

MX370106A

DVB-T/H IQproducer

MG3710A
Vector Signal Generator

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DVB-T/H IQproducer Product Introduction



**MG3710A
Vector Signal Generator**

Version 1.00

ANRITSU CORPORATION

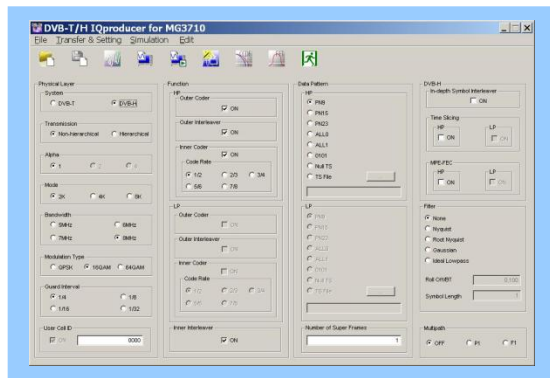
What is DVB-T/H IQproducer?

The MX370106A DVB-T/H IQproducer is PC software meeting the ETSI EN 300 744 V1.5.1 2004-11 Physical Layer standard.

It runs under Windows installed in the MG3710A, MS2690A/91A/92A-020 and MS2830A-020/021 and outputs modulation signals by selecting generated waveform patterns. A license is required for the main frame to output signals.

***Read the “MX3701xxA IQproducer” brochure for detail parameter setting range.**

DVB-T/H IQproducer



Install



- **Generating waveform patterns using DVB-T/H IQproducer => [The main frame requires a license.](#)**

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

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

• MATLAB® is a registered trademark of The MathWorks, Inc.

• Windows® is a registered trademark of Microsoft Corporation in the USA and other countries.

What is DVB-T/H IQproducer?

[Parameter Setting Items Outline]

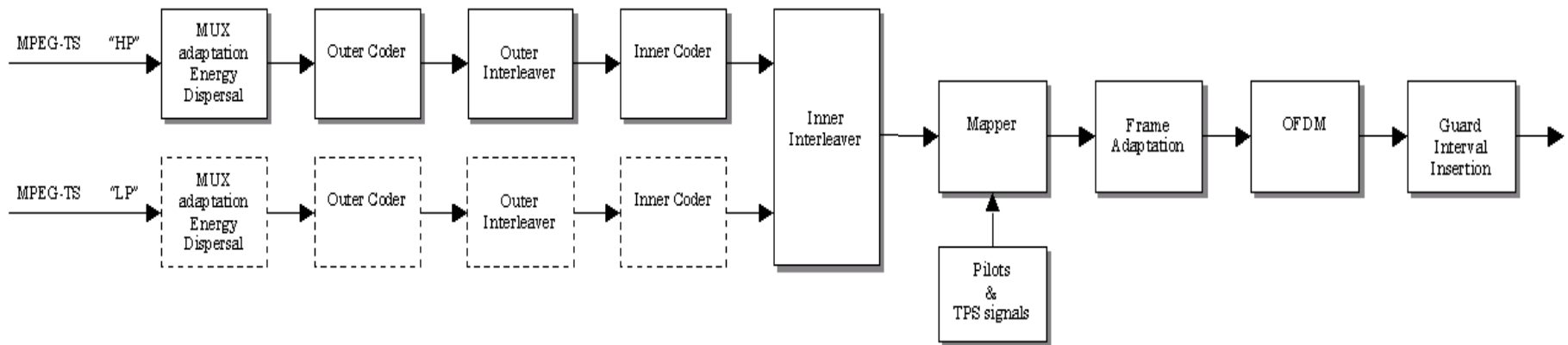
- **System: DVB-T, DVB-H**
- **Physical Layer: Transmission, Mode, Subcarrier Number, Bandwidth, Modulation Type and Guard Interval**
- **Function: Outer Coder, Outer Interleaver, Inner Coder, Code Rate, Inner Interleaver**
- **Data Pattern: When TS File is selected, any MPEG-2TS file (multiplexed audio/video binary data) can be loaded to generate a waveform pattern for monitoring.**
- **DVB-H: In-depth Symbol Interleaver, Time Slicing, MPE-FEC**
- **Filter**
- **Multipath**

What is DVB-T/H IQproducer?

This software processes the DVB-T/H Physical Layer as shown below.

Outer Coder, Outer Interleaver, Inner Coder, Inner When all of Outer Coder, Outer Interleaver, Inner Coder, and Inner Interleaver are turned on and the data selected by Data Pattern is input to the MPEG-TS part.

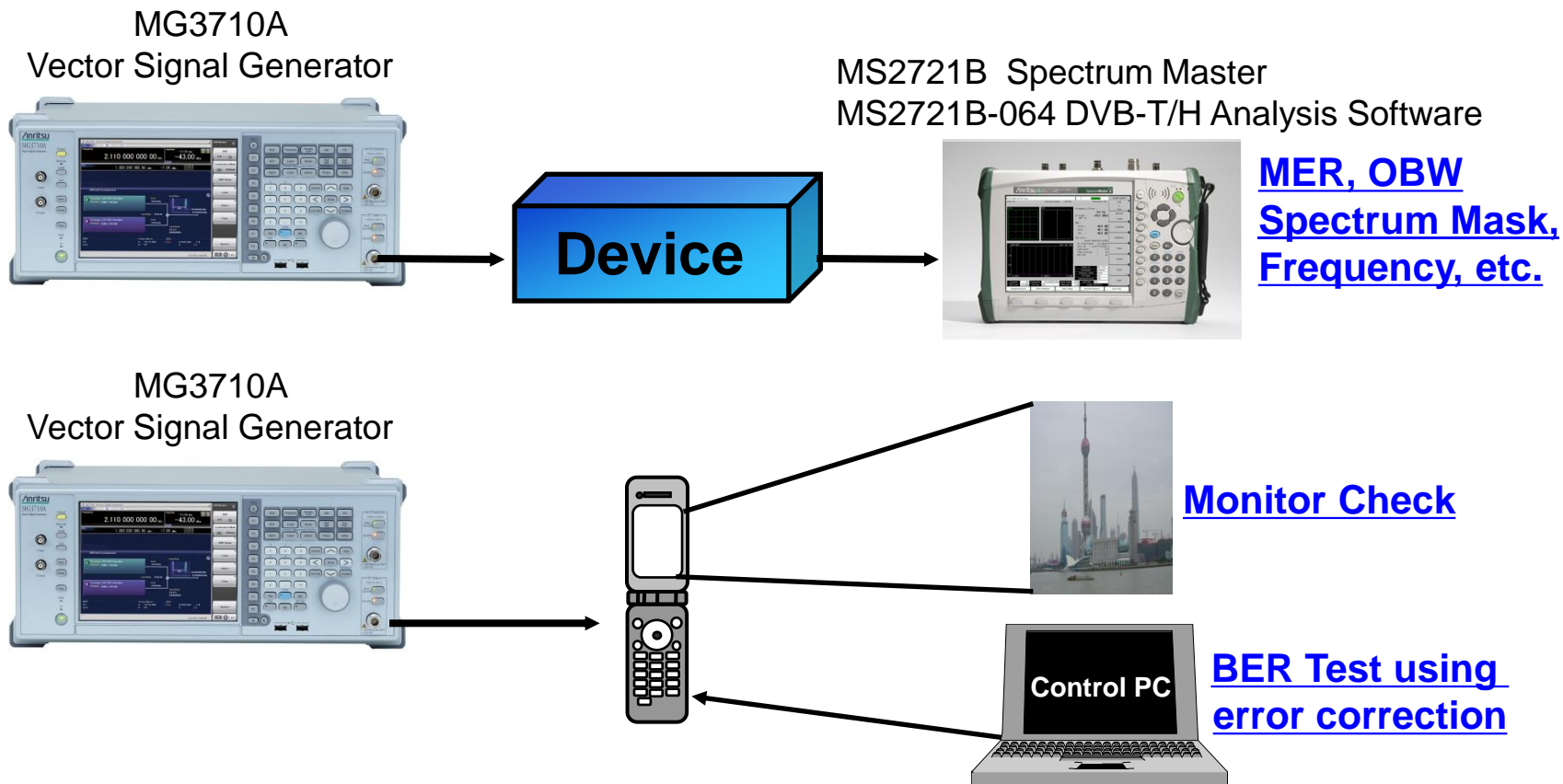
When each block is turned off, all blocks on the front side are turned off. The data selected by Data Pattern is inserted by skipping off blocks.



What is DVB-T/H IQproducer?

The MG3710A Vector Signal Generator outputs the DVB-T/H signal by using the waveform pattern generated by the MX370106A.

The MG3710A is used as a reference signal source for device Tx requirement tests and equipment Rx requirement tests.



DVB-T/H Rx Requirement Tests

The ETSI TR 101 290 DVB measurement guidelines for Rx tests are as follows:

Clause	Items	Outline	MG3710A	
9.14	BER vs. C/N ratio by variation of Gaussian noise power	This measurement can be used to compare the performance of a receiver with theory or with other receivers. - PRBS23 - Gaussian noise (AWGN)		- PRBS23 cannot be used. - Two signals (wanted signal and AWGN) can be output by one unit.
9.15	BER before Viterbi (inner) decoder	This measurement gives an in-service indication of the un-coded performance of the transmitter, channel and receiver. - BER Measurement before Viterbi decoding - The measurement should be based on at least several hundred bit errors.	OK	
9.16	BER before RS (outer) decoder	The BER is the primary parameter that describes the quality of the digital transmission link.		
9.16.1	Out of Service	- Null TS packet (4bytes: 0x47, 0x1F, 0xFF, 0x10. followed by 184 bytes: 0x00)	OK	- Null TS can be selected with Data Pattern.
9.16.2	In Service	- Compare the bit pattern of TS packet before and after RS decoding. - BER < 1e-3	OK	

Merits of MG3710A + MX370106A!

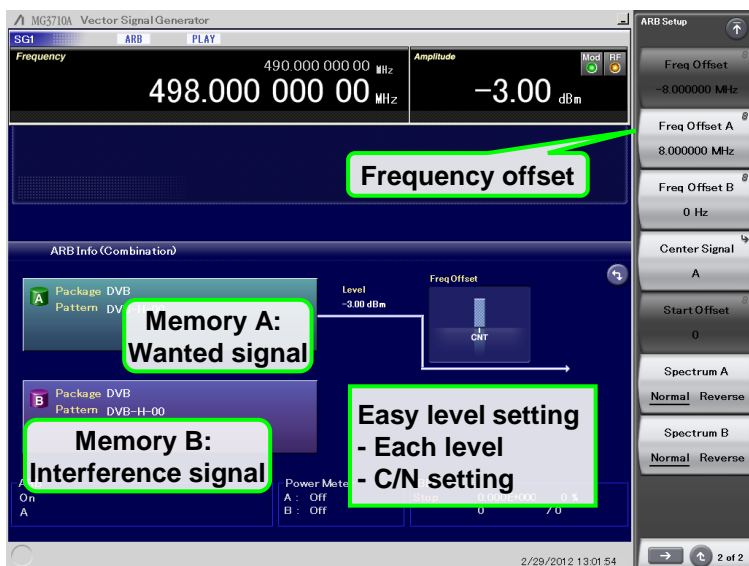
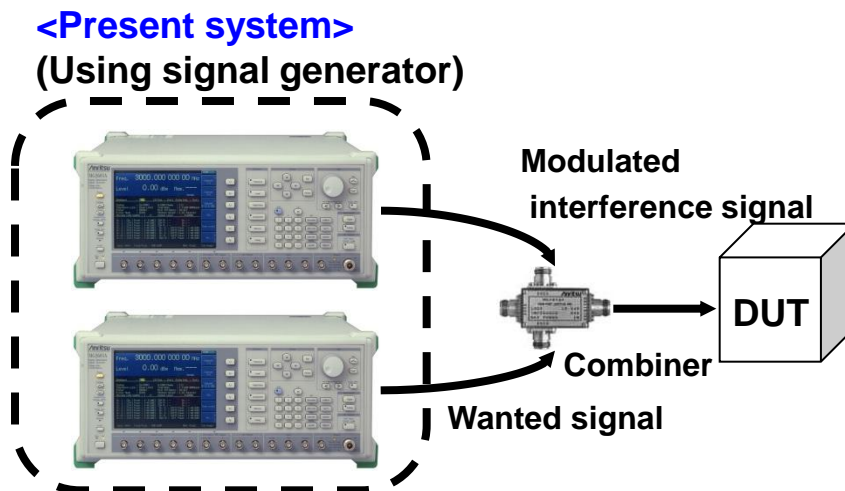
- ◆ One MG3710A unit outputs both wanted and interference signals.

Slide 7

[Merit] Wanted signal + Interference signal

Combination of Baseband Signal <Opt.048/078>

The MG3710A contains two built-in arbitrary waveform memories (A and B) each of which can save one waveform pattern. The MG3710A outputs a signal from one memory or a combined signal from both memories.



MG3710A Setting Screen Example



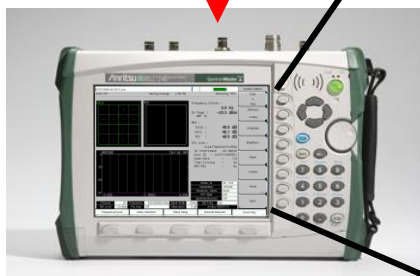
MG3710A



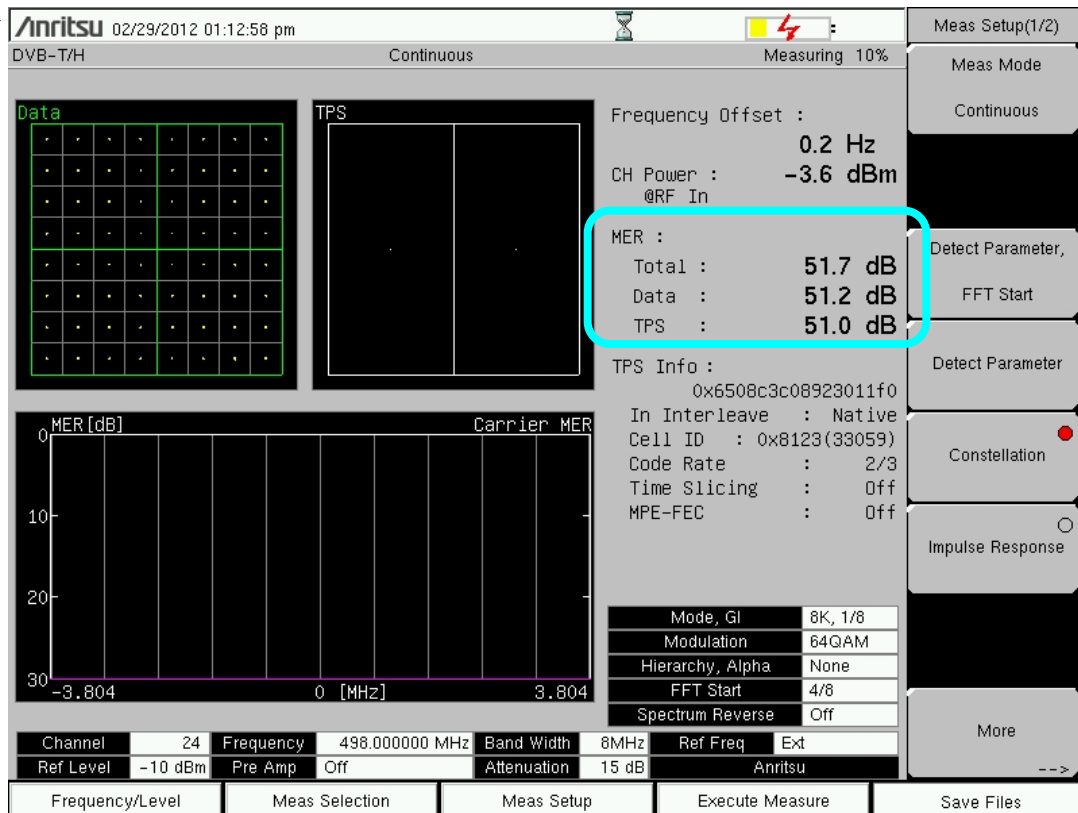
- Merit 1: One MG3710A unit outputs two signals
- Merit 2: No external combiner
- Merit 3: Simple level adjustment

[Merit] MG3710A MER Performance

**MG3710A
Vector Signal Generator**



- MS2721B Spectrum Master
- MS2721B-064 DVB-T/H Analysis Software
- MS2721B-078 DVB-T/H SFN Field Measurement Software
- MS2721B-057 DVB-T/H BER Unit

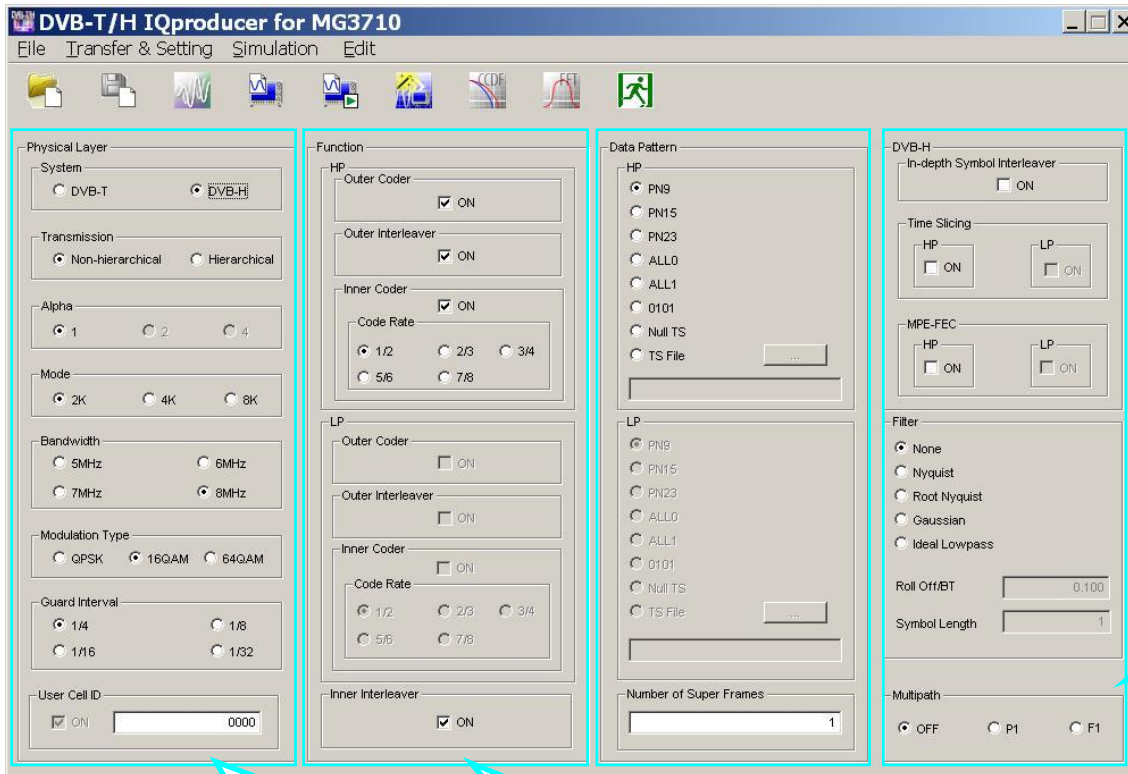


MER: 51 dB*

**The figure shows one measurement sample—not a guaranteed value.*

Main Screen

When DVB-T/H is selected, the Main screen displays all setting parameters. Selecting the buttons on this one screen sets all the parameters.



DVB-H:
- In-depth Symbol Interleaver
- Time Slicing
- MPE-FEC
Filter:
Multipath:

Physical Layer:
System, Transmission,
Mode, Subcarrier Number,
Bandwidth, Modulation Type
and Guard Interval

Function:
- Outer Coder
- Outer Interleaver
- Inner Coder
- Code Rate
- Inner Interleaver

Data Pattern:
**When "TS File" is selected, any MPEG-2TS file
(multiplexed audio/video binary data)
can be loaded to generate a waveform pattern for monitoring.**

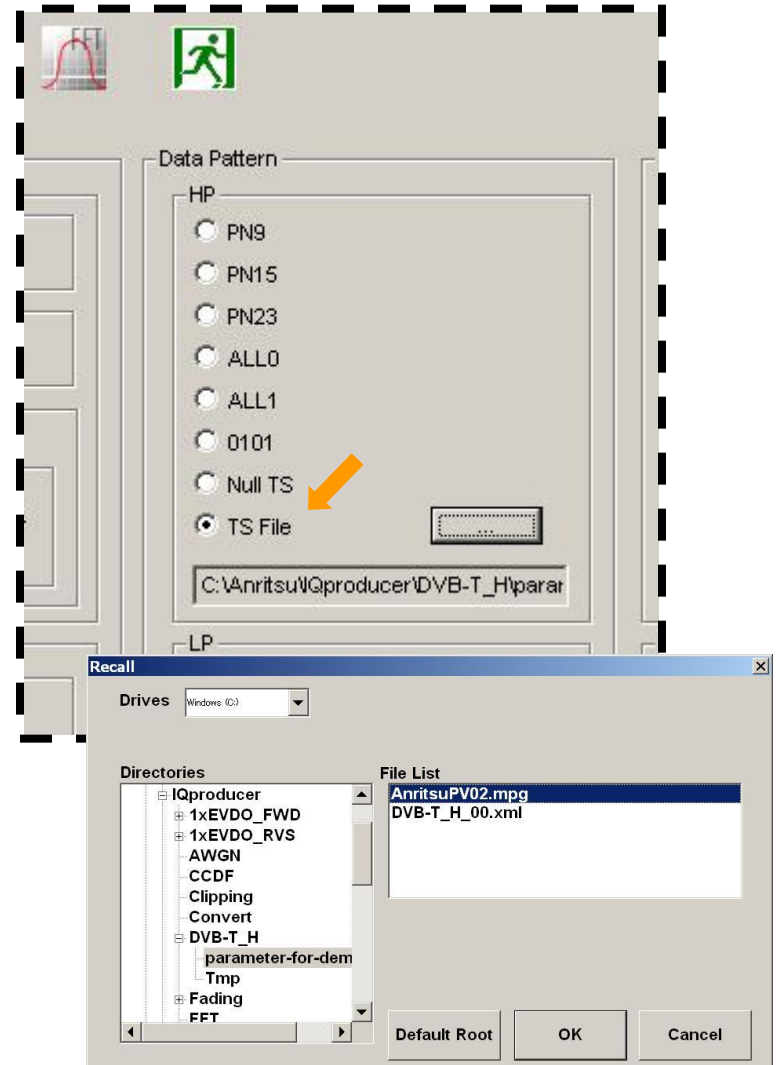
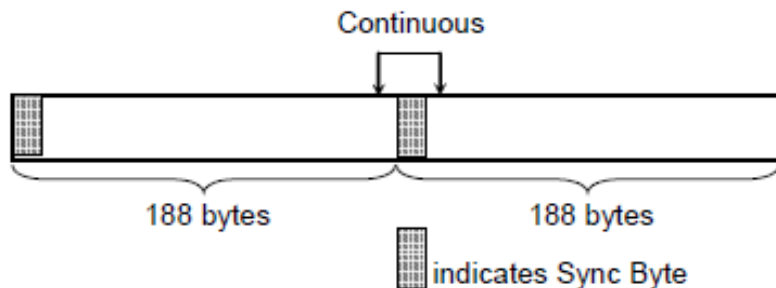
Data Pattern

When **TS File** is selected, a created TS (Transport Stream: multiplexed audio/video binary data) file can be loaded.

By using this movie file, the **integrated operation check** from antenna reception to image playback can be monitored.

[TS Data]

TS data consists of two or more packets (1 packet = 188 bytes). The first byte of each packet is the Sync Byte and is always 47 (hexadecimal). If a TS file not meeting this requirement is selected, an error message is displayed when the [Calculation] button is clicked.



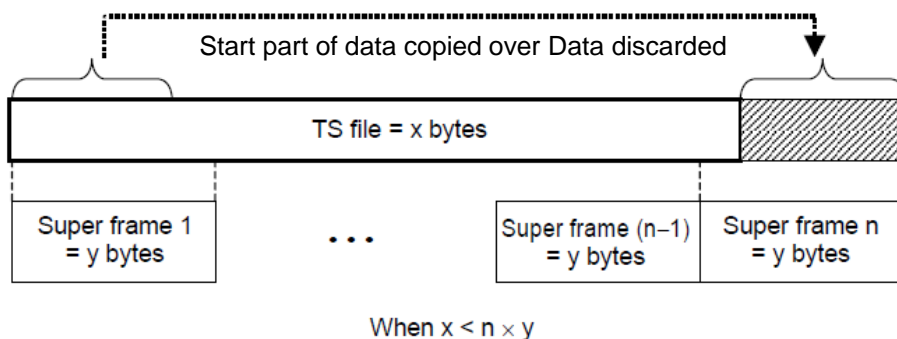
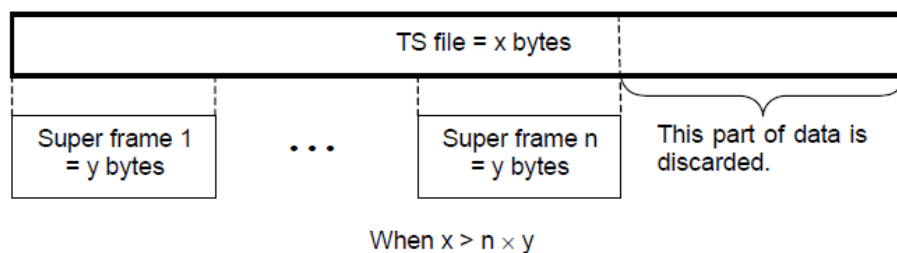
Number of Super Frames

The setting range of Number of Super Frames changes with the MG3710A Mode setting and installed memory option as shown on the right.

The data selected by Data Pattern is truncated at the end of the last super frame set here.

The data processing changes with size of TS File and setting of number of super frames when TS File is selected by Data Pattern (see figure below).

Select Option	Mode	Maximum Number of Super Frames
Memory 64M samples	2K	48
	4K	24
	8K	12
Memory 64M samples x2 (With Option48,78)	2K	96
	4K	48
	8K	24
Memory 256M samples	2K	192
	4K	96
	8K	48
Memory 256M samples x2 (With Option48,78)	2K	385
	4K	192
	8K	96
Memory 1024M samples	2K	385
	4K	192
	8K	96
Memory 1024M samples x2 (With Option48,78)	2K	385
	4K	192
	8K	96



Size of TS File (x bytes)

> Setting of number of super frames
(n * y bytes)

- The TS file data is discontinued on the way.

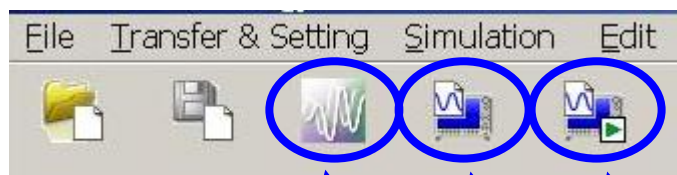
Size of TS File (x bytes)

< Setting of number of super frames
(n * y bytes)

- The same TS File data is repeated from the head.

Generating Waveform: Calculation

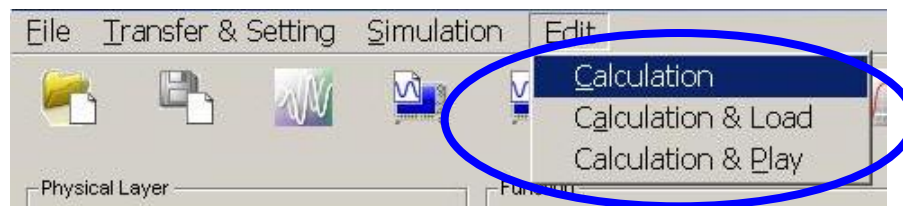
Click the [Calculation] icon to start creation of the waveform pattern after setting the parameters.



Calculation

Calculation & Load

Calculation & Play



Calculation:

Generates a waveform pattern after parameters are set.

/Calculation/

Calculation & Load:

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

/Calculation/ > /Load/

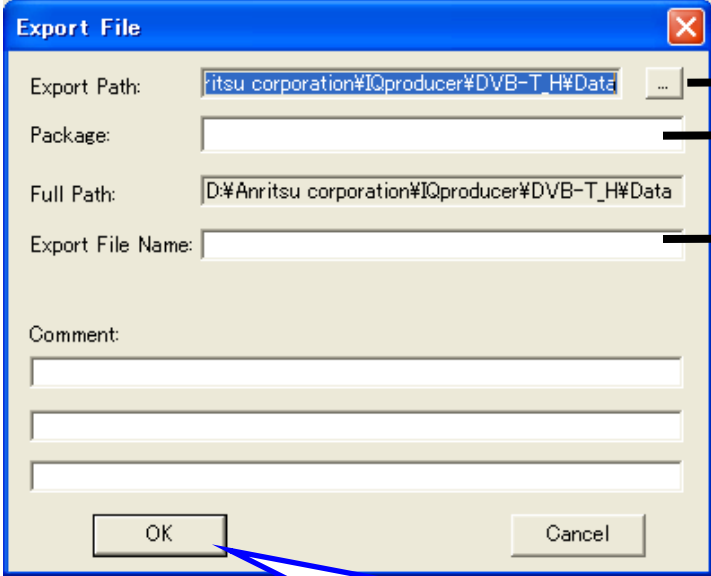
Calculation & Play:

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

/Calculation/ > /Load/ > /Select/

Generating Waveform: Calculation

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



The screenshot shows the 'Export File' dialog box with the following fields and annotations:

- Export Path:** ... **File export destination folder**
- Package:** **Name of waveform pattern package: 31 characters max.**
- Full Path:** **Name of waveform pattern file: 20 characters max.**
- Export File Name:**
- Comment:**

 Comment on MG3710A screen: 38 characters max. per line
- OK** button: **Generate the waveform pattern by clicking the [OK] button.**
- Cancel** button

File size of waveform patterns

The presence/absence of the ARB Memory Expansion (option) and Baseband Signal Combination Function (option) is selected. Selecting the ARB Memory Expansion (option) and the Baseband Signal Combination Function (option) generates a bigger waveform pattern, while selecting the Baseband Signal Combination Function (option) generates a waveform pattern. If an uninstalled option is selected, sometimes the created waveform pattern may not be usable. Set the combination of installed options based on the following setting items.

Items	Combinations of Options
Memory 64M samples	None
Memory 64M samples × 2	Option48 and Option 78
Memory 256M samples	Option45 or Option 75
Memory 256M samples × 2	Option 45 and Option 48 or Option 75 and Option 78
Memory 1024M samples	Option46 or Option 76
Memory 1024M samples × 2	Option 46 and Option 48 or Option 76 and Option 78

The maximum size of the generated waveform pattern for each of the setting items is shown below.

Items	Maximum Size
Memory 64M samples	64M samples
Memory 64M samples × 2 (With Option48, 78)	128M samples
Memory 256M samples	256M samples
Memory 256M samples × 2 (With Option48, 78)	512M samples
Memory 1024M samples	512M samples
Memory 1024M samples × 2 (With Option48, 78)	512M samples

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