n_2)	The value of the parameter *s* is out of the setting range from n_1 to n_2.
The Waveform data file is not generated.	The waveform pattern data file is not generated.
Not enough memory.	The memory capacity is insufficient.

A list of warning messages is shown below.

Table A-2 Warning messages

Warning Message	Description
A Transfer wizard is already running.	The Transfer & Setting Wizard has already been activated.
Carrier Calculation has not yet been executed.	Composition Execute was performed when Carrier Calculate has not been executed.
In Making Multicarrier, please set a value of Wave Data Length to 3	It was tried to make multicarrier from a single carrier waveform data when Frame Length is not set to 3.

Appendix B Initial Value List

Initial values for 1xEV-DO Forward

<Carrier Edit>

Wave Data Length	3 frames
Over Sampling	16
Data Rate	12: 2457.6kbps (1slot)16QAM
TCH Data	PN15
Offset Index	0
TCH 1	5
TCH 2	6
TCH 3	7
TCH 4	8
Reg 1	7FFF
Reg 2	387F
Reg 3	3F80
Reg 4	3C07

<RPC/RA Parameter Edit>

Frame	1
Slot	1
RA Bit	0
RPC Bit	0
CH Power	0 dB
MAC Index 4	Off
MAC Indexes 5 to 63	Off

<Multicarrier Composition>

Spacing	1.23MHz
Carrier 1 to Carrier 8	On
Carrier 9	Off
Pattern Name	Edit_Data

Initial values for 1xEV-DO Reverse

<Waveform Pattern Edit>

Carrier 1 to Carrier 64	Off

The following are applied to all carriers.

Long Code Mask MI	0x3FF00000000
Long Code Mask MQ	0x3FE00000001
Power	0.000 dB
Frequency Offset	0.000 MHz
Delay	0.000 μs
Phase Offset	0.000 πrad.
DRC CH	Off
DRC CH Gain	0.000 dB
DRC Symbol	0000000000000000
DRC Cover Symbol	0000000000000000
ACK CH	Off
ACK CH Bit	AAAAAAAAAAAAAAAA
ACK CH Gain	0.000 dB
DataCH	Off
DataCH Gain	0.000 dB
Data Rate	9.6 kbps
Data	PN9fix
Initial LFSR	1FF
RRI Symbol	9.6 kbps
Data	001

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