

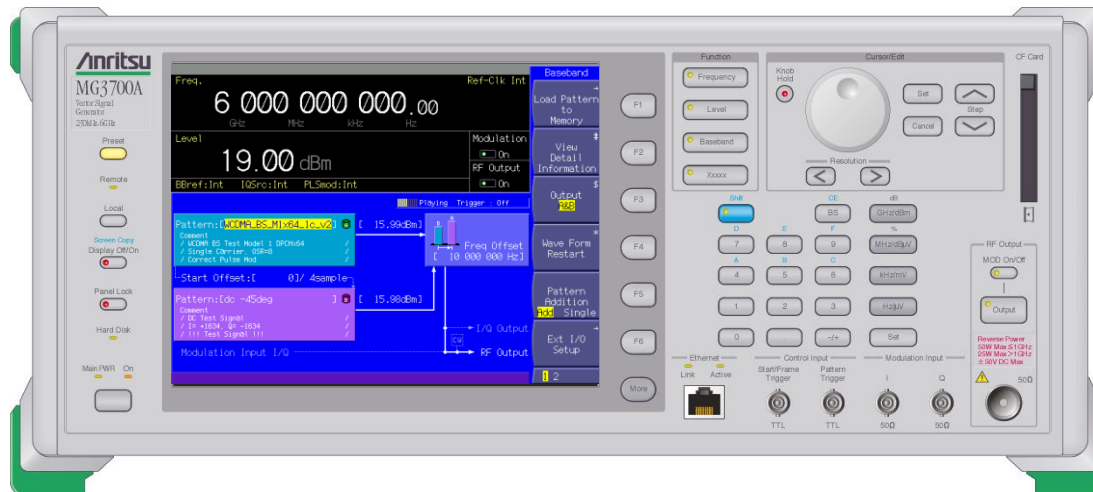
MX370104A

Multi-carrier IQproducer™

MG3700A
Vector Signal Generator

For MG3700A Vector Signal Generator

MX370104A Multi-carrier IQproducer™ Product Introduction



Version 3.00

ANRITSU CORPORATION

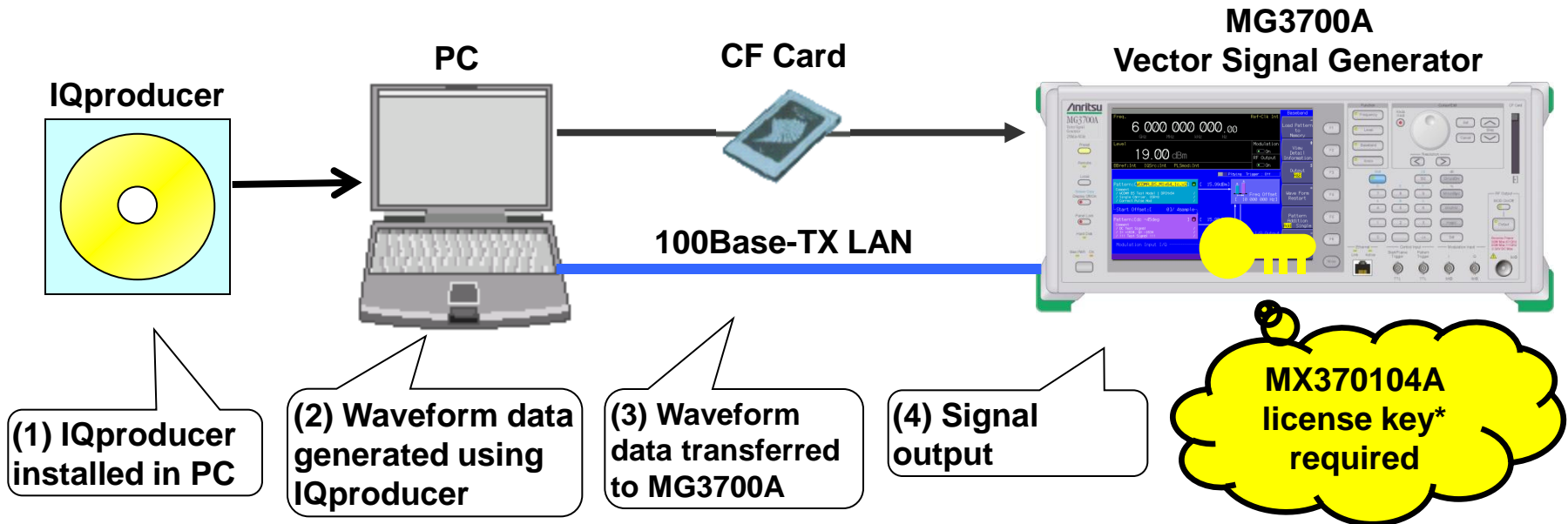
Ordering information

Model/Order No.	Name	Remarks	
— Mainframe —			
MG3700A	Vector Signal Generator		Required
— Options —			
MG3700A-002	Mechanical Attenuator	Standard Electron Attenuator is changed into Mechanical Attenuator.	
MG3700A-011	Upper Frequency 6 GHz	Standard “250 kHz to 3 GHz” is extended to “250 kHz to 6 GHz.”	
MG3700A-021	ARB Memory Upgrade 512 M sample	Standard “128 Msample/channel × 2” is extended to “256 Msample/channel × 2.”	Recommendation
MG3700A-031	High Speed BER Test Function	Standard “1 kbps to 20 Mbps” is extended to “100 bps to 120 Mbps.”	
— Softwares (License Key for IQproducer system) —			
MX370104A	Multi-carrier IQproducer		Required
— Optional accessories —			
W2495AE	MG3700A operation manual	Booklet	Recommendation The PDF manual is on the software CD. Order this when a booklet is required.
W2496AE	MG3700A IQproducer operation manual	Booklet	
W2539AE	MG3700A standard waveform pattern operation manual	Booklet	
W2633AE	MX370104A Multi-carrier IQproducer operation manual	Booklet	
J1261D	Ethernet Cable (Shield Type)	Cross, 3 m	Recommendation Required when PC connected directly to MG3700A by LAN.
Z0777	Standard waveform pattern upgrade kit	DVD set of pre-install wave form pattern of latest version	
G0141	HDD ASSY	Exchange HDD when built-in HDD break.	
J1277	IQ Output Conversion Adapter	Cable that converts IQ output connector (D-sub) of mainframe into BNC	Recommendation Converts IQ output connector on back of MG3700A from D-sub to BNC.

What is Multi-carrier IQproducer?

MX370104A is PC software that can generate waveform patterns of the multi career that uses the modulation signal of various communication systems and the tone signal.

Parameters are set freely with the MX370104A software installed in a PC and the waveform patterns of 32 careers(maximum) are generated. The generated waveform pattern can be transferred to the mainframe of MG3700A via a CF card or a LAN, and the MG3700A mainframe can output the desired signal by selecting a waveform pattern.



*Install the license key file in the main frame when adding a system license to a shipped unit. The MG3700A main frame does not require return to the factory.

What is Multi-carrier IQproducer?

MX370104A Multi-carrier IQproducer is PC software to create multi carrier waveform patterns of modulation signal of various telecommunication systems.

[Multi-purpose function]

- **Waveform that uses tone signals and waveform pattern of various telecommunication systems**
- **Waveform that mixed two different telecommunication systems or more**
- **Waveform with offset that exceeds frequency offset range of two signal combine function of MG3700A**

[Adjust Rate function]

- **Waveform that converts Sampling Rate of two wavy patterns of different telecommunication system into the same value <Two waveforms of a different telecommunication system is output by "Two signal combine function" of MG3700A. >**

[W-CDMA (DL) function]

Multi carrier waveform to which clipping is set. For the evaluation of the base station transmission amplifier of W-CDMA.

- **Generating waveform patterns using MX3701xxA => The main frame requires a license.**

The unlicensed software will run on the PC to test waveform pattern generation but an unlicensed MG3700A cannot output signals because it does not recognize the waveform patterns.

- **Generating waveform patterns using EDA Tools (C, MATLAB, Microwave Office) => Free license**

What is Multi-carrier IQproducer?

[Multi-purpose function]

The Multi-purpose function performs multi-carrier conversion of existing waveform patterns and tone signals using the MG3700A. Using this function, a signal with up to 32 carriers can be converted to a single waveform pattern. (Sometimes it is not possible to set as many as 32 carriers depending on the combination of the frequency offset and waveform pattern. On the other hand, it is possible to create waveform patterns with more than 32 carriers by selecting waveform patterns already created previously using this function.)

Example) Multi career signal of "FWD and RVS" of CDMA2000

Component	wvvi File	Gain (dB)	Freq Offset (MHz)
1	FWD_2457_6kbps_1slot	0.00	+8.750000
2	RVS_RC1_FCH	0.00	+7.500000
3	FWD_2457_6kbps_1slot	0.00	+6.250000
4	RVS_RC1_FCH	0.00	+5.000000
5	FWD_2457_6kbps_1slot	0.00	+3.750000
6	RVS_RC1_FCH	0.00	+2.500000
7	FWD_2457_6kbps_1slot	0.00	+1.250000
8	RVS_RC1_FCH	0.00	0.000000
9	FWD_2457_6kbps_1slot	0.00	-1.250000
10	RVS_RC1_FCH	0.00	-2.500000

Multi-carrier setting screen

Legend

- CDMA2000_FWD_RVS
-
-
-

Add Delete

FFT Points: 16384

Sampling Range: 0 - 16383

Data Length: 25166824

Quick Add Mode: Add, Clear, Off

Mouse Interaction: Cursor, Zoom

Scale: Frequency: -20 - 20 (MHz), Amplitude: 10.0 - -120.0 (dB)

Cursor: Frequency: 0.0000 MHz, Amplitude: -9.2778 dB

Full Scale

Multi-carrier FFT screen

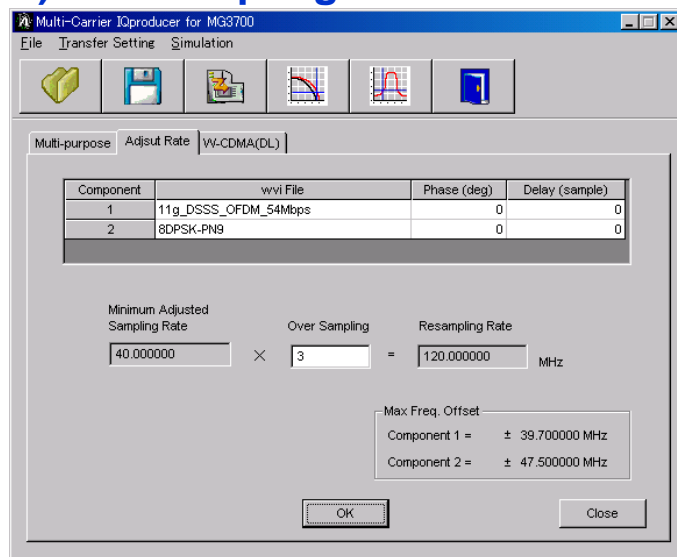
What is Multi-carrier IQproducer?

[Adjust Rate function]

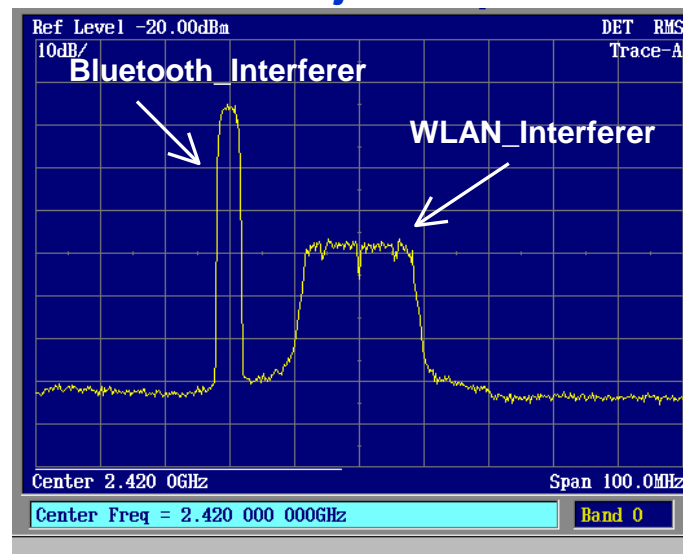
The Adjust Rate function converts two waveform patterns with different sampling rates into two waveform patterns with the same sampling rate.

With the MG3700A two-signal combining function, combining waveform patterns with different sampling rates causes the bandwidth to change because the waveform pattern in memory B is output at the sampling rate of the waveform pattern in memory A. Using the Adjust Rate function, it is possible to combine the Wanted Signal and Interference Signal for various communication systems with the same sampling rate. By matching the sampling rates of the two waveform patterns using this function, it is even possible to output a signal for different communication systems by using the Two Signals Combining function.

Example) The sampling rate of "WLAN and Bluetooth" is adjusted.



Multi-carrier setting screen



Spectrum analysis screen

What is Multi-carrier IQproducer?

[W-CDMA (DL) function]

This function is used to create a waveform pattern by setting any of the 4 or 5 carriers of the W-CDMA Downlink ON/OFF, as well as by setting the Clipping Method, Clipping Reference Level, and Clipping Ratio.

- Carrier Type:

Test Model 1 16DPCH, Test Model 5 2HS-PDSCH
Test Model 1 32DPCH, Test Model 5 4HS-PDSCH
Test Model 1 64DPCH, Test Model 5 8HS-PDSCH

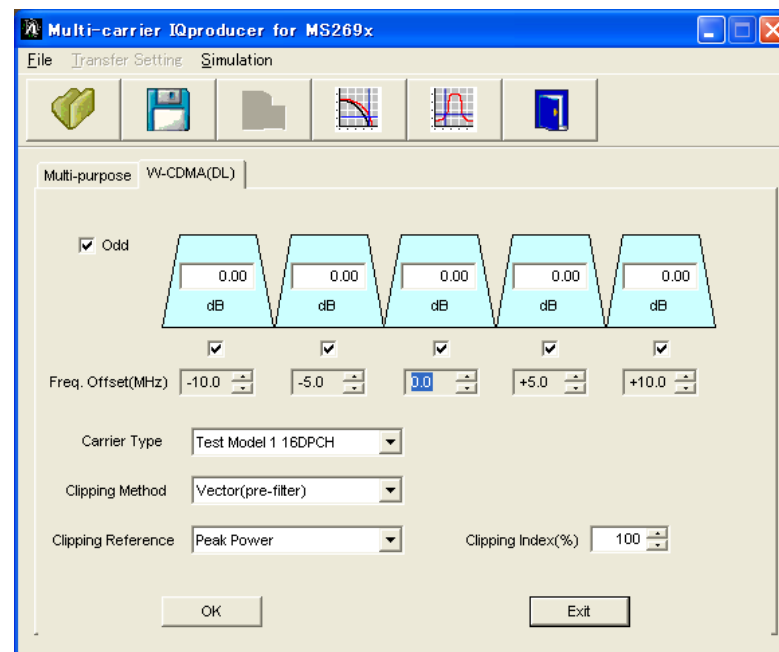
- Clipping Method:

None
Vector (pre-filter)
Vector (post-filter)
Scalar (pre-filter)
Scalar (post-filter)

-Clipping Reference:

Peak Power
RMS Power

(Example) W-CDMA clipping and multi-carrier



Multi-Carrier setting screen

Operation Images

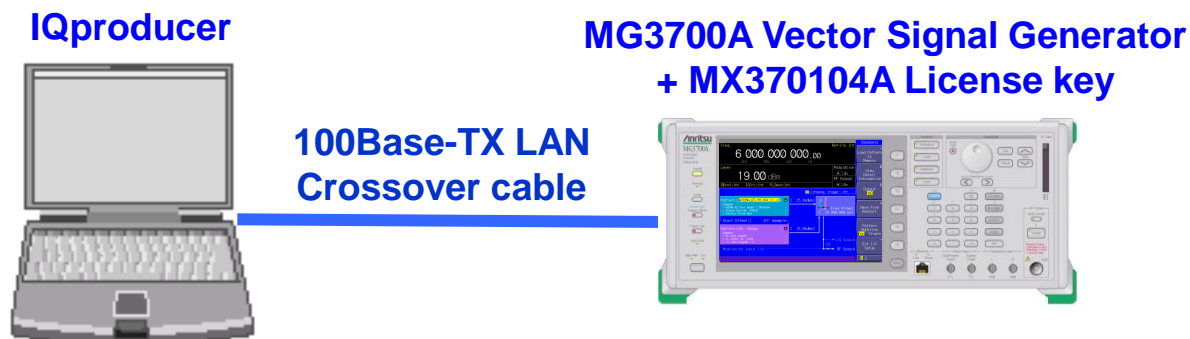
Setup	Slide 9
Starting IQproducer	Slide 10
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Saving/Recalling Parameters	Slide 20

Setup

Connect the MG3700A and PC as shown below.

Install IQproducer in the PC.

Install the MX370104A license key in the MG3700A.



IQproducer™ operating environment

CPU	Pentium III, 1GHz or faster
Memory size	512 Mbytes or more
HDD	5 Gbytes or more
Display	1024 x 768 pixels or more
OS	Windows2000 Professional, Windows XP

* Refer to the appendix [IQproducer Upgrade Procedure] for the installation method of IQproducer.

* Refer to the appendix [Connection to LAN] for the LAN connection between a PC and the MG3700A.

Starting IQproducer

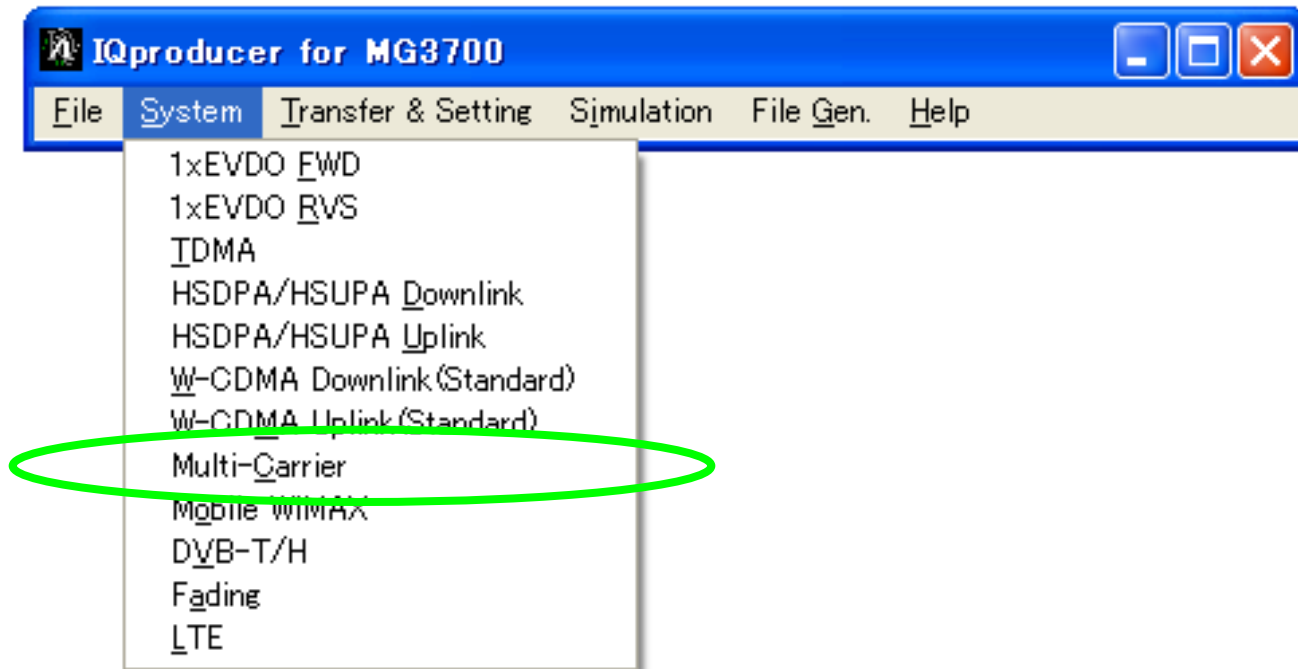
Start IQproducer as follows:

Start > Program > Anritsu Corporation > IQproducer for MG3700A

IQproducer Main Screen

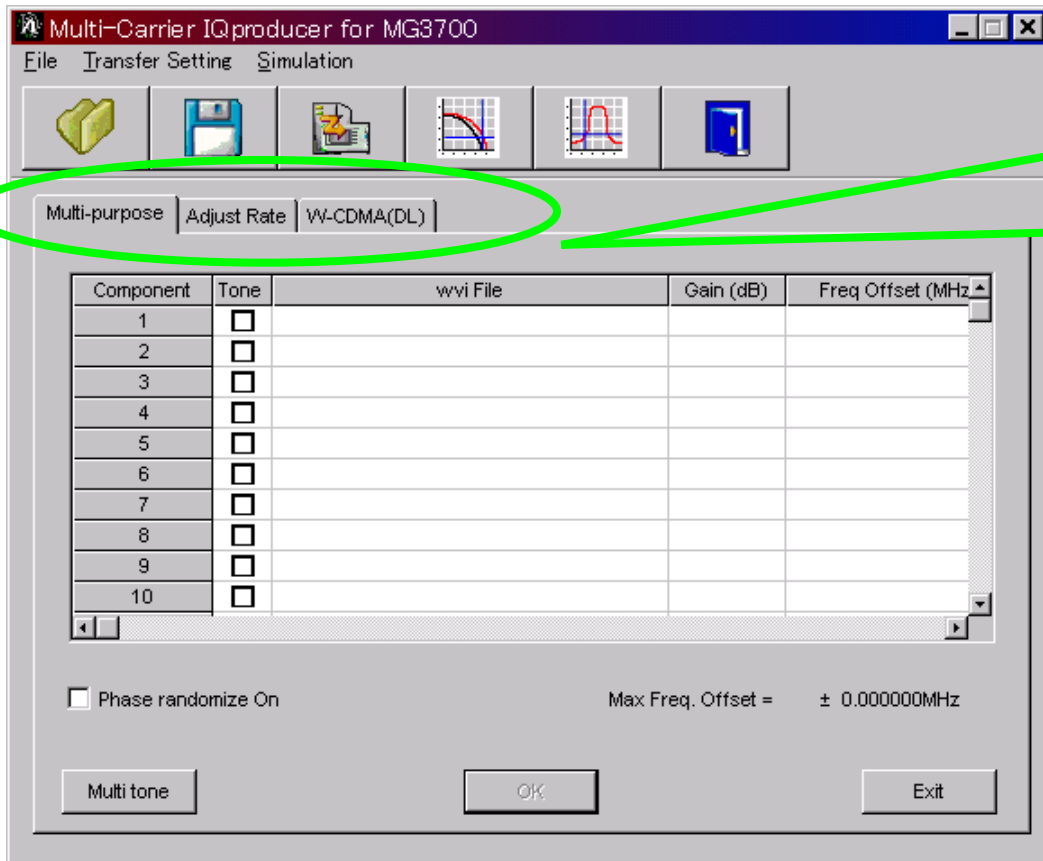
When IQproducer starts, the following screen is displayed.

Choose Multi-Carrier from the [System] pull-down menu.



Editing Parameters: Main screen

When Multi-carrier is selected with System, the main screen where three functions of Multi-purpose, Adjust Rate, and W-CDMA(DL) are chosen is displayed. Each parameter can be set from the screen by selecting either of function.

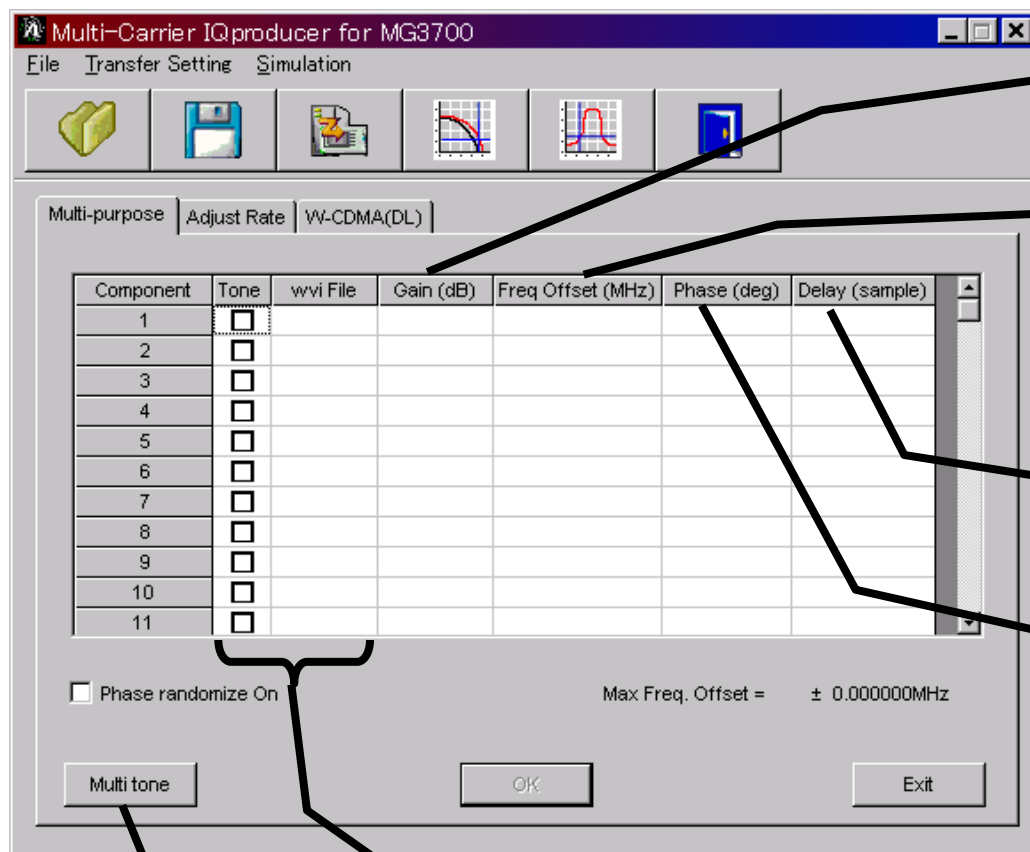


Either of three functions is selected (click).

- Multi-carrier
- Adjust Rate
- W-CDMA (DL)

Editing Parameters: Multi-purpose (1/2)

First, perform settings for the Tone or wvi File parameters for each component.
Check the corresponding Tone checkbox to select Tone.
Next, parameters of Gain, Freq. Offset, Delay, and Phase are set.



Gain:
0.00 to - 80.00 dB,
resolution:0.01 dB

Freq.Offset:
 $-0.4 \times F_s + 0.5 \times BW$
to $0.4 \times F_s - 0.5 \times BW$
(F_s : sampling frequency)
(BW : all band)

Delay: 0 to N-1
(N: Data Points of the source wvi file)

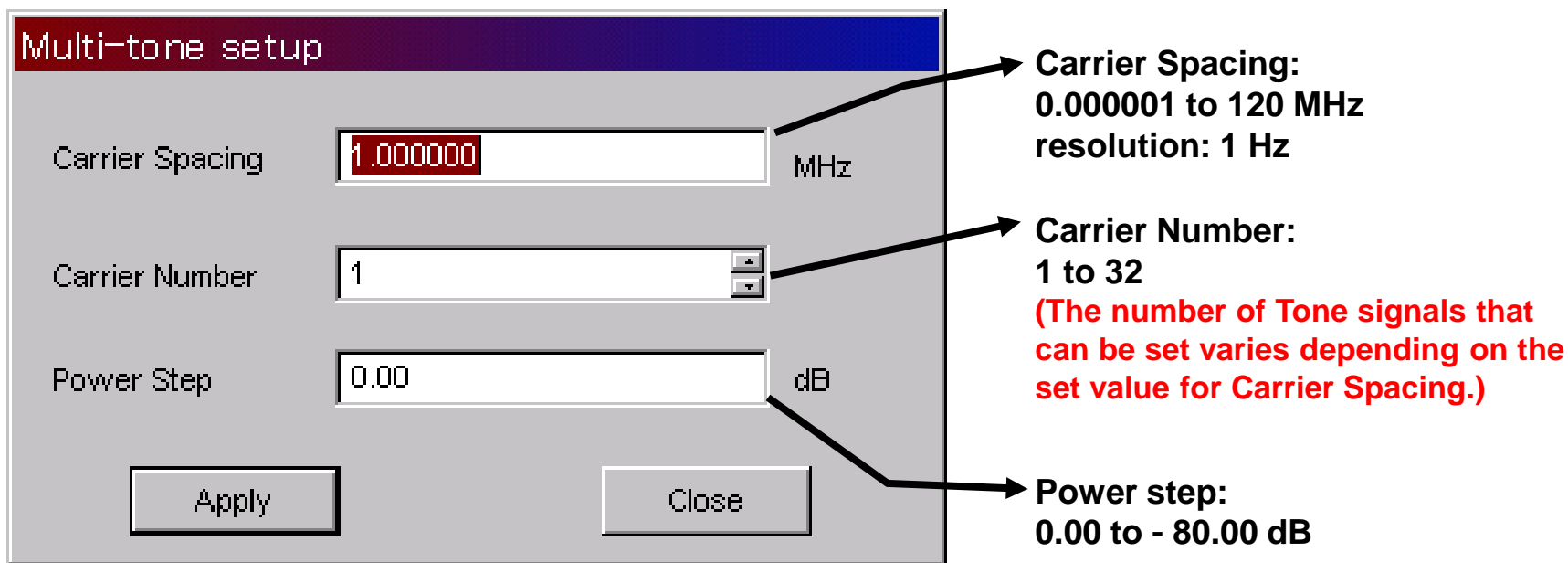
Phase:
0 to 359 degree,
resolution: 1 degree

Next page

Tone, wvi File: Perform settings for the Tone or wvi File parameters.

Editing Parameters: Multi-purpose (2/2)

The Multi-tone function generates Tone signals at the specified frequency interval. This function is enabled when a component is selected to set the specified number of Tone signals starting from the selected component No. If a wvi file is already selected for the corresponding component, then the setting is replaced by the Tone signal setting.



The screenshot shows a dialog box titled "Multi-tone setup" with three input fields and two buttons. The "Carrier Spacing" field is set to "1.000000" MHz. The "Carrier Number" field is set to "1". The "Power Step" field is set to "0.00" dB. The "Apply" and "Close" buttons are at the bottom. Three arrows point from the annotations on the right to the respective fields.

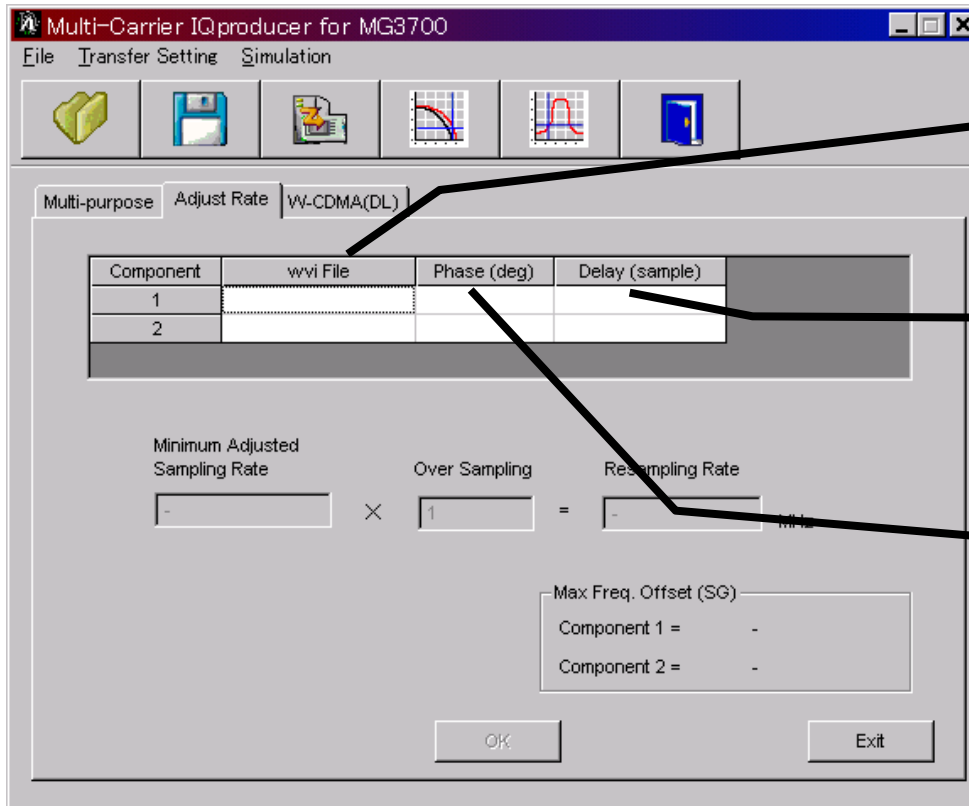
Carrier Spacing:
0.000001 to 120 MHz
resolution: 1 Hz

Carrier Number:
1 to 32
(The number of Tone signals that can be set varies depending on the set value for Carrier Spacing.)

Power step:
0.00 to - 80.00 dB

Editing Parameters: Adjust Rate

Parameters of wvi. File, Phase, and Delay are set.



wvi File:
Waveform pattern used by two wave combine function is selected.

Delay:
0 to N-1
(N: Data Points of the source wvi file)

Phase:
0 to 359 degree,
resolution: 1 degree

[Note] Depending on to the combination of the wvi file set in Component 1, 2 and setting values of Over Sampling, it might take several ten minutes to several hours at calculation time.

Editing Parameters: W-CDMA (DL) (1/2)

Following parameters are set.

The screenshot shows the 'Multi-carrier Editor for MG3700' window with the 'W-CDMA(DL)' tab selected. The interface includes a menu bar (File, Transfer Setting, Simulation), a toolbar with icons for file operations and graphs, and a main parameter area. The 'Carrier allocation selection' checkbox is unchecked. There are four carrier level setting controls, each showing '0.00 dB'. Below these are four carrier selection checkboxes, all unchecked. The 'Freq. Offset(MHz)' values are -7.5, -2.5, +2.5, and +7.5. The 'Carrier Type' is set to 'Test Model1 64DPCH', 'Clipping Method' is 'Non', and 'Clipping Reference' is 'Peak Power'. The 'Clipping Index(%)' is set to 100. 'OK' and 'Exit' buttons are at the bottom.

Carrier allocation selection

Level setting

Carrier selection

Frequency offset

Carrier Type

Clipping Method

Clipping Reference

Clipping Index

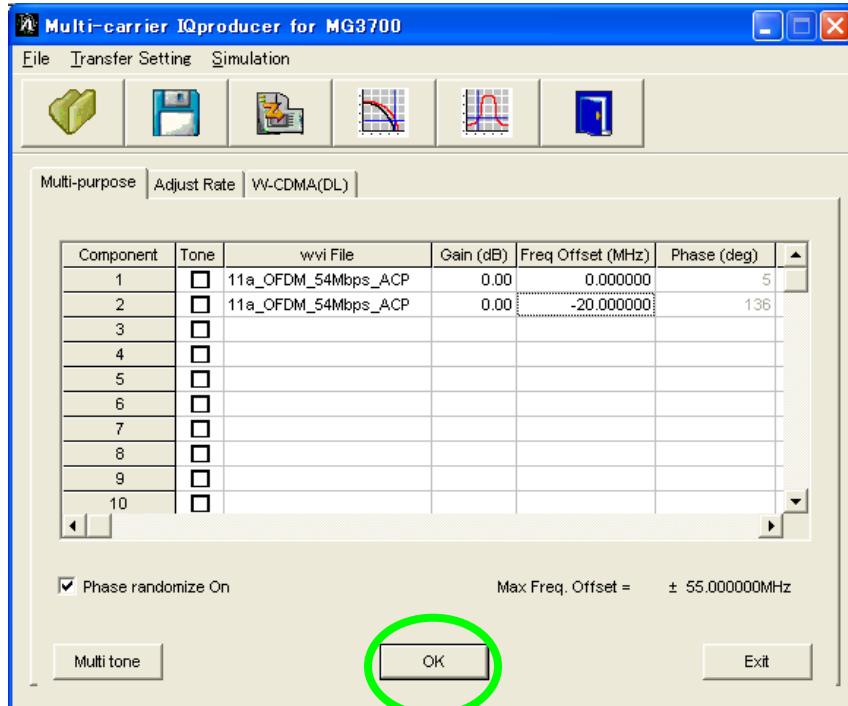
Editing Parameters: W-CDMA (DL) (2/2)

Details on W-CDMA (DL) parameters

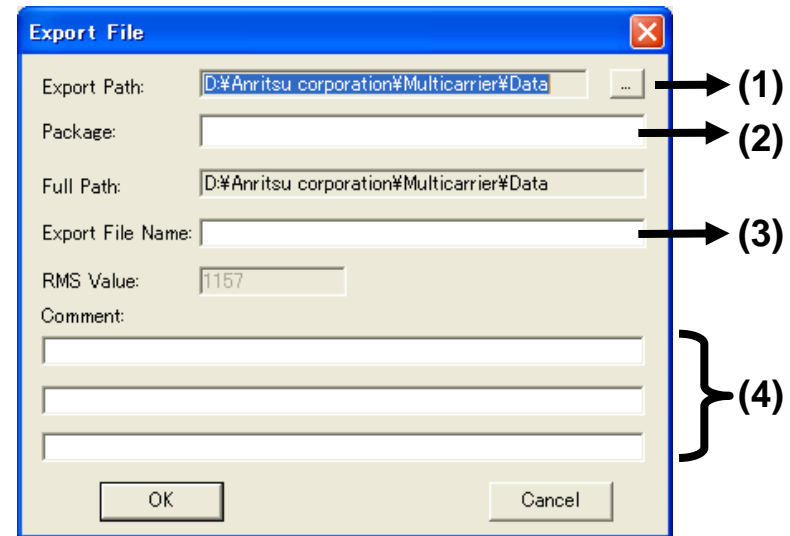
Item	Outlone	Setting range
Carrier allocation selection	Select the carrier allocation.	Selected/not selected
Carrier selection	Select the carrier to be output. Check the checkbox to enable the corresponding carrier.	Enabled/disabled
Level setting	Set the level for each carrier. This can only be set for the enabled carriers.	0.00 to -80.00 dB, resolution: 0.01 dB
Frequency offset setting	Set the frequency offset for each carrier using the step keys. This can only be set for the enabled carriers.	Frequency offset for each carrier ± 1.0 MHz, resolution: 0.1 MHz
Carrier Type selection	Select the W-CDMA test model.	Test Model1 16DPCH, Test Model1 32DPCH, Test Model1 64DPCH, Test Model5 2HS-PDSCH, Test Model5 4HS-PDSCH, Test Model5 8HS-PDSCH
Clipping Method selection	Select the clipping method for the clipping function.	Non, Vector(pre-filter), Vector(post-filter), Scalar(pre-filter), Scalar(post-filter)
Clipping Reference selection	Set the reference value of the clipping ratio for each carrier.	Peak Power, RMS Power
Clipping Index setting	When Peak Power is selected, set the ratio to the maximum peak of the waveform being used in % units. When RMS Power is selected, set the ratio to the RMS Power of the waveform being used in dB unit.	0 to 100%, resolution: 1% (When Clipping Reference is set to Peak Power:) 0.00 to 17.00 dB, resolution: 0.05 dB (When Clipping Reference is set to RMS Power)

Generating Waveform: Calculation

Click the [Calculation] icon to start creation of the waveform pattern after setting the parameters.



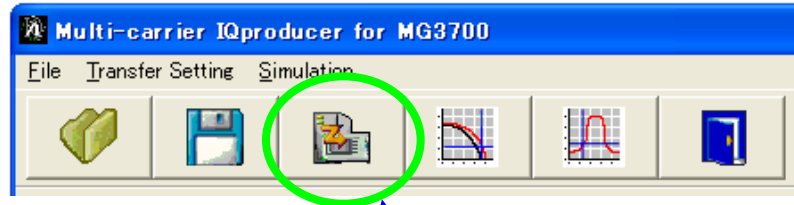
OK: Creates waveform pattern



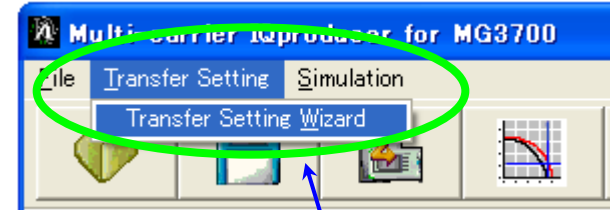
- (1) File export destination folder
- (2) Name of waveform pattern package (31 characters max.)
- (3) Name of waveform pattern file (20 characters max.)
- (4) Comment on screen (38 characters max. per line)

Transferring Waveform Pattern

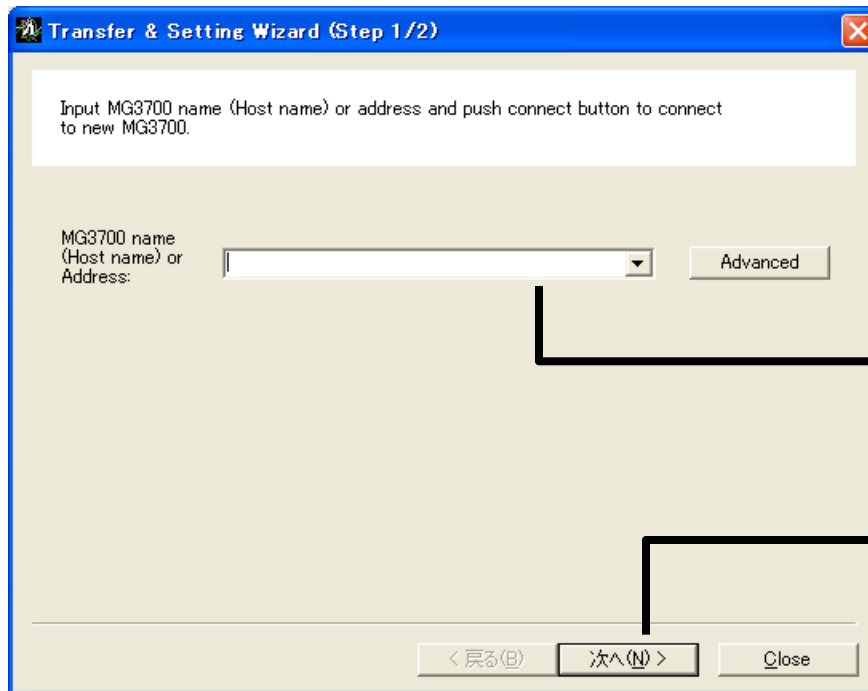
Connect the MG3700A and PC via a LAN.



Transfer & Setting
Wizard



Transfer & Setting
Wizard

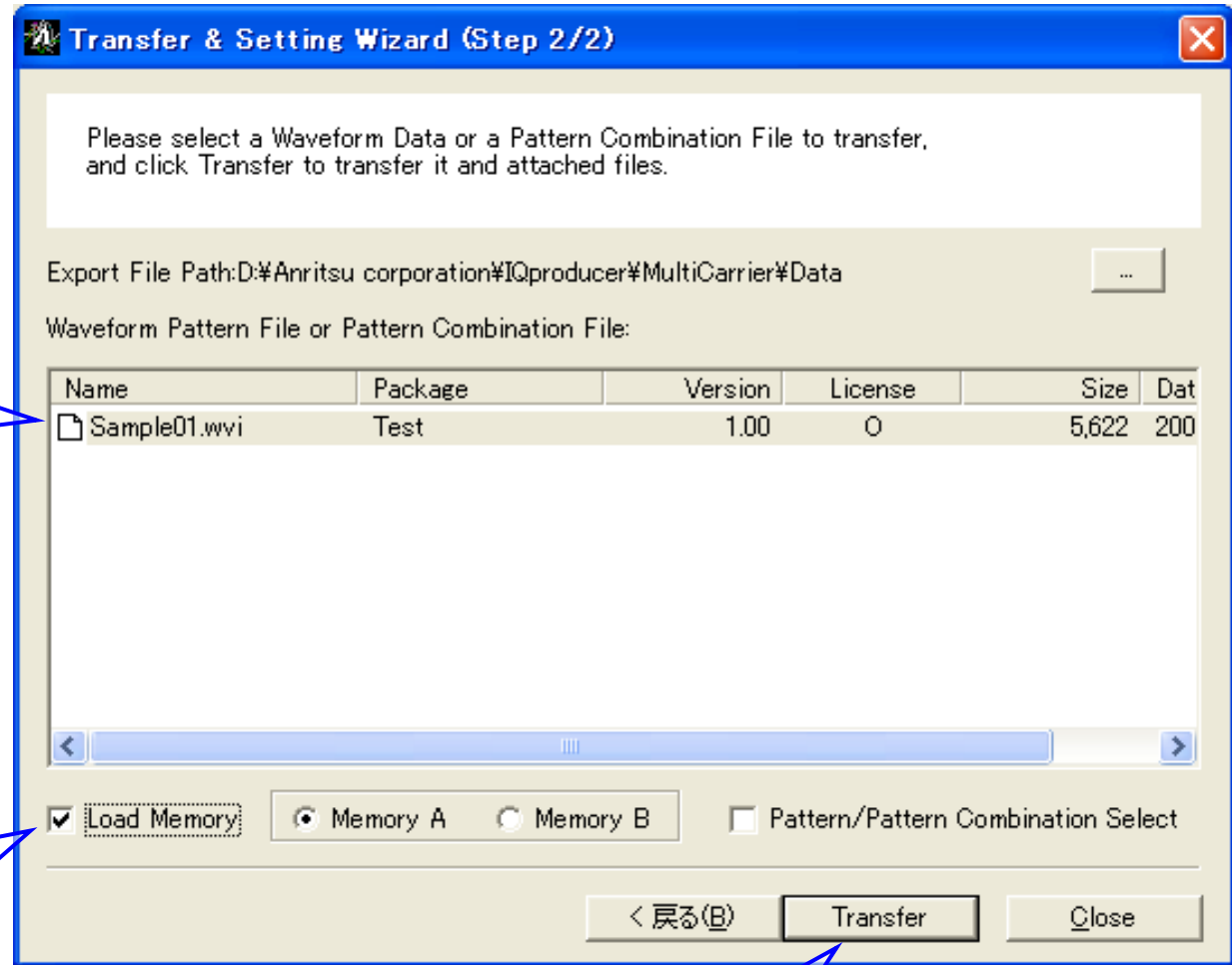


Input name or IP address of
MG3700A.

Connects to LAN

*Read the appended [LAN Connection] for the LAN connection method between the PC and MG3700A.

Transferring Waveform Pattern



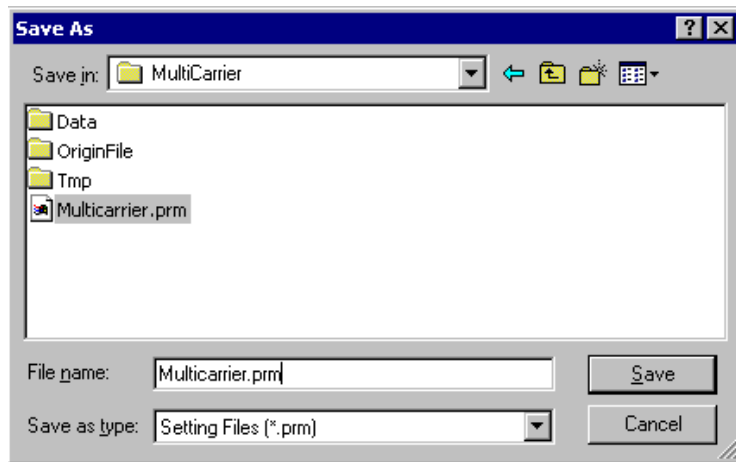
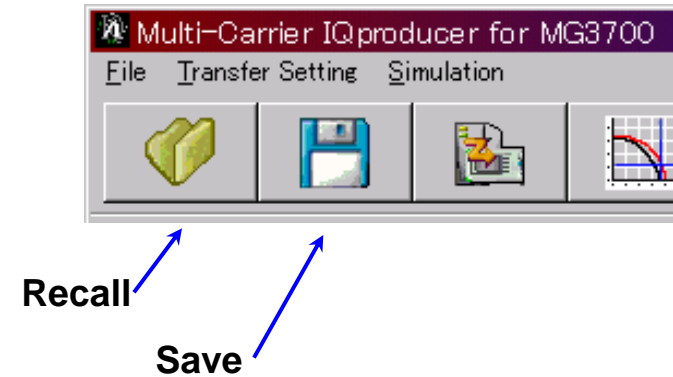
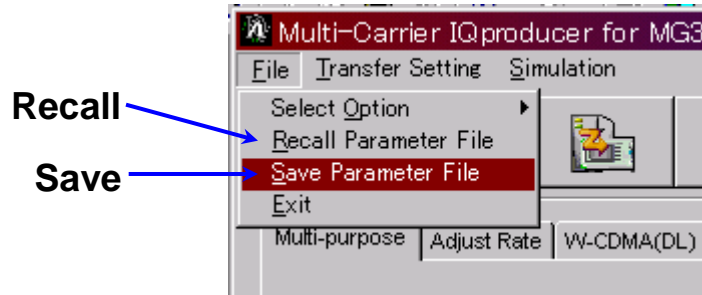
Select waveform pattern saved on MG3700A HDD.

Select when loading waveform pattern into memory at same time as transferring.

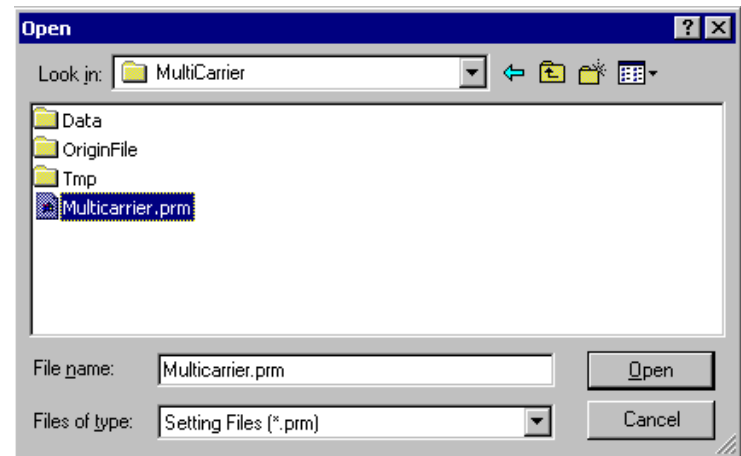
Starts transfer

Saving/Recalling Parameters

The numerical value and the setting of each item can be saved as a parameter file, and can be recalled.



File save screen



File recall screen

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